SECJ2203: Software Engineering

# System Documentation (SD)

2u2i Final Year Project with Industry (FYP-I) Management System

Version 2.0

16 June 2022

School of Computing, Faculty of Engineering

Prepared by: Inferno

**Name of Members:**

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## Revision Page

### a. Overview

In this system documentation version 1.0, it consists of the documentation components that are adapted from IEEE Recommended Practice for Software Requirements Specification, Software Design Description and Software Test Documentation that has been simplified and customized. In this version, it will cover all of the sections from the introduction until the specific requirements.

### b. Target Audience

- Stakeholder
- Development Team
- Users

### c. Project Team Members

List the team members in a table by stating their roles and the status for each assigned task e.g. by sections for this SD version (complete, partially complete, incomplete). If the assigned tasks are not done and have been assigned to other team members, state accordingly.

| Member Name | Role | Task | Status |
|---|---|---|---|
| Shahril Bin Saiful Bahri (A20EC0144) | Team Leader | 3.2 Component Model<br><br>4.2.3 Detail Description of <Notification> subsystem<br><br>6.2 Overall Interface Design | Completed |
| Amir Iskandar Bin Norkhairulazaddin (A20EC0011) | Team Member | 4.1 Complete Package Diagram<br>4.2.4 Detail Description of <Assessment> subsystem<br>5.1 Data Description | Completed |
| Iman Ehsan Bin Hassan (A20EC0048) | Team Member | 3.1 Architectural Style and Rationale<br>4.2.1 Detail Description of <Login> subsystem | Completed |

| | | | |
|---|---|---|---|
| | | 6.1 Overview of Interface | |
| Muhammad Aiman Bin Abdul Razak (A20EC0082) | Team Member | 4.2.2 Detail Description of <Communication> subsystem<br>5.2 Data Dictionary | Completed |

## d. Version Control History

| Version | Primary Author(s) | Description of Version | Date Completed |
|---|---|---|---|
| 1.0 | Shahril Bin Saiful Bahri (Team Leader) | Completed Chapter 1 and 2, Section 1.1 to 1.5 and 2.1 to 2.5 | 05/06/2022 |
| 2.0 | Amir Iskandar Bin Norkhairulazaddin (Team Leader) | Completed Chapter 3 until 6, Section 3.1 to 6.1 | 16/06/2022 |
| | | | |

**Note:**
This System Documentation (SD) template is adapted from IEEE Recommended Practice for Software Requirements Specification (SRS) (IEEE Std. 830-1998), Software Design Descriptions (SDD) (IEEE Std. 10161998 1), and Software Test Documentation (IEEE Std. 829-2008) that are simplified and customized to meet the need of SECJ2203 course at School of Computing, UTM. Examples of models are from Arlow and Neustadt (2002) and other sources stated accordingly.

## Table of Contents

# 1. Introduction

## 1.1 Purpose

This Software Documentation describes the proposed 2u2i Final Year Project with Industry (FYP-I) Management System in which several sections will be clarified. The sections that will be described for this software documentation are the specific requirements, detailed description of components and the requirements matrix. This document contains the system design that explains the architecture of the system. This also includes the complete description of the components used in the system. The data design is also included in this documentation that contains the data description and data dictionary. This documentation was intended for the stakeholder, development team and the system's user. This is to provide them with necessary information about the system that will help them to understand more about the function available in the system. The stakeholder can make a decision, approval or changes to the system based on the documentation. Other than that, the development team can use the documentation to show and monitor their progress in the development process. The audience of the documentation also can provide necessary feedback during the development based on the documentation.

## 1.2 Scope

The software product is the internship system which mainly focuses on final year students that undergo internships. It is a system where all the students will interact to find their right place in the internship. The system add, delete and edit the messages to ease the process of the communication .This helps the students to ask their lecturer if they have any inquiries .Other than that, there are notification systems where the student and lecturer can view ,add,update and delete notifications .This helps students to stay up to date with any new information that is related to internship news.

The scope of this system includes

- User access by authentication
- View message
- Add message
- Delete message
- Edit message
- View notification
- Delete notification
- Upload questions
- View grades
- Take exam

This internship system is an online application that can be accessed by the website which provides both lecturer and student access and find the information more easily. The goal of the system is to create a platform for the student to find their company to do the internships. Meanwhile, the objective is to make lecturer and supervisor jobs easier and save their time of helping their students to find the place for an internship.

## 1.3 **Definitions, Acronyms and Abbreviation**

Definitions of all terms, acronyms and abbreviation used are to be defined here.

| Terms, Acronyms/Abbreviation | Meaning |
|---|---|
| SD | System Documentation |
| Stakeholder | Individual or group that has an interest in any decision or activity of an organization |
| Inquiries | An act of asking information |
| Mnemonic | A system such as pattern of letters, ideas, or associaciations which assists in remembering something. |
| C++ | An object-oriented computer language. |
| IDE | Integrated development environment is software for building applications that combines common developer tools into a single graphical user interface (GUI). |

## 1.4 **References**

1. Sommerville, I. 2016. “Software Engineering”, 10th Edition, Pearson.

## 1.5 **Overview** .

The 2u2i Final Year Project with Industry (FYP-I) Management System consists of introduction, specific requirements, system architectural design, detailed description of components, data design, interface design, requirements matrix, test cases, as well as appendices. In the introductory phase, we describe the purpose and scope of the project. We have also provided definitions and abbreviations, as well as some references. In specific requirements, we have covered several external interface requirements which includes user interfaces, hardware interfaces, software interfaces, and communication interfaces. We also explained about several system features which include user access, communication, notification data and assessment. The performance of the project as well as the constraints were also discussed. Other than that, software system attributes were also discussed. In system architectural design, we have explained about architectural style and rationale as well as component model. For detailed description of components, the complete package diagram as well as detailed description of its subsystems were discussed. Data design section includes the data description and data dictionary. For interface design, we have displayed an overview of the interface as a whole. We have also discussed the requirements matrix. For the last part, we discuss the test cases in the project.

# 2. Specific Requirements

## 2.1 External Interface Requirements

### 2.1.1 User Interfaces

User access

- Users are required to enter their username and password.
- Student will enter the main page of student's profile while supervisor will enter the main page of supervisor profile
- Access will be given to the right username and password through verification
- The username and password will be save for future login
- There will be authentication for the user to make sure that the right user enter the system

Notification

- Users can access the notification by going to the interface and choosing notification
- Students are only able to view the notifications that are available in the notification database.
- Coordinator able to modify the notifications database by adding more notifications to the database.
- Coordinator able to modify the notifications database by updating the searched notifications in the database.
- Coordinator able to modify the notification database by deleting the searched notifications in the database.
- The system will display “no data found” if there is no data found in the database.

Communication

- Students, supervisors, coordinators, coaches, and examiners are able to have full accessibility to view, add, delete, and edit a message.
- Users are able to access messages in the system by going to the interface and choosing notification
- Users are able to view existing messages by them or by other people in the system.
- Users are able add a new message in the system.
- Users are able to delete an existing message in the system.
- Users are able to edit an existing message created by them in the system.

- The system will keep an organized list of messages added by users of the system.

Assessment

- Examiners can upload the questions by adding it into the database.
- Students can take the exam online by attempting it on the system.
- Students can view their grade after they have finished their exam.
- Examiners can view their student's grade after their student;s has finished the exam.

### 2.1.2 Hardware Interfaces

The 2u2i Final Year Project with Industry (FYP-I) Management System is a web based system. The system will be connected to the servers provided by Amazon Web Services and database from MySQL. The web server will have 8 GB of RAM to support the system load while using it. The database will have 1TB capacity to store all of the data. The system can be accessed from multiple devices such as smartphone, laptop or desktop. It also can be accessed by computers that use different operating systems such as Windows, MacOS or Linux. The clients are required to use modern web browsers such as Google Chrome, Microsoft Edge or Mozilla Firefox. The clients also need to have an Internet connection with minimum bandwidth of 10MB/s to access the system. The data from the server will be transferred and received by the clients using basic networking protocols. They also need to enable cookies to ensure they get the best experience using the system.

### 2.1.3 Software Interfaces

1. **Google Chrome (Web Browser)**
   Name: Google Chrome
   Mnemonic: Chrome, Google
   Specification number: 103.0.000.00
   Version number:
   103.0.5060.33 (Windows & macOS & Linux)
   103.0.5060.33(Android)
   103.0.5060.34(iOS)
   Sources: www.google.com/chrome/
   Discussion: We use this web browser to operate our systems because it's easier and fast for our users.

2. **MySQL (Database)**
   Name: MySQL
   Mnemonic: CREATETABLE, SELECT, INSERT INTO
   Specification number: 8.0.00
   Version number: 8.0.28
   Sources: https://www.mysql.com/
   Discussion: The database that we used to create, store, search, and also delete all the data in the system.

3. **VSC (Programming Software)**
   Name: Visual Studio Code
   Mnemonic: C++, Java, Python
   Specification number: 1.67.0
   Version number: 1.67.2
   Sources: https://code.visualstudio.com/
   Discussion: The best IDE for us to operate our programming software using many languages such as MySQL and also C++.

#### 2.1.4 Communication Interfaces

This should list the different communication interfaces, such as local network protocols and so on. For receiving student and college management information and encrypting all important information from and into our system for data transfer security, our system will employ Hypertext Transfer Protocol Secure (https). HTTP is a protocol for sending and receiving data.

TCP/IP (Transmission Control Protocol/Internet Protocol) is also used by the system to link network devices via the internet. It may also be used to send data across the Internet. For data transfer, TCP is used. TCP is compatible with IP and enhances it. It's used to send and receive data through a network. It breaks down any communication into a sequence of packets that are transferred from source to destination, where they are reassembled.

### 2.2 **System Features**

The system features included in the use case diagram. The use case diagrams will be used to explain the features in the system. The domain model will be used to represent the relationship between the classes in the system. There are also use case descriptions and sequence diagrams  to explain all of the processes involved in the 2u2i Final Year Project with Industry (FYP-I) Management System. The use case description will explain all of the condition and flow of the events of a use case while the sequence diagram will explain the interaction of the classes while the use case is executed.

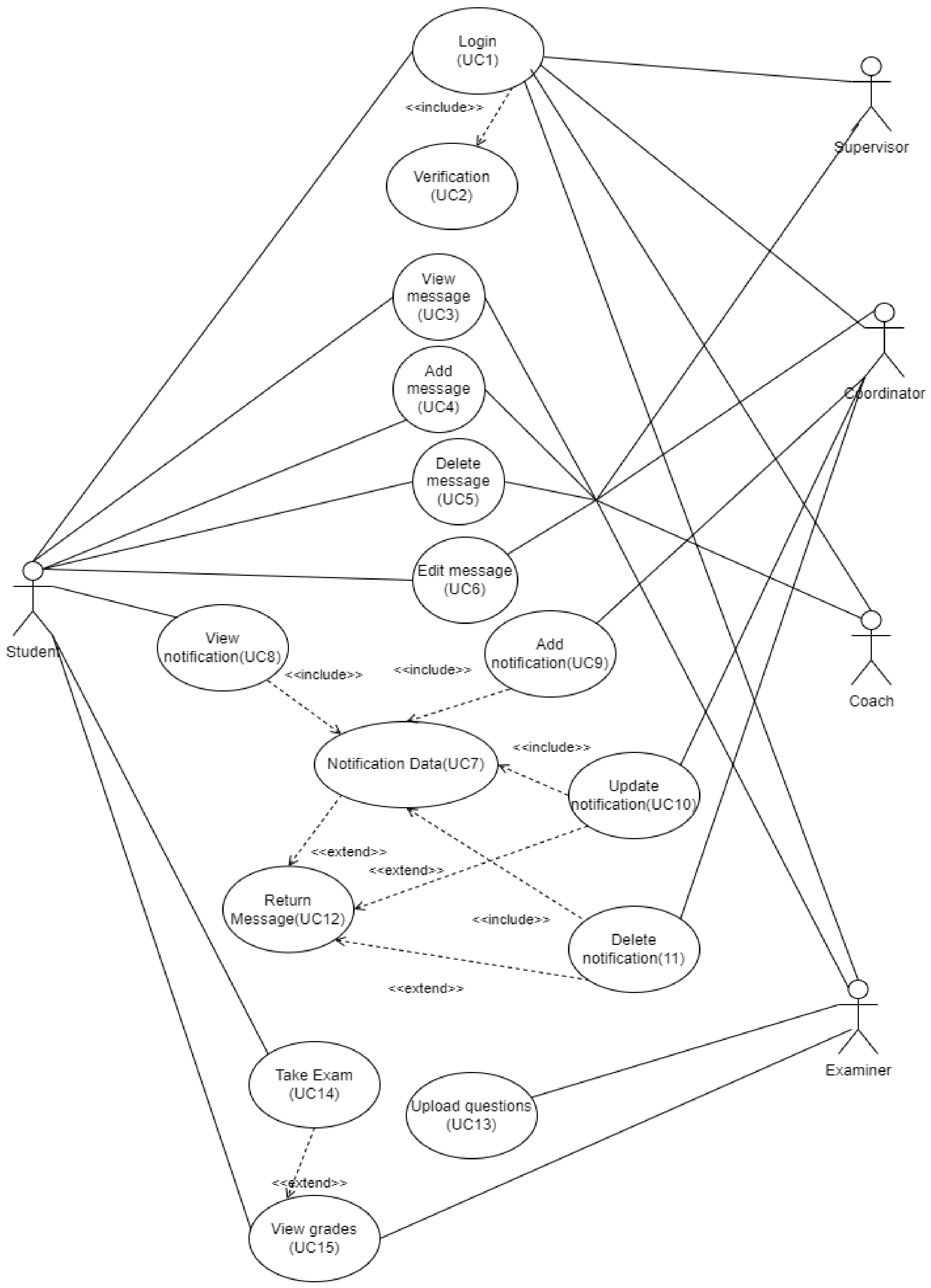


**Figure 2.1: Use Case Diagram for <2u2i Final Year Project with Industry (FYP-I) Management System>**

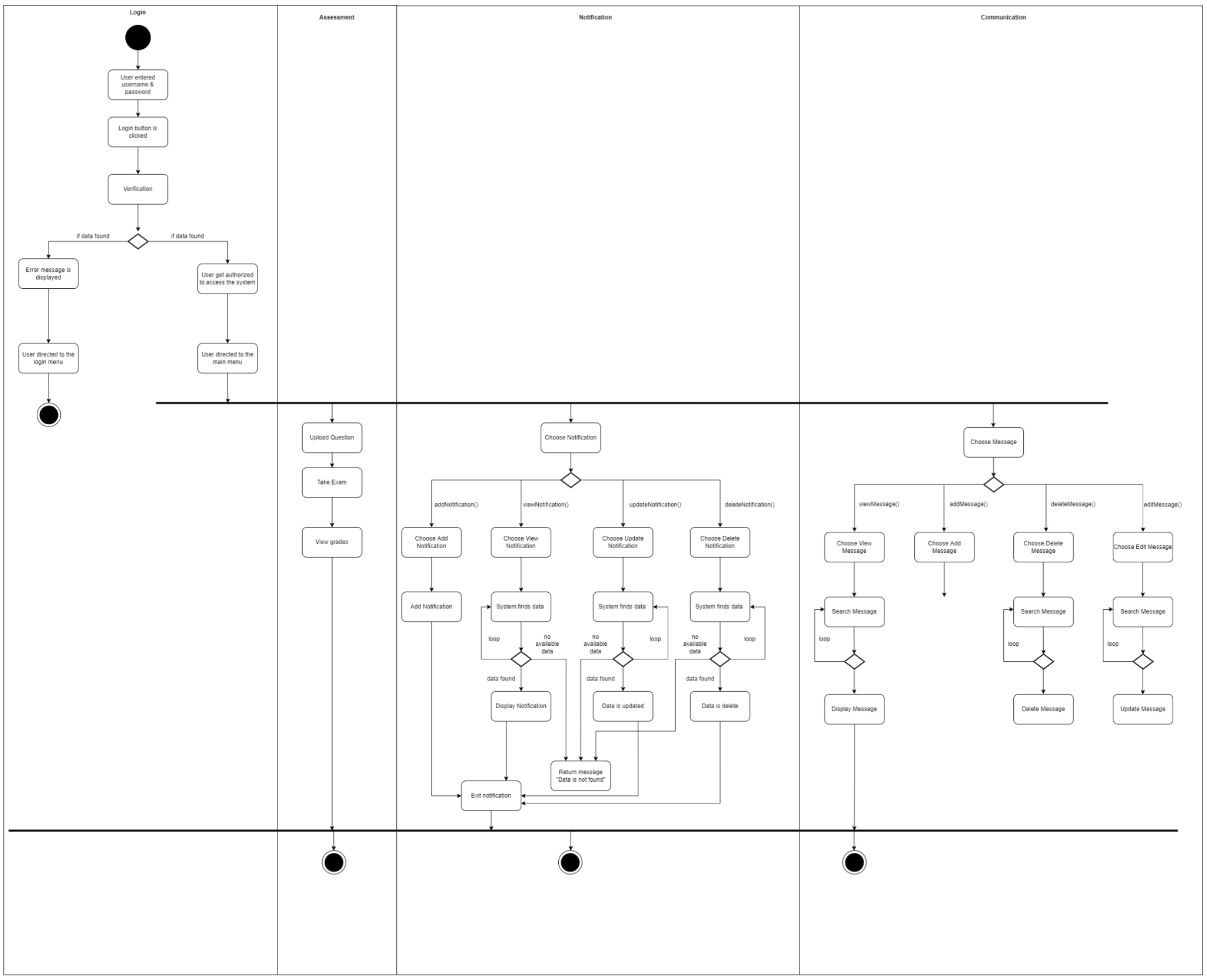


**Figure 2.2: Activity Diagram for <2u2i Final Year Project with Industry (FYP-I) Management System>**

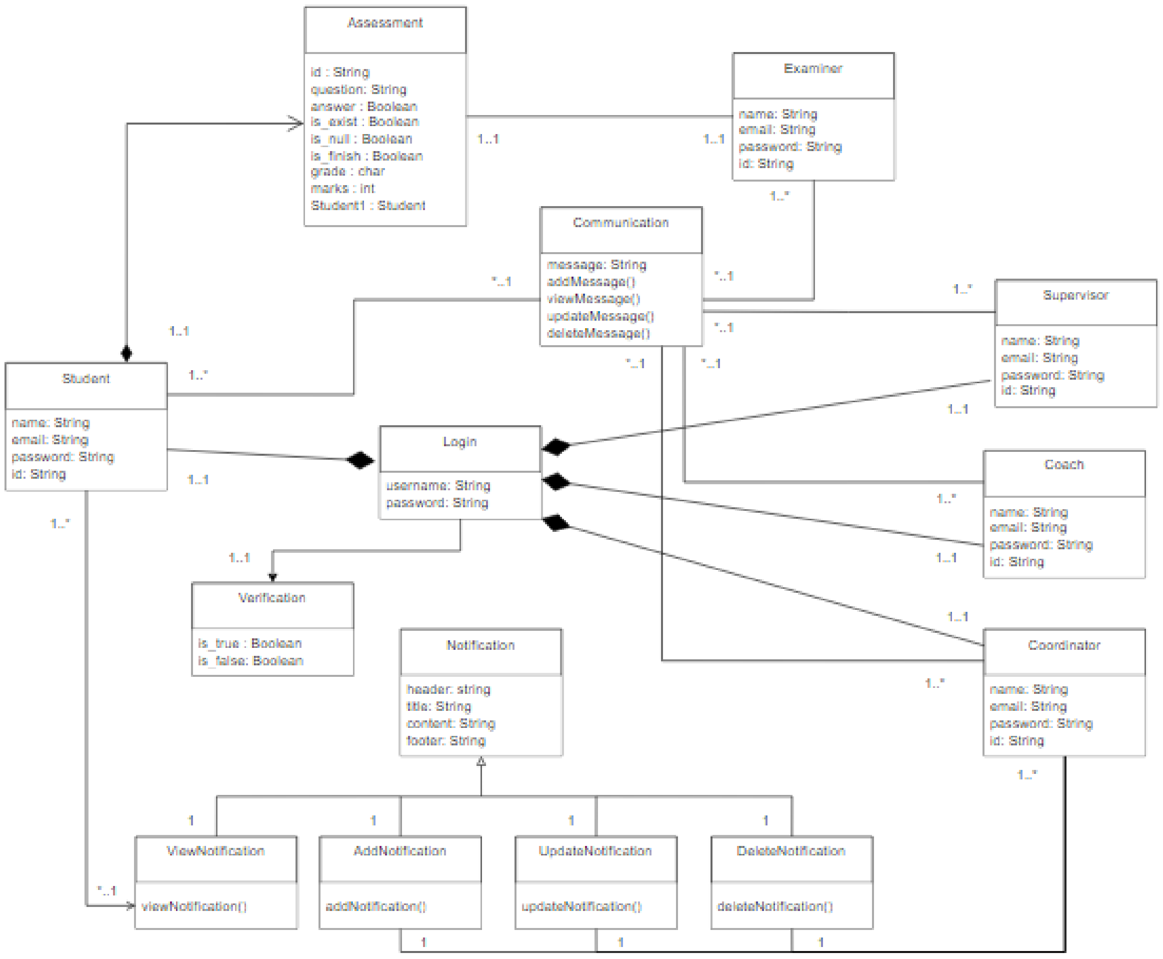


Figure 2.3: Domain Model for <2u2i Final Year Project with Industry (FYP-I) Management System>

### 2.2.1 UC001: Use Case <Login>

| **Use Cases: Login** |
|---|
| **ID: UC1** |
| **Actors:**<br>A1 Student<br>A2 Supervisor<br>A3 Coordinator<br>A4 Coach<br>A5 Examiner |
| **Includes:**<br>UC2 Verification |
| **Extensions Point:** |
| **Preconditions:** |
| **Flow of Events:**<br>1. Users enter their username and password to the system.<br>2. Users click on the login button to proceed accessing the system.<br>3. Include Verification |
| **Postconditions:** |

**Figure 2.4: Use Case Description for <Login>**

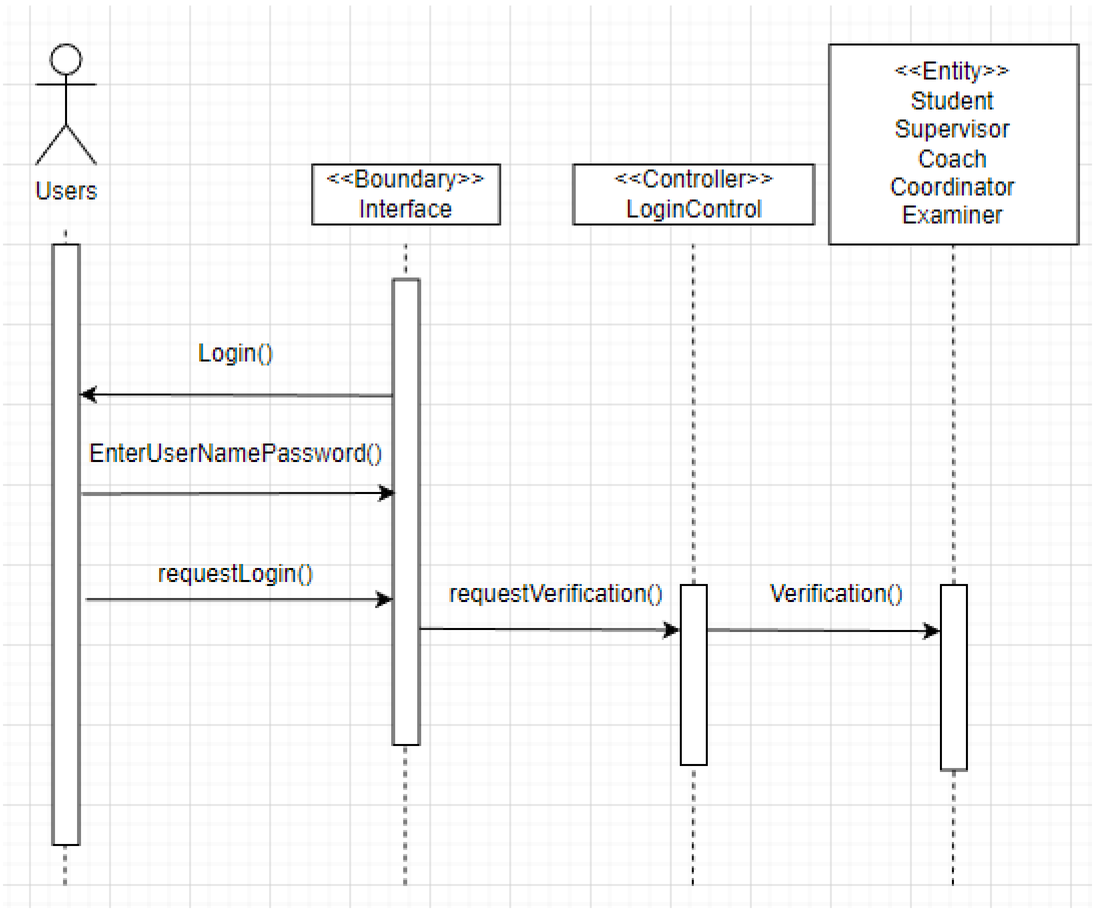
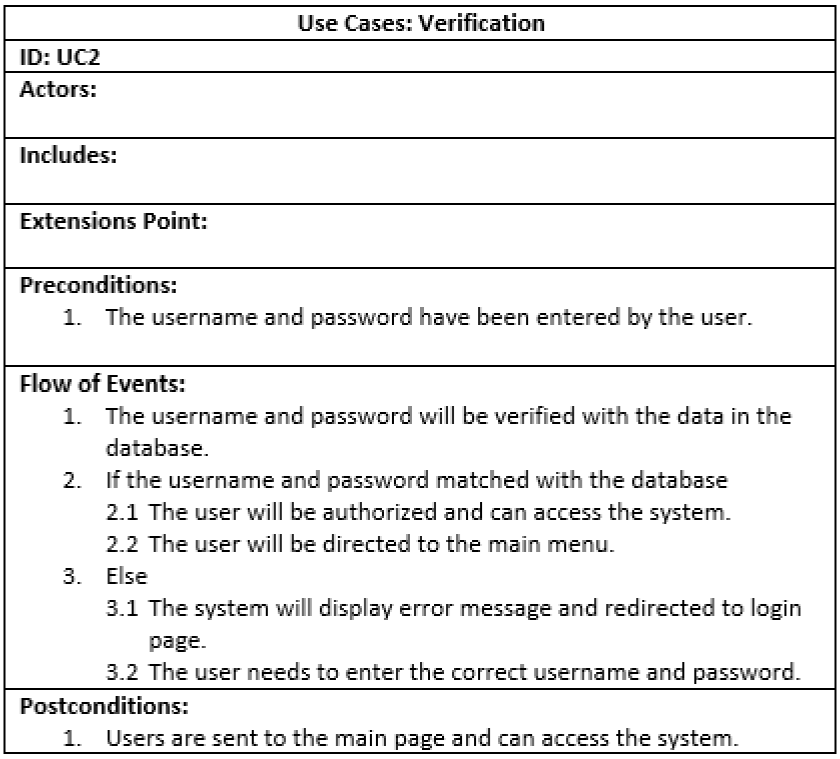


**Figure 2.5: Sequence Diagram for <Login>**

### 2.2.2 UC002: Use Case<Verification>



| Use Cases: Verification |
|---|
| **ID: UC2** |
| **Actors:** |
| **Includes:** |
| **Extensions Point:** |
| **Preconditions:**<br>1. The username and password have been entered by the user. |
| **Flow of Events:**<br>1. The username and password will be verified with the data in the database.<br>2. If the username and password matched with the database<br>2.1 The user will be authorized and can access the system.<br>2.2 The user will be directed to the main menu.<br>3. Else<br>3.1 The system will display error message and redirected to login page.<br>3.2 The user needs to enter the correct username and password. |
| **Postconditions:**<br>1. Users are sent to the main page and can access the system. |

