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CS273 Data Structures

Final Project: Hospital Simulator

Final Summary

For my data structures final project, I simulated one week inside an emergency room. Patients were admitted at random based on the rate the user inputs and passed through waiting room to treatment room to discharge in either a doctor queue or a nurse queue. The queue the patient was sent to was dependent on their illness level. My project currently has a runtime error when inside the updateDoctor(int clock) function trying to add a patient pointer to the doctorQueue inside the TreatmentQueue class. The project was a difficult simulation for me to tackle and I spent over thirty hours working through the assignment.

Some challenges I faced were initially with putting the text files of all of the names into separate vectors for 2000 citizens. I was experiencing a runtime error where the vector was out of range and after countless hours on that one problem, I discovered the last names vector only contained 1000 last names. I doubled the names inside the text file to fix this issue. Another major issue I was experiencing was with adding a new patient to the waitingRoomQueue class. I was adding the same patient for a certain amount of time and then it would be a different patient after that time when I wasn’t debugging. When I was debugging, the names would be different every time and I discovered there was an error with my random class time stamp. I tested the program using the \_sleep function and that showed a different patient every time and helped me solve the issue. I had too many srands and was using the library incorrectly.

I also ended with an error in creating the map that would be iterated through for the final menu after the simulation was run. My error is with inserting into the map with a pair function. I was not able to completely discover what was causing the error. Some things I would do differently include renaming my header files to not be confused with the doctor and nurse queues. I changed the way I was using queues in the program and stopped using waitingRoomQueue, treatmentQueue, and dischargeQueue. They are the names of all of the headerfiles however and that could potentially be confusing as I discovered when writing out my project requirement specifications.

Another thing I would do differently is write out extensive pseudo-code before I create some of the functions. It is a great way to step through the code and figure out what I am trying to get my program to do. This would ultimately be helpful in fixing the runtime error I have in he update function of the treatemeantQueue class.

If my simulation were to run correctly without facing the current runtime error, I would expect the program to be most efficient with two nurses and one doctor. This is because I triaged all of the patients with an illness level of 1 to 10 to go to nurses and 11 to 20 o go to doctors. The program is 70% likely to give a patient an illness level from 1 to 10, hence why more patients would be treated in comparison to one doctor and one nurse or two doctors and one nurse.