

butcher

The Markov Butcher Shop sells premium grade A+ beef. Customers arrive at the butcher shop and form a single queue. There is one butcher who serves customers from the queue on a first-come-first-served basis.

Based on historical data, the interarrival time between customers is exponentially distributed with a mean of 8 minutes. The service times for customers is also exponentially distributed, but with a mean of 6 minutes. The interarrival times and service times are assumed to be independent.

- a. Simulate by hand the service of the first 10 customers. Assume that you have an oracle that generates samples from the interarrival time and service time distributions: the first 10 samples of the interarrival time are 5, 5, 8, 3, 2, 5, 20, 2, 1, 3, and the first 10 samples of the service time are 4, 10, 6, 10, 14, 7, 10, 4, 15, 6.
- b. What is the average waiting time of the first 10 customers?
- c. What is the average delay of the first 10 customers?
- d. What is the server utilization from the time the shop opens until the time the 10th customer departs the shop?
- e. What is the time average number of customers in the shop, from the time the shop opens until the time the 10th customer departs the shop?