



TSE2101 SOFTWARE ENGINEERING FUNDAMENTALS  
SEMESTER 1,  
YEAR 2020/2021

Fraction Learning System For School

Project 3

**GROUP 7**

<b><u>NAME</u></b>	<b><u>STUDENT ID</u></b>
<u>ANG KELVIN</u>	<u>1181101297</u>
<u>CHANG KAI BOON</u>	<u>1181101282</u>
<u>TEY YEE YANG BRANDON</u>	<u>1181100671</u>
<u>LOW QZHI YEE</u>	<u>1181100235</u>

## Table of Content

<b>1.0 Introduction</b>	<b>6</b>
<b>2.0 Project management</b>	<b>10</b>
2.1 Team member	10
2.2 Project plan	11
<b>3.0 System overview</b>	<b>12</b>
3.1 Survey	12
3.2 Problem Statement	14
3.2.1 Teacher	14
3.2.2 Student	14
3.3 System Description	15
3.4 Actors	15
3.5 Use Case Diagram	16
3.5.1 Teacher and Amin	16
3.5.2 Student	17
3.6 Use Case Description	18
3.6.1 All User(Student and Teacher)	18
3.6.2 Student	22
3.6.3 Teacher	24
3.6.4 Admin	26
<b>4.0 Basic requirements</b>	<b>27</b>
4.1 Users	27
4.1.1 Student	27
4.1.2 Teacher	27
4.1.3 Admin	27
4.2 Users Scenario	28
4.2.1 All users(Students and Teachers)	28
4.2.2 Students	31
4.2.3 Teachers	32
4.2.4 Admins	33
<b>5.0 Specific Requirements</b>	<b>34</b>
5.1 Entity-Relationship-Diagram(ERD)	34
5.2 Class Diagram	35
5.3 Sequence Diagram	36
5.3.1 Login/Logout	36
5.3.2 Registration	37
5.3.3 View / Create / Edit and Delete Question	38
5.3.4 View / Create / Edit and Delete Comment	39

5.3.5 View and Do Tutorial	40
5.3.6 View / Create / Edit and Delete Tutorial	41
5.3.7 View Schedule	42
5.3.8 View / Create and Delete Schedule	43
5.3.9 View Notes	44
5.3.10 View / Create / Edit and Delete Notes	45
5.3.11 View Student List	46
5.3.12 View and Edit Profile	47
5.3.13 View Learning Progress	48
5.3.14 View Result	49
5.3.15 Like and Dislike question or comment	51
5.3.16 Mark Comment as solution	52
5.3.17 Manage Database	53
<b>6.0 Data Design</b>	<b>54</b>
6.1 Data Dictionary / Data Structure	54
6.1.1 User Table	54
6.1.2 Student Table	55
6.1.3 Teacher Table	55
6.1.4 Profile Table	56
6.1.5 Schedule Table	56
6.1.6 Tutorial Table	56
6.1.7 Questions Table	57
6.1.8 Solution Table	57
6.1.9 Note Table	58
6.1.10 Comment Table	58
<b>7.0 Architecture Design</b>	<b>59</b>
7.1 Application Architecture Diagram (AAD)	61
7.1.1 Student	62
7.1.2 Teacher	62
7.1.3 Admin	63
<b>8.0 Interface Design</b>	<b>64</b>
8.1 Homepage Interface	64
8.2 Main Interface(Teacher & Student)	65
8.3 Register Interface(Teacher & Student)	67
8.4 Login Interface(Teacher & Student)	68
8.5 Fraction Learning Interface	69
8.5.1 Tutorial Interface for teacher	69
8.5.2 Tutorial interface for student	70
8.5.3 Create Tutorial Interface	71
8.5.4 Edit Tutorial Interface	72

8.6 Schedule Interface	73
8.7 Profile Interface	74
8.8 QnA Interface	75
<b>9.0 Component Design</b>	<b>76</b>
9.1 Registration	76
9.2 Login	77
9.3 Logout	78
9.4 View Profile	79
9.5 Edit Profile	80
9.6 View Schedule	81
9.7 Create Schedule	82
9.8 Edit Schedule	83
9.9 View Notes	84
9.10 Upload Notes	85
9.11 Edit Notes	86
9.12 View Tutorial	87
9.13 Do Tutorial	88
9.14 Upload Tutorial	89
9.15 Manage Tutorial	90
9.16 Student View Result	91
9.17 Teacher View Results	92
9.18 Ask Question	93
9.19 Edit Question	94
9.20 Add Comment	95
9.21 Manage Comment	96
9.22 Mark Comment As Solution	97
9.23 View Student List	98
<b>10.0 Deployment Design</b>	<b>99</b>
<b>11.0 Updated Requirements</b>	<b>100</b>
11.1 Updated Use Case Diagram	100
11.1.1 Teacher and Admin	100
<b>11.2 Updated Sequence Diagram</b>	<b>101</b>
11.2.1 View Tutorial	101
11.2.2 View Result	102
11.2.3 View Learning Progress	103
11.2.4 View/ Do Quiz	103
11.2.5 Add, Edit, Delete Quiz	104
<b>12.0 Test Cases Design</b>	<b>105</b>
12.1 Functional	105

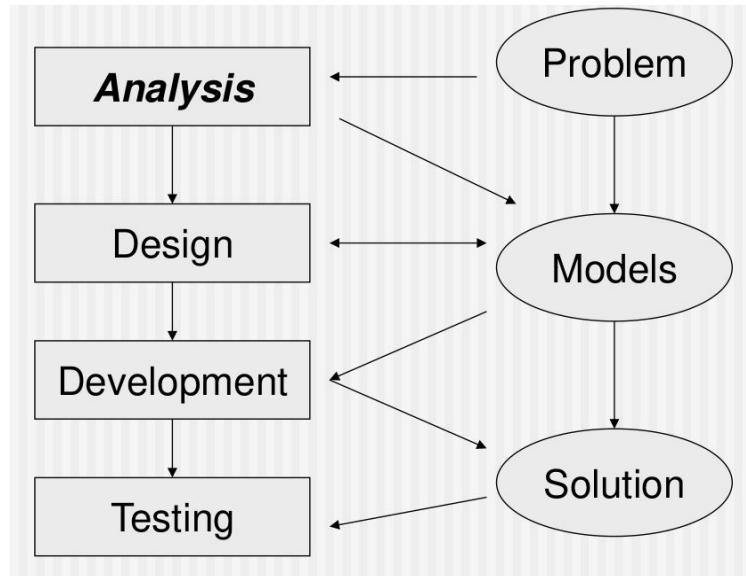
12.2 Environment & Infrastructure	105
12.2.1 Computer Specification	105
12.3 Definition of Modules	106
12.4 Test Cases	112
<b>13.0 Sample Screen</b>	<b>130</b>
13.1 All User	130
13.1.1 Register	130
13.1.2 Login	130
13.1.3 View and edit profile	132
13.1.4 Add,edit and delete question	133
13.1.5 Add,edit and delete comment	134
13.1.6 Like and Dislike question and comment	135
13.1.7 View student's list	136
13.2 Student	136
13.2.1 Main Page	137
13.2.2 View and do tutorial	137
13.2.3 View schedule	138
13.2.4 View note	139
13.2.5 View Result	139
13.2.6 View and do quiz	140
13.3 Teacher	140
13.3.1 Main Page	141
13.3.2 View all student result/learning progress	142
13.3.3 View, create, edit and delete tutorial	143
13.3.4 View,add and delete schedule	144
13.3.5 View, create, edit and delete note	145
13.3.6 Mark as solution	146
13.3.7 Add, edit, delete and mark quiz	147
13.3.7.1 Add quiz	147
13.3.7.2 Add multiple choice question for quiz	148
13.3.7.3 Add true or false question for quiz	149
13.3.7.4 Add essay question for quiz	150
13.3.7.5 Mark quiz	150
13.4 Admin	151
13.4.1 Manage Database	152
<b>14.0 User Guide</b>	<b>152</b>
Step 1 : Install python	153
Link : <a href="https://www.python.org/downloads/release/python-376/">https://www.python.org/downloads/release/python-376/</a>	153
Step 2: Set up command prompt	153
Step 3: Run the server	155

<b>15.0 Conclusion</b>	<b>155</b>
15.1 Summary of Results	156
15.2 Problems Encountered	156
15.3 Limitations and Future Enhancements	157
15.3.1 Limitations	157
15.3.2 Future Enhancements	157
<b>References</b>	<b>157</b>

# 1.0 Introduction

The project title given to the team is “Fraction Learning System For School”. In this project, the team decided to apply all the knowledge that they learn in the TSE2101 Software Engineering Fundamentals course.

Software engineering can be defined as the application of a systematic, disciplined, quantifiable approach to the development, operation and maintenance of software. The common software engineering practice consists of 4 steps, which are understanding the problem, planning a solution, carrying out the plan and examining the result for accuracy. The picture below summarizes the process of software engineering at a high-level view.



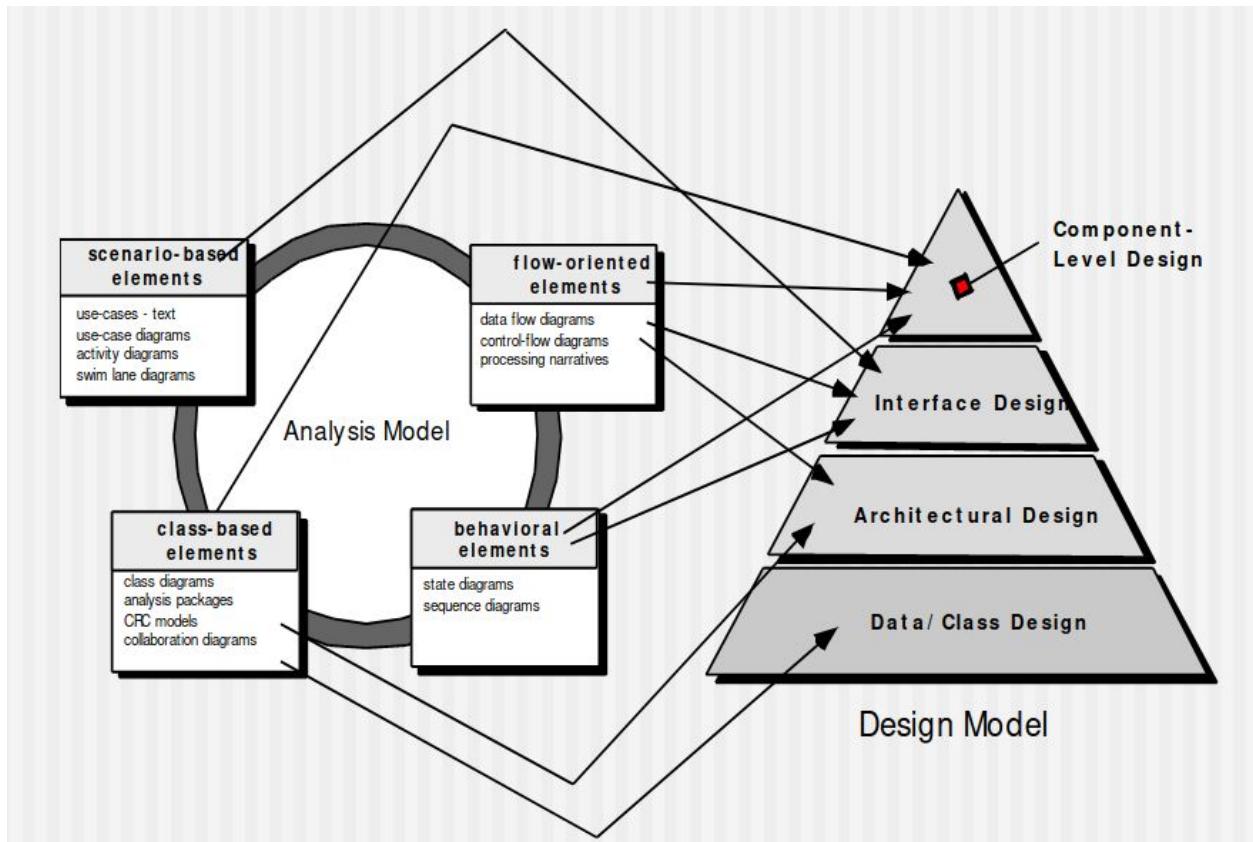
(Figure 1: Model)

By following the model above, the project can be divided into three main parts: requirements engineering, design modelling and prototype development.

The team has carried out project planning and requirements analysis in the requirements engineering part. The team has identified the problem statements by gathering and understanding the problems of learning problems from the users through the online survey that has been conducted successfully using the Google form. Based on the problem statements, the team has come out with a system overview. The details of system overview, basic requirements and specific requirements can be found in section 3.0, 4.0 and 5.0 respectively.

After the system overview was done, the team moved forward to design modelling, which translates the analysis model into the design model.

The diagram below shows how the team transforms the analysis model into a design model.



**(Figure 2: Design Model)**

There are five elements in the Design Model. They are Data elements, Architectural elements, Interface elements, Component elements and Deployment elements. The team has mapped the information from the analysis model to the 5 design representations - Data Design, Architecture Design, Interface Design, Component Design and Deployment Design. The details of these 5 design representations can be found in section 6.0, 7.0, 8.0, 9.0 and 10.0 respectively.

After the design modelling was done, the team moved forward to the last part, which is prototype development. The team decided to use Django, which is a Python-based free and open-source web framework in developing our Fraction Learner system. The reason that the team used this framework is because Django emphasizes reusability of components, less code, low coupling and the principle of don't repeat yourself. On the other hand, the database that the team used is SQLite, which is a relational database management system. The things that you plan are not always perfect, the same goes to the team. During the development process, the team found out that some of the design in the Design Model is not that appropriate. Thus, the team has made an update of them and the details can be found in section 11.0.

Once the source code has been generated, the system must be tested to uncover as many errors as possible before publishing. Thus, the team has designed a series of test cases that have a high likelihood of finding errors. The details of test cases can be found in section 12.0.

Last but not least, the team will show the sample screen of the system of each actor and some user guide in section 13.0 and 14.0 so that the reader of this documentation can have a better understanding of the Fraction Learner system.

## 2.0 Project management

### 2.1 Team member

Role	Name	Work Distribution
Leader	Ang Kelvin	<p><b>Project 1</b></p> <ul style="list-style-type: none"><li>1. ER-diagram</li><li>2. Class diagram</li><li>3. Use case diagram</li><li>4. Use case description</li></ul> <p><b>Project 2</b></p> <ul style="list-style-type: none"><li>1. Interface design</li></ul> <p><b>Project 3</b></p> <ul style="list-style-type: none"><li>1. Schedule module</li><li>2. Quiz module</li><li>3. Database module</li><li>4. Test case</li></ul>
Member	Chang Kai Boon	<p><b>Project 1</b></p> <ul style="list-style-type: none"><li>1. Sequence diagram</li><li>2. Use case description</li></ul> <p><b>Project 2</b></p> <ul style="list-style-type: none"><li>1. Architecture design</li><li>2. Deployment design</li></ul> <p><b>Project 3</b></p> <ul style="list-style-type: none"><li>1. Registration module</li><li>2. Login module</li><li>3. Profile module</li><li>4. Test case</li></ul>
Member	Tey Yee Yang Brandon	<p><b>Project 1</b></p> <ul style="list-style-type: none"><li>1. Users scenario</li><li>2. Use case description</li></ul> <p><b>Project 2</b></p> <ul style="list-style-type: none"><li>1. Component design</li></ul> <p><b>Project 3</b></p> <ul style="list-style-type: none"><li>1. Notes module</li><li>2. Tutorial module</li><li>3. Comment module</li><li>4. Test case</li></ul>

Member	Low Qzhi Yee	<p><b>Project 1</b></p> <ol style="list-style-type: none"> <li>1. Survey</li> <li>2. Problem statement</li> <li>3. Use case description</li> </ol> <p><b>Project 2</b></p> <ol style="list-style-type: none"> <li>1. Data dictionary</li> </ol> <p><b>Project 3</b></p> <ol style="list-style-type: none"> <li>1. View student list module</li> <li>2. View Results module</li> <li>3. Question module</li> <li>4. Test case</li> </ol>
--------	--------------	---

## 2.2 Project plan

The team's project Fraction Learner (Fraction Learning System For School) is a Web Application.

The process model that the team used is the Waterfall model. It is a classical, systematic and sequential life cycle. This means that a phase has to be completed before moving onto the next phase. There are 5 phases in the Waterfall model. They are Communication, Planning, Modeling, Construction and Deployment. The table below shows the details of each phase.

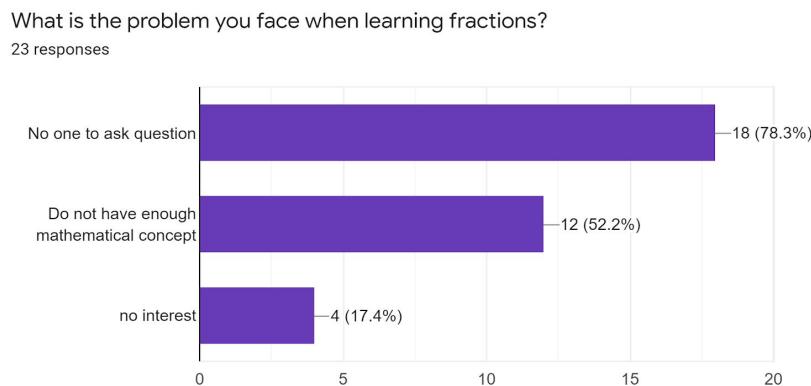
No	Phase	Activities	Target Date
1.	Communication	i) Project initiation ii) Requirement gathering iii) Problem statement	19/07/2020
2.	Planning	i) System overview ii) Basic requirements iii) Specific requirements	09/08/2020
3.	Modeling	i) Analysis ii) Design modelling	13/09/2020
4.	Construction	i) Coding ii) Testing	07/10/2020
5.	Deployment	i) Delivery ii) Feedback	09/10/2020

# 3.0 System overview

## 3.1 Survey

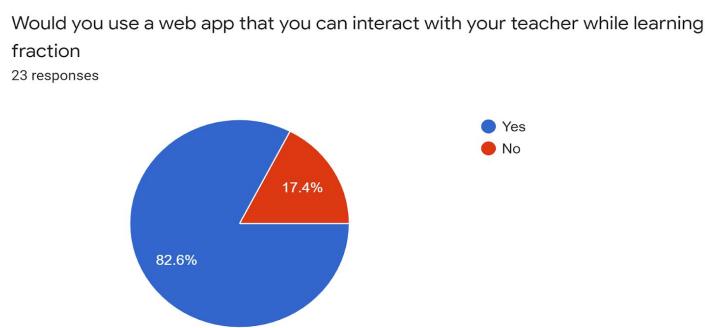
Being given the title of “Fraction Learning System for School”, the team decided to create a web app for students and teachers to interact with each other. To avoid having confirmation bias on the actual issues, the team decided to conduct a survey among our friends from different faculties in MMU and obtained 23 responses. This helps us to confirm the problem the team are trying to solve actually exists among the students. The team also obtained feedback from students about the features they would like to see in this application. Other than that this sparked our thought process on brainstorming new ideas based on their responses.

The results of the survey are summarized as follows:



(Figure 3: Survey)

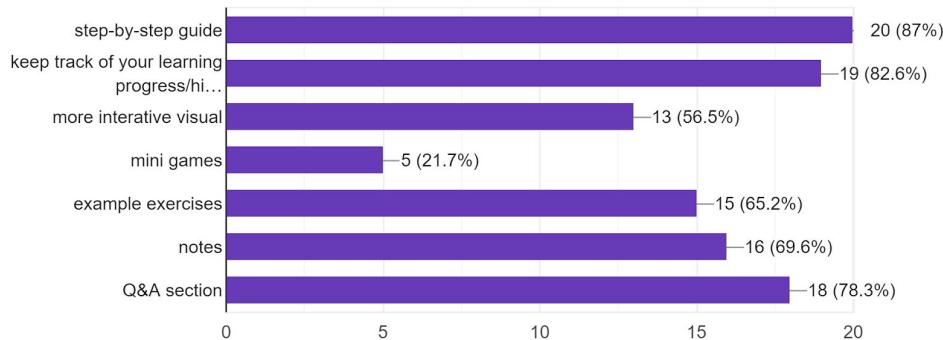
Based on the graph above, most of the respondents agree that they have no one to ask questions when learning fractions. At the same time, more than half of the respondents agree that they do not have enough mathematical knowledge. So, the team also got the result of 82.6% of the responses stating that they would like to have a web app to interact with their teacher when learning fractions as shown in the graph below.



(Figure 4: Graph)

What features would you like to have in the fraction learning web app

23 responses

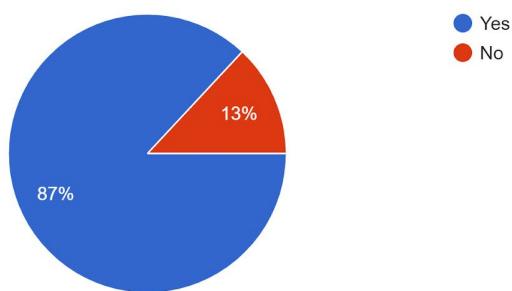


**(Figure 5: Data features)**

The team also asked them to choose the features they would like to add in the web application. After discussing among the team, the team decided to implement the features that at least 50% people chose. The results are shown above as the step-step guide got the highest score of 87%. In this, the team decided to have all answers provided in the app to present in a step-by-step manner. As nearly more than half of the respondents agree to have more interactive visuals in the web app, the team decided to make the app more interactive. The team won't be adding mini games as most of the response did not like the idea. Since the example exercises and notes got 65.2% and 69.6% respectively, the app will be given the adding example exercises and notes functionality. The Q&A section will also be added for the users to ask questions for their problems.

As a parents, would you like to keep track of what your children have learnt?

23 responses



**(Figure 6: Graph)**

The team also will implement the keep track system to let the students see what they have learned and at what progress they have reached as from the graph above most of the parents also want to know their children's progress.

## **3.2 Problem Statement**

The survey conducted with the team's experience as students, the team have discovered a lot of valuable information about current issues. The team is targeting the number of users in the range of primary school students. The problems faced can be classified according to users:

- Could not do arithmetic operations on fractions as they have to deal with two numbers at once (denominator,numerator)
- Less interactive visuals to represent fractions
- Confuse with HOTS question
- Different meaning of fractions such as ratio,operator,quotient,measure
- Problem with improper fraction
- Could not understand the concept of rational numbers

### **3.2.1 Teacher**

The responsibility of teacher is to let the students learn fractions using the effective way in a short term. Oftentimes online learning becomes a one-way communication with students to learn fractions. Through online teaching, teacher can make full use of the app to track students' learning progress and arrange the learning method that best suits each student.

### **3.2.2 Student**

Fraction learning has been a hot term among students to this. This application is about how students can learn it more systematically. In the survey, we realized that students face the above problems and don't know how to solve when learning fractions because no one to ask questions, do not have enough mathematical concepts and no interest when learning fractions.

In this case, the team can solve these problems with the help of fraction learning web application. According to following ways:

- Step-by-step guide
- Keep track of your learning progress/history
- More interactive visual
- Mini games
- Example exercises
- Notes
- Q&A section

### **3.3 System Description**

The Fraction Learning System that the team proposed is a webapps. The system can be accessed by two types of user, Student and Teacher and the system administrator. All use must be logged in before they can access all the functions provided by the system according to their roles.

Teachers can create tutorials for the student to do. Besides, teachers can also remind students on important dates for example the date of exam by using schedule function. Moreover, teachers are able to upload the learning notes to the system.

On the other hand, students can do the tutorial created by their teacher. Students can also view the schedule and learning notes in the system.

Furthermore, teachers and students share some common functions. Both students and teachers can ask questions or post comments on the question. This function is useful when they have some questions and the comment can be used to reply to the question. If the comment is useful, they can mark it as a solution so that others know it. They can also like or dislike the question or comment. Besides, they can also view and edit their profile, view the student list in the class, learning progress and the result of the tutorial.

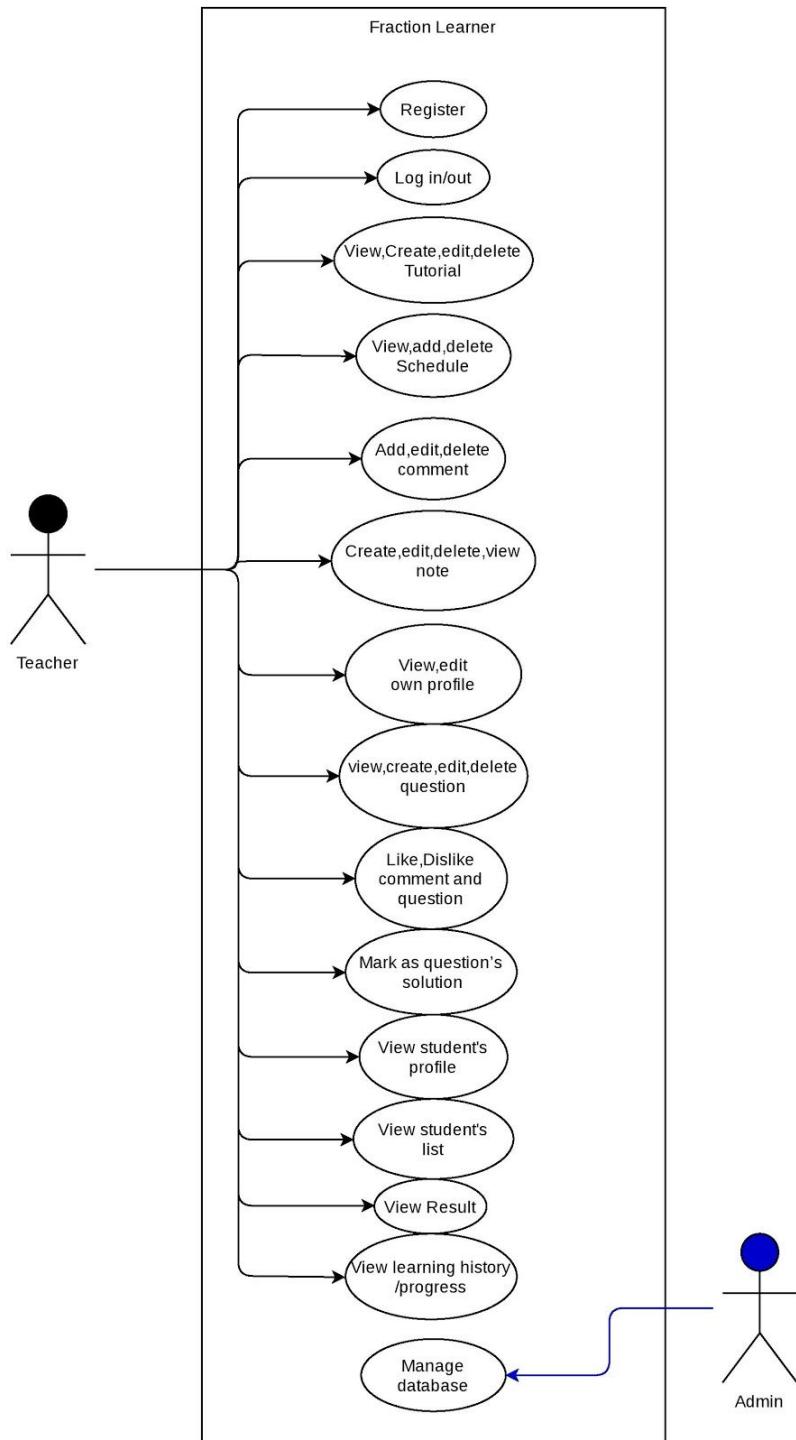
Last but not least, the system admin is able to manage the database of the system. This is useful to prevent the system error.

### **3.4 Actors**

There are 3 actors in the system : Student, Teacher and Admin. The explanation of the actor will be in the below section(Users).

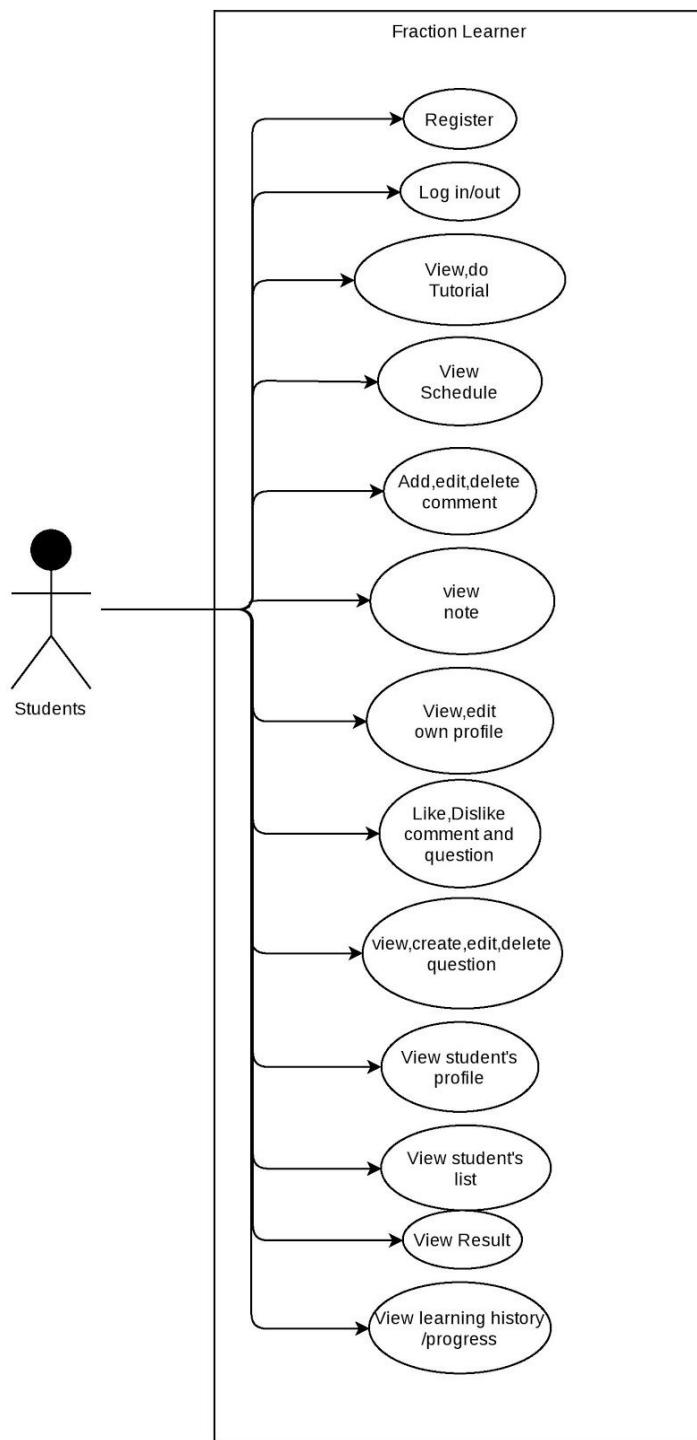
## 3.5 Use Case Diagram

### 3.5.1 Teacher and Admin



(Figure 7: Use case diagram for teacher and admin)

### 3.5.2 Student



(Figure 8: Use case diagram for Student)

## 3.6 Use Case Description

The section is to explain our use case diagram in a more detailed way. There are three actors in our use case diagram which are Student, Teacher and Admin. The actors have their special function in the system but they do share some common function as well. In order to have a clear view of what function belongs to which actor, the team separates them into a few categories in the explanation below. Since there are some functions that share commonly, the team put them under the “All User” to reduce redundancy.

### 3.6.1 All User(Student and Teacher)

#### Name: **Login via email address**

Description: All User login application with the valid email address and password

Preconditions: All User must give the valid email address and completed preference settings

Postconditions: All User will be granted access to the application.

Basic course of action:

1. The use case begins when the user request to the login page
2. The system prompts login detail field to users to login with the valid email address and password
3. The users input login details and verify the authentication details with the system with the valid email address [Alt course A: User enters invalid email address or password]
4. The system displays the homepage.
5. The use case ends when the user has been redirected to the main interface.

Alternate Course A: Student enters invalid email address or password

1. Application continues to prompt until valid email address or password is given
2. Basic course of action continues at step 4 if the user can be authenticated. Else, the use case ends

#### Name: **Logout**

Description: All user logout the application

Preconditions: All user must be logged in and request to logout

Postconditions: All user will be logout and redirect to the menu interface

Basic course of action:

1. The use case begins when the user request to logout the application
2. The system prompts the user to logout
3. The system redirect to the menu interface
4. The use case end when the user has been redirected to the menu interface

**Name: View/Create/Edit/Delete Questions**

Description: All user can view/Create/Edit and Delete question

Preconditions: The user must be logged in to manage the question however they can only edit and delete questions which are asked by themselves.

Postconditions: The question will be displayed to everyone if a new comment is created or edited. The question will no longer exist if it is deleted. Viewing the question will just simply display all the questions in an orderly manner.

Basic course of action:

1. The use case begins when the user is logged in.
2. The systems fetches all the available tutorials from database
3. The user clicked on one of the tutorials.
4. Details of the tutorial and questions asked by the other users is fetch from the database and displayed.
5. The user clicks “ask a question” button, the system then redirects the user to the question page .
6. The user inputs the question details and clicks the “save” button.
7. The input of the users is saved to the database and the system is refreshed to display the question.
8. The user edits the question by clicking the “edit” button. Once the button is clicked, the system will redirect the user to a page to edit the question.
9. The user made the necessary changes and clicked the “save” button.
10. The changes made by the user are then saved to the database and the system is refreshed to display the updated question.
11. The user deletes the question by clicking the “delete” button. The system redirects the user to a page to ask for confirmation to delete the question.
12. The user clicked the “Yes” button.
13. The system removes the comment of the user from the database.
14. The use case ends when the user decides to leave the question page.

**Name: View/Create/Edit/Delete Comment**

Description: All users can view, create, edit, delete comment

Preconditions: The user must be logged in to manage the comments however they can only edit and delete comments which are commented by themselves.

Postconditions: The comments will be displayed to everyone if a new comment is created or edited. The comments will no longer exist if it is deleted. Viewing the comments will just simply display the comments in an orderly manner.

Basic course of action:

1. The use case begins when the user is logged in.
2. The systems fetches all the available tutorials from database
3. The user clicked on one of the tutorials.
4. Details of the tutorial and questions asked by the other users is fetch from the database and displayed.
5. The user clicked on one of the questions asked by the other user.
6. All of the comments of the questions are fetched from the database by the systems.
7. The user created a comment by inputting the desired comment and clicked the “comment” button .

8. The input of the users is saved to the database and the system is refreshed to display the comment.
9. The user edits the comment by clicking the “edit” button. Once the button is clicked, the system will redirect the user to a page to edit the comment.
10. The user made the necessary changes and clicked the “save” button.
11. The changes made by the user are then saved to the database and the system is refreshed to display the updated comments.
12. The user deletes the comment by clicking the “delete” button. The system redirects the user to a page to ask for confirmation to delete the comment.
13. The user clicked the “Yes” button.
14. The system removes the comment of the user from the database.
15. The use case ends when the user decides to leave the question page.

**Name: View student list**

Description: All users can view students' lists in the class.

Preconditions: All user must be logged in and can freely choose to update their personal information

Postconditions: All user will be able to view the students' list

Basic course of action:

1. The use case begins when the student selects to view the student list.
2. The system prompts the students to redirect to the StudentList View Page.
3. The StudentList View Page retrieves all student's lists from databases.
4. The use case ends when the users decide to leave the StudentList View Page.

**Name: View/Edit profile**

Description: All user can view and edit their own profile

Preconditions: All user must be logged in and can freely choose to update their personal information

Postconditions: All user will be able to view and edit their own profile

Basic course of action:

1. The use case begins when the students select to view their own profile.
2. The system prompts the students to redirect to the profile view page.
3. The profile retrieves all user data from databases.
4. The system will prompt and redirect to the profile edit page when the users select to edit profile.
5. The users can set their profile fields and update it.
6. These data will be stored in databases.
7. The use case ends when the users decide to leave the profile edit page.

**Name: View learning progress**

Description: All users can see their learning progress in the profile.

Preconditions: All user must be logged in and can freely choose to see their learning progress

Postconditions: All user will be able to view the learning progress

Basic course of action:

1. The use case begins when the user selects to view the Profile
2. The system prompts the users to redirect to Profile View Page.

- |   |
|---|
| <ol style="list-style-type: none"> <li>3. The Profile View Page retrieves all user data from the database.</li> <li>4. User selects to view learning progress.</li> <li>5. The use case ends when the users decide to leave the Profile View Page.</li> </ol> |
|---|

**Name: View result**

Description: All users can see the result of the tutorial.

Preconditions: All users must logged in and can freely to choose to see the result of the tutorial

Postconditions: All user will be able to view the result

Basic course of action:

1. The use case begins when the user selects to view the result.
2. The system prompts the users to redirect to the Result Page.
3. The Result Page retrieves all results from databases.
4. The use case ends when the users decide to leave the result page.

