MORE GPSS

Examples

REALLOCATE COMMON

- The class of memory known as COMMON defaults to 10,000 bytes under student GPSS/H. Normally, not more than 85 transactions can exist. (error 411 is issued).
- REALLOCATE Compiler Directive:

  REALLOCATE COM, 20000
- Maximum is 32,000bytes.

Example 8 - Bank Model

- Consider a bank which contains tables for filling out slips, etc. and tellers. Assume we have 6 tables and 3 tellers and 40% of the time, a customer can head directly to a teller.

```
        SIMULATE                                    TEL
* Define Ampervariables
        INTEGER     &LIMIT
        REAL        &IAT,&ST1,&ST2
        LET         &LIMIT=5000
        LET         &IAT=50          *
        LET         &ST1=10          *
        LET         &ST2=30
* Block Statements
     GENERATE       RVEXPO(1,&IAT)
     TRANSFER        .4,TAB,TEL
TAB  QUEUE            OVER
        ENTER           1,1
        ADVANCE     RVEXPO(2,&ST1)
        DEPART          OVER
        LEAVE           1,1
```

```
QUEUE           TELLER
ENTER           2,1
ADVANCE         RVEXPO(2,&ST2)
DEPART          TELLER
LEAVE           2,1
TERMINATE

STORAGE         S1,6/S2,3

GENERATE        &LIMIT
TERMINATE       1
START           1
END
```

Example 9 - Carwash

- Only one car can be washed at a time at a small carwash. Cars arrive in a Poisson stream with an average interarrival time of 5 minutes. Carwashing time is exponentially distributed with a mean of 4 minutes. Potential customers who find no waiting space go elsewhere to have their car washed. Assume there are 4 waiting spaces.

  (a) How many cars balked in 100 arrivals?

  (b) How many cars balked in 8 hours?

Carwash simulation

```
                SIMULATE
SPACES          STORAGE     4               4 waiting spaces
                GENERATE    RVEXPO(3,5)     cars arrive
                TRANSFER    BOTH, , BALK
                ENTER       SPACES          maybe ENTER 1,1(see below)
                SEIZE       CARWASH
                LEAVE       SPACES          maybe LEAVE 1,1 (see below)
                ADVANCE     RVEXPO(11,4)
                RELEASE     CARWASH
                TERMINATE   1
*
BALK            TERMINATE   1
*
*               STORAGE     S1,4            Also can be used to define multiple
*                                           Storage (servers). Corresponding to
*                                           ENTER A,B/LEAVE A,B
                START       100
                END
```

Example 10
The testing-and-adjustment system

Assembled computers move through a series of testing stations in the final stage of their production. At the last of these stations, if the computer can not pass the test, the defective one is sent back to an adjustment station. After adjustment, the computer is sent back to the final test station and is tested again. If it fails the test, it is again sent to the adjustment station, and so on.
Assume that computers arrive at the final test station every 6 ± 2.2 minutes. Two testers work side-by-side at the final test station. The time required to test one computer is 12 ± 3.1 minute. In all the computers arrive at the final station, 91 percent can pass the test. The other 9 percent are routed to the adjustment station where there is a single worker who works at the average of 35 ± 11 minutes for adjusting one computer.

Questions on the Testing-and-adjustment system

Use GPSS program to estimate how much staging space should be provided ahead of the final testing station and ahead of the adjustment station (Staging space is the space occupied by work waiting for service to begin.) Your simulation should end when100 computers pass the test and are sent on to packing. How much simulated time has elapsed when this condition is reached?

Testing-and-adjustment system

```
                SIMULATE
                REALLOCATE   COM,30000
                INTEGER      &LIMIT
                LET          &LIMIT=100
TESTER          STORAGE      2
                GENERATE     6,2.2
ARRIVE          QUEUE        LINE1
                ENTER        TESTER
                DEPART       LINE1
                ADVANCE      12, 3.1
                LEAVE        TESTER
                TRANSFER     .09,PASS,ADJUST
PASS            TERMINATE    1
ADJUST          QUEUE        LINE2
                SEIZE        WORKER
                DEPART       LINE2
                ADVANCE      35, 11
                RELEASE      WORKER
                TRANSFER     ,ARRIVE
*
                START        &LIMIT
                END
```

Example 11

People arrive at a newspaper stand with an interarrival time that is exponentially distributed with a mean of 0.5 minute. 55% of the people buy just the morning paper, while 25% buy the morning paper and a *Wall Street Journal*. The remainder buys only the *Wall Street Journal*. One clerk handles the *Wall Street Journal* sales, while another clerk handles morning paper sales. A person buying both goes to the *Wall Street Journal* clerk. The time it takes to serve a customer is 40±4 seconds for all transactions. Write a GPSS program to simulate this system and collect statistics on queues for each type of transactions. Suggest ways for making the system more efficient. Simulation for 2 hours.