CHECKit: A Mobile Exam Checker

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ABSTRACT

Information technology brought forth change in personal communication and the society as a whole. The researchers acknowledge the fact that technology played an important role in the people's daily needs. CHECKit (A Moibile Exam Checker) was made to help teachers in checking papers. This application can easily scan the test paper of the students and show the result of the exam. With the help of this application, it reduces manual checking, which would result into more time for teachers other tasks. The application has different features such as import and export and record of the students through excel file. This application was developed through Android Studio and OpenCV. CHECKit is only running on Android devices with a minimum version of KitKat up to the latest version of Android OS.

KEYWORDS: Exam Checker, Mobile Application, Mobile Checker

1.0 Introduction

A major change has occurred in personal communication and society due to the influence of the information technology. Each day the researchers are a step closer to some undefined goal regarding how advanced our technologies are. The researchers knew that technology plays an

important role in fulfilling the daily needs. Technology can be seen everywhere from a simple sheet of paper to a mobile device. From a day until late night, technology is associated with everyone. A revolution of technology has made human life much easier, making the tasks much faster and, saving time. No one can imagine a life without technology. People are increasingly pursuing work that can be done in the comfort of their habitation.

students from excel file. It shows the score of the student then export it into excel file. It also shows where the student got correct and wrong answers. The application also shows the item analysis of the exam. It scans up to 50 items. While scanning, the test paper must be on a flat surface, so it can be scanned accurately The mobile application will only run on Android devices from KitKat up to the latest version of Android OS. It will not scan if the test paper is not in a flat surface. Unanswered exam papers and multiple shaded answers will be invalid. It cannot scan words it only scans bubble sheet test forms. The users cannot make their own style of shaded exams It will not detect or accept other format of answer sheets except the provided format of the researchers.

For generations, teachers have always complained of the extra effort and time needed to check their students' test papers. Instead of spending the time for checking, the teachers can use it to maximize the time to teach. This mobile application will make it much easier for them to do that task, giving them more time to interact with students or bond with their families.

The mobile application can check multiple choice and shaded exams. The user must sign up an account for security purposes of the application. The researchers will provide a link where the user can download and print the answer sheets. After providing the preferred type of answer sheet and have been distributed to the students to answer. The user can create different subject and section and the user can import the list of

1.1 Objectives of the Study

1. To develop an application that scans the answer sheet and shows the score.
2. To provide teachers with a more convenient way of checking test papers.
3. To store and access record of the student.

2.0 Literature Review

Mobile Application

According to Ivy Wigmore (2014), a mobile app is a software application developed specifically for use on small, wireless computing devices, such as smartphones and tablets, rather than desktop or laptop computers.[1]

Mobile apps are designed with consideration for the demands and

constraints of the devices and also to take advantage of any specialized capabilities they have. A gaming app, for example, might take advantage of the iPhone's accelerometer.

Mobile apps are sometimes categorized according to whether they are web-based or native apps, which are created specifically for a given platform. A third category, hybrid apps, combines elements of both native and Web apps. As the technologies mature, it is expected that mobile application development efforts will focus on the creation of browser-based, device-agnostic Web applications[2].

Android

According to Marziah Karch (2013), an operating system for smartphones and other devices, developed by Android, Inc. and later purchased by Google. The Android platform is based on the Linux operating system, and features numerous apps developed by Google and by third-party developers. Phones running the Android operating system are the primary competitor to Apple's iPhone, and are the best-selling smartphones worldwide.

One of the Android's selling points is an ability to break down application boundaries. Another advantage is that it is easily developed, not to mention its speed of app development. A large community of developers continuously devises and designs apps that enhance the capability of devices. These apps are then made available worldwide through Google's Android Market, or other third-party sites[3].

OpenCV

OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products. Being a BSD-licensed product, OpenCV makes it easy for businesses to utilize and modify the code.

The library has more than 2500 optimized algorithms, which includes a comprehensive set of both classic and state-of-the-art computer vision and machine learning algorithms. These algorithms can be used to detect and recognize faces, identify objects, classify human actions in videos, track camera movements, track moving objects, extract 3D models of objects, produce 3D point clouds from stereo cameras, stitch images together to produce a high resolution image of an entire scene, find similar images from an image database, remove red eyes from images taken using flash, follow eye movements, recognize scenery and establish markers to overlay it with augmented reality, etc. OpenCV has more than 47 thousand people of user community and estimated number of downloads exceeding 18 million. [4]

Scanner

According to Margaret Rose (2014), scanner is a device that captures images from photographic prints, posters, magazine pages, and similar sources for computer editing and display. Scanners come in hand-held, feed-in, and flatbed types and for scanning black-and-white only, or color. Very high resolution scanners are used for scanning for high-resolution printing, but lower resolution

scanners are adequate for capturing images for computer display.

Scanners usually come with software, such as Adobe's Photoshop product, that lets the user resize and otherwise modify a captured image. Different types of scanners are available with different resolutions. In the world of electronic data transmission, scanning is considered to be the most cost-effective and reliable way of transmitting images[5].

Multiple Choice

According to Audrey Watters (2013), the International Test Scoring Machine is a device that removes the burden and much of the expense involved in the accurate scoring of examinations. It is designed specifically for use in educational, business, and governmental institutions where tests of the objective type are used in measuring academic achievement, mental traits, aptitudes, personality, vocational interests, and other areas necessary for the guidance or placement of students and personnel. Large numbers of objective tests requiring “true or false” answers, or the selection of one from among several suggested answers to each question are scored mechanically.

A single answer sheet provides sufficient space for answers on several different subjects, three of which may be scored with one insertion. A glance at the meter reveals the score an accurate total of the right answers the number wrong or the difference between the two. The turn of a control switch puts the scores into the terms desired even into percentage figures[6].

