List of features:

Basic

1) Accept and manage at least 3 multi-connection TCP/IP sockets

2) Implement the packet management codes.

3) Welcome Message

4) Broadcast chat message

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Advanced

1) Nickname

2) Creation of multiple channels with passwords

3) Channel admin power

Description of features:

Accept and manage at least 3 multi-connection TCP/IP sockets

Creates a new thread for new connections and add the new session to the session list.

Implement the packet management codes

All messages that are sent will be encoded and decoded when received by server/client.

Encoding is done by adding the packet header '<' before the message, increasing the char of every character in the message by 1(encryption) and finish by adding the packet trailer '>' to the end of the message.

Location of codes in Client: Line 213 to 238

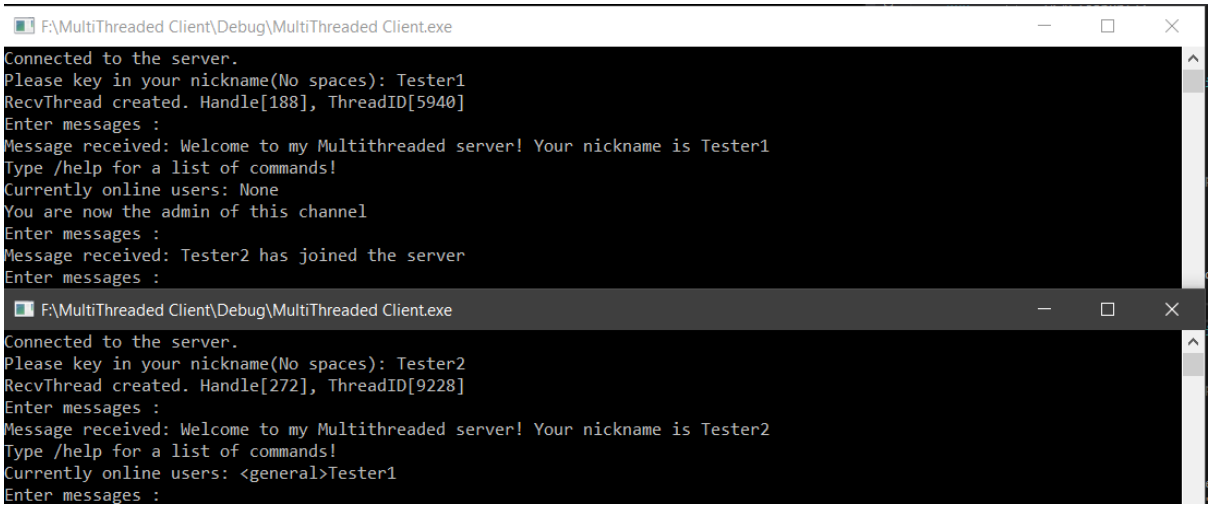
Location of codes in Server: Line 954 to 979

Function names:

```
string packetEncoder(string packet, int packetLength) and
string packetDecoder(string packet, int packetLength)
```

