# **CP2406 Assignment Task 1**

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**Traffic Simulator**

**Problem Specification:**

The problem provided was to design and create a functioning car traffic simulator designed to at least use Cars, Motorbikes and Buses. The program must showcase the road with working traffic lights along with the various vehicles moving along the road and pass through. Not only that but must also allow timing duration for each of the traffic lights to work and allow cars to move through the intersection segments within the simulated road.

**Problem Decomposition:**

As there are various objects needed to run for the simulation to fully function, the objects are divided into the following.

# The vehicle class is an object that could either be a car, bus or motorbike.

id - an identification number that uniquely identifies each vehicle.

Length, Breadth - The dimensions of the vehicle.

Location - The exact place where the vehicle is located at.

Road Location - The road in which the vehicle is currently travelling on.

Speed - How fast a vehicle moves.

Spawn Location - Location in which the vehicle first enters the simulator.

Location on Red Light - Location where a vehicle stops if it is approaching a traffic light that has turned red.

Move Direction - Direction in which the vehicle chooses to take when travelling through an intersection.

**Road**

The road class is an object that could either be a straight intersection

- id - an identifier that will differentiate each road

- Length– the length of road.

-Start location– the coordinate where the road begins.

-End location– the coordinate where the road ends.

-Linked Roads - List of all of the other roads that are connected to this road.

-Linked Traffic Lights - List of all traffic lights that are connected to the road.

-Current Vehicles on road - List of all vehicles that are currently on the road.

**Traffic Light**

The traffic light class will represent a simple red or green traffic light.

id - an identification number that uniquely identifies each road.

red light - the traffic light turns to red.

green light -the traffic light turns to green.

Road Location - the road in which the traffic light is connected to.

Position - The position in which the traffic light is located on the road.

**Main**

This class will have the main() method that will contain the simulation loop.

All the objects needed for the simulation will be created here; creating roads, a car and a traffic light. Locations for roads and thier connection will also be set here. For this version of the program the user will only have conrol over the lenght of the road and the speed.