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THE INVENTORY SYSTEM SIMULATOR (INSSIM). VOLUME II PROGRAM LIST--ETC(U)
AUG 77 W S DEMMY F49620-77-C-0063
UNCLASSIFIED RM-77-03 AFOSR-TR-77-1235 NL

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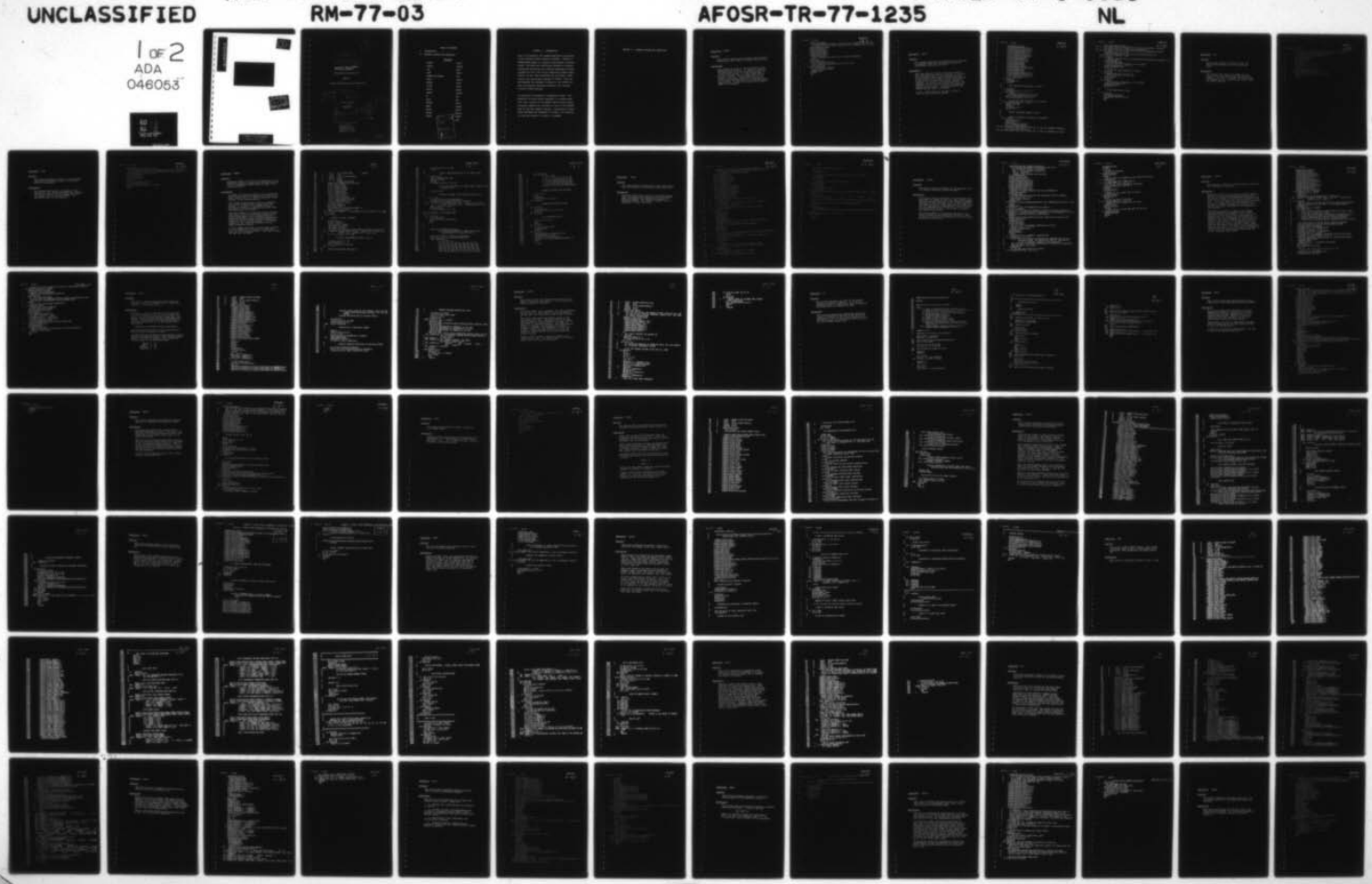

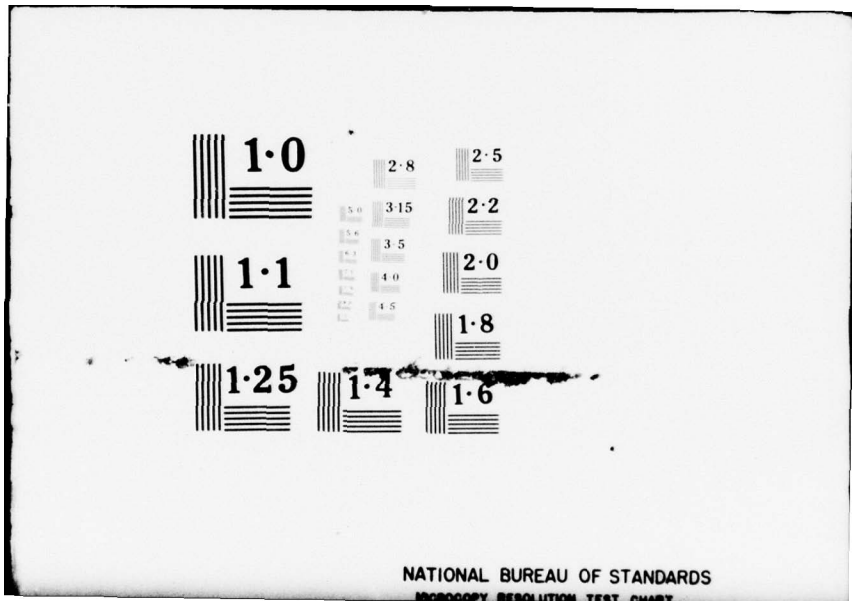
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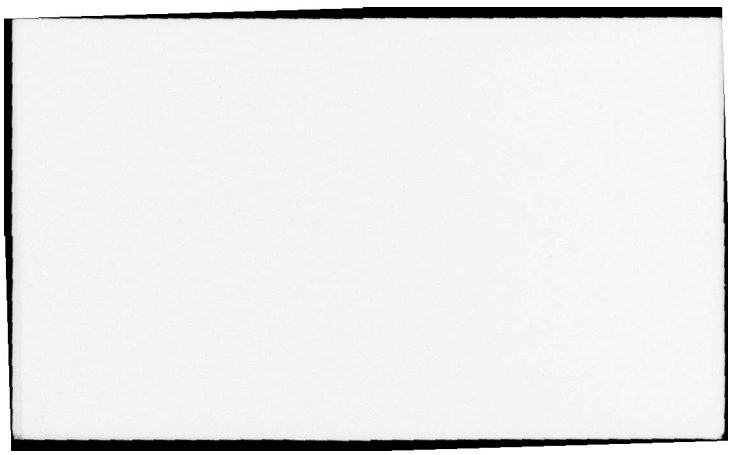

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VOLUME II, PROGRAM LISTINGS AND NARRATIVES.

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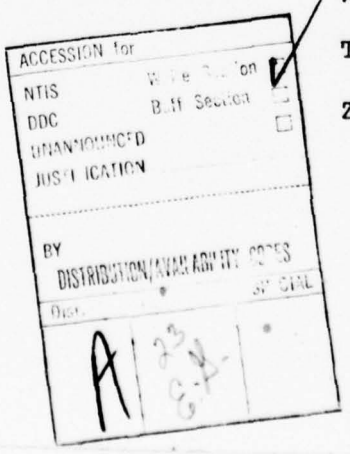

CHAPTER I. INTRODUCTION

This is the second of two volumes describing the features of the Inventory System Simulator (INSSIM). INSSIM is a FORTRAN-based model of a general single-echelon inventory system. The model was specifically designed to evaluate alternative forecasting and inventory management policies proposed for use in the EOQ Buy Computation System (D062). Volume I of this report describes the philosophy, organization, and input/output features of INSSIM. This volume documents the statement listings of each INSSIM program, and provides narratives describing the function of each of these routines.

The routines are presented in alphabetical order. Documentation for each routine consists of a program narrative, and a listing of the FORTRAN code for that routine. Additional comments are included as a part of the FORTRAN code for the more complex routines. Definitions of major INSSIM variables are documented in Volume I, and familiarity with the contents of Volume I is assumed.

CHAPTER II. PROGRAM LISTINGS AND NARRATIVES

Subroutine: BUDGET

Function:

This routine updates period counters and obligation accumulators, and creates two budget review events.

Description:

This routine is called at the conclusion of each budget revision interval. It zeros the accumulator IOBLIG used to record obligations within the current budget period. It then creates type 6 and type 7 events, and puts these events on the Future Events List. These events are used to revise buy guidelines within the budget period, and to signal the beginning of a new budget period, respectively. Finally, the budget period counter, NBPER, is incremented.

BUDGET
p 1 of 1

```
      SUBROUTINE BUDGET
C       AT THE CONCLUSION OF EACH BUDGET REVISION INTERVAL, THIS ROUTINE
C       IS CALLED TO UPDATE PERIOD COUNTERS AND OBLIGATION ACCUMULATORS
      COMMON/IOBLIG/IOBLIG
      COMMON/ITHQ/ITHQ
      COMMON/IDTHQ/IDTHQ
      COMMON/NBPER/NBPER
      COMMON/ITDIV/ITDIV
      COMMON/ITIME/ITIME
C       RESET COUNTERS AND CALL GUIDE TO RESET GUIDELINES
      IOBLIG=0
      ITDIV=ITIME+10
      CALL ENTER(ITDIV,7,0,0,0)
C       PLACE BUDGET REVIEW TRANSACTION ON FE LIST
   12 ITHQ=ITHQ+IDTHQ
      CALL ENTER(ITHQ,8,0,0,0)
C       UPDATE PERIOD COUNTER
      NBPER=NBPER+1
      RETURN
      END
```

Subroutine: CANCLB

Function:

This routine simulates the cancellation of backorders by customers which have been forced to wait an unacceptably long period of time.

Description:

When this routine is called, the stock status of each item being simulated is reviewed. If any item has a backorder that is older than MBODAYS days, routine CANCLB takes action to reflect cancellation of the associated requisition by the requesting customer. To do this, data elements defining the backorder are removed from the Backorder File, and Subroutine CUM is called to update the associated performance statistics. Statistics affected are: IRATON, ICANCL, IBACKT, and IBACKI.

Finally, CANCLB creates a new type 3 event to occur at time ITCANB plus IDCANB.

```
01  12-08-76   19.916

          SUBROUTINE CANCLB
          COMMON/IBACPT/IBACPT(200)
          COMMON/ICANCL/ICANCL(30,3)
          COMMON/IPRIOR/IPRIOR(200)
          COMMON/IQTYB/IQTYB(200)
          COMMON/ITMBAC/ITMBAC(200)
          COMMON/ILOCBK/ILOCBK(200)
          COMMON/NLOCBK/NLOCBK
          COMMON/NBOPT/NBOPT(50)
          COMMON/NBOTU/NBOTU(50)
          COMMON/ITIME/ITIME
          COMMON/ITDAY/ITDAY
          COMMON/MBODAY/MBODAY
          COMMON/ITCANB/ITCANB,IDCANB
          COMMON/IDBUG/IDBUG
          COMMON/NITEM/NITEM
          COMMON/IBACKT/IBACKT(30,3)
          COMMON/IBACKI/IBACKI(30,3)
          COMMON/IRATON/IRATON(30,3)
          DO 50 N=1,NITEM
       50 CONTINUE
          IPT=NBOPT(N)
          JPT=IPT
      C
      C        ARE THERE ANY BACKORDERS ON ITEM N
      C
      100 CONTINUE
          IF(NBOPT(N).LE.0) GO TO 500
      110 CONTINUE
      C        COMPUTE BACKORDER AGE IN DAYS
          IAGE=(ITIME-ITMBAC(JPT))/ITDAY
          IF(IAGE.GT.MBODAY) GO TO 150
      C
      C        IS JPT THE LAST BACKORDER ON THE CHAIN
      140 IF(IBACPT(JPT).LE.0) GO TO 500
      C     UPDATE INDICES
          IPT=JPT
          JPT=IBACPT(JPT)
          GO TO 110
      C
      C        CANCEL BACKORDER LOCATED AT JPT
      C
      C
      C        UPDATE STATISTICS TO REFLECT CANCELATION
      150 CONTINUE
          IQTY=IQTYB(JPT)
          JQTY=-IQTY
          NBOTU(N)=NBOTU(N)-IQTY
          CALL CUM(IRATON,IQTY,N)
1457 DO LOOP INDEX N MAY NOT BE REDEFINED IN CALL OR ABNORMAL FUNCTION
          CALL CUM(ICANCL,IQTY,N)
1457 DO LOOP INDEX N MAY NOT BE REDEFINED IN CALL OR ABNORMAL FUNCTION
```

```
01  12-08-76   19.916
          CALL CUM(IBACKT,JQTY,N)
1457 DO LOOP INDEX N MAY NOT BE REDEFINED IN CALL OR ABNORMAL FUNCTION
          IF(IPRIOR(JPT).EQ.1) CALL CUM(IBACKI,JQTY,N)
1457 DO LOOP INDEX N MAY NOT BE REDEFINED IN CALL OR ABNORMAL FUNCTION
          IF(IDBUG.NE.1) GO TO 160
          WRITE(6,8000)ITIME,N,IQTY,IPRIOR(JPT),ITMBAC(JPT),JPT
     8000 FORMAT(7H CANCEL,I10,5I8)
      160 CONTINUE
     C       RECORD LOCATION JPT AS AVAILABLE FOR FILING OTHER BACKORDER DAT
          NLOCBK=NLOCBK+1
          ILOCBK(NLOCBK)=JPT
     C       IS JPT THE FIRST BACKORDER ON THE CHAIN
          IF(JPT.NE.NBOPT(N)) GO TO 170
          NBOPT(N)=IBACPT(JPT)
          GO TO 50
     C       IS JPT THE LAST ENTRY ON THE CHAIN
      170 CONTINUE
          IF(IBACPT(JPT).NE.0) GO TO 180
     C       SET IPT AS LAST ON THE CHAIN
          IBACPT(IPT)=0
          GO TO 500
      180 CONTINUE
     C       THEN JPT IS IN THE MIDDLE OF THE CHAIN
          IBACPT(IPT)=IBACPT(JPT)
          JPT=IBACPT(IPT)
          GO TO 110
     C
     C       CREATE NEXT REVIEW EVENT
     C
      500 CONTINUE
          ITCANB=ITCANB+IDCANB
          CALL ENTER(ITCANB,3,0,0,0)
          RETURN
          END
```

Subroutine: CUM

Function:

This routine updates the action, units, and dollar counts associated with the statistic ISTAT.

Description:

The variable KFSN defines the number of the items involved and IQTY defines the associated quantity. If IQTY is negative, the action count is decreased by one. The units and dollar counts are always increased.

CUM

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02-11-77 10.619

```
      SUBROUTINE CUM(ISTAT,IQTY,KESN)
C       THIS ROUTINE UPDATES THE ITEMS,UNITS,AND DOLLAR COUNTS
C       ASSOCIATED WITH THE STATISTIC ISTAT
      DIMENSION ISTAT(50,3),UCOST(50)
      COMMON/ITINV/ITINV
      COMMON/UCOST/UCOST
      COST=UCOST(KESN)
      I=ITINV
      IF(IQTY.LT.0) GO TO 21
      ISTAT(I,1)=ISTAT(I,1)+1
      GO TO 22
   21 ISTAT(I,1)=ISTAT(I,1)-1
   22 ISTAT(I,2)=ISTAT(I,2)+IQTY
      DOLLAR=COST*FLOAT(IQTY)
      ISTAT(I,3)=ISTAT(I,3)+IFIX(DOLLAR)
      RETURN
      END
```

Subroutine: CUMB

Function:

This routine updates the units and dollar counts associated with statistic ISTAT. The actions count is not affected.

Description:

The variable KFSN defines the number of items involved and IQTY defines the associated quantity. When called, Subroutine CUMB updates the units and dollar counts of statistic ISTAT. The actions/FSN count is not affected.

02-11-77 19.698

CUMB,
p. 1 of 1

```
      SUBROUTINE CUMB(ISTAT,IQTY,KESN)
C       THIS ROUTINE UPDATES THE UNITS AND DOLLAR COUNTS ASSOCIATED
C       WITH STATISTIC ISTAT. THE ACTIONS COUNT IS NOT EFFECTED
      DIMENSION ISTAT(50,3),UCOST(50)
      COMMON/ITINV/ITINV
      COMMON/UCOST/UCOST
      COST=UCOST(KESN)
      I=ITINV
      ISTAT(I,2)=ISTAT(I,2)+IQTY
      DOLLAR=COST*FLOAT(IQTY)
      ISTAT(I,3)=ISTAT(I,3)+IFIX(DOLLAR)
      RETURN
      END
```

Subroutine: DEMPAR

Function:

Subroutine DEMPAR is called at the beginning of each simulation quarter to generate the specific requisition and serviceable return events to occur in the current quarters.

Description:

In DEMPAR, the variable IDPER is first incremented. This variable defines the historical period in the Demand Driver File to be used in generating demand activity in the current quarter.

Next, DEMPAR generates type 4 event to represent the arrival of serviceable returns within the quarter. At present, it is assumed that all serviceable returns are generated one month after the beginning of the quarter.

Subroutine DEMPAR next generates specific requisition events to occur in the current quarter, and places these events on the Future Events List. Subroutine GETREQ is used to generate requisition sizes with the same probability distributions as observed in AFLC inventory systems. See Volume I, Chapter VI, for a detailed discussion of the demand generation process.

Finally, DEMPAR generates a type 12 event to occur at a time IDPER in the future, and places this event on the Future Events List. This action causes the next call to DEMPAR.

```
      ↑       IDENT   WP1279,XRS/DEMMY                DEMPAR
      $       ENTRY   DECK
      $       PRMFL   C*,W,S,REQS/DEMPAR.O
      $       REMOTE  P*,AC
      $       REMOTE  $$,AC
      C                DEMPAR FOR DODSIM
            SUBROUTINE DEMPAR(IDPER,IP4,IP5)
            COMMON/IGBUG/IGBUG
            COMMON/ITIME/ITIME
            COMMON/ITWEEK/ITWEEK
            COMMON/ITMNTH/ITMNTH
            COMMON/ITQTR/ITQTR
            COMMON/ITYEAR/ITYEAR
            COMMON/NITEM/NITEM
             COMMON/NDENT/NDENT(1)
             COMMON/IDEMND/IDEMND(1,24)
             COMMON/IRETUR/IRETUR(1,24)
             COMMON/IREQ/IREQ(1,24)
            IF(IGBUG.NE.1) GO TO 25
            IY=ITIME/ITYEAR +1
            IQT=ITIME/ITQTR +1
            ITW=(ITIME-(IY-1)*ITYEAR)/ITWEEK +1
            WRITE(6,103)IY,IQT,ITW
        103 FORMAT(12H DEMPAR-----,5X,8HYEAR NO.,I3,5X,7HQTR NO.,I3,5
           1NO.,I3)
         25 CONTINUE
      C
      C        INCREMENT PERIOD COUNTERS
      C
            IDPER=IDPER+1
            DO 100 N=1,NITEM
             IQTY=IDEMND(N,IDPER)
             IRET=IRETUR(N,IDPER)
             IRQ=IREQ(N,IDPER)
             IF(IGBUG.EQ.1)WRITE(6,8013)N,NDENT(N),IDPER,IQTY,IRET,IRQ
       8013  FORMAT(4X,'****DEMPAR--N=',I5,' NDENT=',I5,' IDPER=',I5,
      &                 ' IDEMND=',I5,' IRETRN=',I5,' IREQ=',I5)
            IF(NDENT(N).LE.0) GO TO 100
      C
      C              GENERATE SERVICEABLE RETURNS, IF ANY
      C
             IF(IRET.LE.0)GO TO 30
             IT=ITIME+ITMNTH
             CALL ENTER(IT,4,N,IRET,0)
         30  CONTINUE
      C
      C      REFLECT REQUISTION FOR ITEM N
      C
```

```
500             IF(IQTY.LE.0) GO TO 100
510             ITOT=0
520       C
530       C                   OBTAIN A REQUISITION SIZE IR BY MONTE CARLO
540       C
550          50 R=RANDU(.2)
560             CALL GETREQ(R,IQTY,IRQ)
570             ITEMP=ITOT+IRQ
580             IR=IRQ
590             IF(ITEMP.LE.IQTY) GO TO 60
600       C
610       C                   LIMIT LAST REQUISITION SO THAT TOTAL DEMAND IN QT
620       C                      EQUALS IQTY.
630       C
640             IR=IQTY-ITOT
650       C
660       C                   DETERMINE ARRIVAL TIME FOR THIS REQUISITION
670       C
680          60 CONTINUE
690             IT=ITIME+RANDU(.2)*FLOAT(ITQTR)
700             IF(IGBUG.EQ.1)WRITE(6,8023)IT,N,R,IRQ,IR
710       8023  FORMAT(4X,'****DEMPAR--IT=',I10,'  N=',I4,'  R=',F5.3,
720      &                 '  INITAL REQ-SIZE=',I4,'  FINAL REQ-SIZE=',I4)
730             CALL ENTER(IT,1,N,IR,1)
740             ITOT=ITOT+IR
750             IF(ITOT.LT.IQTY) GO TO 50
760       C
770       C********CREATE NEXT DEMPAR EVENT
780       C
790         100 CONTINUE
800             IT=ITIME+ITQTR
810            CALL ENTER(IT,12,IDPER,0,0)
820            RETURN
830            END
840       C
850       C
860       C
870             SUBROUTINE GETREQ(R,IQTY,IR)
880       C                   THIS ROUTINE DETERMINES A REQUISITION SIZE
890       C                      CORRESPONDING TO A CUM PROB. OF R.
900       C
910             DIMENSION IUCAT(8),CPROB(10,8),IRQ(10,8)
920             DATA IUCAT/1,3,10,31,100,316,1000,3162/
930             DATA CPROB/10*1.,
940       &                 .46,.89,8*1.0,
950       &                 .27,.52,.65,.78,.86,.91,.92,.95,.96,1.0,
960       &                 .23,.53,.70,.78,.82,.90,.92,.97,.99,1.00,
970       &                 .06,.38,.60,.73,.81,.85,.89,.93,.98,1.00,
980       &                 .015,.23,.42,.56,.65,.70,.76,.92,.97,1.00,
990       &                 .012,.17,.31,.37,.48,.55,.60,.78,.87,1.00,
1000      &                 .001,.03,.32,.50,.60,.66,.86,.96,1.00,1.00/
```

```
1010            DATA IRG/10*1,
1020           &                1, 2, 3, 7*3,
1030           &                1, 2, 3, 4, 5, 6, 7, 8, 9, 10,
1040           &                1, 4, 6, 8,10,13,15,20,25, 30,
1050           &                1, 5,10,15,20,25,30,40,70,100,
1060           &                1, 5,10,15,20,25,30,80,150,300,
1070           &                1, 5,10,15,20,25,30,80,200,600,
1080           &                1,20,40,60,80,100,200,300,600,700/
1090     C
1100     C
1110     C                    ESTABLISH DEMAND RATE CATEGORY
1120     C
1130            DO 10 I=1,8
1140            IM=I
1150            IGTY=IUCAT(I)
1160            IF(IGTY.LE.M) GO TO 30
1170        10  CONTINUE
1180     C
1190     C                    DETERMINE REQUISITION SIZE
1200     C
1210        30  CONTINUE
1220            DO 40 I=1,10
1230            IF(CPROB(I,IM).GE.R) GO TO 60
1240        40  CONTINUE
1250        60  CONTINUE
1260     C
1270     C                    SET REQUISITION SIZE
1280     C
1290            IF(I.GT.1)GO TO 80
1300            IR=1
1310            RETURN
1320        80  CONTINUE
1330            IF(I.LT.10)GO TO 100
1340            IR=IRG(10,IM)
1350            RETURN
1360       100  CONTINUE
1370            DPROB=CPROB(I,IM)-CPROB(I-1,IM)
1380            RPROB=R-CPROB(I-1,IM)
1390            DRG=IRG(I,IM)-IRG(I-1,IM)
1400            IR=IRG(I-1,IM)+IFIX(RPROB*DRG/DPROB+.5)
1410            RETURN
1420            END
1430     $      SUBJOB
```

Subroutine: ENTER

Function:

This routine enters transactions on the Future Events List, and updates the associated pointer variables.

