Software Requirements Specification

For

Attendance, Access and Reservation system

Prepared by group 33

Group #33

Team Members

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1. Introduction

1.1 Purpose

Most of the students in universities forge signatures for their daily attendance to cover the necessary percentage. Our system provides a RFID card that allow students to markup their attendance by scanning the card for the specific lectures on particular time. After scanning all the students' details are added to the database of the system. This prevents the forgeries happening in attendance system.

The next purpose of this system is to reserve halls for the events conducted inside the university without facing any difficulties. A central administrator controls the reservation time and allow the users to book the available hall on that particular date and time. This helps to avoid the time clashes prevailed in booking a hall for events.

As our next purpose, we planned to build an access providing system for users to get into some certain places. It means the system scans the RFID card and verifies whether the user can access the certain place or not. This improves a location secured access system inside the universities.

1.2 Document Conventions

//For tracking the changes mark them in the document with color (changes, additions) or cross them (~~deleting~~).

1.3 Intended Audience and Reading Suggestions

1.4 Product Scope

In-Scope

- Allowing online Hall-booking for extra events and lectures
- Allowing users to get information about schedules using Web-Page
- Maintain Daily Time-Table
- Displaying lecture details on tablets in front of each lecture hall
- Scanning RFID tags and Accessing students into lecture halls
- Update Attendance Sheet
- Report generation on Attendance

Out-Scope

- Student tracking system using RFID tags
- Spread among other faculties

1.5 Goals & objective

Goal: the goal of our project is to prevent the forgeries happening in the student attendance system and to avoid traditional attendance system to improve students attention.

Objectives:
Creating a platform to check the attendance of students using RFID card.
Improving student's attention by recording those in the platform.
Creating the platform which will ease for reserving the halls within the university.

2. Overall Description.

2.1 Product Perspective

//Describe the context and origin of the product being specified in this SRS. For example, state whether this product is a follow-on member of a product family, a replacement for certain existing systems, or a new, self-contained product. If the SRS defines a component of a larger system, relate the requirements of the larger system to the functionality of this software and identify interfaces between the two.

2.2 Product Features

- Allows user to reserve lecture halls
- Make students register into the system
- Mark the attendance via RFID scanners
- Check the attendance of student
- Generating the attendance sheet
- Retrieving hall details on the web page
- Displaying lecture details on tablets in front of each lecture hall
- Giving access to lecture halls

2.3 User Classes and Characteristics

Four types of classes are involved in our system.

Registered users- Whether a person is registered into the system or a developer comes under this category.

Requesting for Hall reserving
Checking Attendance details
Receiving RFID cards

Unregistered users-

Capable of checking new posts
Capable of checking lecture time tables.

Admin- updating lecture halls and lecture details. Post new information

Attendance maintaining
Checking the requests for hall reservation

System Administrator- This represents the academic staff. Taking decisions about reservation requests having anytime access for lecture halls.

2.4 Operating Environment

AAR system will mainly operate as a web application. It will be implemented to be responsive for whether it’s a PC, mobile or a tablet device so that it can be accessed via any internet enabled device. As a secondary measure it will also be operating as an Android application to display system details and mark the attendance via rfid cards. This tablet is connected to the rfid scanner using OTG.

2.5 Design and Implementation Constraints

The system fetches data from the database over the Internet. Therefore fundamental necessity for accessing the AAR system is a stable internet connection.

Since the system is implemented in university itself all the information and data will be stored in our servers. Hence, the privacy and protection of user’s information will be depend on service provider’s stability.

Our university servers have automatic backups. Therefore we don’t need any other backup plans.

System users are already well knowledgeable IT people. So extra demos and explanations about usage are not necessary.

System is implemented with the RFID scanners of 125kHz 64bit . If the limit exceeds we are endure of using 13.56MHz 128bits.

2.6 Assumptions and Dependencies

Assumptions

All the users have internet connection

Electricity is supplied to university throughout the day

Admin will update lecture time tables daily.

Students will carry RFID card properly.

One particular student will carry his/her own RFID card only. Hence fake attendance markings will not occur.

Admin will constantly monitor the content in the system in a daily basis

System is secured as the system and servers are in one particular secured place.

Dependencies

The web application will be hosted on client server (university)

Google Firebase will be used as the backend for all the services in our system

3. Feasibility Study

3.1 Operational Feasibility

This measures how far the system meets the requirements of users. Our system will be successful only if it achieves the basic needs when it is developed.

- If we take the major part of our system users, the academic administrators, main problem they face is fraud signatures of students in lecture sign sheets. Our system intends to solve this problem with ER Tag scanners.
- Students are the prior users of our system. According to the survey we did over 80% of students are going through the difficulty of reserving a hall for their needs. Due to the absence of an exact responsible party students have to mere up and down with letters and other proofing in order to get a hall for

their extra needs. So our system will solve this with the online hall reservation system.

- With use of ER tags students are allowed to enter and certify their presence easily. Without going for finger print system here we selected ER scanners as it enhances time saving of students and it ensures lack of issues.
- As this is directly connected with the academic activities of our faculty main point we consider is the data security and reliability.

Featuring all these functions using a single project is really challengeable. But with correct time scheduling we will achieve it. Hence the system is operationally feasible.

3.2 Technical Feasibility

This measures how our team is capable of converting the ideas into working system and whether technical resources meet capacity. There are two main products of our system. Mainly web application and the android app.

Web application is developed by develop using angular 8, HTML and CSS. For the back end development firebase is used as the database service. Those technologies are freely available and also our team has sufficient knowledge about those technologies.

Android application is developing using android studio. Same Firebase database will be using for the android application too. These technologies are also freely accessible. Although the team is lack in knowledge and experiences in android studio, we are learning it and putting into practice.

Arduino technology is used in our system for RFID scanners. We have already bought the scanners and we have learnt them for some extent.

Although we are not fluent in those technologies the sufficient knowledge f/or development is possessed by our team. Since all the technologies are readily available for development our system is technically feasible

3.3 Resource Feasibility

This measures how our team is capable of acquiring resources needed in placing the system.

Good network connection is a must because we are handling with students' attendance and access. If the connection is failed students and the staff have to face difficulties. As university premises holds a good network connection system will work without any downtime.

Good Power connection is also available in the university. For tablet charging purposes electric power is essential.

Therefore proposed system is Resource feasible.

3.4 Economic Feasibility

Economic feasibility is somewhat irrelevant as this system is developed for a group project with non-profitable motive. Even so, we can safely say this is a very cost-effective project due to following points.

- The web application is host free
- Web application should have a domain and we will have to pay a small annual subscription for the domain
- The development tools like android studio and Google firebase for the backend can be used free of charge for the project.
- Since it is developed only by a team of university students, development cost also can be factored as none.
- System testing is cost free (Can use university students for testing)

Therefore, we can conclude that in the both short and long run, the system will be economically feasible.

3.5 Legal Feasibility

Our system doesn’t course any legal or ethical issue because we are not violating any law. We have taken some steps to ensure that our system is legally and ethically feasible.

Personal details of students and other users are maintained in a secure and confidential manner.

Unregistered person cannot log into the system.

Handling user data within the system is confidential. Very responsible person is assigned as the admin and there will be no any issue regarding the privacy of students’ and others’ data.

We are using Free and Open Source Software. Hence no any ethical issue will happen. So the system is legally and ethically feasible

4. Requirements

4.1 Stakeholders

There are many stakeholders for this system such as,

- Director
- Deputy director
- Senior lecturer
- Lecturer
- Instructor
- Admin of academic staff
- Students
- Non-academic staff

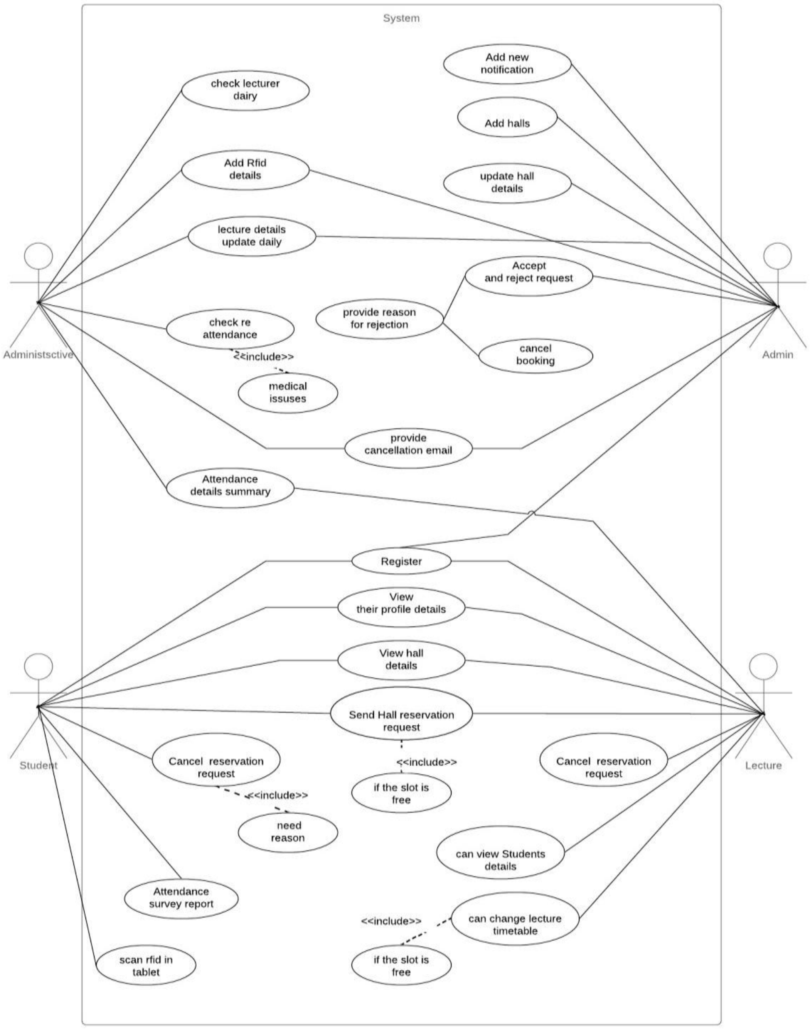
But, here we will be focusing on the actual users of the system which can be categorized to mainly 3 types. They are Registered User, Unregistered User and Admin. The functionalities provided for each user will be explained in sub-chapter 4.2 and 4.3

- **Registered user**
  These are the actual end users who will get benefited most from the system. They are required to register into the system. They are allowed to access all the features of the system. The system is mainly consisting of this user.