<p><b>Name: Like and dislike question or comment</b></p>
--

Description: All user can like and dislike all the comments and questions in the system

Preconditions: The user must be logged in to like the comments and questions in the system

Postconditions: The number of likes of the question or comment will increase by one if the user likes them. Once the question or comment is liked, the “like” button will change to dislike button. The user will be able to remove the like by clicking the “dislike” button.

Basic course of action:

1. The use case begins when the user is logged in.
2. The system fetches all the tutorials from the database and displays them on the mainpage.
3. The user clicked on one of the tutorials.
4. Details of the tutorial ,comments about the questions and questions asked by the other users is fetched from the database and displayed.
5. The user clicks the “like” button located on one of the questions.
6. The system receives the input and increments the number of likes of that question by 1 and changes the “like” button to “dislike” button. The system is then refreshed to display the “dislike” button properly.
7. The user clicks the “dislike” button located on the questions which was liked by the user.
8. The system receives the input and decreases the number of likes of that question by 1 and changes the “dislike” button to “like” button. The system is then refreshed to display the “like” button properly.
9. The user clicks the “like” button located on one of the comments.
10. The system receives the input and increments the number of likes of that comment by 1 and changes the “like” button to “dislike” button. The system is then refreshed to display the “dislike” button properly.
11. The user clicks the “dislike” button located on the comments which was liked by the user.
12. The system receives the input and decreases the number of likes of that comment by 1 and changes the “dislike” button to “like” button. The system is then refreshed to display the “like” button properly.

13. The use case ends when the user decides to leave the question page.

**Name: Mark comment as solution**

Description: All user can mark comment as solution

Preconditions: The user must logged in and can only select the comment as solution for the question that the user posted.

Postconditions: User able to choose comment as solution for the question that the user posted.

Basic course of action:

1. The use case begins when the user selects a comment as a solution in the Question View Page.
2. The system prompts the users to redirect to the confirmation page.
3. The user selects yes.
4. The solution is created and will be saved to the database.
5. The users will be redirected back to the Question View Page by the system and all information will be retrieved from the database.
6. The use case ends when the users decide to leave the Question View Page.

### 3.6.2 Student

**Name: Register via email address**

Description: Students register for the application and selects profile and fill name

Preconditions: The students must register with a valid email address

Postconditions: The students will be granted full access to the functionalities that are available for students of the application

Basic course of action:

1. The use case begins when the students request to the register page
2. The system displays register field for users to register via a valid email address
3. The students input register details and verifies the authentication details with the system with the valid email address [Alt course A: Students enter invalid email address or password]
4. The system receives the preference information and stores it in the database.
5. The system prompts the user everything is all set, and redirects to the login page.
6. The use case ends when the users have been redirected to the main interface.

Alternate Course A: Students enter invalid email address or password

1. Application continues to prompt until a valid email address or password is given.
2. Basic course of action continues at step 4 if the users can be authenticated. Else, the use case ends.

**Name: View/Do Tutorial**

Description: Students can do the tutorial that is set by the teacher and is able to view it after finishing the tutorial.

Preconditions: Students must log in and select the tutorial which tutorial that they want to do.

Postconditions: Students will be able to submit and view back the tutorials after it's done.

Basic course of action:

1. The use case begins when a student chooses to answer a tutorial.
2. The system prompts the users to select different kinds of tutorial.
3. The students choose to do a tutorial.
4. The system fetches tutorials from databases based on the students chosen and sends it to the students.
5. The students involved answer the general fraction of knowledge.
6. The system will compare the student's answer with the correct answer and save the result into database
7. The students view the tutorial that has been done from the general knowledge fraction.
8. The use case ends when the students decide to leave the tutorial section.

**Name: View schedule**

Description: Students can view the schedule that create by teacher

Preconditions: Students must logged in and follow up the time schedule to learn fraction effectively

Postconditions: Students will be able to view the schedule

Basic course of action:

1. The use case begins when the students select a view schedule.
2. The system prompts the students to redirect to the scheduled view page.
3. The view schedule stored in databases.
4. The use case ends when the students decide to leave the scheduled view page.

**Name: View notes**

Description: Students can view the notes that create by teacher

Preconditions: Students must logged in and can use the notes to learn fraction

Postconditions: Students will be able to view notes

Basic course of action:

1. The use case begins when the students select a view notes.
2. The system prompts the students to redirect to the notes view page.
3. The view notes stored in databases.
4. The use case ends when the students decide to leave the notes view page.

### 3.6.3 Teacher

Name: **View/Create/Edit/Delete tutorial**

Description: Teacher can view,create,edit or delete tutorial

Preconditions: Teacher must logged in to view,create,edit or delete different kind of tutorials for students

Postconditions: Teacher will be able to view,create,edit or delete different kind of tutorials for students

Basic course of action:

1. The use case begins when the teacher requests for a tutorial view page.
2. The system prompts the teacher to redirect to the tutorial view page.
3. The system retrieves tutorials from databases.
4. The teacher can request to create a tutorial and the system prompts the teacher to redirect to the tutorial create page.
5. The tutorial fields that are created are saved in the databases.
6. The teacher can edit tutorials for the students.
7. The system prompts the teacher to redirect to the tutorial edit page.
8. The system displays the edited tutorial and updates tutorial fields.
9. The tutorial fields that are edited are saved in the databases.
10. The teacher can delete the tutorial and the system prompts the teacher to redirect to the tutorial delete page.
11. The teacher makes a confirmation with the system and saves it to the databases.
12. The use case ends after the teacher finishes view,create,edit or delete tutorial.

Name: **View/Create/Delete schedule**

Description: Teacher can view,create or delete schedule

Preconditions: Teacher must logged in to view,create or delete the suitable and effective learning schedule for students

Postconditions: Teacher will be able to view,create or delete the schedule for students

Basic course of action:

1. The use case begins when the teacher requests for a schedule view page.
2. The system prompts the teacher to redirect to the schedule view page.
3. The system retrieves schedules from databases.
4. The teacher can request to create a schedule and the system prompts the teacher to redirect to the schedule create page.
5. The schedule fields that are created are saved in the databases.
6. The teacher can delete the schedule and the system prompts the teacher to redirect to the schedule delete page.
7. The teacher makes a confirmation with the system and saves it to the databases.
8. The use case ends after the teacher finishes viewing,creating,editing or deleting schedules.

Name: **View/Create/Edit/Delete notes**

Description: Teacher can view,create,edit or delete notes

Preconditions: Teacher must logged in to view,create,edit or delete different kind of notes for students

Postconditions: Teacher will be able to view,create,edit or delete different kind of notes for students

Basic course of action:

1. The use case begins when the teacher requests for a notes view page.
2. The system prompts the teacher to redirect to the notes view page.
3. The system retrieves notes from databases.
4. The teacher can request to create notes and the system prompts the teacher to redirect to the notes create page.
5. The notes fields that are created are saved in the databases.
6. The teacher can edit notes for the students.
7. The system prompts the teacher to redirect to the notes edit page.
8. The system displays the edited notes and updates notes fields.
9. The tutorial fields that are edited are saved in the databases.
10. The teacher can delete the notes and the system prompts the teacher to redirect to the notes delete page.
11. The teacher makes a confirmation with the system and saves it to the databases.
12. The use case ends after the teacher finishes viewing,creating,editing or deleting notes.

### 3.6.4 Admin

Name: **Manage database**

Description: The admin can observe and manage the system generated user report and update databases from the admin panel

Preconditions: The admin must have login credentials of the admin to the system

Postconditions: The admin is granted access to the admin system.

Basic course of action:

1. The use case begins when the admin requests the login page.
2. The system displays a login field for admin to login via a valid email address and password.
3. The admin input login details and verifies the authentication details with the system with the valid email address [Alt course A: Admin enter invalid email address or password]
4. The system receives the preference information and stores it in the database.
5. The system prompts the admin everything is all set, and redirects to the login page.
6. The admin can manage the user interface for all users.
7. The use case ends when the admin exits the interface.

Alternate Course A: Admin enter invalid email address or password

1. Application continues to prompt until a valid email address or password is given.
2. Basic course of action continues at step 3 if the users can be authenticated. Else, the use case ends.

# **4.0 Basic requirements**

## **4.1 Users**

The team identified that the application will consist of three parties which includes students, teachers and admins. Listed below are the users, their descriptions and responsibilities. There are 25 users in total, 22 of them are students, 2 of them are teachers and the last one is admin.

### **4.1.1 Student**

#### **1. Descriptions**

They are the ones that are learning fractions. The survey reveals that they do not have enough understanding of what they have learnt and they want to have someone who can explain their questions.

#### **2. Responsibilities in the software**

The students can view the notes sent by the teachers and answer the tutorial questions in their free time. They can post questions in the Q&A section to receive feedback from other users. They should also keep a check on the schedule so that they finish their work before the due date ends.

### **4.1.2 Teacher**

#### **1. Descriptions**

They are the ones who will be testing the students on their understanding of fractions and give them guidelines. One of the main users of the web application. They have more authorities than students.

#### **2. Responsibilities in the software**

The teachers can distribute notes and tutorials for students. They need to plan a schedule for the students so that they know when to hand in their work. They should also answer the questions asked by the students in the Q&A section to help them with their problems.

### **4.1.3 Admin**

#### **1. Descriptions**

They have the highest authorities in the system. They are the ones who are supervising to detect any potential errors. They will try to prevent any bugs or abuse of the system. They also will be detecting and banning any potential abusers.

#### **2. Responsibilities in the software**

They have been granted privileged access to the system and database. They can view a system-generated report to detect any abnormalities. They also have been given the power to

ban any users from using the system. They will keep in touch with the developers when there are any problems in the system that needs to be fixed.

## 4.2 Users Scenario

The scenarios will illustrate real-world examples of users interacting with the proposed system. Scenarios are not meant to document every use case probability but to help model the use case diagrams by viewing from the user's perspective.

### 4.2.1 All users(Students and Teachers)

Scenario: A successful attempt to login into the application

1. Jane opens the web application.
2. The application prompts Jane to login via the username
3. Jane enters the correct username and password.
4. Jane is able to access the application.

Scenario: A failed attempt to login into the application

1. Jane opens the web application.
2. The application prompts Jane to login via the username
3. Jane enters the wrong username/password and clicks submit.
4. Jane is unable to access the application.

Scenario: A successful attempt to log out of the application

1. Jane has finished using the application and wants to close it.
2. Jane clicks on the logout button and the application shows a message to notify Jane that she had logged out of the application.
3. The application now redirects to the homepage and waits for the next user to register or login.

Scenario: A successful attempt to create a question

1. Jane wants to ask a question while doing her tutorial.
2. Jane clicks on the "ask a question" button.
3. The application redirects Jane to type her question in the textbox.
4. Jane finished typing her question and now waits for users to answer it.
5. The question is now visible for every user.

Scenario: A successful attempt to edit self's question

1. Jane realized that she has a typo on the question that she asked.
2. Jane clicks on the "edit question" button.
3. The application redirects Jane to retype her question.
4. The question is now edited.

Scenario: A successful attempt to delete self's question

1. Jane has already gotten the answer to her question and she wants to delete her question.
2. Jane now clicks on the "delete question" button.
3. The application will ask again whether Jane wants to delete the question for confirmation.
4. The question is now deleted and it doesn't exist in the system anymore.

Scenario: A successful attempt to view other people's question and comments

1. Jane is curious about other people's questions about fraction and wants to know what other people have said about this question.
2. Jane browses through the question section and clicks on the question that interests her.
3. The question and the comments are now displayed on the screen.

Scenario: A successful attempt to comment on questions

1. Jane wants to comment on questions to give other people more information.
2. Jane clicks on the "leave a comment" button.
3. Jane types in the comments in the textbox.
4. Jane's comment is now visible under the question.

Scenario: A successful attempt to comment on another comment

1. Jane found that one of the comments interests her and decided to comment about it.
2. Jane clicks on the "reply" button under the comment.
3. Jane types in the comment in the textbox.
4. Jane's comment is now visible under the comment of the question.

Scenario: A successful attempt to edit self's comment

1. Jane realized that she has a typo on the comments she types.
2. Jane clicks on the "edit comment" button.
3. The application redirects Jane to retype her comment.
4. The comment is now edited.

Scenario: A successful attempt to delete self's comment

1. Jane wants to delete her comment under a question.
2. Jane now clicks on the "delete" button around the comment.
3. The application will ask again whether Jane wants to delete the comment for confirmation and she clicks ok.
4. The comment is now deleted and it doesn't exist in the system anymore.

Scenario: A successful attempt to like a comment/question

1. Jane thinks that the question/comment she saw is good and wants to agree with it.
2. Jane clicks on the "like" button under the comment/question.
3. The likes in the comment/question are now added by 1.

Scenario: A successful attempt to dislike a comment/question

1. Jane finds out that she accidentally clicked on the “like” button and wants to remove it.
2. Jane clicks on the “dislike” button to undo the action.
3. Jane’s account now does not give a like on the comment/question.

Scenario: A successful attempt to mark comment as solution

1. Jane finds one of the comments in the question is very meaningful and solved the problem in the question and would like other people to see it first.
2. Jane clicks on the “mark as solution” button.
3. The comment with the highest “mark as solution” count is now on the top of other comments.

Scenario: A successful attempt to view the student list

1. Jane wants to know how many students are there and who are in the same class as her.
2. Jane clicks on the “student list” button on the main page.
3. The system now redirects Jane to the student list page.
4. Jane is now able to see who is in the class.

Scenario: A successful attempt to edit self’s profile

1. Jane wants to add/change the profile of her account.
2. Jane clicks on her profile on the top right of her screen.
3. The system redirects Jane to the profile screen.
4. Jane then uploads a new profile.
5. The profile is now changed and updated in the system.

Scenario: A successful attempt to view learning progress

1. Jane wants to view what she had learnt.
2. Jane clicks on the “learning progress” button.
3. The system redirects Jane to see the topics she had studied.
4. The learning progress is shown on the screen.

Scenario: A successful attempt to view result

1. Jane wants to see the results she gets
2. Jane clicks on the “result” button.
3. The system redirects Jane to the screen with the results.
4. Jane now knows the results that she gets.

## 4.2.2 Students

Scenario: A successful attempt to register an account

1. Joe opens the web application.
2. The application prompts Joe to fill in the username, email address and password for the account.
3. The application checks whether the email address and username is used by other users.
4. The validation is complete and the account is ready to use.
5. The system shows that Joe is now able to login into the account created and asks Joe to set up his profile when he logins into the web application.

Scenario: A successful attempt to view the note

1. Joe wants to learn more about fractions
2. Joe clicks on the notes sent by his teacher.
3. The application redirects Joe to the content of the notes.
4. Joe is able to learn more about fractions through the notes.

Scenario: A successful attempt to view the tutorial

1. Joe wants to view the tutorial sent by his teacher.
2. Joe clicks on the tutorial he wants to see.
3. The system redirects Joe to the tutorial.
4. The tutorial is now visible to Joe.

Scenario: A successful attempt to submit the tutorial

1. Joe has done all the questions in the tutorial.
2. Joe clicks on the “submit” button.
3. The answer that Joe has done is now sent to the teacher.
4. The screen show “Thank you for finishing this tutorial”

Scenario: A successful attempt to view the schedule

1. Joe wants to check whether there is work that needs to be done.
2. Joe clicks on the “View Schedule” button.
3. The system redirects Joe to the schedule that is set by the teacher.
4. Joe is now able to see the schedule.

### **4.2.3 Teachers**

Scenario: A successful attempt to create a tutorial

1. John wants to send the tutorial exercise for his students.
2. John clicks on the create “tutorial” button.
3. The system prompts John to upload his tutorial file.
4. John uploaded the tutorial and pressed the “submit” button.
5. The tutorial is now sent to the students and is waiting to be completed.

Scenario: A successful attempt to view tutorial sent

1. John wants to view the tutorial that he sent to the students.
2. John clicks on the tutorial that he wants to view.
3. The system redirects John to the content of the tutorial.
4. John is now able to view the tutorial.

Scenario: A successful attempt to edit the tutorial

1. John realised that the wrong file in the tutorial.
2. John clicks on the tutorial he sent.
3. The system redirects John to the content of the tutorial.
4. John clicks on the “edit” button.
5. John uploaded the correct file for the tutorial and clicked the “submit” button.
6. The content of this tutorial is now updated in the system.

Scenario: A successful attempt to delete a tutorial

1. John realised that two of the tutorials are the same.
2. John clicks on one of the tutorials.
3. The system redirects John to the content of the tutorial.
4. John clicks on the “delete” button.
5. The system prompts John to confirm whether or not he wants to delete this tutorial.
6. The tutorial is now deleted from the system.

Scenario: A successful attempt to create a schedule

1. John wants to create a schedule for the students so that they know when is the due date for the exercises and topics.
2. John clicks on the “schedule” button.
3. The system redirects John to the schedule view page.
4. John clicks on the edit “schedule” button.
5. The system prompts him to insert content in the schedule.
6. The schedule is now updated and is visible by other people.

Scenario: A successful attempt to view the schedule

1. John wants to view the schedule he set.
2. John clicks the “schedule” button.
3. The system redirects John to the schedule view page.
4. John is now able to view the content of the schedule.

Scenario: A successful attempt to delete an content in the schedule

1. John wants to change the content in the schedule he set.
2. John clicks the “schedule” button.
3. The system redirects John to the schedule view page.
4. John clicks the “delete schedule” button.
5. The system prompts John to choose the contents that he wants to delete.
6. John chooses the content that he wants to delete.
7. The system prompts for confirmation to make sure John wants to delete the content.
8. The contents are removed from the schedule and the schedule is updated in the system.

#### **4.2.4 Admins**

Scenario: A successful attempt to login into the application

1. Jack opens the web application.
2. The application prompts Jack to login via the username
3. Jack enters the correct username and password.
4. Jack is redirected to the admin manage screen.

Scenario: A failed attempt to login into the application

1. Jack opens the web application.
2. Jack application prompts Joe to login via the username
3. Jack enters the wrong username/password and clicks submit.
4. Jack is unable to access the application.

Scenario: A successful attempt to ban a user from the system

1. Jack found out that one of the users is creating problems in the application.
2. Jack accesses the database and bans that user's account.
3. The user cannot access the application anymore.

Scenario: A successful attempt to edit information in the system

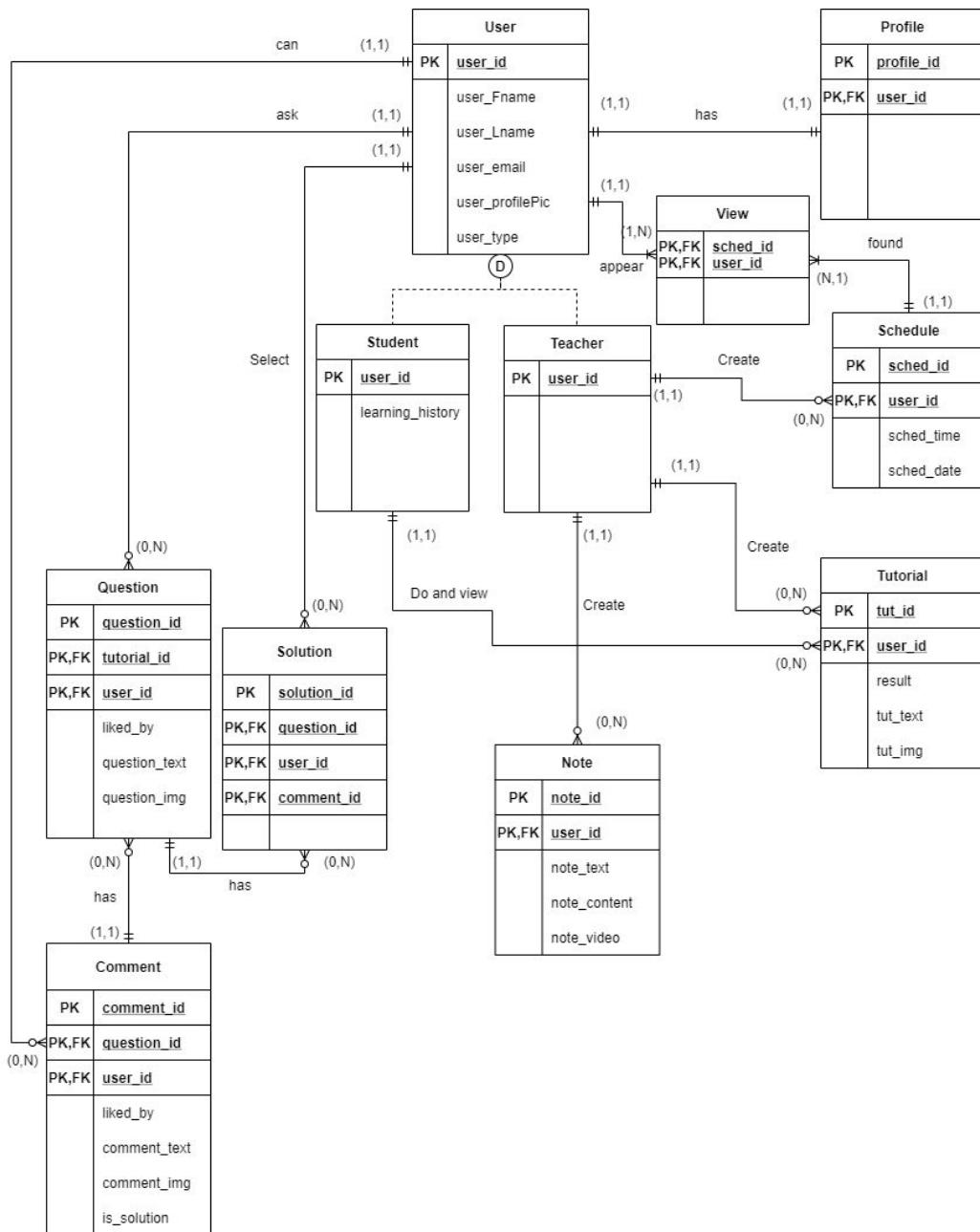
1. Jack wants to edit some information in the system request by the users.
2. Jack accesses the database and edits the information.

The information is updated in the system.

# 5.0 Specific Requirements

## 5.1 Entity-Relationship-Diagram(ERD)

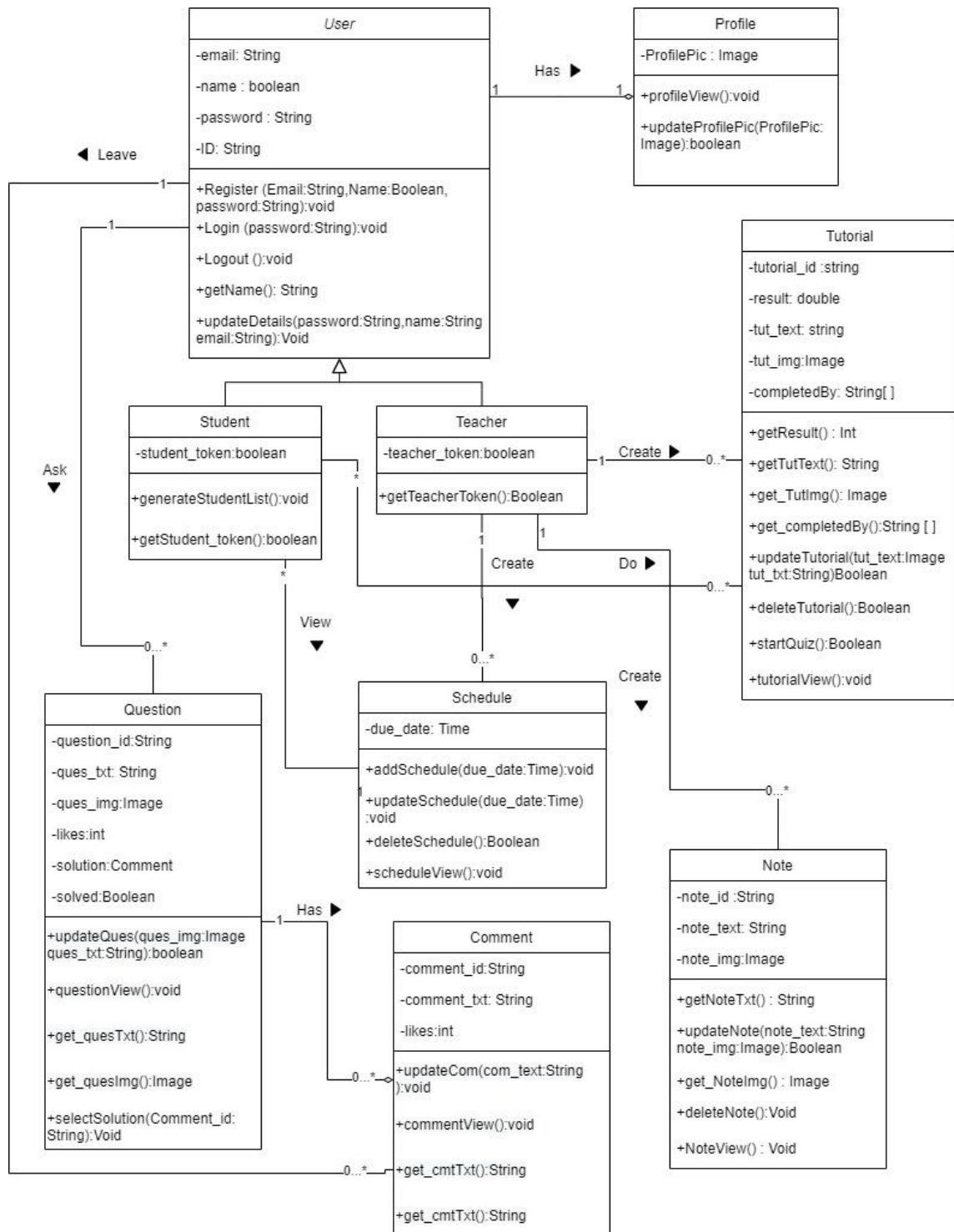
There are many types of ERD can be drawn. The team decided to use the Crow Foot Notation in drawing the ERD.



(Figure 9: ERD)

## 5.2 Class Diagram

Beside ERD, the team also provides the class diagram for showing the system's classes, attributes, methods and the relationship between the objects.

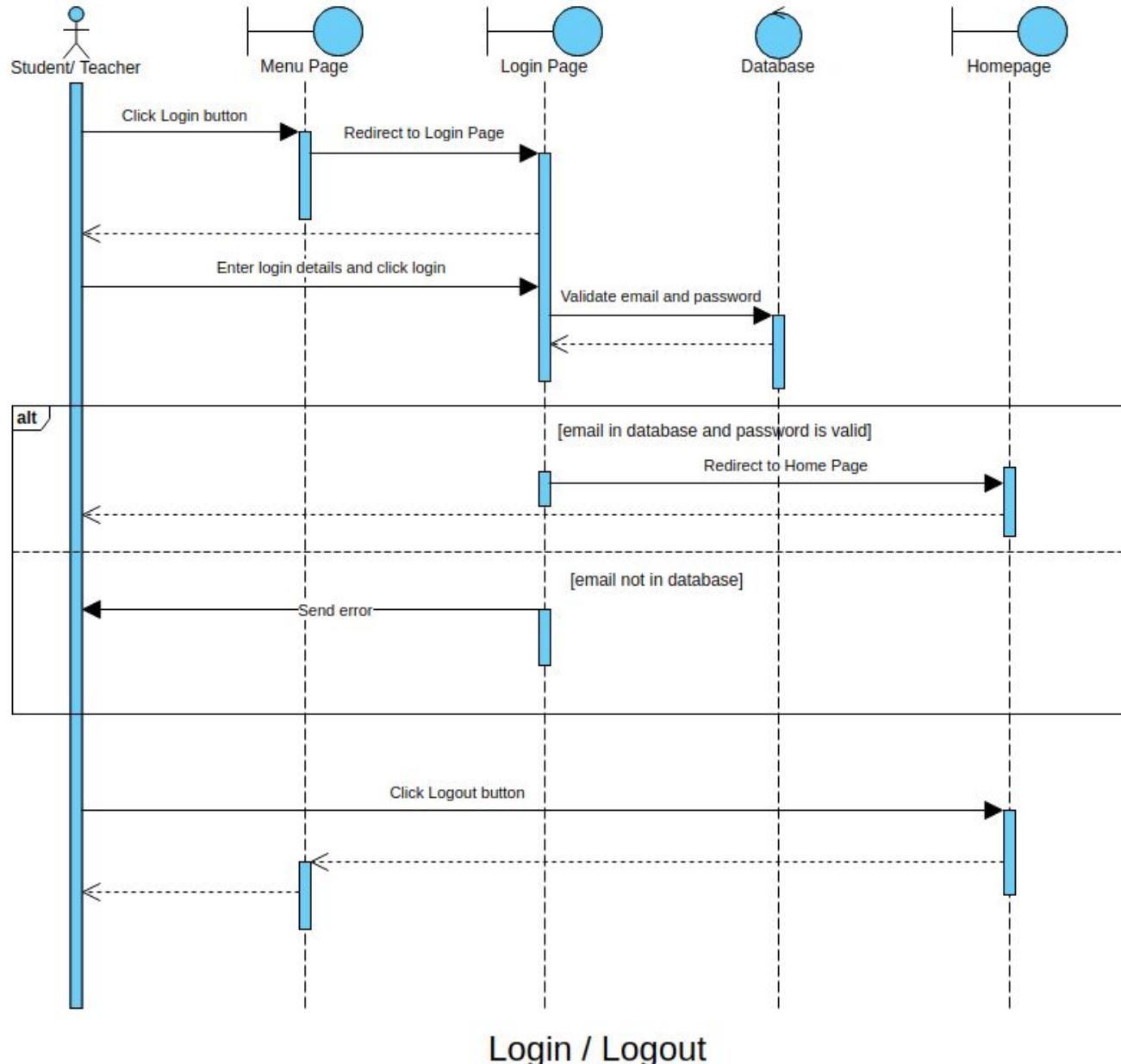


(Figure 10: Class Diagram)

## 5.3 Sequence Diagram

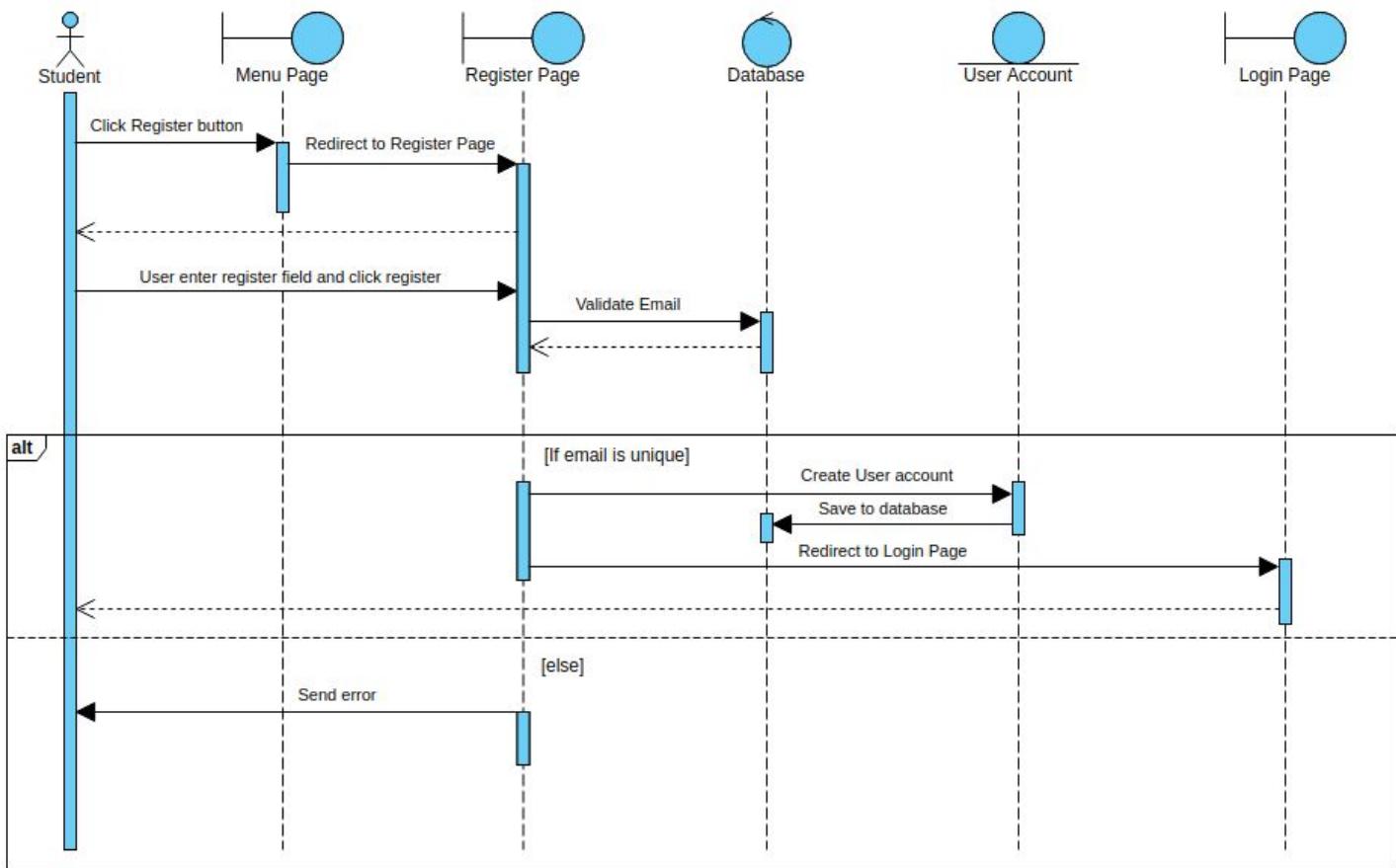
The sequence diagram shows object interaction followed by the time sequence.

