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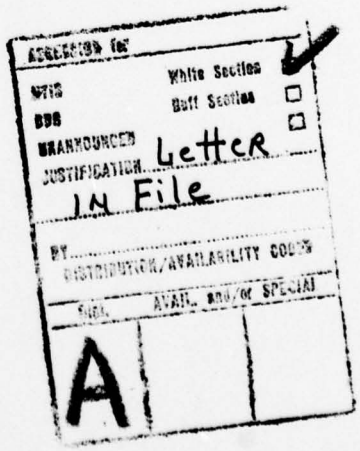
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PREFACE

The value of Computerized Management Information Systems (MIS) was first realized in the 1960's. Since that time numerous approaches have been developed to implement MIS. Some have failed, others have been developed as a backlash to these failures. This report traces, briefly, the history of computerized Management Information Systems, then proposes an approach for the development of a small MIS. This approach was evaluated through the development of the Department of Mathematical Sciences Information System (DEMIS) and its first operational Module, the Student Information System (SIS). The report is divided into five chapters. Chapter 1 traces the history of MIS and outlines the approach proposed for small system development. Chapter 2 discusses general information pertaining to SIS. Chapter 3 sets forth a complete yet simple set of operator instructions. Chapter 4 provides philosophy, approaches and requirements for system maintenance and modification, and Chapter 5 looks at the future of DEMIS and provides some concluding remarks.

Following the text is complete documentation on the system including the design package, a system listing, sample outputs, input card formats, configuration of maintenance and execution decks, a list of error messages with explainations and required corrective actions, and listings of file creation

and SIS cataloging decks.

I gratefully acknowledge the assistance provided by the personnel of the FTU Computer Center whose help made completion of this project possible. I am especially indebted to William H. Branch, Thomas O. Peeples, James Radford, and Bernard L. Slessinger.

Chapter 1

MANAGEMENT INFORMATION SYSTEMS: THEIR HISTORY AND A PROPOSED DEVELOPMENTAL APPROACH

The use of the computer as a management tool is traceable back to the mid 1950's (Mathews, 8). It was first used to reduce clerical work, with applications expanding into payroll, personnel, inventory status, cost distribution, sales analysis and similar applications. The 1960's brought about a new role for the computer, that of providing information which could help in management decision making. In this regard, however, the numerous stand-alone applications which had been developed presented a problem. Each had its own data base which duplicated information found in the other data bases. Not only was this wasteful in terms of duplicate storage of data, but data consistency problems were noted when like data items from several different data bases were examined. While inconsistencies were frequently explainable (e.g. one data base was updated daily, while another might require only monthly updating) questions nevertheless arose as to why data was maintained in more than one location. The solution to these problems was seen as developing separate but integrated data bases which would solve problems of inconsistency and duplication of data, and provide a means of integrating data for use in management oriented information

systems (MIS). The MIS required the variety of information which was then available. The software overhead required in the maintenance of integrated data bases soon led to the contemporary concepts of data base management systems which provide common data bases for a variety of applications. In the mid 1960's several factors combined to cause a tremendous increase in interest in Management Information Systems. These include the availability of integrated data bases, and the third generation computers with their increased speed and power. Management began to accept the computer and realized it's potential to provide information upon which management decisions could be made.

Unfortunately the late 1960's brought an era of unhappy experiences with MIS, many due to the "total" information concept which was not far enough along in its development to be placed into production. This concept also tended to drive an organizations information system rather than to augment and support existing (though perhaps non-automated) systems (Caruth 3:197)(the total concept is further discussed below). Management expected too much, too soon from their MIS, and the results were generally disappointing. The reaction to this experience was reevaluation of MIS theory and a tremendous proliferation of ideas in the literature.

Sherman C. Blumenthal (1) has written a classic text which classifies MIS approaches into six catagories:

1. The organizational approach establishes independent systems along organizational lines, with interaction depending on higher level coordination.
2. The data collection approach is to collect, classify and store data for some unknown future use.
3. The top down approach holds that once the information needs of top management are determined, the system necessary to supply the information can also be determined.
4. The data bank approach sets up a pool of highly detailed, unclassified data for some undetermined future use.
5. The integrated later approach is, as the name implies, a non-plan, a philosophy of continuing to develop more independent applications and "integrate them later".
6. The integrate now (or "total systems") approach, provides an "instant MIS", integrating all ADP functions at once. This is the approach which led to the reevaluation of MIS in the late 1960's.

Blumenthal then presents his own philosophy, with which I am in general agreement. He supports a "bottom up" approach combined with a systems plan. The plan can be considered from two aspects; global, which is a "plan of projects" or a framework for classifying and integrating modules, and

local, which consists of project plans or modules. Using this format, the modules are developed based on priorities, specifications, and integration considerations established by the "framework". Modules are developed to support operating level management. Their "communication" with the data bases of other modules is assured by the specifications developed in the framework. Selected data produced by the modules is copied into other data bases for use by higher level management based on Blumenthal's concept that the information required by higher level management is a subset of that produced by the lower level modules.

Blumenthal also describes the formal activities which should be accomplished in developing a system. These include:

Proposal study,

Problem definition, priority, and budget consideration,

Formal written proposal,

Initial user system organization assessment,

Preparation of a feasibility study,

Presentation of the feasibility study to management,

Assignment of project responsibility, allocation of resources, delegation of a steering committee,

Project planning and control,

Development of functional requirements,

Designing of system specifications,

Programming and testing, and

Conversion and cutover.

The only exceptions to this formal procedure are those applications which are obvious minor development efforts such as "special one-time reports". Most organizations with a major data processing investment utilize the concept proposed by Blumenthal to some extent. Unfortunately, once formal procedures are established for development of a system, generally no system, no matter how small, can be developed without going through the established formal organizational procedures.

The preimplementation criteria are, in themselves, costly enough to eliminate all but major systems from consideration.

The result of this environment is that the required strong economic justification for the small application is impossible, and so small applications tend to either be dropped or to mushroom into large systems, resulting in major contracts and extended periods of time for implementation.

The purpose of this paper is to provide an alternative approach using Blumenthal's "Bottom Up" Theory, but based on the thesis that formal procedures are not always necessary (may be accomplished informally); that requirements do not have to be large enough to justify major investments of time and resources; and that an organization's information requirements can evolve in an open ended plan, based on existing information resources.

This project considers the management information re-

quirements for one department of a college located at a large university. The information requirements were very real, yet probably not economically justifiable as a large project. Previous attempts to design information systems for other colleges in the university had either failed or their planning had dragged on over an extended period of time without realization of an operational system. The length of time to implement the system, the inability to support or maintain it, or the lack of a systemic approach to building a system to meet all information requirements resulted in a general loss of interest and the failure of these systems to produce satisfactory results.

The system described by this project was developed with a different approach, which is characterized by informal, though systematic, development, and includes a generalized MIS framework, which is flexible and open ended, and the first module of the system. The scenario for this approach was:

1. The users were contacted to determine what immediate information requirements existed, and the general nature of possible future additions to the system.
2. Personnel of the computer center were contacted to determine the type of information that was available in existing data bases to support a system such as the users felt they needed.

3. The users were again contacted and their requirements reappraised to make the maximum use of available data, and then the minimum additional data requirements were agreed upon.
4. A major system was conceptionalized which could contain a number of interrelated sub-systems.
5. The subsystem to support the immediate requirements was designed, coded, and implemented.

The system uses top down, structured, modular design and programming for ease of maintenance, and was designed so that it can be run using existing equipment and personnel resources.

User interest and enthusiasm in the project has been maintained at high level. This is attributable to several factors. The information supplied to the users was information they needed and in the required format. The time for development of the system was less than six months, during which the users received frequent, informal feedback on the status of the project. No elaborate justification for the project was required of the users, and rather then enlarging their requirements to justify the project, they were able to reduce requirements to the essential data that was needed. The result of the latter was that the system was able to operate using existing personnel and equipment resources which meant that the users did not have to divert

funds from other projects to pay for this system.

I feel that this concept of ADP support offers a responsive alternative to organizations which have MIS formal planning and design criteria, and where:

a) the information requirements are valid,

b) the information requirements are such that a large expenditure of time and money is not immediately justifiable, and

c) most of the required information is already available in existing data bases.

Chapter 2

SYSTEM IMPLEMENTATION

GENERAL INFORMATION ON DEMIS / SIS

In keeping with the approach described in Chapter 1, a flexible, open ended framework was developed for the Department of Mathematical Sciences Information System (DEMIS). This framework is graphically illustrated in figure 1. No detailed specifications were made for the proposed modules of DEMIS, as this would detract from the flexibility of the system. Generalized contents of the modules are, however, discussed in concept in Chapter 5.

The Student Information System (SIS) is the first module of DEMIS to be implemented, and is designed to provide information to suport management and counselling activities of the Department. SIS has been constructed using contemporary concepts of modular, top down, structured design, and structured programming techniques. It has also been designed to require minimum operator time, training, and skill, as well as minimum maintenance.

SIS provides useful, required, up to date information for the Department of Mathematical Sciences. It establishes a flexible, expandable student data base and a student enrollment statistical data base to be used by DEMIS. It also provides an interface for receiving data elements from the FTU

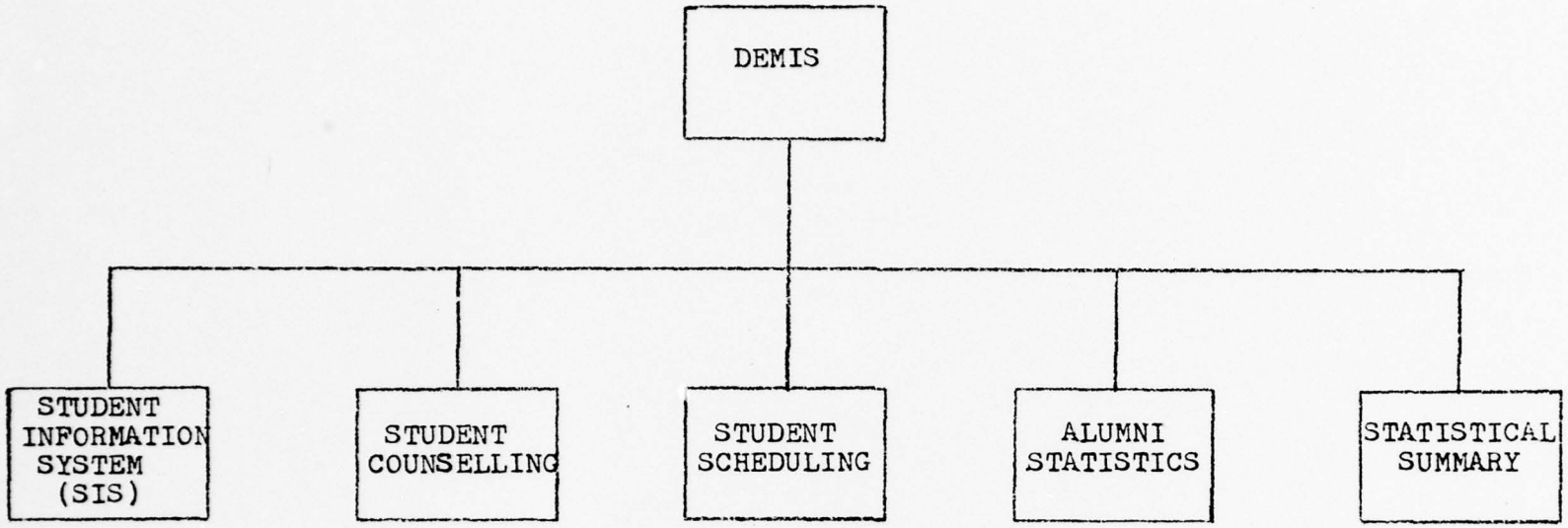


FIGURE 1

DEMIS FRAMEWORK

Student Record Data Base.

SIS BACKGROUND

With the continuing growth of student enrollment in the Department of Mathematical Sciences, it has become more and more apparent that certain required administrative information pertaining to student enrollment is not readily available, or, at least, not available in the required format. As a result, frequent time consuming searches through file cabinets containing student records, or through the numerous available computer printouts, is necessary to assemble the required data. Some of the more pressing information requirements are determining the number of students majoring in the various programs offered by the Department of Mathematical Sciences; determining the number and names of students who are in Post Baccalaureate Status so their progress toward achieving provisional or regular status may be periodically reviewed; providing faculty advisors with immediate background data on students whom they advise as well as data concerning their overall progress. Often, various faculty advisor listings must also be manually modified and up dated.

These problems indicated a need for an information system within the Department. DEMIS was developed to supply this information.

SYSTEM SPECIFICATIONS FOR SIS

In order to meet the requirements stated above, the following specifications were developed of SIS (the first module of DEMIS).

1. Outputs of the system will include:
   - A. A roster of students currently enrolled ordered by major, level of study (undergraduate, post baccalaureate, or graduate) and alphabetical by name (figure 2).
   - B. A roster of students ordered by faculty advisor (figure 3).
   - C. Listing of student-faculty advisor assignments (figure 4).
   - D. Listing of the students advised by each faculty member (figure 5).
   - E. A statistical printout which shows student enrollment at quarter intervals(figure 6).
2. The system should be designed so that it can be operated by clerical personnel in the department.
3. Complete documentation is required for maintenance and modification and to facilitate the addition of other modules to DEMIS.
4. Data maintained in a Mathematics Department Data Base should be minimal, with the greatest portion

DEPARTMENT OF MATHEMATICAL SCIENCES

GRADUATE COMPUTER SCIENCE MAJORS

MAY 26 1976

BAXTER JOHN DENVER 777 77 7777 G-COMP 70E/3.888 ADVISOR: DR C L SMITH SEX: M MARITAL ST:M GR:N
ADDRESS: LOCAL TEL: MEMBR: ACM,,WCTU
PARENT:
QTRS ATTENDED FTU/STATUS:

ROSEN SAMUAL 888 88 8888 G-COMP 70E/3.995 ADVISOR: DR C L SMITH SEX: M MARITAL ST:M GR:N
ADDRESS: RED 999 ORLANDO FL 32456 LOCAL TEL: 305 666 8745 MEMBR: MMC
PARENT: RED 999 ORLANDO FL 32456
QTRS ATTENDED FTU/STATUS:

FIGURE 2

STUDENT ROSTER BY MAJOR / LEVEL OF STUDY

DEPARTMENT OF MATHEMATICAL SCIENCES

FACULTY ADVISOR EXTRACT OF STUDENT ROSTER

MAY 26 1976

```
BAXTER          JIMMY BUD                    777 88 9999 P-COMP 70S/3.985 ADVISOR: DR A C BROWN      SEX: M  MARITAL ST:S GR:N
     ADDRESS:  RFD 1              BUS STOP                FL 22233 LOCAL TEL: 305 666 9874 MEMBR:
          PARENT: 14 BRENT ROAD      CHICAGO                 IL 32564
     QTRS ATTENDED FTU/STATUS:

CONROY          MARY ELLEN                   666 77 8888 P-COMP 70S/3.999 ADVISOR: DR A C BROWN      SEX: F  MARITAL ST:S GR:N
     ADDRESS:  112 JAMES STREET   ORLANDO                 FL 55542 LOCAL TEL: 305 668 9638 MEMBR:
          PARENT: 112 JAMES STREET   ORLANDO               FL 55542
     QTRS ATTENDED FTU/STATUS:

LEU             LEE SHU                      555 66 7777 P-MATH 70S/2.999 ADVISOR: DR A C BROWN      SEX: M  MARITAL ST:S GR:N
     ADDRESS:                                             LOCAL TEL:              MEMBR: SPCA.ACM
          PARENT:
     QTRS ATTENDED FTU/STATUS:

SHOEMACHER      WILLIAM R                    444 55 6666 P-MATH 70S/3.885 ADVISOR: DR A C BROWN      SEX: M  MARITAL ST:M GR:N
     ADDRESS:                                             LOCAL TEL:              MEMBR:
          PARENT:
     QTRS ATTENDED FTU/STATUS:
```

FIGURE 3

STUDENT ROSTER BY FACULTY ADVISOR

DEPARTMENT OF MATHEMATICAL SCIENCES

FACULTY ADVISOR LISTING

GRADUATE MATHEMATICAL SCIENCE MAJORS

MAY 26 1976

STUDENT		FACULTY ADVISOR
JONES	JOHN P	DR JONES
JORGENSEN	OSCAR	DR R DUTTON
WASHINGTON	GEORGE C	

FIGURE 4

STUDENT-FACULTY ADVISOR LISTING

DEPARTMENT OF MATHEMATICAL SCIENCES

MAY 26 197

THE FOLLOWING NAMED STUDENTS ARE ADVISEES OF DR A C BROWN

BAXTER	JIMMY BUD
CONROY	MARY ELLEN
LEU	LEE SHU
SHOEMACHER	WILLIAM B

FIGURE 5

LISTING OF STUDENTS ADVISED BY EACH FACULTY MEMBER

DEPARTMENT OF MATHEMATICAL SCIENCES

STUDENT ENROLLMENT

MAY 26 1976

711

	COMP	MATH	STAT	TOTAL
UNDERGRADUATE	3	0	3	6
GRADUATE	2	3		5
POST BAC	3	3		6
TOTAL	8	6	3	17

704

	COMP	MATH	STAT	TOTAL
UNDERGRADUATE	3	0	3	6
GRADUATE	2	3		5
POST BAC	3	3		6
TOTAL	8	6	3	17

703

	COMP	MATH	STAT	TOTAL
UNDERGRADUATE	1	1	3	5
GRADUATE	3	3		6
POST BAC	3	3		6
TOTAL	7	7	3	17

694

	COMP	MATH	STAT	TOTAL
UNDERGRADUATE	1	1	3	5
GRADUATE	3	3		6
POST BAC	2	3		5
TOTAL	6	7	3	16

692

	COMP	MATH	STAT	TOTAL
UNDERGRADUATE	3	0	3	6
GRADUATE	3	3		6
POST BAC	1	3		4
TOTAL	7	6	3	16

FIGURE 6

STUDENT ENROLLMENT REPORT

of required data extracted from the FTU Student Records.

5. The system must operate on the CFRDC facilities.

SIS CONCEPT

SIS can be described in terms of three general (somewhat simplified) processes as shown in figure 7. These are: update the MATH-DATA-BASE file; load the SPIN-OFF file; and generate reports.

The MATH-DATA-BASE file is one of two data bases maintained by the Department of Mathematical Sciences (the other is the STAT-HIST file which is discussed below). This data base contains four data fields for each student record; faculty advisor name and SSN (Social Security Number), student attendance/status data, student association membership data, and the student SSN which is used to key the student MATH-DATA-BASE record to the FTU Student Record. Additions, changes, and deletions to this data base are made using punched cards. The latter are read into a temporary MATH-CHANGE file where they are sorted and then merged with the MATH-DATA-BASE into a temporary MATH-REORG file. This is then read back into the MATH-DATA-BASE.

The temporary SPIN-OFF file is loaded with selected data fields from FTU records of all students with majors of COMP,

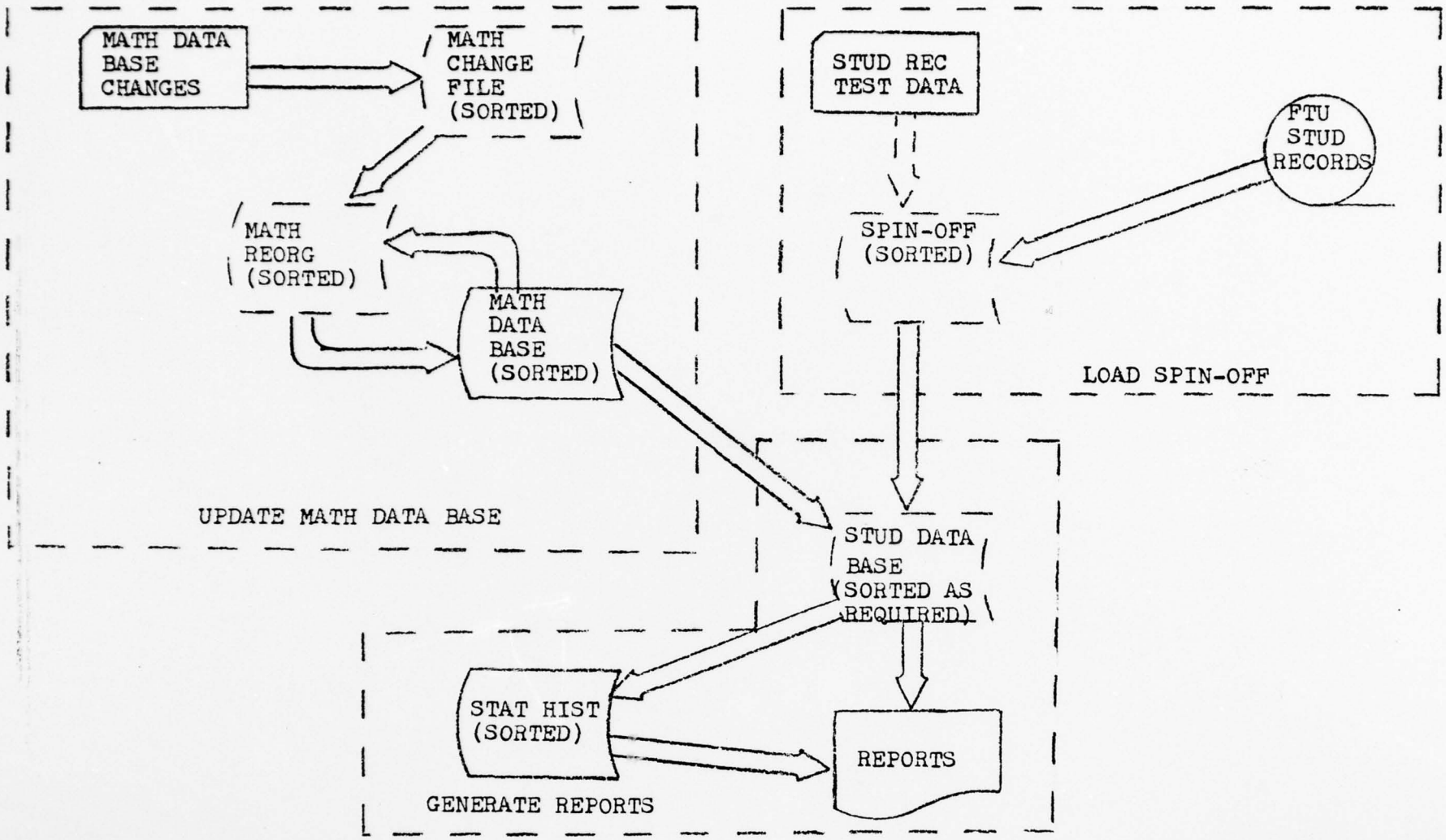


FIGURE 7

SIS OVERVIEW DIAGRAM

MATH, or STAT (an alternate method for loading SPIN-OFF with test data is also provided). Whenever SIS is run, it retrieves the SPIN-OFF file records and uses the data to construct a temporary STUD-DATA-BASE file.

When a report is requested, the records from the MATH-DATA-BASE are merged into the STUD-DATA-BASE, which is then sorted on various combinations of keys to provide the requested reports. Whenever a statistics report is requested, a new set of current student enrollment statistics is compiled and added to the STAT-HIST file before the report is generated.

SIS SYSTEM DESIGN

The System design was developed and implemented through use of IBM's Hierarchy plus Input Process Output (HIPO) technique for system design. This involves the use of system specifications (already discussed), a hierarchical Visual Table of Contents (VTOC) (figure 8), and corresponding Input-Process-Output diagrams (appendix D).

The result of this design process is a modular, structured system design, as indicated in the VTOC. Each module is "called" by it's higher module and, in turn, calls its lower modules. This approach has greatly simplified the design process. It also facilitates maintenance and changes because the appropriate module can be quickly located, and usually any changes made to it will only affect its "parent" and

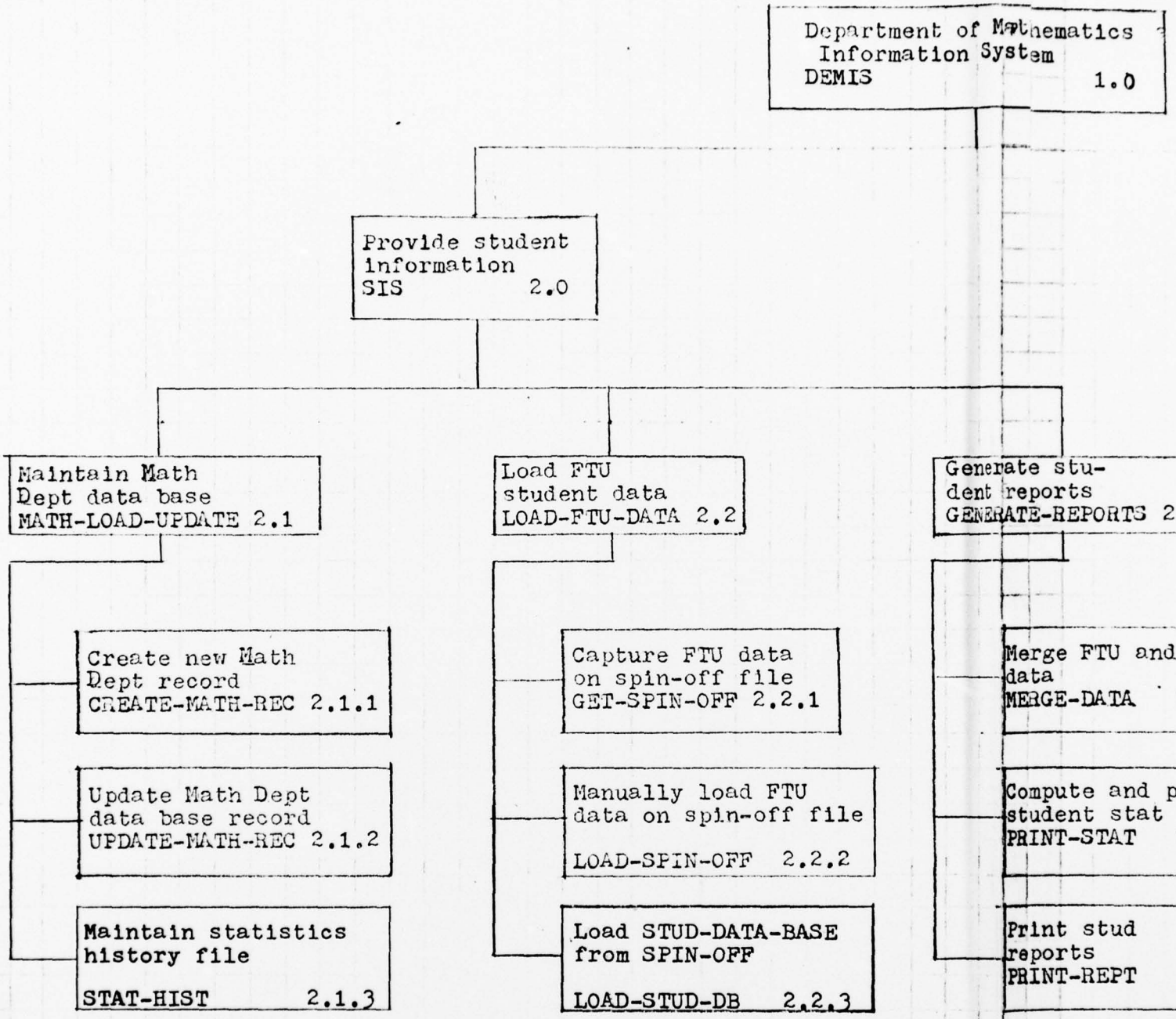
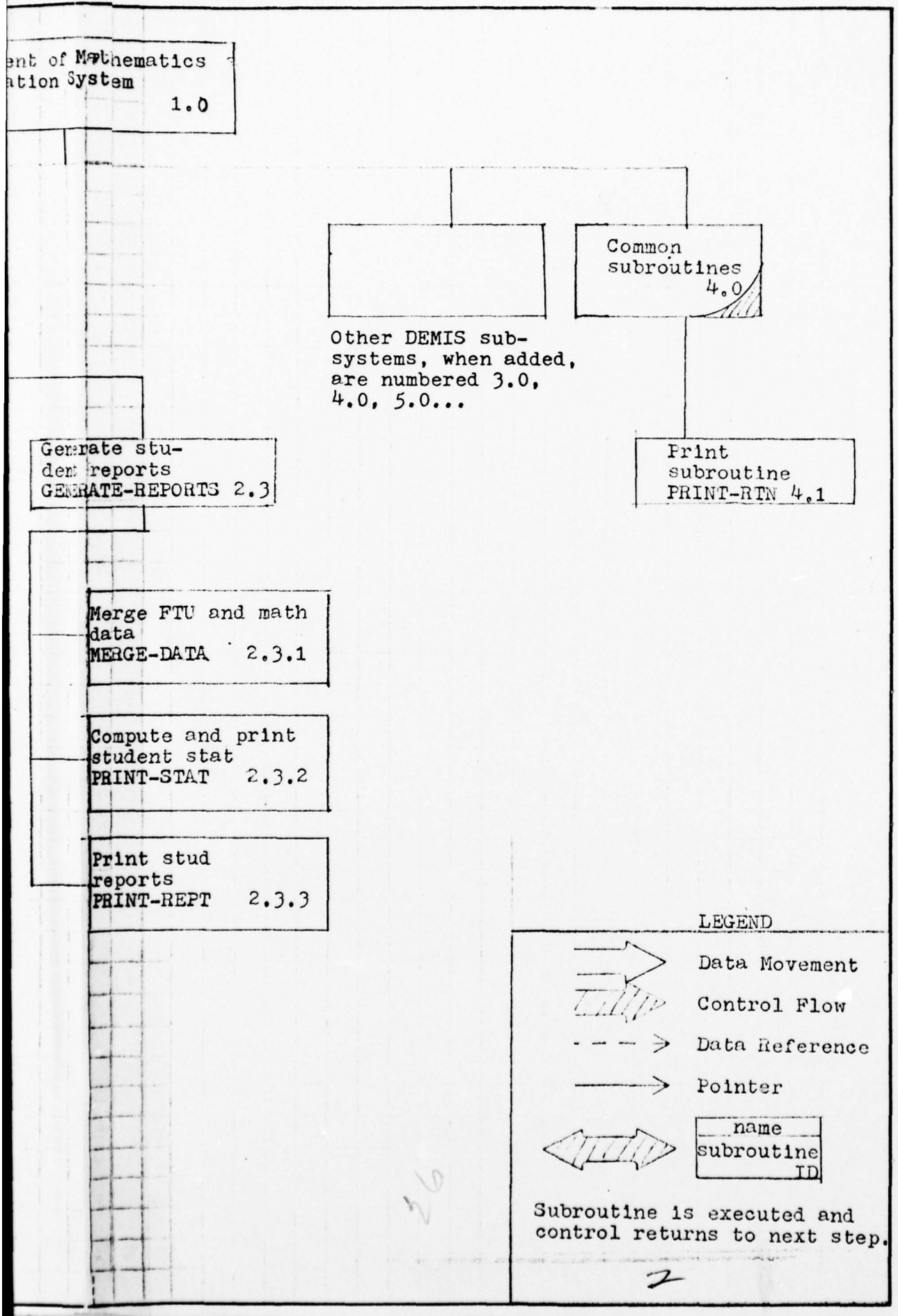


FIGURE 8

HIPO VISUAL TABLE OF CONTENTS (VTOC)

* The number of sheets per pad may vary slightly



IBM HIPO WORKSHEET

Author: Roger Sifrit System/Program: DEMIS Date: 3/6/76 Page: 1 of 1

Diagram ID: Name: VISUAL TABLE OF CONTENTS Description: DEPT OF MATH SCI INFO SYSTEM

GX20-1970-0 U/M 025*
Printed in U.S.A.

"offspring" modules.

The Input-Process-Output diagrams, one of which is provided for, and keyed to , each module in the VTOC, visually and naratively describe the logic, the required inputs, and the outputs produced by each module. The coding was produced so that each module is implemented in a "section" of code which can quickly be identified for maintenance purposes.

Every attempt has been made to use corresponding terms in the VTOC, the Input-Process-Output diagrams, and in the coding.

Close coordination has been made with personnel at the FTU Computer Center, to ensure the compatibility of DEMIS with the FTU Student Records System and to facilitate the use of student record data by DEMIS.

