

CHATROOM IN C

COMPUTER NETWORKS LABORATORY

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OVERVIEW

This is a chatroom made in C language with Socket Programming using threads and select() system call. Both threads and select() system call allows to handle multiple clients in socket programming simultaneously.

This chatroom supports private messages, group chats and file transfer. Messages and file transfers are end-to-end encrypted. No one outside of the chat, not even server, can read or listen to them. Check the features section for more.

USING THREADS

serverThread.c and clientThread.c uses threads to achieve Client Server Architecture.

Command to start serverThread.c:

```
gcc serverThread.c -o serverThread
./serverThread <port_no>
```

Command to start clientThread.c:

```
gcc clientThread.c -o clientThread
./clientThread <IP_Address> <port_no> <username>
```

USING SELECT

server.c and client.c uses select() system call to achieve Client Server Architecture.

Command to start server.c:

```
gcc server.c -o server
./server <port_no>
```

Command to start client.c:

```
gcc client.c -o client
./client <IP_Address> <port_no> <username>
```

FEATURES

- This chatroom can handle **multiple clients** simultaneously.
- **Unique** clients can join and disconnect from the server.
- It supports **message broadcasting** to all clients present in the server as well as **private messaging** between two clients.
- It also supports **file transfer** between two clients.
- You can **report a client** using its username.
- Server has the power to **remove a client**.
- Messages and files are **end-to-end encrypted**.
- If a client is idle for 60 seconds (subjected to change), its session is timed out and it automatically disconnects.
- It also supports **group chats**, and allows clients to **create, join and leave** groups.
- Groups with **no members** are automatically **deleted**.
- Server also has the power to **delete a group**.

COMMANDS SUPPORTED

Common Client Commands

- **<message>**: for broadcasting messages to all clients.
- **@<username> <message>**: enter username of client to send private message.
- **@<username> @file <filename>**: to send file named filename.
- **#<username>**: to report a nuisance-causing client with username.
- **EXIT**: to disconnect from the chat server.

Client Commands for Group chat

- **\$CREATE**: to create a group
- **\$JOIN**: to join a group
- **\$LEAVE**: to leave a group
- **\$<groupname> <message>**: to send message in the group
- **\$<groupname> @file <filename>**: to send file named filename in the group

Server Commands

- **REMOVE <username>**: to remove client named username.
- **DELETE <groupname>**: to delete group named groupname.
- **CLOSE**: to close the server

Developer protocols followed:

- The response from server to client should be of format **>> <server_message>...**

GITHUB LINK OF THE PROJECT:

<https://github.com/pntu007/ChatRoom>

CONTRIBUTORS

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GALLERY

The screenshot displays a Windows 10 desktop with a multi-pane IDE (VS Code) running. The interface is divided into several sections:

