مجلة جامعة بني وليد للعلوم الإنسانية والتطبيقية

تصدر عن جامعة بني وليد – ليبيا

Website: https://jhas-bwu.com/index.php/bwjhas/index

العدد التاسع والعشرون، 2023

Development of an Online Examination System Case Study: Cyprus International University

Mabrouka Algherinai [1*]

[1] Information Technology, The Higher Institute of Sciences and Technology, Aljofra-sokana, Libya

*Crosspnding author: kokyrbab1@gmail.com

تاريخ الاستلام: 2023-06-05 تاريخ القبول: 2023-06-25 تاريخ النشر: 2023-09-07

Abstract: The study set out to develop an online examination system. System design made use of entity relation diagrams (ERDs), case diagrams, site diagrams and object oriented (class) design to model system processes and entities. MYSQL was used to implement the server based database, md5 for encryption. PHP (Hypertext pre-processor) web scripting language was used to enforce interaction with the database. The online examination is an Internet based questionnaire, with questions compiled from different libraries. Its mission is to offer a quick, easy and safe way for students to take the exam. The resulting system was tested and validated. It was able to meet the required specifications and address some limitations of the previous system such as data confidentiality and security.

Keywords: System design, ERD, MYSQL, HTML, Specifications.

Introduction

Test or an examination is an assessment, administered on paper or on a computer, intended to measure the test-takers' knowledge, skills, or aptitudes. Tests are often used in education, professional certification, counselling, psychology, the military and many other fields. The goal of testing is a measurement that is called a test score, which is a summary of the evidence contained in an examinee's response to the items of a test that are related to the construct or constructs being measured [1].

New technologies have been widely used in higher education to deliver curriculum content, [2].

Statement of the Problem

1) Current pen-and-paper evaluation systems are very time consuming; students' scripts must be marked manually.
2) It is difficult to analyze examinations manually.
3) When many candidates sit for an examination, more invigilators are required, which increases cost.
4) Results are not precise because calculations and evaluations are subject to human error.
5) Result processing takes more time as it is done manually.
6) The likelihood of an examination paper being leaked is greater in the current system compared to the proposed system.

Aim and Objectives

The main aim of the proposed project is to develop an effective online examination system for a university.

The objectives of the research are:

1. To survey the latest computer-based examination management systems.
2. To develop a software application for an online examination system.
3. To implement the system using active server pages (ASP).

Significance and Contributions of the System

With the proposed system the following contributions would be made to teaching professionals and educational institutions:

1) It is possible to monitor how much progress a student has made.
2) The progress of many students can be judged immediately.
3) Problematic topics that need revision can easily be identified.
4) A large number of students can assessed fairly and objectively.
5) Opportunities for cheating are reduced.
6) Marking load of teachers is reduced: an assessment for a semester can be made based on students' output over a 2 or 3 hour period.
7) Examinations are more reliable and cheaper to administer.

Scope of the System

This project would be very useful for a university course where regular evaluation of students is required. Further it can also be useful for anyone who requires feedback based on objective type responses, in the corporate world as well as in educational institutions. The project can be used anywhere, as it is a web based application; user location does not matter. The examiner or invigilator does not have to be present when candidates take the examination. The implementation will be based on the three areas: Computer architecture, Performance evaluation Network and Java.

Literature Review

Overview

An electronic examination (e-Exam) system is an examination conducted using the Internet or an intranet. It reduces much of workload involved in examining, training, grading and reviewing. The set of questions commonly used in the e-examination system are multiple choice objective tests and quizzes that can be formally and easily evaluated online [1].

Many institutions are re-evaluating traditional methods and are providing pedagogical materials through the Internet. Several studies have been carried out on distance education, which encompasses web classrooms and web-based online examinations [3]. The development of web-based testing and assessment is an important and growing area of application of web technology [6].

Electronic Examination Systems

An Electronic Examination System (e-Exam) is a cost-effective and popular means of mass evaluation system [4]. Computer based testing can achieve significant cost-savings due to the speed at which results are analysed and presented. The e-Exam is web based system that provides the facility to conduct examinations and view the results of these exams online [8]. Only two categories of people participate in this system: one is the user and the other is the administrator. With the online

examination and result processing system users can create and administer exams, tests, quizzes in a secure client/server environment. Candidates will be thoroughly and efficiently evaluated through a fully automated system that not only saves lot of time but also gives fast results [9].

