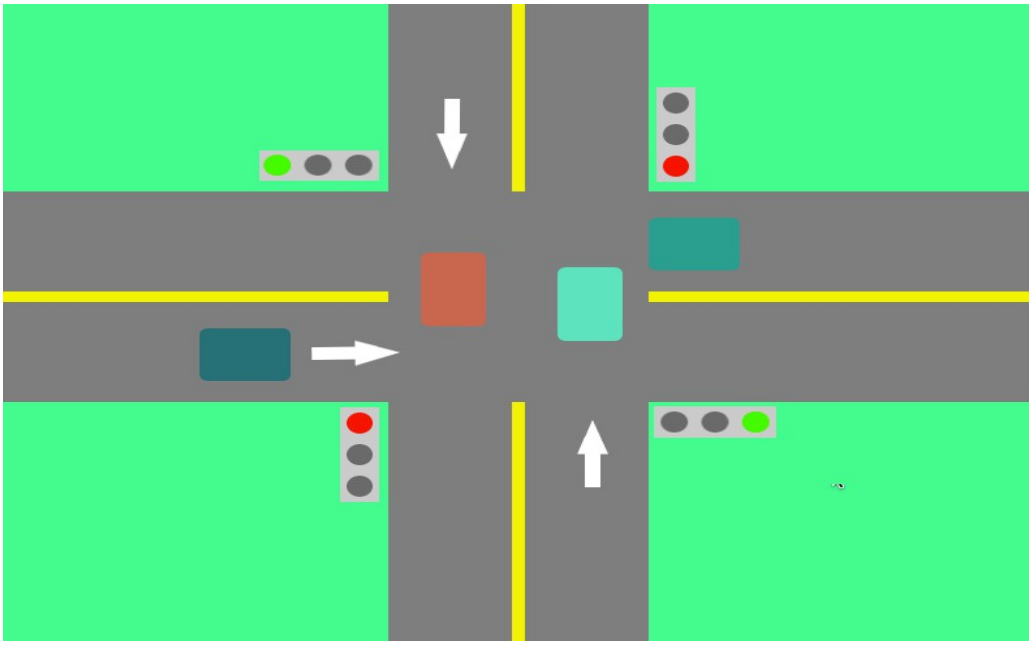
Object-oriented Programming
Section C&D Spring 2022
Course Project

Traffic Simulator **Due: May 31, 2022**



Traffic simulators are essential for proper planning and management of road traffic issues in the modern urban cities. They allow to mathematically model and evaluate the impact of several design aspects (such as capacity, demand, flow-rate, etc.) with various level of details.

The project is to develop an **Object-oriented** Traffic Simulator using the concepts of **association**, **inheritance and polymorphism**. Implement the following classes with appropriate relationships to allow a simple traffic simulation:

- Road: A road allows vehicle movement from an origin to end. For simplicity assume, each road comprises of 2 lanes (each dedicated for movement in each direction) using a strictly linear trajectory (without any curves).
- Intersection: An intersection is a crossing where two or more roads converge. For simplicity, consider a four-way intersection only that uses traffic signals (using a **coordination strategy**) to control traffic flow.
- Traffic Signal: A sequence of 3 signals or lights (red, yellow, and green) to regulate traffic flow. Each light turns on exclusively for a certain time period (in seconds)
- Vehicle: A rectangular object taking a route (a sequence of roads) to reach its destination, moving at a certain speed. It must abide by rules concerning a traffic signal controller, while crossing an intersection.

Implement **at least two** different strategies to coordinate traffic at intersections and evaluate their impact on traffic conditions.

Instructions

- You are provided with a simple graphics library that you may use for rendering graphics and handling events on a Windows console.
- You have to submit a complete working system, along with the source code and a README file that tells us how to use your software.
- Your implementation shall be **object-oriented** according to the description given above. **No credit without proper use of association, inheritance and polymorphism**.
- Your code should be properly commented and use descriptive and meaningful names for classes and their members.
- Your program should be user friendly
- Plagiarism will not be tolerated. It will result in a straight F in the course and forwarded to DC committee, who might award 5 F's in all courses you are taking.
- The project may be done in a group of **three people at max**. Include the name and roll number of group members in the README file.