

Student Performance Tracker App

Project Report submitted for

Software Engineering Principles using Android (CSE4141)

Submitted by:

Name	Regd No.
Sayan Banerjee	1741012003
Soumyadeep Seal	1741012106
Ayantha Pal	1741012147
Amlaan Mohapatra	1741012104

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Department of Computer Science and Engineering

Institute of Technical Education and Research
(Faculty of Engineering)

**SIKSHA 'O' ANUSANDHAN
(Deemed to be University)
Bhubaneswar, Odisha, India**

Certificate

This is to certify that the project report titled “**Student Performance Tracker App**” being submitted by **Sayan Banerjee, Soumyadeep Seal, Ayantha Pal and Amlaan Mohapatra** of CSE section “G” to the Institute of Technical Education and Research, Siksha 'O' Anusandhan Deemed to be University, Bhubaneswar, Odisha for the partial fulfillment for the degree of Bachelor of Technology in Computer Science Engineering is a record of original confide work carried out by them under my supervision and guidance. The project work, in my opinion, has reached the requisite standard fulfilling the requirements for the degree of Bachelor of Technology.

The application developed for this project work have not been submitted in part or full to any other University or Institute for the award of any degree or diploma.

Nimisha Ghosh

Department of Computer Science and Information Technology,
Institute of Technical Education and Research

SIKSHA ‘O’ ANUSANDHAN
(Deemed to be University)
Bhubaneswar, Odisha, India

Declaration

We, the undersigned students of B. Tech. of Computer Science and Engineering (CSE) hereby declare that we own the full responsibility for the information, results etc. provided in this PROJECT titled “**Student Performance Tracker App**” submitted to **Siksha ‘O’ Anusandhan, Deemed to be University, Bhubaneswar** for the partial fulfillment of the subject **Software Engineering Principles using Android (CSE4141)**. We have taken care in all respect to honor the property right and have acknowledged the contribution of others for using them in academic purpose and further declare that just in case of any violation of property right or copyright we, as the candidate(s), will be fully liable.

Name: SAYAN BANERJEE
Regd No.: 1741012003

Name: SOUMYADEEP SEAL
Regd No.: 1741012106

Name: AYANTHA PAL
Regd No.: 1741012147

Name: AMLAAN MOHAPATRA
RegdNo.: 1741012104

DATE: 16 JANUARY 2021

Acknowledgement

It is matter of great pleasure for us to get this opportunity to work on this project work. Firstly, we would like to express our heartily thanks to our guide **Nimisha Ghosh**, who was the main force behind all these efforts and would like to take the opportunity to thank her for suggestions, advice, encouragement during this work and assistance in keeping our progress on schedule.

At last we would like to express a big thank you to all our friends and others who had helped us directly or indirectly.

Name: SAYAN BANERJEE
Regd. No.: 1741012003

Name: SOUMYADEEP SEAL
Regd. No.: 1741012106

Name: AYANTHA PAL
Regd. No.: 1741012147

Name: AMLAAN MOHAPATRA
Regd. No.: 1741012104

Abstract

One of the common ways of checking that knowledge is impacted into students at every level of education is by giving tasks to students and part of the responsibilities of the teacher is to give quizzes to students and check the solution provided by the students. Due to COVID-19, there is a sudden increase in virtual classes. And as there is an increase in online classes, the requirement of several tools for assessment, keeping track of student performance, tests, etc has increased. This work deals with the student performance monitoring problem. This is a performance review app in which faculty can assess the understanding of different concepts of a subject by taking a quiz in several formats. The app will have options like setting type of quiz question set, giving random questions to different students from a set of questions, unique login id for each student, etc. This app requires stable internet connectivity.

The development of this application was carried out on Android Studio IDE using Java programming language and it involved designing and creating working database which is Firebase (Firestore) database for storing application data.

Contribution

We have contributed to this project in following ways:

Name	Regd. No.	Role
Sayan Banerjee	1741012003	Analysis and Coding of Professor
Soumyadeep Seal	1741012106	Analysis and Coding of Student
Ayantha Pal	1741012147	Design and Presentation
Amlaan Mohapatra	1741012104	Testing and Documentation

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Introduction

In today's technologically-driven world, almost every student has access to smart-phones. There are mobile apps for everything nowadays. Schools and teachers can use apps that help both institutes and students grow. With apps, institutes provide students with a resource they are already comfortable using. A mobile app is a simple solution with which teachers and students can maintain records, access information and manage things without putting in a great deal of effort. It also has a simple user interface so end users needn't undergo special training to work or manage it.

The aim of this project is to develop an examination system app by applying software engineering android principles. The system will be designed to be scalable, secure and robust.

The online examination system will help in speeding up the method of conducting examination. Teachers will be able to create examinations by composing a different set of questions. The questions are either multiple choice questions or single (text) answer question. The system will present an easy to use interface for teachers, students and administrators. Once logged in with unique exam ID and password, students will be able to see the examinations due and can take the examination. Candidate is given a limited time to answer the questions and after the time expiry the solution is disabled.

The **goal of this project** is -

- to reduce the amount of paper work.
- efficiently evaluate the candidate thoroughly through a totally automated system.
- comparing with traditional exam system, the cost for an online examination is less.

Objective:

The objective of this project involved an opportunity for students to perform various activities such as allowing student to register in order to use the application functionalities, enables student to select from list of courses, provides student with available quiz question set and provides opportunity for student to check their quiz performance. This project also provided an opportunity for faculties to perform various activities such as allowing teacher registration, enables the teacher to add a new course and quiz, provides an easy way for a teacher to mark quizzes for the student after the teacher has checked that the quizzes and provide teachers with quiz performance marks which provide the information about students progress on the course.

Advantages:

Deploying mobile devices in the education process has great impacts:

- It encourages the students to use the new technology that copes with the new market requirements as well as leverages their intellectual and attitude skills.
- It can connect the students to the various learning institutions in order to enhance their academic level achieve a improved career.
- It bridges the time gap between the instructors and students and increases the interaction and communication among them whereby an academic network is created to exchange information and data easily and effectively.
- In high density schools, the mobile devices could be considered the central tool to achieve the required and fast justice in marking quizzes and assignments resolving by that the continuous complain of the inaccurate regular marking and its long duration.

Problem Statement and Analysis:

The focus of this project work is to develop Android mobile application for student performance tracking. This project was developed mainly for tracking of student's provided solutions to quizzes and it was developed as a mobile application in order to provide better accessibility of the application and easy tracking of the quiz solutions for the users.

Literature Review:

Several countries have already conducted some successful experiments in employing mobile devices in the education system and particularly within the school or university study rooms and its related activities. For example, In Japan, they created an English course for the Japanese students registered in their universities through using mobile devices in addition to a published website. The students use their mobile devices to connect to the designed website to practice the main activities of the course including the explanation and quizzes. Also, they exchange the information and feedbacks with the teachers through sending emails. Technical problems came up in accessing the course materials, especially in accessing the website and downloading the multimedia contents. A research described an experiment for deploying mobiles instruments in quizzes. The students should access web storage to download the required quiz in an offline mode using the cookies technology. They applied HTML 5 for building offline application and tested their work on Apple iPhone. On completion of the quiz, the answers of the students will be verified and the results will be sent to the teachers through SMS. Finally, the authors depicted a XML-based tool for running tests over the students through utilizing smart phones such as Motorola. The tests are implemented in an offline mode. The connection to the Internet whenever is needed, particularly when sending students feedbacks.

