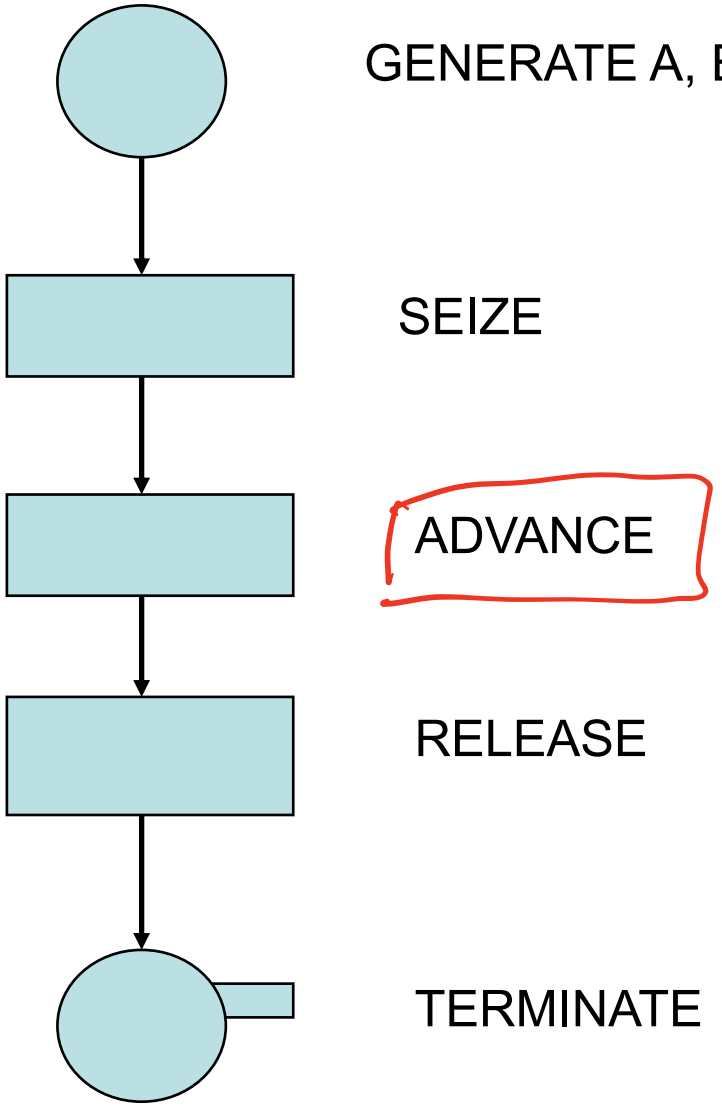
GPSS

More Features

Model Building in GPSS

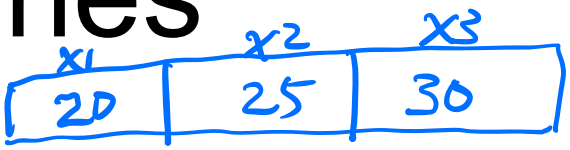
- Block Diagram



Transaction's Attributes

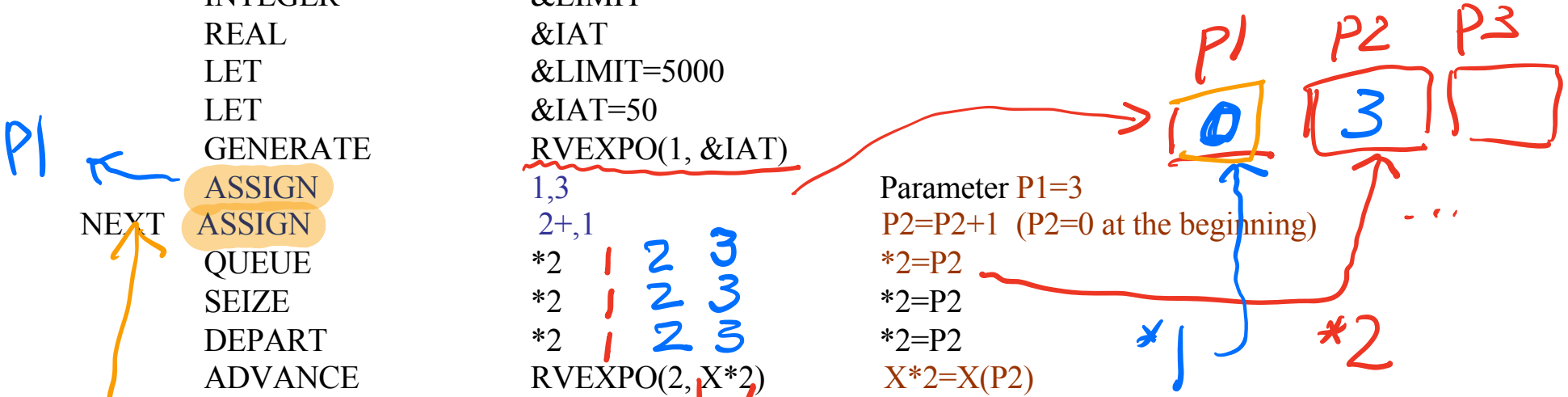
- Like facilities, Storages, Queues, transactions have numerical attributes, or parameters.
- Xact parameters can be used to store information such as this Xact's arrival time, service time, priority level, ect.
- The total number of parameters can be specified by the F parameter of the GENERATE block. The default is 12.
- The SNA (standard numerical attribute) reference the jth parameter as Pj.
- All transaction parameters are initialized to 0.
- To modify the value stored in a transaction parameter, use the ASSIGN block.

