DESIGN AND IMPLEMENTATION OF A CUSTOMIZABLE ONLINE EXAMINATION AND CERTIFICATION SYSTEM
(A CASE STUDY OF EDO UNIVERSITY, UZAIRUE, IYAMHO EDO STATE)

BY

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BEING A PROJECT WORK SUBMITTED TO THE DEPARTMENT OF COMPUTER SCIENCE, SCHOOL OF INFORMATION AND COMMUNICATION TECHNOLOGY, AUCHI POLYTECHNIC, AUCHI, EDO STATE

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CERTIFICATION

We, the undersigned hereby certify that this project was carried out by **UNIMHEN GLORY ORIAZE** with matriculation number **ICT/2252060038** in the department of Computer Science, School of Information and Communication Technology.

We also, certify that the work is adequate in scope and quality in partial fulfillment of the requirements for the award of Higher National Diploma (HND) in Computer Science.

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MR. SYLVESTER AKHETUAMEN **DATE**

(Project Supervisor)

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MR. SYLVESTER AKHETUAMEN **DATE**

(Head, Department of Computer Science)

DEDICATION

This project work is dedicated to God almighty for his mercies and strength throughout my educational pursuit.

ACKNOWLEDGEMENT

My profound and immeasurable gratitude to God almighty for his grace and faithfulness throughout my stay in this polytechnic. To him be the glory and honour.

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God bless you all.

TABLE OF CONTENTS

ABSTRACT

Online Examination System is a web base application that establishes a network between an institution and candidates or students. Online examination systems are being used by an ever-increasing number of institutions to help reduce time deficiency, cost, exam malpractices such as impersonation and other unethical examination related exercises that take place in most independent and national examinations. In this study, an explanation of how online examination systems are related to some traditional or manual based analysis, and techniques are presented and how online examination systems help institutions increase the efficiency of result generation. The project describes various limitations of current system methods and discusses possible solutions that can improve online examination system and makes it applicable to an even broader range of institutions. This project was carried out using tools like php to develop the front-end and MySQL for the back-end of the software online examination system. Evaluation of the project strictly shows that the software system can reduce 50% of the present examination malpractices problem in the current manual system.

Keywords: Online Examination system, PHP language, E-education, Software, Examination.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

As the time has changed and getting change day by day; technologies are introduced and in comparison; to the technical world. In education, the concept of E-Learning (Electronic Learning) has grown rapidly from distance learning to virtual class are as towards the online courses and online examinations.

Online Examination System is a web base application that establishes a network between an institution and candidates or students. Institutes enter on the site and input questions they want in the examination; these questions are displayed as a test to the eligible students. The answers enter by the students are then evaluated and their score is calculated and saved. This score then can be accessed by the institutes to determine the number of students that passes the examination and evaluate their performance. Candidate is given a limited time to answer the questions and after the time expiry the answer paper is disabled automatically and answers is sent to the examiner. Online Examinations System provides a platform to select eligible candidate out of numerous candidate that participate in an examination. The institution has an administrator who keeps an eye on the overall functioning of the system. The online examinations system is application software, which aims at providing services to the institution with an option of selecting the eligible students or candidate without any politics or partiality. Online examinations are conducted through the internet or in an intranet (if within the Organization) to test a remote candidate. Candidate is given a limited time to answer the questions and after the time expiry, the answer page is disabled automatically and answers is sent to the examiner. The examiner will

evaluate answers, either through automated process or manually and the results will be sent to the candidate through email or made available in the web site. Online examination system will help to evaluate student's achievement, and helps to give fair scores. The main objective of Online Examination System is to efficiently evaluate the candidate thoroughly through a fully automated system that not only saves lot of time but also gives fast results. For the institution, it would give flexibility to fit their needs and to the students there will be no loss in time for the need of using extra thing like paper, pen etc. This system also focuses on how to provide a secure environment for Online Examination.

In this study, Edo University has been chosen as the case study. Examination in Edo University is conducted manually. During examination students always looking for center, due to this some student who are not familiarize with the school infrastructure miss the examination. Before the examination commences, the school would have pasted each examination center on the notice board. Thus, the manual system is not efficient, it is on this premise that this research study is set to examine the design and implementation of a customizable examination and certification.

1.2 Statement of the problem

The problem with the current system is that students take their examination manually in Edo University. This outdated system will take long time utilization; the manual procedure used for conducting examination is time consuming process. More time being used by lecturers to bring the questions papers and answer sheets and also more time is needed for students in order to write their examination. Due to this manual examination process, every semester result is always delayed towards the next semester examination. This manual process of conducting examinations has led to some problems. These includes the following:

- Delay in releasing of result.

- Examination malpractice.
- Changing of result.
- Students meeting lecturer for help.
- Insufficient question paper and answer sheet in the examination hall.

1.3 Aim and Objectives of the study

The main aim of this study is to design and implement an online examination and certification system for Edo University to replace the manual system of conducting examination.

The following are the objectives;

i. Provide a system to conduct examination in an efficient manner and minimize the use of manpower.
ii. To provide a mechanism that will store the logs of candidates and their marks and backup for future use.
iii. It will save time and reduce paper work and consequently saving cost.
iv. To reduce the hectic job of assessing the answers given by the candidates.
v. To generate various reports almost instantly when and where required

1.4 Significance of the study

Online examination system will be of great benefit to the student and Edo University at large. This system will reduce the cost of conducting examination in Edo University. With this system, Edo University will experience free and fair examination. Students are able to access their result on time. The system will help students to maximize their potential since they know that the examination is computer-based and there will be no cheating.

1.5 Scope of the study

This study covered the design and implementation of a customizable online examination and certification system. Due to lack of finance, time, inaccessibility to relevant materials and lack of broad knowledge in web development, this system would only enable the institution to administer customized questions during examinations. It supports only multiple-choice questions, can generates reports as soon as the exam ends and allow students to see or display their result after every exam.