Institutional learning management system (LMS) such as Blackboard is used in many cases for online assessment. Web CT, or an in-house product [10]. There are several advantages that institutions and also learners get from online assessment. These include:

1) Time analysis of responses to the question level to better discriminate between candidates [11].
2) Question banks and randomization of questions and response orders to reduce cheating.
3) Automated analysis of results from entire candidate cohorts.
4) Immediate feedback can be given.

However, there are also some difficulties associated with various forms of online assessment [11]. Online assessment may not be effective for evaluating creativity, problem solving ability, critical thinking, reflection, or authentic learning; collectively the characteristics of deep and effective learning. The delivery technology itself creates problems of inter-candidate interaction and is prone to technical malfunctions which can affect many students simultaneously. Should the whole network fail, the examination needs to be rescheduled.

Justification for Online Examinations

Nevertheless, E-exams can be justified in a number of ways. It can help avoid the stresses associated with current paper-based systems; it can assess valuable life skills; it can be better for users – for example by providing on-demand tests with immediate feedback, and perhaps diagnostic feedback, and more accurate results via adaptive testing; it can help improve the technical quality of tests by improving the reliability of scoring[12].

A detailed historical background of online education was presented in by Gaytan and McEwen [15], which discussed its potentials and limitations that could lead to the advancement of the scholarship of teaching and learning.

They stressed the need for online instructors to understand the way online education has evolved over the years from previous conceptions of education and the wide array of implications and assumptions involved in the delivery of online education. They also presented some recommendations for the advancement of online education.

Existing System at the Cyprus International University (ciu)

Until recently, examinations in Cyprus followed traditional pen-and-paper practices: students were given question papers and wrote their answers in answer booklets. The whole process of assigning tests and evaluating the scores after the test was done manually. Processing the test paper, i.e. checking and distributing respective scores took a long time. The existing system at CIU is the product of a mini-project entitled “Online Examination System” carried out by Niraj Lola [13], a 5th semester MCA student at the National Institute of Technology, Calicut in November 2004. He designed an Online Examination system for conducting multiple choice online tests. This system only has three sections which are: English language, Mathematics, and Chemistry, with a time limit for each section. In this system examinees take the exam and are able to view their results immediately after each section. This

system also allows the examinee to know both correct and incorrect answers at the end of each section. The system was developed using Adobe Dreamweaver (CS4), MySQL (Database), Apache Tomcat Server (Server). Its implementation involved two modules; one for the Administrator and the second for the Examinee.

Difficulties with the Existing System

A review of the system identified some difficulties.

1) There is no mechanism to control the number of times a candidate/student can take the exam.
2) Each candidate has only twenty minutes to answer twenty questions in each section. However, a student who is very slow in answering questions might waste the twenty minutes on only one question.
3) Only the Administrator can register each candidate/student for the examination.

In a situation where there are thousands of students to sit for the test, it is very difficult for the Administrator to register and assign an Exam ID to each student, sequentially.

In the university, the first problem encountered in organizing a test is that reams of hard copied documents are still generated. This raises the age-old discussion of keeping information in the form of databases versus keeping the same on sheets of paper. Information's that are being kept in hard-copied documents leads to the following problems:

1. Lack of space: Because academic assessments have legal significance, the documents generated must be carefully stored.
2. Filing poses a problem; Due its tediousness
3. Filtering is difficult: It is hard to filter relevant documents from irrelevant ones when the number involved is very large [16]. Reviewing becomes time consuming: The entire process is carried out manually at the centres and all the records are maintained on the papers. So the maintenance of records is very difficult in the departments, and furthermore, it is very difficult to check the records.

The existing system is paper based, time consuming, inflexible and labor intensive.

System Development

Introduction

This section explains how the new proposed system will be carried out and implemented to ensure the system will work smoothly and effectively.

