# Design and Development of a System for Automatically Generated Question

A project report submitted to the department of Computer Science and Engineering of the World University of Bangladesh in partial fulfillment of the requirement for award of the degree of Bachelor of Science in Computer Science & Engineering

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May 2019

# LETTER OF TRANSMITTAL

May,2019

To
Shamsun Nahar
Senior Lecturer,
Department of Computer Science & Engineering
World University of Bangladesh (WUB)
House #3/A, Road #4, Dhanmondi
Dhaka 1205, Bangladesh.

**Subject: Submission of Project Report.**

Dear Madam,

With due respect, we are pleased to submit the report entitled '**Design and Development of a System for Automatically Generated Question'**. It was a great pleasure to work on such an important topic. The report is prepared according to the requirements and guidelines of the Department of Computer Science and Engineering, World University of Bangladesh (WUB).

We believe that the report will help you to evaluate my project work. It would be a great pleasure for me to interpret any part or whole of the report whenever necessary.

| | | |
|---|---|---|
| Sincerely yours: | Sincerely yours: | Sincerely yours: |
| Md Ashak Bellah Pial | Sharmin Akter | Shahanaz Akter |
| WUB 03/16/35/1729 | WUB 03/16/35/1726 | WUB 03/16/35/1710 |

## World University of Bangladesh

## DECLARATION

We hereby solemnly declare that the project work entitled on **"Design and Development of a System for Automatically Generated Question".,** has been supervised by Shamsun Nahar Lecture, department of Computer Science & Engineering, World University of Bangladesh. We ensure that the project report has not been submitted either in whole or part for any degree or Diploma in any university previously.

We hereby warrant that the work we have presented does not breach any existing copyright rule.

We further undertake to indemnify the university against any loss or damage arising from breach of the forgoing obligation.

| | | |
|---|---|---|
| Sincerely yours: | Sincerely yours: | Sincerely yours: |
| Md Ashak Bellah Pial | Sharmin Akter | Shahanaz Akter |
| WUB 03/16/35/1729 | WUB 03/16/35/1726 | WUB 03/16/35/1710 |

Department of Computer Science and Engineering

World University of Bangladesh (WUB)

# CERTIFICATE

I hereby certify that the Project Report on **"Design and Development of a System for Automatically Generated Question"**, is a confide record of project work done by Md Ashake Bellah Pial, Sharmin Akter and Shahanaz Akter for partial fulfillment of the requirements for award of the degree of the Bachelor of Science in Computer Science and Engineering from World University of Bangladesh(WUB).

The project report has been carried out under my guidance and is a record of the bona-fide work carried out successfully by the students.

Supervisor:

**Shamsun Nahar**

Senior Lecturer

Department of Computer Science and Engineering

World University of Bangladesh (WUB)

## ACKNOWLEDGEMENT

The completion of the project involves and assistance from individuals. It is our pleasure to thank the honorable Vice Chancellor of WUB. Professor Dr. Abdul Manual Choudhury to whom we owe a lot for giving us an opportunity to complete our project.

We are really grateful and wish profound indebtedness to Shamsun Nahar. Senior lecturer. department of CSE. World University of Bangladesh for helping us to prepare a project on **'**Design and Development of a System for Automatically Generated Question**'**. Her endless patient, scholarly guidance, continual encouragement, constant and energetic supervision, valuable advice, reading many inferior drafts and correcting them at all stage have made it possible to complete this project. She has attitude and the substance of genius. She continually and convincingly conveyed a sprite of adventure in regard to the project. Without her guidelines and supreme help this project would not have been possible.

We are also thankful to Asst. Professor Kazi Hasan Robin, Head of the department of CSE and Afzal Hossain, Asst. Professor, Department of CSE for their valuable guidance.

Finally, we would like to thank and love our entire course mate in World University of Bangladesh. who took part in this discussion while completing the course work. Also, we must acknowledge with due respect for the constant support and patience of our parents.

Sincerely yours:

Md Ashak Bellah Pial

WUB 03/16/35/1729

Sincerely yours:

Sharmin Akter

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# ABSTRACT

Education is the backbone of a nation. Examination are very important tools because they complete students to learn. In the examination, question selection plays a key role in question paper. Most of the times, students get only recall type questions during the examinations and sometimes they get that type of question which are repeated several times in several semester. This creates a knowledge gap which is not suitable for the student. To help the teacher avoiding the recall and repetition question paper in examinations this system will be helpful. This system uses certain set of conditions to automatically select questions from this system. This web-based application is designed to create and store all academic questions. Also, teacher can create quiz test for student.

We have studied various kinds of the literature of relevant application. After reviewing

literature we have found limitation in many relevant applications. The main limitation of many of these existing conditions approach implementations is that they use a random generation strategy.

In this project we used proposed software development model which based on iterative approach to software development that focus on the code rather than design.

We follow questionnaire, legacy and brainstorming technique to collect our requirements. We have prepared a questionnaire for requirement collection. We study some projects which are similar to our project and from there we get idea about our project's requirements.

This application will be used to prevent question recall and repetition of same question papers. Using this application, question paper will be created systematically rather than manual creation. All category question papers can be built by using this application. This project is not open source which is only used by authorized person. The authorized person can enter this system by proper authentication. There are 2 types of user in this system - Admin and Teacher. Admin has the superior power of this system that controls the whole system to create the question papers and appoint the Teacher. The entrance of the questions in the system is done by Teacher.

We have used HTML and CSS to design our website frontend and we developed our project with Php and databased manage with MySQL. Also, we took space in a web server and we host our necessary files in the server and we use Google Chrome, Mozilla Firefox as website reliability testing.

By using this web application teacher can easily create question. It will be helpful for the teachers. There are lots of advantage of this web application but it also have few limitations. This system can be designed for further enhancement. This system could be developed according to the needs of user.

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# CHAPTER 1: INTRODUCTION

## 1.1: Introduction

Examinations are important tools for assessing student performance. In the examination, question selection plays a key role in question paper. But now a days the question selection process is handled in traditional systems. We need to change the process of traditional system.

Education is a complex activity. The aim of the students is gain knowledge and develop skills for their career. Most of the times, students get only recall type questions during the examinations and sometimes they get that type of question which are repeated several times in several semester. This creates a knowledge gap which is not suitable for the student.

To help the teacher avoiding the recall and repetition question paper in examinations this system will be helpful. This system uses certain set of conditions to automatically select questions from this system. This web-based application is designed to create and store all academic questions. Also teacher can create quiz test for student.

The use of innovative methods of preparing the exam based on the system had a positive impact on the mobilization and involvement of students, which resulted in a very good performance evaluation questionnaire of the teacher.

We reached and find two method one is recurrent neural network and reinforcement learning. Recurrent neural network is a type of artificial neural network and Reinforcement learning is all about making decisions sequentially.

This system ensures the question modeling process is easy and safe. This project is not open source which is only used by authorized person. The authorized person can enter this system by proper authentication.

## 1.2: Objectives

1. To assist teachers in creating question by using of proposed system.
2. To help the new teacher for understanding university question pattern.
3. To develop an online based quiz exam system.

### 1.3: Justification of Study

Examinations are a very common assessment and evaluation tool in universities and there are many types of examination questions. In this system offers a variety of question with a focus on several aspects of instruction. We are creating this system to help new and old teachers. The new teacher will get an idea about the question pattern and find a concept about what kind of questions the students are accustomed. It will be very helpful for old teachers because questions will not be repeated and also it is a time saving procedure.

### 1.4: **Scope of study**

Using this system will make the both teacher and student are benefited. Teacher will be benefited, by saving time. New appointed teachers are also able to figure out the questions pattern or they can use previous year question. It will generate questions automatically and it will reduce time.

Students will be benefited by increase their dimension. They will be aware of a variety of questions and they will be dynamic. Whenever a teacher teaches something in class they can upload it in this system. This is an efficient and faster way. Teacher can make mid or final questions from that system. Students will able to know the update information from the teachers.

# CHAPTER 2: LITERATURE REVIEW

Examinations is a backbone of education system. They are also very interesting. Examinations are important because they compel students to learn. Without them most students would not learn. In the examination, question selection plays a key role in question paper.