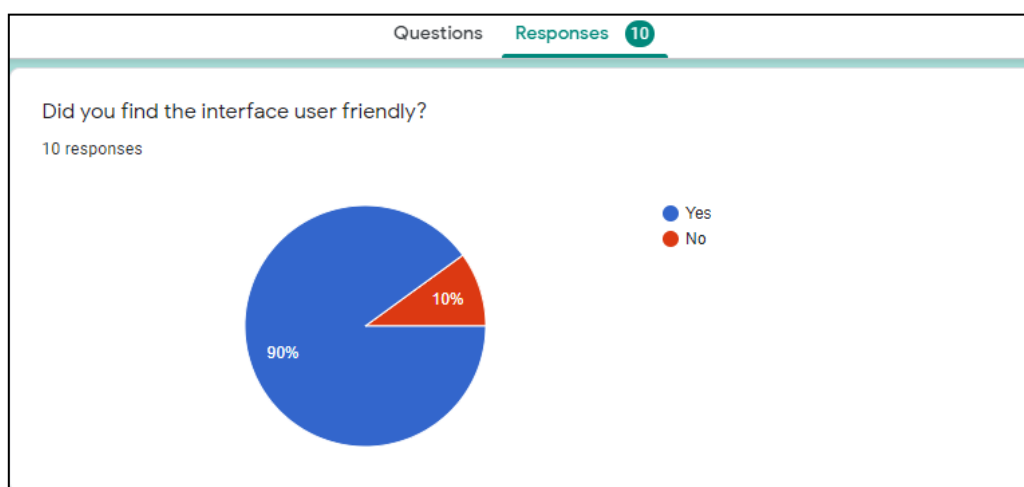
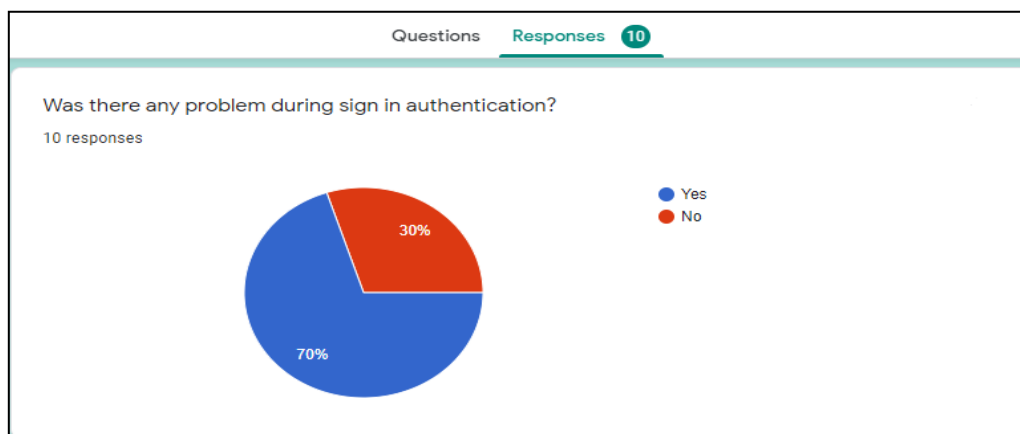
As noticed, all these experiments run in two different modes: online and offline according to the available resources in each academic environment. Each work also runs in different mobile-environment with using a different technology with respect to the available mobile devices with the students as it is a tough task to construct a standardized quiz-application running over all available mobile instruments within the market with its various operating system including iOS and Android in addition to the old versions of cell phones.

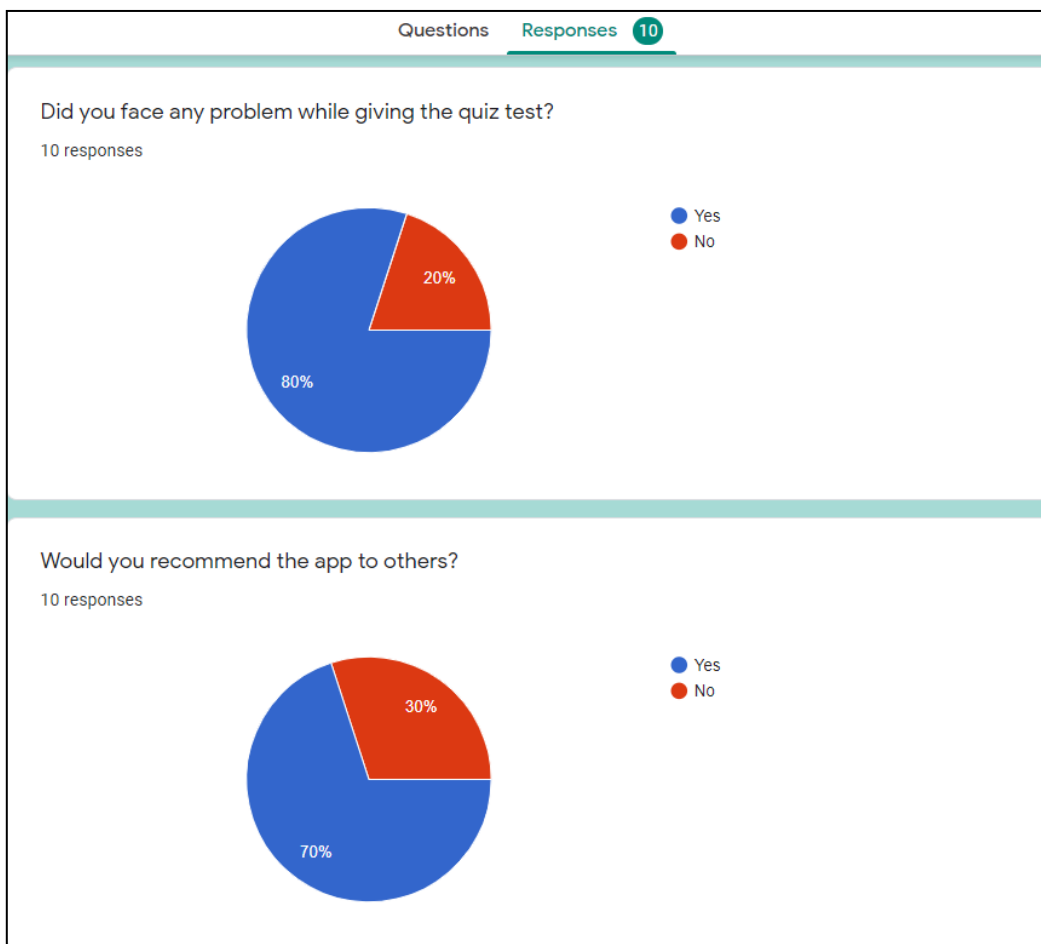
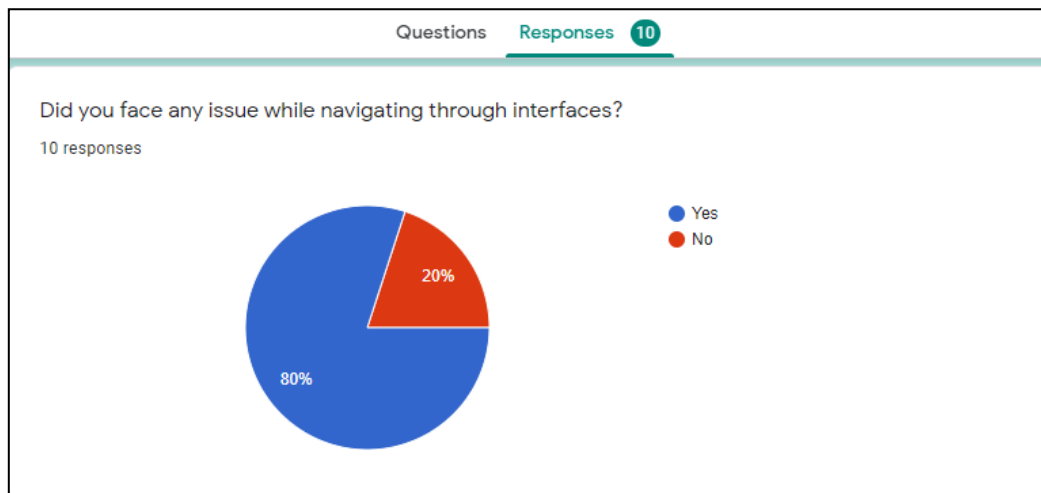
Requirement Analysis and Specification

