

Evaluation of Online MCQ Test System

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APPROVAL CERTIFICATE

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ABSTRACT

In today's world learning capability is judged by means of examinations. Examinations are also important in judging one's personality. Thus, the need of exams today in schools, colleges, institutes, universities and even companies for various purposes is a habitual truth. The general paper-pen exams are now slowly being replaced by the internet based testing system sometimes referred as e-examination system or Online MCQ Test System.

The project described within this document is an Online MCQ Test System that are conducted through the internet for remote students and designed with the specific goal of reducing the chaotic job of assessing the answers given by the students manually. Responses by the students will be checked, automatically and instantly where there is an answer processing module. Being a computerized system the application will reduce paper works. An educational organization will hosts multiple choice questions through the system. Students get the opportunity to give exam by getting registered by the administrator and instantly get result with correct answer which reduces the mental anxiety. This system also has time tracker so it can measure student's required time. Student is given unlimited time to answer the questions and after finishing the exam answers will be evaluated through the automated process and the results will be published on the portal immediately. It can generate various reports and graphs for evaluation purpose almost instantly when and where required.

The main facility of this application is that the exam can be conducted remotely for students and evaluation comes out shortly. Online MCQ Test can be conducted at any time and does not require higher cost as traditional or manual exam system requires. The system reduces paper work involvement and there is no need the presence of invigilators, also no need of arrangement of exam centers. After the establishment of the new system, comparing with traditional exam scenario the cost for an online MCQ Test System will be almost zero if post-implementation maintenance cost is not considered.

As a whole, educational institutes or training centers can use the system to develop their strategy for putting the exams and for getting better result in less time.

ACKNOWLEDGMENT

I would like to start by expressing my deepest gratitude to Almighty Allah for giving me the ability and strength to finish the task successfully.

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Finally, my deepest gratitude and love to my parents and wife for their support, encouragement, and endless love.

TERMINOLOGY

MCQ	Multiple Choice Question
PHP	Hypertext Preprocessor
CSS	Cascading Style Sheet
HTTP	Hyper Text Transfer Protocol
HTML	Hypertext Markup Language
UML	Unified Modeling Language
DFD	Data Flow Diagram
ERD	Entity Relationship Diagram
SRS	Software Requirement Specification
RDBMS	Relational Database Management System
GUI	Graphical User Interface

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Online MCQ Test System is a web based application for skill evaluation. MCQ means Multiple Choice Question. Multiple choices are a form of assessment in which respondents are asked to select the best possible answer out of the choices from a list. Now-a-days the multiple choice format is most frequently used in educational testing. Here, students will be able to give exam and immediately get result with correct answer. This system also has a time tracker so it can measure the time consumption of a student or user.

The proposed system not only replaces paperwork but also releases the workload (e.g. printing exam papers, prepare paper admissions etc). The available E-examination systems only have fixed number of question without any kinds of randomization. On the contrary, the proposed system has a comprehensive test engine or test module with question randomization. The proposed system also allows users to give feedback of the application. The Online MCQ Test System overcomes not only the shortcomings of the existing online examination systems but also the shortcomings of the existing manual exam conducting system. The proposed Online MCQ Test System has better extensibility and flexibility.

This system aims to be a powerful tool for E-learning and online education. The application has designed and developed for educational organizations like schools, colleges, private institutes and various employers to conduct logic test. It is very useful tools for parents to see the academic development of kids to improve their educational skills. It is also very useful tools for university admission seekers to improve their skill before final test. Recruiting agencies, companies can use it for their candidate's skills

evaluation through Online for conducting the MCQ Test which will make easy for them to select the appropriate candidate.

1.2 Objective

- The main purpose of the system is to efficiently evaluate the candidate thoroughly through a fully automated system.
- It reduces paper works, home works and time that provides easy and familiar environment.
- After the cost-benefit analysis it seems to be cost-effective.
- Administrator of the system put in order for conducting the MCQ Test and set up questions for a specific exam that comes randomly.
- The administrator can create, delete and modify test papers and its particular questions.
- User can register, login and give the test through the client computers with his specific id by getting registered by the administrator and can see the results as well.
- This application will provide the environment to give exam for many students at a time.
- As it is an automated system it will display the results as the test gets over. So there is no need to wait for the result.
- Moreover, students will be able to see their rankings and status among more students to verify own condition.
- Number of correct answer and consumed time will set one's ranking.
- During the examination questions are showed randomly. That's why it is not possible to copy for other students that make the exam fruitful for evaluation.
- The system would be extremely reliable and secured and that's why question paper will not be leaked before the actual exam is held.
- The system performs online exam with no error.

1.3 Scope of the Project

Scope of the proposed system is highly express able while comparing with the existing systems that are as follows: -

- The user location is not a considerable factor for the new proposed system.

- The new system will be available and access able from any place of the world at any time.
- There is no restriction on physically presence of examiner or student for giving exam through online.
- Administrator and user will be facilitated in various ways as attractive design and implementation technique deployed.
- Online MCQ Test System has designed and developed for educational organizations like schools, colleges, private institutes and various employers to conduct logic test.

1.4 Most Important Parts of the Project

The end user of the System has basically two parts:

- Administrator or Test Conductor and
- Student

1.4.1 Administrator

Administrator is responsible for the system management and management for the system users. Administrator is also responsible for questions, test or exam, result and ranking and system backup etc. Administrator will act as the test conductor.

1.4.2 Student

Students are the desired user and can be treated as the candidate who are going to be appear for the exam. Students are allowable for access to his corresponding records (results & rank or status) and giving examination.

1.5 Existing System

The existing system (conducting examination process) is typically manual. Existing system is processed by large man power and is very difficult to execute it at different stage. It has some drawbacks. So I have introduced an Online MCQ Test System, which is fully automated.

1.6 Shortcomings of Existing System

- The existing system is fully paper-based system.
- The existing system is very time consuming and tedious activities.
- It is less flexible and provides a very hectic procedure for the people who are appointed to execute the system.
- The possibility of loss of proceedings and supporting documents is high and also record searching or further verification is very difficult.
- Categorically document filing is also a time consuming and tedious train.
- It is very difficult to evaluate the exam physically or manually.
- Results are not precisely calculated and assessments are done manually.
- Result processing requires more time as it is done by hand.
- The maintenance of the exam record is really difficult, taking backup of that record is also difficult and as well as it's very difficult for the people who are engaged to check the records.

1.7 Objective of the Proposed System

- Financial feasibility
- Time flexibility
- Technical & procedural feasibility
- User friendly interface & environmental feasibility

1.8 Limitations of the Proposed System

- Graphical User Interface (GUI) is written in English only.
- The system is developed based on the client-server technology and that's why for normal operation 512 MB RAM (minimum) will be required for client PCs.
- Generally, it will assume that the user of the system has basic knowledge; that means user is not a inexperienced user. Any types of essential data entered by the users or students will be treated as valid information.
- It depends that everyone should follow the international standards for the generating the User ID & should fill up related information in the appropriate format.
- Only registered users will be authorized to access all types of services available in the

system.

1.9 Summary

We have primarily put the definition and objective of the project. We have also point out the drawbacks of the existing system. We have compared the proposed system with the existing system as well as the design of the project is followed in the analysis, design and implementation phases. The project has been concluded successfully at the end and the future plan of the project also given in this project documentation.

CHAPTER 2

ANALYSIS

2.1 Introduction

In this phase, the requirements of the task to be performed is analyzed and later the problem of the proposed system is analyzed and to understand its context. Here, the first step is to studying the existing system and the next step is to understand the requirements and area of the proposed system.

2.2 Feasibility Study

How the development of the application will be effective and beneficial to an institute is measured in this study. It is performed by examining the existing system in the area under inquiry or the idea about the new system usually. It is a test of a system proposal according to its workability, impact on the organization, ability to meet user needs, and effective use of resources.

User's Need?

User demands a web application which will decrease the volume of official procedure (paper work), flexibility, fast documentation finding, changing, adding, removing and generating the reports. User demand is to eliminate mentioned problems above that are facing by users.

How can the problem be defined?

Firstly, we proposed a direction by considering the existing system problems and then we made a full paper based layout of the system. We compared both the problems and needs with the existing system.

In this phase, we were followed through various steps and self judgment. How much feasible is the system proposed? This question was examined by the comparison of the following factors with existing system and proposed system:-

2.2.1 Financial Feasibility

Economic feasibility is known as cost-benefit analysis. It is commonly used to evaluate the efficiency and usefulness of the proposed system. It is a effective method for comparing the benefits between the proposed system and the existing system. If the benefit satisfies then the decision is made to design and development of the system. Otherwise, alterations are made in the proposed system for further analysis.

It has shown that, the manual system is not cost effective because of high labor costs.

2.2.2 Technical Feasibility

It is another way to justify the feasibility of the proposed system. Here, the proposed system requires very nominal hardware or software since the system implemented. No extra software and hardware is required after the system get ready. Manual workers are involved in the existing system that requires extra cost monthly. On the contrary, the proposed system requires very ignorable software and hardware that demands less cost.

The proposed system is feasible technically because it requires less time for record finding and generating essential report. The total process monitoring is also very easy and flexible in the proposed system with compared to the existing system.

2.2.3 Legal Feasibility

It is another measure to justify the feasibility of the proposed system. This kind of feasibility introduces some sort changes in case of job status and transfers or elimination of the employees. The reaction of the existing system employee in case of adopting the proposed system is highly considered. The adoption of the user is also considered. In order to keep running the business the introduction of the new system requires training and skill development program for employees and minimum technical skill for adopting with the new system for students. So the Online MCQ Test System doesn't need much effort to train and alert people. Thus the system can be depicted as much as feasible legally.

2.2.4 Operational Feasibility

Operational feasibility requires some specific issues and the system can be said operationally feasible when the system is fully turned out into a smart and dedicated information system. Operational feasibility is an important requirement of the organization to make the system feasible. Not only that but also an essential ration of the project implementation that includes the following answers:

Is there enough support for the management team from the students?

Will the system be used and work properly if the system is being developed and implemented?

Will there be any arguments from the students that will challenge the possible application benefits?

I hope that, if the design and implementation executes systematically utilization of the computer resources will be optimal and it would help for the improvement of performance status.

2.2.5 Behavioral Feasibility

It should measure the acceptance level of the proposed system in this fetch. People are inherently resistant to change and computer has been known to facilitate changes. It is essential because we need to ensure the verification or authentication, authorization or approval and responsive security of sensitive data of an institute. Administrations are very much responsible for the management of students or users, tests, results and status and secured system backup etc.

2.2.6 Environmental Feasibility

It should ensure that the proposed system will provide a better and more attractive and acceptable working environment with compared to the existing system

2.3 Software Requirement Specification

2.3.1 Proposed System

The main objective of the Online MCQ test System is that it helps educational institution, and corporate world to conduct exams in any number of candidates at a time, in an automated manner. It reduces the time consumption and workload that exist in the current system of examination. Moreover, students will get the facilities to give exam on a specific topic more and more for self judgment. It also helps in storing the record of each examination and the results are also stored in the system. This makes the searching of the records easier than the existing system.