The approaches commonly used till date for selecting questions from a question bank fall under the following two categories-Manual and Automated. The manual approaches are typing method as like as MS word. Automated systems use random item sequencing conditions. The main limitation of many of these existing conditions approach implementations is that they use a random generation strategy and create thousands of question papers with repetitive questions. We have studied various websites and we found some related project like us.

WJEC was established in 1948 as a consortium of local education authorities in Wales. WJEC is an examination board, providing qualifications and exam assessment to schools and colleges in England, Wales, Northern Ireland and independent regions. With over 65 years' experience in delivering qualifications, WJEC is the largest provider in Wales and a leading provider in England and Northern Ireland. (wjec.co.uk/question-bank, 1998)

WJEC Question Bank is a free tool which allows you to create practice question papers from thousands of WJEC past paper questions. Find the questions you need, add them to your paper and export your paper with accompanying mark scheme and examiner's comments as a PDF ready to use in the classroom.

Leaders in the Aviation Examination Preparation, making available over 16000 practice exam questions for the Commercial, Integrated ATP and ATP pilot exams and realistic mock examinations to prepare you adequately for the SACAA examinations. (questionbank.co.za, 2014)

Question bank has been designed to facilitate all Pilot students studying towards their CPL, IATP, ATP, PPL and IR by providing up to date practice questions and up to date, realistic mock examinations to assist the individual in being adequately prepared to sit the relevant SACAA examinations. Includes practice questions and realistic, up to date mock examinations pertaining the relevant syllabus.

IB Question Bank most popular question bank for multiple language supported. In IB question bank firstly need to registration for accessing question bank. Once your registration is successfully completed, you will receive an automated email with instructions and the license

key you purchased. It's a paid version of question bank. In IB question bank you can add teacher logins for your school. You can also remove teacher logins on the same form by choosing the "Remove" box next to the teacher's name. Each license provides you with a maximum of 10 logins per school. All users on a license must be affiliated with the same school. If you are purchasing for multiple schools, you must purchase multiple licenses.

The IB offers an education for students from age 3 to 19, comprising of four programmed that focus on teaching students to think critically and independently, and how to inquire with care and logic. The IB Question Bank prepares students to succeed in a world where facts and fiction merge in the news, and where asking the right questions is a crucial skill that will allow them to flourish long after they've left IB programmed. (ibo.org, 2013)

In this project most challenging part is to collecting data and process them. We reached and find two method one is recurrent neural network and reinforcement learning. Recurrent neural network is a type of artificial neural network. RNN are used in deep learning. Recurrent neural network use feedback loops to process a sequence of data that informs the final output. (Margaret Rouse, 2018)

Reinforcement learning is all about making decisions sequentially. In simple words we can say that the out depends on the state of the current input and the next input depends on the output of the previous input. The perfect example is chess game for reinforcement learning. (Prateek Bajaj, geeksforgeeks.org, 2009)

# CHAPTER 3: METHODOLOGY

## 3.1 Methodology

The main purpose of this system is to help accessing existing questioning system. We have built a web-based application where teacher can create question without any hassle. Because this system generate question automatically without any repetition & also it is time consuming process.

For this system we examined different types of software development model and we create a new model which is suitable for our project. This one is a straightforward and transformable model of methodology that can be utilized to execute this project and work easily.

- With this model revisions of functional requirements are implemented into the development process to give the competitiveness.
- We can divide the project by short and transparent iteration.
- Also, with this model risks are minimized. It requires only initial planning to start the project.

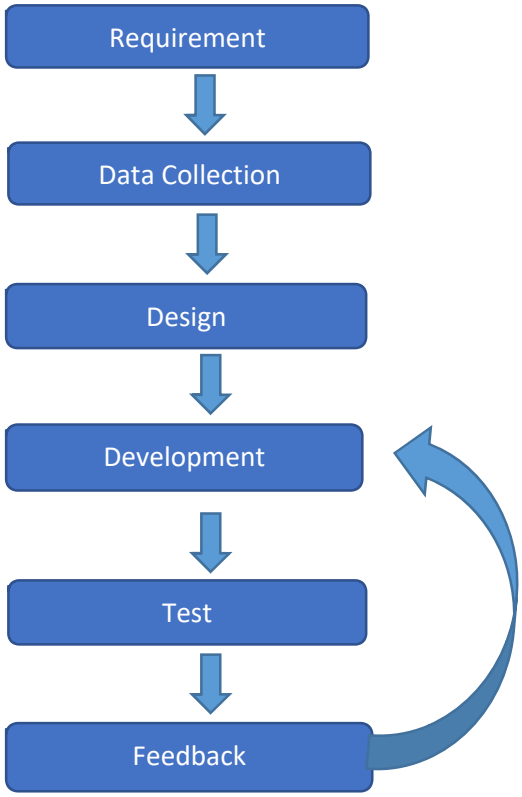


Figure 3.1: Proposed Software Development Model

### 3.1.1 Requirements

Requirement is the important thing to consider as moving on with the research work. Requirement are defined based on how the system work perfectly. To make things clear teacher will be using our web-based application.

We have studied previous online based question bank system which are already stablish and we gather knowledge which our main process of requirement analysis. So, we can call it legacy system requirement elicitation. More insights point about the requirement are discussed in our paper Requirement Analysis, Design and Development chapter.

### 3.1.2 Data Collection

We have discussed with the teachers about their demands. We have prepared the questionnaire to know their demands about question bank of the teachers.

These questions are given below:

Q1: Do you need question bank?

Q2: Is it helpful to create questions for examination?

Q3:  As a new teacher is it beneficial for you?

Q4: Is it helpful to avoiding recall type questions?

Q5: Is it time consuming process?

According to these questions we have got the following results:

For Q1, 80% teachers they said yes that means they need question bank. For Q2, 80% teachers they said yes that means it's helpful. For Q3, 95% new teachers said yes that means beneficial for new teachers. For Q4, 75% teachers they said yes that means it's helpful to avoiding recall type question. For Q5, 80% teachers they said no that means it's not time-consuming process.

Here we made a graph based on our survey.

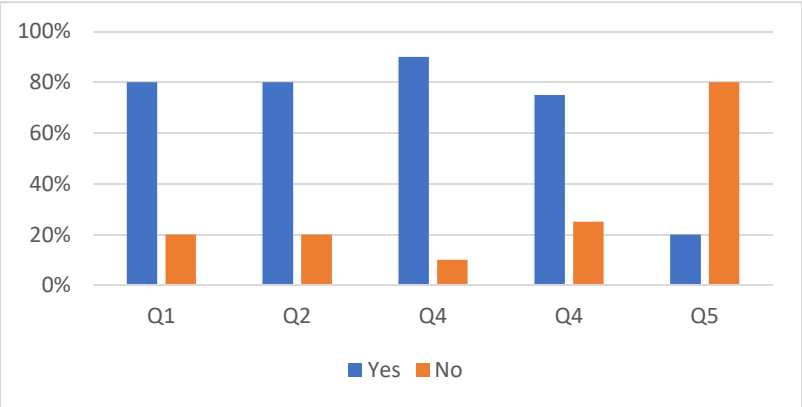


Figure 3.2: Survey Chart

### 3.1.3 Design

The purpose of the design and development process are very challenging part of our project. Design is work process project perspective and drives development.

We designed the frontend part using Html, CSS, jQuery with bootstrap framework.

### 3.1.4 Development

Development is the process and the facility of planning, organizing and controlling the project to accomplish specific goals. Developing tools are mainly used to develop the whole application where all facilities get from the tools.

Development part coding with php language. For our data management we use My SQL database.

### 3.1.5 Test

After completing our project development part, we try to create some demo question to check our application reliability. After doing that we realized our application works as per our objectives. That's means our project runs frequently.

### 3.1.6 Feedback

In feedback stage is compare the output result. If output is successful, then its ok to complete the development stage otherwise back to development stage for edit or modify.

# CHAPTER 4: REQUIREMENT ANALYSIS, DESIGN and DEVELOPMENT

## 4.1 Requirement Analysis

Requirement analysis also called requirement engineering, In systems engineering and software engineering, requirements analysis encompasses those tasks that go into determining user expectation for new or modified product. Requirements analysis is an important aspect of project management.

This project has an admin which have all control to manipulate any user and all facilities. That mean the admin will maintain the overall system. In our project there are teachers who take the facilities of question bank.

