



Second term 1441/2020

**Software Engineering (CS- 310)**  
**BSCS- Section: B**

**Project-Phase No: 2**  
**College Tracking System**  
**(Design)**

**Submitted By**

**Ahmed majed Alotaibi (438020712) – Coordinator**  
**Fahad Abdulaziz Alshaya(439016350)**  
**Ibraheem saleh Altuwayjiri(439013074)**  
**Mohammed khaled Alnasser (439014350)**  
**Khalid Abdulaziz Alotaibi(439012737)**

**Supervisor**

**Dr.Sultan Alqahtani**

**Date: 24/3/2020**

## Table of Contents

<b>ABSTRACT:</b>	<b>3</b>
<b>1.INTRODUCTION:</b>	<b>3</b>
<b>2. DESIGN:</b>	<b>4</b>
<b>2.1. USE-CASE DIAGRAM</b>	<b>4</b>
<b>2.2. MVC PATTERN</b>	<b>5</b>
<b>2.3. CLASS DIAGRAM</b>	<b>6</b>
<b>2.3.1. User class:</b>	<b>6</b>
<b>2.3.2. FacultyStaff_Student class:</b>	<b>7</b>
<b>2.3.2. FacultyStaff class:</b>	<b>10</b>
<b>2.4 STATE DIAGRAM</b>	<b>11</b>
<b>2.5. FLOWCHARTS DIAGRAMS</b>	<b>19</b>
<b>2.6. SEQUENCE DIAGRAM</b>	<b>34</b>
<b>3. USER INTERFACE DESIGN</b>	<b>42</b>
<b>3.1. PICK ROLE PAGE</b>	<b>42</b>
<b>3.2. LOG-IN PAGE</b>	<b>43</b>
<b>3.3. SIGN-UP PAGE</b>	<b>44</b>
<b>3.4. FORGOT PASSWORD PAGE</b>	<b>45</b>
<b>3.5. HOME PAGE</b>	<b>46</b>
<b>3.6. CLASSROOM PAGE</b>	<b>47</b>
<b>3.7. FACULTY STAFF PAGE</b>	<b>48</b>
<b>3.8. EXAMS PAGE</b>	<b>49</b>
<b>3.9. ADD EXAM PAGE</b>	<b>50</b>
<b>3.10. REMOVE EXAM PAGE</b>	<b>51</b>
<b>3.11. NEWS PAGE</b>	<b>52</b>
<b>3.12. SCHEDULE PAGE</b>	<b>53</b>
<b>3.13. ADD COURSE PAGE</b>	<b>54</b>
<b>3.14. REMOVE COURSE PAGE</b>	<b>55</b>
<b>3.15. ME PAGE</b>	<b>56</b>
<b>3.16. EDIT ME PAGE</b>	<b>57</b>
<b>4. CONTRIBUTION:</b>	<b>58</b>
<b>5. CONCLUSION:</b>	<b>58</b>

## **Abstract:**

College Tracking System is a mobile application, designed to guide students and staff members and assist them with their schedule. This application functionality cannot provide any less than these categories. Class location identification, teaching faculties schedules and emails, method of communications as well as office identification and student's examination schedule. In addition, College Tracking System is a standalone application and will behave properly when certain events and properties are met. A secure connection with the university's local area network and a GPS to locate student within the college halls. College tracking system provide a well-organized user interface with color contrast to make the navigation easier.

## **1.Introduction:**

Helping students and guiding them is one of the computer science college management tasks, they are working hard to improve it. In the meantime, students have difficulties searching for certain classrooms, faculty staff office or searching for exam's room and time. In addition, College Tracking System will help college management, staff, student and visitors on those difficulties. nonetheless, our project team has been giving his utmost best since day one. Furthermore, two weeks after our SRS document handed out and our functional and non-functional requirement stated, the way to design our program has been paved. Subsequently, a meeting has been held to discuss the methods of tackling the design implementation. The fruits of such discussion will be explained here in details.

## 2. Design:

### 2.1. Use-Case Diagram

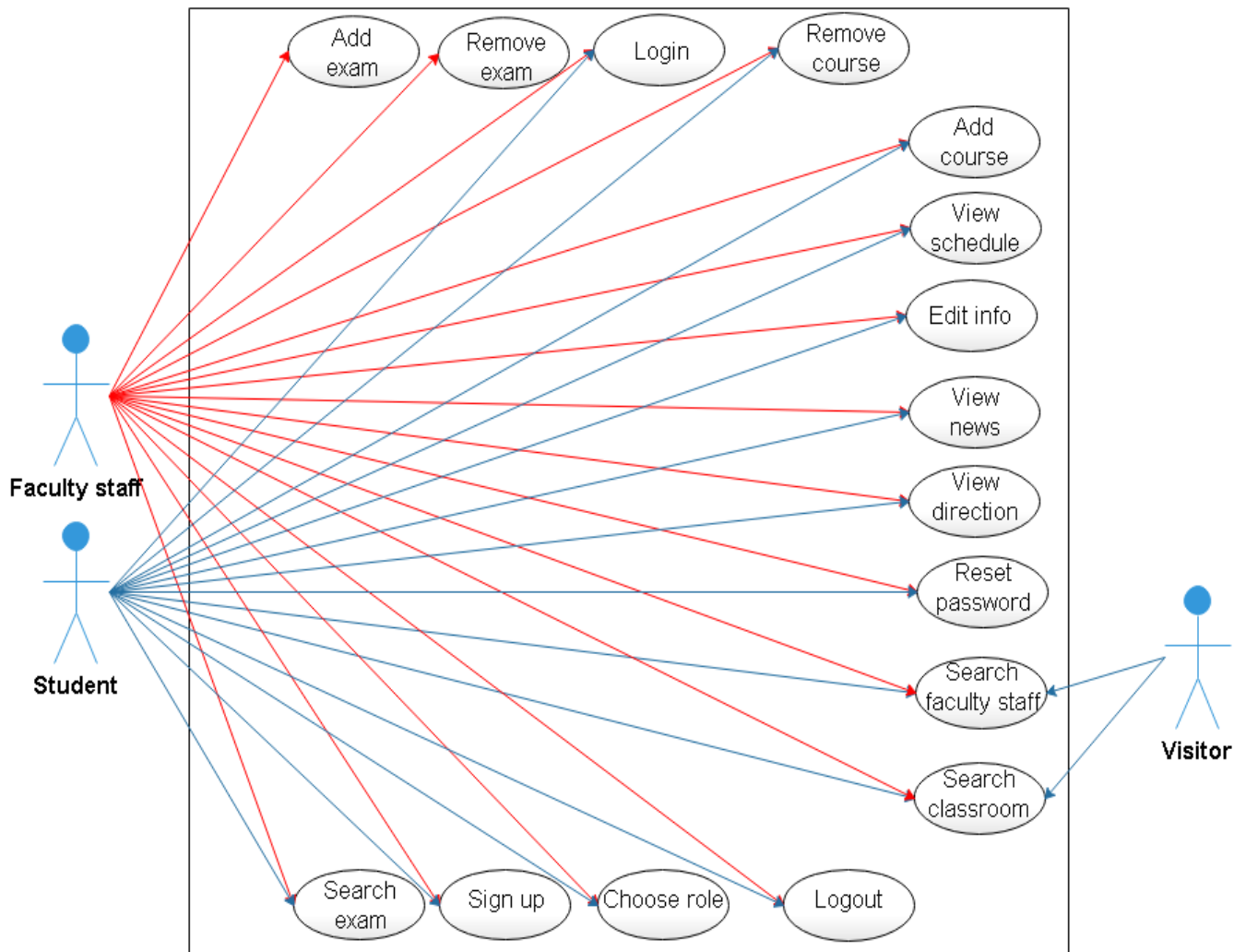


Figure 1 - Use-case diagram

## 2.2. MVC Pattern

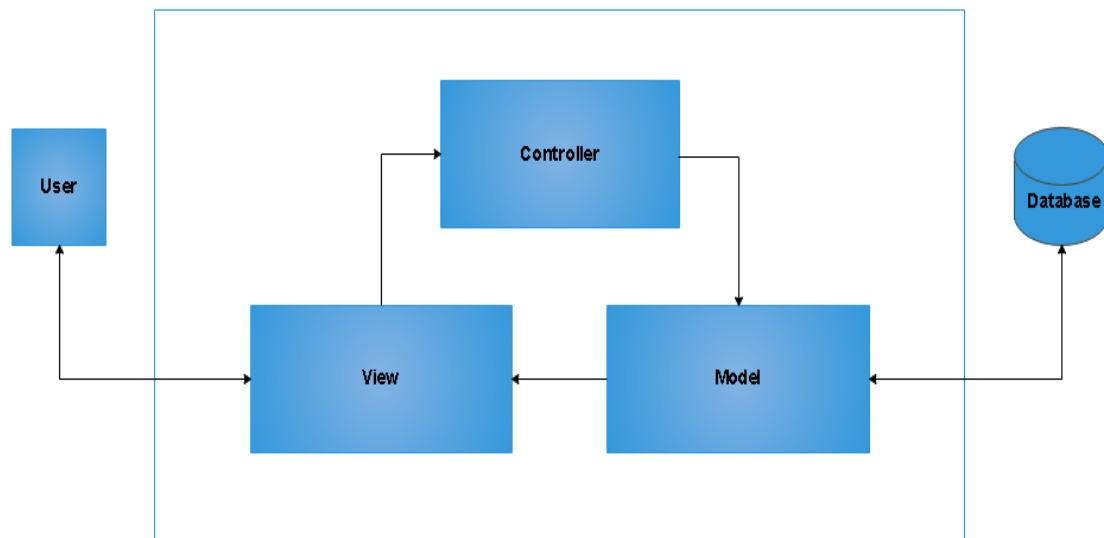


Figure 2 - MVC pattern

## 2.3. Class diagram

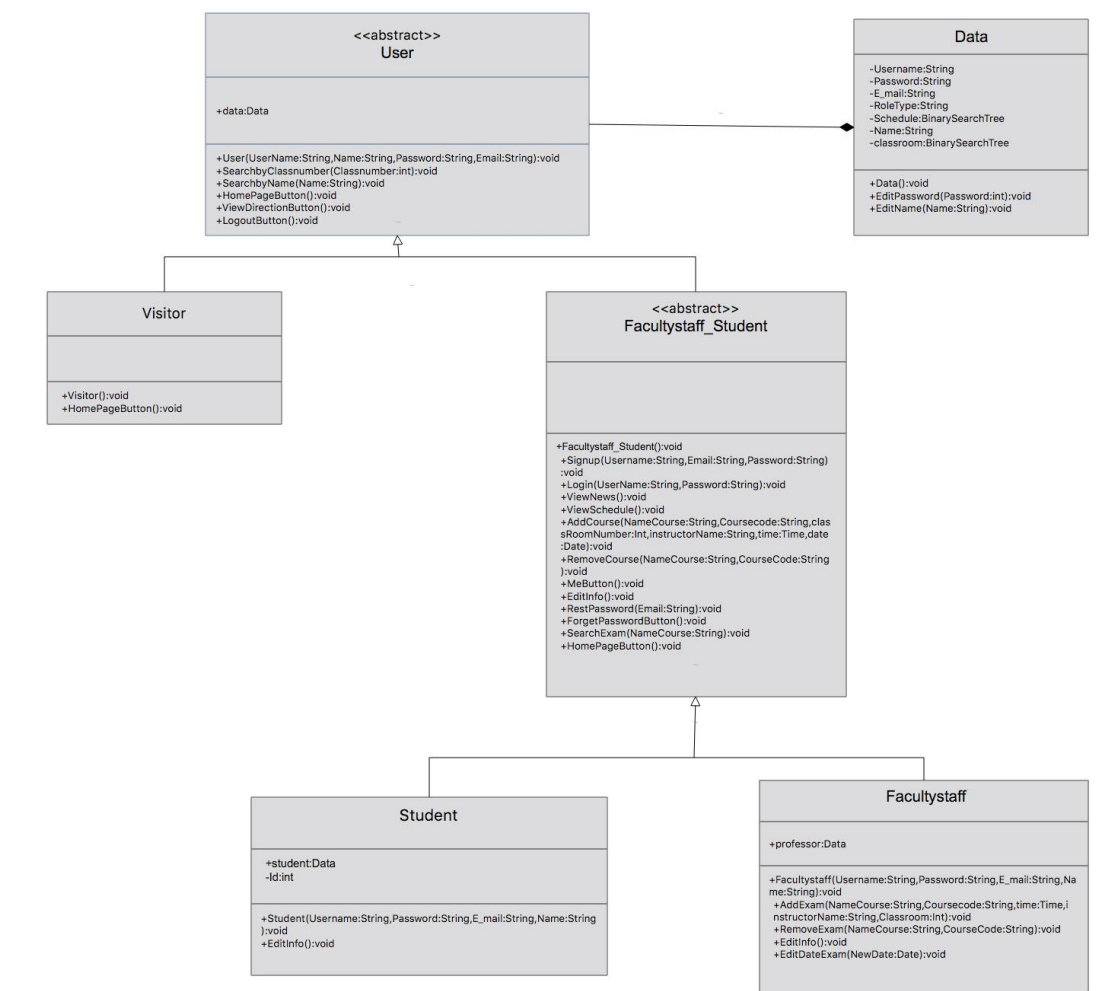


Figure 3 - Class diagram

### 2.3.1. User class:

<b>Class</b>	<b>User</b>
<b>Method</b>	<b>SearchByClassNumber</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>ClassNumber:int</b>
<b>Description</b>	<b>Searches for the classroom location by its number</b>

<b>Class</b>	<b>User</b>
<b>Method</b>	<b>SearchByName</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>Name:String</b>
<b>Description</b>	<b>Searches for the location of the doctor's office by his name</b>

<b>Class</b>	<b>User</b>
<b>Method</b>	<b>HomePageButton</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>none</b>
<b>Description</b>	<b>Open HomePage</b>

<b>Class</b>	<b>User</b>
<b>Method</b>	<b>ViewDirectionButton</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>none</b>
<b>Description</b>	<b>ViewDirection</b>

<b>Class</b>	<b>User</b>
<b>Method</b>	<b>LogOutButton</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>none</b>
<b>Description</b>	<b>Log out of the app</b>

### 2.3.2. FacultyStaff\_Student class:

<b>Class</b>	<b>FacultyStaff_Student</b>
<b>Method</b>	<b>Signup</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>Username:String,Email:String&gt;Password:String</b>
<b>Description</b>	<b>Register for the app</b>

<b>Class</b>	<b>FacultyStaff_Student</b>
<b>Method</b>	<b>Login</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>UserName:String&gt;Password:string</b>
<b>Description</b>	<b>Login</b>

<b>Class</b>	<b>FacultyStaff_Student</b>
<b>Method</b>	<b>ViewNews</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>none</b>
<b>Description</b>	<b>Open “News” page.</b>

<b>Class</b>	<b>FacultyStaff_Student</b>
<b>Method</b>	<b>ViewSchedule</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>none</b>
<b>Description</b>	<b>Open View Schedule page.</b>

<b>Class</b>	<b>FacultyStaff_Student</b>
<b>Method</b>	<b>AddCourse</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>CourseName:String, CourseCode:String, ClassroomNumber:int, InstructorName:string, Time:String, date:String</b>
<b>Description</b>	<b>Add a course in the schedule</b>

<b>Class</b>	<b>FacultyStaff_Student</b>
<b>Method</b>	<b>RemoveCourse</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>CourseName:String, CourseCode:String</b>
<b>Description</b>	<b>Delete a course from the schedule</b>

<b>Class</b>	<b>FacultyStaff_Student</b>
<b>Method</b>	<b>MeButton</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>none</b>
<b>Description</b>	<b>open the profile</b>

<b>Class</b>	<b>FacultyStaff_Student</b>
<b>Method</b>	<b>EditInfo</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>none</b>
<b>Description</b>	<b>Change of personal information</b>

<b>Class</b>	<b>FacultyStaff_Student</b>
<b>Method</b>	<b>RestPassword</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>Email:String</b>
<b>Description</b>	<b>Rest Password</b>



<b>Class</b>	<b>FacultyStaff_Student</b>
<b>Method</b>	<b>ForgetPasswordButton</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>UserName:String,Email:String</b>
<b>Description</b>	<b>Restore password</b>

<b>Class</b>	<b>FacultyStaff_Student</b>
<b>Method</b>	<b>SearchExam</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>NameCourse:String</b>
<b>Description</b>	<b>Finding a classroom location by course</b>

### 2.3.2. FacultyStaff class:

<b>Class</b>	<b>FacultyStaff</b>
<b>Method</b>	<b>AddExam</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>NameCourse:String,CourseCode:String Time:String,IstructorName:String ClassroomNumber:int</b>
<b>Description</b>	<b>Add a test for students</b>

<b>Class</b>	<b>FacultyStaff</b>
<b>Method</b>	<b>RemoveExam</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>NameCourse:String,CourseCode:String</b>
<b>Description</b>	<b>RemoveExam</b>

<b>Class</b>	<b>FacultyStaff</b>
<b>Method</b>	<b>EditInfo</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>none</b>
<b>Description</b>	<b>Change of personal information</b>

<b>Class</b>	<b>FacultyStaff</b>
<b>Method</b>	<b>EditDateExam</b>
<b>Visibility</b>	<b>public</b>
<b>Return type</b>	<b>void</b>
<b>Parameters, types</b>	<b>NewDate:String</b>
<b>Description</b>	<b>Change the test date</b>