1.6 Definition of terms

Examination: is a set of questions or exercises evaluating skill or knowledge

Examination malpractice: unethical or misconduct in an Examination Hall

Structure Query Language: It's a data base application that store different forms of data or information.

PHP: It stands for Hypertext Preprocessor. It is a programming language used to develop web-based application

Software: Written programs or procedures or rules and associated documentation pertaining to the operation of a computer system and that are stored in read/write memory.

CHAPTER TWO

LITERATURE REVIEW

2.1 Review of Related Literature

(Zhenming *et al* 2003) developed a novel online examination system based on a Browser/Server framework which carries out automatic grading of objective questions for basic computer operating skills. The courses included Visual Basic programming, Microsoft Windows operating system, Word, Excel and PowerPoint editing, Internet and Email skills. The system was a distributed collaborative system which was based on Distributed Component Object Model (DCOM) technology. Internet Information Server 4.0 (IIS) was used as the Web Server, Microsoft SQL Server 7.0 as Database Server and a user-friendly browser as the client's interface. Cryptography, real-time monitoring system and data transmission encryption were used to guarantee security of the system. The system can be improved on through a random administration of questions to reduce the level of examination malpractice.

A web based online examination system that is not limited by time and place was developed by (Yuan-Lung *et al*, 2005) to enable students arrange their time for examination in accordance with the progress of their lessons. The system had simple fraud protection function by employing a random generation in the order of questions in each student's test, making cheating extremely difficult. The questions could also be in diagram form, animations and other multimedia forms other than textual test questions, therefore making the test questions more diverse. Teachers can make statistical analysis aimed at a particular test to determine the average mark scored by

students on a particular test, and this can be used as a reference material for teaching remediation. The design was broadly structured into three areas: the student area, the teacher area and others (includes administrator, production group and comments). Implementation was done using Windows 2000 as the operating system. ASP (Active Server Pages) was used to provide a dynamic web page while the functions required by the online examination system were appropriately processed through the VB (Visual Basic) Script in ASP. The system also used the IIS technology (Internet information Server) to construct an ASP platform while Microsoft Access functioned as the database. The database was accessed using ODBC. Users can arrange their examination time in accordance with the progress of their lessons. Test takers can check the test solutions immediately after the test, thus letting students know their mistakes and work to correct them. With the rise in cybercrimes, the security enhancement of the online examination system should be looked into in order to ensure that the questions for students' assessment are not tampered with or leaked prior to formal examination date.

(Rashad *et al*, 2010) developed an examination management system that is capable of supporting an institution's faculty, student and administration roles in the examination process. It employs different kinds of questions such as yes/no questions, multiple choice/single answer questions, multiple choice/multiple answer questions, fill-in the gap questions with a string, numeric answer and essay questions. Examinations are automatically marked on conclusion of the answers and reports for the test are produced. It can be used via the Internet and is therefore suitable for both local and remote examination. The system could help lecturers, instructors, teachers and others who are willing to create new examinations or edit existing ones as well as students participating in the examination. The system was built using various open-source technologies AJAX, PHP,

HTML and MYSQL database. The system would require a more reliable form of security since it can be used via the internet.

(Qiao-fang and Yonf-fe, 2012) developed a self-test online examination system that enables students to randomly select a test paper or use a test question designated by the teacher to test them in order to understand their learning level and adjust their learning progress. The system allows the teacher to manage questions through querying, adding, deleting and modifying the questions. It also ensures that test questions are randomly generated according to specified requirements. A student can also randomly select a paper for self-test. Implementation was done using a Browser/Server model (a special kind of client/server model) as its network application development model. Java Web technologies using JSP Model 1 and JavaBean were used together with Tomcat (open-source software) as the JSP Engine and Web Server. JavaScript was used on the client-side scripting language while JSP was used as the server-side scripting language. The system provides online testing capability for students anytime they want to assess their level of understanding of a course. Also, a combination of client-side programming and server-side programming techniques were used and analyzed in the research. However, this work does not inform us whether the system had a timing feature that logs off the student from the system when his time is up; this will assist in assessing how well the student has mastered a particular course.

(Indoria *et al*, 2012) developed a web based online examination system that generates student's scores on submission of the examination. The Administrator of the system had the privilege of creating, modifying and deleting the test papers. A user can register and login with his/her specific id. The system was structured into two areas which were the administrator area and the operator area (user). System development was achieved using ASP.NET and VB.NET having DB2 as back end (database). Windows 2000 Enterprise was used for the server interface while

either of Windows 95/98/2000/NT could be used for the client interface. The system can generate students report based on the “list of passed students”, “list of students pass with merit” and “list of failed students”. The limitation of this system is that the teacher cannot enter the questions directly into the system and the questions cannot be generated randomly.

The CBT system developed by (Fagbola *et al*, 2013) was an online examination system that assesses students using multiple choice questions set by the lecturers and is capable of grading students accordingly. The system is expected to provide an effective solution for mass student evaluation and provides functionalities such as auto-submission of examination on expiration of set time, auto-grading of students and examination result report generation. The Waterfall Model of software development Life cycle was adopted and the conceptual design (activity diagram, the use cases, the data flow diagram and the entity-relationship diagram) were presented. Macromedia Dreamweaver 8.0, Microsoft Visual Studio 2012 and Microsoft SQL Server 2008 were the tools used for the development of the CBT system. The system was implemented using C# (C Sharp) and SQL server. The CBT system was composed of six different functional pages which are the student login page, the admin login page, the result summary page, the question page, question upload and configuration page and the student result page. It was expected that the system would proffer solutions to challenges such as examination malpractices, low-capacity examination venues, inadequate invigilators and inadequate examination materials. Performance assessment of the CBT system was carried out using 250 students and the statistics proved the system as highly flexible. This CBT system can be improved on through the implementation of essay-based questions. Integration of students’ continuous assessment should also be included for it to be effective in a tertiary institution.

