A SECURE ONLINE COMPUTER-BASED TEST SYSTEM USING FACIAL RECOGNITION BIOMETRIC AUTHENTICATION

(CASE STUDY OF MOUNTAIN TOP UNIVERSITY)

By

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A PROJECT SUBMITTED IN THE DEPARTMENT OF COMPUTER SCIENCE AND MATHEMATICS, COLLEGE OF BASIC AND APPLIED SCIENCES, IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE.

2021

DECLARATION

I hereby declare that this project has been written by me is a record of my own research work. It has not been presented in any previous application for a higher degree of this or any other University. All citations and sources of information are clearly acknowledged by means of reference.

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EBENEZER CHIMENE NWENEKA

_____

Date

CERTIFICATION

This project titled, '**A Secure Online Computer Based Test System Using Facial Recognition Biometric Authentication (Case Study of Mountain Top University)',** prepared and submitted by **EBENEZER CHIMENE NWENEKA** with matriculation number **17010301021** in partial fulfillment of the requirements for the degree of **BACHELOR OF SCIENCE IN COMPUTER SCIENCE.** The original research work was carried out by him under by supervision and is hereby accepted.

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DEDICATION

This Project is completely dedicated to God Almighty and my parents.

ACKNOWLEDGEMENTS

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ABSTRACT

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Computer Based Test (CBT) has grown to become recognized all over the world and is now being implemented by various institutions. With the evident growth in CBT, examination malpractice has found a way to nullify the advantages of CBT. Hence, there is a need to ensure that there are more secure CBT systems. In the recent rimes for instance, some students have been caught writing CBT examination for others despite the security measures. The above-mentioned prevailing challenge inspired the proposed study.

This study aims to develop a web-based application using biometric facial recognition as a means of authentication to augment the regular username and password. In other words, it would prevent impersonation of examination through a secure authentication system. Facial recognition has demonstrated an enhance authentication in various domains.

Adopting the same technology in a critical setting such as examination is therefore highly essential especially at the Mountain Top University. Html and CSS are used to develop the front-end part of the Computer Based Test system. While PHP was used to design the backend and MySQL was the database that was utilized. The performance of the system when compared to the current system in use was found to be satisfactory. The proposed study considered only Multiple-Choice question type. Thus, further improvement using various sorts of questions, such as theory-based could be considered in future work. Again, fingerprint biometric and facial recognition authentication could be combined to provide a more secure system.

Keywords: *CBT, Examination, Facial Recognition, Biometric.*

CHAPTER ONE

INTRODUCTION

1.1   BACKGROUND TO THE STUDY

An examination is one of the best methods used to evaluate student's knowledge and ascertain that the student understands what he/she was taught in the classroom (Ajinaja, 2017). Over the years, there have been several methods used in evaluating students such as projects, pen-written examinations, presentations, assignments, and oral examinations. Technology has come a long way in transforming different aspects of people's lives and assisting in human productivity and accuracy. There is an ever-increasing need for educators and sponsors to explore other cost-effective, foolproof, fraud-free, and less onerous means of assessing students.

The most familiar method of writing examination is an examination administered through question papers where students are expected to write out their answers on a sheet provided which is usually conducted in examination centers. Invigilators are used to restrict communications between examination candidates and prohibit the use of notes or other materials. The manual method which involves pen and paper has been in use for a very long time, the appeal however has reduced due to issues such as examination venue capacity limitations, lack of comfort for examination candidates, delays in the release of results, examination malpractices, printing costs, and human error. Recently, the worldwide pandemic showed another disadvantage to the use of the manual method, begging the need for the automation of the examination system.

The advancement of technology in the education sector has ensured that there is now an avenue for the automation of the examination process. Today, the number of

admissions, placement, and certification examinations that are administered on computers has increased exponentially. When compared with conventional paper-based examinations, computer-based tests have a range of significant advantages including effectiveness, instant marking, and feedback in the case of multiple-choice question examinations. Furthermore, computer-based tests enhance more innovative and authentic assessments due to more advanced technological capacities.

Computer-based testing is an efficient way for examiners to provide a secure, consistent environment for grading student knowledge while significantly enhancing the candidate experience.

1.2   STATEMENT OF THE PROBLEM

Over time, the Computer Based Test has become susceptible to some of the issues that affected traditional Paper Based Tests. There have been known situations where the students have their exams written by other individuals and the likes. Examination candidates have developed strategies that allow various forms of examination malpractices, leading to the need for more secure CBT to uphold the integrity of the examination with particular reference to MTU.

1.3   AIM AND OBJECTIVES OF THE STUDY

This project aims to design a computer-based test system that implements the facial recognition biometric system to provide a more secure and trustworthy examination process.

The objectives of this study include:

- Provide a more friendly and easy-to-use examination platform for students;

- Design a CBT system that provides results instantly for candidates;

- Design a CBT system that makes use of the facial recognition biometric.

1.4 PROPOSED METHODOLOGY

This project aims at developing a system that allows examiners to set their examination/test questions and allows students to take the examinations and check their results. This system will help the school to minimize examination malpractice. There will be a module for the administrator where he/she can edit, add or remove questions as may be required. The system would also mandate the examination candidates to go through facial recognition to ascertain whether or not he or she is supposed to be writing that particular exam with the identification number provided before he or she can take the examination.

The Software Development Life Cycle (SDLC) model for this system is the Waterfall model. Technologies to be employed in the development of this application are HTML, CSS, PHP, JavaScript, and Firebase. HTML, CSS, PHP, and JavaScript are web-based programs while Firebase is good for databases because of its security and its advanced features and properties.

1.5 SCOPE AND LIMITATIONS OF THE STUDY

This study covers the design and implementation of an online computer-based test system with a facial recognition biometric system using Mountain Top University as a case study.

The limitations of the system to be designed are as follows:

- The system supports only multiple-choice questions.

- There could be a tendency for the system to be bypassed if the examinee is an identical twin.

1.6   SIGNIFICANCE OF THE STUDY

The influence of technology in the educational system cannot be undermined as most developed countries have migrated from paper-based tests to computer-based tests.

These computer-based tests, have also become susceptible to some of the same challenges facing paper-based tests and this is begging for the need to secure the system to curb the insecurities.

This project aims at providing a more secure way to ascertain that the exam is being written by the appropriate candidate by employing the use of the facial recognition biometric tool.

1.7   DEFINITION OF TERMS

Computer Based Test: Computer Based Test (CBT) is the use of computers to carry out a test or assessments for students.

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

Biometric: Biometric is a means of using human physical characteristics (face shape, finger prints, etc.) for identification.

Facial recognition: This is a biometric identification done by scanning a person's face and matching it against a library of known faces.

Authentication: Authentication is a way of validating the authenticity of something or someone.

<center>**CHAPTER TWO**</center>

<center>**LITERATURE REVIEW**</center>

2.1 INTRODUCTION

To enhance student learning, academic evaluation is the process of applying evidence in academic programs, to increase efficiency and effectiveness. The single most essential benefit of evaluation is that it allows instructors to identify students' learning gaps, which may be used to adjust their activities and program offerings and to fine-tune the curriculum. Academic evaluation has become a practice or exercise that can be carried out online through the aid of technology.

