Smart Intra-Network Examination System in a Secure Environment

Md. Babul Hossain[1], Rathindra Nath Mohalder[2], Fahim Ahmmed Sohan[3], Md. Shahabub Alam[4], Md. Jakaria Zobair[5], Rafat Ara[6], Md. Abdur Rahim[7]

[1, 2, 4, 5]*Lecturer, Department of Computer Science and Engineering, German University Bangladesh, Gazipur, Bangladesh.*
[3] *Graduated student, Department of Electronics and Communication Engineering, Hajee Mohammad Danesh Science and Technology University, Bangladesh.*
[6, 7] *Assistant Professor, Department of Computer Science and Engineering, German University Bangladesh, Gazipur, Bangladesh.*

ABSTRACT: The examination system of our university is based on a semester system. It has to run eight semesters in four years. The exam controller of this university has to maintain a large number of students in each semester examination. Sometimes it becomes so messy. As a result, it takes too many times to publish the results. Even it may occur minor errors in the manual process. So we are focusing on the new examination pattern and created a network-based examination system for our esteemed institution to handle a large number of students with an accurate assessment. Timing functionalities like automatically secure login, random generation of questions, resumption capability, multi-instructor, random questions distribution, random choice distribution, portability implementation method, and accommodation of a large number of students at a time are the advantages of our proposed project.

The Intra-Network Exam System is implemented in three modules as Admin Module, Teacher Module, and Student Examination Module. Admin module will handle both students' and teachers' Sign-up and log-in. The teacher module adds multiple questions under different courses so that students can easily know about their test details. In the student examination module, students must register with an application and choose interesting courses and participate in the Intra-Network Exam System. Our Intra-Network exam environments also help to improve the quality of examinations in higher education by making performance assessments more accurate and valid as well as more motivating and meaningful to students. In this paper, it is shown how Intra-Network Exam System is
developed and the Data Flow Diagram (DFD) of the system is presented. The programming tools used for the front-end development of the system are PHP, CSS, and HTML while MySQL is used as the database back end. The main objective of this system is to provide an automated system that not only saves a lot of times but also gives accurate and fast results with higher security.

KEYWORDS: LAN, Network, DFD, HTML, PHP, CSS, JSP, HTTP.

I. INTRODUCTION

Intra-Network Exam System is an off-line test simulator is to takes an off-line examination, tests in an efficient manner and has no time-wasting manually checking the test paper [12]. The main objective of this web-based offline examination system is to efficiently evaluate the student thoroughly through a fully automated system that not only saves a lot of time but also gives fast and accurate results. Students give papers according to their convenience from any location by using the internet and time and there is no need of using extra things like paper, pen, etc. [10].

The intra-Network Exam System helps students to offer a quick and easy way to appear for the test. It also provides the results immediately after the examination with 100% accuracy and security [10]. Students can enter to perform exams only with their valid username and password. This examination contains multiple-choice questions and the appropriate number of options. More than one option can be correct but the user can select only one option. This provides a time limit. The

user can see their results after completing the exam. This system is to provide an automated system that not only saves a lot of time but also gives accurate and fast results with higher security [4]. This system also helps the students to write the exam in this network and which can provide security and simplicity and other beneficial features to the user [10].

A. Objective
The main objective of this project is to establish a time-saving and error-less digital exam system. The objectives of this project are -
(i) Intra-Network Exam System can reduce the hectic job of assessing the answers given by candidates manually.
(ii) Responses or the answers by the candidates can be checked automatically and instantly.
(iii) It will reduce paperwork to be an integrated examination System.
(iv) The result can be shown immediately to the students reducing their anxiety.
(v) Can create various reports and graphs for evaluation purposes almost instantly when and where required

