

## **DS Assignment 2 Report**

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### **Induction**

In this assignment, a shared whiteboard is implemented. The whiteboard supports multiple users drawing on a single paint board at the same time, and provides chat room function, so that users can communicate by typing in the process of drawing. But the disadvantage is that the administrator function has not been implemented, but some administrator functions are still open to all users (such as new paint board).

### **system architecture**

The system consists of client and server.

The client is mainly composed of three parts: main interface, listener and receiver. The main interface provides the user interface, including the paint board, button bar, chat room and online user list. The main interface is used to process and provide data for users. The listener is used to capture the user's drawing on the paint board and upload the drawing data. The receiver is used to receive data from the server for real-time interaction.

The server maintains multiple lists, which are used to store online client data , and acts as an information transfer station

### **communication protocols and message formats**

In this system, the socket programming is used, and the TCP protocol is selected as the transmission protocol. The following format is used as the

message format:

Xxxx|xxx|xxx

The first char represents the type of message, followed by the data that need to be transmitted. The data of different blocks are divided by “|” symbol.

### **Implementation details**

The client contains three class: Client, Mlistener and receive. The client is the main class, including the initialization of the client and the implementation of the main interface. Among them, string cur and int curc record the current painting tools and colors respectively. There are 16 kinds of colors, which are stored in a unified list format. Curc stores the index of the current color, and directly accesses colors through colors [curc] when using, so as to facilitate the data transmission and use of colors. Except for the send button (used for chat), the use of other buttons will not produce data interaction with the server, only change the local data. The main data transmission comes from mlistener. Mlistener is a listener based on mouselistener, which sends drawing data to the server by listen the mouse operation on the paint board. Mlistener responds when the mouse is pressed and released, reads the X and Y values when the mouse is pressed and released, and sends data to the server according to the current drawing tool and color. Receive is used to receive data from the server and apply it to the main window.

The server stores the data of all current online clients for updating and transmitting data. When a new client joins, the server will store its relevant data in the ArrayList, update the online user list of all current clients, and distribute a new thread for the client. When the client is closed (judged by catch exception), remove the client from each ArrayList and close the corresponding thread.

### **Analysis and reflection**

In the process of system implementation, I gradually realized that the server only plays the role of transmitting information to other clients for the

client in the whole system. Then, if each client can store the data of other clients independently, the role of the server can be completely replaced. But decentralization also brings additional data storage, which is also its main disadvantage. At the same time, I found that under the client-server system framework, it is relatively difficult to implement the administrator. I think the better way is the administrator-user system framework. The administrator side acts as the server and client, which may make the administrator function better.

But in this system, if we want to implement this system framework, it should not be difficult to modify. I can add the client code to the server, replace the part that uploads the data in the client code with directly distribute it to all lists, and provide the administrator with special buttons for the administrator's related operations. However, due to the problem of time, this part of the content is in the imagination.

All in all, this assignment is a good attempt of the distribution system. I hope to do it better in the future study.