INITIAL DESIGN REPORT

CUPar

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Content

1. Introduction

1.1 Project Overview

CUHK Partner System (CUPar) is an online system aimed to help CUHK students to find their desirable roommates or teammates. It collects requirements and reports the recommended matching to users, helping them to get more choices based on the large database of information of all users. Besides, the system also provides a post system where users can post and find partners to go travelling, attend workshops together, or whatever activities that they are looking for fellows. CUPar is a powerful and beneficial system that helps CUHK students to have more options and get a better result when they are finding partners.

1.2 Objective

The project is designed as an integrated platform which consists of three main systems for finding partners. Roommate matching system allows students to find satisfied roommates. All of them have similar routing, timetable or habit. In that way, they may share a pleasant and memorable dormitory life together. Teammate matching system aims to behave as an advisor for students who are looking for teammates in the same project, providing reliable project teammates and an appropriate combination of teams. With the help of the ranking system, the matching prevents students from free-riders and makes sure that students take their responsibility so that everyone may have fair, satisfying and meaningful project experience. The post system is a convenient channel for students who are going to take part in various activities(workshop, travel, concert etc.) to find fellows and make friends with them.

1.3 Expected Customers and Market

Hostel life is a unique experience in CUHK, while group learning is an essential part of the study during university. However, students may find it hard to find suitable roommates or teammates because of the limitation of social circle or culture background. Not having enough acquaintance of other students in the same college or course (especially in large colleges and courses) sometimes may lead to an unpleasant experience of hostel life or group work. Moreover, in group project, freeriders is a serious problem which lacks punishment nowadays.

If students with the same living habits can be roommates and students with different strengths can be teammates excluding freeriders, the experience of hostel life and group project will be much better. CUPar is a system helping realize the matching and providing a ranking mechanism to evaluate students' strengths and recording freeriders. The online chatting function helps students who feel shy when they face-to-face communicate with others in daily life to have a chance to know different people. The post system, however, extends the matching function to all kinds of activities, not only seeking roommates or teammates.

In short, the following groups of customers will be benefited from our project:
All undergraduate students in CUHK who

    a) have requirements of roommates and
    b) want to form a satisfied group and
    c) look for the fellows with the same interests

1.4 System Features

CUPar is made up of three main functions: roommate seeking, project teammate seeking as well as posting. Roommate seeking and project teammate seeking are the two core functions of CUPar, in which students could express their expectations on their roommates or teammates and then chat with the top potential users provided by our algorithm. Besides, we provide a rating mechanism in project teammate seeking function to grade each user's performance in the previous group activities. This will also behave as a reference for users' later decisions. Posting allows users to write posts to look for fellows with the same interest or ideas, ranging from internships, workshops to travelling.

2. Background

In university life, we need to find partners in many situations. In college, we need to find roommates; in class, we need to find teammates; in entertainment activities, we need to find fellows who have similar interests. However, many students may have the experience that sometimes it is difficult to find ideal partners.

Existing online platforms like Facebook or Wechat can give people a channel to find partners. However, there are still some disadvantages. Students can only find their partners in his or her social circle. If they cannot find partners in their social circle, they have to take the risk of finding freeriders or roommates with totally different habits as they are not familiar with others.

If a student can have a wider range of choices, he or she may be more likely to find an ideal partner. Even though, many students may not know what kind of partners they should find. Therefore, we decide to develop the CUPar system which can help to solve this problem. In the system, we collect requirements from users and help to match them with our algorithm. The information integration can be achieved in a more efficient way and moreover, the students are matched more reasonably.

