# Group #4 – Design

Design Requirements Specification

Revision History

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# Introduction

## Goals and Objectives

This document describes important aspects of the implementation of the Communications System.

## Statement of Scope

Decisions in this document are made based on the following priorities (most important first): Maintainability, Usability, Portability, Efficiency

## Software Context

Server information will be maintained within the Server singleton object. The Server objects various commands will handle the receiving and sending of all communications between the clients.

The Client will be responsible to sending and receiving data from the Server and present this data to the user with the UI.

## Major Constraints

**Issue 1**: Where should we store the database?

**Option 1.1**: We can store the database in the Server object.

**Option 1.2**: We can store the database in a separate file that is properly sorted and accessible by the Server object. The Server object will sort in chronological order and within its respected chatroom.

**Decision:** We should go with 1.1. The database should only be on the “server” since only the Server accesses it because the clients only access the server.

**Issue 2**: Where should we store the information of usernames and passwords?

**Option 1.1**: We can store this information within the Server object.

**Option 1.2**: We can store the information in a separate file that the Server will search through.

**Decision:** They should be stored in the database which after Issue 1 I think should be part of the Server object.

# Data Design

## Client Side

The Client will communicate with the Server to create chatrooms with the createChatroom() method. The user that starts the chatroom becomes the host and is the only one who may lock the Chatroom. A response from the Server will be displayed on the UI confirming a successful creation of a Chatroom.

The Client will frequently send Messages to the server with the combination of the createMessage() and sendMessage() methods. The methods createMessage() and sendMessage() will have two implementations depending on if the Chatroom is locked or not. A response from the Server will be displayed on the UI confirming a Message was successfully sent.

The joinChatroom() method will in invoked when a user successfully logs into the client.

## Server Side

The implementation of the validateUser(username, password) will search through the database of approved personnel.

The Server will receive Messages with the getMessage() method. This message will be stored by calling recordMessage(message, date) where message will be the text message and date is the timestamp.

The Server will redistribute the data to those involved in the Chatroom with the resendMessage() method.

## Chat Room Side

The methods createMessage() and sendMessage() will have two implementations depending on if the Chatroom is locked or not. A response from the Server will be displayed on the UI confirming a Message was successfully sent.

The methods readChatLog() will only display messages sent within the past 24 hours to users. However, Supervisors will be able to view all messages sent through the Chatroom without a time limitation.

## Message Side

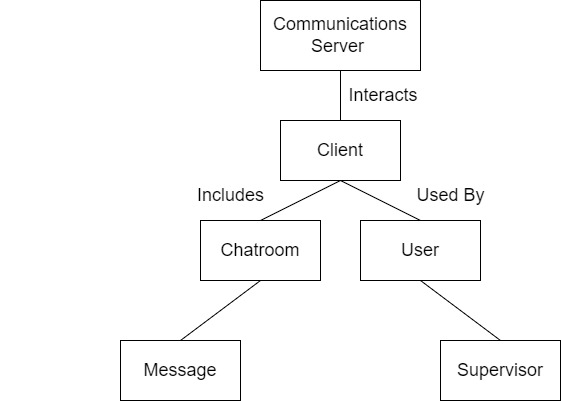
The setMessageContent(String) implementation will require that the textual information to be contained within a String object.

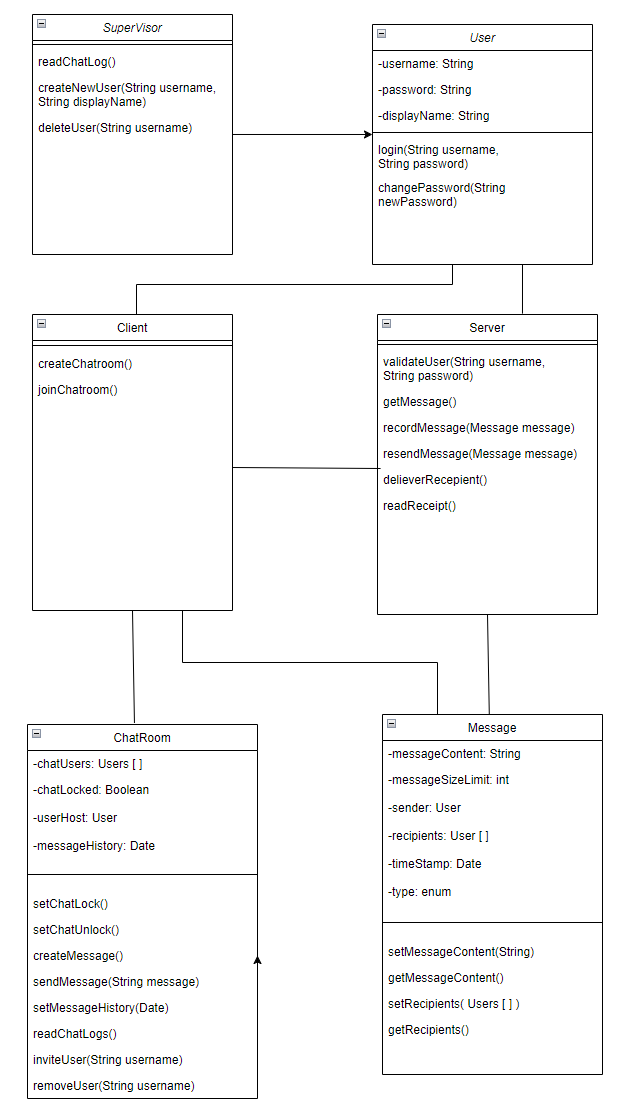
# Architectural and Component-level Design

## Program Structure

The Communications System runs as a client-server application.

