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Research Paper

Streamlining Student Result Processing In Tertiary Institutions: A Software Application Approach

Daniel A[1]., Suleiman, I.A[2]
[1]*Department of Computer Engineering, Faculty of Engineering, Edo State University Uzairue, Km7, Auchi-Abuja Road, Iyamho-Uzairue Edo State, Nigeria*
[2]*Department of Agricultural & Bioenvironmental Engineering, School of Engineering Technology, Auchi Polytechnic, Auchi, PMB 13, Auchi, Edo State.`*
Correspondence: aliu.daniel@edouniversity.edu.ng

ABSTRACT
This paper presents a software application designed to streamline the processing of student results in tertiary institutions. The developed application has been successfully tested and demonstrated to function as intended. It offers high-speed and accurate processing of students' GPAs while presenting the output in the desired format. The user-friendly GUI replaces the command-line approach, making the system easy to use, reasonably secure, and capable of enforcing data integrity. To incorporate computer-based processing of student information, a thorough investigation and analysis of the existing manual methods were conducted. The efficiency of the software can be further improved by implementing the following recommendations: It is essential to validate input data to ensure the integrity of the system and maintain the highest standards of accuracy and security in processing student results. By adopting this software application for processing student results, tertiary institutions can significantly enhance their academic record management's efficiency, accuracy, and speed, promoting a more streamlined and practical approach to student performance evaluation.
Keywords*: Student Result Processing, Tertiary Institutions, GPA Calculation, Software Application, User-Friendly GUI*

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I. INTRODUCTION

Since the Android operating system took over as the leading operating system for smartphones in late 2010, they have been an evolution of changes to the way people interact with the development of Android applications ranging from social media applications Williams and Darwish (20017), productive applications for Taxi Booking and many more which optimizes performance and profitability to our modern generation. Young people between the ages of 16-34 are the most users of smartphones, according to a recent survey carried out by Hamed and Ali (2015). With an estimated 150 million users across the globe, the Android operating system has been the leading choice among smartphone users as the Technology in the Mobile application is getting wider and better, and the result is also having a significant impact on the entire sector. (Thomson, 2001, Oludele, 2015) Android, as an Operating System, works on various types of Smartphones, Tablets etc., as the Major component of performance is based on the kind of Application Software available in the Smartphone. (Anigbogu, 2000) Universities across the globe use the Grade Point Average (GPA) to make their examination and result process easy. This application works efficiently (Afolabi, 2007, Anighbou, 2000, Derbyshire, 2000, Gethead, 2008). An android-based GPA Calculator will be an intelligent tool that calculates GPA within a second. All you need to do is enter all course information, including course name, student grade, credit load and total credit hours for the semester.

With the advancement of Technology and introduction to educational apps, students are not required to invest their time and money to buy any required GPA manual calculator from shops and libraries (Stephens and Sargent, 2009, Thomson, 2001). This Android-based calculator will help students who cannot calculate their performance and improve overall academy wellness. One of the most significant investments in many organizations is creating, maintaining, and retrieving information. It has been estimated that information is essential for correct students' record and examination data in an organization such as a tertiary educational

community. If not properly created and stored, student information will cause many errors in usage (Sridharan and Vikram, 2015). Nearly every section of the educational system requires information processing. With the use of computers for information processing, the following are possible: instant access to students' personal and course information, instant student information updating, automatic computation of the Grade Point Average (GPA), generation of the graduating students' list, monitoring of failed courses, keeping an up-to-date record of the entire student body in the institution, storing course information such as course code, course description, course unit, and scores for GPA computation, and producing user-friendly data entry screens for ease of use. Unfortunately, all educational institutions in the developing world, such as the Universities, Colleges of Education and polytechnics in Nigeria, still operate under the manual method of record keeping and computation of GPA (Anighbou, 2000, Derbyshire, 2000, Gethead, 2008).