SIS FILE DESIGN

The files used by SIS include two permanent files, five temporary files, and a variety of utility sort files. The two permanent files were established to store Mathematics Department unique data (MATH-DEPT-STUD-DB) and student enrollment data (STAT-HIST-DB).

Prior to running SIS a temporary file, SPIN-OFF, must be loaded with certain data from the FTU Student Records (figure 9). This data is placed in a temporary STUD-DATA-BASE file. The MATH-DEPT-STUD-DB is then merged into the

```
   2LAST-NAME              PIC X(18).
   2FRST-MDLE-NAME         PIC X(30).
   2SSN                    PIC 9(09).
   2APPL-TYPE              PIC 9(01).


   2MAJOR-1                PIC 9(04).
   2FTU-SUMMARY.
      2FTU-LAST-QTR        PIC 9(03).
      2FTU-GPA             PIC 9V999.
   2SEX                    PIC X(01).
   2INDX                   PIC X(200).
*     2GRD-IND             PIC X(01).
*     2START-SUB           PIC X(02).
*     2END-SUB             PIC X(02).
   2HOME-STREET            PIC X(20).
   2HOME-CITY              PIC X(20).
   2HOME-STATE             PIC X(02).
   2HOME-ZIP               PIC 9(05).
   2HOME-PHONE             PIC X(10).
   2KIN-STREET             PIC X(20).
   2KIN-CITY               PIC X(20).
   2KIN-STATE              PIC X(02).
   2KIN-ZIP                PIC 9(05).
   2MARITAL-STATUS         PIC 9(01).
```

NOTE: DATA REQUIRED FOR ALL STUDENTS EVER ENROLLED IN FTU

WITH MAJOR CODE OF 0701, 1701, 1702, OR 1790

FIGURE 9

SPIN-OFF INPUT FROM FTU STUDENT RECORDS

STUD-DATA-BASE, to provide for generation of the required reports. Each time new enrollment statistics are generated, they are added to the STAT-HIST-DB to provide a continuous record of enrollment data.

All files used by SIS are sequential. The decision to use sequential files was made based on consideration of the following factors:

a) it is anticipated that large volumes of data will be processed,

b) data from the FTU Student Record Data Base will be sorted in sequence of SSN,

c) conversion from disk to tape, if required, will be facilitated,

d) data must be repeatedly sorted on different keys to produce the required outputs,

e) MATH-DEPT-STUD-DB is stored sequentially by SSN, so that change data can be placed on a file, sorted on SSN, then merged with the MATH-DEPT-STUD-DB, and

f) numerous and frequent changes to the SIS data bases are anticipated which makes other types of files (e.g. ISAM) inefficient.

SIS CODING

DEMIS was coded using COBOL, primarily to facilitate

interfacing with the FTU Student Record System which also uses COBOL. The coding has followed the logic of the HIPO system design, but, of course, is in more detail and includes numerous error checking routines (appendix A) which are not reflected in the HIPO design package. In other cases, where some of the higher level language charactistics of COBOL result in instructions which accomplish a variety of actions, the HIPO diagrams might be more detailed then the coding.

Every effort has been made to use the self-documenting characteristics of COBOL. Storage areas, variables, file names, paragraph names, and section names are written in a descriptive way, providing hopefully meaningful mneumonic names.

Every effort has also been made to provide easy to understand logic flow throughout the program. This, coupled with the program modularity, should facilitate reading of the code. Wherever possible, coding has been designed for clarity, even at the expense of efficiency. Package routines and other features are used wherever possible (e.g. COBOL sort-merge feature and string option).

Chapter 3

USER PROCEDURES FOR SIS

GENERAL

SIS has been designed to require minimum operator training and involvement. It provides a relatively foolproof system providing the procedures listed below are followed.

Many errors in keypunching and out of sequence card input will be detected by SIS and a warning message provided. Some errors, however, cannot be detected by the system (e.g. SSN or spelling of name, address, etc.). Critical data should be double checked by the keypunch operator. Of particular importance is SSN because it is used as the key to locate and update records in most of the files.

All reports can be obtained without complete MATH-DEPT-STUD-DB records. Report formats which are keyed to advisor SSN will, however, be affected by the absence of faculty advisor data (this is further explained below).

MAINTAINING THE MATH-DATA-BASE

The primary task of operating SIS is the maintenance of the MATH-DEPT-STUD-DB. All other data is automatically computed (i.e. statistics) or is provided from the FTU Student Record Data Base.

Changes to the MATH-DEPT-STUD-DB refer to introducing

data into a student record, changing or deleting data in a record, or deleting an entire student record. These changes are accomplished by key punching and inputting cards in the appropriate format (figure 10). When this data is entered into the computer, a search will be made using SSN as a key, to see if a record exists for that particular student. If one does exist, it will be updated. If no record exists, a new record will be created using whatever data is submitted.

There are three data items, in addition to SSN, which must be maintained for each student; faculty advisor (name and SSN), quarters attended FTU and status, and association memberships. The latter two items are for information only (i.e. not used as sort keys) and their absence will in no way affect the operation of SIS (other than blank fields on the printouts). Incomplete faculty advisor data, however, will change the output formats because several reports are keyed to the advisor SSN. All students without an assigned faculty advisor are grouped together as having no assigned advisor.

Building the MATH-DEPT-STUD-DB will be a time consuming process and it is recommended that the data be phased in starting with faculty advisor input.

Sequencing of MATH-DEPT-STUD-DB card changes is immaterial. They are sorted by SIS before any records are updated. There is no need, for example, to place two changes pertaining to the same student physically together in the group of MATH-DEPT-STUD-DB changes.

NOTE: DO NOT USE THIS FORM WHEN ORDERING NEW OR REVISED CARD FORM COMPOSITION.

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Application SIS MATH DB ENTRIES by ROGER W. SIFRIT Date 3/6/76 Job No. DEMIS Sheet No. 1

ADVISOR INPUT

	STUDENT SSN	ADVISOR NAME	ADVSSN
V	9 9 9 9 9 9 9 9 9	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	9 9 9 9 9 9 9 9 9
9	1 2 3 4 5 6 7 8 9 10	11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

QUARTERS ATTENDED FTU AND STATUS (AS MANY ENTRIES AS ARE TO BE ADDED)

	STUDENT SSN	YR	QTR (F,W,S,U) STATUS
Q	9 9 9 9 9 9 9 9 9	9 9	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9

RUNNING SIS

The following conditions must be met before output can be obtained from SIS.

1. The SPIN-OFF file must be created from the FTU Student Records.
2. The MATH-DEPT-STUD-DB file must have been created.
3. The STAT-HIST file must have been created.
4. SIS must be catalogued.
5. The execution deck must be loaded.

The SPIN-OFF file is created by the FTU Computer Center. This should be accomplished as soon as possible after the start of each academic quarter, once the INDEX field of all FTU student records has been updated. It will normally require several days notice for personnel at the center to create this file.

The MATH-DEPT-STUD-DB file is permanently stored. However, should the file be destroyed, it must be regenerated before SIS will work. To accomplish this, load DECK #3 (appendix E) into the card reader and verify the creation and cataloging of the file from the printed listing. This will recreate the MATH-DATA-BASE file without student data. Reloading student data is accomplished by rerunning all previously run changes to the data base, in the same sequence in which they were originally run, with each data deck separated

by a card with an '*' in column #1 (see figure 11). The effect of this procedure is to recreate the data base exactly as it had been previously built. The old change cards must, therefore, be saved and kept in a secure location. They form a data backup for use in case the MATH-DEPT-STUD-DB is damaged or destroyed.

The STAT-HIST file, like the MATH-DEPT-STUD-DB, is a permanent file. If it should be destroyed DECK #4 (appendix E) must be loaded to recreate the file (without data). To reload the data into the file there are two alternate procedures. The first is to recreate the history data as discussed in "Creation of STAT-HIST Data Base" below. The second is to take the most recent printout and use the information there to complete an 'H' card (figure 12) for each quarter in which data is available. The latter procedure is probably the best approach, and will provide a permanent backup deck. The backup deck may then be loaded with the next SIS run.

SIS is permanently catalogued on the CFRDC system, however should it be destroyed, it may be recatalogued by loading DECK # 2 (appendix C).

The execution deck consists of several items (figure 13), which must be in proper sequence. DECK #1 contains the instructions which call SIS to execute the program. This must be immediately followed by a 'Y' card (figure 14). This

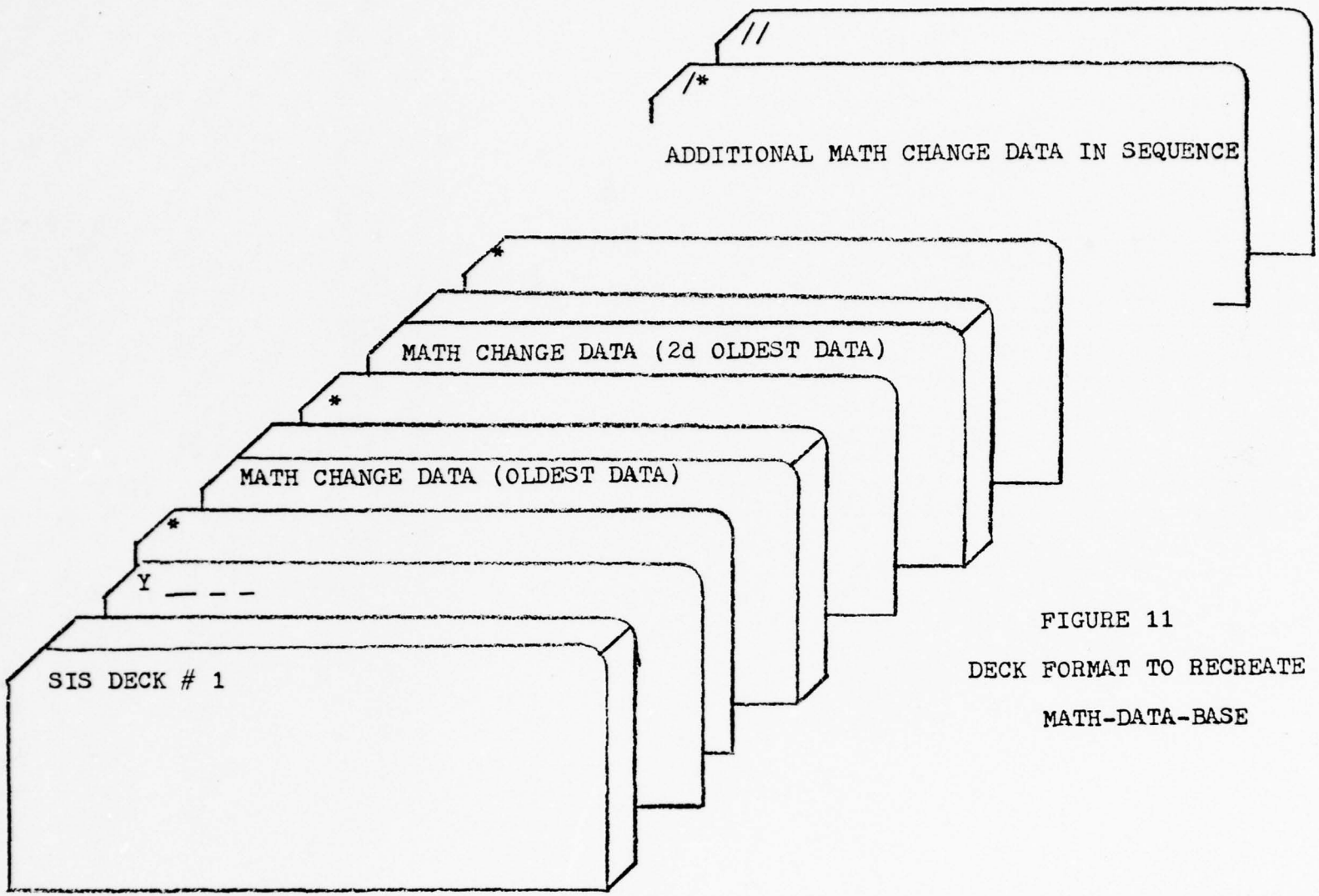


FIGURE 11

DECK FORMAT TO RECREATE

MATH-DATA-BASE

NOTE: DO NOT USE THIS FORM WHEN ORDERING NEW OR REVISED CARD FORM COMPOSITION.

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Application SIS 'H' FORMAT by ROGER W. SIFRIT Date 3/6/76 Job No. _____ Sheet No. _____

ALTER STAT - HIST DATABASE - 'H' FORMAT

H	CURRENT QTR CODE	COMP-UG	COMP-GR	COMP-PB	MATH-UG	MATH-GR	MATH-PB	STAT-UG
9	9	9999	9999	9999	9999	9999	9999	9999
1	2 3 4	5 6 7 8	9 10 11 12	13 14 15 16	17 18 19 20	21 22 23 24	25 26 27 28	29 30 31 32

NOTES: 1. COLUMNS 2 THROUGH 32 MUST EACH CONTAIN A DIGIT Ø THROUGH 9.
2. CURRENT QTR CODE IS THE QUARTER FOR WHICH THE STATISTICAL DATA IS TO BE CHANGED. USE DATA FOUND IN APPENDIX B.

FIGURE 12

STAT-HIST CARD INPUT FORMAT

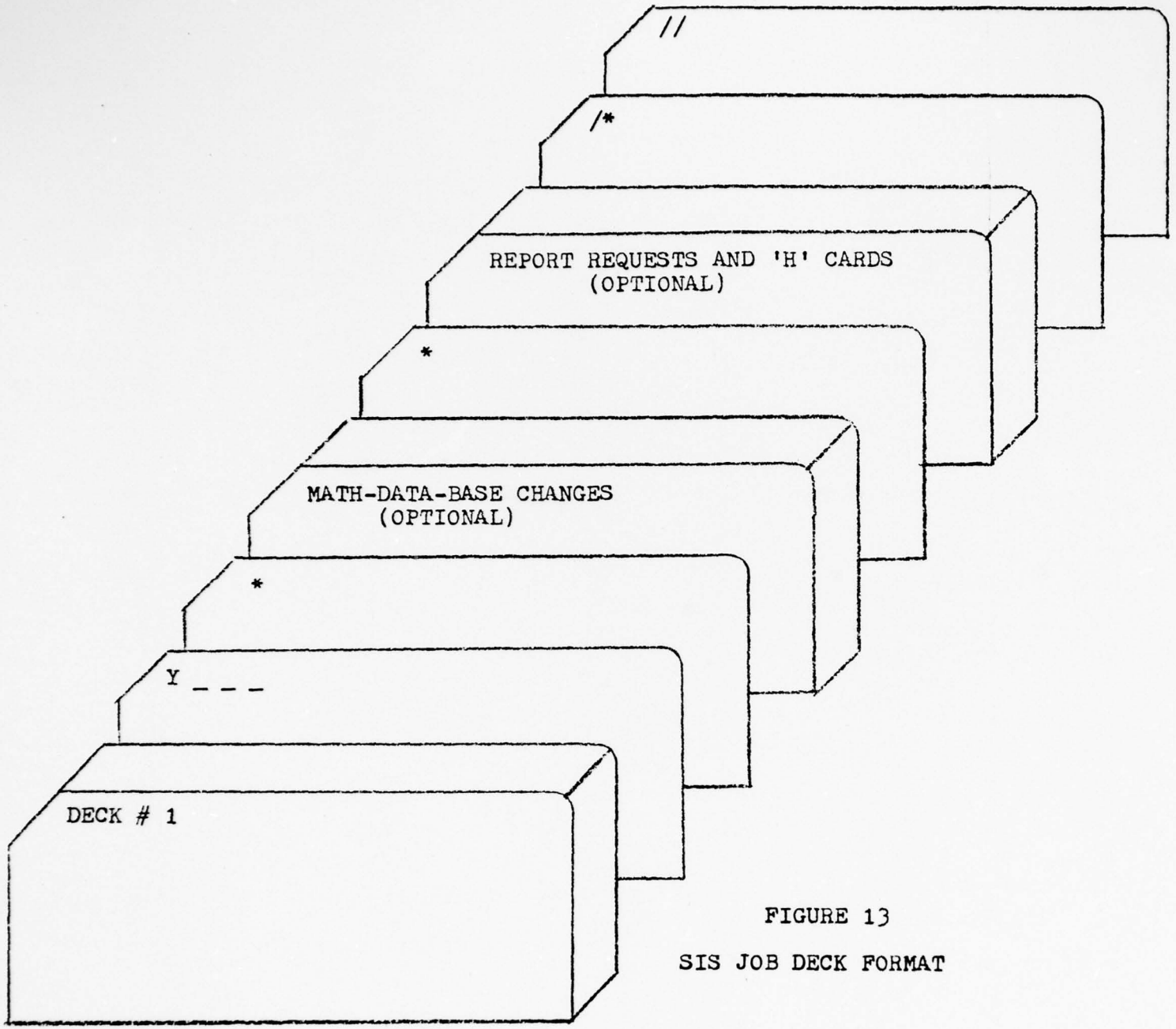


FIGURE 13

SIS JOB DECK FORMAT

NOTE: DO NOT USE THIS FORM WHEN ORDERING NEW OR REVISED CARD FORM COMPOSITION.

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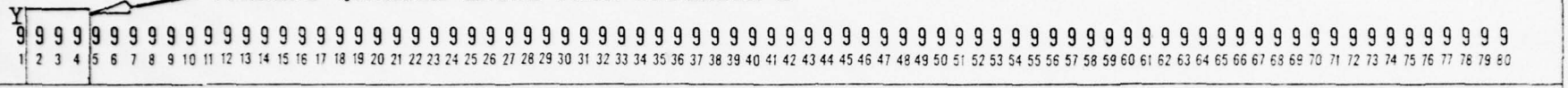
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Application SIS 'Y' FORMAT by Roger W. Sifrit Date 3/6/76 Job No. _____ Sheet No. _____

YEAR AND QUARTER - 'Y' FORMAT

CURRENT QUARTER ENTRY FROM APPENDIX B


Y
9 9 9

card supplies SIS with the present academic year and quarter. Based on this information a search of student records pertaining to that quarter is made. Failure to enter a 'Y' card will cause an immediate termination of the program. Use of incorrect data on this card will cause the wrong data to be searched in the student records, with undeterminable results. The 'Y' card contains four characters. The first character is the letter 'Y'. This is followed by three numbers representing the current fiscal quarter (appendix B). A card with an '*' in column 1 must follow the 'Y' card. Failure to enter an '*' will cause the first MATH-DEPT-STUD-DB change card to be ignored, and a message to this effect will be printed (appendix A). It may also cause damage to the SPIN-OFF file. The next items in the deck are the MATH-DEPT-STUD-DB changes. They may be in any sequence. The system will sort them prior to posting changes to the MATH-DEPT-STUD-DB records (changes are optional when SIS runs). An '*' must follow the changes. Report requests (figure 15) follow, and may be run in any sequence (report requests are optional).

CREATION OF STAT-HIST DATA BASE

The 'Y' card, as mentioned above, indicates to SIS which quarter is to be searched in the SPIN-OFF file (FTU Student Data) to determine current enrollment and statistical data.

NOTE: DO NOT USE THIS FORM WHEN ORDERING NEW OR REVISED CARD FORM COMPOSITION.

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Application SIS REPORT REQUESTS by ROGER W. SIFRIT Date 3/6/76 Job No. _____ Sheet No. _____

REQUEST FOR STUDENT DATA ROSTER - 'R' FORMAT

```
R
9999999999
```

To access data from previous quarters, the 'Y' card must indicate the quarter for which data is to be collected. Therefore, to build the STAT-HIST-DB file, successive runs of SIS must be made, starting with the first quarter (691) up to the current quarter. The quarters are listed in appendix B. This data is automatically stored in the STAT-HIST-DB file and printed with each 'C' report request.

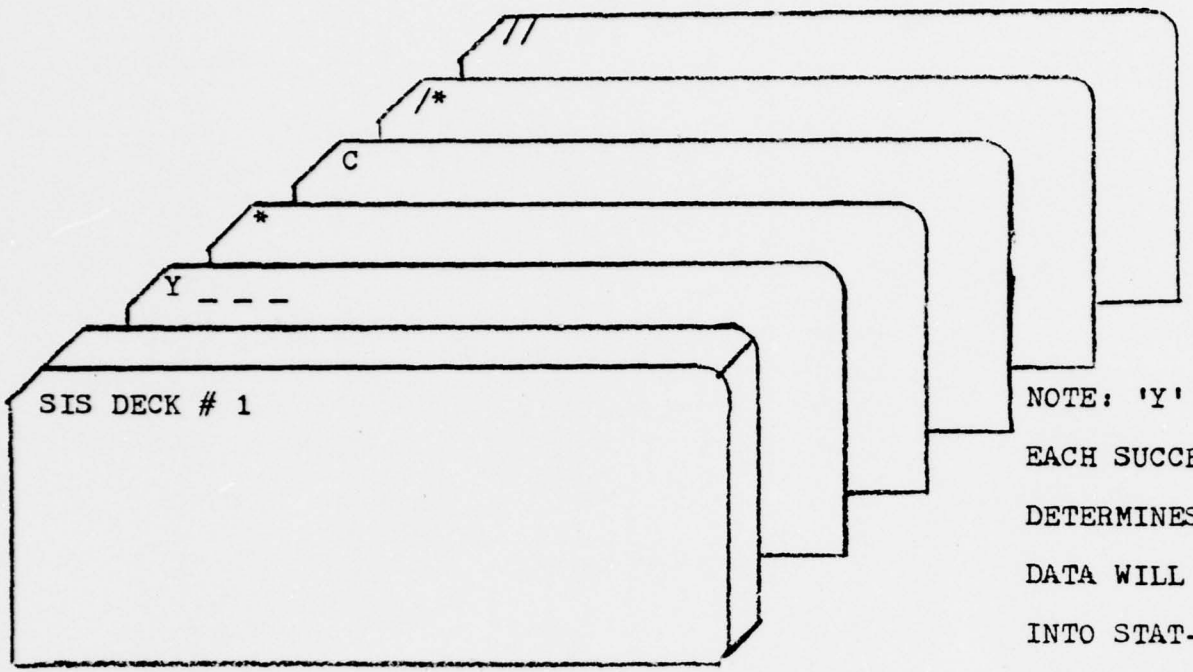
The data deck required to build the STAT-HIST-DB is shown in figure 16.

CHANGING / DELETING DATA FROM THE STAT-HIST DATA BASE

Statistical data stored in the STAT-HIST-DB file may be altered or deleted by using an 'H' format card (figure 12). To add new data, complete the card, as shown in figure 12, with an 'H' in column 1 and numeric data (Ø-9) completely filling columns 2 through 32. Failure to enter data as required will cause the 'H' card to be disregarded by SIS. To delete an entry from STAT-HIST-DB file, enter the date which is to be deleted, then fill columns 8 through 32 with 'Ø's.

REPORT FORMATS

Report formats are shown in figures 2 through 6. The student enrollment report (figure 6) will display all history data in the STAT-HIST-DB file, with the most recent



NOTE: 'Y' CARD MUST BE CHANGED ON EACH SUCCESSIVE RUN. THE 'Y' CARD DETERMINES THE QUARTER FOR WHICH DATA WILL BE COMPUTED AND ENTERED INTO STAT-HIST-DB.

FIGURE 16

DECK FORMAT TO BUILD

STAT-HIST-DB

statistics displayed first. A new entry will be made to the STAT-HIST-DB file every time a 'C' report (figure 15) is requested. If an entry already exists in the file for the quarter indicated on the 'Y' card, the new data which is generated will update the existing entry.

The 'R' report produces two sets of reports (figure 2 and 3): a roster of students currently enrolled by major and level of study, and the same data grouped by faculty advisor.

The 'A' report (figure 5) provides one listing for each faculty advisor showing the students he advises. Those stuents who are not assigned an advisor will appear on one listing, and new / temporary advisor names may be manually entered on the printout.

The 'F' report (figure 4) produces a student-faculty advisor listing by major and level of study.

ERROR MESSAGES

SIS incorporates a number of error checking routines. When an error is detected, a message is printed out to advise the user of the problem, what action SIS has taken, and in some instances what further action the user should take. Once the error message is printed, SIS continues to execute if at all possible. It is, therefore, essential that each output produced by SIS be reviewed and, if error messages occured,

corrective action should be taken by the user. To this end a complete list of SIS generated messages, along with appropriate user responses, appears in appendix A.

Chapter 4

MAINTENANCE OF SIS

GENERAL

Problems arising from SIS operation should be easy to isolate and correct using the documentation provided with this package. This documentation includes the HIPO package (figure 8, appendix D) and a listing of SIS. Other figures found in this report should also be of use in the maintenance of SIS.

SIS has been designed in a modular fashion in the anticipation that additional DEMIS modules will be designed to interact with SIS to perform other functions. Expansion of the MATH-DEPT-STUD-DB, provided that it is accompanied by an identical expansion of the associated sort file, will not affect the operation of SIS. All data transfers, to and from the data base, use the COBOL MOVE CORRESPONDING option. This option has been used so that the locations of the corresponding fields within the sending and receiving records is not critical. This principle holds true for modifications in the SPIN-OFF data received from the FTU Student Records.

For testing purposes, SIS incorporates a procedure for loading the SPIN - OFF file using card input test data. This data is designed to be input in card form using the format

described in figure 17. This data is provided as DECK # 5 for future use and when used should follow the input sequence shown in figure 18. Should additional FTU Student Record data be required by SIS or new DEMIS subsystems, it may be simulated, for test purposes, by defining additional card input formats, adding additional fields to the description of the SPIN-OFF file and its associated sort file, and making appropriate changes to the LOAD-FTU-DATA section.

Should additional MATH-DEPT-STUD-DB fields be required, new card input formats must be defined and additional fields added to the MATH-DEPT-STUD-DB, its associated sort file, and the MATH-CHANGE file. The program sections which process the MATH-DEPT-STUD-DB must also be appropriately modified.

SIS - FTU STUDENT RECORD INTERFACE

A SPIN-OFF file has been temporarily created to contain extracts of the FTU Student Records on all students whose major is COMP, MATH, or STAT. Once this data has been loaded into the SPIN-OFF file by the personnel of the FTU Computer Center, it is available for use by SIS.

The format and data required for the SPIN-OFF file is as shown on the SIS listing (appendix C) as the SPIN-OFF-FD data record. The fields of this record are formatted exactly as the corresponding fields in the FTU Student Record Data Base except for a '2' prefix for each field descrip-

NOTE: DO NOT USE THIS FORM WHEN ORDERING NEW OR REVISED CARD FORM COMPOSITION.

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Application SIS TEST DATA by Roger W. Sifrit Date 3/6/76 Job No. DEMIS Sheet No. 1

BASIC DATA

	SSN	LAST NAME	FIRST, MIDDLE, MAIDEN NAMES	M=1701/1790 >5=UG, 5=PB, 6=GR	C=0701 S=1702	LAST QTR ATTEN (YYQQ)	GPA (NNNN)	SEX(M,F)	MARITAL STATUS (1=S, 2=M, 3=OTHER)
1	9 9 9 9 9 9 9 9 9	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	9	9 9 9 9	9 9 9	9 9 9 9	9	9 9 9 9 9 9 9
	1 2 3 4 5 6 7 8 9 10	11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58	59	60 61 62 63	64 65 66	67 68 69 70	71	72 73 74 75 76 77 78 79 80

STUDENT ADDRESS

	SSN	STREET	CITY	STATE	ZIP	PHONE
2	9 9 9 9 9 9 9 9 9	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	9 9	9 9 9 9 9	9 9 9 9 9 9 9 9 9 9
	1 2 3 4 5 6 7 8 9 10	11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	51 52	53 54 55 56 57	58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

PARENTS ADDRESS

	SSN	STREET	CITY	STATE	ZIP
3	9 9 9 9 9 9 9 9 9	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	9 9	9 9 9 9 9
	1 2 3 4 5 6 7 8 9 10	11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	51 52	53 54 55 56 57

INDEX FIELD

	SSN	QTR 691	QTR 692	QTR 693	...
4	9 9 9 9 9 9 9 9 9	9 9 9 9 9	9 9 9 9 9	9 9 9 9 9	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9

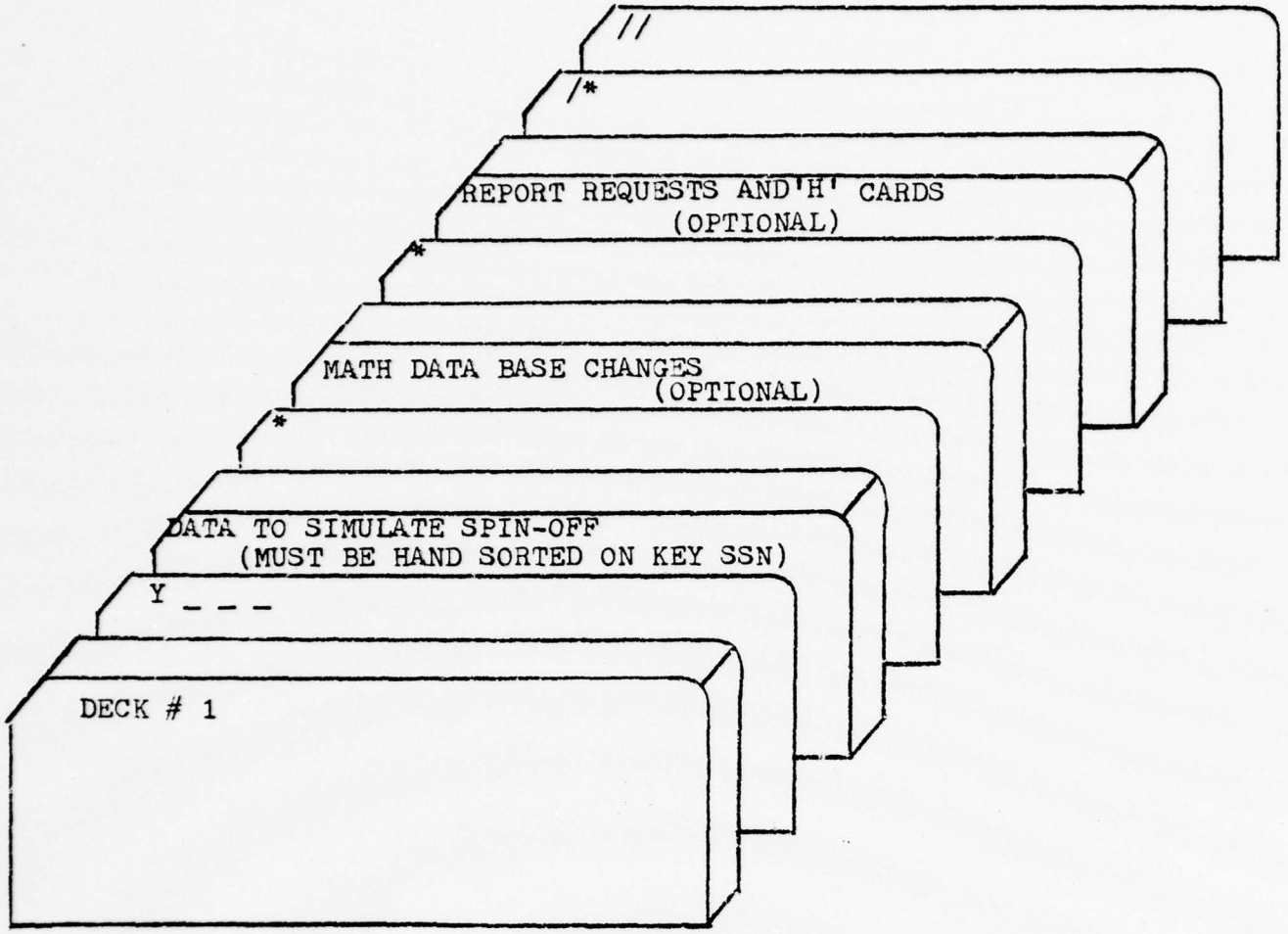


FIGURE 18

DECK FORMAT TO LOAD SPIN-OFF WITH TEST DATA

tion on the FTU Student Record format (e.g. 'LAST-NAME' of the SPIN-OFF-REC of SIS is the receiving field of '2LAST-NAME' of the FTU Student Record). The data description for the required FTU Student Record input is shown in figure 9. The picture description and length of all SPIN-OFF fields are identical to the corresponding record formats of the FTU Student Record Data Base.