(Taşci *et al*, 2014) proposed an online examination system architecture which provides for integrated management of an examination main functionalities. These include question pool creation and update, examination authoring, execution and evaluation, management of the feedbacks from students, along with ensuring use of analysis reports related to the questions and examination created by an intelligent agent in the decision-making processes. The system architecture includes Administration, Implementation, Finalization and Support layer. A Monitoring Agent was designed to help students through creating reports. Analyses on this system at Sakarya University Turkey, showed that the proposed intelligent agent supports online examination system, detects problems that may arise and enables the instructors to make decisions more easily on such problems in a shorter time. The expert system which uses the IF THEN construct is expected to expand to include additional intelligent features with the aim of resolving different problems.

The use of ICT in the assessment of students has evolved over time and will continue to advance due to its effectiveness (Sim *et al*, 2004). Earlier works on CBT Systems have been towards the recording and notification of the student's final examination score. However, this work, in addition to the notification of the student's final score, also presents the student's scores in other forms of assessment. These forms of academic assessment were based on the Babcock University Assessment structure which involves the use of a test, an assignment, a student's attendance to class as well as a mid-semester examination for the student's cumulative assessment prior to the final examination. Thus, a student's final score in a particular course is based on the sum of his final examination score and his cumulative assessment.

2.2 The Concept of Online Examination

In future, the internet world will have an even closer relation with our daily lives, online teaching and online examination are the direction towards which the academic circle will move. An online examination system does not have the limitation of time and place. Users can arrange their examination time in accordance to the progress of their lesson. Since the test is graded by computers, time which would have been required for manual marking and grading is saved. Test takers can check the test solutions immediately after the test, thus letting candidates know their mistakes and work to correct them

2.3 Overview of Online (Computer-Based) Examination

A computer-based examination is a form of assessment in which the computer is an integral part of question papers' delivery, response storage, marking of response or reporting of results from a test or exercise (Whittington *et al*, 2000). It can be a multiple-choice question-based examination system that provides an easy-to-use environment for both Test Conductors and Students appearing for Examination. The main objective of an online (computer-based) examination is to provide all the features that an Examination System must have, with the interfaces that do not scare its users (Baddi, 2010). According to Taylor (2005) as cited in Newhouse (2013), a Computer-Based Testing could be delivered on a stand-alone personal computer, within an isolated Local Area Network (LAN) or through the use of online technologies such as web-pages over the Internet. The two types of online (computer-based) examination are:

2.3.1 Linear Test: This involves a full-length examination in which the computer selects different questions for individuals without considering their performance level.

2.3.2 Adaptive Test: Here the computer selects the range of questions based on individuals' performance level. These questions are taken from a very large pool of possible questions categorized by content and difficulty (Alabi *et al*, 2012).

2.3.4 Effectiveness Of An Online (Computer-Based) Examination

The effectiveness of an Online examination system depends largely on factors such as standardization, security, examination conditions, mode of administering the examination, cost and so on. Some of these factors have been identified in literature as follow:

- An Online (Computer-Based) Examination is cost effective especially when deployed in the conduct of a mass-driven examination as there will be no need to print questions or answer booklets (Fagbola *et al*, 2013).
- (Adewale *et al*, 2012) inferred that, human errors can be eliminated and examination malpractice eradicated when an Online (Computer-Based) Examination is adopted in the process of examination. In the same vein, (Akunyili, 2010) in her presentation in Amsterdam on 'ICT and E-government' stated that manually marked scripts were more prone to errors than computer marked ones.
- In their system design, (Adebayo and Abdulhamid, 2014) stated that security will be more effective since the system includes biometric fingerprint authentication, picture capture and data encryption and decryption.
- (Al-Amri, 2007) also stated that the standardization of test administration conditions is one of the benefits offered by CBTS. No matter the size of the test-takers, CBTS helps test developers to set the same test conditions for all participants.
- (Bodmann, 2004) in their study investigated the effect of several different modes of test administration on scores and completion times. They observed that undergraduate students completed the computer-based assessment test faster than the paper-based assessment test.

- (Jamila *et al*, 2012) presented that technology-based assessment provide opportunities to measure complex form of knowledge and reasoning that is not possible to engage and assess through traditional methods.
- (Osang, 2012) in his study of electronic examination in Nigeria, suggested that course coordinators prefer electronic examination to pen and paper examinations as it requires lesser administrative tasks for the coordinators and enhances a timely release of examination result.

2.4 Applications of Online Examination (Computer-Based Test) Systems in Nigeria

Online examinations which are a variant of a computer-based test system can be used as an assessment-evaluation tool in distance education systems that have quite a number of students. For such systems, good execution of examination aimed at assessment and evaluation is very critical because problems arising from human-centered errors or technical difficulties may lead to questioning of the examination, and thus reliability and efficiency of the distance education systems (Taşci *et al*, 2014).

Resuscitated in 2002 by President Olusegun Obasanjo, National Open University of Nigeria (NOUN) (a distance learning institution) which currently has not less than seven schools and academic centers employs the use of electronic examination in the evaluation phase of students' study circle. Research studied on 105 academic staff revealed that 84 respondents recommended Online Examination System for conducting examination in NOUN based on the fact that it was easy to administer and used by the students. Most especially is the fact that, the result of the examination can be viewed almost immediately after the examination (Osang, 2012).