**Figure 2.6: Use Case Description for <Verification>**

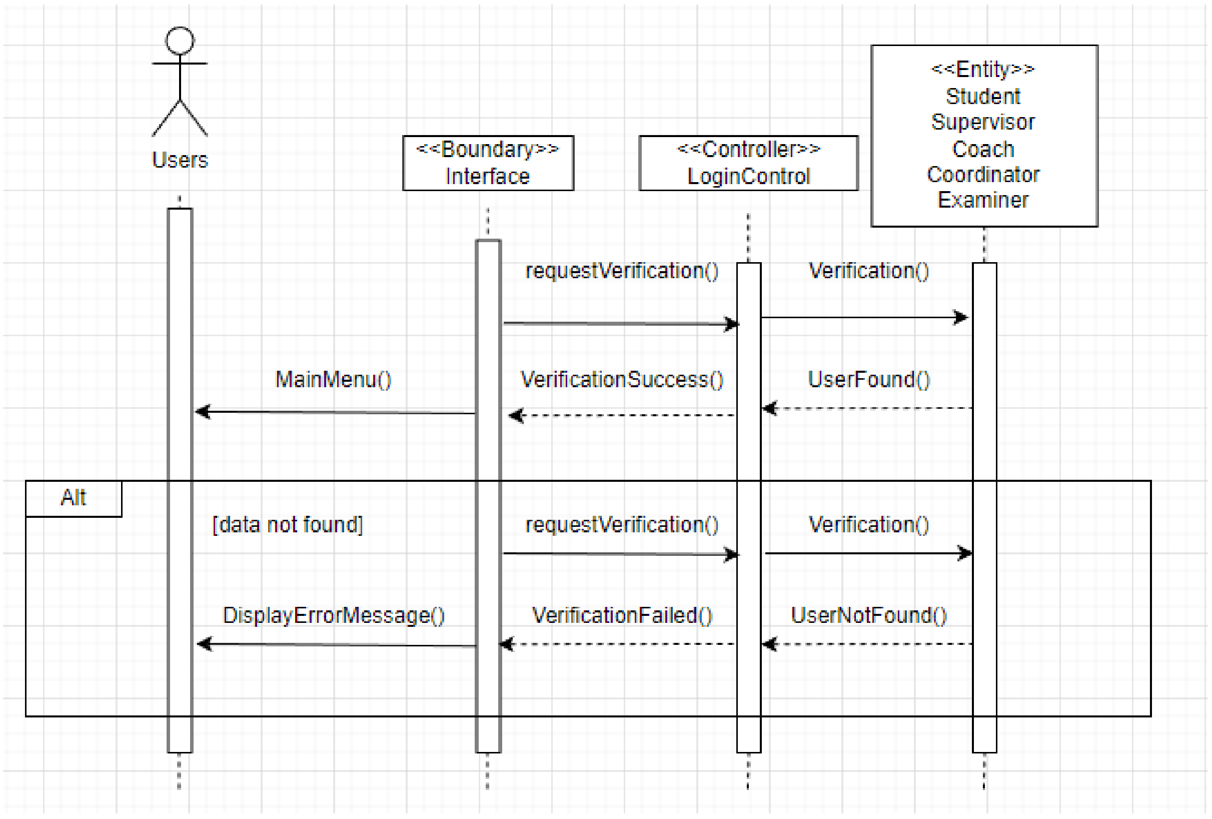
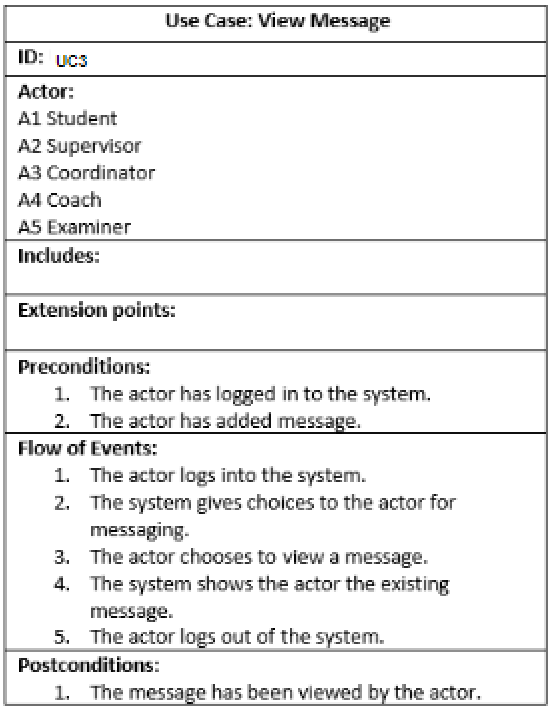


Figure 2.7: Sequence Diagram for <Verification>

### 2.2.3 UC003: Use Case<View Message>



| Use Case: View Message |
|---|
| **ID:** UC3 |
| **Actor:**<br>A1 Student<br>A2 Supervisor<br>A3 Coordinator<br>A4 Coach<br>A5 Examiner |
| **Includes:** |
| **Extension points:** |
| **Preconditions:**<br>1. The actor has logged in to the system.<br>2. The actor has added message. |
| **Flow of Events:**<br>1. The actor logs into the system.<br>2. The system gives choices to the actor for messaging.<br>3. The actor chooses to view a message.<br>4. The system shows the actor the existing message.<br>5. The actor logs out of the system. |
| **Postconditions:**<br>1. The message has been viewed by the actor. |

Figure 2.8: Use Case Description for <View Message>

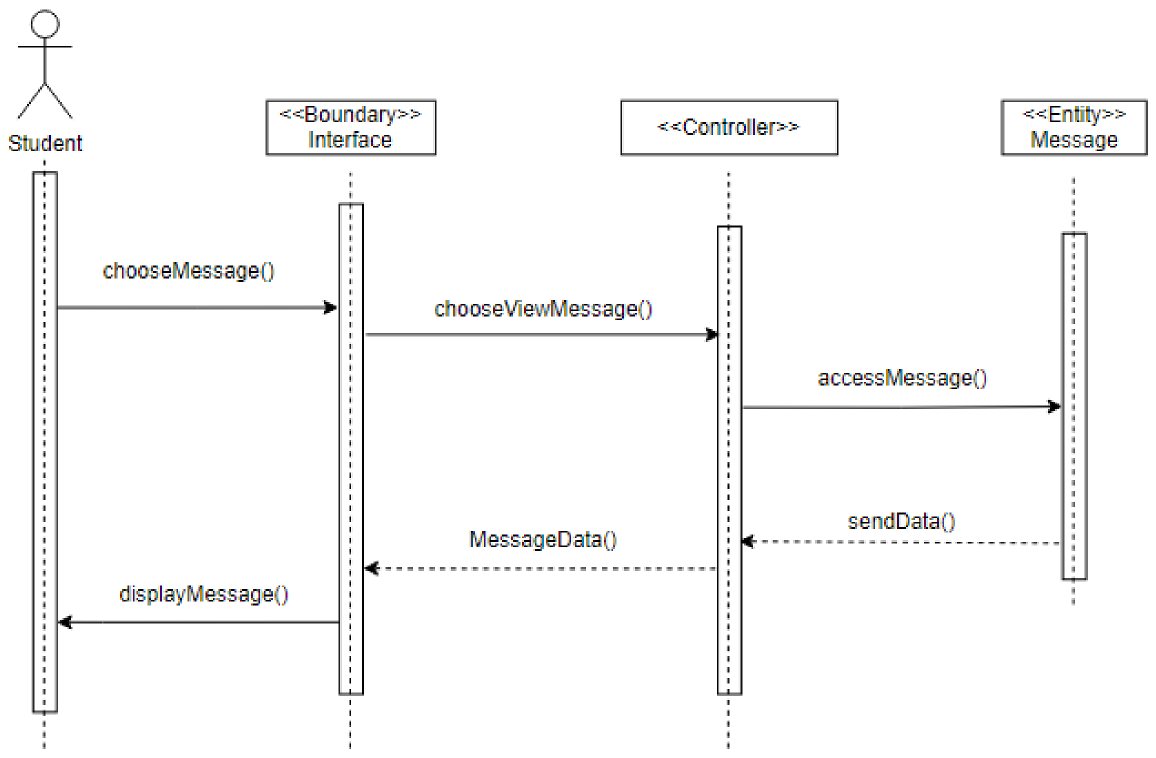
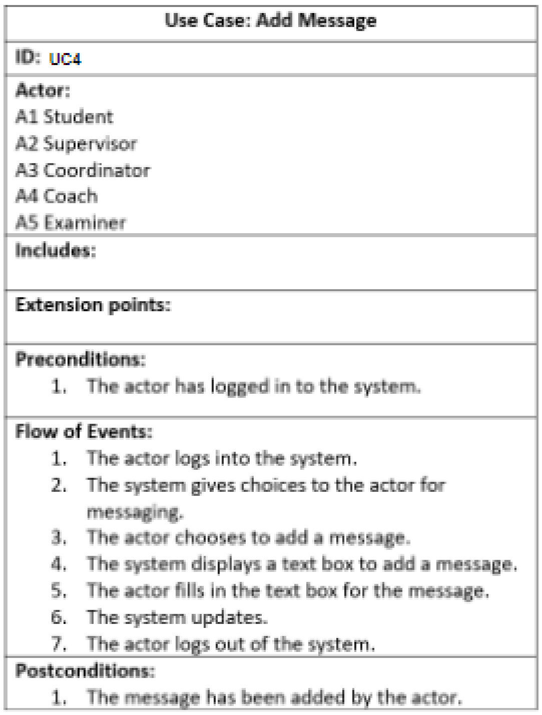


**Figure 2.9: Sequence Diagram for <View Message>**

### 2.2.4 UC004: Use Case<Add Message>



| Use Case: Add Message |
|---|
| **ID:** UC4 |
| **Actor:**<br>A1 Student<br>A2 Supervisor<br>A3 Coordinator<br>A4 Coach<br>A5 Examiner |
| **Includes:** |
| **Extension points:** |
| **Preconditions:**<br>1. The actor has logged in to the system. |
| **Flow of Events:**<br>1. The actor logs into the system.<br>2. The system gives choices to the actor for messaging.<br>3. The actor chooses to add a message.<br>4. The system displays a text box to add a message.<br>5. The actor fills in the text box for the message.<br>6. The system updates.<br>7. The actor logs out of the system. |
| **Postconditions:**<br>1. The message has been added by the actor. |

**Figure 2.10: Use Case Description for <Add Message>**

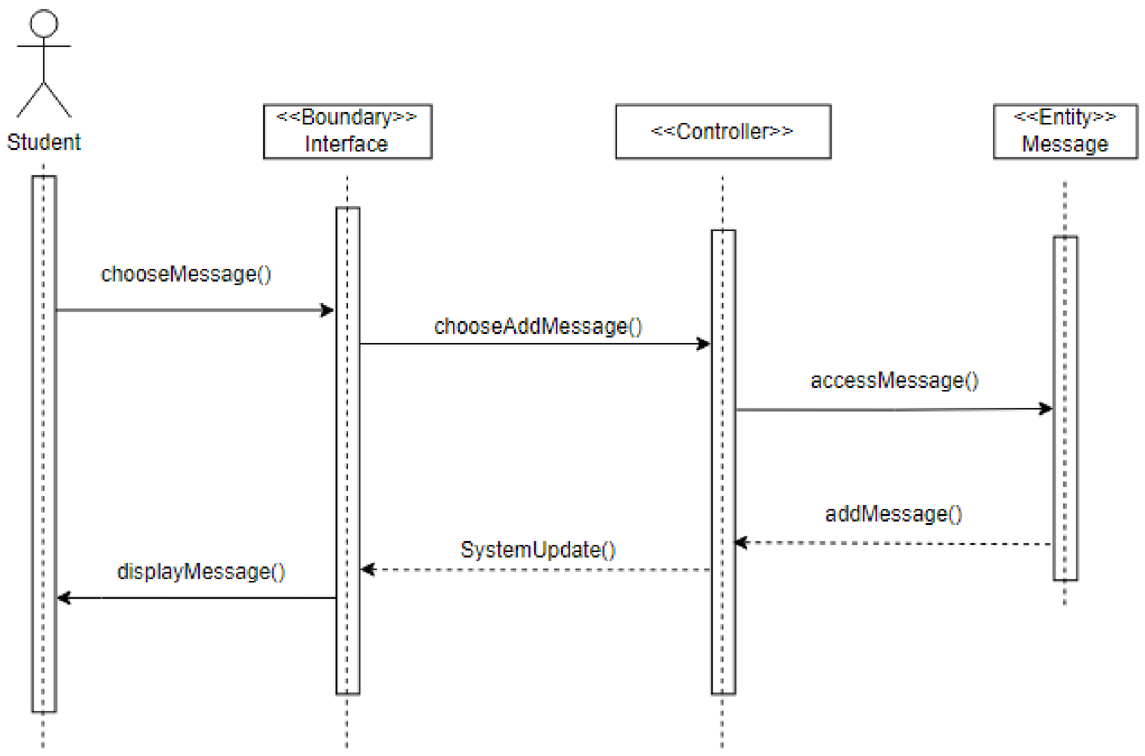
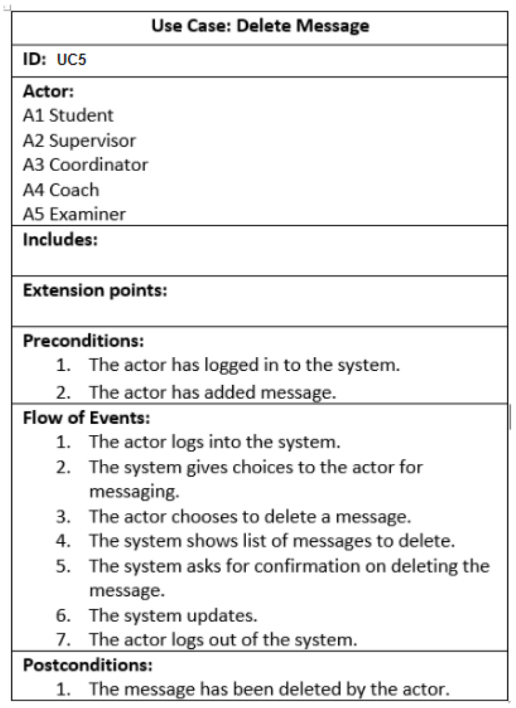


**Figure 2.11: Sequence Diagram for <Add Message>**

### 2.2.5 UC005: Use Case<Delete Message>



| **Use Case: Delete Message** |
|---|
| **ID:** UC5 |
| **Actor:**<br>A1 Student<br>A2 Supervisor<br>A3 Coordinator<br>A4 Coach<br>A5 Examiner |
| **Includes:** |
| **Extension points:** |
| **Preconditions:**<br>1. The actor has logged in to the system.<br>2. The actor has added message. |
| **Flow of Events:**<br>1. The actor logs into the system.<br>2. The system gives choices to the actor for messaging.<br>3. The actor chooses to delete a message.<br>4. The system shows list of messages to delete.<br>5. The system asks for confirmation on deleting the message.<br>6. The system updates.<br>7. The actor logs out of the system. |
| **Postconditions:**<br>1. The message has been deleted by the actor. |

**Figure 2.12: Use Case Description for <Delete Message>**

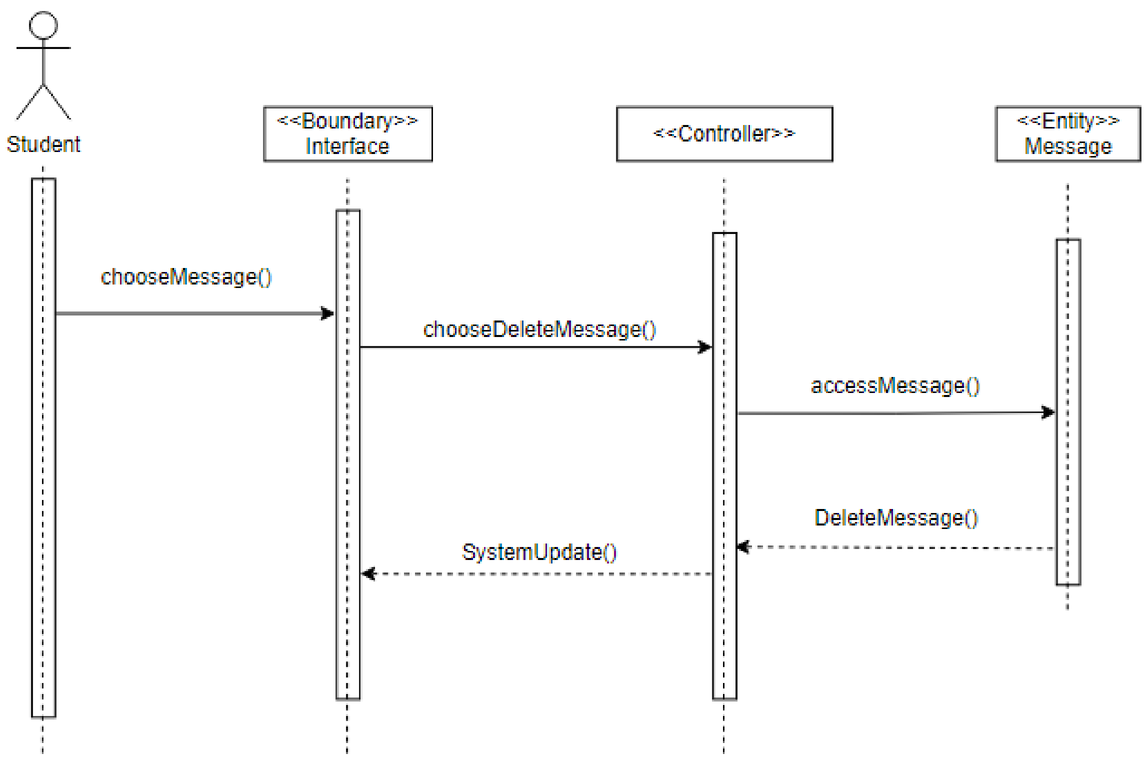
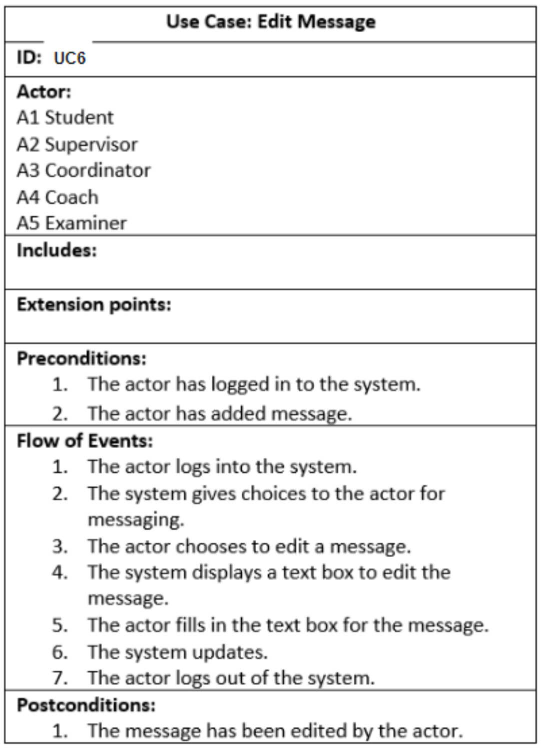


Figure 2.13: Sequence Diagram for <Delete Message>

## 2.2.6 UC006: Use Case<Edit Message>



| Use Case: Edit Message |
|---|
| **ID:** UC6 |
| **Actor:**<br>A1 Student<br>A2 Supervisor<br>A3 Coordinator<br>A4 Coach<br>A5 Examiner |
| **Includes:** |
| **Extension points:** |
| **Preconditions:**<br>1. The actor has logged in to the system.<br>2. The actor has added message. |
| **Flow of Events:**<br>1. The actor logs into the system.<br>2. The system gives choices to the actor for messaging.<br>3. The actor chooses to edit a message.<br>4. The system displays a text box to edit the message.<br>5. The actor fills in the text box for the message.<br>6. The system updates.<br>7. The actor logs out of the system. |
| **Postconditions:**<br>1. The message has been edited by the actor. |

Figure 2.14: Use Case Description for <Edit Message>

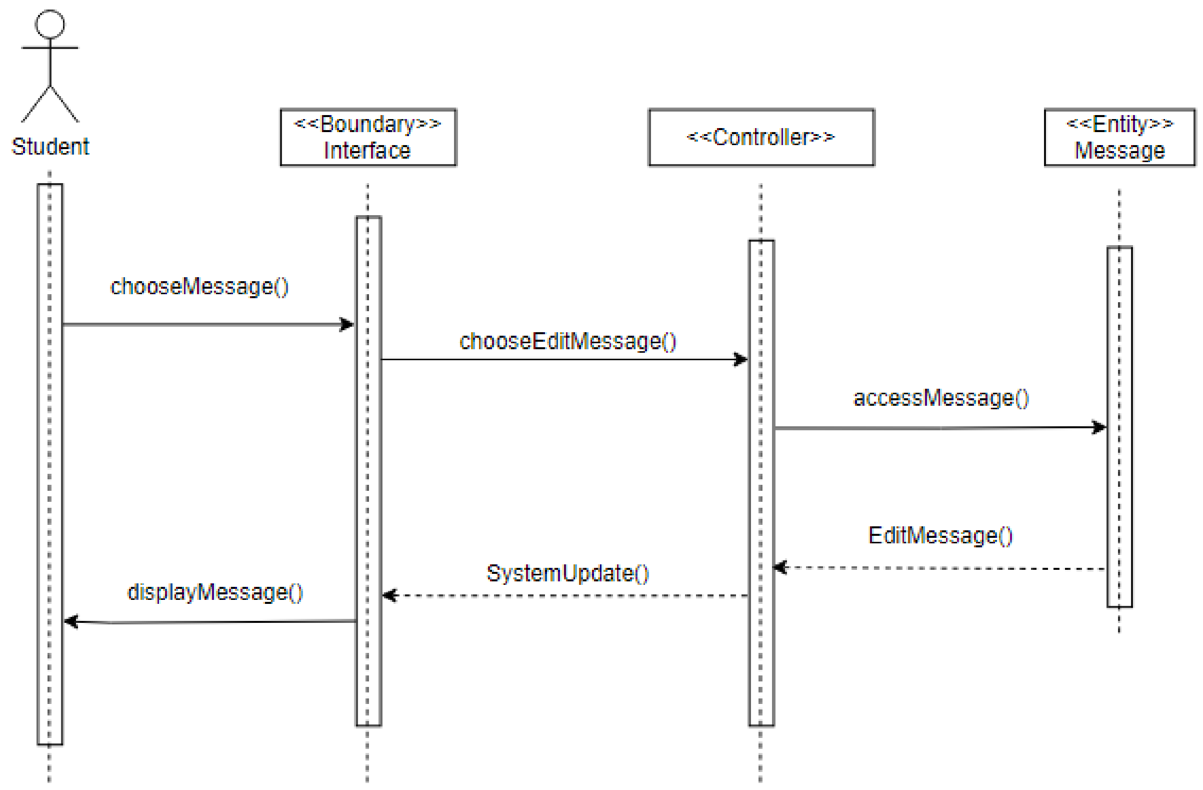


**Figure 2.15: Sequence Diagram for <Edit Message>**

### 2.2.7 UC007: Use Case <Notification Data>

| **Use cases: Notification Data** |
|---|
| **ID: UC7** |
| **Extends:**<br><returnMessage> |
| **Preconditions:** |
| **Flow of Events:**<br>1. If there are data in notification<br>1.1. Return data to users.<br>1.2. System returns back to previous use case.<br>2. Else<br>2.1. There are no data available in the system <returnMessage> |
| **Postconditions:**<br>1. User able to get the data from Notification Data<br>2. User will get an error message if there is no data. |

**Figure 2.16: Use Case Description for <Notification Data>**

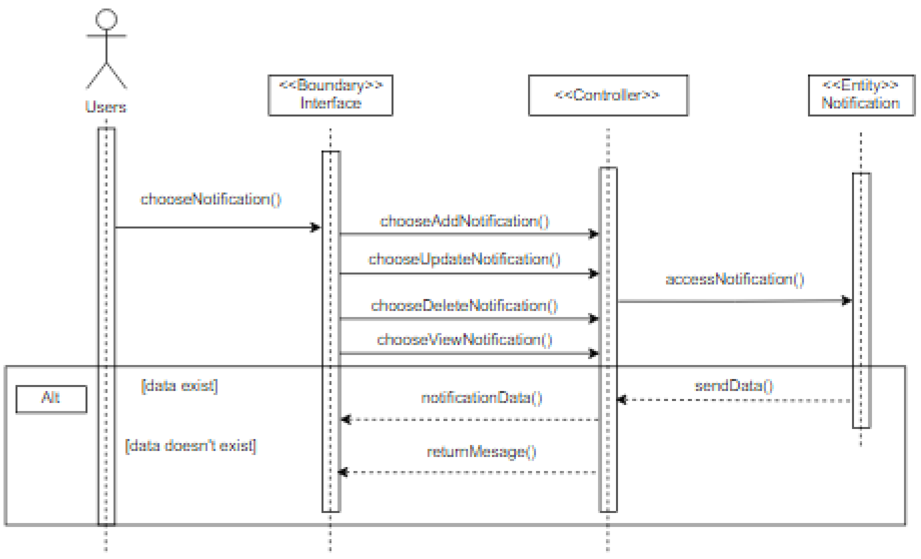


**Figure 2.17: Sequence Diagram for <Notification Data>**

### 2.2.8 UC008: Use Case <View Notification>

| Use cases: View Notification |
|---|
| **ID: UC8** |
| **Actors:**<br>A1 Student |
| **Includes:**<br>UC7 Notification Data |
| **Preconditions:**<br>1. The student has logged in into the system.<br>2. Student has entered the interface of the system. |
| **Flow of Events:**<br>1. Student selects "View Notification"<br>2. include (Notification Data)<br>3. System will send a request to access the notification database<br>4 For each data found<br>4.1. System will print out notification data<br>5. There is no more data<br>5.1 System will exit the use case |
| **Postconditions:**<br>1. System able to display the notification to Students |

**Figure 2.18: Use Case Description for <View Notification>**

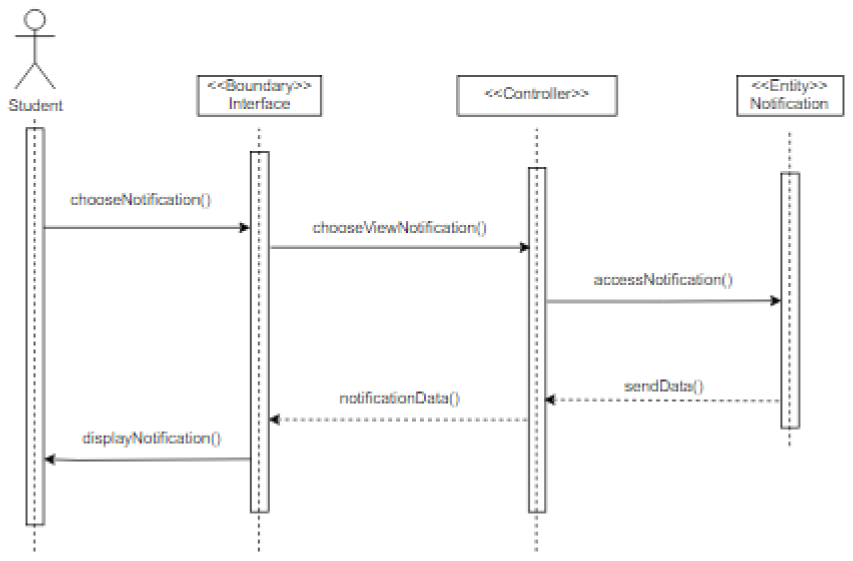


**Figure 2.19: Sequence Diagram for <View Notification>**

### 2.2.9 UC009: Use Case <Add Notification>

| **Use cases: Add Notification** |
|---|
| **ID: UC9** |
| **Actors:**<br>A3 Coordinator |
| **Includes:**<br>UC7 Notification Data |
| **Preconditions:**<br>1. Coordinator is logged in into the system. |
| **Flow of Events:**<br>1. Coordinator selects "Add Notification"<br>2. include (Notification Data)<br>3. System will send a request to access the notification database<br>4. Coordinator add notification to the database. |
| **Postconditions:**<br>1. Coordinator able to add notification to the system for Student to view. |

