

ECEN 602: Network Programming Assignment 1

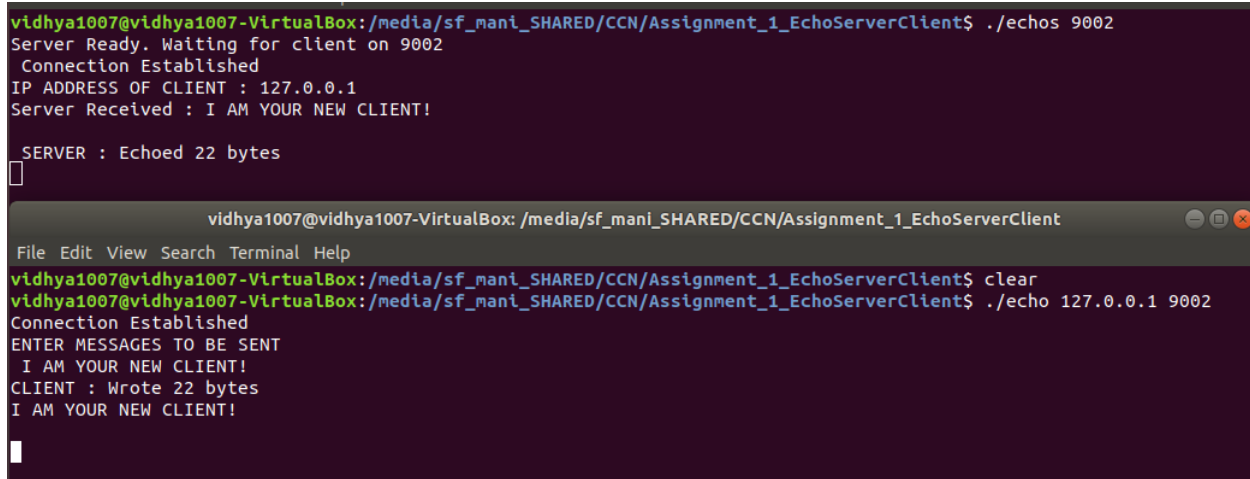
TCP Echo Server and Client

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This document contains a list of screenshots for few of the Test Cases considered.

1) SCREENSHOT 1: One Client One Server Echo Connection



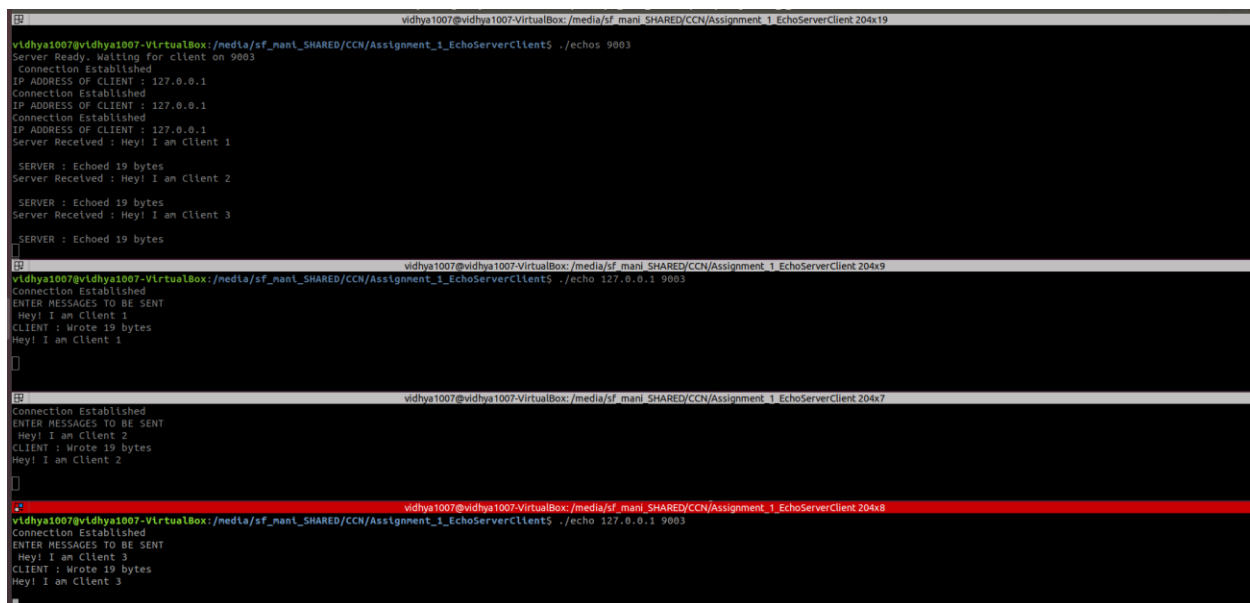
```
vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echos 9002
Server Ready. Waiting for client on 9002
Connection Established
IP ADDRESS OF CLIENT : 127.0.0.1
Server Received : I AM YOUR NEW CLIENT!

SERVER : Echoed 22 bytes

vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient
File Edit View Search Terminal Help
vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ clear
vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echo 127.0.0.1 9002
Connection Established
ENTER MESSAGES TO BE SENT
I AM YOUR NEW CLIENT!
CLIENT : Wrote 22 bytes
I AM YOUR NEW CLIENT!
```