B. Related works
In 2016, Deepankar Vishwas Kotwal, Shubham Rajendra Bhadke, Aishwarya Sanjay Gunjal, and Puspendu Biswas shows that Examination System is a software solution, which allows any industry or institute to arrange, conduct and manage examinations via an online environment[1].
In 2015, Mohammed Issam Younis and Maysam Sameer Hussein shows Web-Based exam Systems [2].
In 2013, C. PAUL NEWHOUSE illustrates the Research with Computer-Based Exams [3].
In 2013, Fagbola Temitayo M., Adigun Adebisi A., and Oke Alice O illustrate that Computer Based Test (CBT) is an effective solution for mass education evaluation [5].
In 2013, Archana M, and Leelavathi R shows an Effective Computer Based Examination System for universities [11].
In 2012, Li, and Liangxu Sun illustrates the research and estimation of an examination system for Microsoft Office software operations [7].
In 2015, Bondre Rutuja Avinash, Durgi Varsha Vijaykumar, Mohite Pradnesh Rajeev, and Parkar Vishal V illustrates the research in various institutes [9].

C. Functional Requirements
It deals with the functionalities required from the system which are as follows [9]:

(i) The project will help the institute conduct its exams.
(ii) Only an authorized person can access related details.
(iii) The organization will register themselves on the website for conducting their exams.
(iv) Organizations can change their information regarding themselves.
(v) The students can log in through ID and Password and give their exams.
(vi) Administrator will be responsible for updating the site.
(vii) The organization can change questions and test papers whenever they want.

D.   Non-Functional Requirements
They are the quality requirements that stipulate how well software does what it has to do.

(i) Performance
No. of terminals to be supported is dependent on the server that we will use at the time of deployment. The web application server used should provide good performance and the ability to manage performance with techniques such as support for caching [9]. After completing the exam, the entire score of the student will be calculated as per the rules in less than a second.

(ii) Availability
The intra-Network Exam System site has 24*7 availability. It can be accessed 24 hours a day. For this UPS support must be on the server-side with a backup of at least 8 hours in case of power failure. Students can take the exam only during the previously allotted time slots, however, can open the site anytime to access other information. Varsity can register for the exam anytime.

(iii). Reliability
It means the extent to which the program performs with the required precision.
The website developed should be extremely reliable and secure so that information about any questions etc. is not leaked before the actual exam is held [8].

(iv) Usability
The website should be user-friendly and should require the least effort to operate. The web server used should provide services like session management to maintain sessions in the application.

(v) Portability

The website is made using HTML, JSP, etc. Which are platform-independent and can be transported to other servers with minimum effort.

(vi) Flexibility

It is the effort required to modify an operational program. The whole website should be made using independent modules so that any changes done in one module should not effects the other one and new modules can be added easily to increase functionality.

II. DESIGN MATERIALS AND TECHNOLOGIES

A. The technologies used to develop this site Frontend Language:

(i) HTML (ii) PHP (iii) CSS (iv) HTTP

(i) HTML

HTML, which stands for Hyper Text Markup Language, is a markup language for web pages. It provides a means to create structured documents including headings, pictures, objects, lists, and other items, and can be used to create interactive pages. It can include or can load scripts in languages such as PHP which affects the 342 behaviour of HTML processors like Web Browsers.

(ii) PHP

PHP stands for Hypertext Preprocessor (earlier called, Personal Home Page), is an HTML-embedded, server-side scripting language designed for web development. PHP is mainly focused on server-side scripting, so you can do anything any other CGI program can do, such as collect form data, generate dynamic page content, or send and receive cookies.

(iii) CSS

CSS stands for Cascading Style Sheets. CSS describes how HTML elements are to be displayed on a screen, paper, or in other media. It is used to design the layout of this site it can control the layout of multiple web pages all at once. **CSS** is independent of HTML.

(iv) HTTP

Hypertext Transfer Protocol is a transaction or oriented client/server protocol between a web browser & a Web Server in this project.

B. Backend Devices
(i) Switches (ii) Computers (iii) Cables
(iv) Connectors.

(i) Switches

A switch is a computer networking device that connects devices on a computer network by using packet switching to receive, process, and forward data to the destination device.