Requirement is a feature of the system or description of something the system is capable of doing in order to fulfill the system's purpose. In this part we will discuss different questionnaires along with software hardware requirements and analyze functional and non-functional requirements.

It also contains all the software requirements in a detailed manner, combining it with the diagrams, descriptions, is sufficient to make designers design and testers test a system to satisfy requirements or not.

Questionnaire:





Analysis shows that the app has received quiet good responses. An app to take quiz is very much essential as it reduces the time consumed by a very high margin and unnecessary manual labour is also reduced.

User Interfaces:

The User Interface Screens as follow -.

Screen name	Description
Splash Screen:	The splash screen of Student Performance Tracker App is the introduction page of this app and appears every time when the app is launched
User Selection:	This is the user selection page where the application user needs to choose the type of user he/she is, who can either be a Student or a Professor
Sign in / Sign Up Page:	The user sign in or sign up page allows user to sign in or sign up by providing their registered email id and password .The page does not accept null inputs.
Subject Page	After successful sign in or sign up of professor, the professor is welcomed to the Subject page where he/she can add or delete subject(s). After successful sign in or sign up of student, the student is welcomed to the Subject page where he/she selects a subject to appear quiz..
Set Page:	The professor can add or delete multiple quiz sets under a subject. The student selects a particular set to appear the quiz.
Question Page:	The professor can add or delete multiple questions with options sets under a subject. The student selects a option under a question to solve the quiz within the time limit.
Quiz Mark:	After successful completion of the quiz, both the professor and the student will be able to check mark of the appeared quiz.

Software Interfaces:

The student performance tracker app is an independent stand-alone application. It is totally self-contained.

- Operating System (OS): Windows 10, MacOS XI
- Tools: Android Studio
- Platform: Android SDK framework
- Android Emulator API 28
- Backend - Java SE, Firebase (Firestore)
- Front end – XML (as UI)

Hardware Interfaces:

- Any android device, with API greater than 28.

Functional Requirements:

Functional requirements define the fundamental actions that system must perform:

- Select the type of user.
- Select a subject (student/professor) / Add or Delete a subject (professor)
- Select a set (student/professor) / Add or Delete a set (professor)
- Select or Edit question options (professor) / Answer question within time limit(student)
- Check mark obtained from the appeared (student) or set (professor) quiz
- Done to complete

Non-functional Requirements:

Non-Functional requirements define the requirements in terms of performance, logical database requirements, design constraints, standards compliance, reliability, availability, security, maintainability, and portability.

Performance Requirements:

- The load time for user interface screens should take no longer than 2 seconds.
- The colour should be elegant and not flashy.
- Language should be English.
- Should be a Scalability System.

Software Quality Attributes:

- **Availability:** The application should be online 24x7 for taking up quiz and setting question sets for different subjects/courses.
- **Correctness:** The set questions and its options allocated should always be correct.
- **Usability:** This app should be useful to the user at the time of requirement.

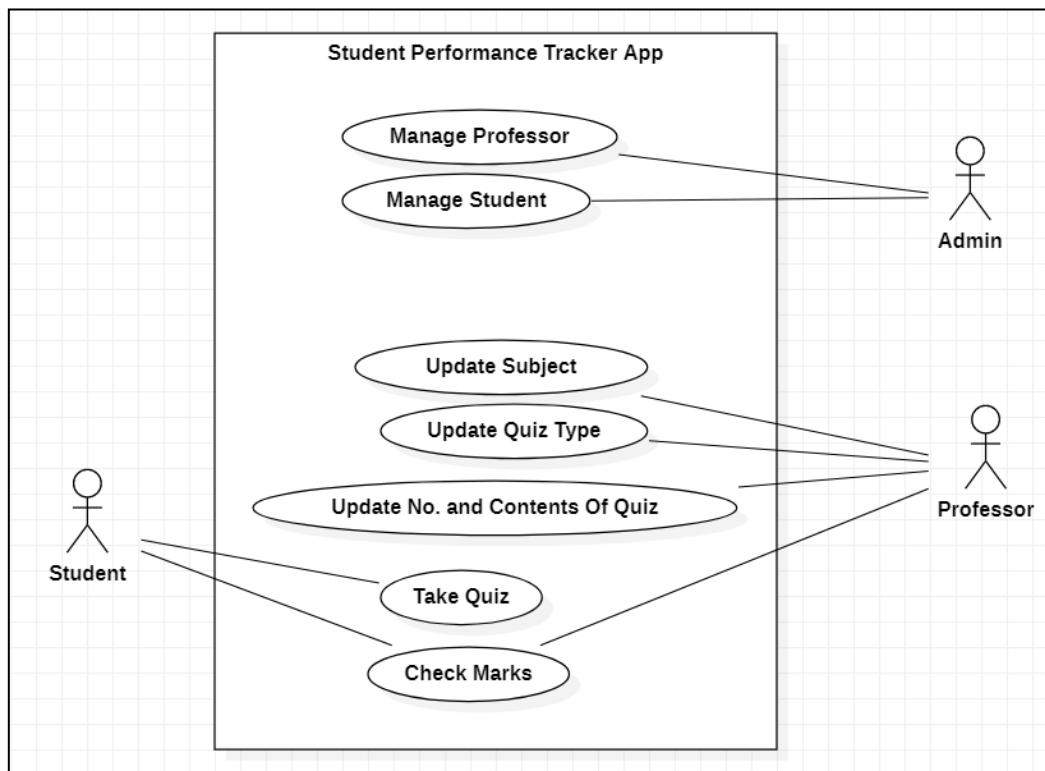
Design

Design may be said as a meaningful representation of something that's to be built. Design can be also said as a practice of taking a specification of observable behavior externally, adding details needed for actual computer system implementation.

