

ONLINE ASSESSMENT AND MANAGEMENT SYSTEM

CHAN HAO KANG

SESSION 2020/2021

**FACULTY OF COMPUTING AND INFORMATICS
MULTIMEDIA UNIVERSITY
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BY

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THIS PROJECT REPORT IS
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DECLARATION

I hereby declare that the work has been done by myself and no portion of the work contained in this thesis has been submitted in support of any application for any other degree or qualification of this or any other university or institute of learning.

A handwritten signature in black ink, appearing to read "CHAN HAO KANG". It is written in a cursive style with some loops and crosses.

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ABSTRACT

This is an application-based project that proposes an online assessment system to replace usual handwritten tests. The approach to carry out this project is started with a background study on the existing assessment systems online. Then, essential features were extracted from the results and incorporate them into the new system. Furthermore, multiple UML diagrams are sketched to visualize the complete design of the system. This system has offered dynamic options to generate different sets of questions for each candidate during the test. This feature solves the problem where some of the candidates are having the same test set. Other than that, this system also offers a tab checking feature that warns candidates if they switch browser tabs when attending tests. This helps to prevent candidates to search for answers during the exam by using two browser tabs. Finally, this system is tested using functional testing to validate its input and output. After the testing phase, this system is deployed using Heroku.

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Abbreviation

DESCRIPTION	ABBREVIATIONS
Functional requirement specification	FRS
Function requirement	FR
Quantity requirement	QS
Unified modelling language	UML
Use case diagram	UCD
Entity relationship diagram	ERD
No date	n.d.
Javascript object notation	JSON
Hypertext transfer protocol	HTTP
JSON Web Token	JWT
Uniform Resource Locator	URL

Chapter 1: Introduction

In the year 2020, the COVID-19 pandemic has affected educational systems worldwide as it slows down the progress of all schools, universities, and colleges due to the rule of social distancing. In this period, examination gains the most attention from students as it might be delayed or even canceled. The ablation of exams will alter the plans of students as it exhibits their performance and chance of getting into their desired college or jobs.

Therefore, an online assessment and management system is needed. It allows users to create and conduct computer-based tests online. This system will provide a lot of convenience to both students and teachers as they do not need to travel to the school to attend the exam. Besides that, this system uses fewer resources such as producing question papers, exam room scheduling, arranging invigilators, coordinating with examiners, and more.

1.1 Problem Statement

1. Inflexibility in generating sets of question
 - Most of the existing systems only allow the user to specify which question should be in the set.
 - Another disadvantage is that the number of question sets is limited and some candidates can have the same set of questions.
2. Lack of cheating prevention measures

- Most of the existing systems do not try to stop candidates from cheating when attempting assessments.
 - Candidates can search for answers while answering at the same time.
3. Lack of question templates
- Existing systems provide fewer question templates for users to create questions.

1.2 Objectives

The purpose of this project is to develop a website for users to create and manage assessments online. The objectives of this project are as follows.

- To design and develop an online assessment and management system.
- To provide dynamic settings for the user to generate different sets of questions.
- To offer multiple types of question templates for the user to create questions.
- To provide a simple checking feature which warns candidates if they switch browser tab when attempting an assessment.

1.3 Project Scope

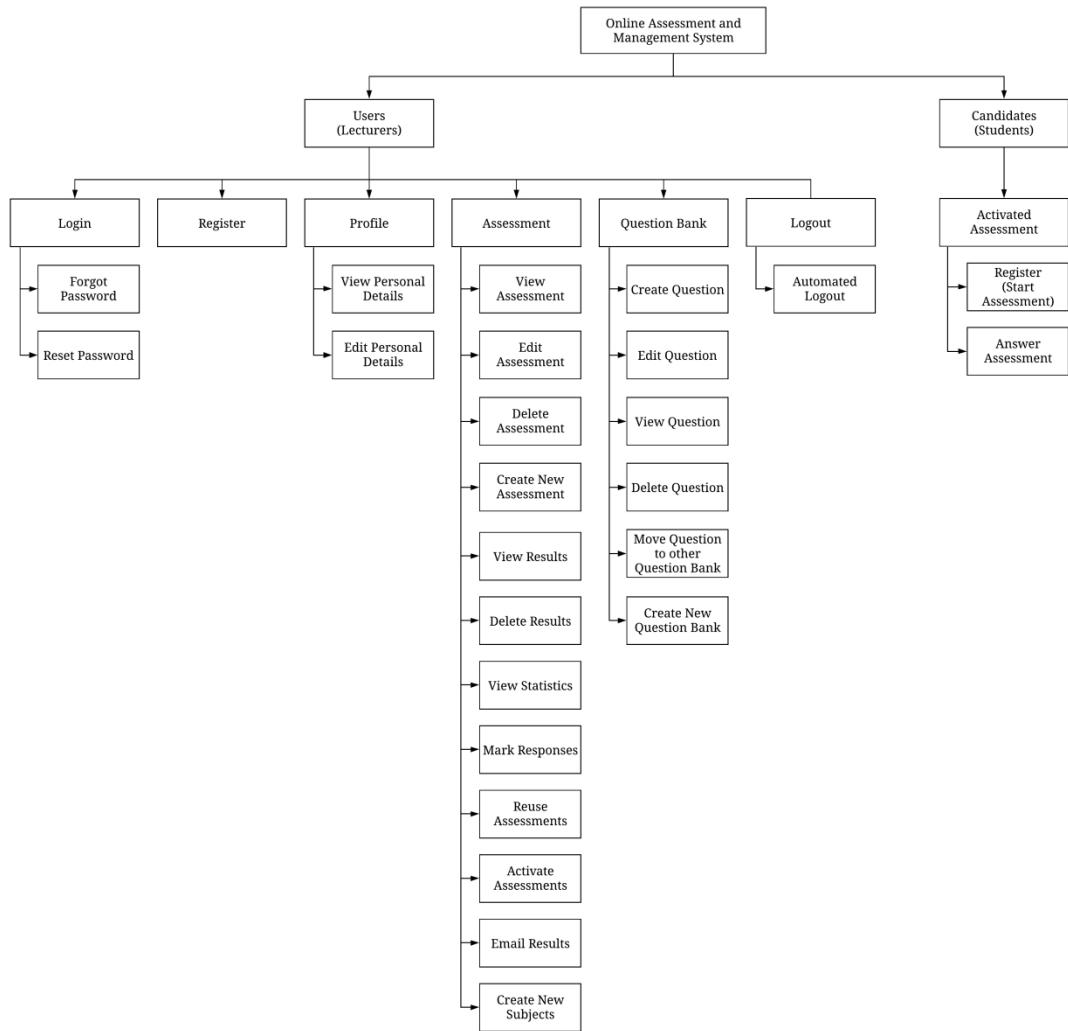


Figure 1.3-1. Work Breakdown Structure

1.4 Project Schedule

1.4.1 FYP 1 Schedule

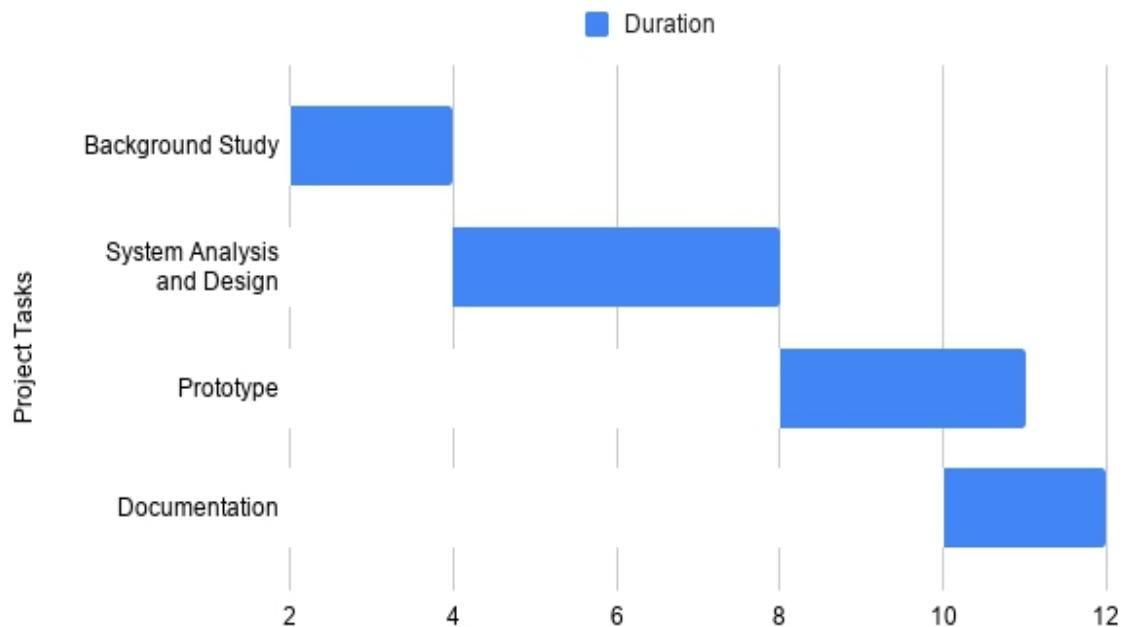


Figure 1.4-1. FYP Part 1 Gantt Chart

For the weekly tasks distribution plan during final year project part (1), starting from week two onwards, I have spent two weeks for background study, a month for system analysis and design, three weeks for building a prototype and another two weeks for finalizing the document.

1.4.2 FYP 2 Schedule



Figure 1.4-2. FYP Part 2 Gantt Chart

Figure 1.4-2 describes the implementation schedule of my Final Year Project Part 2.

The system development phase has taken 11 weeks. It consists of module implementation, input validations, refinement, and deployment. Testing starts after the system development phase is completed followed by the documentation phase.

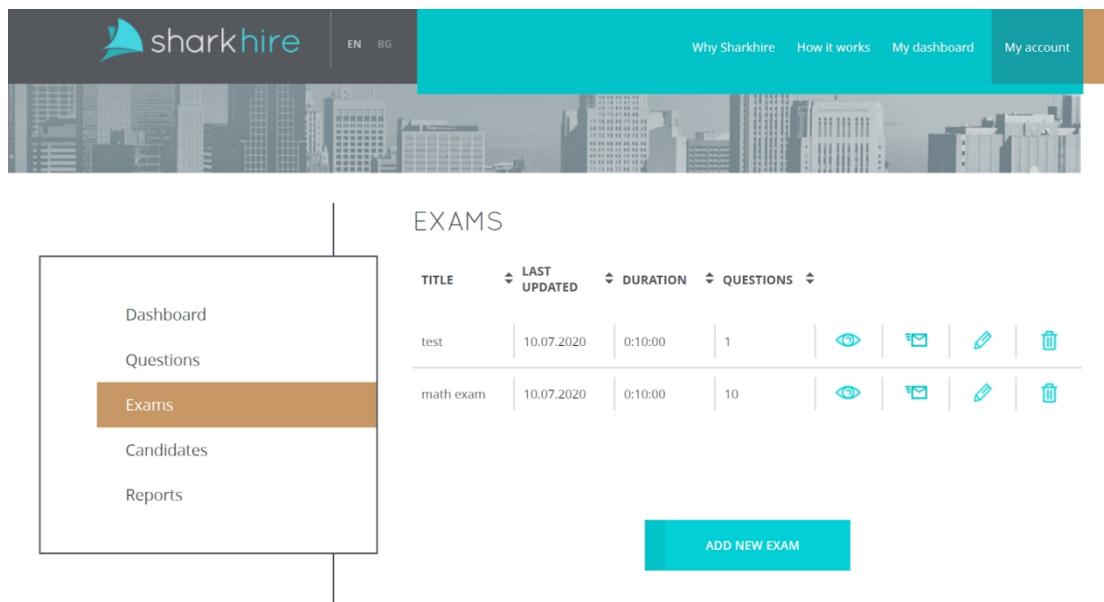
Lastly, the final report is going to be submitted at week 15, while the poster presentation is at week 16.

Chapter 2: Background Study

2.1 Existing Systems

In this section, I have reviewed three existing online assessment systems; namely Sharkhire, Test Portal and Test Invite.

2.1.1 Sharkhire



The screenshot shows the Sharkhire Assessment System. At the top, there is a navigation bar with links for 'Why Sharkhire', 'How it works', 'My dashboard', and 'My account'. Below the navigation bar is a banner featuring a city skyline. On the left side, there is a sidebar with links for 'Dashboard', 'Questions', 'Exams' (which is highlighted with a brown background), 'Candidates', and 'Reports'. The main content area is titled 'EXAMS' and displays a table of exams. The table has columns for 'TITLE', 'LAST UPDATED', 'DURATION', 'QUESTIONS', and actions. There are two rows in the table:

TITLE	LAST UPDATED	DURATION	QUESTIONS				
test	10.07.2020	0:10:00	1				
math exam	10.07.2020	0:10:00	10				

At the bottom right of the main content area is a blue button labeled 'ADD NEW EXAM'.

Figure 2.1-1. Sharkhire Assessment System

Sharkhire is an online assessment system for companies that are interested in their employees' performance and skills. It helps to reduce cost-per-hire by giving job seeker tests online. This system also provides an analysis of the results that makes it easier for the administrator to compare job candidates and their performance. (“Sharkhire”, n.d.)

2.1.1.1 Pros and Cons of Sharkhire

Pros of Sharkhire

- Can randomize questions for objective questions
- Can set time limit for test
- Generates reports and analysis
- Provides automatic grading
- Examiner able to view the responses from the test of every respondents

Cons of Sharkhire

- Examinee can only obtain the test information through email
- Examiner have to send the test information to the candidates one by one
- No question numbering in the tests
- Randomization is not obtained from a subset of a set of questions

2.1.2 Test Portal

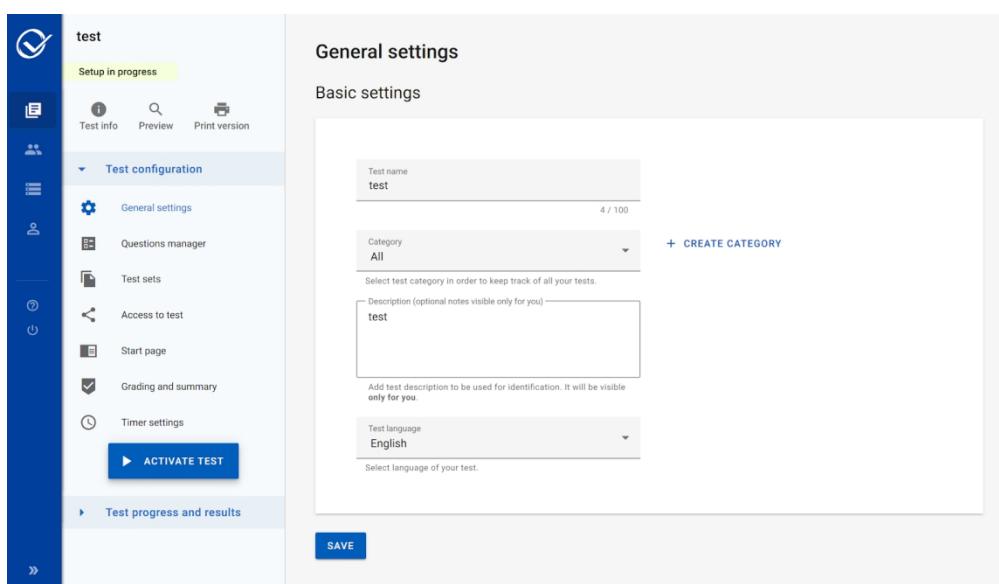


Figure 2.1-2. Test Portal Assessment System

Test portal is an online exam builder system that allows the user to create their tests online. It provides several features such as respondents monitoring, analysis generation, and real-time tracking. (“Testportal”, n.d.)

2.1.2.1 Pros and Cons of Test Portal

Pros of Test Portal

- Real-time tracking
- Question randomization
- Time limit settings for both test and questions
- Statistics of test
- Automatic test sets generator
- Browser tab switching check

Cons of Test Portal

- The number of candidates that can receive or answer tests online is limited to 100 person

2.1.3 Test Invite

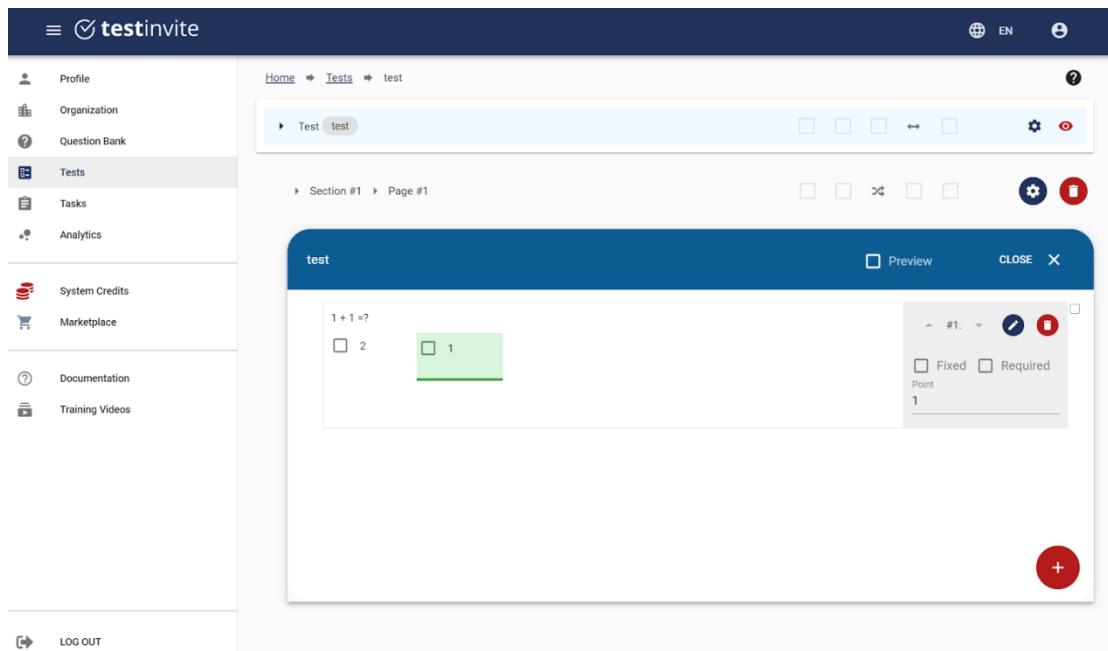


Figure 2.1-3 Test Invite Assessment System

Test Invite is a fully automated pre-employment testing software that lets recruiters to create a custom recruitment pipeline. The user can build an assessment of multiple stages that the candidates can proceed to the next stage as long as they succeed. The system also allows users to apply programming code or video interview questions into their assessment pipeline. (“Testinvite”, n.d.)

2.1.3.1 Pros and Cons of Test Invite

Pros of Test Invite

- Authenticate candidates before test
- Provide statistics results based on the questions
- Live tracking candidate responses

Cons of Test Invite

- Only works on Chrome, Firefox, and Safari browsers
- Invitation code not always works
- No randomization of questions option when generating tests

2.2 Comparison

Table 2.2-1. Existing System Comparison Table

Applications	Sharkhire	Test Portal	Test Invite	Propose System
Functionalities				
Set time duration for the whole test	✓	✓		✓
Set time duration for each questions		✓		✓
Random order of questions and answers	✓	✓		✓
Test sets generator which selects questions randomly and distribute to sets defined by the creator		✓		✓
Set the number of times the respondent can complete the test		✓		✓
Browser tab switching checking mechanism		✓		✓
Result feedback settings		✓		✓
Grading mechanism	✓	✓	✓	✓
Passing score settings	✓	✓	✓	✓
Statistics and analysis of results	✓	✓	✓	✓
Question bank that stores previous	✓		✓	✓

created questions				
Able to view candidates' responses	✓	✓		✓
Access test with authentication			✓	✓

2.3 Proposed Solution

The proposed system allows users options to certain number of questions from the question pool to form different set of questions. So, each candidate will be having a different set of questions. Next, the system will allow users to set warnings to candidates if they switch tabs during the test. The system will submit the test automatically if the candidate violates the rule. Users also can give some chances to the candidates by allowing the system to warn them. This forces the candidate to have only one browser tab on the screen when answering the test. Lastly, the system offers 6 different types of question templates for the user to create questions. They are objectives, short answer, descriptive answer, true or false, and select in order.

Chapter 3: Requirement

An analysis was carried out to determine the requirements, use case and system architecture of this project.

3.1 Functional Requirements

Function Requirement (FR) describes the functions of a system or software. It helps the developer to capture the behavior of the system. The requirements can be expressed as functions, services, or tasks of which the system is required to perform. ("Functional Requirements", n.d.) For this project, the functional requirements describe the behavior of an actor (the user or lecturer) and a guest (the candidate who will attend the assessment).

3.1.1 User Functional Requirements

Table 3.1.1-1. User Functional Requirement Specification

Section ID	Requirement Definition	Version
FRS 1.0	The user shall be able to log in and logout	1.0
FRS 2.0	The user shall be able to reset the password if the user forgot the password	1.0
FRS 3.0	The user shall be able to register into the system	1.0
FRS 4.0	The user shall be able to view his/her profile details	1.0
FRS 5.0	The user shall be able to edit his/her profile details	1.0
FRS 6.0	The user shall be able to create new question bank	2.0
FRS 7.0	The user shall be able to view question bank	2.0
FRS 8.0	The user shall be able to delete question bank	2.0
FRS 9.0	The user shall be able to search question bank	2.0
FRS 10.0	The user shall be able to view his/her questions	1.0
FRS 11.0	The user shall be able to create new questions	1.0
FRS 12.0	The user shall be able to delete questions	1.0

FRS 13.0	The user shall be able to edit questions	1.0
FRS 14.0	The user shall be able to search questions	1.0
FRS 15.0	The user shall be able to view all assessment subjects	2.0
FRS 16.0	The user shall be able to create new subjects	2.0
FRS 17.0	The user shall be able to search subjects	2.0
FRS 18.0	The user shall be able to delete subjects	2.0
FRS 19.0	The user shall be able to view assessments in a selected subject	2.0
FRS 20.0	The user shall be able to create assessments	1.0
FRS 21.0	The user shall be able to edit assessments	1.0
FRS 22.0	The user shall be able to delete assessments	1.0
FRS 23.0	The user shall be able to view results	1.0
FRS 24.0	The user shall be able to view statistics	1.0
FRS 25.0	The user shall be able to mark descriptive questions	1.0
FRS 26.0	The user shall be able to reuse assessments	2.0
FRS 27.0	The user shall be able to activate or deactivate assessments	2.0

Table 3.1.1-2. User Login and Log out

Requirement ID	Requirement Definition	Version
FR 1.1	The system shall allow the user to log in	1.0
FR 1.2	The system shall allow the user to log out	1.0
FR 1.3	The system shall display error messages when user login was unsuccessful	1.0
FR 1.4	The system shall direct the user to the main page if user login is successful	1.0
FR 1.5	The system shall logout user automatically if session expired	2.0

Table 3.1.1-3. User Forgot and Reset Password

Requirement ID	Requirement Definition	Version
FR 2.1	The system shall allow users to reset the password by validating their email address	2.0
FR 2.2	The user shall receive an email with a link that directs the user to password reset page	2.0

Table 3.1.1-4. User Registration

Requirement ID	Requirement Definition	Version
FR 3.1	The system shall allow the user to fill all fields to register	1.0
FR 3.2	The system shall prompt the user to fill all empty fields	1.0
FR 3.3	The system shall display error messages to the user if registration is unsuccessful	1.0
FR 3.4	The system shall direct the user to the main page if user registration is successful	1.0
FR 3.5	The system shall create a new user account if the registration is successful	1.0

Table 3.1.1-5. View Profile Details

Requirement ID	Requirement Definition	Version
FR 4.1	The system shall display the user information such as name, email, profile picture etc.	2.0

Table 3.1.1-6. Edit Profile Details

Requirement ID	Requirement Definition	Version
FR 5.1	The system shall not allow the user to change their email address	1.0
FR 5.2	The system shall allow user to have only one profile picture	1.0
FR 5.3	The system shall validate the profile picture so that it can only receive picture in PNG or JPEG format	1.0
FR 5.4	The system shall direct the user back to the profile page if update is successful	2.0
FR 5.5	The system shall display an error messages if the user input is invalid	2.0

Table 3.1.1-7. Create Question Bank

Requirement ID	Requirement Definition	Version
FR 6.1	The system shall not allow the user to create question bank with existing subject title	2.0

Table 3.1.1-8. View Question Bank

Requirement ID	Requirement Definition	Version
FR 7.1	The system shall only display question banks created by the user	2.0
FR 7.2	The system shall only display the subject title of the question bank	2.0

Table 3.1.1-9. Delete Question Bank

Requirement ID	Requirement Definition	Version
FR 8.1	The system shall also remove all the questions within the question bank	2.0
FR 8.2	The system shall prompt a modal of confirmation to make sure that the user wants to remove the question bank	2.0

Table 3.1.1-10. Search Question Bank

Requirement ID	Requirement Definition	Version
FR 9.1	The system shall display all the search results if it exists	2.0
FR 9.2	The system shall display a message if the search results do not exist	2.0

Table 3.1.1-11. View Questions

Requirement ID	Requirement Definition	Version
FR 10.1	The system shall display all questions within the selected question bank	2.0
FR 10.2	The system shall display question information such as question description and question's type	1.0
FR 10.3	The system shall allow the user to view all question details	2.0

Table 3.1.1-12. Create Questions

Requirement ID	Requirement Definition	Version
FR 11.1	The system shall allow user to set question description, type, choices and answer	1.0
FR 11.2	The system shall direct user back to the respective question bank if question is successfully created	2.0
FR 11.3	The system shall display error messages if the user entered invalid inputs	2.0

Table 3.1.1-13. Delete Question

Requirement ID	Requirement Definition	Version
FR 12.1	The system shall display updated question table after delete question is successful	2.0

Table 3.1.1-14. Edit Question

Requirement ID	Requirement Definition	Version
FR 13.1	The system shall direct user back to that particular question bank if update question is successful	2.0
FR 13.2	The system shall display an error messages if the edit question was unsuccessful	1.0

Table 3.1.1-15. Search Questions

Requirement ID	Requirement Definition	Version
FR 14.1	The system shall allow users to search question using sub-string or based on question's type	2.0
FR 14.2	The system shall display search results if it is successful	1.0
FR 14.3	The system shall display a 'not available' message if search results do not exist	1.0

Table 3.1.1-16. View Assessment Subjects

Requirement ID	Requirement Definition	Version
FR 15.1	The system shall allow user to view all created subjects	2.0
FR 15.2	The system shall display messages if there is not subjects created	2.0

Table 3.1.1-17. Create Assessment Subjects

Requirement ID	Requirement Definition	Version
FR 16.1	The system shall not allow users to create already created subjects	2.0

Table 3.1.1-18. Search Assessment Subjects

Requirement ID	Requirement Definition	Version
FR 17.1	The system shall display message if the search results is empty	2.0
FR 17.2	The system shall display correct search results	2.0

Table 3.1.1-19. Delete Assessment Subjects

Requirement ID	Requirement Definition	Version
FR 18.1	The system shall display updated subjects after removing subject	2.0
FR 18.2	The system shall remove all the assessments within that subject	2.0

Table 3.1.1-20 View Assessments

Requirement ID	Requirement Definition	Version
FR 19.1	The system shall display assessments with the same subject only	2.0
FR 19.2	The system shall allow the user to view a specific assessment details	2.0
FR 19.3	The system shall not allow the user to edit the assessment details when viewing	2.0

Table 3.1.1-21. Create Assessment

Requirement ID	Requirement Definition	Version
FR 20.1	The system shall allow the user to set assessment details such as title, description, questions, time etc	1.0
FR 20.2	The system shall allow the user to retrieve questions from the question bank	1.0
FR 20.3	The system shall allow the user to create questions	2.0
FR 20.4	The system shall allow the user to set score for each question	1.0
FR 20.5	The system shall allow the user to set assessment or question time limits	2.0
FR 20.6	The system shall allow the user to set the start date and end date of the assessment	1.0
FR 20.7	The system shall generate a link or QR code of the assessment	1.0
FR 20.8	The system shall allow the user to set the number of times a candidate can attempt the assessment	1.0
FR 20.9	The system shall allow the user to edit and delete the questions	2.0
FR 20.10	The system shall allow the user to enter set generation details	2.0