## Architecture Diagram:





## Description of Client

## 3.2.1 Client processing narrative

createChatroom() – This method will create a Chatroom Object and ask the host for the users to invite.

joinChatroom() – This method will automatically join all Chatrooms that the user is invited to when they successfully log into the client. Update the list of all possible Chatrooms to join.

openChatroom() – This method will allow the user to select a chatroom to open and read messages.

createMessage() – This method will create a new Message object and ask for textual information.

sendMessage(Message) – This method will send a Message object to the server to be redistributed to all participating users

.

setMessageHistory(Date) – This method will set how long messages persist locally on the user’s machine.

readChatLogs() - This method only useable by Supervisors will allow them to reset a password for a user

setChatLock() – This method will allow the host of a Chatroom to lock the chat’s users list. No alterations to the user list are permitted.

setChatUnlock() – This method will allow the host of a Chatroom to unlock the chat’s users list. Alterations to the user list is permitted.

## 3.2.2 Client Interface description

The Client interface will be constructed with the use of JOptionPane library. The Client will begin with a login window. Once logged into the client there will be a menu options to choose between making a chatroom, opening an existing chatroom, and logging off. Once in a chat room there will be various buttons to activate various methods including sending messages, locking/unlocking the chat, adding, and removing users and exiting the chat.

## 3.2.3 Client processing details

The Client will be implementing with the aid of the functions and processes given by the JOptionPane library. We will be using a do/while loop with an embedded switch statement to initiate the various methods that are needed for our main menu within out project. Each case will have a method that will accomplish a particular task. These methods will be activated when a button is clicked on within the Client. This process will be used within the possible selections of actions within the main menu and within the Chatrooms.

## Description of Server

**3.3.1 Server processing narrative**

validateUser(String username, String password) – This method will confirm the identification of the user logging into the CS. Will look through list of users within database of the Server class.

getMessage() – This method will allow the Server to accept messages made by the users, sent by the client.

recordMessage(Message message) – This method will record the information about a message that was sent to the Sever.

resendMessage(Message message) – This method will redistribute the messages sent to the Server to the recipients of the message.

deliverReceipt() – This method will return a receipt to the sender when a message has been successfully delivered to its destination.

readReceipt() – This method will return a receipt to the sender when a message has been read by its recipient.

**3.3.2 Server interface description**

The Server will receive all its data from the client and will record all the messages that pass through it. Furthermore, the Server will redistribute the message to the selected recipients, sending the data to their clients. The messages will be Asynchronous.

**3.3.3 Server processing details**

The Server will begin the processing and recording of Messages once one is sent from a client.

# User Interface Design

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A picture containing graphical user interface

Description automatically generated

The Client Interface will open with a User Login Page that will have two text areas asking for a Username and Password. Underneath them will be a Login button to submit the username and password. If the Login is unsuccessful the user will be brought back to the login to try again.

Diagram

Description automatically generated

Once the User has successfully logged in they have a decision between 3 different buttons. The first button will allow the user to create a new chatroom as the host. The second button will allow the user to open an existing chatroom. The third button will log them out of the system returning them to the login window.

Diagram

Description automatically generated

If the User wants to make a Chatroom, the user will be presented with a text area to give the chatroom a name. There will also be 2 buttons present the first to confirm the creation of the chatroom and the second to cancel the operation and returning to the main menu window.

Graphical user interface, application

Description automatically generated

If the User wants to open an existing Chatroom, a dropdown menu will appear with the existing Chatrooms to join. Once a preferred chatroom is selected the user can confirm with the help of a button. There will also be a button to cancel the operation which also returns them to the main menu window.

Graphical user interface, text, application, email

Description automatically generated

Once the User opens or creates a chatroom the client will transition to the chat page where the user can send and receive messages from other users. From this page the user can add or remove users with buttons. The host will be able to lock and unlock with buttons. Any Supervisor will be able to read the entire chat logs history with the help of a button. Lastly a button will be available to exit the chat room and returning to the main menu.

# Restrictions, Limitations, and Constraints

There will be a predetermined number of users that will be permitted to log into the Communications System. A of now, there is no method to add additional users.

# Testing Issues

It will be difficult to test the full capabilities of the Communication System with only a single user logged into the system. Therefore, to solve this issue there will need to be test sessions where multiple users are logged into the Communication System at the same time from varying locations.