## 4.2 Hardware & Software Requirement

- Processor 2.4 GHz or above
- RAM 2 GB or above
- Any kind of smart phone.
- Operating System: Windows 7/8/10, MacOS, Ubuntu
- Browser: Google chrome, Mozila Firefox, Opera etc
- Code Editors: Sublime Text 3, Notepad++,
- Local Web Server: Xampp, Wamp etc

## 4.3 Techniques is used

The following software's and tools were selected and used while erecting the system.

- ✓ HTML
- ✓ CSS
- ✓ BOOTSTRAP
- ✓ MySQL
- ✓ JAVASCRIPT
- ✓ AJAX
- ✓ JQUERY
- ✓ XAMPP

The tools and software details are discussed below.

**HTML:** HTML stands for Hypertext markup language, it is a page description language That Creates hypertext or hypermedia documents.HTML inserts control codas within a Document at points that create link (known as hyperlink) to other parts of documents or to other documents anywhere on the www.html embeds control codes in the ASCII text of a document that designate title, heading, graphics and multimedia components, as well as hyperlinks within the document.

**CSS:** CSS is the language for describing the presentation of Web pages, including colors, layout, and fonts. It allows one to adapt the presentation to different types of devices, such as large screens, small screens, or printers. CSS is independent of HTML and can be used with any XML-based markup language.

**jQuery:** jQuery is not a language, but it is a well written JavaScript code. As quoted on official jQuery website, "it is a fast and concise JavaScript Library that simplifies HTML document traversing, event handling, animating, and Ajax interactions for rapid web development. “In order to work with jQuery, you should be aware of the basics of JavaScript, HTML and CSS. It was released in January 2006 at BarCamp NYC by John Resig.

**Bootstrap:** Bootstrap is a free and open-source front-end library for creating websites and web applications. It contains HTML- and CSS-based design templates for typography, forms, buttons, navigation and other interface components, as well as optional JavaScript extensions. It aims to ease the development of dynamic websites and web applications.

Bootstrap is a front-end web framework, that is, an interface for the user, unlike the server-side code which resides on the "back end" or server.

**Ajax:** Ajax is not a technology, but a group of technologies. HTML and CSS can be used in combination to mark up and style information. The DOM is accessed with JavaScript to dynamically display – and allow the user to interact with – the information presented. JavaScript and the XML Http Request object provide a method for exchanging data asynchronously between browser and server to avoid full page reloads

**PHP:** PHP (Hypertext Preprocessor) is a widely used Open Source general-purpose scripting language that is especially suited for Web development and can be embedded into HTML. PHP is also a Server-Side Scripting Language, which means that Internet users are unable to view the source code on the Client-Side because the code is executed on the server. PHP can be used on all major operating systems, including Linux, Unix and Microsoft environments.

**MySQL**: MySQL, the most popular Open Source SQL database, is freely distributed. It is widely supported and can be integrated into different platform. MySQL is a relational database management system that stores data in separate tables rather than putting all the data in one big storeroom. MySQL is currently the most popular open source database server in existence. On top of that, it is very commonly used in conjunction with PHP scripts to create powerful and dynamic server-side applications.

**XAMPP:** XAMPP (an acronym for cross (x)-platform, Apache, MySQL, PHP, and Perl) enables you to install all these elements quickly and easily. It provides an environment for web development. It allows to create web applications with apache, PHP and a MySQL database.

### 4.4: Use-Case Diagram

Use case diagrams are a great way to present a high-level view of your system. They can also express system scope and requirements. A use case diagram is a graphic view of the interactions among the element of the system. Use case describes sequence of actions a system platform that produce an observable result value to particular actor. Use case diagram can be good tool for the project. So, we use this to identify, clarify and organize a system requirement.

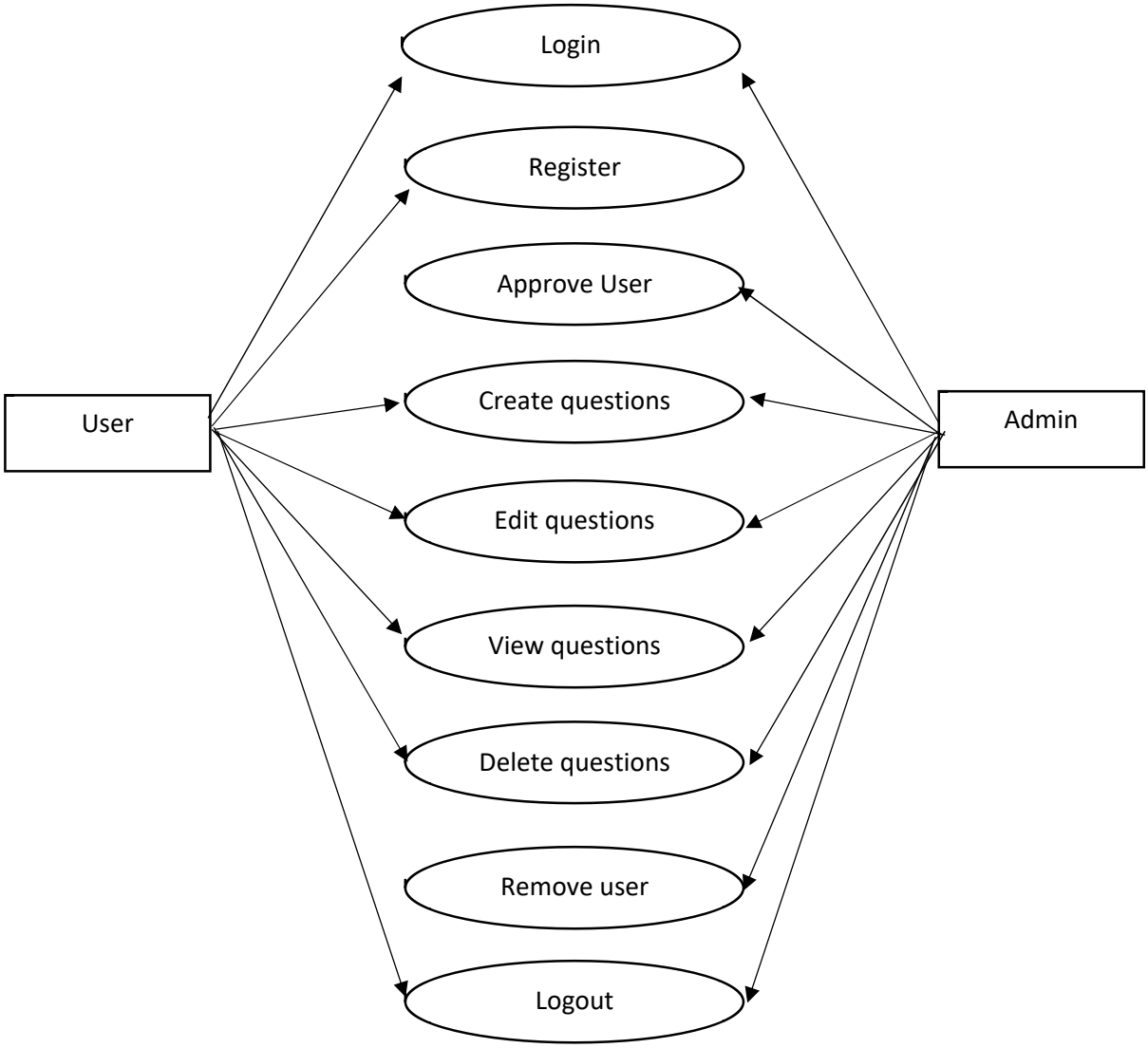


Figure 4.1: Use-Case diagram of our system

### 4.5 E-R Diagram

Entity-Relationship(E-R) Diagram is a visual representation of data that describes how data is related to each other. A basic E-R model is composed of entity types and specifies relationships that can exist between instances of those entity types.

