

>>> Assignment #5 for Simulation (CIS 4930) <<< Due on 06/30/11 in class

This assignment covers material related to beginning CSIM topics. These problems also help establish “building blocks” for your semester project.

Problem #1 (50 points)

Modify the existing CSIM M/M/1 simulation (`mm1_csim.c`) to read interarrival times from an input file. Let the mean service time be fixed to 1.0 seconds per customer. Create a file with 1 million exponentially distributed service time values such that the offered load to the queue is 80%. Run the simulation and submit a screenshot of the results. Submit also a listing of the key function (the `generate()` function) that you modified for this problem. Hint: You can use `genexp.c` to generate exponentially distributed random variables.

Note that you will need to change the stopping criterion for the simulation. To do this make the following changes.

- 1) Add `EVENT DoneEvent;` to globals
- 2) Add `DoneEvent = event("Done event");` to CSIM initializations in `main()`
- 3) Change `hold(SIM_TIME);` to `wait(DoneEvent);` in `main()`
- 4) When you have read all the values from the input file (that is, you are at end-of-file condition) you will need to execute the line of code `set(DoneEvent);` to terminate the simulation

You may also need to make minor changes to `main()` (especially to the output section) since `lambda` is no longer a parameter set in `main()`.

Problem #2 (50 points)

Modify the existing CSIM M/M/1 simulation (`mm1_csim.c`) to have a second queue that has deterministic service time and change the `generate()` function to probabilistically split (with 50/50 probability – a coin flip) the generated customers to each queue. That is, half of the generated customers should go to the queue with exponential service time (the queue that already exists in the model) and the other half to the new queue with deterministic service time. Fix the mean service time for each queue to be 1.0 seconds per customer. Run the simulation such that each queue has an offered load of 80% and submit a screen shot of the results. Run the simulation for a simulated 1 million seconds.

In addition to changing the `generate()` function you will need to do the following:

- 1) Add another `queue()` function
- 2) Add and initialize another Server `FACILITY`
- 3) Carefully update the output results section of `main()`
- 4) Carefully update the header block and inline comments