CP2406 ASSESSMENT TASK 1 WORKING DOCUMENT

# Problem Specification:

The problem is to create a working traffic simulator. The simulator will simulate roads, traffic lights, and vehicles (cars, buses and motorbikes).

# Problem Decomposition:

## Class Design:

Main will act as the simulator and will create each object and call their methods when appropriate.

Objects of the Road class have the role of having a car drive over them and having a traffic light at either the start of the road or the end of the road. The member fields needed will be length. The member fields of this object will be private since they will not be accessed outside of the object. The methods this object will need are; setLength, and getLength(). These will be public since they will be used in Main and in TrafficLight  
 Objects of the Car class have the role of driving on a road and through a traffic light when the traffic light is green. The member fields needed will be length and position. The member fields of this object will be private since they will not be accessed outside of the object. The methods this object will need are; move(), setPosition(int), getLength() and getPosition(). These will be public since they will be used in Main and in Road.  
  
 Objects of the TrafficLight class have the role of being on a road and changing its state. The member fields needed will be position, status and change\_rate. The member fields of this object will be private since they will not be accessed outside of the object. The methods this object will need are; setPosition(), setStatus(), getPositio() and isStatus(). These will be public since they will be used in Main.

## Method Design:

The method signatures for Road should be setLength, and getLength().

setLength() will perform the task of setting the length of the road based on the length of the car. The algorithm it will use it a simple while statement that will set the length only if the int is between 6 and 15. The int is determined at random.

getLength() will perform the task of returning the road’s length

The method signatures for Car should be move(), setPosition(int), getLength() and getPosition().

move() will perform the task of incrementing the car’s position be 1.

setPosition(int) will perform the task of setting the car’s position based on the int passed in.

getLength() will perform the task of returning the length of the car.

getPosition() will perform the task of returning the position of the car.

The method signatures for TrafficLight should be setPosition(), setStatus(), getPositio() and isStatus().

setPosition() will perform the task of setting the position of the traffic light based on the length of the road.

setStatus() will perform the task of changing the state of the traffic light from true to false. The algorithm used is a random int generator and a simple while loop that re-generates the random int only if it is higher than the change\_rate and the status of the traffic lights is false.

getPosition() will perform the task of returning the position of the traffic light.

isStatus() will return true or false for the status of the traffic light.