2.3.2 Detail Objective of the Proposed System

- Online MCQ Test System (OMTS) can be widely used not only in learning institutes but also in corporate world.
- The system generates reports and detail status while completing the exam that saves valuable time.
- It saves time for the analysis of answer sheets.
- After the cost-benefit analysis it seems that the system is cost-effective.
- It can be treated as the popular means of mass-evaluation system as it generates error free exam result.
- Administrator of the system put in order for conducting the MCQ Test and set up questions for a specific exam that comes randomly.
- Students can login through the client computers by getting registered by the administrator.
- The questions are shuffled in a random order. That's why it is not possible to copy for other students that make the exam fruitful for evaluation.
- The proposed system can be used from anywhere at any time as it is a web based application.

2.3.3 Functional Requirements

2.3.3.1 System Interface

The system interface is highly secured and designed in this way that no other applications have any access to its database. Moreover, this system will not access data of any other application's database.

2.3.3.2 User Interface

The Online MCQ Test System is a web-based application and it is possible to access through web browser such as Mozilla Firefox, Internet Explorer and Google Chrome, e.t.c. The web application can be viewed by setting the 1024 x 768 and 800 x 600 pixels resolution.

There is no access in any part of the system for any user without logging into the system.

2.3.3.3 Software Interface

- **Server Side Software**

- ⇒ **Operating System:** Windows
- ⇒ **Web Server:** Apache Server, Wamp Server/Xampp Server
- ⇒ **Server Side Scripting Tools:** PHP Version 5.5.24
- ⇒ **Database Tools:** MySql Database Management System

- **Client Side Software**

- ⇒ Framework of PHP Codeigniter,
- ⇒ jQuery and JavaScript Library
- ⇒ HTML5 and CSS.

2.3.3.4 Hardware Interface

- **Server Side Hardware**

- ⇒ Suggested Hardware by the system.
- ⇒ Processor: Minimum Pentium level processor
- ⇒ RAM: Minimum Random Access Memory of about 256 MB
- ⇒ Hard Disk Drive Space: Minimum Hard Disk Drive space of about 10 GB
- ⇒ Communication hardware to handle the requests of client PCs.

- **Client Side Hardware**

- ⇒ Suggested Hardware by the client's OS and web browser.
- ⇒ Processor: Minimum Pentium level processor
- ⇒ RAM: Minimum Random Access Memory of about 256 MB
- ⇒ Hard Disk Drive Space: Minimum Hard Disk Drive space of about 10 GB
- ⇒ Communication hardware to communicate with the server PC.

2.3.3.5 Communication Interface

Local Area Network (LAN) or Wide Area Network (WAN) is used here for the entire system setup. The network must run under TCP/IP protocol so that application server may available for the desire students or users.

Client Side Operations on Communication Interface

Some operations are handled in this side such as:-

- Report showing,
- User status showing,
- Ranking of the students showing,
- Data entry,
- Option selection.

Server Side Operations on Communication Interface

- Taking Database Backup regularly
- Restoring the last secured backup while destroying the database.

2.3.4 Non-functional Requirements

2.3.4.1 Usability

- Each form should have the link of Menu and essential navigation.
- User will be able to view and make entries in a form within the application.
- There must have the validation to protect inconsistent or invalid entry in the databases.
- For further details presence of hyperlink in each form is essential.
- For easy report production text box and related drop-down list is essential which make the report generation easier.
- The application would be user friendly.
- It should require less effort to handle the entire application.

2.3.4.2 Security

- This application is available for the valid and accepted or approved users only.
- All users will not be able to access the system. Only allowable user or students will be able to use the system and access their data.
- Two types of users are available in this system. One is the administrator of the system and another is valid students or users.
- Security is checked by one's given user ID and protected Password.

2.3.4.3 Maintainability

- Without any registration user manual of the Online MCQ Test System will be provided.
- The link of the user manual will be available on top of the application's home page so that user or student can be able to know the guideline on how to access or handle the system.

2.3.4.4 Portability

- This application developed with the help of HTML, CSS, PHP, etc.
- All those above application tools are known as platform independent tools and that's why the proposed application can be transported to other servers with least effort.

2.3.4.5 Availability

- The application is available for all time.
- Students or user can be able to take exam at anytime from anywhere
- Moreover, they will be able to access the site anytime for accessing essential information when needed.

2.3.4.6 Performance

- Result or score will be available after just finishing the exam.
- Exam score will be visualized and calculated automatically. No other command is essential for that purpose.
- Each student or user will be able to know their ranking and detail status among all participants.
- Students or user will get their free credit for giving exam after the user registration.
- It is possible to get more credits for giving more exams while registration credit or free credit ends. This arrangement can be established through a mobile communication system.

- This application supports multiple users at a time where the synchronization is made with the server.

2.3.5 User Requirements

User requirements for this application are such as:-

- User must have basic knowledge of the use of computer.
- User has to work comfortable with computer.
- User must need the basic knowledge of English language.

2.4 Constraints

Constraints of the application are such as:-

- Graphical User Interface (GUI) is prepared only in English language.
- Only registered and authenticated users or students will be allowed or approved to use the services of the application.
- Identification is done by getting the Student ID and password.
- There are no other facilities for the guest user.
- This application is prepared for the single server
- This application is limited for HTTPS or HTTP.

2.5 Acceptance Criteria

An acceptance criterion is measured by calculating the availability of the functional requirements. What percentage of functional requirements satisfy the demand of the entire system in implementation and testing level predicted at feasibility study level is measured clearly, effectively and efficiently in this stage.

- A user friendly Graphical User Interface (GUI) with appropriate navigation.
- Through network traffic data transfer should be accurate within reasonable time.
- Any kinds of double entry of key value are not acceptable here.
- Log file will be available for the admin module.

2.6 Summary

In this phase, I understood the software requirement specifications clearly for the proposed system. I have arranged all the required workings to start the development of the application in this phase itself so that I have a clear understanding regarding the requirements before designing the application. In this way, I am going to proceed to the design phase followed by the implementation phase of the project.

CHAPTER 3

DESIGN

3.1 Design of Data Model

The process used to define and analysis of data requirement that are essential for the support of business procedure within the scope of related information system of an organization is known as data modeling.

The process of data modeling requires professional data modelers, business partners. It also demands that they work closely as a potential user of the information system.

Three types of data modules are produced. These are used while requirement analysis is progressed into actual database that are essential for the system. The outcomes of the requirement analysis are actually a set of technology independent specification and are used as the initial requirements of the business stakeholders. Thus the conceptual model is developed and is translated into a logical data model, which documents structures of the data that can be implemented in databases.

Multiple logical data model is required for the implementation of a conceptual data model. At last, the logical data model is transferred to a physical data model that organizes the data into tables, and accounts for access, performance and storage details.

Not only data elements but also their structures and relationships between them are defined by the Data Model. Data modeling techniques and methodologies are used to model data in a standard, consistent, predictable manner in order to manage it as a resource. The use of data modeling standards is strongly recommended for all projects requiring a standard means of defining and analyzing data within an organization.

The data model can be used as a technique for detailing business requirements for a specific database because a data model is implemented in a database eventually.

3.1.1 Business Flow Chart

For accessing business data business flow charts are primarily used in a company for idea development that will help to create new strategy in the planning stage. Business flowcharts initiate key point to users, beneficiaries and developers.

Definition

It is graphical representation of the sequence of operations of a business model. Lines and conventional symbols are used to create a business flow chart.

Function

As a visual representation of data flow, it is used to determine the key points of a business model or program model.

It is also used for connecting the key points and for making a relationship between various business processes.

Types

Three types of flowcharts are used for business flowchart such as: high-level flow chart, detailed flow chart and matrix flow chart.

High level flow chart gives a birds-eye view of the key points. The detailed flowcharts are used to breakdown the processes. The matrix flowcharts also break down the processes and give more key points.

Uses

High level flowcharts are used to identify the key points. The detailed flowcharts are used to breakdown the processes. The matrix flowcharts also break down the processes and give more key points.

Shapes

Various shapes like boxes, circles, diamonds and triangles are used to create a flowchart. Each shape represents a certain action or conclusion of action.

Business flowcharts are used to depict the flow of business process.

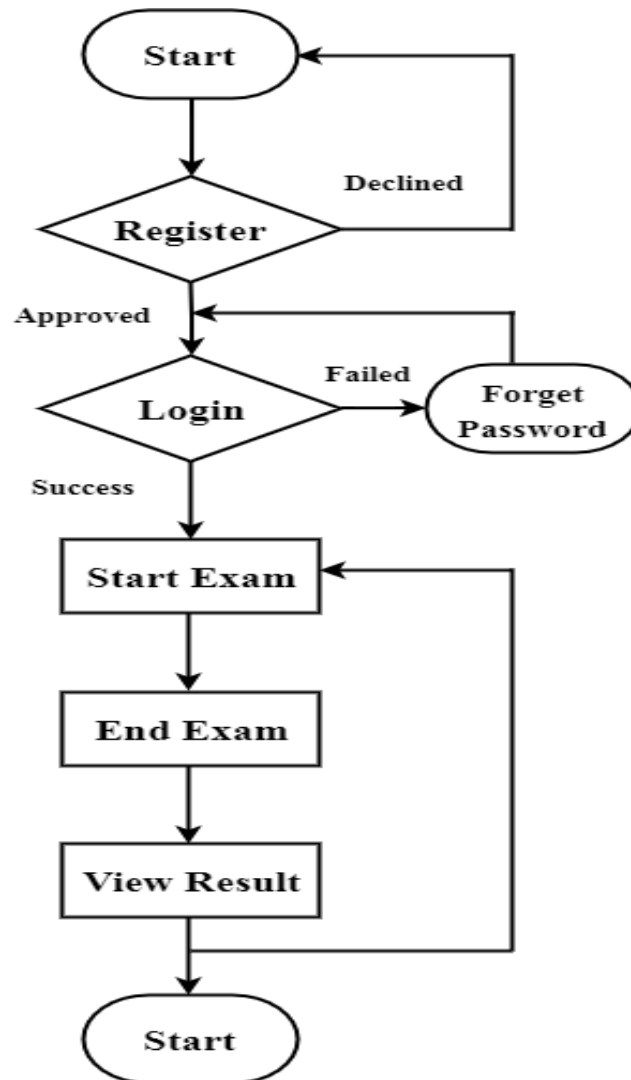


Figure 3.1.1: Business Flowchart

In many ways UML activity diagrams are the object-oriented equivalent of flow charts and data flow diagrams (DFDs) from structured development. Moreover, UML Activity diagram is standardized, supports concurrency and less known syntax, but still simple enough.

3.2 UML Diagrams

The Unified Modeling Language (UML) is a general-purpose, developmental, modeling language in the field of software engineering that is intended to provide a standard way to visualize the design of a system. UML combines best techniques from data modeling (ER diagrams), business modeling, object modeling, and component modeling. It can be used with all processes, throughout a software development life cycle and across different implementation technologies. It uses graphic notation to create visual models of software systems.

3.2.1 Class Diagram

Class diagram is a type of static structure diagram. It describes the structure of a system in details. Class diagram includes the classes of the system and their attributes. It also contains the relationships between the classes. It is the main building block in object oriented modeling. Class diagram can be used for general conceptual modeling and data modeling.

