CS3205 - Assignment1

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1 Question 1

1.1 Part A

Haversine Distance is used to calculate the distance between two points given its Latitude and Longitude.

1.2 Part B

The Python script pings each server(the ip-adresses) 10 times. An API has been used to find the latitude and longitude of the server, which also provides the city(if not available provides, the state or country) that the server is located in.

The Log file for first 5 IP-adresses is shown below

```
Chennai,206.71.50.230, Brooklyn, 297,337,377,365,368,373,279,348,377,368
Chennai,65.49.22.66, United States, 371,330,340,327,421,376,326,330,329,329
Chennai,207.228.238.7, United States, 280,278,279,290,287,279,284,328,354,279
Chennai,184.107.126.165, Montreal, 303,298,294,297,292,296,297,294,296,299
Chennai,131.255.7.26, Buenos Aires, 430,522,467,486,579,471,676,591,563,532
```

1.3 Part C

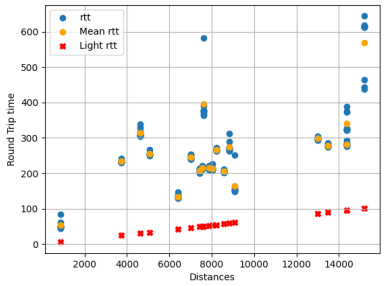

Figure 1:

The Mean Round Trip Time increases with Distance. However there is deviations in this behaviour for certain servers. This is because distance is not the only factor. Other Factors like Number of Routers that the packet travels through and the traffic in networks affect the RTT values. Round Trip Time calculated using the speed of light is much lesser than that was seen using ping. This slowdown was measured by taking the mean of the slowdowns for each server.

```
Slowdown : 5.189749443641382
```

1.4 Part D

The following command is run in a Command Prompt Window:

```
tracert 139.130.4.5
```

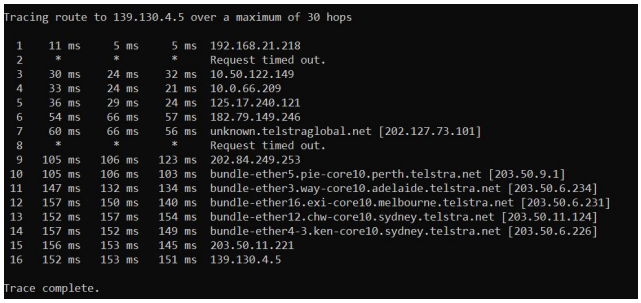

Figure 2:

```
Number of Hops = 16
```

Router number 6 is the last Indian Router

IP Address	Country	Region	City
182.79.149.246	India	Delhi	Delhi

Figure 3:

Router number 7 which is a foreign router is located in *Singapore*

IP Address	Country	Region	City
202.127.73.101	Singapore	Singapore	Singapore

Figure 4:

2 Question 2

2.1 Part A

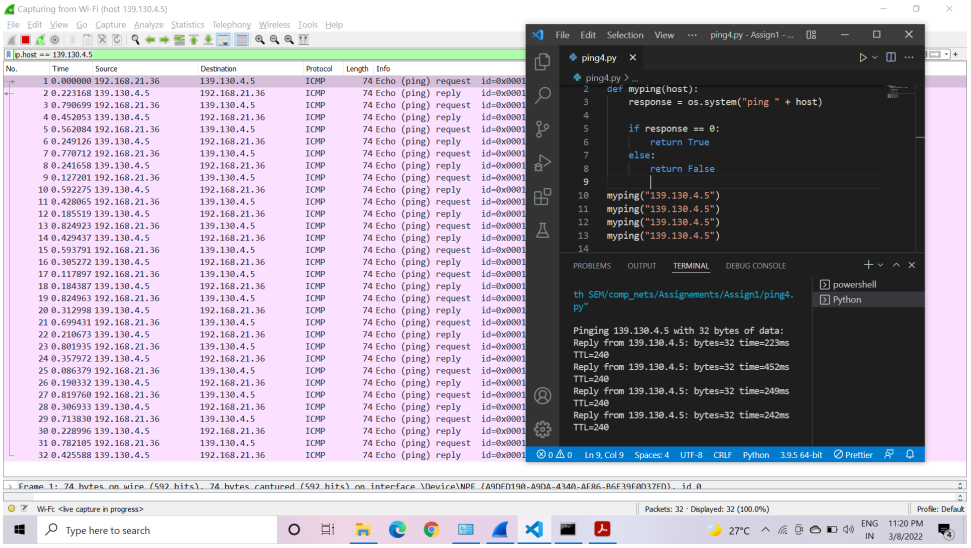

Figure 5:

```
32 packets were exchanged.
```

In the figure the Round Trip Times are available in the Python terminal. The time column in the Wireshark file gives the time elapsed from the previous Captured packet. Every even numbered row represents the return packet(packet from the server) and their time column gives the Round Trip Time of a ping request which is in agreement with the values recorded in the terminal.

