MOBILE APPLICATION FOR ONLINE EXAM MANAGEMENT SYSTEM

By

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A REPORT

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SUBMISSION OF FINAL YEAR PROJECT /DISSERTATION/THESIS

It is hereby certified that _____**CHOONG JOE WEI**_____ (ID No: __**20ACB04216**__) has completed this final year project/ dissertation/ thesis* entitled "<u>MOBILE APPLICATION FOR ONLINE EXAM MANAGEMENT SYSTEM</u>" under the supervision of <u>Dr. Ramesh Kumar Ayyasamy</u> (Supervisor) from the Department of <u>Computer Science</u>, Faculty/Institute* of <u>Information and Communication Technology</u>.

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Name   :   __CHOONG JOE WEI_____

Date   :   ___27 APRIL 2023_____

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Abstract

As the rapid rise in the number of people using smart devices today, mobile applications have been used to solve many kinds of problems. Although there is various online exam software with different functionalities such as online exam management system, scheduling system, grading system, timing system, recording system, attendance system but lack of mobile application that has an integrated functionalities in the market. Hence, I proposed a mobile application named 'ProExam' to manage all the functions that I have stated above for the teachers and students used. Furthermore, the online exam management system allows teachers to create the exam questions for the students to conduct it. Besides, it allows the teachers to set a time limit on the online exam for the students. Above all, a database system will be implemented to keep track of the data of the teachers and students. For this project, I plan to use the Mobile Application Development Life Cycle (MADLC) for developing my mobile application. In short, this project will act as a platform to combine all the functionalities in one application and connect between the teachers and students so that the teachers could have full control of their students.

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CHAPTER 1

Introduction

In this chapter, I will talk about the background and the introduction of the online exam management system. This project will review the existing online exam management system in order to find out the problem statement, weakness and strengthen and state the proposed solution for improvement. In addition, motivation and contribution to the online exam management system will be mentioned as well.

Nowadays, with the expansion of Internet applications and the emergence of virtual universities and distance education, the use of the internet to conduct online exams is urgently required. Apart from this, all people must move in the online learning mode due to the ongoing Covid-19 pandemic. Therefore, many online exam software for teaching and education has appeared as the times needed. In this case, the institution's course assessment method included an online exam. The general exams which are using pens and papers are now slowly being replaced by the online internet-based testing system.

Students are needed to take the exam manually in the traditional examination system. Institute and students require to pay the money for the papers that related to examinations. In the traditional examination system, question papers and answer sheets need to prepare for the students, and then all answer sheets of the students need to collect and evaluate one by one after the end of examination. So, the results will take a long time to be published. All student's report and details of marks are kept on a paper by teachers. In addition, students require to stay in a certain place for conducting the examination. It makes all the process of the examination slow down.

Therefore, a mobile application for the online exam management system is a good method of conducting exam as universities and schools. Students are not required to spend their time in getting to and from the exam center of the school or universities. It enables students to conduct online exam using this system anywhere without having to be somewhere. Besides, teachers do not require retrieving answer sheets, analyzing scores and reveal the results of students to the class when using the online exam management system. It allows

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teachers to benefit from the automatic grading system. In addition, the report of the students does no need to keep by teachers on the papers. It lightens the burden of the teachers.

The online exam management system is used to evaluate activities of learning and the teaching results and to estimate the achievement level of activities of learning and teaching, in order to determine the capacity of the students in understanding the lesson using smartphone without any impact on the traditional school or university course exam that have to use papers, pens and invigilator (A Sarrayrih and Ilyas, 2013). Because there is no paperwork required, it does not waste more expenses as traditional exam situation (Ramu and Arivoli, 2013). For example, print the papers of exam, the paper of admissions for exam need to prepare and others. In addition, as lots of human factors are included in the traditional exam impacts, so it is difficult to offer accurate and true results from the scores. (Nan et al., 2012)

Therefore, online exams are recommended to be used for enhancing the traditional exams. It offers different types of educational opportunities to students such as assisting students with a variety of learning techniques and needs, making students more active, and providing students with more opportunities to access the online databases in exam preparations. In addition, it can offer a direct score evaluation, save expenses of school administration, improve security of exam materials and exam schedule can be more flexible. As a result, the online exam management system can enhance the student's learning quality. (Martono et al., 2020)

In conclusion, implementing a mobile application for the online exam management system will bring many benefits to teachers and students. When the teachers create the exam questions and the students conduct online exam through the mobile application for the online exam management system, it speeds up the process of them. Thus, they will become more active and more likely to use the online exam management system.

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1.1   Problem Statement and Motivation

Problem Statement

Problem Statement 1: Lack of feature about recording face of students

Teachers do not know the action of the students when they are conducting the online exam without the feature of recording face. Because of the online exam, students can conduct exams somewhere. In this case, students can gather with their friends in a certain place to discuss the answers together. In addition, it may happen the case of not the person himself in conducting the exam. Someone may help their friends to conduct the exam or hire someone to conduct their online exam without any awareness of the teachers. Therefore, teachers cannot inspect the students' action and verify the identity of the students. Hence, feature about recording face of students during examination is needed to solve these issues.

Problem Statement 2: Lack of secure browser about preventing students switch to other application

During the online exam, some students can leave the exam page and search the answers through other websites or discuss with their friends by switching to other application. So, students can simply copy answers from some websites and paste answers into the field of answer. Besides, they can switch to other applications such as WhatsApp to exchange the answers with their friends. It creates an opportunity for students to cheat in the online exam. In this case, the exam rules can be easily broken by the students. Because there is no secure browser for the students to prevent cheating, it makes the examination meaningless and superfluous. Thus, security is an important aspect during the online exam.

Problem Statement 3: Lack of feature about exam timer

Some of the online exam management systems may not have an exam timer, it makes teachers unable to set a limited exam time for the students. So, the students will conduct the online exam without a timer during their examination. Because there is no limited time for the students to review it, they do not know how much time has elapsed for their examination. It means they are not able to know exactly how long they have spent on each question. It is difficult for the students to keep track of the exam time. In this case, students always need to refer to the clock to know the remaining time for them to conduct the online exam. In addition, it may happen that students delay their submission as they cannot finish their online

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exam on time. Therefore, students would not be good at managing and assigning their time during the online exam without an exam timer.

Problem Statement 4: Lack of feature about email notification about reminding students to conduct the online exam one day before the exam.

Some students need an email notification to remind them to conduct the online exam one day before the exam. This is because the exam schedule of students is full. So, students may be busy with their revision and examination. Without email notifications, students may mess up and forget to conduct their exam. Students will directly get zero marks for their exam if they are missing out on the examination. In addition, it may also cause students to delay their exam and not enough time to finish their examination. So, the grade of the students who are absent for their exam will be affected. Hence, feature about email notification about reminding students to conduct the online exam one day before the exam is needed to solve these issues.

<u>Motivation</u>

First and foremost, I will propose a **feature about recording face of the students**. Teaches can know the action of the students and verify the identity of the students from the recorded video. So, students will not dare to do anything other than examination when face are being recorded. It reduces the chances of the students who are attempting to cheat. Therefore, it is convenient for teachers to distinguish whether the students have cheated or not from the students' face. In addition, the students must conduct the examination by themselves, so it can prevent the students from requesting other people to help them to conduct their exam.

Secondly, I will propose a **secure browser to prevent students from switch to other applications**. Students cannot open any other windows during their online exam. It means students are only permitted to access the examination window. It can avoid the students searching for answers and copy and paste from other websites. In addition, students are unable to switch to other applications such as WhatsApp for assistance from their friends. It decreases the opportunities for the students who are attempting to cheat. So, it is fair to all the students who are conducting the online exam.

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Thirdly, I will propose a **feature about the exam timer**. Students can review the time of the exam timer until the end of the examination. It is convenient for the students as they do not need to refer to the time from the clock to know how much time has elapsed during their examination. In this case, students have a good management of their time and know how much time is needed for each question. So, most students will be punctual for their submission of exam answers. It makes the process of the students in conducting the exam run smoothly.

Lastly, I will propose a **feature about email notification about reminding students to conduct the online exam one day before the exam.** Students will receive an email notification one day before the exam. It is useful for the students as it sends reminders about the exam date and time that need to be conducted by tomorrow. In this case, students will be punctual for their examinations after receiving the email notification.

1.2   Objectives
The main objectives of this project:
-    **To develop a create exam feature for teachers to eliminate the time-consuming work of evaluating the answers of the students manually**
-    **To develop an attend exam feature for the students to do the exam anywhere**
-    **To develop an exam timer for the students to view how much time has elapsed**

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### 1.3	Project Scope and Direction

The tile of this project is Online Exam Management System. It is a mobile application for teachers to create exam questions and allow students to conduct the exam. To enhance the traditional exams and make it more disciplined and systematic, this project is anticipated to produce a user-friendly mobile application. As a result, several functionalities and features will be developed in this current project. Firstly, an interface of registration and login for the mobile application will be separated by two roles which are teacher and student.

After the login for teachers, Online Exam Management System allows teachers to create an exam by filling in the exam ID, password, and title and scheduling a date for the online exam. There have multiple types of exam questions such as Multiple Choice, Checkboxs and True or False for them to create. When creating the exam questions, there is a limited time for the quiz or exam to let the teachers set. In addition, it allows teachers to set the answers and marks for each questions in advance to let the system mark the answers. This means that it provides teachers with an automatic marking feature to eliminate the need for manual marking. Besides, it allows teachers to turn the exams on or off when exams are available to the students. After the exams are created, they are able to update exams, delete exams and share exams through social media such as WhatsApp. Furthermore, it enables teachers to view their students' results and answers.

After the login for the students, Online Exam Management System allows students to conduct the online exam on the date scheduled by their teachers. So, it allows them to conduct the exams by inputting the exam ID and password given by their teachers to conduct the exam. In addition, it allows students to view the exam timer to know how much time has elapsed. There is an auto-submit function if the students do not submit the exam within the time specified by the teacher. In addition, it enables student to view their past exam results.

Lastly, a mobile application for an Online Exam Management System will involve a database system to store the data of teachers and students, as a backup for the system in case of any adverse events. So, the teachers can easily monitor students' progress and the students are able to keep track of their exam results.

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1.4 Contributions

The contribution of this project is to develop a new user-friendly mobile application for Online Exam Management System that allows teachers to create questions and allows students to conduct exams from anywhere. It will be able to perform a variety of functions, including keeping track of all records of the students in a timely way.

In addition, the app's automatic marking system saves effort and time for teachers while making the mark is transparent and consistent throughout several sections of the same subject. It also reduces the risk of possible errors in manual marking.

Besides, it is flexible as it offers a range of exam types such as multiple choice, checkbox and true false, which can be customized according to the requirements of the subject. In this case, teachers can assess students' understanding and knowledge, while also addressing different learning needs and styles.

Furthermore, a time limit feature enables teachers to set time limits for the exams, which ensures students complete their exams within the specified time frame. It assists students in time management during the exam and avoid them from spending too much time on a section or single question.

Apart from that, it allows teachers to view students' scores and answer after students submitted their exams. This enables teachers to identify patterns and trends in students' academic performance and modify their teaching methods as necessary. Certainly, it presents the results of students in an understandable and structured way in order to let them monitor their progress over time and identify areas for improvement.

As a result, this app reduces paperwork, as well as making the examination more disciplined and systematic. The online exam management system is cheaper than the traditional exam system. Meanwhile, the schools or universities can save time and money without using human work.

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1.5   Report Organization

The details of this research are shown in the following chapters. In Chapter 1, it will discuss the problem statement and motivation, objectives, project scope and contribution. In Chapter 2, some related backgrounds of mobile application for Online Exam Management System are reviewed. In addition, the system architecture diagram, use case diagram, entity relationship diagram and system methodology applied in the project will be provided in Chapter 3. Besides, Chapter 4 provides block diagram, system overview flowchart diagram and flowchart diagram for teachers and students. Furthermore, Chapter 5 describes system implementation which are technologies and tools involved such as hardware and software, software setup and system operation. Next, System Testing and Result, objectives evaluation and project challenges will be discussed in Chapter 6. Lastly, there will be a conclusion including project review, discussion and conclusion, present work, future work and gantt chart in Chapter 7.

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CHAPTER 2: Literature Review

2.1 Review of Existing Mobile application for Online Exam Management System

2.1.1 Test Easy

Test Easy is a free online class exam creator which is used to create, share, and publish exams for teachers and students. This mobile application allows teachers to crop, capture, modify and upload the question paper easily. Trainers, educators, businesses, non-profits, and other professionals who require a simple method to create online tests, examinations, and quizzes by using Test Easy. (play.google.com, n.d.)
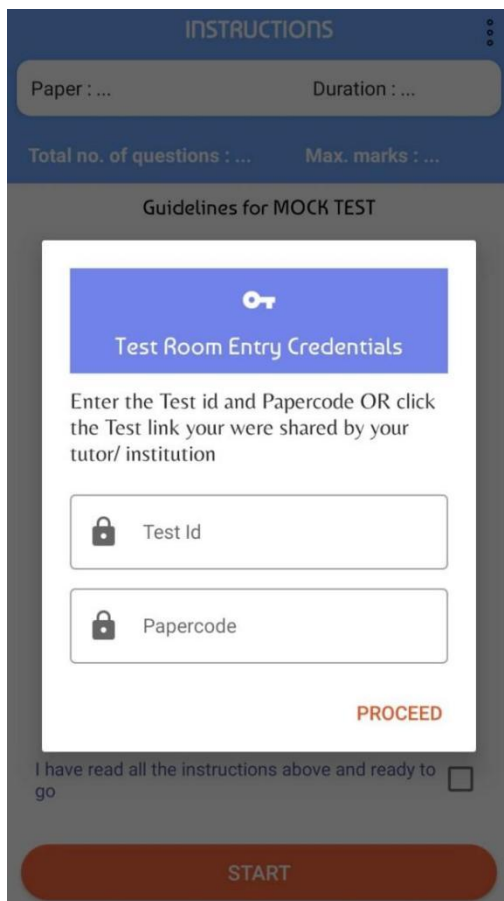
Figure 2.1.1.1 Screenshot of Test Easy homepage for students
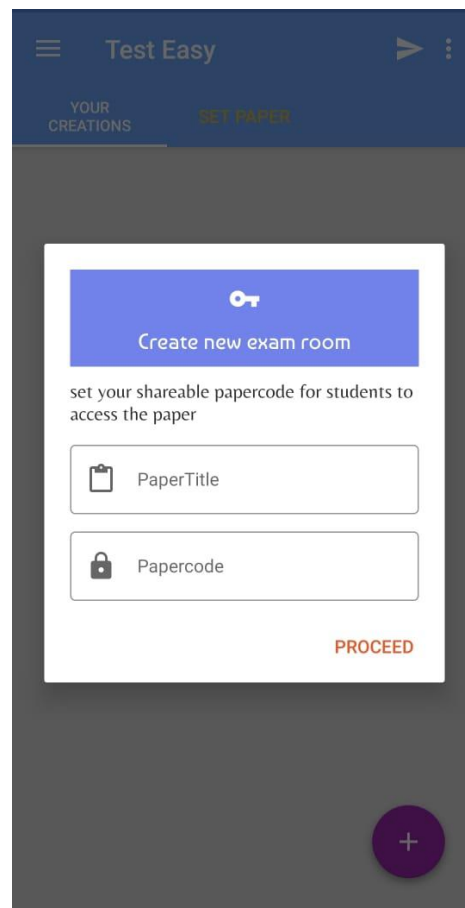
Figure 2.1.1.2 Screenshot of Test Easy homepage for teachers

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Strengths	Weaknesses
- Can share test link for inviting selected students to conduct exam - Can share test ID and Paper code for inviting selected students to conduct exam - Can export PDF file for exam question	- Cannot set limited exam time - Cannot set the duration of the examination - Cannot create a structure question

Table 2.1.1: Strengths and Weaknesses of Test Easy

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2.1.2 Online Exams

The role of the Online Exams is to complete an online exam system for people easy to use. It assists the examiner to enhance the examination. In addition, it helps the examiners and students by providing a time saving and efficient solution for the online exam. Institutes, universities, teachers, and examiners can analyze, measure, and manage online exams in their own method using Online Exams. It can make students more stable. The system has advanced features that make it more goal-oriented and user friendly. (play.google.com, n.d.)
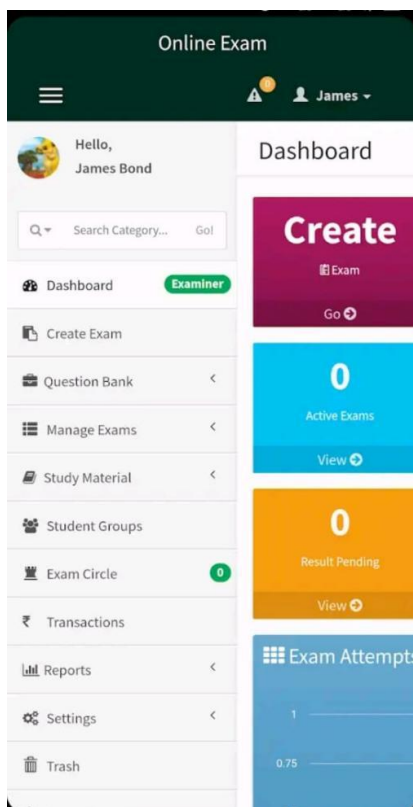
Figure 2.1.2.1 Screenshot of Online exams homepage 1
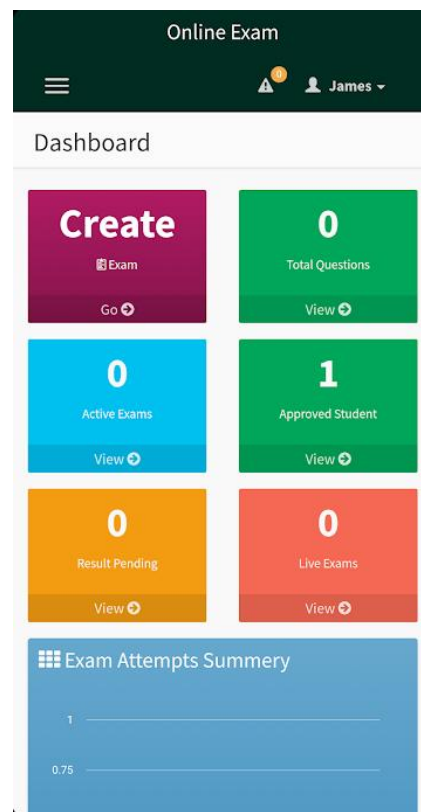
Figure 2.1.2.2 Screenshot of Online exams homepage 2

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Strengths	Weaknesses
- Have result analysis - Can set limited exam time - Email notification for students to conduct exam - Have exam schedules - Face verification - Study material provided	- Cannot generate code generate for inviting selected students to conduct exam - No feature to block users from switching to other applications during examination

Table 2.1.2: Strengths and Weaknesses of Online Exams

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2.1.3 Conduct Exam

Conduct Exam is a powerful online test software that provides a flawless solution of assessment for companies, universities, institutes, and other organizations. Mobile app, web-based version and lifetime basis is available for Online Exam Software. Administrators can create many sorts of examination. Besides, users can conduct exams in online mode or download exam questions and do it in offline mode. The exam and scores will be synced with the version of the web. It supports many languages, allowing users to create examinations in their preferred languages such as Hindi, English and others. In addition, the administrators can also add learning materials in a variety format such as images, video, graphs, text, and equations. It assists the examiner to conduct online exam without wasting any resources. It was created by the team of professional software developers for various educational establishments (Conduct Exam, n.d.).
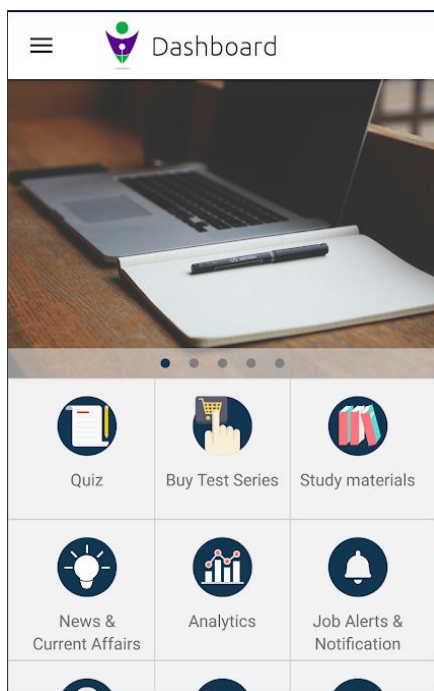
Figure 2.1.3.1 Screenshot of Conduct Exam Homepage
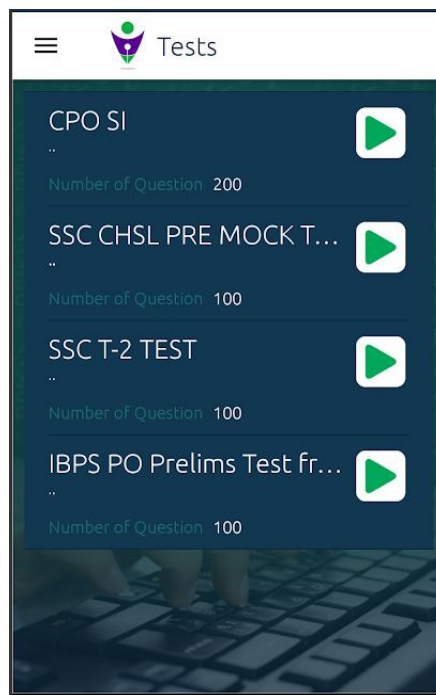
Figure 2.1.3.2 Screenshot of Conduct Exam tests page

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Strengths	Weaknesses
- Have feature to block users from switching to other applications during examination - Randomized questions - Graph analysis for time taken per question - Can assign date and time for the exam	- Cannot generate code generate for inviting selected students to conduct exam - No face recording