Description:

Subroutine ENTER places events on the Future Events List, and updates the associated pointer variables. These transactions are subsequently removed by subroutine REMOVE. See Volume I, Chapter IV for a discussion of these operations.

ENTER,
P. 1 of 2

```
0  02-11-77   11.706

      SUBROUTINE ENTER(KTIME,KTYPE,KESN,KQTY,KPRIOR)
C          THIS ROUTINE ENTERS EVENTS ON THE FUTURE EVENTS LIST
C          AND UPDATES THE CHAIN STRUCTURE
      COMMON/IDBUG/IDBUG
      COMMON/ITIME/ITIME
      COMMON/NENTRY/NENTRY
      COMMON/NEMAX/NEMAX
      COMMON/NFIRST/NFIRST
      COMMON/NLOC/NLOC
      COMMON/NTIME/NTIME
      COMMON/NORDER/NORDER(50)
      COMMON/ILOCEE/ILOCEE(500)
      COMMON/JESN/JESN(500)
      COMMON/JPOINT/JPOINT(500)
      COMMON/JPRIOR/JPRIOR(500)
      COMMON/JQTY/JQTY(500)
      COMMON/JTIME/JTIME(500)
      COMMON/JTYPE/JTYPE(500)
C       BEGIN BY UPDATING COUNT OF ENTRIES IN FIL
      NENTRY=NENTRY+1
C       IF THIS ENTRY EXCEEDS CAPACITY OF THE CHAIN,PRINT
C       ERROR MESSAGE AND QUIT
      IF(NENTRY.GT.NEMAX) GO TO 99
C       PLACE TRANSACTION IN FIRST AVAILABLE LOCATION
   20 K=ILOCEE(NENTRY)
      NLOC=K
      JTIME(K)=KTIME
      JTYPE(K)=KTYPE
      JESN(K)=KESN
      JQTY(K)=KQTY
      JPRIOR(K)=KPRIOR
C       CHECK TO SEE IF THIS IS THE ONLY ENTRY ON THE LIST
      IF(NENTRY.NE.1) GO TO 40
C       UPDATE LIST STATUS AND POINTER VARIABLES
      NFIRST=K
      NTIME=KTIME
      JPOINT(K)=0
      GO TO 100
C       DOES THE NEW TRANSACTION PRECEED ALL OTHER LIST ENTRIES?
   40 IF(KTIME.GE.NTIME) GO TO 60
C       INSERT NEW TRANSACTION AS A FIRST LINK IN THE CHAIN
      JTIME=KTIME
      JPOINT(K)=NFIRST
      NFIRST=K
      GO TO 100
C       THE FOLLOWING STEPS SEARCH DOWN THE FIL AND
C       INSERTS THE TRANSACTION IN THE PROPER LOCATION
   60 JJ=NFIRST
      KJ=JPOINT(JJ)
C       IS JJ THE LAST RECORD ON THE CHAIN
   62 IF(KJ.EQ.0) GO TO 97
C       DOES THE NEW TRANSACTION PRECEED KJ
```

ENTER
p 2 of 2

02-11-77 16.706

```
      IF(ATIME.LT.JTIME(KJ)) GO TO 80
      IJ=KJ
      KJ=JPOINT(IJ)
      GO TO 62
C       INSERT NEW TRANSACTION AS THE LAST LINK ON THE CHAIN
   97 JPOINT(IJ)=K
      JPOINT(K)=0
      GO TO 100
C       INSERT NEW TRANSACTION ON THE CHAIN
   80 JPOINT(IJ)=K
      JPOINT(K)=KJ
      GO TO 100
C       WRITE ERROR MESSAGE
   90 WRITE(6,91)
   91 FORMAT(1HF,55HCAPACITY OF FE CHAIN EXCEEDED CHAIN LISTED ON NEXT P
     CAGE)
      WRITE(6,92)
   92 FORMAT(1HE,33X,65HK          JTIME      JTYPE      JPOINT      JESN
     F JQTY       JPRIOR,/)
      WRITE(6,93) (I,JTIME(I),ITYPE(I),JPOINT(I),JESN(I),JQTY(I),I=1,NFE
     CMAX)
   93 FORMAT(1H ,31X,I4,4X,I8,I9,5X,I5,3X,I10,I9,4X,I2)
      RETURN
  100 CONTINUE
      IF(ERROR.NE.1) GO TO 25
      WRITE(6,8888)(II(I),FTIME,KTYPE,KESN,KQTY,ERROR,K,NFIRST,NEWKEY,NT
     CIME
 8888 FORMAT(2H ENTER ,I10,40X,8I5,I7)
   25 CONTINUE
      RETURN
      END
```

Subroutine: ENTERB

Function:

This routine records backorders in the backorder file, and updates associated pointed variables.

Description:

This routine records backorders in the backorder file. Backorders are stored in link list form, with pointers from each recorded backorder to the oldest outstanding backorder for the associated item. In this link list, the highest priority, oldest backorder is stored first; that is, backorders are recorded on a first in first out basis within priority. See Volume I, Chapter V for variable definitions.

The variable NBOPT (N) defines the location of the oldest, highest priority backorder for item N. When new stock is received, this backorder will be the first requisition to be filled.

ENTERB
p. 1 of 2

```
1  04-16-77    12.104
          SUBROUTINE ENTERB(N,IQTY,IPRI,JTIME)
      C       THIS ROUTINE BACKORDERS REQUISITIONS FOR ITEM N
      C         IQTY=QUANTITY PLACED ON BACKORDER
      C         IPRI =1  HIGH-PRIORITY REQUISITION
      C         IPRI=2  OTHERWISE
      C         JTIME= CLOCK TIME REQ WAS RECEIVED
          COMMON/NBMAX/NBMAX
          COMMON/NLOCBK/NLOCBK
          COMMON/NBOPT/NBOPT(50)
          COMMON/IBACPT/IBACPT(200)
          COMMON/IDFSNB/IDFSNB(200)
          COMMON/ILOCBK/ILOCBK(200)
          COMMON/IPRIOR/IPRIOR(200)
          COMMON/IQTYB/IQTYB(200)
          COMMON/ITMBAC/ITMBAC(200)
      C       RESERVE A STORAGE LOCATION FOR THIS INFORMATION
          IPT=ILOCBK(NLOCBK)
          NLOCBK=NLOCBK-1
      C       DID THIS REQUISITION CAUSE THE BACKORDER FILE TO OVERFLOW
          IF(NLOCBK.GE.0)GO TO 20
      C       WRITE ERROR MESSAGE
          WRITE(6,91)
       91 FORMAT(1H0,20X,53HERROR--BACKORDER FILE OVERFLOW,FILE DUMP ON NEXT
         C PAGE)
          WRITE(6,82)
       82 FORMAT(1H1,10X,23H**BACKORDER FILE DUMP**)
          DO 83 K=1,NBMAX
       83 WRITE(6,84) K,ITMBAC(K),IDFSNB(K),IPRIOR(K),IQTYB(K),IBACPT(K)
       84 FORMAT(1H ,3X,7HREC NO=,I3,5X,7HITMBAC=,I7,5X,7HIDFSNB=,I10,5X,7HI
         CPRIOR=,I1,5X,6HIQTYB=,I7,5X,7HIBACPT=,I7)
          RETURN
      C     RECORD QUANTITY,PRIORITY,FSN ID,AND TIME DATA FOR THIS BO REQ
       20 ITMBAC(IPT)=JTIME
          IDFSNB(IPT)=N
          IPRIOR(IPT)=IPRI
          IQTYB(IPT)=IQTY
      C       ARE ANY OTHER BACKORDERS OUTSTANDING ON ITEM N
          IF(NBOPT(N).GT.0) GO TO 40
      C       RECORD POINTER DATA
          NBOPT(N)=IPT
          IBACPT(IPT)=0
          RETURN
      C       IS THE NEW BO A PRIORITY 1 REQUISITION
       40 IF(IPRI.EQ.1) GO TO 60
      C       NOTE-- NEW LOW PRIORITY BACKORDERS ARE INSERTED LAST ON THE
      C              BACKORDER CHAIN. THE REMAINING STEPS IN THIS PORTION
      C              OF THE SUBROUTINE ACCOMPLISH THIS OBJECTIVE
      C       SET JPT EQUAL TO THE FILE LOCATION NO OF THE FIRST BACKORDERED
      C       REQUISITION IN THE CHAIN
          JPT=NBOPT(N)
      C       IS JPT THE LAST LINK IN THE CHAIN
       49 IF(IBACPT(JPT).EQ.0) GO TO 50
```

ENTER B, p. 2

```
      KPT=IBACPT(JPT)
      JPT=KPT
      GO TO 49
C       RECORD NEW POINTERS
   50 IBACPT(JPT)=IPT
      IBACPT(IPT)=0
      RETURN
C       SET JPT EQUAL TO LOCATION NO OF FIRST BO ON CHAIN
   60 JPT=NBOPT(N)
C       IS BACKORDER JPT A HIGH PRI BO
   61 IF(IPRIOR(JPT).NE.1) GO TO 80
C       IS JPT THE LAST BACKORDER ON THE CHAIN
      IF(IBACPT(JPT).EQ.0) GO TO 62
      KPT=JPT
      JPT=IBACPT(KPT)
      GO TO 61
C       INSERT NEW BO AS LAST LINK ON CHAIN
   62 IBACPT(JPT)=IPT
      IBACPT(IPT)=0
      RETURN
C       IS JPT THE ONLY BO ON CHAIN
   80 IF(JPT.NE.NBOPT(N)) GO TO 81
C       INSERT NEW BO AS FIRST LINK ON CHAIN
      NBOPT(N)=IPT
      IBACPT(IPT)=JPT
      RETURN
C       INSERT NEW BO AS LINK BETWEEN KPT AND JPT
   81 IBACPT(KPT)=IPT
      IBACPT(IPT)=JPT
      RETURN
      END
```

Subroutine: FILLBO

Function:

This routine is called to initiate shipping actions to fill outstanding backorders.

Description:

Subroutine FILLBO (N) is called to initiate shipping actions to fill outstanding backorders for item N. The routine assumes that backordered requisitions are filled using a first in first out, by priority, issue rule. If on hand assets are insufficient to completely fill a given requisition, partial shipments are initiated. Reduced shipments to partially fulfill several outstanding backorders are not permitted in this routine.

When FILLBO is called, it tests if the highest priority outstanding requisition may be filled completely from on hand stock. If so, and if this shipment will not take on hand stock below the support level, the requisition is removed from the backorder list, and a shipment for the requisition quantity is initiated. If the backorder is low priority (that is, code 2), shipments will be made until on hand stocks just equal the support level ISUL (N) for item N. For high priority requisitions, shipments are made until on hand stock is reduced to zero or until all high priority requisitions are filled, whichever occurs first.

FILLBO, p. 1 of 2

```
      SUBROUTINE FILLBO(N)
      COMMON/IDBUG/IDBUG
      COMMON/NBOPT/NBOPT(50)
      COMMON/INVACT/INVACT(50)
      COMMON/IQTYB/IQTYB(200)
      COMMON/ISUL/ISUL(50)
      COMMON/IPRIOR/IPRIOR(200)
      COMMON/ISHIPI/ISHIPI(30,3)
      COMMON/NBOTU/NBOTU(50)
      COMMON/ISHIPT/ISHIPT(30,3)
      COMMON/IBACPT/IBACPT(200)
      COMMON/NLOCBK/NLOCBK
      COMMON/ILOCBK/ILOCBK(200)
   25 IF(NBOPT(N).LE.0) RETURN
      IF(IDBUG.NE.1) GO TO 27
       I=NBOPT(N)
       WRITE(6,990)N,INVACT(N),IQTYB(I),IPRIOR(I),I
  990  FORMAT(' ****FILLBO--ITEM=',I5,'  OH=',I5,'  IQTYB=',I5,
     &          '  IPRIOR=',I5,'  IPT=',I5)
   27 CONTINUE
C       SET IPT EQUAL TO THE POINTER NUMBER OF THE OLDEST,HIGHEST
C       PRIORITY REQUISITION FOR ITEM N ON BACKORDER STATUS.
      IPT=NBOPT(N)
       IF(INVACT(N).LE.0)RETURN
C     **** NOTE ****
C      (A) THIS ROUTINE ASSUMES BO REQUISITIONS ARE FILLED USING
C          A FIFO,BY PRIORITY,ISSUE RULE
C      (B) IF ON-HAND ASSETS ARE INSUFFICIENT TO COMPLETELY FILL A
C          GIVEN REQUISITION,PARTIAL SHIPMENTS ARE INITIATED.
C      (C) REDUCED SHIPMENTS TO PARTIALLY FULFILL SEVERAL
C          OUTSTANDING BACKORDERS ARE NOT PERMITTED IN THIS ROUTINE
C
C       SET ITEST EQUAL TO THE REMAINING ON-HAND INVENTORY,
C       IF THE REQUISITION WAS TO BE COMPLETELY FILLED
       ITEST=INVACT(N)-IQTYB(IPT)
C      IS ITEST ABOVE THE SUPPORT LEVEL
      IF(ITEST.GT.ISUL(N)) GO TO 80
C       IS THIS A PRIORITY 1 REQUISITION
      IF(IPRIOR(IPT).NE.1) GO TO 60
C       CAN THE REQ BE COMPLETELY SATISFIED FROM ON HAND STOCK
      IF(INVACT(N).GE.IQTYB(IPT)) GO TO 80
C       SHIP ALL REMAINING ON-HAND STOCK IN PARTIAL FULFILLMENT
C       OF THIS REQUISITION
      IQTYS=INVACT(N)
C       UPDATE PRIORITY 1 BACKORDER STATISTICS
      JQTYS=-IQTYS
      CALL CUM(ISHIPI,IQTYS,N)
      GO TO 65
C       ARE ON-HAND ASSETS ABOVE THE SUPPORT LEVEL
C     IF(INVACT(N).LE.ISUL(N)) GO TO 70
C       SHIP DOWN TO THE SUPPORT LEVEL
      IQTYS=INVACT(N)-ISUL(N)
```

```
C         UPDATE STOCK STATUS RECORDS TO REFLECT THE PARTIAL SHIPMENT
   65 INVACT(N)=INVACT(N)-IQTYS
      NBOTU(N)=NBOTU(N)-IQTYS
      IQTYB(IPT)=IQTYB(IPT)-IQTYS
C         UPDATE GROSS PERFORMANCE STATISTICS
      JQTYS=-IQTYS
      CALL CUM(ISHIPT,IQTYS,N)
C         AT THIS POINT,NO FURTHER SHIPMENTS SHOULD BE POSSIBLE, SINCE
C         HIGH PRIORITY REQUISITIONS ARE PROCESSED FIRST
   70 RETURN
C         SHIP TO FILL THE ENTIRE REQUISITION
   80 IQTYS=IQTYB(IPT)
C         UPDATE STOCK STATUS RECORDS
      INVACT(N)=INVACT(N)-IQTYS
      NBOTU(N)=NBOTU(N)-IQTYS
      JQTYS=-IQTYS
      CALL CUM(ISHIPT,IQTYS,N)
C         IS THIS A PRIORITY 1 REQ.
      IF(IPRIOR(IPT).NE.1) GO TO 100
C         UPDATE PRIORITY 1 STATISTICS
      CALL CUM(ISHIPI,IQTYS,N)
C         REMOVE REQUISITION FROM THE BACKORDER FILE
  100 NBOPT(N)=IBACPT(IPT)
      NLOCBK=NLOCBK+1
      ILOCBK(NLOCBK)=IPT
C         RETURN TO BEGINNING OF ROUTINE TO SEE IF ANY MORE BO
C         NEED TO BE PROCESSED.
      GO TO 25
      END
```

Subroutine: FOR576

Function:

This routine updates forecasted demand rates and standard deviation estimates based on information recorded in the History File.

Description:

This routine uses an eight quarter moving average to update forecasts of the net annual demand rate ADR(N), the MAD of quarterly unit demand QMAD, and average requisition size REQSIZ(N) associated with item N. The estimate of the standard deviation of lead time demand RSIGLT(N) is then updated using the formula

RSIGLT(N)=0.5945*QMAD*(0.82375+0.42625*RLT)

where RLT denotes the total of the administrative and production leadtimes for item N.

To avoid numerical problems in other routines, FOR576 compares the computed values to the following bounds, and, if the bound is violated, FOR576 resets the variable equal to the associated bound.

ADR(N)	$\geq$	0.0
QMAD	$\geq$	.01
RSIGLT(N)	$\geq$	.01
REQSIZ(N)	$\geq$	1.0

```
20      $       IDENT   WP0287,ADDSC-CALLAHAN
30      $       FORTY   DECK
40      $       PRMFL   C*,W,S,REQS/FOR576.0
50      $       REMOTE  P*,AC
60      $       REMOTE  $$,AC
70              SUBROUTINE FOR576(N)
80               COMMON/IFBUG/IFBUG
90               COMMON/ITIME/ITIME
100              COMMON/ITQTR/ITQTR
110              COMMON/NDEMAC/NDEMAC(1)
120              COMMON/NRETAC/NRETAC(1)
130              COMMON/NREQAC/NREQAC(1)
140             COMMON/NDEMND/NDEMND(1,24)
150              COMMON/REQSIZ/REQSIZ(1)
160             COMMON/NRETUR/NRETUR(1,24)
170              COMMON/NREQ/NREQ(1,24)
180             COMMON/ADR/ADR(1)
190             COMMON/RSIGLT/RSIGLT(1)
200             COMMON/NDENT/NDENT(1)
210             COMMON/LTADM/LTADM(1)
220             COMMON/LTPROD/LTPROD(1)
230             COMMON/UCOST/UCOST(1)
240             COMMON/IDBUG/IDBUG
250             COMMON/ICDFOR/ICDFOR
260             COMMON/ICDSIG/ICDSIG
270             COMMON/SRFOR/SRFOR,SRPLT,GDFOR
280              LW=6
290              NLOOP=24
300             IDUM=0
310              IFUM=0
320             IRUM=0
330              KK=NDENT(N)
340              IF(KK.GT.8)KK=8
350              KL=KK-1
360              DO 1 I=1,KL
370             IDUM=IDUM + NDEMND(N,I)
380              IFUM=IFUM + NREQ(N,I)
390           1 IRUM=IRUM + NRETUR(N,I)
400     C
410              IT=MOD(ITIME,ITQTR)
420              R=FLOAT(IT)/FLOAT(ITQTR)
430              RM=1.-R
440              DUM=R*FLOAT(NDEMAC(N))+FLOAT(IDUM)+RM*FLOAT(NDEMND(N,KK))
450              FUM=R*FLOAT(NREQAC(N))+FLOAT(IFUM)+RM*FLOAT(NREQ(N,KK))
460              RUM=R*FLOAT(NRETAC(N))+FLOAT(IRUM)+RM*FLOAT(NRETUR(N,KK))
```

```
      C
      C
      *
      *              COMPUTE LEVELS BASED ON NET DEMANDS, WHERE NET IS
      *                   DEMAND MINUS SERVICEABLE RETURNS FOR THE PAS
      *                   MONTHS,
      *              RETURNS ARE ADDITIONS TO ON-HAND ASSETS.
      *
            FOR=DUM-RUM
            IF(FOR.LE.0.)GO TO 1000
            FORCST=FOR/FLOAT(KK)
       900  ADR(N)=FORCST*4.
      C
      C              COMPUTE MAD OF QUARTERLY DEMAND
      C
            QMAD=0.
            FORCST=DUM/FLOAT(KK)
            DO 20 I=1,KK
            ABSDEV=ABS(FLOAT(NDEMND(N,I))-FORCST)
        20  QMAD=QMAD+ABSDEV
            QMAD=QMAD/FLOAT(KK)
            IF(QMAD.LT. 0.01) QMAD=0.01
      C
      C              COMPUTE STANDARD DEVIATION OF LEADTIME DEMAND
      C
            RLT=FLOAT(LTADM(N)+LTPROD(N))
            RSIGLT(N)=0.5945*QMAD*(0.82375+0.42625*RLT)
            IF(RSIGLT(N).LT. 0.01) RSIGLT(N)= 0.01
      C
```

```
760     C               COMPUTE AVERAGE REQUISITION SIZE
770     C
775             IF(IFUM.LT.1)IFUM=1
780             R=FLOAT(IDUM)/FLOAT(IFUM)
790             IF(R.LT.1.)R=1.
800             REQSIZ(N)=R
810      2000 IF(IFBUG .NE. 1) RETURN
820           WRITE(LW,100)
830           WRITE(LW,200) N,NDENT(N),NLOOP,ICDFOR,ICDSIG,LTADM(N),LTP
840           WRITE(LW,300)
850            WRITE(LW,200)NDEMAC(N),(NDEMND(N,J),J=1,KK)
860            WRITE(LW,200)NRETAC(N),(NRETUR(N,J),J=1,KK)
870            WRITE(LW,200)NREQAC(N),(NREQ(N,J),J=1,KK)
880           WRITE(LW,400)
890           WRITE(LW,500) FORCST,ADR(N),REQSIZ(N),UCOST(N),QMAD,RSIGL
900       100  FORMAT(1H ,4X,'****FOR576--N,NDENT,NLOOP,ICDFOR,ICDSIG',
910     &                 'LTADM,LTPROD')
920       200 FORMAT(1H ,4X,12I7/12I7)
930       300  FORMAT(1H ,9X,'DEMAND, RETURNS, AND FREQ',
940     &                'IN CURRENT HISTORY FILE')
950       400  FORMAT(1H ,'     FORCST       ADR   AVE-REQ    UCOST',
960     &                   'QMAD    RSIGLT')
970       500  FORMAT(1H ,6F10.4)
980           RETURN
990      1000 RSIGLT(N)=.5
1000          ADR(N)=0.0
1010          IF(IFBUG .NE. 1) RETURN
1020          GO TO 2000
1030          END
1040    $      ENDJOB
```

Subroutine: FORUPD

Function:

This routine slides the demand history files for all items at the end of each quarter. It also resets the demand accumulator variables.

