

# **Report**

## **Requirements:**

- 1.) Python 3 and above
- 2.) Python Random Library
- 3.) Python Math Library
- 4.) Python Numpy Library
- 5.) Node JS

## **Nomenclature:**

- 1.) T1 - Truck
- 2.) T21 - Unloaded Tanker
- 3.) T22 - Loaded Tanker
- 4.) T31 - Unloaded Troller
- 5.) T32 - Loaded Troller
- 6.) B1 - Bus
- 7.) C1 - Car
- 8.) E - E-rickshaw
- 9.) T4 - Tempos
- 10.) B2 - Bikes & Scooty
- 11.) C2 - Cycles

## **Assumptions:**

- 1.) 1 Unit = 2.5 meters
- 2.) Maximum Capacity of Road = 150 units
- 3.) 6 Lanes in a Road (3 Lanes for Incoming, 3 Lanes for Outgoing)
- 4.) Maximum Capacity of Each Lane = 25 Units
- 5.) Units Consumed by each Truck and Bus = 5 Units
- 6.) Units Consumed by each Loaded and Unloaded Tanker = 6 Units

- 7.) Units Consumed by each Loaded and Unloaded Troller = 7 Units
- 8.) Units Consumed by each Car, Tempo and E-rickshaw = 2 Units
- 9.) Units Consumed by each Bike, Scootie and Cycle = 1 Units
- 10.) Average Speed of Loaded Troller, Loaded Tanker and cycle = 10
- 11.) Average Speed of Unloaded Troller and Truck = 15
- 12.) Average Speed of Bus, Unloaded Tanker and E-Rickshaw = 20
- 13.) Average Speed of Tempo = 25
- 14.) Average Speed of Car = 30
- 15.) Average Speed of Bike/Scooty = 35

### **traffic.py**

- 1) **Constructor of class road** :- It defines various arrays for each kind of vehicle and variables like congestion, space and vehicles.
- 2) **Display()** :- It prints the details of the road, number of vehicles, space consumed and the corresponding congestion.
- 3) **fillGap()**:- It is used to fill the vacant spaces of the road as soon as the vehicle starts moving ahead on Green Signal.
- 4) **countveh()**:- It counts the vehicle present in a lane and the vehicles being added further.
- 5) **Merge()**:- On observing the real time situation we often see that multiple bikes, scooties and cycles stand in a single lane. Similar is the working of the function.
- 6) **getvehicle()**:-
- 7) **userInput()**:- It is used to take the input for the user and store it in a file, which will be used ahead.
- 8) **main()**:- It is used to take the user choice and correspondingly take the values either by default case or by user input case. Various nomenclatures are also explained in the this part of the code. It is the backbone of all the functions defined in and outside the class.
- 9) **Constructor of class vehicle**:- Defines the type of the vehicle and space of the corresponding vehicle.
- 10) **direction()**:- It gives the direction to each vehicle entering the road.
- 11) **ButtonClick()**:- It is used to give a road some extra time to clear the congestion and shift the signalling if a road has been cleared.

## Movement.py

- 1) **arrange()**:- It is used to arrange the vehicles according to their direction of movement on the road. If the vehicle is not been able to get placed in the desired lane, then he will be placed in the waiting queue until there is a vacancy to the road he wants to.
- 2) **inCenterLaneMovingRight()**:- It gives information to the drivers to who is in the centre lane but wants to take a right turn, in which cases he may have a collision with the other lanes.
- 3) **inRightMovingStraight()**:- It gives information to the drivers to who is in the right lane but wants to go straight, in which cases he may have a collision with the other lanes.
- 4) **movementLane()**:- It calculates the speed of all the vehicles on the road and how long will they take to cross the roundabout.

## Signal.py

- 1) **Constructor of class Signal**:- It is used to define the signal colour of each road for a round-about and also specify the duration of the signal.
- 2) **MoveLeft()**:-
- 3) **moveForward()**:- It is used to move the traffic forward as soon as the Green Signal is given and also predict the motion of the remaining vehicles.
- 4) **FCFS()**:- This function comes into action when all the signal lights are Orange and in the time slot 22:00pm - 06:00am. This part of the code will start from road 1 and will traverse all the roads sequentially and if a vehicle is found in any lane, then that vehicle would be passed according to First Come First Serve Basis.
- 5) **lightGreen()**:- This part of the code works when the Green Signal is given to a road. It also calculates the count of vehicles that have crossed the road and the vehicles remaining and print the new arrangement for the road.
- 6) **mainSignal()**:- This function gives the signalling of each road in clockwise direction and tell the Left lane movement.

## default.pys

- 1) **inflow()**:- This function works when the user entered values have to be read from the file and respective task have to be performed that is the arrangement and signalling.
- 2) **takeDefault()**:- Takes the time in 24 hour format and call the function according to that time to give the congestion.

- 3) **Early()**:- Works when the time entered by the user is between 22 (10pm) and 6 am and record is maintained for that case.

### **test.py**

- 1) **recording()**:- records the congestion values observed in past along with time and congestion of all roads and total vehicles on the road.