- **Unregistered user**
  Any person who visit the website without register falls into this Category. He can only view posts. Not allowed to booking hall or view attendance.

- **Admin**
  High powerful person of the system. Admin can be a member of the academic staff.

4.2 Use Cases and Use Case Diagrams



4.3 Use Case Narratives

Login and Registration System

Use Case Name	**Login**
Use Case Description	This is where users enter the system
Participating Actors	Registered User Admin
Pre-Condition	-
Basic Flow	1. Go to the web application 2. Press Sign in 3. Enter login credentials 4. Press login

Use Case Name	**Register**
Use Case Description	This is where user can join the web application
Participating Actors	Unregistered User
Pre-Condition	Restricted for university students and staffs
Basic Flow	1. Go to the web application 2. Press Sign up 3. Enter personal details 4. Press Register

Hall Booking System

Use Case Name	**View booking**
Use Case Description	User can view other user's booking
Participating Actors	Registered User
Pre-Condition	User should be logged into the system
Basic Flow	1. Press Hall reservation button 2. Click My booking Button

Use Case Name	**Request new booking**
Use Case Description	User can book a lecture hall
Participating Actors	Registered User
Pre-Condition	User should be logged into the system
Basic Flow	1. Press Hall reservation button 2. Select a hall 3. Fill required details 4. Press Submit button

Use Case Name	**Delete Booking**
Use Case Description	Delete an existing booking by the user
Participating Actors	Registered User
Pre-Condition	User should be logged into the system
Basic Flow	1. Click Hall reservation Button 2. Click My Booking 3. Click the selected Booking from the list 4. Press Delete button

Use Case Name	**Update Booking**
Use Case Description	User can update the details of his booking
Participating Actors	Registered booking
Pre- Condition	User should be logged into the system
Basic flow	1. Click Hall reservation button 2. Click My Booking 3. Select a previous booking 4. Click Update 5. Edit details 6. Click submit

Use Case Name	**Accept/ Remove booking**
Use Case Description	Admins can Accept or Remove new Booking
Participating Actors	Admin
Pre-Condition	User should be logged into the system
Basic Flow	1. Press New booking 2. Select one of the list 3. Check Details 4. Press Remove or Accept button

Use Case Name	**View My Profile**
Use Case Description	Users can view their own profile
Participating Actors	Registered User
Pre-Condition	User should be logged into the system
Basic Flow	Click on my profile button

Use Case Name	**Update/Delete own Profile**
Use Case Description	Users can alter their own profile
Participating Actors	Registered User
Pre-Condition	User should be logged into the system
Basic Flow	1. Click on my profile button 2. Click on update/delete profile button 3. Click confirm.

Post Sharing

Use Case Name	**Post New Information**
Use Case Description	Admin can post information
Participating Actors	Admin
Pre-Condition	User should be logged into the system
Basic Flow	1. Click My Profile 2. Click Posts 3. Click New 4. Enter the post content 5. Click Confirm

Use Case Name	**Edit Post**
Use Case Description	Admin can edit posts
Participating Actors	Admin
Pre-Condition	User should be logged into the system
Basic Flow	1. Go to My profile 2. Select Posts 3. Click Edit button 4. Select the post 5. Make Changes 6. Click Confirm

Use Case Name	**Delete Post**
Use Case Description	Admin can delete posts
Participating Actors	Admin
Pre-Condition	User should be logged into the system
Basic Flow	1. Go to My profile 2. Select Posts 3. Click Delete button 4. Select the post 5. Click Confirm

Use Case Name	**View Posts**
Use Case Description	User can view the posts posted by admin
Participating Actors	Registered User Unregistered User Admin
Pre-Condition	-
Basic Flow	1. Go to our home page 2. Click on a post

View Attendance

Use Case Name	**View Attendance**
Use Case Description	Users can view their attendance
Participating Actors	Registered User
Pre-Condition	User should be logged into the system
Basic Flow	1. Press Attendance 2. View Attendance

4.4 Functional Requirements

Web application

- Make hall reservation/cancellation request
- Check hall availability for reservation
- View hall details
- View reserved hall booking details
- View lecture time tables
- Check student attendance
- Check student attendance report
- Receive notifications

Web application (Admin)

Apart from above mentioned functionalities admin can also perform the following functions.

- Sending confirmation mail
- Capable of registering students and staffs to the system
- Maintain time table
- Maintain Records

Mobile application

- Students attendance can be marked
- View details of the hall
- View hall booking details

4.5 Non Functional Requirements

■ Maintainability

The System is available 24x7 for the users with internet connection. All the data will be backup in case of any failures or errors in the system.
All the bookings are verified and accepted by the admin. Therefore maintaining the system and the relevant data is carried out under admin.

■ Operability

Even though the system users are belong to UCSC and are well trained with IT , for the ease of the users the system would be user friendly and lightweight so that it can also work with low internet connection.

■ Performance requirement

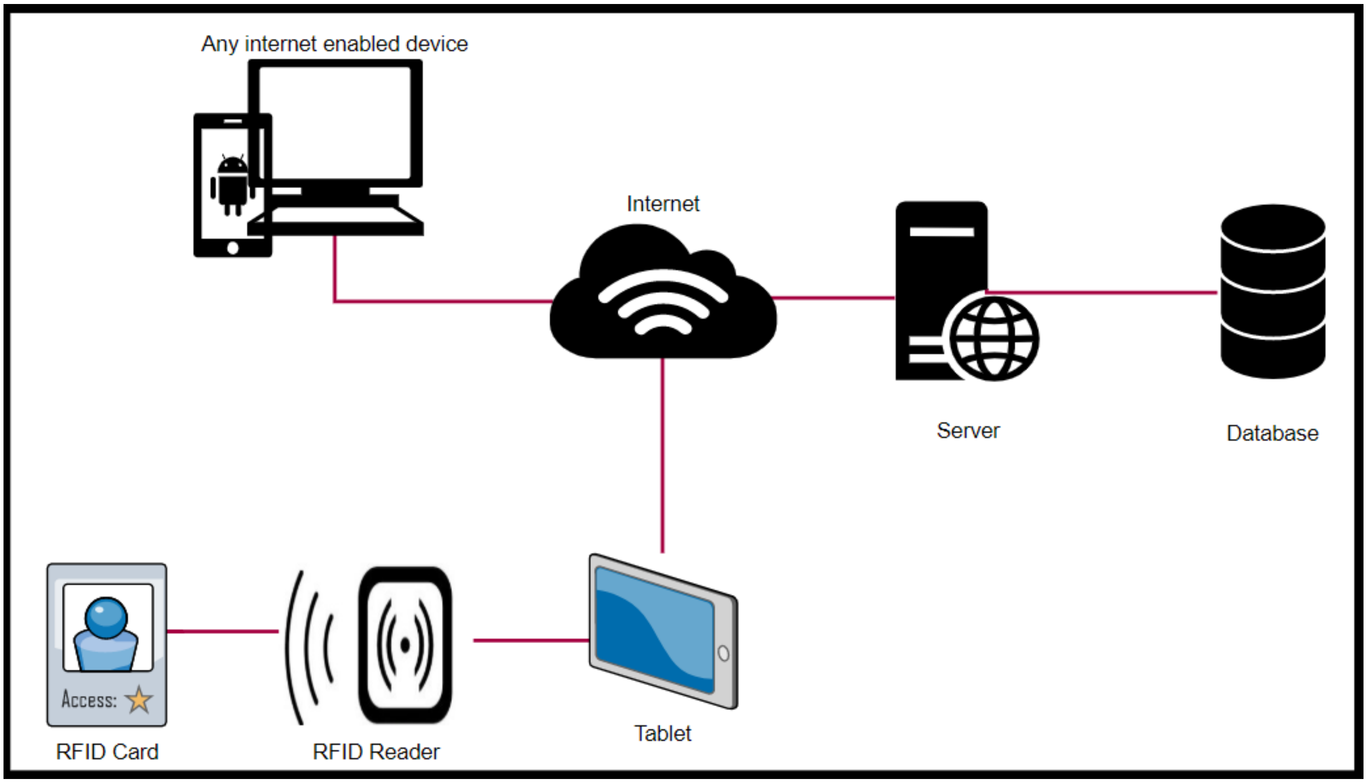
Since this software is going to be web-based, it does require a powerful server machine with high band internet access. So, we hope to hire an effective web server.