Table 2.1.3: Strengths and Weaknesses of Conduct Exam

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2.1.4 QuizPro

    QuizPro is an application that allows users to create and share quizzes easily and students can conduct quizzes and view the scores. It can be used by the trainers, teachers, business, event organizers and others to attend professional test online. (APKPure.com, n.d.)
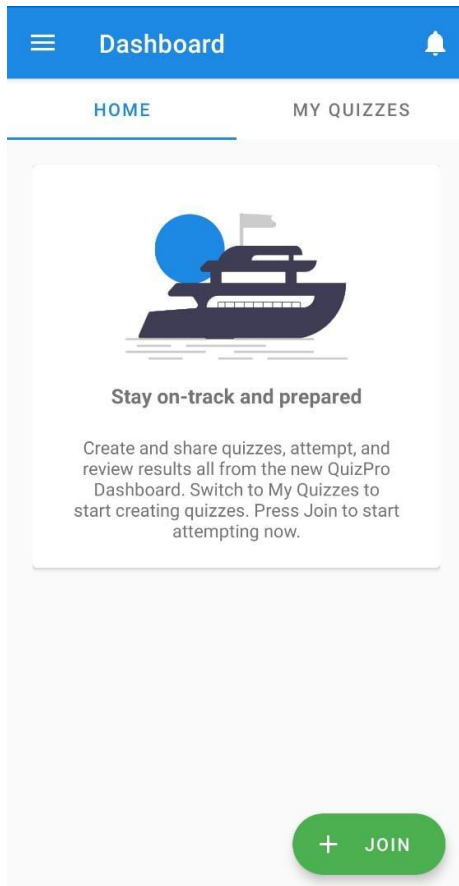
Figure 2.1.4.1 Screenshot of
QuizPro homepage 1
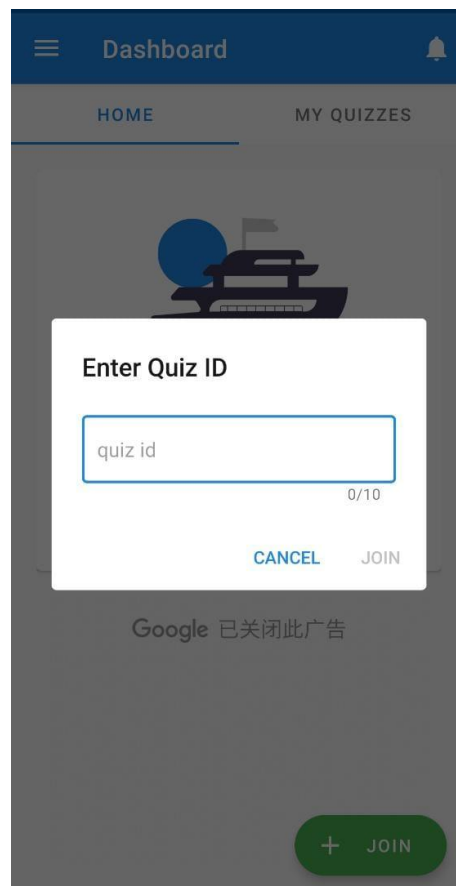
Figure 2.1.4.2 Screenshot of
QuizPro homepage 2

Strengths	Weaknesses
- Can share exam by Quiz ID and password for attempting exam - Import questions from Excel file - Support multiple types of question - Have notifications for conduct quiz	- No feature to block users from switching to other applications during examination - Cannot set limited exam time - No exam schedules - No result analysis

Table 2.1.4: Strengths and Weaknesses of QuizPro

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2.1.5 MtestM

    MtestM is an exam maker application that enables users to design, share and publish examinations. It can many types of exam questions on an Excel spreadsheet. Educators, non-profits, trainers, business and other professionals who require a simple method to create tests, exams, and quizzes. In addition, it can publish exam question in a few minutes. (AppGrooves, n.d.)
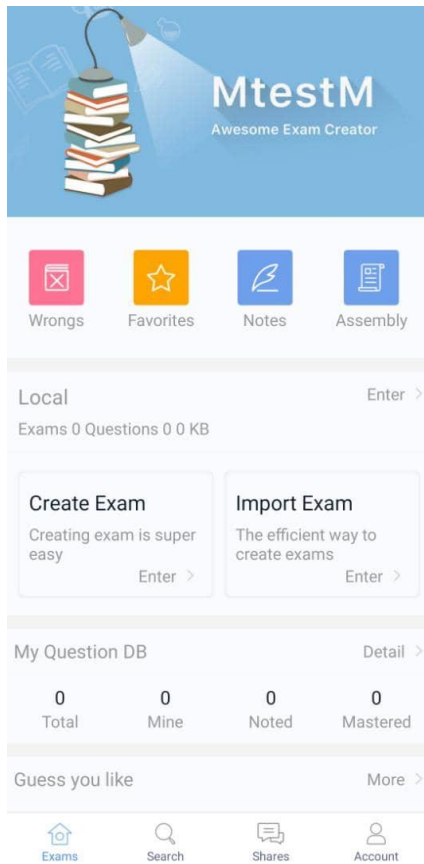
Figure 2.1.5.1 Screenshot of MtestM homepage
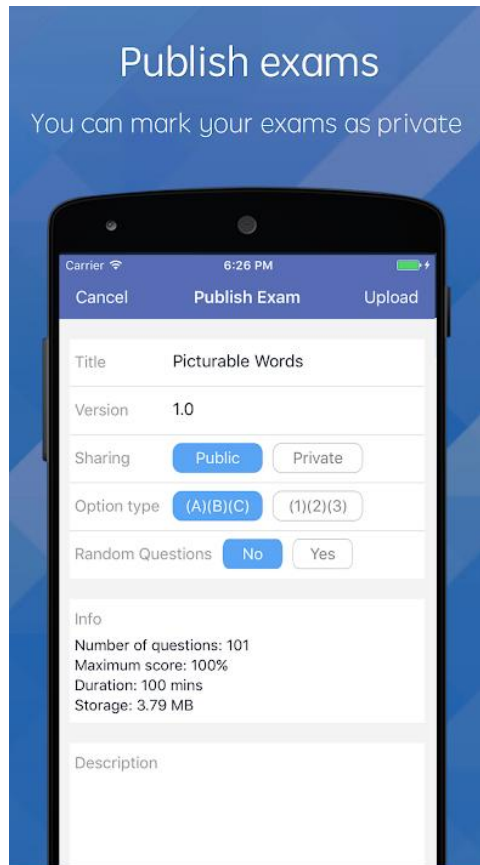
Figure 2.1.5.2 Screenshot of MtestM publish exams page

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Strengths	Weaknesses
- Can create multiple choice, single choice, matching and fill in the blank question - Grade report - Can import an excel file for creating exam question - Can create exam in an excel document	- No feature to block users from switching to other applications during examination - No email notification for students to conduct exam

Table 2.1.5: Strengths and Weaknesses of MtestM

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2.1.6 Exampro India

Exampro India is used to handle data linked with its coaching programmes efficiently and transparently. It is a user-friendly software with outstanding features such as fees management, online attendance, full performance reports, homework submission, and so on. So, parents can keep track of their children's class information. It is a fantastic combination of intriguing features and user interface with simple design that kids, parents, and instructors all adore. (APKPure.com, n.d.)
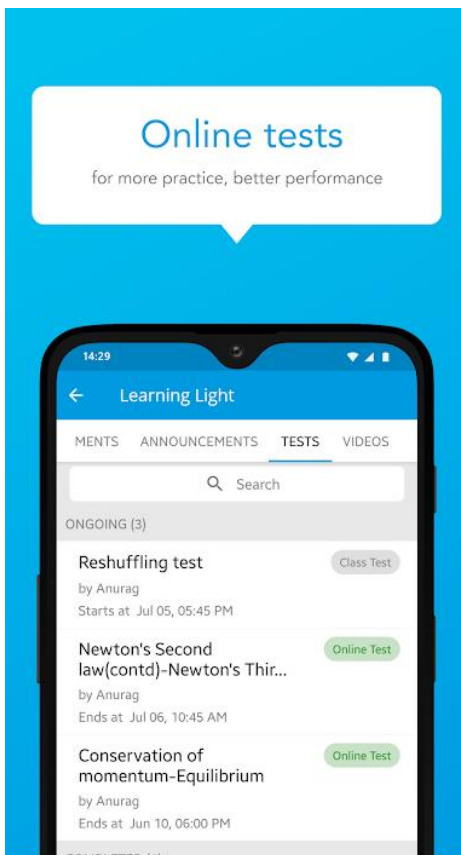
Figure 2.1.6.1 Screenshot of Exampro India online tests page
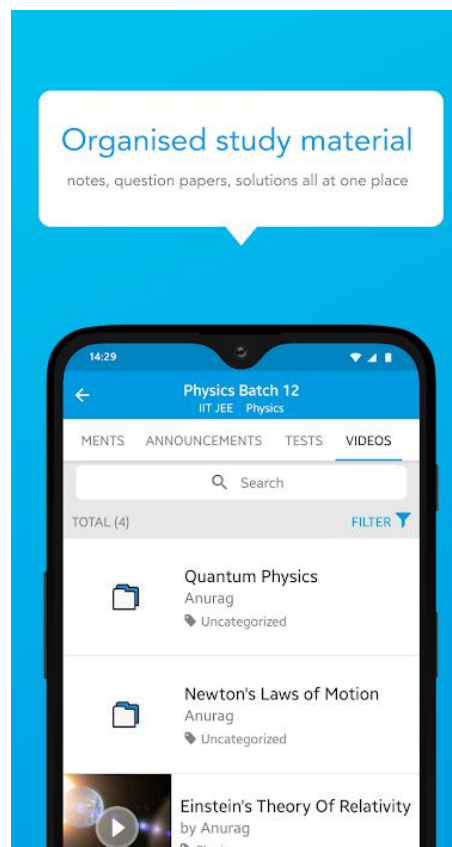
Figure 2.1.6.2 Screenshot of Exampro India study materials page

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Strengths	Weaknesses
- Can view exam timetable - Study material exists such as video - Live chat	- No feature to block users from switching to other applications during examination - No email notification for students to conduct exam - Cannot set limited exam time

Table 2.1.6: Strengths and Weaknesses of Exampro India

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2.1.7 CAQ

CAQ app is a quiz creator that allows users to create, modify, load, import and export quizzes. It is really simple and enjoyable to use. To make a quiz, launch the app and hit 'create a quiz,' so users can generate up to 50 questions per quiz. For Android 3.0 and higher, it also has a dark mode. Drawing questions, multiple choice, flashcards and other types of questions are also supported. It also includes a Windows PC edition. (Jephthah, 2022)
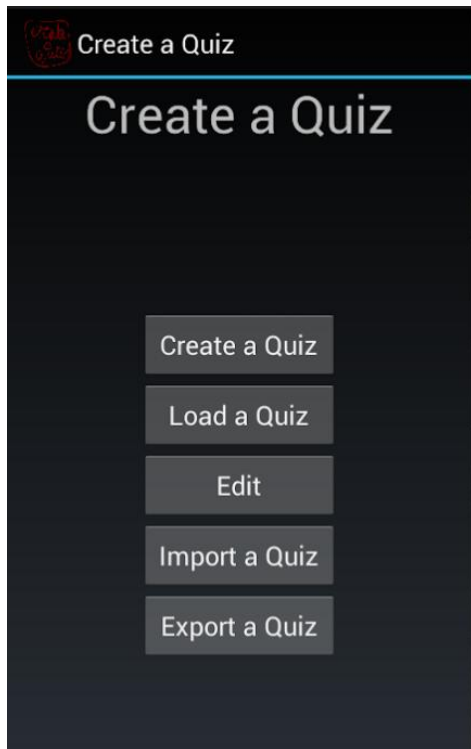
Figure 2.1.7.1 Screenshot of CAQ homepage
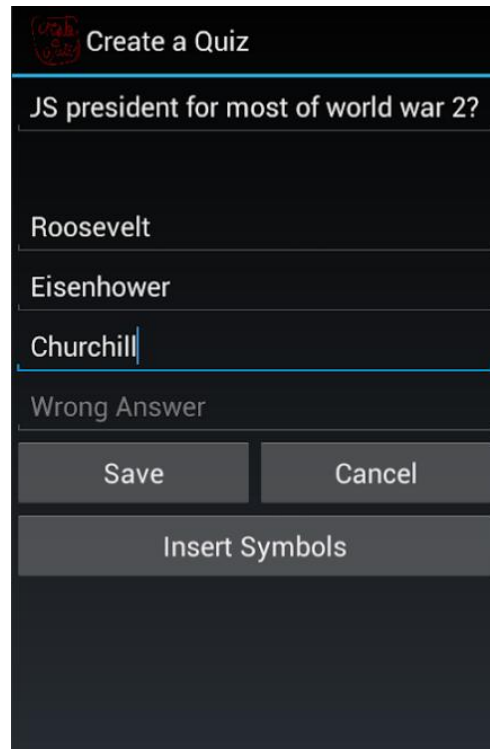
Figure 2.1.7.2 Screenshot of CAQ create quiz question page

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Strengths	Weaknesses
- Can import and export quiz - Support multiple types of question	- Cannot view exam timetable - Cannot set limited exam time - No randomized questions - No result analysis

Table 2.1.7: Strengths and Weaknesses of CAQ

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2.1.8 WiFiStudy

    WiFiStudy is a professional and educational website. It is one of the most useful apps for both job seekers and competitors. WiFiStudy's major goal is to provide students and job seekers with a single study platform so that they may prepare for numerous competitive tests. This mobile application as an one-stop shops for all competitive exams in India. (Crunchbase, n.d.)
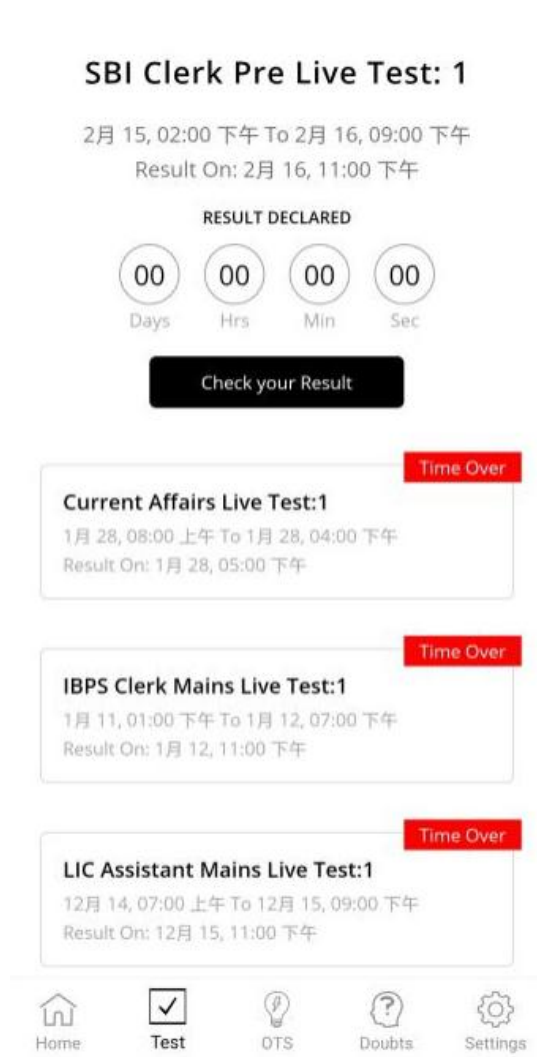
Figure 2.1.8.1 Screenshot of WiFiStudy
test page

Figure 2.1.8.2 Screenshot of WiFiStudy
result analysis page

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Strengths	Weaknesses
- Have exam timer - Have result analysis - Can view exam timetable - Can do quiz	- Cannot create exam question - No feature to block users from switching to other applications during examination - No email notification for students to conduct exam

Table 2.1.8: Strengths and Weaknesses of WiFiStudy

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CHAPTER 3 System Methodology/Approach

3.1 System Architecture Diagram
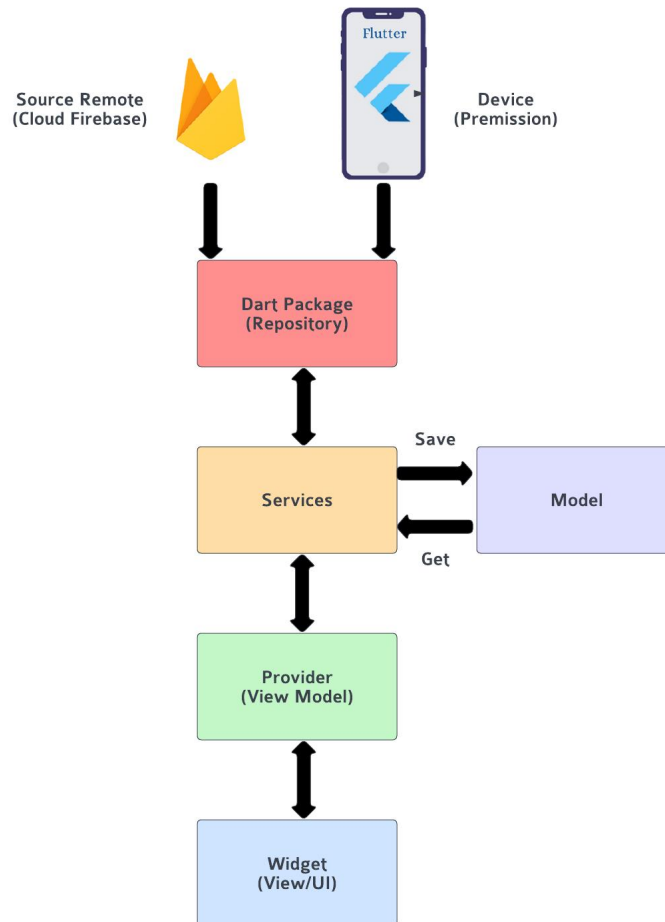
Figure 3.1: System Architecture Diagram

Firstly, the Dart Package will ask Cloud Firestore for a certain set of data and wait for its response. Additionally, Dart Package requests permissions for the device. The Dart Package will process the response and transmit it to the services after receiving them from the Cloud Firestore. After that, the provider will retrieve the plugin and raw data from the Dart Package after receiving the function from the services while the model class saves the raw data. The dependent widgets or user interface pages can be provided by the provider. Each pair of providers and widgets received dependency injection. As a result, it is simple to manage and update the user interface design on the page.

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3.2 Use Case Diagram and Description

Figure 3.2: Use case diagram of Online Exam Management System

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The overall system separated two roles of users which are teacher and student. The teacher and student in this application need to sign up for an account and login into the app. In addition, they can view the user profile and edit their profile as needed. Besides, they are able to reset their password in the app.

For a teacher's role, they are able to create the exams including add exam questions. The exam questions will be stored in the database. Furthermore, they can update and delete the exam for their students after the exams are created. Hence, the exam questions will be updated in the database as well. In addition, they can share the exam through the social media platform such as WhatsApp. Besides, the system will obtain the students' exam results and answer data from the database so that he teachers can view the students' exam result and answer.

For a student's role, they can conduct the exam by entering the exam ID and password that is shared by their teachers. The system will obtain the time duration data set by their teachers from the database so that students can view the exam timer during the exam. In addition, students are able to submit their answers and the answers will be stored in the database. The system will generate the students' result and store it in the database. Besides, students are able to view their exam result obtained from the database.

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3.3 Entity Relationship Diagram
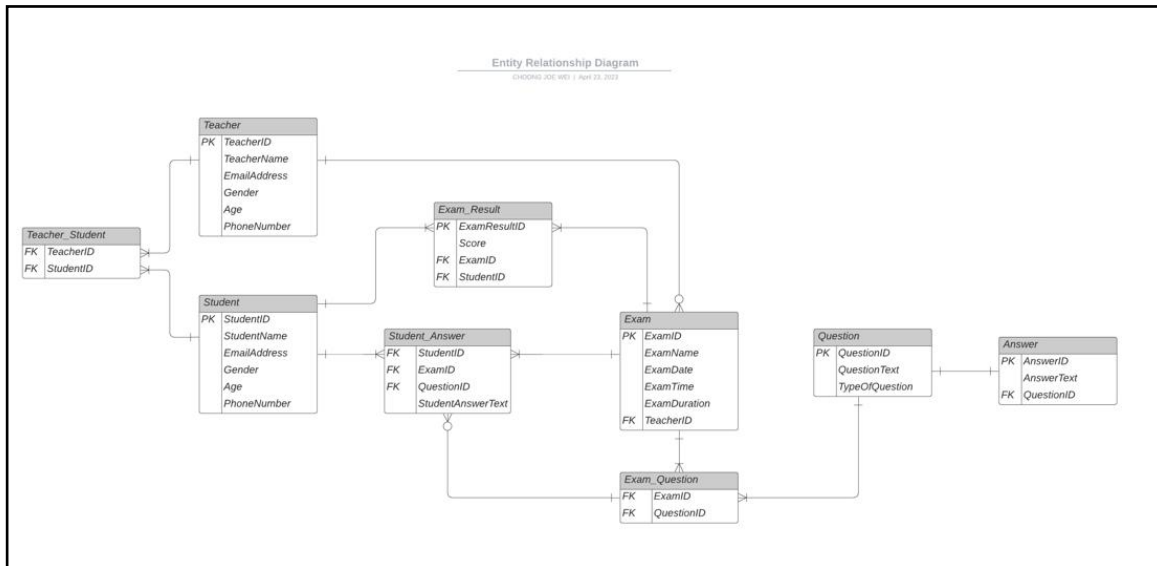
Figure 3.3: Entity Relationship Diagram of Online Exam Management System

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3.4 Sytem Methodology

The life-cycle methodology that I have chosen for the mobile application for Online Exam Management System is Mobile Application Development Life Cycle (MADLC). This is because MADLC method can be systematically developed in the mobile application. Identification Phase, Design Phase, Development Phase, Prototyping Phase, Testing Phase, Deployment Phase and Maintenance Phase are involved in MADLC. (Kaur and Kaur, 2015)
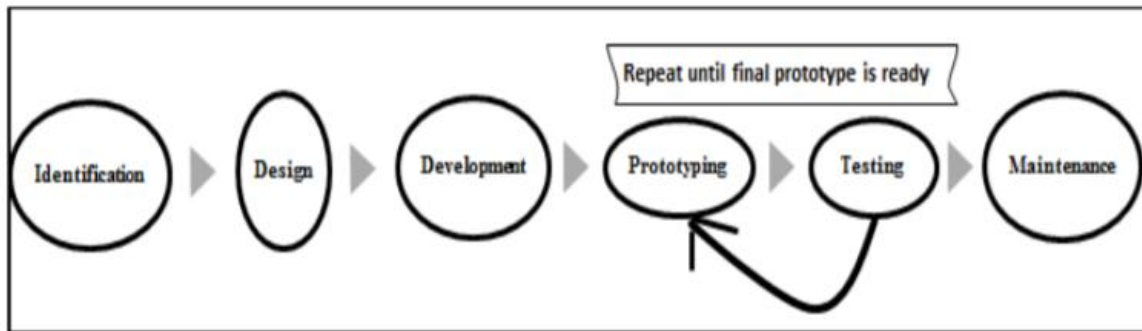
Figure 3.4: Mobile Application Development Life Cycle Model (MADLC)
(Kaur and Kaur, 2015)

Identification Phase

The initial phase involves gathering and categorising ideas. The consumer or the developers can both provide suggestions. (Kaur and Kaur, 2015)

