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Project Ranking II

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constraints options for group decision making. The current version of the system is an organized, structured way of making decisions which enhances the identification and subsequent refinement of criteria considered, and provides a concise, highly credible format for presentation and justification of decisions.

PREFACE

This program was conducted by the Department of Industrial Engineering, Auburn University, under Contract F08635-84-K-0268 with the Air Force Armament Laboratory, Eglin Air Force Base, Florida 32542-5000. Nolan E. Taconi from the Programs Branch (XPB), managed the program for the Armament Laboratory. The program was conducted during the period from July 1984 to March 1986.

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SUMMARY

This paper describes the methodology developed for a defense department laboratory for project selection and the results of use of the computerized ranking procedure for other complex managerial decisions. In addition to project selection, the system is feasible and instructive in personnel selection, comparison of management strategies, purchasing decisions and merit-based distribution awards. The massive input required by many existing systems is not necessary for this absolute deviation ranking system. Up to 20 attributes and 200 projects can be compared. Measures of consistency and reliability are proposed for estimating the validity of the final weights considering missing values. Preliminary experiments and actual use of the system provide empirical validation and show the results are satisfactory. Further research is underway for the refinement of the system. The impact on reliability of the number of items compared, the comparison scale employed and the number of missing observations provide fertile fields for future work. Extensions of the basic and additive individualized multicriteria models provide for voting, hierarchy and constraints options for group decision making. The current version of the system is an organized, structured way of making decisions which enhances the identification and subsequent refinement of criteria considered, and provides a concise, highly credible format for presentation and justification of decisions.

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SECTION I

INTRODUCTION

Many organizations and individuals experience difficulties when considering which projects to give their support. Other complex managerial decisions creating problems include, for example, 1) developing policies for selection of personnel incorporating nondiscriminatory and affirmative action procedures; 2) comparison of management strategies such as running a university on the semester or quarter system; 3) purchase of equipment like compatible, user-friendly computer hardware and software; and 4) distribution of awards, funding, promotions and/or tenure based on merit. Crucial to the managerial decision making process is the ability to communicate decisions to subordinates and superiors. What is needed is an organized, structured way of making decisions which enhances the identification and subsequent refinement of criteria considered, and provides a concise, highly credible format for presentation and justification of decisions.

The task addressed in recent research by the authors was to extend existing methodologies in the design and implementation of a simple but effective computerized ranking procedure for a defense department laboratory. The immediate goal was to provide a documented procedure for selection of projects to be funded. Ongoing research includes further refinements and training of personnel in the use of the system. Other research in progress

by the authors involves the application of the ranking system to the four areas listed above and a modification of the program to allow implementation on personal computers.

SECTION II

DISCUSSION OF EXISTING RANKING METHODS

Numerous efforts have been made to provide a workable methodology for project selection for the defense department, but past efforts have failed [1]. Further attempts to develop utility type models [2] have met only limited success because consistency must be assumed and the process of using the models is very time consuming. An extensive literature survey was made in earlier work by the investigator [3].

1. THE VON NEUMANN-MORGENSTERN AXIOMS

The basis for most modern utility research is Theory of Games and Economic Behavior [4] in which the use of expected utility hypothesis is explained. This approach is based on the idea that a utility can be assigned to each outcome, developed in the 1940's by von Neumann and Morgenstern. Since they are basic to all decision theory, the axioms and notation are included here.

a. Notation

1. $x = y$ indicates that the decision maker is indifferent between the outcomes x and y.
2. $x > y$ indicates that the decision maker prefers the outcome x to the outcome y.

3. $x < y$ indicates that the decision maker prefers the outcome y to the outcome x.

b. The Axioms

A.1. For two consequences x and y, one and only one of the following relations holds:

(a) $x = y$,

(b) $x > y$,

(c) $x < y$.

This axiom provides for comparability of consequences.

A.2. If $x > y$ and $y > z$, then $x > z$. This axiom establishes transitivity.

B.1. $x < y$ implies $x < px + (1-p)y$, where p is the probability of consequence $x(0 < p < 1)$. This means that if y is preferred to x, then the decision maker will prefer a lottery between x and y to the certain outcome x as long as the probability of receiving y in the lottery exceeds zero.

B.2. $x > y$ implies $x > px + (1-p)y$. This is the converse of axiom B.1.

B.3. $x < z < y$ implies: There is a p $(0 < p < 1)$ such that the decision maker has the following preference: $px + (1-p)y<z$. This axiom establishes the commensurability of the consequences. That is, no matter how superior outcome y is perceived to be with respect to z, there is a sufficiently large probability p such that the certain outcome z is preferred to the lottery over x and y.

B.4. $x > z > y$ implies: There is a p $(0 < p < 1)$ such that $px + (1-p)y > z$. This is the converse of axiom B.3.

C.1. $px + (1-p)y = (1-p)y + px$. This is the utility theory analog of the mathematics associative law.

C.2. $p(qx + (1-q)y) + (1-p)y = pqx + (1-pq)y$. This is the utility theory analog of the mathematics distributive law, where q is also a probability $(0 < q < 1)$.

2. STATISTICAL DECISION THEORY

The next major contribution was made by Savage in 1954 [5] in his The Foundation of Statistics. Axioms incorporating subjective expected utility were estimated by the decision maker during the decision making process.

By applying statistical theory to actual problems, Bayesian or statistical decision theory was developed by such men as Schlaifer [6], Raiffa and Schlaifer [7], and Pratt, et al. [8].

The next step was the investigation of specific characteristics of decision problems. Methods to assess utility functions were proposed by Pratt [9], Schlaifer [6], and Novick and Lindley [10]. The assignment of subjective probabilities was suggested by Winkler [11], Edwards [12], Schlaifer [13], and Tversky and Kahneman [14]. Group decision problems were studied by Arrow [15] and Keeney and Kirkwood [16], and the question of multi-attribute preferences was discussed by Fishburn [17,18,19], Pollak [20], Raiffa [21], Keeney [22,23], and Keeney and Raiffa [2].

3. MULTI-ATTRIBUTE UTILITY THEORY

Until now, only one attribute had been considered. A method was developed by Keeney and Raiffa [2] for dealing with more than one. They distinguished between a value function, a multi-attribute preference function where each decision outcome can be measured with certainty for each attribute, and a utility function, a multi-attribute preference function with at least one evaluation uncertainty.

The simplest utility function for n attributes is

$$u(\overline{x}) = \sum_{i+1}^{n} k_1 u_1(x_i), \tag{1}$$

where $\overline{x}$ = n-vector of attribute value, x_1, x_2, ..., x_n,

$u(\overline{x})$ = utility of the vector $\overline{x}$,

k_i = weighting of attribute x_i, $i=1,2,\ldots,n$,

x_i = a value of the attribute x_i,

$u_i(x_i)$ = marginal utility of x_i.

Fishburn [18,19,24,25,26] noted that the additive utility model for two attributes x and y is applicable if and only if x and y are additive independent. Thus, the paired preference comparison of any two lotteries depends only on these marginal probability distributions. He also extended the two-attribute independence to the general n-attribute case and developed the multilinear utility function later refined by Farquhar [27].

$$u(\bar{x}) = \sum_{i=1}^{n} k_i u_i(x_i) + \sum_{i=1}^{n} \sum_{j>1}^{n} k_{ij} u_i(x_i) u_j(x_j)$$

$$+ \sum_{i=1}^{n} \sum_{j>i}^{n} \sum_{m>j}^{n} k_{ijm} u_i(x_i) u_j(x_j) u_m(x_m) + \ldots$$

$$+ k_{123\ldots n}\, u_1(x_1) u_2(x_2) \ldots u_n(x_n) \qquad (2)$$

where the notation is identical to that for (1) except for the additional weighting constants (the k's) with multiple subscripts.

Another important concept is utility independence. A set of attributes is said to be jointly utility independent if and only if each of the attributes is utility independent of its complement (the remaining attributes). The multilinear utility function is applicable only when the attributes are jointly utility independent.

If the attributes $(x_1, x_2, \ldots, x_n)$ are mutually utility independent, then the utility function $u(\bar{x})$ takes the following multiplicative form:

$$ku(\bar{x}) + 1 = \prod_{i=1}^{n} (kk_i u_i(x_i) + 1), \qquad (3)$$

where

1. $u(\bar{x})$ is normalized by $u(x_1^{o}, x_2^{o}, \ldots, x_n^{o})$

   and $u(x_1^{*}, x_2^{*}, \ldots, x_n^{*}) = 1$,

2. $u_1(x_1)$ is a marginal (conventional) utility function on X_i normalized by $u_i(x_i^o) = 0$ and $u_i(x_i^*) = 1$, $i=1,2,\ldots,n$,

3. $k_i = u(x_i^*, \bar{x}_i^o)$,

4. k is a scaling constant determined by an iterative procedure.

Keeney [28] shows that when the sum of the n scaling constants (the k_i's) is equal to one, (3) reduces to the additive model (1).

While the multiplicative model is easy to assess, (2^n-2) subsets must be verified for mutual utility independence.

Fortunately, this can be simplified by using these equations, proven equivalent by Keeney and Raiffa [2]:

1. Attributes $X_1, X_2, \ldots, X_n$ are mutually utility independent.

2. $\bar{X}_i$ is utility independent, $i=1,2,\ldots,n$.

3. $(X_i, X_{i+1},\ldots,X_n)$ is utility independent for $i=1,2,\ldots,n$ and $(X_1,X_2,\ldots,X_{n-1})$ is utility independent.

4. $X_i,X_{i+1})$ is utility independent for $i+1,2,\ldots,n-1$, $n \geq 3$.

5. X_1 is utility independent and (X_1, X_i) is preferentially independent for $i=2,3,\ldots,n$, $n \geq 3$. This condition can

be generalized to require that any single attribute, not necessarily X, is utility independent.

In these equations, cases 2 through 5 require only n assumptions. In equation 5, the term preferential independence refers to value functions, or trade-offs under certainty. A pair of attributes X_1 and X_2 is preferentially independent of its complement, $\overline{X}_{12}$, if the conditional preferences over (X_1, X_2) given some value $\overline{X}_1$ or $\overline{X}_2$ do not depend on $\overline{X}_{12}$.

This method has the additional advantage of having been successfully applied, most notably in the summer of 1971 by de Neufville and Keeney [29] in choosing the site for a new airport in Mexico City.

One-way utility independence, developed by Keeney [23], is the decomposition of a two-attribute utility function u(x,y) when only one is utility independent of the other.

If X is utility independent of Y, then

$$u(x,y) = u(x^o,y) + u(x,y^o) \frac{u(x^*,y) - u(x^o,y)}{u(x^*,y^o)}, \tag{4}$$

where u(x,y) is normalized by $u(x^o,y^o) = 0$ and $u(x^*,y^*) = 1$. An equivalent decomposition was derived by Bell [30] using conditional utility functions.

If X is utility independent of Y, then

$$\begin{aligned} u(x,y) = {} & u(x^o,y^*)\, u(y/x^o) + u(x^*,y^o)\, u(x/y^o) \\ & + (1-u(x^*,y^o))\, u(y/x^*)\, u(x/y^o) \\ & - u(x^o,y^*)\, u(y/x^o)\, u(x/y^o). \end{aligned} \tag{5}$$

If Y is utility independent of X, then (2) is applicable.

$u(x,y)$ differs from $u(x/y)$ in that $u(x,y)$ is the decision maker's utility for the joint outcomes x and y and $u(x/y)$ is the decision maker's utility for the outcome x, given that the outcome y is received.

Another example with a simple and efficient decomposition and a difficult to verify requisite is interpolation independence, developed by Bell [30]:

"If the conditional utility function $u(x,y)$ may be defined by a relation of the form

$$u(x/y) = \emptyset(y)\, n(x/y^{*}) + (1-\emptyset(y))\, u(x/y^{o}), \tag{6}$$

then I will say that X is interpolation independent of Y and write X(II)Y."

If X and Y are jointly interpolation independent, then

$$u(x,y) = au(x/y^{o}) + bu(y/x^{o}) - ku(x/y^{o})\, u(y/x^{o}) + (k-a)\, u(x/y^{o})\, u(y/x^{*}) + (k-b)\, u(x/^{*})\, u(y/x^{o}) + (1-k)\, u(x/y^{*})\, u(y/x^{*}), \tag{7}$$

where $a = u(x^{*},y^{o})$; $b = u(x^{o},y^{*})$ and k is an independent constant.

4. ANALYTIC HIERARCHY

This method, developed by Saaty [31], relies on reducing systems to pairwise comparisons of components grouped by shared characteristics. These pairs are compared on some scale.

After all values have been entered, the maximum eigenvalue and its associated normalized eigenvector are calculated by computer. This eigenvector represents the best weighting for the factors.

The consistency factor is

$$CI = \text{Consistence Index} = \frac{\lambda\ max - n}{n-1}$$

RI = Random Index = determined for n by experiment and reported in Saaty [31] (p. 31),

Consistency Ratio = CI/RI

If the consistency is greater than 1.00, then a preference of $a<b<c<a$ may exist. If the consistency is greater than .1 and less than 1.0, then there may be a problem of degree. The decision maker may have said that a is strongly preferred to b, b is strongly preferred to c, and a is strongly preferred to c. In this case, a should be very strongly preferred to c.

5. EVALUATION OF AVAILABLE METHODS

The importance of allowing for multiattributed decision making is elaborated by Winkler [32]. A variety of approaches to developing multidimensional evaluations have been suggested in the literature. The decisions made during project selection and many other ranking processes are such that no ideal answer exists. Fuzzy goal programming and fuzzy multicriteria programming techniques are reviewed by Ignizio [33] and suggested for use in decision making. The subjective nature of decisions such

as project selection lends itself to preference comparisons [34]. These comparisons can be consolidated into a ranked and weighted set of projects using Saaty's Analytic Hierarchy Process [31] or linear and mathematical programming methods [35,36]. Holistic judgements have been used for small sets of comparisons and empirical validation [37] does seem appropriate for determining the credibility of decisions based on personal preferences. Saaty [31] overcomes the consistency difficulty for small problems of fifteen or fewer options, but extensive input is still required. The Saaty procedure calls for a complete matrix of paired comparisons on some scale. This would amount to $n(n-1)/2$ comparisons, or 105 in a case with 15 options. A recent study by Zahedi [38] employed a Saaty-based method of multiple-criterion ranking, but the author's example (p. 103) was a totally consistent matrix which is not realistic in practice. Hannon [39] concurs that the consistent case is trivial since any column of the input matrix is the weight vector for the solution. Experience of the authors [3] has shown that in order to achieve consistency with a large matrix, the scale must be expanded much beyond Saaty's scale. Another study, by O'Grady and Menon [40], uses multiple criteria, but does not provide the flexibility for each user to choose his own set of criteria. Research by the authors shows the selection of such criteria is virtually unrepeatable. A recent article describes a preference weighting scheme using absolute deviations [41]. This article describes how models based on absolute deviations may be used to weight any

number of projects by either individuals, groups, or in hierarchies. However, the particular formulation used in [41] assumes the comparisons are in reference to an ideal. In applications considered by this paper, no ideal is known, so a modified model is needed.

In summary, some pertinent methodological problems remaining are 1) decreasing the amount of input needed for single and multiattribute decision making, 2) allowing the comparison of large numbers of items and 3) providing an estimate of the consistency of the results. These problems are addressed, but not totally solved, by the methodology developed and implemented in this study.

SECTION III

METHODOLOGY

1. SAATY METHOD

The procedure developed by Saaty [31] asks the decision maker to state his preference on some scale, which Saaty recommends be based on divisions of seven or nine. These preferences may be represented in a matrix, A as:

$$
A = \begin{array}{c} \\ 1 \\ 2 \\ \vdots \\ i \\ \vdots \\ j \\ \vdots \\ n \end{array}
\begin{array}{c}
\begin{array}{cccccc} 1 & 2 & \ldots & i & \ldots & j \ldots \; n \end{array} \\
\begin{bmatrix}
1 & a_{12} & a_{1i} & a_{1j} & a_{1n} \\
1/a_{12} & 1 & & & \\
\vdots & & & & \\
1/a_{1i} & & 1 \ldots & a_{ij} & \ldots \\
\vdots & & & & \\
1/a_{ij} & \ldots & 1/a_{ij} & \ldots 1 & \\
\vdots & & & & \\
1/a_{1n} & & & & 1
\end{bmatrix}
\end{array}
\tag{8}
$$

where a_{ij} represents the degree of preference the decision maker has for project i over project j, and $a_{ji} = 1/a_{ij}$.

Saaty then finds the maximum latent root, λ. In the perfectly consistent case, $\lambda = n$.

If $\lambda = n$, then each preference a_{ij} is exactly consistent and

$$a_{ij} = \frac{w_i}{w_j} . \tag{9}$$

Thus, multiplication of the consistent A matrix by the vector W = $[w_1, w_2 \ldots w_n]$ of weights gives W, as illustrated below:

$$A\,W^T \quad \begin{bmatrix} (1-n) & \frac{w_1}{w_j} & \cdots & \frac{w_n}{w_n} \\ \frac{w_2}{w_1} & (1-n) & \cdots & \\ \vdots & & & \\ \frac{w_n}{w_1} & & & (1-n) \end{bmatrix} \begin{bmatrix} w_1 \\ w_2 \\ \\ \\ w_n \end{bmatrix} \tag{10}$$

$$= \begin{bmatrix} w_1 - nw_1 + \frac{w_1}{w_2}(w_2) + \ldots + \frac{w_1}{w_n}(w_n) \\ \vdots \\ w_i \ \ldots \\ \\ \frac{w_n}{w_1}(w_n) \ldots \qquad \ldots + w_n - n(w_n) \end{bmatrix} = \begin{bmatrix} w_1 \\ w_2 \\ \\ \\ w_n \end{bmatrix} = W^T \tag{11}$$

Inconsistencies in preferences stated by the decision maker result in a less than perfect weight vector and increase the difference between λ and n. Saaty is therefore able to measure consistency using $C_s = \frac{\lambda - n}{n-1}$. He further refines the consistency estimate for size using statistics determined from simulations. However, this technique lacks the ability to estimate missing values.

2. ABSOLUTE DEVIATION PROCEDURE

Using an absolute deviation procedure, the model may be formulated using the A matrix as

$$\min \sum_{k=1}^{k} (\varepsilon_k^+ + \varepsilon_k^-) = Z \tag{12}$$

$$\text{ST: } w_i - a_{ij} w_j - \varepsilon_k^+ + \varepsilon_k^- = 0 \tag{13}$$

$$\sum_{i=1}^{n} w_i = 1 \tag{14}$$

where

for ranking n projects, for each i and j from 1 to n,

k is the number of comparisons, $n-1 \leq k \leq n(n-1)/2$,

w_i is the weight of project i,

a_{ij} is the degree of preference for project i over project j for comparison k,

ε_i^+ and ε_i^- are the positive and negative errors for comparison k, and

Z is the value of the objective function.

For the perfectly consistent case $Z = \sum_{k=1}^{k} (\varepsilon_k^+ + \varepsilon_k^-) = 0$ therefore $a_{ij} = \frac{wi}{wj}$ as before and the w_i for the absolute deviation must be exactly the same as using the normalized eigenvector. Of course, as the inconsistency increases, the w_i obtained by the two methods will not be the same.

A crude measure of consistency may be obtained where there is redundancy by finding Z/(n-1) as illustrated in the following example. Further statistical work is now being conducted by the

author to adjust this consistency for the amount of redundancy and size of n.

3. EXAMPLE OF BASIC ABSOLUTE DEVIATION METHOD

A decision maker must choose among three alternatives. He decides that he can make quality statements about the paired relationships; hence he states he prefers two strongly over one, three strongly over one and three very strongly over two. Using a scale of one to nine, these statements are translated into the quantitative matrix.

$$= \begin{array}{c} \\ 1 \\ 2 \\ 3 \end{array} \begin{array}{c} \begin{array}{ccc} 1 & 2 & 3 \end{array} \\ \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \end{array} = \begin{bmatrix} 1 & 5 & 5 \\ 1/5 & 1 & 7 \\ 1/5 & 1/7 & 1 \end{bmatrix} \qquad (15)$$

This matrix is translated into the model given as follows:

$$\text{Min} \qquad \varepsilon_1^+ + \varepsilon_1^- + \varepsilon_2^+ + \varepsilon_2^- + \varepsilon_3^+ + \varepsilon_3^- = Z \qquad (16)$$

$$\text{ST:} \quad w_1 - 5w_2 - \varepsilon_1^+ + \varepsilon_1^- = 0 \qquad (17)$$

$$w_2 - 7w_3 - \varepsilon_2^+ + \varepsilon_2^- = 0 \qquad (18)$$

$$w_1 - 5w_3 - \varepsilon_3^+ + \varepsilon_3^- = 0 \qquad (19)$$

$$w_1 + w_2 + w_3 = 1 \qquad (20)$$

The solution of this problem is $w_1 = 0.8140$, $w_2 = 0.1630$, $w_3 = 0.0233$, $Z = 0.6977$.

A measure of consistency might be formed by dividing Z by n-1, hence a crude measure for this problem would be 0.35. Also note

that the a_{ij} implied by the final solution are $a_{12} = \frac{w_1}{w_2} = \frac{35}{7} = 5$,

$a_{13} = \frac{w_1}{w_3} = \frac{35}{1} = 35$ and, $a_{23} = \frac{w_2}{w_2} = 7$.

This suggests to the decision maker that perhaps he understated the relative importance of project three overall. The decision maker may wish to alter some choices. The procedure indicates a likely place to look for errors and will automatically estimate and insert missing values.

4. EVALUATION OF ABSOLUTE DEVIATION METHODOLOGY

Evaluation of the Saaty and absolute deviation techniques reveals that, for consistent comparisons, the two methods are identical, even when many comparisons are omitted in the absolute deviation technique input. As few as n-1 interlinked comparisons will produce results equivalent to the Saaty results for n(n-1)/2 comparisons.

If the available comparisons are not linked, erroneous output is produced. For example, if there is a project or projects for which no comparisons are made, the solution will yield a weight of zero for these projects.

Assuming that all alternatives are linked by comparisons, the robustness of the consistency estimate varies directly with the number of redundant comparisons. The redundancies reduce the impact on the validity of the final weight vector of a single very wrong comparison.

The absolute deviation method thus offers the potential of being identical to the Saaty method in the consistent case. It addresses the weakness of the Saaty method, offering a relatively simple solution to the problem of estimating some missing values. An additional advantage of the absolute deviation method is that it can readily be programmed using standard L.P. software packages.

In order to incorporate the strengths of the absolute deviation technique into a managerial decision-making program under development, the basic absolute deviation model has been expanded to provide for multiple criteria, committee and/or hierarchical decision making and to allow constraints.

5. ADDITIVE MODEL

The additive model may be easily employed by first determining the attributes relating to given decision alternatives. The weights of the attributes may be obtained by use of the basic model. In practice an independent check of one or more of the weights by another method, such as trade-offs, may be desirable. The investigator must next use the basic model on the alternatives for each attribute and combine the resulting project weight vectors into a matrix, F, which is the multiplied by the attribute weight vector, W, to give the final weight vector, W_f.

$$FW = W_f \tag{21}$$

6. VOTING MODEL

The simple voting model may proceed by assuming each of the m members is equal and, for each member, scaling that member's sum of weights for the n projects to be 1/m. Thus,

$$\sum_{i=1}^{n} w_i = 1/m \tag{22}$$

where w_i is the member's weight for project i. The group vote for project i will be the sum of the members' votes for project i. An alternative, through rarely feasible in practice, would be for each member to weigh the other voting members. The sum of project weights for member j would then be scaled to sum to w_j instead of 1/m. This particular version might also be applicable to elections.

A voting model, which might produce better results when there are small groups of voters with only a limited number of choices, is available (but not yet programmed or tested).

After each of the V voters has ranked the same n projects and is satisfied with his individually produced weights w_{1v}, $w_{2v} \ldots w_{nv}$, the K_v comparisons, a_{ijv}, of each voter, v, are combined to produce final weights w_1, $w_2 \ldots w_n$ using the model:

$$\min \sum_{v=1}^{V} \sum_{k_v=1}^{K_v} (\varepsilon^{+}_{vk_v} + \varepsilon^{-}_{vk_v}) = Z \tag{23}$$

$$\text{ST:} \quad w_{iv} - a_{ijv} w_{jv} - \varepsilon^{+}_{vk_v} + \varepsilon^{-}_{vk_v} = 0 \tag{24}$$

for $v=1 \ldots V$; $k_v = 1 \ldots K_v$; $1 \leq i \leq n$; $1 \leq j \leq n$;

$n-1 \leq K_v \leq n(n-1)/2$

$$\left(\sum_{i=1}^{n} \sum_{v=1}^{V} w_{iv} \right) - w_i = 0 \qquad (25)$$

$$\sum_{i=1}^{n} w_i = 1 \qquad (26)$$

This a priori optimal model might be more desirable than the simpler additive voting model where each person's vote has equal weight.

7. HIERARCHY MODEL

Finally, the most difficult problem arises in hierarchies, where it is desirable to weight or rank tasks at lower levels. For example, a division may have two departments, as in Figure 1.

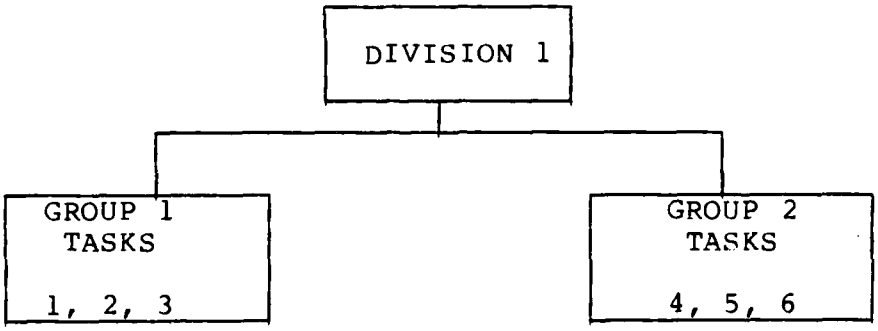

Figure 1. Hierarchical Organization.

$$
A = \begin{array}{c|c|c}
 & 1\ 2\ 3 & 4\ 5\ 6 \\
\hline
\begin{array}{c}1\\1\\2\\3\end{array} & A_1 & \begin{array}{ccc} * & & \\ & & * \\ * & & \end{array} \; A_2 \\
\hline
\begin{array}{c}4\\5\\6\end{array} & \begin{array}{ccc} * & * & \\ & & \\ * & & \end{array} \; A_3 & A_4
\end{array}
$$

Figure 2. Combined Preference Matrix. Submatrices A_1 and A_4 are Derived from Group 1 and 2 Approved Weights. Division Chief Fills in Some Connecting Comparisons (*'S) in Shaded Submatrices.

Groups 1 and 2 can then prioritize within their respective organizations. The division leader may accept their ranking, discuss individual comparisons and reweight, or substitute his own order (he is in charge). After a satisfactory set of weights is obtained within each group, the division head must compare one or more (m - 1 or more in general) tasks from each group. That is, A_2 and A_3 in Figure 2 are partially or completely filled in. Optionally, additional projects may be added by the chief. Such an example is found in the User Guide, Appendix A. This problem is again solvable by our procedure.

8. CONSTRAINTS MODEL

Resource allocations may be made using the final weights from any model. If budget and manpower are to be considered as separate constraints, the model is as follows:

$$\text{Max} \quad \sum_{i=1}^{n} w_i X_i \tag{27}$$

$$\text{ST:} \quad \sum_{i=1}^{n} b_i X_i \leq B \tag{28}$$

$$\sum_{i=1}^{n} m_i X_i \leq M \tag{29}$$

where w_i is the weight of project i, for each of the n projects,

X_i must equal 0 or 1,

b_i is the budget estimate for project i,

B is the available budget,

m_i is the manpower required for project i, and

M is the available manpower.

In the above model one can easily add further breakdowns, such as 6.1, 6.2, or 6.3 program budgets, or skill level and grade breakouts for manpower. Other restrictions such as forced entry of micro-managed projects or assuring a minimum level of activity for each organization may be conveniently entered.

9. COMPUTATIONAL METHODS

The models shown have been programmed for the "VAX" and "IBM" computers. The basic code used was "LINDO" with a FORTRAN matrix generator and a report writer developed for interactive input and output.

Tests of these models indicate that a full matrix of about 55 projects can be weighted, and that 300 projects can be weighted if a minimally dense matrix is input.

SECTION IV

RESULTS

The decision-making results from use of the models implemented as formulated above are illustrated by the following examples and summaries of output.

1. SAATY VERSUS ABSOLUTE DEVIATION

First, the Saaty and absolute deviation techniques are compared to establish the feasibility of analysis for large numbers of projects, n, and when increasing numbers of comparisons, k, are missing. The runs reported are illustrative, not a precise quantification of the relationship between number of missing values and consistency.

Empirical observation of trends in a realistic example of good but not perfect consistency show that the objective function, Z, decreases with the number of comparisons, k. (Omitting a comparison is equivalent to omitting a constraint.) As k varies from its maximum n(n-1)/2 to its minimum, n-1, Z approaches zero, but the final weights stay the same. To further substantiate this observation, two input matrices from Saaty [31] were tested as input to the absolute deviation model. Results are summarized in Tables 1, 2 and 3. Comparison of Saaty and absolute deviation techniques show the increase in consistency (decrease in Z) with fewer comparisons and the effect of decreasing consistency on the weight vector. More details are found in Appendix B.

TABLE 1

TEST EXAMPLE

IMPACT ON WEIGHT VECTOR AND OBJECTIVE FUNCTION OF DECREASING NUMBERS OF COMPARISONS WHEN FULL MATRIX SHOWED GOOD CONSISTENCY

n = 5	Saaty [3]	Absolute Deviation					
Comparisons, k	10	10	9	8	7	6	5
Weights w_1	0.045	0.045455	0.061	0.061	0.061	0.061	0.061
w_2	0.218	0.204545	0.183	0.183	0.183	0.183	0.183
w_3	0.534	0.545455	0.550	0.550	0.550	0.550	0.550
w_4	0.073	0.068182	0.069	0.069	0.069	0.069	0.069
w_5	0.130	0.136364	0.137	0.137	0.137	0.137	0.137
Objective Z	-	0.318181	0.214	0.191	0.191	0.137	0.092

TABLE 2

SAATY SCHOOL EXAMPLE

IMPACT ON WEIGHT VECTOR AND OBJECTIVE FUNCTION OF DECREASING NUMBERS OF COMPARISONS WHEN FULL MATRIX SHOWED MODERATE CONSISTENCY

n = 6		Saaty [30]	Absolute Deviation		
Comparisons, k		15	15	10	5
Weights	w_1	0.33	0.302	0.366	0.348
	w_2	0.05	0.050	0.020	0.070
	w_3	0.03	0.043	0.052	0.050
	w_4	0.09	0.050	0.073	0.070
	w_5	0.23	0.252	0.122	0.119
	w_6	0.27	0.302	0.366	0.348
Objective Z		-	1.1799	0.610	0.0

TABLE 3

SAATY SCHOOL EXAMPLE

IMPACT ON WEIGHT VECTOR AND OBJECTIVE FUNCTION
OF DECREASING NUMBERS OF COMPARISONS WHEN
FULL MATRIX SHOWED POOR CONSISTENCY

n = 6		Saaty [30]	Absolute Deviation		
Comparisons, k		15	15	10	5
Weights	w_1	0.32	0.511	0.504	0.316
	w_2	0.14	0.128	0.126	0.079
	w_3	0.03	0.021	0.034	0.105
	w_4	0.13	0.042	0.042	0.316
	w_5	0.24	0.170	0.168	0.106
	w_6	0.14	0.128	0.126	0.079
Objective Z		-	1.8723	1.4034	0.0

These preliminary results illustrated the feasibility of the absolute deviation procedure for giving close estimates for the weight vector even when many comparisons are omitted if the comparisons input are consistent. The patterns observed in the relationship between the objective function, Z and the numbers of missing observations spurred additional study.

2. ADDITIVE MODEL RESULTS

An additive model was used to provide (optional) multi-criteria capabilities. The system was used in an actual hiring decision process where 7 applicants were ranked on 7 criteria. Thus an attribute matrix, A, was generated, and for each attribute, the applicants were rated with respect to that attribute. This produced 7 more matrices, B - H. To test the impact of missing values, for each matrix A - H, and for r=0,3,5,6,8,10,and 15, comparisons were randomly selected to be omitted. Three different random selections of r comparisons were made for each matrix and each r except 0 and 15. Final weights are listed in Table 4 according to number of comparisons. (Only some of the weights obtained displayed.) Since n=7, the number of comparisons possible ranges from 21 to 6.

TABLE 4

PERSONNEL EXAMPLE USING ADDITIVE MODEL WITH 7 CRITERIA AND 7 APPLICANTS IMPACT ON FINAL WEIGHT VECTOR OF DECREASING NUMBERS OF COMPARISONS

n=7		Absolute Deviation		
Comparisons, k		21	15	10
Weights	w_1	0.081	0.086	0.074
	w_2	0.029	0.029	0.017
	w_3	0.243	0.246	0.266
	w_4	0.111	0.100	0.107
	w_5	0.071	0.074	0.073
	w_6	0.212	0.205	0.190
	w_7	0.253	0.256	0.272

This demonstrates that in a real-life decision making scenario, the absolute deviation technique can produce a believable result even when many comparisons are omitted. The decision maker who generated the set of final weights from 21 comparisons in each matrix was complemented by the rest of the search committee for the impressively thorough nature of his decision report. They agreed with the results of his ranking.

3. CONSISTENCY AND RELIABILITY

The additive model matrices generated in the Personnel Example were considered individually and compared to provide further data on the relationship of the number of projects compared, n, with the number of comparisons, k, (ranging from $M = (n)(n-1)/2$ to $(n-1)$ and the objective function, Z, for matrices A - H of differing consistencies. Figure 1 shows the average value of Z for each number of comparisons for n=7. If the observations from each matrix A - H were fit to a straight line, then for a matrix, say A, the slope m_A of line L_A is the ratio of the change in objective function ΔZ to the change in number of observations, Δk. If it is assumed that this slope is constant for all k, it provides a measure of reliability based on the objective function and number of comparisons.

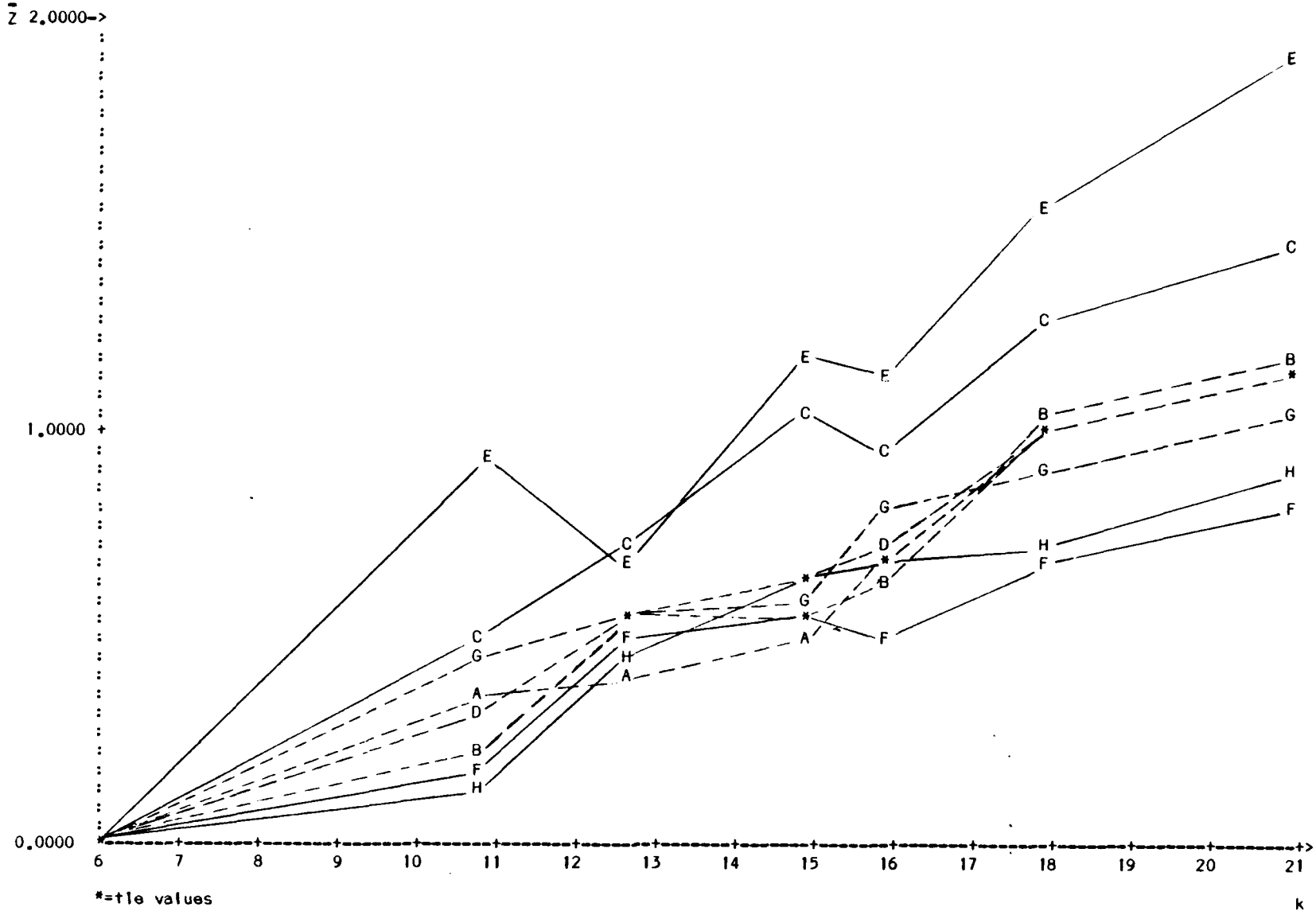

Figure 3. Plot of Average Objective Function, $\bar{Z}$ vs Number of Comparisons, k, for Matrices A-H.

Since the scale, s, (range of input values) influences the maximum inconsistency, a reliability index based on Z/k should be normalized with respect to scale. If

$$Z_M = (S-1)\frac{(n-1)}{2} \tag{30}$$

is taken as an estimate of the worst error, Z_M, for a matrix of size n generated with scale s, then a possible reliability index RI, is

$$RI = \frac{2Z}{k(S-1)(n-1)} \tag{31}$$

statistical evaluation of the above result and investigation of the robustness of the assumptions is ongoing. Future experiments should investigate the linearity of Z/k, the impact of n, and the effect of s on the proposed reliability index.

4. EXAMPLES

Further examples of the use of the Basic Model 1, Additive Model 2, Voting Model 3, Hierarchy Model 4, and the Constraints Model 5, are found in Appendix A, the User Manual. A composite example incorporating all the models is reported in Section VI of the User Manual, and Appendix B, Additional Examples, contains detailed input and output information on other applications of the system tested. Appendix C contains a copy of the commented computer program implementing the methodology described herein.

SECTION V

CONCLUSIONS

1. SUMMARY OF RESULTS

A feasible and instructive method has been developed for ranking projects or making other decisions such as personnel selection, policy making, presentation and allocation of merit awards. The structured methodology now implemented on "VAX" and "IBM" computers provides insight into the decision making process for the decision maker and everyone to be apprised of the decisions. In addition to facilitating communication, it establishes credibility and is a powerful tool in investigation of the processes being considered, and in negotiations.

The currently implemented program provides a mechanism for selection among up to 200 projects based on their overall worth or on up to 20 different criteria. Voluminous input required by other systems is reduced by allowing many preference comparisons to be omitted. Consistency increases when fewer observations are input since the user is not forced to guess when uncertain of some comparisons. The reliability of the final weight vector increases with the consistency of the input and with the percentage of possible comparisons actually input. Further investigation is proposed regarding the effect on the consistency and reliability indices suggested of the number of items compared, the comparison scale employed, and the number of missing observations. More applications of the system are

planned and simulations could be designed to table the consistency and reliability indices. Future enhancements to the computerized system will be based on feedback from the defense department laboratory currently using the system.

2. RECOMMENDATIONS

A useful avenue for further research would be to more fully implement the existing research and analytic programs. Such a system should include (1) Streamlined programs (2) Data input (3) Storage (4) Matrix Generation (5) Merging (6) Error Detection (7) Training (8) Use of other data bases and (9) Stand-alone Programs for the Z-100.

The first step would be to collect the opinions of the users to make the basic programs more responsive to needs of the various users. One important task would be to develop a stand-alone version of the program that could be executed at the user's desk or taken to another location. Methodology might be altered so that, by using least squares procedures, preference values in the comparison matrix could be estimated prior to going into the weighting process. Other features of new research would be to improve the procedure for determining which comparisons are contributing heavily to the inconsistency of the result. Also, sensitivity analysis would be made available to determine the impact of errors on the final outcome. The effect of scale would be investigated further, and the hierarchy model refined.

More specifically, a follow-on study would entail development of an integrated MIS system based on the Z-100 as a

stand-alone computer. Where the Z-100 size limitations constrain the model, an interface with the "VAX" computer and currently existing programs could be provided. Data-base information could also be retrievable from the "CYBER." The Basic, Additive and simple Voting models and a tailored version of the Hierarchy model would be available using the Z-100 as a stand-alone computer. Accessing of the models would be aided by an interactive front-end program on the Z-100 which could also direct any links with the "VAX" or "CYBER" needed to access data-base records of projects, run a sensitivity analysis, provide optional access to stored files, do extremely large examples, use an improved voting model such as the one described below, or execute an enhanced Constraints model. Development of the interface would be enhanced by working closely with potential users, receiving the assistance of one designated person at the laboratory, and helping potential users to write personalized operating instructions.

Features of the Z-100 based integrated Management Information System would, for example, allow the decision maker to

* enter data and execute tailored versions of the Basic, Additive, Voting and Hierarchy models,
* experiment with several runs of various models while remaining at his own work station and protecting his privacy.
* avoid any (highly unlikely) breaches of security due to unauthorized access of the "VAX,"

* employ interfaces with the the "VAX" and "CYBER" for
  - optional file storage and access to group member files,
  - executing runs with large numbers of comparisons,
  - running a sensitivity analysis,
  - executing a newly proposed Voting model,
  - executing the Constraints model, and
  - interfacing with task description and accounting records.

The implementation of the system on the Z-100 could involve breaking the existing software into modules and reducing the number of possible comparisons entered at one time. A new model for estimating ranks and weights could free the Z-100 portion of the system from the licensed software package, "LINDO", thus enhancing portability. The new model estimates weights as

$$\hat{w} = (B^T B)^{-1} B^T E \tag{32}$$

where $\hat{w}$ is the estimated weights vector and the B matrix is derived from the input comparisons matrix A. Matrix B has one row for each of the C non-zero comparisons in the matrix, A. For each comparison a_{ij}, B has a row, c, with only 2 nonzero elements:

$$b_{ci} = -1 \tag{33}$$

and

$$b_{cj} = a_{ij} \tag{34}$$

Row C + 1 of matrix B is all ones.

This least squares procedure provides a reasonable estimate of ranks and weights, but in the rare event that the matrix B is singular, the user would have to use the "VAX" system. Singularity is not a problem with "LINDO." The actual number of comparisons which could be accommodated on the Z-100 would be determined during further studies.

Further study would thus provide additional advantages such as:

- <u>facilitating user access</u> by implementing portions of the system on the Z-100.

- <u>linking with task description and accounting databases</u> to provide the decision maker ready access to such data as the description of a task and its projected cost over the next 5 years, money spent, and money remaining unconstrained,

- <u>improving the Voting model</u> to provide a better estimate when small groups are voting on a small number of tasks by testing and refining a new model. After each of the V voters ranked the same n projects and was satisfied with his individually produced weights $w_{1v}, w_{2v} \ldots w_{nv}$, the K_v comparisons, a_{ijv}, of each voter, v, would be combined to produce final weights $w_1, w_2 \ldots w_n$ perhaps using the model:

$$\min \sum_{v=1}^{V} \sum_{k_v=1}^{K_v} (\varepsilon^{+}_{vk_v} + \varepsilon^{-}_{vk_v}) = Z \qquad (35)$$

$$\text{ST:} \quad w_{iv} - a_{ijv}\, w_{jv} - \varepsilon^{+}_{vk_v} + \varepsilon^{-}_{vk_v} = 0 \tag{36}$$

for $v=1 \ldots V$; $k_v = 1 \ldots K_v$; $1 \leq i \leq n$; $1 \leq j \leq n$;

$n-1 \leq K_v \leq n\,(n-1)/2$

$$\left(\sum_{i=1}^{n} \sum_{v=1}^{V} w_{iv} \right) - q_i = 0 \tag{37}$$

$$\sum_{i=1}^{n} w_i = 1 \tag{38}$$

An important consideration in the system would be to determine what programs should be ranked. Any set of programs may be weighted, but for reasons of efficiency and time, certain programs may not be considered. For example, all 6.2 work ought to be weighted, but the time involved would be greater. It might be better to combine work units into work packages for ranking at the division and lab levels. Further, 6.2 lab funded programs may be desirable to breakout. Still further, micromanaged, mortgaged, and very important programs may be removed. The remaining set would be more manageable and would include only those programs about which there is some doubt about funding. The work here would develop a screening method from interviews with key personnel to insure that only those requiring a decision are ranked.

A further consideration would be to implement at higher levels of the organization existing programs which reduce the

effort involved in ranking. The members might thus be able to rank the laboratory programs using as few as three comparisons even though such results would not be as strong as those produced from more comparisons.

Future efforts could include designing a system for coordinating the rank program with the existing financial database and storing the information generated by the ranking process. The input and output formats of the system would be specified. Personnel in DLX would be asked to participate in this specification by communicating their needs and preferences. Methods for implementing the system would be investigated. DLX would provide instruction with regard to the current financial database and how it is accessed and updated. If the financial database could easily be automatically linked to the ranking programs, this would be done. Otherwise, DLX would provide a manual link or the link would be constructed in a future effort. If improvements in the current data base and procedures were needed, recommendations would be submitted. A suitable language for writing the system program would be determined. The program would be written and documented, and trial runs would be made using DLX personnel input.

The total thrust effort would be summarized after the final selections were made to determine if the lab program is emphasizing the currently identified needs for certain capabilities.

Verification and validation should be done before any system could be viewed as complete. The entire system would be verified by going over all the options in the training sessions and determining whether the program produces the anticipated results and how closely those results conform to the overall feelings of the user. This step would be time-consuming, but existing test examples indicate that a verifiable program could be produced with effort.

The validation of the programs would be more difficult. By validation it is meant that the high ranked projects do tend to be the high payoff projects in the end. The present program provides only for setting up validation procedures using the audit trail allowed by the system. The reason for this is that most programs to be ranked go for 2 or more years, but this effort would be completed in less than 2 years. The procedures necessary for completion of the validation would be included in the final report.

After the system was programmed and all the procedures including optimization were worked out to the satisfaction of key personnel, the users of the system would be trained. For this purpose, one person in DLX should be designated to learn the operation of the programs thoroughly. Also, the investigators would help users write operating instructions and train all users the laboratory designated and made available, not to exceed one from each branch, two from each division, and six others from the laboratory.

In addition, the system program would be maintained by KR. Further efforts would include the training of KR personnel on the program in addition to providing the instructions and the documented program.

Investigations would be carried out concerning the possibility of making: 1. cut or delay decisions, 2. group decisions, 3. extending this methodology to other laboratories, and 4. determining manpower requirements using top down - bottom up planning procedures.

If budget restraints force a program to be discontinued during the current or coming year, the question arises as to whether the program effort should be stopped or simply delayed. In order to solve this problem by a model, rankings for FY + 2 are necessary. The investigation of this problem would consider the feasibility of making realistic rankings 2 or more years ahead. If such rankings were feasible, the effort and cost involved would still need to be studied to determine if the potential value is great enough to justify the cost.

APPENDIX A

USER MANUAL: RANKING SYSTEM FOR PROJECT SELECTION

1. DESCRIPTION

Rank and weight projects on an individual basis with regard to overall worth or selected attributes. Vote on project ranks as an equal group; or, as part of the hierarchy, retrieve subordinates' rankings, modify and/or supplement them. Maximize the number of projects funded based on their individual costs, final weights, and overall budget. Provide an audit trail of the decision making process, if desired.

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a. OVERVIEW

Goal - Provide a decision support system to improve the project selection mechanism and provide an optional audit trail.

Method - Use one or a combination of the five models to configure a decision support system for your particular application.

BASIC Model 1 - Rank projects based on overall worth

Input: List of projects and comparisons based on overall worth. (Program estimates missing comparisons.)

Output: Project ranks and weights and an estimate of the consistency of comparisons.

ADDITIVE (Attributes) Model 2 - Rank projects based on multiple criteria.

Input: List of projects and attributes, attribute comparisons, then project comparisons with respect to each attribute. (Program estimates missing comparisons.)

Output: Attribute ranks, weights and estimate of consistency of comparison; within each attribute, project ranks, weights and consistency estimates; then, final ranks and weights of projects.

VOTING Model 3 - Combine a committee's project weights.

Input: Project weights produced by execution of other models (using the same set of projects).

Output: Final project ranks and weights.

HIERARCHY Model 4 - Modify and combine subordinates' project weights.

Input: Project weights produced by execution of other models by subordinates ranking different projects; list of projects and comparisons to be added, modified or deleted; new comparisons connecting the (revised) subordinates' comparisons (program estimates missing comparisons).

Output: Final project ranks and weights and consistency estimate.

CONSTRAINTS Model 5 - Allocate scarce resources, such as money.

Input: List of limiting constraints (such as costs, manpower, facilities); project weights produced by executing other models; for each project and each constraint, the requirements of the project.

Output: List of projects to fund and value of the objective function.

b. DIRECTIONS FOR USE

(1) STEP 1: Select Model(s) and Prepare Input

(a) BASIC Model 1 Rank Projects Based on Overall Worth.

The weights produced by executing this model may be final or they may be used again. At a later time, comparisons may be retrieved from a file, viewed and changed before rerunning Model 1. Alternatively, the BASIC model can be run as a prerequisite to the VOTING, HIERARCHY, or CONSTRAINTS Model(s).

1) New Set of Comparisons

Using an input form copied from Section III of this manual, fill in information about the projects to be ranked.

EXAMPLE OF LIST STYLE INPUT

NAME: padgettm INPUT FILE NAME(S)(if any) none

ORGANIZATION: DLXB OUTPUT FILE NAME dlxbla.dat

PURPOSE: compare projects NAME OF ATTRIBUTE (if any) overall worth

NUMBER	NAME (LIST PROJECTS OR ATTRIBUTES)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE								
				TIE 1	2	WEAK 3	4	STRONG 5	6	7	ABSOLUTE 8	9
1	PR1	3	1					5				
2	PR2	3	1									9
3	PR3	4	1		2							
4	PR4	5	1			3						
5	PR5	3	2			3						
		2	4			3						
		2	5		2							
		3	4								8	
		3	5				4					
		5	4		2							

First, list projects then perform pairwise comparisons of projects. Beginning with the first project, compare it with a project below it on the list. For example, to show you prefer PR2 over PR1 by a degree of 5 (strongly): write 2 in the first row under PREFERRED, write 1 under NOT PREFERRED, and put a 5 in column 5 of the same row. For each project on the list, compare it with at least one project below it. The program will estimate missing comparisons. See Model 1 system flow diagram in Section A-3.d.(1) and execution of Model 1 using the above input in Section A-3.e.(1).

EXAMPLE OF MATRIX STYLE INPUT

(Optional input style especially desirable for HIERARCHY Model 4)

NAME_____ Input file name (if any):_____

ORGANIZATION:_____ Name of output file to contain results:_____
(See rules for file name selection below.)

PURPOSE:_____ Name of attribute (if any):_____

PROJECT OR ATTRIBUTE FOR FILE	PROJECT (OR ATTRIBUTE) NAME (Up to 32 spaces long)	COMPARISONS (see rules below)				
		1	2	3	4	5
1	PR1					
2	PR2	5			3	2
3	PR3	9	3		8	4
4	PR4	2				
5	PR5	3			2	

Up to 200 total projects and up to 20 attributes may be used.

Rules for comparisons:

Choose a scale: x to y where $0 < x < y < 50$ and x and y are real numbers.
(Each user may choose own scale)
For selected pairs, enter comparison.

For example, if you choose a scale of 1 to 9 and prefer PR2 over PR1 by a degree of 5 out of 9, enter 5 in row 2, column 1 of matrix. If you had preferred PR1 over PR2, a number should have been entered in row 1, column 2 - diagonally opposite to the 5 you entered. If PR3 is preferred over PR4 by a factor of 8 out of 9, enter 8 in row 3, column 2. If you do not prefer either project, indicate a tie by entering a 1 in either row 2, column 1 or row 1, column 2.

Missing comparisons will be estimated by the program. User must input enough comparisons to connect the rows by being sure to compare each listed project with at least one project below it on the list. A comparison in row i, column j automatically supplies a value for row j, column i. All diagonal values are set to 1 by the program.

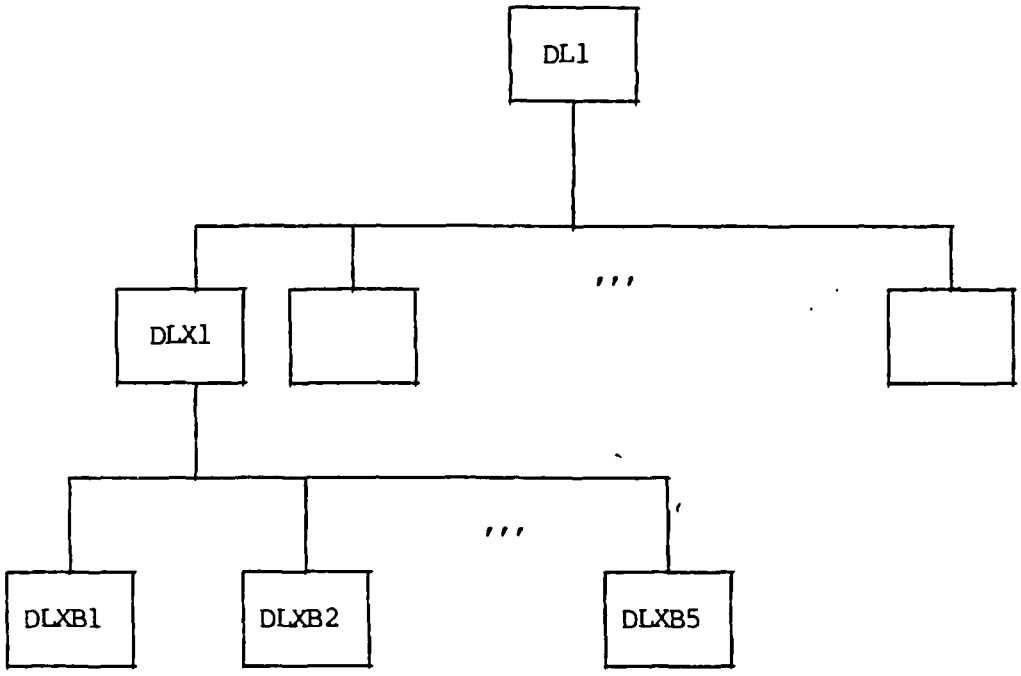

Figure A-1. Example of File Name Selection

Suggested rules for file name selection:

The left most letters of the filename are the user's organization letters. The second from right digit is the number of the individual user (1-5 at each level). The rightmost letter (a to z) indicates the particular file. A user's official file must have a rightmost zero (0) instead of a letter. All user accounts must be part of the LINDO group on the VAX 2. The system will automatically prefix the user's last name to the file name. The file type should be DAT.

Examples: [PADGETTM] DLXB1a.DAT

[PADGETTM] DLXB10.DAT (official)

2) Recheck of earlier run of BASIC Model 1.

Print off old output file (e.g., TYPE filename).

Prepare corrected input using one of the input forms described above.

(b) ADDITIVE (Attributes) Model 2

1) New weightings

LIST OF INPUT TO PREPARE FOR ADDITIVE MODEL:

a) Prepare input for 1 to 20 attributes as for BASIC Model 1, listing names and comparisons for each attribute.

b) For each attribute, prepare input as for BASIC Model 1, using up to 200 projects with respect to that attribute.

This results in one form for comparing attributes and separate forms for comparing projects with respect to each attribute. All will use the same output file. See the system flow diagram for Model 2 and the example of Model 2 in Sections A-3.d.(2) and A-3.e.(2), respectively.

2) Repeated weightings

Prepare input as described above, indicating changes to be made in comparison values. List names of input files where current information is stored.

(c) VOTING Model 3

All voters have equal weight and each must have previously weighted the same projects.

EXAMPLE OF INPUT VOTING MODEL 3

Number of voters (2-5): 2
Number of projects: 3
Name of official input file for each voter:
[PADGETTM] DLXB10.DAT
[SMITH] DLXB20.DAT

Project Number in All Files	Project Name in All Files
1	PR1
2	PR2
3	PR3

Note: If an inconsistency in the number of projects in each file is found, the lowest number will be used. If an inconsistency in the names of projects is found, the names from the first file will be used. Any inconsistencies will be reported to the user. Only official files (ending in 0.DAT) should be used for input! See examples in Sections A-3.d.(3) and A-3.e.(3) and A-3.f.

(d) HIERARCHY Model 4

First, have subordinates produce individual lists of weights using BASIC Model 1 or ADDITIVE Model 2, storing the results in an official file. If individuals are ranking the same tasks, results should be pooled using VOTING Model 3 (and/or HIERARCHY Model 4) to produce group lists of weights. Up to 20 lists, each ranking different projects, may be input to the HIERARCHY Model 4.

Second, retrieve each list of ranks and weights (e.g. using TYPE filename). Approve and/or modify these weights. (Remember the actual comparison matrices are stored in official files produced by Models 1, 2, 3, or 4). Omit projects certain to be funded or dropped. Add new projects if desired. The new matrix could be viewed to confirm agreement with earlier weights or spotlight needed changes.

Third, using a list of projects for each individual or group, fill in an input form as illustrated below. (Program will output this list for you. Input forms can be copied from the one in this user guide.)

EXAMPLE OF INPUT FOR HIERARCHY MODEL 4

Source	Project Name & Number in Ascending Order as in Input File	New Project Number	Comparisons to be changed or added 1	2	3	4	5	6	7
Subl:DLXB10	2 PR2	1	///	///	9				
	3 PR3	2	///	///					5
Subl:DLXB20	3 PROJ3	3		2	///	///	///	6	
	4 PROJ4	4		3	///	///	/0/		
	5 PROJ5	5			///	4	///		7
New projects added by supervisor (underlined)	1 NEW1	6					5		
	2 NEW2	7	3			9		3	

Note: Shaded areas represent matrices constructed by program from input files. Supervisor may still change entries here. Supervisor should add enough comparisons to connect all rows. Program will estimate missing values. See instructions for BASIC Model 1 input for more information on file name conventions and both list and matrix style input forms.

System flow diagrams and HIERARCHY Model examples are found in Sections A-3.d.(4) and A-3.e.(4), respectively. One possible configuration using all the models is illustrated in Section A-3.f.

Temporary diagonal convention: In order to override subordinates' preferences appearing below the diagonal of the subordinate's individual preference matrix, input the new preference as j over i by degree k <u>and</u> zero out the inverse of the original preference by inputting a new preference of i over j by degree 0. For example, to change new project number 5 to prefer 5 over 4 by degree 4 enter a 4 in row 5 column 4 and <u>also</u> enter a zero in row 4 column 5. For new (underlined) comparisons linking subordinates' matrices, only one entry is necessary.

(e) CONSTRAINTS Model 5

First, choose one or more constraints such as costs, manpower, and available facilities upon which to base the funding decision. Next, a unit, such as dollars, man hours, or hours available is input. Third, the total resources available for each restraint must be indicated. Fourth, resource requirements for each project are determined and entered using a list similar to the one below.

INPUT FOR CONSTRAINTS MODEL 5

	CONSTRAINTS	UNITS	TOTAL RESOURCES
1.	Costs	Thousands of Dollars	5,000
2.	Manpower	Man Months	100

PROJECT NAME	RESOURCE REQUIREMENTS FOR CONSTRAINTS RESOURCE #1	RESOURCE #2
PR1	2,000	40
PR2	750	30
PR3	100	16
PR4	2,300	55
PR5	500	19

System flow charts all indicate that the CONSTRAINTS Model may be entered following any other model(s). See Sections A-3.d.(5) and A-3.e.(5) for a system flow diagram and example of model execution. The composite example in section A-3.f. also uses the CONSTRAINTS Model.

(2) STEP 2: LOGON to Eglin VAX 2 Computer and Enter LINDO System

The Eglin VAX 2 can be accessed from a laboratory terminal or from a terminal using a dial-up modem.

(a) Dial-up Using model (optional)

(For LOGON from laboratory omit this section.)

Your dial-up terminal should be set to emulate a VT-100. Configuration required includes 8 bit, no parity, 1 stop bit, and no local echo.

Phone lines for 300 Baud or 1200 Baud are available. If one number is busy, dial the other one. Phone numbers are subject to change.

DIAL-UP PHONE NUMBERS

300 Baud Lines

(904) 882-8691
-8692

1200 Baud Lines

(904) 882-3811
-3798
-8329

(b) LOGON from laboratory terminal

Logon to Eglin VAX2 computer and enter LINDO system. (Caps represent system output; underlined small letters are user input; remarks are in parentheses.)

EXAMPLE OF LOGON AND ENTRY TO LINDO SYSTEM FROM LABORATORY TERMINAL:

SYSTEM: UV2 (return)

USERNAME: Colburn (return)

PASSWORD: 4AC23A8 (return)

$: Lindo (return)
: User (return) (Specify model and files)

(3) STEP 3: Executive Desired Model and Interpret Results

Respond to system prompts. Use prepared input. Refine your weights by repeating as needed. See system flow diagrams and examples in Sections A-3.d., A-3.e., and A-3.f.

Interpretation of results can be quick and simple or intensive and recursive, according to the user's need and his satisfaction with preliminary results.

Briefly, the output from BASIC Model 1 consists of a ranked and weighted list of the projects (or other items) compared. The objective function (OBJ) represents the sum of the errors due to inconsistent input by the user. The index is the objective function divided by the number (n) of projects compared. The optionally viewed Delta matrix displays the difference between the user's input, a_{ij}, and w_i/w_j, the input expected for row i and column j for perfect consistency. So, a large number in row i column j of the Delta matrix, say d_{ij}, gives a possible source of inconsistency. If there is a high inconsistency, and d_{ij} is large the user should reevaluate his comparisons, particularly those involving projects i and j. For more detailed instruction, the user may refer to the body of the final report and/or contact the principal investigator.

(4) STEP 4: LOGOUT, Save or Delete Output File

ENTER "QUIT" TO LEAVE LINDO
: quit (return)

SAVE OR DELETE OUTPUT FILE(S/D) s (return)

ENTER "LOGOUT" TO LEAVE VAX2
: logout (return)

c. INPUT FORMS

Example input forms for list, matrix, and constraints model may be duplicated for your use in planning program input.

Name _____ Input file name (if any): _____

Organization _____ Name of output file to contain results: _____

Purpose: _____ Name of attribute (if any): _____

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS

Name: _____ Input file name (if any): _____

Organization: _____ Name of output file to contain results: _____

Purpose: _____ Name of attribute (if any): _____

Project or attribute for File	Project (or Attribute) Name (up to 32 spaces long)	Comparisons 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1																									
2																									
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									
16																									
17																									
18																									
19																									
20																									
21																									
22																									
23																									
24																									

Name _____ Input file name (if any): _____

Organization _____ Name of output file to contain results: _____

Purpose _____

PROJECT (OR ATTRIBUTE) NAME (UP TO 32 SPACES LONG)	RESOURCE REQUIREMENTS FOR CONSTRAINT #									
	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										

Name: _____ Input file name (if any): _____

Organization: _____ Name of output file to contain results: _____

Purpose: _____

CONSTRAINTS	UNITS	TOTAL RESOURCES
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

d. SYSTEM FLOW DIAGRAMS

The following diagrams outline the user input needed for each model type and indicate possible responses to the output from each model. The different models may be treated as modules forming a complex system, or run as stand-alone additions, or updates to the database.

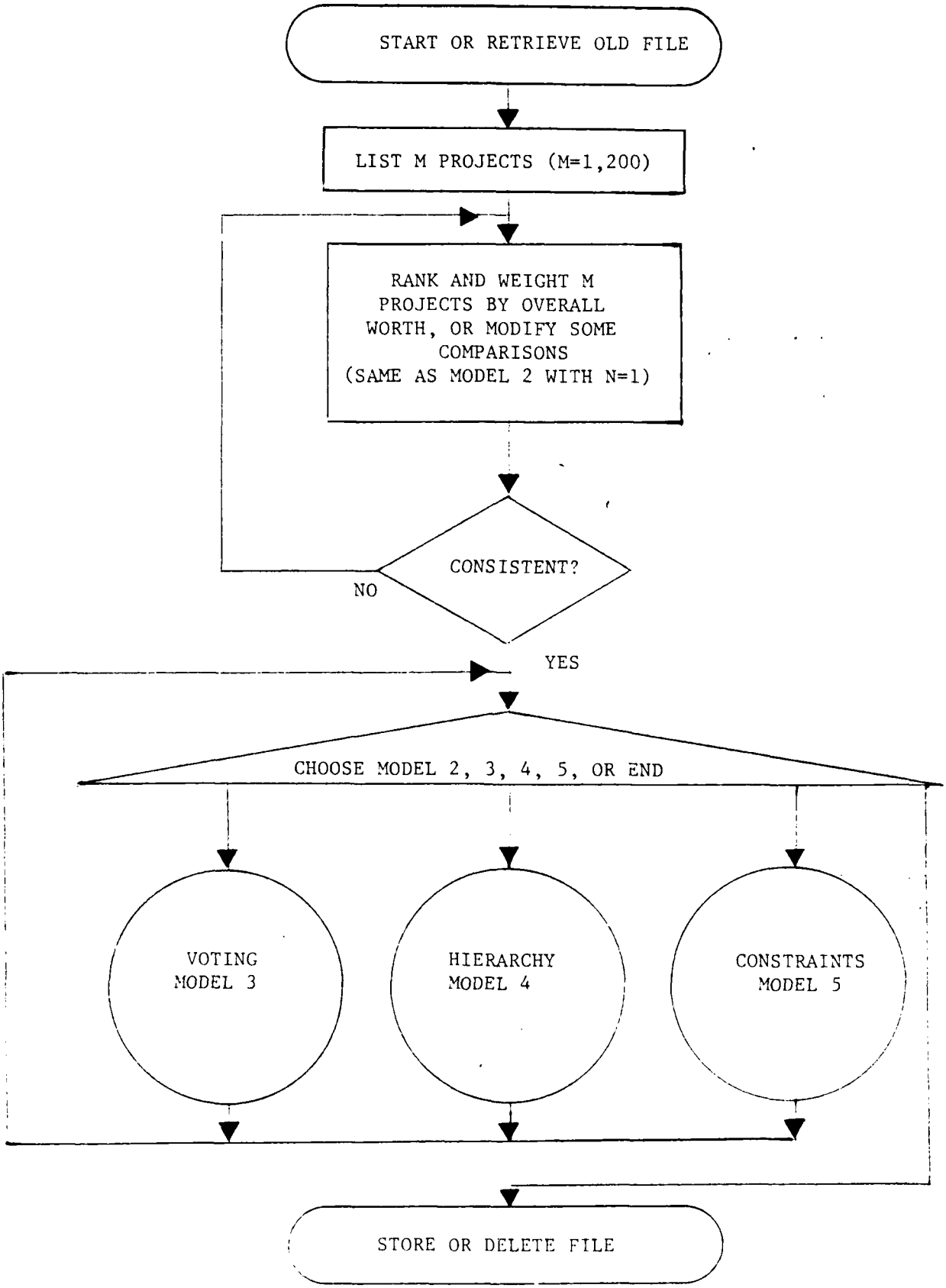

Figure A-2. (1) Basic Model 1 (with refinements and constraints optional).

