

CS3093D Networks Laboratory - Assignment 4

Anandu B Ajith - B180288CS

20 February 2022

Question 1

Instructions

- Code can be compiled using “make” and binaries will be placed in “./bin”.
- Server code is in “1/src/server.c” and Client code is in “1/src/client.c”, and common headers in “1/src/common.h”, and common function in “1/src/common.c”
- Client takes nickname as input, and connects to the server
- If the nickname is already in use, the server will send message and client will disconnect.
- Client messages are sent to server, and server broadcasts it to other connected clients.
- Server uses “poll()” to keep track of which sockets have data to read

Screenshots

Figure 1: Starting the server left, and starting 3 clients

```
1 2 3 4 5 6 7 8 9 10
13:34
100% muted 26% 2% BSNL WIFI 0 KB/s 0 KB/s 93%
./bin/server
anandu@inspiron [13:33:58] [~/Desktop/networkslab/assignment_04/1] [main]
→ % ./bin/server
accepted connection
Broadcast "anandu has joined the chat" from "server"

[1645085050][server] Connected to server
[1645085050][server] anandu has joined the chat
[1645085050][server] Connected users are: anandu
#> .

./bin/client
anandu@inspiron [13:33:58] [~/Desktop/networkslab/assignment_04/1] [main]
→ % ./bin/client
Enter NickName: example1

./bin/client
anandu@inspiron [13:34:03] [~/Desktop/networkslab/assignment_04/1] [main]
→ % ./bin/client
Enter NickName: example2

1: ./bin/client* 17/02 13:34:28
```

Figure 2: Currently connected usernames are displayed when new client connects

```
1 2 3 4 6 9 10 13:34 /: 66% muted 26% 3% BSNL WIFI 0 KB/s 0 KB/s 93%

./bin/server
anandu@inspiron [13:33:58] [~/Desktop/networkslab/assignment_04/1] [main]
→ % ./bin/server
accepted connection
Broadcast "anandu has joined the chat" from "server"
accepted connection
Broadcast "example1 has joined the chat" from "server"
accepted connection
Broadcast "example2 has joined the chat" from "server"

[1645085050][server] Connected to server
[1645085050][server] anandu has joined the chat
[1645085050][server] Connected users are: anandu
[1645085076][server] example1 has joined the chat
[1645085078][server] example2 has joined the chat
#> :

[1645085076][server] Connected to server
[1645085076][server] example1 has joined the chat
[1645085076][server] Connected users are: anandu, example1
[1645085078][server] example2 has joined the chat
#> :

[1645085078][server] Connected to server
[1645085078][server] example2 has joined the chat
[1645085078][server] Connected users are: anandu, example1, example2
#> :

1:./bin/client*
```

Figure 3: Messages being broadcast to all connected clients

```
1 2 3 4 6 9 10 13:34 /: 66% muted 26% 3% BSNL WIFI 0 KB/s 0 KB/s 93%

./bin/server
anandu@inspiron [13:33:58] [~/Desktop/networkslab/assignment_04/1] [main]
→ % ./bin/server
accepted connection
Broadcast "anandu has joined the chat" from "server"
accepted connection
Broadcast "example1 has joined the chat" from "server"
accepted connection
Broadcast "example2 has joined the chat" from "server"
Broadcast "hi there " from "anandu"
Broadcast "hello anandu" from "example1"
Broadcast "hello again" from "example2"

[1645085050][server] Connected to server
[1645085050][server] anandu has joined the chat
[1645085050][server] Connected users are: anandu
[1645085076][server] example1 has joined the chat
[1645085078][server] example2 has joined the chat
[1645085089][anandu] hi there
[1645085092][example1] hello anandu
[1645085095][example2] hello again
#> :

[1645085076][server] Connected to server
[1645085076][server] example1 has joined the chat
[1645085076][server] Connected users are: anandu, example1
[1645085078][server] example2 has joined the chat
[1645085089][anandu] hi there
[1645085092][example1] hello anandu
[1645085095][example2] hello again
#> :

[1645085078][server] Connected to server
[1645085078][server] example2 has joined the chat
[1645085078][server] Connected users are: anandu, example1, example2
[1645085089][anandu] hi there
[1645085092][example1] hello anandu
[1645085095][example2] hello again
#> :

1:./bin/client*
```