TIME PARAMETER ADJUSTMENTS

Periodic reviews should be made of the time limit parameters assigned to SIS (both CPU and I-O). Should the actual run times exceed the present limits, appropriate adjustments must be made to the job card in DECK #1.

HIPO / SOURCE LISTING CORRESPONDENCE

The following procedure may be used to help locate a specific area of SIS where a program modification is to be made:

1) locate the area in question on the HIPO VTOC,
2) refer to the I-P-O diagram whose number is referenced by the VTOC,
3) when the appropriate I-P-O diagram is found, locate the reference note in the source listing for that particular I-P-O diagram, and

4) read the code to locate the appropriate coding to be modified.

The source program for SIS is available at two locations. The original SIS deck is stored in the Department of Mathematical Sciences office. The source listing is also recorded on magnetic tape in the CFRDC PANVALET system.

FILE MAINTENANCE

Periodically, SIS should be reviewed to determine if the file space allocation requires modification. Initially SIS was created with the minimum allocation of "SPACE=(TRK,(1,1))". This limit should cause no problems in executing SIS. As certain data bases increase in size, however, inefficiencies may develop and the space parameters should be adjusted.

The sort file work areas used by SIS have space parameters of "SPACE=(TRK(20),,CONTIG)", which should be adjusted upward if the sort merge routines develop problems or if they appear to be inefficient due to an increase in the length of the data files. The first indication of the space problem in sorting will be encountered during a sort-merge of the STUD-DATA-BASE. Adjustments of these space parameters require changes to JCL cards for SORTWK01,SORTWK02, and SORTWK03.

Chapter 5

FUTURE DEVELOPMENT OF DEMIS

The following is a very generalized "framework" for the future development of DEMIS, and in keeping with the basic concepts of this paper, the framework should remain flexible and open ended. Possible additional modules of DEMIS are shown in figure 1 and discussed below. Naturally, before undertaking the development of a new module for DEMIS, the designer should determine the system requirements and specifications.

A Student Counselling Module for DEMIS would offer an increased scope of the counselling feature offered by SIS. The counselling module could provide a degree plan for students based on their areas of interest, program requirements, transfer credits and other appropriate considerations. It should produce a written program of instruction for each student, with a copy for his faculty advisor.

A Student Scheduling Module might receive input based on data made available by the Student Counselling Module, a student's program requirements, the work load each student desires to carry, and faculty availability. Projected offerings and a recommended schedule for each student for the following two or more quarters could then be made. Such a system would help optimize class sizes, provide an orderly sequence of course offerings for students, bring about optimum faculty

utilization, reduce faculty workloads and could possibly result in a tangible monitary savings to both students and the school. The facilities for computer science majors (e.g. computer facilities) could be better utilized. Certain programming courses might,for example, be concentrated during summer quarters when school attendance is low. During the remainder of the year a more balanced schedule of programming and non-programming courses could be offered.

The FTU Alumni Association is currently investigating the development of a new computerized alumni information system. If these plans are realized, the data bases developed to support that system could be made available to DEMIS. Some of the information which might be of value would be a periodic listing of alumni and the type of jobs they hold. This would be valuable for curriculum development and counselling and could provide feedback to faculty so that adjustments might be made to the approach and content of individual course offerings. The result could be dynamic, "self evaluating" curriculum development procedure for the Department.

A Departmental Statistical Summary Module may be designed to provide statistical data, primarily from other DEMIS modules and data bases, for management use within the department. Such data might include student enrollment, faculty qualifications and specialties, alumni employment,evaluation of the "strengths" of FTU students (based on course balance),

average grade evaluation, and other similar areas. This data could be used to support management decisions, to provide information to potential students, and to determine qualifications and prerequisites for admission based on the profile of a typical successful student. The information provided by this system might also provide a profile to be used in the selection of new faculty members.

These are some modules which may be added to DEMIS to increase the management type information available to the staff and faculty of the Department of Mathematical Sciences. In addition to supporting activities in the Department, several other benefits can accrue from development of DEMIS. The design and construction of additional modules as student projects can provide an excellent opportunity for students interested in computer business applications, and specifically management information systems. The experience gained in developing a production system cannot be matched in any other way and can integrate the formal course work of the student. It could better prepare the student for the business world by providing him with experience and confidence.

Other student projects might be realized in generalizing DEMIS so that it can be used in other departments.

CONCLUSION

SIS provides student information and is the initial module

of DEMIS. SIS is designed to be operated with a minimum of time, effort, and technical expertise, and it provides useful data to support administrative and student advisement activities within the Department of Mathematical Sciences.

The approach used to produce DEMIS is a valid concept in MIS development. While the case study presented in this paper pertained to an educational institution, it is equally applicable to an organization with existing ADP facilities and sufficient capacity to support an additional MIS.

The generalized flexible framework forces consideration of the other potential modules without the requirement for a formal study and the danger of delay in satisfying immediate information requirements. It also prevents the danger of becoming "locked" into a rigid framework which will not provide the flexibility necessary to meet rapidly changing information requirements.

The implementation of individual modules creates a quickly realizeable goal, and can produce tangible results in a short period of time. This makes this approach both attractive and economical.

The informal procedures to implement modules can, however, be dangerous. Certainly any large system which represents a sizeable and costly undertaking should meet formal procedural requirements as listed in Chapter 1.

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Appendix A

ERROR MESSAGES

ERROR MESSAGES

The error messages generated by SIS are listed below in alphabetical order with an appropriate user response. The more significant error messages generated will include an '*' as the first character of the error message. Note that where the message includes the comment 'THE FOLLOWING INPUT CARD DISREGARDED: (CARD TEXT)' that the referenced card has been completely ignored by SIS.

01 MSG: ATTENDANCE DATA ENTRY TO BE DELETED NOT FOUND. THE FOLLOWING INPUT CARD DISREGARDED: (CARD IMAGE)

User Response: A request was made to delete an attendance data entry, and the entry could not be found. Check for the correct SSN on input cards, check to make sure that column 1 has the correct code, and check previous listing of data to ensure that the entry to be deleted is exactly the same as on the listing. The listing should also be checked to ensure that previously entered incorrect data is not on the record (i.e. an inbeded space in the data string, a leading space in the data string, or a missing or extra character in the data string). If the input card is incorrect make appropriate changes. If an incorrect data string is found in

the student record the entire data field must be purged using a 'Z' format card followed on the next SIS run with a 'Q' format card with corrected attendance record data.

02 MSG: * CANNOT DETERMINE IF (STUDENT LAST NAME, STUDENT FIRST NAME, STUDENT SSN) IS GRAD, UG, OR PB - IS NOT INCLUDED IN STATISTICS.

User response: SPIN-OFF file does not show the level of study of the student indicated. If SPIN-OFF file is loaded from test data, an error is probably present in the test data. If SPIN-OFF file is loaded with FTU Student Record Data, then consult with the Data Base Administrator.

Note: Statistics reports will not include this student.

03 MSG: * CANNOT DETERMINE LAST QRT ATTENDED FOR (STUDENT LAST NAME, STUDENT FIRST NAME, STUDENT SSN). CHECK SPIN-OFF DATA AND CURRENT QRT INPUT.

User Response: SPIN-OFF file does not show the student indicated as being enrolled in the quarter specified on the 'Y' card or any previous quarter. If SPIN-OFF file is loaded with test data, an error is probably present in the test data. If SPIN-OFF file is loaded with FTU Student Record Data, then check for incorrect data on the 'Y' card. If 'Y'

card is correct consult the Data Base Administrator.
Note: Statistics reports will not include this student.

04 MSG: * CANNOT DETERMINE MAJOR OF (STUDENT LAST NAME, STUDENT FIRST NAME, STUDENT SSN) DATA NOT INCLUDED IN STATISTICS.

User Response: SPIN-OFF file indicates that the subject student is not a MATH, COMP, or STAT major. If SPIN-OFF file is loaded with test data, an error is probably present in the test data. If SPIN-OFF file is loaded with FTU Student Record Data, then consult with the Data Base Administrator.
Note: Statistics Report will not include this student.

05 MSG: CANNOT LOCATE RECORD TO BE CHANGED FOR SSN (SSN FROM INPUT CARD) THE FOLLOWING INPUT CARD DISREGARDED: (CARD IMAGE).

User Response: A request was made to delete or alter data in a student record in the MATH-DATA-BASE, probably with card format 'Z', 'X', or 'D'. The SSN on the change card did not match any record in the MATH-DATA-BASE, and so SIS could not make the correction. Check for proper code in column 1 of the change card, or for incorrect SSN in columns 2-10.

06 MSG: ENTRY TO BE DELETED NOT FOUND IN STATISTICS HIST FILE THE FOLLOWING INPUT CARD DISREGARDED: (CARD TEXT)

User Response: An 'H' change to delete an entry in the Statistics History file was made, and SIS could not locate the entry to be deleted. Check the date on the input card with a current listing for correctness, check the 'H' card format to ensure that the correct data is in columns 2 through 7 of the input card. If an addition was to be made to the Statistics History file, check for zeros incorrectly filling columns 8 through 32 of the input card.

07 MSG: * EXPECTED BUT DID NOT FIND * TO INDICATE END MARKER FOR SPIN-OFF. THE FOLLOWING INPUT CARD DISREGARDED: (CARD TEXT).

User Response: If SPIN-OFF is loaded with FTU Student Record Data, the first two input cards were not a 'Y' card followed by a card with an '*' in column 1. As a result, the SPIN-OFF data base has been damaged. Correct the job deck and rerun SIS after SPIN-OFF has been reloaded. If SPIN-OFF is being loaded with test data insert an '*' after the test data and rerun SIS.

08 MSG: * EXPECTED TO FIND * AT END OF MATH CHANGE CARD INPUT FOUND INSTEAD THE FOLLOWING DATA WHICH IS DISRE-

GARDED: * CARD IMAGE: (CARD TEXT).

User Response: A card with the asterisk in column 1 must immediately follow the last MATH-DATA-BASE change card. SIS found instead a character which was not a change request nor an asterisk. If a card with an asterisk in column 1 is missing, place one in the DECK (figure 13). If the card text indicates that it is for a MATH-DATA-BASE change, check the card format for correct code in column 1, and resubmit change. If the disregarded card was a report request, the report will not be generated.

09 MSG: ILLEGAL ENTRY ON HISTORY ALTERATION REQUEST. THE FOLLOWING INPUT CARD DISREGARDED: (CARD TEXT).

User Response: An 'H' card contains illegal data. Check proper format for 'H' card, repunch card and rerun SIS.

10 MSG: ILLEGAL ENTRY ON REPORT REQUEST. THE FOLLOWING INPUT CARD DISREGARDED: (CARD TEXT)

User Response: Column 1 of the input card contained a valid character to generate a report, however other extraneous data was found on the card. Check the input card for extraneous data (if it is a report request) or for an incorrect code in column 1 (if it is not a report request).

11 MSG: ILLEGAL ENTRY ON YEAR AND QUARTER INPUT CARD THE FOLLOWING INPUT CARD DISREGARDED: (CARD TEXT)
User Response: 'Y' card contains illegal data in columns 5 through 80 and was out of place. Probable cause is wrong use of 'Y' in column 1. Check card and correct data in column 1.

12 MSG: ILLEGAL INPUT ON ADVISOR INPUT CARD THE FOLLOWING INPUT CARD DISREGARDED: (CARD TEXT)
User Response: 'V' card has blanks or alphabetic characters in columns 2 through 10 or numeric data appears in columns 11 through 80. Check 'V' format and correct the card (if input was intended to be a 'V' card) or check for an incorrect code in column 1.

13 MSG: INVALID CODE IN COLUMN 1 OF INPUT CARD. THE FOLLOWING INPUT CARD DISREGARDED: (CARD TEXT)
User Response: An unauthorized code was entered in column 1 of input card. Check proper format and enter correct code on card.

14 MSG: * INVALID CURRENT QUARTER SPECIFIED ON INPUT CARD - PROCESSING TERMINATING. THE FOLLOWING INPUT CARD DISREGARDED: (CARD TEXT)
User Response: 'Y' card contained an invalid quarter code. Check quarter code list (appendix B) for

correct conversion data, make correction and rerun SIS.

15 MSG: INVALID SSN ON INPUT CARD. THE FOLLOWING INPUT CARD DISREGARDED: (CARD TEXT)

User Response: Check input card SSN for blanks or non-numeric data in columns 2 through 10.

16 MSG: MEMBERSHIP ENTRY TO BE DELETED NOT FOUND. THE FOLLOWING INPUT CARD DISREGARDED: (CARD TEXT)

User Responses: A request was made to delete an association membership entry, however the entry could not be found. Check for correct SSN in columns 2 through 10 of input card, then ensure that the data to be deleted is exactly the same on both the input card and a current listing. Check to make sure that the correct code was entered in column 1 of the input card.

17 MSG: ** MISSING OR OUT OF SEQUENCE CURRENT QUARTER CARD PROCESSING TERMINATING THE FOLLOWING INPUT CARD DISREGARDED: (CARD TEXT)

User Response: 'Y' card was not found as the first card of the job deck as required. SIS has been aborted. Check job deck for proper placement of 'Y' card, then rerun SIS.

18 MSG: * NO INPUT FROM STUD DATA BASE.

User Response: While attempting to generate a

report, SIS found no data in the STUD-DATA-BASE. Probable cause is no data in SPIN-OFF file. If SPIN-OFF is loaded with test data, ensure that input deck is correctly formatted, then rerun SIS. If SPIN-OFF is loaded with FTU Student Record Data, then ensure that the first two cards of the job deck contain a 'Y' card immediately followed by a card with an '*' in column 1. If not, SPIN-OFF file has been damaged, and it must be reloaded before SIS is rerun. If the job deck is correct then attempt to rerun SIS. If the same error message is generated, consult with the Data Base Administrator.

19 MSG: * SSN (SSN OF STUDENT) NOT FOUND IN FTU SUPPLIED DATA. VERIFY SSN.

User Response: A student listed in the MATH-DATA-BASE (by SSN) cannot be located in SPIN-OFF file. If SPIN-OFF is loaded with test data, incorrect test data is the probable cause. If SPIN-OFF is loaded from FTU Student Record Data, then verify the correctness of the student's SSN in the MATH-DATA-BASE. If the student is a COMP, MATH, or STAT major, then consult with the Data Base Administrator. Note: Statistics report will not include this student.

Appendix B

CURRENT QUARTER TABLE

Appendix B

Current Quarter Codes

Academic Quarter	Current Quarter Code Recognized by SIS	Sequential Quarter
F68	691	01
W69	692	02
S69	693	03
U69	694	04
F69	701	05
W70	702	06
S70	703	07
U70	704	08
F70	711	09
W71	712	10
S71	713	11
U71	714	12
F71	721	13
W72	722	14
S72	723	15
U72	724	16
F72	731	17
W73	732	18
S73	733	19
U73	734	20
F73	741	21
W74	742	22
S74	743	23
U74	744	24

Academic Quarter	Current Quarter Code Recognized by SIS	Sequential Quarter
F74	751	25
W75	752	26
S75	753	27
U75	754	28
F75	761	29
W76	762	30
S76	763	31
U76	764	32
F76	771	33
W77	772	34
S77	773	35
U77	774	36
F77	781	37
W78	782	38
S78	783	39
U78	784	40

Appendix C

SIS LISTING

(LISTING IS EXTERNAL TO THE BOUND REPORT)

Appendix D

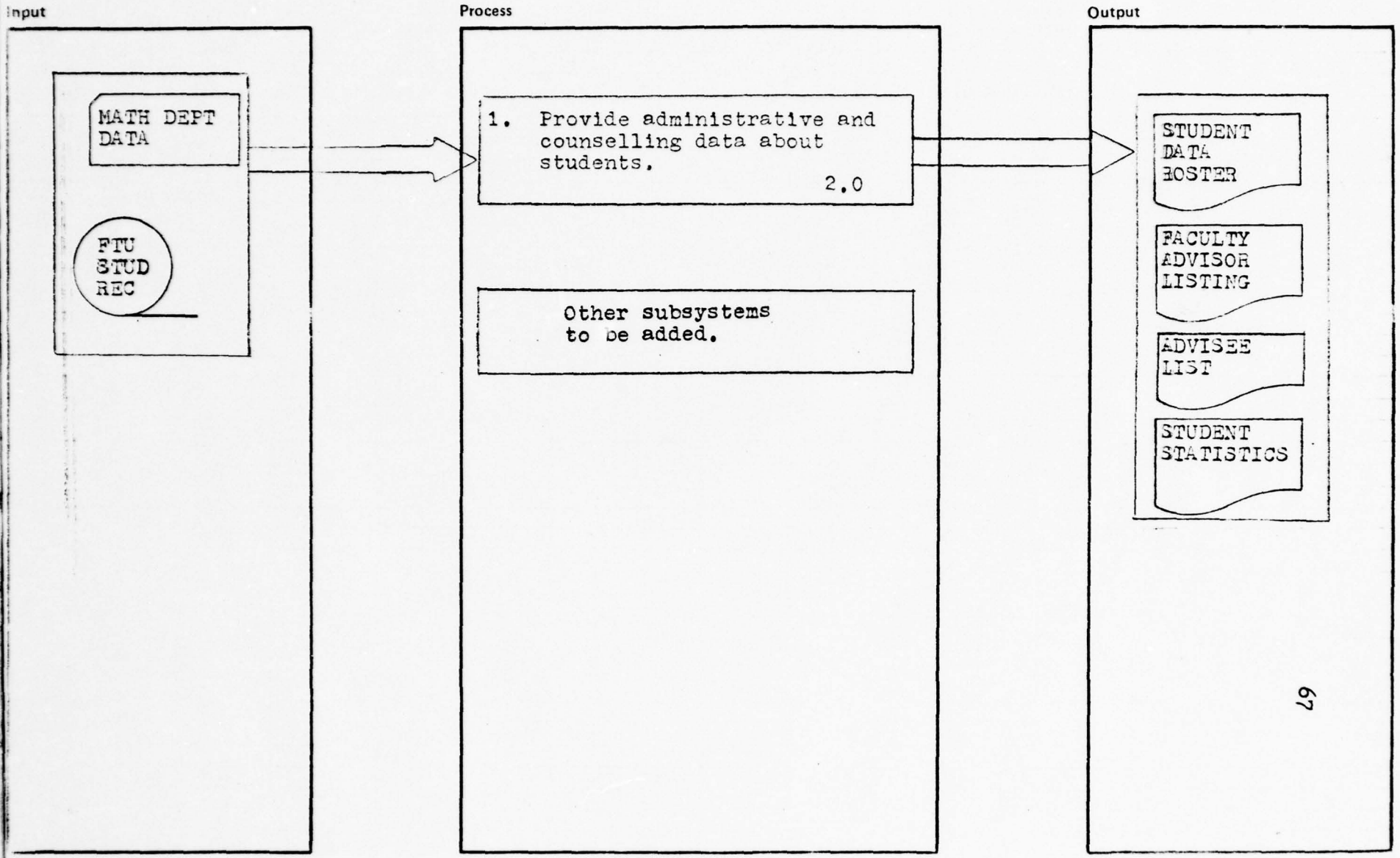
HIPO INPUT-PROCESS-OUTPUT (I-P-O) DIAGRAMS

IBM HIPO WORKSHEET

GX20-1970-0 U/M 025 *
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: DEMIS Date: 3/6/76 Page: 1 of 1

Diagram ID: 1.0 Name: DEMIS Description: DEPT OF MATH INFO SYSTEM

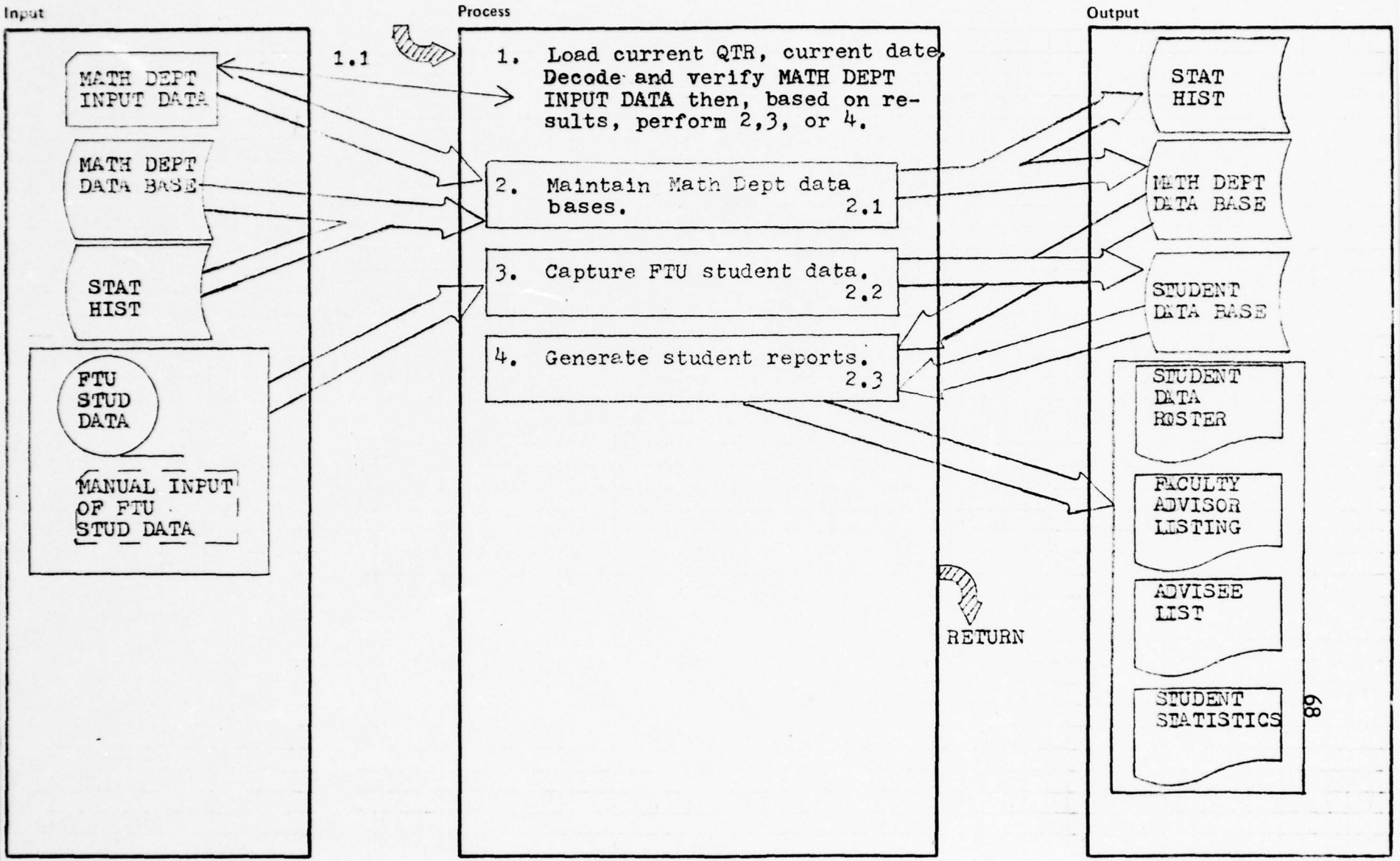


IBM HIPO WORKSHEET

GX20-1970-0 U/M 025 *
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: SIS Date: 3/6/76 Page: 1 of 1

Diagram ID: 2.0 Name: SIS Description: STUDENT INFORMATION SYSTEM

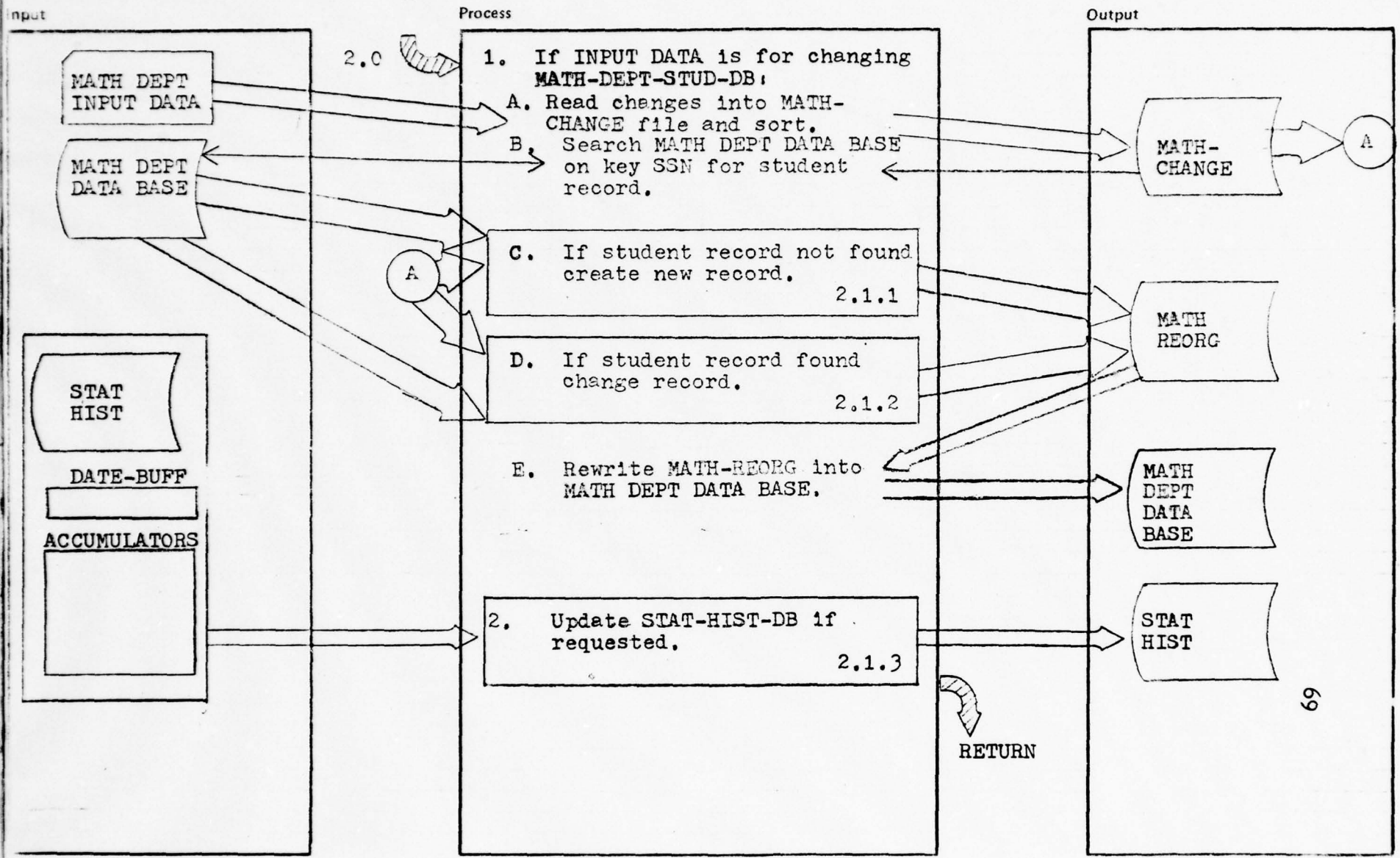


IBM HIPO WORKSHEET

GX20-1970-0 U/M 025 *
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: SIS Date: 3/6/76 Page: 1 of 1

Diagram ID: 2.1 Name: MATH-LOAD-UPDATE Description: MAINTAIN MATH DEPT DATA BASE

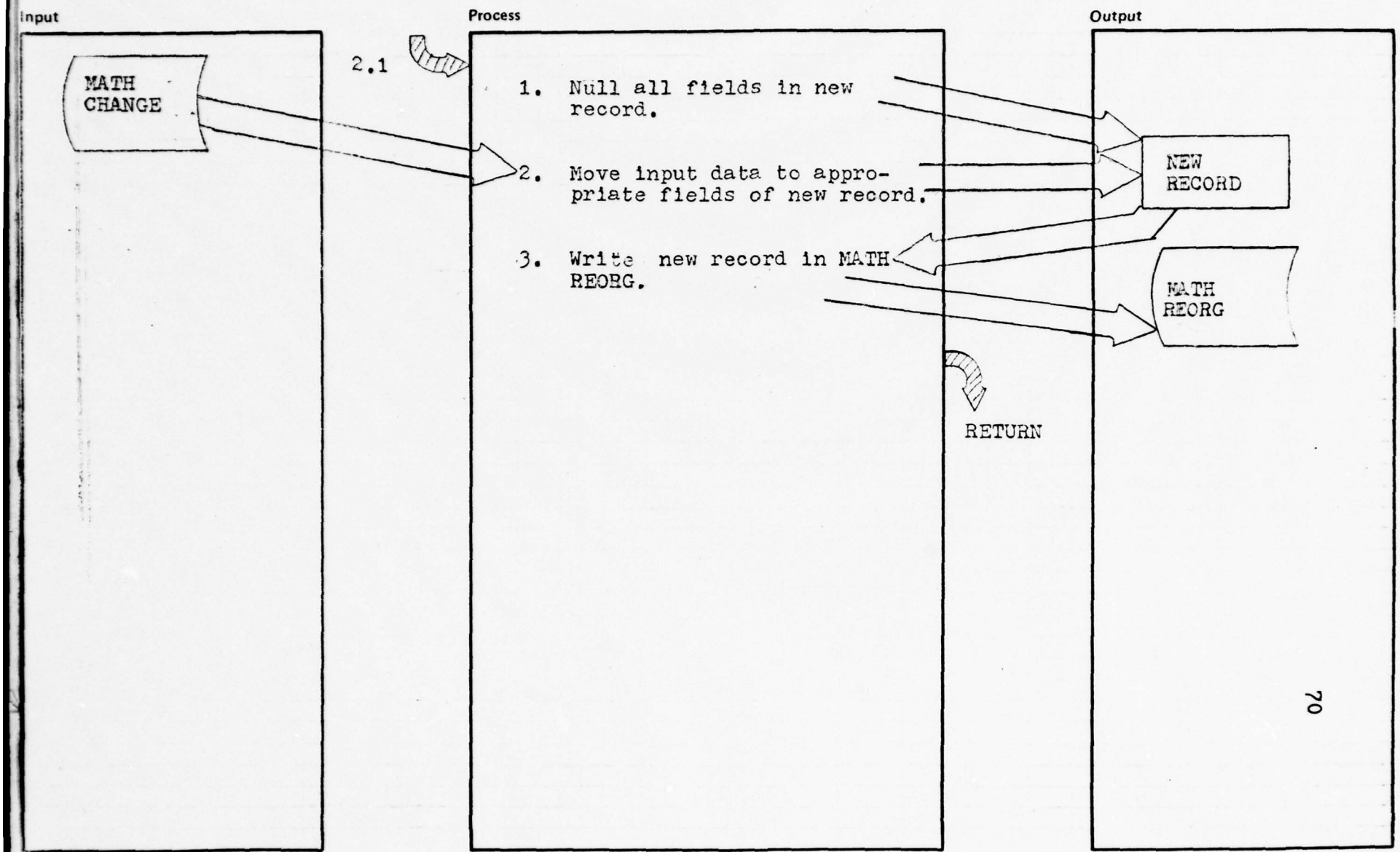


IBM HIPO WORKSHEET

GX20-1970-0 U/M 025 *
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: SIS Date: 3/6/76 Page: 1 of 1