## 2.4 State diagram

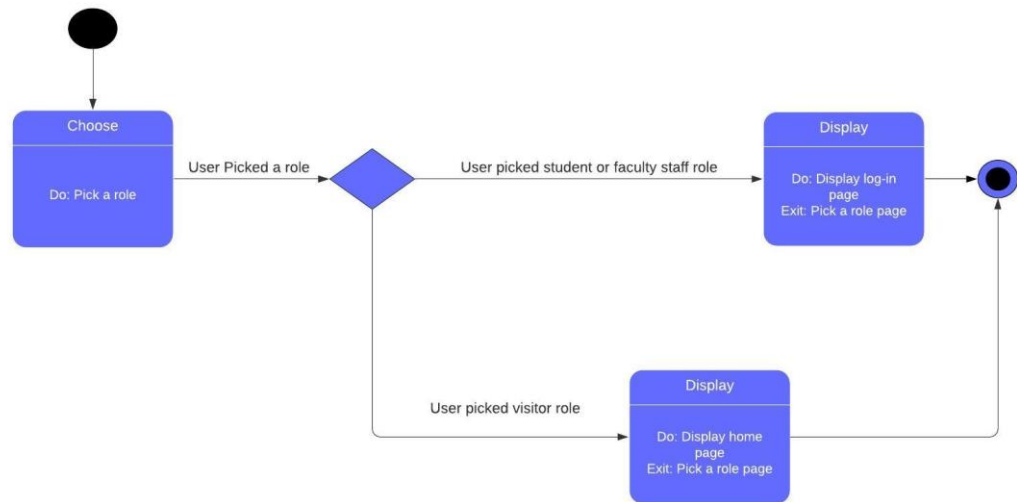


Figure 4 - Pick a role state diagram

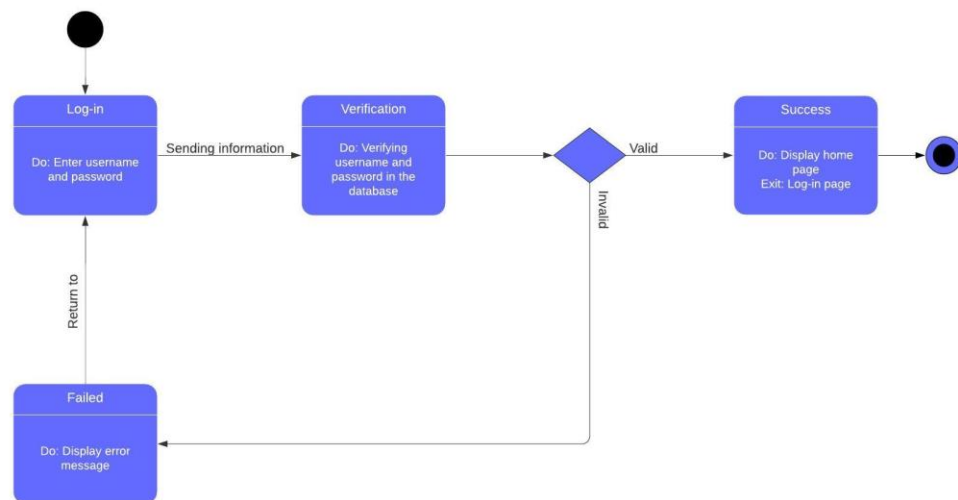


Figure 5 - Log-in state diagram

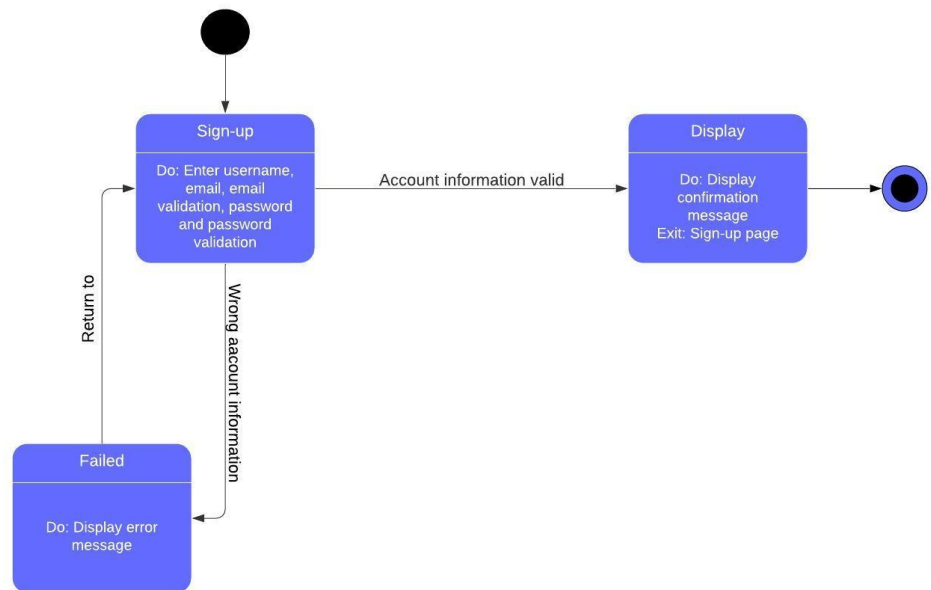


Figure 6 - Sign-up state diagram

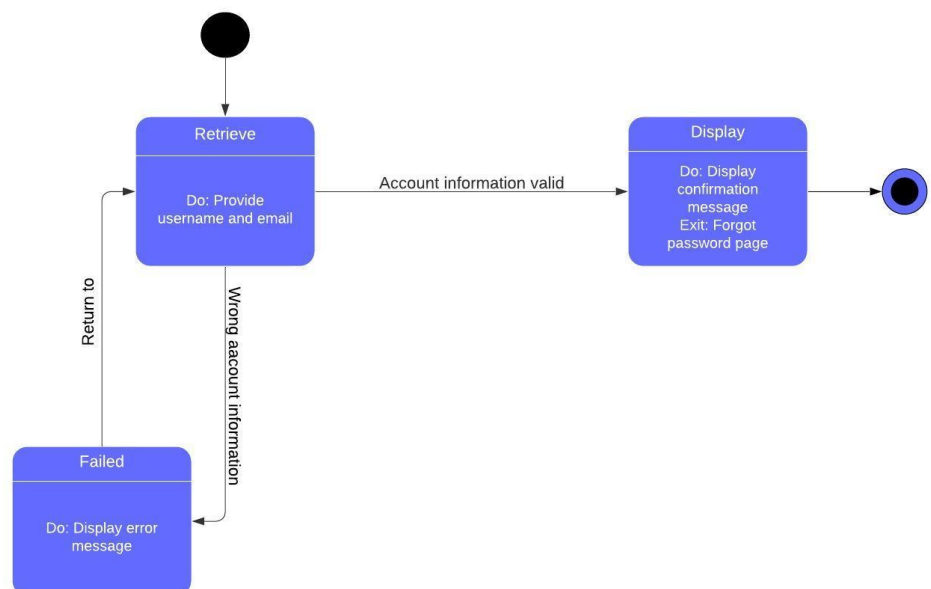


Figure 7 - Forgot password state diagram

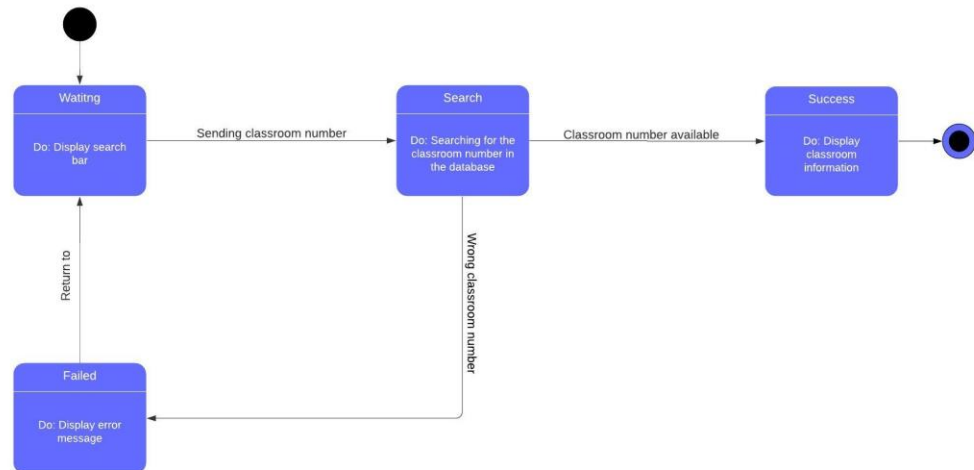


Figure 8 - Search classroom state diagram

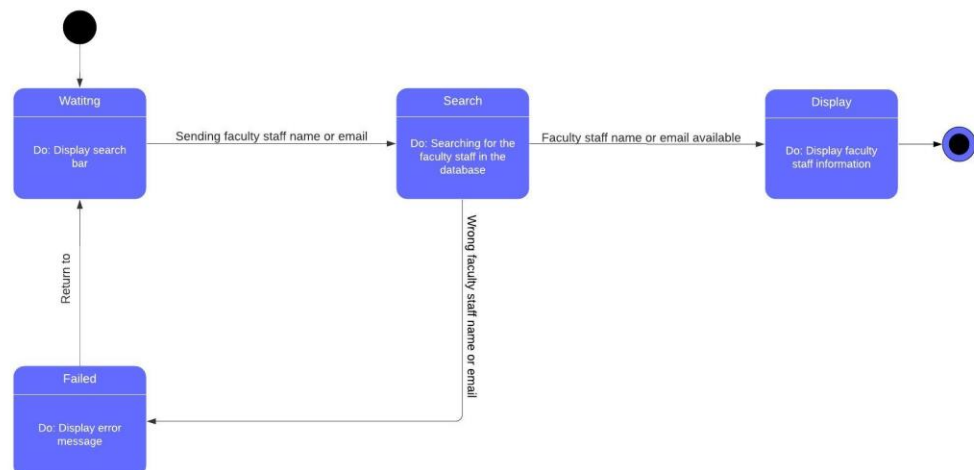


Figure 9 - Search faculty staff state diagram

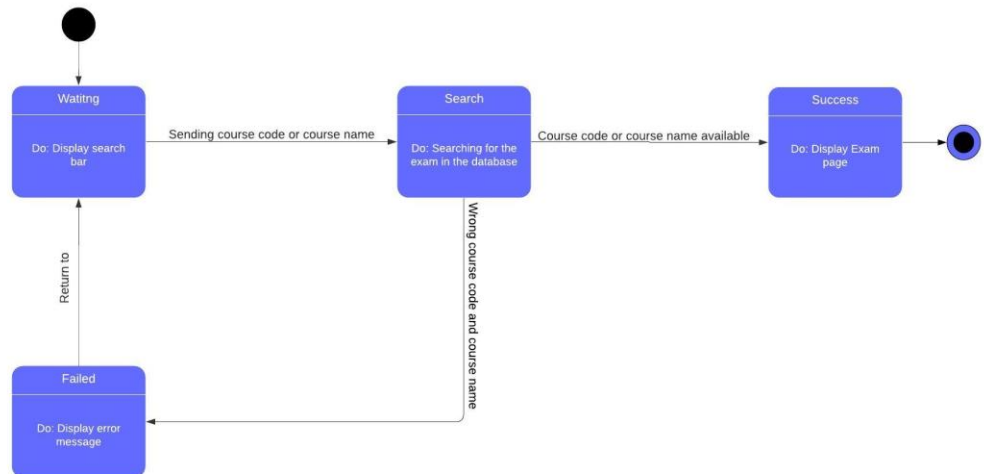


Figure 10 - Search exam state diagram

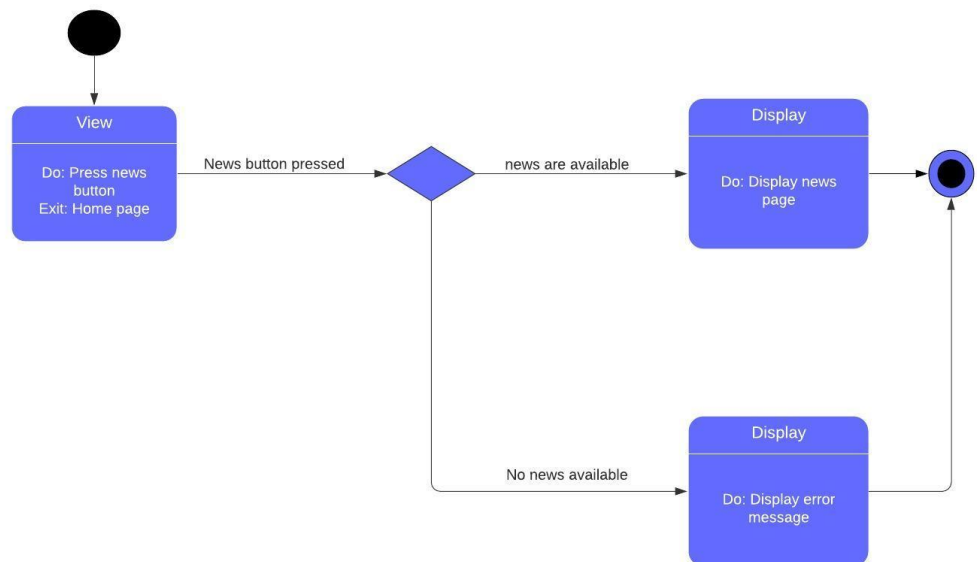


Figure 11 - News state diagram

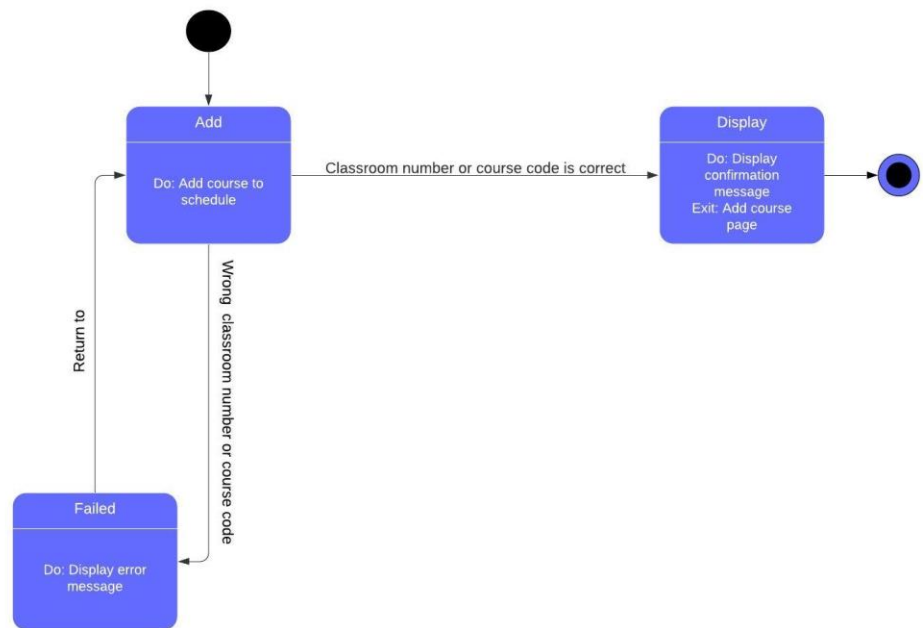


Figure 12 - Add course state diagram

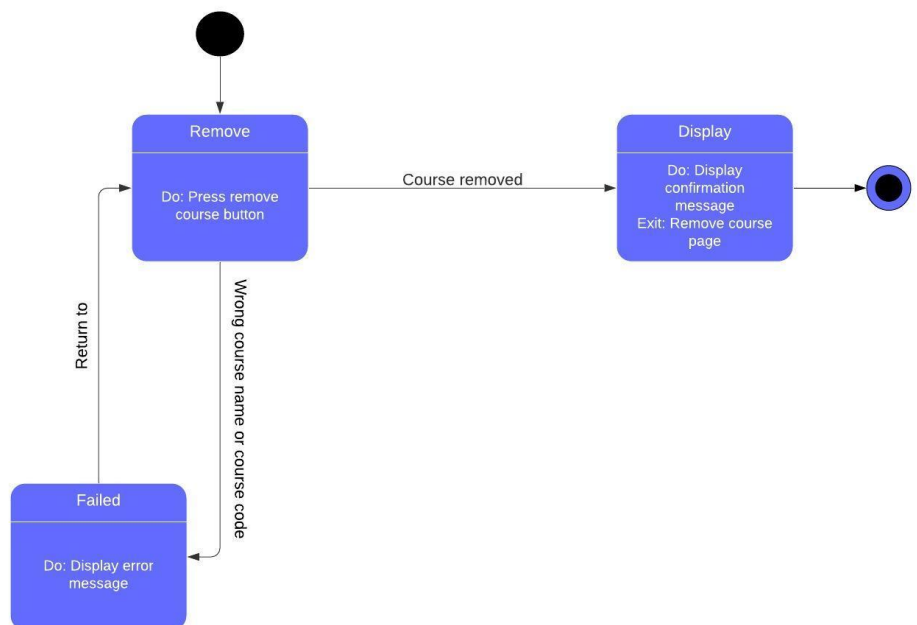


Figure 13 - Remove course state diagram

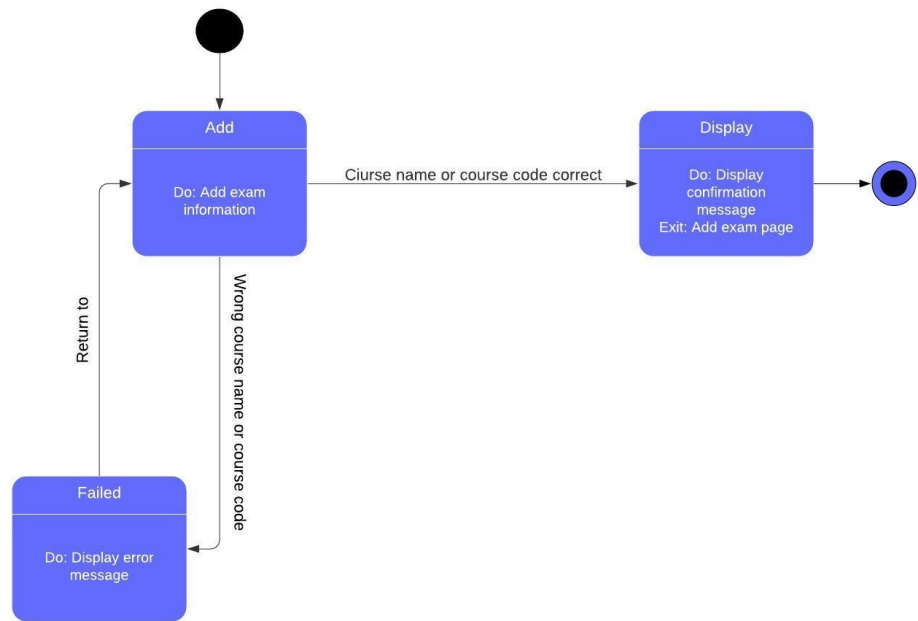


Figure 14 - Add exam state diagram

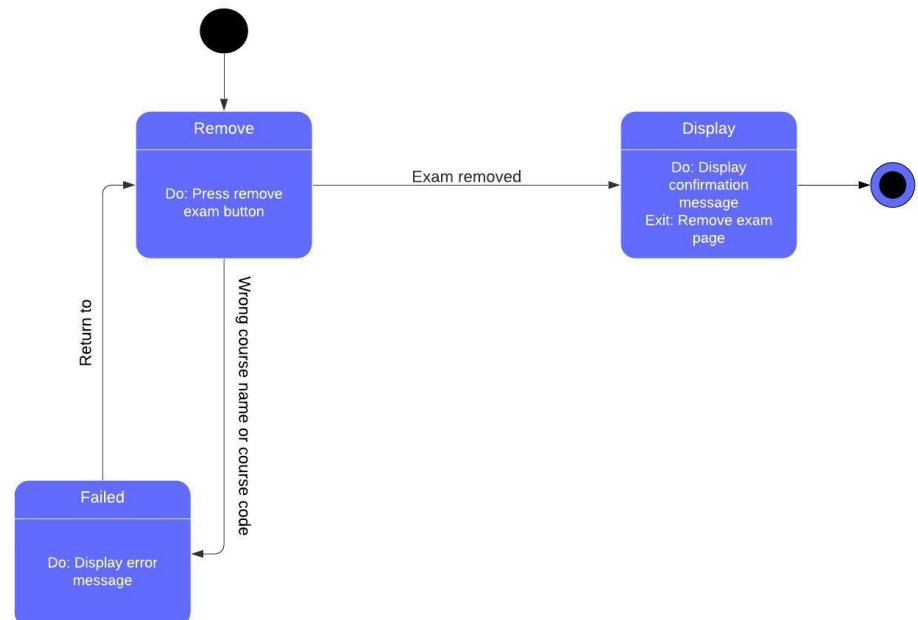


Figure 15 - Remove exam state diagram



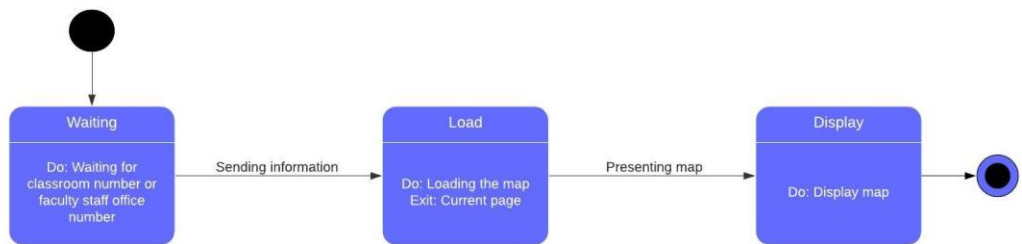


Figure 16 - Direction state diagram

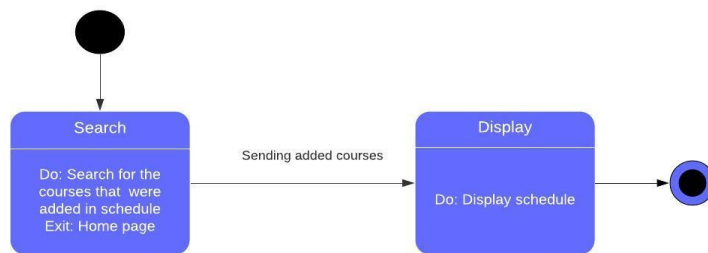


Figure 17 - Schedule state diagram

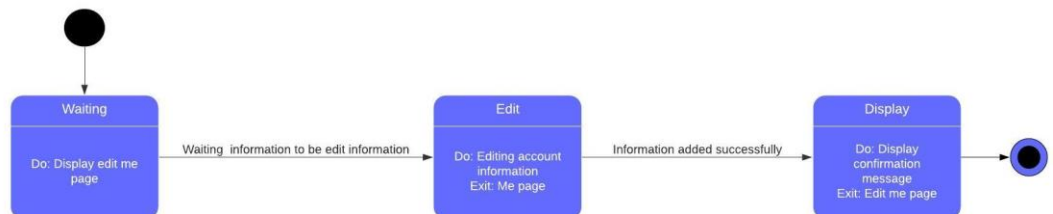


Figure 18 - Edit info state diagram

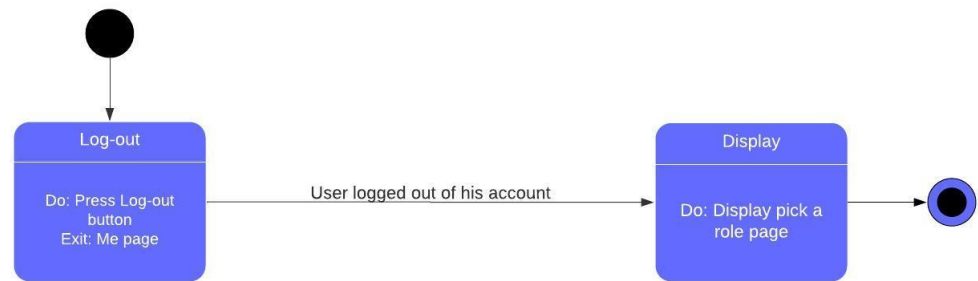


Figure 19 - Log-out state diagram

## 2.5. Flowcharts Diagrams

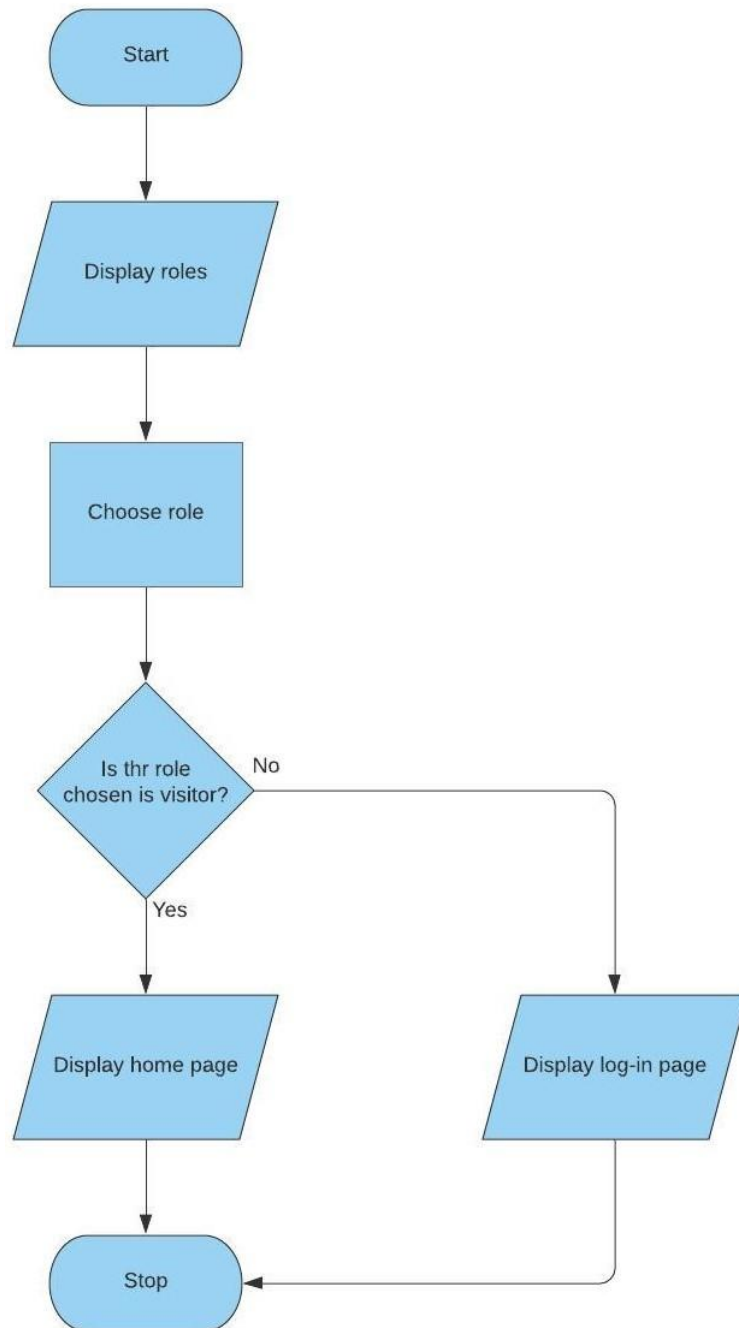


Figure 20 - Pick a role flowchart diagram

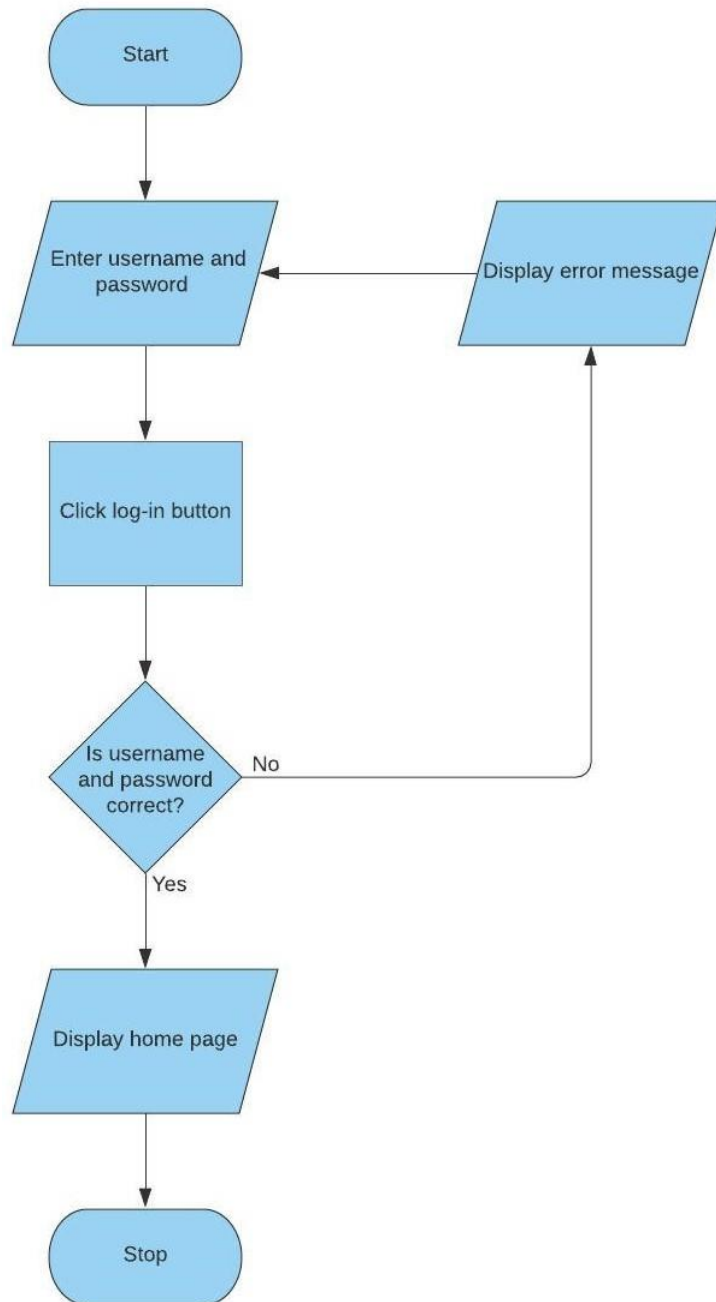


Figure 21 - Log-in flowchart diagram