Tertiary institutions in Nigeria now use CBTS in the Post Unified Tertiary and Matriculation Examination (Post-UTME) for screening their students. Also, some Nigerian universities are almost fully or partially implementing the CBTS for assessing their students. These include:

- National Open University of Nigeria (NOUN)
- University of Ilorin, Ilorin
- Federal University of Technology, Minna
- Covenant University, Ota (Private)
- University of Nigeria, Nsukka
- University of Lagos, Lagos
- Auchi Polytechnic, Auchi

However, NOUN is the only Nigerian University that is fully implementing CBTS for assessing her students and this is employed through the internet. Other universities employ the use of the Intranet (Adegbija *et al*, 2012). Furthermore, the Joint Admissions and Matriculation Board (JAMB) which is the national matriculation examination body for admissions into Nigerian higher institutions of learning has adopted the use of a CBTS for the conduct of its examination. The revolutionary dimensions of this ICT-enhanced service can only be appreciated when compared with the former system where the examination results were anxiously awaited by the candidates for close to eight weeks as against seven working days with the use of a CBTS (Akunyili, 2010).

CHAPTER THREE

SYSTEM DESIGN AND ANALYSIS

3.1 Research Methodology

The research methodology adopted in this work is design science approach (Hevner et. al, 2005; March and Smith, 1995). In this approach, the first step is to identify the existence of a problem that requires viable solution.

- Initial investigation was carried out through interaction and enquiries with technology users and domain experts to establish the existence of real problems that require technical solutions by way of deploying available I.T appliances.
- A review of related literature was carried out on the established research domain of interest such as research journals, product manuals, books and related technical materials.
- Key concepts were identified, defined, and research objectives written
- Thereafter, a case study was selected using Examination conduct to establish the technical feasibility of the deployment of biometric attendance system based on fingerprint recognition to provide solution to the established real-life problem.

3.2 System Study

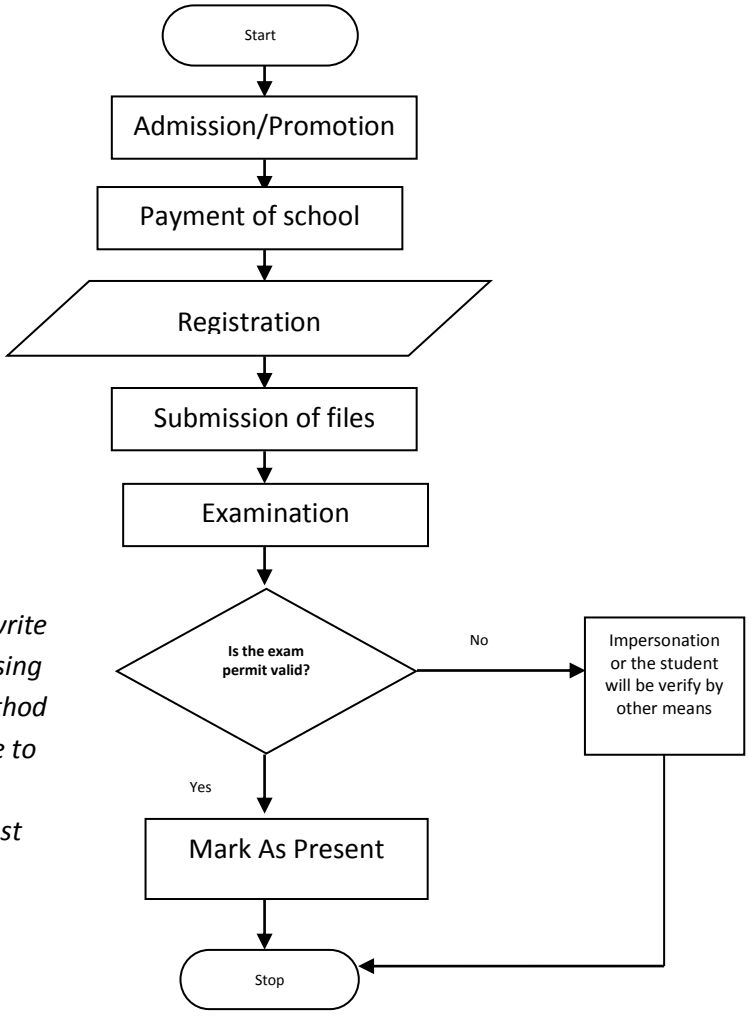
I went through literature on online examination system, and also, I visited different schools such as the School of Engineering, School of art and design, School of Information and Communication Technology etc. of Edo University to investigate the way examination is carried out. I discovered that they used manual system of conducting examination which include the use of paper and pen, also, the way of capturing attendance information and verifying if a student is eligible to sit for an examination is taken manually by using an attendance sheet. Problems such as student impersonation, stress (because the student has to go through a long process so as to just obtain an examination slip which he or she can use to prove that he or she is eligible to sit for an exam), and unsecured authentication of students are encountered in the manual examination system. Hence, it is time-consuming.

3.3 System Analysis

I have study Edo university and find existing system is human entry and keeping of the details of the student who are registered already and it is very stressful for each student to go to examination center to write their examinations. It is very problematic to the students from afar distance to reach the examination center. This system is required to prepare registration form, application form and question paper for the students and required to print a lot of number, manual calculation of how many students registered and verification of details of the students by hand is very difficult. This requires quite a lot of time and wastage of money as it requires quite lot of manpower to do that, another factor that takes into accounts that is the possibility of errors. The existing system cannot be used for personal and quick reference; thus, it is inefficient, time Consuming for creating question paper, time to check right and wrong answers, Calculation of

Marks, require lecturers to monitor examination centers, student needs to come examination centers.

3.3.1 Flowchart of the Existing System



Examination: students write exam as at when due using paper and pen. This method of examination is prone to impersonation, time consuming and not cost effective.

Figure 3.1: Flowchart of the existing system

The Admission/Promotion:

At the stage, the student is admitted into the institution or promoted from one level to another.

Payment of school fees:

The school fees payment made by the student is processed and acknowledged at this stage.

Registration:

At this stage, the student login to the school portal and carries out all the steps required for the registration and prints out the necessary documents.

Submission of files:

The printed documents are filed and submitted to the departmental administrator by the student.