Diagram ID: 2.1.1 Name: CREATE-MATH-REC Description: CREATE NEW MATH DEPT RECORD

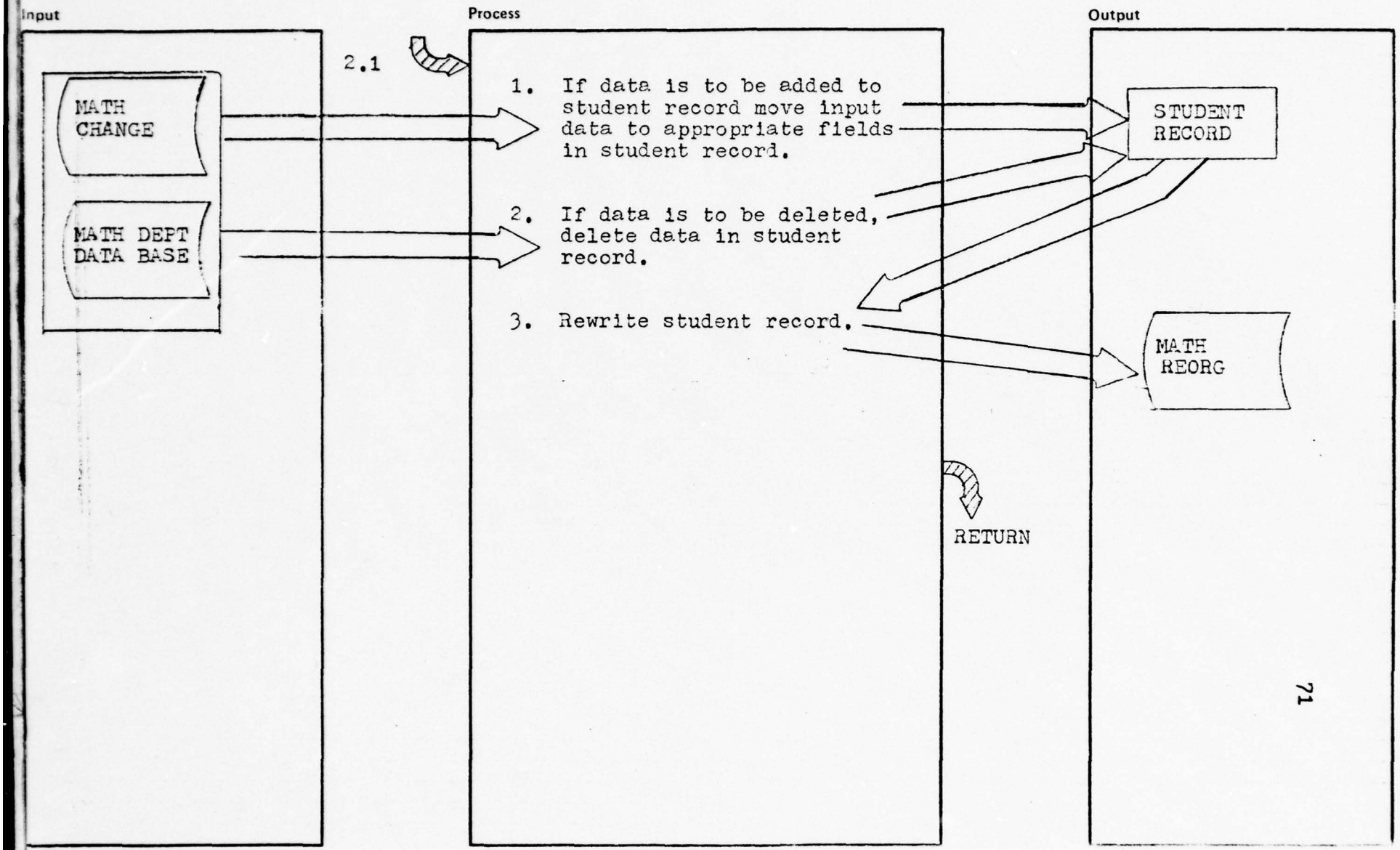


IBM **HIPO WORKSHEET**

GX20-1970-0 U/M 025 *
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: SIS Date: 3/6/76 Page: 1 of 1

Diagram ID: 2.1.2 Name: UPDATE-MATH-REC Description: UPDATE MATH DEPT DATA BASE RECORD

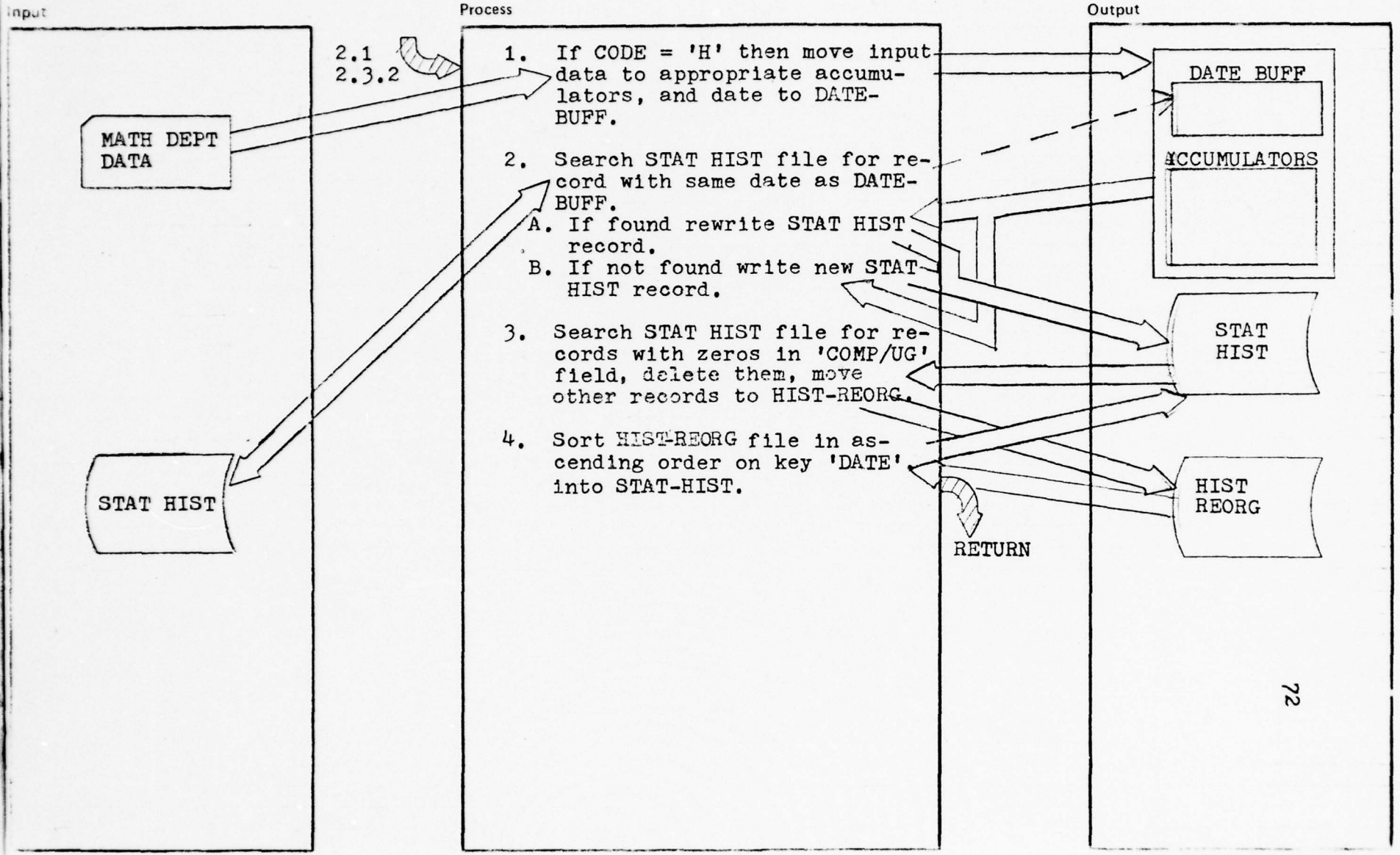


IBM HIPO WORKSHEET

GX20-1970-0 U/M 025 *
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Author: ROGER SIFRIT System/Program: SIS Date: 3/20/76 Page: 1 of 1

Diagram ID: 2.1.3 Name: STAT-HIST Description: MAINTAIN STATISTICS HISTORY FILE

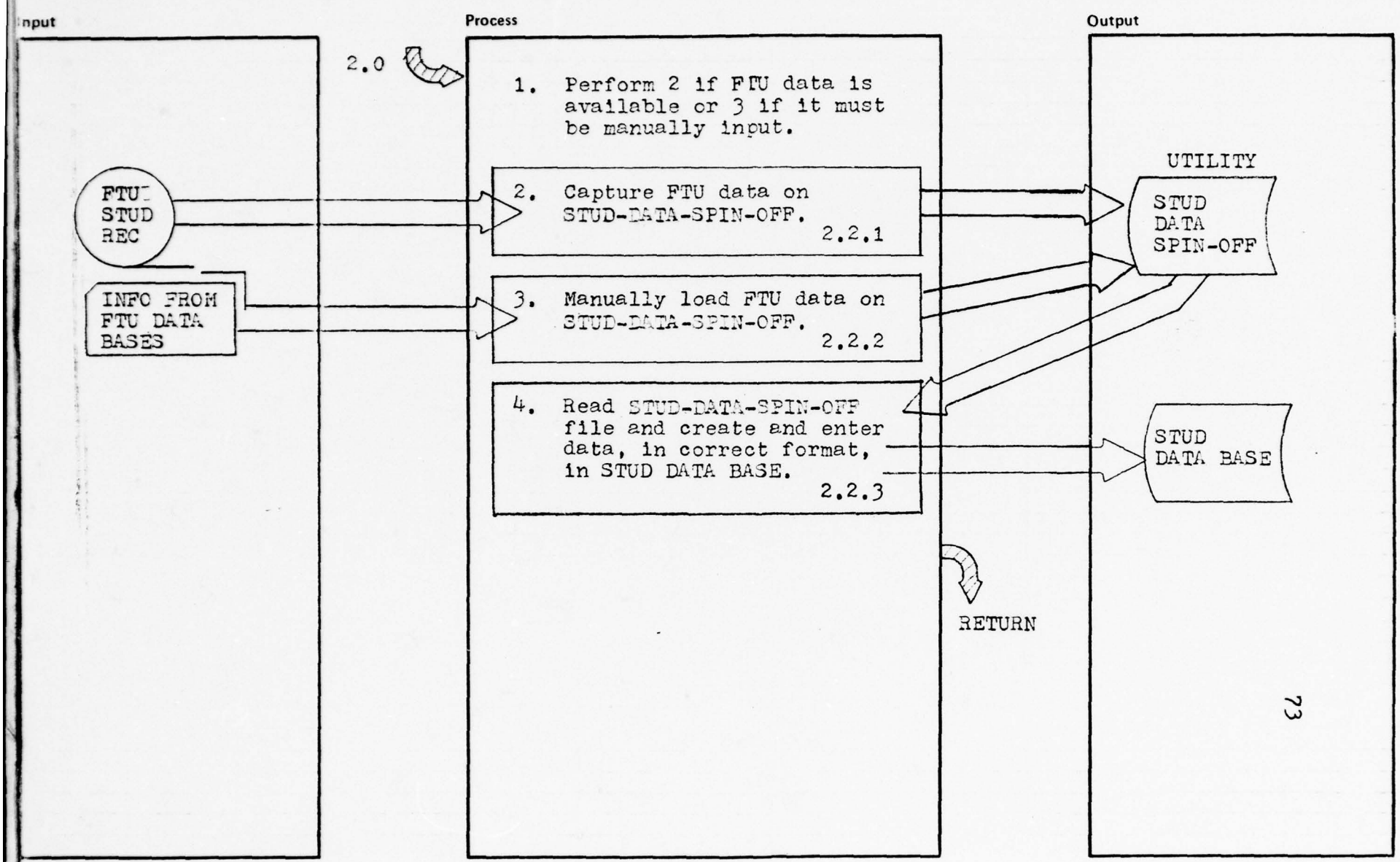


IBM **HIPO WORKSHEET**

GX20-1970-0 U/M 025 *
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: SIS Date: 3/6/76 Page: 1 of 1

Diagram ID: 2.2 Name: LOAD-FTU-DATA Description: LOAD FTU STUDENT DATA

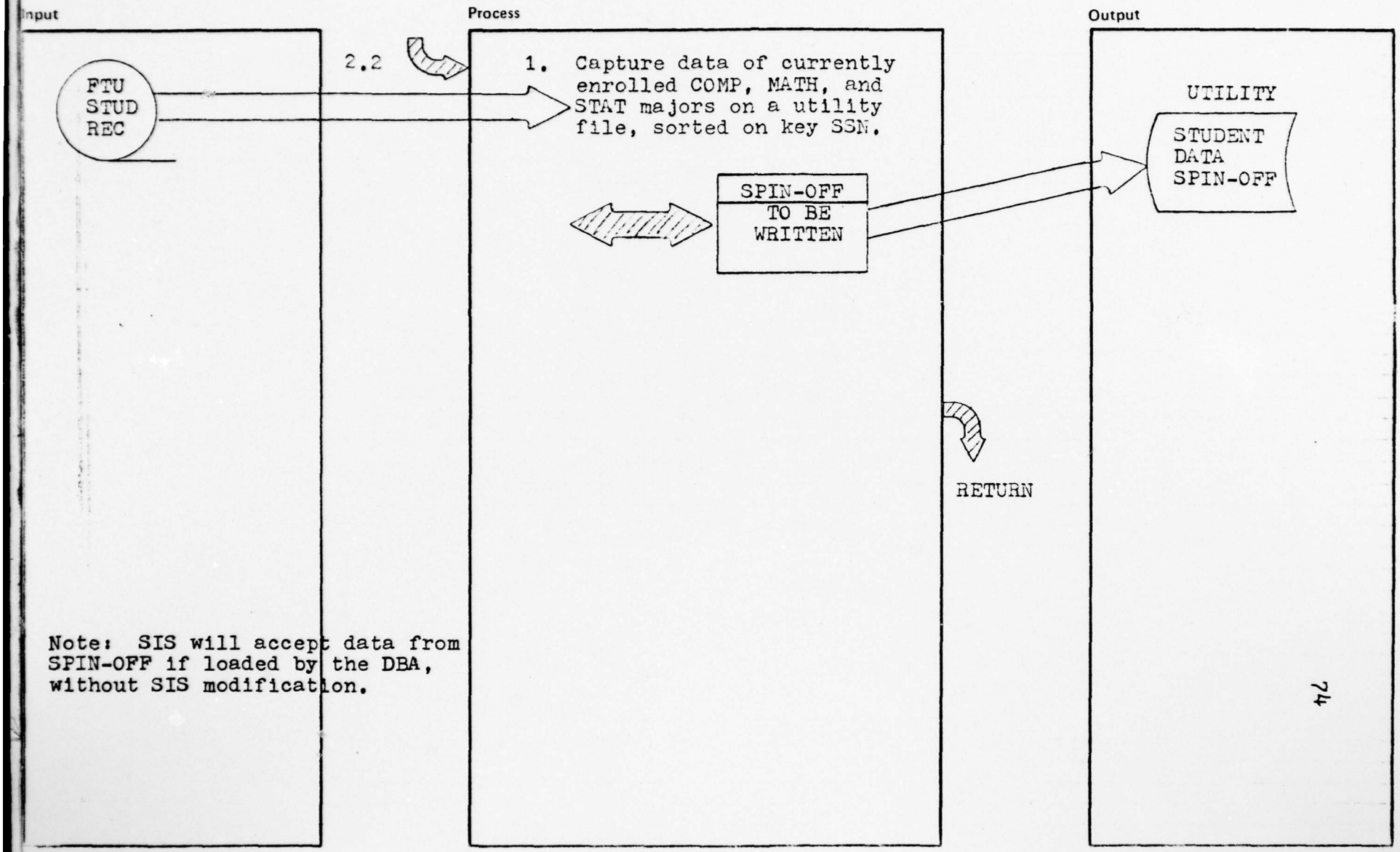


IBM **HIPO WORKSHEET**

GX20-1970-0 U/M 025 *
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: SIS Date: 3/6/76 Page: 1 of 1

Diagram ID: 2.2.1 Name: GET-SPIN-OFF Description: CAPTURE FTU DATA ON SPIN-OFF FILE



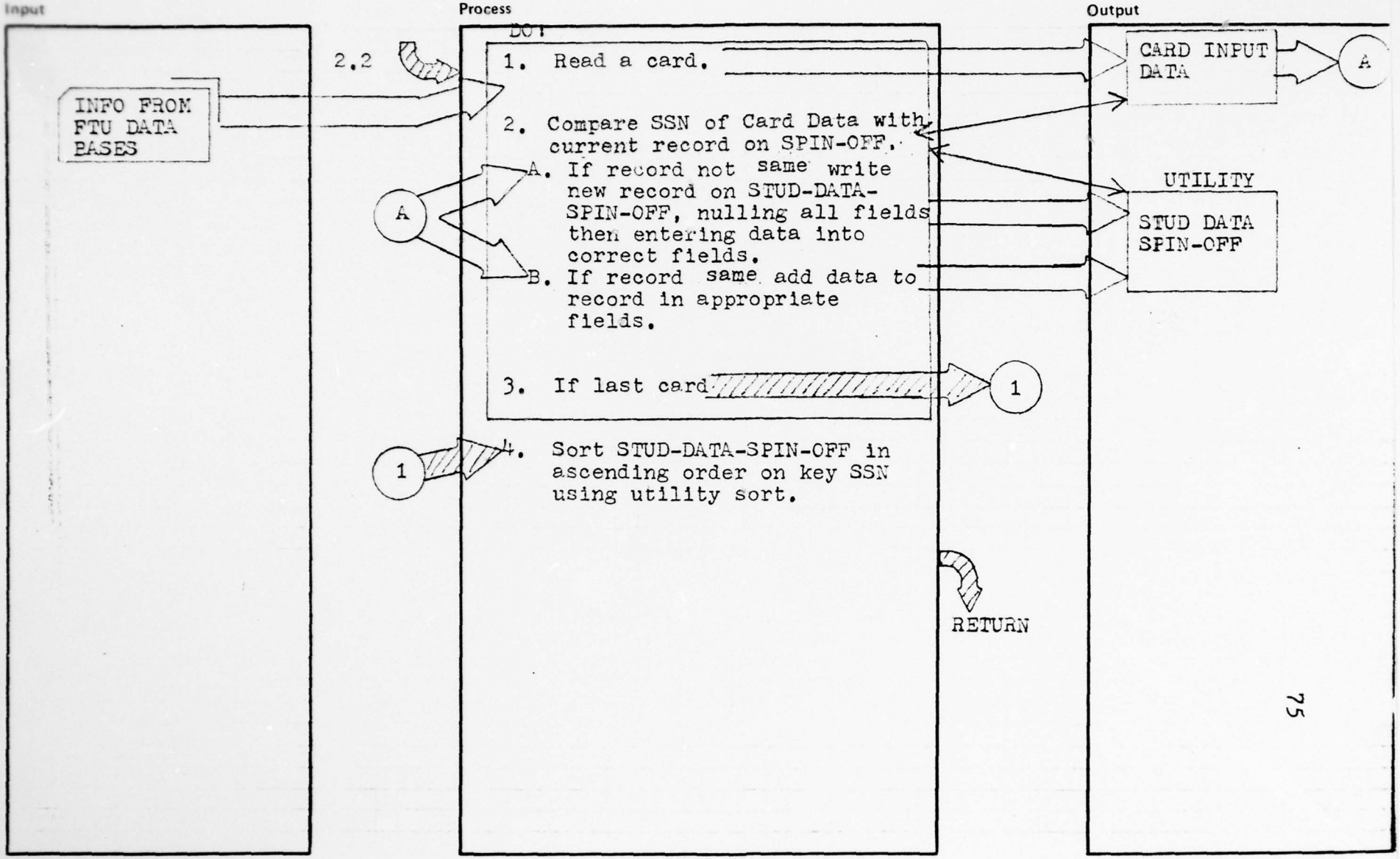
Note: SIS will accept data from SPIN-OFF if loaded by the DBA, without SIS modification.

IBM HIPO WORKSHEET

GX20-1970-0 U/M 025
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: SIS Date: 3/6/76 Page: 1 of 1

Diagram ID: 2.2.2 Name: LOAD-SPIN-OFF Description: MANUALLY LOAD FTU DATA ON SPIN-OFF

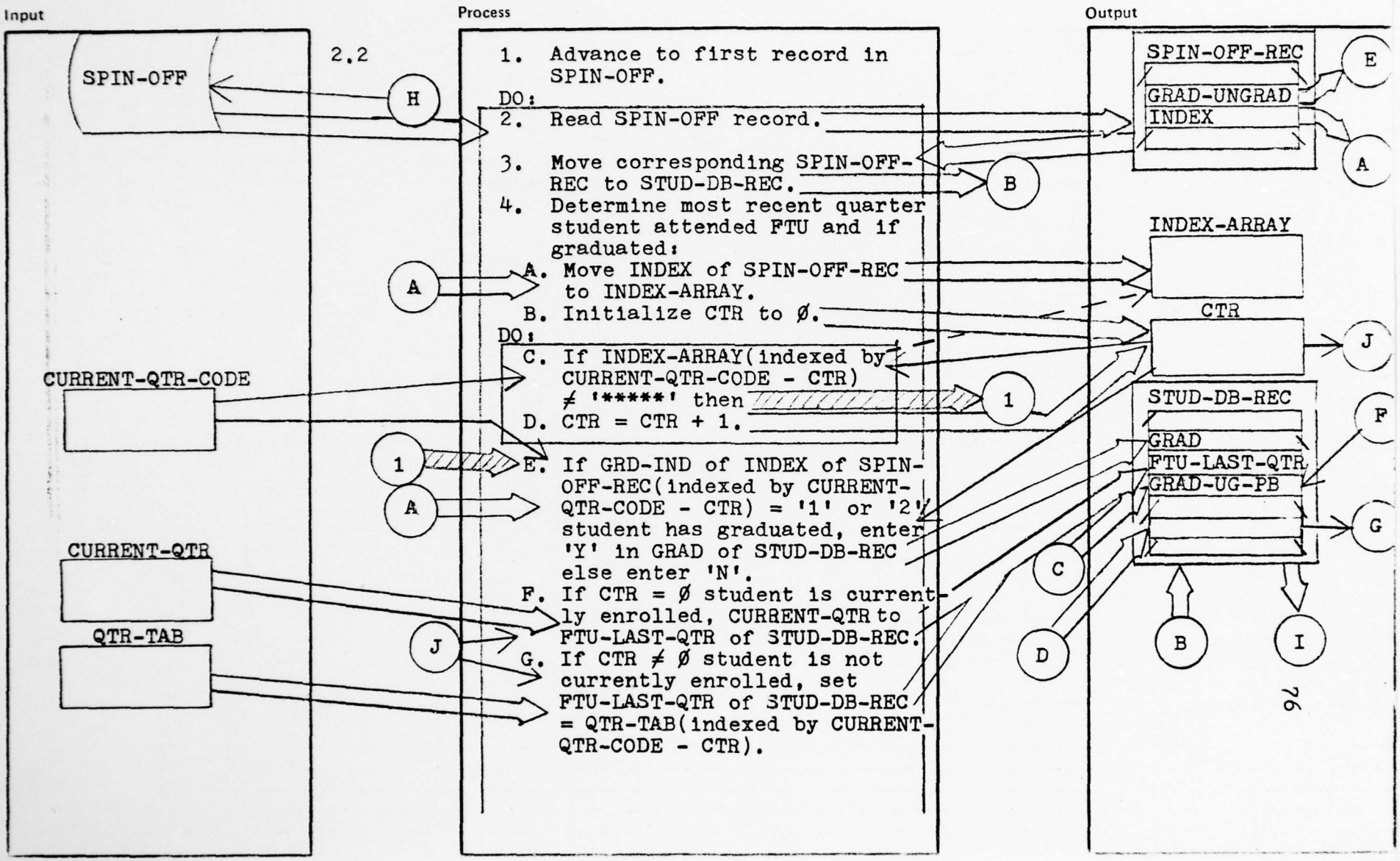


IBM HIPO WORKSHEET

GX20-1970-0 U/M 025
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: SIS Date: 3/28/76 Page: 1 of 2

Diagram ID: 2.2.3 Name: LOAD-STUD-DB Description: LOAD STUD-DATA-BASE FROM SPIN-OFF

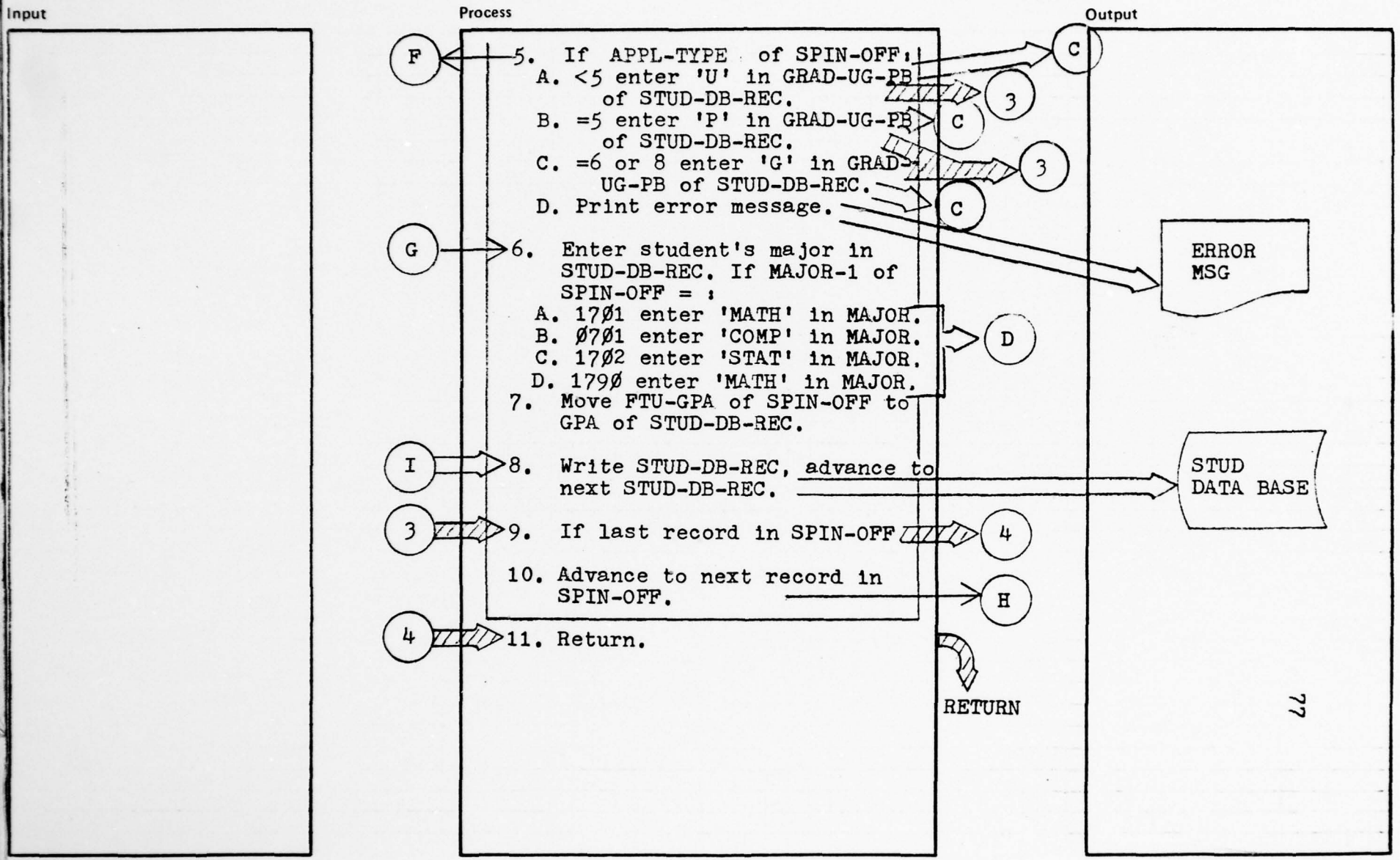


IBM HIPO WORKSHEET

GX20-1970-0 U/M 025 *
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: SIS Date: 3/28/76 Page: 2 of 2

Diagram ID: 2.2.3 Name: LOAD-STUD-DB Description: LOAD STUD-DATA-BASE FROM SPIN-OFF

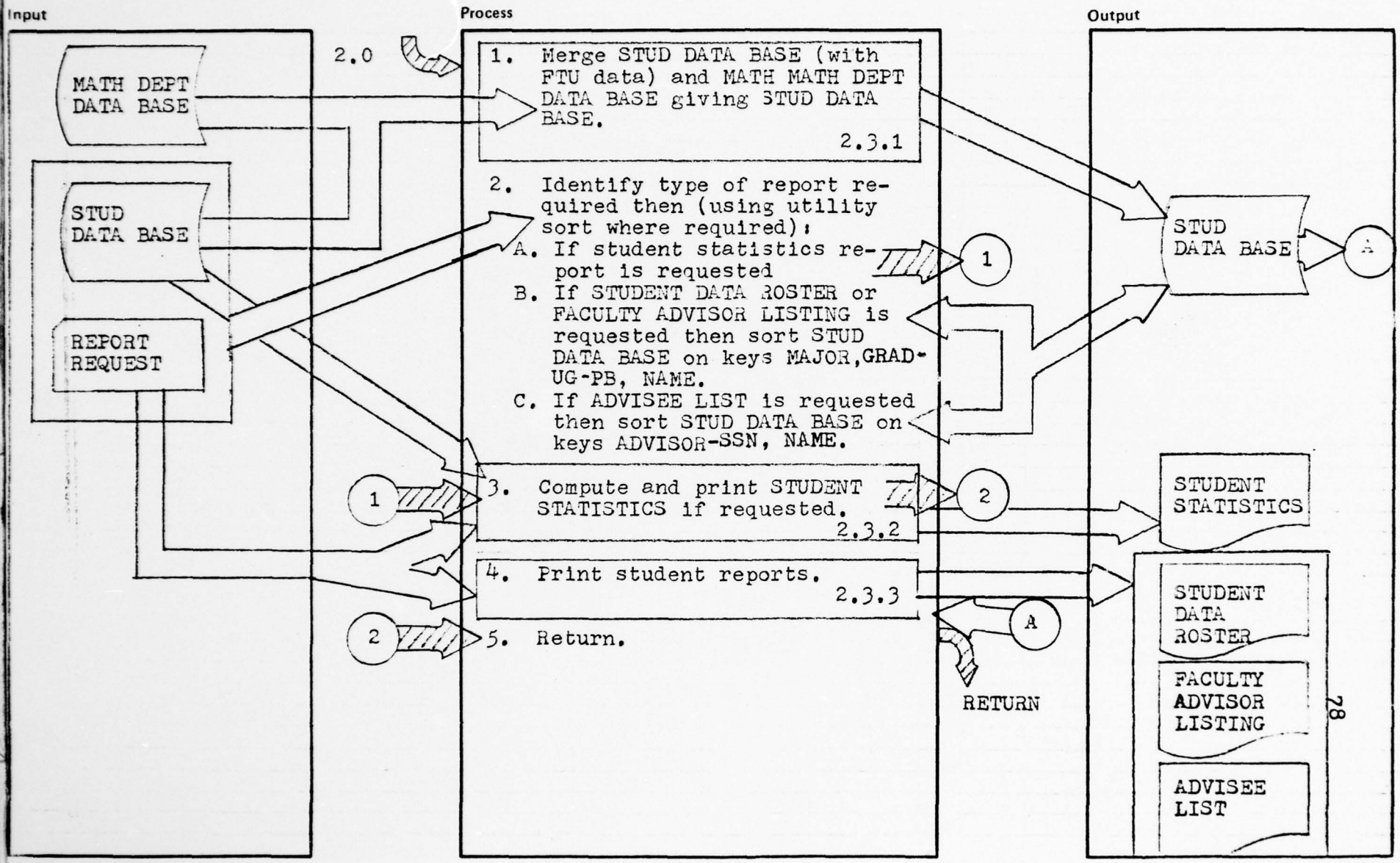


IBM **HIPO WORKSHEET**

GX20-1970-0 U/M 025 *
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Author: ROGER SIFRIT System/Program: SIS Date: 3/6/76 Page: 1 of 1