**Figure 2.20: Use Case Description for <Add Notification>**

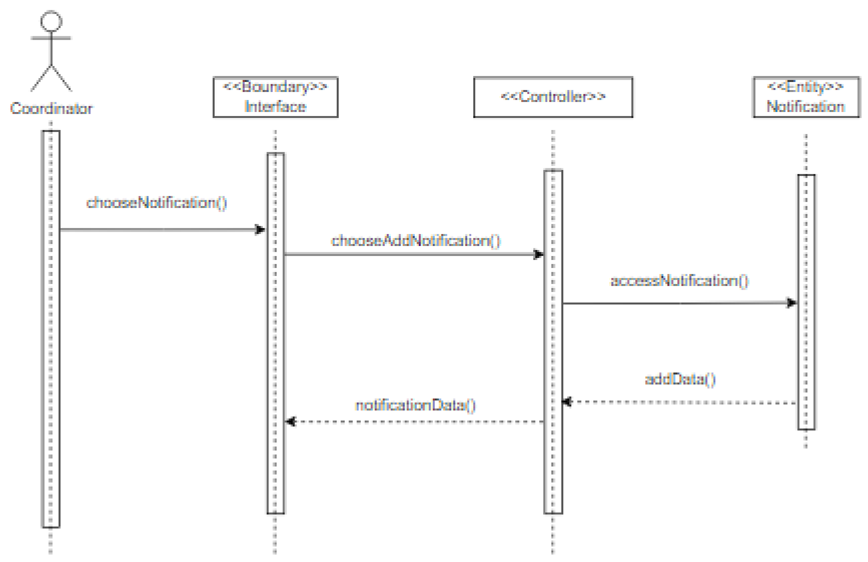


**Figure 2.21: Sequence Diagram for <Add Notification>**

### 2.2.10 UC010: Use Case <Update Notification>

| **Use cases: Update Notification** |
|---|
| **ID: UC10** |
| **Actors:**<br>A3 Coordinator |
| **Includes:**<br>UC7 Notification Data |
| **Extends:**<br><returnMessage> |
| **Preconditions:**<br>1. Coordinator is logged in into the system. |
| **Flow of Events:**<br>1. Coordinator selects "Update Notification"<br>2. include (Notification Data)<br>3. System will send a request to access the notification database<br>4. While searching for notification<br>    4.1. If notification data is found<br>        4.1.1. Coordinator is able to update the notification<br>    4.2 Else<br>        <returnMessage> |
| **Postconditions:**<br>1. Coordinator able to update the notification data |

**Figure 2.22: Use Case Description for <Update Notification>**

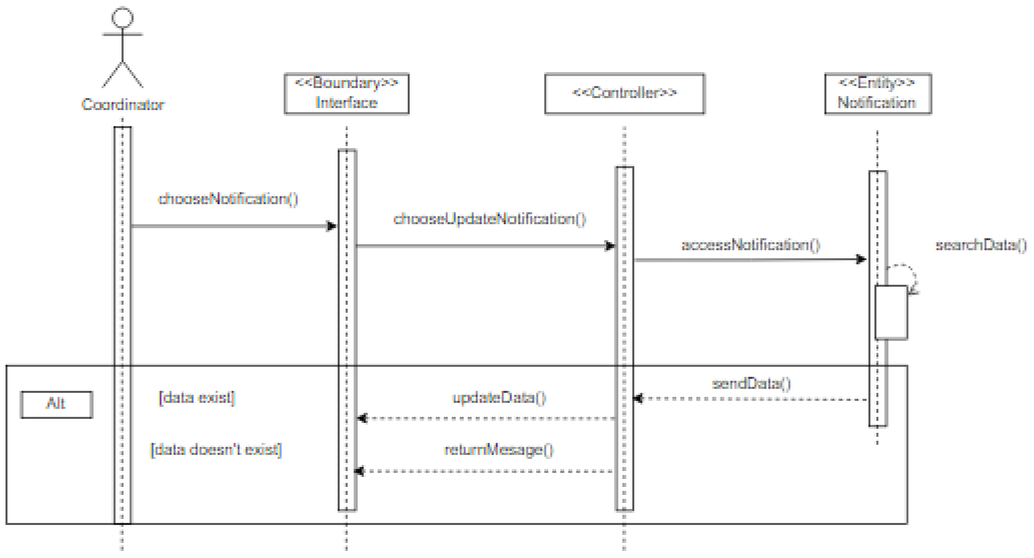


**Figure 2.23: Sequence Diagram for <Update Notification>**

### 2.2.11 UC011: Use Case <Delete Notification>

| **Use cases: Delete Notification** |
|---|
| **ID: UC11** |
| **Actors:**<br>A3 Coordinator |
| **Includes:**<br>UC7 Notification Data |
| **Extends:**<br><returnMessage> |
| **Preconditions:**<br>1. Coordinator is logged in into the system. |
| **Flow of Events:**<br>1. Coordinator selects "Delete Notification"<br>2. include (Notification Data)<br>3. System will send a request to access the notification database<br>4. While searching for notification<br>4.1. If notification data is found<br>4.1.1. Coordinator is able to delete the notification<br>4.2 Else<br><returnMessage> |
| **Postconditions:**<br>1. Coordinator able to delete the notification data |

**Figure 2.24: Use Case Description for <Delete Notification>**

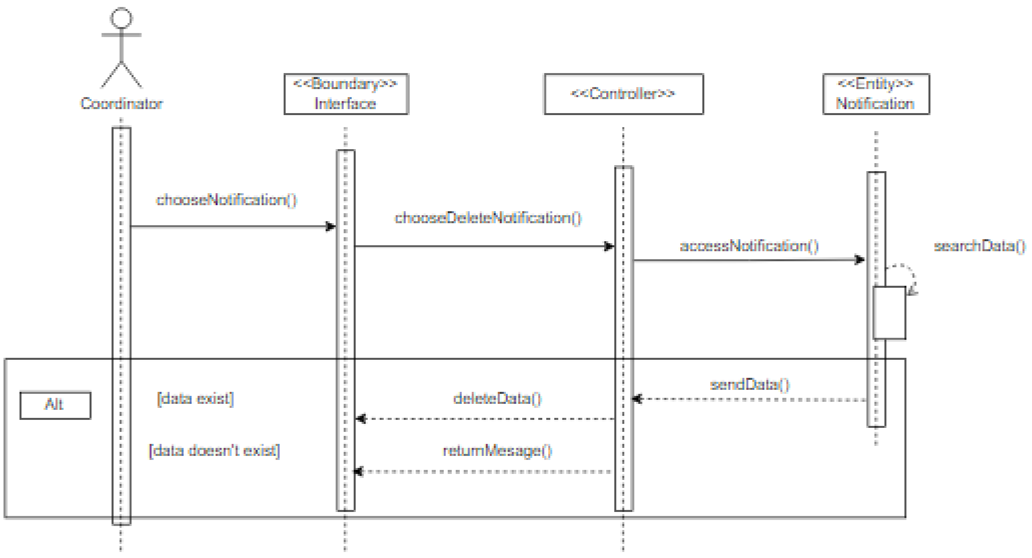


Figure 2.25: Sequence Diagram for <Delete Notification>

### 2.2.12 UC012: Use Case <Return Message>

| **Extension use cases: Return Message** |
|---|
| **ID: UC12** |
| **Extends:**<br>UC7 Notification Data at <returnMessage><br>UC10 Update Notification at <returnMessage><br>UC11 Delete Notification at <returnMessage> |
| **Flow of Events:**<br>1. System will print out a message "No notification data available" |
| **Postconditions:**<br>1. Users can add types of news that they want in their notification<br>2. Users can view the news that they had selected for their notification |

Figure 2.26: Use Case Description for <Return Message>

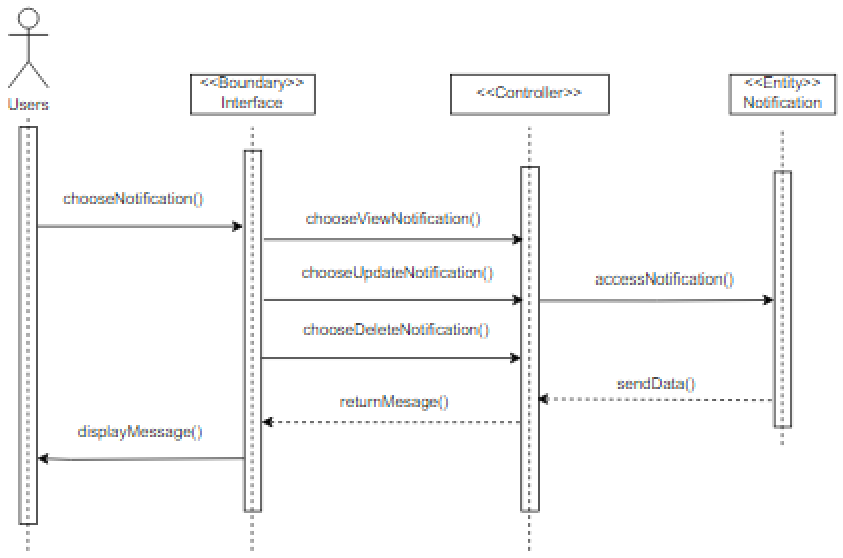


**Figure 2.27: Sequence Diagram for <Return Message>**

### 2.2.13 UC013: Use Case<Upload Question>

| Use case: Upload Question |
|---|
| **ID: UC13** |
| **Actors:** A5 Examiner |
| **Includes:** |
| **Extension Points:** |
| **Preconditions:** 1. The examiner has logged in to the system. |
| **Flow of Events:** 1. The examiner clicks on the button that they want to upload the question. 2. If the question not uploaded yet 2.1 The file that contains the questions can be uploaded by clicking the upload button. 2.2 The answer for each of the question need to be set by clicking the right answer for the question. 2.3 The system stores the questions and answers 2.4 The exam is ready to be taken by the students 3. Else 3.1 The message about the question has been uploaded will be displayed. 3.2 The examiner will be redirected to main page. |
| **Postconditions:** 1. The question has been uploaded to the system. |

**Figure 2.28: Use Case Description for <Upload Question>**

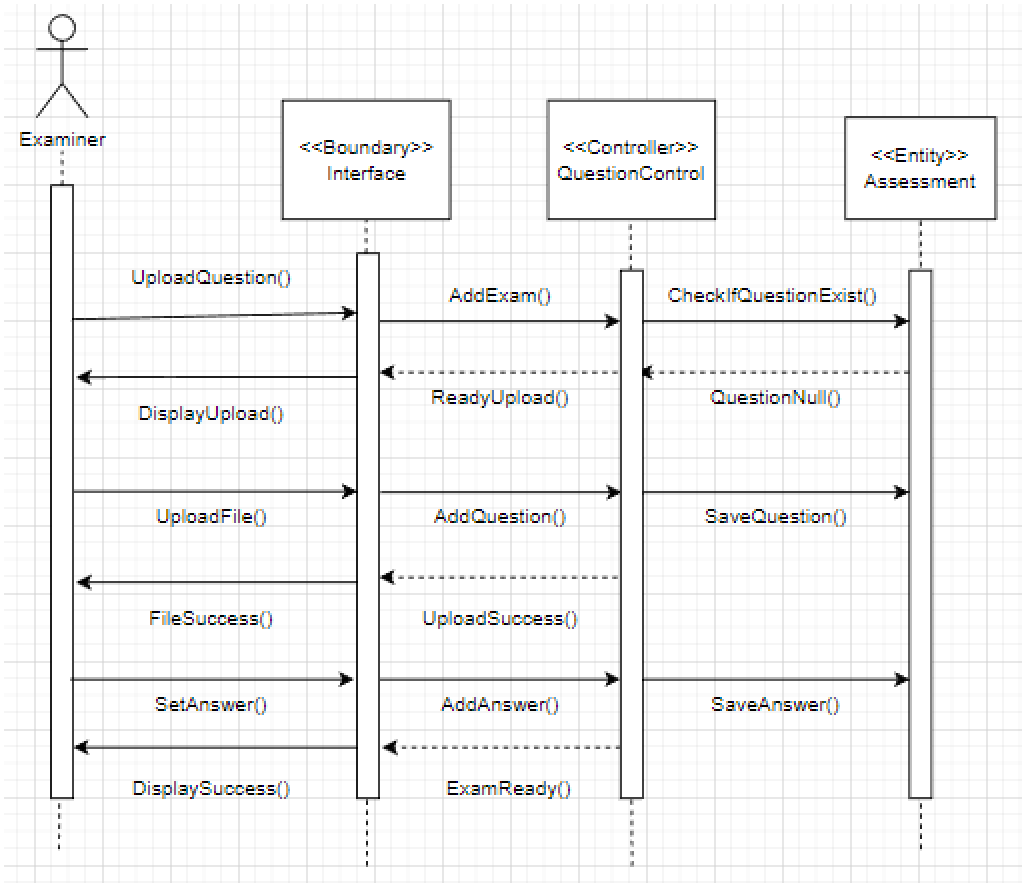


**Figure 2.29: Sequence Diagram for <Upload Question> if Question Not Available**

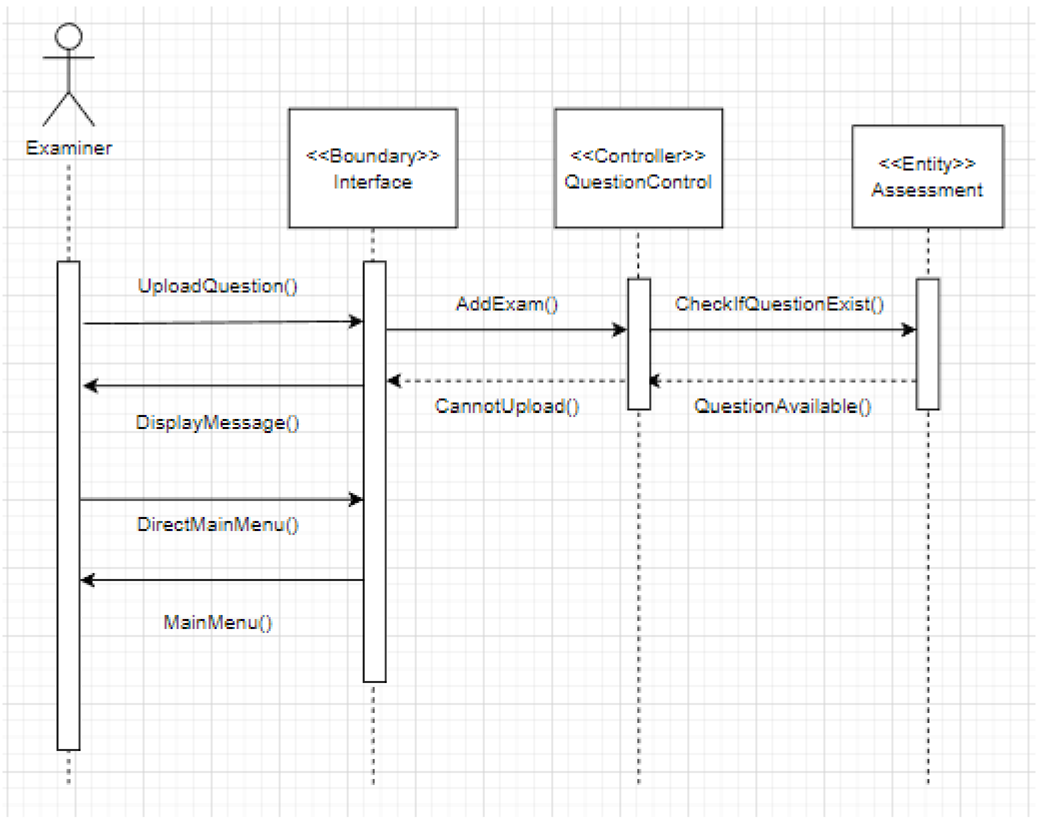
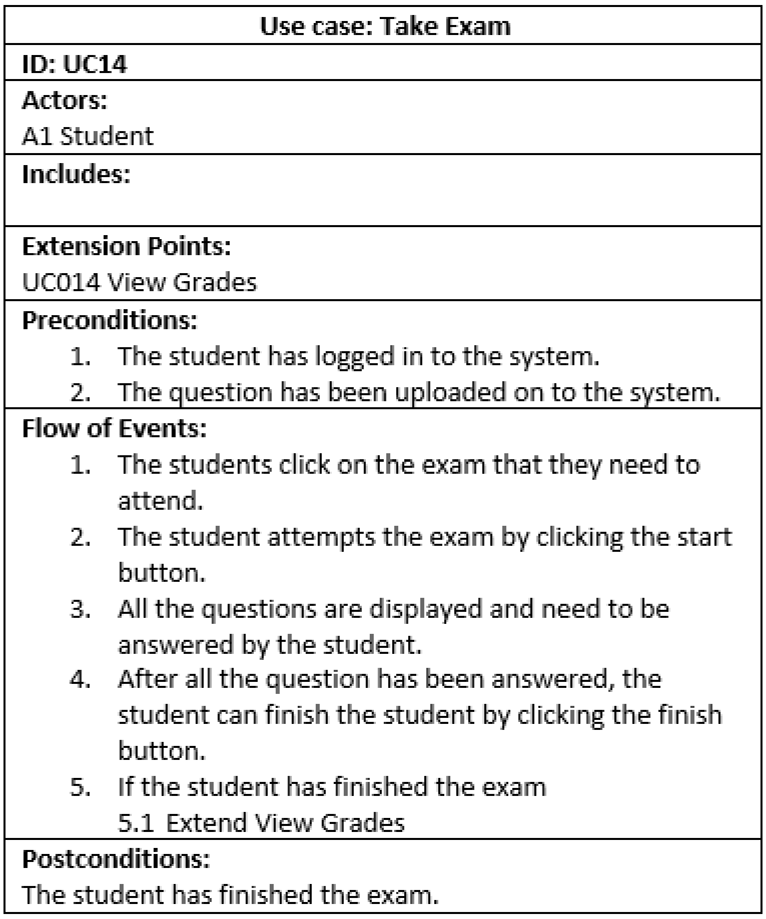


**Figure 2.30: Sequence Diagram for <Upload Question> if Question Available**

### 2.2.14 UC014: Use Case<Take Exam>



| **Use case: Take Exam** |
|---|
| **ID: UC14** |
| **Actors:**<br>A1 Student |
| **Includes:** |
| **Extension Points:**<br>UC014 View Grades |
| **Preconditions:**<br>1. The student has logged in to the system.<br>2. The question has been uploaded on to the system. |
| **Flow of Events:**<br>1. The students click on the exam that they need to attend.<br>2. The student attempts the exam by clicking the start button.<br>3. All the questions are displayed and need to be answered by the student.<br>4. After all the question has been answered, the student can finish the student by clicking the finish button.<br>5. If the student has finished the exam<br>5.1 Extend View Grades |
| **Postconditions:**<br>The student has finished the exam. |

**Figure 2.31: Use Case Description for <Take Exam>**

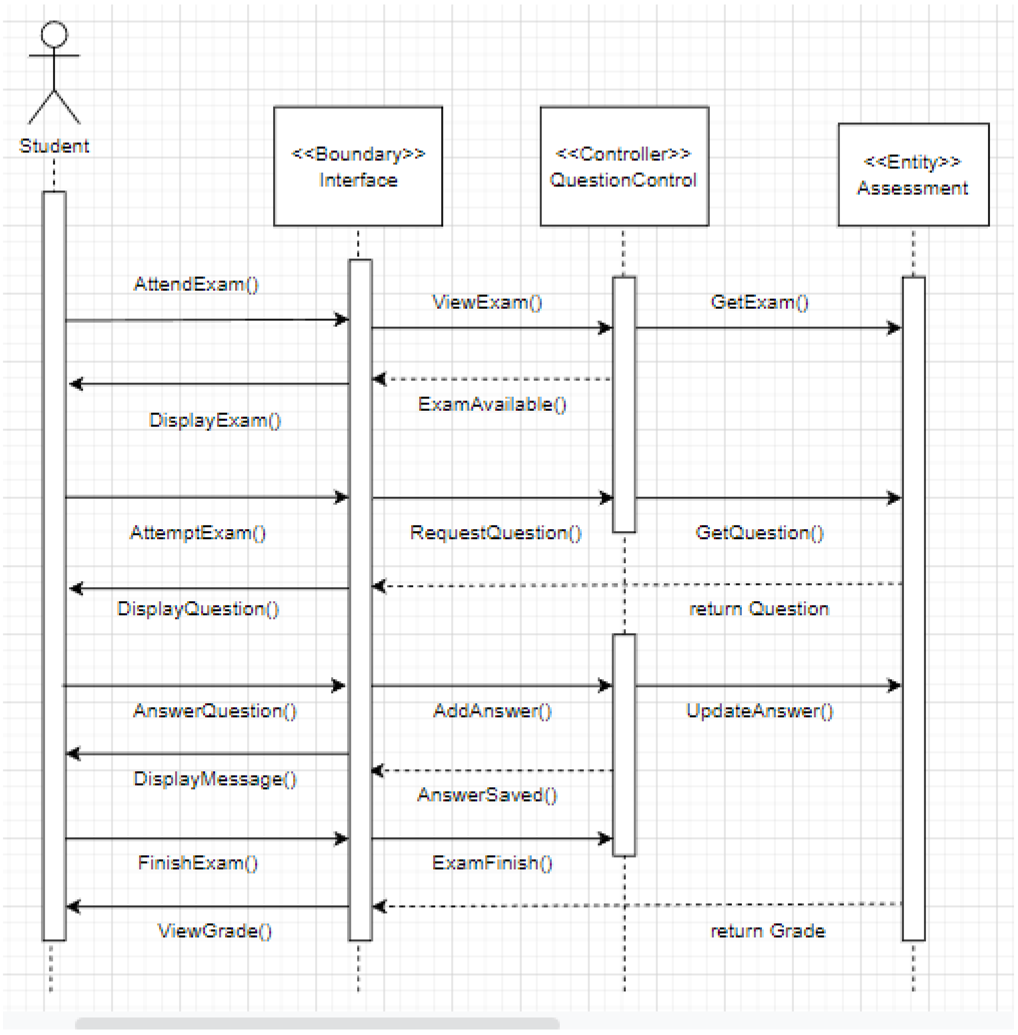
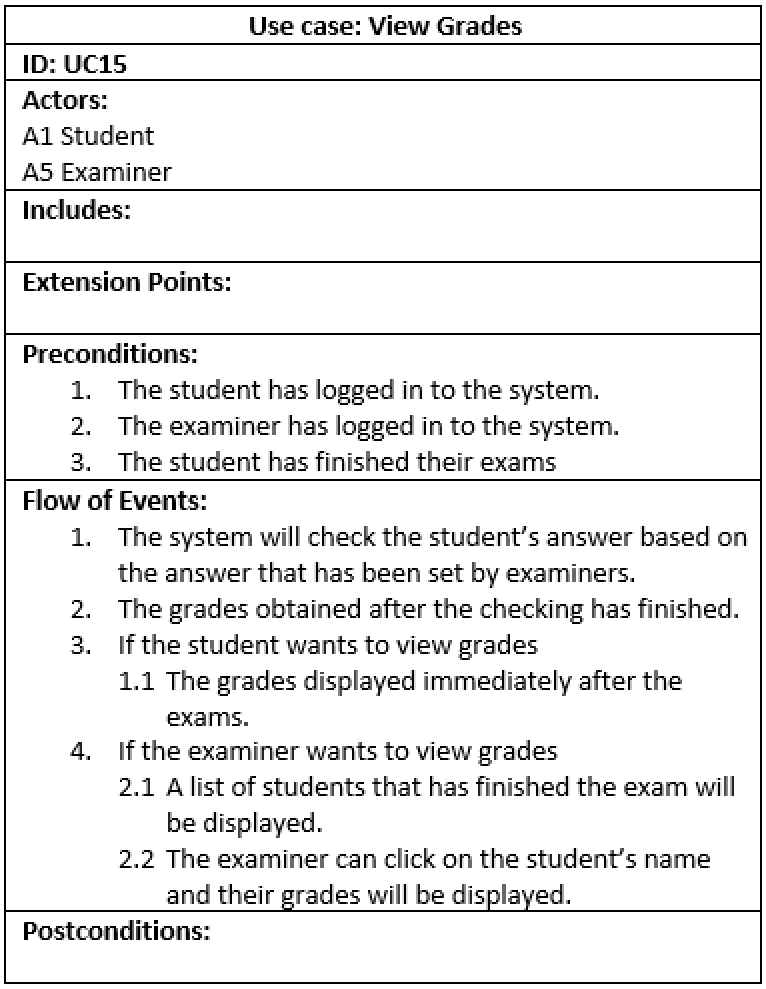


**Figure 2.32: Sequence Diagram for <Take Exam>**

### 2.2.15 UC015: Use Case<View Grades>



**Use case: View Grades**

**ID: UC15**

**Actors:**
A1 Student
A5 Examiner

**Includes:**

**Extension Points:**

**Preconditions:**

1. The student has logged in to the system.
2. The examiner has logged in to the system.
3. The student has finished their exams

**Flow of Events:**

1. The system will check the student's answer based on the answer that has been set by examiners.
2. The grades obtained after the checking has finished.
3. If the student wants to view grades
   1.1 The grades displayed immediately after the exams.
4. If the examiner wants to view grades
   2.1 A list of students that has finished the exam will be displayed.
   2.2 The examiner can click on the student's name and their grades will be displayed.

**Postconditions:**

**Figure 2.33: Use Case Description for <View Grades>**

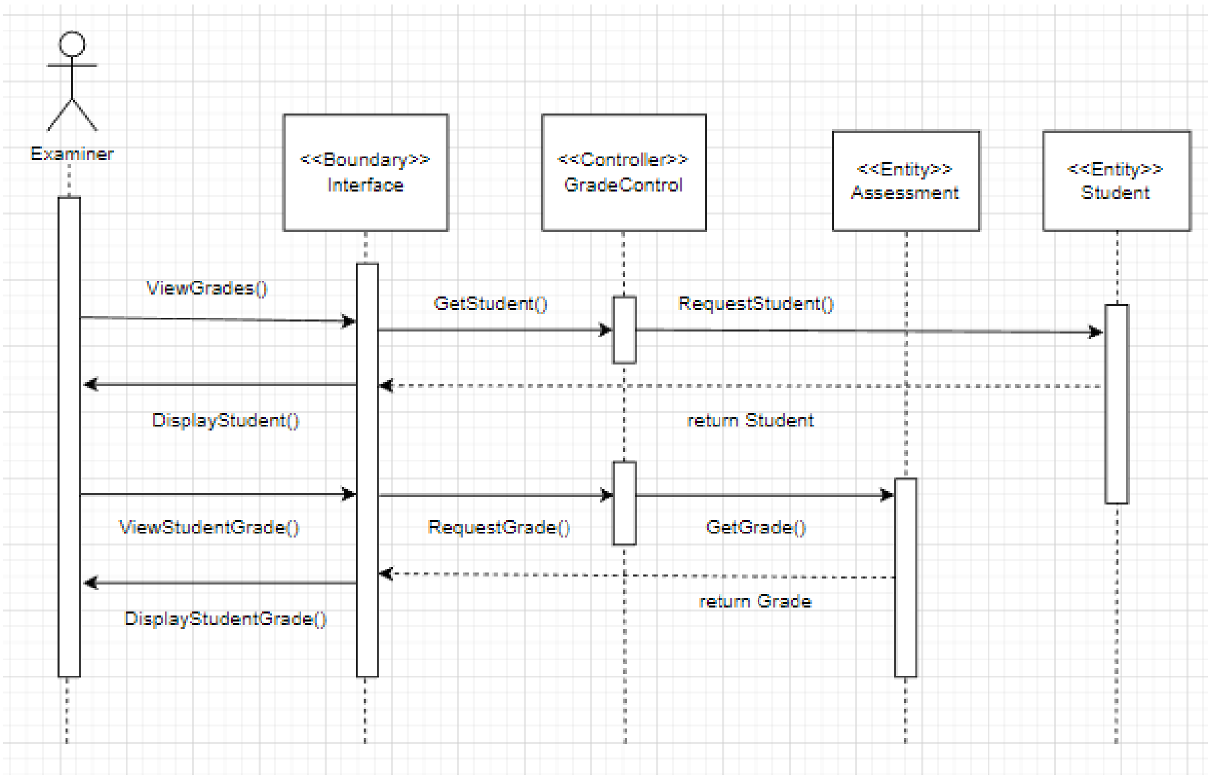


**Figure 2.34: Sequence Diagram for <View Grades>**

## 2.3 **Performance and Other Requirements**

- The **RESPONSE TIME** of the system should be only 1.0 second after the user clicks on the system.
- The **WORKLOAD** of the system should be able to handle more than 1000 students (including staff) and at least 200 users at one time during peak hours.
- The **THROUGHPUT** of the system should be around 10 operations per second. This means that the system can handle updating, adding, deleting and viewing content all at the same time.
- The **CAPACITY** of the system should be around 10 contents in a page with scrolling involved.