Description:

Subroutine FORUPD first increments the counter NDENT(N) for each item N. This variable counts the number of periods that item N has been in the inventory system.

The routine then slides the history values to the next oldest time slot. Variables affected are the NDEMND, number of units demanded per quarter, NRETUR, the number of serviceable returns, and NREQ, the number of requisitions submitted. The oldest quarter of data is dropped. The accumulator variables NDEMAC(N), NREQAC(N), and NRETAC(N) are then reset to zero. These variables are used to record the cumulative demand activity that occurs within the current quarter.

Finally, FORUPD places a new type 9 event on the Future Events List. This causes FORUPD to be called again IDFOR time units in the future.

```
$       IDENT   WP#287,ADDSC-CALLAHAN
$       FORTY   DECK
$       PRMFL   C*,W,S,REQS/FORUPD.O
$       REMOTE  P*,AC
$       REMOTE  $$,AC
        SUBROUTINE FORUPD
C         THIS ROUTINE SLIDES THE DEMAND HISTORY FILES FOR ALL ITE
C         THE END OF EACH FORECAST INTERVAL, RESETS IDAY, AND ZERO
C         THE DEMAND ACCUMULATORS
        COMMON/ITFOR/ITFOR,IDFOR
        COMMON/NITEM/NITEM
         COMMON/NDEMND/NDEMND(1,24)
         COMMON/NRETUR/NRETUR(1,24)
         COMMON/NREQ/NREQ(1,24)
         COMMON/NDEMAC/NDEMAC(1)
         COMMON/NRETAC/NRETAC(1)
         COMMON/NREQAC/NREQAC(1)
         COMMON/NDENT/NDENT(1)
        N=1
C         HAS ITEM N ENTERED THE SYSTEM YET
      5  CONTINUE
         NDENT(N)=NDENT(N)+1
         IF(NDENT(N).GE.0) GO TO 20
        GO TO 25
C     *** NOTE ***
C         BY CONVENTION NDENT(N) IS NEGATIVE UNTIL THE ITEM ENTERS
C         THE INVENTORY MANAGEMENT SYSTEM
C
C         SLIDE THE DEMAND HISTORY FILES FOR ALL ITEMS
     20 CONTINUE
         KK=8
         KP=KK+1
         KL=KK-1
         DO 21 I=1,KL
         IS1= KP-I
         IS2= KK-I
         NDEMND(N,IS1)=NDEMND(N,IS2)
         NRETUR(N,IS1)=NRETUR(N,IS2)
         NREQ(N,IS1)=NREQ(N,IS2)
   21    CONTINUE
         NREQ(N,1)=NREQAC(N)
         NREQAC(N)=0
         NRETUR(N,1)=NRETAC(N)
         NRETAC(N)=0
        NDEMND(N,1)=NDEMAC(N)
        NDEMAC(N)=0
C         HAVE ALL ITEMS BEEN PROCESSED
```

```
490          25 IF(N.GE.NITEM) GO TO 26
500             N=N+1
510             GO TO 5
520          26 CONTINUE
530      C         CREATE EVENT TO TRIGGER NEXT UPDATE
540             ITFOR=ITFOR+IDFOR
550             CALL ENTER(ITFOR,9,0,0,0)
560             RETURN
570             END
580      $       ENDJOB
```

Subroutine: GP

Function:

This routine provides a X-Y plot of the vectors provided as calling parameters. It is used by subroutine PLOTR to provide four plots of inventory characteristics as a function of time.

Description:

This routine automatically determines appropriate values for maximum and minimum of each plot axis. Definitions of each of the calling parameters are provided on page 1 of the program listing, and will not be discussed further here.

```
      SUBROUTINE GP(X,Y,L,S,M,N,W,LN,A,PLOT)
C**
C**   CONTROL
C**
C
C**   CALL GP (X, Y, L, S, M, W, LN, A, PLOT)
C**
C**   WHERE
C**         X = ARRAY OF INDEPENDENT VALUES, DIMENSIONED X(M),
C**         Y = ARRAY OF SETS OF DEPENDENT VALUES, DIMENSIONED Y(M,N),
C**         L = NUMBER OF LINES TO BE SKIPPED BEFORE DISPLAY,
C**         S = NUMBER OF SPACES FROM THE LEFT SIDE OF PAGE TO
C**             BE SKIPPED BEFORE DISPLAY,
C**         M = NUMBER OF POINTS IN EACH SET,
C**         N = NUMBER OF SETS OF POINTS,
C**         W = WIDTH OF DISPLAY IN PRINT SPACES,
C**        LN = LENGTH OF DISPLAY IN PRINT LINES,
C**         A = ARRAY OF SINGLE CHARACTERS, DIMENSIONED A(N),TO
C**             REPRESENT THE TREND FOR EACH SET (EX.- DATA A/1HA,
C**             1HB,...,ETC.)
C**      PLOT = ARRAY OF SINGLE CHARACTERS GENERATED BY GP TO
C**             DISPLAY TRENDS, DIMENSIONED PLOT (LN,W),
C**
      INTEGER S, W, W1
C
      DIMENSION X(M), Y(M,N), A(N), PLOT(LN,W)
C
      DATA BLANK/1H /, EDGE/1H*/
      DATA ORD/1H /,ABSIS/1H-/
C
C**   CHECK MAXIMUM WIDTH AND LENGTH REQUESTED AND
C**   EXIT IF NOT CORRECT
C**
      IF (S+W .GT. 131) GO TO 900
      IF (L+LN .GT. 58) GO TO 800
C
C**   FIND MINIMUM AND MAXIMUM OF X AND Y
C**
      XMAX=X(1)
      XMIN=X(1)
C
      DO 10 I=2,M
      IF (X(I) .GT. XMAX) XMAX=X(I)
   10 IF (X(I) .LT. XMIN) XMIN=X(I)
C
      YMAX=Y(1,1)
      YMIN=Y(1,1)
C
      DO 20 I=1,M
      DO 20 J=1,N
      IF (Y(I,J) .GT. YMAX) YMAX=Y(I,J)
```

```
   20  IF (Y(I,J) .LT. YMIN) YMIN=Y(I,J)
C
C
C*****************************************************************
C
C        SET ORIGIN AT (0.,0.)
C
      YMIN=0.
      XMIN=0.
C
C        BEGIN ON NEW PAGE
C
      WRITE(5,610)
  610 FORMAT(1H1)
C*****************************************************************
C
C**   COMPUTE SCALE FACTOR -- P FOR X, Q FOR Y
C**
      P=FLOAT(W-1)/(XMAX-XMIN)
      Q=FLOAT(LN-1)/(YMAX-YMIN)
C
C**   BLANK PLOT ARRAY
C**
      DO 30 I=1,W
      DO 30 J=1,LN
   30 PLOT(J,I)=BLANK
C
C**   CONSTRUCT BORDER OF DISPLAY
C**
      DO 40 J=1,LN
      I=1
      PLOT(J,I)=EDGE
      I=W
   40 PLOT(J,I)=EDGE
C
      W1=W-1
      DO 50 I=2,W1
      J=1
      PLOT(J,I)=EDGE
      J=LN
   50 PLOT(J,I)=EDGE
C
C**   COMPUTE SUBSCRIPTS AND INSERT TREND CHARACTER IN
C**   PLOT ARRAY
C**
      DO 60 I=1,M
      DO 60 J=1,N
      I1=1+INT(0.5+P*(X(I)-XMIN))
      J1=LN-INT(0.5+Q*(Y(I,J)-YMIN))
   60 PLOT(J1,I1)=A(J)
C
C**   SKIP L LINES BEFORE BEGINNING DISPLAY PRINTING
```

```
C
      DO 70 K=1,L
   70 WRITE (6,600)
  600 FORMAT (1H )
C
C**   WRITE OUT PLOT ARRAY, SKIPPING S SPACES BEFORE PRINTING
C**   EACH LINE OF DISPLAY
C**
      DO 80 J=1,LN
   80 WRITE(5,601) (BLANK,K=1,S),(PLOT(J,I),I=1,W)
  601 FORMAT (132A1)
      WRITE (6,602) XMIN,XMAX,YMIN,YMAX
  602 FORMAT (1HO,5X,6HXMIN =E16.8,10X,6HXMAX =E16.8,10X,
     X     6HYMIN =E16.8,10X,6HYMAX =E16.8)
      RETURN
C**
C**   ERROR MESSAGES BEFORE TERMINATION
C**
  800 WRITE (6,603) L, LN
  603 FORMAT (30HAL+LN IS GREATER THAN 58    L =I3,5X,4HLN =I3)
  900 WRITE (6,604) S, W
  604 FORMAT (30HAS+W IS GREATER THAN 131    S =I3,5X,3HW =I3)
      STOP
      END
```

Subroutine: GUIDE

Function:

This routine establishes guidelines for levels computations to be performed by subroutine LEVELN.

Description:

This routine establishes guidelines for levels computations based on a comparison of current obligations and budget authorizations for the current budget period. However, no buys are permitted after the obligation ceiling for a given budget interval has been reached.

Methodology to be used in establishing buy guidelines is determined by the code ICDGID provided as input to the simulation.

At the end of this event, GUIDE places a new type 7 event on the Future Events List.

```
      SUBROUTINE GUIDE
C       THIS ROUTINE ESTABLISHES GUIDELINES FOR LEVELS COMPUTATIONS
C       ACCORDING TO POLICY STATED IN AFLCM 67-6, HOWEVER NO BUYS ARE
C       PERMITTED AFTER THE OBLIGATION CEILING FOR A GIVEN BUDGET
C       INTERVAL IS REACHED.
      COMMON/IGBUG/IGBUG
      COMMON/IDDIV/IDDIV
      COMMON/IOBLIG/IOBLIG
      COMMON/ITDIV/ITDIV
      COMMON/ITHQ/ITHQ
      COMMON/ITIME/ITIME
      COMMON/ITYEAR/ITYEAR
      COMMON/MAXBUY/MAXBUY
      COMMON/NBPER/NBPER
      COMMON/GSLF/GSLF
      COMMON/GRLF/GRLF
      COMMON/GTLF/GTLF
      COMMON/GUIDI/ICDGID,NPH,NPOLCY,IDJAXR,IDJAXS,SHORT(10)
      COMMON/IBAUTH/IBAUTH(12)
      COMMON/GEOQ/GEOQ(3)
C       DO CURRENT OBLIGATIONS EXCEED THE CEILING
      IF(IOBLIG.LE.IBAUTH(NBPER))GO TO 11
      IF(MAXBUY.LE.0) GO TO 20
      MAXBUY=0
      GO TO 20
   11 CONTINUE
      MAXBUY=9999999
   20 CONTINUE
      IF(IGBUG.NE.1) GO TO 30
      R=FLOAT(ITIME)/FLOAT(ITYEAR)
      WRITE(6,8000)ITIME,NBPER,IOBLIG,IBAUTH(NBPER),R,MAXBUY
 8000 FORMAT(7H GID576,I10,5H-----,6HNBPER=,I5,5X,12HOBLIGATIONS=,I10,5X
     C,11HAUTHORIZED=,I10,5X,5HYEAR=,F6.3,5X,8HMAXBUY= ,I9)
   30 CONTINUE
      IF(ICDGID.EQ.1) GO TO 50
      IF(ICDGID.EQ.2) GO TO 40
      GEOQ(1)=3.
      GEOQ(2)=6.
      GEOQ(3)=12.
      GSLF=1.
      GSULF=0.
      GTLF=24.
      GRLF=12.
      GO TO 50
   40 CONTINUE
      CALL A22JAX
   50 CONTINUE
C       COMPUTE TIME FOR NEXT GUIDELINE REVIEW
      ITDIV=ITDIV+IDDIV
C       IF NEXT REVIEW TIME PRECEEDS NEXT BUDGET REVISION
C       PLACE REVIEW EVENT ON FE LIST
      IF(ITDIV.GE.ITHQ) GO TO 13
```

```
      CALL ENTER(IFDIV,7,0,0,0)
   13 CONTINUE
      RETURN
      END
```

Subroutine: INBUDG1

Function:

This routine performs initialization functions required in simulating buy guidelines events.

Description:

The subroutine INBUDG1 sets authorized and projected obligation ceilings. The routine also initializes obligation and period counters, and places the initial budget review event on the Future Events List.

The routine sets the authorized budget ceilings equal to the total dollar demand to be generated in the corresponding budget interval. That is, it sets the budget authorization equal to the dollar value of unit demand in the array IDEMND; this array drives the simulated demand activity for the simulation.

Finally, routine INBUDG1 places a type 8 event on the Future Events List.

```
      SUBROUTINE INBDG1
C       THIS ROUTINE SETS AUTHORIZED AND PROJECTED OBLIGATIONS CEILINGS
C       EQUAL TO THE TOTAL DOLLAR DEMAND OBSERVED IN THE CORRESPONDING
C       BUDGET INTERVAL. THE ROUTINE ALSO INITIALIZES OBLIGATION AND
C       PERIOD COUNTERS AND PLACES THE BUDGET REVIEW EVENT ON THE FEL.
      DIMENSION TOTAL(30)
      COMMON/BPER/BPER
      COMMON/IOBLIG/IOBLIG
      COMMON/NITEM/NITEM
      COMMON/INQTR/INQTR
      COMMON/NBPER/NBPER
      COMMON/ITHQ/ITHQ
      COMMON/IDEMND/IDEMND(50,81)
      COMMON/UCOST/UCOST(50)
      COMMON/IBAUTH/IBAUTH(12)
      COMMON/IBPROJ/IBPROJ(12)
C
C        COMPUTE ACTUAL $/QTR DEMAND
C
      ISW=1
      IF(ISW.EQ.1)GO TO 200
      DO 30 I=1,27
      TOTAL(I)=0.
      SUM=0.
      DO 13 N=1,NITEM
      IF(IDEMND(N,I).GE.999999) GO TO 13
      SUM=SUM+FLOAT(IDEMND(N,I))*UCOST(N)
   13 CONTINUE
      TOTAL(I)=SUM
   30 CONTINUE
C
C        SET AUTHORIZED BUDGET EQUAL TO ACTUAL DEMAND
C
      DO 50 I=1,7
      K=4*I-3
      SUBTOT=TOTAL(K)+TOTAL(K+1)+TOTAL(K+2)+TOTAL(K+3)
      IBAUTH(I)=BPER*SUBTOT
      IBPROJ(I)=SUBTOT
   50 CONTINUE
      WRITE(6,8000)(I,TOTAL(I),I=1,27)
 8000 FORMAT(///20X,6HQTR NO,8X,7H$DEMAND///30(I26,F15.2/))
      WRITE(6,8010)(K,IBPROJ(K),IBAUTH(K),K=1,7)
 8010 FORMAT(///20X,6H YR NO,8X,7H$ACTUAL,10X,5H$AUTH///10(I26,2I15/))
      GO TO 500
  200 CONTINUE
      DO 250 I=1,7
      IBAUTH(I)=99999999.
  250 IBPROJ(I)=99999999.
  500 CONTINUE
C       ENTER BUDGET REVISION EVENT ON FE LIST
      CALL ENTER(ITHQ,8,1,0,0)
C       INITIALIZE BUDGET INTERVAL COUNTER
```

```
      NBPER=0
      RETURN
      END
```

Subroutine: INFEL

Function:

This routine initializes the Future Events List to an empty status.

Description:

Subroutine INFEL initializes the Future Events List. Subsequently, Subroutines ENTER and REMOVE update this list. See Volume I, Chapter IV, for a detailed discussion of these activities.

INFEL,
P. 1 of 1

```
02-11-77    13.687
      SUBROUTINE INFEL
C       THIS ROUTINE INITIALIZES THE FUTURE EVENTS
C       LIST TO BE EMPTY STATUS
      COMMON/BENTRY/NENTRY
      COMMON/BNEMAX/NEMAX
      COMMON/BTIME/BTIME
      COMMON/ILOCFE/ILOCFE(500)
      NEMAX=500
      NENTRY=0
      NTIME=999999
      DO 1 I=1,NEMAX
    1 ILOCFE(I)=1
      RETURN
      END
```

Subroutine: INITAL

Function:

This routine sets the values of critical timing variables and initializes the Future Events List.

Description:

First, this routine calls Subroutine INFEL to initialize the Future Events List. Next, major parameters for the Backorder File are set, and the Backorder File is initialized.

Major timing variables are then set assuming that there are 100 time units in each simulated day. At present, Subroutine INITAL assumes that there are 7 days per week, 4 weeks per month, 3 months per quarter, and 4 quarters in each year.

Subroutine INITAL then sets the simulation clock and statistics collection variables; specifically, it sets:

ITIME = 0.

ITINV = 1.

INITAL then sets other significant timing variables discussed in Chapter IV, Volume I.

