

- Report in maximum of 2 pages
- The total value of the assignment is 6 points
- You can write your answers either in Finnish, Swedish or English
- Deadline for this assignment is Thursday, March 15th, 2018 at 16:00.
- Return your report via MyCourses

Assignment 2.1 - A queuing model

A Cab Company owns four taxis. The taxi service operates for 10 hours daily. Calls arrive at the dispatching office according to a stationary Poisson process with a mean of 20 calls per hour (the time between calls is exponentially distributed with a mean of 1/20 hours). The length of the ride is known to be exponentially distributed with a mean of 11.5 minutes. Because of the high demand on the cab service, the waiting list at the dispatching office is limited to 16 customers. Once the limit is reached, additional customers are advised to seek service elsewhere because of the expected long wait.

The company manager is afraid that she may be losing too much business and thus would like to consider increasing the size of her fleet. She estimates that the average income per ride is about \$5. She also estimates that a new cab can be purchased for \$15,000. A new cab is kept in service for 5 years and then sold for \$7500. The annual cost of maintaining and operating a taxi is \$15,000 a year. Can the manager justify increasing the size of her fleet? For the analysis assume a 10% interest rate.

Hints:

- Simulate independent replications of the 10-hour daily work shift to define the expected daily revenue.
- The model you are building is nearly the same, as in the 2nd exercise. Only, the capacity of the server is 4 or 5 and you have to consider how to limit the length of the queue.