■ Accuracy

As the system deals with booking, the data should be accurate and updated. Admin deals with the bookings and updating the system. Therefore the accuracy of the data is maintaine

5. System Architecture

5.1 High Level Architecture

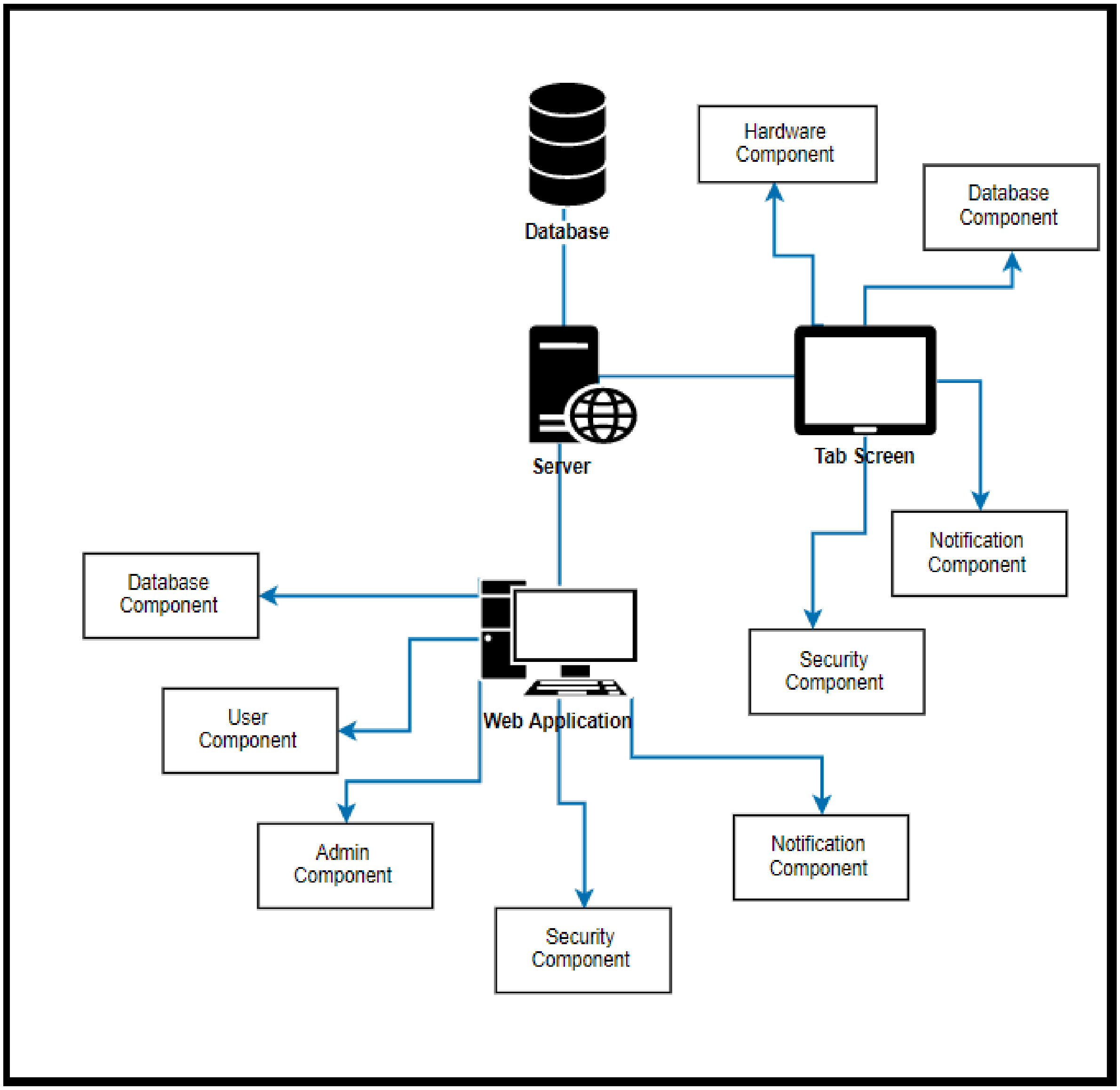


As seen in the above diagram, both web application and Tablet requires network connectivity .The web app is hosted in AWS Dedicated Server. Ultimately, both application connects to the Google Firebase Database which is a cloud based database which acts as the back-end for the whole system.

5.2 Components and Their Responsibilities

Component	Responsibility
Admin Component	● Confirm reservation ● Add/Delete/Edit Post ● Add/Edit/Delete Hall details ● Sent notifications
User Component	● Booking halls ● View Attendance ● Edit User details
Security Component	● Verifies users based on their registration details
Database Component	● Store Data Safety
Notification Component	● Notify users for special messages
Hardware Component	● Read RFID tag and discover details