Welcome Message

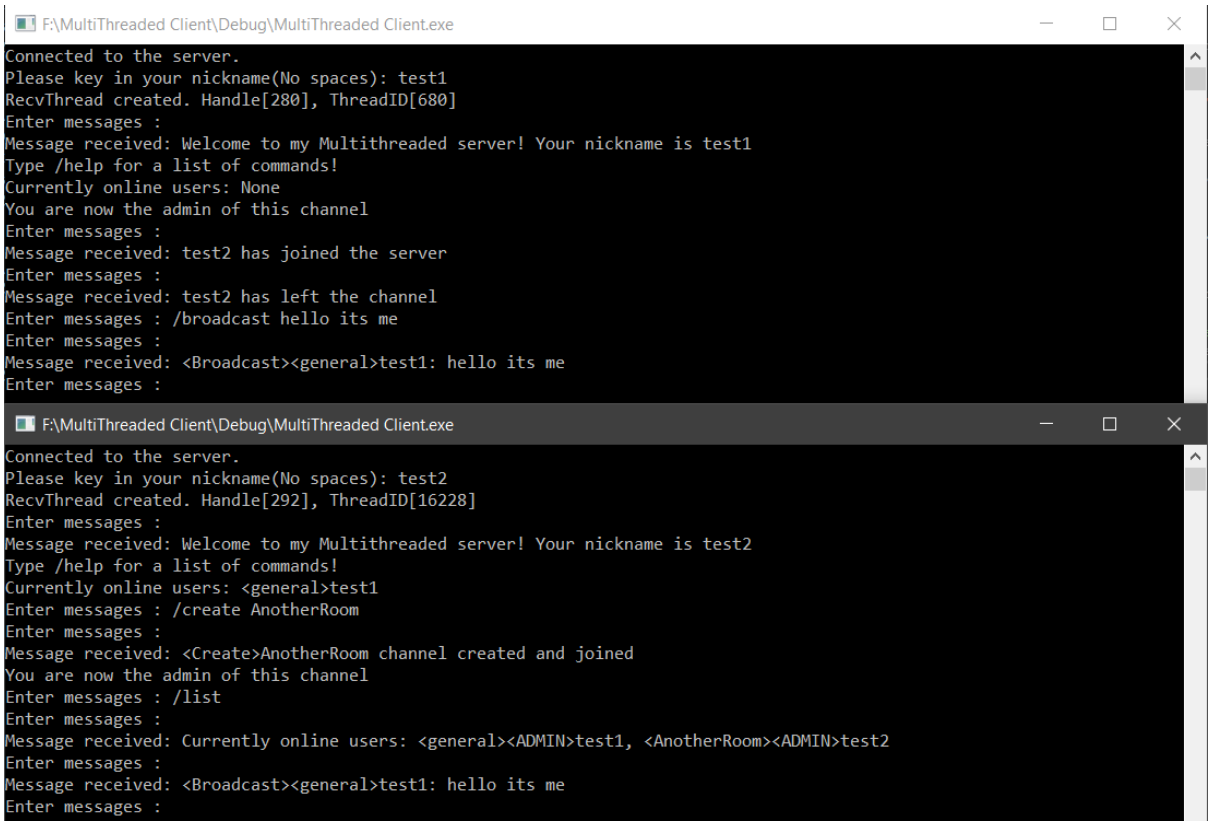
Server will send welcome message to user after he/she keyed in his/her nickname from the client. Welcome message includes the list of users current in the server and telling the user about the /help command to see the full list of commands.



Location of codes in Server: Line 261 to 314 under function RecvThread().

Broadcast chat message

This is used by typing /broadcast <message>. This broadcasts the player message throughout the entire server regardless of what channel the other users are in.