Figure 4: Message is broadcast when client leaves with Ctrl+C

```

1 2 3 4 6 9 10 13:35 /: 66% muted 26% 3% BSNL WIFI 0 KB/s 0 KB/s 93%

./bin/server
anandu@inspiron [13:33:58] [~/Desktop/networkslab/assignment_04/1] [main]
→ % ./bin/server
accepted connection
Broadcast "anandu has joined the chat" from "server"
accepted connection
Broadcast "example1 has joined the chat" from "server"
accepted connection
Broadcast "example2 has joined the chat" from "server"
Broadcast "hi there " from "anandu"
Broadcast "hello anandu" from "example1"
Broadcast "hello again" from "example2"
Broadcast "I'm leaving" from "example2"
Broadcast "Bye" from "example2"
Broadcast "example2 has left the chat" from "server"

[1645085050][server] Connected to server
[1645085050][server] anandu has joined the chat
[1645085050][server] Connected users are: anandu
[1645085076][server] example1 has joined the chat
[1645085078][server] example2 has joined the chat
[1645085089][anandu] hi there
[1645085092][example1] hello anandu
[1645085095][example2] hello again
[1645085108][example2] I'm leaving
[1645085109][example2] Bye
[1645085109][server] example2 has left the chat

#> :

[1645085076][server] Connected to server
[1645085076][server] example1 has joined the chat
[1645085076][server] Connected users are: anandu, example1
[1645085078][server] example2 has joined the chat
[1645085089][anandu] hi there
[1645085092][example1] hello anandu
[1645085095][example2] hello again
[1645085108][example2] I'm leaving
[1645085109][example2] Bye
[1645085109][server] example2 has left the chat

#> :

[1645085078][server] Connected to server
[1645085078][server] example2 has joined the chat
[1645085078][server] Connected users are: anandu, example1, example2
[1645085089][anandu] hi there
[1645085092][example1] hello anandu
[1645085095][example2] hello again
[1645085108][example2] I'm leaving

#> :

Closing connection [1m-5.6s]

anandu@inspiron [13:35:09] [~/Desktop/networkslab/assignment_04/1] [main *]
→ %

1:zshx 17/02 13:35:13

```

Figure 5: Server disconnects when trying to join with already existing username

```

1 2 3 4 6 9 10 13:35 /: 66% muted 26% 3% BSNL WIFI 0 KB/s 0 KB/s 93%

./bin/server
anandu@inspiron [13:33:58] [~/Desktop/networkslab/assignment_04/1] [main]
→ % ./bin/server
accepted connection
Broadcast "anandu has joined the chat" from "server"
accepted connection
Broadcast "example1 has joined the chat" from "server"
accepted connection
Broadcast "example2 has joined the chat" from "server"
Broadcast "hi there " from "anandu"
Broadcast "hello anandu" from "example1"
Broadcast "hello again" from "example2"
Broadcast "I'm leaving" from "example2"
Broadcast "Bye" from "example2"
Broadcast "example2 has left the chat" from "server"
accepted connection
User already exists :(

[1645085050][server] Connected to server
[1645085050][server] anandu has joined the chat
[1645085050][server] Connected users are: anandu
[1645085076][server] example1 has joined the chat
[1645085078][server] example2 has joined the chat
[1645085089][anandu] hi there
[1645085092][example1] hello anandu
[1645085095][example2] hello again
[1645085108][example2] I'm leaving
[1645085109][example2] Bye
[1645085109][server] example2 has left the chat

#> :

[1645085076][server] Connected to server
[1645085076][server] example1 has joined the chat
[1645085076][server] Connected users are: anandu, example1
[1645085078][server] example2 has joined the chat
[1645085089][anandu] hi there
[1645085092][example1] hello anandu
[1645085095][example2] hello again
[1645085108][example2] I'm leaving
[1645085109][example2] Bye
[1645085109][server] example2 has left the chat

#> :

[1645085126][server] Connected to server
[1645085126][server] Username already in use

#> :

Closing connection

anandu@inspiron [13:35:26] [~/Desktop/networkslab/assignment_04/1] [main *]
→ %

1:zshx 17/02 13:35:28

```

Question 2

Instruction

- Code can be compiled using “make” and binaries will be placed in “./bin”.
- Server code is in “2/src/server.c” and Client code is in “2/src/client.c”, and common headers in “common.h”.
- Server will “fork()” itself when it receives a new connection from client.
- Client can send queries, server will respond with result, Ctrl-C can be used to exit client.