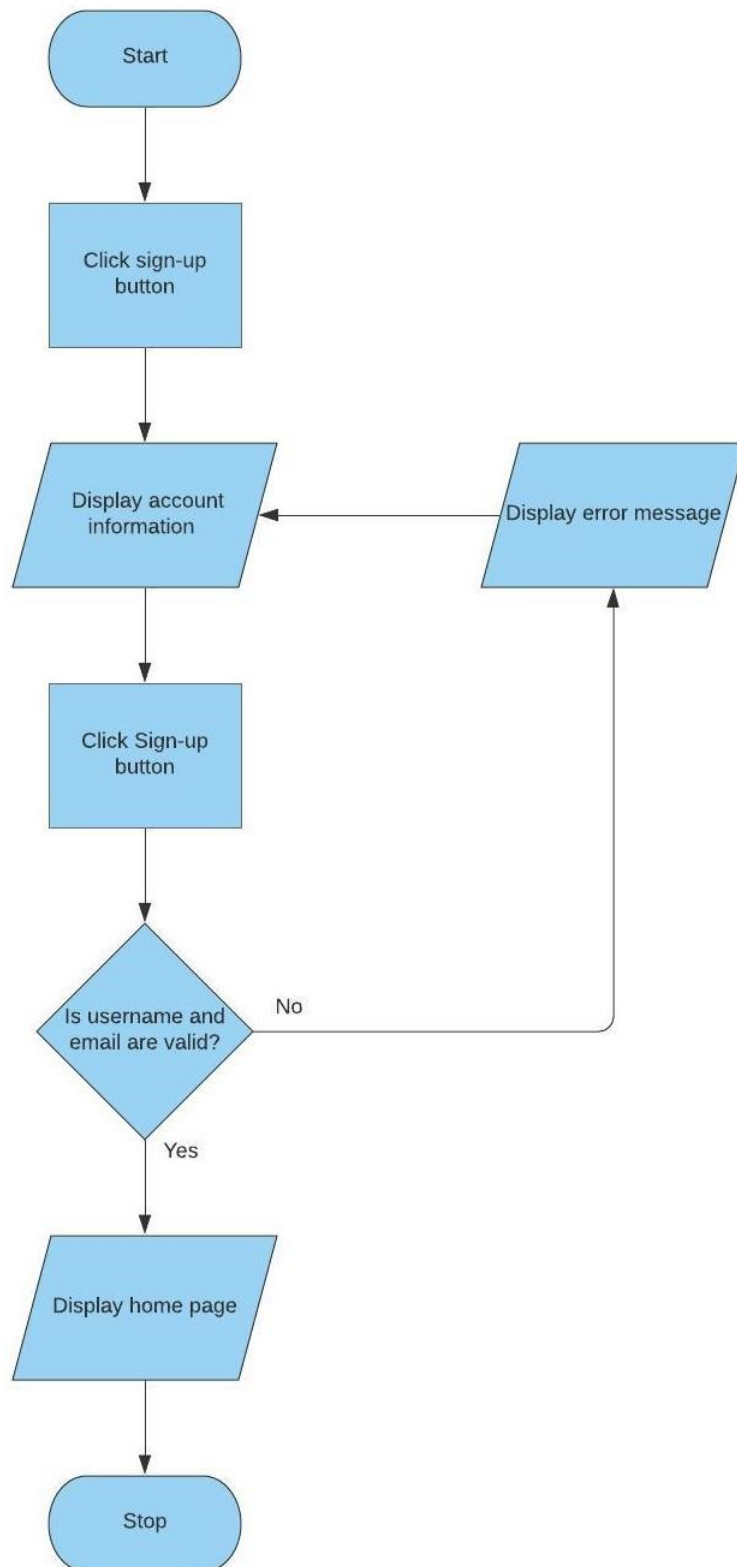


Figure 22 - Sign-up flowchart diagram

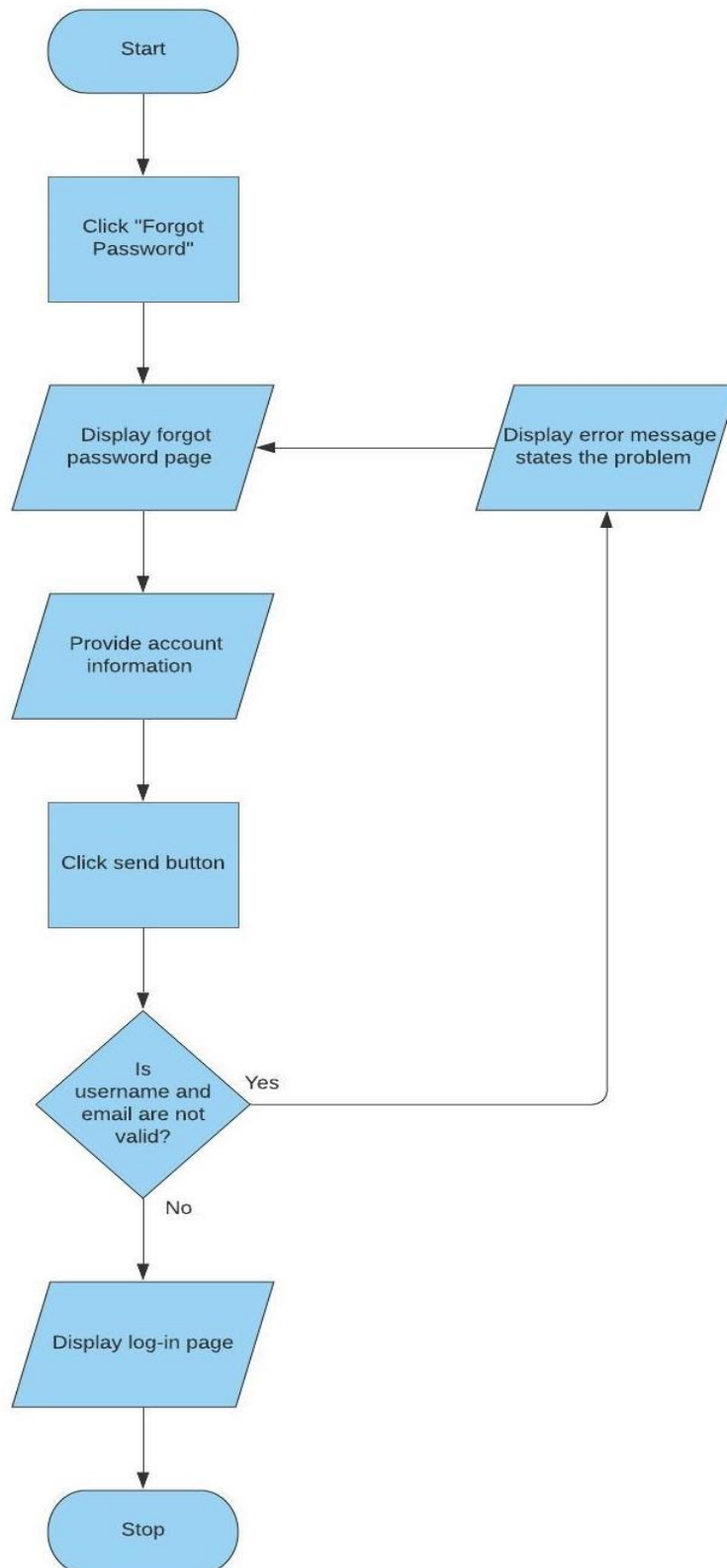


Figure 23 - Forgot password flowchart diagram

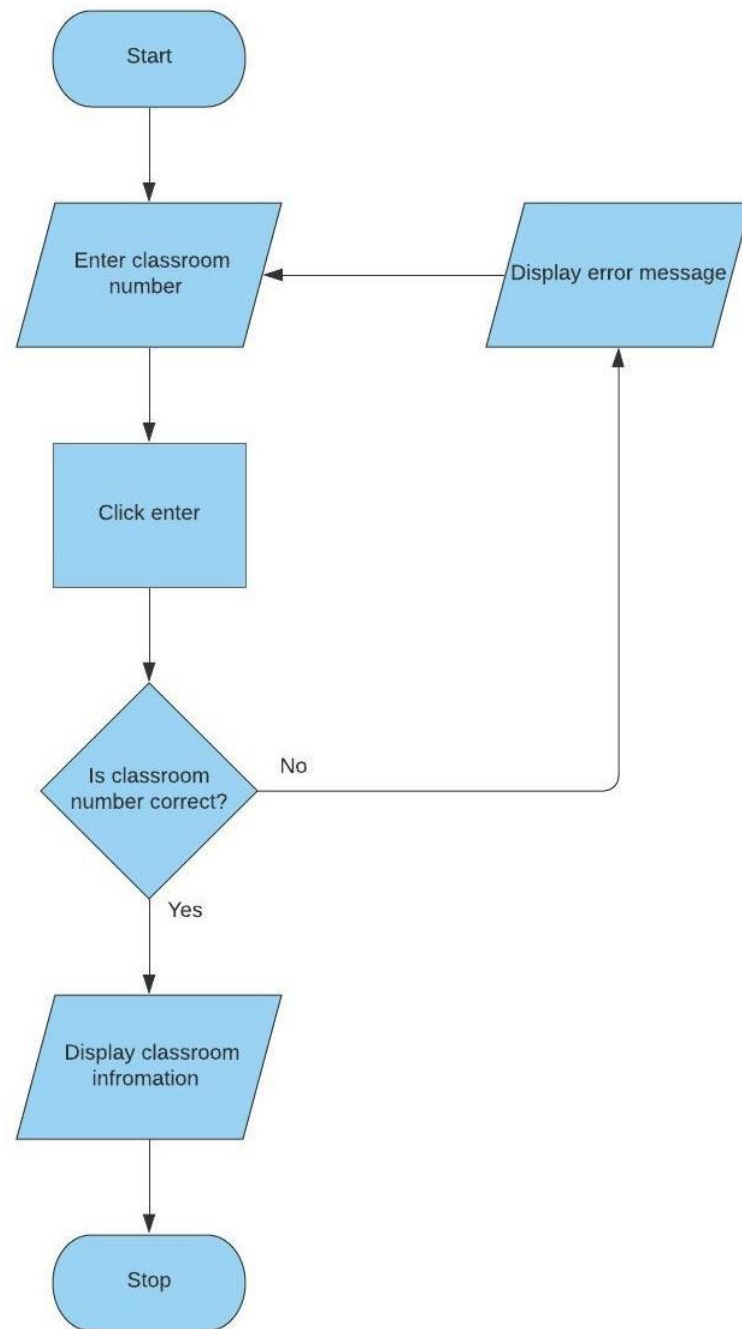


Figure 24 - Search classroom flowchart diagram

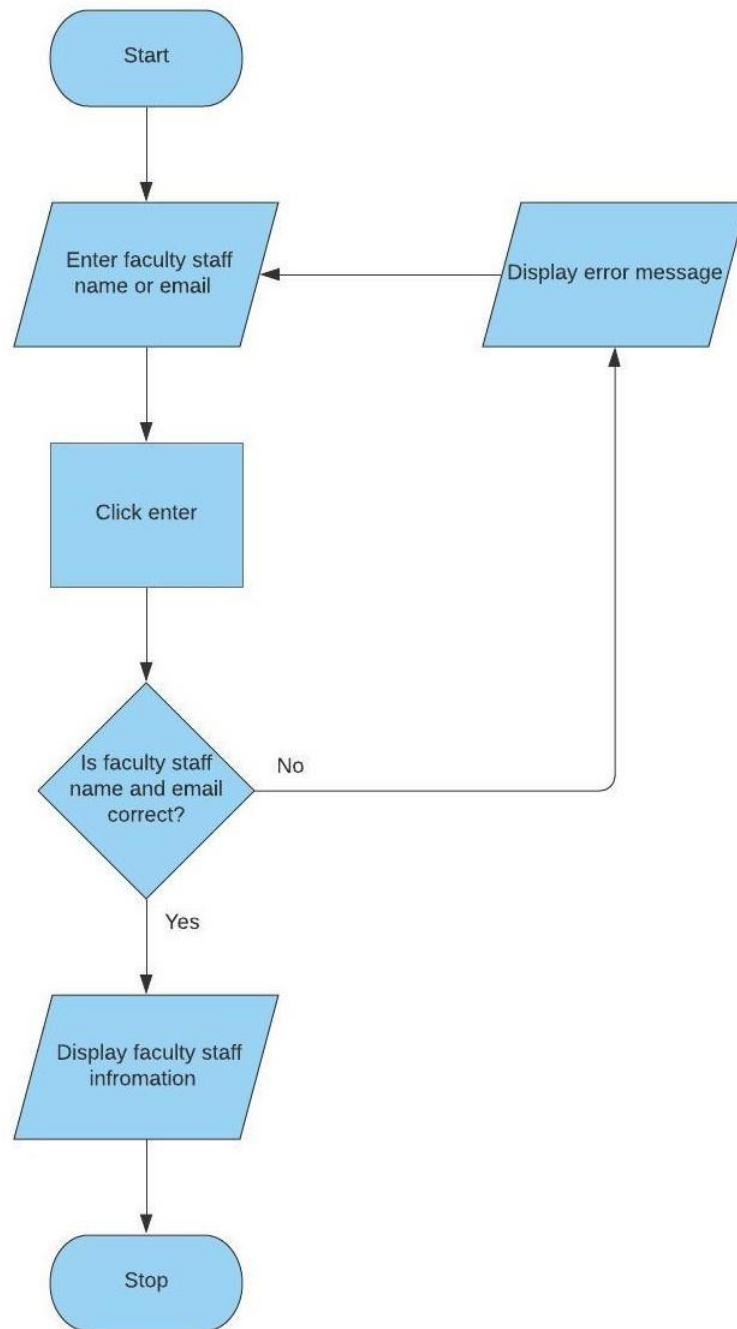


Figure 25 - Search faculty staff flowchart diagram



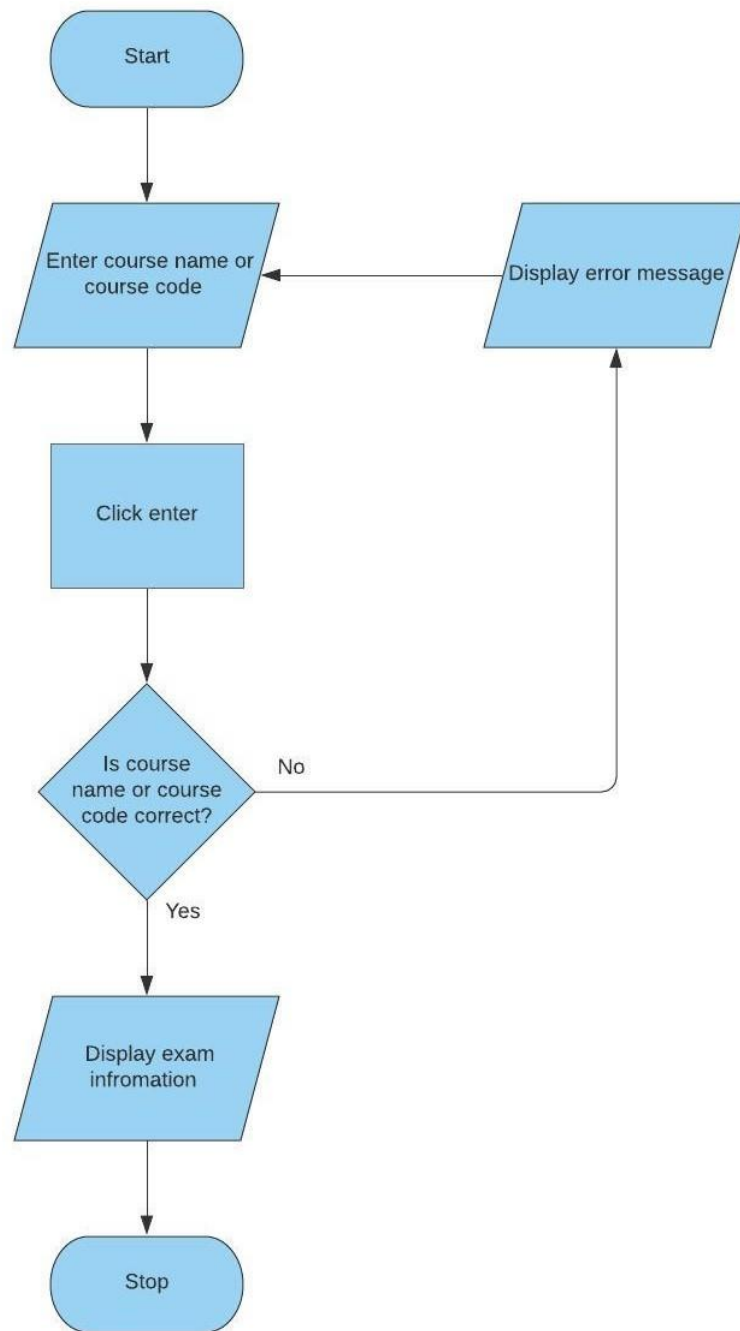


Figure 26 - Exam flowchart diagram

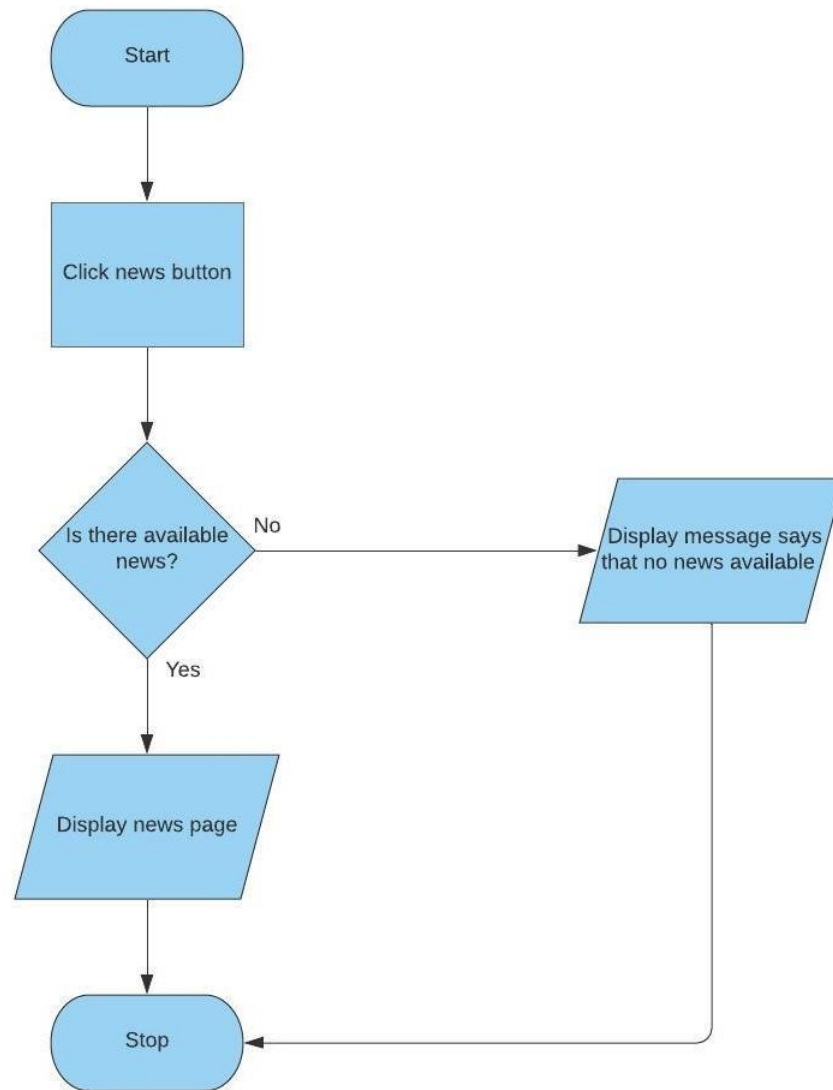


Figure 27 - News flowchart diagram

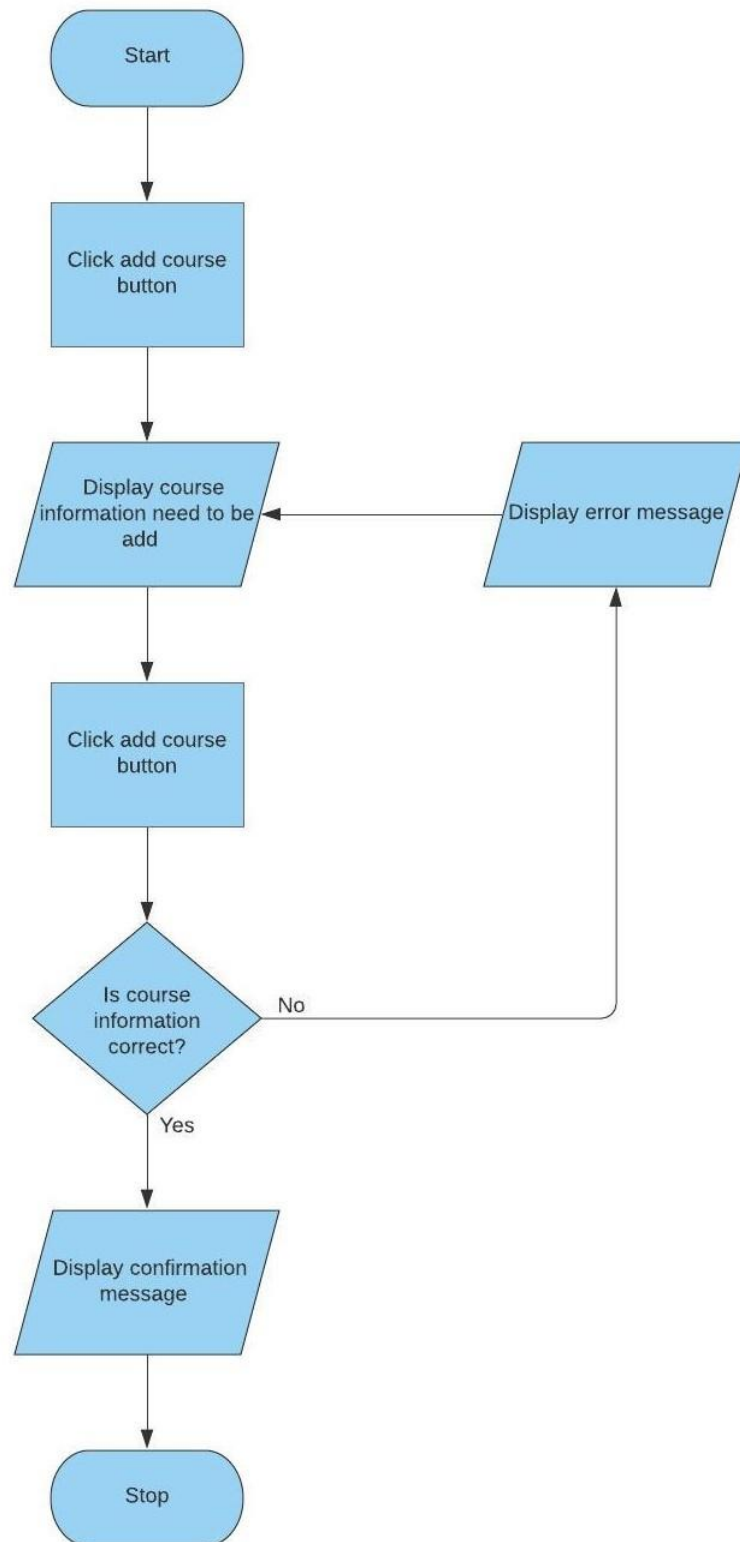


Figure 28 - Add course flowchart diagram

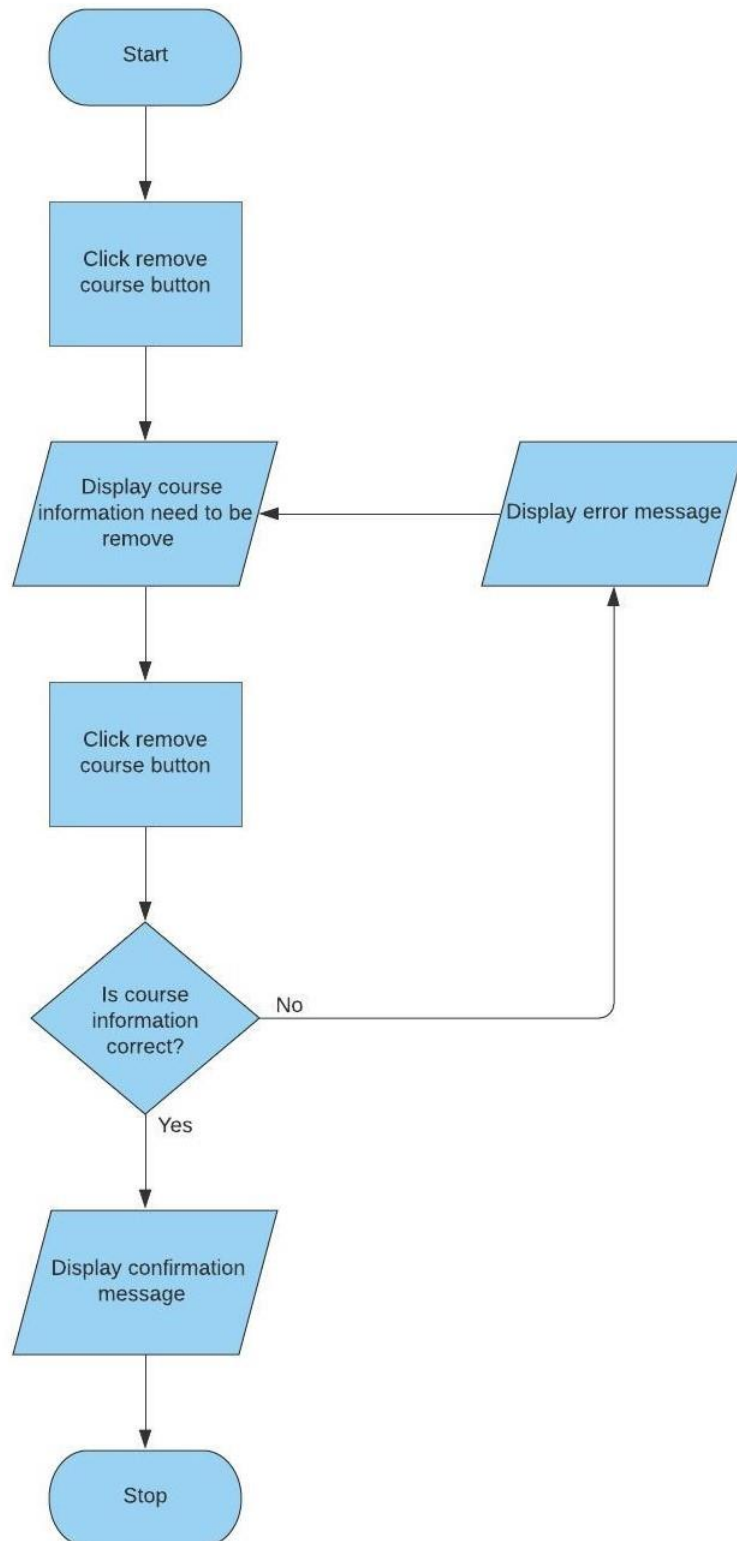


Figure 29 - Remove course flowchart diagram

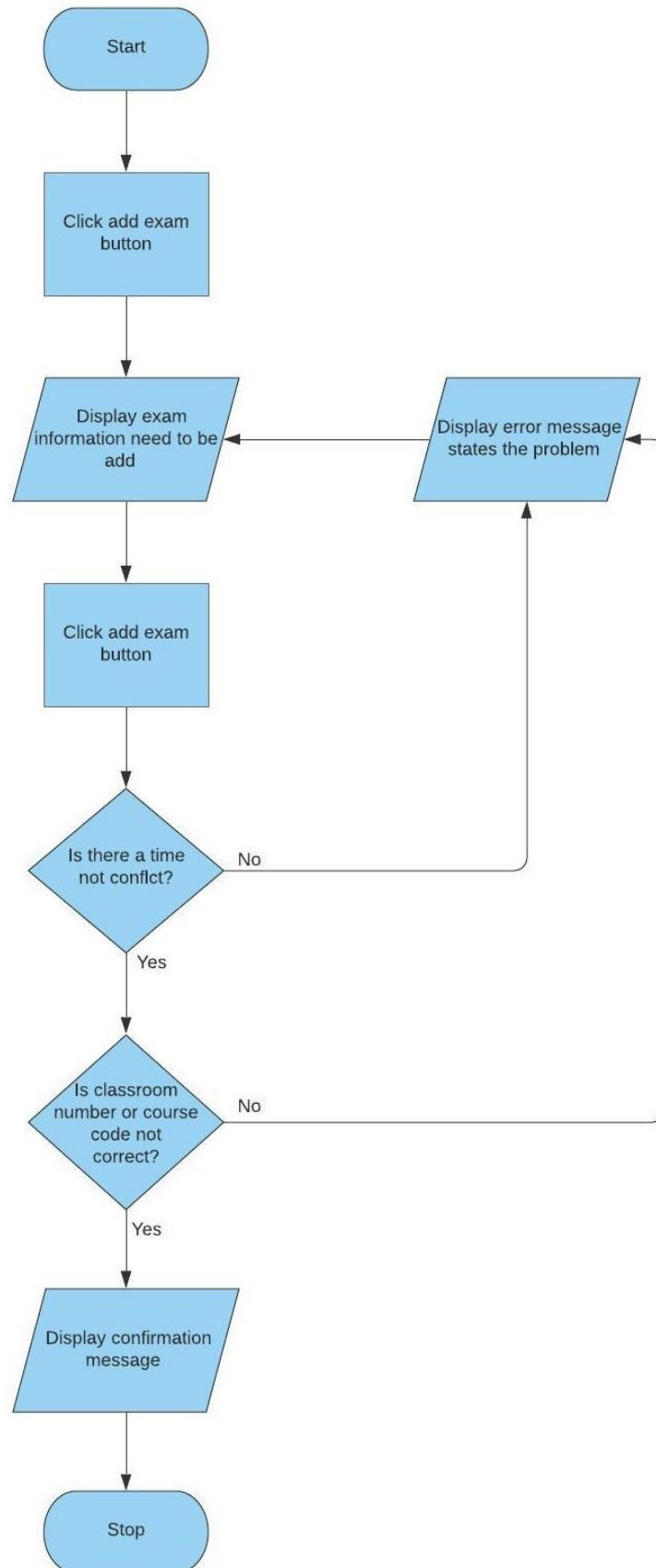


Figure 30 - Add exam flowchart diagram

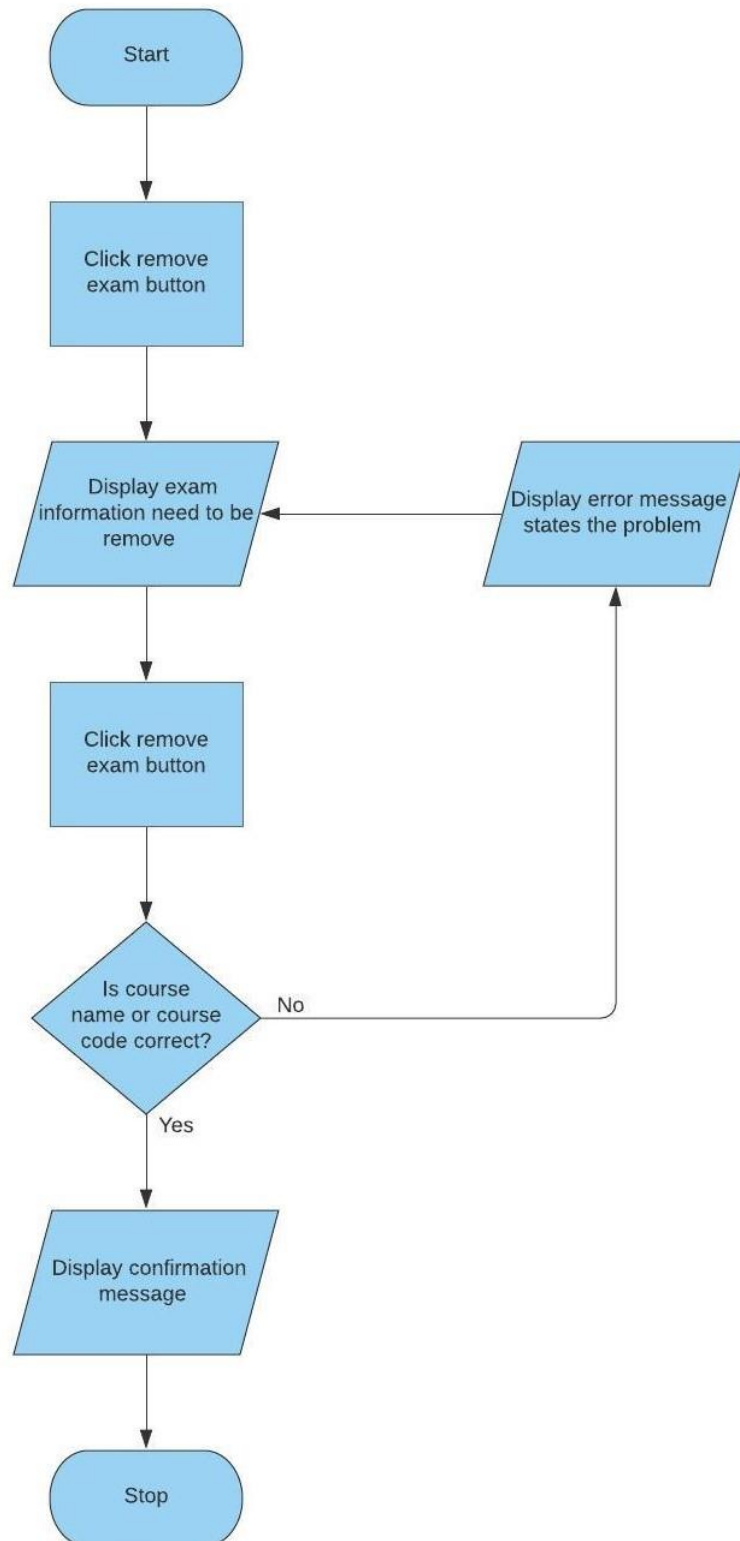


Figure 31 - Remove exam flowchart diagram

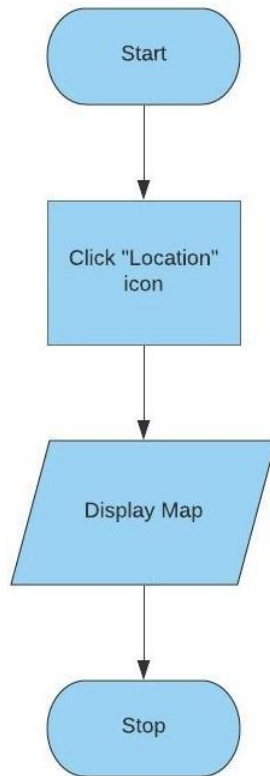


Figure 32 - Direction flowchart diagram

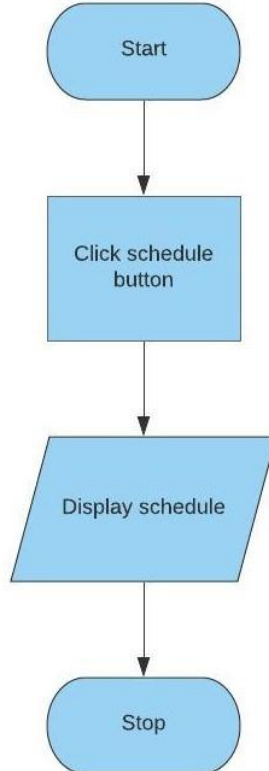


Figure 33 - Schedule flowchart diagram

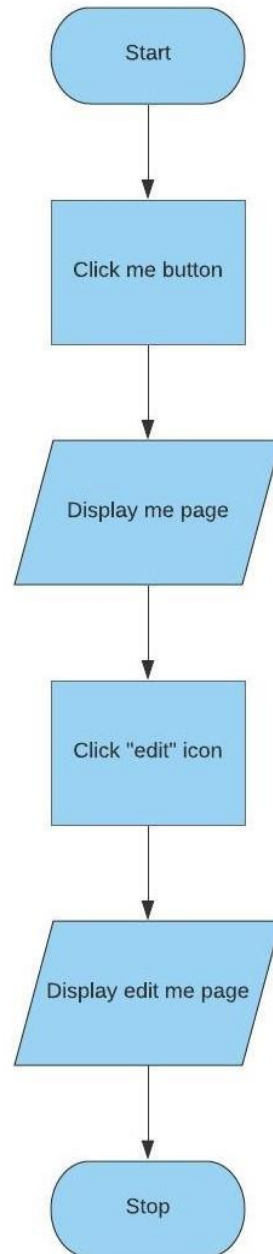


Figure 34 - Edit me flowchart diagram



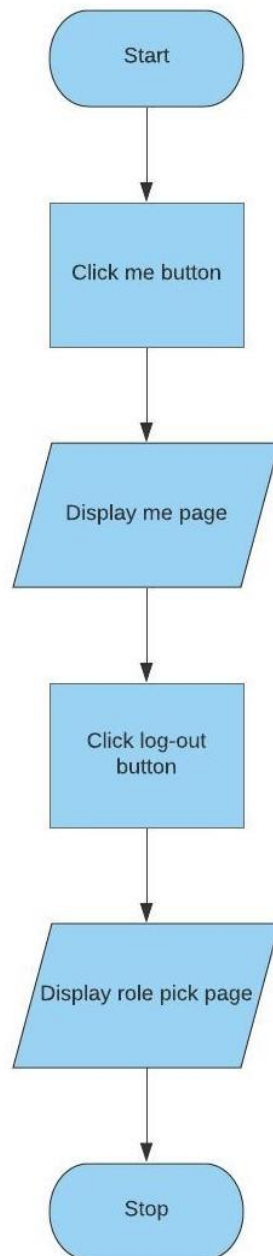


Figure 35 - Log-out flowchart diagram

## 2.6. Sequence Diagram

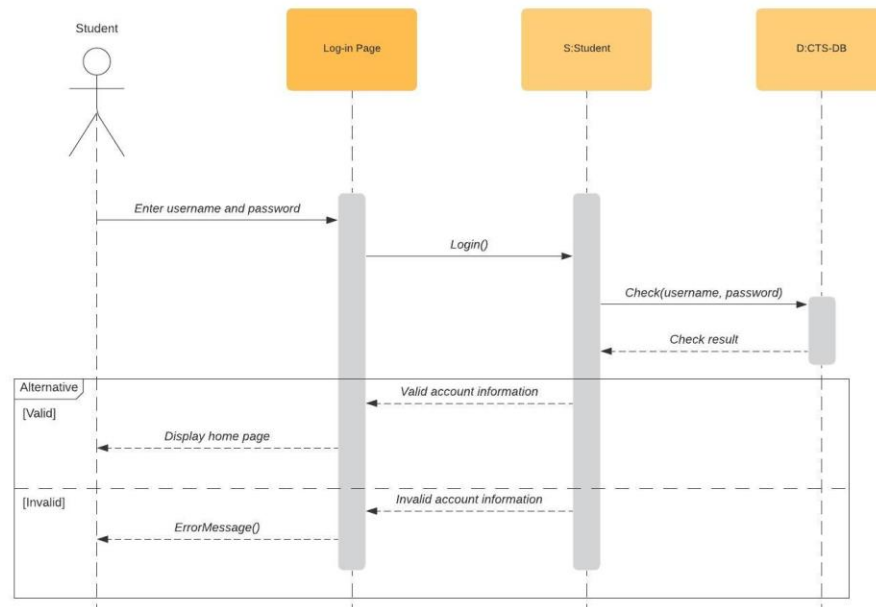


Figure 36 - Log-in sequence diagram

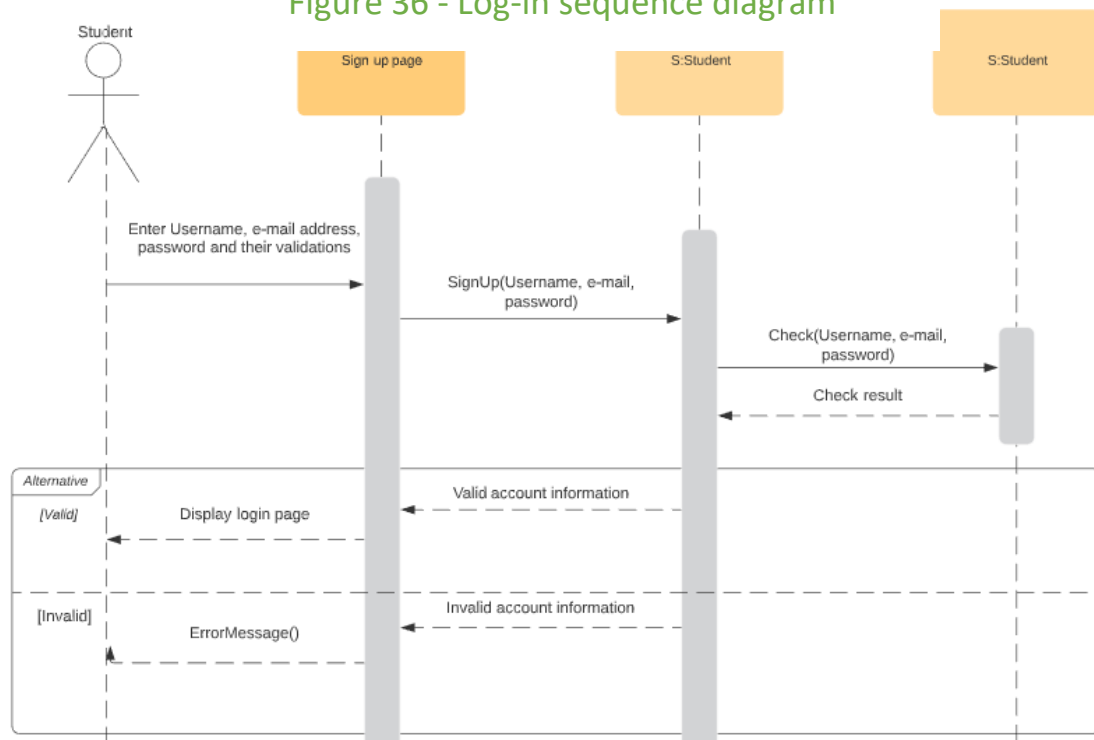


Figure 37 - Sign-up sequence diagram

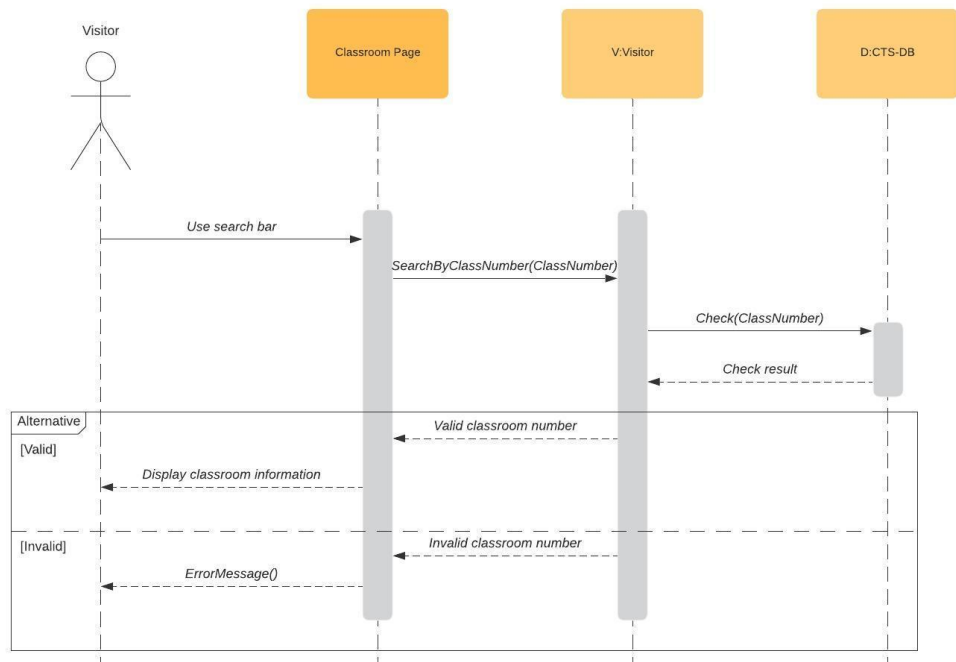


Figure 38 - search by class number sequence

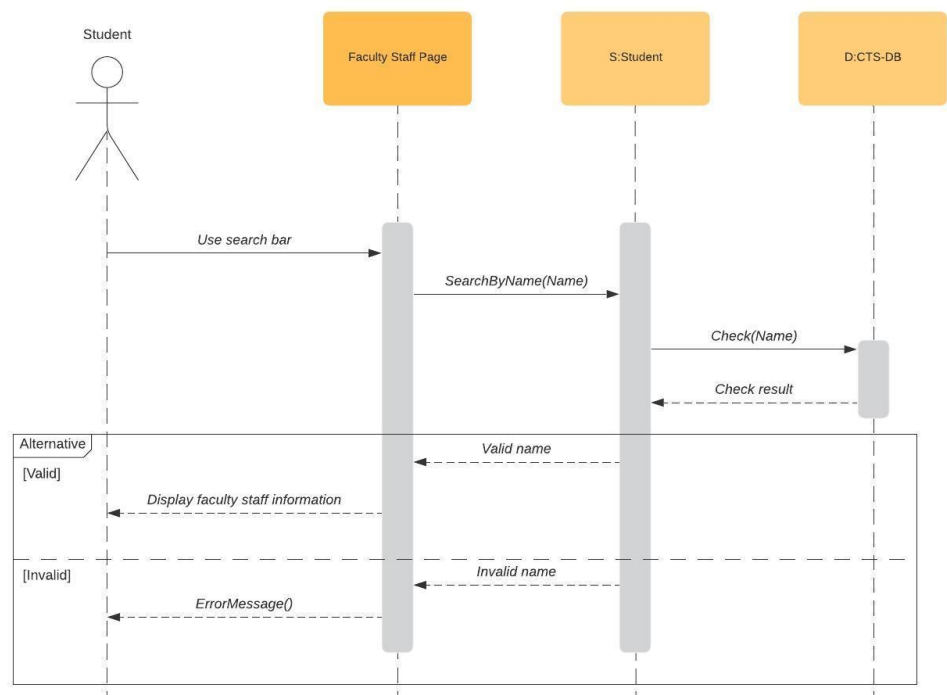