### 5.3.1 Login/Logout



(Figure 11: Login/ Logout)

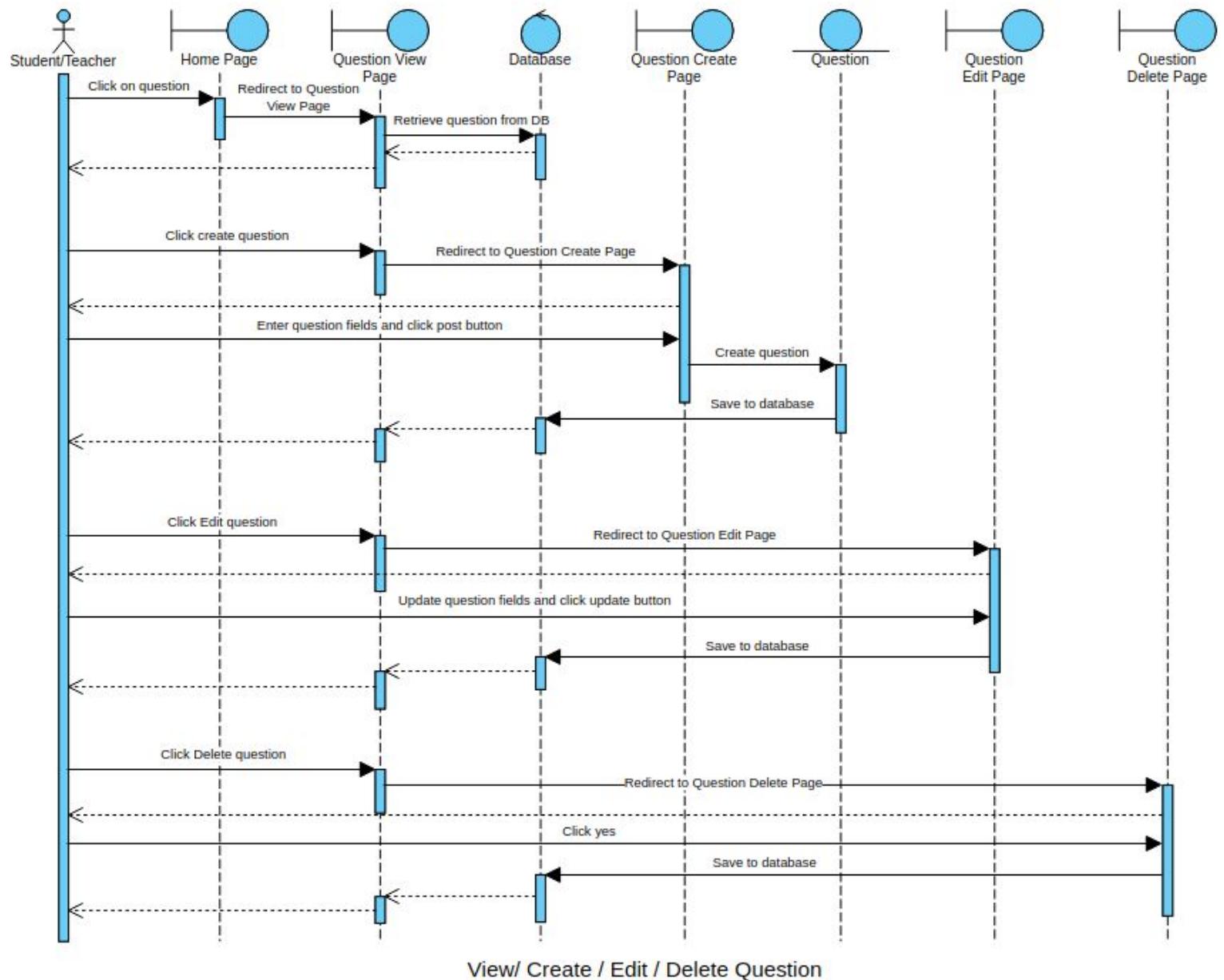
### 5.3.2 Registration



Registration

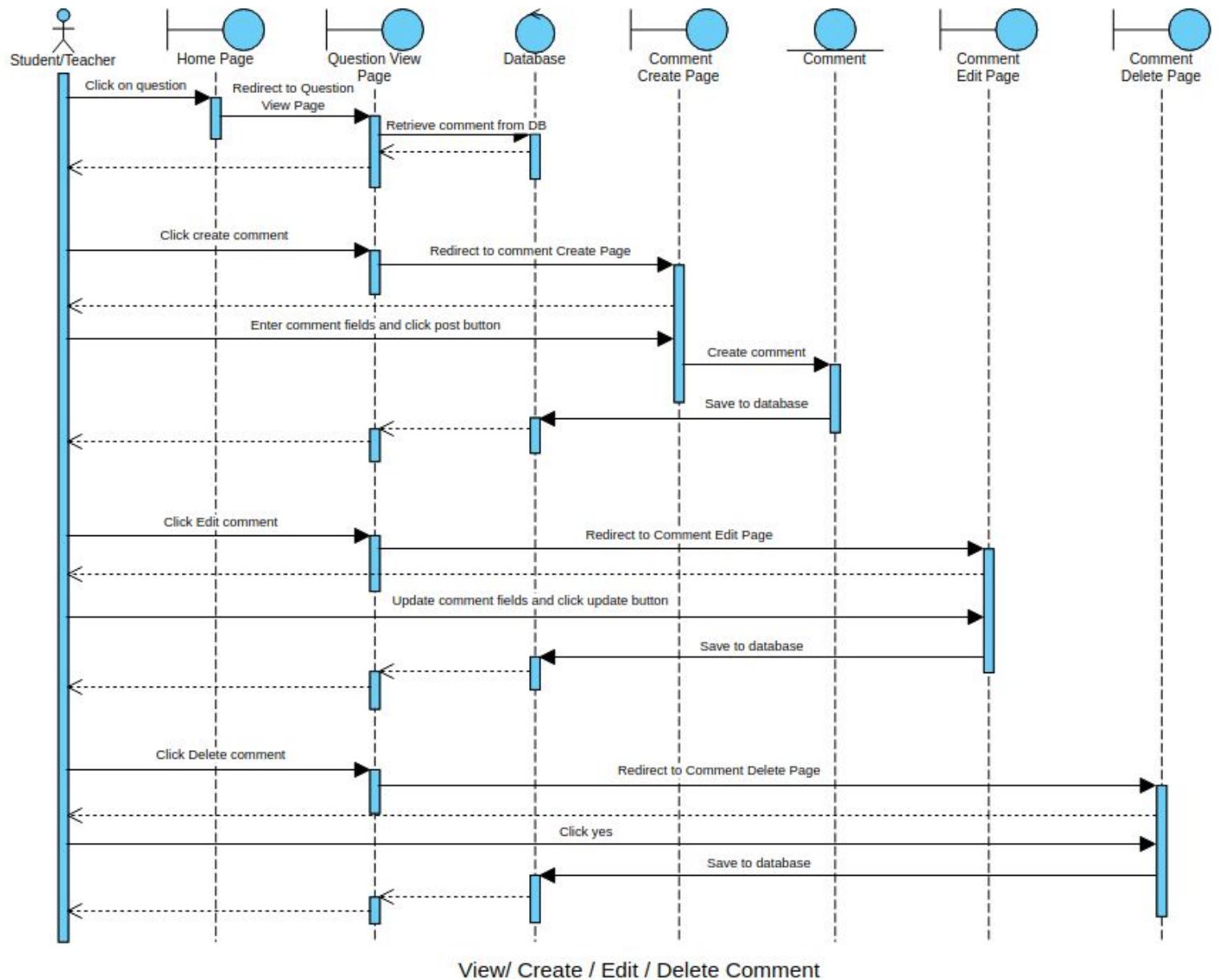
(Figure 12: Registration)

### 5.3.3 View / Create / Edit and Delete Question



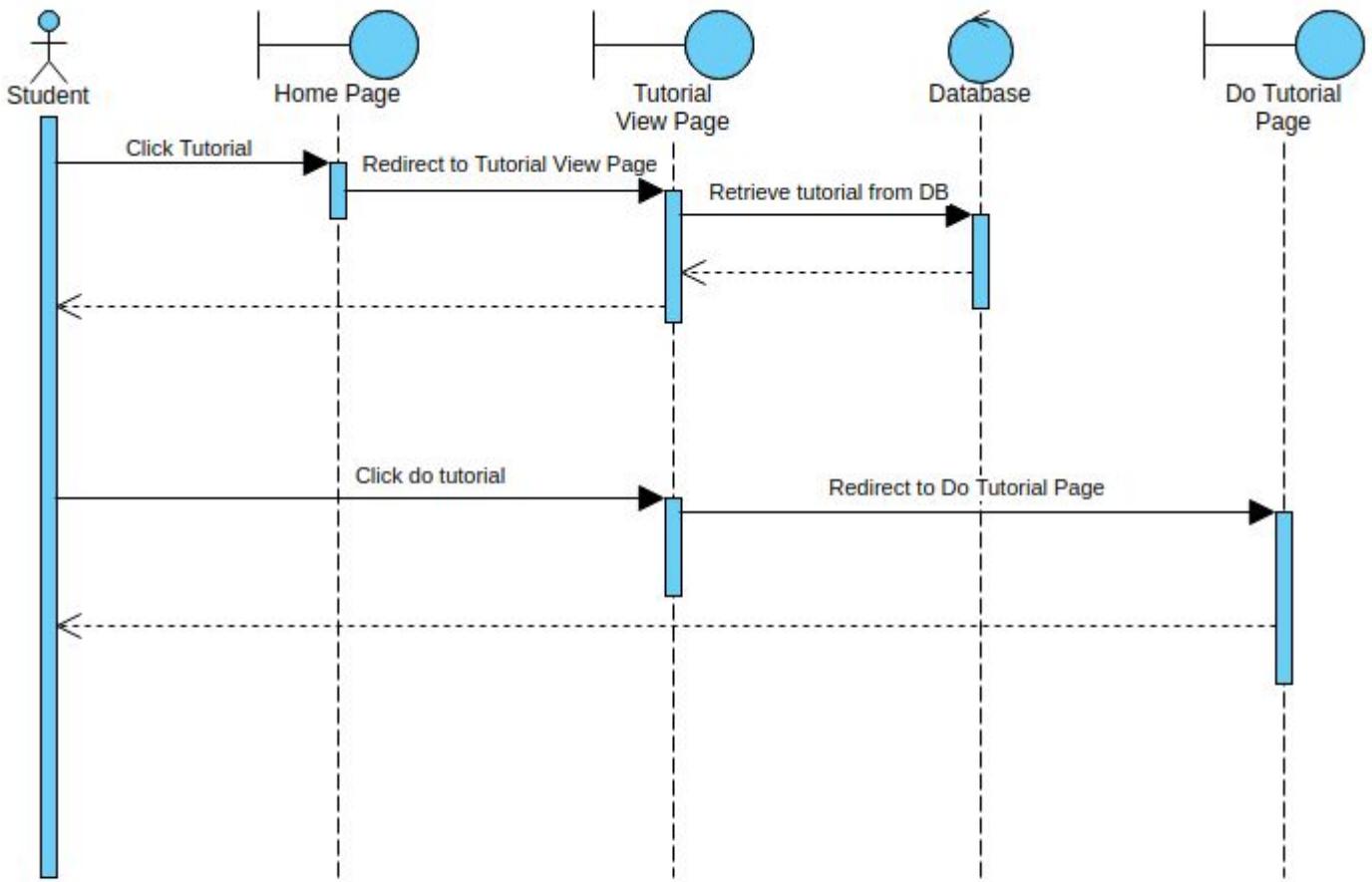
(Figure 13: View / Create / Edit and Delete Question)

### 5.3.4 View / Create / Edit and Delete Comment



(Figure 14: View/ Create/ Edit/ Delete comment)

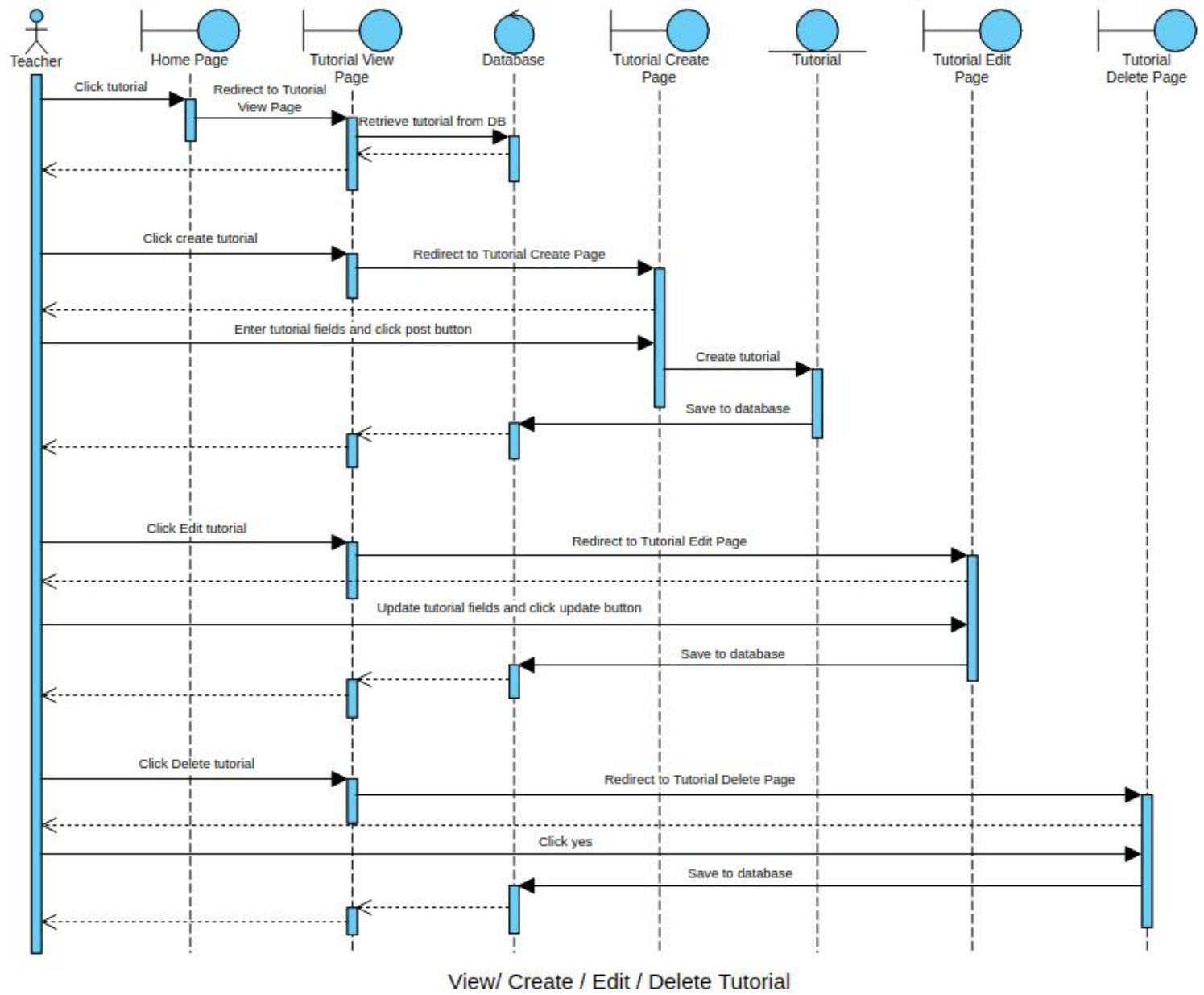
### 5.3.5 View and Do Tutorial



View/ Do Tutorial

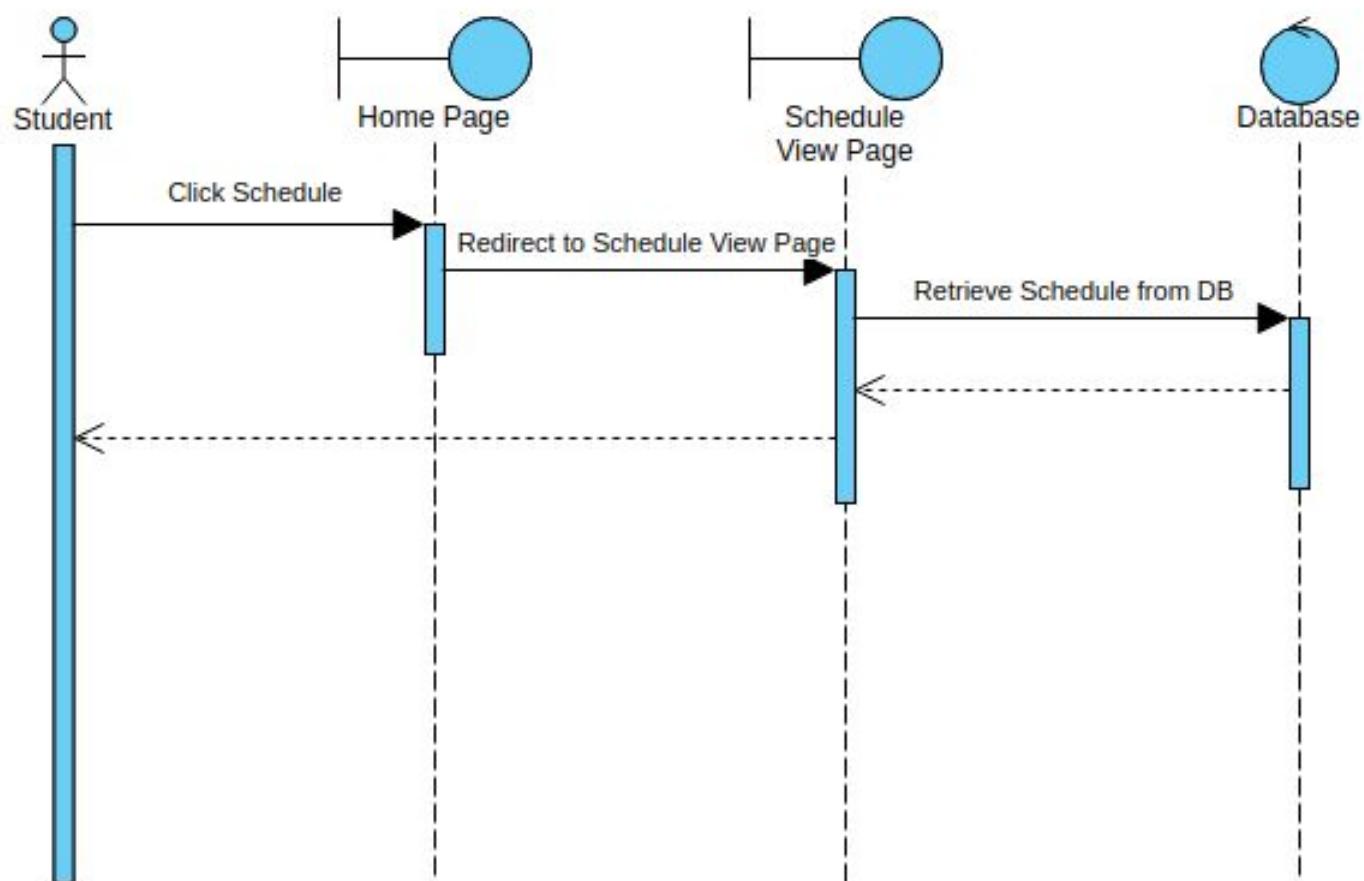
(Figure 15: View/ Do tutorial)

### 5.3.6 View / Create / Edit and Delete Tutorial



(Figure 16: View/ Create/ Edit/ Delete tutorial)

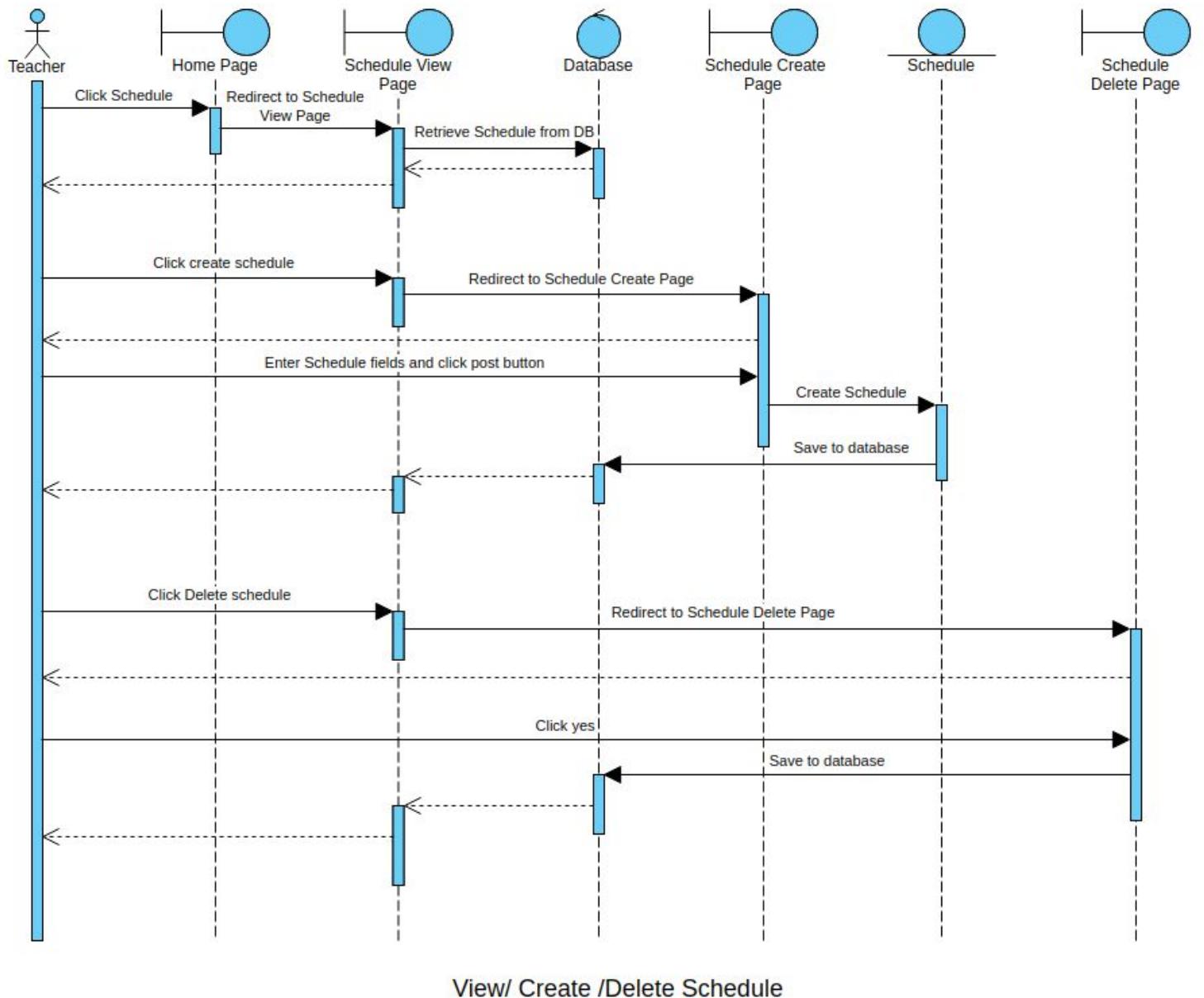
### 5.3.7 View Schedule



**View Schedule**

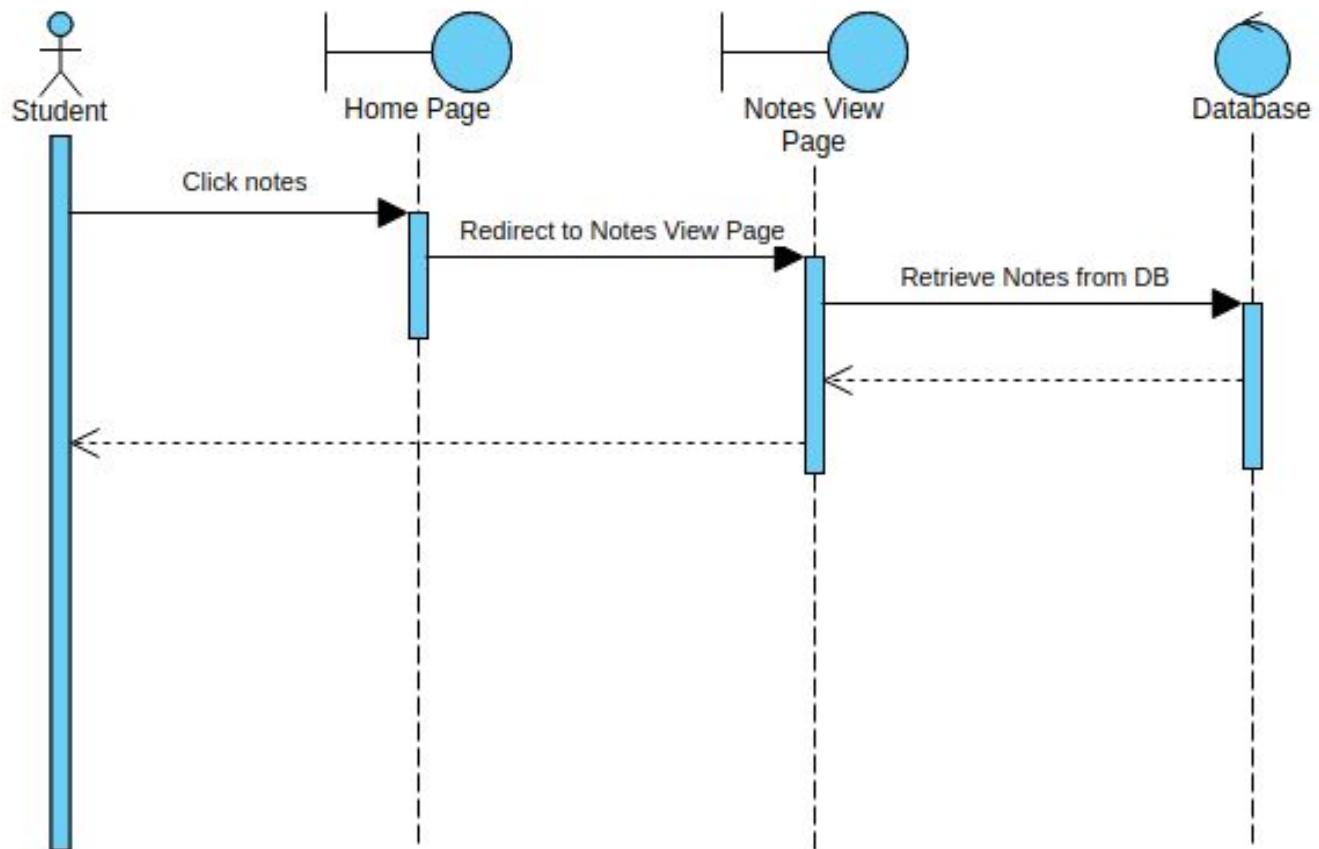
(Figure 17: View Schedule)

### 5.3.8 View / Create and Delete Schedule



(Figure 18: View/ Create/ Delete Schedule)

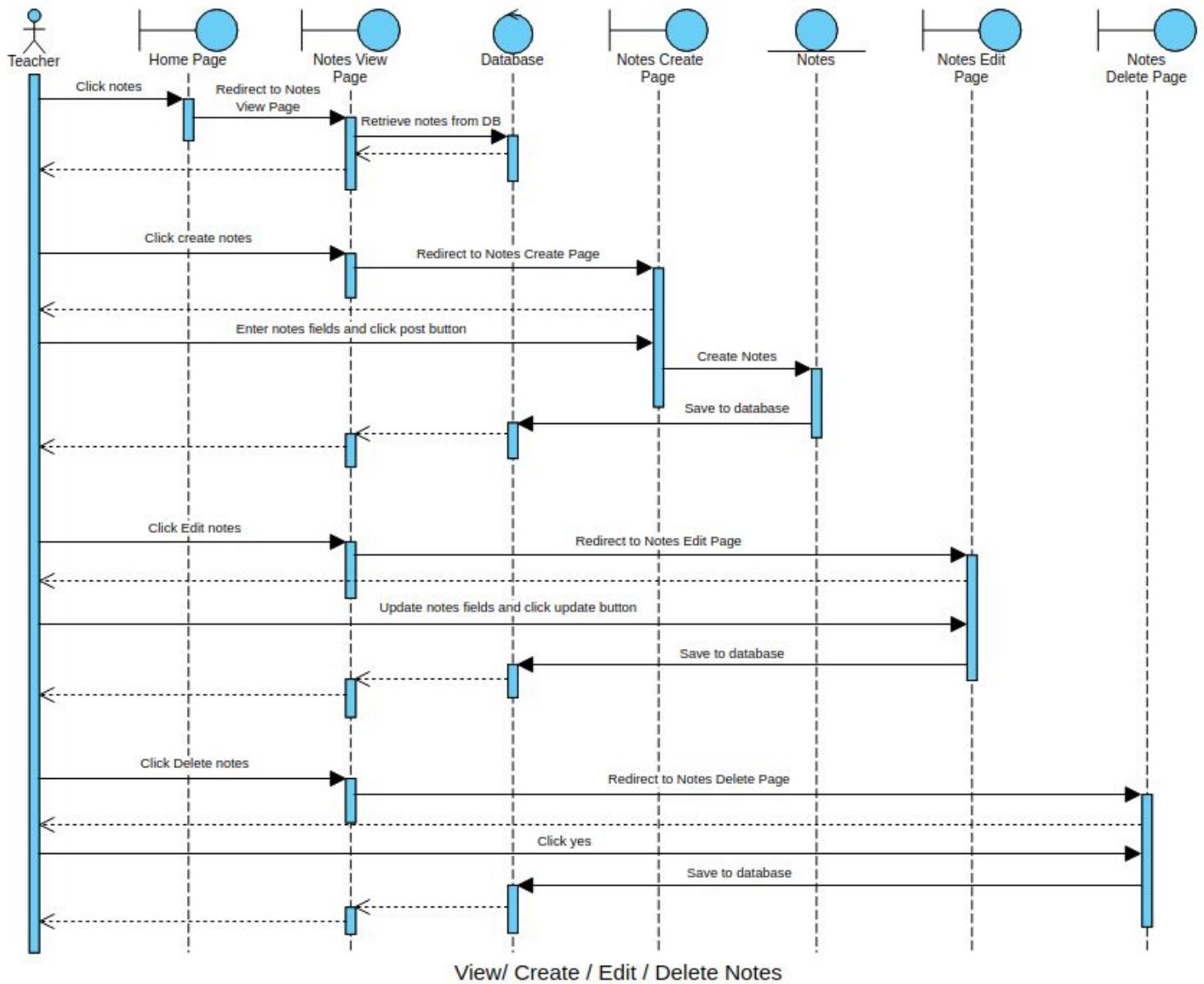
### 5.3.9 View Notes



View Notes

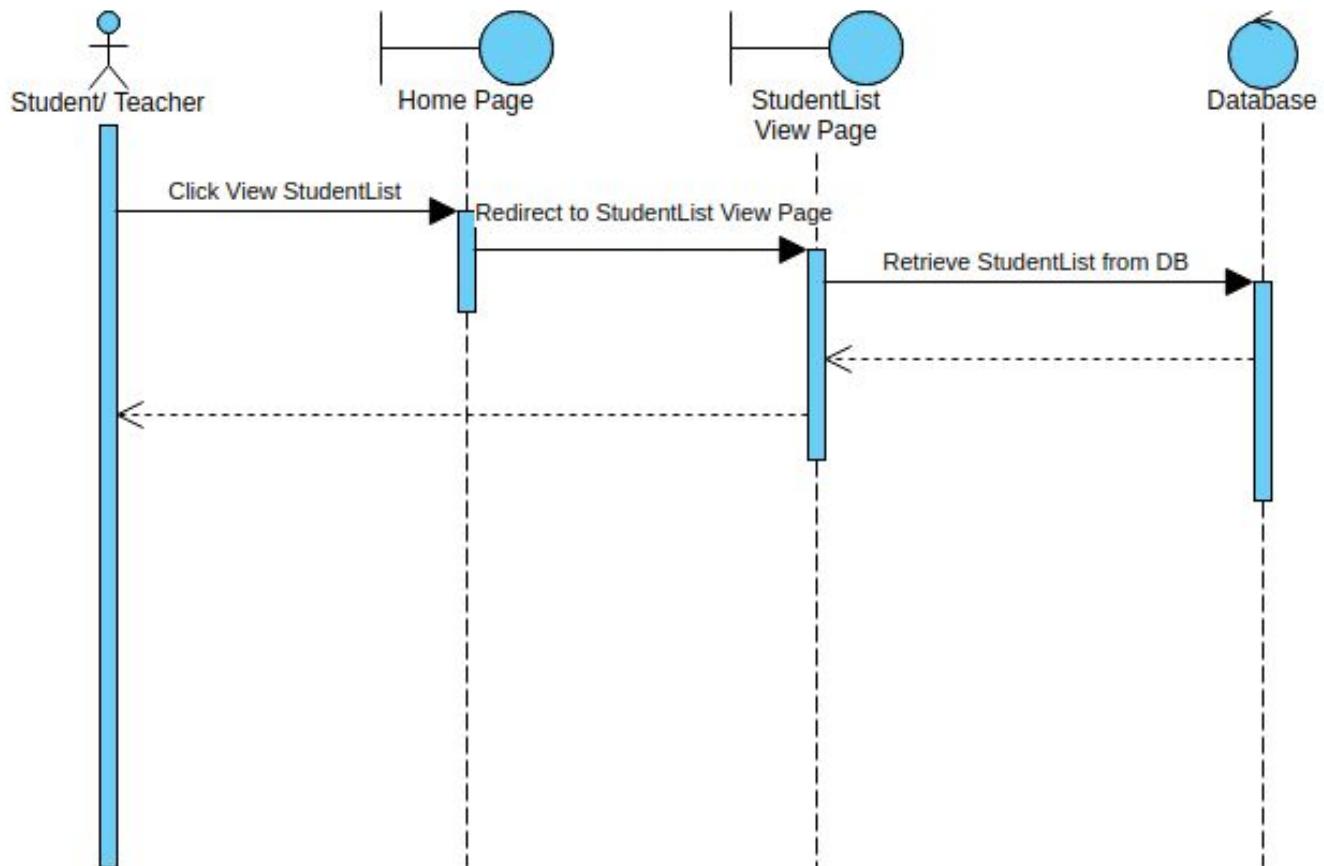
(Figure 19: View notes)

### 5.3.10 View / Create / Edit and Delete Notes



(Figure 20:View/ Create/ Edit/ Delete notes)

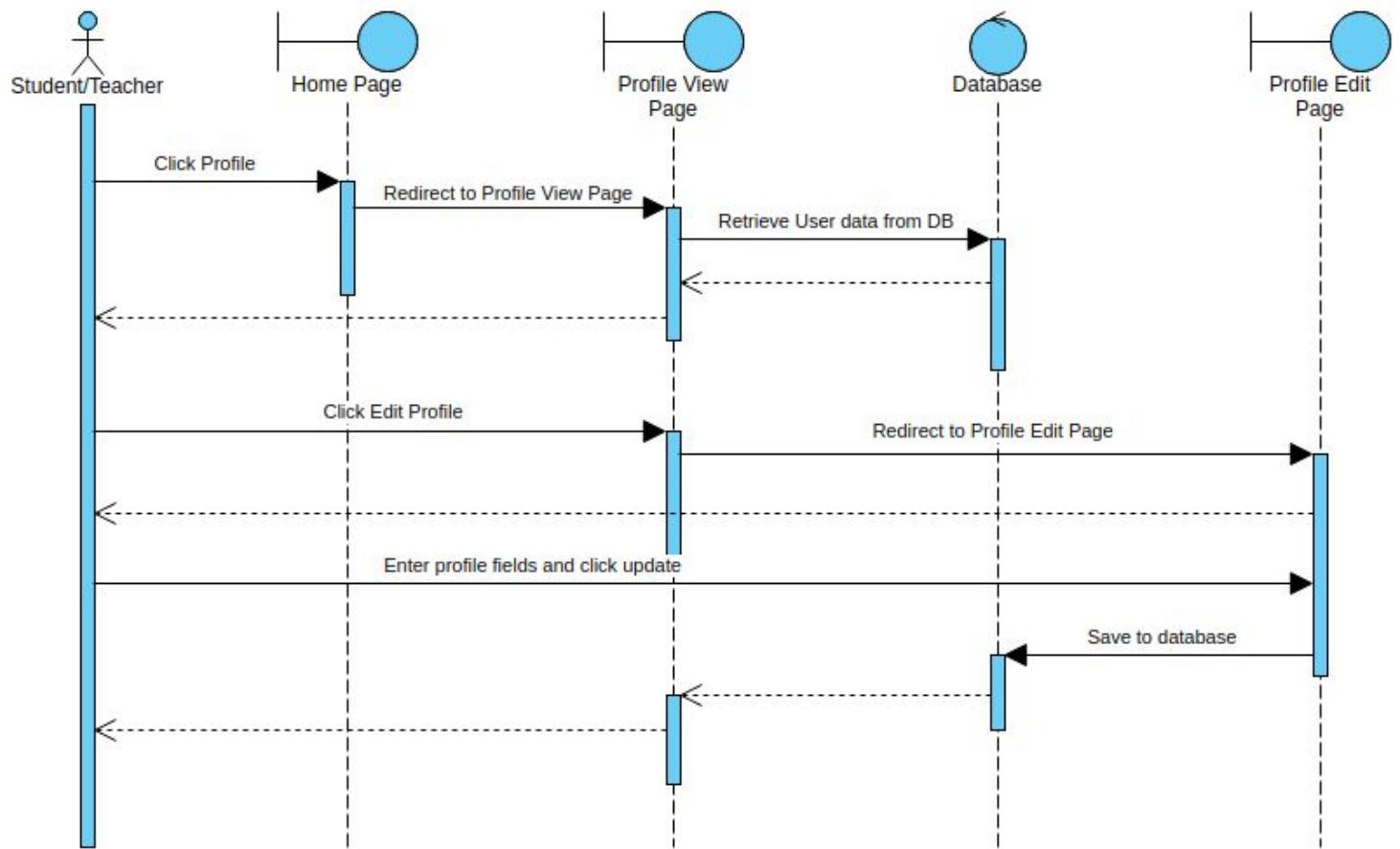
### 5.3.11 View Student List



View StudentList

(Figure 21: View student list)