Finally, INITAL places transactions for event types 3, 5, 6, 10, 11, 12, and 13 on the Future Events List, provided these events are to be simulated in the current simulation run.

```
      $       IDENT   WP0287,ADDSC-CALLAHAN
      $       FORTY   DECK
      $       PRMFL   C*,W,S,REQS/INITAL.O
      $       REMOTE  P*,AC
      $       REMOTE  $$,AC
              SUBROUTINE INITAL
      C         THIS ROUTINE
      C         INITIALIZES THE FUTURE EVENTS LIST.
      C
               COMMON/IDBUG/IDBUG,IEBUG,IFBUG,IGBUG,IHBUG
               COMMON/ITRACE/ITRACE,ISTRAC
              COMMON/IDDIV/IDDIV
              COMMON/IDLEVL/IDLEVL
              COMMON/IDSTAT/IDSTAT
              COMMON/IDTHQ/IDTHQ
              COMMON/IKDEM/IKDEM
              COMMON/INQTR/INQTR
              COMMON/IQTRND/IQTRND
              COMMON/ISTOCK/ISTOCK,IDSTOC
              COMMON/ISTOP/ISTOP
              COMMON/ISTAT/ISTAT
              COMMON/ITCANB/ITCANB,IDCANB
              COMMON/ITDAY/ITDAY
              COMMON/ITDIV/ITDIV
              COMMON/ITFOR/ITFOR,IDFOR
              COMMON/ITHQ/ITHQ
              COMMON/ITIME/ITIME
              COMMON/ITINV/ITINV
              COMMON/ITLEVL/ITLEVL
              COMMON/ITMNTH/ITMNTH
              COMMON/ITQTR/ITQTR
              COMMON/ITWEEK/ITWEEK
              COMMON/ITYEAR/ITYEAR
              COMMON/MBODAY/MBODAY
              COMMON/NBMAX/NBMAX
              COMMON/NENTRY/NENTRY
              COMMON/NFEMAX/NFEMAX
              COMMON/NFIRST/NFIRST
              COMMON/NITEM/NITEM
              COMMON/NLOC/NLOC
              COMMON/NLOCBK/NLOCBK
              COMMON/NTIME/NTIME
              COMMON/RAND/IX,IY
              COMMON/ILOCBK/ILOCBK(200)
      C
```

```
      C       INITIALIZE THE FUTURE EVENTS LIST
      C
            NFEMAX=500
           CALL INFEL
      C
      C         SET PARAMETERS FOR BACKORDER FILE
      C
            NBMAX=100
           NLOCBK=NBMAX
           DO 10 I=1,NBMAX
        10 ILOCBK(I)=NBMAX+1-I
      C       SET TIMING VARIABLES BASED ON 100 TIME UNITS PER DAY
      C         7 DAYS/WEEK, 4 WEEKS/MONTH , 4 QUARTERS/YEAR
           ITDAY=100
           ITWEEK=7*ITDAY
           ITMNTH=4*ITWEEK
           ITQTR=3*ITMNTH
           ITYEAR=4*ITQTR
      C       SET TIMING VARIABLES FOR MANAGEMENT AND DATA COLLECTIONS
      C         CURRENT SIMULATION CLOCK TIME
           ITIME=0
      C         CURRENT STATISTICS COLLECTION INTERVAL
           ITINV=1
      C         END OF CURRENT QUARTER
           IQTRND=ITQTR
      C         TIME OF FIRST HQ USAF BUDGET AUTHORIZATION
           ITHQ=10
      C         TIME BETWEEN HQ USAF BUDGET REVISIONS
           IDTHQ=4*ITQTR
      C         TIME OF FIRST DIVISION LEVEL REVIEW
           ITDIV=20
      C         TIME BETWEEN DIVISION LEVEL REVIEWS
           IDDIV=ITMNTH
      C         TIME OF FIRST STOCK LEVEL COMPUTATION
           ITLEVL=30
      C         TIME BETWEEN STOCK LEVEL COMPUTATIONS
          IDLEVL=2*ITWEEK
      C       TIME OF FIRST STOCK STATUS REVIEW
           ISTOCK=40
      C       TIME BETWEEN STOCK STATUS REVIEQS
          IDSTOC=2*ITWEEK
      C       TIME TO ACTIVATE STATISTICS COLLECTION ROUTINE
           ISTAT=ITWEEK-5
      C         TIME BETWEEN STATISTICAL UPDATES
           IDSTAT=ITWEEK
      C       STOP AFTER SIMULATION INQTR QUARTERS
           ISTOP=INQTR*ITQTR
      C       PLACE INITIAL MANAGEMENT AND DATA COLLECTION EVENTS ON
```

```
C       THE FUTURE EVENTS LIST.
C               STAT--REVIEW STOCK STATUS
      CALL ENTER(ISTOCK,5,0,0,0)
C               LEVEL--COMPUTE INV CONTROL LEVELS
      CALL ENTER(ITLEVL,6,0,0,0)
C               SSTAT--ACCUMULATE STATUS STATISTICS
      CALL ENTER(ISTAT,11,1,0,0)
C               IT0UT--END OF SIMULATION PERIOD
      CALL ENTER(ISTOP,10,0,0,0)
C
C       CREATE FORECAST EVENT
C
  100 CONTINUE
       ITFOR=ITQTR
       IDFOR=ITQTR
C               FORUPD--UPDATE DEMAND HISTORY FILES
      CALL ENTER(ITFOR,9,0,0,0)
C               DEMPAR--GENERATE DEMAND
      CALL ENTER(100,12,0,0,0)
C
C               CANCLB--CANCELLATION REVIEW EVENT GOES HERE--
C                   CANCELLATIONS ARE NOT SIMULATED IN THIS STUDY
C
       MBODAY=100
       IDCANB=ITMNTH
C
C       INITIALIZE FOR PLOT OF STOCK HISTORY
C
       IF(ISTRAC.LE.0) GO TO 200
       CALL ENTER(ITRACE,13,0,0,0)
  200  CONTINUE
      RETURN
      END
$      ENDJOB
```

Subroutine: INITEM

Function:

This routine initializes the Item Data File by reading input from File 07, and then performs item-related initializing calculations.

Description:

Input may be provided to this routine in either binary or BCD format. The specific type of input is determined by the variable INTYPE. A detailed description of data contained on file 07 is presented in Vol I, Chap VII.

After reading information on a given item, INITEM then performs several calculations. First, it zeros the demand history accumulators NRETAC, NDEMAC, and NREQAC used to record demand activity for each given item. Inventory status variables and associated pointers are then updated. In the present coding, all due-in inventories are assumed to be on hand; consequently, INITEM increases the variable INVACT(N) by the amount of due-in inventory, and sets the variable INVDUE(N) to zero.

Next, the demand history arrays are initialized using the first NDHIS periods of data recorded in the Demand Driver File. See Vol I, Chap IV, for definition of these data elements.

Finally, subroutine INITEM initializes the variables IBOPOH(J) and IBOPOR(J). These variables record the initial and on order inventories at the beginning of the simulation run.

If an end of file is encountered in reading File 07, subroutines OUT, OUTCST, and PLOTR are called to write out performance statistics summaries.

```
      $       IDENT   WP0287,ADDSC-CALLAHAN
      $       FORTY   DECK
      $       PRMFL   C*,W,S,REQS/INITEM.O
      $       REMOTE  P*,AC
      $       REMOTE  $$,AC
            SUBROUTINE INITEM
      C*************INITEM*******************
            CHARACTER ALC,FSN,UM,NOUN,MGTCD
            COMMON/FSN/ALC,FSN(4),UM,NOUN(2),MGTCD(4),IOH,IOR,IPPL,IR
           COMMON/GSLF/GSLF
           COMMON/IDBUG/IDBUG
           COMMON/ITDAY /ITDAY
           COMMON/ITMNTH/ITMNTH
           COMMON/NITEM/NITEM
            COMMON/NDEM/NDEM
            COMMON/NDHIS/NDHIS
            COMMON/INLU/INLU
            COMMON/INTYPE/INTYPE
            COMMON/IEBUG/IEBUG
           COMMON/IBOP/IBOPOH(3),IBOPOR(3)
           COMMON/IDEMND/IDEMND(1,24)
           COMMON/RMREQS/RMREQS(1)
           COMMON/INVACT/INVACT(1)
           COMMON/NORDPT/NORDPT(1)
           COMMON/NDEMAC/NDEMAC(1)
            COMMON/NRETAC/NRETAC(1)
            COMMON/NREQAC/NREQAC(1)
            COMMON/NDEMND/NDEMND(1,24)
            COMMON/NRETUR/NRETUR(1,24)
            COMMON/NREQ/NREQ(1,24)
           COMMON/NDENT/NDENT(1)
           COMMON/INVDUE/INVDUE(1)
           COMMON/NBOPT/NBOPT(1)
           COMMON/NBOTU/NBOTU(1)
           COMMON/REQSIZ/REQSIZ(1)
           COMMON/REQMAD/REQMAD(1)
           COMMON/LTPROD/LTPROD(1)
           COMMON/LTADM/LTADM(1)
           COMMON/UCOST/UCOST(1)
           COMMON/ADR/ADR(1)
           COMMON/ISUL/ISUL(1)
            COMMON/IREQ  /IREQ(1,24)
            COMMON/IRETUR/IRETUR(1,24)
           COMMON/IRL/IRL(1)
           COMMON/ITL/ITL(1)
           COMMON/IROL/IROL(1)
           COMMON/IRQTY/IRQTY(1)
           COMMON/RMTBR /RMTBR(1)
           COMMON/RMEAN/RMEAN(1)
           COMMON/RTREND/RTREND(1)
           COMMON/RMAD  /RMAD(1)
           COMMON/RERSUM/RERSUM(1)
           COMMON/KNT   /XNT(1)
```

```
      COMMON/GEOQ/GEOQ(3)
      COMMON/GEOQF/GEOQF(3)
       COMMON/ICDFOR/ICDFOR
C
C
C                SET NUMBER OF PERIODS OF DATA INPUT
C
       IDPER=NDEM
C
C       READ DEMAND DATA FOR ITEM N FROM LOGICAL UNIT LR
       LR=INLU
       IKNT=0
      DO 100 N=1,NITEM
   10 CONTINUE
C
C                READ ITEM DATA INPUT FROM FILE LR
C
       IF(INTYPE.EQ.2) GO TO 20
C
C                READ BCD INPUT
C
       IKNT=IKNT+1
       READ(LR,8000,END=200) ALC,FSN,UM,UCOST(N),NOUN,MGTCD,IOH,
     &          LTADM(N),LTPROD(N),IPPL,IPPPR
C
       RIPPPR=FLOAT(IPPPR)/100.
       IF(IEBUG.EQ.1)WRITE(6,8010)IKNT,ALC,FSN,UM,UCOST(N),NOUN,
     &          IOH,IOR,LTADM(N),LTPROD(N),IPPL,RIPPPR
       IF(IEBUG.EQ.1)WRITE(6,8015)(I,I=1,10)
C
C                READ DEMAND,RETURNS, AND REQ-FREQUENCY
C
       READ(LR,8000)(IDEMND(N,J),J=1,IDPER)
       IF(IEBUG.EQ.1)WRITE(6,8020)(IDEMND(N,J),J=1,IDPER)
       READ(LR,8000)(IRETUR(N,J),J=1,IDPER)
       IF(IEBUG.EQ.1)WRITE(6,8030)(IRETUR(N,J),J=1,IDPER)
       READ(LR,8000)(IREQ(N,J),J=1,IDPER)
       IF(IEBUG.EQ.1)WRITE(6,8040)(IREQ(N,J),J=1,IDPER)
       GO TO 50
C
C                READ BINARY DATA
C
   20  CONTINUE
       IKNT=IKNT+1
       READ(LR)ALC,FSN,IR,UM,UCOST(N),NOUN,MGTCD,IOH,IOR,
     &          LTADM(N),LTPROD(N),IPPL,RIPPPR
       IF(IEBUG.EQ.1)WRITE(6,8010)IKNT,ALC,FSN,UM,UCOST(N),NOUN,
     &          MGTCD,IOH,IOR,LTADM(N),LTPROD(N),IPPL,RIPPPR
       READ(LR)ALC,FSN,IR,IDEMND
       IF(IEBUG.EQ.1)WRITE(6,8020)(IDEMND(N,J),J=1,IDPER)
       READ(LR)ALC,FSN,IR,IRETUR
       IF(IEBUG.EQ.1)WRITE(6,8030)(IRETUR(N,J),J=1,IDPER)
       READ(LR)ALC,FSN,IR,IREQ
       IF(IEBUG.EQ.1)WRITE(6,8040)(IREQ(N,J),J=1,IDPER)
C                WRITE INPUT DATA TO FILE 09
```

```
1110     C
1120     C
1130     C
1140      8000  FORMAT(V)
1150      8010  FORMAT(/I5,1X,A2,1X,A2,A4,A6,A3,1X,A2,F11.2,1X,A6,A4,
1160     &              T53,2A1,A4,A2,2X,2I7,3I6,F5.2)
1170      8015  FORMAT(I21,10I10)
1180      8020  FORMAT('IDEMND  DEMAND/QTR',(T21,10I10))
1190      8030  FORMAT('IRETUR  RETURN/QTR',(T21,10I10))
1200      8040  FORMAT('IREQ    REQ   /QTR',(T21,10I10))
1210     C
1220        50  CONTINUE
1230     C                INDICATE ITEM HAS NDHIS PERIODS OF DEMAND HISTORY
1240     C
1250           NDENT(N)=NDHIS
1260     C
1270     C     ZERO DEMAND HISTORY RECORDS
1280            NRETAC(N)=0
1290           NDEMAC(N)=0
1300            NREQAC(N)=0
1310           DO 65 J=1,NDHIS
1320        65 NDEMND(N,J)=IDEMND(N,J)
1330     C       SET INVENTORY DUE-IN TO ZERO
1340        70 INVDUE(N)=0
1350           NBOTU(N)=0
1360           NBOPT(N)=0
1370           NORDPT(N)=0
1380     C
1390     C                LOAD DEMAND HISTORY ARRAYS
1400     C
1410            KK=NDHIS
1420            DO 1 I=1,NDHIS
1430            NDEMND(N,KK)=IDEMND(N,I)
1440            NRETUR(N,KK)=IRETUR(N,I)
1450            NREQ(N,KK)=IREQ(N,I)
1460            KK=KK-1
1470         1  CONTINUE
1480     C
1490     C                SLIDE DOWN DATA IN DEMAND ARRAYS
1500     C
1510            KK=NDHIS+1
1520            DO 2 I=1,IDPER
1530            IDEMND(N,I)=IDEMND(N,KK)
1540            IRETUR(N,I)=IRETUR(N,KK)
1550            IREQ(N,I)=IREQ(N,KK)
1560            KK=KK+1
1570         2  CONTINUE
```

```
1580     C
1590     C
1600     C                ESTABLISH BEGINNING INVENTORY LEVELS
1610     C
1620           INVACT(N)=IOH+IOR
1630      100  CONTINUE
1640     C
1650     C          INITIALIZE GROSS ON-HAND AND ON-ORDER STATISTICS
1660     C
1670       110 CONTINUE
1680           DO 130 N=1,NITEM
1690           IF(NDENT(N).LT.0) GO TO 130
1700           IF(INVACT(N).LE.0) GO TO 120
1710           IBOPOH(1)=IBOPOH(1)+1
1720           IBOPOH(2)=IBOPOH(2)+INVACT(N)
1730           IBOPOH(3)=IBOPOH(3)+IFIX(UCOST(N)*FLOAT(INVACT(N)))
1740       120 CONTINUE
1750           IF(INVDUE(N).LE.0) GO TO 130
1760            IBOPOR(1)=IBOPOR(1)+1
1770           IBOPOR(2)=IBOPOR(2)+INVDUE(N)
1780           IBOPOR(3)=IBOPOR(3)+IFIX(UCOST(N)*FLOAT(INVDUE(N)))
1790       130 CONTINUE
1800       140 CONTINUE
1810           RETURN
1820       200 WRITE(6,8200)
1830      8200 FORMAT(1H1,////20X,'END OF FILE READINF.....')
1840           CALL OUT
1850            CALL OUTCST
1860           CALL PLOTR
1870           STOP
1880           END
1890     $      ENDJOB
```

Subroutine: ITRSLT

Function:

This routine writes details of the performance statistics associated with a given item to File 08.

Description:

This routine first converts recorded values of performance statistics to floating point variables stored in the array RID. It then writes a single binary record for this item to File 08. Record lay outs for this record are defined in Vol I, App B. See Vol I, Chap VIII, for an additional discussion of this routine.

```
C               ITRSLT,O  OUTPUT ITEM PERFORMANCE STATISTICS TO FILE 08
C
      SUBROUTINE ITRSLT
      COMMON/FSN/ALC,FSN(4),UM,NOUN(2),MGIED(4),IOH,IOR,IPPL,IPPPR
      COMMON/IDENT/IDENT,MRUN,IREPL
      COMMON/INQTR/INQTR
      COMMON/COSORD/COSORD(3)
      COMMON/ISMORD/ISMORD(30,3)
      COMMON/ILGORD/ILGORD(30,3)
      COMMON/POLICY/ICDEOQ,ICDSL
      COMMON/LTADM/LTADM(1)
      COMMON/LTPROD/LTPROD(1)
      COMMON/UCOST/UCOST(1)
      COMMON/IREQT/IREQT(30,3)
      COMMON/IRETRN/IRETRN(30,3)
      COMMON/IBAKDT/IBAKDT(30,3)
      COMMON/IORDER/IORDER(30,3)
      COMMON/INVDAY/INVDAY(30,3)
      COMMON/IFILLT/IFILLT(30,3)
      DIMENSION RJD(16,10)
      DIMENSION RID(16,10)
C
C               ON FIRST REPLICATION, ZERO THE RJD-ARRAY
C
      IF(IREPL.GT.1) GO TO 20
      DO 10 I=1,INQTR
      DO 10 J=1,10
      RJD(I,J)=0.
   10 CONTINUE
   20 CONTINUE
C
C
C               CONVERT INTEGERS TO FLOATING POINT FOR OUTPUT
C
      TDENT=IDENT
      TCDSL=ICDSL
      TRUN=MRUN
      TLT=LTADM(1)+LTPROD(1)
      ROH=IOH+IOR
C
C               COMPUTE DIFFERENCES OF I- AND JD- ARRAYS.
C                   THESE ARE THE OPERATING RESULTS FOR THE CURRENT
C                   ITEM.
C
      DO 100 I=1,INQTR
      RID(I,1)=IREQT(I,1)-RJD(I,1)
      RID(I,2)=IREQT(I,2)-RJD(I,2)
      RID(I,3)=IRETRN(I,2)-RJD(I,3)
      RID(I,4)=IBAKDT(I,1)-RJD(I,4)
      RID(I,5)=IBAKDT(I,2)-RJD(I,5)
      RID(I,6)=IORDER(I,2)-RJD(I,6)
      RID(I,7)=INVDAY(I,2)-RJD(I,7)
```

ITRSLT
p. 1 of 2

ITRSLT, p 2 of 3

```
      RID(I,8)=IFILLT(I,1)+RJD(I,8)
      RID(I,9)=IFILLT(I,2)+RJD(I,9)
      RID(I,10)=COSORD(1)*FLOAT(ISMORD(I,1))+
     &          COSORD(2)*FLOAT(ILGORD(I,1)) + RJD(I,10)
  100 CONTINUE
C
CCC
C           WRITE RESULTS TO FILE 08
C
      WRITE(8)IDENT,TCDSL,TRUN,ALC,FSN,MGIGD,UCOST(1),TLT,
     &          ROH,RID
CCC
C
CCC         RECORD CURRENT VALUES FOR USE ON NEXT ITEM
C
      DO 300 I=1,INQTR
      DO 300 J=1,13
      RJD(I,J)=RID(I,J)+RJD(I,J)
  300 CONTINUE
      RETURN
      END
```

Subroutine: LEVEL

Function:

This routine computes new inventory control levels for each item being simulated.

Description:

Subroutine LEVEL first calls subroutine FOR576(N) to update estimates of annual demand rate, the standard deviation of demand in the leadtime, and average requisition size. Next, subroutine LEVELN(N) is called to compute new control levels for item N. After new control levels have been computed for each item, LEVEL creates the next level calculation event (event type 6), and puts it in the Future Events List.

LEVEL
p. 1 of 1

```
      SUBROUTINE LEVEL
      COMMON/COSHRT/COSHRT
      COMMON/IDLEVL/IDLEVL
      COMMON/ITLEVL/ITLEVL
      COMMON/NITEM/NITEM
       COMMON/NDENT/NDENT(1)
      DO 10  N=1,NITEM
C
C             UPDATE ESTIMATES OF ANNUAL DEMAND RATE(ADR),RSIGLT,
C                 AND AVERAGE REQUISITION SIZE
C
      CALL FOR576(N)
1457 DO LOOP INDEX N MAY NOT BE REDEFINED IN CALL OR ABNORMAL FUNCTION
C
C             COMPUTE NEW INVENTORY CONTROL LEVELS
C
       CALL LEVELN(N)
1457 DO LOOP INDEX N MAY NOT BE REDEFINED IN CALL OR ABNORMAL FUNCTION
   10 CONTINUE
C
C             CREATE NEXT LEVELING EVENT
C
      ITLEVL=ITLEVL + IDLEVL
      CALL ENTER(ITLEVL,6,0,0,0)
      RETURN
      END
```

Subroutine: LEVELN

Function:

This routine computes new reorder, termination, retention, and support levels for a given item N.

Description:

This routine is controlled by the management codes ICDEOQ, ICDSL, and ICDSLL provided as input through File 05. These codes specify formulas to be used in computing order quantities, establishing safety levels, and limiting safety levels, respectively. The meanings of these codes are defined in detail in Vol I, Chap VII.

After order quantity and safety level values are computed, they are bounded by input parameters EOQMIN, EOQMAX, SLMIN, and SLMAX. The safety level bounds are dependent upon bounding flag code ICDSLL.

With the current coding, safety level is set to be no less than SLMIN months of supply. Also, the safety level is limited to be no more than either (a) three times the standard deviation of demand in the leadtime, or (b) the expected number of units to be demanded in the leadtime, whichever is smaller.

The routine concludes by computing termination, retention, and support levels using the parameters GTLF, GRLF, and GSULF.