Design Phase

In this phase, the mobile application team's concept is turned into an initial design for the app. (Kaur and Kaur, 2015)

Development Phase

The application is coded at this phase. Different modules of the same prototype might be coded at the same time. (Kaur and Kaur, 2015)

Prototyping Phase

The functional needs of each prototype are examined at this phase. The prototypes are put through their paces before being submitted to the customer for feedback. The essential adjustments are performed throughout the development phase after receiving feedback. When

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the second prototype is complete, it is combined with the first prototype, tested and sent to the customer. Until final prototype is complete, the prototyping, testing and development phases are repeated. (Kaur and Kaur, 2015)

Testing Phase

The prototype types are tested on an emulator or simulator before being tested on the real device. (Kaur and Kaur, 2015)

Deployment Phase

The application is ready to be deployed after the testing is done and the client's final feedback is received. (Kaur and Kaur, 2015)

Maintenance Phase

Users' feedback is gathered, and necessary modifications are implemented in the form of bug repairs or enhancements. (Kaur and Kaur, 2015)

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CHAPTER 4 System Design

4.1 Block Diagram
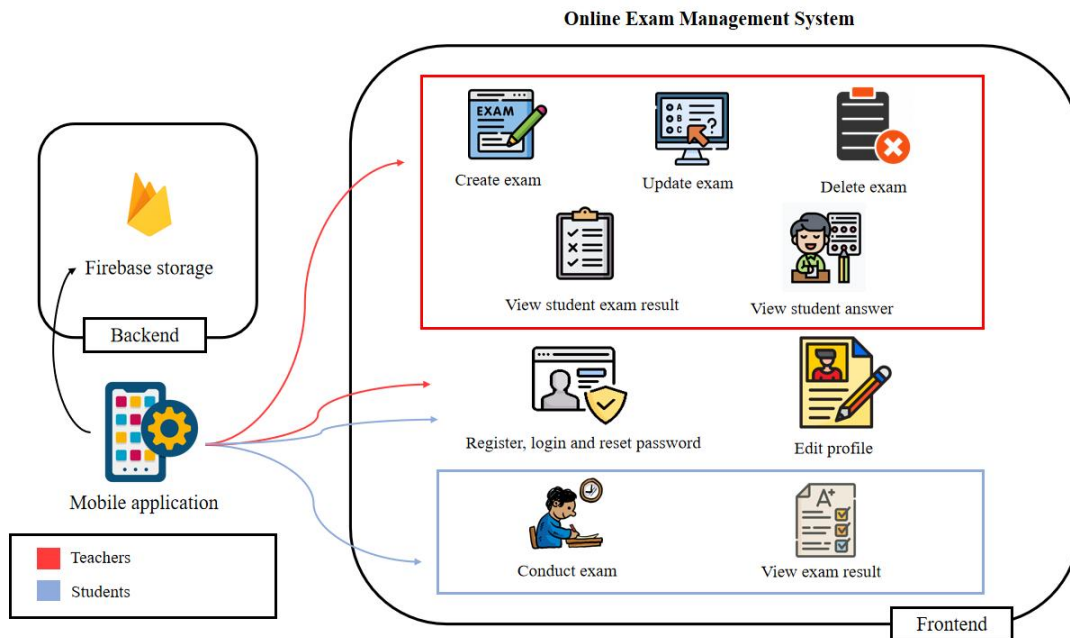
Figure 4.1: Block Diagram

The overall system separated two roles of users which are teacher and student. The teacher and student in this application need to register an account and login as their selected role. In addition, they can reset their password and edit their profile. For a teacher's role, they are able to create, update and delete an exam for their students. After creating an exam, they can share the exam through the social media platform. In addition, teachers can view who have attended their exam with the exam result and answer of students. For a student's role, they can conduct the exam by entering the exam ID and password that is shared by their teachers. After they finish conducting an exam, students are able to view their exam result. Lastly, all user's data and exam details will be stored in the database.

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4.2 System Overview Flowchart
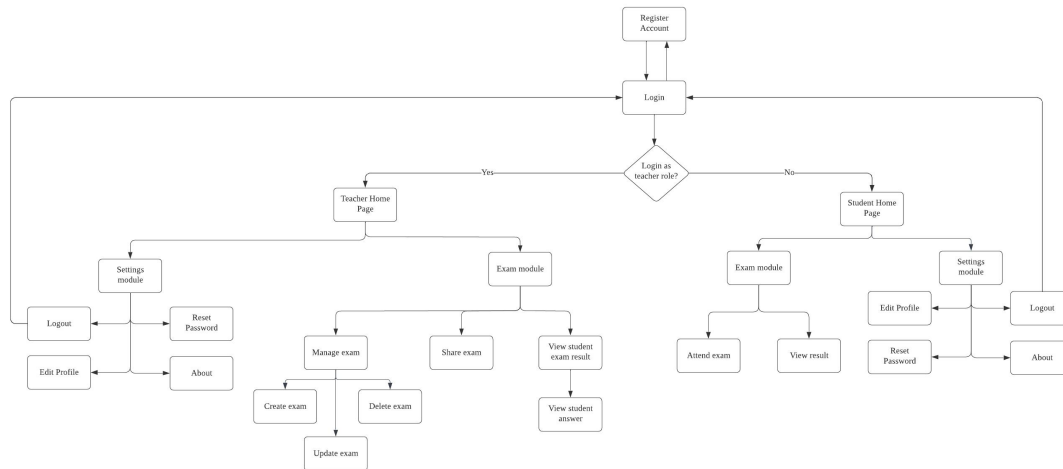
Figure 4.2: System Overview Flowchart

This is the system flowchart of the application in this project. First and foremost, users need to register and login as their selected role.

There are two module which are Settings module and Exam module for teacher and student. For the Settings module, they are the same. They can edit profile, reset password, view the background history details of the system and lastly is logout if they want.

If the user is logged in as a teacher, they will be taken to the Teacher Homepage. For the Exam module of teachers, teachers can manage exam including create, update and delete exam. After creating an exam, they can share the exam through the social media platform. In addition, teachers can view the exam results and answers of the students.

If the user is logged in as a student, they will be taken to the Student Homepage. For the Exam module of students, students can attend exam by entering the exam ID and password that is shared by their teachers. After they finish conducting an exam, students are able to view their exam result.

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4.3 Flowchart

4.3.1 Flowchart (Teacher)

4.3.1.1 Flowchart of Sign Up and Login
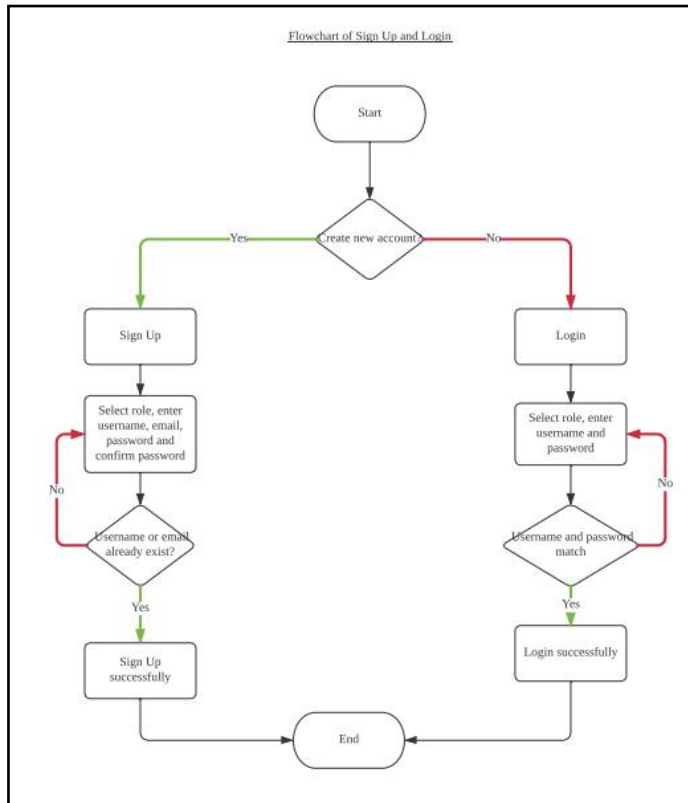
4.3.1.2 Flowchart of Forgot Password
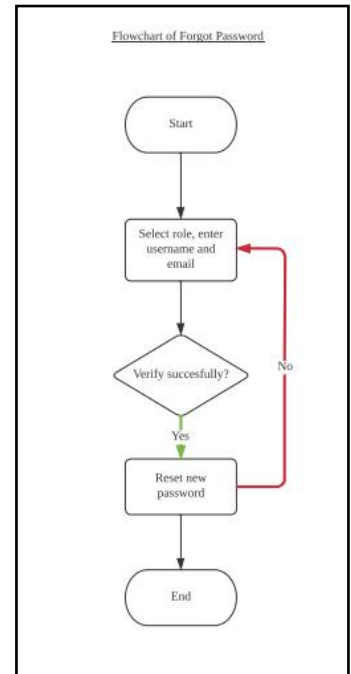
Figure 4.3.1.1 & Figure 4.3.1.2 Flowchart of Sign Up and Login & Forgot Password

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4.3.1.3 Flowchart of Create Exam
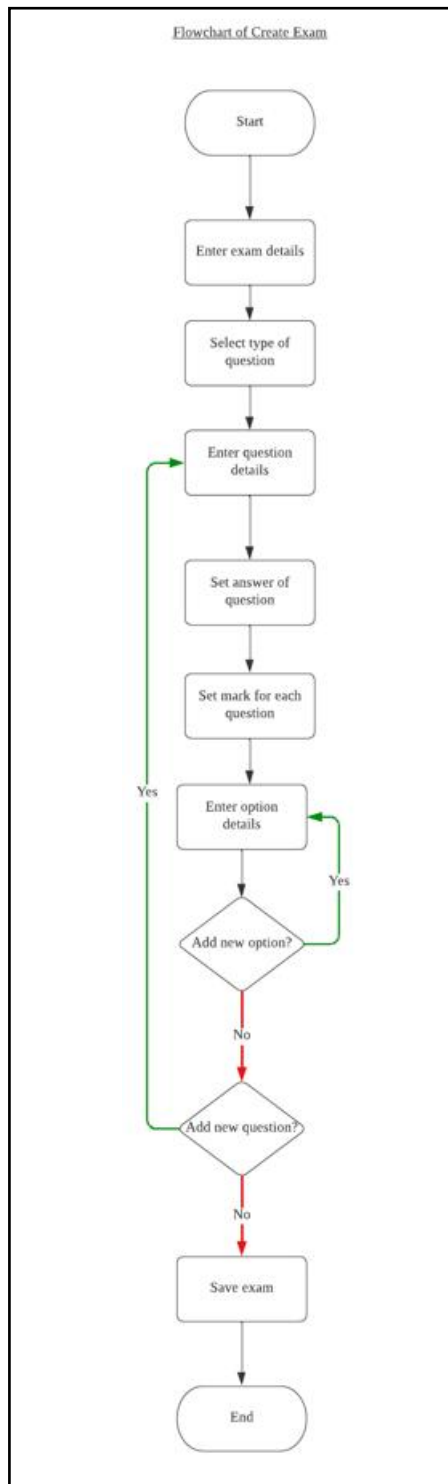
4.3.1.4 Flowchart of Update Exam
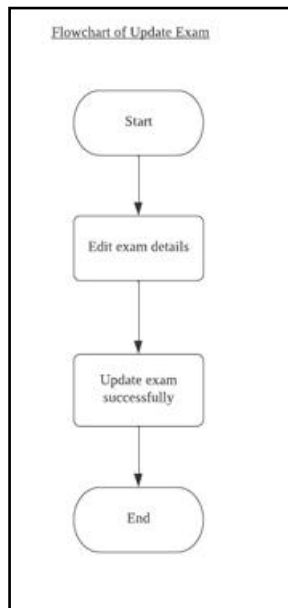
Figure 4.3.1.3 & Figure 4.3.1.4 Flowchart of Create Exam & Update Exam

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4.3.1.5 Flowchart of Delete Exam

4.3.1.6 Flowchart of Share Exam

Flowchart of Delete Exam

Start

Delete exam

Confirm delete?

No

Yes

Delete exam successfully

End

Flowchart of Share Exam

Start

Share exam

Select social media platform

Share exam successfully

End
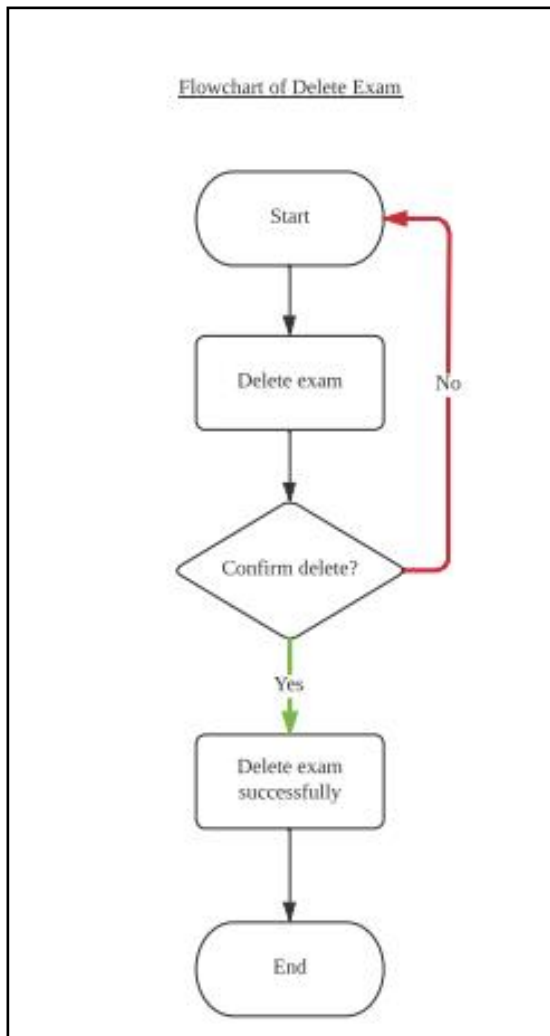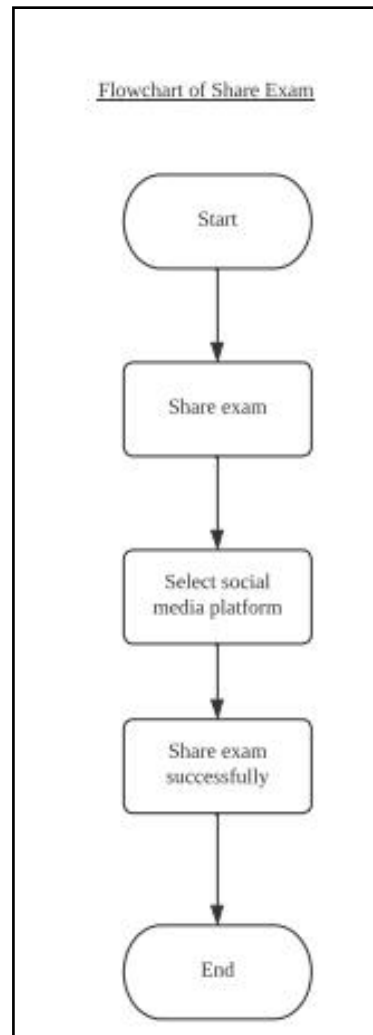
Figure 4.3.1.5 & Figure 4.3.1.6 Flowchart of Delete Exam & Share Exam

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4.3.1.7 Flowchart of View Student Exam Result
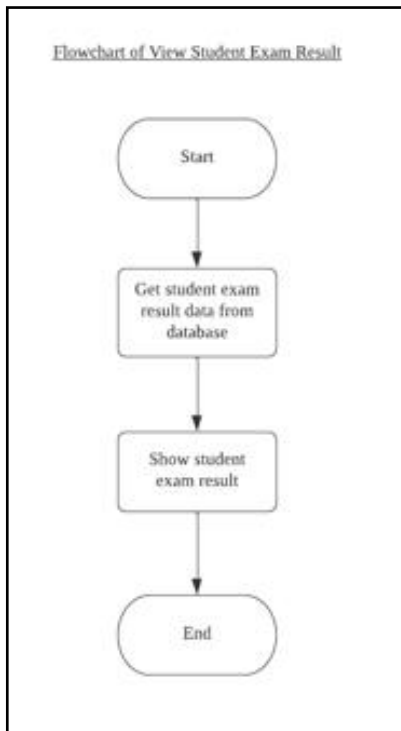
4.3.1.8 Flowchart of View Student Answer
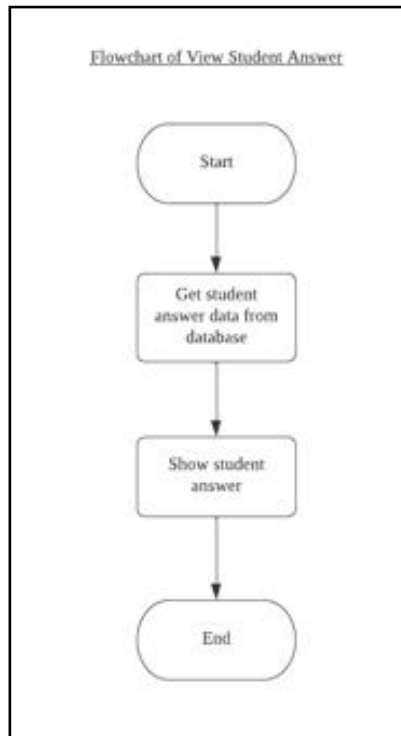
Figure 4.3.1.7 & Figure 4.3.1.8 Flowchart of View student Exam Results & Student Answer

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4.3.2 Flow Chart (Student)

4.3.2.1 Flowchart of Sign Up and Login
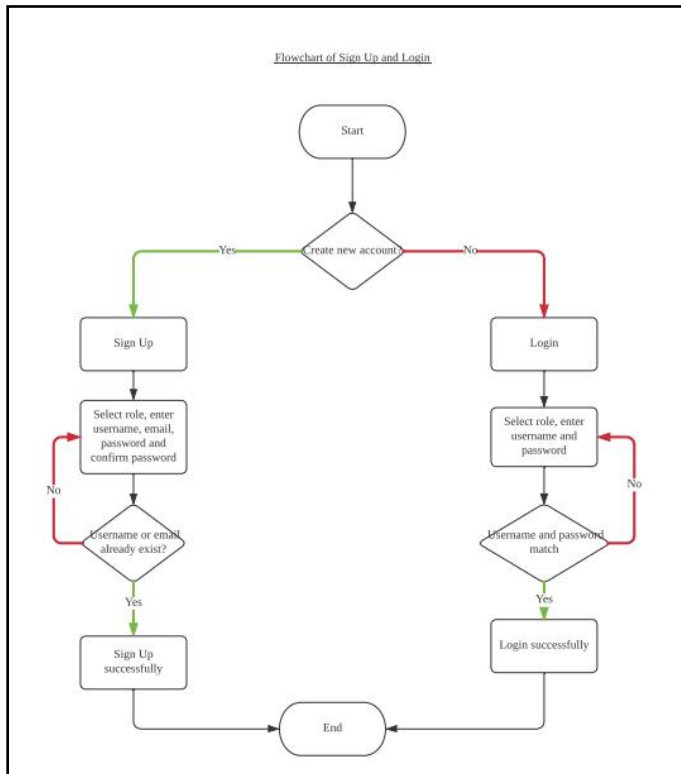
4.3.2.2 Flowchart of Forgot Password
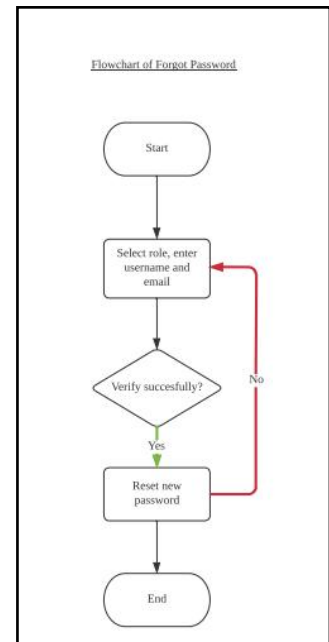
Figure 4.3.2.1 & Figure 4.3.2.2 Flowchart of Sign Up and Login & Forgot Password

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4.3.2.3 Flowchart of Conduct Exam
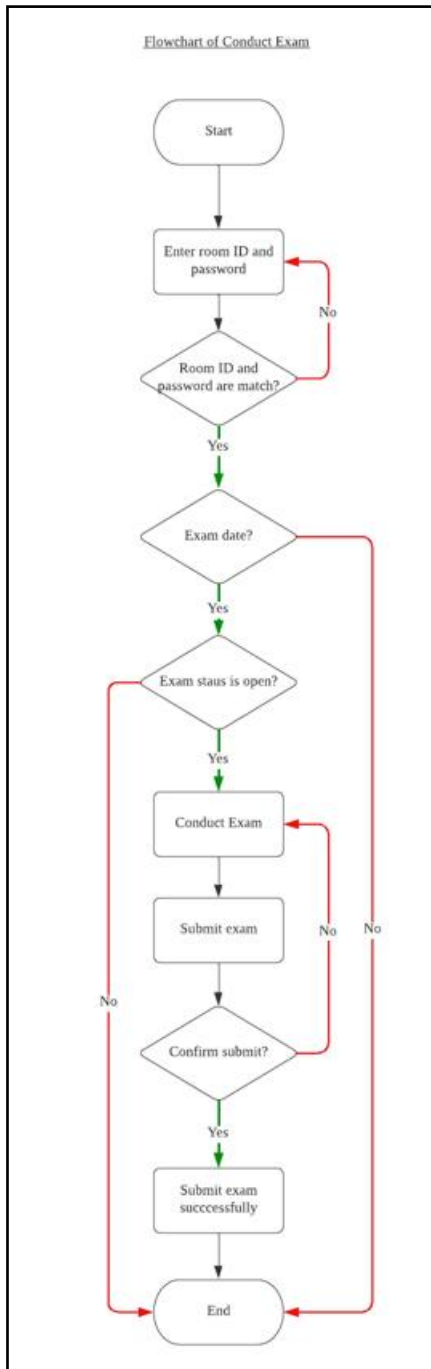
4.3.2.4 Flowchart of View Exam Result
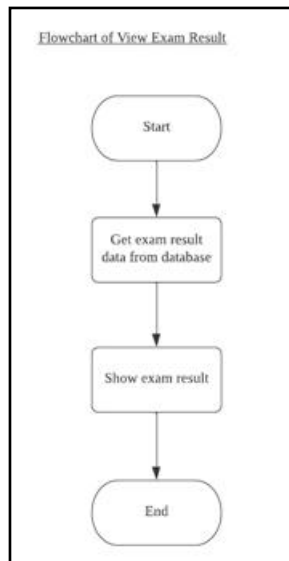
Figure 4.3.2.3 & Figure 4.3.2.4 Flowchart of Conduct Exam & View Exam Result

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CHAPTER 5 System Implementation

5.1 Technologies and Tools Involved

5.1.1 Hardware

In this project, android mobile device and computer are required hardware. A computer is used in the process of coding. An android mobile device is used for testing and deploying this Online Exam Management System application.

