Queuing Theory: Classwork

February 10, 2010

Problem 1

An airport baggage processing counter must decide how many parallel service channels to provide. They estimate that during rush hour the average number of arrivals per hour is approximately 40. They also estimate that on an average, a server will take about 5.5 minutes to serve a typical customer. Using only this information how many service channels do you recommend?

Problem 2

You are selling your home. You observe that at any time there are typically about 50 homes for sale in your area. New homes go on the market at a rate of about 5 per week. About how long will it take to sell your home? What assumptions are made to arrive at your answer?

Problem 3

A study on reliability based service life assessment of aging concrete structures[1] suggests that a Poisson process can be used to represent the occurrence of structural loads over time. Suppose the mean time between occurrences of loads in 0.5 year then:

- How many loads can be expected to occur during a 2-year period?
- What is the probability that more than 5 loads occur per year?
- How long must a time period be so that the probability of no loads during that period is at most 0.1?

[1] J. of Structural Eng., 1993: 1600-1621