

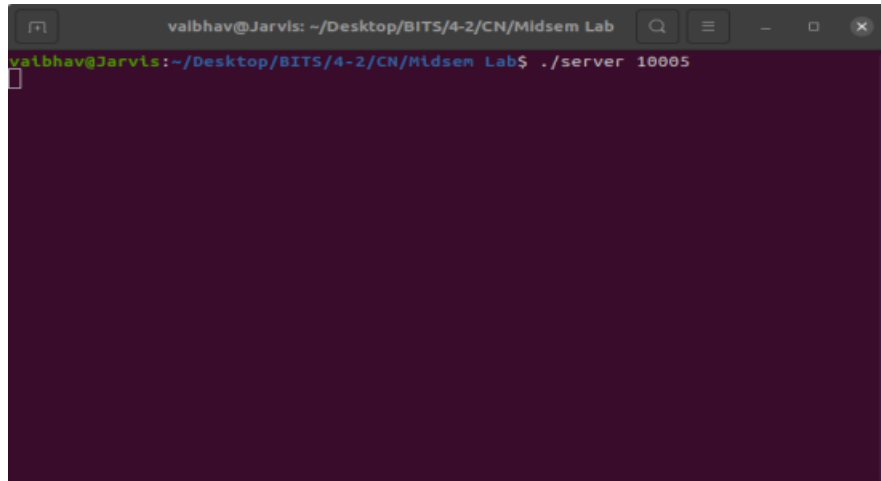
Computer Networks Midsem Lab

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Write a TCP server and a client for the following.

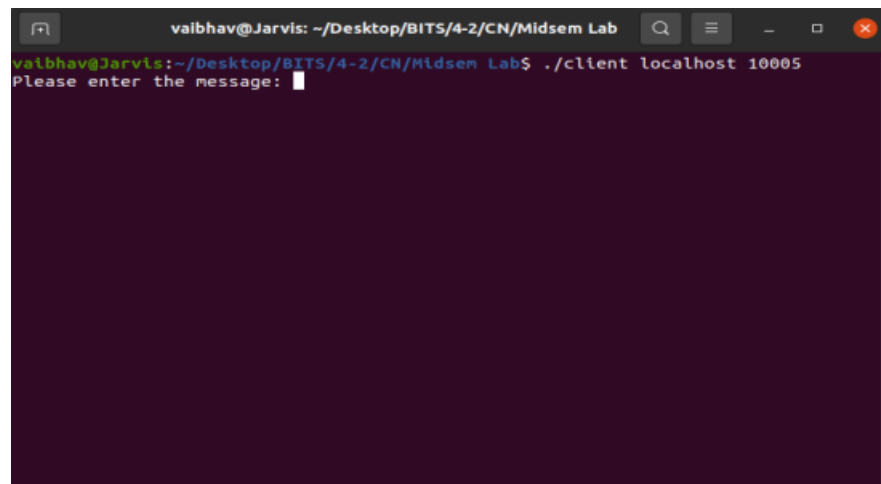
1. The server as a command line argument accepts the port number to which it should bind. (2 marks)

A terminal window with a dark purple background. The title bar reads 'vaibhav@Jarvis: ~/Desktop/BITS/4-2/CN/Midsem Lab'. The prompt is 'vaibhav@Jarvis:~/Desktop/BITS/4-2/CN/Midsem Lab\$'. The command entered is './server 10005'.

```
vaibhav@Jarvis:~/Desktop/BITS/4-2/CN/Midsem Lab$ ./server 10005
```

Here 10005 is the port that is given to the server

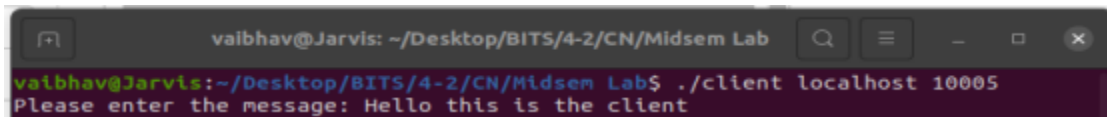
2. The client, as command line arguments, accepts the IP address and the port number at which it will find the server. (2 marks)

A terminal window with a dark purple background. The title bar reads 'vaibhav@Jarvis: ~/Desktop/BITS/4-2/CN/Midsem Lab'. The prompt is 'vaibhav@Jarvis:~/Desktop/BITS/4-2/CN/Midsem Lab\$'. The command entered is './client localhost 10005'. Below the command, the text 'Please enter the message:' is displayed with a cursor.

