

Program design / a brief description

According to the assignment requirement, this program can come true the server and client connection and multiple client's communication.

The first step establishes a connection between the server side and the client side so that the users can achieve accounts and passwords login on the client side (the information of accounts and passwords in credentials.txt). After that, scanning the imported credentials.txt verify that the user is in the record. In the reading of the file, the username and password are converted into two lists that must correspond to each other in order to log in successfully. The password is entered incorrectly three times into the sleep state for 10 seconds, and the time of logins is cleared.

Next, the part of the function implementation builds step by step. The first one is BCM, it can come true that people send messages from client to server and include specific times and usernames. But for the server, we only need to transmit the specific content, we can only send the content after the BCM message from clients to servers. The message from all users will be written in one text in order to get in RDM part with 'b' requirement.

The second function is to build the ATU part, we need to record the active users to check and print all active users in the server except the client (because we need to print other active users grouping), so we write the user login status directly to the text (userlog.txt). In order to confirm the user's login and the status, the OUT-part condition of users will be deleted from userlog.txt, which also confirms whether the user is active or not.

The next function is SRB, which need to choose one or more users to group in a separate room, we can choose from active users in userlog.txt. Overlay of IDs for different rooms to create files We need to overlay the ID numbers for the different rooms before creating the file (SR_ID_messageLog.txt), according to the existing SR_ID_messageLog.txt to overlay ID numbers of different files and rooms. In SRM part, users can send messages for separate room who in and messages will be written in SR_ID_messageLog.txt (ID will be changed according to users whose room). The one important thing is the format of the message that must be the same for example SRM 1 Hello (SRM room-number content), because I use lists and indexes to match room and content. The sixth part is RDM, which will come true through two sections (s and b), 's' will get messages in separate room users in, and 'b' will get broadcast messages. My code also uses lists and indexes to get messages in different texts and get time to compare, since we need to get the time after message time. it should follow the format (eg: RDM s 03 Aug 2022 10:40:30 or RDM b 03 Aug 2022 10:40:30), the time format is same in whole parts (03 Aug 2022 10:40:30).

However, the DPD part is not finished. There are many parts that are not great and my code is also so long. The code test needs to follow format and needs to use credentials.txt to login(the information of users need save here).

the application layer message format

The output in Client:

```

[(base) xiaokeaiwangxindeMacBook-Pro:desktop xiaokeaiwangxin$ python3 TCPClient3.py 127.0.0.1 2000
Username:obiwan
Password:(jedimaster)
4; 04 Aug 2022 09:02:21; obiwan;127.0.0.1;2000
Welcome to TOOM!
Enter one of the following commands (BCM, ATU, SRB, SRM, RDM, OUT, UPD):
BCM hello
Broadcast message,broadcast at 04 Aug 2022 09:02:29
Enter one of the following commands (BCM, ATU, SRB, SRM, RDM, OUT, UPD):
ATU
hans, active since 04 Aug 2022 08:51:01.
luke, active since 04 Aug 2022 08:51:45.yoda, active since 04 Aug 2022 08:51:50.
Enter one of the following commands (BCM, ATU, SRB, SRM, RDM, OUT, UPD):
SRB luke
Separate chat room has been created, room ID:1, users in this room:obiwan, luke
Enter one of the following commands (BCM, ATU, SRB, SRM, RDM, OUT, UPD):
SRM 1 have a nice day
1 have a nice day
Enter one of the following commands (BCM, ATU, SRB, SRM, RDM, OUT, UPD):
RDM s 04 Aug 2022 08:51:01
Messages in separate rooms since 04 Aug 2022 08:51:01
room-1: #1;obiwan;have at 04 Aug 2022 09:03:07
Enter one of the following commands (BCM, ATU, SRB, SRM, RDM, OUT, UPD):
RDM b 04 Aug 2022 08:51:01
obiwan broadcasted BCM "hello" at 03 Aug 2022 21:01:15
hans broadcasted BCM "hello" at 04 Aug 2022 08:59:21
obiwan broadcasted BCM "hello" at 04 Aug 2022 09:02:29

Enter one of the following commands (BCM, ATU, SRB, SRM, RDM, OUT, UPD):
OUT
Bye,obiwan

```

The output in server:

```

[(base) xiaokeaiwangxindeMacBook-Pro:desktop xiaokeaiwangxin$ python3 TCPServer3.py 2000

===== Server is running =====
===== Waiting for connection request from clients...=====
obiwan broadcasted BCM "hello" at 04 Aug 2022 09:02:29
obiwan issued ATU command
Return messages:
hans, active since 04 Aug 2022 08:51:01.
luke, active since 04 Aug 2022 08:51:45.
yoda, active since 04 Aug 2022 08:51:50.
obiwan issued SRB command
Return message:
Separate chat room has been created, room ID:1, users in this room:obiwan, luke
obiwan issued a message in separate room 1: #1;04 Aug 2022 09:03:07;obiwan;have a nice day
RDM command issued from obiwan
Return message
Return message
obiwan broadcasted BCM "hello" at 03 Aug 2022 21:01:15
hans broadcasted BCM "hello" at 04 Aug 2022 08:59:21
obiwan broadcasted BCM "hello" at 04 Aug 2022 09:02:29
obiwan logout

```

Text created



**SR_1_messagelog.
txt**



B_message.txt



userlog.txt