

## CSE 412 (Simulation and modeling lab)

### Assignment -1 (Single-server queueing system simulation)

- (a) Write code for simulation of a single-server queueing system. The input file provides mean interarrival time, mean service time, and number of customers. Three performance metrics average delay in queue, average number in queue, server utilization should be written in the output file. Also the final value of simulation clock (the time the simulation ends) when the stopping criterion ( $n$  customers have completed their delays in queue) is met should be written in the output file.

#### Single-server queueing system

Mean interarrival time      1.000 minutes

Mean service time            0.500 minutes

Number of customers        1000

Average delay in queue      0.430 minutes

Average number in queue    0.418

Server utilization            0.460

Time simulation ended       1027.915 minutes

- (b) For this task, you are going to vary the mean service time which is  $k$  times the mean interarrival time. Run the experiment for  $k = 0.5, 0.6, 0.7, 0.8, 0.9$

$k$	average delay in queue	average number in queue	server utilization	time the simulation ended
0.5				
0.6				
0.7				
0.8				
0.9				

- (c) You have generated uniform and exponential random variates during this experiment. Display various statistics [min, max, median,  $P(x)$ ,  $F(x)$ ] for them.