Table 3.1.1-22. Edit Assessment

Requirement ID	Requirement Definition	Version
FR 21.1	The system shall allow the user to edit an assessment if it is not activated before	2.0
FR 21.2	The system shall be able to display error messages if the update was unsuccessful	1.0

Table 3.1.1-23. Delete Assessment

Requirement ID	Requirement Definition	Version
FR 22.1	The system shall display updated sets of assessments in the table if delete assessment is successful	2.0

Table 3.1.1-24. View Result

Requirement ID	Requirement Definition	Version
FR 23.1	The system shall display the results of all the candidates that participated that particular assessment	2.0
FR 23.2	The system shall allow the user to view the candidate's response	1.0
FR 23.3	The system shall allow the user to delete the responses of a candidate	2.0
FR 23.4	The system shall allow the user to email all results to all respective candidates	2.0

Table 3.1.1-25. View Statistics

Requirement ID	Requirement Definition	Version
FR 24.1	The system shall display the statistics of a selected assessment	1.0
FR 24.2	The system shall display statistics based on the questions	2.0

Table 3.1.1-26. Mark Descriptive Questions

Requirement ID	Requirement Definition	Version
FR 25.1	The system shall allow the user to give score and feedback according to the candidate's response	2.0
FR 25.2	The system shall display all descriptive questions for the user to mark	2.0

Table 3.1.1-27. Reuse Assessments

Requirement ID	Requirement Definition	Version
FR 26.1	The system shall allow the user to reuse assessments if the assessment status is 'ended'	2.0
FR 26.2	The system shall remove all the responses, results and statistics of that assessment	2.0
FR 26.3	The system shall display a confirmation modal to obtain confirmation from the user	2.0

Table 3.1.1-28. Assessment Status

Requirement ID	Requirement Definition	Version
FR 27.1	The system shall allow the user to activate an assessments if the assessment's details is filled up	2.0
FR 27.2	The system shall not allow the user to edit the assessment if the status is not 'Setup in progress'	2.0
FR 27.3	The system shall only display the results, markings, statistics if the status is 'Ended'	2.0
FR 27.4	The system shall allow the user to delete the assessment if the status is not 'Activated'	2.0
FR 27.5	The system shall allow the user to manually end the assessment	2.0

3.1.2 Candidate Functional Requirement

Table 3.1.2-1. Candidate Functional Requirement Specification

Section ID	Requirement Definition	Version
FRS 28.0	The candidate shall be able to access to the assessment	1.0
FRS 29.0	The candidate shall be able to attempt the assessment without obstacle	1.0
FRS 30.0	The system shall restrain the assessment based on the settings set by the user	1.0

Table 3.1.2-2. Candidate Access Assessment

Requirement ID	Requirement Definition	Version
FR 28.1	The system shall allow the candidate to insert their name and email address before the tests	1.0
FR 28.2	The system shall make sure the candidate has fill up all the required fields	1.0
FR 28.3	The system shall give access to the candidate to attend the assessment if is authenticated	2.0
FR 28.4	The system shall display error messages if the candidate email is not authenticated	2.0

Table 3.1.2-3. Candidate Attempting the Assessment

Requirement ID	Requirement Definition	Version
FR 29.1	The system shall allow the candidate to answer questions	1.0
FR 29.2	The system shall allow the candidate to submit the assessment	1.0
FR 29.3	The system shall allow the candidate to skip the questions	2.0
FR 29.4	The questions generated should follow the set generation settings that is set by the user	2.0

Table 3.1.2-4. Assessment Restraint

Requirement ID	Requirement Definition	Version
FR 30.1	The system shall be ended if the assessment time is up	1.0
FR 30.2	The system shall be able to skip the question to the next question if the time limit for question is over	2.0
FR 30.3	The system shall allow the candidates to attempt the assessment based on the number of attempts set by the user	1.0
FR 30.4	The system shall give warnings to the candidates if they switches tabs (if the tab check settings is switch on)	2.0
FR 30.5	The system shall submit the assessments until a certain number of warnings passes	2.0

3.2 Quality Requirements

Quality requirements are the specifications of the quality of the product. The table below illustrates the quality requirements of this project.

Table 3.2-1. Quality Requirements

Requirement ID	Requirement Definition	Version
QR 1.0	The system shall only allow authorized user access	1.0
QR 2.0	The system shall ensure that users can only access to their own information	1.0
QR 3.0	The system shall handle exceptions and show proper messages accordingly	1.0
QR 4.0	The system shall ensure that the data from the user is inserted correctly into the database	1.0
QR 5.0	The system shall provide responsive and simple user interface design	1.0
QR 6.0	The system shall ensure that the time for an assessment is working correctly	1.0
QR 7.0	The system shall ensure that the setup and activation status is updated accordingly	1.0

3.3 Use Case Diagram

A UCD specifies the expected behavior of an actor. There are two actors in this system, the users (lecturer) and the candidates (students). The figures below illustrate the scenario of the users and candidates in the system.

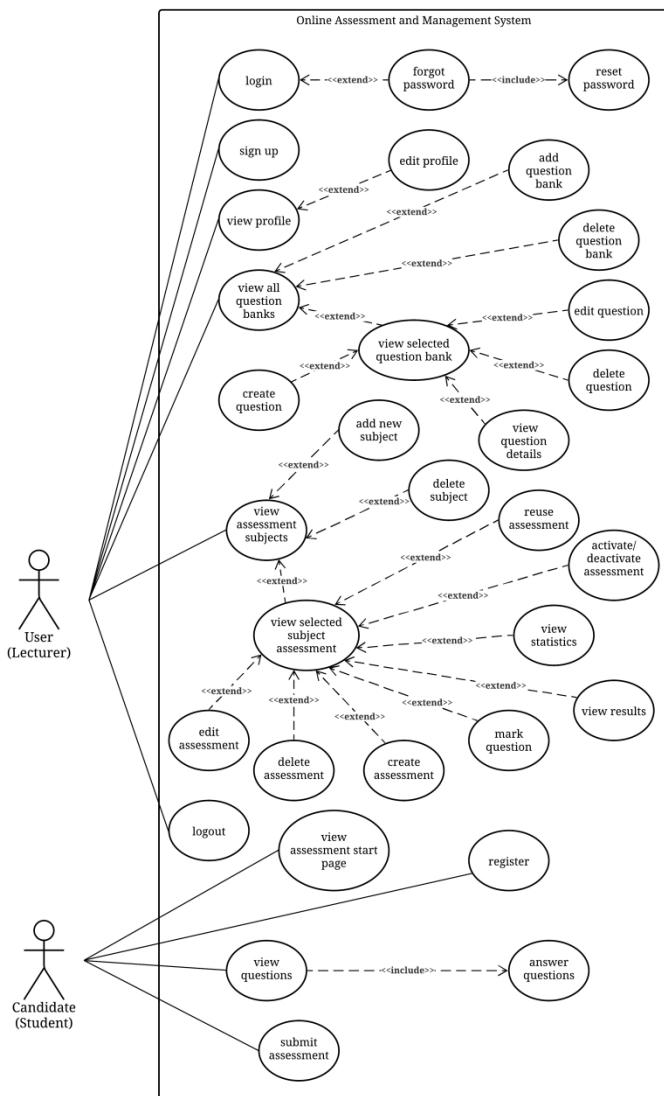


Figure 3.3-1. Use Case Diagram

The user has to login or sign up to access the system. If the user forgets his/her password, the user can proceed to reset the password. After the user has logged into the system, the user can choose to view their profile, question banks, and a list of subjects that contain the assessments. The user can choose to update his/her details when he/she is visiting the profile page. Next, the user can decide to view, delete or create new subjects on the question bank page or assessment page. Then, the user can decide to edit, delete, view, and create questions or assessments after the user selects a particular subject on the question bank page or the assessment page. Other than that, the user can choose to view results and statistics; mark questions, activate or deactivate assessments, and even reuse them. Lastly, the user can choose to logout of the system.

The candidates will be directed to the start page once they receive their assessment link. Candidates have to register to start their test. Once they successfully registered, they can start by reading and answering the questions. Lastly, the candidate must submit their responses before time is up.

3.4 System Architecture

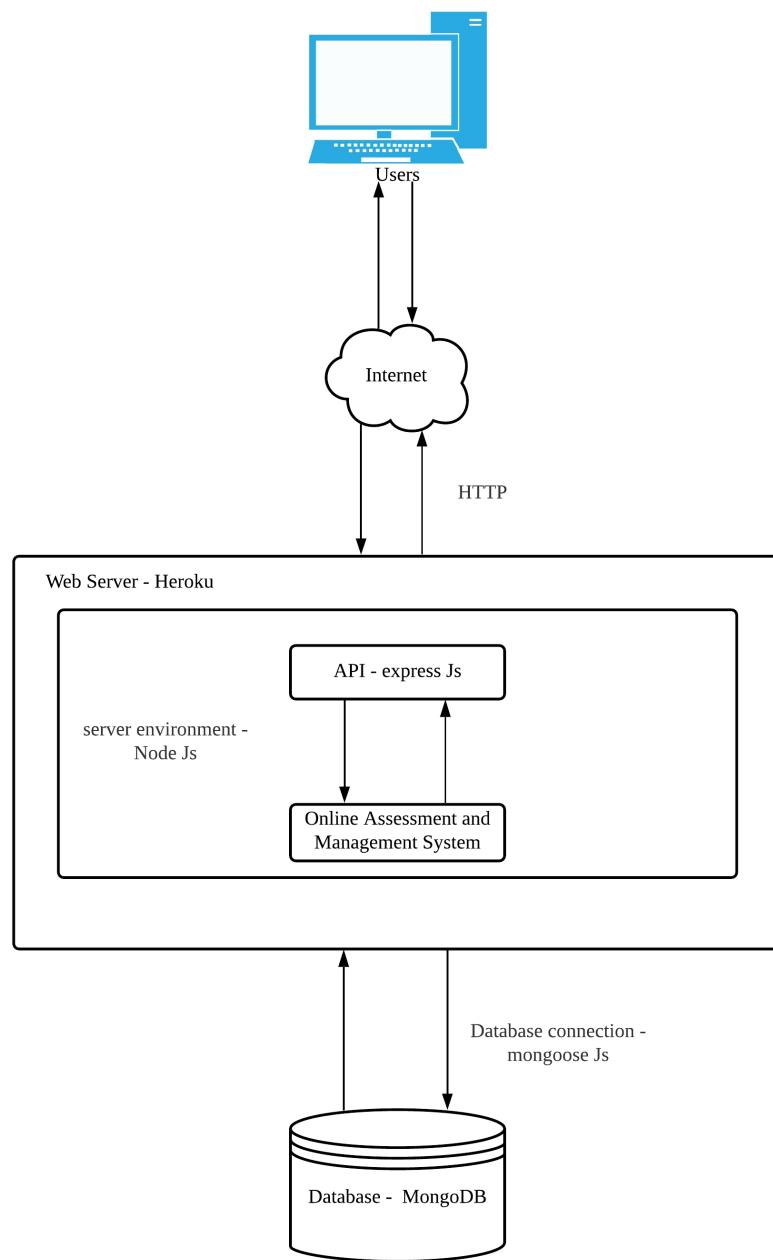


Figure 3.4-1. System Architecture

3.4.1 Express Js

Express Js is a back end web application framework for Node Js.

3.4.2 Node Js

Node Js is a JavaScript run time built on Chrome's V8 JavaScript engine. It brings JavaScript to the server. (“Node.js”, n.d.)

3.4.3 Mongoose Js

Mongoose is an Object Data Modeling library for MongoDB and Node.js. It helps to connect data, validate schema and translate objects from MongoDB to code. (“Introduction to Mongoose for MongoDB”, n.d.)

3.4.4 MongoDB

MongoDB is a NoSQL document database in which the users can store JSON documents in it. (“Introduction to Mongoose for MongoDB”, n.d.)

3.4.5 Heroku

Heroku is a platform as a service that enables developers to build, run and operate applications entirely in the cloud.

Chapter 4: Design

System design is the process of defining elements of a system like modules based on the specified requirements. (“System Design”, 2020). In this project, Unified Modelling Language (UML) and entity relationship diagram is applied to visualize the aspect of the system.

4.1 Sequence Diagram

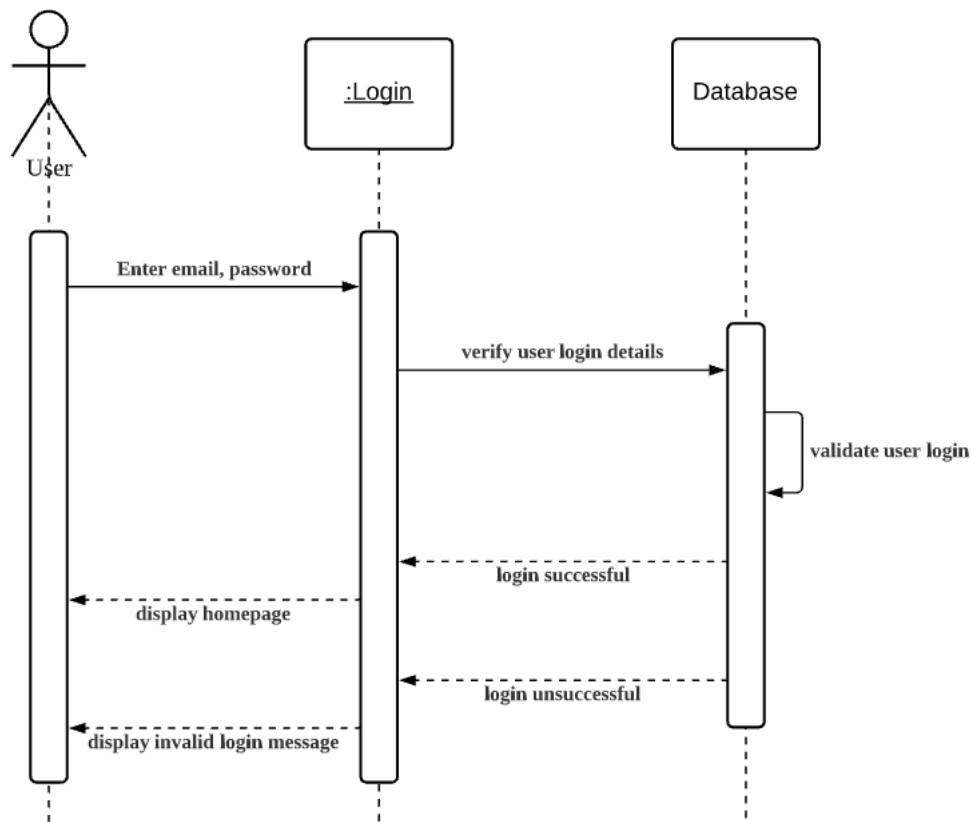


Figure 4.1-1 User Login

The user needs to login to use the system. To access the system, the user needs to insert the correct email and password. If the email and password are wrong, an

invalid message will be displayed to the user. If it is correct, the system will direct the user to the home page.

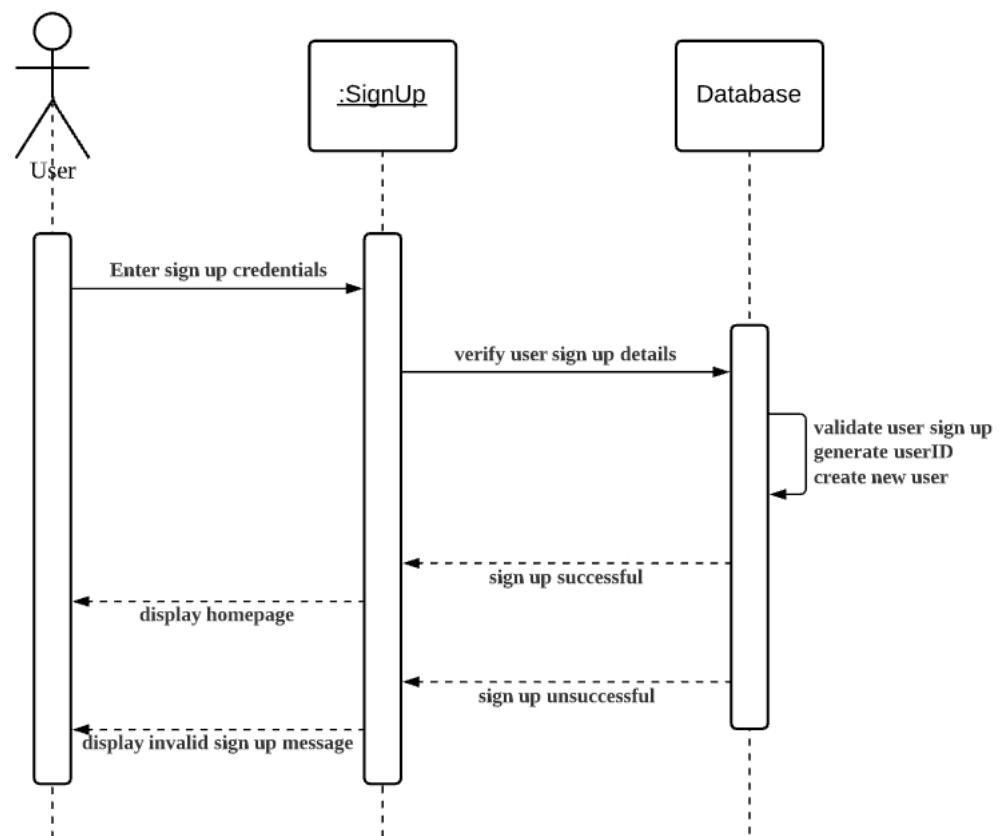


Figure 4.1-2 User Sign Up

The user has to sign up to access the system. To sign up, the user needs to insert the credentials to create an account. If the sign-up is successful, the system will direct the user to the home page. Else, it will display an error message.

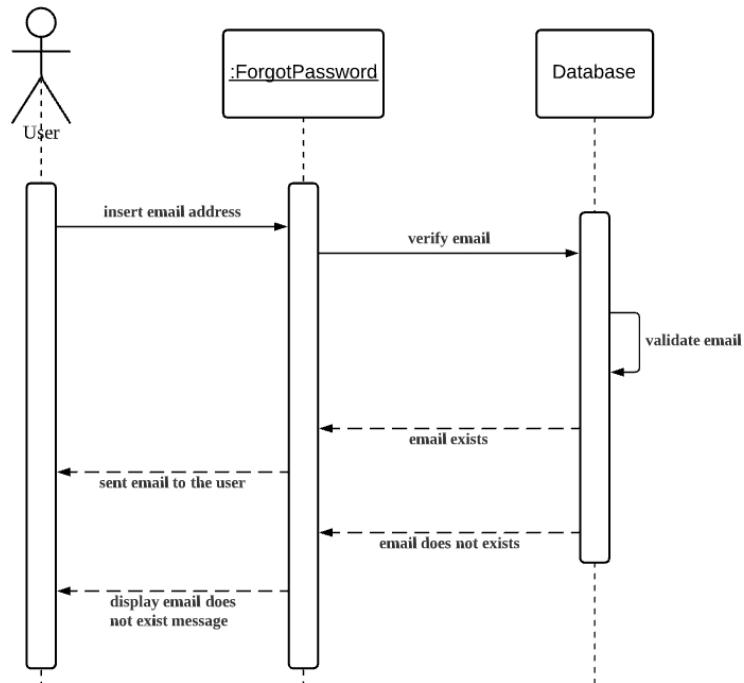


Figure 4.1-3 Forgot Password

The user can apply for a password change if he/she forgets his/her password. The system will validate his/her email to prove that the account exists. If the account exists, the system will send an email to the user to change his/her password. Else, the system will display an error message to the user.

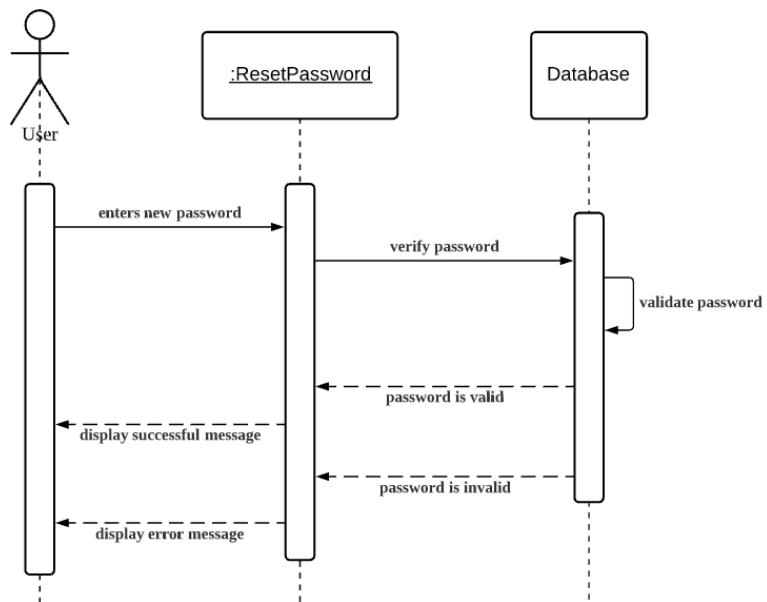


Figure 4.1-4 Reset Password

Once the user obtains the reset password link from his/her email, the system will direct the user to reset password page. The user then resets his/her password. If reset is successful, the system will direct the user to the login page. Else, an error message will show up.

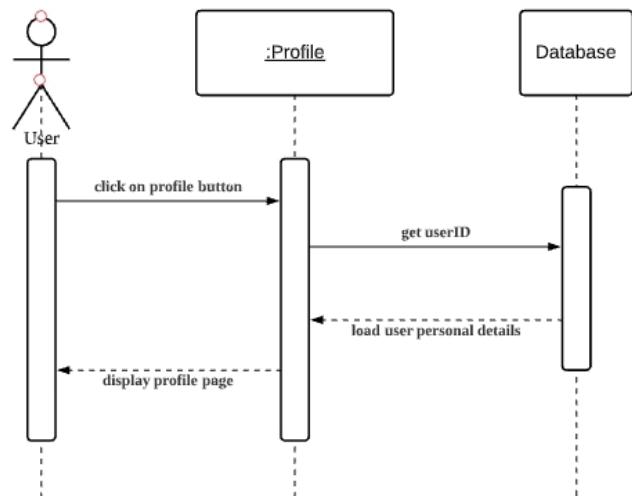


Figure 4.1-5 View Profile

When the user clicks on the 'profile' button, the system will load the user's details and display them on the profile page.

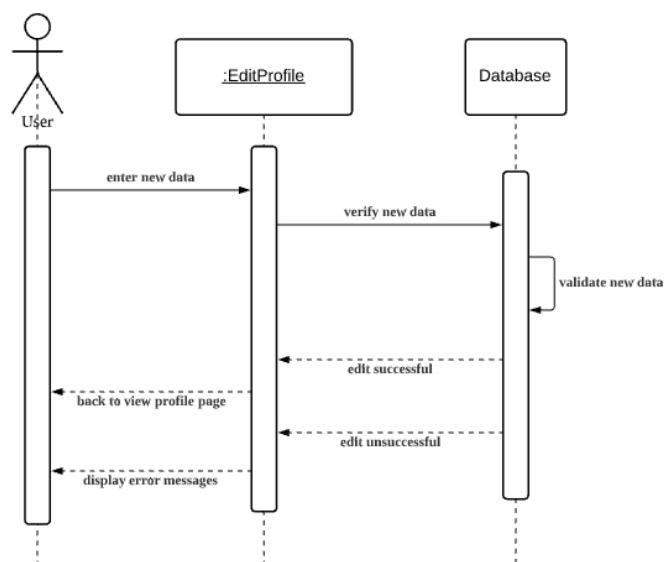


Figure 4.1-6 Edit Profile

To update the user's profile, the user needs to click on the 'edit' button. The system will direct the user to edit profile page. Then, the user can enter the information that he desires. The system will then validate the user input. If it is correct, the system will direct the user back to the view profile page. However, it will display an error message if it fails to validate.

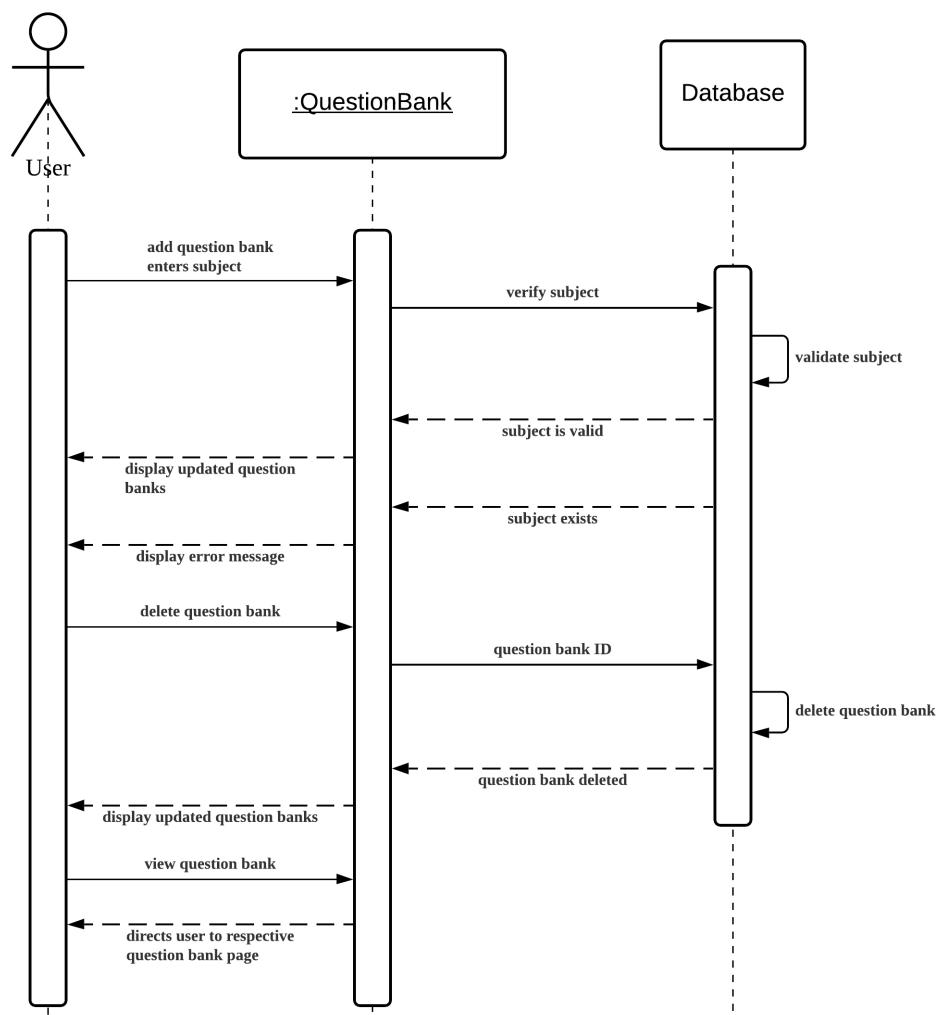


Figure 4.1-7 Add, Delete and View Question Bank

A user has to create a question bank to add questions. To create a question bank, the user only needs to enter a name, usually the question's subject. The system will

validate the subject and will display an updated question bank list if successfully created. Or else, an error message will be shown. Next, if the user wants to delete an existing question bank, he/she just needs to press the delete subject button. The system will automatically display the updated question bank list after the process is done. Lastly, if the user wants to view the set of questions within a question bank, he/she just has to select the desired question bank and the system will direct the user to the respective page.