For some other activities without specification or constraints, like playing sports or traveling, there's a post system which offers users a chance to organize such activities and find partners with the same interest.
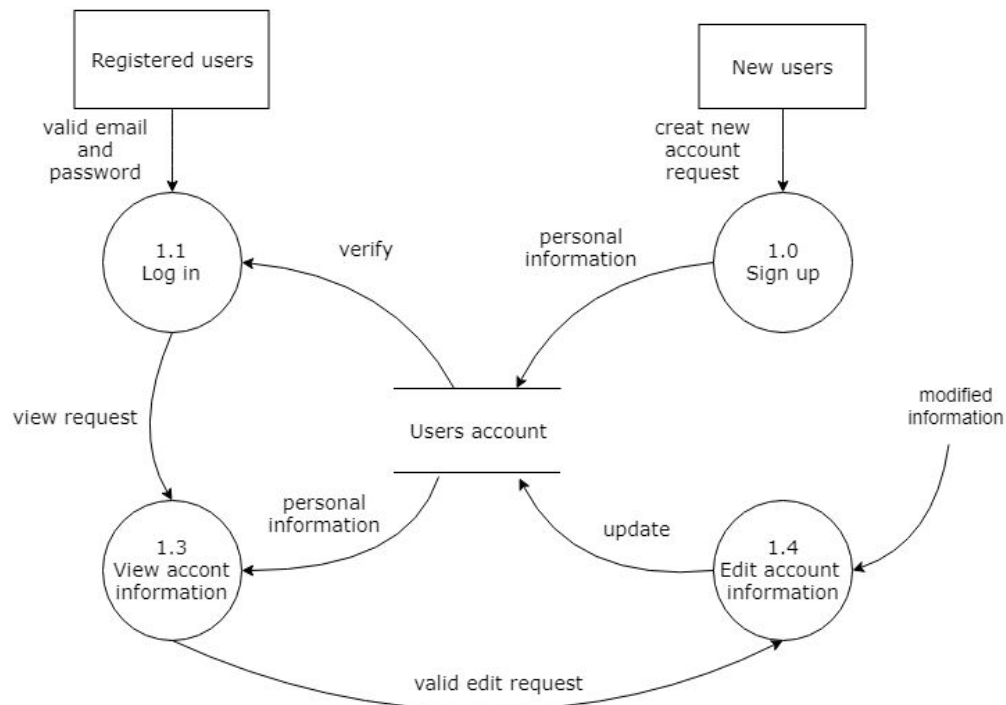
In general, our project is designed to offer CUHK students a more efficient way to find all kind of partners.
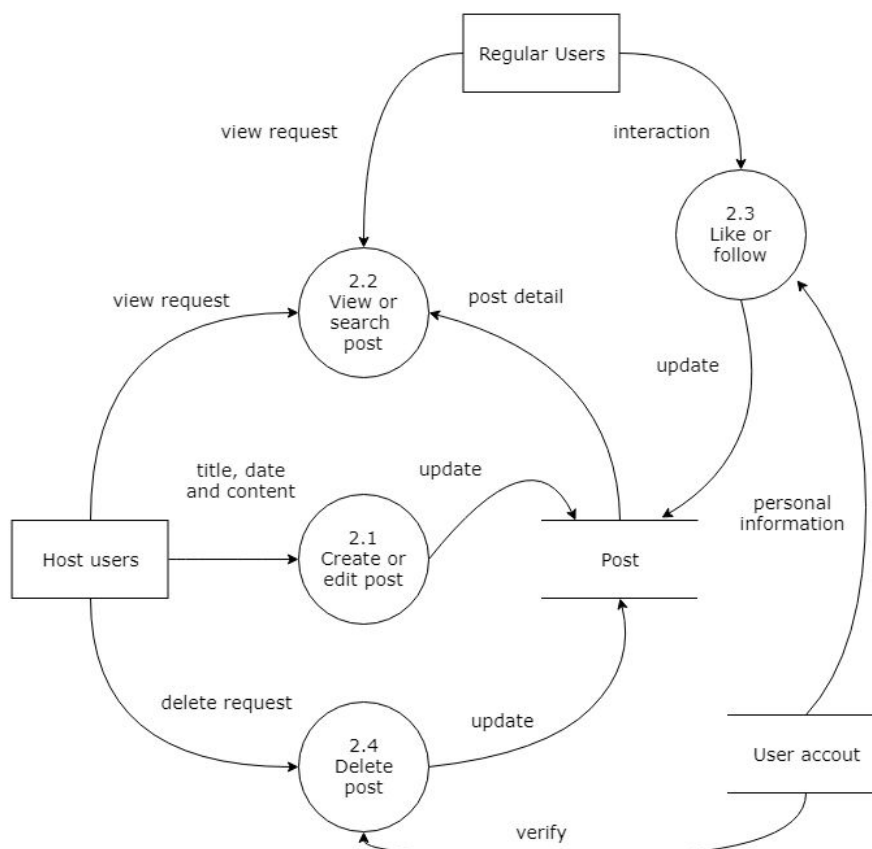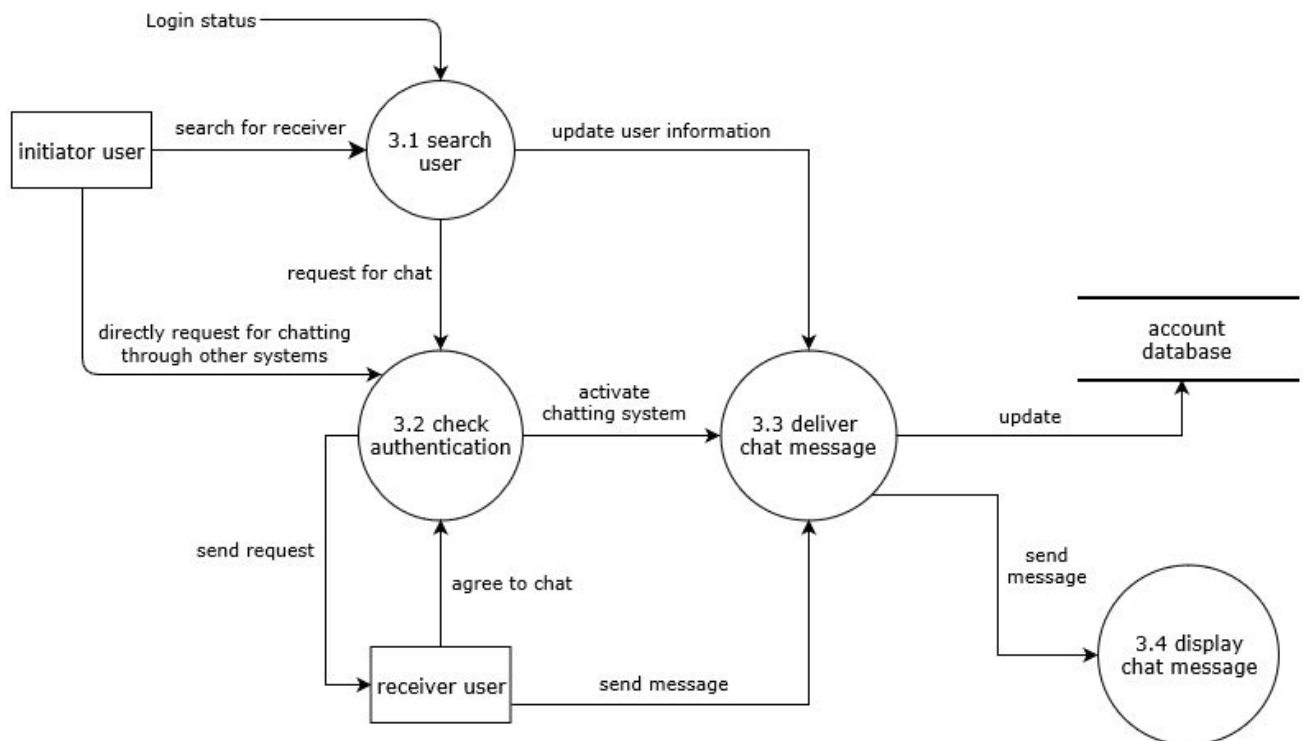
3. Specification