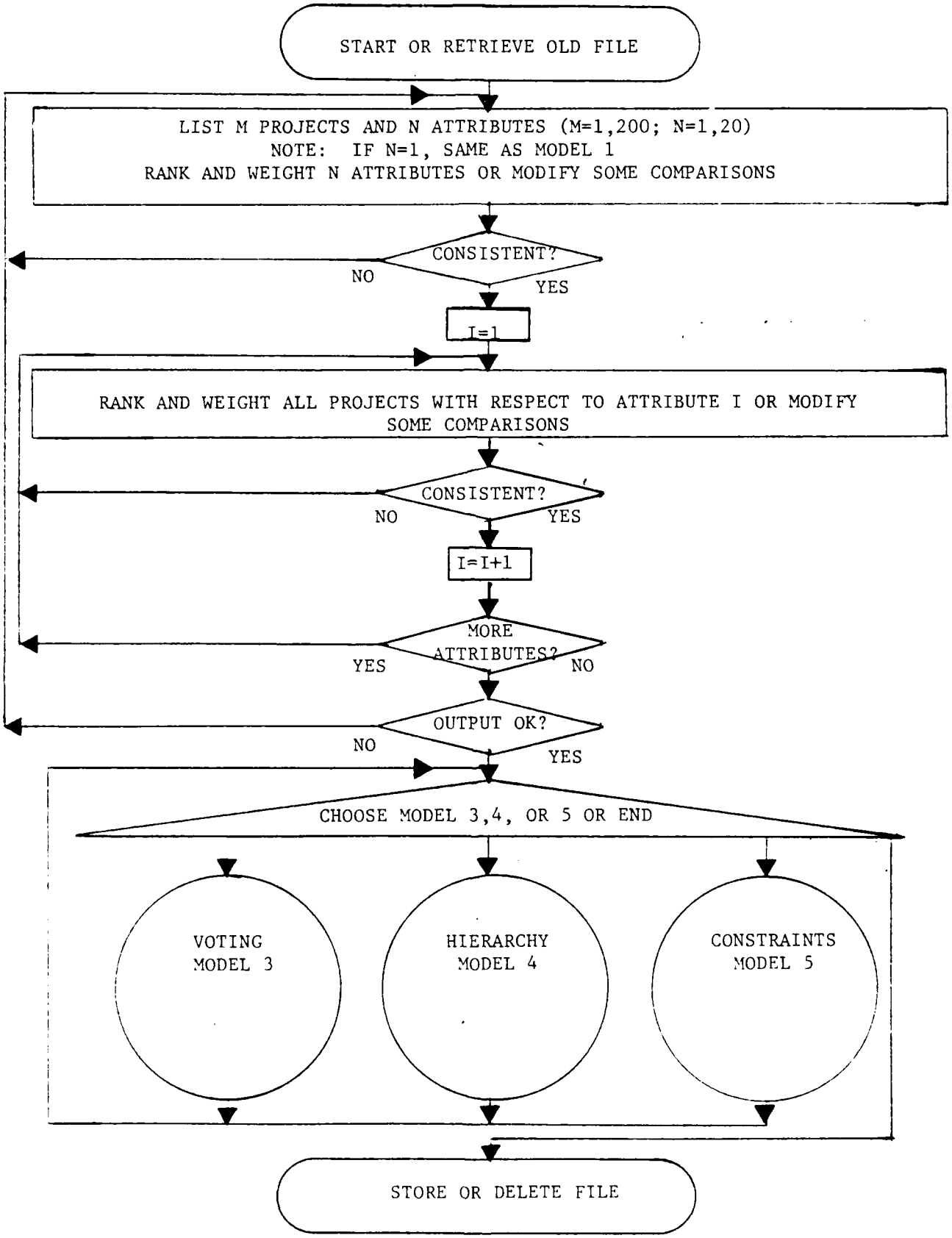

Figure A-3. (2) Additive (Attributes) Model 2.

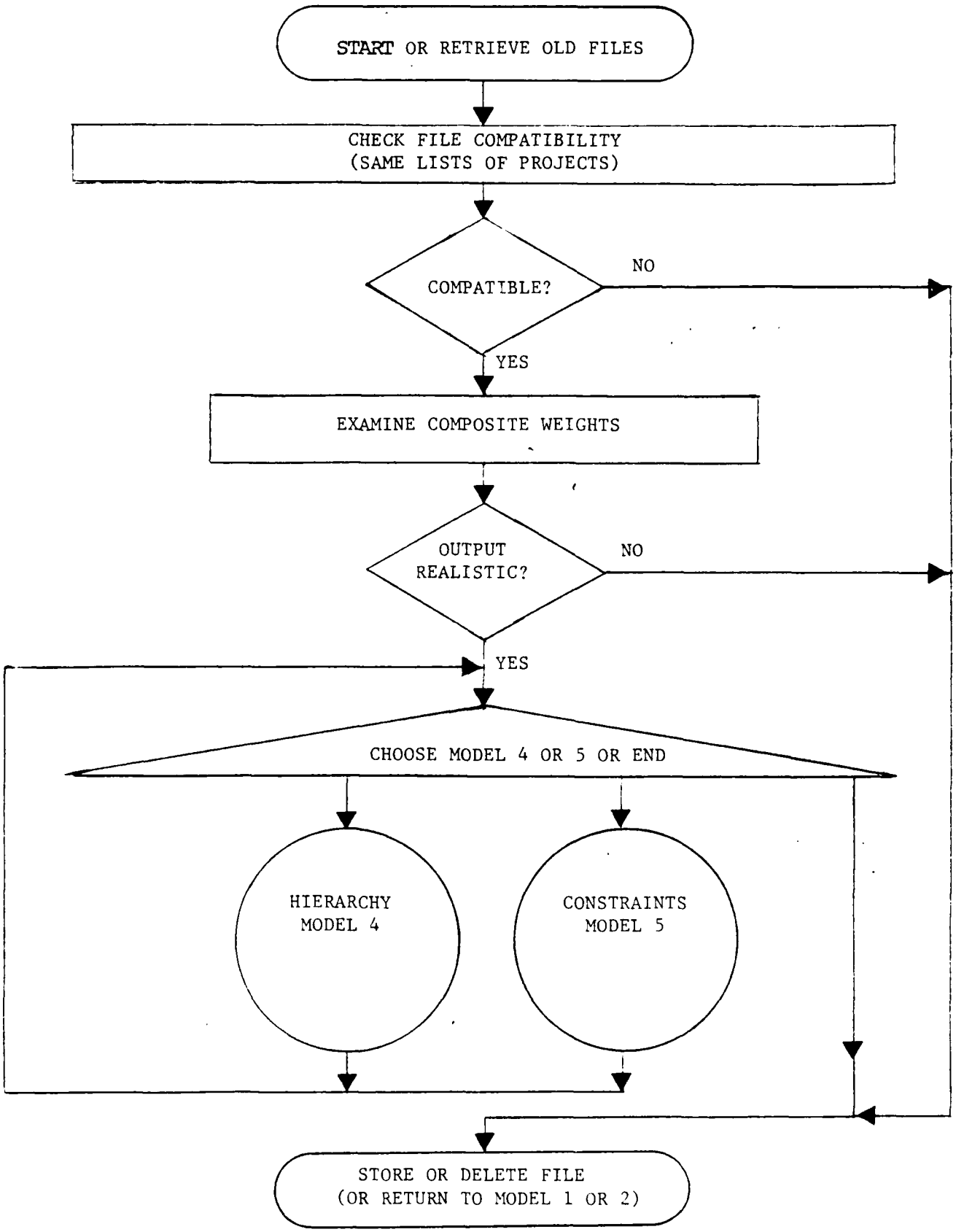

Figure A-4. (3) Voting Model 3.

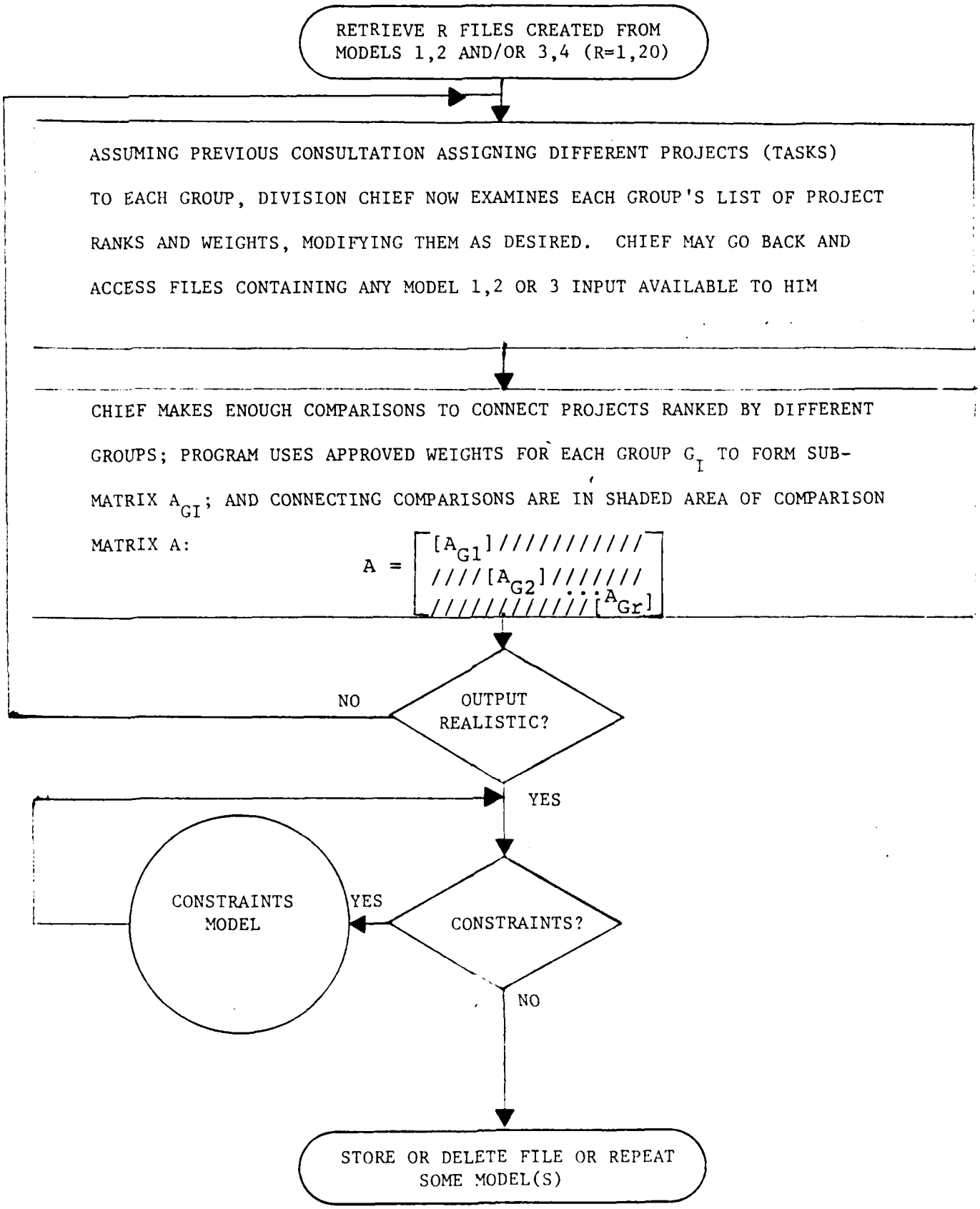

Figure A-5. (4) Hierarchy Model 4.

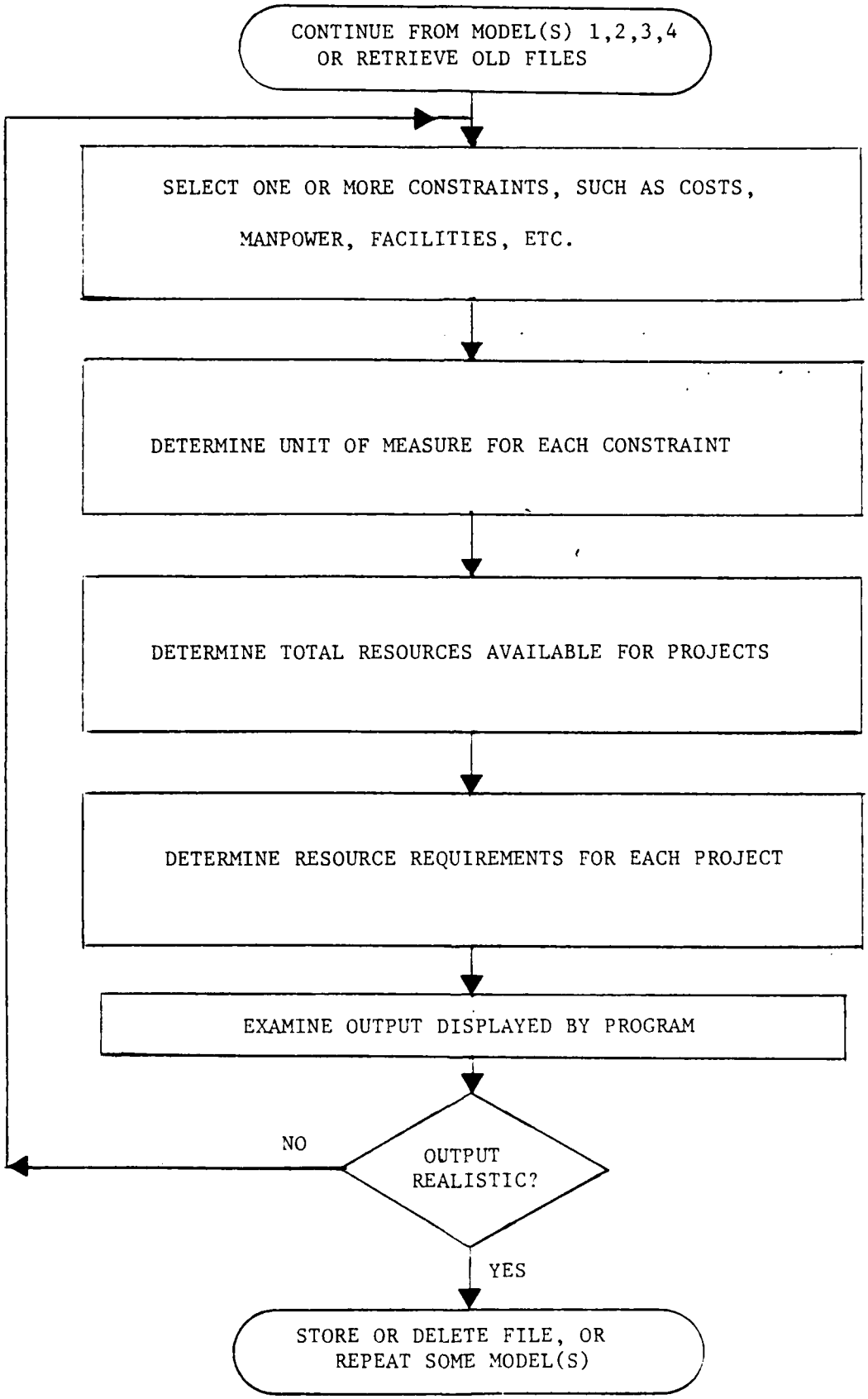

Figure A-6. (5) Constraints Model 5.

e. EXAMPLES OF EACH MODEL

(1) BASIC MODEL 1

(With refinements and constraints optional)

INPUT FILE

Name: Colburn

Input file name (if any): none

Organization: dlxb

Name of output file to contain results: dlxbla.dat

Purpose: Example of Model 1, Basic Model

Name of attribute (if any): overall worth

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PR1	2	1	5	
2	PR2	3	1	9	
3	PR3	4	1	2	
4	PR4	5	1	3	
5	PR5	3	2	3	
		2	4	3	
		2	5	2	
		3	4	8	
		3	5	4	
		5	4	2	

Name: Colburn

Input file name (if any): None

Organization: dlxb

Name of output file to contain results: dlxbla.dat

Purpose: example of Model 1, Basic Model

Name of attribute (if any): overall worth

Project or attribute for File	Project (or Attribute) Name (up to 32 spaces long)	Comparisons 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	PR1																								
2	PR2	5			3	2																			
3	PR3	9	3		8	4																			
4	PR4	2																							
5	PR5	3			2																				
6																									
7																									
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									
16																									
17																									
18																									
19																									
20																									
21																									
22																									
23																									
24																									

EXECUTED RUN

```
%PHOTO-I-INIT, Recording initiated at 21 21 38 32
$ LINDO
 LINDO (UC  6 DEC 82)
  USER


          LINDO USER INTERFACE
          FOR PROJECT RANKING
               MENU 0 0


      0 --ENTER (CHANGE) HEADER INFORMATION
      1 --EXECUTE BASIC MODEL
      2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      3 --EXECUTE VOTING MODEL
      4 --EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[0]

PLEASE ENTER YOUR NAME
gadgetts
ORGANIZATION (DLX, DL(B, ETC).
ilib
PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE )
ENTER A MAXIMMUM OF FIVE LINES, ENTERING A BLANK LINE
TO QUIT BEFORE FIVE LINES
compare projects

               MENU 0 0


      0 --ENTER (CHANGE) HEADER INFORMATION
      1 --EXECUTE BASIC MODEL
      2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      3 --EXECUTE VOTING MODEL
      4 --EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[1]

          MENU 1 1 -- BASIC MODEL


      0 --SPECIFY NUMBER OF PROJECTS
      1 --READ OLD PROJECT MATRIX FROM FILE
      2 --ENTER (CHANGE) PROJECT NAMES
      ** --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
      4 --DISPLAY COMPARISONS
      ** --CALCULATE WEIGHTS
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [2]
```

```
ENTER PROJECT NAMES  QUIT WITH A BLANK LINE
#1
pr1
#           2
pr2
#           3
pr3
#           4
pr4
#           5
pr5
#           6

          MENU 1 1 -- BASIC MODEL

     0 --SPECIFY NUMBER OF PROJECTS
     1 --READ OLD PROJECT MATRIX FROM FILE
     2 --ENTER (CHANGE) PROJECT NAMES
     3 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     4 --DISPLAY COMPARISONS
     ##--CALCULATE WEIGHTS
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE (3)

ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

2 1 5
3 1 9
4 1 2
5 1 3
3 2 3
2 4 3
2 5 2
3 4 8
3 5 4
5 4 2
0 0 0
          MENU 1 1 -- BASIC MODEL

     0 --SPECIFY NUMBER OF PROJECTS
     1 --READ OLD PROJECT MATRIX FROM FILE
     2 --ENTER (CHANGE) PROJECT NAMES
     3 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     4 --DISPLAY COMPARISONS
     5 --CALCULATE WEIGHTS
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE (5)

YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      15

[illegible]
```

```
RANK     PROJECT # AND NAME                    WEIGHT
  1          3 pr3                           0 54545456
  2          2 pr2                           0 20454545
  3          5 pr5                           0 13636364
  4          4 pr4                           0 06818182
  5          1 pr1                           0 04545455

OBJ=  0 3182, INDEX=  0 0636--CONSISTENT
VIEW DELTA MATRIX (Y/[N])?

          MENU 1 1 -- BASIC MODEL

    0 --SPECIFY NUMBER OF PROJECTS
    1 --READ OLD PROJECT MATRIX FROM FILE
    2 --ENTER (CHANGE) PROJECT NAMES
    3 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
    4 --DISPLAY COMPARISONS
    5 --CALCULATE WEIGHTS
    6 --HELP ON PROJECT RANKING INTERFACE
    7 --RETURN TO MAIN MENU

 PLEASE ENTER NUMBER OF YOUR CHOICE [7]

             MENU 0 0

    0 --ENTER (CHANGE) HEADER INFORMATION
    ##--EXECUTE BASIC MODEL
    ##--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
    ##--EXECUTE VOTING MODEL
    ##--EXECUTE HIERARCHY MODEL
    5 --EXECUTE CONSTRAINTS MODEL
    6 --HELP ON PROJECT RANKING INTERFACE
    7 --END PROGRAM, DELETE RESULTS
    8 --END PROGRAM, SAVE(PRINT) RESULTS

 PLEASE ENTER NUMBER OF YOUR CHOICE[8]

ENTER NAME OF OUTPUT FILE
dlxbla dat
WOULD YOU CARE FOR A PRINTED COPY (Y/N) ? [N]

  quit
FORTRAN STOP
$ photo/off
```

OUTPUT FILE

```
=001NAME
    padgettm
=002ORGANIZATION
    dlrb
=003PURPOSE
    compare projects



=004MODEL TYPE (1-5)
    1
=005NUMBER OF PROJECTS(1-200)
      5
=006NUMBER OF ATTRIBUTES(1- 20)
      1
=007NUMBER AND NAME OF ATTRIBUTES
      1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES)
      1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES)
    0 00000000
=010NUMBER AND NAME OF PROJECTS
      1 pr1
      2 pr2
      3 pr3
      4 pr4
      5 pr5

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
      1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   1 00000000   0 00000000   3 00000000   2 00000000
      9 00000000   3 00000000   1 00000000   8 00000000   4 00000000
      2 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      3 00000000   0 00000000   0 00000000   2 00000000   1 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 04545455 0 20454545 0 54545456 0 06818182 0 13636364
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 04545455 0 20454545 0 54545456 0 06818182 0 13636364
999999
```

(2) ADDITIVE MODEL 2

Name: Colburn

Input file name (if any): None

Organization: dlxb

Name of output file to contain results: dlxb2a.dat

Purpose: Example of Model 2, Additive (attributes) Model

Name of attribute (if any):

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE 1	WEAK 2	3	4	STRONG 5	6	7	8	ABS. 9	COMMENTS
1	AT1	1	2			3							
2	AT2	3	1					5					
3	AT3	3	2		2								

Name: Colburn

Input file name (if any): none

Organization: dlxb

Name of output file to contain results: dlxb2a.dat

Purpose: Example of Model 2, Additive (attributes) Model

Name of attribute (if any): AT1

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PR1	1	2	3	
2	PR2	1	3	3	
3	PR3	1	4	2	
4	PR4	4	3	2	

Name: Colburn

Input file name (if any): none

Organization: dlxb

Name of output file to contain results: dlxb2a.dat

Purpose: Example of Model 2, Additive (attributes) Model

Name of attribute (if any): AT2

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PR1	2	1	4	
2	PR2	1	3	2	
3	PR3	2	4	3	
4	PR4	2	4		

Name: Colburn

Input file name (if any): none

Organization: dlxb

Name of output file to contain results: dlxb2a.dat

Purpose: Example of Model 2, Additive (attributes) Model

Name of attribute (if any): AT3

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PR1	1	2	3	
2	PR2	1	3	6	
3	PR3	1	4	2	
4	PR4	2	3	2	

EXECUTED RUN

```
%PHOTO-I-INIT, Recording initiated at 21 26 32 57
$ lindo
 LINDO (UC  6 DEC 82)
  user


          LINDO USER INTERFACE
          FOR PROJECT RANKING
               MENU 0 0


     0 --ENTER (CHANGE) HEADER INFORMATION
     1 --EXECUTE BASIC MODEL
     2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     3 --EXECUTE VOTING MODEL
     4 --EXECUTE HIERARCHY MODEL
     5 --EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM, DELETE RESULTS
     8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[0]

PLEASE ENTER YOUR NAME:
colburn
ORGANIZATION (DLX, DLXB, ETC):
dlxb
PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE.)
ENTER A MAXIMMUM OF FIVE LINES, ENTERING A BLANK LINE
TO QUIT BEFORE FIVE LINES.
compare projects using attributes

               MENU 0 0


     0 --ENTER (CHANGE) HEADER INFORMATION
     1 --EXECUTE BASIC MODEL
     2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     3 --EXECUTE VOTING MODEL
     4 --EXECUTE HIERARCHY MODEL
     5 --EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM, DELETE RESULTS
     8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[1]:
2
          MENU 1 2--ADDITIVE (ATTRIBUTES) MODEL


     0 --SPECIFY NUMBER OF ATTRIBUTES
     1 --READ OLD ATTRIBUTES MATRIX FROM FILE
     2 --SPECIFY NUMBER OF PROJECTS
     3 --READ OLD PROJECT MATRIX FROM FILE
     4 --ENTER (CHANGE) ATTRIBUTE NAMES
     5 --ENTER (CHANGE) PROJECT NAMES
     ** --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     ** --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
     ** --CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
     10 --HELP WITH PROJECT RANKING INTERFACE
```

```
      11--RETURN TO MAIN MENU

   PLEASE ENTER NUMBER OF YOUR CHOICE.[  4 ]:

 ENTER ATTRIBUTE NAMES. QUIT WITH A BLANK LINE
 #1.
 att1
 #          2:
 att2
 #          3:
 att3
 #          4:

          MENU 1 2--ADDITIVE (ATTRIBUTES) MODEL


      0 --SPECIFY NUMBER OF ATTRIBUTES
      1 --READ OLD ATTRIBUTES MATRIX FROM FILE
      2 --SPECIFY NUMBER OF PROJECTS
      3 --READ OLD PROJECT MATRIX FROM FILE
      4 --ENTER (CHANGE) ATTRIBUTE NAMES
      5 --ENTER (CHANGE) PROJECT NAMES
      6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
      **--ENTER (CHANGE) (ADD) PROJECT COMPARISONS
      8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
      **--CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
      10--HELP WITH PROJECT RANKING INTERFACE
      11--RETURN TO MAIN MENU

   PLEASE ENTER NUMBER OF YOUR CHOICE.[  6 ]:

ATTRIBUTE COMPARISONS
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

1 2 3
3 1 5
3 2 2
0 0 0
          MENU 1 2--ADDITIVE (ATTRIBUTES) MODEL


      0 --SPECIFY NUMBER OF ATTRIBUTES
      1 --READ OLD ATTRIBUTES MATRIX FROM FILE
      2 --SPECIFY NUMBER OF PROJECTS
      3 --READ OLD PROJECT MATRIX FROM FILE
      4 --ENTER (CHANGE) ATTRIBUTE NAMES
      5 --ENTER (CHANGE) PROJECT NAMES
      6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
      **--ENTER (CHANGE) (ADD) PROJECT COMPARISONS
      8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
      **--CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
      10--HELP WITH PROJECT RANKING INTERFACE
      11--RETURN TO MAIN MENU

   PLEASE ENTER NUMBER OF YOUR CHOICE [  5 ]

ENTER PROJECT NAMES  QUIT WITH A BLANK LINE
#1
proj1
```

```
pr2
#           3
pr3
#           4
pr4
#           5

          MENU 1.2--ADDITIVE (ATTRIBUTES) MODEL


      0 --SPECIFY NUMBER OF ATTRIBUTES
      1 --READ OLD ATTRIBUTES MATRIX FROM FILE
      2 --SPECIFY NUMBER OF PROJECTS
      3 --READ OLD PROJECT MATRIX FROM FILE
      4 --ENTER (CHANGE) ATTRIBUTE NAMES
      5 --ENTER (CHANGE) PROJECT NAMES
      6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
      7 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
      8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
      **--CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
      10--HELP WITH PROJECT RANKING INTERFACE
      11--RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE.[  7 ]:

WITH RESPECT TO ATTRIBUTE   1 att1
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT.

1 2 3
1 3 3
1 4 2
4 3 2


0 0 0
WITH RESPECT TO ATTRIBUTE   2 att2
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

2 1 4
1 3 2
2 4 3
0 0 0
WITH RESPECT TO ATTRIBUTE   3 att3
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT.

1 2 3
1 3 6
1 4 2
2 3 2
0 0 0
          MENU 1.2--ADDITIVE (ATTRIBUTES) MODEL


      0 --SPECIFY NUMBER OF ATTRIBUTES
      1 --READ OLD ATTRIBUTES MATRIX FROM FILE
      2 --SPECIFY NUMBER OF PROJECTS
      3 --READ OLD PROJECT MATRIX FROM FILE
      4 --ENTER (CHANGE) ATTRIBUTE NAMES
      5 --ENTER (CHANGE) PROJECT NAMES
```

```
     6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     7 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
     9 --CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
     10--HELP WITH PROJECT RANKING INTERFACE
     11--RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [  9 ]:

YOU ARE NOW ENTERING THE LINDO SYSTEM.
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      4

 DO RANGE(SENSITIVITY) ANALYSIS?
> n
ATTRIBUTE WEIGHTS


  RANK   ATTRIBUTE # AND NAME                    WEIGHT
    1        3 att3                             0 78947365
    2        1 att1                             0 15789473
    3        2 att2                             0 05263158

OBJ=  0 6842, INDEX=  0 1711--SOME CONSISTENCY
VIEW DELTA MATRIX (Y/[N])?
n
DISPLAY PROJECT WEIGHTS FOR EACH ATTRIBUTE?(Y/[N])
Y
YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      5

 DO RANGE(SENSITIVITY) ANALYSIS?
> n
WITH RESPECT TO ATTRIBUTE    1  att1
  RANK     PROJECT # AND NAME                     WEIGHT
    1          1 pr1                            0 46153843
    2          4 pr4                            0 23076922
    3          3 pr3                            0 15384616
    3          2 pr2                            0 15384616

OBJ=  0 0769, INDEX=  0 0192--CONSISTENT
VIEW DELTA MATRIX(Y/[N])?

YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      4

 DO RANGE(SENSITIVITY) ANALYSIS?
>
WITH RESPECT TO ATTRIBUTE    2  att2
  RANK     PROJECT # AND NAME                     WEIGHT
    1          2 pr2                            0 58536583
    2          4 pr4                            0 19512196
    3          1 pr1                            0 14634146
    4          3 pr3                            0 07317073

OBJ=  0 0000, INDEX=  0 0000--CONSISTENT
VIEW DELTA MATRIX(Y/[N])?

YOU ARE NOW ENTERING THE LINDO SYSTEM
```

```
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      4

 DO RANGE(SENSITIVITY) ANALYSIS?
> n
WITH RESPECT TO ATTRIBUTE    3  att3
  RANK     PROJECT # AND NAME                    WEIGHT
    1          1 pr1                          0.50000000
    2          4 pr4                          0.25000000
    3          2 pr2                          0.16666667
    4          3 pr3                          0.08333334

OBJ=  0.0000, INDEX=  0.0000--CONSISTENT
VIEW DELTA MATRIX(Y/[N])?

           FINAL WEIGHTS
  RANK     PROJECT # AND NAME                    WEIGHT
    1          1 pr1                          0.47531348
    2          4 pr4                          0.24407524
    3          2 pr2                          0.18667918
    4          3 pr3                          0.09393207

HIT <RETURN> TO CONTINUE

           MENU 1.2--ADDITIVE (ATTRIBUTES) MODEL


     0 --SPECIFY NUMBER OF ATTRIBUTES
     1 --READ OLD ATTRIBUTES MATRIX FROM FILE
     2 --SPECIFY NUMBER OF PROJECTS
     3 --READ OLD PROJECT MATRIX FROM FILE
     4 --ENTER (CHANGE) ATTRIBUTE NAMES
     5 --ENTER (CHANGE) PROJECT NAMES
     6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     7 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
     9 --CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
    10--HELP WITH PROJECT RANKING INTERFACE
    11--RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE ( 11 )

              MENU 0.0


     0 --ENTER (CHANGE) HEADER INFORMATION
     **--EXECUTE BASIC MODEL
     **--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     **--EXECUTE VOTING MODEL
     **--EXECUTE HIERARCHY MODEL
     5 --EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM, DELETE RESULTS
     8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE(8)

ENTER NAME OF OUTPUT FILE
[illegible]
WOULD YOU LIKE FOR A PRINTED COPY (Y/N) ? [N]
```

```
quit
FORTRAN STOP
$ photo/off
```

OUTPUT FILE

```
=001NAME
    colburn
=002ORGANIZATION
    dlxb
=003PURPOSE
    compare projects using attributes



=004MODEL TYPE (1-5)
    2
=005NUMBER OF PROJECTS(1-200)
      4
=006NUMBER OF ATTRIBUTES(1- 20)
      3
=007NUMBER AND NAME OF ATTRIBUTES
      1 att1
      2 att2
      3 att3

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1 00000000   3 00000000   0 00000000
      0 00000000   1 00000000   0 00000000
      5 00000000   2 00000000   1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES)
    0 15789473 0 05263158 0 78947365
=010NUMBER AND NAME OF PROJECTS
      1 pr1
      2 pr2
      3 pr3
      4 pr4

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
      1 00000000   3 00000000   3 00000000   2 00000000
      0 00000000   1 00000000   1 00000000   0 00000000
      0 00000000   0 00000000   1 00000000   0 00000000
      0 00000000   0 00000000   2 00000000   1 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 46153843 0 15384616 0 15384616 0 23076922
= 13PROJECT MATRIX FOR ATTRIBUTE #  2
      1 00000000   0 00000000   2 00000000   0 00000000
      4 00000000   1 00000000   0 00000000   3 00000000
      0 00000000   0 00000000   1 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES)
    0 14634146 0 58536583 0 07317073 0 19512196
= 15PROJECT MATRIX FOR ATTRIBUTE #  3
      1 00000000   3 00000000   6 00000000   2 00000000
      0 00000000   1 00000000   2 00000000   0 00000000
      0 00000000   0 00000000   1 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES)
    0 5[illegible] 0 16[illegible] [illegible] 0 25000000
[illegible] PROJECT WEIGHTS [illegible] ORDER AS NAMES)
```

```
 0 47531348 0 18657918 0 09393207 0 24407524
999999
```

(3) VOTING MODEL 3

INPUT FILE

Name: Colburn

Organization: dlxb

Purpose: Example of Model 3, Voting Model

Input file name (if any): dlxb1o.dat dlxb2o.dat

Name of output file to contain results: dlxb3a.dat

Name of attribute (if any): overall worth

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PR1				
2	PR2				
3	PR3				

```
=001NAME
    colburn
=002ORGANIZATION
    dlsb
=003PURPOSE
    input for model 3



=004MODEL TYPE (1-5)
    1
=005NUMBER OF PROJECTS(1-200)
      3
=006NUMBER OF ATTRIBUTES(1- 20)
      1
=007NUMBER AND NAME OF ATTRIBUTES
      1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES)
      1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES)
    0 00000000
=010NUMBER AND NAME OF PROJECTS
      1 pr1
      2 pr2
      3 pr3

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
      1 00000000   3 00000000   0 00000000
      0 00000000   1 00000000   6 00000000
      0 00000000   0 00000000   1 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 72000003 0 24000001 0 04000000
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 72000003 0 24000001 0 04000000
999999
```

```
=001NAME
    colburn
=002ORGANIZATION
    dlxb
=003PURPOSE
    input for model 3



=004MODEL TYPE (1-5)
    1
=005NUMBER OF PROJECTS(1-200)
     3
=006NUMBER OF ATTRIBUTES(1- 20)
     1
=007NUMBER AND NAME OF ATTRIBUTES
     1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES)
     1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES)
    0 00000000
=010NUMBER AND NAME OF PROJECTS
     1 pr1
     2 pr2
     3 pr3

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
     1 00000000   0 00000000   0 00000000
     4 00000000   1 00000000   0 00000000
     2 00000000   0 00000000   1 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 14285715 0 57142860 0 28571430
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 14285715 0 57142860 0 28571430
999999
```

EXECUTED RUN

```
%PHOTO-I-INIT, Recording initiated at 09 24 58 81
$ lindo
 LINDO (UC  6 DEC 82)
  user


          LINDO USER INTERFACE
          FOR PROJECT RANKING
               MENU 0 0


      0 --ENTER (CHANGE) HEADER INFORMATION
      1 --EXECUTE BASIC MODEL
      2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      3 --EXECUTE VOTING MODEL
      4 --EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[0]

PLEASE ENTER YOUR NAME
colburn
ORGANIZATION (DLX, DLXB, ETC)
dlxb
PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE )
ENTER A MAXIMMUM OF FIVE LINES, ENTERING A BLANK LINE
TO QUIT BEFORE FIVE LINES
to vote

               MENU 0 0


      0 --ENTER (CHANGE) HEADER INFORMATION
      1 --EXECUTE BASIC MODEL
      2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      3 --EXECUTE VOTING MODEL
      4 --EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[1]
3
            MENU 1 3 -- VOTER MODEL


      0 ENTER (ADD) INPUT FILE NAMES
      1 VERIFY INPUT FILES
      **CALCULATE WEIGHTS
      3 HELP WITH PROJECT RANKING INTERFACE
      4 RETURN TO MAIN MENU

  PLEASE ENTER THE NUMBER OF YOUR CHOICE[ 0 ]

ENTER FILE NAMES OF VOTERS, BLANK LINE WHEN DONE
dlxb1.dat
dlxb2.dat
```

```
            MENU 1 3 -- VOTER MODEL


        0 ENTER (ADD) INPUT FILE NAMES
        1 VERIFY INPUT FILES
        2 CALCULATE WEIGHTS
        3 HELP WITH PROJECT RANKING INTERFACE
        4 RETURN TO MAIN MENU

    PLEASE ENTER THE NUMBER OF YOUR CHOICE[ 2 ].

    RANK     PROJECT # AND NAME                    WEIGHT
      1          1 pr1                          0.43142858
      2          2 pr2                          0.40571430
      3          3 pr3                          0.16285715

HIT <RETURN> TO CONTINUE

            MENU 1 3 -- VOTER MODEL


        0 ENTER (ADD) INPUT FILE NAMES
        1 VERIFY INPUT FILES
        2 CALCULATE WEIGHTS
        3 HELP WITH PROJECT RANKING INTERFACE
        4 RETURN TO MAIN MENU

    PLEASE ENTER THE NUMBER OF YOUR CHOICE[ 4 ].

                MENU 0 0


        0 --ENTER (CHANGE) HEADER INFORMATION
        **--EXECUTE BASIC MODEL
        **--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
        **--EXECUTE VOTING MODEL
        **--EXECUTE HIERARCHY MODEL
        5 --EXECUTE CONSTRAINTS MODEL
        6 --HELP ON PROJECT RANKING INTERFACE
        7 --END PROGRAM. DELETE RESULTS
        8 --END PROGRAM. SAVE(PRINT) RESULTS

    PLEASE ENTER NUMBER OF YOUR CHOICE[8]

ENTER NAME OF OUTPUT FILE
jlrb3a dat
WOULD YOU CARE FOR A PRINTED COPY (Y/N) ? [N]
y
  quit
FORTRAN STOP
$ photo/off
```

OUTPUT FILE

```
=001NAME
    colburn
=002ORGANIZATION
    dixb
=003PURPOSE
    to vote



=004MODEL TYPE (1-5).
    3
=005NUMBER OF PROJECTS(1-200):
      3
=006NUMBER OF ATTRIBUTES(1- 20)
      1
=007NUMBER AND NAME OF ATTRIBUTES
      1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES).
      1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0 00000000
=010NUMBER AND NAME OF PROJECTS.
      1 pr1
      2 pr2
      3 pr3

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
      0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 43142858 0 40571430 0 16285715
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 43142858 0 40571430 0 16285715
999999
```

(4) HIERARCHY MODEL 4

INPUT FILE

Name: Colburn

Input file name (if any): dlxb10.dat dlxbo.dat

Organization: dlxb

Name of output file to contain results: dlxb4a.dat

Purpose: Example of Model 4, Hierarchy Model

Name of attribute (if any):

Project or attribute for File	Project (or Attribute) Name (up to 32 spaces long)	Comparisons 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	PR2	///	///	9																					
2	PR3	///	///					5																	
3	PROJ3		2	///	///	///	6																		
4	PROJ4		3	///	///	0																			
5	PROJ5			///	4	///		7																	
6	NEW1					5																			
7	NEW2	3			9		3																		
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									
16																									
17																									
18																									
19																									
20																									
21																									
22																									
23																									
24																									

Name: Colburn

Input file name (if any): dlxb1o.dat dlxb2o.dat

Organization: dlxb

Name of output file to contain results: dlxb4a.dat

Purpose: Example of Model 4, Hierarchy Model

Name of attribute (if any):

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE 1	WEAK 2	3	4	STRONG 5	6	7	8	ABS. 9	COMMENTS
1	2 PR2	1	3									9	
2	3 PR3	2	7					5					
3	3 PROJ3	3	2		2								
4	4 PROJ4	3	6						6				
5	5 PROJ5	4	2			3							
6	NEW1	5	4				4						
7	NEW2	4	5										
		5	7							7			
		6	5					5					
		7	1			3							
		7	4									9	
		7	6			3							

```
=001NAME
    colburn
=002ORGANIZATION
    dixb
=003PURPOSE
    input to the hierarchy model


=004MODEL TYPE (1-3):
    1
=005NUMBER OF PROJECTS(1-200):
      3
=006NUMBER OF ATTRIBUTES(1- 20):
      1
=007NUMBER AND NAME OF ATTRIBUTES
      1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES).
    0 00000000
=010NUMBER AND NAME OF PROJECTS:
      1 pr1
      2 pr2
      3 pr3

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
      1 00000000   3 00000000   0 00000000
      0 00000000   1 00000000   4 00000000
      0 00000000   0 00000000   1 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 70588237 0 23529412 0 05882353
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 70588237 0 23529412 0 05882353
999999
```

```
=001NAME
    colburn
=002ORGANIZATION
    dlsb
=003PURPOSE
    input to the hierarchy model



=004MODEL TYPE (1-5):
    1
=005NUMBER OF PROJECTS(1-200):
     5
=006NUMBER OF ATTRIBUTES(1- 20)
     1
=007NUMBER AND NAME OF ATTRIBUTES
     1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES)
     1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES)
    0 00000000
=010NUMBER AND NAME OF PROJECTS
     1 proj1
     2 proj2
     3 proj3
     4 proj4
     5 proj5

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
     1 00000000   0 00000000   0 00000000   0.00000000   0 00000000
     3 00000000   1 00000000   4 00000000   0.00000000   0 00000000
     0 00000000   0 00000000   1.00000000   0.00000000   0 00000000
     5 00000000   0 00000000   0 00000000   1.00000000   0 00000000
     0 00000000   0 00000000   0 00000000   4.00000000   1 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 03361345 0 10084033 0 02521008 0 16806722 0 67226887
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 03361345 0 10084033 0 02521008 0 16806722 0 67226887
999999
```

EXECUTED RUN

```
%PHOTO-I-INIT, Recording initiated at 22:10:19.28
$ lindo
 LINDO (UC  6 DEC 82)
  user


          LINDO USER INTERFACE
          FOR PROJECT RANKING
               MENU 0.0


       0 --ENTER (CHANGE) HEADER INFORMATION
       1 --EXECUTE BASIC MODEL
       2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
       3 --EXECUTE VOTING MODEL
       4 --EXECUTE HIERARCHY MODEL
       5 --EXECUTE CONSTRAINTS MODEL
       6 --HELP ON PROJECT RANKING INTERFACE
       7 --END PROGRAM, DELETE RESULTS
       8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[0]:

PLEASE ENTER YOUR NAME:
colburn
ORGANIZATION (DLX, DLXB, ETC):
dlxb
PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE.)
ENTER A MAXIMMUM OF FIVE LINES, ENTERING A BLANK LINE
TO QUIT BEFORE FIVE LINES.
combine results from two files using hierarchy model

               MENU 0.0


       0 --ENTER (CHANGE) HEADER INFORMATION
       1 --EXECUTE BASIC MODEL
       2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
       3 --EXECUTE VOTING MODEL
       4 --EXECUTE HIERARCHY MODEL
       5 --EXECUTE CONSTRAINTS MODEL
       6 --HELP ON PROJECT RANKING INTERFACE
       7 --END PROGRAM, DELETE RESULTS
       8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[1]:
4
       HIERARCHY MODEL


ENTER THE NAME OF INPUT FILE # 1 ,OR BLANK TO QUIT
dlxblo dat
FOR FILE # 1 CHOOSE ACTION

       0--VIEW HEADER INFORMATION
       1--LIST PROJECTS
       2--LOAD ALL PROJECTS
       3--LOAD CERTAIN PROJECTS ONLY
       4--LOAD NO PROJECTS
       5--HELP ON PROJECT RANKING INTERFACE
```

```
PLEASE ENTER NUMBER OF CHOICE(2)
3
ENTER PROJECT NUMBERS TO BE INCLUDED, QUIT WITH 0
2
3
0
ENTER THE NAME OF INPUT FILE # 2 ,OR BLANK TO QUIT
d1:b2o dat
FOR FILE # 2 CHOOSE ACTION

      0--VIEW HEADER INFORMATION
      1--LIST PROJECTS
      2--LOAD ALL PROJECTS
      3--LOAD CERTAIN PROJECTS ONLY
      4--LOAD NO PROJECTS
      5--HELP ON PROJECT RANKING INTERFACE

PLEASE ENTER NUMBER OF CHOICE(2):
3
ENTER PROJECT NUMBERS TO BE INCLUDED, QUIT WITH 0
3
4
5
0
ENTER THE NAME OF INPUT FILE # 3 ,OR BLANK TO QUIT
```

```
                MENU 1.4.1 HIERARCHY CONTINUED

     0 --VERIFY FILE INPUT
     1 --RECALL ADDITIONAL PROJECTS
     **--ADD NEW PROJECTS OF YOUR OWN
     3 --CHANGE PROJECT NAMES
     4 --LOAD COMPARISONS FROM SUBORDINATE FILES
     5 --SPECIFY NUMBER OF ATTRIBUTES
     6 --READ OLD ATTRIBUTE MATRIX FROM A FILE
     7 --ENTER (CHANGE) ATTRIBUTE NAMES
     **--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     **--ADD (CHANGE) PROJECT COMPARISONS
     10--DISPLAY PROJECT OR ATTRIBUTE MATRIX
     **--CALCULATE WEIGHTS
     12--HELP ON PROJECT RANKING INTERFACE
     13--RETURN TO MAIN MENU

PLEASE ENTER NUMBER OF CHOICE( 4)
```

```
                MENU 1.4.1 HIERARCHY CONTINUED

     0 --VERIFY FILE INPUT
     **--RECALL ADDITIONAL PROJECTS
     2 --ADD NEW PROJECTS OF YOUR OWN
     3 --CHANGE PROJECT NAMES
     **--LOAD COMPARISONS FROM SUBORDINATE FILES
     5 --SPECIFY NUMBER OF ATTRIBUTES
     6 --READ OLD ATTRIBUTE MATRIX FROM A FILE
     7 --ENTER (CHANGE) ATTRIBUTE NAMES
```

```
      **--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
      9 --ADD (CHANGE) PROJECT COMPARISONS
      10--DISPLAY PROJECT OR ATTRIBUTE MATRIX
      11--CALCULATE WEIGHTS
      12--HELP ON PROJECT RANKING INTERFACE
      13--RETURN TO MAIN MENU

 PLEASE ENTER NUMBER OF CHOICE[ 9]
2
ENTER NAMES OF NEW PROJECTS. QUIT WITH A BLANK
new1
new2


                MENU 1 4 1 HIERARCHY CONTINUED

      0 --VERIFY FILE INPUT
      **--RECALL ADDITIONAL PROJECTS
      2 --ADD NEW PROJECTS OF YOUR OWN
      3 --CHANGE PROJECT NAMES
      **--LOAD COMPARISONS FROM SUBORDINATE FILES
      5 --SPECIFY NUMBER OF ATTRIBUTES
      6 --READ OLD ATTRIBUTE MATRIX FROM A FILE
      7 --ENTER (CHANGE) ATTRIBUTE NAMES
      **--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
      9 --ADD (CHANGE) PROJECT COMPARISONS
      10--DISPLAY PROJECT OR ATTRIBUTE MATRIX
      11--CALCULATE WEIGHTS
      12--HELP ON PROJECT RANKING INTERFACE
      13--RETURN TO MAIN MENU

 PLEASE ENTER NUMBER OF CHOICE[ 9]
0

SOURCE                          PROJECT                 NEW PROJECT NUMBER
  1 d1xb1o dat                  2 pr2                          1
  1 d1xb1o dat                  3 pr3                          2
  2 d1xb2o dat                  3 proj3                        3
  2 d1xb2o dat                  4 proj4                        4
  2 d1xb2o dat                  5 proj5                        5
 25 ***USER-ADDED PROJECT***    0 new1                         6
 25 ***USER-ADDED PROJECT***    0 new2                         7

HIT  RETURN> TO CONTINUE


                MENU 1 4 1 HIERARCHY CONTINUED

      0 --VERIFY FILE INPUT
      **--RECALL ADDITIONAL PROJECTS
      2 --ADD NEW PROJECTS OF YOUR OWN
      3 --CHANGE PROJECT NAMES
      **--LOAD COMPARISONS FROM SUBORDINATE FILES
      5 --SPECIFY NUMBER OF ATTRIBUTES
      6 --READ OLD ATTRIBUTE MATRIX FROM A FILE
      7 --ENTER (CHANGE) ATTRIBUTE NAMES
      **--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
```

```
     9 --ADD (CHANGE) PROJECT COMPARISONS
     10--DISPLAY PROJECT OR ATTRIBUTE MATRIX
     11--CALCULATE WEIGHTS
     12--HELP ON PROJECT RANKING INTERFACE
     13--RETURN TO MAIN MENU

 PLEASE ENTER NUMBER OF CHOICE( 9)

WITH RESPECT TO ATTRIBUTE   1 OVERALL WORTH
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

1 3 9
2 7 5
3 2 2
3 6 6
4 2 3
5 4 4
4 5 0
5 7 7
6 5 5
7 1 3
7 4 9
7 6 3
0 0 0
```

MENU 1 4 1 HIERARCHY CONTINUED

```
     0 --VERIFY FILE INPUT
     ##--RECALL ADDITIONAL PROJECTS
     2 --ADD NEW PROJECTS OF YOUR OWN
     3 --CHANGE PROJECT NAMES
     ##--LOAD COMPARISONS FROM SUBORDINATE FILES
     5 --SPECIFY NUMBER OF ATTRIBUTES
     6 --READ OLD ATTRIBUTE MATRIX FROM A FILE
     7 --ENTER (CHANGE) ATTRIBUTE NAMES
     ##--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     9 --ADD (CHANGE) PROJECT COMPARISONS
     10--DISPLAY PROJECT OR ATTRIBUTE MATRIX
     11--CALCULATE WEIGHTS
     12--HELP ON PROJECT RANKING INTERFACE
     13--RETURN TO MAIN MENU

 PLEASE ENTER NUMBER OF CHOICE(11)

YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      1

 DO RANGE(SENSITIVITY) ANALYSIS?
 ? n
ATTRIBUTE WEIGHTS


  RANK   ATTRIBUTE # AND NAME                    WEIGHT
    1        1 OVERALL WORTH                     1.00000000

[illegible]
DISPLAY DELTA MATRIX [illegible]
```

```
DISPLAY PROJECT WEIGHTS FOR EACH ATTRIBUTE?(Y/[N])

YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP     24

 DO RANGE(SENSITIVITY) ANALYSIS?
? n
                FINAL WEIGHTS
  RANK     PROJECT # AND NAME                    WEIGHT
    1          1 pr2                           0.63679248
    2          2 pr3                           0.21226415
    3          3 proj3                         0.07075471
    4          7 new2                          0.04245283
    5          5 proj5                         0.01886792
    6          6 new1                          0.01415094
    7          4 proj4                         0.00471698

HIT <RETURN> TO CONTINUE



                  MENU 1 4 1 HIERARCHY CONTINUED

      0 --VERIFY FILE INPUT
      **--RECALL ADDITIONAL PROJECTS
      2 --ADD NEW PROJECTS OF YOUR OWN
      3 --CHANGE PROJECT NAMES
      **--LOAD COMPARISONS FROM SUBORDINATE FILES
      5 --SPECIFY NUMBER OF ATTRIBUTES
      6 --READ OLD ATTRIBUTE MATRIX FROM A FILE
      7 --ENTER (CHANGE) ATTRIBUTE NAMES
      **--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
      9 --ADD (CHANGE) PROJECT COMPARISONS
      10--DISPLAY PROJECT OR ATTRIBUTE MATRIX
      11--CALCULATE WEIGHTS
      12--HELP ON PROJECT RANKING INTERFACE
      13--RETURN TO MAIN MENU

 PLEASE ENTER NUMBER OF CHOICE(13)

                MENU 0 0


      0 --ENTER (CHANGE) HEADER INFORMATION
      **--EXECUTE BASIC MODEL
      **--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      **--EXECUTE VOTING MODEL
      **--EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE(8)

ENTER NAME OF OUTPUT FILE
j1xb4x.dat
WOULD YOU LIKE FOR A PRINTED COPY (Y/N)    [N]
```

```
quit
FORTRAN STOP
$ photo/off
```

OUTPUT FILE

```
=001NAME
    colburn
=002ORGANIZATION
    dlxb
=003PURPOSE:
    combine results from two files using hierarchy model



=004MODEL TYPE (1-5):
    4
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      1
=007NUMBER AND NAME OF ATTRIBUTES
      1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    1.00000000
=010NUMBER AND NAME OF PROJECTS:
      1 pr2
      2 pr3
      3 proj3
      4 proj4
      5 proj5
      6 new1
      7 new2

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   3.00000000   9.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   5.00000000
      0.00000000   2.00000000   1.00000000   0.33333340   1.33333373   6.00000000   0.00000000
      0.00000000   3.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   4.00000000   1.00000000   0.00000000   7.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   5.00000000   1.00000000   0.00000000
      3.00000000   0.00000000   0.00000000   9.00000000   0.00000000   3.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0.63679248 0.21226415 0.07075471 0.00471698 0.01886792 0.01415094 0.04245283
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0.63679248 0.21226415 0.07075471 0.00471698 0.01886792 0.01415094 0.04245283
999999
```

(5) CONSTRAINTS MODEL 5

INPUT FILE

Name: Colburn

Input file name (if any): dlxb3o.dat

Organization: dlxb

Name of output file to contain results: none

Purpose: Example of Model 5, Constraints Model

	CONSTRAINTS	UNITS	TOTAL RESOURCES
1	Costs	Thousands of Dollars	5000
2	Manpower	Man Months	100
3			
4			
5			
6			
7			
8			
9			
10			

Name: Colburn

Input file name (if any): dlxb3o.dat

Organization: dlxb

Name of output file to contain results: none

Purpose: Example of Model 5, Constraints Model

	PROJECT (OR ATTRIBUTE) NAME (UP TO 32 SPACES LONG)	RESOURCE REQUIREMENTS FOR CONSTRAINT # 1	2	3	4	5	6	7	8	9	10
1	PR1	2000	40								
2	PR2	750	30								
3	PR3	100	16								
4	PR4	2300	55								
5	PR5	500	19								
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											

```
=001NAME:
    colburn
=002ORGANIZATION:
    dlab
=003PURPOSE:
    input to the constraints model



=004MODEL TYPE (1-5):
    1
=005NUMBER OF PROJECTS(1-200):
    5
=006NUMBER OF ATTRIBUTES(1- 20):
    1
=007NUMBER AND NAME OF ATTRIBUTES
    1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
    1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0 00000000
=010NUMBER AND NAME OF PROJECTS:
    1 pr1
    2 pr2
    3 pr3
    4 pr4
    5 pr5

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
    1 00000000   0 00000000   0 00000000   0 00000000   4 00000000
    3 00000000   1 00000000   5 00000000   0 00000000   0 00000000
    0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
    0 00000000   0 00000000   0 00000000   1 00000000   3 00000000
    0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0 17857143 0 53571427 0 10714287 0 13392857 0 04464286
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 17857143 0 53571427 0 10714287 0 13392857 0 04464286
999999
```

EXECUTED RUN

```
%PHOTO-I-INIT, Recording initiated at 22 48 26 14
$ lindo
 LINDO (UC  6 DEC 82)
  user


          LINDO USER INTERFACE
          FOR PROJECT RANKING
               MENU 0.0


     0 --ENTER (CHANGE) HEADER INFORMATION
     1 --EXECUTE BASIC MODEL
     2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     3 --EXECUTE VOTING MODEL
     4 --EXECUTE HIERARCHY MODEL
     5 --EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM, DELETE RESULTS
     8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[0]:

PLEASE ENTER YOUR NAME:
colburn
ORGANIZATION (DLX, DLXB, ETC)
dlxb
PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE.)
ENTER A MAXIMMUM OF FIVE LINES, ENTERING A BLANK LINE
TO QUIT BEFORE FIVE LINES.
decide which projects to fund.
projects have already been rank    weighted

               MENU 0.0


     0 --ENTER (CHANGE) HEADER INFORMATION
     1 --EXECUTE BASIC MODEL
     2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     3 --EXECUTE VOTING MODEL
     4 --EXECUTE HIERARCHY MODEL
     5 --EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM, DELETE RESULTS
     8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[1]:
5



            MENU 1.5 -- CONSTRAINTS MODEL

     0  --ENTER PROJECTS AND WEIGHTS
     1  --READ PROJECTS AND WEIGHTS FROM A FILE
     2  --ENTER CONSTRAINTS
     ** --ENTER RESOURCE REQUIREMENTS FOR PROJECTS
     ** --CALCULATE WHICH PROJECTS ARE TO BE FUNDED
     5  --VIEW PROJECT WEIGHTS AND NAMES
```

```
      6  --HELP WITH PROJECT RANKING INTERFACE

      7  --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [ 0 ]
1
PLEASE INPUT NAME OF FILE
d1xb3o.dat



            MENU 1.5 -- CONSTRAINTS MODEL

      0  --ENTER PROJECTS AND WEIGHTS
      1  --READ PROJECTS AND WEIGHTS FROM A FILE
      2  --ENTER CONSTRAINTS
      ** --ENTER RESOURCE REQUIREMENTS FOR PROJECTS
      ** --CALCULATE WHICH PROJECTS ARE TO BE FUNDED
      5  --VIEW PROJECT WEIGHTS AND NAMES
      6  --HELP WITH PROJECT RANKING INTERFACE
      7  --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [ 2 ]:
5
PROJECT                    WEIGHTS
  1 pr1                          0.17857143
  2 pr2                          0.53571427
  3 pr3                          0.10714287
  4 pr4                          0.13392857
  5 pr5                          0.04464286

HIT <RETURN> TO CONTINUE



            MENU 1.5 -- CONSTRAINTS MODEL

      0  --ENTER PROJECTS AND WEIGHTS
      1  --READ PROJECTS AND WEIGHTS FROM A FILE
      2  --ENTER CONSTRAINTS
      ** --ENTER RESOURCE REQUIREMENTS FOR PROJECTS
      ** --CALCULATE WHICH PROJECTS ARE TO BE FUNDED
      5  --VIEW PROJECT WEIGHTS AND NAMES
      6  --HELP WITH PROJECT RANKING INTERFACE
      7  --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [ 2 ]:

ENTER NAME OF CONSTRAINT #  1, BLANK TO QUIT
costs
ENTER UNITS OF CONSTRAINT #            1
thousands of dollars
ENTER TOTAL AMOUNT OF AVAILABLE costs
IN UNITS OF thousands of dollars

5000
ENTER NAME OF CONSTRAINT #  2, BLANK TO QUIT
manpower
ENTER UNITS OF CONSTRAINT #            2
man months
```

```
ENTER TOTAL AMOUNT OF AVAILABLE manpower
IN UNITS OF man months

100
ENTER NAME OF CONSTRAINT #  3. BLANK TO QUIT



            MENU 1.5 -- CONSTRAINTS MODEL

     0  --ENTER PROJECTS AND WEIGHTS
     1  --READ PROJECTS AND WEIGHTS FROM A FILE
     2  --ENTER CONSTRAINTS
     3  --ENTER RESOURCE REQUIREMENTS FOR PROJECTS
     ** --CALCULATE WHICH PROJECTS ARE TO BE FUNDED
     5  --VIEW PROJECT WEIGHTS AND NAMES
     6  --HELP WITH PROJECT RANKING INTERFACE
     7  --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [ 3 ]:

FOR PROJECT #  1-pr1                      ENTER
REQUIREMENT OF costs                     IN thousands of dollars
2000
REQUIREMENT OF manpower                  IN man months
40
FOR PROJECT #  2-pr2                      ENTER
REQUIREMENT OF costs                     IN thousands of dollars
750
REQUIREMENT OF manpower                  IN man months
30
FOR PROJECT #  3-pr3                      ENTER
REQUIREMENT OF costs                     IN thousands of dollars
100
REQUIREMENT OF manpower                  IN man months
16
FOR PROJECT #  4-pr4                      ENTER
REQUIREMENT OF costs                     IN thousands of dollars
2300
REQUIREMENT OF manpower                  IN man months
55
FOR PROJECT #  5-pr5                      ENTER
REQUIREMENT OF costs                     IN thousands of dollars
500
REQUIREMENT OF manpower                  IN man months
19



            MENU 1.5 -- CONSTRAINTS MODEL

     0  --ENTER PROJECTS AND WEIGHTS
     1  --READ PROJECTS AND WEIGHTS FROM A FILE
     2  --ENTER CONSTRAINTS
     3  --ENTER RESOURCE REQUIREMENTS FOR PROJECTS
     4  --CALCULATE WHICH PROJECTS ARE TO BE FUNDED
     5  --VIEW PROJECT WEIGHTS AND NAMES
     6  --HELP WITH PROJECT RANKING INTERFACE
```

```
      7  --RETURN TO MAIN MENU

   PLEASE ENTER NUMBER OF YOUR CHOICE [ 4 ].

     LP OPTIMUM FOUND  AT STEP      5
    FIX ALL VARS.(     3)  WITH RC >  0.162337E-02
SET     X0004 TO     0 AT     1 BND=  0.85432333      TWIN=  0.85367066
SET     X0005 TO     0 AT     2 BND=  0.82142860      TWIN=  0.82142860

NEW INTEGER SOLUTION OF  0.821429      AT BRANCH       2 PIVOT       7
 BOUND ON OPTIMUM: 0.8214286
 DELETE     X0005 AT LEVEL      2
   FLIP     X0004 TO      1 WITH BOUND  0.8536707
 DELETE     X0004 AT LEVEL      1
   RELEASE FIXED VARS.
    ENUMERATION COMPLETE. BRANCHES=      2  PIVOTS=     14

LAST INTEGER SOLUTION IS THE BEST FOUND
FOND THE FOLLOWING PROJECTS
          1  pr1
          2  pr2
          3  pr3
OBJ=  0.8214286      THE CLOSER OBJ IS TO 1, THE BETTER
HIT RETURN TO CONTINUE


            MENU 1.5 -- CONSTRAINTS MODEL

      0  --ENTER PROJECTS AND WEIGHTS
      1  --READ PROJECTS AND WEIGHTS FROM A FILE
      2  --ENTER CONSTRAINTS
      3  --ENTER RESOURCE REQUIREMENTS FOR PROJECTS
      4  --CALCULATE WHICH PROJECTS ARE TO BE FUNDED
      5  --VIEW PROJECT WEIGHTS AND NAMES
      6  --HELP WITH PROJECT RANKING INTERFACE
      7  --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [ 7 ].

             MENU 0.0


      0 --ENTER (CHANGE) HEADER INFORMATION
      **--EXECUTE BASIC MODEL
      **--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      **--EXECUTE VOTING MODEL
      **--EXECUTE HIERARCHY MODEL
      **--EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS.

  PLEASE ENTER NUMBER OF YOUR CHOICE[8]
7
  quit
FORTRAN STOP
$ play/rec/out=mc15.tst
%PLAYBACK-W-NOFILE, No logfile specified on command line. Assume PHOTO.LOG
```

```
%RMS-E-FLK, file currently locked by another user
%RMS-F-IFI, invalid internal file identifier (IFI) value
$ photo/off
```

f. COMPOSITE EXAMPLE

(1) Flow Diagram

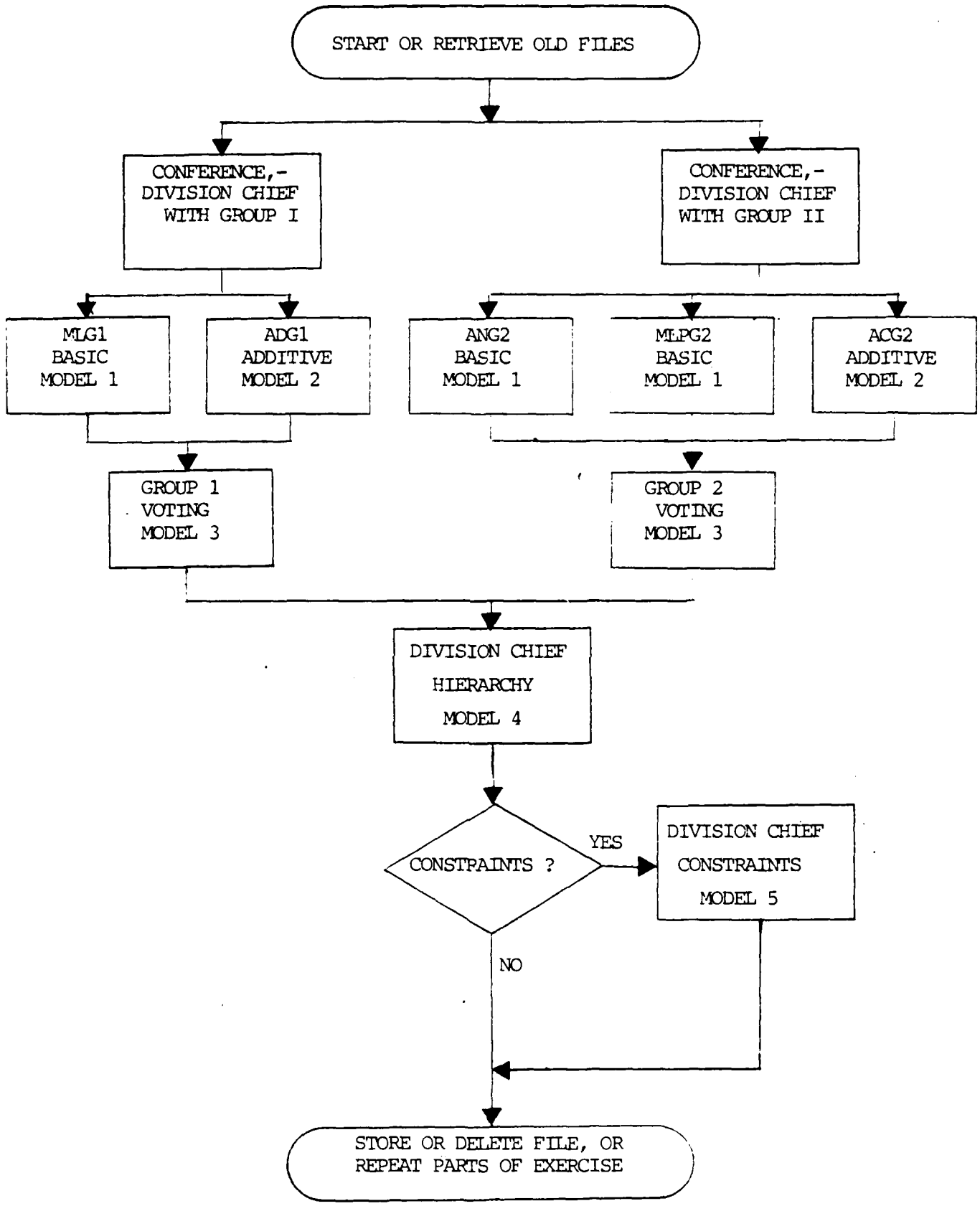

Figure A-7. (1) Flow Diagram.

Input, Executed Runs and Output

Input, Executed Runs, and Output using the BASIC Model for Person 1.