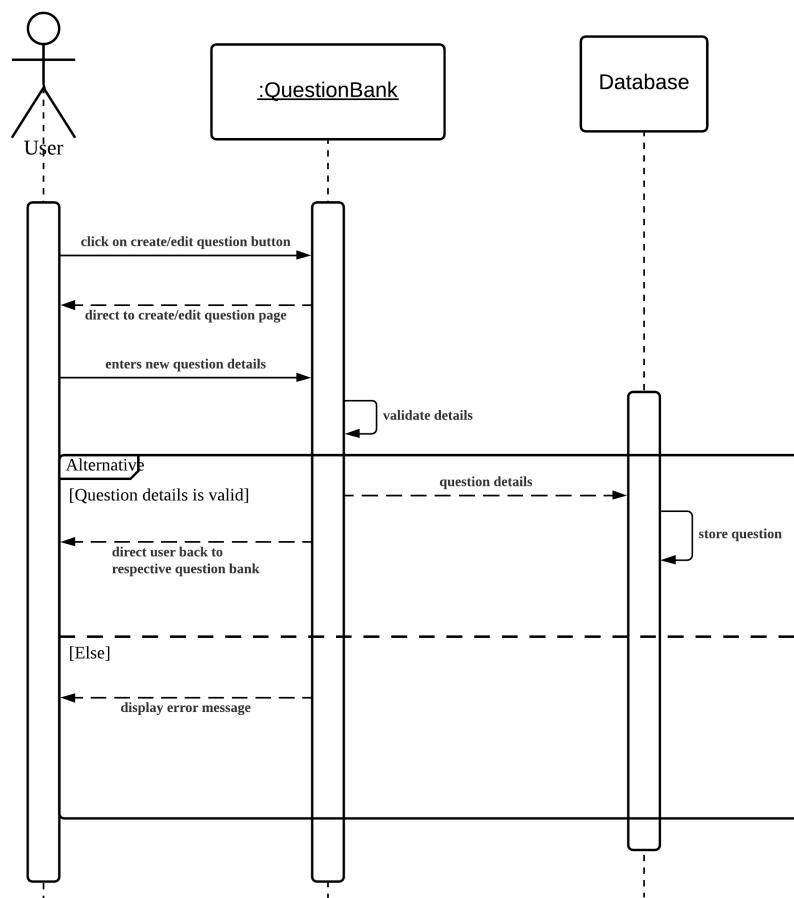


Figure 4.1-8 Create or Edit Question in Question Bank

The user can choose to create or edit existing questions in the question bank. The system will direct the user to create or edit page respectively. Then, the system will

validate the question details that are entered by the user. The system will store the question details into the database and direct the user back to the question bank page if the details are valid. Else, the system will display error messages.

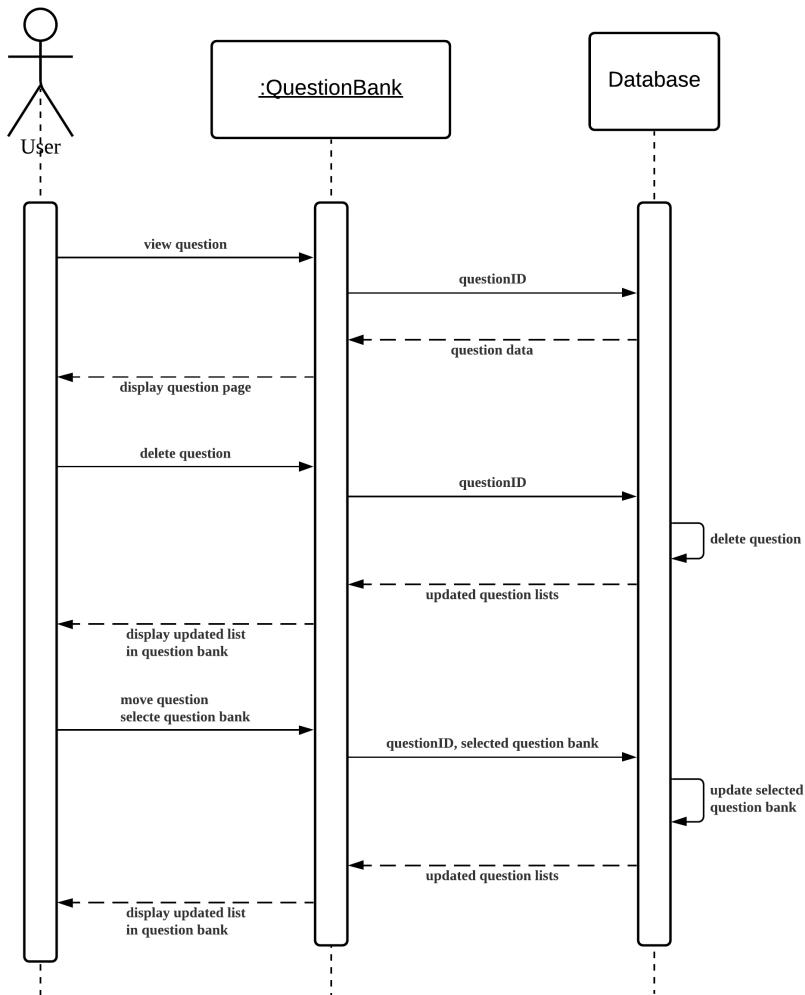


Figure 4.1-9 View, Delete and Move Questions in Question Bank

If the user wants to view question details, he/she can click on the ‘view’ button that directs him/her to the view question detail page. The user can also delete questions by clicking on the delete button and the system will display an updated question list in the question bank. Lastly, the user can move questions by selecting the question

and his/her desire question bank.

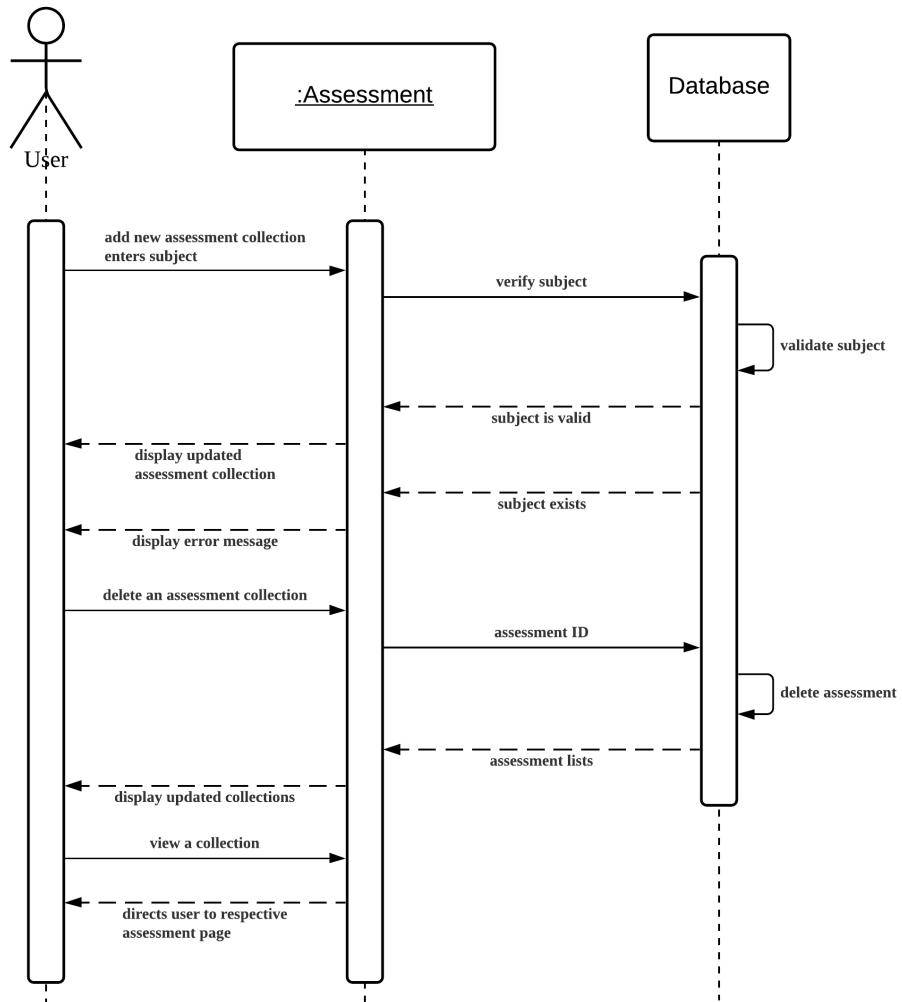


Figure 4.1-10 Add, Delete and View Assessment Collections

A user has to create a collection (subject) to create assessments. Other than that, a user can also delete and view assessments within the collection.

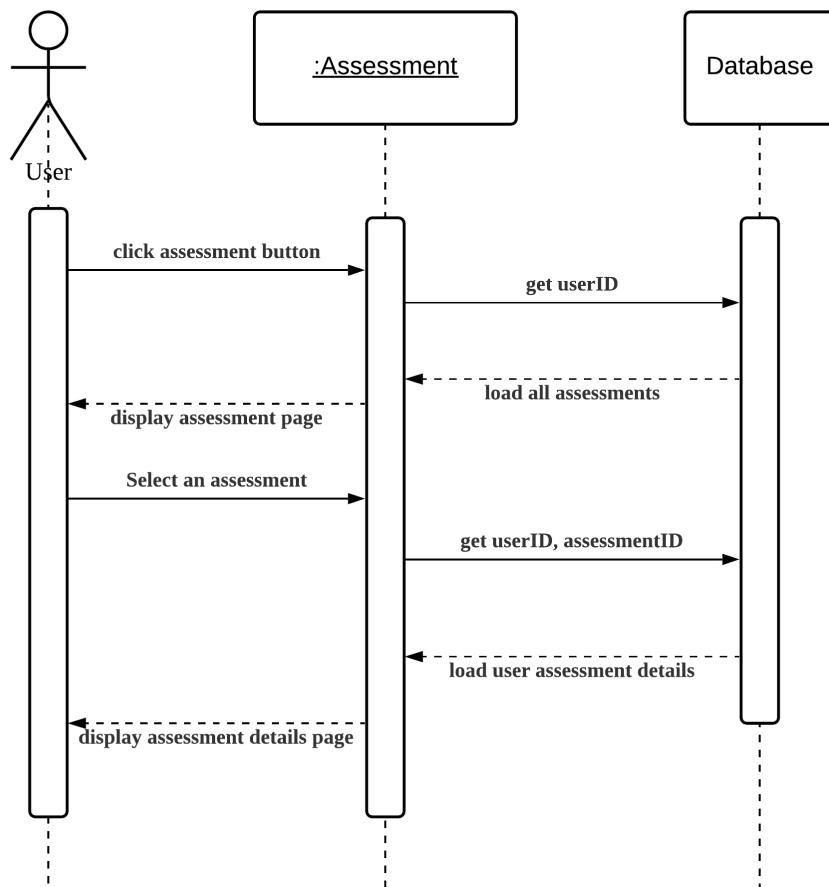


Figure 4.1-11 View Assessment Details

To view the assessment details, the user has to be on the assessment page. After that, the user needs to select an assessment that he/she wants to view. Then, the system will direct the user to the assessment details page.

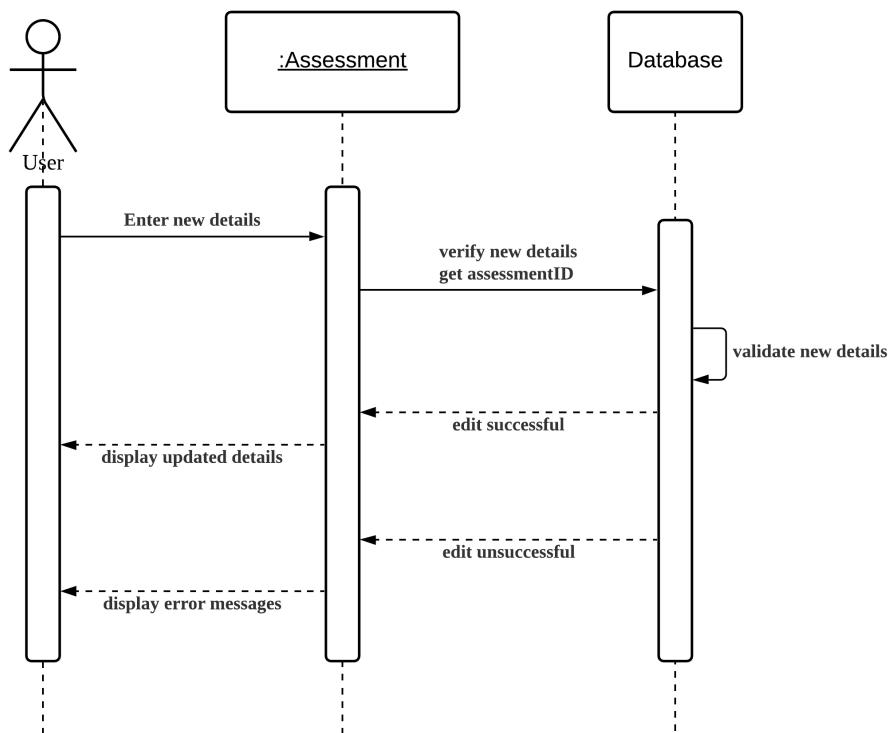


Figure 4.1-12 Edit Assessment

In this case, the user is already on the edit assessment page. To edit the assessment, the user needs to enter the new details and then submit it to the database. The system will then validate the details. If it is successful, the system will display the page with updated details. Else, the system will display error messages.

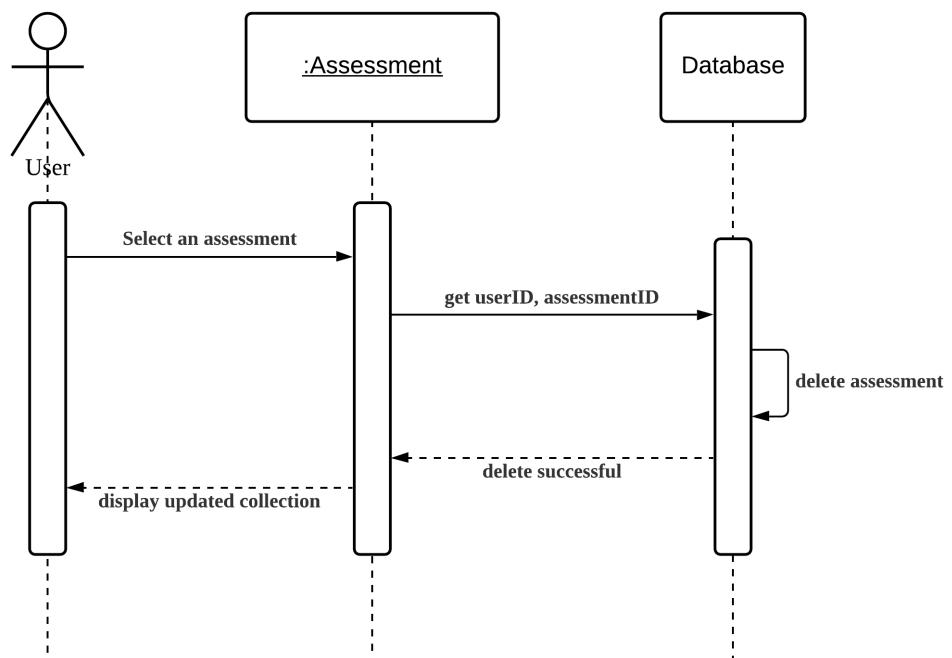


Figure 4.1-13 Delete Assessment

To delete an assessment, the user has to be on the assessment page. Then, the user selects an assessment that he/she wants to delete. If the removal is successful, the system will display an updated assessment collection to the user.

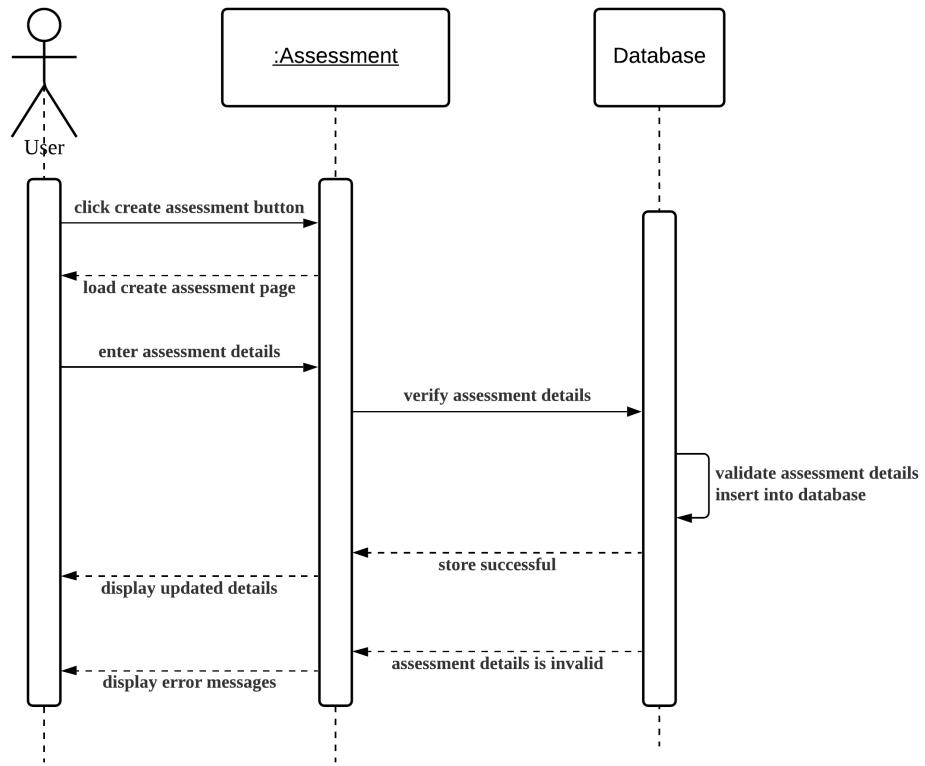


Figure 4.1-14 Create Assessment

To create an assessment, the user has to be on the assessment page. The system will direct the user to the create assessment page after he/she clicked the 'create assessment' button. Then, the user can enter the assessment details into the system. The system will validate the assessment details and will display an error message if the creation is unsuccessful. Else, the system will display updated details for the user to view.

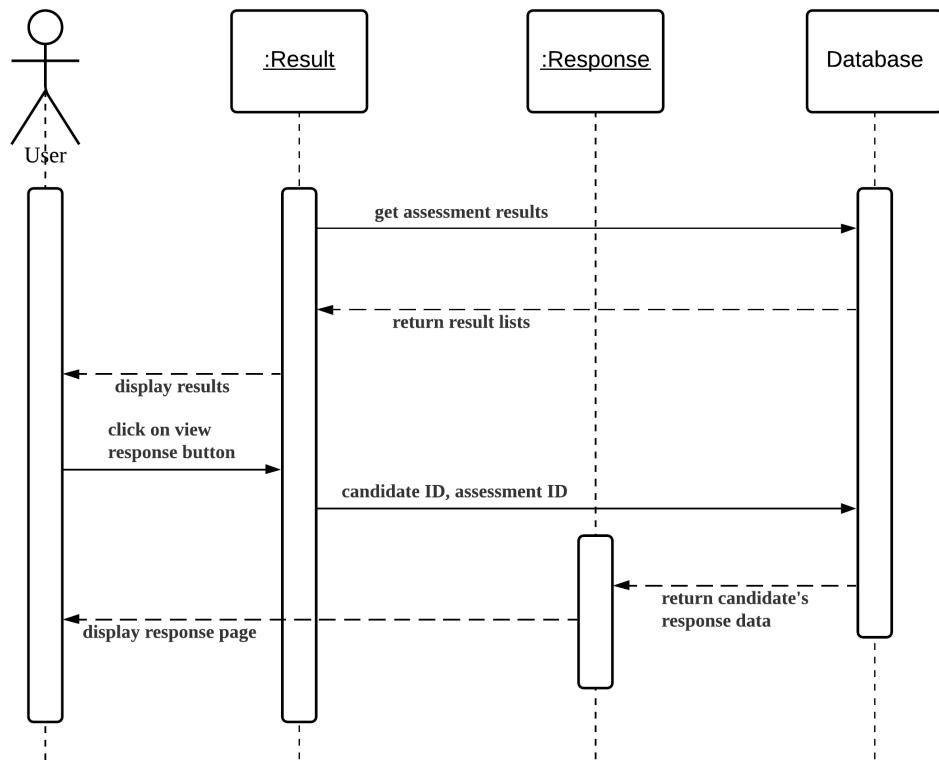


Figure 4.1-15 View Assessment Result and Candidate's Response

A user can view all the results of an assessment if the user visits the result page. Also, the user can view candidates' responses by clicking on the 'view response' button. The system will direct the user to the response page that contains the responses of the selected candidate.

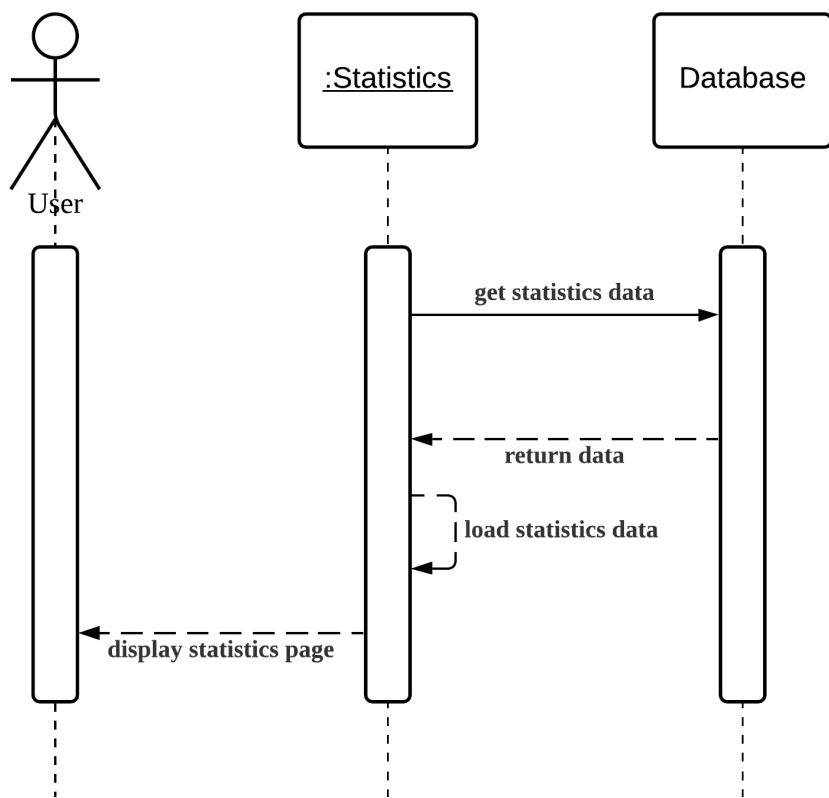


Figure 4.1-16 View Statistics

A user can view the statistics of an assessment. The system obtains the statistics data from the database and displays it to the user.

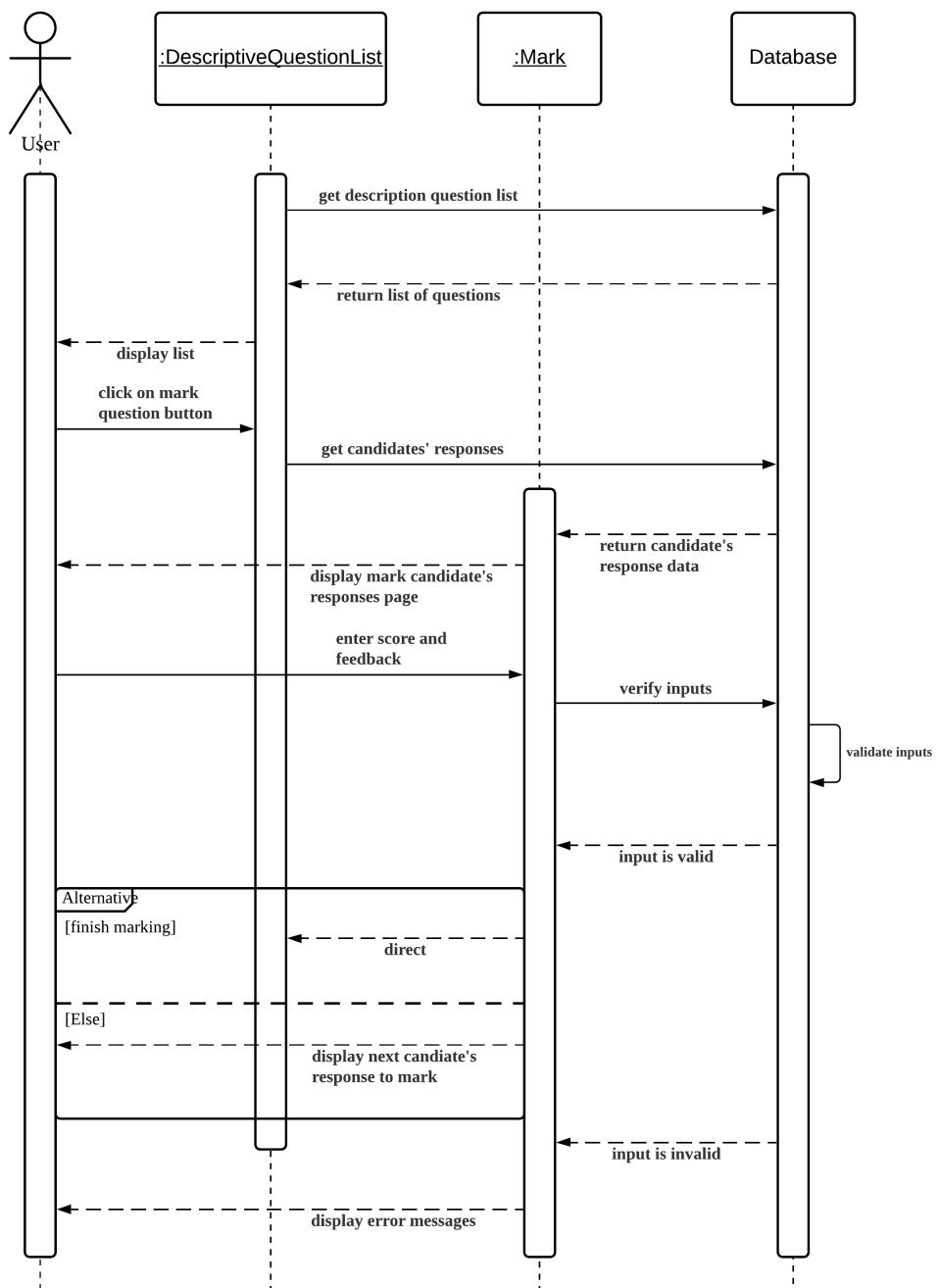


Figure 4.1-17 View Descriptive Question List and Mark Candidates' Response

A user can view the descriptive questions from an assessment. To mark them, the user has to navigate to the mark question page by clicking on the 'mark' button.

Then, the user can proceed to marking and giving feedback. Next, the system will validate the inputs and will direct the user back to the descriptive question list page if that particular question is done marking or display the next response if that question is not done marking. If the input is invalid, the system will display an error message on the screen.

