**CS 225 P1 Project Proposal Name: \_\_\_\_Jack Lee\_\_\_\_\_\_\_\_\_\_\_**

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| **Provide an overall description of the project.** | |
| I plan to make a traffic simulation to study the effects of different road conditions and driving scenarios. The study will consist of various vehicle objects, with fast and slow cars, and perhaps semi-trucks and motorcycles. Because cars behave differently when different people drive them, there will also be different drivers using inheritance based on a GenericDriver. This way, slow drivers can drive fast cars and vice versa, which will be accurate to real life conditions. The road will be straight to mimic a US interstate, with variables to change the speed limit, number of lanes, and the weather. It will be interesting to see how the addition of new lanes or inclement weather affects traffic throughput. There will be a brake distance calculation system that depends on the driver’s reaction time, weather (visibility), and speed in order to determine when each driver will brake if the driver in front of it applies the brakes. The simulation will assume that fuel is limitless and that all vehicles are properly serviced and will not spontaneously break down, although an unstable car type would be interesting to simulate.  The user will be able to determine the road and weather conditions, the types of cars and drivers on the road, and they will be able to cause individual cars to slow down or stop. They will be able to add or remove cars to simulate cars leaving or entering the highway, and the console will output the number of cars on the road, the average speed, and the traffic flow rate. | |
| **Describe how the project will implement the project requirements.** | |
| **File I/O** | The user will be able to import text files with given road conditions and set driver/vehicle combinations to simulate. They will also be able to export the simulation settings as a text file to load again. If time allows, custom vehicle and driver creation via text files will be implemented as well. |
| **Exception**  **Handling** | The program will use exception handling to validate user input. The car and vehicle selection will be a number-based system, where each option will correspond to a number that the user can input. If the user inputs a letter or a number that does not correspond to an option, they will be asked to retry with the reason for the error. |
| **Inheritance** | There will be GenericVehicle and GenericDriver classes that contain the attributes needed for all of the drivers and vehicles (maxSpeed, reactionTime, velocity, acceleration, etc.)  In cases where the attributes are similar, the driver’s attributes will take precedence over the vehicle’s attributes (a slow driver will drive a fast car slowly, but it will still accelerate quickly).  Using these generic classes, subclasses can be created for different drivers (aggressive, slow, intoxicated or reckless) and different vehicles (sports car, pickup truck, commuter car) with different behaviors. If time allows, there will be other vehicles than cars, such as motorcycles and semi-trucks. |