INPUT FILE

Name: Man 1

Input file name (if any): None

Organization: dlxb

Name of output file to contain results: dlxblo.dat

Purpose: Composite example, Basic Model

Name of attribute (if any):

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PR1	1	2	3	
2	PR2	3	1	4	
3	PR3	3	4	2	
4	PR4				

EXECUTED RUN

```
%PHOTO-I-INIT, Recording initiated at 23:07:50.63
$ lindo
 LINDO (UC  6 DEC 82)
  user


          LINDO USER INTERFACE
          FOR PROJECT RANKING
               MENU 0 0


     0 --ENTER (CHANGE) HEADER INFORMATION
     1 --EXECUTE BASIC MODEL
     2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     3 --EXECUTE VOTING MODEL
     4 --EXECUTE HIERARCHY MODEL
     5 --EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM, DELETE RESULTS
     8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[0]:

PLEASE ENTER YOUR NAME:
man 1
ORGANIZATION (DLX, DLX3, ETC):
dlxb
PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE )
ENTER A MAXIMMUM OF FIVE LINES, ENTERING A BLANK LINE
TO QUIT BEFORE FIVE LINES
compare four projects

               MENU 0 0


     0 --ENTER (CHANGE) HEADER INFORMATION
     1 --EXECUTE BASIC MODEL
     2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     3 --EXECUTE VOTING MODEL
     4 --EXECUTE HIERARCHY MODEL
     5 --EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM, DELETE RESULTS
     8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[1]:

          MENU 1.1 -- BASIC MODEL


     0 --SPECIFY NUMBER OF PROJECTS
     1 --READ OLD PROJECT MATRIX FROM FILE
     2 --ENTER (CHANGE) PROJECT NAMES
     ##--ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     4 --DISPLAY COMPARISONS
     ##--CALCULATE WEIGHTS
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [2]:
```

```
ENTER PROJECT NAMES  QUIT WITH A BLANK LINE
#1
pr1
#           2
pr2
#           3
pr3
#           4
pr4
#           5

          MENU 1 1 -- BASIC MODEL


     0 --SPECIFY NUMBER OF PROJECTS
     1 --READ OLD PROJECT MATRIX FROM FILE
     2 --ENTER (CHANGE) PROJECT NAMES
     3 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     4 --DISPLAY COMPARISONS
     ##--CALCULATE WEIGHTS
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [3].

ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

1 2 3
3 1 4
3 4 2
0 0 0
          MENU 1 1 -- BASIC MODEL


     0 --SPECIFY NUMBER OF PROJECTS
     1 --READ OLD PROJECT MATRIX FROM FILE
     2 --ENTER (CHANGE) PROJECT NAMES
     3 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     4 --DISPLAY COMPARISONS
     5 --CALCULATE WEIGHTS
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [5].

YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      4

 DO RANGE(SENSITIVITY) ANALYSIS?
? n
  RANK     PROJECT # AND NAME                 WEIGHT
    1          3 pr3                        0 54545456
    2          4 pr4                        0 27272728
    3          1 pr1                        0 13636364
    4          2 pr2                        0 04545455

OBJ=  0 0000,  INDEX=  0 0000--CONSISTENT
VIEW DELTA MATRIX (Y/[N])
```

```
        MENU 1.1 -- BASIC MODEL

    0 --SPECIFY NUMBER OF PROJECTS
    1 --READ OLD PROJECT MATRIX FROM FILE
    2 --ENTER (CHANGE) PROJECT NAMES
    3 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
    4 --DISPLAY COMPARISONS
    5 --CALCULATE WEIGHTS
    6 --HELP ON PROJECT RANKING INTERFACE
    7 --RETURN TO MAIN MENU

 PLEASE ENTER NUMBER OF YOUR CHOICE [7]

            MENU 0.0

    0 --ENTER (CHANGE) HEADER INFORMATION
    **--EXECUTE BASIC MODEL
    **--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
    **--EXECUTE VOTING MODEL
    **--EXECUTE HIERARCHY MODEL
    5 --EXECUTE CONSTRAINTS MODEL
    6 --HELP ON PROJECT RANKING INTERFACE
    7 --END PROGRAM, DELETE RESULTS
    8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[8]

ENTER NAME OF OUTPUT FILE
diablo dat
WOULD YOU CARE FOR A PRINTED COPY (Y/N) ? [N]

  quit
FORTRAN STOP
$ lindo
 LINDO (UC  6 DEC 82)
  user
```

OUTPUT FILE

```
=001NAME
    man 1
=002ORGANIZATION
    dlsb
=003PURPOSE
    compare four projects



=004MODEL TYPE (1-5)
    1
=005NUMBER OF PROJECTS(1-200)
      4
=006NUMBER OF ATTRIBUTES(1- 20)
      1
=007NUMBER AND NAME OF ATTRIBUTES
      1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES)
      1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES)
    0 00000000
=010NUMBER AND NAME OF PROJECTS
      1 pr1
      2 pr2
      3 pr3
      4 pr4

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
      1 00000000   3 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000
      4 00000000   0 00000000   1 00000000   2 00000000
      0 00000000   0 00000000   0 00000000   1 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 13636364 0 04545455 0 54545456 0 27272728
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 13636364 0 04545455 0 54545456 0 27272728
999999
```

Input, Executed Runs, and Output using the ADDITIVE Model for Person 2

INPUT FILE

Name: Man 2

Input file name (if any): none

Organization: dlxb

Name of output file to contain results: dlxb2o.dat

Purpose: Composite example, Additive (attributes) model

Name of attribute (if any):

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE 1	WEAK 2	3	4	STRONG 5	6	7	8	ABS. 9	COMMENTS
1	ATT1	1	2			3							
2	ATT2	1	3				4						
3	ATT3	1	4		2								
4	ATT4	2	3							7			
		3	4								8		

Name: Man 2

Input file name (if any): none

Organization: dlxb

Name of output file to contain results: dlxb2o.dat

Purpose: Composite example, Additive (attributes) Model

Name of attribute (if any): ATT1

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PR1	1	2	3	
2	PR2	1	3	1	
3	PR3	4	3	5	
4	PR4	4	2	4	

Name: Man 2

Input file name (if any): none

Organization: dlxb

Name of output file to contain results: dlxb2o.dat

Purpose: Composite example, Additive (attributes) Model

Name of attribute (if any): ATT2

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PR1	1	2	3	
2	PR2	1	3	4	
3	PR3	1	4	5	
4	PR4				

Name: Man 2

Input file name (if any): none

Organization: dlxb

Name of output file to contain results: dlxb2o.dat

Purpose: Composite example, Additive (attributes) model

Name of attribute (if any): ATT3

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PR1	2	1	4	
2	PR2	3	1	4	
3	PR3	4	1	2	
4	PR4				

Name: Man 2

Input file name (if any): none

Organization: dlxb

Name of output file to contain results: dlxb2o.dat

Purpose: Composite example, Additive (attributes) model

Name of attribute (if any): ATT4

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PR1	1	2	3	
2	PR2	2	3	4	
3	PR3	4	2	3	
4	PR4	1	3	6	

EXECUTED RUN

```
          LINDO USER INTERFACE
          FOR PROJECT RANKING
               MENU 0.0

      0 --ENTER (CHANGE) HEADER INFORMATION
      1 --EXECUTE BASIC MODEL
      2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      3 --EXECUTE VOTING MODEL
      4 --EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[0]:

PLEASE ENTER YOUR NAME:
man 2
ORGANIZATION (DLX, DLXB, ETC):
dlxb

PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE.)
ENTER A MAXIMMUM OF FIVE LINES. ENTERING A BLANK LINE
TO QUIT BEFORE FIVE LINES.
to compare 4 projects

               MENU 0.0

      0 --ENTER (CHANGE) HEADER INFORMATION
      1 --EXECUTE BASIC MODEL
      2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      3 --EXECUTE VOTING MODEL
      4 --EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[1]:
2
          MENU 1.2--ADDITIVE (ATTRIBUTES) MODEL

      0 --SPECIFY NUMBER OF ATTRIBUTES
      1 --READ OLD ATTRIBUTES MATRIX FROM FILE
      2 --SPECIFY NUMBER OF PROJECTS
      3 --READ OLD PROJECT MATRIX FROM FILE
      4 --ENTER (CHANGE) ATTRIBUTE NAMES
      5 --ENTER (CHANGE) PROJECT NAMES
      **--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
      **--ENTER (CHANGE) (ADD) PROJECT COMPARISONS
      8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
      **--CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
      10--HELP WITH PROJECT RANKING INTERFACE
      11--RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [  4 ]
```

```
ENTER ATTRIBUTE NAMES  QUIT WITH A BLANK LINE
#1
att1
#           2
att2
#           3
att3
#           4
att4
#           5

          MENU 1.2--ADDITIVE (ATTRIBUTES) MODEL


     0 --SPECIFY NUMBER OF ATTRIBUTES
     1 --READ OLD ATTRIBUTES MATRIX FROM FILE
     2 --SPECIFY NUMBER OF PROJECTS
     3 --READ OLD PROJECT MATRIX FROM FILE
     4 --ENTER (CHANGE) ATTRIBUTE NAMES
     5 --ENTER (CHANGE) PROJECT NAMES
     6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     **--ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
     **--CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
     10--HELP WITH PROJECT RANKING INTERFACE
     11--RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE.[  6 ]

ATTRIBUTE COMPARISONS
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

1 2 3
1 3 4
1 4 2
2 3 7
3 4 8
0 0 0

          MENU 1.2--ADDITIVE (ATTRIBUTES) MODEL


     0 --SPECIFY NUMBER OF ATTRIBUTES
     1 --READ OLD ATTRIBUTES MATRIX FROM FILE
     2 --SPECIFY NUMBER OF PROJECTS
     3 --READ OLD PROJECT MATRIX FROM FILE
     4 --ENTER (CHANGE) ATTRIBUTE NAMES
     5 --ENTER (CHANGE) PROJECT NAMES
     6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     **--ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
     **--CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
     10--HELP WITH PROJECT RANKING INTERFACE
     11--RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [  5 ]
```

```
ENTER PROJECT NAMES  QUIT WITH A BLANK LINE
#1
pr1
#           2
pr2
#           3
pr3
#           4
pr4
#           5

          MENU 1.2--ADDITIVE (ATTRIBUTES) MODEL

      0 --SPECIFY NUMBER OF ATTRIBUTES
      1 --READ OLD ATTRIBUTES MATRIX FROM FILE
      2 --SPECIFY NUMBER OF PROJECTS
      3 --READ OLD PROJECT MATRIX FROM FILE
      4 --ENTER (CHANGE) ATTRIBUTE NAMES
      5 --ENTER (CHANGE) PROJECT NAMES
      6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
      7 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
      8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
      ##--CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
      10--HELP WITH PROJECT RANKING INTERFACE
      11--RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE.[  7 ].

WITH RESPECT TO ATTRIBUTE   1 att1
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT.

1 2 3
1 3 1
4 3 5
4 2 4
0 0 0
WITH RESPECT TO ATTRIBUTE   2 att2
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

1 2 3
1 3 4
1 4 5
0 0 0
WITH RESPECT TO ATTRIBUTE   3 att3
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

2 1 4
3 1 4
4 1 2
0 0 0
WITH RESPECT TO ATTRIBUTE   4 att4
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

1 2 3
2 3 4
4 2 3
1 3 6
0 0 0

          MENU 1.2--ADDITIVE (ATTRIBUTES) MODEL
```

```
      0 --SPECIFY NUMBER OF ATTRIBUTES
      1 --READ OLD ATTRIBUTES MATRIX FROM FILE
      2 --SPECIFY NUMBER OF PROJECTS
      3 --READ OLD PROJECT MATRIX FROM FILE
      4 --ENTER (CHANGE) ATTRIBUTE NAMES
      5 --ENTER (CHANGE) PROJECT NAMES
      6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
      7 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
      8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
      9 --CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
      10--HELP WITH PROJECT RANKING INTERFACE
      11--RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE.[  9 ].

YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      9

 DO RANGE(SENSITIVITY) ANALYSIS?
? n
ATTRIBUTE WEIGHTS


  RANK  ATTRIBUTE # AND NAME                WEIGHT
    1       1 att1                          0.72103006
    2       2 att2                          0.24034335
    3       3 att3                          0.03433476
    4       4 att4                          0.00429185

OBJ=  1.2961, INDEX=  0.3240--SOME CONSISTENCY
VIEW DELTA MATRIX (Y/[N])?

DISPLAY PROJECT WEIGHTS FOR EACH ATTRIBUTE?(Y/[N])
Y
YOU ARE NOW ENTERING THE LINDO SYSTEM.
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      5

 DO RANGE(SENSITIVITY) ANALYSIS?
? n
WITH RESPECT TO ATTRIBUTE   1  att1
  RANK     PROJECT # AND NAME                 WEIGHT
    1          4 pr4                        0.45454544
    2          1 pr1                        0.34090909
    3          2 pr2                        0.11363636
    4          3 pr3                        0.09090909

OBJ=  0.2500, INDEX=  0.0625--CONSISTENT
VIEW DELTA MATRIX(Y/[N])?

YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      4
```

```
 DO RANGE(SENSITIVITY) ANALYSIS?
? n
WITH RESPECT TO ATTRIBUTE   2  att2
  RANK     PROJECT # AND NAME                    WEIGHT
    1          1 pr1                          0.56074768
    2          2 pr2                          0.18691589
    3          3 pr3                          0.14018692
    4          4 pr4                          0.11214954

OBJ=  0.0000, INDEX=  0.0000--CONSISTENT
VIEW DELTA MATRIX(Y/[N])?

YOU ARE NOW ENTERING THE LINDO SYSTEM.
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      4

 DO RANGE(SENSITIVITY) ANALYSIS?
? n
WITH RESPECT TO ATTRIBUTE   3  att3
  RANK     PROJECT # AND NAME                    WEIGHT
    1          2 pr2                          0.36363637
    1          3 pr3                          0.36363637
    3          4 pr4                          0.18181819
    4          1 pr1                          0.09090909

OBJ=  0.0000, INDEX=  0.0000--CONSISTENT
VIEW DELTA MATRIX(Y/[N])?


YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      5

 DO RANGE(SENSITIVITY) ANALYSIS?
? n
WITH RESPECT TO ATTRIBUTE   4  att4
  RANK     PROJECT # AND NAME                    WEIGHT
    1          1 pr1                          0.40000001
    1          4 pr4                          0.40000001
    3          2 pr2                          0.13333334
    4          3 pr3                          0.06666667

OBJ=  0.1333, INDEX=  0.0333--CONSISTENT
VIEW DELTA MATRIX(Y/[N])?

          FINAL WEIGHTS
  RANK     PROJECT # AND NAME                    WEIGHT
    1          1 pr1                          0.38541576
    2          4 pr4                          0.36265475
    3          2 pr2                          0.13991685
    4          3 pr3                          0.11201268

HIT <RETURN> TO CONTINUE
```

```
          MENU 1.2--ADDITIVE (ATTRIBUTES) MODEL

      0 --SPECIFY NUMBER OF ATTRIBUTES
      1 --READ OLD ATTRIBUTES MATRIX FROM FILE
      2 --SPECIFY NUMBER OF PROJECTS
      3 --READ OLD PROJECT MATRIX FROM FILE
      4 --ENTER (CHANGE) ATTRIBUTE NAMES
      5 --ENTER (CHANGE) PROJECT NAMES
      6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
      7 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
      8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
      9 --CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
      10--HELP WITH PROJECT RANKING INTERFACE
      11--RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [ 11 ]

            MENU 0.0


      0 --ENTER (CHANGE) HEADER INFORMATION
      **--EXECUTE BASIC MODEL
      **--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      **--EXECUTE VOTING MODEL
      **--EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[8]

ENTER NAME OF OUTPUT FILE
d1xb2o dat
WOULD YOU CARE FOR A PRINTED COPY (Y/N) ? [N]


  quit
FORTRAN STOP
$ lindo
 LINDO (UC  6 DEC 82)
  user
```

OUTPUT FILE

```
=001NAME:
    man 2
=002ORGANIZATION:
    dlxb
=003PURPOSE:
    to compare 4 projects



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200)
      4
=006NUMBER OF ATTRIBUTES(1- 20)
      4
=007NUMBER AND NAME OF ATTRIBUTES
      1 att1
      2 att2
      3 att3
      4 att4

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1 00000000   3 00000000   4 00000000   2 00000000
      0 00000000   1 00000000   7 00000000   0 00000000
      0 00000000   0 00000000   1 00000000   8 00000000
      0 00000000   0 00000000   0 00000000   1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0 72103006 0 24034335 0 03433476 0 00429185
=010NUMBER AND NAME OF PROJECTS
      1 pr1
      2 pr2
      3 pr3
      4 pr4

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
      1 00000000   3 00000000   1 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   1 00000000   0 00000000
      0 00000000   4 00000000   5 00000000   1 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 34090909 0 11363636 0 09090909 0 45454544
= 13PROJECT MATRIX FOR ATTRIBUTE #  2
      1 00000000   3 00000000   4 00000000   5 00000000
      0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   1 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES)
    0 56074768 0 18691589 0 14018692 0 11214954
= 15PROJECT MATRIX FOR ATTRIBUTE #  3
      1 00000000   0 00000000   0 00000000   0 00000000
      4 00000000   1 00000000   0 00000000   0 00000000
      4 00000000   0 00000000   1 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   1 00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES)
```

```
    0 09090909 0 36363637 0 36363637 0 18181819
= 17PROJECT MATRIX FOR ATTRIBUTE #  4
      1 00000000   3 00000000   6 00000000   0 00000000
      0 00000000   1 00000000   4 00000000   0 00000000
      0 00000000   0 00000000   1 00000000   0 00000000
      0 00000000   3 000[illegible]000   0 00000000   1 00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
    0 40000001 0 13333334 0 06666667 0 40000001
= 19FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 38541576 0 13991695 0 11201268 0 36265475
999999
```

Input, Executed Run, and Output Using the BASIC Model for Person 3.

INPUT FILE

Name: Man 3

Organization: dlxb

Purpose: Composite example,Basic Model

Input file name (if any): none

Name of output file to contain results: dlxb13o.dat

Name of attribute (if any): overall worth

Project or attribute for File	Project (or Attribute) Name (up to 32 spaces long)	Comparisons 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	PROJ1		3	3	5																				
2	PROJ2			4																					
3	PROJ3				5																				
4	PROJ4					2																			
5	PROJ5	6																							
6																									
7																									
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									
16																									
17																									
18																									
19																									
20																									
21																									
22																									
23																									
24																									

EXECUTED RUN

```
          LINDO USER INTERFACE
          FOR PROJECT RANKING
               MENU 0 0

      0 --ENTER (CHANGE) HEADER INFORMATION
      1 --EXECUTE BASIC MODEL
      2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      3 --EXECUTE VOTING MODEL
      4 --EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[0]

PLEASE ENTER YOUR NAME
man 3
ORGANIZATION (DLX, DLXB, ETC)
dlxb
PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE )
ENTER A MAXIMMUM OF FIVE LINES, ENTERING A BLANK LINE
TO QUIT BEFORE FIVE LINES
to compare 5 projects

               MENU 0.0

      0 --ENTER (CHANGE) HEADER INFORMATION
      1 --EXECUTE BASIC MODEL
      2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      3 --EXECUTE VOTING MODEL
      4 --EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[1]

          MENU 1.1 -- BASIC MODEL

      0 --SPECIFY NUMBER OF PROJECTS
      1 --READ OLD PROJECT MATRIX FROM FILE
      2 --ENTER (CHANGE) PROJECT NAMES
      ##--ENTER (CHANGE) (ADD) PROJECT COMPARISONS
      4 --DISPLAY COMPARISONS
      ##--CALCULATE WEIGHTS
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --RETURN TO MAIN MENU
```

```
  PLEASE ENTER NUMBER OF YOUR CHOICE [2]

ENTER PROJECT NAMES. QUIT WITH A BLANK LINE
#1
proj1
#           2:
proj2
#           3.
proj3
#           4.
proj4
#           5:
proj5
#           6:

          MENU 1 1 -- BASIC MODEL


     0 --SPECIFY NUMBER OF PROJECTS
     1 --READ OLD PROJECT MATRIX FROM FILE
     2 --ENTER (CHANGE) PROJECT NAMES
     3 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     4 --DISPLAY COMPARISONS
     **--CALCULATE WEIGHTS
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [3]

ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT.

1 2 3
2 3 4
3 4 5
4 5 2
5 1 6
1 3 3
1 4 5
0 0 0
          MENU 1 1 -- BASIC MODEL


     0 --SPECIFY NUMBER OF PROJECTS
     1 --READ OLD PROJECT MATRIX FROM FILE
     2 --ENTER (CHANGE) PROJECT NAMES
     3 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     4 --DISPLAY COMPARISONS
     5 --CALCULATE WEIGHTS
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [5]

YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      8

DO RANGE(SENSITIVITY) ANALYSIS?
 N
 RANK     PROJECT # AND NAME                    WEIGHT
```

```
    1          5 proj5                        0 76271182
    2          1 proj1                        0 12711865
    3          3 proj3                        0 04237288
    3          2 proj2                        0 04237288
    5          4 proj4                        0.02542373

OBJ=  1 7119. INDEX=  0 3424--SOME CONSISTENCY
VIEW DELTA MATRIX (Y/[N])?

          MENU 1 1 -- BASIC MODEL


     0 --SPECIFY NUMBER OF PROJECTS
     1 --READ OLD PROJECT MATRIX FROM FILE
     2 --ENTER (CHANGE) PROJECT NAMES
     3 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     4 --DISPLAY COMPARISONS
     5 --CALCULATE WEIGHTS
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [7].

              MENU 0 0


     0 --ENTER (CHANGE) HEADER INFORMATION
     **--EXECUTE BASIC MODEL
     **--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     **--EXECUTE VOTING MODEL
     **--EXECUTE HIERARCHY MODEL
     5 --EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM. DELETE RESULTS
     8 --END PROGRAM. SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[8]

ENTER NAME OF OUTPUT FILE
dlxb3o dat
WOULD YOU CARE FOR A PRINTED COPY (Y/N) ? [N]

  quit
FORTRAN STOP
$ lindo
 LINDO (UC  6 DEC 82)
  user
```

OUTPUT FILE

```
=001NAME
    man 3
=002ORGANIZATION
    dlxb
=003PURPOSE
    to compare 5 projects



=004MODEL TYPE (1-5).
    1
=005NUMBER OF PROJECTS(1-200)
      5
=006NUMBER OF ATTRIBUTES(1- 25)
      1
=007NUMBER AND NAME OF ATTRIBUTES
      1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES).
      1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES).
    0 00000000
=010NUMBER AND NAME OF PROJECTS
      1 proj1
      2 proj2
      3 proj3
      4 proj4
      5 proj5

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1 00000000   3 00000000   3 00000000   5 00000000   0 00000000
      0 00000000   1 00000000   4 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   1 00000000   5 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   2 00000000
      6 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES).
    0 12711865 0 04237288 0 04237288 0 02542373 0 76271182
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 12711865 0 04237288 0 04237288 0 02542373 0 76271182
999999
```

Input, Executed Run, and Output using the BASIC Model for Person 4

INPUT FILE

Name: Man 4

Input file name (if any): none

Organization: dlxb

Name of output file to contain results: dlxb40.dat

Purpose: Composite example, Basic model

Name of attribute (if any):

Project or attribute for File	Project (or Attribute) Name (up to 32 spaces long)	Comparisons 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	PROJ1		3																						
2	PROJ2																								
3	PROJ3		4																						
4	PROJ4					3																			
5	PROJ5	4																							
6																									
7																									
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									
16																									
17																									
18																									
19																									
20																									
21																									
22																									
23																									
24																									

EXECUTED RUN

```
        LINDO USER INTERFACE
        FOR PROJECT RANKING
             MENU 0 0

    0 --ENTER (CHANGE) HEADER INFORMATION
    1 --EXECUTE BASIC MODEL
    2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
    3 --EXECUTE VOTING MODEL
    4 --EXECUTE HIERARCHY MODEL
    5 --EXECUTE CONSTRAINTS MODEL
    6 --HELP ON PROJECT RANKING INTERFACE
    7 --END PROGRAM, DELETE RESULTS
    8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[0]

PLEASE ENTER YOUR NAME:
man 4
ORGANIZATION (DLX, DLXB, ETC)
dlxb
PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE )
ENTER A MAXIMMUM OF FIVE LINES, ENTERING A BLANK LINE
TO QUIT BEFORE FIVE LINES
compare five projects

             MENU 0 0

    0 --ENTER (CHANGE) HEADER INFORMATION
    1 --EXECUTE BASIC MODEL
    2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
    3 --EXECUTE VOTING MODEL
    4 --EXECUTE HIERARCHY MODEL
    5 --EXECUTE CONSTRAINTS MODEL
    6 --HELP ON PROJECT RANKING INTERFACE
    7 --END PROGRAM, DELETE RESULTS
    8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[1]

         MENU 1 1 -- BASIC MODEL

    0 --SPECIFY NUMBER OF PROJECTS
    1 --READ OLD PROJECT MATRIX FROM FILE
    2 --ENTER (CHANGE) PROJECT NAMES
    ##--ENTER (CHANGE) (ADD) PROJECT COMPARISONS
    4 --DISPLAY COMPARISONS
    ##--CALCULATE WEIGHTS
    6 --HELP ON PROJECT RANKING INTERFACE
    7 --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE (2)
```

```
ENTER PROJECT NAMES  QUIT WITH A BLANK LINE
#1
proj1
#           2
proj2
#           3
proj3
#           4
proj4
#           5
proj5
#           6

          MENU 1.1 -- BASIC MODEL


     0 --SPECIFY NUMBER OF PROJECTS
     1 --READ OLD PROJECT MATRIX FROM FILE
     2 --ENTER (CHANGE) PROJECT NAMES
     3 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     4 --DISPLAY COMPARISONS
     ##--CALCULATE WEIGHTS
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [3]

ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

1 2 3
3 2 4
5 1 4
4 5 3
0 0 0
          MENU 1 1 -- BASIC MODEL


     0 --SPECIFY NUMBER OF PROJECTS
     1 --READ OLD PROJECT MATRIX FROM FILE
     2 --ENTER (CHANGE) PROJECT NAMES
     3 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     4 --DISPLAY COMPARISONS
     5 --CALCULATE WEIGHTS
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [5]

YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      5

 DO RANGE(SENSITIVITY) ANALYSIS?
 n
  RANK     PROJECT # AND NAME                    WEIGHT
    1          4 proj4                        0 64285713
    2          5 proj5                        0 21428572
    3          3 proj3                        0 07142857
    4          1 proj1                        0 05357143
    5          2 proj2                        0 01785714

OBJ=  0 0000, INDEX=  0 0000--CONSISTENT
NEW DELTA MATRIX (Y/(N))?
```

```
          MENU 1.1 -- BASIC MODEL

      0 --SPECIFY NUMBER OF PROJECTS
      1 --READ OLD PROJECT MATRIX FROM FILE
      2 --ENTER (CHANGE) PROJECT NAMES
      3 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
      4 --DISPLAY COMPARISONS
      5 --CALCULATE WEIGHTS
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --RETURN TO MAIN MENU

   PLEASE ENTER NUMBER OF YOUR CHOICE [7]


            MENU 0.0


      0 --ENTER (CHANGE) HEADER INFORMATION
      ##--EXECUTE BASIC MODEL
      ##--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      ##--EXECUTE VOTING MODEL
      ##--EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

   PLEASE ENTER NUMBER OF YOUR CHOICE[8]

ENTER NAME OF OUTPUT FILE
dlxb4o dat
WOULD YOU CARE FOR A PRINTED COPY (Y/N) ? [N]

  quit
FORTRAN STOP
$ lindo
 LINDO (UC  6 DEC 82)
  user
```

OUTPUT FILE

```
=001NAME
    man 4
=002ORGANIZATION.
    dlab
=003PURPOSE
    compare five projects



=004MODEL TYPE (1-5)
    1
=005NUMBER OF PROJECTS(1-200):
      5
=006NUMBER OF ATTRIBUTES(1- 20)
      1
=007NUMBER AND NAME OF ATTRIBUTES
      1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0 00000000
=010NUMBER AND NAME OF PROJECTS:
      1 proj1
      2 proj2
      3 proj3
      4 proj4
      5 proj5

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1 00000000   3 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   3 00000000
      4 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0 05357143 0 01785714 0 07142857 0 64285713 0 21428572
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 05357143 0 01785714 0 07142857 0 64285713 0 21428572
999999
```

Input, Executed Run, and Output using the ADDITIVE Model for Person 5

INPUT FILE

Name: Man 5 Input file name (if any): none

Organization: dlxb Name of output file to contain results: dlxb5o.dat

Purpose: Composite example, Additive (attributes) Model Name of attribute (if any):

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	Attribute 1	1	2	5	
2	Attribute 2				

Name: Man 5

Input file name (if any): none

Organization: dlxb

Name of output file to contain results: dlxb5o.dat

Purpose: Composite example, Additive (attributes) Model

Name of attribute (if any): Attribute 1

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PROJ1	1	2	3	
2	PROJ2	2	3	4	
3	PROJ3	1	4	2	
4	PROJ4	1	5	7	
5	PROJ5	2	5	6	

Name: Man 5

Input file name (if any): None

Organization: dlxb

Name of output file to contain results: dlxb5o.dat

Purpose: Composite example, Additive (attributes) model

Name of attribute (if any): Attribute 2

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PROJ1	3	1	5	
2	PROJ2	2	1	4	
3	PROJ3	1	4	7	
4	PROJ4	5	4	8	
5	PROJ5				

EXECUTED RUN

```
          LINDO USER INTERFACE
          FOR PROJECT RANKING
               MENU 0 0


     0 --ENTER (CHANGE) HEADER INFORMATION
     1 --EXECUTE BASIC MODEL
     2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     3 --EXECUTE VOTING MODEL
     4 --EXECUTE HIERARCHY MODEL
     5 --EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM, DELETE RESULTS
     8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[0]:

PLEASE ENTER YOUR NAME.
man 5
ORGANIZATION (DLX, DLXB, ETC):
dlxb
PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE.)
ENTER A MAXIMUM OF FIVE LINES, ENTERING A BLANK LINE
TO QUIT BEFORE FIVE LINES.
rank five projects

               MENU 0.0


     0 --ENTER (CHANGE) HEADER INFORMATION
     1 --EXECUTE BASIC MODEL
     2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     3 --EXECUTE VOTING MODEL
     4 --EXECUTE HIERARCHY MODEL
     5 --EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM, DELETE RESULTS
     8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[1].
2
          MENU 1 2--ADDITIVE (ATTRIBUTES) MODEL


     0 --SPECIFY NUMBER OF ATTRIBUTES
     1 --READ OLD ATTRIBUTES MATRIX FROM FILE
     2 --SPECIFY NUMBER OF PROJECTS
     3 --READ OLD PROJECT MATRIX FROM FILE
     4 --ENTER (CHANGE) ATTRIBUTE NAMES
     5 --ENTER (CHANGE) PROJECT NAMES
     **--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     **--ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
     **--CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
     10--HELP WITH PROJECT RANKING INTERFACE
     11--RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE.[  4 ].

ENTER ATTRIBUTE NAMES  QUIT WITH A BLANK LINE
*1
attribute 1
*          2
attribute 2
*          3
```

```
          MENU 1 2--ADDITIVE (ATTRIBUTES) MODEL

     0 --SPECIFY NUMBER OF ATTRIBUTES
     1 --READ OLD ATTRIBUTES MATRIX FROM FILE
     2 --SPECIFY NUMBER OF PROJECTS
     3 --READ OLD PROJECT MATRIX FROM FILE
     4 --ENTER (CHANGE) ATTRIBUTE NAMES
     5 --ENTER (CHANGE) PROJECT NAMES
     6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     **--ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
     **--CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
     10--HELP WITH PROJECT RANKING INTERFACE
     11--RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [  6 ]:

ATTRIBUTE COMPARISONS
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

1 2 5
0 0 0
          MENU 1 2--ADDITIVE (ATTRIBUTES) MODEL

     0 --SPECIFY NUMBER OF ATTRIBUTES
     1 --READ OLD ATTRIBUTES MATRIX FROM FILE
     2 --SPECIFY NUMBER OF PROJECTS
     3 --READ OLD PROJECT MATRIX FROM FILE
     4 --ENTER (CHANGE) ATTRIBUTE NAMES
     5 --ENTER (CHANGE) PROJECT NAMES
     6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     **--ENTER (CHANGE) (ADD) PROJECT COMPARISONS
     8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
     **--CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
     10--HELP WITH PROJECT RANKING INTERFACE
     11--RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [  5 ]:

ENTER PROJECT NAMES  QUIT WITH A BLANK LINE
#1
proj1
#          2
proj2
#          3
proj3
#          4
proj4
#          5
proj5
#          6
```

```
              MENU 1 2--ADDITIVE (ATTRIBUTES) MODEL

        0 --SPECIFY NUMBER OF ATTRIBUTES
        1 --READ OLD ATTRIBUTES MATRIX FROM FILE
        2 --SPECIFY NUMBER OF PROJECTS
        3 --READ OLD PROJECT MATRIX FROM FILE
        4 --ENTER (CHANGE) ATTRIBUTE NAMES
        5 --ENTER (CHANGE) PROJECT NAMES
        6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
        7 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
        8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
        9 --CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
        10--HELP WITH PROJECT RANKING INTERFACE
        11--RETURN TO MAIN MENU

   PLEASE ENTER NUMBER OF YOUR CHOICE [  7 ]:

WITH RESPECT TO ATTRIBUTE   1 attribute 1
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

1 2 3
2 3 4
1 4 2
1 5 7
2 5 6
0 0 0
WITH RESPECT TO ATTRIBUTE   2 attribute 2
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

3 1 5
2 1 4
1 4 7
5 4 8
0 0 0
              MENU 1 2--ADDITIVE (ATTRIBUTES) MODEL

        0 --SPECIFY NUMBER OF ATTRIBUTES
        1 --READ OLD ATTRIBUTES MATRIX FROM FILE
        2 --SPECIFY NUMBER OF PROJECTS
        3 --READ OLD PROJECT MATRIX FROM FILE
        4 --ENTER (CHANGE) ATTRIBUTE NAMES
        5 --ENTER (CHANGE) PROJECT NAMES
        6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
        7 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
        8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
        9 --CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
        10--HELP WITH PROJECT RANKING INTERFACE
        11--RETURN TO MAIN MENU

   PLEASE ENTER NUMBER OF YOUR CHOICE [  9 ]

YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      2

DO RANGE(SENSITIVITY) ANALYSIS?
? N
ATTRIBUTE WEIGHTS
```

```
  RANK   ATTRIBUTE # AND NAME                    WEIGHT
    1        1 attribute 1                      0.83333331
    2        2 attribute 2                      0.16666666

OBJ=  0.0000, INDEX=  0.0000--CONSISTENT
VIEW DELTA MATRIX (Y/[N])?

DISPLAY PROJECT WEIGHTS FOR EACH ATTRIBUTE?(Y/[N])
Y
YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      6

 DO RANGE(SENSITIVITY) ANALYSIS?
> n
WITH RESPECT TO ATTRIBUTE   1  attribute 1
  RANK     PROJECT # AND NAME                    WEIGHT
    1          1 proj1                          0.48554912
    2          4 proj4                          0.24277456
    3          2 proj2                          0.16184972
    4          5 proj5                          0.06936417
    5          3 proj3                          0.04046243

OBJ=  0.2543, INDEX=  0.0509--CONSISTENT
VIEW DELTA MATRIX(Y/[N])?

YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      5

 DO RANGE(SENSITIVITY) ANALYSIS?
> n
WITH RESPECT TO ATTRIBUTE   2  attribute 2

 RANK     PROJECT # AND NAME                    WEIGHT
   1          3 proj3                          0.44303799
   2          2 proj2                          0.35443038
   3          5 proj5                          0.10126583
   4          1 proj1                          0.08860759
   5          4 proj4                          0.01265823

OBJ=  0.0000, INDEX=  0.0000--CONSISTENT
VIEW DELTA MATRIX(Y/[N])?

          FINAL WEIGHTS
 RANK     PROJECT # AND NAME                    WEIGHT
   1          1 proj1                          0.41939220
   2          4 proj4                          0.20442183
   3          2 proj2                          0.19394650
   4          3 proj3                          0.10755835
   5          5 proj5                          0.07468111

HIT <RETURN> TO CONTINUE
```

```
          MENU 1 2--ADDITIVE (ATTRIBUTES) MODEL

      0 --SPECIFY NUMBER OF ATTRIBUTES
      1 --READ OLD ATTRIBUTES MATRIX FROM FILE
      2 --SPECIFY NUMBER OF PROJECTS
      3 --READ OLD PROJECT MATRIX FROM FILE
      4 --ENTER (CHANGE) ATTRIBUTE NAMES
      5 --ENTER (CHANGE) PROJECT NAMES
      6 --ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
      7 --ENTER (CHANGE) (ADD) PROJECT COMPARISONS
      8 --VIEW PROJECT OR ATTRIBUTE COMPARISONS
      9 --CALCULATE ATTRIBUTE AND PROJECT WEIGHTS
      10--HELP WITH PROJECT RANKING INTERFACE
      11--RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [ 11 ]:

             MENU 0 0

      0 --ENTER (CHANGE) HEADER INFORMATION
      ##--EXECUTE BASIC MODEL
      ##--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      ##--EXECUTE VOTING MODEL
      ##--EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[8]

ENTER NAME OF OUTPUT FILE
jlxb5o dat
WOULD YOU CARE FOR A PRINTED COPY (Y/N) ? [N]

  quit
FORTRAN STOP
$ lindo
 LINDO (UC  6 DEC 82)
```

OUTPUT FILE

```
=001NAME:
    man 5
=002ORGANIZATION:
    dlab
=003PURPOSE:
    rank five projects



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      5
=006NUMBER OF ATTRIBUTES(1- 20):
      2
=007NUMBER AND NAME OF ATTRIBUTES
      1 attribute 1
      2 attribute 2

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1 00000000   5 00000000
      0 00000000   1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0 83333331 0 16666666
=010NUMBER AND NAME OF PROJECTS:
      1 proj1
      2 proj2
      3 proj3
      4 proj4
      5 proj5

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
      1 00000000   3 00000000   0 00000000   2 00000000   7 00000000
      0 00000000   1 00000000   4 00000000   0 00000000   6 00000000
      0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 48554912 0 16184972 0 04046243 0 24277456 0 06936417
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1 00000000   0 00000000   0 00000000   7 00000000   0 00000000
      4 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   8 00000000   1 00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES)
    0 08860759 0 35443038 0 44303799 0 01265823 0 10126583
= 15FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 41939220 0 19394650 0 10755835 0 20442183 0 07468111
999999
```

Input, Executed Run, and Output using the VOTING Model for

Group 1 - (Person 6)

INPUT FILE

Name: Man 6

Input file name (if any): dlxb1o.dat dlxb2o.dat

Organization: dlxb

Name of output file to contain results: dlxb6o.dat

Purpose: Composite example, Voting Model

Name of attribute (if any):

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PR1				
2	PR2				
3	PR3				
4	PR4				

EXECUTED RUN

```
LINDO USER INTERFACE
FOR PROJECT RANKING
     MENU 0.0

0 --ENTER (CHANGE) HEADER INFORMATION
1 --EXECUTE BASIC MODEL
2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
3 --EXECUTE VOTING MODEL
4 --EXECUTE HIERARCHY MODEL
5 --EXECUTE CONSTRAINTS MODEL
6 --HELP ON PROJECT RANKING INTERFACE
7 --END PROGRAM, DELETE RESULTS
8 --END PROGRAM, SAVE(PRINT) RESULTS

PLEASE ENTER NUMBER OF YOUR CHOICE(0)

PLEASE ENTER YOUR NAME.
man 6
ORGANIZATION (DLX, DLX3, ETC).
dlxb
PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE )
ENTER A MAXIMMUM OF FIVE LINES, ENTERING A BLANK LINE
TO QUIT BEFORE FIVE LINES
combine results of man 1 and man 2

          MENU 0 0

0 --ENTER (CHANGE) HEADER INFORMATION
1 --EXECUTE BASIC MODEL
2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
3 --EXECUTE VOTING MODEL
4 --EXECUTE HIERARCHY MODEL
5 --EXECUTE CONSTRAINTS MODEL
6 --HELP ON PROJECT RANKING INTERFACE
7 --END PROGRAM, DELETE RESULTS
8 --END PROGRAM, SAVE(PRINT) RESULTS

PLEASE ENTER NUMBER OF YOUR CHOICE(1)
3
          MENU 1 3 -- VOTER MODEL

0 ENTER (ADD) INPUT FILE NAMES
1 VERIFY INPUT FILES
**CALCULATE WEIGHTS
3 HELP WITH PROJECT RANKING INTERFACE
4 RETURN TO MAIN MENU

PLEASE ENTER THE NUMBER OF YOUR CHOICE( 0 )

ENTER FILE NAMES OF VOTERS, BLANK LINE WHEN DONE
dlxb1o dat
dlxb2o dat
```

```
            MENU 1 3 -- VOTER MODEL

      0 ENTER (ADD) INPUT FILE NAMES
      1 VERIFY INPUT FILES
      2 CALCULATE WEIGHTS
      3 HELP WITH PROJECT RANKING INTERFACE
      4 RETURN TO MAIN MENU

   PLEASE ENTER THE NUMBER OF YOUR CHOICE[ 2 ]

   RANK     PROJECT # AND NAME                    WEIGHT
     1          3 pr3                          0 32873362
     2          4 pr4                          0 31769103
     3          1 pr1                          0 26088971
     4          2 pr2                          0 09268570

HIT <RETURN> TO CONTINUE

            MENU 1 3 -- VOTER MODEL


      0 ENTER (ADD) INPUT FILE NAMES
      1 VERIFY INPUT FILES
      2 CALCULATE WEIGHTS
      3 HELP WITH PROJECT RANKING INTERFACE
      4 RETURN TO MAIN MENU

   PLEASE ENTER THE NUMBER OF YOUR CHOICE[ 4 ]

              MENU 0 0


      0 --ENTER (CHANGE) HEADER INFORMATION
      **--EXECUTE BASIC MODEL
      **--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      **--EXECUTE VOTING MODEL
      **--EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

   PLEASE ENTER NUMBER OF YOUR CHOICE[8]

ENTER NAME OF OUTPUT FILE
jlxb60 dat
WOULD YOU CARE FOR A PRINTED COPY (Y/N) ? [N]

  quit
FORTRAN STOP
$ lindo
LINDO (UC  & DEC 82)
  user
```

OUTPUT FILE

```
=001NAME
    man 6
=002ORGANIZATION
    dlab
=003PURPOSE
    combine results of man 1 and man 2



=004MODEL TYPE (1-5)
    3
=005NUMBER OF PROJECTS(1-200)
      4
=006NUMBER OF ATTRIBUTES(1- 20)
      1
=007NUMBER AND NAME OF ATTRIBUTES
      1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES)
      1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES)
    0 00000000
=010NUMBER AND NAME OF PROJECTS
      1 pr1
      2 pr2
      3 pr3
      4 pr4

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
      0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 26088971 0 09268570 0 32873362 0 31769103
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 26088971 0 09268570 0 32873362 0 31769103
999999
```

Input, Executed Run, and Output using the VOTER Model

for Group 2 - (Person 7)

INPUT FILE

Name: Man 7

Input file name (if any): dlxb3o.dat dlxb4o.dat dlxb5o.dat

Organization: dlxb

Name of output file to contain results: dlxb7o.dat

Purpose: Composite example, Voting Model

Name of attribute (if any):

NUMBER	NAME (LIST ATTRIBUTES OR PROJECTS)	PREFERRED	NOT PREFERRED	DEGREE OF PREFERENCE TIE WEAK STRONG ABS. 1 2 3 4 5 6 7 8 9	COMMENTS
1	PROJ1				
2	PROJ2				
3	PROJ3				
4	PROJ4				
5	PROJ5				

EXECUTED RUN

```
          LINDO USER INTERFACE
          FOR PROJECT RANKING
               MENU 0.0

     0 --ENTER (CHANGE) HEADER INFORMATION
     1 --EXECUTE BASIC MODEL
     2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     3 --EXECUTE VOTING MODEL
     4 --EXECUTE HIERARCHY MODEL
     5 --EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM, DELETE RESULTS
     8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[0]:

PLEASE ENTER YOUR NAME:
man 7
ORGANIZATION (DLX, DLXB, ETC):
dlxb
PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE.)
ENTER A MAXIMMUM OF FIVE LINES. ENTERING A BLANK LINE
TO QUIT BEFORE FIVE LINES.
three way vote with man 3, man 4, and man 5

               MENU 0.0

     0 --ENTER (CHANGE) HEADER INFORMATION
     1 --EXECUTE BASIC MODEL
     2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     3 --EXECUTE VOTING MODEL
     4 --EXECUTE HIERARCHY MODEL
     5 --EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM, DELETE RESULTS
     8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[1]:
3
            MENU 1.3 -- VOTER MODEL

     0 ENTER (ADD) INPUT FILE NAMES
     1 VERIFY INPUT FILES
     **CALCULATE WEIGHTS
     3 HELP WITH PROJECT RANKING INTERFACE
     4 RETURN TO MAIN MENU

  PLEASE ENTER THE NUMBER OF YOUR CHOICE[ 0 ]

ENTER FILE NAMES OF VOTERS, BLANK LINE WHEN DONE
dlxb3o.dat
dlxb4o.dat
dlxb5o.dat
```

```
            MENU 1.3 -- VOTER MODEL


      0 ENTER (ADD) INPUT FILE NAMES
      1 VERIFY INPUT FILES
      2 CALCULATE WEIGHTS
      3 HELP WITH PROJECT RANKING INTERFACE
      4 RETURN TO MAIN MENU

   PLEASE ENTER THE NUMBER OF YOUR CHOICE[ 2 ]:

   RANK     PROJECT # AND NAME                    WEIGHT
     1          5 proj5                        0.35055956
     2          4 proj4                        0.29090089
     3          1 proj1                        0.20002742
     4          2 proj2                        0.08472551
     5          3 proj3                        0.07378660

HIT <RETURN> TO CONTINUE

            MENU 1.3 -- VOTER MODEL


      0 ENTER (ADD) INPUT FILE NAMES
      1 VERIFY INPUT FILES
      2 CALCULATE WEIGHTS
      3 HELP WITH PROJECT RANKING INTERFACE
      4 RETURN TO MAIN MENU

   PLEASE ENTER THE NUMBER OF YOUR CHOICE[ 4 ]:

               MENU 0.0


      0 --ENTER (CHANGE) HEADER INFORMATION
      **--EXECUTE BASIC MODEL
      **--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      **--EXECUTE VOTING MODEL
      **--EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM. DELETE RESULTS
      8 --END PROGRAM. SAVE(PRINT) RESULTS

   PLEASE ENTER NUMBER OF YOUR CHOICE[8]

ENTER NAME OF OUTPUT FILE
31ab7o.dat
WOULD YOU CARE FOR A PRINTED COPY (Y/N) ? [N]

   quit
FORTRAN STOP
$ lindo
 LINDO (UC  6 DEC 82)
  user
```

OUTPUT FILE

```
=001NAME
    man 7
=002ORGANIZATION
    dlab
=003PURPOSE
    three way vote with man 3, man 4, and man 5



=004MODEL TYPE (1-5).
    3
=005NUMBER OF PROJECTS(1-200)
      5
=006NUMBER OF ATTRIBUTES(1- 20)
      1
=007NUMBER AND NAME OF ATTRIBUTES
      1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES)
      1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES)
    0 00000000
=010NUMBER AND NAME OF PROJECTS
      1 proj1
      2 proj2
      3 proj3
      4 proj4
      5 proj5

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 20002742 0 08472551 0 07378660 0 29090089 0 35055956
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 20002742 0 08472551 0 07378660 0 29090089 0 35055956
999999
```

Input, Executed Run, and Output using the HIERARCHY Model and the CONSTRAINTS Model for Division Chief - (Person 8)

INPUT FILE

Name: Man 8

Input file name (if any): dlxb6o.dat dlxb7o.dat

Organization: dlxb

Name of output file to contain results: dlxb9o.dat

Purpose: Composite example, Hierarchy Model

Name of attribute (if any):

Project or attribute for File	Project (or Attribute) Name (up to 32 spaces long)	Comparisons 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	PR1				5																				
2	PR3																								
3	PR4							3																	
4	PROJ1																								
5	PROJ2			4																					
6	NEW1							2																	
7	NEW2					4																			
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									
16																									
17																									
18																									
19																									
20																									
21																									
22																									
23																									
24																									

Name: Man 8 Input file name (if any): none

Organization: dlxb Name of output file to contain results: dlxb9o.dat

Purpose: Composite example, Constraints Model

CONSTRAINTS	UNITS	TOTAL RESOURCES
1 Costs	Thousands of Dollars	1000
2		
3		
4		
5		
6		
7		
8		
9		
10		

Name: Man 8

Input file name (if any): none

Organization: dlxb

Name of output file to contain results: dlxb9o.dat

Purpose: Composite example, Constraints Model

	PROJECT (OR ATTRIBUTE) NAME (UP TO 32 SPACES LONG)	RESOURCE REQUIREMENTS FOR CONSTRAINT # 1	2	3	4	5	6	7	8	9	10
1	PR1	200									
2	PR3	100									
3	PR4	500									
4	PROJ1	300									
5	PROJ2	50									
6	NEW1	750									
7	NEW2	450									
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											

EXECUTED RUN

```
          LINDO USER INTERFACE
          FOR PROJECT RANKING
               MENU 0 0


      0 --ENTER (CHANGE) HEADER INFORMATION
      1 --EXECUTE BASIC MODEL
      2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      3 --EXECUTE VOTING MODEL
      4 --EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[0].

PLEASE ENTER YOUR NAME.
man 8
ORGANIZATION (DLX, DLXB, ETC).
dlxb
PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE )
ENTER A MAXIMMUM OF FIVE LINES, ENTERING A BLANK LINE
TO QUIT BEFORE FIVE LINES.
combine projects ranked by group1 with those ranked by
group2, and add two new projects

               MENU 0 0


      0 --ENTER (CHANGE) HEADER INFORMATION
      1 --EXECUTE BASIC MODEL
      2 --EXECUTE ADDITIVE (ATTRIBUTES) MODEL
      3 --EXECUTE VOTING MODEL
      4 --EXECUTE HIERARCHY MODEL
      5 --EXECUTE CONSTRAINTS MODEL
      6 --HELP ON PROJECT RANKING INTERFACE
      7 --END PROGRAM, DELETE RESULTS
      8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[1]
4
      HIERARCHY MODEL


ENTER THE NAME OF INPUT FILE # 1 ,OR BLANK TO QUIT
dlxb60 dat
FOR FILE # 1 CHOOSE ACTION

      0--VIEW HEADER INFORMATION
      1--LIST PROJECTS
      2--LOAD ALL PROJECTS
      3--LOAD CERTAIN PROJECTS ONLY
      4--LOAD NO PROJECTS
      5--HELP ON PROJECT RANKING INTERFACE

PLEASE ENTER NUMBER OF CHOICE[2]
3
ENTER PROJECT NUMBERS TO BE INCLUDED, QUIT WITH 0
1
3
4
0
ENTER THE NAME OF INPUT FILE # 2 ,OR BLANK TO QUIT
dlxb70 dat
FOR FILE # 2 CHOOSE ACTION
```

```
        0 --VIEW HEADER INFORMATION
        1--LIST PROJECTS
        2--LOAD ALL PROJECTS
        3--LOAD CERTAIN PROJECTS ONLY
        4--LOAD NO PROJECTS
        5--HELP ON PROJECT RANKING INTERFACE

 PLEASE ENTER NUMBER OF CHOICE(2)
 3

ENTER PROJECT NUMBERS TO BE INCLUDED, QUIT WITH 0
1
2
0
ENTER THE NAME OF INPUT FILE # 3 ,OR BLANK TO QUIT



                    MENU 1 4 1 HIERARCHY CONTINUED

      0 --VERIFY FILE INPUT
      1 --RECALL ADDITIONAL PROJECTS
      **--ADD NEW PROJECTS OF YOUR OWN
      3 --CHANGE PROJECT NAMES
      4 --LOAD COMPARISONS FROM SUBORDINATE FILES
      5 --SPECIFY NUMBER OF ATTRIBUTES
      6 --READ OLD ATTRIBUTE MATRIX FROM A FILE
      7 --ENTER (CHANGE) ATTRIBUTE NAMES
      **--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
      **--ADD (CHANGE) PROJECT COMPARISONS
      10--DISPLAY PROJECT OR ATTRIBUTE MATRIX
      **--CALCULATE WEIGHTS
      12--HELP ON PROJECT RANKING INTERFACE
      13--RETURN TO MAIN MENU

 PLEASE ENTER NUMBER OF CHOICE( 4)



                    MENU 1 4 1 HIERARCHY CONTINUED

      0 --VERIFY FILE INPUT
      **--RECALL ADDITIONAL PROJECTS
      2 --ADD NEW PROJECTS OF YOUR OWN
      3 --CHANGE PROJECT NAMES
      **--LOAD COMPARISONS FROM SUBORDINATE FILES
      5 --SPECIFY NUMBER OF ATTRIBUTES
      6 --READ OLD ATTRIBUTE MATRIX FROM A FILE
      7 --ENTER (CHANGE) ATTRIBUTE NAMES
      **--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
      9 --ADD (CHANGE) PROJECT COMPARISONS
      10--DISPLAY PROJECT OR ATTRIBUTE MATRIX
      11--CALCULATE WEIGHTS
      12--HELP ON PROJECT RANKING INTERFACE
      13--RETURN TO MAIN MENU

 PLEASE ENTER NUMBER OF CHOICE( 9)
2
ENTER NAMES OF NEW PROJECTS, QUIT WITH A BLANK
new1
new2
```

```
                    MENU 1 4 1 HIERARCHY CONTINUED

     0 --VERIFY FILE INPUT
     ##--RECALL ADDITIONAL PROJECTS
     2 --ADD NEW PROJECTS OF YOUR OWN
     3 --CHANGE PROJECT NAMES
     ##--LOAD COMPARISONS FROM SUBORDINATE FILES
     5 --SPECIFY NUMBER OF ATTRIBUTES
     6 --READ OLD ATTRIBUTE MATRIX FROM A FILE
     7 --ENTER (CHANGE) ATTRIBUTE NAMES
     ##--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     9 --ADD (CHANGE) PROJECT COMPARISONS
     10--DISPLAY PROJECT OR ATTRIBUTE MATRIX
     11--CALCULATE WEIGHTS
     12--HELP ON PROJECT RANKING INTERFACE
     13--RETURN TO MAIN MENU

 PLEASE ENTER NUMBER OF CHOICE[ 9]
0

SOURCE                              PROJECT                     NEW PROJECT NUMBER
  1 dlxb6o dat                      1 pr1                                1
  1 dlxb6o dat                      3 pr3                                2
  1 dlxb6o dat                      4 pr4                                3
  2 dlxb7o dat                      1 proj1                              4
  2 dlxb7o dat                      2 proj2                              5
 26 ***USER-ADDED PROJECT***        0 new1                               6
 26 ***USER-ADDED PROJECT***        0 new2                               7

HIT <RETURN> TO CONTINUE
```



```
                    MENU 1 4 1 HIERARCHY CONTINUED

     0 --VERIFY FILE INPUT
     ##--RECALL ADDITIONAL PROJECTS
     2 --ADD NEW PROJECTS OF YOUR OWN
     3 --CHANGE PROJECT NAMES
     ##--LOAD COMPARISONS FROM SUBORDINATE FILES
     5 --SPECIFY NUMBER OF ATTRIBUTES
     6 --READ OLD ATTRIBUTE MATRIX FROM A FILE
     7 --ENTER (CHANGE) ATTRIBUTE NAMES
     ##--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     9 --ADD (CHANGE) PROJECT COMPARISONS
     10--DISPLAY PROJECT OR ATTRIBUTE MATRIX
     11--CALCULATE WEIGHTS
     12--HELP ON PROJECT RANKING INTERFACE
     13--RETURN TO MAIN MENU

 PLEASE ENTER NUMBER OF CHOICE[ 9]

WITH RESPECT TO ATTRIBUTE   1 OVERALL WORTH
ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON
ENTER ZEROS TO QUIT

1 4 5
3 7 3
7 5 4
5 7 2
5 3 4
0 0 0
```

```
                MENU 1 4 1 HIERARCHY CONTINUED

     0 --VERIFY FILE INPUT
     **--RECALL ADDITIONAL PROJECTS
     2 --ADD NEW PROJECTS OF YOUR OWN
     3 --CHANGE PROJECT NAMES
     **--LOAD COMPARISONS FROM SUBORDINATE FILES
     5 --SPECIFY NUMBER OF ATTRIBUTES
     6 --READ OLD ATTRIBUTE MATRIX FROM A FILE
     7 --ENTER (CHANGE) ATTRIBUTE NAMES
     **--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     9 --ADD (CHANGE) PROJECT COMPARISONS
     10--DISPLAY PROJECT OR ATTRIBUTE MATRIX
     11--CALCULATE WEIGHTS
     12--HELP ON PROJECT RANKING INTERFACE
     13--RETURN TO MAIN MENU

 PLEASE ENTER NUMBER OF CHOICE(11):

YOU ARE NOW ENTERING THE LINDO SYSTEM
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP      1

 DO RANGE(SENSITIVITY) ANALYSIS?
> n
ATTRIBUTE WEIGHTS


  RANK  ATTRIBUTE # AND NAME                WEIGHT
    1       1 OVERALL WORTH                 1 00000000

OBJ=  0.0000, INDEX=  0 0000--CONSISTENT
DISPLAY DELTA MATRIX(Y/(N))?

DISPLAY PROJECT WEIGHTS FOR EACH ATTRIBUTE?(Y/(N))
Y
YOU ARE NOW ENTERING THE LINDO SYSTEM.
WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS, RESPOND WITH AN "N"
    LP OPTIMUM FOUND  AT STEP     11

 DO RANGE(SENSITIVITY) ANALYSIS?
> n
WITH RESPECT TO ATTRIBUTE    1 OVERALL WORTH
PROJECT WEIGHTS WITH RESPECT TO ATTRIBUTE    1 OVERALL WORTH
  RANK     PROJECT # AND NAME                 WEIGHT
    1          1 pr1                        0 37345105
    2          6 new1                       0 25309196
    3          2 pr3                        0 13267513
    4          7 new2                       0 12654598
    5          4 proj1                      0 07469022
    6          5 proj2                      0 03163650
    7          3 pr4                        0 00790912

OBJ=  0 8693, INDEX=  0 1242--SOME CONSISTENCY
VIEW DELTA MATRIX(Y/(N))?

              FINAL WEIGHTS
  RANK     PROJECT # AND NAME                 WEIGHT
    1          1 pr1                        0 37345105
    2          6 new1                       0 25309196
```

```
3        2 pr3                        0.13267513
4        7 new2                       0.12654598
5        4 proj1                      0.07469022
6        5 proj2                      0.03163650
7        3 pr4                        0.00790912

HIT <RETURN> TO CONTINUE


                MENU 1.4.1 HIERARCHY CONTINUED

     0 --VERIFY FILE INPUT
     **--RECALL ADDITIONAL PROJECTS
     2 --ADD NEW PROJECTS OF YOUR OWN
     3 --CHANGE PROJECT NAMES
     **--LOAD COMPARISONS FROM SUBORDINATE FILES
     5 --SPECIFY NUMBER OF ATTRIBUTES
     6 --READ OLD ATTRIBUTE MATRIX FROM A FILE
     7 --ENTER (CHANGE) ATTRIBUTE NAMES
     **--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS
     9 --ADD (CHANGE) PROJECT COMPARISONS
     10--DISPLAY PROJECT OR ATTRIBUTE MATRIX
     11--CALCULATE WEIGHTS
     12--HELP ON PROJECT RANKING INTERFACE
     13--RETURN TO MAIN MENU

 PLEASE ENTER NUMBER OF CHOICE[13]:

               MENU 0.0


     0 --ENTER (CHANGE) HEADER INFORMATION
     **--EXECUTE BASIC MODEL
     **--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     **--EXECUTE VOTING MODEL
     **--EXECUTE HIERARCHY MODEL
     5 --EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM, DELETE RESULTS
     8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[8]:
5



             MENU 1.5 -- CONSTRAINTS MODEL

     0  --ENTER PROJECTS AND WEIGHTS
     1  --READ PROJECTS AND WEIGHTS FROM A FILE
     2  --ENTER CONSTRAINTS
     **  --ENTER RESOURCE REQUIREMENTS FOR PROJECTS
     **  --CALCULATE WHICH PROJECTS ARE TO BE FUNDED
     5  --VIEW PROJECT WEIGHTS AND NAMES
     6  --HELP WITH PROJECT RANKING INTERFACE
     7  --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [ 2 ]
```

```
ENTER NAME OF CONSTRAINT #  1. BLANK TO QUIT
costs
ENTER UNITS OF CONSTRAINT #            1
thousands of dollars
ENTER TOTAL AMOUNT OF AVAILABLE costs
IN UNITS OF thousands of dollars

1000
ENTER NAME OF CONSTRAINT #  2. BLANK TO QUIT



            MENU 1 5 -- CONSTRAINTS MODEL

     0  --ENTER PROJECTS AND WEIGHTS
     1  --READ PROJECTS AND WEIGHTS FROM A FILE
     2  --ENTER CONSTRAINTS
     3  --ENTER RESOURCE REQUIREMENTS FOR PROJECTS
     ** --CALCULATE WHICH PROJECTS ARE TO BE FUNDED
     5  --VIEW PROJECT WEIGHTS AND NAMES
     6  --HELP WITH PROJECT RANKING INTERFACE
     7  --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [ 3 ]

FOR PROJECT #  1-pr1                        ENTER
REQUIREMENT OF costs                      IN thousands of dollars
200
FOR PROJECT #  2-pr3                        ENTER
REQUIREMENT OF costs                      IN thousands of dollars
100
FOR PROJECT #  3-pr4                        ENTER
REQUIREMENT OF costs                      IN thousands of dollars
500
FOR PROJECT #  4-proj1                      ENTER
REQUIREMENT OF costs                      IN thousands of dollars
300
FOR PROJECT #  5-proj2                      ENTER
REQUIREMENT OF costs                      IN thousands of dollars
50
FOR PROJECT #  6-new1                       ENTER
REQUIREMENT OF costs                      IN thousands of dollars
750
FOR PROJECT #  7-new2                       ENTER
REQUIREMENT OF costs                      IN thousands of dollars
450



            MENU 1 5 -- CONSTRAINTS MODEL

     0  --ENTER PROJECTS AND WEIGHTS
     1  --READ PROJECTS AND WEIGHTS FROM A FILE
     2  --ENTER CONSTRAINTS
     3  --ENTER RESOURCE REQUIREMENTS FOR PROJECTS
     4  --CALCULATE WHICH PROJECTS ARE TO BE FUNDED
     5  --VIEW PROJECT WEIGHTS AND NAMES
```

```
      6  --HELP WITH PROJECT RANKING INTERFACE
      7  --RETURN TO MAIN MENU

   PLEASE ENTER NUMBER OF YOUR CHOICE [ 4 ]:

     LP OPTIMUM FOUND  AT STEP      4
    FIX ALL VARS (     5)  WITH RC >  0.147637E-01
SET     X0006 TO     0 AT     1 BND=  0.53776270      TWIN=  0.53776270

NEW INTEGER SOLUTION OF  0.537763      AT BRANCH       1 PIVOT       5
 BOUND ON OPTIMUM: 0.5377627
 DELETE     X0006 AT LEVEL      1
   RELEASE FIXED VARS
   FIX ALL VARS (     2)  WITH RC >  0.970186E-01
SET     X0006 TO     0 AT     1 BND=  0.71410215      TWIN=  0.71410215
SET     X0004 TO     1 AT     2 BND=  0.71087754      TWIN=  0.69475460
SET     X0007 TO     1 AT     3 BND=  0.64102483      TWIN=  0.64102483
SET     X0002 TO     0 AT     4 BND=  0.60632378      TWIN=  0.60632378

NEW INTEGER SOLUTION OF  0.606324      AT BRANCH       5 PIVOT      15
 BOUND ON OPTIMUM: 0.7317998
 DELETE     X0002 AT LEVEL      4
   FLIP     X0007 TO      0 WITH BOUND  0.6410248

NEW INTEGER SOLUTION OF  0.612453      AT BRANCH       5 PIVOT      17
 BOUND ON OPTIMUM: 0.7317998
 DELETE     X0007 AT LEVEL      3
   FLIP     X0004 TO      0 WITH BOUND  0.6947546

NEW INTEGER SOLUTION OF  0.664309      AT BRANCH       5 PIVOT      18
 BOUND ON OPTIMUM: 0.7317998
 DELETE     X0004 AT LEVEL      2
   FLIP     X0006 TO      1 WITH BOUND  0.7141021
 DELETE     X0006 AT LEVEL      1
   RELEASE FIXED VARS.

PIVOT LIMIT OF     27 EXCEEDED.  HOW MANY  MORE ALLOWED?
> 100
    ENUMERATION COMPLETE  BRANCHES=      5  PIVOTS=     27

LAST INTEGER SOLUTION IS THE BEST FOUND
FOUND THE FOLLOWING PROJECTS
          1  pr1
          2  pr3
          5  proj2
          7  new2
OBJ=  0.6643087      THE CLOSER OBJ IS TO 1. THE BETTER
HIT RETURN TO CONTINUE



          MENU 1.5 -- CONSTRAINTS MODEL

     0  --ENTER PROJECTS AND WEIGHTS
     1  --READ PROJECTS AND WEIGHTS FROM A FILE
     2  --ENTER CONSTRAINTS
     3  -- ENTER RESOURCE REQUIREMENTS FOR PROJECTS
     4  --CALCULATE WHICH PROJECTS ARE TO BE FUNDED
     5    VIEW PROJECT WEIGHTS AND NAMES
```

```
     6  --HELP WITH PROJECT RANKING INTERFACE
     7  --RETURN TO MAIN MENU

  PLEASE ENTER NUMBER OF YOUR CHOICE [ 7 ]

              MENU 0 0


     0 --ENTER (CHANGE) HEADER INFORMATION
     **--EXECUTE BASIC MODEL
     **--EXECUTE ADDITIVE (ATTRIBUTES) MODEL
     **--EXECUTE VOTING MODEL
     **--EXECUTE HIERARCHY MODEL
     **--EXECUTE CONSTRAINTS MODEL
     6 --HELP ON PROJECT RANKING INTERFACE
     7 --END PROGRAM, DELETE RESULTS
     8 --END PROGRAM, SAVE(PRINT) RESULTS

  PLEASE ENTER NUMBER OF YOUR CHOICE[8]

ENTER NAME OF OUTPUT FILE
dlxb9o dat
WOULD YOU CARE FOR A PRINTED COPY (Y/N) ? [N]

  quit
FORTRAN STOP
$ photo/off
```

OUTPUT FILE

```
=001NAME
    man 8
=002ORGANIZATION
    dlxb
=003PURPOSE
    combine projects ranked by group1 with those ranked by
    group2, and add two new projects


=004MODEL TYPE (1-5)
    5
=005NUMBER OF PROJECTS(1-200)
      7
=006NUMBER OF ATTRIBUTES(1- 20)
      1
=007NUMBER AND NAME OF ATTRIBUTES
      1 OVERALL WORTH

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES)
      1 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES)
    1 00000000
=010NUMBER AND NAME OF PROJECTS
      1 pr1
      2 pr3
      3 pr4
      4 proj1
      5 proj2
      6 new1
      7 new2

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1
      1 00000000   2 91477833   0 79362041   5 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 28194773   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   3 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   2 35088777   0 00000000   0 00000000
      0 00000000   0 00000000   4 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   2 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   4 00000000   0 00000000   1 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 37345105 0 13267513 0 00790912 0 07469022 0 03163650 0 25309195 0 12654598
= 13FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 37345105 0 13267513 0 00790912 0 07469022 0 03163650 0 25309195 0 12654598
999999
```

APPENDIX B

ADDITIONAL EXAMPLES

1. TEST EXAMPLE

Results from ranking projects using the Saaty-based program developed during Phase I [3] to the results from using the artificial deviation technique with a standard linear programming package to illustrate the effectiveness of the new technique even with missing comparisons when input is quite consistent. Eliminating a constraint is equivalent to omitting a comparison. The computer input and output below shows that a non-technical user needs an interactive frontend such as the one provided by this project. The objective function values and the weights given appear in Table B-1.