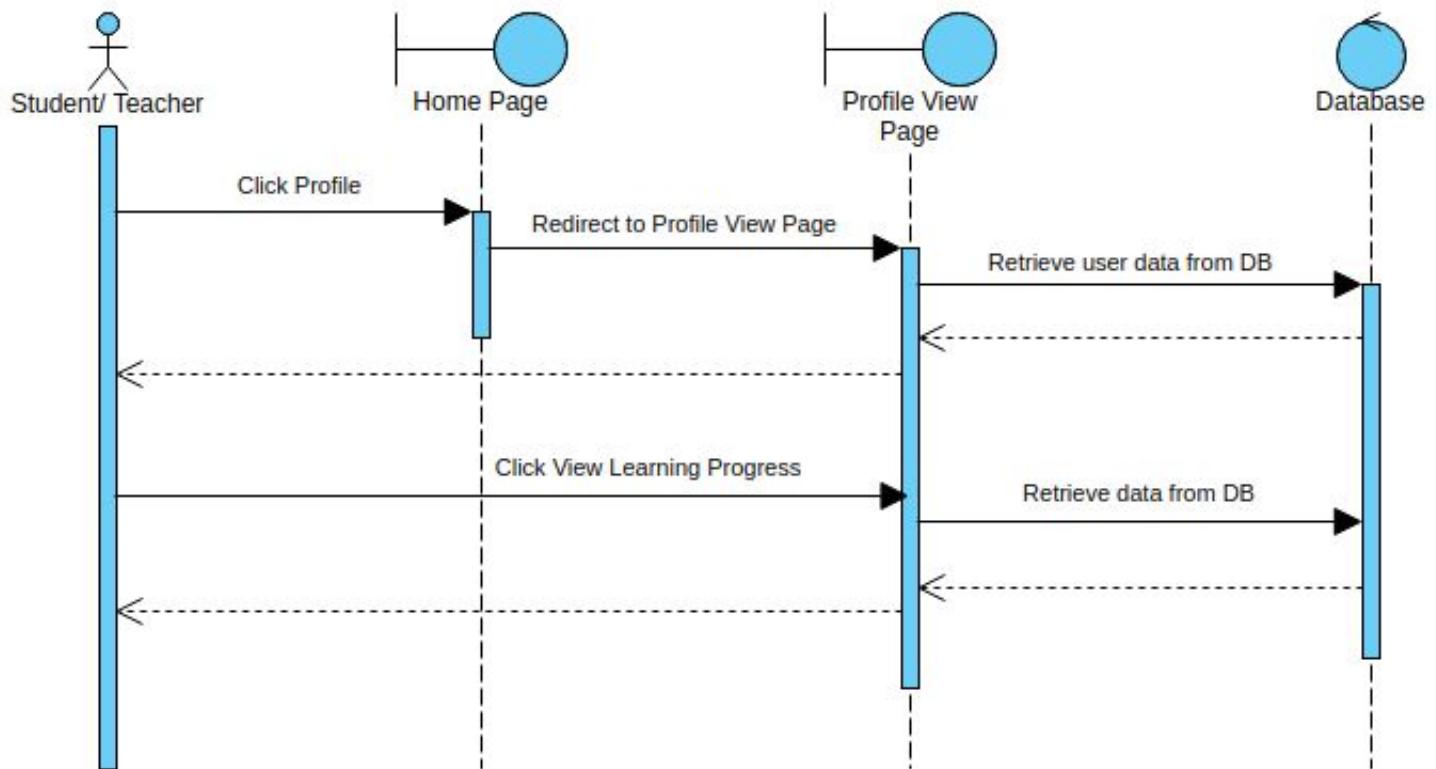
### 5.3.12 View and Edit Profile



View/ Edit Profile

(Figure 22: View/ Edit profile)

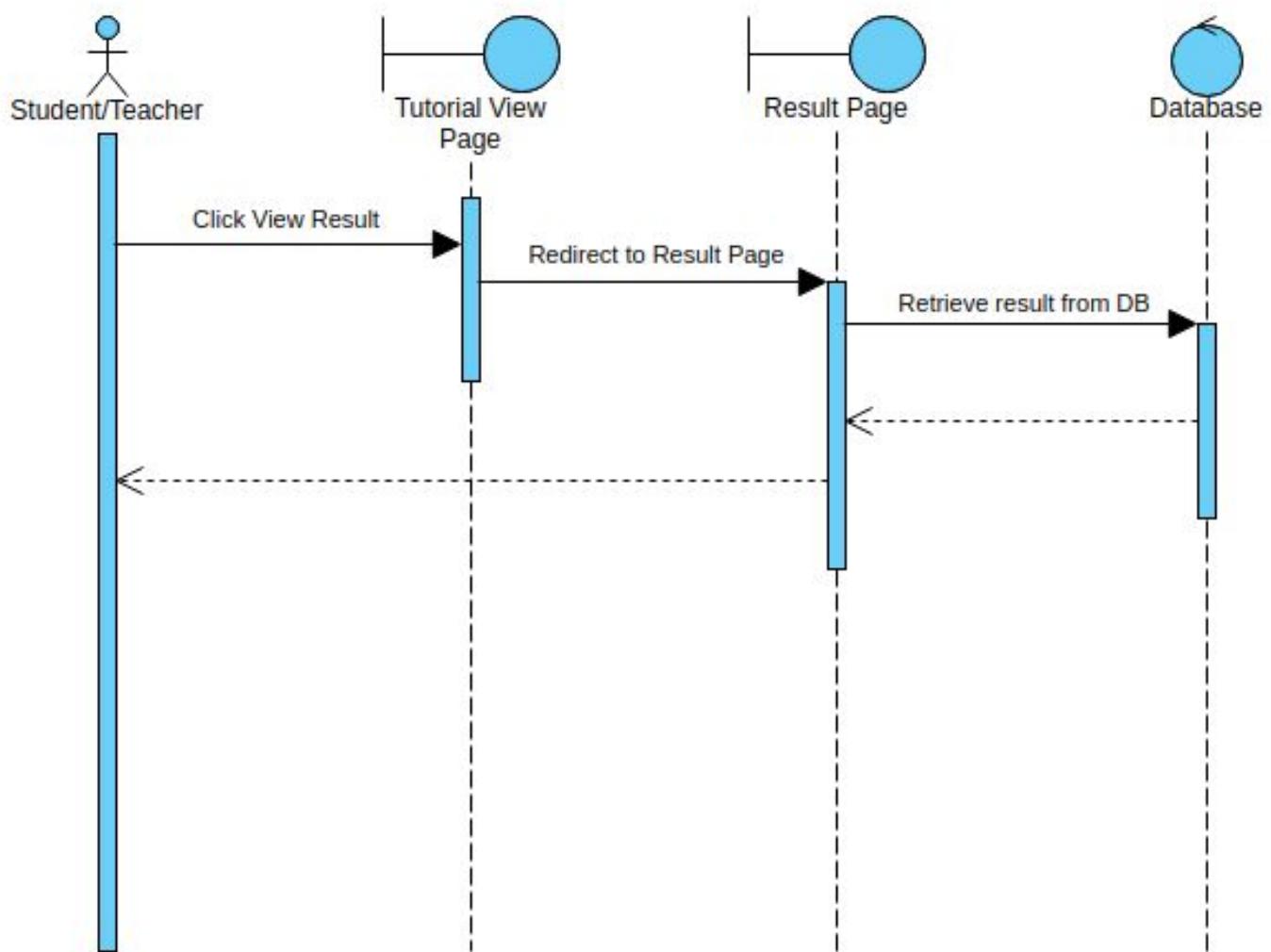
### 5.3.13 View Learning Progress



View Learning Progress

(Figure 23: View Learning progress)

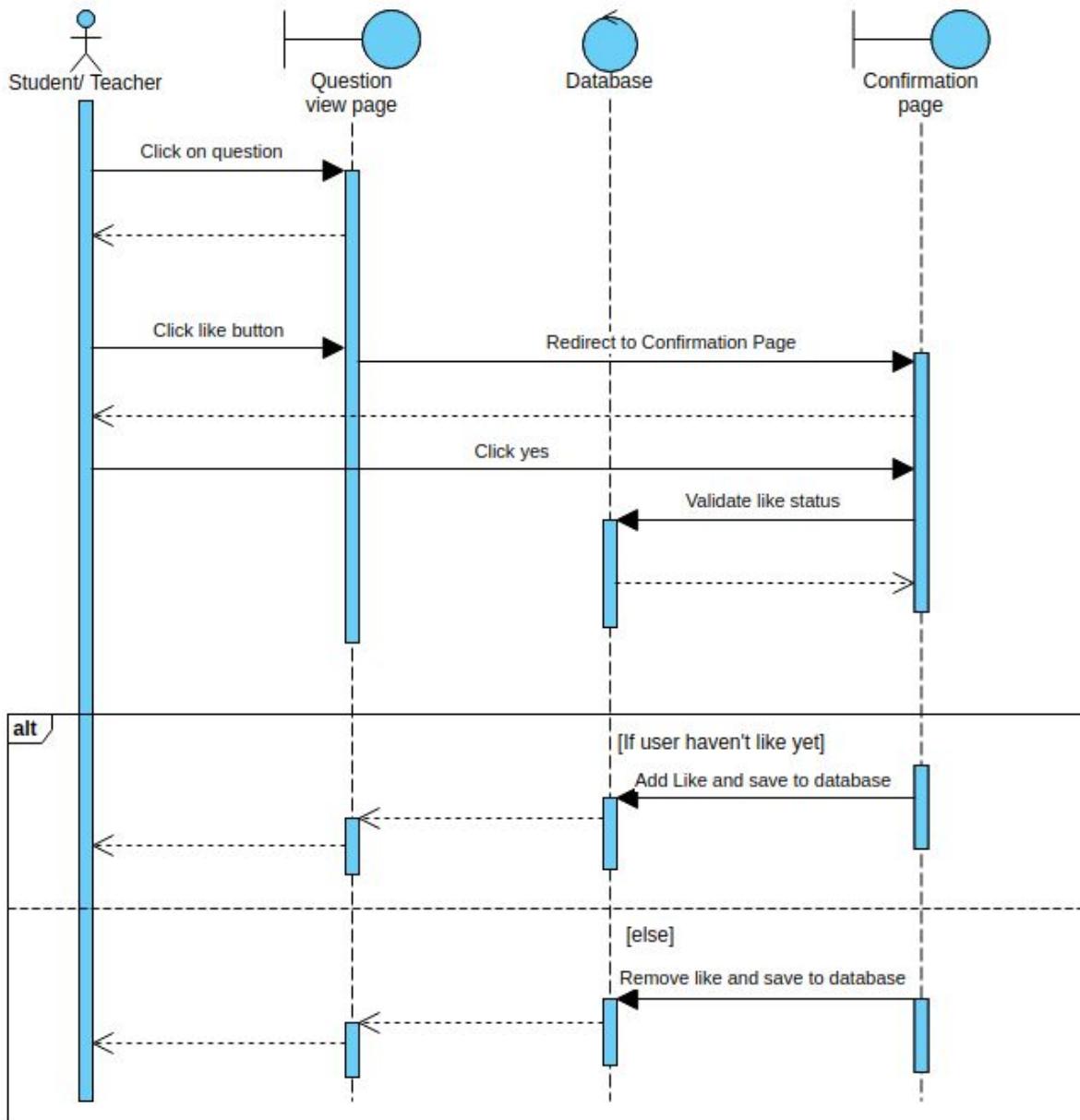
### 5.3.14 View Result



View Result

**(Figure 24: View result)**

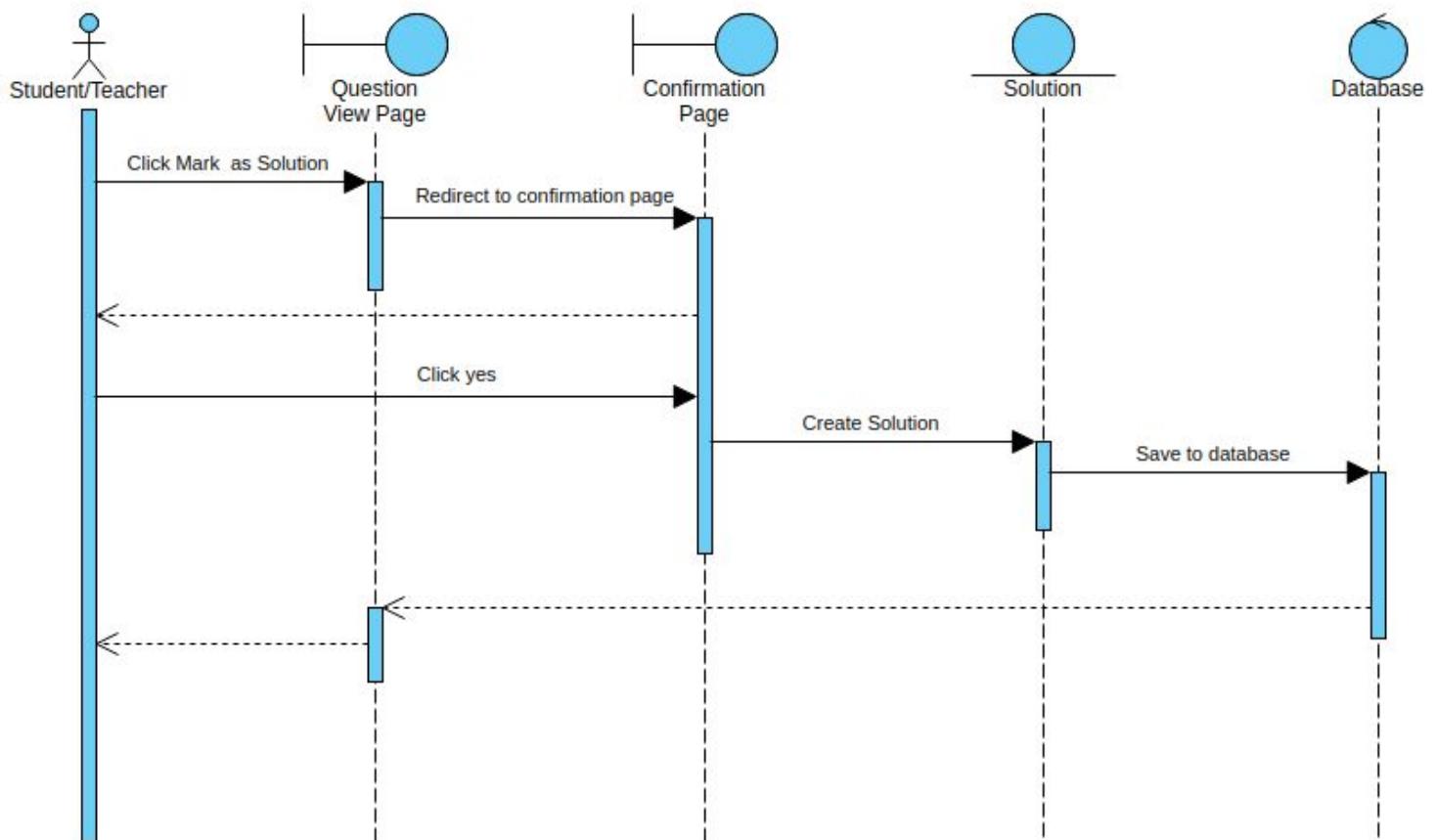
### 5.3.15 Like and Dislike question or comment



Like and Dislike question or comment

(Figure 25: Like and dislike question or comment)

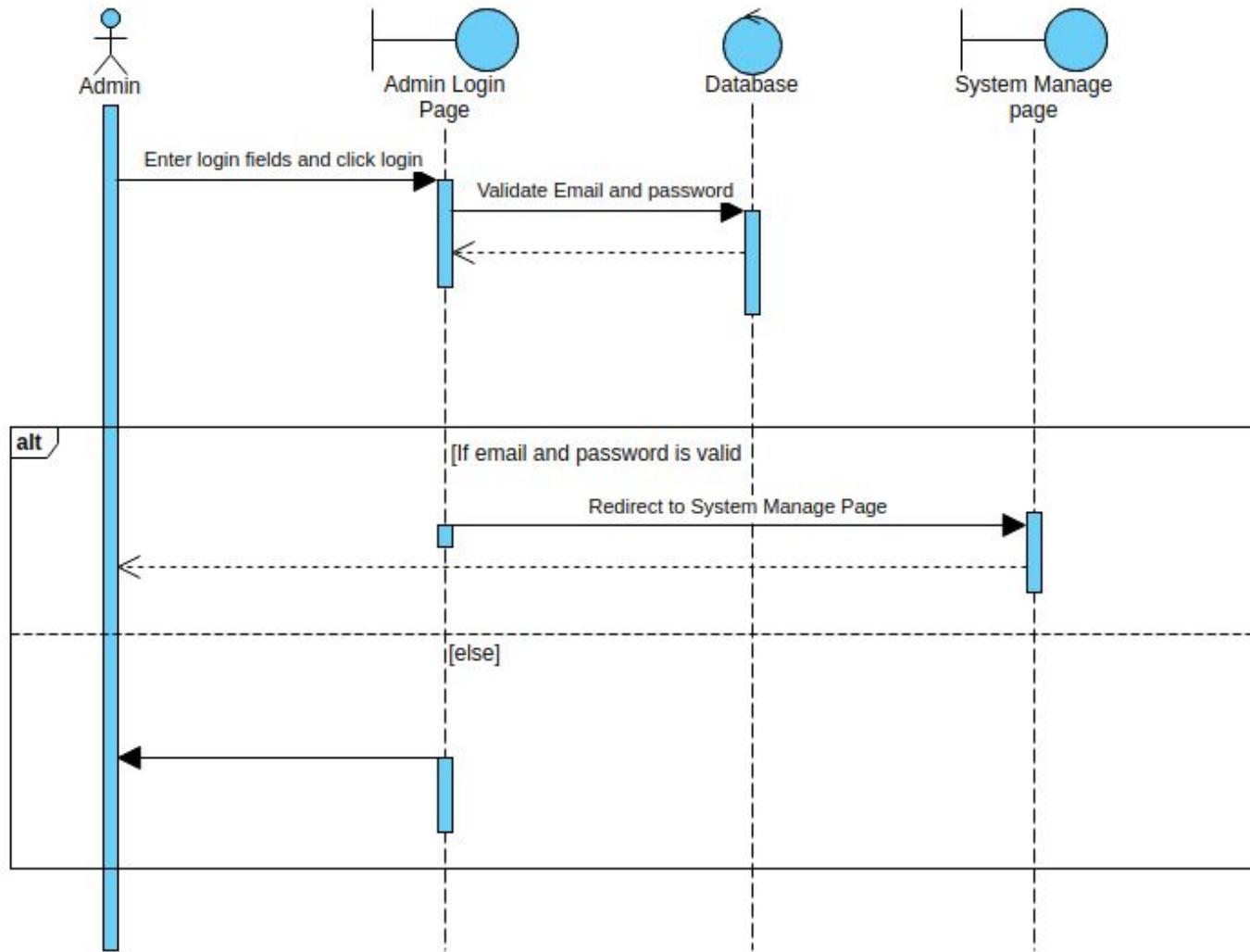
### 5.3.16 Mark Comment as solution



Mark comment as solution

(Figure 26: Mark comment as solution)

### 5.3.17 Manage Database



Manage Database

(Figure 27: Manage Database)

# 6.0 Data Design

## 6.1 Data Dictionary / Data Structure

The data structure will be referring to the data dictionary as data dictionary has more details and these two are very similar.

### 6.1.1 User Table

Field Name	Data Type	Length	Null	Description
user_id	Short Text	5	Not null	Primary key of User table. Needed to uniquely identify each object in the table
username	Short Text	<50	Not null	Username, it is a login credentials and it must be unique too.
user_Fname	Short Text	<50	Not null	User's first name
user_Lname	Short Text	<50	Not null	User's last name
user_email	Long Text	<255	Not null	User's personal email
user_profilePic	Image	-	Not null	User's profile
user_type	Short Text	<7	Not null	To determine the user account type, to know whether they are students or teachers

### 6.1.2 Student Table

Field Name	Data Type	Length	Null	Description
user_id	Short Text	5	Not null	Primary key of User table. Needed to uniquely identify each object in the table
username	Short Text	<50	Not null	Username, it is a login credentials and it must be unique too.
user_Fname	Short Text	<50	Not null	User's first name
user_Lname	Short Text	<50	Not null	User's last name
user_email	Long Text	<255	Not null	User's personal email
user_profilePic	Image	-	Not null	User's profile
user_type	Short Text	<7	Not null	To determine the user account type, to know whether they are students or teachers
learniny_history	Long Text	<255	-	User can review the learning history that done before

### 6.1.3 Teacher Table

Field Name	Data Type	Length	Null	Description
user_id	Short Text	5	Not null	Primary key of User table. Needed to uniquely identify each object in the table
username	Short Text	<50	Not null	Username, it is a login credentials and it must be unique too.
user_Fname	Short Text	<50	Not null	User's first name
user_Lname	Short Text	<50	Not null	User's last name
user_email	Long Text	<255	Not null	User's personal email
user_profilePic	Image	-	Not null	User's profile
user_type	Short Text	<7	Not null	To determine the user account type, to know whether they are students or teachers

#### 6.1.4 Profile Table

Field Name	Data Type	Length	Null	Description
profile_id	Short Text	<7	Not null	Primary key, user identification for profile purpose
user_id	Short Text	5	Not null	Primary key and foreign key, needed to know whose profile is the current profile.

#### 6.1.5 Schedule Table

Field Name	Data Type	Length	Null	Description
sched_id	Short Text	<7	Not null	Primary key. Needed to uniquely identify each object in the table
user_id	Short Text	5	Not null	Primary key and foreign key, needed to know who is assigned to the schedule

#### 6.1.6 Tutorial Table

Field Name	Data Type	Length	Null	Description
tutorial_id	Short Text	5	Not null	Primary key. Needed to uniquely identify each object in the table
user_id	Short Text	5	Not null	Primary key and foreign key, it is required to know who is the author of the tutorial
result	Long Text	<255	-	Contains all the result of the tutorial
tut_text	Long Text	<255	-	Content of the tutorial
tut_img	Image	-	-	An image field

### 6.1.7 Questions Table

Field Name	Data Type	Length	Null	Description
question_id	Short Text	5	Not null	Primary key, Needed to uniquely identify each object in the table
tutorial_id	Short Text	5	Not null	Primary key and foreign key, it is required to know which tutorial does the question belong to.
user_id	Short Text	5	Not null	Primary key and foreign key, it is required to know who asked the question
liked_by	Short Text	5	-	Liked by contains user id, it is used to record user who have liked post
question_text	Long Text	<255	-	Contains all the content of the question
question_img	Image	-	-	Image field

### 6.1.8 Solution Table

Field Name	Data Type	Length	Null	Description
solution_id	Short Text	5	Not null	Primary key, Needed to uniquely identify each object in the table
question_id	Short Text	5	Not null	Primary key and foreign key, it is required to know which question does the solution solved
user_id	Short Text	5	Not null	Primary key and foreign key, it is required to know who gave the solution
comment_id	Short Text	5	Not null	Primary key and foreign key, it is required to know which comment is the solution

### 6.1.9 Note Table

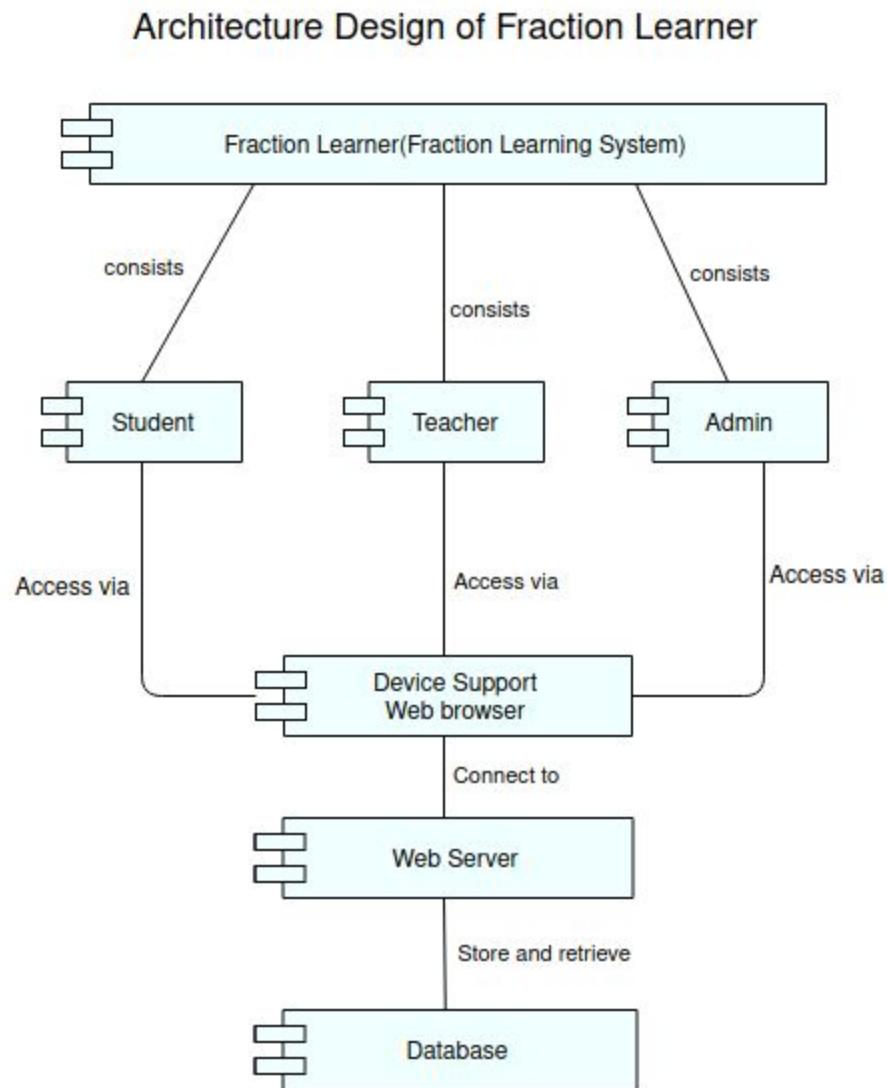
Field Name	Data Type	Length	Null	Description
note_id	Short Text	5	Not null	Primary key and foreign key, Needed to uniquely identify each object in the table
user_id	Short Text	5	Not null	Primary key and foreign key, it is needed to know who created the notes
note_text	Long Text	<255	-	Contains the title of the note
note_content	Long Text	<255	-	Contains all the content of note
note_video	Varbinary	-	-	Video field

### 6.1.10 Comment Table

Field Name	Data Type	Length	Null	Description
comment_id	Short Text	5	Not null	Primary key, Needed to uniquely identify each object in the table
question_id	Short Text	5	Not null	Primary key and foreign key, it is required to know which question does the comment belong to.
user_id	Short Text	5	Not null	Primary key and foreign key, it is required to know who created the comment
liked_by	Short Text	5	-	Liked by contains user id, it is used to record user who have liked post
comment_text	Long Text	<255	-	Content of the comment
comment_img	Image	-	-	Image field of comment
is_solution	Boolean	1	-	Indicate whether the comment is solution

## 7.0 Architecture Design

According to IEEE definition, Architecture design is the process of defining a collection of hardware and software components and their interfaces to establish the framework for the development of a computer system[1].



(Figure 28: Architecture Design of Fraction Learner)

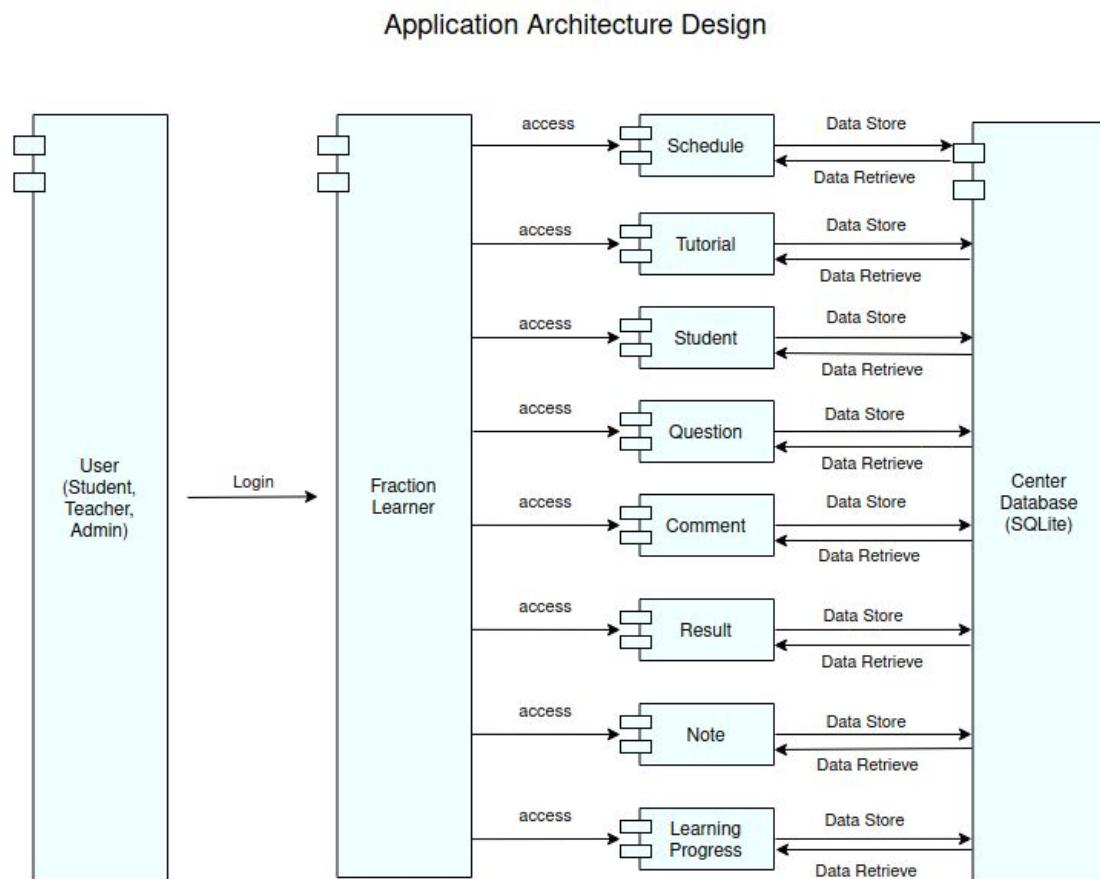
The team decided to use Component Structure in the architecture design. The diagram above shows the relationship between each major component in the system and how they interact with each other. As we can see, the Fraction Learner consists of three types of user which are student, teacher and admin. The user can access the system via any device that supports the web browser. The web browser will connect to the web server, retrieve the data from a center database and display the result on the web browser.

For the architecture styles, the team decided to use Data-centered architecture. This is because this fraction learner system is used by a few different types of users who access the same database.

## 7.1 Application Architecture Diagram (AAD)

An Application Architecture Diagram provides a high-level graphical view of the application architecture to identify the application components, databases and their interactions[2].

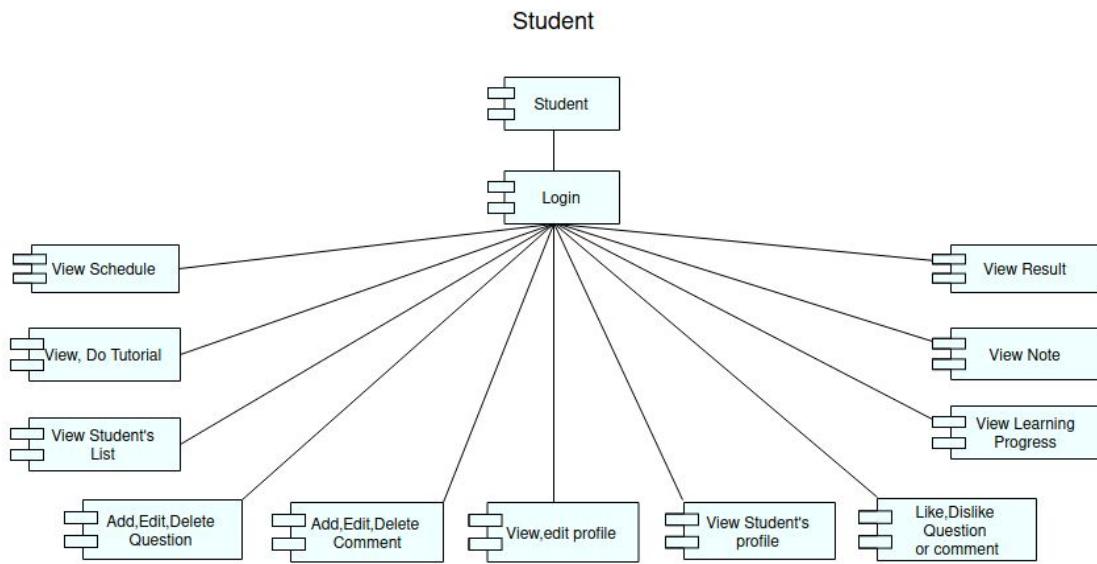
In the example below, the interactions between the components at the Fraction Learner are displayed:



(Figure 29: Application Architecture Design)

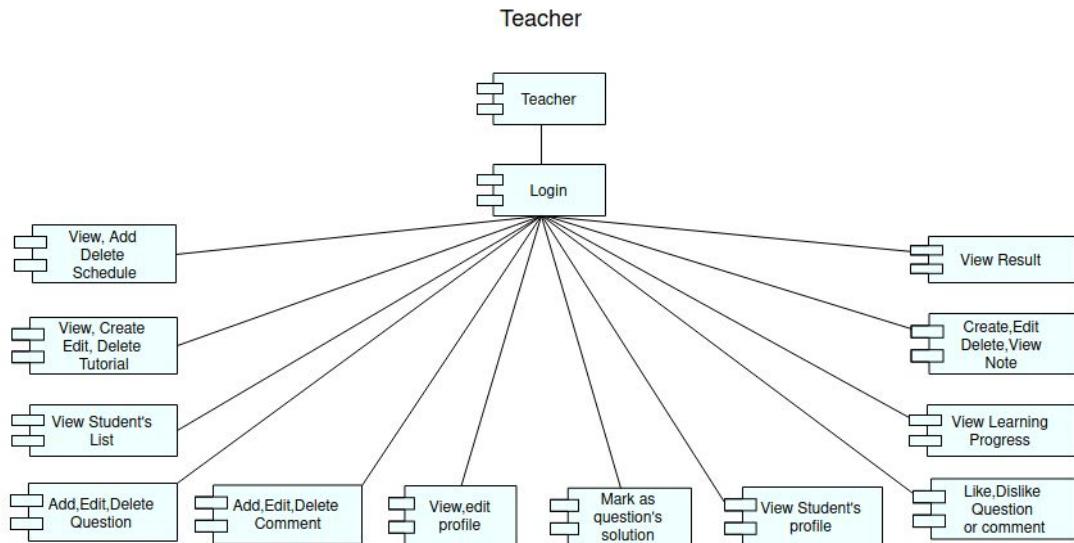
In the diagram above, it shows the users' interaction with our application(Fraction Learner). First, the users must login to our system before they can access all the components in the system. Once the user login, they can freely access the function that belongs to their user's roles. They can access the components and all the data will be stored or retrieved from the centered database. The three diagrams below show the interaction of each user in a more detailed way.

### 7.1.1 Student



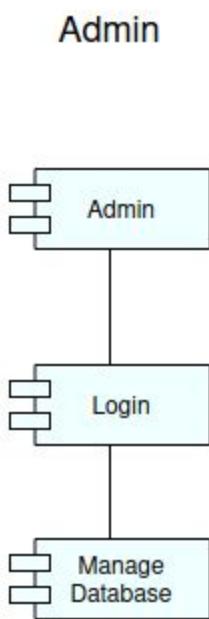
(Figure 30: Application Architecture Design of Student)

### 7.1.2 Teacher



(Figure 31: Application Architecture Design of Teacher)

### 7.1.3 Admin



(Figure 32: Application Architecture Design of Admin)

## 8.0 Interface Design

User interface is a very important aspect of software. A very well designed user interface enables users to interact with the software with ease. The team spends a lot of time designing the user interface to make sure that each of our users, teacher or students can use our software without any problem. The team chose a dark colour so that it is more comfortable for the user's eyes. The team also added some responsive elements to the web application so that the web application looks appealing to the user.

### 8.1 Homepage Interface

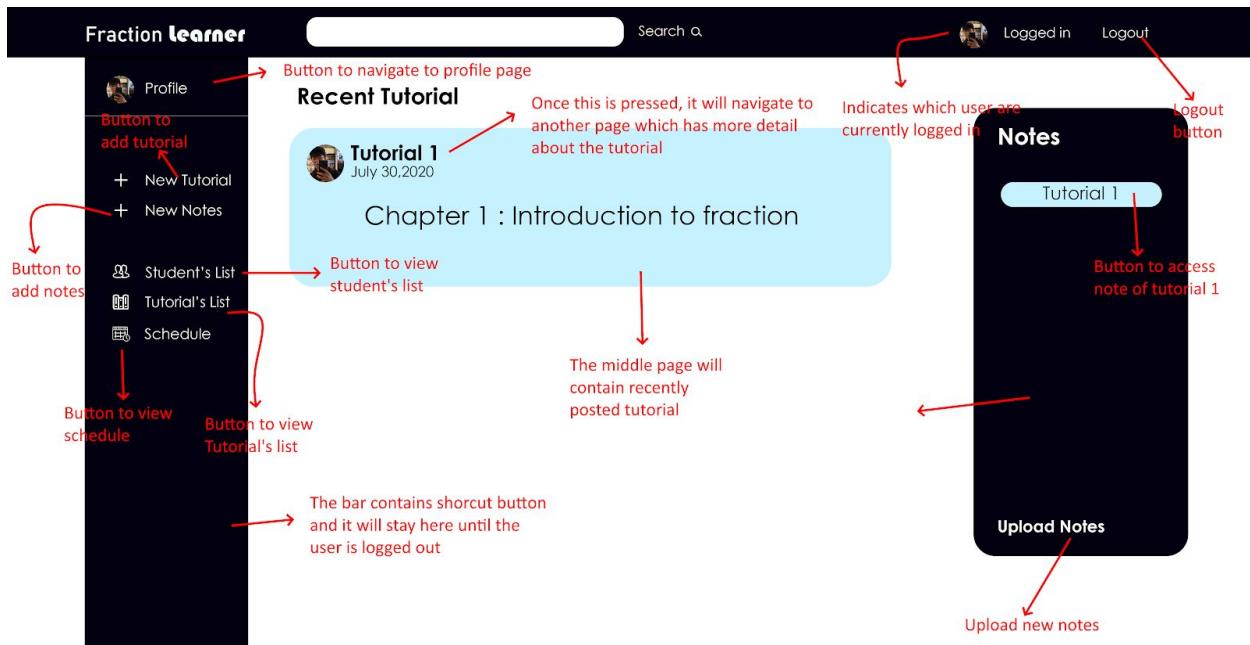
The figure (figure 9) below shows the User interface of new users who have not tried our application before or unauthenticated users. The interface will change after the user is logged in depending on the user account's type. If the user logged in is a teacher, the UI provided will be slightly different from the student's account as the teacher is allowed to manipulate the contents of the tutorials. While for students, the user interface will be rather simpler to ease the learning process, improve learning efficiency and to reduce time spent in learning the application.