A class has the main object and methods. The class diagram represents the relationship between the object of a class. In a class diagram, classes are represented with boxes.

- Top part of a class contains the name of the class itself.
- Middle part of a class contains the attributes of the class.
- Lower part of a class contains the methods of the class.

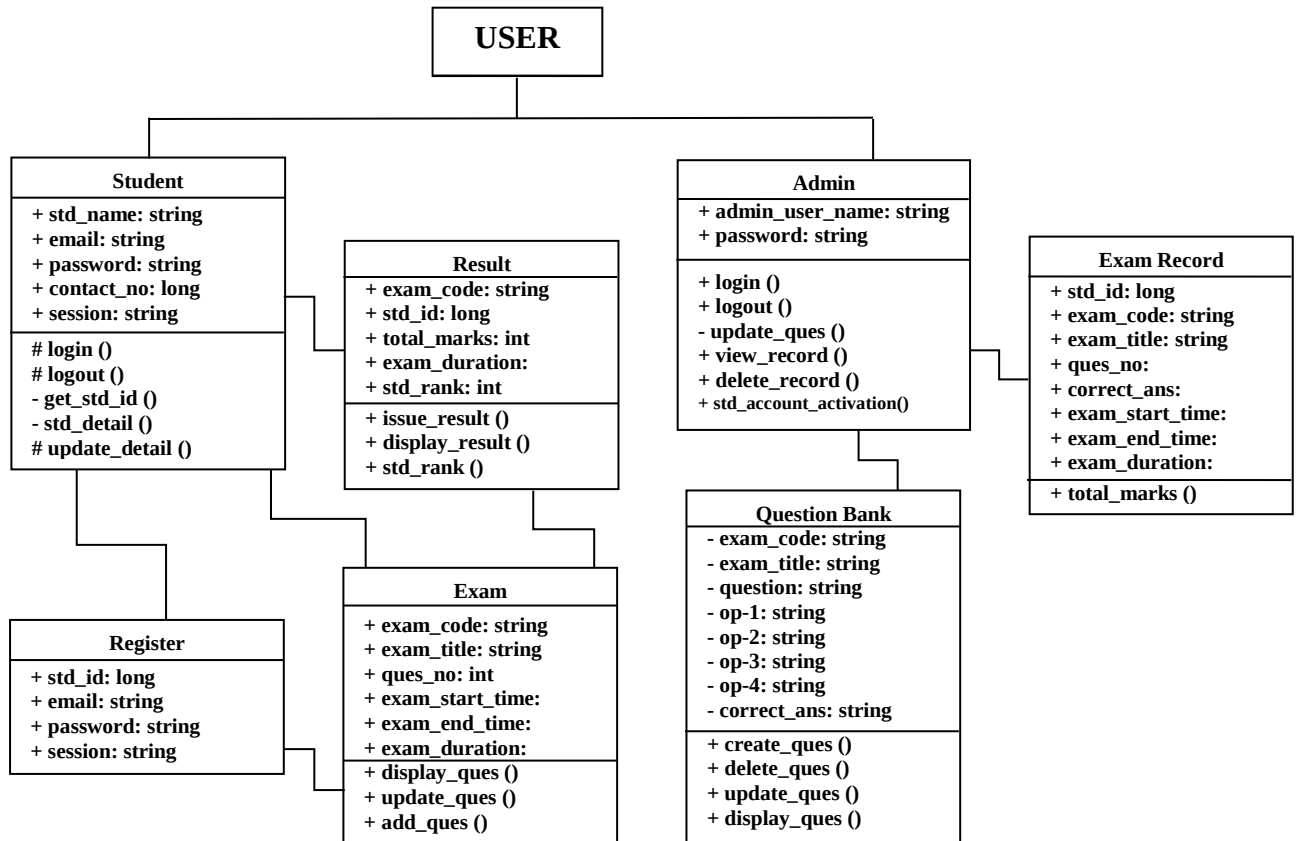


Figure 3.2.1: Class Diagram

3.2.2 Use Case Diagram

Use case diagram is one kind of behavioral diagram. It is used for use-case analysis. Graphical overview of the functionality provided by a system is presented by the use case diagram in terms of actors. The actor can be a human or other external system. In modern software engineering, use case is an important and valuable requirement analysis technique. Sometimes it represents missions or the goals of stakeholders.

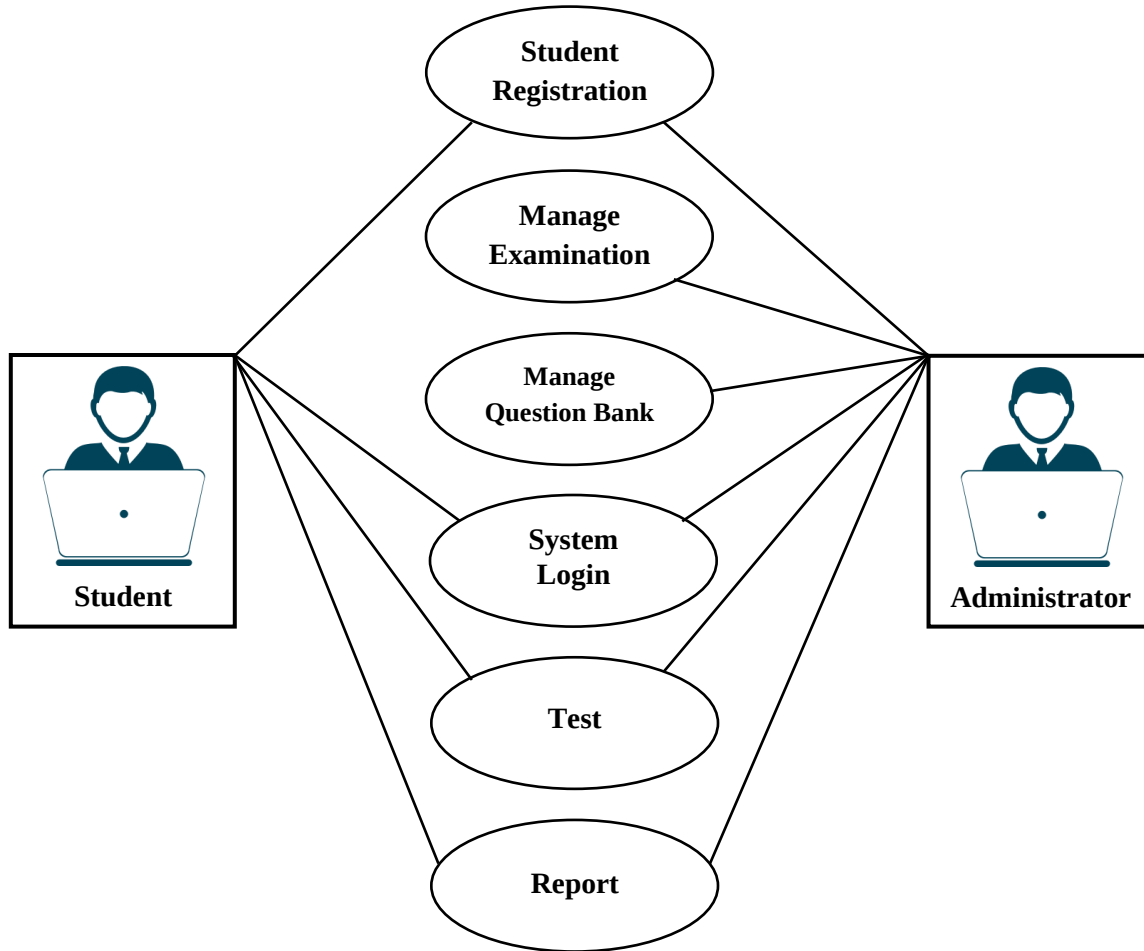
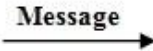


Figure 3.2.2: Use-case Diagram

3.2.3 Sequence Diagram

A sequence diagram is typically an interaction diagram. It shows the objects operation state with one another. It also shows and maintains the order of object operation scenario. It is a build of a message sequence chart. It shows the detail object interaction scenario with respect to time sequence. It illustrates the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use case realizations in the Logical View of the system under development.

Notation of Sequence Diagram

Object	Objects are instances of classes, and are arranged horizontally. The pictorial representation for an object is a class with the name prefixed by the object name (optional) and a semi-colon.	
Actor	Actors can also communicate with objects, so they too can be listed as a column. An Actor is modeled using the ubiquitous symbol, the stick figure.	
Lifeline	The Lifeline identifies the existence of the object over time. The notation for a Lifeline is a vertical dotted line extending from an object.	
Activation	Activations, modeled as rectangular boxes on the lifeline, indicate when the object is performing an action.	
Messages	Messages, modeled as horizontal arrows between Activations, indicate the communications between objects.	

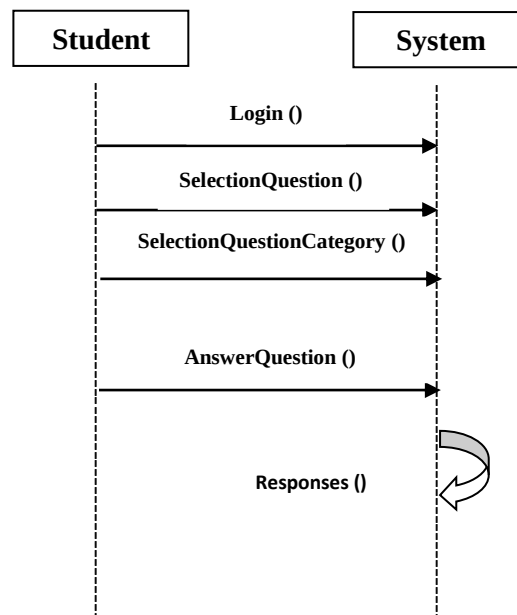


Figure 3.2.3: Sequence Diagram

3.2.4 Data Flow Diagram

A **data flow diagram (DFD)** is a graphical representation of the "flow" of data through an information system, modeling its *process* aspects. Sometimes a DFD is used as a beginning step to create an outline of the system before going into great detail and can be used for the visualization of data processing or structured design.

Notation of Data Flow Diagram

Four notations are used to complete a DFD. These notations are given below:-

Dataflow	The data flow is used to describe the movement of information from one part of the system to another part. Flows represent data in motion. It is a pipe line through which information flows. Data flow is represented by an arrow.	
Function	A circle or bubble represents a process that transforms incoming data to outgoing data. Process shows a part of the system that transforms inputs to outputs.	
Input or Output	A square defines a source or destination of system data. External entities represent any entity that supplies or receives information from the system but is not a part of the system.	
Data Store	The data store represents a logical file. A logical file can represent either a data structure or a physical file on disk. Use data store is used to collect data at rest or a temporary repository of data. It is represented by an open rectangle.	