Here, the server port opens, client establishes a connection. Sends a message and receives the echoed back text which it prints to the console.

2) SCREENSHOT 2: One Server Multiple Clients Echo Connection (3 CLIENT Connection)



```
vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient 204x19
vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echos 9003
Server Ready. Waiting for client on 9003
Connection Established
IP ADDRESS OF CLIENT : 127.0.0.1
Connection Established
IP ADDRESS OF CLIENT : 127.0.0.1
Connection Established
IP ADDRESS OF CLIENT : 127.0.0.1
Server Received : Hey! I am Client 1

SERVER : Echoed 19 bytes
Server Received : Hey! I am Client 2

SERVER : Echoed 19 bytes
Server Received : Hey! I am Client 3

SERVER : Echoed 19 bytes

vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient 204x9
vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echo 127.0.0.1 9003
Connection Established
ENTER MESSAGES TO BE SENT
Hey! I am Client 1
CLIENT : Wrote 19 bytes
Hey! I am Client 1

vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient 204x7
Connection Established
ENTER MESSAGES TO BE SENT
Hey! I am Client 2
CLIENT : Wrote 19 bytes
Hey! I am Client 2

vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient 204x8
vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echo 127.0.0.1 9003
Connection Established
ENTER MESSAGES TO BE SENT
Hey! I am Client 3
CLIENT : Wrote 19 bytes
Hey! I am Client 3
```

Establishing a single server and 3 client connections. All the 3 clients connect to the server and send and receive data

3) SCREENSHOT 3: Incorrect input Arguments

```
vidhya1007@vidhya1007-VirtualBox:/media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echos
Incorrect number of arguments.Use echos <PortNumber>
vidhya1007@vidhya1007-VirtualBox:/media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$
```

When an invalid set of input arguments are given, it returns an error message prompting the user.

4) SCREENSHOT 4: Line of Text Terminated by a new line

```
vidhya1007@vidhya1007-VirtualBox:/media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echos 9005
Server Ready. Waiting for client on 9005
Connection Established
IP ADDRESS OF CLIENT : 127.0.0.1
Server Received : Hey! I am going to terminate by a new line!

SERVER : Echoed 44 bytes
[

vidhya1007@vidhya1007-VirtualBox:/media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient
File Edit View Search Terminal Help
vidhya1007@vidhya1007-VirtualBox:/media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echo 127.0.0.1 9005
Connection Established
ENTER MESSAGES TO BE SENT
Hey! I am going to terminate by a new line!
CLIENT : Wrote 44 bytes
Hey! I am going to terminate by a new line!
[
```

On entering a new line, a \n or a new line is reflected on the server side and also on the echoed text.

5) SCREENSHOT 5: Line of Text, Maximum line length without a new line

```
vidhya1007@vidhya1007-VirtualBox:/media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echos 9005
Server Ready. Waiting for client on 9005
Connection Established
IP ADDRESS OF CLIENT : 127.0.0.1
Server Received : The geographical term Bharat (Bhārat; pronounced ['bʱaːɽət] (About this sound listen)), which is recognised by the Constitution of India as an official name for the country,[19][24] is used b
SERVER : Echoed 199 bytes
Server Received : y many Indian languages in its variations. It is a modernisation of the historical name Bharatavarsha, which traditionally referred to the Indian subcontinent and gained increasing curre
ncy from the
SERVER : Echoed 199 bytes
Server Received : mid-19th century as a native name for India.[19][25]
SERVER : Echoed 53 bytes
[

vidhya1007@vidhya1007-VirtualBox:/media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient
File Edit View Search Terminal Help
vidhya1007@vidhya1007-VirtualBox:/media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echo 127.0.0.1 9005
Connection Established
ENTER MESSAGES TO BE SENT
The geographical term Bharat (Bhārat; pronounced ['bʱaːɽət] (About this sound listen)), which is recognised by the Constitution of India as an official name for the country,[19][24] is used by many India
n languages in its variations. It is a modernisation of the historical name Bharatavarsha, which traditionally referred to the Indian subcontinent and gained increasing currency from the mid-19th century
as a native name for India.[19][25]
CLIENT : Wrote 199 bytes
The geographical term Bharat (Bhārat; pronounced ['bʱaːɽət] (About this sound listen)), which is recognised by the Constitution of India as an official name for the country,[19][24] is used b
CLIENT : Wrote 199 bytes
y many Indian languages in its variations. It is a modernisation of the historical name Bharatavarsha, which traditionally referred to the Indian subcontinent and gained increasing currency from the
CLIENT : Wrote 53 bytes
mid-19th century as a native name for India.[19][25]
[
```