Need For the New (proposed) System

All the limitations mentioned in the existing system will be addressed by the proposed system. This will be achieved through the following measures in the proposed system:

1. Each candidate will be able to take the exam only once. If the candidate attempts to log in a second time to take the exam, a web page will be displayed with a message informing the candidate he can only take the exam one time and directing him back to the home page. This improvement will control the number of times a candidate can sit for the test.

2. Each question in each section will be assigned one minute. This is to help the candidate to be time conscious and manage his time in answering questions. This should increase the number of questions answered by the candidate.
3. The Examination ID for each candidate is generated automatically and stored in the database after the candidate has successfully registered for the exam. Candidates can register by themselves, without the help of the Administrator. In this way, time will not be wasted on the registration process.
4. In the existing system the site is limited to only three sections of questions which are Performance Evaluation Network, Computer Architecture, and Java. In the proposed system there will be more than three sections and the answer to each question will be displayed before the student attempts the next question. The grade of the exam will be displayed when the administrator clicks on the grade button after the student has answered the question on that particular section.

To solve these problems, a computerized system is required. A web based application will provide a flexible working environment that will be easy to use and will reduce the time for report generation and other paper work. This online examination system will also provide an efficient computerized solution for the student that wants to sit for the test. The system will be easy to administer, reliable and cost effective.

The main purpose of the proposed system, therefore, is to provide a comprehensive computerized system that can capture, collate and analyze the data from these tests. The new system is needed to solve the limitations discovered in the previous system.

System Analysis & Design

System analysis is a problem-solving technique that decomposes a system into its component pieces for the purpose of studying how well those component parts work and interact to accomplish their purpose [16]. The design of the online examination and result processing system will be broken down into two key facets with the following identified functions:

A. System Analysis

1) Preliminary investigation
2) Problem analysis
3) Requirement analysis

B. System Design

1) Design
2) Overview of the new system
3) Construction
4) Implementation

C. Preliminary Investigation

The preliminary investigation must define the scope of the project and the perceived problems, opportunities, and directives. This phase is not intended to take much time [17]. The preliminary investigation typically includes the following tasks:

1) Definition of the study approach (interview or observation)
2) Development of problem statement

D. Development of Problem Statement

The following information was obtained from a study of the existing system.

a) Information Data

Input

1) Wastage of resources
2) Too much paper work
3) Information may not be accurate
4) Delay in viewing scores

Output

1) Candidates not answering examination questions in time allotted
2) Limited to only three subject areas
3) Too much paper work generated

Stored data

1) Data organization is very poor (too much paper work)
2) Stored data not easily retrieved
3) Result/scores not immediately accessible by students
4) Year-to-year comparisons difficult

Efficiency

1) Do not improve student's efficiency
2) Do not improve quality of CIU test system

Control

1) Data or information not adequately secure
2) Chance of question paper being leaked before the examination day
3) Crimes (e.g. alterations can be made to data).

Finances

1. Cost of purchasing papers and printing materials are high.
2. The number of staff required is large.

Problem Analysis

The goal of problem analysis is to study and understand the problem domain well enough to thoroughly analyze its problems, opportunities and constraints.

Requirement Analysis

The requirement analysis defines the requirements for the proposed system. The key here is what, not how. The requirement analysis phase answers the question, what do the users (candidates and the administrator) need and want from the new system. Design of the logical model of the E-exam (the proposed system) will be carried out by drawing the Case Diagram, and the State Diagram.

Characteristics of the Proposed System

The Online Examination System created for taking CIU exam has following features:

1) In comparison to the existing system, the proposed system will be less time consuming and more efficient.
2) The proposed system will provide instant feedback to students
3) Analysis at many levels will be very easy because it is automated.
4) Results will be precise and accurate, and will be available within a very short span of time because calculations and evaluations are done by the simulator itself.

5) The proposed system is very secure with no chances of leakage of the question paper because it is dependent on only one person, the administrator.
6) Each candidate can sit for the examination only one time.
7) The logs of registered candidates and their marks are stored and can be backed up for future use.

What are the user's demonstrable needs?

The user needs a system which will remove all the problems mentioned earlier. The user wants a web-based system which will reduce the bulk of paperwork, provide ease of work, flexibility, fast record finding, ability to modify, add, and remove items, and generate reports.