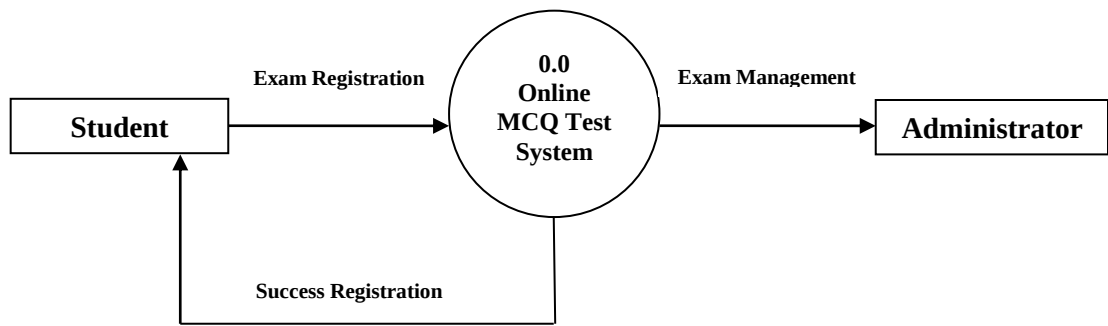


Figure 3.2.4.1: Data Flow Diagram Level-0

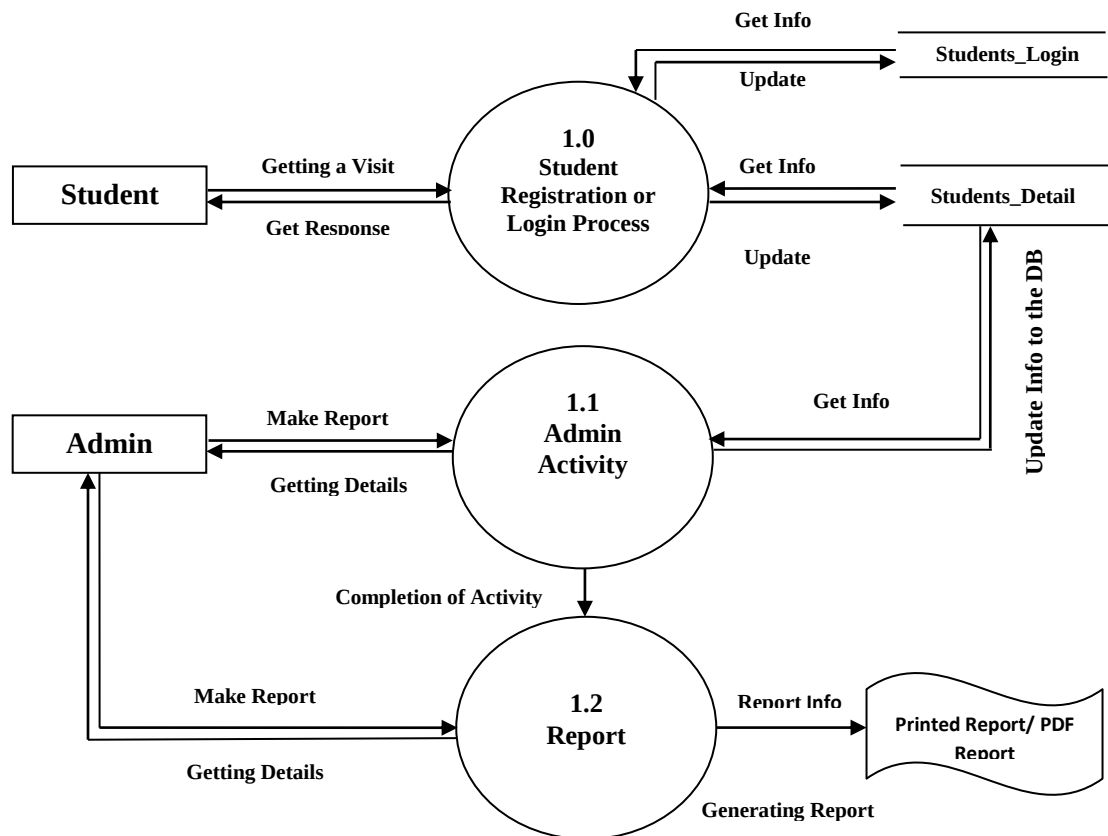


Figure 3.2.4.2: Data Flow Diagram Level-1

3.3 System Module Design

Firstly, I have arranged all the essential elements to develop the application for enhancing the concept regarding the requirements before design and development of the system. Then software requirement specifications were analyzed and took a clear concept of the system. In this way, I have decided to go forward to the design phase tagged on by the implementation phase immediately.

3.3.1 Module Details

In the proposed system I have introduced three modules that are such as:

- Student or User Module
- Question Bank Module
- Exam or Test Module
- Administrator Module

3.3.1.1 Student or User Module

- Requesting for the registration.
- Login into the system after accepting registrations by the administrator.
- Selecting the exam topic.
- Selecting the exam questions.
- Appearing for the e-examination.
- Viewing result after finishing the exam.
- Viewing the ranking and self status after finishing the exam.
- Changing the password.
- Password resetting in case of forgotten.
- Students will be permitted to use the system after registration only.
- Students will be able to get access through the remote PC by getting registered by the administrator.
- Students can take exam at anytime from anywhere

3.3.1.2 Question Bank Module

- Selecting the exam topic.
- Selecting the exam category or subject.
- Add New Question.
 - ⇒ Input to the Question.
 - ⇒ Input to the answer 1, 2, 3, 4.
 - ⇒ Input to the correct answer.
- Adding/editing/deleting the MCQ questions.
- Question activation.
- Search specific question.

3.3.1.3 Exam Module

- **Test Process**
 - ⇒ Login to the online examination system.
 - ⇒ Attend Test
 - ⇒ Submit
- **Test Sequence**
 - ⇒ Start
 - ⇒ Timer (Exam Duration)
 - ⇒ Finish
- **Question Sequence**
 - ⇒ Questions are available in the form of MCQ.
 - ⇒ Questions come out randomly.
- **Analysis**
 - ⇒ Authenticating students based on username (e-mail ID) and password.
 - ⇒ Keeping records of student's responses to every question.
 - ⇒ Checking whether the given response is correct or not.
 - ⇒ Keeping records of marks and time consumed by all the students.
 - ⇒ Keeping records of different exam particulars of same student in different time.

3.3.1.4 Administrator Module

Administrator module is very important module. It is authenticated by user id and password for security purpose. Password is given in encrypted format and that's why no other user will be able to enter into the secured system. Only valid administrator will be permitted to enter into the administrative section of the application. This module gives emphasis on some sort of special tasks such as maintenance of the application. It also focuses on the student account management, question handling and exam data entry related tasks.

- Login into the application.
- Admin password changing.
- Authenticating & accepting registrations of students.
- Edit/Deleting/Creating the records.
- Adding/editing/deleting the questions.
- Posting multiple options to respective question.
- Marking correct answer within the given options.
- Keeping track on times limit of the question-answering system.
- Set marks.
- Set rankings.
- Taking back up of the database.

3.4 Database Design

Database design is the most important factor for a software design. I have used MySQL Database that is RDBMS. Database is used to store the actual data. The diagram of a physical database is given below:

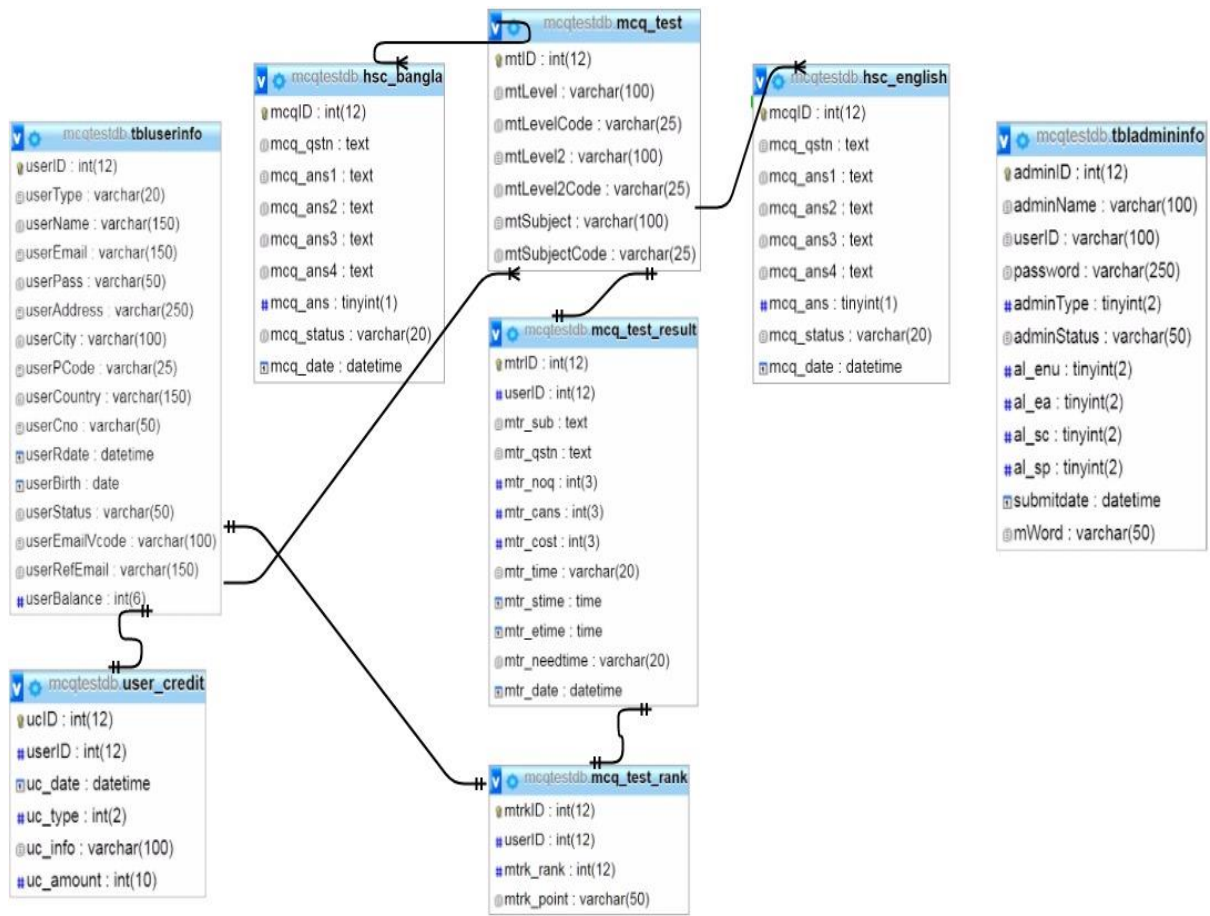


Figure 3.4: ERD (Entity Relationship Diagram)

3.4.1 Database Details for Online MCQ Test System

The main tables are:

tbladmininfo: How the entire system is administered is illustrated in this table. The fields are given below:

Name	Type	Size
adminID	int	12
adminName	varchar	100
userID	varchar	100
password	varchar	250
adminType	tinyin	2
adminStatus	varchar	50
al_enu	tinyin	2

al_ea	tinyin	2
al_sc	tinyin	2
al_sp	tinyin	2
submitdate	datetime	
mWord	varchar	50

