

# Orbital 2022 Milestone 3 Report



**Team Name:** W

**Team Members:** Farrel Dwireswara Salim & Elbert Benedict

**Proposed level of achievement:** Artemis

**Application name:** Chattoku

**Poster:** [Link](#)

**Video:** [Link](#)

**Chattoku GitHub repository:** [Link](#)

**User's Guide:** [Link](#)

**Developer's Guide:** [Link](#)

# Instructions to run Chattoku

Chattoku has been deployed for users to take a look at what this app can do.

## Android

For android users, we have built a standalone app which you can download anytimes. You can download the apk [here](#).

## iOS

Unfortunately, we haven't successfully built a standalone iOS app. However, you can still try using Chattoku by following the instructions below,

1. Install Expo Go from app store
2. Do any of the two steps given below,
  - Create an Expo Go account using your email and send your registered email to our telegram account (@sugiyemm or @elben85), or
  - Login to Expo Go using our test account (username: chattoku-test , password: chattokucp2106)
3. Scan the QR code below,



**Note:** We have created a test account for you to use in Chattoku (email: chattokutesting@gmail.com, password: elbertpro). However, you are still advised to register using your own email. After signing up, you need to verify your email first. Do check your spam folder for that.



# Poster

Team W proudly presents  
**CHAOKU**

Chattoku, comes from chat + otaku, is a mobile app specifically made for anime appreciators



Discuss your favorite anime with other users  
Get next anime to watch with our ML-powered recommendation system  
MyAnimeList  
Anime data that is integrated to MyAnimeList

Character by akane-k from pixabay

Sample Screenshots



Developed by:  
- Farrel Dwireswara Salim  
- Elbert Benedict

Powered by:



## Features

- Anime Database**
  - Search anime functionality
  - List of currently airing and top anime
  - Add or remove anime from user's favorite list
  - Recommendation system
- Authentication**
  - Login Page
  - Register Page
  - Forgot Password Page
  - Resend verification email functionality
  - Logout functionality
  - Delete Account functionality
- Friend System**
  - Send friend request
  - Accept and reject friend request
  - View friend's favorite anime & genre
- Group System**
  - Create and edit group
  - Invite other user to group
  - Group Admin System
  - Accept and reject group invitation
  - Leave group
  - Group chat
- Profile Customization**
  - Edit user's username, bio, and profile image
  - Add and remove genre from favorite
  - View user's past forum posts
- Chat System**
  - One on one messaging
  - Group messaging
- Block System**
  - Block and unblock other user
  - Restrict blocked user from sending private message
  - Restrict blocked user from sending friend request
- Forum System**
  - Create own forum
  - Add post and comment
  - Like & dislike post
  - Follow a specific forum to get notification
  - Forum Ban system
  - Forum Admin system



Scan to install the app

# Background

## **Motivation**

As an anime lover, it is not rare for us, members of team W, we often found ourselves in a situation where we want to find a new anime to watch, but do not know where to find a good anime which suits our preference. We also often found ourselves to feel lost regarding trending topics of anime because we don't know who to discuss it with. There are some who have tried to do this such as Reddit and MyAnimeList. However, both MyAnimeList and Reddit do not have a feature where anime lovers can find a new anime which is specially tailored for them. Moreover, MyAnimeList, does not have a mobile application for its forum while Reddit is not specially made for anime lovers, which sometimes cause us to feel a bit lost. Considering all of this, our team decided to create Chattoku (Chat + Otaku), a platform where fellow anime lovers can both interact with the anime community and to also get an anime recommendation based on their preference.

## **Aim**

We aim to create a cross-platform mobile application for anime lovers that will provide them with anime databases, a recommendation system based on their favorite genre and anime series, as well as a platform to discuss various topics with other users.

## **Project scope**

Chattoku utilizes mobile applications (for Android and iOS) as the front-end for users to interact with each other through chats and forums, as well as providing them with anime databases. This will be done in React Native, and deployed in the Expo host.

Machine learning algorithms will be used to implement the anime recommendation system. This will be done using python and Flask. Furthermore, the recommendation system will be deployed in Heroku.

A set of back-end APIs will be used for authentication and database. This will be done using Firebase.

## User stories

Priority level: \*\*\* - **Must** have, \*\* - **Should** have, \* - **Could** have

Priority Level	As a ...	I would like to ...	Status
***	User	Create an account and login to Chattoku.	Implemented
***	User	Input my anime genre preferences	Implemented
***	User	Input my favorite anime	Implemented
***	User	Customise my username, profile picture, and bio	Implemented
***	User	Be able to log out from Chattoku	Implemented
***	User	Be able to delete my account in case I no longer want to use Chattoku	Implemented
***	User	Create a new forum	Implemented
***	User	Be a super-admin of my created forum so that I can control all activity in this forum.	Implemented
***	Forum super-admin	Do everything that forum admin can do in my forum	Implemented
***	Forum admin	Ban or unban non-admins from my forum	Implemented
***	User	Create, update, and delete my post and comment in a forum	Implemented
***	User	Like or dislike on posts made in the forum	Implemented
***	User	Follow a forum that interests me so that I can receive notifications every time there is a new post in this forum	Implemented
***	User	Unfollow a forum that I previously followed when I no longer interested	Implemented

***	User	Know the currently trending anime	Implemented
**	User	Initiate a private chat with other users	Implemented
**	User	Receive message notifications	Implemented
		Become friend with other user so that I can view other's favorite anime and genre	
**	User	Send a friend request to other user	Implemented
**	User	Cancel friend request that I've sent	Implemented
**	User	Accept or reject friend request that I've received	Implemented
**	User	Receive notification when other user sends a friend request	Implemented
**	User	Receive notification when my friend request is accepted or rejected	Implemented
**	User	Unfriend another user	Implemented
**	User	Create a group with other users so that I can message everyone in this group	Implemented
**	User	Be a group super-admin of my created group so that I can regulate group's activity	Implemented
**	Group super-admin	Do everything that group admin can do in my group	Implemented
**	Group super-admin	Change user's role from member to admin and vice versa	Implemented
**	Group super-admin	Remove group admins from my group	Implemented
**	Group admin	Invite other user to my group	Implemented
**	Group admin	Cancel user invitation to my group	Implemented
**	Group admin	Remove other non-admins from my group	Implemented
**	User	Leave a group when I no longer interested in becoming it's member	Implemented

**	User	Receive notification when a group send me an invitation	Implemented
**	User	Receive notification when one of my group has new member	Implemented
**	User	Decline private chat requests with other users (Blocking system)	Implemented
**	Forum admin	Delete posts or comments made by non-admins in my forum	Implemented
**	Forum super-admin	Change user's role from member to admin and vice versa	Implemented
**	Forum super-admin	Ban or unban forum admins from my forum	Implemented
**	Forum super-admin	Delete posts or comments made by admins in my forum	Implemented
**	User	Sort the forum posts by latest or trending	Limited (By default, forum post is sorted by latest)
**	User	Find my previous forum posts easily	Implemented
**	User	Find a detail of a specific anime	Implemented
**	User	Get an anime recommendation based on my chosen genres and favorite anime series	Implemented
*	User	Be able to switch to dark mode	Unsatisfied
*	User	Get a tutorial to use the Chattoku app	Limited (There is only user's guide, no in-app tutorial)

## Acknowledgements

- [MyAnimeList](#) for providing anime data.
- [Jikan API](#) for providing easy access to MyAnimeList data.
- [Akane-k](#) for the character used in our project poster.
- [chandan-02](#) for the anime fun facts.
- Some code implementations may have been inspired from [Expo documentation](#), [Firebase documentation](#), or [StackOverflow answers](#).

# Development Plan

## Tech stack

Technology	Purposes	Reasons
<b>Git &amp; GitHub</b>	Version control, collaboration, and code review to maintain code quality	It facilitates a seamless collaboration
<b>React Native (Javascript)</b>	Build the front-end of the mobile application	<ol style="list-style-type: none"><li>1. Popular framework (Lot of resources online)</li><li>2. Cross-platform (Easier to develop Android and iOS application together)</li><li>3. Members' familiarity with ReactJS</li></ol>
<b>Firebase</b>	Development of the back-end of the application, including storage and user authentication.	<ol style="list-style-type: none"><li>1. Popular backend service (Many resources on the internet)</li><li>2. Variety of APIs which are useful for the development of Chattoku</li><li>3. Has a free tier pricing plan</li></ol>
<b>Expo</b>	Deployment of the mobile application	Ease of deployment, especially for React Native app
<b>Jest</b>	Software testing for the Chattoku app	<ol style="list-style-type: none"><li>1. Popular testing framework (Various resources online)</li><li>2. Works well with React Native program</li></ol>

<b>Python</b>	Implement the machine learning algorithm to get anime recommendations for users	Python has various libraries that are useful in developing a machine learning model.
<b>Heroku</b>	Deployment of the anime recommendation server	Ease of deployment and members' past experience with Heroku
<b>Postman</b>	API testing for the anime recommendation server	It provides API testing
<b>Jikan API</b>	Fetch anime data from myanimelist server.	It is a free and open-source API which makes getting anime data much easier
<b>Prettier</b>	Code auto formatter	It eases the standardization of code styling

#### Other External Libraries used:

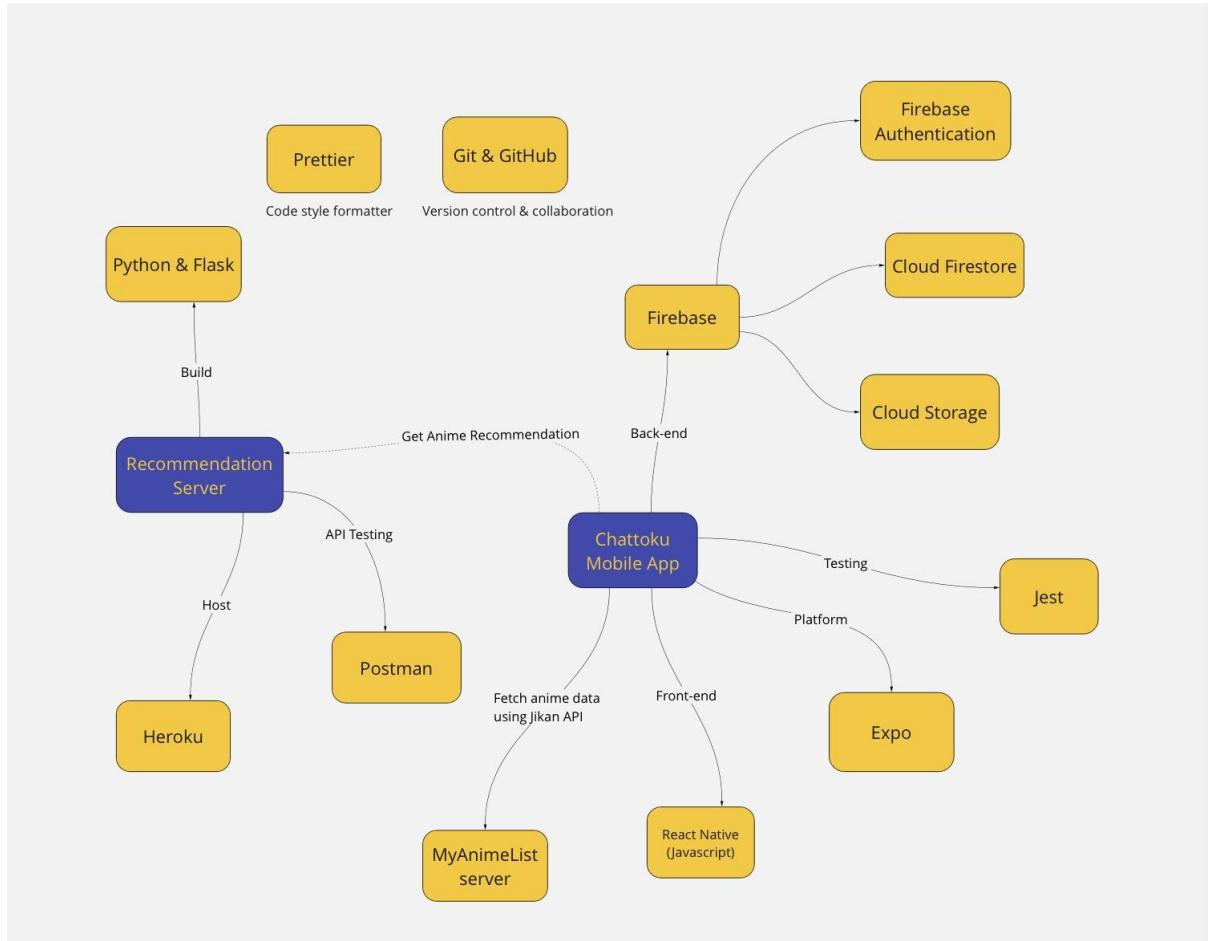
Name	Purposes
@react-navigation	Stack and bottom tabs navigation
axios	Send HTTP requests
dotenv	Enable using environment variable
expo-device	Get information of device used to run Chattoku app
expo-image-picker	Upload image from camera or gallery
expo-linking	Enable user to open link
expo-notifications	Enable push notifications
expo-updates	Enable app to be hosted at Expo
firebase	Firebase APIs to allow Chattoku's front-end to communicate with Firebase server

firebase-admin	Used in testing firebase functionality
styled-components	Creating and abstracting styles for Chattoku's UI components
lodash	Enable delayed function
react-native-elements	UI libraries
react-native-gifted-chat	Used in Chattoku's chat functionality
react-native-vector-icons	Contains various icons that we have used for Chattoku
react-test-renderer	Used in testing, specifically for rendering components and saving snapshots
@testing-library/react-native	Used in testing, specifically for rendering components and simulating actions
firebase-jest-mock	Used in testing firebase authentication and firestore



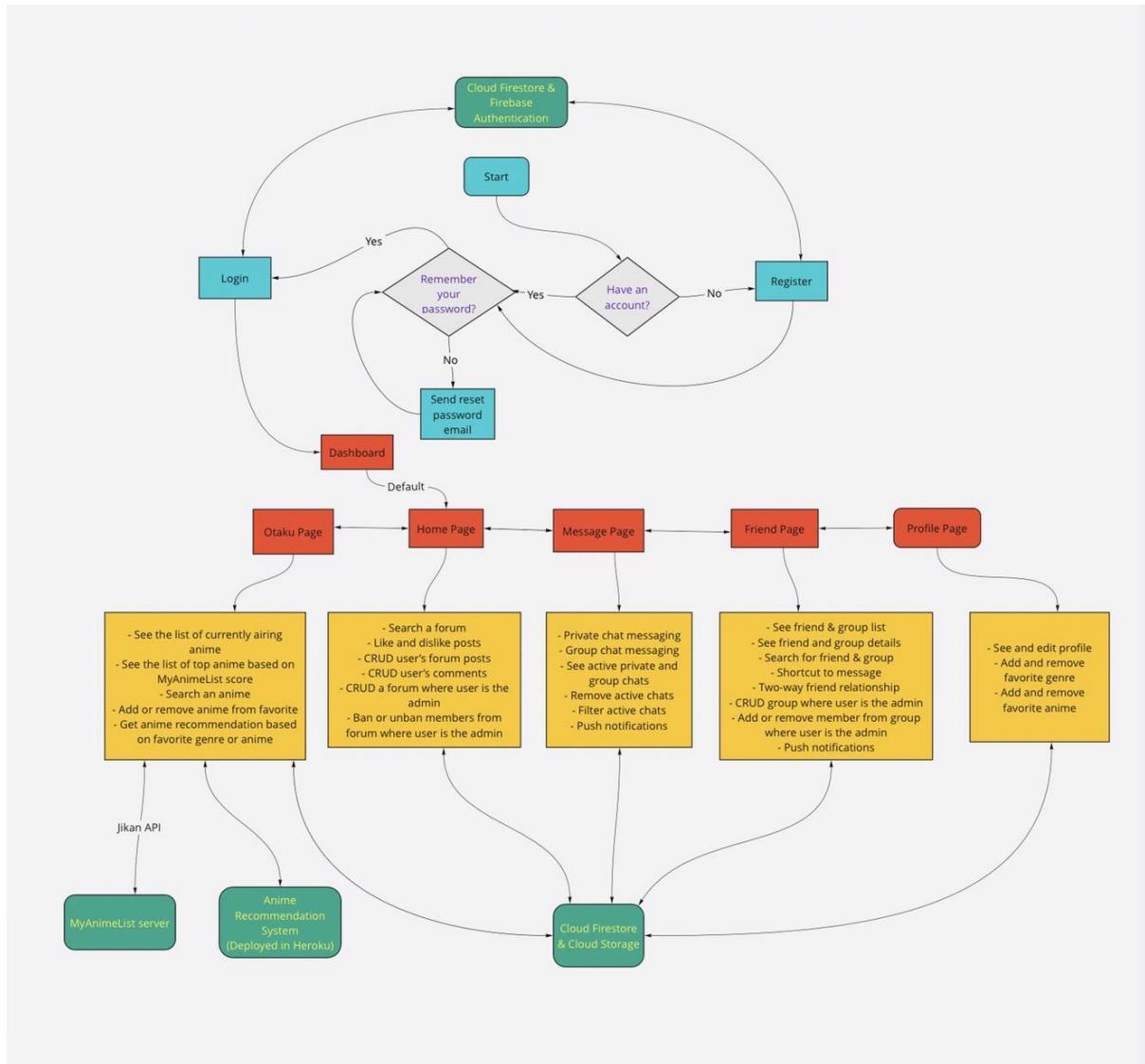
# Software Architecture

Shown below is Chattoku's software architecture.



# Application design flow

Shown below is Chattoku's design flow.





# App Features

## Overview of Features

1. Authentication
  - Login page
  - Register page
  - Forgot Password page
  - Logout functionality
  - Resend authentication email functionality
  - Delete account functionality
2. Forum system
  - Allow users to create, update, and delete post and comments
  - Allow users to create their own forum
  - Allow users to search forum and forum post
  - Like and dislike post
  - Allow forum admin to ban users
  - Allow forum admin to delete any posts and comments on forum he/she owns
  - Allow admin to edit forum details
3. Anime database
  - Search a specific anime by its title
  - Add and remove anime from user's favorite list
  - Get currently airing and top anime
  - Get anime recommendations based on user's favorite genre or favorite anime
4. Friend system
  - Send friend request to other user
  - Accept or reject friend request sent by other user
  - Cancel friend request that has been sent
  - Search friend by username
  - Allow user to view friend's favorite genre & anime
5. Group system
  - Create group
  - Allow group admin to customize group's info
  - Allow group admin to invite other user
  - Allow group admin to remove group member (excluding other admins)
  - Allow group admin to cancel group invitation to other user
  - Allow group owner to delete group
  - Allow group owner to promote member to admin, and vice versa
  - Allow user to accept or reject group invitation
  - Allow user to leave group
6. Chat system

- One-on-One messaging
  - Group messaging
  - View active private & group chat lists
  - Remove specific chat from chat lists
  - Labels on unread message
  - Pressable avatar in group's chat
7. Blocking system
- Block and unblock other user
  - Automatically unfriend and remove any corresponding friend request when blocking a user, if any
  - Restrict user to send a friend request to all accounts that blocked it
  - Restrict user to send a private message to all accounts that blocked it
8. Profile page
- Allow user to customize its username, bio, and profile picture
  - Fetch user's favorite anime and genre
  - Stack navigation to "edit favorite genre" section
  - Allow users to see past post
9. Notification System
- Allow user to get notification when receiving friend request
  - Allow user to get notification when receiving group invitation
  - Allow user to get notification when receiving new message
  - Allow user to get notification when there is a new post in a forum that he/she followed

## ML Powered Anime Recommendation System

Chattoku has an Anime Recommendation System which will provide anime recommendations based on the user's favorite genre or anime.

Chattoku's Anime Recommendation System is mainly built using Python. This system employs Flask to set up a web server easily. The Anime Recommendation System is deployed on Heroku for easy access to its API endpoints to receive recommendations.

To implement Chattoku's Anime Recommendation System, first we need to collect the dataset which will be used to train our model. Using Jikan API and Node JS, we retrieve the data of the top 3000 anime listed in MyAnimeList on 9 June 2022 and save it as a CSV file. Each anime data in the CSV file consists of MyAnimeList ID, score, genres, themes, and demographics as shown below.

Mal_id	Score	Genres	Themes	Demographics
5114	9.14	['Action','Adventure','Drama','Fantasy']	['Military']	['Shounen']
28977	9.08	['Action','Comedy','Sci-Fi']	['Gag Humor','Historical','Parody','Samurai']	['Shounen']
9253	9.08	['Drama','Sci-Fi','Suspense']	['Psychological','Time Travel']	[]
38524	9.07	['Action','Drama']	['Gore','Military','Survival']	['Shounen']
9969	9.05	['Action','Comedy','Sci-Fi']	['Gag Humor','Historical','Parody','Samurai']	['Shounen']
39486	9.05	['Action','Comedy','Drama','Sci-Fi']	['Gag Humor','Historical','Parody','Samurai']	['Shounen']
11061	9.05	['Action','Adventure','Fantasy']	[]	['Shounen']
42938	9.04	['Drama','Romance','Supernatural']	[]	['Shoujo']
15417	9.04	['Action','Comedy','Sci-Fi']	['Gag Humor','Historical','Parody','Samurai']	['Shounen']
50265	9.04	['Action','Comedy']	['Childcare']	['Shounen']
820	9.03	['Drama','Sci-Fi']	['Adult Cast','Military','Space']	[]
34096	8.99	['Action','Comedy','Sci-Fi']	['Gag Humor','Historical','Parody','Samurai']	['Shounen']
35180	8.96	['Drama','Slice of Life']	['Childcare','Iyashikei','Strategy Game']	['Seinen']

For each anime, we create its vector representation based on its genres, themes, and demographics. Using K-Nearest Neighbors, for every possible vector  $v$ , we can find 5 animes from the dataset such that its vector representation is nearest to  $v$ . Then, for the 5 datas found, we retrieve its MyAnimeList ID.

To use the recommendation server, simply send a post request to <https://chattoku-recommendation-system.herokuapp.com/predict>.

The message body of the post request must be a string of anime genres (Genre, Theme, and Demographic listed in [here](#) are all considered as genres in this system). See picture below for example.

https://chattoku-recommendation-system.herokuapp.com/predict

POST https://chattoku-recommendation-system.herokuapp.com/predict

Params Authorization Headers (8) Body **Text** Pre-request Script Tests Settings Cookies

Body: "genres": "Drama, Romance, Music, School"

Headers (6) Test Results

Body Cookies Headers (6) Test Results

Pretty Raw Preview Visualize JSON

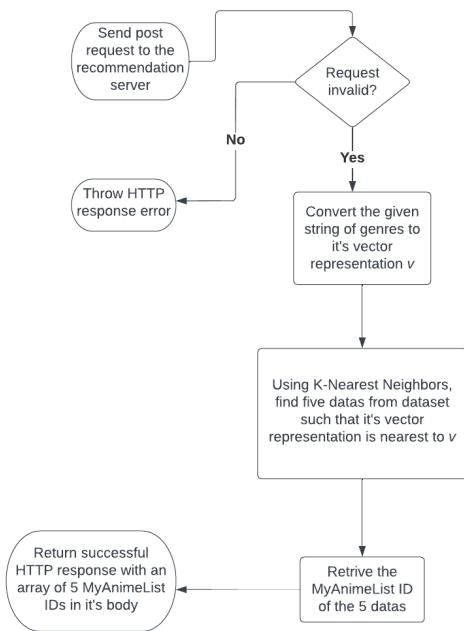
```

1 ...
2 ... "genres": "Drama, Romance, Music, School"
3 ...
4 ...
5 ...
6 ...
7 ...
8 ...
9 ...