Answer Sheet

According to Adrian Rosebrock (2013), answer sheet or bubble sheet is a special type of form used in multiple choice question examinations. Optical mark recognition is used to detect answers. The most well known company in the United States involved with optical answer sheets is the Scantron Corporation, although certain uses require their own customized system. The terms "Optical answer sheet" and "scantron" have become more or less interchangeable.

Answer sheets usually have a set of blank ovals or boxes that correspond to each question, often on separate sheets of paper. Bar codes may mark the sheet for automatic processing, and each series of ovals filled will return a certain value when read. In this way students' answers can be digitally recorded, or identity given[7].

Janice E. Velasquez et.al (2013), “Design and Development of an Online Exam Maker and Checker” an online computer aided tool was designed primarily for the conduct of online examination. The system was created using PHP, a web based scripting language, and MySQL as the database software. The system focuses on the automation of students' examinations; preparation, scheduling, checking and grading. A database is provided for the storage of exam questions, answers to questions and students' records. The system allows instructors to create an exam by entering questions with its corresponding answers into the database. Instructors are provided with three options on the type of exam; these include, True or False, Multiple Choice and Fill in the Blanks. It is similar to the researchers application because it also checks exams[8]. It is different to the

application of the researchers because "CHECKit" can scan and it is an offline application.

Ruellyn Ilagan Evangelista et. al (2015), The "Exam Analysis: is a Mobile Exam Item Analysis for LPU College of Computer Studies" an application which uses answer sheet that needs to be shaded in answering. It is used for capturing types of exams such as multiple choice, true or false or by shading with a pen, and the information gathered by capturing a snapshot of the exam paper will be used in an item analysis to have a specific data result. The application requires USB Tethering and Wi-Fi Hotspot because it uses XAMPP as the external database. Before the application can function, it should be connected first to the computer that has XAMPP installed and save the template of the exam paper in the root directory of the phone. The application has features that allows users to select whether the analysis will be done for preliminary, midterm, semifinal, or final exam. The user can input the correct key answers to the exam, and edit it later, take a picture of the exam paper and then upload it into the application, review the papers, and perform item analysis.

The mobile application is not capable of transferring data result into document, text, and other files. It is also not capable of transferring files over the net, recognizing the types of exam such as identification, enumeration, matching type, essay, and other type of exam which involve words or sentences as answer. It is also not capable of backing up files. The clarity of the images depends upon the image captured[9]. This application is related to the researcher's topic because it also scans test papers. The difference is that the "CheckIt" can export student's record as excel file.

Kotobee (2014), BookWidgets is a learning platform that allows teachers to create fun and engaging interactive lessons for tablets and computers. The tool has over 40 activities, such as quizzes, crosswords, worksheets, and other interactive teaching apps. Once the teacher has made an assignment, the student can fill it in and send it back to the teacher. The teachers' dashboard allows the user to follow their student in time and give them constructive feedback. The user may access the platform and download the results anytime, anywhere[11]. The system is related because it is about exams and exercises for teachers and students to use. It does not scan exams it is only use for creating exams.

Jason Tomaszewski (2013), GradeBook Pro is a powerful classroom management tool. Its many features allow teachers to categorize assignments and view grades by category, use either weighted or standard grade scales, award extra credit or deduct penalty points, calculate the average score for each assignment, evaluate overall class performance, email grade, attendance or status reports to students. The user can create PDF reports of class grades, rosters and attendance records[11]. This application is related to the current study because it is helpful for teachers to compute the grades of the students in their record. Their application is a system type that stores data of the student while the application that the researchers will develop cannot store data.

Prasanna Bharti (2017), Socrative Teacher is an app that the developer a Boston high school math teacher claims (s)he saves 80 minutes a week in grading time. That alone is reason enough to take a flyer on it. Socrative Learner requires each student has the technology to run the

app, but it turns multiple choice, true false, and "quick quiz" answers digital for instantaneous grading[12]. This application has the same idea of the current study because it is about saving time in grading. Students must use the application to answer their activity and will be automatically checked.

Adrew Cullison (2017), Grade Ticker is an app on multi-page exams, many teachers find it necessary to write the number of points deducted per page at the bottom of each page, and then they have to go back through at the end to add it all up. To streamline that process with Grade Ticker, which lets the user see what they have deducted as they go and adds it all up to the user at the end[13]. This application can relate to the researchers study because of its design for creating multiple page exams for grading. The researchers application cannot store data that can deduct the grades of the students.

The capstone project entitled "Online Grades Viewer for Lyceum of the Philippines University Batangas - High School" by Aguilar et. al (2014) would enable students to view their grades online. This website lessens the time it takes for the student to view their grades and can maintain the integrity and confidentiality of the student grades. Even at home, students can view their grades, which can save time and effort. This website has three portals; the admin, faculty, and students[14]. This is similar to the present study because it also deals with viewing of grades. The difference is that the grade that will be viewed is the total grades instead of exam grades.

According to Chadwick et. al (2016), "FormScanner: Open-Source Solution for Grading Multiple-Choice Exams" multiple-choice exam remains a staple for many introductory physics courses. Today, one usually grades the exams with a form scanner that utilizes optical mark recognition (OMR). Several companies provide these scanners and particular forms, such as the eponymous "Scantron." OMR scanners combine hardware and software--a scanner and OMR program--to read and grade student-filled forms[15]. This is like the present topic because it is also a scanner which checks test papers. The only difference is, the students will have a spreadsheet with students' scores, answers to individual questions, and detailed analysis of the class' performance.

According to Han Hsiao (2014), the creator of "Mobile grading paper-based programming exams" it is an innovative mobile application to support grading paper-based programming exams. We call the app – Programming Grading Assistant (PGA). [16]. It scans pre-generated QR-codes of paper-based question-and-concepts associations and uses OCR to recognize handwritten because it mentions about scanning and using Android is different with the present study.