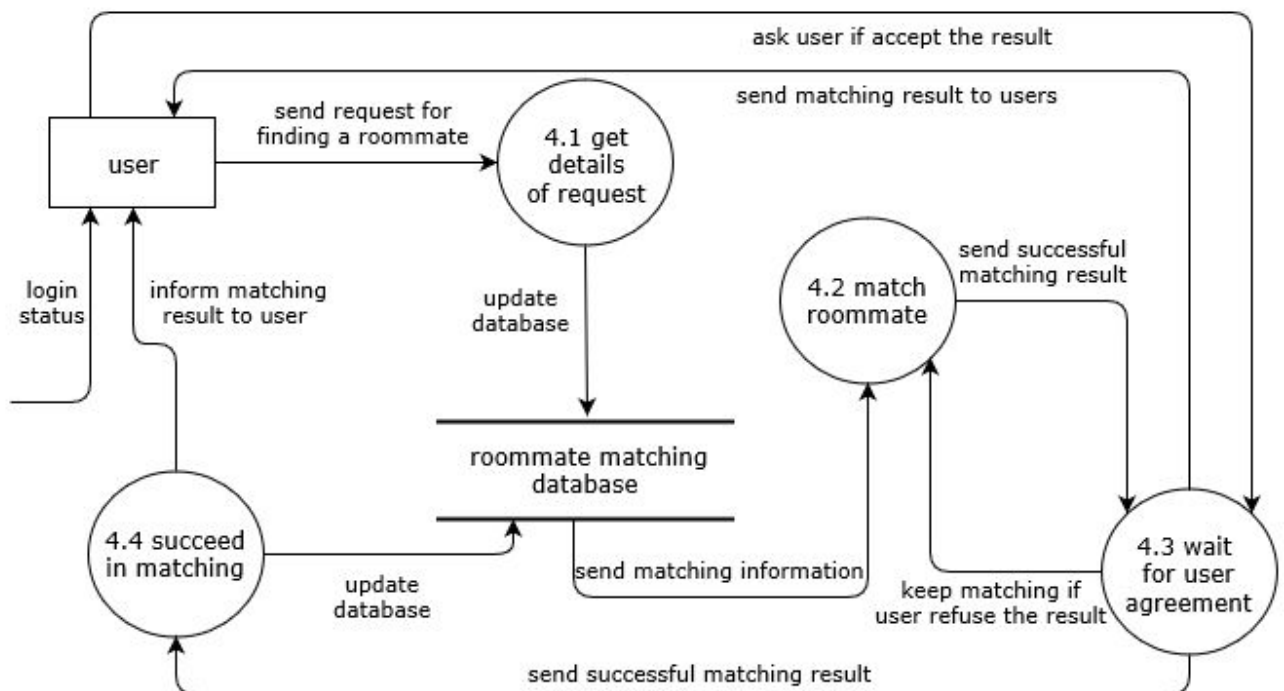## 3.1 Data Flow Diagram
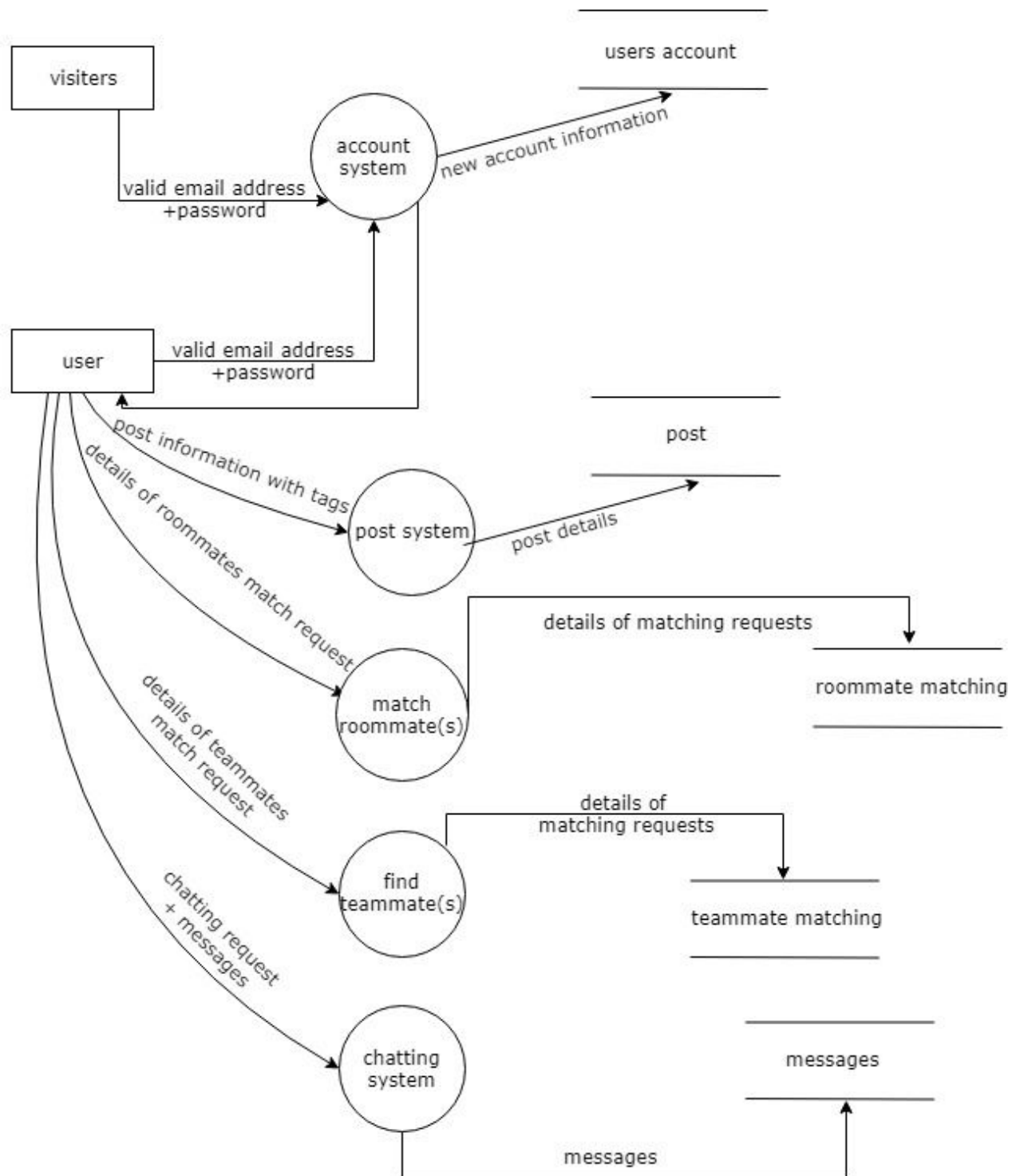
3.1.1 Account Management