```

200 OK 1421 ms 215 B Save Response

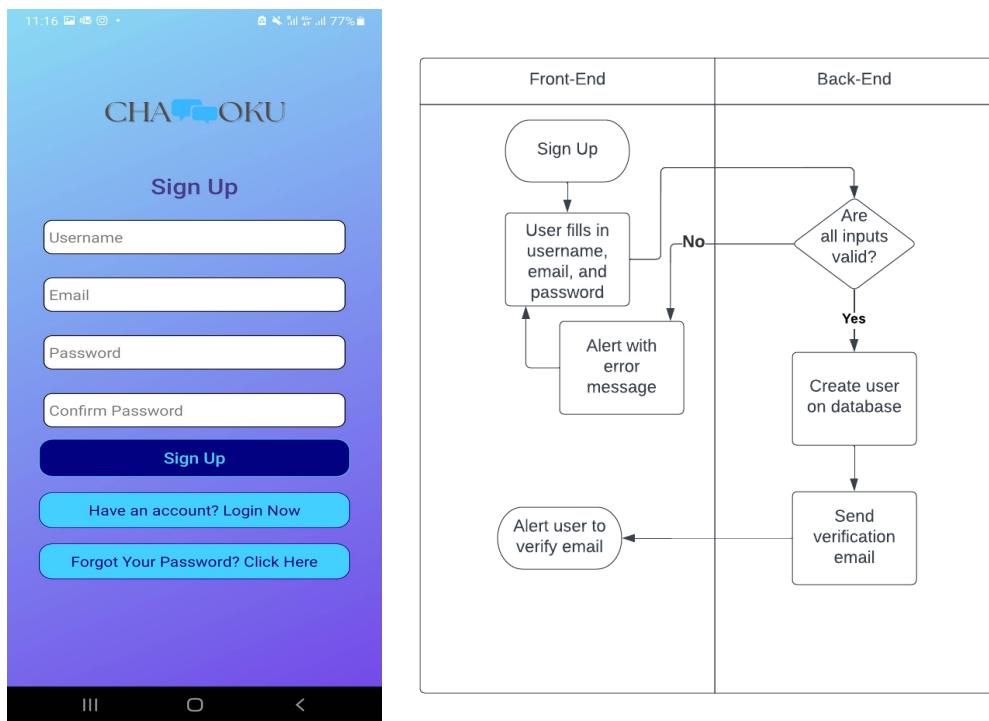
Cookies Capture requests Bootcamp Runner Trash



# Authentication System

## - Account Creation

To use the Chattoku app, you must create an account first. If you don't have an account, you simply need to click the *Sign Up* button on the starting screen.

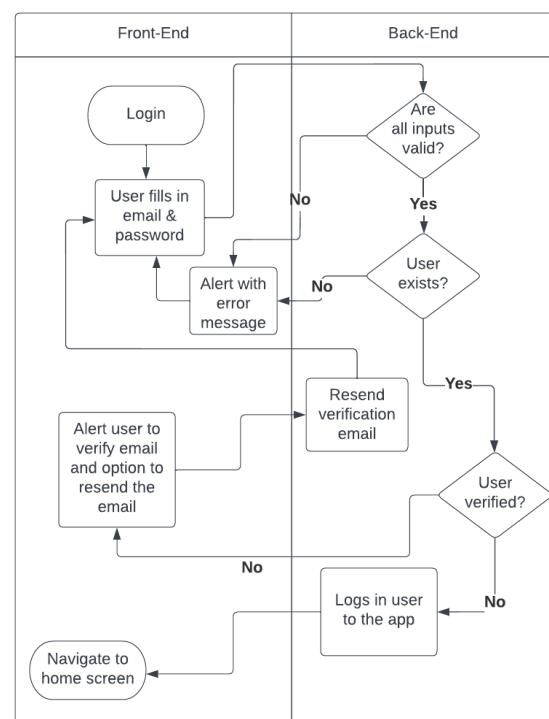
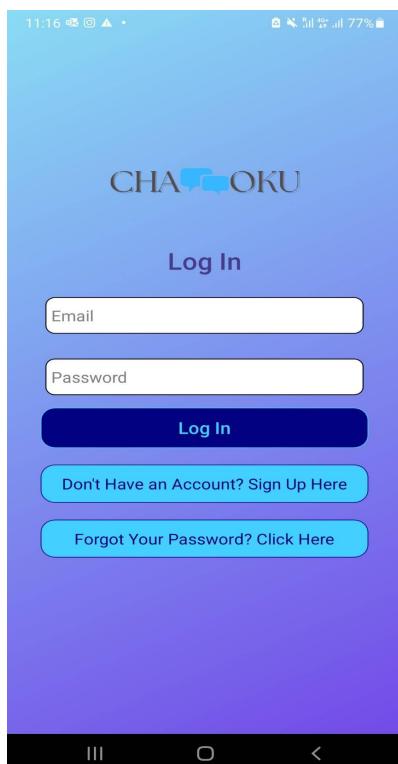


Provide your username, email address, and password to create a new account. As you will need to verify your email, do register with your valid email address. Note that each username must consist of alphanumeric characters and it must be unique for each account. Furthermore, the password must be at least 6 characters long. Therefore, you may encounter a situation where the system rejects your registration.

If this happens, simply change your email, username or password, depending on the error message shown. After successful sign up, a verification email will be sent to the chosen email (check your spam folder). You must verify your email first before logging in to the app.

## Login System

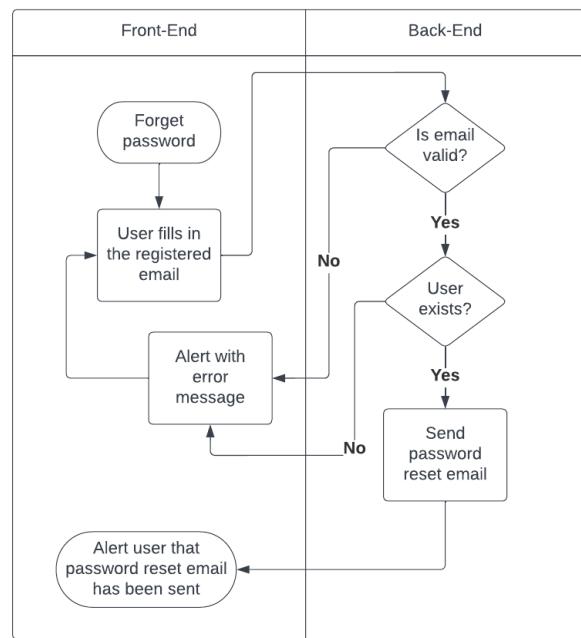
If you already have an account, simply login into your account by filling your registered email and password. If you have verified your email, you will be navigated to the home page of Chattoku. Else if you haven't verified your email, an alert with an option to resend verification email will be prompted to you.



In case you forget about your password, you can also click on the Forget Password button and reset your password.

## Forgot Password System

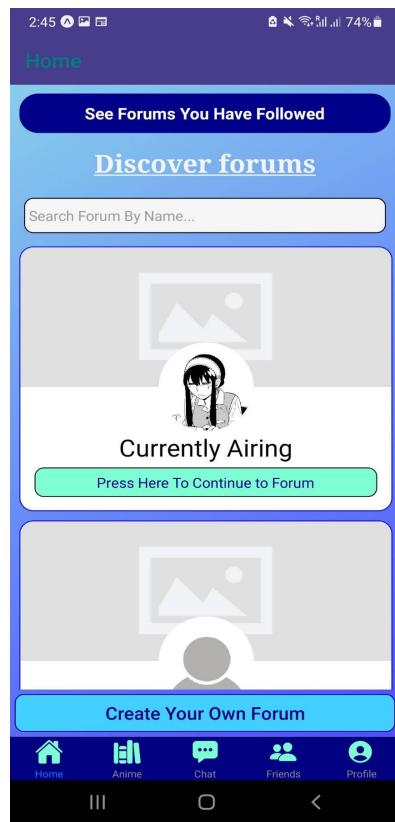
If you forgot about your password, Chattoku can help you to reset your password. To do that, in the *Forgot Password* page, simply fill in your registered email and click on *Send Password Reset Email* button. An email to help reset your password will be sent to you. Do note that the new password must be at least six characters. After changing your password, you can go to the *Login* page and log in with your new password.



# Forum System

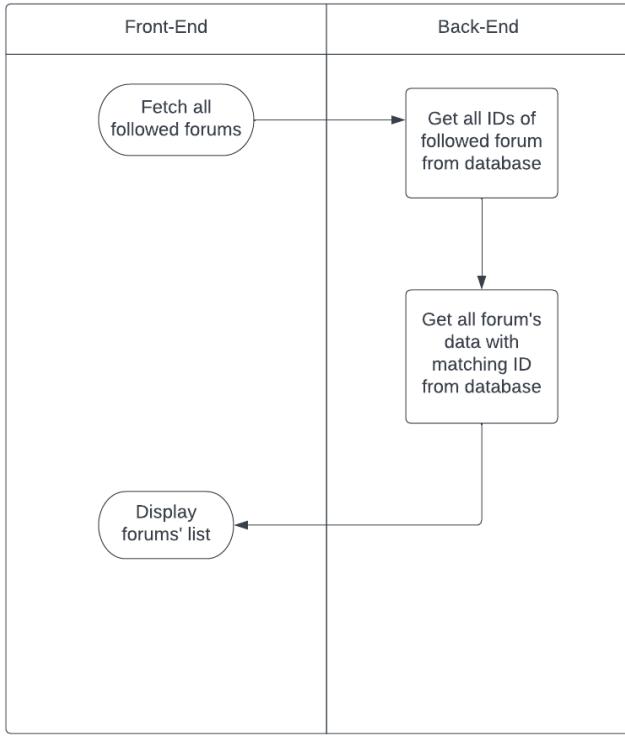
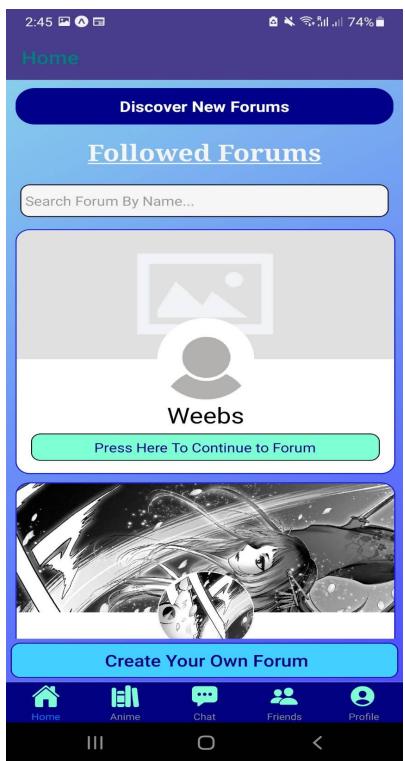
## **Forum List Page**

After successful login, you will be navigated to this page by default. On this page, you can see lists of available forums. To create your own forum, simply click on the button at the bottom of the page, and you will be navigated to the *Add Forum Page*. If you want to view the details of a specific forum, you can press the *Continue* button that is available for each forum, and the system will navigate you to the *Forum Home* page. Else if you want to see the list of forums that you've followed, simply click on the button at the top of the page, and you will be navigated to the *Followed Forum* page.



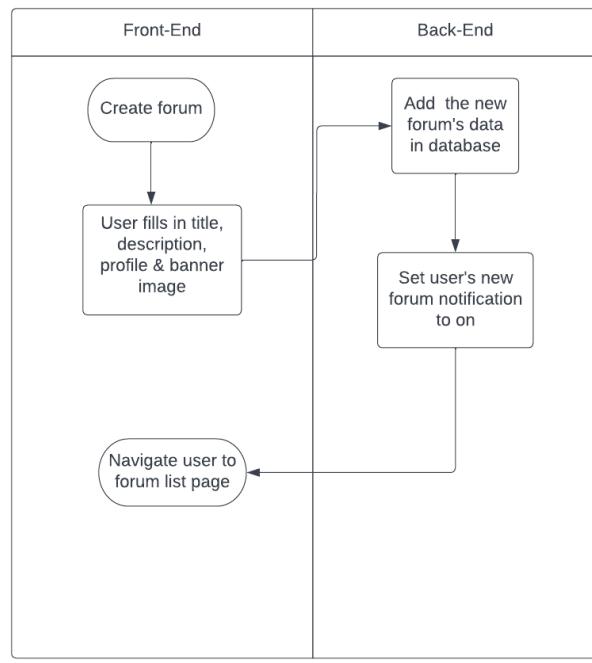
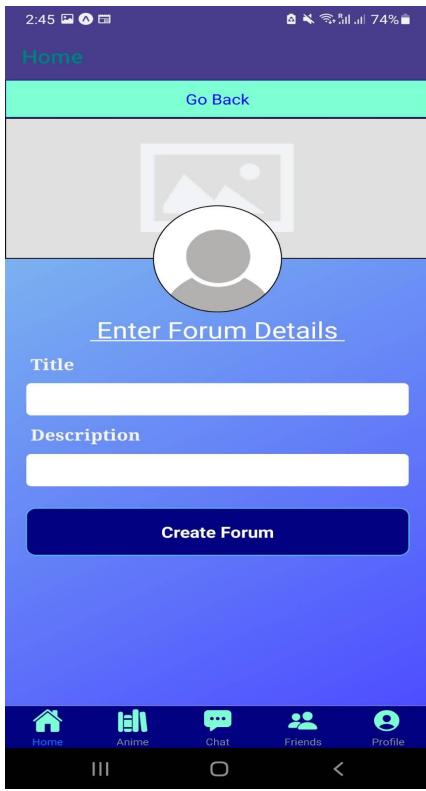
## Followed Forum Page

On this page, you can see the list of forums that you've followed. To go back to the Forum List page, you can just press the *Discover New Forums* button.



## Add Forum Page

On this page, you can create your own forum. To customize the banner or profile of the forum, simply press the corresponding part, and then you can choose to pick the image from the library or camera. Do note that the forum that you've created is considered as your followed forum, and you will be notified whenever there is a new post in that forum.

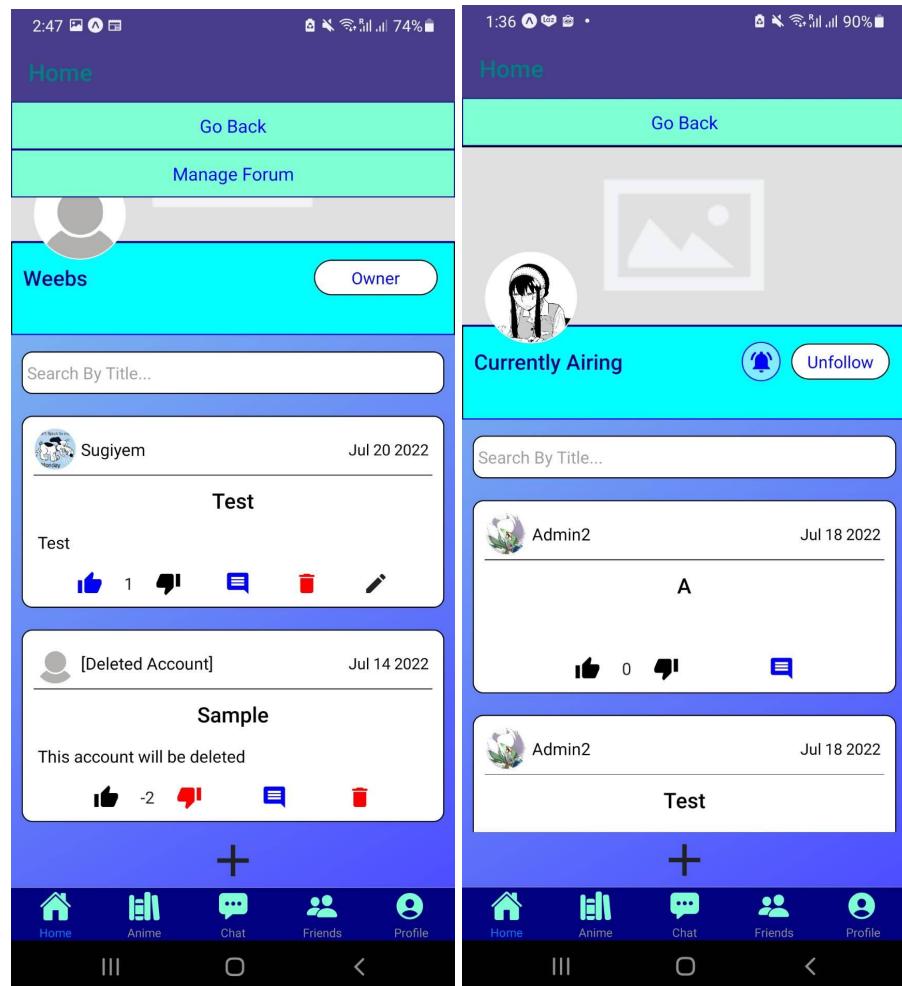


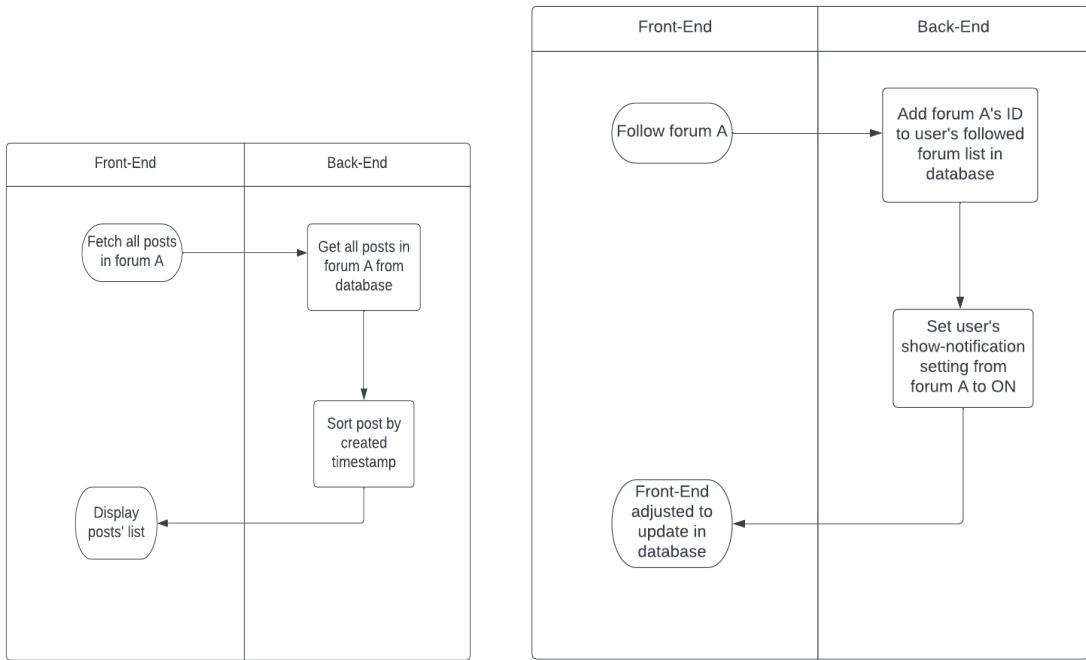
## Forum Home Page

On this page, you can see all the posts that have been created in a specific forum. To add a new post, simply click on the Plus symbol on the bottom of the page, and you will be navigated to the Add Post page. On each post, there will be *Thumbs-Up*, *Thumbs-Down*, and Comment icons. If you press the *Thumbs-Up* icon, the like counter will be increased. Else if you press the *Thumbs-Down* icon, the like counter will be decreased. Quite different from the previous two icons, clicking the *Comment* icon will navigate you to the *Forum Post* page, which consists of all the comments to the current post.

Beside the three icons explained before, there are two additional icons that you might see on a specific post. The first one is the *Remove* icon, which will permanently delete the corresponding post from the forum. Remove icon is accessible only for the creator of the post, as well as the forum's owner and admins who had received the authority to delete the post. The other additional icon is the *Edit* icon, which will navigate the current user to the *Edit Post* page if clicked. This icon is accessible only for the creator of the post.

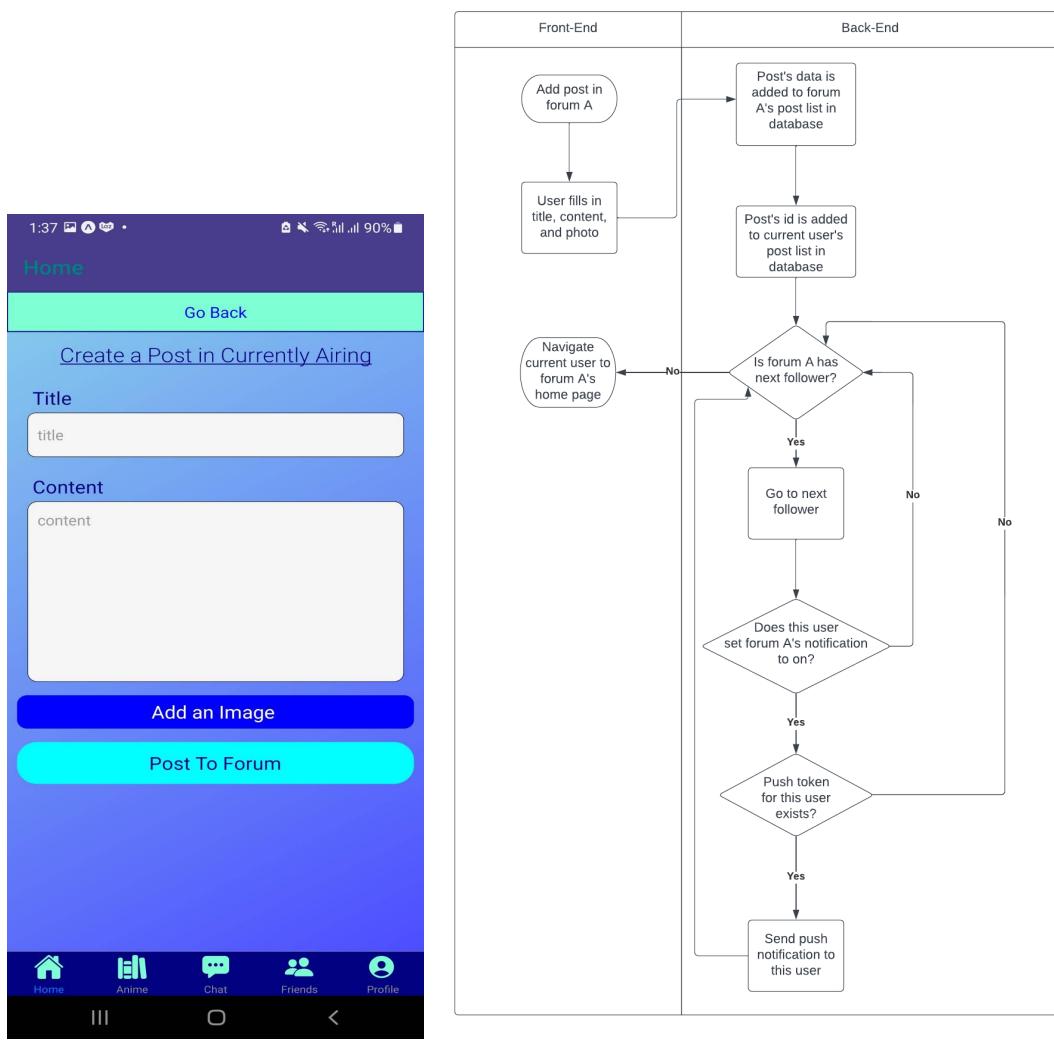
The header of this page is also worth explaining. If you are the owner or admins of the forum, you will have access to the *Manage Forum* button. Furthermore, if you are the owner of the forum, there will be an Owner badge on the header of the forum. Else, if you are not the owner of the forum, there will exist a *Follow* or *Unfollow* button on the header, depending on whether you follow the forum or not.





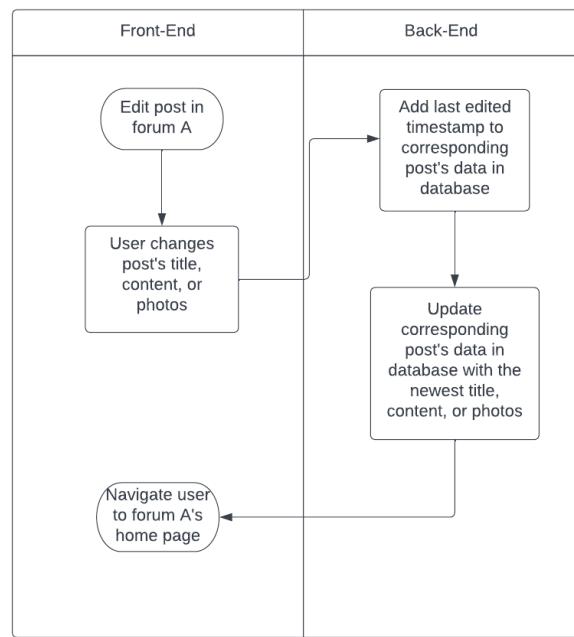
## Add Post Page

On this page, you can create your own post for a specific forum. Do note that you can add at maximum 10 images for each post. After successful post creation, you will be navigated back to the corresponding *Forum Home* page.