How can the problem be redefined?

Our proposed conception of the system, taking into account the problems of the existing system, is set out on paper. We matched the problems and needs of the existing system and requirements to the structure of the proposed system. We further updated the layout on the basis of redefined the problems.

In the feasibility study phase we had undergone through various steps, which are described as under.

How feasible is the system proposed?

This was analyzed by comparing the following factors with both the existing systems and proposed system.

Effort

Compared to the existing system, the proposed system will provide a better working environment in which there will be ease of work and the effort required will be comparatively less than the existing system.

Time

The time required generating a report or for doing any other work will be comparatively much less than in the existing system. Record finding and updating will take less time than the existing system.

Labor

In the existing system, the number of staff required for completing the work is large; the new system will require a smaller number of staff.

System Design

This stage involves creating the structure of modules that best solves the problems specified above; that is, the development of specifications or a 'blueprint' of how the system will work.

Design Approach

In the software development process, the system design phase involves decomposing a software system into modules and defining the relationship among these constituent modules. Usually, combinations of two or more design approaches are employed in the execution of a project [18]. In the case of the examination and result processing system, the following design approaches were employed:

Modern Structure (site) Design

This is a process-oriented technique for breaking up a large program into a hierarchy of modules that result in a computer program that is easier to implement and maintain (change) [19]. It is considered a process-oriented technique because its emphasis is on the process building blocks in the E-exam.

Object-Oriented Design

The first thing is to identify the object that represents actual data with its domain. Once the object's behaviors and responsibilities have been determined, the next step is to create a detailed model of how the objects will interact with each other [20].

System Implementation

Introduction

If the proposed system is to be implemented holistically, it is a departure from the old ways of writing exams in CIU. Introducing such a system has to be done with care. After the completion of the coding processes, it is necessary to perform a wide range of activities before the E-exam system can be operational.

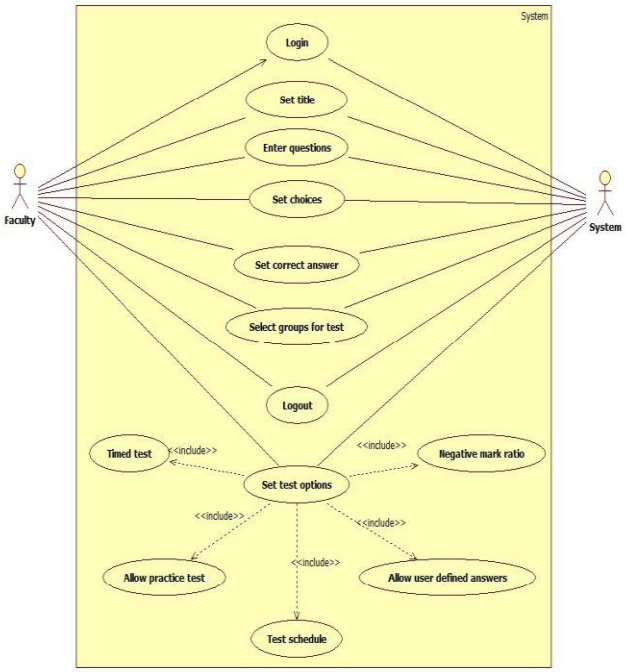

Fig. 1: Activity diagram for the system

Such activities include system testing, system implementation, system maintenance, functional requirements, specification report for the system, software system attributes.

Overview of the System

The online examination and result processing system created for taking the online WAEC test a different sequence of activities for candidates and for the administrator. The following are stages for candidates:

1) Login with username and password / Register
2) New User Registration
3) Edit Profile/View Result
4) Select Subject
5) Examination

6) View my score
7) Log out

The system has the following stages for the administrator:

1) Login
2) View user (edit, delete and reset exam for candidate)
3) Edit Subjects
4) View All Subjects
5) Add Questions
6) View all scores
7) Log out

Modular Design

A software system is always divided into several sub systems that facilitates its development. A software system that is structured into several subsystems is easier to develop and test. The different subsystems are known as modules and the process of dividing an entire system into subsystems is known as modularization, or decomposition.

The different modules are.