Description	Specifications
Model	MSI - GF63 thin
Processor	Intel Core i7-10750H
Operating System	Windows 10
Graphic	NVIDIA GeForce 1650
Memory	8GB RAM
Storage	1TB SATA HDD

Table 5.1.1 Specifications of laptop

5.1.2 Software

Before starting to develop the Online Exam Management System, three software are required to be installed and used on my laptop:

Figure 5.1.2.1 Flutter logo

1. **Flutter**

   Flutter is a free tool that enables developers to create native cross-platform apps using only one codebase and programming language. It was developed by Google and uses Dart programming language. In addition, it offers a comprehensive selection of pre-built widgets and tools, making it simple to produce beautiful UI designs and animations. (Carlos Gonzalez, n.d.)

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In this project, the mobile application will be developed using Flutter to create user interface and do coding.
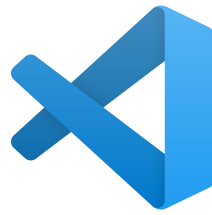
Figure 5.1.2.2 Visual Studio Code logo

2. Visual Studio Code

Visual Studio Code is a portable and cross-platform source code editor created by Microsoft for Linux, Windows, and macOS. Due to its user-friendly design, robust editing features, and numerous customization choices, it has rapidly grown in popularity among developers since its initial release in 2015. It supports numerous programming languages, which also provides capabilities like code completion, syntax highlighting, Git integration, and debugging. As a result, VS Code is a robust and flexible code editor that offers developers with high-quality code and a seamless coding experience. (Kanjilal, 2015)

In this project, the mobile application will be built using Visual Studio Code to create a Flutter project.

Figure 5.1.2.3 Firebase logo

3. Google Firebase

Firebase is a Google product that makes it simple for developers to create, manage, and grow apps. It assists developers to create the apps more quickly and securely. No programming is needed on the side of firebase, so it is easy to use its features efficiently. It offers cloud storage and offers services to IOS, Android, unity, and web. (GeeksforGeeks, 2020)

In this project, all the data of the online exam management system such as information of students will be stored in the Firebase.

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5.2 Software Setup

5.2.1 Visual Studio Code Flutter

1. Install Flutter SDK

- Select one of your operating system (Windows, masOS, Linux or ChromeOS)   to
download
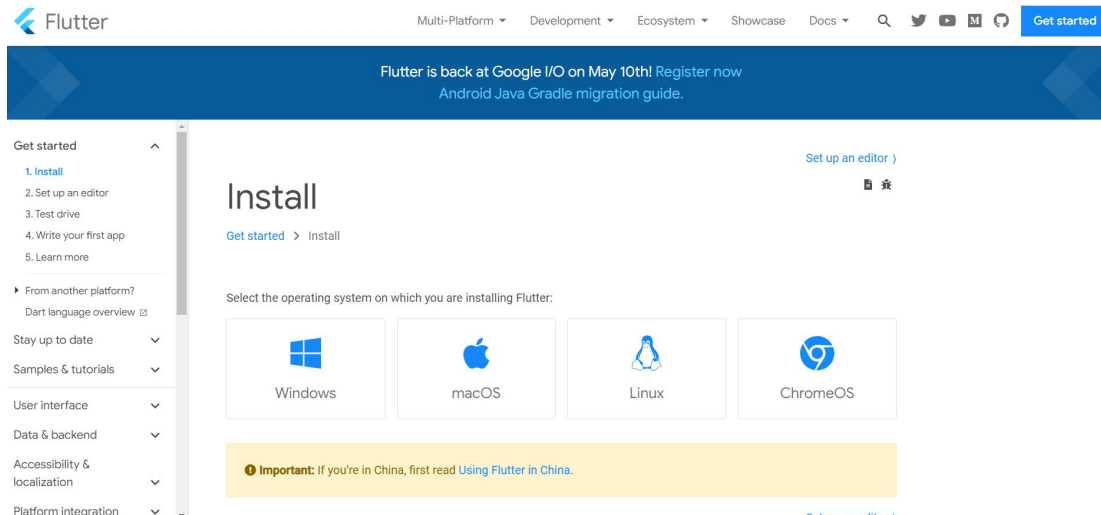
Figure 5.2.1.1 Figure of Install Flutter SDK

2. Install an Integrated Development Environment (IDE)

- Search for "Flutter" and "Dart" and install the extensions
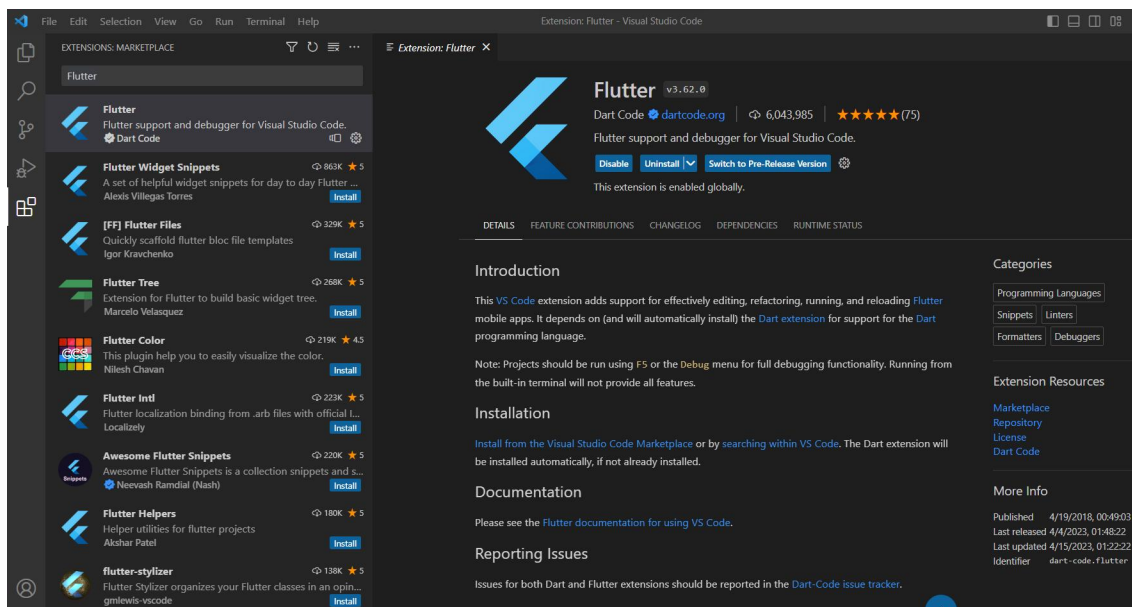
Figure 5.2.1.2 Figure of Install IDE of Flutter

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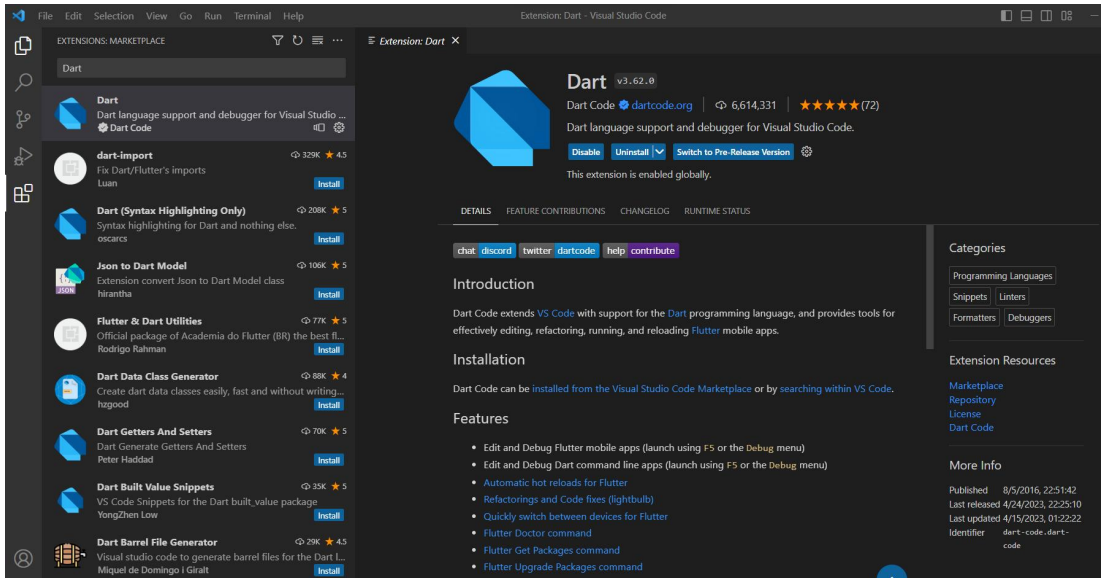
Figure 5.2.1.3 Figure of Install IDE of Dart

3. Create a new Flutter project

   - Press Ctrl+Shift+P to create a new project
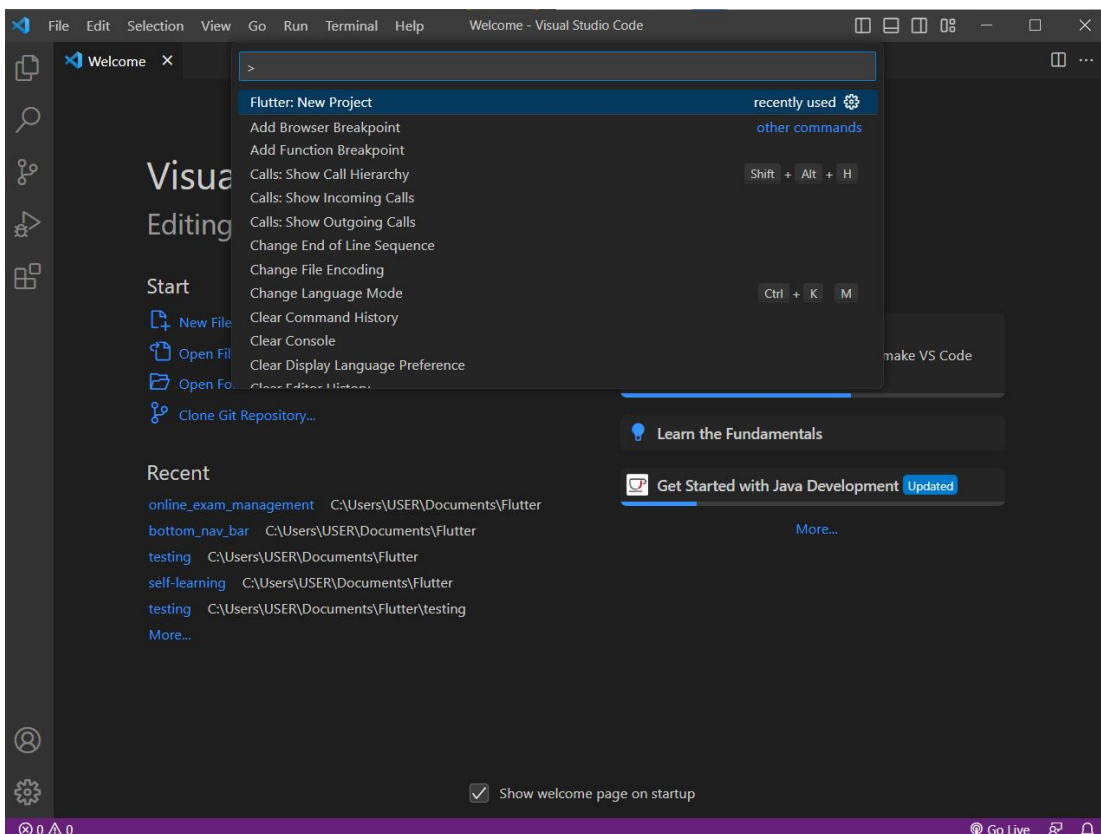
Figure 5.2.1.4 Figure of Create Flutter project

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4. Add dependencies

- All Firebase services need this dependency in the project

Figure 5.2.1.5 Figure of Firebase services dependency

- This dependency is needed to use Firebase Realtime Database in the project

Figure 5.2.1.6 Figure of Firebase Realtime Database dependency

- This dependency is required to use Firebase Cloud Storage in the project

Figure 5.2.1.7 Figure of Firebase Cloud Storage dependency

- This dependency is needed to use Cloud Firestore in the project

Figure 5.2.1.8 Figure of Firebase Storage dependency

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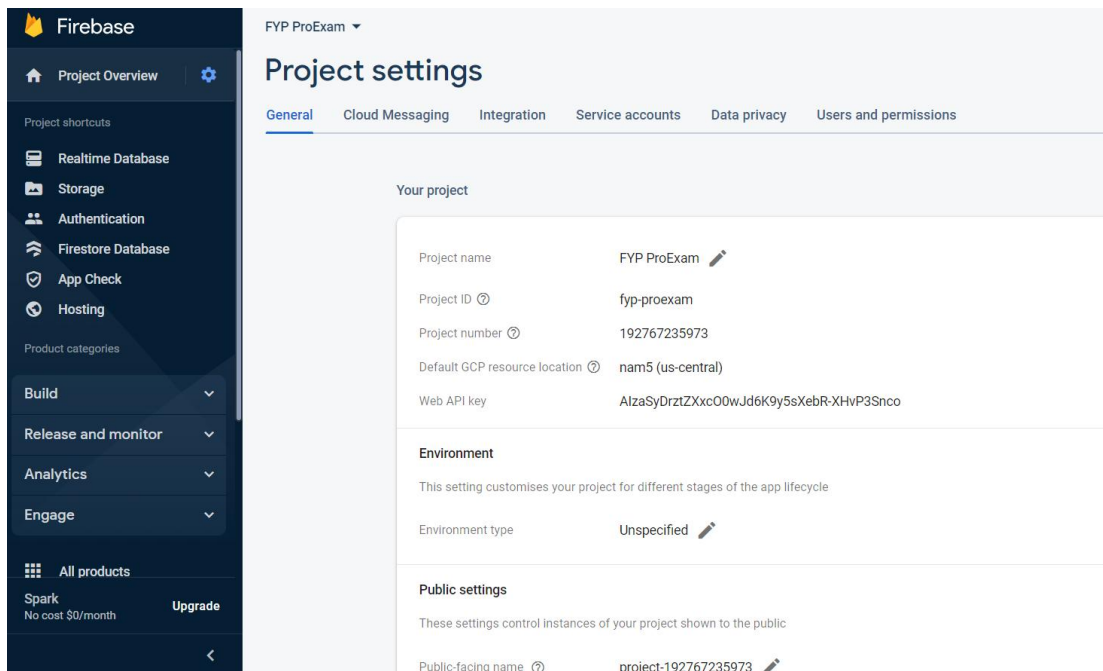
5.2.2 Firebase

Figure 5.2.2.1 Figure of Firebase project setup
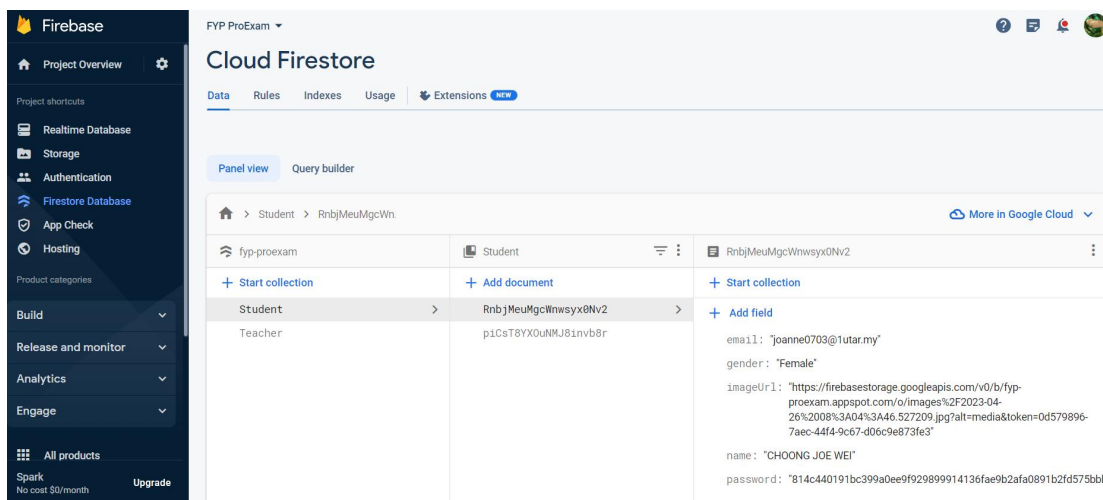
Figure 5.2.2.2 Figure of Cloud Firestore

All user data will be saved in Cloud Firestore, which will be split into two roles, Teacher and Student.

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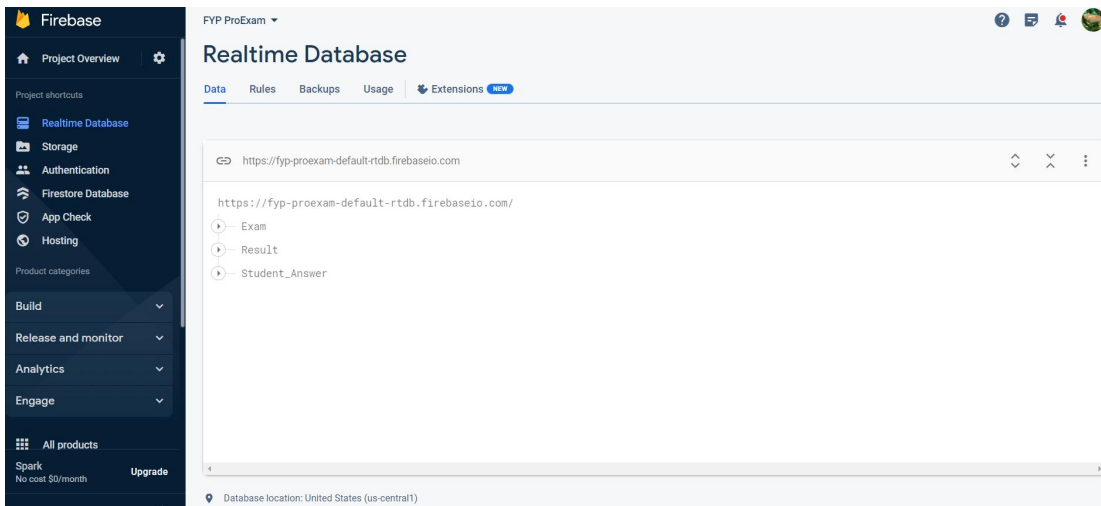
Figure 5.2.2.3 Figure of Realtime Database

All exam data will be saved in Realtime Database with three tables which are Exam, Result, and Student_Answer.
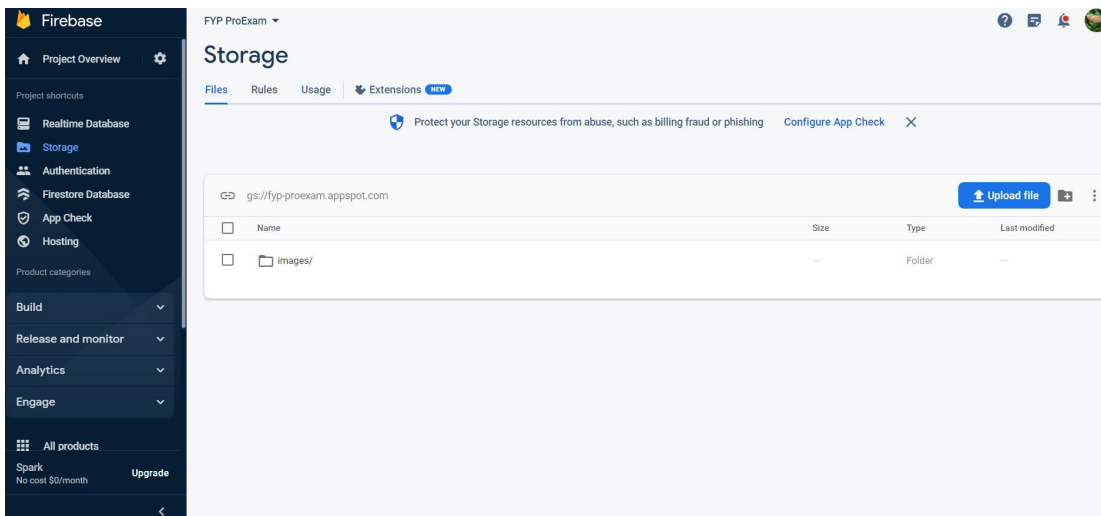
Figure 5.2.2.4 Figure of Firebase Cloud Storage

User profile image will be stored in the Firebase Cloud Storage under a file named images.

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5.3 System Operation

5.3.1 App Icon
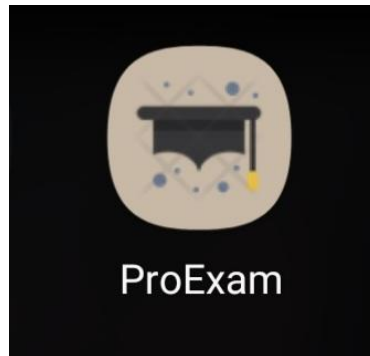
Figure 5.3.1 App Icon

This ProExam app icon is a graduation cap for users to distinguish my app.

5.3.2 Login Page

Figure 5.3.2 Login Page

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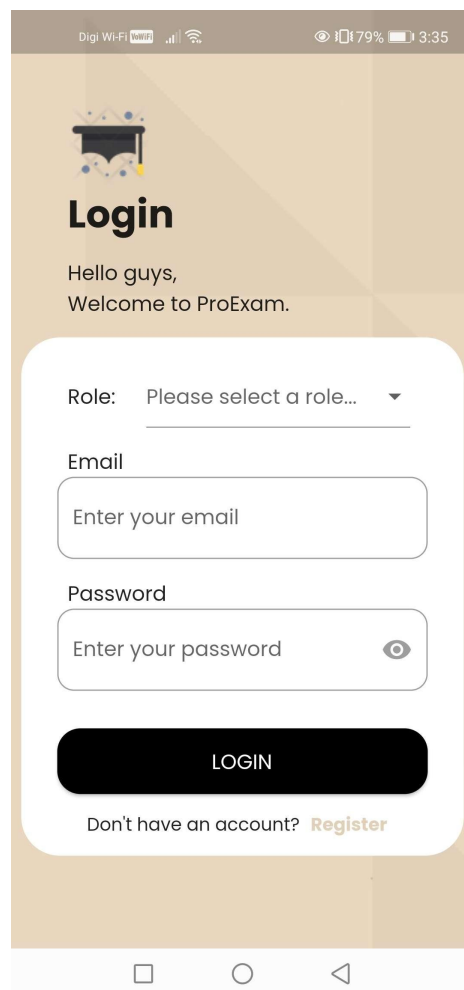
This is the Login page which is the main page will appear for the users. Users need to select their role which is teacher or student and fill up the correct details which is email and password before entering the app. If the users do not have an account, users can click on the "Register" to register a new account.