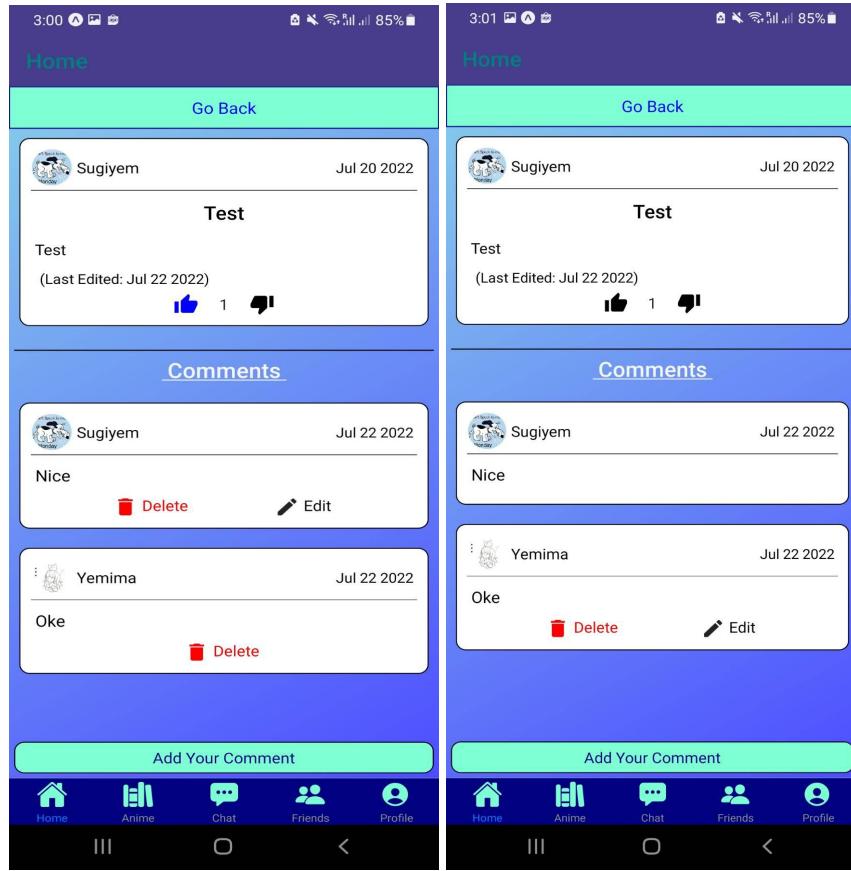
## Edit Post Page

On this page, you can edit the post that you've created. Do note that you can add at maximum 10 images for each post. After successful edit, you will be navigated back to the corresponding *Forum Home* page.



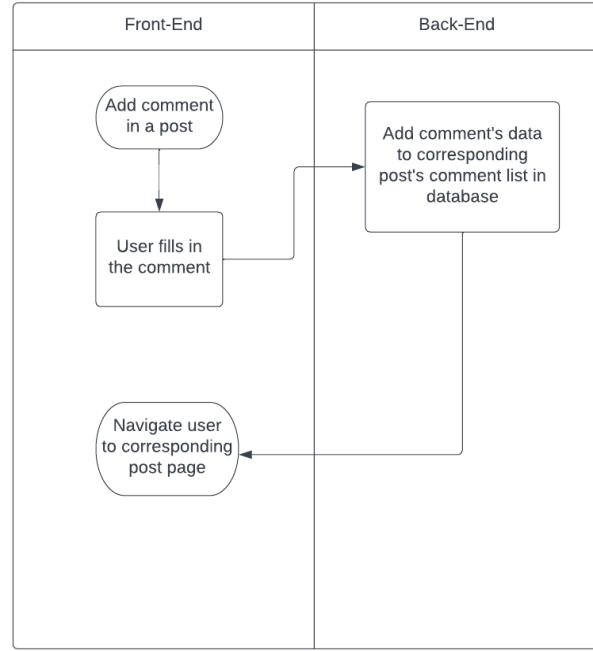
## Forum Post Page

On this page, you can see the main post at the top of the page, followed by all the comments of the post on the section below it. To add a new comment, simply click on the *Add Comment* button on the bottom of the page, and you will be automatically navigated to the *Add Comment* page. Additionally, there are two icons that you might see in each comment. The first is the Delete icon, which will permanently remove the corresponding comment when pressed. This Delete icon is only accessible for the writer of the comment, as well as the forum's owner and admins who had received the authority to delete the comment. The other additional icon is the Edit icon, which will navigate the current user to the *Edit Comment* page if clicked. This icon is accessible only for the commenter.



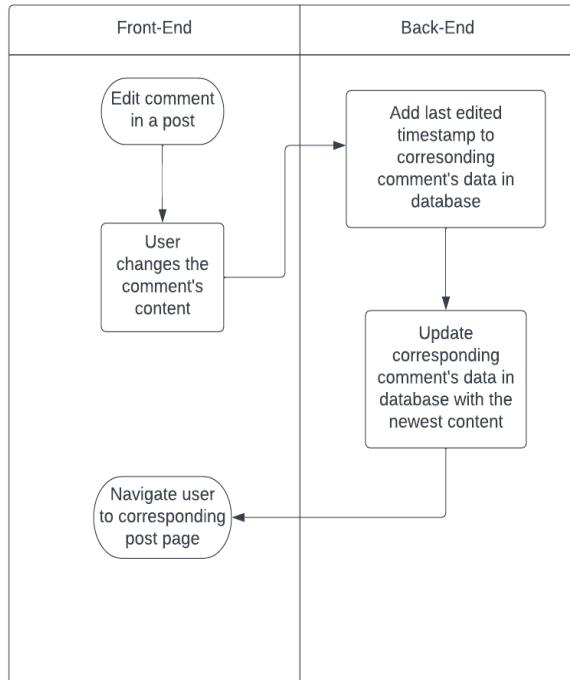
## Add Comment Page

On this page, you can add a comment to a specific post. After successful comment creation, you will be navigated back to the corresponding *Forum Post* page.



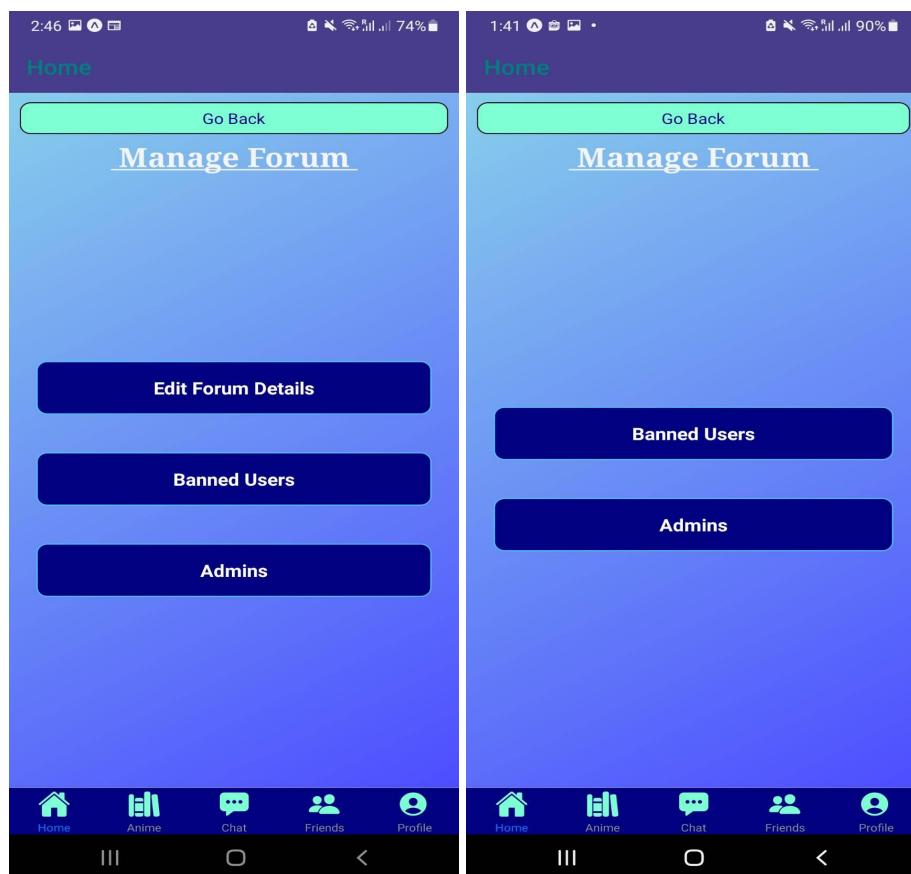
## Edit Comment Page

On this page, you can edit the comment that you've created. After successful edit, you will be navigated back to the corresponding *Forum Post* page.



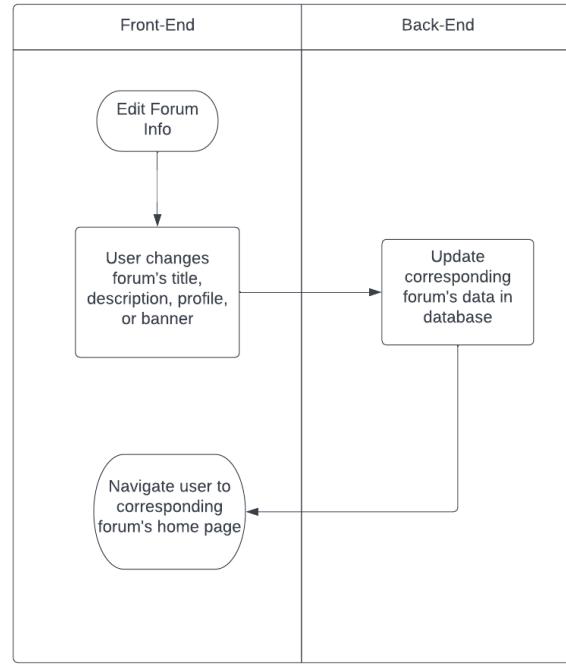
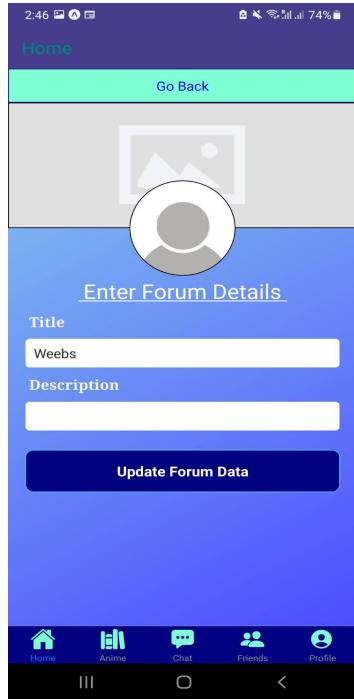
## Manage Forum Page

This page is available only for the owner and admin of a specific forum. If you are the admin of the forum, there will be two buttons available, *Banned Users* button, which will navigate you to the Banned List page when pressed, and *Admins* button, which will navigate you to the Admin List page if clicked. If you are the owner of the forum, you can access the two buttons explained before, as well as the *Edit Forum* buttons, which will navigate you to the *Edit Forum* page.



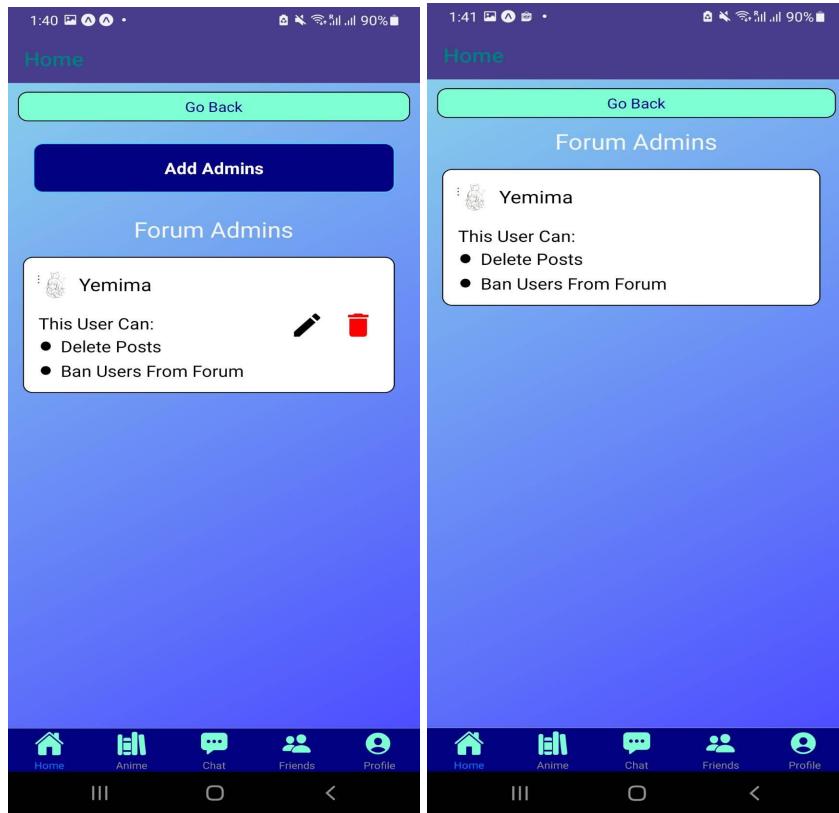
## Edit Forum Page

This page is accessible only for the owner of the forum. Here, you can customize the title, description, profile, and banner of the forum. After successful edit, you will be navigated back to the *Forum Home* page.



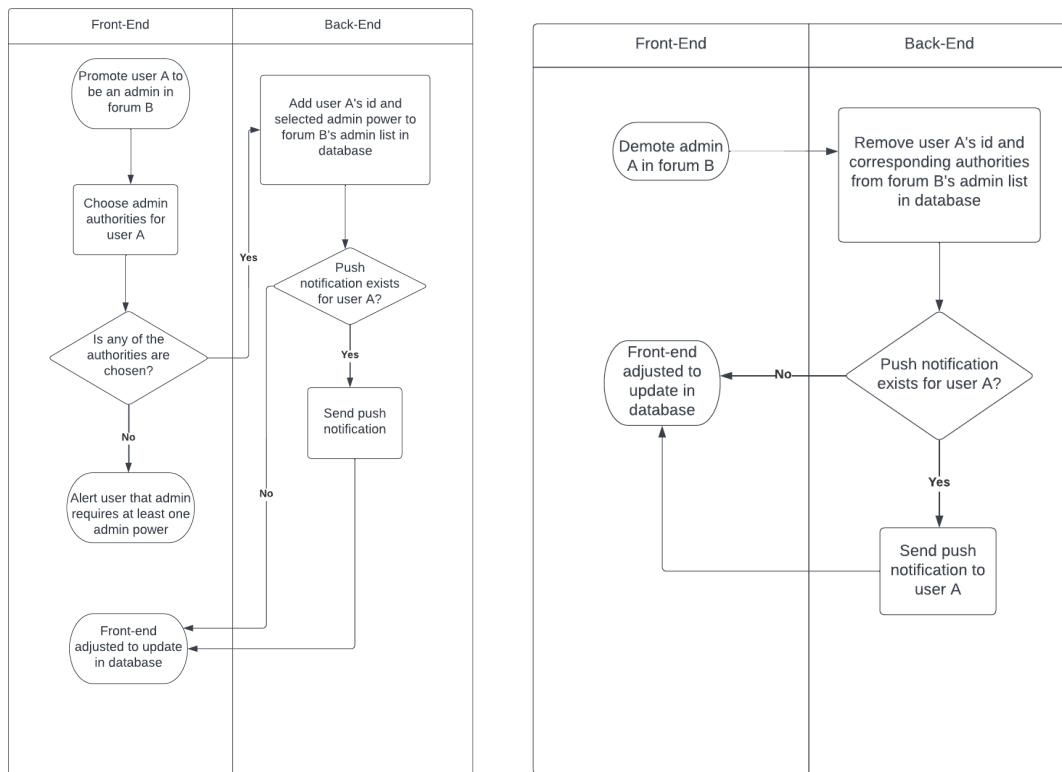
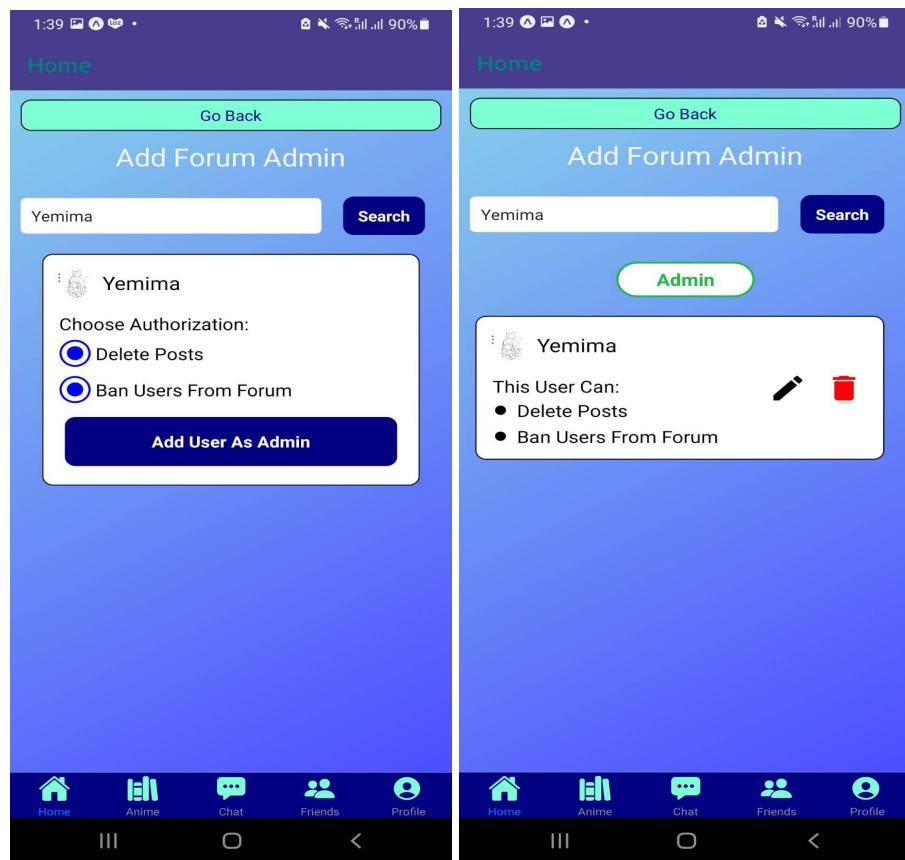
## Admin List Page

This page is available only for the owner and the admins of the forum. If you are the admin of the forum, you will see the list of all the admins of the forum. Else, if you are the owner of the forum, you can see the list of all the admins of the forum, as well as the access to *Edit* and *Remove* icon for each admin. If the *Edit* icon is pressed, you can edit the authorities of the corresponding admin. Else if the *Remove* icon is clicked, the corresponding admin will be demoted. Furthermore, as the owner of the forum, you also have access to *Add Admins* button which will navigate you to the *Add Admin* page when clicked.



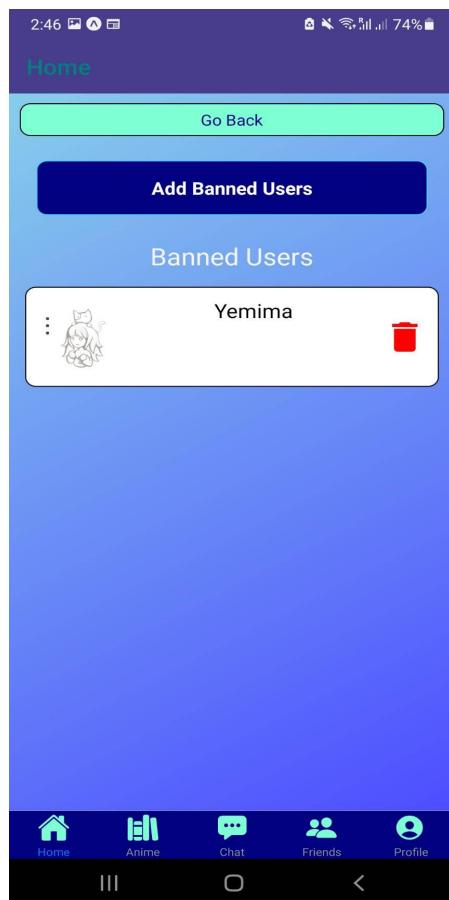
## Add Admin Page

This page is only available for the owner of the forum. As the owner of the forum, you can promote other users to be the admin of the forum. To do that, simply fill in the exact username of the user that you want to promote, and press the *Search* button. After that, if user exists, choose the admin power that you intend to give and click the *Add User As Admin* button. Do note that in order to successfully promote a user, you need to give at least one authorization.



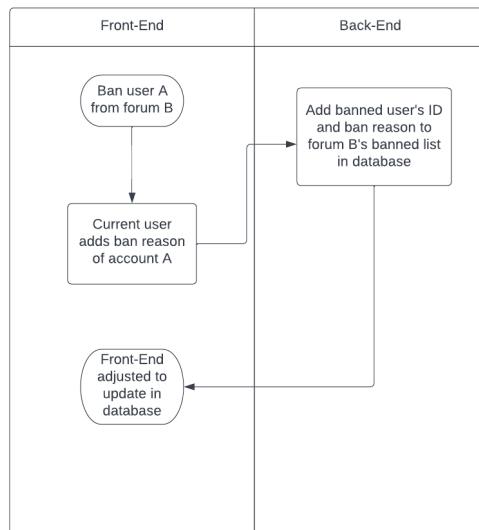
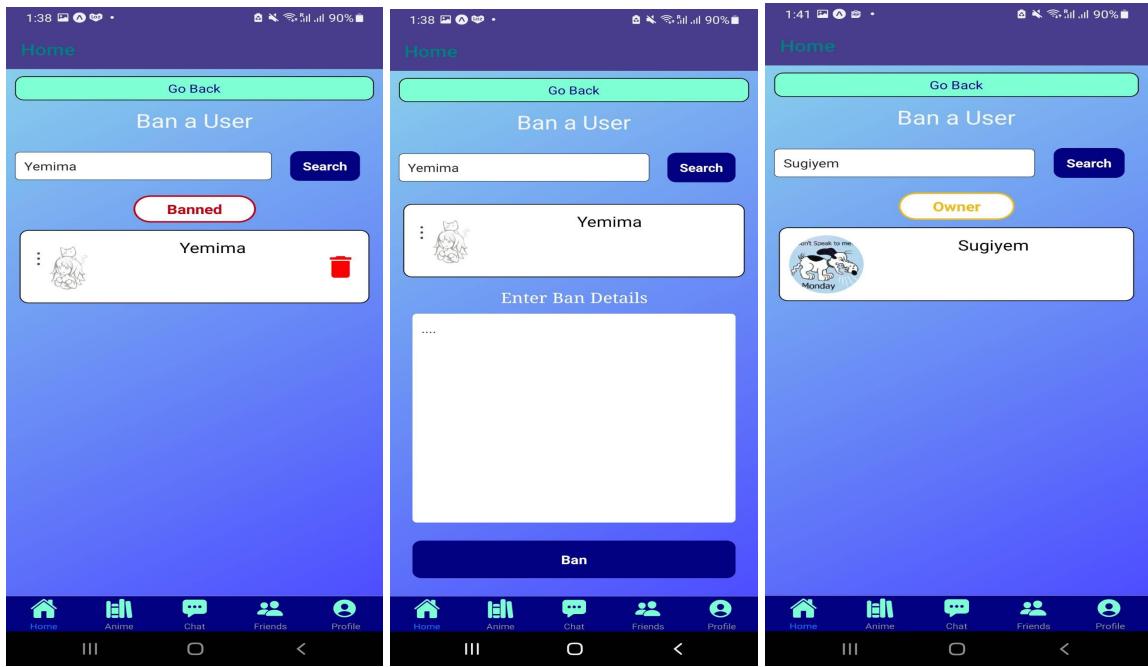
## Banned List Page

This page is only available for the owner and the admins of the forum. If you are an admin who doesn't have the authority to ban users, you can only see the *Go Back* button and the list of currently banned accounts. Else, if you are the owner of the forum or admin who has the authority to ban users, you can see the *Add Banned Users* button, as well as the *Remove* icon for every banned account. Clicking the *Add Banned Users* button will navigate you to the Add Banned page. Expectedly, pressing the *Remove* icon will unban the corresponding user.