## 2.4 **Design Constraints**

- The system will be represented following the standards that are used on websites nowadays so the users can easily understand the system.
- The contents of the system shall follow the regulations by the Malaysia Government and Universiti Teknologi Malaysia (UTM).

- The language that will be used in the system is only limited to English and Bahasa Melayu.
- The system shall store the file related to the Final Year Project of 2u2i students that are currently doing their industrial training including their assessment.
- The file stored can only be accessed by those who have authorities.
- The website is constrained by the capacity of access that it can have at one time. Heavy load can cause the transfer of data to be slower and may cause server down.

## 2.5 **Software System Attributes**

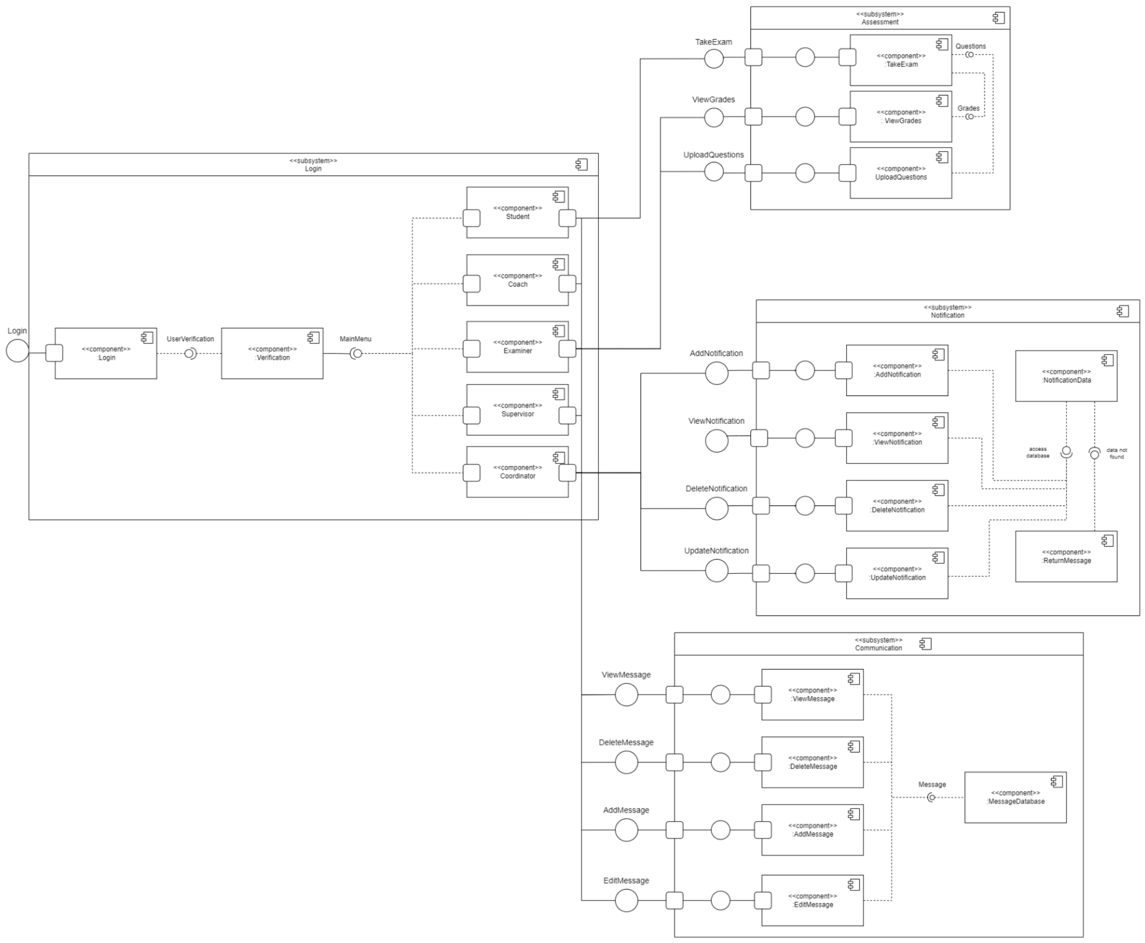
- The system is available on any web browser
- Unique username and password registered for every user. They can use the username and password to log in to the system.
- Users can view, add, delete, edit messages to any users that are registered to the system.
- Students are able to view notifications that have been sent by the coordinator.
- The students are able to view their grades after they finished the exam.

# 3.0 System Architectural Design

### 3.1 Architecture Style and Rationale

The architectural style that we use is layered architecture style. The layered architecture style is organized into horizontal layers where each layer will perform a specific role in the system. There are 4 layers of layered architecture: presentation layer, data service layer , business logic layer and data access layer. It is composed of many layers that function together as a single unit of software. The layered architecture style usually works where the data stores are controlled by layer .The client needs to request the systems to perform certain actions. Basically the data is held on the central database where all subsystems can be accessed and this makes the activities to be more manageable as it is split into smaller tasks. Here are a lot of reasons why we choose this kind of architecture .One of the reasons is this architecture helps us to organize the data of the students and lecturers in a single database and are able to be accessed by the university. With this architecture, we are able to see any development changes in each of the subsystems and are able to make the changes .Other than that, layered architecture is simple and it is easy to implement and learn. Next , it has the consistency in the overall code and the layered projects. Also, it is browable where all the objects are kept together.

## 3.2 Component Model



<<subsystem>> Assessment
TakeExam
ViewGrades
UploadQuestions
<<component>> :TakeExam
<<component>> : ViewGrades
<<component>> UploadQuestions
Questions
Grades
<<subsystem>> Login
Login
<<component>> :Login
UserVerification
<<component>> :Verification
MainMenu
<<component>> Student
<<component>> Coach
<<component>> Examiner
<<component>> Supervisor
<<component>> Coordinator
<<subsystem>> Notification
AddNotification
ViewNotification
DeleteNotification
UpdateNotification
<<component>> :AddNotification
<<component>> :ViewNotification
<<component>> :DeleteNotification
<<component>> :UpdateNotification
<<component>> :NotificationData
access database
data not found
<<component>> :ReturnMessage
<<subsystem>> Communication
ViewMessage
DeleteMessage
AddMessage
EditMessage
<<component>> :ViewMessage
<<component>> :DeleteMessage
<<component>> :AddMessage
<<component>> :EditMessage
Message
<<component>> :MessageDatabase

**Figure 3.1: Component Diagram of <Inferno 2u2i Final Year Project with Industry (FYP-I) Management System >**

In the system, there are a total of 4 subsystems which are the login, assessment, communication and notification subsystem. Each of these subsystems will be connected as shown above. The login subsystem is connected to the other 3 subsystems. This is because the user needs to log into the system first before they can access the system. In the Login subsystem, the verification needs the login information from the login component. Then, the verification component will let the user access into the system according to their role. In the Assessment subsystem, there dependencies exist between the components. The take exam component needs to require the question from the upload question component. Then, the view grades component needs to require grades from the take exam component. In the Notification subsystem, all of the components are connected to the notification data component. In the Communication subsystem, all of the components are connected to the message database.

# 4.0 Detailed Description of Components

## 4.1 Complete Package Diagram.

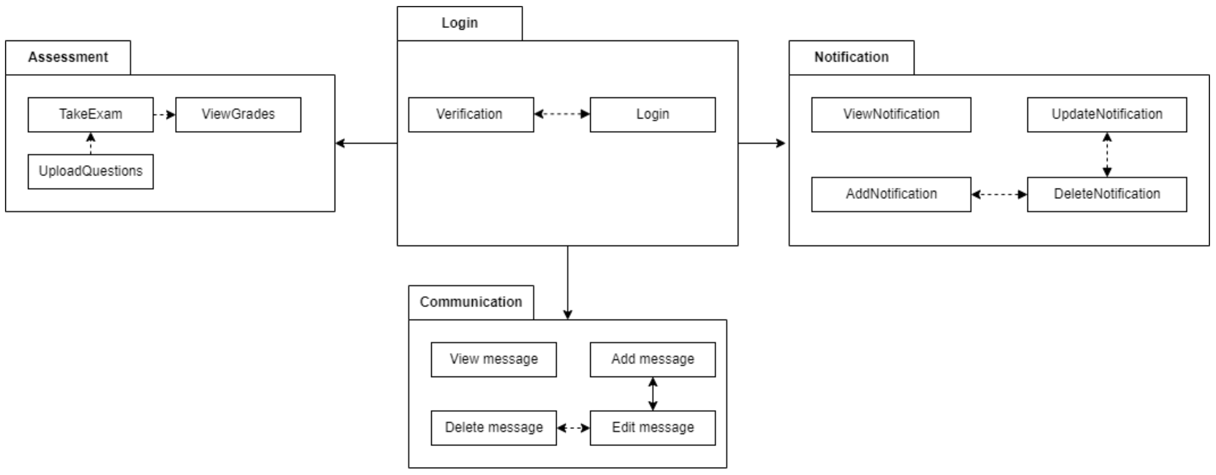


Figure 4.1: Package Diagram for <Inferno 2u2i Final Year Project with Industry (FYP-I) Management System>

## 4.2 Detailed Description

### 4.2.1 P001: <Login> Subsystem

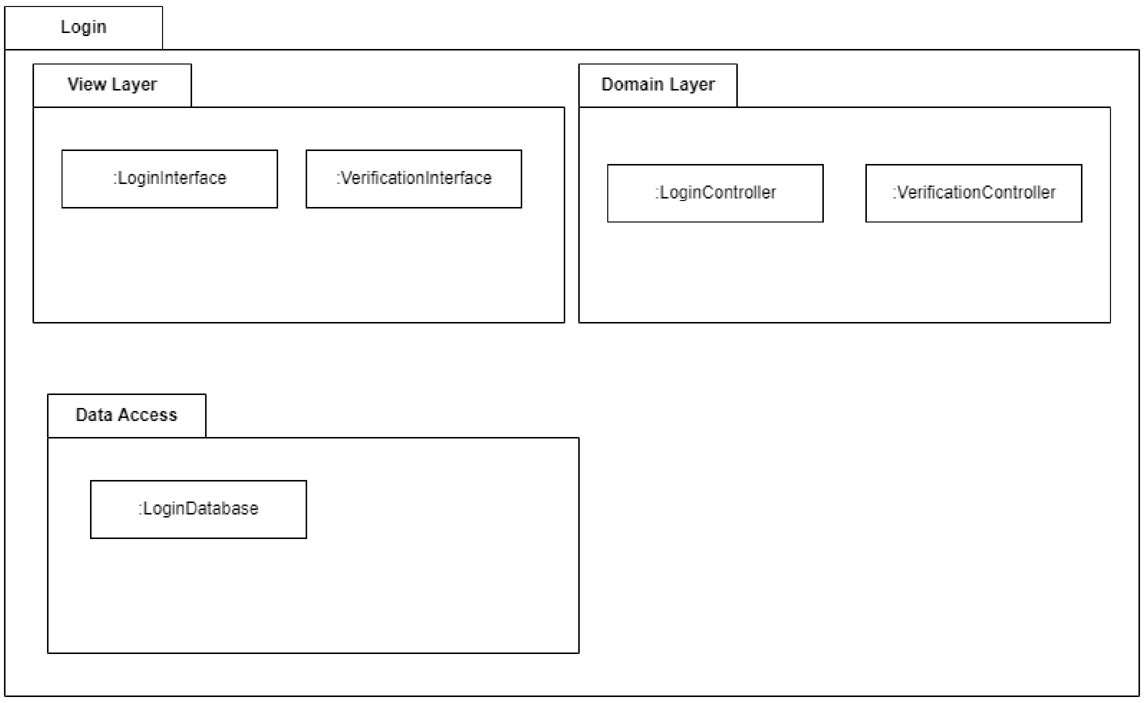


Figure 4.2: Package Diagram for <Login> Subsystem

### 4.2.1.1 Class Diagram

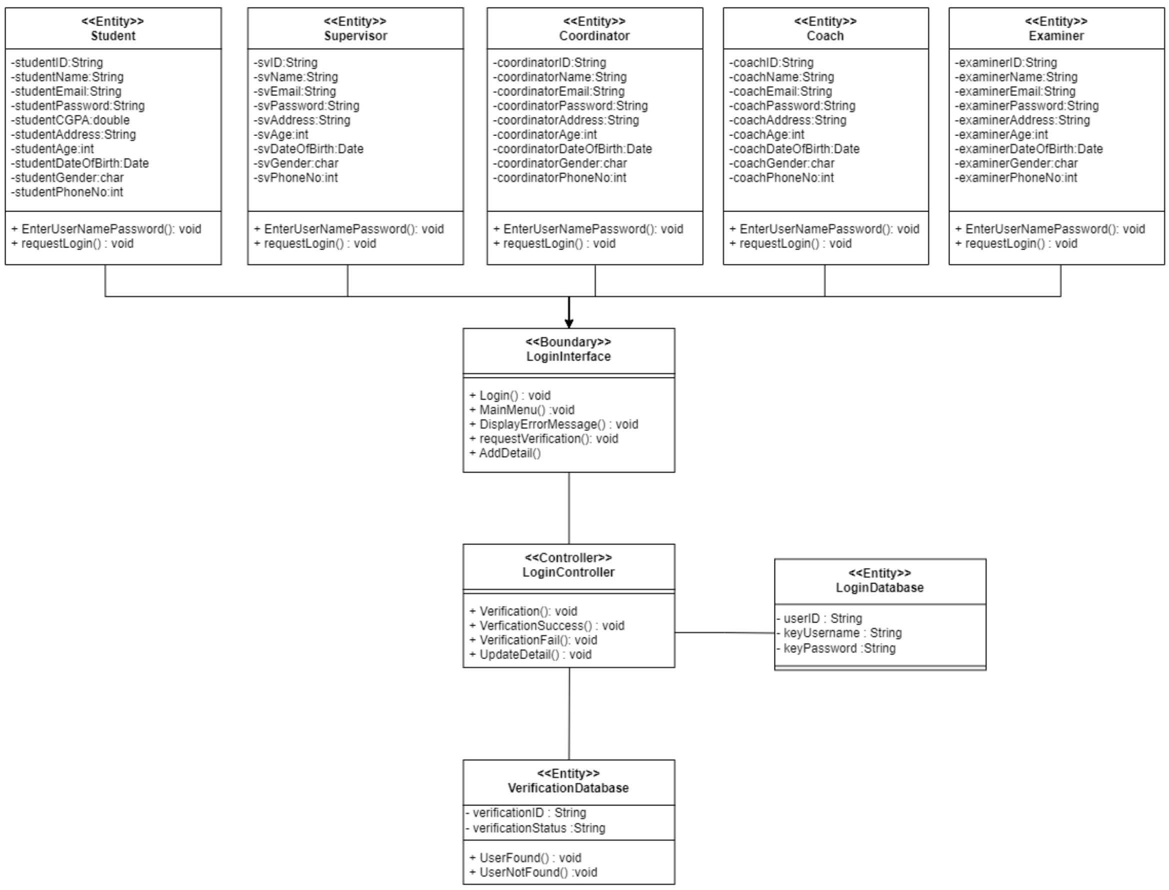


**Figure 4.3: Class Diagram for <Login> Subsystem**

| | |
|---|---|
| **Entity Name** | Student |
| **Method Name** | EnterUserNamePassword() |
| **Input** | keyUsername, keyPassword |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User entered their username and password by keyboard<br>3. End |

| | |
|---|---|
| **Entity Name** | Student |
| **Method Name** | requestLogin() |
| **Input** | GUI Input |

| | |
|---|---|
| **Output** | |
| **Algorithm** | 1. Start<br>2. User click on the login button<br>3. End |

| | |
|---|---|
| **Entity Name** | Supervisor |
| **Method Name** | EnterUserNamePassword() |
| **Input** | keyUsername, keyPassword |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User entered their username and password by keyboard<br>3. End |

| | |
|---|---|
| **Entity Name** | Supervisor |
| **Method Name** | requestLogin() |
| **Input** | GUI Input |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User click on the login button<br>3. End |

| | |
|---|---|
| **Entity Name** | Coordinator |
| **Method Name** | EnterUserNamePassword() |
| **Input** | keyUsername, keyPassword |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User entered their username and password by keyboard<br>3. End |

| | |
|---|---|
| **Entity Name** | Coordinator |
| **Method Name** | requestLogin() |
| **Input** | GUI Input |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User click on the login button<br>3. End |

| | |
|---|---|
| **Entity Name** | Coach |
| **Method Name** | EnterUserNamePassword() |
| **Input** | keyUsername, keyPassword |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User entered their username and password by keyboard<br>3. End |

| | |
|---|---|
| **Entity Name** | Coach |
| **Method Name** | requestLogin() |
| **Input** | GUI Input |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User click on the login button<br>3. End |

| | |
|---|---|
| **Entity Name** | Examiner |
| **Method Name** | EnterUserNamePassword() |
| **Input** | keyUsername, keyPassword |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User entered their username and password by keyboard<br>3. End |

| | |
|---|---|
| **Entity Name** | Examiner |
| **Method Name** | requestLogin() |
| **Input** | GUI Input |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User click on the login button<br>3. End |

| | |
|---|---|
| **Entity Name** | VerificationDatabase |
| **Method Name** | UserFound() |
| **Input** | keyUsername, keyPassword |
| **Output** | verificationStatus |
| **Algorithm** | 1. Start<br>2. If keyUsername && keyPassword not null |

| | |
|---|---|
| | 2.1 If keyUsername && keyPassword match<br>2.2 verificationStatus = “success”<br>3. End |

| | |
|---|---|
| **Entity Name** | VerificationDatabase |
| **Method Name** | UserNotFound() |
| **Input** | keyUsername,keyPassword |
| **Output** | verificationStatus |
| **Algorithm** | 1. Start<br>2. If keyUsername && keyPassword null<br>2.1 If keyUsername && keyPassword not matched<br>2.2 verificationStatus = “fail”<br>3. End |

### 4.2.1.2 Sequence Diagram

a) SD001: Sequence diagram for Login

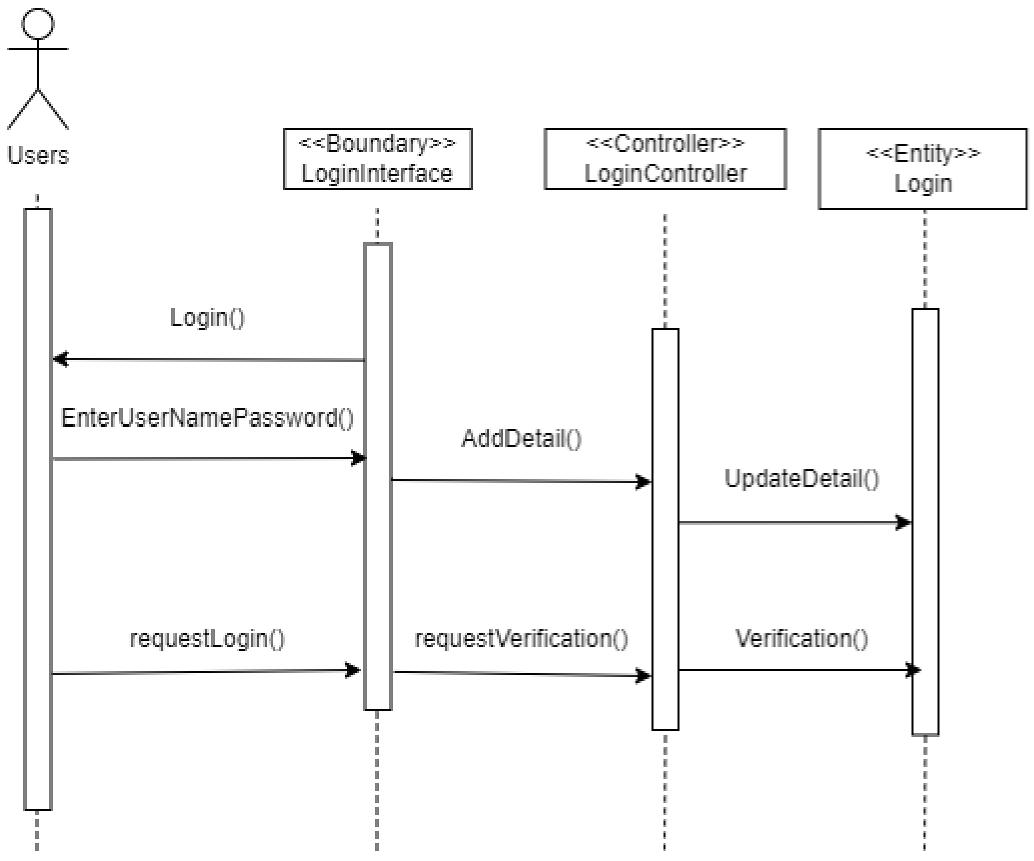


Figure 4.4: Sequence Diagram for <Login>

b) SD002: Sequence diagram for Verification

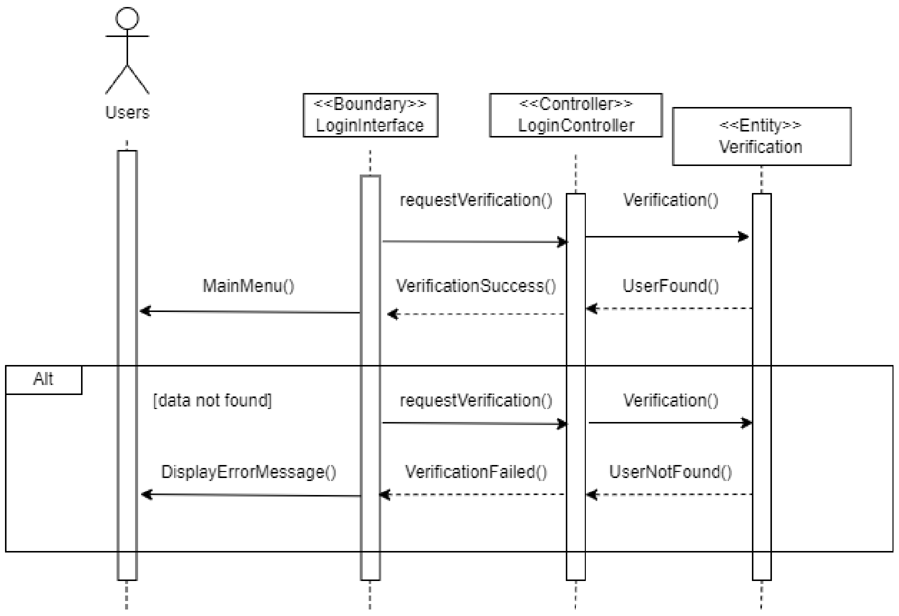


Figure 4.5: Sequence Diagram for <Verification>

### 4.2.2 P002: <Communication> Subsystem

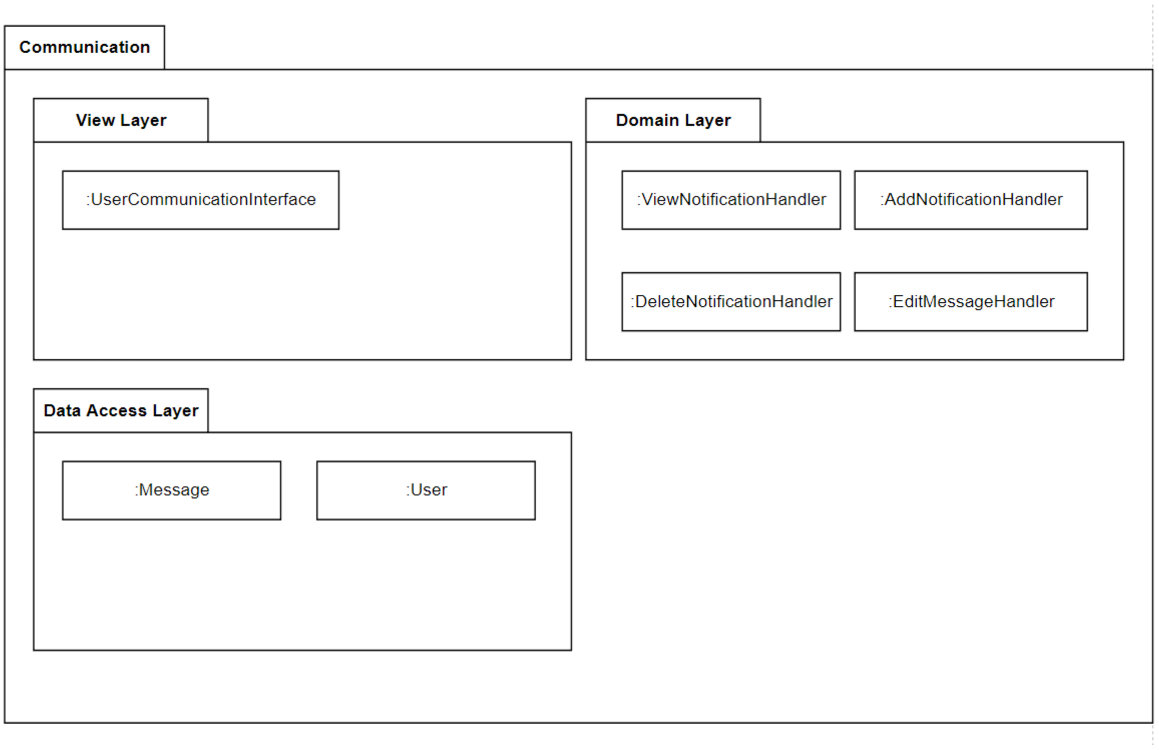


Figure 4.6: Package Diagram for <Communication> Subsystem

### 4.2.2.1 Class Diagram

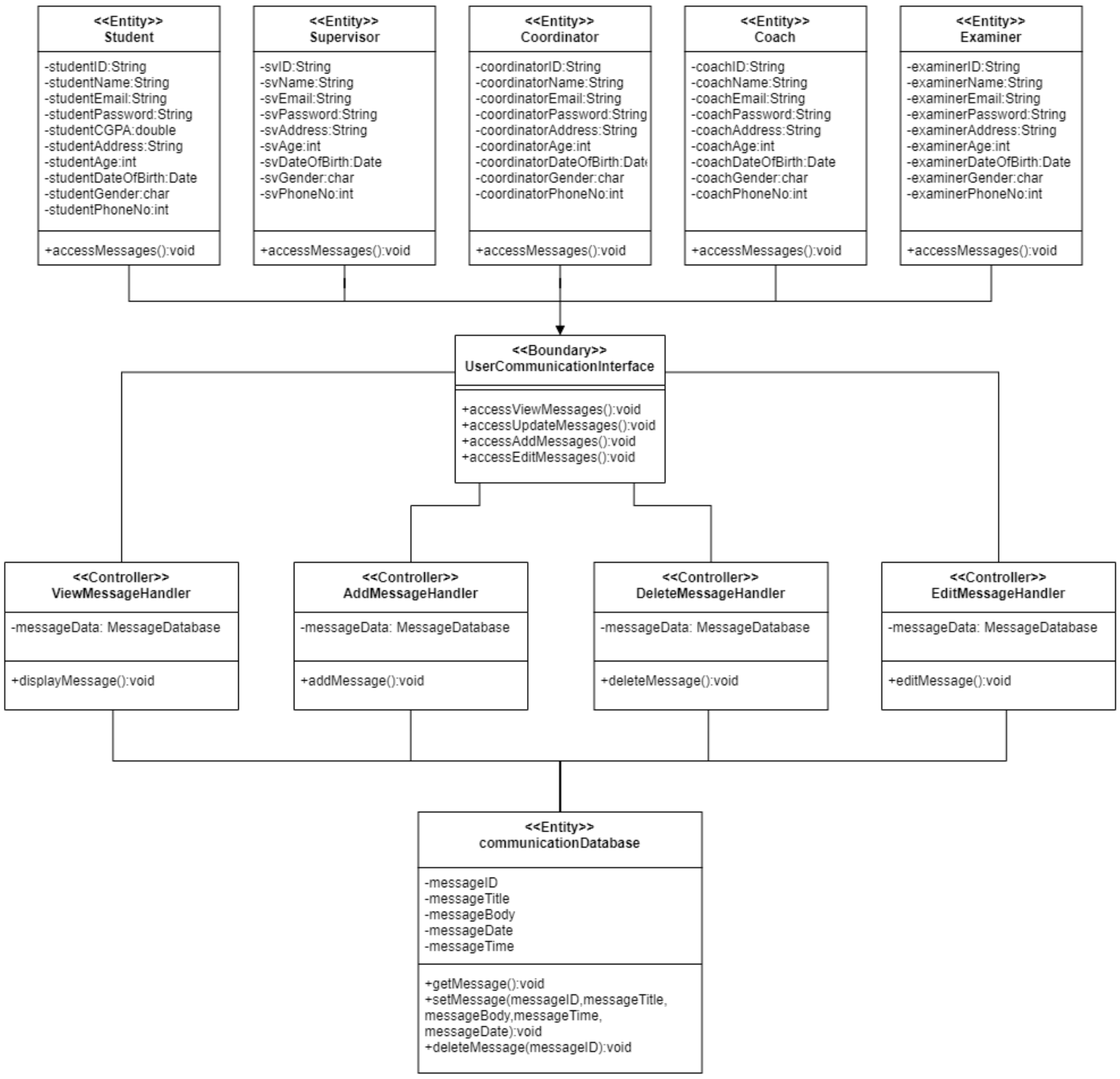


**Figure 4.7: Class Diagram for <Communication> Subsystem**

| | |
|---|---|
| **Entity Name** | Student |
| **Method Name** | accessMessages |
| **Input** | studentID, studentPassword |
| **Output** | messageData |
| **Algorithm** | 1. Start<br>2. Student logs in to system with ID and password<br>3. Student chooses to view, add, delete, or edit message<br>4. If student chooses to view message, communication database will get and display messages<br>5. Else if student chooses to add message, student can add message which will be set by communication database |

