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RESEARCH ARTICLE OPEN ACCESS

DESIGN AND IMPLEMENTATION OF AN ANDROID BASED GPA CALCULATOR

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ABSTRACT

This paper presented a software application meant to ease the processing of students results in a tertiary institution. The application was successfully developed, tested, and found to be working as expected. It is capable of processing students' GPA with high speed and accuracy, and presenting output in the required form. It is easy to use due to the use of a GUI rather than command line approach, reasonably secured, and enforces data integrity. In order to introduce the use of computers into the manual processing of students' information, careful investigation and analyses were carried out on the existing method. The efficiency of the software can be further enhanced based on the following recommendations: Effort should be made to validate the input data to ensure the integrity of the system.

INTRODUCTION

Since android operating system took over as the leading operating systems 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 recent survey carried out by Hamed and Ali, (2015). With an estimated 150 million users across the globe, 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 outcome of the result is also having a great impact on the entire sector. (Thomson, 2001, Oludele, 2015) Android as an Operating System works on various types of Smartphones, Tablet etc. as the Major component of performance is totally based on the type of Application Software available in the Smart phone. (Anigbogu, 2000) Universities across the globe use the Grade Point Average (GPA) to make their examination and result processes easily. This application is effective and works efficiently (Afolabi, 2007, Anighbou, 2000, Darbyshrre, 2000, Gethead, 2008). An android-based GPA Calculator will be a smart tool that calculates GPA within a second. All you need to do is enter all course information ranging from course name, student grade, credit load and total credit hour 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 are

unable to calculate their performance and improve overall academy wellness of students. One of the largest investments in many organizations is the creation, maintenance, and retrieval of information. It has been estimated that in an organization such as a tertiary educational community, information is highly essential for correct students' record and examination data. Student information, if not properly created and stored, 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 the purpose of GPA computation, and producing user-friendly data entry screens for ease of use. It is unfortunate that 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, Darbyshrre, 2000, Gethead, 2008).

The manual system employed is not very efficient, in that a lot of paper work has to be done which takes a reasonable length of time to prepare, Therefore, because of this 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 over emphasized.

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

Students' Examination Result is the summary of each of the semester or four years performance in a degree program. (Schroeder 2010), A students' 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 the design and development of 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, is time consuming for the student and due to the lack of result computing knowledge it is very cumbersome for student to understand which make it very easy for error. The aim of this project is to design and implement an android based GPA calculator. The project work will help in a good number of ways to ease the operation of the existing system this will make it easy for every student to be able to calculate his/her GPA without wasting time and this will help the student to confirm his or her result.

RESEARCH METHODOLOGY

SYSTEM ANALYSIS AND DESIGN

SYSTEM ANALYSIS

System analysis is a problem-solving technique that decomposes a system into its component pieces for the purpose of studying how well those components work and interact to accomplish their purpose. It is the data

of this analysis activity that gives the specification of what the proposed system will do, based on the requirements.

REQUIREMENT SPECIFICATION

Functional Requirements

The requirement of this functionality is to provide interaction facilities for the user, collecting and manipulating data for use between the front end and the back end, and display the data needed by the user.

Non-functional Requirements

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. The requirements include; usability, reliability, performance, correctness, and security.

ANALYSIS OF THE EXISTING SYSTEM

The existing system (software package) adopted in the university for the processing of students' results is the Microsoft Excel package. This package allows students data such as the matriculation number, program level, department, courses, and examination scores which are 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

Problems of the Existing System

The existing system is work 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 computation 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.

Solution to the Problem

This project will provide solutions to the above mentioned problems by designing an android based application using java programming language that will enable the Student calculate their GPA on their own with the use of their smart phones. The Application will be easy to use that even student without much computer knowledge will be able to make use of it. This will be very covenant for the student because they are familiar with the use of their smartphone, which makes it even for user-friendly to the student.

SYSTEM FEASIBILITY STUDY

Feasibility Study of a system is the study of viability of that system, 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, 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.

NEW SYSTEM DESIGN

This App is designed to ensure that the students are able to calculate their GPA on their own to verify it there was no mistake during compilation of result from MS Excel. The new system will allow user to make this

calculation with help of this application instilled on their smartphone and the result will be generated within some millisecond, which makes it fast and easy to use.