Table 3.4.1.1: tbladmininfo

tbluserinfo: User related all information is stored in this table. The fields are given below:

Name	Type	Size
userID	int	12
userType	varchar	20
username	varchar	150
userEmail	varchar	150
userPass	varchar	50
userAddress	varchar	250
userCity	varchar	100
userPCode	varchar	25
userCountry	varchar	150
userCno	varchar	50
userRdate	datetime	
userBirth	date	50
userStatus	varchar	50
userEmailVcode	varchar	100
userRefEmail	varchar	150
userBalance	int	6

Table 3.4.1.2: tbluserinfo

mcq_test: MCQ Test related information is stored in this table. The fields are given below:

Name	Type	Size
mtID	int	12
mtLevel	varchar	100

mtLevelCode	varchar	25
mtLevel2	varchar	100
mtLevel2Code	varchar	25
mtSubject	varchar	100
mtSubjectCode	varchar	25

Table 3.4.1.3: mcq_test

mcq_test_result: How MCQ Test related result is processed and stored in this table. The fields are given below:

Name	Type	Size
mtrID	int	12
userID	int	12
mtr_sub	text	
mtr_qstn	text	
mtr_noq	int	3
mtr_cans	int	3
mtr_cost	int	3
mtr_time	varchar	20
mtr_stime	time	
mtr_etime	time	
mtr_needtime	varchar	20
mtr_date	datetime	

Table 3.4.1.4: mcq_test_result

mcq_test_rank: How student's ranking system is calculated can be depicted from this table. The fields are given below:

Name	Type	Size
mtrkID	int	12
userID	int	12
mtrk_rank	int	12
mtrk_point	varchar	50

Table 3.4.1.5: mcq_test_rank

user_credit: User or Student will get free credit initially and later they will be capable to earn more credit. User credit related information will be stored in this table. The fields are given below:

Name	Type	Size
ucID	int	12
userID	int	12
uc_date	datetime	
uc_type	int	2
uc_info	varchar	100
uc_amount	int	10

Table 3.4.1.6: user_credit

hsc_bangla: It is an exam category and there are lots of categories that a student can choose. Here, s specific category – hsc bangla related information is stored in this table. The fields are given below:

Name	Type	Size
mcqID	int	12
mcq_qstn	text	
mcq_ans1	text	
mcq_ans2	text	
mcq_ans3	text	
mcq_ans4	text	
mcq_ans	tinyint	1
mcq_status	varchar	250
mcq_date	Datetime	

Table 3.4.1.7: hsc_bangla

3.5 Summary

This chapter describes detail design of the application. The design of the data model, Business flowcharts of different procedure, GUI design of the system with reports and database design are described in this chapter. The physical schema required for the system and description of the tables with field details are also given in this chapter.

CHAPTER 4

IMPLEMENTATION

4.1 Implementation Overview:

To make fast, secure and robust, latest and modern methodology and technology is used to implement the “Online MCQ Test System”. The technology which is used to implement, makes this project user friendly, reliable and standard centralized web based system.

4.1.1 Architecture

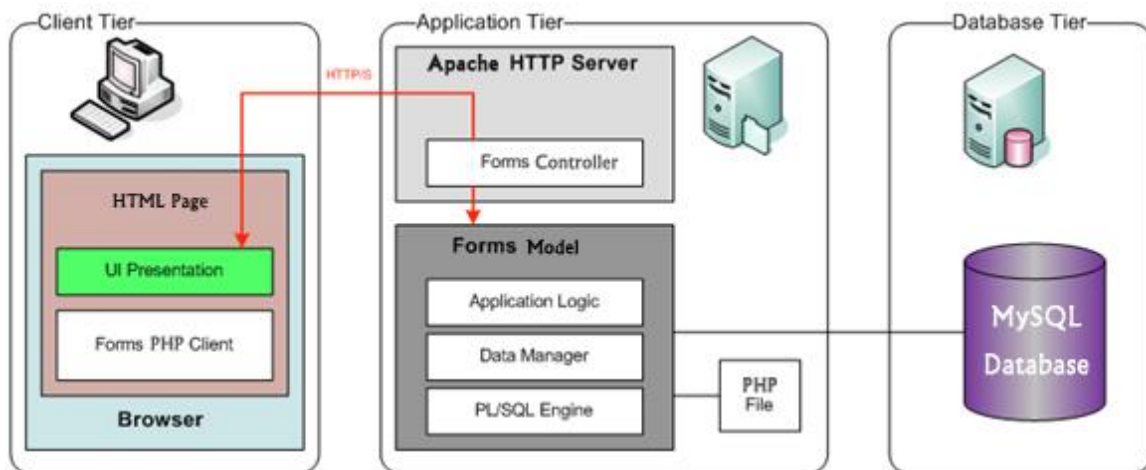


Figure 4.1.1 Architecture

Three tire architecture:

Client: PHP Codeigniter Framework, jQuery JavaScript Library, HTML5 and CSS.

Application Server: Apache HTTP Server.

Database: MySQL Database.

4.1.2 Methodology

RDBMS: To ensure maximum database connection and performance for load balancing MySQL RDMBS is used in this project.

4.1.3 Technology

- **Draw.io:** It's used to design business flowchart and use case diagram.
- **Codeigniter:** It's a PHP framework with MVC architecture. It's used to make the software light weight, secured and extendable.
- **jQuery:** It's a JavaScript library used to simplify the client-side scripting and interactive user interface.

After completing the Software Requirement Specification (SRS), Work Flow Diagram, Entity Relationship Diagram (ERD), the Graphical User Interface (GUI) is designed. This software's GUI is designed according to the Constantine and Lockwood described collection of principles for improving the quality of user interface design. These principles are

- **The structure principle.** Design should organize the user interface purposefully, in meaningful and useful ways based on clear, consistent models that are apparent and recognizable to users, putting related things together and separating unrelated things, differentiating dissimilar things and making similar things resemble one another. The structure principle is concerned with overall user interface architecture.
- **The simplicity principle.** Design should make simple, common tasks simple to do, communicating clearly and simply in the user's own language, and providing good shortcuts that are meaningfully related to longer procedures.
- **The visibility principle.** Design should keep all needed options and materials for a given task visible without distracting the user with extraneous or redundant information. Good designs don't overwhelm users with too many alternatives or confuse them with unneeded information.
- **The feedback principle.** Design should keep users informed of actions or interpretations, changes of state or condition, and errors or exceptions that are relevant and of interest to the user through clear, concise, and unambiguous language familiar to users.
- **The tolerance principle.** Design should be flexible and tolerant, reducing the cost of mistakes and misuse by allowing undoing and redoing, while also preventing errors

wherever possible by tolerating varied inputs and sequences and by interpreting all reasonable actions reasonable.

- **The reuse principle.** Design should reuse internal and external components and behaviors, maintaining consistency with purpose rather than merely arbitrary consistency, thus reducing the need for users to rethink and remember.

After completing all the above activities, the coding and implementation started.

4.2 Screen Shots

4.2.1 Student's Register:

localhost/mcqtest/register

Welcome Guest! Register | Login | Theme: Black & Orange

MCQ Test
Test your mcq skill online

Home MCQ Test **Signup** News About Us Contact Us

Home News About Us Contact Us

Create a new MCQ User Account

- * Get 25 Taka (25 mcq exam) free credit on registration .
- * Refer your friend to get more (10 Taka) free credit.

Full Name : *
User Id (Email) : *
Password : *
Confirm Password : *
Mobile Number :
Birth Date :
Referrer Id (Email) :
Verification Code : * **JIXLZK**

Submit

M.B. After Submit Registration form a email verification and account activation mail will be send to your email address. So please check your email inbox and just click on account activation link then login and enjoy MCQ test.

Top Ranking

Rank	Name
1	atikuzzaman
2	Md. Abul monsur Khan
3	Afrina Akter Sweet
4	Md. Kamruzzaman Imran
5	Habibur Rahman
6	milton mozumder
7	Md. Hafizur Rahman
8	Zubair Ahmed
9	MD.Motasimbillah
10	Mahedy Hassan

Last Exam Result

Name	Md. Aminul Islam
Subject	gk_bangladesh
Mark	10/10
Time	00:00:40/00:10:00
Date	07/10/2017
Time	12:31:07

Home About Us Contact Us Register

Welcome, Guest!
✓ Self examine your knowledge

Latest News
General Knowledge Question Bank Uploaded
General Knowledge question bank uploaded for both Bangladesh and International Affairs....