This section not only state specific requirements but also designs. Instead it provides a background for those requirements as well as the different design in the app design, which are defined in section 4, and makes them easier to understand.

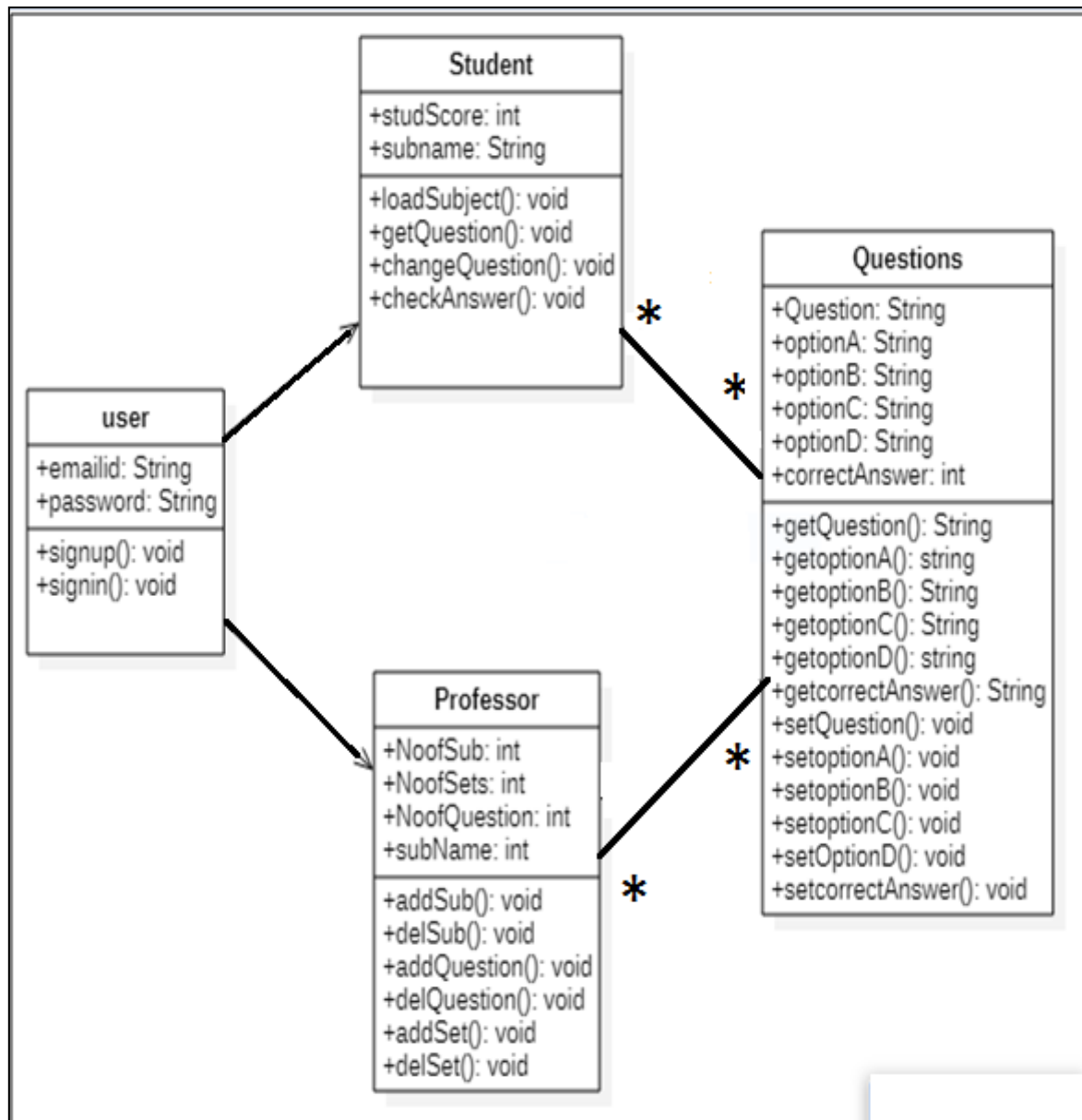
Use Case diagram:

The use case diagram provides information about the functions of the appliance and therefore the interaction between actors within the application. It shows the connection i.e. the relationship in between functions in the application. The actors in this project are student and professor as shown below:



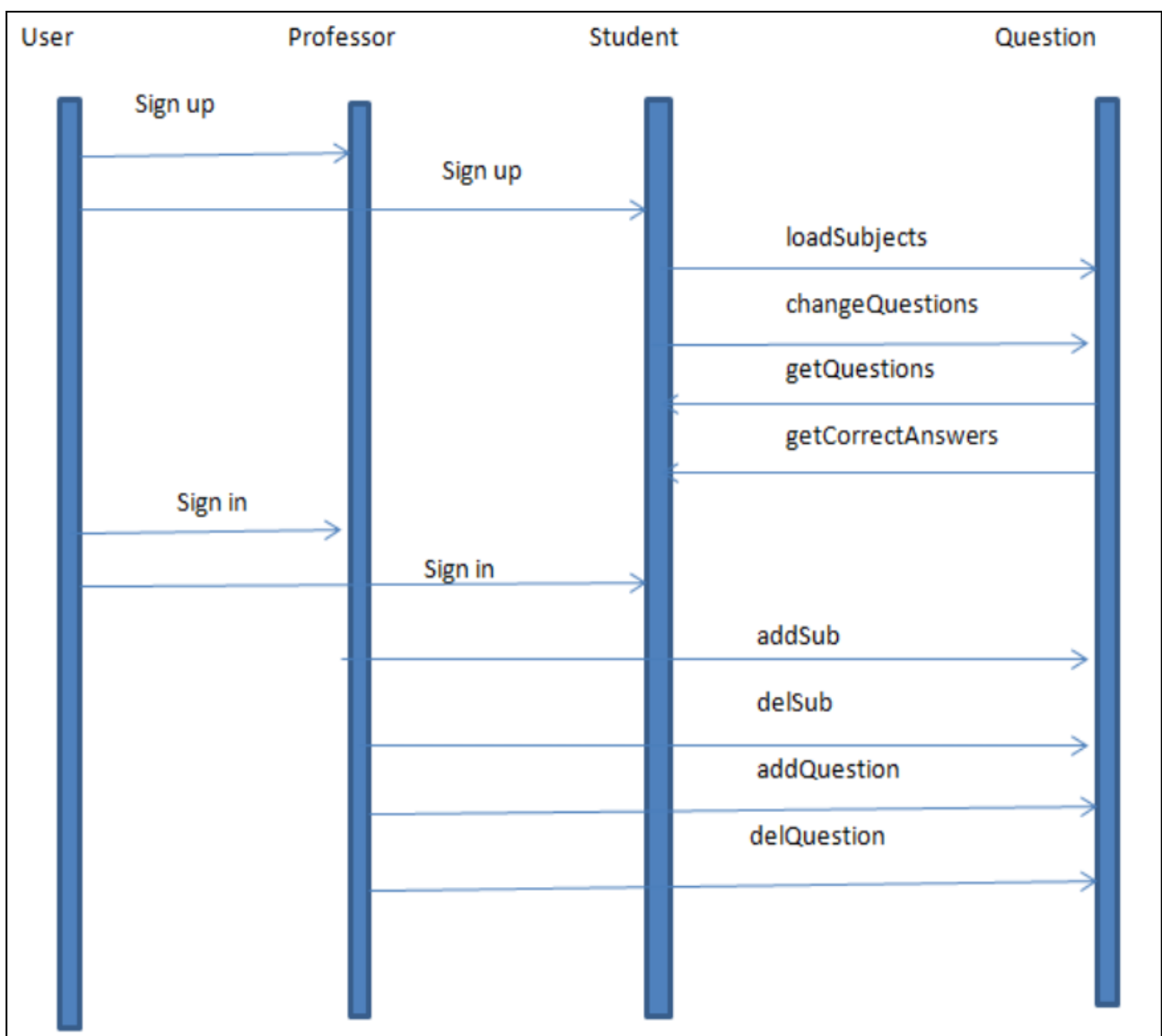
Class Diagram:

The class diagram provides information about the classes within the application with their responsibilities and shows the interaction between the classes that shows the application collaboration. The figure below shows this application's class diagram:



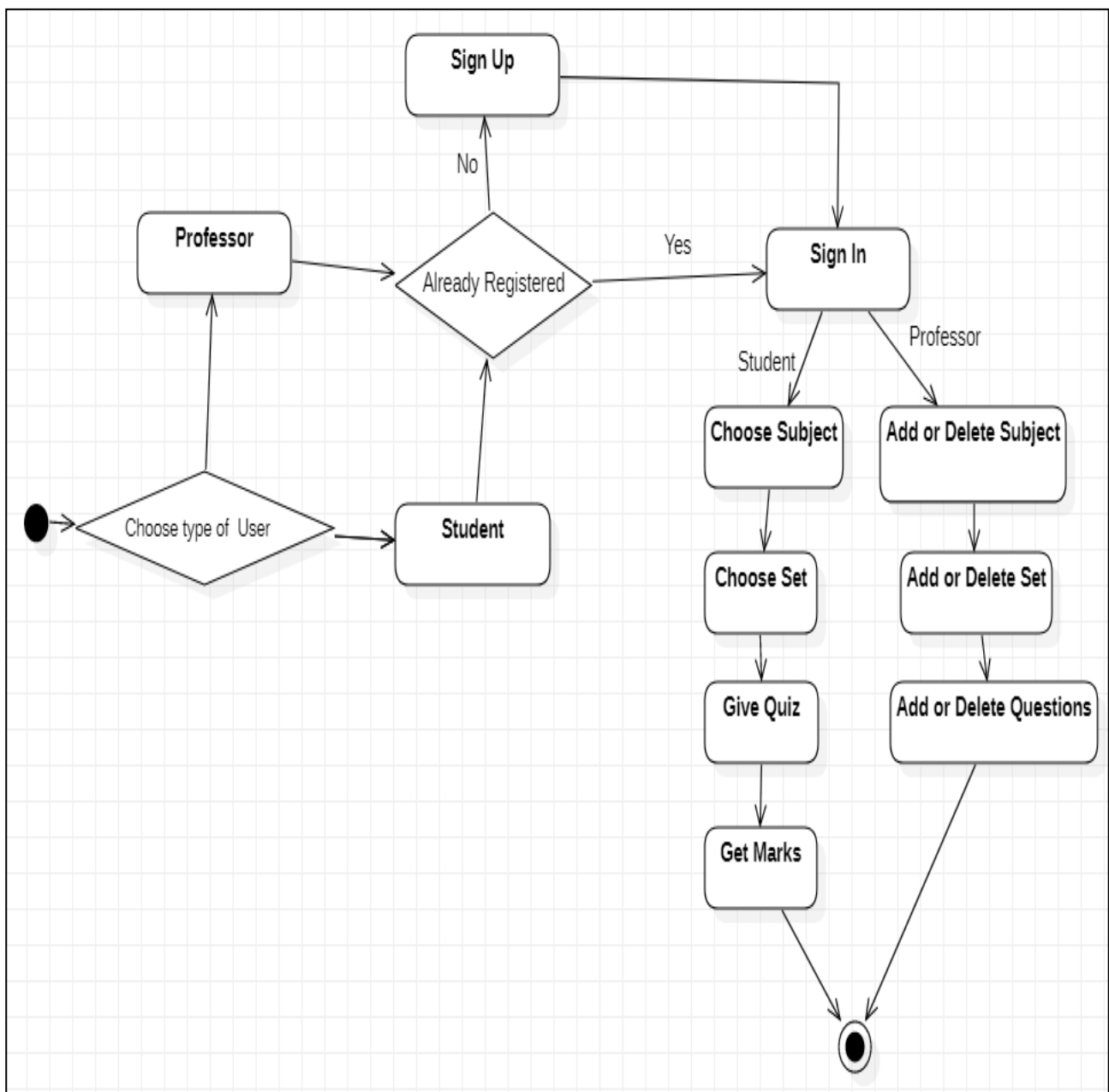
Sequence Diagram:

The sequence diagram provides an in depth step by step description of the application's use case diagrams functionalities and it helps in providing a better understanding of the application's functionalities. The sequence diagram is an interactive diagram that shows how and therefore the order during which objects in an application interact with each other in time sequence. The sequence diagram for this project is shown below:



Activity Diagram:

An activity diagram is a behavioral diagram i.e. it depicts the behavior of a system. An activity diagram portrays or shows the various decision paths that exist while the activity is being executed as the control flow from a start point to a finish point. The activity diagram for this project is shown below:



Coding – the source code

This section describes the implementation of all the interfaces involved during this application and realisation of application specification, idea and design style . It involves programming codes written so as to meet ideas and requirements of every interface of the appliance involving XML and Android Java codes.

The app has the following code and setup which runs in the backend and it will be working in any android app with API greater than 28.