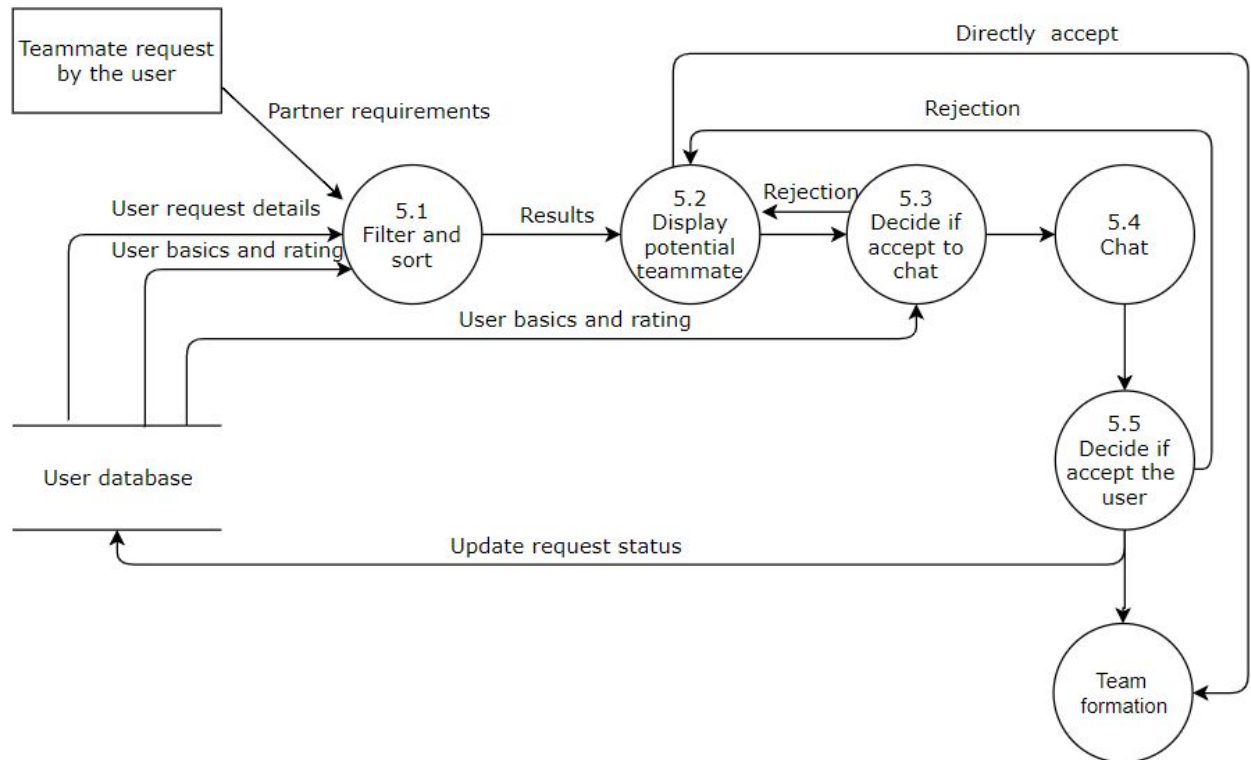### 3.1.2 Post

3.1.3 Chat
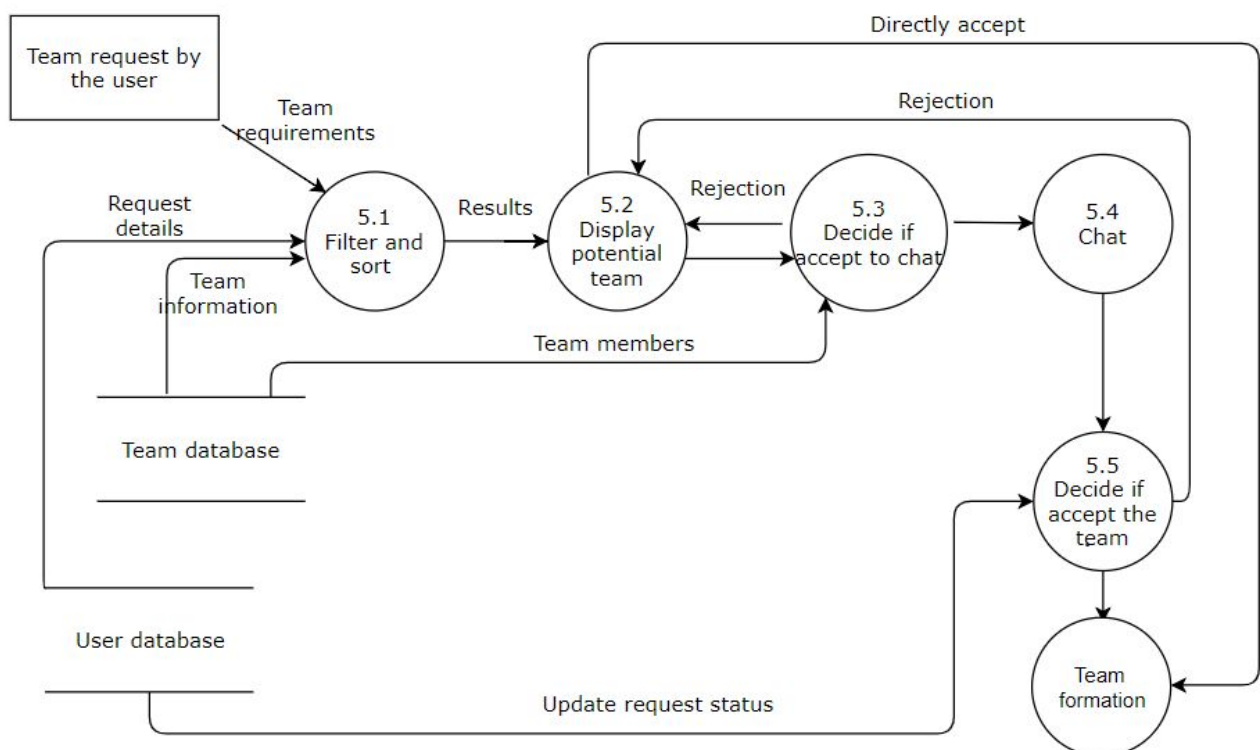

3.1.4 Match Roommate

3.1.5 Match Teammate

Individual Matching

Team Matching

3.2 Complete Features in Detail

3.2.1 Accounting Management

New users can sign up their accounts by inputting their own email addresses. Registered users can log in with their own accounts verified by account information database synchronically. Then they can view and edit their account information. In particular, changing password must be verified via email.

3.2.2 Post

Users can create a post with title, date, tags, and content to call for fellows. He or she can update or delete the post if the post is overdue or the quota is full. All users can view or search for posts. The interaction with the post system includes follow and like, and relevant users' information will be appended to the post.

3.2.3 Chat

Users can search for other users and request for chatting with others, as long as users know the other user's SID. The request will also be sent from other systems. If the other users accept the request, the chat will begin. All chatting messages will be saved in the account database for users' future reviewing. This function is combined with other functions like Post to provide efficient communication between potential partners.

3.2.4 Match Roommate

The system will collect users' detailed information and save it in our roommate matching system database. The system will then integrate the information and do matching according to our algorithm and send the results to relevant users. If someone refuses the result, the system will keep finding roommates for him or her. If the matching succeeds, the users' information will be removed from the roommate matching database.

3.2.5 Match Teammate

Individual Matching

Users who want to find a teammate release a teammate request. Details will be stored in user database and further passed to function "filter and sort". Potential matching results will be returned. Users may refer to potential teammate's information and decide whether to have a chat or reject directly. If rejected, they can choose to continue matching or end the request. After chatting, users could decide again whether to accept or reject. If accepted, a new team is formed and relevant information would be updated.