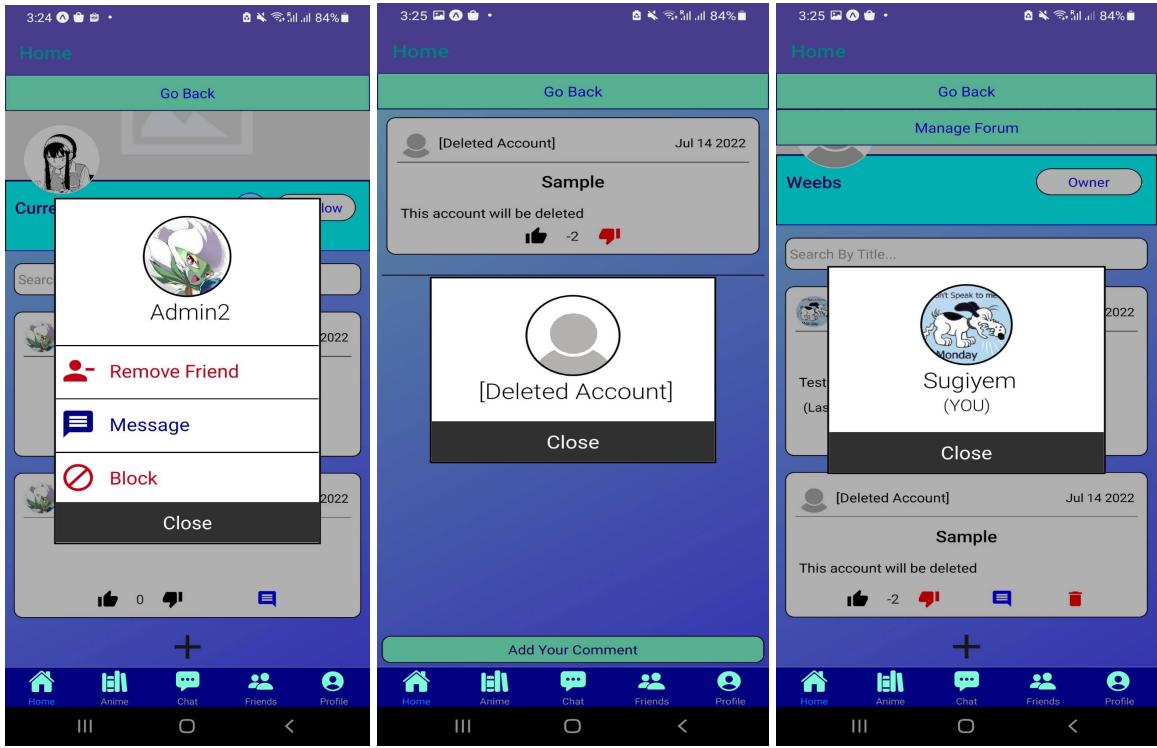
## Add Banned Page

This page is only accessible for the owner of the forum, as well as all the admins who received the authority to ban users. On this page, you can ban other users by searching its exact username. By default, a regular admin can only ban other non-admins. On the other hand, the owner of the forum can ban every user.



## Profile Overlay

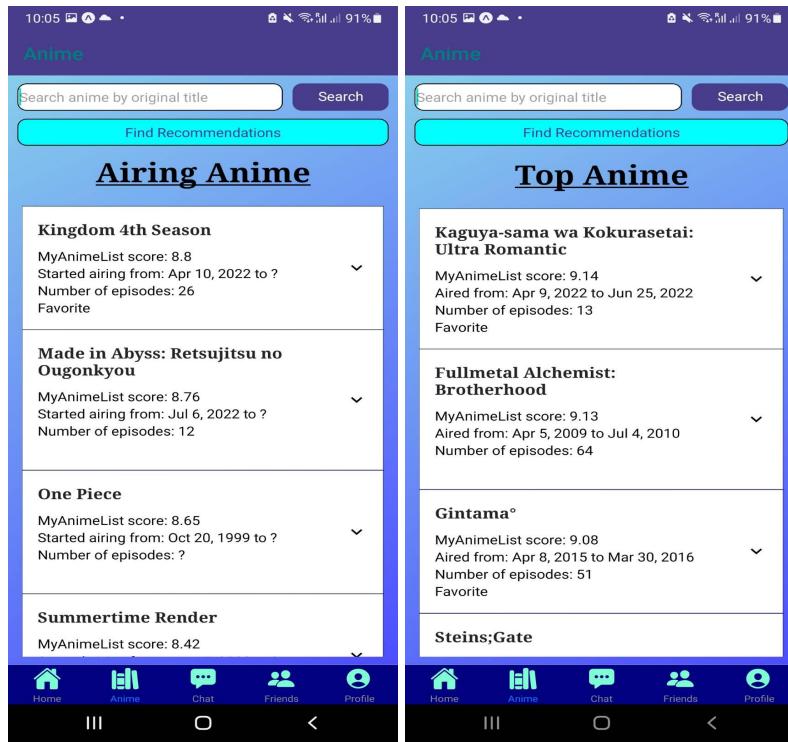
To improve user's experience, each user's avatar in the Forum Section will be pressable, and an overlay will be shown whenever it is clicked, as shown below. With this, you can easily add another user as a friend, send private messages, or even block a malicious user.



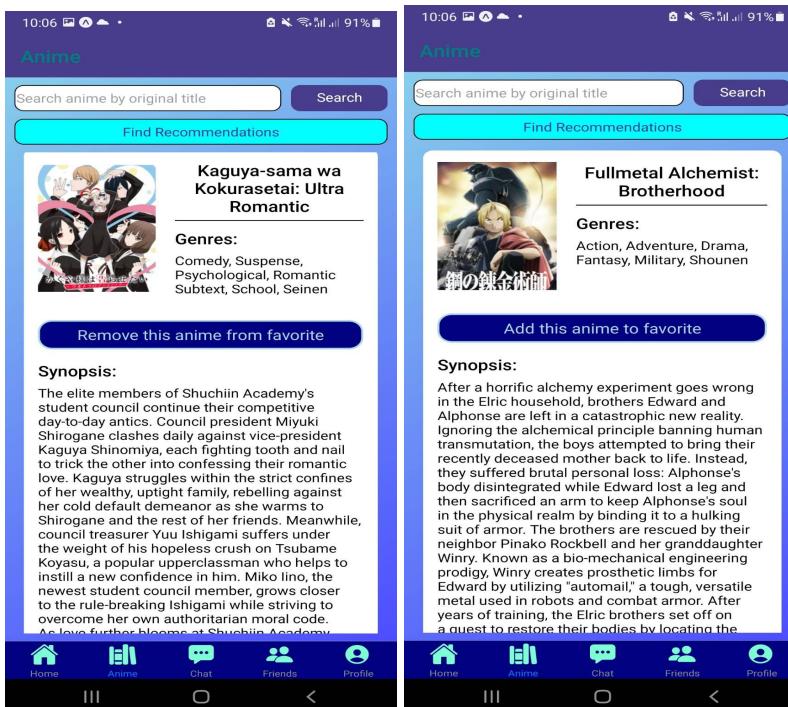
## Anime Section

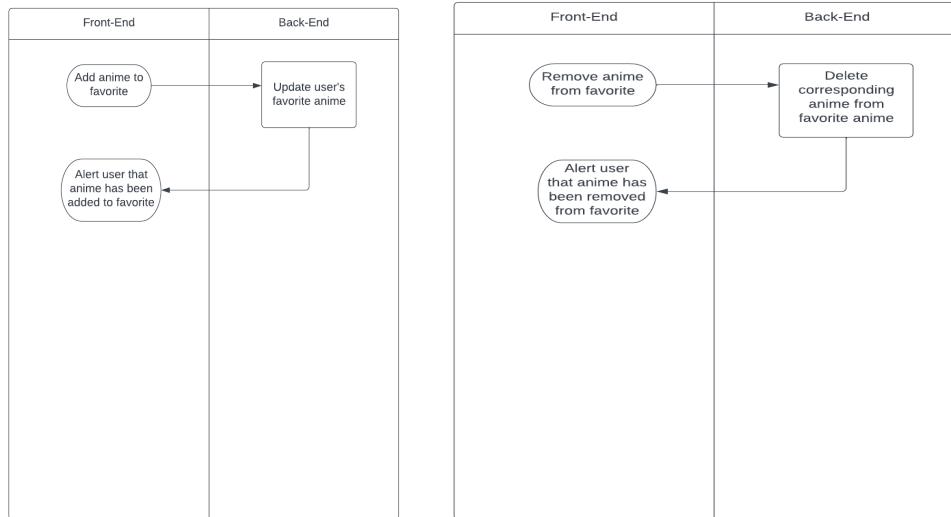
### Anime Home Page

By default, if you click on the anime part on the bottom tab, it will navigate you to the *Anime Home* page, which consists of *Anime Search Bar*, *Find Recommendations* button, list of airing anime, followed by a list of top anime when you scroll down.



If you click on the right part of a specific anime, it will display you with some data regarding this anime. Furthermore, if this anime is listed as your favorite, it also shows the *Remove anime from favorite* button which will delete this anime from the user's favorite list if clicked. Conversely, if this anime is not listed as your favorite, it shows the *Add anime to favorite* button which if pressed, will add the corresponding anime to the user's favorite list.

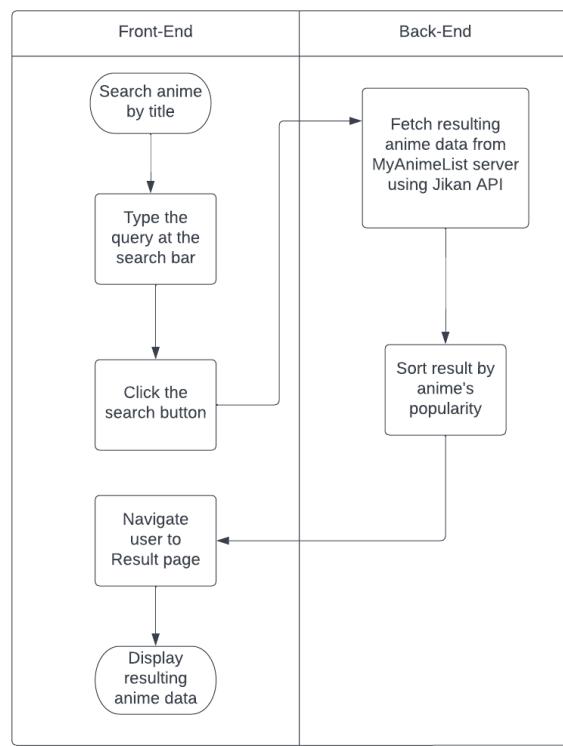




In chattoku, you can also search for a specific anime based on its original title. Simply write your query title in the *Anime Search Bar* and click on the *Search* button. This will navigate you to the *Anime Result* page where users can see the list of searched anime. Another primary functionality of Chattoku is the anime recommendation system. To use this functionality, first you need to click on the *Get Recommendation* button which can be found on the top of *Anime Home* page. This will then navigate you to the *Recommendation Choices* page.

## Anime Search Page

On this page, you can see the list of anime that matches with your query. By default, the anime will be sorted in MyAnimeList popularity order, where the most popular result will be displayed at the top. Furthermore, if you want to search anime with another query, simply use the *Anime Search Bar* at the top again.



## Recommendation Choices Page

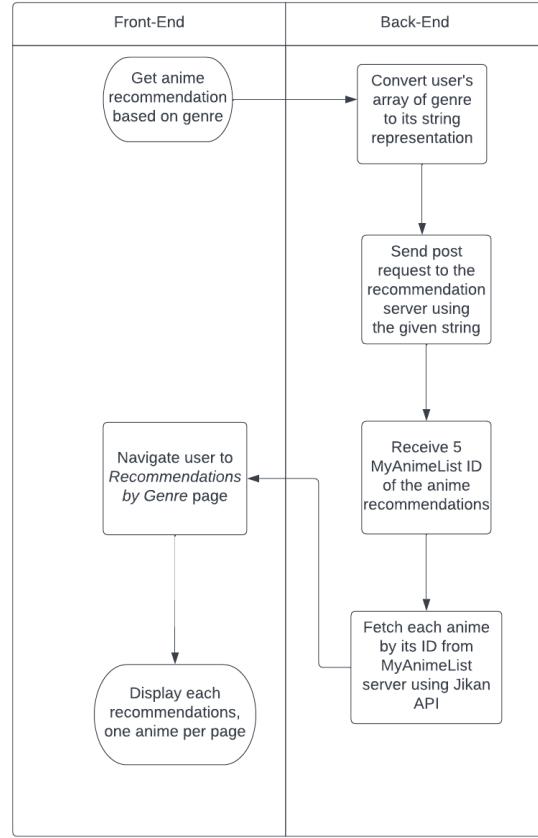
On this page, there will be two primary buttons which you can press, *Recommendation from anime*, or *Recommendation from genre*. If you press the *Recommendation from anime* button, you will be navigated to the *Favorite Anime*

page where you can see the list of your favorite anime. Else, if you click on the *Recommendation from genre* button, you will be navigated to *Recommendations By Genre* page.



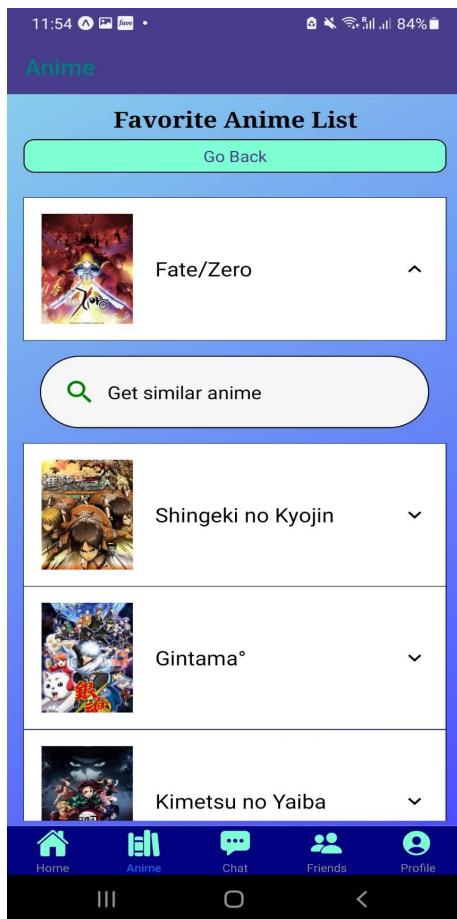
## Recommendations by Genre Page

On this page, you will see all anime recommendations based on your favorite genre. Each page will have the data of one specific anime. To find another anime that is recommended to you, simply click on the *Next recommendation* or *Previous recommendation* button. By default of the recommendation system, you can only get five anime recommendations. However, you can still get another recommendation based on your favorite genre by editing your genre lists and go back to this page.



## Favorite Anime page

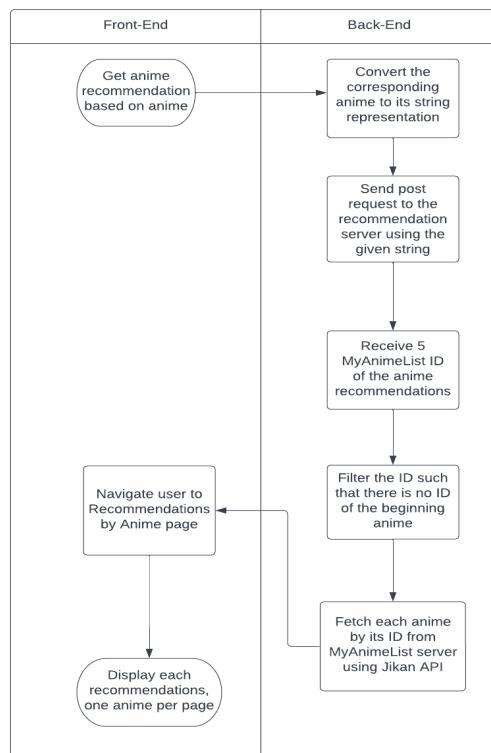
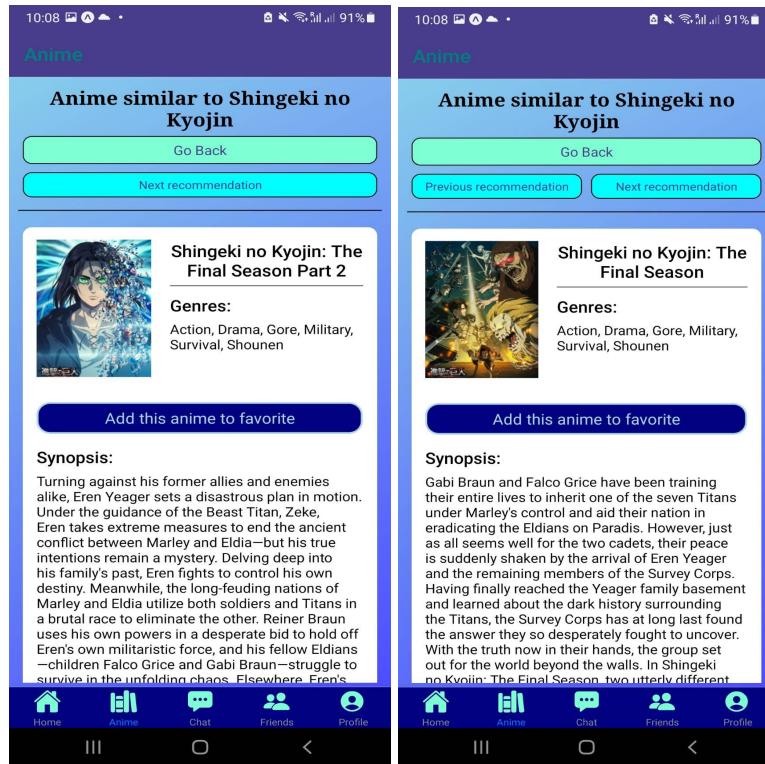
On this page, you will see the list of your favorite anime. To get the recommendation, you can just click on the right part of any of your favorite anime. Then, the *Get similar anime* icon will be displayed. Simply press the *Get similar anime* icon, and you will be navigated to *Recommendations by Anime* page.



## Recommendations by Anime Page

On this page, you will see all anime recommendations which are similar to the chosen favorite anime. Each page will have the data of one specific anime. To find another anime which is similar to this picked favorite anime, simply click on the *Next recommendation* or *Previous recommendation* button. By default of the recommendation system, you can only get either four or five anime.

recommendations. However, you can view another anime recommendation by going back to the Favorite Anime page and choosing a different favorite anime.

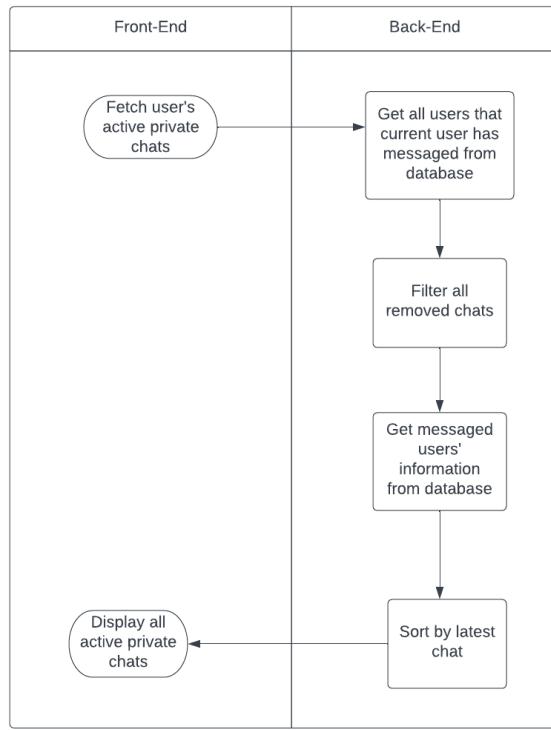


## **Chat System**

### **Private Chat List Page**

If you click on the *Chat* icon on the bottom tab, you will be navigated to the *Private Chat List* page where you can see all your active private chats. On each chat, we can check the time and text of the last message. Furthermore, there is also an exclamation badge to indicate whether you've read the last message on the corresponding chat or not.

If you press the right side of a specific chat, two additional icons will be shown. The first one is the Open Message icon, which will navigate you to the corresponding Private Messaging page when pressed. The other one is the Remove icon, which will remove the pressed chat from your active private chat list. Do note that pressing the Remove icon won't remove any message in the corresponding chat.

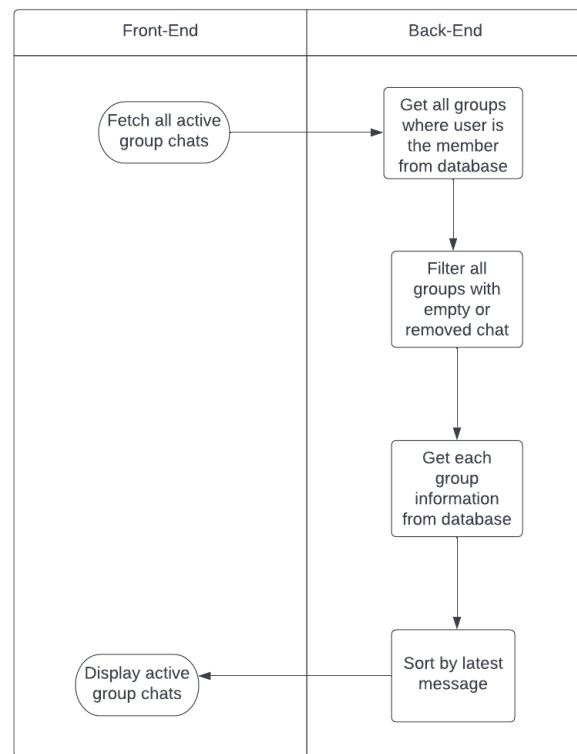
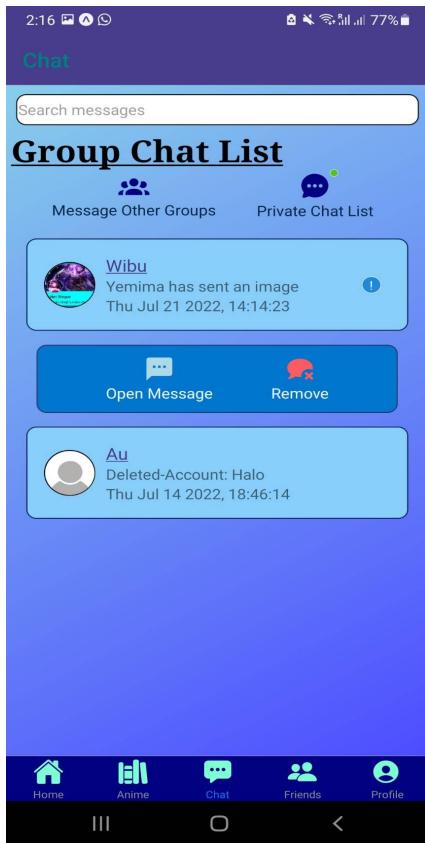


At the top of the chat lists, there is a *Group Chat* icon which will navigate you to the Group Chat List page once you click it. If you have an unread group message, there will be a notification badge on this button. If you want to send a message to other users, simply click on the *New Message* icon and it will navigate you to the *Add Message* page.

### Group Chat Lists Page

On the Group Chat List page, you can see all your active group chats. Similar to the Private Chat List page, the text and time of the last message sent on each chats will be displayed. Furthermore, for each chats, there is also a label to indicate whether you've read the last message in it or not.

If you click on the right part of a specific group chat, two additional icons, Open Message and Remove will be displayed. Pressing the Open Message icon will navigate you to the corresponding Group Messaging page. Else, pressing the Remove icon will remove the clicked chat from the active group chat list.



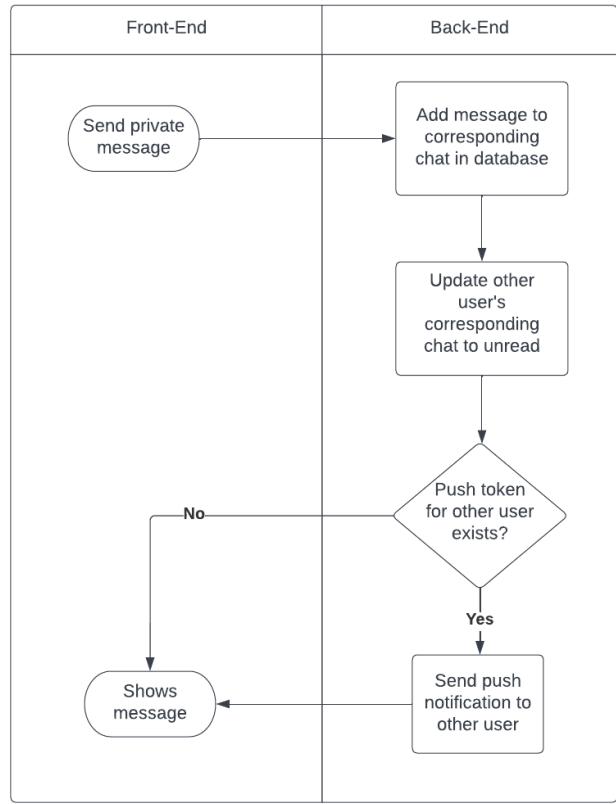
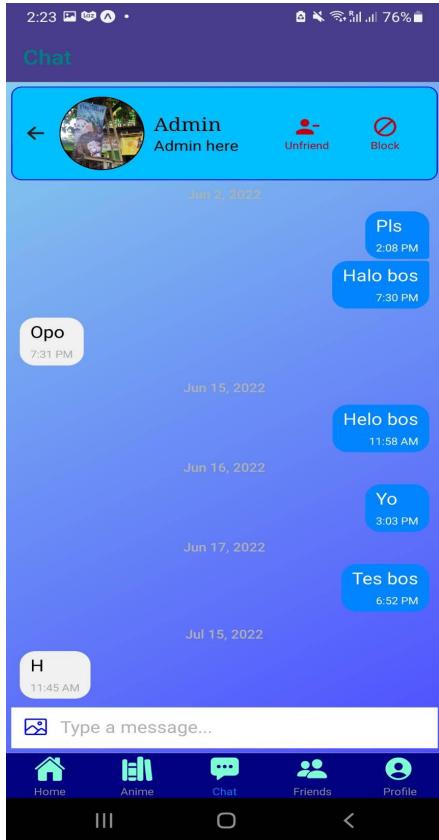
At the top of the chat lists, there is a *Private Chat* button which will navigate you back to active private chat lists once you click it. If you have an unread private message, there will be a *notification* badge on this button. If you want to send a message to other groups, simply click on the *Message other groups* button and it will navigate you to the Group List page, where you can see all groups that you've joined.