The manual system employed is not very efficient in that a lot of paperwork has to be done, which takes a reasonable length of time to prepare; therefore, because of these problems and errors arising from such a system, a software-computerized result processing system becomes inevitable; the benefits accruable from the computer-based system cannot be overemphasized.

The computation of examination results and registration of students is an object-centred activity, with the Student being the dominant object in this case. The effort expended in the process of registration of students and computation of their examination results is excellent (Thomson, 2001). It is quite worrisome that these processes are carried out every academic session, putting the operators in a continuous and ever-demanding cycle. Hence, the need to evolve a computerized process that will effectively and efficiently capture all the essential data associated with the registration and examination result processing within the university and the interactions among the objects (Savage, 2001).

Students' Examination Result summarises each semester or four years' performance in a degree program. (Schroeder 2010), A student's result is prepared or formed by the scores entered on the designed score sheet by the individual subject lecturers on semester examinations (Schroeder, 2010). This genuine and noble desire necessitated designing and developing the Undergraduate Registration and Examination Processing System software (Vangel, 2013; Williams et al., 2017, Savage, 2001). The errors associated with the existing manual system for calculating students' results in most universities in Nigeria are time-consuming for the Student. Due to the lack of result computing knowledge, it is very cumbersome for Students to understand, making it very easy to error. This project aims to design and implement an Android-based GPA calculator. The project work will help in many ways to ease the operation of the existing system; this will make it easy for every Student to calculate their GPA without wasting time, and this will help the Student to confirm their result.

II. RESEARCH METHODOLOGY

2.1 System Analysis and Design

2.1.1 System Analysis

System analysis is a problem-solving technique that decomposes a system into its component pieces to study how well those components work and interact to accomplish their purpose. The data of this analysis activity gives the specification of what the proposed system will do, based on the requirements.

2.2 REQUIREMENT SPECIFICATION

2.2.1 Functional Requirements

This functionality requires providing interaction facilities for the user, collecting and manipulating data for use between the front and back end, and displaying the data needed by the user.

2.2.2 Non-functional Requirements

The requirements include; usability, reliability, performance, correctness, and security. These requirements ensure that the proposed system meets the need for its design and implementation purpose. Non-functional requirements do not provide any facility (for the user) to interact with the system.

2.3 Analysis Of The Existing System

The existing system (software package) adopted in the university for processing students' results is the Microsoft Excel package. This package allows students' data, such as the matriculation number, program level, department, courses, and examination scores needed for computing the GPA and CGPA, to be entered into cells using the package's functions. After computation of the GPA and CGPA, the Master Mark Sheet and other results printouts are designed as a spreadsheet (using Microsoft Excel package) where all the students' results

2.3.1 Problems of the Existing System

The existing system works fine; however, it is very complex for a student to get access to, and it is not suitable for calculating a (one) student result; it is mainly used for multiple computations and has to work with the help of a computer and domain knowledge is highly required because all the codes are encoded within the cell in MS Excel.

2.3.2 The Solution to the Problem

This project will solve the abovementioned problems by designing an Android-based application using Java programming language that will enable students to calculate their GPA using their smartphones. The application will be easy to use, and even Students without much computer knowledge will be able to use it. This will be very covenant for the Student because they are familiar with using their Smartphone, making it even more user-friendly.

2.4 System Feasibility Study

Feasibility Study of a system is the study of the viability of that system; a study on search Engine android app was carried out by me in the aspects of the hardware requirement such as the processor, random access memory (RAM), the software requirement such as the operating system, a programming language which is Java Programming language for program design, the financial cost of the program and the duration of time I have to carry out this project, and I got to understand that the project is feasible.

2.5 New System Design

This App is designed to ensure that the students can calculate their GPA independently to verify there was no mistake while compiling results from MS Excel. The new system will allow the users to make this calculation with the help of this application instilled on their Smartphones. The result will be generated within a millisecond, making it fast and easy to use.