- Top Menu Bar:** File, Edit, Selection, View, Go, Run, and a search icon.
- Top Toolbar:** Includes icons for file operations (save, open, close), a search icon, and a refresh icon.
- Editor Area:** Contains four terminal windows, each with a title bar and a list of messages.
 - suprit.txt U X:** ChatRoom > suprit.txt. Messages: 1 Me: Hello, 2 [BROADCAST] harsh: Hello, 3 Me: Are tum log kya kar rahe ho, 4.
 - saurav.txt U X:** ChatRoom > saurav.txt. Messages: 1 [BROADCAST] suprit: Hello, 2 [BROADCAST] harsh: Hello, 3 Me: @harsh Hi bro, 4 [BROADCAST] suprit: Are tum log kya, 5.
 - harsh.txt U X:** ChatRoom > harsh.txt. Messages: 1 [BROADCAST] suprit: Hello, 2 Me: Hello, 3 saurav: Hi bro, 4 [BROADCAST] suprit: Are tum log kya kar, 5.
- Bottom Panel:** Labeled 'PROBLEMS', 'OUTPUT', 'DEBUG CONSOLE', 'TERMINAL', and 'PORTS'. The 'TERMINAL' tab is active, showing four terminal windows with the following content:
 - Terminal 1 (suprit.txt):** sauravubuntu@LAPTOP-902M4UGH: ~/CN_L AB/ChatRoom\$./server 8080 Server listening on port 8080... New client connected: suprit New client connected: saurav New client connected: harsh 111108168101072 @harsh 1111140980832105072 11110403210110409711403211409710703 20971211070321031111080321091171160 32101114065
 - Terminal 2 (saurav.txt):** sauravubuntu@LAPTOP-902M4UGH: ~/CN_L AB/ChatRoom\$./client 127.0.0.1 808 0 suprit fileName: suprit.txt Enter message: Are tum log kya kar rahe ho Enter message:
 - Terminal 3 (harsh.txt):** sauravubuntu@LAPTOP-902M4UGH: ~/CN_L AB/ChatRoom\$./client 127.0.0.1 808 0 saurav fileName: saurav.txt Enter message: @harsh Hi bro Enter message:
 - Terminal 4 (suprit.txt):** sauravubuntu@LAPTOP-902M4UGH: ~/CN_L AB/ChatRoom\$./client 127.0.0.1 808 0 harsh fileName: harsh.txt Enter message: Hello Enter message:
- Status Bar:** At the bottom, it shows 'WSL: Ubuntu 22.04', 'In 1, Col 10', 'Spaces: 4', 'UTF-8', 'LF', and 'Plain Text'.

[illegible]

The screenshot shows the Visual Studio Code interface with the 'suprit.txt - ChatRoom - Visual Studio Code' window. The Explorer pane on the left lists the project files: `client.c`, `server.c`, `serverThread.c`, `suprit.txt`, and `serverThreadDemo.c`. The main editor displays the chatroom interface with a list of messages and a terminal window at the bottom showing the execution of the program.

The chatroom messages are as follows:

- 27 Me: now server will remove you
- 28 [BROADCASTING][14:56]Hacker : no please
- 29 Me: EXIT
- 30 [BROADCASTING][14:58]Hacker : yo i am back
- 31 [BROADCASTING][14:58]harsh : congratulations
- 32 [BROADCASTING][14:58]saurav : Kis liye
- 33 [BROADCASTING][14:58]hacker : no i will hack your server
- 34 Me: \$CREATE fileTest
- 35 >> fileTest GROUP CREATED SUCCESSFULLY
- 36 Me: Guys join fileTest
- 37 Me: \$JOIN fileTest
- 38 >> YOU ARE ALREADY IN fileTest GROUP
- 39 [fileTest][15:00]harsh : eTest GROUP I sent you a file n
- 40
- 11 [BROADCASTING][14:52]harsh : nya group
- 12 [BROADCASTING][14:53]suprit : join Society
- 13 [BROADCASTING][14:53]saurav : I will act as Dr. Hathi
- 14 Me: I didn't get the message from society
- 15 [BROADCASTING][14:53]harsh : I will choose Jetha la
- 16 [BROADCASTING][14:54]suprit : lets report hacker
- 17 [BROADCASTING][14:54]harsh : omk
- 18 Me: yo i am back
- 19 [BROADCASTING][14:56]suprit : now server will remove you
- 20 Me: no please
- 21 Me: yo i am back
- 22 [BROADCASTING][14:58]harsh : congratulations
- 23 [BROADCASTING][14:58]saurav : Kis liye
- 24 Me: no i will hack your server
- 25 [BROADCASTING][15:00]suprit : Guys join fileTest
- 26 Me: EXIT
- 27

The terminal window at the bottom shows the execution of the program. The output is as follows:

```

> Enter message:
Server closed the connection. Exiting...
^C
suprit-nalk@suprit-nalk-HP-Laptop-15s-dx1xxx:~/Desktop/CN/Group C
$ ./suprit-nalk-HP-Laptop-15s-dx1xxx:~/Desktop/CN/Group C
fileTest: suprit.txt
Enter message: $CREATE fileTest
Enter message: Guys join fileTest
Enter message: $JOIN fileTest
Enter message:

```