Figure 39 - search by name sequence diagram

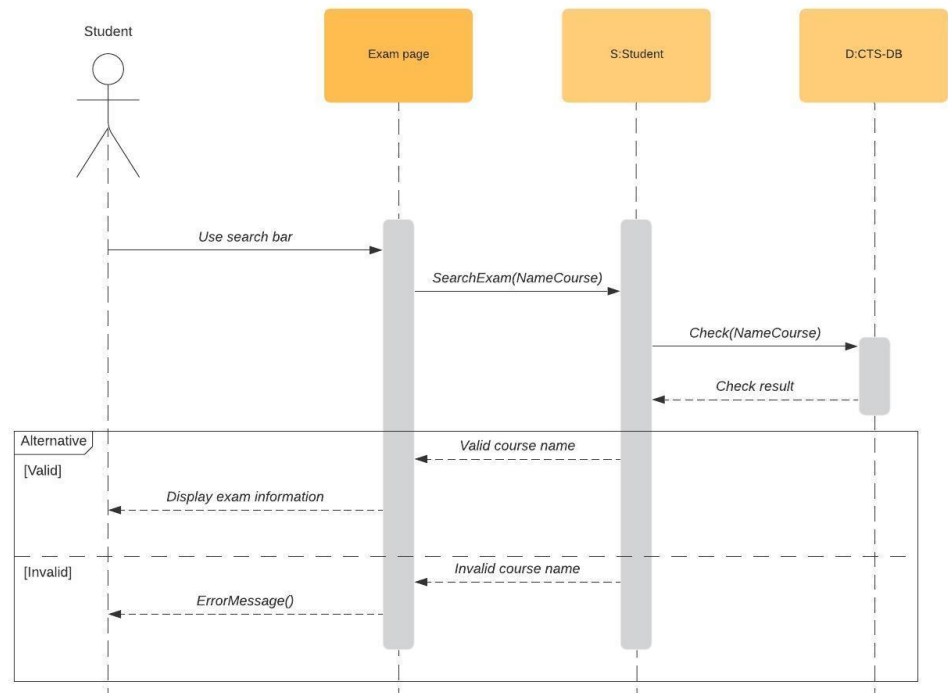


Figure 40 - search exam sequence diagram

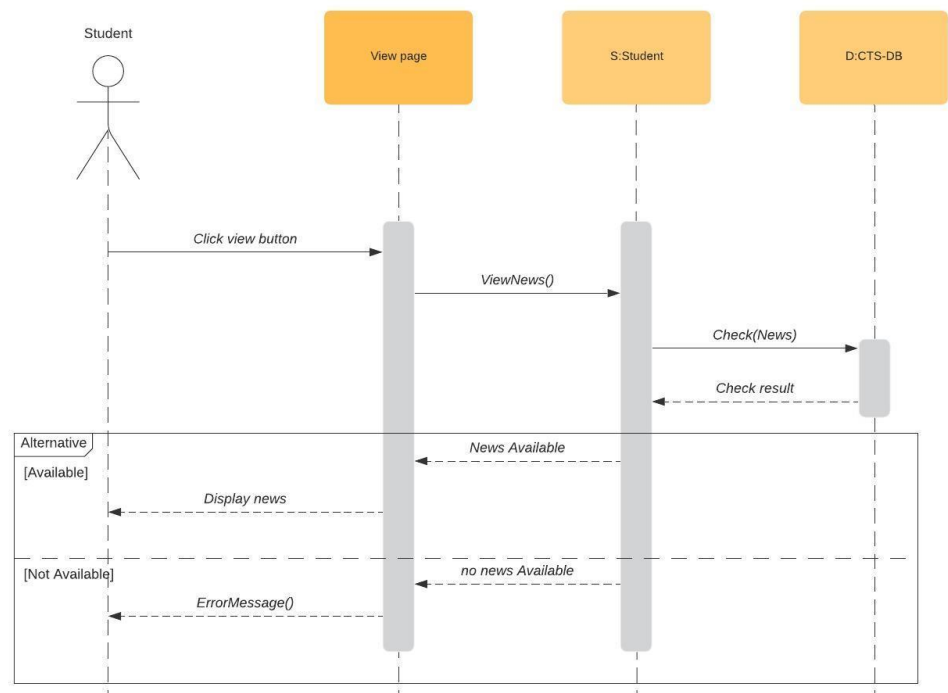


Figure 41 - View news sequence diagram

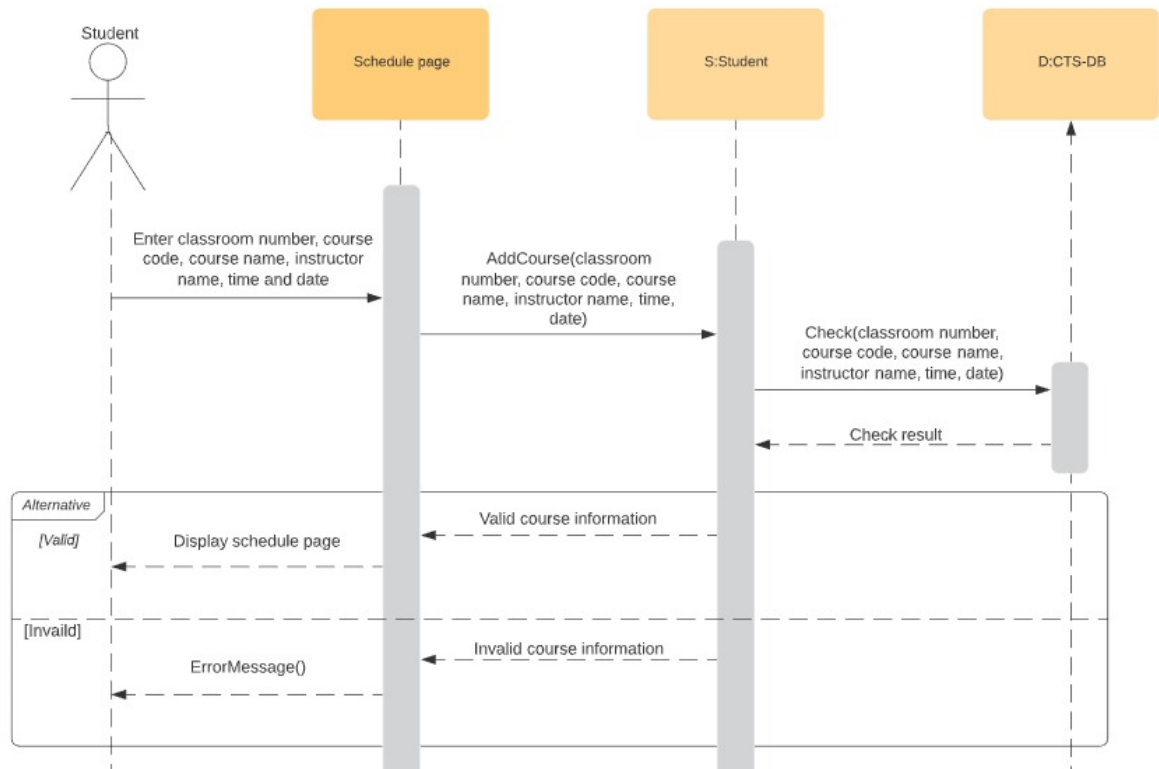


Figure 42 - Add course sequence diagram

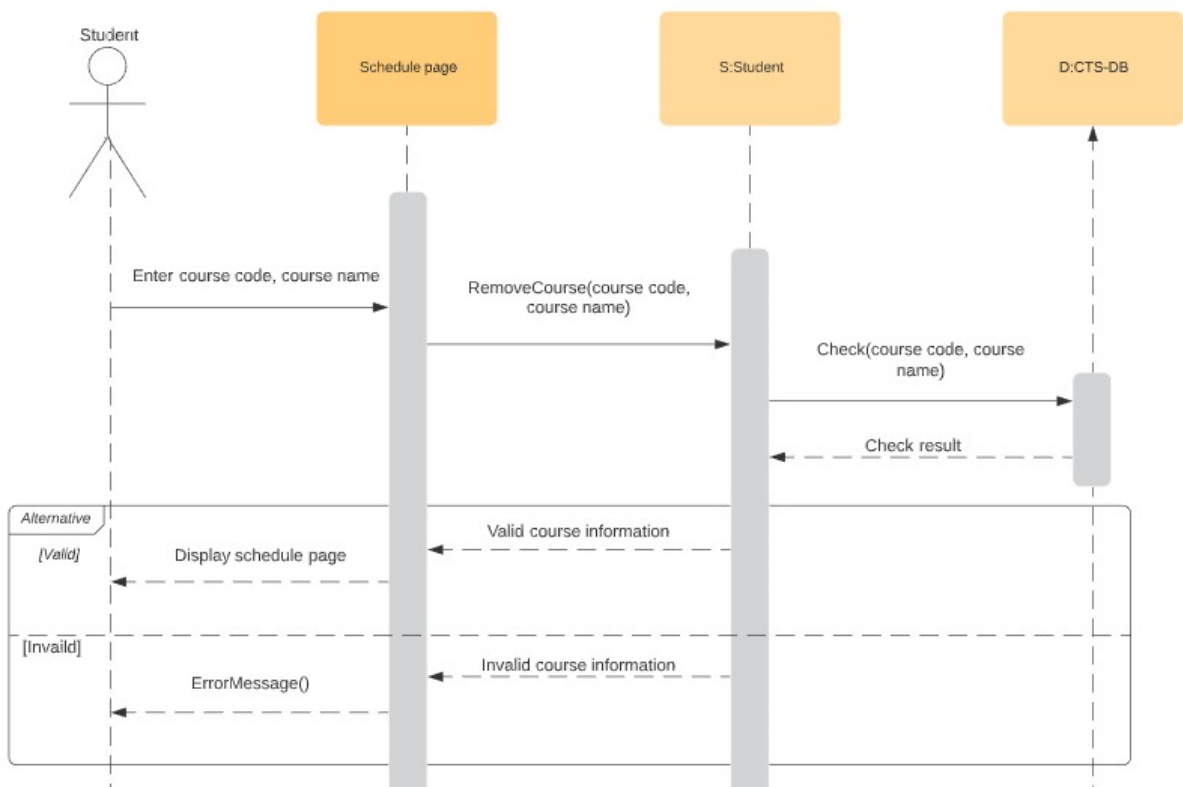


Figure 43 - Remove course sequence diagram

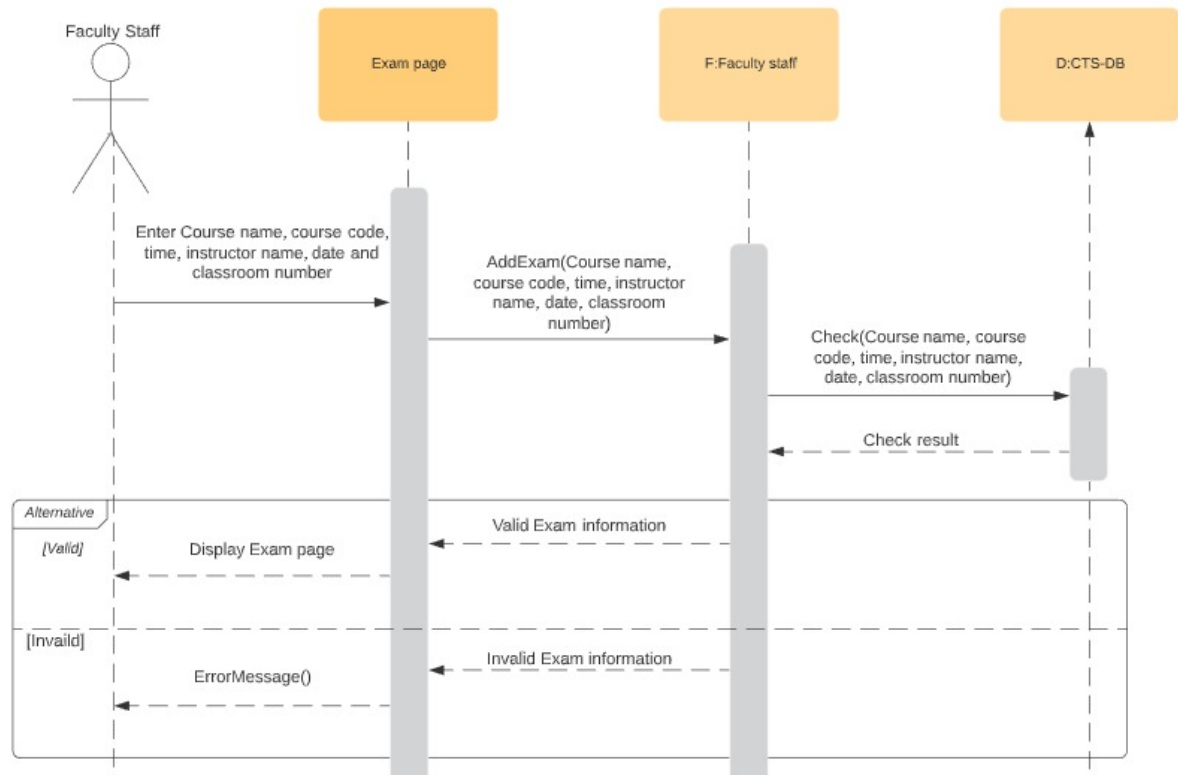


Figure 44 - Add exam sequence diagram

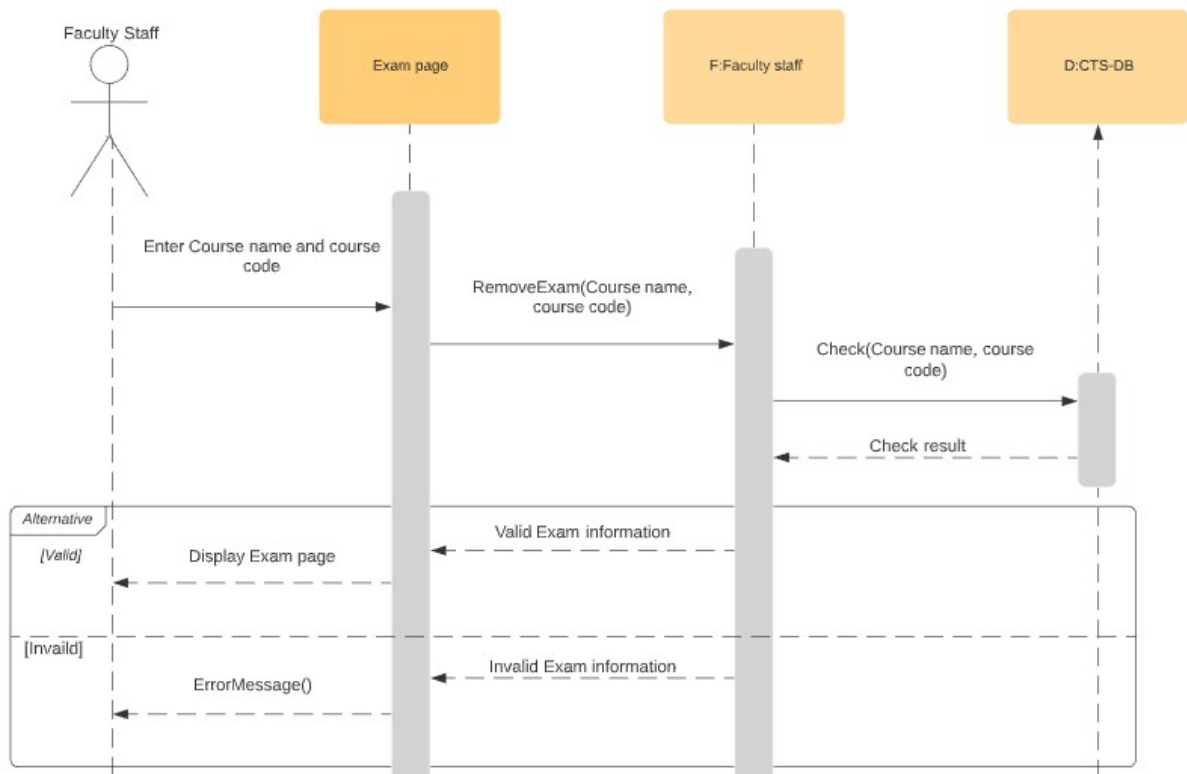


Figure 45 - Remove exam sequence diagram

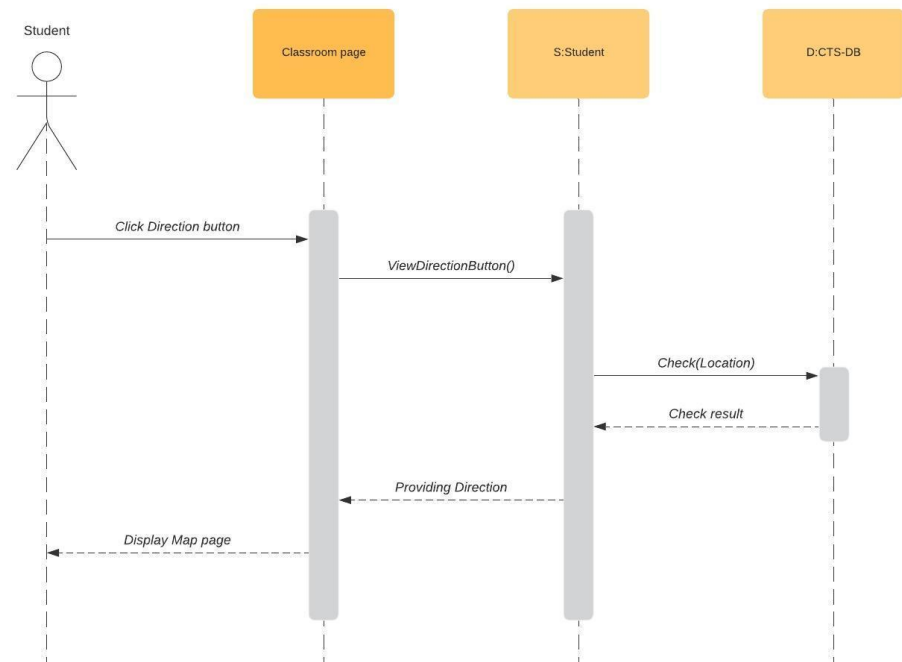


Figure 46 - View direction sequence diagram

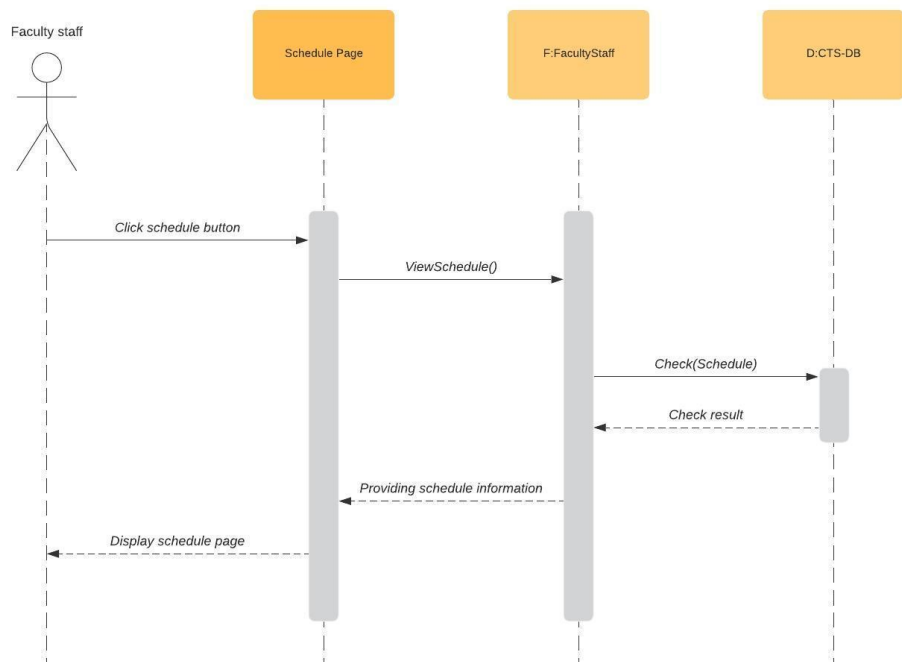


Figure 47 - View schedule sequence diagram

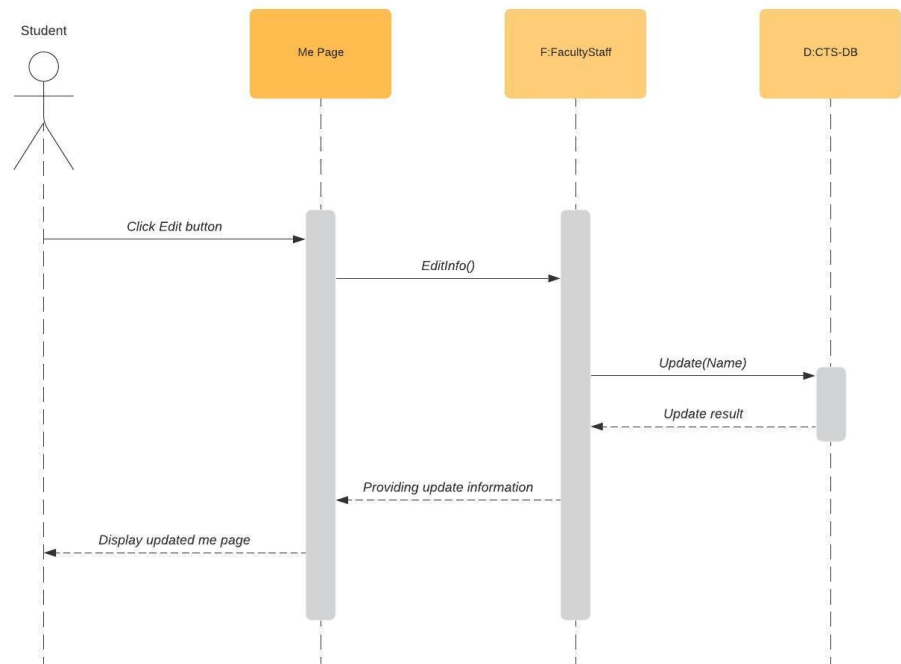


Figure 48 Edit info sequence diagram

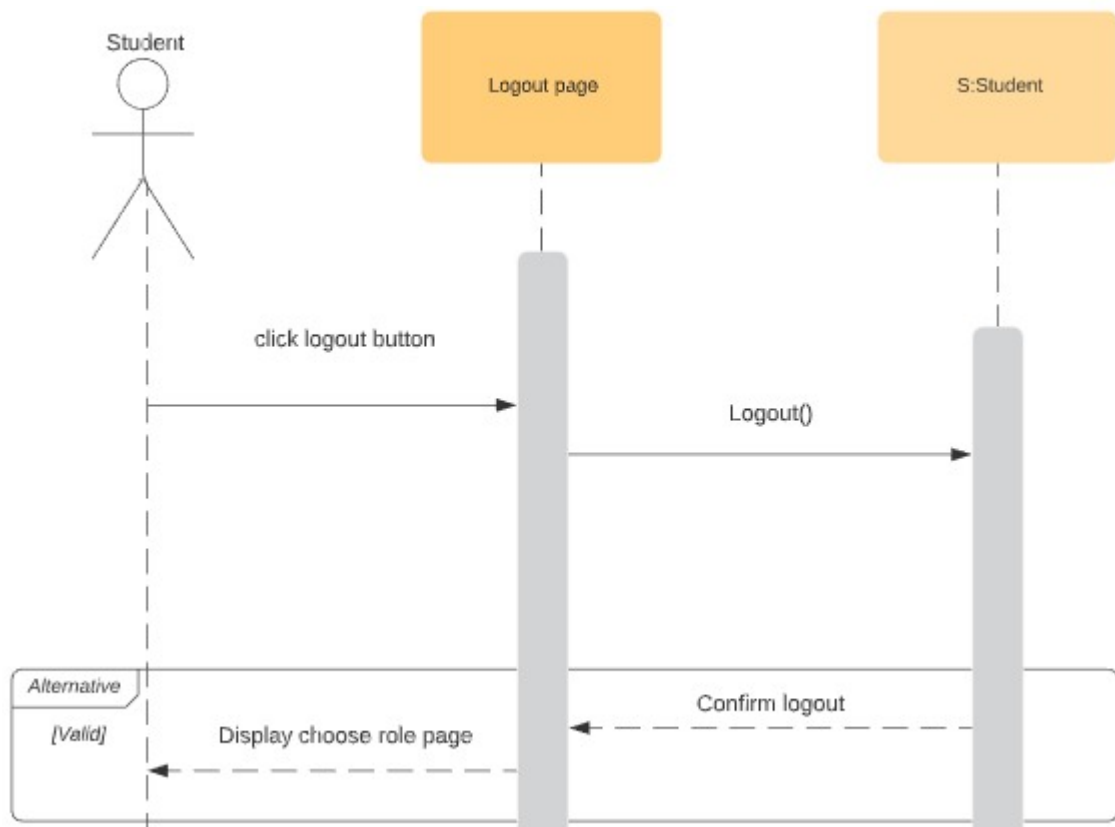


Figure 49 Log-out sequence diagram



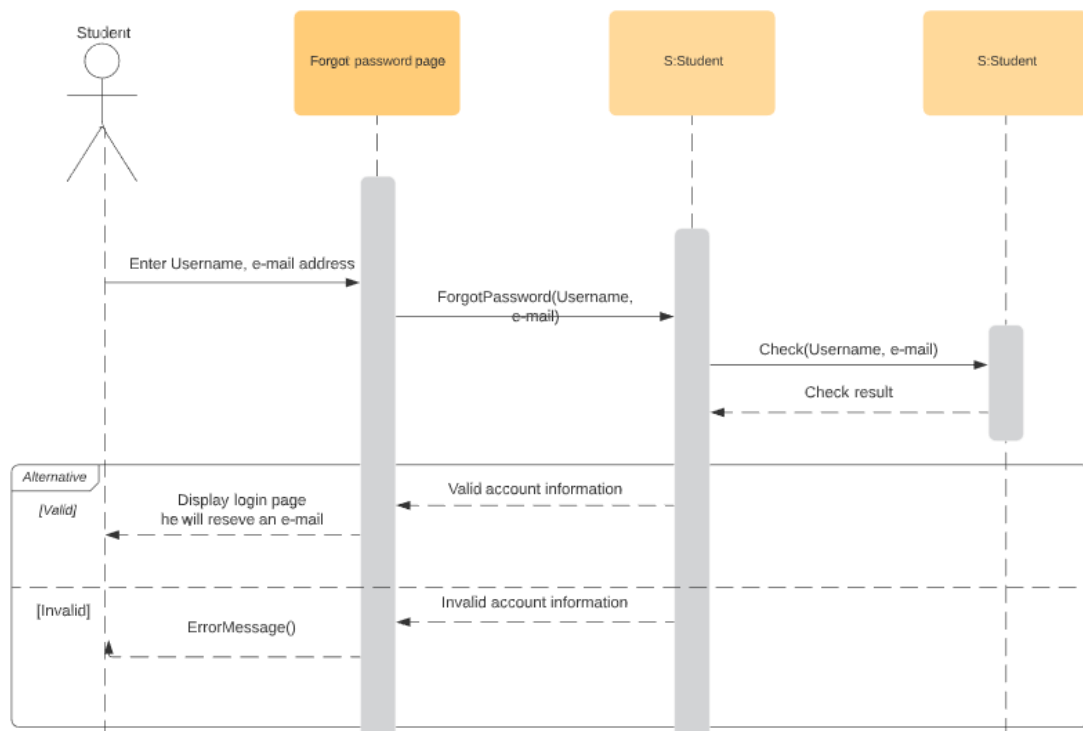


Figure 50 Forgot password sequence diagram

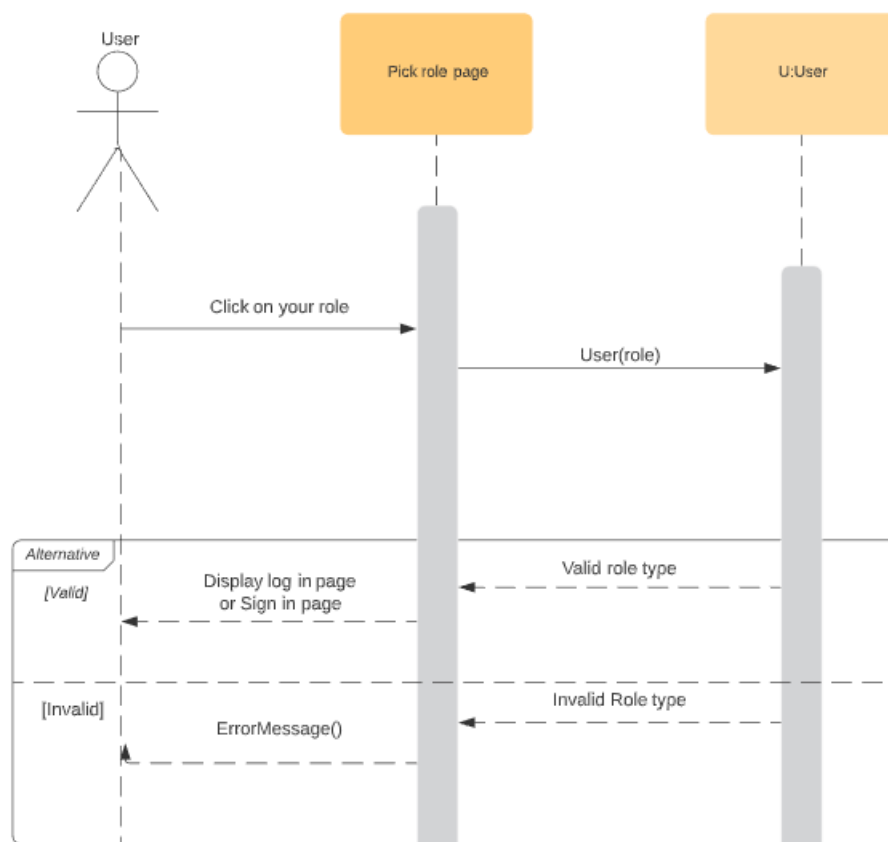


Figure 51 Pick role sequence diagram

### 3. User interface Design

This section contains screenshots and a detailed description of the CTS user Interface.

#### 3.1. Pick role page

Pick role page is a page that enables users to pick their suited roles such as Faculty Staff, Student, and Visitor.

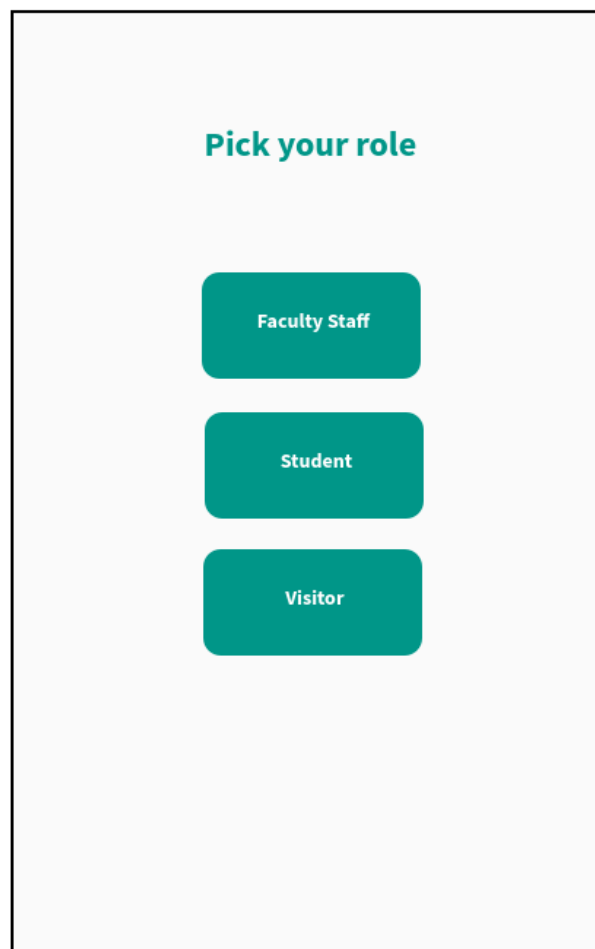


Figure 52 – Pick role page

