Jonathan Laughlin

CS273

Pete Tucker

7/18/19

Final Project Summary

I decided for the comparisons to stay with a constant 35 patients per hour arrival rate, and a 168-hour time period. I averaged 4 trials to see what the average wait time for these intervals are.

**1 doctor and 1 nurse**

After running multiple tests, the average wait time per patient seems to be right around 100 minutes, ranging from about 80 to 160 minutes. After reviewing the other comparisons it is obvious that this has the highest average wait time.

**1 doctor 2 nurse**

After running a few tests on these settings, the average wait time for each person is right around 60 minutes, much lower than that of just 1 doctor and 1 nurse. This really shows how having just 1 more nurse can drastically impact speed.

**2 doctors 1 nurse**

After running a few tests on these settings, I noticed the range gap was similar to the first set of tests, ranging from around 50 to 120 minutes average wait time. However, the average wait time for these settings is right around 80 minutes. This really shows how more nurses will decrease the average wait time, as the higher priority illnesses are more common.

After looking at these three different tests it is very clear how just one additional doctor or nurse can shave quite a lot of time off the average wait time. If the arrival rate was higher, I would assume I would see a much larger gap between the three. Assuming you let this go longer than a week of 168 hours, there would be most likely a larger gap in wait time, as the 1 doctor 1 nurse would not be able to get to as many patients as the other two.

Below is a plot graph of both increasing patient arrival rates and, different combinations of doctors and nurses. The points are based on a total simulated time of 168 hours or 10,080 minutes. The values are based on an average of 5 run times.

After reviewing the plot graph, I am actually quite intrigued with the data plots as I was not expecting a few of them to be the way that they are. For example, a few had a higher average of around 40 patients per hour, compared to 60, which is a bit strange to me. Studying the graph, I can see why it looks the way it does, as there seems to be a relationship between the higher number of nurses and doctors, and the higher the patient arrival rate is, the longer average visit time is. The less nurses and doctors there are and the higher the patient arrival rate is, the larger gap between averages there are. After observing a bit longer with a linear trend line on each plot, it is clearly visible that as the number of doctors and nurses increase, the average wait time for each person decreases steadily.

Throughout the implementation process, my design was constantly changing. I was constantly noticing I needed more functions or classes to do certain things. For example, I started off will about five classes in my first stages of design and ended up having 12 classes. There were also multiple times in which I added more functions than I had originally, and/or even changing if things were public, private, or protected in classes. There were also multiple times in which I added a class or a function, then realized it was not as useful as I was hoping for, or there was an easier way to do what I was wanting and so I ended up scraping the idea. There were multiple times where I got stuck on something but through persistence, I was able to overcome them and end up with a solid product. I also got a bit confused at times when creating my UML as there are so many connecting parts, but I will get better with time.