| | |
|---|---|
| | 6. Else if student chooses to delete message, student can delete message which will be removed by communication database<br>7. Else if student chooses to edit message, student can edit message by resetting the message data in communication database<br>8. End |

| | |
|---|---|
| **Entity Name** | Supervisor |
| **Method Name** | accessMessages |
| **Input** | svID, svPassword |
| **Output** | messageData |
| **Algorithm** | 1. Start<br>2. Supervisor logs in to system with ID and password<br>3. Supervisor chooses to view, add, delete, or edit message<br>4. If supervisor chooses to view message, communication database will get and display messages<br>5. Else if supervisor chooses to add message, supervisor can add message which will be set by communication database<br>6. Else if supervisor chooses to delete message, supervisor can delete message which will be removed by communication database<br>7. Else if supervisor chooses to edit message, supervisor can edit message by resetting the message data in communication database<br>8. End |

| | |
|---|---|
| **Entity Name** | Coordinator |
| **Method Name** | accessMessages |
| **Input** | coordinatorID, coordinatorPassword |
| **Output** | messageData |
| **Algorithm** | 1. Start<br>2. Coordinator logs in to system with ID and password<br>3. Coordinator chooses to view, add, delete, or edit message<br>4. If coordinator chooses to view message, communication database will get and display messages<br>5. Else if coordinator chooses to add message, coordinator can add message which will be set by communication database<br>6. Else if coordinator chooses to delete message, coordinator can delete message which will be removed by communication database<br>7. Else if coordinator chooses to edit message, coordinator can edit message by resetting the message data in communication database<br>8. End |

| | |
|---|---|
| **Entity Name** | Coach |
| **Method Name** | accessMessages |
| **Input** | coachID, coachPassword |

| | |
|---|---|
| **Output** | messageData |
| **Algorithm** | 1. Start<br>2. Coach logs in to system with ID and password<br>3. Coach chooses to view, add, delete, or edit message<br>4. If coach chooses to view message, communication database will get and display messages<br>5. Else if coach chooses to add message, coach can add message which will be set by communication database<br>6. Else if coach chooses to delete message, coach can delete message which will be removed by communication database<br>7. Else if coach chooses to edit message, coach can edit message by resetting the message data in communication database<br>8. End |

| | |
|---|---|
| **Entity Name** | Examiner |
| **Method Name** | accessMessages |
| **Input** | examinerID, examinerPassword |
| **Output** | messageData |
| **Algorithm** | 1. Start<br>2. Examiner logs in to system with ID and password<br>3. Examiner chooses to view, add, delete, or edit message<br>4. If examiner chooses to view message, communication database will get and display messages<br>5. Else if examiner chooses to add message, examiner can add message which will be set by communication database<br>6. Else if examiner chooses to delete message, examiner can delete message which will be removed by communication database<br>7. Else if examiner chooses to edit message, examiner can edit messages by resetting the message data in communication database<br>8. End |

| | |
|---|---|
| **Entity Name** | UserCommunicationInterface |
| **Method Name** | accessViewMessages, accessAddMessages, accessDeleteMessages, accessEditMessages |
| **Input** | - |
| **Output** | - |
| **Algorithm** | 1. Start<br>2. Interface receives choice by user<br>3. If user chooses view message, go to viewMessageHandler<br>4. Else if user chooses add message, go to addMessageHandler<br>5. Else if user chooses delete message, go to deleteMessageHandler<br>6. Else if user chooses edit message, go to editMessageHandler<br>7. End |

| | |
|---|---|
| **Entity Name** | iewMessageHandler |

| | |
|---|---|
| **Method Name** | displayMessage |
| **Input** | - |
| **Output** | - |
| **Algorithm** | 1. Start<br>2. viewMessageHandler will display message from communication database<br>3. End |

| | |
|---|---|
| **Entity Name** | addMessageHandler |
| **Method Name** | addMessage |
| **Input** | - |
| **Output** | - |
| **Algorithm** | 1. Start<br>2. addMessageHandler will add new message data to communication database<br>3. End |

| | |
|---|---|
| **Entity Name** | deleteMessageHandler |
| **Method Name** | deleteMessage |
| **Input** | - |
| **Output** | - |
| **Algorithm** | 1. Start<br>2. deleteMessageHandler will delete existing message data from communication database<br>3. End |

| | |
|---|---|
| **Entity Name** | editMessageHandler |
| **Method Name** | editMessage |
| **Input** | - |
| **Output** | - |
| **Algorithm** | 1. Start<br>2. editMessageHandler will edit existing message data from communication database<br>3. End |

| | |
|---|---|
| **Entity Name** | MessageDatabase |
| **Method Name** | getMessage, setMessage |
| **Input** | messageData |
| **Output** | messageData |
| **Algorithm** | 1. Start<br>2. Database will receive command from user<br>3. If user wants to view message, communication database will get and display message data |

| | |
|---|---|
| | 4. Else if user wants to add message, communication database will set new message into message data in communication database<br>5. Else if user wants to delete message, communication database will delete message by messageID<br>6. Else if user wants to edit message, communication database will set new message to the existing message |

### 4.2.2.2 Sequence Diagram

a) SD003: Sequence diagram for View Message

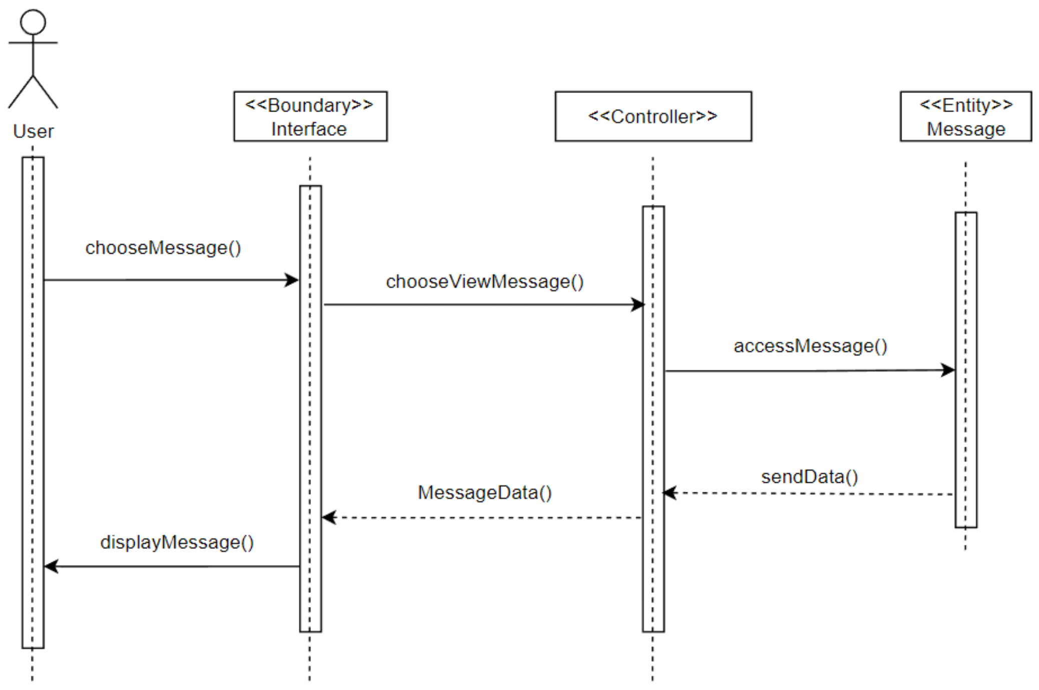


**Figure 4.8: Sequence Diagram for <View Message>**

b) SD004: Sequence diagram for Add Message

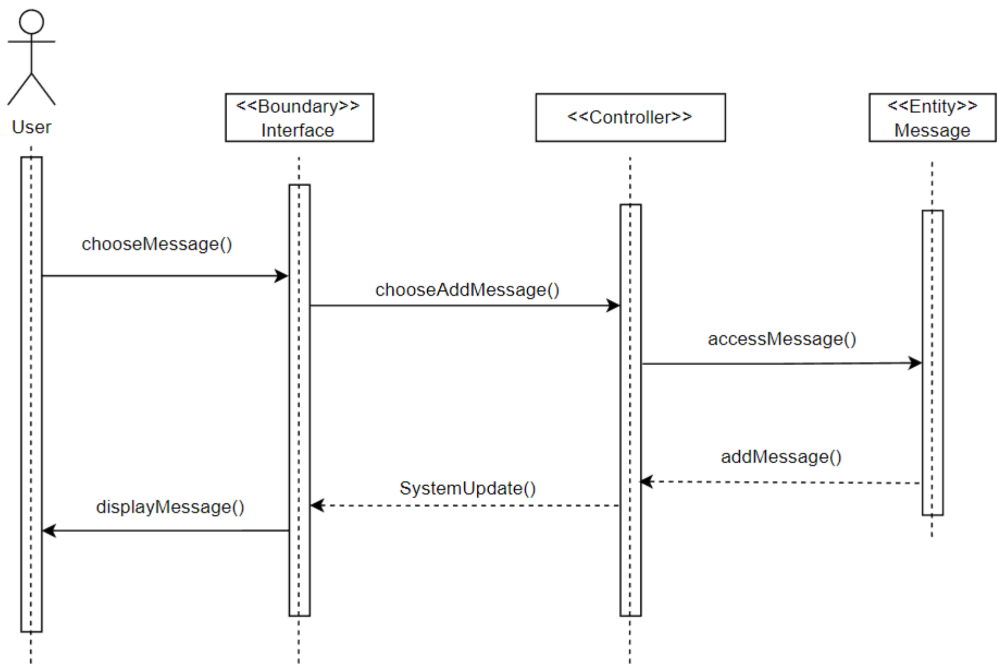


**Figure 4.9: Sequence Diagram for <AddMessage>**

c) SD005: Sequence diagram for Delete Message

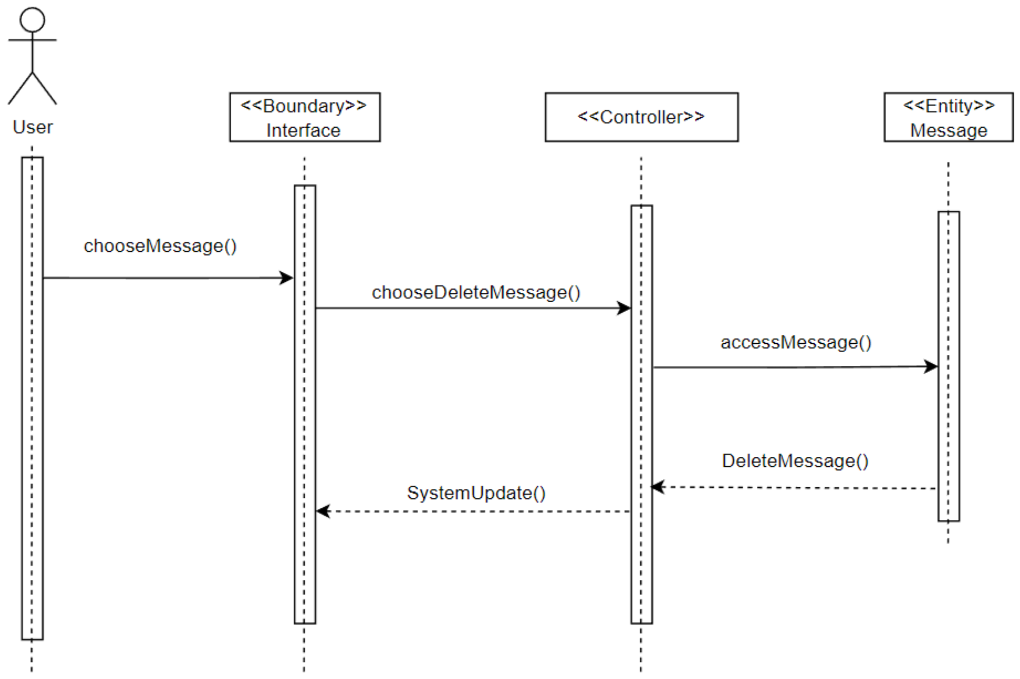


**Figure 4.10: Sequence Diagram for <Delete Message>**

d) SD006: Sequence diagram for Edit Message

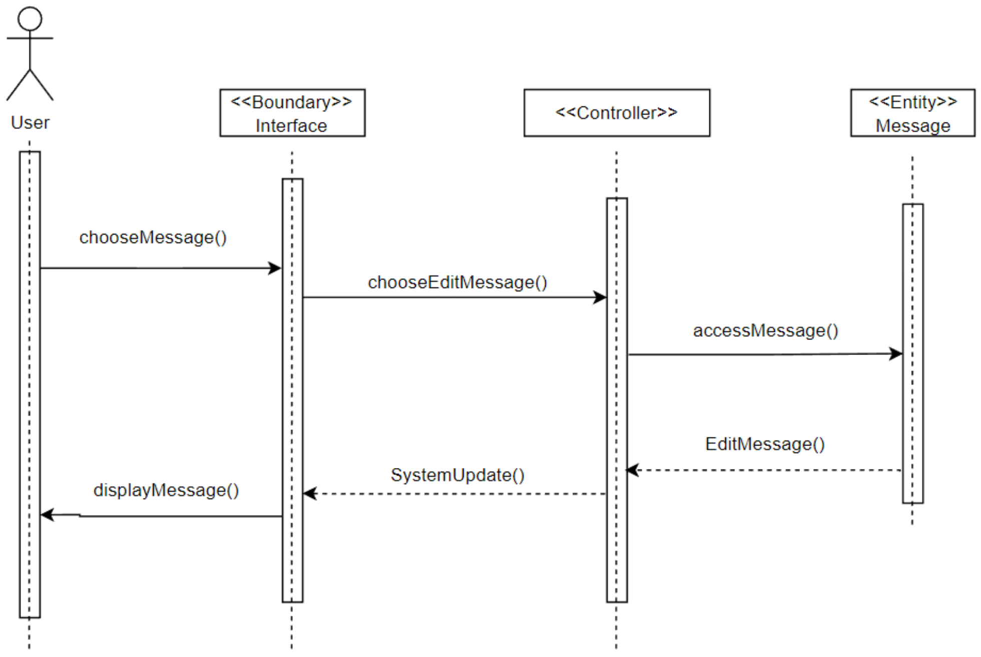


**Figure 4.11: Sequence Diagram for <Edit Message>**

### 4.2.3 P003: <Notification> Subsystem

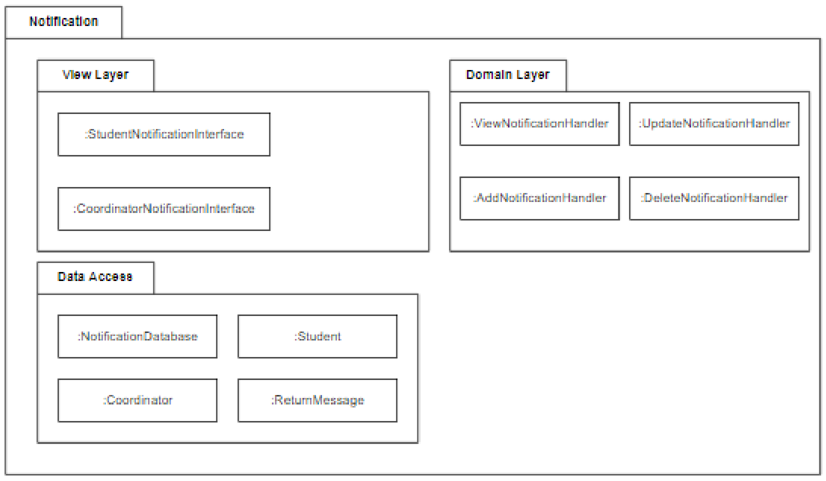


**Figure 4.12: Package Diagram for <Notification> Subsystem**

#### 4.2.3.1 Class Diagram

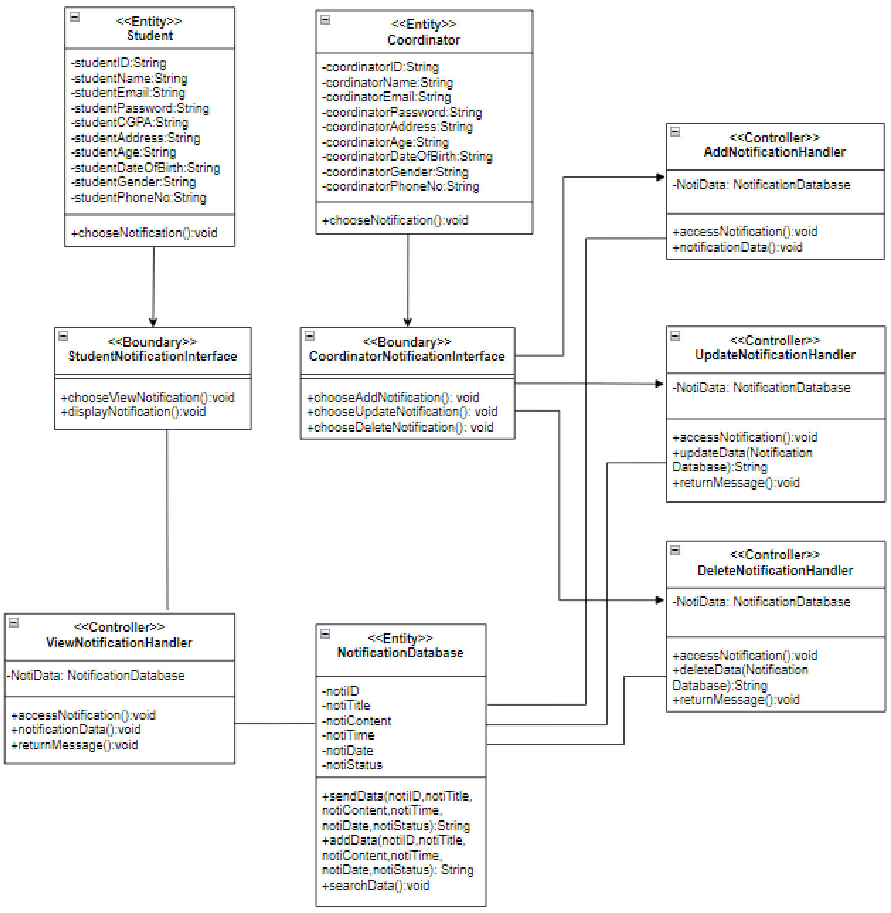

<<Entity>>
Student
-studentID:String
-studentName:String
-studentEmail:String
-studentPassword:String
-studentCGPA:String
-studentAddress:String
-studentAge:String
-studentDateOfBirth:String
-studentGender:String
-studentPhoneNo:String
+chooseNotification():void
<<Entity>>
Coordinator
-coordinatorID:String
-cordinatorName:String
-cordinatorEmail:String
-coordinatorPassword:String
-coordinatorAddress:String
-coordinatorAge:String
-coordinatorDateOfBirth:String
-coordinatorGender:String
-coordinatorPhoneNo:String
+chooseNotification():void
<<Controller>>
AddNotificationHandler
-NotiData: NotificationDatabase
+accessNotification():void
+notificationData():void
<<Boundary>>
StudentNotificationInterface
+chooseViewNotification():void
+displayNotification():void
<<Boundary>>
CoordinatorNotificationInterface
+chooseAddNotification(): void
+chooseUpdateNotification(): void
+chooseDeleteNotification(): void
<<Controller>>
UpdateNotificationHandler
-NotiData: NotificationDatabase
+accessNotification():void
+updateData(Notification Database):String
+returnMessage():void
<<Controller>>
DeleteNotificationHandler
-NotiData: NotificationDatabase
+accessNotification():void
+deleteData(Notification Database):String
+returnMessage():void
<<Controller>>
ViewNotificationHandler
-NotiData: NotificationDatabase
+accessNotification():void
+notificationData():void
+returnMessage():void
<<Entity>>
NotificationDatabase
-notiID
-notiTitle
-notiContent
-notiTime
-notiDate
-notiStatus
+sendData(notiID,notiTitle, notiContent,notiTime, notiDate,notiStatus):String
+addData(notiID,notiTitle, notiContent,notiTime, notiDate,notiStatus): String
+searchData():void

**Figure 4.13: Class Diagram for <Notification> Subsystem**

| | |
|---|---|
| **Entity Name** | Student |
| **Method Name** | chooseNotification() |
| **Input** | GUI Input |
| **Output** | - |
| **Algorithm** | 1. Start<br>2. Student choose notification<br>3. End |

| | |
|---|---|
| **Entity Name** | Coordinator |
| **Method Name** | chooseNotification() |
| **Input** | GUI Input |
| **Output** | - |
| **Algorithm** | 1. Start<br>2. Coordinator choose notification<br>3. End |

| | |
|---|---|
| **Entity Name** | NotificationDatabase |

| | |
|---|---|
| **Method Name** | sendData()<br>addData()<br>searchData() |
| **Input** | notiID,notiTitle,notiContent,notiTime,notiDate,notiStatus |
| **Output** | - |
| **Algorithm** | 1. Start<br>2. Controller request access to database<br>3. If the controller wants to add data, it will add it to the database<br>4. If controller wants data it will search the data using searchData<br>5. Existed data will be sent back to controller<br>6. End |

| | |
|---|---|
| **Boundary Name** | StudentNotificationInterface |
| **Method Name** | chooseViewNotification()<br>displayNotification() |
| **Input** | - |
| **Output** | displayNotification() |
| **Algorithm** | 1. Start<br>2. Choose view notification<br>3. Data from ViewNotificationHandler is shown using displayNotification()<br>4. End |

| | |
|---|---|
| **Boundary Name** | CoordinatorNotificationInterface |
| **Method Name** | chooseAddNotification()<br>chooseUpdateNotification()<br>chooseDeleteNotification() |
| **Input** | - |
| **Output** | - |
| **Algorithm** | 1. Start<br>2. If choose add notification, go to AddNotificationHandler<br>3. If choose update notification, go to UpdateNotificationHandler<br>4. If choose delete notification, go to DeleteNotificationHandler<br>5. End |

| | |
|---|---|
| **Controller Name** | ViewNotificationHandler |
| **Method Name** | accessNotification()<br>notificationData()<br>returnMessage() |
| **Input** | - |
| **Output** | - |
| **Algorithm** | 1. Start<br>2. Request access data at NotificationDatabase<br>3. If data exist data will be sent to StudentNotificationInterface |

| | |
|---|---|
| | 4. Else it will returnMessage showing error<br>5. End |

| | |
|---|---|
| **Controller Name** | AddNotificationHandler |
| **Method Name** | accessNotification()<br>notificationData() |
| **Input** | - |
| **Output** | - |
| **Algorithm** | 1. Start<br>2. Request access data at NotificationDatabase<br>3. End |

| | |
|---|---|
| **Controller Name** | UpdateNotificationHandler |
| **Method Name** | accessNotification()<br>updateNotificationData()<br>returnMessage() |
| **Input** | - |
| **Output** | - |
| **Algorithm** | 1. Start<br>2. Request access data at NotificationDatabase<br>3. If data exist coordinator can update data<br>4. Else it will returnMessage showing error<br>5. End |

| | |
|---|---|
| **Controller Name** | DeleteNotificationHandler |
| **Method Name** | accessNotification()<br>deletenotificationData()<br>returnMessage() |
| **Input** | - |
| **Output** | - |
| **Algorithm** | 1. Start<br>2. Request access data at NotificationDatabase<br>3. If data exist coordinator can update data<br>4. Else it will returnMessage showing error<br>5. End |