### 3.2. Log-in page

After the user picks a role. For student and faculty staff, it will open a log-in page. On the other hand, the visitor doesn't need to sign-up. The sign-in page asks the user to enter the username and password. After that, the user can use the login button to enter his account. If the user doesn't have an account, the user can use the sign-up button to lead the user to the sign-up page. And this page has a future that is "Forgot password" we will discuss it in 3.4.

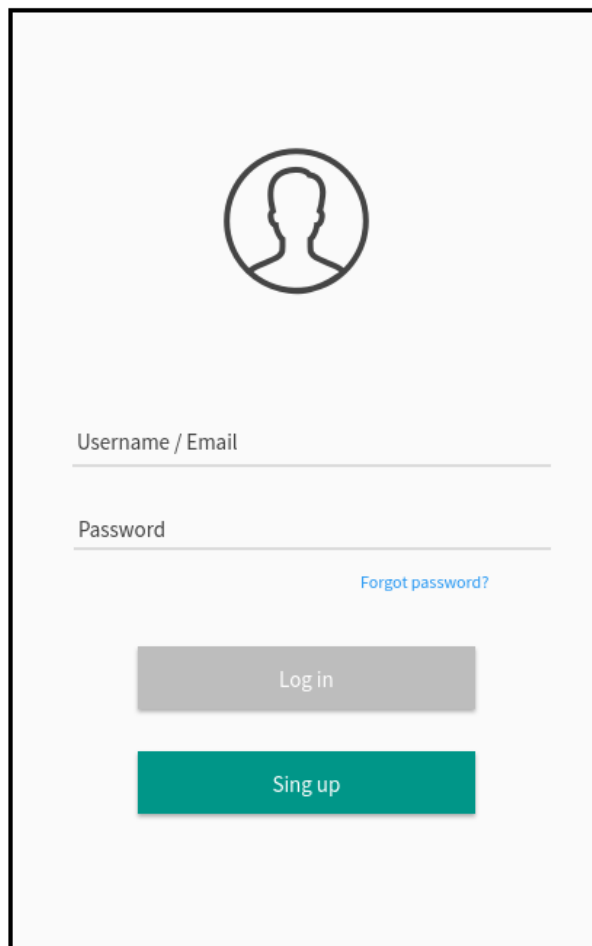


Figure 53 – Log-in page

### 3.3. Sign-up page

On this page, the user will enter account information such as username, email, email validation, password and password validation. The user also can upload a personal picture if he wants. After the user filled up the information, he can use the sign-up button to finish setting up the account. After that, it will direct the user to the home page.

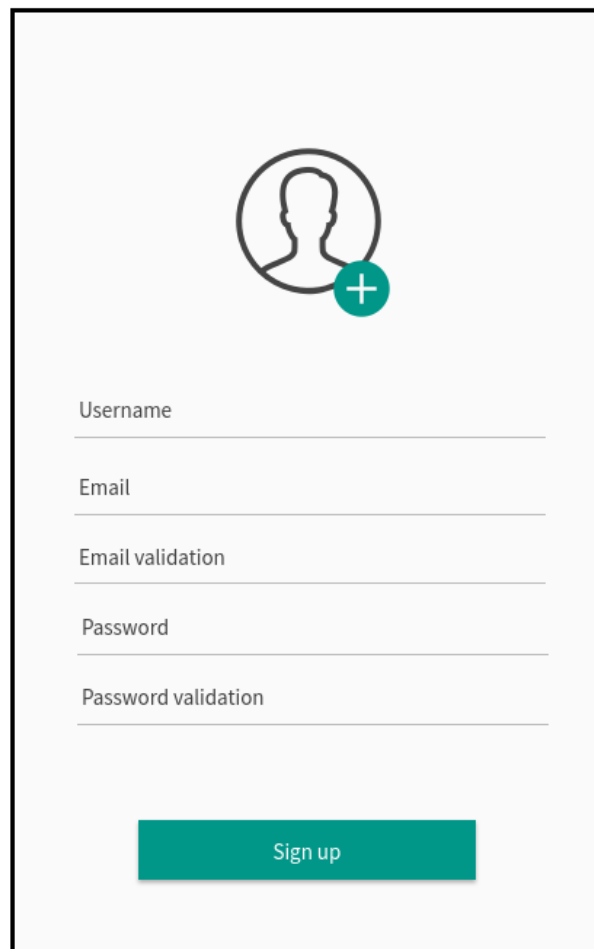
A sign-up page form with a light gray background and a black border. At the top center is a circular icon containing a gray silhouette of a person's head and shoulders, with a small teal circle containing a white plus sign at the bottom right. Below the icon are five input fields, each with a label and a horizontal line: 'Username', 'Email', 'Email validation', 'Password', and 'Password validation'. At the bottom center is a teal rectangular button with the text 'Sign up' in white.

Figure 54 – Sign-up page

