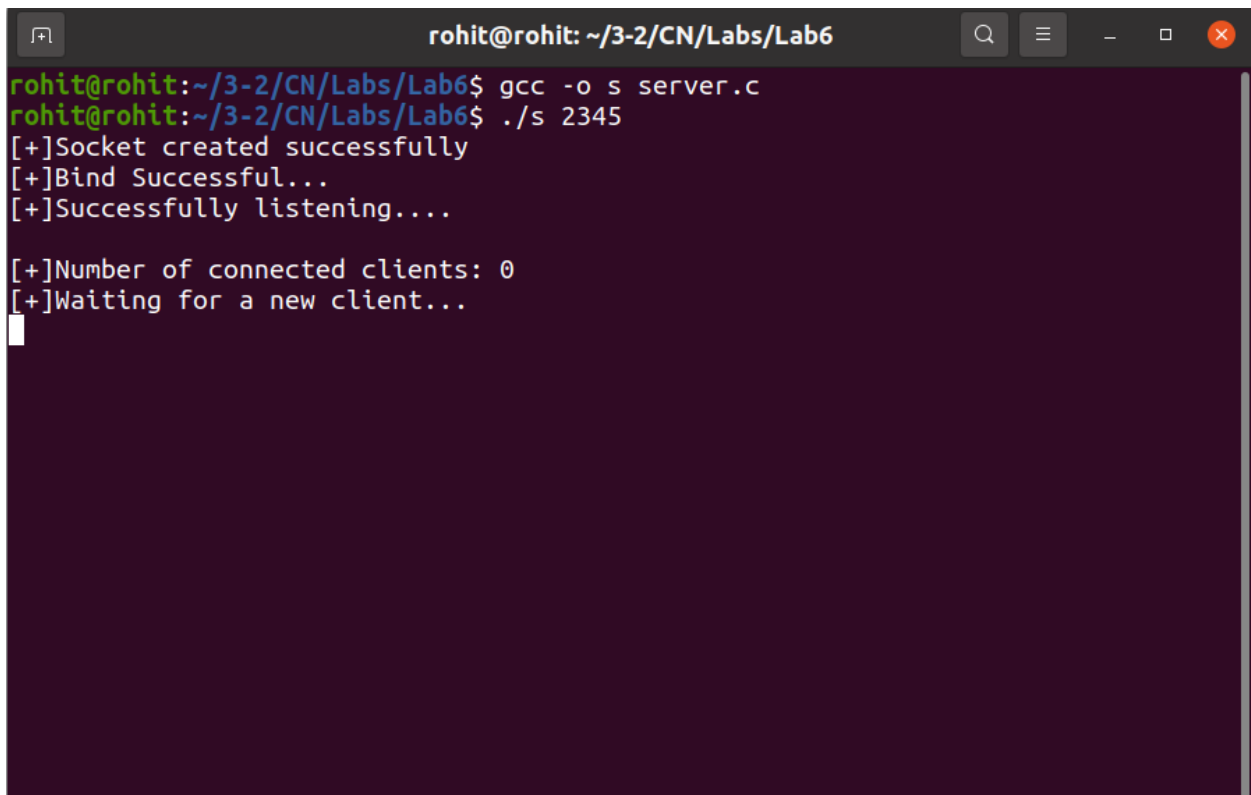**ROHIT GARG**
2018A7PS0193G

COMPUTER NETWORKS
CS F303
Lab-6

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

The server executable(./s) accepts server port number i.e. 2345 from command-line argument and binds the socket. Server is now listening passively to incoming client connections if any.
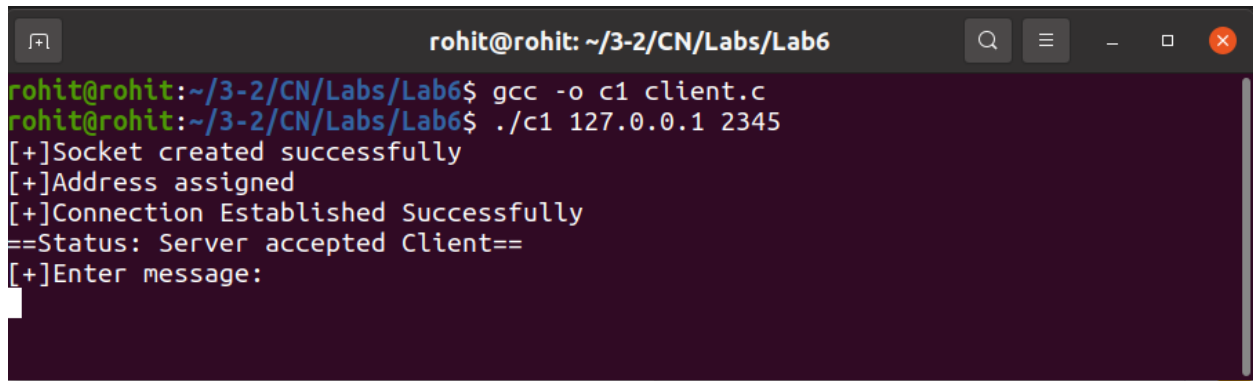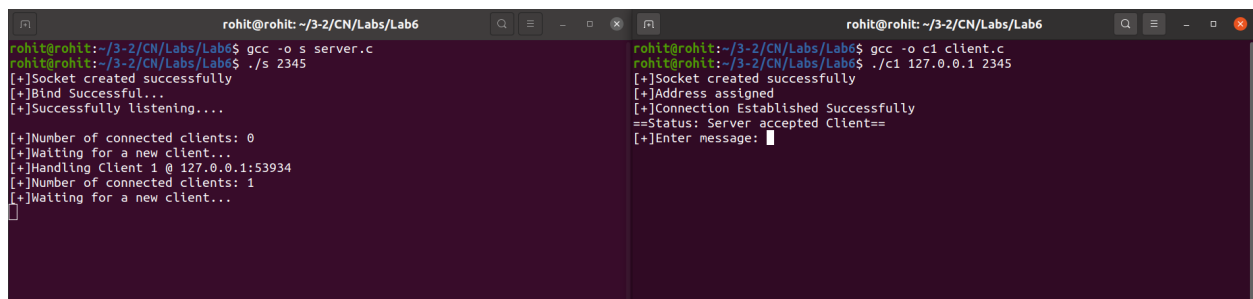
2. The client, as command line arguments, accepts the IP address and the port number at which it will find the server. (1 mark)

The client executable (./c1) takes server's IP address and server port number(here 2345) as cmd-arguments in order and sends a connection request to the server. The server connects to the server since the number of clients initially was 0 and now its 1 (<=4).

3. After connecting to the server, the client reads a line from the standard input and sends it to the server. (1 mark)

client(./c1) reads "client1 here" from standard input and sends this string to the server.

server terminal is updated and server prints the received string in reverse order

Complete client-server view:

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 or all the clients. (1 mark)

