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| Software Design & Implementation |
| Project Design |
| Group 30 |

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## Introduction

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# Use Case Diagrams:

## Introduction:

#### Figure 1.1 (Login)

This diagram shows the login process. It assumes that the user is valid and will use their credentials to log in. The credentials introduced by the user are then validated by the database.

## Figure 1.2 (Send Message)

A user attempts to send a message, the system will first need to validate their connection to ensure that the target user is online and connected to the broker.

* If the user is online:
  + The source message is sent, and the source chat history is updated
  + The target user is notified, and the target user’s chat history is also updated
  + The chat histories on both ends are updated within the database
* If the user is offline:
  + The source message is stored within the database temporarily
  + The source user’s connection is then repeatedly checked until they are confirmed to be online
  + Once the source user is online, their message is then sent to the target user, and the following stages mentioned above occur

#### Figure 1.3 (Make Room)

The diagram shows the process that occurs when a user makes a new room. The user is assumed to be Admin as by making a room the user becomes that Room’s Admin by default. The new room is made, and the database is updated. The Admin then has the option to add users to room and make these users moderators. The Admin can also make channels in the room. Whenever any changes are made the database is updated.

****Login includes the input login credentials. Input login credentials includes authorise credentials. Authorise credentials extends to valid password. Authorise credentials also extends to invalid password.

Figure 1.1.1: Login Use Case

****Source user actor is associated with the send message use case. Send Message includes validate connection. Validate connection extends to user offline. User offline includes store message. Store message includes update database. It also includes validate connection. Validate connection also extends to user online. User online includes update logs. Update logs includes update database. Update database is associated with the Database actor. User online includes notify contact. User online also includes update chat. Receive message includes update chat. Receive message also includes notify contact. Target User actor is associated with the receive message use case.

Figure 1.2: Send Message Use Case

Admin actor is associated with make room use case. Make room use case includes update database. Update database is associated with the database actor. Make room extends to create channel. Create channel includes update database. Make room also extends to add user. Add user is associated with the user actor. Add user also extends to make moderator. Make moderator is associated with the moderator actor. The admin is a child of the moderator.

Figure 1.2.3: Make Room Use Case

# Activity Diagrams:

## Introduction:

#### Figure 2.1 (Login)

In this scenario, the User attempts to login into the application by inputting the User credentials (i.e., Username and Password). The credentials are then authenticated against the existing credentials within the database.

* If the password is valid, the user gets access to their user space
* If the password is invalid, the user is notified of their credentials being incorrect and are asked to try again.

#### Figure 2.2 (Send Message)

The activity diagram covers the flow of events required to send a message. The user triggers an event when sending a new message using the application. The source user’s status is validated to ensure they are connected to the broker. If the source user is offline, the message is temporarily stored in the database. The application keeps checking the status of the users every 10 seconds. Once the source user's connection is established as being online, the system retrieves any messages that are stored in the database. A queue of messages to be sent is created and messages are ordered accordingly in a first in, first out fashion. A fork then occurs for several activities to run concurrently, such as notifying the target user that a new message has been received, updating chat logs, and updating the chat history itself. Once these are all completed, they merge back to end the 'send message' activity.

#### **Figure 2.3 (Make Room)**

The activity diagram shows the process that occurs when a user makes a new room. First, the user is promoted to room Admin. The Admin is then given the option to add a user to the room. If they do, they are then given the option to make the user a moderator. Regardless of if they make the new user moderator or not, the Admin is given the option of adding a user again, looping back. Once the Admin has finished adding users, they are then given the option to add a channel to the room. If they choose yes, they can add the channel and then the option is given again, the same as when adding users. The database is then updated, and process concludes.

While the add user and add channel options should not be unique to this process, they are still part of the process for making a new room and should be given immediately.



Figure 2.1.1: Login Activity Diagram

The login activity is initiated. User inputs their username and password. Control flow points to a decision node to check credentials combination against database. If credentials match the control flow logs the user into their own space. Control flow points to activity final node and stops all control flows. If credentials do not match control flow notifies user of incorrect credentials. Control flow then asks the user to re-enter their credentials. The control flow then loops back to the input username and password activity.



Figure 2.2: Send Message Activity Diagram

The send message activity is initiated. The control flow points to the send a message through the chat activity. Control flow moves then moves onto a decision node to check user’s connection. If the user is offline, the control flow moves to the store message in database activity. Control flow then loops back to check user connection. If the user is online, the control flow moves to the retrieve any stored messages activity. It then flows to create a queue of messages to be sent. Control flow forks at this point to run three activities concurrently, update the chat, update the chat log file, and notify the receiver. The control flow merges back and points to the activity final node and stops all control flows.

The make room activity is initiated by User. User is made Admin of room. Control flow moves to a decision node to ask whether to add a user to the room. If yes, the user is added to the room. Then, another decision node asks whether to make that user a moderator. If yes, user is made a moderator. Control flow loops back to add user decision node. If no to moderator option, user control flow loops back to add decision node. If no more users to add, control flow moves to another decision node asking to add a channel. If yes, the channel is added. Control flow then loops back to the add channel decision node. If no, database is updated. Control flow moves to activity final node.

Figure 2.3 Make Room Activity Diagram

# Class Diagram

Diagram

Description automatically generated

Figure 3.1 Class Diagram

#### Figure 3.1: Class Diagram

# Sequence Diagrams

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# Component Diagrams

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# FSM Diagrams

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# Communication Diagrams

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# Deployment Diagrams

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# GUI Mockup

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# Libraries

# Conclusion

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