

Group 7: "Flower bottle" vases

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Github link: https://github.com/sophiashe123456/chatsystem_sp_ass.git

Chat System function introduce

This is a simple socket-based chat system based on python programming language that supports the following features:

- Broadcast messages
- Private messages
- File transfer
- List online users
- List groups
- Group chat
- Group file transfer
- List group members
- User exit from the chat system

Commands Overview

- **Public Message:** Just type the message and press Enter.
- **Private Message:** /msg <username> <message>
- **File Transfer:** /file <username> <filename>
- **List Online Users:** /list
- **List Groups:** /showgroups
- **Create a Group:** /create <groupname>
- **Join a Group:** /join <groupname>
- **Send a Group Message:** /group <groupname> <message>
- **Quit:** /quit
- **List group members name:** /showgroupmembers <groupname>
- **Send a file within the group:** /groupfile <groupname> <filename>

Prepare

1. Clone or download the project files, including `server.py` and `client.py` etc.
2. Ensure `server.py` and `client.py` are in the same directory.
3. Run the chat system from the terminal or select other appropriate environment (VS Code, PyCharm etc.).
4. Ensure you have all the needed libraries:

```
pip install websocket  
pip install cryptography  
pip install pycryptodome  
pip install aioconsole
```
5. Generate RSA keys in the same directory:

```
python rsa_tool.py
```

----- As following -----

```
(.venv) (base) sophia@sophiadeMacBook-Pro chatsystem4 4 % python rsa_tool.py
Do you want to create new key pairs? (yes/no): yes
Enter the file path to save the public key (default: public.pem):
Enter the file path to save the private key (default: private.pem):
Private key saved to private.pem
Public key saved to public.pem
```

6. Check your own IP address, the following use 192.168.1.104 as example.

Instruction

● Starting the Server

- **Start the Server:** Run the server script (server.py) use following code:
`python server.py private.pem`
- You should see a message indicating that: WebSocket server started and listening on ws://0.0.0.0:8767.

----- As following -----

```
(.venv) (base) sophia@sophiadeMacBook-Pro chatsystem4 4 % python server.py private.pem
*****
WebSocket Server started and listening on ws://0.0.0.0:8767
*****
```

● Connecting Clients

- **Start Client for User sophia:** Run the client script (client1.py) for the first user:
`python client.py 192.168.1.104 public.pem` (change to your server IP address)
- **Enter the username when prompted:** Enter your username: sophia
- **Start Client for User jojo:** Run another instance of the client script for the second user: `python client.py 192.168.1.104 public.pem`
- **Enter the username when prompted:** Enter your username: jojo

----- As following -----

```
(.venv) (base) sophia@sophiadeMacBook-Pro chatsystem4 4 % python client.py 192.168.1.104 public.pem
Connecting to ws://192.168.1.104:8767
Enter your username: sophia
Handshake Finished. Start AES encrypted transmission
SUCCESS: Username registered.
Enter message to send (or 'quit' to quit):
```

● Using the Chat System

Once both clients are connected, you can use the following commands to interact:

➤ **Check online users**

- ✓ Show all active online users: Use `/list` command. Example:

```
Enter message to send (or 'quit' to quit): /list
*****
OnLine Users:
**** jojo          - Last Message: No messages sent yet ****
**** nana          - Last Message: 2024-07-21 11:55:33 ****
*****
```

➤ Public Messages

- ✓ **Send a Public Message:** Any message that does not start with a command (`/msg`, `/file`, `/list`, `/group`, `/create`, `/join`, `/quit`.) will be broadcast to all connected users.
Example:

✚ User nana types: hi

✚ All other users should see: [Broadcast from nana]: hi

```
Enter message to send (or 'quit' to quit): hi
```

```
Broadcast message sent: hi
```

(nana send)

```
[Broadcast from nana]: hi
```

(others receive)

➤ Private Messages

- ✓ **Send a Private Message:** Use the `/msg receive_client_name message` command to send a private message to a specific user. Example:

✚ User sophia types: `/msg jojo` How are you?

✚ Only User jojo should see: Private message from sophia: How are you?