Team Matching

The process is similar to the above individual partner matching. The only difference is the information which will be passed to the users is the potential team information including the team members and their information. Users could select any member of the team to chat. The remaining steps will be the same.
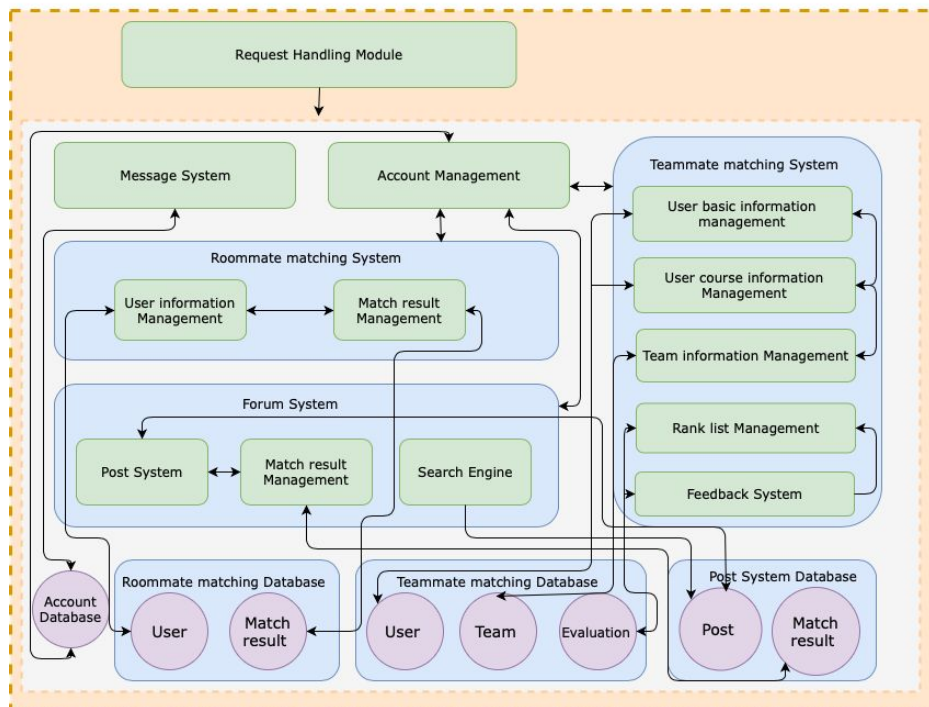
4. Architecture

4.1 Architecture Diagram

Architecture Diagram
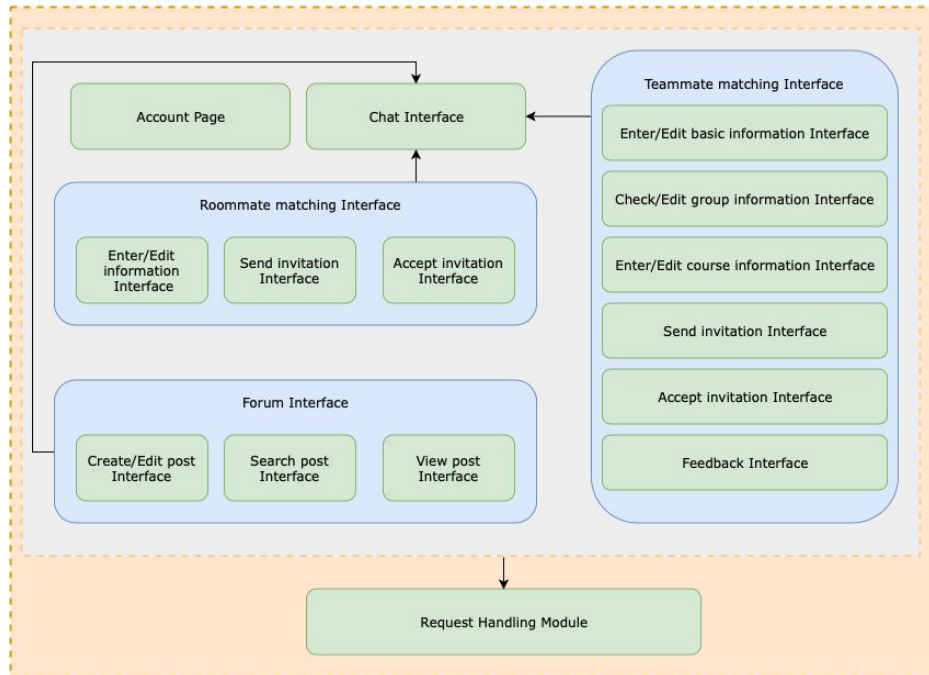
Technics

Front End

Version Control

Back End

4.2 System Component

4.2.1 Find a roommate
Users can upload personal information with requirements for potential roommates to find roommate(s). This component will mainly interact with user database.

4.2.2 Find group project teammates
Users can upload course information with personal skills to find group project teammates, or teams under demands to find more teammates can find more members with keyword tags and descriptions of the existing teams. This component will mainly interact with user database.

4.2.3 Post System
Users can post with tags to find partners for whatever activities, such as workshops, traveling and so forth. This component will mainly interact with post database.