2.2 Part B

2.2.1 i

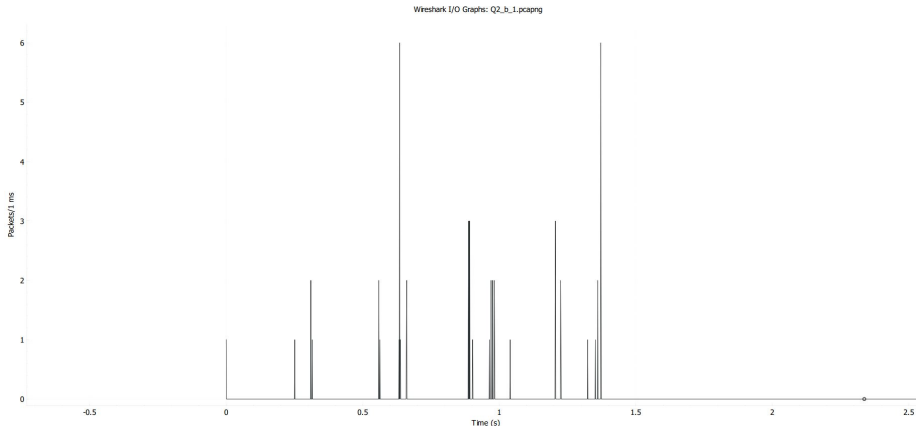

Figure 6:

Packets exchanged in the first 5 seconds:

```
Packets exchanged in the 1st second : 35
Packets exchanged in the 2nd second : 16
Packets exchanged in the 3rd second : 0
Packets exchanged in the 4th second : 0
Packets exchanged in the 5th second : 0
```

2.2.2 ii

Including Error packets there are a total of 76 packets
Out of which 40 are outgoing and 36 are incoming

2.3 iii

Incoming Data size = 22,768 Bytes.
Outgoing Data size = 4200 Bytes.

2.4 Part C

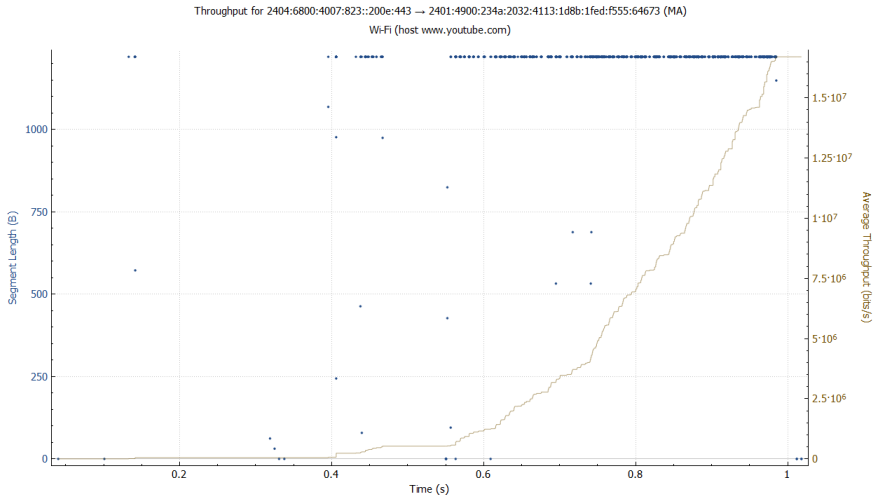

Figure 7:

2.5 Question 3

Test coded message:

```
044B5281EE2E8BCC8942220109C9D2463BA1D0D0061BBDB1486A839085726203A5B8
E044B31D89E44F2B05C9760A6101855E2F2181D1504EA981ADD80EFF0DAD660A03D9
95E44E2901DDE82F1325AFD206D39C81E83EC3A5C9E8662B97B85C
```

Decoded Message:

```
It was a bright cold day in February, and the clocks were striking thirteen.
```