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COSC-223

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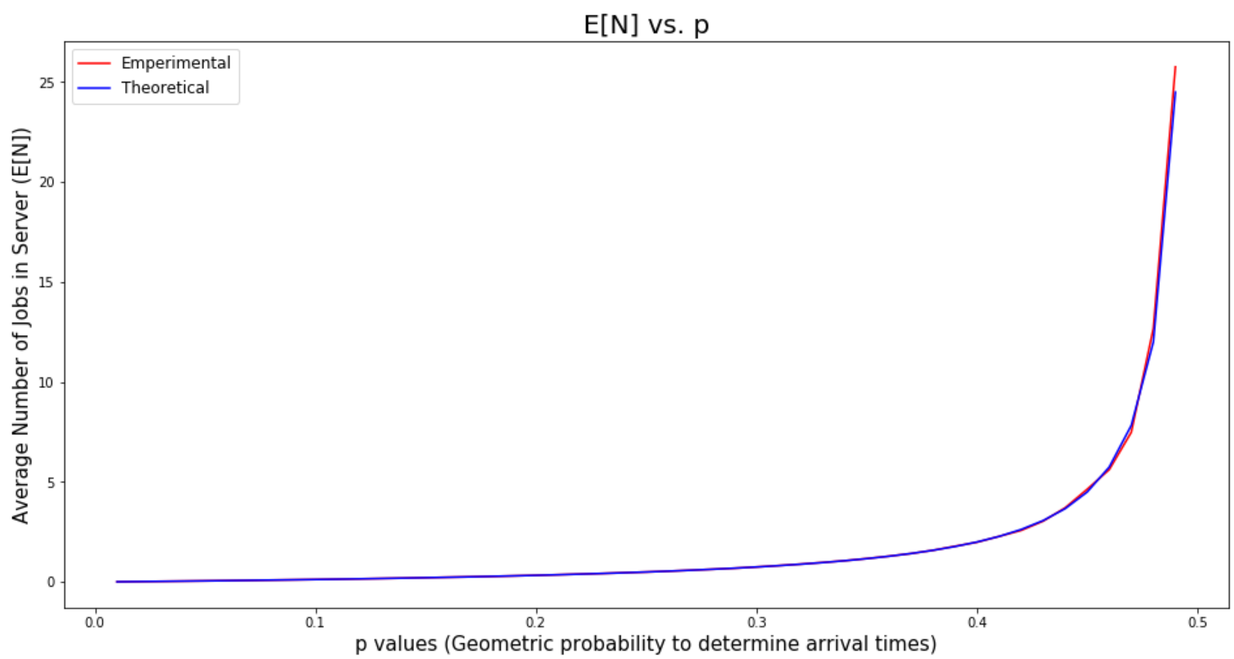
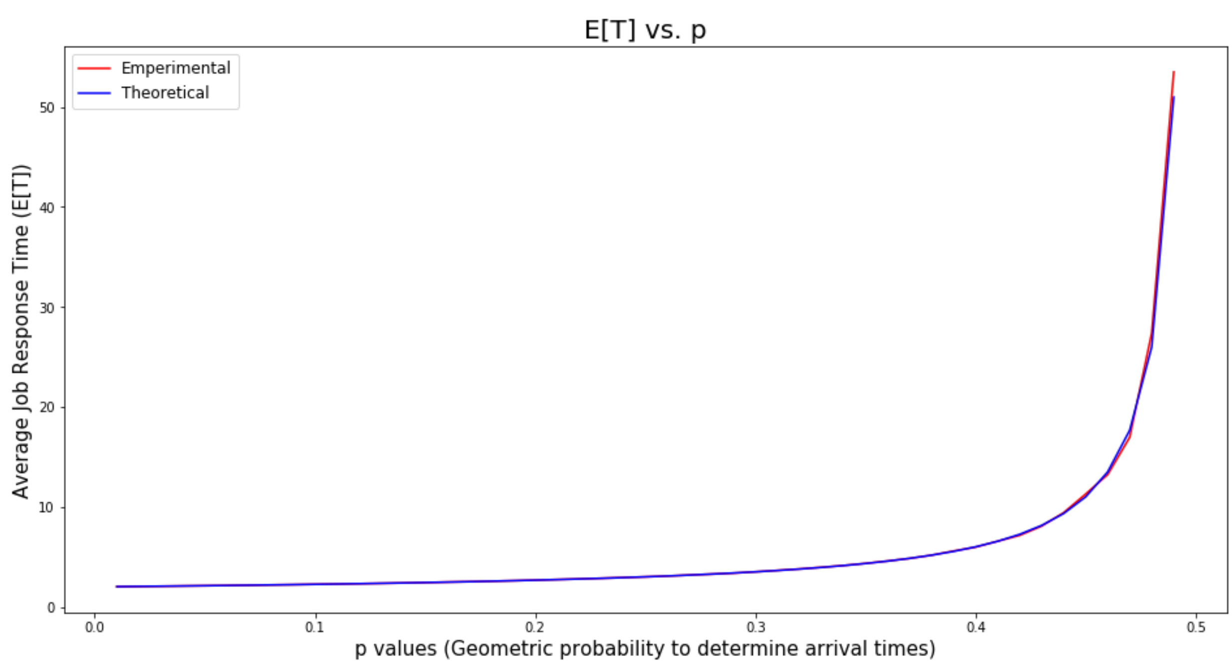
HW8 Part 4 Graphs and Discussion





Both graphs appear to show E[N] and E[T] increase gradually at first but as p gets closer and closer to 0.5, the value of q, then both values increase exponentially. The graphs are nearly identical in shape, however the values of E[T] are 2-3 times greater than the values of E[N]. It makes sense that as p increases, the average number of jobs in the server and the average response time increase because p increasing represents an decrease in the average time until a new job arrives. This means more jobs coming into the server and so more jobs will be waiting, and a job must wait longer. As p gets very close to q, which determines the job size, it makes sense that E[N] and E[T] increase exponentially, because the difference between average time until a job arrives and the average size of the job shrinks. This means a job is arriving at nearly the same rate that a job is being completed on average, so the size of the queue will decrease less and less of the time.

Furthermore, by comparing the graphs with the theoretical graph, we can see that the values match very closely throughout meaning that the simulation is working properly. The biggest deviation comes at the end when $p = 0.49$ which might be because of the high variability caused by a p so close to q or may be because performance degrades even faster than the theoretical value when p gets very close to q.

Citations:

Discussed briefly with my study group of Matthew Kaneb, Will DeGroot and David Dang.