4.3.4 Chat
Users can chat with other users to learn more about each other after they have the intention to become partners. This part mainly interacts with the other three main functions where users find their partners.
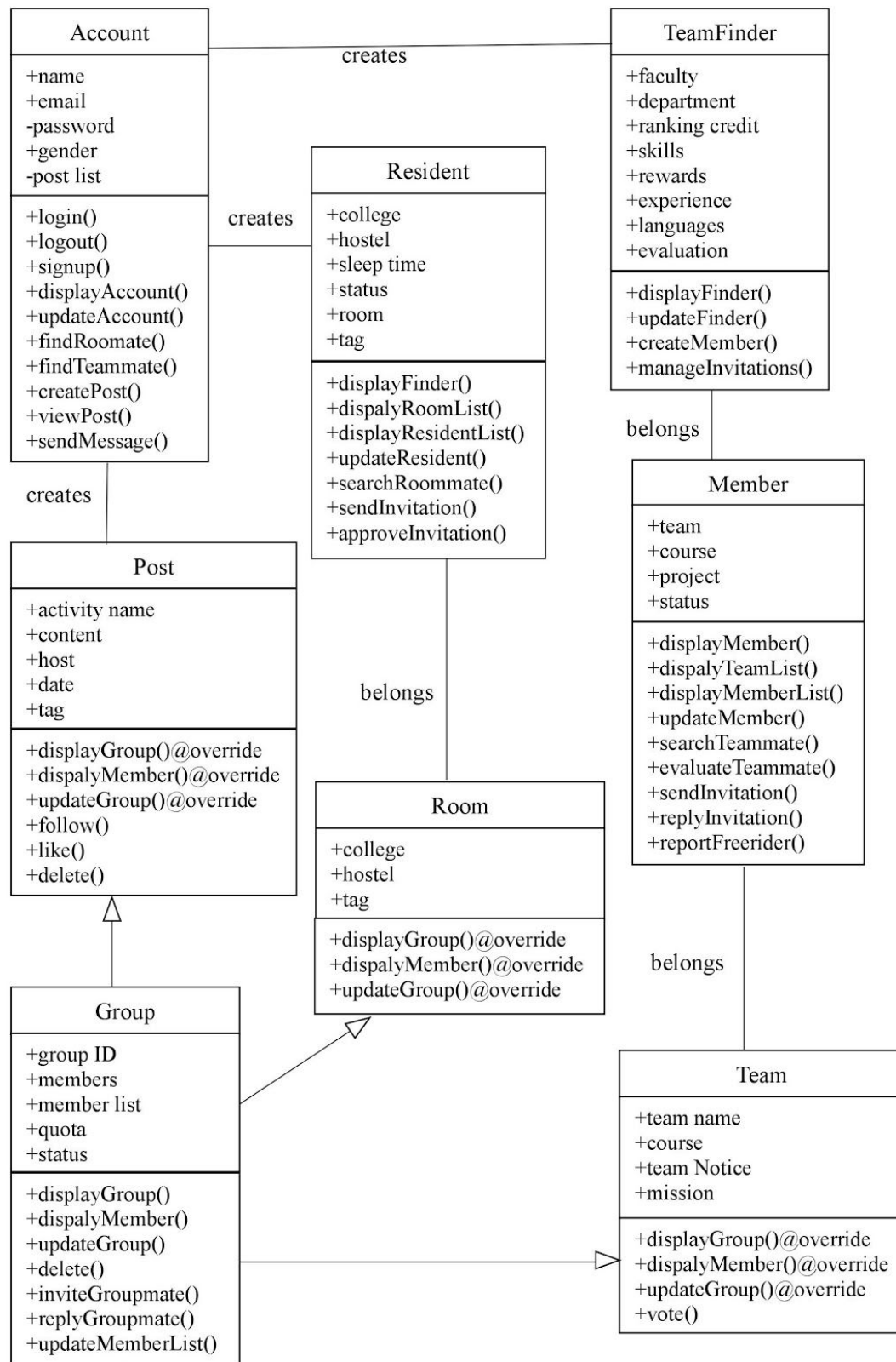
4.3.5 Search for users
Our system allows users to search for others so that if they are interested in some activities posted on the forum, they can directly chat with the person who posted this post and decide whether to join or not. The function is mainly used as a support for the forum.
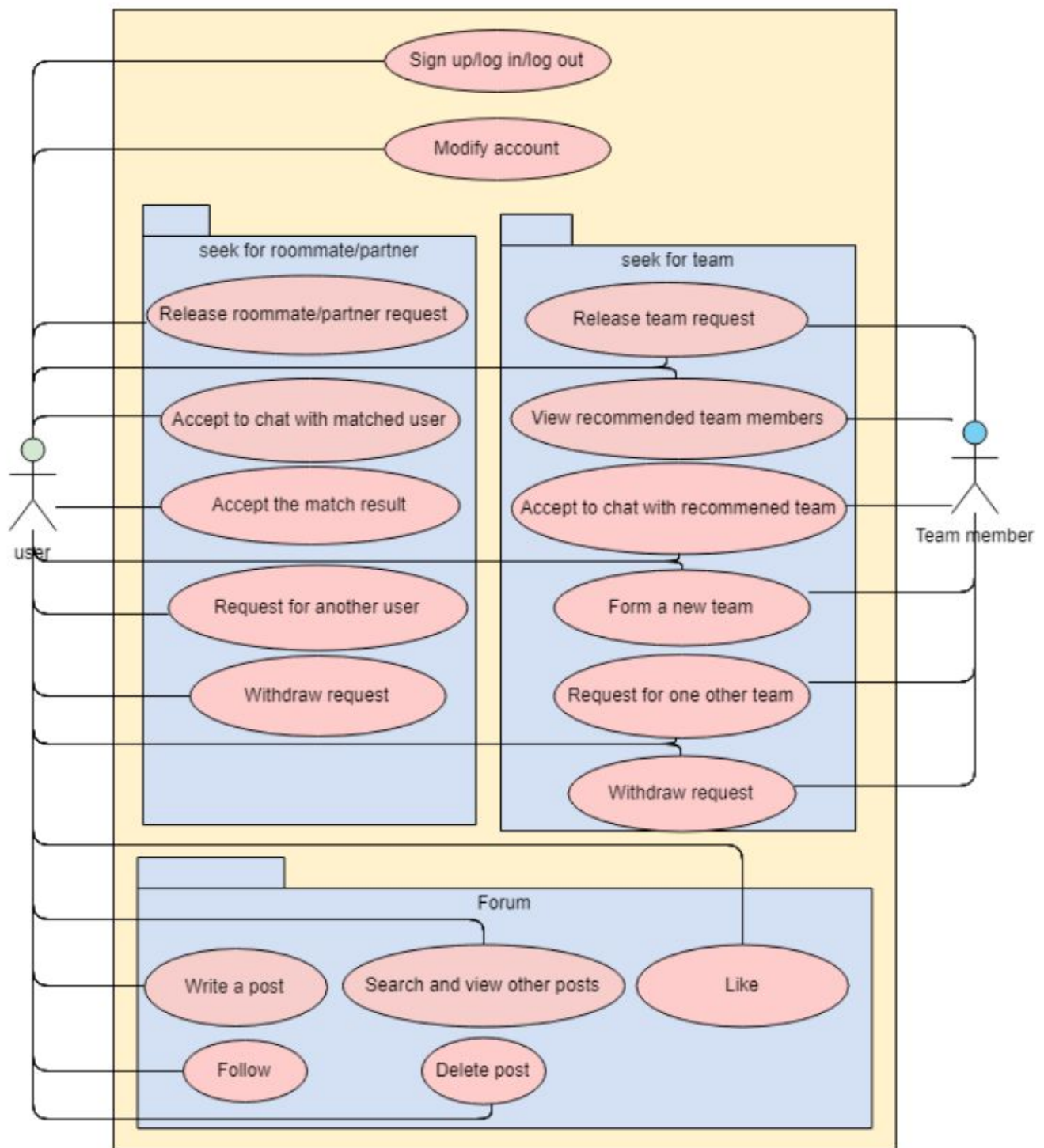
4.2.6 Give feedback of teammates
After finishing a project, users can give feedback from their teammates, which will keep users away from freeriders to some extent. People with feedbacks of free-riders or irresponsible teammates will get low ranks which will affect their finding teammates process in the future. This component mainly interacts with user database.

