Project No. 4
Simulatin a Queuing System with Feedback

ECE 642
Dr. Bijan Jabbari

In this project we simulate an M/M/1 queue with feedback at the output, such that a customer completing service either leaves the system, or (with fixed probability p) re-enters the system. See *Bertsekas&Gallager*, p. 228 for examples and analysis. For numerical results assume $p = 0.2$ and 0.5.

Part a: Assume that successive service times for a customer that re-enters the queue are independent. Plot the mean queue size and mean time in the system for an infinite-length queue. Compare simulation results with the expected analytical values.

Part b: Now assume that the service times of those customers who re-enter the queue are not varied. Obtain the same plots as in Part a and compare the results.

Now using the results in parts a and b, discuss whether the independence assumption is valid.