

Project Overview:

My project will simulate a valet service for a shopping mall parking garage. This software would allow for cars to be monitored in their parking, retrieval, and management of the cars as time passes. This simulation would involve things such as customers arriving, customers coming back to retrieve their car, and parking lot capacity changes as a whole to different floors of a garage.

Implementation:

I plan to use a `std::map` where it will be used to store and manipulate data that is related to data regarding the parking garage. The map will have each key represent a different floor on the parking garage. The map will categorize these levels of the parking garage into three different `std::lists` that will hold information regarding the cars that are parked on the level including the spaces where cars are currently parked, the times when these cars were parked, and the available parking spaces as it changes over time.

One map entry would be for the first level of the parking garage. The three lists within this level would include the spaces that are parked within, arrival times, and the available parking spaces. This would continue in map entries for the other levels of the garage.

The simulation will run over 10-minute intervals which will update the parking garage's status. Each interval will either allow for cars to arrive and be parked or to be retrieved by the owner. A valet system will handle this process and the parking lot will be shown in updated form after each 10 minute interval.

Simulated Events:

The simulation will focus primarily on car arrivals, car retrievals, parking lot capacity/overflow, as well as the fixed time periods it will operate over. A car arrival will happen randomly and the max cars that arrive every interval will be 10 cars. Car retrievals will also happen randomly at the same rate and will have a max retrieval rate of 5 cars each interval. Furthermore, in relation to parking garage overflow, if the garage is full cars will have to wait at the entrance until there are more retrievals. While the garage is in overflow status and there are a maximum of 5 cars waiting, there will be no more cars that are allowed to join the queue as they will be blocking the road outside of the garage.