Queues in Series



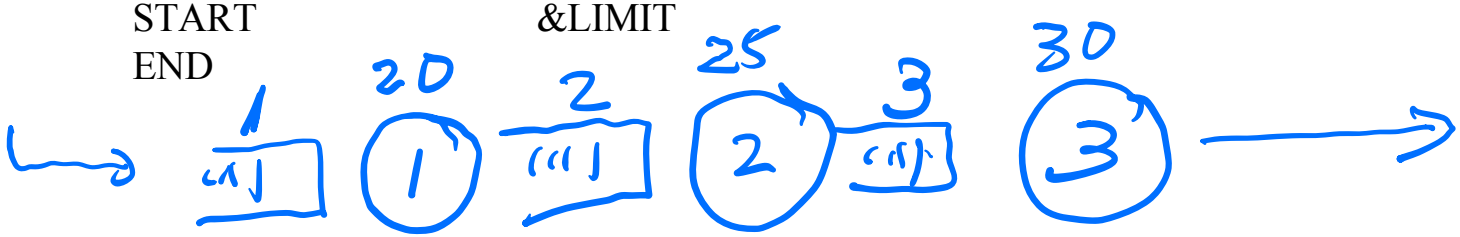

```
            SIMULATE
            INITIAL     X1, 20/X2, 25/X3, 30
* Define ampervariables
            INTEGER     &LIMIT
            REAL        &IAT
            LET         &LIMIT=5000
            LET         &IAT=50
            GENERATE    RVEXPO(1, &IAT)
            ASSIGN      1,3
NEXT        ASSIGN      2+,1
            QUEUE       *2
            SEIZE       *2
            DEPART      *2
            ADVANCE     RVEXPO(2, X*2)
            RELEASE     *2
            LOOP        *1,NEXT
            TABULATE    RES
RES         TABLE       M1, 10, 10, 10
            TERMINATE   1
*
            START       &LIMIT
            END
```

Savevalues: X1=20, X2=25, X3=30



2

X*2 → X1



ASSIGN

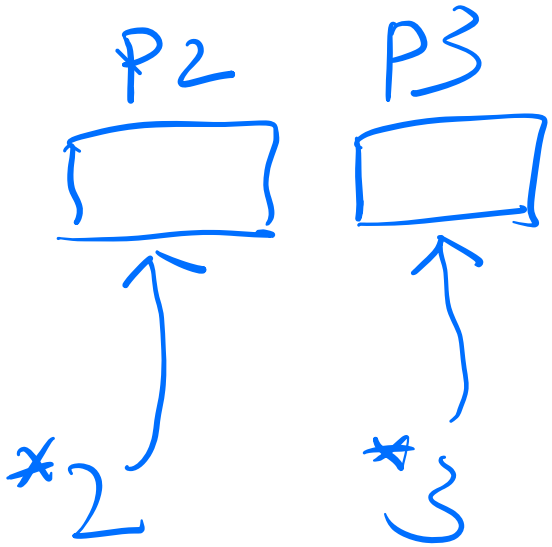
- ASSIGN 1,3 store 3 into P1 or P1=3
  ASSIGN 1+,3 increments P1 by 3
  P1=P1+3
  ASSIGN 1-,3 decrements P1 by 3
  P1=P1-3

ASSIGN 1, RVEXPO(1, 20)

store exponential variate with mean 20 into P1.

Indirect Addressing

- Parameters of transactions can be called by indirect addressing.
- For example:
  - *2 - value stored in P2
  - *3 - value stored in P3



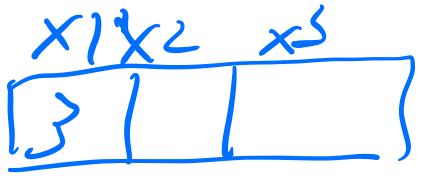
INITIAL statement and Savevalues

- Savevalues are storage location accessible to all transactions.
- SNA for the jth savevalue is Xj. X1 X2 X3 . .
- The INITIAL statement is used to initialize the values of savevalues.
- INITIAL X1, 20/X2, 25/X3, 30

  X1=20, X2=25, X3=30

The SAVEVALUE block

- SAVEVALUE block modifies the value of a savevalue.
- SAVEVALUE is analogous to the ASSIGN block in terms of modifying the value of transaction parameter.
- Examples:



SAVEVALUE 1, 3 store 3 into X1, X1=3

SAVEVALUE 1+, 3 increments X1 by 3
X1=X1+3

SAVEVALUE 1-, 3 decrements X1 by 3
X1=X1-3

SAVEVALUE 1, RVEXPO(1, 20)

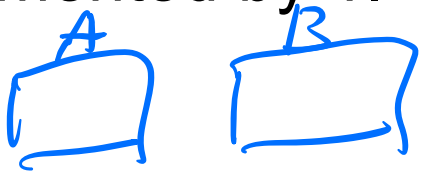
store exponential variate with mean 20 into X1.