3.0 Methods

The Mobile App Development Life Cycle is a popular type of an application development model for mobile application development. This process of building an application follows a detailed one step at a time approach. It consists of a detailed plan describing how to develop, maintain and replace specific mobile application. The life cycle defines a methodology for improving the quality of the mobile application and the overall development process.

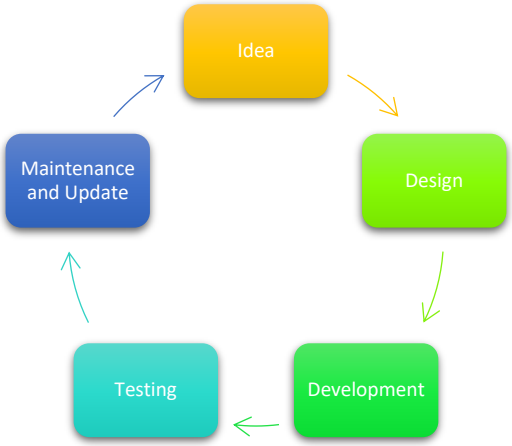

Figure 1. Mobile App Development Life Cycle

Idea

The researchers dedicated enough time to this phase, conducting extensive data gathering and brainstorming to gain as many ideas as possible. The idea focuses on defining and capturing the needs and problems that a mobile application is to address, solve and set the stage for the rest of the phases of the mobile application development. With the help from their adviser they come up with various topics however one topic will only be approved by their dean. They have looked for similar type of applications and interviewed some teachers then gather more information about the topic.

Design

During this second stage, the researchers designed the application layouts. The researchers worked on the possible look of the application. They conducted prototyping with the use of Adobe XD a computer application for designing the user interface of a mobile application to properly see the interface of the mobile application. This phase is usually accompanied by documentation for each idea, which enables other members of the team to review it for verification.

Development

The purpose of the development phase is to implement the idea according to the design made during the design phase in each target technology. It is the development phase in which the realization of the abstract ideas and concepts takes place. If errors and conflicts occur, they must be repaired immediately. It could lead to an increase in overall effort since possible errors can be attributed to different phases and are not always caused by the previous phase.

Testing

The application that is developed in the development phase are integrated into a mobile device to test if all the functions is working properly. They need to perform all the testing activities functional and non-functional to make sure that the system meets the requirements.

Maintenance and Update

It is important that after the mobile applications gets in the hands of the users, proper maintenance and updates are needed for the application to be close to perfection. This is important because it avoids a situation where the app retention rate drops.