(Figure 33 : Homepage for unauthenticated users)

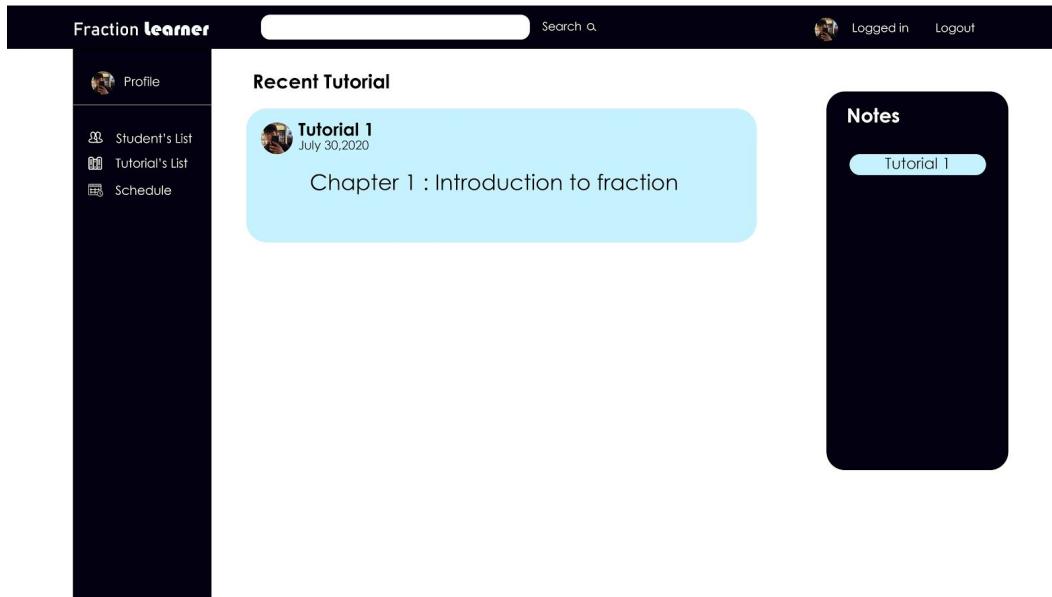
The interface for unauthenticated users has two login and register buttons. Two on the header and two in the middle of the application. The login buttons on the taskbar are for users who used our application before and they are very familiar with our application. They do not need to navigate all the way down to login. The register button on the header is for new users to register in case they did not read the button in the middle of the application. While the two buttons are intentionally implemented bigger to allow users who are not familiar with the application to login and register as they are easier to be seen. The header is dynamic and the login and register button will change according to the user authentication status. If the user is logged in and authenticated, it will change to a user profile picture and logout button.

## 8.2 Main Interface(Teacher & Student)



(Figure 34 : Main Interface for authenticated teachers)

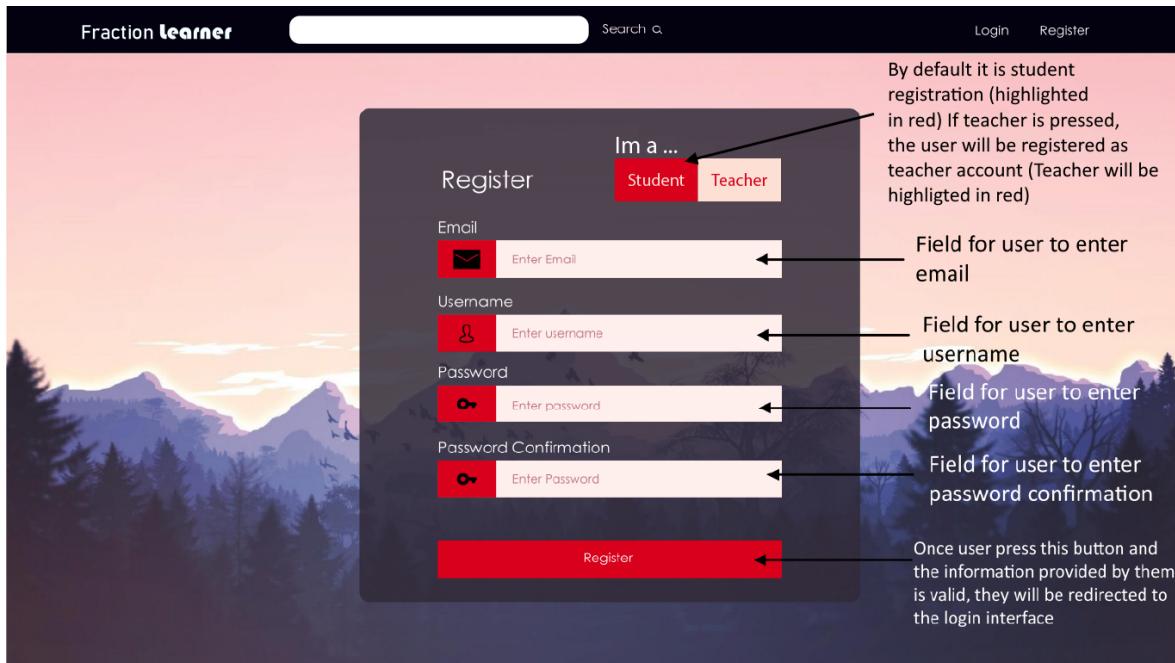
The figure above also shows the main interface for teachers. There is not much difference between teacher and student interface. There are two side bars in the main interface and it is there to bring shortcuts to the users. The major difference is student's interface does not have a new tutorial, new notes and upload notes button in their side bars. All of the buttons in the figure above bring the user to a new scene. The "logout" button will log out the current user and return the user to the homepage (figure 9). The "student list's" and "tutorial's list" buttons will redirect users to another page which the system will generate all the student's name and tutorial in a list form respectively. "New tutorial" button and "New Notes" button redirect the user to a new scene which has an interface that allows the user to create a new tutorial and new notes for the student. The "upload notes" button behaves the same as the "New Notes" button. If the user presses on the header of the tutorial, it will redirect the user to view the detail of the tutorial which is the tutorial interface (Figure .All the buttons listed also function the same. The figure below shows the main interface of the student account. It can be clearly seen that the student's account does not have "+ New Tutorial", "+ New Notes" and "Upload Notes" buttons, as they are not supposed to manipulate the contents.



(Figure 35 : Main Interface for authenticated students)

## 8.3 Register Interface(Teacher & Student)

The register interface will be the same for both teacher and student. There is a button for users to select on their roles, either student or teacher. By default, the registration is for students as there will be more students than teachers in the application. If the button is clicked, “teacher” will be highlighted in red to notify the user on the matter that they are being registered as a teacher. The illustration is shown in the figure below. (No more register as teacher)

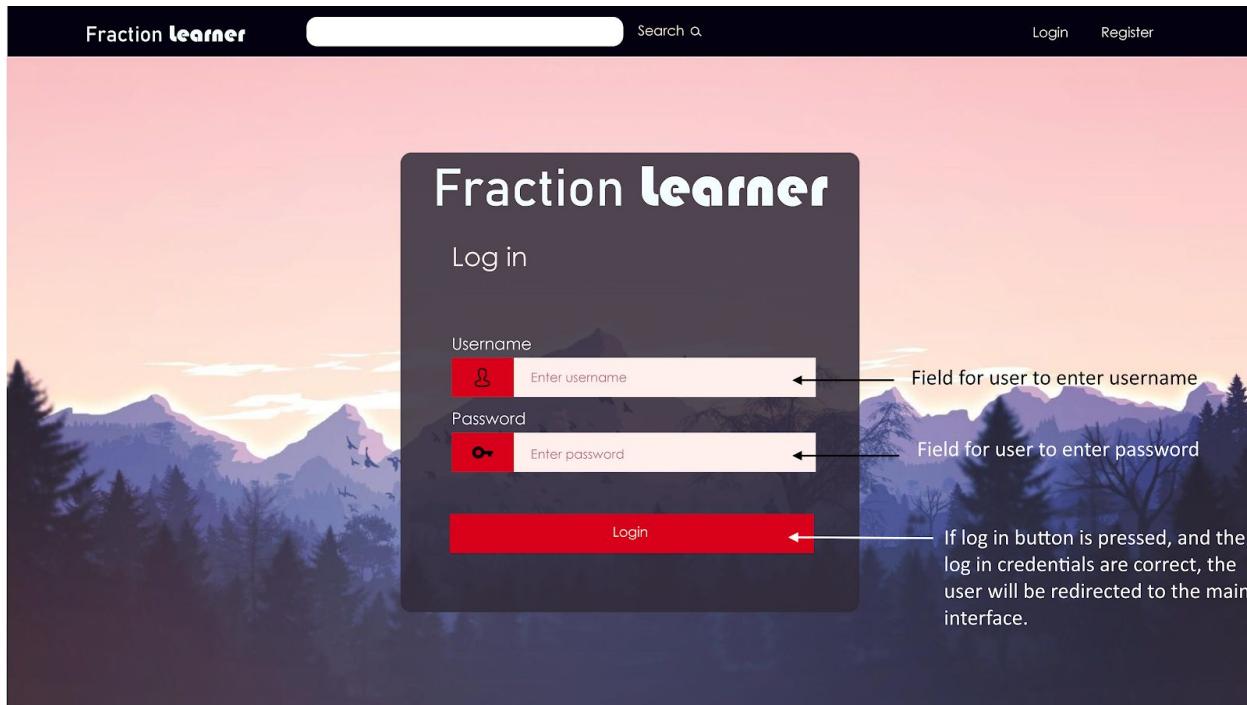


(Figure 36 : Register Interface)

There are four fields in the registration form, Email, username, password and password confirmation. The data entered must be filled and valid before the account is registered. Else, the error message will prompt. Once registered, the user will be redirected to the login interface.

## 8.4 Login Interface(Teacher & Student)

The login interface is the same for both account types (Teacher and Student). It has two fields, username and password. If the credentials are all valid and the “login” button is pressed, the user will be redirected to the main interface. The interface is shown in the figure below.



(Figure 37 : Login Interface)

## 8.5 Fraction Learning Interface

### 8.5.1 Tutorial Interface for teacher

The tutorial interface looks simple and clean. Teachers have access to edit the tutorial which they have posted by clicking the edit button located on the left upper corner of the tutorial. The user will be redirected to the edit tutorial page. (Figure 20: edit tutorial interface). Teachers can click on the view history & result button to view on the students result and to track on student learning progress. The user will be redirected to another page which has filtered data of the results and students who have not completed the tutorial. If the comment button is clicked, the user will be redirected to a page which shows all the comments given by students. The like button will just simply give a thumbs up to the tutorial. Once the user has already liked the tutorial, the button will turn into a dislike button. The figure below shows the tutorial interface

The screenshot displays the 'Tutorial 1 : Chapter 1 : Introduction to fraction' page. On the left sidebar, there are links for 'File', 'Tutorial', 'Notes', 'Student's List', 'Teacher's List', 'Module', 'No of likes' (with a 'Like' button), and 'Upload Notes'. The main content area shows a title 'Tutorial 1' posted on July 30, 2020. Below it is the chapter title 'Chapter 1 : Introduction to fraction' with four circular diagrams illustrating fractions: 1 (whole circle),  $\frac{1}{2}$  (half circle),  $\frac{1}{4}$  (quarter circle), and  $\frac{3}{4}$  (three-quarters circle). A text block follows, and below it are 'Likes' (23 Likes), 'Questions' (3 Questions), and 'Quiz' buttons. To the right of the text block are buttons for 'edit the tutorial' (pencil icon) and 'Delete' (trash bin icon). The 'Quiz' section contains a question 'Quiz 1' with the text 'learning progress and result'. It includes a 'View History & Result' button, a 'Add Quiz' button, and a 'Delete All Quiz' button. Below this is a 'Quiz 1' section with the text 'learning progress and result'. It lists two options: 'Lorem ipsum dolor sit amet.' and 'Lorem ipsum dolor sit amet.'. The first option is preceded by a radio button. A dark circle is placed next to the second option, with a callout 'Dark circle indicates this is the answer for the quiz'. To the right of the quiz section are buttons for 'Delete' (trash bin icon) and 'Edit' (pencil icon).

(Figure 38: Tutorial Interface (teachers))

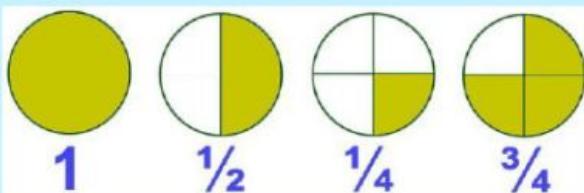
## 8.5.2 Tutorial interface for student

Student tutorial interface is similar to teacher's but does not have the access to the tools to manipulate the content of the tutorial. They can only read the tutorial, ask questions about the tutorial and do the quiz. The interface is shown in the figure below.

### Tutorial 1 : Chapter 1 : Introduction to fraction



#### Chapter 1 : Introduction to fraction

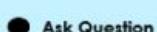


Lorem ipsum dolor sit amet, consectetur adipiscing elit. Curabitur pretium id justo in volutpat. Nam sagittis ornare lorem eu scelerisque. Quisque tincidunt turpis vitae nulla facilisis, vitae pretium nulla fringilla. In tincidunt egestas lorem, non ullamcorper eros. Quisque ante leo, dapibus ac pulvinar sit amet, cursus ac lorem. Quisque vehicula pulvinar sem, id fermentum metus sodales vitae. Nam pretium ante sit amet turpis interdum blandit. Pellentesque elementum malesuada lectus, eu pellentesque lectus fermentum eget. Phasellus felis tortor, dictum ut scelerisque sed, ornare vitae erat. Sed tempor mauris odio, id semper urna dictum vitae. Proin non urna efficitur, ultrices orci eget, purus.

23 Likes    3 Question



Like



Ask Question

← Button to ask question

#### Quiz

#### Quiz : Introduction to fraction

Marks : 3



← Button to view the result of the quiz

Start Quiz

← Button to start doing the quiz

#### Notes

Tutorial 1

(Figure 39: Tutorial Interface (Student))

### 8.5.3 Create Tutorial Interface

This interface is only available for teachers only. It shows up whenever the teacher clicked the “+ New Tutorial” located at the left side bar.

**Tutorial**

Title\*  
 Field to enter Title of tutorial

Content\*  
 Field to enter content of tutorial

Image  
 Indicate the image that are currently uploaded

Button to upload photo

**Notes**

Tutorial 1

**Quiz**

Quiz 1

Content\*  
 Field to enter content of quiz

To select the answer for the quiz  
 Lorem ipsum dolor sit amet.  
 Lorem ipsum dolor sit amet.

Button to add more quiz to the tutorial  
 Button to delete the quiz

Button to add more selection to the quiz

(Figure 40:Create Tutorial Interface (teachers))

## 8.5.4 Edit Tutorial Interface

The edit tutorial is only available for teachers and the owner of the tutorial. The user can make the necessary changes here and click the save button to save the changes they have made. The figure below shows the edit tutorial interface (figure : Edit tutorial interface)

The screenshot shows the Fraction Learner application's edit tutorial interface. At the top, there is a navigation bar with the title "Fraction Learner", a search bar, and links for "Logged in" and "Logout". On the left, a sidebar menu includes "Profile", "+ New Tutorial", "+ New Notes", "Student's List", "Tutorial's List", and "Schedule". The main content area displays a tutorial titled "Tutorial 1 : Chapter 1 : Introduction to fraction". The "Title\*" field contains "Chapter 1 : Introduction to fraction". The "Content\*" field contains a large block of placeholder text. The "Image\*" field shows a preview of an image named "image/fraction.jpg". Below the image field, there is a "Change :" section with a "Upload Photo" button and a link to "Upload photo to change the photo". A red "Save" button is located at the bottom right of the main content area. To the right of the main content is a dark sidebar titled "Notes" which lists "Tutorial 1" and has a "Upload Notes" button. Callouts provide additional information: one points to the "Content\*" field with the text "The field contain content previously entered by the user. The user can make changes freely and click save button to save the changes"; another points to the "Save" button with the text "Save button to save the changed content".

(Figure 41: Edit Tutorial Interface (teachers))

## 8.6 Schedule Interface

The figure below shows the interface for the schedule function. The interface is similar for both user, teacher and student. Students cannot manipulate the schedule, hence they do not have an “add event” button and an “edit” schedule button.



(Figure 42 : Schedule Interface (teachers))

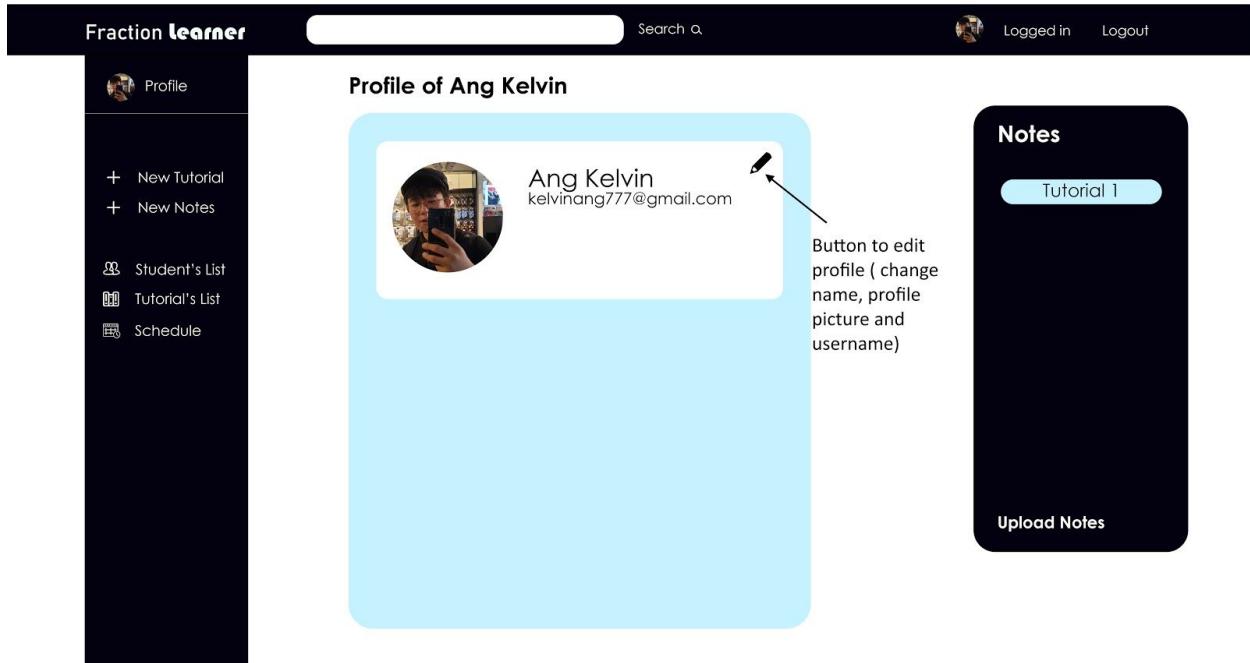
The edit schedule button allows the user to edit the schedule. The interface allows the user to remove unwanted schedules. The “add event” button allows the teacher to schedule a tutorial submission date for students. The figure below shows the interface for adding events to the schedule.

This screenshot shows the "Schedule" interface for creating a new event. It includes fields for "Start Time" and "End Time", both with dropdown menus. A third field, "Tutorial:", also has a dropdown menu. Below these is a large text area labeled "Content / Instruction:" with the placeholder text "Field for teacher to add instructions or comment for the event". At the bottom is a red "Save" button with the label "Save the event". To the right, there is a vertical sidebar titled "Notes" with a "Tu" entry and an "Upload" button.

(Figure 43 : Schedule Interface (teachers))

## 8.7 Profile Interface

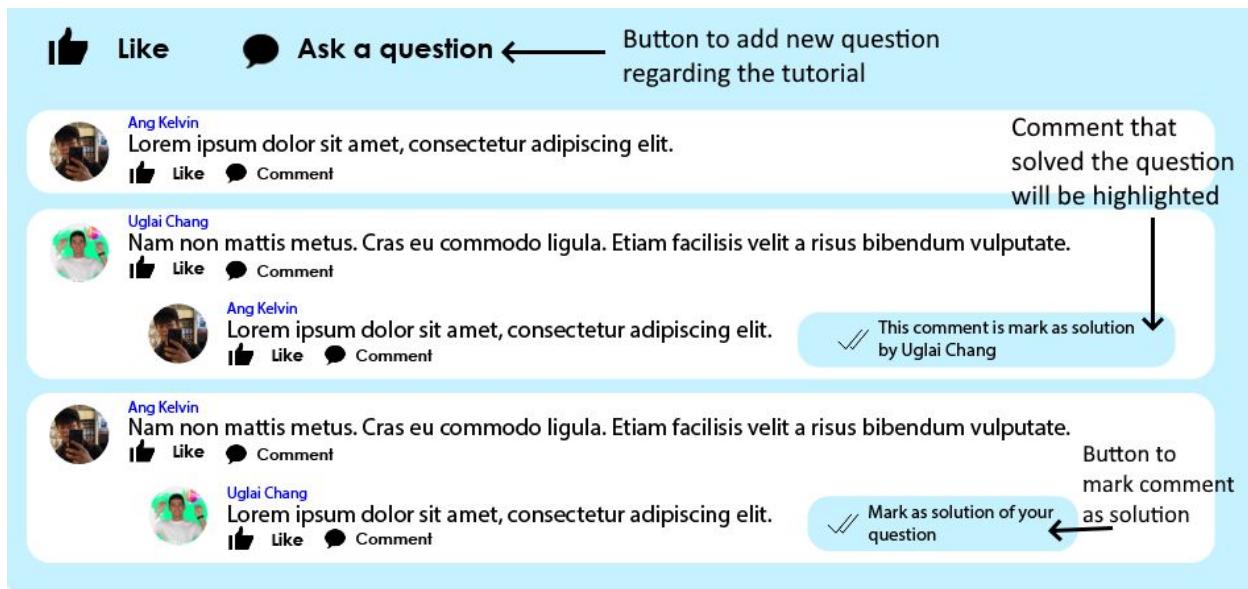
The figure below shows the interface for the profile. The profile interface shows the profile picture, username and the email address of the user. They can interact with the edit button to change their credentials if necessary. The interface of changing the profile picture and account credentials are similar to the edit tutorial interface. The interface of a visitor's profile is the same as viewing the user's own profile, but without the edit button .



(Figure 44 : Profile Interface)

## 8.8 QnA Interface

Asking questions is one of the most effective ways of learning. Hence, the team implemented a clear and centralized interface for all users. All users can ask questions and they can also answer all the questions. To ask questions, the user only needs to press the Ask Question button in the tutorial interface . The user will be directed a page where they can enter their questions. The user can select the best answer from the comments by clicking the “Mark as solution” button. Then the comment will be highlighted. Users can leave comments by pressing the “comment” button, then they will be redirected to a page where they can enter their comment. The figure below shows the interaction described. (Figure : Question and Answer Interface)

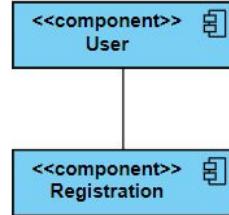


(Figure 45: QnA Interface)

# 9.0 Component Design

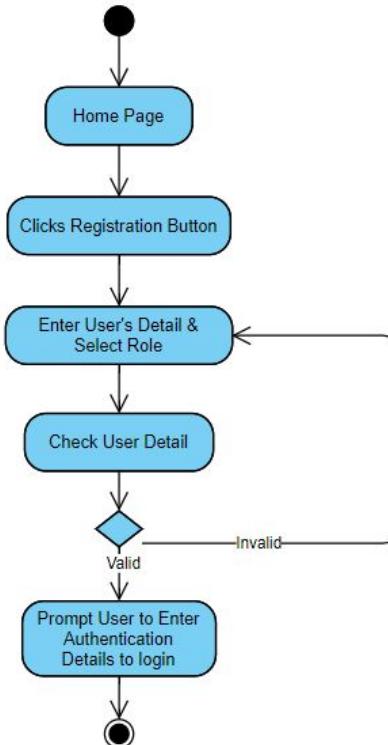
Since there are some components that share commonly, the team uses “User” to indicate both teacher and student to reduce redundancy.

## 9.1 Registration



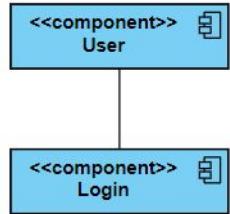
(Figure 46: Registration Component Diagram)

### Activity Diagram



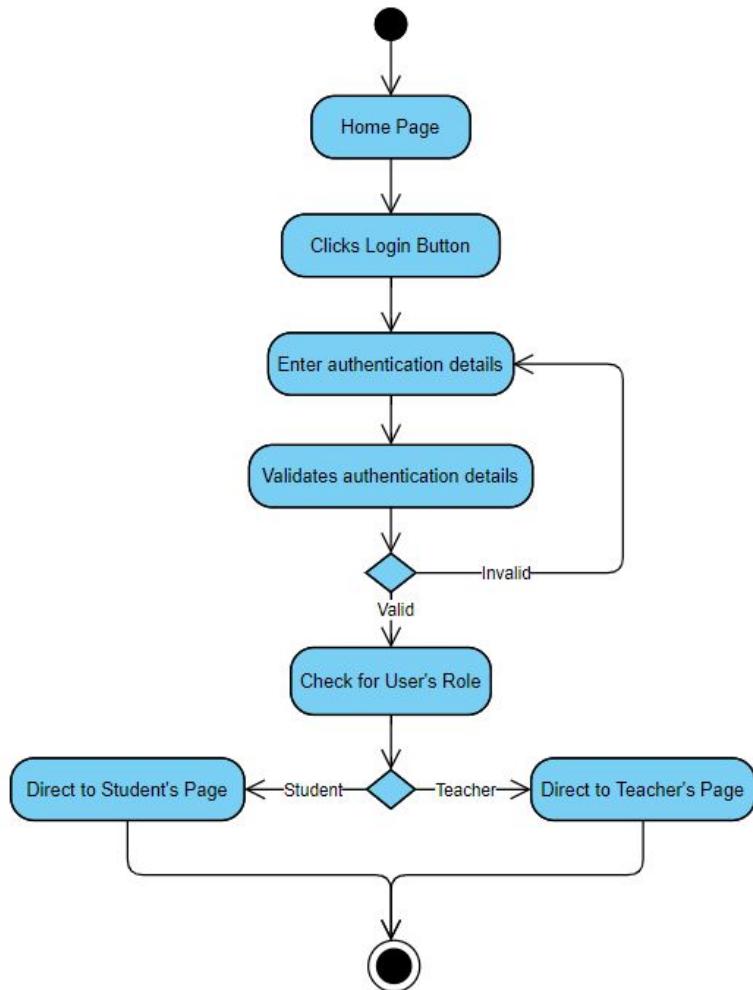
(Figure 47: Registration Activity Diagram)

## 9.2 Login



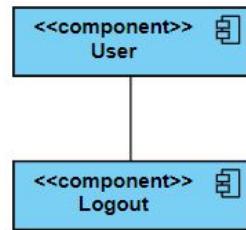
(Figure 48: Login Activity Diagram)

### Activity Diagram



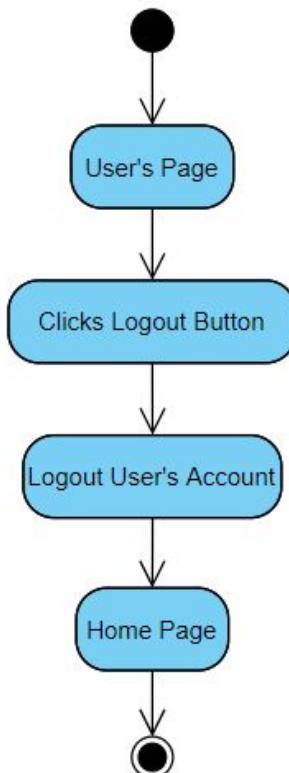
(Figure 49: Login Activity Diagram)

## 9.3 Logout



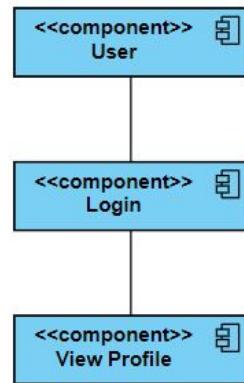
(Figure 50: Logout Component Diagram)

### Activity Diagram



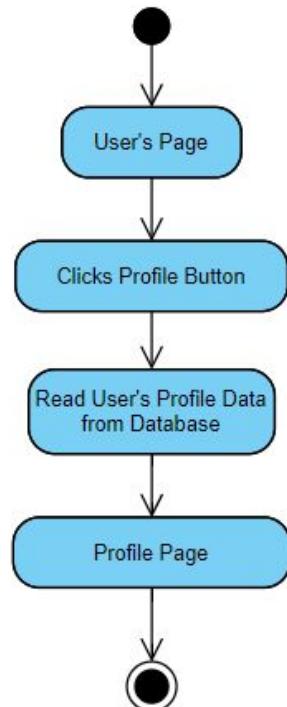
(Figure 51: Logout Activity Diagram)

## 9.4 View Profile



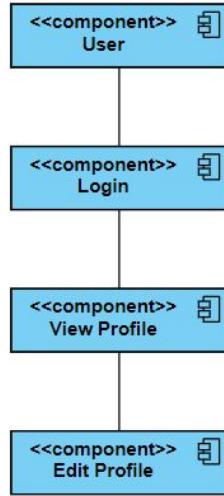
(Figure 52: View Profile Component Diagram)

### Activity Diagram



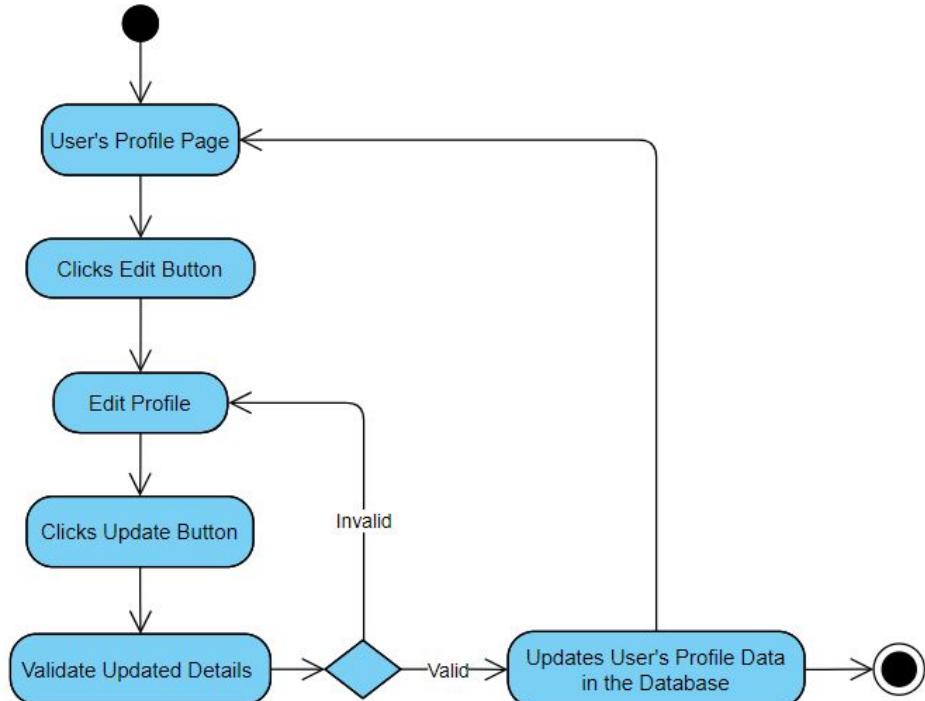
(Figure 53: View Profile Activity Diagram)

## 9.5 Edit Profile



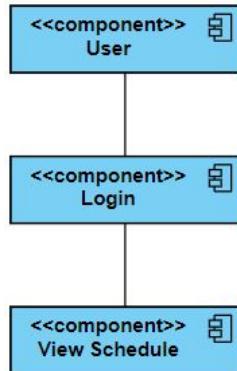
(Figure 54: Edit Profile Component diagram)

### Activity Diagram



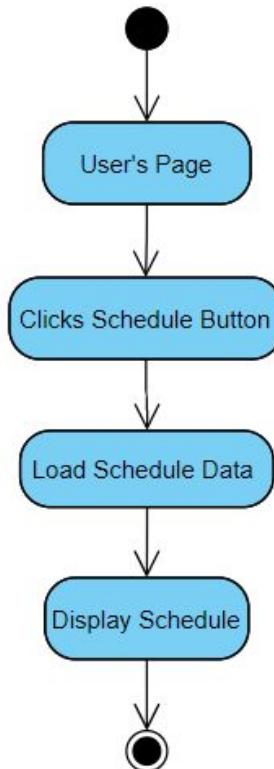
(Figure 55: Edit Profile Activity diagram)

## 9.6 View Schedule



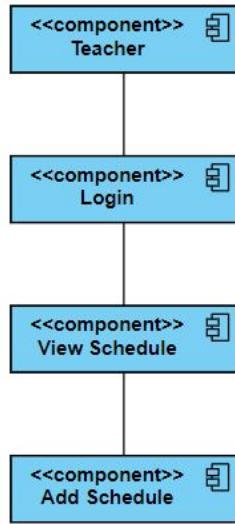
(Figure 56: View Schedule Component Diagram)

### Activity Diagram



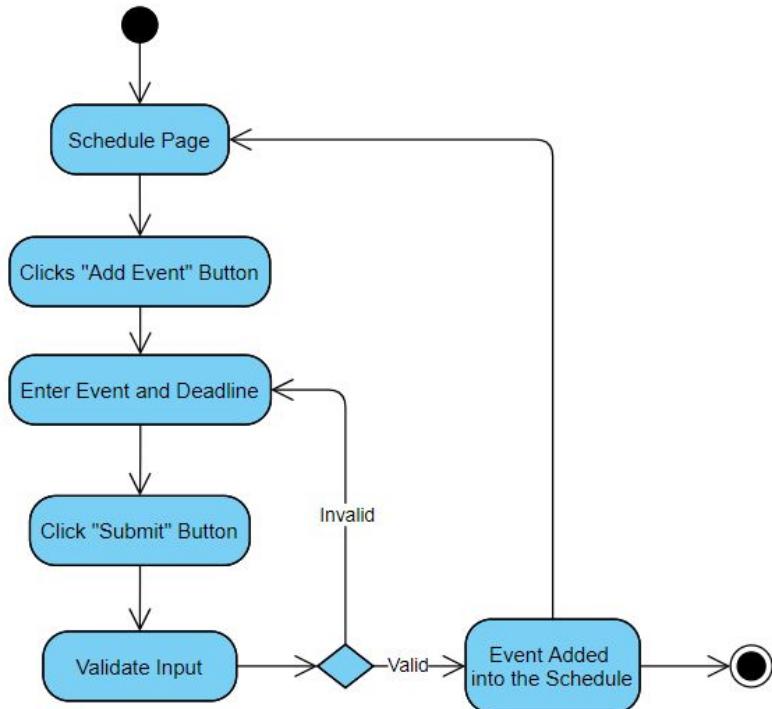
(Figure 57: View Schedule Activity Diagram)

## 9.7 Create Schedule



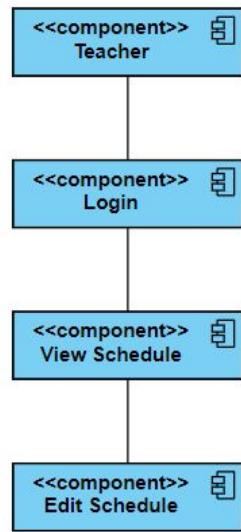
(Figure 58: Create Schedule Component diagram)

