MAP 6264 Homework 3 (Blocked Customers Delayed) 30 Points

Augment your code of Homework 1 (Blocked Customers Cleared) so that it will now describe the case where the blocked customers wait in an infinite-capacity queue and are served in FIFO order. Include code and output.

1. Fill in the table. Cases 1-4 use the same assumptions as Homework 1 about the input process and the service times. In each "theory" box write the theoretical value if you can calculate it; if not, write NA. In Case 1, show all formulas used; in every other case, if you give a "theory" answer, explain how you arrived at that answer. Run each simulation for at least 100,000 arrivals (1,000,000 if feasible). Take the unit of measurement to be the average service time (2.4 seconds), and take the number of servers to be 10.

2. Draw the graph of $P(W > t)$ versus t (measured in units of average service time) for Case 1 when the arrival rate is 4 customers per second, and plot the corresponding simulation points given in the table. On the same graph, plot the simulation points for Case 2 (to illustrate that the probabilities are not insensitive to the distribution of service times; for clarity, use different symbols for the simulation points for each case).

3. Repeat question (1) with the arrival rate increased to 4.2 arrivals per second.

	1		2		3		4	
$\lambda = 4$ arrivals/second	theory	simulation	theory	simulation	theory	simulation	theory	simulation
ρ								
$E(W)$								
$P(W > 0)$								
$P(W > 1)$								
$P(W > 2)$								
$P(W > 3)$								
$P(W > 4)$								
$P(W > 5)$								
$P(W > 6)$								
$P(W > 7)$								
$P(W > 8)$								

	1		2		3		4	
$\lambda = 4.2$ arrivals/second	theory	simulation	theory	simulation	theory	simulation	theory	simulation
ρ								
$E(W)$								
$P(W > 0)$								
$P(W > 1)$								
$P(W > 2)$								
$P(W > 3)$								
$P(W > 4)$								
$P(W > 5)$								
$P(W > 6)$								
$P(W > 7)$								
$P(W > 8)$								