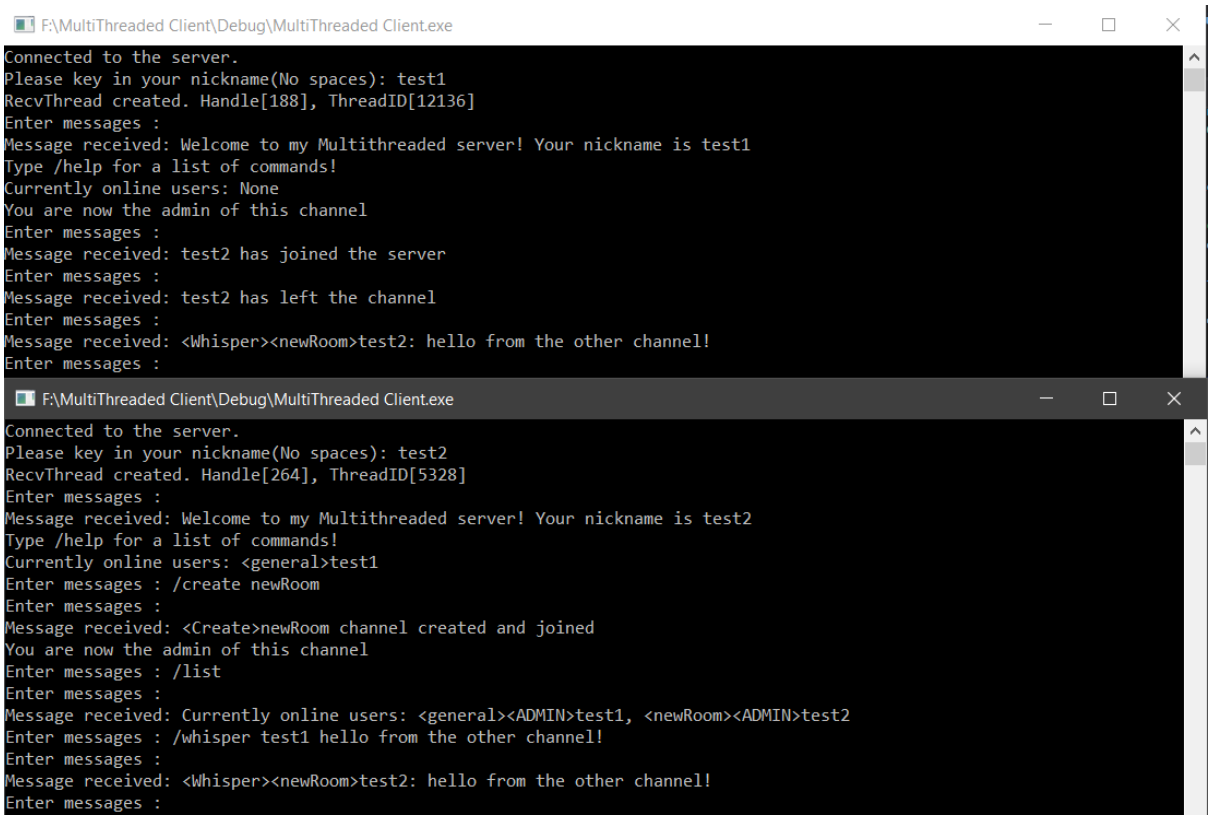


As shown from the /list command, the 2 users are in different channels and the broadcast still goes through as intended.

Location of codes in Server: Line 434 to 461 under function RecvThread().

Whispering (Direct message to the single destination)

Direct message a user regardless of which channel the user is in. The command is /whisper <targetuser> <message>. The server will send an error to the user if the target user is not found.



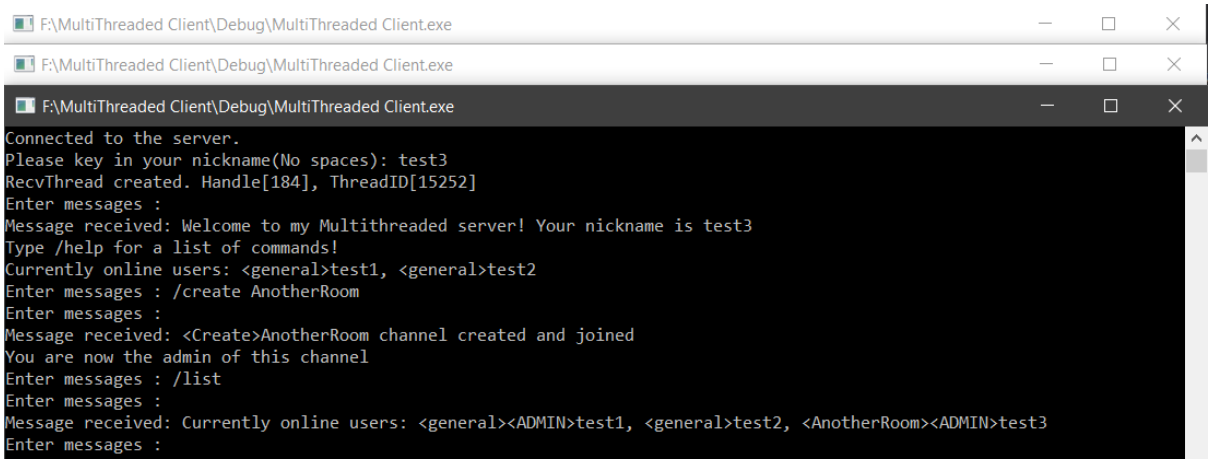
As shown from the /list command, the 2 users are in different channels and the whisper still goes through as intended. The user also gets a copy of the message to confirm that it is successfully sent to the target user.