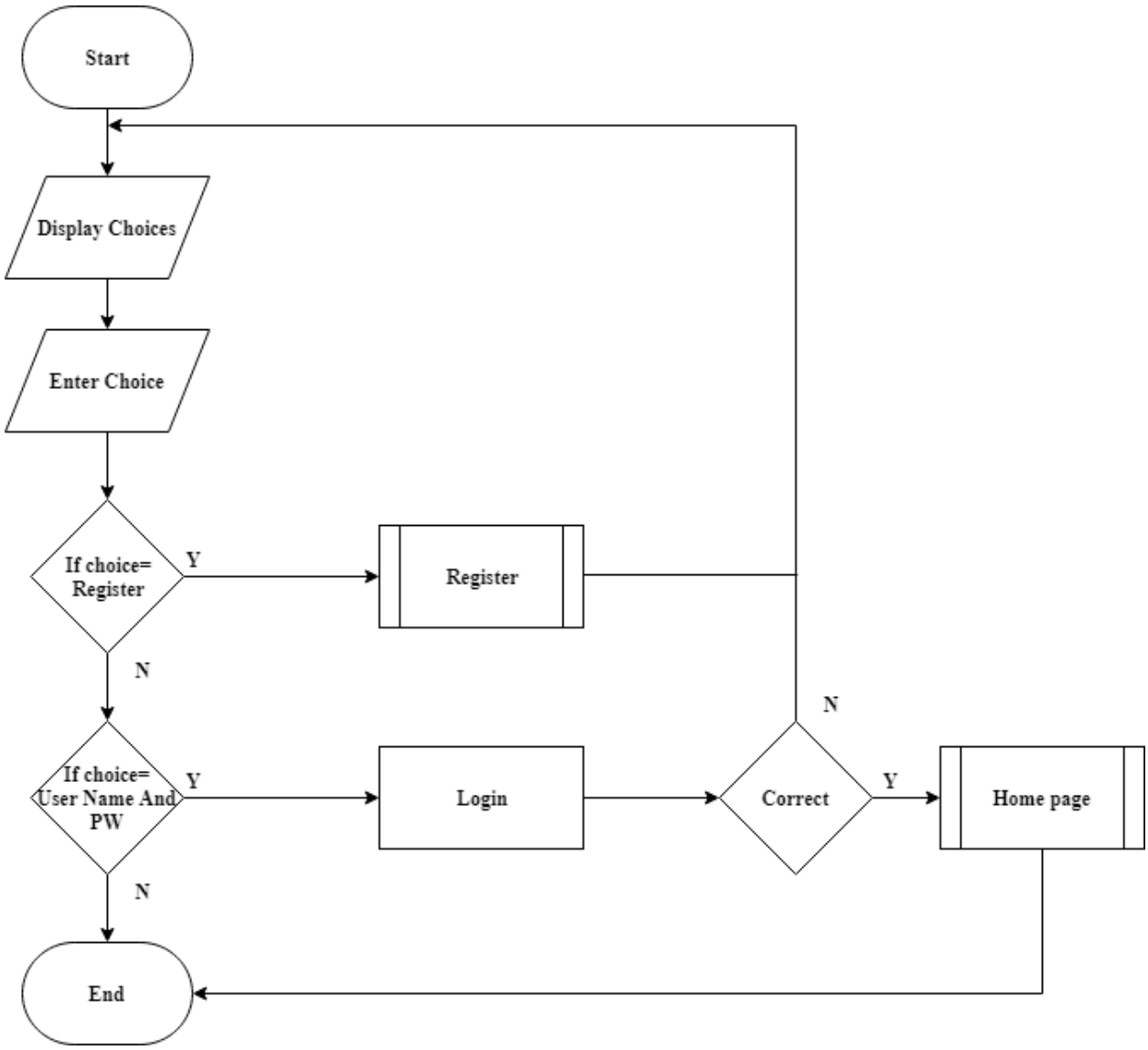

Figure 2. Login Screen

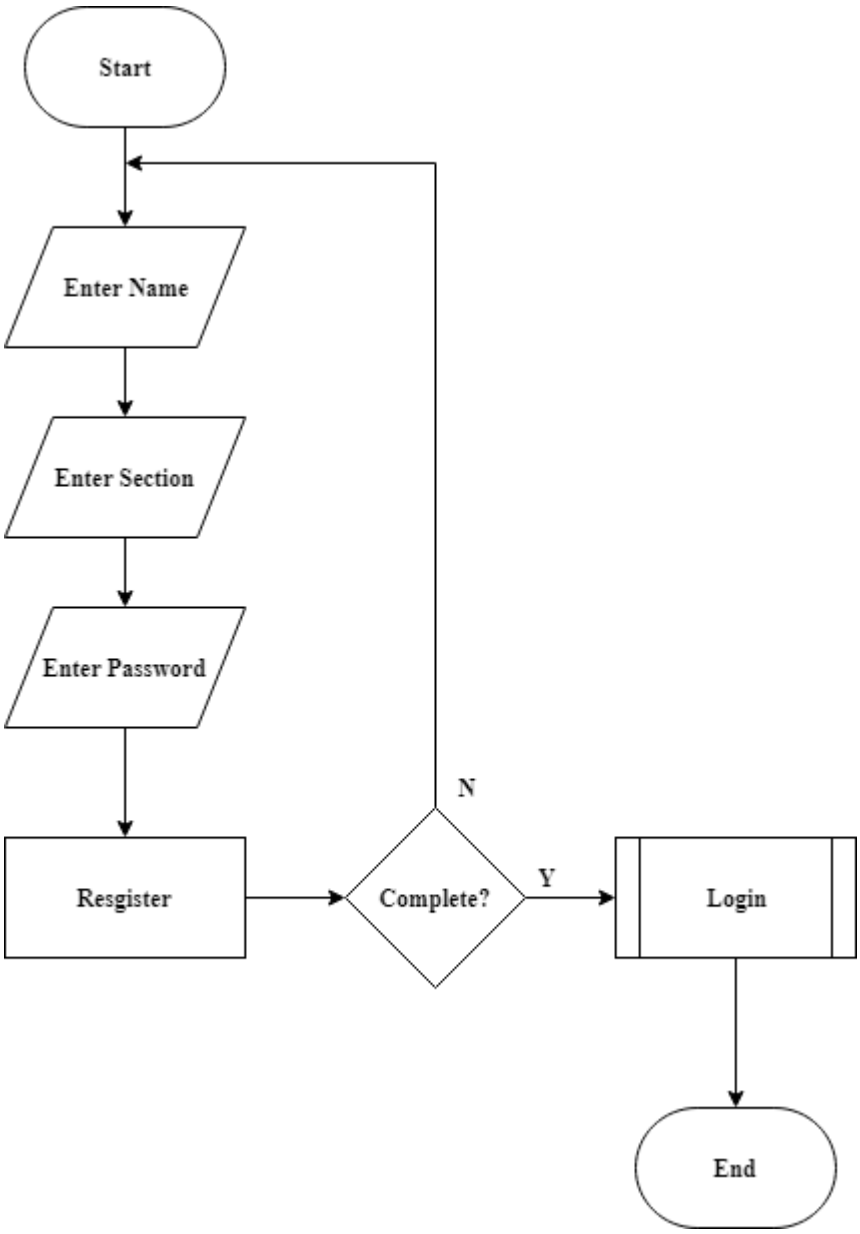

Figure 3. Register

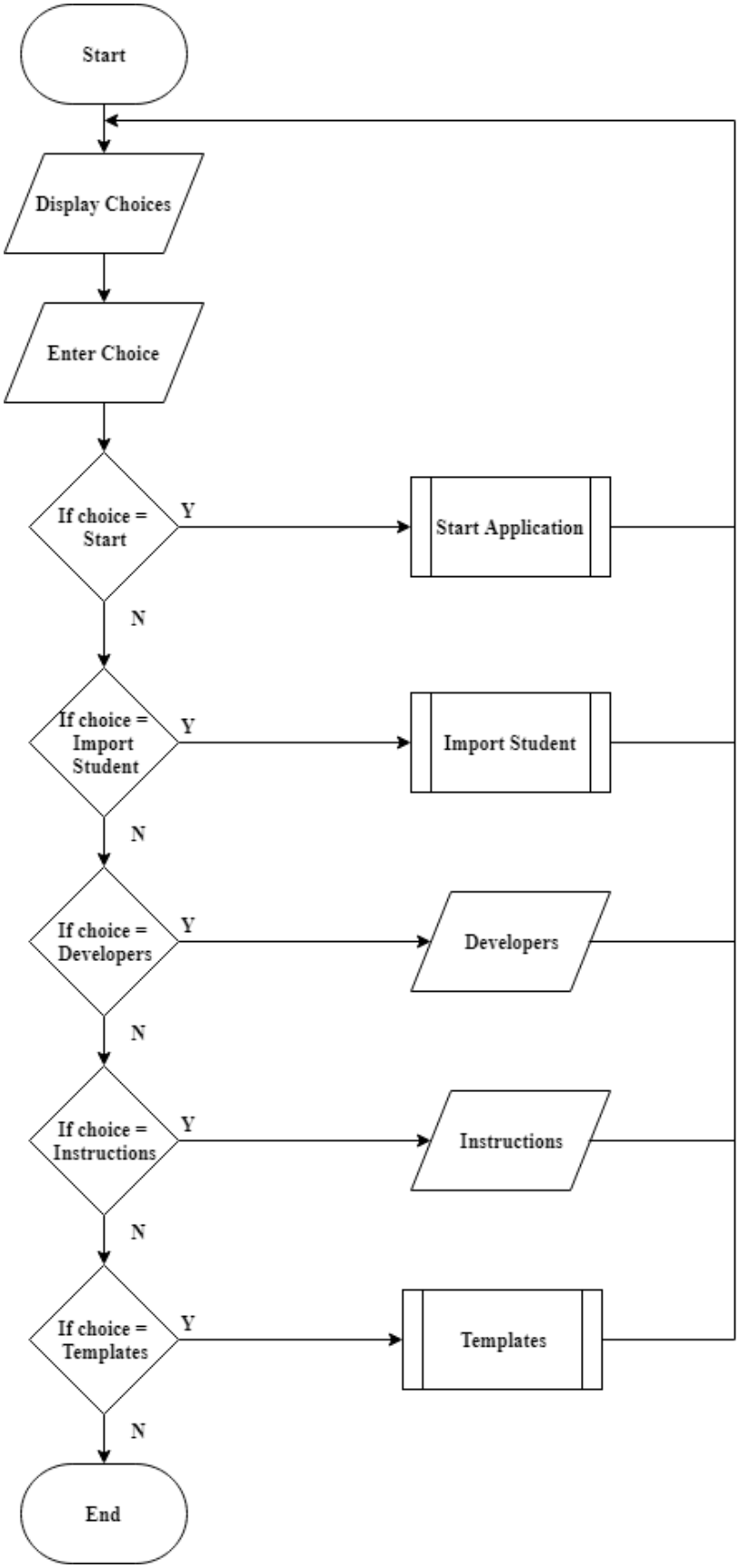

Figure 4. Home Page

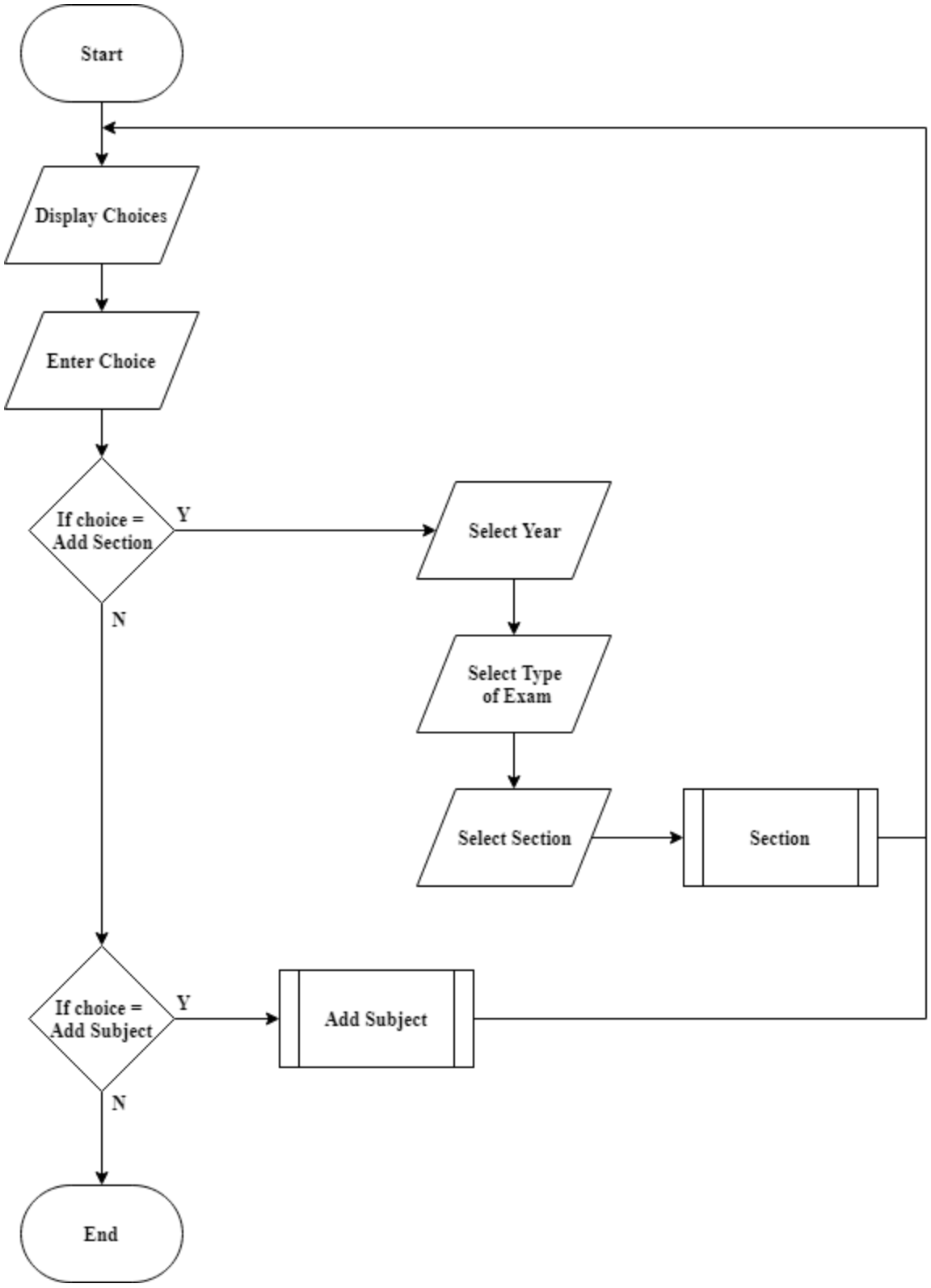

Figure 5. Start Application

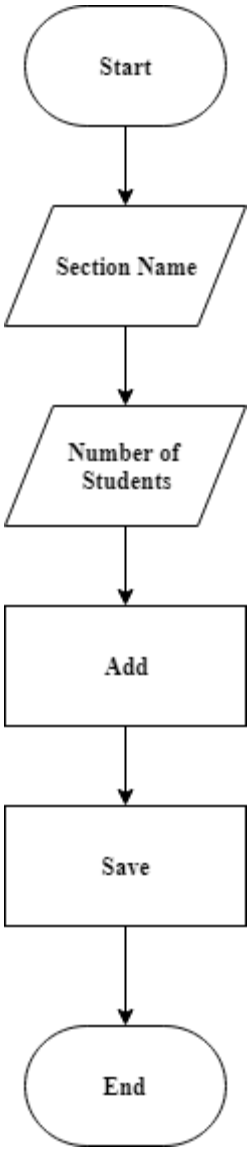

Figure 6. Add Section

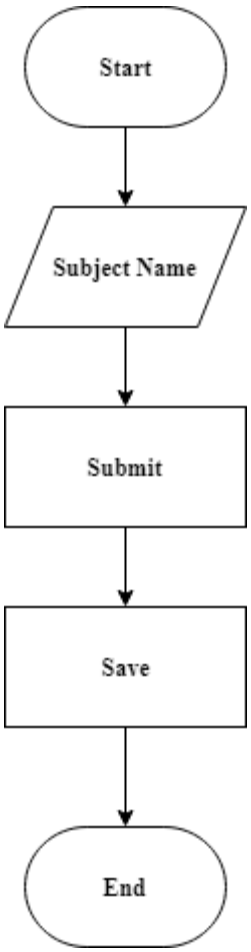

Figure 7. Add Subject

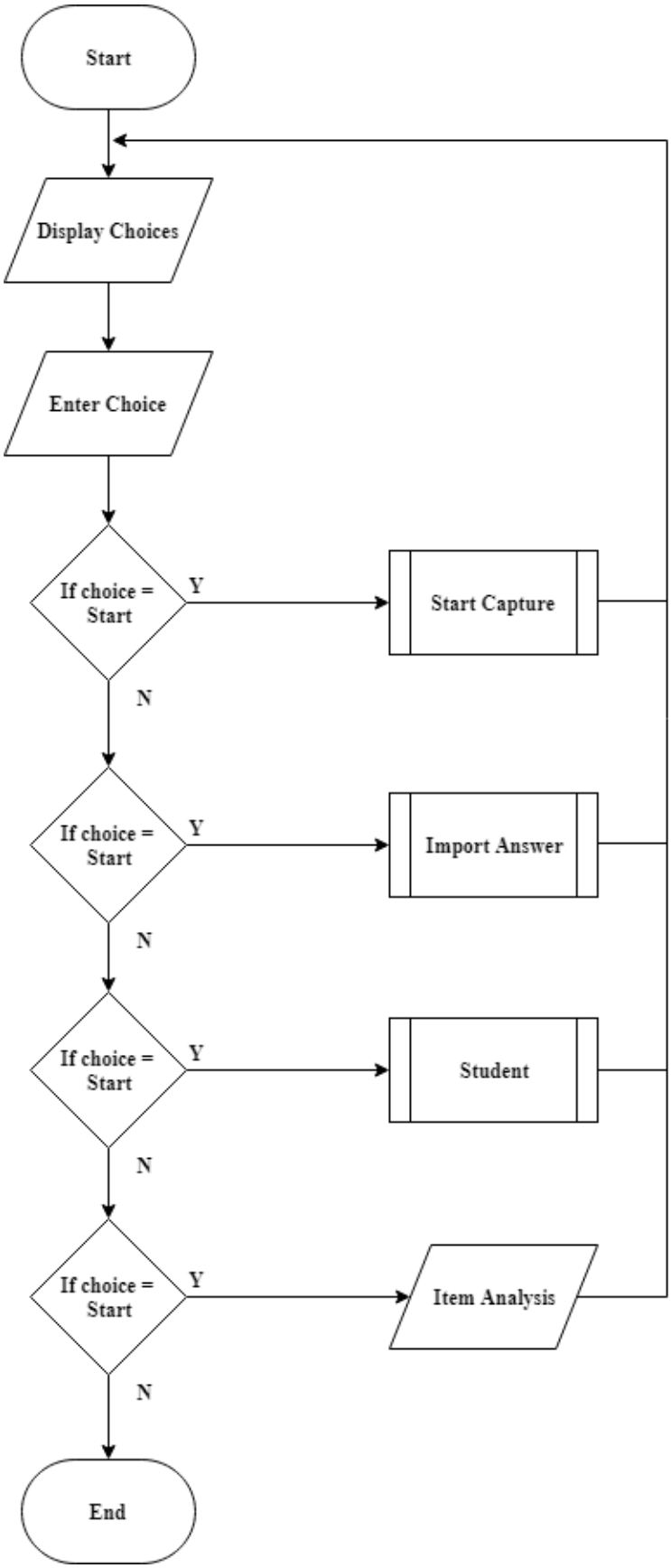

Figure 8. Main Screen

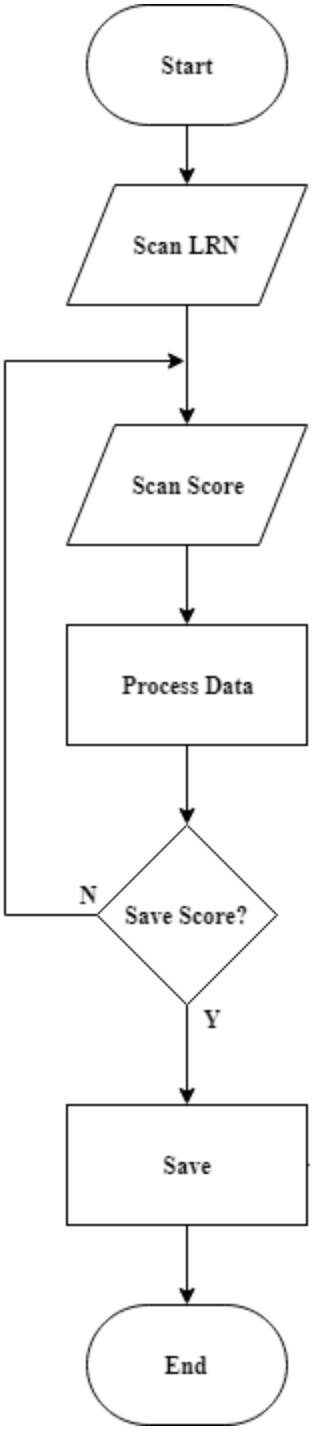

Figure 9. Start Capture

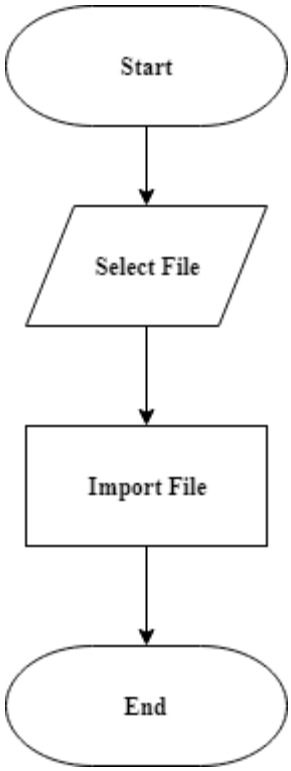

Figure 10. Import Answer

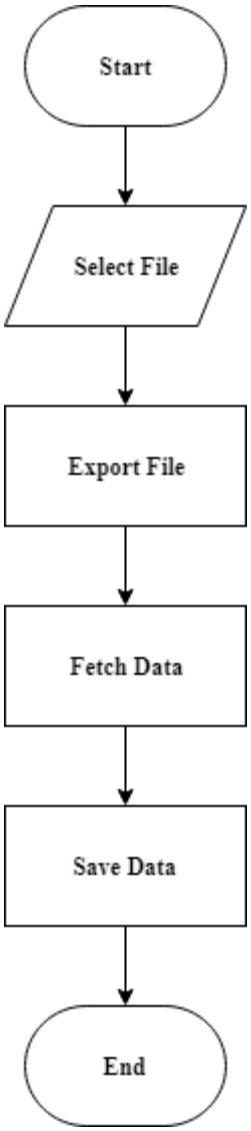

Figure 11. Students Score

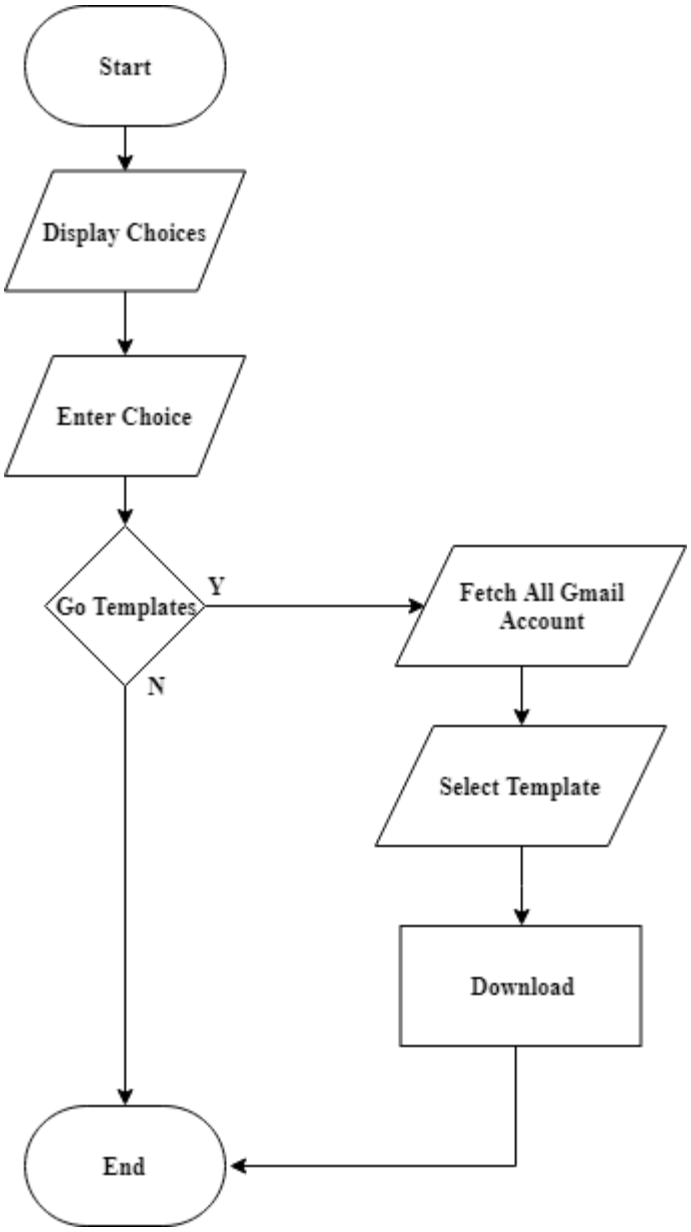