The entered paragraph has a length , greater than the allocated Maximum size of the buffer used.(200)
Hence, it transfers every 200 bytes at once till end of text.

6) SCREENSHOT 6: Line with no characters and EOF

```
File Edit View Search Terminal Help
vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echos 9005
Server Ready. Waiting for client on 9005
Connection Established
IP ADDRESS OF CLIENT : 127.0.0.1
EOF for client
Disconnecting client
Child Process ID: 7660
█

vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient

File Edit View Search Terminal Help
vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echo 127.0.0.1 9005
Connection Established
ENTER MESSAGES TO BE SENT
EOF Cntrl+D
Disconnecting client
vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$
```

Line with no characters and EOF(Cntrl+D) , terminates the client process and prints its disconnection message and its corresponding child process ID in the server side.

7) SCREENSHOT 7: Client Terminated after entering Text

```
vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echos 9005
Server Ready. Waiting for client on 9005
Connection Established
IP ADDRESS OF CLIENT : 127.0.0.1
EOF for client
Disconnecting client
Child Process ID: 7667
█

vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient

File Edit View Search Terminal Help
vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ ./echo 127.0.0.1 9005
Connection Established
ENTER MESSAGES TO BE SENT
Hey! I am client. I am going to terminate using Cntrl+DEOF Cntrl+D
Disconnecting client
vidhya1007@vidhya1007-VirtualBox: /media/sf_man1_SHARED/CCN/Assignment_1_EchoServerClient$ █
```

The client disconnects when fgets returns a NULL or if eof is detected. Here, since EOF is detected even before fgets returns a NULL, the client disconnects before being able to transfer the data.

- 8) **SCREENSHOT 8: SignalHandler implementation check**, which closes the child server process when a client terminates. The screenshot shows that the PID of the child server process is 7672

```
vidhya1007@vidhya1007-VirtualBox:/media/sf_mani_SHARED/CCN/Assignment_1_EchoServerClient$ ./echos 9005
Server Ready. Waiting for client on 9005
Connection Established
IP ADDRESS OF CLIENT : 127.0.0.1
Server Received : Hey! I am going to terminate. Check my server child's PID when I end.

SERVER : Echoed 70 bytes
EOF for client
Disconnecting client
Child Process ID: 7672
█

vidhya1007@vidhya1007-VirtualBox:/media/sf_mani_SHARED/CCN/Assignment_1_EchoServerClient$

File Edit View Search Terminal Help
vidhya1007@vidhya1007-VirtualBox:/media/sf_mani_SHARED/CCN/Assignment_1_EchoServerClient$ ./echo 127.0.0.1 9005
Connection Established
ENTER MESSAGES TO BE SENT
Hey! I am going to terminate. Check my server child's PID when I end.
CLIENT : Wrote 70 bytes
Hey! I am going to terminate. Check my server child's PID when I end.

EOF Cntrl+D
Disconnecting client
vidhya1007@vidhya1007-VirtualBox:/media/sf_mani_SHARED/CCN/Assignment_1_EchoServerClient$
```

- 9) **SCREENSHOT 9: Printing the error conditions.**

```
vidhya1007@vidhya1007-VirtualBox:/media/sf_mani_SHARED/CCN/Assignment_1_EchoServerClient$ ./echo 127.0.0.1 9005
Connection not established
Exiting due to error : Connection refused
vidhya1007@vidhya1007-VirtualBox:/media/sf_mani_SHARED/CCN/Assignment_1_EchoServerClient$ █
```

When client is trying to connect to server that is not active, Connection error is printed and the error message corresponding to the errno is “Connection Refused”