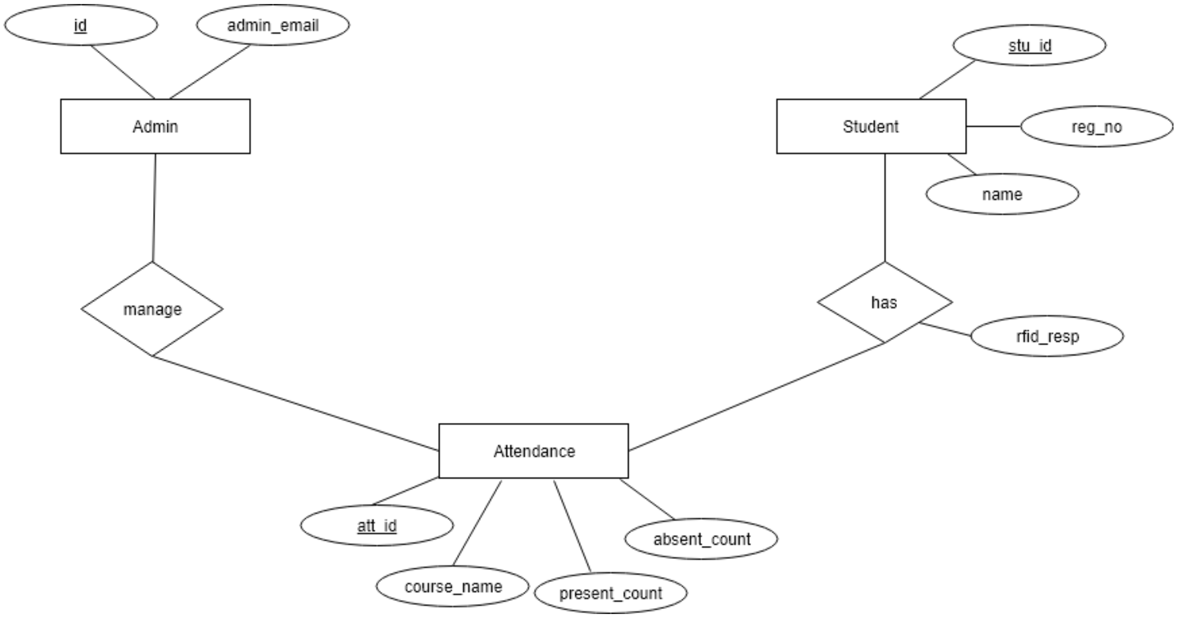
5.3 Component Interactions



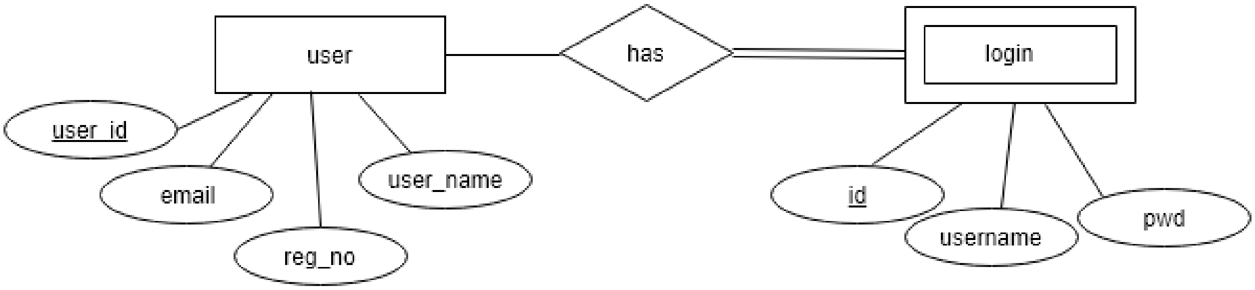
6. System Design

6.1 Entity Relationship diagram

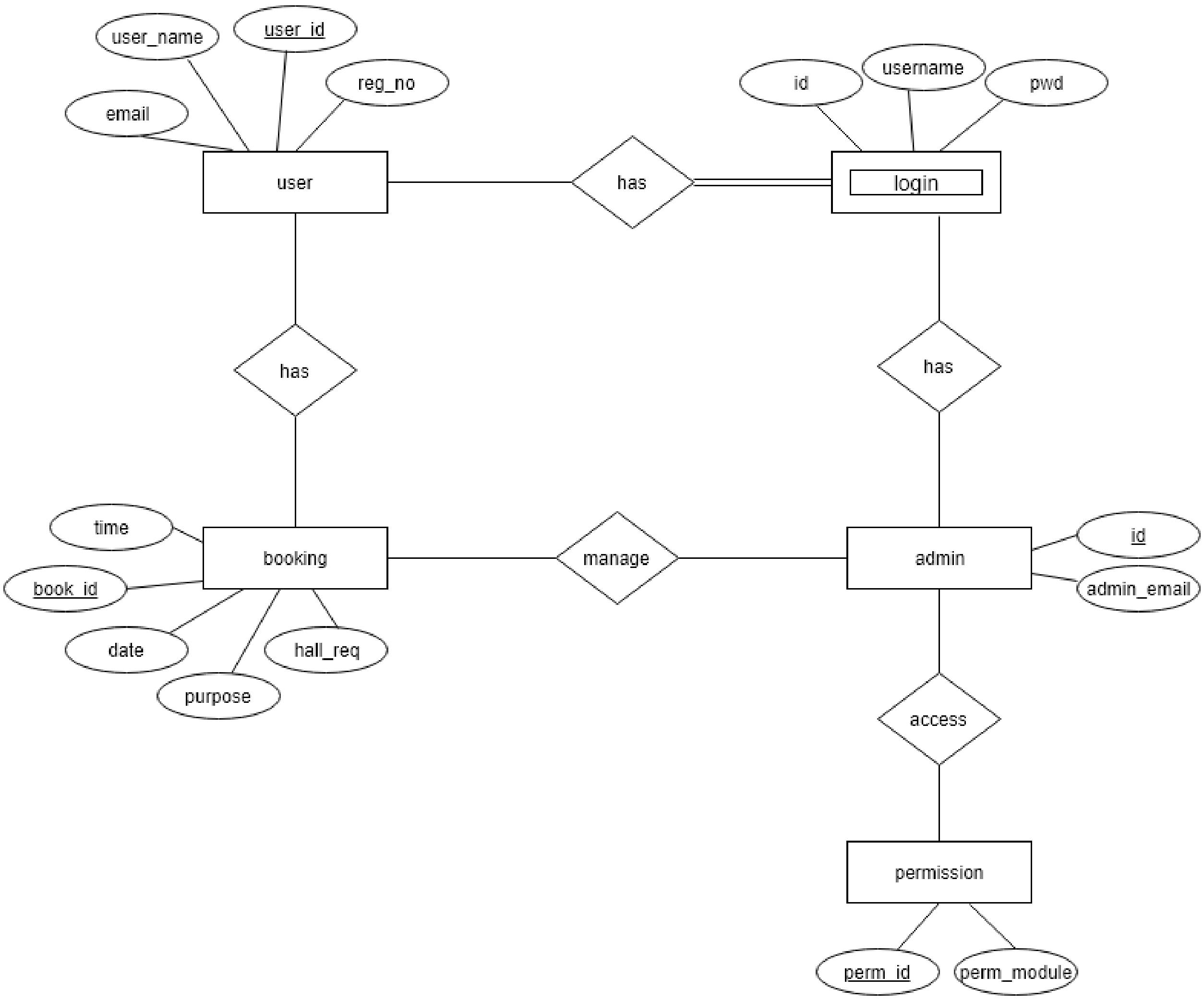
6.1.1 Attendance system



6.1.2 Access system

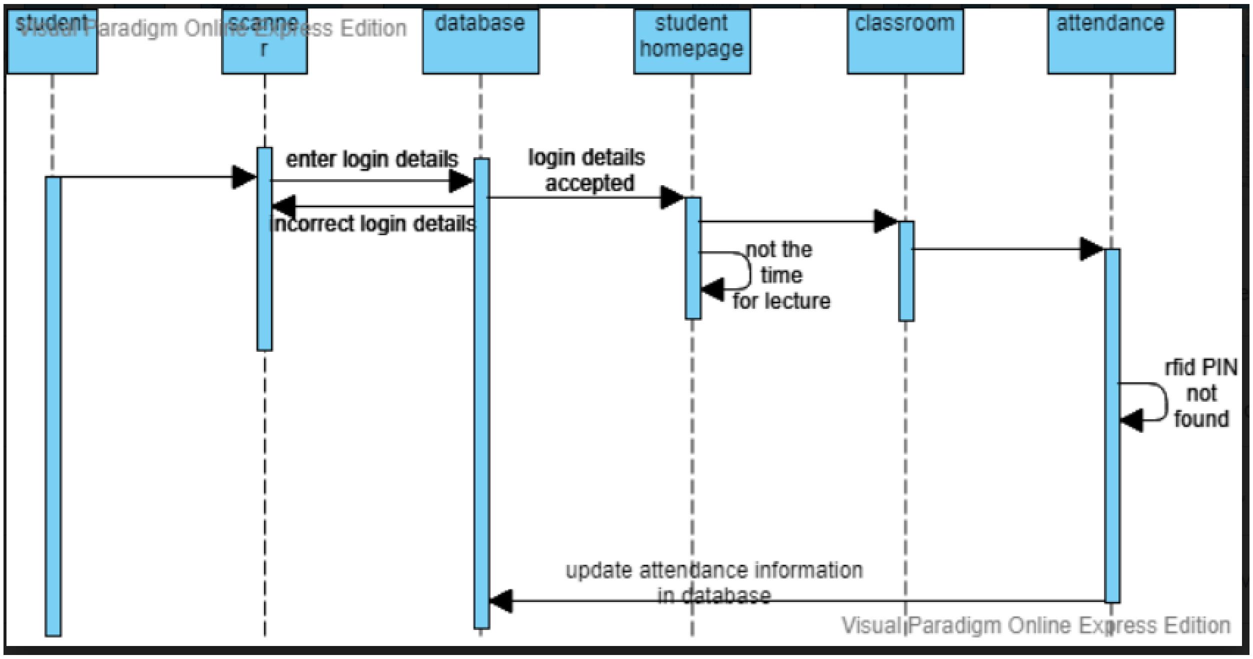


6.1.3 Reservation system

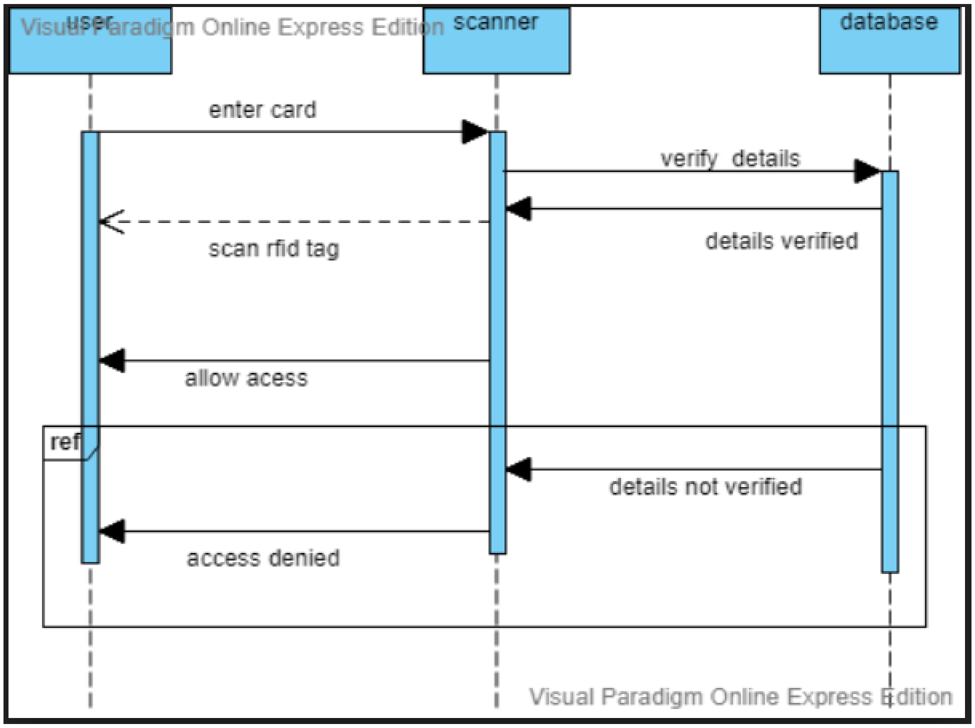


6.2 Sequence Diagram

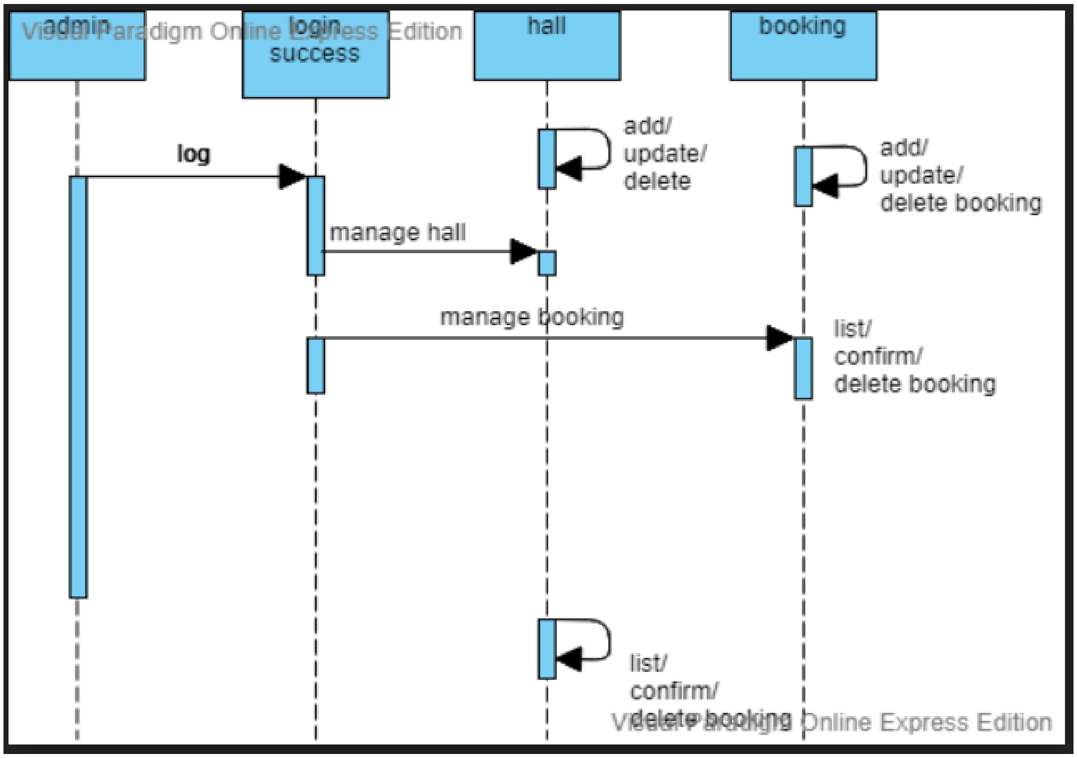
6.2.1 Attendance system



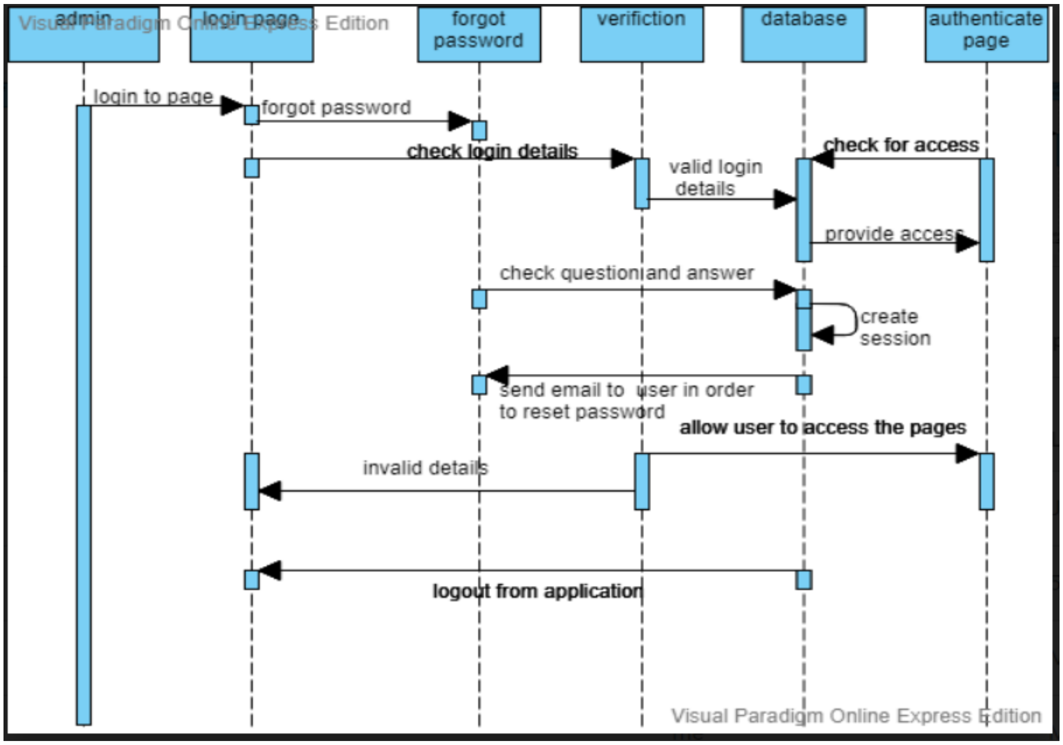