The server program receives the string "client1 here" and prints the string in reverse order on std output as"ereh 1tneilc". Server now reads the input from stdin as "hello client server here" and sends it to the client who had messaged it first. In this case it is c1 and hence sends it to c1.
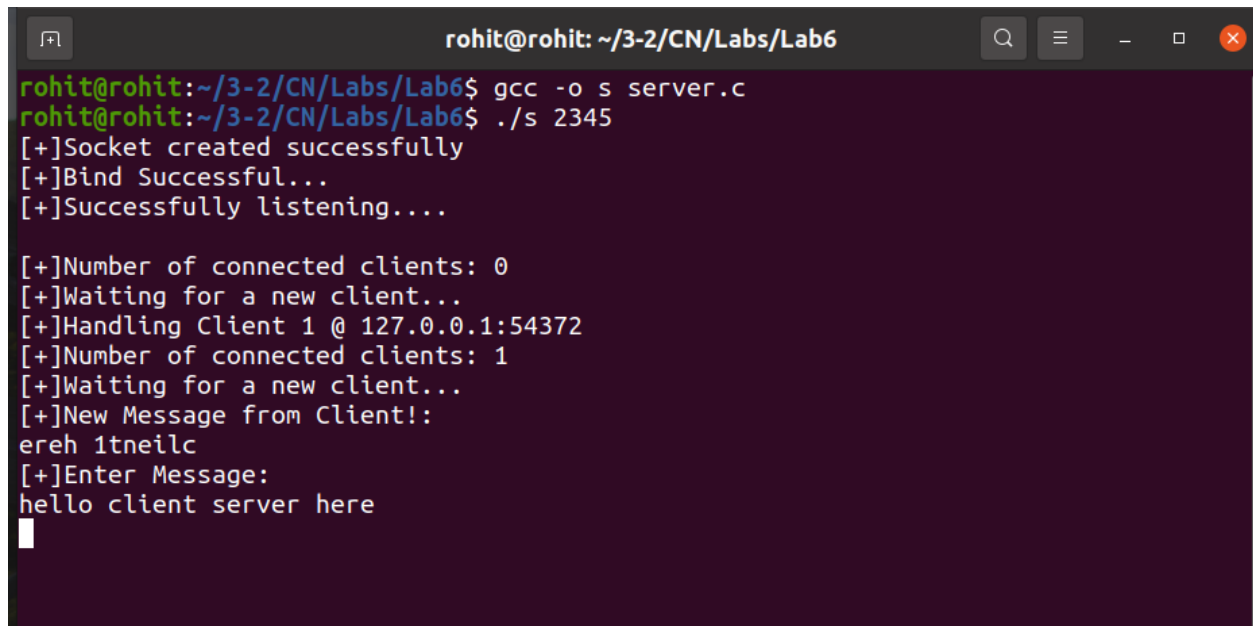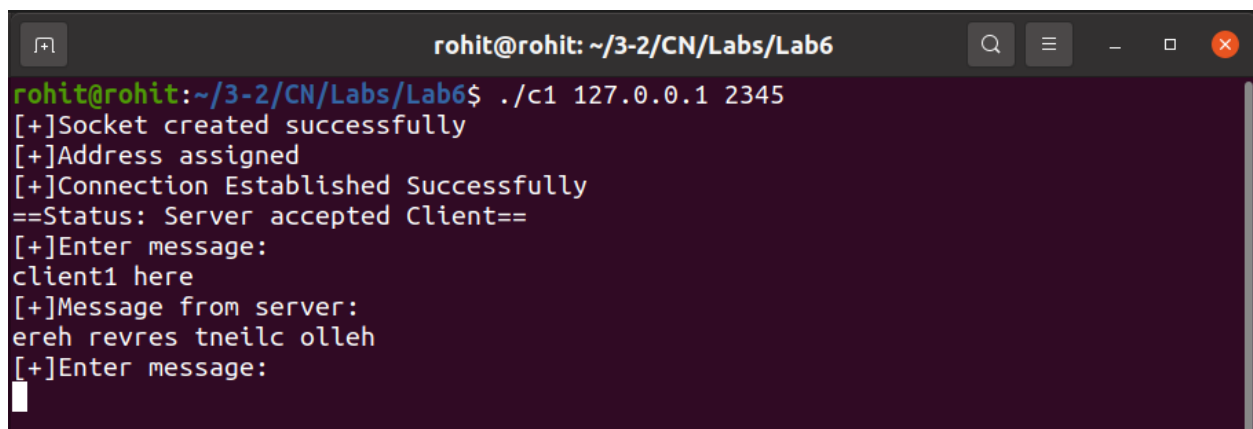
```
rohit@rohit: ~/3-2/CN/Labs/Lab6
rohit@rohit:~/3-2/CN/Labs/Lab6$ gcc -o s server.c
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./s 2345
[+]Socket created successfully
[+]Bind Successful...
[+]Successfully listening....

[+]Number of connected clients: 0
[+]Waiting for a new client...
[+]Handling Client 1 @ 127.0.0.1:54372
[+]Number of connected clients: 1
[+]Waiting for a new client...
[+]New Message from Client!:
ereh 1tneilc
[+]Enter Message:
hello client server here
```

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

The client program receives the string "hello client server here" and prints the string in reverse order on std output as "ereh revres tneilc olleh". Client is now ready for new input from stdin.

```
rohit@rohit: ~/3-2/CN/Labs/Lab6
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c1 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Established Successfully
==Status: Server accepted Client==
[+]Enter message:
client1 here
[+]Message from server:
ereh revres tneilc olleh
[+]Enter message:
```

6. The client exits if the user types "exit". (1 mark)

User types exits at the terminal and the client informs the server and then exits the connection.