Subscribe Newsletter

9:34 AM
11/10/2017

Figure 4.2.1 Student's Register Screenshot

4.2.2 Student's Login:

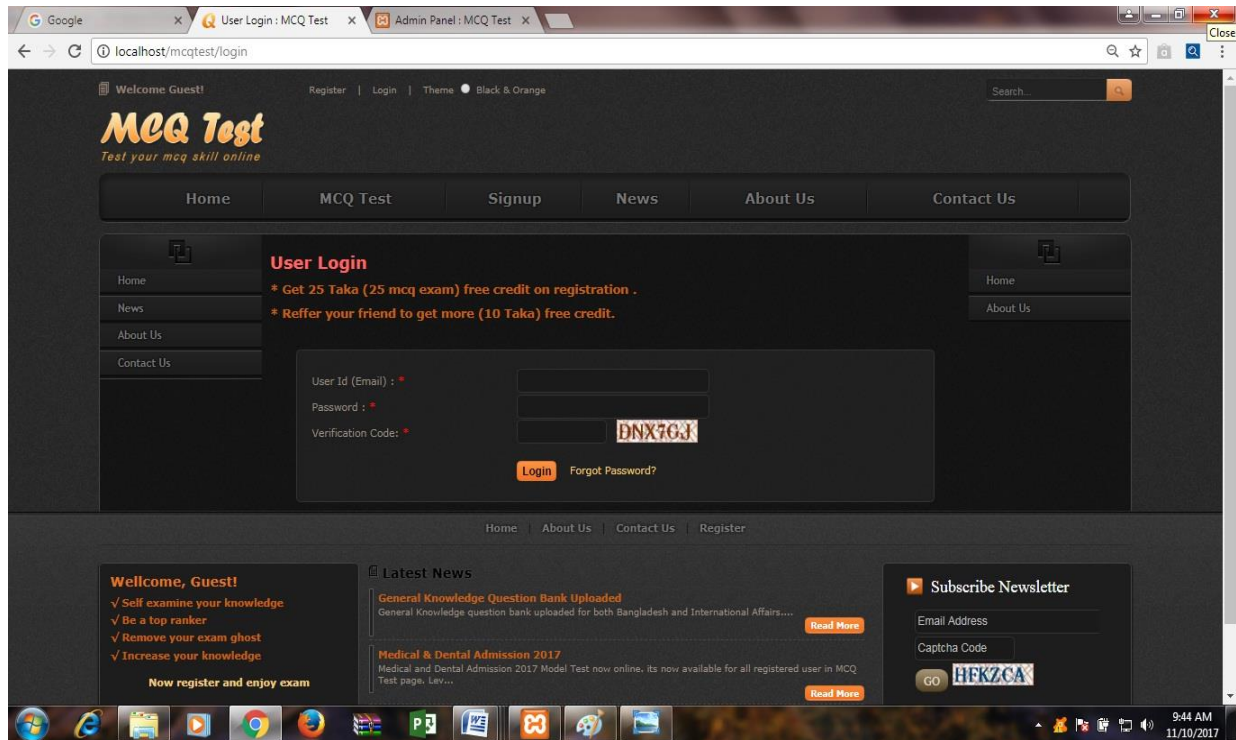


Figure 4.2.2 Student's Login Screenshot

4.2.3 MCQ Test:

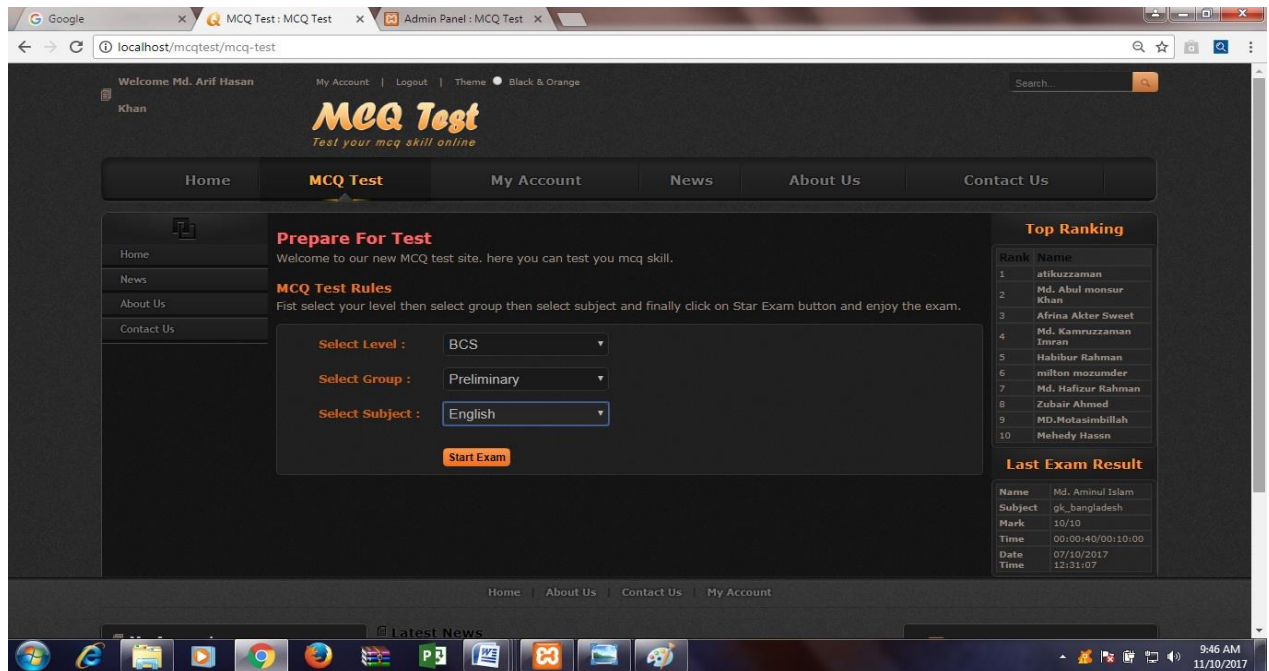


Figure 4.2.3 MCQ Test Screenshot

4.2.4 MCQ Test Questions:

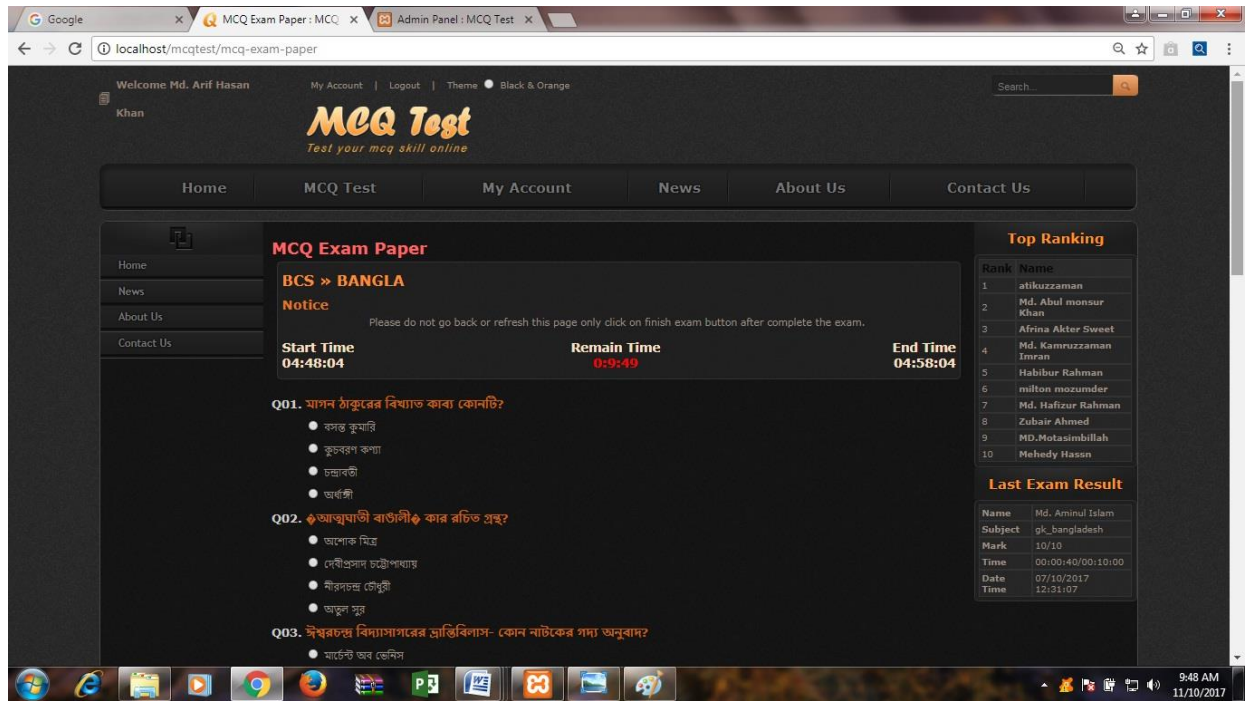


Figure 4.2.4 MCQ Test Question Screenshot

4.2.5 MCQ Test Result:

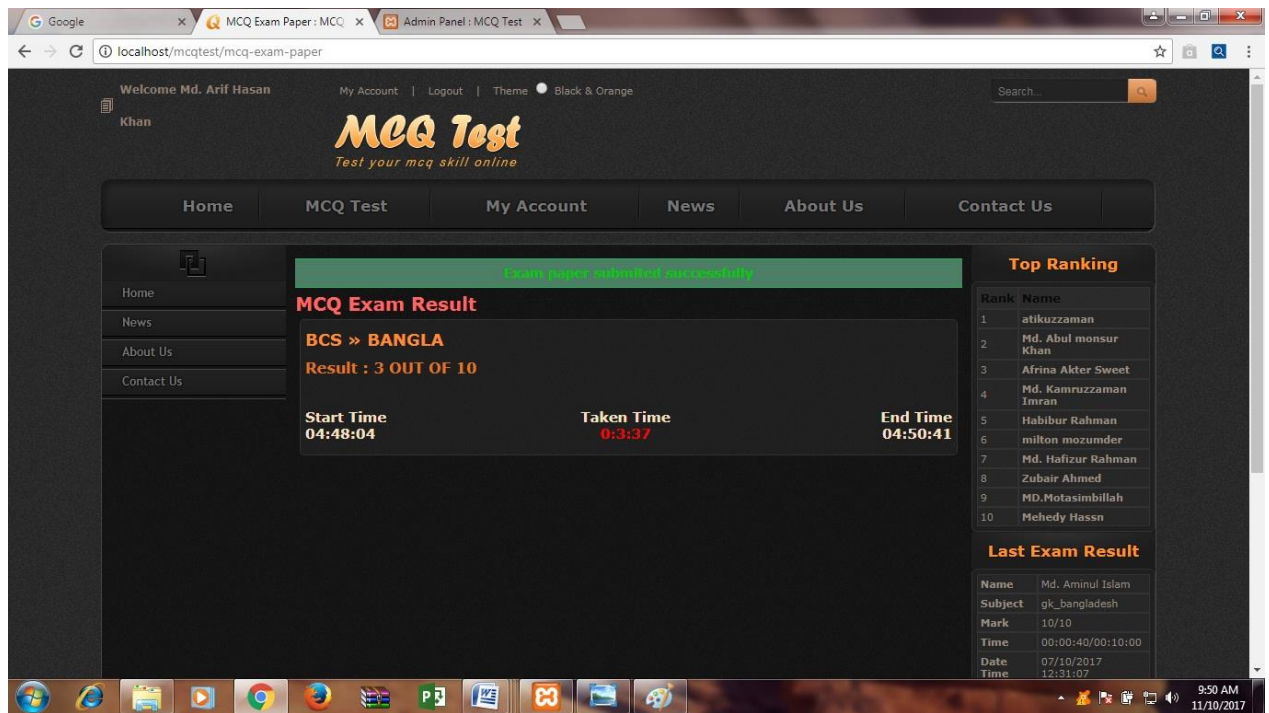


Figure 4.2.5: MCQ Test Result Screenshot

4.2.6 Student's Account Detail:

The screenshot shows the 'My Account' page for a student named Md. Arif Hasan Khan. The page layout includes a top navigation bar with links to Home, MCQ Test, My Account (active), News, About Us, and Contact Us. A left sidebar contains links to Home, News, About Us, and Contact Us. The main content area is divided into several sections:

- My Account:** Displays the user's name, 'Md. Arif Hasan Khan', and an 'Edit Profile' button.
- Profile Info:** A table containing personal details:

Name	Md. Arif Hasan Khan
Email	arif123@gmail.com
Address	...
Country	...
Phone	01685109179
Referrer	...
- Credit Info:** Shows a credit balance of 24 Tk and a 'View Details' button.
- Exam Result:** A table showing exam performance:

Total Exam	Mark Achievement	Time Achievement	Rank
1	3 [30.0%] out of 10	00:02:37 [26.2%] out of 00:10:00	654
- Exam Records:** A table listing exam attempts with columns for Subject, Date & Time, Got Mark, Total Mark, Taken Time, and Exam Time. It includes a search bar and pagination controls.
- Top Ranking:** A list of top performers with their ranks and names.
- Last Exam Result:** A summary of the most recent exam attempt, including subject, mark, time, and date.

Figure 4.2.6: Student's or User's Account Detail Screenshot

4.2.7 Administrator's Login:

The screenshot shows the 'ADMIN PANEL' login page. The page features the MCQ Test logo and a 'Login Area' with the following fields and elements:

- Username:** A text input field.
- Password:** A text input field.
- Verification Code:** A text input field with a CAPTCHA image showing the code 'DBZTKX'.
- Login:** A blue button to submit the login information.

The page is powered by MCQ Test, as indicated by the footer text.