### Activity Diagram



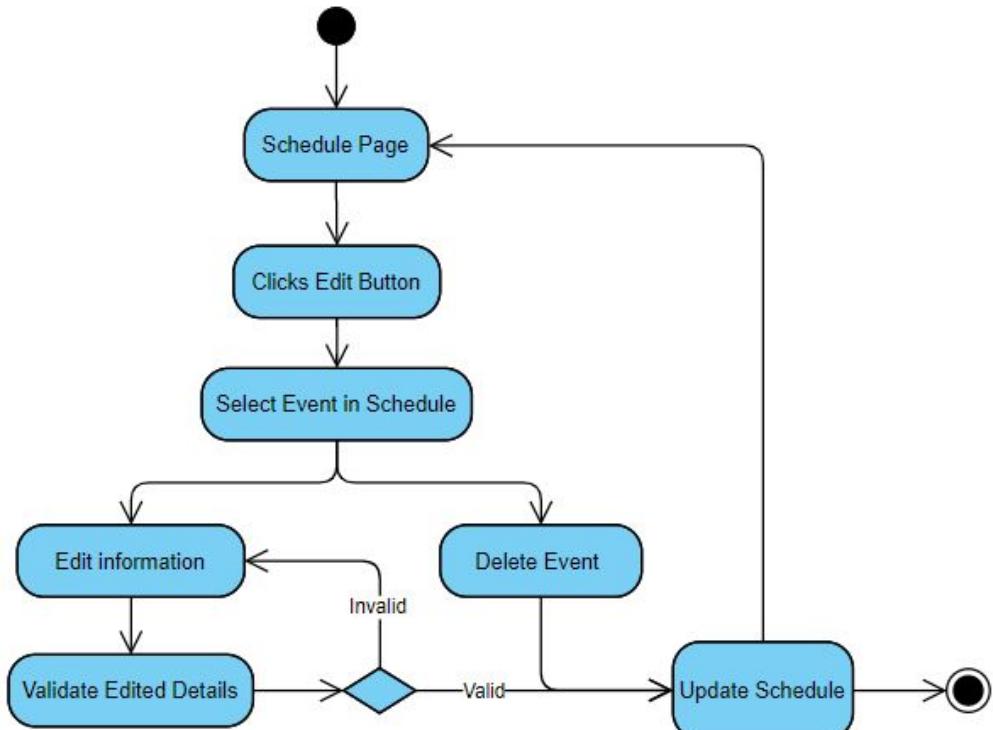
(Figure 59: Create Schedule Activity diagram)

## 9.8 Edit Schedule



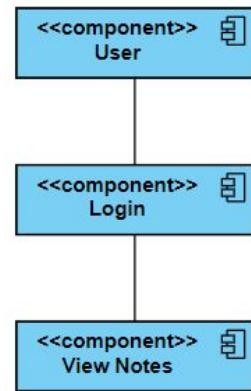
(Figure 60: Edit Schedule Component Diagram)

### Activity Diagram



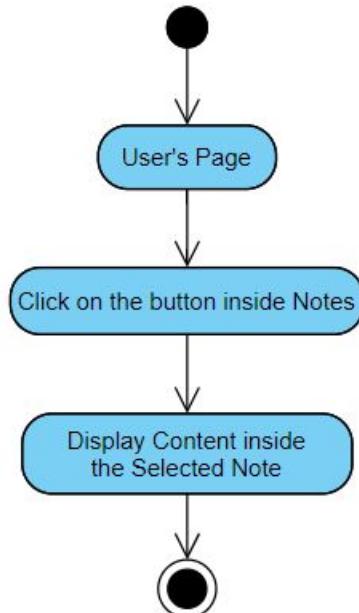
(Figure 61: Edit Schedule Activity Diagram)

## 9.9 View Notes



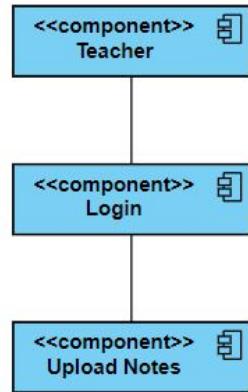
(Figure 62: View Notes Component diagram)

### Activity Diagram



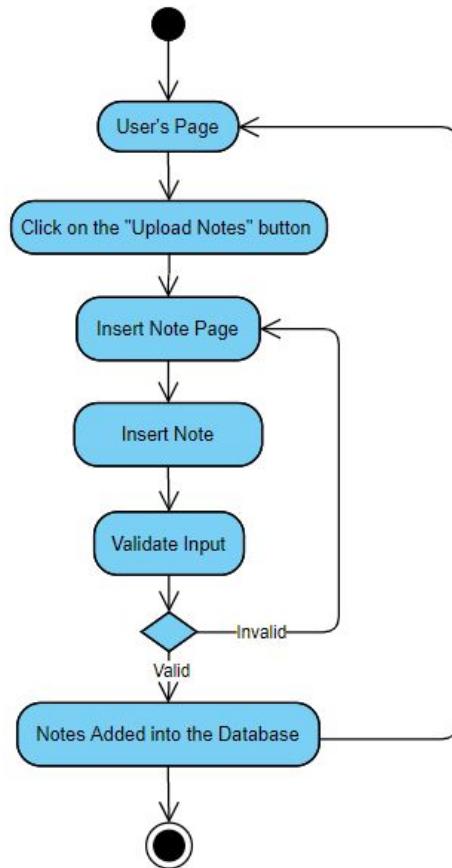
(Figure 63: View Notes Activity diagram)

## 9.10 Upload Notes



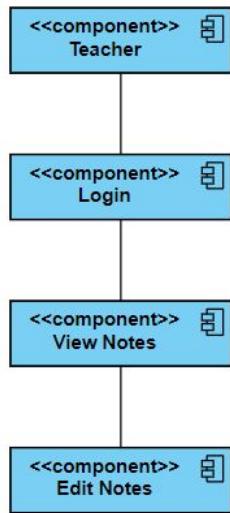
(Figure 64: Upload Notes Component Diagram)

### Activity Diagram



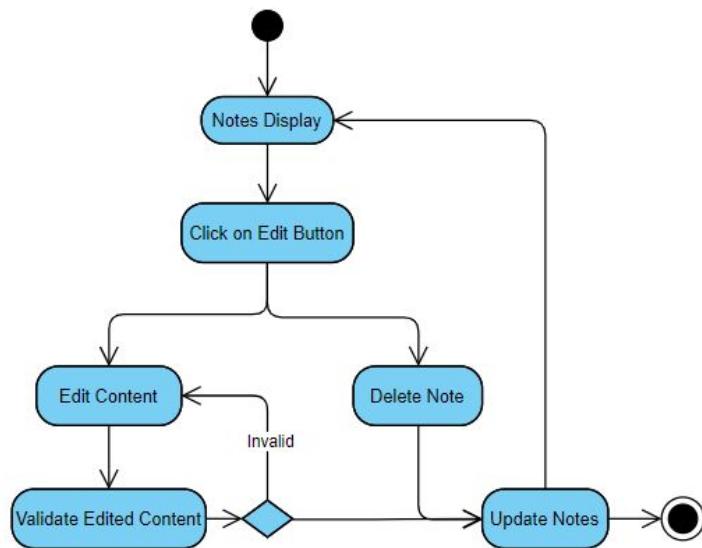
(Figure 65: Upload Notes Activity Diagram)

## 9.11 Edit Notes



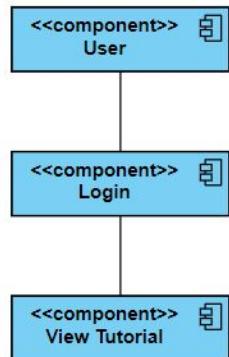
(Figure 66: Edit Notes Component diagram)

### Activity Diagram



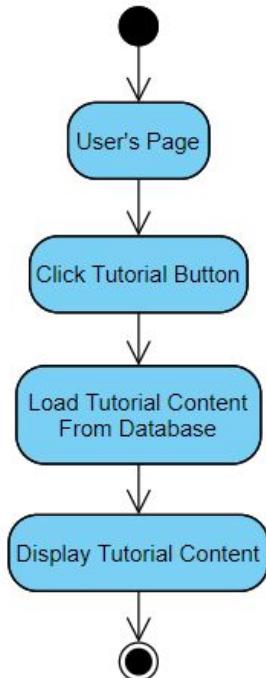
(Figure 67: Edit Notes Activity diagram)

## 9.12 View Tutorial



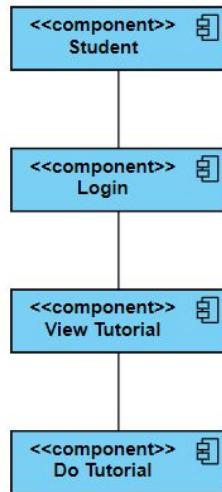
(Figure 68: View Tutorial Component diagram)

### Activity Diagram



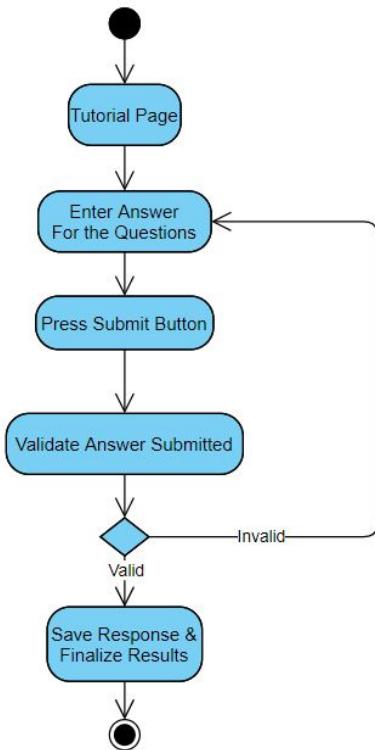
(Figure 69: View Tutorial Activity diagram)

## 9.13 Do Tutorial



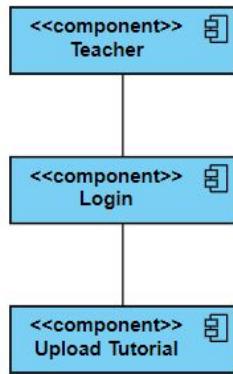
(Figure 70: Do Tutorial Component Diagram)

### Activity Diagram



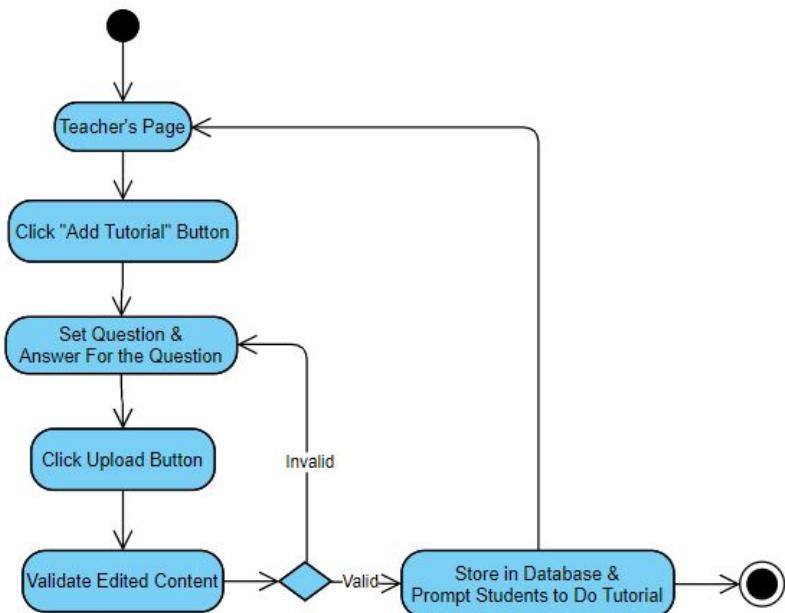
(Figure 71: DoTutorial Activity Diagram)

## 9.14 Upload Tutorial



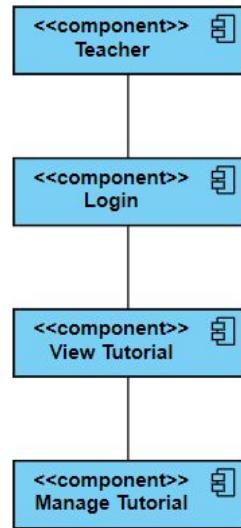
(Figure 72: Upload Tutorial Component Diagram)

### Activity Diagram



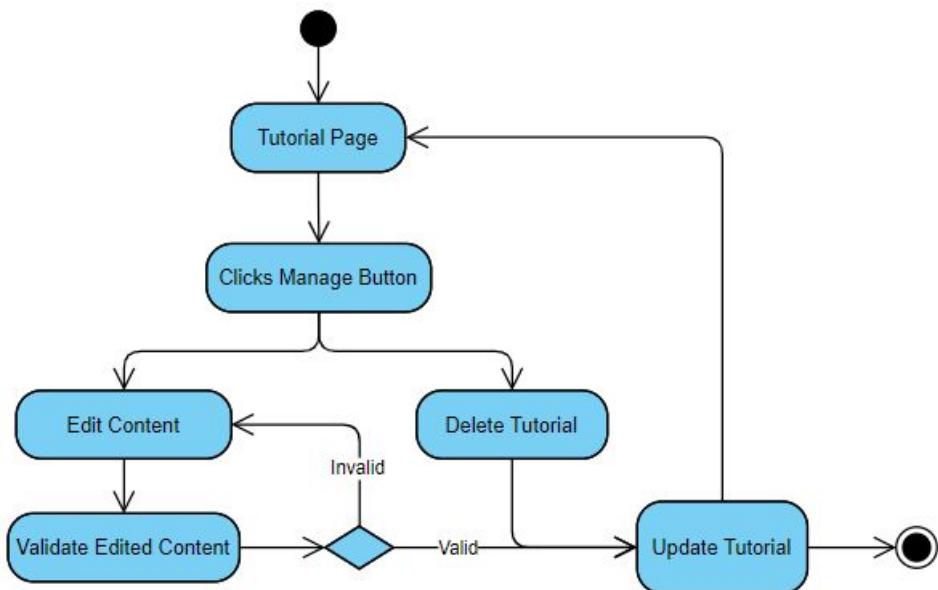
(Figure 73: Upload Tutorial Activity Diagram)

## 9.15 Manage Tutorial



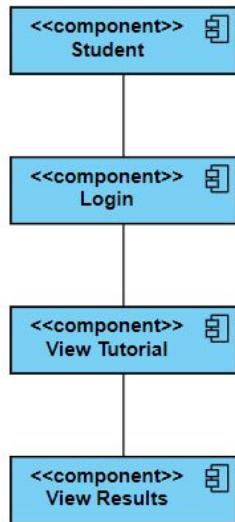
(Figure 74: Manage Tutorial Component Diagram)

### Activity Diagram



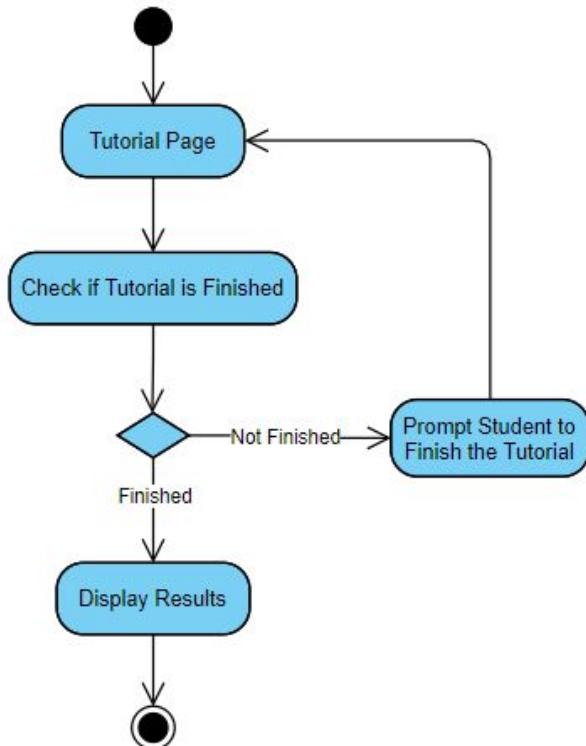
(Figure 75: Manage Tutorial Activity Diagram)

## 9.16 Student View Result



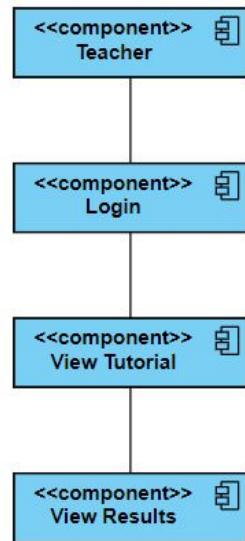
(Figure 76: Student View Result Component Diagram)

### Activity Diagram



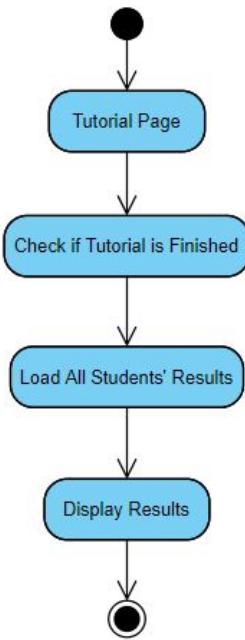
(Figure 77: Student View Result Activity Diagram)

## 9.17 Teacher View Results



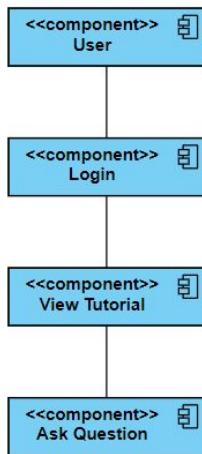
(Figure 78: Teacher View Result Component Diagram)

### Activity Diagram



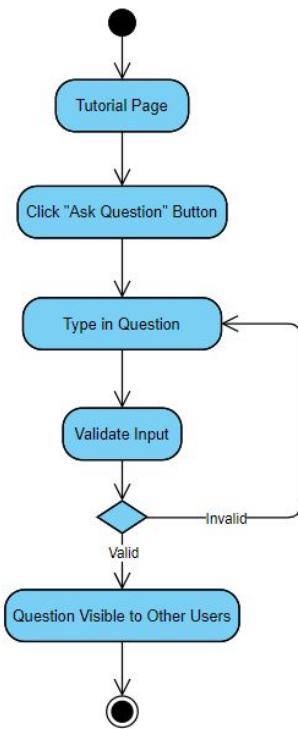
(Figure 79: Teacher View Result Activity Diagram)

## 9.18 Ask Question



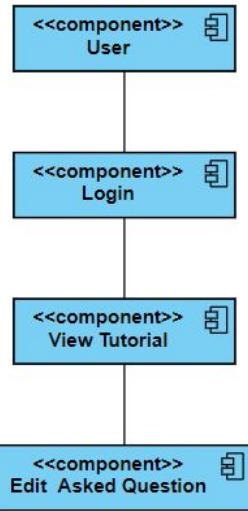
(Figure 80: Ask Question Component Diagram)

### Activity Diagram



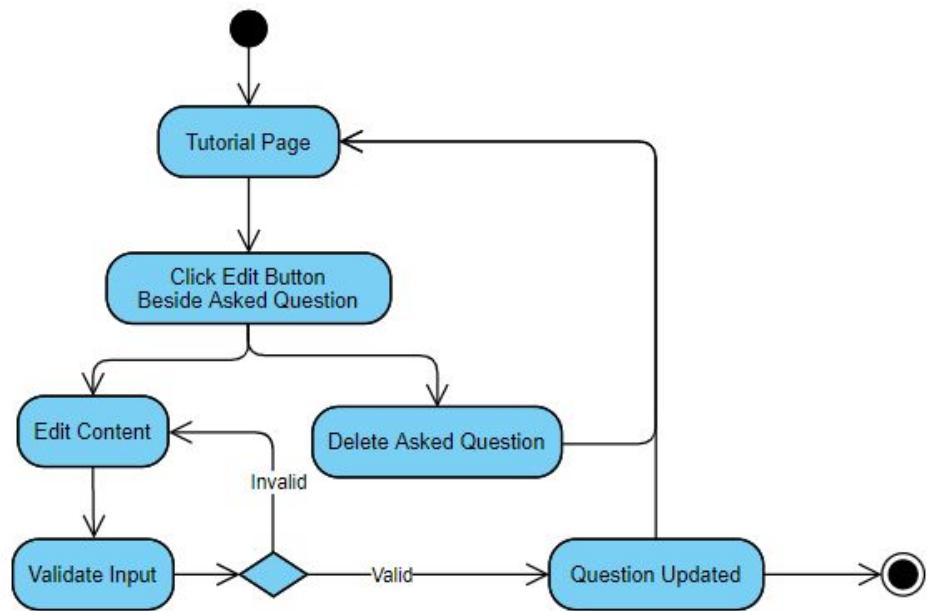
(Figure 81: Ask Question Activity Diagram)

## 9.19 Edit Question



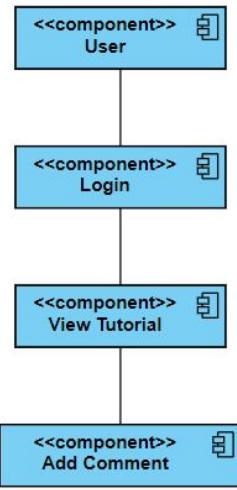
(Figure 82: Edit Question Component Diagram)

### Activity Diagram



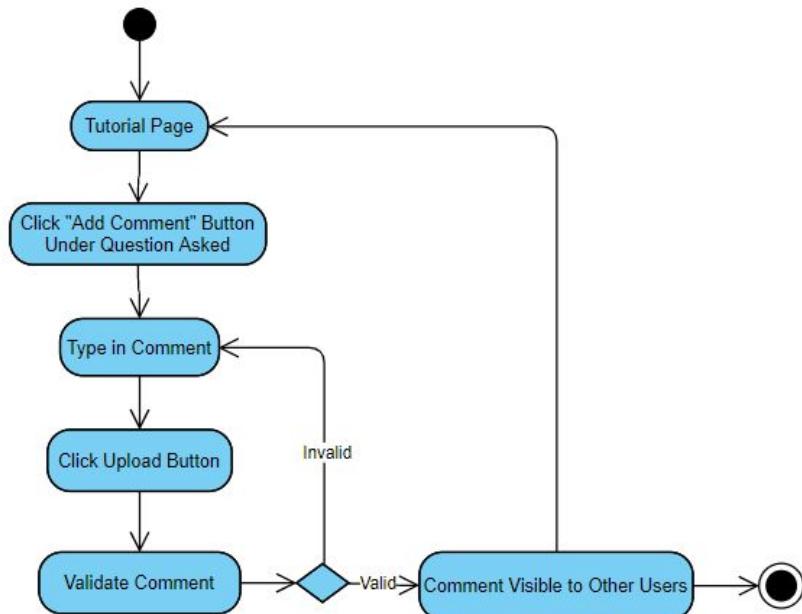
(Figure 83: Edit Question Activity Diagram)

## 9.20 Add Comment



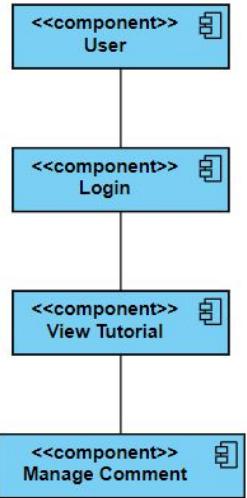
(Figure 84: Add Comment Component Diagram)

### Activity Diagram



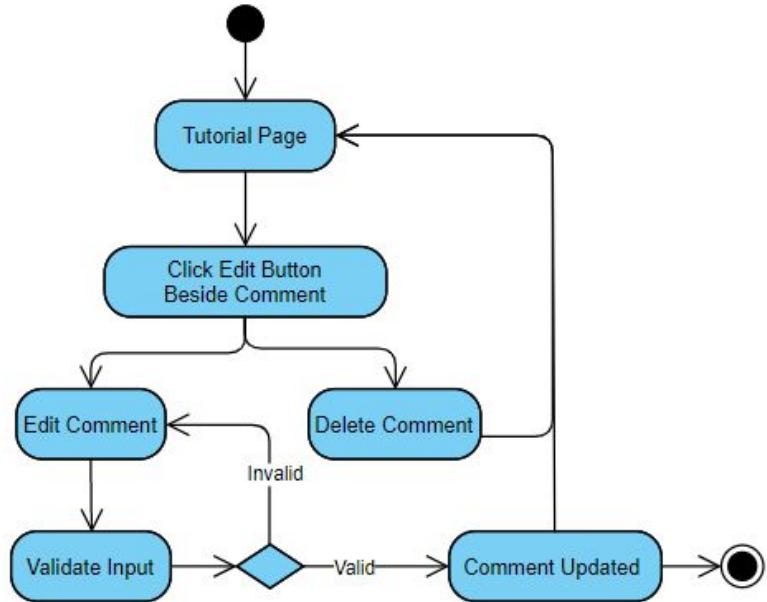
(Figure 85: Add Comment Activity Diagram)

## 9.21 Manage Comment



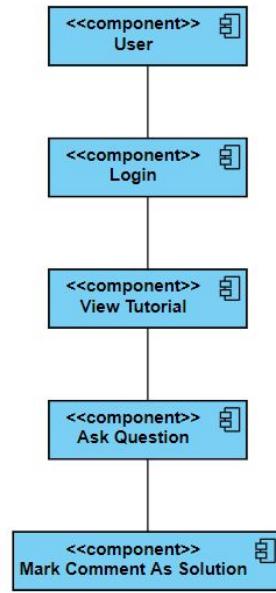
(Figure 86: Manage Comment Component Diagram)

### Activity Diagram



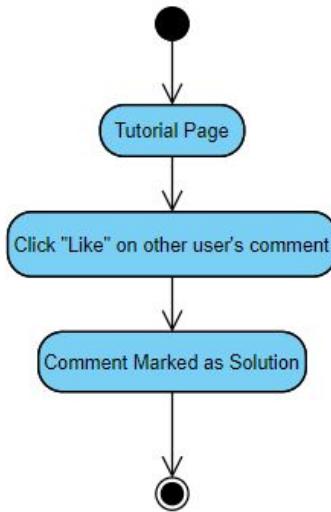
(Figure 87: Manage Comment Activity Diagram)

## 9.22 Mark Comment As Solution



(Figure 88: Mark Comment As Solution Component Diagram)

### Activity Diagram

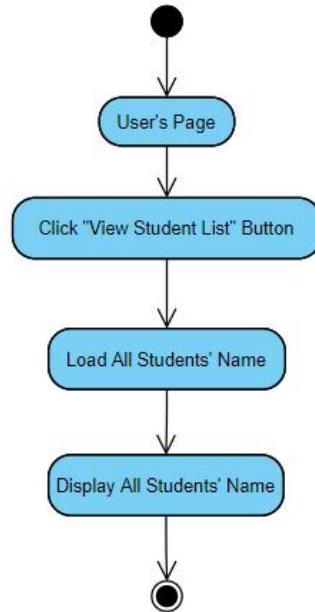


(Figure 89: Mark Comment As Solution Activity Diagram)

## 9.23 View Student List

(Figure 90: View Student List Component Diagram)

### Activity Diagram

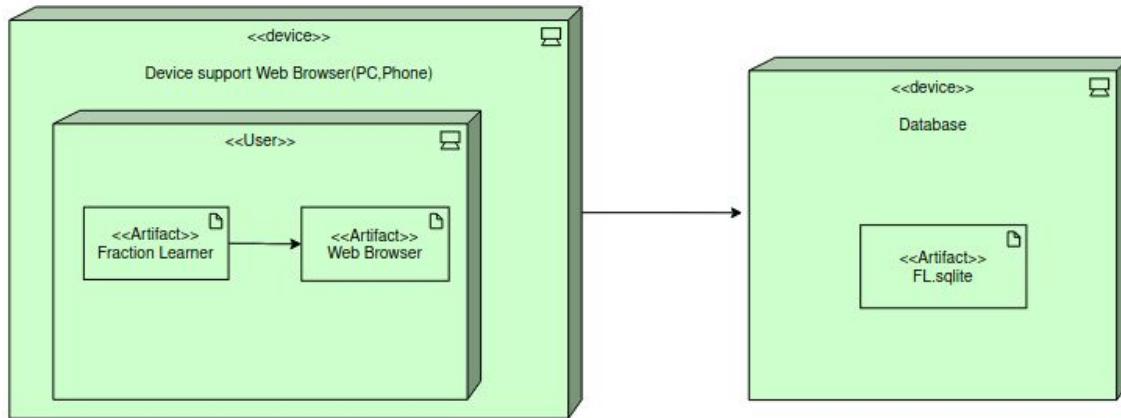


(Figure 91 View Student List Activity Diagram)

# 10.0 Deployment Design

The deployment design indicates how software functionality and subsystems will be allocated within the physical computing environment.

Deployment Design



(Figure 92: Deployment Diagram)

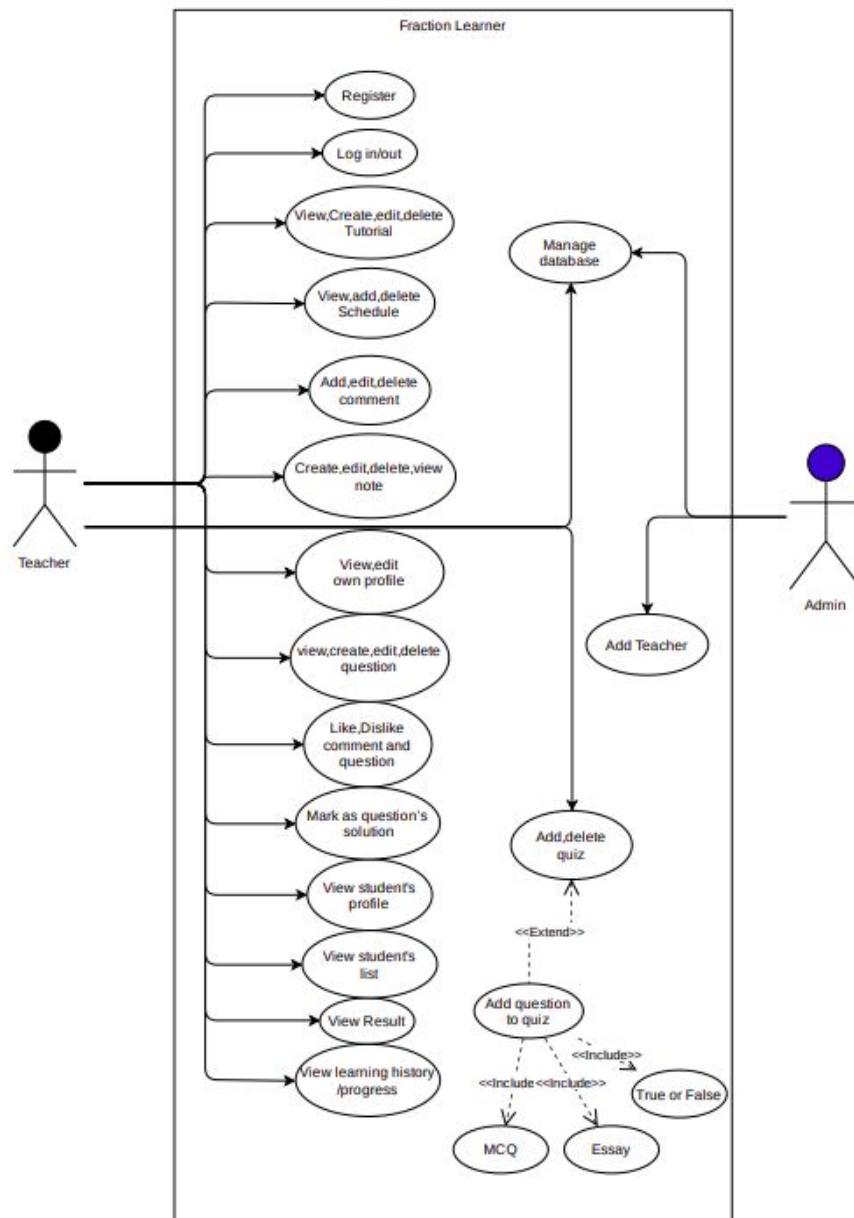
Figure 67 shows the connection of each component from the hardware's view. The Fraction Learner Artifact connects to the database artifact via web browser artifact in a device that supports web Browser such as PC, Handphone, tablet and etc. This diagram shows the interaction between the devices and components.

# 11.0 Updated Requirements

In this section, we will place the requirements that have been updated from project 1 and project 2.