1) Login Module
2) Registration module
3) Question paper creation Module
4) Examination Module
5) Student Module
6) Administrator Module

Design Stages for Candidates

Login/And New User (registration for candidates).

There is a quality login window because this is more secure than other login forms: in a normal login window, multiple logins are available so that more than one person can access the test with their individual login. In this project, each user can login with his/her username and his/her password to enter the site. Hence it is more secure and reliable than the previously used online exam simulator.

Registration

This is the web page where the registration process will be done by each candidate before sitting for the exam. The registration page has the following items that each candidate must fill in correctly: Candidate's Email address, User Name, Password. Retype Password, Contact number, Address, City, pin code. After the candidate has successfully registered, he/she will have to login with a valid username and password.

Change Password

Each candidate has the opportunity to change his/her password after login is successful as often as he/she wishes. The effect of this change will also be updated in the database.

Edit Profile/View Result

At this initial stage the candidate cannot view a result but he can edit his profile and change his password if he wants to

Subject Selection

The test page is the most important page in this project. From the given choices, the candidate can select his subject (like Performance Evaluation Network, Java) to take the exam.

Examination

After the candidate has selected a subject, the next web page will display the questions. Only one multi-choice question will be displayed at a time. A timer is set for each multi-choice question. If the candidate fails to select an answer to the question from the options given within one minute, then the next question will be displayed automatically. This improvement in the system will help the candidates to be time conscious and he/she will be able to answer more questions. Poor time management was one of the limitations in the existing system.

View My Scores

After the candidate has answered the last question, he/she will be instructed to click on the grade button which will display the student's grade. The student will be instructed to print out this page.

Log Out For Candidate

Each candidate will be advised to log out after finishing the exam to exit the examination site.

Design Stages for the Administrator

Login

The administrator has a unique User Name and Password which he/she can use to login to the site and perform some administrative task. If the wrong username and password is entered by the administrator, he/she will not be able to login.

View Users

Only the administrator has the privilege to view all users (candidates). The administrator has the ability to manage users, manage subjects, manage results, prepare questions and reset exams for any candidate if the need arises. All these tasks can be performed on the web page (front end). There is no need to manipulate the database (back end).

Edit Subjects

The administrator is able to add subjects, if and when the need arises. The effect of this change will be updated automatically in the database.

View Subjects

The administrators can view all subjects and decide to edit or add more

View All Scores

Only the administrator has the access to view the scores of all candidates. The scores will be displayed on a single web page. The date each candidate sat for the exam will be displayed along with each candidate's names and score.

Log Out Admin

It is advisable for the administrator to log out of the site as soon as he/she has finished the task to prevent other unauthorized users from manipulating the site.

Database Design

Data storage is a critical component of this system. All information systems create, read, update and delete data, which are stored in a database. The most popular from a database used is the relational database. For the purpose of this project, Microsoft Access version will be used for data storage. The name of the database is "configure _test".

Home Page:

This is the first page to be viewed by the examinee (usually a student). It is the page introducing the examinee to the task ahead.

Login Page:

This is the page where examinees who are registered users log in their username and password. Successful login leads the examinee to the next page. If the examinee is not yet a registered user, he/she clicks on the click here link below the login link, and will be directed to the Registration Page.

Registration Page:

This is where the unregistered user becomes a registered user. It requests the candidate to provide: his/her first name, last name, e-mail address, user name, and password, re-type password, and phone number. After successful registration of this information, the examinee will be redirected to the Login page and asked to log in with a valid username and password.

Select A Subject Page:

This is the next page after the Login page. It asks the candidate to select a subject from the list of three subjects in the dropdown menu.

Question Interface Page:

After the candidate has selected a subject, the questions will be displayed on the next web page. Only one multi-choice question will be displayed at a time. The Next Question icon on this page when clicked automatically brings up the next question from the database. A timer is set for each multi-choice question. If the candidate fails to select an answer to the question from the options given within one minute, the next question will be displayed automatically. The series of questions that is displayed to a candidate is drawn randomly from the database. It has a score reader which records the number of correct answers in the examination but does not record the incorrect answers in the examination.

Result Interface Page:

After candidates have answered the last question, they will be automatically taken to this page, where they will see their scores.