6.2.2 Access system



6.2.3 Reservation system

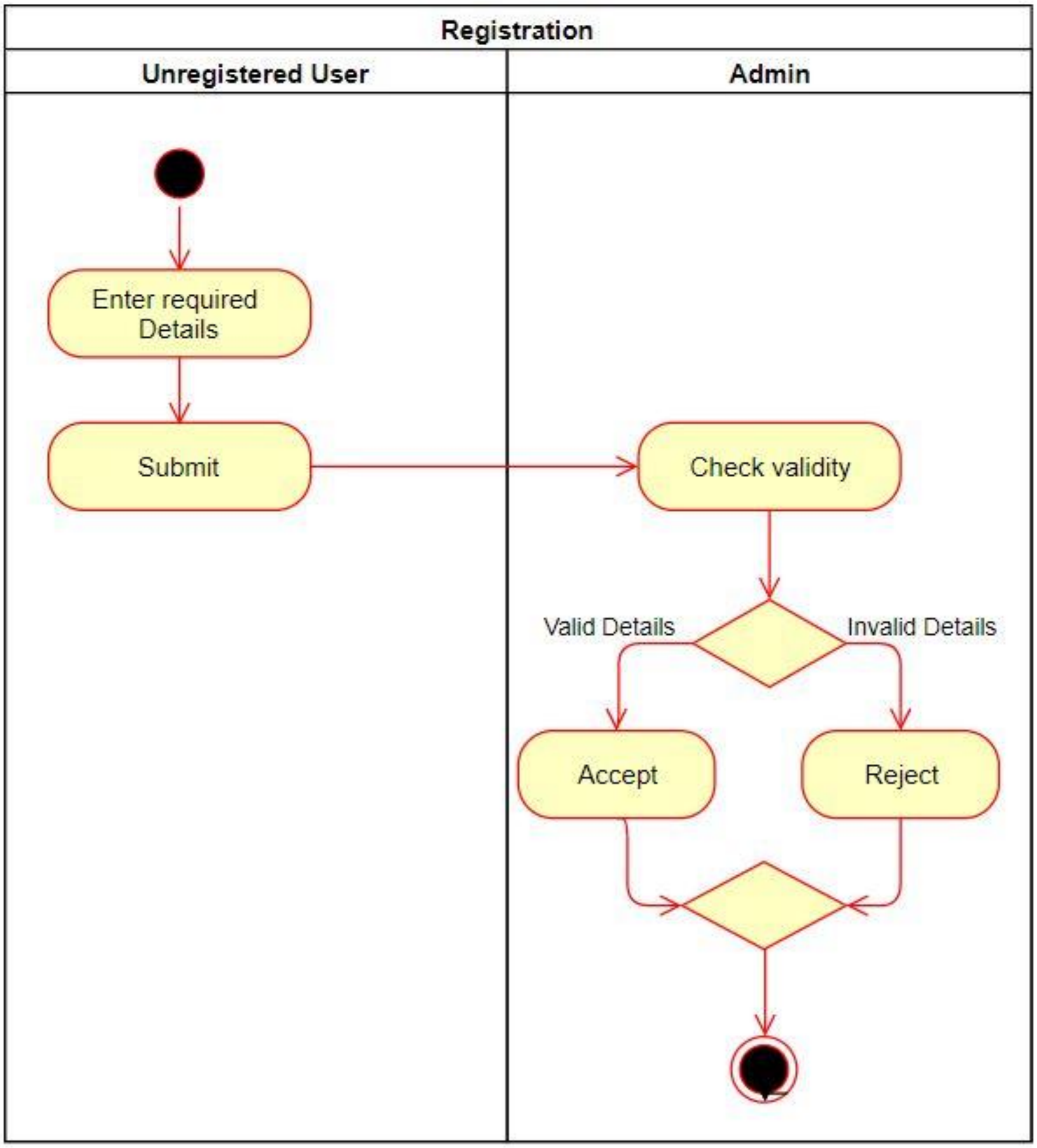


6.2.4 Login sequence

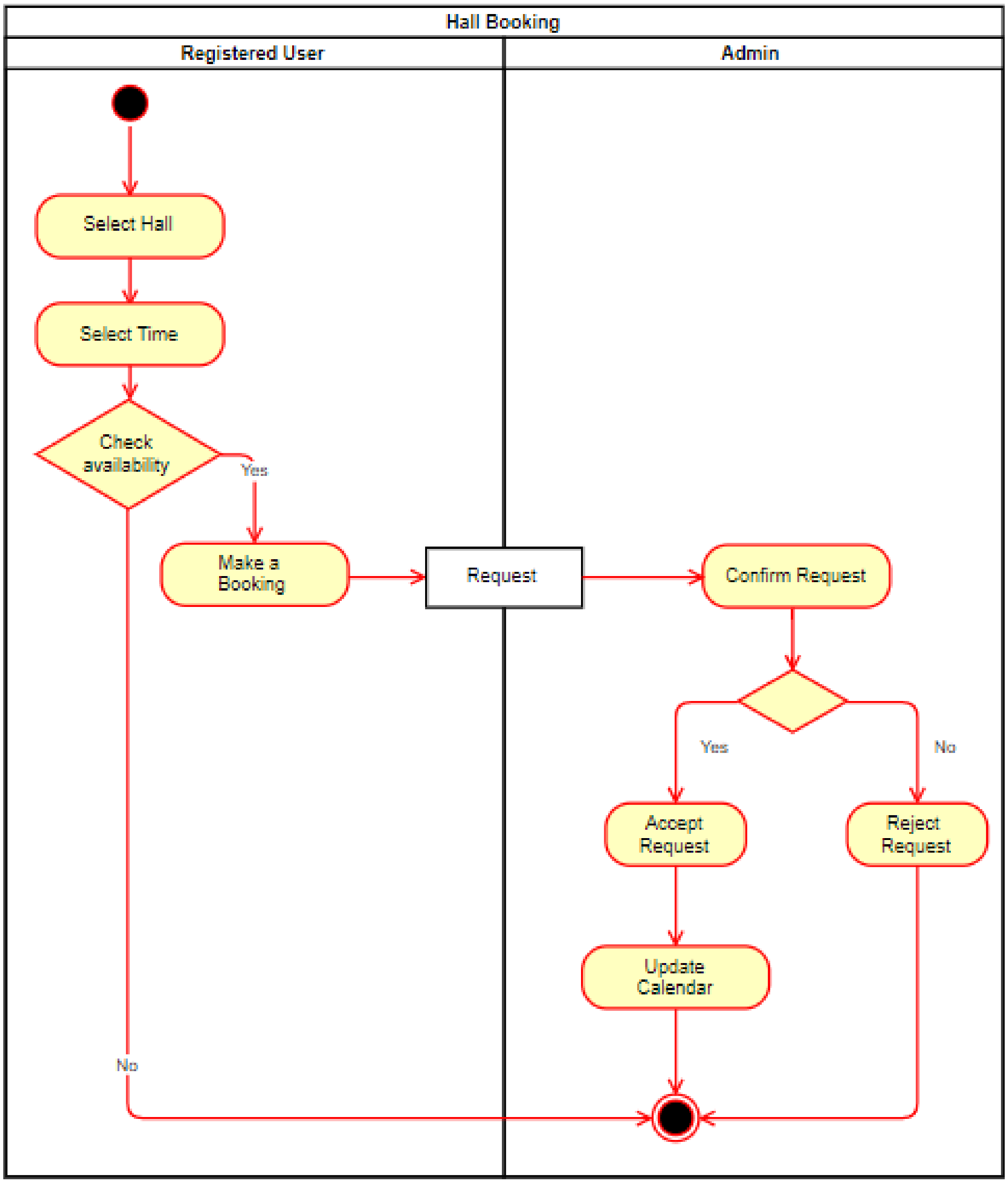


6.3 Activity Diagram

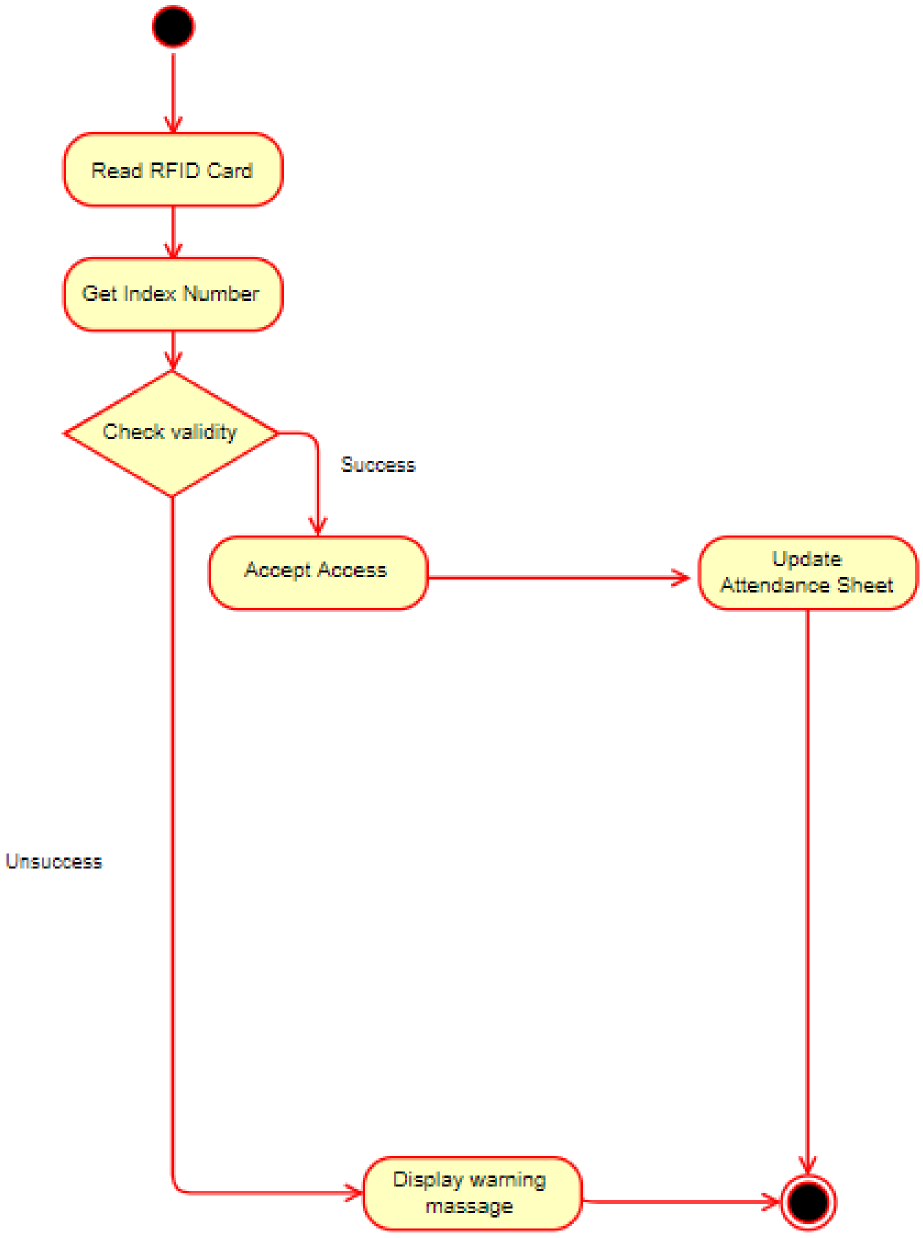
6.3.1 Activity Diagram for Registration



6.3.2 Activity Diagram for Hall Booking System

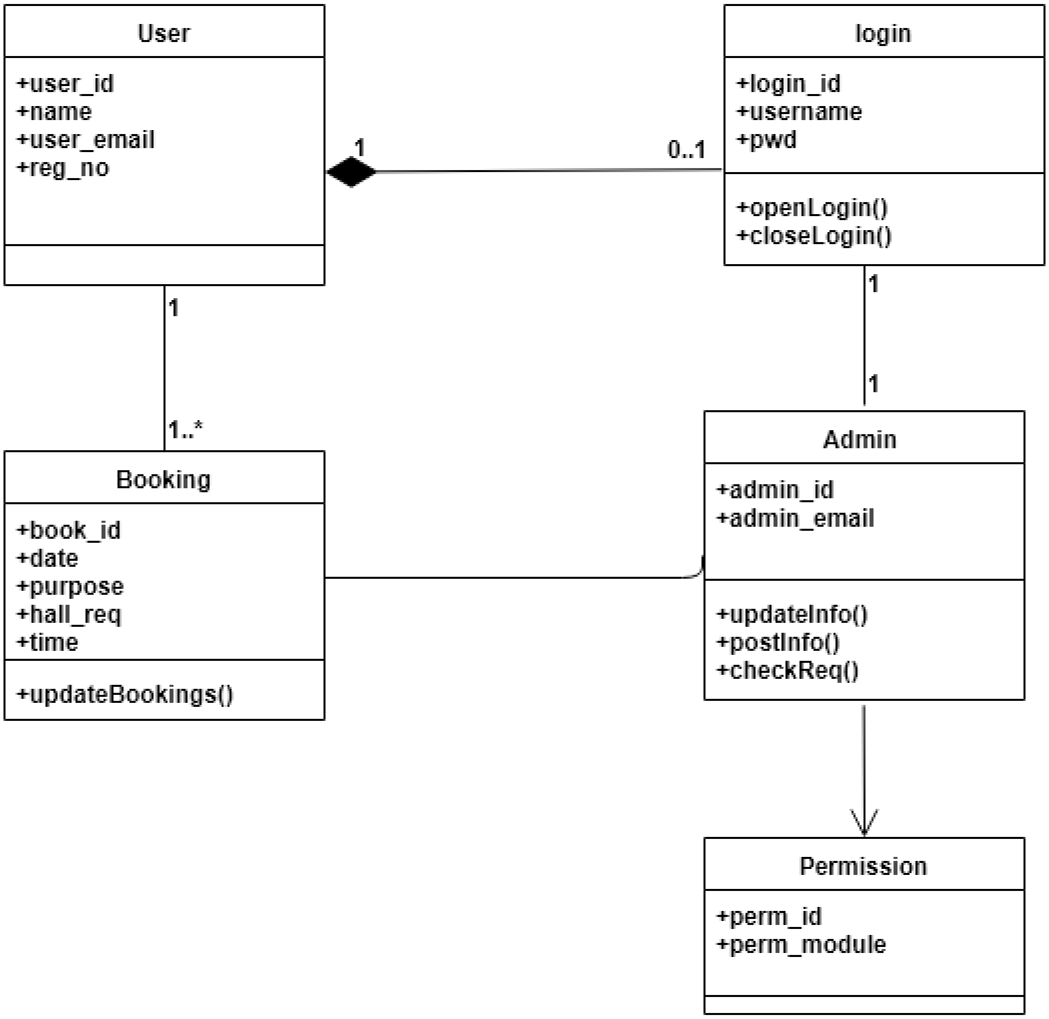


6.3.3 Activity Diagram for Update Attendance

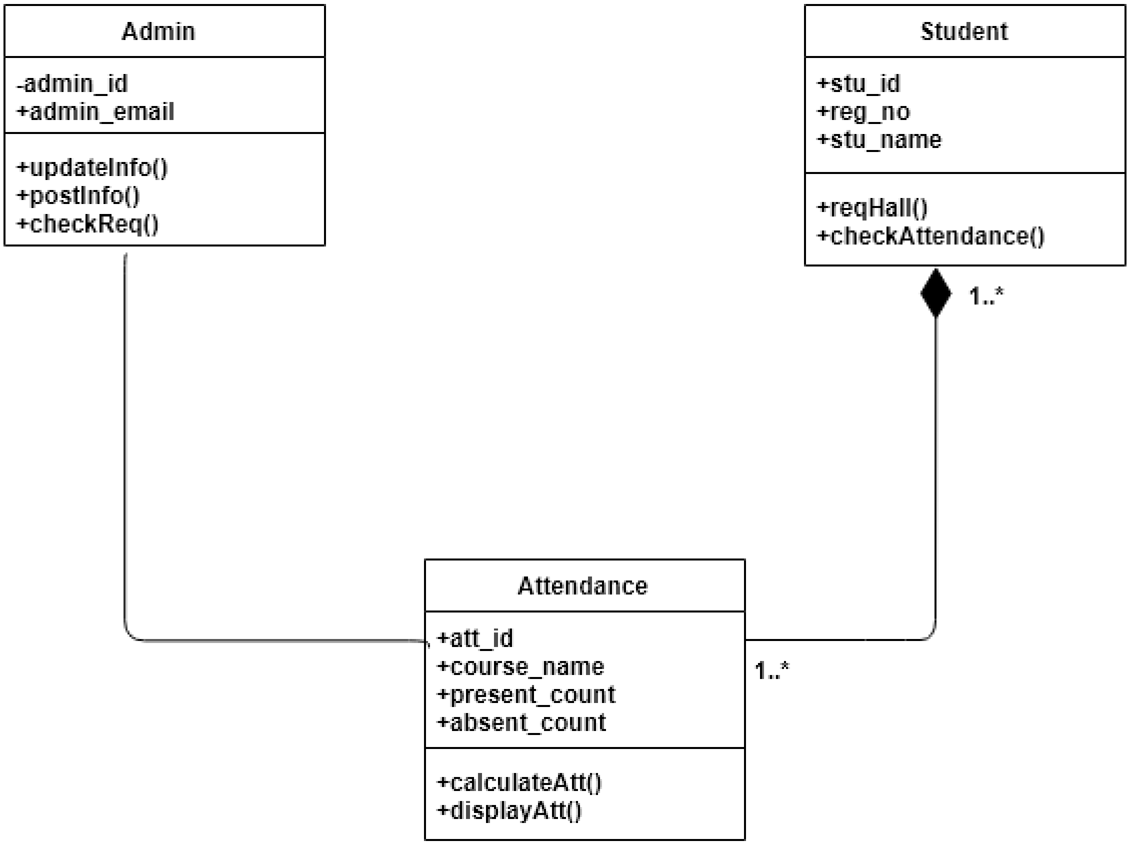


6.4 Class diagram

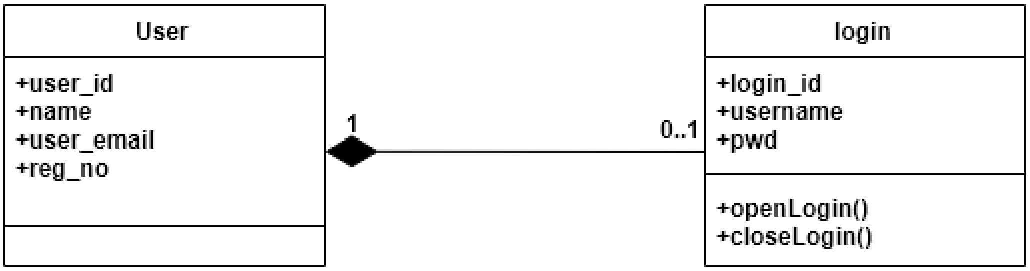