2.2 RELATED CONCEPTS

Computer-based assessment is the practice of administering quizzes and assessments to students using a computer rather than paper. Computer-based assessments are already commonly employed in many eLearning settings. For example, anyone that has engaged in a written driver's test recently, most likely utilized a computer (Bhatia, 2021).

2.2.1 PAPER TEST VS. COMPUTER TEST

According to (Theodore, 2012), some people are apprehensive about taking a computer-based test. Many individuals consider computers impersonal, if not hostile. However, computers offer a significant advantage in terms of scoring efficiency, particularly when the test is constructed in a multiple-choice format.

One advantage of computer testing is that tests can be arranged based on their difficulty level. A software program can be built in stages, starting with the easiest questions and progressing to the most difficult ones. This saves time, concern, and money. When the goal is to rank test-takers as a percentile slice of a peer group

population, computer testing, and scoring are especially useful. The paradigm is also beneficial in study courses targeted at achieving high scores on mandatory admission tests (Theodore, 2012). Navigation, the method by which the test taker goes through the test questions, is occasionally found to be deficient in computer and software testing. It requires either keyboarding abilities or the usage of electronic mouse devices, both of which function at varying levels of efficiency (Theodore, 2012). It may be difficult for someone taking a computer test to go back and forth between questions and issues. On a paper exam, the test taker can read the full section or return to a tough question quickly.

2.2.2 ROLE OF ICT IN ACADEMIC ASSESSMENTS

According to (Marina, 2015), the use of ICT in assessment practices in education is one of the most important things that schools and instructors should consider. These benefits include the ability to improve and enhance assessment. The fundamental topic of this study is: What roles may ICT play in supporting assessment in education? ICT plays a variety of roles and assists in educational assessment processes. This document divides its roles into two sections: testing and tasks. ICT can be used in testing to conduct tests, score tests, analyze results, and help teachers assess learning outcomes (Marina, 2015). Furthermore, ICT can be used to help students complete tasks such as portfolio and project-based assessments. Students can develop electronic versions of their portfolios thanks to advances in information and communication technology. ICT can also help pupils finish their projects. Teachers must understand that the criteria used to evaluate e-portfolios and projects must also evaluate students' digital use.

According to (WU, 2021), information and communication technology (ICT) in learning institutions has increased learning by leaps and bounds over the last few

decades. Technology-enhanced learning in both pre-schools and higher education institutions functions as a supporting educational tool for disseminating learners' information and abilities. The majority of previous studies on the impact of technology in education have found that technology-enhanced learning has facilitated knowledge and skill acquisition. Crucial thinking is one of the critical areas where technology has greatly increased understanding, as students are empowered to approach and exploit chances with daring and potential (WU, 2021). Furthermore, the introduction of ICT as an interconnected environment has ushered students into a new era of digital learning. ICT has assisted institutions in making more informed decisions, which has resulted in the adoption of measures responsible for maintaining the economy's and the environment's integrity. This results in the advancement of a revolutionary, comprehensive, and higher-quality education system. As a result of ICT implementation in schools, learning has become more participatory and learner-centered. Students have been able to be agents of change and transformation in society by utilizing ICT (WU, 2021). Using scientific methodologies, this research study will investigate the role of ICT in achieving sustainable education by 2030 (WU, 2021). The research question will be determined using data in this study. This study will begin with a focus on earlier research on technology and education (literature review), followed by a technique where data analysis will be performed, research results, a discussion, and ultimately the conclusion of this research.

2.2.3 SECURE AND SAFE E-ASSESSMENT

The authors (Miguel et al., 2015) found that in classifying and securing e-assessments, there are several elements to consider, such as classification and security. The security properties that are related to e-assessments are first evaluated through the selection of the most relevant security properties. Once these properties

have been selected, a framework is then created to depict how the various e-assessment types and factors are associated with these properties. Finally, the study proposed a secure e-assessment technology that incorporates functional requirements (Miguel et al., 2015).

2.2.4 BIOMETRIC AUTHENTICATION

According to (Sharma, 2015), biometrics is the process of establishing an individual's identity based on physiological and behavioral traits such as the face, fingerprints, hand geometry, iris, keystroke, signature, voice, and so on. The fact that biometrics offers various advantages over standard authentication approaches may not be immediately obvious. Unlike passwords, which can be forgotten or lost, biometric features are impossible to replicate, exchange, and spread. Since this, an authentication strategy based on biometrics is a strong alternative to existing authentication schemes (Sharma, 2015). At various applications, several biometric traits have been in use.

(Shrivastava, 2013) defines biometrics as the automated use of physiological or behavioral features to determine or validate identity. Several features of this definition need to be clarified. All biometric identifier scans are classified into two categories:

1. Physiological
2. Personality

Physiological or behavioral characteristics include: Biometrics is the measuring of distinguishing physiological and behavioral features. Physiological biometrics are based on direct measurements of a portion of the human body and include finger-scan, facial-scan, iris-scan, hand-scan, and retina-scan.

2.2.5 FACE RECOGNITION SYSTEMS

Face recognition systems employ computer algorithms to identify specific, distinguishing features on a person's face. These features, such as the distance between the eyes or the contour of the chin, are then mathematically represented and compared to data on other faces collected in a face recognition database.

According to (Cahit Gürel & Abdulkadir Erden, 2012), a face recognition system is one of the biometric information processes, and its applicability and operating range are greater than those of other biometric information processes, such as fingerprint, iris scanning, signature, and so on.

2.3 RELATED WORKS

The goal of a research study by (Omorogiuwa & Nwukor, 2017) is to develop a web-based computer center that uses biometric fingerprints for verification/authentication and ties the MAC addresses of all the systems in the center to the program server, tying the computers to the server through quantum mechanics distribution (QKD) for the intranet only, to prevent intruders via intranet; and build a MAC address of all the systems in the center to The CBT authentication software's front-end was built with Visual Studio, while the product itself was built with Visual Basic.NET. The backend was designed using the MySQL server program, therefore all of the data for the CBT authentication software is stored there. In this system, all unauthorized users are blocked and appropriate warning messages are sent to the client by the server when they initiate the Login procedure (Omorogiuwa & Nwukor, 2017).

In his research, (Ajinaja, 2017)concluded that instructors should investigate other methods of student assessment. Some of the primary features of his Computer-based Test program are flexible timing flexibility, stand-alone topic module, resilience, and

scalability. His CBT system was built utilizing both the Waterfall Model and Reuse-oriented Software Process Models, which are both widely acknowledged. As a template design, he used Source-Based technologies such as the XAMP server, PHP, MySQL, JavaScript, Hypertext Markup Language, and Cascading Style Sheet. Based on what was provided, the system was able to provide timely notification of the student's final score as well as a report. It also had provision for diagrammatic questions as well as mathematical symbols in all subjects. His work focused on using a Component-Based software model in the development of a Computer-based Test software, that is, the reuse of a single-core component of the software over and over to develop multiple components of the software. No two-component areas (subject) are the same but all (sub-component) follow the template component. The limitation to this work, however, is the fact that an unauthorized student could have access to another student's examination profile (Ajinaja, 2017).

