

UML Specification and UI Design Document

C³U



Group A1

Version 1.0.0

Chen Hing Chin 1155174447

Du Fangzhou 1155173892

Gao Jiaqi 1155157043

Li Peiran 1155174020

Zhou Jieya 1155173741

Printing Date: 30/03/2024

CSCI3100

Department of Computer Science and Engineering

The Chinese University of Hong Kong

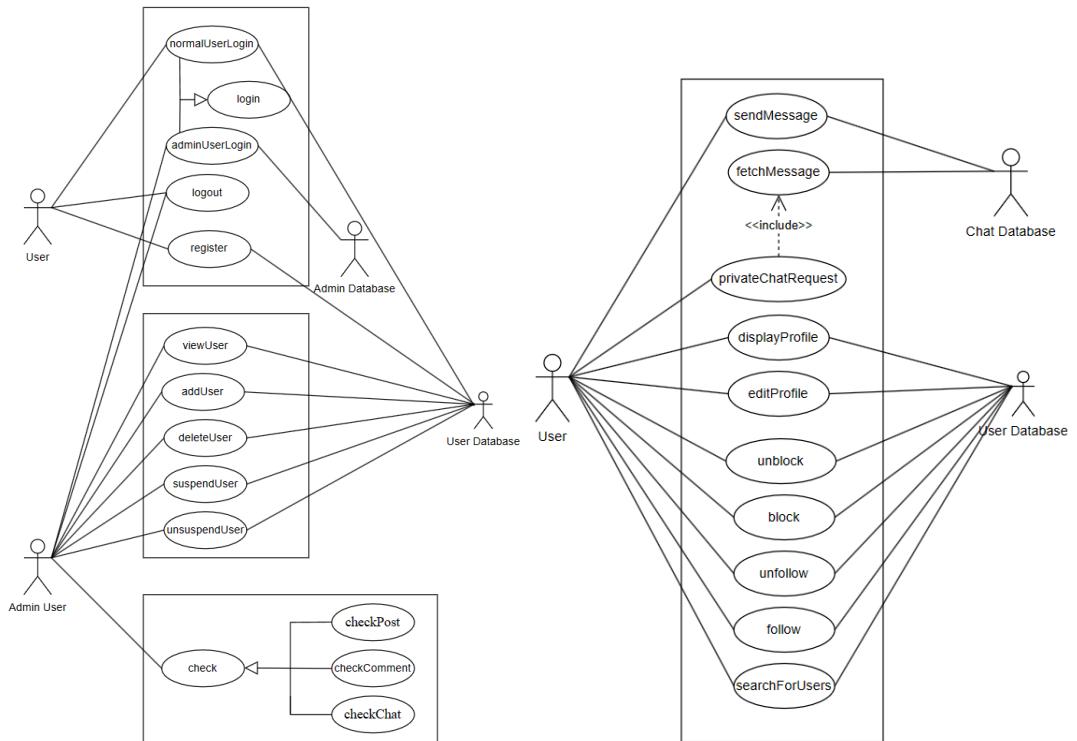
Table of Contents

1. UML Design.....	3
1.1 Component: Account, Admin User Management and User Interactions.....	3
1.1.1 Use case Diagram.....	3
1.1.2 Class Diagram.....	3
1.1.3 Sequence Diagram.....	4
1.1.4 Functionality.....	6
1.1.5 Procedures and Functions.....	7
1.2 Component: Post and Comment.....	9
1.2.1 Use-case Diagram.....	9
1.2.2 Class Diagram.....	9
1.2.3 Sequence Diagram.....	9
1.2.4 Functionality.....	11
1.2.5 Procedures and Functions.....	11
1.3 Component: Notification.....	13
1.3.1 Use-case Diagram.....	13
1.3.2 Class Diagram.....	13
1.3.3 Sequence Diagram.....	14
1.3.4 Functionality.....	14
1.3.5 Procedures and Functions.....	14
2. UI design.....	15
2.1 View: Login/Register.....	15
2.1.1 Description of the view.....	15
2.1.2 Screen Images.....	16
2.2 View: Homepage (after login).....	16
2.2.1 Description of the view.....	16
2.2.2 Screen Images.....	17
2.3 View: Following/Follower List & Blacklist.....	17
2.3.1 Description of the view.....	17
2.3.2 Screen Images.....	18
2.4 View: Chat Room.....	18
2.4.1 Description of the view.....	18
2.4.2 Screen Images.....	19
2.5 View: Post with Comments.....	19
2.5.1 Description of the view.....	19
2.5.2 Screen Images.....	19
2.6 View: Search with recommendations.....	20
2.6.1 Description of the view.....	20
2.6.2 Screen Images.....	20
2.7 View: Profile Page.....	20
2.7.1 Description of the view.....	20
2.7.2 Screen Images.....	21
2.8 View: Admin Page.....	21
2.8.1 Description of the view.....	21
2.8.2 Screen Images.....	21