System Testing

Testing is often seen as a means of establishing that a program is error-free and that it performs as planned. However, it is almost impossible to test a program so thoroughly that it can be claimed to be free of errors. Unit testing is carried out by testing all the events and modules that have been coded and sub tested for a program as an integrated unit.

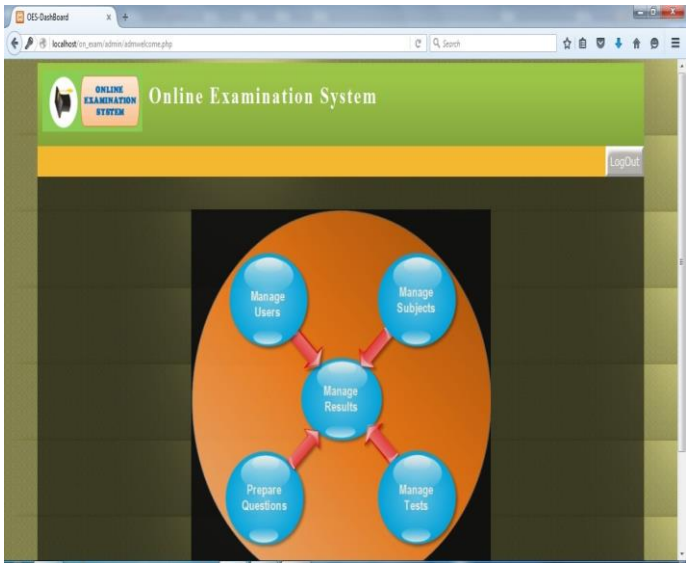

Fig. 2: Admin dashboard page

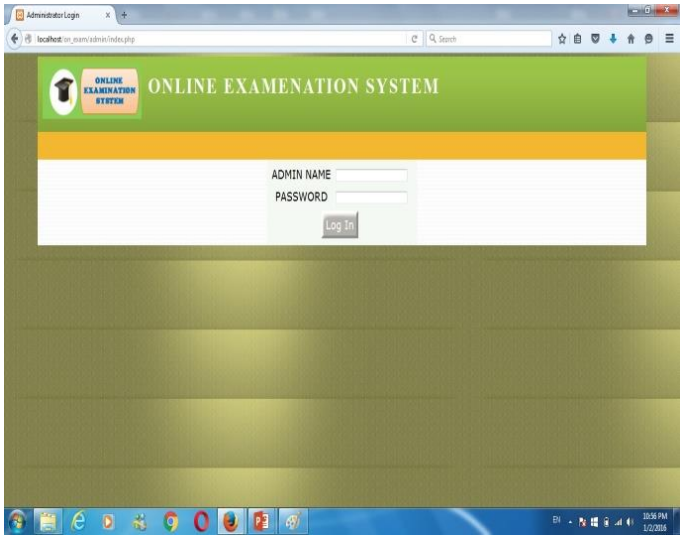

Fig.3: Login page for Admin

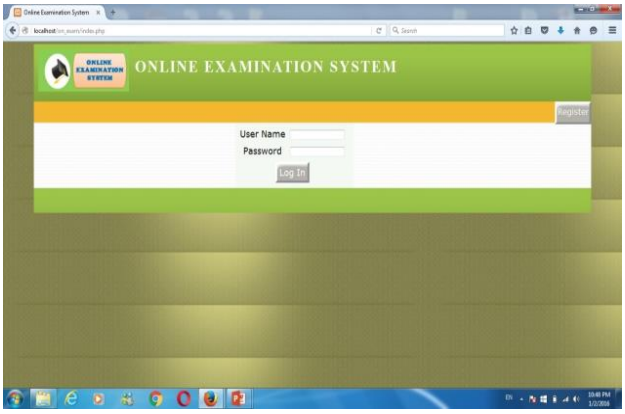

Fig. 4: Login page for student

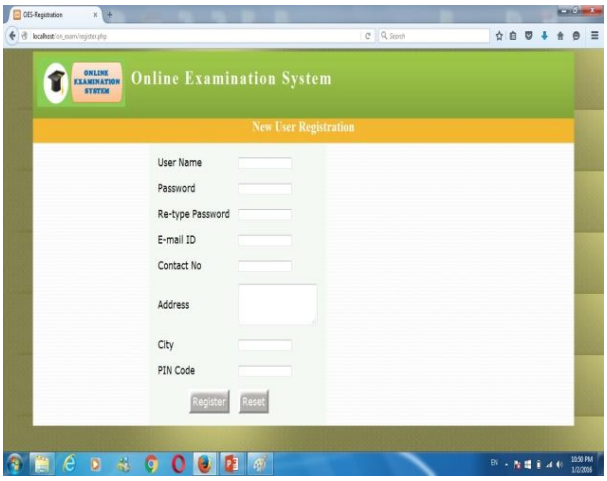

Fig. 5: Registration Page for student

The types of tests carried out fall into the following categories:

1) Test that there are no errors in syntax and language in the program code.

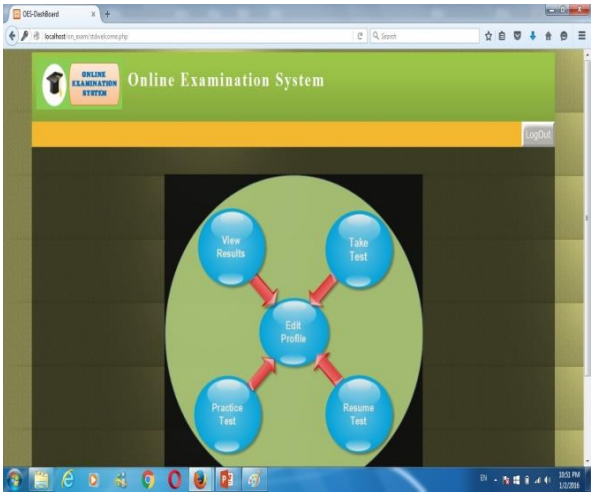

Fig. 6: Student dashboard page

2) Test that data which are valid are entered into the system.
3) Test each module with sample data to determine actions and reactions in a real life situation.
4) Test the performance of the system, such as the speed of response ties and handling of large volumes of data.
5) Test that the examination score is automatically generated immediately after exams.
6) Test that each candidate can answer the test only one time.
7) Test that the administrator can view all the student data and scores.
8) Test that the administrator can edit, delete, and reset exams for candidates if the need arises.

Functional Requirements

For the proposed system to be implemented properly the following hardware and software requirements must be available.

Hardware Requirements

Network: a local area network (LAN) is required to be constructed in the university. If the application is to be run at more than one exam center, a wide area network link between the LANs of the university's exam centres is needed. The LAN is constructed using wireless technology. The wireless LAN requires wireless network cards for each system.

1) *Client system:* Pentium IV, 2.4GHz processor, IGB RAM, 80G HDD (Hard Disk Drive).