Location of codes in Server: Line 383 to 416 under function RecvThread().

List of connected socket descriptors (User list)

The command is /list. It shows the list of users in the server in the format:

<Current channel user is in> <if user is admin in the channel, it will show admin> <user Nickname>

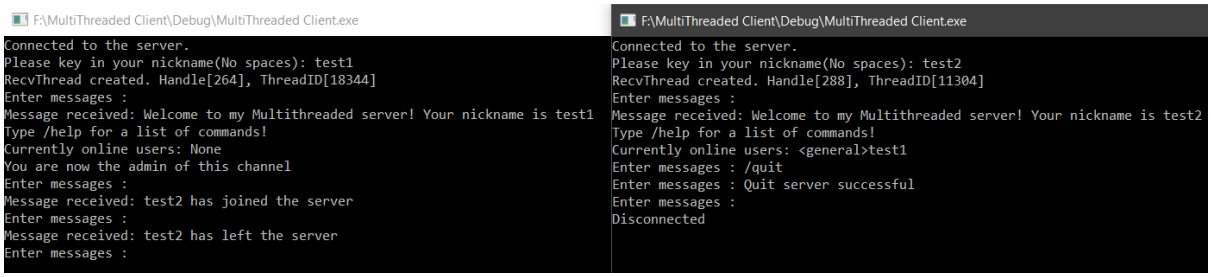


As shown, there are 3 Clients currently in the server and it shows all 3 clients correctly and the channel they are under.

Location of codes in Server: Line 338 to 382 under function RecvThread().

Quit and close connection

The command is /quit and the client that sent it will disconnect from the server after receiving the command /ClientQuit from the server. The server will also send a message to the other connected clients that someone disconnected.



Location of codes in Client: Line 46 to 51 under function RecvThread().

Location of codes in Server: Line 462 to 480 under function RecvThread().

Print out help menu

The command for the help menu is /help. It shows all the commands available in the server.

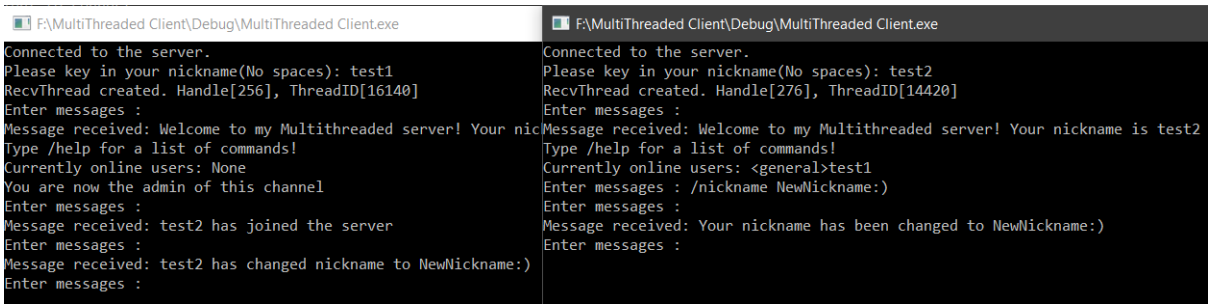
```
Enter messages : /help
Enter messages :
Message received:
COMMAND LIST
/help                                   (Show list of commands)
/nickname <newNickname>                 (Change current nickname)
/list                                   (Show list of current users in the server)
/broadcast <message>                    (Broadcast message through entire server)
/whisper <targetuser> <message>         (Direct message a user regardless of channel)
/quit                                   (Quit the server)
/create <channelName> <password>        (Create a new channel, can leave password empty if no password)
/join <channelName> <password>          (Join another channel, can leave password empty if no password)
/setpassword <newpassword>              (Change channel password if user is admin)
/channelname <newchannelName>           (Change channel name if user is admin)

Enter messages :
```

Location of codes in Server: Line 417 to 433 under function RecvThread().

