**Simulation Project – 4th Assignment**

*Please note that any exchange of code with another student is discouraged as it constitutes cheating*. *We will run Moss to verify that there has not been code sharing.*

**1. Project description**

The objective of this last assignment is to use your simulation model that you developed in assignment 3 to gain insights into the behavior of the system. Specifically, you will obtain curves of the 95th percentile of the end-to-end delay and of the probability that the server of the client queue (hereafter referred to as the client server) is idle as a function of the thresholds TL and TH. Based on these curves you will determine the best values of the thresholds TL and TH that minimize the 95th percentile of the end-to-end delay and at the same time the probability that the client server is idle is less or equal to 0.01.

**2. Deliverables**

Modify your simulation to estimate the probability that the client server is idle. This is a time-average probability, and you can obtain it by keeping track of the total time the client server is idle and then dividing this total time by the simulation time. Calculate this idle probability for each batch. For this you will have to keep track of the total time the simulation spent in each batch as well. After you simulated for the 30 batches, you can calculate the super mean and its confidence interval. This estimation is in addition to the existing code that you have already in place for the estimation of the 95th percentile.

The rest of the simulation assumptions, input parameters, etc, are the same as in assignment 3.

*What to obtain*

Run your simulation for various values of the two thresholds and subsequently plot the 95th percentile and the probability that the client server is idle. For this, fix the lower threshold to 1 and then run the simulation for various values of the high threshold which are greater than 1. Repeat this by increasing the lower threshold to 2 and run the simulation for various values of the high threshold which are greater than 2, and so on, until you have sufficient data points to be able to identify a trend.

Plot your results and determine the best values of the two thresholds that minimize the 95th percentile of the end-to-end delay and at the same time the probability that the client server is idle is less or equal to 0.01.

*What to submit*

Submit your program and a report containing all the curves and your conclusions.