MainActivity.java:

```
package com.example.androidquizapp;

import androidx.appcompat.app.AlertDialog;
import androidx.appcompat.app.AppCompatActivity;

import android.content.DialogInterface;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;

public class MainActivity extends AppCompatActivity
{
    @Override
```

```

protected void onCreate(Bundle
savedInstanceState)
{
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);

    public void professor(View view)
    {
        startActivity(new Intent(MainActivity.this,
        ProfessorActivity.class));
    }

    public void student(View view)
    {
        startActivity(new Intent(MainActivity.this,
        StudentActivity.class));
    }
}

```

activity_main.xml:

```

<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"

```

```
android:layout_height="match_parent"  
tools:context=".MainActivity">
```

```
<TextView
```

```
    android:id="@+id/textView3"  
    android:layout_width="wrap_content"  
    android:layout_height="wrap_content"  
    android:layout_marginStart="171dp"  
    android:layout_marginTop="250dp"  
    android:layout_marginEnd="170dp"  
    android:layout_marginBottom="532dp"  
    android:text="Which type of user are you?"  
    android:textSize="20sp"  
    android:textStyle="bold"  
    app:layout_constraintBottom_toBottomOf="parent"  
    app:layout_constraintEnd_toEndOf="parent"  
    app:layout_constraintHorizontal_bias="0.504"  
    app:layout_constraintStart_toStartOf="parent"  
    app:layout_constraintTop_toTopOf="parent"  
    app:layout_constraintVertical_bias="1.0" />
```

```
<Button
```

```
    android:id="@+id/button3"  
    android:layout_width="259dp"  
    android:layout_height="126dp"  
    android:layout_marginStart="109dp"  
    android:layout_marginEnd="109dp"  
    android:background="#039BE5"  
    android:onClick="student"  
    android:text="Student"  
    app:layout_constraintBottom_toBottomOf="parent"  
    app:layout_constraintEnd_toEndOf="parent"  
    app:layout_constraintHorizontal_bias="0.59"  
    app:layout_constraintStart_toStartOf="parent"
```

```
app:layout_constraintTop_toTopOf="parent"
app:layout_constraintVertical_bias="0.403" />
```

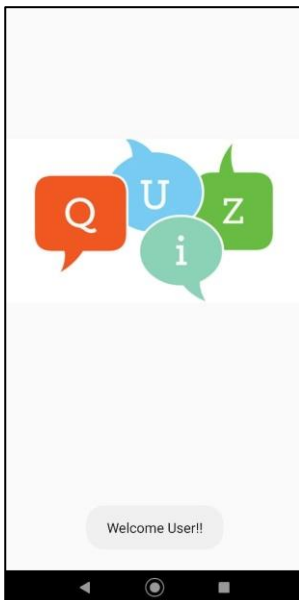
```
<Button
```

```
    android:id="@+id/button5"
    android:layout_width="259dp"
    android:layout_height="126dp"
    android:layout_marginStart="109dp"
    android:layout_marginEnd="109dp"
    android:background="#43A047"
    android:onClick="professor"
    android:text="Professor"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.59"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.669" />
```

```
</androidx.constraintlayout.widget.ConstraintLayout>
```


Testing and Results

This section describes the running and executing software application so as to seek out bugs within the software. Testing can be defined as the process of verifying and validating that software program meets the needs and technical requirements that guided the designing and development of the application. The following figures with their names represent the User Interfaces (UI) in this application:

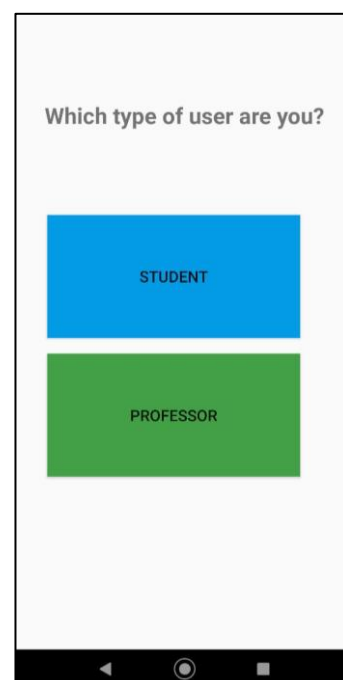


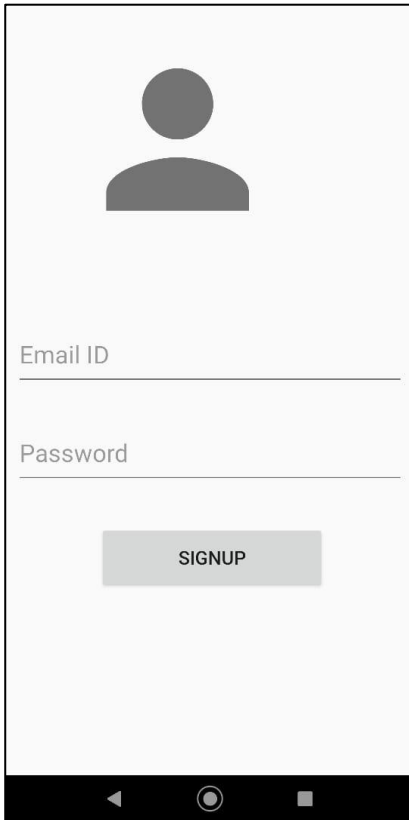
Splash Screen:

This is the splash screen of Student Performance Tracker App which is the introduction page of this app and appears every time when the app is launched.

User Selection Page:

This is the user selection page where the application user needs to choose the type of user he/she is, who can either be a Student or a Professor.




 A mobile app UI mockup for the Professor Sign in page. It features a grey silhouette of a person's head and shoulders at the top. Below this are two input fields: the first is labeled "Email ID" and the second is labeled "Password". At the bottom of the form is a grey button with the text "SIGNUP" in white. The entire form is set against a light grey background with a black Android navigation bar at the very bottom.

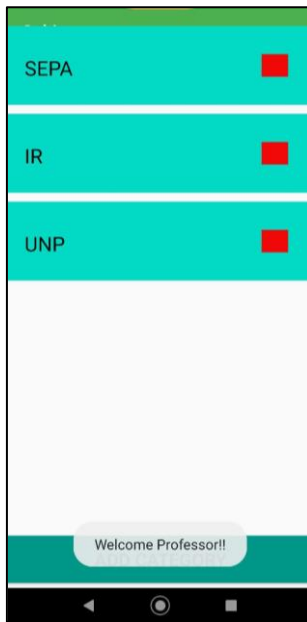
Professor Sign in Page:

The professor sign in page allows professor to sign in by providing their registered email id and password and click on the sign in button. If professor is new to app and don't have an account then he/she needs to click on "Sign-up" to proceed to sign up page The sign in page does not accept null inputs.

Professor Sign up Page:

The professor sign up page allows professor to sign up as new professor by providing their email id and password and click on the sign up button. The signup page does not accept null inputs.


 A mobile app UI mockup for the Professor Sign up page. It features an illustration of a woman in a red sweater holding a clipboard and pointing upwards. Below the illustration are two input fields: the first contains the text "abcd@gmail.com" and the second contains a series of dots ".....". At the bottom of the form is a grey button with the text "SIGNIN" in white. Below the button is a link that says "Don't have an account? Sign-up here". The entire form is set against a light grey background with a black Android navigation bar at the very bottom.