SYSTEM ARCHITECTURE

This deals with the conceptual models that define the structure components and inter-relationship among the component of the system. 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 relation.

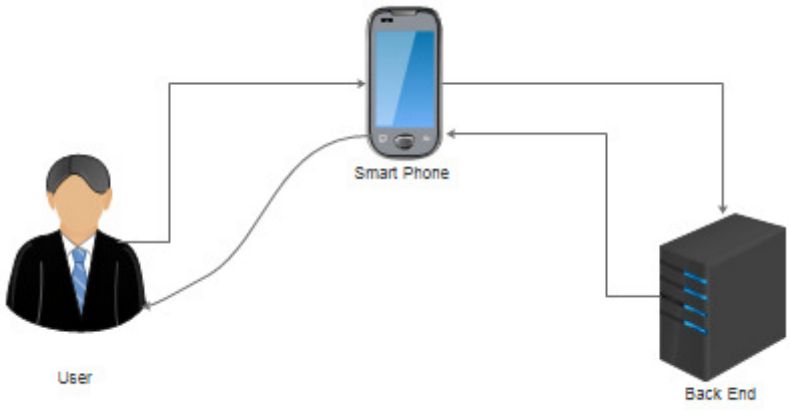

Figure: 1: System Architecture

SYSTEM FLOWCHART

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

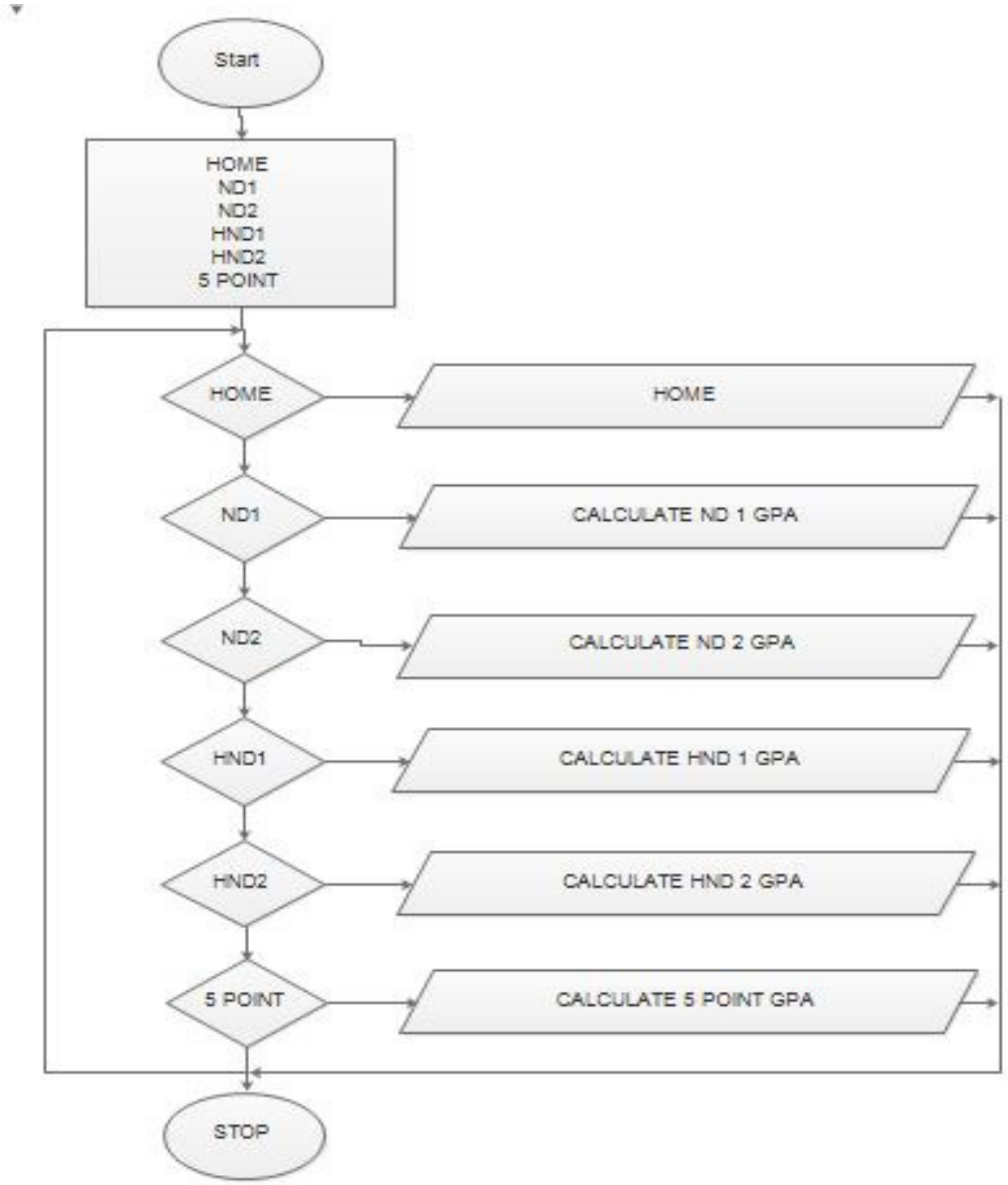

Figure: 2: System flowcharts

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 convention alongside the difficulties faced and how they were addressed.