The server is informed about client exiting and server then seeks a new client.

7. The server at a time accepts at the most four clients. (4 marks) Any client above the limit is rejected. (4 marks) As and when the number is less than the limit, the server accepts the new client. (2 marks)

Server is capable of handling a maximum of 4 concurrent clients. Here 4 clients c1 c2 c3 c4 connect successfully to the server.

If additional client now tries to joins the server, the connection is refused by the server
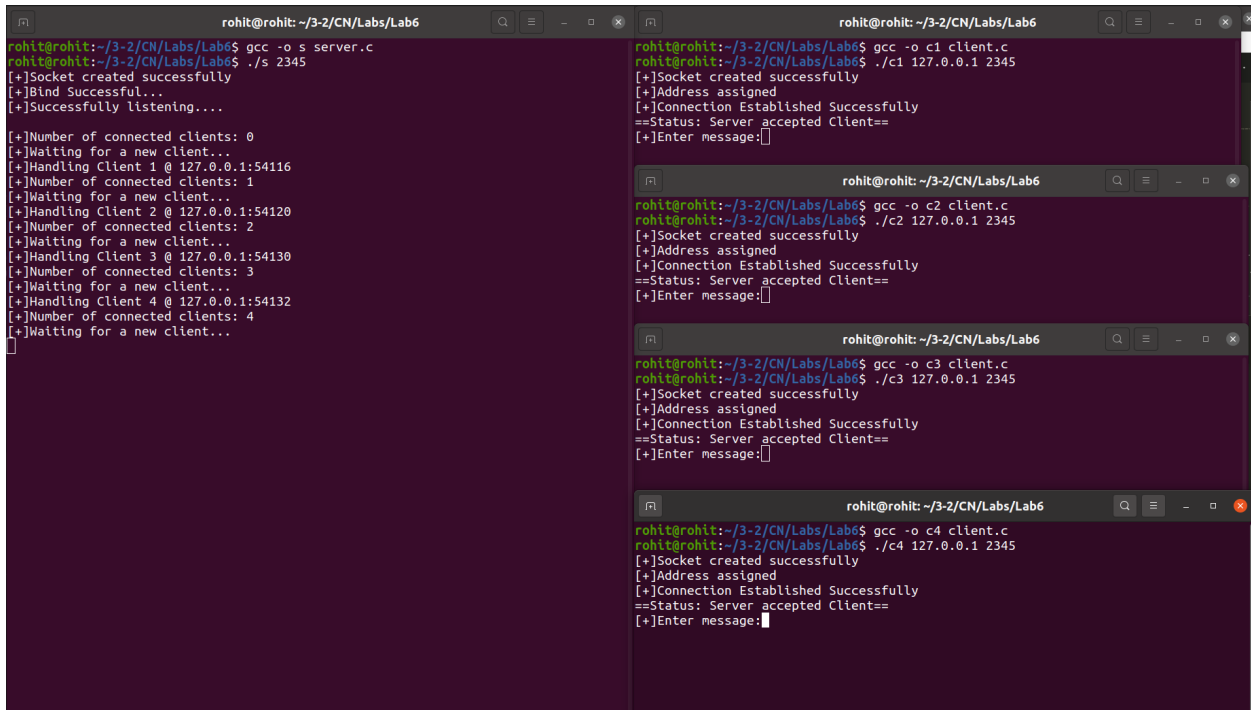
```
rohit@rohit:~/3-2/CN/Labs/Lab6$ gcc -o s server.c
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./s 2345
[+]Socket created successfully
[+]Bind Successful...
[+]Successfully listening....

[+]Number of connected clients: 0
[+]Waiting for a new client...
[+]Handling Client 1 @ 127.0.0.1:54492
[+]Number of connected clients: 1
[+]Waiting for a new client...
[+]Handling Client 2 @ 127.0.0.1:54494
[+]Number of connected clients: 2
[+]Waiting for a new client...
[+]Handling Client 3 @ 127.0.0.1:54496
[+]Number of connected clients: 3
[+]Waiting for a new client...
[+]Handling Client 4 @ 127.0.0.1:54498
[+]Number of connected clients: 4
[+]Waiting for a new client...
[+]Maximum Client Limit Reached...
[+]Refusing Connection to new client...
[+]Number of connected clients: 4
[+]Waiting for a new client...
```

```
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c1 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Established Successfully
==Status: Server accepted Client==
[+]Enter message:
```

```
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c2 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Established Successfully
==Status: Server accepted Client==
[+]Enter message:
```

```
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c3 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Established Successfully
==Status: Server accepted Client==
[+]Enter message:
```

```
rohit@rohit:~/3-2/CN/Labs/Lab6$ gcc -o c5 client.c
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c5 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Declined
rohit@rohit:~/3-2/CN/Labs/Lab6$
```

```
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c4 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Established Successfully
==Status: Server accepted Client==
[+]Enter message:
```