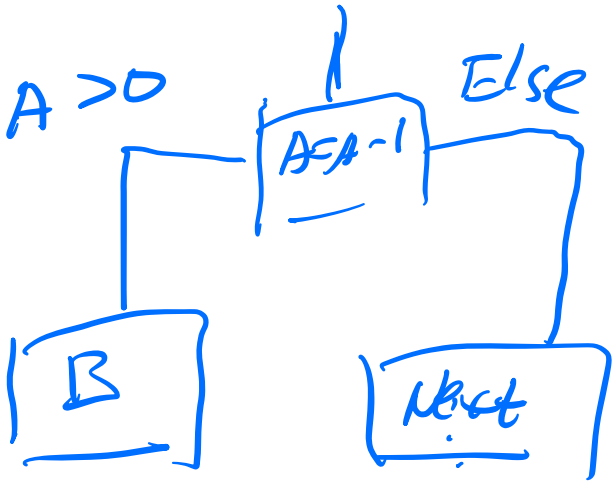
LOOP

- When a Xact enters LOOP block:

  LOOP A, B

  The value of A is decremented by 1.





A=A-1

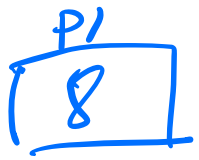
If A>0,

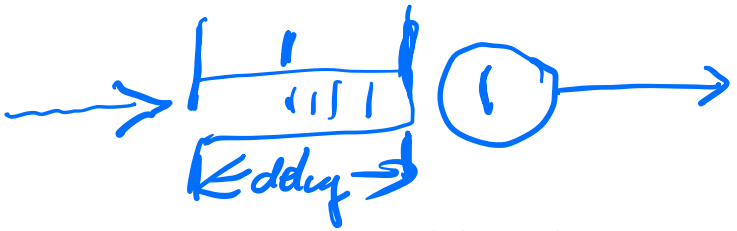
the Xact is moved to the B block.

Else,

the Xact is moved to the next sequential block.

Round Robin Model





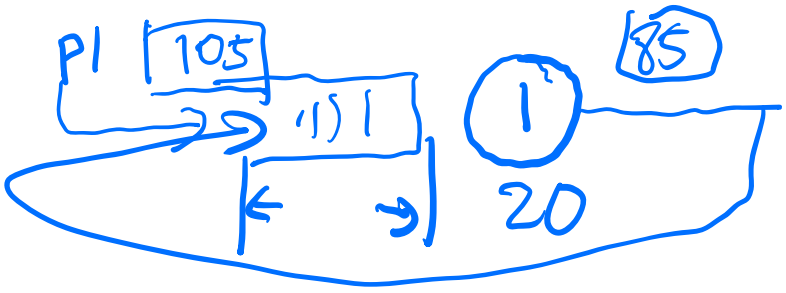

```
                SIMULATE
                GENERATE    RVEXPO (1,50)
                ASSIGN      1, RVEXPO(1,30)
NEXT            QUEUE       1
                SEIZE       1
                DEPART      1
                TEST  G     P1,20, LAST
                ASSIGN      1,V1
                VARIABLE    P1-20
                ADVANCE     20
                RELEASE     1
                BUFFER
                TRANSFER    ,NEXT
LAST            ADVANCE     *1
                RELEASE     1
                TERMINATE   1
                START       1000
                END
```

P1=RVEXPO(1,30)

col
1

If (P1>20) is false, go to LAST
P1=V1 (variable)
calculate V1: P1-20 (start at col 1)
service for 20 minutes

note: this is for the CEL. If it is used, this transaction will SEIZE the server again
*1=P1, service time is P1 here.



TEST

- TEST block are used to compare pair of numbers A and B. If the condition is not met, it moves to the block specified in parameter C.
- Example: TEST G A, B, C

  If (A>B), move to next block

  Else, move to the block specified by C

Other operators:

TEST GE A,B,C
TEST E A,B,C
TEST NE A,B,C
TEST LE A,B,C
TEST L A,B,C

Variables

- Variables are used for arithmetic calculation.
- The SNA for the jth valuable is Vj.
- Associate with each variable is a definition statement which specifies an arithmetic expressioin.
- When a varialbe is referenced (ASSIGN, 1,V1), the corresponding arithmetic expression is evaluated →

  1 VARIABLE P1-20 (start at column 1)