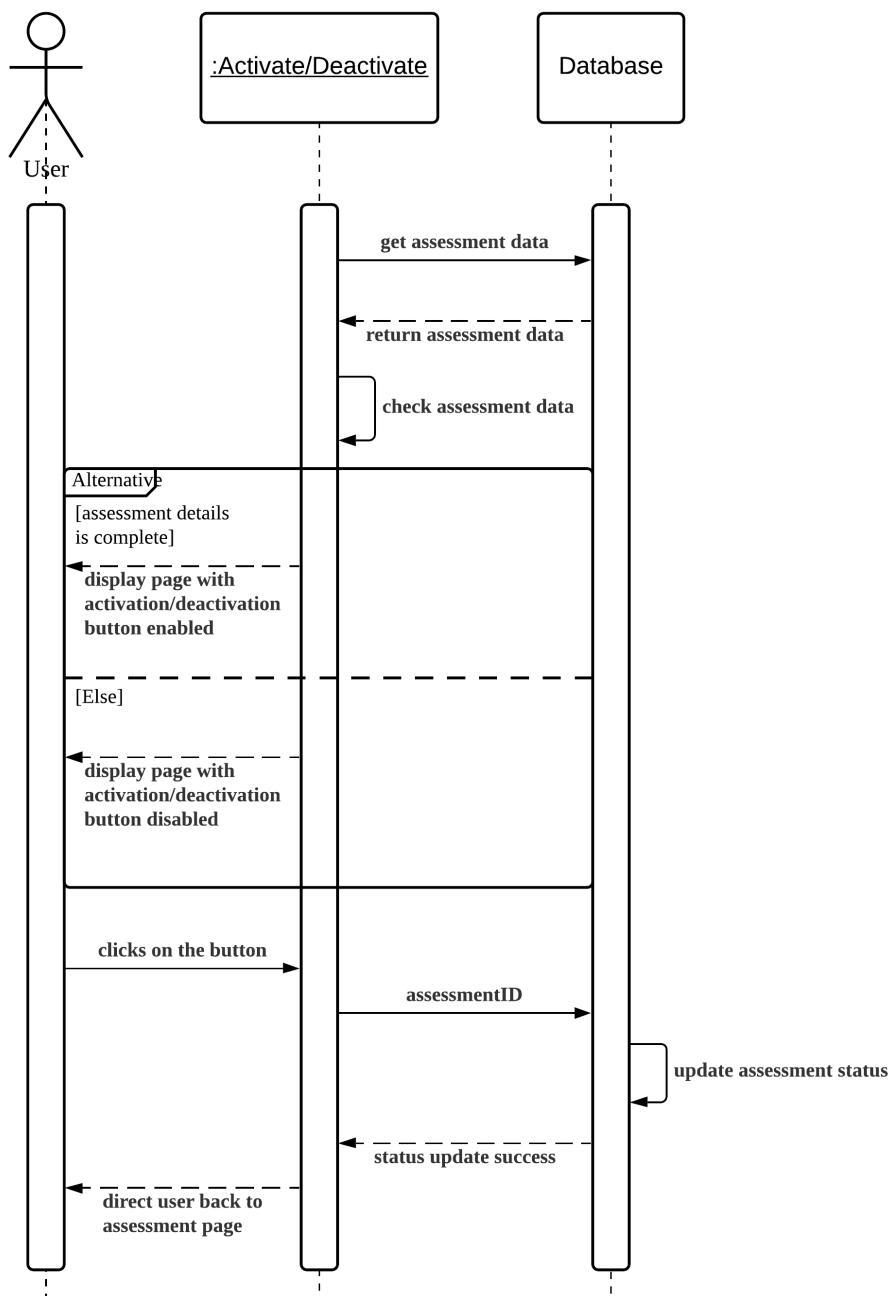


Figure 4.1-18 Activate or Deactivate Assessment

The system will check the completeness of the assessment before allowing the candidate to activate the assessment. If the system allowed the user to activate or deactivate it, the user has to click on the activate or deactivate button to send an

update action to the database. The system will direct the user back to the assessment page if the status update is finish.

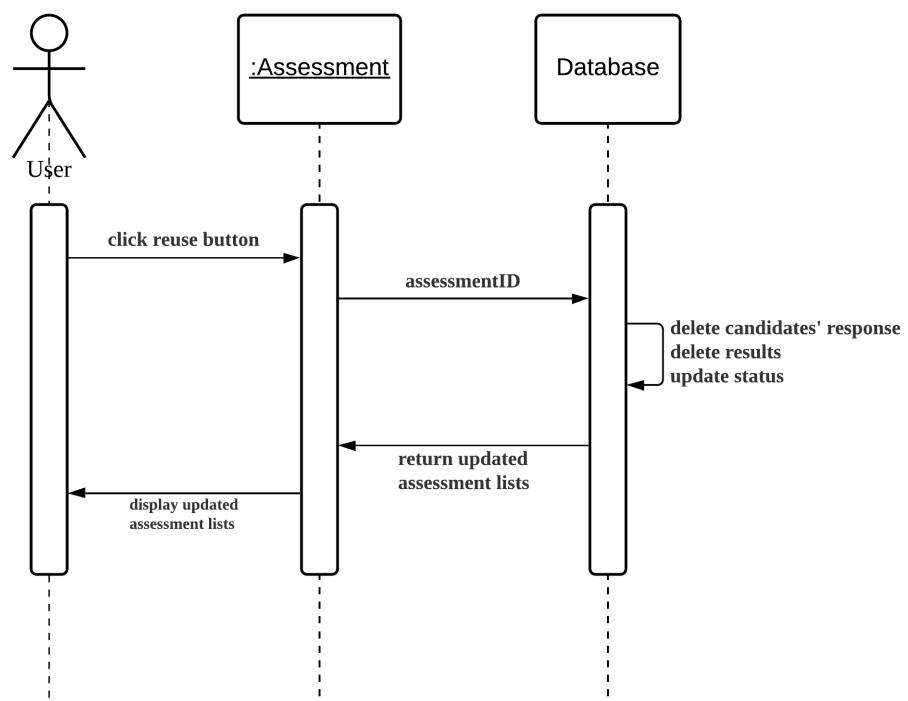


Figure 4.1-19 Reuse Assessment

The user clicks on the reuse assessment button to reuse an assessment. The system will remove the candidates' responses, results and update the assessment's status. Then, the system will return a list of assessments with the updated assessment and display it to the user.

4.2 Activity Diagram

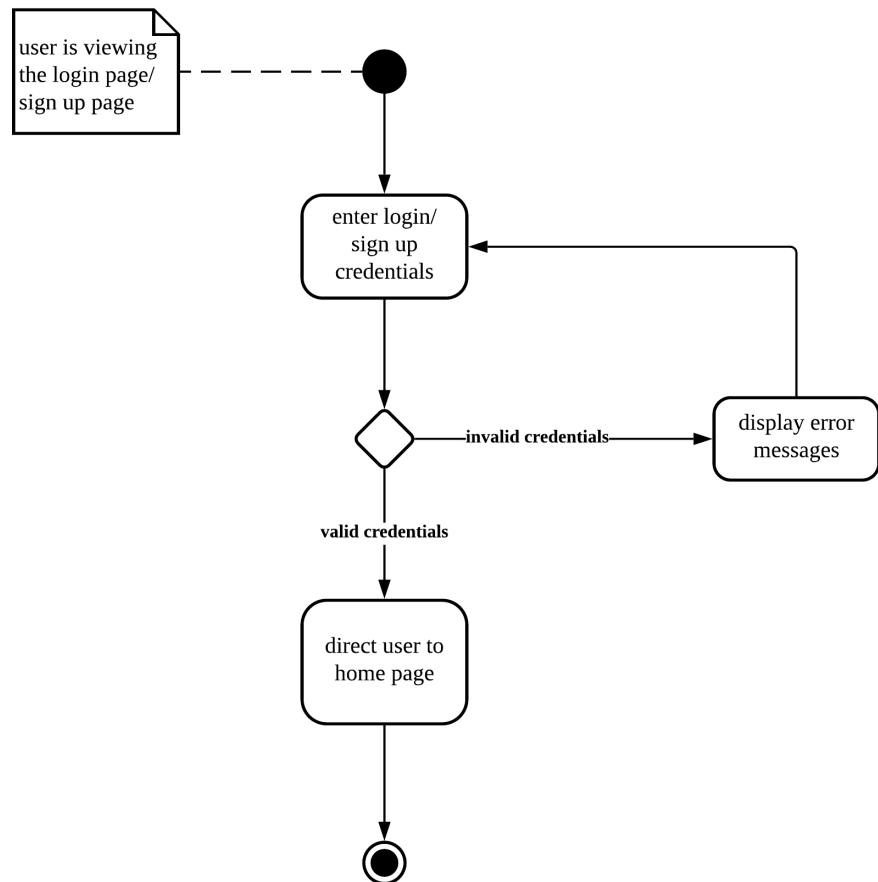


Figure 4.2-1 User Login or Sign up

Users have to login or sign up to access the system. To login or sign up, the user needs to verify their credentials. If it is valid, the system will direct the user to the home page. However, if it is invalid, the user has to rectify their credentials.

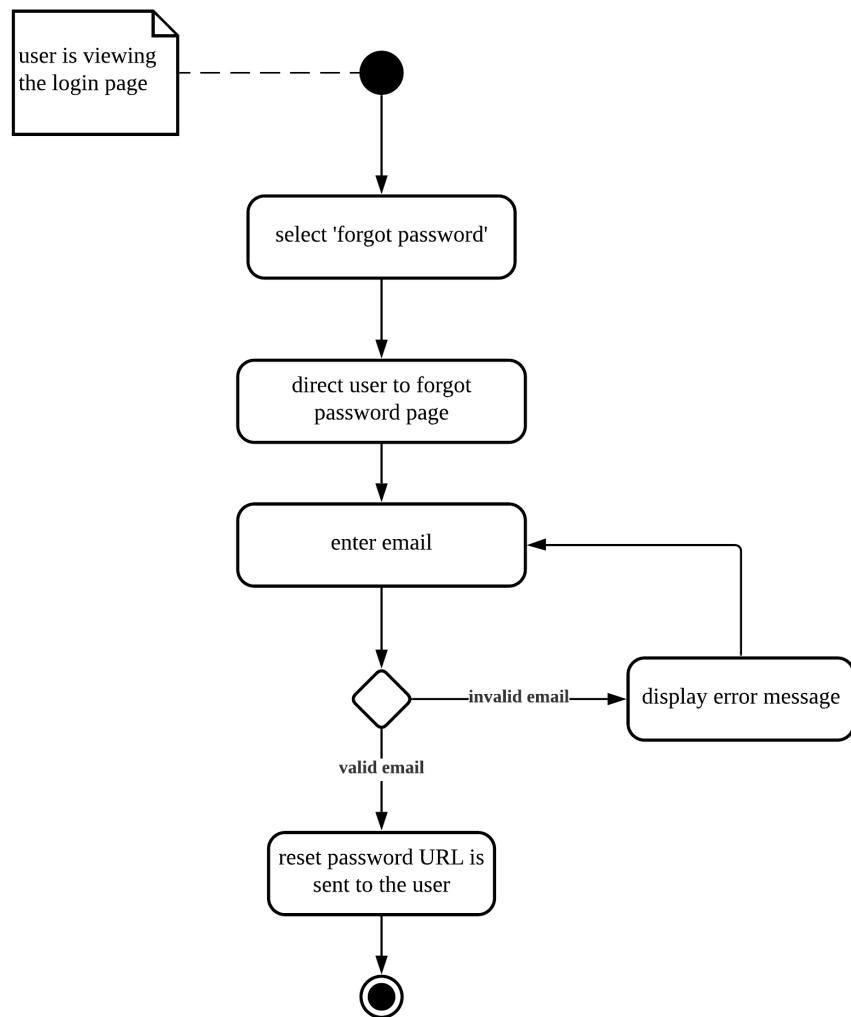


Figure 4.2-2 User Forget Password

If users forget their password, they can proceed to the forgot password page. On that page, they have to enter their email. The system will check the existence of that email. If that email exists, the system will send a reset password URL to the user through email.

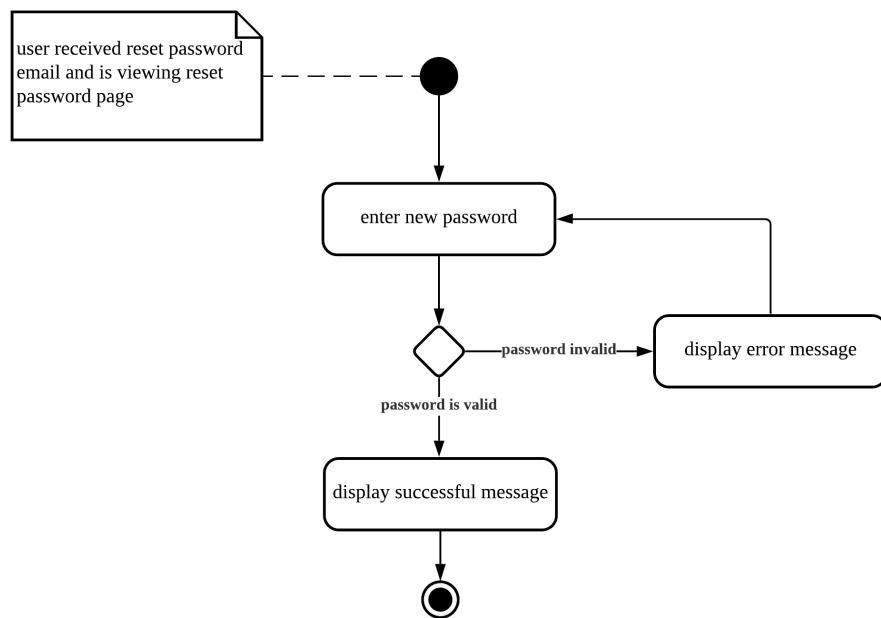


Figure 4.2-3 User Reset Password

The user will be directed to this page after they clicked on the reset password URL in their email. The user can reset their password here then the system will check the validity of the password.

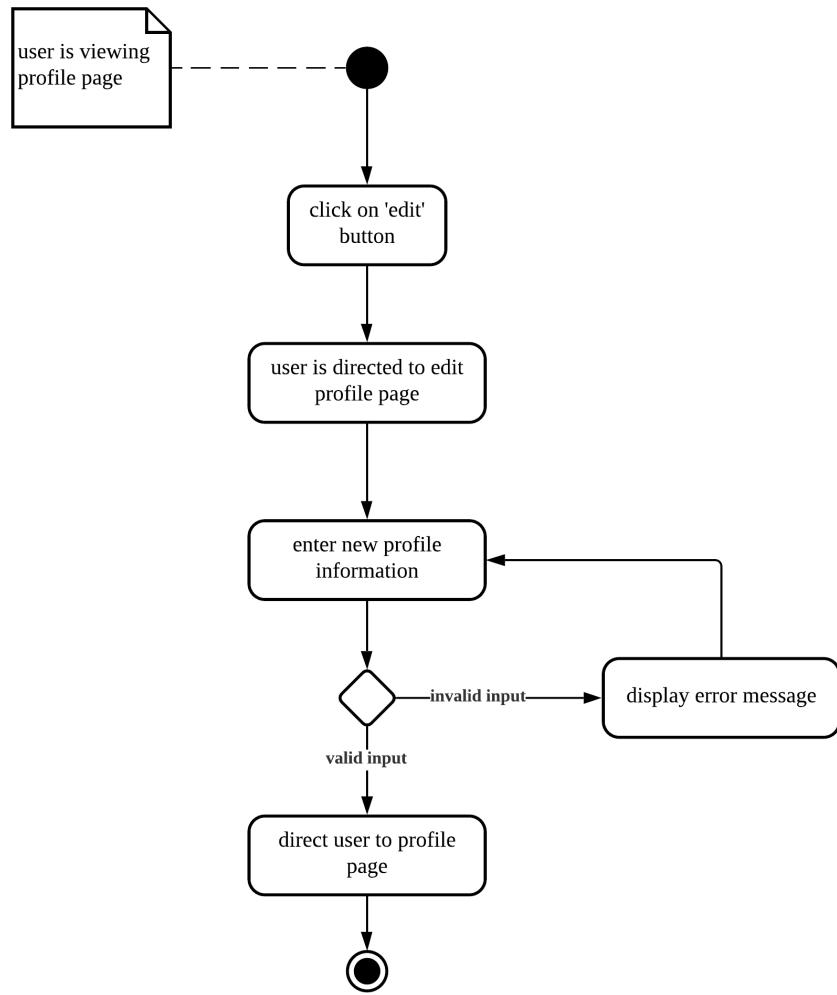


Figure 4.2-4 User Edit Profile Data

If the user wants to edit his/ her profile details while viewing, the user can click on the ‘edit’ button that will direct his/ her to the edit profile page. The system will validate his/ her new details and will display error messages if there is an error; direct the user back to the profile page if the details are valid.

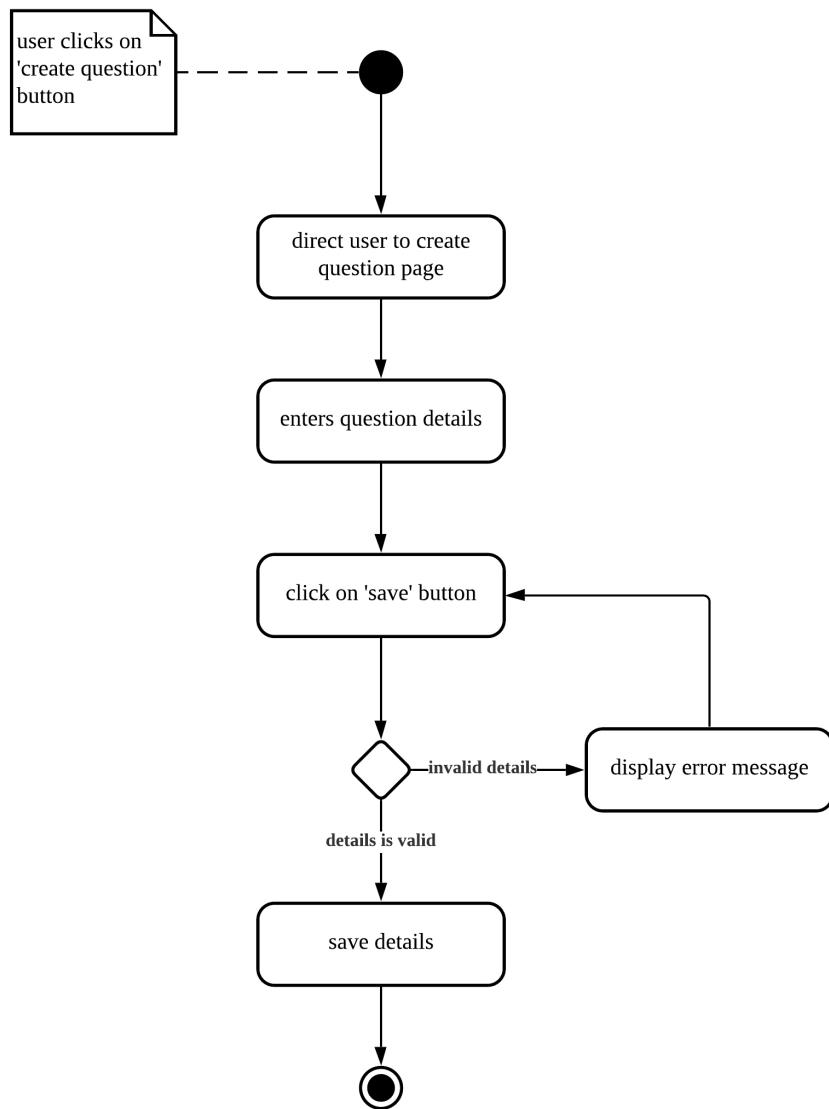


Figure 4.2-5 User Create Question

The system will direct the user to create a question page after he clicked on the 'create question' button. The user must click on the 'save' button to save his/ her question. The system will validate the question and will display error messages if there is an error but will save the details if the question details are valid.

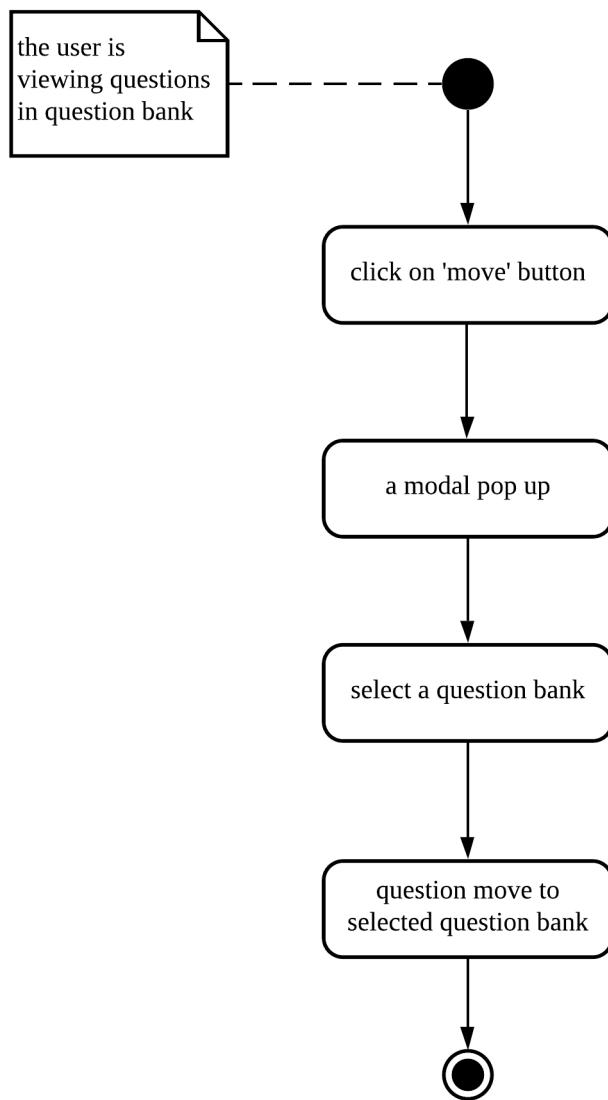


Figure 4.2-6 User Move Question

A modal will show up if the user wants to move the question to another question bank. In that modal, the user can select a question bank subject to place the question. After the selection, the question is moved to the selected question bank.

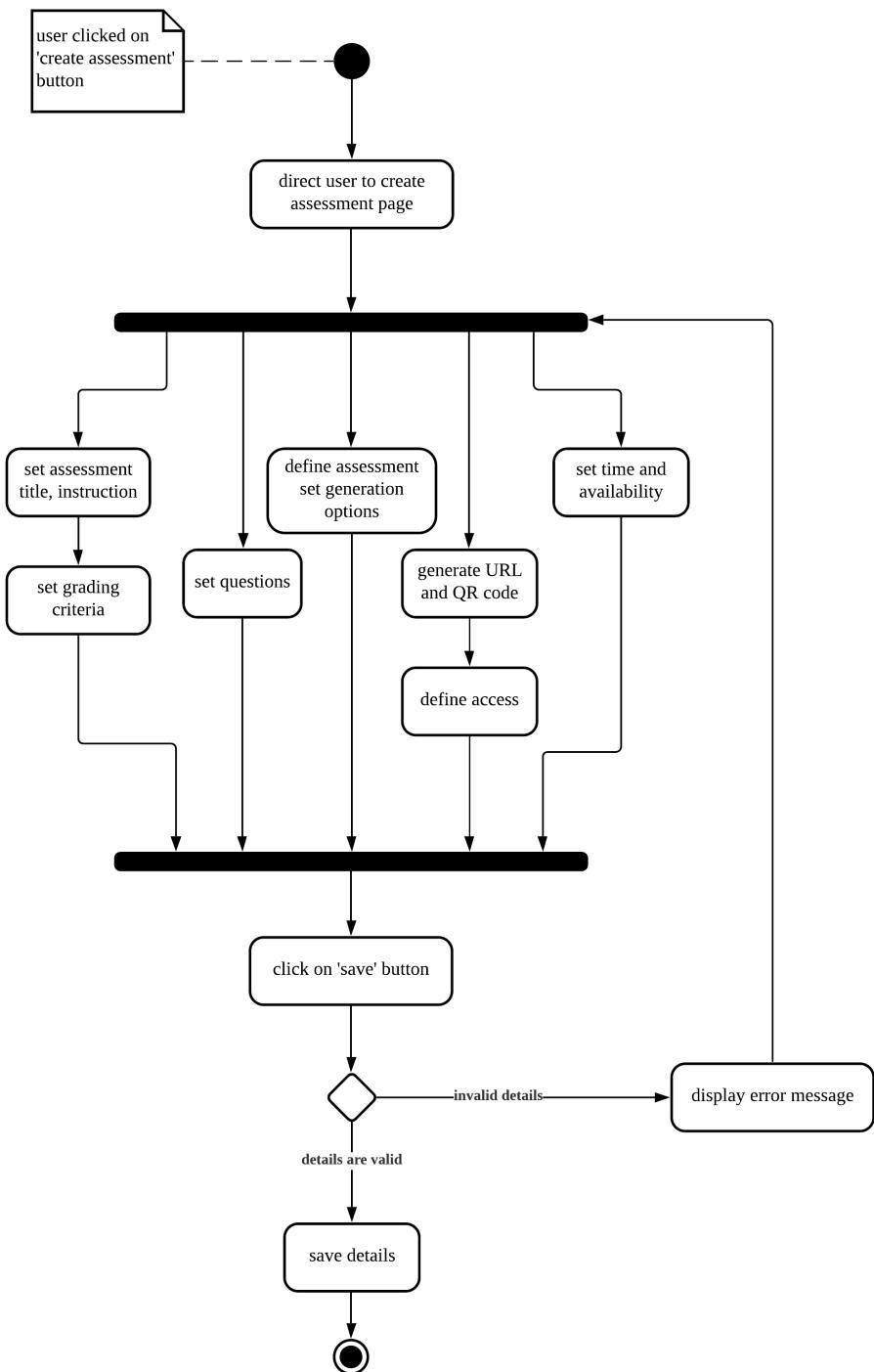


Figure 4.2-7 User Create Assessment

If the user wants to create a new assessment, the user has to set criteria such as assessment title, questions, time etc. The system will validate the details after the

user clicks on the ‘save’ button. Then, the system will display a message if there is an error. If there are no errors, the system will save the details.

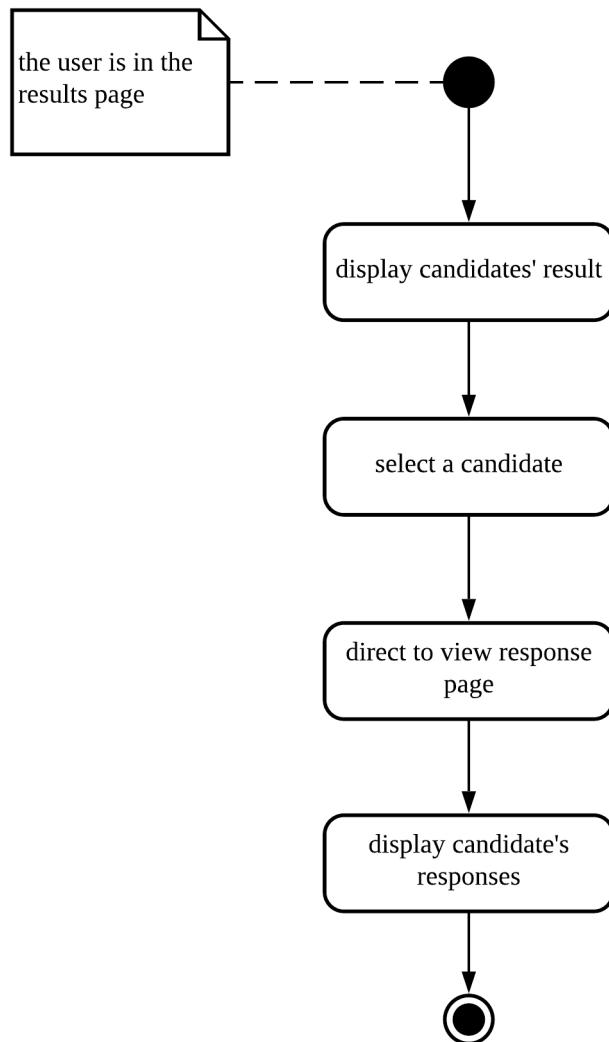


Figure 4.2-8 User View Results and Candidate’s Responses

The system will direct the user to view the response page after the user selects a candidate that he/ she wants to view. Then, the page will display information like the candidate’s name, email, grade, and responses.