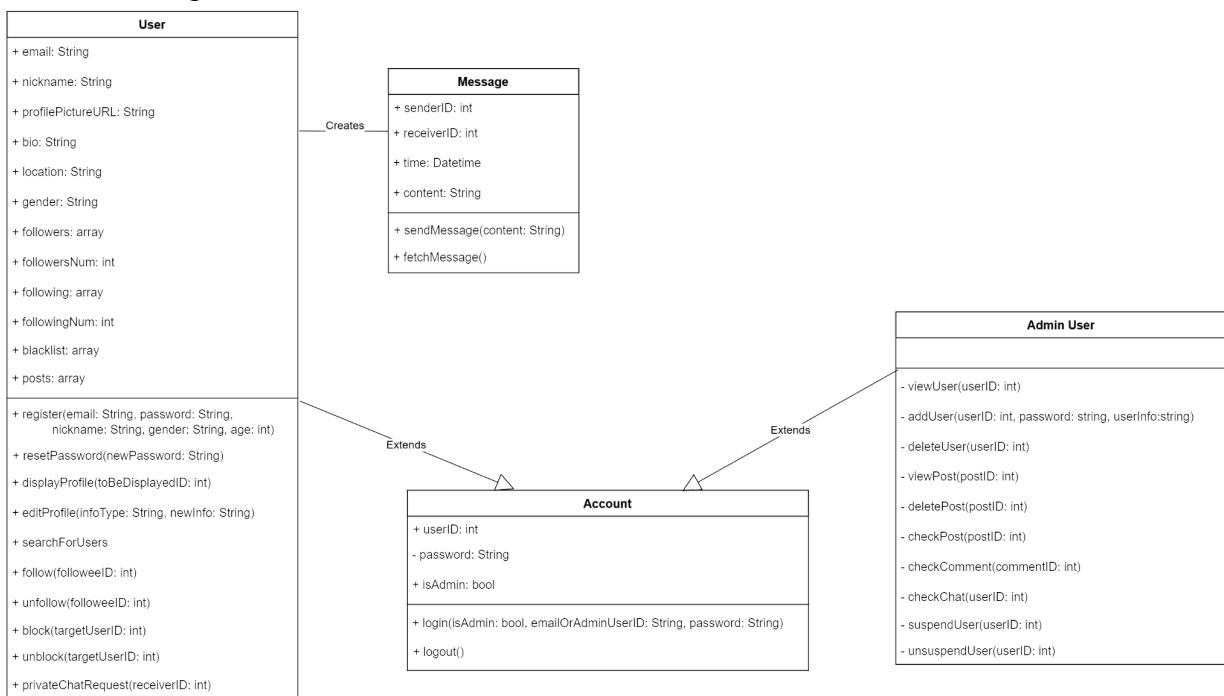
1. UML Design

1.1 Component: Account, Admin User Management and User Interactions

1.1.1 Use case Diagram

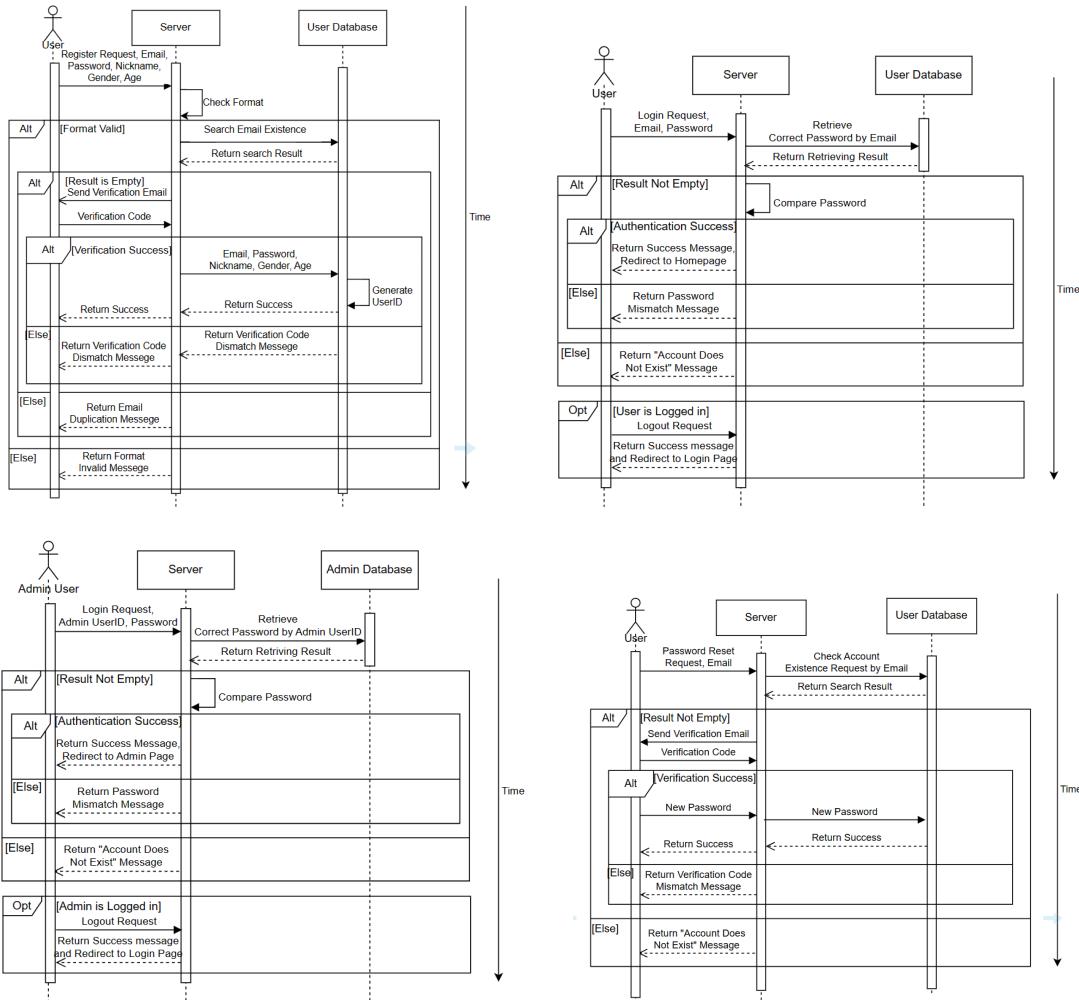


1.1.2 Class Diagram

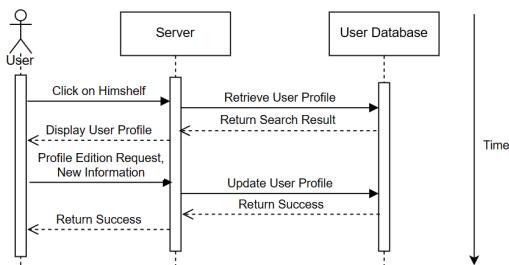


1.1.3 Sequence Diagram

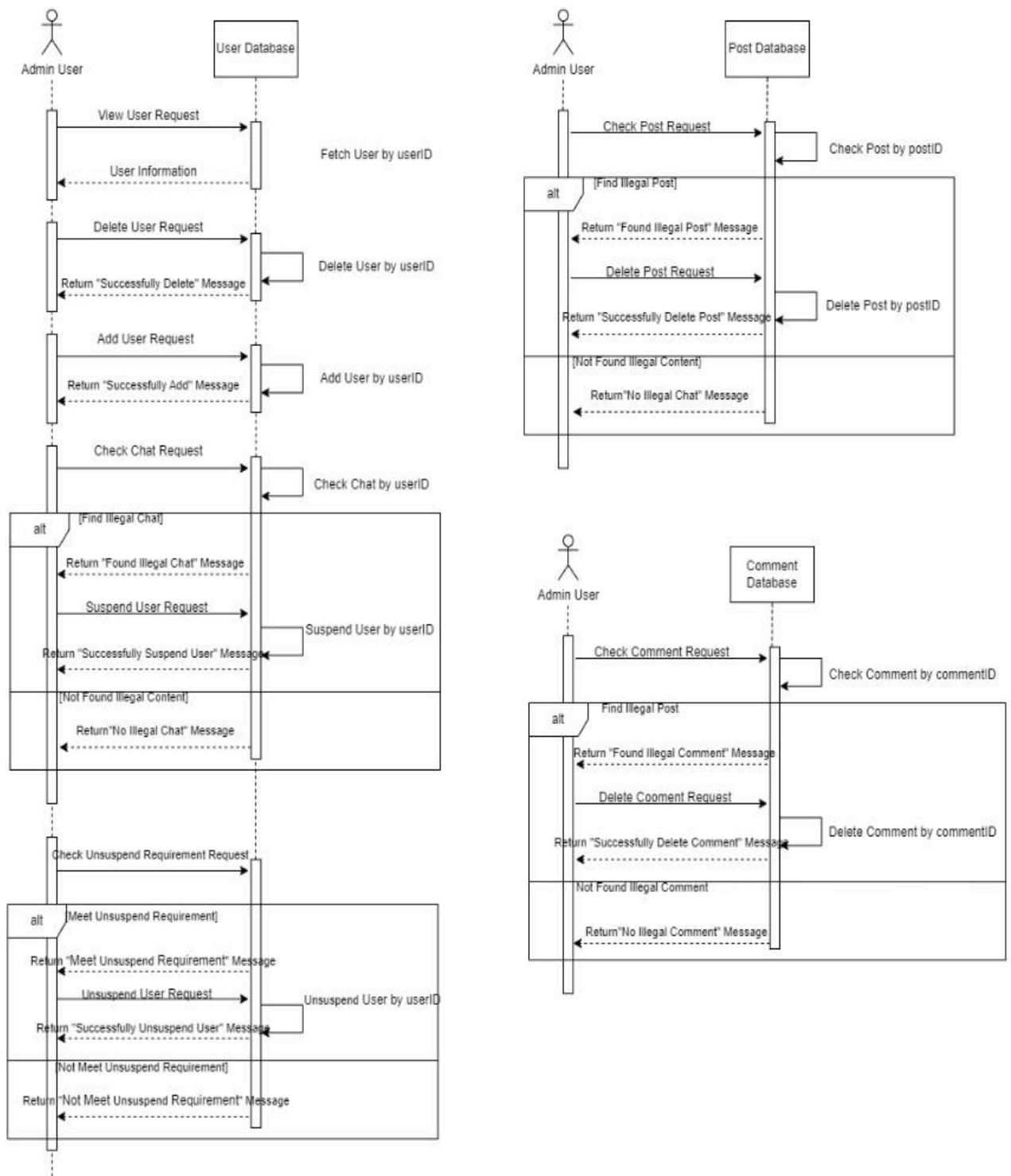
a) Register, Login, and Reset Password



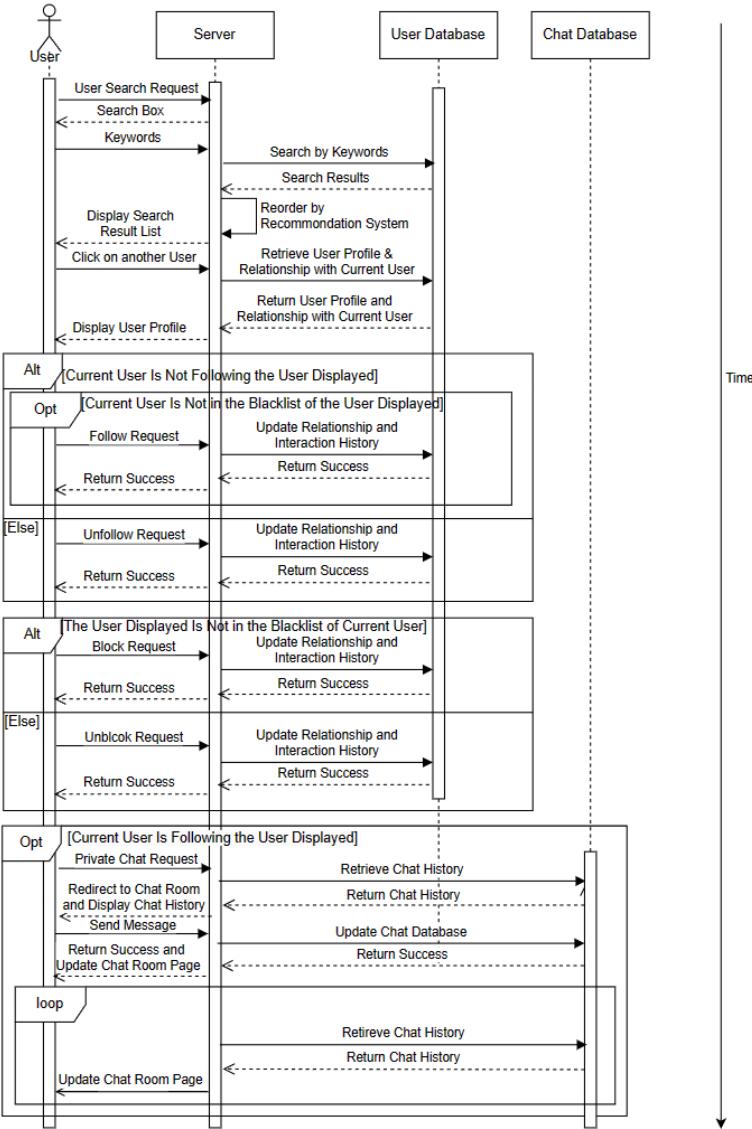
b) Edit Profile



c) Admin User Management



d) User Interactions



1.1.4 Functionality

This component involves account management functions and user interaction functions. The class Account has three attributes, userID, password, and isAdmin. It also has two functions, login and logout. User is a class inherited from Account, with some extra attributes such as email and some extra functions such as register, edit profile, search for users, follow, and block. Moreover, there is a function in the User class named privateChatRequest, which will start a private chat with another user. During the private chat, users can send messages to others and receive messages in real-time. The information of each message and the sending and fetching functions of messages are handled by the Message class.

The Admin User is a special user in C³U and the admin user component is implemented as a separate module. It is implemented by inheriting the attributes of the Account component, which include userID, password, and "isAdmin" to distinguish user types. Additionally, it inherits the login function from its parent. Admin Users possess the authority to manage both users and posts. Specifically, the admin user can fetch all users through the viewUser() function and can delete users through the

`deleteUser()` function. When the user meets problems when registering, the Admin user can help users register by the `addUser()` function. In addition, the admin user can view specified posts via the `viewPost()` function and delete posts via the `deletePost()` function. The admin user will first check the content of chat, posts and comments, then delete and suspend illegal content and suspend the user with foul actions. The user account will be unsuspended when the unsuspended condition is met.

1.1.5 Procedures and Functions

Account Class

Function	Description