Model 7 BASIC

SAMPLE PROBLEM

1.00	0.20	0.11	0.50	0.33
5.00	1.00	0.33	3.00	2.00
9.00	3.00	1.00	8.00	4.00
2.00	0.33	0.13	1.00	0.50
3.00	0.50	0.25	2.00	1.00

SETUP

MIN S1 + S2 + S3 + S4 + S5 + S6 + S7 + S8 + S9 + S10 + S11 + S12 + S13
+ S14 + S15 + S16 + S17 + S18 + S19 + S20

SUBJECT TO

(1)	-5W1	+ W2				- S1 + S2	= 0
(2)	-9W1		+W3			- S3 + S4	= 0
(3)	-2W1			+ W4		- S5 + S6	= 0
(4)	-3W1				+ W5	- S7 + S8	= 0
(5)		-3W2	+ W3			- S9 + S10	= 0
(6)		- W2		+3W4		- S11 + S12	= 0
(7)		- W2			+2W5	- S13 + S14	= 0
(8)			- W3	+8W4		- S15 + S16	= 0
(9)			- W3		+4W5	- S17 + S18	= 0
(10)				-2W4	+ W5	- S19 + S20	= 0
(11)	W1	+ W2	+ W3	+ W4	+ W5		= 1

SOLUTION

	SAATY	ABSOLUTE DEVIATION
W1	0.045	0.045455
W2	0.218	0.204545
W3	0.534	0.545455
W4	0.073	0.068182
W5	0.130	0.136364
OBJ		0.318181

REMOVE SOME OF THE CONSTRAINTS

REMOVE CONSTRAINT #	W1	W2	W3	W4	W5	OBJ.
1	.061	.183	.550	.069	.137	.214
1,6	.061	.183	.550	.069	.137	.191
1,6,8	.061	.183	.550	.069	.137	.191
1,3,6,8	.061	.183	.550	.069	.137	.137
1,3,4,6,8	.061	.183	.550	.069	.137	.092

A_{ij}'s

1.00	——	——	——	——
4.50	1.00	——	3.00	1.50
12.0	2.67	1.00	8.00	4.00
1.50	——	——	1.00	——
3.00	——	——	2.00	1.00

2. SAATY SCHOOL EXAMPLES

a. Output Files Documenting Table 2

= 11PROJECT MATRIX FOR ATTRIBUTE # 1 INCONSISTANT CASE, NO MISSING VALUES

1 00000000	4 00000000	3 00000000	1 00000000	3 00000000	4 00000000
0 00000000	1 00000000	7 00000000	3 00000000	0 00000000	1 00000000
0 00000000	0 00000000	1 00000000	0 00000000	0 00000000	0 00000000
0 00000000	0 00000000	5 00000000	1 00000000	1 00000000	0 00000000
0 00000000	5 00000000	5 00000000	0 00000000	1 00000000	3 00000000
0 00000000	0 00000000	6 00000000	3 00000000	0 00000000	1 00000000

= 11PROJECT MATRIX FOR ATTRIBUTE # 1 INCONSISTENT CASE, FIVE MISSING VALUES

1 00000000	4 00000000	3 00000000	1 00000000	3 00000000	4 00000000
0 00000000	1 00000000	0 00000000	3 00000000	0 00000000	0 00000000
0 00000000	0 00000000	1 00000000	0 00000000	0 00000000	0 00000000
0 00000000	0 00000000	0 00000000	1 00000000	0 00000000	0 00000000
0 00000000	5 00000000	5 00000000	0 00000000	1 00000000	0 00000000
0 00000000	0 00000000	6 00000000	3 00000000	0 00000000	1 00000000

= 11PROJECT MATRIX FOR ATTRIBUTE # 1 INCONSISTENT CASE, TEN MISSING VALUES

1 00000000	4 00000000	3 00000000	1 00000000	3 00000000	4 00000000
0 00000000	1 00000000	0 00000000	0 00000000	0 00000000	0 00000000
0 00000000	0 00000000	1 00000000	0 00000000	0 00000000	0 00000000
0 00000000	0 00000000	0 00000000	1 00000000	0 00000000	0 00000000
0 00000000	0 00000000	0 00000000	0 00000000	1 00000000	0 00000000
0 00000000	0 00000000	0 00000000	0 00000000	0 00000000	1 00000000

b. Output Files Documenting Table 3

= 11PROJECT MATRIX FOR ATTRIBUTE # 1 CONSISTENT CASE, ZERO MISSING VALUES

1.00000000	5.00000000	7.00000000	5.00000000	3.00000000	1.00000000
0.00000000	1.00000000	3.00000000	0.00000000	0.00000000	0.00000000
0.00000000	0.00000000	1.00000000	0.00000000	0.00000000	0.00000000
0.00000000	5.00000000	4.00000000	1.00000000	0.00000000	0.00000000
0.00000000	6.00000000	5.00000000	5.00000000	1.00000000	1.00000000
0.00000000	6.00000000	5.00000000	6.00000000	0.00000000	1.00000000

= 11PROJECT MATRIX FOR ATTRIBUTE # 1: CONSISTENT CASE, FIVE MISSING VALUES

1.00000000	5.00000000	7.00000000	5.00000000	3.00000000	1.00000000
0.00000000	1.00000000	0.00000000	0.00000000	0.00000000	0.00000000
0.00000000	0.00000000	1.00000000	0.00000000	0.00000000	0.00000000
0.00000000	5.00000000	0.00000000	1.00000000	0.00000000	0.00000000
0.00000000	6.00000000	5.00000000	0.00000000	1.00000000	0.00000000
0.00000000	0.00000000	5.00000000	6.00000000	0.00000000	1.00000000

= 11PROJECT MATRIX FOR ATTRIBUTE # 1. CONSISTENT CASE, TEN MISSING VALUES

1.00000000	5.00000000	7.00000000	5.00000000	3.00000000	1.00000000
0.00000000	1.00000000	0.00000000	0.00000000	0.00000000	0.00000000
0.00000000	0.00000000	1.00000000	0.00000000	0.00000000	0.00000000
0.00000000	0.00000000	0.00000000	1.00000000	0.00000000	0.00000000
0.00000000	0.00000000	0.00000000	0.00000000	1.00000000	0.00000000
0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	1.00000000

3. PERSONNEL EXAMPLE

a. Output Files Documenting Table 4

```
=001NAME
    COLBURN
=002ORGANIZATION:
    DLXB
=003PURPOSE:
    HIRING EXAMPLE. ZERO MISSING PROJECT AND ATTRIBUTE VALUES



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20).
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1 00000000   0. 00000000   0 00000000   0. 00000000   0. 00000000   0. 00000000   0. 00000000
      2 00000000   1. 00000000   1. 00000000   1. 00000000   3. 00000000   0. 00000000   1. 00000000
      3. 00000000   0. 00000000   1. 00000000   0. 00000000   2. 00000000   0. 00000000   2. 00000000
      4. 50000000   0. 00000000   2. 00000000   1. 00000000   3. 00000000   0. 00000000   3. 00000000
      3. 00000000   0. 00000000   0. 00000000   0. 00000000   1. 00000000   0. 00000000   3. 00000000
      9. 00000000   4. 00000000   3. 00000000   4. 00000000   5. 00000000   1. 00000000   5. 00000000
      5. 00000000   0. 00000000   0. 00000000   0. 00000000   0. 00000000   0. 00000000   1. 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0. 04282655 0. 09635974 0. 12847966 0. 19271947 0. 07708780 0. 38543895 0. 07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1. 00000000   0. 00000000   0. 00000000   0. 00000000   0. 00000000   0. 00000000   0. 00000000
      3. 00000000   1. 00000000   0. 00000000   1. 00000000   2. 00000000   0. 00000000   0. 00000000
      5. 00000000   5. 00000000   1. 00000000   3. 00000000   4. 00000000   0. 00000000   3. 00000000
      3 00000000   0. 00000000   0. 00000000   1. 00000000   2. 00000000   0. 00000000   2. 00000000
      1. 00000000   0. 00000000   0. 00000000   0. 00000000   1. 00000000   0. 00000000   0. 00000000
      8. 00000000   6. 00000000   4. 00000000   6. 00000000   7. 00000000   1. 00000000   7. 00000000
      4. 00000000   2. 00000000   0. 00000000   0. 00000000   2. 00000000   0. 00000000   1. 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0. 04086266 0. 07945517 0. 20431328 0. 07945517 0. 05107832 0. 47673097 0. 06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1. 00000000   7. 00000000   0. 00000000   3. 00000000   2. 00000000   2. 00000000   0. 00000000
      0. 00000000   1. 00000000   0. 00000000   0. 00000000   0. 00000000   0. 00000000   0. 00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
- 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08163265 0.02040816 0.48979592 0.08163265 0.04081633 0.12244898 0.16326530
- 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
- 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.12345679 0.02645503 0.37037036 0.07407407 0.06172840 0.15873016 0.18518518
- 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
- 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.13043478 0.02608696 0.26086956 0.10434783 0.08695652 0.13043478 0.26086956
- 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
- 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06382979 0.02836879 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
- 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   5.00000000   1.00000000   1.00000000
999999
- 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05133471 0.02874743 0.05749487 0.14373717 0.07186858 0.28747433 0.35934290
- 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
- 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES).
    0 07547170 0 02641509 0 52830189 0 10566038 0 10566038 0 13207547 0 02641509
= 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 08113996 0 02909927 0 24293540 0 11100346 0 07102947 0 21185337 0 25293908
999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION

=003PURPOSE:
    6 MISSING PROJECT VALUES, REP 1



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   0.00000000   1.00000000   3.00000000   4.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   4.00000000   6.00000000   7.00000000   1.00000000   0.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.02608696 0.07826087 0.13043478 0.08695652 0.05217392 0.52173913 0.10434783
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   0.00000000   0.00000000   0.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6 00000000   9 00000000   1 00000000   5 00000000   5 00000000   4 00000000   4 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   3 00000000   1 00000000   0 00000000
      0 00000000   7 00000000   0 00000000   3 00000000   4 00000000   2 00000000   1 00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0 07667032 0 02628697 0 46002191 0 09200438 0 04600219 0 11500548 0 18400876
= 15PROJECT MATRIX FOR ATTRIBUTE #  3.
      1 00000000   5 00000000   0 00000000   0 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   8 00000000   1 00000000   5 00000000   6 00000000   3 00000000   2 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      2 00000000   6 00000000   0 00000000   0 00000000   2 00000000   1 00000000   2 00000000
      0 00000000   7 00000000   0 00000000   0 00000000   3 00000000   0 00000000   1 00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0 12820514 0 02564103 0 38461539 0 07692308 0 06410257 0 12820514 0 19230770
- 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1 00000000   7 00000000   0 00000000   4 00000000   1 00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   0 00000000   1 00000000   0 00000000   3 00000000   1 00000000   1 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   1 00000000   2 00000000   0 00000000
      0 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   2 00000000   1 00000000   0 00000000
      2 00000000   5 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0 14762741 0 02108963 0 29525483 0 03690685 0 09841828 0 10544816 0 29525483
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1 00000000   7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   9 00000000   1 00000000   4 00000000   6 00000000   2 00000000   1 00000000
      2 00000000   0 00000000   0 00000000   1 00000000   4 00000000   0 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      3 00000000   6 00000000   0 00000000   2 00000000   3 00000000   1 00000000   0 00000000
      4 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 50000000   1 00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0 05714286 0 02857143 0 34285712 0 08571428 0 05714286 0 17142856 0 25714284
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1 00000000   7 00000000   2 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   4 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      5 00000000   6 00000000   5 00000000   2 00000000   4 00000000   1 00000000   0 00000000
      0 00000000   0 00000000   6 00000000   0 00000000   5 00000000   1 00000000   1 00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0 05797102 0 02898551 0 05797102 0 14492753 0 07246377 0 28985506 0 34782609
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   4 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   2 00000000
      7 00000000   0 00000000   1 00000000   0 00000000   5 00000000   4 00000000   7 00000000
      0 00000000   4 00000000   0 00000000   1 00000000   0 00000000   0 00000000   4 00000000
      2 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   4 00000000
      0 00000000   0 00000000   0 00000000   1 50000000   2 00000000   1 00000000   4 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES).
    0 07547170 0 02641509 0 52830189 0 10566038 0.10566038 0.13207547 0.02641509
= 25FINAL PROJECT WEIGHTS.(SAME ORDER AS NAMES)
    0 08599483 0 02865432 0 24573030 0.10019866 0.07435068 0.20533775 0.25973344
999999
```

```
=001NAME:
    COLBURN
=002ORGANIZATION:

=003PURPOSE:
    15 MISSING PROJECT VALUES. ONE REP ONLY



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGANIZATION AND MANAGEM
      5 ACTIVITY LEVEL
      6 EXPERIENCE IN PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000
      4.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04000000 0.12000000 0.20000000 0.12000000 0.04000000 0.31999999 0.16000000
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0 09545454 0 01363636 0 57272726 0 03181818 0 04772727 0 04772727 0 19090909
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1 00000000   5 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0 09345794 0 01869159 0 28037384 0 09345794 0 04672897 0 18691589 0 28037384
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1 00000000   7 00000000   0 00000000   4 00000000   1 00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0 10108303 0 01444043 0 50541514 0 02527076 0 10108303 0 05054151 0 20216605
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1 00000000   7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      4 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0 05833333 0 00833333 0 29166669 0 11666667 0 11666667 0 17500001 0 23333333
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1 00000000   7 00000000   2 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      5 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0 05668017 0 00809717 0 02834008 0 17004049 0 05668017 0 28340080 0 39676115
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   4 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      7 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      1 50000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
```

```
- 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
    0 06629834 0 02209945 0. 46408841 0 09944752 0. 13259669 0. 19889504 0. 01657459
- 25FINAL PROJECT WEIGHTS. (SAME ORDER AS NAMES)
    0 07385347 0 01710458 0. 26636171 0. 10728279 0. 07285835 0. 19011517 0. 27242392
999999
```

b. Table of Objective Functions and Output Files Documenting Figure 3.

TABLE B-1

IMPACT ON THE AVERAGE OBJECTIVE FUNCTION, $\overline{Z}$, OF DECREASING NUMBERS OF COMPARISONS, k, FOR MATRICES GENERATED IN THE PERSONNEL EXAMPLE WHERE $\overline{Z}$ IS THE AVERAGE OF THREE RANDOMLY GENERATED REPLICATES FOR EACH NON-TRIVIAL VALUE OF k

Number of Comparisons, K	OBJ. FUNCTION VALUE (Z) FOR EACH GROUP OF N PROJECTS A-H (N=7)							
	Z(A)	Z(B)	Z(C)	Z(D)	Z(E)	Z(F)	Z(G)	Z(H)
21								
	1.2141	1.2554	1.5510	1.1852	2.0000	0.9149	1.1232	0.9868
AVE.	1.2141	1.2554	1.5510	1.1852	2.0000	0.9149	1.1232	0.9868
18								
	0.9302	1.0644	1.3333	1.1078	1.8522	0.8227	0.8689	0.6326
	1.0220	1.1518	1.3152	0.8314	1.4630	0.7801	0.9534	0.9213
	1.0493	1.0305	1.4574	1.0998	1.6829	0.6879	0.9720	0.8322
AVE.	1.0005	1.0822	1.3686	1.0130	1.6660	0.7636	0.9314	0.7954
16								
	1.0220	0.4794	1.1573	0.7160	0.9848	0.7159	0.8411	0.7388
	0.6582	0.9557	0.7815	0.8119	1.2278	0.4393	0.9178	0.6457
	0.6120	0.5953	1.1053	0.8056	1.4255	0.4696	0.8619	0.9075
AVE.	0.7641	0.6768	1.0147	0.7778	1.2127	0.5416	0.8736	0.7640
15								
	0.4980	0.5611	1.2826	0.7563	1.5263	0.4604	0.6616	0.6674
	0.5683	0.6000	1.1446	0.6795	1.2759	0.5714	0.6957	0.5811
	0.5706	0.5204	0.8421	0.6735	0.8679	0.7419	0.6166	0.7641
AVE.	0.5456	0.5605	1.0898	0.7031	1.2234	0.5912	0.6580	0.6709
13								
	0.4832	0.3866	0.8675	0.5598	0.5455	0.4762	0.5469	0.4240
	0.3374	0.3942	0.7290	0.5714	1.0411	0.4925	0.5185	0.3780
	0.4270	0.9020	0.6509	0.6364	0.5419	0.5329	0.6687	0.5726
AVE.	0.4159	0.5609	0.7491	0.5892	0.7095	0.5005	0.5780	0.4582
11								
	0.3656	0.3109	0.7621	0.1514	0.8511	0.1771	0.3145	0.1321
	0.2589	0.2725	0.2991	0.3950	0.7457	0.2464	0.4762	0.1874
	0.6299	0.2731	0.5822	0.4910	1.3226	0.2523	0.6972	0.1818
AVE.	0.4181	0.2855	0.5478	0.3458	0.9731	0.2253	0.4960	0.1671
6								
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AVE.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

```
*001NAME
    COLBURN
*002ORGANIZATION
    DLXB
*003PURPOSE
    HIRING EXAMPLE, ZERO MISSING PROJECT AND ATTRIBUTE VALUES



*004MODEL TYPE (1-5)
    2
*005NUMBER OF PROJECTS(1-200)
      7
*006NUMBER OF ATTRIBUTES(1- 20)
      7
*007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
*008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1 00000000   0 00000000   0 00000000   0.00000000   0.00000000   0.00000000   0 00000000
      2 00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3 00000000   0 00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4 50000000   0 00000000   2.00000000   1.00000000   3.00000000   0.00000000   3 00000000
      3 00000000   0 00000000   0.00000000   0.00000000   1.00000000   0.00000000   3 00000000
      9 00000000   4.00000000   3 00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5 00000000   0 00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
*009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0 04282655 0 09635974 0 12847966 0.19271947 0.07708780 0.38543895 0.07708780
*010NUMBER AND NAME OF PROJECTS
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
* 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1 00000000   0 00000000   0 00000000   0 00000000   0.00000000   0.00000000   0 00000000
      3 00000000   1 00000000   0 00000000   1 00000000   2.00000000   0 00000000   0.00000000
      5 00000000   5.00000000   1 00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3 00000000   0 00000000   0 00000000   1 00000000   2.00000000   0.00000000   2 00000000
      1.00000000   0 00000000   0 00000000   0 00000000   1.00000000   0.00000000   0 00000000
      8 00000000   6 00000000   4 00000000   6 00000000   7.00000000   1.00000000   7.00000000
      4 00000000   2 00000000   0 00000000   0 00000000   2.00000000   0.00000000   1 00000000
999999
* 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 04086266 0 07945517 0 20431328 0.07945517 0 05107832 0 47673097 0.06810443
* 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1 00000000   7 00000000   0 00000000   3 00000000   2 00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0.00000000   0.00000000   0 00000000
```

```
      6 00000000   9 00000000   1 00000000   5 00000000   5 00000000   4 00000000   4 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   6 00000000   0 00000000   2 00000000   3 00000000   1 00000000   0 00000000
      2 00000000   7 00000000   0 00000000   3 00000000   4 00000000   2 00000000   1 00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0 08163265 0 02040816 0 48979592 0 08163265 0 04081633 0 12244898 0 16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1 00000000   5 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   8 00000000   1 00000000   5 00000000   6 00000000   3 00000000   2 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      2 00000000   6 00000000   0 00000000   3 00000000   2 00000000   1 00000000   2 00000000
      3 00000000   7 00000000   0 00000000   4 00000000   3 00000000   0 00000000   1 00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0 12345679 0 02645503 0 37037036 0 07407407 0 06172840 0 15873016 0 18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1 00000000   7 00000000   0 00000000   4 00000000   1 00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   5 00000000   1 00000000   2 00000000   3 00000000   1 00000000   1 00000000
      0 00000000   4 00000000   0 00000000   1 00000000   1 00000000   2 00000000   2 00000000
      0 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   2 00000000   1 00000000   0 00000000
      2 00000000   5 00000000   0 00000000   0 00000000   3 00000000   2 00000000   1 00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0 13043478 0 02608696 0 26086956 0 10434783 0 08695652 0 13043478 0 26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1 00000000   7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   9 00000000   1 00000000   4 00000000   6 00000000   2 00000000   1 00000000
      2 00000000   6 00000000   0 00000000   1 00000000   4 00000000   0 00000000   0 00000000
      2 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      3 00000000   6 00000000   0 00000000   2 00000000   3 00000000   1 00000000   0 00000000
      4 00000000   7 00000000   0 00000000   3 00000000   3 00000000   1 50000000   1 00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0 06382979 0 02836879 0 34042552 0 08510638 0 05673759 0 17021276 0 25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1 00000000   7 00000000   2 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   5 00000000   4 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   4 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      5 00000000   6 00000000   5 00000000   2 00000000   4 00000000   1 00000000   0 00000000
      7 00000000   7 00000000   6 00000000   3 00000000   5 00000000   1 00000000   1 00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0 05133471 0 02874743 0 05749487 0 14373717 0 07186858 0 28747433 0 35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   4 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   2 00000000
      7 00000000   8 50000000   1 00000000   5 00000000   5 00000000   4 00000000   7 00000000
      1 50000000   4 00000000   0 00000000   1 00000000   1 00000000   0 00000000   4 00000000
      2 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   4 00000000
      3 00000000   5 00000000   0 00000000   1 50000000   2 00000000   1 00000000   4 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
```

```
= 24PROJECT WE'GHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
   0 07547170 0 02641509 0 52830189 0 10566038 0 10566038 0 13207547 0 02641509
= 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
   0 08113996 0 02909927 0 24293540 0 11100346 0 07102947 0 21185337 0 25293908
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
   0 07547170 0 02641509 0 52830189 0. 10566038 0. 10566038 0. 13207547 0. 02641509
= 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
   0 07692412 0 02820364 0 24043813 0. 11290092 0. 06996678 0. 21496889 0. 25657749
999999
```

```
      6 00000000   9 00000000   1 00000000   5 00000000   5 00000000   4 00000000   4 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   6 00000000   0 00000000   2 00000000   3 00000000   1 00000000   0 00000000
      2 00000000   7 00000000   0 00000000   3 00000000   4 00000000   2 00000000   1 00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0 08163265 0 02040816 0 48979592 0 08163265 0 04081633 0 12244898 0 16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1 00000000   5 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   8 00000000   1 00000000   5 00000000   6 00000000   3 00000000   2 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      2 00000000   6 00000000   0 00000000   3 00000000   2 00000000   1 00000000   2 00000000
      3 00000000   7 00000000   0 00000000   4 00000000   3 00000000   0 00000000   1 00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0 12345679 0 02645503 0 37037036 0 07407407 0 06172840 0 15873016 0 18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1 00000000   7 00000000   0 00000000   4 00000000   1 00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   5 00000000   1 00000000   2 00000000   3 00000000   1 00000000   1 00000000
      0 00000000   4 00000000   0 00000000   1 00000000   1 00000000   2 00000000   2 00000000
      0 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   2 00000000   1 00000000   0 00000000
      2 00000000   5 00000000   0 00000000   0 00000000   3 00000000   2 00000000   1 00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0 13043478 0 02608696 0 26086956 0 10434783 0 08695652 0 13043478 0 26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1 00000000   7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   9 00000000   1 00000000   4 00000000   6 00000000   2 00000000   1 00000000
      2 00000000   6 00000000   0 00000000   1 00000000   4 00000000   0 00000000   0 00000000
      2 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      3 00000000   6 00000000   0 00000000   2 00000000   3 00000000   1 00000000   0 00000000
      4 00000000   7 00000000   0 00000000   3 00000000   3 00000000   1 50000000   1 00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0 06382979 0 02836879 0 34042552 0 08510638 0 05673759 0 17021276 0 25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1 00000000   7 00000000   2 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   5 00000000   4 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   4 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      5 00000000   6 00000000   5 00000000   2 00000000   4 00000000   1 00000000   0 00000000
      7 00000000   7 00000000   6 00000000   3 00000000   5 00000000   1 00000000   1 00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0 05133471 0 02874743 0 05749487 0 14373717 0 07186858 0 28747433 0 35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   4 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   2 00000000
      7 00000000   8 50000000   1 00000000   5 00000000   5 00000000   4 00000000   7 00000000
      1 50000000   4 00000000   0 00000000   1 00000000   1 00000000   0 00000000   4 00000000
      2 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   4 00000000
      3 00000000   5 00000000   0 00000000   1 50000000   2 00000000   1 00000000   4 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION:

=003PURPOSE:
    3 MISSING ATTRIBUTE VALUES, REP 3



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
    7
=006NUMBER OF ATTRIBUTES(1- 20):
    7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1 00000000   0 00000000   0 00000000   0. 00000000   0. 00000000   0. 00000000   0. 00000000
      2 00000000   1. 00000000   0. 00000000   1. 00000000   3. 00000000   0. 00000000   1. 00000000
      3 00000000   0. 00000000   1. 00000000   0. 00000000   2. 00000000   0. 00000000   2. 00000000
      4. 50000000   0. 00000000   2. 00000000   1. 00000000   3. 00000000   0. 00000000   3. 00000000
      0 00000000   0. 00000000   0. 00000000   0. 00000000   1. 00000000   0. 00000000   3. 00000000
      0. 00000000   4. 00000000   3. 00000000   4. 00000000   5. 00000000   1. 00000000   5. 00000000
      5. 00000000   0. 00000000   0. 00000000   0. 00000000   0. 00000000   0. 00000000   1. 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0. 02463054 0. 11083744 0. 14778325 0. 11083744 0. 07389162 0. 44334975 0. 08866995
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1 00000000   0 00000000   0 00000000   0 00000000   0. 00000000   0 00000000   0. 00000000
      3 00000000   1 00000000   0. 00000000   1 00000000   2. 00000000   0 00000000   0. 00000000
      5 00000000   5 00000000   1 00000000   3. 00000000   4. 00000000   0. 00000000   3. 00000000
      3. 00000000   0 00000000   0 00000000   1. 00000000   2. 00000000   0. 00000000   2. 00000000
      1. 00000000   0. 00000000   0 00000000   0. 00000000   1. 00000000   0. 00000000   0. 00000000
      8. 00000000   6 00000000   4 00000000   6 00000000   7. 00000000   1. 00000000   7. 00000000
      4 00000000   2 00000000   0 00000000   0 00000000   2 00000000   0. 00000000   1. 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0 04086266 0 07945517 0. 20431328 0. 07945517 0. 05107832 0. 47673097 0 06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1 00000000   7 00000000   0 00000000   3 00000000   2 00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
   0 07547170 0 02641509 0 52830189 0. 10566038 0. 10566038 0. 13207547 0. 02641509
= 25FINAL PROJECT WEIGHTS: (SAME ORDER AS NAMES)
   0 08144297 0 02914429 0 23788673 0. 11141542 0. 07076127 0. 21345448 0. 25589484
999999
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08163265 0.02040816 0.48979592 0.08163265 0.04081633 0.12244898 0.16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.12345679 0.02645503 0.37037036 0.07407407 0.06172840 0.15873016 0.18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.13043478 0.02608696 0.26086956 0.10434783 0.08695652 0.13043478 0.26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06382979 0.02836879 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   5.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05133471 0.02874743 0.05749487 0.14373717 0.07186858 0.28747433 0.35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION

=003PURPOSE.
    3 MISSING ATTRIBUTE VALUES, REP 2



=004MODEL TYPE (1-5)
    2
=005NUMBER OF PROJECTS(1-200)
      7
=006NUMBER OF ATTRIBUTES(1- 20)
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1 00000000   0 00000000   0. 00000000   0. 00000000   0. 00000000   0. 00000000   0. 00000000
      2 00000000   1 00000000   1. 00000000   1. 00000000   0. 00000000   0. 00000000   0. 00000000
      3 00000000   0. 00000000   1. 00000000   0 00000000   2. 00000000   0. 00000000   2. 00000000
      4. 50000000   0 00000000   2 00000000   1. 00000000   3. 00000000   0. 00000000   3. 00000000
      3 00000000   0. 00000000   0. 00000000   0. 00000000   1. 00000000   0. 00000000   3. 00000000
      9 00000000   4. 00000000   3. 00000000   4 00000000   0. 00000000   1. 00000000   5. 00000000
      5 00000000   0 00000000   0 00000000   0. 00000000   0. 00000000   0. 00000000   1. 00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES)
    0 04395605 0 09890110 0 13186812 0 19780220 0 06593406 0 39560440 0. 06593406
=010NUMBER AND NAME OF PROJECTS.
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1 00000000   0 00000000   0. 00000000   0 00000000   0. 00000000   0. 00000000   0. 00000000
      3 00000000   1 00000000   0 00000000   1. 00000000   2. 00000000   0. 00000000   0. 00000000
      5 00000000   5 00000000   1 00000000   3. 00000000   4. 00000000   0. 00000000   3. 00000000
      3. 00000000   0 00000000   0 00000000   1. 00000000   2. 00000000   0. 00000000   2. 00000000
      1 00000000   0 00000000   0. 00000000   0. 00000000   1. 00000000   0. 00000000   0. 00000000
      8 00000000   6 00000000   4 00000000   6 00000000   7 00000000   1. 00000000   7. 00000000
      4 00000000   2 00000000   0 00000000   0. 00000000   2 00000000   0. 00000000   1. 00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0 04086266 0 07945517 0 20431328 0 07945517 0 05107832 0 47673097 0 06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2.
      1 00000000   7 00000000   0 00000000   3 00000000   2 00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
    0 07547170 0. 02641509 0. 52830189 0. 10566038 0. 10566038 0. 13207547 0. 02641509
= 25FINAL PROJECT WEIGHTS: (SAME ORDER AS NAMES)
    0 07817043 0 02911632 0. 23831698 0. 11100342 0. 06777517 0. 21796450 0. 25765324
999999
```

```
=001NAME
    COLCURN
=002ORGANIZATION.

=003PURPOSE:
    COOP EXAMPLE
    3 MISSING VALUES FROM ATTRIBUTE MATRIX, REP 1


=004MODEL TYPE (1-5).
    2
=005NUMBER OF PROJECTS(1-200).
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   0.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   0.00000000   3.00000000   4.00000000   5.00000000   1.00000000   0.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04651163 0.13953489 0.13953489 0.06976745 0.41860467 0.04651163
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   6.00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04086266 0.07945517 0.20431328 0.07945517 0.05107832 0.47673097 0.06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
*001NAME:
    COLBURN
*002ORGANIZATION:

*003PURPOSE:
    3 MISSING PROJECT VALUES, REP 1



*004MODEL TYPE (1-5):
    2
*005NUMBER OF PROJECTS(1-200):
      7
*006NUMBER OF ATTRIBUTES(1- 20):
      7
*007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
*008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
*009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
*010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
* 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   0.00000000   0.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
* 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.03402187 0.08505467 0.17010935 0.08505467 0.04252734 0.51032805 0.07290401
* 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      0.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08130082 0.02032520 0.48780489 0.09756098 0.04878049 0.12195122 0.14227642
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   0.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.11608624 0.02487562 0.34825870 0.06965175 0.05804312 0.20895524 0.17412935
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.13043478 0.02608696 0.26086956 0.10434783 0.08695652 0.13043478 0.26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   0.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06382979 0.02836880 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   0.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   0.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   5.00000000   0.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05385997 0.04488330 0.05385997 0.12567325 0.07540395 0.26929983 0.37701976
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      7.00000000   0.00000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
- 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES)
   0 07497657 0 02624180 0 52483600 0 10496720 0 10496720 0 13120900 0 03280225
- 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
   0 08080322 0 03533419 0 23676960 0 10519397 0 07226644 0 21262519 0 25700745
999999
```

```
=001NAME:
    COLBURN
=002ORGANIZATION:
    DLXB
=003PURPOSE:
    3 MISSING VALUES, REP 2


=004MODEL TYPE (1-5):
   2
=005NUMBER OF PROJECTS(1-200):
     7
=006NUMBER OF ATTRIBUTES(1- 20):
     7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
   0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP 1
      2 APP 2
      3 APP 3
      4 APP 4
      5 APP 5
      6 APP 6
      7 APP 7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   6.00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
   0.04017857 0.07812500 0.20089285 0.07812500 0.06696428 0.46874997 0.06696428
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   0.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   0.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08484849 0.01818182 0.50909090 0.04242424 0.09090909 0.12727273 0.12727273
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   0.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   0.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   0.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.11345219 0.02431118 0.34035656 0.06807131 0.05672609 0.22690438 0.17017828
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   0.00000000   1.00000000   0.00000000   3.00000000   0.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.09259259 0.01851852 0.46296296 0.07407407 0.07407407 0.09259259 0.18518518
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   0.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.00000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06331658 0.03618091 0.33768845 0.08442211 0.05628141 0.16884422 0.25326633
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      0.00000000   7.00000000   6.00000000   0.00000000   5.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.06217617 0.03108808 0.05181347 0.15544042 0.07772021 0.31088084 0.31088084
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
- 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
    0.07497657 0.02624180 0.52483600 0.10496720 0.10496720 0.13120900 0.03280225
- 25FINAL PROJECT WEIGHTS: (SAME ORDER AS NAMES)
    0.07694322 0.02858478 0.27707133 0.10496751 0.07557819 0.22229193 0.21456304
999999
```

```
=001NAME:
    COLBURN
=002ORGANIZATION:

=003PURPOSE:
    3 MISSING PROJECT VALUES, REP 3



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   4.00000000   0.00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.02851324 0.08553971 0.17107943 0.08553971 0.04276986 0.51323825 0.07331976
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   0.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08731809 0.02494803 0.52390850 0.05821206 0.04365904 0.08731809 0.17463617
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   0.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   0.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.11093502 0.02377179 0.33280507 0.06656101 0.09984153 0.19968306 0.16640253
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   0.00000000   1.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.12195122 0.02439024 0.29268292 0.09756097 0.09756097 0.12195122 0.24390244
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   0.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06382979 0.02836880 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   0.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   5.00000000   0.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05594406 0.01958042 0.03496503 0.13986014 0.07832167 0.27972028 0.39160839
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   0.00000000   0.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      0.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
- 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
    0.06920415 0.03114187 0.48442906 0.10380623 0.12456748 0.15570934 0.03114187
- 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0.07920866 0.02595663 0.23403794 0.10509671 0.08183280 0.21249147 0.26137581
999999
```

```
=001NAME:
    COLBURN
=002ORGANIZATION

=003PURPOSE:
    FIVE MISSING ATTRIBUTE VALUES, REP 1



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   0.00000000   3.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      0.00000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      0.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04395605 0.09890110 0.13186812 0.19780220 0.06593406 0.39560440 0.06593406
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   6.00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04086266 0.07945517 0.20431328 0.07945517 0.05107832 0.47673097 0.06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08163265 0.02040816 0.48979592 0.08163265 0.04081633 0.12244898 0.16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.12345679 0.02645503 0.37037036 0.07407407 0.06172840 0.15873016 0.18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.13043478 0.02608696 0.26086956 0.10434783 0.08695652 0.13043478 0.26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06382979 0.02836879 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   5.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05133471 0.02874743 0.05749487 0.14373717 0.07186858 0.28747433 0.35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
   0.07547170 0.02641509 0.52830189 0.10566038 0.10566038 0.13207547 0.02641509
= 25FINAL PROJECT WEIGHTS: (SAME ORDER AS NAMES)
   0.08144297 0.02914429 0.23788673 0.11141542 0.07076127 0.21345448 0.25589484
999999
```

```
=001NAME:
    COLBURN
=002ORGANIZATION:

=003PURPOSE:
    FIVE MISSING ATTRIBUTE VALUES, REP 2



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.05063291 0.11392405 0.15189874 0.11392405 0.07594937 0.45569620 0.03797469
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   6.00000000  -7.00000000  -1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04086266 0.07945517 0.20431328 0.07945517 0.05107832 0.47673097 0.06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6 00000000   9 00000000   1 00000000   5 00000000   5 00000000   4 00000000   4 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   6 00000000   0 00000000   2 00000000   3 00000000   1 00000000   0 00000000
      2 00000000   7 00000000   0 00000000   3 00000000   4 00000000   2 00000000   1 00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0 08163265 0 02040816 0 48979592 0 08163265 0 04081633 0 12244898 0 16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1 00000000   5 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   8 00000000   1 00000000   5 00000000   6 00000000   3 00000000   2 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      2 00000000   6 00000000   0 00000000   3 00000000   2 00000000   1 00000000   2 00000000
      3 00000000   7 00000000   0 00000000   4 00000000   3 00000000   0 00000000   1 00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0 12345679 0 02645503 0 37037036 0 07407407 0 06172840 0 15873016 0 18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1 00000000   7 00000000   0 00000000   4 00000000   1 00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   5 00000000   1 00000000   2 00000000   3 00000000   1 00000000   1 00000000
      0 00000000   4 00000000   0 00000000   1 00000000   1 00000000   2 00000000   2 00000000
      0 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   2 00000000   1 00000000   0 00000000
      2 00000000   5 00000000   0 00000000   0 00000000   3 00000000   2 00000000   1 00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0 13043478 0 02608696 0 26086956 0 10434783 0 08695652 0 13043478 0 26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1 00000000   7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   9 00000000   1 00000000   4 00000000   6 00000000   2 00000000   1 00000000
      2 00000000   6 00000000   0 00000000   1 00000000   4 00000000   0 00000000   0 00000000
      2 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      3 00000000   6 00000000   0 00000000   2 00000000   3 00000000   1 00000000   0 00000000
      4 00000000   7 00000000   0 00000000   3 00000000   3 00000000   1 50000000   1 00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0 06382979 0 02836879 0 34042552 0 08510638 0 05673759 0 17021276 0 25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1 00000000   7 00000000   2 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   5 00000000   4 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   4 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      5 00000000   6 00000000   5 00000000   2 00000000   4 00000000   1 00000000   0 00000000
      7 00000000   7 00000000   6 00000000   3 00000000   5 00000000   1 00000000   1 00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0 05133471 0 02874743 0 05749487 0 14373717 0 07186858 0 28747433 0 35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   4 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   2 00000000
      7 00000000   8 50000000   1 00000000   5 00000000   5 00000000   4 00000000   7 00000000
      1 50000000   4 00000000   0 00000000   1 00000000   1 00000000   0 00000000   4 00000000
      2 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   4 00000000
      3 00000000   5 00000000   0 00000000   1 50000000   2 00000000   1 00000000   4 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
    0.07547170 0.02641509 0.52830189 0.10566038 0.10566038 0.13207547 0.02641509
= 25FINAL PROJECT WEIGHTS: (SAME ORDER AS NAMES)
    0.07608838 0.02959624 0.22424002 0.11243914 0.06759096 0.22600278 0.26404253
999999
```

```
=001NAME

=002ORGANIZATION

=003PURPOSE:
    FIVE MISSING ATTRIBUTE VALUES, REP 3



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1 00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2 00000000   1.00000000   1.00000000   1.00000000   0.00000000   0.00000000   1.00000000
      3 00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4 50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04000000 0.11999999 0.11999999 0.21599999 0.07200000 0.35999998 0.07200000
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1 00000000   0 00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3 00000000   1 00000000   0 00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2 00000000
      1.00000000   0.00000000   0 00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   6 00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0 00000000   0.00000000   2 00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0 04086266 0 07945517 0.20431328 0 07945517 0.05107832 0.47673097 0 06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1 00000000   7.00000000   0 00000000   3 00000000   2 00000000   2.00000000   0.00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08163265 0.02040816 0.48979592 0.08163265 0.04081633 0.12244898 0.16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.12345679 0.02645503 0.37037036 0.07407407 0.06172840 0.15873016 0.18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.13043478 0.02608696 0.26086956 0.10434783 0.08695652 0.13043478 0.26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06382979 0.02836879 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   5.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05133471 0.02874743 0.05749487 0.14373717 0.07186858 0.28747433 0.35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
- 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
    0.07547170 0.02641509 0.52830189 0.10566038 0.10566038 0.13207547 0.02641509
- 25FINAL PROJECT WEIGHTS: (SAME ORDER AS NAMES)
    0.08292935 0.02873009 0.25098684 0.10988273 0.07069645 0.20624015 0.25053436
999999
```

```
=001NAME:
    COLBURN
=002ORGANIZATION:

=003PURPOSE:
    5 MISSING PROJECT VALUES. REF 1



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
    7
=006NUMBER OF ATTRIBUTES(1- 20):
    7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP 1
      2 APP 2
      3 APP 3
      4 APP 4
      5 APP 5
      6 APP 6
      7 APP 7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   0.00000000   0.00000000   6.00000000   7.00000000   1.00000000   0.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04715127 0.05893910 0.23575638 0.06876227 0.05893910 0.41257367 0.11787819
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      0.00000000   7.00000000   0.00000000   3.00000000   0.00000000   0.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08308606 0.01780416 0.49851632 0.06231454 0.08902077 0.12462908 0.12462908
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   1.00000000   5.00000000   0.00000000   3.00000000   2.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      0.00000000   7.00000000   0.00000000   4.00000000   0.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.12345679 0.02469136 0.37037036 0.07407407 0.07407407 0.14814815 0.18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   1.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   0.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.21212122 0.03030303 0.15151516 0.07575758 0.07575758 0.15151516 0.30303031
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   0.00000000   6.00000000   2.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   0.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06642067 0.01476015 0.33210331 0.08856089 0.05535055 0.17712177 0.26568267
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      0.00000000   7.00000000   6.00000000   3.00000000   5.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.07009346 0.04672897 0.05607477 0.14018692 0.07009346 0.28037384 0.33644861
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   0.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
    0.07240590 0.05962839 0.50684130 0.10136826 0.10136826 0.12671033 0.03167758
= 25FINAL PROJECT WEIGHTS:(SAME ORDER AS NAMES)
    0.10448364 0.03699770 0.22120433 0.10174116 0.07431701 0.20940103 0.25185317
999999
```

```
=001NAME:
    COLBURN
=002ORGANIZATION:

=003PURPOSE:
    5 MISSING PROJECT VALUES, REP 2



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   1.00000000   0.00000000   4.00000000   0.00000000   3.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   0.00000000   4.00000000   6.00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.06645570 0.03797469 0.13291140 0.08860760 0.06645570 0.53164560 0.07594937
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   0.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   0.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08403362 0.01680672 0.50420165 0.10084034 0.04201681 0.12605041 0.12605041
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   8.00000000   1.00000000   5.00000000   0.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.06930693 0.02970297 0.41584161 0.06930693 0.06930693 0.13861386 0.20792080
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   0.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   0.00000000   1.00000000   0.00000000   0.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.09493671 0.01898734 0.47468352 0.06329114 0.06329114 0.09493671 0.18987341
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   0.00000000   1.00000000   4.00000000   0.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   0.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06276151 0.01673640 0.33472803 0.08368201 0.08368201 0.16736402 0.25104603
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   0.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   0.00000000   3.00000000   0.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05721097 0.01787843 0.03337306 0.13349225 0.07151371 0.28605485 0.40047678
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   0.00000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
    0.07497657 0.02624180 0.52483600 0.10496720 0.10496720 0.13120900 0.03280225
= 25FINAL PROJECT WEIGHTS:(SAME ORDER AS NAMES)
    0.07081347 0.02092541 0.27831000 0.10060933 0.07010349 0.20429297 0.25494534
999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION

=003PURPOSE
    5 MISSING VALUES, REP 3



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1 00000000   0 00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2 00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3 00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4 50000000   0 00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3 00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9 00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5 00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0 09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1 00000000   0 00000000   0 00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3 00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5 00000000   0.00000000   1.00000000   0.00000000   4.00000000   0.00000000   3.00000000
      3 00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8 00000000   6.00000000   4.00000000   6.00000000   0.00000000   1.00000000   0.00000000
      4 00000000   2 00000000   0 00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0 03112840 0 09338522 0 14007783 0.09338522 0.03501946 0.56031132 0.04669261
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1 00000000   0 00000000   0.00000000   3 00000000   2.00000000   2.00000000   0.00000000
      0 00000000   1 00000000   0 00000000   0.00000000   0.00000000   0 00000000   0 00000000
```

```
      0.00000000   9.00000000   1.00000000   5.00000000   0.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   0.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
- 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.21052632 0.01754386 0.42105263 0.07017544 0.03508772 0.10526316 0.14035088
- 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   0.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
- 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.06944444 0.01388889 0.41666666 0.08333333 0.06944444 0.13888888 0.20833333
- 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   0.00000000   1.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   0.00000000   2.00000000   1.00000000
999999
- 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.10638298 0.04255319 0.31914896 0.10638298 0.10638298 0.10638298 0.21276596
- 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   0.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
- 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.05668016 0.03643725 0.34008098 0.08502024 0.05668016 0.17004049 0.25506073
- 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   0.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   0.00000000   1.00000000   1.00000000
999999
- 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.06006006 0.02402402 0.06006006 0.12012012 0.07507508 0.30030030 0.36036038
- 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   0.00000000   4.00000000   7.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   0.00000000   0.00000000   1.50000000   2.00000000   1.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
    0.07547170 0.02641509 0.52830189 0.10566038 0.10566038 0.13207547 0.02641509
= 25FINAL PROJECT WEIGHTS: (SAME ORDER AS NAMES)
    0.08438044 0.02978010 0.25170219 0.10296828 0.07573641 0.21152270 0.24388988
999999
```

```
*001NAME:

*002ORGANIZATION:

*003PURPOSE:
    SIX MISSING ATTRIBUTE VALUES, REP 1



*004MODEL TYPE (1-5):
    2
*005NUMBER OF PROJECTS(1-200):
      7
*006NUMBER OF ATTRIBUTES(1- 20):
      7
*007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
*008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   0.00000000   1.00000000   0.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   0.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
*009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04048583 0.09109312 0.12145749 0.09109312 0.21862349 0.36437249 0.07287449
*010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
* 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   6.00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
* 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04086266 0.07945517 0.20431328 0.07945517 0.05107832 0.47673097 0.06810443
* 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6 00000000   9 00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0 00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0 00000000   5 00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0 00000000   6 00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2 00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0 08163265 0 02040816 0.48979592 0.08163265 0.04081633 0.12244898 0.16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5 00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1 00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8 00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0 00000000   6 00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0 00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2 00000000   6 00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0 12345679 0 02645503 0.37037036 0.07407407 0.06172840 0.15873016 0.18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5 00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0 00000000   5.00000000   0 00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0 13043478 0 02608696 0.26086956 0.10434783 0 08695652 0.13043478 0.26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2 00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3 00000000   6.00000000   0 00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0 06382979 0.02836879 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1 00000000   7 00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0 00000000   1 00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4 00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3 00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0 00000000   4 00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5 00000000   6 00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7 00000000   7.00000000   6.00000000   3.00000000   5.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0 05133471 0 02874743 0 05749487 0.14373717 0.07186858 0.28747433 0.35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   3 00000000   0 00000000   0 00000000   0.00000000   0 00000000   4.00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0.00000000   2.00000000
      7 00000000   8 50000000   1 00000000   5 00000000   5 00000000   4.00000000   7.00000000
      1 50000000   4 00000000   0 00000000   1 00000000   1.00000000   0 00000000   4.00000000
      2 00000000   4 00000000   0 00000000   0 00000000   1.00000000   0 00000000   4 00000000
      3 00000000   5 00000000   0 00000000   1 50000000   2 00000000   1 00000000   4.00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1.00000000
999999
```

```
- 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
    0.07547170 0.02641509 0.52830189 0.10566038 0.10566038 0.13207547 0.02641509
- 25FINAL PROJECT WEIGHTS:(SAME ORDER AS NAMES)
    0.07412660 0.02926720 0.25551081 0.10783528 0.06749561 0.21320097 0.25256360
999999
```

```
=001NAME:

=002ORGANIZATION:

=003PURPOSE:
    SIX MISSING ATTRIBUTE VALUES, REP 2



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   0.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      9.00000000   4.00000000   0.00000000   4.00000000   5.00000000   1.00000000   0.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04371585 0.09836065 0.09836065 0.09836065 0.04918033 0.39344260 0.21857923
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   6.00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04086266 0.07945517 0.20431328 0.07945517 0.05107832 0.47673097 0.06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
    0.08163265 0.02040816 0.48979592 0.08163265 0.04081633 0.12244898 0.16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
    0.12345679 0.02645503 0.37037036 0.07407407 0.06172840 0.15873016 0.18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
    0.13043478 0.02608696 0.26086956 0.10434783 0.08695652 0.13043478 0.26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
    0.06382979 0.02836879 0.34042502 0.08510638 0.05673759 0.17021276 0.25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   5.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
    0.05133471 0.02874743 0.05749487 0.14373717 0.07186858 0.28747433 0.35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
   0.07547170 0.02641509 0.52830189 0.10566038 0.10566038 0.13207547 0.02641509
= 25FINAL PROJECT WEIGHTS:(SAME ORDER AS NAMES)
   0.07462171 0.02912832 0.27403656 0.11288564 0.07503410 0.21167204 0.22262165
999999
```

```
=001NAME:

=002ORGANIZATION:

=003PURPOSE:
    SIX MISSING ATTRIBUTE VALUES, REP 3



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
     7
=006NUMBER OF ATTRIBUTES(1- 20):
     7
=007NUMBER AND NAME OF ATTRIBUTES
     1 ACADEMIC FIELD
     2 COMMUNICATIONS
     3 HUMAN RELATIONS
     4 ORGAN & MANAGEMENT
     5 ACTIVITY LEVEL
     6 EXP & PLACEMENT
     7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
     1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
     0.00000000   1.00000000   1.00000000   1.00000000   0.00000000   0.00000000   1.00000000
     0.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
     4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
     0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
     0.00000000   4.00000000   3.00000000   0.00000000   5.00000000   1.00000000   5.00000000
     5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04907976 0.09202454 0.12269939 0.22085890 0.07361963 0.36809817 0.07361963
=010NUMBER AND NAME OF PROJECTS:
     1 APP1
     2 APP2
     3 APP3
     4 APP4
     5 APP5
     6 APP6
     7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
     1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
     3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
     5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
     3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
     1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
     8.00000000   6.00000000   4.00000000   6.00000000   7.00000000   1.00000000   7.00000000
     4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04086266 0.07945517 0.20431328 0.07945517 0.05107832 0.47673097 0.06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
     1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
     0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08163265 0.02040816 0.48979592 0.08163265 0.04081633 0.12244898 0.16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.12345679 0.02645503 0.37037036 0.07407407 0.06172840 0.15873016 0.18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.13043478 0.02608696 0.26086956 0.10434783 0.08695652 0.13043478 0.26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06382979 0.02836879 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   5.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05133471 0.02874743 0.05749487 0.14373717 0.07186858 0.28747433 0.35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
   0 07547170 0 02641509 0 52830189 0. 10566038 0. 10566038 0. 13207547 0. 02641509
= 25FINAL PROJECT WEIGHTS. (SAME ORDER AS NAMES)
   0 08262303 0 02940029 0 24327964 0. 11050042 0. 07145255 0. 21102306 0. 25171909
999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION:

=003PURPOSE:
    6 MISSING PROJECT VALUES, REP 1



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000.   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   0.00000000   1.00000000   3.00000000   4.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   4.00000000   6.00000000   7.00000000   1.00000000   0.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.02608696 0.07826087 0.13043478 0.08695652 0.05217392 0.52173913 0.10434783
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   0.00000000   0.00000000   0.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   3.00000000   1.00000000   0.00000000
      0.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.07667032 0.02628697 0.46002191 0.09200438 0.04600219 0.11500548 0.18400876
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   0.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   8.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   0.00000000   2.00000000   1.00000000   2.00000000
      0.00000000   7.00000000   0.00000000   0.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.12820514 0.02564103 0.38461539 0.07692308 0.06410257 0.12820514 0.19230770
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   0.00000000   1.00000000   0.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.14762741 0.02108963 0.29525483 0.03690685 0.09841828 0.10544816 0.29525483
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   0.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.05714286 0.02857143 0.34285712 0.08571428 0.05714286 0.17142856 0.25714284
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      0.00000000   0.00000000   6.00000000   0.00000000   5.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05797102 0.02898551 0.05797102 0.14492753 0.07246377 0.28985506 0.34782609
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   0.00000000   1.00000000   0.00000000   5.00000000   4.00000000   7.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
* 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES)
   0 07547170 0 02641509 0 52830189 0 10566038 0 10566038 0 13207547 0 02641509
* 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
   0 08599483 0 02865432 0 24573030 0 10019866 0 07435068 0.20533775 0.25973344
999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION:

=003PURPOSE:
    6 MISSING VALUES. REP 2



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP 1
      2 APP 2
      3 APP 3
      4 APP 4
      5 APP 5
      6 APP 6
      7 APP 7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   0.00000000   6.00000000   7.00000000   1.00000000   0.00000000
      0.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.05236908 0.06982543 0.23940149 0.07980050 0.05985037 0.41895261 0.07980050
= 13PROJECT MATRIX FOR ATTRIBUTE #  2.
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6 00000000   9 00000000   1 00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0 00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0 00000000
      0 00000000   0 00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0 00000000   6 00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      0 00000000   7 00000000   0 00000000   3.00000000   0.00000000   0.00000000   1.00000000
999999
- 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08695652 0.02173913 0.52173913 0.06521739 0.04347826 0.13043478 0.13043478
- 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1 00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0 00000000   1 00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3 00000000   0 00000000   1.00000000   0.00000000   6.00000000   3.00000000   2.00000000
      0 00000000   6 00000000   0 00000000   1.00000000   0.00000000   0.00000000   0.00000000
      0 00000000   5.00000000   0.00000000   0 00000000   1.00000000   0.00000000   0.00000000
      2.00000000   0 00000000   0.00000000   3.00000000   0.00000000   1.00000000   2.00000000
      3 00000000   7 00000000   0.00000000   4.00000000   0.00000000   0.00000000   1.00000000
999999
- 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.07168459 0 01433692 0.43010750 0.05376344 0.07168459 0.14336918 0.21505375
- 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   1.00000000   0.00000000   2.00000000
      0 00000000   4.00000000   0.00000000   0.00000000   1 00000000   0.00000000   0.00000000
      0 00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0 00000000
      2 00000000   5 00000000   0 00000000   0.00000000   0.00000000   2.00000000   1.00000000
999999
- 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.08771930 0 03508772 0.26315790 0.08771930 0.08771930 0.26315790 0.17543860
- 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   0.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      0.00000000   6 00000000   0 00000000   1.00000000   4.00000000   0.00000000   0.00000000
      0 00000000   5.00000000   0 00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   0.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   0.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
- 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06474821 0.01438849 0.34532374 0.08633094 0.05755396 0.17266187 0.25899282
- 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2 00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0 00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   1 00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3 00000000   5 00000000   4 00000000   1.00000000   1.00000000   0 00000000   0 00000000
      0 00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5 00000000   6 00000000   5 00000000   2.00000000   4.00000000   1 00000000   0.00000000
      7 00000000   7.00000000   6.00000000   0.00000000   5.00000000   0.00000000   1 00000000
999999
- 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0 04986702 0.04654256 0.05585106 0.14960106 0.06981383 0.27925533 0.34906915
- 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0 00000000   1 00000000   0.00000000   0.00000000   0.00000000   0 00000000   2 00000000
      7 00000000   0 00000000   1 00000000   0 00000000   0.00000000   4.00000000   7.00000000
      1 50000000   4 00000000   0 00000000   1.00000000   1.00000000   0.00000000   0.00000000
      2 00000000   0 00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3 00000000   5.00000000   0 00000000   1 50000000   2.00000000   1 00000000   4.00000000
      0 00000000   0 00000000   0 00000000   0.00000000   0 00000000   0 00000000   1 00000000
999999
```

```
- 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES)
    0 07289294 0 02733485 0 51025057 0 10933941 0 10933941 0 13667427 0 03416857
- 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 06656827 0 03484492 0 25398463 0 10626052 0 07264239 0 23112857 0 23457073
999999
```

```
*001NAME
    COLBURN
*002ORGANIZATION

*003PURPOSE:
    6 MISSING PROJECT VALUES, REP 3



*004MODEL TYPE (1-5):
    2
*005NUMBER OF PROJECTS(1-200).
      7
*006NUMBER OF ATTRIBUTES(1- 20):
      7
*007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
*008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1 00000000   0 00000000   0 00000000   0.00000000   0 00000000   0.00000000   0.00000000
      2 00000000   1.00000000   1 00000000   1.00000000   3 00000000   0.00000000   1.00000000
      3 00000000   0.00000000   1 00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4 50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3 00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3 00000000
      9 00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5 00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
*009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0 09635974 0.12847966 0 19271947 0.07708780 0.38543895 0.07708780
*010NUMBER AND NAME OF PROJECTS.
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1 00000000   0 00000000   0 00000000   0.00000000   0.00000000   0.00000000   0 00000000
      3 00000000   1 00000000   0.00000000   1 00000000   2.00000000   0.00000000   0.00000000
      5 00000000   5 00000000   1.00000000   3 00000000   0.00000000   0.00000000   0.00000000
      3 00000000   0 00000000   0.00000000   1.00000000   0.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0 00000000   6 00000000   0 00000000   6 00000000   7.00000000   1 00000000   0.00000000
      4 00000000   2 00000000   0 00000000   0 00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES)
    0 03061225 0 07142857 0 21428572 0 07142857 0 06122449 0 42857143 0 12244899
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1 00000000   7 00000000   0 00000000   0 00000000   0.00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
```

```
      6 00000000   0 00000000   1 00000000   5 00000000   5 00000000   4 00000000   4 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   6 00000000   0 00000000   2 00000000   3 00000000   1 00000000   0 00000000
      0 00000000   7 00000000   0 00000000   3 00000000   0 00000000   2 00000000   1 00000000
999999
- 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0 08009154 0 01716247 0 48054919 0 09610984 0 08581236 0 12013730 0 12013730
- 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1 00000000   0 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   8 00000000   1 00000000   0 00000000   6 00000000   0 00000000   2 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   6 00000000   0 00000000   0 00000000   2 00000000   1 00000000   0 00000000
      3 00000000   7 00000000   0 00000000   4 00000000   3 00000000   0 00000000   1 00000000
999999
- 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0 12698413 0 02721089 0 38095239 0 04761905 0 06349207 0 16326530 0 19047619
- 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1 00000000   7 00000000   0 00000000   0 00000000   1 00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   5 00000000   1 00000000   2 00000000   3 00000000   1 00000000   1 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   2 00000000   0 00000000
      0 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   2 00000000   1 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   3 00000000   2 00000000   1 00000000
999999
- 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0 05660377 0 02358491 0 28301886 0 14150943 0 09433962 0 11792453 0 28301886
- 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1 00000000   7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   9 00000000   1 00000000   4 00000000   0 00000000   0 00000000   0 00000000
      2 00000000   6 00000000   0 00000000   1 00000000   4 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      3 00000000   6 00000000   0 00000000   0 00000000   3 00000000   1 00000000   0 00000000
      0 00000000   7 00000000   0 00000000   3 00000000   3 00000000   1 50000000   1 00000000
999999
- 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0 06451613 0 03225807 0 32258064 0 08064516 0 06451613 0 19354840 0 24193549
- 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   4 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   4 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      5 00000000   0 00000000   5 00000000   2 00000000   4 00000000   1 00000000   0 00000000
      0 00000000   7 00000000   6 00000000   0 00000000   5 00000000   1 00000000   1 00000000
999999
- 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0 06217617 0 03108808 0 05181347 0 15544042 0 07772021 0 31088084 0 31088084
- 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   2 00000000
      0 00000000   8 50000000   1 00000000   5 00000000   5 00000000   4 00000000   7 00000000
      0 00000000   4 00000000   0 00000000   1 00000000   1 00000000   0 00000000   4 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   4 00000000
      3 00000000   5 00000000   0 00000000   0 00000000   2 00000000   1 00000000   4 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
```

```
* 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES)
   0 04355066 0 06148328 0 52260792 0 10452159 0 10452159 0 13065198 0 03266300
* 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
   0 06854790 0 03196300 0 24409525 0 11989675 0 08021656 0 21845075 0 23682982
999999
```

```
=001NAME:

=002ORGANIZATION:

=003PURPOSE:
    EIGHT MISSING ATTRIBUTE VALUES, REP 1



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   0.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04807692 0.10817307 0.14423077 0.10817307 0.08653846 0.43269229 0.07211538
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   6.00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04086266 0.07945517 0.20431328 0.07945517 0.05107832 0.47673097 0.06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08163265 0.02040816 0.48979592 0.08163265 0.04081633 0.12244898 0.16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.12345679 0.02645503 0.37037036 0.07407407 0.06172840 0.15873016 0.18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.13043478 0.02608696 0.26086956 0.10434783 0.08695652 0.13043478 0.26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06382979 0.02836879 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   5.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05133471 0.02874743 0.05749487 0.14373717 0.07186858 0.28747433 0.35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
* 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES)
    0 07547170 0 02641509 0 52830189 0 10566038 0 10566038 0 13207547 0.02641509
* 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 07588934 0 02946383 0 23687953 0 11180048 0 06880711 0 22181129 0.25534838
999999
```

```
=001NAME

=002ORGANIZATION

=003PURPOSE
    EIGHT MISSING ATTRIBUTE VALUES. REP 2



=004MODEL TYPE (1-5)
    2
=005NUMBER OF PROJECTS(1-200)
      7
=006NUMBER OF ATTRIBUTES(1- 20)
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1 00000000   0 00000000   0.00000000   0 00000000   0.00000000   0 00000000   0 00000000
      2 00000000   1 00000000   1.00000000   1 00000000   0.00000000   0.00000000   0.00000000
      3 00000000   0 00000000   1.00000000   0 00000000   0 00000000   0.00000000   0.00000000
      4 50000000   0.00000000   2.00000000   1 00000000   0.00000000   0.00000000   0.00000000
      3 00000000   0 00000000   0.00000000   0 00000000   1.00000000   0.00000000   0.00000000
      9 00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   0.00000000
      5 00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0 04115226 0 09259259 0.12345679 0.09259259 0 07407407 0.37037036 0.20576133
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1 00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3 00000000   1 00000000   0 00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5 00000000   5 00000000   1.00000000   3 00000000   4.00000000   0.00000000   3.00000000
      3 00000000   0.00000000   0 00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1 00000000   0 00000000   0.00000000   0.00000000   1.00000000   0.00000000   0 00000000
      8 00000000   6 00000000   4.00000000   6 00000000   7.00000000   1.00000000   7.00000000
      4 00000000   2 00000000   0 00000000   0 00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0 04086266 0 07945517 0 20431328 0.07945517 0 05107832 0 47673097 0.06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1 00000000   7 00000000   0.00000000   3 00000000   2 00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0.00000000   0 00000000   0 00000000   0 00000000
```

```
      6 00000000   9 00000000   1 00000000   5 00000000   5 00000000   4 00000000   4 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   6 00000000   0 00000000   2 00000000   3 00000000   1 00000000   0 00000000
      2 00000000   7 00000000   0 00000000   3 00000000   4 00000000   2 00000000   1 00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
    0 08163265 0 02040816 0 48979592 0 08163265 0 04081633 0 12244898 0 16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3
      1 00000000   5 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   8 00000000   1 00000000   5 00000000   6 00000000   3 00000000   2 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      2 00000000   6 00000000   0 00000000   3 00000000   2 00000000   1 00000000   2 00000000
      3 00000000   7 00000000   0 00000000   4 00000000   3 00000000   0 00000000   1 00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
    0 12345679 0 02645503 0 37037036 0 07407407 0 06172840 0 15873016 0 18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1 00000000   7 00000000   0 00000000   4 00000000   1 00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   5 00000000   1 00000000   2 00000000   3 00000000   1 00000000   1 00000000
      0 00000000   4 00000000   0 00000000   1 00000000   1 00000000   2 00000000   2 00000000
      0 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   2 00000000   1 00000000   0 00000000
      2 00000000   5 00000000   0 00000000   0 00000000   3 00000000   2 00000000   1 00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
    0 13043478 0 02608696 0 26086956 0 10434783 0 08695652 0 13043478 0 26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1 00000000   7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   9 00000000   1 00000000   4 00000000   6 00000000   2 00000000   1 00000000
      2 00000000   6 00000000   0 00000000   1 00000000   4 00000000   0 00000000   0 00000000
      2 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      3 00000000   6 00000000   0 00000000   2 00000000   3 00000000   1 00000000   0 00000000
      4 00000000   7 00000000   0 00000000   3 00000000   3 00000000   1 50000000   1 00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
    0 06382979 0 02836879 0 34042552 0 08510638 0 05673759 0 17021276 0 25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1 00000000   7 00000000   2 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   5 00000000   4 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   4 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      5 00000000   6 00000000   5 00000000   2 00000000   4 00000000   1 00000000   0 00000000
      7 00000000   7 00000000   6 00000000   3 00000000   5 00000000   1 00000000   1 00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
    0 05133471 0 02874743 0 05749487 0 14373717 0 07186858 0 28747433 0 35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   4 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   2 00000000
      7 00000000   8 50000000   1 00000000   5 00000000   5 00000000   4 00000000   7 00000000
      1 50000000   4 00000000   0 00000000   1 00000000   1 00000000   0 00000000   4 00000000
      2 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   4 00000000
      3 00000000   5 00000000   0 00000000   1 50000000   2 00000000   1 00000000   4 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
```

```
* 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
    0 07547170 0 02641509 0 52830189 0 10566038 0 10566038 0 13207547 0 02641509
* 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 07582919 0 02902471 0 27885395 0 11091612 0 07411520 0 20888640 0 22237445
99999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION.
    DLXB
=003PURPOSE:
    8 MISSING ATTRIBUTE VALUES. REP 3



=004MODEL TYPE (1-5).
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACEDEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   0.00000000   0.00000000   5.00000000   1.00000000   0.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.03649635 0.10948905 0.10948905 0.16423358 0.08759125 0.43795621 0.05474453
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   6.00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04086266 0.07945517 0.20431328 0.07945517 0.05107832 0.47673097 0.06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08163265 0.02040816 0.48979592 0.08163265 0.04081633 0.12244898 0.16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.12345679 0.02645503 0.37037036 0.07407407 0.06172840 0.15873016 0.18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.13043478 0.02608696 0.26086956 0.10434783 0.08695652 0.13043478 0.26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06382979 0.02836879 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   5.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05133471 0.02874743 0.05749487 0.14373717 0.07186858 0.28747433 0.35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
* 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
   0 07547170 0 02641509 0 52830189 0 10566038 0 10566038 0 13207547 0 02641509
* 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
   0 07757311 0 02883624 0 22839920 0 11327492 0 06960222 0 21764751 0 26466686
999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION

=003PURPOSE
    EIGHT MISSING PROJECT VALUES, REP 1



=004MODEL TYPE (1-5)
    2
=005NUMBER OF PROJECTS(1-200)
      7
=006NUMBER OF ATTRIBUTES(1- 20)
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP 1
      2 APP 2
      3 APP 3
      4 APP 4
      5 APP 5
      6 APP 6
      7 APP 7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   0.00000000   4.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   0.00000000   6.00000000   0.00000000   1.00000000   7.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.05316456 0.07088608 0.26582277 0.07088608 0.05316456 0.42531645 0.06075949
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6 00000000   9 00000000   1 00000000   0 00000000   5.00000000   4 00000000   4.00000000
      0 00000000   6 00000000   0 00000000   1 00000000   0.00000000   0.00000000   0.00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1.00000000   0 00000000   0 00000000
      0 00000000   6 00000000   0 00000000   2 00000000   0.00000000   1.00000000   0.00000000
      2 00000000   7 00000000   0.00000000   0.00000000   4.00000000   2.00000000   1.00000000
999999
- 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0 08032128 0 02008032 0 48192769 0 06024096 0 09638554 0.12048192 0.14056224
- 15PROJECT MATRIX FOR ATTRIBUTE #  3
      1 00000000   5 00000000   0 00000000   1 00000000   0.00000000   0.00000000   0.00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0.00000000   0.00000000   0.00000000
      3 00000000   0 00000000   1 00000000   0 00000000   6.00000000   3.00000000   0.00000000
      0 00000000   0 00000000   0 00000000   1 00000000   1.00000000   0.00000000   0.00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1.00000000   0.00000000   0.00000000
      0 00000000   6 00000000   0 00000000   3 00000000   2.00000000   1.00000000   2.00000000
      3 00000000   7 00000000   0 00000000   0 00000000   0.00000000   0.00000000   1.00000000
999999
- 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0 08152174 0 01630435 0 48913044 0.05434782 0.08152174 0.16304348 0.11413044
- 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   0 00000000   0.00000000   0.00000000   0.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   1.00000000   0.00000000   3.00000000   1.00000000   1.00000000
      0 00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      0.00000000   0.0 00000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
- 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0 22727272 0.03409091 0.17045455 0.22727272 0.05681818 0.11363636 0.17045455
- 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1 00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   9.00000000   1.00000000   0.00000000   6.00000000   2.00000000   1.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
- 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06349207 0.03174603 0.28571430 0.09523810 0.04761905 0.19047619 0.28571430
- 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5 00000000   6.00000000   5.00000000   2.00000000   0.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
- 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.04687500 0.03906250 0.03906250 0.15625000 0.15625000 0.23437500 0.32812497
- 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      0.00000000   0.00000000   1.00000000   0.00000000   5.00000000   0.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      2 00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
- 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES)
   0 06400000 0 0240 0000 0 47999999 0 09599999 0 09599999 0 19199999 0 04800000
- 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
   0 09218589 0 03298905 0 22759938 0 13459003 0 10428451 0 19249366 0 21585746
999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION

=003PURPOSE
    8 MISSING PROJECT VALUES. REP 2



=004MODEL TYPE (1-5)
    2
=005NUMBER OF PROJECTS(1-200)
      7
=006NUMBER OF ATTRIBUTES(1- 20)
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS.
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   0.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   0.00000000   0.00000000   0.00000000   7.00000000   1.00000000   7.00000000
      0.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04326923 0.05769231 0.28846154 0.09615385 0.07211538 0.34615386 0.09615385
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6 00000000   9 00000000   1 00000000   5 00000000   5 00000000   4 00000000   4 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   6 00000000   0 00000000   2 00000000   3 00000000   1 00000000   0 00000000
      2 00000000   7 00000000   0 00000000   3 00000000   4 00000000   2 00000000   1 00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
    0 08722742 0 01869159 0 52336448 0 06542056 0 04361371 0 13084112 0 13084112
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1 00000000   5 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   8 00000000   1 00000000   5 00000000   6 00000000   3 00000000   2 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      2 00000000   6 00000000   0 00000000   3 00000000   2 00000000   1 00000000   2 00000000
      3 00000000   7 00000000   0 00000000   4 00000000   3 00000000   0 00000000   1 00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
    0 10714286 0 03571429 0 32142857 0 06428572 0 06428572 0 21428572 0 19285715
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1 00000000   7 00000000   0 00000000   4 00000000   1 00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   5 00000000   1 00000000   2 00000000   3 00000000   1 00000000   1 00000000
      0 00000000   4 00000000   0 00000000   1 00000000   1 00000000   2 00000000   2 00000000
      0 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   2 00000000   1 00000000   0 00000000
      2 00000000   5 00000000   0 00000000   0 00000000   3 00000000   2 00000000   1 00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
    0 27397260 0 04109589 0 20547944 0 06849315 0 06849315 0 13698630 0 20547944
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1 00000000   7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   9 00000000   1 00000000   4 00000000   6 00000000   2 00000000   1 00000000
      2 00000000   6 00000000   0 00000000   1 00000000   4 00000000   0 00000000   0 00000000
      2 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      3 00000000   6 00000000   0 00000000   2 00000000   3 00000000   1 00000000   0 00000000
      4 00000000   7 00000000   0 00000000   3 00000000   3 00000000   1 50000000   1 00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
    0 05970149 0 01492537 0 35820895 0 08955224 0 05970149 0 17910448 0 23880596
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1 00000000   7 00000000   2 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   5 00000000   4 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   4 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      5 00000000   6 00000000   5 00000000   2 00000000   4 00000000   1 00000000   0 00000000
      7 00000000   7 00000000   6 00000000   3 00000000   5 00000000   1 00000000   1 00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
    0 04938272 0 04938272 0 03703704 0 14814815 0 07407407 0 29629630 0 34567901
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   4 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   2 00000000
      7 00000000   8 50000000   1 00000000   5 00000000   5 00000000   4 00000000   7 00000000
      1 50000000   4 00000000   0 00000000   1 00000000   1 00000000   0 00000000   4 00000000
      2 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   4 00000000
      3 00000000   5 00000000   0 00000000   1 50000000   2 00000000   1 00000000   4 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
```

```
* 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES).
   0 06299213 0 03149607 0 47244096 0 12598427 0 09448819 0 18897638 0 02362205
* 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
   0 10531601 0 03939297 0 22199050 0 10559852 0.06918761 0 22394235 0 23457202
999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION
    DLXB
=003PURPOSE
    8 MISSING PROJECT VALUES. REP 3


=004MODEL TYPE (1-5)
    2
=005NUMBER OF PROJECTS(1-200):
    7
=006NUMBER OF ATTRIBUTES(1- 20):
    7
=007NUMBER AND NAME OF ATTRIBUTES
    1 ACADEMIC FIELD
    2 COMMUNICATIONS
    3 HUMAN RELATIONS
    4 ORGAN & MANAGEMENT
    5 ACTIVITY LEVEL
    6 EXP & PLACEMENT
    7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
    1.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
    2.00000000  1.00000000  1.00000000  1.00000000  3.00000000  0.00000000  1.00000000
    3.00000000  0.00000000  1.00000000  0.00000000  2.00000000  0.00000000  2.00000000
    4.50000000  0.00000000  2.00000000  1.00000000  3.00000000  0.00000000  3.00000000
    3.00000000  0.00000000  0.00000000  0.00000000  1.00000000  0.00000000  3.00000000
    9.00000000  4.00000000  3.00000000  4.00000000  5.00000000  1.00000000  5.00000000
    5.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000  1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
  0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
    1 APP1
    2 APP2
    3 APP3
    4 APP4
    5 APP5
    6 APP6
    7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
    1.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
    3.00000000  1.00000000  0.00000000  1.00000000  0.00000000  0.00000000  0.00000000
    5.00000000  5.00000000  1.00000000  0.00000000  4.00000000  0.00000000  0.00000000
    3.00000000  0.00000000  0.00000000  1.00000000  0.00000000  0.00000000  2.00000000
    1.00000000  0.00000000  0.00000000  0.00000000  1.00000000  0.00000000  0.00000000
    8.00000000  6.00000000  4.00000000  0.00000000  7.00000000  1.00000000  0.00000000
    4.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000  1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
  0.05562914 0.07417218 0.11125828 0.16688742 0.06357616 0.44503310 0.08344371
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
    1.00000000  7.00000000  0.00000000  3.00000000  0.00000000  2.00000000  0.00000000
    0.00000000  1.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
```

```
      0 00000000   9 00000000   1 00000000   5 00000000   0 00000000   4 00000000   0 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   6 00000000   0 00000000   2 00000000   0 00000000   1 00000000   0 00000000
      2 00000000   7 00000000   0 00000000   3 00000000   0 00000000   0 00000000   1 00000000
999999
- 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
    0 18372704 0 02624672 0 36745408 0 07349081 0 03674541 0 09186352 0 22047244
- 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1 00000000   5 00000000   0 00000000   0 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   0 00000000   1 00000000   5 00000000   6 00000000   3 00000000   2 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   3 00000000   2 00000000   1 00000000   2 00000000
      3 00000000   0 00000000   0 00000000   0 00000000   3 00000000   0 00000000   1 00000000
999999
- 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
    0 12987013 0 01298701 0 38961041 0 07792208 0 06493507 0 12987013 0 19480520
- 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1 00000000   7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   5 00000000   1 00000000   2 00000000   3 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   0 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   2 00000000   1 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   3 00000000   2 00000000   1 00000000
999999
- 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
    0 05286344 0 03303965 0 26431718 0 13215859 0 08810573 0 16519824 0 26431718
- 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1 00000000   7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   9 00000000   1 00000000   4 00000000   6 00000000   0 00000000   0 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      3 00000000   6 00000000   0 00000000   2 00000000   0 00000000   1 00000000   0 00000000
      0 00000000   7 00000000   0 00000000   3 00000000   3 00000000   0 00000000   1 00000000
999999
- 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
    0 07185629 0 02994012 0 35928145 0 08982036 0 05988024 0 17964073 0 20958084
- 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1 00000000   7 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   4 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      5 00000000   6 00000000   0 00000000   2 00000000   0 00000000   1 00000000   0 00000000
      0 00000000   7 00000000   6 00000000   3 00000000   0 00000000   0 00000000   1 00000000
999999
- 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
    0 04907976 0 03067485 0 06134970 0 12269939 0 12269939 0 24539879 0 36809817
- 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   4 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   2 00000000
      7 00000000   8 50000000   1 00000000   0 00000000   5 00000000   4 00000000   7 00000000
      0 00000000   4 00000000   0 00000000   1 00000000   0 00000000   0 00000000   4 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   4 00000000
      0 00000000   0 00000000   0 00000000   1 50000000   0 00000000   1 00000000   4 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES)
   0 07061633 0 05815463 0 49431431 0 12357858 0 09886286 0 12357858 0 03089464
= 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
   0 07685993 0 03235593 0 23061706 0 11345329 0 09111633 0 19439454 0 26120293
999999
```

```
=001NAME

=002ORGANIZATION:

=003PURPOSE:
    TEN MISSING ATTRIBUTE VALUES, REP 1



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   0.00000000   1.00000000   3.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      9.00000000   0.00000000   3.00000000   4.00000000   0.00000000   1.00000000   0.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04301075 0.09677420 0.12903227 0.09677420 0.03225807 0.38709679 0.21505378
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   6.00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04086266 0.07945517 0.20431328 0.07945517 0.05107832 0.47673097 0.06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08163265 0.02040816 0.48979592 0.08163265 0.04081633 0.12244898 0.16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.12345679 0.02645503 0.37037036 0.07407407 0.06172840 0.15873016 0.18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.13043478 0.02608696 0.26086956 0.10434783 0.08695652 0.13043478 0.26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06382979 0.02836879 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   5.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05133471 0.02874743 0.05749487 0.14373717 0.07186858 0.28747433 0.35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
- 24PROJECT WEIGHT  FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
    0 07547170 0 02641509 0 52830189 0 10566038 0 10566038 0 13207547 0 02641509
- 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 07637110 0 02905433 0 27607334 0 11208171 0 07489999 0 21063295 0 22088666
999999
```

```
=001NAME

=002ORGANIZATION

=003PURPOSE
    TEN MISSING ATTRIBUTE VALUES, REP 2



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.03546099 0.07092199 0.12765957 0.19148935 0.19148935 0.31914893 0.06382979
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   6.00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04086266 0.07945517 0.20431328 0.07945517 0.05107832 0.47673097 0.06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
- 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08163265 0.02040816 0.48979592 0.08163265 0.04081633 0.12244898 0.16326530
- 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
- 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.12345679 0.02645503 0.37037036 0.07407407 0.06172840 0.15873016 0.18518518
- 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
- 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.13043478 0.02608696 0.26086956 0.10434783 0.08695652 0.13043478 0.26086956
- 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
- 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06382979 0.02836879 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
- 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   5.00000000   1.00000000   1.00000000
999999
- 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05133471 0.02874743 0.05749487 0.14373717 0.07186858 0.28747433 0.35934290
- 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES)
    0 07547170 0 02641509 0 52830189 0 10566038 0 10566038 0 13207547 0 02641509
= 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
    0 08139938 0 02893067 0 25647622 0 10695969 0 06978324 0 20360139 0 25284943
999999
```

```
=001NAME

=002ORGANIZATION

=003PURPOSE
    TEN MISSING ATTRIBUTE VALUES. REP 3



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   1.00000000   0.00000000   0.00000000   1.00000000
      0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      0.00000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      0.00000000   0.00000000   3.00000000   4.00000000   0.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.01574803 0.11811024 0.15748033 0.11811024 0.03937008 0.47244096 0.07874016
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   6.00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04086266 0.07945517 0.20431328 0.07945517 0.05107832 0.47673097 0.06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   5.00000000   5.00000000   4.00000000   4.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   7.00000000   0.00000000   3.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08163265 0.02040816 0.48979592 0.08163265 0.04081633 0.12244898 0.16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2.00000000   6.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.12345679 0.02645503 0.37037036 0.07407407 0.06172840 0.15873016 0.18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   1.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   2.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   9.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.13043478 0.02608696 0.26086956 0.10434783 0.08695652 0.13043478 0.26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   6.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4.00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.06382979 0.02836879 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   4.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   6.00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   3.00000000   5.00000000   1.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.05133471 0.02874743 0.05749487 0.14373717 0.07186858 0.28747433 0.35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   8.50000000   1.00000000   5.00000000   5.00000000   4.00000000   7.00000000
      1.50000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   4.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   4.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
- 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES)
   0 07547170 0 02641509 0 52830189 0 10566038 0 10566038 0 13207547 0 02641509
- 25FINAL PROJECT WEIGHTS (SAME ORDER AS NAMES)
   0 07784112 0 02768723 0 23236895 0 11446036 0 07012381 0 21528821 0 26223040
999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION

=003PURPOSE
    10 MISSING PROJECT VALUES, REP 1



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP 1
      2 APP 2
      3 APP 3
      4 APP 4
      5 APP 5
      6 APP 6
      7 APP 7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   0.00000000   0.00000000   3.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   2.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   7.00000000
      0.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.05440415 0.05440415 0.27202073 0.09067358 0.03108808 0.43523318 0.06217617
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      0 00000000   9 00000000   1 00000000   5 00000000   5 00000000   4 00000000   4 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   6 00000000   0 00000000   0 00000000   3 00000000   1 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   3 00000000   0 00000000   0 00000000   1 00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0 06048387 0 02016129 0 48387098 0 09677420 0 09677420 0 12096775 0 12096775
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1 00000000   0 00000000   0 00000000   0 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   1 00000000   5 00000000   6 00000000   3 00000000   2 00000000
      0 00000000   6 00000000   0 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   6 00000000   0 00000000   0 00000000   2 00000000   1 00000000   0 00000000
      3 00000000   0 00000000   0 00000000   0 00000000   3 00000000   0 00000000   1 00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0 06880734 0 02293578 0 41284406 0 08256881 0 06880734 0 13761468 0 20642203
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1 00000000   0 00000000   0 00000000   4 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   1 00000000   2 00000000   0 00000000   1 00000000   1 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   1 00000000   0 00000000   2 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   5 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   0 00000000   2 00000000   1 00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0 10638298 0 04255319 0 21276596 0 10638298 0 10638298 0 21276596 0 21276596
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1 00000000   7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   0 00000000   1 00000000   4 00000000   6 00000000   0 00000000   1 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      2 00000000   5 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      3 00000000   0 00000000   0 00000000   2 00000000   0 00000000   1 00000000   0 00000000
      4 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 50000000   1 00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0 06358819 0 00908403 0 31794095 0 07948524 0 05299016 0 19076458 0 28614685
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   4 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   4 00000000   1 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   4 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      5 00000000   0 00000000   5 00000000   2 00000000   0 00000000   1 00000000   0 00000000
      7 00000000   7 00000000   6 00000000   0 00000000   0 00000000   1 00000000   1 00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0 03773585 0 03773585 0 04402516 0 17610063 0 17610063 0 26415095 0 26415095
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   2 00000000
      7 00000000   0 00000000   1 00000000   5 00000000   5 00000000   4 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   1 00000000   0 00000000   4 00000000
      0 00000000   4 00000000   0 00000000   0 00000000   1 00000000   0 00000000   4 00000000
      0 00000000   0 00000000   0 00000000   1 50000000   2 00000000   1 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
```

```
* 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
   0 07547170 0 02641509 0 52830189 0. 10566038 0. 10566038 0. 13207547 0 02641509
* 25FINAL PROJECT WEIGHTS: (SAME ORDER AS NAMES)
   0 06276526 0 03270170 0 23452362 0. 12646738 0. 12010501 0. 21568190 0. 20775318
999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION

=003PURPOSE:
    10 MISSING PROJECT VALUES, REP 2



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP 1
      2 APP 2
      3 APP 3
      4 APP 4
      5 APP 5
      6 APP 6
      7 APP 7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   0.00000000   0.00000000   7.00000000   1.00000000   7.00000000
      0.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.05250000 0.07000000 0.18000001 0.15750000 0.06000000 0.42000002 0.06000000
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   0.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   0.00000000   1.00000000   0.00000000   0.00000000   4.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      2.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
   0.08547009 0.00854701 0.51282054 0.05128206 0.04273504 0.12820514 0.17094018
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   8.00000000   1.00000000   5.00000000   0.00000000   0.00000000   2.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      0.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0.15469615 0.03314918 0.29005527 0.05801105 0.07734808 0.15469615 0.23204421
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   0.00000000   0.00000000   4.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   1.00000000   0.00000000   0.00000000   0.00000000   1.00000000
      0.00000000   4.00000000   0.00000000   1.00000000   1.00000000   0.00000000   2.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2.00000000   5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0.11560693 0.04624277 0.23121387 0.02890173 0.11560693 0.23121387 0.23121387
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   9.00000000   1.00000000   0.00000000   6.00000000   2.00000000   1.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000
      4.00000000   0.00000000   0.00000000   0.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0.05544148 0.03285421 0.29568788 0.19712527 0.04928132 0.14784394 0.22176592
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   4.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5.00000000   0.00000000   0.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0.06926407 0.02164502 0.04329004 0.17316017 0.08658008 0.34632033 0.25974026
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   2.00000000
      7.00000000   0.00000000   1.00000000   5.00000000   0.00000000   4.00000000   0.00000000
      1.50000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   4.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
   0.07648184 0.05353729 0.53537283 0.10707457 0.06692161 0.13384321 0.02676864
= 25FINAL PROJECT WEIGHTS:(SAME ORDER AS NAMES)
   0.08930604 0.03199489 0.21969996 0.11490265 0.08123406 0.24997570 0.21268673
999999
```

```
=001NAME:
    COLBURN
=002ORGANIZATION:

=003PURPOSE:
    10 MISSING VALUES, REP 3



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   1.00000000   1.00000000   3.00000000   0.00000000   1.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   2.00000000   0.00000000   2.00000000
      4.50000000   0.00000000   2.00000000   1.00000000   3.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   3.00000000
      9.00000000   4.00000000   3.00000000   4.00000000   5.00000000   1.00000000   5.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP 1
      2 APP 2
      3 APP 3
      4 APP 4
      5 APP 5
      6 APP 6
      7 APP 7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0 00000000
      3.00000000   1.00000000   0.00000000   0.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   0.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6 00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000
      0.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0 05286344 0 05286344 0.26431718 0.15859032 0.06607930 0.31718063 0.08810573
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7 00000000   0.00000000   3.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6.00000000   9.00000000   1.00000000   0.00000000   0.00000000   0.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   0.00000000   0.00000000   3.00000000   1.00000000   0.00000000
      0.00000000   7.00000000   0.00000000   0.00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
    0.09504951 0.01782178 0.57029706 0.03168317 0.03564357 0.10693070 0.14257427
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   8.00000000   1.00000000   5.00000000   6.00000000   0.00000000   2.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000   2.00000000
      0.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
    0.11396012 0.04273504 0.34188035 0.06837607 0.05698006 0.20512822 0.17094018
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1.00000000   7.00000000   0.00000000   4.00000000   0.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   2.00000000   3.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   2.00000000   2.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
    0.07741936 0.01935484 0.38709679 0.19354840 0.12903227 0.09677420 0.09677420
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   6.00000000   0.00000000   0.00000000   3.00000000   1.00000000   0.00000000
      0.00000000   7.00000000   0.00000000   0.00000000   3.00000000   0.00000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
    0.05607476 0.03738318 0.33644858 0.08411215 0.05607476 0.16822429 0.26168224
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1.00000000   7.00000000   2.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   0.00000000   0.00000000   1.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   4.00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0.00000000   6.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000
      7.00000000   7.00000000   6.00000000   0.00000000   5.00000000   0.00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
    0.05327020 0.05179047 0.06214857 0.07457828 0.07457828 0.31074283 0.37289140
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      7.00000000   8.50000000   1.00000000   0.00000000   0.00000000   0.00000000   7.00000000
      1.50000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   4.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3.00000000   5.00000000   0.00000000   1.50000000   2.00000000   1.00000000   4.00000000
      0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
    0.05415162 0.04332130 0.37906137 0.14440434 0.10830325 0.21660650 0.05415162
= 25FINAL PROJECT WEIGHTS: (SAME ORDER AS NAMES)
    0.07001420 0.03938530 0.26391080 0.10229155 0.07986928 0.21833080 0.22619811
999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION:

=003PURPOSE:
    15 MISSING ATTRIBUTE VALUES, ONE REP ONLY



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200):
      7
=006NUMBER OF ATTRIBUTES(1- 20):
      7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGAN & MANAGEMENT
      5 ACTIVITY LEVEL
      6 EXP & PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      2.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      4.50000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      9.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000
      5.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.03636364 0.07272727 0.10909091 0.16363636 0.10909091 0.32727271 0.18181819
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3.00000000   1.00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      5.00000000   5.00000000   1.00000000   3.00000000   4.00000000   0.00000000   3.00000000
      3.00000000   0.00000000   0.00000000   1.00000000   2.00000000   0.00000000   2.00000000
      1.00000000   0.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      8.00000000   6.00000000   4.00000000   6.00000000   7.00000000   1.00000000   7.00000000
      4.00000000   2.00000000   0.00000000   0.00000000   2.00000000   0.00000000   1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04086266 0.07945517 0.20431328 0.07945517 0.05107832 0.47673097 0.06810443
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000   7.00000000   0.00000000   3.00000000   2.00000000   2.00000000   0.00000000
      0.00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
```

```
      6 00000000   9 00000000   1 00000000   5 00000000   5.00000000   4.00000000   4 00000000
      0 00000000   6 00000000   0.00000000   1 00000000   2.00000000   0.00000000   0.00000000
      0 00000000   5 00000000   0.00000000   0 00000000   1.00000000   0.00000000   0.00000000
      0 00000000   6 00000000   0.00000000   2 00000000   3 00000000   1.00000000   0.00000000
      2 00000000   7.00000000   0 00000000   3 00000000   4.00000000   2.00000000   1.00000000
999999
= 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES):
    0 08163265 0 02040816 0.48979592 0.08163265 0.04081633 0.12244898 0.16326530
= 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1.00000000   5 00000000   0.00000000   1.00000000   2.00000000   0.00000000   0.00000000
      0.00000000   1 00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      3 00000000   8 00000000   1.00000000   5.00000000   6.00000000   3.00000000   2.00000000
      0.00000000   6 00000000   0.00000000   1 00000000   1.00000000   0.00000000   0.00000000
      0.00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      2 00000000   6 00000000   0.00000000   3 00000000   2.00000000   1.00000000   2.00000000
      3.00000000   7.00000000   0.00000000   4.00000000   3.00000000   0.00000000   1.00000000
999999
= 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
    0 12345679 0.02645503 0 37037036 0.07407407 0.06172840 0.15873016 0.18518518
= 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1 00000000   7 00000000   0.00000000   4.00000000   1.00000000   2.00000000   0.00000000
      0 00000000   1.00000000   0.00000000   0.00000000   0 00000000   0.00000000   0.00000000
      5 00000000   5 00000000   1.00000000   2.00000000   3 00000000   1.00000000   1.00000000
      0 00000000   4 00000000   0 00000000   1 00000000   1.00000000   2.00000000   2.00000000
      0 00000000   4 00000000   0.00000000   0.00000000   1 00000000   0.00000000   0.00000000
      0 00000000   5.00000000   0.00000000   0.00000000   2.00000000   1.00000000   0.00000000
      2 00000000   5.00000000   0.00000000   0.00000000   3.00000000   2.00000000   1.00000000
999999
= 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
    0 13043478 0 02608696 0.26086956 0.10434783 0.08695652 0.13043478 0.26086956
= 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1.00000000   7.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0 00000000   1.00000000   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      5 00000000   9.00000000   1.00000000   4.00000000   6.00000000   2.00000000   1.00000000
      2 00000000   6 00000000   0.00000000   1.00000000   4.00000000   0.00000000   0.00000000
      2 00000000   5.00000000   0.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      3 00000000   6 00000000   0.00000000   2.00000000   3.00000000   1.00000000   0.00000000
      4 00000000   7.00000000   0.00000000   3.00000000   3.00000000   1.50000000   1.00000000
999999
= 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
    0 06382979 0 02836879 0.34042552 0.08510638 0.05673759 0.17021276 0.25531915
= 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1 00000000   7 00000000   2.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      0 00000000   1 00000000   0 00000000   0.00000000   0.00000000   0.00000000   0.00000000
      0 00000000   4 00000000   1.00000000   0.00000000   0 00000000   0 00000000   0.00000000
      3 00000000   5 00000000   4 00000000   1 00000000   1.00000000   0.00000000   0.00000000
      0 00000000   4 00000000   4.00000000   0.00000000   1.00000000   0.00000000   0.00000000
      5 00000000   6 00000000   5.00000000   2.00000000   4.00000000   1.00000000   0.00000000
      7 00000000   7 00000000   6.00000000   3.00000000   5.00000000   1 00000000   1.00000000
999999
= 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
    0 05133471 0 02874743 0.05749487 0.14373717 0.07186858 0.28747433 0.35934290
= 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   3 00000000   0 00000000   0 00000000   0.00000000   0.00000000   4.00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0.00000000   2 00000000
      7 00000000   8 50000000   1 00000000   5 00000000   5 00000000   4.00000000   7 00000000
      1 50000000   4 00000000   0 00000000   1 00000000   1 00000000   0.00000000   4 00000000
      2 00000000   4 00000000   0 00000000   0 00000000   1.00000000   0.00000000   4 00000000
      3 00000000   5 00000000   0 00000000   1 50000000   2.00000000   1.00000000   4.00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
   0.07547170 0.02641509 0.52830189 0.10566038 0.10566038 0.13207547 0.02641509
= 25FINAL PROJECT WEIGHTS:(SAME ORDER AS NAMES)
   0.07972055 0.02883406 0.27815160 0.10951868 0.07471027 0.20156585 0.22749901
999999
```

```
=001NAME
    COLBURN
=002ORGANIZATION

=003PURPOSE
    15 MISSING PROJECT VALUES. ONE REP ONLY



=004MODEL TYPE (1-5):
    2
=005NUMBER OF PROJECTS(1-200).
    7
=006NUMBER OF ATTRIBUTES(1- 20).
    7
=007NUMBER AND NAME OF ATTRIBUTES
      1 ACADEMIC FIELD
      2 COMMUNICATIONS
      3 HUMAN RELATIONS
      4 ORGANIZATION AND MANAGEM
      5 ACTIVITY LEVEL
      6 EXPERIENCE IN PLACEMENT
      7 RESUME PRESENTATION

999999
=008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):
      1.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
      2.00000000  1.00000000  1.00000000  1.00000000  3.00000000  0.00000000  1.00000000
      3.00000000  0.00000000  1.00000000  0.00000000  2.00000000  0.00000000  2.00000000
      4.50000000  0.00000000  2.00000000  1.00000000  3.00000000  0.00000000  3.00000000
      3.00000000  0.00000000  0.00000000  0.00000000  1.00000000  0.00000000  3.00000000
      9.00000000  4.00000000  3.00000000  4.00000000  5.00000000  1.00000000  5.00000000
      5.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000  1.00000000
999999
=009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):
    0.04282655 0.09635974 0.12847966 0.19271947 0.07708780 0.38543895 0.07708780
=010NUMBER AND NAME OF PROJECTS:
      1 APP1
      2 APP2
      3 APP3
      4 APP4
      5 APP5
      6 APP6
      7 APP7

999999
= 11PROJECT MATRIX FOR ATTRIBUTE #  1:
      1.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
      3.00000000  1.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
      5.00000000  0.00000000  1.00000000  0.00000000  0.00000000  0.00000000  0.00000000
      3.00000000  0.00000000  0.00000000  1.00000000  0.00000000  0.00000000  0.00000000
      1.00000000  0.00000000  0.00000000  0.00000000  1.00000000  0.00000000  0.00000000
      8.00000000  0.00000000  0.00000000  0.00000000  0.00000000  1.00000000  0.00000000
      4.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000  1.00000000
999999
= 12PROJECT WEIGHTS FOR ATTRIBUTE #  1(SAME ORDER AS NAMES):
    0.04000000 0.12000000 0.20000000 0.12000000 0.04000000 0.31999999 0.16000000
= 13PROJECT MATRIX FOR ATTRIBUTE #  2:
      1.00000000  7.00000000  0.00000000  3.00000000  2.00000000  2.00000000  0.00000000
      0.00000000  1.00000000  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
```

```
      6 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
- 14PROJECT WEIGHTS FOR ATTRIBUTE #  2(SAME ORDER AS NAMES)
   0 09345454 0 01363636 0 57272726 0 03181818 0 04772727 0 04772727 0 19090909
- 15PROJECT MATRIX FOR ATTRIBUTE #  3:
      1 00000000   5 00000000   0 00000000   1 00000000   2 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
- 16PROJECT WEIGHTS FOR ATTRIBUTE #  3(SAME ORDER AS NAMES):
   0 09345794 0 01869159 0 28037384 0 09345794 0 04672897 0 18691589 0 28037384
- 17PROJECT MATRIX FOR ATTRIBUTE #  4:
      1 00000000   7 00000000   0 00000000   4 00000000   1 00000000   2 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
- 18PROJECT WEIGHTS FOR ATTRIBUTE #  4(SAME ORDER AS NAMES):
   0 10108303 0 01444043 0 50541514 0 02527076 0 10108303 0 05054151 0 20216605
- 19PROJECT MATRIX FOR ATTRIBUTE #  5:
      1 00000000   7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      5 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      4 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
- 20PROJECT WEIGHTS FOR ATTRIBUTE #  5(SAME ORDER AS NAMES):
   0 05833333 0 00833333 0 29166669 0 11666667 0 11666667 0 17500001 0 23333333
- 21PROJECT MATRIX FOR ATTRIBUTE #  6:
      1 00000000   7 00000000   2 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      3 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      5 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      7 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
- 22PROJECT WEIGHTS FOR ATTRIBUTE #  6(SAME ORDER AS NAMES):
   0 05668017 0 00809717 0 02834008 0 17004049 0 05668017 0 28340080 0 39676115
- 23PROJECT MATRIX FOR ATTRIBUTE #  7:
      1 00000000   3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   4 00000000
      0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      7 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000   0 00000000
      1 50000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000   0 00000000
      2 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000   0 00000000
      3 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000   0 00000000
      0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   0 00000000   1 00000000
999999
```

```
= 24PROJECT WEIGHTS FOR ATTRIBUTE #  7(SAME ORDER AS NAMES):
   0.06629834 0.02209945 0.46408841 0.09944752 0.13259669 0.19889504 0.01657459
= 25FINAL PROJECT WEIGHTS: (SAME ORDER AS NAMES)
   0.07385347 0.01710458 0.26636171 0.10728279 0.07285835 0.19011517 0.27242392
999999
```

