Simulation Home Assignment 2

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Task1

In order to get a more stable result, we simulate the system for 100000 seconds.
Because the each queue in the queuing system is symmetric, so we only measure the the number of jobs in the system.
You can test our program with different parameter to specify different strategies. For exmaple:
java MainSimulation Random
java MainSimulation Round
java MainSimulation smallest

When the mean arrival time is 0.11 seconds, the mean number of jobs in the queue 1 with random algorithm is 44.63354.

When the mean arrival time is 0.11 seconds, the mean number of jobs in the queue 1 with round algorithm is 27.61301.

When the mean arrival time is 0.11 seconds, the mean number of jobs in the queue 1 with smallest algorithm is 10.72082.

When the mean arrival time is 0.15 seconds, the mean number of jobs in the queue 1 with random algorithm is 9.3173.

When the mean arrival time is 0.15 seconds, the mean number of jobs in the queue 1 with round algorithm is 5.9976.

When the mean arrival time is 0.15 seconds, the mean number of jobs in the queue 1 with smallest algorithm is 3.9353.

When the mean arrival time is 2 seconds, the mean number of jobs in the queue 1 with Round algorithm is 0.25843.

When the mean arrival time is 2 seconds, the mean number of jobs in the queue 1 with random algorithm is 0.24966.

When the mean arrival time is 2 seconds, the mean number of jobs in the queue 1 with smallest algorithm is 0.25048.

From above, when the arrival time is 0.11 and 0.15, we see that to send the job to queueing system with the smallest number of jobs is the best algorithm. When the arrival time is equal and bigger than 0.2, the three methods almost have the same results.

Task2

We used simulation program to simulate the procedure that pharmacist fill coming prescriptions. We simulate this process for 100000 hours.

1.The average time his work will have finished is 18:10 every day.

2.The average time from the arrival of a prescription until it has been filled in is 57.8748 minutes.

Task3

We used simulation program to simulate 31268 “runs” of the system, the mean time until the system breaks down is 3.1981.