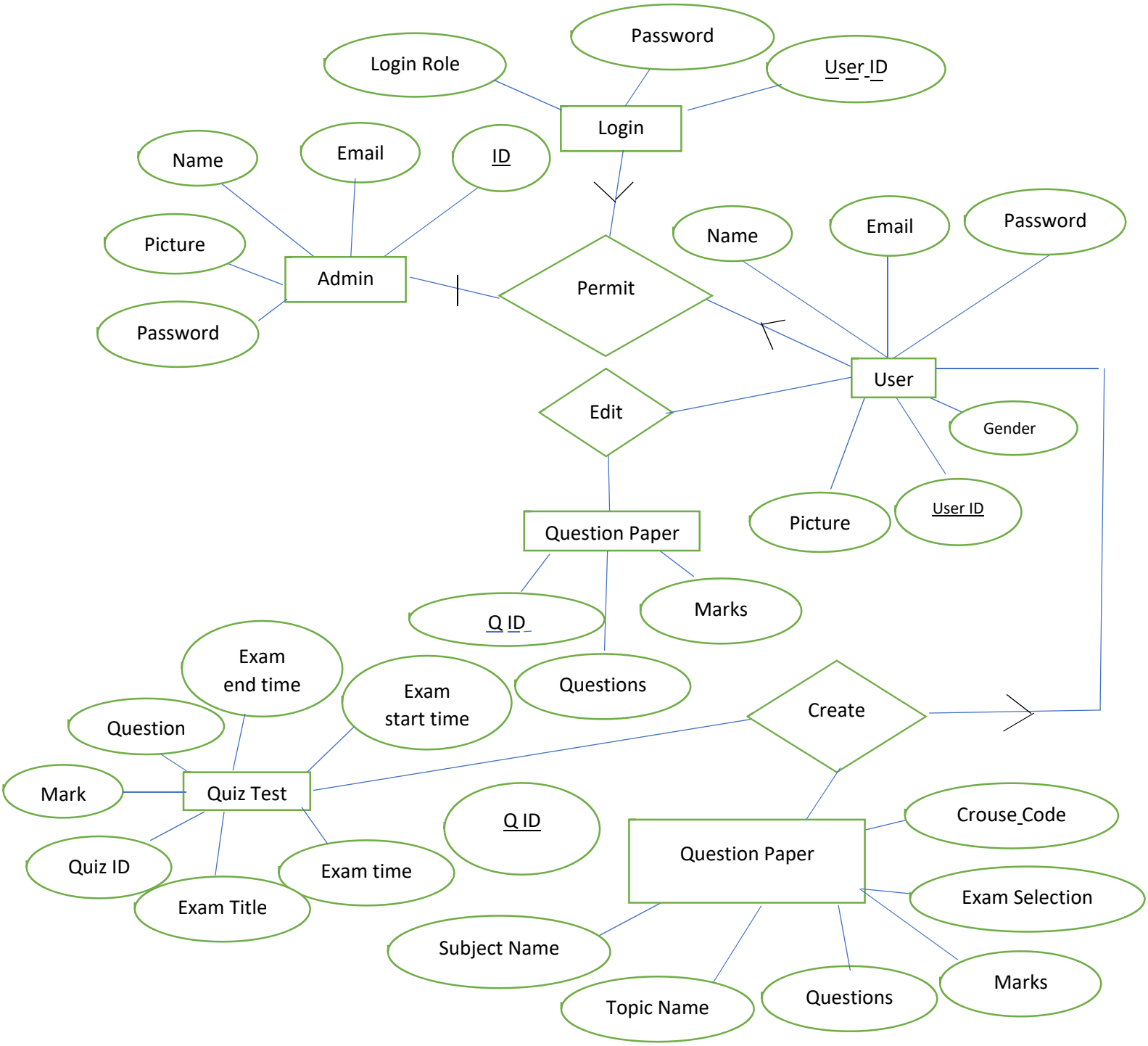


Figure 4.2: ER Diagram of our system

### 4.5: Dataflow Diagram:

A dataflow model is a type of data model that determines the logical structure of a database and fundamentally determines in which manner data can be stored, organized, and manipulated. The most popular example of a database model is the relational model, which uses a table-based format.

In the following figure 4.3 shows the relationship among database tables:

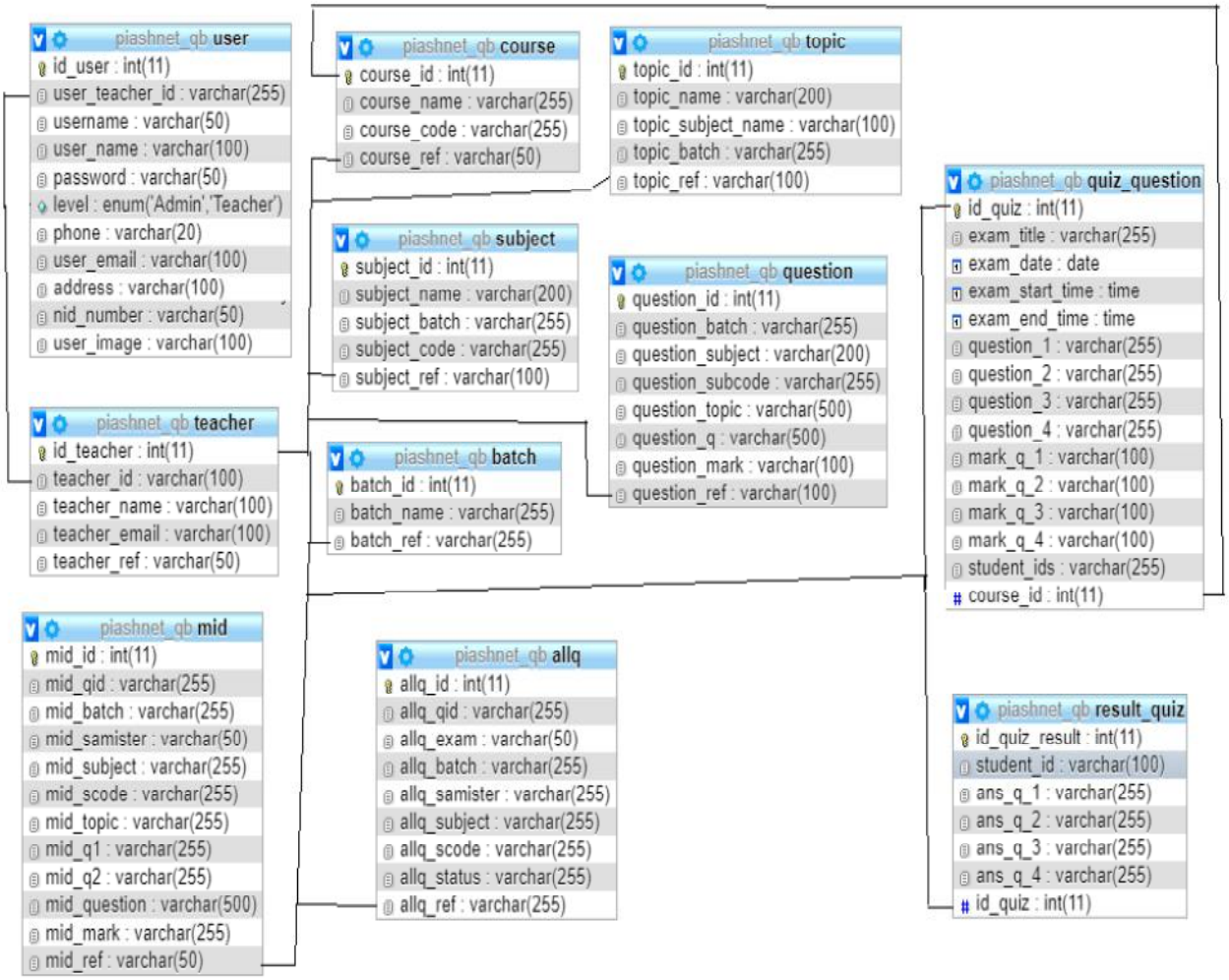


Figure 4.3: Dataflow Diagram

# CHAPTER 5: PROJECT DESCRIPTION

User interface (UI) design isn't just about buttons and menus; it's about the interaction between the user and the application. This means that user interface design isn't about how a product looks, but rather about how it works. In this chapter some screenshot of this application have been presented. The screenshots are presented here as user panel based.

## 5.1: Admin Login Page

Here is our admin login page screenshot. In this form admin and user can login through his/her user name and password.