5.3.3 Register Page
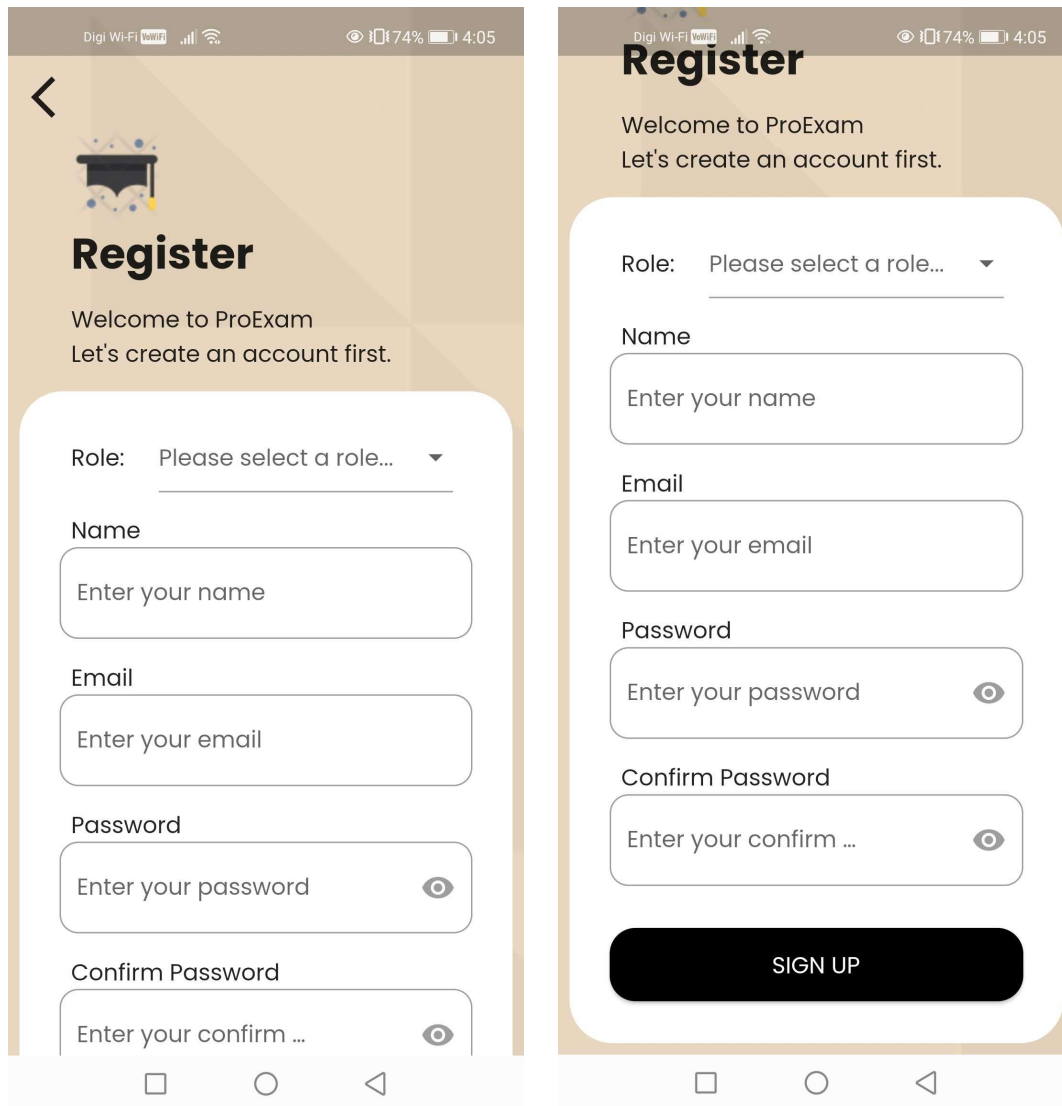
Figure 5.3.3 Register Page

This is the Register page for users after users clicking on the "Register" in the Login page (*Figure 5.3.2 Login Page)*. Users are required to select the role and fill in the following account details such as name, email, password and confirm password. They can either choose

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teacher or student as a role when registering the account. Users cannot register with the same email as another pre-registered user.

5.3.4 Teacher Home Page

Figure 5.3.4 Teacher Home Page

This is the Home page for teacher after users login successfully as a teacher role. The main feature for the teachers is to create exam, they can start to create an exam by clicking on the "Create exam" dashboard.

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5.3.5 Create Exam Page

Figure 5.3.5 Create Exam Page

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This is the Create Exam page after users click on the Create exam dashboard in Teacher Home page (*Figure 5.3.4 Teacher Home Page*). There are three parts needed to complete for creating an exam which are exam room details, exam paper details and create question.
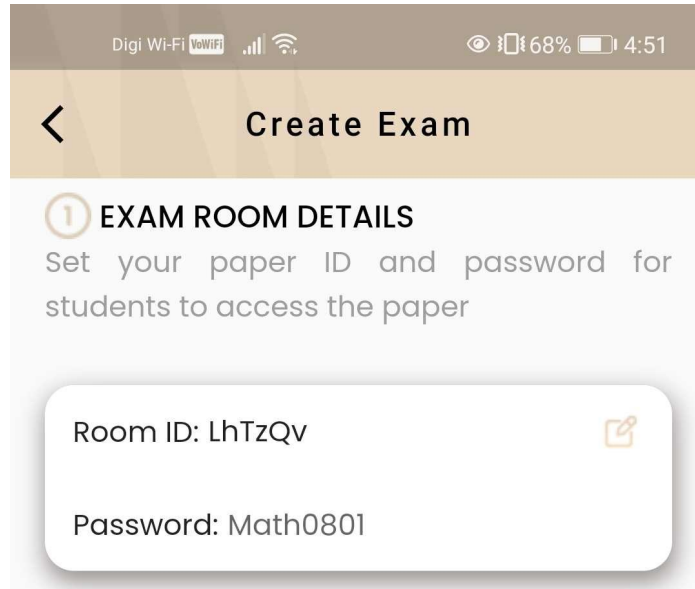
Figure 5.3.6 First part for Create Exam Page

First and foremost, teachers need to set the room ID and password for students to access the exam. There is an auto-generated icon located on the right side of the room ID, the system will auto generate six random digits number after clicking on the icon. Teachers also can key in the room ID by themself, the room ID cannot be repeated with other people. Furthermore, the password must be 8 digits for security.

Figure 5.3.7 Second part for Create Exam Page

In addition, teachers are required to set the title, date and duration for an exam. Date dialog will be displayed for the teachers after click on the Date field. The date dialog will only show today and future dates, no previous days will be selected for the exam. In addition, the duration must be in the types of number.

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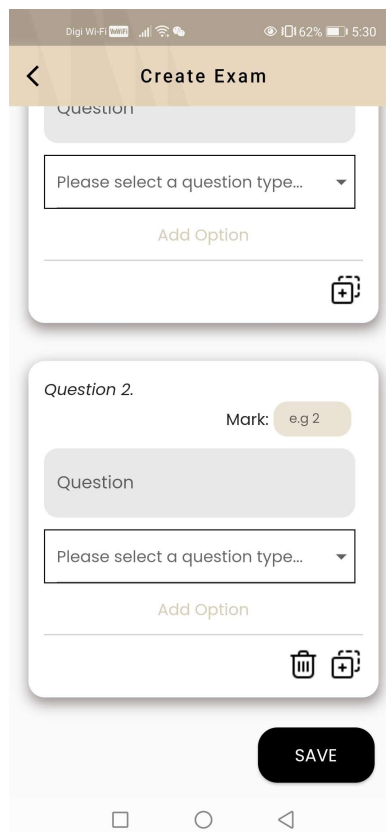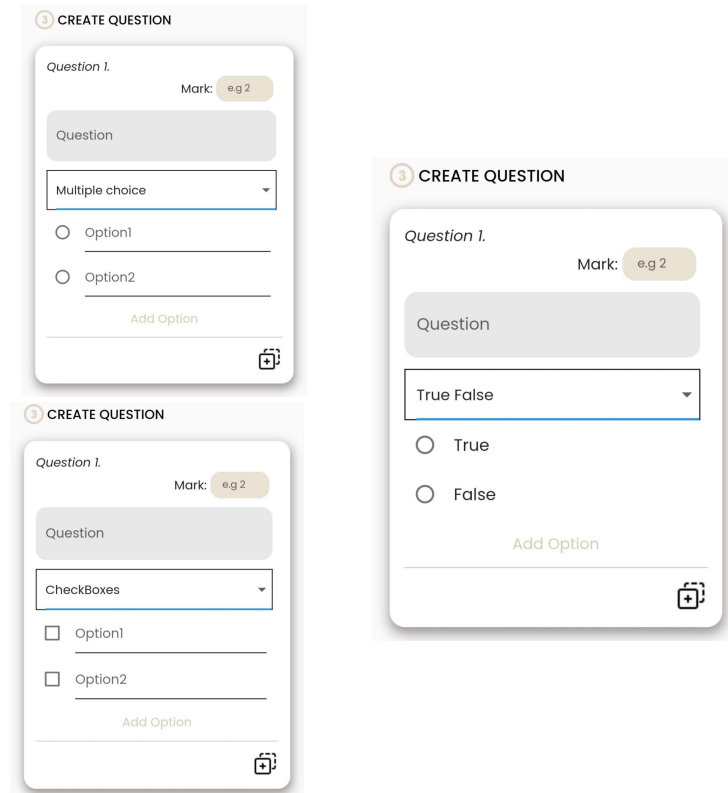
Figure 5.3.8 Third part for Create Exam Page

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After teachers fill in everything of the first two parts, they can start to create the question for an exam. Firstly, they can set a mark for each question. Teachers can choose the type of question they want such as Multiple choice, Checkboxes and True False. If necessary, teachers can click on the "Add Option" at the bottom of the option field for adding more options.

When the selection is Multiple choice, a radio button will be showed in the question and teachers can only select one correct answer for the question.
When the selection is Checkboxes, a checkbox will be showed in the question and teachers can select multiple correct answer for the question.
When the selection is True False, True and False with radio button will be showed in the question and teachers can only select True or False for the question.

After teachers complete question 1, they can add a new exam question by clicking on the duplicate icon that located in the bottom right corner of the question. After adding a new exam question, teachers can delete a question by clicking on the rubbish icon that is located in the bottom right corner of the question.
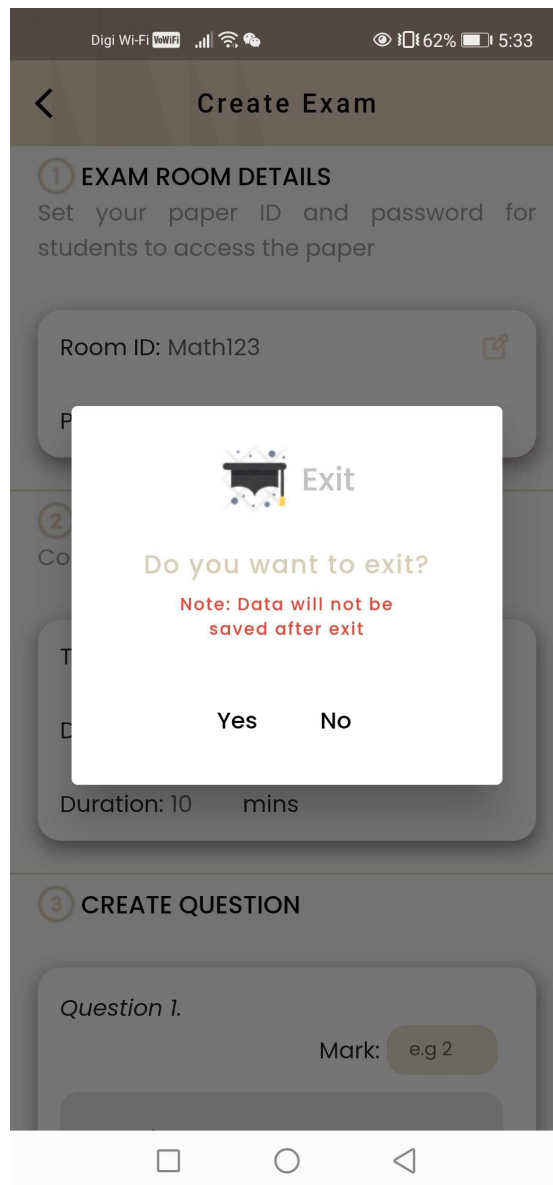
Figure 5.3.9 Exit Custom Dialog for Create Exam Page

When teachers creating an exam and press on the back button of the phone unintentionally, an exit custom dialog will be showed out for users. Users will exit the ProExam app and all exam data will not be saved after clicking on the Yes.

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5.3.6 Teacher Home Page after created exam
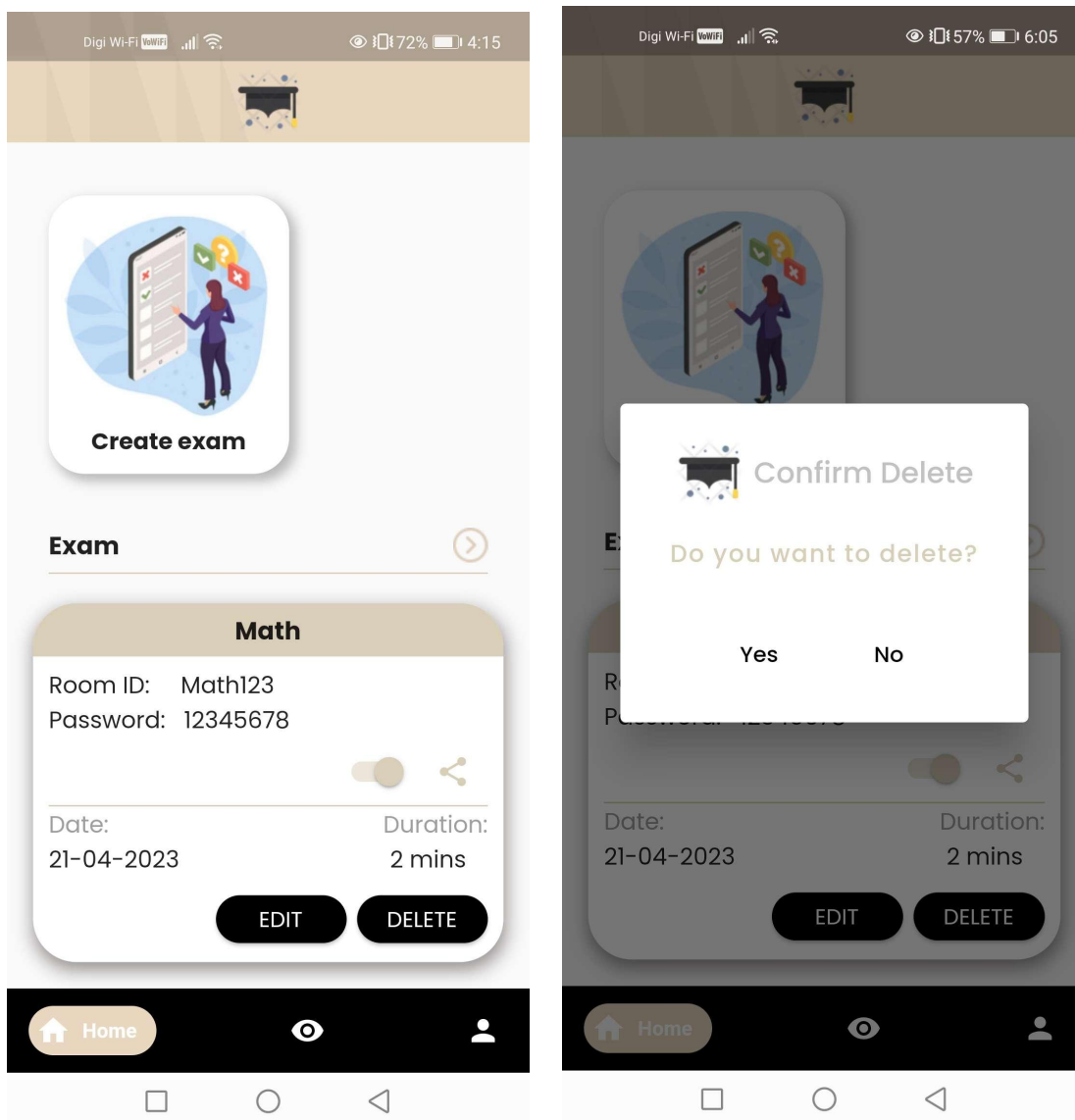
Figure 5.3.10 Teacher Home Page after created exam

Once all details are completed and click the 'SAVE' button in the Create Exam page (*Figure 5.3.5 Create Exam Page),* the system will immediately turn back to the Teacher Home page and exam data will be added to this page. They are able to edit and delete an exam. Furthermore, they can control the exams by flipping the Switch icon to the "on" or "off" position.

Confirm delete custom dialog will be showed out for users after teachers clicking on the 'DELETE' button. The selected created exam will be deleted successfully after clicking on the Yes.

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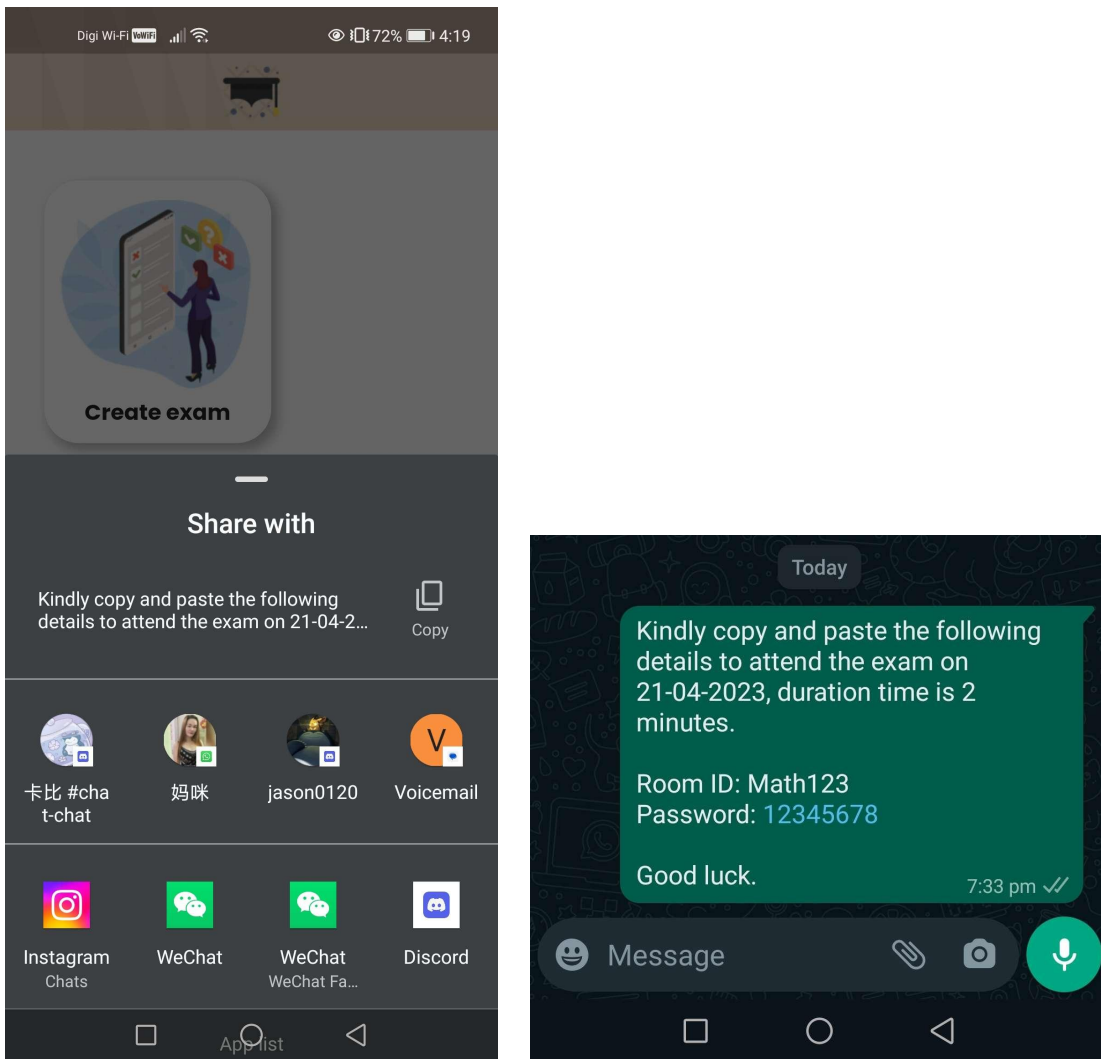
Figure 5.3.11 Share Exam

Teachers can share the exam details through social media such as WhatsApp, Email, and so on for their students to attend an exam by clicking on the share icon. In addition, they can also copy the exam details by clicking on the Copy icon.

