Project No. 2
Simulation of an M/M/1 Queue

ECE 642
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This project builds upon the two previous computer simulation assignments (Project 1, Parts I and II) and shows you how to simulate an M/M/1 queueing system using MATLAB.

Consider a high speed transmission link represented by an M/M/1 model of single-server queue with Poisson arrival and exponential service time as depicted blow. The link is assumed to have a capacity of 155 Mbps and the length of packets are exponentially distributed with mean packet size of 2325 bits. We want to simulate the system for the desired utilizations.

Plot the queue size (including server), expected queue size, mean delay through the system vs. time for $\rho = 0.50$. Also plot the probability density of the queue size for $\rho = 0.50$. Compare the simulation results with analytical results. Now consider $\rho = 0.3, 0.50, 0.9$ and $\rho = .95$ and obtain delay vs. throughput of the system. In the same graph plot the analytical results.

Note: You should run the simulation for a number of seeds and average out the means.