### 3.4. Forgot password page

This page enables the user to retrieve his password. By entering the user his username and email address, it will send an email that will provide him the forgotten password. Username and email address must be correct otherwise it will give the user a wrong message states what is the problem.

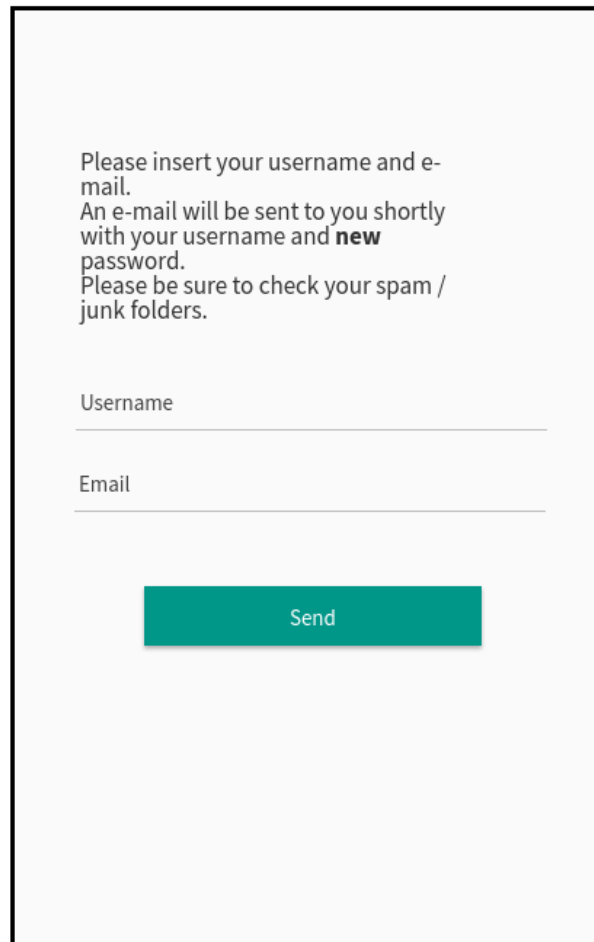
A screenshot of a web form for forgetting a password. The form is enclosed in a black rectangular border. At the top, there is a block of text: "Please insert your username and e-mail. An e-mail will be sent to you shortly with your username and **new** password. Please be sure to check your spam / junk folders." Below this text are two input fields. The first is labeled "Username" and the second is labeled "Email". Both labels are positioned to the left of their respective input lines. At the bottom of the form, there is a teal-colored button with the word "Send" written in white text.

Figure 55 – Forgot password page

### 3.5. Home page

After the user entered his account, the home page will appear. It contains the software logo and buttons that represent classrooms, faculty staff, exams, schedule, home, and me (user profile).



Figure 56 – Home page

### 3.6. Classroom page

The classroom button on the home page opens a classroom page that enables the user to search for classrooms. As a result of entering classroom number in the search bar, it'll appear information about the classroom that have been searched like, the class number, floor number, and direction button that leads the user to the classroom location. There is a color bar in each class states that