### 4.2.3.2 Sequence Diagram

a)SD007 : Sequence diagram for NotificationDatabase

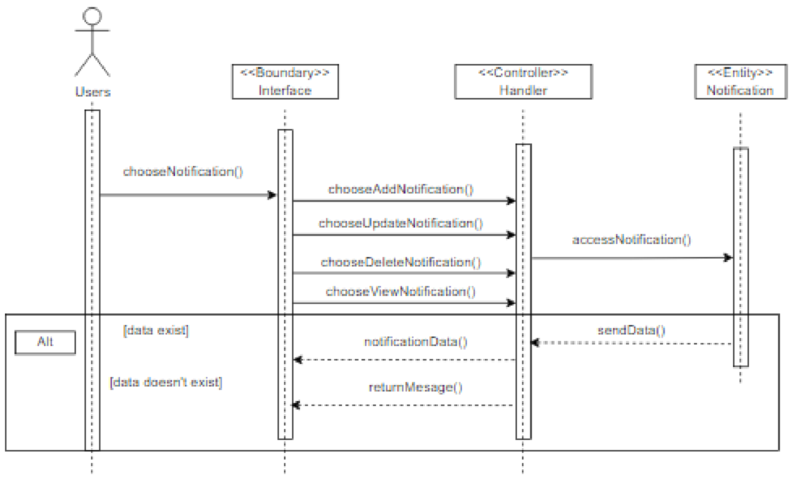


**Figure 4.14: Sequence Diagram for <NotificationDatabase>**

b)SD008 : Sequence diagram for ViewNotification

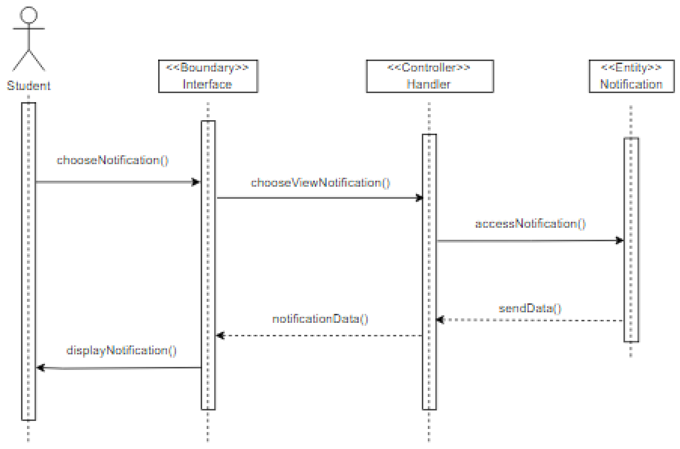


**Figure 4.15: Sequence Diagram for <ViewNotification>**

c)SD009 : Sequence diagram for AddNotification

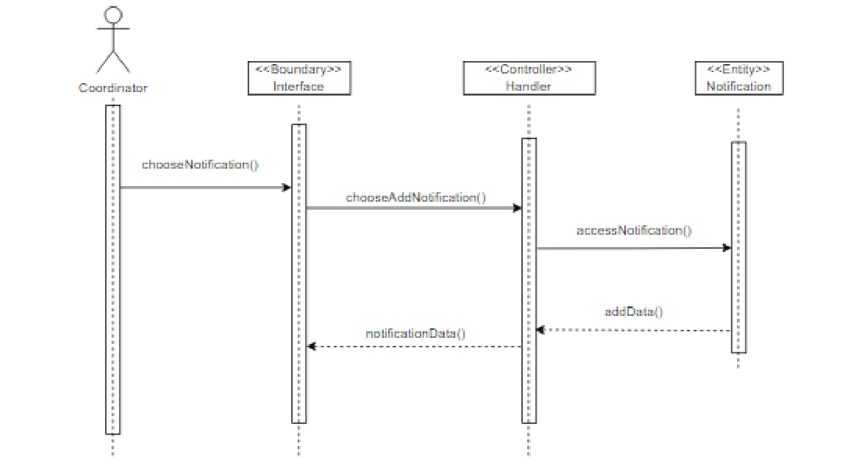


**Figure 4.16: Sequence Diagram for <AddNotification>**

d)SD010 : Sequence diagram for UpdateNotification

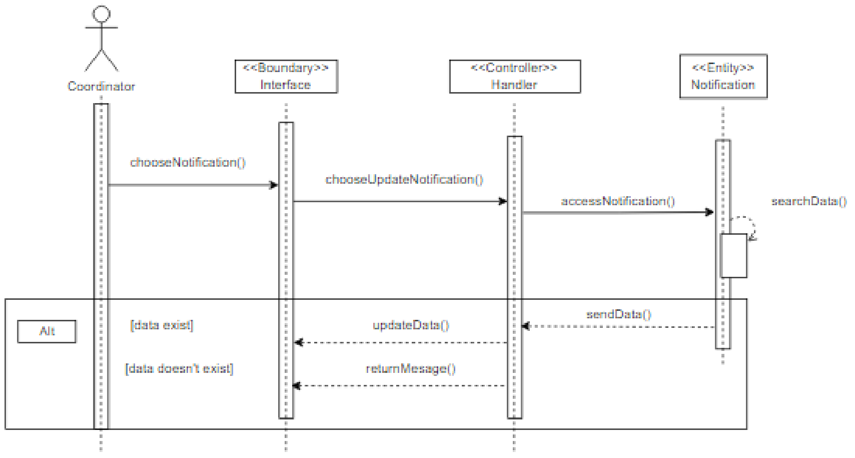


**Figure 4.17: Sequence Diagram for <UpdateNotification>**

e)SD011 : Sequence diagram for DeleteNotification

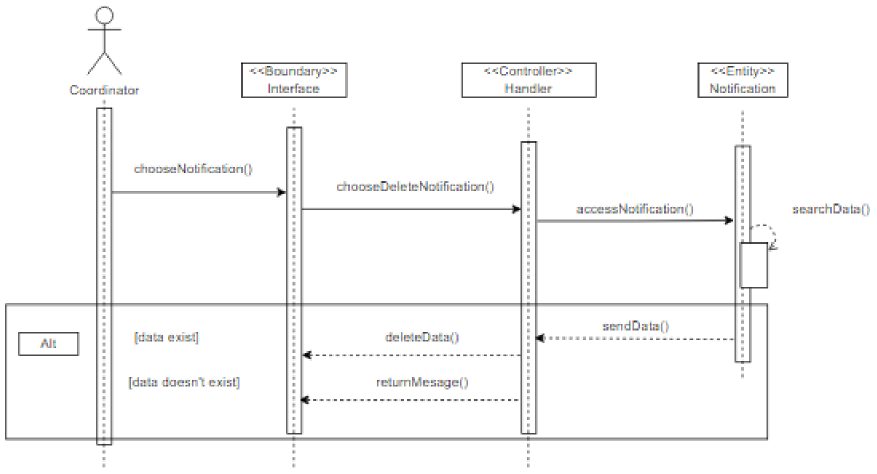


**Figure 4.18: Sequence Diagram for <DeleteNotification>**

f)SD012 : Sequence diagram for ReturnMessage

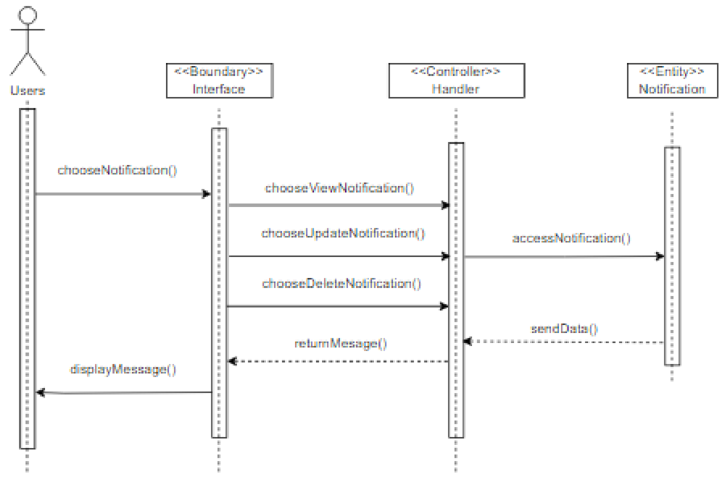


**Figure 4.19: Sequence Diagram for <ReturnMessage>**

### 4.2.4 P004: <Assessment> Subsystem

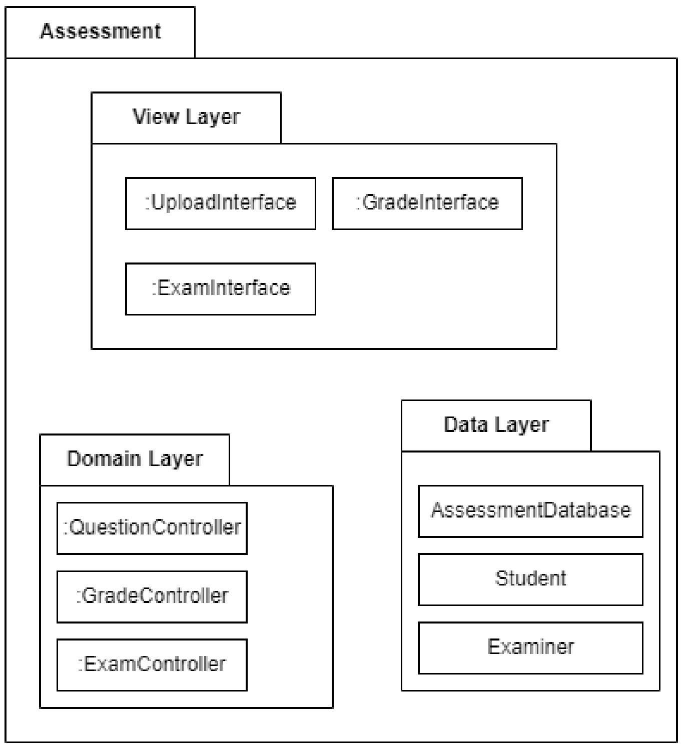


**Figure 4.20: Package Diagram for <Assessment> Subsystem**

### 4.2.4.1 Class Diagram

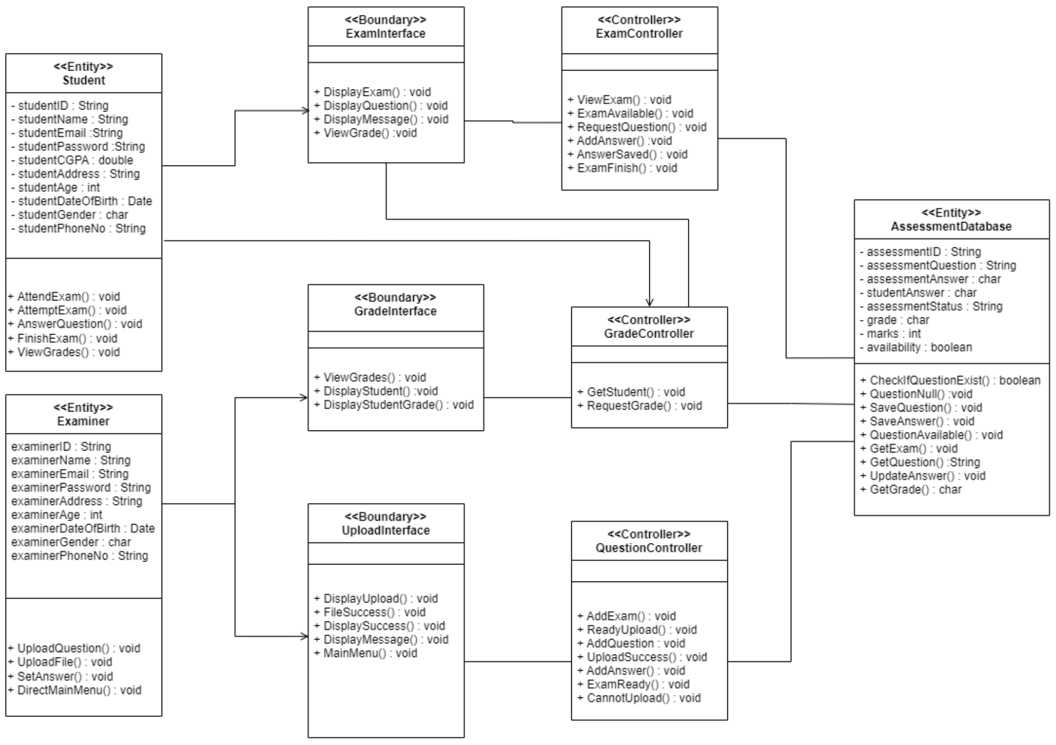


**Figure 4.21: Class Diagram for <Assessment> Subsystem**

| | |
|---|---|
| **Entity Name** | Student |
| **Method Name** | AttendExam() |
| **Input** | GUI Input |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User clicks on the attend exam button<br>3. Exam information is displayed<br>4. End |

| | |
|---|---|
| **Entity Name** | Student |
| **Method Name** | AttemptExam() |
| **Input** | GUI Input |
| **Output** | |
| **Algorithm** | 1. Start |

| | |
|---|---|
| | 2. User clicks on the attempt exam button<br>3. Exam is started and questions is displayed<br>4. End |

| | |
|---|---|
| **Entity Name** | Student |
| **Method Name** | AnswerQuestion() |
| **Input** | studentAnswer |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User enters their answer for the question<br>3. studentAnswer is updated<br>4. End |

| | |
|---|---|
| **Entity Name** | Student |
| **Method Name** | FinishExam() |
| **Input** | GUI Input |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User clicks on the finish button<br>3. Message indicate exam has finished is displayed<br>4. End |

| | |
|---|---|
| **Entity Name** | Student |
| **Method Name** | ViewGrades() |
| **Input** | |
| **Output** | grade |
| **Algorithm** | 1. Start<br>2. Grade is obtained from the database<br>3. Grade is displayed<br>4. End |

| | |
|---|---|
| **Entity Name** | Examiner |
| **Method Name** | UploadQuestion() |
| **Input** | GUI Input |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User clicks on the upload question button<br>3. Upload menu is displayed<br>4. End |

| | |
|---|---|
| **Entity Name** | Examiner |
| **Method Name** | UploadFile() |

| | |
|---|---|
| **Input** | assessmentQuestion |
| **Output** | |
| **Algorithm** | 1. Start<br>2. If assessmentQuestion not available<br>    2.1 User enters the question for the exam<br>    2.2 The assessment question is updated<br>    2.3 Success message is displayed<br>3. Else<br>    3.1 User cannot upload the question<br>    3.2 Message about the question already available is displayed<br>    3.3 User directed to the main menu.<br>4. End |

| | |
|---|---|
| **Entity Name** | Examiner |
| **Method Name** | DirectMainMenu() |
| **Input** | GUI Input |
| **Output** | |
| **Algorithm** | 1. Start<br>2. User clicks on the back to main menu button<br>3. Main menu is displayed<br>4. End |

| | |
|---|---|
| **Entity Name** | AssessmentDatabase |
| **Method Name** | CheckIfQuestionExist() |
| **Input** | |
| **Output** | availability |
| **Algorithm** | 1. Start<br>2. If assessmentQuestion is not null<br>    2.1 return true<br>3. End |

| | |
|---|---|
| **Entity Name** | AssessmentDatabase |
| **Method Name** | QuestionNull() |
| **Input** | |
| **Output** | availability |
| **Algorithm** | 1. Start<br>2. if assessmentQuestion is null<br>    2.1 return false<br>3. End |

| | |
|---|---|
| **Entity Name** | AssessmentDatabase |
| **Method Name** | SaveQuestion() |

| | |
|---|---|
| **Input** | assessmentQuestion |
| **Output** | |
| **Algorithm** | 1. Start<br>2. Assessment question entered by the user is updated in the database<br>3. End |

| | |
|---|---|
| **Entity Name** | AssessmentDatabase |
| **Method Name** | SaveAnswer() |
| **Input** | assessmentAnswer |
| **Output** | |
| **Algorithm** | 1. Start<br>2. Assessment answer entered by the user is updated in the database<br>3. End |

| | |
|---|---|
| **Entity Name** | AssessmentDatabase |
| **Method Name** | QuestionAvailable() |
| **Input** | |
| **Output** | |
| **Algorithm** | 1. Start<br>2. If assessmentQuestion not null<br>2.1 availability = true<br>3. End |

| | |
|---|---|
| **Entity Name** | AssessmentDatabase |
| **Method Name** | GetExam() |
| **Input** | |
| **Output** | assessmentID |
| **Algorithm** | 1. Start<br>2. assessmentID is obtained from the database<br>3. assessmentID is sent to the controller<br>4. End |

| | |
|---|---|
| **Entity Name** | AssessmentDatabase |
| **Method Name** | GetQuestion() |
| **Input** | |
| **Output** | assessmentQuestion |
| **Algorithm** | 1. Start<br>2. assessmentQuestion is obtained from the database<br>3. assessmentQuestion is sent to the controller<br>4. End |

| | |
|---|---|
| **Entity Name** | AssessmentDatabase |
| **Method Name** | UpdateAnswer() |
| **Input** | studentAnswer |
| **Output** | |
| **Algorithm** | 1. Start 2. studentAnswer is updated in the database 3. End |

| | |
|---|---|
| **Entity Name** | AssessmentDatabase |
| **Method Name** | GetGrade() |
| **Input** | |
| **Output** | grade |
| **Algorithm** | 1. Start 2. Grade is calculated based on the amount of correct answer by the student 3. If marks<=40 3.1 grade='F' 4. else if marks<=50 4.1 grade='D' 5. else if marks<=60 5.1 grade='C' 6. else if marks<=80 6.1 grade='B' 7. else if marks<=100 7.1 grade='A' 8. return grade 9. End |

### 4.2.4.2 Sequence Diagram

a)SD013 : Sequence diagram for Upload Questions

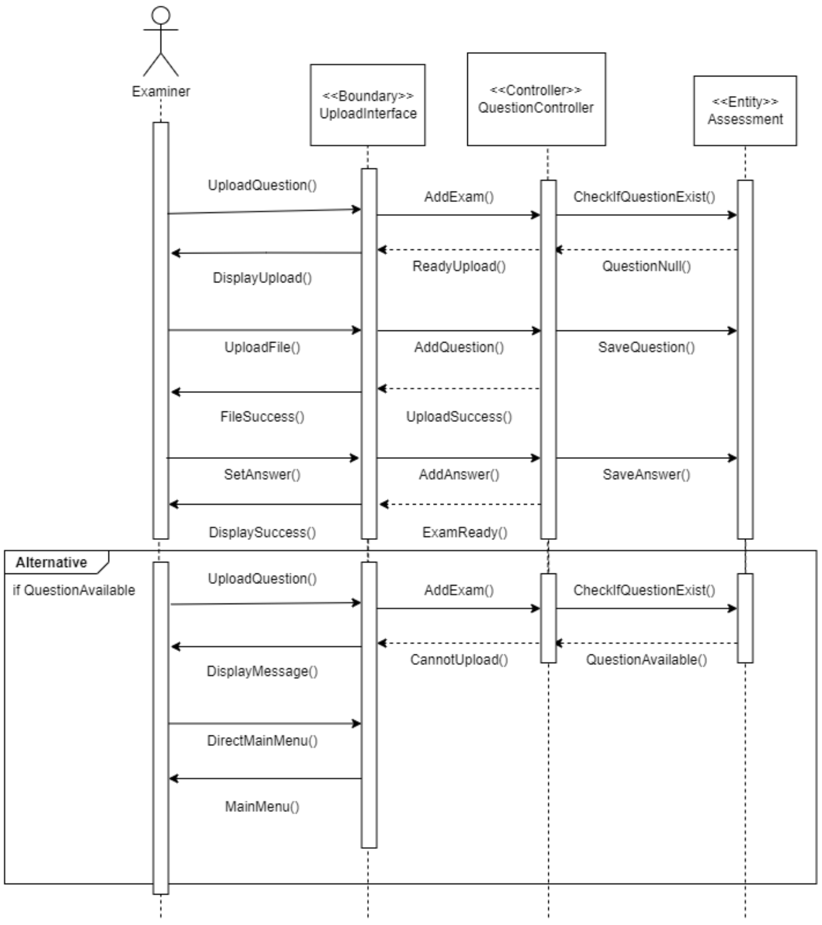


**Figure 4.22: Sequence Diagram for <Upload Question>**

b)SD014 : Sequence diagram for Take Exam

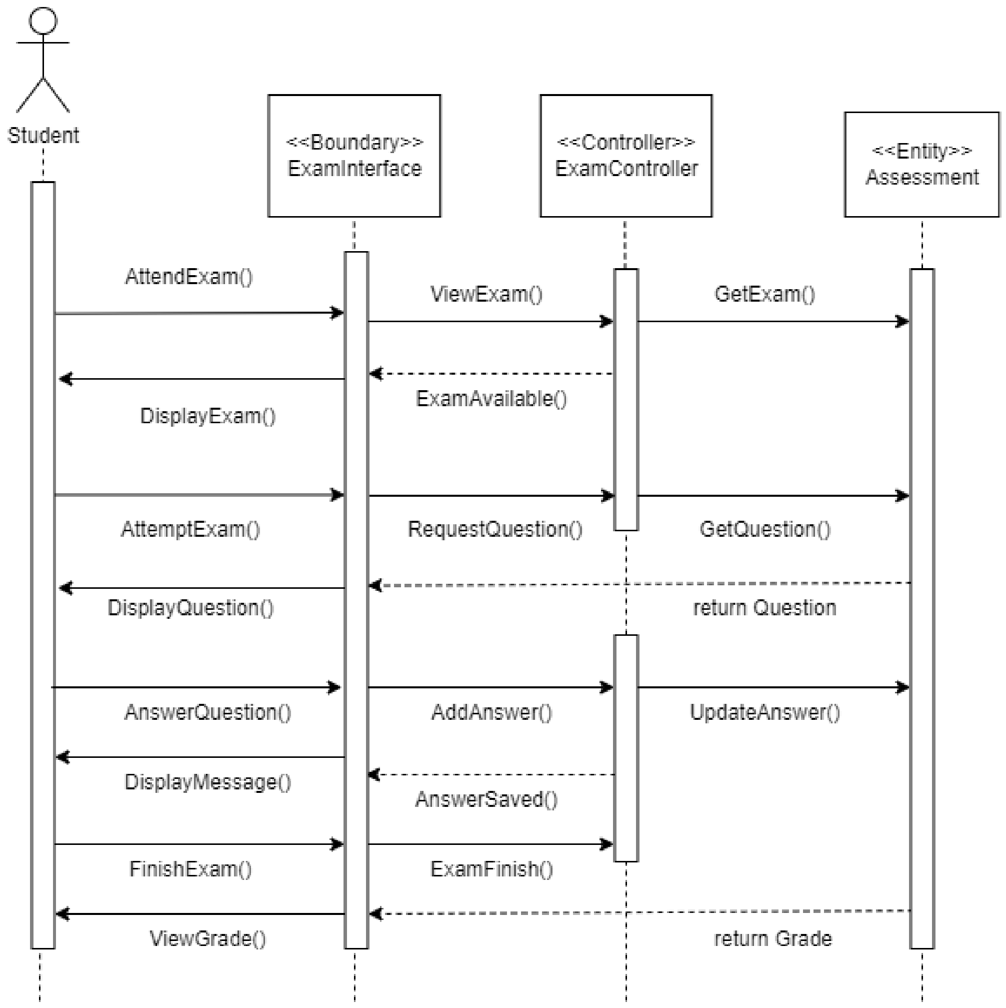


**Figure 4.23: Sequence Diagram for <Take Exam>**

c)SD015 : Sequence diagram for View Grade

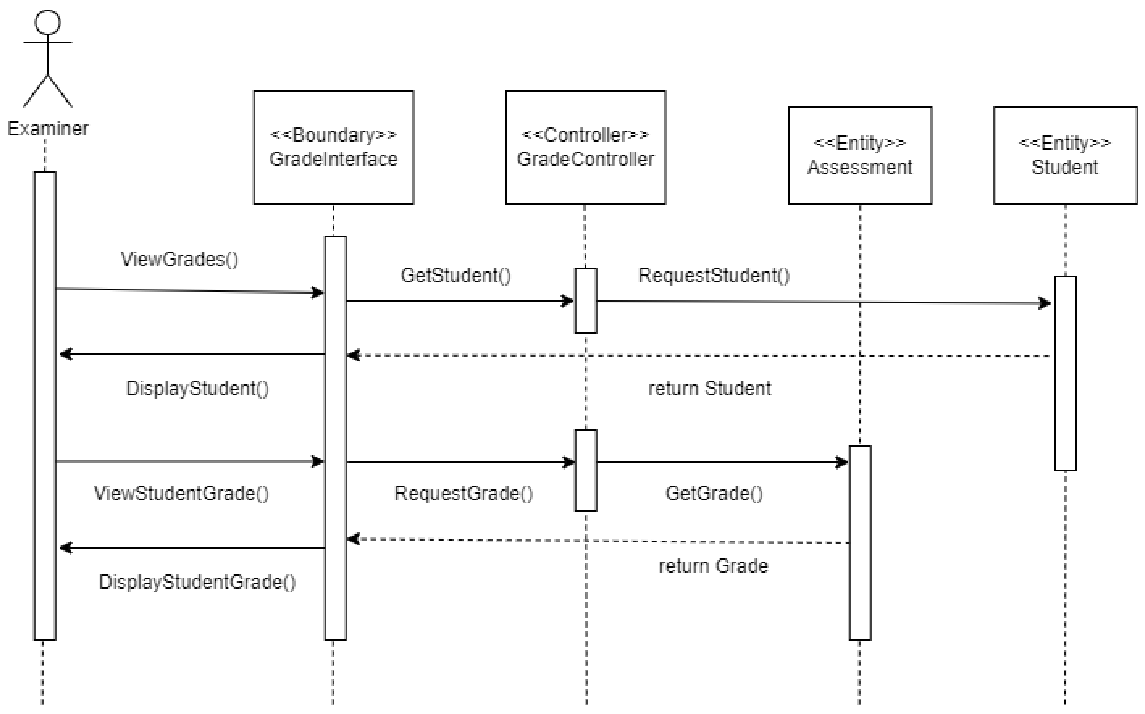


**Figure 4.24: Sequence Diagram for <Vire Grades>**

# 5.0 **Data Design**

## 5.1 Data Description

The major data or systems entities are stored into a relational database named Inferno 2u2i Final Year Project with Industry (FYP-I) Management System, processed and organized into *10* entities as listed in Table 5.1.