(ii) Computers

A computer network is a telecommunications network that allows nodes to share resources. In computer networks, networked computing devices exchange data with each other using a data link. The connections between nodes are established using cable media.

(iii) Cables

A Cable is an actual path over which an electrical signal travels as it moves from one component to another computer. There are different types of network cables, such as coaxial cables, optical fiber cables, and twisted pair cables. Here twisted pairs are used to create intra-network in this project.

(iv) Connectors

A Connector is a simple device that physically links, couples, or connects, two things together. A male connector has pins that fit into the sockets, or receptacles, of a female connector, as the connectors mate. A male connector sometimes is referred to as a plug and a female connector as a jack.

C. Topology

A network topology is a pattern in which nodes are connected to a local area network (LAN) or another network via links (e.g., twisted-pair copper wire cable or optical fiber cable). There are many different types of network topologies used in LANs such that Bus, Star, Ring, Mesh, Tree, and Hybrid. Here the Star topology is used to design LAN.

III. IMPLEMENTATION
A. Intra-Network Exam System

The Intra-Network Exam Systems are developed by LAN connection. LAN stands for local area network, which is a group of computers and associated devices that share a common communications line to a server. Typically, a LAN encompasses computers and peripherals connected to a server within a distinct geographic area such as an office or a commercial establishment computers

use a LAN connection to share resources such as network storage. A local area network may serve as few as two or three users such as a Lab room or several hundred users in a larger office. LAN networking comprises cables, switches, routers, and other components that let users connect to internal servers, and websites.

Software Requirements
 (i) PHP
(ii) MySQL Server
(iii) Sublime Text Editor
(iv) XAMP Local Server

Hardware Requirements
(i) Pentium IV 2.0 and above.
(ii) 2 GB RAM
(iii) 20 GB HDD Space

A. Admin Diagram
The functionalities of the admin are adding details of new students, and staff and or deleting or modifying the same. The additional responsibilities of the admin are providing appropriate login details for the registered users of the portal.
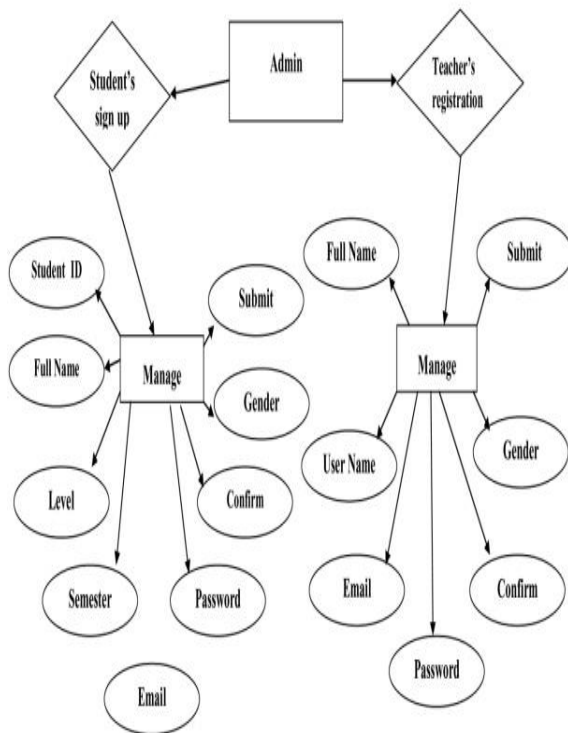

Figure 1: Admin's diagram for Intra–Network-Based LAN examination System.