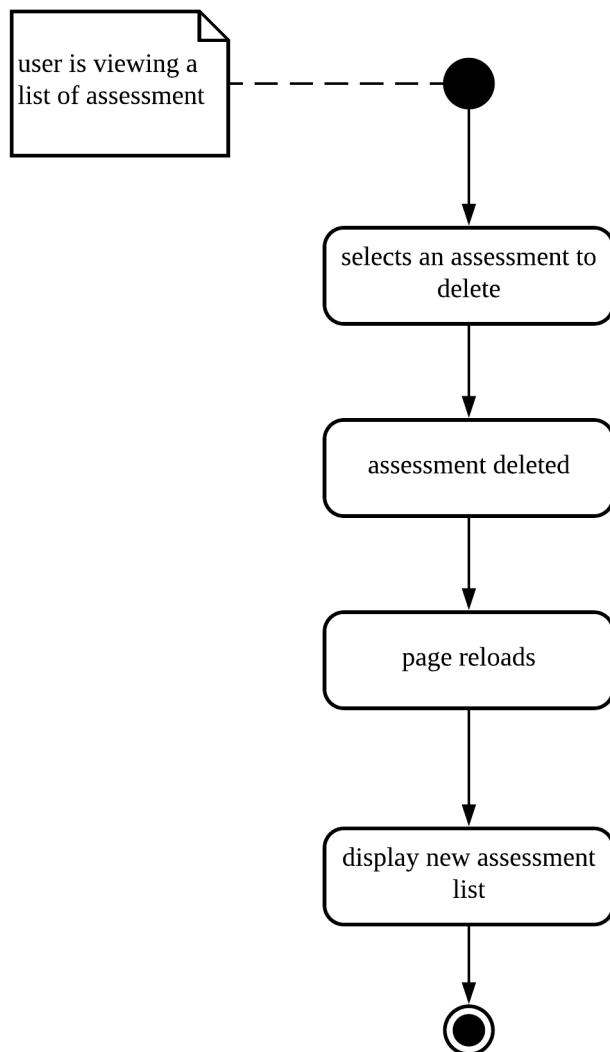


Figure 4.2-9 User Delete Assessment

A user selects an assessment to delete. Then, the page reloads and displays an updated list of assessments to the user.

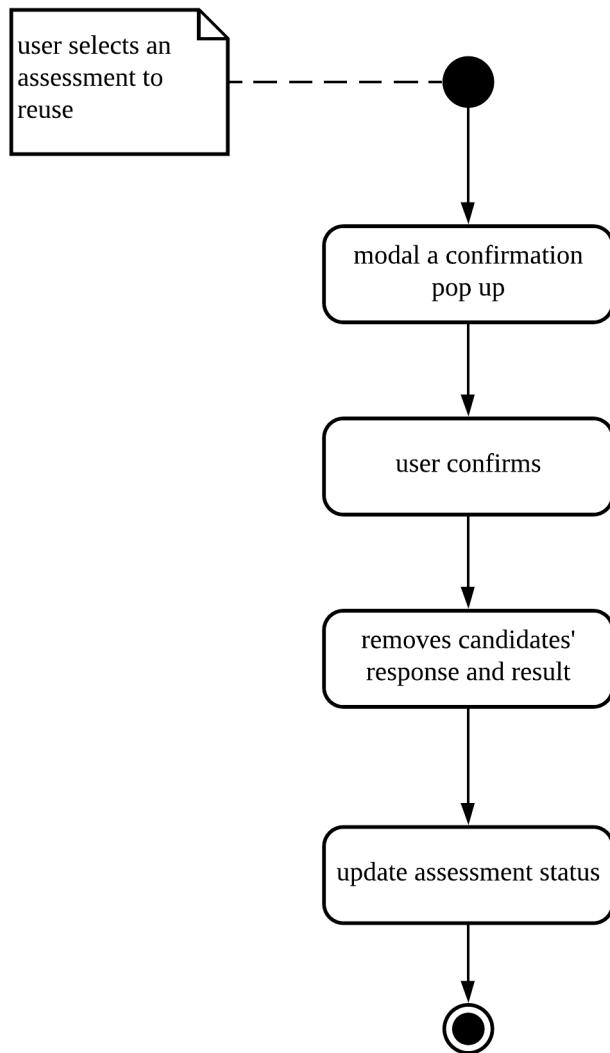


Figure 4.2-10 User Reuse Assessment

A modal of confirmation will show up if the user clicks on the 'reuse assessment' button. If the user confirms, the system will remove all the responses and result within that assessment and update the status of the assessment.

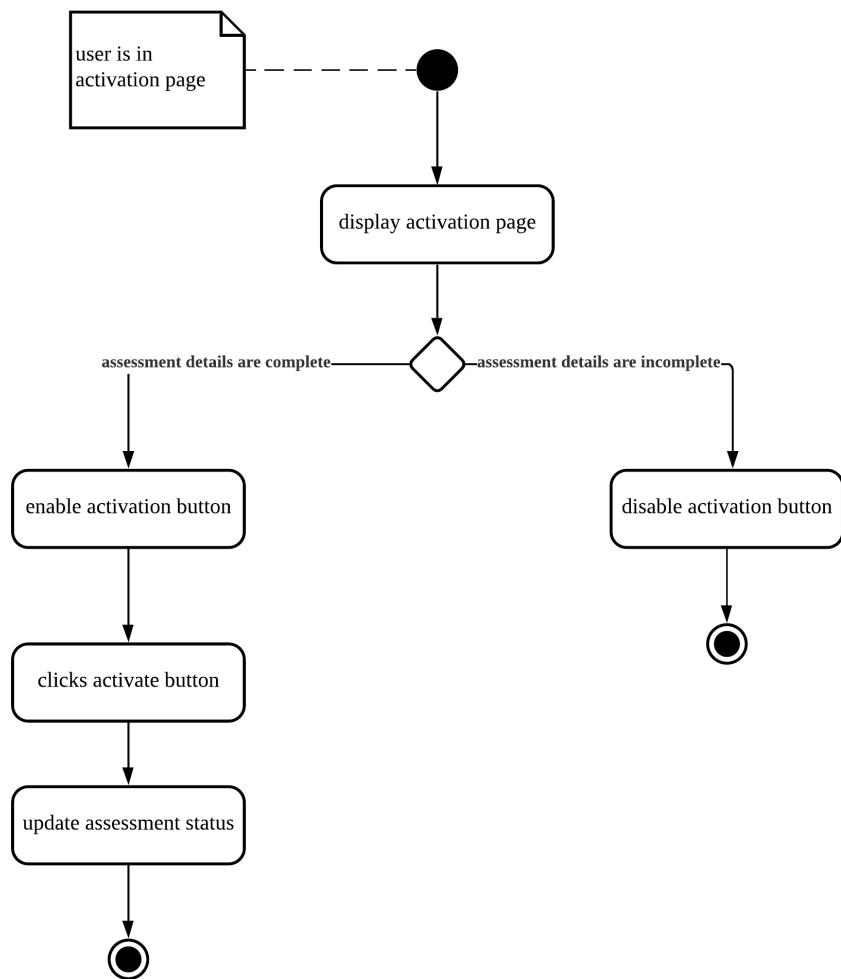


Figure 4.2-11 User Activate Assessment

An assessment has to be activated for candidates to attempt. Before activation, the system will check the completeness of that assessment. If it is not finished, the activation button will be disabled. The assessment's status will update to 'activated' if the user completed the assessment setup and clicks on the activation button.

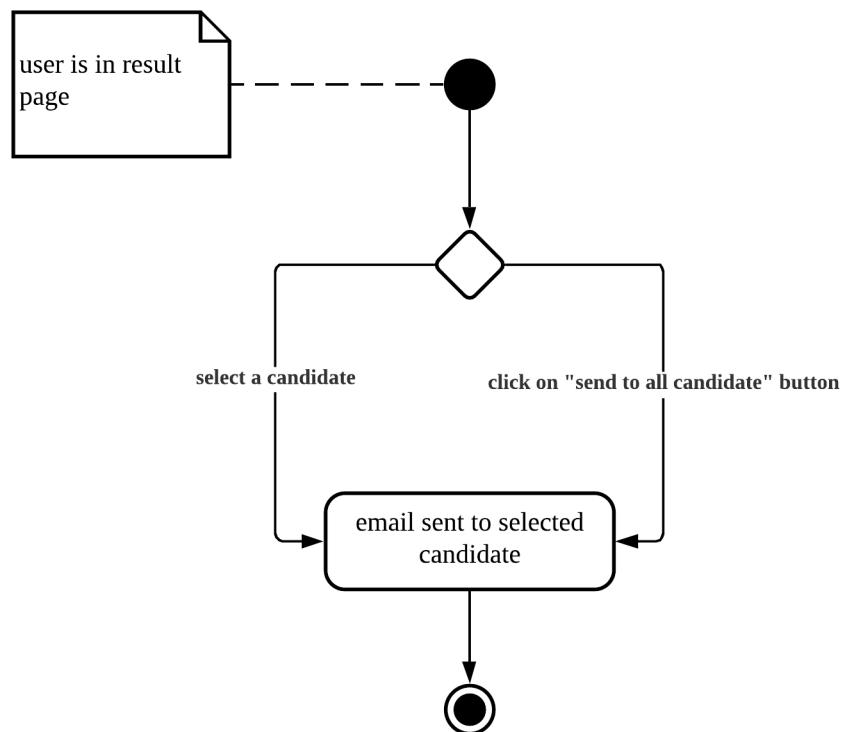


Figure 4.2-12 User Send Email Results to Candidates

There are two ways to send email to each candidate; sent to one candidate or all candidates.

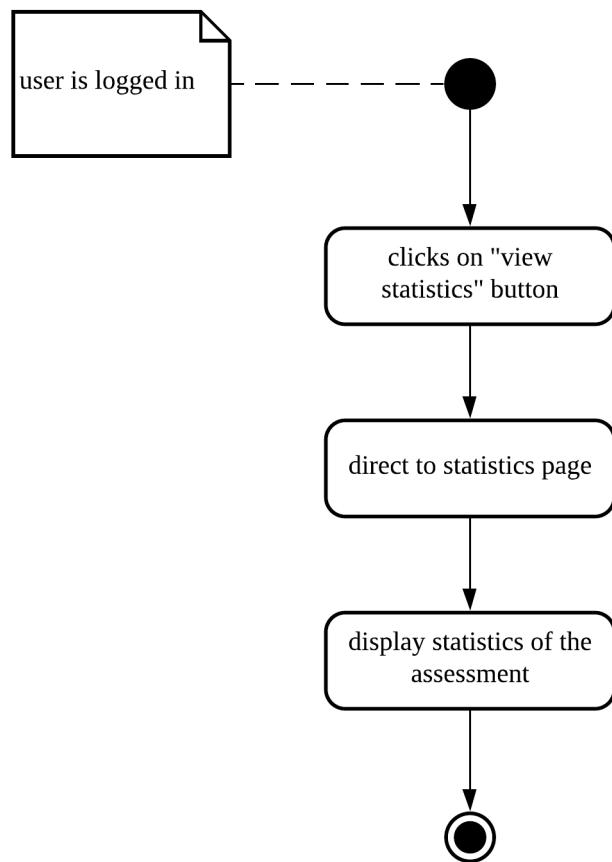


Figure 4.2-13 User View Statistics

The user will be directed to the statistics page if the user clicks on the “view statistics” button. The system will display the statistics to the user.

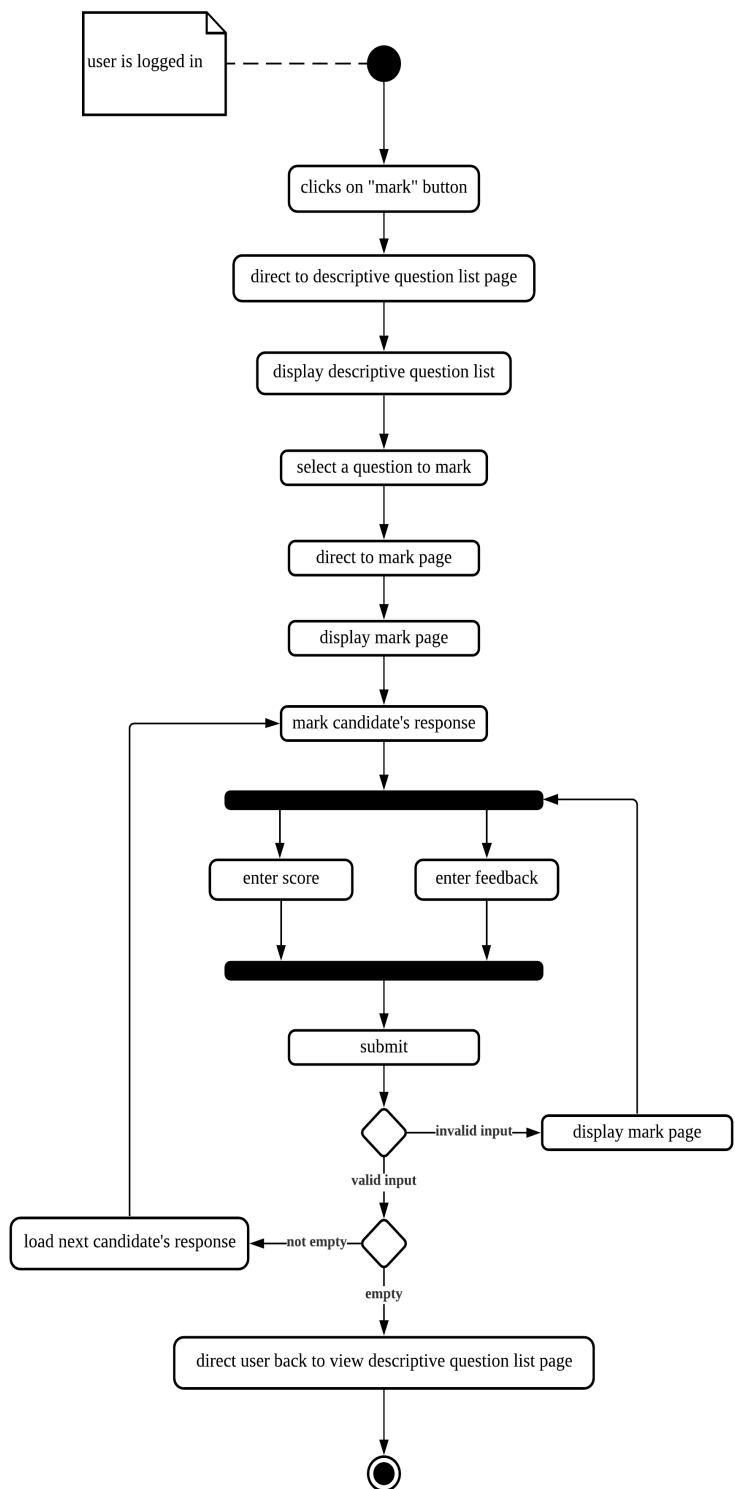


Figure 4.2-14 User Mark Responses

Users can view all the descriptive questions of an assessment on the descriptive question list page. Each question in the list contains a button that will direct the user to the mark responses page. On that page, the user can mark all responses of the same question. The system will validate the user's input after he/ she submitted the score and feedback of the candidate. If it is valid, the system will check if there is another response of the same question. If there are responses left, the system will display the next response. Else, the system will direct the user back to the descriptive question list page.

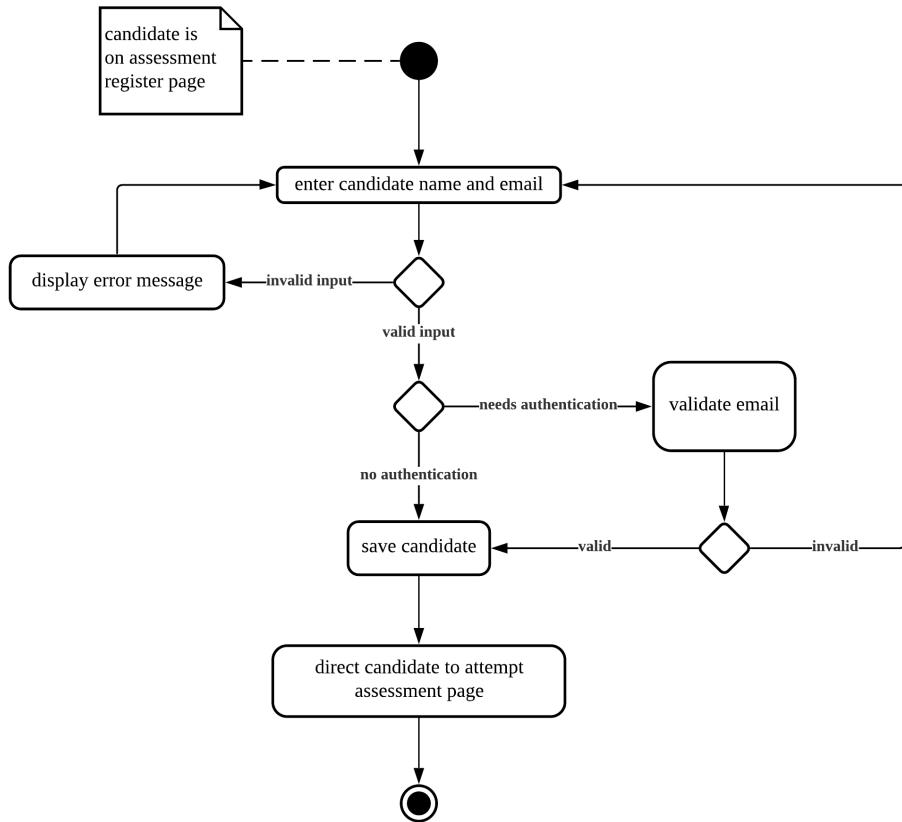


Figure 4.2-15 Candidate Register to the Assessment

Candidates have to register to attempt the assessment. After the system validates the input, the system will direct the candidates to the attempt assessment page if no authentication is needed. If the user requires email authentication (check the email is in the list defined by the user), the system will validate the email and only allow candidates to access if their emails are in the list. Then, the system will save the candidate's information and direct the user to attempt tassessment page.

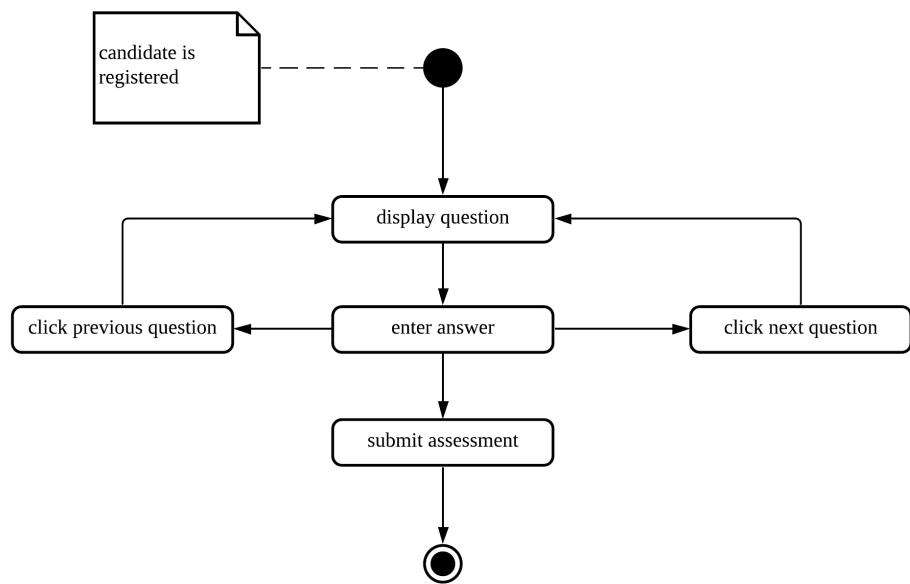


Figure 4.2-16 Candidate Attempt Assessment

Candidates can go to the next and previous question. They can submit the assessment after they have finished answering the assessment.

4.3 Entity Relationship Diagram (ERD)

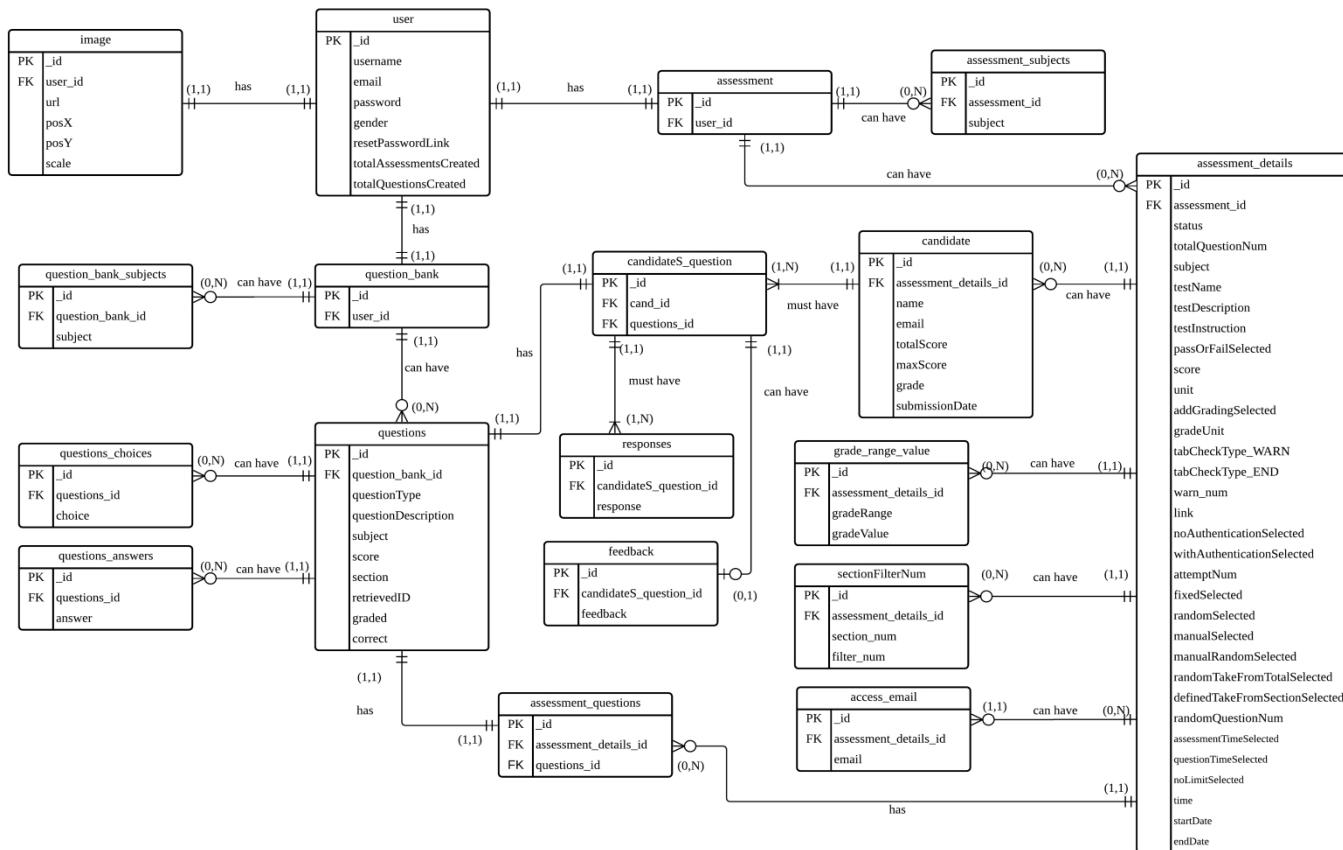


Figure 4.3-1 Entity Relationship Diagram

4.4 Data Dictionary

Table 4.4-1 User Table

Table Name	Attribute Name	Data Type	Constraint/ Key	Reference Table	Description
user	_id	varchar	Primary key, not null	-	Unique identifier for user
	username	varchar	Not null	-	User name
	email	varchar	Not null	-	User email
	password	varchar	Not null	-	User password
	gender	varchar	-	-	User gender
	resetPasswordLink	varchar	-	-	A JWT that is needed for password reset
	totalAssessmentsCreated	int	-	-	Total number of assessments
	totalQuestionsCreated	int	-	-	Total number of questions

Table 4.4-2 Image Table

Table Name	Attribute Name	Data Type	Constraint/ Key	Reference Table	Description
image	_id	varchar	Primary key, not null	-	Unique identifier for image
	user_id	varchar	Foreign key, not null	user	Unique identifier from user table
	url	varchar	Not null	-	URL of the image
	posX	varchar	Not null	-	Position X of the image

	posY	varchar	Not null	-	Position Y of the image
	scale	varchar	Not null	-	Scale of the image

Table 4.4-3 Question Bank Table

Table Name	Attribute Name	Data Type	Constraint/ Key	Reference Table	Description
question_bank	_id	varchar	Primary key, not null	-	Unique identifier for question_bank
	user_id	varchar	Foreign key, not null	user	Unique identifier from user table

Table 4.4-4 Question Bank Subject Table

Table Name	Attribute Name	Data Type	Constraint/ Key	Reference Table	Description
question_bank_subject	_id	varchar	Primary key, not null	-	Unique identifier for question_bank_subject
	question_bank_id	varchar	Foreign key, not null	question_bank	Unique identifier from question_bank table
	subject	varchar	Not null	-	Subject of the question bank

Table 4.4-5 Questions Table

Table Name	Attribute Name	Data Type	Constraint / Key	Reference Table	Description
questions	_id	varchar	Primary key, not null	-	Unique identifier for questions
	question_bank_id	varchar	Foreign key, not	question_bank	Unique identifier from question_bank table

		null		
questionType	varchar	Not null	-	Question type
Question Description	varchar	Not null	-	Question description
subject	varchar	Not null	-	Question subject
score	int	-	-	Question score
section	int	-	-	Question's section in assessment
retrievedID	varchar	-	-	Question id that is retrieved from the question bank to the assessment
graded	boolean	-	-	The question graded or not
correct	boolean	-	-	The question answered correctly or not

Table 4.4-6 Question Choices Table

Table Name	Attribute Name	Data Type	Constraint/ Key	Reference Table	Description
questions_choices	_id	varchar	Primary key, not null	-	Unique identifier for questions_choices
	questions_id	varchar	Foreign key, not null	questions	Unique identifier from questions table
	choice	varchar	Not null	-	Choice of the question

Table 4.4-7 Question Answers Table

Table Name	Attribute Name	Data Type	Constraint/ Key	Reference Table	Description
questions_answers	_id	varchar	Primary key, not null	-	Unique identifier for questions_answers
	questions_id	varchar	Foreign key, not null	questions	Unique identifier from questions table
	answer	varchar	Not null	-	Answer of the question

Table 4.4-8 Assessment Table

Table Name	Attribute Name	Data Type	Constraint/ Key	Reference Table	Description
assessment	_id	varchar	Primary key, not null	-	Unique identifier for assessment
	user_id	varchar	Foreign key, not null	user	Unique identifier from user table

Table 4.4-9 Assessment Subjects Table

Table Name	Attribute Name	Data Type	Constraint / Key	Reference Table	Description
assessment_subjects	_id	varchar	Primary key, not null	-	Unique identifier for assessment_subjects
	assessment_id	varchar	Foreign key, not null	assessment	Unique identifier from assessment table
	subject	varchar	Not null	-	Assessment subject