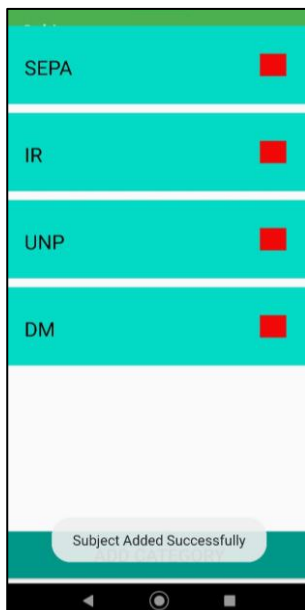
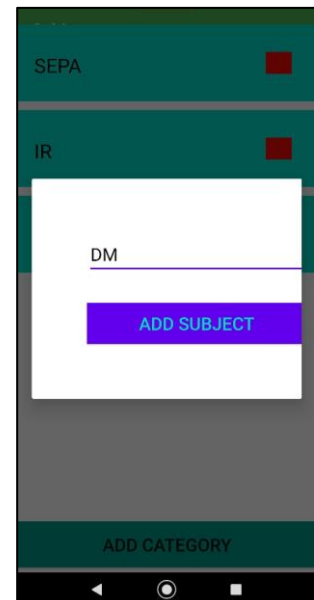


Subject Page for Professor:

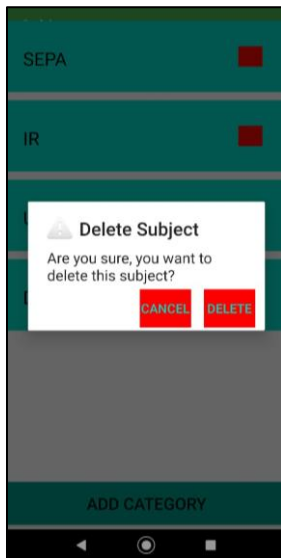
After successful sign in or sign up of professor, the professor is welcomed to the Subject

Adding a Subject by Professor:

The professor can add subject(s) in which he/she wants to take quiz by giving the subject name.



Upon **successful addition of subject(s)** in which the professor wants to have quiz by giving the subject name, a message namely “Subject Added Successfully” is displayed.



Professor Deleting Subject(s):

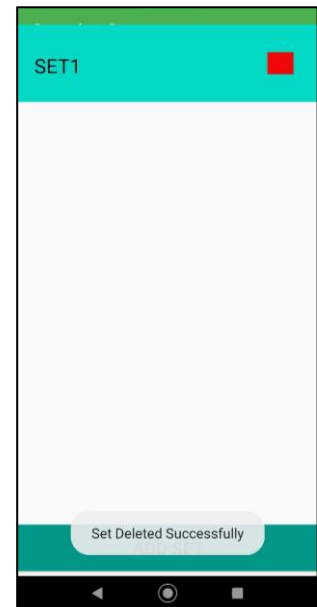
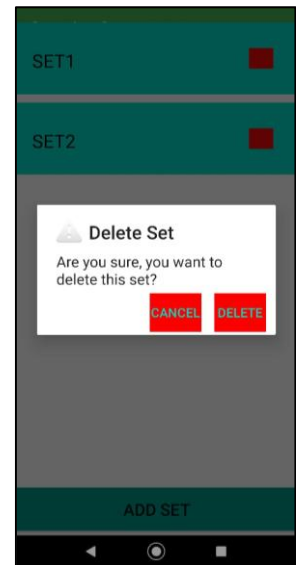
The professor can delete subject(s) in which he/she does not want to take quiz or wrong subject is added.

Professor Adding Set(s):

The professor can add different quiz set(s) under subjects with name in which different questions can be added.

Professor Deleting Set(s):

The professor can delete quiz set(s) with wrong names or the unwanted sets wrongly added.

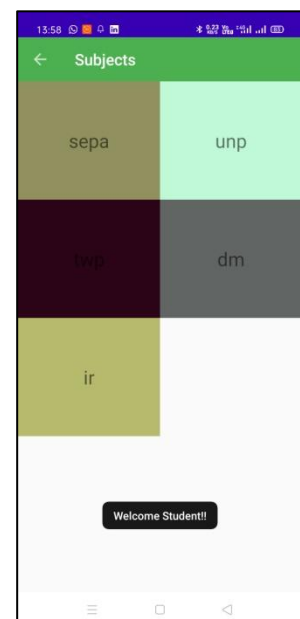



Professor Adding Question(s):

The professor can add multiple question(s) with multiple choice options in different sets for multiple subjects.

Student Subject:

After signup/sign in, the student selects subject to appear for its quiz.





abcd@gmail.com

SIGNIN


Don't have an account yet? Sign up here

Student Sign in Page:

The student sign in page allows student too sign in by providing their registered email id and password and click on the sign in button. If student is new to app and don't have an account then he/she needs to click on "Sign-up" to proceed to sign up page The sign in page does not accept null inputs

Student Sign up Page:

The student sign up page allows student to sign up as new student by providing their email id and password and click on the sign up button. The signup page does not accept null inputs.



Email ID

Password

SIGNUP

2/5

Question 1

9

A

B

C

D

Quiz Question:

The student appearing a specific set of type quiz will have 4 options and a 10sec timer for each question.