LEVELN
p. 1 of 4

```
      SUBROUTINE LEVELN(N)
C
C       THIS ROUTINE COMPUTES REORDER,STOCK OBJECTIVE,RETENTION,
C            TERMINATION, AND SUPPORT LEVELS.
C
       COMMON/IHBUG/IHBUG
       COMMON/COSHRT/COSHRT
      COMMON/COSHLD/COSHLD
      COMMON/COSORD/COSORD(3)
       COMMON/CSTBRK/CSTBRK
      COMMON/GSULF/GSULF
      COMMON/GRLF/GRLF
      COMMON/GSLF/GSLF
      COMMON/GTLF/GTLF
      COMMON/ITLEVL/ITLEVL
      COMMON/IDLEVL/IDLEVL
      COMMON/NITEM/NITEM
      COMMON/POLICY/ICDEOQ,ICDSL,EOQMAX,EOQMIN,SLMAX,SLMIN,RLF,TLF,SULF
      COMMON/ADR/ADR(50)
      COMMON/LTADM/LTADM(50)
      COMMON/LTPROD/LTPROD(50)
      COMMON/IRQTY/IRQTY(50)
      COMMON/IRL/IRL(50)
      COMMON/IROL/IROL(50)
      COMMON/ISUL/ISUL(50)
      COMMON/ITL/ITL(50)
      COMMON/RSIGLT/RSIGLT(50)
       COMMON/REQSIZ/REQSIZ(50)
      COMMON/UCOST/UCOST(50)
      DATA Z/1.0/
      DATA ITLMIN,IRLMIN/99999999,99999999/
C
C       COMPUTE PLANNING FACTORS
C
       AMDA=COSHRT
      RLTM=LTADM(N)*LTPROD(N)
      IF(RLTM.LT.1.)RLTM=0.5
****
      AD=ADR(N)
      RLT=AD*RLTM/12.
      RMR=AD/12.
      UC=UCOST(N)
      ADDR=UC*AD
C
C       ESTIMATE STD DEVIATION OF FORECAST ERRORS
C
      SIG=RSIGLT(N)
C
C     SET COR EQUAL TO SMALL PURCHASE ORDER COST
      COR=COSORD(1)
C
C       BRANCH BY EOQ FORMULA CODE
```

LEVELN, P. 2 of 4

```
C
      GO TO (110,120,130,140,150,160,170,180,190),ICDEOQ
C
C       2 FEB 70 GUIDELINE LTR POLICY
C
  110  IF(ADDR.GE.1000.) GO TO 62
       Q=12.*RMR
       GO TO 200
   62 IF(ADDR.GE.5000.) GO TO 64
       Q=6.*RMR
       GO TO 200
   64 Q=3.*RMR
       GO TO 200
C
C             AFLC 57-6 POLICY---DEC 1976
C
  120  Q=SQRT(2.*CeR*AD/(COSHLD*UC))
       ACOST=Q*UC
       IF(ACOST.LT.CSTBRK) GO TO 200
       COR=COSORD(2)
       Q=SQRT(2.*COR*AD/(COSHLD*UC))
       GO TO 200
  130  CONTINUE
  140  CONTINUE
  150  CONTINUE
  160  CONTINUE
  170  CONTINUE
  180  CONTINUE
  190  CONTINUE
       WRITE(6,8195)ICDEOQ,ICDSL
 8195  FORMAT('****LEVELN--UNDEFINED FORMULA CODE,...',
     &        ' ICDEOQ=',I3,'  ICDSL=',I3)
       STOP
C
C       CHECK ORDER SIZE LIMITS
  200 CONTINUE
       EMX=EOQMAX*RMR
       IF(Q.GT.EMX) Q=EMX
       EMX=EOQMIN*RMR
       IF(Q.LT.EMX) Q=EMX
       IF(Q.LT. 1.)Q= 1.
C
C       BRANCH BY SAFETY LEVEL FORMULA CODE ICDSL
C
       GO TO (310,320,330,340,350,360,370,380,390),ICDSL
C
C       2 FEB 70 GUIDELINE LTR POLICY
C
  310 SL=1.*RMR
       GO TO 500
C
C       23 AUG 68 GUIDELINE LTR POLICY
```

```
1  04-16-77    12.082
      C
        320 SL=0.25*RLT
            GO TO 500
      C
      C        AFLCM 57-6 POLICY
      C
        330   Z=SQRT(REQSIZ(N))
              GO TO 358
      C
      C              PT-FORMULA TO MINIMIZE UNITS BACKORDERED
      C
        340   Z=1.
              GO TO 358
      C
      C              PT-FORMULA TO MINIMIZE REQUISITIONS BACKORDERED
      C
        350   Z=REQSIZ(N)
      C
      C
        358   CONTINUE
              RNUM=AMDA*SIG*(1.-EXP(-1.414*Q/SIG))
              DNOM=2.*COSWLD*UC*Z*1.414*Q
              RK=0.707*ALOG(RNUM/DNOM)
              SL=RK*SIG
              GO TO 500
      C
      C
        360   CONTINUE
        370   CONTINUE
        380   CONTINUE
        390   CONTINUE
              WRITE(6,8195)ICDEOQ,ICDSL
              STOP
      ************************************************************************
      *****
        500   CONTINUE
      C
      C              LIMIT SAFETY LEVEL
      C                  FIRST,CHECK MINIMUM
              SLM=SLMIN*RMR
              IF(SL.LT.SLM)SL=SLM
      C
      C              LIMITS SL TO LESS THAN LEADTIME DEMAND
      C
              SLM=RLT*RMR
              IF(SL.GT.SLM)SL=SLM
      C
      C              LIMIT SL TO LESS THAN 3*SIG
      C
              SLM=3.*SIG
              IF(SL.GT.SLM)SL=SLM
      **
```

LEVELN (CONTINUED)


```
      ************************************************************
      C
      C     COMPUTE LEVELS
      C
            IRQTY(N)=Q+0.5
            IROL(N)=SL+RLT+0.5
            ITL(N)=SLMAX*RMR+RLT+GTLF*RMR+0.5
            IRL(N)=FLOAT(ITL(N))+GRLF*RMR+0.5
            IF(ITL(N).LE.ITLMIN) ITL(N)=ITLMIN
            IF(IRL(N).LE.IRLMIN)IRL(N)=IRLMIN
            ISUL(N)=GSULF*RLT
       3000 CONTINUE
            ROL=FLOAT(IROL(N))
             IF(IHBUG.NE.1) RETURN
             WRITE(6,8903)N,IRQTY(N),IROL(N),ITL(N),IRL(N),ISUL(N)
       8903  FORMAT(4X,'****LEVELN-N=',I5,'  IRQTY=',I5,'  IROL=',I5,
     8               '  ITL=',I5,'  IRL=',I5,'  ISUL=',I5)
             RETURN
            END
```

Subroutine: MAIN

Function:

MAIN is the primary INSSIM routine. This routine coordinates input of data, initialization of the simulation, event sequencing, and output reporting.

Description:

This routine is described in detail in Vol I, Chap V.

```
      $       IDENT   WP0287,ADDSC-CALLAHAN
      $       FORTY   DECK
      $       OPTION  FORTRAN
      $       PRMFL   C*,W,S,REQS/MAIN.O
      $       LIMITS  5,32K
      $       REMOTE  P*,AC
      $       REMOTE  $$,AC
              CHARACTER TEXT*40
              INTEGER PX(52),PY(52,4)
     *-----------------------------------------------------------
              COMMON/BPER/BPER
              COMMON/COSHLD/COSHLD
              COMMON/COSORD/COSORD(3)
               COMMON/CSTBRK/CSTBRK
              COMMON/COSHRT/COSHRT
               COMMON/FSN/ALC,FSN(4),UM,NOUN(2),MGTCD(4),IOH,IOR,IPPL,IR
              COMMON/GMRQF/GMRQF
              COMMON/GRLF/GRLF
              COMMON/GROQF/GROQF
              COMMON/GSLF/GSLF
              COMMON/GSULF/GSULF
              COMMON/GTLF/GTLF
              COMMON/GUIDI/ICDGID,NPH,NPOLCY,IDJAXR,IDJAXS,SHORT(16)
              COMMON/GUIDII/DEMFAC,ALTMAX,PLTMAX,GRPSEL,IBEGIN,IEND
              COMMON/ICDFOR/ICDFOR
              COMMON/ICDSIG/ICDSIG
              COMMON/IDBUG/IDBUG
               COMMON/IEBUG/IEBUG
              COMMON/IGBUG/IGBUG
              COMMON/IFBUG/IFBUG
               COMMON/IHBUG/IHBUG
              COMMON/IDDIV/IDDIV
               COMMON/IDENT/IDENT,IRUN,IREPL
              COMMON/IDLEVL/IDLEVL
              COMMON/IDSTAT/IDSTAT
              COMMON/IDTHQ/IDTHQ
              COMMON/IKDEM/IKDEM
               COMMON/INLU/INLU
               COMMON/INTYPE/INTYPE
              COMMON/INQTR/INQTR
              COMMON/IOBLIG/IOBLIG
              COMMON/IPFOR/IPFOR
              COMMON/IQTRND/IQTRND
              COMMON/ISTAT/ISTAT
              COMMON/ISTOCK/ISTOCK,IDSTOC
              COMMON/ISTOP/ISTOP
              COMMON/ITCANB/ITCANB,IDCANB
```

```
      COMMON/ITDAY/ITDAY
      COMMON/ITDIV/ITDIV
      COMMON/ITFOR/ITFOR,IDFOR
      COMMON/ITHQ/ITHQ
      COMMON/ITINV/ITINV
      COMMON/ITIME/ITIME
      COMMON/ITLEVL/ITLEVL
      COMMON/ITMNTH/ITMNTH
      COMMON/ITQTR/ITQTR
      COMMON/ITWEEK/ITWEEK
      COMMON/ITYEAR/ITYEAR
      COMMON/MAXBUY/MAXBUY
      COMMON/MBODAY/MBODAY
      COMMON/NBPER/NBPER
      COMMON/NBMAX/NBMAX
       COMMON/NDEM/NDEM
       COMMON/NDHIS/NDHIS
      COMMON/NENTRY/NENTRY
      COMMON/NFEMAX/NFEMAX
      COMMON/NFIRST/NFIRST
      COMMON/NITEM/NITEM
      COMMON/NLOC/NLOC
      COMMON/NLOCBK/NLOCBK
       COMMON/NRELP/NREPL
      COMMON/NTIME/NTIME
      COMMON/POLICY/ICDEOQ,ICDSL,EOQMAX,EOQMIN,SLMAX,SLMIN,RLF,B
      COMMON/ADR/ADR(1)
      COMMON/IDEMND/IDEMND(1,24)
       COMMON/IRETUR/IRETUR(1,24)
       COMMON/IREQ/IREQ(1,24)
      COMMON/INVACT/INVACT(1)
      COMMON/INVDUE/INVDUE(1)
      COMMON/IRL/IRL(1)
      COMMON/IROL/IROL(1)
      COMMON/IRQTY/IRQTY(1)
      COMMON/ISUL/ISUL(1)
      COMMON/ITL/ITL(1)
      COMMON/LTADM/LTADM(1)
      COMMON/LTPROD/LTPROD(1)
      COMMON/XNT    /XNT(1)
      COMMON/NBOPT/NBOPT(1)
      COMMON/NBOTU/NBOTU(1)
      COMMON/NDEMAC/NDEMAC(1)
       COMMON/NRETAC/NRETAC(1)
       COMMON/NREQAC/NREQAC(1)
       COMMON/NDEMND/NDEMND(1,24)
       COMMON/NRETUR/NRETUR(1,24)
       COMMON/NREQ/NREQ(1,24)
      COMMON/NDENT/NDENT(1)
      COMMON/NORDPT/NORDPT(1)
      COMMON/REQMAD/REQMAD(1)
      COMMON/REQSIZ/REQSIZ(1)
      COMMON/RERSUM/RERSUM(1)
```

```
      COMMON/RMAD   /RMAD(1)
      COMMON/RMEAN/RMEAN(1)
      COMMON/RMREQS/RMREQS(1)
      COMMON/RMTBR  /RMTBR(1)
      COMMON/RSIGLT/RSIGLT(1)
      COMMON/RTREND/RTREND(1)
      COMMON/UCOST/UCOST(1)
      COMMON/ILOCFE/ILOCFE(500)
      COMMON/JFSN/JFSN(500)
      COMMON/JPOINT/JPOINT(500)
      COMMON/JPRIOR/JPRIOR(500)
      COMMON/JQTY/JQTY(500)
      COMMON/JTIME/JTIME(500)
      COMMON/JTYPE/JTYPE(500)
      COMMON/IBACPT/IBACPT(100)
      COMMON/IBFSNB/IBFSNB(100)
      COMMON/ILOCBK/ILOCBK(100)
      COMMON/IPRIOR/IPRIOR(100)
      COMMON/IQTYB/IQTYB(100)
      COMMON/ITMBAC/ITMBAC(100)
      COMMON/IBOP/IBOPOH(3),IBOPOR(3)
      COMMON/IBAUTH/IBAUTH(12)
      COMMON/IBPROJ/IBPROJ(12)
      COMMON/GEOQ/GEOQ(3)
      COMMON/GEOQF/GEOQF(3)
      COMMON/IBACKI/IBACKI(30,3)
      COMMON/IBACKT/IBACKT(30,3)
      COMMON/IBAKDI/IBAKDI(30,3)
      COMMON/IBAKDT/IBAKDT(30,3)
      COMMON/ICANCL/ICANCL(30,3)
      COMMON/IDISPS/IDISPS(30,3)
      COMMON/IEXPED/IEXPED(30,3)
      COMMON/IFILLI/IFILLI(30,3)
      COMMON/IFILLT/IFILLT(30,3)
      COMMON/INVOH/INVOH(30,3)
      COMMON/INVDAY/INVDAY(30,3)
      COMMON/INVOR/INVOR(30,3)
      COMMON/IORDER/IORDER(30,3)
      COMMON/IRATON/IRATON(30,3)
      COMMON/IRECET/IRECET(30,3)
      COMMON/IREQC  /IREQC(30,3)
      COMMON/IREQI  /IREQI(30,3)
      COMMON/IREQT/IREQT(30,3)
      COMMON/IRETRN/IRETRN(30,3)
      COMMON/ISHIPI/ISHIPI(30,3)
      COMMON/ISHIPT/ISHIPT(30,3)
      COMMON/ITERM  /ITERM(30,3)
       COMMON/ITRACE/ITRACE,ISTRAC
       DIMENSION CSHORT(4)
```

```
*-----------------------------------------------------------------
C
*       SET CODES FOR GUIDELINE REVISIONS
      NPH=20
      GTLF=24.
      GRLF=12.
      GSULF=8.
      GSLF=1.
      GROQF=1.
C
C
C               READ INPUT DATA
C
 10   CONTINUE
      WRITE(6,8000)
 8000 FORMAT(1H1, T30, 'INVENTORY SYSTEM SIMULATOR'//T34,
     &            'RUN PARAMETERS'///)
C
C               READ RUN IDENTIFICATION(CARD TYPE C1)
C
      READ(5,8001,END=9999)IDENT,TEXT
 8001 FORMAT(V)
      WRITE(6,8002)IDENT,TEXT
 8002 FORMAT('  (C1)  RUN-ID. ',I6,'  TITLE. ',A40)
C
C               READ OUTPUT CONTROLS(CARD CODE C2)
C
      READ(5,8003)ITWRT,IOUT,IGRAPH,IPUNCH
 8003 FORMAT(V)
      WRITE(6,8004)ITWRT,IOUT,IGRAPH,IPUNCH
 8004 FORMAT('//'  (C2)  OUTPUT CONTROLS...(NOTE. 1=YES)'//
     &          ' ITWRT ',T16,'IT.WRITE= ',I3//
     &          ' IOUT ',T16,'SUMMARY = ',I3//
     &          ' IGRAPH ',T16,'GRAPHS  = ',I3//
     &          ' IPUNCH ',T16,'PUNCH   = ',I3)
C
C               READ DEBUG FLAGS
C
      READ(5,8003)IDBUG,IEBUG,IFBUG,IGBUG,IHBUG,ITRACE,ISTRAC
      WRITE(6,8005)IDBUG,IEBUG,IFBUG,IGBUG,IHBUG,ITRACE,ISTRAC
 8005 FORMAT('//'  (C3)  DEBUG FLAGS'//
     &          T16,'IDBUG = ',I3//
     &          T16,'IEBUG = ',I3//
     &          T16,'IFBUG = ',I3//
     &          T16,'IGBUG = ',I3//
     &          T16,'IHBUG = ',I3///
     &          ' ITRACE ',T16,'START TRACE AT ',I6,'  FOR ITEM 1'/
     &          ' ISTRAC ',T16,'STOP TRACE AT ',I6)
C
C               DEFINE ITEM INPUT FILES
C
      READ(5,8003)INLU,INTYPE,NDEM
      WRITE(6,8010)INLU,INTYPE,NDEM
 8010 FORMAT('//'  (C4)  ITEM INPUT FILES'//
     &          ' INLU ',T16,'FILE = ',I3/
     &          ' INTYPE ',T16,'TYPE = ',I3,'  (1 = BCD; 2 = BINARY
     &          ' NDEM ',T16,'QTRS = ',I3)
C
```

```
C                READ MANAGEMENT METHOD CODES(CARD TYPE C5)
C
        READ(5,8003)ICDFOR,ICDSIG,ICDEOQ,ICDSL,ICDSLL,ICDBG,ICDSR
        WRITE(6,8050)ICDFOR,ICDSIG,ICDEOQ,ICDSL,ICDSLL,ICDBG,ICDB
 8050   FORMAT(1H1,/ (C5)  MANAGEMENT METHODS TO BE USED //
     &          ' ICDFOR ',T16,' FORECAST FORMULA  = ',I3//
     &          ' ICDSIG ',T16,' STD DEV  FORMULA  = ',I3//
     &          ' ICDEOQ ',T16,' EOQ      FORMULA  = ',I3//
     &          ' ICDSL  ',T16,' SAFETY STK   CODE = ',I3//
     &          ' ICDSLL ',T16,' SAFETY LIMIT CODE = ',I3//
     &          ' ICDBG  ',T16,' BUDGET GUIDE CODE = ',I3//
     &          ' ICDSR  ',T16,' RETURNS CODE      = ',I3)
C
C                READ MANAGEMENT PARAMETERS(CARD CODE C6)
C
        READ(5,8003)EOQMIN,EOQMAX,SLMIN,SLMAX
        WRITE(6,8060)EOQMIN,EOQMAX,SLMIN,SLMAX
 8060   FORMAT(///,' (C6)  MANAGEMENT PARAMETERS //
     &          ' EOQMIN ',T16,' MIN EOQ(MNTHS) ',T40,F10.4//
     &          ' EOQMAX ',T16,' MAX EOQ(MNTHS) ',T40,F10.4//
     &          ' SLMIN  ',T16,' MIN SAFETY LV(MNTHS) ',T40,F10.4//
     &          ' SLMAX  ',T16,' MAX SAFETY LV(MNTHS) ',T40,F10.4)
C
C                READ SYSTEM PARAMETERS(CARD TYPE C7)
C
        READ(5,8003)COSHLD,CSHORT,COSORD(1),COSORD(2),CSTBRK
        WRITE(6,8070)COSHLD,CSHORT,COSORD(1),COSORD(2),CSTBRK
 8070   FORMAT(///' (C7)  SYSTEM PARAMETERS ///
     &          ' COSHLD ',T16,' HOLDING COST/$-INV ',T40,F10.4//
     &          ' CSHORT ',T16,' SHORTAGE COST ',T40,4F10.4///
     &          'COSORD(1) ',T16,' SMALL ORDER COST ',T40,F10.4//
     &          'COSORD(2) ',T16,' LARGE ORDER COST ',T40,F10.4///
     &          ' CSTBRK ',T16,' COST BREAK-POINT ',T40,F10.4)
C
C                READ SIMULATION SIZE PARAMETERS(CARD TYPE C8)
C
        READ(5,8003)NRUN,INQTR,NREPL,NITEM,NDHIS
        WRITE(6,8080)NRUN,INQTR,NREPL,NITEM,NDHIS
 8080   FORMAT(///' (C8)  SIMULATION SIZE ///
     &          ' NRUN ',T16,' NUMBER OF RUNS ',T40,I5//
     &          ' INQTR ',T16,' NUMBER OF QUARTERS ',T40,I5//
     &          ' NREPL ',T16,' NO. OF REPLICATIONS ',T40,I5//
     &          ' NITEM ',T16,' NO. OF ITEMS/REPL ',T40,I5//
     &          ' NDHIS ',T16,' NO. OF HISTORY QTRS ',T40,I5)
C
C                END OF RUN DEFINITION INPUT
C
C
```

```
C*************************************************************
C
C                BEGIN SIMULATION
C
C*************************************************************
      DO 99 MRUN=1,NRUN
      IRUN=MRUN
      COSHRT=CSHORT(MRUN)
      WRITE(6,8898)COSHRT
 8898 FORMAT(1H1,25(' ****'),2(/' **'),
     &       T28,'BEGIN SIMULATION WITH COSHRT =',F10.4,
     &       2(/' **'),25(' ****'))
C
C                INITIALIZE RANDOM NUMBER STREAM
C
      R=RANDU(-.1)
C
C
      REWIND INLU
C
C                BEGIN REPLICATION LOOP
C
      CALL ZERO
      DO 95 KREPL=1,NREPL
      IPLOT=0
      IREPL=KREPL
   15 CONTINUE
C
C                INITIALIZE THE FUTURE EVENTS LIST(INITAL),
C                   AND READ ITEM DEMAND DATA (INITEM).
C
      CALL INITAL
      CALL INITEM
      IF(IBBUG .NE. 1) GO TO 16
      CALL WRIFEL
   16 CONTINUE
C
C*****************************************
C
C
C       REMOVE NEXT EVENT FROM FUTURE EVENTS LIST
C     ***BRANCH BY TYPE OF TRANSACTION***
   20 CALL REMOVE(ITIME,KTYPE,IP3,IP4,IP5)
      GO TO ( 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33
     C, 36, 37, 38, 39),KTYPE
C
C*********************************************
C
   21 CONTINUE
C       REFLECT RECEIPT OF TRANSACTION
C       REQUISITION
C
      CALL REQ(IP3,IP4,IP5,ITIME)
      GO TO 20
   22 CONTINUE
C       RECEIPT OF SHIPMENT
```

```
C       REFLECT RECEIPT
        CALL RECEIV(IP3,IP4)
        GO TO 20
   23 CONTINUE
C
C         REVIEW BACKORDERS.  CANCEL THOSE OLDER THAN MBODAY DAYS
C
        CALL CANCLB
        GO TO 20
C
C                 SERVICEABLE RETURN EVENT
C
   24  CALL RET(IP3,IP4,ITIME)
        GO TO 20
   25 CONTINUE
C       STATUS REVIEW
        CALL STATUS
        GO TO 20
   26 CONTINUE
C       LEVELS COMPUTATION
        CALL LEVEL
        GO TO 20
   27 CONTINUE
C       BUY GUIDELINE
        CALL GUIDE
        GO TO 20
   28 CONTINUE
C       BUDGET REVIEW
        CALL BUDGET
        GO TO 20
   29 CONTINUE
C       FORECAST UPDATE
        CALL FORUPD
        GO TO 20
   30 CONTINUE
C*************************************
C
C       END OF RUN
C
C*************************************
        IF(ITWRT.EQ.1) CALL ITRSLT
        IF(KREPL.LT.NREPL) GO TO 95
  300 CONTINUE
        IF(IDBUG.EQ.1) CALL WRIFEL
       IF(IOUT .NE. 1) GO TO 98
       CALL OUT
        CALL OUTCST
    98 CONTINUE
        WRITE(6,302)
       IF(IGRAPH .EQ. 1) CALL PLOTR
       IF(IPUNCH.NE.1) GO TO 233
       DO 232 J=1,3
       DO 232 I=1,INQTR
```

```
      WRITE(6,381)IDENT,MRUN,KREPL,J,I,
     &            IORDER(I,J),INVOH(I,J),INVOR(I,J),IBACKT(I,J),
     &            IBAKDT(I,J),IRETRN(I,J),IREQT(I,J),IFILLT(I,J)
  381 FORMAT(5I5,8I10)
  382 FORMAT(1H1,' IDENT MRUN  REP  J    QTR  ',
     &            T30,'IORDER',T40,'INVOH',T50,'INVOR',T60,'IBACKT',
     &            T70,'IBAKDT',T80,'IRETRN',T90,'IREQT',T100,'FILLT
  232 CONTINUE
  233 CONTINUE
      R=(ITIME-800)/ITYEAR+1
       NPLOT=1
      WRITE(6,8333)NPLOT,R
      WRITE(6,8330)
      WRITE(6,8332) (I,PX(I),(PY(I,J),J=1,4),I=1,IPLOT)
      GO TO 99
   31 CONTINUE
C       SPECIAL STATISTICS
      CALL SSTAT(IP3)
      GO TO 20
   32 CONTINUE
C       DEMAND PARAMETER UPDATE
      CALL DEMPAR(IP3,IP4,IP5)
      GO TO 20
   33 CONTINUE
       IF(ITIME.GT.ISTRAC) GO TO 332
C        RECORD HISTORY FOR ITEM NPLOT
      IPLOT=IPLOT+1
      PX(IPLOT)=ITIME
      PY(IPLOT,1)=INVACT(1)
      PY(IPLOT,2)=INVDUE(1)
      PY(IPLOT,3)=NBOTU(1)
      PY(IPLOT,4)=IOBLIG
       IF(IPLOT.LT.48) GO TO 331
      R=(ITIME-800)/ITYEAR+1
      WRITE(6,8333)NPLOT,R
      WRITE(6,8332) (I,PX(I),(PY(I,J),J=1,4),I=1,IPLOT)
 8330 FORMAT(//11X,4HWEEK,11X,4HTIME,8X,7HON-HAND,9X,6HDUE-IN,3
     C-ORDERED  //)
 8332 FORMAT(52(6I15/))
 8333 FORMAT(1H1//20X,22HSTOCK HISTORY FOR ITEM,I5,10X,5HYEAR=,5
      IPLOT=0
C
```

```
C         WRITE BACKORDER FILE
C
      IF(IDBUG.NE.1) GO TO 331
      DO 298 N=1,NITEM
      IF(NBOPT(N).LE.0) GO TO 298
      JPT=NBOPT(N)
  288 CONTINUE
      I=JPT
      WRITE(6,8444)I,IDFSNB(I),IQTYB(I),IPRIOR(I),ITMBAC(I),IBA
 8444 FORMAT(I10,5I8)
      IF(IBACPT(JPT).EQ.0) GO TO 298
      JPT=IBACPT(JPT)
      GO TO 288
  298 CONTINUE
  331 CONTINUE
      INEXT=ITIME+ITWEEK
      CALL ENTER(INEXT,13,0,0,IPLOT)
      GO TO 20
C
C               TURN OFF DEBUG SWITCH (IDBUG)
C
  332   IDBUG=0
        GO TO 20
   34 CONTINUE
   35 CONTINUE
   36 CONTINUE
   37 CONTINUE
   38 CONTINUE
   39 CONTINUE
C       KTYPE OUT OF RANGE-WRITE ERROR MESSAGE
      WRITE(6,113) KTYPE
  113 FORMAT(1H1,21H***ERROR***    KTYPE=,I3,3X,12HOUT OF RANGE)
       STOP
C
C               END OF LOOP
C
   95   CONTINUE
   99 CONTINUE
      GO TO 10
 9999  CONTINUE
 9998  FORMAT(/////' ****MAIN--END OF FILE 05')
       STOP
      END
$      ENDJOB
C
```

Subroutine: ORDER

Function:

This routine performs the bookkeeping tasks required to reflect the placement of an order to replenish existing stocks, and to schedule the receipt of an order.