Diagram ID: 2.3 Name: GENERATE-REPORTS Description: GENERATE STUDENT REPORTS

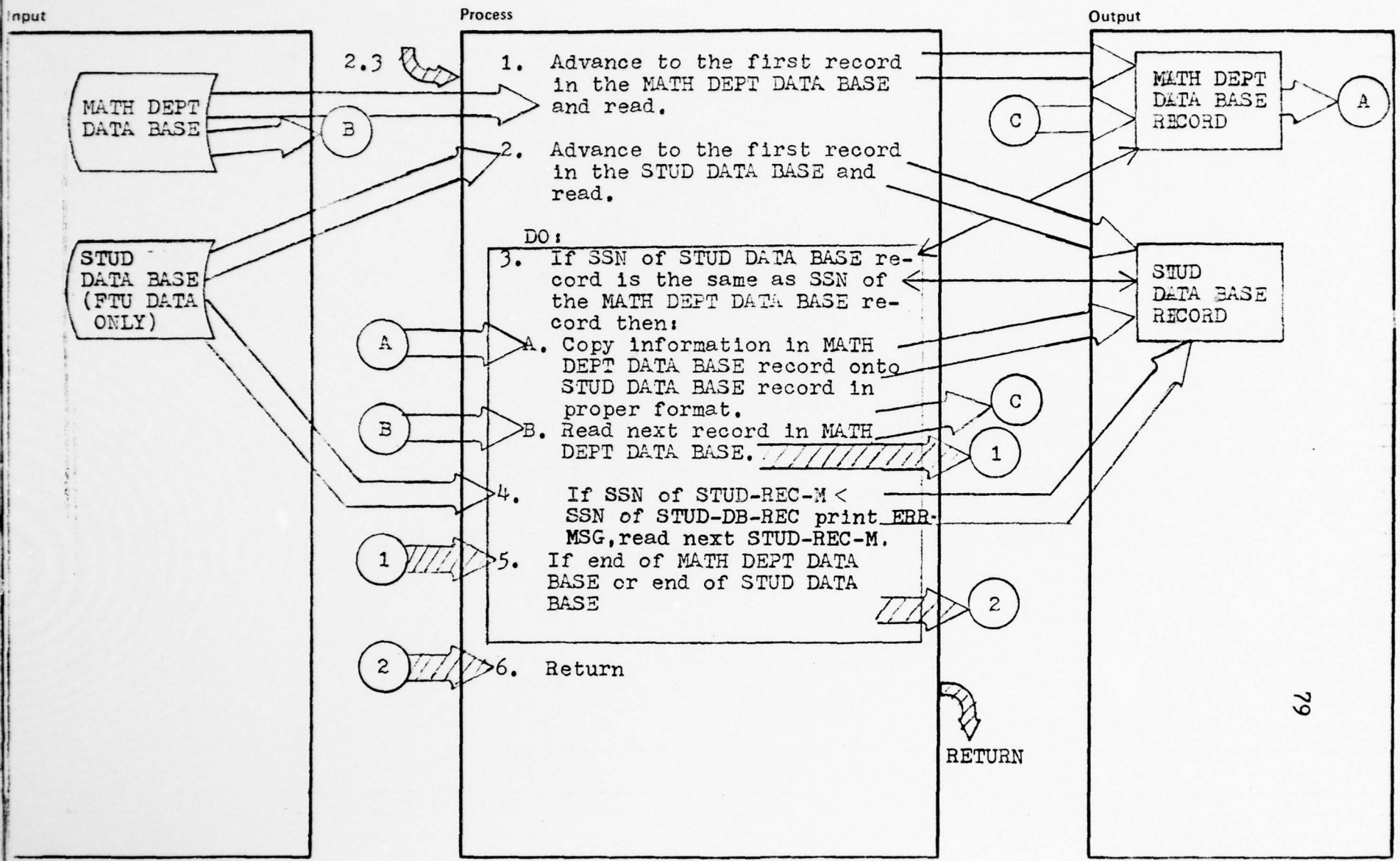


IBM **HIPO WORKSHEET**

GX20-1970-0 U/M 025 *
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: SIS Date: 3/6/76 Page: 1 of 1

Diagram ID: 2.3.1 Name: MERGE-DATA Description: MERGE FTU AND MATH DATA

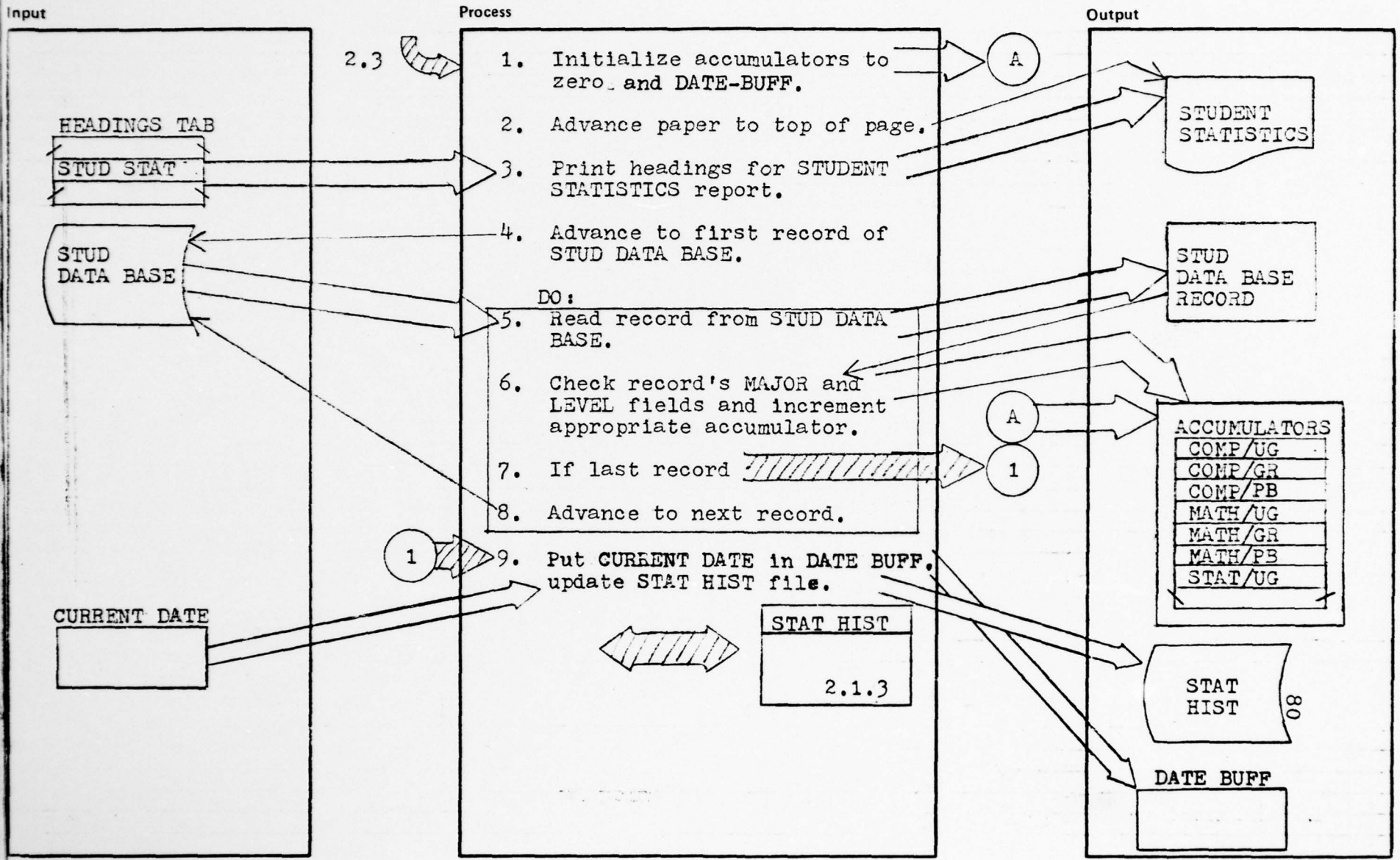


IBM HIPO WORKSHEET

GX20-1970-0 U/M 025 *
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Author: ROGER SIFRIT System/Program: SIS Date: 3/6/76 Page: 1 of 2

Diagram ID: 2.3.2 Name: PRINT-STAT Description: COMPUTE AND PRINT STUDENT STAT

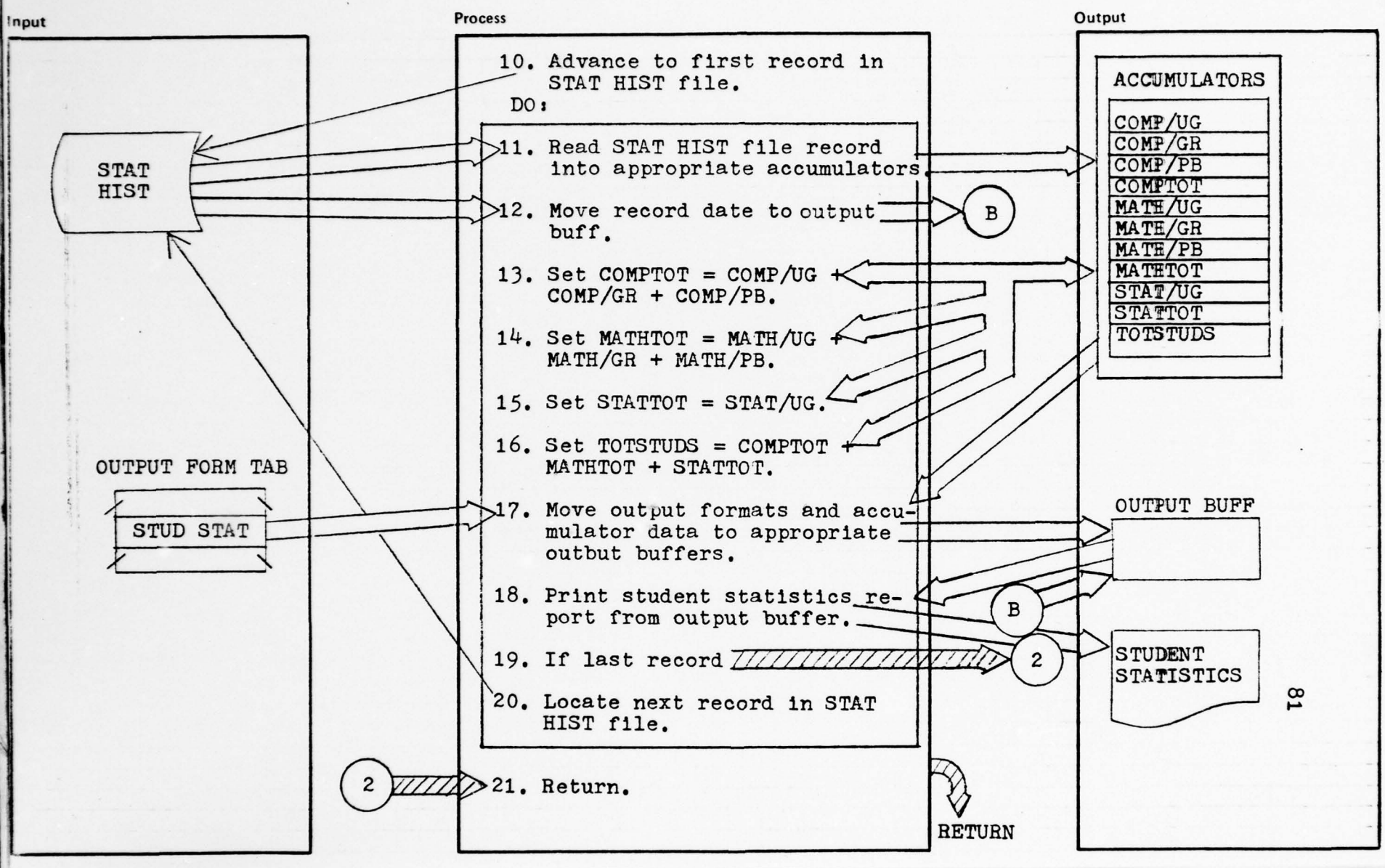


IBM HIPO WORKSHEET

GX20-1970-0 U/M 025 *
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: SIS Date: 3/20/76 Page: 2 of 2

Diagram ID: 2.3.2 Name: PRINT-STAT Description: COMPUTE AND PRINT STUDENT STAT

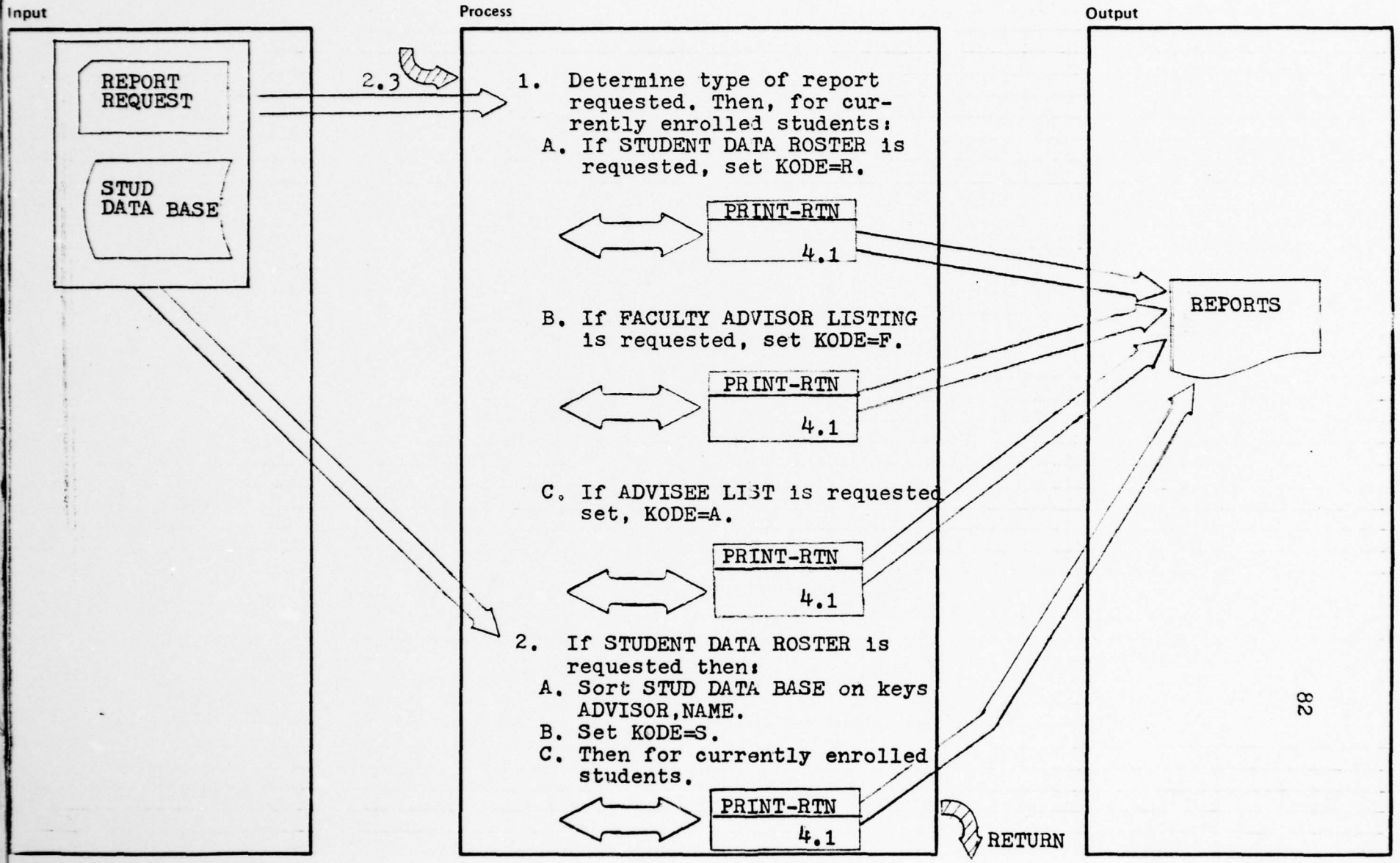


IBM HIPO WORKSHEET

GX20-1970-0 U/M 025 *
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: SIS Datr 3/6/76 Page: 1 of 1

Diagram ID: 2.3.3 Name: PRINT-REPT Description: PRINT STUD REPORTS

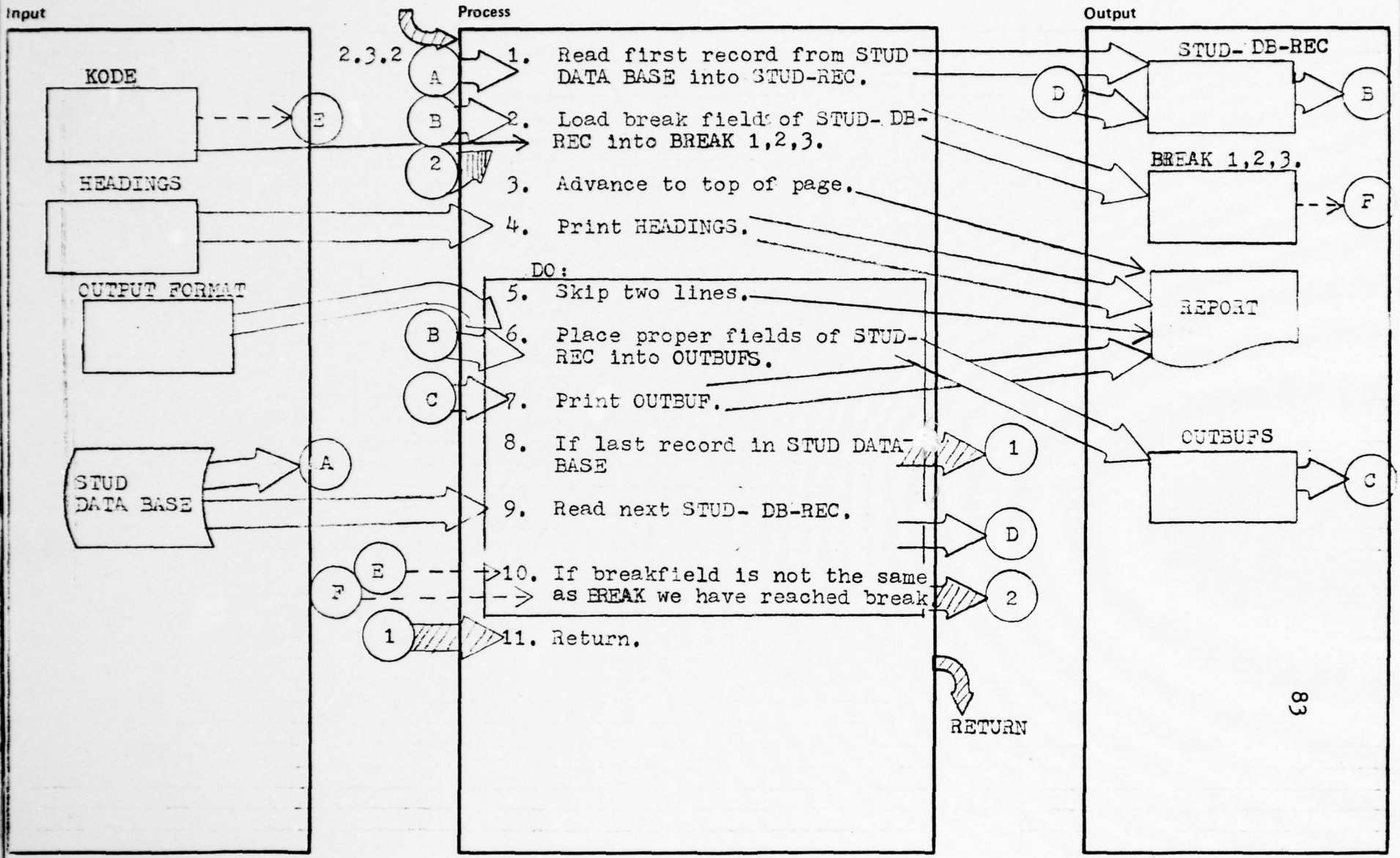


IBM HIPO WORKSHEET

GX20-1970-0 U/M 025 *
Printed in U.S.A.

Author: ROGER SIFRIT System/Program: SIS Date: 3/6/76 Page: 1 of 1

Diagram ID: 4.1 Name: PRINT-RTN Description: PRINT SUBROUTINE



Appendix E

SIS DECK LISTINGS

```
//COMP698P JOB (1770,3386,NCLZ,FTU,25,34,),'ROGER SIFRIT',CLASS=B,      X
//              MSGLEVEL=(1,1)
//JOBLIB DD DSN=FTU.OU.P1770.PRMOD,DISP=SHR
//STEP1 EXEC PGM=SIS
//PROUT      DD SYSOUT=A
//DISKSPO     DD DSN=FTU.OU.P1770.SPO,                                  X
//               DISP=(OLD,KEEP),                                       X
//               SPACE=(TRK,(1,1)),                                     X
//               UNIT=DISK,VOL=SER=FTUPK1
//DISKSDB      DD DSN=FTU.OU.P1770.SDB,                                 X
//               DISP=(NEW,DELETE),                                     X
//               SPACE=(TRK,(1,1)),                                     X
//               UNIT=3330
//DISKMDB      DD DSN=FTU.OU.P1770.MDB,                                 X
//               DISP=(OLD,KEEP),                                       X
//               SPACE=(TRK,(1,1)),                                     X
//               UNIT=DISK,VOL=SER=FTUPK1
//HISTDB     DD DSN=FTU.OU.P1770.HDB,                                   X
//               DISP=(OLD,KEEP),                                       X
//               SPACE=(TRK,(1,1)),                                     X
//               UNIT=DISK,VOL=SER=FTUPK1
//DISKMR      DD DSN=FTU.OU.P1770.MR,                                   X
//               DISP=(NEW,DELETE),                                     X
//               SPACE=(TRK,(1,1)),                                     X
//               UNIT=3330
//DISKCG      DD DSN=FTU.OU.P1770.CG,                                   X
//               DISP=(NEW,DELETE),                                     X
//               SPACE=(TRK,(1,1)),                                     X
//               UNIT=3330
//DISKHR      DD DSN=FTU.OU.P1770.HR,                                   X
//               DISP=(NEW,DELETE),                                     X
//               SPACE=(TRK,(1,1)),                                     X
//               UNIT=3330
//SORTLIB      DD DSN=SYS1.SORTLIB,DISP=SHR
//SORTWK01     DD UNIT=SYSDA,SPACE=(TRK,(20),,CONTIG)
//SORTWK02     DD UNIT=SYSDA,SPACE=(TRK,(20),,CONTIG)
//SORTWK03     DD UNIT=SYSDA,SPACE=(TRK,(20),,CONTIG)
//SYSOUT    DD   SYSOUT=A
//OUTSORT    DD   SYSOUT=A
//READER  DD *

**********                    INSERT DATA HERE                    **********

/*
//
```

LISTING OF DECK # 1 (SIS RUN DECK)

```
//COMP698P JOB (1770,3376,NCLZ,FTU,5,5),'ROGER SIFRIT',CLASS=B,          X
//             MSGLEVEL=(1,1)
/*JOBPARM PSS=NO,F=1410,K=61
//        EXEC COBUCLG
          IDENTIFICATION DIVISION.
          PROGRAM-ID. CREATE MATH-DEPT-STUD-DB.
          ENVIRONMENT DIVISION.
          INPUT-OUTPUT SECTION.
          FILE-CONTROL.
              SELECT MATH-DEPT-STUD-DB ASSIGN TO DA-3330-S-DISKMDB.
          DATA DIVISION.
          FILE SECTION.
          FD   MATH-DEPT-STUD-DB LABEL RECORD IS STANDARD RECORDING MODE F
               DATA RECORD IS STUD-REC-M.
          01   STUD-REC-M.
               02 ATTEND-DATA          PIC X(100).
               02 MBR-DATA             PIC X(70).
               02 SSN                  PIC 9(09).
               02 ADVISOR-NAME         PIC X(18).
               02 ADVISOR-SSN          PIC 9(09).
          PROCEDURE DIVISION.
               OPEN OUTPUT MATH-DEPT-STUD-DB.
               MOVE SPACES TO STUD-REC-M.
               MOVE ZEROS TO SSN OF STUD-REC-M.
               WRITE STUD-REC-M.
               CLOSE MATH-DEPT-STUD-DB.
               STOP RUN.
//GO.DISKMDB  DD DSN=FTU.OU.P1770.MDB,                                   X
//               SPACE=(TRK,(1,1)),                                      X
//               DISP=(NEW,KEEP,CATLG),                                  X
//               UNIT=DISK,VOL=SER=FTUPK1
/*
//
```

LISTING OF DECK # 3

(FOR CREATION OF MATH-DEPT-STUD-DB FILE)

```
//COMP698P JOB (1770,3376,NCLZ,FTU,5,5),'ROGER SIFRIT',CLASS=B,          X
//             MSGLEVEL=(1,1)
//       EXEC COBUCLG
      IDENTIFICATION DIVISION.
      PROGRAM-ID. CREATE STAT-HIST-DB.
      ENVIRONMENT DIVISION.
      INPUT-OUTPUT SECTION.
      FILE-CONTROL.
          SELECT STAT-HIST-DB ASSIGN TO DA-3330-S-HISTDB.
      DATA DIVISION.
      FILE SECTION.
      FD  STAT-HIST-DB LABEL RECORD IS STANDARD RECORDING MODE IS F
          DATA RECORD IS STAT-REC.
      01  STAT-REC.
          03 QTR                    PIC 9(03).
          03 COMP-UG                PIC 9(04).
          03 COMP-GR                PIC 9(04).
          03 COMP-PR                PIC 9(04).
          03 MATH-UG                PIC 9(04).
          03 MATH-GR                PIC 9(04).
          03 MATH-PR                PIC 9(04).
          03 STAT-UG                PIC 9(04).
      PROCEDURE DIVISION.
          OPEN OUTPUT STAT-HIST-DB.
          MOVE ZEROS TO STAT-REC.
          WRITE STAT-REC.
          CLOSE STAT-HIST-DB.
          STOP RUN.
//GO.HISTDB DD DSN=FTU.OU.P1770.HDB,                                    X
//             DISP=(NEW,KEEP,CATLG),                                   X
//             SPACE=(TRK,(1,1)),                                       X
//             UNIT=DISK,VOL=SER=FTUPK1
/*
//
```

LISTING OF DECK # 4

(FOR CREATION OF STAT-HIST-DB FILE)