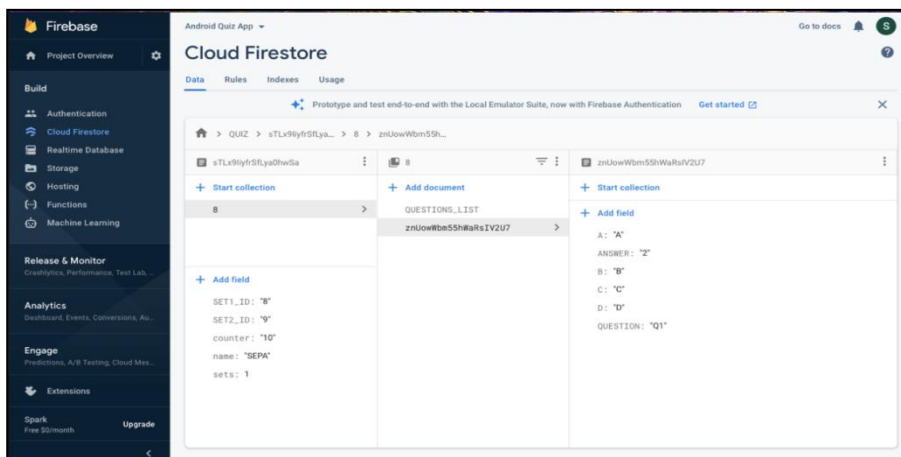
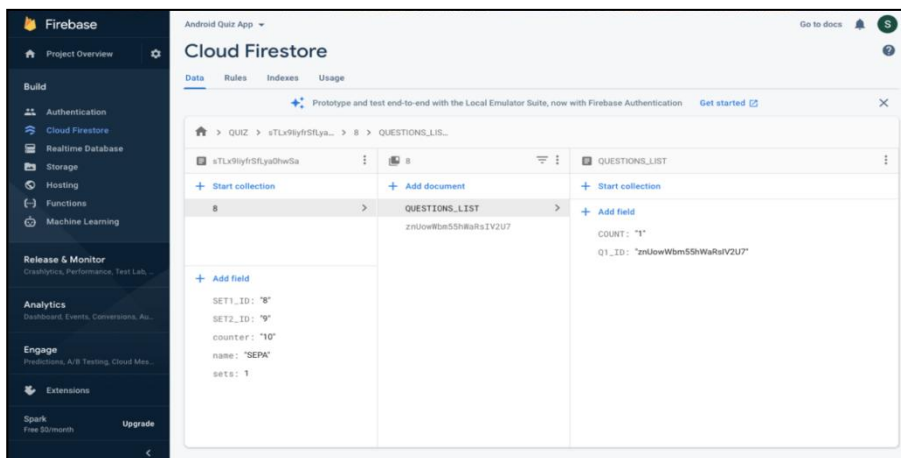
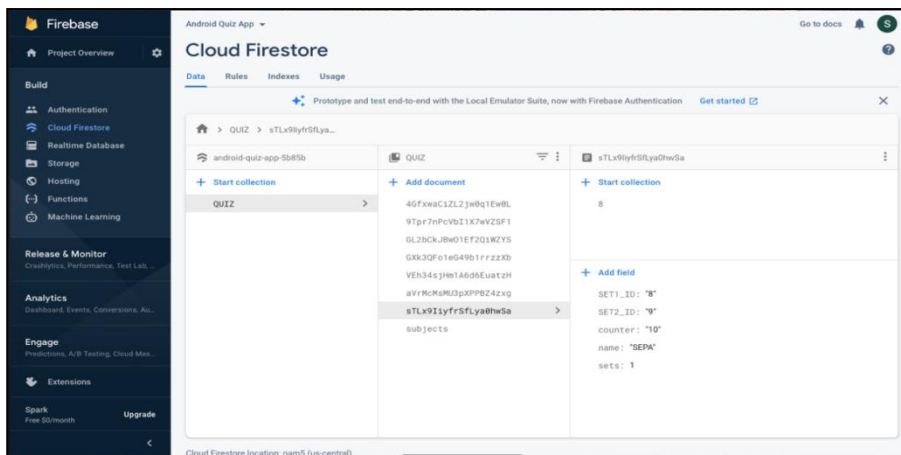
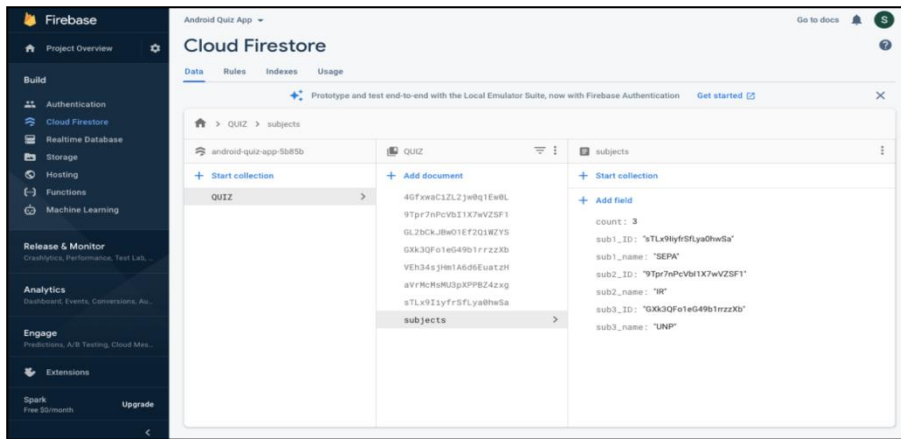
Quiz Mark:

After successful completion of quiz of a set type under a subject, the student will be able to see his/her mark for the appeared quiz.

SCORE

2/5

DONE



Firestore (Fire-store) Database

Summary – Discussion

The Student Performance Tracker App described in this document has been designed to fill a specific niche in the market by providing educational institutions with the ability to offer its students an online quiz option without having to invest large amounts of time and money in having custom physical quiz exam on paper. The system, which is highly customizable, allows to easily managing the content, most importantly the question set and options, themselves through a very intuitive interface.

This project involved an easy and mobile way of tracking student performance in providing complete and required quiz solutions by developing an Android operating system mobile application. The application allows the teacher to register, to add course, add quiz question sets, update sets, mark quiz for the student with correct quiz solution, check student's quiz submission and completion.

The application allows the student to register, to attempt quiz and check performance through marks. The targeted group tentatively involved professors and students and after the development and completion of this project, the project was tested on android emulator device in order to confirm that the required objectives and goals of this project were successfully achieved.

Conclusion and Future Works

The development of this application was successful with achievement of all the compulsory and necessary technical requirements which enable easy tracking of quizzes on phones by the users of this application. This project improved our technical and programming skills through working with Android studio and other mobile application development technologies such as XML, Firebase.

The challenges in the development of this project include creating a responsive user interface with tools such as list views. Also getting familiar with android studio development tool was challenging at the beginning such as software debugging, creating and running of application on virtual device. During the designing and development phase of this project, requirement of skills and knowledge from other programming technologies which we were not familiar with also contributed to the challenges faced and these challenges were a part of milestones in success of the project.

There are possible improvements that can be included in this project in the future by increasing functionalities of the project in order to improve users' satisfaction. Such improvement includes providing functionality that permits the user to reset his/her password. In future this can be developed into a full-fledged app which can be used by all types of people in educational institutions, parents at any time with a lot of more choices.

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Mapping of Pos and PSOs to Evidences

Student Performance Tracker App		
POs and PSOs	Descriptions of POs and PSOs	Evidences (Page No.)
PO1	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	Project Report: Abstract (iv), Introduction(1-3)
PO2	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	Project Report: Introduction, Literature Review (1-3) Summary(23) Conclusion and Future Work(24)
PO3	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	Project Report: Requirement Analysis and Specification(4-8), Design(9-12)
PO4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	Project Report: Design(9-12)
PO5	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	Project Report: Coding – source code(13-16)
PO6	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	Project Report: Testing and Results(17-22)
PO7	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	Demonstration of app

PO8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	Project Report: Declaration(ii)
PO9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Project Report: Contribution(v), Presentation
PO10	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	Project Report and Presentation
PO11	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	Presentation
PO12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	Project Report: Conclusion and Future Work(24)
PSO-I	The ability to understand, analyze and develop computer programs in the areas related to business intelligence, web design and networking for efficient design of computer-based systems of varying complexities.	Project Report: Coding(13-16)
PSO-II	The ability to applying standard practices and strategies in software development using open-ended programming environments to deliver a quality product for business success.	Coding in Android Studio Demonstration of app