2) *Laptops:* Intel Centurion 2.0 GHz processor, 2GB RAM, 120GB, wireless NIC (Network Interface Card) card.

Software Requirements

A. Operating systems

1) windows 8 – for server
2) MySQL (WAMPP version 2.5) – for server.

B.Windows Vista/XP for clients and laptops.

Specification Report for the Oroposed System

The specification report for the proposed system is illustrated below:

System Interface

The application would be a self-contained system. It will not access data from any other application, nor will other application have access to its data.

User Interface

Application will be accessed through a Browser Interface. The interface would be viewed best using 1024 x 768 and 800 x 600 pixels resolution setting. The software would be fully compatible with Microsoft Internet Explorer version 6 and above. No user would be able to access any part of the application without logging on to the system.

Communication Interface

The system should be accessed over a LAN specifically on an Intranet. For clients to access the application server, the network should be running TCP/IP protocol.

Conclusion

This project report entitled "Online Examination System" has come to the final stage. The system has been carefully developed; it is free of errors and at the same time it is efficient and time-saving for candidates, lecturers and administrators. It is important that the system is robust, and provision is provided for future development in the system. The entire system is secured. The e-Exam is a small but effective system for conducting online examinations. Once the test has been distributed, completed submissions are electronically sent to the online exam data processing engine, which stores, scores, and tabulates them. Results are published by the reporting module. Detailed records of all data turned in by each respondent are readily accessible by authorized users from the online exam Microsoft Access database. It is cost effective; it can be easily modified, and it can be converted for other testing purposes. For example it can be converted to an online quizzing system, qualification tests for industrial workers, or an online Feed Back System.