2.5.1 System Architecture

This deals with the conceptual models that define the structural components and inter-relationship among the system element. It denotes the high-level structure of software which comprises the software elements (entities), the relationship between them, and in some cases, the attributes of both entities and relationships.

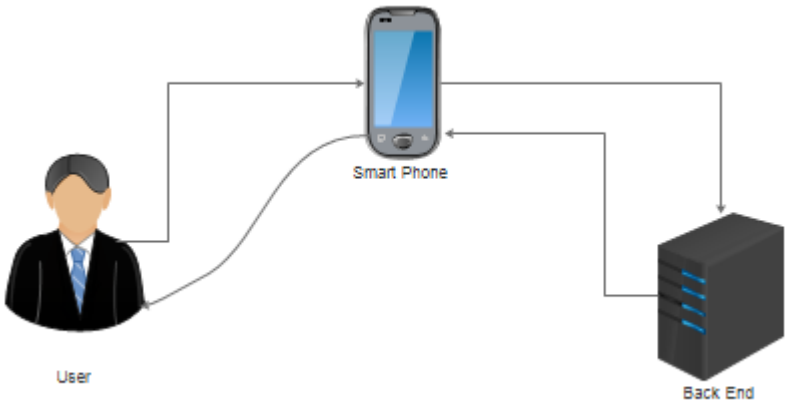

Figure: 1: System Architecture

2.5.2 System Flowchart

System flowcharts display how data flows in a system and how decisions are made to control events. To illustrate this, symbols are used. They are connected to show what happens to data and where it goes.