Table 4.4-10 Assessment Details Table

Table Name	Attribute Name	Data Type	Constraint/ Key	Reference Table	Description
assessment_details	_id	varchar	Primary key, not null	-	Unique identifier for assessment_details
	assessmen t_id	varchar	Foreign key, not null	assessment	Unique identifier from assessment table
	status	varchar	Not null	-	Assessment status
	totalQuest ionNum	int	Not null	-	Total number of questions in assessment
	subject	varchar	Not null	-	Assessment's subject
	testName	varchar	Not null	-	Assessment title
	testDescri ption	varchar	-	-	Assessment Description
	testInstruc tion	varchar	Not null	-	Assessment instruction
	passOrFai lSelected	boolean	Not null	-	The grading is based on pass or fail
	score	varchar	-	-	Passing score
	unit	varchar	-	-	Passing unit in percentage or points
	addGradin gSelected	boolean	Not null	-	The grading is based on the grade defined by the user
	gradeUnit	varchar	-	-	Grading unit in percentage or points
	tabCheck Type_WA RN	boolean	Not null	-	Gives warning first if candidates switches tabs
	tabCheck Type_EN D	boolean	Not null	-	Ends the assessments if the candidates switches tabs

warn_num	int	-	-	Number of warnings given for switching tabs
link	varchar	Not null	-	URL link for candidates to attend the assessment
noAuthenticationSelected	boolean	Not null	-	Do not need to authenticate user email
withAuthenticationSelected	boolean	Not null	-	Need to authenticate user email
attemptNum	varchar	Not null	-	Number of attempts a candidate can attend an assessment
fixedSelected	boolean	Not null	-	Fixed order of questions and choices
randomSelected	boolean	Not null	-	Random order of questions and choices
manualSelected	boolean	Not null	-	Manually set the order of questions and choices
manualRandomSelected	boolean	Not null	-	Randomly sort the choices if the user wants to set the order of questions himself/herself
randomTakeFromTotalSelected	boolean	Not null	-	Randomly sort questions out from all questions
definedTakeFromSectionSelected	boolean	Not null	-	Defined number of questions to sort based on sections
randomQuestionNum	int	-	-	Number of questions to sort
assessmen	boolean	Not null	-	Time limit for an

	tTimeSelected				assessment
	questionTimeSelected	boolean	Not null	-	Time limit for each questions
	noLimitSelected	boolean	Not null	-	No time limit
	time	varchar	Not null	-	Time for assessment of per questions
	startDate	datetime	Not null	-	Start date and time of the assessment
	endDate	datetime	Not null	-	End date and time of the assessment

Table 4.4-11 Grade Range and Value Table

Table Name	Attribute Name	Data Type	Constraint / Key	Reference Table	Description
grade_range_value	_id	varchar	Primary key, not null	-	Unique identifier
	assessment_id	varchar	Foreign key, not null	assessment_details	Unique identifier
	gradeRange	varchar	Not null	-	Ranges between two numbers
	gradeValue	varchar	Not null	-	Grade value between two numbers

Table 4.4-12 Section Filter Number Table

Table Name	Attribute Name	Data Type	Constraint / Key	Reference Table	Description
sectionFilterNum	_id	varchar	Primary key, not null	-	Unique identifier
	assessment_details_id	varchar	Foreign key, not null	assessment_details	Unique identifier
	section_num	int	Not null	-	Section number
	filter_num	int	Not null	-	Filter number

Table 4.4-13 Access Email Table

Table Name	Attribute Name	Data Type	Constraint / Key	Reference Table	Description
access_email	_id	varchar	Primary key, not null	-	Unique identifier
	assessment_details_id	varchar	Foreign key, not null	assessment_details	Unique identifier
	email	varchar	Not null	-	Email that is allowed to attempt the assessment

Table 4.4-14 Assessment Questions Table

Table Name	Attribute Name	Data Type	Constraint / Key	Reference Table	Description
assessment_questions	_id	varchar	Primary key, not null	-	Unique identifier
	assessment_details_id	varchar	Foreign key, not null	assessment_details	Unique identifier
	questions_id	varchar	Foreign key, not null	questions	Unique identifier

Table 4.4-15 Candidate Table

Table Name	Attribute Name	Data Type	Constraint / Key	Reference Table	Description
candidate	_id	varchar	Primary key, not null	-	Unique identifier
	assessment_details_id	varchar	Foreign key, not null	assessment_details	Unique identifier
	name	varchar	Not null	-	Name of the candidate
	email	varchar	Not null	-	Email of the candidate
	totalScore	varchar	Not null	-	Total score in percentage or points
	maxScore	int	Not null	-	Maximum score that can be obtain
	grade	varchar	Not null	-	Candidate grade
	submissionDate	varchar	Not null	-	Submission date of assessment

Table 4.4-16 Candidate's Question Table

Table Name	Attribute Name	Data Type	Constraint / Key	Reference Table	Description
candidateS-question	_id	varchar	Primary key, not null	-	Unique identifier
	cand_id	varchar	Foreign key, not null	candidate	Unique identifier
	questions_id	varchar	Foreign key, not null	questions	Unique identifier

Table 4.4-17 Candidate's Responses Table

Table Name	Attribute Name	Data Type	Constraint / Key	Reference Table	Description
responses	_id	varchar	Primary key, not null	-	Unique identifier
	candidateS-question_id	varchar	Foreign key, not null	candidateS-question	Unique identifier
	response	varchar	Not null	-	Response written or selected by the candidate

Table 4.4-18 Feedback Table

Table Name	Attribute Name	Data Type	Constraint / Key	Reference Table	Description
responses	_id	varchar	Primary key, not null	-	Unique identifier
	candidateS-question_id	varchar	Foreign key, not null	candidateS-question	Unique identifier
	feedback	varchar	Not null	-	Feedback given by the user

Chapter 5: Implementation

5.1 System Specifications

This project was being developed on the following specifications:

Table 5.1-1 System Specifications

Processor	Intel® Core™ i7-8565U CPU @ 1.80 GHZ 1.99 GHZ
GPU	Intel® UHD Graphics 620
RAM	8.00 GB
Laptop Model	MateBook 13
Operating System	Windows 10, 64-bit
Database	Mongodb
Browser	Chrome (Version 88.0.4324.150)
Storage	450GB SSD

5.2 System Highlights

This section describes the features and modules of the system.

5.2.1 Login

A login page is where the system validates users to give them the authority to access the system. To login, the user has to validate their email and password to gain access to the system.

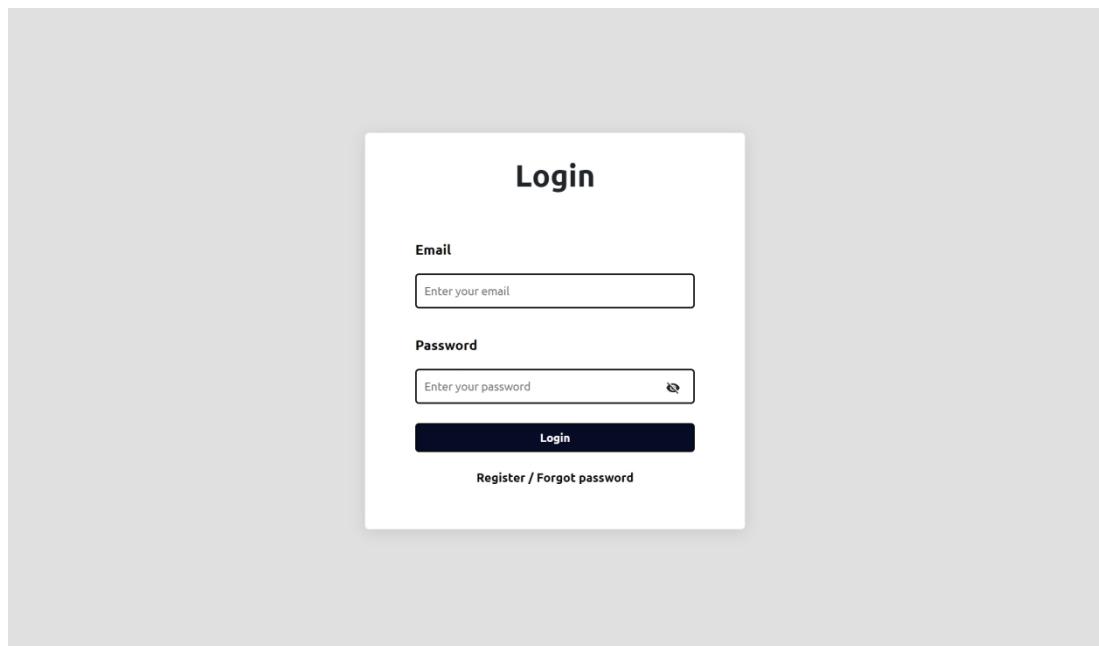
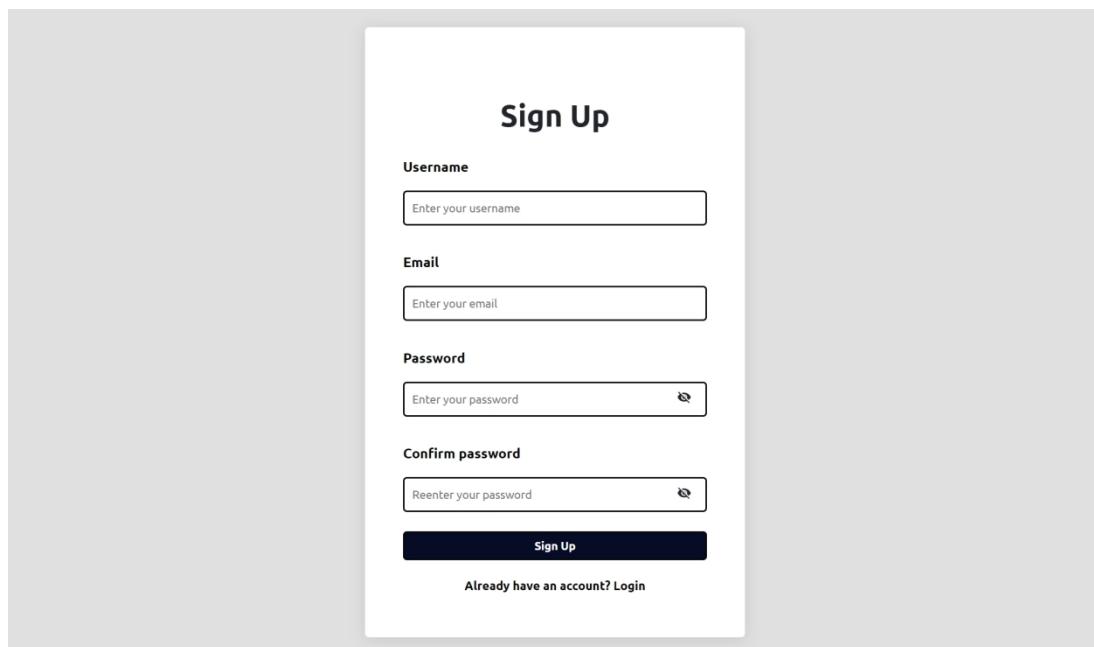


Figure 5.2-1 Login Page

5.2.2 Sign Up

A sign-up page enables users to register to gain access to the system. To sign-up, the user has to enter their username, email, and password.

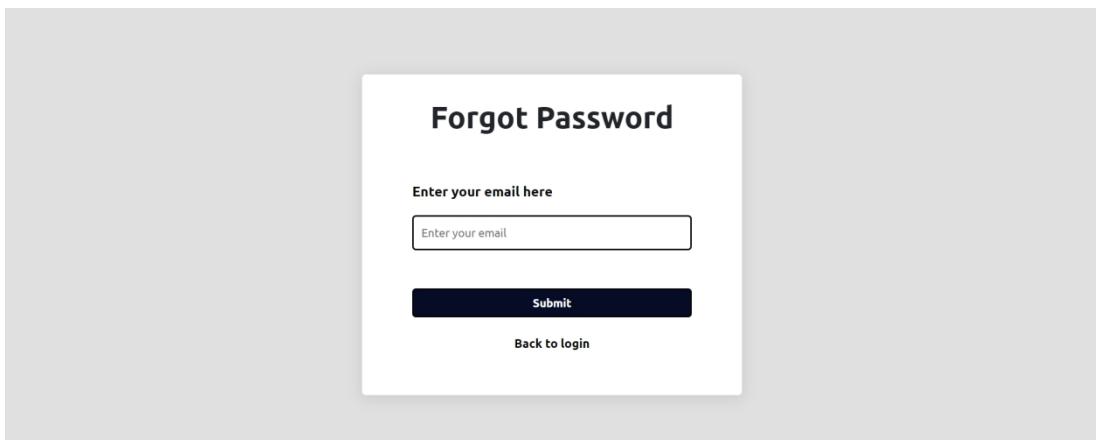


The screenshot shows a 'Sign Up' form on a light gray background. The form is titled 'Sign Up' in bold black text at the top center. It contains four input fields: 'Username' (placeholder: 'Enter your username'), 'Email' (placeholder: 'Enter your email'), 'Password' (placeholder: 'Enter your password'), and 'Confirm password' (placeholder: 'Reenter your password'). Each input field has a small eye icon to its right for password visibility. Below the input fields is a dark blue 'Sign Up' button with white text. At the bottom of the form, there is a link 'Already have an account? Login'.

Figure 5.2-2 Sign Up Page

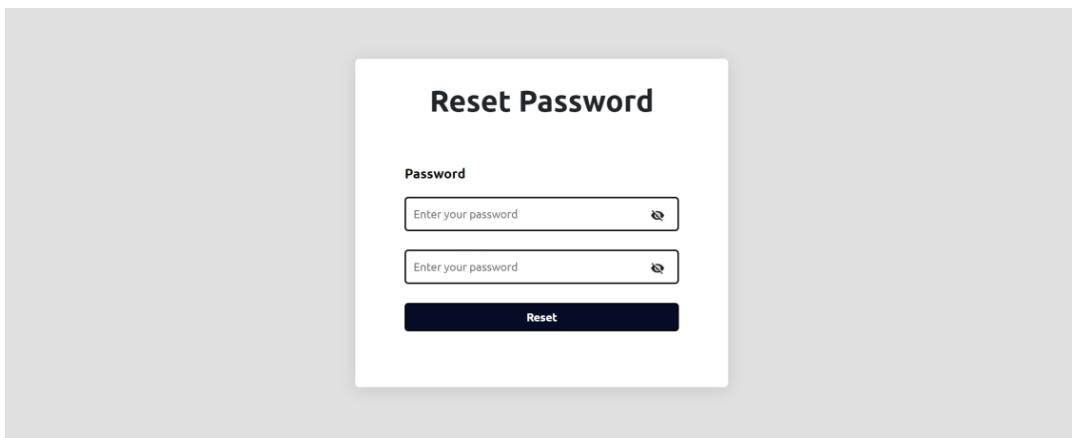
5.2.3 Forgot and Reset Password

A user might forget his/her password. After selecting the forgot password button in the login page in figure 5.2.1, the system will direct the user to forgot password page in figure 5.2-3. The user will receive an email containing the reset password link. The link will direct the user to reset the password page in figure 5.2-4, where user can update their password.



The image shows a "Forgot Password" page. It features a central white rectangular form with a dark blue header containing the title "Forgot Password". Below the title is a text input field with the placeholder "Enter your email here". Underneath the input field is a dark blue "Submit" button. At the bottom of the form is a small link "Back to login". The entire form is set against a light gray background.

Figure 5.2-3 Forgot Password Page

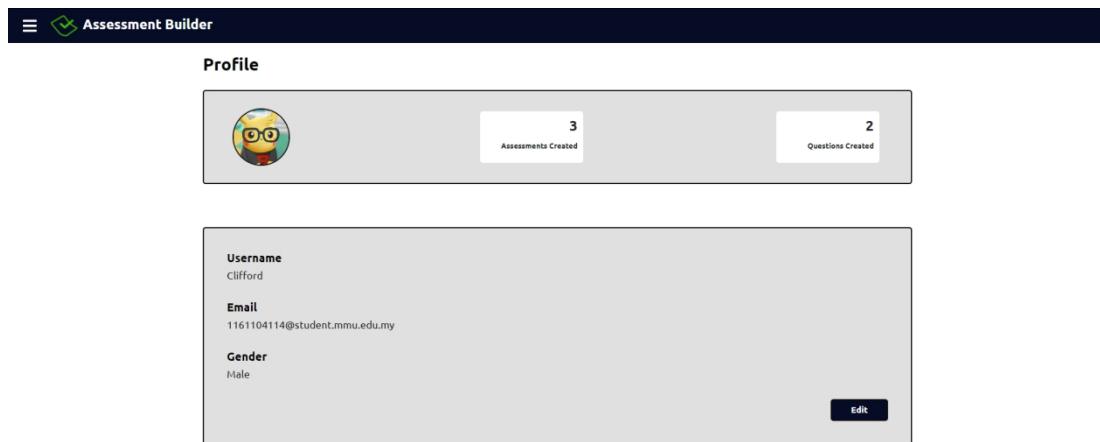


The image shows a "Reset Password" page. It features a central white rectangular form with a dark blue header containing the title "Reset Password". Below the title are two text input fields, both with the placeholder "Enter your password". Each input field has a small circular icon with a question mark next to it. Underneath the input fields is a dark blue "Reset" button. The entire form is set against a light gray background.

Figure 5.2-4 Reset Password Page

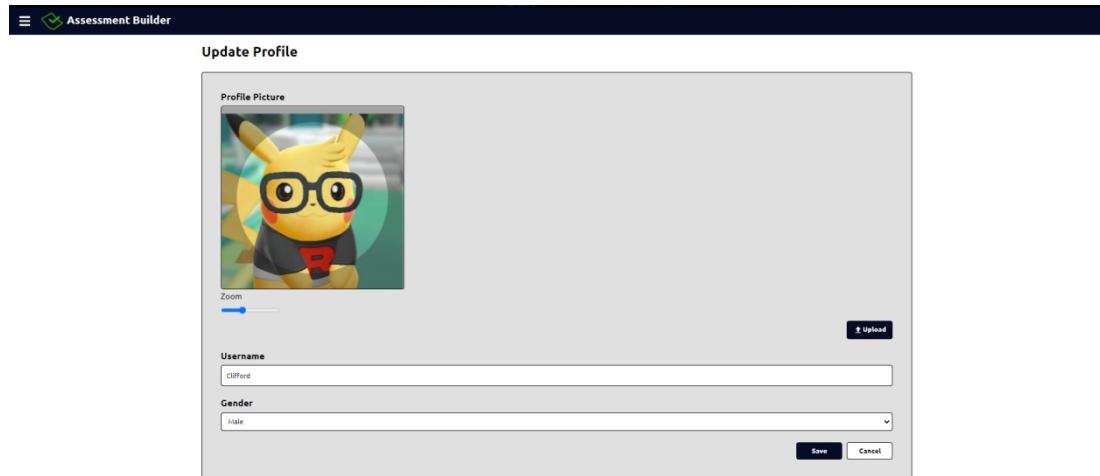
5.2.4 Profile

Users can view their profile details on the profile page (figure 5.2-5); edit profile details on the edit profile page (figure 5.2-6).



The screenshot shows the 'Profile' section of the Assessment Builder interface. At the top, there is a navigation bar with the 'Assessment Builder' logo and a menu icon. Below the navigation bar, the word 'Profile' is centered above a large rectangular container. Inside this container, there is a circular profile picture placeholder with a cartoon character, followed by two smaller boxes: one containing the number '3' and the text 'Assessments Created', and another containing the number '2' and the text 'Questions Created'. Below this, a larger box displays user information: 'Username' (Clifford), 'Email' (1161104114@student.mmu.edu.my), and 'Gender' (Male). A dark blue 'Edit' button is located at the bottom right of this box.

Figure 5.2-5 Profile Page



The screenshot shows the 'Update Profile' section of the Assessment Builder interface. At the top, there is a navigation bar with the 'Assessment Builder' logo and a menu icon. Below the navigation bar, the word 'Update Profile' is centered above a large rectangular container. Inside this container, there is a 'Profile Picture' section featuring a Pikachu character wearing glasses, with a 'Zoom' slider and a 'Upload' button. Below this, there are three input fields: 'Username' (Clifford), 'Gender' (Male, selected from a dropdown menu), and a 'Save' button at the bottom right. There is also a 'Cancel' button.

Figure 5.2-6 Update Profile Page

5.2.5 Question Bank

Figure 5.2-7 is the first page of the question bank that displays a list of subjects created by the user. Each subject contains questions related to that subject. On this page, the user can add, search, and delete subjects. Figure 5.2-8 is the second page of the question bank. It displays a list of questions within a question bank. On this page, the user can search, create, delete, and view questions; the user can also move questions to other subjects.

The screenshot shows a dark-themed web interface for 'Assessment Builder'. At the top, there's a navigation bar with a menu icon and the 'Assessment Builder' logo. Below it, the title 'Question Banks - Subjects' is centered. There are two input fields: 'Enter new subject here' and 'Add', followed by a search field 'Enter subject here to search'. A table lists three subjects: 'programming' (id 1), 'calculus' (id 2), and 'english' (id 3). Each row has an 'Options' column with edit and delete icons. At the bottom, there are pagination controls and a 'Rows per page' dropdown set to 10.

#	Subject	Options
1	programming	
2	calculus	
3	english	

Figure 5.2-7 List of Subjects

This screenshot shows the 'Question Bank - programming' page. It features a search bar for questions and a dropdown for 'Select question type'. A 'Clear' button is located below the search bar. A table lists two questions: 'Is C++ a programming language?' (True or False) and 'select the correct programming language' (Multiple Choice). Each question has an 'Options' column with edit and delete icons. At the bottom, there are pagination controls and a 'Create Question' button.

#	Question Description	Question Type	Options
1	Is C++ a programming language ?	True or False	
2	select the correct programming language	Multiple Choice	

Figure 5.2-8 List of Questions

5.2.6 Create Question

This page is where users create their questions. They can start with selecting a question template then fill up all the required fields. There are a total of 6 question templates. Also, an editor-type input feature is provided that allows the user to insert pictures, emojis, math functions, and more while creating a question.

The screenshot shows the 'Create Question' interface. At the top, there's a dark header bar with the 'Assessment Builder' logo and a menu icon. Below it, the main title 'Create Question' is centered. The first section is 'Question Type', which has a dropdown menu set to 'Single Choice'. The next section is 'Question Description', containing a rich text editor toolbar and a text area with placeholder text: 'Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque id diam eu nulla iaculis aliquet at et mauris.' Below this is a 'Add Choice' button. The following sections are 'Choice 1' and 'Choice 2', each with its own rich text editor and text area. 'Choice 1' contains placeholder text: 'Praesent euismod pellentesque nulla at ornare. Maecenas pharetra convallis odio et venenatis'. 'Choice 2' contains placeholder text: 'Morbi nec nisl eu eros euismod suscipit laoreet ut neque. Fusce ut erat at augue eleifend porta vehicula vel nisi.' At the bottom, there are 'Save' and 'Cancel' buttons.

Figure 5.2-9 Create Question Page

5.2.7 Edit Question

This page is where the users edit their questions. The user cannot change the question type (the template) but the descriptions, choices, and answers.

The screenshot shows the 'Edit Question' interface. At the top, there's a navigation bar with three horizontal lines and a green circular icon, followed by the text 'Assessment Builder'. Below this is a title 'Edit Question'. Underneath the title, it says 'Question Type: True or False'. A large text area labeled 'Question Description' contains the text 'is C++ a programming language ?'. Above this text area is a toolbar with various icons for bold, italic, underline, etc. Below the text area is a section labeled 'Answer' with the instruction 'Select the correct answer'. It contains two buttons: 'True' (highlighted in green) and 'False'. At the bottom of the form are two buttons: 'Save' (in a dark blue box) and 'Cancel'.

Figure 5.2-10 Edit Question Page

5.2.8 View Question Details

This page is where the users view their question's details. The choices highlighted in green are the correct answer; while white is the incorrect answer.

The screenshot shows a web-based application interface for 'Assessment Builder'. At the top, there is a dark header bar with a menu icon (three horizontal lines) and the text 'Assessment Builder' next to a green checkmark icon. Below the header, the main content area has a title 'View Question' and a subtitle 'Question Type : Multiple Choice'. A section titled 'Question Description' contains the text 'select the correct programming language'. Below this is a section titled 'Question Choices' containing three options: 'python', 'javascript', and 'the nun'. The 'python' and 'javascript' options are highlighted with a green background, indicating they are correct answers. The 'the nun' option is in a white box, indicating it is an incorrect answer. At the bottom right of the content area is a small black button labeled 'Back'.

Figure 5.2-11 View Question Page

5.2.9 Move Question

A modal window will show up when the user wants to move questions to another question bank. To move a question, the user has to select an existing subject from the selection. After that, the system will display an updated question list just like in figure 5.2-8.

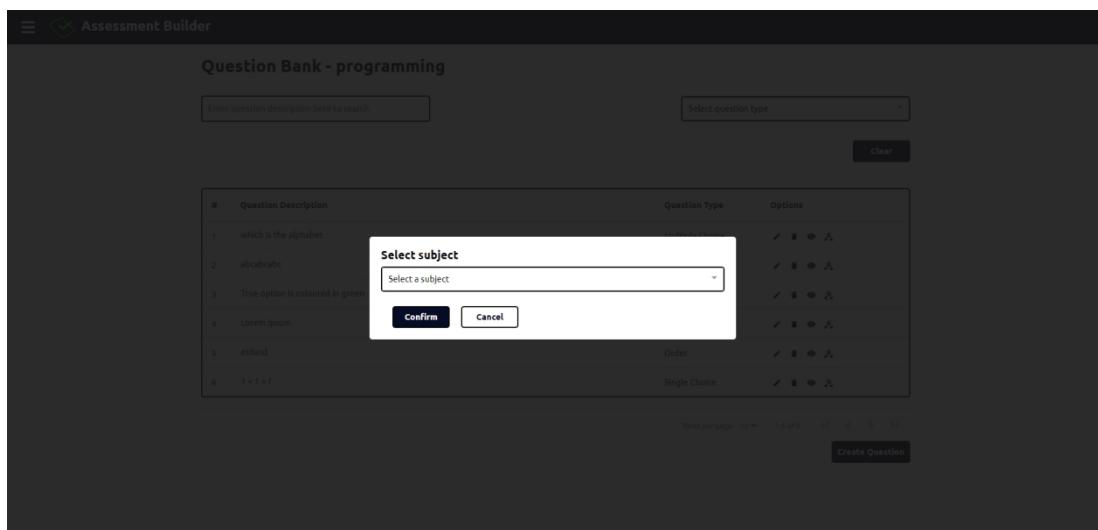


Figure 5.2-12 Confirmation Modal Window

5.2.10 List of Assessment Subject / Home

This page is shown to the user once they logged into the system. It displays a list of subjects created by the user. Each subjects contain assessments related to that subject.

On this page, the user can add, search and delete subjects. Also, a sidebar is provided where users can use it to navigate to other pages. The sidebar is flexible, and users can open and closes it wherever they want.

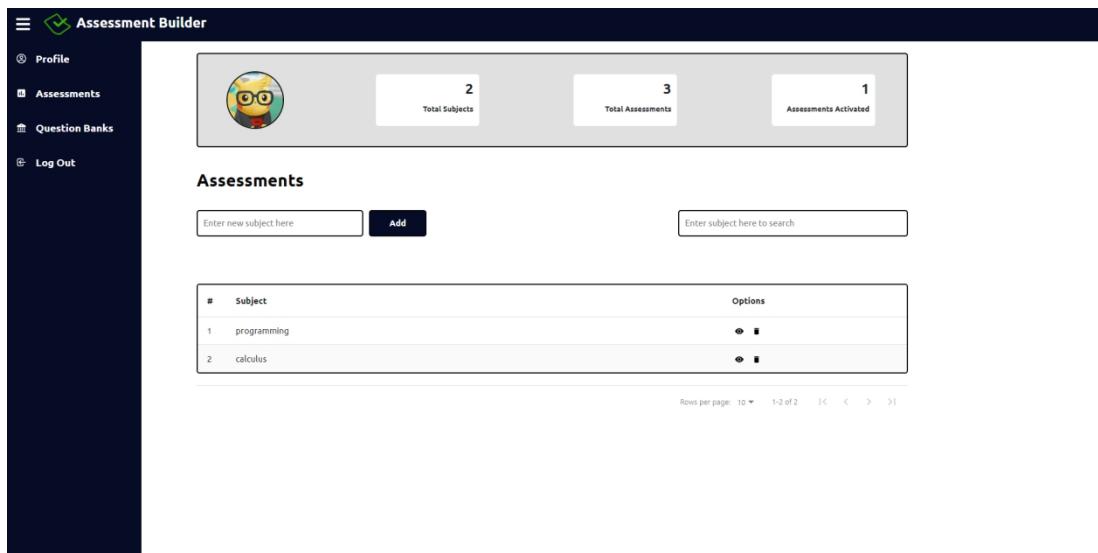


Figure 5.2-13 Home Page

5.2.11 View List of Assessments

This page displays a list of assessments within a subject. The table displays the title and status of the assessment; and a list of options available for that assessment.