login	The user can choose whether to log in as a normal user or as an admin user. For normal user login, the user is supposed to provide the email and password; for admin user login, the admin is supposed to provide the Admin UserID and the password. On success, the user or admin will be redirected to the homepage or admin page. Otherwise, an invalid message will be sent.
logout	Once the user clicks the logout button, the function will redirect to the login page and return a message to the user.

Admin User Class

Function	Description
viewUser	Admin User can fetch all users' information in the User Database by inputting specific userID, or directly displaying all users' information.
addUser	This function allows the Admin User to create new users to help those who have trouble registering. It will store the corresponding userID, password and other information in the User Database.
deleteUser	This function allows Admin User to delete users by specific userID, and the corresponding user information will be deleted from the User Database.
viewPost	Admin User can fetch the content of posts in the Post database by the postID.
deletePost	This function allows Admin User to delete posts by specific userID, and the corresponding posts information will be deleted from the Post Database.
checkPost	This function checks for any illegal content within a post by calling the "postCheck" function provided by the Post component. If any posts are found illegal, they will be deleted from the Post database.
checkComment	This function checks for any illegal content within a post by calling the "commentCheck" function provided by the Comment component. If any comments are found illegal, they will be deleted from the Comment database.
checkChat	This function checks for any illegal content within a chat by calling the "chatCheck" function provided by the Chat component. If any comments are found illegal, they will be deleted from the Comment database.

suspendUser	Admin User can pass a userID to this function to suspend a specific user. The admin user will first call the check function to check chat, post and comment, and if illegal content is found, this function (suspendUser) will be called to suspend user accounts.
unsuspendUser	The admin user can pass a userID to this function to unsuspend a specific user. If the suspended account meets the decapsulation requirements, the admin user will unsuspend the account.