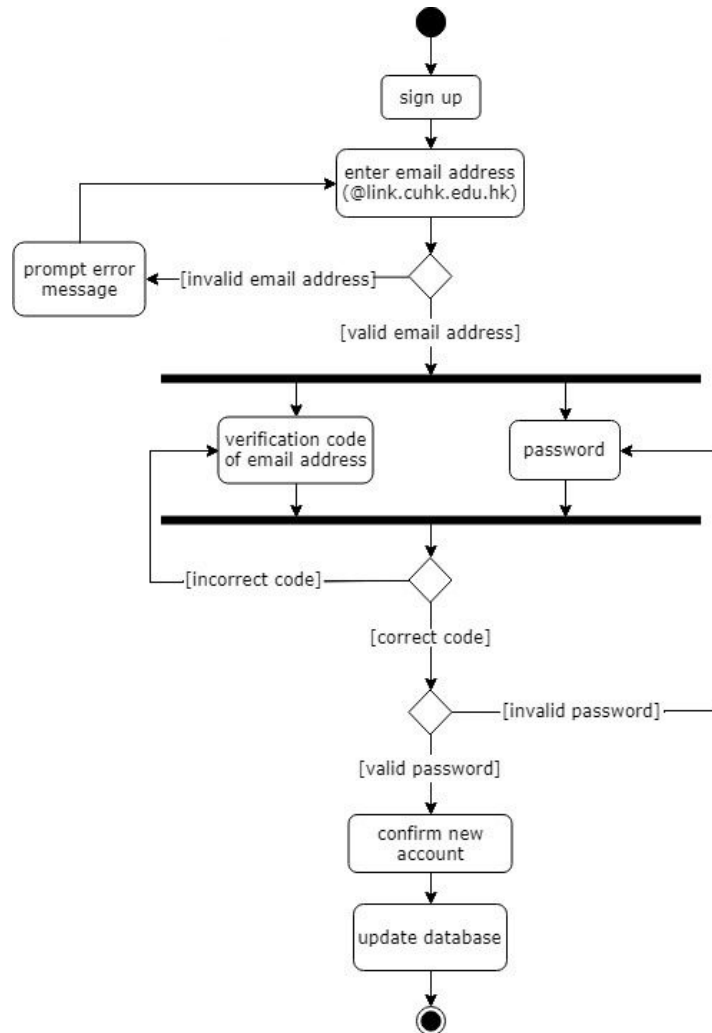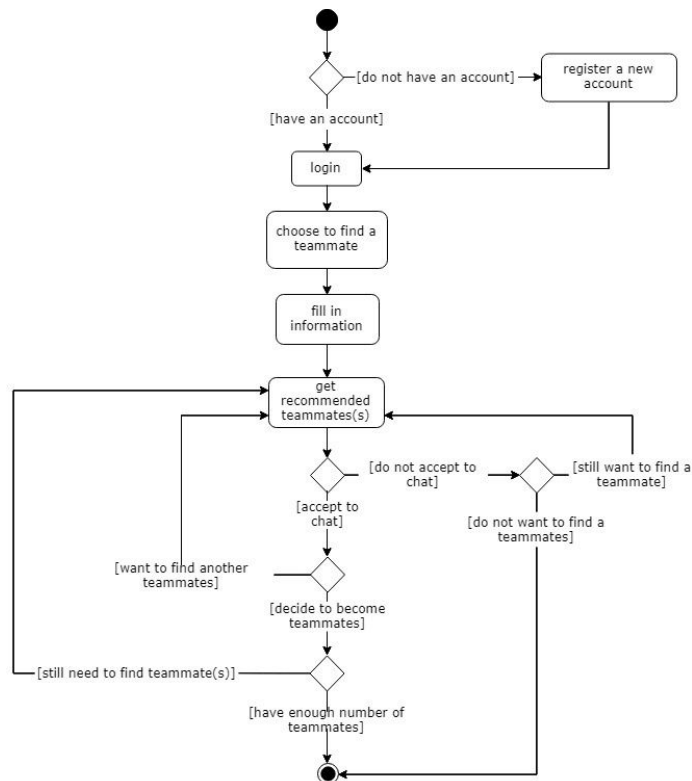## 4.3 Description of Major System Components by UML

4.3.1 Class Diagram

Account

+name
+email
-password
+gender
-post list

+login()
+logout()
+signup()
+displayAccount()
+updateAccount()
+findRoomate()
+findTeammate()
+createPost()
+viewPost()
+sendMessage()

creates

TeamFinder

+faculty
+department
+ranking credit
+skills
+rewards
+experience
+languages
+evaluation

+displayFinder()
+updateFinder()
+createMember()
+manageInvitations()

creates

Resident

+college
+hostel
+sleep time
+status
+room
+tag

+displayFinder()
+dispalyRoomList()
+displayResidentList()
+updateResident()
+searchRoommate()
+sendInvitation()
+approveInvitation()

belongs

Member

+team
+course
+project
+status

+displayMember()
+dispalyTeamList()
+displayMemberList()
+updateMember()
+searchTeammate()
+evaluateTeammate()
+sendInvitation()
+replyInvitation()
+reportFreerider()

creates

Post

+activity name
+content
+host
+date
+tag

+displayGroup()@override
+dispalyMember()@override
+updateGroup()@override
+follow()
+like()
+delete()

belongs

Room

+college
+hostel
+tag

+displayGroup()@override
+dispalyMember()@override
+updateGroup()@override

belongs

Group

+group ID
+members
+member list
+quota
+status

+displayGroup()
+dispalyMember()
+updateGroup()
+delete()
+inviteGroupmate()
+replyGroupmate()
+updateMemberList()

Team

+team name
+course
+team Notice
+mission

+displayGroup()@override
+dispalyMember()@override
+updateGroup()@override
+vote()

