User’s Manual

**Description:**

The Queue Simulator makes use of two data structures to simulate a business operation. A FIFO queue stores customers as a business would have a waiting line, and a priority queue/Heap holds all ‘would-be’ customers, ordering them by time priority. Priority is determined by arrival time, unless it is a departure event, in which case departure takes precedent in the sort.

When run, the program will load customers into the priority queue (PQ) in the scale of 2M+1, where M is the number of service agents available. The program will maintain approximately this amount as long as there are customers to be generated. An event process will handle the motion of customers between the structures while accumulating statistics.

The event process act as a business would. Customers come in at seemingly random time intervals, with the average number arrivals meeting the specification of the user. And customers depart at seemingly random times, again with an average interval specified by the user. Customers that enter when there is no line and a server is available will be immediately served and departed. If that is not the case a line will form. As servers become available the one in the line longest will be taken first. Departures will be put back into the PQ and processed down the line. Upon a departure event the customer will share its data with the accumulators. Accumulated data will be shared to the statistics class and relevant data will be sent to the screen.

**Output Format:**

The output will show all statistics on the screen in the following tabulated form.

--- Simulated ---

|  |  |  |
| --- | --- | --- |
|  | Modeled | Simulated |
| Percent Idle :: | 0.000000 | 0.000000 |
| Avg Population :: | 0.000000 | -.------ |
| Avg Time In Sys :: | 0.000000 | 0.000000 |
| Avg Num In Queue :: | 0.000000 | -.------ |
| Avg Time Waiting :: | 0.000000 | 0.000000 |
| Util. Factor :: | 0.000000 | 0.000000 |
|  | Prob. Of Wait: | 0.000000 |
|  |  |  |

Modeled data refers to the data submitted by the analytical model, and Simulated refers to the data submitted by the simulation.

**How to Operate:**

* Load designated folder into PuTTY and access host directory designated digioacchinoe
* Use “make all” command to build all files pertaining to the project
* Run main program using “./Sim”

**Unit testing -** Files related to unit testing can be made using the following

**Make testCust –** operates a test of the customer class.

**Make testHeap** – outputs contents of a test Heap, a test FIFO queue, and verifies the acceptable operation of the heap.

**Make testSim** – acts as a test bench for Sim.

**Make Sim –** the operation of this module is defined above.

**Github Repo:**

https://github.com/EricDiGi/QueueSimulator.git