User Class

Function	Description
register	New users can use the register function to create an account by providing an email, password, and some basic information. The function will check the input format and verify the email. After verification, a new account will be created.
resetPassword	This function allows users to reset the password. If a user requests to reset the password, the function will send a verification code to the user's email address. The user can set a new password after inputting the verification code.
displayProfile	This function will display the information and the recent posts of the corresponding user when clicking on an avatar. The display can be changed according to the relationship between the currently logged-in user and the user being displayed. For example, if the current is in the blacklist of the user being displayed, all the information will be hidden.
editProfile	This function allows users to edit their profiles.
searchForUsers	This function allows users to search for other users by keywords, including UserID, email address, and nickname. The search results will be reordered based on the user's browsing history.
follow	When viewing another user's profile, if the user is not following the user displayed, he can click the "Follow" button to follow the target user.
unfollow	When viewing another user's profile, if the user is following the user displayed, he can click the "Unfollow" button to unfollow the target user.
block	When viewing another user's profile, if the user displayed is not on the blacklist of the current user, the current user can click the "Block" button to add the target user to the blacklist.
unblock	When viewing another user's profile, if the user displayed is in the blacklist of the current user, the current user can click the "Unblock" button to remove the target user from the blacklist.
privateChatRequest	When viewing another user's profile, if the current user is following the user displayed, he can request to have a private chat with the target user. On receiving the request, the function will redirect the

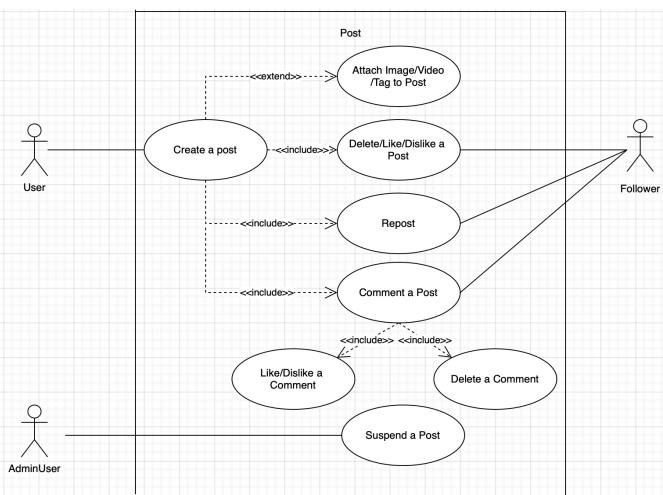
	user to the chat room page and display the chat history. It will also constantly request chat history updates.
--	--

Message Class

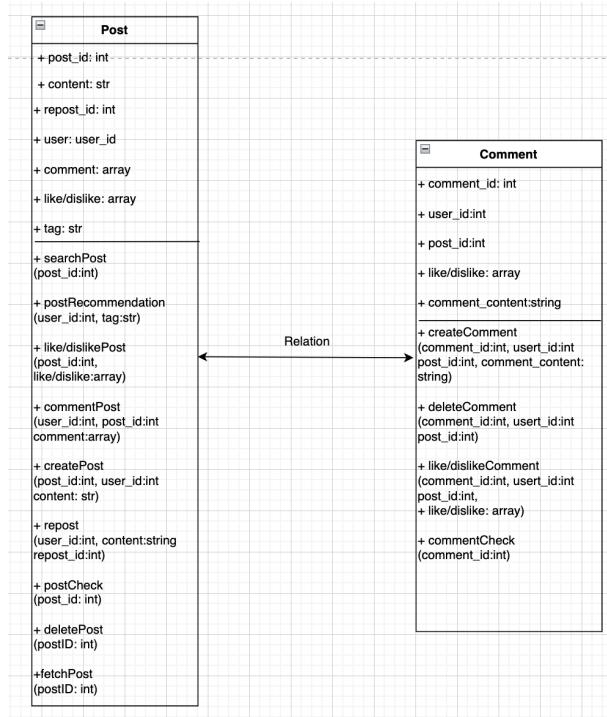
Function	Description
sendMessage	In a private chat room, a user can send messages to another user.
fetchMessage	This function is constantly called when the private chat room is open in order to update the chat history in real-time.