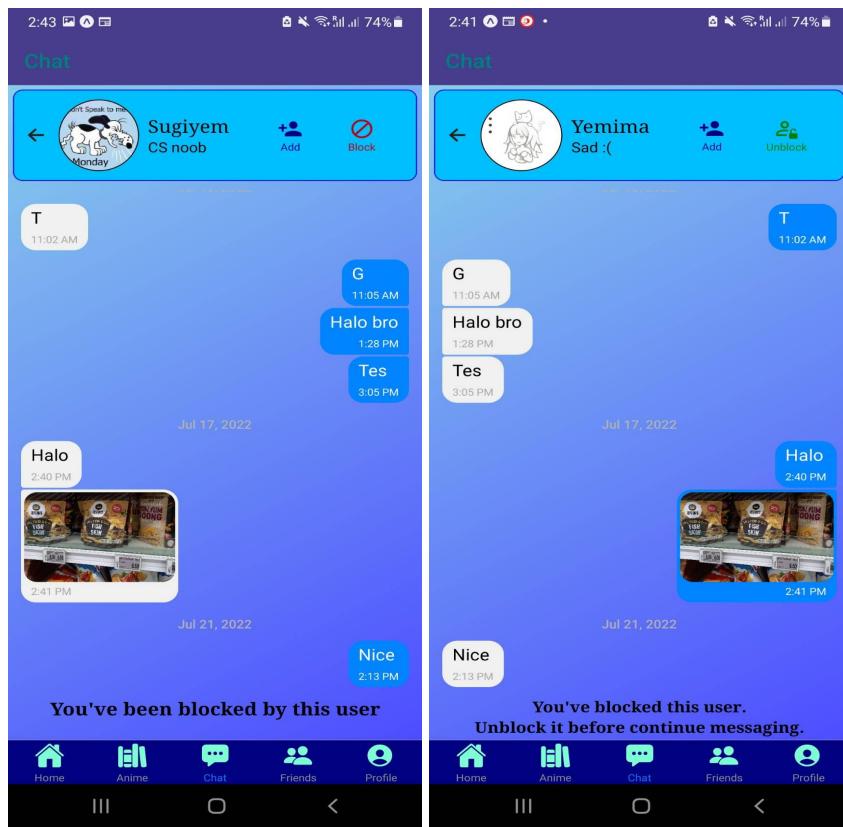
## Private Messaging Page

This page is where you send private messages with a specific user. You can send messages similar to other messenger apps. By clicking on the Photo icon located on the bottom left of the page, you can send an image to other user. When you send a private message, the recipient of the message will get a push notification to notify he/she that there is a new message from you. Do note that if the other user blocks you, or is blocked by you, you can't send any private message.

For user's ease of use, we also provide various shortcuts in the header of the page. For example, you can block the other user by simply pressing the *Block* icon on the

header. Similarly, you can also send a friend request by clicking the *Add Friend* icon on the header.

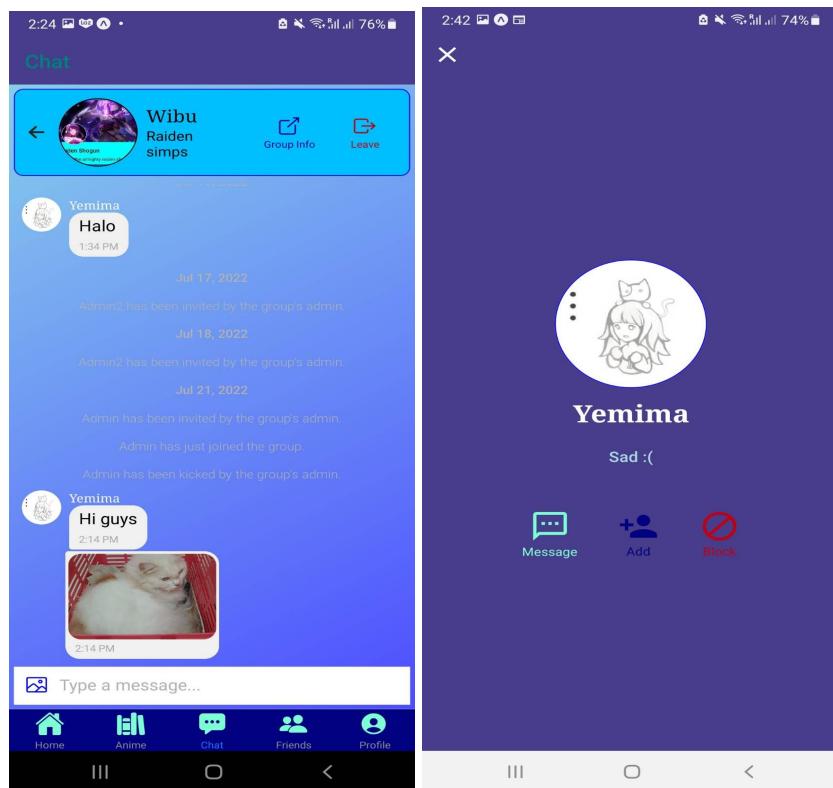


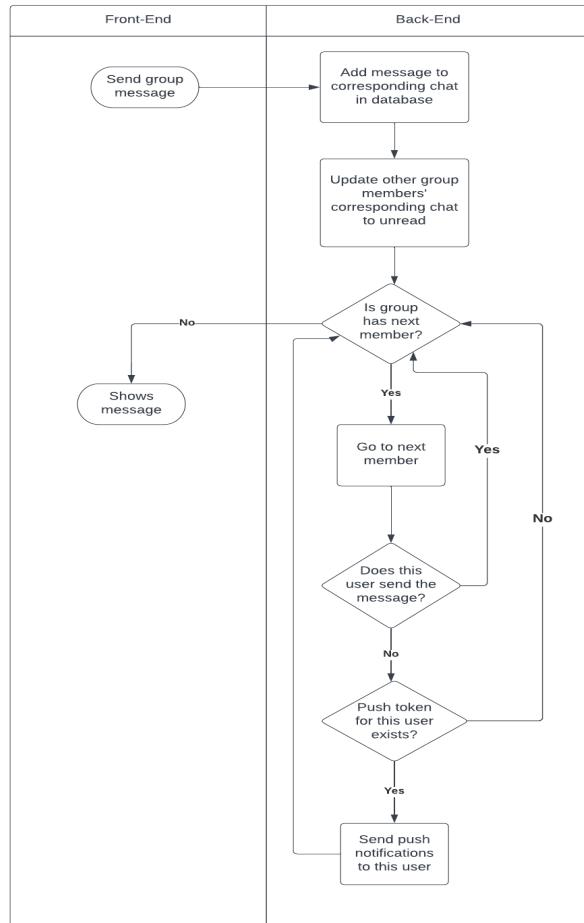


## Group Messaging Page

This page is where you send group messages with a specific group. Similar to the Private Messaging page, you can send messages and photos just like in other messenger apps. When you send a message in a group, all members of the group will get a push notification to notify them that there is a new message from the current group.

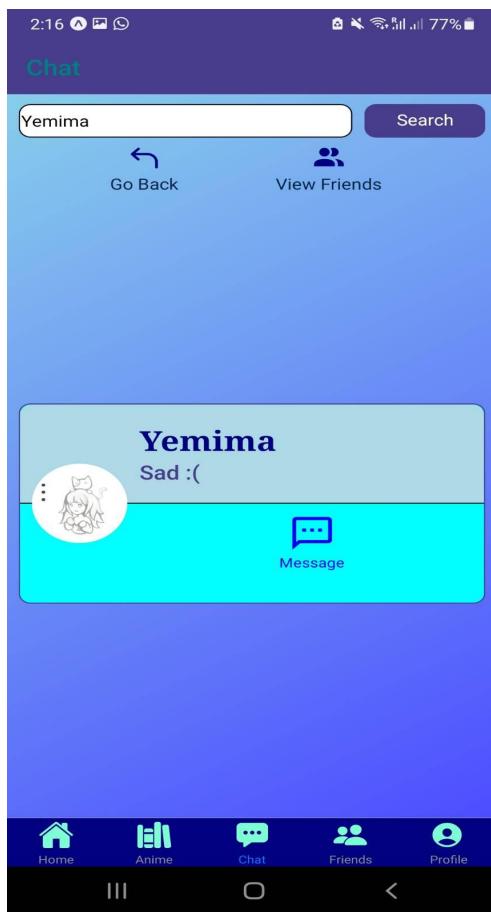
Additionally, in the header of the chat, there will be two additional icons, *Group Info*, which will navigate you to the group info page when pressed, and *Leave*, which will cause you to leave the current group if pressed. Furthermore, for better client experience, you can click on the avatar of the other user, and it will show a shortcut for you to interact with this user, as shown in the image below.





## Add Message Page

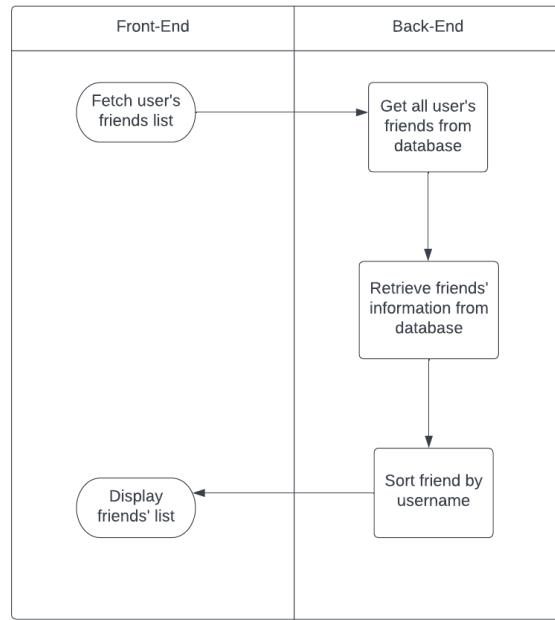
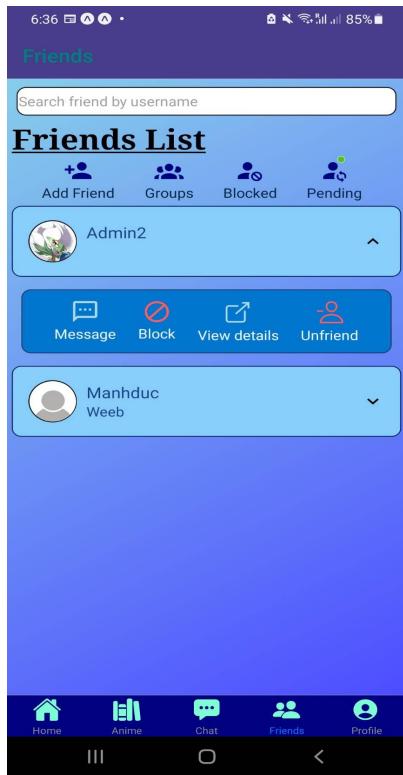
On this page, you can send a new message to other users. To do that, simply write the exact username of the user which you want to send a message to, and click the search button. Each click will render the page differently, according to the existence of a user with such username. When a searched user exists, a *Message* icon will be shown. If you press that icon, you will be navigated to the *Private Messaging* page with the corresponding user.



## Friend & Blocking System

### Friend List Page

If you click on the Friends icon on the bottom tab, you will be navigated to the *Friend List* page, which displays all the users that have been added as your friend. By using the search bar at the top, you can also search for your friend with a specific username.



At the top of the lists, there are four additional icons. If you want to add another user as a friend, simply click on the *Add Friends* button and it will navigate you to the *Add Friend* page. If you want to see your group's list, you can click on the *Groups* button and it will navigate you to the *Group List* page. If you click on the *Blocked* icon, you will be navigated to the *Blocked List* page. Else if you press the *Pending* icon, you will be navigated to the *Pending Request* page. Additional thing to note is that there will be a green badge in the *Pending* icon to indicate if there is a pending friend request that needs your response.

At the friend lists on the Friend List page, If you click on the right part of a specific friend, it will show four additional icons, *Message*, *Block*, *View Details*, and *Unfriend*. If you click on the *Unfriend* button, it will remove this user from your friend list. Else, if you press the *Block* icon, this user will be unfriended and blocked. Else, if you click on the *Message* button, the screen will navigate to a direct messaging page between you and this friend which has been covered in previous part. Else, if you press the *View Details* button, you will be navigated to the *Friend Info* page where you can see this user's information.

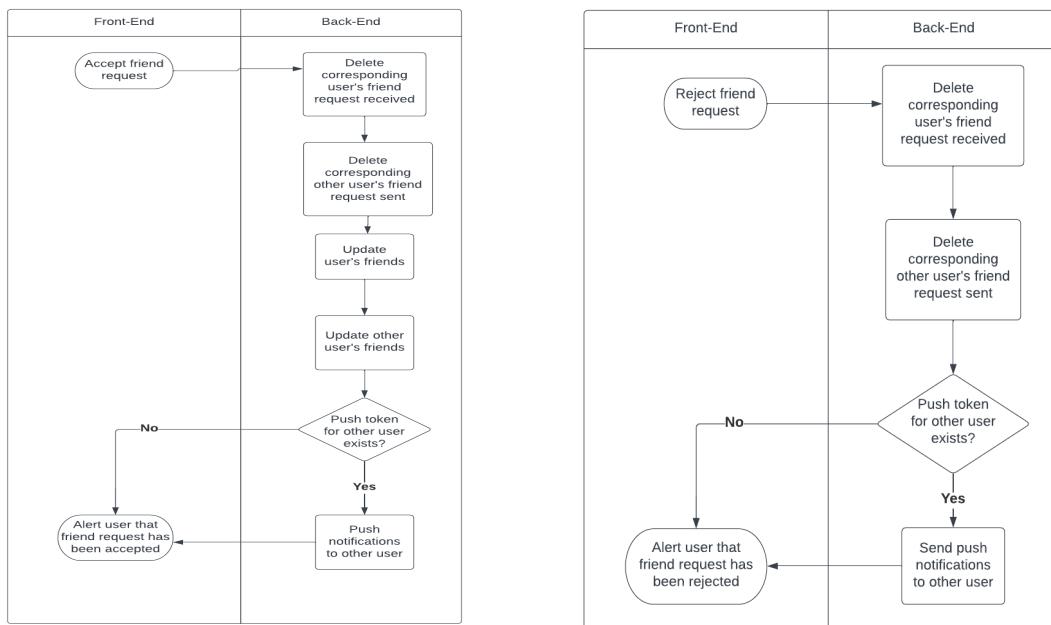
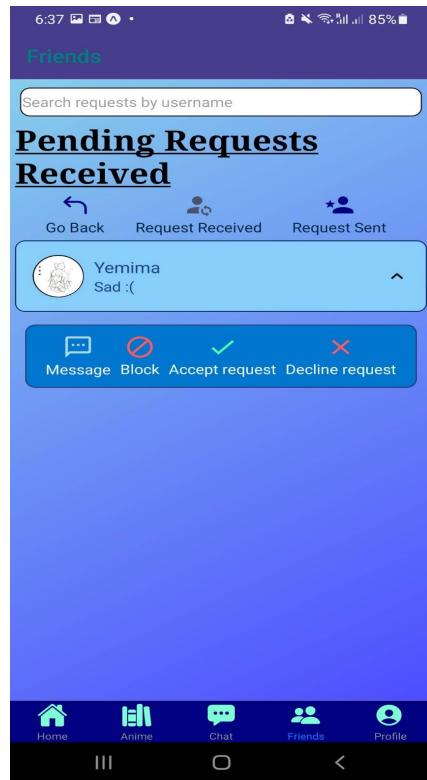
## Friend Info Page

On this page, you can see your friend's basic information such as profile picture, username, and bio. Additionally, you can also view the *Friends Only* information such as the user's favorite anime and genre.



## Pending Request Page

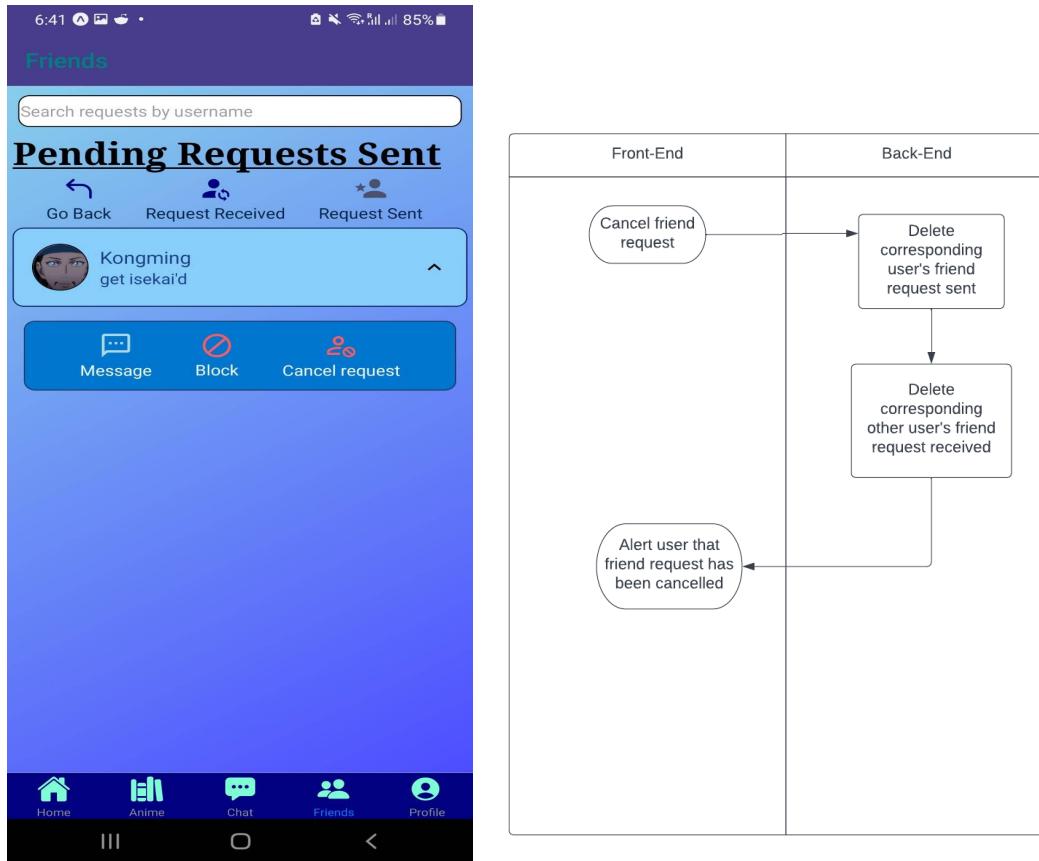
By default, you will see the list of all pending friend requests that you have received on this page. If you click on the right side of a specific user, it will display three additional icons, *Message*, which have been covered before, *Accept request*, which will accept the corresponding friend request if clicked, and *Reject request*, which will reject the corresponding friend request if pressed. Furthermore, if you accept or reject a friend request sent by another user, this user will get notification telling that its friend request has been accepted (or rejected).



You can also see the list of all pending friend requests that you have sent by clicking the Send Request Icon on the top right of the page. Conversely, if you want to go back to the list of all pending friend requests that you have received, you can simply click on the Received request Icon.

Similarly, if you click on the right side of a specific user in the list of all pending requests that you have sent, two additional buttons will be shown. The first icon is

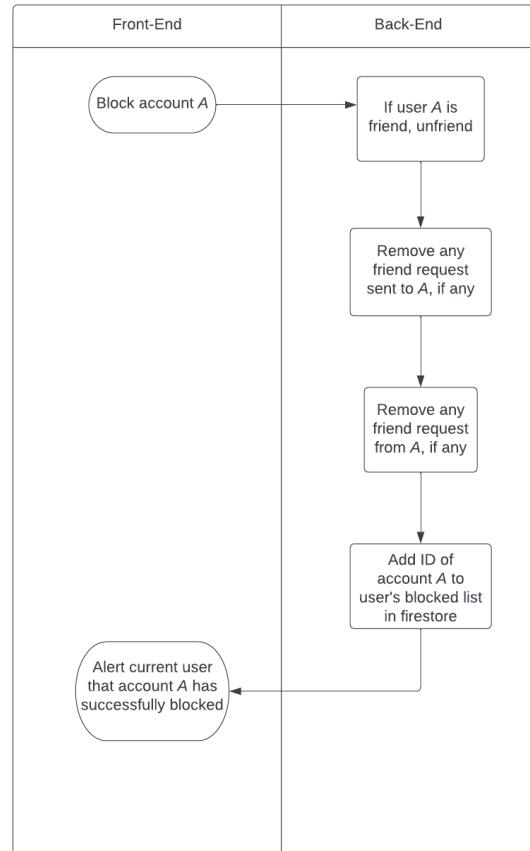
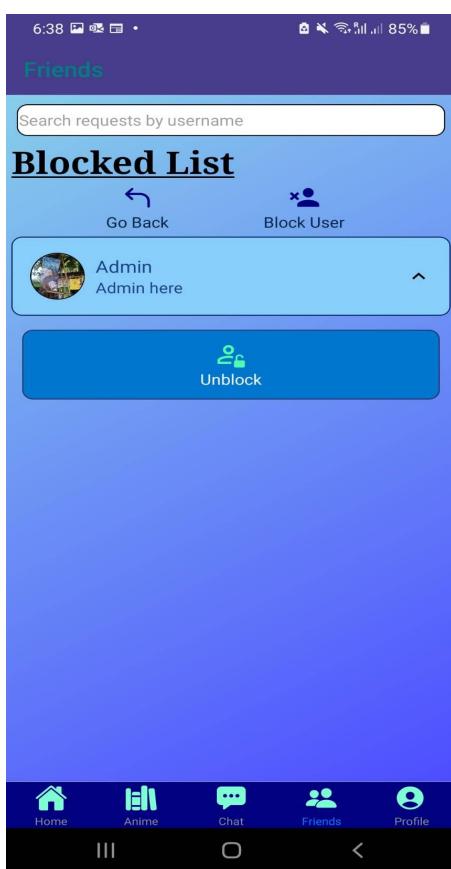
*Message*, which has been explained before. The other is the *Cancel Request* icon, which will cancel the corresponding friend request that you've sent.



## Blocked List Page

On this page, you will see the list of users that you've blocked. If you click on the right side of a specific user, an Unblock icon will be displayed. When you press this icon, the corresponding user will be unblocked.

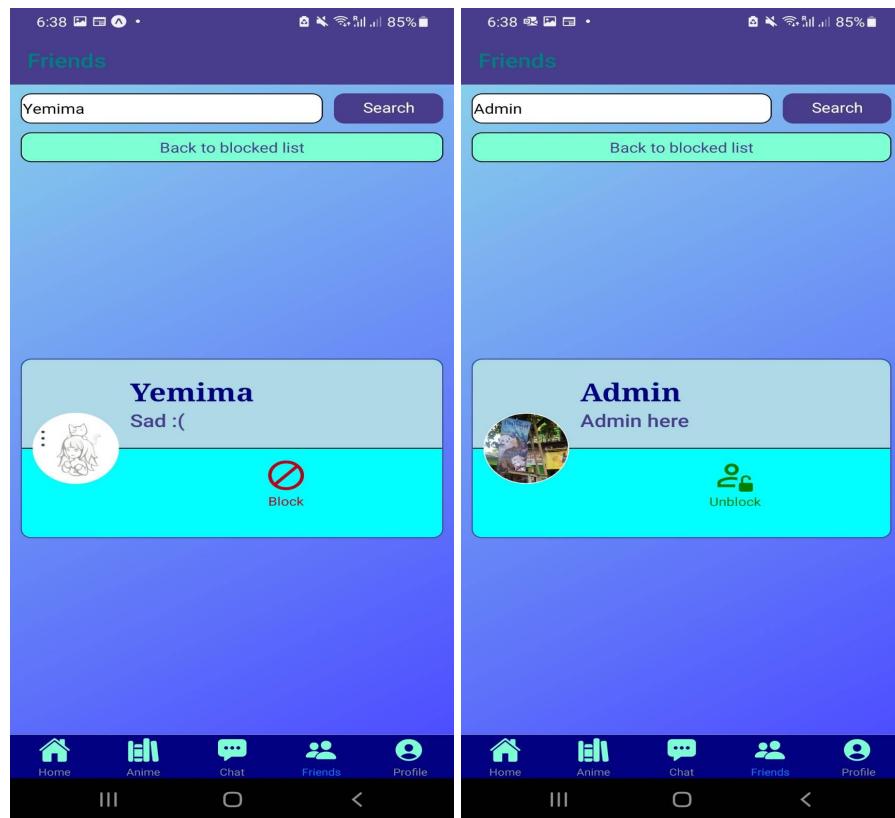
At the top of this page, there is also the *Block User* icon. If you click this icon, you will be navigated to the *Block User* page, where you can block other users.