Examination attendance (Conduct):

When it is time for examination, the student is expected to arrive at the examination hall with his/her exam permit (photo card or id card), this exam permit serves as an authorization for them to gain access to the exam hall and participate fully in the examination. The student is verified with the permit. But this is still not a strong measure or security because the eyes are used in this case to check for the occurred passport and the physically occurring human. Several problems tend to exist within the use of the system and as such include:

- Inefficient in its usage and comprehend the act of examination impersonation
- The process of authorization is based on a concept of what you have; which can be manipulated at any time.

- Matching to establish security measures occurs through the physical eye and this is a very big problem and requires great power of recognition, hence an impersonator can be present with recognition.

Hence this system needs to be corrected by deploying an Online examination System.

3.4 Design of the Proposed System

The modern automated system is developed with the aim to overcome the drawbacks of existing manual system. We have study manual examination system of Edo University and identify possible automation. The proposed system has got many advantages were People from different parts of the world can register very easily. The new system is more automated. It is maze in such a manner that the entire new student can understand all the options in it very easily. It is made in a quick and easy referential manner. Access to all important matters were not always locked and can be opened easily at the time of urgency. The advantages of proposed system were that security is maintained in the new system. Securities for all necessary data are maintained off the record as it is easily understandable and user friendly, quick entries can be made in this system provides complete online web-based solution, including student registration, tests, storing of results.

- Complete web-based administrator can manage examination and question bank from web interface.
- No geographical boundary
- Student can deliver examination from anywhere of the world.
- 100% accuracy in result calculation
- Randomization of question set

3.4.1 Flowchart of the Proposed System

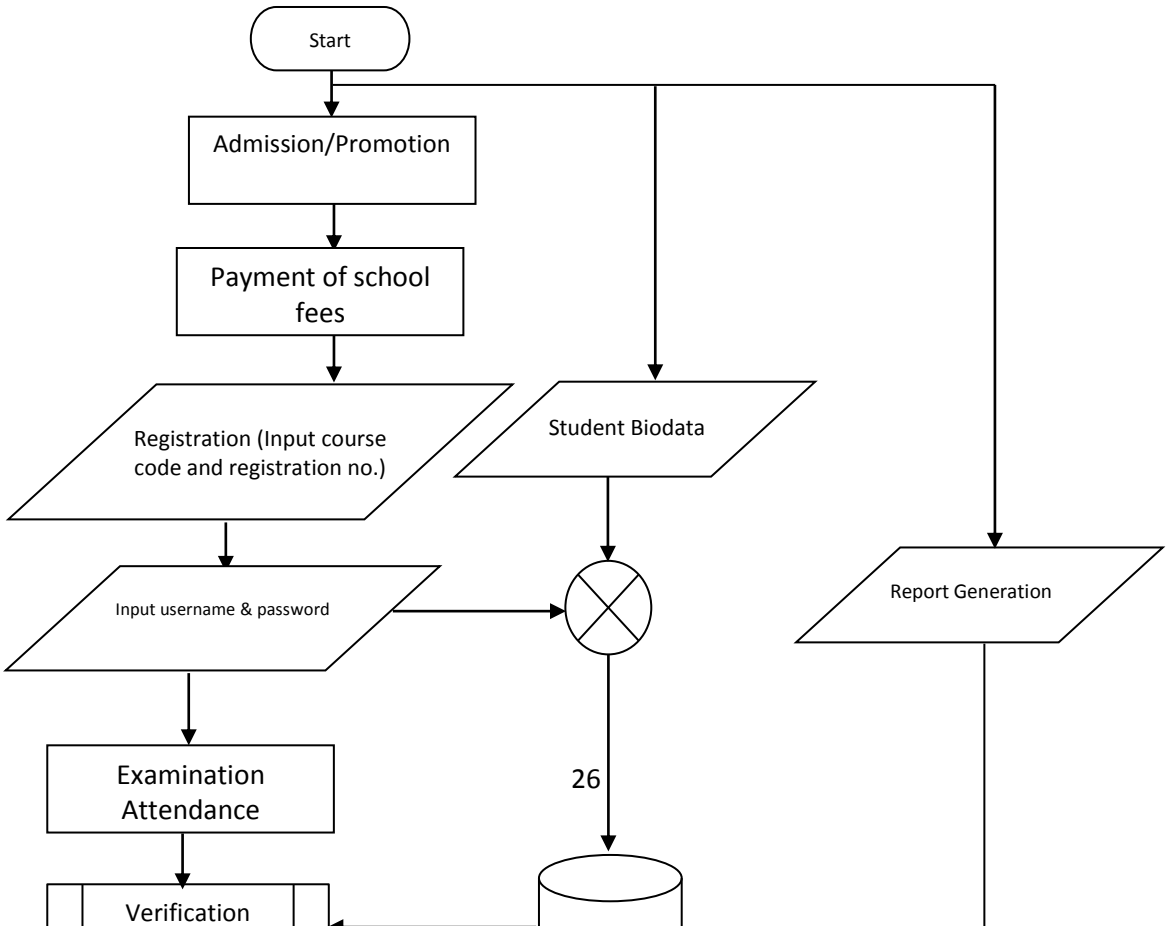


Figure 3.2: Flowchart of the proposed system

CHAPTER FOUR

PROGRAM IMPLEMENTATION AND TESTING

This chapter describes and shows how this standalone system is implemented, developed and tested, using the appropriate necessary programming languages, tools and technology.

4.1 IMPLEMENTATION

System or Software Implementation is the conversion of the System Requirements into an executable and working system.

4.1.1 Implementation Choices

The Automated Examination Attendance System based on Fingerprint Recognition works as web-based application system. It was implemented using PHP, HTML, CSS, JavaScript, and

MySQL was used for the database and the Integrated Development Environment (IDE) used was Bracket text editor and XAMPP was used as the offline local server.