Description:

Subroutine ORDER first enters a type 2 event (receipt) onto the Future Events List. This will cause a receipt for IBQ units of item N a leadtime into the future. Next, ORDER updates the variables IOBLIG and INVDUE(N) which record the dollar values of obligations within the current budget period and the total number of units on order for item N, respectively. Performance variables IBOPSM and IBOPLG are next updated to reflect any small or large purchases which are placed in the initial quarter of the simulation. Finally, subroutine ORDER updates the pointer NORDPT(N) which points from item N to the corresponding receipt event on the Future Events List.

```
      $       IDENT   WP0287,ADDSC-CALLAHAN
      $       FORTY   DECK
      $       PRMFL   C*,W,S,REQS/ORDER.O
      $       REMOTE  P*,AC
      $       REMOTE  $$,AC
            SUBROUTINE ORDER(N,IBQ,JTIME)
      C       THIS ROUTINE UPDATES STATISTICS TO REFLECT AN ORDER FOR
      C       UNITS OF ITEM N, WITH DELIVERY DATE SCHEDULED FOR JTIME
      C       PLACES THE ASSOCIATED RECEIPT TRANSACTION ON THE FUTURE
      C       LIST.
            COMMON/IDBUG/IDBUG
            COMMON/IOBLIG/IOBLIG
            COMMON/NLOC/NLOC
            COMMON/CSTBRK/CSTBRK
            COMMON/ISMORD/ISMORD(30,3)
            COMMON/ILGORD/ILGORD(30,3)
            COMMON/IORDER/IORDER(30,3)
            COMMON/NORDPT/NORDPT(50)
            COMMON/INVDUE/INVDUE(50)
            COMMON/UCOST/UCOST(50)
            COMMON/JPRIOR/JPRIOR(500)
             COMMON/ITIME/ITIME
             COMMON/IBOPCT/IBOPSM(3),IBOPLG(3)
      C       PLACE ORDER FOR IBQ UNITS
            CALL ENTER(JTIME,2,N,IBQ,0)
            NPPT=NORDPT(N)
      C       UPDATE STATUS STATISTICS
            IOBLIG=FLOAT(IOBLIG)+FLOAT(IBQ)*UCOST(N)
            INVDUE(N)=INVDUE(N)+IBQ
             DVORD=FLOAT(IBQ)*UCOST(N)
             IF(ITIME .LE. 0) GO TO 100
            CALL CUM(IORDER,IBQ,N)
            DVORD=FLOAT(IBQ)*UCOST(N)
            IF(DVORD .GE. CSTBRK) CALL CUM(ILGORD,IBQ,N)
            IF(DVORD .LT. CSTBRK) CALL CUM(ISMORD,IBQ,N)
             GO TO 200
        100  IDVORD=IFIX(DVORD)
             IF(DVORD .GE. CSTBRK) GO TO 150
             IBOPSM(1)=IBOPSM(1) + 1
             IBOPSM(2)=IBOPSM(2) + IBQ
             IBOPSM(3)=IBOPSM(3) + IDVORD
             GO TO 200
        150  IBOPLG(1)=IBOPLG(1) +1
             IBOPLG(2)=IBOPLG(2) + IBQ
             IBOPLG(3)=IBOPLG(3) + IDVORD
        200  CONTINUE
      C       ARE ANY OTHER ORDERS OUTSTANDING ON THIS ITEM
            IF(NORDPT(N).GT.0) GO TO 11
            JPRIOR(NLOC)=0
            GO TO 12
      C       UPDATE ORDER REFERENCE DATA
         11 JPRIOR(NLOC)=NORDPT(N)
      C       SET ORDER POINTER
```

```
550          12 NORDPT(N)=NLOC
560             IF(IDBUG.NE.1) GO TO 20
570             WRITE(6,8000)N,IBQ,NORDPT(N),NPPT,NLOC
580       8000 FORMAT(7H ORDER ,I26,718)
590          20 CONTINUE
600             RETURN
610             END
620       $       ENDJOB
```

Subroutine: OUT

Function:

This routine produces a report of performance statistics which summarize results for the entire simulation run.

Description:

Subroutine OUT first updates the variables INVOH (I,1) and INVDAY (I,1) to record last quarter statistics, that is, results for period ITINV.

Subroutine OUT then produces 9 summary tables which describe the quarter by quarter activity observed during the simulation run. The tables appear in three separate formats, and each format is repeated with the performance statistics reported in terms of the number of actions that occurred, the number of units effected, and the total dollar value of these units, respectively.

At the bottom of each table the average per year for the simulation is printed. This value is obtained by totalling the quarter by quarter results within the same column, and dividing this total by the number of years that were simulated.

```
$       IDENT   WP0287,ADDSC-CALLAHAN
$       FORTV   DECK
$       PRMFL   C*,W,S,REQS/OUT.O
$       REMOTE  P*,AC
$       REMOTE  $$,AC
C               SUBROUTINE OUT
      SUBROUTINE OUT
      DIMENSION ITOTL(23,3),AVEVR(23)
       COMMON/INQTR/INQTR
      COMMON/ITIME/ITIME
      COMMON/ITYEAR/ITYEAR
      COMMON/ITINV/ITINV
      COMMON/INVACT/INVACT(50)
      COMMON/NDENT/NDENT(50)
       COMMON/NREPL/NREPL
      COMMON/NITEM/NITEM
      COMMON/IBOP/IBOPOH(3),IBOPOR(3)
      COMMON/IBACKI/IBACKI(30,3)
      COMMON/IBACKT/IBACKT(30,3)
      COMMON/IBAKDI/IBAKDI(30,3)
      COMMON/IBAKDT/IBAKDT(30,3)
      COMMON/ICANCL/ICANCL(30,3)
      COMMON/IDISPS/IDISPS(30,3)
      COMMON/IEXPED/IEXPED(30,3)
      COMMON/IFILLI/IFILLI(30,3)
      COMMON/IFILLT/IFILLT(30,3)
      COMMON/IORDER/IORDER(30,3)
      COMMON/INVDAY/INVDAY(30,3)
      COMMON/INVOH/INVOH(30,3)
      COMMON/INVOR/INVOR(30,3)
      COMMON/IRATON/IRATON(30,3)
      COMMON/IRECET/IRECET(30,3)
      COMMON/IREQC /IREQC(30,3)
      COMMON/IREQI /IREQI(30,3)
      COMMON/IREQT/IREQT(30,3)
      COMMON/IRETRN/IRETRN(30,3)
      COMMON/ISHIPI/ISHIPI(30,3)
      COMMON/ISHIPT/ISHIPT(30,3)
      COMMON/ITERM /ITERM(30,3)
C
C          TIDY UP LAST PERIOD STATISTICS
C
```

```
440             I=ITINV
450             INVDAY(I,1)=0
460             INVOH(I,1)=0
470             DO 500 N=1,NITEM
480             IF(NDENT(N).LT.0) GO TO 500
490             INVOH(I,1)=INVOH(I,1)+1
500             IF(INVACT(N).LE.0) GO TO 500
510             INVDAY(I,1)=INVDAY(I,1)+1
520         500 CONTINUE
530             R=FLOAT(ITIME)/FLOAT(ITYEAR)
540       C
550              RN=R/FLOAT(NITEM)/FLOAT(NREPL)
560             DO 201 I=1,23
570             DO 201 J=1,3
580             AVEYR(I)=0.
590         201 ITOTL(I,J)=0
600             J=1
610           2 CONTINUE
620             ASSIGN 41 TO ISW
630           1 IF(J.GT.3) GO TO 900
640             WRITE(6,100)
650             WRITE(6,102)
660             WRITE(6,103)
670             WRITE(6,102)
680             GO TO(10,20,30),J
690          10  RITE(6,104)
700             GO TO 40
710          20  RITE(6,106)
720             GO TO 40
730          30  RITE(6,107)
740          40  O TO ISW,(41,51,52)
750          41  RITE(6,105)
760              RITE(6,108)
770              RITE(6,109)
780              RITE(6,110)
790             WRITE(6,121)IBOPOH(J),IBOPOR(J)
800              DO 50 I=1,INQTR
810             ITOTL(1,J)=ITOTL(1,J)+INVOH(I,J)
820             ITOTL(2,J)=ITOTL(2,J)+INVOR(I,J)
830             ITOTL(3,J)=ITOTL(3,J)+IRECET(I,J)
840             ITOTL(4,J)=ITOTL(4,J)+IRETRN(I,J)
850             ITOTL(5,J)=ITOTL(5,J)+ISHIPT(I,J)
860             ITOTL(6,J)=ITOTL(6,J)+ISHIPI(I,J)
870             ITOTL(7,J)=ITOTL(7,J)+IORDER(I,J)
880             ITOTL(8,J)=ITOTL(8,J)+IREQT(I,J)
890             ITOTL(9,J)=ITOTL(9,J)+IREQC(I,J)
900             ITOTL(10,J)=ITOTL(10,J)+IREQI(I,J)
910          50 WRITE(6,120) I,INVOH(I,J),INVOR(I,J),IRECET(I,J),IRETRN(I,
920            CT(I,J),ISHIPI(I,J),IORDER(I,J),IREQT(I,J),IREQC(I,J),IREQ
930              RITE(6,110)
```

```
      RITE(6,202) (ITOTL(I,J),I=1,10)
  202 FORMAT(1H0,8H*TOTALS*,I10,9(2X,I10))
      DO 203 I=1,10
  203 AVEYR(I)=FLOAT(ITOTL(I,J))/R
      RITE(6,204) (AVEYR(I),I=1,10)
  204 FORMAT(1H0,6HAVE/YR,1X,10(3X,F9.0))
      DO 305 I=1,10
  305 AVEYR(I)=FLOAT(ITOTL(I,J))/RN
      RITE(6,306)(AVEYR(I),I=1,10)
  306 FORMAT(1H0,6HAVE/IY,1X,10(3X,F9.2))
      ASSIGN 51 TO ISW
      GO TO 1
   51 RITE(6,111)
      RITE(6,112)
      WRITE(6,67)
      DO 57 I=1,INQTR
      ITOTL(11,J)=ITOTL(11,J)+IEXPED(I,J)
      ITOTL(12,J)=ITOTL(12,J)+IRATON(I,J)
      ITOTL(13,J)=ITOTL(13,J)+IDISPS(I,J)
      ITOTL(14,J)=ITOTL(14,J)+ITERM(I,J)
   57 RITE(6,113) I,IEXPED(I,J),IRATON(I,J),IDISPS(I,J),ITERM(I
      RITE(6,67)
      RITE(6,205)(ITOTL(I,J),I=11,14)
  205 FORMAT(1H0,31X,8H*TOTALS*,4(2X,I10))
      DO 206 I=11,14
  206 AVEYR(I)=FLOAT(ITOTL(I,J))/R
      WRITE(6,207) (AVEYR(I),I=11,14)
  207 FORMAT(1H0,33X,7HAVE/YR ,4(3X,F9.0))
      DO 315 I=11,14
  315 AVEYR(I)=FLOAT(ITOTL(I,J))/RN
      WRITE (6,316)(AVEYR(I),I=11,14)
  316 FORMAT(1H0,33X,6HAVE/IY,4(3X,F9.2))
      ASSIGN 52 TO ISW
      GO TO 1
   52 RITE(6,114)
      RITE(6,115)
      RITE(6,116)
      RITE(6,68)
      DO 58 I=1,INQTR
      IF(IREQT(I,J).LE.0) GO TO 62
      T1=FLOAT(IFILLT(I,J))/FLOAT(IREQT(I,J))
      GO TO 63
   62 T1=0.
   63 CONTINUE
      IF(IREQI(I,J).LE.0) GO TO 64
      T2=FLOAT(IFILLI(I,J))/FLOAT(IREQI(I,J))
      GO TO 65
   64 CONTINUE
      T2=0.
   65 CONTINUE
      ITOTL(15,J)=ITOTL(15,J)+IBACKT(I,J)
      ITOTL(16,J)=ITOTL(16,J)+IBACKI(I,J)
```

```
1460          ITOTL(17,J)=ITOTL(17,J)+IBAKDT(I,J)
1470          ITOTL(18,J)=ITOTL(18,J)+IBAKDI(I,J)
1480          ITOTL(19,J)=ITOTL(19,J)+INVDAY(I,J)
1490          ITOTL(20,J)=ITOTL(20,J)+IFILLT(I,J)
1500          ITOTL(21,J)=ITOTL(21,J)+IFILLI(I,J)
1510       58 WRITE(6,117) I,IBACKT(I,J),IBACKI(I,J),IBAKDT(I,J),IBAKDI
1520         CINVDAY(I,J),IFILLT(I,J),IFILLI(I,J),T1,T2
1530          WRITE(6,68)
1540          WRITE(6,208) (ITOTL(I,J),I=15,21)
1550      208 FORMAT(1H0,8X,8H*TOTALS*,1X,7(I10,2X))
1560          DO 209 I=15,21
1570      209 AVEYR(I)=FLOAT(ITOTL(I,J))/R
1580          AVEYR(22)=FLOAT(ITOTL(20,J))/FLOAT(ITOTL(8,J))
1590          AVEYR(23)=FLOAT(ITOTL(21,J))/FLOAT(ITOTL(10,J))
1600      210 FORMAT(1H0,9X,7HAVE/YR   ,7F12.0,2F14.3)
1610          WRITE(6,210) (AVEYR(I),I=15,23)
1620           DO 325 I=15,23
1630      325   AVEYR(I)=FLOAT(ITOTL(I,J))/RN
1640           WRITE(6,329)(AVEYR(I),I=15,23)
1650      329   FORMAT(1H0,9X,6HAVE/IY,7F12.2,2F14.3)
1660          J=J+1
1670          GO TO 2
1680       67 FORMAT(1H ,35X,2H--,2X,4(12H     --------))
1690       68 FORMAT(1H ,11X,2H--,2X,7(12H     --------),2(14H     ------
1700      100 FORMAT(1H1,/,/,/,/)
1710      101 FORMAT(1H ,/,/)
1720      102 FORMAT(1H ,43X,44(1H-))
1730      103 FORMAT(1H ,43X,44HP E R F O R M A N C E   S T A T I S T I
1740      104 FORMAT(1H ,/,/,54X,25H***   ACTIONS/FSN@S   ***,/)
1750      105 FORMAT(1H0,69X,10HPRIORITY 1)
1760      107 FORMAT(1H ,/,/,56X,19H$$$   DOLLARS   $$$)
1770      106 FORMAT(1H ,/,/,56X,17H...   UNITS   ...)
1780      108 FORMAT(1H ,10X,21HINVENTORY   INVENTORY,28X,67HTOTAL      I
1790         C    ORDERS      TOTAL        REQS     PRIORITY 1)
1800      109 FORMAT(1H ,128HPERIOD     ON HAND    ON ORDER    RECEIPTSI
1810         CNS     SHIPMENTS   SHIPMENTS    PLACED   REQUISITIONS  CAI
1820         CEQUISITIONS)
1830      110 FORMAT(1H ,2X,2H--,2X,10(4X,8(1H-)))
1840      111 FORMAT(1H0,54X,9HRATIONING)
1850      112 FORMAT(1H ,33X,57HPERIOD   EXPEDITES    ACTIONS     DISPOI
1860         CMINATIONS)
1870      113 FORMAT(1H ,35X,I2,2X,4(4X,I8))
1880      114 FORMAT(1H0,44X,20HTOTAL     PRIORITY 1)
1890      115 FORMAT(1H ,20X,108HTOTAL     PRIORITY 1  BACKORDER   BACKI
1900         CINVENTORY    TOTAL     PRIORITY 1   TOT FILLS     PRI 1 FI
1910      116 FORMAT(1H ,9X,120HPERIOD   BACKORDERS  BACKORDERS     DAYS
1920         CDAYS        DAYS       FILLS       FILLS        /TOT REG I
1930         CI REGS)
1940      117 FORMAT(1H ,11X,I2,2X,7(4X,I8),2(4X,F10.2))
1950      120 FORMAT(1H ,2X,I2,2X,10(4X,I8))
1960      121 FORMAT(1H ,1X,3HBOP,2X,2(4X,I8))
1970          RETURN
1980          END
1990          SUBROUTINE
```

Subroutine: OUTCST

Function:

This routine prints a summary of ordering activity observed during the simulation run.

Description:

This routine prints a summary table describing the number of order actions taken, the number of units effected, and the total dollar value of these orders. The results are segregated in terms of "small ordering actions" and "large ordering actions". A small ordering action is defined as an order whose total dollar value is less than CSTBRK dollars.

Finally, subroutine OUTCST prints averages per year of each of the statistics presented.

OUTCST
p. 1 of 2

```
      SUBROUTINE OUTCST
       COMMON/NITEM/NITEM
       COMMON/NREPL/NREPL
       COMMON/INQTR/INQTR
      COMMON/ISMORD/ISMORD(30,3)
      COMMON/ILGORD/ILGORD(30,3)
       COMMON/COSORD/COSORD(3)
      COMMON/IBOPCT/IBOPSM(3),IBOPLG(3)
      COMMON/CSTBRK/CSTBRK
      DIMENSION IDUM(3),ITOT(9)
      LW=6
       CORDSM=COSORD(1)
       CORDLG=COSORD(2)
      DO 1 I=1,9
    1 ITOT(I)=0
      WRITE(LW,100)
      WRITE(LW,200)
      WRITE(LW,800) CORDSM,CORDLG
      WRITE(LW,300)
      IDUM(1)=IBOPSM(1) + IBOPLG(1)
      IDUM(2)=IBOPSM(2) + IBOPLG(2)
      IDUM(3)=IBOPSM(3) + IBOPLG(3)
      WRITE(LW,700) IBOPSM,IBOPLG,IDUM
       DO 2 I=1,INQTR
      DO 3 J=1,3
      K=J + 3
      L=J + 6
      IDUM(J)=ISMORD(I,J) + ILGORD(I,J)
      ITOT(J)=ITOT(J) + ISMORD(I,J)
      ITOT(K)=ITOT(K) + ILGORD(I,J)
    3 ITOT(L)=ITOT(L) + IDUM(J)
    2 WRITE(LW,400) I,(ISMORD(I,J),J=1,3),(ILGORD(I,K),K=1,3),IDUM
      WRITE(LW,500) ITOT
      TOTSM=FLOAT(ITOT(1))*CORDSM
      TOTLG=FLOAT(ITOT(4))*CORDLG
      TOT=TOTSM + TOTLG
      WRITE(LW,600) TOTSM,TOTLG,TOT
      WRITE(LW,900) CSTBRK
       RN=FLOAT(NITEM*NREPL)
       TOTSM=TOTSM/RN
       TOTLG=TOTLG/RN
       TOT=TOTSM+TOTLG
       WRITE(LW,605)
  605  FORMAT(//T10,'AVERAGE COST/ITEM/YR')
       WRITE(6,600)TOTSM,TOTLG,TOT
  100 FORMAT(1H1,44X,'*****      ORDER COST STATISTICS      *****')
  200 FORMAT(1H0,'TIME',10X,'SMALL ORDERS',18X,'LARGE ORDERS',18X,'TOTAL
     1 ORDERS')
  300 FORMAT(1H0,3X,3(4X,'NUMBER      UNITS    DOLLARS'))
  400 FORMAT(1H ,I3,4X,3(I6,I10,I10,4X))
  500 FORMAT(1H0,'TOTALS',1X,3(I6,I10,I10,4X))
  600 FORMAT(1H0,'SMALL ORDER COST ',E15.8,' PLUS LARGE ORDER COST ',E15
```

)1 04-16-77 12.087

OUTCST
p 2

```
     1,8,' EQUALS TOTAL ORDER COST ',E15.8)
 700 FORMAT(1H0,'BOP',4X,3(I6,I10,I10,4X))
 800 FORMAT(1H0,'COST TO ORDER',4X,F6.2,24X,F6.2)
 900 FORMAT(1H0,'EOQ BUY DOLLAR BREAK POINT ',F10.2)
     RETURN
     END
```

Subroutine: PLOTR

Function:

This routine plots peformance statistics verses time for several performance measures.