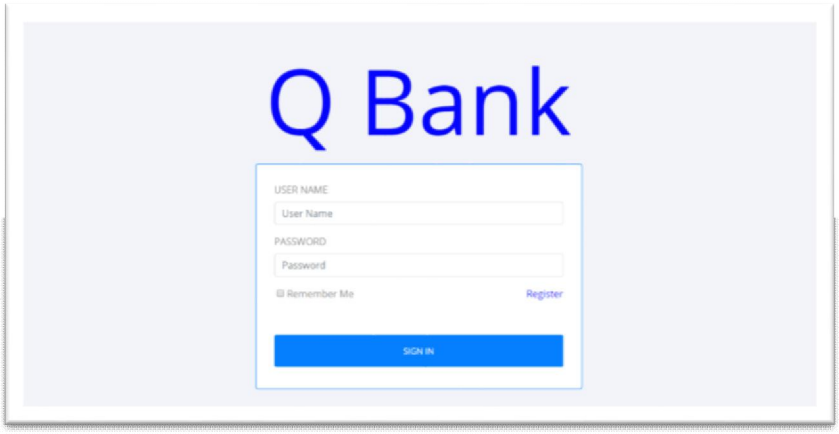


Figure 5.1: Admin login page

## 5.2: Teacher Registration Process

In this tab teacher put their ID. When a new teacher create an account the first step is to check his/her teacher ID.

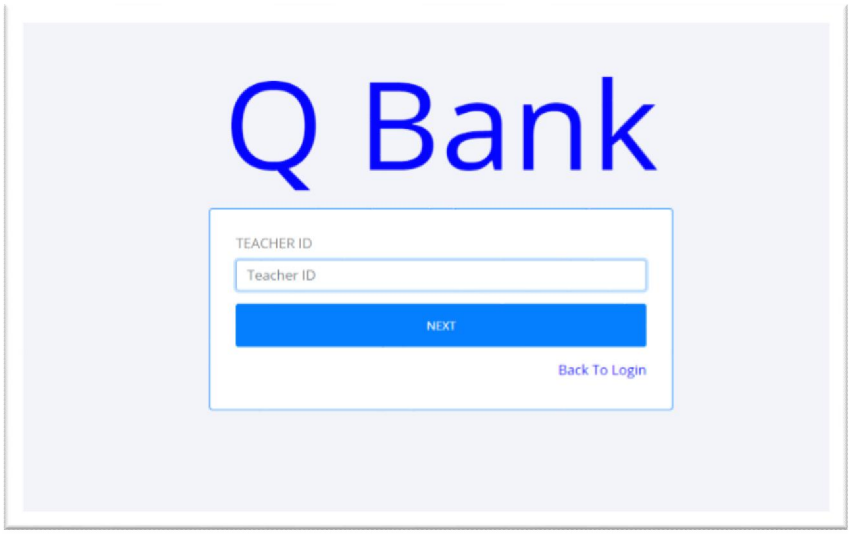


Figure 5.2: Teacher ID Check Form

If teacher ID is match, then second step is fill up the form.

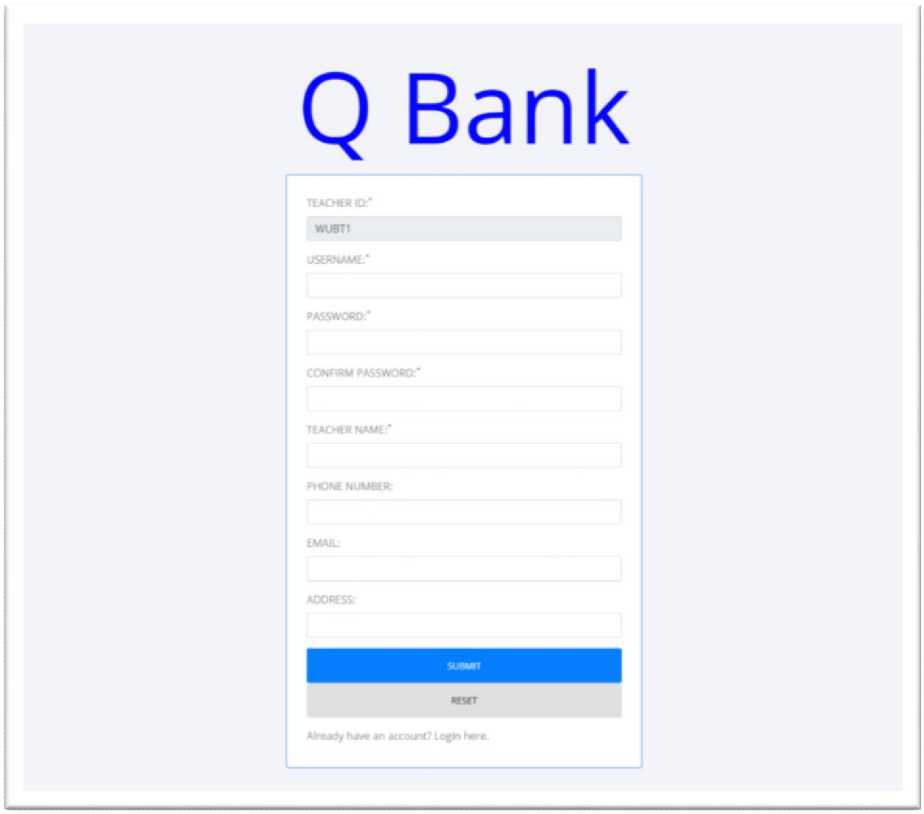


Figure 5.3: Teacher Registration Form

### 5.3: Teacher add form for admin

This is our add teacher ID page screenshot. In this page admin can add the teacher ID here.

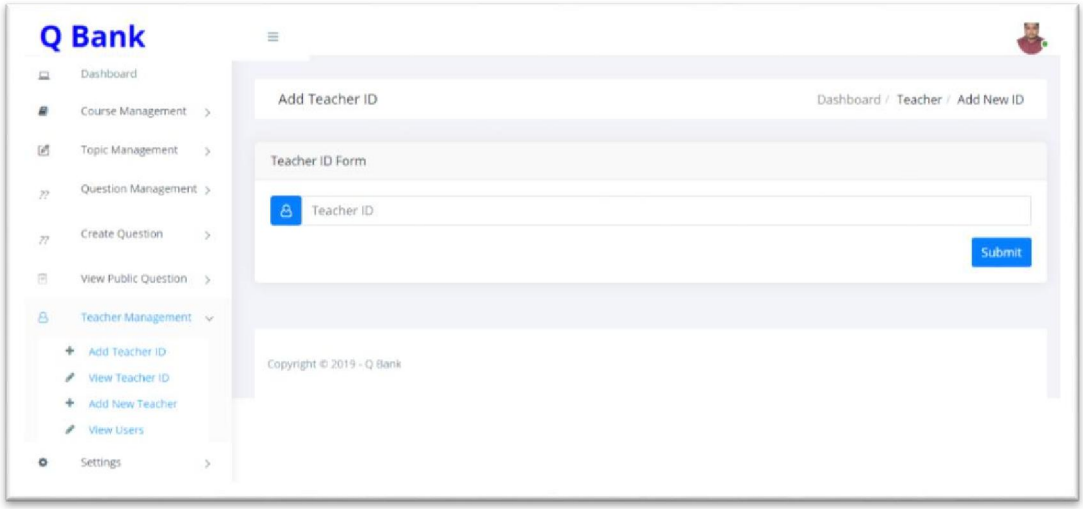


Figure 5.4: Teacher ID insert form

Here admin can also add teacher name and details.