APPENDIX C

COPY OF COMMENTED PROGRAM

```
      SUBROUTINE USER(INFILE)
C
      COMMON/USER/NPURP(5),UNAME,ORGZ
      COMMON/HEAD/MODEL,NPROJS,NATTRS
      COMMON/MAX/MAXPRJ,MAXATR
      COMMON/PR1/PRNAME(200)
      COMMON/PRO/PRMATR(200,200),PRWTS(200)
      COMMON/AT1/ATNAME(20),ATMATR(20,20),ATWTS(20)
      COMMON/BIGPROJ/ATRPRO(200,200,20)
      COMMON/CONTROL/CLS
C
C --- GLOSSARY OF VARIABLES
C --- NAME       USE      TYPE      RANGE              DEFINITION
C --- ANSWER     UI,U     CHAR*2    ANY                USER'S ANSWER TO QUESTIONS
C --- ATMATR     I        REAL      0 & UP             ATTRIBUTE COMPARISONS
C                         (MAXATR,MAXATR)
C --- ATNAME     I        CHAR*24   ANY                ATTRIBUTE NAMES
C                         (MAXATR)
C --- ATRPRO     N        REAL      0 & UP             PROJ COMP. FOR EA. ATTRIBUTE
C                         (MAXPRJ,MAXPRJ,MAXATR)
C --- ATWTS      I        REAL      0 - 1.0            ATTRIBUTE WEIGHTS
C --- CHOICE     M        INT       0 - 8              USER'S CHOICE
C --- CLS        U        INT       12                 CLEAR SCREEN CHARACTER
C --- HEADFLAG   M        LOGICAL   .TRUE.-.FALSE.     HAS HEADER INFO BEEN ENTERED
C --- I          M        INT       ANY                COUNTER
C --- INFILE     N        INT                          LINDO PARAMETER
C --- J          M        INT       ANY                COUNTER
C --- MAXATR     I        INT       20                 MAX NUMBER OF ATTRIBUTES
C --- MAXPRJ     I        INT       200                MAX NUMBER OF PROJECTS
C --- MENUOO     I,FO,M   CHAR*2    '0'-'8'            MENU LABELS
C                         (8)
C --- MODEL      M        INT       1-5                MODEL NUMBER
C --- NATTRS     I,M      INT       1                  NUMBER OF ATTRIBUTES
C --- NPROJS     I        INT       2-MAXPRJ           NUMBER OF PROJECTS
C --- NPURP      UI,UO    CHAR*80   ANY                PURPOSE
C                         (5)
C --- ORGZ       UI,UO    CHAR*80   ANY                ORGANIZATION
C --- PRMATR     I        REAL      NON NEGATIVE       PROJECT COMPARISONS
C                         (MAXPRJ,MAXPRJ)
C --- PRNAME     I        CHAR*24   ANY                PROJECT NAMES
C                         (MAXPRJ)
C --- PRWTS      I        REAL      0-1.0              PROJECT WEIGHTS
C                         (MAXPRJ)
C --- UNAME      UI,UO    CHAR*80   ANY                USER'S NAME
C
      REAL  PRMATR,
     *      PRWTS,
     *      ATMATR,
     *      ATWTS,
     *      ATRPRO
      CHARACTER*24 ATNAME/20*' '/
      CHARACTER*2 MENUOO(9)/'0','1','2','3','4','5','6','7','8'/,
     *            ANSWER
      CHARACTER*80 NPURP/5*' '/,
     *             UNAME,
     *             ORGZ,
     *             PRNAME*24/200*' '/
      LOGICAL  HEADFLAG/.FALSE./
      INTEGER  CHOICE,
     *         CLS/12/,
     *         MODEL/0/,
     *         NPROJS/0/,
     *         NATTRS/1/,
     *         MAXPRJ/200/,
     *         MAXATR/20/
C
      MAXATR=20
C
C     INITIALIZE ARRAYS
      DO I=1,MAXPRJ
        PRWTS(I)=0
        DO J=1,MAXPRJ
          PRMATR(I,J)=0
C         DO K=1,MAXATR
C           ATRPRO(I,J,K)=0
C         END DO
        END DO
      END DO
```

```
            DO I=1,MAXATR
              ATWTS(I)=0
              DO J=1,MAXATR
                ATMATR(I,J)=0
              END DO
            END DO
            ATNAME(1)='OVERALL WORTH'
            CHOICE=0
            NATTRS=1
            ATMATR(1,1)=1.0
C
C D         WRITE(6,*)('ENTERING SUBROUTINE USER')
C
            WRITE(6,7)
7           FORMAT(//,                LINDO USER INTERFACE'/
     *                                FOR PROJECT RANKING')
            DO WHILE (.TRUE.)
            WRITE(6,8)(CLS,CLS,CLS)
9           WRITE(6,10)((MENU00(I),I=1,9),CHOICE)
8           FORMAT(1X,A1,A1,A1,                    MENU 0.0'//)
10          FORMAT(  ',A2,'--ENTER (CHANGE) HEADER INFORMATION'/
     *       ',A2,'--EXECUTE BASIC MODEL'/
     *       ',A2,'--EXECUTE ADDITIVE (ATTRIBUTES) MODEL'/
     *       ',A2,'--EXECUTE VOTING MODEL'/
     *       ',A2,'--EXECUTE HIERARCHY MODEL'/
     *       ',A2,'--EXECUTE CONSTRAINTS MODEL'/
     *       ',A2,'--HELP ON PROJECT RANKING INTERFACE'/
     *       ',A2,'--END PROGRAM, DELETE RESULTS'/
     *       ',A2,'--END PROGRAM, SAVE(PRINT) RESULTS'//
     *       ' PLEASE ENTER NUMBER OF YOUR CHOICE(',I1,']:')
            READ(5,11)(ANSWER)
11          FORMAT(A)
            I=CHOICE
            IF (ANSWER.NE.' ') THEN
            IF (INDEX('0123456789',ANSWER(1:1)).EQ.0) THEN
              WRITE(6,*)('PLEASE ENTER A NUMBER')
              GOTO 9
            END IF
            CHOICE=ICHAR(ANSWER(1:1))-48
            IF (CHOICE.GT.8) THEN
              WRITE(6,*)('CHOICE MUST BE BETWEEN 0 AND 8')
              CHOICE=I
              GOTO 9
            END IF
C --- CHECK TO SEE IF CHOICE IS INVALID DUE TO PREVIOUS CHOICES
            IF (ANSWER(1:1).NE.MENU00(CHOICE+1)) THEN
              WRITE(6,*)(' CHOICE ',ANSWER(1:1),' INVALID AT THIS POINT.')
              CHOICE=I
              GOTO 9
            END IF
            END IF
C --- CHOICE IS O.K.
            IF (CHOICE.EQ.0) THEN
C ---         CHANGE HEADER INFO
              WRITE(6,1)(CLS,CLS,CLS)
1             FORMAT(1X,A1,A1,A1)
              IF (HEADFLAG) THEN
C ---           HEADER INFORMATION HAS BEEN ENTERED, MODIFY IT
                ANSWER=' '
                DO WHILE(CHOICE.NE.6)
21              WRITE(6,20)
20              FORMAT(//////'              MENU 1.0'//
     *                  '      1--CHANGE NAME'/
     *                  '        2--CHANGE ORGANIZATION'/
     *                  '        3--CHANGE PURPOSE'/
     *                  '        4--VIEW CURRENT HEADER INFORMATION'/
     *                  '      5--HELP ON PROJECT RANKING INTERFACE'/
     *                  '        6--RETURN TO MAIN MENU'//
     *                  ' ENTER NUMBER OF CHOICE')
                READ(5,22)(ANSWER)
22              FORMAT(A)
                IF (INDEX('0123456789',ANSWER(1:1)).EQ.0) THEN
                  WRITE(6,*)('PLEASE ENTER A NUMBER BETWEEN 1 AND 6')
                  GOTO 21
                END IF
                CHOICE=ICHAR(ANSWER(1:1))-48
                IF (CHOICE.GT.6) THEN
                  WRITE(6,*)('PLEASE ENTER A NUMBER BETWEEN 1 AND 6')
                  GOTO 21
```

```
0159                END IF
0160 C  D           WRITE(6,*)('MAKE CHANGES')
0161                IF (CHOICE.EQ.1) THEN
0162    C ---         CHANGE NAME
0163                  WRITE(6,27)(UNAME)
0164    27            FORMAT(' OLD NAME IS:'/1X,A/' WHAT SHOULD NAME BE?')
0165                  READ(5,23)(UNAME)
0166                ELSE IF (CHOICE.EQ.2) THEN
0167    C ---         CHANGE ORGANIZATION
0168                  WRITE(6,28)(ORGZ)
0169    28            FORMAT(' OLD ORGANIZATION IS:'/1X,A/' WHAT SHOULD IT BE?')
0170                  READ(5,23)(ORGZ)
0171                ELSE IF (CHOICE.EQ.3) THEN
0172    C ---         CHANGE PURPOSE
0173                  WRITE(6,*)('OLD PURPOSE IS:')
0174                  DO I=1,5
0175                    IF (NPURP(I).EQ.' ') GOTO 29
0176                    WRITE(6,25)(NPURP(I))
0177                  END DO
0178    29            CONTINUE
0179                  WRITE(6,*)('PLEASE ENTER NEW PURPOSE:')
0180                  DO I=1,5
0181                    READ(5,23)(NPURP(I))
0182                    IF (NPURP(I).EQ.' ') GOTO 30
0183                  END DO
0184    30            CONTINUE
0185                ELSE IF (CHOICE.EQ.4) THEN
0186    C ---         VIEW HEADER INFORMATION
0187                  WRITE(6,31)(UNAME,ORGZ)
0188    31            FORMAT(/' NAME:'/1X,A//' ORGANIZATION:'/1X,A//' PURPOSE:')
0189                  DO I=1,5
0190                    IF (NPURP(I).EQ.' ') GOTO 32
0191                    WRITE(6,25)(NPURP(I))
0192                  END DO
0193    32            CONTINUE
0194                ELSE IF (CHOICE.EQ.5) THEN
0195    C ---         USER NEEDS HELP
0196                  CALL NHELP(0)
0197                END IF
0198                END DO
0199              ELSE
0200 C  D           WRITE(6,*)('ENTER HEADER INFORMATION')
0201                HEADFLAG=.TRUE.
0202                WRITE(6,*)('PLEASE ENTER YOUR NAME:')
0203                READ(5,23)(UNAME)
0204    23          FORMAT(A)
0205                WRITE(6,*)('ORGANIZATION (DLX, DLXB, ETC):')
0206                READ(5,23)(ORGZ)
0207                WRITE(6,26)
0208    26          FORMAT(' PURPOSE (IF THIS FILE IS OFFICIAL, SO STATE.)'/
0209         *        ' ENTER A MAXIMMUM OF FIVE LINES, ENTERING A BLANK LINE'/
0210         *        ' TO QUIT BEFORE FIVE LINES.')
0211                DO I=1,5
0212                  READ(5,23)(NPURP(I))
0213                  IF (NPURP(I).EQ.' ') GOTO 24
0214                END DO
0215    24          CONTINUE
0216 C  D           WRITE(6,25)(NPURP(I),I=1,5)
0217    25          FORMAT(1X,A)
0218              END IF
0219              IF (MENUOO(2).EQ.'1') THEN
0220                CHOICE=1
0221              ELSE
0222                CHOICE=8
0223              END IF
0224            ELSE IF (CHOICE.EQ.1) THEN
0225    C ---     MODEL=1
0226              MODEL=1
0227              CALL MOD1
0228    C ---     MAKE IT IMPOSSIBLE TO RUN ANY OTHER MODEL EXCEPT MODEL 5
0229              DO I=2,5
0230                MENUOO(I)='##'
0231              END DO
0232              CHOICE=8
0233            ELSE IF (CHOICE.EQ.2) THEN
0234 C  D         WRITE(6,*)('NATTRS=',NATTRS)
0235              CALL MOD2
0236              MODEL=2
0237    C ---     MAKE IT IMPOSSIBLE TO RUN ANY MODEL EXCEPT MODEL 5
```

```
0238                DO I=2,5
0239                  MENUOO(I)='##'
0240                END DO
0241                CHOICE=8
0242              ELSE IF (CHOICE.EQ.3) THEN
0243      C ---     MODEL=3
0244                MODEL=3
0245                CALL MOD3
0246                DO I=2,5
0247                  MENUOO(I)='##'
0248                END DO
0249                CHOICE=8
0250              ELSE IF (CHOICE.EQ.4) THEN
0251                MODEL=4
0252                CALL MOD4
0253      C ---     MAKE IT IMPOSSIBLE TO RUN ANY MODEL EXCEPT MODEL 5
0254                DO I=2,5
0255                  MENUOO(I)='##'
0256                END DO
0257                CHOICE=8
0258              ELSE IF (CHOICE.EQ.5) THEN
0259                MODEL=5
0260                CALL MOD5
0261                DO I=2,6
0262                  MENUOO(I)='##'
0263                END DO
0264                CHOICE=8
0265              ELSE IF (CHOICE.EQ.6) THEN
0266      C ---     HELP
0267                CALL NHELP(O)
0268                CHOICE=I
0269              ELSE IF (CHOICE.EQ.7) THEN
0270      C ---     QUIT, DON'T SAVE RESULTS
0271  C   D         WRITE(6,*)('LEAVING SUBROUTINE USER')
0272                RETURN
0273              ELSE IF (CHOICE.EQ.8) THEN
0274      C ---     QUIT, SAVE RESULTS
0275                CALL NSAVE
0276  C   D         WRITE(6,*)('LEAVING SUBROUTINE USER')
0277                RETURN
0278              END IF
0279              END DO
0280              RETURN
0281              END
```

PROGRAM SECTIONS

	Name	Bytes	Attributes
0	$CODE	1815	PIC CON REL LCL SHR EXE RD NOWRT LONG
1	$PDATA	1315	PIC CON REL LCL SHR NOEXE RD NOWRT LONG
2	$LOCAL	164	PIC CON REL LCL NOSHR NOEXE RD WRT LONG
3	USER	560	PIC OVR REL GBL SHR NOEXE RD WRT LONG
4	HEAD	12	PIC OVR REL GBL SHR NOEXE RD WRT LONG
5	MAX	8	PIC OVR REL GBL SHR NOEXE RD WRT LONG
6	PR1	4800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
7	PRO	160800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
8	AT1	2160	PIC OVR REL GBL SHR NOEXE RD WRT LONG
9	BIGPROJ	3200000	PIC OVR REL GBL SHR NOEXE RD WRT LONG
10	CONTROL	4	PIC OVR REL GBL SHR NOEXE RD WRT LONG
	Total Space Allocated	3371638	

ENTRY POINTS

Address	Type	Name	References
0-00000000		USER	1#

VARIABLES

Address	Type	Name	Attributes	References							
2-00000012	CHAR	ANSWER		52	110=	113	114	118	125	126	138=
				149=	151	155					
**	I*4	CHOICE		59	87=	98	112	118=	119	121=	125
				127=	132	139	155=	156	161	166	171
				185	194	220=	222=	224	232=	233	241=
				242	249=	250	257=	258	264=	265	268=
				269	273						
10-00000000	I*4	CLS	COMM	10	59D	97(3)	134(3)				
2-00000014	L*4	HEADFLAG		58D	136	201=					
**	I*4	I		71=	72	74	80=	81	83	98(2)=	112=
				74	127	174=	175	176	180=	181	182
				121	150	191	211=	212	213	229=	230
				189=	239	246=	247	254=	255	261=	262
				238=							
				268							
AP-00000004●	I*4	INFILE		1							
**	I*4	J		73=	74	82=	83				
5-00000004	I*4	MAXATR	COMM	5	59D	68=	80	82			
5-00000000	I*4	MAXPRJ	COMM	5	59D	71	73				
4-00000000	I*4	MODEL	COMM	4	59D	226=	236=	244=	251=	259=	
4-00000008	I*4	NATTRS	COMM	4	59D	88=					
4-00000004	I*4	NPROJS	COMM	4	59D						
3-000001E0	CHAR	ORGZ	COMM	3	54	168	170=	187	206=		
3-00000190	CHAR	UNAME	COMM	3	54	163	165=	187	203=		

ARRAYS

Address	Type	Name	Attributes	Bytes	Dimensions	References				
8-000001E0	R*4	ATMATR	COMM	1600	(20, 20)	8	46	83=	89=	
8-00000000	CHAR	ATNAME	COMM	480	(20)	8	51D	86=		
9-00000000	R*4	ATRPRO	COMM	3200000	(200, 200, 20)	9	49			
8-00000820	R*4	ATWTS	COMM	80	(20)	8	46	81=		
2-00000000	CHAR	MENUOO		18	(9)	52D	98	125	219	230=
						239=	247=	255=	262=	
3-00000000	CHAR	NPURP	COMM	400	(5)	3	54D	175	176	181=
						182	190	191	212=	213
7-00000000	R*4	PRMATR	COMM	160000	(200, 200)	7	46	74=		
6-00000000	CHAR	PRNAME	COMM	4800	(200)	6	54D			
7-00027100	R*4	PRWTS	COMM	800	(200)	7	46	72=		

LABELS

Address	Label	References						
1-000002FA	1'	134	135#					
1-000000E3	7'	93	94#					
1-00000126	8'	97	99#					
0-00000114	9	98#	116	122	128			
1-0000014A	10'	98	100#					
1-000002F8	11'	110	111#					
1-00000303	20'	140	141#					
**	21	140#	153	158				
1-000003F3	22'	149	150#					
1-000004B4	23'	165	170	181	203	204#	206	212
0-000005DF	24	213	215#					
1-0000050E	25'	176	191	217#				
1-00000486	26'	207	208#					
1-000003F5	27'	163	164#					
1-00000421	28'	168	169#					
0-00000413	29	175	178#					
0-00000473	30	182	184#					
1-00000453	31'	187	188#					
0-000004EF	32	190	193#					

FUNCTIONS AND SUBROUTINES REFERENCED

Type	Name	References	
I*4	LIB$INDEX	114	151
	MOD1	227	
	MOD2	235	
	MOD3	245	
	MOD4	252	
	MOD5	260	
	NHELP	196	267
	NSAVE	275	

```
      SUBROUTINE DLTMAT(NUMEL,MATRIX,WEIGHTS,MAXSIZ)
C
C *** ******************************************************************
C       GENERATES AND DISPLAYS A DELTA MATRIX AFTER PROJECT (OR ATTRIBUTE)
C       WEIGHTS HAVE BEEN CALCULATED. PRFLAG IS TRUE FOR PROJECTS, AND
C       FALSE FOR ATTRIBUTES.
C *** ******************************************************************
C
C --- GLOSSARY OF VARIABLES
C --- NAME      USE      TYPE     RANGE            DEFINITION
C --- DELTA     M,FO     REAL     ANY              DELTA MATRIX
C                        (MAXPRJ,MAXPRJ)
C --- I         M        INT      1-NUMEL          COUNTER
C --- J         M        INT      1-NUMEL          COUNTER
C --- MATRIX    U        REAL     ANY              COMPARISON MATRIX
C                        (MAXPRJ,MAXPRJ)
C --- MAXSIZ    U        INT      NPROJS,NATTRS    DIM. OF MATRIX
C --- NEW       M        REAL     ANY              CALCULATED COMPARISON
C --- NUMEL     U        INT      1-NPROJS         NUMBER OF PRODS. OR ATTRIBUTES
C --- TEST      UI,U     CHAR*1   ANY              USER'S RESPONSE
C --- WEIGHTS   U        REAL     0 - 1.0          PROJECT OR ATTRIBUTE WEIGHTS
C                        (MAXPRJ)
C
      REAL     MATRIX,
     *         WEIGHTS(*),
     *         DELTA(200,200),
     *         NEW
      INTEGER  NUMEL,
     *         MAXSIZ,
     *         I,
     *         J
      CHARACTER*1 TEST
      DIMENSION MATRIX(MAXSIZ,MAXSIZ)
C
C D   WRITE(6,*)('ENTERING SUBROUTINE DLTMAT')
      DO I=1,NUMEL
        DO J=1,NUMEL
          IF (MATRIX(I,J).GT.0.0001) THEN
            IF (WEIGHTS(J).GT.0.0001) THEN
              NEW=WEIGHTS(I)/WEIGHTS(J)
            ELSE
              NEW=0
            END IF
            DELTA(I,J)=MATRIX(I,J)-NEW
          ELSE
            DELTA(I,J)=0
          END IF
        END DO
C ***   WRITE EACH ROW TO THE SCREEN
        WRITE(6,10)(DELTA(I,J),J=1,NUMEL)
10      FORMAT(200(1X,F8.4))
      END DO
      WRITE(6,*)('HIT <RETURN> TO CONTINUE')
      READ(5,11)(TEST)
11    FORMAT(A)
C D   WRITE(6,*)('LEAVING SUBROUTINE DLTMAT')
      RETURN
      END
```

PROGRAM SECTIONS

	Name	Bytes	Attributes
0	$CODE	300	PIC CON REL LCL SHR EXE RD NOWRT LONG
1	$PDATA	38	PIC CON REL LCL SHR NOEXE RD NOWRT LONG
2	$LOCAL	160092	PIC CON REL LCL NOSHR NOEXE RD WRT LONG
	Total Space Allocated	160430	

ENTRY POINTS

Address	Type	Name	References
0-00000000		DLTMAT	1#

VARIABLES

Address	Type	Name	Attributes	References							
**	I*4	I		29	37=	39	41	45(2)	47	51	
**	I*4	J		29	38=	39	40	41	45(2)	47	51(2)=
AP-00000010@	I*4	MAXSIZ		1	29	34(2)					
**	R*4	NEW		25	41=	43=	45				
AP-00000004@	I*4	NUMEL		1	29	37	38	51			
2-00027100	CHAR	TEST		33	55=						

ARRAYS

Address	Type	Name	Attributes	Bytes	Dimensions	References				
2-00000000	R*4	DELTA		160000	(200,200)	25	45=	47=	51	
AP-00000008@	R*4	MATRIX		**	(*,*)	1	25	34	39	45
AP-0000000C@	R*4	WEIGHTS		**	(*)	1	25	40	41(2)	

LABELS

Address	Label	References	
1-00000018	10'	51	52#
1-00000024	11'	55	56#

```
      SUBROUTINE INMAT(PRFLAG)
C --- ------------------------------------------------------------------
C     READS IN PROJECT (IF PRFLAG IS TRUE) OR ATTRIBUTE (IF PRFLAG
C     IS FALSE) MATRIX FROM USER.
C --- ------------------------------------------------------------------
C
C --- GLOSSARY OF VARIABLES
C --- NAME       USE      TYPE      RANGE            DEFINITION
C --- ATMATR     M        REAL      0 & UP           ATTRIBUTE MATRIX
C                         (MAXATR,MAXATR)
C --- ATNAME     N        CHAR*24   ANY              NAMES OF ATTRIBUTES
C                         (MAXATR)
C --- ATWTS      N        REAL      0 - 1.0          ATTRIBUTE WEIGHTS
C --- CLS        U        INTEGER   12               CLEAR SCREEN CHARACTER
C --- COLUMN     UI,U     INT       1-MAXPRJ         CURRENT COLUMN NUMBER
C --- COMPARISON UI,U     REAL      0 & UP           VALUE OF COMPARISON
C --- I          M        INT       1-MAXPRJ         COUNTER
C --- J          M        INT       1-MAXPRJ         COUNTER
C --- MAXROW     M        INT       1-MAXPRJ         SIZE OF MATRIX
C --- MODEL      N        INT       1-5              MODEL NUMBER
C --- NATTRS     N        INT       1-MAXATR         NUMBER OF ATTRIBUTES
C --- NPROJS     N        INT       2-MAXPRJ         NUMBER OF PROJECTS
C --- PRMATR     M        REAL      NON NEGATIVE     PROJECT COMPARISONS
C                         (MAXPRJ,MAXPRJ)
C --- PRFLAG     U        LOGICAL   .TRUE.-.FALSE.   IS IT PROJECT OR ATTRIBUTE MAT.
C --- PRWTS      N        REAL      0-1.0            PROJECT WEIGHTS
C                         (MAXPRJ)
C --- ROW        UI,U     INT       0 & UP           CURRENT ROW NUMBER
C
      COMMON/PRO/PRMATR(200,200),PRWTS(200)
      COMMON/AT1/ATNAME(20),ATMATR(20,20),ATWTS(20)
      COMMON/HEAD/MODEL,NPROJS,NATTRS
      COMMON/CONTROL/CLS
C
      INTEGER ROW/0/,
     *        COLUMN/0/,
     *        NPROJS,
     *        NATTRS,
     *        MAXROW,
     *        CLS
      REAL COMPARISON/0.0/,
     *     PRMATR,
     *     PRWTS,
     *     ATMATR,
     *     ATWTS
      LOGICAL PRFLAG
      CHARACTER*24 ATNAME
C
C D   WRITE(6,*)('ENTERING SUBROUTINE INMAT')
C
      IF (PRFLAG) THEN
        MAXROW=NPROJS
      ELSE
        MAXROW=NATTRS
      END IF
      WRITE(6,1)
1     FORMAT(' ENTER COMPARISONS IN THE FORM ROW COLUMN COMPARISON'/
     *  ' ENTER ZEROS TO QUIT.'/)
      READ(5,*)(ROW,COLUMN,COMPARISON)
      DO WHILE (ROW.GT.0.AND.COLUMN.GT.0)
        IF (ROW.GT.MAXROW.OR.COLUMN.GT.MAXROW) THEN
C ---         OUT OF BOUNDS ERROR
          WRITE(6,2) (MAXROW)
2         FORMAT(' ERROR-- ',I3,' IS THE MAXIMUM ALLOWABLE ROW OR',
     *          ' COLUMN NUMBER.')
        ELSE IF (PRFLAG) THEN
          PRMATR(ROW,COLUMN)=COMPARISON
        ELSE
          ATMATR(ROW,COLUMN)=COMPARISON
        END IF
        READ(5,*)(ROW,COLUMN,COMPARISON)
      END DO
      WRITE(6,8)(CLS,CLS,CLS)
8     FORMAT(1X,A1,A1,A1)
C
C --- CHECK FOR ANY UNNECCESARY VALUES
C
      IF (PRFLAG) THEN
        DO I=1,MAXROW-1
```

```
0080                DO J=I+1,MAXROW
0081                  IF (PRMATR(I,J).NE.0.AND.PRMATR(J,I).NE.0) THEN
0082                    WRITE(6,3)(J,I)
0083    3               FORMAT(' WARNING-- EXTRA VALUE AT POSITION ',I3,',',
0084     *                I3,' IGNORED.')
0085                    PRMATR(J,I)=0
0086                  END IF
0087                END DO
0088              END DO
0089            ELSE
0090              DO I=1,MAXROW-1
0091                DO J=I+1,MAXROW
0092                  IF (ATMATR(I,J).NE.0.AND.ATMATR(J,I).NE.0) THEN
0093                    WRITE(6,3)(J,I)
0094                    ATMATR(J,I)=0
0095                  END IF
0096                END DO
0097              END DO
0098            END IF
0099    C ---   MAKE SURE PRINCIPLE DIAGONAL IS ALL ONES
0100            IF (PRFLAG) THEN
0101              DO I=1,MAXROW
0102                PRMATR(I,I)=1.0
0103              END DO
0104            ELSE
0105              DO I=1,MAXROW
0106                ATMATR(I,I)=1.0
0107              END DO
0108            END IF
0109            RETURN
0110            END
```

PROGRAM SECTIONS

	Name	Bytes	Attributes
0	$CODE	651	PIC CON REL LCL SHR EXE RD NOWRT LONG
1	$PDATA	210	PIC CON REL LCL SHR NOEXE RD NOWRT LONG
2	$LOCAL	12	PIC CON REL LCL NOSHR NOEXE RD WRT LONG
3	PRO	160800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
4	AT1	2160	PIC OVR REL GBL SHR NOEXE RD WRT LONG
5	HEAD	12	PIC OVR REL GBL SHR NOEXE RD WRT LONG
6	CONTROL	4	PIC OVR REL GBL SHR NOEXE RD WRT LONG
	Total Space Allocated	163849	

ENTRY POINTS

Address	Type	Name	References
0-00000000		INMAT	1#

VARIABLES

Address	Type	Name	Attributes	References							
6-00000000	I*4	CLS	COMM	33	35	73(3)					
2-00000004	I*4	COLUMN		35D	59=	60	61	67	69	71=	
2-00000008	R*4	COMPARISON		41D	59=	67	69	71=			
**	I*4	I		79=	80	81(2)	82	85	90=	91	92(2)
				93	94	101=	102(2)	105=	106(2)		
**	I*4	J		80=	81(2)	82	85	91=	92(2)	93	94
**	I*4	MAXROW		35	52=	54=	61(2)	63	79	80	90
				91	101	105					
5-00000000	I*4	MODEL	COMM	32							
5-00000008	I*4	NATTRS	COMM	32	35	54					
5-00000004	I*4	NPROJS	COMM	32	35	52					
AP-00000004@	L*4	PRFLAG		1	46	51	66	78	100		
2-00000000	I*4	ROW		35D	59=	60	61	67	69	71=	

ARRAYS

Address	Type	Name	Attributes	Bytes	Dimensions	References				
4-000001E0	R*4	ATMATR	COMM	1600	(20, 20)	31	41	69=	92(2)	94=
						106=				
4-00000000	CHAR	ATNAME	COMM	480	(20)	31	47			
4-00000820	R*4	ATWTS	COMM	80	(20)	31	41			
3-00000000	R*4	PRMATR	COMM	160000	(200, 200)	30	41	67=	81(2)	85=
						102=				
3-00027100	R*4	PRWTS	COMM	800	(200)	30	41			

LABELS

Address	Label	References		
1-00000000	1'	56	57#	
1-00000050	2'	63	64#	
1-0000009A	3'	82	83#	93
1-00000091	8'	73	74#	

```
      SUBROUTINE MATGEN(NUMEL,MATRIX,WEIGHTS,MAXSIZ)
C
C***  ***************************************************************
C     * MATGEN PRODUCES AN LP FORMULATION FOR PROJECT (OR ATTRIBUTE)  *
C     * COMPARISONS PASSED IN ARRAY MATRIX.  NUMEL IS THE NUMBER OF   *
C     * ELEMENTS (PROJECTS OR ATTRIBUTES). WEIGHTS ARE RETURNED IN    *
C     * PARAMETER WEIGHTS.                                            *
C***  ***************************************************************
C
C--- GLOSSARY OF VARIABLES
C
C### NOTE: MORE INFORMATION CAN BE FOUND ABOUT THE VARIABLES MARKED '(LINDO)'
C            IN THE LINDO USER'S MANUAL
C
C--- NAME       USE      TYPE     RANGE              DEFINITION
C--- ALPHA      I,U      I(0:9)   '0'-'9'            INTEGER REP. OF DIGITS
C--- DUAL       I        REAL     ANY                REDUCED COST OF LP VAR. (LINDO)
C--- I          M        INT      ANY                COUNTER, TEMPORARY USE
C--- IDROW      M        INT      ANY                NUMBER OF CURRENT ROW (LINDO)
C--- II         M        INT      ANY                COUNTER
C--- IRO        M        INT      ANY                ROWS WITH NONZERO COEFFICIENTS
C                        (MAXPRJ)                    (LINDO PARAMETER)
C--- J          M        INT      ANY                COUNTER
C--- K          M        INT      ANY                COUNTER
C--- KONDN      I        INT      2,4,5              SOLUTION STATUS FROM LINDO
C                                              (2-INFEASIBLE, 4-OPTIMAL, 5-UNBOUNDED)
C--- L          M        INT      ANY                TEMPORARY USE
C--- MATRIX     U        REAL     ANY                COMPARISON MATRIX
C                        (MAXPRJ,MAXPRJ) OR (MAXATR,MAXATR)
C--- MAXSIZ     U        INT      MAXATR,MAXPRJ      MAXIMUM SIZE OF MATRIX
C        (MAXATR IF ATTRIBUTE WEIGHTS ARE BEING CALCULATED,MAXPRJ FOR PROJECTS)
C--- NAME       M        INT      ANY                NAME OF LP VARIABLE (LINDO)
C                        (8)
C--- NONZ       M        INT      ANY        NUMBER OF NONZERO COIFFICIENTS (LINDO)
C--- NUMCOMP    I,M      INT      ANY                NUMBER OF COMPARISONS IN MATRIX
C--- NUMEL      U        INT      1-MAXPRJ           DIM. OF MATRIX
C                (NUMEL=NPROJS FOR PROJECT WEIGHTS, =NAITRS FOR ATTRIBUTES)
C--- PRIMAL     I,U      REAL     ANY                VALUE OF LP VARIABLE (LINDO)
C--- ROWPOS     M        INT      ANY                ROW IN WHICH COMP. WILL BE
C--- S          I,U      INT      'S'                INTEGER REPRESENTAION OF 'S'
C--- TRUBLE     I        LOGICAL  .TRUE.-.FALSE.     WAS TROUBLE ENCOUNTERED (LINDO)
C--- VAL        M        REAL     ANY                VALUE OF NONZERO COEFFICIENTS
C--- W          I        INT      'W'                INTEGER REPRESENTATION OF 'W'
C--- WEIGHTS    M        REAL     0-1.0              WEIGHTS OF PROJECTS OR ATTS.
C
      REAL MATRIX,
     *     WEIGHTS(*),
     *     VAL(200),
     *     PRIMAL,
     *     DUAL
      INTEGER NUMEL,
     *        ROWPOS(200,200),
     *        I,
     *        II,
     *        J,
     *        K,
     *        KONDN,
     *        L,
     *        MAXSIZ,
     *        NONZ,
     *        IRO(200),
     *        NAME(8)/8*' '/,
     *        IDROW,
     *        NUMCOMP,
     *        ALPHA(0:9)/'0','1','2','3','4','5','6','7','8','9'/,
     *        W/'W'/,
     *        S/'S'/
      LOGICAL TRUBLE
      DIMENSION MATRIX(MAXSIZ,MAXSIZ)
C
C
C D   WRITE(6,*)('ENTERING SUBROUTINE MATGEN')
C
C***  INITIALIZE VARIABLES
      II=0
      K=0
      KONDN=0
      L=0
      NONZ=0
```

```
0080              IDROW=0
0081              NUMCOMP=0
0082              TRUBLE=.FALSE.
0083              PRIMAL=0
0084              DUAL=0
0085      C ***   INITIALIZE ARRAYS
0086              DO I=1,200
0087                VAL(I)=0
0088                IRO(I)=0
0089                DO J=1,200
0090                  ROWPOS(I,J)=0
0091                END DO
0092              END DO
0093      C
0094      C ***   INITIALIZE LINDO SYSTEM
0095              CALL INIT
0096      C ***   SET UP OBJECTIVE (FIRST ROW OF LP)
0097              CALL DEFROW(1,0,IDROW,TRUBLE)
0098      C
0099      C
0100      6       FORMAT(200(5X,F9.4))
0101      C
0102      C ***   FIND NUMBER OF COMPARISONS AND DEFINE A ROW FOR EACH
0103      C
0104              DO I=1,NUMEL
0105                DO J=1,NUMEL
0106                  IF (I.NE.J.AND.MATRIX(I,J).NE.0) THEN
0107                    NUMCOMP=NUMCOMP+1
0108                    CALL DEFROW(0,0,IDROW,TRUBLE)
0109                    ROWPOS(I,J)=IDROW
0110                  END IF
0111                END DO
0112              END DO
0113      C
0114      C ***   DEFINE A NORMALIZING ROW
0115              CALL DEFROW(0,1,IDROW,TRUBLE)
0116      C ###   NOTICE-THE VALUE IN IDROW IS USED-DO NOT MODIFY
0117      C
0118      5       FORMAT(200(3X,I3))
0119      C
0120      C ***   GENERATE WEIGHT VARIABLES
0121      C
0122              NAME(1)=W
0123              DO I=1,NUMEL
0124                NONZ=0
0125      C ***     CALCULATE COLUMN NAME
0126                K=I
0127                DO J=6,2,-1
0128                  L=(K/10)*10
0129                  NAME(J)=ALPHA(K-L)
0130                  K=K/10
0131                END DO
0132      C
0133      C ***     FIND ALL NON-ZERO COIFICIENTS FOR THIS COLUMN
0134      C
0135                DO II=1,NUMEL
0136                  IF (ROWPOS(I,II).NE.0) THEN
0137                    NONZ=NONZ+1
0138                    VAL(NONZ)=1
0139                    IRO(NONZ)=ROWPOS(I,II)
0140                  ELSE IF (ROWPOS(II,I).NE.0) THEN
0141                    NONZ=NONZ+1
0142                    VAL(NONZ)=-(MATRIX(II,I))
0143                    IRO(NONZ)=ROWPOS(II,I)
0144                  END IF
0145                END DO
0146      C ***     INCLUDE NORMALIZING ROW
0147                NONZ=NONZ+1
0148                VAL(NONZ)=1
0149                IRO(NONZ)=IDROW
0150                CALL APPCOL(NAME,NONZ,VAL,IRO,TRUBLE)
0151      1         FORMAT(' NAME=',8A1)
0152      2         FORMAT(5X,'K',5X,'VAL',5X,'IRO',200(/5X,I3,3X,I3,3X,F9.4))
0153              END DO
0154      C
0155      C ***   GENERATE S (ABSOULUTE DEVIATION) VARIABLES
0156      C
0157              NAME(1)=S
0158              IRO(1)=1
```

```
0159                VAL(1)=1
0160                NONZ=2
0161                DO I=1,2*NUMCOMP
0162      C ***       GENERATE COLUMN NAMES
0163                  K=I
0164                  DO J=6,2,-1
0165                    L=(K/10)*10
0166                    NAME(J)=ALPHA(K-L)
0167                    K=K/10
0168                  END DO
0169                  VAL(2)=(-1)**I
0170                  IRO(2)=(I-1)/2+2
0171                  CALL APPCOL(NAME,NONZ,VAL,IRO,TRUBLE)
0172      C ***        ******CHECK FOR TROUBLE*****************************
0173                END DO
0174      C
0175      C ***     INVOKE LINDO TO CALCULATE WEIGHTS
0176      C
0177                WRITE(6,1976)
0178      1976      FORMAT(' YOU ARE NOW ENTERING THE LINDO SYSTEM.'/
0179          *              ' WHEN ASKED IF YOU WISH TO DO A SENSITIVITY ANALYSIS,',
0180          *              ' RESPOND WITH AN "N"')
0181                CALL GO(0,KONDN)
0182      C
0183      C ***     RETURN WEIGHTS
0184      C
0185                DO I=1,NUMEL
0186                  CALL REPVAR(I,PRIMAL,DUAL)
0187                  WEIGHTS(I)=PRIMAL
0188                END DO
0189      C
0190 C    D         WRITE(6,*)('LEAVING SUBROUTINE MATGEN')
0191                RETURN
0192                END
```