## 11.1 Updated Use Case Diagram

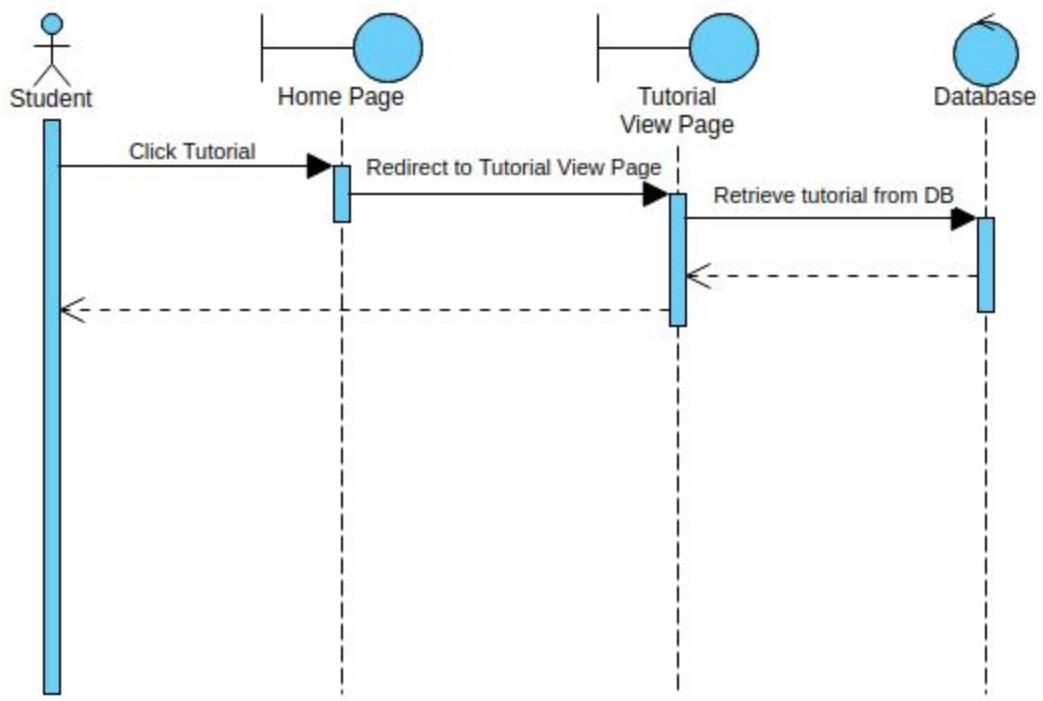
### 11.1.1 Teacher and Admin



(Figure 93: Updated Teacher and Admin Use Case Diagram)

## 11.2 Updated Sequence Diagram

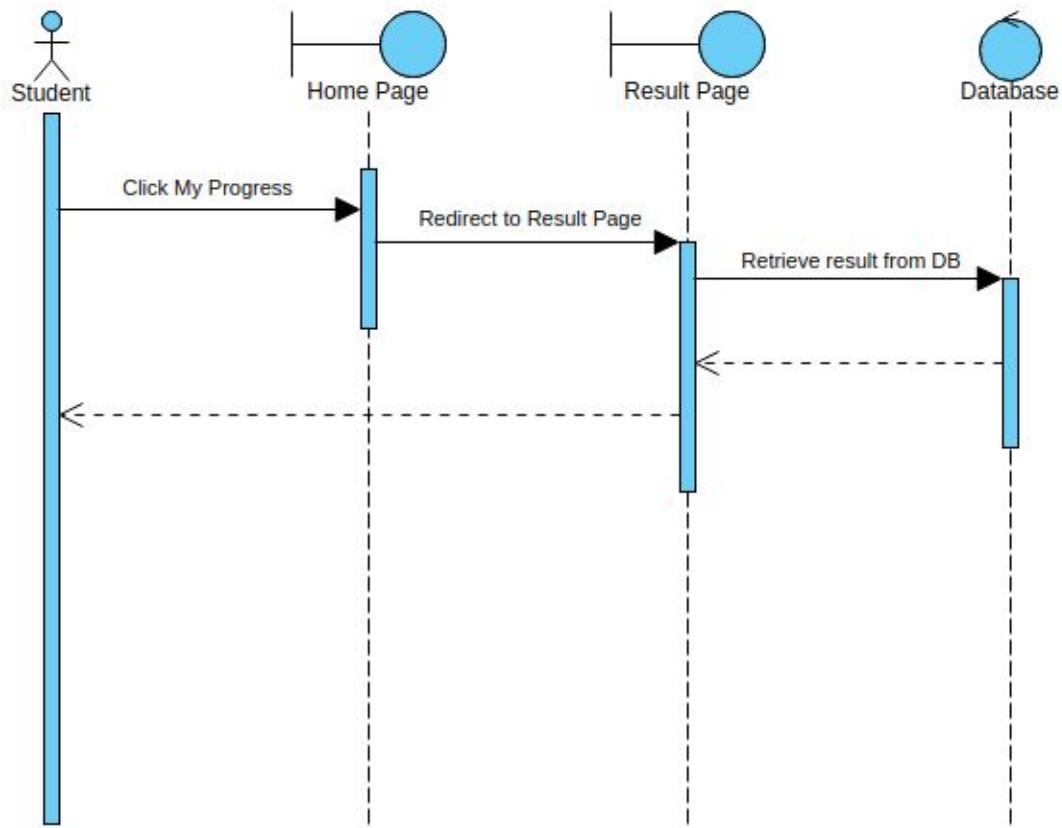
### 11.2.1 View Tutorial



View Tutorial

(Figure 94: View tutorial Updated Sequence Diagram)

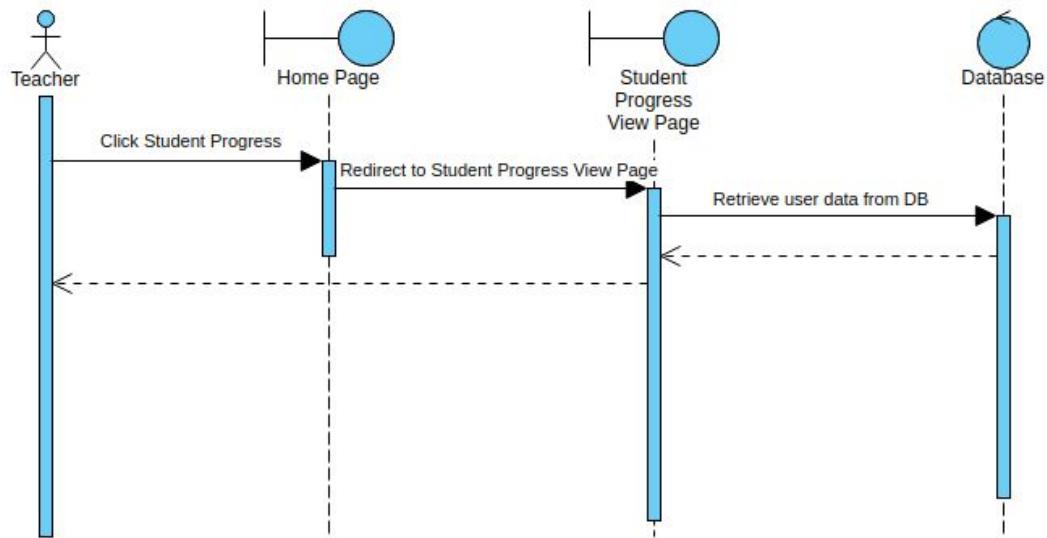
## 11.2.2 View Result



View Result

(Figure 95: View Result Updated Sequence Diagram)

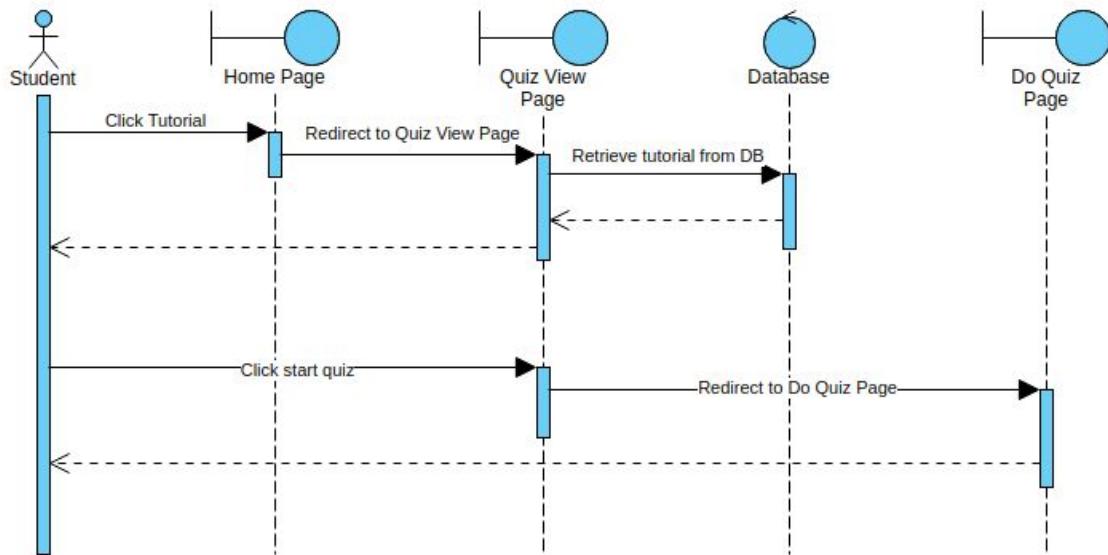
### 11.2.3 View Learning Progress



View Learning Progress

(Figure 96: View Learning Progress updated Sequence Diagram)

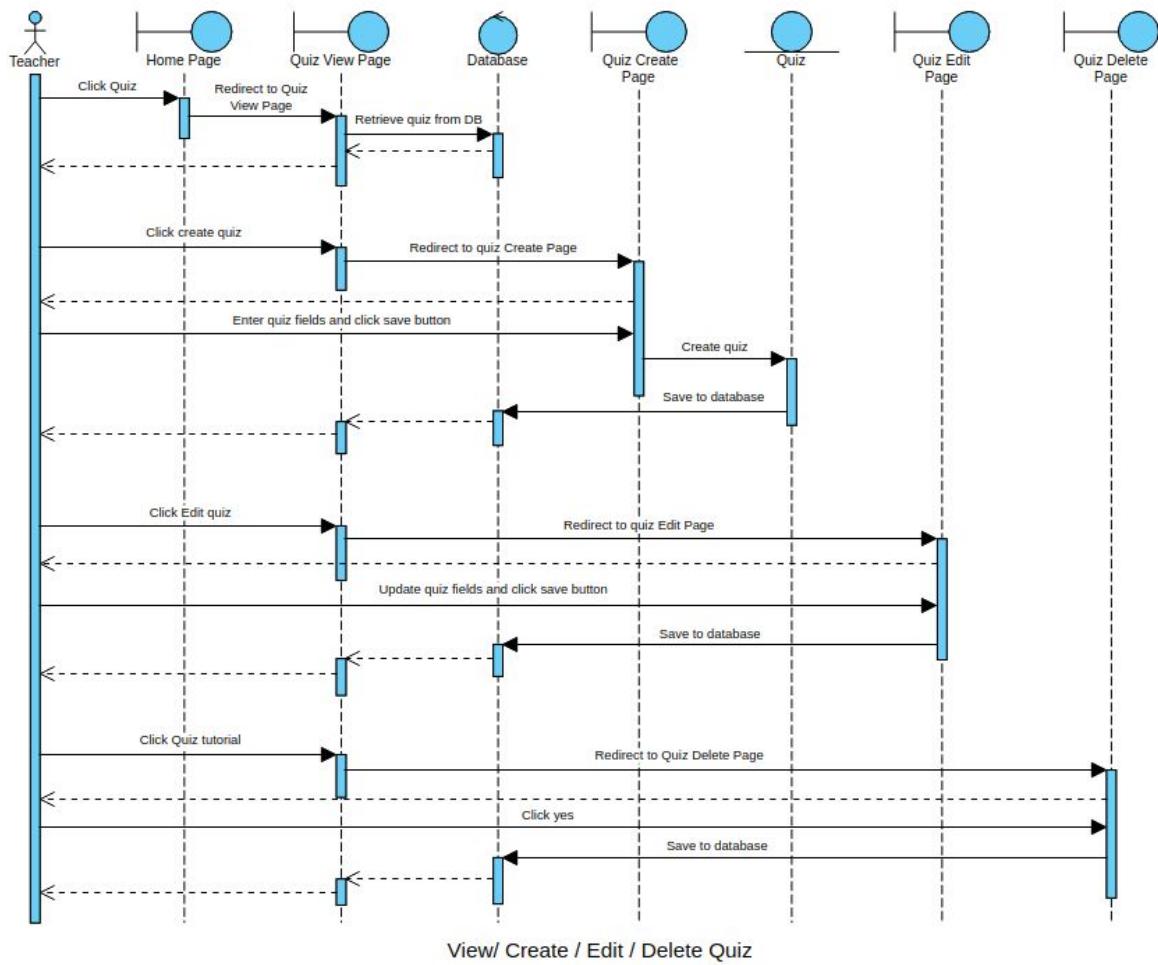
### 11.2.4 View/ Do Quiz



View/Do Quiz

(Figure 97: View/Do quiz updated sequence diagram)

## 11.2.5 Add, Edit, Delete Quiz



(Figure 98: Add,edit,delete quiz updated sequence diagram )

# **12.0 Test Cases Design**

## **12.1 Functional**

The team will be conducting functional testing manually. Each functional requirement is derived from the Use Case Diagram (UCD). Note that some functional requirements are grouped together to prevent redundancy of test cases. Complete test case and requirements are presented in section 11.4 Test cases.

## **12.2 Environment & Infrastructure**

This section describes the hardware, software and operating system that will be used for this system testing.

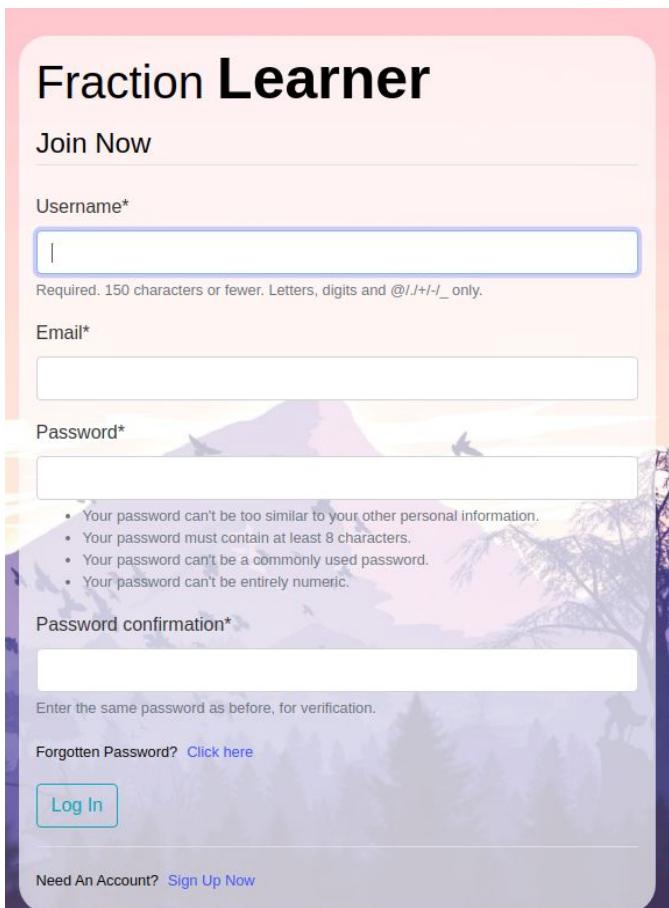
### **12.2.1 Computer Specification**

The following table shows the hardware environment used for this testing.

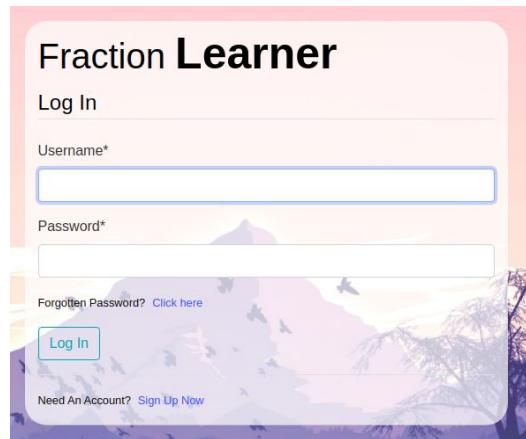
Operating System	Windows 10 Home Single Language 64-bit (10.0, Build 18362)
Processor	Intel(R)Core (TM)i7-7700HQ CPU@2.80Hz(8CPUs),~2.8GHz
Graphics Card	NVIDIA GeForce GTX 860 2GB
Disk Type	SSD
Memory	8GB
Monitor Resolution	1920 x 1080
Peripheral	Mouse with a scroll wheel

## 12.3 Definition of Modules

Upon inspection, the software can be categorized into the following modules for easier failure grouping and testing.

<b>M01 : Registration</b>
 <p>The screenshot shows the registration page for 'Fraction Learner'. The page has a pink header bar with the title 'Fraction Learner' and a 'Join Now' button. Below this is a form with four fields: 'Username*', 'Email*', 'Password*', and 'Password confirmation*'. Each field has a descriptive placeholder text and a character limit of 150 characters. There is also a password strength indicator below the password fields. A 'Log In' button is at the bottom left, and a 'Sign Up Now' link is at the bottom right. The background features a faint illustration of a landscape with mountains and trees.</p> <p style="text-align: center;"><b>(Figure 99: Registration Module )</b></p>
<p><b>Description :</b> Registration module of the web application, it is required for student users to register an account to use the web application. It has 4 fields, Username, Email, Password and Password confirmation</p>

## M02 : Login/Logout

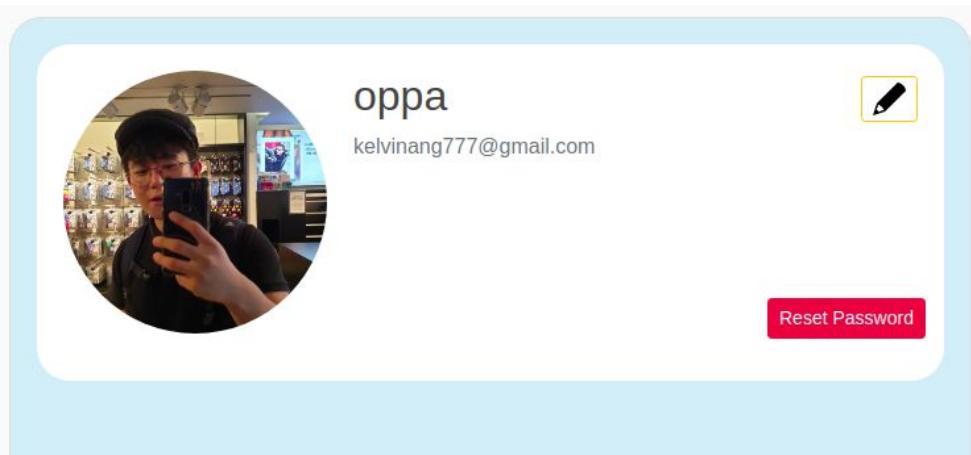


(Figure 100: Login Module )

### Description :

Login and Logout module of the web application. All the users are required to login before they can use the web application. If they log out of the web application, they will be redirected to here if they decided to login again

## M03: Profile

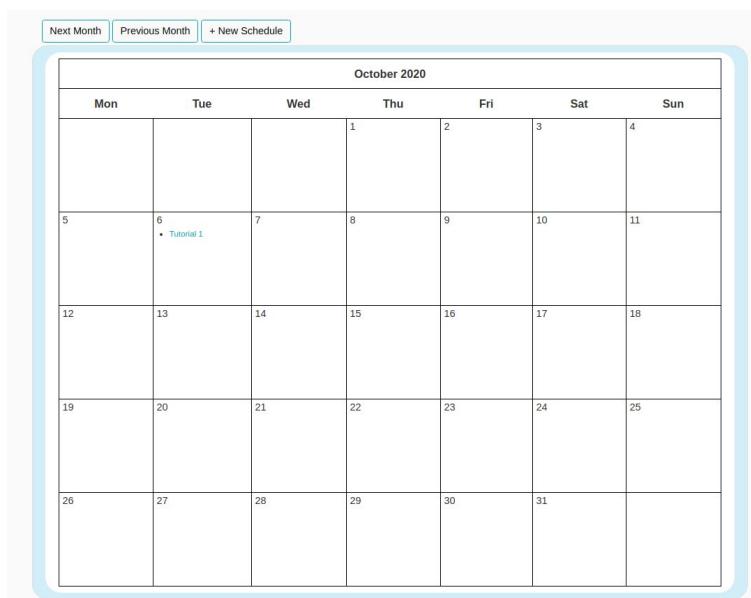


(Figure 101: Profile Module )

### Description :

Profile module of the web application. It is needed for the users to know how their credential will look like in the application. It is also needed so that they could edit the credentials and reset their password.

## M04: Schedule

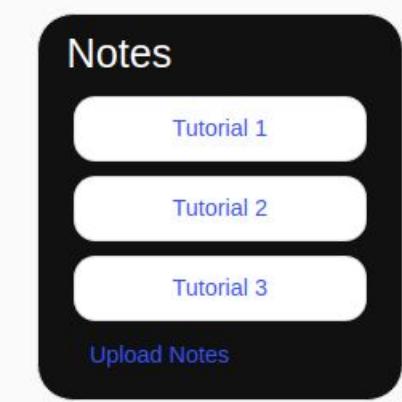


(Figure 102: Schedule Module )

### Description:

Schedule module for the web app. It is needed for students to know what tasks are required to be done. Teachers can make use of the schedule to organise the learning schedule of the student.

## M05: Notes



(Figure 103: Notes Module )

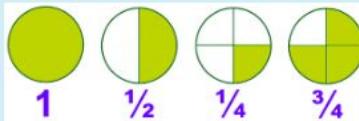
### Description :

Notes module. Teachers use this module to upload notes for students. While students can download it from here.

## M06: Tutorial

Kelvin October 07, 2020

### Chapter 1 : Intro to Fraction



1       $\frac{1}{2}$        $\frac{1}{4}$        $\frac{3}{4}$

Lorem ipsum dolor sit amet, consectetur adipiscing elit. In dictum fermentum neque eget vehicula. Integer bibendum vulputate ipsum ut euismod. Duis tortor leo, euismod in dolor auctor, tempor efficitur sem. Quisque vel nisl vel orci venenatis consectetur. Morbi ac venenatis lorem, sit amet facilisis enim. Nam id mauris vitae mi consequat rhoncus sed id felis. Donec elit sem, pellentesque fringilla dui fringilla, mattis ornare velit. Integer eget sem justo. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Vivamus aliquet congue posuere. Suspendisse massa lorem, pharetra sed laoreet quis, finibus quis purus.

Likes : 1

 Like  Ask a question

(Figure 104: Tutorial Module )

Description : Teachers are able to view, do, upload, and manage tutorial  
Students are able to view and do tutorial

## M07: View Results

### List of complete exams

User	Quiz	Completed	Score(%)	
				Filter
Kelvin	Quiz For Tutorial 1	Oct. 7, 2020	100	<a href="#">View details</a>
Kelvin	Quiz For Tutorial 1	Oct. 7, 2020	67	<a href="#">View details</a>
Kelvin	Quiz For Tutorial 1	Oct. 7, 2020	0	<a href="#">View details</a>
oppa	Quiz For Tutorial 1	Oct. 7, 2020	100	<a href="#">View details</a>

(Figure 105: View ResultModule )

Description : All users are able to view results of the quiz.

## M08: Question

Likes : 1  
Like Ask a question

**student** Likes :0  
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

**student2** Likes :0  
. Nam id mauris vitae  
mi consequat rhoncus  
sed id felis. Donec elit  
sem, pellentesque

✓ This comment is the solution

**Kelvin** Likes :1  
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Like

(Figure 106: Question Module )

Description : All users are able to ask, edit, add question

## M09 : Comment

Like Comment

**student2** Likes :0  
. Nam id mauris vitae  
mi consequat rhoncus  
sed id felis. Donec elit  
sem, pellentesque

✓ This comment is the solution

Like

(Figure 107: Comment Module )

Description :

All users are able to add/manage comment

### M10: View Student List

#### Teacher



Kelvin

teacher@gmail.com

#### Student



student

student@gmail.com



student2

student2@gmail.com

(Figure 108: View Student List Module )

#### Description:

All users are able to view the student list. The list also shows the teachers of the web app

### M11: Quiz

#### List of quiz

Title	Category	Exam	Single attempt	
Quiz For Tutorial 1	Tutorial 1	True	False	<a href="#">View details</a>

(Figure 109: Quiz Module )

#### Description :

Teachers are able to view, edit, and view quiz. Students are able to view and do quiz

## M12: Database

Site administration

AUTHENTICATION AND AUTHORIZATION		
Groups	<a href="#"></a> Add	<a href="#"></a> Change
Users	<a href="#"></a> Add	<a href="#"></a> Change
ESSAY		
Essay style questions	<a href="#"></a> Add	<a href="#"></a> Change
MULTICHOICE		
Multiple Choice Questions	<a href="#"></a> Add	<a href="#"></a> Change
QUIZ		
Categories	<a href="#"></a> Add	<a href="#"></a> Change
Quizzes	<a href="#"></a> Add	<a href="#"></a> Change
Sub-Categories	<a href="#"></a> Add	<a href="#"></a> Change
User progress records	<a href="#"></a> Add	<a href="#"></a> Change
SCHEDULER		
Schedules	<a href="#"></a> Add	<a href="#"></a> Change
TRUE_FALSE		
True/False Questions	<a href="#"></a> Add	<a href="#"></a> Change
TUTORIAL		
Comments	<a href="#"></a> Add	<a href="#"></a> Change
Files admins	<a href="#"></a> Add	<a href="#"></a> Change
Qcomments	<a href="#"></a> Add	<a href="#"></a> Change
Tutorials	<a href="#"></a> Add	<a href="#"></a> Change
USERS		
Profiles	<a href="#"></a> Add	<a href="#"></a> Change

(Figure 110: Database Module )

Description :

Module for admin to manage user, user's permission and database.

## 12.4 Test Cases

\*Valid username = "oppa"

Valid password = "kaiboonCLSSadmin123"

TCID	Description/ Title	Module Involved	Steps	Input	Expected Output	Actual Output	Status
TC01	User tries to register without any credentials entered.	M01	1. Click register button	-	The system will display "Please fill out this field."	The system displays "Please fill out this field."	Pass
TC02	User enter invalid username, invalid email, and invalid password and wrong password confirmation	M01	1. Enter username in the username textfield 2. Enter email in the email text field 3. Enter password in the password text field 4. Enter the password confirmation in the password confirmation text field	Username = "Kel Oppa"  Email = "gmail.com"  Password = "1234567"  Password Confirmation= "1234"	The user will not be able to register an account and the system will show error messages :" Invalid email ,username and password confirmation"	The user fails to register an account and the system display 2 error messages : "Enter a valid username. This value may contain only letters, numbers, and @/./+/-_ characters." and "The two password fields didn't match."	Pass
TC03	User enters valid username, valid email, but invalid password and invalid password confirmation	M01	1. Enter username in the username textfield 2. Enter email in the email text field 3. Enter password in the password text field 4. Enter the password confirmation in the password confirmation text field	Username = "KelOppa"  Email = "kelvinang77@gmail.com"  Password = "12345678"  Password Confirmation= "1234"	The user will not be able to register an account and the system will show error messages :" Invalid password confirmation"	The user fails to register an account and the system displays "The two password fields didn't match."	Pass

TC04	User enters valid username, valid email and valid password confirmation but invalid password	M01	1. Enter username in the username textfield 2. Enter email in the email text field 3. Enter password in the password text field 4. Enter the password confirmation in the password confirmation text field	Username = "KelOppa"  Email = "kelvinang77@gmail.com"  Password = "12345678"  Password Confirmation= "kaiboonc"	The user will not be able to register an account and the system will show error messages :" Invalid password "	The user fails to register an account and the system displays "This password is too common. " and "This password is entirely numeric".	Pass
TC05	User enters valid username, valid email, valid password confirmation and valid password	M01	1. Enter username in the username textfield 2. Enter email in the email text field 3. Enter password in the password text field 4. Enter the password confirmation in the password confirmation text field	Username = "KelOppa"  Email = "kelvinang77@gmail.com"  Password = "kaiboon2323"  Password Confirmation= "kaiboon2323"	The user will register an account successfully and redirected to the login page	The user successfully registered an account successfully and redirected to the login page	pass
TC06	User enter a valid username but not a valid password	M02	1.Enter username in the username text field 2. Enter password in the password text field 3. Click the login button	Username = "oppa"  Password = "123456"	The system will display "Please enter a correct username and password. Note that both fields may be case-sensitive"	The system displays "Please enter a correct username and password. Note that both fields may be case-sensitive"	Pass

TC07	User enter an invalid username and random password	M02	1.Enter username in the username text field 2. Enter password in the password text field 3. Click the login button	Username = "Trump" Password = "69abcd"	The system will display "Please enter a correct username and password. Note that both fields may be case-sensitive"	The system displays "Please enter a correct username and password. Note that both fields may be case-sensitive"	Pass
TC08	User enter valid password but invalid username	M02	1.Enter username in the username text field 2. Enter password in the password text field 3. Click the login button	Username = "Trump" Password = "kaiboonCL Sadmin123"	The system will display "Please enter a correct username and password. Note that both fields may be case-sensitive"	The system displays "Please enter a correct username and password. Note that both fields may be case-sensitive"	Pass
TC09	User Try to login without enter any username or password	M02	1. Click the login button	-	The system will display "Please enter a correct username and password. Note that both fields may be case-sensitive"	The system displays "Please enter a correct username and password. Note that both fields may be case-sensitive"	Pass
TC10	User Enter valid username and valid password	M02	1.Enter username in the username text field 2. Enter password in the password text field 3. Click the login button	Username = "oppa" Password = "kaiboonCL Sadmin123"	The user is able to login into system and see the main page	The user successfully login into system and see the main page	Pass
TC11	User updates profile with the same credentials	M03	1. Click on edit button 2. Click Update button	-	The user will Data will still be the same.	The system display "updated successfully" message, and the user's data is still the same	Pass

TC12	User updates profile with invalid user name and invalid email	M03	1. Click on edit button 2. Enter username in the username text field 3. Enter the email in the email text field 4. Click Update button	Username = "Kel Oppa"  Email = "gmail.com"	The user will not be able to update the profile and the system will “display invalid credentials”	The user could not update the profile and the system display Please include an @ in the email address.'gmail.com' is missing an @	Pass
TC13	User updates profile with valid user name and invalid email	M03	1. Click on edit button 2. Enter username in the username text field 3. Enter the email in the email text field 4. Click Update button	Username = "Kelvin12"  Email = "gmail.com"	The user will not be able to update the profile and the system will “display invalid email format”	The user could not update the profile and the system display “Please include an @ in the email address.'gmail.com' is missing an @”	Pass
TC14	User updates profile with invalid user name and valid email	M03	1. Click on edit button 2. Enter username in the username text field 3. Enter the email in the email text field 4. Click Update button	Username = "Kel Oppa"  Email = "kelvin123@gmail.com"	The user will not be able to update the profile and the system will “display invalid username”	The user could not update the profile and the system displayed “Enter a valid username. This value may contain only letters, numbers, and @/./+/-_ characters.”	Pass
TC15	User updates profile with valid user name and valid email	M03	1. Click on edit button 2. Enter username in the username text field 3. Enter the email in the email text field 4. Click Update button	Username = "KelOppa"  Email = "kelvin123@gmail.com"	The user credentials will be updated successfully and the system display “Updated Successfully”	The user credential is updated successfully and the system displays “Your account has been updated !”	Pass
TC16	User request for reset	M03	1. Click on reset password button	-	The user will not receive any	The system does not send any	Pass

	password with no input on email		2. Click Request password reset button		email and the system prompt error message: "Please fill in your email"	email and the system prompt error message: "Please fill out this field"	
TC17	User request for reset password with invalid email	M03	1.Click on reset password button 2. Enter email in the email field 3. Click Request password reset button	Email = "gmail.com"	The user will not receive any email and the system prompt error message: "Invalid Email"	The system does not send any email and the system prompt error message "Please include an @ in the email address.'gmail.com' is missing an @"	Pass
TC18	User reset password with no input given	M03	1.Click on reset password button 2. Enter email in the email field 3. Click Request password reset button 4. Click on the link in the email received 5. Click on reset Password button	-	The user will not be able to reset the password and the system will prompt error message: "Please fill out the credentials listed"	The system does not reset the user's password and it prompt error messages: "Please fill out this field."	Pass
TC19	User reset password with invalid password and invalid password confirmation	M03	1.Click on reset password button 2. Enter email in the email field 3. Click Request password reset button 4. Click on the link in the email received 5. Enter new password in the new password field 6. Enter new password confirmation in the new	New password = "1212123"  New password confirmation = "676767"	The user will not be able to reset the password and the system will display message "The password confirmation is different from the password!"	The user could not reset the password and the system display "The two password fields didn't match."	Pass

			password confirmation field 7. Click on reset Password button				
TC20	User reset password with invalid password but valid password confirmation	M03	1.Click on reset password button 2. Enter email in the email field 3. Click Request password reset button 4. Click on the link in the email received 5. Enter new password in the new password field 6. Enter new password confirmation in the new password confirmation field 7. Click on reset Password button	New password = "123456"  New password confirmation = "123456"	The user will not be able to reset the password, the system will display message "Invalid password format"	The user could not reset the password and the system display 3 messages :"This password is too short. It must contain at least 8 characters." , "This password is too common." and "This password is entirely numeric."	Pass
TC21	User reset password with valid password and valid password confirmation	M03	1.Click on reset password button 2. Enter email in the email field 3. Click Request password reset button 4. Click on the link in the email received 5. Enter new password in the new password field 6. Enter new password confirmation in the new password confirmation	New password = "akvin5656"  New password confirmation = "akvin5656"	The user will be able to reset the password.	The user successfully resetted the password	Pass

			field 7. Click on reset Password button				
TC22	User view the current schedule	M04	1. Click on schedule button	-	The system should display the schedule showing task needed to be done	The system displayed the schedule with some tasks.	Pass
TC23	User view the next month schedule	M04	1. Click on schedule button 2. Click on Next Month button	-	The system should display the schedule of next month	The system displayed the next month schedule with some tasks.	Pass
TC24	User view the previous month schedule	M04	1. Click on schedule button 2. Click on Previous Month button	-	The system should display the schedule of previous month	The system displayed the previous month schedule with some tasks.	Pass
TC25	User add new schedule to the schedule with no input. (Only teacher and admin account can do this)	M04	1. Click on schedule button 2. Click on + new schedule button 3. Click on yes button	-	The system should not be able to add the new schedule and the system display "Please fill in this field."	The system does not add the schedule and the system display "Please fill in this field"	Pass
TC26	User add new schedule to the schedule with all the info filled in .(Only teacher and admin account can do this)	M04	1. Click on schedule button 2. Click on + new schedule button 3. Enter the title in title field 4. Enter the Description in the description field 5.Select start time 6. Select select end time 7. Click on yes	Title= "Tutorial 2"  Description = "Please do tutorial 2"  Start time = 8/10/2020 04.43 PM End Time = 9/10/2020 04.43 PM	The system should add the schedule into the database and display it in the schedule	The system added the schedule and display it in the schedule	Pass

			button				
TC27	User view the detail of the schedule	M04	1. Click on schedule button 2. Click on the schedule on the schedule.	-	The system should display the details of the schedule	The system displayed the details of the schedule .	Pass
TC28	User edit the schedule with no new input. (Only teacher and admin account can do this)	M04	1. Click on schedule button 2. Click on the schedule on the schedule. 3. Click on yes button	-	The system should not make any changes to the data of the schedule.	The system did not change the data of the schedule and redirect the user to the schedule's detail page	Pass
TC29	User edit the schedule with all input (Only teacher and admin account can do this)	M04	1. Click on schedule button 2. Click on the schedule on the schedule. 3. Enter title in title text field 4. Enter the description of the schedule 5. Adjust the Start time and end time 3. Click on yes button	Title= "Tutorial 2 edited"  Description = "Please do tutorial 2 edited"  Start time = 9/10/2020 04.43 PM End Time = 10/10/2020 04.43 PM	The system should be able to update the schedule and display the schedule again	The system updated the schedule according to the changes made and display the schedule detail again	Pass
TC30	User download notes	M05	1. Click on the button that has the name of the note that needed to be downloaded.	-	The user should be able to download the chosen note and the content of the notes must be correct and viewable.	The user is able to download the chosen note and the content of the note is viewable.	Pass
TC31	User upload notes (Only admin and teacher can do this)	M05	1. Click on the "Upload Notes" button or the "New Notes" button.	Title = "Notes 5"  File = "Notes5.pdf"	The user should be able to upload the note and the note should be visible	The note is successfully uploaded and is visible to every user.	Pass

			2. Click on the "Choose File" button and select file to upload. 3. Type in the Title of the notes 4. Click Yes button	"	to other users		
TC32	User tries to upload notes without inserting any file or title	M05	1. Click on the "Upload Notes" button or the "New Notes" button. 2. Click Yes button	-	The system should prompt the user to insert a file or fill in the title	The system prompts the user to insert a file or fill in the title	Pass
TC33	User edit notes (Only admin and teacher can do this)	M05	1. Click on the "Manage Notes" button. 2. Select the notes that need to be edited. 3. Upload new file or type in new title 4. Click save button to save the edited note	File = "Note5.pdf"  Title = "Note 5"	The system should update the notes and is visible to others	The note is updated and visible to others	Pass
TC34	User tries to edit notes without inserting any file or title	M05	1. Click on the "Manage Notes" button. 2. Select the notes that need to be edited. 3. Click save button to save the edited note	-	The system should prompt the user to insert a file or fill in the title name	The system prompts the user to insert a file or fill in the title name	Pass
TC35	User view tutorial content	M06	1. Click on the button of the tutorial that wanted to be view	-	The system should redirect the user to the page of the tutorial	The system successfully redirects the user to the page of the tutorial	Pass
TC36	User upload	M06	1. Click on the	Title =	The system	The system	Pass

	new tutorial (Only admin and teacher can do this)		<p>“+New Tutorial” button</p> <p>2. Type in the title, fill in the content and upload picture if needed.</p> <p>3. Click the save button</p>	<p>“Notice1”</p> <p>Content = “Pls do tutorial”</p> <p>File = “Notice.pdf”</p>	should upload the new tutorial and every user should be able to view the tutorial	successfully uploaded the tutorial and is now visible to every user	
TC37	User tries to upload tutorial without inserting any title or content	M06	<p>1. Click on the “+New Tutorial” button</p> <p>2. Click save button</p>	-	The system should prompt the user to fill in the title and content	The system prompts the user to fill in the title and content	Pass
TC38	User edit uploaded tutorial (Only admin and teacher can do this)	M06	<p>1. Click on the tutorial that is needed to edit</p> <p>2. Click on the “Edit” button</p> <p>3. Type in the title, fill in the content and upload picture if needed.</p> <p>4. Click the save button</p>	<p>Title = “Notice1”</p> <p>Content = “Pls do tutorial”</p> <p>File = “Notice.pdf”</p>	The system should update the tutorial and is visible to others	The tutorial is updated and visible to others	Pass
TC39	User tries to edit tutorial without inserting any title or content	M06	<p>1. Click on the tutorial that is needed to edit</p> <p>2. Click on the “Edit” button</p> <p>3. Click save button</p>	-	The system should prompt the user to fill in the title and content	The system prompts the user to fill in the title and content	Pass
TC40	User delete uploaded tutorial (Only admin and teacher can do this)	M06	<p>1. Click on the tutorial</p> <p>2. Click on the “Delete” button</p> <p>3. Click on confirm button</p>	-	The system should delete the tutorial	The tutorial is successfully deleted	Pass
TC41	User give the tutorial a like	M06	<p>1. Click on the tutorial</p>	-	The tutorial should be mark	The tutorial is successfully liked	Pass

			2. Click on the like button 3. Click on the confirm button		as like		
TC42	User undo the like on the tutorial	M06	1. Click on the tutorial 2. Click on the dislike button 3. Click on the confirm button	-	The like on the tutorial should be no more	Successfully undo the like on the tutorial	Pass
TC43	User view the previous result	M07	1.Click on Student Progress button 2.Click on the view details button to see the previous result	-	The system should be display the previous result	The system displayed the previous result	Pass
TC44	User ask question	M08	1.Click on Tutorial's List button 2.Click on any chapter button 3.Click on ask a text button 4.Enter text in the question box 5.Click on the submit button	What is fraction?	The system should be display the question	The system displayed the question	Pass
TC45	User edit question	M08	1.Click on Tutorial's List button 2.Click on any chapter button 3.Click on the edit button 4.Enter text in the text box Click on the submit button	What is the suggested answer?	The system should be display the edited question	The system displayed the edited question	Pass
TC46	User add question	M08	1.Click on Tutorial's List button	What is the numerator?	The system should be display the	The system displayed the question added	Pass