## Block User Page

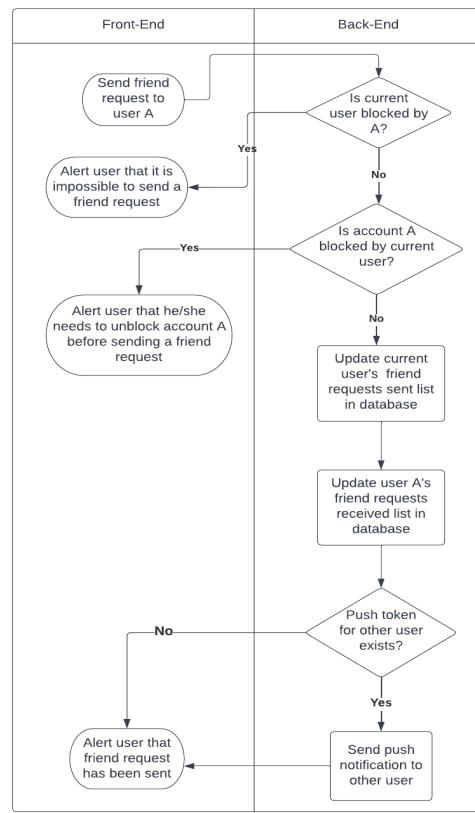
On this page, you can block other users. To do that, simply write the exact username of the user which you want to block, and click the search button. Each click will

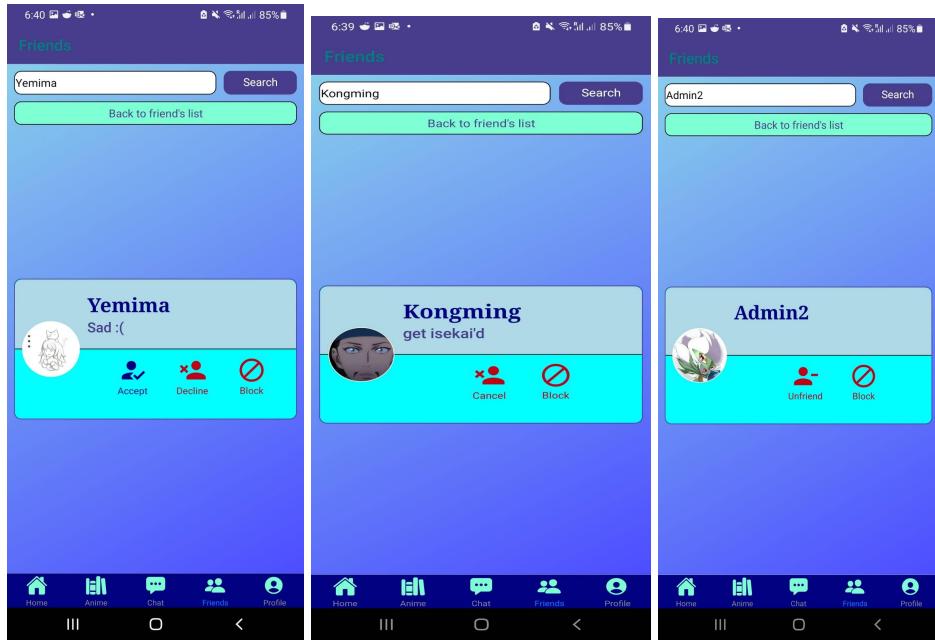
render the page differently, according to the existence of a user with such username, and whether the user found is already blocked or not. When the user found is already blocked, the Unblock icon, which will unblock the corresponding user if pressed, is shown. Else if the user found is not yet blocked, the Block icon, which will block the corresponding user if clicked, is shown. Do note that by blocking a specific user, any friend relation or request, if any, will be removed. Additionally, the blocked user won't be able to send private messages or friend requests to you. The converse is also true, you won't be able to send private messages or friend requests to the blocked user as long as you haven't unblocked it.



## Add Friend Page

On this page, you can add other users as a friend. To do that, simply write the exact username of the user which you want to add as a friend on the search bar, and click the *search* button. Each click on will render the page differently, according to the existence of a user with such username, and the friendship status between user found and you. Do note also that you won't be able to send a friend request to a user that you have blocked, or a user that blocks you.





## Group System

### Group List Page

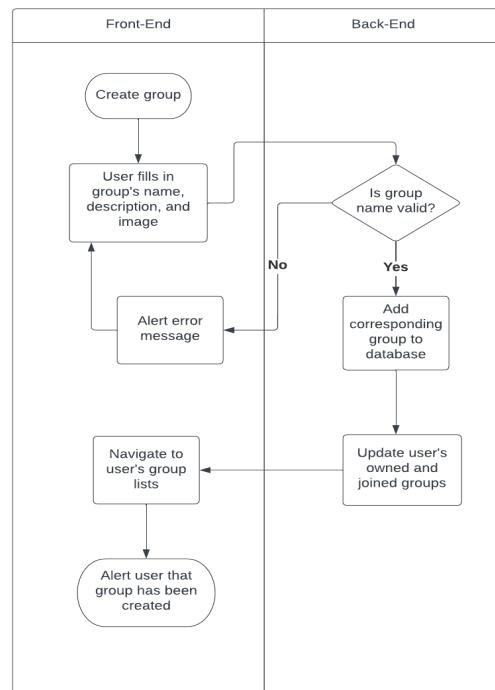
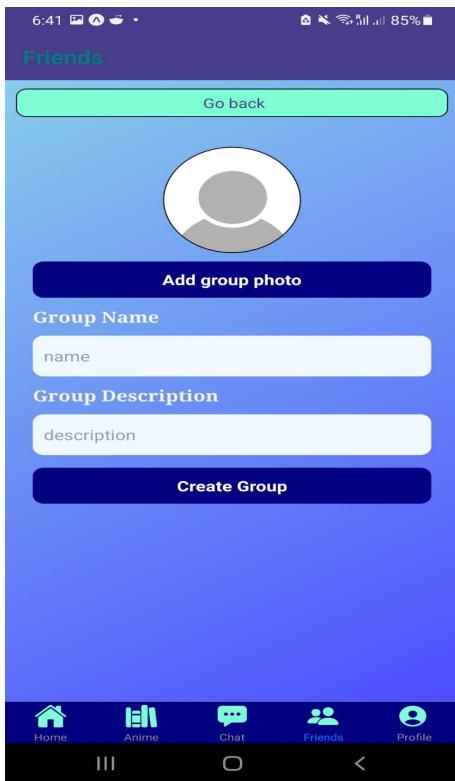
On this page, you will see the list of groups that you've joined. If you click on the right side of a specific group, it will display three additional icons, *Detail*, which will navigate user to *Group Info* page if clicked, *Message*, which will navigate user to Messaging page of this group when pressed, and *Leave Group*, which will let user to left this group once clicked.



On top of the group lists there is also the *Add Group* icon and the *Group Invitations* icon. If you click on the *Add Group* icon, you will be navigated to the *Create Group* page where you can make your own group. Otherwise, if you click on the *Invitation* icon, you will be navigated to the *Group Invitations* page where you can see the list of group invitations that you have. Additionally, if you have a pending group invitation, a notification badge will be shown in the *Invitation* icon.

## Group Creation Page

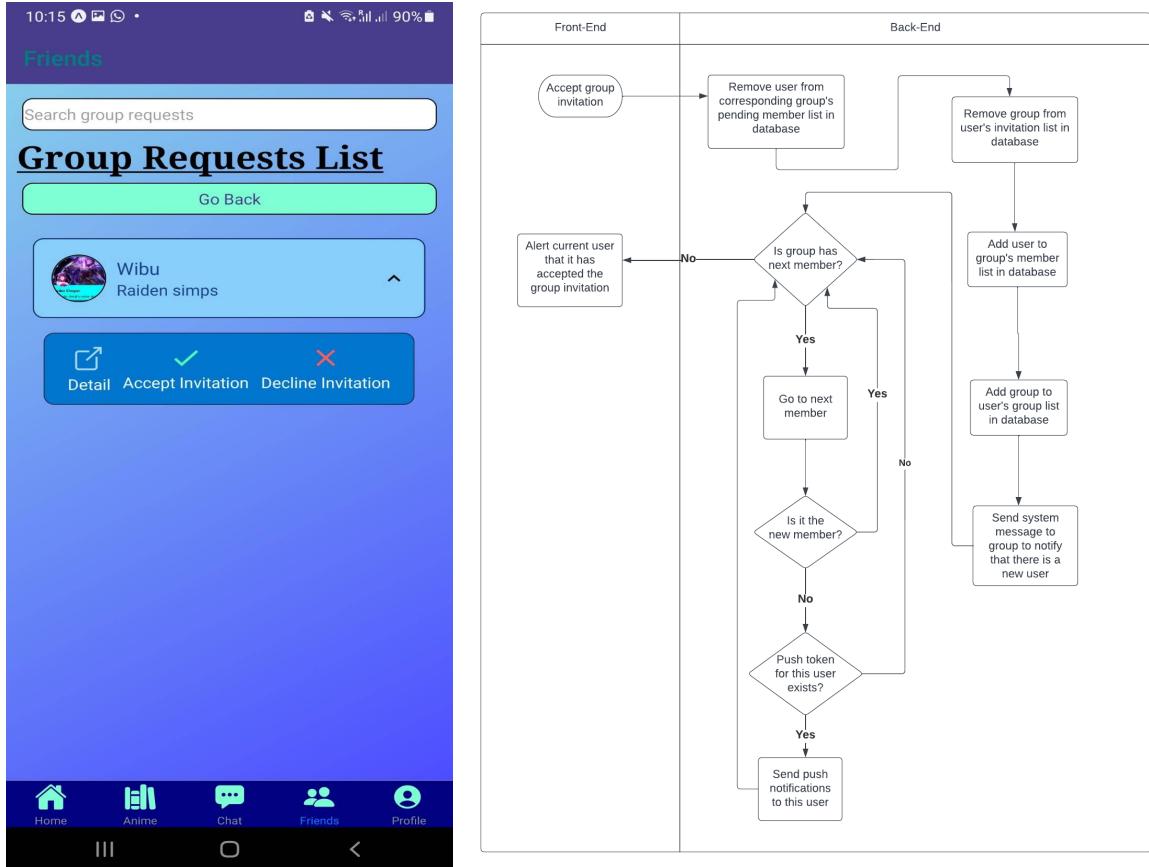
On this page, you can create a new group. To do that, simply choose the group name, description, image, and then click on the *Create Group* button. Note that you can't create a group if its name is empty.



## Group Invitations Page

On this page, you will see the list of all group invitations that you have received. If you click on the right side of a specific group, it will display three additional icons, *Detail*, which will navigate you to the *Group Request Info* page, *Accept invitation*,

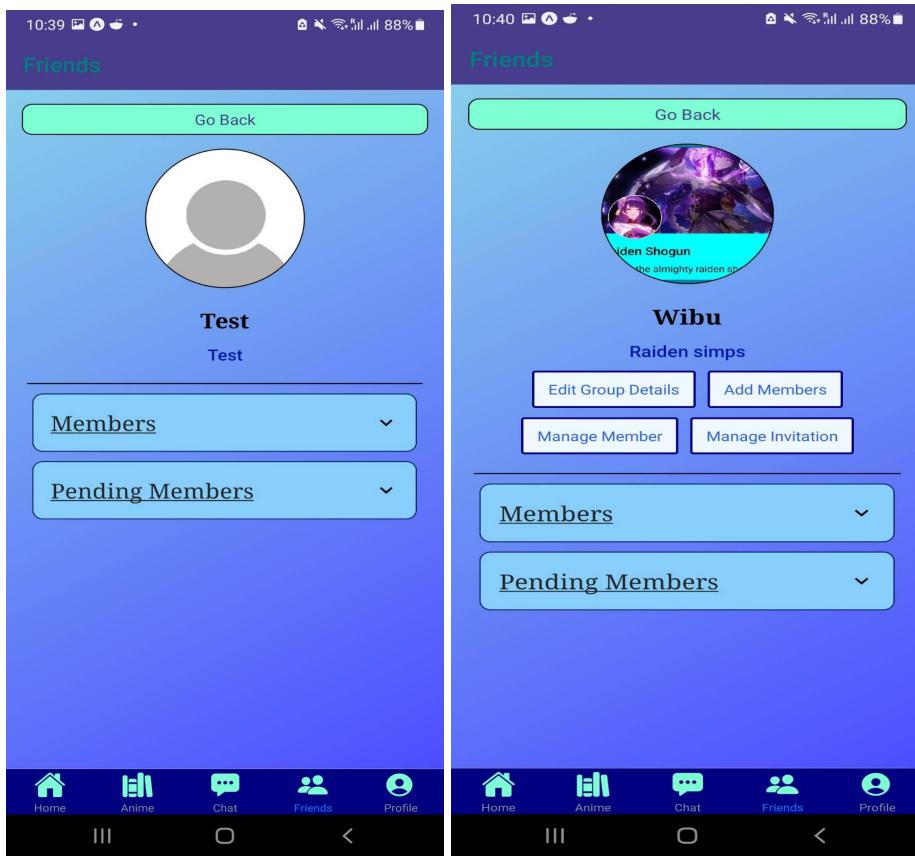
which will accept this group invitation if clicked, and *Reject invitation*, which will reject this group invitation if pressed. Additionally, if you accept a group invitation, every member of the corresponding group will be notified that there is a new member in the group.

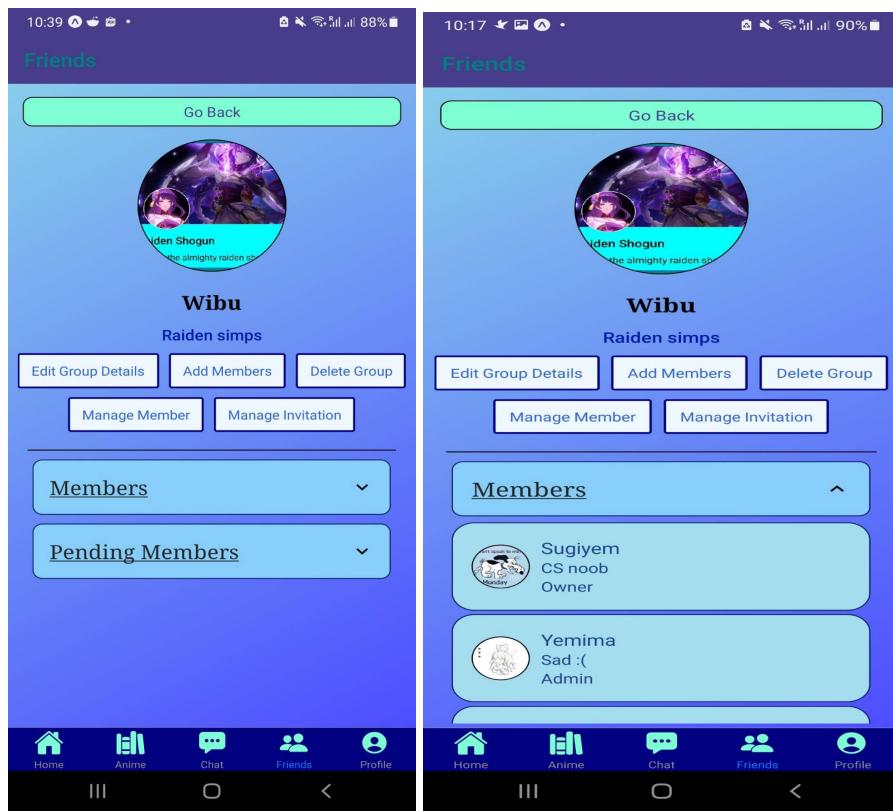


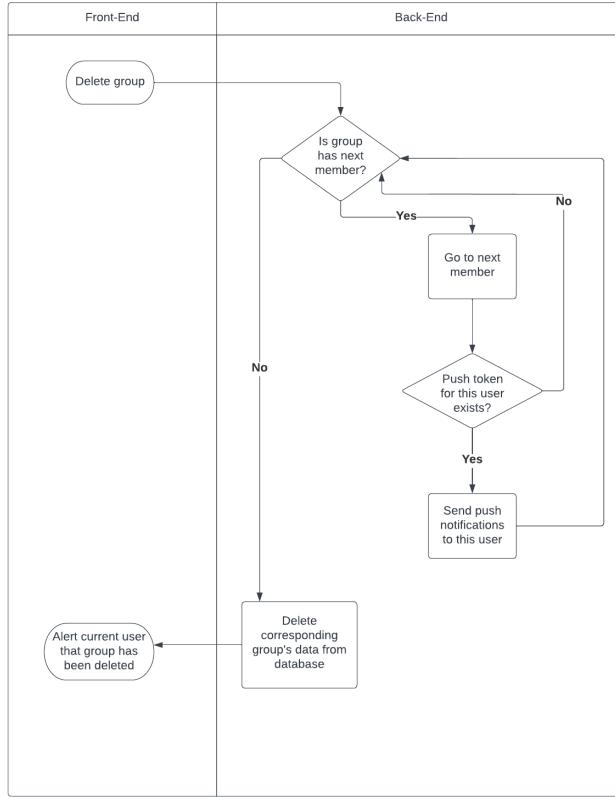
## Group Info Page

On this page, you can see the details of a specific group. By default, you can see the group's name, picture, description, list of members, and list of pending members. If you are the admin of the group, there will be 4 additional buttons shown on this

page. Those buttons are the *Edit Group Details* button, which will navigate you to the *Edit Group* page if pressed, *Manage Members* button, which will navigate you to *Manage Member* page when clicked, *Manage Invitations* page, which will navigate you to *Manage Invitation* page if when pressed, and *Add Members* button, which will navigate you to *Add Member* page if clicked. Additionally, if you are the owner of the group, you will have access to four previous buttons, as well as the *Delete Group* button, which will permanently delete the group if clicked. Do note that if you delete a group, all the group members will receive a push notification.







## Group Request Info Page

On this page you can see the details regarding a specific group that invites you. By default, you can only see the group's name, picture, description, as well as the list of members in the group.



## **Manage Group Members Page**

This page is only visible for the group's admin and owner. By default, this page will display the list of all group's members. If the current user is only a group admin, it can remove any group non-admins on this page. Else, if the current user is the group owner, it can remove any group members (admin and non-admin), as well as promoting a member to admin, and vice versa. Do note that if you are the owner of the group, promoting a member to admin will give it the ability to invite other users and remove non-admin group members.

Additionally, promoting member to admin, demoting admin to member, and removing member from the group will send a push notification to the corresponding user.

10:18

Friends

Search member by username

## Member's List

Go back

 Sugiyem CS noob Owner	
 Yemima Sad :( Admin	
 Admin Admin here Member	 Remove

III O <

10:17

Friends

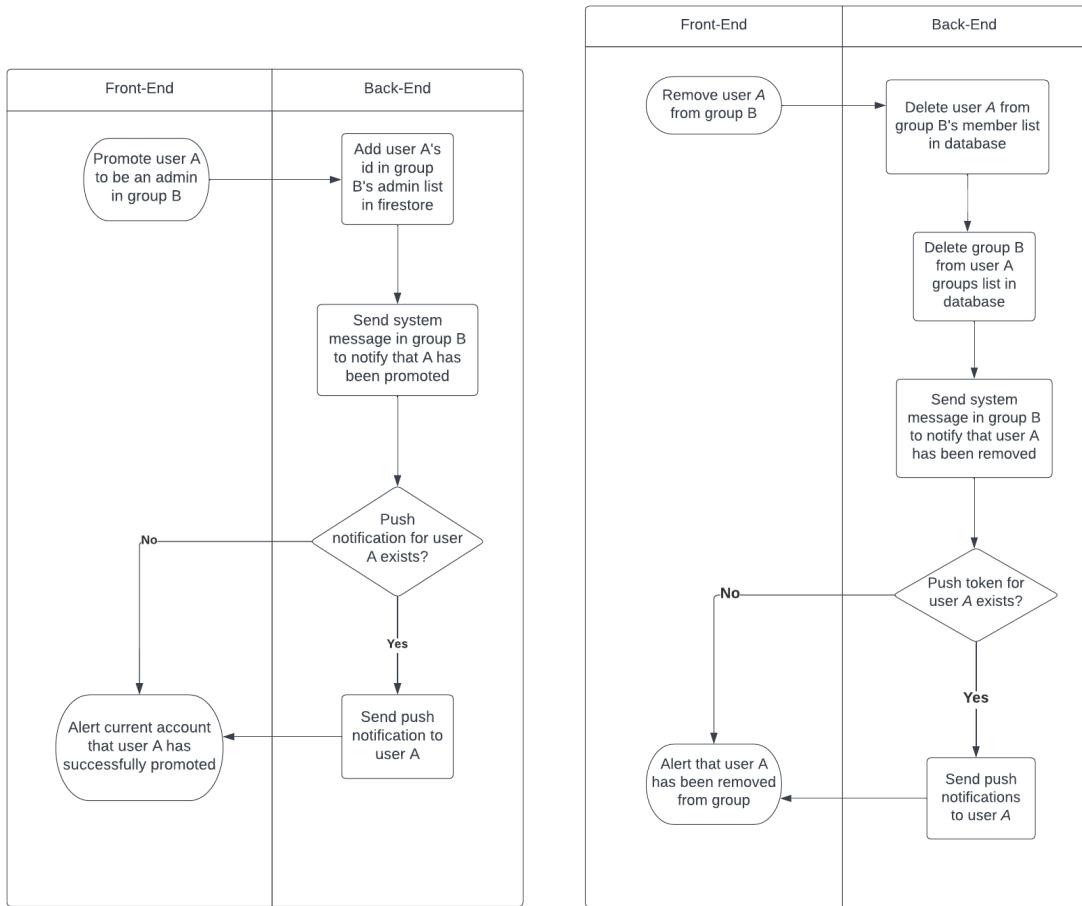
Search member by username

## Member's List

Go back

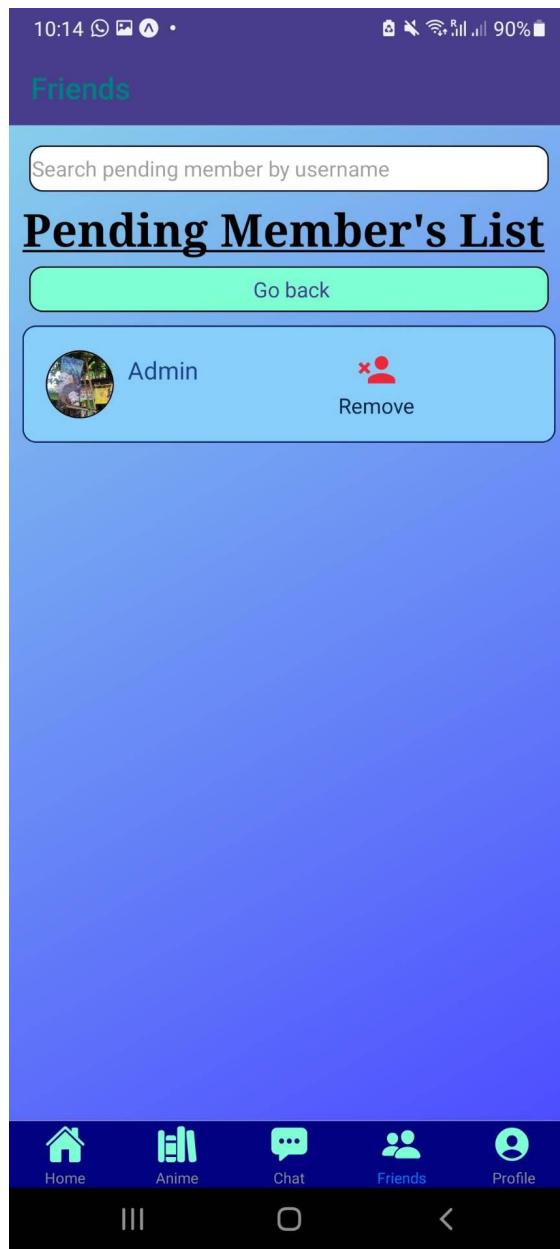
 Sugiyem CS noob Owner		
 Yemima Sad :( Admin	 Remove	 Demote
 Admin Admin here Member	 Remove	 Promote

III O <



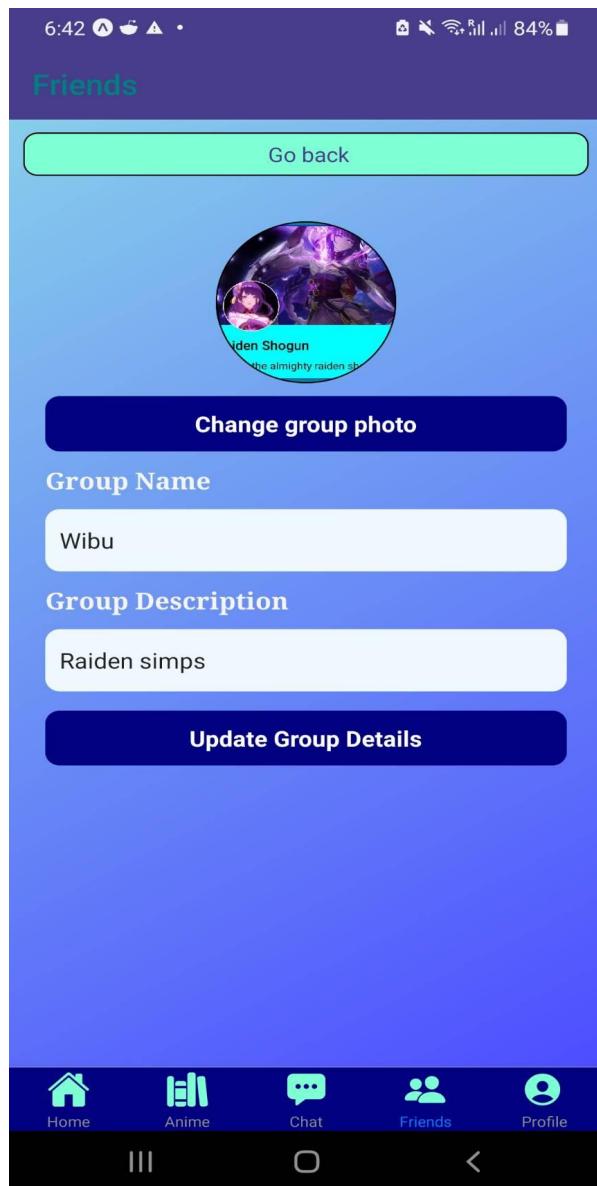
## **Manage Group Invitations Page**

This page is only visible for the group's admin and owner. By default, this page will display the list of pending members of the group (users that have been invited to the group but haven't responded to the invitation). As the admin of the group, you can remove any pending member shown on this page.