The screenshot shows the 'Assessments - programming' page. At the top, there are three summary boxes: 'Total Assessments' (3), 'Setup in Progress' (1), and 'Assessments Activated' (1). Below this is a search bar and a 'Create Assessments' button. A table lists three assessments:

#	Assessment Title	Status	Options
1	programming	Setup in progress	
2	english	Activated	
3	New assessment	Ended	

At the bottom, there are additional options: Edit, Delete, Results, Reuse, View, Mark, Statistics, and a row per page dropdown set to 10.

Figure 5.2-14 Lists of Assessment in a Subject

5.2.12 Create, Edit and View Assessment

Create, edit, and view assessment page displays the same layout but the only difference between create, edit, and view is that the user cannot change the details while viewing.

The screenshot shows the 'Edit Assessment' page of the Assessment Builder. At the top, there is a navigation bar with a menu icon, the 'Assessment Builder' logo, and a search bar. Below the navigation bar, the main content area is titled 'Edit Assessment'. It contains several sections:

- Start/Questions/Sets**: Buttons for starting the assessment, viewing questions, and managing sets.
- Access/Timer**: Buttons for setting access rules and a timer.
- Title**: A field containing 'New assessment'.
- Description**: A note stating 'Notes that are only visible by you (Optional)' followed by a text area labeled 'Enter the description here'.
- Instruction**: A note stating 'Rules that are visible to candidates' followed by a rich text editor toolbar and a large text area.
- Grading Criteria**: A section with two radio button options:
 - Pass or fail
 - Enter passing score
 - Enter the passing score here
 - Select unit type
 - Define grade range
- Tab Checking**: A section with two radio button options:
 - Give warning
 - End assessment immediately
- Buttons**: 'Save' and 'Back' buttons at the bottom right.

Figure 5.2-15 Create, Edit or View Assessment Page (Start)

This page is where the user sets the title, description, instruction, grading criteria of an assessment; and setting tab checking criteria.

The screenshot shows the 'Edit Assessment' page of the Assessment Builder. At the top, there is a dark header bar with the 'Assessment Builder' logo and a menu icon. Below the header, the title 'Edit Assessment' is displayed. A horizontal toolbar contains five buttons: 'Start' (gear icon), 'Questions' (document icon, highlighted in green), 'Sets' (two document icons), 'Access' (person icon), and 'Timer' (clock icon). To the right of the toolbar is a 'Add Section' button. The main content area is titled 'Questions' and contains a single question card for 'Question 1'. The question text is 'is C++ a programming language ?'. Below the text are two answer options: 'true' (selected and highlighted in green) and 'false'. Above the question card are its metadata: 'Question Type: True or False', 'Score: 1', and 'Description'. At the bottom of the question card are 'Create Question' and 'Retrieve from Question Bank' buttons. At the very bottom of the page are 'Save' and 'Back' buttons.

Figure 5.2-16 Create, Edit or View Assessment Page (Questions)

This page is where the user set their questions for the assessment. The user can either create questions themselves (figure 5.2-9) or retrieve existing questions from the question bank (figure 5.2-20). Also, the user can swap the question choices and answers manually.

The screenshot shows the 'Edit Assessment' page of the Assessment Builder. At the top, there are five tabs: 'Start', 'Questions', 'Sets' (which is highlighted in green), 'Access', and 'Timer'. Below the tabs, there are two main sections. The first section, 'Question Order and Assessment Set Generation', contains three radio button options: 'Fixed order of questions and choices', 'Random order of questions and choices', and 'Define sets manually'. The third option is selected. The second section, 'Create Assessment Sets', also contains three radio button options: 'Filter out questions randomly based on total questions', 'Filter questions based on sections', and 'Randomize the choices for each questions during test'. The third option is selected. At the bottom right, there are 'Save' and 'Back' buttons.

Figure 5.2-17 Create, Edit or View Assessment Page (Sets)

This page is where the system provides dynamic settings for question set generation. All the questions used for the set generation are from the questions shown on the question page in figure 5.2-16. Each set generated is different so the chance of each candidate receiving the same question set is small. There are two ways for the user to generate sets, they are:

- The user defines a number of questions to filter out from all questions.
- The user defines the number of questions to filter based on each section.

The screenshot shows the 'Edit Assessment' page of the Assessment Builder. At the top, there is a navigation bar with a menu icon and the 'Assessment Builder' logo. Below the navigation bar, the title 'Edit Assessment' is displayed. A toolbar contains five buttons: 'Start' (gear icon), 'Questions' (document icon), 'Sets' (list icon), 'Access' (person icon, highlighted in green), and 'Timer' (clock icon). The main content area includes a 'URL' field containing the URL <https://assessmentbuilder.herokuapp.com/assessment/start/60222f78d998890015dt>, a 'QR Code' section with a large QR code, and an 'Authentication Methods' section. In the 'Authentication Methods' section, the 'No authentication' option is selected (radio button is filled). A yellow callout box with a question mark icon states 'Everyone with the link can attempt this assessment'. The 'With authentication' option is also present. At the bottom, there is a 'Number of attempts' dropdown set to '1', and two buttons: 'Save' and 'Back'.

Figure 5.2-18 Create, Edit and View Assessment Page (Access)

This page is where users obtain the URL and QR code of their assessment. Also, the user can select options to authenticate candidates' email here. Other than that, the user can also set the number of attempts for candidates to attempt the system.

The screenshot shows the 'Edit Assessment' page in the Assessment Builder. At the top, there are five tabs: 'Start' (selected), 'Questions', 'Sets', 'Access', and 'Timer'. Below the tabs, there are sections for 'Duration' and 'Availability'. In the 'Duration' section, the 'No time limit' option is selected. In the 'Availability' section, the start date and time is set to 02/11/2021, 2:30 PM and the end date and time is set to 02/20/2021, 12:00 AM. At the bottom right are 'Save' and 'Back' buttons.

Figure 5.2-19 Create, Edit and View Assessment Page (Timer)

The user can set the time for the whole assessment or per question and availability of the assessment here. Availability here means the time for the assessment to start and end.

5.2.13 Obtain Questions from Question Bank

This page is where the users obtain questions from the question bank and pass it to the assessment. Question rows will be labeled in yellow if the user retrieves the questions before. Furthermore, the user can add multiple questions to the assessment at once.

The screenshot shows the 'Assessment Builder' interface with the title 'Question Bank'. At the top, there are search and filter fields: 'Enter question description here to search', 'Select question type' (dropdown), and 'Select subject' (dropdown). Below these are two buttons: 'Clear' and 'Add Selected'. A table displays two questions. The first question, 'is C++ a programming language?', is highlighted in yellow and has a checkbox in the 'Options' column that is unchecked. The second question, 'select the correct programming language', is in white and has a checked checkbox in the 'Options' column. At the bottom, there are pagination controls: 'Rows per page: 10', '1-2 of 2', and navigation arrows.

#	Question Description	Subject	Question Type	Options
1	is C++ a programming language ?	programming	True or False	<input type="checkbox"/>
2	select the correct programming language	programming	Multiple Choice	<input checked="" type="checkbox"/>

Figure 5.2-20 Obtain Questions

5.2-14 Activate Assessment

The user can activate or deactivate their assessments through this page. The system will check the completeness of the assessment setup before allowing them to activate or deactivate the assessment. The activation or deactivation button will work if it is completed, otherwise the button will be disabled.



Figure 5.2-21 Activation Page

5.2.15 View Descriptive Questions

This page displays all the descriptive question of an assessment for the user to mark accordingly. The user can click on the ‘Mark’ button to navigate to the grading page (figure 5.2-23) to assign scores to his/ her candidates.

The screenshot shows a web-based application interface titled 'Assessment Builder'. At the top left is a menu icon (three horizontal lines) and the 'Assessment Builder' logo. Below the header, the title 'Descriptive Questions' is centered. A search bar with the placeholder 'Enter question description here to search' is positioned below the title. The main content area contains a table with one row. The table has three columns: '#', 'Question Description', and 'Options'. The first row shows '# 1' and 'Question Description 123123' under the first two columns. Under the 'Options' column, there is a single button labeled 'Mark'. At the bottom of the page, there is a pagination section with 'Rows per page: 10' and '1-1 of 1' followed by navigation icons (< > >>). A 'Back' button is located at the bottom right.

#	Question Description	Options
1	123123	Mark

Figure 5.2-22 View Description Question List Page

5.2.16 Mark Descriptive Responses

This page allows the user to assign scores and give feedback to the candidates. The system will display the next candidate's responses if there are responses left or direct the user back to the previous page in figure 5.2-22 if the user finishes marking that question.

The screenshot shows a web-based application interface for marking responses. At the top, a dark header bar features the 'Assessment Builder' logo. Below the header, the main content area has a white background with several input fields and sections:

- Grade Responses**: A section title.
- Question Description**: A text input field containing the text "ABCCC".
- Responses**: A section title. Below it, a form displays:
 - Name: chan
 - Email: chk@gmail.com
 - Answer:
123
- Score Assigned (Max 5 marks):** An input field labeled "Enter score".
- Feedback (Optional):** An input field labeled "Enter your feedback here".
- Buttons**: A "Confirm" button at the bottom right of the main form, and a "Back" button at the bottom center.

Figure 5.2-23 Mark Responses Page

5.2.17 View Results

This is the page where users can view their candidates' scores, grades, and submission dates. Other than that, the user can remove the result or email the results to all candidates accordingly. Also, the user can also view the candidates' responses by click on the first button starting from the left at the option section in the table.

The screenshot shows the 'Results' page of the Assessment Builder application. At the top, there are search fields for 'Search email', 'Search name', 'Search score', and 'Search grade'. Below these is a 'Reset' button. The main area displays a table with one row of data:

#	Email	Name	Score	Grade	Submission Date	Option
1	chlk@gmail.com	chan	100.00 %	PASS	2021-2-11 14:39:58	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

At the bottom of the page, there are links for 'Send to all candidates' and 'Back', along with pagination controls for 'Rows per page: 10', '1-1 of 1', and navigation arrows.

Figure 5.2-24 View Results Page

5.2.18 View Candidate's Responses

This page is where users can view a selected candidate's questions, responses, and feedback.

The screenshot shows the 'View Response' page from the Assessment Builder application. At the top, there is a dark header bar with the 'Assessment Builder' logo and a 'View Response' button. Below the header, the page displays the following information:

Candidate Details:
Candidate Name: chan
Candidate Email: chk@gmail.com
Submission Date: 2021-2-11 14:39:58
Score: 100.00 %
Grade: PASS

Question 1:
Question: Is C++ a programming language?
Response: true (highlighted in green)

Question 2:
Question: ABCCC
Response: 123 (highlighted in yellow)

A 'Back' button is located at the bottom right of the page.

Figure 5.2-25 View Candidate's Responses Page

5.2.19 View Statistics

This page allows the user to view the statistics of the overall results and questions of an assessment.

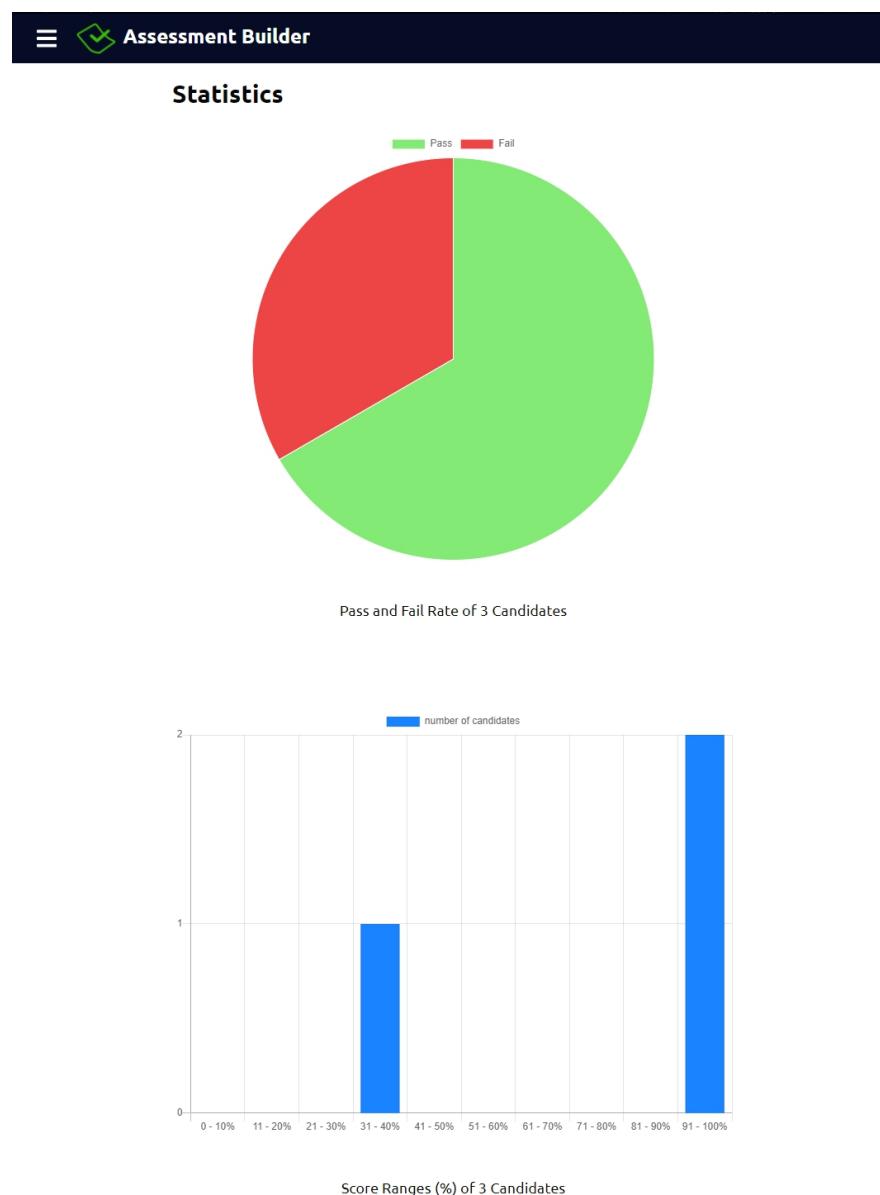


Figure 5.2-26 View Statistics

5.2.20 Candidate Sign Up for the Test

This is the starting page for the candidates. The candidates can obtain information about their test here. They have to sign up here before answering the test.

Instructions

- Lorem ipsum dolor sit amet.

Candidate Name

Candidate Email

Start Test

Figure 5.2-27 Starting Page of an Assessment

5.2.21 Answering Questions

This is the page where the candidates answer their questions. They can proceed to the next question or previous questions by clicking on the ‘next’ or ‘back’ button.

Question 1

is C++ a programming language ?

true

false

Back **Next**

Figure 5.2-28 Attempting Questions Page

Chapter 6: Testing

Functional testing is conducted to examine the input and output of the system are as expected or not. The sections below only include test scenarios and cases that are highly critical to the system.

6.1 Test Scenarios

Table 6.1-1 Create Question Test Scenarios

Test Case ID	Title	Expected Results	Status
CQ01	Create a single choice question	<ul style="list-style-type: none">• Redirect user to view question list page• User is able to find his/ her newly created question in the list	Pass
CQ02	Create a multiple choice question	<ul style="list-style-type: none">• Redirect user to view question list page• User is able to find his/ her newly created question in the list	Pass
CQ03	Create a descriptive question	<ul style="list-style-type: none">• Redirect user to view question list page• User is able to find his/ her newly created question in the list	Pass
CQ04	Create a true or false question	<ul style="list-style-type: none">• Redirect user to view question list page• User is able to find his/ her newly created question in the list	Pass
CQ05	Create a short answer question	<ul style="list-style-type: none">• Redirect user to view question list page• User is able to find his/ her newly created question in the list	Pass

CQ06	Create a select in order question	<ul style="list-style-type: none"> • Redirect user to view question list page • User is able to find his/ her newly created question in the list 	Pass
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Table 6.1-2 View Questions in Question Bank Scenarios

Test Case ID	Title	Expected Results	Status
VQB01	Move question to other subject/ question bank	The selected question is in the correct question bank	Pass
VQB02	View question details	Question details is as expected	Pass
VQB03	Delete a question	Updated question list is displayed	Pass

Table 6.1-3 Setting Questions In Assessment Scenarios

Test Case ID	Title	Expected Results	Status
SQA01	Retrieve questions from question bank	The questions list is updated with the questions retrieved from the question bank	Pass
SQA02	Store question to question bank	The question bank is updated with the new question	

Table 6.1-4 Attempting Assessment Scenarios

Test Case ID	Title	Expected Results	Status
AA01	Tab switching (1)	An alert shows up during the test	Pass
AA02	Tab switching (2)	The test is submitted automatically by the system	Pass
AA03	Assessment time	Test is submitted automatically	Pass
AA04	Question time	Displays next question if it is not the last question; submit if it is the last question	Pass

Table 6.1-5 View Result Scenarios

Test Case ID	Title	Expected Results	Status
VR01	View candidate's responses	Information displayed is match with the selected candidate's email, name, etc	Pass
VR02	Delete candidate's result	Result lists is updated	Pass
VR03	Email results to candidates	All candidates receive their respective results through email	Pass
VR04	Download results	csv file or excel file saved to user's personal computer	Pass

Table 6.1-6 Viewing Assessment Scenarios

Test Case ID	Title	Expected Results	Status
VA01	Reuse assessment	Assessment's status updated to 'setup in progress'	Pass
VA02	Delete assessment	Assessment is deleted	Pass
VA03	Activate assessment	Assessment status is updated to 'Activated'	Pass

6.2 Test Cases

Table 6.2-1 Test Case of Creating a Single Choice Question

Test Case ID	CQ01				
Module	Create Question				
Test Title	Create a single choice question				
Test Description	Test single choice question template is working as expected				
Test Priority	High				
Precondition	User is in create question page				
No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Select “single choice” as the question type	-	“Add Choice” button is shown	“Add Choice” button is shown	Pass
2	Enter question description	1 + 1 = ?	-	-	-
3	Click on “Add Choice” button twice	-	Two choice input shows up	Two choice input shows up	Pass
4	Enter choices	Choice 1: 1 Choice 2: 2	-	-	-
5	Select choice 2 as the answer	-	Choice 2 is marked as the answer	Choice 2 is marked as the answer	Pass
6	Click on ‘save’ button	-	Redirect user to question bank page and the created question is in the question list	Redirect user to question bank page and the created question is in the question list	Pass

Table 6.2-2 Test Case of Creating a Multiple Choice Question

Test Case ID	CQ02
Module	Create Question
Test Title	Create a multiple choice question
Test Description	Test multiple choice question template is working as expected
Test Priority	High
Precondition	User is in create question page

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Select “multiple choice” as the question type	-	“Add Choice” button is shown	“Add Choice” button is shown	Pass
2	Enter question description	Which is the alphabet	-	-	-
3	Click on “Add Choice” button 3 times	-	3 choice input shows up	3 choice input shows up	Pass
4	Enter choices	Choice 1: 1 Choice 2: A Choice 3: B	-	-	-
5	Select choice 2 and 3 as the answer	-	Choice 2 and 3 is marked as the answer	Choice 2 and 3 is marked as the answer	Pass
6	Click on ‘save’ button	-	Redirect user to question bank page and the created question is in the question list	Redirect user to question bank page and the created question is in the question list	Pass

Table 6.2-3 Test Case of Creating a Descriptive Question

Test Case ID	CQ03
Module	Create Question
Test Title	Create a descriptive question
Test Description	Test descriptive question template is working as expected
Test Priority	High
Precondition	User is in create question page

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Select “descriptive” as the question type	-	Message : “The answer will be retrieved from the candidates after they have attempted your assessment” is displayed	Message : “The answer will be retrieved from the candidates after they have attempted your assessment” is displayed	Pass
2	Enter question description	Lorem ipsum dolor sit amet.	-	-	-
3	Click on ‘save’ button	-	Redirect user to question bank page and the created question is in the question list	Redirect user to question bank page and the created question is in the question list	Pass

Table 6.2-4 Test Case of Creating a True or False Question

Test Case ID	CQ04
Module	Create Question
Test Title	Create a true or false question
Test Description	Test true or false question template is working as expected
Test Priority	High
Precondition	User is in create question page

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Select “True or False” as the question type	-	True or False option is displayed.	True or False option is displayed.	Pass
2	Enter question description	Lorem ipsum dolor sit amet	-	-	-
3	Select ‘true’ as the answer	-	True option is coloured in green	True option is coloured in green	Pass
4	Click on ‘save’ button	-	Redirect user to question bank page and the created question is in the question list	Redirect user to question bank page and the created question is in the question list	Pass

Table 6.2-5 Test Case of Creating a Short Answer Question

Test Case ID	CQ05
Module	Create Question
Test Title	Create a short answer question
Test Description	Test short answer question template is working as expected
Test Priority	High
Precondition	User is in create question page

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Select “Short Answer” as the question type	-	“Add Answer” button is displayed.	“Add Answer” button is displayed.	Pass
2	Enter question description	Lorem ipsum dolor sit amet	-	-	-
3	Enter an answer	Lorem ipsum	-	-	-
4	Click on ‘save’ button	-	Redirect user to question bank page and the created question is in the question list	Redirect user to question bank page and the created question is in the question list	Pass

Table 6.2-6 Test Case of Creating a Order Question

Test Case ID	CQ06
Module	Create Question
Test Title	Create an order question
Test Description	Test order question template is working as expected
Test Priority	High
Precondition	User is in create question page

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Select “Order” as the question type	-	“Add Answer” button is displayed.	“Add Answer” button is displayed.	Pass
2	Enter question description	Lorem ipsum dolor sit amet	-	-	-
3	Click on “Add Answer” 3 times	-	Three row input is displayed	Three row input is displayed	Pass
4	Enter answers	Row 1: One Row 2: Two Row 3: Three	-	-	-
5	Click on ‘save’ button	-	Redirect user to question bank page and the created question is in the question list	Redirect user to question bank page and the created question is in the question list	Pass

Table 6.2-7 Test Case of Moving a Question to Other Subject

Test Case ID	VQB01
Module	Question Bank
Test Title	Move question to other subject
Test Description	Test question is moved to the correct subject
Test Priority	High
Precondition	User is viewing question list of a subject, has at least two subjects (A and B)

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Clicks on the ‘move question’ button of the selected question	Selected question : X	A modal containing list of subjects is displayed.	A modal containing list of subjects is displayed.	Pass
2	Selects a subject	Subject: B	-	-	-
3	Clicks on the ‘confirm’ button	-	Modal is closed, question list is updated	Modal is closed, question list is updated	Pass
4	Navigate to question bank - subject B page	-	Question X is in the question list of subject B	Question X is in the question list of subject B	Pass

Table 6.2-8 Test Case of Viewing Question Details

Test Case ID	VQB02
Module	Question
Test Title	View question details
Test Description	Test question details is same with what was selected
Test Priority	High
Precondition	User is viewing a list of questions in the question bank

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Clicks on the “view” button on the question that I desire to view	-	-	-	-
2	Direct user to question page	-	-	-	-
3	View question details	-	Question details is as expected	Question details is as expected	Pass

Table 6.2-9 Test Case of Deleting a Question

Test Case ID	VQB03
Module	Question Bank
Test Title	Delete question
Test Description	Test delete question function is working as expected
Test Priority	High
Precondition	User is viewing a list of questions in the question bank

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Clicks on the “delete” button on the question that I desire to delete	-	Updated question list is displayed	<ul style="list-style-type: none"> • Updated question list is displayed • Question is deleted 	Pass

Table 6.2-10 Test Case of Retrieving Questions

Test Case ID	SQA01
Module	Assessment
Test Title	Retrieve questions from question bank
Test Description	Test retrieve question function is working as expected
Test Priority	High
Precondition	User is viewing question page

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Clicks on the “retrieve question from question bank” button	-	Direct to question bank page	Direct to question bank page	Pass
2	Select questions	-	-	-	-
3	Clicks on the “Add Selected” button	-	Selected questions are marked showing that they are taken before	Selected questions are marked showing that they are taken before	Pass
4	Clicks on the “back” button	-	Direct user back to question page	Direct user back to question page	Pass
5	View questions	-	The questions list is updated with the questions retrieved from the question bank	The questions list is updated with the questions retrieved from the question bank	Pass

Table 6.2-11 Test Case of Storing Question

Test Case ID	SQA01
Module	Assessment
Test Title	Store Question to question bank
Test Description	Test storing function is working as expected
Test Priority	High
Precondition	User is viewing question page

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Clicks on the “store” button on the question that I desire to store	-	A modal shows up	A modal shows up	Pass
2	Select a subject	Selected subject: programming	-	-	-
3	Clicks on the “Confirm” button	-	The modal closes	The modal closes	Pass
4	Navigate to question bank page	-	Direct user back to question bank	Direct user back to question bank	Pass
5	Select a subject	Selected subject: programming	Direct to question bank - programming	Direct to question bank - programming	Pass
6	View question list	-	The selected question is in the list	The question list is updated with the selected question from the question page in assessment	Pass

Table 6.2-12 Test Case of Tab Switching (1)

Test Case ID	AA01
Module	Candidate
Test Title	Tab switching (1)
Test Description	Will an alert shows up when the candidate switches tab during the test
Test Priority	High
Precondition	Candidate is attending the test; user set tab checking settings to “give warning”

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Switches the tab (candidate is not using the application)	-	-	-	-
2	Tab switches back to the application	-	An alert shows up	An alert shows up with message: “Please do not switch tabs, or else this assessment will be ended immediately”	Pass

Table 6.2-13 Test Case of Tab Switching (2)

Test Case ID	AA01				
Module	Candidate				
Test Title	Tab switching (2)				
Test Description	Will the test be submitted automatically if the candidate switches tabs				
Test Priority	High				
Precondition	Candidate is attending the test; user set tab checking settings to “end assessment immediately”				
No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Switches the tab (candidate is not using the application)	-	-	-	-
2	Tab switches back to the application	-	The assessment is submitted immediately	Redirect to starting page of the assessment	Fail
Reason of failure: Submit function is not called when the tab switch counter increments. The function should be called once the counter increases.					
Updated Output: <ul style="list-style-type: none"> • The assessment is submitted immediately. • Redirect to starting page of the assessment. 					
Updated Status: Pass					

Table 6.2-14 Test Case of Assessment Time

Test Case ID	AA03
Module	Candidate
Test Title	Assessment Time
Test Description	Will the assessment be submitting automatically if time is up
Test Priority	High
Precondition	Candidate is attending the test; user has set time for the assessment

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Wait for the time to finish	-	Test is submitted automatically	<ul style="list-style-type: none"> • Stills stays at the same page. • The test is not submitted 	Fail
Reason of failure:					
Did not set limitation logic on the time counter. It goes lower than 0 counter. The test should be submitted once the counter reaches 0.					
Updated Output: <ul style="list-style-type: none"> • Direct to starting page of the test. • The test is submitted. 					
Updated Status: Pass					

Table 6.2-15 Test Case of Question Time

Test Case ID	AA04
Module	Candidate
Test Title	Question Time
Test Description	Will the system displays the next question or submit the test if the question's time is up
Test Priority	High
Precondition	Candidate is attending the test; user has set time for the question

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Wait for the time to finish (not the last question of the test)	-	Displays next question	Displays next question	Pass
2	Wait for the time to finish (the last question of the test)	-	Assessment is submitted	Direct to starting page of the test; the test is submitted	Pass

Table 6.2-16 Test Case of Viewing Candidate's Responses

Test Case ID	VR01
Module	Result
Test Title	View candidate's responses
Test Description	Test that the information shown on that page is the same as the selected candidate
Test Priority	High
Precondition	User is in result page

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Clicks on the 'view response' button on the candidate that I desire to view	-	Direct to candidate's responses page	Direct to candidate's responses page	Pass
2	View the candidate's information (email, name, submission date, score and grade)	-	Information displayed matches the ones in the result page	Information displayed matches the ones in the result page	Pass

Table 6.2-17 Test Case of Deleting a Result

Test Case ID	VR02
Module	Result
Test Title	Delete a result
Test Description	Test delete result function works as expected
Test Priority	High
Precondition	User is in result page

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Clicks on the ‘delete’ button on the result that I desire to remove	-	Result list is updated	<ul style="list-style-type: none"> • Result is deleted • Result list is updated 	Pass

Table 6.2-18 Test Case of Email Results

Test Case ID	VR03
Module	Result
Test Title	Email result to each candidate
Test Description	Test email result function works as expected
Test Priority	High
Precondition	User is in result page

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Clicks on ‘email’ button on a result that I desire to email to that candidate	-	Candidate receives his/her result through email	Selected candidate receives his/her result through email	Pass
2	Clicks on “send result to all candidates” button	-	All candidates receive their respective results through email	All candidates receive their respective results through email	Pass

Table 6.2-19 Test Case of Download Results

Test Case ID	VR04
Module	Result
Test Title	Download results
Test Description	Test download result function works as expected
Test Priority	High
Precondition	User is in result page

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Clicks on 'export' button	-	Request file format	Request file format	Pass
2	Selects csv or excel file format	-	csv file or excel file saved to user's personal computer	csv file or excel file saved to user's personal computer	Pass

Table 6.2-20 Test Case of Reusing Assessment

Test Case ID	VA01
Module	Assessment
Test Title	Reuse assessment
Test Description	Test reuse assessment function works as expected
Test Priority	High
Precondition	User is viewing list of assessment, assessment's status is 'ended'

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Clicks on 'reuse' button	-	Confirmation modal shows up	Confirmation modal shows up	Pass
2	Clicks on 'yes' button	-	Assessment's status updated to 'setup in progress'	Assessment's status updated to 'setup in progress'	Pass

Table 6.2-21 Test Case of Deleting Assessment

Test Case ID	VA02
Module	Assessment
Test Title	Reuse assessment
Test Description	Test delete assessment function works as expected
Test Priority	High
Precondition	User is viewing list of assessment

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Clicks on 'delete' button	-	Assessment is deleted	<ul style="list-style-type: none"> • Assessment is deleted • List of assessment updated 	Pass

Table 6.2-22 Test Case of Activating an Assessment

Test Case ID	VA03
Module	Assessment
Test Title	Activate assessment
Test Description	Test activate assessment function works as expected
Test Priority	High
Precondition	User is viewing list of assessment, assessment's status is 'setup in progress', assessment setup is completed

No.	Procedure	Test Data	Expected Output	Actual Output	Status
1	Clicks on 'activate' button	-	Assessment status is updated to 'Activated'	<ul style="list-style-type: none"> • Direct to assessment list page • Assessment status is updated to 'Activated' 	Pass

Chapter 7: Conclusion

COVID-19 pandemic has slowed down the progress of all schools, universities, and colleges worldwide. Therefore, an online assessment and management system is developed to provide an environment for teachers and students to attend or manage tests online.

