Lab 5   {August 25, 2014}   10 points

Simulating a Shopper visiting Second Floor stores in RoboMall

Note: Lab 5 (one submission per program team), runs for two weeks. Attendance is required the first week, but optional the second week.

In Program 5, you must simulate multiple concurrent shoppers shopping in the two-floor RoboMall. To assist the student in breaking up a large programming assignment into smaller design components, Lab 5 addresses an easier problem, simulating one shopper (shopper 1) shopping on the Second Floor where all store clerks operate use round robin scheduling. Lab 5 involves two command line arguments:

> ./lab5 stores time_slice

and an example is:

> ./lab5 4 50

This indicates that shopper 1 enters the RoboMall at A1 to visit 4 stores on the Second Floor of RoboMall with all Second Floor store clerks using a time slice of 5 seconds per customer.

The program then reads in **stores** lines of input of the form:

> xpos ypos   service_time

where

> xpos ypos   indicate the ith store location on the Second Floor of the RoboMall

> service_time   indicates that shopper 1 requires **service_time** units of simulated time from the clerk at the indicated store.

For example, using the above shopper 1 visiting **4** stores, subsequent sample input of:

```
 6   4     10
10  12     85
12   4    102
 4  12     26
```

means that shopper 1 requires 1 second of service at store (6, 4), 8.5 seconds of service at store (10, 12), 10.2 seconds of service at store (12, 4) and 2.6 seconds of service at store (4, 12) with all stores on the Second Floor of RoboMall.

Main Assignment

Lab 5 runs over two lab periods and your program implements clerk service time in each store as a round robin (RR) queue with the time slice specified by the command line argument. Note, for a single shopper simulation, the RR queue is overkill and the queue mechanism does not get fully exercised in Lab 5. However, it is important to have an operational RR queue mechanism for Lab 5 before moving on to Program 5. If your team does not have a working version of Program 3, we will make a working C version of a RR queue available prior to the start of the lab. Shopper 1 exits the RoboMall at A1 after visiting its final store.

Note - Neither Lab 5 nor Program 5 require you to use an event list.

Lab Program Output

The Lab 5 program prints out a log of shopper 1's significant events that includes, but not necessarily in this format:

> Shopper 1 arrives at store *s* at time *t*.
> After using *z* time slices at store *s*, shopper 1 leaves store *s* at time *t*.
> …
> Shopper 1 exits the RoboMall at time *t*.

Lab 5 Assignment

0. Prior to coming to the lab prepare a preliminary solution to the program above.
1. Create a make file.
2. Build and run the program on your own test data at first.
3. Run the program on the provided test data file 'lab5.dat' redirecting the output to lab5.txt
4. Create a README file that contains any useful information to assist in the grading of your lab program.
5. Create a tarred file that contains all the source and header files, the make file and the README file and your output file.
6. Use the Linux version of 'turnin' to turn-in the tarred file. [The deadline for this lab turn-in is <u>8 days</u> after the beginning of your assigned lab 5.]