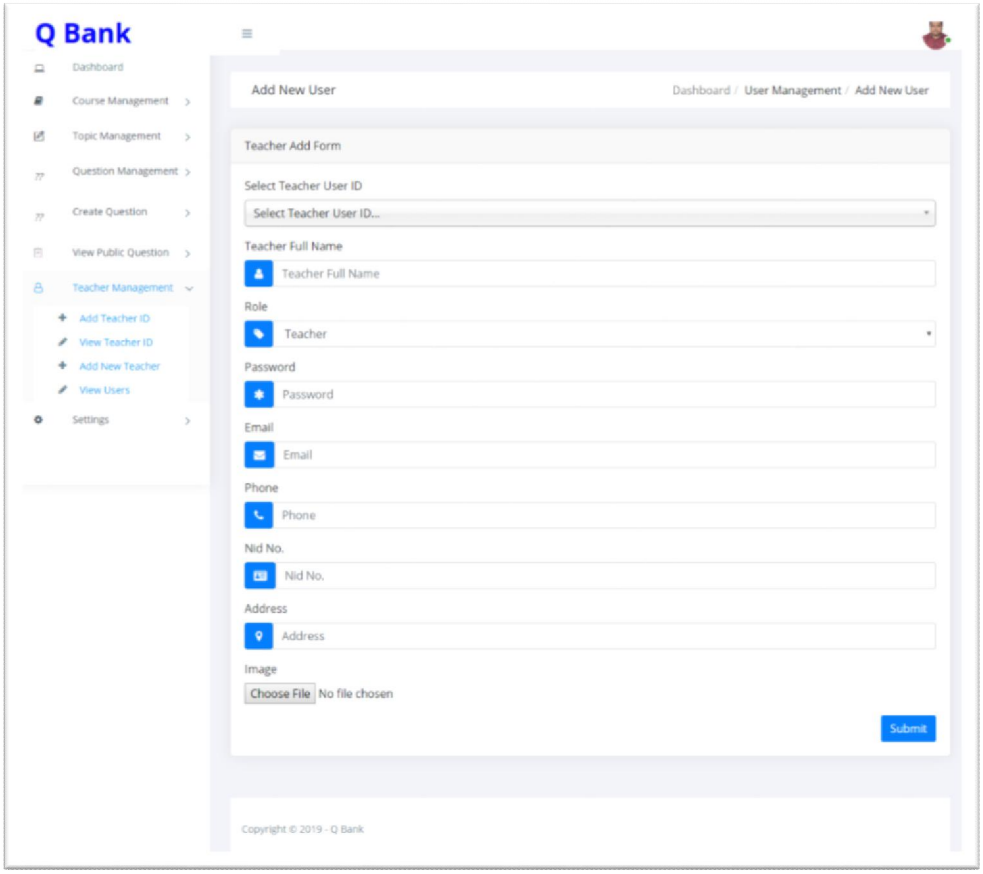


Figure 5.5: Teacher Insert Form for Admin

### 5.4: Add Batch Option

This page teacher can add batch with course name.

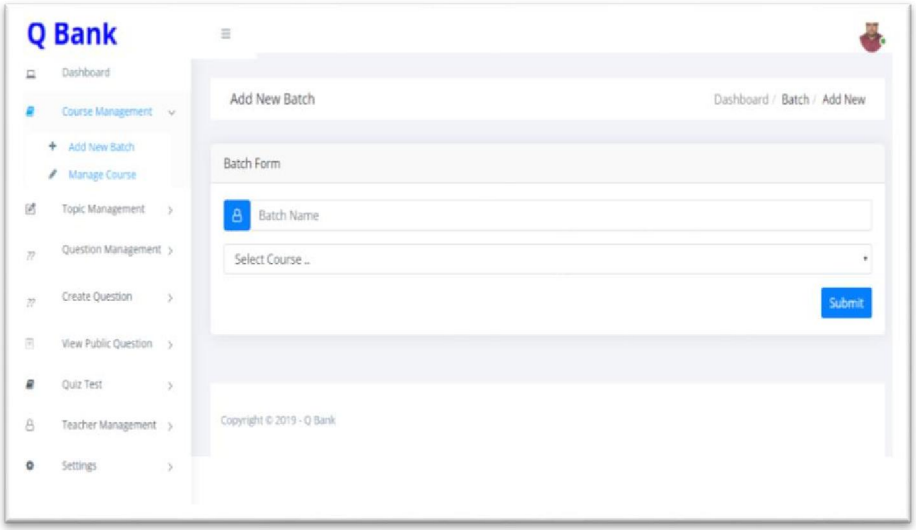


Figure 5.6: Add Batch Form

### 5.5: Add Course and Course Code

This is our course name and course code adding page screenshot. This page is controlled by only admin.

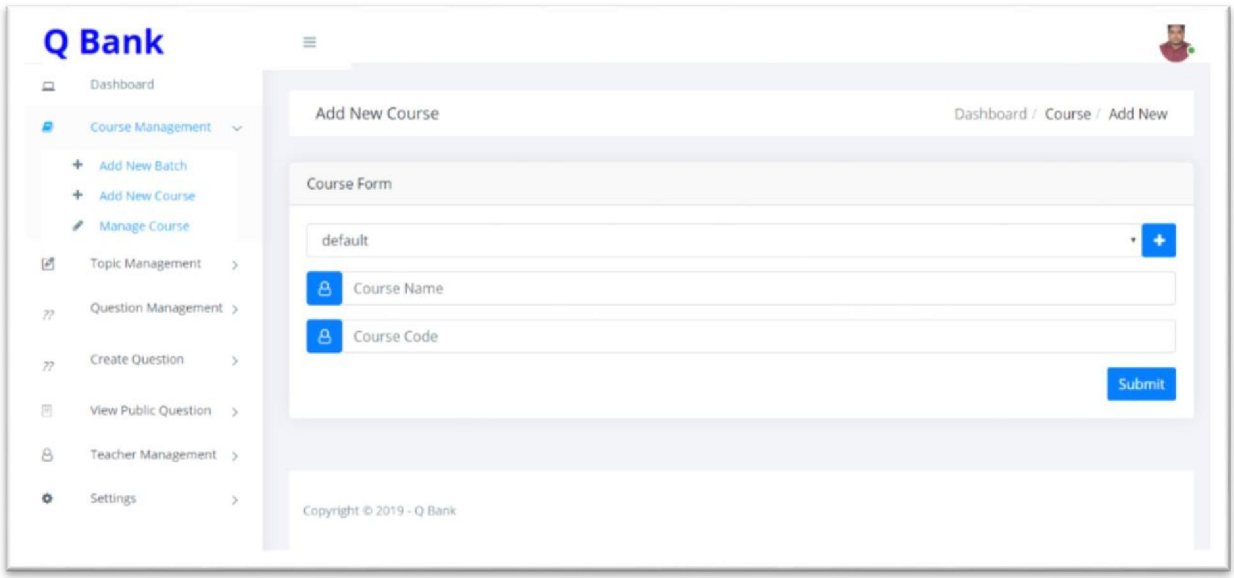


Figure 5.7: Course Insert Form

### 5.6: Topic Management Page

This is our system topic management page. In this page teacher can add topic.

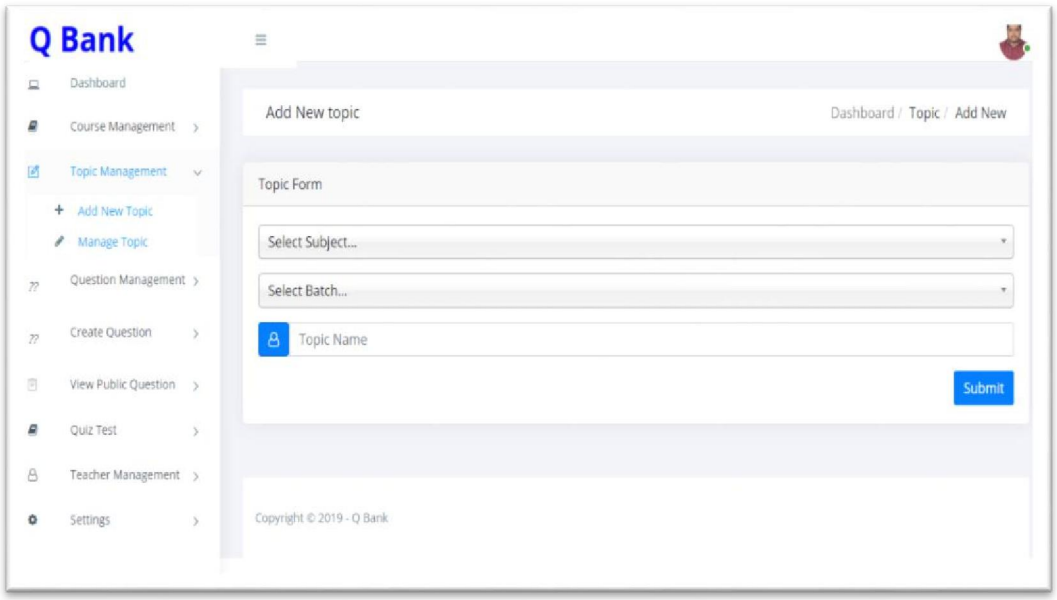


Figure 5.8: Topic Management

### 5.7: Question Management Page

This is our question management page. In this page teacher add topic with marks.