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5.3.7 Edit Created Exam Page
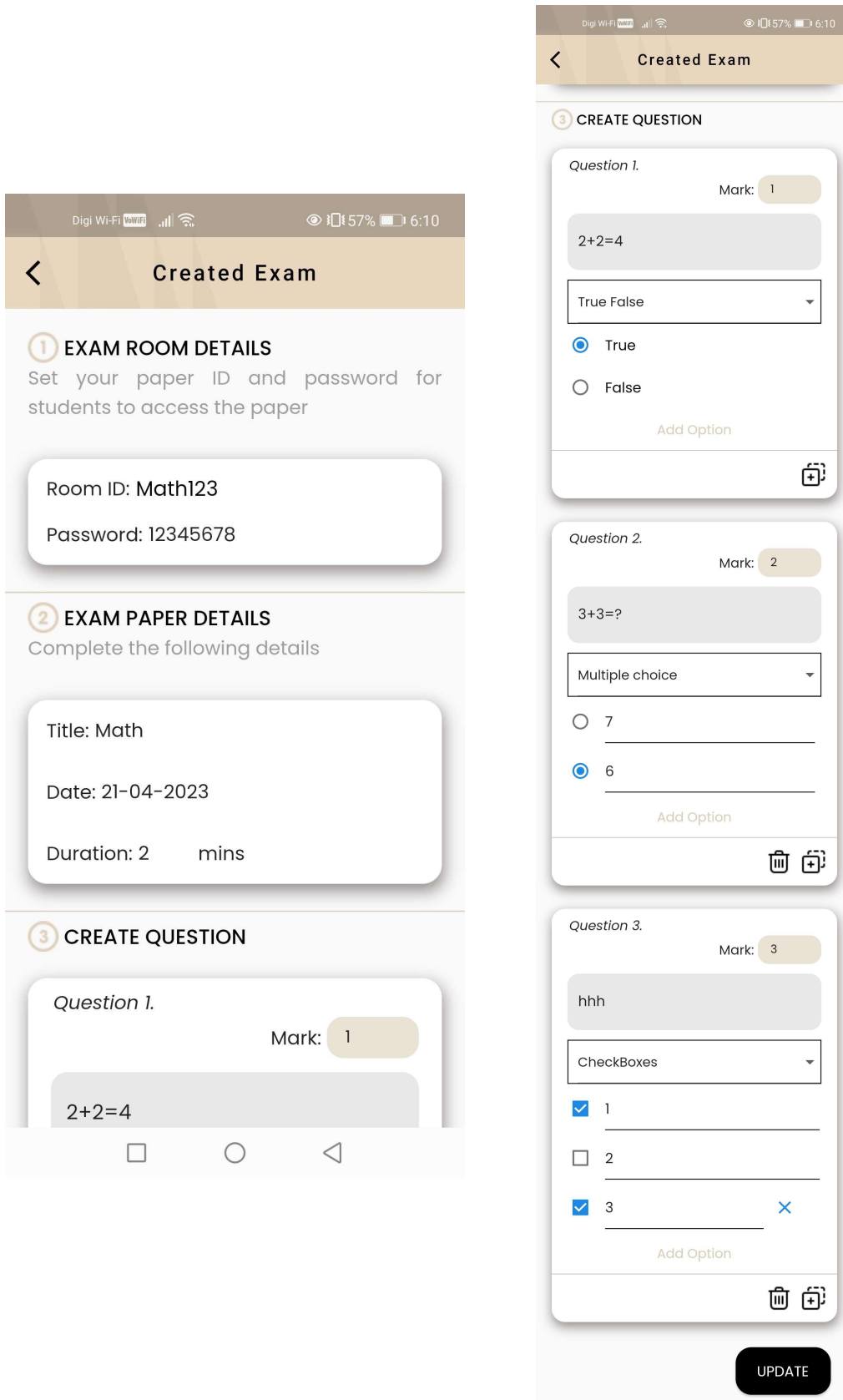
Figure 5.3.12 Edit Created Exam Page

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Created Exam page is for teachers to edit the created exam after clicking on the 'EDIT' button in Teacher Home page (Figure *5.3.10 Teacher Home Page after created exam).* All exam details created by the teacher will be displayed and they can update them except the room ID by clicking on the 'UPDATE' button.

5.3.8 Teacher View Page
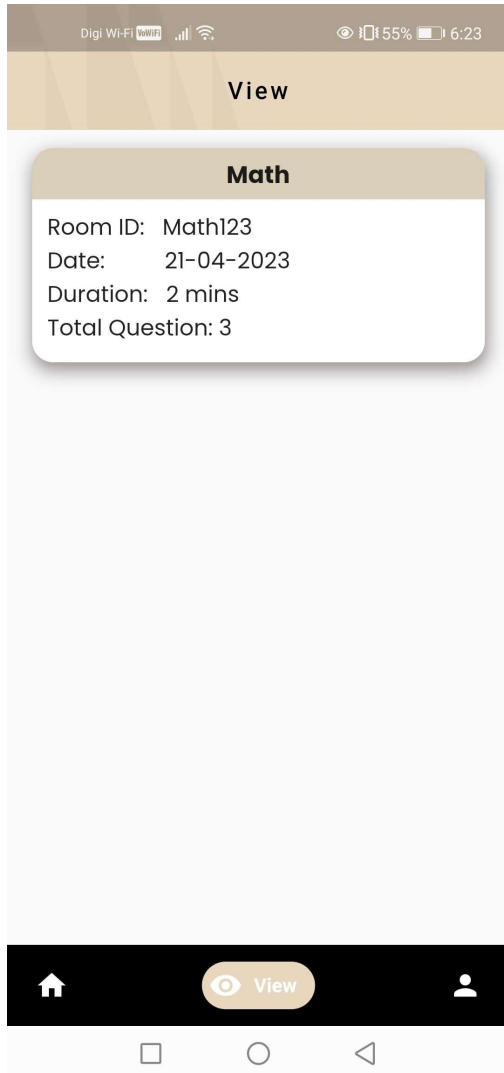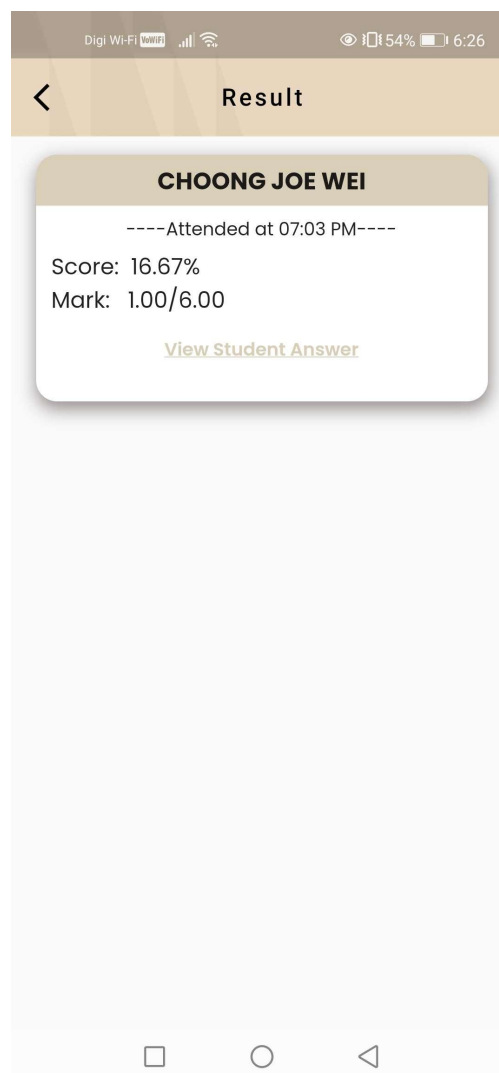
Figure 5.3.13 Teacher View Page   *Figure 5.3.14 Student Result Page*

This is the Teacher View page where all created exams will be displayed along with their exam title, room ID, date, duration, and total question in this page.

After clicking on the Exam dashboard in Teacher View Page *(Figure 5.3.13 Teacher View Page)*, it will navigate to the Student Result page. All student results will be displayed on this

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page so that teachers are able to view their students' exam details such as name, attendance exam time, score, and mark. In addition, teacher can view their students' answer by clicking on the "View Student Answer".

5.3.9 Student Answer Page
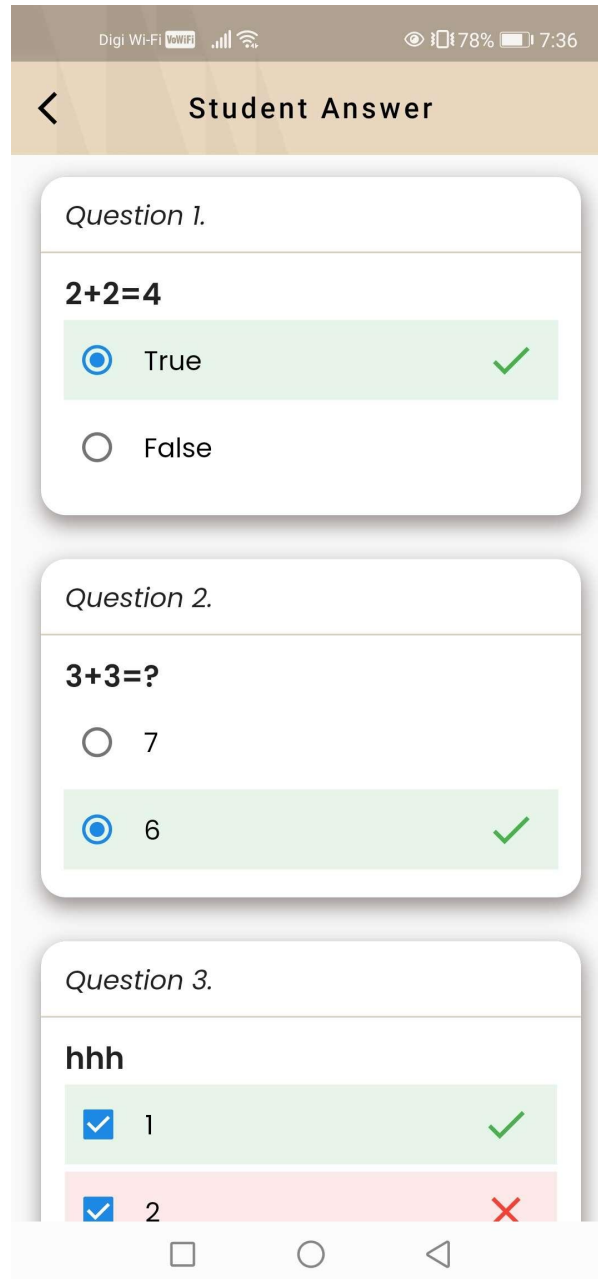
Figure 5.3.15 Student Answer Page

After clicking on the "View Student Answer" in Student Result Page *(Figure 5.3.14 Student Result Page)*, the students' answers will be displayed for the teachers to review.

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5.3.10 Student Home Page

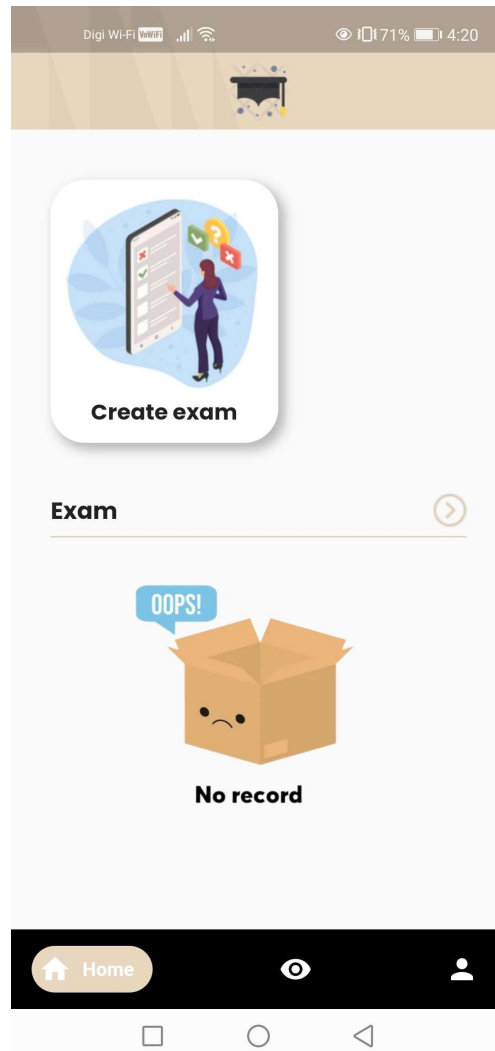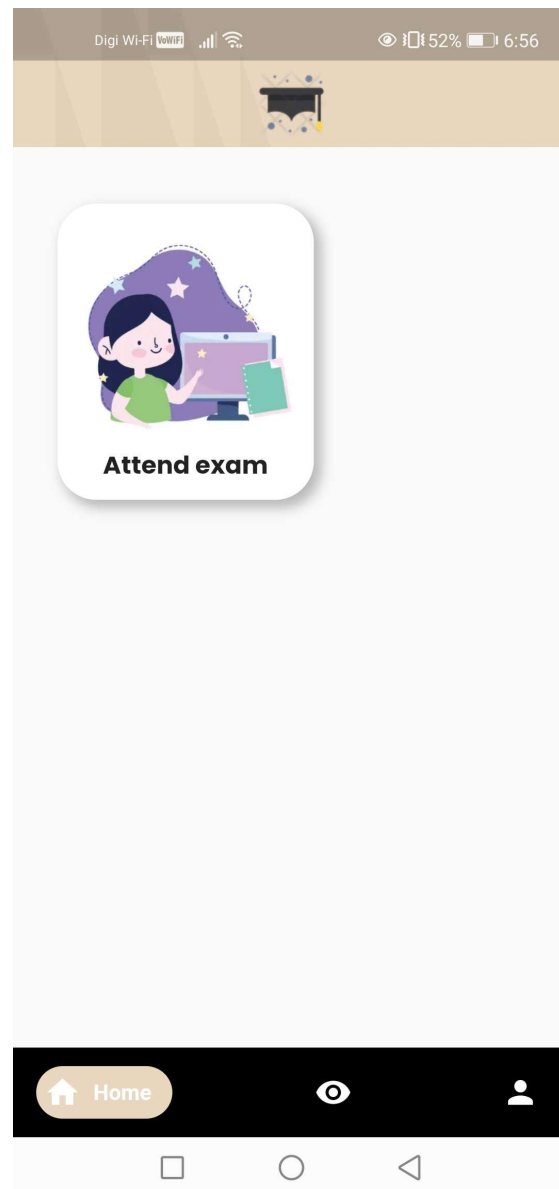*Figure 5.3.16 Student Home Page*

This is the Home page for students after users login successfully as a student role. The main feature for the students is to attend exam, they can start to create an exam by clicking on the "Attend exam" dashboard.

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5.3.11 Attend Exam Page
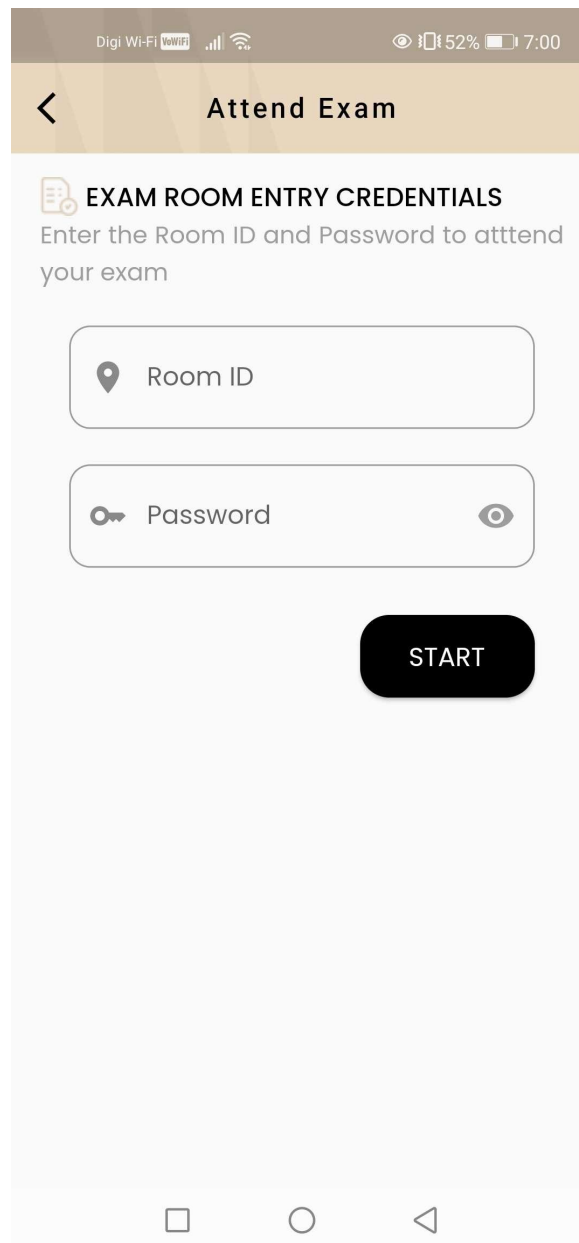
Figure 5.3.17 Attend Exam Page

This is the Attend Exam page after users click on the Attend exam dashboard in Student Home page (*Figure 5.3.16 Student Home Page*). Students are required to fill in correctly the room ID and password that have been set by their teacher for the exam. Furthermore, students need to attend the exam on the date arranged by the teacher, and they are not allowed to take the exam on other dates. Additionally, students are not allowed to take the exam while the exam status is closed.

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5.3.12 Exam Page
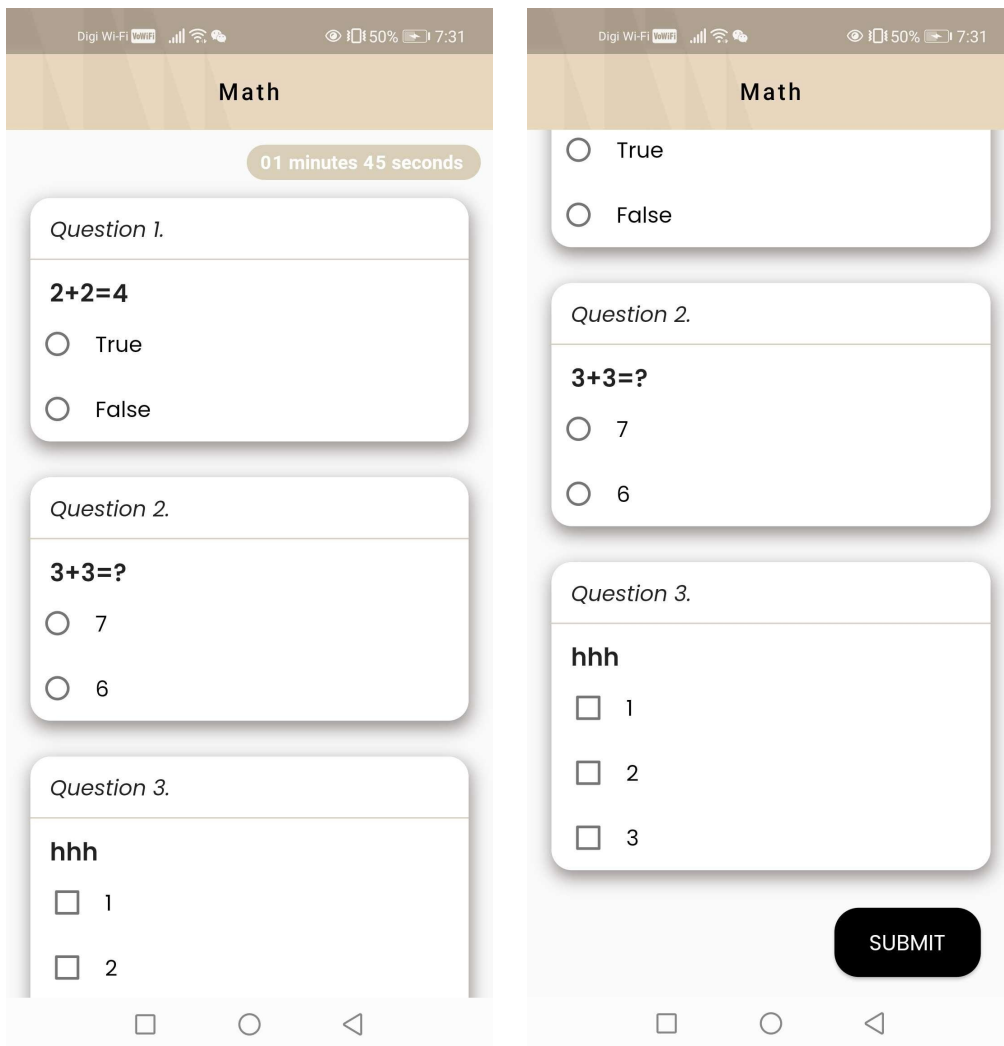
Figure 5.3.18 Exam Page

After students input the room ID and password correctly, the system will navigate the students to the Exam page to conduct the exam. The app bar displays the exam title and an exam timer is displayed in the upper right corner of the question for students to review. If the students do not complete the questions within the duration, the system will automatically submit their answer.

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5.3.13 Student View Page
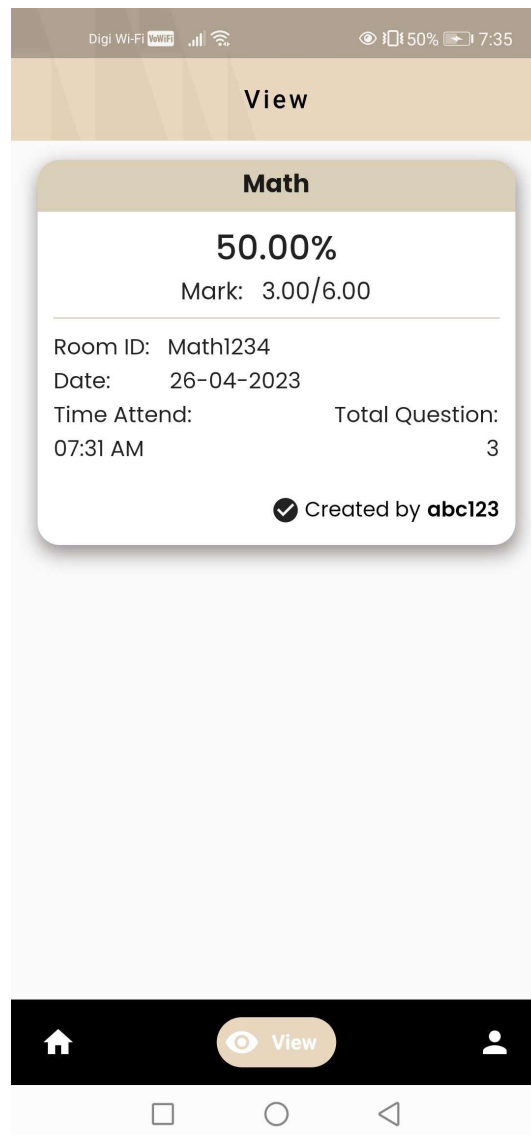
Figure 5.3.19 Student View Page

This is the Student View page where all past exams details and results of the students will be displayed along with their score, mark, exam title, room ID, date, attendance exam time, total question, and teacher name in this page. Hence, students are able to review their exam details.