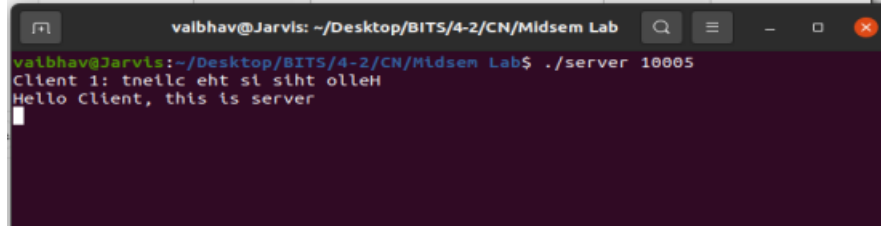
```
vaibhav@Jarvis:~/Desktop/BITS/4-2/CN/Midsem Lab$ ./client localhost 10005
Please enter the message: 
```

Here localhost is the IP Address given to the client along with the port 10005

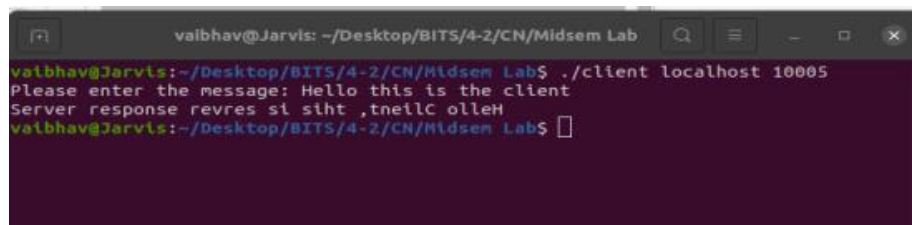
3. After connecting to the server, the client reads a line from the standard input and sends it to the server. (2 marks)



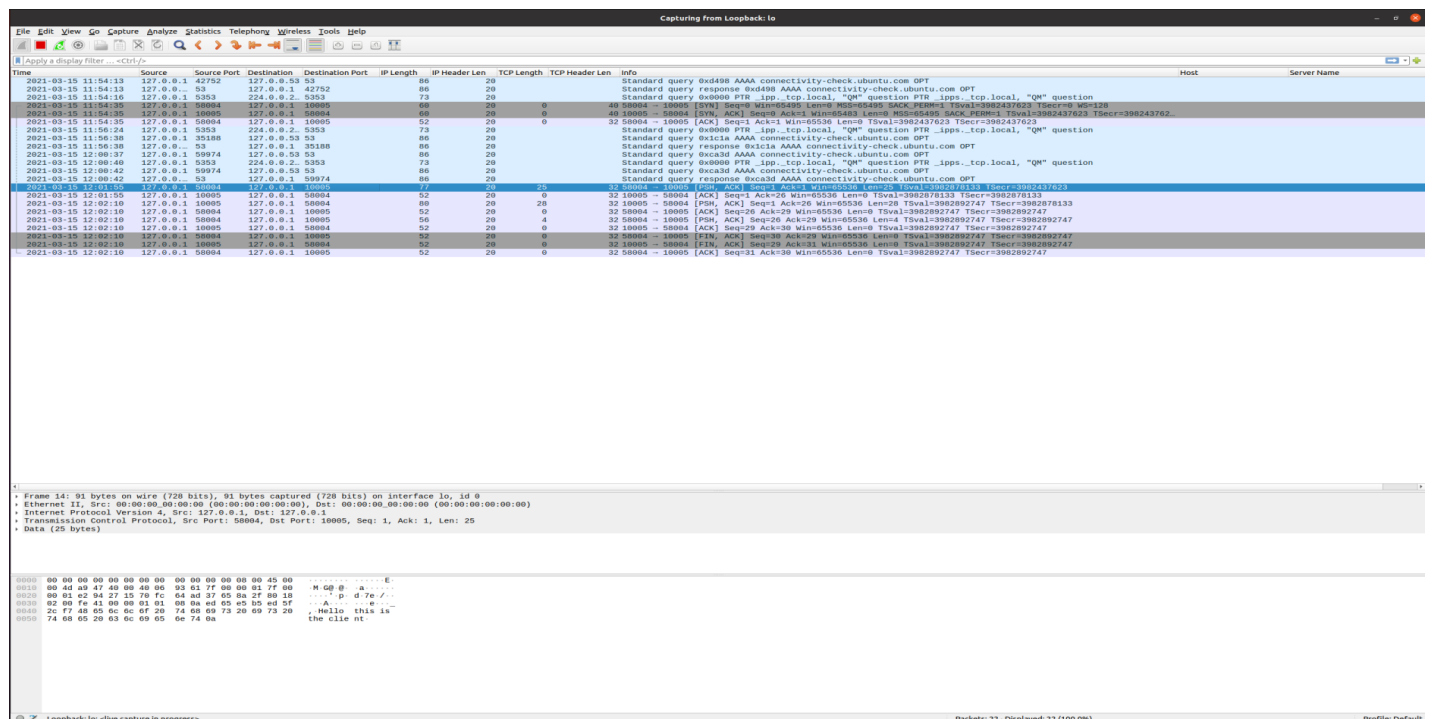
4. The server prints the received line in the reverser order (2 marks) and reads a line from the standard input and sends it to the client. (2 marks)