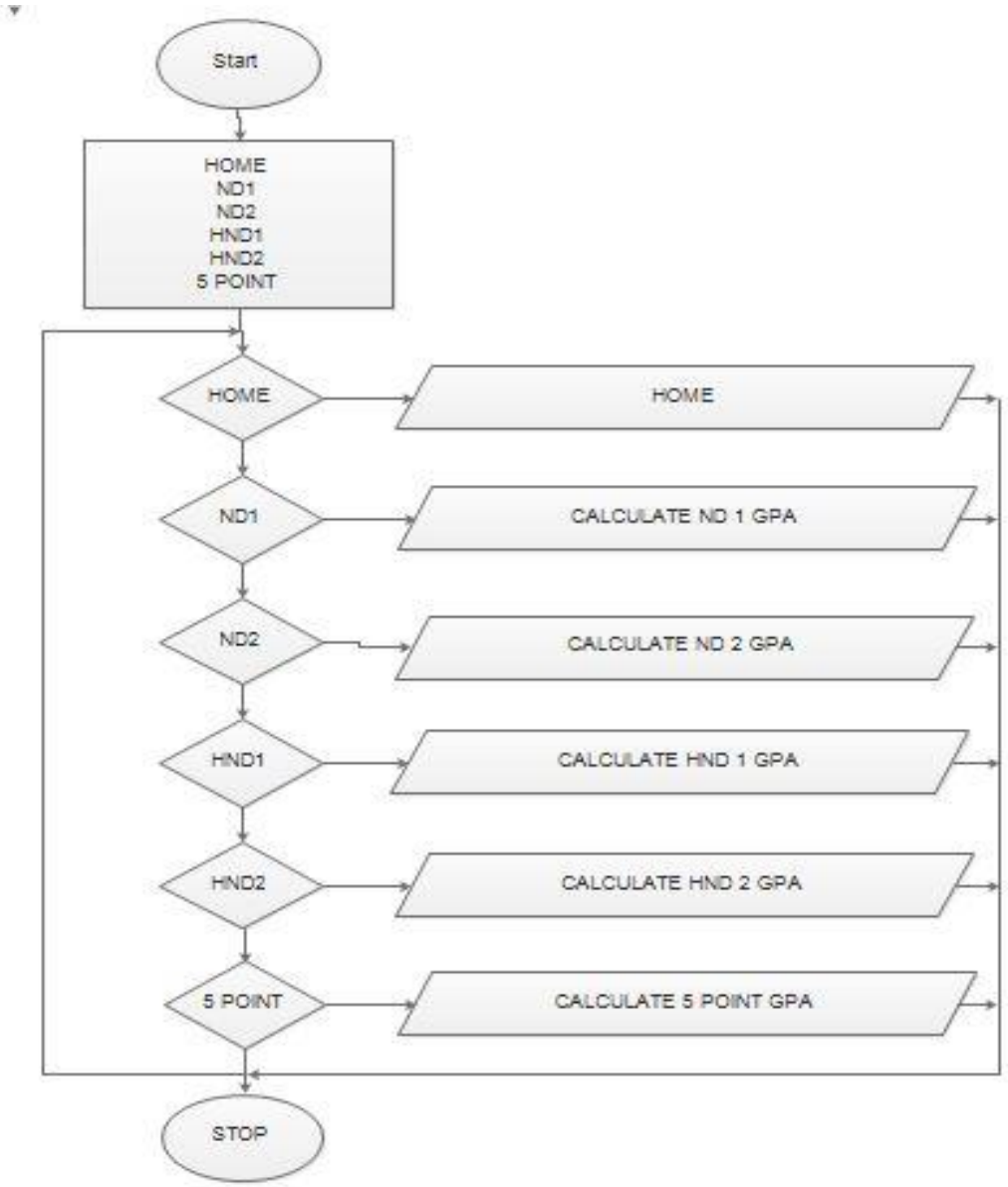

Figure: 2: System flowcharts

III. RESULTS AND DISCUSSION

The Development section describes how the different components in the project have been implemented, which consist of the development tools, implementation and documentation standards and conventions alongside the difficulties faced and how they were addressed.

3.1 System Development

Development is the stage where the ultimate goal of making a system or software a reality is achieved. In this phase, the actual coding of the software using Java programming language was used, which was also a direct translation of the user needs and the system requirement into a developer-friendly document.

The system is developed to generate to perform GPA calculations for Computer Science Students of NILEST And also for the general department whole

3.2 System Implementation

System implementation defines how the information system should be built (i.e. physical system design). It ensures that the information system is operational and used. It also ensures that the information system meets quality standards. On the other hand, system evaluation provides feedback for system improvement and helps measure the developed system's success. This chapter describes how the system works and how the best computer knowledge can advance the effective gaming of pot and pan.

User Interface

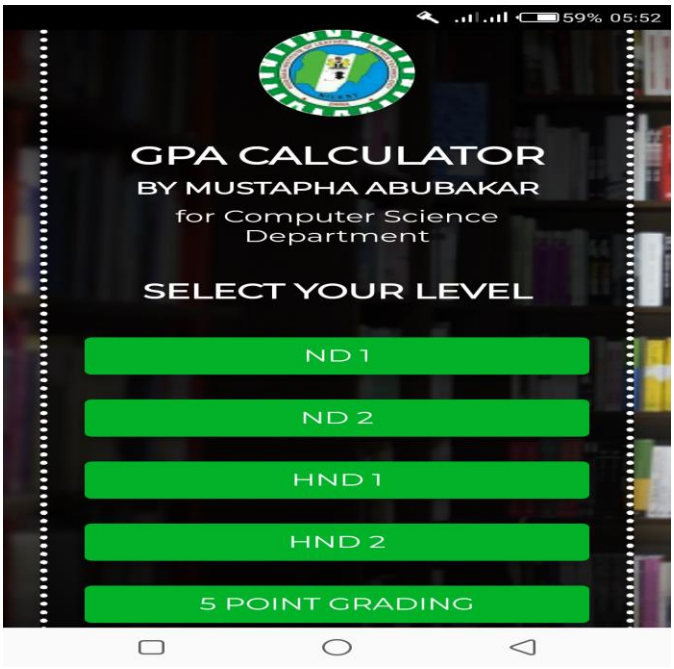

Figure 3: Main Manu.