Description:

This routine calls subroutine GP to produce four separate types of plots. These are:

a. Requisitions, cancellations, and disposals by quarter.

b. On-hand, on-order, and backordered stock by quarter. Aggregate pipeline stock is also plotted, where aggregate stock equals on-hand plus on-order stocks.

c. Requisitions, fills, backorders, and cancellations by quarter.

d. Cumulative budgeted expenditures and cumulative obligations (i.e., dollar value of orders placed) by quarter.

02-11-77 11.691

PLOTR,
P. 1 of 2

```
      SUBROUTINE PLOTP
      COMMON /INVOH/INVOH(30,3)
      COMMON /INVOR/INVOR(30,3)
      COMMON /IBACKT/IBACKT(30,3)
      COMMON /ICANCL/ICANCL(30,3)
      COMMON/IDISPS/IDISPS(30,3)
      COMMON /IREQT/IREQT(30,3)
      COMMON /IFILLT/IFILLT(30,3)
      COMMON /IREQC/IREQC(30,3)
      COMMON /IRAUTH/IRAUTH(12)
      COMMON /IORDER/IORDER(30,3)
      DIMENSION X(31),Y(31,4),PLT(50,100),A(4)
      DIMENSION RMEAS(3)
      DATA (RMEAS(I),I=1,3)/6HDSNS  ,6HUNITS ,6HDOLLRS/
      DATA CH/1HH/,CO/1HO/,CB/1HB/,CA/1HA/,CR/1HR/,CF/1HF/,CC/1HC/
      DATA CD/1HD/
      X(31)=0.
      DO 5 I=1,4
    5 Y(31,I)=0.
      A(1)=CR
      A(2)=CC
      A(3)=CD
      DO 110 J=1,3
      WRITE(6,3)
      WRITE(6,8006) RMEAS(J)
      WRITE(6,8040)
 8040 FORMAT(10X,16HREQUISITIONS = R,5X,17HCANCELLATIONS = C,5X,13HDISPO
     1SALS = D)
      DO 105 I=1,30
      X(I)=FLOAT(I)
      Y(I,1)=FLOAT(IREQT(I,J))
      Y(I,2)=FLOAT(ICANCL(I,J))
      Y(I,3)=FLOAT(IDISPS(I,J))
  105 CONTINUE
      CALL GP(X,Y,0,16,31,3,100,40,A,PLT)
  110 CONTINUE
      A(1)=CH
      A(2)=CO
      A(3)=CB
      A(4)=CA
      DO 10 J=1,3
      DO 20 I=1,30
      Y(I,1)=FLOAT(IHVOH(I,J))
      Y(I,2)=FLOAT(INVOR(I,J))
      Y(I,3)=FLOAT(IBACKT(I,J))
   20 Y(I,4)=FLOAT(IHVOH(I,J))+FLOAT(INVOR(I,J))
      WRITE (6,3)
      WRITE(6,8010)
      WRITE(6,8000)RMEAS(J)
 8010 FORMAT(10X,11HON-HAND = H,5X,12HON-ORDER = O,5X,14HBACKORDERS = B,
     15X,13HAGGREGATE = A)
   10 CALL GP(X,Y,0,16,31,4,100,40,A,PLT)
```

```
      A(1)=CR
      A(2)=CF
      A(3)=CR
      A(4)=CC
      DO 30 J=1,3
      Y(1,1)=FLOAT(IREJT(1,J))
      Y(1,2)=FLOAT(IFILLT(1,J))
      Y(1,3)=FLOAT(IBACKT(1,J))
      Y(1,4)=FLOAT(ICANCL(1,J))
      DO 40 I=2,30
      Y(I,1)=FLOAT(IREJT(I,J))+Y(I-1,1)
      Y(I,2)=FLOAT(IFILLT(I,J))+Y(I-1,2)
      Y(I,3)=FLOAT(IBACKT(I,J))+Y(I-1,3)
   40 Y(I,4)=FLOAT(ICANCL(I,J))+Y(I-1,4)
      WRITE (6,3)
      WRITE(6,8020)
      WRITE(6,8000)RMEAS(J)
 8020 FORMAT(10X,16HREJECTIONS = R,5X,9HFILLS = F,5X,14HBACKORDERS = B
     1,5X,17HCANCELLATIONS = C)
   30 CALL GP(X,Y,0,16,31,4,100,40,A,PLT)
      A(1)=CB
      A(2)=CO
      I=3
      Y(1,1)=FLOAT(IBACKH(1))
      Y(1,2)=FLOAT(IORDER(1,J))
      DO 60 I=2,30
      KK=((I-1)/4)+1
      IBI=0
      DO 70 K=1,KK
   70 IBI=IBI+IBACKH(K)
      Y(I,1)=FLOAT(IBI)
   60 Y(I,2)=FLOAT(IORDER(I,J))+Y(I-1,2)
      WRITE (6,3)
      WRITE(6,8030)
      WRITE(6,8000)RMEAS(J)
 8030 FORMAT(10X,10HBUDGET = B,5X,10HORDERS = O)
   50 CALL GP(X,Y,0,16,31,2,100,40,A,PLT)
    3 FORMAT('1')
 8000 FORMAT('0','MEASURED IN ...',A6)
      RETURN
      END
```

Subroutine: RANDU

Function:

This routine generates uniformally distributed random numbers on the interval 0. to 1.0.

Description:

This routine uses the congruential method to generate pseudo-random numbers. A call of the form

CALL RANDU (X)

where X is negative, causes the random number seed to be set to the absolute value of X. If X is positive, X has no effect on the calculation.

12-11-77 10.717 RANDU--U(0,1) RANDOM NUMBER GENERATOR.

```
C                RANDU--U(0,1) RANDOM NUMBER GENERATOR.
      FUNCTION RANDU(X)
C                A CALL WITH X < 0. INITIALIZES THE RANDOM NUMBER STREAM.
      IF(X) 10,20,20
   20 RN=RHO*RANDU
      RN1=AMOD(RN,RN)
      RANDU=RN1/RN
      RETURN
   10 RHO=7.**13
      RN=10.**10
      RANDU=-X
      GO TO 20
      END
```

Subroutine: RECEIV

Function:

This routine updates stock status records to reflect the receipt of a replenishment order (event type 2) from a supplier of inventory system.

Description:

This routine updates stock status records to reflect the receipt of an order for IQTY units of item N during the current period. The routine then initiates shipment actions to fill any outstanding backorders.

By convention, order histories are maintained for each item in the form of a string-list ordered from the newest to the oldest outstanding order. When an outstanding order is received, this string must be updated to drop the last element on the string (orders are assumed not to cross). The variable NORDPT (N) indicates the position in the Future Events List of the most recent order for item N. Beginning with this record, the routine searches down the order string to locate the oldest order. The last record on this string is the oldest order placed.

By convention, orders are terminated by setting the order quantity to zero and removing the order transaction from the Future Events List at the regular due-in time.

RECEIV, p. 1 of 2

```
      SUBROUTINE RECEIV(N,IQTY)
C       THIS ROUTINE UPDATES STOCK STATUS RECORDS TO REFLECT RECEIPT
C       OF AN ORDER FOR IQTY UNITS OF ITEM N DURING PERIOD I.
C       THE ROUTINE THEN INITIATES SHIPMENT ACTIONS TO FULFILL
C       OUTSTANDING BACKORDERS IF ANY.
      COMMON/IDBUG/IDBUG
      COMMON/NLOCBK/NLOCBK
      COMMON/IRECET/IRECET(30,3)
      COMMON/ISHIPI/ISHIPI(30,3)
      COMMON/ISHIPT/ISHIPT(30,3)
      COMMON/JPRIOR/JPRIOR(500)
      COMMON/IQTYB/IQTYB(200)
      COMMON/IPRIOR/IPRIOR(200)
      COMMON/NBOTU/NBOTU(50)
      COMMON/ILOCBK/ILOCBK(200)
      COMMON/NORDPT/NORDPT(50)
      COMMON/INVACT/INVACT(50)
      COMMON/INVDUE/INVDUE(50)
      COMMON/NBOPT/NBOPT(50)
      COMMON/ISUL/ISUL(50)
      COMMON/IBACPT/IBACPT(200)
C       ---NOTE---
C       BY CONVENTION ORDER HISTORIES ARE MAINTAINED FOR EACH ITEM IN
C       THE FORM OF A STRING LIST ORDERED FROM THIS NEWEST TO THE
C       OLDEST OUTSTANDING ORDER. WHEN AN OUTSTANDING ORDER IS RECEIVED,
C       THIS STRING MUST BE UPDATED TO DROP THE LAST ELEMENT ON THE
C       STRING(ORDERS ARE ASSUMED NOT TO CROSS).  THE NEXT FEW STATEMENT
C       ACCOMPLISH THIS UPDATE.
      NPT=NORDPT(N)
C       IS THIS THE ONLY OUTSTANDING ORDER FOR THIS ITEM
      IF(JPRIOR(NPT).NE.0) GO TO 10
C       SET POINTS TO INDICATE THERE IS NO LONGER AN OUTSTANDING ORDER
      NORDPT(N)=0
      GO TO 15
C       SET POINTERS TO SEARCH DOWN ORDER STRING
   10 NPP=NPT
      NPT=JPRIOR(NPP)
C       IS NPT THE OLDEST OUTSTANDING ORDER
      IF(IDBUG.NE.1) GO TO 12
      WRITE(6,991)NPP,NPT
   12 CONTINUE
  991 FORMAT(1H ,13HLOOP ENTERED-,7HJPRIOR=,I4,4HNPT=,I2)
      IF(JPRIOR(NPT).NE.0) GO TO 10
C       THEN NPT IS THE ORDER JUST RECEIVED, REMOVE THE RECORD FROM THE
C       END OF THE ORDER STRING
      JPRIOR(NPP)=0
C       BY CONVENTION ORDERS ARE TERMINATED BY SETTING THE ORDER
C       QUANTITY TO ZERO AND REMOVING THE ORDER TRANSACTION FROM THE
C       FUTURE EVENTS LIST AT THE REGULAR DUE-IN TIME.
C
C       HAS THIS ORDER BEEN TERMINATED.
   15 IF(IQTY.EQ.0) RETURN
```

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RECEIV, p. 2 of 2

```
C               ADJUST GROSS RECEIPT STATISTICS
      JQTY=-IQTY
      CALL CUM(IRECET,IQTY,N)
C       ADJUST ASSETS FOR THIS ITEM
      INVACT(N)=INVACT(N)+IQTY
      INVDUE(N)=INVDUE(N)-IQTY
C       ARE THERE ANY BACKORDERS ON THIS ITEM.
      IF(NBOPT(N).LE.0) RETURN
      CALL FILLBO(N)
      RETURN
      END
```

Subroutine: REMOVE

Function:

This routine removes the earliest transaction from the Future Events List, and updates the chain list structure.

Description:

This routine determines the "current" event to be simulated within INSSIM. For a detailed description of the event bookkeeping process, see Volume I, Chapter IV.

REMOVE
p. 1 of 1

```
      SUBROUTINE REMOVE(KTIME,KTYPE,KESN,KQTY,KPRIOR)
C        THIS ROUTINE REMOVES THE EARLIEST TRANSACTION FROM THE
C        CURRENT EVENTS CHAIN, AND UPDATES THE CHAIN STRUCTURE
      COMMON/IDBUG/IDBUG
      COMMON/NENTRY/NENTRY
      COMMON/NFIRST/NFIRST
      COMMON/NTIME/NTIME
      COMMON/ILOCFE/ILOCFE(500)
      COMMON/JFSN/JFSN(500)
      COMMON/JPOINT/JPOINT(500)
      COMMON/JPRIOR/JPRIOR(500)
      COMMON/JQTY/JQTY(500)
      COMMON/JTIME/JTIME(500)
      COMMON/JTYPE/JTYPE(500)
      K=NFIRST
      KTIME=JTIME(K)
      KTYPE=JTYPE(K)
      KESN=JFSN(K)
      KQTY=JQTY(K)
      KPRIOR=JPRIOR(K)
      NFIRST=JPOINT(K)
      NTIME=JTIME(NFIRST)
      IF(IDBUG.NE.1) GO TO 25
      WRITE(6,8000)KTIME,KTYPE,KESN,KQTY,KPRIOR,K
 8000 FORMAT(7H REMOVE,I10,5I8)
   25 CONTINUE
C        IS THIS THE LAST TRANSACTION ON THE LIST
      IF(NENTRY.GT.1) GO TO 19
C        SET LIST CLOCK UP A LARGE INCREMENT
      NTIME=9999999
C        RECORD LOCATION K AS AVAILABLE
   19 ILOCFE(NENTRY)=K
C        DECREMENT COUNT OF LIST ENTRIES
      NENTRY=NENTRY-1
      RETURN
      END
```

AD-A046 053 DECISION SYSTEMS DAYTON OH F/G 15/5
THE INVENTORY SYSTEM SIMULATOR (INSSIM). VOLUME II PROGRAM LIST--ETC(U)
AUG 77 W S DEMMY F49620-77-C-0063
UNCLASSIFIED RM-77-03 AFOSR-TR-77-1235 NL

2 OF 2
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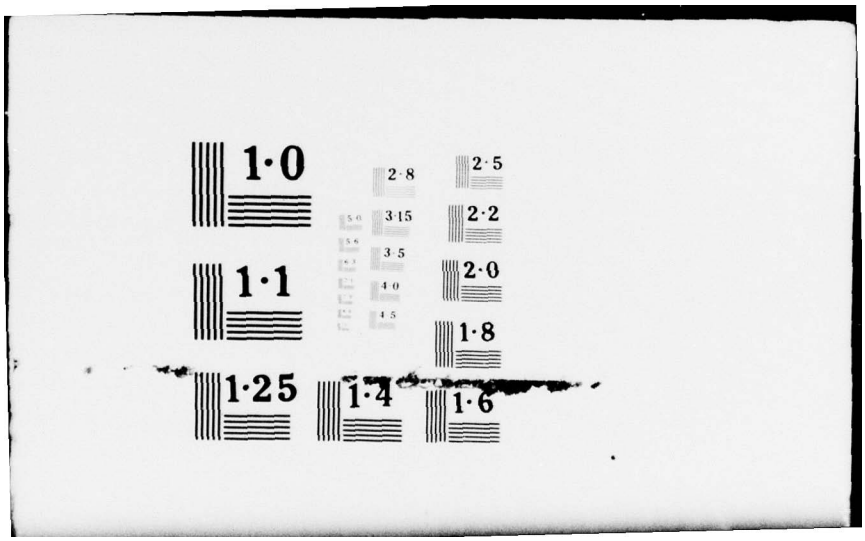
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Subroutine: REQ

Function:

This routine reflects the receipt of a customer requisition (event type 1), and associated shipping and/or backorder actions.

Description: This routine is called a statement of the form

CALL REQ (N, IQTY, IPRI, LTIME)

Where

N = item number associated with the current requisition event

IQTY = quantity associated with this requisition

IPRI = the priority of the requisition, where IPRI = 1 denotes a high priority requisition, and IPRI = 2 denotes a low priority requisition

LTIME = the time of receipt of the current requisition

First, the subroutine REQ updates the accumulators NDEMAC (N) and NREQAC (N). Next, the routine attempts to ship on hand assets to fill this requisition. For low priority requisitions (i.e. requisitions with a priority code = 2) units are shipped until on hand stock reaches the support level for the item. For high priority requisitions, shipments are made until on hand stock is reduced to zero.

If there is insufficient stock to completely satisfy the requisition, subroutine ENTERB is called to record a backorder for this item.

At the conclusion of the routine, subroutine CUM is called to update shipping and fillrate statistics.

REQ, p. 1 of 2

```
      SUBROUTINE REQ(N,IQTY,IPRI,LTIME)
C       THIS ROUTINE REFLECTS PROCESSING OF A REQUISITION FOR IQTY
C       UNITS OF ITEM N DURING PERIOD I,WHERE IPRI=1 DENOTES A HIGH
C       PRIORITY REQUISITION; IPRI=2 DENOTES A LOW PRIORITY REQUISITION
C       JTIME DENOTES THE CLOCK TIME THE REQ WAS RECEIVED
C       RECORD REQUISITION DATA
      COMMON/REQSIZ/REQSIZ(50)
      COMMON/REQMAD/REQMAD(50)
      COMMON/NDEMAC/NDEMAC(50)
       COMMON/NREQAC/NREQAC(50)
      COMMON/IREQI /IREQI(30,3)
      COMMON/IREQT/IREQT(30,3)
      COMMON/INVACT/INVACT(50)
      COMMON/ISUL/ISUL(50)
      COMMON/ISHIPI/ISHIPI(30,3)
      COMMON/ISHIPT/ISHIPT(30,3)
      COMMON/IFILLT/IFILLT(30,3)
      COMMON/IFILLI/IFILLI(30,3)
      COMMON/NBOTU/NBOTU(50)
      CALL CUM(IREQI,IQTY,N)
C       IS THIS A PRIORITY 1 REQ
      IF(IPRI.NE.1) GO TO 20
      CALL CUM(IREQI,IQTY,N)
C       UPDATE DEMAND ACCUMULATOR AND EXPONENTIALLY SMOOTHED
   20 NDEMAC(N)=NDEMAC(N)+IQTY
       NREQAC(N)=NREQAC(N)+1
C       IS THERE ANY STOCK ON HAND
      IF(INVACT(N).GT.0) GO TO 40
C       PUT THIS REQUISITION IN BACKORDER STATUS
      CALL ENTERB(N,IQTY,IPRI,LTIME)
C       UPDATE BACKORDER STATISTICS
      NBOTU(N)=NBOTU(N)+IQTY
      RETURN
C       SET ITEST=STOCK REMAINING IF THE ORDER WERE FILLED COMPLETELY
   40 ITEST=INVACT(N)-IQTY
C       IS ITEST ABOVE THE SUPPORT LEVEL
      IF(ITEST.GT.ISUL(N)) GO TO 80
C       IS THIS REQ PRIORITY 1
      IF(IPRI.NE.1) GO TO 60
C       CAN THE REQUISITION BE COMPLETELY SATISFIED FROM STOCK ON-HAND
      IF(INVACT(N).GE.IQTY) GO TO 60
C       SHIP ALL REMAINING ON-HAND STOCK IN PARTIAL FULFILLMENT
C       OF THIS REQUISITION
      IQTYS=INVACT(N)
C       COMPUTE QUANTITY TO BE BACKORDERED AND UPDATE PRI-1 STATS
      IBK=IQTY-IQTYS
      CALL CUM(ISHIPI,IQTYS,N)
      CALL CUMB(IFILLI,IQTYS,N)
      GO TO 65
C       ARE ON-HAND ASSETS ABOVE THE SUPPORT LEVEL
   60 IF(INVACT(N).LE.ISUL(N)) GO TO 70
C       SHIP DOWN TO THE SUPPORT LEVEL
```

REQ (CONTINUED)
p 2 of 2

```
      IQTYS=INVACT(N)-ISUL(N)
C       BACKORDER THE REMAINING QUANTITY
      IBK=IQTY-IQTYS
   65 CALL ENTERB(N,IBK,IPRI,LTIME)
C       UPDATE STOCK STATUS RECORDS
      INVACT(N)=INVACT(N)-IQTYS
      NBOTU(N)=NBOTU(N)+IBK
C       UPDATE GROSS PERFORMANCE STATISTICS
      JQTYS=-IQTYS
      CALL CUM(ISHIPT,IQTYS,N)
      CALL CUMB(IFILLT,IQTYS,N)
      RETURN
   70 CONTINUE
C        BACKORDER ENTIRE REQUISITION
      CALL ENTERB(N,IQTY,IPRI,LTIME)
C        UPDATE STOCK STATUS RECORDS
C        UPDATE STOCK STATUS RECORDS
      NBOTU(N)=NBOTU(N)+IQTY
      RETURN
C       SHIP TO FILL THE ENTIRE REQUISITION
   80 IQTYS=IQTY
C       UPDATE THE STOCK STATUS RECORDS
      INVACT(N)=INVACT(N)-IQTYS
C       UPDATE PERFORMANCE
      JQTYS=-IQTYS
      CALL CUM(ISHIPT,IQTYS,N)
      CALL CUM(IFILLT,IQTYS,N)
C       IS THIS A PRIORITY 1 REQUISITION
      IF(IPRI.NE.1) GO TO 85
C       UPDATE PRIORITY 1 STATISTICS
      CALL CUM(ISHIPI,IQTYS,N)
      CALL CUM(IFILLI,IQTYS,N)
   85 CONTINUE
      RETURN
      END
```

Subroutine: RET

Function:

This routine reflects the receipt of serviceable returns by the supply system (event code = 4).

Description:

First, the accumulator NRETAC (N) is updated to reflect the receipt of IQTY units of item N. Next, the performance statistic IRETRN is updated, and onhand assets INVACT (N) are increased. Finally, subroutine FILLBO is called in an attempt to fill any outstanding backorders.