✚ User sophia will see a confirmation: Private message to jojo: How are you?

```
Enter message to send (or 'quit' to quit): /msg jojo nihao
```

```
fPrivate message to jojo: nihao
```

(nana send)

```
Private message from USER [nana]: nihao
```

(jojo receive)

➤ File Transfer

- ✓ **Send a File:** Use the `/file receive_client_name path/file_name` command to send a file to a specific user. Example:

✚ User sophia wants to send a file named example.txt to User jojo. User sophia types: `/file jojo example.txt`

✚ User sophia will see a confirmation: File example.txt sent to jojo successfully.

```
Enter message to send (or 'quit' to quit): /file jojo example.txt
```

```
File 'example.txt' sent to jojo.
```

- User jojo will receive the file, automatically download in her computer and open the file in a separate window and receive a notification: 'You received file 'example.txt' from sophia.

```

Enter message to send (or 'quit' to quit):
You received file 'example.txt' from sophia
  tmp
  jojo / file_rcv / user_sophia
  example.txt

```

➤ Group Chat

- ✓ **Create a group:** Use the */create* command to create a chat group. Example:

- User sophia wants to create a chat-group groupa. User sophia types the following command and will automatically join the group herself: */create groupa*
- sophia should receive: Group groupa created and joined.

```

Enter message to send (or 'quit' to quit): /create haha
SUCCESS: Group 'haha' created and joined.

```

- ✓ **Join a group:** Use the */join* command to join a chat group. Example:

- Anyone else that wants to chat with all the members in groupa at the same time need to join the group. If jojo wants to join the group, she types: */join groupa*.
- jojo should receive: Joined group groupa.

```

Enter message to send (or 'quit' to quit): /join haha
SUCCESS: Joined group 'haha'.

```

- If clients join some group does not exist, they should receive: Group '{group_name}' does not

```

Enter message to send (or 'quit' to quit): /join nanana
ERROR: Group 'nanana' does not exist.

```

- If clients create a group using the exiting group name, they should receive: Group '{group_name}' already exists.

```

Enter message to send (or 'quit' to quit): /create haha
ERROR: Group 'haha' already exists.

```

- ✓ **Show group details.** Example:

- If clients want to check what groups are there, need to type the following to show all the groups:

```

Enter message to send (or 'quit' to quit): /showgroups
*****
Groups:
**** Group: haha - Members: 0 ****
*****

```

- ✚ If clients joined groupa and want to check the name of all the members in the groupa, need to type: */showgroupmembers*

```
Enter message to send (or 'quit' to quit): /showgroupmembers groupa

*****
Groups:
**** Group: groupa                - Members: 2 ****
1: sophia
2: jojo
*****
```

- ✓ **Send a group message.** Example:

- ✚ User sophia types '*/group group_name message*': */group groupa Hi*.

```
Enter message to send (or 'quit' to quit): /group groupa Hi

Group message to groupa: Hi
```

- ✚ Only group member in groupa should see: [Receive group groupa message from sophia]: Hi.

```
Enter message to send (or 'quit' to quit):
[Group groupa message from sophia]: Hi
```

- ✓ **Send a file within the group.** Example:

- ✚ User sophia types '*/groupfile group_name path/file_name*': */groupfile groupa file.txt*.

```
Enter message to send (or 'quit' to quit): /groupfilee groupa file.txt

File 'file.txt' sent to group member: sophia.

Enter message to send (or 'quit' to quit):
File 'file.txt' sent to group member: jojo.

Enter message to send (or 'quit' to quit):
File 'file.txt' sent to group groupa finished.
```

- ✚ All the group members in groupa should receive the file, automatically download in their computer and open the file in a separate window and receive a notification: [You receive file.txt from Group groupa sophia].

```
Enter message to send (or 'quit' to quit):
You received file 'file.txt' from Group groupa_sophia
```

Example Chat Session

Here is an example chat session with the commands, sophia and jojo are the only clients connected with server1 at the moment:

1 Public Message:

- **Sophia** types: Hello everyone!

- **Jojo** sees: [Broadcast from sophia]: Hello everyone!

2 List clients:

- **Sophia** types: /list
- **Sophia** sees: sophia, jojo

3 Private Message:

- **Sophia** types: /msg jojo How are you?
- **Jojo** sees: Private message from sophia: How are you?
- **Sophia** sees: Private message to jojo: How are you?

4 File Transfer:

- **Sophia** types: /file jojo example.txt
- **Sophia** sees a notification: File example.txt sent to jojo successfully.
- **Jojo** receives the file, file download in jojo's computer and opened in a separate window, and jojo sees a notification: You received file example.txt from sophia.

5 Group Message:

- **Sophia** types: /create haha
- **Sophia** sees: Group haha created and joined.
- **Jojo** types: /showgroups
- **Jojo** sees: haha
- **Jojo** types: /join haha
- **Jojo** sees: Joined group haha
- **Jojo** types: /showgroupmembers
- **Jojo** sees: jojo sophia
- **Jojo** types: /group haha Hello there!
- **Sophia** sees: [Receive group haha message from jojo]: Hello there!
- **Sophia** types: /groupfile haha file.txt
- **Jojo** sees: [Receive file.txt from Group haha sophia].

If client nana is in the group, she should receive the message and file same as jojo and sophia at the same time.