Comp90015 - Assignment 2 – Project: Distributed Shared White Board Report

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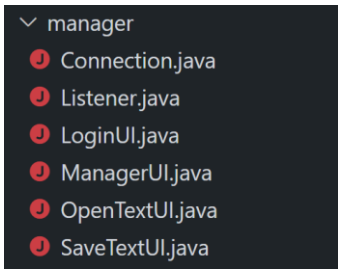
1 Introduction

Assignment 2 is intended to implement a Distributed Shared White Board. This application allows manager and users to draw on the white board together. White board can draw line, circle, rectangle, oval. Also, white board can draw like pencil and choose color. Manager can create a whiteboard and allow or kick the client; as well as new, open, save, saveAs and close function. Socket is used to transport the information between manager and users. Thread is used to achieve the concurrency of communication. TCP protocol is used for manager and clients to transport the information reliably. The whole program is divided into three parts: manager, client and common. Details will be provided below.

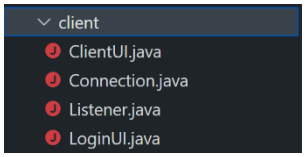
2 Components of the system

Manager



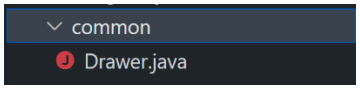
Manager can create the white board, use a name to login in (LoginUI.java). The white board is show on the (ManagerUI.java). Both manager and client can draw a line, circle, rectangle, oval, free and choose a color. Manager can choose to new, save, saveAs, open, and exit a whiteboard. When using the saveAs function, it will use the (SaveTextUI.jave) to choose to save as a text to graph. Manager can also open a text file when choosing open, and it will pop up the (OpenTextUI.java). Every board will establish a connection by (Connection.java). This is thread-per-connection method. Every connection will create a thread. This method will be explained specifically later. All the action on the white board will be caught by the (Listener.java). Manager can kick out the client from the white board.

Client



Client is like Manager but with relatively less function. To log in is as a client, first the client's name must be the uniquely in the user list. And the client needs to get the permission of the manager to log in (LoginUI.java). As mentioned before, client can draw the same thing as the manager. Client will send the draw back to manager (Connection.java). Action on the white board will be caught by the (Listener.java) too.

Common



Common is used for manager and client to draw on the white board. Graphics2D is the method that used to draw. Graphics2D defines several methods for adding or changing state properties of graphics.

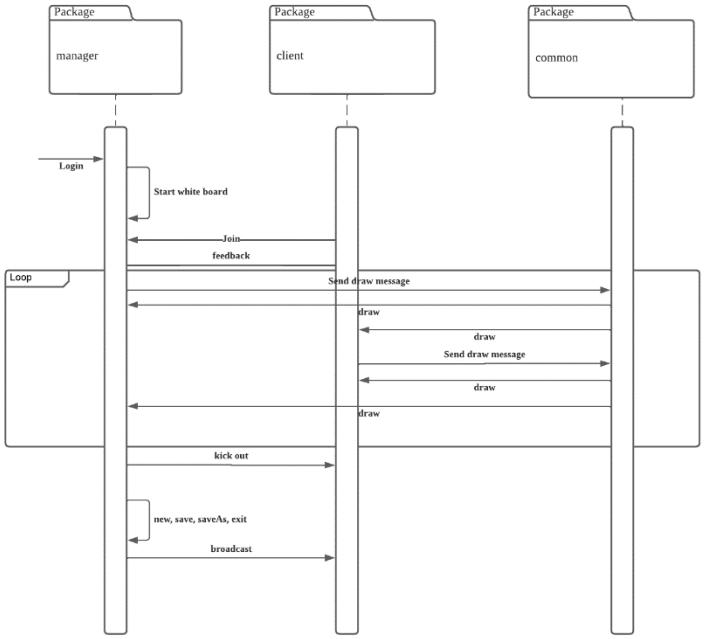
3 Protocol

Between the communication of manager and clients, TCP protocol is used to make the communication more reliable. As mentioned above, thread-per-connection is used for connection. To compare with thread-per-request, it is not necessary to establish connection per request. The draw on the white board will not only draw once a time. Thread-per-connection will save more resources. Throughput is much better than worker-pool. And it is easier to use and manage. However, the speed of the reaction is not as fast as the thread-per-request. If the number of the clients is too much. It may cause block.

4 Message format

To communicate between the manager and clients the format of the message is designed. The message is a string that has two parts, message type and message. The message type includes begin, request, draw, over, new, kick, delete, client out. Manager and clients will act according to the message type.

5 Design diagram



6 Innovation

Apart from the basic function, this application achieved 2 advanced innovations. Firstly, Managers can new, save, saveAs, exit the file. New means make a new white board to manager himself and all clients. Save will save the white board now as a quick saving to a text file. Manager can also open a text file. SaveAs can save the file to both text files and images.

The second innovation is that manager can kick any clients from the white board. The kicked client will be notified he is kicked out and other clients will be notified which client is kicked out.