B. Teacher Diagram
The teacher module describes the complete functions and responsibilities of the teacher. The main action for the teacher to perform is to add appropriate subject-wise questions to the question bank or the database with the correct options marked.
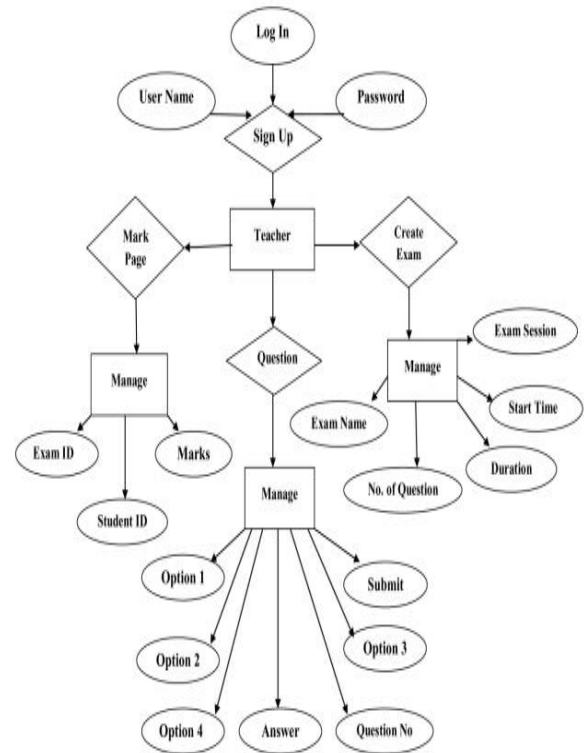

Figure 2: Teacher's diagram for Intra–Network-Based LAN examination System

C.   Student's Diagram
The functionalities of the student are limited to just attending tests. This exam system is aimed at making the test process as simple as possible and the direct beneficiaries of this system are the students as it reduces the fatigue present in the paper and pen-based test processes.
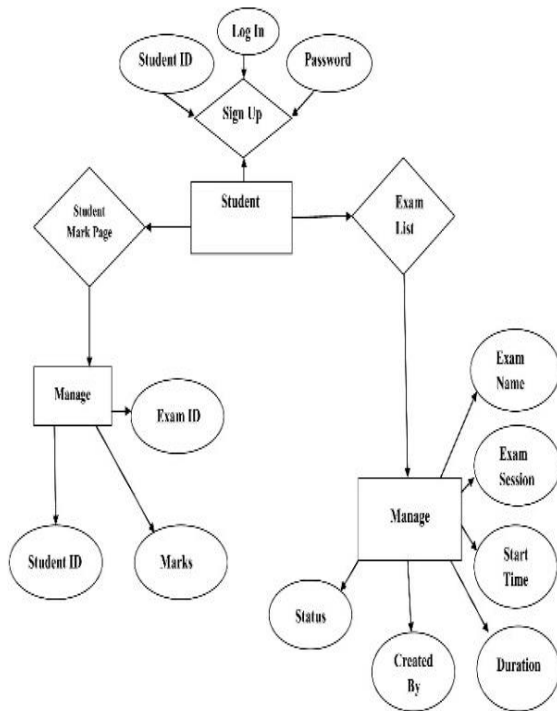
Figure 3: Student's diagram for Intra–Network-Based LAN examination System

Reasons of using Computerized Exam System over Manual Examination System
We have used Computerized Exam System over Manual Examination System because of the following advantages-
(i) Low cost
(ii) Time-saving
(iii) Ease of handling of data
(iv) Prohibit cheating in exam
(v) Accurate results than manual exam system
(vi) Reduce Needless manpower
(vii) Increased efficiency
(viii) Environment friendly as it decreases the production of the carbon-based question paper.

Reasons of using Intra-Network Exam System is used instead of Online Exam System-
We have built this project to provide our university with a secure environment with errorless criteria in a very short area. It does not need a full-time internet connection server. Hence the cost and maintenance are very lower than the online exam system. As the system is used for the only internal exam of the university, hence it is a better option than both Online and manual-based exam systems.

IV. CONCLUSION
The result of this implementation will be a fully-fledged working examination system for any institutes. This system also helps the students to write the exam in this network and which can provide simplicity and other beneficial features to the user. Apart from this, students will be able to view their exam status. Each user will have his/her independent working status [9].

The future work of our project is to add additional security functionalities like finger print recognition or face recognition to the login module. Apart from just testing the students on an objective basis, the theoretical knowledge can also be tested with adding brief answers to the test portal.

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