Figure 12. Templates

Figure 13. Application Logo

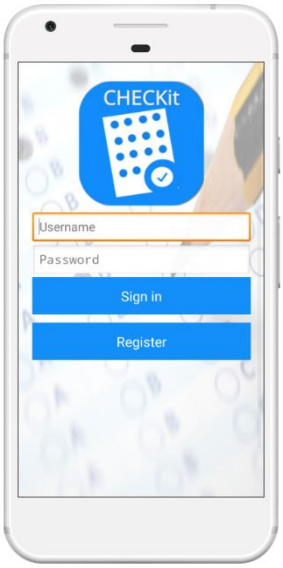

Figure 14. Main Screen

This is where the user creates or login an account

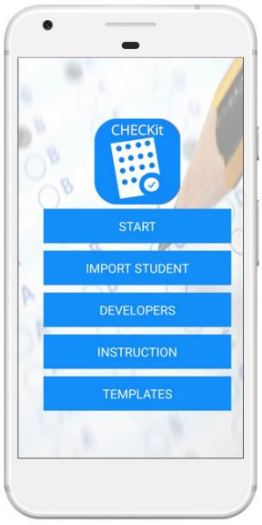

Figure 15. Home Page

This page contains the Start, Import Student, Developers, Instructions and Templates

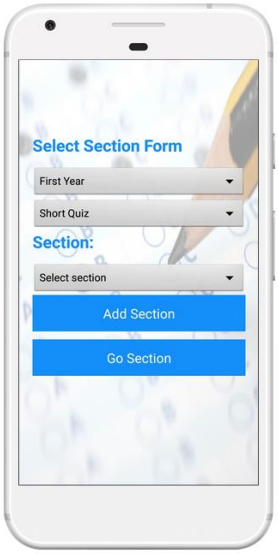

Figure 16. Start

In this page, the user creates a section and go to the section.

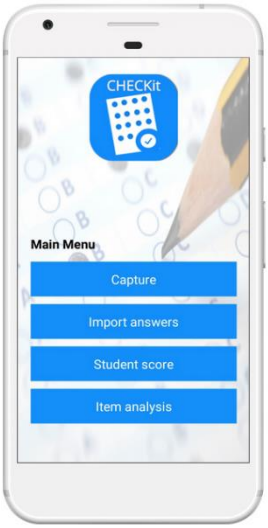

Figure 17. Create Subject

After creating a section, the user creates a subject for the student.

Figure 18. Adding Student

In this page is where the user search for the section and then input the number of students of the section.