6.4.1 Reservation system



6.4.2 Attendance System

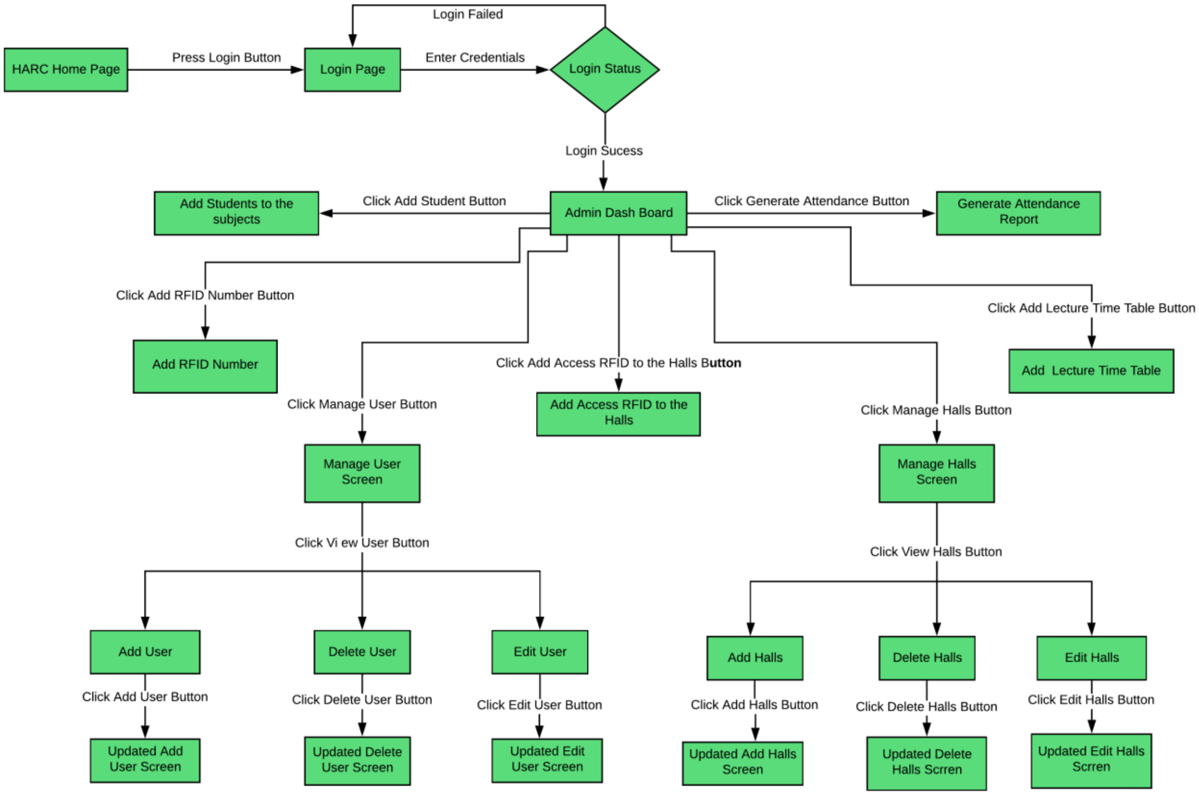


6.4. 3 Access System

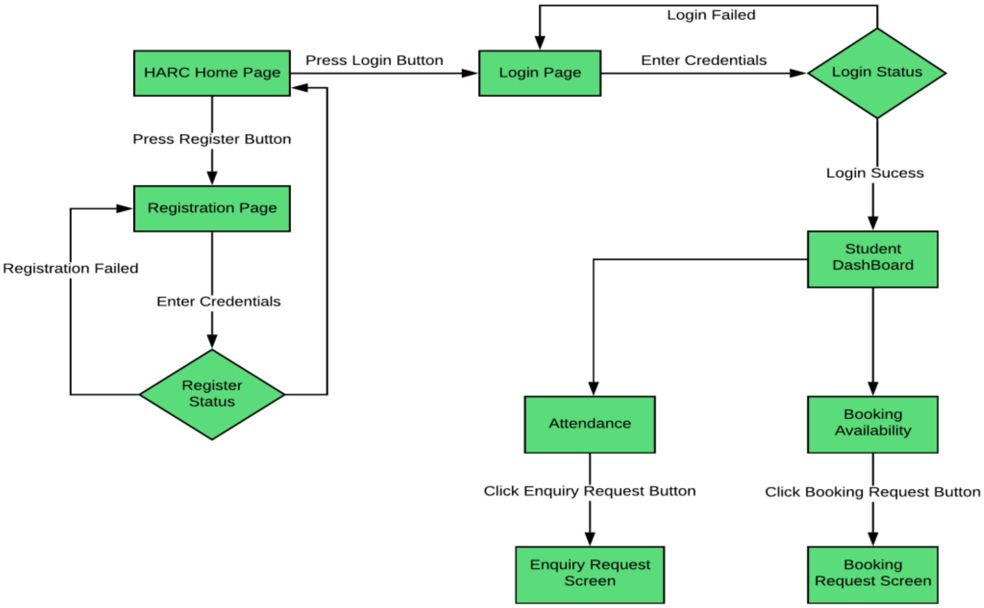


6.5 User Interface Flow Diagram

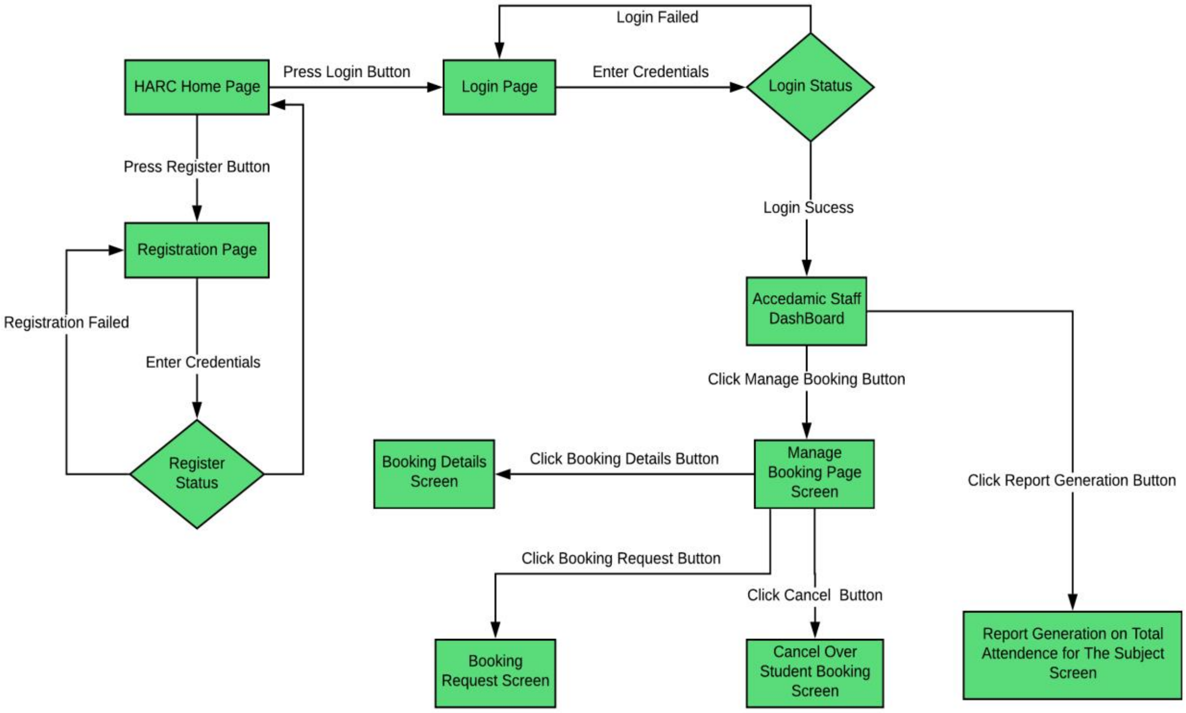
6.5.1 User Interface Flow Diagram for Admin



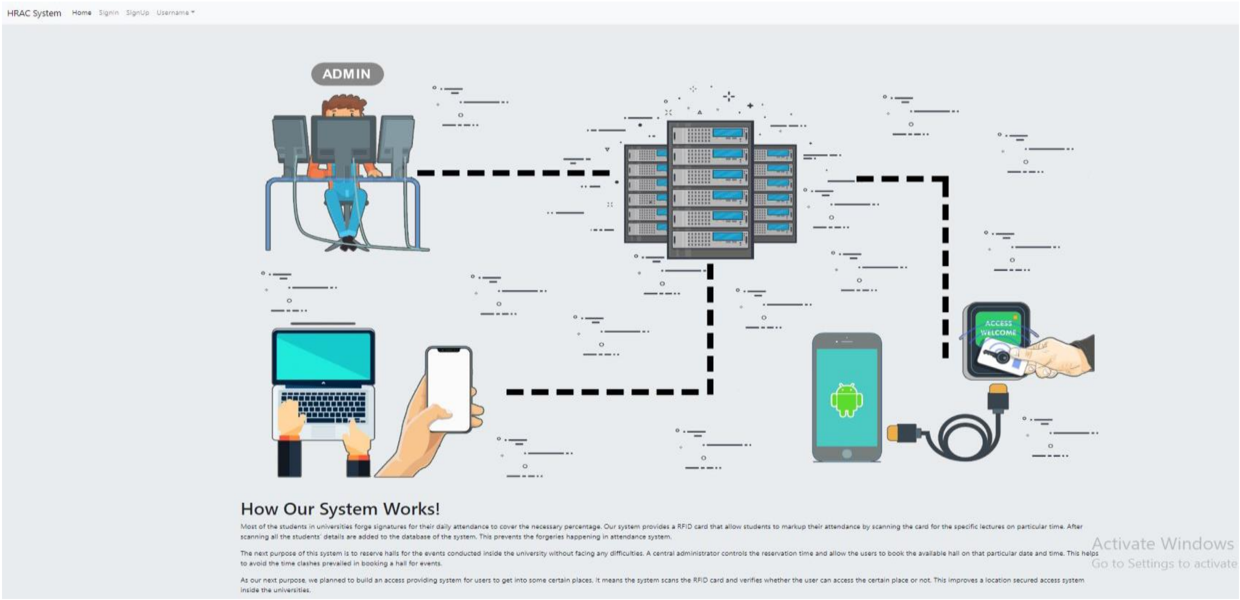
6.5.2 User Interface Flow Diagram for Student



6.5.3 User Interface Flow diagram for Academic Staff


HARC Home Page
Press Login Button
Login Page
Login Failed
Enter Credentials
Login Status
Login Sucess
Press Register Button
Registration Page
Registration Failed
Enter Credentials
Register Status
Accedamic Staff DashBoard
Click Manage Booking Button
Manage Booking Page Screen
Click Booking Details Button
Booking Details Screen
Click Report Generation Button
Click Booking Request Button
Click Cancel Button
Booking Request Screen
Cancel Over Student Booking Screen
Report Generation on Total Attendence for The Subject Screen

7. User Interface Mockups



How Our System Works!