Suppose c1 exits from the server, now total 3 clients are still connected to the server.

```
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c1 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Established Successfully
==Status: Server accepted Client==
[+]Enter message:
exit
[+]Client Exiting...rohit@rohit:~/3-2/CN/Labs/Lab6$
```

But When one of the clients exits, it creates space for the client. So again when our client no.5 tries to connect, it connects successfully. So the total number of active clients remains at most 4.

```
rohit@rohit:~/3-2/CN/Labs/Lab6$ gcc -o s server.c
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./s 2345
[+]Socket created successfully
[+]Bind Successful...
[+]Successfully listening....

[+]Number of connected clients: 0
[+]Waiting for a new client...
[+]Handling Client 1 @ 127.0.0.1:54492
[+]Number of connected clients: 1
[+]Waiting for a new client...
[+]Handling Client 2 @ 127.0.0.1:54494
[+]Number of connected clients: 2
[+]Waiting for a new client...
[+]Handling Client 3 @ 127.0.0.1:54496
[+]Number of connected clients: 3
[+]Waiting for a new client...
[+]Handling Client 4 @ 127.0.0.1:54498
[+]Number of connected clients: 4
[+]Waiting for a new client...
[+]Maximum Client Limit Reached...
[+]Refusing Connection to new client...
[+]Number of connected clients: 4
[+]Waiting for a new client...
[+]Client Abrupty Terminated...
[+]3 clients still connected...
[+]Handling Client 4 @ 127.0.0.1:54532
[+]Number of connected clients: 4
[+]Waiting for a new client...
```

```
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c1 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Established Successfully
==Status: Server accepted Client==
[+]Enter message:
exit
[+]Client Exiting...rohit@rohit:~/3-2/CN/Labs/Lab6$
```

```
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c2 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Established Successfully
==Status: Server accepted Client==
[+]Enter message:
```

```
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c3 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Established Successfully
==Status: Server accepted Client==
[+]Enter message:
```

```
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c5 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Declined
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c5 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Established Successfully
==Status: Server accepted Client==
[+]Enter message:
```

```
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c4 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Established Successfully
==Status: Server accepted Client==
[+]Enter message:
```

Note: Additionally client can also exit the connection using ctrl+c interrupt.


```
rohit@rohit:~/3-2/CN/Labs/Lab6$ gcc -o c1 client.c
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./c1 127.0.0.1 2345
[+]Socket created successfully
[+]Address assigned
[+]Connection Established Successfully
==Status: Server accepted Client==
[+]Enter message:
^C
Client Terminated
```



```
rohit@rohit:~/3-2/CN/Labs/Lab6$ gcc -o s server.c
rohit@rohit:~/3-2/CN/Labs/Lab6$ ./s 2345
[+]Socket created successfully
[+]Bind Successful...
[+]Successfully listening....

[+]Number of connected clients: 0
[+]Waiting for a new client...
[+]Handling Client 1 @ 127.0.0.1:54556
[+]Number of connected clients: 1
[+]Waiting for a new client...
[+]Client Abrupty Terminated...
[+]0 clients still connected...
```