1.2 Component: Post and Comment

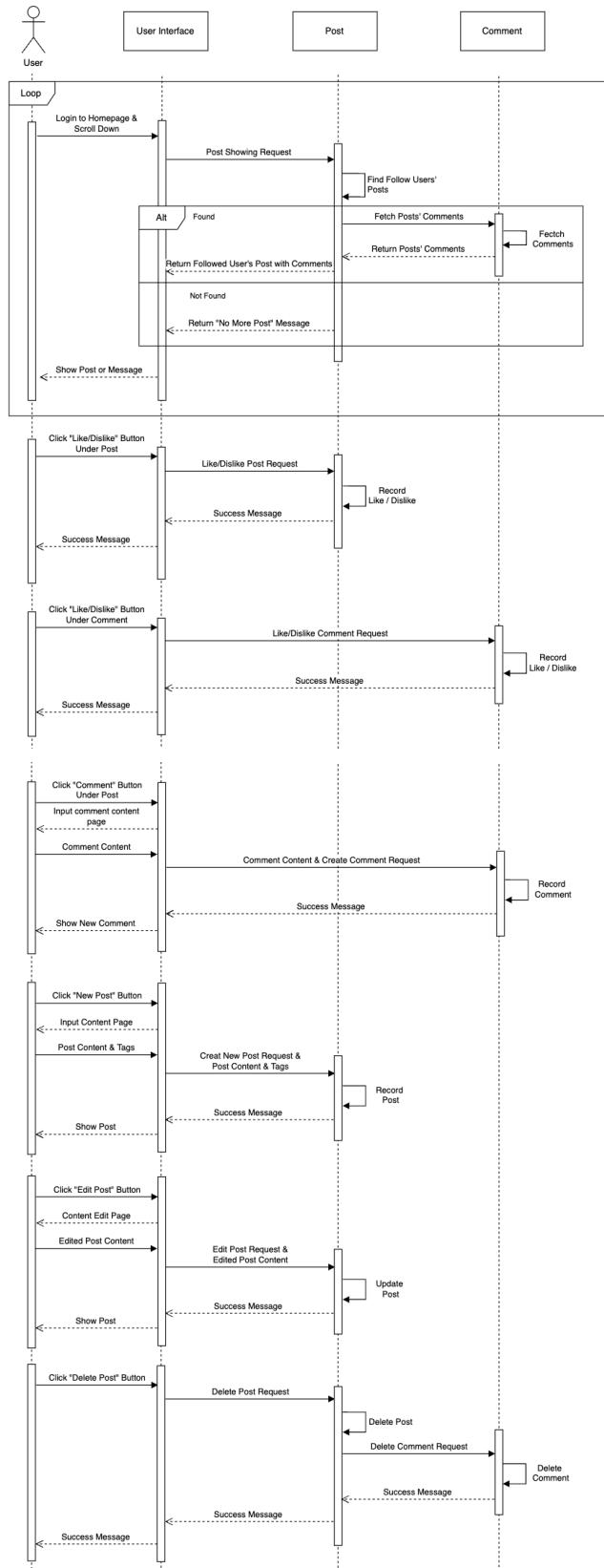
1.2.1 Use-case Diagram

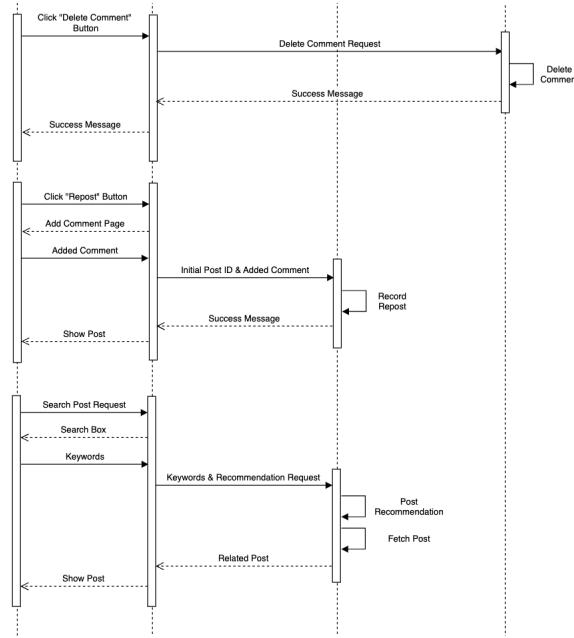


1.2.2 Class Diagram



1.2.3 Sequence Diagram





1.2.4 Functionality

This component represents the post-related aspect of our software and can be further divided into two parts: Post and Comment.

The Post component includes attributes such as post_id, related content, user_id, Like/Dislike information, and check status. It also provides an interface for common post-related actions from the current user and retrieves check information from the admin user.

On the other hand, the Comment component consists of attributes such as comment_id, related content, user_id, Like/Dislike information, and check status. It offers an interface for common comment-related actions from the current user and provides check information to support the admin authority.

When the FetchPost function is called, the Post object retrieves the associated comments using the interface provided by the Comment Component.

1.2.5 Procedures and Functions

Post Class

Function	Description
fetchPost	Once a user has logged in, the user's home page will display posts from the user and their friends. Users can view more posts by scrolling down the page. At this time the posts and corresponding information such as comments and likes are fetched.
like/dislikePost	When users view a post, they can interact with it by clicking the like or dislike buttons under the post. This behavior will be recorded in the post database and will affect the recommendation function.
like/dislikeComment	When users view a comment under a post, they can interact with it by clicking the like or dislike buttons

	under the comment.
commentPost	Users can click on the "Comment" button to post their views at the bottom of the post while browsing the post. This function will use the “createComment” interface provided by the Comment Component. Each comment contains the author ID, post content, and which post it belongs to.
createPost	Users can create posts by entering any content and attaching tags. The post will then be associated with the user. The tags attached to the post will be called by the recommendation function later.
editPost	This function allows users to make changes to published posts. The modification history and content of the post will then be updated.
repost	If a user appreciates a post from another user, he can use the repost function to make the post appear on his home page. The user can add a comment to the original post when reposting, but the comment will appear along with the content of the post, not as a comment in the comments section.
postCheck	Admin could check all users' posts via its method “checkPost” which would call the “postCheck” interface provided by the Post component. Admins can use this function to view all posts and delete them if necessary.
postRecommendation	The “postRecommendation” function is mainly related to the searchPost function. This function prioritizes posts that are of interest to users based on their browsing history.
searchPost	This function allows users to input topics or keywords they are interested in. This function will then fetch the most relevant results from the database based on the keywords and user preferences.

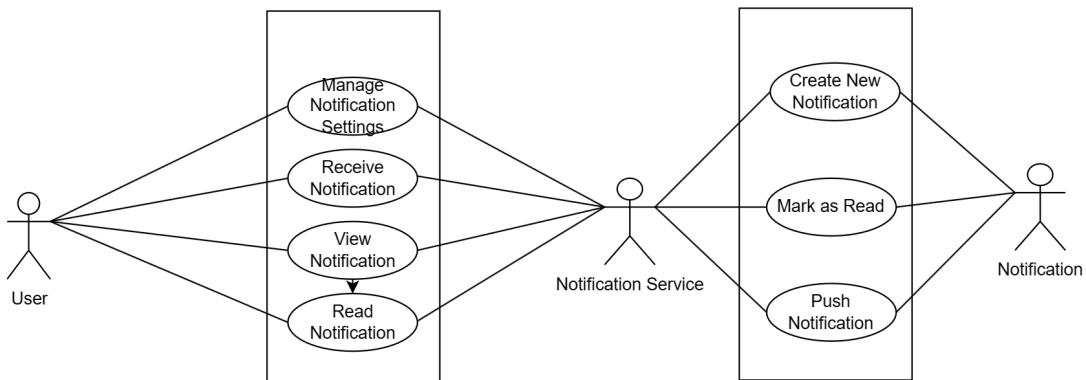
Comment Component

Function	Description
createComment	The “commentPost” method of the Post component will call the “createComment” method of the Comment component when the user comments on related posts. After this action, a comment will be

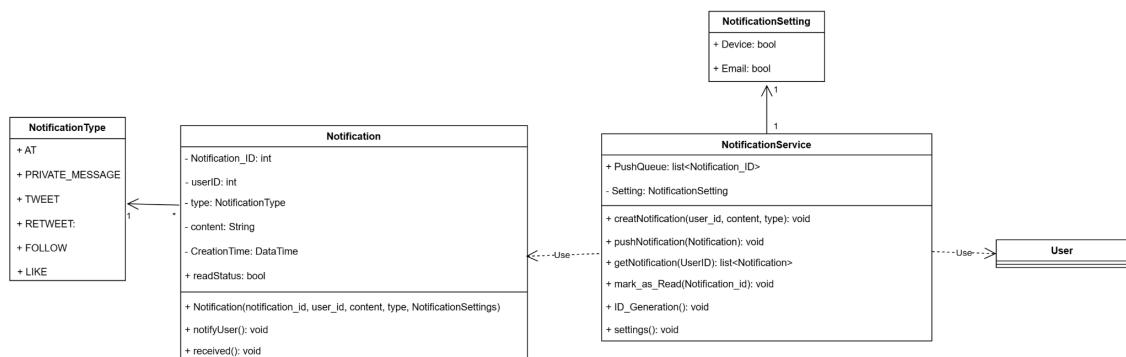
	successfully created with a related commentID.
deleteComment	The “deleteComment” method will be called when the user requests the Comment component to delete a comment on a related post and will delete related comments.
like/dislikeComment	The “like/dislikeComment” method will be called when the user requests to Post a component like/dislike a comment on a related post, and will then update the number of likes according to the user's action.
fetchComment	Once a post is fetched, the system will retrieve its related comments. Subsequently, both the post and the comments will be displayed to the user.
commentCheck	The admin user can check the comments using the “checkComment” method, which calls the checkComment function in the Comment component. This action updates the check status of the comment. Once the admin user has performed this action, the related comment will become inactive and will no longer be fetched.