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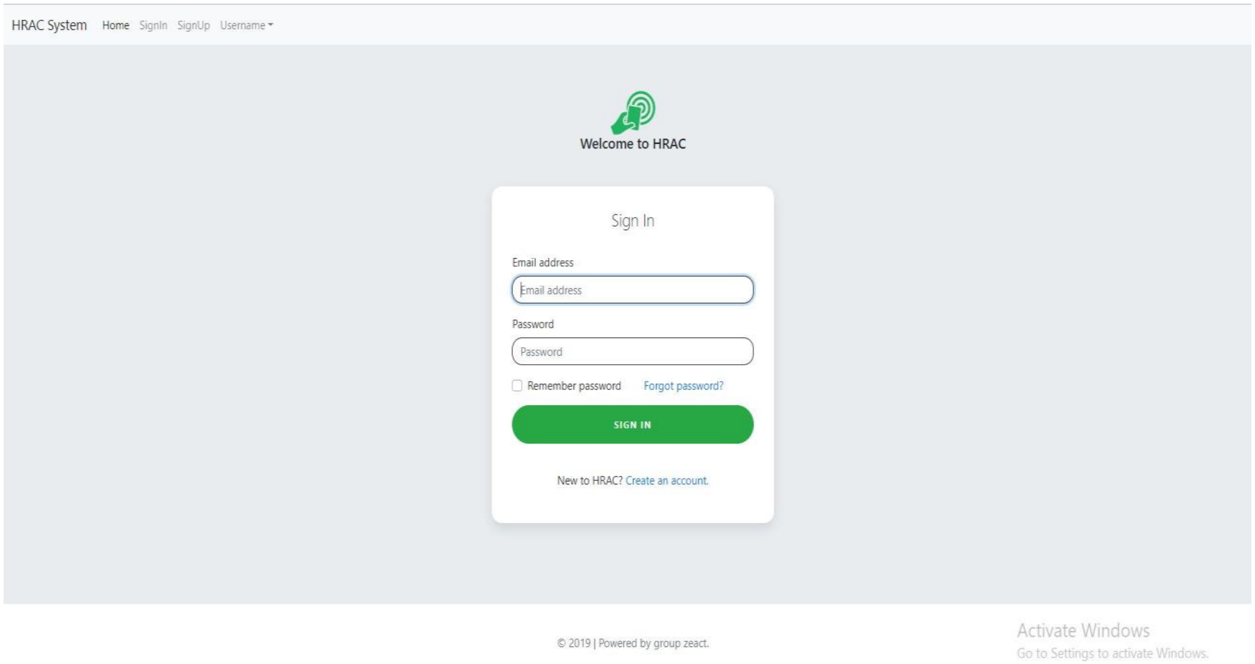

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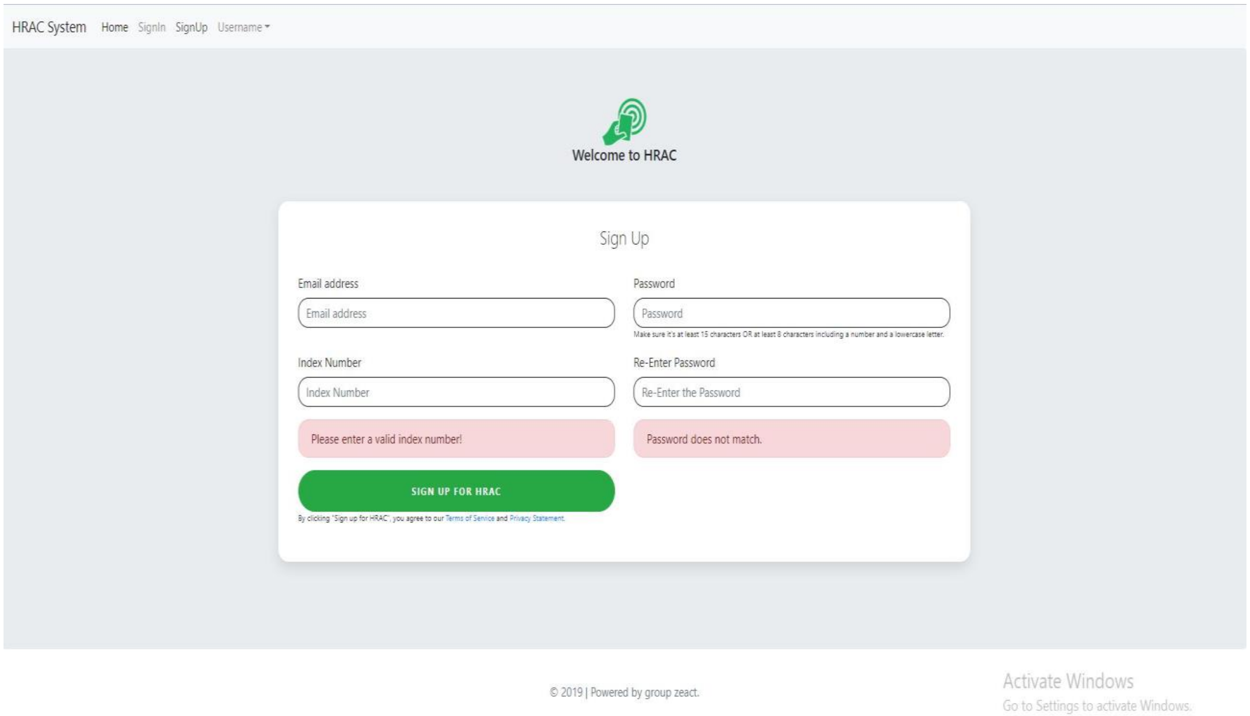

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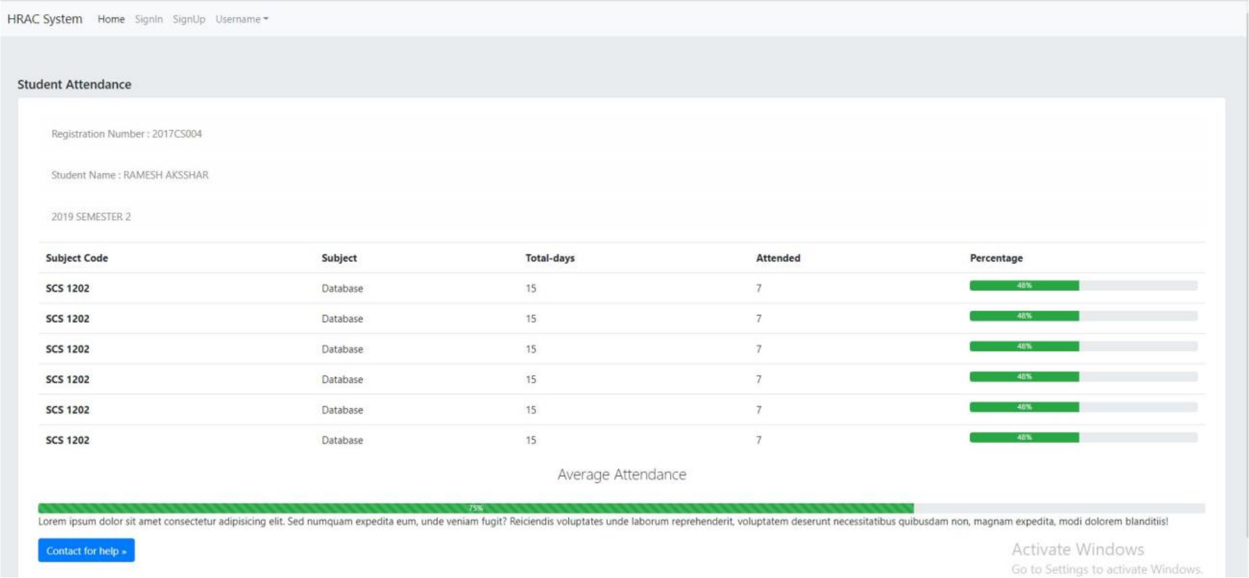

Student Attendance

Registration Number : 2017CS004

Student Name : RAMESH AKSSHAR

2019 SEMESTER 2

Subject Code	Subject	Total-days	Attended	Percentage
SCS 1202	Database	15	7	48%
SCS 1202	Database	15	7	48%
SCS 1202	Database	15	7	48%
SCS 1202	Database	15	7	48%
SCS 1202	Database	15	7	48%
SCS 1202	Database	15	7	48%

Average Attendance

75%

Lorem ipsum dolor sit amet consectetur adipisicing elit. Sed numquam expedita eum, unde veniam fugit? Reiciendis voluptates unde laborum reprehenderit, voluptatem deserunt necessitatibus quibusdam non, magnam expedita, modi dolorem blanditiis!