4.1.1.1 PHP

PHP is a general-purpose programming language originally designed for web development. It was originally created by Rasmus Lerdorf in 1994; the PHP reference implementation is now produced by The PHP Group. PHP originally stood for Personal Home Page, but it now stands for the recursive initialism PHP: Hypertext Preprocessor.

PHP code may be executed with a command line interface (CLI), embedded into HTML code, or it can be used in combination with various web template systems, web content management systems, and web frameworks. PHP code is usually processed by a PHP interpreter implemented as a module in a web server or as a Common Gateway Interface (CGI) executable. The web server combines the results of the interpreted and executed PHP code, which may be any type of data, including images, with the generated web page. PHP can be used for many programming tasks outside of the web context, such as standalone graphical applications and robotic drone control.

4.1.1.2 Hyper Text Mark-up Language (HTML)

This is the standard markup language for creating web pages and web applications. With Cascading Style Sheets (CSS) and JavaScript, it forms a triad of cornerstone technologies for the World Wide Web.

Web browsers receive HTML documents from a web server or from local storage and render the documents into multimedia web pages. HTML describes the structure of a web page semantically and originally included cues for the appearance of the document.

HTML elements are the building blocks of HTML pages. With HTML constructs, images and other objects such as interactive forms may be embedded into the rendered page. HTML provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. HTML elements are delineated by tags, written using angle brackets. Tags such as <img /> and <input /> directly introduce content into the page. Other tags such as <p>surround and provide information about document text and may include other tags as sub-elements. Browsers do not display the HTML tags, but use them to interpret the content of the page.

4.1.1.3 Cascading Style Sheet (CSS)

This is a style sheet language used for describing the presentation of a document written in a markup language like HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.

CSS is designed to enable the separation of presentation and content, including layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple web pages to share formatting by specifying the relevant CSS in a separate *.css* file, and reduce complexity and repetition in the structural content.

Separation of formatting and content also makes it feasible to present the same markup page in different styles for different rendering methods, such as on-screen, in print, by voice (via speech-based browser or screen reader), and on Braille-based tactile devices. CSS also has rules for alternate formatting if the content is accessed on a mobile device.

The name cascading comes from the specified priority scheme to determine which style rule applies if more than one rule matches a particular element. This cascading priority scheme is predictable.

The CSS specifications are maintained by the World Wide Web Consortium (W3C). Internet media type (MIME type) text/css is registered for use with CSS by RFC 2318 (March 1998). The W3C operates a free CSS validation service for CSS documents.

4.1.1.4 JavaScript (JS)

This is often abbreviated as JS, is a high-level, interpreted programming language that conforms to the ECMA Script specification. JavaScript has curly-bracket syntax, dynamic typing, prototype-based object-orientation, and first-class functions.

Alongside HTML and CSS, JavaScript is one of the core technologies of the World Wide Web. JavaScript enables interactive web pages and is an essential part of web applications. The vast majority of websites use it, and major web browsers have a dedicated JavaScript engine to execute it.

As a multi-paradigm language, JavaScript supports event-driven, functional, and imperative (including object-oriented and prototype-based) programming styles. It has APIs for working with text, arrays, dates, regular expressions, and the DOM, but the language itself does not include any I/O, such as networking, storage, or graphics facilities. It relies upon the host environment in which it is embedded to provide these features.

4.1.1.5 MySQL

MySQL is an Oracle-backed open-source relational database management system (RDBMS) based on Structured Query Language (SQL). MySQL runs on virtually all platforms,

including Linux, UNIX and Windows. Although it can be used in a wide range of applications. MySQL is most often associated with web applications and online publishing.

4.1.1.6 XAMPP

XAMPP is a software distribution which provides the Apache web server, MySQL database (actually MariaDB), Php and Perl (as command-line executables and Apache modules) all in one package. It is available for Windows, MAC and Linux systems. No configuration is necessary to integrate PHP with MySQL. It is a great fit for this course and provides a relatively stress-free installation and way to manage the configuration changes. Also provided is PhpMyAdmin which gives a graphical user interface (GUI) tool for managing MySQL databases.

4.2 SYSTEM REQUIREMENTS

The system requirements are the software and hardware requirements. The software requires a set of instructions that controls a computer's action. It is a computer program that accomplishes some specific applications or tasks. This software can be purchased or a user can develop the software from software developers.

The hardware requirements unlike the software refer to the physical components of the computer i.e. the peripherals in this design. The hardware and software requirements for this system are listed below.

4.2.1 Software Requirements

- Operating System Windows 2007/2010/later versions\
- Browser Chrome
- Web/Application Server XAMPP
- Database Server MySQL
- Database Connectivity PHP

- IDE Bracket

4.2.2 Hardware Requirements

- Computer Desktop/laptop
- Intel Core i3 and above 1.6 GHZ or above
- RAM Capacity 4GB or above
- Hard Disk 120GB or above

4.3 SAMPLE INTERFACES

4.3.1 Login

The admin or students will insert his username and password in the provided spaces and click on the LOGIN button (Figure 1.1).

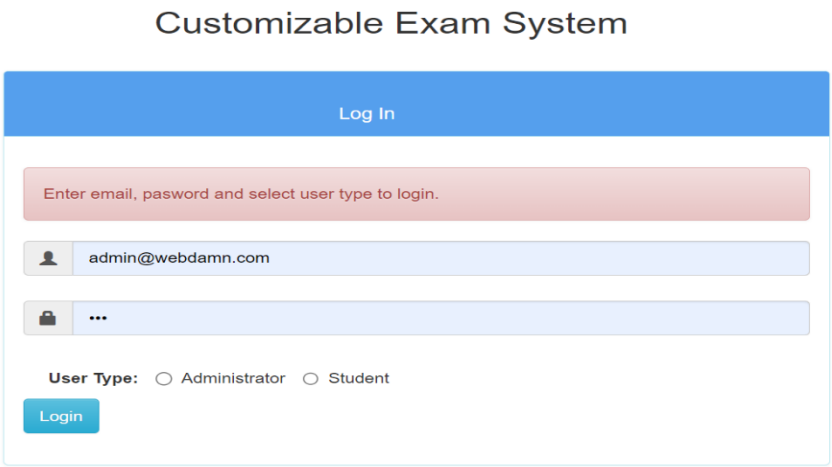


Figure 1.1: Login Interface

4.3.2 Admin Welcome Page

After Login in, this window will open as the welcome page which will allow admin to navigate to his/her dashboard. The admin welcome page is divided into two parts: Exam and User. (Figure 1.2).