Screenshots

```
1 2 3 4 10:00 /: 65% muted 14% 13% = ajithkumar 0 KB/s 0 KB/s 86%
anandu@inspiro [09:59:23] [~/Desktop/networkslab/assignment_04/2] [main *]
→ % ./bin/server
Waiting for connections
Connected to Client 1
[Client1] 22+44
[Server]: 66

Connected to Client 2
[Client2] 39+2
[Server]: 78

[Client2] 1--2
[Server]: 3

[Client1] -444+33
[Server]: -14652

[Client1] -4
[Server]: Error: Invalid Expression

[Client2] 44/3
[Server]: 14.666667

[Client2] 2/0
[Server]: Error: Division by zero

[Client1] 4+33
[Server]: 37

Disconnected from Client 1
Connected to Client 3
[Client3] 3+44
[Server]: 47

anandu@inspiro [09:59:23] [~/Desktop/networkslab/assignment_04/2] [main *]
→ % ./bin/client
Connected to server

Enter the query: 22+44
[Server] 66

Enter the query: -444+33
[Server] -14652

Enter the query: -4
[Server] Error: Invalid Expression

Enter the query: 4+33
[Server] 37

Enter the query: ^C
Closing connection [1m-4.5s]

anandu@inspiro [10:00:30] [~/Desktop/networkslab/assignment_04/2] [main *]
→ % ./bin/client
Connected to server

Enter the query: 3+44
[Server] 47

Enter the query:

anandu@inspiro [09:59:14] [~/Desktop/networkslab/assignment_04/2] [main *]
→ % ./bin/client
Connected to server

Enter the query: 39+2
[Server] 78

Enter the query: 1--2
[Server] 3

Enter the query: 44/3
[Server] 14.666667

Enter the query: 2/0
[Server] Error: Division by zero

Enter the query:

1: ./bin/client*
```

```
1 2 3 6 9 10 13:04 /: 66% muted 27% 13% \ BSNL WIFI 0 KB/s 0 KB/s 76%
→ % ./bin/server
Waiting for connections
Connected to Client 1
[Client1] 3+3
[Server]: 6

Connected to Client 2
[Client2] 3333-38
[Server]: 3295

Connected to Client 3
[Client3] 33+333333
[Server]: 333366

[Client3] 3+3
[Server]: 9

[Client3] 8-8
[Server]: 0

[Client3] 1/9
[Server]: 0.111111

[Client3] 1/0
[Server]: Error: Division by zero

Disconnected from Client 2

anandu@inspiro [13:02:40] [~/Desktop/networkslab/assignment_04/2] [main]
→ % ./bin/client
Connected to server

Enter the query: 33+333333
[Server] 333366

Enter the query: 3+3
[Server] 9

Enter the query: 8-8
[Server] 0

Enter the query: 1/9
[Server] 0.111111

Enter the query: 1/0
[Server] Error: Division by zero

Enter the query:

1: [tmux]*

anandu@inspiro [13:02:18] [~/Desktop/networkslab/assignment_04/2] [main]
→ % ./bin/client
Connected to server

Enter the query: 3333-38
[Server] 3295

Enter the query: ^C
Closing connection [1m-6.3s]

anandu@inspiro [13:04:00] [~/Desktop/networkslab/assignment_04/2] [main]
→ %

anandu@inspiro [13:02:25] [~/Desktop/networkslab/assignment_04/2] [main]
→ % ./bin/client
Connected to server

Enter the query: 3+3
[Server] 6

Enter the query:
```