Advanced feature: Nickname

The client side will prompt the user to key in his/her nickname on connecting to the server. The nickname is then sent to the server and saved under the SessionInfo of the user. This nickname is used commonly throughout the server in commands. Users can also change their nickname anytime by using the command /nickname <newNickname>. By doing so, the user's nickname will be changed and a message will be sent to the other users telling them that the user's nickname has been changed.



Location of codes in Client: Line 133 to 160 under function main().

Location of codes in Server: Line 259 to 337 under function RecvThread().

Advanced feature: Creation of multiple channels with passwords

Users can create multiple channels with passwords in the server. There is a channel struct and a channelList vector of the channel struct to store all the currently existing channels. The default channel is called general and the name can't be switched but can be set to have a password. The commands are /create <serverName> <password> and /join <serverName> <password>, the password can be left empty if there isn't a password for the channel. The password can only be set by the admin of the channel. Default messages are only sent to users in the SAME channel. The channel the user is in is saved together in the user's SessionInfo as a string of the channel's name. If there is no one left in the channel and the channel isn't the general channel, the channel is deleted to save memory space. A message will also be shown to tell other users that the user has left/joined the channel.

```
Enter messages : /create AnotherRoom
Enter messages :
Message received: <Create>AnotherRoom channel created and joined
You are now the admin of this channel
Enter messages :
```

```
Enter messages : /join general
Enter messages :
Message received: <Join>Joined general channel
Users currently in general channel: <ADMIN>test1, NewNickname:)
Enter messages :
```

Location of codes in Server: Line 32 to 42(Declaration) & Line 482 to 832 under function RecvThread().

Advanced feature: Channel admin power

The first user in the channel will be given admin power. The channel struct will save the admin user's socket in the struct. The users that get admin powers will get a message telling them "You are now admin of this channel". People with admin powers can change the name of the channel(if it is not the general channel) and set/change the password of the channel. The admin powers will be passed on to another user in the channel if the admin is to leave the channel or quit the server. The commands are: /setpassword <newPassword> and /channelname <newChannelName>.

Passing of admin power:

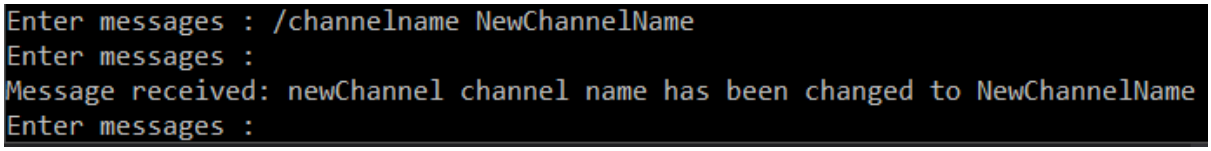
```
Enter messages : /create newChannel
Enter messages :
Message received: <Create>newChannel channel created and joined
You are now the admin of this channel
Enter messages :
```

```
Message received: test1 has left the channel
Enter messages :
Message received: You are now the admin of this channel
Enter messages :
```

Changing of channel password:

```
Enter messages : /setpassword newPassword
Enter messages :
Message received: newChannel channel password has been changed to newPassword
Enter messages :
```

Changing of channel name:



Location of codes in Server: Line 870 to 944(Setpassword and change channel name command) & Line 555 to 593(transferring admin powers) under function RecvThread().