PROGRAM SECTIONS

	Name	Bytes	Attributes
0	$CODE	634	PIC CON REL LCL SHR EXE RD NOWRT LONG
1	$PDATA	132	PIC CON REL LCL SHR NOEXE RD NOWRT LONG
2	$LOCAL	161908	PIC CON REL LCL NOSHR NOEXE RD WRT LONG
	Total Space Allocated	162674	

ENTRY POINTS

Address	Type	Name	References
0-00000000		MATGEN	1#

VARIABLES

Address	Type	Name	Attributes	References							
2-0002778C	R*4	DUAL		46	84=	186A					
2-00027790	I*4	I		51	86=	87	88	90	104=	106(2)	109
				123=	126	136	139	140	142	143	161=
				163	169	170	185=	186A	187		
2-0002779C	I*4	IDROW		51	80=	97A	108A	109	115A	149	
**	I*4	II		51	75=	135=	136	139	140	142	143
**	I*4	J		51	89=	90	105=	106(2)	109	127=	129
				164=	166						
**	I*4	K		51	76=	126=	128	129	130(2)=	163=	165
				166	167(2)=						
2-00027794	I*4	KONDN		51	77=	181A					
**	I*4	L		51	78=	128=	129	165=	166		
AP-00000010@	I*4	MAXSIZ		1	51	69(2)					
2-00027798	I*4	NONZ		51	79=	124=	137(2)=	138	139	141(2)=	142
				143	147(2)=	148	149	150A	160=	171A	
**	I*4	NUMCOMP		51	81=	107(2)=	161				
AP-00000004@	I*4	NUMEL		1	51	104	105	123	135	185	

2-00027788	R*4	PRIMAL	46	83=	186A	187			
2-000277A4	I*4	S	51D	157					
2-000277A8	L*4	TRUBLE	68	82=	97A	108A	115A	150A	171A
2-000277A0	I*4	W	51D	122					

ARRAYS

Address	Type	Name	Attributes	Bytes	Dimensions	References				
2-00027760	I*4	ALPHA		40	(0:9)	51D	129	166		
2-00027420	I*4	IRO		800	(200)	51	88=	139=	143=	149=
AP-00000008@	R*4	MATRIX		**	(*, *)	150A	158=	170=	171A	
2-00027740	I*4	NAME		32	(8)	1	46	69	106	142
2-00000320	I*4	ROWPOS		160000	(200, 200)	51D	122=	129=	150A	157=
						166=	171A			
						51	90=	109=	136	139
						140	143			
2-00000000	R*4	VAL		800	(200)	46	87=	138=	142=	148=
AP-0000000C@	R*4	WEIGHTS		**	(*)	150A	159=	169=	171A	
						1	46	187=		

LABELS

Address	Label	References	
**	1'	151#	
**	2'	152#	
**	5'	118#	
**	6'	100#	
1-0000000C	1976'	177	178#

FUNCTIONS AND SUBROUTINES REFERENCED

Type	Name	References		
	APPCOL	150	171	
	DEFROW	97	108	115
	GO	181		
	INIT	95		
	REPVAR	186		

```
      SUBROUTINE MOD1
C
C *** ************************************************************
C     MOD1 PROCESSES MODEL 1
C *** ************************************************************
C
      COMMON/HEAD/MODEL,NPROJS,NATTRS
      COMMON/MAX/MAXPRJ,MAXATR
      COMMON/PR1/PRNAME(200)
      COMMON/PRO/PRMATR(200,200),PRWTS(200)
      COMMON/BIGWTS/WTMTX(200,20)
      COMMON/CONST/OBJ
      COMMON/BIGPROJ/ATRPRO(200,200,20)
      COMMON/CONTROL/CLS
C
C --- GLOSSARY OF VARIABLES
C --- NAME      USE      TYPE     RANGE            DEFINITION
C --- ANSWER    UI,U     CHAAR*2  ANY              USER'S ANSWER TO QUESTIONS
C --- ATRPRO    M,FI,FO  REAL     0 & UP           PROJ COMP. FOR EA. ATTRIBUTE
C                                (MAXPRJ,MAXPRJ,MAXATR)
C --- CHOICE    M        INT      0-7              USER'S CHOICE FROM MENU
C --- CLS       U        INTEGER  12               CLEAR SCREEN CHARACTER
C --- FNAME     UI,U     CHAR*24  ANY              NAME OF INPUT FILE
C --- I         M        INT      ANY              COUNTER, INDEX, ETC
C --- INDX      M,FO     REAL     NON NEGATIVE     OBJ/NPROJS
C --- INUNIT    I,U      INT      20               INPUT UNIT NUMBER
C --- ITEMP     M        INT      ANY              TEMPORARY USE
C --- J         M        INT      ANY              COUNTER, INDEX, ETC
C --- K         M        INT      ANY              COUNTER, INDEX, ETC
C --- MAXATR    U        INT      20               MAX NUMBER OF ATTRIBUTES
C --- MAXPRJ    U        INT      200              MAX NUMBER OF PROJECTS
C --- MENU11    M,UO     CHAR*2   '0'-'7','##'     HEADINGS FOR MENU
C                                (8)
C --- MODEL     N        INT      1-5              MODEL NUMBER
C --- NATTRS    N        INT      1                NUMBER OF ATTRIBUTES
C --- NPROJS    N        INT      2-MAXPRJ         NUMBER OF PROJECTS
C --- OBJ       U,UO     REAL     NON-NEGATIVE     VALUE OF OBJECTIVE FUNCTION
C --- POINT     M        INT      0-NPROJS         POINTERS USED TO SORT PROJECTS
C                                (MAXPRJ)
C --- PRMATR    UI,FI    REAL     NON NEGATIVE     PROJECT COMPARISONS
C                                (MAXPRJ,MAXPRJ)
C --- PRNAME    UI,FO    CHAR*24  ANY              PROJECT NAMES
C                                (MAXPRJ)
C --- PRWTS     UO,FO    REAL     0-1.0            PROJECT WEIGHTS
C                                (MAXPRJ)
C --- RANK      M,UO     INT      0-NPROJS         RANKS OF PROJECTS
C                                (MAXPRJ)
C --- TEMP      UI,M     CHAR*24  ANY              TEMP USE
C --- TEST      UI,FI,U  CHAR*4   ANY              TEMP USE
C --- WTMTX     M,FO     REAL
C                                (MAXPRJ,MAXATR)  PROJECT WEIGHTS FOR EA. ATR.
C
      CHARACTER*2 MENU11(8)/'0','1','2','##','4','##','6','7'/,
     *            ANSWER,
     *            PRNAME*24,
     *            TEMP*24
      CHARACTER*24 FNAME
      CHARACTER*4  TEST
      INTEGER     CHOICE/2/,
     *            CLS,
     *            POINT(200),
     *            RANK(200),
     *            MAXPRJ,
     *            NPROJS,
     *            MODEL,
     *            INUNIT/20/,
     *            NATTRS,
     *            MAXATR,
      REAL        PRMATR,
     *            OBJ,
     *            INDX,
     *            WTMTX,
     *            PRWTS
C D   WRITE(6,*)('ENTERING SUBROUTINE MOD1')
C
      WRITE(6,1)(CLS,CLS,CLS)
    1 FORMAT(1X,A1,A1,A1'          MENU 1.1 -- BASIC MODEL'//)
      DO WHILE (.TRUE.)
    4   WRITE(6,2)((MENU11(I),I=1,8),CHOICE)
```

```
2         FORMAT(6X,A2,'--SPECIFY NUMBER OF PROJECTS'/
     *     6X,A2,'--READ OLD PROJECT MATRIX FROM FILE'/
     *     6X,A2,'--ENTER (CHANGE) PROJECT NAMES'/
     *     6X,A2,'--ENTER (CHANGE) (ADD) PROJECT COMPARISONS'/
     *     6X,A2,'--DISPLAY COMPARISONS'/
     *     6X,A2,'--CALCULATE WEIGHTS'/
     *     6X,A2,'--HELP ON PROJECT RANKING INTERFACE'/
     *     6X,A2,'--RETURN TO MAIN MENU'/
     *     3X,'PLEASE ENTER NUMBER OF YOUR CHOICE.[',I1,']:')
          READ(5,3)(ANSWER)
3         FORMAT(A)
          I=CHOICE
          IF (ANSWER.NE.'  ') THEN
          IF (INDEX('0123456789',ANSWER(1:1)).EQ.0) THEN
            WRITE(6,*)('ENTRY MUST BE A NUMBER- PLEASE REENTER')
            GOTO 4
          END IF
          CHOICE=ICHAR(ANSWER(1:1))-48
          IF (CHOICE.GT.7) THEN
            WRITE(6,*)('PLEASE ENTER A NUMBER FROM 0 TO 7')
            CHOICE=I
            GOTO 4
          END IF
C --- CHECK TO SEE IF ENTRY IS INVALID DUE TO PREVIOUS CHOICE
          IF (ANSWER(1:1).NE.MENU11(CHOICE+1)) THEN
            WRITE(6,*)(CHOICE,' INVALID AT THIS POINT. REENTER')
            CHOICE=I
            GOTO 4
          END IF
          END IF
C --- CHOICE O.K.
          IF (CHOICE.EQ.0) THEN
5           WRITE(6,*)('PLEASE INPUT NUMBER OF PROJECTS')
            READ(5,*)(NPROJS)
            IF (NPROJS.LT.1.OR.NPROJS.GT.MAXPRJ) THEN
              WRITE(6,*)('NUMBER OF PROJECTS MUST BE BETWEEN 1 AND ',MAXPRJ)
              GOTO 5
            END IF
            MENU11(4)='3'
            CHOICE=3
            WRITE(6,1)(CLS,CLS,CLS)
          ELSE IF (CHOICE.EQ.1) THEN
C ---       INPUT PROJECTS FROM A FILE
            WRITE(6,*)('ENTER NAME OF INPUT FILE')
            READ(6,444)(FNAME)
444         FORMAT(A)
            WRITE(6,8)(CLS,CLS,CLS)
            OPEN(UNIT=INUNIT,FILE=FNAME,STATUS='OLD',ERR=777)
C ---       FIND NUMBER OF PROJECTS
445         READ(INUNIT,446,ERR=776,END=776)(TEST)
446         FORMAT(1X,A)
            IF (TEST.NE.'=005') GOTO 445
            READ(INUNIT,339,ERR=776,END=776)(NPROJS)
339         FORMAT(5X,I3)
C ---       FIND PROJECT NAMES
447         READ(INUNIT,446,ERR=776,END=776)(TEST)
            IF (TEST.NE.'=010') GOTO 447
            READ(INUNIT,448,ERR=776,END=776)(PRNAME(I),I=1,NPROJS)
448         FORMAT(9X,A)
C ---       FIND PROJECT COMPARISON MATRIX
449         READ(INUNIT,446,ERR=776,END=776)(TEST)
            IF (TEST.NE.'= 11') GOTO 449
            DO I=1,NPROJS
              READ(INUNIT,450,ERR=776,END=776)(PRMATR(I,J),J=1,NPROJS)
450           FORMAT(5X,8(F12.8,1X))
            END DO
            CLOSE (UNIT=INUNIT)
            CHOICE=5
            MENU11(4)='3'
            MENU11(6)='5'
            GOTO 778
776         WRITE(6,*)('ERROR READING FILE ',FNAME)
            GOTO 778
777         WRITE(6,*)('ERROR OPENING FILE ',FNAME,' NO DATA READ.')
778         CONTINUE
          ELSE IF (CHOICE.EQ.2) THEN
C ---       PROJECT NAMES
            IF (NPROJS.EQ.0) THEN
C ---         USER HASN'T ENTERED NUMBER OF PROJECTS YET.
```

```
                WRITE(6,*)('ENTER PROJECT NAMES. QUIT WITH A BLANK LINE')
                WRITE(6,*)('#1:')
                READ(5,3)(PRNAME(1))
                DO WHILE (PRNAME(NPROJS+1).NE.' ')
                  NPROJS=NPROJS+1
                  IF (NPROJS.EQ.MAXPRJ) THEN
                    WRITE (6,*)(MAXPRJ,' IS THE MAXIMUM NUMBER OF PROJECTS')
                    GOTO 7
                  END IF
                  WRITE(6,*)('#',NPROJS+1,':')
                  READ(5,3)(PRNAME(NPROJS+1))
                END DO
 7              CONTINUE
              ELSE
C ---             USER HAS ENTERED NUMBER OF PROJECTS
                WRITE(6,*)('ENTER PROJECT NAMES. QUIT WITH A BLANK LINE')
                DO I=1,NPROJS
                  WRITE(6,*)('#',I,':')
                  READ(5,3)(TEMP)
                  IF (TEMP.EQ.' ') GOTO 6
                  PRNAME(I)=TEMP
                END DO
 6              CONTINUE
              END IF
              CHOICE=3
              MENU1(4)='3'
              WRITE(6,1)(CLS,CLS,CLS)
            ELSE IF (CHOICE.EQ.3) THEN
C ---         ADD COMPARISONS
              CALL INMAT(.TRUE.)
              DO I=1,NPROJS
                DO J=1,NPROJS
                  ATRPRO(I,J,1)=PRMATR(I,J)
                END DO
              END DO
              CHOICE=5
              MENU1(6)='5'
            ELSE IF (CHOICE.EQ.4) THEN
C ---         VIEW PROJECT MATRIX
              DO J=1,NPROJS
                WRITE(6,1234)(PRMATR(J,K),K=1,NPROJS)
 1234           FORMAT(/5X,8(F8.4,1X)/)
              END DO
              WRITE(6,*)('HIT <RETURN> TO CONTINUE')
              READ(5,1235)(TEST)
 1235         FORMAT(A)
              CHOICE=1
              WRITE(6,1)(CLS,CLS,CLS)
            ELSE IF (CHOICE.EQ.5) THEN
C ---         CALCULATE WEIGHTS
              CALL MATGEN(NPROJS,PRMATR,PRWTS,MAXPRJ)
C ---         SORT PROJECTS AND WEIGHTS FOR OUTPUT, AND STORE WEIGHTS
              DO I=1,NPROJS
                POINT(I)=I
                WTMTX(I,1)=PRWTS(I)
              END DO
              DO I=1,NPROJS-1
                DO J=I+1,NPROJS
                  IF (PRWTS(POINT(J)).GT.PRWTS(POINT(I))) THEN
                    ITEMP=POINT(I)
                    POINT(I)=POINT(J)
                    POINT(J)=ITEMP
                  END IF
                END DO
              END DO
              RANK(1)=1
              DO I=2,NPROJS
                IF (PRWTS(POINT(I)).LT.PRWTS(POINT(I-1))) THEN
                  RANK(I)=I
                ELSE
                  RANK(I)=RANK(I-1)
                END IF
              END DO
              WRITE(6,8)(CLS,CLS,CLS)
 8            FORMAT(1X,A1,A1,A1)
              WRITE(6,7777)(RANK(I),POINT(I),PRNAME(POINT(I)),PRWTS(POINT(I)),
     *                      I=1,NPROJS)
 7777         FORMAT(3X,'RANK    PROJECT # AND NAME',17X,'WEIGHT'/
     *            200(3X,I3,6X,I3,1X,A,4X,F10.8/))
```

```
0238                INDX=OBJ/FLOAT(NPROJS)
0239                IF (INDX.LE.0.) THEN
0240                  WRITE(6,7778)(OBJ,INDX)
0241      7778        FORMAT(' OBJ=',F8.4,' INDEX=',F8.4,'--CONSISTENT')
0242                ELSE IF (INDX.LE.1.0) THEN
0243                  WRITE(6,7779)(OBJ,INDX)
0244      7779        FORMAT(' OBJ=',F8.4,' INDEX=',F8.4,'--SOME CONSISTENCY')
0245                ELSE
0246                  WRITE(6,7780)(OBJ,INDX)
0247      7780        FORMAT(' OBJ=',F8.4,' INDEX=',F8.4,'--CONSISTENCY PROBLEMS')
0248                END IF
0249                WRITE(6,*)('VIEW DELTA MATRIX (Y/[N])?')
0250                READ(5,7781)(TEST)
0251      7781      FORMAT(A)
0252                IF (TEST(1:1).EQ.'Y') CALL DLTMAT(NPROJS,PRMATR,PRWTS,200)
0253                CHOICE=7
0254                WRITE(6,1)(CLS,CLS,CLS)
0255              ELSE IF (CHOICE.EQ.6) THEN
0256      C ---     USER IS IN NEED OF ASSISTANCE
0257                CALL NHELP(11)
0258                CHOICE=1
0259              ELSE IF (CHOICE.EQ.7) THEN
0260      C ---     RETURN TO MAIN MENU
0261  C   D         WRITE(6,*)('LEAVING SUBROUTINE MOD1')
0262                RETURN
0263              END IF
0264            END DO
0265            END
```

PROGRAM SECTIONS

	Name	Bytes	Attributes
0	$CODE	2807	PIC CON REL LCL SHR EXE RD NOWRT LONG
1	$PDATA	1053	PIC CON REL LCL SHR NOEXE RD NOWRT LONG
2	$LOCAL	1988	PIC CON REL LCL NOSHR NOEXE RD WRT LONG
3	HEAD	12	PIC OVR REL GBL SHR NOEXE RD WRT LONG
4	MAX	8	PIC OVR REL GBL SHR NOEXE RD WRT LONG
5	PR1	4800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
6	PRO	160800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
7	BIGWIS	16000	PIC OVR REL GBL SHR NOEXE RD WRT LONG
8	CONST	4	PIC OVR REL GBL SHR NOEXE RD WRT LONG
9	BIGPROJ	3200000	PIC OVR REL GBL SHR NOEXE RD WRT LONG
10	CONTROL	4	PIC OVR REL GBL SHR NOEXE RD WRT LONG
	Total Space Allocated	3387476	

ENTRY POINTS

Address	Type	Name	References
0-00000000		MOD1	1#

VARIABLES

Address	Type	Name	Attributes	References
2-00000650	CHAR	ANSWER		53 89= 92 93 97 104
2-00000688	I*4	CHOICE		59D 79 91 97= 98 100= 104 105
				106= 111 119= 121 147= 155 183= 186
10-00000000	I*4	CLS	COMM	194= 196 205= 207 253= 255 258= 259
				14 59 76(3) 120(3) 126(3) 185(3) 206(3) 232(3)
				254(3)
2-0000066A	CHAR	FNAME		57 124= 127A 151 153
**	I*4	I		79(2)= 91= 100 106 137(2)= 142= 143 175=
				176 179 189= 191(2) 205 211= 212(2) 213(2)
				215= 216 217 218 219 225= 226(2) 227(2)
				229(2) 234(5)= 258
**	R*4	INDX		69 238= 239 240 242 243 246
2-0000068C	I*4	INUNIT		59D 127A 129 132 135 137 140 143
				146A
**	I*4	ITEMP		218= 220
2-00000694	I*4	J		143(2)= 190= 191(2) 198= 199 216= 217 219

**	I*4	K		220							
				199(2)=							
4-00000004	I*4	MAXATR	COMM	8	59						
4-00000000	I*4	MAXPRJ	COMM	8	59	114	115	164	165	209A	
3-00000000	I*4	MODEL	COMM	7	59						
3-00000008	I*4	NATTRS	COMM	7	59						
3-00000004	I*4	NPROJS	COMM	7	59	113=	114(2)	132=	137	142	143
				157	162	163(2)=	164	168	169	175	189
				190	198	199	209A	211	215	216	225
				234	238	252A					
8-00000000	R*4	OBJ	COMM	12	69	238	240	243	246		
2-00000652	CHAR	TEMP		53	177=	178	179				
2-00000682	CHAR	TEST		58	129=	131	135=	136	140=	141	203=
				250=	252						

ARRAYS

Address	Type	Name	Attributes	Bytes	Dimensions	References					
9-00000000	R*4	AIRPRO	COMM	3200000	(200, 200, 20)	13	191=				
2-00000640	CHAR	MENU11		16	(8)	53D	79	104	118=	148=	
						149=	184=	195=			
2-00000000	I*4	POINT		800	(200)	59	212=	217(2)	218	219(2)=	
						220=	226(2)	234(3)			
6-00000000	R*4	PRMATR	COMM	160000	(200, 200)	10	69	143=	191	199	
						209A	252A				
5-00000000	CHAR	PRNAME	COMM	4800	(200)	9	53	137=	161=	162	
						169=	179=	234			
6-00027100	R*4	PRWTS	COMM	800	(200)	10	69	209A	213	217(2)	
						226(2)	234	252A			
2-00000320	I*4	RANK		800	(200)	59	224=	227=	229(2)=	234	
7-00000000	R*4	WTMTX	COMM	16000	(200, 20)	11	69	213=			

LABELS

Address	Label	References						
1-00000195	1'	76	77#	120	185	206	254	
1-000001C3	2'	79	80#					
1-00000312	3'	89	90#	161	169	177		
**	4	79#	95	101	107			
**	5	112#	116					
0-0000066E	6	178	181#					
0-000005D8	7	166	171#					
1-00000341	8'	126	232	233#				
1-0000031A	339'	132	133#					
1-00000314	444'	124	125#					
**	445	129#	131					
1-00000316	446'	129	130#	135	140			
**	447	135#	136					
1-0000031F	448'	137	138#					
0-00000398	449	140#	141					
1-00000323	450'	143	144#					
0-0000044C	776	129(2)	132(2)	135(2)	137(2)	140(2)	143(2)	151#
0-00000474	777	127	153#					
0-000004A4	778	150	152	154#				
1-00000330	1234'	199	200#					
1-0000033F	1235'	203	204#					
1-0000034A	7777'	234	236#					
1-00000388	7778'	240	241#					
1-000003B1	7779'	243	244#					
1-000003DD	7780'	246	247#					
1-0000040D	7781'	250	251#					

FUNCTIONS AND SUBROUTINES REFERENCED

Type	Name	References
	DLTMAT	252
	FOR$CLOSE	146
	FOR$OPEN	127
	INMAT	188
I*4	LIB$INDEX	93
	MATGEN	209
	NHELP	257

```
      SUBROUTINE MOD2
C
C *** ***************************************************************
C     MOD2 PROCESSES MODEL 2
C *** ***************************************************************
C
      COMMON/HEAD/MODEL,NPROJS,NATTRS
      COMMON/AT1/ATNAME(20),ATMATR(20,20),ATWTS(20)
      COMMON/MAX/MAXPRJ,MAXATR
      COMMON/BIGPROJ/ATRPRO(200,200,20)
      COMMON/PR1/PRNAME(200)
      COMMON/PRO/PRMATR(200,200),PRWTS(200)
      COMMON/BIGWTS/WTMTX(200,20)
      COMMON/CONST/OBJ
      COMMON/CONTROL/CLS
C
C --- GLOSSARY OF VARIABLES
C --- NAME      USE     TYPE     RANGE            DEFINITION
C --- ANSWER    UI,U    CHAR*2   ANY              USER'S ANSWER TO QUESTIONS
C --- ATMATR    UI,FI,FO REAL    NON NEGATIVE     ATTRIBUTE COMPARISONS
C                       (MAXATR)
C --- ATNAME    UI,FI,FO CHAR*24 ANY              ATTRIBUTE NAMES
C                       (MAXATR)
C --- ATRPRO    M,FI,FO REAL     0 & UP           PROJ COMP. FOR EA. ATTRIBUTE
C                       (MAXPRJ,MAXPRJ,MAXATR)
C --- ATWTS     M,FO,UO REAL     0-1.0            ATTRIBUTE WEIGHTS
C                       (MAXATR)
C --- CHAR      M,FI    CHAR*1   ANY              POSITION FINDER IN FILE
C --- CHOICE    M       INT      0-7              USER'S CHOICE FROM MENU
C --- CLS       U       INTEGER  12               CLEAR SCREEN CHARACTER
C --- FNAME     UI,U    CHAR*24  ANY              NAME OF INPUT FILE
C --- I         M       INT      ANY              COUNTER
C --- II        M       INT      ANY              COUNTER
C --- INDX      M,FO    REAL     NON NEGATIVE     OBJ/NPROJS
C --- INUNIT    I,U     INT      20               FILE INPUT UNIT
C --- J         M       INT      ANY              COUNTER
C --- K         M       INT      ANY              COUNTER
C --- MAXATR    U       INT      20               MAX NUMBER OF ATTRIBUTES
C --- MAXPRJ    U       INT      200              MAX NUMBER OF PROJECTS
C --- MENU12    M,UO    CHAR*2   '0'-'11','##'    HEADINGS FOR MENU
C                       (12)
C --- MODEL     N       INT      1-5              MODEL NUMBER
C --- NATTRS    M,UI,FI INT      1-MAXATR         NUMBER OF ATTRIBUTES
C --- NPROJS    M       INT      2-MAXPRJ         NUMBER OF PROJECTS
C --- NUM       FI,M    INT      ANY              LOCATION OF PROJ. COMPARISONS
C --- OBJ       U,UO    REAL     NON-NEGATIVE     VALUE OF OBJECTIVE FUNCTION
C --- POINT     M       INT      0-NPROJS         POINTERS USED TO SORT PROJECTS
C                       (MAXPRJ)
C --- PRMATR    UI,FI   REAL     NON NEGATIVE     PROJECT COMPARISONS
C                       (MAXPRJ,MAXPRJ)
C --- PRNAME    UI,FO   CHAR*24  ANY              PROJECT NAMES
C                       (MAXPRJ)
C --- PRWTS     UO,FO   REAL     0-1.0            PROJECT WEIGHTS
C                       (MAXPRJ)
C --- RANK      M,UO    INT      0-NPROJS         RANKS OF PROJECTS
C                       (MAXPRJ)
C --- TEMP      UI,M    CHAR*24  ANY              TEMP USE
C --- TEST      UI,FI,U CHAR*4   ANY              TEMP USE
C --- WGTFLG    M       LOG      .TRUE.,.FALSE.   HAVE WEIGHTS BEEN COMPUTED?
C --- WTMTX     M,FO    REAL                      PROJECT WEIGHTS FOR EA. ATR.
C                       (MAXPRJ,MAXATR)
C
      CHARACTER*2 MENU12(12)/'0','1','2','3','4','5','##',
     *                       '##','8','##','10','11'/,
     *                ANSWER
      CHARACTER*1  CHAR
      CHARACTER*4  TEST
      CHARACTER*24 ATNAME,
     *             FNAME,
     *             PRNAME,
     *             TEMP
      REAL         ATMATR,
     *             ATWTS,
     *             ATRPRO,
     *             OBJ,
     *             INDX,
     *             PRMATR,
     *             PRWTS,
     *             WTMTX
```

```
      INTEGER     CHOICE/4/,
     *            CLS,
     *            RANK(200),
     *            I,J,K,NUM,
     *            INUNIT/20/,
     *            POINT(200),
     *            MAXPRJ,
     *            NPROJS,
     *            MODEL,
     *            NATTRS,
     *            MAXATR
      LOGICAL     WGTFLG
C D   WRITE(6,*)('ENTERING SUBROUTINE MOD2')
C
      ATNAME(1)=' '
C
      WRITE(6,1)(CLS,CLS,CLS)
1     FORMAT(1X,A1,A1,A1'          MENU 1.2--ADDITIVE (ATTRIBUTES) MODEL'//)
      DO WHILE (.TRUE.)
4       WRITE(6,2)((MENU12(I),I=1,12),CHOICE)
2       FORMAT(6X,A2,'--SPECIFY NUMBER OF ATTRIBUTES'/
     *    6X,A2,'--READ OLD ATTRIBUTES MATRIX FROM FILE'/
     *    6X,A2,'--SPECIFY NUMBER OF PROJECTS'/
     *    6X,A2,'--READ OLD PROJECT MATRIX FROM FILE'/
     *    6X,A2,'--ENTER (CHANGE) ATTRIBUTE NAMES'/
     *    6X,A2,'--ENTER (CHANGE) PROJECT NAMES'/
     *    6X,A2,'--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS'/
     *    6X,A2,'--ENTER (CHANGE) (ADD) PROJECT COMPARISONS'/
     *    6X,A2,'--VIEW PROJECT OR ATTRIBUTE COMPARISONS'/
     *    6X,A2,'--CALCULATE ATTRIBUTE AND PROJECT WEIGHTS'/
     *    6X,A2,'--HELP WITH PROJECT RANKING INTERFACE'/
     *    6X,A2,'--RETURN TO MAIN MENU'//
     *    3X,'PLEASE ENTER NUMBER OF YOUR CHOICE.[ ',I2,' ]:')
        READ(5,3)(ANSWER)
3       FORMAT(A)
C D     WRITE(6,*)('NATTRS=',NATTRS)
        I=CHOICE
        IF (ANSWER.NE.'  ') THEN
        IF (INDEX('0123456789',ANSWER(1:1)).EQ.0) THEN
          WRITE(6,*)('ENTRY MUST BE A NUMBER. PLEASE REENTER.')
          GOTO 4
        END IF
        IF (INDEX('0123456789',ANSWER(2:2)).EQ.0) THEN
          WRITE(6,*)('ANSWER MUST BE A NUMBER. PLEASE REENTER')
          GOTO 4
        END IF
        IF (ANSWER(2:2).EQ.' ') THEN
          CHOICE=ICHAR(ANSWER(1:1))-48
        ELSE
          CHOICE=(ICHAR(ANSWER(1:1))-48)*10+ICHAR(ANSWER(2:2))-48
        END IF
        END IF
C --- CHECK TO SEE IF ENTRY IS INVALID DUE TO PREVIOUS CHOICE
        IF ('##'.EQ.MENU12(CHOICE+1)) THEN
          WRITE(6,*)(CHOICE,' INVALID AT THIS POINT. REENTER')
          CHOICE=I
          GOTO 4
        END IF
C --- CHOICE O.K.
        IF (CHOICE.EQ.0) THEN
          WRITE(6,8)(CLS,CLS,CLS)
8         FORMAT(1X,A1,A1,A1)
5         WRITE(6,*)('PLEASE INPUT NUMBER OF ATTRIBUTES')
          READ(5,*)(NATTRS)
          IF (NATTRS.LT.1.OR.NATTRS.GT.MAXATR) THEN
            WRITE(6,*)('MUST BE BETWEEN 1 AND ',MAXATR,'.')
            GOTO 5
          END IF
          CHOICE=4
          MENU12(7)='6'
          WRITE(6,8)(CLS,CLS,CLS)
        ELSE IF (CHOICE.EQ.1) THEN
C ---       INPUT ATTRIBUTE MATRIX FROM AN EXTERNAL FILE
          WRITE(6,8)(CLS,CLS,CLS)
          WRITE(6,*)('ENTER NAME OF INPUT FILE')
          READ(6,444)(FNAME)
444       FORMAT(A)
          WRITE(6,8)(CLS,CLS,CLS)
          OPEN(UNIT=INUNIT,FILE=FNAME,STATUS='OLD',ERR=777)
```

```
C ---         FIND NUMBER OF ATTRIBUTES
445           READ(INUNIT,446,ERR=778,END=778)(TEST)
446           FORMAT(1X,A)
              IF (TEST.NE.'=006') GOTO 445
              READ(INUNIT,339,ERR=778,END=778)(NATTRS)
339           FORMAT(5X,I3)
C ---         FIND ATTRIBUTE NAMES
447           READ(INUNIT,446,ERR=778,END=778)(TEST)
              IF (TEST.NE.'=007') GOTO 447
              READ(INUNIT,448,ERR=778,END=778)(ATNAME(I),I=1,NATTRS)
448           FORMAT(9X,A)
C ---         FIND ATTRIBUTE COMPARISON MATRIX
449           READ(INUNIT,446,ERR=778,END=778)(TEST)
              IF (TEST.NE.'=008') GOTO 449
              DO I=1,NATTRS
              READ(INUNIT,450,ERR=778,END=778)(ATMATR(I,J),J=1,NATTRS)
450             FORMAT(5X,8(F12.8,1X))
              END DO
              CLOSE (UNIT=INUNIT)
              CHOICE=7
              MENU12(7)='6'
              MENU12(8)='7'
            ELSE IF (CHOICE.EQ.2) THEN
              WRITE(6,8)(CLS,CLS,CLS)
6             WRITE(6,*)('PLEASE INPUT NUMBER OF PROJECTS')
              READ(5,*)(NPROJS)
              IF (NPROJS.LT.1.OR.NPROJS.GT.MAXPRJ) THEN
                WRITE(6,*)('MUST BE BETWEEN 1 AND',MAXPRJ,'.')
                GOTO 6
              END IF
              CHOICE=5
              MENU12(8)='7'
              WRITE(6,8)(CLS,CLS,CLS)
            ELSE IF (CHOICE.EQ.3) THEN
C ---         INPUT PROJECT MATRICIES FROM EXTERNAL FILE
C ---             (INPUTS PROJECT MATRIX FOR EACH ATTRIBUTE. THUS THE INPUT
C ---              FILE MUST HAVE AT LEAST AS MANY ATTRIBUTES AS THE MODEL
C ---              BEING RUN.)
C
              WRITE(6,8)(CLS,CLS,CLS)
              WRITE(6,*)('ENTER NAME OF INPUT FILE')
              READ(6,444)(FNAME)
              WRITE(6,8)(CLS,CLS,CLS)
              OPEN(UNIT=INUNIT,FILE=FNAME,STATUS='OLD',ERR=777)
C ---         FIND NUMBER OF PROJECTS
456           READ(INUNIT,446,ERR=778,END=778)(TEST)
              IF (TEST.NE.'=005') GOTO 456
              READ(INUNIT,339,ERR=778,END=778)(NPROJS)
C ---         FIND NUMBER OF ATTRIBUTES. MAKE SURE THAT THERE ARE ENOUGH
451           READ(INUNIT,446,ERR=778,END=778)(TEST)
              IF (TEST.NE.'=006') GOTO 451
              READ(INUNIT,339,ERR=778,END=778)(I)
              IF (I.LT.NATTRS) THEN
                WRITE(6,*)('FILE ',FNAME,' HAS ONLY',I,' ATTRIBUTES.',
     *                     NO PROJECTS WERE READ')
                GOTO 452
              END IF
C ---         FIND PROJECT NAMES
454           READ(INUNIT,446,ERR=778,END=778)(TEST)
              IF (TEST.NE.'=010') GOTO 454
              READ(INUNIT,448,ERR=778,END=778)(PRNAME(I),I=1,NPROJS)
C ---         FIND PROJECT COMPARISON MATRICIES
              DO K=1,NATTRS
455             READ(INUNIT,453,ERR=778,END=778)(CHAR,NUM)
453             FORMAT(1X,A,I3)
                NUM=IFIX((FLOAT(NUM)-11)/2)+1
                IF (CHAR.NE.'='.OR.NUM.NE.K) GOTO 455
                DO I=1,NPROJS
             READ(INUNIT,450,ERR=778,END=778)(ATRPRO(I,J,K),J=1,NPROJS)
                END DO
              END DO
452           CONTINUE
              CLOSE (UNIT=INUNIT)
              CHOICE=9
              MENU12(8)='7'
              MENU12(10)='9'
            ELSE IF (CHOICE.EQ.4) THEN
C ---             ENTER ATTRIBUTE NAMES
              WRITE(6,8)(CLS,CLS,CLS)
```

```
            IF (NATTRS.EQ.1) THEN
C ---          USER HASN'T ENTERED NUMBER OF ATTRIBUTES YET.
              WRITE(6,*)('ENTER ATTRIBUTE NAMES. QUIT WITH A BLANK LINE')
                NATTRS=0
              WRITE(6,*)('#1:')
              READ(5,3)(ATNAME(1))
              DO WHILE (ATNAME(NATTRS+1).NE.' ')
                NATTRS=NATTRS+1
                IF (NATTRS.EQ.MAXATR) THEN
                  WRITE (6,*)(MAXATR,' IS THE MAXIMUM NUMBER OF ATTRIBUTES')
                  GOTO 7
                END IF
                WRITE(6,*)('#',NATTRS+1,':')
                READ(5,3)(ATNAME(NATTRS+1))
              END DO
7             CONTINUE
              IF (NATTRS.LT.1) NATTRS=1
            ELSE
C ---          USER HAS ENTERED NUMBER OF ATTRIBUTES
              WRITE(6,*)('ENTER ATTRIBUTE NAMES. QUIT WITH A BLANK LINE')
              DO I=1,NATTRS
                WRITE(6,*)('#',I,':')
                READ(5,3)(TEMP)
                IF (TEMP.EQ.' ') GOTO 26
                ATNAME(I)=TEMP
              END DO
26            CONTINUE
            END IF
            IF (NATTRS.LT.1) NATTRS=1
            CHOICE=6
            MENU12(7)='6'
            WRITE(6,8)(CLS,CLS,CLS)
          ELSE IF (CHOICE.EQ.5) THEN
C ---          PROJECT NAMES
            WRITE(6,8)(CLS,CLS,CLS)
            IF (NPROJS.EQ.0) THEN
C ---          USER HASN'T ENTERED NUMBER OF PROJECTS YET.
              WRITE(6,*)('ENTER PROJECT NAMES. QUIT WITH A BLANK LINE')
              WRITE(6,*)('#1:')
              READ(5,3)(PRNAME(1))
              DO WHILE (PRNAME(NPROJS+1).NE.' ')
                NPROJS=NPROJS+1
                IF (NPROJS.EQ.MAXPRJ) THEN
                  WRITE (6,*)(MAXPRJ,' IS THE MAXIMUM NUMBER OF PROJECTS')
                  GOTO 17
                END IF
                WRITE(6,*)('#',NPROJS+1,':')
                READ(5,3)(PRNAME(NPROJS+1))
              END DO
17            CONTINUE
            ELSE
C ---          USER HAS ENTERED NUMBER OF PROJECTS
              WRITE(6,*)('ENTER PROJECT NAMES. QUIT WITH A BLANK LINE')
              DO I=1,NPROJS
                WRITE(6,*)('#',I,':')
                READ(5,3)(TEMP)
                IF (TEMP.EQ.' ') GOTO 16
                PRNAME(I)=TEMP
              END DO
16            CONTINUE
            END IF
            CHOICE=7
            MENU12(8)='7'
            WRITE(6,8)(CLS,CLS,CLS)
          ELSE IF (CHOICE.EQ.6) THEN
C ---          INPUT ATTRIBUTE COMPARISONS
            WRITE(6,8)(CLS,CLS,CLS)
            WRITE(6,*)('ATTRIBUTE COMPARISONS')
            CALL INMAT(.FALSE.)
            CHOICE=5
          ELSE IF (CHOICE.EQ.7) THEN
C ---          INPUT PROJECT COMPARISONS
            DO I=1,NATTRS
              WRITE(6,4597)(I,ATNAME(I))
4597          FORMAT(' WITH RESPECT TO ATTRIBUTE ',I3,1X,A)
              DO J=1,NPROJS
                DO K=1,NPROJS
                  PRMATR(J,K)=ATRPRO(J,K,I)
                END DO
```

```
                END DO
                CALL INMAT(.TRUE.)
                DO J=1,NPROJS
                  DO K=1,NPROJS
                    ATRPRO(J,K,I)=PRMATR(J,K)
                    IF (J.EQ.K) THEN
                      PRMATR(J,K)=1
                    ELSE
                      PRMATR(J,K)=0
                    END IF
                  END DO
                END DO
              END DO
              CHOICE=9
              MENU12(10)='9'
            ELSE IF (CHOICE.EQ.8) THEN
C ---         VIEW PROJECT OR ATTRIBUTE MATRIX
              WRITE(6,8)(CLS,CLS,CLS)
903           WRITE(6,*)('VIEW <P>ROJECT OR <A>TTRIBUTE COMPARISONS?')
              READ(5,900)(CHAR)
900           FORMAT(A)
              IF (CHAR.EQ.'A') THEN
                DO I=1,NATTRS
                  WRITE(6,901)(ATMATR(I,J),J=1,NATTRS)
901               FORMAT(5X,200(F8.4,1X))
                END DO
              ELSE IF (CHAR.EQ.'P') THEN
904             WRITE(6,*)('ENTER ATTRIBUTE NUMBER FOR WHICH YOU WISH TO',
     *                     SEE PROJECT COMPARISONS')
                READ(5,902)(K)
902             FORMAT(I3)
                IF (NATTRS.GT.0) THEN
                IF (K.LT.1.OR.K.GT.NATTRS) THEN
                  WRITE(6,*)('ENTER A NUMBER BETWEEN 1 AND',NATTRS)
                  GOTO 904
                END IF
                DO I=1,NPROJS
                  WRITE(6,901)(ATRPRO(I,J,K),J=1,NPROJS)
                END DO
                END IF
              ELSE
                WRITE(6,*)('PLEASE ANSWER WITH A "P" OR AN "A"')
                GOTO 903
              END IF
              WRITE(6,*)('HIT <RETURN> TO CONTINUE')
              READ(5,900)(CHAR)
              CHOICE=6
              WRITE(6,8)(CLS,CLS,CLS)
            ELSE IF (CHOICE.EQ.9) THEN
C ---           CALCULATE WEIGHTS
C ---             FIRST, CALCULATE ATTRIBUTE WEIGHTS
              CALL MATGEN(NATTRS,ATMATR,ATWTS,MAXATR)
C ---         SORT ATTRIBUTES BY WEIGHT
              RANK(1)=1
              DO I=1,NATTRS
                POINT(I)=I
              END DO
              DO I=1,NATTRS-1
                DO J=I,NATTRS
                  IF (ATWTS(POINT(I)).LT.ATWTS(POINT(J))) THEN
                    K=POINT(I)
                    POINT(I)=POINT(J)
                    POINT(J)=K
                  END IF
                END DO
              END DO
              DO I=2,NATTRS
                  IF (ATWTS(POINT(I)).LT.ATWTS(POINT(I-1))) THEN
                    RANK(I)=I
                  ELSE
                    RANK(I)=RANK(I-1)
                  END IF
              END DO
              WRITE(6,8)(CLS,CLS,CLS)
              WRITE(6,*)('ATTRIBUTE WEIGHTS')
              WRITE(6,27)(RANK(I),POINT(I),ATNAME(POINT(I)),ATWTS(POINT(I)),
     *          I=1,NATTRS)
27            FORMAT(//3X,'RANK  ATTRIBUTE #,AND NAME',13X,'  WEIGHT',20(/
     *          3X,I3,4X,I3,1X,A,6X,F10.8))
```

```
0396                INDX=OBJ/FLOAT(NPROJS)
0397                IF (INDX.LE.0.) THEN
0398                  WRITE(6,7778)(OBJ,INDX)
0399    7778          FORMAT(' OBJ=',F8.4,', INDEX=',F8.4,'--CONSISTENT')
0400                ELSE IF (INDX.LE.1.0) THEN
0401                  WRITE(6,7779)(OBJ,INDX)
0402    7779          FORMAT(' OBJ=',F8.4,', INDEX=',F8.4,'--SOME CONSISTENCY')
0403                ELSE
0404                  WRITE(6,7780)(OBJ,INDX)
0405    7780          FORMAT(' OBJ=',F8.4,', INDEX=',F8.4,'--CONSISTENCY PROBLEMS')
0406                END IF
0407                WRITE(6,*)('VIEW DELTA MATRIX (Y/[N])?')
0408                READ(5,200)(ANSWER)
0409                IF (ANSWER(1:1).EQ.'Y') CALL DLTMAT(NATTRS,ATMATR,ATWTS,MAXATR)
0410    C ---         NOW, CALCULATE PROJECT WEIGHTS
0411                WRITE(6,*)('DISPLAY PROJECT WEIGHTS ,
0412         *                 'FOR EACH ATTRIBUTE?(Y/[N])')
0413                READ(5,2001)(ANSWER)
0414    2001        FORMAT(A)
0415                WGTFLG=(ANSWER(1:1).EQ.'Y')
0416                DO I=1,NATTRS
0417                  DO J=1,NPROJS
0418                    DO K=1,NPROJS
0419                      PRMATR(J,K)=ATREFRO(J,K,I)
0420                    END DO
0421                  END DO
0422                  WRITE(6,8)(CLS,CLS,CLS)
0423                  CALL MATGEN(NPROJS,PRMATR,PRWTS,MAXPRJ)
0424    C ---         STORE WEIGHTS FOR EACH ATTRIBUTE
0425                  DO J=1,NPROJS
0426                    WTMTX(J,I)=PRWTS(J)
0427                  END DO
0428                  IF (WGTFLG) THEN
0429    C ---       SORT PROJECTS BY WEIGHT
0430                DO II=1,NPROJS
0431                  POINT(II)=II
0432                END DO
0433                DO II=1,NPROJS-1
0434                  DO J=II+1,NPROJS
0435                    IF (PRWTS(POINT(J)).GT.PRWTS(POINT(II))) THEN
0436                      K=POINT(II)
0437                      POINT(II)=POINT(J)
0438                      POINT(J)=K
0439                    END IF
0440                  END DO
0441                END DO
0442                RANK(1)=1
0443                DO II=2,NPROJS
0444                  IF (PRWTS(POINT(II)).LT.PRWTS(POINT(II-1))) THEN
0445                    RANK(II)=II
0446                  ELSE
0447                    RANK(II)=RANK(II-1)
0448                  END IF
0449                END DO
0450                WRITE(6,8)(CLS,CLS,CLS)
0451                WRITE(6,2010)(I,ATNAME(I))
0452    2010        FORMAT(' WITH RESPECT TO ATTRIBUTE ',I3,2X,A)
0453          WRITE(6,7777)(RANK(II),POINT(II),PRNAME(POINT(II)),PRWTS(POINT(II)),
0454         *                 II=1,NPROJS)
0455    7777        FORMAT(3X,'RANK      PROJECT # AND NAME',17X,'WEIGHT'/
0456         *          200(3X,I3,6X,I3,1X,A,4X,F10.8/))
0457                INDX=OBJ/FLOAT(NPROJS)
0458                IF (INDX.LE.0.) THEN
0459                  WRITE(6,7778)(OBJ,INDX)
0460                ELSE IF (INDX.LE.1.0) THEN
0461                  WRITE(6,7779)(OBJ,INDX)
0462                ELSE
0463                  WRITE(6,7780)(OBJ,INDX)
0464                END IF
0465                WRITE(6,*)('VIEW DELTA MATRIX(Y/[N])?')
0466                READ(5,7781)(TEST)
0467                IF (TEST(1:1).EQ.'Y') CALL DLTMAT(NPROJS,PRMATR,PRWTS,MAXPRJ)
0468                END IF
0469                END DO
0470    C ---       SUM UP WEIGHTS
0471                DO I=1,NPROJS
0472                  PRWTS(I)=0
0473                  DO J=1,NATTRS
0474                    PRWTS(I)=PRWTS(I)+WTMTX(I,J)*ATWTS(J)
```

```
0475                  END DO
0476                END DO
0477      C ---     SORT PROJECTS BY WEIGHT
0478                DO I=1,NPROJS
0479                  POINT(I)=I
0480                END DO
0481                DO I=1,NPROJS-1
0482                  DO J=I+1,NPROJS
0483                    IF (PRWTS(POINT(J)).GT.PRWTS(POINT(I))) THEN
0484                      K=POINT(I)
0485                      POINT(I)=POINT(J)
0486                      POINT(J)=K
0487                    END IF
0488                  END DO
0489                END DO
0490                RANK(1)=1
0491                DO I=2,NPROJS
0492                  IF (PRWTS(POINT(I)).LT.PRWTS(POINT(I-1))) THEN
0493                    RANK(I)=I
0494                  ELSE
0495                    RANK(I)=RANK(I-1)
0496                  END IF
0497                END DO
0498                WRITE(6,8)(CLS,CLS,CLS)
0499                WRITE(6,*)('                FINAL WEIGHTS')
0500                WRITE(6,7777)(RANK(I),POINT(I),PRNAME(POINT(I)),PRWTS(POINT(I)),
0501          *                   I=1,NPROJS)
0502                WRITE(6,*)('HIT <RETURN> TO CONTINUE')
0503                READ(5,7781)(TEST)
0504      7781      FORMAT(A)
0505                WRITE(6,8)(CLS,CLS,CLS)
0506                CHOICE=11
0507              ELSE IF (CHOICE.EQ.10) THEN
0508      C ---     USER NEEDS HELP
0509                CALL NHELP(12)
0510                CHOICE=1
0511              ELSE IF (CHOICE.EQ.11) THEN
0512      C ---     RETURN TO MAIN
0513 C    D         WRITE(6,*)('LEAVING SUBROUTINE MOD2')
0514                RETURN
0515              END IF
0516              GOTO 779
0517      777     WRITE(6,*)('ERROR IN OPENING FILE ',FNAME,' NO DATA READ')
0518              GOTO 779
0519      778     WRITE(6,*)('ERROR READING FILE ',FNAME)
0520      779     CONTINUE
0521            END DO
0522            END
```

PROGRAM SECTIONS

	Name	Bytes	Attributes
0	$CODE	7035	PIC CON REL LCL SHR EXE RD NOWRT LONG
1	$PDATA	1927	PIC CON REL LCL SHR NOEXE RD NOWRT LONG
2	$LOCAL	2260	PIC CON REL LCL NOSHR NOEXE RD WRT LONG
3	HEAD	12	PIC OVR REL GBL SHR NOEXE RD WRT LONG
4	AT1	2160	PIC OVR REL GBL SHR NOEXE RD WRT LONG
5	MAX	8	PIC OVR REL GBL SHR NOEXE RD WRT LONG
6	BIGPROJ	3200000	PIC OVR REL GBL SHR NOEXE RD WRT LONG
7	PR1	4800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
8	PRO	160800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
9	BIGWTS	16000	PIC OVR REL GBL SHR NOEXE RD WRT LONG
10	CONST	4	PIC OVR REL GBL SHR NOEXE RD WRT LONG
11	CONTROL	4	PIC OVR REL GBL SHR NOEXE RD WRT LONG
	Total Space Allocated	3395010	

ENTRY POINTS

Address	Type	Name	References
0-00000000		MOD2	1#

VARIABLES

Address	Type	Name	Attributes	References
2-00000658	CHAR	ANSWER		63 113= 117 118 122 126 127 129(2) 408= 409 413= 415
2-0000065A	CHAR	CHAR		66 222= 225 336= 338 343 362=
2-00000690	I*4	CHOICE		80D 99 116 127= 129= 133 134 135= 139 148= 151 178= 181 189= 192 232= 235 267= 270 299= 302 307= 308 330= 332 363= 365 506= 507 510= 511
11-00000000	I*4	CLS	COMM	15 80 96(3) 140(3) 150(3) 153(3) 157(3) 182(3) 191(3) 198(3) 201(3) 237(3) 269(3) 272(3) 301(3) 304(3) 334(3) 364(3) 390(3) 422(3) 450(3) 498(3) 505(3)
2-0000065F	CHAR	FNAME		68 155= 158A 200= 202A 212 517 519
2-00000694	I*4	I		80 99(2)= 116= 135 168(2)= 173= 174 210= 211 212 219(2)= 226= 227 258= 259 262 291= 292 295 310= 311(2) 315 321 339= 340 353= 354 371= 372(2) 374= 375 376 377 378 383= 384(2) 385(2) 387(2) 392(5)= 416= 419 426 451(2) 471= 472 474(3) 478= 479(2) 481= 482 483 484 485 491= 492(2) 493(2) 495(2) 500(5)= 510
**	I*4	II		430= 431(2) 433= 434 435 436 437 443= 444(2) 445(2) 447(2) 453(5)=
**	R*4	INDX		72 396= 397 398 400 401 404 457= 458 459 460 461 463
2-000006A4	I*4	INUNIT		80D 158A 160 163 166 168 171 174 177A 202A 204 206 208 210 217 219 222 227 231A
2-00000698	I*4	J		80 174(2)= 227(2)= 313= 315(2) 319= 321(2) 322 323 325 340(2)= 354(2)= 375= 376 378 379 417= 419(2) 425= 426(2) 434= 435 437 438 473= 474(2) 482= 483 485 486
2-0000069C	I*4	K		80 221= 225 227 314= 315(2) 320= 321(2) 322 323 325 346= 349(2) 354 377= 379 418= 419(2) 436= 438 484= 486
5-00000004	I*4	MAXATR	COMM	9 80 144 145 246 247 368A 409A
5-00000000	I*4	MAXPRJ	COMM	9 80 185 186 280 281 423A 467A
3-00000000	I*4	MODEL	COMM	7 80
3-00000008	I*4	NATTRS	COMM	7 80 143= 144(2) 163= 168 173 174 211 221 238 241= 244 245(2)= 246 250 251 254(2)= 258 266(2)= 310 339 340 348 349 350 368A 371 374 375 383 392 409A 416 473
3-00000004	I*4	NPROJS	COMM	7 80 184= 185(2) 206= 219 226 227 273 278 279(2)= 280 284 285 291 313 314 319 320 353 354 396 417 418 423A 425 430 433 434 443 453 457 467A 471 478 481 482 491 500
2-000006A0	I*4	NUM		80 222= 224(2)= 225
10-00000000	R*4	OBJ	COMM	14 72 396 398 401 404 457 459 461 463
2-00000677	CHAR	TEMP		68 260= 261 262 293= 294 295
2-0000065B	CHAR	TEST		67 160= 162 166= 167 171= 172 204= 205 208= 209 217= 218 466= 467 503=
2-000006A8	L*4	WGTFLG		91 415= 428

ARRAYS

Address	Type	Name	Attributes	Bytes	Dimensions	References
4-000001E0	R*4	ATMATR	COMM	1600	(20, 20)	8 72 174= 340 368A 409A
4-00000000	CHAR	ATNAME	COMM	480	(20)	8 68 94= 168= 243= 244 251= 262= 311 392 451
6-00000000	R*4	ATRPRO	COMM	3200000	(200, 200, 20)	10 72 227= 315 321= 354 419
4-00000820	R*4	ATWTS	COMM	80	(20)	8 72 368A 376(2) 384(2) 392 409A 474
2-00000640	CHAR	MENU12		24	(12)	63D 99 133 149= 179= 180= 190= 233= 234= 268= 300= 331=

2-00000320	I*4	POINT		800	(200)	80	372=	376(2)	377	378(2)=	
						379=	384(2)	392(3)	431=	435(2)	
						436	437(2)=	438=	444(2)	453(3)	
						479=	483(2)	484	485(2)=	486=	
						492(2)	500(3)				
8-00000000	R*4	PRMATR	COMM	160000	(200, 200)	12	72	315=	321	323=	
						325=	419=	423A	467A		
7-00000000	CHAR	PRNAME	COMM	4800	(200)	11	68	219=	277=	278	
						285=	295=	453	500		
8-00027100	R*4	PRWTS	COMM	800	(200)	12	72	423A	426	435(2)	
						444(2)	453	467A	472=	474(2)=	
						483(2)	492(2)	500			
2-00000000	I*4	RANK		800	(200)	80	370=	385=	387(2)=	392	
						442=	445=	447(2)=	453	490=	
						493=	495(2)=	500			
9-00000000	R*4	WTMTX	COMM	16000	(200, 20)	13	72	426=	474		

LABELS

Address	Label	References							
1-00000383	1'	96	97#						
1-000003B8	2'	99	100#						
1-000005DF	3'	113	114#	243	251	260	277	285	293
**	4	99#	120	124	136				
0-000001D4	5	142#	146						
0-0000054C	6	183#	187						
0-00000B20	7	248	253#						
1-000005E1	8'	140	141#	150	153	157	182	191	198
		201	237	269	272	301	304	334	364
		390	422	450	498	505			
0-00000E1A	16	294	297#						
0-00000D84	17	282	287#						
0-00000BC6	26	261	264#						
1-00000642	27'	392	394#						
1-000005F0	339'	163	164#	206	210				
1-000005EA	444'	155	156#	200					
**	445	160#	162						
1-000005EC	446'	160	161#	166	171	204	208	217	
**	447	166#	167						
1-000005F5	448'	168	169#	219					
0-0000044C	449	171#	172						
1-000005F9	450'	174	175#	227					
**	451	208#	209						
0-00000934	452	214	230#						
1-00000606	453'	222	223#						
0-000007FC	454	217#	218						
0-00000878	455	222#	225						
**	456	204#	205						
0-0000097C	777	158	202	517#					
0-00000954	778	160(2)	163(2)	166(2)	168(2)	171(2)	174(2)	204(2)	206(2)
		208(2)	210(2)	217(2)	219(2)	222(2)	227(2)	519#	
0-00001B78	779	516	518	520#					
1-0000062F	900'	336	337#	362					
1-00000631	901'	340	341#	354					
1-0000063F	902'	346	347#						
0-00001074	903	335#	359						
**	904	344#	351						
1-00000707	2001'	408	413	414#					
1-00000709	2010'	451	452#						
1-0000060C	4597'	311	312#						
1-0000072C	7777'	453	455#	500					
1-00000685	7778'	398	399#	459					
1-000006AB	7779'	401	402#	461					
1-000006D7	7780'	404	405#	463					
1-0000076D	7781'	466	503	504#					