Improvements can be made in this project by allowing collaboration in creating assessments, especially the creating questions part. Collaboration allows the users to create better quality assessments for their students.

Conclusively, these two semesters have been an excellent learning experience for me. I have learned how to build a full-stack application, designing a system, planning requirements, and more. I hope that the knowledge gain from this project will help me to become a much better programmer in the future.

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Appendix A

Commercialization Proposal

COMMERCIALIZATION PROPOSAL

ONLINE ASSESSMENT AND MANAGEMENT SYSTEM

**CHAN HAO KANG
FACULTY OF COMPUTING AND INFORMATICS
MULTIMEDIA UNIVERSITY**

Executive Summary

This system offers a platform for teachers to manage and conduct assessments online. Subscription services are provided to our customers on a monthly basis. There are a lot of features available in our application; such as statistical analysis, automatic grading, customize tests, and more. The most unique and one of the strengths of this system is that it can generate different sets of questions for each candidate. The minister of education is the most potential customer as currently there is no official website used for every school or university to conduct tests online. Due to the pandemic, it provides a great opportunity to promote this system to any potential customers as it does help in solving current problems in educational areas.

Objectives

- To design and develop an online assessment and management system.
- To provide dynamic settings for the user to generate different sets of questions.
- To offer multiple types of question templates for the user to create questions.
- To provide a simple checking feature which warns candidates if they switch browser tab when attempting an assessment.

Market Analysis

Target Analysis

The most potential customer to have this application is the ministry of education. This is because they can set new policies for every school and university to conduct exams online. Other than that, any company around the world is also one of the target customers as they can use this system to evaluate their employees' performances.

Competitors

Potential competitors are all the assessment tools online. Below lists the assessment tools that are widely used in many countries.

- Quizizz
- Google forms
- Kahoot
- Poll Everywhere
- Mentimeter

Unique Value Proposition

A dynamic option is offered in the system to provide ways for the user to generate a different set of questions in the assessment. This helps to solve the problem where the user needs to define questions manually to create a question set. The other problem is that each candidate might receive the same set of questions during the test.

The strength of this system is it will generate a new set of questions at any time when a candidate started the test.

Business Model

This system is going to provide subscription services to every customer. Each customer has to pay up to RM100 as a subscription fee monthly.

Marketing

Direct marketing :

- This will be carried out by meeting the minister of educations or CEO of companies to promote and introduce this system.

Mass marketing :

- This will be carried out by advertising this system in any online platforms, with a budget of RM20,000.

SWOT Analysis

Strength :

- This application provides most of the basic needs for managing and conducting tests online.
- This application can run in many environments.
- This application contains a lot of features that might satisfy the user.
- Dynamic settings for question set generation allows each candidate to have a different set of questions during the test.

Weaknesses:

- Although this application can run on mobiles, tablets environment, there might be unexpected errors because testing is not conducted on these environments.

Opportunities:

- COVID-19 pandemic in the year 2020 provides an opportunity to promote this system to everyone in education areas as the progress of conducting tests is affected worldwide.
- Educational systems still using physical means to conduct tests.

Threats:

- The technologies used in implementing this system are fast-evolving. Therefore, this system might require constant maintenance and improvements in the future.

Appendix B

Meeting Logs (FYP1)



TPT3101/TPR3321 Final Year Project (FYP1) Meeting Log Trimester 1, 2020/21 (Trimester ID:2010)

Meeting Date: 7/18/2020	Meeting No.: 1
Meeting Mode: Google meet	
Project ID: 1685	Project Type: Application-based
Project Title : Online Assessment and Management System	
Student ID : 1161104114	Student Name: Chan Hao Kang
Student Programme and Specialisation: Software Engineering	
Supervisor Name: Dr. Foo Lee Kien	Co-Supervisor Name: Dr. Chua Sook Ling (if applicable)
Collaborating Company: - (if applicable)	Company Supervisor Name: - (if applicable)

1. WORK DONE

[Please write the details of the work done, after the last meeting]

Tasks: Problem Formulation and Project Planning / Background Study or Literature Review / Requirement Analysis or Theoretical Framework / Design or Research Methodology / Prototype Development or Proof of Concept / Draft Report Completion
(Please strike out the tasks, which are not applicable for the work done, after the last meeting)

Details (in point form):

- Background study of some existing system
- Identify pros and cons of the system

2. WORK TO BE DONE

[Please write the details of the work to be done, before the next meeting]

Tasks: Problem Formulation and Project Planning / Background Study or Literature Review / Requirement Analysis or Theoretical Framework / Design or Research Methodology / Prototype Development or Proof of Concept/ Draft Report Completion
(Please strike out the tasks, which are not applicable for the work to be done, before the next meeting)

Details (in point form):

- Draft for introduction and background study

3. PROBLEMS ENCOUNTERED AND SOLUTIONS

[Please write the details of the problems encountered, after the last meeting and provide the solutions / plan for the solutions]

- None

4. COMMENTS (Supervisor / Co-Supervisor / Company Supervisor)

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Supervisor's Signature



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Student's Signature

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Co-Supervisor's Signature
(if applicable)

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Company Supervisor's Signature
(if applicable)



TPT3101/TPR3321 Final Year Project (FYP1) Meeting Log
Trimester 1, 2020/21 (Trimester ID:2010)

Meeting Date: 7/24/2020	Meeting No.: 2
Meeting Mode: Google meet	
Project ID: 1685	Project Type: Application-based
Project Title : Online Assessment and Management System	
Student ID : 1161104114	Student Name: Chan Hao Kang
Student Programme and Specialisation: Software Engineering	
Supervisor Name: Dr. Foo Lee Kien	Co-Supervisor Name: Dr. Chua Sook Ling (if applicable)
Collaborating Company: - (if applicable)	Company Supervisor Name: - (if applicable)

1. WORK DONE

[Please write the details of the work done, after the last meeting]

Tasks: Problem Formulation and Project Planning / Background Study or Literature Review / Requirement Analysis or Theoretical Framework / Design or Research Methodology / Prototype Development or Proof of Concept / Draft Report Completion
(Please strike out the tasks, which are not applicable for the work done, after the last meeting)

Details (in point form):

- chapter 1, problem statement and objectives
- chapter 2, background studies

2. WORK TO BE DONE

[Please write the details of the work to be done, before the next meeting]

Tasks: Problem Formulation and Project Planning / Background Study or Literature Review / Requirement Analysis or Theoretical Framework / Design or Research Methodology / Prototype Development or Proof of Concept/ Draft Report Completion
(Please strike out the tasks, which are not applicable for the work to be done, before the next meeting)

Details (in point form):

- Project Scope, Gantt Chart, Methodology

3. PROBLEMS ENCOUNTERED AND SOLUTIONS

[Please write the details of the problems encountered, after the last meeting and provide the solutions / plan for the solutions]

- None

4. COMMENTS (Supervisor / Co-Supervisor / Company Supervisor)

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Supervisor's Signature

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Student's Signature

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Co-Supervisor's Signature
(if applicable)

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Company Supervisor's Signature
(if applicable)



TPT3101/TPR3321 Final Year Project (FYP1) Meeting Log
Trimester 1, 2020/21 (Trimester ID:2010)

Meeting Date: 7/30/2020	Meeting No.: 3
Meeting Mode: Google meet	
Project ID: 1685	Project Type: Application-based
Project Title : Online Assessment and Management System	
Student ID : 1161104114	Student Name: Chan Hao Kang
Student Programme and Specialisation: Software Engineering	
Supervisor Name: Dr.Foo Lee Kien	Co-Supervisor Name: Dr.Chua Sook Ling (if applicable)
Collaborating Company: - (if applicable)	Company Supervisor Name: - (if applicable)

1. WORK DONE

[Please write the details of the work done, after the last meeting]

Tasks: Problem Formulation and Project Planning / Background Study or Literature Review / Requirement Analysis or Theoretical Framework / Design or Research Methodology / Prototype Development or Proof of Concept / Draft Report Completion
(Please strike out the tasks, which are not applicable for the work done, after the last meeting)

Details (in point form):

- Methodology
- Project Scope
- Weekly task distribution plan

2. WORK TO BE DONE

[Please write the details of the work to be done, before the next meeting]

Tasks: Problem Formulation and Project Planning / Background Study or Literature Review / Requirement Analysis or Theoretical Framework / Design or Research Methodology / Prototype Development or Proof of Concept/ Draft Report Completion
(Please strike out the tasks, which are not applicable for the work to be done, before the next meeting)

Details (in point form):

- Fix mistakes on Project Scope, Gantt Chart

3. PROBLEMS ENCOUNTERED AND SOLUTIONS

[Please write the details of the problems encountered, after the last meeting and provide the solutions / plan for the solutions]

- None

4. COMMENTS (Supervisor / Co-Supervisor / Company Supervisor)

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Supervisor's Signature


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Student's Signature

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Co-Supervisor's Signature
(if applicable)

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Company Supervisor's Signature
(if applicable)



**TPT3101/TPR3321 Final Year Project (FYP1) Meeting Log
Trimester 1, 2020/21 (Trimester ID:2010)**

Meeting Date: 7/8/2020	Meeting No.: 4
Meeting Mode: Google meet	
Project ID: 1685	Project Type: Application-based
Project Title : Online Assessment and Management System	
Student ID : 1161104114	Student Name: Chan Hao Kang
Student Programme and Specialisation: Software Engineering	
Supervisor Name: Dr.Foo Lee Kien	Co-Supervisor Name: Dr.Chua Sook Ling (if applicable)
Collaborating Company: - (if applicable)	Company Supervisor Name: - (if applicable)

1. WORK DONE

[Please write the details of the work done, after the last meeting]

Tasks: Problem Formulation and Project Planning / Background Study or Literature Review / Requirement Analysis or Theoretical Framework / Design or Research Methodology / Prototype Development or Proof of Concept / Draft Report Completion
(Please strike out the tasks, which are not applicable for the work done, after the last meeting)

Details (in point form):

- Fix mistakes on gantt chart and project scope

2. WORK TO BE DONE

[Please write the details of the work to be done, before the next meeting]

Tasks: Problem Formulation and Project Planning / Background Study or Literature Review / Requirement Analysis or Theoretical Framework / Design or Research Methodology / Prototype Development or Proof of Concept/ Draft Report Completion
(Please strike out the tasks, which are not applicable for the work to be done, before the next meeting)

Details (in point form):

- Functional requirements
- Use case diagram
- Activity diagram

3. PROBLEMS ENCOUNTERED AND SOLUTIONS

[Please write the details of the problems encountered, after the last meeting and provide the solutions / plan for the solutions]

- None

4. COMMENTS (Supervisor / Co-Supervisor / Company Supervisor)

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Supervisor's Signature

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Student's Signature

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Co-Supervisor's Signature
(if applicable)

.....
Company Supervisor's Signature
(if applicable)



TPT3101/TPR3321 Final Year Project (FYP1) Meeting Log
Trimester 1, 2020/21 (Trimester ID:2010)

Meeting Date: 6/10/2020	Meeting No.: 5
Meeting Mode: Google meet	
Project ID: 1685	Project Type: Application-based
Project Title : Online Assessment and Management System	
Student ID : 1161104114	Student Name: Chan Hao Kang
Student Programme and Specialisation: Software Engineering	
Supervisor Name: Dr. Foo Lee Kien	Co-Supervisor Name: Dr.Chua Sook Ling (if applicable)
Collaborating Company: - (if applicable)	Company Supervisor Name: - (if applicable)

1. WORK DONE

[Please write the details of the work done, after the last meeting]

Tasks: Problem Formulation and Project Planning / Background Study or Literature Review / Requirement Analysis or Theoretical Framework / Design or Research Methodology / Prototype Development or Proof of Concept / Draft Report Completion
(Please strike out the tasks, which are not applicable for the work done, after the last meeting)

Details (in point form):

- use case diagram
- system architecture
- system design
- interface design

2. WORK TO BE DONE

[Please write the details of the work to be done, before the next meeting]

Tasks: Problem Formulation and Project Planning / Background Study or Literature Review / Requirement Analysis or Theoretical Framework / Design or Research Methodology / Prototype Development or Proof of Concept/ Draft Report Completion

(Please strike out the tasks, which are not applicable for the work to be done, before the next meeting)

Details (in point form):

- fix mistakes on sequence diagram, activity diagram and entity relationship diagram
- match interface design with erd

3. PROBLEMS ENCOUNTERED AND SOLUTIONS

[Please write the details of the problems encountered, after the last meeting and provide the solutions / plan for the solutions]

- None

4. COMMENTS (Supervisor / Co-Supervisor / Company Supervisor)

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Supervisor's Signature

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Student's Signature

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Co-Supervisor's Signature
(if applicable)

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Company Supervisor's Signature
(if applicable)

Meeting Logs (FYP2)



TPT3101/TPR3321 Final Year Project (FYP2) Meeting Log Trimester 2, 2020/21 (Trimester ID:2020)

Meeting Date: 10/12/2020	Meeting No.:1
Meeting Mode: Google Meet	
Project ID: 1685	Project Type: Application-based
Project Title : Online Assessment and Management System	
Student ID : 1161104114	Student Name: Chan Hao Kang
Student Programme and Specialisation: Software Engineering	
Supervisor Name: Dr. Foo Lee Kien	Co-Supervisor Name: Dr. Chua Sook Ling (if applicable)
Collaborating Company: - (if applicable)	Company Supervisor Name: - (if applicable)

1. WORK DONE

[Please write the details of the work done, after the last meeting]

Tasks: Implementation / Testing (Application-based projects) or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion
(Please strike out the tasks, which are not applicable for the work done, after the last meeting)

Details (in point form):

- 70% of all user interface (css)

2. WORK TO BE DONE

[Please write the details of the work to be done, before the next meeting]

Tasks: Implementation / Testing (Application-based projects) or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion
(Please strike out the tasks, which are not applicable for the work to be done, before the next meeting)

Details (in point form):

- implement api of register and login
- connect to frontend

3. PROBLEMS ENCOUNTERED AND SOLUTIONS

[Please write the details of the problems encountered, after the last meeting and provide the solutions / plan for the solutions]

- none at the moment

4. COMMENTS (Supervisor / Co-Supervisor / Company Supervisor)

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Supervisor's Signature



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Student's Signature

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Co-Supervisor's Signature
(if applicable)

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Company Supervisor's Signature
(if applicable)



TPT3101/TPR3321 Final Year Project (FYP2) Meeting Log
Trimester 2, 2020/21 (Trimester ID:2020)

Meeting Date: 24/12/2020	Meeting No.:2
Meeting Mode: Google Meet	
Project ID: 1685	Project Type: Application-based
Project Title : Online Assessment and Management System	
Student ID : 1161104114	Student Name: Chan Hao Kang
Student Programme and Specialisation: Software Engineering	
Supervisor Name: Dr. Foo Lee Kien	Co-Supervisor Name: Dr. Chua Sook Ling (if applicable)
Collaborating Company: - (if applicable)	Company Supervisor Name: - (if applicable)

1. WORK DONE

[Please write the details of the work done, after the last meeting]

Tasks: Implementation / Testing (Application-based projects) or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion
(Please strike out the tasks, which are not applicable for the work done, after the last meeting)

Details (in point form):

- Login module
- Register module
- Profile module

2. WORK TO BE DONE

[Please write the details of the work to be done, before the next meeting]

Tasks: Implementation / Testing (Application-based projects) or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion
[Please strike out the tasks, which are not applicable for the work to be done, before the next meeting]

Details (in point form):

- Implement api for question bank module

3. PROBLEMS ENCOUNTERED AND SOLUTIONS

[Please write the details of the problems encountered, after the last meeting and provide the solutions / plan for the solutions]

- none at the moment

4. COMMENTS (Supervisor / Co-Supervisor / Company Supervisor)

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Supervisor's Signature



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Student's Signature

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Co-Supervisor's Signature
(if applicable)

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Company Supervisor's Signature
(if applicable)



TPT3101/TPR3321 Final Year Project (FYP2) Meeting Log
Trimester 2, 2020/21 (Trimester ID:2020)

Meeting Date: 14/1/2021	Meeting No.:3
Meeting Mode: Google Meet	
Project ID: 1685	Project Type: Application-based
Project Title : Online Assessment and Management System	
Student ID : 1161104114	Student Name: Chan Hao Kang
Student Programme and Specialisation: Software Engineering	
Supervisor Name: Dr. Foo Lee Kien	Co-Supervisor Name: Dr. Chua Sook Ling (if applicable)
Collaborating Company: - (if applicable)	Company Supervisor Name: - (if applicable)

1. WORK DONE

[Please write the details of the work done, after the last meeting]

Tasks: Implementation / Testing (Application-based projects) or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion
(Please strike out the tasks, which are not applicable for the work done, after the last meeting)

Details (in point form):

- Assessment module
- Candidate module

2. WORK TO BE DONE

[Please write the details of the work to be done, before the next meeting]

Tasks: Implementation / Testing (Application-based projects) or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion
(Please strike out the tasks, which are not applicable for the work to be done, before the next meeting)

Details (in point form):

- Implement results module, statistics module, marking descriptive question module

3. PROBLEMS ENCOUNTERED AND SOLUTIONS

[Please write the details of the problems encountered, after the last meeting and provide the solutions / plan for the solutions]

- none at the moment

4. COMMENTS (Supervisor / Co-Supervisor / Company Supervisor)

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Supervisor's Signature



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Student's Signature

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Co-Supervisor's Signature
(if applicable)

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Company Supervisor's Signature
(if applicable)



FACULTY OF
COMPUTING
& INFORMATICS

TPT3101/TPR3321 Final Year Project (FYP2) Meeting Log
Trimester 2, 2020/21 (Trimester ID:2020)

Meeting Date: 27/1/2021	Meeting No.:4
Meeting Mode: Google Meet	
Project ID: 1685	Project Type: Application-based
Project Title : Online Assessment and Management System	
Student ID : 1161104114	Student Name: Chan Hao Kang
Student Programme and Specialisation: Software Engineering	
Supervisor Name: Dr. Foo Lee Kien	Co-Supervisor Name: Dr. Chua Sook Ling (if applicable)
Collaborating Company: - (if applicable)	Company Supervisor Name: - (if applicable)

1. WORK DONE

[Please write the details of the work done, after the last meeting]

Tasks: Implementation / Testing (Application-based projects) or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion
(Please strike out the tasks, which are not applicable for the work done, after the last meeting)

Details (in point form):

- Results module
- Statistics module
- Marking descriptive questions module

2. WORK TO BE DONE

[Please write the details of the work to be done, before the next meeting]

Tasks: Implementation / Testing (Application-based projects) or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion
(Please strike out the tasks, which are not applicable for the work to be done, before the next meeting)

Details (in point form):

- Question Bank and Assessments - subject based
- Sets/settings - adjustments
- Profile - remove unnecessary inputs
- Move questions between question banks
- Statistics -show questions
- Reuse assessments

3. PROBLEMS ENCOUNTERED AND SOLUTIONS

[Please write the details of the problems encountered, after the last meeting and provide the solutions / plan for the solutions]

- none at the moment

4. COMMENTS (Supervisor / Co-Supervisor / Company Supervisor)

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Supervisor's Signature



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Student's Signature

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Co-Supervisor's Signature
(if applicable)

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Company Supervisor's Signature
(if applicable)



TPT3101/TPR3321 Final Year Project (FYP2) Meeting Log
Trimester 2, 2020/21 (Trimester ID:2020)

Meeting Date: 11/2/2021	Meeting No.:5
Meeting Mode: Google Meet	
Project ID: 1685	Project Type: Application-based
Project Title : Online Assessment and Management System	
Student ID : 1161104114	Student Name: Chan Hao Kang
Student Programme and Specialisation: Software Engineering	
Supervisor Name: Dr. Foo Lee Kien	Co-Supervisor Name: Dr. Chua Sook Ling (if applicable)
Collaborating Company: - (if applicable)	Company Supervisor Name: - (if applicable)

1. WORK DONE

[Please write the details of the work done, after the last meeting]

Tasks: Implementation / Testing (Application-based projects) or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion
(Please strike out the tasks, which are not applicable for the work done, after the last meeting)

Details (in point form):

- Question Bank and Assessments - subject based
- Sets/settings - adjustments
- Profile - remove unnecessary inputs
- Move questions between question banks
- Statistics -show questions
- Reuse assessments

2. WORK TO BE DONE

[Please write the details of the work to be done, before the next meeting]

Tasks: Implementation / Testing (Application-based projects) or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion
(Please strike out the tasks, which are not applicable for the work to be done, before the next meeting)

Details (in point form):

- Update sequence diagrams, activity diagram and erd in document

3. PROBLEMS ENCOUNTERED AND SOLUTIONS

[Please write the details of the problems encountered, after the last meeting and provide the solutions / plan for the solutions]

- none at the moment

4. COMMENTS (Supervisor / Co-Supervisor / Company Supervisor)

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Supervisor's Signature



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Student's Signature

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Co-Supervisor's Signature
(if applicable)

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Company Supervisor's Signature
(if applicable)



TPT3101/TPR3321 Final Year Project (FYP2) Meeting Log
Trimester 2, 2020/21 (Trimester ID:2020)

Meeting Date: 18/2/2021	Meeting No.:6
Meeting Mode: Google Meet	
Project ID: 1685	Project Type: Application-based
Project Title : Online Assessment and Management System	
Student ID : 1161104114	Student Name: Chan Hao Kang
Student Programme and Specialisation: Software Engineering	
Supervisor Name: Dr. Foo Lee Kien	Co-Supervisor Name: Dr. Chua Sook Ling (if applicable)
Collaborating Company: - (if applicable)	Company Supervisor Name: - (if applicable)

1. WORK DONE

[Please write the details of the work done, after the last meeting]

Tasks: ~~- Implementation / Testing (Application-based projects) or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion~~
(Please strike out the tasks, which are not applicable for the work done, after the last meeting)

Details (in point form):

- Updated documents
- Sequence diagrams, activity diagrams, erd

2. WORK TO BE DONE

[Please write the details of the work to be done, before the next meeting]

Tasks: Implementation-/Testing (Application-based projects) or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion
[Please strike out the tasks, which are not applicable for the work to be done, before the next meeting)

Details (in point form):

- Test system

3. PROBLEMS ENCOUNTERED AND SOLUTIONS

[Please write the details of the problems encountered, after the last meeting and provide the solutions / plan for the solutions]

- none at the moment

4. COMMENTS (Supervisor / Co-Supervisor / Company Supervisor)

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Supervisor's Signature


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Student's Signature

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Co-Supervisor's Signature
(if applicable)

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Company Supervisor's Signature
(if applicable)



TPT3101/TPR3321 Final Year Project (FYP2) Meeting Log
Trimester 2, 2020/21 (Trimester ID:2020)

Meeting Date: 25/2/2021	Meeting No.:7
Meeting Mode: Google Meet	
Project ID: 1685	Project Type: Application-based
Project Title : Online Assessment and Management System	
Student ID : 1161104114	Student Name: Chan Hao Kang
Student Programme and Specialisation: Software Engineering	
Supervisor Name: Dr. Foo Lee Kien	Co-Supervisor Name: Dr. Chua Sook Ling (if applicable)
Collaborating Company: - (if applicable)	Company Supervisor Name: - (if applicable)

1. WORK DONE

[Please write the details of the work done, after the last meeting]

Tasks: - Implementation / Testing (Application-based projects) / or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion
(Please strike out the tasks, which are not applicable for the work done, after the last meeting)

Details (in point form):

- Functionality test

2. WORK TO BE DONE

[Please write the details of the work to be done, before the next meeting]

Tasks: Implementation / Testing (Application-based projects) or Evaluation of Findings and Research Contribution (Research-based projects) / Commercialisation Proposal (Application-based projects) or Research Paper (Research-based Projects) / Draft Final Report Completion
(Please strike out the tasks, which are not applicable for the work to be done, before the next meeting)

Details (in point form):

- Commercialisation Proposal

3. PROBLEMS ENCOUNTERED AND SOLUTIONS

[Please write the details of the problems encountered, after the last meeting and provide the solutions / plan for the solutions]

- none at the moment

4. COMMENTS (Supervisor / Co-Supervisor / Company Supervisor)

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Supervisor's Signature



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Student's Signature

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Co-Supervisor's Signature
(if applicable)

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Company Supervisor's Signature
(if applicable)

Appendix C

Turnitin Report

FYP2

ORIGINALITY REPORT

14%

SIMILARITY INDEX

2%

INTERNET SOURCES

4%

PUBLICATIONS

13%

STUDENT PAPERS

PRIMARY SOURCES

1

Submitted to Multimedia University

Student Paper

8%

2

Submitted to Sim University

Student Paper

1%

3

Submitted to Multimedia university College of Kenya - Mbagathi Campus

Student Paper

1%

4

Submitted to University of Mauritius

Student Paper

<1%

5

Submitted to Asia Pacific Institute of Information Technology

Student Paper

<1%

6

Submitted to The British College

Student Paper

<1%

7

Submitted to University of Technology, Sydney

Student Paper

<1%

8

"Applied Informatics", Springer Science and Business Media LLC, 2018

Publication

<1%