Exam: This is the part where admin creates new exam to be written by students.

User: This is where admin add new user. The admin can add a new user and assigned a role to the user which is either student or admin.

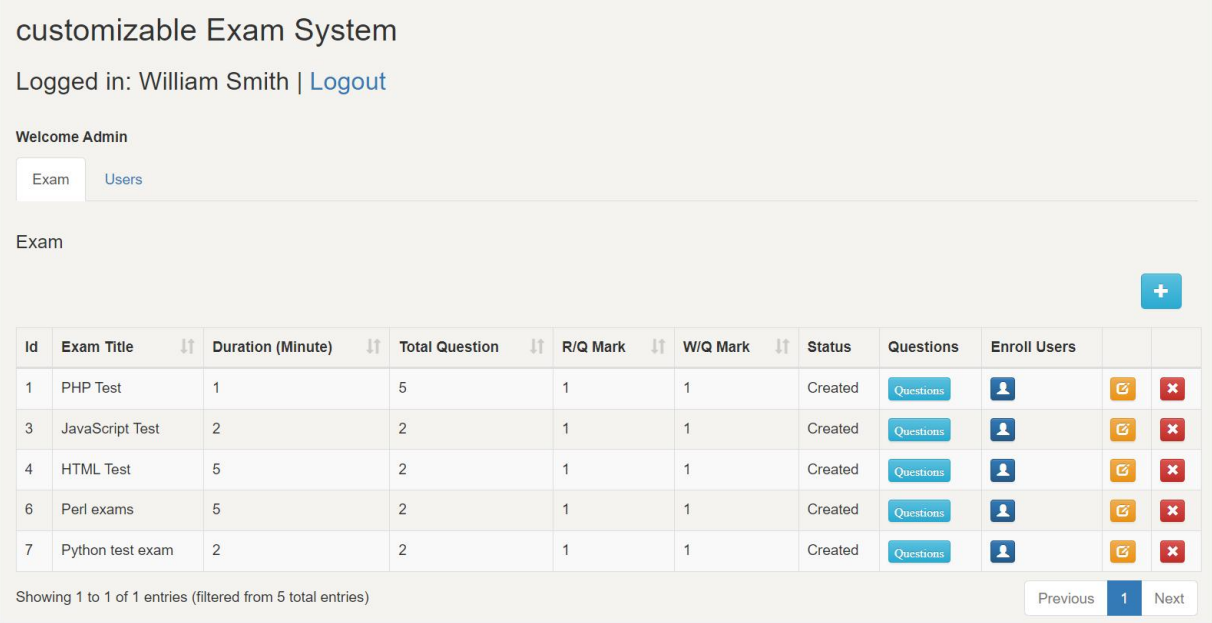
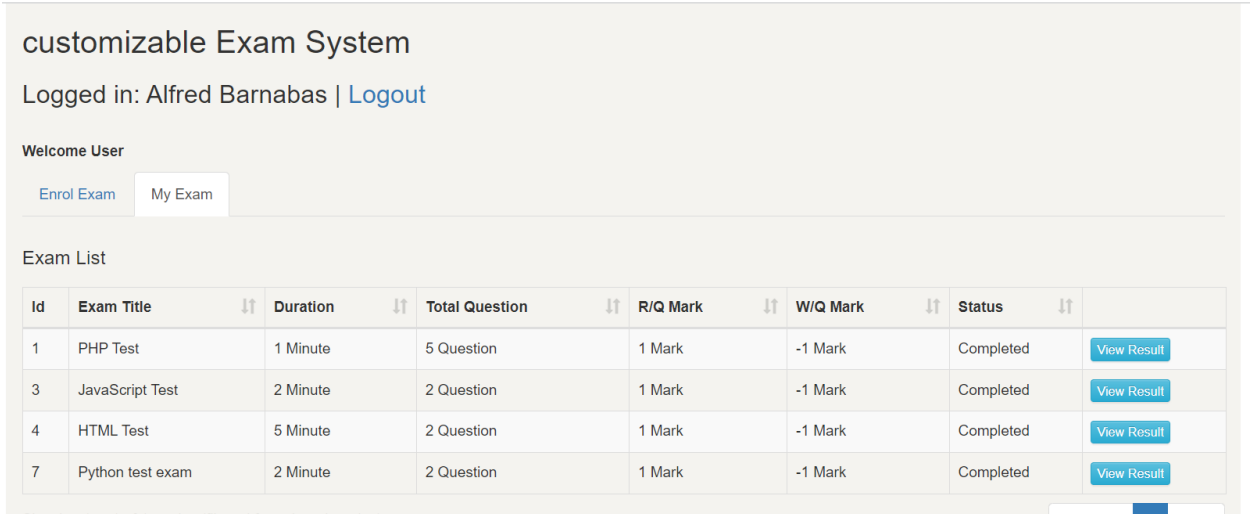


Figure 1.2: Admin welcome page

4.3.3 Student Welcome Page

After Login in, this window will open as the welcome page which will allow the student to navigate to his/her dashboard. The student welcome page consists of two parts: Enroll Exam and My Exam; which enables to students to enroll for an exam and writes the exam respectively. (Figure 1.3).