This is the interface where the user can interact with the system

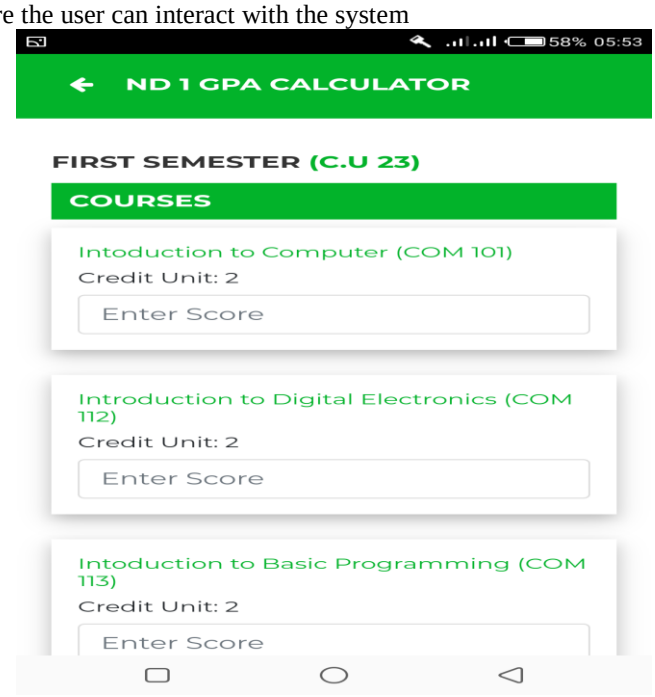

Figure 4: ND 1 Calculator Dashboard.

This is where ND1 can interact to calculate their result.

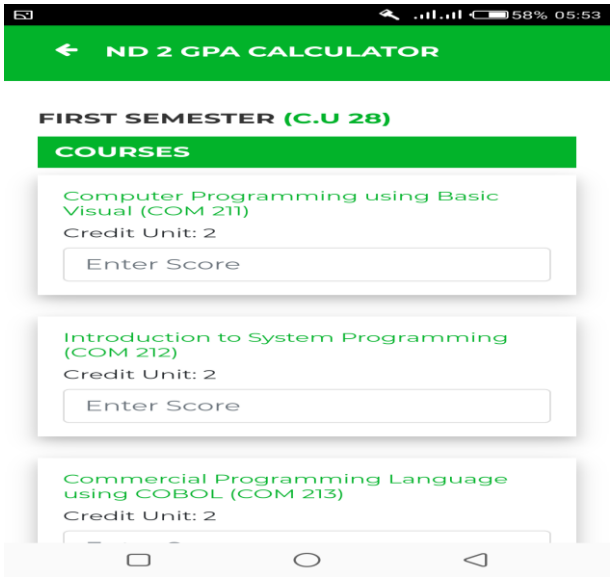

Figure 5: ND 2 Calculator Dashboard.
This is where ND2 can interact to calculate their result.