1.3 Component: Notification

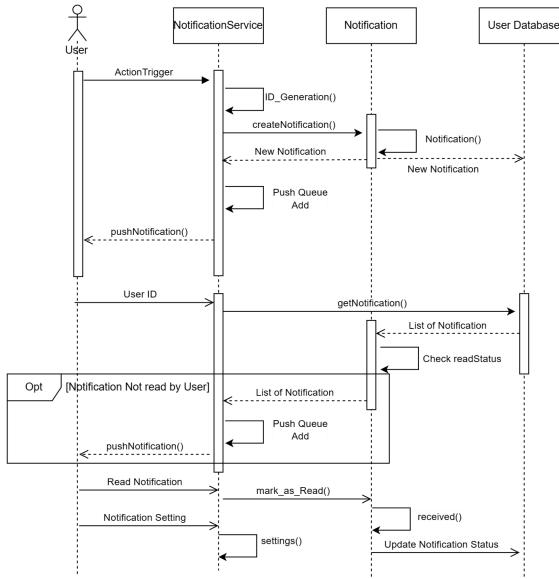
1.3.1 Use-case Diagram



1.3.2 Class Diagram



1.3.3 Sequence Diagram



1.3.4 Functionality

This component provides functions of the notification system to manage and deliver notifications to users. This system is built around several key classes.

At the core of the notification system is the Notification Class, which has all the necessary details of a notification, it has a unique identifier (Notification_ID), the user it is associated with (userID), the type of notification (NotificationType), the content of the message (content), the time of creation (CreationTime), and the read status (readStatus). The NotificationType is an enumerated class that defines kinds of notifications including AT, PRIVATE_MESSAGE, TWEET, RETWEET, FOLLOW, and LIKE.

To manage the delivery of notifications, the Notification Service Class is built. It has 2 attributes, a push queue(PushQueue), and Settings(NotificationSetting), where NotificationSettings is an enumerated class with 2 boolean attributes Device and Email, representing the deserved ways to receive notifications. The Notification Service Class is responsible for creating notifications (createNotification()), pushing notifications to the user's device or email (PushNotification()), retrieving notifications for a user (GetNotification()), marking notifications as read (Mark_as_Read()), generating unique identifiers for new notifications (ID_Generation()), and adjusting user notification settings (Settings()).

1.3.5 Procedures and Functions

Notification Class

Function	Description
Notification	It is a constructor of the Notification class, which initializes a new notification with the provided user ID, content, and type, and then stores it in the system.
notifyUser	It pushes the notification according to its attributes which are receiver ID, content, and notification type.
received	It changes the notification attribute readStatus to true, representing this notification has been read.

NotificationService Class

Function	Description
createNotification	When user action is triggered, a new notification is created with the information needed, including userID, content, and notification type. It will also record the data time and call the IDGeneration() function.
pushNotification	When a push request is received, It pushes all notifications to the push queue.
getNotification	It retrieves notification of a user from the User Database.
markAsRead	When a user reads a notification, the function is called and marks the corresponding notification as read.
IDGeneration	It generates a unique ID for a new notification.
settings	Users can change their preferred way of receiving notifications through this function.

2. UI design

2.1 View: Login/Register

2.1.1 Description of the view

After a user visits our C³U website, a well-designed welcome page will be shown on the screen. It includes the logo of this application, login banner string, “register” button, and “login” button (Figure 1). Users can choose any one of them according to his/her decision.

If a user is the first time using our application, he/she can press “register” to create a new account. The register page requires the user to input their nickname, password, email address, and age, as well as choose their gender. Then, the user needs to verify the email by requesting a verification code to be sent to his/her email address and input the code he/she received. After rechecking the password and email verification, the user's new account will be created successfully (Figure 2).

If a user already has an account, he/she can press the “login” button to get into a new page (Figure 3). This page will automatically record the profile picture and nickname of the currently logged-in user and display relevant information on the screen. Users need to input their password accordingly. C3U also provides users with two specials, the first one is “find password.” If a user forgets their password after several times attempting to log in, they can click this button to find their password by inputting the verification code sent to their email. The second one is designed for admin users to log in to their accounts which is similar to the normal user login process.

2.1.2 Screen Images

Share Your Voice Online

[Register](#) [Login→](#)



C3U
Home Explore Notifications Messages Profile Settings

Figure 1 Welcome Page

Nickname:

Password:

RecheckPassword:

Age:

Gender: male

Email: get verification code

Verification code:

Register

C3U
Home Explore Notifications Messages Profile Settings

CSCI3100 2024Spring Group A1

Figure 2 Register Page

Share Your Voice Online



GroupA1Student
 Password

[Forgot your password](#) [Find it](#)

[Do not have account](#) [Register](#)

Login

You are an admin user?

[Login here](#)

C3U

Home Explore Notifications Messages Profile Settings

Figure 3 Login Page

2.2 View: Homepage (after login)

2.2.1 Description of the view

After users have successfully logged in, C³U automatically redirects them to the homepage (Figure 4). The left sidebar of the homepage displays the main functions of C³U, including home, search, messages, and more. By clicking on the labels in the left sidebar, users can quickly navigate to the corresponding function pages. In addition, there is a “Post” button at the bottom of the left sidebar. Whenever users want to publish a post, they can simply click the “Post” button and our website will quickly jump to a post edit page (Figure 5) for users to write anything they want to share. If the cursor is hovering over the account information at the bottom, a menu will be shown for logout and password reset (Figure 6).

In the center section of the homepage, posts from people the user follows are displayed in reverse chronological order. Users can browse more posts by scrolling down the page. In addition to browsing posts, users can click on the input box at the top to enter text or add an image, and then click the Post button. A post can then be quickly published.

On the right sidebar, our website showcases trending topics as the hottest discussions on our platform. Users can click on the headings below the Trend section to explore relevant information and engage in those discussions.

There is also a Search button at the right top of the homepage. Users can click this button and type any topic or user they are interested in to get some information.