			2.Click on any chapter button 3.Click on ask a question button 4.Enter text in the text box 5.Click on the submit button		question added		
TC47	User delete question	M08	1.Click on Tutorial's List button 2.Click on any chapter button 3.Click on delete button 4.Click on yes button or cancel button	-	The system should be delete question	The system delete question	Pass
TC48	User mark as solution of the question uploaded	M08	1.Click on Tutorial's List button 2.Click on any chapter button 3.Click on the Mark as a solution button of the comment posted 4.Click on yes button	-	The system should be display "This comment is the solution"	The system displayed "This comment is the solution"	Pass
TC49	User undo as solution of the comment posted	M08	1.Click on Tutorial's List button 2.Click on any chapter button 3.Click on the Undo as a solution button of the comment posted 4.Click on yes button	-	The system should display"Mark as solution!"	The system displayed "Mark as solution!"	Pass
TC50	User add comment	M09	1. Click on the tutorial	Comment = "Hello"	The comment should be added	The comment is successfully	

	under question		2. Click on the comment button 3. Type in comment 4. Click on submit button		under the question	added under the question	
TC51	User tries to add comment without inserting any input	M09	1. Click on the tutorial 2. Click on the comment button 3. Click on submit button	-	The system should prompt the user to fill in the comment	The system prompts the user to fill in the comment	
TC52	User edit own comment	M09	1. Click on the tutorial 2. Click on the “Edit” button beside the comment 3. Type in a new comment . 4. Click the save button	Comment = “Hello there”	The system should update the tutorial and is visible to others	The comment is updated	
TC53	User tries to edit comment without inserting anything	M09	1. Click on the tutorial 2. Click on the “Edit” button 3. Click submit button	-	The system should prompt the user to fill in the comment	The system prompts the user to fill in the comment	
TC54	User delete own comment	M09	1. Click on the tutorial 2. Click on the “Delete” button beside the comment 3. Click on confirm button	-	The system should delete the comment	The comment is successfully deleted	
TC55	User give the comment a like	M09	1. Click on the tutorial 2. Click on the like button 3. Click on the confirm button	-	The comment should be mark as like	The comment is successfully liked	
TC56	User undo	M09	1. Click on the	-	The like on the	Successfully undo	

	the like on the comment		tutorial 2. Click on the dislike button 3. Click on the confirm button		comment should be no more	the like on the comment	
TC57	User view the students list	M10	1.Click on Student's List button	-	The system should be display the student list include teachers	The system displayed the student list include teachers	
TC58	User view all the available quizzes	M11	1.Click on Quiz button	-	The system should display all the available quizzes	The system displayed all the available quizzes	Pass
TC59	User view the detail of the quizzes	M11	1.Click on Quiz button 2. Click on View details button	-	The system should display the details of the quiz	The system displayed the details of the quiz	Pass
TC60	User attempts the quiz with no input	M11	1.Click on Quiz button 2. Click on View details button 3. Click on start quiz button 4. Click on check button	-	The user should not be able to proceed to the next question of the quiz and the system display error message: "Please select one of these options"	The user could not proceed to the next question of the quiz and the system display error message: "Please select one of these options"	Pass
TC61	User attempts the quiz with all the required inputs	M11	1.Click on Quiz button 2. Click on View details button 3. Click on start quiz button 4. Select the question's answer 5. Click on check button	-	The system should display the results after the user has finished the quiz	The system displayed the result of the user after the user finished the quiz	Pass
TC62	User add MCQ Question with	M11	1. Click on add quiz question button	-	The system should display a message:	The system displayed a message :	Pass

	no input  (Only teacher and admin account can do this)		2. Click on add MCQ question 3.Click save button		"Please fill in the required fields."	Please correct the error below." and rejected the question	
TC63	User add MCQ Question with all the required inputs  (Only teacher and admin account can do this)	M11	1. Click on add quiz question button 2. Click on add MCQ question 3.Enter question text in the question field 4. Select the category 5. Enter the answers in the three answer fields. 6.Select the correct answer 7.Click save button	Question = what is 1+1  Category = tutorial 2  Figure= Fraction.png  Answers 1 = 1 (Correct)  Answers 2 = 2  Answers 3 = 3	The system should be able to add the quiz into the database.	The system successfully added the new question and displayed a message : "The question what is 1+1 is added successfully !"	Pass
TC64	User add True false Question with no input  (Only teacher and admin account can do this)	M11	1. Click on add quiz question button 2. Click on add True False question 3.Click save button	-	The system should display a message: "Please fill in the required fields."	The system displayed a message : "Please correct the error below." and rejected the question	Pass
TC65	User add True false Question with all the required	M11	1. Click on add quiz question button 2. Click on add MCQ question	Question = Is $1/4 + 2/4 = 6/4$ correct ?	The system should be able to add the quiz into the database.	The system successfully added the new question and displayed a	Pass

	inputs  (Only teacher and admin account can do this)		3.Enter question text in the question field 4. Select the category 6.Click correct if the question is true, else ignore 7.Click save button	Category = tutorial 2  Figure= Fraction2.png		message : "The True/False Question "Is $\frac{1}{4} + \frac{2}{4} = \frac{6}{4}$ correct ?" was added successfully!""	
TC66	User add Essay Question with no input  (Only teacher and admin account can do this)	M11	1. Click on add quiz question button 2. Click on add Essay question 3.Click save button	-	The system should display a message: "Please fill in the required fields."	The system displayed a message : "Please correct the error below." and rejected the question"	Pass
TC67	User add essay Question with all the required inputs  (Only teacher and admin account can do this)	M11	1. Click on add quiz question button 2. Click on add MCQ question 3.Enter question text in the question field 4.Click save button	Question = Prove that $\frac{1}{2} + \frac{1}{2}$ is equal to 1.  Category = tutorial 2	The system should be able to add the quiz into the database.	The system successfully added the new question and displayed a message : "The Essay style question "Prove that $\frac{1}{2} + \frac{1}{2}$ is equal to 1." was added successfully."	Pass
TC68	User add quiz with no input  (Only teacher and admin account can do this)	M11	1. Click on add quiz button 2.Click save button	-	The system should display a message: "Please fill in the required fields."	The system displayed a message : "Please correct the error below." and rejected the quiz	pass
TC69	User add quiz with all	M11	1.Click on add quiz button	Title = Quiz 2	The system should accept	The system displayed a	pass

	the required inputs (Only teacher and admin account can do this)		2. Enter quiz title in the title text field 3. Enter the description of the quiz in the description field 4. Enter a user friendly url in the user friendly url field 5. Selects Category 6.Select Questions to be added	Description = Please study tutorial 2 and attempt quiz 2  User friendly url = quiz2  Category = tutorial2  Questions = [ is 3/4 + 1/4 = 1 correct,Tutorial 2]	the input and add the quiz into the database	message : "The Quiz "Quiz 2" was added successfully." and the quiz is added to the database	
TC70	User views the overall structure of database (Student cannot use this function)	M12	1. Click on manage database button.	-	The system should preview all the available models in the system	The system displayed all the models in the system	Pass
TC71	User add new teacher to the database	M12	1.Click on manage database button. 2. Enter username in the username field 3.Enter password and password confirmation.	-	The system should be able to add the new teacher into the database	The system saved the new teacher into the database	Pass

# 13.0 Sample Screen

## 13.1 All User

### 13.1.1 Register

Fraction Learner

Search

Login Register

## Fraction Learner

Join Now

Username\*

Email\*

Password\*

Your password can't be too similar to your other personal information.  
Your password must contain at least 8 characters.  
Your password can't be a commonly used password.  
Your password can't be entirely numeric.

Password confirmation\*

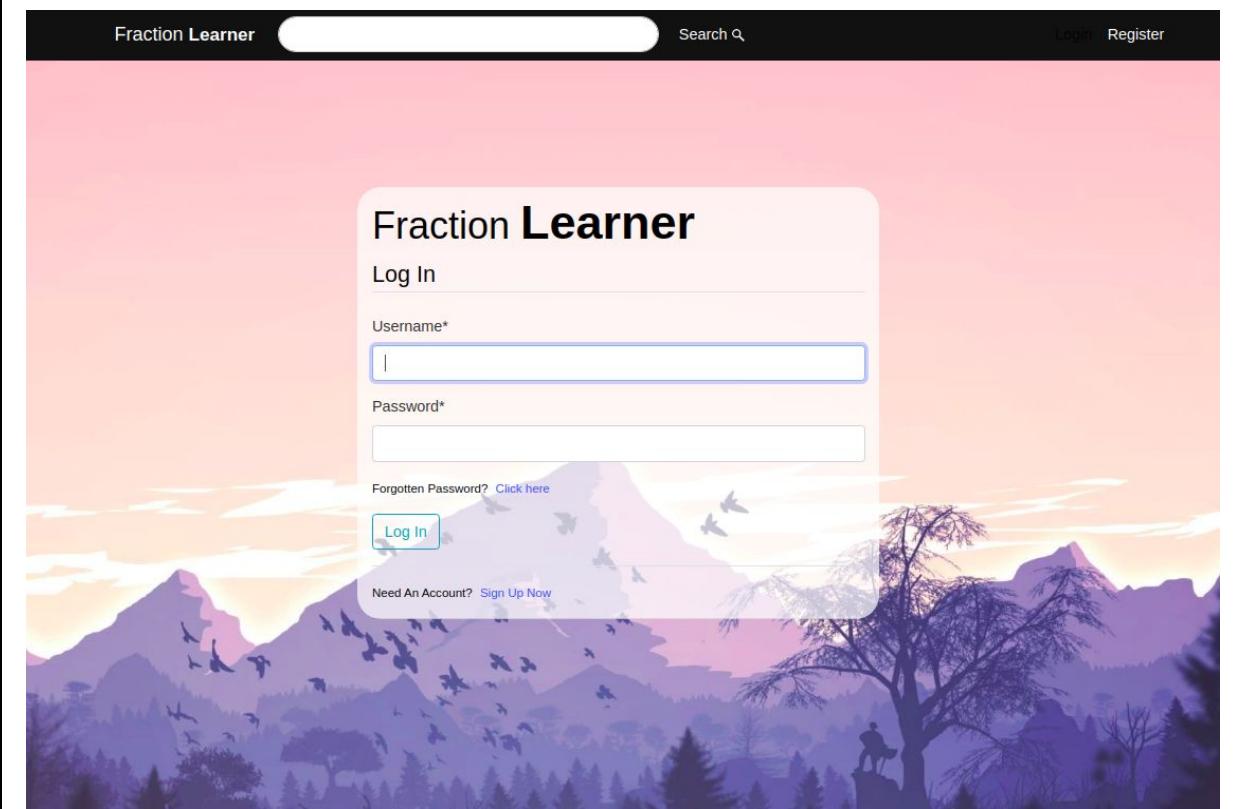
Enter the same password as before, for verification.

Register

Already Have An Account? [Login Now](#)

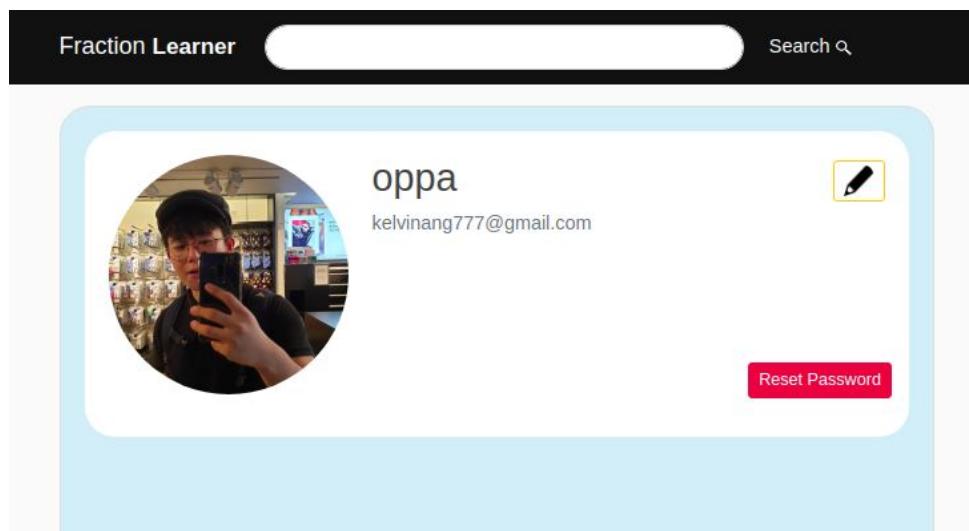
(Figure 111: Register Sample Screen )

## 13.1.2 Login



(Figure 112: Login Sample Screen )

### 13.1.3 View and edit profile

A screenshot of the Fraction Learner mobile application showing the "Profile Info" editing screen. At the top, there is a black navigation bar with the text "Fraction Learner" on the left and a search bar on the right. Below the navigation bar is a light blue rectangular card with a thin border. Inside the card, there is a circular profile picture of a person wearing a cap and glasses, holding a phone. Below the profile picture, the text "Profile Info" is centered. Underneath the profile picture, there is a form field labeled "Username\*" with the value "oppa" entered. A small note below the input field says "Required. 150 characters or fewer. Letters, digits and @/\_+/- only." Below the username field is another form field labeled "Email\*" with the value "kelvinang777@gmail.com" entered. Below the email field is a section labeled "Image\*" with a "Currently:" label followed by a file path "profile\_pics/73482568\_10212027579283612\_7981727906755772416\_o.jpg". Below this is a "Change:" label with a "Choose File" button and the text "No file chosen". At the bottom of the card is a blue rectangular "Update" button.

(Figure 113 & 114: Profile Sample Screen )

### 13.1.4 Add,edit and delete question

The screenshot shows a user profile for 'oppa' (October 08, 2020) with edit and delete icons. Below the profile is the title 'Chapter 2: Intro to Fraction 2'. A message follows: 'Hello this is the tutorial 2'. Below the message are 'Likes : 0', a 'Like' button, and an 'Ask a question' button. A reply from 'oppa' (Likes : 0) says 'Question 1testing'. Below the reply are 'Like' and 'Comment' buttons. At the bottom right is a 'Back to Home' button.

The screenshot shows a navigation bar with 'Fraction Learner' and a search bar. Below is a large 'Question' header. A 'Comment\*' label is followed by a large text input area. At the bottom left is a 'Submit' button.

(Figure 115 & 116: Question Sample Screen )

### 13.1.5 Add,edit and delete comment

The screenshot shows a user profile for 'oppa' from October 08, 2020. The post title is 'Chapter 2: Intro to Fraction 2'. The post content is 'Hello this is the tutorial 2'. It has 0 likes. There are 'Like' and 'Ask a question' buttons.

A comment by 'oppa' is shown below, reading 'Question 1testing'. It has 0 likes. There are 'Like' and 'Comment' buttons.

Below that is another comment by 'oppa' reading 'comment 1 testing'. This comment has a 'Mark as solution!' button, which is highlighted in blue. It also has a 'Like' button and edit/delete buttons.

At the bottom right is a 'Back to Home' button.

The screenshot shows a 'Comment' section. A placeholder text 'Qcomment\*' is visible above a text input field containing 'comment 1 testing'. Below the input field is a 'Submit' button.

(Figure 117 & 118: Comment Sample Screen )

### 13.1.6 Like and Dislike question and comment

The screenshot shows a mobile application interface. At the top, there is a user profile picture of a person taking a selfie, followed by the username "oppa" and the date "October 08, 2020". Below the profile picture are two icons: a yellow pencil and a red trash can. The main title of the post is "Chapter 2: Intro to Fraction 2". A brief description below the title reads "Hello this is the tutorial 2". The post has 0 likes. There are two interaction buttons: "Like" with a thumbs-up icon and "Ask a question" with a speech bubble icon. Below the post, a comment is shown from the same user "oppa". The comment text is "Question 1testing". To the right of the comment are two icons: a red trash can and a yellow pencil. Below the comment, another reply from "oppa" is shown: "comment 1 testing". This reply also includes a "Like" button with a thumbs-up icon and two icons: a red trash can and a yellow pencil. At the bottom right of the screen, there is a blue button labeled "Mark as solution !". At the very bottom of the screen, there is a navigation bar with the text "Fraction Learner" on the left, a search bar in the center, and a "Back to Home" button on the right.

This screenshot shows a modal dialog box. The title of the dialog is "Like | Dislike". The main question inside the box is "Are you sure ?". At the bottom of the dialog are two buttons: "Yes,I'm Sure" on the left and "Cancel" on the right.

(Figure 119 & 120: Like Sample Screen )

### 13.1.7 View student's list

The screenshot shows a mobile application interface titled "Fraction Learner". At the top, there is a search bar labeled "Search" with a magnifying glass icon. Below the search bar, the word "Teacher" is displayed. A user profile card for "KelviOppa" is shown, featuring a circular profile picture of a person, the name "KelviOppa", and the email "teachers@gmail.com". Below this, under the heading "Student", are two more user profile cards: one for "student" (with a circular profile picture of a person in a pink shirt) and another for "student2" (with a circular profile picture of a person in a teal icon). Both student profiles include their names and emails: "student" at "student@gmail.com" and "student2" at "student2@gmail.com".

Fraction Learner

Search

Teacher

KelviOppa  
teachers@gmail.com

---

Student

student  
student@gmail.com

student2  
student2@gmail.com

(Figure 119: Student's List Sample Screen )

## 13.2 Student

### 13.2.1 Main Page

(Figure 120: Student's Main Page Sample Screen )

### 13.2.2 View and do tutorial

(Figure 121: Student's Tutorial Sample Screen )

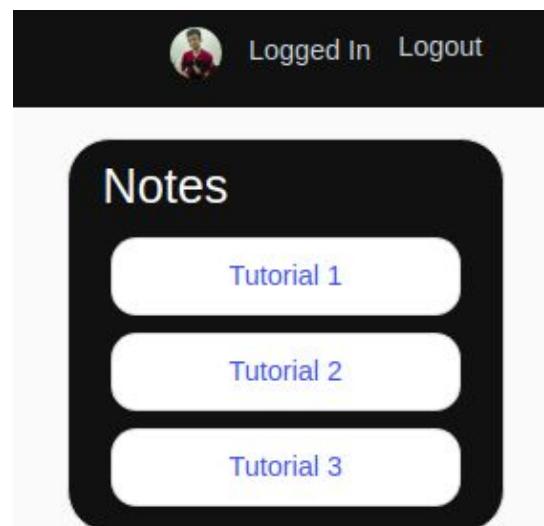
### 13.2.3 View schedule

The screenshot shows a web-based student schedule interface. At the top, there is a dark header bar with the text "Fraction Learner" on the left, a search bar in the center containing the placeholder "Search", and a user profile icon with the text "Logged In" and "Logout" on the right. Below the header, there are two buttons: "Next Month" and "Previous Month". The main content area is a light gray box containing a monthly calendar for October 2020. The calendar has a light blue border and is organized into weeks. The days of the week are labeled at the top: Mon, Tue, Wed, Thu, Fri, Sat, Sun. The dates for each day are listed sequentially from top to bottom. A specific event, "Tutorial 1", is noted for Tuesday, October 6th. The entire calendar is set against a white background.

October 2020						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
			1	2	3	4
5	6 • Tutorial 1	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

(Figure 123: Student's Schedule Sample Screen )

### 13.2.4 View note



(Figure 123: Student's Note Sample Screen )

### 13.2.5 View Result

The screenshot shows a mobile application interface. At the top, there is a black header bar with the text "Fraction Learner" on the left and a search bar on the right. Below the header is a section titled "Question Category Scores" which contains a table. The table has four columns: "Category", "Correctly answererd", "Incorrect", and "%". There are two rows: one for "asdasd" with values 1, 1, and 100, and one for "Tutorial 1" with values 0, 1, and 0. Below this section is another titled "Previous exam papers" with the sub-instruction "Below are the results of exams that you have sat.". Underneath this is a table with four columns: "Quiz Title", "Score", "Possible Score", and "%". There is one row for "Quiz For Tutorial 1" with values 3, 3, and 100.

Category	Correctly answererd	Incorrect	%
asdasd	1	1	100
Tutorial 1	0	1	0

Quiz Title	Score	Possible Score	%
Quiz For Tutorial 1	3	3	100

(Figure 123: Student's Result Sample Screen )

### 13.2.6 View and do quiz

Fraction Learner

Search q

## Quiz

Category: Tutorial 1

### Quiz For Tutorial 1

This is a simple quiz for tutorial 1 to test your understanding

[Start quiz](#)

Question category: **None**

Question 1 of 3

What is  $\frac{2}{4} + \frac{1}{2}$

1/2

3/2

1

3/4

**Check**

**(Figure 124 & 125: Student's Do quiz Sample Screen )**

## 13.3 Teacher

### 13.3.1 Main Page

The screenshot shows the 'Fraction Learner' application interface for teachers. At the top, there is a navigation bar with the title 'Fraction Learner', a search bar, and a user account section showing 'Logged In' and 'Logout'. On the left, a sidebar contains links for 'Profile', 'Recent Tutorial', 'Notes', and various management functions like 'New Tutorial', 'Quiz Question', 'Quiz', 'Student Progress', 'Manage Notes', 'Manage Database', 'Student's List', 'Tutorial's List', 'Schedule', and 'Quiz'. The main content area displays two recent tutorials: 'Chapter 2: Intro to Fraction 2' by oppa (October 08, 2020) and 'Chapter 1 : Intro to Fraction' by KelviOppa (October 07, 2020). A notes section on the right lists 'Tutorial 1', 'Tutorial 2', and 'Tutorial 3', with a 'Upload Notes' button.

(Figure 126: Teacher's Main Page Sample Screen )

### 13.3.2 View all student result/learning progress

The screenshot shows a web-based application titled "Fraction Learner". At the top, there is a search bar with the placeholder "Search" and a magnifying glass icon. Below the search bar, the title "List of complete exams" is displayed. A table follows, showing the results of six completed quizzes. The columns in the table are "User", "Quiz", "Completed", "Score(%)", and "View details". Each row contains one user's information for a specific quiz, including their name, the quiz title, the date it was completed, the score, and a link to view more details.

User	Quiz	Completed	Score(%)	
				Filter
KelviOppa	Quiz For Tutorial 1	Oct. 7, 2020	100	<a href="#">View details</a>
KelviOppa	Quiz For Tutorial 1	Oct. 7, 2020	100	<a href="#">View details</a>
KelviOppa	Quiz For Tutorial 1	Oct. 7, 2020	33	<a href="#">View details</a>
KelviOppa	Quiz For Tutorial 1	Oct. 8, 2020	0	<a href="#">View details</a>
oppa	Quiz For Tutorial 1	Oct. 8, 2020	67	<a href="#">View details</a>
student	Quiz For Tutorial 1	Oct. 8, 2020	100	<a href="#">View details</a>

(Figure 126: Teacher's View Student Progress Sample Screen )

### 13.3.3 View, create, edit and delete tutorial

Fraction Learner  Search 

Tutorial

Title\*

Content\*

Image

No file chosen

 oppa October 08, 2020  

## Chapter 2: Intro to Fraction 2

Hello this is the tutorial 2

Likes : 0  Like  Ask a question

(Figure 127 & 128: Teacher's Tutorial Sample Screen )

### 13.3.4 View,add and delete schedule

The image displays two screenshots of a teacher's scheduling application interface.

**Screenshot 1 (Top): October 2020 Calendar**

This screenshot shows a monthly calendar for October 2020. The days of the week are labeled at the top: Mon, Tue, Wed, Thu, Fri, Sat, Sun. The dates are arranged in a grid. A blue box highlights the 6th, which has a small note: "• Tutorial 1".

October 2020						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
			1	2	3	4
5	6 • Tutorial 1	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

**Screenshot 2 (Bottom): New Event Form**

This screenshot shows a "New Event" form. It includes fields for Title\*, Description\*, Start time\*, and End time\*. There is also a checkbox labeled "Yes".

Fraction Learner  Search

New Event

Title\*

Description\*

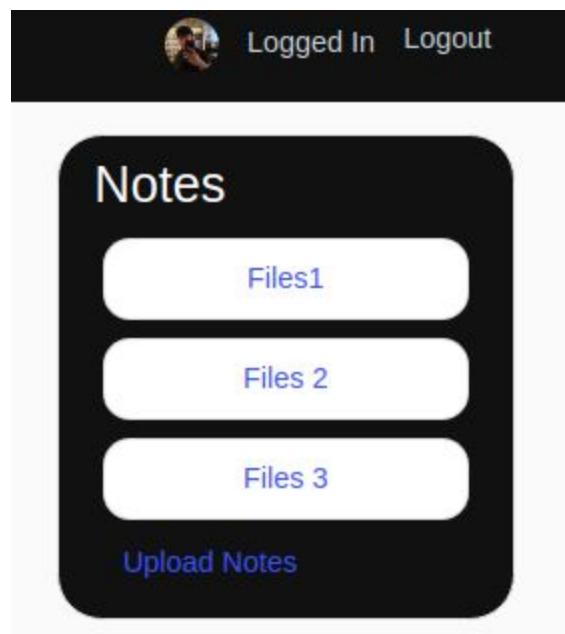
Start time\*  
 mm/dd/yyyy, --::--

End time\*  
 mm/dd/yyyy, --::--

Yes

(Figure 129 & 130: Teacher's Schedule Sample Screen )

### 13.3.5 View, create, edit and delete note



Select files admin to change

Action:   0 of 3 selected

- FILES ADMIN
- Files 3
- Files 2
- Files1

3 files admins

(Figure 131 & 132: Teacher's Notes Sample Screen )

### 13.3.6 Mark as solution

The image shows a mobile application interface for managing student posts. At the top, there is a header bar with the text "Fraction Learner" on the left and a search bar on the right. Below the header, two student posts are displayed:

**oppa Likes :0**  
Question 1testing

**oppa Likes :0**  
comment 1 testing

Both posts include standard social media-style controls: a like button (blue thumbs up), a comment button (speech bubble), and edit/delete buttons (trash can and pencil).

A blue callout bubble with a checkmark icon and the text "Mark as solution !" is positioned next to the second post.

At the bottom, a modal dialog box is open, asking the teacher if they are sure they want to undo a comment as their solution. The dialog has a "Yes,I'm Sure" button.

**(Figure 133 & 134: Teacher's Solution Sample Screen )**

### 13.3.7 Add, edit, delete and mark quiz

#### 13.3.7.1 Add quiz

Fraction Learner  Search 

#### Add Quiz Question

[Add MCQ Question](#)

[Add True|False Question](#)

[Add Essay Question](#)

(Figure 135: Teacher's Add Quiz Sample Screen )

### 13.3.7.2 Add multiple choice question for quiz

#### Add Multiple Choice Question

Question:

Enter the question text that you want displayed

Category:

Sub-Category:

Figure:  No file chosen

Quiz:

Available Quiz

Filter

Quiz For Tutorial 1

Chosen Quiz

"/>

Hold down "Control", or "Command" on a Mac, to select more than one.

Explanation:

Explanation to be shown after the question has been answered.

Answer Order:

The order in which multichoice answer options are displayed to the user

**ANSWERS**

CONTENT 0

Add another Answer

(Figure 136: Teacher's Add MCQ Sample Screen )

### 13.3.7.3 Add true or false question for quiz

#### Add True/False Question

Question:

Enter the question text that you want displayed

Category:

Sub-Category:

Figure:  No file chosen

Quiz:  Filter   
Quiz For Tutorial 1

**Chosen Quiz ?**

**Choose all**

Hold down "Control", or "Command" on a Mac, to select more than one.

Explanation:

Explanation to be shown after the question has been answered.

Correct  
Tick this if the question is true. Leave it blank for false.

(Figure 137: Teacher's Add T|F question Sample Screen )

#### 13.3.7.4 Add essay question for quiz

Add Essay style question

Question:  Enter the question text that you want displayed

Category:

Sub-Category:

Quiz:

Available Quiz:

Filter

Quiz For Tutorial 1

Chosen Quiz:

Hold down "Control", or "Command" on a Mac, to select more than one.

Explanation:

Explanation to be shown after the question has been answered.

(Figure 138: Teacher's Add Essay question Sample Screen )

### 13.3.7.5 Mark quiz

## Quiz title: Quiz For Tutorial 1

### Category: Tutorial 1

This is a simple quiz for tutorial 1 to the testing your understanding

User: KelviOppa

Completed: Oct. 7, 2020

Score: 100%

Question	User answer		
Is $\frac{3}{4} + \frac{1}{4} = 1$ correct ?	True	Correct	<button>Toggle whether correct</button>
Please calculate $\frac{1}{2} + \frac{1}{2}$	1	Correct	<button>Toggle whether correct</button>
What is $\frac{2}{4} + \frac{1}{2}$	1	Correct	<button>Toggle whether correct</button>

(Figure 139: Teacher's Add Mark Quiz Sample Screen )

## 13.4 Admin

### 13.4.1 Manage Database

Django administration

Site administration

AUTHENTICATION AND AUTHORIZATION

	Add	Change
Groups		
Users		

ESSAY

	Add	Change
Essay style questions		

MULTICHOICE

	Add	Change
Multiple Choice Questions		

QUIZ

	Add	Change
Categories		
Quizzes		
Sub-Categories		
User progress records		

SCHEDULER

	Add	Change
Schedules		

TRUE\_FALSE

	Add	Change
True/False Questions		

TUTORIAL

	Add	Change
Comments		
Files admins		
Qcomments		
Tutorials		

USERS

	Add	Change
Profiles		

(Figure 140: Manage Database Sample Screen )

# 14.0 User Guide

The user guide below is showcased in the operating system Window. For other platform users, the steps are the same,

## Step 1 : Install python

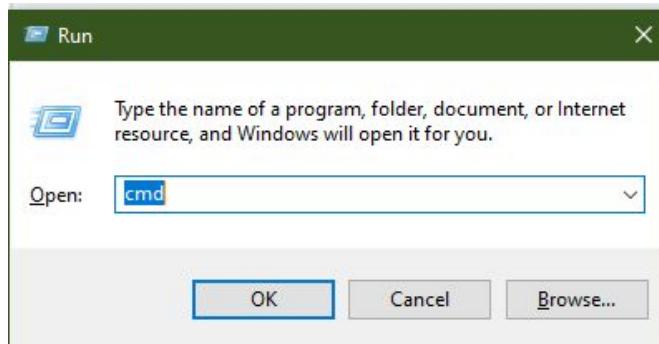
please ensure that the device used to run the application has python installed and the version must be below 3.7.6. The link is attached as below :

Link : <https://www.python.org/downloads/release/python-376/>

## Step 2: Set up command prompt

We need to install a virtual environment in the command prompt so that it would not interfere and slow down other computer processes.

Open up the command prompt by pressing win + R, then in the run bar type in cmd. Then the command prompt will appear.



(Figure 141 : Run bar)

Once the command prompt has appeared, type in the command pip install virtualenvwrapper-win, this is the command to install the virtual environment

```
C:\Users\kelvi>pip install virtualenvwrapper-win
```

(Figure 142 : Installing virtual environment)

After installing the virtual environment, make a virtual environment named test. The command is "mkvirtualenv test".

```
C:\Users\kelvi>mkvirtualenv test
Using base prefix 'c:\\users\\kelvi\\appdata\\local\\programs\\python\\python37'
New python executable in C:\Users\kelvi\Envs\test\Scripts\python.exe
Installing setuptools, pip, wheel...
done.

(test) C:\Users\kelvi>
```

(Figure 143: Making a virtual environment)

Note that the virtual environment name will appear on the left side of the command prompt, indicating that you are in the virtual environment. If you accidentally close the command prompt, just type “workon test” in the command prompt to activate the virtual environment again

```
C:\Users\kelvi> workon test  
(test) C:\Users\kelvi>
```

(Figure 144: Reactivating Virtual Environment)

Next change the command prompt directory to where you installed the FL\_SE file.

```
(test) C:\Users\kelvi>cd desktop/FL_SE  
(test) C:\Users\kelvi\Desktop\FL_SE>
```

(Figure 145: Changing directory to FL\_SE)

Then in the command prompt, type in the command below:

“pip install -r requirements.txt “

```
(test) C:\Users\kelvi\Desktop\FL_SE>pip install -r requirements.txt  
Collecting django<2.2.13  
  Using cached Django-2.2.13-py3-none-any.whl (7.5 MB)  
Collecting django-model-utils==3.1.1  
  Using cached django_model_utils-3.1.1-py2.py3-none-any.whl (29 kB)  
Collecting Pillow>4.0.0  
  Using cached Pillow-7.2.0-cp37-cp37m-win_amd64.whl (2.1 MB)  
Collecting django-crispy-forms>1.9.1  
  Using cached django_crispy_forms-1.9.2-py3-none-any.whl (108 kB)  
Processing c:\users\kelvi\appdata\local\pip\cache\wheels\ae\f3\45\beb01ae21675a479f301aaab7a59fc3b1b04ab4d36e08fb289\django_bower-5.2.0-py3-none-any.whl  
Collecting pytz  
  Using cached pytz-2020.1-py2.py3-none-any.whl (510 kB)  
Collecting sqlparse  
  Downloading sqlparse-0.4.1-py3-none-any.whl (42 kB)  
    |██████████| 42 kB 353 kB/s  
Collecting six  
  Using cached six-1.15.0-py2.py3-none-any.whl (10 kB)  
Installing collected packages: pytz, sqlparse, django, django-model-utils, Pillow, django-crispy-forms, six, django-bower  
Successfully installed Pillow-7.2.0 django-2.2.13 django-bower-5.2.0 django-crispy-forms-1.9.2 django-model-utils-4.0.0 pytz-2020.1 six-1.15.0 sqlparse-0.4.1
```

(Figure 146 : installing plugins in virtual environment)

Then change your directory again by typing cd django\_quiz

```
(test) C:\Users\kelvi\Desktop\FL_SE>cd django_quiz  
(test) C:\Users\kelvi\Desktop\FL_SE\django_quiz>
```

(Figure 147: Change directory to django\_quiz folder)

Then in command prompt, type in the command below:

py setup.py install

```
(test) C:\Users\kelvi\Desktop\FL_SE\django_quiz>py setup.py install
```

(Figure 148: Setting up django quiz)

Then go into the previous directory by typing the command “cd ..” and change the directory to flse by typing the following command “cd flse”

```
(test) C:\Users\kelvi\Desktop\FL_SE\django_quiz>cd ..  
(test) C:\Users\kelvi\Desktop\FL_SE>cd flse  
(test) C:\Users\kelvi\Desktop\FL_SE\flse>_
```

(Figure 149: Change directory to flse)

### Step 3: Run the server

After setting up the command prompt, type in the command “py manage.py runserver” to run the server.

```
(test) C:\Users\kelvi\Desktop\FL_SE\flse>py manage.py runserver  
Watching for file changes with StatReloader  
Performing system checks...  
  
System check identified no issues (0 silenced).  
October 11, 2020 - 11:22:11  
Django version 2.2.13, using settings 'flse.settings'  
Starting development server at http://127.0.0.1:8000/  
Quit the server with CTRL-BREAK.
```

(Figure 150: Running Server)

Then simply open a web browser and type in localhost:8000 to use the web application.



(Figure 151: Connect to the web app)

The setup only needs to be done once, to run the server next time, simply cd into “FL\_SE/flse” and activate the virtual environment (“workon test”), test, and type in “py manage.py runserver”

# **15.0 Conclusion**

## **15.1 Summary of Results**

It was a wonderful learning experience for the team while working on this project. Through the effort for about 14 weeks, the team has successfully completed and created a simple web app named Fraction Learner, which is a fraction learning system for school.

This project took the team through the various stages of software development and gave the team a real insight into the world of software engineering. Without a proper software engineering practice, it is impossible for the team to complete this project from scratch. Every stage in software development is vital as they provide a systematic, disciplined and quantifiable approach to the development and maintenance of the software.

Moreover, various problems and challenges that the team encountered during the software development process gave the team a feel of the developers' industry. It was due to this project the team came to know how professional software is designed.

Last but not least, the team would also like to thank Dr Norain for the guidance and consultation along these 14 weeks.

## **15.2 Problems Encountered**

The team has encountered a few problems along the software development process. The team faced quite a number of problems during the construction stage due to the fact that the team doesn't know Django very well. For example, the team keeps getting data wrongly and the redirection of URL was confusing. Besides, since Django is a predefined framework, some parts of django are difficult to modify. In order to overcome this problem, the team has to modify the design of the system in project 1 and project 2 to suit the model-template-views architectural pattern of Django.

Furthermore, the team also faced difficulties when each member of the team worked on different modules in the early of construction stages. It was difficult to track the progress of each member. Thus, the team decided to use Git, which is the version-control system for tracking changes in source code. Apparently, Git has solved the problem.

## **15.3 Limitations and Future Enhancements**

### **15.3.1 Limitations**

Currently, the system is still running at the localhost only, this means that only the pc which connected to the same wifi with the server can access to the system.

### **15.3.2 Future Enhancements**

The team would like to improve the interface and make it more user friendly and beautiful, for example, some interactive content. Besides, the team planned to add more functionality in the system such as organizing a meeting. Last but not least, the team will definitely host the Fraction Learner so that everyone can access the system through the browser.

# References

[1] Dinesh Thakur. Computer notes, A Complete Guide.

*<https://ecomputernotes.com/software-engineering/architecturaldesign>*

[2] SAP Documentation:

*[https://help.sap.com/saphelp\\_pd1660\\_eam/helpdata/en/c7/f874676e1b10149b1f94a2cec3891d/frameset.htm](https://help.sap.com/saphelp_pd1660_eam/helpdata/en/c7/f874676e1b10149b1f94a2cec3891d/frameset.htm)*