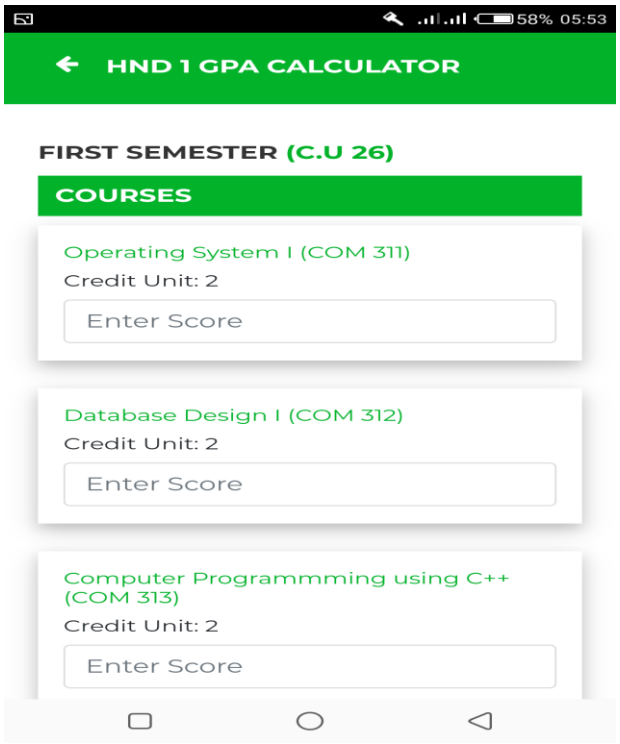

Figure 6: HND1 Calculator Dashboard.
This is where HND1 can interact to calculate their result.

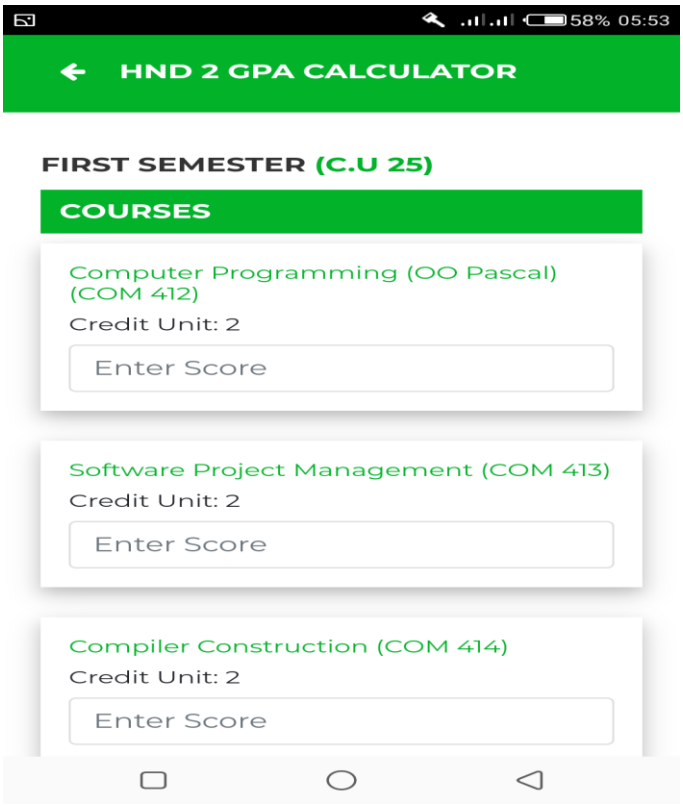

Figure 7: HND2 Calculator Dashboard.
This is where HND2 can interact to calculate their result.

