6.1: A two-runway (one runway for landing, one for taking off) airport is being designed for propeller-driven aircraft. The time to land an airplane is known to be exponentially distributed with a mean of 1.5 minutes. If airplane arrivals are assumed to occur at random, what arrival rate can be tolerated if the average wait in the sky is not to exceed 3 minutes?

6.4: At Metropolis City Hall, two workers “pull strings” every day. Strings arrive to be pulled on the average of one every ten minutes throughout the day. It takes an average of 15 minutes to pull a string. Both times between arrivals and service times are exponentially distributed. What is the probability that there are no strings to be pulled in the system at a random point in time? What's the expected number of strings waiting to be pulled? What's the probability that both string pullers are busy? What’s the effect on performance if a third string puller, working at the same speed as the first two, is added to the system?

6.8: Arrivals to an airport are all directed to the same runway. At a certain time of the day, these arrivals form a Poisson process with rate 30 per hour. The time to land an aircraft is a constant 90 seconds. Determine LQ, wQ, L, and w for this airport. If a delayed aircraft burns $5000 worth of fuel per hour on the average, determine the average cost per aircraft of delay waiting to land.
6.17: in example 6.17, compare the system with c=1, c=2 and c=3 servers on the bias of server utilization p (the proportion of time a typical server is busy).

6.22: In Example 6.18 suppose that the overall arrival rate is expected to increase to 160 per hour. If the service rates do not change, how many clerks will be needed at service centers 2 and 3, just to keep up with customer load?

6.26: Study the effect of pooling server (having multiple servers draw from a single queue, rather than each having its own queue) by comparing the performance measure for two M/M/1 queues, each with arrival rate (landa) and service rate (gamma), to an M/M/2 queue with the arrival rate 2*(landa), and service rate (gamma) for each server.