In the paper written by (Chinedum, 2017), she ascertained that by making use of biometrics it is possible to confirm or establish an individuals identity based on what he or she is rather than what he or she possesses(e.g. an ID card) or what he or she remembers(e.g. a password). She was motivated by the wide variety of systems that require a reliable personal recognition system to either confirm or determine the identity of an individual requesting their service. The purpose of such systems is to ensure that the rendered services are accessed only by a legitimate user, and not anyone else. The methodology that has confirmed this project is by the questionnaire ran interviews, observation, researches, and experimentation. In the absence of a robust personal recognition scheme, these systems are vulnerable to the wile of an imposter. Biometric recognition refers to the automatic recognition of individuals based on their physiological and or behavioral characteristics. With this, the results of

using a biometric system as security access for any access to any systems or information that is classified will be to stop an unauthorized person from having access to the information. In this work, VB Net is a programing language used to develop the project (Chinedum, 2017).

In a paper by (Desmond Bala Bisandu, 2020) a computer-based test (CBT) mobile application with a multimodal biometric authentication was proposed. He believed that the need for such a system had become necessary due to the increasing number of examination malpractice cases during the conduct of examinations in Nigerian tertiary institutions. One of the major forms of examination malpractices identified is impersonation. The study was carried out on the state of computer-based tests in the University of Jos, Nigeria, it was implemented and used to get observations, findings, and relevant information on how the system can address impersonation. The implementation of the mobile application was done with Flutter (a framework of dart programming language). Python (python facial recognition package server) was used to handle face recognition. The backend used a database known as Firebase (Firebase collections/real-time database) which was used to store all data and carry out other related user validation functions. The work presented has rebounded to solving the problem of examination malpractice and impersonation in computer-based tests in the University of Jos as observed during validation with up to 97% level of reliability at different levels of authentication which makes the solution a highly recommended system with amazing results (Desmond Bala Bisandu, 2020).

In a paper by (Saleh M. Al-Saleem, 2014) some security issues that were faced with the computer-based testing systems were outlined. One of the security considerations mentioned was the identification and authentication of the examinee. It was stated that

a range of authentication could be used and some methods for authenticating the CBT

system were recommended amongst which was the multimodal biometric approach.

2.4 SUMMARY OF RELATED WORK

The table below summarizes findings from other similar papers on computer-based test systems using facial recognition biometrics, as well as the various verification and authentication procedures employed.

S/N	Author(s)	Year	Title	Methodology
1	Agnes Manurung, Amalia Fildzah, Juniastel Rajagukguk	2018	Computer Based Test (CBT) System for Student Academic Examination	This research was part of research and development research. The model design was adopted from Thiagaraja, which has the Four-D model: define, design, development, disseminate. This research was executed until the limited trial of the design model because of the lack of time of this study.
2.	I.B Ahmed, M.A Mohamed, A.M Noma	2018	A Framework For Secure Online Exam Using Biometric Fingerprint And Steganography Techniques	The combination of steganography and biometric fingerprint technique further strengthen the security of the online exam.
3.	Handjoko Permanaa,	2021	Design of Computer Based Test with	Using the Moodle platform version 3.6.4, this project attempted to create

	Ananda Ayu Dewi Sekartajib, and Dewi Muliyatic		Moodle Platform for High School Physics Class X	a computer-based test design (CBT) for physics class X. This study employs research and development (R&D) procedures based on the ADDIE development paradigm (Analysis, Design, Implementation, and Evaluation). The product shows computer-based tests created with Moodle media platform by giving five different sorts of objective assessments with a variety of question sets. Furthermore, the examination is taken in an exam isolation room which is accompanied by a secure exam browser application.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1   ANALYSIS OF THE EXISTING MTU CBT SYSTEM

The existing CBT system being used in Mountain Top University has been found to have a few security issues which could prove to allow for examination malpractice. Students who haven't used the CBT system before are expected to create a new profile with their matriculation number and other details and are to create a password that would be used to log in to the system to permit them to take part in the examination. At the end of the exam, the results aren't shown so the candidate isn't able to view his or her score.

The analysis of the existing system was looked into and the following merits and demerits were identified.

3.1.1   BENEFITS OF THE EXISTING SYSTEM

The benefits of the existing system are:

1. Makes the examination process easier and faster.

2. Marking accuracy

3.1.2   LIMITATIONS OF THE EXISTING SYSTEM

The existing CBT system, though it promises to be void of any form of malpractice, is not without its defects. After analyzing the current system, the following are the observations that call for a modification in the way in which the examination process is carried out:

1. There is an avenue for impersonation as an ineligible student/examine only needs access to the username and password of the eligible candidate to be able to log into his or her examination profile.

2. Inability to view scores after submitting.

3.2 ANALYSIS OF THE PROPOSED SYSTEM

The proposed system is expected to improve on some of the flaws that have been experienced in the existing system. The student would be expected to register on the system for the first time with his matriculation number and other information and would need to create a password as well. The next step would be for the student to register his or her face via the facial recognition tool. Once the registration process has been completed, the student would need to input his or her user-id (matriculation number) and password and then pass through the facial recognition tool before he or she can be permitted by the system to take the exam. Also, once the student is done with the examination and has submitted the system would compute and display the student's result for that course so that the student would be able to view his or her score.

The system would go through the following stages:

1. Requirements Analysis and Definition

2. System and Software Design

3. Implementation and Unit testing

4. Integration and System testing

5. Operation and Maintenance

3.2.1 REQUIREMENT ANALYSIS

The creation of a clear explanation, frequently in simple language, of what the system is intended to provide for its users is part of requirement analysis and specification. The system's functioning and evolution will be governed by several limitations. This information is called the requirements specification. Through the entirety of this document, the suggested system that would be constructed in this project will be referred to as MTU E-exam. The User and System needs will be clarified and represented using use case diagrams in this section, as well as the functional and non-functional requirements. Use case diagrams would be used as a requirement discovery tool to explain the interactions between the system's elements in greater detail.

Requirements Elicitations were derived via interactions with Mountain Top University students and ICT professionals, as well as a literature review of other comparable publications.

3.2.2 USER REQUIREMENTS

This section explains the system's end-user needs. Students and an administrator are the users of this system. The system's Use Case Diagrams (informal graphical representations of requirements) reflect the user requirements as well as more precise system requirements (particular functions to be performed by the system) as shown in figures. 3.1 and 3.2. The user requirement specifies the services that the MTU E-exam system is expected to provide to system users, as well as the restrictions that it must follow. The following are the user requirements for the MTU E-exam system:

A. Student

   i.   Register on the system

   ii.   Log in to the system

iii.   Take an examination

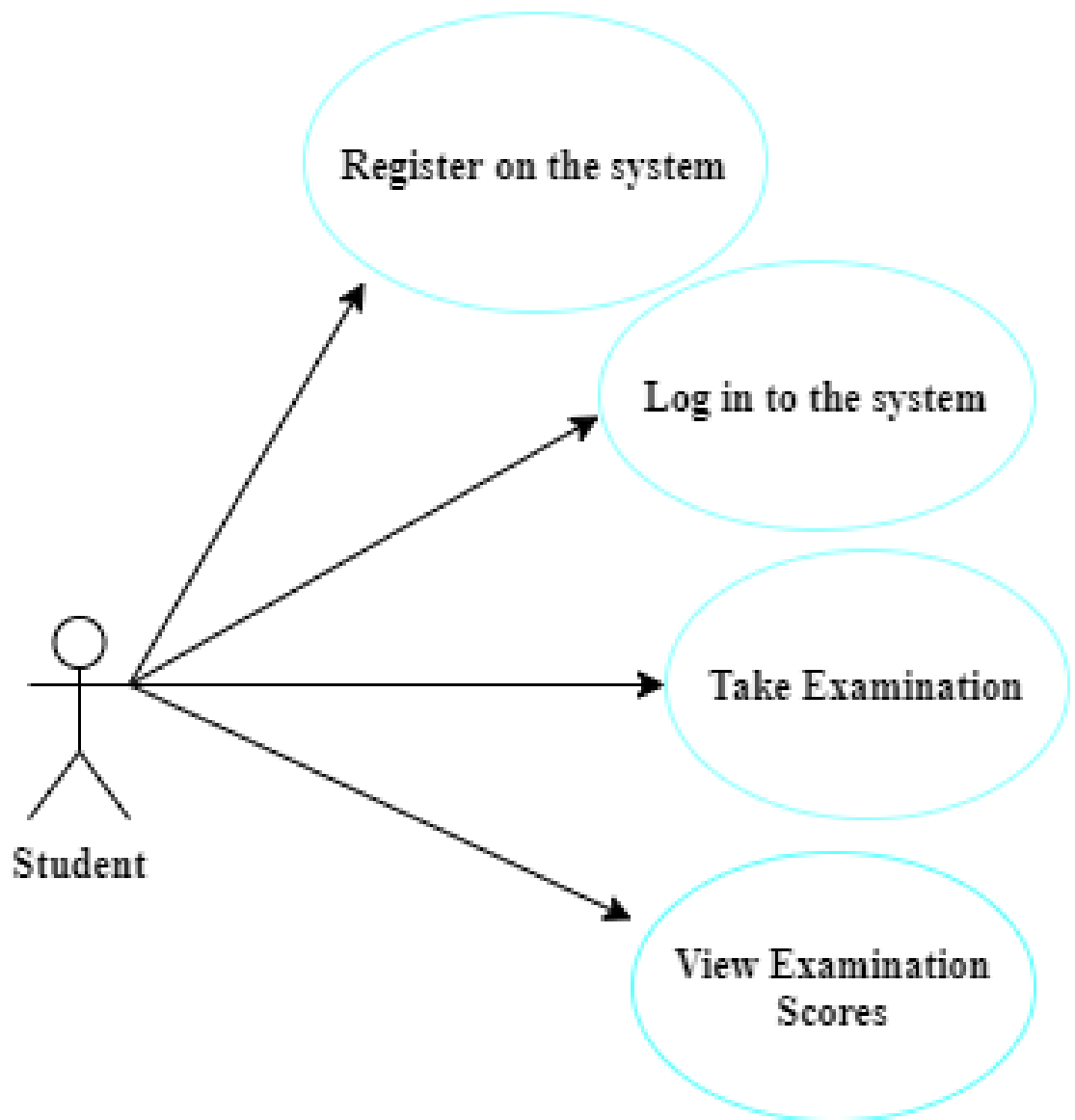iv.   View scores at the end of the assessment.

Fig 3.1 Use case diagram for the User (Student) in the system

B. The Administrator

    i.   Upload question, options, and correct answers

   ii.   Set timer for each paper
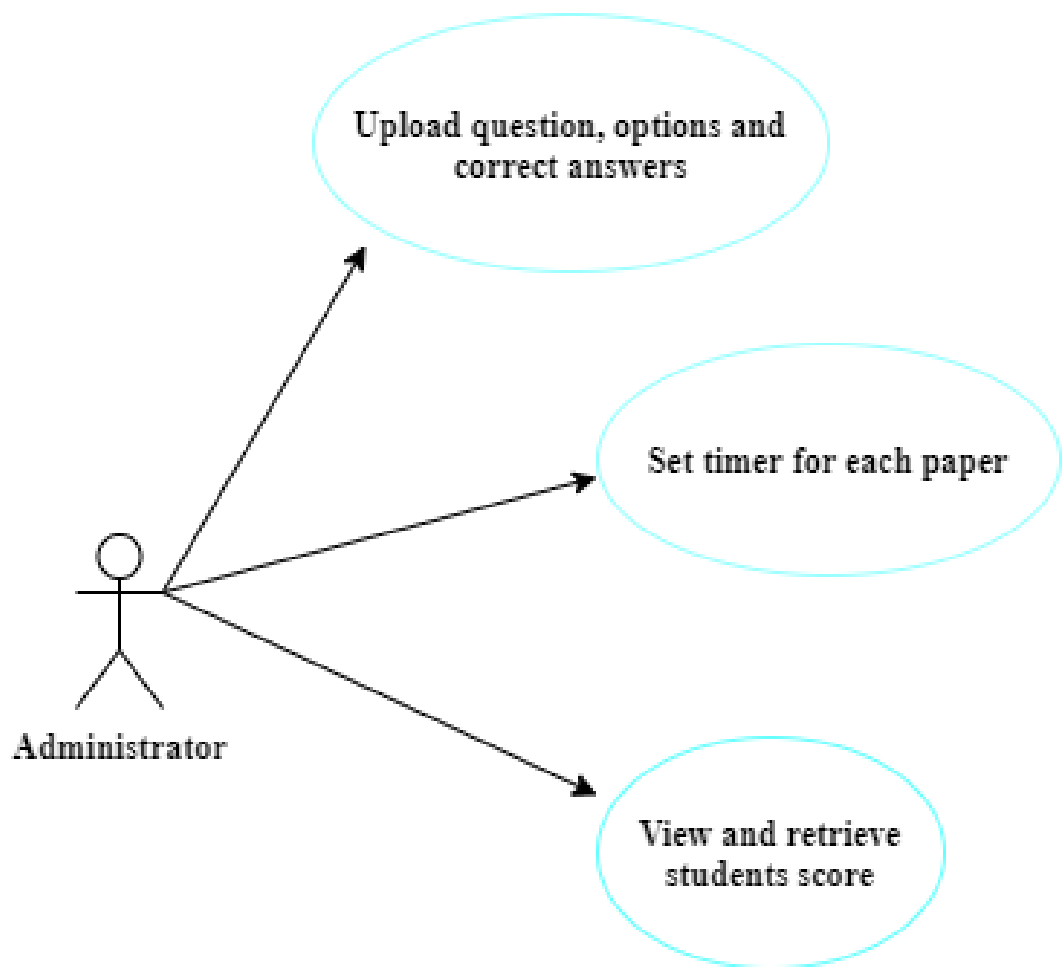
  iii.   Retrieve and view student scores

Fig 3.2: Use case diagram for the Administrator

3.2.3 SYSTEM REQUIREMENT SPECIFICATIONS

In this section of the project, the system's needs would be broken down into a more complete description, which would include the system's operations, services, and operational limits. The following are the system requirements for the MTU E-exam System:

3.2.3.1 FUNCTIONAL REQUIREMENTS

The descriptions of services the system should deliver, how the system should react to specific inputs, and how the system should behave in specific situations are referred to as functional requirements. The system performs the following functions:

a) Authenticates student's login details

b) Restrict the student to make only one selection of the options to the questions

c) Allow the student to go back to review or modify already answered questions

d) Generate questions randomly

e) Prevent repetition of questions already generated

f) Calculate student's score at the end of the examination

3.2.3.2 NON-FUNCTIONAL REQUIREMENTS

Rather than specific behaviors, they are the requirements that establish the criteria that can be used to judge the operation of a system. The system:

a) Possesses short response time and increased speed in executing user request;

b) Is reliable, that is, guarantees a minimum rate of failure occurrence;

c) Is user-friendly, that is, the user interface is easy to use;

d) Is scalable, that is, does not collapse with additional resources or users;

e) Possesses a large memory size;

f) Is maintainable;

3.2.3.3 HARDWARE REQUIREMENTS

Certain hardware requirements must be met for project efficiency to be dependable and productive:

a) 250 GB hard drive

b) 2 GB ram size

c) A working webcam

3.2.3.4 SOFTWARE REQUIREMENTS

For efficiency of use and to have system performance in developing of software the following various software requirement must be met Operating system: Mac OS, Windows, Linux, etc.