4.4 SYSTEM TESTING

System testing is to check each step of the program to make sure that the designed software is working properly. The system was tested by inserting the admin username and password, then registering some people where the system excellently saved their information in the database, and it was saved successfully.

4.4.1 Unit Testing

The software interface and program unit functionalities of the system were tested to check how each is working (Table 4.1).

Test Cases	**Explanation**	**Result**
LOGIN	To check if only admin and student will be able to login after filling in the correct details in the available fields. Check if it was successful	pass
PREVIEW	To check if the admin and student will be able to visit their respective dashboard	Pass
ADD USER	To check if the admin can add user (student or admin) of different classes. Check if it was successful	Pass

ENROLL EXAM	To check if the student can enroll and write an exam. If it was successful	Pass

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 SUMMARY

This project: a Customizable Online Examination System (COES) is developed after reviewing and analyzing the existing manual system at the investigation stage.

The design is implemented using WordPress, MYSQL for database and XAMPP as the offline local server. The web application starts with login which contains Admin or student login, then the Welcome Page where Admin or students can either click on to view their respective dashboard.

5.2 CONCLUSION

In an evolving and technologically-developing world such as Nigeria, where there is a dearth of lecturers who are saddled with much responsibilities than they can handle, the need for a Customizable Online Examination System that can take up some of their routinely but relevant task cannot be overemphasized. This work was aimed at designing and implementing a Customizable Online Examination System that prevents the delay in the notification of a student's final course score, take off the burden of marking examination papers and also eases the preparation of examination questions through the re-use of questions from the question bank of the COES. Online examination system is the best compared to paper-based exam. The automated system helps students and lecturers to save time and makes the process faster. It saves space since answers papers will not be used. With a user-friendly system that has security, integrity and the database is neither inconsistent nor redundant.

5.3 RECOMMENDATIONS

From the outcome of this work, it can be said that the use of a COES can promote academic efficiency through a timely notification of students' performance with reduced man-hour expenditure from the lecturer. Academic institutions should explore the vast opportunities provided by ICT in the educational system especially as it concerns student assessment. The benefits of a COES such as; reduced cost of implementation through the use of open-source

technologies, reduction in the use of stationeries for test administration, reduced time and labor could enhance the profitability of an academic institution.

This System can be adopted for use in either a secondary or tertiary institution for the administration of examinations ranging from a small to large number of students. Lecturers should be encouraged to structure the questions to appropriately assess a student's knowledge of the course work since the COES uses multiple choice-based questions. This work can be improved on as follows:

- Introduction of other forms of question types such as theory-based questions and diagrammatic questions to make the test questions more diverse.
- Enhancement of the security of the system so that students can take examinations online at a specified time.
- Inclusion of course materials so that these can be assessed by the student online.
- Automatic delivering of the students' login details to their mobile phones or email address.

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APPENDIX I: SOURCE CODE

Admin/User (Home Page) Login

```
<?php
include_once 'config/Database.php';
include_once 'class/User.php';

$database = new Database();
$db = $database->getConnection();

$user = new User($db);

if($user->loggedIn()) {
	if(!empty($_SESSION["role"]) && $_SESSION["role"] == 'admin') {
		header("Location: exam.php");
	} else if (!empty($_SESSION["role"]) && $_SESSION["role"] == 'user'){
		header("Location: view_exam.php");
	}
}

$loginMessage = '';
if(!empty($_POST["login"]) && !empty($_POST["email"]) && !empty($_POST["password"])
&& !empty($_POST["loginType"]) && $_POST["loginType"]) {
	$user->email = $_POST["email"];
	$user->password = $_POST["password"];
	$user->loginType = $_POST["loginType"];
	if($user->login()) {
		if($_SESSION["role"] == 'admin') {
			header("Location: exam.php");
		} else if ($_SESSION["role"] == 'user'){
			header("Location: view_exam.php");
		}
	} else {
		$loginMessage = 'Invalid login! Please try again.';
	}
} else if (empty($_POST["login"]) || empty($_POST["email"]) || empty($_POST["password"])||
empty($_POST["loginType"])){
	$loginMessage = 'Enter email, pasword and select user type to login.';
}
```

Process Exam Page

```
<?php
include_once 'config/Database.php';
include_once 'class/User.php';

$database = new Database();
$db = $database->getConnection();

$user = new User($db);

if(!$user->loggedIn()) {
	header("Location: index.php");
}
include('inc/header.php');
?>
<title>customizable Exam System</title>
<script src="js/jquery.dataTables.min.js"></script>
<script src="js/dataTables.bootstrap.min.js"></script>
<link rel="stylesheet" href="css/dataTables.bootstrap.min.css" />
<script src="js/exam.js"></script>
<script src="js/general.js"></script>
<?php include('inc/container.php');?>
<div class="container" style="background-color:#f4f3ef;">
	<h2>customizable Exam System</h2>
	<?php include('top_menus.php'); ?>
	<br>
	<h4>Exam</h4>
	<div>
		<div class="panel-heading">
			<div class="row">
				<div class="col-md-10">
					<h3 class="panel-title"></h3>
				</div>
				<div class="col-md-2" align="right">
					<button type="button" id="addExam" class="btn btn-info" title="Add
Exam"><span class="glyphicon glyphicon-plus"></span></button>
				</div>
			</div>
		</div>
		<table id="examListing" class="table table-bordered table-striped">
			<thead>
				<tr>
					<th>Id</th>
					<th>Exam Title</th>
					<th>Duration (Minute)</th>
					<th>Total Question</th>
					<th>R/Q Mark</th>
					<th>W/Q Mark</th>
					<th>Status</th>
					<th>Questions</th>
					<th>Enroll Users</th>
					<th></th>
					<th></th>
				</tr>
			</thead>
		</table>
	</div>
```