

Project 1 Reflective Essay

Modelling and Simulation
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Model

Our model was good because it captured all the basics of the dining hall system. It also had a lot of output information in the form of labelled graphs, making it easy to see and understand the results. Lastly, although we wrote a lot of code, it was mostly modular, so we could edit one part of the code such as the arrivals without affecting another part like swiping into the food court.

One of the weaknesses of our model was that the lambda value for our exponential distribution, which was supposed to represent average number of events in an interval, was based on the percentage students available. Ideally, it would instead be based on the ratio of the percent students available at that time to the average percent students available on that day, better distributing the arrivals across the entire lunch period on the less busy days such as Wednesdays. To do this, we would have to calculate the average percent students available per day and rethink our lambda value.

Additionally, our exponential distribution stores the arrival time for each person with person as the index, which is less effective than it would be to store the number of people that arrived per minute with the minute as the index. This was because the simulation iterates over minutes, not people, so if the indexing system matched up, it would simplify the code significantly at this interface. Rewriting the arrival times function to make this change in how the information is stored would be a good improvement.

Lastly, the organization of the code could use some work. To make it easier to run the simulation for each day, each function returns the information it has compiled in the form of an array / list. If one passed the wrong output information as input into one of the functions, it would screw up the system. Therefore, we should make a new state, either for each day, or one for the whole week, which is passed to the functions to add information into, reducing the number of arrays passed around between functions and making the code organization more straightforward.

Teaming

Working with Bahar went really well. We scheduled several times to meet at the library and work together. Afterwards, if we felt like something needed more work, one of us would take responsibility for completing that part of the project and work on it on our own.

Since Bahar was new to programming, she had to learn about things such as queues and the scope of variables. Because of this, she also had a more objective understanding of the code, which helped to keep perspective on what the purpose of each part of our code was. Her asking clarifying questions was useful for both of us, because it also helped me to make sure that I understood how the code was working well enough to teach someone else.

Bahar was a great project partner, and helped with every aspect of the project, including working on and reviewing the code, writing out a lot of the answers to the QMRI questions, and, importantly, helping with organizational things such as volunteering printing out our work, which I have a tendency to forget about.

I feel like I could have been a slightly better assignment partner by not obsessing over improving the code so much and being just a little bit less ambitious. However, we produced a project that I'm proud of, so I am happy with how it turned out.

Looking Back

Through doing this project, I have familiarized myself more with python and libraries such as matplotlib. This is a good start, and something I hope to continue working on in this class. I also want to learn what I can do with numpy and pandas because that seems like very useful basic knowledge. I guess I would say that my goal is to venture outside of the modsim library and into actual python libraries at least a little bit. It was also good for me to get back into programming after almost a month since I last wrote code.

Also, I learned what a computational essay is, wrote my first one, and learned more in depth how to use cocalc and jupyter notebooks. Something that I have been trying to work on recently is learning how to document my work better, for others' understanding as well as for my own organization. I think that computational essays are going to be an important tool for me to learn how to document my code better because they give me a format to work from.

Looking Ahead

For the next project, I think I will try to frontload the work more, so that I'm not still working on the project on the day that it is due. I will also try to write an overall code outline at the start and try to stay within that purview, to prevent becoming overambitious about what I can get done in a week as well as to keep the code more organized the next time around.