LISTING OF DECK # 5a

(TEST DATA USED TO SIMULATE SPIN-OFF FILE ENTRIES)

```
**********                    SPIN-OFF TEST DATA                    **********

111111111PETERSON          OSCAR                          4170271140004M1
211111111199 BLUES STREET     OVIDA                  FL998873057418523
311111111111 JAZZ BLVD        NEW ORLEANS            LA55555
4111111111 0000 0003 0408 0912 1315 1620 2125 2629 3036**************************
4111223333***** 0003 0408 0912 1315 1620 2125 2629 3036**************************
1111223333JORGENSEN        OSCAR                          6179071139914M2
1123456789JONES            JOHN P                         6179071138884M1
4123456789***** 0003 0408 0912 1315 1620 2125 2629 3036**************************
212345678944 SHIPWRECK WAY    TAMPA                  FL325563057747532
312345678925 SHORE DRIVE      SHEEPSHEAD BAY         NY11112
1153283376SIERIT           ROGER WILLIAM                  6070170240004M2
2153283376129R ROYAL BIRKDALE ROCKLEDGE              FL329553056310184
3153283376421 FORTH STREET    FT LAUDERDDLE          FL33012
4153283376 0000 0005 0609 1013 1417 18211222S**********************************
4222222222***** 0003 0408 0912 1315 1620 2125 2629 3036**************************
1222222222MANIX            KARL                           3170270124444M1
1223334444WASHINGTON       GEORGE C                       6179071139984M1
4223334444***** 0003 0408 0912 1315 1620 2125 2629 3036**************************
2223334444111 WASHINGTON AVE  WASHINGTON             DC767678007661976
3223334444600 PENN AVE        WASHINGTON             DC76776
4333333333***** 0003 0408 0912 1315 1620 2125 2629 3036**************************
1333333333SMITH            BETTY JONES                    3170271132SF1
233333333312 SHORT STREET     FLAG CITY              FL333543056667856
333333333342 TEMPLE AVENUE    TEMPLE                 TX68953
4333445555***** 0003 0408 0912 1315 1620 2125 2629 3036**************************
1333445555ZEWCHOWSKI       PETER ADRIAN                   5179071135554M2
244444444466 APPLE WAY        APPLE OF EYE           FL777883054442563
344444444466 APPLE WAY        APPLE OF EYE           FL77788
4444444444 0000 0003 0408***** 1315 1620***** 2629 3036**************************
1444444444APPLETON         MARY CARLTON                   4070171128884F1
4444556666***** 0003 0408 0912 1315 1620 2125 2629 3036**************************
1444556666SHOEMACHER       WILLIAM B                      5179071138854M2
4555555555***** 0003 0408********** 1620***** 2629 3036**************************
1555555555ZIMMERMAN        SETH ARNOLD                    4070171123334M1
4555667777***** 0003 0408 0912 1315 1620 2125 2629 3036**************************
1555667777LEE              LEE SHU                        5179071129994M1
4666666666***** 0003 0408 0912 1315 1620 2125 2629 3036**************************
1666666666BROWN            ADOLPH RONALD                  4070171125554M1
1666778888CONROY           MARY ELLEN                     5070171139994F1
366677888112 JAMES STREET     ORLANDO                FL55542
266677888112 JAMES STREET     ORLANDO                FL555423056689638
4666778888***** 0003 0408 0912 1315 1620 2125 2629 3036**************************
4777777777***** 0003 0408 0912 1315 1620 2125 2629 3036**************************
1777777777BAXTER           JOHN DENVER                    6070171138884M2
1777889999BAXTER           JIMMY BUD                      5070171139854M1
377788999914 BRENT ROAD       CHICAGO                IL32564
4777889999**************** 0912 1315 1620 2125 2629 3036**************************
2777889999RED 1               BUS STOP               FL2223330566698?4
4888888888***** 0003 0408 0912 1315 1620 2125 2629 3036**************************
1888888888ROSEN            SAMUAL                         6070171139954M2
288888888RED 999              ORLANDO                FL324563056668745
388888888RED 999              ORLANDO                FL32456
4888999999********************************* 2125 2629 3036**************************
1888999999REYNOLDS         BURTRAND R                     5070171125554M1
288899999953 TOBACCO ROAD     ORLANDO                FL555443054442536
388899999966 CIGAR WAY        HICK TOWN              CA99999
2999999999555 FIFTH STREET    ORLANDO                FL123453053334444
1999999999BROWN            JOSEPH DONALD                  417017013222M1
3999999999666 SIXTH STREET    DALLAS                 TX99999
4999999999********** 0002 0306 0406 07102111**************************************
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AD-A052 628 FLORIDA TECHNOLOGICAL UNIV ORLANDO F/G 9/2
DEMIS, AN INFORMATION SYSTEM TO SUPPORT EDUCATIONAL MANAGEMENT --ETC(U)
JUN 76 R W SIFRIT

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00002           IDENTIFICATION DIVISION.
00003           PROGRAM-ID.  STUDENT INFORMATION SYSTEM.
00004           AUTHOR. ROGER W SIFRIT.
00005           INSTALLATION.  FTU.
00006           DATE-WRITTEN.  MARCH 31, 1976.
00007           DATE-COMPILED. JUN  3,1976.
00008           SECURITY.  THE REPORTS PRODUCED BY THIS PROGRAM CONTAIN
00009              INFORMATION WHICH IS PERSONAL IN NATURE.
00010           REMARKS.
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00012            ENVIRONMENT DIVISION.
00013            CONFIGURATION SECTION.
00014            SOURCE-COMPUTER.  IBM-360-65.
00015            OBJECT-COMPUTER.  IBM-360-65.
00016            INPUT-OUTPUT SECTION.
00017            FILE-CONTROL.
00018                SELECT CARD-IN ASSIGN TO UT-S-READER.
00019                SELECT PRINT-FILE ASSIGN TO UT-S-PROUT.
00020                SELECT MATH-CHANGE ASSIGN TO UT-S-DISKCG.
00021                SELECT SPIN-OFF ASSIGN TO DA-3330-S-DISKSPO.
00022                SELECT STUD-DATA-BASE ASSIGN TO DA-3330-S-DISKSDB.
00023                SELECT STAT-HIST-DB ASSIGN TO DA-3330-S-HISTDB.
00024                SELECT MATH-DEPT-STUD-DB ASSIGN TO DA-3330-S-DISKMDB.
00025                SELECT SORT-WORK-SDB ASSIGN TO DA-3330-S-SORTWK01.
00026                SELECT SORT-WORK-HDB ASSIGN TO DA-3330-S-SORTWK01.
00027                SELECT INPUT-SORT-FILE ASSIGN TO DA-3330-S-SORTWK01.
00028                SELECT SORT-WORK-SPO ASSIGN TO DA-3330-S-SORTWK01.
00029                SELECT MATH-REORG ASSIGN TO DA-3330-S-DISKMR.
00030                SELECT HIST-REORG ASSIGN TO DA-3330-S-DISKHR.
00031            I-O-CONTROL.
00032                SAME SORT AREA FOR SORT-WORK-SDB SORT-WORK-HDB SORT-WORK-SPO
00033                INPUT-SORT-FILE.
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00035           DATA DIVISION.
00036
00038           FILE SECTION.

00040           FD  CARD-IN LABEL RECORD IS OMITTED RECORDING MODE IS F RECORD
00041               CONTAINS 80 CHARACTERS
00042               DATA RECORDS ARE CODE-CHECK,
00043               FTU-ATTEND-Q, ALTER-STAT-HIST-H, ASSN-MBR-M, MBR-DELETE-X,
00044               INDEX-4, BASIC-DATA-1, PARENTS-ADDRESS-3, STUD-ADDRESS-2,
00045               FTU-ATTEND-DELETE-Z, YEAR-AND-QUARTER-Y, ADVISOR-V.
00046           01  CODE-CHECK.
00047               02 COOD                        PIC X(01).
00048               02 REST                        PIC X(79).
00049           01  FTU-ATTEND-Q.
00050               02 FILLER                      PIC X(01).
00051                  02 SSN                      PIC 9(09).
00052               02 ATTEND-DATA                 PIC X(70).
00053           01  ALTER-STAT-HIST-H.
00054               02 FILLER                      PIC X(01).
00055               02 HIST-DATA.
00056                  03 QTR-H                    PIC 9(03).
00057                  03 COMP-UG                  PIC 9(04).
00058                  03 COMP-GR                  PIC 9(04).
00059                  03 COMP-PB                  PIC 9(04).
00060                  03 MATH-UG                  PIC 9(04).
00061                  03 MATH-GR                  PIC 9(04).
00062                  03 MATH-PB                  PIC 9(04).
00063                  03 STAT-UG                  PIC 9(04).
00064               02 FILLER-H                    PIC X(48).
00065           01  ASSN-MBR-M.
00066               02 FILLER                      PIC X(01).
00067               02 SSN                         PIC 9(09).
00068               02 MBR-DATA                    PIC X(70).
00069           01  MBR-DELETE-X.
00070               02 FILLER                      PIC X(01).
00071               02 SSN                         PIC 9(09).
00072               02 ASSN-NAME                   PIC X(70).
00073           01  INDEX-4.
00074               02 FILLER                      PIC X(01).
00075               02 SSN                         PIC 9(09).
00076               02 INDEX-DATA                  PIC X(70).
00077           01  BASIC-DATA-1.
00078               02 FILLER                      PIC X(01).
00079               02 SSN                         PIC 9(09).
00080               02 LAST-NAME                   PIC X(18).
00081               02 FRST-MDLE-NAME              PIC X(30).
00082               02 APPL-TYPE                   PIC 9(01).
00083               02 MAJOR-1                     PIC 9(04).
00084               02 FTU-SUMMARY.
00085                  05 FTU-LAST-QTR             PIC 9(03).
00086                  05 FTU-GPA                  PIC 9V999.
00087               02 SEX                         PIC X(01).
00088               02 MARITAL-STATUS              PIC 9(01).
00089               02 FILLER                      PIC X(08).
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00090          01  PARENTS-ADDRESS-3.
00091              02 FILLER                  PIC X(01).
00092              02 SSN                     PIC 9(09).
00093              02 KIN-STREET              PIC X(20).
00094              02 KIN-CITY                PIC X(20).
00095              02 KIN-STATE               PIC X(02).
00096              02 KIN-ZIP                 PIC 9(05).
00097              02 FILLER                  PIC X(23).
00098          01  STUD-ADDRESS-2.
00099              02 FILLER                  PIC X(01).
00100              02 SSN                     PIC 9(09).
00101              02 HOME-STREET             PIC X(20).
00102              02 HOME-CITY               PIC X(20).
00103              02 HOME-STATE              PIC X(02).
00104              02 HOME-ZIP                PIC 9(05).
00105              02 HOME-PHONE              PIC 9(10).
00106              02 FILLER                  PIC X(13).
00107          01  FTU-ATTEND-DELETE-Z.
00108              02 FILLER                  PIC X(01).
00109              02 SSN                     PIC 9(09).
00110              02 ATTEND-DATA             PIC X(04).
00111              02 FILLER                  PIC X(66).
00112          01  YEAR-AND-QUARTER-Y.
00113              02 FILLER                  PIC X(01).
00114              02 DATA-Y.
00115                 05 SCHOOL-YEAR          PIC 9(02).
00116                 05 SCHOOL-QUARTER       PIC 9(01).
00117              02 FILLER-Y                PIC X(76).
00118          01  ADVISOR-V.
00119              02 FILLER                  PIC X(01).
00120              02 SSN                     PIC 9(09).
00121              02 ADVISOR-NAME            PIC X(18).
00122              02 ADVISOR-SSN             PIC 9(09).
00123              02 FILLER                  PIC X(43).

00125          FD  MATH-CHANGE  LABEL RECORD IS STANDARD RECORDING MODE F
00126              DATA RECORDS ARE CODE-CHECK-W, FTU-ATTEND-W, ASSN-MBR-W,
00127              MBR-DELETE-W, FTU-ATTEND-DELETE-W, ADVISOR-W,
00128              MATH-CHANGE-REC.
00129          01  CODE-CHECK-W.
00130              02 COWD                    PIC X(01).
00131              02 REST-W                  PIC X(79).
00132          01  FTU-ATTEND-W.
00133              02 FILLER                  PIC X(01).
00134                 02 SSN                  PIC 9(09).
00135              02 ATTEND-DATA             PIC X(70).
00136          01  ASSN-MBR-W.
00137              02 FILLER                  PIC X(01).
00138              02 SSN                     PIC 9(09).
00139              02 MBR-DATA                PIC X(70).
00140          01  MBR-DELETE-W.
00141              02 FILLER                  PIC X(01).
00142              02 SSN                     PIC 9(09).
00143              02 ASSN-NAME               PIC X(70).
00144          01  FTU-ATTEND-DELETE-W.
00145              02 FILLER                  PIC X(01).
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00146                02 SSN                          PIC 9(09).
00147                02 ATTEND-DATA                  PIC X(04).
00148                02 FILLER                       PIC X(66).
00149           01   ADVISOR-W.
00150                02 FILLER                       PIC X(01).
00151                02 SSN                          PIC 9(09).
00152                02 ADVISOR-NAME                 PIC X(18).
00153                02 ADVISOR-SSN                  PIC 9(09).
00154                02 FILLER                       PIC X(43).
00155           01   MATH-CHANGE-REC.
00156                05 FILLER                       PIC X(01).
00157                05 SSN                          PIC 9(09).
00158                05 FILLER                       PIC X(70).

00160           FD   STUD-DATA-BASE LABEL RECORD IS STANDARD  RECORDING MODE IS F
00161                DATA RECORD IS STUD-DB-REC.
00162           01   STUD-DB-REC.
00163                02 LAST-NAME                    PIC X(18).
00164                02 FRST-MDLE-NAME               PIC X(30).
00165                02 SSN                          PIC 9(09).
00166                02 GRAD-UG-PB                   PIC X(01).
00167                02 MAJOR                        PIC X(04).
00168                02 GPA                          PIC 9V999.
00169                02 SEX                          PIC X(01).
00170                02 GRAD                         PIC X(01).
00171                02 FTU-LAST-QTR                 PIC 9(03).
00172                02 HOME-STREET                  PIC X(20).
00173                02 HOME-CITY                    PIC X(20).
00174                02 HOME-STATE                   PIC X(02).
00175                02 HOME-ZIP                     PIC X(05).
00176                02 HOME-PHONE                   PIC X(10).
00177                02 KIN-STREET                   PIC X(20).
00178                02 KIN-CITY                     PIC X(20).
00179                02 KIN-STATE                    PIC X(02).
00180                02 KIN-ZIP                      PIC X(05).
00181                02 MARITAL-STATUS               PIC X(01).
00182                02 ATTEND-DATA                  PIC X(70).
00183                02 MBR-DATA                     PIC X(70).
00184                02 ADVISOR-NAME                 PIC X(18).
00185                02 ADVISOR-SSN                  PIC 9(09).

00187           FD   PRINT-FILE LABEL RECORDS OMITTED DATA RECORD IS PRINT-LINE.
00188           01   PRINT-LINE                     PIC X(133).

00190           FD   SPIN-OFF LABEL RECORD IS STANDARD RECORDING MODE IS F
00191                DATA RECORD IS SPIN-OFF-REC.
00192           01   SPIN-OFF-REC.
00193                02 LAST-NAME                    PIC X(18).
00194                02 FRST-MDLE-NAME               PIC X(30).
00195                02 SSN                          PIC 9(09).
00196                02 APPL-TYPE                    PIC 9(01).
00197                02 MAJOR-1                      PIC 9(04).
00198                02 FTU-SUMMARY.
00199                   05 FTU-LAST-QTR              PIC 9(03).
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00200                    05 FTU-GPA              PIC 9V999.
00201                02  SEX                    PIC X(01).
00202                02  INDX                   PIC X(200).
00203           *        05 GRD-IND              PIC X(01).
00204           *        05 START-SUB            PIC X(02).
00205           *        05 END-SUB              PIC X(02).
00206                02  HOME-STREET            PIC X(20).
00207                02  HOME-CITY              PIC X(20).
00208                02  HOME-STATE             PIC X(02).
00209                02  HOME-ZIP               PIC X(05).
00210                02  HOME-PHONE             PIC X(10).
00211                02  KIN-STREET             PIC X(20).
00212                02  KIN-CITY               PIC X(20).
00213                02  KIN-STATE              PIC X(02).
00214                02  KIN-ZIP                PIC 9(05).
00215                02  MARITAL-STATUS         PIC X(01).

00217           FD   STAT-HIST-DB LABEL RECORD IS STANDARD RECORDING MODE IS F
00218                DATA RECORD IS STAT-REC.
00219           01   STAT-REC.
00220                03 QTR                     PIC 9(03).
00221                03 COMP-UG                 PIC 9(04).
00222                03 COMP-GR                 PIC 9(04).
00223                03 COMP-PB                 PIC 9(04).
00224                03 MATH-UG                 PIC 9(04).
00225                03 MATH-GR                 PIC 9(04).
00226                03 MATH-PB                 PIC 9(04).
00227                03 STAT-UG                 PIC 9(04).

00229           SD   SORT-WORK-SDB RECORDING MODE IS F DATA RECORD IS
00230                SORT-SDB-REC.
00231           01   SORT-SDB-REC.
00232                02 LAST-NAME               PIC X(18).
00233                02 FRST-MDLE-NAME          PIC X(30).
00234                02 SSN                     PIC 9(09).
00235                02 GRAD-UG-PB              PIC X(01).
00236                02 MAJOR                   PIC X(04).
00237                02 FTU-GPA                 PIC 9V999.
00238                02 SEX                     PIC X(01).
00239                02 GRAD                    PIC X(01).
00240                02 FTU-LAST-QTR            PIC 9(03).
00241                02 HOME-STREET             PIC X(20).
00242                02 HOME-CITY               PIC X(20).
00243                02 HOME-STATE              PIC X(02).
00244                02 HOME-ZIP                PIC X(05).
00245                02 HOME-PHONE              PIC X(10).
00246                02 KIN-STREET              PIC X(20).
00247                02 KIN-CITY                PIC X(20).
00248                02 KIN-STATE               PIC X(02).
00249                02 KIN-ZIP                 PIC X(05).
00250                02 MARITAL-STATUS          PIC X(01).
00251                02 ATTEND-DATA             PIC X(70).
00252                02 MBR-DATA                PIC X(70).
00253                02 ADVISOR-NAME            PIC X(18).
00254                02 ADVISOR-SSN             PIC 9(09).
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00256          FD  MATH-DEPT-STUD-DB LABEL RECORD IS STANDARD RECORDING MODE F
00257              DATA RECORD IS STUD-REC-M.
00258          01  STUD-REC-M.
00259              02 ATTEND-DATA          PIC X(100).
00260              02 MBR-DATA             PIC X(70).
00261              02 SSN                  PIC 9(09).
00262              02 ADVISOR-NAME         PIC X(18).
00263              02 ADVISOR-SSN          PIC 9(09).

00265          FD  HIST-REORG LABEL RECORD IS STANDARD DATA RECORD IS
00266              HIST-REORG-REC.
00267          01  HIST-REORG-REC.
00268              03 QTR                  PIC 9(03).
00269                 03 COMP-UG           PIC 9(04).
00270                 03 COMP-GR           PIC 9(04).
00271                 03 COMP-PB           PIC 9(04).
00272                 03 MATH-UG           PIC 9(04).
00273                 03 MATH-GR           PIC 9(04).
00274                 03 MATH-PB           PIC 9(04).
00275                 03 STAT-UG           PIC 9(04).

00277          SD  INPUT-SORT-FILE RECORDING MODE F DATA RECORD IS
00278              INPUT-SORT.
00279          01  INPUT-SORT.
00280              05 FILLER               PIC X(01).
00281              05 SSN                  PIC 9(09).
00282              05 FILLER               PIC X(70).

00284          SD  SORT-WORK-HDB  RECORDING MODE F DATA RECORD IS
00285              SORT-HDB-REC.
00286          01  SORT-HDB-REC.
00287              03 QTR                  PIC 9(03).
00288                 03 COMP-UG           PIC 9(04).
00289                 03 COMP-GR           PIC 9(04).
00290                 03 COMP-PB           PIC 9(04).
00291                 03 MATH-UG           PIC 9(04).
00292                 03 MATH-GR           PIC 9(04).
00293                 03 MATH-PB           PIC 9(04).
00294                 03 STAT-UG           PIC 9(04).

00296          SD  SORT-WORK-SPO RECORDING MODE IS F DATA RECORD IS
00297              SORT-SPO-REC.
00298          01  SORT-SPO-REC.
00299              02 LAST-NAME            PIC X(18).
00300              02 FRST-MDLE-NAME       PIC X(30).
00301              02 SSN                  PIC 9(09).
00302              02 APPL-TYPE            PIC 9(01).
00303              02 MAJOR-I              PIC 9(04).
00304              02 FTU-SUMMARY.
00305                 05 FTU-LAST-QTR      PIC 9(03).
00306                 05 FTU-GPA           PIC 9V999.
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00307                02 SEX                      PIC X(01).
00308                02 INDX                     PIC X(200).
00309           *       05 GRD-IND               PIC X(01).
00310           *       05 START-SUB             PIC X(02).
00311           *       05 END-SUB               PIC X(02).
00312                02 HOME-STREET              PIC X(20).
00313                02 HOME-CITY                PIC X(20).
00314                02 HOME-STATE               PIC X(02).
00315                02 HOME-ZIP                 PIC 9(05).
00316                02 HOME-PHONE               PIC 9(10).
00317                02 KIN-STREET               PIC X(20).
00318                02 KIN-CITY                 PIC X(20).
00319                02 KIN-STATE                PIC X(02).
00320                02 KIN-ZIP                  PIC 9(05).
00321                02 MARITAL-STATUS           PIC X(01).

00323           FD   MATH-REORG LABEL RECORD IS STANDARD DATA RECORD IS
00324                MATH-REORG-REC.
00325           01   MATH-REORG-REC.
00326                02 ATTEND-DATA              PIC X(100).
00327                02 MBR-DATA                 PIC X(70).
00328                02 SSN                      PIC 9(09).
00329                02 ADVISOR-NAME             PIC X(18).
00330                02 ADVISOR-SSN              PIC 9(09).
00331
00332

00334           WORKING-STORAGE SECTION.
00335           77   ERR-MSG-LINE              PIC X(133) VALUE SPACES.
00336           77   WORK-AREA1                PIC X(133).
00337           77   WORK-AREA2                PIC X(133).
00338           77   CURRENT-QTR-CODE          PIC 9(02).
00339           77   CURRENT-QTR               PIC 9(03).
00340           77   CTR                       PIC 9(10).
00341           77   PTR                       PIC 9(10).
00342           77   MATH-CHANGE-MADE          PIC X(01) VALUE 'Y'.
00343           77   SUBSCRPT                  PIC 9(10) VALUE IS ZERO, USAGE COMP.
00344           77   HEADINGS                  PIC X(20).
00345           77   OUTPUT-FORMAT             PIC X(20).
00346           77   BREAK                     PIC X(20).
00347           77   DATE-BUFF                 PIC X(06).
00348           *    YYMMDD
00349           77   TEMP                      PIC X(20).
00350           77   ERROR-WARNING             PIC X(18) VALUE '*** ERROR WARNING:'.
00351           77   BREAK-STATUS              PIC X(03) VALUE ' NO'.
00352           77   KODE                      PIC X(01) VALUE SPACES.
00353           77   BREAK-1                   PIC X(04).
00354           77   BREAK-2                   PIC X(01).
00355           77   BREAK-3                   PIC 9(09).
00356           77   VALIDITY-INDICATOR        PIC X(07).
00357           77   SSNUM                     PIC 9(09).
00358           77   QTR-BUFF                  PIC 9(03) VALUE ZEROS.
00359           77   DELETE-CHAR               PIC X(01) VALUE SPACES.
00360           01   RECORD-BUFF.
00361                02 ATTEND-DATA              PIC X(100).
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00362                02 MBR-DATA                PIC X(70).
00363                02 SSN                     PIC 9(09).
00364                02 ADVISOR-NAME            PIC X(18).
00365                02 ADVISOR-SSN             PIC 9(09).
00366
00367           01   FTU-LAST-QTR-EDIT.
00368                05 LAST-YR-ATT-EDIT        PIC 9(02).
00369                05 FILLER                  PIC X(01).
00370           01   ACCUMULATORS.
00371                03 COMP-UG                 PIC 9(04) VALUE ZERO.
00372                03 COMP-GR                 PIC 9(04) VALUE ZERO.
00373                03 COMP-PB                 PIC 9(04) VALUE ZERO.
00374                03 COMPTOT                 PIC 9(04) VALUE ZERO.
00375                03 MATH-UG                 PIC 9(04) VALUE ZERO.
00376                03 MATH-GR                 PIC 9(04) VALUE ZERO.
00377                03 MATH-PB                 PIC 9(04) VALUE ZERO.
00378                03 MATHTOT                 PIC 9(04) VALUE ZERO.
00379                03 STAT-UG                 PIC 9(04) VALUE ZERO.
00380                03 STATTOT                 PIC 9(04) VALUE ZERO.
00381                03 TOTSTUDS                PIC 9(04) VALUE ZERO.
00382           01   FORMER-STUD-HEAD.
00383                05 FILLER                  PIC X(39) VALUE SPACES.
00384                05 FILLER                  PIC X(56) VALUE 'NOT CURRENTLY ENROLLE
00385           -    'D BUT LISTED IN MATH DEPT DATA BASE'.
00386                05 FILLER                  PIC X(38) VALUE SPACES.
00387           01   INDEX-CONVERT.
00388                05 INDEX-DATA              PIC X(70).
00389                05 FILLER                  PIC X(130)  VALUE        '************
00390           -    '**************************************************************'.
00391           01   ATTEND-ARRAY              PIC X(120).
00392           01   ATTEND-TAB REDEFINES ATTEND-ARRAY.
00393                02 QTR-ATTEND              PIC X(04) OCCURS 30 INDEXED BY Q.
00394           01   MBR-TAB-FIELD             PIC X(100).
00395           01   MBR-TAB REDEFINES MBR-TAB-FIELD.
00396                02 MBR                     PIC X(10) OCCURS 10 INDEXED BY M.
00397           01   RECORD-CHANGE.
00398                02 FILLER                  PIC X(14) VALUE ' STUDENT SSN: '.
00399                02 SSN                     PIC 9(09).
00400                02 FILLER                  PIC X(16) VALUE ' FIELD CHANGED: '.
00401                02 FIELD-CHANGED           PIC X(12).
00402                02 NEW-DATA                PIC X(82).
00403           01   STUD-REC-TEMP.
00404                02 ATTEND-DATA             PIC X(80) VALUE SPACES.
00405                02 MBR-DATA                PIC X(70) VALUE SPACES.
00406                02 SSN                     PIC 9(09) VALUE ZEROS.
00407                02 ADVISOR-NAME            PIC X(18) VALUE SPACES.
00408                02 ADVISOR-SSN             PIC 9(09) VALUE ZEROS.
00409           01   TODAYS-DATE.
00410                02 CURRENT-DAYT.
00411                   05 YY                   PIC 9(02).
00412                   05 MM                   PIC 9(02).
00413                   05 DD                   PIC 9(02).
00414           01   MONTH-TAB-DATA            PIC X(36) VALUE 'JANFEBMARAPRMAYJUNJUL
00415           -    'AUGSEPOCTNOVDEC'.
00416           01   MONTH-TAB REDEFINES MONTH-TAB-DATA.
00417                02 MONTH-ALPHA             PIC X(03) OCCURS 12 TIMES.
00418           01   DATE-IN-PRINT-FORM.
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00419                02 MONTH                    PIC X(03).
00420                02 FILLER                   PIC X(01) VALUE SPACES.
00421                02 DD                       PIC 9(02).
00422                02 FILLER                   PIC X(03) VALUE ' 19'.
00423                02 YY                       PIC 9(02).
00424
00425            01  QTR-CONVERT-TAB.
00426                05 FILLER                   PIC X(78)  VALUE '69169269369470170270
00427           -    '37047117127137147217227237247317327337347417427437447517521.
00428                05 FILLER                   PIC X(60)      VALUE                '75
00429           -    '37547617627637647717727737747817827837847917927937948018021.
00430                05 FILLER                   PIC X(60) VALUE                     '80
00431           -    '38048118128138148218228238248318328338348418428438448518521.
00432                05 FILLER                   PIC X(60)    VALUE                  '85
00433           -    '38548618628638648718728738748818828838848918928938949019021.
00434                05 FILLER                   PIC X(06) VALUE '903904'.
00435            01  QTR-TAB REDEFINES QTR-CONVERT-TAB.
00436                02 YR-QTR OCCURS 88 TIMES INDEXED BY YQ.
00437                   05 QTR                   PIC 9(03).
00438            01  INDEX-ARRAY-LOAD-FIELD PIC X(200).
00439            01  INDEX-ARRAY REDEFINES INDEX-ARRAY-LOAD-FIELD.
00440                02 INDEX-ENTRY OCCURS 40 TIMES.
00441                   05 GRD-IND               PIC 9(01).
00442                   05 START-SUB             PIC 9(02).
00443                   05 END-SUB               PIC 9(02).
00444            01  PAGE-HEAD-DEPT.
00445                05 FILLER                   PIC X(49) VALUE SPACES.
00446                05 FILLER                   PIC X(35) VALUE 'DEPARTMENT OF MATHEMA
00447           -    'TICAL SCIENCES'.
00448                05 FILLER                   PIC X(49) VALUE SPACES.
00449            01  TITLE-ROST.
00450                05 FILLER                   PIC X(44) VALUE SPACES.
00451                05 TITLE-LINE               PIC X(46).
00452                05 FILLER                   PIC X(43) VALUE SPACES.
00453            01  STUD-STAT-HEAD.
00454                05 FILLER                   PIC X(58) VALUE SPACES.
00455                05 FILLER                   PIC X(18) VALUE 'STUDENT ENROLLMENT'.
00456                05 FILLER                   PIC X(57) VALUE SPACES.