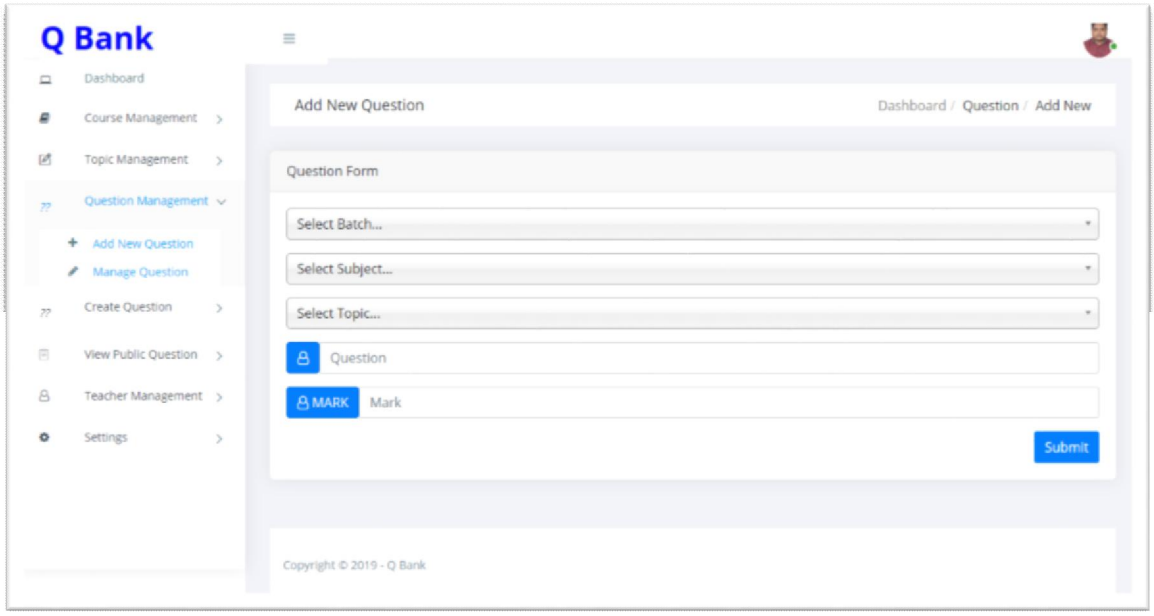


Figure 5.9: Question Insert Form

### 5.8: Create Question Page

This is our question creation page. Here teacher can create question for student. First teacher selects exam type midterm or final exam. Then teacher select subject and batch after selecting both, system show the topic selection box and mark input box. Teacher just select topic and give mark system will create question according to compression database mark and given mark.

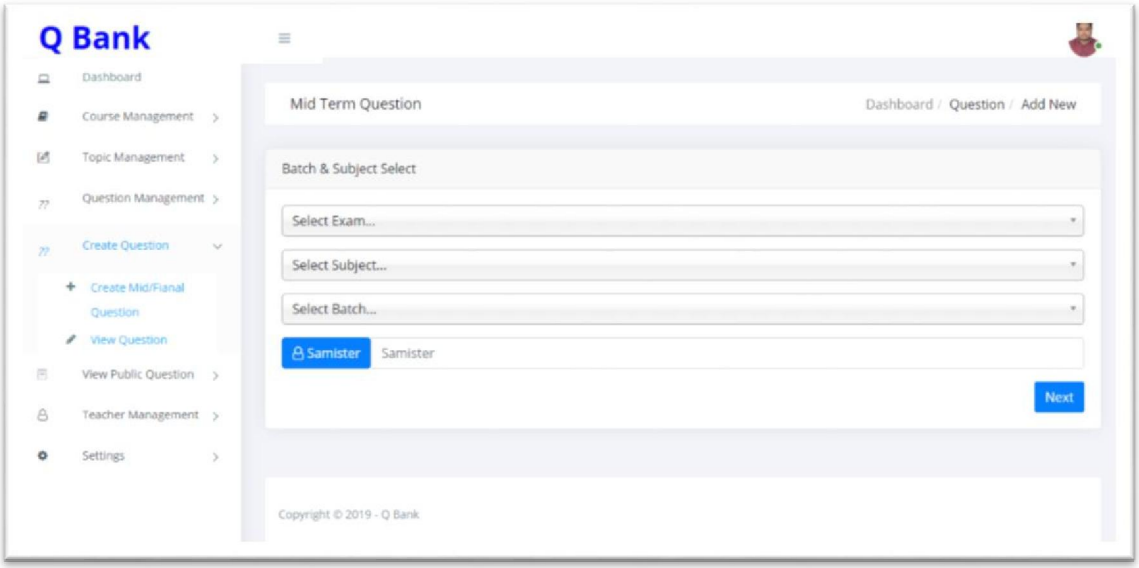


Figure 5.10: Question Creation Form

### 5.9: Question Paper Layout

This is a printout format of sample question paper.

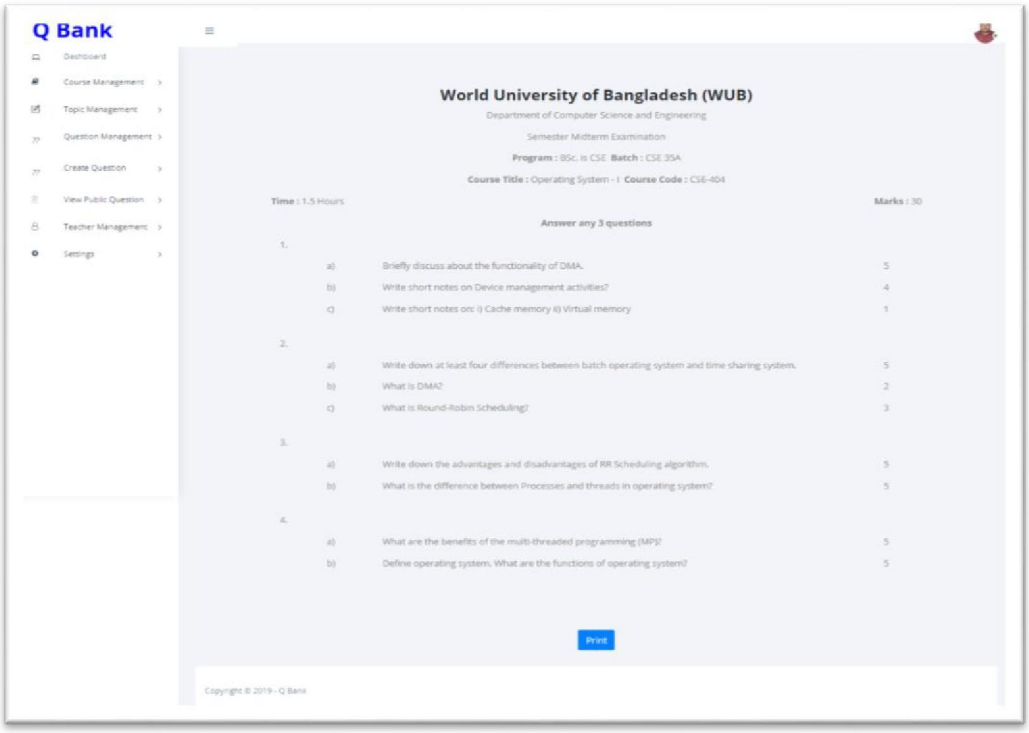


Figure 5.11: Question Paper Layout

### 5.10: Question Paper Edit Layout

In this page teacher can edit the created question paper if they need to any change of question title or mark.