FUNCTIONS AND SUBROUTINES REFERENCED

Type	Name	References	
	DLTMAT	409	467
	FOR$CLOSE	177	231
	FOR$OPEN	158	202
	INMAT	306	318
I*4	LIB$INDEX	118	122
	MATGEN	368	423
	NHELP	509	

```
      SUBROUTINE MOD3
C *** ***************************************************************
C     *MOD3 PROCESSES MODEL THREE, THE VOTER MODEL. USER INPUTS THE*
C     *NAMES OF FROM ONE TO TWENTY EXTERNAL FILES, EACH CONTAINING *
C     *THE RANKING OF ONE VOTER. FROM THIS, A COMPOSITE SET OF     *
C     *WEIGHTS IS CALCULATED.                                      *
C     *          NOTE THAT WHILE THE INPUT RANKINGS MAY BE DONE BY *
C     *MODELS 1,2,3 OR 4 ALL INPUT FILES MUST RANK THE SAME PROJECTS
C *** ***************************************************************
C
      COMMON/HEAD/MODEL,NPROJS,NATTRS
      COMMON/MAX/MAXPRJ,MAXATR
      COMMON/PR1/PRNAME(200)
      COMMON/PRO/PRMATR(200,200),PRWTS(200)
      COMMON/BIGWTS/WTMTX(200,20)
      COMMON/CONTROL/CLS
C
C --- GLOSSARY OF VARIABLES
C --- NAME       USE      TYPE      RANGE            DEFINITION
C --- ANSWER     UI,U     CHAAR*2   ANY              USER'S ANSWER TO QUESTIONS
C --- CHOICE     M        INT       0-7              USER'S CHOICE FROM MENU
C --- CLS        U        INTEGER   12               CLEAR SCREEN CHARACTER
C --- I          M        INT       ANY              COUNTER
C --- INDX       M,FO     REAL      NON NEGATIVE     OBJ/NPROJS
C --- INFILE     U,I      INT       20               INPUT FILE UNIT #
C --- INNAME     UI,U     CHAR*24   ANY              INPUT FILE NAMES
C                                   (30)
C --- J          M        INT       ANY              COUNTER
C --- K          M        INT       ANY              COUNTER
C --- MAXATR     U        INT       20               MAX NUMBER OF ATTRIBUTES
C --- MAXPRJ     U        INT       200              MAX NUMBER OF PROJECTS
C --- MENU13     M,UO     CHAR*2    '0'-'5','##'     HEADINGS FOR MENU
C                                   (6)
C --- MODEL      N        INT       1-5              MODEL NUMBER
C --- NATTRS     N        INT       1                NUMBER OF ATTRIBUTES
C --- NPROJS     M        INT       2-MAXPRJ         NUMBER OF PROJECTS
C --- NUMBER     FI,U     INT       ANY              NUMBER OF PROJECTS IN FILE
C --- NVOTER     UI,U     INT       1-30             NUMBER OF VOTERS
C --- OBJ        U,UO     REAL      NON-NEGATIVE     VALUE OF OBJECTIVE FUNCTION
C --- POINT      M        INT       0-NPROJS         POINTERS USED TO SORT PROJECTS
C                                   (MAXPRJ)
C --- PRCHECK    FI,U     CHAR*24   ANY              TEMP PROJECT NAMES
C                                   (MAXPRJ)
C --- PRMATR     UI,FI    REAL      NON NEGATIVE     PROJECT COMPARISONS
C                                   (MAXPRJ,MAXPRJ)
C --- PRNAME     UI,FO    CHAR*24   ANY              PROJECT NAMES
C                                   (MAXPRJ)
C --- PRWTS      UO,FO    REAL      0-1.0            PROJECT WEIGHTS
C                                   (MAXPRJ)
C --- RANK       M,UO     INT       0-NPROJS         RANKS OF PROJECTS
C                                   (MAXPRJ)
C --- RNUMBER    FI,U     REAL      0-1.0            TEMPORARY PROJECT WEIGHTS
C                                   (MAXPRJ)
C --- RRR        M        REAL      NON NEGATIVE     SUM OF PROJECT WEIGHTS
C --- TEMP       UI,M     CHAR*24   ANY              TEMP USE
C --- TEST       UI,FI,U  CHAR*4    ANY              TEMP USE
C --- TEXT       FI,UO    CHAR      ANY              HOLDS HEADER INFORMATION
C --- TTEXT      FI,U     CHAR      ANY              TEMP USE
C --- WTMTX      M,FO     REAL                       PROJECT WEIGHTS FOR EA. ATR.
C                                   (MAXPRJ,MAXATR)
      CHARACTER*2 MENU13(6)/'0','1','##','3','4','5'/,
     *            ANSWER
      CHARACTER*24 PRNAME,
     *             PRCHECK(200),
     *             INNAME(30),
     *             TTEXT
      CHARACTER*70 TEXT
      CHARACTER*4 TEST
C
      REAL       PRMATR,
     *           WTMTX
     *           PRWTS,
     *           RRR,
     *           RNUMBER(200)
C
      INTEGER CHOICE/0/,
     *           CLS,
     *           MODEL,
     *           RANK(200),
```

```
     *          POINT(200),
     *          NPROJS,
     *          NATTRS,
     *          MAXPRJ,
     *          MAXATR,
     *          NVOTER/0/,
     *          I,
     *          INFILE/20/,
     *          NUMBER/0/,
     *          J,K
          LOGICAL INFLAG/.FALSE./
C
C D       WRITE(6,*)('ENTERING SUBROUTINE MOD3')
          WRITE(6,1)(CLS,CLS,CLS)
1         FORMAT(1X,A1,A1,A1          MENU 1.3 -- VOTER MODEL'//)
          DO WHILE (.TRUE.)
4           WRITE(6,2)((MENU13(I),I=1,5),CHOICE)
2           FORMAT(6X,A2,'ENTER (ADD) INPUT FILE NAMES'/
     *          6X,A2,'VERIFY INPUT FILES'/
     *          6X,A2,'CALCULATE WEIGHTS'/
     *          6X,A2,'HELP WITH PROJECT RANKING INTERFACE'/
     *          6X,A2,'RETURN TO MAIN MENU'/
     *          3X,'PLEASE ENTER THE NUMBER OF YOUR CHOICE[ ',I1,' ]:')
            READ(5,3)(ANSWER)
3           FORMAT (A)
            I=CHOICE
            IF (ANSWER.NE.'  ') THEN
            IF (INDEX('0123456789',ANSWER(1:1)).EQ.0) THEN
              WRITE(6,*)('ENTRY MUST BE A NUMBER')
              GOTO 4
            END IF
            CHOICE=ICHAR(ANSWER(1:1))-48
            IF (CHOICE.GT.4)  THEN
              WRITE(6,*)('CHOICE MUST BE BETWEEN 0 AND 5--PLEASE REENTER')
              CHOICE=I
              GOTO 4
            END IF
C           CHECK TO SEE IF CHOICE IS INVALID DUE TO PREVIOUS CHOICE
            IF (ANSWER(1:1).NE.MENU13(CHOICE+1)) THEN
              WRITE(6,*)(CHOICE,' INVALID AT THIS POINT, PLEASE REENTER')
              CHOICE=I
              GOTO 4
            END IF
            END IF
C ***       CHOICE O.K.
            IF (CHOICE.EQ.0) THEN
C ***         ENTER FILE NAMES
              WRITE(6,8)(CLS,CLS,CLS)
8             FORMAT(1X,A1,A1,A1)
              WRITE(6,*)('ENTER FILE NAMES OF VOTERS, BLANK LINE WHEN DONE')
20            NVOTER=NVOTER+1
              IF (NVOTER.GT.30) GOTO 660
              READ(5,3)(INNAME(NVOTER))
              IF (INNAME(NVOTER).NE.'  ') GOTO 20
660           NVOTER=NVOTER-1
              WRITE(6,8)(CLS,CLS,CLS)
C
C ***         VOTER FILE NAMES HAVE BEEN ENTERED
C ***         IF THERE IS AT LEAST ONE FILE NAME, ALLOW USER TO CALCULATE
C ***         WEIGHTS
              IF (NVOTER.GE.1) THEN
                MENU13(3)='2'
                CHOICE=2
              END IF
            ELSE IF (CHOICE.EQ.1) THEN
C ***         VERIFY INPUT FILE CHOICES
              I=1
              WRITE(6,8)(CLS,CLS,CLS)
              DO WHILE (I.LE.NVOTER)
                OPEN (UNIT=INFILE,FILE=INNAME(I),STATUS='OLD',ERR=777)
C ***           READ NAME FROM FILE
21              READ(INFILE,5,ERR=778,END=778)(TEST)
5               FORMAT(1X,A)
                IF (TEST.NE.'=001') GOTO 21
                READ(INFILE,22,ERR=778,END=778)(TEXT)
22              FORMAT(5X,A)
                WRITE(6,*)('NAME=',TEXT)
C ***           READ ORGANIZATION
23              READ(INFILE,5,ERR=778,END=778)(TEST)
```

```
                IF (TEST.NE.'=002') GOTO 23
                READ(INFILE,22,ERR=778,END=778)(TEXT)
                WRITE(6,*)('ORGANIZATION=',TEXT)
C ***           READ PURPOSE
24              READ(INFILE,5,ERR=778,END=778)(TEST)
                IF (TEST.NE.'=003') GOTO 24
                WRITE(6,*)('PURPOSE:')
                DO J=1,5
                  READ(INFILE,22,ERR=778,END=778)(TEXT)
                  IF (TEXT.EQ.' ') GOTO 28
                  WRITE(6,*)(TEXT)
                END DO
28              CONTINUE
C ***           READ MODEL TYPE
25              READ(INFILE,5,ERR=778,END=778)(TEST)
                IF (TEST.NE.'=004') GOTO 25
                READ(INFILE,22,ERR=778,END=778)(TEST)
                WRITE(6,*)('MODEL NUMBER=',TEST)
C ***           READ NUMBER OF PROJECTS
27                READ(INFILE,5,ERR=778,END=778)(TEST)
                  IF (TEST.NE.'=005') GOTO 27
                  IF (I.EQ.1) THEN
C ***               THIS IS FIRST FILE TO BE READ
                    READ(INFILE,29,ERR=778,END=778)(NPROJS)
29                  FORMAT(5X,I3)
                    WRITE(6,*)('NUMBER OF PROJECTS=',NPROJS)
                  ELSE
C ***               THIS IS NOT FIRST FILE TO BE READ, IT SHOULD BE COMPARED
C ***               TO THE FIRST FILE
                    READ(INFILE,29,ERR=778,END=778)(NUMBER)
                    IF (NUMBER.EQ.NPROJS) THEN
                      WRITE(6,*)('NUMBER OF PROJECTS=',NUMBER)
                    ELSE
                      WRITE(6,*)('NUMBER OF PROJECTS=',NUMBER,' INCONSISTANT')
                      WRITE(6,*)('FILE ',INNAME(I),' NOT INCLUDED IN VOTE')
C ***                 DELETE THIS NAME FROM LIST OF INPUT FILES
                      CLOSE (UNIT=INFILE)
                      GOTO 779
                    END IF
                  END IF
C
C ***           DISPLAY LIST OF PROJECTS IF USER WISHES
C
                WRITE(6,*)('DO YOU WISH TO SEE A LIST OF PROJECTS(Y/N)? [N]')
                READ(5,3)(ANSWER)
                IF (I.EQ.1.OR.ANSWER.EQ.'Y') THEN
26                READ(INFILE,5,ERR=778,END=778)(TEST)
                  IF (TEST.NE.'=010') GOTO 26
                  IF (I.EQ.1) THEN
C ***               FIRST FILE TO BE READ
                    DO J=1,NPROJS
                      READ(INFILE,30,ERR=778,END=778)(PRNAME(J))
                      IF (ANSWER.EQ.'Y') WRITE(6,*)(J,'  ',PRNAME(J))
                    END DO
                  ELSE
C ***               THIS IS NOT FIRST FILE TO BE READ. COMPARE WITH FIRST
                    DO J=1,NPROJS
                      READ(INFILE,30,ERR=778,END=778)(TTEXT)
30                    FORMAT(9X,A)
                      WRITE(6,*)(J,'  ',TTEXT)
                      IF (TTEXT.NE.PRNAME(J)) THEN
C ***                   NAME IS INCONSISTANT
                        WRITE(6,*)('---INCONSISTANT')
                      END IF
                    END DO
                  END IF
C
C ***             FINISHED CHECKING PROJECT NAMES
C
                END IF
                CLOSE (UNIT=INFILE)
                WRITE(6,*)('DO YOU WISH TO INCLUDE THIS FILE IN VOTE(Y/N)? [Y]')
                READ(5,3)(ANSWER)
                IF (ANSWER.EQ.'N') THEN
                  GOTO 779
                ELSE
                  I=I+1
                END IF
                GOTO 776
```

```
C ***          --ERROR IN OPENING FILE--
777            WRITE(6,*)('ERROR OPENING FILE ',INNAME(I))
               GOTO 779
C ***          --ERROR IN READING FILE--
778            WRITE(6,*)('ERROR READING FILE ',INNAME(I))
               CLOSE (UNIT=INFILE)
               CONTINUE
779
C ***            DELETE THIS FILE NAME FROM LIST OF FILES
                 DO K=I+1,NVOTER
                   INNAME(K-1)=INNAME(K)
                 END DO
                 NVOTER=NVOTER-1
776            CONTINUE
             END DO
C ***        MAKE SURE THERE IS AT LEAST ONE VOTER FILE
             IF (NVOTER.LT.1) THEN
               MENU13(3)='##'
               WRITE(6,*)('--WARNING-THERE ARE NO VOTER FILES LEFT')
               CHOICE=0
             ELSE
               CHOICE=2
             END IF
           ELSE IF (CHOICE.EQ.2) THEN
             WRITE(6,8)(CLS,CLS,CLS)
C ***        CALCULATE WEIGHTS
             DO I=1,NPROJS
               PRWTS(I)=0
             END DO
             DO I=1,NVOTER
               OPEN (UNIT=INFILE,FILE=INNAME(I),STATUS='OLD',ERR=667)
C ***          READ NUMBER OF PROJECTS
40               READ(INFILE,5,ERR=668,END=668)(TEST)
                 IF (TEST.NE.'=005') GOTO 40
                 IF (I.EQ.1) THEN
C ***              THIS IS FIRST FILE TO BE READ
                   READ(INFILE,29,ERR=668,END=668)(NPROJS)
                 ELSE
C ***              THIS IS NOT FIRST FILE TO BE READ, IT SHOULD BE COMPARED
C ***              TO THE FIRST FILE
                   READ(INFILE,29,ERR=668,END=668)(NUMBER)
                   IF (NUMBER.GT.NPROJS) THEN
WRITE(6,*)('PROJECT NUMBER INCONSISTANT IN FILE ',INNAME(I))
                   END IF
                   IF (NUMBER.LT.NPROJS) THEN
WRITE(6,*)('PROJECT NUMBER INCONSISTANT IN FILE ',INNAME(I))
C ***                DO NOT INCLUDE THIS FILE
                     GOTO 669
                   END IF
                 END IF
C
C ***            READ PROJECT NAMES
C
41               READ(INFILE,5,ERR=668,END=668)(TEST)
                 IF (TEST.NE.'=010') GOTO 41
                 IF (I.EQ.1) THEN
C ***              FIRST FILE TO BE READ
                   DO J=1,NPROJS
                     READ(INFILE,30,ERR=668,END=668)(PRNAME(J))
                   END DO
                 ELSE
C ***              THIS IS NOT FIRST FILE TO BE READ. COMPARE WITH FIRST
                   DO J=1,NPROJS
                     READ(INFILE,30,ERR=668,END=668)(TEXT)
                     IF (TEXT.NE.PRNAME(J)) THEN
C ***                  NAME IS INCONSISTANT
                       INFLAG=.TRUE.
                     END IF
                   END DO
                 END IF
IF (INFLAG) WRITE(6,*)('NAME INCONSISTANCIES IN FILE ',INNAME(I))
                 INFLAG=.FALSE.
C
C ***            FINISHED CHECKING PROJECT NAMES
C
C ***            READ IN WEIGHTS AND TALLY TOTALS
C
50               READ(INFILE,5,ERR=668,END=668)(TEXT)
                 IF (TEXT(1:1).NE.'=' .OR. TEXT(5:17).NE.'FINAL PROJECT') GOTO 50
                 READ(INFILE,51,ERR=668,END=668)(RNUMBER(J),J=1,NPROJS)
```

```
51              FORMAT(5X,8(F10.8,1X))
                DO J=1,NPROJS
                  PRWTS(J)=PRWTS(J)+RNUMBER(J)
                END DO
                CLOSE(UNIT=INFILE)
              GOTO 666
C ***         --ERROR IN OPENING FILE--
667           WRITE(6,*)('ERROR OPENING FILE ',INNAME(I))
              GOTO 669
C ***         --ERROR IN READING FILE--
668           WRITE(6,*)('ERROR READING FILE ',INNAME(I))
              CLOSE (UNIT=INFILE)
669           CONTINUE
C ***           DELETE THIS FILE NAME FROM LIST OF FILES
C               DO K=I+1,NVOTER
C                 INNAME(K-1)=INNAME(K)
C               END DO
                NVOTER=NVOTER-1
666           CONTINUE
            END DO
C ***       NORMALIZE WEIGHTS, AND STORE IN WTMTX
            DO I=1,NPROJS
              PRWTS(I)=PRWTS(I)/FLOAT(NVOTER)
              WTMTX(I,1)=PRWTS(I)
            END DO
C ***       DISPLAY FINAL WEIGHTS
C ***       CHECK TO SEE IF WEIGHTS ARE NORMAL
            RRR=0
            DO I=1,NPROJS
              RRR=RRR+PRWTS(I)
            END DO
            IF (RRR.GT.1.005.OR.RRR.LT.0.995) WRITE(6,66)
66          FORMAT(' WARNING, WEIGHTS ARE NOT NORMALIZED, PROBABLE ',
     *          'ERROR IN INPUT FILE(S).')
C ---       SORT PROJECTS AND WEIGHTS FOR OUTPUT
            DO I=1,NPROJS
              POINT(I)=I
            END DO
            DO I=1,NPROJS-1
              DO J=I+1,NPROJS
                IF (PRWTS(POINT(J)).GT.PRWTS(POINT(I))) THEN
                  K=POINT(I)
                  POINT(I)=POINT(J)
                  POINT(J)=K
                END IF
              END DO
            END DO
            RANK(1)=1
            DO I=2,NPROJS
              IF(PRWTS(POINT(I)).LT.PRWTS(POINT(I-1))) THEN
                RANK(I)=I
              ELSE
                RANK(I)=RANK(I-1)
              END IF
            END DO
            WRITE(6,7777)(RANK(I),POINT(I),PRNAME(POINT(I)),PRWTS(POINT(I)),
     *          I=1,NPROJS)
7777        FORMAT(3X,'RANK',  PROJECT # AND NAME',17X,'WEIGHT'/
     *          20Q(3X,I3,6X,I3,1X,A,4X,F10.8/))
            WRITE(6,*)('HIT <RETURN> TO CONTINUE')
            READ(5,7781)(TEST)
7781        FORMAT(A)
            CHOICE=4
            WRITE(6,8)(CLS,CLS,CLS)
          ELSE IF (CHOICE.EQ.3) THEN
C ***       USER NEEDS HELP
            CALL NHELP(13)
            CHOICE=1
            WRITE(6,8)(CLS,CLS,CLS)
          ELSE IF (CHOICE.EQ.4) THEN
C ***       RETURN TO MAIN MENU
C D         WRITE(6,*)('LEAVING SUBROUTINE MOD3')
            RETURN
          END IF
        END DO
      END
```

PROGRAM SECTIONS

	Name	Bytes	Attributes
0	$CODE	3959	PIC CON REL LCL SHR EXE RD NOWRT LONG
1	$PDATA	1014	PIC CON REL LCL SHR NOEXE RD NOWRT LONG
2	$LOCAL	8376	PIC CON REL LCL NOSHR NOEXE RD WRT LONG
3	HEAD	12	PIC OVR REL GBL SHR NOEXE RD WRT LONG
4	MAX	8	PIC OVR REL GBL SHR NOEXE RD WRT LONG
5	PR1	4800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
6	PRO	160800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
7	BIGWTS	16000	PIC OVR REL GBL SHR NOEXE RD WRT LONG
8	CONTROL	4	PIC OVR REL GBL SHR NOEXE RD WRT LONG
	Total Space Allocated	194973	

ENTRY POINTS

Address	Type	Name	References
0-00000000		MOD3	1#

VARIABLES

Address	Type	Name	Attributes	References
2-00001EFC	CHAR	ANSWER		61 103= 106 107 111 118 203= 204 211 231= 232
2-00001F60	I*4	CHOICE		76D 96 105 111= 112 114= 118 119 120= 125 142= 144 256= 258= 260 379= 381 384= 386
8-00000000	I*4	CLS	COMM	16 76 93(3) 127(3) 135(3) 147(3) 261(3) 380(3) 385(3)
**	I*4	I		76 96(2)= 105= 114 120 146= 148 149 180 193 204 207 235(2)= 239 242 246 263= 264 266= 267 271 279 282 292 307 324 327 338= 339(2) 340(2) 345= 346 352= 353(2) 355= 356 357 358 359 365= 366(2) 367(2) 369(2) 372(5)= 384
2-00001F68	I*4	INFILE		76D 149A 151 154 158 160 163 167 173 175 178 182 188 195A 205 210 216 229A 243A 267A 269 273 277 290 295 300 314 316 321A 328A
2-00001F70	L*4	INFLAG		90D 303= 307 308=
**	I*4	J		76 166= 209= 210 211(2) 215= 218 219 294= 295 299= 301 316(2)= 318= 319(3) 356= 357 359 360
**	I*4	K		76 246= 247(2) 358= 360
4-00000004	I*4	MAXATR	COMM	12 76
4-00000000	I*4	MAXPRJ	COMM	12 76
3-00000000	I*4	MODEL	COMM	11 76
3-00000008	I*4	NATTRS	COMM	11 76
3-00000004	I*4	NPROJS	COMM	11 76 182= 184 189 209 215 263 273= 278 281 294 299 316 318 338 345 352 355 356 365 372
2-00001F6C	I*4	NUMBER		76D 188= 189 190 192 277= 278 281
2-00001F64	I*4	NVOTER		76D 130(2)= 131 132 133 134(2)= 140 148 246 249(2)= 253 266 334(2)= 339
**	R*4	RRR		70 344= 346(2)= 348(2)
2-00001F5C	CHAR	TEST		68 151= 153 158= 159 163= 164 173= 174 175= 176 178= 179 205= 206 269= 270 290= 291 377=
2-00001F16	CHAR	TEXT		67 154= 156 160= 161 167= 168 169 300= 301 314= 315(2)
2-00001EFE	CHAR	TTEXT		63 216= 218 219
**	R*4	WTMTXPRWTS		70

ARRAYS

Address	Type	Name	Attributes	Bytes	Dimensions	References
2-00001C2C	CHAR	INNAME		720	(30)	63 132= 133 149A 193 239 242 247(2)= 267A 279 282 307 324 327
2-00000960	CHAR	MENU13		12	(6)	61D 96 118 141= 254=
2-00000640	I*4	POINT		800	(200)	76 353= 357(2) 358 359(2)= 360= 366(2) 372(3)
2-0000000C	CHAR	PRCHECK		4800	(200)	63
6-00000000	R*4	PRMATR	COMM	160000	(200, 200)	14 70
5-00000000	CHAR	PRNAME	COMM	4800	(200)	13 63 210= 211 219 295= 301 372
6-00027100	R*4	PRWTS	COMM	800	(200)	14 264= 319(2)= 339(2)= 340 346 357(2) 366(2) 372
2-00000320	I*4	RANK		800	(200)	76 364= 367= 369(2)= 372
2-00000000	R*4	RNUMBER		800	(200)	70 316= 319
7-00000000	R*4	WTMTX	COMM	16000	(200, 20)	15 340=

LABELS

Address	Label	References
1-00000223	1'	93 94#
1-0000024B	2'	96 97#
1-00000318	3'	103 104# 132 203 231
**	4	96# 109 115 121
1-00000323	5'	151 152# 158 163 173 178 205 269 290 314
1-0000031A	8'	127 128# 135 147 261 380 385
0-000001BC	20	130# 133
**	21	151# 153
1-00000327	22'	154 155# 160 167 175
0-00000340	23	158# 159
0-000003C4	24	163# 164
0-0000046C	25	173# 174
0-00000628	26	205# 206
0-000004F0	27	178# 179
0-0000046A	28	168 171#
1-0000032B	29'	182 183# 188 273 277
1-00000330	30'	210 216 217# 295 300
**	40	269# 270
0-00000AE8	41	290# 291
0-00000BF8	50	314# 315
1-00000334	51'	316 317#
1-00000341	66'	348 349#
0-000001FD	660	131 134#
0-00000D06	666	322 335#
0-00000CD4	667	267 324#
0-00000C98	668	269(2) 273(2) 277(2) 290(2) 295(2) 300(2) 314(2) 316(2) 327#
0-00000D04	669	284 325 329#
0-00000908	776	237 250#
0-000008B8	777	149 239#
0-0000087C	778	151(2) 154(2) 158(2) 160(2) 163(2) 167(2) 173(2) 175(2) 178(2) 182(2) 188(2) 205(2) 210(2) 216(2) 242#
0-000008E8	779	196 233 240 244#
1-0000038C	7777'	372 374#
1-000003CD	7781'	377 378#

FUNCTIONS AND SUBROUTINES REFERENCED

Type	Name	References
	FOR$CLOSE	195 229 243 321 328
	FOR$OPEN	149 267
I*4	LIB$INDEX	107
	NHELP	383

```
      SUBROUTINE MOD4
C
C *** ****************************************************************
C       * SUBROUTINE MOD4 IS INVOKED WHEN USER WISHES TO RUN THE HIERARCHY
C       * MODEL.
C       ****************************************************************
C
      COMMON/HEAD/MODEL,NPROJS,NATTRS
      COMMON/MAX/MAXPRJ,MAXATR
      COMMON/PR1/PRNAME(200)
      COMMON/PRO/PRMATR(200,200),PRWTS(200)
      COMMON/BIGWTS/WTMTX(200,20)
      COMMON/BIGPROJ/ATRPRO(200,200,20)
      COMMON/CONST/OBJ
      COMMON/AT1/ATNAME(20),ATMATR(20,20),ATWTS(20)
      COMMON/CONTROL/CLS
C
C --- GLOSSARY OF VARIABLES
C --- NAME       USE       TYPE     RANGE              DEFINITION
C --- ANSWER     UI,U      CHAR*2 ANY                  USER'S ANSWER TO QUESTIONS
C --- ATMATR     FI,UI,M REAL       0 & UP            ATTRIBUTE COMPARISONS
C                          (MAXATR,MAXATR)
C --- ATNAME     UI,FI     CHAR*24 ANY                 ATTRIBUTE NAMES
C                          (MAXATR)
C --- ATRPRO     M,FI,FO REAL       0 & UP            PROJ COMP. FOR EA. ATTRIBUTE
C                          (MAXPRJ,MAXPRJ,MAXATR)
C --- ATWTS      M,FO,UO REAL       0-1.0             ATTRIBUTE WEIGHTS
C --- CHOICE     M         INT      0-7               USER'S CHOICE FROM MENU
C --- CLS        U         INTEGER  12                CLEAR SCREEN CHARACTER
C --- CTEMP      FI,UI,M CHAR       ANY               TEMP USE
C --- FLAG       M         LOGICAL  .TRUE.-.FALSE.    TEMP USE
C --- FNAME      UI,U      CHAR*24 ANY                 NAME OF INPUT FILE
C --- I          M         INT      ANY               COUNTER, ETC
C --- II         M         INT      ANY               COUNTER, ETC
C --- INDX       M,FO      REAL     NON NEGATIVE      OBJ/NPROJS
C --- INFILE     I,U       INT      21                INPUT UNIT
C --- INNAME     UI,U      CHAR*24 ANY                 INPUT FILE NAMES
C --- J          M         INT      ANY               COUNTER, ETC
C --- JJ         M         INT      ANY               COUNTER, ETC
C --- K          M         INT      ANY               COUNTER, ETC
C --- LDFLAG     M         LOGICAL  .TRUE.-.FALSE.    HAVE COMP. BEEN LOADED?
C --- MAXATR     U         INT      20                MAX NUMBER OF ATTRIBUTES
C --- MAXPRJ     U         INT      200               MAX NUMBER OF PROJECTS
C --- MENU141    M,UO      CHAR*2   '0'-'13','##'     HEADINGS FOR MENU
C                          (14)
C --- MODEL      N         INT      1-5               MODEL NUMBER
C --- NATTRS     N         INT      1                 NUMBER OF ATTRIBUTES
C --- NPROJS     M         INT      2-MAXPRJ          NUMBER OF PROJECTS
C --- NUMBER     FI,U      INT      ANY               NUMBER OF PROJS FROM FILES
C --- NUMFILES   M         INT      1-25              NUMBER OF INPUT FILES
C --- NUMLIST    FI,U      INT      1-MAXPRJ          NUMBER OF PROJECTS IN EACH FILE
C --- OBJ        U,UO      REAL     NON-NEGATIVE      VALUE OF OBJECTIVE FUNCTION
C --- OLDMATR    M         REAL     0 & UP            ORIGINAL PROJ COMP FROM INPUT
C                          (MAXPRJ-MAXPRJ)
C --- POINT      M         INT      0-NPROJS          POINTERS USED TO SORT PROJECTS
C                          (MAXPRJ)
C --- PRMATR     UI,FI     REAL     NON NEGATIVE      PROJECT COMPARISONS
C                          (MAXPRJ,MAXPRJ)
C --- PRNAME     UI,FO     CHAR*24 ANY                 PROJECT NAMES
C                          (MAXPRJ)
C --- PRWTS      UO,FO     REAL     0-1.0             PROJECT WEIGHTS
C                          (MAXPRJ)
C --- RANK       M,UO      INT      0-NPROJS          RANKS OF PROJECTS
C                          (MAXPRJ)
C --- SORPOS     UI,UO,U INT        1-MAXPRJ          POSITION IN SOURCE OF PROJECTS
C                          (MAXPRJ)
C --- SOURCE     UI,UO,U INT        1-26              SOURCE NUMBER FOR EACH PROJECT
C                          (MAXPRJ)          (SOURCE=26 MEANS USER ADDED PROJECT)
C --- TEMP       UI,M      CHAR*24 ANY                 TEMP USE
C --- TEMP2      M         INT      ANY               TEMP USE
C --- TEMPLIST   UI,M      INT      1-MAXPRJ          LIST OF PROJECTS TO BE INCLUDED
C                          (MAXPRJ)
C --- TEMPNAME   FI,UO,U CHAR*24 ANY                  PROJ NAMES FROM FILE
C                          (MAXPRJ)
C --- TEST       UI,FI,U CHAR*4  ANY                  TEMP USE
C --- TEXT       FI,UO     CHAR*70 ANY                 HEADER INFORMATION
C --- WTFLG      M         LOGICAL  .TRUE.-.FALSE.    SHOULD WEIGHTS BE DISPLAYED?
C --- WTMTX      M,FO      REAL
C                          (MAXPRJ,MAXATR)           PROJECT WEIGHTS FOR EA. ATR.
```

```
      REAL     PRMATR,
     *         OLDMATR(200,200),
     *         WTMTX,
     *         PRWTS,
     *         ATRPRO,
     *         OBJ,
     *         INDX,
     *         ATMATR,
     *         ATWTS
      CHARACTER*24 PRNAME,
     *             ATNAME,
     *             TEMPNAME(200),
     *             FNAME,
     *             INNAME(26),
     *             CTEMP
      CHARACTER*2 ANSWER,
     *            MENU141(14)/'0','1','##','3','4','5','6','7','##','##',
     *                        '10','##','12','13'/
      CHARACTER*4 TEST
      CHARACTER*70 TEXT
      INTEGER MODEL,
     *         CLS,
     *         POINT(200),
     *         NPROJS,
     *         NATTRS,
     *         RANK(200),
     *         MAXPRJ,
     *         MAXATR,
     *         NUMFILES,
     *         NUMLIST(25),
     *         INFILE/21/,
     *         SORPOS(200),
     *         SOURCE(200),
     *         TEMPLIST(200),
     *         TEMP,
     *         TEMP2,
     *         I,
     *         J,II,JJ,
     *         K,
     *         NUMBER,
     *         CHOICE
      LOGICAL FLAG,
     *         WTFLG,
     *         LDFLAG/.FALSE./
C
C     WRITE(6,*)('ENTERING SUBROUTINE MOD4')
      WRITE(6,1)(CLS,CLS,CLS)
1     FORMAT(1X,A1,A1,A1'       HIERARCHY MODEL'//)
      NUMFILES=1
      INNAME(26)='***USER-ADDED PROJECT***'
      ANSWER='2'
      WRITE(6,8)(CLS,CLS,CLS)
2     CONTINUE
8       FORMAT(1X,A1,A1,A1)
        WRITE(6,3)(NUMFILES)
3       FORMAT(' ENTER THE NAME OF INPUT FILE #',I2,' ,OR BLANK TO QUIT')
        READ(5,4)(INNAME(NUMFILES))
4       FORMAT(A)
      IF (INNAME(NUMFILES).NE.' ') THEN
6       WRITE(6,7)(NUMFILES)
7       FORMAT(' FOR FILE #',I2,' CHOOSE ACTION'//
     *         6X,' 0--VIEW HEADER INFORMATION'/
     *         6X,' 1--LIST PROJECTS'/
     *         6X,' 2--LOAD ALL PROJECTS'/
     *         6X,' 3--LOAD CERTAIN PROJECTS ONLY'/
     *         6X,' 4--LOAD NO PROJECTS'/
     *         6X,' 5--HELP ON PROJECT RANKING INTERFACE'//
     *         1X,'PLEASE ENTER NUMBER OF CHOICE[2]:')
        READ(5,4)(ANSWER)
        IF (ANSWER.EQ.' ') THEN
          ANSWER='2'
        ELSE
        IF (INDEX('0123456',ANSWER(1:1)).EQ.0) THEN
          WRITE(6,*)('ANSWER MUST BE A NUMBER BETWEEN 0 AND 6')
          ANSWER=TEST
          GOTO 6
        END IF
        END IF
C ***   ANSWER O.K.
```

```
            IF (ANSWER(1:1).EQ.'0') THEN
C             VIEW HEADER INFORMATION
              WRITE(6,8)(CLS,CLS,CLS)
              OPEN (UNIT=INFILE,FILE=INNAME(NUMFILES),STATUS='OLD')
C ***           READ NAME FROM FILE
21                READ(INFILE,5)(TEST)
5                 FORMAT(1X,A)
                  IF (TEST.NE.'=001') GOTO 21
                  READ(INFILE,22)(TEXT)
22                FORMAT(5X,A)
                  WRITE(6,*)('NAME=',TEXT)
C ***           READ ORGANIZATION
23                READ(INFILE,5)(TEST)
                  IF (TEST.NE.'=002') GOTO 23
                  READ(INFILE,22)(TEXT)
                  WRITE(6,*)('ORGANIZATION=',TEXT)
C ***           READ PURPOSE
24                READ(INFILE,5)(TEST)
                  IF (TEST.NE.'=003') GOTO 24
                  WRITE(6,*)('PURPOSE:')
                  DO J=1,5
                    READ(INFILE,22)(TEXT)
                    IF (TEXT.EQ.' ') GOTO 28
                    WRITE(6,*)(TEXT)
                  END DO
28                CONTINUE
C ***           READ MODEL TYPE
25                READ(INFILE,5)(TEST)
                  IF (TEST.NE.'=004') GOTO 25
                  READ(INFILE,22)(TEST)
                  WRITE(6,*)('MODEL NUMBER=',TEST)
              CLOSE (UNIT=INFILE)
            ELSE IF (ANSWER(1:1).EQ.'1') THEN
C ***         LIST PROJECTS
              WRITE(6,8)(CLS,CLS,CLS)
              OPEN (UNIT=INFILE,FILE=INNAME(NUMFILES),STATUS='OLD',ERR=666)
C ***         FIND NUMBER OF PROJECTS
30            READ(INFILE,5,ERR=667,END=667)(TEST)
              IF (TEST.NE.'=005') GOTO 30
              READ(INFILE,31,ERR=667,END=667)(NUMBER)
31            FORMAT(5X,I3)
32            READ(INFILE,5,ERR=667,END=667)(TEST)
              IF (TEST.NE.'=010') GOTO 32
              READ(INFILE,33,ERR=667,END=667)(TEMPNAME(J),J=1,NUMBER)
33            FORMAT(9X,A)
              WRITE(6,34)(J,TEMPNAME(J),J=1,NUMBER)
34            FORMAT(/200(/3X,I3,3X,A))
              CLOSE (UNIT=INFILE)
            ELSE IF (ANSWER(1:1).EQ.'2') THEN
C ***         INCLUDE ALL PROJECTS
              WRITE(6,8)(CLS,CLS,CLS)
              OPEN (UNIT=INFILE,FILE=INNAME(NUMFILES),STATUS='OLD',ERR=666)
C ***         FIND NUMBER OF PROJECTS
40            READ(INFILE,5,ERR=667,END=667)(TEST)
              IF (TEST.NE.'=005') GOTO 40
              READ(INFILE,31,ERR=667,END=667)(NUMBER)
              NUMLIST(NUMFILES)=NUMBER
41            READ(INFILE,5,ERR=667,END=667)(TEST)
              IF (TEST.NE.'=010') GOTO 41
              READ(INFILE,33,ERR=667,END=667)(TEMPNAME(J),J=1,NUMBER)
              DO J=NPROJS+1,NPROJS+NUMBER
                SOURCE(J)=NUMFILES
                SORPOS(J)=J-NPROJS
                PRNAME(J)=TEMPNAME(SORPOS(J))
              END DO
              NPROJS=NPROJS+NUMBER
              NUMFILES=NUMFILES+1
              CLOSE (UNIT=INFILE)
              GOTO 2
            ELSE IF (ANSWER(1:1).EQ.'3') THEN
C ***         LOAD CERTAIN PROJECTS ONLY
              WRITE(6,8)(CLS,CLS,CLS)
              J=1
              OPEN (UNIT=INFILE,FILE=INNAME(NUMFILES),STATUS='OLD',ERR=666)
C ***         FIND NUMBER OF PROJECTS
50            READ(INFILE,5,ERR=667,END=667)(TEST)
              IF (TEST.NE.'=005') GOTO 50
              READ(INFILE,31,ERR=667,END=667)(NUMBER)
              NUMLIST(NUMFILES)=NUMBER
```

```
52          READ(INFILE,5,ERR=667,END=667)(TEST)
            IF (TEST.NE.'=010') GOTO 52
            READ(INFILE,33,ERR=667,END=667)(TEMPNAME(JJ),JJ=1,NUMBER)
            WRITE(6,*)('ENTER PROJECT NUMBERS TO BE INCLUDED, QUIT WITH 0')
51          READ(5,*,ERR=667,END=667)(TEMPLIST(J))
            IF (TEMPLIST(J).GT.NUMBER) THEN
              WRITE(6,*)('THERE ARE ONLY',NUMBER,' PROJECTS IN FILE')
              GOTO 51
            END IF
            IF (TEMPLIST(J).GT.0) THEN
              J=J+1
              GOTO 51
            END IF
            J=J-1
C           SORT TEMPLIST
            DO II=1,J-1
              DO JJ=II+1,J
                IF (TEMPLIST(JJ).LT.TEMPLIST(II)) THEN
                  TEMP=TEMPLIST(JJ)
                  TEMPLIST(JJ)=TEMPLIST(II)
                  TEMPLIST(II)=TEMP
                END IF
              END DO
            END DO
C ***       PLACE CONTENTS OF TEMPLIST INTO SORPOS
            DO II=NPROJS+1,NPROJS+J
              SORPOS(II)=TEMPLIST(II-NPROJS)
              SOURCE(II)=NUMFILES
              PRNAME(II)=TEMPNAME(SORPOS(II))
            END DO
            NPROJS=NPROJS+J
            NUMFILES=NUMFILES+1
            CLOSE(UNIT=INFILE)
            GOTO 2
          ELSE IF (ANSWER(1:1).EQ.'4') THEN
            WRITE(6,8)(CLS,CLS,CLS)
C ***       LOAD NO PROJECTS
            GOTO 2
          ELSE IF (ANSWER(1:1).EQ.'5') THEN
C ***       HELP IS NEEDED
            WRITE(6,8)(CLS,CLS,CLS)
            CALL NHELP(141)
          END IF
          GOTO 6
        END IF
        GOTO 669
666     WRITE(6,*)('ERROR OPENING FILE ',INNAME(NUMFILES))
        GOTO 2
667     WRITE(6,*)('ERROR READING FILE ',INNAME(NUMFILES))
        CLOSE (UNIT=INFILE)
        GOTO 2
669     CONTINUE
        NUMFILES=NUMFILES-1
        CHOICE=4
60      WRITE(6,61)((MENU141(I),I=1,14),CHOICE)
61      FORMAT(//,                    MENU 1.4.1 HIERARCHY CONTINUED'//
     *          6X,A2,'--VERIFY FILE INPUT'/
     *          6X,A2,'--RECALL ADDITIONAL PROJECTS'/
     *          6X,A2,'--ADD NEW PROJECTS OF YOUR OWN'/
     *          6X,A2,'--CHANGE PROJECT NAMES'/
     *          6X,A2,'--LOAD COMPARISONS FROM SUBORDINATE FILES'/
     *          6X,A2,'--SPECIFY NUMBER OF ATTRIBUTES'/
     *          6X,A2,'--READ OLD ATTRIBUTE MATRIX FROM A FILE'/
     *          6X,A2,'--ENTER (CHANGE) ATTRIBUTE NAMES'/
     *          6X,A2,'--ENTER (CHANGE) (ADD) ATTRIBUTE COMPARISONS'/
     *          6X,A2,'--ADD (CHANGE) PROJECT COMPARISONS'/
     *          6X,A2,'--DISPLAY PROJECT OR ATTRIBUTE MATRIX'/
     *          6X,A2,'--CALCULATE WEIGHTS'/
     *          6X,A2,'--HELP ON PROJECT RANKING INTERFACE'/
     *          6X,A2,'--RETURN TO MAIN MENU'//
     *          2X,'PLEASE ENTER NUMBER OF CHOICE[',I2,']:')
        READ(5,4)(ANSWER)
        II=CHOICE
        IF (ANSWER.NE.'  ') THEN
        IF (INDEX('0123456789',ANSWER(1:1)).EQ.0) THEN
          WRITE(6,*)('ANSWER MUST BE A NUMBER, PLEASE REENTER')
          GOTO 60
        END IF
        IF (INDEX(' 0123456789',ANSWER(2:2)).EQ.0) THEN
```

```
0317              WRITE(6,*)('ANSWER MUST BE A NUMBER, PLEASE REENTER')
0318              GOTO 60
0319            END IF
0320            IF (ANSWER(2:2).EQ.' ') THEN
0321              CHOICE=ICHAR(ANSWER(1:1))-48
0322            ELSE
0323              CHOICE=(ICHAR(ANSWER(1:1))-48)*10+ICHAR(ANSWER(2:2))-48
0324            END IF
0325            IF (ANSWER.NE.MENU141(CHOICE+1)) THEN
0326              WRITE(6,*)(CHOICE,'INVALID AT THIS POINT, REENTER')
0327              CHOICE=11
0328              GOTO 60
0329            END IF
0330            END IF
0331  C ***     CHOICE O.K.
0332            WRITE(6,8)(CLS,CLS,CLS)
0333            IF (CHOICE.EQ.0) THEN
0334  C ***       VERIFY FILE INPUT
0335              WRITE(6,7654)(SOURCE(J),INNAME(SOURCE(J)),SORPOS(J),PRNAME(J),
0336     *                      J,J=1,NPROJS)
0337  7654        FORMAT(/1X,'SOURCE',28X,'PROJECT',20X,'NEW PROJECT NUMBER'/
0338     *                 200(1X,I3,':',A,4X,I3,1X,A,8X,I3/))
0339  70          FORMAT(3X,'PROJECT #',3X,'NAME',24X,'SOURCE FILE #',3X,
0340     *                 'POSITION IN SOURCE'/200(7X,I3,5X,A,10X,I3,14X,I3/))
0341  C ***       PAUSE FOR A MOMENENT
0342              WRITE(6,*)('HIT <RETURN> TO CONTINUE')
0343              READ(5,5)(TEST)
0344              WRITE(6,8)(CLS,CLS,CLS)
0345              CHOICE=11
0346            ELSE IF (CHOICE.EQ.1) THEN
0347              TEMP=NPROJS
0348  C ***       RECALL ADDITIONAL PROJECTS
0349              WRITE(6,71)
0350  71          FORMAT(' ENTER ADDITIONAL PROJECTS IN THE FORM'/
0351     *                '<SOURCE FILE #><SPACE><PROJECT # IN SOURCE FILE>'/
0352     *                ' ENTER ZEROS TO QUIT'/)
0353  72          READ(5,*)(SOURCE(NPROJS+1),SORPOS(NPROJS+1))
0354              IF (SOURCE(NPROJS+1).GT.0.AND.SORPOS(NPROJS+1).GT.0) THEN
0355  C ***         THIS PROJECT IS TO BE INCLUDED
0356  C ***         TEST TO MAKE SURE IT HASNT ALREADY BEEN INCLUDED
0357                DO I=1,NPROJS
0358                  FLAG=(SORPOS(I).EQ.SORPOS(NPROJS+1))
0359                  IF (SOURCE(I).EQ.SOURCE(NPROJS+1).AND.FLAG) THEN
0360  C ***             PROJECT HAS ALREADY BEEN INCLUDED
0361                    WRITE(6,*)('THAT PROJECT HAS ALREADY BEEN INCLUDED')
0362                    GOTO 72
0363                  END IF
0364                END DO
0365                NPROJS=NPROJS+1
0366                GOTO 72
0367              END IF
0368              WRITE(6,8)(CLS,CLS,CLS)
0369  C ***       USER IS DONE ENTERING NEW PROJECTS
0370  C ***       SORT BY SOURCE NUMBER AND POSITION IN SOURCE NEW PROJ. ONLY
0371              DO I=TEMP+1,NPROJS-1
0372                DO J=I,NPROJS
0373                  FLAG=(SOURCE(J).EQ.SOURCE(I).AND.SORPOS(J).LT.SORPOS(I))
0374                  IF (SOURCE(J).LT.SOURCE(I).OR.FLAG) THEN
0375                    TEMP2=SOURCE(J)
0376                    SOURCE(J)=SOURCE(I)
0377                    SOURCE(I)=TEMP2
0378                    TEMP2=SORPOS(J)
0379                    SORPOS(J)=SORPOS(I)
0380                    SORPOS(I)=TEMP2
0381                  END IF
0382                END DO
0383              END DO
0384  C ***       RETRIEVE NEW PROJECT NAMES
0385              TEMP2=0
0386              I=TEMP+1
0387  6606        IF (I.LE.NPROJS) THEN
0388                IF (TEMP2.NE.SOURCE(I)) THEN
0389  C
0390  C ***           OPEN NEW FILE
0391  C
0392                  IF (I.GT.TEMP+1) CLOSE(UNIT=INFILE)
0393                  TEMP2=SOURCE(I)
0394                  OPEN (UNIT=INFILE,FILE=INNAME(TEMP2),STATUS='OLD',ERR=6601)
0395  73              READ(INFILE,5,ERR=6602,END=6602)(TEST)
```

```
                IF (TEST.NE.'=010') GOTO 73
              END IF
      74      READ(INFILE,75,ERR=6602,END=6602)(NUMBER,CTEMP)
      75      FORMAT(5X,I3,1X,A)
              IF (NUMBER.NE.SORPOS(I)) GOTO 74
              PRNAME(I)=CTEMP
              GOTO 6605
      6601    WRITE(6,*)('ERROR OPENING FILE ',INNAME(TEMP2))
              GOTO 6603
      6602    WRITE(6,*)('ERROR READING FILE ',INNAME(TEMP2))
      6603    CONTINUE
              DO J=I+1,NPROJS
                SOURCE(J-1)=SOURCE(J)
                SORPOS(J-1)=SORPOS(J)
              END DO
              I=I-1
              NPROJS=NPROJS-1
      6605    CONTINUE
              I=I+1
              GOTO 6606
            END IF
            IF (NPROJS.GT.TEMP) CLOSE(UNIT=INFILE)
      C ***   SORT ALL PROJECTS
            DO I=1,NPROJS-1
              DO J=I,NPROJS
                IF (SOURCE(J).LT.SOURCE(I).OR.(SOURCE(J).EQ.SOURCE(I).AND.
     *            SORPOS(J).LT.SORPOS(I))) THEN
                  TEMP2=SOURCE(J)
                  SOURCE(J)=SOURCE(I)
                  SOURCE(I)=TEMP2
                  TEMP2=SORPOS(J)
                  SORPOS(J)=SORPOS(I)
                  SORPOS(I)=TEMP2
                  CTEMP=PRNAME(J)
                  PRNAME(J)=PRNAME(I)
                  PRNAME(I)=CTEMP
                END IF
              END DO
            END DO
            CHOICE=4
          ELSE IF (CHOICE.EQ.2) THEN
      C ***   ADD PROJECTS OF YOUR OWN
            WRITE(6,*)('ENTER NAMES OF NEW PROJECTS, QUIT WITH A BLANK')
      94    NPROJS=NPROJS+1
              READ(5,4)(PRNAME(NPROJS))
              SOURCE(NPROJS)=26
              SORPOS(NPROJS)=0
            IF (PRNAME(NPROJS).NE.' ') GOTO 94
            NPROJS=NPROJS-1
            CHOICE=9
            WRITE(6,8)(CLS,CLS,CLS)
          ELSE IF (CHOICE.EQ.3) THEN
      C ***   CHANGE PROJECT NAMES
            WRITE(6,*)('ENTER NEW PROJECT NAMES, BLANK TO QUIT')
            I=1
      2002  WRITE(6,*)('PROJECT NUMBER',I,' :')
            READ(5,4)(CTEMP)
            IF (CTEMP.EQ.' '.OR.I.EQ.NPROJS) GOTO 2010
            PRNAME(I)=CTEMP
            I=I+1
            GOTO 2002
      2010  CONTINUE
            CHOICE=11
            WRITE(6,8)(CLS,CLS,CLS)
          ELSE IF (CHOICE.EQ.4) THEN
      C     LOAD COMPARISONS FROM SUBORDINATE FILES
            II=1
            JJ=1
      83    CONTINUE
            DO WHILE(SOURCE(II).EQ.SOURCE(JJ).AND.JJ.LE.NPROJS)
              JJ=JJ+1
            END DO
            JJ=JJ-1
      90    FORMAT(' II=',I3,' SOURCE(II)=',I3,' INNAME=',A)
            OPEN (UNIT=INFILE,FILE=INNAME(SOURCE(II)),STATUS='OLD',ERR=6611)
      C ***   LOAD PROJECT WEIGHTS FOR SOURCE(II) STORE IN PRWTS
      80    READ(INFILE,81,ERR=6612,END=6612)(TEST,TEXT)
      81    FORMAT(1X,A,A)
              IF (TEST(1:1).NE.'='.OR.TEXT(1:13).NE.'FINAL PROJECT') GOTO 80
```

```
0475                  READ(INFILE,82,ERR=6612,END=6612)(PRWTS(J),J=II,JJ)
0476        82        FORMAT(5X,8(F10.8,1X))
0477                CLOSE (UNIT=INFILE)
0478                GOTO 6614
0479        C
0480        C ***   ERROR HANDELING FOR LOAD WEIGHTS OPTION
0481        C
0482        6611    WRITE(6,*)('ERROR OPENING FILE ',INNAME(SOURCE(II)))
0483                GOTO 6613
0484        6612    WRITE(6,*)('ERROR READING FILE ',INNAME(SOURCE(II)))
0485                CLOSE (UNIT=INFILE)
0486        6613    CONTINUE
0487        C ***   DELETE THOSE PROJECTS FROM ERRONEOUS FILE
0488                I=JJ-II+1
0489                DO J=JJ+1,NPROJS
0490                  SORPOS(J-I)=SORPOS(J)
0491                  SOURCE(J-I)=SOURCE(J)
0492                  PRNAME(J-I)=PRNAME(J)
0493                END DO
0494                NPROJS=NPROJS-(JJ-II)-1
0495                JJ=II
0496                IF (JJ.LE.NPROJS) GOTO 83
0497                GOTO 6615
0498        C ***   END OF ERROR HANDELING
0499        C
0500        6614    CONTINUE
0501        C ***   CALCULATE COMPARISONS BASED ON FINAL WEIGHTS
0502                DO I=II,JJ
0503                  DO J=I,JJ
0504                    IF (PRWTS(J).NE.0) OLDMATR(I,J)=PRWTS(I)/PRWTS(J)
0505                  END DO
0506                END DO
0507 C  D           WRITE(6,*)('JJ=',JJ,' NPROJS=',NPROJS)
0508                IF (JJ.LT.NPROJS) THEN
0509                  II=JJ+1
0510                  JJ=II
0511                  GOTO 83
0512                END IF
0513        6615    DO I=1,NATTRS
0514                  DO J=1,NPROJS
0515                    DO K=1,NPROJS
0516                      ATRPRO(J,K,I)=OLDMATR(J,K)
0517                    END DO
0518                  END DO
0519                END DO
0520        C ***   CHANGE STATUS OF CERTAIN MENU ITEMS
0521                MENU141(5)='##'
0522                MENU141(2)='##'
0523                MENU141(10)='9'
0524                MENU141(12)='11'
0525                MENU141(3)='2'
0526                LDFLAG=.TRUE.
0527                CHOICE=9
0528              ELSE IF (CHOICE.EQ.5) THEN
0529        C ***   SPECIFY NUMBER OF ATTRIBUTES
0530        2001    WRITE(6,*)('PLEASE INPUT NUMBER OF ATTRIBUTES')
0531                READ(5,*)(I)
0532                IF (I.GT.MAXATR.OR.I.LT.1) THEN
0533                  WRITE(6,*)('MUST BE BETWEEN 1 AND ',MAXATR)
0534                  GOTO 2001
0535                END IF
0536                IF (I.GT.NATTRS.AND.LDFLAG) THEN
0537                  DO J=NATTRS+1,I
0538                    DO II=1,NPROJS
0539                      DO JJ=1,NPROJS
0540                        ATRPRO(II,JJ,J)=OLDMATR(II,JJ)
0541                      END DO
0542                    END DO
0543                  END DO
0544                END IF
0545                NATTRS=I
0546                CHOICE=7
0547                MENU141(9)='8'
0548                IF (ATNAME(1).EQ.'OVERALL WORTH'.AND.NATTRS.GT.1) ATNAME(1)=' '
0549                WRITE(6,8)(CLS,CLS,CLS)
0550              ELSE IF (CHOICE.EQ.6) THEN
0551        C ***   READ OLD ATTRIBUTES MATRIX FROM A FILE
0552        C ---     INPUT ATTRIBUTE MATRIX FROM AN EXTERNAL FILE
0553                  WRITE(6,*)('ENTER NAME, OF INPUT FILE')
```

```
                READ(6,444)(FNAME)
444             FORMAT(A)
                WRITE(6,8)(CLS,CLS,CLS)
                OPEN(UNIT=INFILE,FILE=FNAME,STATUS='OLD',ERR=6620)
C ---           FIND NUMBER OF ATTRIBUTES
445             READ(INFILE,446,ERR=6621,END=6621)(TEST)
446             FORMAT(1X,A)
                IF (TEST.NE.'=006') GOTO 445
                READ(INFILE,339,ERR=6621,END=6621)(NATTRS)
339             FORMAT(5X,I3)
C ---           FIND ATTRIBUTE NAMES
447             READ(INFILE,446,ERR=6621,END=6621)(TEST)
                IF (TEST.NE.'=007') GOTO 447
                READ(INFILE,448,ERR=6621,END=6621)(ATNAME(I),I=1,NATTRS)
448             FORMAT(9X,A)
C ---           FIND ATTRIBUTE COMPARISON MATRIX
449             READ(INFILE,446,ERR=6621,END=6621)(TEST)
                IF (TEST.NE.'=008') GOTO 449
                DO I=1,NATTRS
                  READ(INFILE,450,ERR=6621,END=6621)(ATMATR(I,J),J=1,NATTRS)
450               FORMAT(5X,8(F12.8,1X))
                END DO
                CLOSE (UNIT=INFILE)
                DO I=1,NATTRS
                  DO J=1,NPROJS
                    DO K=1,NPROJS
                      ATRPRO(J,K,I)=OLDMATR(J,K)
                    END DO
                  END DO
                END DO
                IF (LDFLAG) THEN
                  CHOICE=11
                ELSE
                  CHOICE=4
                END IF
                MENU141(9)='8'
6620            WRITE(6,*)('ERROR OPENING FILE ',FNAME)
                GOTO 6622
6621            WRITE(6,*)('ERROR READING FILE ',FNAME)
                NATTRS=1
                CLOSE (UNIT=INFILE)
6622            CONTINUE
            ELSE IF (CHOICE.EQ.7) THEN
C ***         ENTER (CHANGE) ATTRIBUTE NAMES
C ---           ATTRIBUTE NAMES
                II=NATTRS
                IF (NATTRS.LE.1) THEN
C ---             USER HASN'T ENTERED NUMBER OF PROJECTS YET.
                  NATTRS=0
                  WRITE(6,*)('ENTER ATTRIBUTE NAMES. QUIT WITH A BLANK LINE')
                  WRITE(6,*)('#1:')
                  READ(5,900)(ATNAME(1))
                  DO WHILE (ATNAME(NATTRS+1).NE.' ')
                    NATTRS=NATTRS+1
                    IF (NATTRS.EQ.MAXATR) THEN
                      WRITE(6,*)(MAXATR,' IS THE MAXIMUM NUMBER OF ATTRIBUTES')
                      GOTO 777
                    END IF
                    WRITE(6,*)('#',NATTRS+1,':')
                    READ(5,900)(ATNAME(NATTRS+1))
                  END DO
777               CONTINUE
                ELSE
C ---             USER HAS ENTERED NUMBER OF ATTRIBUTES
                  WRITE(6,*)('ENTER ATTRIBUTE NAMES. QUIT WITH A BLANK LINE')
                  DO I=1,NATTRS
                    WRITE(6,*)('#',I,':')
                    READ(5,900)(CTEMP)
                    IF (CTEMP.EQ.' ') GOTO 26
                    ATNAME(I)=CTEMP
                  END DO
26                CONTINUE
                END IF
C D             WRITE(6,*)('PROJECT NAMES LOADED; NATTRS=',NATTRS)
                IF (NATTRS.GT.II.AND.LDFLAG) THEN
                  DO I=II+1,NATTRS
                    DO J=1,NPROJS
                      DO K=1,NPROJS
                        ATRPRO(J,K,I)=OLDMATR(J,K)
```

```
                    END DO
                  END DO
                END DO
              END IF
              CHOICE=8
              MENU141(9)='8'
              WRITE(6,8)(CLS,CLS,CLS)
            ELSE IF (CHOICE.EQ.8) THEN
C ***         ENTER ATTRIBUTE COMPARISONS
              CALL INMAT(.FALSE.)
              IF (LDFLAG) THEN
                CHOICE=9
              ELSE
                CHOICE=4
              END IF
            ELSE IF (CHOICE.EQ.9) THEN
C ***         ADD PROJECT COMPARISONS (INMAT(.TRUE.) LOADS PRMATR)
              DO I=1,NATTRS
                WRITE(6,7112)(I,ATNAME(I))
7112            FORMAT(' WITH RESPECT TO ATTRIBUTE ',I3,1X,A)
                DO J=1,NPROJS
                  DO K=1,NPROJS
                    PRMATR(J,K)=ATRPRO(J,K,I)
                  END DO
                END DO
                CALL INMAT(.TRUE.)
                DO J=1,NPROJS
                  DO K=1,NPROJS
                    ATRPRO(J,K,I)=PRMATR(J,K)
                  END DO
                END DO
              END DO
              IF (LDFLAG) THEN
                CHOICE=11
                MENU141(12)='11'
              ELSE
                CHOICE=4
              END IF
            ELSE IF (CHOICE.EQ.10) THEN
C ---         VIEW PROJECT OR ATTRIBUTE MATRIX
903           WRITE(6,*)('VIEW <P>ROJECT OR <A>TTRIBUTE COMPARISONS?')
              READ(5,900)(ANSWER)
900           FORMAT(A)
              IF (ANSWER.EQ.'A') THEN
                DO I=1,NATTRS
                  WRITE(6,901)(ATMATR(I,J),J=1,NATTRS)
901               FORMAT(5X,200(F8.4,1X))
                END DO
              ELSE IF (ANSWER.EQ.'P') THEN
                IF (NATTRS.LE.1) THEN
                  K=1
                ELSE
904               WRITE(6,*)('ENTER ATTRIBUTE NUMBER FOR WHICH YOU WISH TO',
     *                     ' SEE PROJECT COMPARISONS')
                  READ(5,902)(K)
902               FORMAT(I3)
                  IF (K.LT.1.OR.K.GT.NATTRS) THEN
                    WRITE(6,*)('ENTER A NUMBER BETWEEN 1 AND',NATTRS)
                    GOTO 904
                  END IF
                END IF
                DO I=1,NPROJS
                  WRITE(6,901)(ATRPRO(I,J,K),J=1,NPROJS)
                END DO
              ELSE
                WRITE(6,*)('PLEASE ANSWER WITH A "P" OR AN "A"')
                GOTO 903
              END IF
              WRITE(6,*)('HIT <RETURN> TO CONTINUE')
              READ(5,900)(ANSWER)
              CHOICE=11
              WRITE(6,8)(CLS,CLS,CLS)
            ELSE IF (CHOICE.EQ.11) THEN
C ---         CALCULATE WEIGHTS
C ---           FIRST, CALCULATE ATTRIBUTE WEIGHTS
C D           WRITE(6,*)('ABOUT TO CALL MATGEN FOR ATTRIBUTES; NATTRS=',NATTRS)
              CALL MATGEN(NATTRS,ATMATR,ATWTS,MAXATR)
C D           WRITE(6,*)('JUST CALLED MATGEN FOR ATTRIBUTES; NATTRS=',NATTRS)
C ---         SORT ATTRIBUTES BY WEIGHT
```

```
      RANK(1)=1
      DO I=1,NATTRS
        POINT(I)=I
      END DO
      DO I=1,NATTRS-1
        DO J=I,NATTRS
          IF (ATWTS(POINT(I)).LT.ATWTS(POINT(J))) THEN
            K=POINT(I)
            POINT(I)=POINT(J)
            POINT(J)=K
          END IF
        END DO
      END DO
      DO I=2,NATTRS
          IF (ATWTS(POINT(I)).LT.ATWTS(POINT(I-1))) THEN
            RANK(I)=I
          ELSE
            RANK(I)=RANK(I-1)
          END IF
      END DO
      WRITE(6,8)(CLS,CLS,CLS)
      WRITE(6,*)('ATTRIBUTE WEIGHTS')
      WRITE(6,27)(RANK(I),POINT(I),ATNAME(POINT(I)),ATWTS(POINT(I)),
     *  I=1,NATTRS)
27    FORMAT(//3X,'RANK  ATTRIBUTE # AND NAME',13X,'  WEIGHT',20(/
     *  3X,I3,4X,I3,1X,A,6X,F10.8))
      INDX=OBJ/FLOAT(NATTRS)
      IF (INDX.LE.0.1) THEN
        WRITE(6,7778)(OBJ,INDX)
7778    FORMAT(' OBJ=',F8.4,', INDEX=',F8.4,'--CONSISTENT')
      ELSE IF (INDX.LE.1.0) THEN
        WRITE(6,7779)(OBJ,INDX)
7779    FORMAT(' OBJ=',F8.4,', INDEX=',F8.4,'--SOME CONSISTENCY')
      ELSE
        WRITE(6,7780)(OBJ,INDX)
7780    FORMAT(' OBJ=',F8.4,', INDEX=',F8.4,'--CONSISTENCY PROBLEMS')
      END IF
      WRITE(6,*)('DISPLAY DELTA MATRIX(Y/[N])?')
      READ(5,900)(ANSWER)
      IF (ANSWER(1:1).EQ.'Y') CALL DLTMAT(NATTRS,ATMATR,ATWTS,MAXATR)
C ---     NOW, CALCULATE PROJECT WEIGHTS
      WRITE(6,*)('DISPLAY PROJECT WEIGHTS FOR',
     *  ' EACH ATTRIBUTE?(Y/[N])')
      READ(5,900)(ANSWER)
      WTFLG=(ANSWER.EQ.'Y')
      DO I=1,NATTRS
        WRITE(6,8)(CLS,CLS,CLS)
        DO J=1,NPROJS
          DO K=1,NPROJS
            PRMATR(J,K)=ATRPRO(J,K,I)
          END DO
        END DO
        CALL MATGEN(NPROJS,PRMATR,PRWTS,MAXPRJ)
C ---   STORE WEIGHTS FOR EACH ATTRIBUTE
        DO J=1,NPROJS
          WTMTX(J,I)=PRWTS(J)
        END DO
        IF (WTFLG) THEN
        WRITE(6,7112)(I,ATNAME(I))
C ---   SORT PROJECTS BY WEIGHT
      DO II=1,NPROJS
        POINT(II)=II
      END DO
      DO II=1,NPROJS-1
        DO J=II+1,NPROJS
          IF (PRWTS(POINT(J)).GT.PRWTS(POINT(II))) THEN
            K=POINT(II)
            POINT(II)=POINT(J)
            POINT(J)=K
          END IF
        END DO
      END DO
      RANK(1)=1
      DO II=2,NPROJS
        IF (PRWTS(POINT(II)).LT.PRWTS(POINT(II-1))) THEN
          RANK(II)=II
        ELSE
          RANK(II)=RANK(II-1)
        END IF
```

```
0791                END DO
0792              WRITE(6,8)(CLS,CLS,CLS)
0793              WRITE(6,4591)(I,ATNAME(I))
0794     4591     FORMAT(' PROJECT WEIGHTS WITH RESPECT TO ATTRIBUTE ',I3,1X,A)
0795              WRITE(6,7777)(RANK(II),POINT(II),PRNAME(POINT(II)),PRWTS(POINT(II)),
0796         *                  II=1,NPROJS)
0797                INDX=OBJ/FLOAT(NPROJS)
0798                IF (INDX.LE.0.) THEN
0799                  WRITE(6,7778)(OBJ,INDX)
0800                ELSE IF (INDX.LE.1.0) THEN
0801                  WRITE(6,7779)(OBJ,INDX)
0802                ELSE
0803                  WRITE(6,7780)(OBJ,INDX)
0804                END IF
0805                WRITE(6,*)('VIEW DELTA MATRIX(Y/[N])?')
0806                READ(5,7781)(TEST)
0807                IF (TEST(1:1).EQ.'Y') CALL DLTMAT(NPROJS,PRMATR,PRWTS,MAXPRJ)
0808                END IF
0809                END DO
0810     C ---      SUM UP WEIGHTS
0811                DO I=1,NPROJS
0812                  PRWTS(I)=0
0813                  DO J=1,NATTRS
0814                    PRWTS(I)=PRWTS(I)+WTMTX(I,J)*ATWTS(J)
0815                  END DO
0816                END DO
0817     C ---      SORT PROJECTS BY WEIGHT
0818                DO I=1,NPROJS
0819                  POINT(I)=I
0820                END DO
0821                DO I=1,NPROJS-1
0822                  DO J=I+1,NPROJS
0823                    IF (PRWTS(POINT(J)).GT.PRWTS(POINT(I))) THEN
0824                      K=POINT(I)
0825                      POINT(I)=POINT(J)
0826                      POINT(J)=K
0827                    END IF
0828                  END DO
0829                END DO
0830                RANK(1)=1
0831                DO I=2,NPROJS
0832                  IF (PRWTS(POINT(I)).LT.PRWTS(POINT(I-1))) THEN
0833                    RANK(I)=I
0834                  ELSE
0835                    RANK(I)=RANK(I-1)
0836                  END IF
0837                END DO
0838                WRITE(6,8)(CLS,CLS,CLS)
0839                WRITE(6,*)('                    FINAL WEIGHTS')
0840                WRITE(6,7777)(RANK(I),POINT(I),PRNAME(POINT(I)),PRWTS(POINT(I)),
0841         *                  I=1,NPROJS)
0842     7777       FORMAT(3X,'RANK    PROJECT # AND NAME',17X,'WEIGHT'/
0843         *          20Q(3X,I3,6X,I3,1X,A,4X,F10.8))
0844                WRITE(6,*)('HIT <RETURN> TO CONTINUE')
0845                READ(5,7781)(TEST)
0846     7781       FORMAT(A)
0847                CHOICE=13
0848                WRITE(6,8)(CLS,CLS,CLS)
0849              ELSE IF (CHOICE.EQ.12) THEN
0850     C ***      USER NEEDS HELP
0851                CALL NHELP(142)
0852                CHOICE=II
0853              ELSE IF (CHOICE.EQ.13) THEN
0854     C ***      RETURN TO MAIN MENU
0855 C   D          WRITE(6,*)('LEAVING SUBROUTINE MOD4')
0856                RETURN
0857              END IF
0858              GOTO 60
0859              END
```

PROGRAM SECTIONS

	Name	Bytes	Attributes
0	$CODE	10511	PIC CON REL LCL SHR EXE RD NOWRT LONG
1	$PDATA	2661	PIC CON REL LCL SHR NOEXE RD NOWRT LONG
2	$LOCAL	170388	PIC CON REL LCL NOSHR NOEXE RD WRT LONG
3	HEAD	12	PIC OVR REL GBL SHR NOEXE RD WRT LONG
4	MAX	8	PIC OVR REL GBL SHR NOEXE RD WRT LONG
5	PRI	4800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
6	PRO	160800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
7	BIGWTS	16000	PIC OVR REL GBL SHR NOEXE RD WRT LONG
8	BIGPROJ	3200000	PIC OVR REL GBL SHR NOEXE RD WRT LONG
9	CONST	4	PIC OVR REL GBL SHR NOEXE RD WRT LONG
10	AT1	2160	PIC OVR REL GBL SHR NOEXE RD WRT LONG
11	CONTROL	4	PIC OVR REL GBL SHR NOEXE RD WRT LONG
	Total Space Allocated	3567348	

ENTRY POINTS

Address	Type	Name	References
0-00000000		MOD4	1#

VARIABLES

Address	Type	Name	Attributes	References
2-00029680	CHAR	ANSWER		95 130= 148= 149 150= 152 154= 159 191 207 228 272 276 309= 311 312 316 320 321 323(2) 325 674= 676 681 702= 750= 751 755= 756
2-000296E4	I*4	CHOICE		100 291= 292 310 321= 323= 325 326 327= 333 345= 346 435= 436 445= 447 458= 460 527= 528 546= 550 585= 587= 596 637= 640 644= 646= 648 666= 669= 671 703= 705 847= 849 852= 853
11-00000000	I*4	CLS	COMM	16 100 126(3) 131(3) 161(3) 193(3) 209(3) 230(3) 273(3) 278(3) 332(3) 344(3) 368(3) 446(3) 455(3) 548(3) 556(3) 639(3) 704(3) 732(3) 758(3) 792(3) 838(3) 848(3)
2-00029668	CHAR	CTEMP		89 398= 401 429= 431 452= 453 454 621= 622 623
**	L*4	FLAG		121 358= 359 373= 374
2-00029650	CHAR	FNAME		89 554= 557A 590 592
2-000296D0	I*4	I		100 292(2)= 357= 358 359 371= 372 373(2) 374 376 377 379 380 386= 387 388 392 393 400 401 407 411(2)= 414(2)= 419= 420 421(3) 424 425 427 428 430 431 450= 451 453 454 455(2)= 488= 490 491 492 502= 503 504(2) 513= 516 531= 532(2) 536 537 545 567(2)= 572= 573 577= 580 619= 620 623 629= 632 650= 651(2) 655 661 677= 678 694= 695 713= 714(2) 716= 717 718 719 720 725= 726(2) 727(2) 729(2) 734(5)= 757= 761 767 770(2) 793(2) 811= 812 814(3) 818= 819(2) 821= 822 823 824 825 831= 832(2) 833(2) 835(2) 840(5)=
2-000296D8	I*4	II		100 253= 254 255 257 258 263= 264(2) 265 266(2) 310= 327 345 458 462= 465 470 475 482 484 488 494 495 502 509= 510 538= 540(2) 599= 628 629 703 772= 773(2) 775= 776 777 778 779 785= 786(2) 787(2) 789(2) 795(5)= 852
**	R*4	INDX		80 738= 739 740 742 743 746 797= 798 799 800 801 803
2-000296CC	I*4	INFILE		100D 162A 164 167 171 173 176 180 186 188 190A 194A 196 198 200 202 206A 210A 212 214 216 218 226A 232A 234 236 238 240 270A 287A 392A 394A 395 398 417A 470A 472 475 477A 485A 557A 559 562 565 567 570 573 576A 594A
2-000296D4	I*4	J		100 179= 202(2)= 204(3)= 218(2)= 219= 220 221(2) 222(2) 231= 242 243 247 248(2)= 251(2)= 253

				254	263	268	335(6)=	372=	373(2)	374	375
				376	378	379	407=	408(2)	409(2)	420=	421(3)
				423	424	426	427	429	430	475(2)=	489=
				490(2)	491(2)	492(2)	503=	504(3)	514=	516(2)	537=
				540	573(2)=	578=	580(2)	630=	632(2)	653=	655(2)
				659=	661(2)	678(2)=	695(2)=	717=	718	720	721
				759=	761(2)	766=	767(2)	776=	777	779	780
				813=	814(2)	822=	823	825	826		
	**	I*4	JJ	100	240(2)=	254=	255	256	257	463=	465(2)
				466(2)=	468(2)=	475	488	489	494	495=	496
				502	503	508	509	510=	539=	540(2)	
	2-000296DC	I*4	K	100	515=	516(2)	579=	580(2)	631=	632(2)	654=
				655(2)	660=	661(2)	683=	687=	689(2)	695	719=
				721	760=	761(2)	778=	780	824=	826	
	2-000296EC	L*4	LDFLAG	121D	526=	536	584	628	643	665	
	4-00000004	I*4	MAXATR	9	100	532	533	608	609	709A	751A
	4-00000000	I*4	MAXPRJ	9	100	764A	807A				
	3-00000000	I*4	MODEL	8	100						
	3-00000008	I*4	NATTRS	8	100	513	536	537	545=	548	562=
				567	572	573	577	593=	599	600	602=
				606	607(2)=	608	612	613	619	628	629
				650	677	678	682	689	690	709A	713
				716	717	725	734	738	751A	757	813
	3-00000004	I*4	NPROJS	8	100	215(2)	221	224(2)=	263(2)	264	268(2)=
				335	347	353(2)	354(2)	357	358	359	365(2)=
				371	372	387	407	412(2)=	417	419	420
				439(2)=	440	441	442	443	444(2)=	453	465
				489	494(2)=	496	508	514	515	538	539
				578	579	630	631	653	654	659	660
				694	695	759	760	764A	766	772	775
				776	785	795	797	807A	811	818	821
				622	631	640					
	2-000296E0	I*4	NUMBER	100	198=	202	204	214=	215	218	219
				224	236=	237	240	243	244	398=	400
	**	I*4	NUMFILES	100	128=	134	136	138	139	162	194
				210	215	220	225(2)=	232	237	265	269(2)=
				284	286	290(2)=					
	9-00000000	R*4	OBJ	14	80	738	740	743	746	797	799
				801	803						
	**	I*4	TEMP	100	256=	258	347=	371	386	392	417
	**	I*4	TEMP2	100	375=	377	378=	380	385=	388	393=
				394	403	405	423=	425	426=	428	
	2-00029682	CHAR	TEST	98	154	164=	166	171=	172	176=	177
				186=	187	188=	189	196=	197	200=	201
				212=	213	216=	217	234=	235	238=	239
				343=	395=	396	472=	474	559=	561	565=
				566	570=	571	806=	807	845=		
	2-00029686	CHAR	TEXT	99	167=	169	173=	174	180=	181	182
				472=	474						
	2-000296E8	L*4	WTFLG	121	756=	769					