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RET
p. 1 of 1

```
      SUBROUTINE RET(N,IQTY,ITIME)
      COMMON/NRETAC/NRETAC(1)
      COMMON/IRETRN/IRETRN(30,3)
      COMMON/INVACT/INVACT(1)
      COMMON/NBOPT/NBOPT(1)
*
*       UPDATE SERVICEABLE RETURN ACCUMULATOR
*
      NRETAC(N)=NRETAC(N) + IQTY
*
*       UPDATE AGGREGATE PERFORMANCE STATISTICS
*
      CALL CUM(IRETRN,IQTY,N)
*
*       UPDATE CURRENT ON-HAND ASSETS FOR ITEM N
*
      INVACT(N)=INVACT(N) + IQTY
*
*       ARE THERE ANY BACKORDERS ON THIS ITEM
*
      IF(NBOPT(N) .LE. 0) RETURN
*
*       ELSE REDUCE BACKORDERS BY AMOUNT OF RETURNS
*
      CALL FILLBO(N)
      RETURN
      END
```

Subroutine: SSTAT

Function:

This routine updates time persistent and end of period statistics.

Description:

This routine is called at the end of each simulation week. Subroutine SSTAT first updates the performance statistics INVDAY, IBAKDT, and IBAKDI. These variables record inventory-weeks and backorder week measures.

At the end of each quarter, the routine computes values for the end of period variables INVOH, INVOR, IVACKT, and IBACKI. These variables record the end of period status for on hand stocks, on order stocks, and total backorders and priority 1 backorders. The period counters KEND (which denotes the week number within the quarter) and ITINV (the current quarter number) are also incremented by one at the end of each quarter.

Finally, this routine ends by entering a new type 11 event onto the Future Events List.

```
      $      IDENT   WP8287,ADDSC-CALLAHAN
      $       FORTY   DECK
      $      PRMFL   C*,W,S,REQS/SSTAT.O
      $      REMOTE  P*,AC
      $      REMOTE  $$,AC
            SUBROUTINE SSTAT(KEND)
      C                 SUBROUTINE SSTAT
            COMMON/IDSTAT/IDSTAT
            COMMON/ISTAT/ISTAT
            COMMON/ISTOP/ISTOP
            COMMON/ITIME/ITIME
            COMMON/ITINV/ITINV
            COMMON/ITQTR/ITQTR
            COMMON/NITEM/NITEM
             COMMON/NBMAX/NBMAX
             COMMON/NLOCBK/NLOCBK
            COMMON/INVACT/INVACT(50)
            COMMON/INVDUE/INVDUE(50)
            COMMON/NDENT/NDENT(50)
            COMMON/IBACKI/IBACKI(30,3)
            COMMON/IBACKT/IBACKT(30,3)
            COMMON/IBAKDT/IBAKDT(30,3)
            COMMON/IBAKDI/IBAKDI(30,3)
            COMMON/INVDAY/INVDAY(30,3)
            COMMON/INVOH/INVOH(30,3)
            COMMON/INVOR/INVOR(30,3)
            COMMON/NBOTU/NBOTU(50)
            COMMON/UCOST/UCOST(50)
            I = ITINV
            DO 50 N= 1,NITEM
            IF(NDENT(N).LE.0) GO TO 50
            IF(INVACT(N).LE.0)GO TO 20
            INVDAY(I,1) = INVDAY(I,1) + 1
            INVDAY(I,2) =INVDAY(I,2) + INVACT(N)
            INVDAY(I,3) = INVDAY(I,3) + IFIX(UCOST(N)*FLOAT(INVACT(N))
             GO TO 50
         20 CONTINUE
            IF(NBOTU(N).LE.0)GO TO 50
             NRS=NBOTU(N)
             CALL CUMB(IBAKDT,NRS,N)
             CALL CUMB(IBAKDI,NRS,N)
         50 CONTINUE
      C
```

```
      C              UPDATE REQUISITIONS-SHORT COUNT
      C
            NRS=NBMAX-NLOCBK
            IF(NRS.LE.0) GO TO 60
            IBAKDT(I,1)=IBAKDT(I,1)+NRS
            IBAKDI(I,1)=IBAKDI(I,1)+NRS
         60 CONTINUE
      C
           KP = ITQTR/IDSTAT
           IF(KEND.GE.KP)GO TO 100
           KEND = KEND + 1
           GO TO 200
      C
      C              UPDATE END OF PERIOD STATISTICS
      C
         100 CONTINUE
           DO 150 N=1,NITEM
           IF(NDENT(N).LE.0) GO TO 150
           IF(INVACT(N).GT.0) CALL CUM(INVOH,INVACT(N),N)
           IF(NBOTU(N).GT.0) CALL CUMB(IBACKT,NBOTU(N),N)
            IF(NBOTU(N).GT.0) CALL CUMB(IBACKI,NBOTU(N),N)
           IF(INVDUE(N).GT.0) CALL CUM(INVOR,INVDUE(N),N)
         150 CONTINUE
      C
      C              UPDATE COUNT OF EOP REQUISITIONS SHORT
      C
            NRS=NBMAX-NLOCBK
            IF(NRS.LE.0) GO TO 160
            IBACKT(I,1)=IBACKT(I,1)+NRS
            IBACKI(I,1)=IBACKI(I,1)+NRS
         160 CONTINUE
      C
      C              INCREMENT PERIOD COUNTERS
      C
            KEND=1
            ITINV=ITINV+1
      C
      C              CREATE NEXT STATISTICS COLLECTION EVENT
      C
         200 CONTINUE
           ISTAT = ISTAT + IDSTAT
           CALL ENTER(ISTAT,11,KEND,KEND,KEND)
           RETURN
           END
      $     ENDJOB
```

Subroutine: STATUS

Function:

This routine represents a stock status review event (event type 5).

Description:

First, subroutine STATUS calls subroutine STATN (N) for each item N simulated. STATN compares current on hand and on order stocks to the inventory control levels associated with item N. Finally, subroutine STAT enters a new type 5 event on the Future Events List.

STATUS
p. 1 of 1

```
1  04-16-77   12.098

          SUBROUTINE STATUS
          COMMON/NITEM/NITEM
          COMMON/ITIME/ITIME
          COMMON/ISTOCK/ISTOCK,IDSTOC
          COMMON/NDENT/NDENT(50)
          DO 10 N=1,NITEM
          CALL STATN(N)
1457 DO LOOP INDEX N MAY NOT BE REDEFINED IN CALL OR ABNORMAL FUNCTION
       10 CONTINUE
          IS=ITIME+IDSTOC
          CALL ENTER(IS,5,0,0,0)
          RETURN
          END
```

Subroutine: STATN

Function:

This routine compares the asset position of item N to its precomputed reorder point, termination, and retention levels. It then initiates buy actions according to the models described in AFLC/ACDRL Working Paper 73, March 1974, by Robert J. Stevens.

Description:

This routine is controlled by the code ICDFOR provided at input through file 05. Eight code values are possible; these are defined in detail in AFLC/ACDRL Working Paper 73.

Basically, each of these alternate computations compare available assets to the reorder level, and initiate ordering actions (using subroutine ORDER) if appropriate. The formulas differ in the types of assets which are added together to compare with the reorder level.

At present, termination and disposal actions are not coded into this routine. Consequently, simulation of termination and disposal policies are not presently possible.

STATN, p. 1 of 3

```
      SUBROUTINE STATN(N)
*       THIS ROUTINE COMPARES THE ASSET POSITION OF ITEM N
*       TO ITS PRECOMPUTED REORDER POINT,  AND INITIATES BUYS
*       ACCORDING TO THE MODELS ON SERVICEABLE RETURNS DES, IN FOR576
*
        COMMON/IDBUG/IDBUG
        COMMON/ICDFOR/ICDFOR
      COMMON/ITIME/ITIME
      COMMON/ITMNTH/ITMNTH
        COMMON/NBMAX/NBMAX
        COMMON/NLOCBK/NLOCBK
      COMMON/INVACT/INVACT(50)
      COMMON/INVDUE/INVDUE(50)
      COMMON/IROL/IROL(50)
      COMMON/IRQTY/IRQTY(50)
      COMMON/LTADM/LTADM(50)
      COMMON/LTPROD/LTPROD(50)
      COMMON/NBOTU/NBOTU(50)
      COMMON/SRFOR/SRFOR,SRPLT,GDFOR
*
*       COMPUTE INVENTORY POSITION
*
        NRS=NBMAX-NLOCBK
      INPOS=INVACT(N) + INVDUE(N) - NBOTU(N)
        IF(IDBUG.EQ.1)WRITE(6,8013)INVACT(N),INVDUE(N),NBOTU(N),INPOS,NRS
 8013   FORMAT(4X,'****STATN--UNITS OH=',I5,'  DUE-IN=',
     &          I5,'  BO=',I5,'  INPOS=',I5,'  REQ-SHORT=',I5)
*
*       GO TO ASSIGNED SERVICEABLE RETURN MODEL
*
      GO TO (91,91,92,92,92,92,91,91),ICDFOR
*
   91 CONTINUE
*
*       MODELS 1,2,7 AND 8 FOR SERVICEABLE RETURNS
*
*       IS INVENTORY POSITION ON OR BELOW REORDER POINT
*
      IEOQ=IRQTY(N)
      INVPOS=INPOS
   99 IF(INVPOS .GT. IROL(N)) RETURN
*
*       COMPUTE TOTAL BUY QUANTITY (EOQ + ROLDF)
*
   97 IBQ=IEOQ + (IROL(N) - INVPOS)
*
*        COMPUTE DELIVERY DATES FOR ORDER
*
   95 IDELIV=ITIME+ITMNTH*(LTADM(N)+LTPROD(N))
*
*         PLACE ORDER FOR IBQ UNITS
*
```

STATN,
p. 2 of 3

```
      CALL ORDER(N,IBQ,IDELIV)
      RETURN
*
   92 CONTINUE
*
*      COMPUTE AMMENDED INVENTORY POSITION
*
      ISRPLT=SRPLT + .5
      IANPOS=INPOS + ISRPLT
      INVPOS=IANPOS
      IF(ICDFOR .EQ. 3) GO TO 99
      IF(ICDFOR .GE. 5) GO TO 94
*
*      IS AMMENDED INVENTORY POSITION ON OR BELOW REORDER POINT
*      FOR MODEL 4 ONLY
*
      IF(INVPOS .GT. IROL(N)) RETURN
*
*      COMPUTE PROCUREMENT CYCLE (EOQ PERIOD)
*      AND SERVICEABLE RETURNS EXPECTED IN THIS CYCLE
*
   94 IPC=(FLOAT(IRQTY(N))/GDFOR) + .5
      ISRPC=FLOAT(IPC)*SRFOR + .5
*
*
*      REDUCE REORDER QUANTITY (EOQ) BY EXPECTED SERVICEABLE RETURNS
*      IN PROCUREMENT CYCLE
*
      IEOQ=IRQTY(N) - ISRPC
      IF(ICDFOR .GE. 5) GO TO 98
      IF(IEOQ .LT. 0) IEOQ=0
*
*      COMPUTE BUY QUANTITY FOR MODEL 4
*
      INVPOS=INPOS
      GO TO 97
*
   98 CONTINUE
*
*      IS INVENTORY POSITION ON OR BELOW REORDER POINT FOR MODELS 5 AND6
*
      IF(INPOS .GT. IROL(N)) RETURN
*
*      COMPUTE TOTAL BUY QUANTITY FOR MODEL 5
*
      IBQ=IEOQ + IROL(N) - INPOS
      IF(ICDFOR .EQ. 6) GO TO 96
      IF(IBQ .LE. 0) RETURN
      GO TO 95
*
   96 CONTINUE
*
```

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```
*       COMPUTE TOTAL BUY QUANTITY FOR MODEL 6
*
      AEOQ=.5*FLOAT(IRQTY(N))
      IF(FLOAT(IBQ) .LE. AEOQ) IBQ=AEOQ + .5
      IF(FLOAT(IBQ) .GT. AEOQ) IBQ=IBQ
      IF(IBQ .LE. 0) RETURN
      GO TO 95
      END
```

Subroutine: WRIFEL

Function:

This routine writes to File 06 all of the current elements in the Future Events List.

Description:

This routine provides a detailed listing of all information currently recorded in the Future Events List. See Volume I, Chapter IV for a detailed description of routines WRIFEL, INFEL, ENTER, and REMOVE.

WRIFEL
p. 1 of 1

02-11-77 10.614

```
      SUBROUTINE WRIFEL
      COMMON/NFIRST/NFIRST
      COMMON/NENTRY/NENTRY
      COMMON/JPOINT/JPOINT(500)
      COMMON/JESN/JESN(500)
      COMMON/JQTY/JQTY(500)
      COMMON/JPRIOR/JPRIOR(500)
      COMMON/JTYPE/JTYPE(500)
      COMMON/JTIME/JTIME(500)
      COMMON/ILOCFE/ILOCFE(500)
      WRITE(6,8015)JTIME(NFIRST),NFIRST,NENTRY
 8015 FORMAT(///20X,29HEVENTS LIST AT TIME ,3110//)
      WRITE(6,8020)(K,JTIME(K),JTYPE(K),JESN(K),JQTY(K),JPRIOR(K),JPOINT
     C(K),K=1,NENTRY)
 8020 FORMAT(500(10X,7110/))
      RETURN
      END
```

Subroutine: TERMIN

Function:

This routine terminates all or part of the most recent replenishment order (if any) still in the administrative phase.

Description:

Subroutine TERMIN terminates all or part of the latest buy (if any) still in the administrative phase (i.e. not yet on contract). The routine continues to terminate orders until either (a) total assets terminated equals the termination quantity or (b) all buys still in the administrative phase have been canceled, whichever occurs first.

By convention, outstanding orders are terminated by setting the order quantity to zero on the Future Events List, and updating the associated pointer structure. The associated receipt event is not removed from the Future Events List, however, until the originally scheduled due-in time.

Note: This routine was not used in the current study, and may not be compatible with other INSSIM subroutines.

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```
      SUBROUTINE TERMIN(KFSN,ITQ)
C       THIS ROUTINE TERMINATES ALL OR PART OF THE LATEST BUY(IF ANY)
C       STILL IN THE ADMINISTRATIVE PHASE (I.E. NOT YET ON CONTRACT)
C       UNTIL EITHER (1)TOTAL ASSETS TERMINATED EQUALS THE TERMINATION
C       QUANTITY (ITQ) OR (2)ALL BUYS STILL IN THE ADMINISTRATIVE PHASE
C       HAVE BEEN CANCELLED, WHICHEVER OCCURS FIRST.
      COMMON/IDBUG/IDBUG
      COMMON/IOBLIG/IOBLIG
      COMMON/ITIME/ITIME
      COMMON/ITMNTH/ITMNTH
      COMMON/INVDUE/INVDUE(50)
      COMMON/LTPROD/LTPROD(50)
      COMMON/NORDPT/NORDPT(50)
      COMMON/UCOST/UCOST(50)
      COMMON/JQTY/JQTY(500)
      COMMON/JTIME/JTIME(500)
      COMMON/JPRIOR/JPRIOR(500)
      COMMON/ITERM /ITERM(30,3)
      COMMON/INVOR/INVOR(30,3)
      IF(IDBUG.NE.1) GO TO 18
      WRITE(6,8000)ITIME,KFSN,ITQ,NORDPT(KFSN)
 8000 FORMAT(7H TERMIN,I10,8I8)
   18 CONTINUE
C       ARE THERE ANY ORDERS OUTSTANDING ON ITEM KFSN
      IF(NORDPT(KFSN).LE.0) RETURN
C       OBTAIN LOCATION OF ORDER DATA ON FUTURE EVENTS LIST
   20 KORD=NORDPT(KFSN)
C       COMPUTE THE DATE THAT THE MOST RECENT PURCHASE ORDER CLEARS
C       THE ADMINISTRATIVE PHASE.
   25 IDUE=JTIME(KORD)
      IADM=IDUE-ITMNTH*LTPROD(KFSN)
C       IS THE ORDER ALREADY ON CONTRACT
      IF(IADM.LT.ITIME) RETURN
C       DOES THE ORDER QUANT. EXCEED THE TERMINATION QUANTITY.
      IF(JQTY(KORD).LE.ITQ) GO TO 40
C       DECREASE THE ORDER BY THE TERMINATION QUANTITY.
      JQTY(KORD)=JQTY(KORD)-ITQ
C       UPDATE ON-ORDER STATUS RECORDS
      INVDUE(KFSN)=INVDUE(KFSN)-ITQ
      IOBLIG=FLOAT(IOBLIG)-FLOAT(ITQ)*UCOST(KFSN)
      JTQ=-ITQ
      CALL CUM(ITERM,ITQ,KFSN)
      CALL CUM(INVOR,JTQ,KFSN)
      RETURN
C    *** NOTE ***
C         BY CONVENTION,OUTSTANDING ORDERS ARE TERMINATED BY SETTING
C         THE ORDER QUANTITY TO ZERO ONTHE FUTURE EVENTS LIST,
C         AND UPDATING THE FSN CROSS REFERENCE STRUCTURE.  THE RECEIPT
C         TRANSACTION IS NOT REMOVED FROM THE FUTURE EVENTS LIST HOWEVER
C         UNTIL THE ORIGINALLY ANTICIPATED DUE-IN-TIME.
C
C       UPDATE ON-ORDER STATUS RECORDS
```

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```
      40 KQTY=JQTY(KORD)
         JQTY(KORD)=0
         NORDPT(KFSN)=JPRIOR(KORD)
         INVDUE(KFSN)=INVDUE(KFSN)-KQTY
         IOBLIG=FLOAT(IOBLIG)-FLOAT(ITQ)*UCOST(KFSN)
         JTQ=-KQTY
         CALL CUM(ITERM,KQTY,KFSN)
         CALL CUM(INVOR,JTQ,KFSN)
         ITQ=ITQ-KQTY
   C       ARE THERE ANY OTHER ORDERS OUTSTANDING ON ITEM KFSN
         IF(NORDPT(KFSN).GT.0) GO TO 20
         RETURN
         END
```

Subroutine: ZERO

Function:

This routine zeros the INSSIM statistical accumulators.

Description:

This routine is called at the beginning of each INSSIM run to zero the variables for recording performance statistics, beginning on hand and on order stocks, and obligations.

```
10       $       IDENT   WP0287,ADDSC-CALLAHAN
20       $       FORTY   DECK
30       $       PRMFL   C*,W,S,REQS/ZERO.O
40       $       REMOTE  P*,AC
50       $       REMOTE  $$,AC
60              SUBROUTINE ZERO
70              COMMON/IOBLIG/IOBLIG
80              COMMON/IBOP/IBOPOH(3),IBOPOR(3)
90              COMMON/IBAUTH/IBAUTH(12)
100             COMMON/IBPROJ/IBPROJ(12)
110             COMMON/IBACKI/IBACKI(30,3)
120             COMMON/IBACKT/IBACKT(30,3)
130             COMMON/IBAKDI/IBAKDI(30,3)
140             COMMON/IBAKDT/IBAKDT(30,3)
150             COMMON/ICANCL/ICANCL(30,3)
160             COMMON/IDISPS/IDISPS(30,3)
170             COMMON/IEXPED/IEXPED(30,3)
180             COMMON/IFILLI/IFILLI(30,3)
190             COMMON/IFILLT/IFILLT(30,3)
200             COMMON/INVDAY/INVDAY(30,3)
210             COMMON/INVOH/INVOH(30,3)
220             COMMON/INVOR/INVOR(30,3)
230             COMMON/IORDER/IORDER(30,3)
240             COMMON/IRATON/IRATON(30,3)
250             COMMON/IRECET/IRECET(30,3)
260             COMMON/IREQC /IREQC(30,3)
270             COMMON/IREQI /IREQI(30,3)
280             COMMON/IREQT/IREQT(30,3)
290             COMMON/IRETRN/IRETRN(30,3)
300             COMMON/ISHIPI/ISHIPI(30,3)
310             COMMON/ISHIPT/ISHIPT(30,3)
320             COMMON/ITERM /ITERM(30,3)
0325             COMMON/ISMORD/ISMORD(30,3)
0326             COMMON/ILGORD/ILGORD(30,3)
0327             COMMON/IBOPCT/IBOPSM(3),IBOPLG(3)
330      C        ZERO STATISTICAL ACCUMULATORS
340             IOBLIG=0
350             DO 25 I=1,30
360             DO 25 J=1,3
370             ICANCL(I,J)=0
380             INVOH(I,J)=0
390             INVOR(I,J)=0
400             IRECET(I,J)=0
410             IRETRN(I,J)=0
420             INVDAY(I,J)=0
430             IORDER(I,J)=0
```

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This report describes the features of the Inventory System Simulator (INSSIM), a FORTRAN-based simulation model of a general single-location inventory system. The model was specifically designed to evaluate alternate forecasting and inventory management policies proposed for use in the EOQ Buy Computation System (D062). Volume I of this report describes the philosophy, organization, and input/output features of INSSIM. Volume II documents the FORTRAN statement listings of each INSSIM program, and provides narratives describing the functions of each routine.

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```
440             IDISPS(I,J)=0
450             ITERM(I,J)=0
460             IEXPED(I,J)=0
470             IRATON(I,J)=0
480             IREQC(I,J)=0
490             IREQT(I,J)=0
500             IREQI(I,J)=0
510             IBACKT(I,J)=0
520             IBACKI(I,J)=0
530             IBAKDT(I,J)=0
540             IBAKDI(I,J)=0
550             IFILLT(I,J)=0
560             IFILLI(I,J)=0
570             ISHIPT(I,J)=0
580             ISHIPI(I,J)=0
0585             ISMORD(I,J)=0
0586             ILGORD(I,J)=0
590          25 CONTINUE
600       C
610       C        ZERO ON-HAND AND ON-ORDER COUNTERS
620       C
630             DO 110 I=1,3
640             IBOPOH(I)=0
650             IBOPOR(I)=0
0655             IBOPSM(I)=0
0656             IBOPLG(I)=0
660         110 CONTINUE
670             RETURN
680             END
690       $      ENDJOB
```