Figure 4.2.7: Administrator's Login Screenshot

4.2.8 Admin Panel:

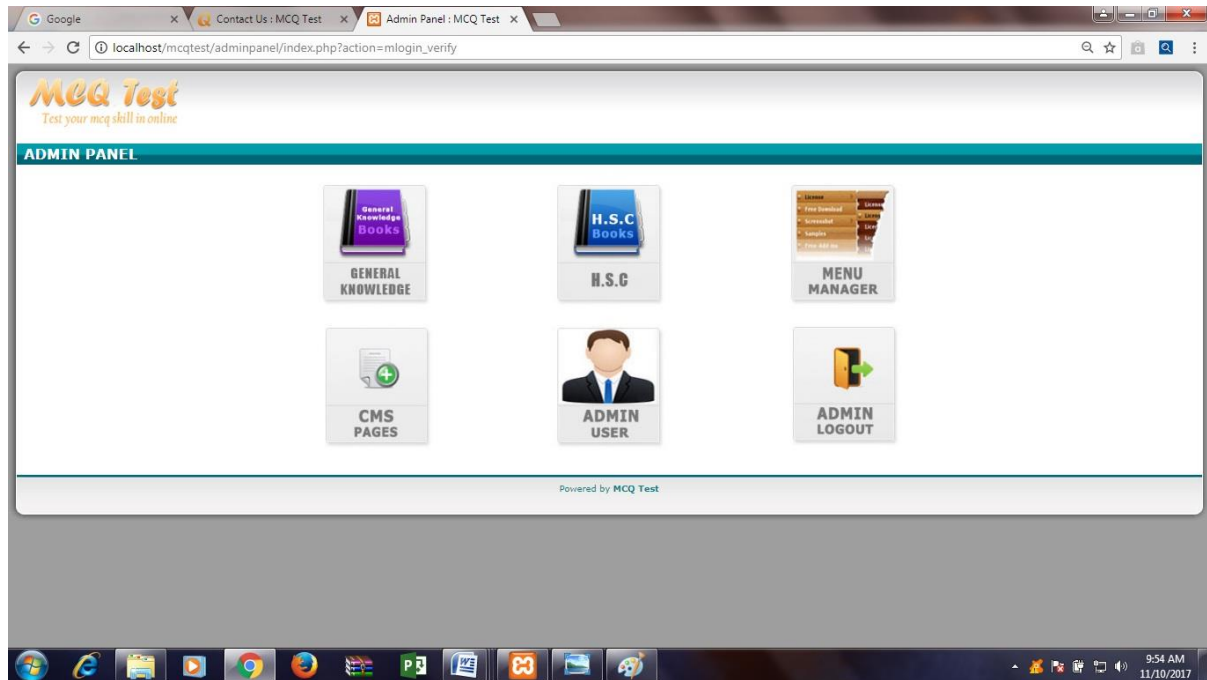


Figure 4.2.8: Admin Panel Screenshot

4.2.9 Menu Manager

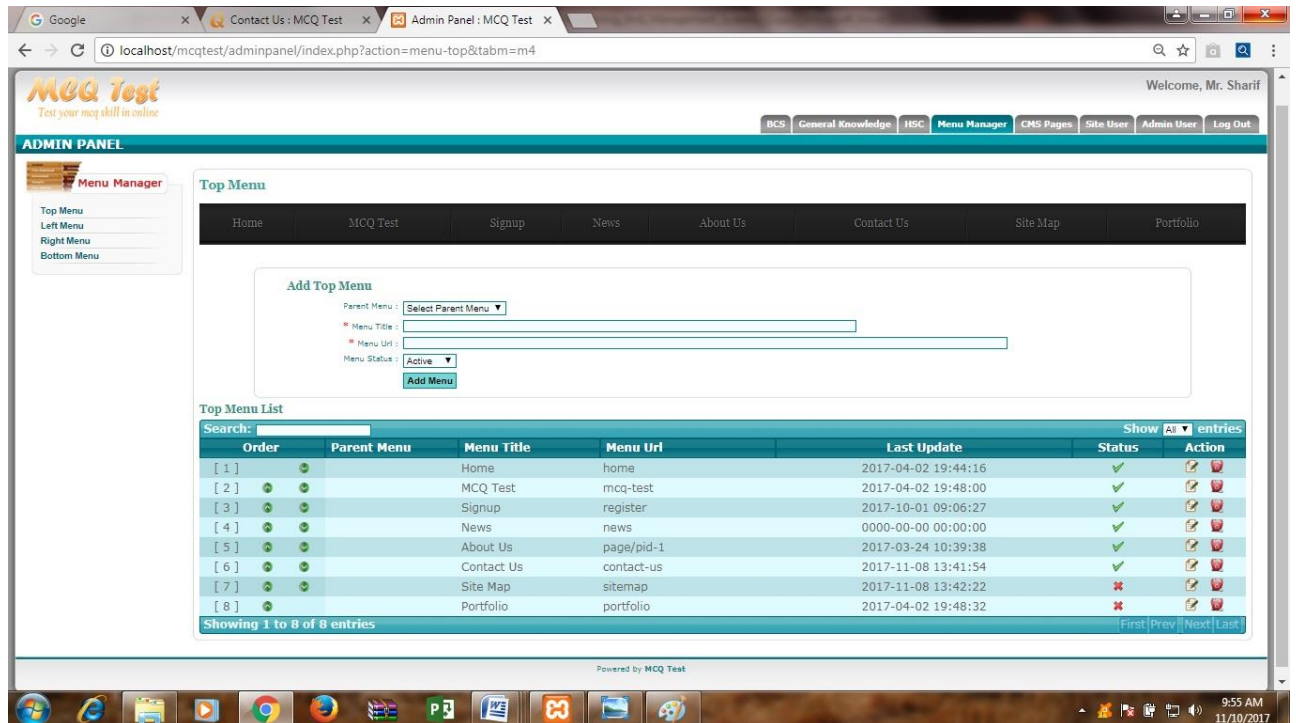


Figure 4.2.9: Menu Manager Screenshot

4.2.10 Site User Manager:

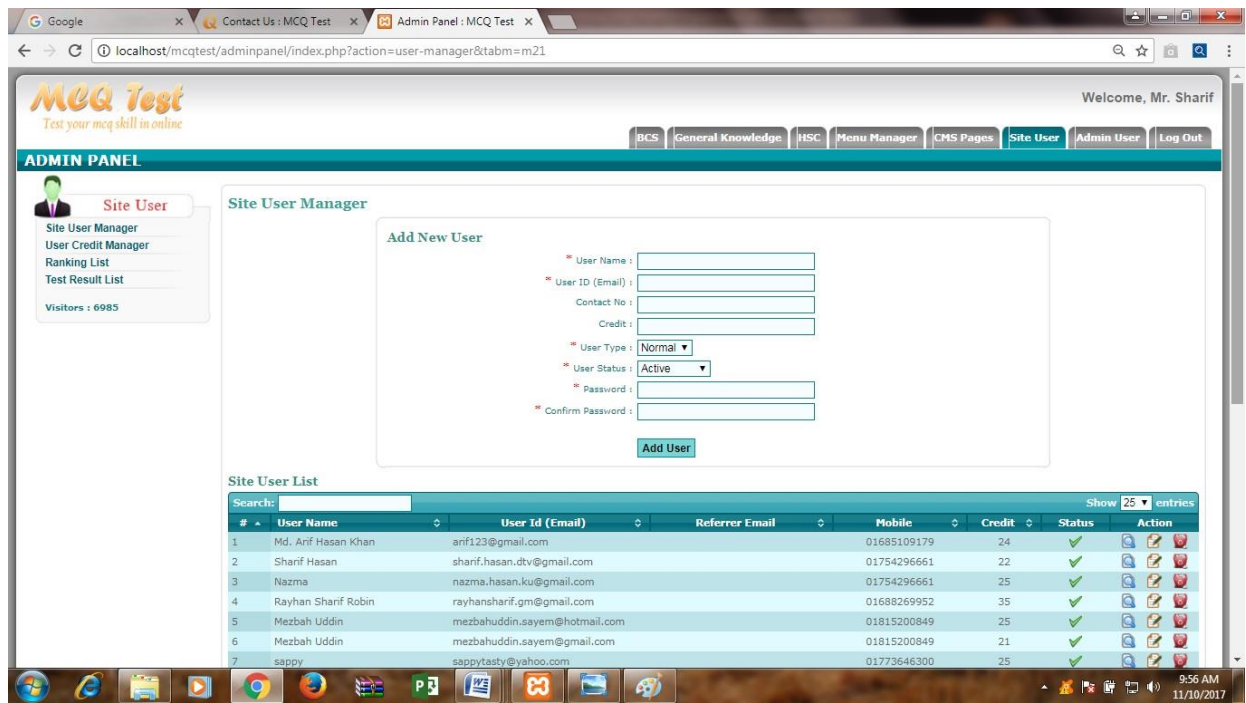


Figure 4.2.10: Site User Manager Screenshot

4.2.11 Add Question:

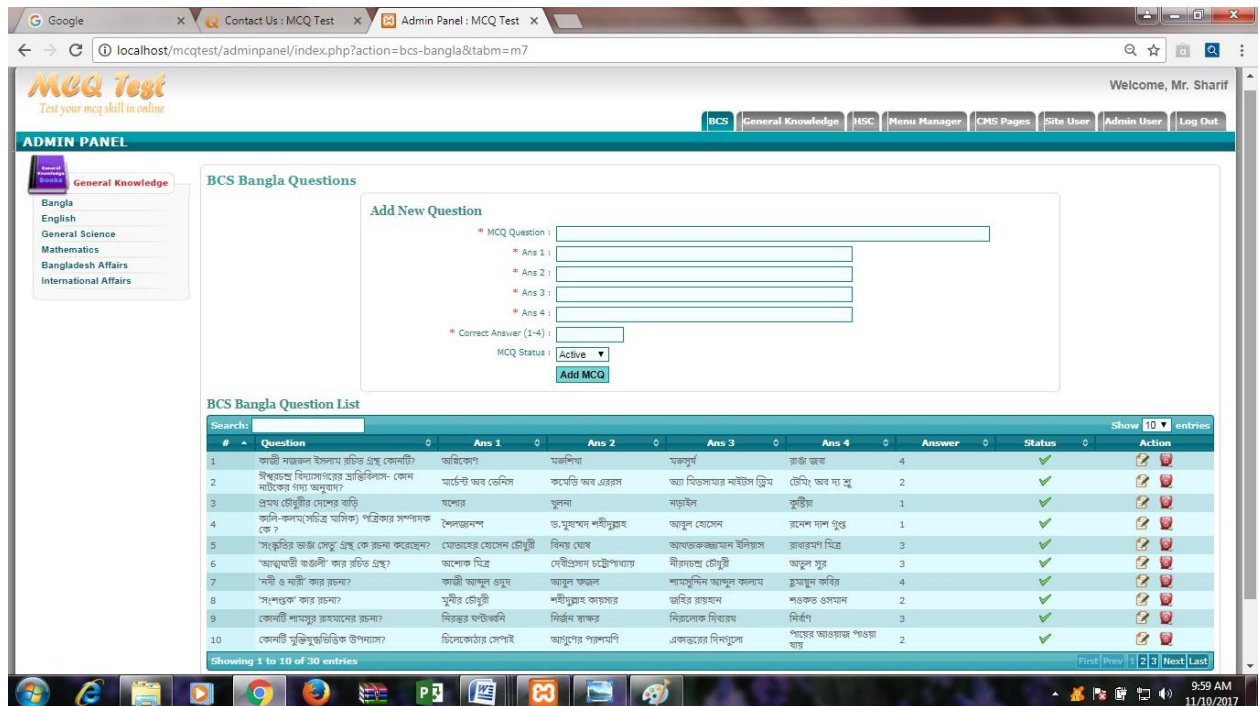


Figure 4.2.11: Add Question Screenshot

4.2.12 MCQ Test Result Management from Admin:

The screenshot displays the 'MCQ Test Result List' in the Admin Panel. The table contains the following data:

#	Name	Subject	Date	Got Mark	Total Mark	Taken Time	Exam Time
1	Md. Anif Hasan Khan	bcs_bangla	2017-11-10 04:50:41	3 / 10	157 / 600		
2	Md. Aminul Islam	gk_bangladesh	2017-10-07 12:31:07	10 / 10	40 / 600		
3	Md. Aminul Islam	gk_bangladesh	2017-10-07 12:30:06	10 / 10	43 / 600		
4	Md. Aminul Islam	gk_bangladesh	2017-10-07 12:29:07	9 / 10	46 / 600		
5	Md. Aminul Islam	gk_bangladesh	2017-10-07 12:27:52	9 / 10	59 / 600		
6	Md. Aminul Islam	gk_bangladesh	2017-10-07 12:26:39	8 / 10	70 / 600		
7	Md. Aminul Islam	gk_bangladesh	2017-10-07 12:25:11	10 / 10	68 / 600		
8	Md. Aminul Islam	gk_bangladesh	2017-10-07 12:23:37	5 / 10	86 / 600		
9	Md. Aminul Islam	hsc_accounting	2017-10-07 12:21:41	6 / 10	158 / 600		
10	Md. Aminul Islam	gk_bangladesh	2017-10-07 12:18:44	4 / 10	148 / 600		
11	Amirul Saleheen	gk_bangladesh	2017-10-07 12:16:18	7 / 10	94 / 600		
12	Sharif Hasan	hsc_bangla	2017-10-07 10:54:28	5 / 10	85 / 600		
13	Sharif Hasan	gk_international	2017-10-07 10:53:03	0 / 10	5 / 600		
14	Sharif Hasan	bcs_bangla	2017-10-07 10:46:53	1 / 10	72 / 600		
15	athikurrahman	gk_international	2017-10-06 06:07:46	7 / 10	150 / 600		
16	S. M. Imranul Islam	gk_bangladesh	2017-10-05 04:08:41	10 / 10	38 / 600		
17	Mir Armaan	hsc_accounting	2017-10-01 12:48:14	7 / 10	160 / 600		
18	Mir Armaan	gk_bangladesh	2017-10-01 12:44:43	4 / 10	87 / 600		
19	Amirul Saleheen	gk_bangladesh	2017-10-01 12:19:18	10 / 10	41 / 600		
20	Amirul Saleheen	gk_bangladesh	2017-10-01 12:18:13	5 / 10	76 / 600		
21	Md. Shariful Hasan Khan	hsc_math	2017-10-01 09:55:13	1 / 1	16 / 600		
22	Md. Shariful Hasan Khan	bcs_english	2017-10-01 09:27:17	4 / 10	177 / 600		
23	athikurrahman	hsc_bangla	2017-10-01 04:27:31	5 / 10	291 / 600		
24	athikurrahman	gk_bangladesh	2017-10-01 04:22:11	10 / 10	78 / 600		
25	athikurrahman	gk_international	2017-10-01 04:19:24	6 / 10	205 / 600		

Figure 4.2.12: MCQ Test Result Management from Admin Screenshot

4.2.13 MCQ Test Ranking Management from Admin:

The screenshot displays the 'MCQ Test Ranking List' in the Admin Panel. The table contains the following data:

#	Name	Rank	Point	Action
1	atkuzzaman	1	96.3	
2	Md. Abul monsur Khan	2	94.6	
3	Afrina Akter Siveet	3	94.3	
4	Md. Kamruzzaman Imran	4	93.3	
5	Habibur Rahman	5	90.9	
6	milton mozumdar	6	90.8	
7	Md. Hafizur Rahman	7	89.9	
8	Zubair Ahmed	8	89.5	
9	MD.Motasimbillah	9	88.3	
10	Mehedy Hasan	10	87.9	
11	Md. Nazim Ahmed	11	87.3	
12	Shamsul Huda	12	86.5	
13	Md.Omar Faruque (shamim)	13	86.1	
14	Amit Kumar Tarafder	14	85.8	
15	Rana Masud	15	85.7	
16	Foyzal	16	85.6	
17	Bosu Dev Roy	17	84.9	
18	Md Delovar Hossain	18	84.7	
19	MD.Kamrul Hasan	19	84.5	
20	MD. Mashur Rahman	20	84.3	
21	Tohidul Islam	21	83.7	
22	Tavfique Ahmed	22	83.6	
23	Irfan Ahmed Borshon	23	83.4	
24	A.K.M Shahabuddin	24	83.3	
25	mubin	25	82.4	

Figure 4.2.13: MCQ Test Ranking Management from Admin Screenshot

4.3 Software Testing

Software testing is an investigation conducted to provide stakeholders with information about the quality of the product or service under test. Software testing can also provide an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation. Test techniques include, but are not limited to, the process of executing a program or application with the intent of finding software bugs (errors or other defects).

Software testing can be stated as the process of validating and verifying that a software program/application/product:

1. Meets the requirements that guided its design and development;
2. Works as expected;
3. Can be implemented with the same characteristics.
4. Satisfies the needs of stakeholders

Software testing, depending on the testing method employed, can be implemented at any time in the development process. Traditionally most of the test effort occurs after the requirements have been defined and the coding process has been completed, but in the agile approaches most of the test effort is on-going. As such, the methodology of the test is governed by the chosen software development methodology.

4.3.1 Testing Methods

Static vs. Dynamic Testing: There are many approaches to software testing. Reviews, walkthroughs, or inspections are referred to as static testing, whereas actually executing programmed code with a given set of test cases is referred to as dynamic testing. Static testing can be omitted, and unfortunately in practice often is. Dynamic testing takes place when the program itself is used. Dynamic testing may begin before the program is 100% complete in order to test particular sections of code and are applied to discrete functions or modules. Typical techniques for this are either using stubs/drivers or execution from a debugger environment.

4.3.2 The Box Approach

Software testing methods are traditionally divided into white-box and black-box testing. These two approaches are used to describe the point of view that a test engineer takes when designing test cases.

White-Box Testing: White-box testing (also known as clear box testing, glass box testing, and transparent box testing and structural testing) tests internal structures or workings of a program, as opposed to the functionality exposed to the end-user. In white-box testing an internal perspective of the system, as well as programming skills, are used to design test cases. The tester chooses inputs to exercise paths through the code and determine the appropriate outputs. This is analogous to testing nodes in a circuit, e.g. in-circuit testing (ICT).

While white-box testing can be applied at the unit, integration and system levels of the software testing process, it is usually done at the unit level. It can test paths within a unit, paths between units during integration, and between subsystems during a system-level test. Though this method of test design can uncover many errors or problems, it might not detect unimplemented parts of the specification or missing requirements.

Techniques used in white-box testing include:

- API testing (application programming interface) - testing of the application using public and private APIs
- Code coverage - creating tests to satisfy some criteria of code coverage (e.g., the test designer can create tests to cause all statements in the program to be executed at least once)
- Fault injection methods - intentionally introducing faults to gauge the efficacy of testing strategies
- Mutation testing methods
- Static testing methods

Code coverage tools can evaluate the completeness of a test suite that was created with any method, including black-box testing. This allows the software team to examine parts of a system that are rarely tested and ensures that the most important function points have been tested. Code coverage as a software metric can be reported as a percentage for:

- *Function coverage*, which reports on functions executed
- *Statement coverage*, which reports on the number of lines executed to complete the test

100% statement coverage ensures that all code paths, or branches (in terms of control flow) are executed at least once. This is helpful in ensuring correct functionality, but not sufficient since the same code may process different inputs correctly or incorrectly.

Black-box Testing



Black-box Testing treats the software as a "black box", examining functionality without any knowledge of internal implementation. The tester is only aware of what the software is supposed to do, not how it does it. Black-box testing methods include: equivalence partitioning, boundary value analysis, all-pairs testing, state transition tables, decision table testing, fuzz testing, model-based testing, use case testing, exploratory testing and specification-based testing.

Grey-box Testing: Grey-box testing (American spelling: gray-box testing) involves having knowledge of internal data structures and algorithms for purposes of designing tests, while executing those tests at the user, or black-box level. The tester is not required to have full access to the software's source code. Manipulating input data and formatting output do not qualify as grey-box, because the input and output are clearly outside of the "black box" that we are calling the system under test. This distinction is particularly important when conducting integration testing between two modules of code written by two different developers, where only the interfaces are exposed for test. However, modifying a data repository does qualify as grey-box, as the user would not normally be able to change the data outside of the system under test. Grey-box testing may also

include reverse engineering to determine, for instance, boundary values or error messages.

Visual Testing: The aim of visual testing is to provide developers with the ability to examine what was happening at the point of software failure by presenting the data in such a way that the developer can easily find the information he requires, and the information is expressed clearly.

At the core of visual testing is the idea that showing someone a problem (or a test failure), rather than just describing it, greatly increases clarity and understanding. Visual testing therefore requires the recording of the entire test process – capturing everything that occurs on the test system in video format. Output videos are supplemented by real-time tester input via picture-in-a-picture webcam and audio commentary from microphones.

CHAPTER 5

CONCLUSION AND FUTURE WORK

5.1 Conclusion

Online MCQ Test System (web based application) is a non removable examination pattern of today's life and has become a fast growing examination method because of its speed and accuracy. We need more time saving and more accurate examination system as the number of applicants is increasing day by day. For all IT students and professionals, it is very important to have some basic understanding about this kind of online examination system. It is also needed less manpower to execute the examination. The system is designed for educational organizations like schools, colleges, private institutes and recruiting agencies to conduct their objective exams of their candidates on a regular basis, it saves students time in examinations. Organizations can also easily check the performance of the student that they give in an examination. As a result of this, organizations would be able to release results in less time. It is very useful tools for parents to see the academic development of kids to improve their educational skills as well as useful for university admission seekers, BCS candidates, professional job seekers to improve their skill before final test from home. The user with minimum knowledge about computer can be able operate the system easily. It also helps the environment by saving paper.

5.2 Future Work

Developments in software technology are continuing dynamically. This has forced me to look for new approaches to design and development. In order to face this situation, the modules in a package should be upgraded any time. The modules in this package can be subjected to further enhancement. Such as-

- Developed discussion forums and blogs.
- Implementation on clouds server.
- Multimedia feature supports.
- Integrate learning material.

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