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 calculation for Computer Science Student of NILEST And also for the general department all whole

SYSTEM IMPLEMENTATION

System implementation is the process of defining 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 to measure the success of the developed system. This chapter describes how the system works and how best computers knowledge can advance the effective gaming of pot and pan.

User Interface

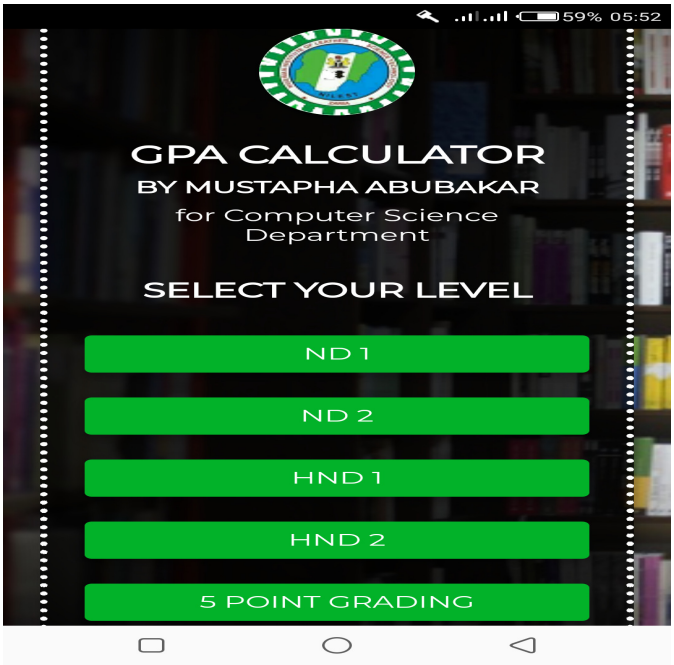

Figure 3: Main Manu.

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

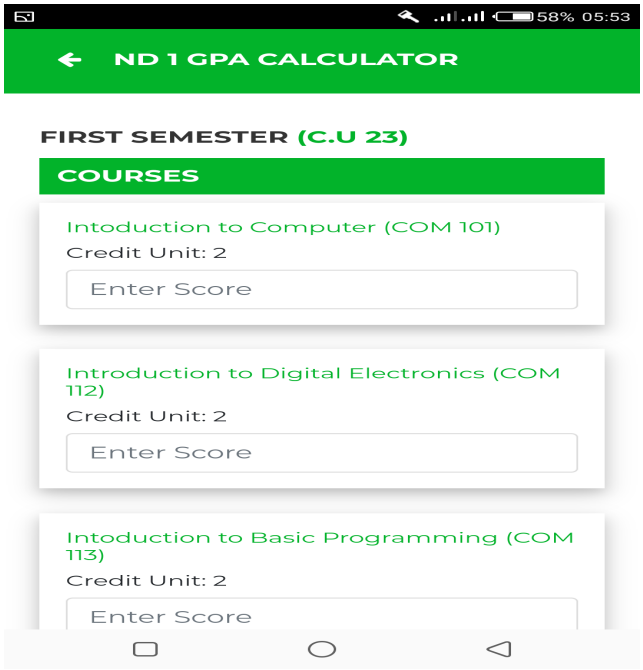

Figure 4: ND 1 Calculator Dashboard.