3.2.4 SYSTEM DESIGN

The system was designed based on the requirements specification. The Sequence diagrams, Data flow diagrams, and architectural design are presented in figures 3.3 to 3.9.
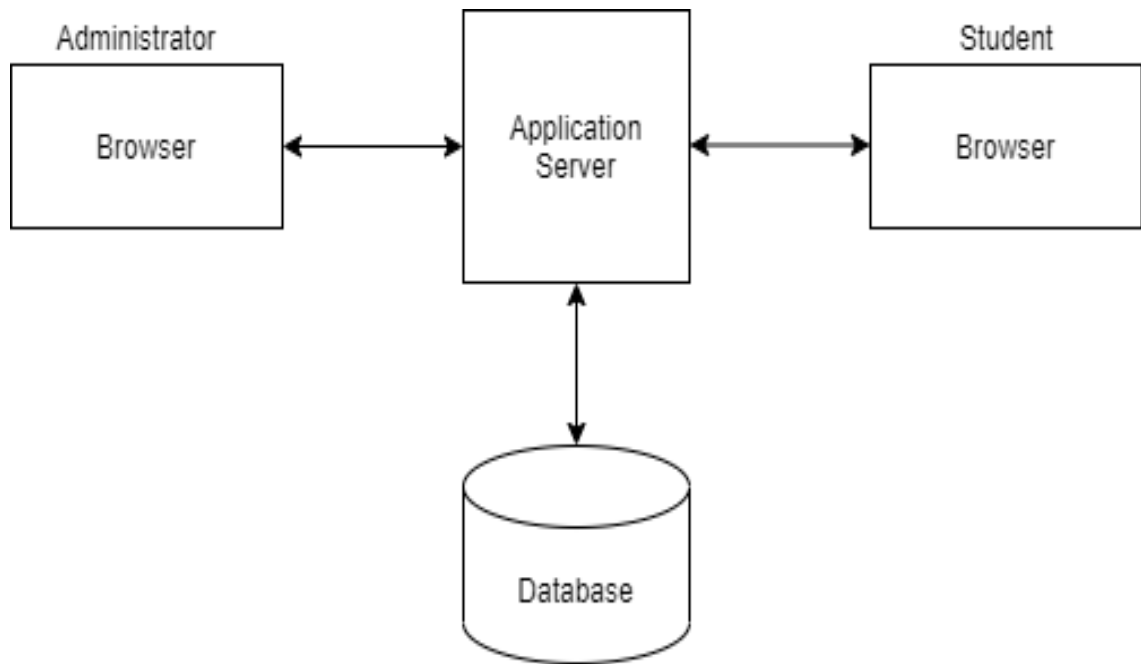
Fig 3.3: Architecture of MTU E-exam
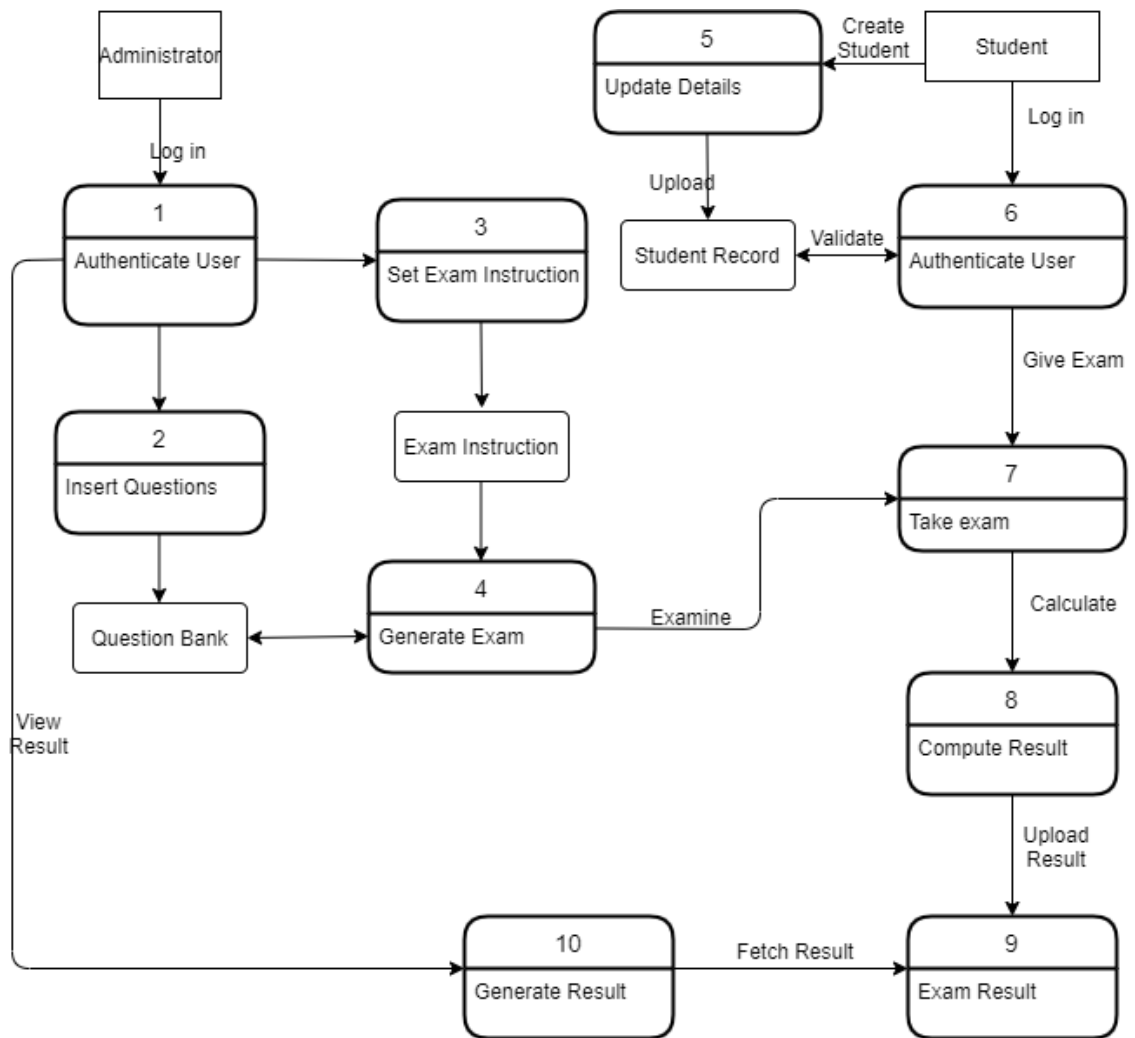
Fig 3.4: Data Flow Diagram for MTU E-exam
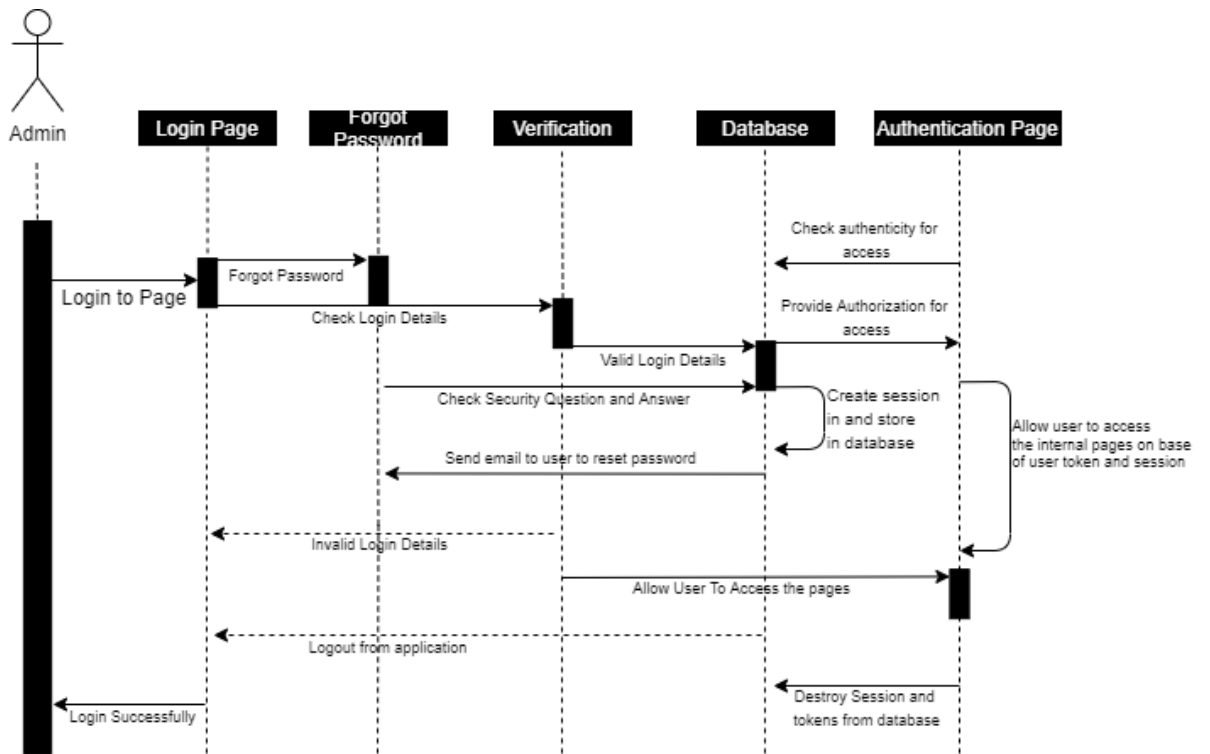
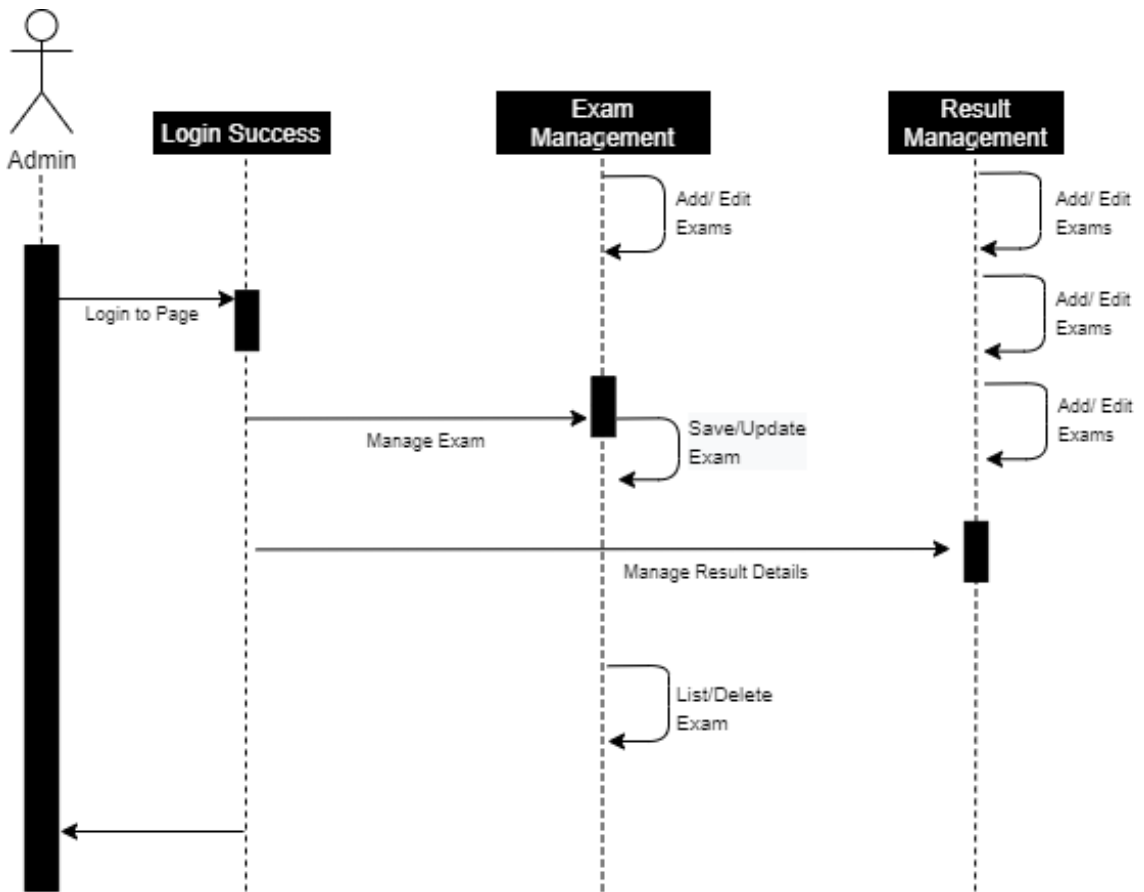Fig 3.5: Sequence Diagram for Admin Login Process

