Vincent Dante-Maniglia Software Development Project Proposal 5/2/17

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**Abstract**

In the state of New York, traffic is becoming more complicated with the increasing numbers of vehicles, and impatient drivers who face delays and have to worry about being late or accidents occurring. The purpose of this project is to create a simulation app that can help drivers better understand traffic flows and improve their recognition of traffic patterns.

**Introduction**

Some vehicular accidents are the result of faulty traffic lights. In this simulation app, those situations can be reduced by allowing the user to direct traffic flows by controlling the traffic lights. The user can tap the lights to change the colors and regulate the traffic while trying to avoid as many accidents as possible. This app utilizes a lot of “If” statements to direct traffic lights and the cars on the road. Most of the actions of the app can be done with switch variables that operate the traffic lights. It is all coordinated by the user and there can be a time limit on each traffic light that is red. There will be limits to the simulation and some scenarios that can appear be realistic. The code in the app is all about switching, choosing which light to switch and to direct the traffic flow, while avoiding accidents and not keeping drivers waiting too long. The limit of the game is reached if the line of cars extends to the end of the screen. If that happens, the game will end because a major traffic jam has occurred.

**System Requirements**

To run, the system requires Java and a minimal amount of memory. A mouse or touchscreen capability is necessary.

**Detailed System Description**

The program code will carefully keep the cars moving inside the grid, which shows the roads and their intersections, and Boolean variables determine the traffic light colors and control the movement and speed of vehicles. Levels will vary from easy to hard, the first level will start with a simplistic street with a few intersections, the second will include more intersections and an increasing number of cars, and the third level will be a street in New York City where there will be many intersections and more traffic lights.

This game is all about coordination and timing, with the programming of motion and with active functions of this game, it can make for an intellectually challenging app for people to enjoy testing their reflexes and hand/eye coordination. The code that the game currently has functions perfectly with the commands, being in synch with the actual performance of the game. The cars all move together while on the Y axis of the screen while they obey the brightly colored circle at the top-left of the screen as a real traffic light. When it is red, the code executes the command for the cars to stop, when it is green the cars move again. It will take more time to have all the cars move in different directions along with many other lights for them to obey. The speed of the cars is limited with the get speed values along with the get move north variables so the cars don’t move at extreme speeds and go off the pane. The cars are represented by colored rectangles which simulate the size of the cars from a bird’s eye view.

In the initial stages of designing the simulation, the first car created was yellow and the other cars were all green. Further additions to the code have improved the quality of the app. Now there is a road implemented into the layout, a large gray rectangle has been placed in the center of the app, the length is about as tall as the window, and the width is wide enough to provide enough room for two cars on the road. Additionally, the vehicles have been changed to two different colored cars moving in opposite directions. The new colors for the cars are: blue, red, purple, beige, cyan, aquamarine, brown, green, yellow, dark cyan, gold, orange, and pale green. All these colors now add more to the scene and increase diversity of the cars using the Math.random method. Now there is a new traffic light that was constructed using the same code from the earlier version, but the positioning has been changed to the adjacent corner of the intersection opposite the first traffic light. The player now has control of both stop lights. The objective of the game is to control the flow of traffic while avoiding collisions. Though a scoring mechanism and penalties do not exist yet, with further development, those can be implemented in the future. More adjustments to the code have added some logic of real life into the game. For example, when the traffic light of either road is red and if the cars are in the intersection, they still move forward, but as soon as they pass through the intersection and enter the main road again, they stop. This is similar to real life when the driver passes the light and proceeds. However, both cars now stop in the game regardless of what side of the road they are on, but further adjustments could be made if time permitted. The cars now teleport back to the beginnings of the roads on opposite sides on where they began. The cars drive on both sides of the road in opposite directions, simulating a one-way road, though without divider lines. The code for movements of the cars have map directions set into their programming such as North for vertical and West for horizontal. By using the teleport function and combining the varying colors, the code executes the sequence in such a way that it almost perfectly simulates the traffic flow with different colored cars to show continuity. When fully developed, not only could this be an entertaining app to pass time, but children could learn how traffic works through coordinating traffic lights and directing the flow of traffic. This may still be a prototype but if given more time and development, it can become a very fun and educational app for aspiring future drivers.

**Literature Survey and Conclusion**

In terms of “real world” apps, there are very sophisticated ones like Waze available that show actual traffic patterns in real time, to help drivers avoid traffic jams. Also, there is a great deal of development currently taking place regarding autonomous cars, which will incorporate radar, lasers, GPS and other technological techniques to navigate to destinations and hopefully reduce traffic accidents and fatalities. Obviously, my project is nowhere near that level of ability, complexity and sophistication, but as my coding skills continue to evolve, I envision being able to create game apps with more realistic graphics, and perhaps someday I will be employed at a company that is in the forefront of developing exciting new emerging technology.