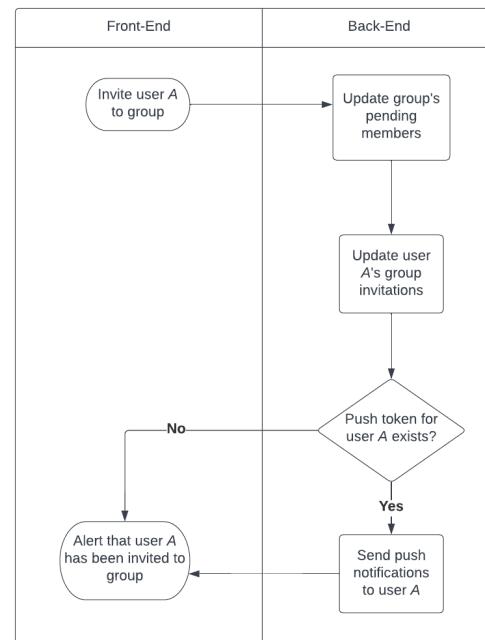
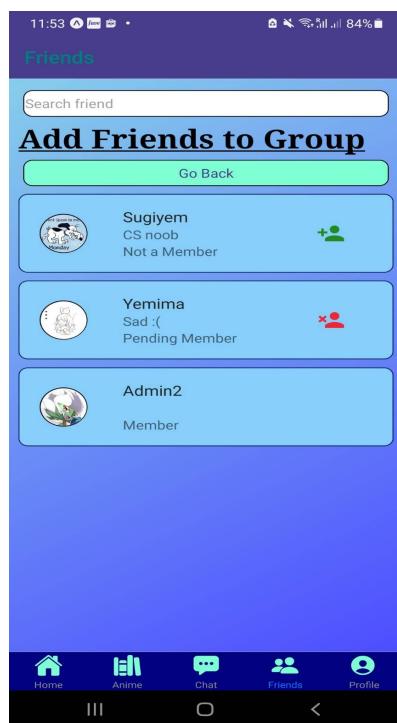
## Edit Group Page

This page is only visible for the group's admin and owner. In this page, you can update your group's name, picture, and description. After customizing your group's profile, don't forget to press the Update Group Details button to submit the change. Do note that the group's name must be a non-empty string.



## Add Members Page

This page is only visible to the group's admin and owner. On this page, you can add another user to your group. By default, this page will display a list of your friends and their group role (whether they are a member, pending member, or non-member). As the admin of the group, you can invite non-members and cancel the pending member's invitation shown on this page. Do note that you can't remove member in this page (you can do it in the *Manage Members* page).



# Profile System

## Profile Info Page

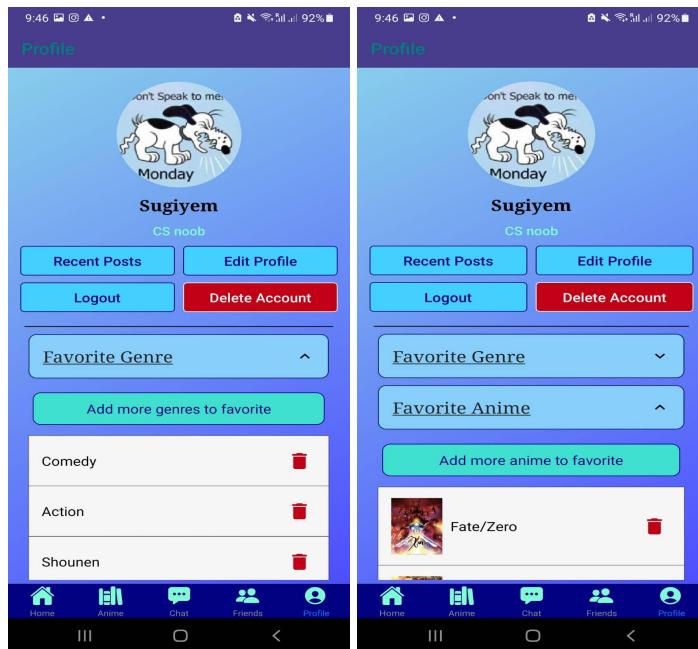
If you click on the profile part in the bottom tab, it will navigate you to the *Profile Info* page by default.



If you click on the *Logout* button, it will sign you out of the application and navigate you back to the login page. If you click on the *Edit Profile* button, it will bring you to the *Edit Profile* page.

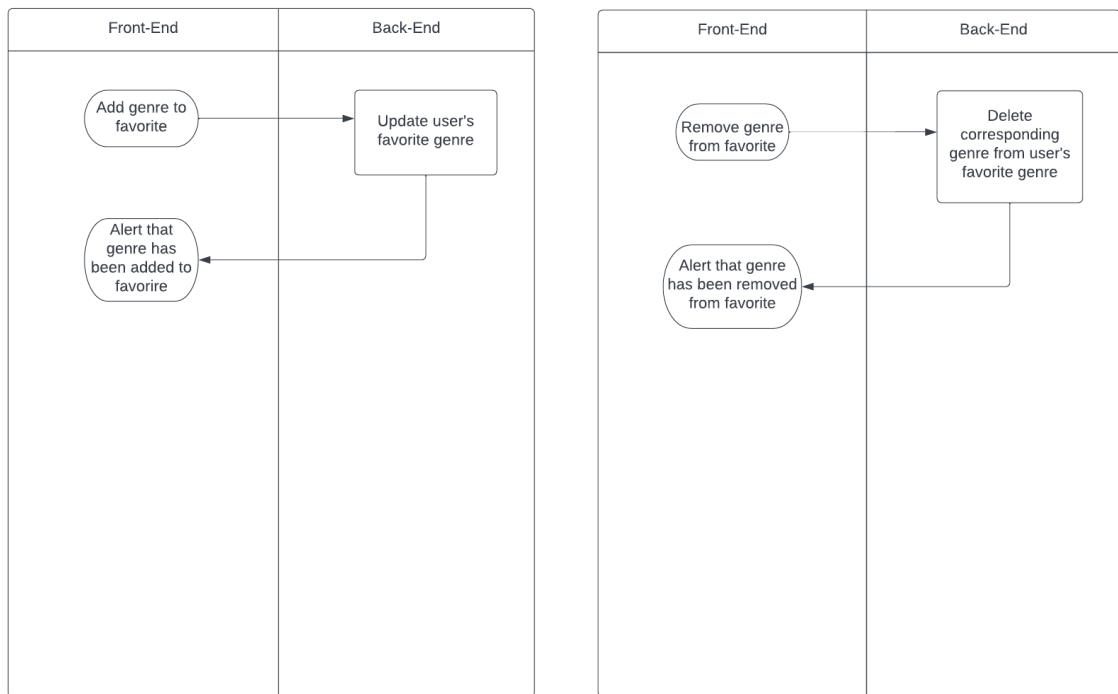
If you click on the right part of the *Favorite Genre* title, it will display your current list of favorite genres. Alternatively, if you click on the right part of the *Favorite Anime* title, it will display your current list of favorite animes. Furthermore, if you swipe each of your favorite anime or genre, it will render a *remove* button, which when you click, will remove the specific anime or genre from your favorite list.

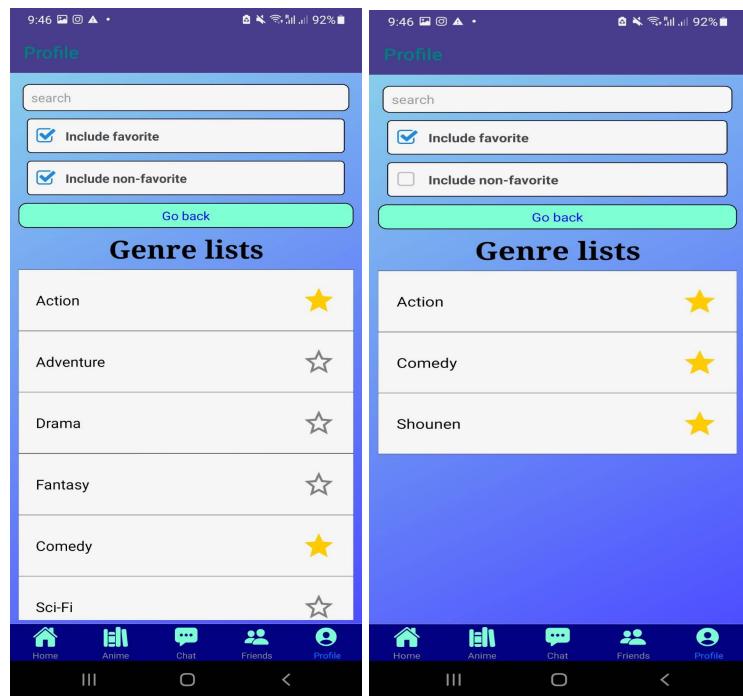
If you click on the *Add more anime to favorite* button, it will navigate you to the anime page which has been covered before. If you click on the *Add more genre to favorite*, it will navigate you to the *Genre* page, which consists of all available genres to choose as your favorite.



## Genre Page

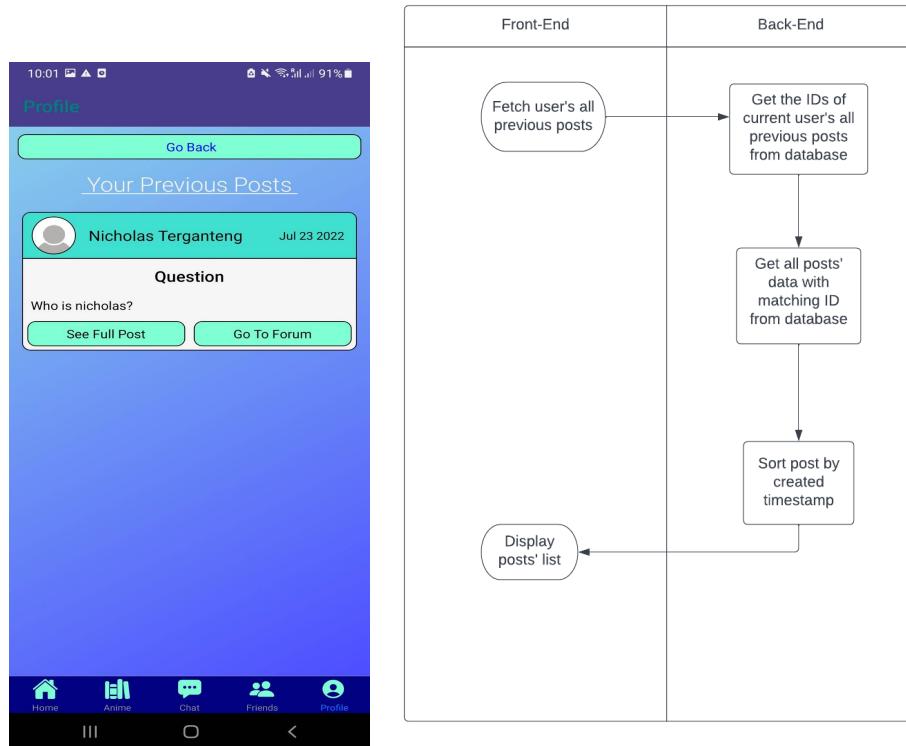
On this page, if you swipe a genre which is listed as your favorite, it will render a *remove* button which will remove it from your favorite list. In contrast, if you swipe a genre which is not listed as your favorite, it will render an *add* button which will add it to your favorite list. Furthermore, you can also filter a genre by its name and its status (whether it is listed as your favorite or not).





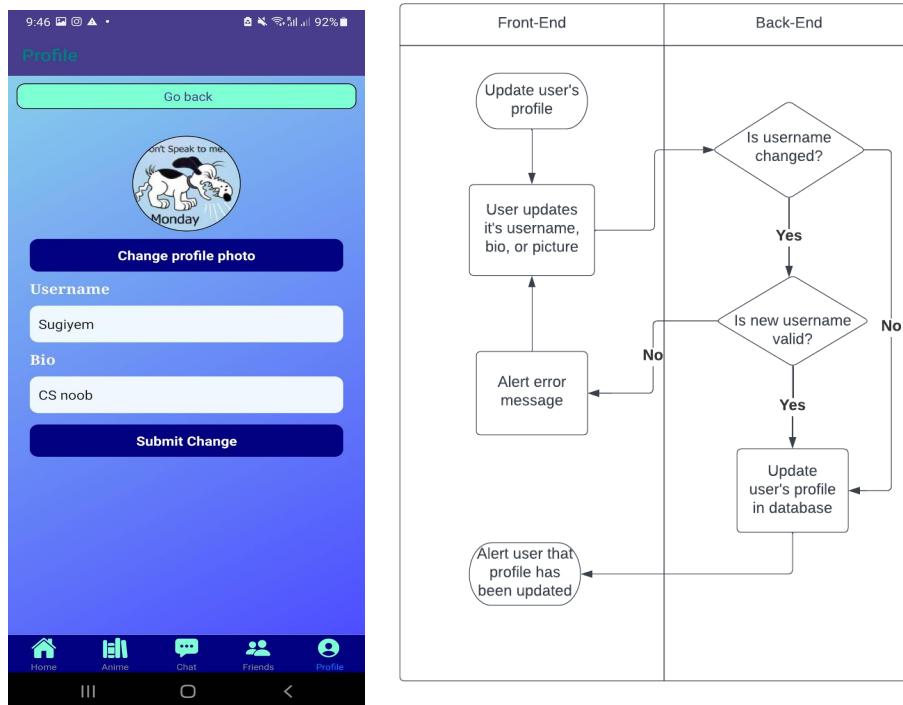
**Previous Forum Post Page**

On this page, you can see all previous posts that you have created. By default, this post is sorted by its created timestamp.



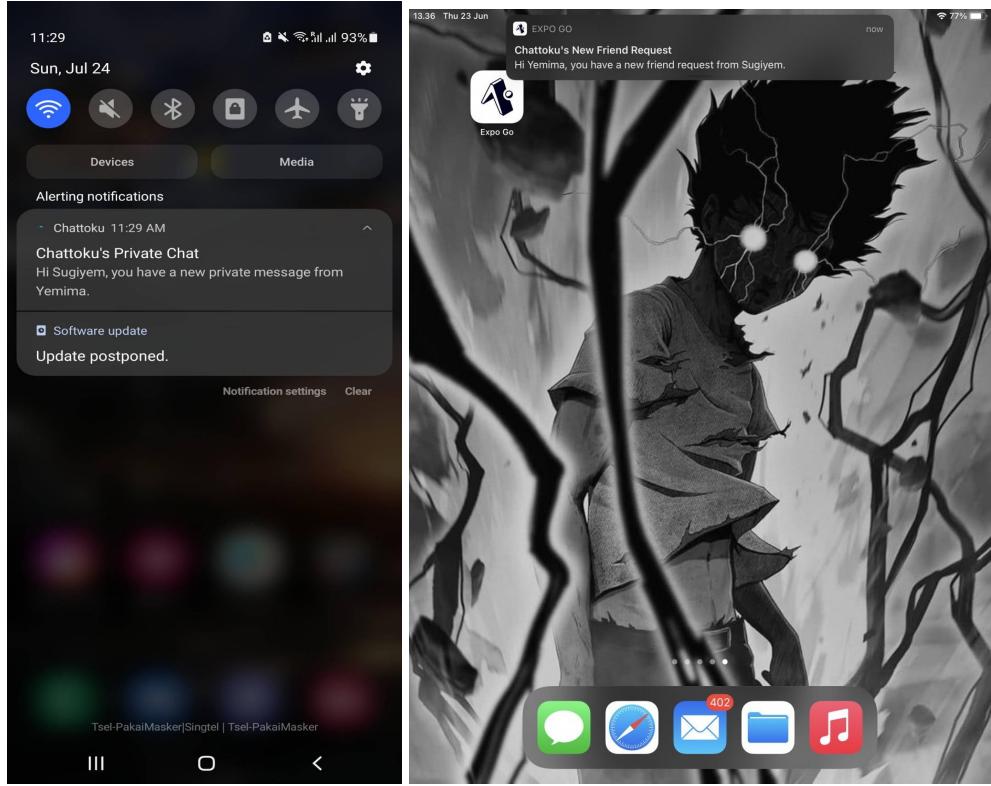
## Edit Profile Page

On this page, you can customize your username, bio, and profile picture. Note that username must contain alphanumeric characters and is unique for each user. Hence, there might be a situation where you can't change to a specific username. After customizing your profile, don't forget to click on the *Submit Change* button to save your changes.



## Notification System

Because we implement the app in two different platforms, standalone app for android, and expo-hosted for iOS, there are some differences between how notification systems are implemented. For the expo-hosted app for iOS, the notification system is implemented using Expo-Notification. However, for the standalone android app, the notification system is implemented using Expo-Notification and Firebase Cloud Messaging (FCM).





# Software Engineering Practices

- ***GitHub Version Control***

To easily collaborate with each other, we use GitHub to maintain the project's integrity. Everytime we want to create a new feature, fix bugs, or add more testing, we create a new issue first where we explain concisely what is going to be changed. Then, we branch off the *master* branch, and continue to work on the new branch. When we are ready to merge the modified branch into our *master* branch, we will open a new Pull Request where we explain the updated features that the branch contains. The other user will then review the branch to ensure that there is no bug in the program, as well as maintaining that the code follows Software Engineering principles such as *Abstraction* or *Separation of Concerns*. After the other user has approved the change in this branch, the branch will be merged to the *master* branch.

- ***Continuous Integration with GitHub Actions***

To further ensure that any changes to the *master* branch are not breaking the entire codebase, we use GitHub Actions to set up our own workflow. This workflow will be automated as follows,

1. Do a clean install of the project dependencies on the latest Ubuntu version
2. Run all written tests in the project (currently, unit and UI tests)

The workflow will pass if and only if all the tests in the project pass. A badge will appear to indicate whether the workflow passed or failed.

Each creation of a pull request will trigger this workflow to help developers spot any issues with the code before merging to the main branch. Furthermore, each push to the *master* branch of the project repository will also trigger this workflow.

The screenshot shows the GitHub Pull Requests page for the repository 'sugiyem / Chattoku'. A modal at the top encourages labeling issues and pull requests for new contributors. The main list shows three open pull requests:

- #41: Add notification system (enhancement) - 1 comment
- #40: Forum enhancement (bug, enhancement) - 2 comments, 11 reviews
- #37: Add recommendation system (enhancement) - 1 comment

Filters at the top include 'is:pr is:open'.

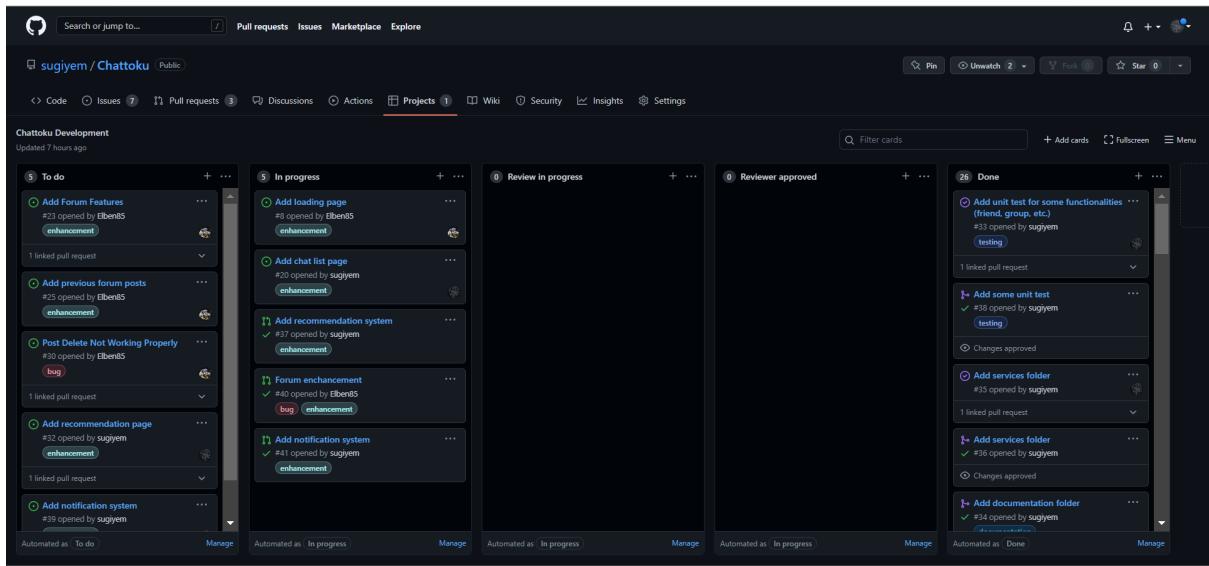
The screenshot shows the GitHub Repository page for 'sugiyem / Chattoku'. The repository is public and has 5 branches and 0 tags. The master branch commit history is displayed:

- sugiyem Merge pull request #38 from sugiyem/Add-Some-Unit-Test ... (d7a21f8, 2 days ago, 126 commits)
- .github/workflows Change workflow (12 days ago)
- \_test\_ Change how each tests import services-related component (5 days ago)
- android Deploy app to expo host (22 days ago)
- doc Add documentation folder (8 days ago)
- ios Deploy app to expo host (22 days ago)
- src Merge branch 'Add-Services-Folder' into Add-Some-Unit-Test (5 days ago)
- .buckconfig Created a new Expo app (last month)
- .env Add .env file (last month)

The right sidebar includes sections for About (Chattoku is Team W's Orbital 2022 Project), Releases (No releases published, Create a new release), and Packages.

## - ***Planning with GitHub Projects***

Using GitHub Projects, we employ a Card-Based task allocation system to keep track of our current progress. This helps us to keep each other to work in an organized manner.



## - **Code Style**

Both team members use Prettier, a Javascript code formatter, in our IDE to maintain a standardized code styling throughout the whole project. Using Prettier results in codes which are more human readable compared to not using any code formatter. This helps our team in understanding each other's code more efficiently. Moreover, due to the standardized code styling, we would not run into any issues due to different code formats, such as trailing commas when parsing a JSON object.

## - **2 Weeks Sprint**

Our team follows the 2 week sprint method, where our team would meet up every 2 weeks to follow up on the task that each member has done and to divide up tasks in the next 2 weeks.