00457            01  DATE-HEAD.
00458                05 FILLER                   PIC X(61) VALUE SPACES.
00459                05 DATE-OUT                 PIC X(11).
00460                05 FILLER                   PIC X(61) VALUE SPACES.
00461            01  STUD-STAT-COL-HEAD.
00462                05 FILLER                   PIC X(56) VALUE SPACES.
00463                05 FILLER                   PIC X(19) VALUE 'COMP      MATH     '.
00464                05 FILLER                   PIC X(16) VALUE ' STAT      TOTAL'.
00465                05 FILLER                   PIC X(42) VALUE SPACES.
00466            01  STUD-STAT-UNGRAD.
00467                05 FILLER                   PIC X(41) VALUE SPACES.
00468                05 FILLER                   PIC X(15) VALUE 'UNDERGRADUATE  '.
00469                05 COMP-UG                  PIC ZZZ9  VALUE ZEROS.
00470                05 FILLER                   PIC X(06) VALUE SPACES.
00471                05 MATH-UG                  PIC ZZZ9  VALUE ZEROS.
00472                05 FILLER                   PIC X(06) VALUE SPACES.
00473                05 STAT-UG                  PIC ZZZ9  VALUE ZEROS.
00474                05 FILLER                   PIC X(06) VALUE SPACES.
00475                05 TOT-UG                   PIC ZZZZ9 VALUE ZEROS.
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00476              05 FILLER                  PIC X(42) VALUE SPACES.
00477          01  STUD-STAT-GRAD.
00478              05 FILLER                  PIC X(41) VALUE SPACES.
00479              05 FILLER                  PIC X(15) VALUE 'GRADUATE       '.
00480              05 COMP-GR                 PIC ZZZ9  VALUE ZEROS.
00481              05 FILLER                  PIC X(06) VALUE SPACES.
00482              05 MATH-GR                 PIC ZZZ9  VALUE ZEROS.
00483              05 FILLER                  PIC X(16) VALUE SPACES.
00484              05 TOT-GR                  PIC ZZZZ9 VALUE ZEROS.
00485              05 FILLER                  PIC X(42) VALUE SPACES.
00486          01  STUD-STAT-TOT.
00487              05 FILLER                  PIC X(41) VALUE SPACES.
00488              05 FILLER                  PIC X(15) VALUE 'TOTAL          '.
00489              05 COMPTOT                 PIC ZZZ9  VALUE ZEROS.
00490              05 FILLER                  PIC X(06) VALUE SPACES.
00491              05 MATHTOT                 PIC ZZZ9  VALUE ZEROS.
00492              05 FILLER                  PIC X(06) VALUE SPACES.
00493              05 STATTOT                 PIC ZZZ9  VALUE ZEROS.
00494              05 FILLER                  PIC X(07) VALUE SPACES.
00495              05 TOTSTUDS                PIC ZZZ9  VALUE ZEROS.
00496              05 FILLER                  PIC X(42) VALUE SPACES.
00497          01  STUD-STAT-POST-BAC.
00498              05 FILLER                  PIC X(41) VALUE SPACES.
00499              05 FILLER                  PIC X(15) VALUE 'POST BAC       '.
00500              05 COMP-PB                 PIC ZZZ9  VALUE ZEROS.
00501              05 FILLER                  PIC X(06) VALUE SPACES.
00502              05 MATH-PB                 PIC ZZZ9  VALUE ZEROS.
00503              05 FILLER                  PIC X(16) VALUE SPACES.
00504              05 TOT-PB                  PIC ZZZZ9 VALUE ZEROS.
00505              05 FILLER                  PIC X(42) VALUE SPACES.
00506          01  ABBR-NAME.
00507              05 LAST-NAME               PIC X(15).
00508              05 FRST-MDLE-NAME          PIC X(10).
00509          01  FAC-ADV-HEAD.
00510              05 FILLER                  PIC X(55) VALUE SPACES.
00511              05 FILLER                  PIC X(16) VALUE 'FACULTY ADVISOR '.
00512              05 FILLER                  PIC X(07) VALUE 'LISTING'.
00513              05 FILLER                  PIC X(55) VALUE SPACES.
00514          01  FAC-ADV-COL-HEAD.
00515              05 FILLER                  PIC X(47) VALUE SPACES.
00516              05 FILLER                  PIC X(07) VALUE 'STUDENT'.
00517              05 FILLER                  PIC X(21) VALUE SPACES.
00518              05 FILLER                  PIC X(15) VALUE 'FACULTY ADVISOR'.
00519              05 FILLER                  PIC X(43) VALUE SPACES.
00520          01  FAC-ADV-DET-LINE.
00521              05 FILLER                  PIC X(42) VALUE SPACES.
00522              05 NAME                    PIC X(25).
00523              05 FILLER                  PIC X(07) VALUE SPACES.
00524              05 ADVISOR-NAME            PIC X(18).
00525              05 FILLER                  PIC X(41) VALUE SPACES.
00526          01  ADVISEE-HEAD.
00527              05 FILLER                  PIC X(10) VALUE SPACES.
00528              05 FILLER                  PIC X(45) VALUE 'THE FOLLOWING NAMED S
00529         -    'TUDENTS ARE ADVISEES OF '.
00530              05 ADVISOR-NAME            PIC X(18).
00531              05 FILLER                  PIC X(60) VALUE SPACES.
00532          01  ADVISEE-HEAD-ALT.
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00533                05 FILLER                  PIC X(10) VALUE SPACES.
00534                05 FILLER                  PIC X(73) VALUE 'THE FOLLOWING NAMED S
00535           -    'TUDENTS ARE ADVISEES OF THE FACULTY MEMBER INDICATED'.
00536                05 FILLER                  PIC X(50) VALUE SPACES.
00537            01  CURRENT-QTR-PRINT.
00538                05 FILLER                  PIC X(65) VALUE SPACES.
00539                05 QTR-PRINT               PIC X(03) VALUE SPACES.
00540                05 FILLER                  PIC X(65) VALUE SPACES.
00541            01  NAME-LINE.
00542                05 FILLER                  PIC X(01) VALUE SPACES.
00543                05 LAST-NAME               PIC X(18).
00544                05 FRST-MDLE-NAME          PIC X(30).
00545                05 FILLER                  PIC X(01) VALUE SPACES.
00546                05 SSN                     PIC 999B99B9999B.
00547                05 GRAD-UG-PB              PIC X(01).
00548                05 FILLER                  PIC X(01) VALUE '-'.
00549                05 MAJOR                   PIC X(04).
00550                05 FILLER                  PIC X(01) VALUE SPACES.
00551                05 FTU-LAST-QTR.
00552                   06 LAST-YR-ATT          PIC 9(02).
00553                   06 LAST-QTR-ATT         PIC X(01).
00554                05 FILLER                  PIC X(01) VALUE '/'.
00555                05 GPA                     PIC 9.999.
00556                05 FILLER                  PIC X(10) VALUE ' ADVISOR: '.
00557                05 ADVISOR-NAME            PIC X(18).
00558                05 FILLER                  PIC X(06) VALUE ' SEX: '.
00559                05 SEX                     PIC X(01).
00560                05 FILLER                  PIC X(01)  VALUE SPACES.
00561                05 FILLER                  PIC X(12) VALUE ' MARITAL ST:'.
00562                05 MARITAL-STATUS          PIC X(01).
00563                05 FILLER                  PIC X(04) VALUE ' GR:'.
00564                05 GRAD                    PIC X(01).
00565            01  ADDR-LINE.
00566                05 FILLER                  PIC X(18) VALUE '           ADDRESS:'.
00567                05 FILLER                  PIC X(02) VALUE SPACES.
00568                05 HOME-STREET             PIC X(20).
00569                05 FILLER                  PIC X(01) VALUE SPACES.
00570                05 HOME-CITY               PIC X(20).
00571                05 HOME-STATE              PIC BXXB.
00572                05 HOME-ZIP                PIC X(05).
00573                05 FILLER                  PIC X(12) VALUE ' LOCAL TEL: '.
00574                05 HOME-PHONE              PIC XXXBXXXBXXXX.
00575                05 FILLER                  PIC X(08) VALUE ' MEMBR: '.
00576                05 MBR-DATA                PIC X(31).
00577            01  ADDR-PARENT-LINE.
00578                05 FILLER                  PIC X(15) VALUE SPACES.
00579                05 FILLER                  PIC X(08) VALUE 'PARENT: '.
00580                05 KIN-STREET              PIC X(20).
00581                05 FILLER                  PIC X(01) VALUE SPACES.
00582                05 KIN-CITY                PIC X(20).
00583                05 KIN-STATE               PIC BXXB.
00584                05 KIN-ZIP                 PIC X(05).
00585                05 FILLER                  PIC X(63) VALUE SPACES.
00586
00587            01  FTU-ATTN-LINE.
00588                05 FILLER                  PIC X(35) VALUE '         QTRS ATTENDE
00589           -    'D FTU/STATUS: '.
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00590                05 ATTEND-DATA                 PIC X(70).
00591           01   WARNING-MSG.
00592                05 FILLER                      PIC X(40) VALUE ' * WARNING: INPUT CAR
00593           -    'D NOT PROCESSED *'.
00594                05 FILLER                      PIC X(95) VALUE SPACES.
00595           01   ADVISEE-DET-LINE.
00596                05 FILLER                      PIC X(10) VALUE SPACES.
00597                05 NAME                        PIC X(25).
00598                05 FILLER                      PIC X(98) VALUE SPACES.
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00600          *****  REFERENCE HIPO 2.0 *****
00601           PROCEDURE DIVISION.
00602               PERFORM ACCEPT-DATE-FROM-SYSTEM.
00603               OPEN INPUT CARD-IN.
00604               READ CARD-IN AT END GO TO EOJ.
00605               PERFORM LOAD-CURRENT-QTR-DATA.
00606               IF KODE = 'T' GO TO EOJ.
00607               READ CARD-IN AT END GO TO EOJ.
00608               PERFORM LOAD-FTU-DATA THRU END-FTU-DATA-SECTION.
00609           READ-CARD-LOOP.
00610               READ CARD-IN AT END GO TO EOJ.
00611               PERFORM CARD-FORMAT-VERIFY.
00612               IF VALIDITY-INDICATOR = 'INVALID' GO TO READ-CARD-LOOP.
00613               IF COOD = 'R' OR 'F' OR 'A' OR 'C'
00614                   PERFORM GENERATE-REPORTS, MOVE 'N' TO MATH-CHANGE-MADE.
00615               IF COOD = 'H' PERFORM MATH-LOAD-UPDATE.
00616               IF COOD = 'V' OR 'Q' OR 'Z' OR 'M' OR 'X' OR 'D'
00617                   MOVE 'Y' TO MATH-CHANGE-MADE
00618                   PERFORM LOAD-MATH-CHANGE-FILE THRU
00619                       END-LOAD-MATH-CHANGE-FILE,
00620                   PERFORM MATH-LOAD-UPDATE.
00621               GO TO READ-CARD-LOOP.
00622           EOJ.
00623               CLOSE CARD-IN.
00624               STOP RUN.

00626           ACCEPT-DATE-FROM-SYSTEM.
00627               ACCEPT CURRENT-DAYT FROM DATE.
00628               MOVE DD OF CURRENT-DAYT TO DD OF DATE-IN-PRINT-FORM.
00629               MOVE YY OF CURRENT-DAYT TO YY OF DATE-IN-PRINT-FORM.
00630               MOVE MONTH-ALPHA (MM OF CURRENT-DAYT) TO MONTH OF
00631                   DATE-IN-PRINT-FORM.
00632               MOVE DATE-IN-PRINT-FORM TO DATE-OUT OF DATE-HEAD.

00634           LOAD-CURRENT-QTR-DATA.
00635               IF COOD IS NOT EQUAL TO 'Y' THEN
00636                   MOVE ' **MISSING OR OUT OF SEQUENCE CURRENT QUARTER CARD P
00637           -       'ROCESSING TERMINATING.' TO ERR-MSG-LINE
00638                   PERFORM INVALID-INPUT
00639                   MOVE 'T' TO KODE
00640                   GO TO END-CURRENT-QTR-DATA.
00641               MOVE DATA-Y TO CURRENT-QTR.
00642               SET YQ TO 1.
00643               MOVE 1 TO PTR.
00644               SEARCH YR-QTR VARYING PTR
00645                   AT END MOVE ' * INVALID CURRENT QUARTER SPECIFIED ON INPUT
00646           -       'CARD - PROCESSING TERMINATING.' TO ERR-MSG-LINE
00647                       PERFORM INVALID-INPUT
00648                       MOVE 'T' TO KODE
00649                       GO TO END-CURRENT-QTR-DATA
00650                   WHEN CURRENT-QTR IS EQUAL TO YR-QTR (YQ)
00651                       MOVE PTR TO CURRENT-QTR-CODE.
00652               OPEN OUTPUT  PRINT-FILE.
00653               MOVE SPACES TO PRINT-LINE.
00654               WRITE PRINT-LINE FROM CURRENT-QTR-CODE AFTER POSITIONING 3
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00655                   LINES.
00656               CLOSE PRINT-FILE.
00657           END-CURRENT-QTR-DATA. EXIT.
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00659            INVALID-INPUT SECTION.
00660                OPEN OUTPUT PRINT-FILE.
00661                WRITE PRINT-LINE FROM ERROR-WARNING
00662                   AFTER POSITIONING 3 LINES.
00663                WRITE PRINT-LINE FROM ERR-MSG-LINE
00664                   AFTER POSITIONING 2 LINES.
00665                MOVE SPACES TO ERR-MSG-LINE.
00666                STRING ' THE FOLLOWING INPUT CARD DISREGARDED: ' CODE-CHECK
00667                   DELIMITED BY SIZE
00668                   INTO ERR-MSG-LINE.
00669                WRITE PRINT-LINE FROM ERR-MSG-LINE
00670                      AFTER POSITIONING 2 LINES.
00671                MOVE SPACES TO ERR-MSG-LINE.
00672                CLOSE PRINT-FILE.
```

```
00674           CARD-FORMAT-VERIFY SECTION.
00675           REPORT-REQUEST.
00676                MOVE 'VALID' TO VALIDITY-INDICATOR.
00677               IF COOD = 'R' OR 'F' OR 'A' OR 'C'
00678                  THEN IF REST IS NOT EQUAL TO SPACES THEN
00679                  MOVE ' ILLEGAL ENTRY ON REPORT REQUEST' TO ERR-MSG-LINE
00680                  PERFORM INVALID-INPUT
00681                  MOVE 'INVALID' TO VALIDITY-INDICATOR.
00682               IF COOD = 'H'
00683                  THEN IF HIST-DATA IS NOT NUMERIC OR FILLER-H IS NOT = ' '
00684                     MOVE ' ILLEGAL ENTRY ON HISTORY ALTERATION REQUEST'
00685                        TO ERR-MSG-LINE
00686                     PERFORM INVALID-INPUT
00687                     MOVE 'INVALID' TO VALIDITY-INDICATOR.
00688               IF COOD = 'Y'
00689                  THEN IF DATA-Y IS NOT NUMERIC OR FILLER-Y IS NOT = ' '
00690                  MOVE ' ILLEGAL ENTRY ON YEAR AND QUARTER INPUT CARD'
00691                     TO ERR-MSG-LINE
00692                  PERFORM INVALID-INPUT
00693                  MOVE 'INVALID' TO VALIDITY-INDICATOR.
00694               IF COOD = '1' OR '2' OR '3' OR '4' OR 'V' OR 'Q' OR 'D'
00695                     OR 'Z' OR 'M' OR 'X'
00696                  THEN IF SSN OF BASIC-DATA-1 IS NOT NUMERIC THEN
00697                  MOVE ' INVALID SSN ON INPUT CARD' TO ERR-MSG-LINE
00698                  PERFORM INVALID-INPUT
00699                  MOVE 'INVALID' TO VALIDITY-INDICATOR.
00700               IF COOD = 'V'
00701                  THEN IF ADVISOR-NAME OF ADVISOR-V IS NOT ALPHABETIC
00702                     OR ADVISOR-SSN OF ADVISOR-V IS NOT NUMERIC
00703                  MOVE ' ILLEGAL INPUT ON ADVISOR INPUT CARD' TO
00704                     ERR-MSG-LINE
00705                  PERFORM INVALID-INPUT
00706                  MOVE 'INVALID' TO VALIDITY-INDICATOR.
00707               IF COOD = '*' GO TO END-VERIFY.
00708               IF COOD IS NOT EQUAL TO 'R' AND 'F' AND 'A' AND 'C' AND 'H'
00709                  AND 'Y' AND '1' AND '2' AND '3' AND '4' AND 'V' AND 'Q'
00710                  AND 'D' AND 'Z' AND 'M' AND 'X' THEN
00711                  MOVE 'INVALID' TO VALIDITY-INDICATOR
00712                  MOVE ' INVALID CODE IN COLUMN 1 OF INPUT CARD' TO
00713                     ERR-MSG-LINE
00714                  PERFORM INVALID-INPUT.
00715           END-VERIFY.
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00717           LOAD-MATH-CHANGE-FILE SECTION.
00718               OPEN OUTPUT MATH-CHANGE.
00719           READ-INTO-MATH-CHANGE.
00720               MOVE SPACES TO CODE-CHECK-W.
00721               MOVE      CODE-CHECK TO CODE-CHECK-W.
00722               WRITE CODE-CHECK-W.
00723           READ-CHANGE.
00724               READ CARD-IN AT END GO TO END-LOAD-MATH-CHANGE-FILE.
00725               PERFORM CARD-FORMAT-VERIFY.
00726               IF VALIDITY-INDICATOR = 'INVALID' GO TO
00727                  READ-CHANGE.
00728               IF COOD IS EQUAL TO 'V' OR 'Q' OR 'Z' OR 'M' OR 'X' OR 'D'
00729                  THEN GO TO READ-INTO-MATH-CHANGE.
00730               IF COOD IS NOT EQUAL TO '*'
00731               THEN OPEN OUTPUT PRINT-FILE
00732                  MOVE          ' * EXPECTED TO FIND * AT END OF MATH CHANGE
00733           -      'CARD INPUT _ FOUND INSTEAD THE FOLLOWING DATA WHICH IS DISRE
00734           -      'GARDED: '   TO PRINT-LINE
00735                  WRITE PRINT-LINE AFTER POSITIONING 2 LINES
00736                  STRING ' * CARD  IMAGE: ' CODE-CHECK DELIMITED BY SIZE
00737                     INTO PRINT-LINE
00738                  WRITE PRINT-LINE AFTER POSITIONING 2 LINES
00739                  CLOSE PRINT-FILE.
00740               CLOSE MATH-CHANGE.
00741               MOVE 102400 TO SORT-CORE-SIZE
00742               SORT INPUT-SORT-FILE
00743                  ASCENDING KEY SSN OF INPUT-SORT
00744                  USING MATH-CHANGE
00745                  GIVING MATH-CHANGE.
00746           END-LOAD-MATH-CHANGE-FILE. EXIT.
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00748          ***** REFERENCE HIPO 2.1 *****
00749           MATH-LOAD-UPDATE SECTION.
00750               IF COOD = 'H' THEN PERFORM STAT-HIST THRU EXIT-STAT-HIST
00751                  ELSE PERFORM MERGE-MATH-DATA THRU END-MERGE-MATH-DATA.
00752               GO TO END-MATH-LOAD-UPDATE-SECTION.

00754           MERGE-MATH-DATA.
00755               OPEN I-O MATH-DEPT-STUD-DB.
00756               OPEN INPUT MATH-CHANGE.
00757               OPEN OUTPUT MATH-REORG.
00758               MOVE SPACES TO  MATH-REORG-REC.
00759               READ MATH-CHANGE AT END GO TO TRANSFER-REST-OF-MATH-FILE.
00760               READ MATH-DEPT-STUD-DB AT END GO TO CLOSE-MATH-FILES.
00761               PERFORM INITIALIZE-RECORD-BUFF.
00762               IF SSN OF MATH-CHANGE-REC < SSN OF STUD-REC-M
00763                  THEN PERFORM CREATE-MATH-REC, PERFORM READ-MATH-CHANGE
00764                  ELSE MOVE CORR STUD-REC-M TO RECORD-BUFF, PERFORM
00765                     READ-FILES-TO-BE-MERGED.
00766               GO TO COMPARE-FOR-MERGE.

00768           READ-FILES-TO-BE-MERGED.
00769               READ MATH-DEPT-STUD-DB AT END
00770                  PERFORM WRITE-NEW-FILES-ONLY
00771                  GO TO CLOSE-MATH-FILES.
00772           READ-MATH-CHANGE.
00773               READ MATH-CHANGE AT END
00774                  GO TO TRANSFER-REST-OF-MATH-FILE.
00775
00776           COMPARE-FOR-MERGE.
00777               IF SSN OF MATH-CHANGE-REC = SSN OF RECORD-BUFF
00778                  PERFORM UPDATE-MATH-REC, PERFORM READ-MATH-CHANGE
00779                  GO TO COMPARE-FOR-MERGE.
00780                IF DELETE-CHAR IS NOT = 'D'
00781                  THEN IF SSN OF RECORD-BUFF IS NOT = 0
00782                     THEN WRITE MATH-REORG-REC FROM RECORD-BUFF
00783                        PERFORM INITIALIZE-RECORD-BUFF
00784                  ELSE NEXT SENTENCE
00785                     ELSE MOVE SSN OF RECORD-BUFF TO SSN OF MATH-REORG-REC
00786                        PERFORM INITIALIZE-RECORD-BUFF
00787                        MOVE SSN OF MATH-REORG-REC TO SSN OF RECORD-BUFF
00788                        WRITE MATH-REORG-REC FROM RECORD-BUFF.
00789                     MOVE SPACES TO DELETE-CHAR.
00790               IF SSN OF MATH-CHANGE-REC = SSN OF STUD-REC-M
00791                  THEN MOVE CORR STUD-REC-M TO RECORD-BUFF,
00792                     PERFORM UPDATE-MATH-REC
00793                     PERFORM READ-MATH-CHANGE
00794                     PERFORM READ-FILES-TO-BE-MERGED
00795                  ELSE IF SSN OF MATH-CHANGE-REC > SSN OF STUD-REC-M
00796                     THEN MOVE STUD-REC-M TO RECORD-BUFF
00797                        WRITE MATH-REORG-REC FROM RECORD-BUFF
00798                        PERFORM INITIALIZE-RECORD-BUFF
00799                        PERFORM READ-FILES-TO-BE-MERGED
00800                     ELSE PERFORM CREATE-MATH-REC
00801                        PERFORM READ-MATH-CHANGE.
00802               GO TO COMPARE-FOR-MERGE.
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00803
00804          INITIALIZE-RECORD-BUFF.
00805              MOVE SPACES TO RECORD-BUFF, MOVE ZEROS TO SSN OF
00806                 RECORD-BUFF, MOVE ZEROS TO ADVISOR-SSN OF RECORD-BUFF.
00807
00808          WRITE-NEW-FILES-ONLY.
00809              IF SSN OF RECORD-BUFF IS EQUAL TO 0
00810                 THEN PERFORM CREATE-MATH-REC
00811                 ELSE IF SSN OF RECORD-BUFF IS EQUAL TO SSN OF
00812                    MATH-CHANGE-REC
00813                    THEN PERFORM CREATE-MATH-REC
00814                    ELSE WRITE MATH-REORG-REC FROM RECORD-BUFF
00815                       PERFORM INITIALIZE-RECORD-BUFF,
00816                       PERFORM CREATE-MATH-REC.
00817              READ MATH-CHANGE AT END WRITE MATH-REORG-REC FROM
00818                 RECORD-BUFF, GO TO CLOSE-MATH-FILES.
00819              GO TO WRITE-NEW-FILES-ONLY.
00820
00821          TRANSFER-REST-OF-MATH-FILE.
00822              IF SSN OF RECORD-BUFF IS NOT = 0
00823                 THEN IF SSN OF RECORD-BUFF = SSN OF STUD-REC-M
00824                    THEN WRITE MATH-REORG-REC FROM RECORD-BUFF
00825                       PERFORM INITIALIZE-RECORD-BUFF
00826                    ELSE WRITE MATH-REORG-REC FROM RECORD-BUFF
00827                       PERFORM INITIALIZE-RECORD-BUFF
00828                       WRITE MATH-REORG-REC FROM STUD-REC-M
00829                 ELSE   WRITE MATH-REORG-REC FROM STUD-REC-M.
00830              READ MATH-DEPT-STUD-DB AT END GO TO CLOSE-MATH-FILES.
00831              GO TO TRANSFER-REST-OF-MATH-FILE.
00832          CLOSE-MATH-FILES.
00833              MOVE SPACES TO  DELETE-CHAR.
00834              CLOSE MATH-DEPT-STUD-DB,
00835                    MATH-CHANGE,
00836                    MATH-REORG.
00837              OPEN INPUT MATH-REORG,
00838                   OUTPUT MATH-DEPT-STUD-DB.

00840          TRANSFER-TO-MATH-DB.
00841              READ MATH-REORG      AT END GO TO END-MERGE-MATH-DATA.
00842              MOVE SPACES TO STUD-REC-M.
00843              MOVE ZEROS TO SSN OF STUD-REC-M, MOVE ZEROS TO ADVISOR-SSN
00844                 OF STUD-REC-M.
00845              IF SSN OF MATH-REORG-REC IS NOT EQUAL TO 0
00846                 THEN WRITE STUD-REC-M FROM MATH-REORG-REC.
00847              GO TO TRANSFER-TO-MATH-DB.
00848          END-MERGE-MATH-DATA.
00849              CLOSE MATH-REORG, MATH-DEPT-STUD-DB.

00851         ***** REFERENCE HIPO 2.1.1 *****
00852          CREATE-MATH-REC.
00853              IF COWD = 'V' MOVE CORR ADVISOR-W
00854                 TO RECORD-BUFF,
00855              ELSE IF COWD = 'O'  MOVE CORR FTU-ATTEND-W
00856                 TO RECORD-BUFF,
00857              ELSE IF COWD = 'M' MOVE CORR ASSN-MBR-W
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00858                   TO RECORD-BUFF.
00859               ELSE
00860                   STRING ' CANNOT LOCATE RECORD TO BE CHANGED FOR SSN '
00861                       SSN OF MBR-DELETE-W DELIMITED BY SIZE INTO
00862                       ERR-MSG-LINE
00863                       MOVE MATH-CHANGE-REC TO CODE-CHECK
00864                       PERFORM INVALID-INPUT.

00866           ***** REFERENCE HIPO 2.1.2 *****
00867            UPDATE-MATH-REC.
00868                IF COWD = 'V' PERFORM CODE-V THRU CODE-V-EXIT.
00869                IF COWD = 'Q' PERFORM CODE-Q THRU CODE-Q-EXIT.
00870                IF COWD = 'M' PERFORM CODE-M THRU CODE-M-EXIT.
00871                IF COWD = 'Z' PERFORM CODE-Z THRU CODE-Z-EXIT.
00872                IF COWD = 'X' PERFORM CODE-X THRU CODE-X-EXIT.
00873                IF COWD = 'D' PERFORM CODE-D THRU CODE-D-EXIT.
00874
00875            CODE-V.
00876                MOVE CORR ADVISOR-W TO RECORD-BUFF.
00877            CODE-V-EXIT. EXIT.
00878
00879            CODE-Q.
00880                MOVE SPACES TO WORK-AREA1.
00881                MOVE SPACES TO WORK-AREA2.
00882                MOVE ATTEND-DATA OF FTU-ATTEND-W TO WORK-AREA1.
00883                MOVE ATTEND-DATA OF RECORD-BUFF TO WORK-AREA2.
00884                MOVE SPACES TO ATTEND-DATA OF RECORD-BUFF.
00885                STRING WORK-AREA2 WORK-AREA1 DELIMITED BY
00886                    ' ' INTO ATTEND-DATA OF RECORD-BUFF.
00887            CODE-Q-EXIT. EXIT.
00888
00889            CODE-M.
00890                MOVE SPACES TO WORK-AREA1.
00891                MOVE SPACES TO WORK-AREA2.
00892                MOVE MBR-DATA OF ASSN-MBR-W TO WORK-AREA1.
00893                MOVE MBR-DATA OF RECORD-BUFF TO WORK-AREA2.
00894                MOVE SPACES TO MBR-DATA OF RECORD-BUFF.
00895                STRING WORK-AREA2 ',' WORK-AREA1 DELIMITED
00896                    BY ' ' INTO MBR-DATA OF RECORD-BUFF.
00897            CODE-M-EXIT. EXIT.
00898
00899            CODE-D.
00900                MOVE 'D' TO DELETE-CHAR.
00901            CODE-D-EXIT. EXIT.
00902
00903            CODE-Z.
00904                IF ATTEND-DATA OF FTU-ATTEND-DELETE-W IS EQUAL TO SPACES
00905                    THEN MOVE SPACES TO ATTEND-DATA OF RECORD-BUFF.
00906                        GO TO CODE-Z-EXIT.
00907                MOVE SPACES TO ATTEND-ARRAY.
00908                MOVE ATTEND-DATA OF RECORD-BUFF TO ATTEND-ARRAY.
00909                MOVE 1 TO PTR.
00910                SET Q TO 1.
00911                SEARCH QTR-ATTEND VARYING PTR AT END MOVE
00912                    ' ATTENDANCE DATA ENTRY TO BE DELETED NOT FOUND ' TO
00913                    ERR-MSG-LINE
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00914                   PERFORM INVALID-INPUT
00915               WHEN QTR-ATTEND (Q) = ATTEND-DATA OF FTU-ATTEND-DELETE-W
00916                   MOVE ZEROS TO  QTR-ATTEND (Q)
00917                   PERFORM FILL-IN-A UNTIL PTR = 30
00918                   MOVE ATTEND-ARRAY TO ATTEND-DATA OF RECORD-BUFF.
00919           CODE-Z-EXIT. EXIT.
00920
00921           FILL-IN-A.
00922               MOVE QTR-ATTEND (Q + 1) TO QTR-ATTEND (Q).
00923               SET Q UP BY 1.
00924               ADD 1 TO PTR.
00925           END-FILL-IN-A.  EXIT.
00926
00927           CODE-X.
00928               MOVE SPACES TO MBR-TAB-FIELD.
00929               SET M TO 1.
00930               MOVE 1 TO PTR.
00931               UNSTRING MBR-DATA OF RECORD-BUFF DELIMITED BY ',' INTO
00932                   MBR (M) MBR (M + 1) MBR (M + 2) MBR (M + 3) MBR (M + 4)
00933                   MBR (M + 5) MBR (M + 6) MBR (M + 7) MBR (M + 8)
00934                   MBR (M + 9) MBR (M + 10).
00935               SEARCH MBR VARYING PTR AT END MOVE
00936                   ' MEMBERSHIP ENTRY TO BE DELETED NOT FOUND '
00937                   TO ERR-MSG-LINE PERFORM INVALID-INPUT
00938               WHEN    MBR (M) = ASSN-NAME OF MBR-DELETE-W
00939                   MOVE SPACES TO MBR (M)
00940                   PERFORM FILL-IN-M UNTIL PTR = 9
00941                   MOVE MBR-TAB-FIELD TO MBR-DATA OF RECORD-BUFF.
00942           CODE-X-EXIT. EXIT.
00943
00944           FILL-IN-M.
00945               MOVE MBR (M + 1) TO MBR (M).
00946               SET M UP BY 1.
00947               ADD 1 TO PTR.
00948           END-FILL-IN-M. EXIT.

00950          ***** REFERENCE HIPO 2.1.3 *****
00951           STAT-HIST.
00952               OPEN I-O   STAT-HIST-DB, OUTPUT HIST-REORG,
00953                   OUTPUT PRINT-FILE.
00954               MOVE ZEROS TO HIST-REORG-REC.
00955               IF COOD = 'H'
00956                   MOVE ZEROS TO ACCUMULATORS
00957                   MOVE CORR HIST-DATA TO ACCUMULATORS
00958                   MOVE QTR-H TO QTR-BUFF
00959               PERFORM READ-HIST THRU EXIT-READ-HIST.
00960               CLOSE STAT-HIST-DB, HIST-REORG, PRINT-FILE.
00961               IF  QTR-BUFF IS NOT EQUAL TO 0
00962                   THEN IF ACCUMULATORS IS EQUAL TO 0
00963                   THEN MOVE
00964                   ' ENTRY TO BE DELETED NOT FOUND IN STATISTICS HIST FILE '
00965                   TO ERR-MSG-LINE,
00966                   PERFORM INVALID-INPUT.
00967               PERFORM SORT-STAT-HIST.
00968           EXIT-STAT-HIST. EXIT.
00969
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00970           READ-HIST.
00971               READ STAT-HIST-DB AT END GO TO  END-READ-HIST.
00972               IF QTR  OF STAT-REC IS EQUAL TO  QTR-BUFF
00973                  THEN MOVE CORR ACCUMULATORS TO STAT-REC.
00974                       MOVE ZEROS TO  QTR-BUFF.
00975               IF COMP-UG OF STAT-REC IS NOT EQUAL TO 0
00976                  THEN WRITE HIST-REORG-REC FROM STAT-REC.
00977               GO TO READ-HIST.
00978           END-READ-HIST.
00979               MOVE ZEROS TO HIST-REORG-REC.
00980               IF ACCUMULATORS IS NOT EQUAL TO 0
00981                  THEN IF  QTR-BUFF IS NOT EQUAL TO 0
00982                  THEN MOVE CORR ACCUMULATORS TO HIST-REORG-REC
00983                  MOVE  QTR-BUFF TO  QTR OF HIST-REORG-REC
00984                  MOVE ZEROS TO  QTR-BUFF
00985                  WRITE HIST-REORG-REC.
00986           EXIT-READ-HIST. EXIT.
00987
00988           SORT-STAT-HIST.
00989               MOVE 102400 TO SORT-CORE-SIZE.
00990               SORT SORT-WORK-HDB
00991                  DESCENDING KEY QTR     OF SORT-HDB-REC
00992                  USING HIST-REORG
00993                  GIVING STAT-HIST-DB.
00994           END-MATH-LOAD-UPDATE-SECTION.
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00996          ***** REFERENCE HIPO 2.2 *****
00997           LOAD-FTU-DATA SECTION.
00998                IF COOD IS NOT EQUAL TO '1' AND '2' AND '3' AND '4'  THEN
00999                   GO TO GET-SPIN-OFF.
01000                OPEN OUTPUT SPIN-OFF.
01001
01002           INTTIALIZE-SPO-REC.
01003                MOVE SPACES TO SPIN-OFF-REC.
01004                MOVE ZEROS TO SSN OF SPIN-OFF-REC.
01005                MOVE ZEROS TO FTU-SUMMARY OF SPIN-OFF-REC.
01006
01007          ***** REFERENCE HIPO 2.2.2 *****
01008           DECODE-SPIN-OFF.
01009                IF COOD = '1' MOVE CORR BASIC-DATA-1 TO SPIN-OFF-REC.
01010                IF COOD = '2' MOVE CORR STUD-ADDRESS-2 TO SPIN-OFF-REC.
01011                IF COOD = '3' MOVE CORR PARENTS-ADDRESS-3 TO SPIN-OFF-REC.
01012                IF COOD = '4' MOVE CORR INDEX-4 TO INDEX-CONVERT
01013                   MOVE INDEX-CONVERT TO INDX OF SPIN-OFF-REC