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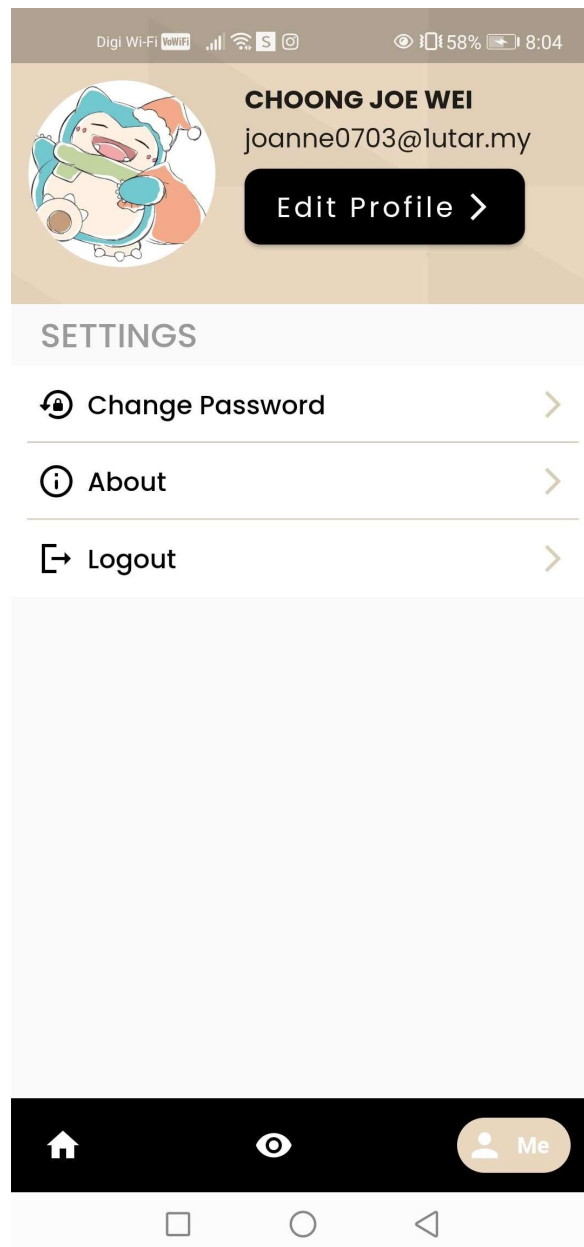
5.3.14 Settings Page

Figure 5.3.20 Settings Page

The Settings page design for two roles which are teachers and students are the same. The profile image, name and email of users will be shown on the header part. Users are able to edit their profile, change password, view about page, and logout the app.

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5.3.15 Edit Profile Page
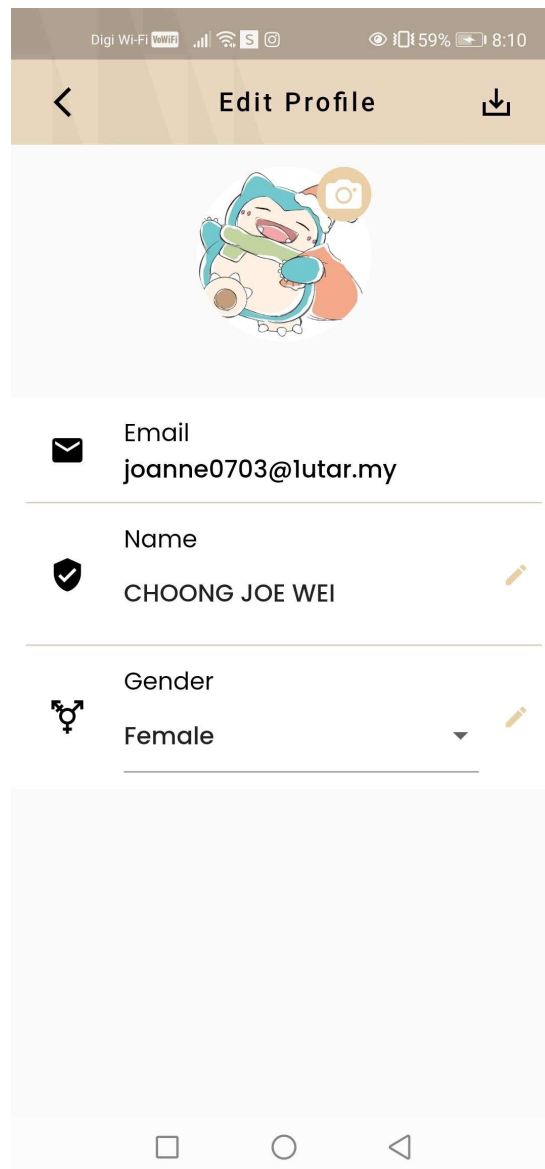
Figure 5.3.21 Edit Profile Page

Edit Profile page allows users to edit their profile after clicking on the 'Edit Profile' button in User page (Figure *5.3.20 Settings Page)*. Users can pick an image from their device and upload the profile image by clicking on the camera icon. In addition, they can change their name and gender except the email.

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5.3.16 Change Password Page
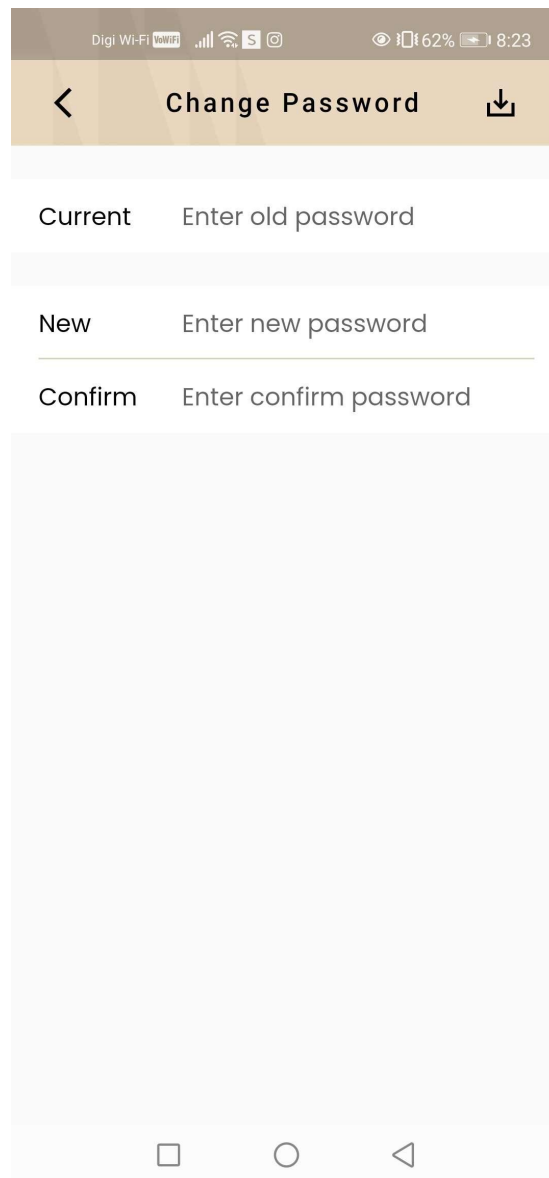
Figure 5.3.22 Change Password Page

After users clicking on "Change Password" in User page (*Figure 5.3.20 User Page)*, Change Password page will be appeared for users. Users are required to enter the current password, new password and confirm new password. When all information entered by the users are correct, the password will be changed successfully for the users.

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5.3.17 About Page

Figure 5.3.23 About Page

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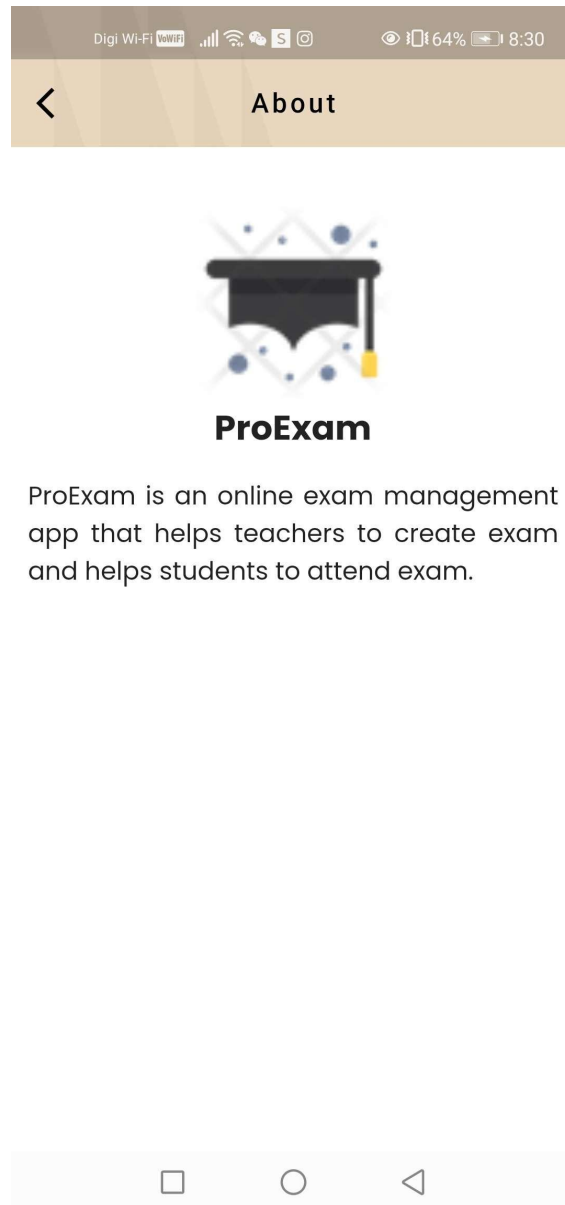
5.3.18 Logout and Exit Custom Dialog
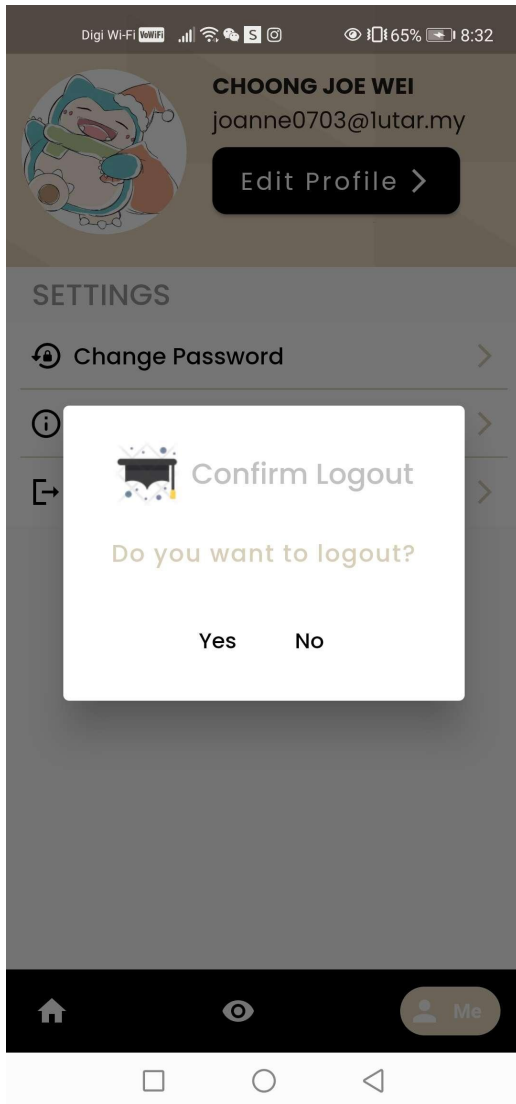
Figure 5.3.24 Logout Custom Dialog   *Figure 5.3.25 Exit Custom Dialog*
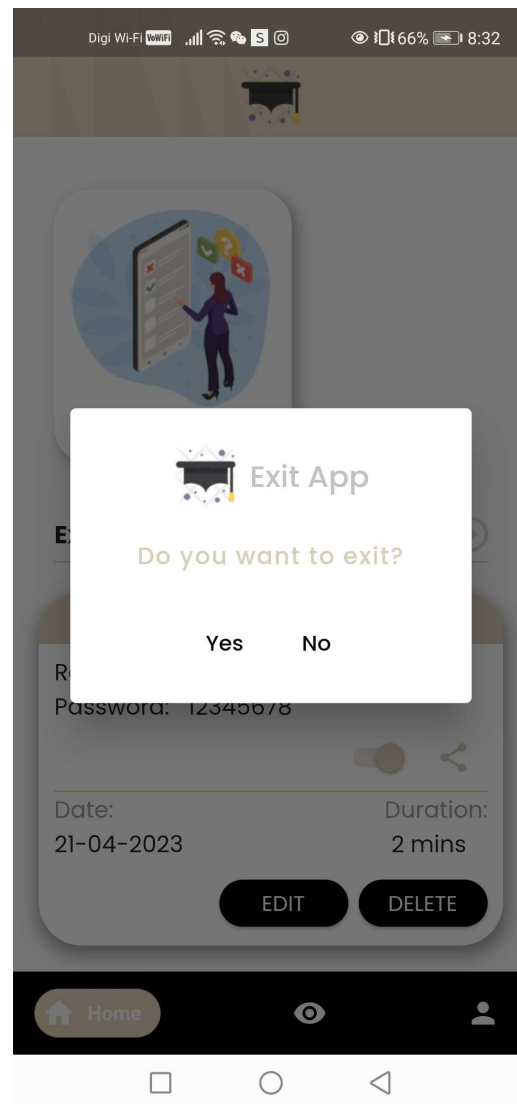
When users clicking on the Logout in User page (*Figure 5.3.20 User Page)*, a confirm logout custom dialog will be showed out for the users. Users will go back to the Login page (*Figure 5.3.2 Login Page)* after clicking on the Yes.

When users press on back button of the phone in the Home page, an exit custom dialog will be showed out for the users. Users will exit the ProExam app after clicking on the Yes.

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CHAPTER 6 System Evaluation and Discussion

6.1 System Testing and Result

6.1.1 Register Page

Test Case	Expected Result	Actual Result	Status
Without select a role	Show error message	Show error message	Pass
Leave name field empty	Show error message	Show error message	Pass
Leave email field empty	Show error message	Show error message	Pass
Leave password filed empty	Show error message	Show error message	Pass
Leave confirm password filed empty	Show error message	Show error message	Pass
Press "show eye" icon	Show password	Show password	Pass
Press "hide eye" icon	Hide password	Hide password	Pass
Press "back" button	Direct back to Login page	Direct back to Login page	Pass
Insert invalid email format	Show "Invalid email format"	Show "Invalid email format"	Pass
Insert email that already exist	Show "Email exist"	Show "Email exist"	Pass
Password not same with confirm password	Show error message	Show error message	Pass
Insert password length less than 5	Show error message	Show error message	Pass
Select role, insert name, email, password and confirm password in correct format	1. User data is stored in the database 2. Show "Sign up successfully"	1. User data is stored in the database 2. Show "Sign up successfully"	Pass

Table 6.1.1 System testing for Register page

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6.1.2 Login Page

Test Case	Expected Result	Actual Result	Status
Without select a role	Show error message	Show error message	Pass
Leave email field empty	Show error message	Show error message	Pass
Leave password field empty	Show error message	Show error message	Pass
Press "show eye" icon	Show password	Show password	Pass
Press "hide eye" icon	Hide password	Hide password	Pass
Insert invalid email format	Show "Invalid email format"	Show "Invalid email format"	Pass
Login with account does not exist	Show "Invalid email or password"	Show error message	Pass
Press "Register"	Navigate to Register page	Navigate to Register page	Pass
Select role as a Teacher, insert correct email and password and press "Login" button	Navigate to Teacher Home page	Navigate to Teacher Home page	Pass
Select role as a Student, insert correct email and password and press "Login" button	Navigate to Student Home page	Navigate to Student Home page	Pass

Table 6.1.2 System testing for Login page

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6.1.3 Teacher Home Page

Test Case	Expected Result	Actual Result	Status
Press "Create exam" dashboard	Navigate to Create Exam page	Navigate to Create Exam page	Pass
Press "Edit" button of created exam	Navigate to Edit Created Exam page	Navigate to Edit Created Exam page	Pass
Press "Delete" button of created exam	Show confirm delete custom dialog	Show confirm delete custom dialog	Pass
Press "Yes" of confirm delete custom dialog	Show "Delete exam successfully"	Show "Delete exam successfully"	Pass
Press "No" of confirm delete custom dialog	Exit confirm delete custom dialog	Exit confirm delete custom dialog	Pass
Press "Switch" icon when on	Change "Switch" icon to off	Change "Switch" icon to off	Pass
Press "Switch" icon when off	Change "Switch" icon to on	Change "Switch" icon to on	Pass
Press "Share" icon	Show social media dialog	Show social media dialog	Pass
Select one social media of social media dialog	Direct to selected social media	Direct to selected social media	Pass
Press "View" button of bottom navigation bar	Navigate to Teacher View page	Navigate to Teacher View page	Pass
Press "Settings" button of bottom navigation bar	Navigate to Settings page	Navigate to Settings page	Pass

Table 6.1.3 System testing for Teacher Home page

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6.1.4 Create Exam Page

Test Case	Expected Result	Actual Result	Status
Leave room ID field empty	Show error message	Show error message	Pass
Leave password field empty	Show error message	Show error message	Pass
Leave title field empty	Show error message	Show error message	Pass
Does not select date	Show error message	Show error message	Pass
Leave duration field empty	Show error message	Show error message	Pass
Password length not in 8	Show "Password length must in 8"	Show "Password length must in 8"	Pass
Insert room ID that already exist	Show "Room ID exist"	Show "Room ID exist"	Pass
Press "Auto generated" icon	Show generated 6-digits room ID	Show generated 6-digits room ID	Pass
Leave mark field empty	Show error message	Show error message	Pass
Leave question field empty	Show error message	Show error message	Pass
Does not select question type	Show error message	Show error message	Pass
Leave option field empty	Show error message	Show error message	Pass
Does not select the "Radio button" icon or "Checkboxes" icon for a question	Show "Please select a answer for question X"	Show "Please select a answer for question X"	Pass
Select "Radio button" icon	Selected "Radio button" icon is checked	Selected "Radio button" icon is checked	Pass
Select "Check boxes" icon	Selected "Check boxes" icon is checked	Selected "Check boxes" icon is checked	Pass

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Deselect "Radio button" icon	Selected "Radio button" icon is unchecked	Selected "Radio button" icon is unchecked	Pass
Deselect "Check boxes" icon	Selected "Check boxes" icon is unchecked	Selected "Check boxes" icon is unchecked	Pass
Press "Add Option"	Show one more option	Show one more option	Pass
Press "Delete" icon of option	Selected option is deleted	Selected option is deleted	Pass
Press "Duplicate" icon of question	Show one more question	Show one more question	Pass
Press "Rubbish" icon of question	Delete selected question	Delete selected question	Pass
Press "back" button	Show confirm exit custom dialog	Show confirm exit custom dialog	Pass
Press "Yes" of confirm exit custom dialog	Direct back to Teacher Home page	Direct back to Teacher Home page	Pass
Press "No" of confirm exit custom dialog	Exit confirm exit custom dialog	Exit confirm exit custom dialog	Pass
Press "Submit" button once all details in correct format	1. Exam data is stored in the database 2. Show "Exam created successfully" 3. Direct back to Teacher Home Page	1. Exam data is stored in the database 2. Show "Exam created successfully" 3. Direct back to Teacher Home Page	Pass

Table 6.1.4 System testing for Create Exam page

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6.1.5 Edit Created Exam Page

Test Case	Expected Result	Actual Result	Status
Leave password field empty	Show error message	Show error message	Pass
Leave title field empty	Show error message	Show error message	Pass
Leave duration field empty	Show error message	Show error message	Pass
Password length not in 8	Show "Password length must in 8"	Show "Password length must in 8"	Pass
Leave mark field empty	Show error message	Show error message	Pass
Leave question field empty	Show error message	Show error message	Pass
Does not select question type	Show error message	Show error message	Pass
Leave option field empty	Show error message	Show error message	Pass
Does not select the "Radio button" icon or "Checkboxes" icon for a question	Show "Please select a answer for question X"	Show "Please select a answer for question X"	Pass
Select "Radio button" icon	Selected "Radio button" icon is checked	Selected "Radio button" icon is checked	Pass
Select "Check boxes" icon	Selected "Check boxes" icon is checked	Selected "Check boxes" icon is checked	Pass
Deselect "Radio button" icon	Selected "Radio button" icon is unchecked	Selected "Radio button" icon is unchecked	Pass
Deselect "Check boxes" icon	Selected "Check boxes" icon is unchecked	Selected "Check boxes" icon is unchecked	Pass
Press "Add Option"	Show one more	Show one more	Pass

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	option	option	
Press "Delete" icon of option	Selected option is deleted	Selected option is deleted	Pass
Press "Duplicate" icon of question	Show one more question	Show one more question	Pass
Press "Rubbish" icon of question	Delete selected question	Delete selected question	Pass
Press "back" button	Show confirm exit custom dialog	Show confirm exit custom dialog	Pass
Press "Yes" of confirm exit custom dialog	Direct back to Teacher Home page	Direct back to Teacher Home page	Pass
Press "No" of confirm exit custom dialog	Exit confirm exit custom dialog	Exit confirm exit custom dialog	Pass
Press "Update" button once all details in correct format but student has attended the exam	Show "Cannot update once has student attended the exam"	Show "Cannot update once has student attended the exam"	Pass
Press "Update" button once all details in correct format and condition	1. Exam data is updated in database 2. Show "Exam updated successfully"	1. Exam data is updated in database 2. Show "Exam updated successfully"	Pass

Table 6.1.5 System testing for Edit Created Exam page

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6.1.6 Teacher View Page

Test Case	Expected Result	Actual Result	Status
Press "Exam" dashboard	Navigate to Student Result page	Navigate to Student Result page	Pass
Press "Home" button of bottom navigation bar	Navigate to Teacher Home page	Navigate to Teacher Home page	Pass
Press "Settings" button of bottom navigation bar	Navigate to Settings page	Navigate to Settings page	Pass

Table 6.1.6 System testing for Teacher View page

6.1.7 View Student Result Page

Test Case	Expected Result	Actual Result	Status
Press "View Student Answer"	Navigate to View Student Answer page	Navigate to View Student Answer page	Pass
Press "Back" button	Direct back to Teacher View page	Direct back to Teacher View page	Pass

Table 6.1.7 System testing for Student Result page

6.1.8 View Student Answer Page

Test Case	Expected Result	Actual Result	Status
Press "Back" button	Direct back to View Student Result page	Direct back to View Student Result page	Pass