References

[1] S.D. Achtemeier, L.V. Morris, L. V. and C.L. Finnegan. (2003). "Considerations for developing evaluations of online courses." Journal of Asynchronous Learning Networks, 7(1), 1-13.

[2] BabatundeIpaye (2009), "E-Learning in a Nigerian Open University", National Open University bipaye@gmail.com

[3] A. Huszti and A. Petho (2008), "A Secure Electronic Exam System", Informatika

[4] M. Ibrahiem, M. El Emary, A.A. Jihad. And Abu Al Sondos (2006), "An Online Website for Tutoring and E-Examination of Economic Course", American Journal of Applied Sciences 3 (2): Page 1715-1718

[5] T. Schramm (2008), "E-Assessments and E-Exams for Geomatics Studies", Department of Geomatics Hafen City University Hamburg Hebebrandstraße 1, 22297 Hamburg, Germany

[6] YuanZhenming, Zhang Liang, Zhan Guohua (2003), "A Novel Web-Based Online Examination System for Computer Science Education", 33rd ASEE/IEEE Frontiers in Education Conference, S3F-7-S3F-10

[7] J. C Adams and A. A. Armstrong (1998), "A Web-based testing: A study in integrity," World Wide Web, vol. 1, no. 4, pp. 193-208.

[8] J.S. Iyilade and W.O. Odekunle. (2005). "A web-based student testing and assessment system". In Proceedings of the International Conference on Application ofIctto Teaching, Research, and Adminstration, AICTTRA (Vol. 1, pp. 16-24).

[9] VijayIndoria, Prashant Sharma, AnoopSoni, (2004), project report on online examination, international school of informatics and management.

[10] D. Pullen and B.Cusack. (2007). "Schooling without borders". Technology and teaching, 101-114.

[11]E. Gvozdenko and D. Chambers. (2007). "Applying Computerised Testing & Certainty Based Assessment to Reveal More about Student Learning: From Theory To Practice". International Journal of Learning, 13(12).

[12]C. Rogers (2006) "Faculty perceptions about e-cheating during online testing,"J.Comput. Sci. Colleges, vol.22, no. 2, pp. 206-212.

[13] J. *Gaytan* and B.C. *McEwen*. (2007). "Effective online instructional and assessment strategies". American Journal of Distance Education, 21(3), 117–132.

[14]NirajLola.(2004), e-Exam: the online examination system, Y2m004. Department of Computer Science and Engineering National Institute of Technology, Calicut, pp. 7-11.

[15] Niraj Lola. (2004), e-Exam the online examination system, Y2m004. Department of computer science and engineering national institute of technology, Calicut, pp. 7-11.

[16]Smarty,Navin,(2009) (http://.answer.yahoo.com> other-education, (2010).

[17] Thefreewikipedia,Test(studentassessment),(2010), (http"//en.wikipedia.org/wiki/Test_ (student _assessment), (2010).

[18] Thomas Schramm (2008), "E-Assessments and E-Exams for Geomatics Studies", Department of Geomatics Hafen City University Hamburg Hebebrandstraße 1, 22297 Hamburg, Germany

[19] Vijay Indoria, Prashant Sharma, AnoopSoni, (2004), project report on online examination, international school of informatics and management.

[20] Yuan Zhenming, Zhang Liang, Zhan Guohua (2003), "A Novel Web-Based Online Examination System For Computer Science Education", 33rd ASEE/IEEE Frontiers in Education Conference, S3F-7-S3F-10 Fels ő oktatásban. Page 1-7. Of Nigeria, page 1-11.

Mabrouka M. Al geryani was born in the city of Sawknah in 1985, she graduated from the Higher Institute for Comprehensive Careers Al Jufrah-Sawknah. She worked as a tutor in the Institute from 2009 to 2012, and is currently pursuing her master's degree in Cyprus, Cyprus International University in Information Technology.