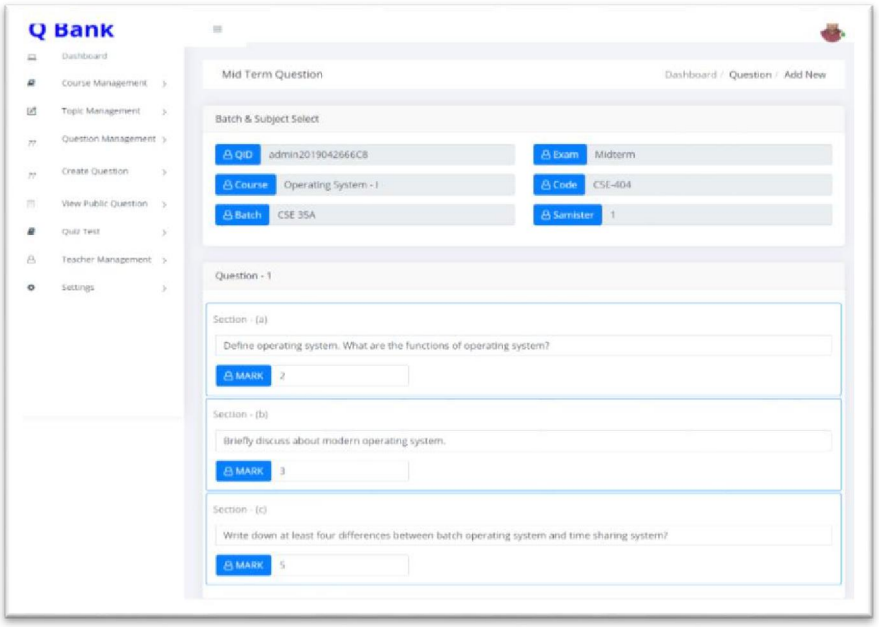


Figure 5.12: Edit Question Paper

### 5.11: Create Quiz Question

In this page teacher can create quiz test question and set the exam time and date. Quiz test time and date will be the key role in this page. Student cannot enter the exam page without date and time matching.

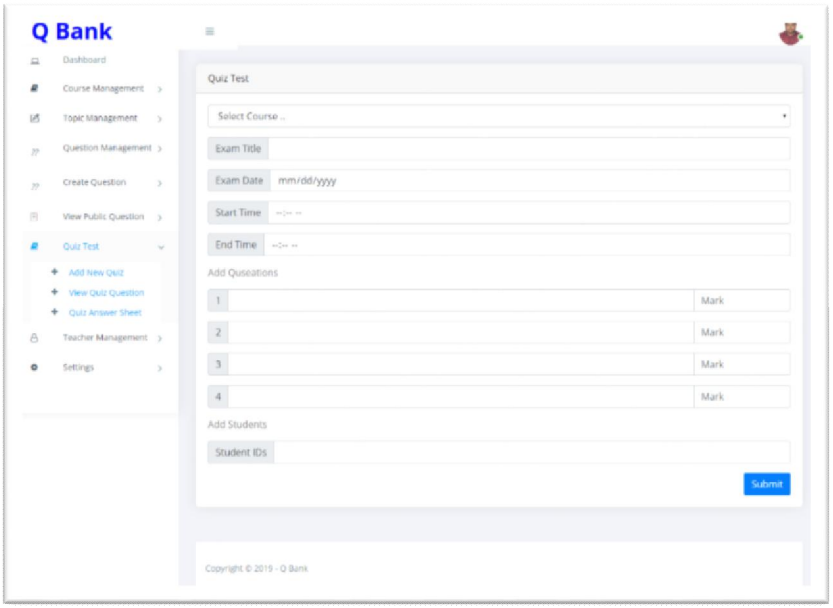


Figure 5.13: Create Quiz Question

### 5.12: Student Login for Quiz Exam

This is our student login page. In this page student start his/her exam for giving student id and course code input.

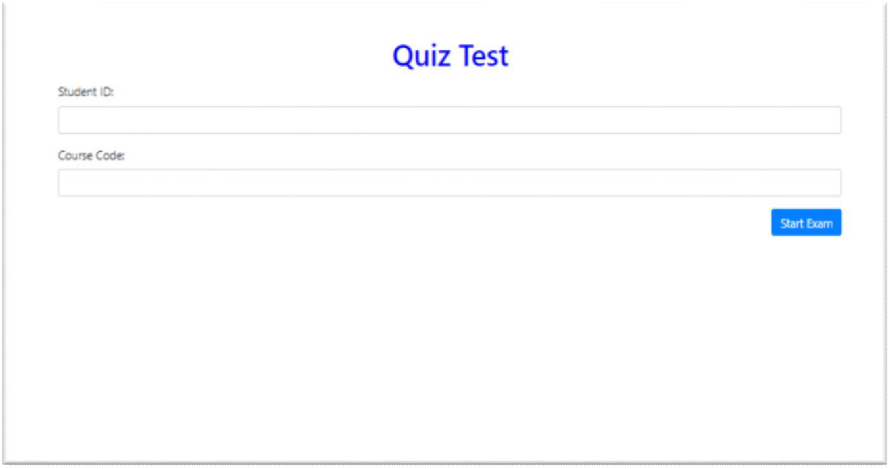


Figure 5.14: Student Login Page

### 5.13: Exam Page

This is our exam page. This page only shows when exam date and time matched otherwise this page not show.

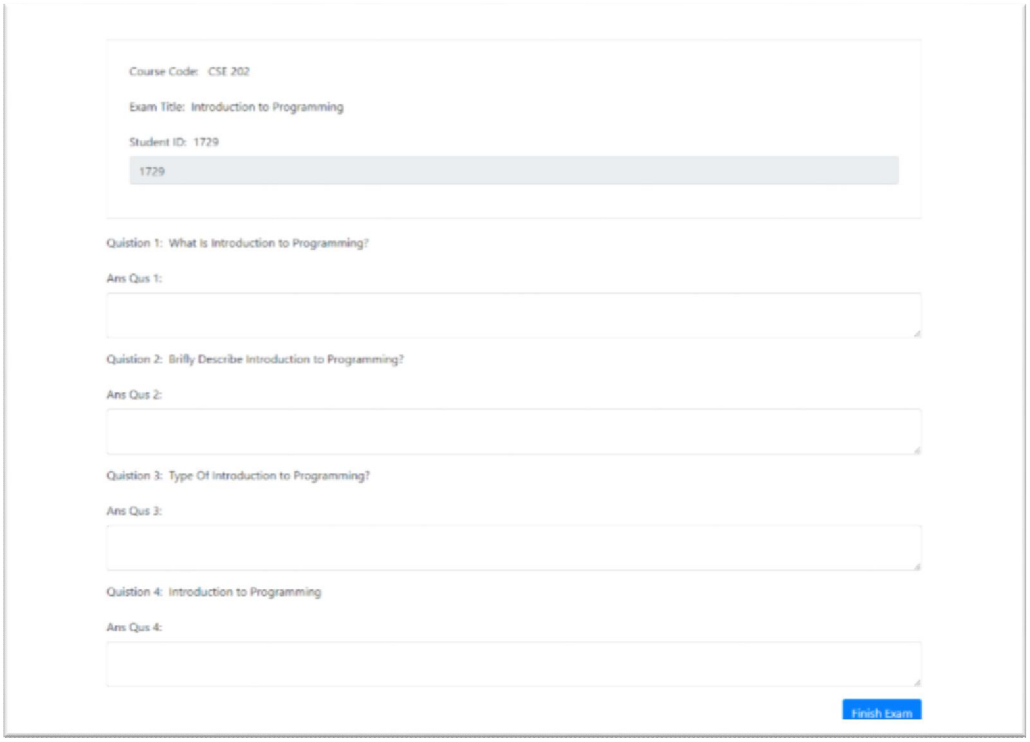


Figure 5.15: Quiz Exam Page

# CHAPTER 6: CONCLUSION

## 6.1: Conclusion

Web applications are becoming so popular day by day. Most of the sector is becoming digitalized in our country. So our educational sector should be digitalized. The government should focus on this sector. The process of making such kind of system is not so easy. So it wasn't easy to design & developed the whole system. It needs considerable amount of time and effort to design and developed the system correctly. As well as we need concern about such kind of practical problem and that's systematically solution.

The system has been built with proper validation and tested as many times. We were very careful and always focus on our goals and how to succeed to the target and goals. We are successful in building a question papers and online based quiz test using this system with the exception of manual process. The project has been developed with as much as devotion as possible. We are so hopeful about success of this project.

## 6.2: Limitations

1. Adding multiple topics in creating question section are not possible.
2. Adding figure in question paper are not possible.

## 6.3: Future Works

The project has been done doesn't mean that it's finished. It's just a start of this project. For getting better service from this web application, many updated issues can be occurred.

1. Currently we are not able to add multiple topic in creating question paper. We will try it in future.
2. Currently we are not able add figure in question paper. We will try it in future.
3. In future you add the MCQ exam in this system.

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