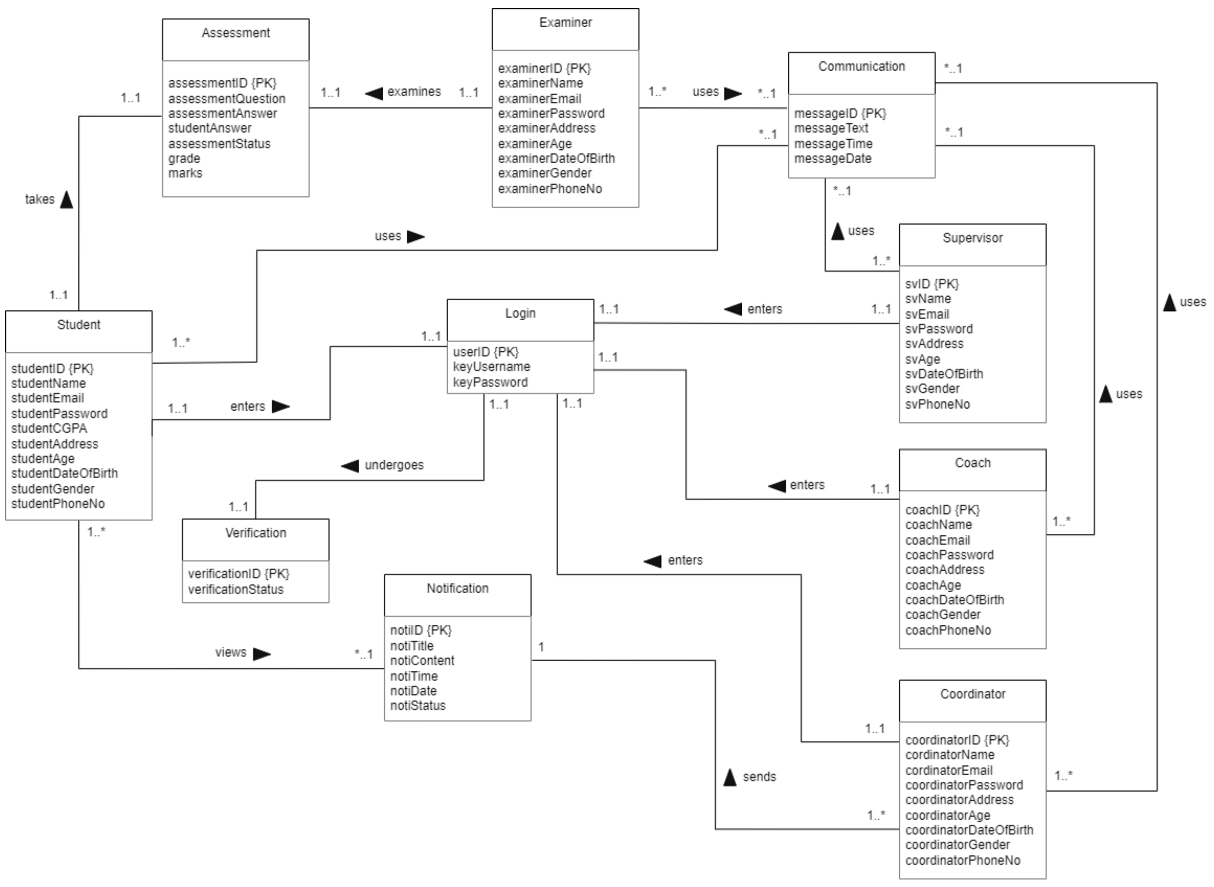


**Figure 5.1: Entity Relationship Diagram for <Inferno 2u2i Final Year Project with Industry (FYP-I) Management System>**

Table 5.1: Description of Entities in the Database

| No. | Entity Name | Description |
|---|---|---|
| 1. | Student | Store the information of the student |
| 2. | Coach | Store the information of the coach |
| 3. | Supervisor | Store the information of the supervisor |
| 4. | Examiner | Store the information of the examiner |
| 5. | Coordinator | Store the information of the coordinator |
| 6. | Assessment | Store the information related to assessment |
| 7. | Communication | Store the messages between users |
| 8. | Notification | Store the information about notifications |
| 9. | Login | Store the information related to login |
| 10 | Verification | Store the information related to verification |

## 5.2 Data Dictionary

### 5.2.1 Entity: <Student>

| Attribute Name | Type | Description |
|---|---|---|
| studentID | VARCHAR2(10) | Student ID, Primary Key |
| studentName | VARCHAR2(50) | Student full name |
| studentEmail | VARCHAR2(20) | Student email |
| studentPassword | VARCHAR2(20) | Student password |
| studentCGPA | NUMERIC(2,2) | Student CGPA |
| studentAddress | VARCHAR(100) | Student current address |
| studentAge | INT | Student age |
| studentDateOfBirth | DATE | Student date of birth |
| studentGender | CHAR(1) | Student gender |
| studentPhoneNo | VARCHAR(15) | Student phone number |

### 5.2.2 Entity: <Coach>

| Attribute Name | Type | Description |
|---|---|---|
| coachID | VARCHAR2(10) | Coach ID, Primary Key |
| coachName | VARCHAR2(50) | Coach full name |
| coachEmail | VARCHAR2(20) | Coach email |
| coachPassword | VARCHAR2(20) | Coach password |
| coachAddress | VARCHAR2(100) | Coach current address |
| coachAge | INT | Coach age |

| | | |
|---|---|---|
| coachDateOfBirth | DATE | Coach date of birth |
| coachGender | CHAR(1) | Coach gender |
| coachPhoneNo | VARCHAR2(15) | Coach phone number |

### 5.2.3 Entity: <Supervisor>

| **Attribute Name** | **Type** | **Description** |
|---|---|---|
| svID | VARCHAR2(10) | Supervisor ID, Primary Key |
| svName | VARCHAR2(50) | Supervisor full name |
| svEmail | VARCHAR2(20) | Supervisor email |
| svPassword | VARCHAR2(20) | Supervisor password |
| svAddress | VARCHAR2(100) | Supervisor current address |
| svAge | INT | Supervisor age |
| svDateOfBirth | DATE | Supervisor date of birth |
| svGender | CHAR(1) | Supervisor gender |
| svPhoneNo | VARCHAR2(15) | Supervisor phone number |

### 5.2.4 Entity: <Examiner>

| **Attribute Name** | **Type** | **Description** |
|---|---|---|
| examinerID | VARCHAR2(10) | Examiner ID, Primary Key |
| examinerName | VARCHAR2(50) | Examiner full name |
| examinerEmail | VARCHAR2(20) | Examiner email |
| examinerPassword | VARCHAR2(20) | Examiner password |
| examinerAddress | VARCHAR2(100) | Examiner current address |
| examinerAge | INT | Examiner age |
| examinerDateOfBirth | DATE | Examiner date of birth |
| examinerGender | CHAR(1) | Examiner gender |
| examinerPhoneNo | VARCHAR2(15) | Examiner phone number |

### 5.2.5 Entity: <Coordinator>

| **Attribute Name** | **Type** | **Description** |
|---|---|---|
| coordinatorID | VARCHAR2(10) | Coordinator ID, Primary Key |
| coordinatorName | VARCHAR2(50) | Coordinator full name |
| coordinatorEmail | VARCHAR2(20) | Coordinator email |
| coordinatorPassword | VARCHAR2(20) | Coordinator password |
| coordinatorAddress | VARCHAR2(100) | Coordinator current address |
| coordinatorAge | INT | Coordinator age |
| coordinatorDateOfBirth | DATE | Coordinator date of birth |

| | | |
|---|---|---|
| coordinatorGender | CHAR(1) | Coordinator gender |
| coordinatorPhoneNo | VARCHAR2(15) | Coordinator phone number |

### 5.2.6 Entity: <Assessment>

| Attribute Name | Type | Description |
|---|---|---|
| assessmentID | VARCHAR2(10) | Assessment ID, Primary Key |
| assessmentQuestion | VARCHAR2(200) | Question in the assessment |
| assessmentAnswer | CHAR(1) | Answer for the question |
| studentAnswer | CHAR(1) | Answer for the question by the student |
| assessmentStatus | VARCHAR(20) | Status of the assessment (exist/null/finish) |
| grade | CHAR(1) | Grade of the assessment obtained by student |
| marks | INT | Mark of the assessment obtained by student |

### 5.2.7 Entity: <Communication>

| Attribute Name | Type | Description |
|---|---|---|
| messageID | VARCHAR2(10) | Message ID, Primary Key |
| messageText | VARCHAR(200) | Text for the message |
| messageTime | TIME | Time of the message created |
| messageDate | DATE | Date of the message created |

### 5.2.8 Entity: <Notification>

| Attribute Name | Type | Description |
|---|---|---|
| notiID | VARCHAR2(10) | Notification ID, Primary Key |
| notiTitle | VARCHAR(50) | Title of the notification |
| notiContent | VARCHAR(100) | Content of the notification |
| notiTime | TIME | Time of the notification created |
| notiDate | DATE | Date of the notification created |
| notiStatus | VARCHAR(20) | Status of the notification created |

### 5.2.9 Entity: <Login>

| Attribute Name | Type | Description |
|---|---|---|
| userID | VARCHAR2(10) | User ID, Primary Key |
| keyUsername | VARCHAR2(20) | Username key in by user |

|  |  |  |
|---|---|---|
| keyPassword | VARCHAR2(20) | Password key in by user |

### 5.2.10 Entity: <Verification>

| **Attribute Name** | **Type** | **Description** |
|---|---|---|
| verificationID | VARCHAR2(10) | Verification ID, Primary Key |
| verificationStatus | VARCHAR2(20) | Status for the verification (true/false) |

# 6.0 Interface Design

## 6.1 Overview of Interface

For login , where all the process started , the user whether student or lecturer will need to login by inserting their username and password. After that, the user is needed to click the button so that the process can be carried on. The system will be required to be verified by finding the data that synchronizes with the existing data. There will be two conditions where if the data have been found, the user will get the authorization to access the system and will be directed to the main menu which contains a lot of option to choose from such as notification , messaging and much more

If the data has not been found, there will be an error message displayed and it will be redirected to the login menu.

For communication, this is the platform where the users are able to communicate with each other through messaging. There will be four functions that can be used for communication such as View Message, Add Message ,Delete Message and Edit Message.The history of messaging and text will be saved into the database.

For View Message, the user is required to search for the message that the user wanted. If the message is nowhere to be found, the user is required to find the message again. Then, the message will be displayed on the screen.

For Add Message, the user is able to add any message to the other users whether they have any questions to ask to their lecturer regarding the status of their internships. This can be done by sending the message including photo, file and much more.

For Delete Message, the users are able to delete the message that they have sent whether it is a photo or file. Sometimes the users have mistakenly sent the messages to the wrong person. so the user needs to search for the message that they want to delete and just delete it. They can delete as much they want . There are no restrictions on deleting the message.

For Edit Message, the users have the rights to edit the messages that they have sent to other users. This can be done by searching the messages that they want to edit. Here the users are able to edit the message and there will be a notification pop out saying that the messages have been updated . This is to prevent any miscommunication between users such as student and lecturer or student and the company that they intern with.

For notification, this is where the user will get their notifications such as email. For Coordinator, the features are Add Notification, Update Notification, and Delete Notification, while Students features are only View Notification. All data that are related to notification are saved in Notification Data.

For add notification, the coordinator must select Add Notification and it will send the request to the database to access, and the coordinator is able to add notification to the database.

For update notification, the coordinator must select Update Notification and it will send a request to the database to access, and the system will search for the available data. If the data exists, then the coordinator is able to update the notification, else it will return back an error message.

For delete notification, the coordinator must select Delete Notification and it will send a request to the database to access, and the system will search for the available data. If the data exists, then the coordinator is able to delete the notification, else it will return back an error message.

For view notification, the student must select View Notification and it will send a request to the database to access, and the system will search for available data. If the data exists, then the system will print out all the notification data until there is no more available data.

For assessment, this is where the students are able to take exams which are uploaded by the examiners. Features for assessment are Upload Question, Take Exam, and View Grades.

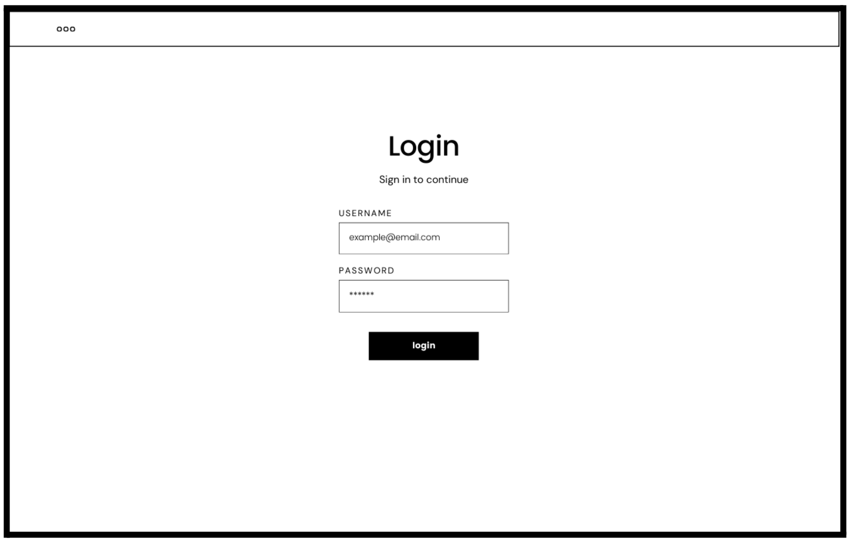
For the Upload Question, the examiner must select the button that they want to upload the question. If the question is not yet uploaded, the file containing the questions can be uploaded by clicking the upload button, then the answer for each question needs to be set by clicking the right answer for the questions. System then stores the questions and answers in the database. Else, if the questions is already uploaded, it will print out a message telling that the questions had been uploaded before, and then the examiner will be redirected to the main page.

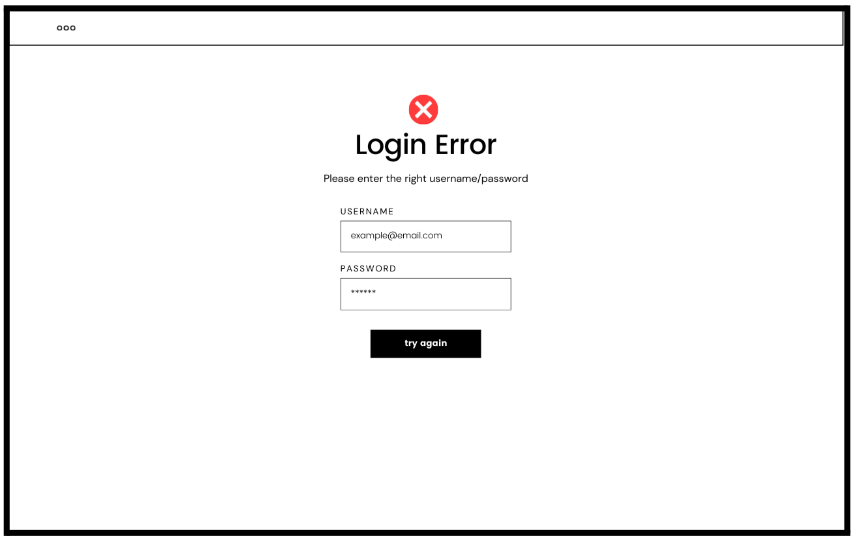
For the Take Exam, the exam questions must already be uploaded to the database, and the student needs to click on the exam that they need to attend. Students then attempt the exam by clicking the start button, all questions that are displayed must be answered by the student. After finishing all questions, students are able to click the finish button to complete the Take Exam.

For the View Grades, the exam questions must already be finished by the students. The system will check the student’s answer based on the answer sheet that has been uploaded to the database. The grades are obtained after checking is finished. If the student wants to view grades, the grades will be displayed immediately after the exam. If the examiner wants to view a student's grade, a list of students that finished the exam will be displayed, and the examiner is able to click any student’s name to view their grades.

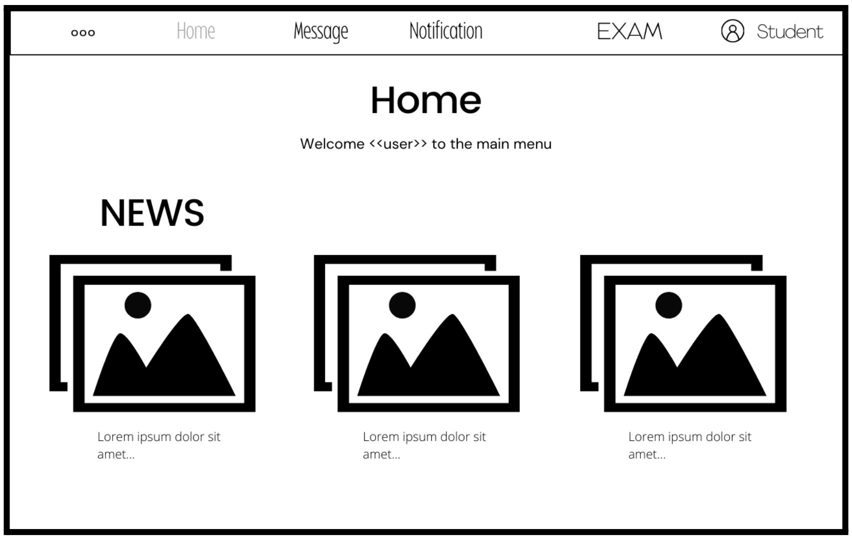
## 6.2 Overall Interface Design

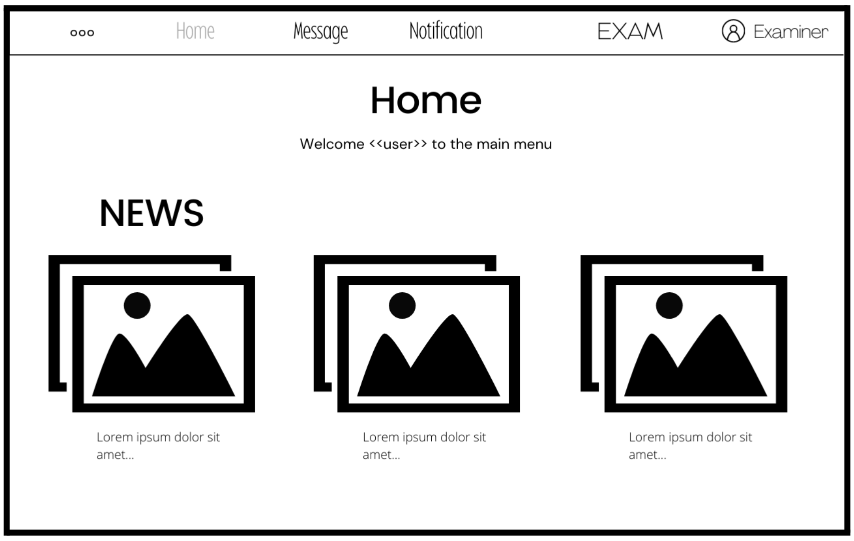
-Login Interface



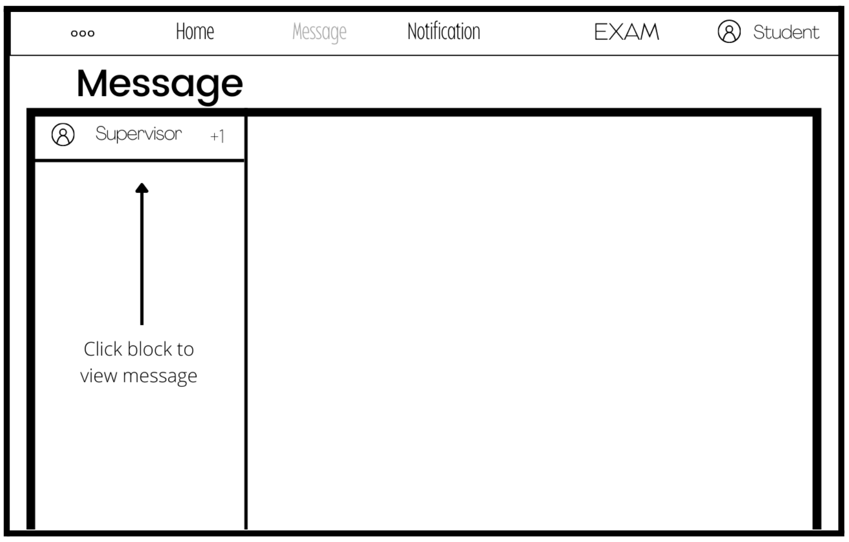


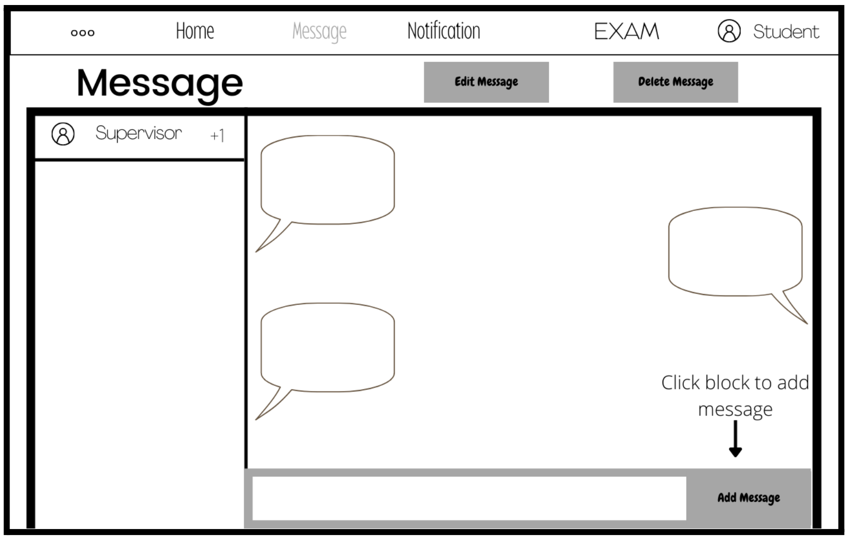
-Home Interface

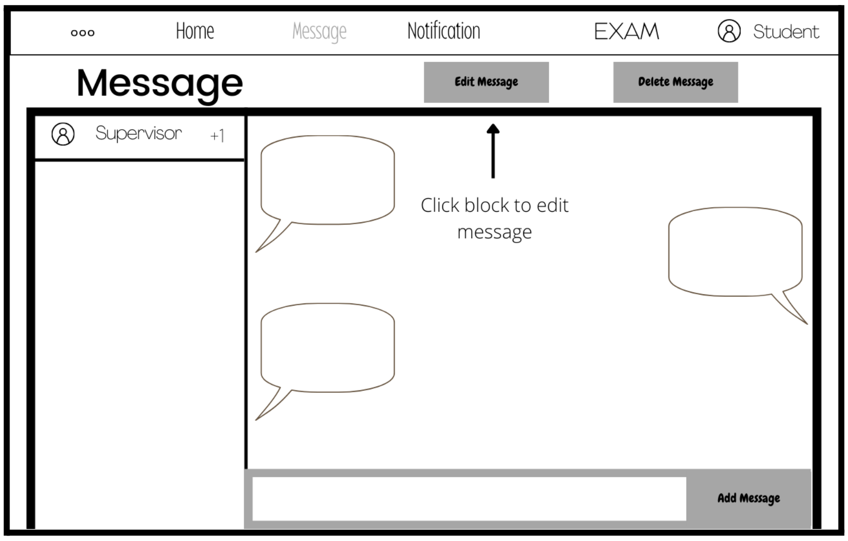

ooo
Home
Message
Notification
EXAM
Student
Home
Welcome <<user>> to the main menu
NEWS
Lorem ipsum dolor sit amet...
Lorem ipsum dolor sit amet...
Lorem ipsum dolor sit amet...

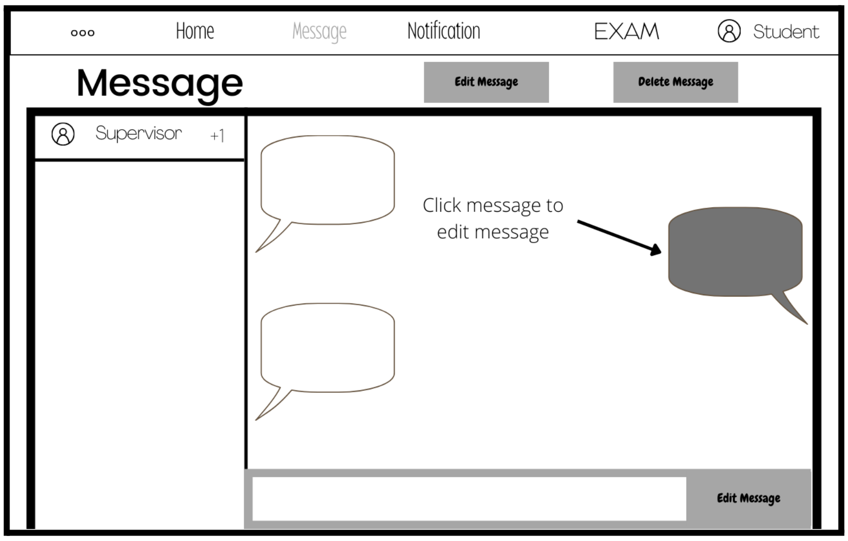

ooo
Home
Message
Notification
EXAM
Examiner
Home
Welcome <<user>> to the main menu
NEWS
Lorem ipsum dolor sit amet...
Lorem ipsum dolor sit amet...
Lorem ipsum dolor sit amet...

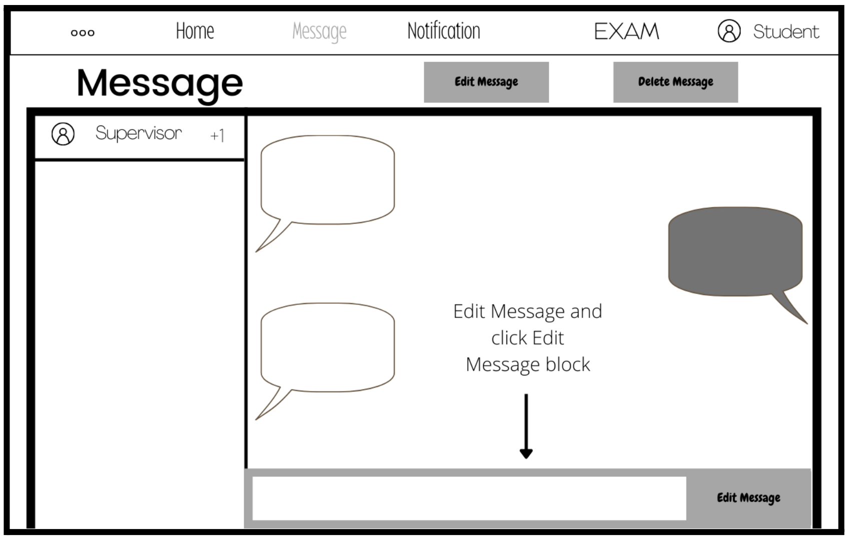
-Message Interface

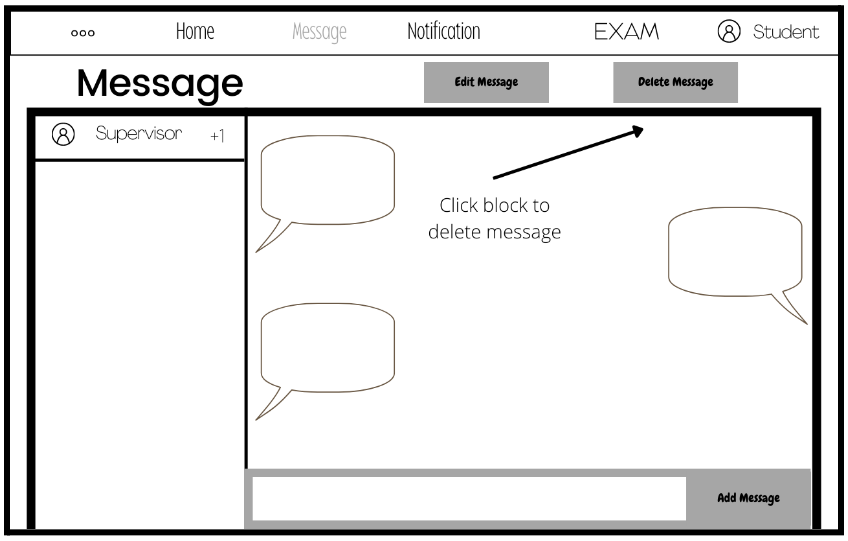


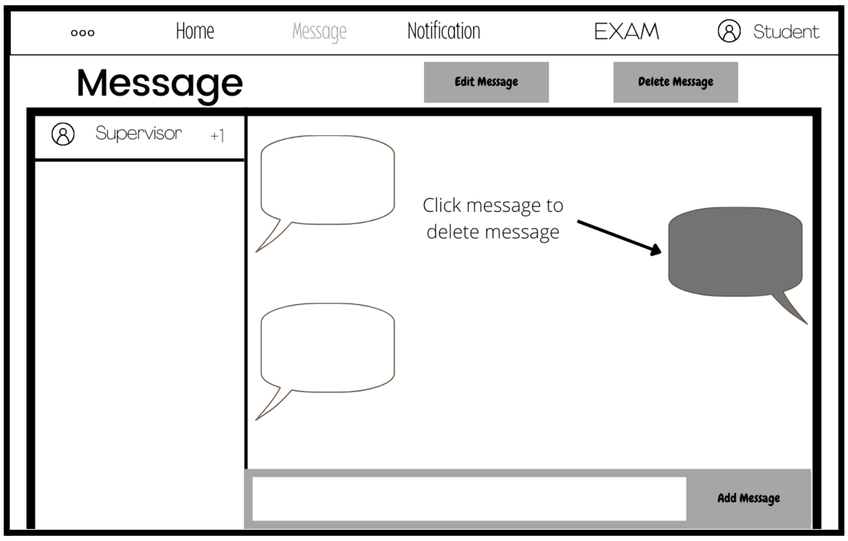

ooo
Home
Message
Notification
EXAM
Student
Message
Edit Message
Delete Message
Supervisor +1
Click block to add message
Add Message


ooo
Home
Message
Notification
EXAM
Student
Message
Edit Message
Delete Message
Supervisor +1
Click block to edit message
Add Message

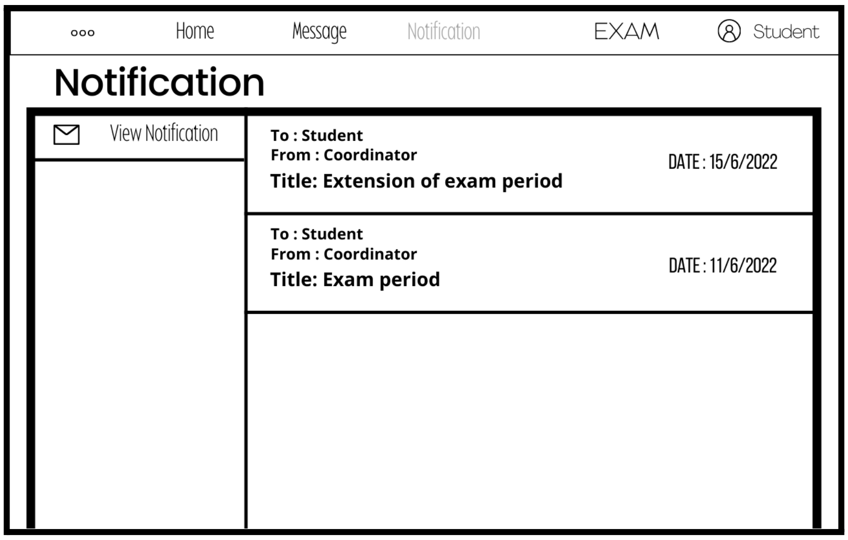

ooo
Home
Message
Notification
EXAM
Student
Message
Edit Message
Delete Message
Supervisor +1
Click message to edit message
Edit Message