2.2.2 Screen Images

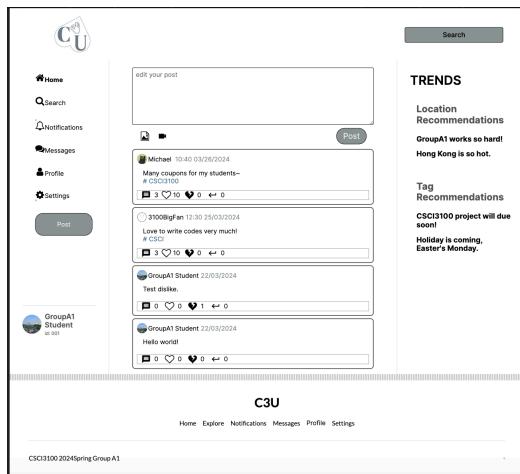


Figure 4 Homepage

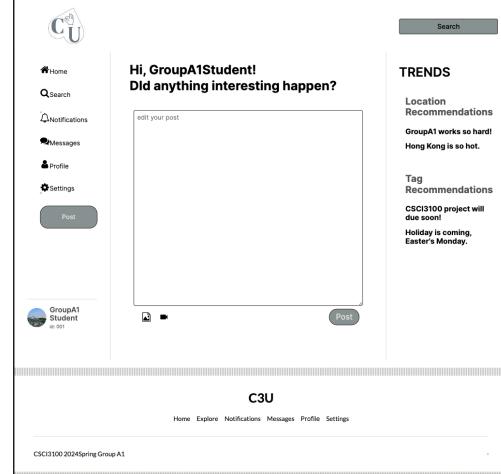


Figure 5 Create a Post



Figure 6 Menu for Logout and Reset Password

2.3 View: Following/Follower List & Blacklist

2.3.1 Description of the view

Users can view their followers, their following users and Blacklist on this page, which can be reached through the user profile page. By clicking the number of followers or number of followings on the user profile, users will enter a corresponding Following List (Figure 7) or Follower List (Figure 8). These 2 lists include a list of user blocks that show brief information about users' followers and followings, including their user ID, user name, profile photo and self-introduction. The button on the right-hand side of the user block represents the relation, the blue button[Following] means the main User is following that distinct user. The gray button[Follow] means the main user hasn't followed that user yet.

By clicking the navigation bar [Blacklist, Followers, Following], users can move to the corresponding page easily. The gray color at the navigation bar represents the current location. Users can arrive at Blacklist (Figure 9) through the navigation bar here, or the user setting page. The Blacklist has a similar structure as another, it has a list of user blocks storing blocked user information and blocked data. The black button represents that the user has been blocked. Clicking the relation button, users can take serious actions to manage their relations, such as [follow, unfollow, block, unblock].

2.3.2 Screen Images

The figure consists of two side-by-side screenshots of the C3U application interface.

Left Screenshot (Following List):

- Header:** GroupA1 Student ID: 001
- Sections:**
 - TRENDS:** Location Recommendations: GroupA1 works so hard! Hong Kong is so hot. Tag Recommendations: CSCI3100 project will due soon! Holiday is coming, Easter's Monday.
 - Following:**
 - Love3100 (004) CGPA 3.879 (Following)
 - Michael (003) I like the sunshine sooo much! (Following)
 - TeacherHa (005) I love teaching (Following)
 - 3100BigFan (006) I love study (Following)
- Bottom:** C3U Home Explore Notifications Messages Profile Settings

Right Screenshot (Followers List):

- Header:** GroupA1 Student ID: 001
- Sections:**
 - TRENDS:** Location Recommendations: GroupA1 works so hard! Hong Kong is so hot. Tag Recommendations: CSCI3100 project will due soon! Holiday is coming, Easter's Monday.
 - Followers:**
 - Love3100 (004) CGPA 3.979 (Following)
 - Michael (003) I like the sunshine sooo much! (Follow)
 - TeacherHa (005) I love teaching (Follow)
 - 3100BigFan (006) I love study (Following)
- Bottom:** C3U Home Explore Notifications Messages Profile Settings

Footers: CSC3100 2024Spring Group A1

Figure 7 Following List

Figure 8 Followers List

The screenshot shows the C3U application interface with the Blacklist section highlighted.

- Header:** GroupA1 Student ID: 001
- Sections:**
 - TRENDS:** Location Recommendations: GroupA1 works so hard! Hong Kong is so hot. Tag Recommendations: CSCI3100 project will due soon! Holiday is coming, Easter's Monday.
 - Blacklist:**
 - Bluee (007) Block Date: 1/1/2024 (Blocked)
 - I Hate Study (008) Block Date: 22/3/2024 (Blocked)
 - Love3100 (004) Block Date: 26/3/2024 (Blocked)
 - Michael (003) Block Date: 28/3/2024 (Blocked)
- Bottom:** C3U Home Explore Notifications Messages Profile Settings

Footer: CSC3100 2024Spring Group A1

Figure 9 Blacklist

2.4 View: Chat Room

2.4.1 Description of the view

No matter what page the users are on, they can enter the private chat room by clicking the Message button on the left sidebar (Figure 10). There are 2 parts to the Message page, a chat room in the middle and a chat list on the right.

The top of the chat room displays a bold user name and profile photo indicating the current conversation's recipient. The button with a “!” icon in the upper right corner, suggests settings for the chat. The conversation area consists of a series of message bubbles including the messages sending time. The message bubbles at the right is sent by the main user. Messages consist of various content types, such as text and images. At the bottom of the chat room, there is a text input field where new messages can be typed. A smiley face at the right could add emojis to the conversation, and the “+” icon allows users to attach files or images to the message.

In the chat list, a search bar with the text “Search Messages or User” has functionality for filtering or finding specific conversations or contacts. A “+” button adjacent to the search bar could start a new chat or add new contacts. There is a list of previews of conversations under the search bar. Each

preview contains a profile photo, nickname and userID. The gray color indicates the current conversation target.

2.4.2 Screen Images



Figure 10 Chat Room

2.5 View: Post with Comments

2.5.1 Description of the view

Users can click on any posts to access their details, which include the full text of the post (with the possibility of some content being truncated on the home page), accompanying images, and comments on the post, as shown in Figure 11.

Within this page, users can interact with posts by liking or disliking them, writing comments, and reposting. Taking comment as an example, after the user clicks on the comment icon at the bottom left of the post, an input box will pop up below this post (Figure 12). Users can comment on the post by typing a comment in the input box and clicking the Reply button. Besides, users can also engage with comments posted by other users that they find interesting by liking or commenting on them.

2.5.2 Screen Images

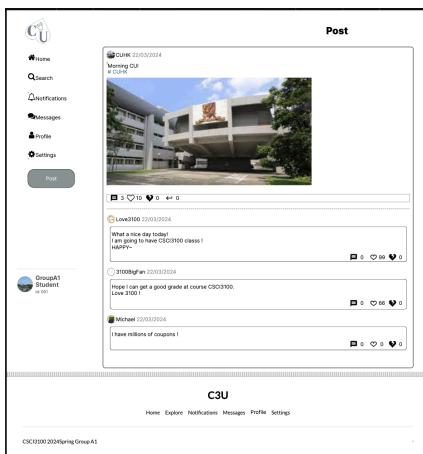


Figure 11 Show Post

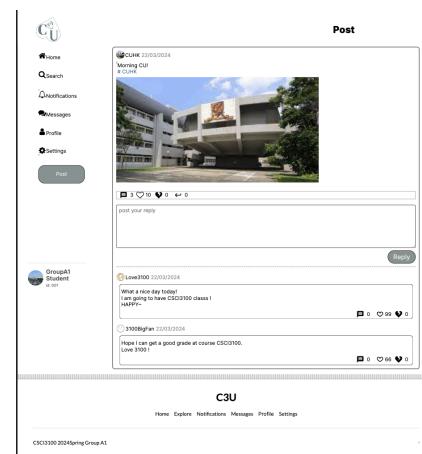


Figure 12 Write Comment

2.6 View: Search with recommendations

2.6.1 Description of the view

Users can access the search page through the navigation bar on the left side of the user interface or the "Search" button in the upper right corner.