5. The client prints the received line in the reverse order and exits. The server is ready to accept a new client. (2 marks)

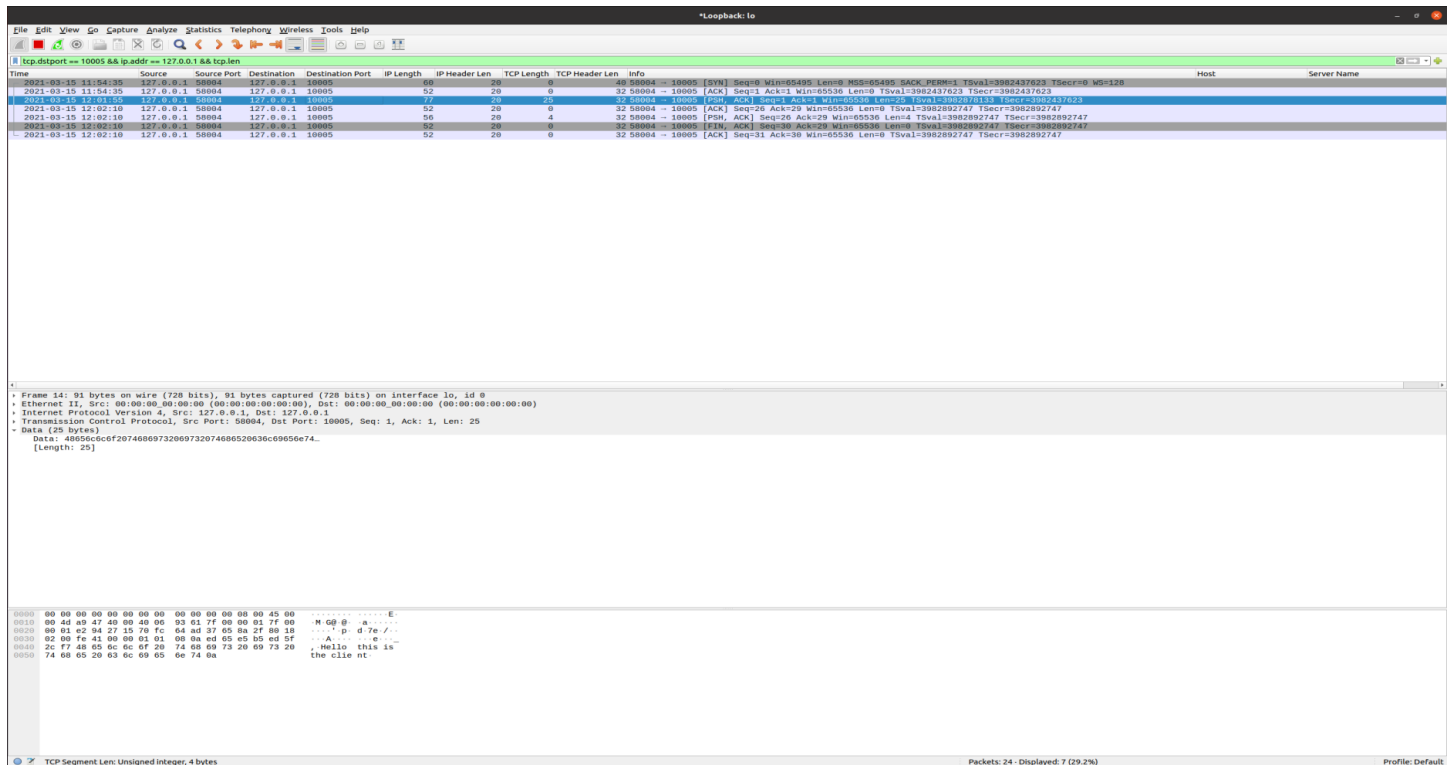


6. Use Wireshark to capture the packets (2 marks)



Here the packets have been captured using the loopback.io which captures the localhost connection as that is the IP Address of the server.

7. Write a filter that will find what were the sizes of the TCP segment sent from the client to the server. (2 marks)



I have added few columns on the wireshark which will help in better understanding of the packets.

tcp.len is used to show the length of the tcp packet. Tcp.hdr_len shows the length of the tcp header. Ip.len displays the ip length and ip.hdr_len displays the ip header length.

The filter used here is `tcp.dstport == 10005 && ip.addr == 127.0.0.1 && tcp.len`. The port used is **10005**.

The TCP Segment size is `tcp.hdr_len + tcp.len = 32 + 25 = 57`

8. Compare the number of bytes in the line with those observed in the TCP segment. Justify how the values match. (2 marks)

IP Length= IP header length + tcp segment length + tcp header length

ip.len = ip.hdr_len + tcp.len + tcp.hdr_len

In the 3rd row,

IP Length =77

IP Header Length = 20

TCP Length = 25

TCP Header Length = 32

We can clearly see that $20+25+32 = 77$ which justifies the formula. This is the reason why IP Length is larger in size as compared to the actual length of the TCP segment.