-Notification Interface

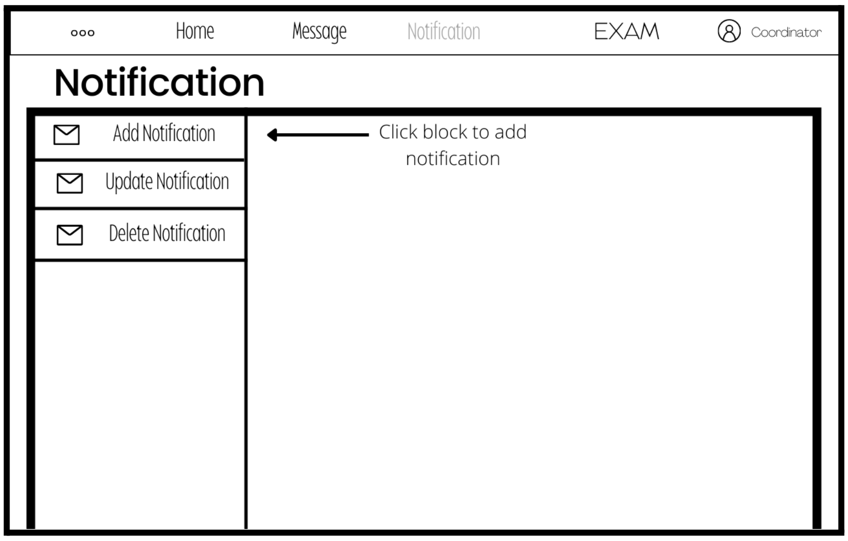

ooo Home Message Notification EXAM Student

Notification

View Notification

To : Student
From : Coordinator
Title: Extension of exam period
DATE : 15/6/2022

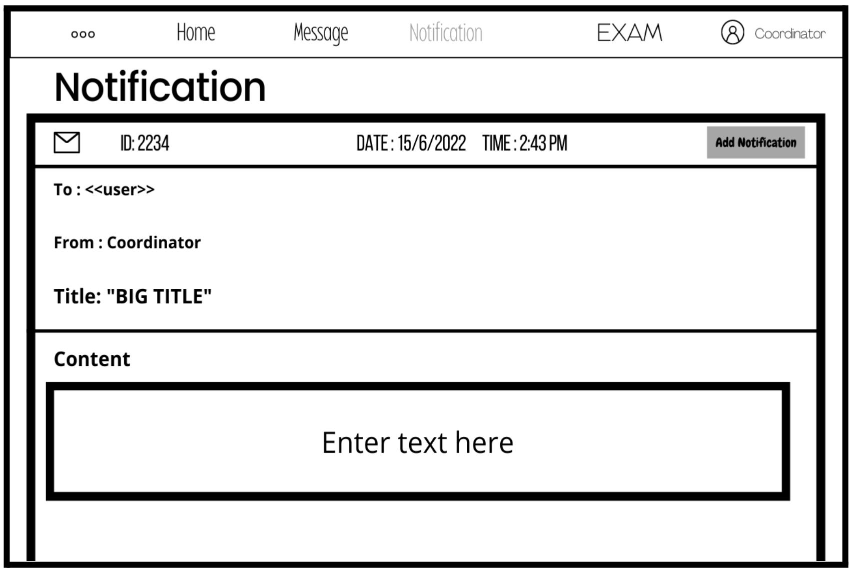
To : Student
From : Coordinator
Title: Exam period
DATE : 11/6/2022


ooo Home Message Notification EXAM Coordinator

Notification

Add Notification
Update Notification
Delete Notification

Click block to add notification


ooo Home Message Notification EXAM Coordinator

Notification

ID: 2234 DATE : 15/6/2022 TIME : 2:43 PM Add Notification

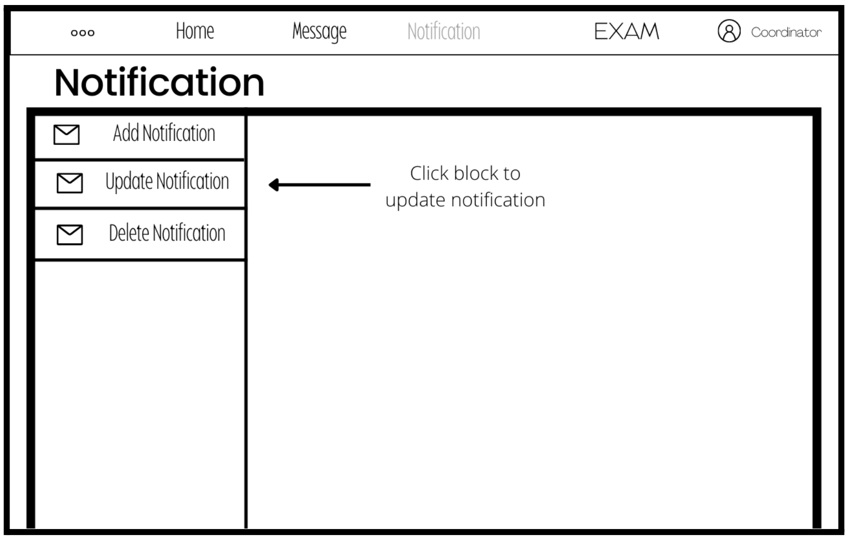
To : <<user>>

From : Coordinator

Title: "BIG TITLE"

Content

Enter text here



ooo Home Message Notification EXAM Coordinator

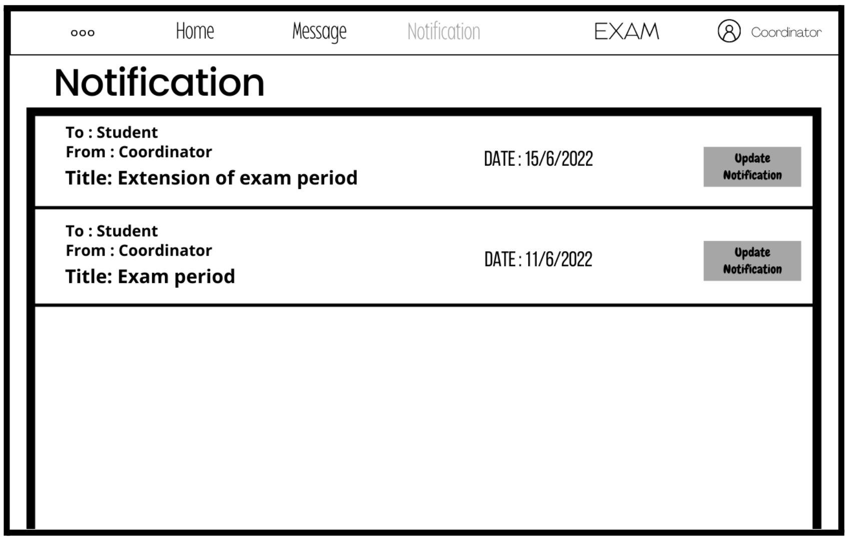
Notification

Add Notification

Update Notification

Delete Notification

Click block to update notification

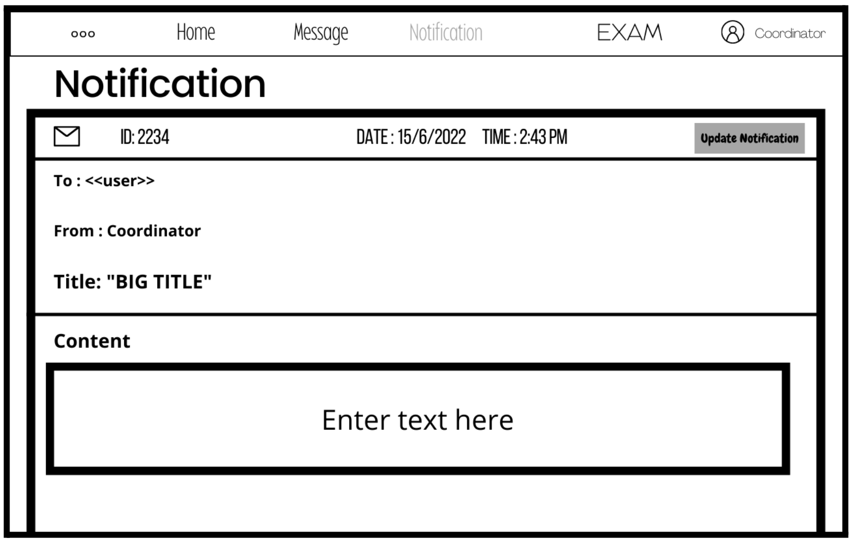


ooo Home Message Notification EXAM Coordinator

Notification

To : Student
From : Coordinator
Title: Extension of exam period
DATE : 15/6/2022
Update Notification

To : Student
From : Coordinator
Title: Exam period
DATE : 11/6/2022
Update Notification



ooo Home Message Notification EXAM Coordinator

Notification

ID: 2234 DATE : 15/6/2022 TIME : 2:43 PM
Update Notification

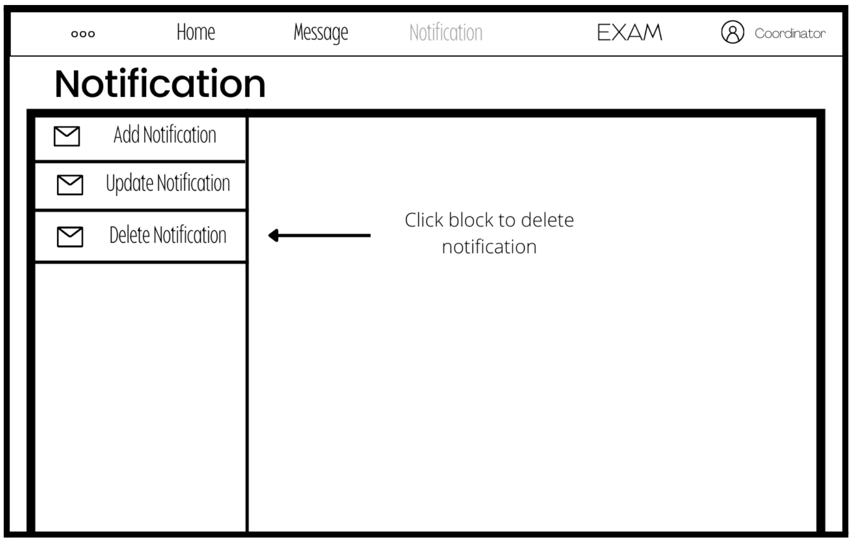
To : <<user>>

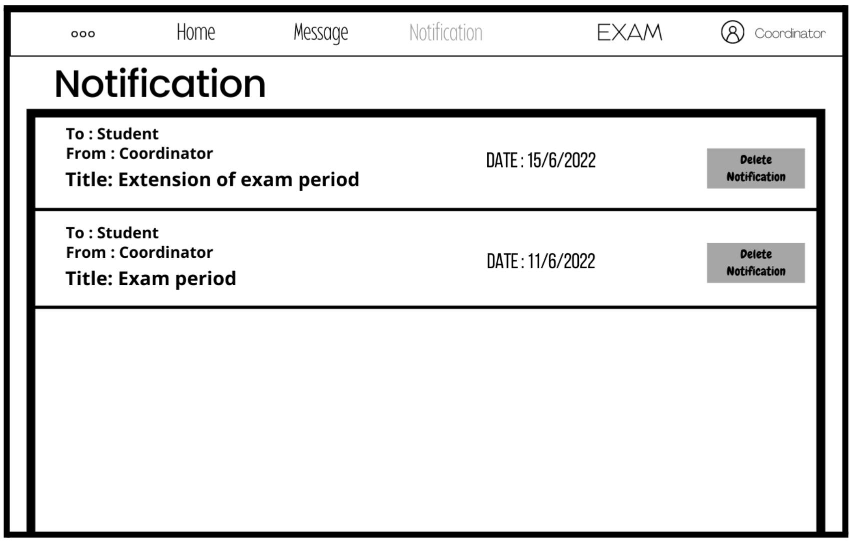
From : Coordinator

Title: "BIG TITLE"

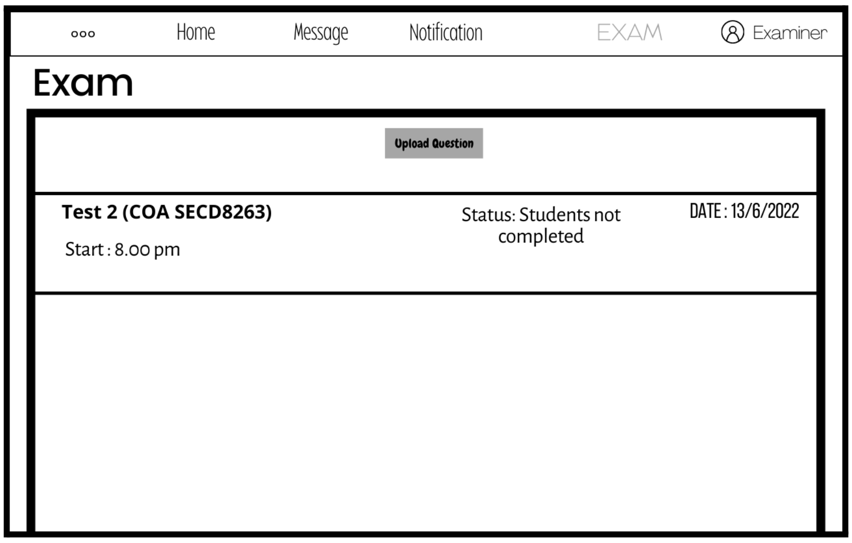
Content

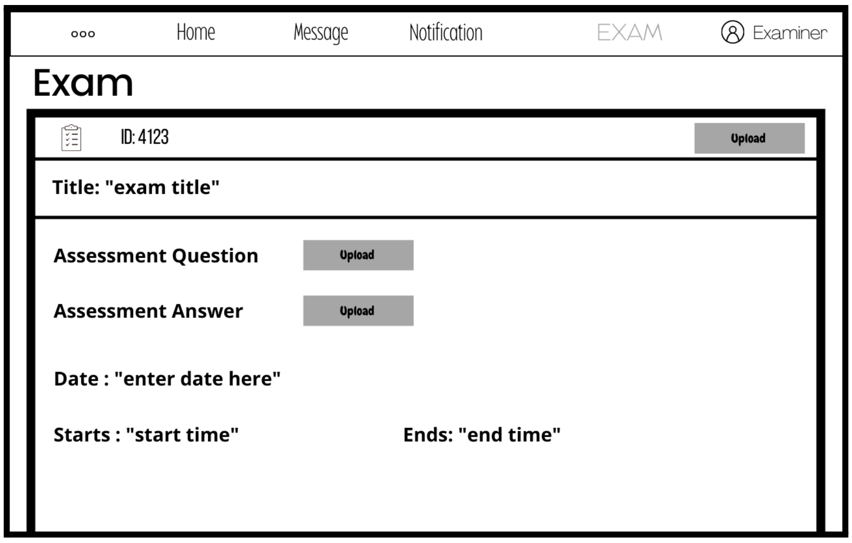
Enter text here





-Exam Interface





Exam

ID: 4123

Title: "exam title"

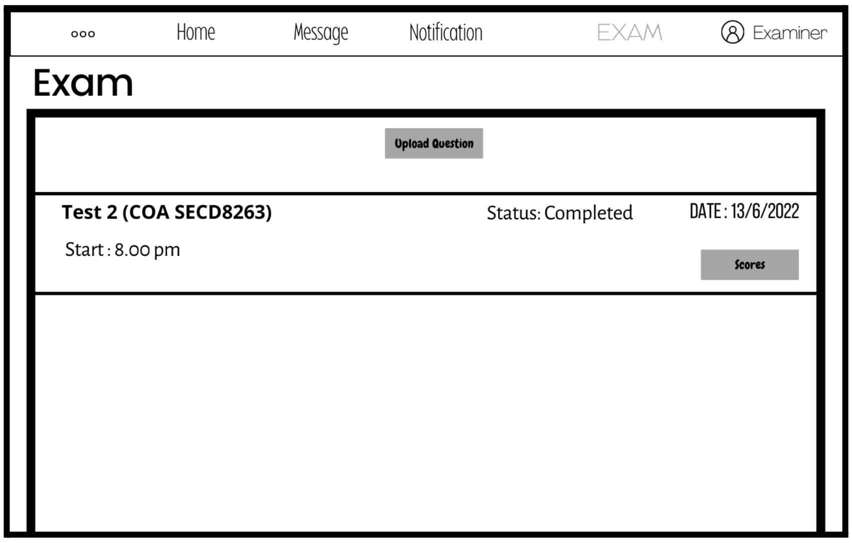
Assessment Question

Assessment Answer

Date : "enter date here"

Starts : "start time"

Ends: "end time"



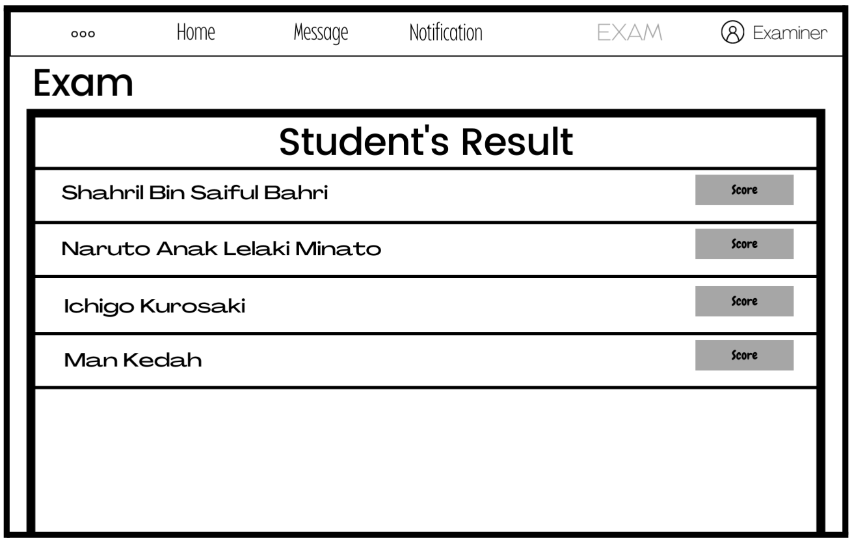
Exam

Test 2 (COA SECD8263)

Status: Completed

DATE : 13/6/2022

Start : 8.00 pm



Exam

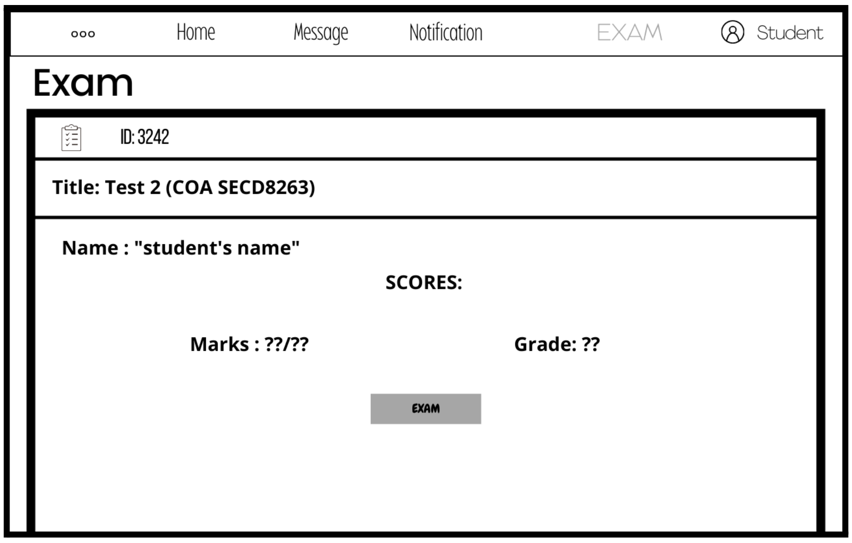
Student's Result

Shahril Bin Saiful Bahri

Naruto Anak Lelaki Minato

Ichigo Kurosaki

Man Kedah



ooo Home Message Notification EXAM Student

Exam

ID: 3242

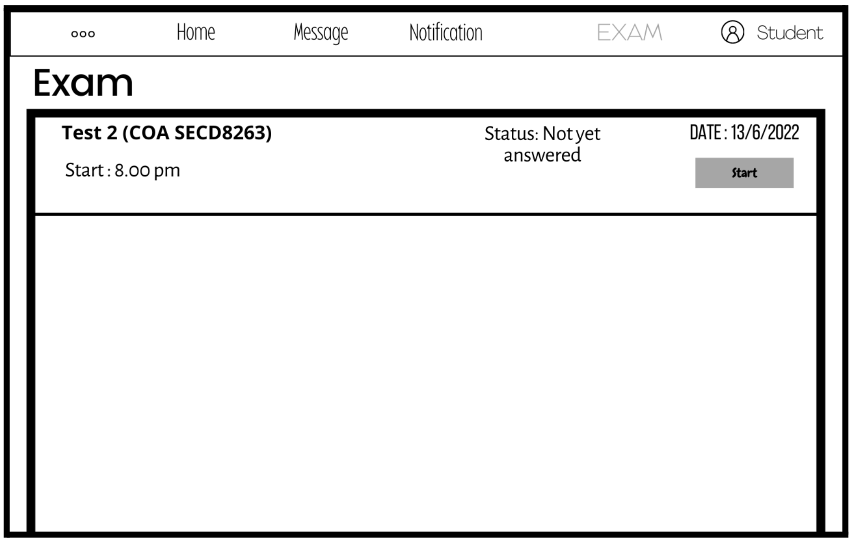
Title: Test 2 (COA SECD8263)

Name : "student's name"

SCORES:

Marks : ??/??

Grade: ??



ooo Home Message Notification EXAM Student

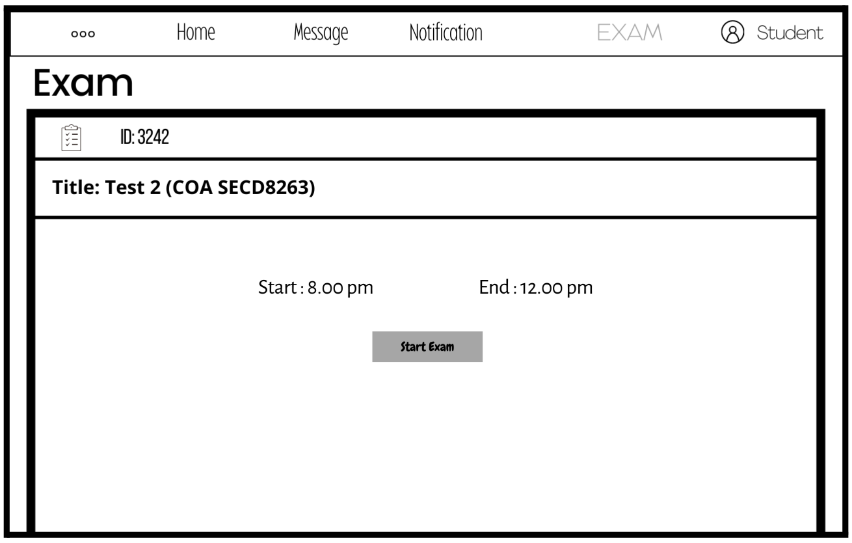
Exam

Test 2 (COA SECD8263)

Start : 8.00 pm

Status: Not yet answered

DATE : 13/6/2022



ooo Home Message Notification EXAM Student

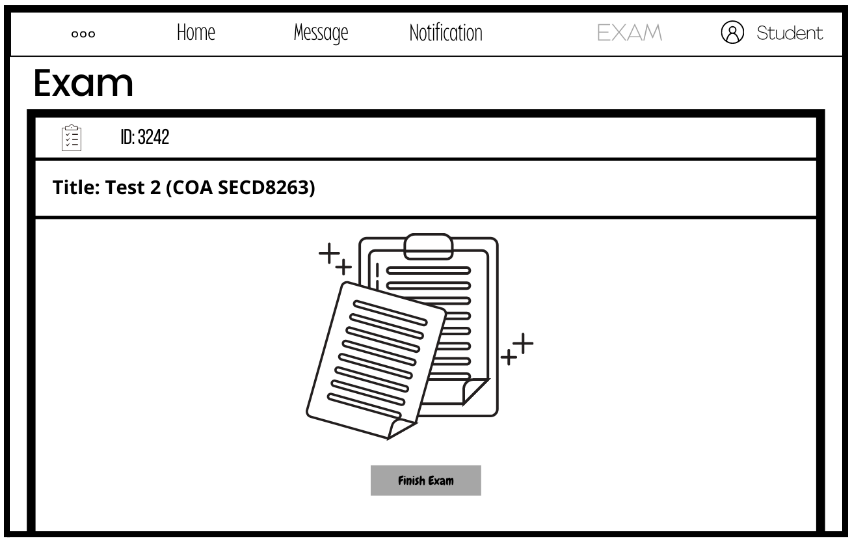
Exam

ID: 3242

Title: Test 2 (COA SECD8263)

Start : 8.00 pm

End : 12.00 pm

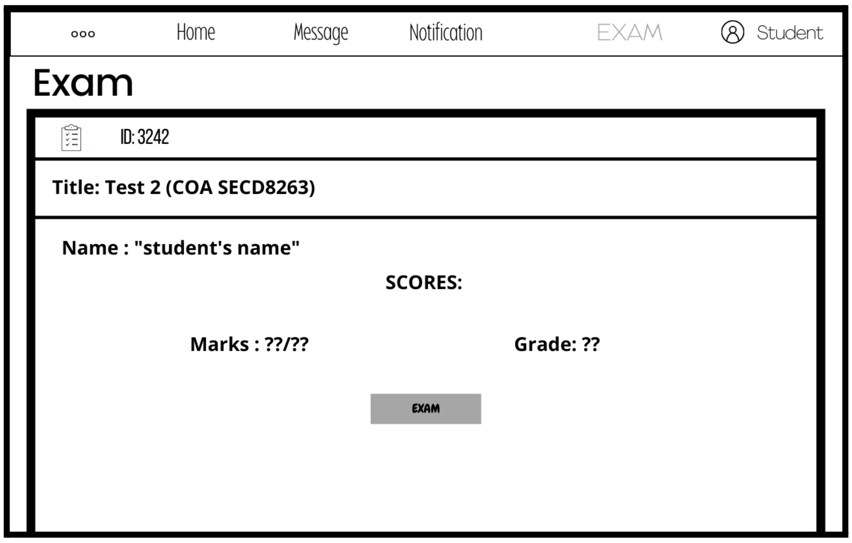

ooo Home Message Notification EXAM Student

Exam

ID: 3242

**Title: Test 2 (COA SECD8263)**

Finish Exam


ooo Home Message Notification EXAM Student

Exam

ID: 3242

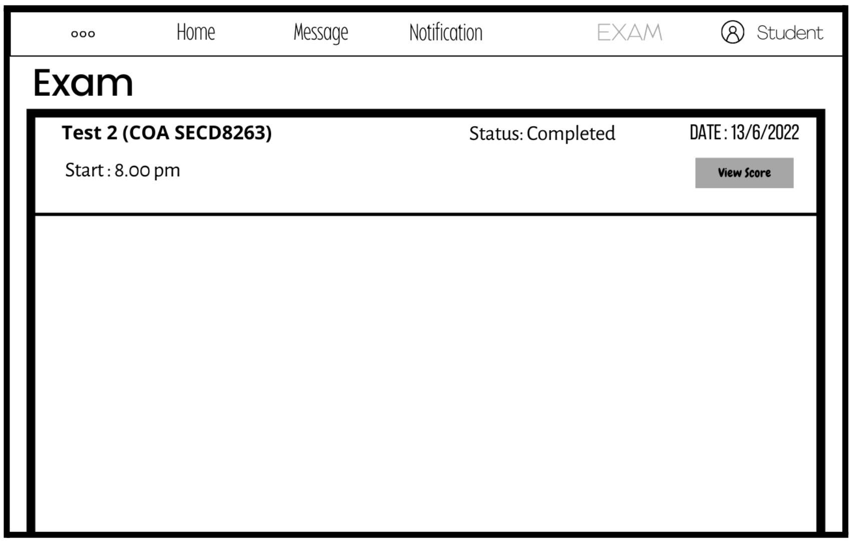
**Title: Test 2 (COA SECD8263)**

**Name : "student's name"**

**SCORES:**

**Marks : ??/??** **Grade: ??**

EXAM


ooo Home Message Notification EXAM Student

Exam

**Test 2 (COA SECD8263)** Status: Completed DATE : 13/6/2022

Start : 8.00 pm

View Score