**University of Plymouth**

**NET107:** Principles of Infrastructure

Coursework

Traffic Lights –Report

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# Overview

The Traffic light client and server aims to represent a realistic situation of a crossroad with cars and how the server manages to the traffic system.

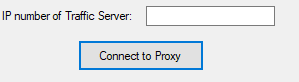
The traffic light program handles many connections (4 clients will connect to a single server) from different IPs and a restriction was made so that same IP connection can be blocked.

The light system displays Red until ten cars are on the que and also a timer was set to check the number of cars on each road deciding which road’s car should be allowed to go or halt. Each IP connection is being taken as one road of a cross section, making the program smoother to run on server side.

# Client

## Usage

The user has to make sure that the server and the client is connected with the help of IPS.



To run the application the client can send any number of car one by one ( like in a real world) and to confirm a car has been sent and received by the server messages are displayed both in the server and client side.  For a better understanding of the situation an animation was created for the user which really stands out as the animation was fully raw coded without the use of any DLL or vector which was really tough for animating in a real time server.

# Server

## Usage

**Need server picture!!!!!!!!!!**

The user writes in the IPS of each client that requires a connection. Which in turn represents one road in the crossroad. The number of cars being sent from the client are fetched up in the server and thus acts upon the request of the client which is basically deciding when the cars should be allowed to go and on which side of the crossroad.

# Application Layer Protocol (API)( how its done)

When a connection is made between the client and server a string messages are being exchanged between the client and the server ensuring the user about the connection. Once , the connection is made user can decide the number of cars which are also being send as messages in to an array ( need array name and explanation with array ) which is used ………. The server has a time ticker which reads picks up the number of car on each road thus decides to which road should be allowed depending on which road hits the number of 10 cars first, light message which is also sent as string message are being displayed on both side -client and server side. After cars being allowed to leave the client side is reset to 0 so that the user can send in more car.

Picture with code with description is needed here!!

# Evaluation(how we feel)

Overall the application is a simulation of real world traffic lights, and why we are so satisfied with our application is because our server actually work like real server where the client requests something and the server reacts accordingly more over we have a somewhat working animation with bitmap where it will help the user to understand the actual situation of the crossroads. But, however we would have been really pleased if the animation actually worked for all the roads and if we actually could make the program more efficient. But, still as out server if capable of handling multiple IPS(clients) and react accordingly we think it is really capable of even handling real life traffic lights . More over the application really stands out in the top because with every decision both the server and the client displays message showing what actually had happened which makes it easier to use , moreover even if multiple connection are made from separate ips and different people are handling it both will be aware of what is actually going on the server and client side.

## Highlights

## Limitations

Due to usage of the animation it was creating a massive memory usage as the bitmap images we used could not be disposed thus we had to enforce garbage collector in order to make the program more efficient. Also, even though the server and client communicates perfectly and decides how the car should behave but however while testing out the animation some mistakes were actually found especially with east and south road. It was observed that even though server and received 10 cars and decided what to be done with them, but an extra car was being drawn. On, the other hand on south road it was found that the cars were not spawning in the right place. But, however the server itself can decide and handle many connection but the problem persists with the animation.

Finally , as all the messages are being sent from and into main thread having multiple client from the same IP halt the application , however multiple clients from multiple Ips works fine ,similarly if client and server is being ran in the same ip its work fine.

## Further Development

If there was a scope to develop the application further we would have created separate thread for each connection with blocking the main thread which for any application is not good. Moreover, we would have implemented a linked list for storing IP addresses which would potentially help us with many other connections of IP(client) and handle their request in real-time.

Finally , we would have changed the simulation into more realistic situation where emergencies like ambulance or creating a 2 way road rather than a one way road .

# Contributions

Ill Leave this on you bro