4.3.2 UML Case Diagram

4.3.3 UML Activity Diagram

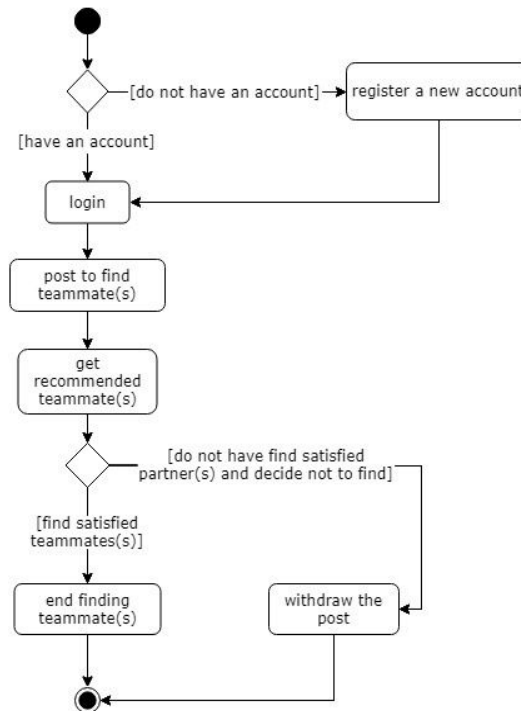**Register a new account**

Match roommate

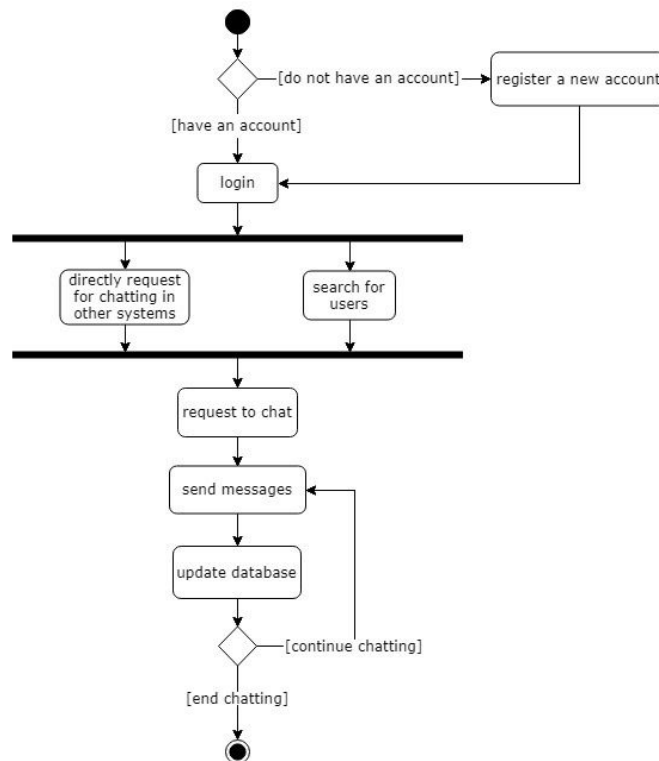

Match teammate
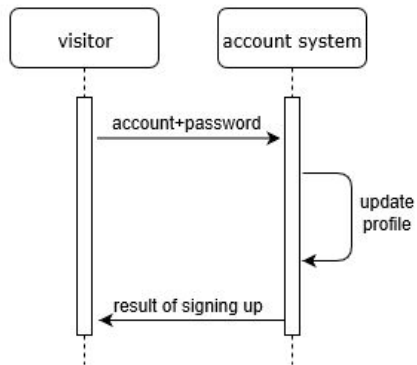
Post

Chat

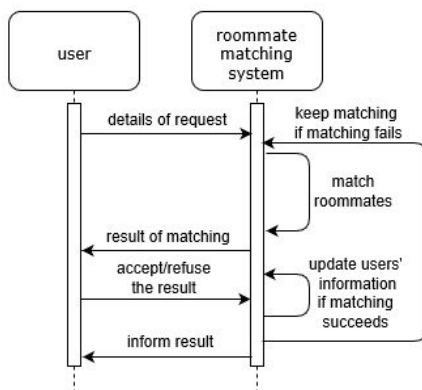CSCI3100 Software Engineering
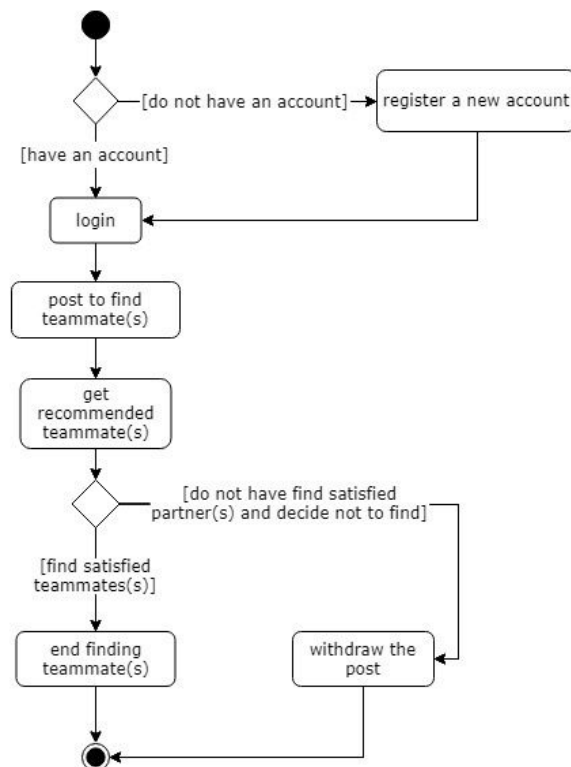
4.3.4 UML Sequential Diagram

a.sign up

b. login
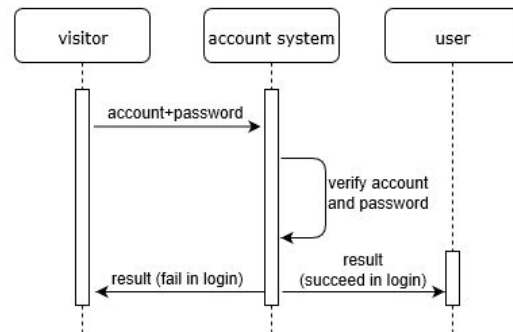
c. chat
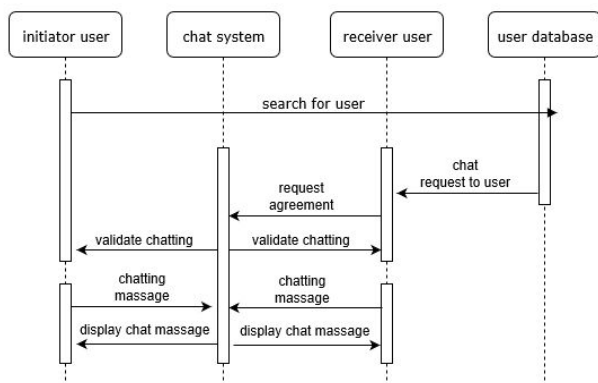
d. post

e. roommate

f. teammate