ARRAYS

Address	Type	Name	Attributes	Bytes	Dimensions	References				
10-000001E0	R*4	ATMATR	COMM	1600	(20, 20)	15	80	573=	678	709A
						751A				
10-00000000	CHAR	ATNAME	COMM	480	(20)	15	89	548(2)=	567=	605=
						606	613=	623=	651	734
						770	793			
8-00000000	R*4	ATRPRO	COMM	3200000	(200, 200, 20)	13	80	516=	540=	580=
						632=	655	661=	695	761
10-00000820	R*4	ATWTS	COMM	80	(20)	15	80	709A	718(2)	726(2)
						734	751A	814		
2-000293C4	CHAR	INNAME		624	(26)	89	129=	136=	138	162A
						194A	210A	232A	284	286
						335	394A	403	405	470A
						482	484			
2-00029634	CHAR	MENU141		28	(14)	95D	292	325	521=	522=
						523=	524=	525=	547=	589=
						638=	667=			
2-00027740	I*4	NUMLIST		100	(25)	100	215=	237=		
2-00000000	R*4	OLDMATR		160000	(200, 200)	80	504=	516	540	580
						632				

2-00027100	I*4	POINT		800	(200)	100	714=	718(2)	719	720(2)=	
						721=	726(2)	734(3)	773=	777(2)	
						778	779(2)=	780=	786(2)	795(3)	
						819=	823(2)	824	825(2)=	826=	
						832(2)	840(3)				
6-00000000	R*4	PRMATR	COMM	160000	(200, 200)	11	80	655=	661	761=	
						764A	807A				
5-00000000	CHAR	PRNAME	COMM	4800	(200)	10	89	222=	266=	335	
						401=	429	430(2)=	431=	440=	
						443	454=	492(2)=	795	840	
6-00027100	R*4	PRWTS	COMM	800	(200)	11	80	475=	504(3)	764A	
						767	777(2)	786(2)	795	807A	
						812=	814(2)=	823(2)	832(2)	840	
2-00027420	I*4	RANK		800	(200)	100	712=	727=	729(2)=	734	
						784=	787=	789(2)=	795	830=	
						833=	835(2)=	840			
2-000277A4	I*4	SORPOS		800	(200)	100	221=	222	264=	266	
						335	353=	354	358(2)	373(2)	
						378	379(2)=	380=	400	409(2)=	
						421(2)	426	427(2)=	428=	442=	
						490(2)=					
2-00027AC4	I*4	SOURCE		800	(200)	100	220=	265=	335(2)	353=	
						354	359(2)	373(2)	374(2)	375	
						376(2)=	377=	388	393	408(2)=	
						421(4)	423	424(2)=	425=	441=	
						465(2)	470	482	484	491(2)=	
2-00027DE4	I*4	TEMPLIST		800	(200)	100	242=	243	247	255(2)	
						256	257(2)=	258=	264		
2-00028104	CHAR	TEMPNAME		4800	(200)	89	202=	204	218=	222	
						240=	266				
7-00000000	R*4	WTMTX	COMM	16000	(200, 20)	12	80	767=	814		

LABELS

Address	Label	References							
1-000003BD	1'	126	127#						
0-0000009C	2	132#	227	271	275	285	288		
1-000003E8	3'	134	135#						
1-00000420	4'	136	137#	148	309	440	452		
1-00000520	5'	164	165#	171	176	186	196	200	212
		216	234	238	343	395			
**	6	139#	155	281					
1-00000422	7'	139	140#						
1-000003DF	8'	131	133#	161	193	209	230	273	278
		332	344	368	446	459	549	556	639
		704	732	758	792	838	848		
0-000001E0	21	164#	166						
1-00000524	22'	167	168#	173	180	188			
0-00000250	23	171#	172						
0-000002C0	24	176#	177						
0-00000358	25	186#	187						
0-00001B6E	26	622	625#						
1-000008CE	27'	734	736#						
0-00000356	28	181	184#						
**	30	196#	197						
1-00000528	31'	198	199#	214	236				
**	32	200#	201						
1-0000052D	33'	202	203#	218	240				
1-00000531	34'	204	205#						
**	40	212#	213						
0-00000624	41	216#	217						
**	50	234#	235						
0-0000083C	51	242#	245	249					
0-000007B8	52	238#	239						
0-00000A68	60	292#	314	318	328	858			
1-00000542	61'	292	293#						
**	70'	339#							
1-000007ED	71'	349	350#						
0-00000D20	72	353#	362	366					

**	73	395#	396						
0-00000F44	74	398#	400						
1-00000862	75'	398	399#						
**	80	472#	474						
1-0000086A	81'	472	473#						
1-0000086F	82'	475	476#						
0-0000126C	83	464#	496	511					
**	90'	469#							
0-000010DC	94	439#	443						
1-00000882	339'	562	563#						
1-0000087C	444'	554	555#						
**	445	559#	561						
1-0000087E	446'	559	560#	565	570				
**	447	565#	566						
1-00000887	448'	567	568#						
0-00001820	449	570#	571						
1-0000088B	450'	573	574#						
0-00000998	666	194	210	232	284#				
0-0000095C	667	196(2)	198(2)	200(2)	202(2)	212(2)	214(2)	216(2)	218(2)
		234(2)	236(2)	238(2)	240(2)	242(2)	286#		
**	669	283	289#						
0-00001AD8	777	610	615#						
1-000008BB	900'	605	613	621	674	675#	702	750	755
1-000008BD	901'	678	679#	695					
1-000008CB	902'	687	688#						
**	903	673#	699						
0-00001E68	904	685#	691						
**	2001	530#	534						
0-000011A0	2002	451#	456						
0-00001214	2010	453	457#						
1-00000993	4591'	793	794#						
0-00000F0C	6601	394	403#						
0-00000F90	6602	395(2)	398(2)	405#					
0-00000FC7	6603	404	406#						
0-00000FF5	6605	402	413#						
0-00000E94	6606	387#	415						
0-000013DC	6611	470	482#						
0-0000139C	6612	472(2)	475(2)	484#					
0-000014OF	6613	483	486#						
**	6614	478	500#						
0-0000148A	6615	497	513#						
0-00001970	6620	557	590#						
0-00001993	6621	559(2)	562(2)	565(2)	567(2)	570(2)	573(2)	592#	
0-00001995	6622	591	595#						
1-00000898	7112'	651	652#	770					
1-000007A5	7654'	335	337#						
1-000009C6	7777'	795	840	842#					
1-00000911	7778'	740	741#	799					
1-00000937	7779'	743	744#	801					
1-00000963	7780'	746	747#	803					
1-00000A07	7781'	806	845	846#					

FUNCTIONS AND SUBROUTINES REFERENCED

Type	Name	References							
	DLTMAT	751	807						
	FOR$CLOSE	190	206	226	270	287	392	417	477
		485	576	594					
	FOR$OPEN	162	194	210	232	394	470	557	
	INMAT	642	658						
I*4	LIB$INDEX	152	312	316					
	MATGEN	709	764						
	NHELP	279	851						

```
      SUBROUTINE MOD5
C
C ***  ******************************************************************
C      * MOD5 IS FOR THE CONSTRAINTS MODEL. ALLOWS USER TO DECIDE WHICH
C      * PROJECTS TO FUND BASED ON AVAILABLE RESOURCES, RESOURCE REQUIREMENTS,
C      * AND PROJECT WEIGHTS.
C ***  ******************************************************************
C
      COMMON/HEAD/MODEL,NPROJS,NATTRS
      COMMON/MAX/MAXPRJ,MAXATR
      COMMON/PR1/PRNAME(200)
      COMMON/PRO/PRMATR(200,200),PRWTS(200)
      COMMON/COST2/COBJ,FCOST(200)
      COMMON/BIGWTS/WTMTX(200,20)
      COMMON/CONTROL/CLS
C
C --- GLOSSARY OF VARIABLES
C --- NAME       USE      TYPE      RANGE            DEFINITION
C --- ALPHA      I,U      INT(0:9)'0'-'9'            CHARACTER REP. OF NUMERALS
C --- AMOUNT     UI,U     REAL      ANY              AMOUNT OF CONSTRAINT AVAILABLE
C                         (20)
C --- ANSWER     UI,U     CHAR*2 ANY                 USER'S ANSWER TO QUESTIONS
C --- CHOICE     M        INT       0-7              USER'S CHOICE FROM MENU
C --- CLS        U        INTEGER 12                 CLEAR SCREEN CHARACTER
C --- COBJ       UO       REAL      ANY              VALUE OF OBJECTIVE
C --- CONSTR     UI,UO    CHAR*24 ANY                NAME OF CONSTRAINTS
C --- FCOST      U        REAL      0,1              FUND PROJECT OR NOT
C                         (MAXPRJ)
C --- FNAME      UI,U     CHAR*24 ANY                NAME OF INPUT FILE
C --- I          M        INT       ANY              COUNTER
C --- IDROW      N        INT       ANY              ROW NUMBER (RETURNED BY LINDO)
C --- INUNIT     I,U      INT       21               INPUT FILE UNIT
C --- IRO        M        INT       ANY              NUMBERS OF NONZERO ROWS (LINDO)
C                         (21)
C --- J          M        INT       ANY              COUNTER
C --- K          M        INT       ANY              COUNTER
C --- KONDN      N        INT       2,4,5            STATUS (RETURNED BY LINDO)
C --- L          M        INT       ANY              TEMP
C --- MAXATR     U        INT       20               MAX NUMBER OF ATTRIBUTES
C --- MAXPRJ     U        INT       200              MAX NUMBER OF PROJECTS
C --- MENU15     M,UO     CHAR*2    '0'-'7','##'     HEADINGS FOR MENU
C                         (8)
C --- MODEL      N        INT       1-5              MODEL NUMBER
C --- NAME       M        INT       ANY              NAME OF COLUMN (LINDO)
C                         (32)
C --- NATTRS     N        INT       1                NUMBER OF ATTRIBUTES
C --- NCONSTR    M        INT       1-20             NUMBER OF CONSTRAINTS
C --- NONZ       M        INT       ANY              NUMBER OF NONZERO COEFFICIENTS
C --- NPROJS     M        INT       2-MAXPRJ         NUMBER OF PROJECTS
C --- PRMATR     UI,FI    REAL      NON NEGATIVE     PROJECT COMPARISONS
C                         (MAXPRJ,MAXPRJ)
C --- PRNAME     UI,FO    CHAR*24 ANY                PROJECT NAMES
C                         (MAXPRJ)
C --- PRWTS      UO,FO    REAL      0-1.0            PROJECT WEIGHTS
C                         (MAXPRJ)
C --- REQUIRE    UI,U     REAL      ANY              RESOURCE REQUIREMENTS
C                         (NPROJS,20)
C --- TEST       UI,FI,U  CHAR*4    ANY              TEMP USE
C --- TRUBLE     N        LOGICAL   .TRUE.-.FALSE.   OUT OF SPACE(RETURNED BY LINDO)
C --- UNITS      UI,UO    CHAR      ANY              UNITS OF RESOURCE
C                         (20)
C --- VAL        M        REAL      ANY              COEFFICIENT VALUES (LINDO)
C                         (21)
C --- WTMTX      M,FO     REAL
C                         (MAXPRJ,MAXATR)           PROJECT WEIGHTS FOR EA. ATR.
      CHARACTER*2 MENU15(8)/'0','1','2','##','##','5','6','7'/,
     *            ANSWER
      CHARACTER*24 PRNAME,
     *             FNAME,
     *             TEXT,
     *             CONSTR(20),
     *             UNITS(20)
      CHARACTER*4 TEST
      INTEGER CHOICE/0/,
     *        I,J,K,
     *        MODEL,
     *        NATTRS,
     *        MAXPRJ,
     *        MAXATR,
```

```
     *          NPROJS,
     *          INUNIT/21/,
     *          NCONSTR/0/,
     *          KONDN,
     *          NONZ,
     *          IRO(21),
     *          IDROW,
     *          CLS,
     *          NAME(8)/'X','7*',' '/
     *          ALPHA(0:9)/'0','1','2','3','4','5','6','7','8','9'/
      REAL      AMOUNT(20),
     *          WTMTX,
     *          COBJ,
     *          FCOST,
     *          REQUIRE(200,20),
     *          PRWTS,
     *          PRMATR,
     *          VAL(21)
      LOGICAL TRUBLE/.FALSE./
C
C
C D   WRITE(6,*)('ENTERING SUBROUTINE MOD5')
      IF (NPROJS.GT.0) THEN
        CHOICE=2
      ELSE
        CHOICE=0
      END IF
      DO WHILE (.TRUE.)
        WRITE(6,1)((MENU15(I),I=1,8),CHOICE)
1       FORMAT(/////                    MENU 1.5 -- CONSTRAINTS MODEL'//
     *          6X,A2,' --ENTER PROJECTS AND WEIGHTS'/
     *          6X,A2,' --READ PROJECTS AND WEIGHTS FROM A FILE'/
     *          6X,A2,' --ENTER CONSTRAINTS'/
     *          6X,A2,' --ENTER RESOURCE REQUIREMENTS FOR PROJECTS'/
     *          6X,A2,' --CALCULATE WHICH PROJECTS ARE TO BE FUNDED'/
     *          6X,A2,' --VIEW PROJECT WEIGHTS AND NAMES'/
     *          6X,A2,' --HELP WITH PROJECT RANKING INTERFACE'/
     *          6X,A2,' --RETURN TO MAIN MENU'//
     *          3X,'PLEASE ENTER NUMBER OF YOUR CHOICE [ ',I1,' ]:')
3       READ(5,2)(ANSWER)
2       FORMAT(A)
        I=CHOICE
        IF (ANSWER.NE.' ') THEN
        IF (INDEX('0123456',ANSWER(1:1)).EQ.0) THEN
          WRITE(6,*)('ANSWER MUST BE A NUMBER(0-7), PLEASE REENTER')
          GOTO 3
        END IF
        CHOICE=ICHAR(ANSWER(1:1))-48
        IF (ANSWER(1:1).NE.MENU15(CHOICE+1)) THEN
          WRITE(6,*)(CHOICE,'INVALID AT THIS POINT, REENTER')
          CHOICE=1
          GOTO 3
        END IF
        END IF
C ***   CHOICE IS O.K.
        WRITE(6,666)(CLS,CLS,CLS)
666     FORMAT(1X,A1,A1,A1)
        IF (CHOICE.EQ.0) THEN
C ***     ENTER PROJECTS AND WEIGHTS FROM TERMINAL
          NPROJS=1
4         WRITE(6,*)('ENTER NAME OF PROJECT #',NPROJS,',OR BLANK TO QUIT')
          READ(5,2)(PRNAME(NPROJS))
          IF (PRNAME(NPROJS).NE.' ') THEN
            WRITE(6,*)('PLEASE ENTER WEIGHT OF PROJECT #',NPROJS)
            READ(5,*)(PRWTS(NPROJS))
            NPROJS=NPROJS+1
            GOTO 4
          END IF
          NPROJS=NPROJS-1
          IF (NCONSTR.GT.0) THEN
            MENU15(4)='3'
            CHOICE=3
          ELSE
            CHOICE=2
          END IF
          WRITE(6,666)(CLS,CLS,CLS)
        ELSE IF (CHOICE.EQ.1) THEN
C ***     READ PROJECTS AND WEIGHTS FROM A FILE
          WRITE(6,*)('PLEASE INPUT NAME OF FILE')
```

```
      READ(5,2)(FNAME)
C  D  WRITE(6,*)(FNAME)
      WRITE(6,666)(CLS,CLS,CLS)
      OPEN (UNIT=INUNIT,FILE=FNAME,STATUS='OLD',ERR=777)
C ***  FIND NUMBER OF PROJECTS
5     READ(INUNIT,6,ERR=778,END=778)(TEST)
6     FORMAT(1X,A)
      IF (TEST.NE.'=QOS') GOTO 5
      READ(INUNIT,7,ERR=778,END=778)(NPROJS)
7     FORMAT(5X,I3)
C ***  FIND PROJECT NAMES
8     READ(INUNIT,6,ERR=778,END=778)(TEST)
      IF (TEST.NE.'=QIO') GOTO 8
      READ(INUNIT,9,ERR=778,END=778)(PRNAME(I),I=1,NPROJS)
9     FORMAT(9X,A)
C ***  READ FINAL WEIGHTS
10    READ(INUNIT,11,ERR=778,END=778)(TEST,TEXT)
11    FORMAT(1X,A,A)
      IF (TEST(1:1).NE.'=' .OR.TEXT(1:13).NE.'FINAL PROJECT') GOTO 10
      READ(INUNIT,12,ERR=778,END=778)(PRWTS(J),J=1,NPROJS)
12    FORMAT(5X,8(F10.8,1X))
      CLOSE (UNIT=INUNIT)
      IF (NCONSTR.GT.0) THEN
        MENU15(4)='3'
        CHOICE=3
      ELSE
        CHOICE=2
      END IF
      GOTO 779
C
C ***  HANDLE ERRORS IN FILES
C
777   WRITE(6,*)('ERROR OPENING FILE ',FNAME)
      GOTO 779
778   WRITE(6,*)('ERROR READING FILE ',FNAME)
      CLOSE (UNIT=INUNIT)
      NPROJS=0
779   CONTINUE
    ELSE IF (CHOICE.EQ.2) THEN
C ***  ENTER CONSTRAINTS
      NCONSTR=1
13    WRITE(6,20)(NCONSTR)
20    FORMAT(' ENTER NAME OF CONSTRAINT #',I3,', BLANK TO QUIT')
      READ(5,2)(CONSTR(NCONSTR))
      IF (CONSTR(NCONSTR).NE.' ') THEN
        WRITE(6,*)('ENTER UNITS OF CONSTRAINT #',NCONSTR)
        READ(5,2)(UNITS(NCONSTR))
        WRITE(6,14)(CONSTR(NCONSTR),UNITS(NCONSTR))
14      FORMAT(' ENTER TOTAL AMOUNT OF AVAILABLE ',A/
     *    ' IN UNITS OF ',A7)
        READ(5,*)(AMOUNT(NCONSTR))
        NCONSTR=NCONSTR+1
        GOTO 13
      END IF
      NCONSTR=NCONSTR-1
      IF (NPROJS.GT.0) THEN
        MENU15(4)='3'
        CHOICE=3
      ELSE
        CHOICE=0
      END IF
      WRITE(6,666)(CLS,CLS,CLS)
    ELSE IF (CHOICE.EQ.3) THEN
C ***  ENTER RESOURCE REQUIREMENTS FOR PROJECTS
      DO I=1,NPROJS
        WRITE(6,55)(I,PRNAME(I))
55      FORMAT(' FOR PROJECT #',I3,'-',A,' ENTER')
        DO J=1,NCONSTR
          WRITE(6,*)('REQUIREMENT OF ',CONSTR(J),' IN ',UNITS(J))
          READ(5,*)(REQUIRE(I,J))
        END DO
      END DO
C     MENU15(3)='##'
      MENU15(5)='4'
      CHOICE=4
      WRITE(6,666)(CLS,CLS,CLS)
    ELSE IF (CHOICE.EQ.4) THEN
C ***  CALCULATE WHICH ARE TO BE FUNDED
      CALL INIT
```

```
C ***         DEFINE FIRST (OBJECTIVE) ROW
              CALL DEFROW(-1,0,IDROW,TRUBLE)
C ***         DEFINE A ROW FOR EACH CONSTRAINT
              DO I=1,NCONSTR
                CALL DEFROW(1,AMOUNT(I),IDROW,TRUBLE)
              END DO
C ***         APPEND ALL COLUMNS
              NONZ=NCONSTR+1
              DO I=1,21
                IRO(I)=I
              END DO
              DO I=1,NPROJS
C ***           GENERATE COLUMN NAME
                K=I
                DO J=5,2,-1
                  L=(K/10)*10
                  NAME(J)=ALPHA(K-L)
                  K=K/10
                END DO
C ***           GENERATE ARRAY VAL
                VAL(1)=PRWTS(I)
                DO J=1,NCONSTR
                  VAL(J+1)=REQUIRE(I,J)
                END DO
                CALL APPCOL(NAME,NONZ,VAL,IRO,TRUBLE)
              END DO
C ***         SET THE NUMBER OF INTEGER VARIABLES TO NPROJS
              CALL NINTEQ(NPROJS)
C ***         INVOKE LINDO TO SOLVE
              CALL GO(0,KONDN)
C ***         DISPLAY PROJECTS TO BE FUNDED
              WRITE(6,666)(CLS,CLS,CLS)
              WRITE(6,*)('FUND THE FOLLOWING PROJECTS')
              DO I=1,NPROJS
                IF (FCOST(I).GT.0) WRITE(6,*)(I,'  ',PRNAME(I))
              END DO
              WRITE(6,*)('OBJ=',COBJ,' THE CLOSER OBJ IS TO 1, THE BETTER')
              WRITE(6,*)('HIT RETURN TO CONTINUE')
              READ(5,2001)(TEST)
2001          FORMAT(A)
C             MENU15(4)='##'
C             MENU15(5)='##'
              CHOICE=7
              WRITE(6,666)(CLS,CLS,CLS)
            ELSE IF (CHOICE.EQ.5) THEN
C ***         VIEW PROJECT WEIGHTS AND NAMES
              WRITE(6,15)(J,PRNAME(J),PRWTS(J),J=1,NPROJS)
15            FORMAT(' PROJECT', 20X, 'WEIGHTS', 200(/1X,I3,1X,A,5X,F10.8))
              WRITE(6,*)('HIT <RETURN> TO CONTINUE')
              READ(5,2)(TEST)
              CHOICE=1
              WRITE(6,666)(CLS,CLS,CLS)
            ELSE IF (CHOICE.EQ.6) THEN
C ***         USER IS IN NEED OF ASSISTANCE
              CALL NHELP(15)
              CHOICE=1
            ELSE IF (CHOICE.EQ.7) THEN
C ***         RETURN TO MAIN MENU
C ***         STORE PROJECT WEIGHTS IN WTMTX
              DO I=1,NPROJS
                WTMTX(I,1)=PRWTS(I)
              END DO
C  D          WRITE(6,*)('LEAVING SUBROUTINE MOD5')
              RETURN
            END IF
          END DO
          END
```

PROGRAM SECTIONS

	Name	Bytes	Attributes
0	$CODE	2731	PIC CON REL LCL SHR EXE RD NOWRT LONG
1	$PDATA	1060	PIC CON REL LCL SHR NOEXE RD NOWRT LONG
2	$LOCAL	17732	PIC CON REL LCL NOSHR NOEXE RD WRT LONG
3	HEAD	12	PIC OVR REL GBL SHR NOEXE RD WRT LONG
4	MAX	8	PIC OVR REL GBL SHR NOEXE RD WRT LONG
5	PR1	4800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
6	PRO	160800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
7	COST2	804	PIC OVR REL GBL SHR NOEXE RD WRT LONG
8	BIGWTS	16000	PIC OVR REL GBL SHR NOEXE RD WRT LONG
9	CONTROL	4	PIC OVR REL GBL SHR NOEXE RD WRT LONG
	Total Space Allocated	203951	

ENTRY POINTS

Address	Type	Name	References
0-00000000		MOD5	1#

VARIABLES

Address	Type	Name	Attributes	References							
2-00004390	CHAR	ANSWER		66	119=	122	123	127	128		
**	I*4	CHOICE		74D	103=	105=	108	121	127=	128	129
				130=	137	151=	153=	156	183=	185=	197
				216=	218=	221	233=	235	280=	282	288=
				290	293=	294					
9-00000000	I*4	CLS	COMM	15	74	135(3)	155(3)	161(3)	220(3)	234(3)	269(3)
				281(3)	289(3)						
7-00000000	R*4	COBJ	COMM	13	90	274					
2-00004392	CHAR	FNAME		68	159=	162A	191	193			
**	I*4	I		74	108(2)=	121=	130	172(2)=	223=	224(2)	228
				241=	242	246=	247(2)	249=	251	258	260
				271=	272(3)	288	293	297=	298(2)		
2-000043DC	I*4	IDROW		74	239A	242A					
2-000043CC	I*4	INUNIT		74D	162A	164	167	170	172	175	178
				180A	194A						
2-000043C8	I*4	J		74	178(2)=	226=	227(2)	228	252=	254	259=
				260(2)	284(4)=						
**	I*4	K		74	251=	253	254	255(2)=			
2-000043D4	I*4	KONDN		74	267A						
**	I*4	L		253=	254						
4-00000004	I*4	MAXATR	COMM	10	74						
4-00000000	I*4	MAXPRJ	COMM	10	74						
3-00000000	I*4	MODEL	COMM	9	74						
3-00000008	I*4	NATTRS	COMM	9	74						
2-000043D0	I*4	NCONSTR		74D	149	181	199=	200	202	203	204
				205	206(2)	209	210(2)=	213(2)=	226	241	245
				259							
2-000043D8	I*4	NONZ		74	245=	262A					
3-00000004	I*4	NPROJS	COMM	9	74	102	139=	140	141	142	143
				144	145(2)=	148(2)=	167=	172	178	195=	214
				223	249	265A	271	284	297		
2-000043C2	CHAR	TEST		73	164=	166	170=	171	175=	177	276=
				287=							
2-000043AA	CHAR	TEXT		68	175=	177					
2-000043E0	L*4	TRUBLE		98D	239A	242A	262A				

ARRAYS

Address	Type	Name	Attributes	Bytes	Dimensions	References				
2-00000074	I*4	ALPHA		40	(0:9)	74D	254			
2-0000009C	R*4	AMOUNT		80	(20)	90	209=	242A		
2-00003FD0	CHAR	CONSTR		480	(20)	68	202=	203	206	227
7-00000004	R*4	FCOST	COMM	800	(200)	13	90	272		
2-00000000	I*4	IRO		84	(21)	74	247=	262A		

2-00003FC0	CHAR	MENU15		16	(8)		66D	108	128	150=	182=
							215=	232=			
2-00000054	I*4	NAME		32	(8)		74D	254=	262A		
6-00000000	R*4	PRMATR	COMM	160000	(200, 200)		12	90			
5-00000000	CHAR	PRNAME	COMM	4800	(200)		11	68	141=	142	172=
							224	272	284		
6-00027100	R*4	PRWTS	COMM	800	(200)		12	90	144=	178=	258
							284	298			
2-000000EC	R*4	REQUIRE		16000	(200, 20)		90	228=	260		
2-000041B0	CHAR	UNITS		480	(20)		68	205=	206	227	
2-00003F6C	R*4	VAL		84	(21)		90	258=	260=	262A	
8-00000000	R*4	WTMTX	COMM	16000	(200, 20)		14	90	298=		

LABELS

Address	Label	References							
1-0000018A	1'	108	109#						
1-00000333	2'	119	120#	141	159	202	205	287	
0-00000068	3	119#	125	131					
0-00000154	4	140#	146						
**	5	164#	166						
1-0000033E	6'	164	165#	170					
1-00000342	7'	167	168#						
**	8	170#	171						
1-00000347	9'	172	173#						
0-000003C4	10	175#	177						
1-0000034B	11'	175	176#						
1-00000350	12'	178	179#						
0-000004D0	13	200#	211						
1-0000038E	14'	206	207#						
1-000003E6	15'	284	285#						
1-0000035D	20'	200	201#						
1-000003C5	55'	224	225#						
1-00000335	666'	135	136#	155	161	220	234	269	281
		289							
0-0000049C	777	162	191#						
0-00000468	778	164(2)	167(2)	170(2)	172(2)	175(2)	178(2)	193#	
0-000004C1	779	187	192	196#					
1-000003E4	2001'	276	277#						

FUNCTIONS AND SUBROUTINES REFERENCED

Type	Name	References	
	APPCOL	262	
	DEFROW	239	242
	FOR$CLOSE	180	194
	FOR$OPEN	162	
	GO	267	
	INIT	237	
I*4	LIB$INDEX	123	
	NHELP	292	
	NINTEQ	265	

```
      SUBROUTINE NHELP(MENU)
C *** ***************************************************************
C     SUBROUTINE NHELP PROVIDES USER WITH HELP IN RUNNING THE PROJECT
C     RANKING USER-INTERFACE. MENU IS THE NUMBER OF THE CURRENT MENU.
C *** ***************************************************************
C
      COMMON/CONTROL/CLS
C
C --- GLOSSARY OF VARIABLES
C --- NAME      USE     TYPE     RANGE          DEFINITION
C     ANSWER    UI,U    CHAR*1   ANY            USER'S RESPONSE
C     CLS       UO      INT      12             CLEAR SCREEN CHARACTER
C     I         M       INT      ANY            COUNTER
C     LINE      FI,UO   CHAR*80  ANY            LINE OF TEXT FROM HELP FILE
C     MENU      U       INT      ANY            MENU NUMBER (FROM CALLING PROC.)
C     NAME      M       CHAR*15  ANY            NAME OF HELP FILE
C     NLINES    I,U     INT      ANY (24)       NUMBER OF LINES ON TERMINAL
      INTEGER MENU,
     *        CLS,
     *        NLINES/24/,
     *        I
      CHARACTER*1 ANSWER
      CHARACTER*80 LINE
      CHARACTER*15 NAME
C
C D   WRITE(6,*)('ENTERING SUBROUTINE NHELP')
      WRITE(6,1)
1     FORMAT(//12X,'HELP'/
     * ' 1 -- GENERAL HINTS'/
     * ' 2 -- HELP WITH CURRENT MENU'//
     * ' PLEASE ENTER CHOICE[1]:')
      READ (5,2)(ANSWER)
2     FORMAT(A)
      IF (ANSWER.EQ.'2') THEN
        NAME='GENERAL.TXT'
        IF (MENU.EQ.0) THEN
          NAME='MOO.TXT'
        ELSE IF (MENU.EQ.11) THEN
          NAME='M11.TXT'
        ELSE IF (MENU.EQ.12) THEN
          NAME='M12.TXT'
        ELSE IF (MENU.EQ.13) THEN
          NAME='M13.TXT'
        ELSE IF (MENU.EQ.141) THEN
          NAME='M141.TXT'
        ELSE IF (MENU.EQ.142) THEN
          NAME='M142.TXT'
        ELSE IF (MENU.EQ.15) THEN
          NAME='M15.TXT'
        END IF
      ELSE
C ***   GENERAL HELP
        NAME='GENERAL.TXT'
      END IF
        WRITE(6,3)(CLS,CLS,CLS)
3       FORMAT(1X,A1,A1,A1/)
        OPEN (UNIT=10,FILE=NAME,STATUS='OLD',ERR=777)
780     CONTINUE
        DO I=4,NLINES
          READ(10,22,ERR=777,END=781)(LINE)
22        FORMAT(A)
          WRITE(6,*)(LINE)
23        FORMAT(1X,A)
        END DO
        WRITE(6,*)('HIT RETURN TO CONTINUE OR ANY KEY TO RETURN TO MENU')
        READ(5,2)(ANSWER)
        IF (ANSWER.EQ.' ') GOTO 780
        GOTO 778
781     CONTINUE
        WRITE(6,*)('HIT RETURN TO CONTINUE')
        READ(5,2)(ANSWER)
        GOTO 778
777     WRITE(6,*)('ERROR IN HELP FILE')
778     CONTINUE
C D   WRITE(6,*)('LEAVING SUBROUTINE NHELP')
      CLOSE (UNIT=10)
      RETURN
      END
```

PROGRAM SECTIONS

	Name	Bytes	Attributes
0	$CODE	563	PIC CON REL LCL SHR EXE RD NOWRT LONG
1	$PDATA	259	PIC CON REL LCL SHR NOEXE RD NOWRT LONG
2	$LOCAL	188	PIC CON REL LCL NOSHR NOEXE RD WRT LONG
3	CONTROL	4	PIC OVR REL GBL SHR NOEXE RD WRT LONG
	Total Space Allocated	1014	

ENTRY POINTS

Address	Type	Name	References
0-00000000		NHELP	1#

VARIABLES

Address	Type	Name	Attributes	References							
2-00000000	CHAR	ANSWER		22	32=	34	66=	67	71=		
3-00000000	I*4	CLS	COMM	7	18	55(3)					
**	I*4	I		18	59=						
2-00000001	CHAR	LINE		23	60=	62					
AP-00000004@	I*4	MENU		1	18	36	38	40	42	44	46
				48							
2-00000051	CHAR	NAME		24	35=	37=	39=	41=	43=	45=	47=
				49=	53=	57A					
2-00000060	I*4	NLINES		18D	59						

LABELS

Address	Label	References			
1-00000058	1'	27	28#		
1-000000B7	2'	32	33#	66	71
1-000000B9	3'	55	56#		
1-000000C3	22'	60	61#		
**	23'	63#			
0-00000210	777	57	60	73#	
0-0000022A	778	68	72	74#	
**	780	58#	67		
0-000001D4	781	60	69#		

FUNCTIONS AND SUBROUTINES REFERENCED

Type	Name	References
	FOR$CLOSE	76
	FOR$OPEN	57

```
      SUBROUTINE NSAVE
C *** ***************************************************************
C *** * SAVES RANKING INFORMATION IN AN EXTERNAL FILE FOR LATER RECALL*
C *** * ALSO ALLOWS USER TO PRINT RESULTS IF HE OR SHE SO DESIRES.   *
C *** ***************************************************************
C
      COMMON/USER/NPURP(5),UNAME,ORGZ
      COMMON/HEAD/MODEL,NPROJS,NATTRS
      COMMON/MAX/MAXPRJ,MAXATR
      COMMON/PR1/PRNAME(200)
      COMMON/PRO/PRMATR(200,200),PRWTS(200)
      COMMON/AT1/ATNAME(20),ATMATR(20,20),ATWTS(20)
      COMMON/BIGPROJ/ATRPRO(200,200,20)
      COMMON/BIGWTS/WTMTX(200,20)
C
C --- GLOSSARY OF VARIABLES
C --- NAME       USE      TYPE      RANGE            DEFINITION
C --- ANSWER     UI,U     CHAR*2    ANY              USER'S ANSWER TO QUESTIONS
C --- ATMATR     FO       REAL      0 & UP           ATTRIBUTE COMPARISONS
C                         (MAXATR,MAXATR)
C --- ATNAME     FO       CHAR*24 ANY                ATTRIBUTE NAMES
C                         (MAXATR)
C --- ATRPRO     FO       REAL      0 & UP           PROJ COMP. FOR EA. ATTRIBUTE
C                         (MAXPRJ,MAXPRJ,MAXATR)
C --- ATWTS      FO       REAL      0 - 1.0          ATTRIBUTE WEIGHTS
C --- FILENAME   UI,U     CHAR*24 ANY                NAME OF OUTPUT FILE
C --- I          M        INT       ANY              COUNTER
C --- J          M        INT       ANY              COUNTER
C --- K          M        INT       ANY              COUNTER
C --- L          M        INT       ANY              COUNTER
C --- MAXATR     U,FO     INT       20               MAX NUMBER OF ATTRIBUTES
C --- MAXPRJ     U,FO     INT       200              MAX NUMBER OF PROJECTS
C --- MODEL      FO       INT       1-5              MODEL NUMBER
C --- NATTRS     FO,U     INT       1                NUMBER OF ATTRIBUTES
C --- NPROJS     FO,U     INT       2-MAXPRJ         NUMBER OF PROJECTS
C --- NPURP      FO       CHAR*80 ANY                PURPOSE
C                         (5)
C --- ORGZ       FO       CHAR*80 ANY                ORGANIZATION
C --- OTFILE     I,U      INT       10               OUTPUT FILE UNIT
C --- PRMATR     FO       REAL      NON NEGATIVE     PROJECT COMPARISONS
C                         (MAXPRJ,MAXPRJ)
C --- PRNAME     FO       CHAR*24 ANY                PROJECT NAMES
C                         (MAXPRJ)
C --- PRWTS      FO       REAL      0-1.0            PROJECT WEIGHTS
C                         (MAXPRJ)
C --- UNAME      FO       CHAR*80 ANY                USER'S NAME
C --- WTMTX      FO       REAL
C                         (MAXPRJ,MAXATR)            PROJECT WEIGHTS FOR EA. ATR.
      REAL       PRMATR,
     *           PRWTS,
     *           ATMATR,
     *           WTMTX,
     *           ATWTS,
     *           ATRPRO
      INTEGER    MODEL,
     *           NPROJS,
     *           NATTRS,
     *           MAXPRJ,
     *           MAXATR,
     *           OTFILE/10/,
     *           I,J,K,L
      CHARACTER*24       ATNAME,
     *                   PRNAME
      CHARACTER*80       NPURP,
     *                   UNAME,
     *                   ORGZ,
     *                   FILENAME
      CHARACTER*1        ANSWER
C
C D   WRITE(6,*)('ENTERING SUBROUTINE NSAVE, NATTRS=',NATTRS)
      WRITE(6,*)('ENTER NAME OF OUTPUT FILE')
      READ(5,21)(FILENAME)
21    FORMAT(A)
      OPEN (UNIT=OTFILE,FILE=FILENAME,STATUS='NEW')
      WRITE(OTFILE,1)(UNAME)
1     FORMAT(' =OO1NAME:'/5X,A)
      WRITE(OTFILE,2)(ORGZ)
2     FORMAT(' =OO2ORGANIZATION:'/5X,A)
      WRITE(OTFILE,3)(NPURP(I),I=1,5)
```

```
3       FORMAT(' =003PURPOSE:'5(/5X,A))
        WRITE(OTFILE,4)(MODEL)
4       FORMAT(' =004MODEL TYPE (1-5):'/5X,I1)
        WRITE(OTFILE,5)(MAXPRJ,NPROJS)
5       FORMAT(' =005NUMBER OF PROJECTS(1-',I3,'):'/5X,I3)
        WRITE(OTFILE,6)(MAXATR,NATTRS)
6       FORMAT(' =006NUMBER OF ATTRIBUTES(1-',I3,'):'/5X,I3)
        WRITE(OTFILE,7)(I,ATNAME(I),I=1,NATTRS)
7       FORMAT(' =007NUMBER AND NAME OF ATTRIBUTES'20(/5X,I3,1X,A))
        WRITE(OTFILE,999)
999     FORMAT(' 999999')
        WRITE(OTFILE,88)
88      FORMAT(' =008ATTRIBUTE MATRIX (N X N WHERE N IS # OF ATTRIBUTES):')
        DO I=1,NATTRS
          WRITE(OTFILE,8)(ATMATR(I,J),J=1,NATTRS)
8         FORMAT(5X,8(F12.8,1X))
        END DO
        WRITE(OTFILE,999)
        WRITE(OTFILE,9)(ATWTS(I),I=1,NATTRS)
9       FORMAT(' =009ATTRIBUTE WEIGHTS (SAME ORDER AS NAMES):'/
     *    5X,20(F10.8,1X))
        WRITE(OTFILE,10)(I,PRNAME(I),I=1,NPROJS)
10      FORMAT(' =010NUMBER AND NAME OF PROJECTS:',
     *    200(/5X,I3,1X,A))
        WRITE(OTFILE,999)
        L=11
        DO I=1,NATTRS
          WRITE(OTFILE,11)(L,I)
11        FORMAT(' =',I3,'PROJECT MATRIX FOR ATTRIBUTE #',I3,':')
          DO J=1,NPROJS
            WRITE(OTFILE,111)(ATRPRO(J,K,I),K=1,NPROJS)
111         FORMAT(5X,8(F12.8,1X))
          END DO
          WRITE(OTFILE,999)
          L=L+1
          WRITE(OTFILE,675)(L,I)
675       FORMAT(' =',I3,'PROJECT WEIGHTS FOR ATTRIBUTE #',I3,'(SAME ORDER ',
     *      'AS NAMES):')
          WRITE(OTFILE,13)(WTMTX(J,I),J=1,NPROJS)
          L=L+1
        END DO
        WRITE(OTFILE,12)(L)
12      FORMAT(' =',I3,'FINAL PROJECT WEIGHTS:(SAME ORDER AS NAMES)')
        WRITE(OTFILE,13)(PRWTS(I),I=1,NPROJS)
13      FORMAT(5X,8(F10.8,1X))
        WRITE(OTFILE,999)
        WRITE(6,*)('WOULD YOU CARE FOR A PRINTED COPY (Y/N) ? [N]')
        READ(5,235)(ANSWER)
235     FORMAT(A)
        IF (ANSWER.EQ.'Y'.OR.ANSWER.EQ.'y') THEN
          CLOSE (UNIT=OTFILE,STATUS='PRINT')
        ELSE
          CLOSE (UNIT=OTFILE)
        END IF
C D     WRITE(6,*)('LEAVING SUBROUTINE NSAVE')
        RETURN
        END
```

PROGRAM SECTIONS

	Name	Bytes	Attributes
0	$CODE	1197	PIC CON REL LCL SHR EXE RD NOWRT LONG
1	$PDATA	687	PIC CON REL LCL SHR NOEXE RD NOWRT LONG
2	$LOCAL	200	PIC CON REL LCL NOSHR NOEXE RD WRT LONG
3	USER	560	PIC OVR REL GBL SHR NOEXE RD WRT LONG
4	HEAD	12	PIC OVR REL GBL SHR NOEXE RD WRT LONG
5	MAX	8	PIC OVR REL GBL SHR NOEXE RD WRT LONG
6	PR1	4800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
7	PRO	160800	PIC OVR REL GBL SHR NOEXE RD WRT LONG
8	AT1	2160	PIC OVR REL GBL SHR NOEXE RD WRT LONG
9	BIGPROJ	3200000	PIC OVR REL GBL SHR NOEXE RD WRT LONG
10	BIGWTS	16000	PIC OVR REL GBL SHR NOEXE RD WRT LONG
	Total Space Allocated	3386424	

ENTRY POINTS

Address	Type	Name	References
0-00000000		NSAVE	1#

VARIABLES

Address	Type	Name	Attributes	References							
2-00000050	CHAR	ANSWER		68	127=	129(2)					
2-00000000	CHAR	FILENAME		64	72=	74A					
**	I*4	I		55	79(2)=	87(3)=	93=	94	98(2)=	101(3)=	106=
				107	110	115	118	123(2)=			
**	I*4	J		55	94(2)=	109=	110	118(2)=			
**	I*4	K		55	110(2)=						
**	I*4	L		55	105=	107	114(2)=	115	119(2)=	121	
5-00000004	I*4	MAXATR	COMM	9	55	85					
5-00000000	I*4	MAXPRJ	COMM	9	55	83					
4-00000000	I*4	MODEL	COMM	8	55	81					
4-00000008	I*4	NATTRS	COMM	8	55	85	87	93	94	98	106
4-00000004	I*4	NPROJS	COMM	8	55	83	101	109	110	118	123
3-000001E0	CHAR	ORGZ	COMM	7	64	77					
2-00000054	I*4	OTFILE		55D	74A	75	77	79	81	83	85
				87	89	91	94	97	98	101	104
				107	110	113	115	118	121	123	125
				130A	132A						
3-00000190	CHAR	UNAME	COMM	7	64	75					

ARRAYS

Address	Type	Name	Attributes	Bytes	Dimensions	References		
8-000001E0	R*4	ATMATR	COMM	1600	(20, 20)	12	49	94
8-00000000	CHAR	ATNAME	COMM	480	(20)	12	62	87
9-00000000	R*4	ATRPRO	COMM	3200000	(200, 200, 20)	13	49	110
8-00000820	R*4	ATWTS	COMM	80	(20)	12	49	98
3-00000000	CHAR	NPURP	COMM	400	(5)	7	64	79
7-00000000	R*4	PRMATR	COMM	160000	(200, 200)	11	49	
6-00000000	CHAR	PRNAME	COMM	4800	(200)	10	62	101
7-00027100	R*4	PRWTS	COMM	800	(200)	11	49	123
10-00000000	R*4	WTMTX	COMM	16000	(200, 20)	14	49	118

LABELS

Address	Label	References	
1-00000048	1'	75	76#
1-00000059	2'	77	78#
1-00000072	3'	79	80#
1-0000008B	4'	81	82#
1-000000A9	5'	83	84#
1-000000D1	6'	85	86#

1-000000FB	7'	87	88#				
1-00000173	8'	94	95#				
1-00000180	9'	98	99#				
1-000001BD	10'	101	102#				
1-000001EF	11'	107	108#				
1-0000026C	12'	121	122#				
1-000002A0	13'	118	123	124#			
1-00000046	21'	72	73#				
1-00000137	88'	91	92#				
1-0000021B	111'	110	111#				
1-000002AD	235'	127	128#				
1-00000228	675'	115	116#				
1-0000012D	999'	89	90#	97	104	113	125

FUNCTIONS AND SUBROUTINES REFERENCED

Type	Name	References	
	FOR$CLOSE	130	132
	FOR$OPEN	74	

```
C
      SUBROUTINE OUTSPC(  LSTALL)
C
C
C --- ***********************************************************************
C --- OUTSPC 0.1
C --- SUBROUTINE OUTSPC(K) IS A LINDO SUBROUTINE CALLED BY LINDO
C --- SUBROUTINE GO TO PRODUCE AN OUTPUT REPORT.  THIS ROUTINE HAS BEEN
C --- MODIFIED TO SUPPRESS WRITE STATEMENTS AND ASSIGN OBJECTIVE
C --- FUNCTION VALUE AND PROJECT OR ATTRIBUTE WEIGHTS TO VARIABLES IN
C --- USER COMMON BLOCKS
C --- ***********************************************************************
C
C --- ###WARNING TO PROGRAMMERS
C --- MAKE MINIMAL CHANGES IN THIS LINDO SYSTEM SUBROUTINE
C --- SUPPRESS PRINTED OUTPUT
C --- STORE NEEDED VALUES IN ARRAYS FOR LATER OUTPUT
C --- ***DO NOT CHANGE ANY LINDO COMMON BLOCK VARIABLES***
C
C --- MODIFIED BY:  M. L. PADGETT
C --- DATE MODIFIED:  AUGUST 8, 1984
C
C  PRINT A SOLUTION REPORT
C  INPUTS:
C    LSTALL = 1; STANDARD REPORT;  0; NONZEROES ONLY
C   OUTSPC CALLS: GETPRC; REPROW; PRTRNM; QCPOBJ; REPVAR; PRTVNM;
CLONE BLANK
      INTEGER*2 NOWIN
C-32KCOLS       INTEGER*2 JBASIC
      COMMON IPVT,JPVT,MXROW,ZVAL,MINP,MROW,NINT,NXTPVT,NEGATE,INTGR
      COMMON LEVEL,ZBAR,EPSLON,MJRIT,MDLIT,LPLIM,MAXIT,ONE
      COMMON FINITY,INFAM,PURE,MRO,K32,LTRACE,PMIX,INFEAS,ONEPLS
      COMMON IOFREQ,EPCOL,EPRHS,DELTA,ONEDEL,DETERM,NMUL,MAXMUL
      COMMON NUSED,MINOUT,NC,NSKIP,NTI,NTF,LASTCK,NEGSRQ,M3,LIMRNV
      COMMON BMAX,ITRATE,MXCOLS,MXELS,MXINTS,IDTRM,ZINV,SBJPVT
      COMMON NTRNEG,REDCST,ILLKND,PSTORE,UNSAT,NOCUT,SPACE(4)
      COMMON JBASIC(1100),BHAT(1100),AHAT(1100),ALPHA(1100)
      COMMON NOWIN(4000),INDEX(980),BOUND(980),JVAL(980)
      COMMON SUB(4000),ESTUP(980),ESTOWN(980),NZLIST(1100)
CLOSE BLANK
CLONE QCOMP
      COMMON /QCOMP/ LEMKE, JOUT, JART
CLOSE QCOMP
CLONE VARN
      DOUBLE PRECISION VARNAM
      COMMON /VARN/ VARNAM(4000)
      DOUBLE PRECISION ROWNAM
      COMMON /ROWN/ NORONM, ROWNAM(1100)
CLOSE VARN
CLONE VUBLP
CIBM  INTEGER*2 ISROW
C-32KNONZ       INTEGER*2 JCOLFR
      COMMON /VUBLP/ M, N, MPSNAM, INEQLT(240), LASTK, B(1100),
     * A(26000), ISROW(26000), JCOLFR(4000), LST2, NCOL
CLOSE VUBLP
CLONE IOVARS
      COMMON /IOVARN/ LINPUT, LOUT, IFBAT, NCPVAR, LOCUR,
     1 LLGTH, NEXTBL, LOCSGN, LINLEN, LTERM, KRPTIK
C-FORT77        CHARACTER*1 NULL, INLINE, MNSPLS, KALFNM, KOMENT, KHSTAR
      COMMON /IOVARK/ NULL, KOMENT, KHSTAR, MNSPLS(7), KALFNM(36),
     * INLINE(132)
CLOSE IOVARS
C --- USER COMMON
C --- USER COMMON
      COMMON/CONST/OBJ
      COMMON/HEAD/MODEL,NPROJS,NATTRS
      COMMON/COST2/COBJ,FCOST(200)
C --- USER COMMON
C --- USER COMMON
      DOUBLE PRECISION TMPVAR
C-FORT77        CHARACTER*1 LINOUT
      DIMENSION LINOUT(8)
C
C --- GLOSSARY OF VARIABLES:
C
C --- NAME      USE      TYPE       RANGE       DEFINITION
C
C --- ALPRWT:   M        REAL       (0.-1.)     ALPRWT(I,J) = WEIGHT OF
C ---                   (MAXPRJ X MAXATR)      PROJECT I WRT ATTRIBUTE J
```

```
C --- ATFLAG:  U       INT        (Y/N)       IF YES, MODEL 4 AND NOW
C --- ATNUM:   U       INT        (O-NATTRS)  IF O NOT PROCESSING
C --- ATNAME:  N       INT        (ANY)       ATTRIBUTE NAMES ARRAY
C --- ATMATR:  N       INT        (O-9)       FINAL ATTRIBUTE
C --- ATWTS:   M       REAL       (O.-1.)     ATTRIBUTE WEIGHT ARRAY
C --- COBJ:    M       REAL       (O.-LARGE)  COST MODEL OBJECTIVE VALUE
C --- FCOST:   M       REAL       (O./1.)     FUND PROJECT(I) IF FCOST(I)
C --- KK:      I,M     INT        INTEGER     COUNTER
C --- MODEL:   I       INT        (1-5)       MODEL NUMBER
C --- NATTRS:  I       INT        (1-MAXATR)  NUMBER OF ATTRIBUTES
C --- NO:      I,U     INT        ('N')       NO
C --- NPROJS:  I       INT        (1-MAXPRJ)  NUMBER OF PROJECTS
C --- NVOTER:  I       INT        (1-5)       NUMBER OF FUTURE VOTERS
C --- NUM:     I,M     INT        INTEGER     NUMBER OF ATTRIBUTES OR PROJ
C --- OBJ:     M       REAL       (O-LARGE)   OBJECTIVE FUNCTION VALUE
C --- PRMATR:  I       INT        (O-9)       CURRENT PROJECT MATRIX
C --- PRWTS:   I       REAL       (O.-1.)     CURRENT PROJECT WTS
C --- W:       I       INT        ('W')       W
C --- X:       I       INT        ('X')       X
C --- YES:     I       INT        ('Y')       YES
C
      INTEGER ATFLAG,
     *        ALSO2,
     *        ATNUM,
     *        FFLAG,
     *        MODEL,
     *        NVOTER,
     *        NO,
     *        NPROJS,
     *        NATTRS,
     *        ATNAME,
     *        ATMATR,
     *        PRMATR
      INTEGER W,
     *        X,
     *        NUM,
     *        YES
      REAL ALPRWT,
     *     ATWTS,
     *     COBJ,
     *     FCOST,
     *     PRWTS,
     *     OBJ
      DATA W/'W'/,
     *     NO/'N'/,
     *     X/'X'/,
     *     YES/'Y'/
      NUM = O
C
C --- END USER VARIABLES
C
CLONE DATE
C  DATE 11 FEB 83
CLOSE DATE
C
C 100 FORMAT(' ','ENTERING SUBROUTINE OUTSPC','OBJ=',F18.8)
C
C --- RESULTS IMPRESSION
C
C     WRITE( LOUT, 501)
C  RECALC OBJ IF THIS IS A OP
      IF ( LEMKE .GT. 1) CALL OCPOBJ
C  COPY SHORT OUTPUT TO TERMINAL IF IT IS NOT OUTPUT UNIT
C     IF ( LTERM .NE. LOUT) WRITE( LTERM, 501)
      SUMAT = BHAT( MXROW)
      IF ( LEMKE .LE. O) SUMAT = - SUMAT* INEQLT( MXROW)
C     WRITE( LOUT, 4) MXROW, SUMAT
```

```
C
C --- USER STORAGE OF OBJECTIVE FUNCTION VALUE
C
      OBJ = SUMAT
      COBJ = SUMAT
C
      IF ( LTERM .NE. LOUT) WRITE( LTERM, 4) MXROW, SUMAT
    4 FORMAT(I3,')          ',G17.9)
      IF (LTRACE .LE. -5) GO TO 399
C  SAVE CURRENT VALUE OF INFEAS
      ISAVE = INFEAS
      CALL GETPRC
C  RESTORE INFEAS  VALUE
      INFEAS = ISAVE
      IF ( LTRACE .LE. -3) GO TO 310
C     WRITE( LOUT,103)
C 103 FORMAT(/1X,'VARIABLE',7X,'  VALUE',10X,'REDUCED COST')
C
C --- LOOP TO GET VARIABLE NAME, VALUE
C
      KK = 0
      DO  250 J = 1, N
      JARG = J
      CALL REPVAR( JARG, BHATJ, SUMAT)
      IF ( BHATJ .EQ. 0. .AND. LSTALL .EQ. 0) GO TO 250
      CALL PRTVNM( JARG, JARG, 1, LINOUT)
C
C --- USER STORAGE OF VALUE FOR W001,W002,...WNNN IN THAT ORDER
C --- *** ASSUMES PROJECT WEIGHTS ARE NAMED WITH EXACTLY ONE W
C ---     AND ARE ENTERED TO LINDO IN THE ORDER W1,W2,... AS IN
C ---     SUBROUTINE MOD1
C
      IF (MODEL .EQ. 5) GO TO 300
      GOTO 3
C
C ---    NUM IS NUMBER OF PROJECTS
C
  300    CONTINUE
         NUM = NPROJS
C
                FCOST(J ) = BHATJ
C        WRITE(6,102) FCOST(J),BHATJ
C 102    FORMAT(' ',F5.3,F5.3)
    3    CONTINUE
C     WRITE( LOUT, 207)( LINOUT(I),I=1,8), BHATJ, SUMAT
C207  FORMAT(2X,8A1,1X,F16.6,2X,F16.6)
  250 CONTINUE
C     CONTINUE
  310 CONTINUE
C     WRITE( LOUT, 320)
C 320 FORMAT(/7,'    ROW       SLACK OR SURPLUS      DUAL PRICES')
C  IF FOR SOME STRANGE REASON THERE ARE NO CONSTRAINTS...
      IF ( M .LE. 1) GO TO 399
      DO 380 I = 2, M
      IARG = I
      CALL REPROW( IARG, PRIMAL, DUAL)
C  CHECK IF WE ONLY WANT NONZERO OUTPUT
      IF ( DUAL .EQ. 0. .AND. LSTALL .EQ. 0) GO TO 380
      CALL PRTRNM( IARG, LINOUT)
C     WRITE( LOUT,370) ( LINOUT( K), K = 1, NCPVAR), PRIMAL, DUAL
  370 FORMAT(1X,8A1,')          ,F16.6,2X,F16.6)
  380  CONTINUE
  399 CONTINUE
C     WRITE( LOUT,400) MDLIT
  400 FORMAT(/,' NO. ITERATIONS=',I8)
C     IF ( NINT .GT. 0) WRITE(LOUT,410) MJRIT,DETERM,IDTRM
  410 FORMAT(' BRANCHES=',I5,' DETERM.=',F7.3,'E',I3)
  501 FORMAT(/,10X,'OBJECTIVE FUNCTION VALUE'    /)
C     WRITE(6,101) OBJ
  101 FORMAT(' ','LEAVING SUBROUTINE OUTSPC','OBJ=',F18.8)
      RETURN
      END
```

PROGRAM SECTIONS

	Name	Bytes	Attributes
0	$CODE	315	PIC CON REL LCL SHR EXE RD NOWRT LONG
1	$PDATA	19	PIC CON REL LCL SHR NOEXE RD NOWRT LONG
2	$LOCAL	128	PIC CON REL LCL NOSHR NOEXE RD WRT LONG
3	$BLANK	65852	PIC OVR REL GBL SHR NOEXE RD WRT LONG
4	OCOMP	12	PIC OVR REL GBL SHR NOEXE RD WRT LONG
5	VARN	32000	PIC OVR REL GBL SHR NOEXE RD WRT LONG
6	ROWN	8804	PIC OVR REL GBL SHR NOEXE RD WRT LONG
7	VUBLP	229384	PIC OVR REL GBL SHR NOEXE RD WRT LONG
8	IOVARN	44	PIC OVR REL GBL SHR NOEXE RD WRT LONG
9	IOVARK	712	PIC OVR REL GBL SHR NOEXE RD WRT LONG
10	CONST	4	PIC OVR REL GBL SHR NOEXE RD WRT LONG
11	HEAD	12	PIC OVR REL GBL SHR NOEXE RD WRT LONG
12	COST2	804	PIC OVR REL GBL SHR NOEXE RD WRT LONG
	Total Space Allocated	338090	

ENTRY POINTS

Address	Type	Name	References
0-00000000		OUTSPC	2#

VARIABLES

Address	Type	Name	Attributes	References		
**	R*4	ALPRWT		129		
**	I*4	ALSD2		113		
**	I*4	ATFLAG		113		
**	I*4	ATMATR		113		
**	I*4	ATNAME		113		
**	I*4	ATNUM		113		
**	R*4	ATWTS		129		
2-0000002C	R*4	BHATJ		182A	183	199
3-00000064	R*4	BMAX	COMM	35		
12-00000000	R*4	COBJ	COMM	67	129	163=
3-00000078	R*4	DELTA	COMM	33		
3-00000080	R*4	DETERM	COMM	33		
2-0000003C	R*4	DUAL		214A	216	
3-00000070	R*4	EPCOL	COMM	33		
3-00000074	R*4	EPRHS	COMM	33		
3-00000030	R*4	EPSLON	COMM	31		
**	I*4	FFLAG		113		
3-00000048	R*4	FINITY	COMM	32		
**	I*4	I		212=	213	
2-00000034	I*4	IARG		213=	214A	217A
3-000000C8	I*4	IDTRM	COMM	35		
8-00000008	I*4	IFBAT	COMM	57		
3-000000DC	I*4	ILLKND	COMM	36		
3-0000004C	I*4	INFAM	COMM	32		
3-00000064	I*4	INFEAS	COMM	32	169	172=
3-00000024	I*4	INTGR	COMM	30		
3-0000006C	I*4	IOFREQ	COMM	33		
3-00000000	I*4	IPVT	COMM	30		
**	I*4	ISAVE		169=	172	
3-000000B8	I*4	ITRATE	COMM	35		
**	I*4	J		180=	181	199
2-00000028	I*4	JARG		181=	182A	184(2)A
4-00000008	I*4	JART	COMM	42		
4-00000004	I*4	JOUT	COMM	42		
3-00000004	I*4	JPVT	COMM	30		
3-00000058	I*4	K32	COMM	32		
9-00000008	I*4	KHSTAR	COMM	60		
**	I*4	KK		179=		
9-00000004	I*4	KOMENT	COMM	60		
8-00000028	I*4	KRPTIK	COMM	57		

3-000000A4	I*4	LASTCK	COMM	34			
7-000003CC	I*4	LASTK	COMM	53			
4-00000000	I*4	LEMKE	COMM	42	153	157	
3-00000028	I*4	LEVEL	COMM	31			
3-000000B0	I*4	LIMRNV	COMM	34			
8-00000020	I*4	LINLEN	COMM	57			
8-00000000	I*4	LINPUT	COMM	57			
8-00000014	I*4	LLGTH	COMM	57			
8-0000001C	I*4	LOCSGN	COMM	57			
8-00000010	I*4	LOCUR	COMM	57			
8-00000004	I*4	LOUT	COMM	57	165		
3-0000003C	I*4	LPLIM	COMM	31			
7-00038000	I*4	LST2	COMM	53			
AP-00000004●	I*4	LSTALL		2	183	216	
8-00000024	I*4	LTERM	COMM	57	165(2)		
3-0000005C	I*4	LTRACE	COMM	32	167	173	
7-00000000	I*4	M	COMM	53	211	212	
3-000000AC	I*4	M3	COMM	34			
3-00000040	I*4	MAXIT	COMM	31			
3-00000088	I*4	MAXMUL	COMM	33			
3-00000038	I*4	MDLIT	COMM	31			
3-00000090	I*4	MINOUT	COMM	34			
3-00000010	I*4	MINP	COMM	30			
3-00000034	I*4	MJRIT	COMM	31			
11-00000000	I*4	MODEL	COMM	66	113	191	
7-00000008	I*4	MPSNAM	COMM	53			
3-00000054	I*4	MRO	COMM	32			
3-00000014	I*4	MROW	COMM	30			
3-000000BC	I*4	MXCOLS	COMM	35			
3-000000C0	I*4	MXELS	COMM	35			
3-000000C4	I*4	MXINTS	COMM	35			
3-00000008	I*4	MXROW	COMM	30	156	157	165
7-00000004	I*4	N	COMM	53	180		
11-00000008	I*4	NATTRS	COMM	66	113		
3-00000094	I*4	NC	COMM	34			
7-00038004	I*4	NCOL	COMM	53			
8-0000000C	I*4	NCPVAR	COMM	57			
3-00000020	I*4	NEGATE	COMM	30			
3-000000A8	I*4	NEGSRO	COMM	34			
8-00000018	I*4	NEXTBL	COMM	57			
3-00000018	I*4	NINT	COMM	30			
3-00000084	I*4	NMUL	COMM	33			
**	I*4	NO		113	135D		
3-000000E8	I*4	NOCUT	COMM	36			
6-00000000	I*4	NORONM	COMM	48			
11-00000004	I*4	NPROJS	COMM	66	113	197	
3-00000098	I*4	NSKIP	COMM	34			
3-000000A0	I*4	NTF	COMM	34			
3-0000009C	I*4	NTI	COMM	34			
3-000000D4	I*4	NTRNEG	COMM	36			
9-00000000	I*4	NULL	COMM	60			
**	I*4	NUM		125	139=	197=	
3-0000008C	I*4	NUSED	COMM	34			
**	I*4	NVOTER		113			
3-0000001C	I*4	NXTPVT	COMM	30			
10-00000000	R*4	OBJ	COMM	65	129	162=	
3-00000044	R*4	ONE	COMM	31			
3-0000007C	R*4	ONEDEL	COMM	33			
3-00000068	R*4	ONEPLS	COMM	32			
3-00000060	R*4	PMIX	COMM	32			
2-00000038	R*4	PRIMAL		214A			
**	I*4	PRMATR		113			
**	R*4	PRWTS		129			
3-000000E0	R*4	PSTORE	COMM	36			
3-00000050	R*4	PURE	COMM	32			

3-00000008	R*4	REDCST	COMM	36					
3-00000000	R*4	SBJPVT	COMM	35					
2-00000020	R*4	SUMAT		156=	157(2)=	162	163	165	182A
**	R*8	TMPVAR		70					
3-000000E4	R*4	UNSAT	COMM	36					
**	I*4	W		125	135D				
**	I*4	X		125	135D				
**	I*4	YES		125	135D				
3-0000002C	R*4	ZBAR	COMM	31					
3-000000CC	R*4	ZINV	COMM	35					
3-0000000C	R*4	ZVAL	COMM	30					

ARRAYS

Address	Type	Name	Attributes	Bytes	Dimensions	References		
7-00001500	R*4	A	COMM	104000	(26000)	53		
3-0000235C	R*4	AHAT	COMM	4400	(1100)	37		
3-0000348C	R*4	ALPHA	COMM	4400	(1100)	37		
7-000003D0	R*4	B	COMM	4400	(1100)	53		
3-0000122C	R*4	BHAT	COMM	4400	(1100)	37	156	
3-0000744C	R*4	BOUND	COMM	3920	(980)	38		
3-0000E08C	R*4	ESTDWN	COMM	3920	(980)	39		
3-0000D16C	R*4	ESTUP	COMM	3920	(980)	39		
12-00000004	R*4	FCOST	COMM	800	(200)	67	129	199=
3-000064FC	I*4	INDEX	COMM	3920	(980)	38		
7-0000000C	I*4	INEQLT	COMM	960	(240)	53	157	
9-00000088	I*4	INLINE	COMM	528	(132)	60		
7-0001A840	I*4	ISROW	COMM	104000	(26000)	53		
3-000000FC	I*4	JBASIC	COMM	4400	(1100)	37		
7-00034180	I*4	JCOLFR	COMM	16000	(4000)	53		
3-0000839C	I*4	JVAL	COMM	3920	(980)	38		
9-00000028	I*4	KALFNM	COMM	144	(36)	60		
2-00000000	I*4	LINOUT		32	(8)	72	184A	217A
9-0000000C	I*4	MNSPLS	COMM	28	(7)	60		
3-000045BC	I*2	NOWIN	COMM	8000	(4000)	28	38	
3-0000F00C	I*4	NZLIST	COMM	4400	(1100)	39		
6-00000004	R*8	ROWNAM	COMM	8800	(1100)	47	48	
3-000000EC	R*4	SPACE	COMM	16	(4)	36		
3-000092EC	R*4	SUB	COMM	16000	(4000)	39		
5-00000000	R*8	VARNAM	COMM	32000	(4000)	45	46	

LABELS

Address	Label	References		
0-000000F5	3	192	202#	
1-00000004	4	165	166#	
**	101	228#		
0-000000F5	250	180	183	205#
0-000000EC	300	191	196#	
0-000000F9	310	173	207#	
**	370	219#		
0-00000136	380	212	216	220#
0-0000013A	399	167	211	221#
**	400	223#		
**	410	225#		
**	501	226#		

FUNCTIONS AND SUBROUTINES REFERENCED

Type	Name	References
	GETPRC	170
	PRTRNM	217
	PRTVNM	184
	QCPOBJ	153

```
        REPROW                                  214

        REPVAR                                  182

  +-----------------------------------------------+
  |          KEY TO REFERENCE FLAGS               |
  |   =    - Value Modified                       |
  |   #    - Defining Reference                   |
  |   A    - Actual Argument, possibly modified   |
  |   D    - Data Initialization                  |
  |  (n)   - Number of occurrences on line        |
  +-----------------------------------------------+

COMMAND QUALIFIERS

  FORT/LIST/CROSS AUUSER12

  /CHECK=(NOBOUNDS,OVERFLOW,NOUNDERFLOW)
  /DEBUG=(NOSYMBOLS,TRACEBACK)
  /STANDARD=(NOSYNTAX,NOSOURCE_FORM)
  /SHOW=(NOPREPROCESSOR,NOINCLUDE,MAP,NODICTIONARY,SINGLE)
  /WARNINGS=(GENERAL,NODECLARATIONS)
  /CONTINUATIONS=19  /CROSS_REFERENCE  /NOD_LINES  /NOEXTEND_SOURCE  /F77
  /NOG_FLOATING  /I4  /NOMACHINE_CODE  /OPTIMIZE

COMPILATION STATISTICS

  Run Time:            95.43 seconds
  Elapsed Time:        357.15 seconds
  Page Faults:         7231
  Dynamic Memory:      1544 pages
```

COLBURN END OF LIST COLBURN END OF LIST COLBURN

COLBURN END OF LIST COLBURN END OF LIST COLBURN

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