By following this method, our team members would be much more informed regarding each other's progress. Moreover, we can divide tasks based on each team member's capacity, interest, as well as skillset. As a result, this will result in a much more efficient software development and also maintaining as well as improving the speed of the development throughout the development of the project



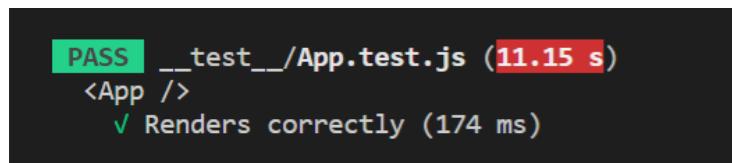
# Testing

## Unit Tests

As of milestone 3, we've tested almost all components in Chattoku using unit tests written in Jest framework. The test results are shown below.

### - *Test Entire Application*

Objective	Result (Pass / Fail)
To test that entire application run without error	Pass



### - *Test Chattoku's UI*

Objective	Result (Pass / Fail)
Test that all component renders correctly	Pass
Test that props can be successfully passed to a component	Pass
Test that all component with textInputs will has the correct input after successful onChangeText interaction	Pass
Test that all component with buttons will call the correct jest mock function after successful onPress interaction	Pass

### - *Test Chattoku's Authentication System*

Objective	Input	Output	Result
Test that user's username must be a non-empty string	"" (Empty string)	Invalid username	Pass
Test that user's username must consists of alphanumeric characters	"yem@123"	Invalid username	Pass
Test that user's username	"Sugiyem" (Username that	Username has been taken	Pass

must be unique	has been taken)		
Test that non-empty username that only consists of alphanumeric characters and has not been taken is valid	“Yem” (Username that has not been taken)	Valid username	Pass
Test that user's password must be not less than 6 characters	“berts”	Invalid password	Pass
Test that password with 6 or more characters is valid	“yemyem”	Valid password	Pass
Test that user's email must not be an empty string	“” (empty string)	Invalid email	Pass
Test that user's email must has a '@'	“chattoku”	Invalid email	Pass
Test that user's email must not have more than 1 '@'	“chattoku@chattoku@chattoku”	Invalid email	Pass
Test that user's email must have at least one ‘.’ after '@'	chattoku@chattoku	Invalid email	Pass
Test that email with one '@' and at least one ‘.’ after it is valid	chattoku@chattoku.com	Valid email	Pass
Test that user can sign up for Chattoku	signUp function is called	mockCreateUserWithEmailAndPassword is called	Pass
Test that user can login to Chattoku	login function is called	mockSignInWithEmailAndPassword is called	Pass
Test that user can logout from Chattoku	signOut function is called	mockSignOut function is called	Pass

- **Test Chattoku's Forum System**

Objective	Input	Output	Result
To test that user can create forum	createForum function is called	Successful	Pass

To test that user can edit forum's info	editForum function is called	Successful	Pass
To test that user can follow forum	followForum function is called	Successful	Pass
To test that user can unfollow forum	unfollowForum function is called	Successful	Pass
To test that user can change forum's notification setting	updateNotification function is called	Successful	Pass
To test that user can create post	addPost function is called	Successful	Pass
To test that user can delete post	deletePost function is called	Successful	Pass
To test that user can edit post	editPost function is called	Successful	Pass
To test that user can like/dislike post	updateLikes function is called	Successful	Pass
To test that user can create comment	addComment function is called	Successful	Pass
To test that user can delete comment	deleteComment function is called	Successful	Pass
To test that user can edit comment	editComment function is called	Successful	Pass
To test that user can ban other account from forum	addBannedUsers function is called	Successful	Pass
To test that user can unban other account from forum	deleteBannedUsers function is called	Successful	Pass
To test that user can check if other account is banned from forum	isUserBanned is called with banned user	True	Pass
To test that user can check if other account is not banned from forum	isUserBanned is called with unbanned user	False	Pass
To test that user can add forum admin	addAdmin function is called	Successful	Pass
To test that user can remove forum admin	removeAdmin function is called	Successful	Pass

To test user can edit forum admin power	editAdminPower function is called	Successful	Pass
To test that user can check if other account is authorized to ban	isAuthorizedToBanUsers is called with authorized user	True	Pass
To test that user can check if other account is not authorized to ban	isAuthorizedToBanUsers is called with unauthorized user	False	Pass
To test that user can check if other account is authorized to remove post	isAuthorizedToDeletePosts is called with authorized user	True	Pass
To test that user can check if other account is not authorized to remove post	isAuthorizedToDeletePosts is called with unauthorized user	False	Pass
To test that user can fetch data of all available forums	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch data of all followed forums	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch all posts in a forum	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch all posts that he/she created	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch all comments in a post	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch all banned users in a forum	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch all admins in a forum	Tested with dummy inputs	Matched with what was expected	Pass

- ***Test Chattoku's Anime System***

Objective	Input	Output	Result
To test that user can add anime to favorite	addAnimeToFavorite function is called	Successful	Pass

To test that user can remove anime from favorite	removeAnimeFromFavorite function is called	Successful	Pass
To test that user can add genre to favorite	addGenreToFavorite function is called	Successful	Pass
To test that user can remove genre from favorite	removeGenreFromFavorite function is called	Successful	Pass
To test that user can fetch its favorite anime	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch currently airing anime	Corresponding AnimeFetch function is called	Mock axios.get is called	Pass
To test that user can fetch top anime	Corresponding AnimeFetch function is called	Mock axios.get is called	Pass
To test that user can fetch searched anime	Corresponding AnimeFetch function is called	Mock axios.get is called	Pass
To test that user can fetch specific anime based on its MyAnimeList ID	Corresponding AnimeFetch function is called	Mock axios.get is called	Pass
To test that the system can convert anime to its string representation	{ genres: ["Comedy", "Drama"], themes: ["Historical"], demographics: ["Seinen"] }	"Comedy, Drama, Historical, Seinen"	Pass
To test that the system can convert genre to its string representation	["Action", "Psychological", "Drama"]	"Action, Psychological, Drama"	Pass
To test that user can fetch the data of recommended anime	FetchRecommendations function is called	Mock axios.post is called	Pass

#### - **Test Chattoku's Friend System**

Objective	Input	Output	Result
To test that user can send friend request	addFriend function is called	Successful	Pass
To test that user can accept friend request	acceptFriendRequest function is called	Successful	Pass

To test that user can reject friend request	rejectFriendRequest function is called	Successful	Pass
To test that user can cancel friend request	cancelFriendRequest function is called	Successful	Pass
To test that user can unfriend	removeFriend function is called	Successful	Pass
To test that user can fetch its friends	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch its incoming requests	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch its outgoing requests	Tested with dummy inputs	Matched with what was expected	Pass

- ***Test Chattoku's Group System***

Objective	Input	Output	Result
To test that user can create group	createGroup function is called	Successful	Pass
To test that user can update group details	editGroupDetails function is called	Successful	Pass
To test that user can add another user to a group	addUserToGroup function is called	Successful	Pass
To test that user can remove another user from a group	removeUserFromGroup function is called	Successful	Pass
To test that user can cancel group invitation	cancelGroupInvitation function is called	Successful	Pass
To test that user can accept group invitation	acceptGroupInvitation function is called	Successful	Pass
To test that user can reject group invitation	declineGroupInvitation function is called	Successful	Pass

To test that user can leave group	leaveGroup function is called	Successful	Pass
To test that user can delete group	deleteGroup function is called	Successful	Pass
To test that user can add group admin	promoteMemberToAdmin function is called	Successful	Pass
To test that user can remove group admin	demoteAdminToMember function is called	Successful	Pass
To test that user can fetch data of all its groups	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch all groups that invite it	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch all members of a group	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch all pending members of a group	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch all admins of a group	Tested with dummy inputs	Matched with what was expected	Pass

- ***Test Chattoku's Message System***

Objective	Input	Output	Result
To test that user can send a private message	sendPrivateChat function is called	Successful	Pass
To test that user can send a group message	sendGroupChat function is called	Successful	Pass
To test that user can remove private chat from active chat lists	removePrivateChat function is called	Successful	Pass
To test that user can remove group chat from active chat lists	removeGroupChat function is called	Successful	Pass
To test that the system can send a message to a	sendSystemMessageToUser function is called	Successful	Pass

private chat			
To test that the system can send a message to a group chat	sendSystemMessageToGroup function is called	Successful	Pass
To test that user can fetch all its active private chats	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can fetch all its active group chats	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can check if there is unread private message	Tested with dummy inputs	Matched with what was expected	Pass
To test that user can check if there is unread group message	Tested with dummy inputs	Matched with what was expected	Pass

- ***Test Chattoku's Notification System***

Objective	Input	Output	Result
To test that notification can be pushed to a specific user	sendPushNotification function is called	Successful	Pass
To test that notification can be pushed to all users in a specific group	sendNotificationToAllGroupMembers function is called	Successful	Pass
To test that notification can be pushed to all users who follow a specific forum	NotifyAllFollowers function is called	Successful	Pass

## API Tests

Additionally, using Postman, we have also tested out HTTP requests sent to our Anime Recommendation System endpoint as summarized below.

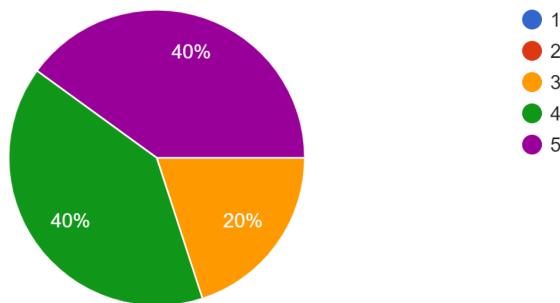
Base URL: <https://chattoku-recommendation-system.herokuapp.com>

Endpoint	Method	Body	Expected Status	Expected Output	Result
/predict	GET	-	405 (method not allowed)	-	Pass
/predict	POST	-	400 (bad request)	-	Pass
/predict	POST	{ "genres": "" }	200 (Ok)	Array containing 10 IDs	Pass
/predict	POST	{ "genres": "Action, Comedy" }	200 (Ok)	Array containing 10 IDs	Pass
/predict	POST	{ "genres": "Action, Comedy", "anyData": [] }	200 (Ok)	Array containing 10 IDs	Pass

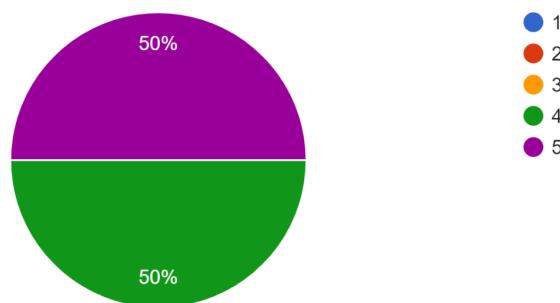
## User Acceptance Testing

We've also conducted an User Acceptance Testing (UAT) for milestone 3. We invited ten NUS (National University of Singapore) students who are interested in anime to test and review our application. We let the reviewers rate the four main functionalities of the app, which are **Anime Database & Recommendation**, **Forum System**, **Friend System**, and **Private & Group Messaging**. The result of the test for this four functionalities can be summarized as below,

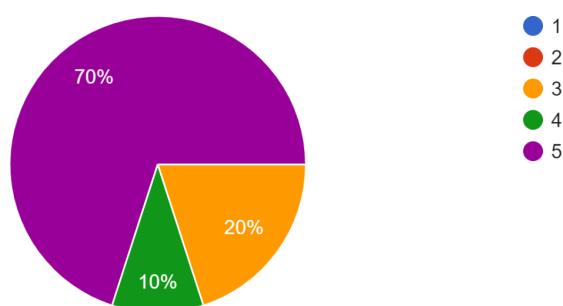
- Anime Database & Recommendation (rated 4.2 out of 5 in average)



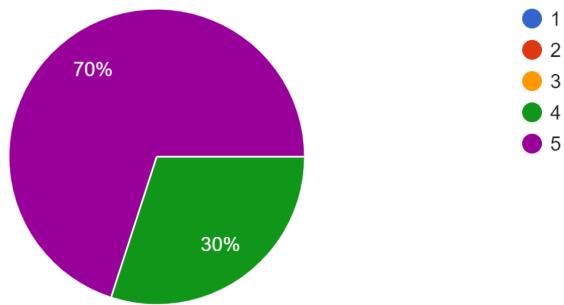
- Forum System (rated 4.5 out of 5 in average)



- Friend System (rated 4.5 out of 5 in average)

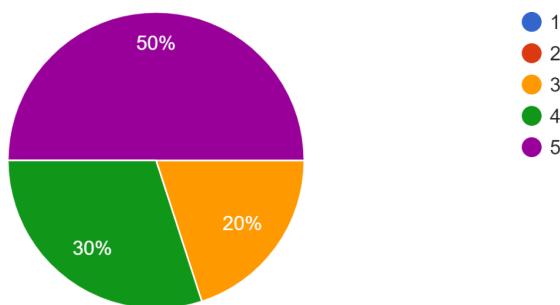


- Private & Group Messaging (rated 4.7 out of 5 in average)

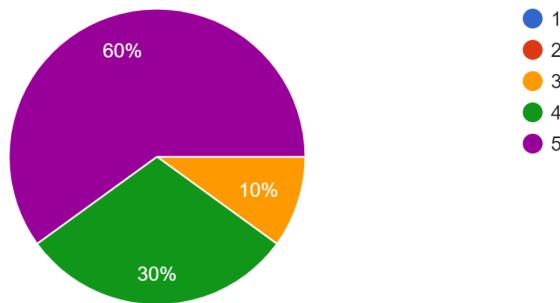


Beside these four results, we also asked the reviewers to rate the overall design of the app, as well as their overall experience in using Chattoku. The result is shown below,

- Overall Design (rated 4.2 out of 5 in average)



- Overall Experience (rated 4.5 out of 5)



From the User Acceptance Testing, it can be concluded that the app usability is high and potential users are satisfied with the Chattoku's performance.

# Reflections

## Problems Encountered

1. Familiarization - there are some tech stacks which none of our team members had used before, which causes some delay in the project due to the need to familiarize ourselves with the tech stacks.
2. Many bugs - we have encountered a lot of advanced bugs which do not affect the workflow of the app, but causes some warnings to appear.
3. Lack of iOS devices - Our team only has one iPad to test out our application in iOS devices during development.
4. Heroku free tier - For some reason the recommendation server keeps shutting down after idling for some period of time. Turns out this situation was quite regular for Heroku free service. Thankfully, it can be resolved by redeploying the server and setting up a cron job which calls the server every 30 minutes.
5. Due to expo restriction on iOS deployment, our team was not able to deploy the app for iOS.

## Final Thoughts

Through user acceptance testing, unit tests, and some manual testing, we found out that our app is still lacking in some areas. Although most testers believe that the application is usable overall, there are still some parts of the application which require a redundant amount of action (For example, needing 2 button clicks when it could be modified to only 1 button click).

Due to our overly ambitious planning at the start, we ended up taking the approach of quantity over quality where it can be seen that some of the components of the app still have room for improvements. Moreover, we didn't have the time to implement some nice to have features such as:

1. Dark Mode
2. In App Tutorial
3. Forum sorting based on several categories

Through this 3 months long journey we have learned a lot regarding some of the most popular frameworks for mobile app creation such as expo and firebase.

Moreover, we have learned the importance of implementing good software engineering practices firsthand. Not only that, but we also learnt the importance and methods on software testing as well as the importance of UI/UX design and their impact to the final result.

We hope that our documentations will be able to provide insights to readers and that they can hopefully learn something from our project, be it from our successes or shortcomings.

# Appendix

## Project Log

Task	Date	Farrel	Elbert	Remarks
Refinement of ideas	9 May 2022	2h	2h	1. Revise project proposal
Refinement of ideas	10 May 2022	2h	2h	1. Revise project proposal
Lift-Off	11 May 2022	3h	1h	1. Poster and video creation
Project consultation	12 May 2022	3h	1h	1. Project consultation with advisor 2. Picking up react native & firebase
Picking up relevant technology	13 May 2022	2h	0h	1. Picking up react native & firebase
Mission control 1 & Team meeting	14 May 2022	5h	4h	1. React Native tutorial 2. Discuss what to do for the next two weeks 3. Create the github repository 4. Configure firebase with the app
Application development	15 May 2022	1h	0h	1. Continue configuring firebase to the app
Application development	16 May 2022	2h	1h	1. Create navigation bar for dashboard screen 2. Enable fetching anime data 3. Check firebase configuration
Application	17 May	2h	0h	1. Create anime

development	2022			search bar
Application development	18 May 2022	2h	0h	1. Anime screen UI
Application development	19 May 2022	2h	0h	1. Anime screen UI
Application development	20 May 2022	1h	0h	1. Create navigation to login and signup screen
Mission control 2	21 May 2022	5h	6h	1. Software Engineering tutorial 2. Login & Sign Up 3. Database Discussion 4. Code Review 5. Profile screen UI
Application development	22 May 2022	4h	8h	1. Login & Sign Up 2. Profile screen UI 3. Enable app to use camera & library
Application development	23 May 2022	2h	0h	1. Favorite anime & genre UI
Application development	24 May 2022	4h	1h	1. Login & Signup Bug Fixes 2. Allow user to add and remove a specific anime to favorite 3. Edit profile system
Application development	25 May 2022	3h	0h	1. Edit genre screen
Application development	26 May 2022	2h	0h	1. Clean up code 2. Prototype friend system
Application development	27 May 2022	5h	1h	1. Prototype friend system 2. Code Review 3. Fix bug in iOS

Mission control 3	28 May 2022	7h	8h	1. Machine learning tutorial 2. Code review 3. Forum prototype 4. Basic chat functionality 5. Add README to github repo
Application development	29 May 2022	8h	15h	1. Forum Prototype 2. Basic chat functionality 3. Add README to github repo 4. Add more feature to profile customization system
Deployment	30 May 2022	10h	2h	1. Debug code 2. Add more styling to the app 3. Write milestone 1 report and user's guide 4. Deploy app to expo host
Milestone 1	9 - 30 May 2022	77h	52h	
Break	31 May 2022	0h	0h	rest
Break	1 June 2022	0h	0h	rest
Application development	2 June 2022	5h	0h	1. Add prototype chat list
Application development	3 June 2022	2h	0h	1. Add forgot password feature
Mission control 4	4 June 2022	6h	6h	1. Machine learning tutorial 2 2. Code review 3. Dividing Task 4. Modify friend system

				5. Fix iOS testing error
Application development	5 June 2022	5h	6h	1. Add Edit Feature 2. Research on like + dislike system, debouncing 3. Fix Post Delete Bug 4. Modify friend system
Application development & testing	6 June 2022	2h	0h	1. Configure jest and add simple testing 2. Add workflow
Application development	7 June 2022	6h	2h	1. Code review 2. Add group system
Application development	8 June 2022	6h	0h	1. Add group system 2. Research on recommendation system
Recommendation system development	9 June 2022	2h	2h	1. Convert data from myAnimeList from json to csv using node.js 2. Create prototype anime recommendation system
Recommendation system development	10 June 2022	2h	0h	1. Refine the recommendation system
Recommendation system development & testing	11 June 2022	5h	2h	1. Deploy recommendation system to heroku 2. Test recommendation system API
Application development & testing	12 June 2022	3h	6h	1. Unit testing 2. Add Like System 3. Add Forum and

				post search 4. Add Create Forum Skeleton
Application development documentation &	13 June 2022	4h	0h	1. Add recommendation page 2. Add documentation folder
Application development	14 June 2022	5h	2h	1. Code Review 2. Add recommendation page 3. Refine group system code
Application development	15 June 2022	2h	0h	1. Create services folder for managing Backend-related functionality 2. Fix group invitation label bug
Application testing	16 June 2022	3h	0h	1. Add testing for Anime-related component
Application development	17 June 2022	5h	0h	1. Add active group chat list
Application development	18 June 2022	1h	6h	1. Styled create forum screen 2. Add edit forum screen 3. Allow owner to delete users post 4. Add forum banner 5. Clean up Chat-related code
Application development	19 June 2022	1h	8h	1. Research on notification for Expo app 2. Created Edit Forum Screen 3. Implemented ban

				/ unban system
Application testing	20 June 2022	3h	0h	1. Add testing for Chat-related component
Application development	21 June 2022	5h	0h	1. Code review 2. Add notification on some friend and group component
Application development documentation &	22 June 2022	3h	3h	1. Write milestone 2 report & developer's guide 2. Code Review 3. Reorganized some code
Application development documentation &	23 June 2022	7h	2h	1. Code review 2. Update notifications 3. Write milestone 2 report & developer's guide 4. Add notification unit testing
Application development documentation &	24 June 2022	6h	0h	1. Code review 2. Add chat notifications 3. Write testing report
Application development documentation &	25 June 2022	6h	8h	1. Code review 2. Update project's poster 3. Continue working on the developer's guide 4. Fix chat bug 5. Sorum re-styling 6. Start on creating past forum post list
Application development documentation &	26 June 2022	5h	15h	1. Code review 2. Create app demo video 3. Fix forum bug 4. Add forum follow

				system 5. Add list of past forum post
Application testing & documentation	27 June 2022	6h	2h	1. Code review 2. Add unit test for signup, login, logout 3. Fix anime search bar bug 4. Publish the newest version of app to expo server 5. Finalize milestone 2 submission
Milestone 2	31 May - 27 June 2022	112h	60h	
Peer Review	28 June 2022	0h	2h	1. Peer Review
Application Development	29 June 2022	2h	0h	1. Start working on group admin system 2. Lock app screen orientation
Application Development	30 June 2022	6h	2h	1. Start working on forum admin system 2. Add group admin system
Application Testing	1 July 2022	2h	0h	1. Add unit test for group admin system
Application Development & Testing	2 July 2022	4h	10h	1. Code Review 2. Peer Review 3. Add Forum Admin System 4. Start working on block user system
Application Development	3 July 2022	4h	6h	1. Fix Add Forum Admin System 2. Add Loading Animation 3. Add static

				version of profile popup 4. Fix group admin system 5. Code review
Application Development	4 July 2022	2h	0h	1. Add more functionality to chat system
Application Development	5 July 2022	5h	3h	1. Code review 2. Add forum profile popup 3. Add more functionality to chat system
Application Development & Testing	6 July 2022	3h	0h	1. Fix chat system bug 2. Add more unit test for chat system
Application Development	7 July 2022	3h	2h	1. Code review 2. Start adding timestamp to post and comments 3. Fix chat system bug
Application Testing	8 July 2022	2h	0h	1. Add unit test for block system
Application Development & Testing	9 July 2022	3h	0h	1. Fix block system bug 2. Start adding unit test for chat system UI
Application Testing	10 July 2022	4h	6h	1. Add unit test for chat system UI 2. Code review
Application Development	11 July 2022	4h	3h	1. Optimize firebase usage 2. Start adding unit test for friend system UI
Application Development &	12 July 2022	4h	7h	1. Add unit test for friend system UI

Testing					2. Code review 3. Pushed forum image upload for review 4. Started on login restyling
Application Development & Testing	13 July 2022	3h	5h		1. Finished up on forum upload image feature 2. Finished Login styling 3. Add unit test for forum system
Application Development	14 July 2022	3h	0h		1. Fix add group member bug 2. Start working on delete account functionality
Application Deployment	15 July 2022	2h	0h		1. Initial android app build 2. Fix notification not shown in standalone android app
Application Development	16 July 2022	5h	8h		1. Code review 2. Adjust Forum styling 3. Add delete account functionality 4. Start restyling friend section page
Application Development	17 July 2022	3h	2h		1. Adjust friend section styling 2. Adjust chat section styling 3. Add loading animation for friend & chat sections 4. Finished up forum styling 5. Bug fixes
Documentation	18 July 2022	3h	3h		1. Write Milestone 3 Report and

				Developer's Guide 2. Bug Fixes 3. Started on Anime styling 4. Restyle Friend screen
Application Testing	19 July 2022	4h	0h	1. Start writing unit tests for Forum UI
Application Development & Testing	20 July 2022	3h	2h	1. Add Forum front-end unit tests 2. Continue with Anime Styling 3. Code review
Application Development	21 July 2022	1h	2h	1. Code review 2. Finalize Anime styling 3. Insert Loading Animation on Auth related Screens
Application Testing & Documentation	22 July 2022	3h	4h	1. Code review 2. Continue writing developer's guide 3. Start conducting User Acceptance Testing
Application Testing & Documentation	23 July 2022	2h	5h	1. Update demo video 2. Update poster 3. Continue on User Acceptance Testing 4. Anime Testing
Application Testing & Documentation	24 July 2022	5h	12h	1. Code review 2. Add profile UI test 3. Update developer's guide & milestone 3 report 4. Continue on User Acceptance Testing 5. Bug Fixes 6. Minor Enhancements
Application Testing	25 July	6h	2h	1. Finalize

& Documentation	2022			milestone 3 report 2. Minor enhancements
Milestone 3	28 June - 25 July 2022	91h	86h	
Total	9 May - 25 July 2022	280h	198h	