if the class is available or not. For classes that have a green bar, it means that the class is not occupied. The red color bar states that the class is occupied. If the user entered the wrong classroom number, it will display an error message that describes the problem. Users can go back to the home page by using the home button.

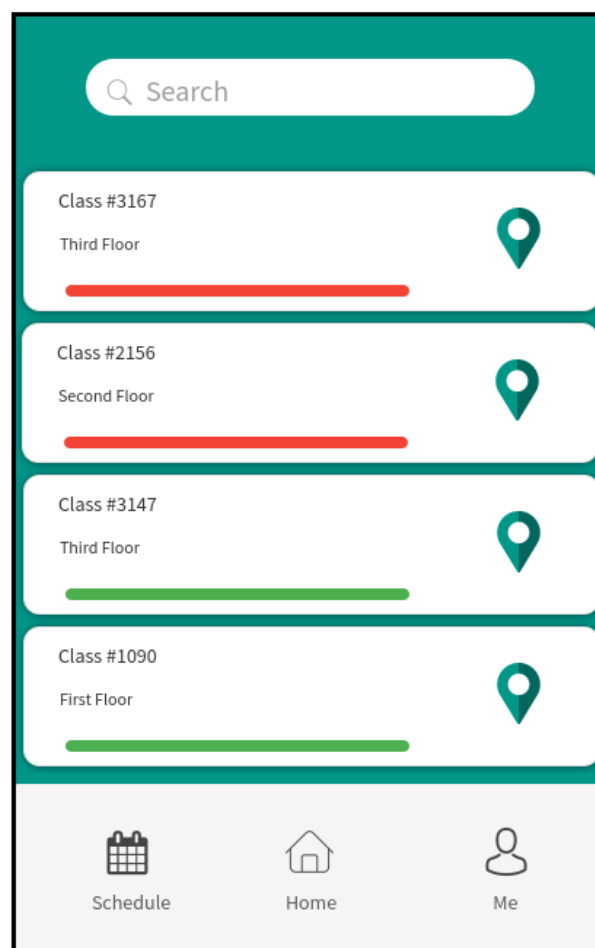


Figure 57 – Classroom page

### 3.7. Faculty Staff page

The faculty staff button opens a page that enables the user to search for faculty staff and their information. By entering the faculty staff name or email address in the search bar, as a result of searching, it will provide information and current schedule and the direction of the faculty staff office that has been searched. If the user entered a wrong faculty staff name or email address, it will display an error message describing the problem. Users can go back to the home page by using the home button.

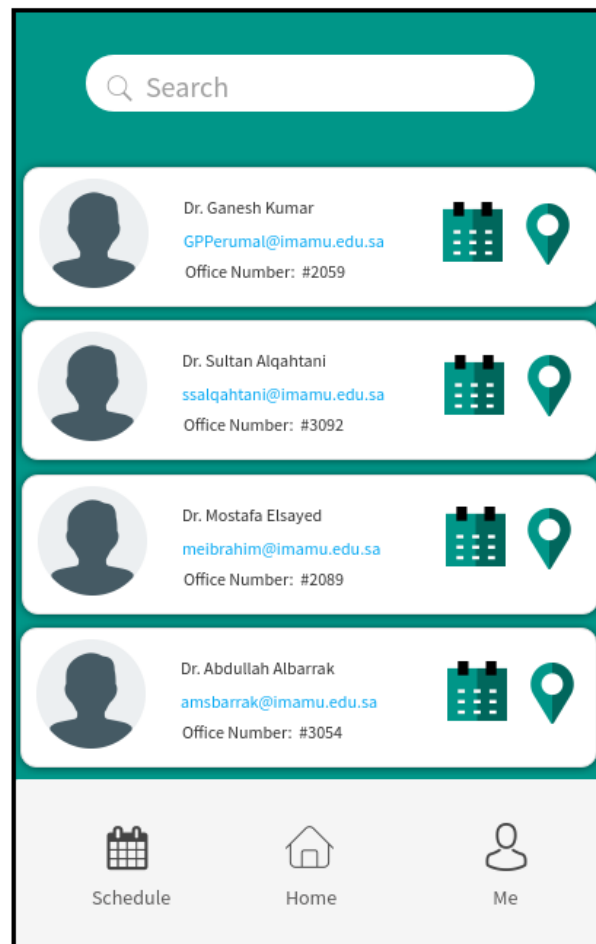


Figure 58 – Faculty Staff page



### 3.8. Exams page

The Exams button opens the page that can let the user search for exams. Users can search by entering the course name or course code in the search bar. On the exams page, there are two buttons that can add and remove exams. Faculty staff user is the only user that can add and delete exams. If the user enters a wrong course name or course code, he will get a wrong message states the problem. Note that the exam button available only for student and faculty staff.