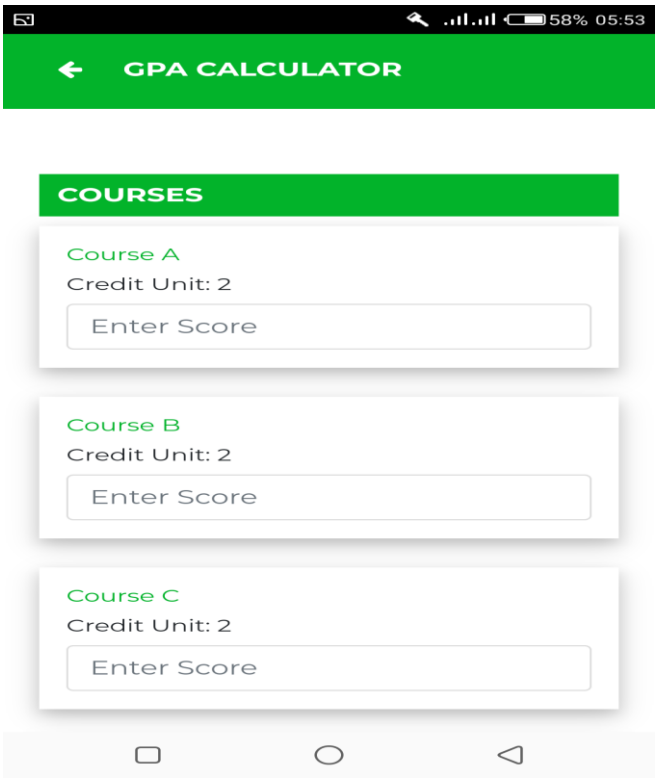

Figure 8: 5 Point GPA Calculator.
This is where you can interact to calculate the result.

3.3 Testing

This discusses the various testing approaches adopted by the researcher and system conversion/changeover plans.

3.3.1 Unit Testing

A unit is the smallest testable part of the software. It usually has one or a few inputs and usually a single output. In Object-Oriented programming, the smallest unit is a method which may belong to a base/super class, abstract class or derived/child class. In procedural programming, a team may be an individual program, function, procedure, etc.
Unit testing is a level of software testing where individual units/components are tested. The purpose is to validate that each software unit performs as designed. Unit testing frameworks, drivers, stubs, and mock/fake objects assist in unit testing.

3.3.2 Integration Testing

Integration testing is a level of software testing where individual units are combined and tested as a group. This testing aims to expose the faults in the interaction between integrated units. Test drivers and test stubs are used to assist in integration testing.

3.3.3 System Conversion Plan

System conversion or changeover is concerned with the smooth shift from one way of doing things to another and mitigating disruption to business activities during the changeover. Systematically, it means changing the old system with the new one without disrupting the flow of operations for this developed system. Direct changeover is suggested. The system is implemented directly as there are no other systems it replaces.

3.4 System Requirements

System requirements or software lists what software programs or hardware devices are required to operate the program. These are the necessary specifications your computer must have to use the software or hardware.

3.4.1 Hardware Requirements

Hardware is the computer equipment and devices involved in a computer system's function together with the software components. Hardware is the physical components of the computer system assembled to interact with the software to form a hybrid system.
The minimum hardware requirements are:

i. Android Version 4.2 and Above
ii. 100MB available disks space
iii. RAM (1gig)

3.4.2 Software Requirements

The programming language used in writing this software is Java, and it was made to run on Mobile/Smart Phones. **Operating system:** Android Version 4.2 and above
Memory: The minimum memory requirement is 1 gigabyte.

IV. CONCLUSION

To introduce the use of computers in the manual processing of students' information, careful investigation and analyses were carried out on the existing method. Many text and journal (handbook) records were consulted to have an in-depth understanding of the significant concepts of operations. This work finally presented a software application to ease processing of students' results in Polytechnics and universities. The application was successfully developed, tested, and found to be working as expected. After the trend of investigation and initial analysis had been made on both the manual system (old) and the new system of carrying out the operation of students' result processing, it became apparent that It is capable of storing and processing students' results with high speed and accuracy and presenting output in certain required forms. It has some

qualities, such as a reduction in the cost of processing and a decrease in time spent computing GPAs. The Application software is flexible and can be modified to suit record-keeping and data processing. It is easy to use because it uses a GUI (Graphical user interface) rather than a command line approach, is reasonably secure, and enforces data integrity. With this application, the processing of students' results can be automated to a large extent, thereby reducing processing time and increasing accuracy.

The efficiency of the software can be further enhanced based on the following recommendations: Efforts should be made to validate the input data to ensure the integrity of the system. The primary users should be given an initial orientation on interacting with the design for optimal utilization of the system facilities. Further work should be done to calculate the result using grade order; based on the limitation of this project, it is recommended that further research should be carried out so that necessary amendments, as well as improvement, can be made.

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