

## **CS 550 Project Proposal: 3D Traffic Management Simulation**

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### **Goal:**

The goal of this project is to create a real-time 3D simulation of a traffic management system that incorporates basic traffic rules, vehicle movement, and intersection control. The simulation aims to showcase the implementation of 3D computer graphics in modeling a realistic traffic environment.

### **Features:**

- **Traffic Light Control:**

- i. The simulation will include traffic lights at intersections, controllable via keyboard keys for user interaction.
- ii. Additionally, key time values will dynamically change the traffic lights for specific durations, adding a time-based element to the traffic signal management.

- **Vehicle Behavior and Traffic Rules:**

- i. Different vehicles in the simulation will adhere to traffic rules based on their respective lanes.
- ii. Each lane will have its designated traffic light, determining vehicle movement and behavior, adding realism to traffic flow simulation.

- **Visual Enhancements:**

- i. Lighting will be implemented to elevate the visual appeal, creating a more realistic and immersive experience within the simulation.

- **Viewpoint and Camera Control:**

- i. Users will have options to observe the simulation from various viewpoints and camera angles using keyboard keys (e.g., W, A, S, D), offering flexibility in exploring the simulated traffic environment.

- **Simulation Layout and Control:**

- i. The simulation aims to replicate a scenario similar to the provided picture with four roads, each equipped with distinct traffic lights controllable via keyboard input.
- ii. Key time values will be predefined to regulate the traffic lights' changes at specific intervals, ensuring a controlled traffic flow within the simulation.

- **Vehicle Movement Based on Traffic Lights:**

- i. When the green light illuminates, vehicles in the respective lanes will transition to other lanes, simulating movement towards a designated endpoint within the simulation.

**Additional Features (if time permits):**

If time allows, streetlights may be implemented and controlled in coordination with vehicle movement and traffic flow, adding further environmental realism to the simulation.