This is where ND1 can interact with to calculate their result.

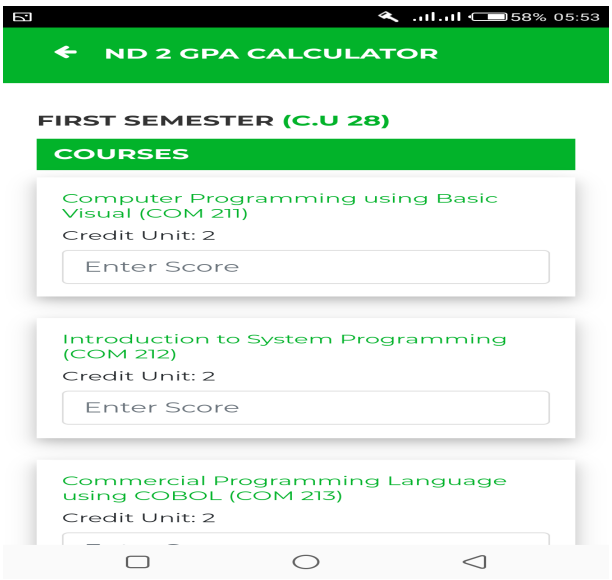

Figure 5: ND 2 Calculator Dashboard.

This is where ND2 can interact with to calculate their result.

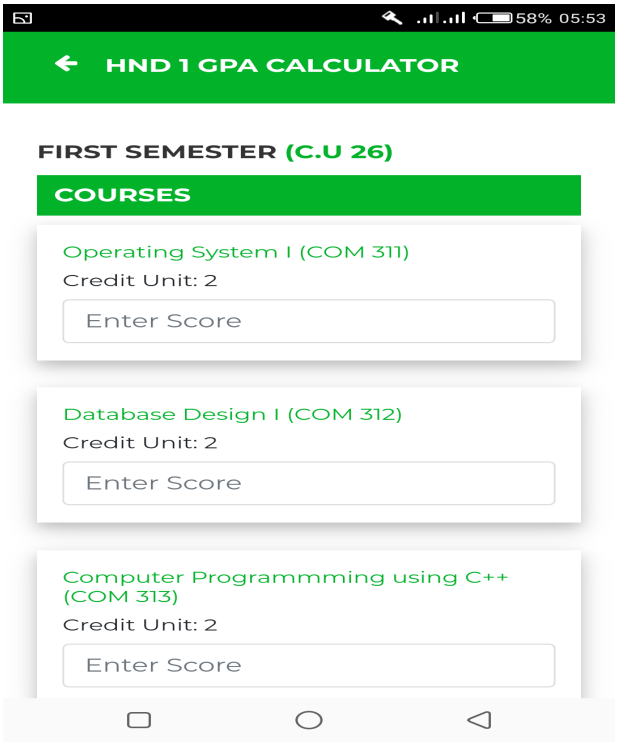

Figure 6: HND1 Calculator Dashboard.

This is where HND1 can interact with to calculate their result.