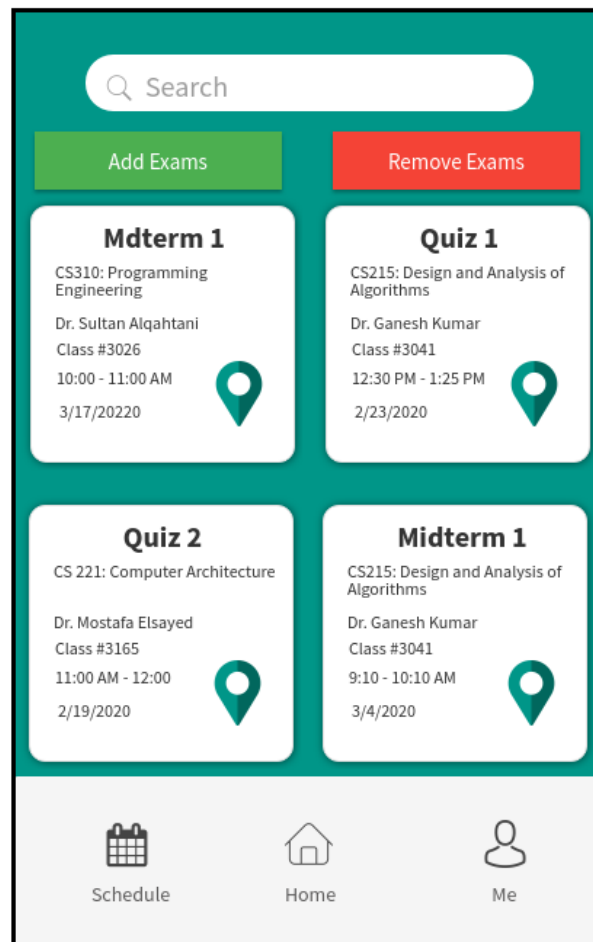
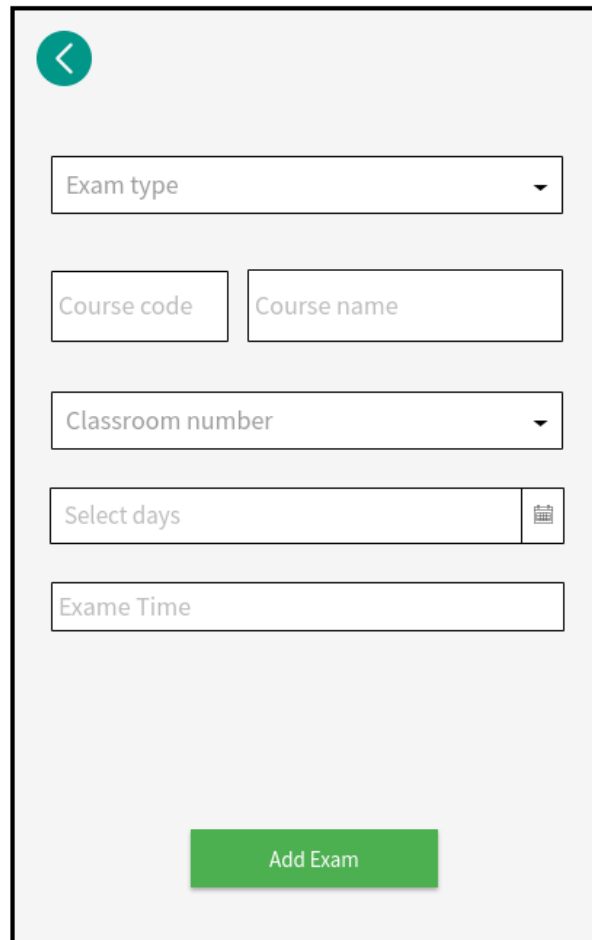


Figure 59 – Exams page

### 3.9. Add exam page

The add exam button on the exam page opens a page that enables the user to add an exam. Users provide the following information exam type, course code, course name, classroom number, date and time. Users can go back to the schedule page by pressing the back button in the upper left corner of the page. If any of the previous information is entered wrong, it will give a wrong message states what is the problem. The add exam button available only for faculty users.



The screenshot displays a mobile application interface for adding an exam. At the top left, there is a green circular back button with a white left-pointing arrow. Below this, the form consists of several input fields: a dropdown menu labeled 'Exam type', two adjacent text input fields labeled 'Course code' and 'Course name', a dropdown menu labeled 'Classroom number', a text input field labeled 'Select days' followed by a small calendar icon, and a text input field labeled 'Exam Time'. At the bottom center of the form is a green rectangular button with the text 'Add Exam' in white.

Figure 60 – Add exam page

### 3.10. Remove exam page

The remove exam button on the exam page opens a page that enables the user to remove the exam. Users provide the following information exam type, course code, course name. Users can go back to the schedule page by pressing the back button in the upper left corner of the page. if any of the previous information is entered wrong, it will give a wrong message states what is the problem. The remove exam button available only for faculty staff users.

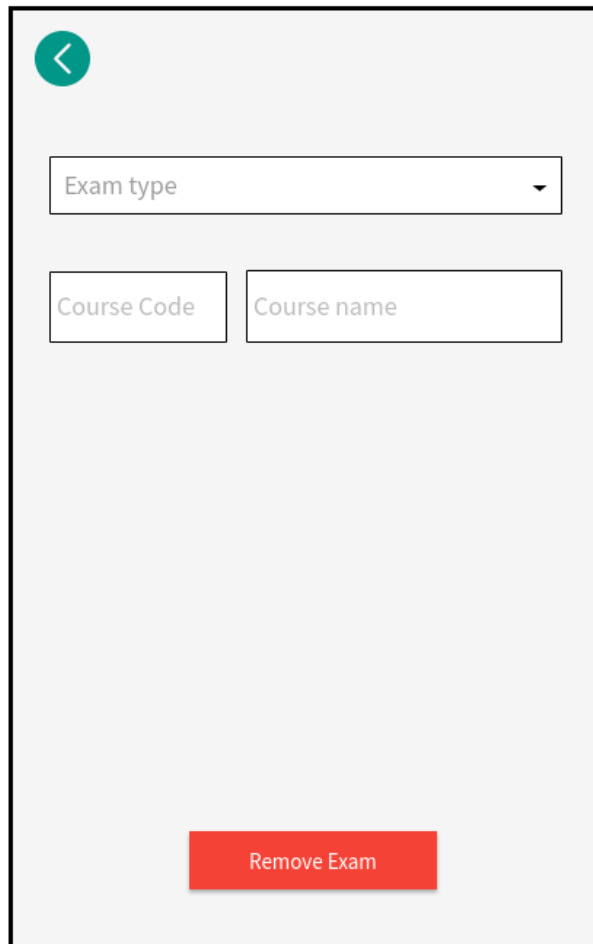
A screenshot of a mobile application interface for removing an exam. The page has a light gray background. In the top left corner, there is a teal circular button with a white left-pointing arrow. Below this, there is a white rectangular dropdown menu with the text "Exam type" and a small downward arrow on the right. Underneath the dropdown, there are two white rectangular input fields side-by-side; the left one is labeled "Course Code" and the right one is labeled "Course name". At the bottom center of the page, there is a red rectangular button with the text "Remove Exam" in white.

Figure 61 – Remove exam page

### 3.11. News page

The news button on the home page opens a page that lets the user see and search news. If the user pressed the news button and there was no news, it will give a message states that there no news available. News button available only for student and faculty staff users.

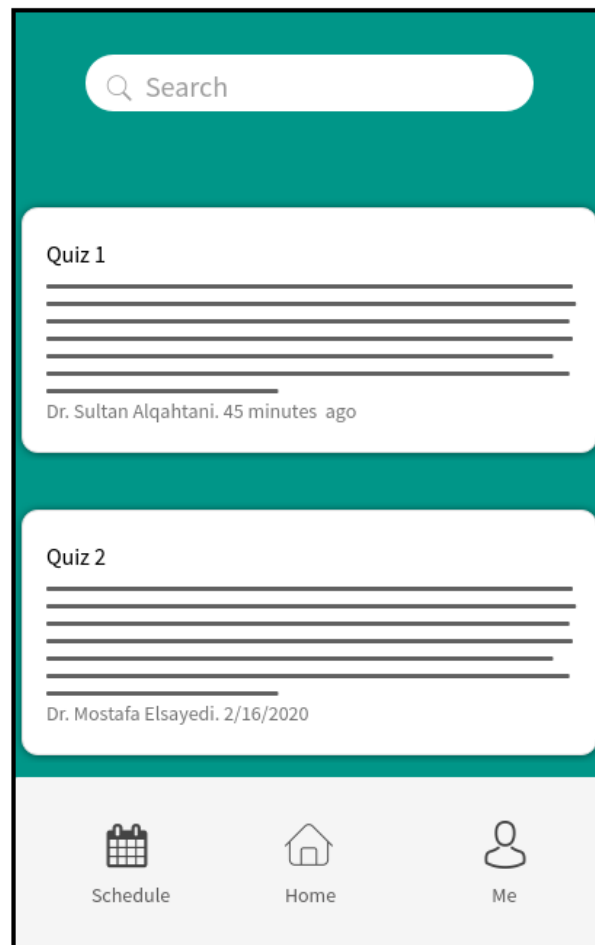


Figure 62 – News page

### 3.12. Schedule page

The add exam button on the exam page opens a page that enables the user to add an exam. Users provide the following information exam type, course code, course name, classroom number, date and time. Also, after the user added the course to the schedule, it will give the course a colorful line to differentiate from other courses. Users can go back to the schedule page by pressing the back button in the upper left corner of the page. If any of the previous information is entered wrong, it will give a wrong message states what is the problem. The add exam button available only for faculty users.

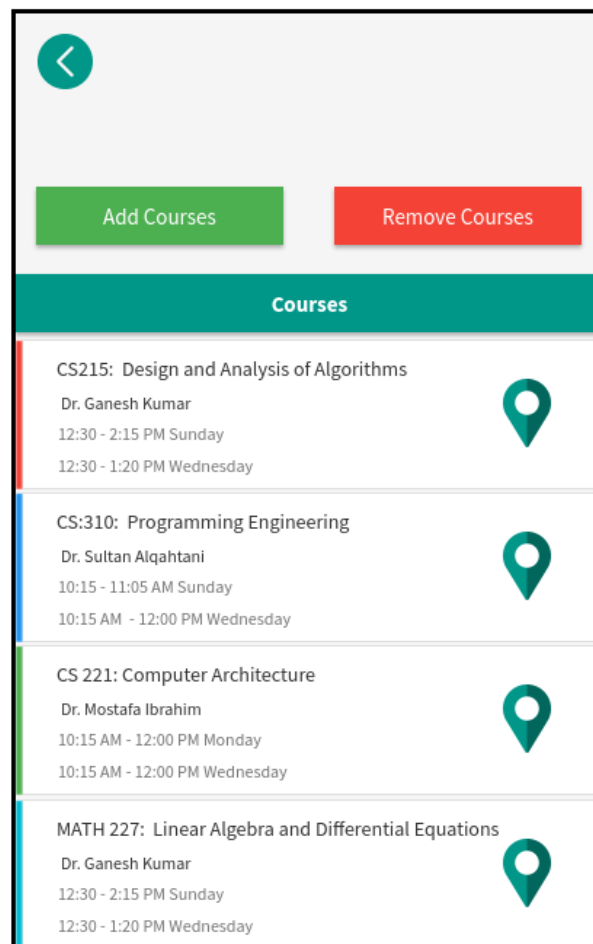
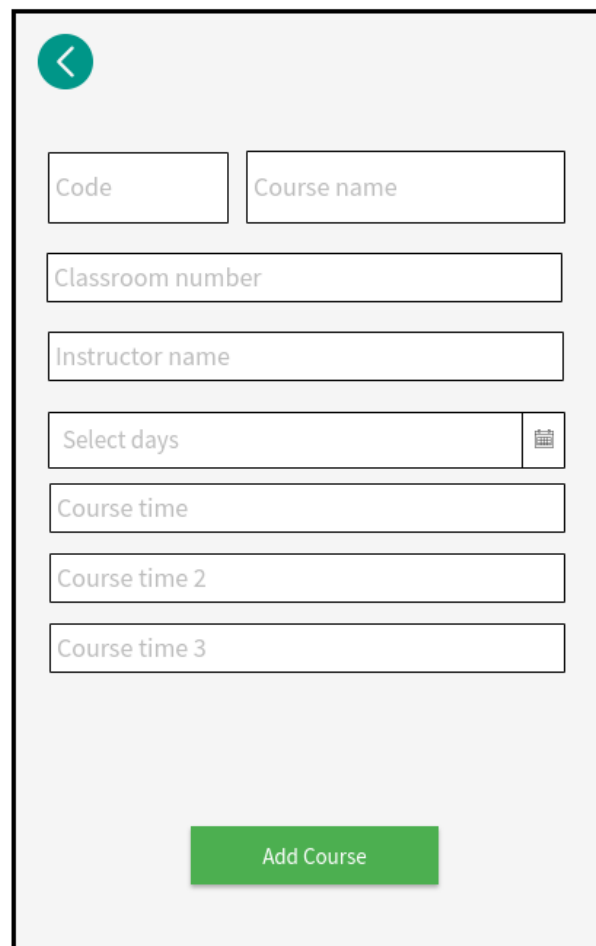


Figure 63 – Schedule page

### 3.13. Add course page

The add course button on the schedule page opens a page that enables the user to add courses. The user provides the following information course code, course name, classroom number, instructor name (for student users), days of the week, course time and additional time if there needed. After the user completes the course information, he can press the add course button to add the course. Users can go back to the schedule page by pressing the back button in the upper left corner of the page. If there was wrong information, an error message will appear that states the problem.



The image shows a mobile application screen for adding a course. At the top left is a green circular back button with a white left-pointing arrow. Below it are several input fields: 'Code' and 'Course name' are side-by-side; 'Classroom number', 'Instructor name', 'Course time', 'Course time 2', and 'Course time 3' are stacked vertically. The 'Select days' field is followed by a small calendar icon. At the bottom center is a green rectangular button with the text 'Add Course' in white.

Figure 64 – Add course page

### 3.14. Remove course page

The remove course button on the schedule page opens a page that enables the user to remove courses. The user provides the following information course code and course name. After the user completes the information, he can press the remove course button to remove the course. Users can go back to the schedule page by pressing the back button in the upper left corner of the page. If there was wrong information, an error message will appear that states the problem.

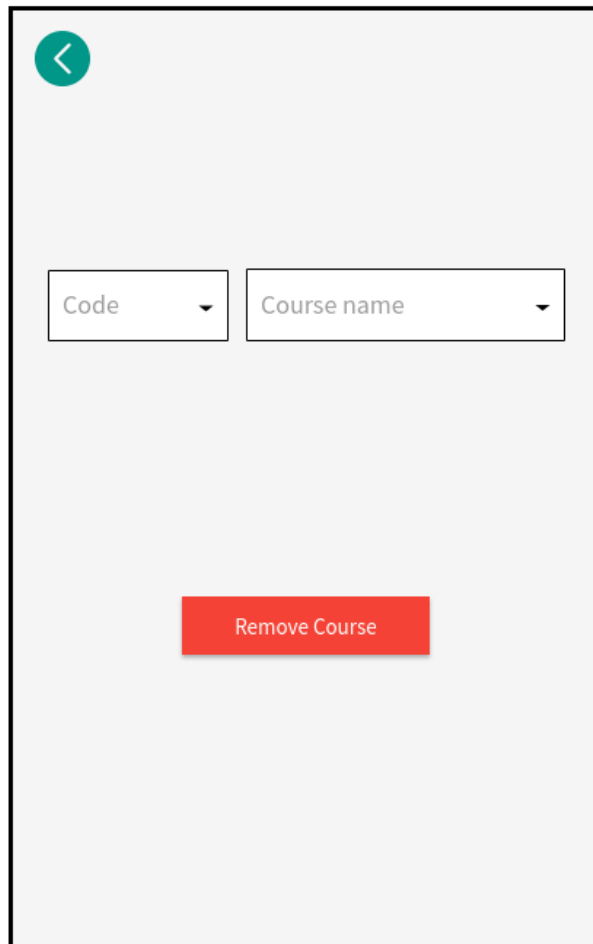
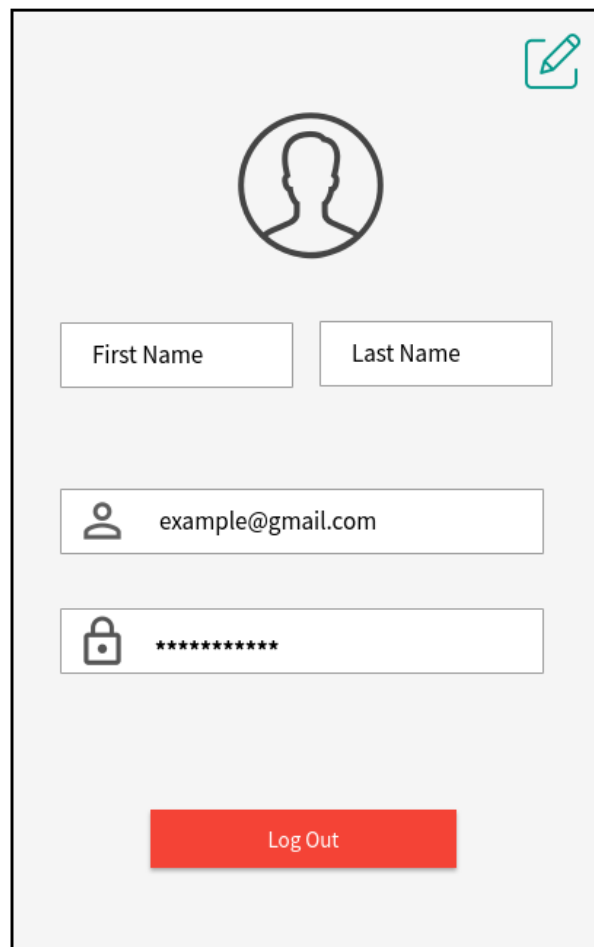
A mobile application screen for removing a course. At the top left is a teal circular back button with a white left-pointing arrow. Below it are two white input fields with thin black borders. The first field is labeled 'Code' and the second is labeled 'Course name', both with a small downward arrow on the right. At the bottom center is a red rectangular button with the text 'Remove Course' in white.

Figure 65 – Remove course page

### 3.15. Me page

Me button on the home page opens the profile page. The page contains useful information. Users can edit the information by pressing the edit button in the right upper corner of the page. Users can log out of his account by pressing the log-out button. This page available only for faculty staff and student users.



The image shows a mobile application interface for a user profile page. At the top right is a teal edit icon (pencil in a square). Below it is a circular profile picture placeholder. Underneath the profile picture are two input fields: 'First Name' and 'Last Name'. Below these is a single input field for an email address, preceded by a person icon, containing the text 'example@gmail.com'. Below the email field is a single input field for a password, preceded by a lock icon, containing ten asterisks. At the bottom center is a red rectangular button with the text 'Log Out'.

Figure 66 – Me page



### 3.16. Edit me page

The edit button on me page enables the user to edit his account information. After the user presses the button, he can edit his personal photo, first name, last name, email address, and password. After the user finished editing his account information, he can press the save button to save his edited information.

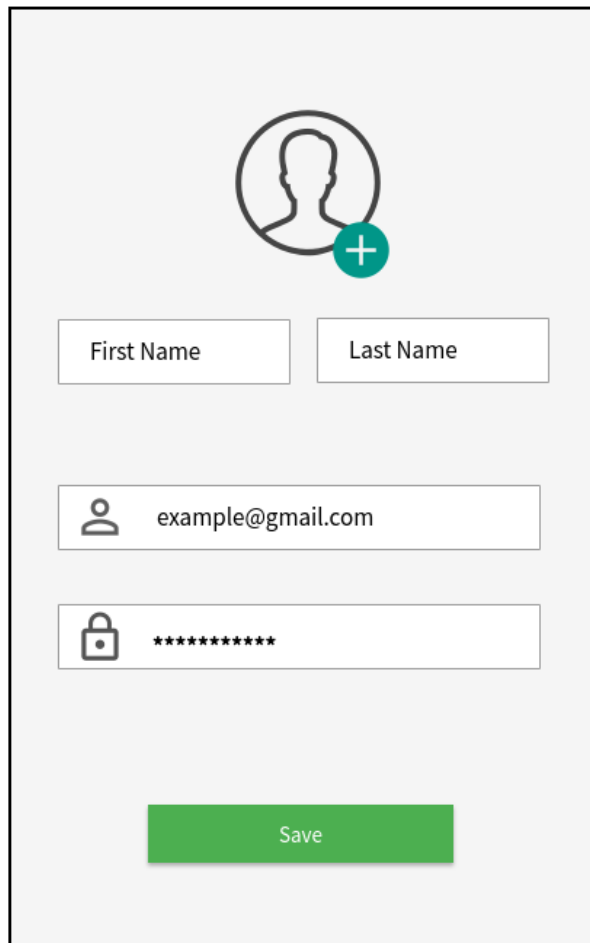
A screenshot of a mobile application's 'Edit me' page. At the top is a circular profile picture placeholder with a green plus sign. Below it are two input fields for 'First Name' and 'Last Name'. Further down is an email input field with a person icon and the text 'example@gmail.com'. Below the email field is a password input field with a lock icon and ten asterisks. At the bottom is a green 'Save' button.

Figure 67 –Edit me page

#### **4. Contribution:**

<https://github.com/AhmedMaj/CollegeTrackingSystem.git>

#### **5. Conclusion:**

In conclusion, guiding students through this application is what the team members strive to do. This design document should help navigating the key points of our project implementation. Reassuring the readers in the end of phase 3 a demonstration product will be released for revision. In this document, the reader can review the user interface, the class information and the class hierarchy of the program. Furthermore, here the reader can preview the class diagram and the attributes as well as the methods of those classes in details. Lastly, with the help of this application the days of clueless students wondering off the college halls are over and their precious time won't be wasted.