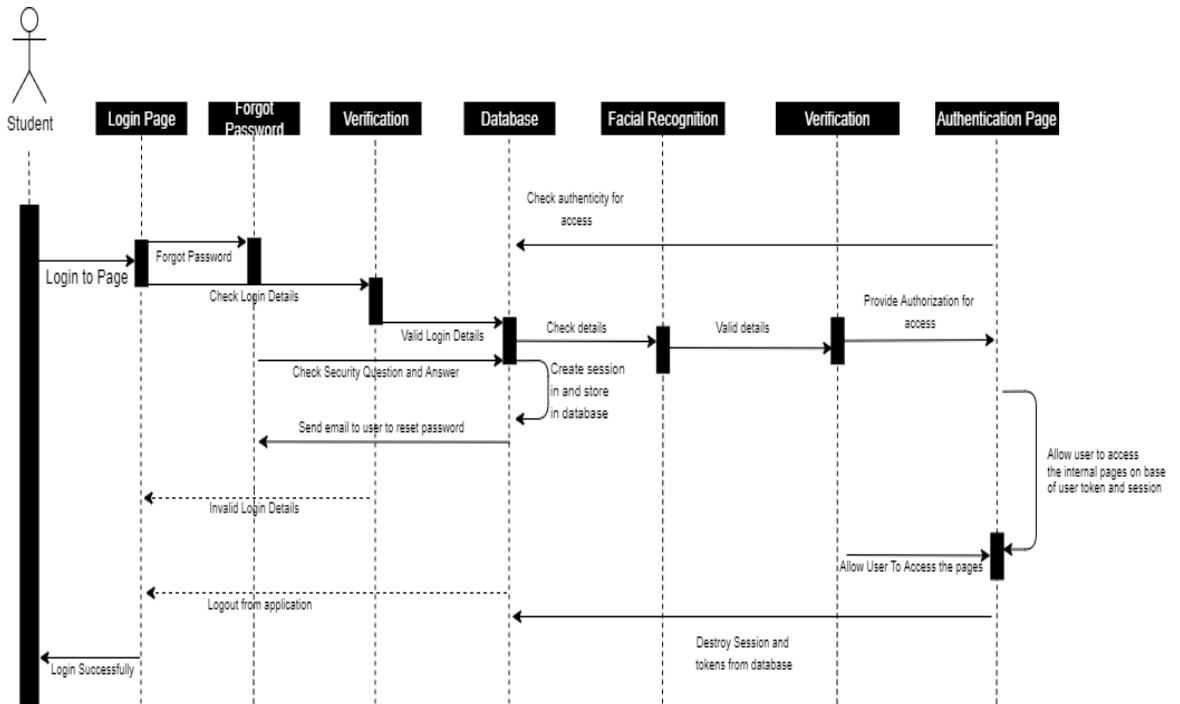Fig 3.6: Sequence Diagram for Admin Processes

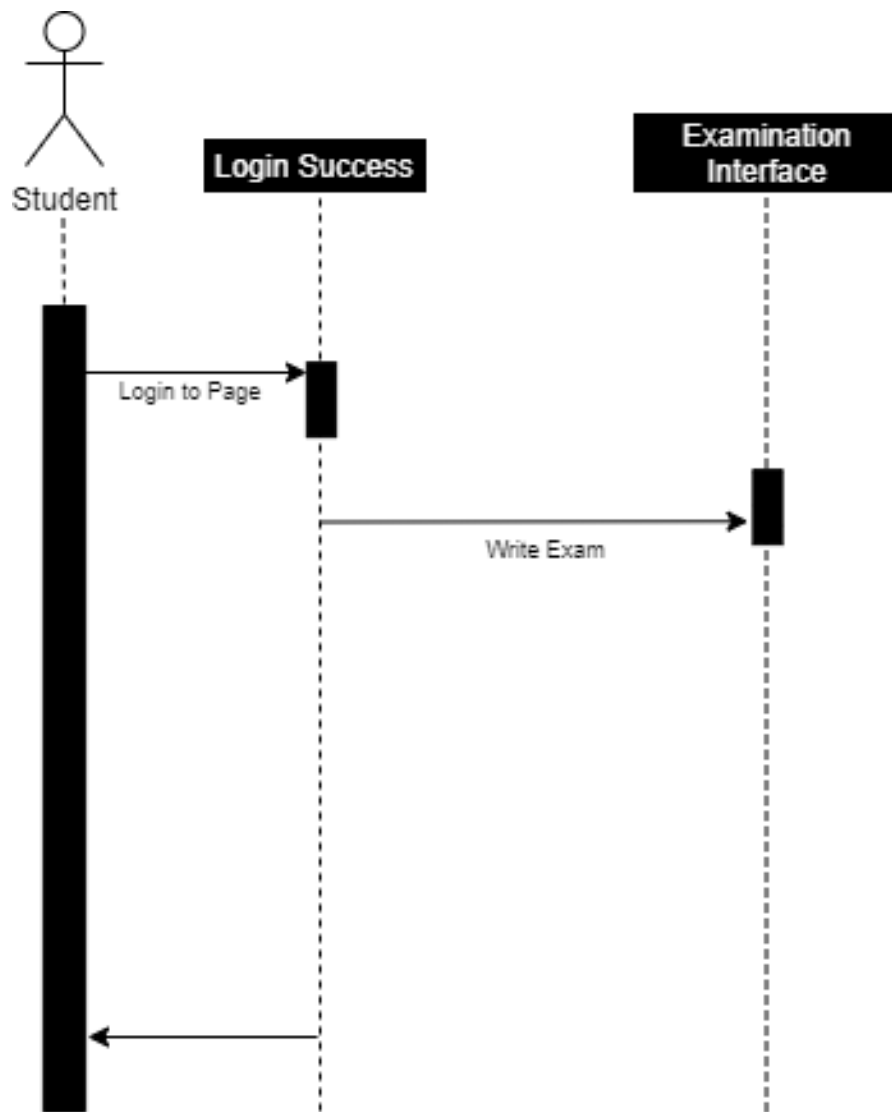Fig 3.7: Sequence Diagram for Student Login