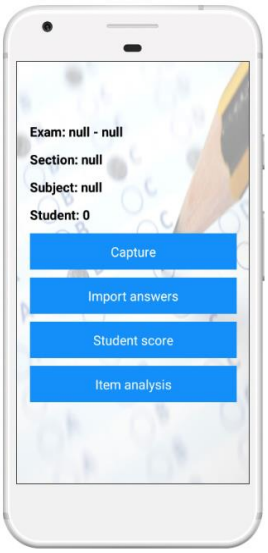

Figure 19. Scanning Menu

In this page contains the
Capture, Import Answers,
Student Score and Item Analysis

Figure 20. Capture Button

This page is where the user
inputs the students number
before scanning.

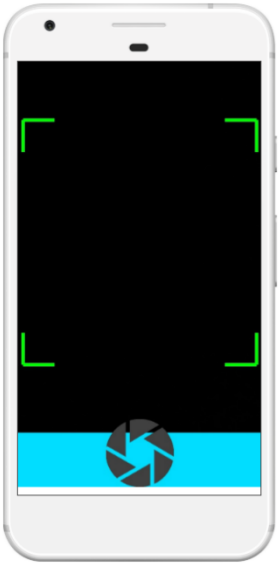

Figure 21. Scanning

This is where the user scans the test paper of the student.

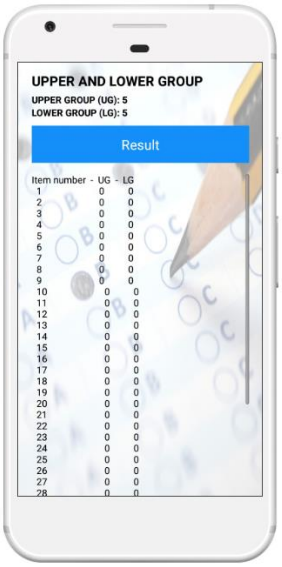

Figure 22. Item Analysis

This page shows the item analysis of the student.

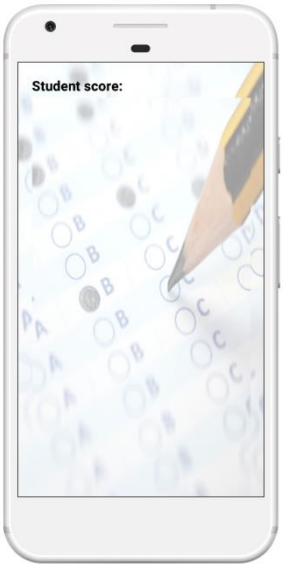

Figure 23. Result

In this page it shows the result
of the student's exam.

Figure 24. Developers

This page shows the developers
information of the application.

5.0 Summary

Summary

The main purpose of this mobile application is to help the faculty. The project aimed to provide teachers with a more convenient way of checking test papers with minimal effort and to provide accessibility to store and access record of the student. This study is similar to other exam scanning applications though this study has different feature such as; importing and exporting the records of the student and access student record from excel file. The researchers looked for similar type of applications and interviewed some teachers to gather more information about the topic.

Conclusion

The following conclusion were drawn based on the findings of the study:

1. CHECKit will benefit the professors in checking test papers.
2. It will reduce time and effort of the professors in checking test papers.
3. It highly stores and access the record of the student through MS Excel.

Recommendation

The following recommendations are hereby presented

1. CHECKit can be a basis for the future researchers to promote and improve the application
2. They should go through a research to utilize and enhance the answer sheet scanning for quicker result.
3. They should also develop a new feature of the application for the professors to fully handle the mobile scanner application such as improving the scanning process.

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