Link：https://pan.baidu.com/s/1PrvvWXy1d4wLl0ce1aaCqg?pwd=9t0k
提取码：9t0k

P2P Chat

The design of P2P Chat.

Classes

P2P Chat has two packages, one is chat package, the other one is server package. Chat package has three classes, ChatUI, User, Users. Use class and users class are used to define two objects use and users. User is used to store the IP, username and port of a specific user. Users is used to store use object. ChatUI is used to show a GUI window, realize the Multiple threads and listener. There are four Button in the GUI window. Each Button has a ActionListener to run the different methods in this class. Click Button send to run the sendUserMessage method, click button clear to cleat the input field, click button login to run the thread listener whose name is LoginServer to connect the user and server, and click button exit to exit P2P Chat. SendUserMessage method can start the ClientSendThread in a loop to implements broadcasting to all of the user, or it can send message to the specific user. LoginServer is used to judge if connect successfully, receive the information which the server or other user send. Receiving other users' message need to start the ClientReceiveThread.

Server package has one class, ServerUI Class. ServerUI is used to show the server GUI and implements the relative functions. There are 6 buttons in the Server window. Each Button has a ActionListener to run the different methods in this class. Click Button kick to run the kick method, click Button connect to run the startServer method, click Button stop to run the stopServer method, click Button clear to clear the input field, click Button send to run the sendSystemMessage method, and click Button viewHistory to run the view method. Kick method is used to send stop command to the specific user to kick it. StartServer method is used to start the serverlistenThread which is used to confirm if connect successfully and start the serverthread thread. Serverthread method is used to reserve and broadcast the outline information, and update the user list. StopServer method is used to exit the server. SendSystemMessage is used to send the information to all

of the users. View method is used to send the get history command to a specific user, show the received history information and back to the origin state.

GUI

There are 2 GUI to help the user access to the System. One is Server GUI, the other one is Chat GUI. Server GUI is designed for the Administrator who can kick user, view the history of specific user, broadcast the stop information or other specific information to all of the users. Chat GUI is designed to the users who can broadcast to all of the users, and send message to specific user. Both of these GUI can show a list of all of the online users.

To realize these functions, I choose to use JAVA. Swing to design the GUI. For example, using JPanel design the layout, using JList shows the list of users and using JButton listens the click action. I also can use AWT to design the GUI. However. AWT is the early package for coding the GUI, and Swing is a refinement and extension of AWT. Using Swing can help me improvement the GUI easily in the future, and make my code can be ran in different platform.

Implement functions

Broadcast and Send

Broadcast and send to specific user function were implemented in P2P. P2P means a user send the information to the other user directly, instead of using server. There are two new object user and users in P2P Chat. User can store the port and the IP address to make other users can use Socket to connect to it. Users is a Arraylist which store connected user which can help broadcast the message to every connected user.

The message sent and received were implement by Socket, ObjectInputStream, ObjectOutputStream and Thread.

Socket is the intermediate software abstraction layer between the application layer and THE TCP/IP protocol family. In java, it is usually used to implement the connection between the server and client. Using ServerSocket (Int Port) to send the connecting request, and using Socket (InetAddress serverIP, Int port) to

receive the connecting request.

ObjectInputStream and ObjectOutputStream are IO Stream. ObjectOutputStream is used to implement serialization, and the ObjectInputStream is used to implement deserialization. The transmit object must implement Serializable.

Thread can realize the client or server can receive message all the time by looping. Below is the code about the connect between user and user to implement P2P cheat.

```
public void run() {

    try {
        serversocket = new ServerSocket(port);
        while (true) {
            Socket clientsocket = serversocket.accept();
            ObjectOutputStream out = new ObjectOutputStream(clientsocket.getOutputStream());
            ObjectInputStream in = new ObjectInputStream(clientsocket.getInputStream());
            String type = (String) in.readObject();
            if (type.equalsIgnoreCase("{*^$>Message")) {
                String name = (String) in.readObject();
                String mess = (String) in.readObject();
                history.append(name + " to you:" + "\n");
                history.append(" " + mess + "\n");
            }

        }

    } catch (Exception e) {
        history.append("Fail to send"+"\n");
    }
}
```

```
public void run() {
    try {
        Socket socket = new Socket(address, port);
        ObjectOutputStream out = new ObjectOutputStream(socket.getOutputStream());
        out.writeObject("{*^$>Message");
        out.writeObject(name);
        out.writeObject(message);
        out.flush();
    } catch (Exception e) {
        history.append("Fail to send"+"\n");
    }
}
```

Stop

To implement close connection and announced to all other clients. When the user clicks the exit button, the client sends stop information command to server, and the server broadcast the stop information command to other clients by send and broadcast function.

Kick and View history

Administrators have the right to kick and view history. When the administrator chooses the user and click Button kick, the server sends stop command to the

client, then the client do the same thing as the stop function. The client sends stop information command to the server. Then the server broadcast the stop information and kick information.

When the administrator chooses the user and click Button history, the server sends history command to the client. Then the client sends its history to server. Finally, the server shows the history. Once the Button history was clicked, it will become the Button back to show the original information of the server.

List

Once a client was connected, it will send the connect command to the server. The server reserves the command, add the client to the list and broadcast this list. Other clients reserve the list and show it.

The pros and cons of P2P chat

Pros

1. Realize the P2P chat between clients and clients
2. Easy to use by GUI
3. The user can communicate on different or same computer by P2P Chat.
4. High compatibility of GUI
5. High scalability
6. High rate of fault tolerance
7. Final consistency
8. Decentration, server is only a special client.

Cons

1. Client need to login by server, so the client cannot communicate directly without login. Although the server is a special client, it is necessary.
2. High redundancy. Messages may be forwarded or delivered multiple times caused the repeat of message.