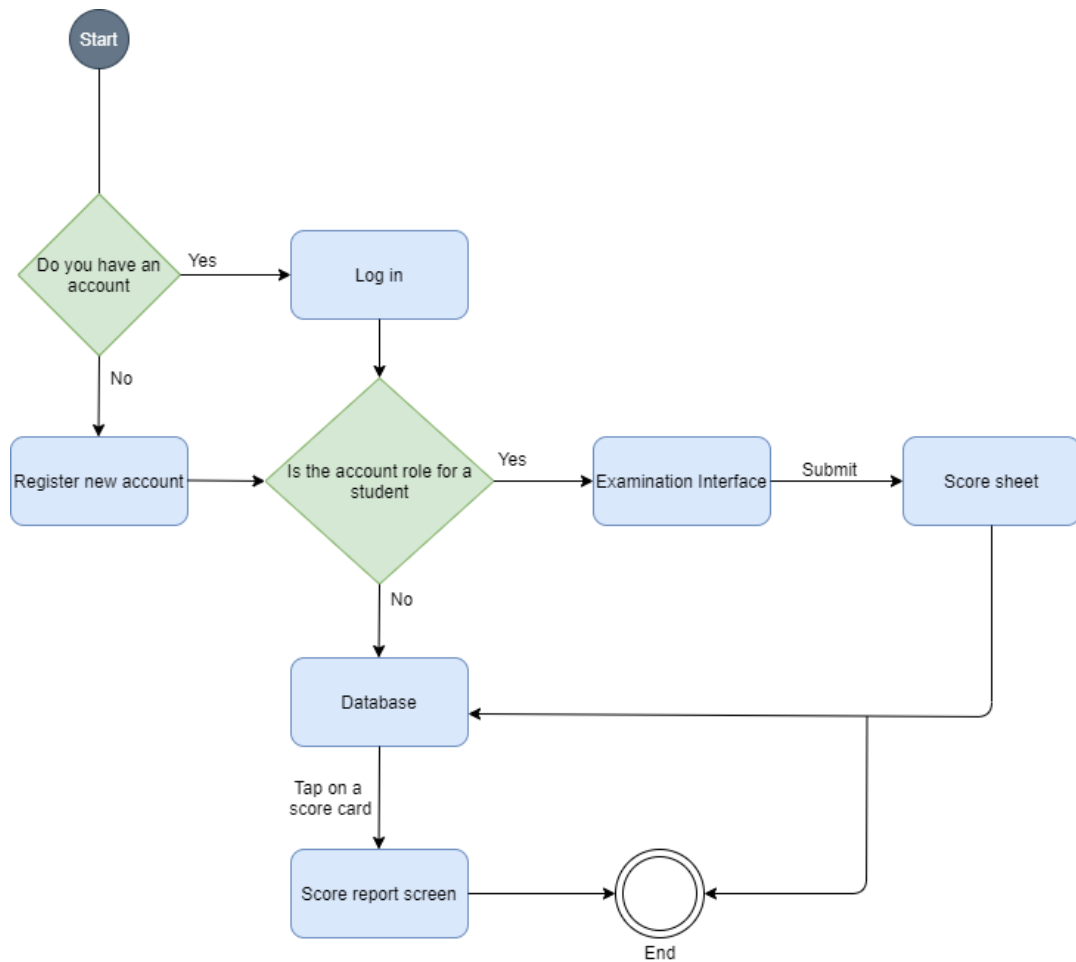Fig 3.8: Sequence Diagram for Student Activity

Fig 3.9: Activity Diagram of MTU E-exam

3.3 DEVELOPMENT TOOLS

The MTU E-exam system was developed using WAMP Server, Hypertext Markup Language (HTML), JavaScript and Cascading Style Sheet (CSS), PHP, and MySQL.

CHAPTER FOUR

IMPLEMENTATION AND RESULT

4.1 INTRODUCTION

This chapter gives the implementation and testing overview of the application: it starts with the program implementation specifics of the system and then goes to give a higher-level perspective of the application and subsequently ends up with methods and requirements for deploying the application.

4.2 SYSTEM MODULES

The system is composed of three major modules as follows:

a) The Index Page - This is the first page that appears when the system is launched from the web browser. It provides navigation to the other modules of the system such as the administrator interface and the student's interface.

b) Administrator Module - Access to this page is restricted to an administrator whose login details (username and password) are authenticated by the system. Upon successful login, he can change his password via the change password menu. The upload of examination questions and review of student responses to the questions are some of the functions which the administrator can perform via a successful login through this interface.

c) Student Module – A student is allowed to log in here and has the option to register if he or she hasn't registered before. Upon successful login to the system, the first question together with its instruction is generated. The Examination timer is activated and the student is automatically logged off the system upon expiration of the timer or submission of the completed test by the student. The system automatically generates the student's score for that

particular course upon submission. The figure 4.1 is the first page the student sees when opening the application, it is the welcome page. Figure 4.2 is the student registration page. This is where the student registers on the system. Figure 4.3 is the student login page; it is where the student signs in to write the examination after already going through the registration process. Figure 4.4 is the examination page and figure 4.5 is where the results for the examination is displayed upon submission of the examination.
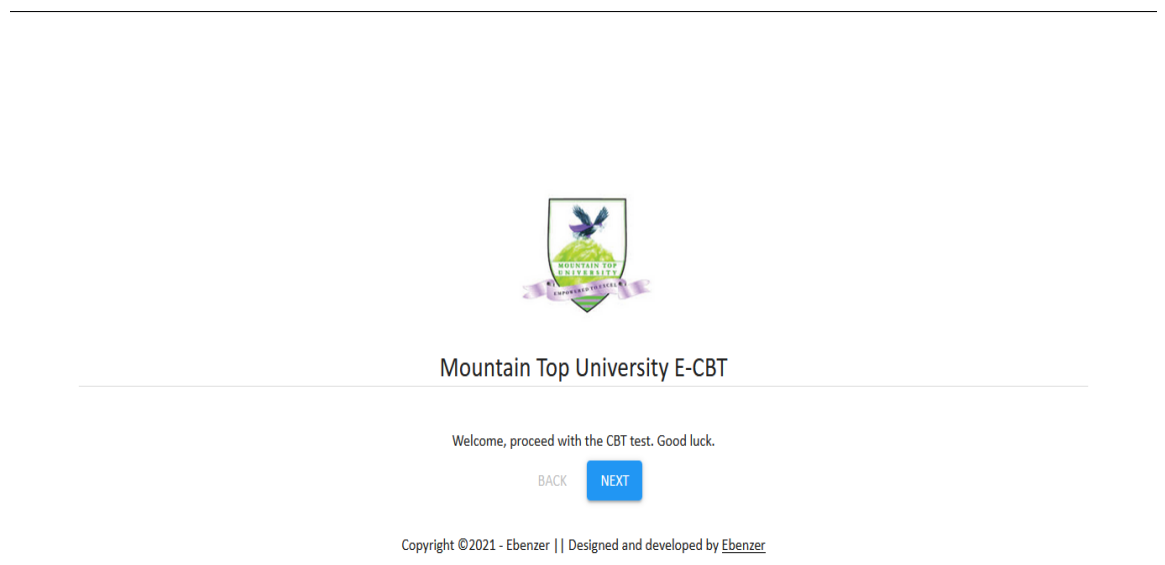

Fig 4.1: Student Welcome Page

Fig 4.2: The Student Registration Page

Sign In

Matric No

Password

SIGN IN

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Fig 4.3: The Student Log in Page

Fig 4.4: The Examination Page

Fig 4.5: The Score Page

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 SUMMARY

After going through the problems being experienced with the current CBT system being utilized by the school, this proposed system is believed to help eradicate the problems associated with the already existing system using the facial recognition biometric tool which will make it near impossible for a student to impersonate another student and have access to his or her examination portal and it will also make the examination process/ experience easier and much more comfortable.

5.2 CONCLUSION

This project work presents a Web based CBT system with facial recognition biometric authentication feature which can be applied in various academic institutions to improve their online examination process. The suggested system's features were highlighted, leading to the creation of a final system that acts as a proof of concept. In addition, the research can be regarded to have met its stated goals. It is envisaged that by using this system, the problem of examination impersonation will be solved beyond Mountain Top University, Nigeria.

5.3 CHALLENGES

Some of the challenges encountered while carrying out this project include poor internet connectivity and time constraints.

5.4 RECOMMENDATION FOR FURTHER STUDY

This work could be improved on by:

a) Introduction of other forms of question types such as theory-based questions and diagrammatic questions to make the test questions more diverse;

b) Inclusion of course materials so that these can be assessed by the student online;

c) Introducing the double authentication of both facial recognition and fingerprint biometric technique to further secure the examination process.

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