01014                   MOVE SSN OF INDEX-4 TO SSN OF SPIN-OFF-REC.
01015           END-DECODE.  EXIT.
01016
01017           READ-NEXT-CARD.
01018                READ CARD-IN AT END GO TO
01019                   CHECK-FOR-END-OF-SPO.
01020                IF COOD IS NOT EQUAL TO '1' AND '2' AND '3' AND '4'  THEN
01021                   WRITE SPIN-OFF-REC
01022                   CLOSE SPIN-OFF
01023                   GO TO CHECK-FOR-END-OF-SPO.
01024                IF SSN OF BASIC-DATA-1 IS NOT EQUAL TO SSN OF SPIN-OFF-REC
01025                   THEN WRITE SPIN-OFF-REC
01026                   PERFORM INITIALIZE-SPO-REC.
01027                PERFORM DECODE-SPIN-OFF THRU END-DECODE.
01028                GO TO READ-NEXT-CARD.
01029


01031          ***** REFERENCE HIPO 2.2.1 *****
01032           GET-SPIN-OFF.
01033          *    GET-SPIN-OFF TO BE WRITTEN.


01035           CHECK-FOR-END-OF-SPO.
01036                IF COOD IS NOT EQUAL TO '*' THEN
01037                   MOVE ' * EXPECTED BUT DID NOT FIND * TO INDICATE END MARKE
01038          -     'R FOR SPIN-OFF ' TO ERR-MSG-LINE,
01039                   PERFORM INVALID-INPUT.


01041          ***** REFERENCE HIPO 2.2.3 *****
01042           LOAD-STUD-DB.
01043                OPEN INPUT SPIN-OFF.
01044                OPEN OUTPUT STUD-DATA-BASE.
01045                PERFORM INITIALIZE-STUD-DB-REC.
01046           TRANSFER-DATA.
01047                READ SPIN-OFF AT END GO TO END-OF-LOAD-STUD-DB.
01048                MOVE CORR SPIN-OFF-REC TO STUD-DB-REC.
01049                MOVE FTU-GPA OF SPIN-OFF-REC TO GPA OF STUD-DB-REC.
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01050           MOST-RECENT-QTR-AND-IF-GRAD.
01051               MOVE INDX  OF SPIN-OFF-REC TO INDEX-ARRAY-LOAD-FIELD.
01052               MOVE 0 TO CTR.
01053           SET-CTR-LOOP.
01054               MOVE CURRENT-QTR-CODE TO SUBSCRPT, SUBTRACT CTR FROM
01055                   SUBSCRPT.
01056               IF INDEX-ENTRY (SUBSCRPT)
01057                   IS NOT EQUAL TO '*****' THEN
01058                       GO TO HAS-STUD-GRADUATED.
01059               ADD 1 TO CTR.
01060               IF (CURRENT-QTR-CODE -  CTR) > 0 GO TO SET-CTR-LOOP
01061               ELSE STRING ' * CANNOT DETERMINE LAST QTR ATTENDED FOR '
01062                   LAST-NAME OF SPIN-OFF-REC FRST-MDLE-NAME OF SPIN-OFF-REC
01063                   SSN OF SPIN-OFF-REC
01064                   ' CHECK SPIN-OFF DATA AND CURRENT QTR INPUT'
01065                   DELIMITED BY SIZE INTO ERR-MSG-LINE
01066                   OPEN OUTPUT PRINT-FILE
01067                   WRITE PRINT-LINE FROM ERR-MSG-LINE AFTER POSITIONING
01068                       3 LINES
01069                   CLOSE PRINT-FILE
01070                   MOVE SPACES TO ERR-MSG-LINE.
01071           HAS-STUD-GRADUATED.
01072               IF (CURRENT-QTR-CODE - CTR) = 0
01073                   THEN MOVE '?' TO GRAD OF STUD-DB-REC
01074                        MOVE ZEROS TO FTU-LAST-QTR OF STUD-DB-REC
01075                       GO TO STUD-LEVEL-OF-STUDY.
01076               MOVE CURRENT-QTR-CODE TO SUBSCRPT, SUBTRACT CTR FROM
01077                   SUBSCRPT.
01078               IF GRD-IND OF INDEX-ENTRY (SUBSCRPT)
01079                   IS EQUAL TO '1' OR '2'
01080                   MOVE 'Y' TO GRAD OF STUD-DB-REC
01081               ELSE MOVE 'N' TO GRAD OF STUD-DB-REC.
01082               SET YQ TO SUBSCRPT
01083               MOVE YR-QTR (YQ)
01084                   TO FTU-LAST-QTR OF STUD-DB-REC.
01085           STUD-LEVEL-OF-STUDY.
01086               IF APPL-TYPE OF SPIN-OFF-REC < 5 MOVE 'U' TO
01087                   GRAD-UG-PB OF STUD-DB-REC.
01088               IF APPL-TYPE OF SPIN-OFF-REC = 5 MOVE 'P' TO
01089                   GRAD-UG-PB OF STUD-DB-REC.
01090               IF APPL-TYPE OF SPIN-OFF-REC = 6 OR APPL-TYPE OF SPIN-OFF-REC
01091                   = 8 MOVE 'G' TO GRAD-UG-PB OF STUD-DB-REC.
01092               IF APPL-TYPE OF SPIN-OFF-REC IS NOT EQUAL TO 1 AND 2 AND 3
01093                   AND 4  AND 5 AND 6 AND 8 THEN
01094                   MOVE '?' TO GRAD-UG-PB OF STUD-DB-REC
01095                       STRING ' * CANNOT DETERMINE IF ' LAST-NAME OF
01096                           SPIN-OFF-REC FRST-MDLE-NAME OF SPIN-OFF-REC
01097                           SSN OF SPIN-OFF-REC
01098                           ' IS GRAD, UG, OR PB - IS NOT INCLUDED IN STATISTICS
01099           -       ' ' DELIMITED BY SIZE INTO ERR-MSG-LINE
01100                       OPEN OUTPUT PRINT-FILE
01101                       WRITE PRINT-LINE FROM ERR-MSG-LINE AFTER POSITIONING 3
01102                           LINES
01103                       CLOSE PRINT-FILE
01104                       MOVE SPACES TO ERR-MSG-LINE.
01105           ENTER-STUD-MAJOR.
01106               IF MAJOR-1 OF SPIN-OFF-REC = 1701
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01107                   THEN MOVE 'MATH' TO MAJOR OF STUD-DB-REC.
01108               IF MAJOR-1 OF SPIN-OFF-REC = 1790
01109                   THEN MOVE 'MATH' TO MAJOR OF STUD-DB-REC.
01110               IF MAJOR-1 OF SPIN-OFF-REC = 0701
01111                   THEN MOVE 'COMP' TO MAJOR OF STUD-DB-REC.
01112               IF MAJOR-1 OF SPIN-OFF-REC = 1702
01113                   THEN MOVE 'STAT' TO MAJOR OF STUD-DB-REC.
01114               IF MAJOR-1 OF SPIN-OFF-REC IS NOT EQUAL TO
01115                   1701 AND 1790 AND 0701 AND 1702
01116                   THEN MOVE '????' TO MAJOR OF STUD-DB-REC
01117                       STRING ' * CANNOT DETERMINE MAJOR OF ' LAST-NAME OF
01118                       SPIN-OFF-REC FRST-MDLE-NAME OF SPIN-OFF-REC SSN OF
01119                           SPIN-OFF-REC
01120                       ' DATA NOT INCLUDED IN STATISTICS' DELIMITED BY SIZE
01121                       INTO ERR-MSG-LINE
01122                   OPEN OUTPUT PRINT-FILE
01123                   WRITE PRINT-LINE FROM ERR-MSG-LINE AFTER POSITIONING
01124                       3 LINES
01125                   CLOSE PRINT-FILE
01126                   MOVE SPACES TO ERR-MSG-LINE.
01127           MOVE-GPA.
01128               MOVE FTU-GPA OF FTU-SUMMARY OF SPIN-OFF-REC TO GPA OF
01129                   STUD-DB-REC.
01130           WRITE-STUD-DB-REC.
01131               IF SSN OF STUD-DB-REC IS NOT EQUAL TO 0
01132                   THEN IF SSN OF STUD-DB-REC IS NUMERIC
01133                   THEN WRITE STUD-DB-REC.
01134               PERFORM INITIALIZE-STUD-DB-REC.
01135               GO TO TRANSFER-DATA.
01136           INITIALIZE-STUD-DB-REC.
01137               MOVE SPACES TO STUD-DB-REC.
01138               MOVE ZEROS TO GPA OF STUD-DB-REC.
01139               MOVE ZEROS TO FTU-LAST-QTR OF STUD-DB-REC.
01140               MOVE ZEROS TO ADVISOR-SSN OF STUD-DB-REC.
01141               MOVE ZEROS TO SSN OF STUD-DB-REC.
01142           END-OF-LOAD-STUD-DB.
01143               CLOSE SPIN-OFF, STUD-DATA-BASE.
01144           END-FTU-DATA-SECTION.
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01146          ***** REFERENCE HIPO 2.3 *****
01147           GENERATE-REPORTS SECTION.
01148               SORT SORT-WORK-SDB
01149                   ASCENDING KEY SSN OF SORT-SDB-REC
01150                   USING STUD-DATA-BASE
01151                   GIVING STUD-DATA-BASE.
01152               IF MATH-CHANGE-MADE = 'N' GO TO BRANCH-TO-PRINT-RTN.
01153               OPEN OUTPUT PRINT-FILE.
01154               OPEN INPUT MATH-DEPT-STUD-DB.
01155               OPEN I-O STUD-DATA-BASE.
01156               PERFORM MERGE-DATA.
01157               PERFORM READ-NEXT-STUD-DB-REC.
01158               PERFORM COMPARE-RECORDS THRU END-OF-MERGE-DATA.
01159               CLOSE PRINT-FILE.
01160               CLOSE MATH-DEPT-STUD-DB, STUD-DATA-BASE.
01161           BRANCH-TO-PRINT-RTN.
01162               PERFORM IDENTIFY-TYPE-REPORT THRU EXIT-ID-REPORT.
01163               GO TO EXIT-GEN-RPTS-SECTION.

01165          ***** REFERENCE HIPO 2.3.1 *****
01166           MERGE-DATA.
01167               READ MATH-DEPT-STUD-DB AT END WRITE STUD-DB-REC,
01168                   GO TO END-OF-MERGE-DATA.
01169           READ-NEXT-STUD-DB-REC.
01170               READ STUD-DATA-BASE AT END GO TO END-OF-MERGE-DATA.
01171
01172           COMPARE-RECORDS.
01173               IF SSN OF STUD-DB-REC = SSN OF STUD-REC-M THEN
01174                   MOVE CORR STUD-REC-M TO STUD-DB-REC
01175                   WRITE STUD-DB-REC
01176                   PERFORM NULL-STUD-DB-REC
01177                   PERFORM READ-NEXT-STUD-DB-REC, PERFORM MERGE-DATA,
01178                       GO TO COMPARE-RECORDS.
01179               IF SSN OF STUD-REC-M < SSN OF STUD-DB-REC THEN
01180                   STRING ' * SSN ' SSN OF STUD-REC-M ' NOT FOUND IN FTU '
01181                       'SUPPLIED DATA. VERIFY SSN.' DELIMITED BY SIZE
01182                       INTO ERR-MSG-LINE
01183                   WRITE PRINT-LINE FROM ERR-MSG-LINE AFTER POSITIONING 3
01184                       LINES
01185                   MOVE SPACES TO ERR-MSG-LINE
01186                   PERFORM MERGE-DATA
01187               GO TO COMPARE-RECORDS.
01188               WRITE STUD-DB-REC.
01189               PERFORM READ-NEXT-STUD-DB-REC.
01190               GO TO COMPARE-RECORDS.
01191           END-OF-MERGE-DATA. EXIT.
01192           NULL-STUD-DB-REC.
01193               IF ADVISOR-NAME OF STUD-REC-M IS EQUAL TO SPACES
01194                   THEN IF ADVISOR-SSN OF STUD-REC-M IS EQUAL TO ZEROS
01195                   THEN IF ATTEND-DATA OF STUD-REC-M = SPACES
01196                   THEN IF    MBR-DATA OF STUD-REC-M = SPACES
01197                   THEN MOVE ZEROS TO SSN OF STUD-REC-M.

01199          ***** REFERENCE HIPO 2.3 (CONT) *****
01200           IDENTIFY-TYPE-REPORT.
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01201               IF COOD = 'C' PERFORM PRINT-STAT THRU END-PRINT-STAT.
01202               IF COOD = 'R' OR 'F' THEN
01203                  MOVE 102400 TO SORT-CORE-SIZE
01204                  SORT SORT-WORK-SDB
01205                     DESCENDING KEY FTU-LAST-QTR OF SORT-SDB-REC
01206                     ASCENDING KEY MAJOR           OF SORT-SDB-REC
01207                     ASCENDING KEY GRAD-UG-PB      OF SORT-SDB-REC
01208                     ASCENDING KEY LAST-NAME       OF SORT-SDB-REC
01209                     ASCENDING KEY FRST-MDLE-NAME OF SORT-SDB-REC
01210                     USING STUD-DATA-BASE
01211                     GIVING STUD-DATA-BASE
01212                  PERFORM PRINT-REPT THRU END-OF-PRINT-REPT.
01213               IF COOD = 'A' THEN
01214                  MOVE 102400 TO SORT-CORE-SIZE
01215                  SORT SORT-WORK-SDB
01216                     ASCENDING KEY ADVISOR-SSN     OF SORT-SDB-REC
01217                     ASCENDING KEY LAST-NAME       OF SORT-SDB-REC
01218                     ASCENDING KEY FRST-MDLE-NAME OF SORT-SDB-REC
01219                     USING STUD-DATA-BASE
01220                     GIVING STUD-DATA-BASE
01221                  PERFORM PRINT-REPT THRU END-OF-PRINT-REPT.
01222            EXIT-ID-REPORT.  EXIT.

01224           ***** REFERENCE HIPO 2.3.2 *****
01225            PRINT-STAT.
01226                OPEN OUTPUT PRINT-FILE.
01227                MOVE ZEROS TO ACCUMULATORS.
01228                MOVE ZEROS TO  QTR-BUFF.
01229                WRITE PRINT-LINE FROM PAGE-HEAD-DEPT AFTER POSITIONING 0
01230                   LINES.
01231                WRITE PRINT-LINE FROM STUD-STAT-HEAD AFTER POSITIONING
01232                   2 LINES.
01233                WRITE PRINT-LINE FROM DATE-HEAD AFTER POSITIONING 2 LINES.
01234                OPEN INPUT STUD-DATA-BASE.
01235            COMPUTE-CURRENT-STAT.
01236                READ STUD-DATA-BASE AT END CLOSE STUD-DATA-BASE,
01237                   GO TO CURRENT-QTR-TO-QTR-BUFF.
01238                IF FTU-LAST-QTR OF STUD-DB-REC IS NOT EQUAL TO
01239                   CURRENT-QTR THEN GO TO COMPUTE-CURRENT-STAT.
01240                IF MAJOR OF STUD-DB-REC = 'COMP' THEN PERFORM COMP-TALLY.
01241                IF MAJOR OF STUD-DB-REC = 'MATH' THEN PERFORM MATH-TALLY.
01242                IF MAJOR OF STUD-DB-REC = 'STAT' THEN ADD 1 TO STAT-UG
01243                   OF ACCUMULATORS.
01244                GO TO COMPUTE-CURRENT-STAT.
01245            COMP-TALLY.
01246                IF GRAD-UG-PB OF STUD-DB-REC = 'G' THEN
01247                   ADD 1 TO COMP-GR OF ACCUMULATORS.
01248                IF GRAD-UG-PB OF STUD-DB-REC = 'U' THEN
01249                   ADD 1 TO COMP-UG OF ACCUMULATORS.
01250                IF GRAD-UG-PB OF STUD-DB-REC = 'P' THEN
01251                   ADD 1 TO COMP-PB OF ACCUMULATORS.
01252            MATH-TALLY.
01253                IF GRAD-UG-PB OF STUD-DB-REC = 'G' THEN
01254                   ADD 1 TO MATH-GR OF ACCUMULATORS.
01255                IF GRAD-UG-PB OF STUD-DB-REC = 'U' THEN
01256                   ADD 1 TO MATH-UG OF ACCUMULATORS.
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01257              IF GRAD-UG-PB OF STUD-DB-REC = 'P' THEN
01258                 ADD 1 TO MATH-PB OF ACCUMULATORS.
01259          CURRENT-QTR-TO-QTR-BUFF.
01260              MOVE CURRENT-QTR TO QTR-BUFF.
01261          UPDATE-STAT-HIST-FILE.
01262              OPEN I-O STAT-HIST-DB. OUTPUT HIST-REORG.
01263              PERFORM READ-HIST THRU EXIT-READ-HIST.
01264              CLOSE STAT-HIST-DB. HIST-REORG.
01265              PERFORM SORT-STAT-HIST.
01266              OPEN INPUT STAT-HIST-DB.
01267          PRINT-STAT-LOOP.
01268              READ STAT-HIST-DB AT END GO TO END-PRINT-STAT-LOOP.
01269              MOVE ZEROS TO ACCUMULATORS.
01270              MOVE CORR STAT-REC TO ACCUMULATORS.
01271              ADD COMP-UG OF ACCUMULATORS    COMP-GR OF ACCUMULATORS
01272                 COMP-PB OF ACCUMULATORS GIVING COMPTOT OF ACCUMULATORS.
01273              ADD MATH-UG OF ACCUMULATORS MATH-GR OF ACCUMULATORS
01274                 MATH-PB OF ACCUMULATORS GIVING MATHTOT OF ACCUMULATORS.
01275              MOVE STAT-UG OF ACCUMULATORS TO STATTOT OF ACCUMULATORS.
01276              ADD COMPTOT OF ACCUMULATORS MATHTOT OF ACCUMULATORS
01277                 STATTOT OF ACCUMULATORS GIVING TOTSTUDS OF ACCUMULATORS.
01278              MOVE QTR OF STAT-HIST-DB TO QTR-PRINT.
01279              WRITE PRINT-LINE FROM CURRENT-QTR-PRINT AFTER POSITIONING
01280                 3 LINES.
01281              WRITE PRINT-LINE FROM STUD-STAT-COL-HEAD AFTER POSITIONING
01282                 2 LINES.
01283              ADD MATH-UG OF ACCUMULATORS STAT-UG OF ACCUMULATORS COMP-UG
01284                 OF ACCUMULATORS GIVING TOT-UG OF STUD-STAT-UNGRAD.
01285              MOVE CORR ACCUMULATORS TO STUD-STAT-UNGRAD.
01286              WRITE PRINT-LINE FROM STUD-STAT-UNGRAD AFTER POSITIONING
01287                 2 LINES.
01288              ADD MATH-GR OF ACCUMULATORS COMP-GR OF ACCUMULATORS GIVING
01289                 TOT-GR OF STUD-STAT-GRAD.
01290              MOVE CORR ACCUMULATORS TO STUD-STAT-GRAD.
01291              WRITE PRINT-LINE FROM STUD-STAT-GRAD AFTER POSITIONING
01292                 2 LINES.
01293              ADD COMP-PB OF ACCUMULATORS MATH-PB OF ACCUMULATORS
01294                 GIVING TOT-PB OF STUD-STAT-POST-BAC.
01295              MOVE CORR ACCUMULATORS TO STUD-STAT-POST-BAC.
01296              WRITE PRINT-LINE FROM STUD-STAT-POST-BAC AFTER
01297                 POSITIONING 2 LINES.
01298              MOVE CORR ACCUMULATORS TO STUD-STAT-TOT.
01299              WRITE PRINT-LINE FROM STUD-STAT-TOT AFTER POSITIONING
01300                 2 LINES.
01301              MOVE SPACES TO PRINT-LINE.
01302              WRITE PRINT-LINE AFTER POSITIONING 3 LINES.
01303              GO TO PRINT-STAT-LOOP.
01304          END-PRINT-STAT-LOOP.
01305              MOVE SPACES TO PRINT-LINE.
01306              WRITE PRINT-LINE AFTER POSITIONING 0 LINES.
01307              CLOSE PRINT-FILE. STAT-HIST-DB.
01308          END-PRINT-STAT. EXIT.

01310         ***** REFERENCE HIPO 2.3.3 *****
01311          PRINT-REPT.
01312              IF COOD = 'R' THEN MOVE 'R' TO KODE.
```

```
01313                IF COOD = 'F' THEN MOVE 'F' TO KODE.
01314                IF COOD = 'A' THEN MOVE 'A' TO KODE.
01315                PERFORM PRINT-RTN THRU PRINT-RTN-END.
01316                IF COOD = 'R' THEN
01317                   MOVE 102400 TO SORT-CORE-SIZE
01318                   SORT SORT-WORK-SDB
01319                      DESCENDING KEY ADVISOR-SSN OF SORT-SDB-REC
01320                      ASCENDING KEY LAST-NAME      OF SORT-SDB-REC
01321                      ASCENDING KEY FRST-MDLE-NAME OF SORT-SDB-REC
01322                      USING STUD-DATA-BASE
01323                      GIVING STUD-DATA-BASE
01324                   MOVE 'S' TO KODE
01325                   PERFORM PRINT-RTN THRU PRINT-RTN-END.
01326             END-OF-PRINT-REPT. EXIT.
01327             EXIT-GEN-RPTS-SECTION.  EXIT.
```

```
01329          ***** REFERENCE HIPO 4.1 *****
01330           PRINT-RTN SECTION.
01331               MOVE ' NO' TO BREAK-STATUS.
01332               OPEN INPUT STUD-DATA-BASE OUTPUT PRINT-FILE.
01333               READ STUD-DATA-BASE
01334                  AT END  MOVE '* NO INPUT FROM STUD DATA BASE' TO
01335                  PRINT-LINE, WRITE PRINT-LINE AFTER POSITIONING 2 LINES
01336                  GO TO   EXIT-PRINT-RTN-SECTION.
01337           LOOP-PRINT-RTN.
01338               PERFORM LOAD-BREAK-FIELDS.
01339               PERFORM PRINT-HEADINGS THRU EXIT-PRINT-HEADINGS.
01340               PERFORM PRINT-DATA THRU EXIT-PRINT-DATA UNTIL BREAK-STATUS
01341                  IS NOT EQUAL TO ' NO'.
01342               IF BREAK-STATUS IS NOT EQUAL TO 'EOF' THEN
01343                  MOVE ' NO' TO BREAK-STATUS
01344                  GO TO LOOP-PRINT-RTN.
01345           PRINT-RTN-END.
01346               MOVE SPACES TO PRINT-LINE.
01347               WRITE PRINT-LINE AFTER POSITIONING 0 LINES.
01348               CLOSE STUD-DATA-BASE, PRINT-FILE.
01349           EXIT-PRINT-RTN-SECTION.
01350               GO TO END-OF-PRINT-RTN-SECTION.


01352           PRINT-HEADINGS.
01353               MOVE SPACES TO PRINT-LINE.
01354               WRITE PRINT-LINE FROM PAGE-HEAD-DEPT AFTER POSITIONING
01355                  0 LINES.
01356               IF KODE = 'R' OR 'F' THEN
01357                  PERFORM FORMULATE-SUB-HEADINGS THRU EXIT-SUB-HEAD.
01358               IF KODE = 'F'
01359                  WRITE PRINT-LINE FROM FAC-ADV-HEAD AFTER POSITIONING
01360                     2 LINES.
01361               IF KODE = 'R' OR 'F'
01362                  WRITE PRINT-LINE FROM TITLE-ROST AFTER POSITIONING
01363                     2 LINES.
01364               IF KODE = 'S' MOVE '  FACULTY ADVISOR EXTRACT OF STUDENT ROST
01365           -      'ER  ' TO TITLE-LINE
01366                  WRITE PRINT-LINE FROM TITLE-ROST AFTER POSITIONING 2
01367                     LINES.
01368               IF KODE = '0' WRITE PRINT-LINE FROM FORMER-STUD-HEAD AFTER
01369                  POSITIONING 2 LINES.
01370               WRITE PRINT-LINE FROM DATE-HEAD AFTER POSITIONING 2 LINES.
01371               MOVE SPACES TO PRINT-LINE, WRITE PRINT-LINE AFTER POSITIONING
01372                  2 LINES.
01373               IF KODE = 'A'
01374                  THEN IF ADVISOR-NAME OF STUD-DB-REC IS EQUAL TO SPACES
01375                     THEN WRITE PRINT-LINE FROM ADVISEE-HEAD-ALT AFTER
01376                        POSITIONING 2 LINES
01377                  ELSE MOVE ADVISOR-NAME OF STUD-DB-REC TO ADVISOR-NAME
01378                     OF ADVISEE-HEAD
01379                  WRITE PRINT-LINE FROM ADVISEE-HEAD AFTER POSITIONING
01380                     2 LINES.
01381               IF KODE = 'F' WRITE PRINT-LINE FROM FAC-ADV-COL-HEAD AFTER
01382                  POSITIONING 2 LINES.
01383           EXIT-PRINT-HEADINGS.   EXIT.
01384
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01385           LOAD-BREAK-FIELDS.
01386               MOVE MAJOR OF STUD-DB-REC TO BREAK-1.
01387               MOVE GRAD-UG-PR OF STUD-DB-REC TO BREAK-2.
01388               MOVE ADVISOR-SSN OF STUD-DB-REC TO BREAK-3.
01389
01390           FORMULATE-SUB-HEADINGS.
01391               IF MAJOR OF STUD-DB-REC = 'COMP' THEN
01392                  IF GRAD-UG-PR OF STUD-DB-REC = 'G' THEN
01393                     MOVE '        GRADUATE COMPUTER SCIENCE MAJORS      '
01394                       TO TITLE-LINE
01395                  ELSE IF GRAD-UG-PR OF STUD-DB-REC = 'U' THEN
01396                     MOVE '    UNDERGRADUATE COMPUTER SCIENCE MAJORS      '
01397                       TO TITLE-LINE
01398                  ELSE MOVE '  POST-BACCALAUREATE COMPUTER SCIENCE MAJORS  '
01399                    TO TITLE-LINE
01400                  ELSE NEXT SENTENCE.
01401               IF MAJOR OF STUD-DB-REC = 'MATH' THEN
01402                  IF GRAD-UG-PR OF STUD-DB-REC = 'G' THEN
01403                     MOVE '      GRADUATE MATHEMATICAL SCIENCE MAJORS      '
01404                       TO TITLE-LINE
01405                  ELSE IF GRAD-UG-PR OF STUD-DB-REC = 'U' THEN
01406                     MOVE '        UNDERGRADUATE MATHEMATICS MAJORS        '
01407                       TO TITLE-LINE
01408                  ELSE MOVE
01409                     'POST-BACCALAUREATE MATHEMATICAL SCIENCE MAJORS'
01410                       TO TITLE-LINE
01411                  ELSE NEXT SENTENCE.
01412               IF MAJOR OF STUD-DB-REC = 'STAT' THEN
01413                  MOVE '        UNDERGRADUATE STATISTICS MAJORS         '
01414                    TO TITLE-LINE.
01415           EXIT-SUB-HEAD.  EXIT.
01416
01417           PRINT-DATA.
01418               MOVE CORR STUD-DB-REC TO ABBR-NAME.
01419               IF KODE = 'S'
01420                  THEN IF FTU-LAST-QTR OF STUD-DB-REC IS NOT EQUAL TO
01421                    CURRENT-QTR
01422                    THEN IF ADVISOR-SSN OF STUD-DB-REC IS EQUAL TO ZERO
01423                       THEN PERFORM CONTINUE-ON, GO TO PRINT-DATA.
01424               IF KODE = 'S' THEN PERFORM ROSTER-PRINT.
01425               IF KODE = 'R'
01426                  THEN IF FTU-LAST-QTR OF STUD-DB-REC
01427                    IS EQUAL TO CURRENT-QTR
01428                    THEN PERFORM ROSTER-PRINT.
01429               IF KODE = 'O'
01430                  THEN IF FTU-LAST-QTR OF STUD-DB-REC IS NOT EQUAL TO
01431                  CURRENT-QTR
01432                 THEN IF  ATTEND-DATA OF STUD-DB-REC IS     EQUAL TO ' '
01433                  THEN IF MBR-DATA OF STUD-DB-REC IS EQUAL TO ' '
01434                  THEN IF ADVISOR-NAME OF STUD-DB-REC IS EQUAL TO ' '
01435                  THEN IF ADVISOR-SSN OF STUD-DB-REC IS EQUAL TO 0
01436                  THEN GO TO CONTINUE-ON.
01437               IF KODE = 'O' PERFORM ROSTER-PRINT.
01438               IF KODE = 'F' AND FTU-LAST-QTR OF STUD-DB-REC IS =
01439                  CURRENT-QTR
01440                  MOVE ABBR-NAME TO NAME OF FAC-ADV-DET-LINE
01441                  MOVE ADVISOR-NAME OF STUD-DB-REC TO ADVISOR-NAME
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01442                    OF FAC-ADV-DET-LINE
01443                WRITE PRINT-LINE FROM FAC-ADV-DET-LINE AFTER
01444                    POSITIONING 2 LINES.
01445            IF KODE =  'A'
01446                THEN IF FTU-LAST-QTR OF STUD-DB-REC IS EQUAL TO
01447                    CURRENT-QTR
01448                MOVE ABBR-NAME TO NAME OF ADVISEE-DET-LINE
01449                WRITE PRINT-LINE FROM ADVISEE-DET-LINE AFTER POSITIONING
01450                    2 LINES.
01451        CONTINUE-ON.
01452            READ STUD-DATA-BASE AT END MOVE 'EOF' TO BREAK-STATUS
01453                GO TO EXIT-PRINT-DATA.
01454        CONTINUE-ON-END.
01455            IF KODE = 'F'
01456                THEN IF FTU-LAST-QTR OF STUD-DB-REC IS NOT EQUAL TO
01457                    CURRENT-QTR  THEN MOVE 'EOF' TO BREAK-STATUS.
01458                    GO TO EXIT-PRINT-DATA.
01459            IF KODE = 'R'
01460                THEN IF FTU-LAST-QTR OF STUD-DB-REC IS NOT EQUAL TO
01461                    CURRENT-QTR
01462                    THEN MOVE '0' TO KODE
01463                            MOVE 'YES' TO BREAK-STATUS
01464                            GO TO EXIT-PRINT-DATA.
01465            IF KODE = 'R' OR 'F'
01466                THEN IF MAJOR OF STUD-DB-REC
01467                IS NOT EQUAL TO BREAK-1 OR GRAD-UG-PR OF STUD-DB-REC
01468                IS NOT EQUAL TO BREAK-2
01469                    MOVE 'YES' TO BREAK-STATUS.
01470            IF KODE =  'A' OR 'S'
01471                THEN IF BREAK-3 IS NOT EQUAL TO ADVISOR-SSN
01472                OF STUD-DB-REC THEN MOVE 'YES' TO BREAK-STATUS.
01473            IF KODE = '0' MOVE ' NO' TO BREAK-STATUS.
01474        EXIT-PRINT-DATA.  EXIT.
01475
01476        ROSTER-PRINT.
01477            MOVE CORR STUD-DB-REC TO NAME-LINE.
01478            MOVE FTU-LAST-QTR OF STUD-DB-REC TO FTU-LAST-QTR-EDIT.
01479            MOVE LAST-YR-ATT-EDIT TO LAST-YR-ATT OF FTU-LAST-QTR
01480                OF NAME-LINE.
01481            IF LAST-QTR-ATT       = '1' THEN
01482                MOVE 'F' TO LAST-QTR-ATT SUBTRACT 1 FROM LAST-YR-ATT-EDIT
01483                MOVE LAST-YR-ATT-EDIT TO LAST-YR-ATT.
01484            IF LAST-QTR-ATT = '2' THEN
01485                MOVE 'W' TO LAST-QTR-ATT.
01486            IF LAST-QTR-ATT = '3' THEN
01487                MOVE 'S' TO LAST-QTR-ATT.
01488            IF LAST-QTR-ATT = '4' THEN
01489                MOVE 'U' TO LAST-QTR-ATT.
01490            IF MARITAL-STATUS OF NAME-LINE = '1' THEN
01491                MOVE 'S' TO MARITAL-STATUS OF NAME-LINE.
01492            IF MARITAL-STATUS OF NAME-LINE = '2' THEN
01493                MOVE 'M' TO MARITAL-STATUS OF NAME-LINE.
01494            IF MARITAL-STATUS OF NAME-LINE = '3' THEN
01495                MOVE '0' TO MARITAL-STATUS OF NAME-LINE.
01496            WRITE PRINT-LINE FROM NAME-LINE AFTER POSITIONING 2 LINES.
01497            MOVE CORR STUD-DB-REC TO ADDR-LINE.
01498            WRITE PRINT-LINE FROM ADDR-LINE AFTER POSITIONING 1 LINES.
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01499                MOVE CORR STUD-DB-REC TO ADDR-PARENT-LINE.
01500                WRITE PRINT-LINE FROM ADDR-PARENT-LINE AFTER POSITIONING
01501                    1 LINES.
01502                MOVE CORR STUD-DB-REC TO FTU-ATTN-LINE.
01503                WRITE PRINT-LINE FROM FTU-ATTN-LINE AFTER POSITIONING
01504                    1 LINES.
01505            END-OF-PRINT-RTN-SECTION.
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*STATISTICS*      SOURCE RECORDS =  1505      DATA DIVISION STATEMENTS =   503      PROCEDURE
*OPTIONS IN EFFECT*      SIZE =  120832  BUF =   12496  LINECNT = 57  SPACE1, FLAGE,   SEQ,
*OPTIONS IN EFFECT*      NODMAP, NOPMAP, NOCLIST,   SUPMAP, NOXREF, NOSXREF,   LOAD, NODECK
*OPTIONS IN EFFECT*      NOTERM, NONUM, NOBATCH, NONAME, COMPILE=01, NOSTATE, NORESIDENT, N
*OPTIONS IN EFFECT*        OPTIMIZE, NOSYMDMP, NOTEST, NOVERB,   ZWB, SYST, NOENDJOB
                                                  ---CFRDC-HASP JOB STATISTICS---
TIMES    --       2.07 MINUTES ELAPSED      29.44 SECONDS CPU          8.32 SECONDS I/O      $16
UR       --      1,512 CARDS READ               0 CARDS PUNCHED      1,580 LINES PRINTED
TO/CORE  --        416 DISK EXCPS               0 TAPE EXCPS         120K REQUESTED

                                                    H A S P    S Y S T E M    L O G

$ 20.42.19 JOB 174 -- COMP698P --I5  C B
N 20.44.23 JOB 174 END EXECUTION.

//COMP698P JOB (1770,3386,$$$$,FTU,45,30,20,,,7),'ROGER SIFRIT',        X JOB 174
//          CLASS=B,MSGLEVEL=(1,1)
***JOBPARMPSS=NO
//       EXEC COBUC,PARM=FLAGE
XXCOB4C    PROC  LIB1='USF.SS.COPYLIB',LIB2='SYS2.NPDSSRCE',              00000100
XX              UN1=,UN2=,VL1=,VL2=                                       00000200
*** ALIAS NAME -                                                         00000300
*** DATE LAST MODIFIED - 12/23/75 - RSP                                  00000400
XXCOB      EXEC  PGM=IKFCBL00,PARM=NOLOAD                                00000500
XXSTEPLIB  DD  DSN=SYS1.PPLINK,DISP=SHR                                  00000600
//COB.SYSIN  DD *
X/SYSIN    DD  DSN=&&SOURCE,DISP=(OLD,DELETE)                            00000700
XXSYSLIB   DD  DSN=&LIB1,DISP=SHR,UNIT=&UN1,VOL=&VL1                     00000800
IEF653I SUBSTITUTION JCL - DSN=USF.SS.COPYLIB,DISP=SHR,UNIT=,VOL=
XX         DD  DSN=&LIB2,DISP=SHR,UNIT=&UN2,VOL=&VL2                     00000900
IEF653I SUBSTITUTION JCL - DSN=SYS2.NPDSSRCE,DISP=SHR,UNIT=,VOL=
XXSYSLIN   DD  DSN=&&LOADSET,DISP=(MOD,PASS),                            00001000
XX             UNIT=SYSDA,SPACE=(CYL,(1,1)),DCB=(RECFM=FB,BLKSIZE=800)   00001100
XXSYSPRINT DD  SYSOUT=A                                                  00001200
XXSYSPUNCH DD  DUMMY,SYSOUT=                                             00001300
XXSYSUT1   DD  UNIT=SYSDA,SPACE=(CYL,(2,1))                              00001400
XXSYSUT2   DD  UNIT=SYSDA,SPACE=(CYL,(2,1))                              00001500
XXSYSUT3   DD  UNIT=SYSDA,SPACE=(CYL,(2,1))                              00001600
XXSYSUT4   DD  UNIT=SYSDA,SPACE=(CYL,(2,1))                              00001700
XXSYSUT5   DD  UNIT=SYSDA,SPACE=(CYL,(2,1),RLSE),DISP=(MOD,PASS)         00001800
*** PROJ 0030            CFRDC SYSTEMS PROGRAMMING                       00001900
//
***************  ALLOCATION FOR   COMP698P.         .COB        (STEP 001)  ***************
    STEPLIB      350     3330  DISK    SYSLNK   SYS1.PPLINK
    SYSIN        403     2540  RDR              SYS76155.T204220.RV151.COMP698P.R0000001
    SYSLIB       354     3330  DISK    USFPK2   USF.SS.COPYLIB
                 150     3330  DISK    SYSIPL   SYS2.NPDSSRCE
    SYSLIN       351     3330  DISK    SYSWK2   SYS76155.T204220.RV151.COMP698P.LOADSET
    SYSPRINT     430     1403  PRT              SYS76155.T204220.RV151.COMP698P.R0000002
    SYSPUNCH    DUMMY                          NULLFILE
    SYSUT1       351     3330  DISK    SYSWK2   SYS76155.T204220.RV151.COMP698P.R0000003
    SYSUT2       151     3330  DISK    SYSWK1   SYS76155.T204220.RV151.COMP698P.R0000004
    SYSUT3       151     3330  DISK    SYSWK1   SYS76155.T204220.RV151.COMP698P.R0000005
    SYSUT4       351     3330  DISK    SYSWK2   SYS76155.T204220.RV151.COMP698P.R0000006
    SYSUT5       351     3330  DISK    SYSWK2   SYS76155.T204220.RV151.COMP698P.R0000007
```