On the search page, the user can see the personalized recommendations. On the left side, "Location Recommendations" are based on the location obtained by the user after authorization. On the right-hand side, "Tag recommendations" uses the tag that the user frequently uses. When searching, the user needs to input the text in the search bar and select the search kind including "User" and "Post".

After choosing to search for a user, the corresponding target user information, including the profile picture, nickname, and signature, will be displayed in the middle of the page. Users can click the target user for further interaction.

After choosing to search for posts, the corresponding post will be displayed, including the content, poster, post time and popularity (number of likes, comments and repost). In particular, users can click the specific button to choose the ordering criteria of the search results, including "most related, hottest and latest".

2.6.2 Screen Images

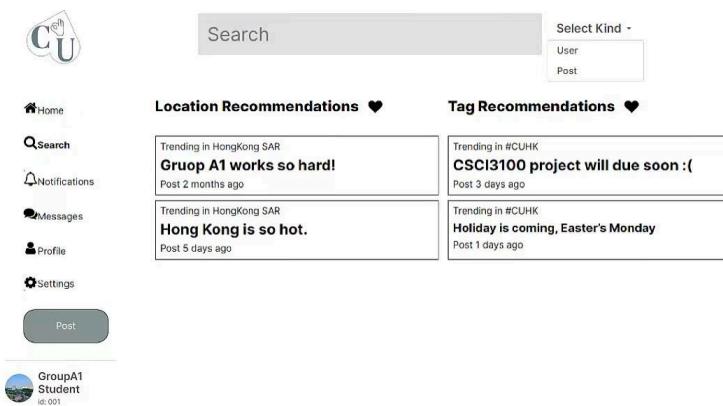


Figure 13 Search Page

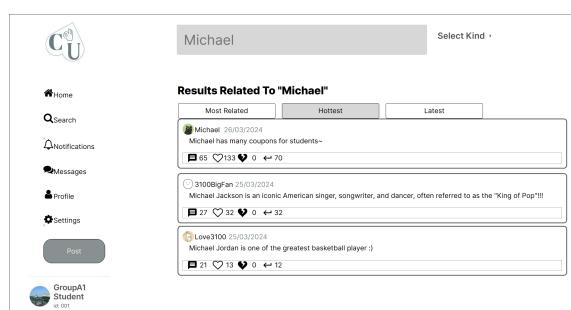


Figure 14 Result of Post-Research

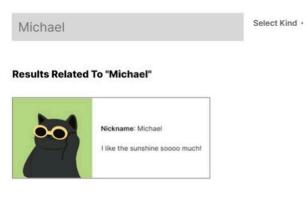


Figure 15 Result of User-Research

2.7 View: Profile Page

2.7.1 Description of the view

The profile page shows the basic information of a user, including the profile picture, nickname, id, email, gender, age, location, recent posts, number of followers and the number of users he or she is following. Clicking “followers” or “following” will redirect the user to the Following/Follower List page. If the profile is of the user himself or herself (Figure 16), there will be an “Edit Profile” button, and clicking this button will open the profile editing page (Figure 17), where the user can edit his or her information. If the profile is of other users (Figure 18), there will be a button to follow or unfollow the user being displayed, and a button blocking or unblocking the user being displayed. If the user himself or herself is following the user being displayed, there will also be a button to start a private chat.

2.7.2 Screen Images

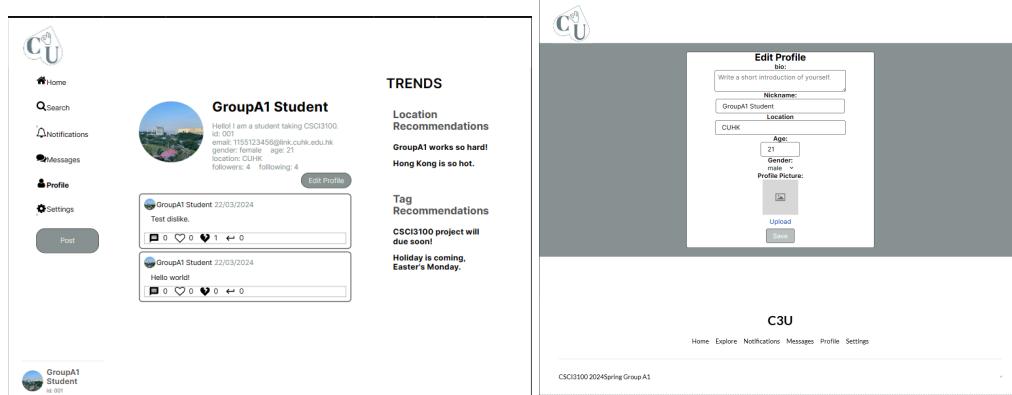


Figure 16 Own Profile Page

Figure 17 Profile Editing Page

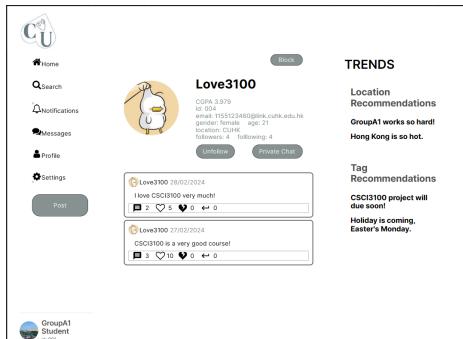


Figure 18 Other's Profile Page

2.8 View: Admin Page

2.8.1 Description of the view

Admin users can moderate posts and other users on the manage user/post page. When managing users (Figure 19), the admin user can view all user information including user profile, user register date and user-related history by clicking the “view” button. Besides, admin users could create new user accounts by clicking the button “Add User” in the upper right corner, after which the screen will be redirected to the Add User page (Figure 20). Moreover, Admin users can delete and suspend specific users.

In addition, admin users can access the detailed content of a specific post by clicking on the "view" button. They also have the authority to delete posts (Figure 21).

2.8.2 Screen Images

Manage Users

Search User

Add User +

User ID	Name	Register Date	Action	Action	Action
GroupA1 Student 001	GroupA1 Student	1/1/2024	View	Suspend	Delete
User 002	User	1/1/2024	View	Suspend	Delete
Michael 003	Michael	1/1/2024	View	Suspend	Delete
Love3100 004	Love3100	1/1/2024	View	Suspend	Delete
TeacherHa 005	TeacherHa	1/1/2024	View	Suspend	Delete
3100BigFan 006	3100BigFan	1/1/2024	View	Suspend	Delete

Admin Add User

Nickname:

Password:

RecheckPassword:

Age:

Gender: Option 1 Option 2

Email:

Add +

Figure 19 Manage Users Page

Figure 20 Create New User Page

Manage Posts

Search Post

Post ID	Post Date	Action	Action
Post ID: 001	28/02/2024	View	Delete
Post ID: 002	28/02/2024	View	Delete
Post ID: 003	28/02/2024	View	Delete
Post ID: 004	02/03/2024	View	Delete
Post ID: 005	Datehere	View	Delete

Figure 21 Manage Posts Page