Table 6.1.8 System testing for View Student Answer page

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6.1.9 Student Home Page

Test Case	Expected Result	Actual Result	Status
Press "Attend exam" dashboard	Navigate to Attend Exam page	Navigate to Attend Exam page	Pass
Press "View" button of bottom navigation bar	Navigate to Student View page	Navigate to Student View page	Pass
Press "Settings" button of bottom navigation bar	Navigate to Settings page	Navigate to Settings page	Pass

Table 6.1.9 System testing for Student Home page

6.1.10 Attend Exam Page

Test Case	Expected Result	Actual Result	Status
Leave room ID field empty	Show error message	Show error message	Pass
Leave password field empty	Show error message	Show error message	Pass
Press "show eye" icon	Show password	Show password	Pass
Press "hide eye" icon	Hide password	Hide password	Pass
Press "back" button	Direct back to Student Home page	Direct back to Student Home page	Pass
Insert wrong room ID and password	Show "Invalid room ID and password"	Show "Invalid room ID and password"	Pass
Insert correct room ID and password but not on the exam date set by teacher	Show "Only able to attend exam on XX-XX-XX"	Show "Only able to attend exam on XX-XX-XX"	Pass
Insert correct room ID and password but exam status is close	Show "Exam status is off"	Show "Exam status is off"	Pass
Insert correct room ID and password but have taken the exam before	Show "You have attended exam before"	Show "You have attended exam before"	Pass
Insert correct room ID and password in valid condition and press "Start" button	Navigate to Exam page	Navigate to Exam page	Pass

Table 6.1.10 System testing for Attend Exam page

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6.1.11 Exam Page

Test Case	Expected Result	Actual Result	Status
Press "back" icon of the device	Remain in the Exam page	Remain in the Exam page	Pass
Select "Radio button" icon	Selected "Radio button" icon is checked	Selected "Radio button" icon is checked	Pass
Select "Check boxes" icon	Selected "Check boxes" icon is checked	Selected "Check boxes" icon is checked	Pass
Deselect "Radio button" icon	Selected "Radio button" icon is unchecked	Selected "Radio button" icon is unchecked	Pass
Deselect "Check boxes" icon	Selected "Check boxes" icon is unchecked	Selected "Check boxes" icon is unchecked	Pass
Exam time end	1. Show "Exam submitted successfully" 2. Redirect to Student Home page	1. Show "Exam submitted successfully" 2. Redirect to Student Home page	Pass
Press "Submit" button	1. Exam answer and result are stored in the database 2. Show "Exam submitted successfully" 3. Redirect to Student Home page	1. Exam answer and result are stored in the database 2. Show "Exam submitted successfully" 3. Redirect to Student Home page	Pass

Table 6.1.11 System testing for Exam page

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6.1.12 Student View Page

Test Case	Expected Result	Actual Result	Status
Press "Home" button of bottom navigation bar	Navigate to Teacher Home page	Navigate to Teacher Home page	Pass
Press "Settings" button of bottom navigation bar	Navigate to Settings page	Navigate to Settings page	Pass

Table 6.1.12 System testing for Student View page

6.1.13 Settings Page

Test Case	Expected Result	Actual Result	Status
Press "Edit profile" button	Navigate to Edit Profile page	Navigate to Edit Profile page	Pass
Press "Change password"	Navigate to Change Password page	Navigate to Change Password page	Pass
Press "About"	Navigate to About page	Navigate to About page	Pass
Press "Logout"	Show confirm logout custom dialog	Show confirm logout custom dialog	Pass
Press "Yes" of confirm logout custom dialog	Navigate to Login page	Navigate to Login page	Pass
Press "No" of confirm logout custom dialog	Exit confirm logout custom dialog	Exit confirm logout custom dialog	Pass
Press "Home" button of bottom navigation bar	Navigate to Home page	Navigate to Home page	Pass
Press "View" button of bottom navigation bar	Navigate to View page	Navigate to View page	Pass

Table 6.1.13 System testing for Settings page

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6.1.14 Edit Profile Page

Test Case	Expected Result	Actual Result	Status
Leave name filed empty	Show error message	Show error message	Pass
Press "back" button	Direct back to Settings page	Direct back to Settings page	Pass
Press "Camera" icon	1. Navigate to gallery of device 2. User can pick image from gallery	1. Navigate to gallery of device 2. User can pick image from gallery	Pass
Press "Save" icon	1. User data is updated in database 2. Show "Profile updated successfully"	1. User data is updated in database 2. Show "Profile updated successfully"	Pass

Table 6.1.14 System testing for Edit Profile page

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6.1.15 Change Password Page

Test Case	Expected Result	Actual Result	Status
Leave current password filed empty	Show error message	Show error message	Pass
Leave new password filed empty	Show error message	Show error message	Pass
Leave confirm new password filed empty	Show error message	Show error message	Pass
New password not same with confirm password	Show error message	Show error message	Pass
New password length not greater than 5	Show error message	Show error message	Pass
Insert wrong current password	Show "Invalid current password"	Show "Invalid current password"	Pass
Press "back" button	Direct back to Settings page	Direct back to Settings page	Pass
Press "Save" icon with valid inputs	1. Password is updated in database 2. Show "Password changed successfully"	1. Password is updated in database 2. Show "Password changed successfully"	Pass

Table 6.1.15 System testing for Change Password page

6.1.16 About Page

Test Case	Expected Result	Actual Result	Status
Press "back" button	Direct back to Settings page	Direct back to Settings page	Pass

Table 6.1.16 System testing for About page

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6.2 Project Challenges

First and foremost, Flutter has its difficulties and limitation in its implementation, which prevent students from switching to other applications during exams to avoid cheating. This is because it lacks an inherent capability to limit access to other applications. This means that in order to implement this functionality effectively, I must come up with a solution myself. It can be time-consuming and complex, requiring regular updates and maintenance.

Another challenge is a large number of students can take an online exam and the application must be able to handle the load without crashing. In this case, I need to make sure the app is scalable so that it can support several concurrent users.

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6.3 Objectives Evaluation

Objectives	Evaluation	Conclusion
To develop a create exam feature for teachers to eliminate the time-consuming work of evaluating the answers of the students manually	This objectives is met as teachers can create an exam with variety types of questions such as multiple choice, checkboxes and true false. Additionally, it exists automated marking system saves teachers time in manually evaluating student answers	Achieved
To develop an attend exam feature for the students to do the exam anywhere	This objectives is met as students can attend the exams created by their teachers anywhere using their mobile devices.	Achieved
To develop an exam timer for the students to view how much time has elapsed	This objectives is met as students are able to view the exam timer at all times during the exams, giving them a clear idea of how much time is left to finish the exam.	Achieved

Table 6.3 Objectives Evaluation

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CHAPTER 7 Conclusion

7.1 Project Review, Discussion and Conclusion

During the continuing COVID-19 epidemic, online testing is becoming increasingly popular. Its advantages are particularly appealing to teachers, students, and colleges. In this competitive period, every university is seeking for high-quality, low-cost test techniques. During the COVID-19 pandemic, universities have been forced to implement an online examination method.

In comparison to a paper-based test, Online Exam Management System is the finest. The automated system saves time for teachers and students and speeds up the process. It helps to save space because no answer papers are required. All types of paperwork are transformed to digital form and reducing the quantity of paper used. As a result, teachers and students can obtain the benefit from this mobile application for Online Exam Management System while also can meet the demands of the students.

This project is developing an Online Exam Management System for teachers and students in the mobile application. On the **teacher side** currently, there are 13 functionalities for them which are login and logout function, reset password function, update profile, upload profile image from device, create exam, update exam, delete exam, change exam status, share exam, view the timing of student exam attendance, view student result, view student answer and dashboard. For the create exam, it includes add a new question function and add a new option function. While on the **student side**, there are 7 functionalities for them which are login and logout function, reset password function, update profile, upload profile image from device, attend exam, view result and dashboard.

As a result, objectives of the project have been achieved. Firstly, this project has implemented a create exam feature for teachers to create and customize exams with a variety of question types and eliminate the time-consuming work of manually evaluating the answers of the students. Secondly, there is an attend exam feature for the students to do the exam regardless of their location. Lastly, a visible and clear exam timer allows students to refer throughout the exams and know how much time has elapsed.

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7.2 Present Work

This project has several features that have been accomplished. Firstly, teachers are able to create an exam by filling in some details such as Room ID, password, exam title, date, duration, and question. There is an automatic room ID generation function allows teachers to start creating exams smoothly and quickly. Also, the multiple type of questions such as multiple choice, checkbox and true false are provided for teachers to choose. Multiple-choice allows teachers to select one correct answer while checkbox allows teachers to select multiple correct answers. Furthermore, teachers can decide the number of question and option using add a new question and option function as no limitation for the questions. In addition, teachers can determine the points for each question. After an exam is created, teachers can update exams, delete exams and share exams to their students through the social media such as WhatsApp, Instagram, Email and so on. Exam status can be changed to open or closed by the teachers. Once students have taken the exams, teachers are no longer able to update the exams anymore.

In addition, students can only attend the exam on the selected date, the exam status is open and the room ID and password created by the teacher are correctly filled. During the exam, there is an exam timer in the upper right corner of the page, followed by the duration set by the teacher to let students know how much time is left on the exam. Students can submit their answers after completing the exam. If the exam time is over without the student submitting an answer, the student's answers will be submitted automatically. Once the students have submitted their exams, the teacher can check the student's exam attendance time, student result and student answer. In this case, the list of students who have taken the exam will be shown to the teachers. For the students side, students can view the exam details and result. Lastly, the teachers do not need to grade student papers one by one, as the results are based on an automated marking system.

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7.3 Future Work

For future work, this project will be working on the implementation of face recording feature for preventing students to cheat. The recorded video will be displayed to the teacher. From this recorded video, teachers can know the behavior of students such as looking away from the screen, attempt to access unauthorized material or having other people in the room. It ensures the fairness for each student. In addition, implement an exam schedule feature and reminder notifications. It helps students keep track of their exam schedules by sending them upcoming exams reminders, especially if they are taking multiple exams. These reminders can be sent via push notifications or email, including information about the exam title, date, duration, and so on.

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7.4 Gantt Chart

7.4.1 Final Year Project 1

Task Name	Start Date	End Date	6/13/2022	6/20/2022	6/27/2022	7/4/2022	7/11/2022	7/18/2022	7/25/2022	8/1/2022	8/8/2022	8/15/2022	8/22/2022
Identification Phase													
Review background information	6/13/2022	6/15/2022	■										
Review problem statement	6/16/2022	6/19/2022	■										
Review project objectives	6/20/2022	6/21/2022		■									
Review project scope	6/22/2022	6/22/2022		■									
Review literature review	6/22/2022	6/23/2022		■									
Summary of review application	6/24/2022	6/24/2022		■									
Review project plan	6/25/2022	6/27/2022			■								
Design Phase													
Review mobile interface design	6/29/2022	7/1/2022			■								
Review use case diagram	7/2/2022	7/4/2022				■							
Review development methodology	7/5/2022	7/7/2022				■							
Review development tools	7/8/2022	7/10/2022				■							
Development Phase													
Develop user interface	7/11/2022	7/17/2022					■						
Develop teacher application	7/18/2022	5/24/2022						■					
Develop student application	7/25/2022	6/29/2022							■				
Connect application to database	8/1/2022	8/9/2022								■			
Integrate complete system	8/10/2022	8/14/2022									■		
Prototype Phase													
Initial prototype	8/15/2022	8/22/2022										■	■

Figure 7.4.1 Figure of FYP1 Gantt Chart

7.4.2 Final Year Project 2

Figure 7.4.2 Figure of FYP2 Gantt Chart

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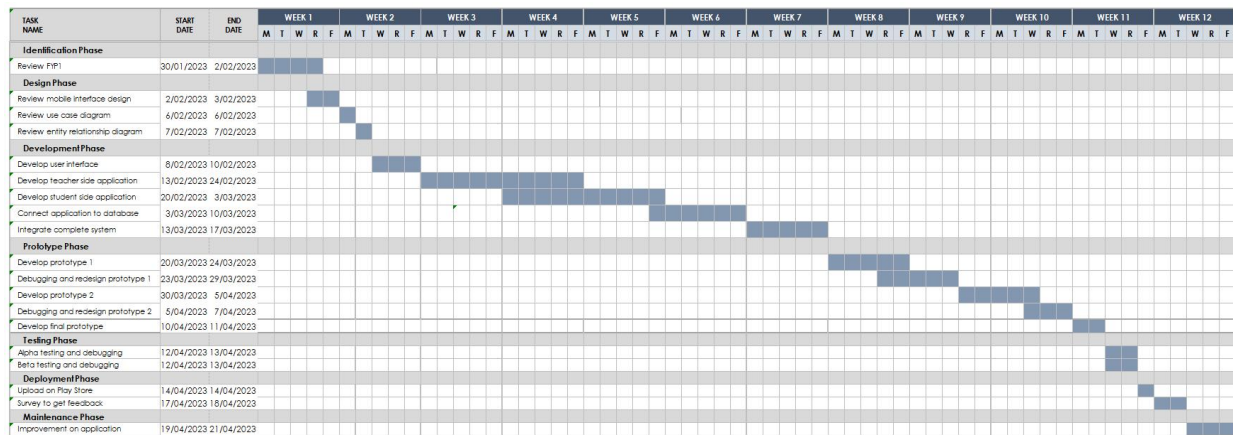
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FINAL YEAR PROJECT WEEKLY REPORT
(Project II)

Trimester, Year: T3Y3	Study week no.: 1
Student Name & ID: Choong Joe Wei 20ACB04216	
Supervisor: Dr. Ramesh Kumar Ayyasamy	
Project Title: Mobile application for Online Exam Management System	

1. WORK DONE

    i.   Modify some design of the app

2. WORK TO BE DONE

    i.   Retrieve the added question data from the Firebase and display it on the Edit page

    i.   Implement the function of loading exam UI according the data stored in the created exam

3. PROBLEMS ENCOUNTERED

    i.   No

4. SELF EVALUATION OF THE PROGRESS

    i.   Need to work harder

_____
Supervisor's signature

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Student's signature

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FINAL YEAR PROJECT WEEKLY REPORT
(Project II)

Trimester, Year: T3Y3	**Study week no.: 2**
Student Name & ID: Choong Joe Wei 20ACB04216	
Supervisor: Dr. Ramesh Kumar Ayyasamy	
Project Title: Mobile application for Online Exam Management System	

1. WORK DONE

    i.   Retrieve the added question data from the Firebase and display it on the Edit page

    ii.   Implement the function of loading exam UI according the data stored in the created exam

2. WORK TO BE DONE

    i.   Implement the function of updating exam details

    ii.   Implement the function of reload UI once teacher add question, delete question and add option in the update exam page

3. PROBLEMS ENCOUNTERED

    i.   No

4. SELF EVALUATION OF THE PROGRESS

    i.   Need to work harder

_____
Supervisor's signature

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FINAL YEAR PROJECT WEEKLY REPORT
(Project II)

Trimester, Year: T3Y3	**Study week no.: 3**
Student Name & ID: Choong Joe Wei 20ACB04216	
Supervisor: Dr. Ramesh Kumar Ayyasamy	
Project Title: Mobile application for Online Exam Management System	

1. WORK DONE

i.   Implement the function of updating exam details
ii. Implement the function of reload UI once teacher add question, delete question and add option in the update exam page

2. WORK TO BE DONE

i.   Implement function of deleting the created exam
ii.   Implement function of sharing exam to the students via social media
iii. Implement function of allowing student to take the exam with Room ID and password

3. PROBLEMS ENCOUNTERED

i.   No

4. SELF EVALUATION OF THE PROGRESS

i.   Need to work harder

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Supervisor's signature

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Student's signature

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FINAL YEAR PROJECT WEEKLY REPORT
(Project II)

Trimester, Year: T3Y3	**Study week no.: 4**
Student Name & ID: Choong Joe Wei 20ACB04216	
Supervisor: Dr. Ramesh Kumar Ayyasamy	
Project Title: Mobile application for Online Exam Management System	

1. WORK DONE

    i.   Implement function of deleting the created exam
    ii.   Implement function of sharing exam to the students via social media
    iii.   Implement function of allowing student to take the exam with Room ID and password

2. WORK TO BE DONE

    i.   Design the Attend Exam Page for the student
    ii.   Display the exam questions made by the teacher on the Attend Exam Page for student to attend the exam

3. PROBLEMS ENCOUNTERED

    i.   No

4. SELF EVALUATION OF THE PROGRESS

    i.   Need to work harder

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    Supervisor's signature   Student's signature

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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T3Y3	Study week no.: 5
Student Name & ID: Choong Joe Wei 20ACB04216	
Supervisor: Dr. Ramesh Kumar Ayyasamy	
Project Title: Mobile application for Online Exam Management System	

1. WORK DONE

i. Design the Attend Exam Page for the student
ii. Display the exam questions made by the teacher on the Attend Exam Page for student to attend the exam

2. WORK TO BE DONE

i. Implement function of only allow the student to take the exam on the selected date created by the teacher

3. PROBLEMS ENCOUNTERED

ii. No

4. SELF EVALUATION OF THE PROGRESS

i. Need to work harder

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        Supervisor's signature   Student's signature

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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T3Y3	**Study week no.: 6**
Student Name & ID: Choong Joe Wei 20ACB04216	
Supervisor: Dr. Ramesh Kumar Ayyasamy	
Project Title: Mobile application for Online Exam Management System	

1. WORK DONE

    i.   Implement function of only allow the student to take the exam on the selected date created by the teacher

2. WORK TO BE DONE

    i.   Design an exam timer
    ii.   Implement the exam timer for students to view while they are taking the exam and exam timer is followed by the duration set by the teacher

3. PROBLEMS ENCOUNTERED

    i.   No

4. SELF EVALUATION OF THE PROGRESS

    i.   Need to work harder

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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T3Y3	**Study week no.: 7**
Student Name & ID: Choong Joe Wei 20ACB04216	
Supervisor: Dr. Ramesh Kumar Ayyasamy	
Project Title: Mobile application for Online Exam Management System	

1. WORK DONE

    i.   Design an exam timer

    ii.   Implement the exam timer for students to view while they are taking the exam and exam timer is followed by the duration set by the teacher

2. WORK TO BE DONE

    i.   Design and adding a Switch icon

    ii.   Implement function of allowing teachers to turn on or off the exam through Switch icon

3. PROBLEMS ENCOUNTERED

    i.   No

4. SELF EVALUATION OF THE PROGRESS

    i.   Need to work harder

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       Supervisor's signature   Student's signature

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FINAL YEAR PROJECT WEEKLY REPORT
(Project II)

Trimester, Year: T3Y3	Study week no.: 8
Student Name & ID: Choong Joe Wei 20ACB04216	
Supervisor: Dr. Ramesh Kumar Ayyasamy	
Project Title: Mobile application for Online Exam Management System	

1. WORK DONE

    i.   Design and adding a Switch icon
    ii.   Implement function of allowing teachers to turn on or off the exam through Switch icon

2. WORK TO BE DONE

    i.   Store student answer into the Student_Answer in Firebase
    ii.   Show the result of the student on teacher side and student side

3. PROBLEMS ENCOUNTERED

    i.   No

4. SELF EVALUATION OF THE PROGRESS

    i.   Need to work harder

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FINAL YEAR PROJECT WEEKLY REPORT
(Project II)

Trimester, Year: T3Y3	**Study week no.: 9**
Student Name & ID: Choong Joe Wei 20ACB04216	
Supervisor: Dr. Ramesh Kumar Ayyasamy	
Project Title: Mobile application for Online Exam Management System	

1. WORK DONE

    i.   Store student answer into the Student_Answer in Firebase

    ii.   Show the result of the student on teacher side and student side

2. WORK TO BE DONE

    i.   Implement function of calculating the mark of the student and store their result such as mark in percentage and total mark obtained into the Result table in Firebase

3. PROBLEMS ENCOUNTERED

    i.   No

4. SELF EVALUATION OF THE PROGRESS

    i.   Need to work harder

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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T3Y3	**Study week no.: 10**
Student Name & ID: Choong Joe Wei 20ACB04216	
Supervisor: Dr. Ramesh Kumar Ayyasamy	
Project Title: Mobile application for Online Exam Management System	

1. WORK DONE

    i.   Implement function of calculating the mark of the student and store their result such as mark in percentage and total mark obtained into the Result table in Firebase

2. WORK TO BE DONE

    i.   Implement function of allowing teacher to view which student has taken an exam by showing the student name, result and attend time in recycle view on teacher side

    ii.   Design a recycle view for showing the student details

3. PROBLEMS ENCOUNTERED

    i.   No

4. SELF EVALUATION OF THE PROGRESS

    i.   Need to work harder

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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T3Y3	Study week no.: 11
Student Name & ID: Choong Joe Wei 20ACB04216	
Supervisor: Dr. Ramesh Kumar Ayyasamy	
Project Title: Mobile application for Online Exam Management System	

1. WORK DONE

    i.   Implement function of allowing teacher to view which student has taken an exam by showing the student name, result and attend time in recycle view on teacher side

    ii.   Design a recycle view for showing the student details

2. WORK TO BE DONE

    i.   Design Student Answer Page to show the student answer

    ii.   Implement function of allowing teacher to view the student answer on Student Answer Page

3. PROBLEMS ENCOUNTERED

    i.   No

4. SELF EVALUATION OF THE PROGRESS

    i.   Need to work harder

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FINAL YEAR PROJECT WEEKLY REPORT
(Project II)

Trimester, Year: T3Y3	**Study week no.: 12**
Student Name & ID: Choong Joe Wei 20ACB04216	
Supervisor: Dr. Ramesh Kumar Ayyasamy	
Project Title: Mobile application for Online Exam Management System	

1. WORK DONE

    i.   Design Student Answer Page to show the student answer
    ii.   Implement function of allowing teacher to view the student answer on Student Answer Page

2. WORK TO BE DONE

    i.   Design correct icon and wrong icon
    ii.   Implement function of showing correct icon or wrong icon depending on student has answered the question correctly or not

3. PROBLEMS ENCOUNTERED

    i.   No

4. SELF EVALUATION OF THE PROGRESS

    i.   Need to work harder

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FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

Full Name(s) of Candidate(s)	CHOONG JOE WEI
ID Number(s)	20ACB04216
Programme / Course	FICT IA
Title of Final Year Project	Mobile application for Online Exam Management System

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Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.

_____   _____

Signature of Supervisor   Signature of Co-Supervisor

Name: Dr. Ramesh Kumar Ayyasamy _____   Name: _____

Date: ____27/4/2023_____   Date: _____

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Student Name	CHOONG JOE WEI
Supervisor Name	Dr Ramesh Kumar Ayyasamy

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I, the author, have checked and confirmed all the items listed in the table are included in my report.

_____
(Signature of Student)
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