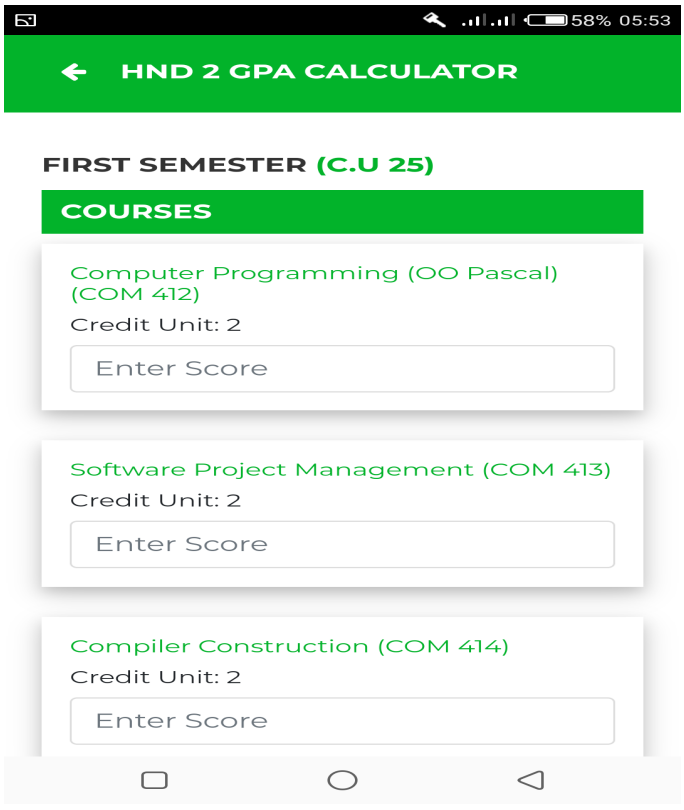

Figure 7: HND2 Calculator Dashboard.

This is where HND2 can interact with to calculate their result.

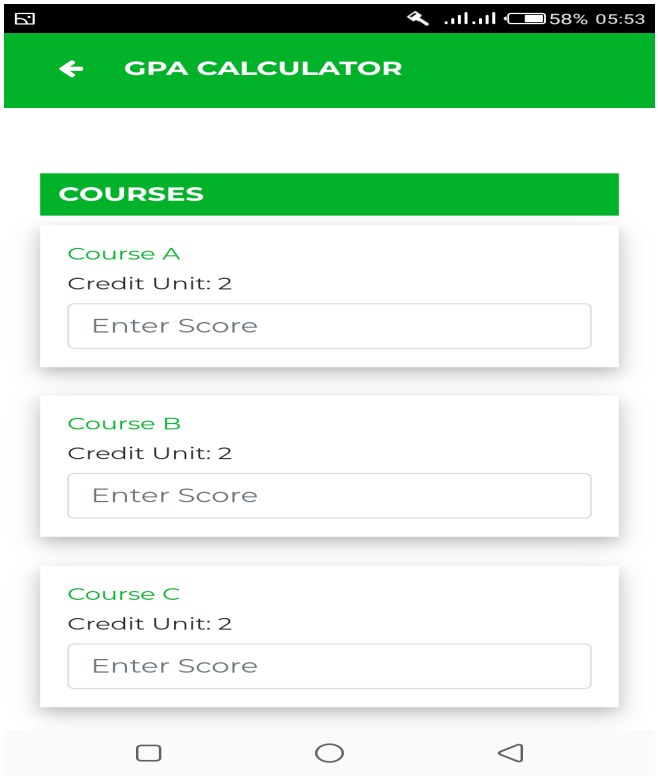

Figure 8: 5 Point GPA Calculator.

This is where you can interact with to calculate the result.

TESTING

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

Unit Testing

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

Integration Testing

Integration testing is a level of software testing where individual units are combined together and tested as a group. The purpose of this testing is to expose the faults in the interaction between integrated units. Tests drivers and test stubs are used to assist in integration testing.

System Conversion Plan

System conversion or changeover is concerned with the smooth shift from one way of doing things to another and the mitigation of 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 is actually replacing.

SYSTEM REQUIREMENTS

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

Hardware Requirements

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

i. Android Version 4.2 and Above

ii. 100MB available disks space

iii. RAM (1gig)

Software Requirements

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

CONCLUSION

In order to introduce the use of computers into 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 and thorough understanding of the major concepts of operations. This work finally presented a software application meant to ease the 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 obvious 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 reduction in the cost of processing, reduction in time spent in computing GPAs. The Application software is flexible and can be modified to suite any kind of record keeping and data processing. It is easy to use due to the use of a GUI (Graphical user interface) rather than command line approach, 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.

RECOMMENDATION

The efficiency of the software can be further enhanced based on the following recommendations: Effort 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 how to interact with the system for optimal utilization of the facilities of the system. Further work should be done to calculate the result using grade order, based on the limitation of this project, it is recommended that the further research should be carried out so that necessary amendments as well as improvement can be made.

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