# IMPLEMENTATION OF BLOOM'S TAXONOMY FOR ACADEMIC EVALUATION

 $\mathbf{BY}$ 

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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### **APPROVAL**

This Project titled "Implementation of Bloom's Taxonomy for Academic Evaluation", submitted by Fahim Hasan Himel to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 25 January, 2024.

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### **DECLARATION**

We hereby declare that, this project has been done by us under the supervision of **Dr. Fizar Ahmed, Associate Professor, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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Finally, I must acknowledge with due respect the constant support and patients of my parents.

### **ABSTRACT**

Aim of this project is to implement Bloom's Taxonomy model on academic evaluation system. Academic evaluation measures the performance of students. It is actually the outcome of a student's learning. It's a traditional process of academic learning process. It's teacher's job to evaluate their students. Teachers can actually see the outcomes of their students. It helps teachers to smoothen their teaching process. Students also learn about their progress. It motivates them to move forward. My aim is to smoothen this evaluating process by implementing Bloom's Taxonomy model. Educators can effortlessly formulate exam questions in alignment with the Bloom's Taxonomy structure. They are also responsible for grading the exams. Students have access to their exam outcomes through the system and can observe their individual progress. Additionally, administrators have the authority to oversee and regulate the system's settings. The development of this project is followed by the agile methodology. This facilitated ongoing input, iterative enhancements, and effective risk handling throughout the project duration.

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### **CHAPTER 1**

### INTRODUCTION

### 1.1 Introduction

The Bloom's Taxonomy model categorizes learning goals using appropriate verbs, arranging educational objectives by their complexity levels. Crafted by Benjamin Bloom, an esteemed American psychiatrist known for his substantial impact on talent development and learning mastery in education, this taxonomy comprises six tiers, each representing distinct cognitive abilities or levels of comprehension. These are: Remember, Understand, Apply, Analyze, Evaluate and Create.

If we can implement this model on our traditional evaluating system, we will see benefits of it. Monitoring level of the teachers would be very high. They can communicate with their students in a much better way which will be very beneficial in this educational journey. Students will be more focused in their learning process. It will help them to achieve their targets and increase their hunger of knowledge. Teacher will also be more helpful and focused for their students.

### 1.2 Motivation

As a student, I feel that learning has no bound. But in this deep sea of knowledge, a student can find themselves less focused if they are not aware of their lacking and skills. My aim is to boost up this knowledge process into next level. I believe, if we can implement the Bloom's Taxonomy Model in our early stage of education, it will boost the learning process of the students.

## 1.3 Objectives

- Understand the principles and hierarchy of Bloom's Taxonomy.
- Integrate Bloom's Taxonomy into assessment strategies across curriculum areas.
- Evaluate the impact of Bloom's Taxonomy on enhancing learning outcomes.
- Build a simple web-based evaluation system with a mobile app for implementing the model.
- User-friendly system for the students and the teachers.

### **1.4 Expected Outcome**

1. **Encouragement of the students:** This new method will encourage the students to dive deep into the ocean of knowledge. It will help them to gain their hunger of knowledge.

2. **Gaining of Practical Knowledge:** It will help the students to try to develop their interest of practical knowledge.

3. **Pressure less education**: Many students in our country still find reading as a boring task. This new method will increase their interest of learning new thing. Thus it can lessen the pressure of the students.

4. **Improvement of Teaching method:** It will improve the traditional teaching method.

5. **Strong Communication Between the Teachers and Students:** This new method will increase the engagement of the teachers with their students.

### 1.5 Report Layout

### **Chapter 1: Introduction**

This section delves into the project's driving force, articulates its goals, and emphasizes the expected results. Moreover, the layout of the report is specified in the final part of this chapter.

### **Chapter 2: Background**

This part investigates the historical background of the project, provides an in-depth analysis of similar work, and compares it with other websites. Additionally, it defines the extent of the problem and elucidates the challenges that the project aims to address.

### **Chapter 3: Requirement Specification**

In this chapter, the project's necessities are addressed, encompassing aspects such as business process modeling, gathering and analyzing requirements, outlining the use case model, developing a logical relational database model, and specifying design requirements.

### **Chapter 4: Design Specification**

In this chapter, the project's design elements are discussed, comprising front-end and back-end designs, interaction design, and user experience (UX). Additionally, it delineates the necessary implementation specifications crucial for the project's successful execution.

### **Chapter 5: Implementation and Testing**

This chapter primarily focuses on front-end designs, interactions, and the implementation of the database. Additionally, it encompasses the execution of tests along with their respective outcomes and reports.

### **Chapter 6: Conclusion and Future Scope**

The final chapter covers the project's conclusion and potential future directions.

### **CHAPTER 2**

### **BACKGROUND**

### 2.1 Introduction

Currently, almost every school has academic evaluation system on web or phone. But it is not common to have Bloom's Taxonomy method in these systems. So, I found it difficult to figure it out first. I tried to build the traditional evaluating system first, then applied on it

.

### 2.2 Related Work

Numerous websites exist like janison.com which are used for academic evaluation. There are some student research paper about evaluating student performance based on Bloom's Taxonomy levels. Some are given below

- Significance of Bloom's Taxonomy for Attainment of Program Outcome (PO) and Course Outcome (CO) in Educational Institute
- Developing students' academic writing skills through the use of Bloom's taxonomy strategies (analysis, synthesis, evaluation)
- STUDENT PERFORMANCE EVALUATION MODEL BASED ON BLOOM'S TAXONOMY USING FUZZY LOGIC

## 2.3 Comparative Studies

Comparative studies play a crucial role in analyzing and understanding the similarities and differences between different entities, such as websites or systems. In the context of a Academic Evaluating website, conducting comparative studies can provide meaningful understandings regarding the strong and weak points of similar existing platforms

Some potential areas of focus for comparative studies in the context of this system could include:

- User Interface and Experience: Analyzing the user interfaces and experiences of existing evaluating systems to identify best practices and user-friendly design elements.
- **Interactive Dashboard**: Comparing the comprehensiveness and quality of interactive dashboard options available on different platforms.

- Communication Platform: Evaluating the effectiveness and convenience of communication features between teachers and students, such as messaging systems or chat functionalities.
- **Proper Calculation of Result:** Assessing the proper calculation for accurate result.
- **Proper Monitoring System**: Establish the proper monitoring system after getting idea by researching.
- **Different panel for Both**: Should have different panel for both teachers and students.

## 2.4 Challenges

Some challenges I have faced given below:

- Lack of Training: Lacking of Training for the teachers.
- **Time-consuming Process:** It's a time consuming process. Teachers have to go through a long process for evaluating and monitoring the students.
- Lack of Information: Difficulty in accessing comprehensive and up-to-date information.
- Communication Barriers: Challenges in effective communication between teachers and students.

### CHAPTER 3

## REQUIREMENT SPECIFICATION

### 3.1 Business Processing Model

A business process model depicts the step-by-step progression of tasks within a particular business procedure. In the context of a house rent website, a simplified representation of the business process model could include the following key steps:

**User Registration**: Users can register on the website by providing their basic information and creating a username and password for both teacher and student.

**School Listing:** Admin can include as many schools as they want.

Class and Section Listing: Admin can enlist as many classes and sections as they want.

**School Selection:** Admin can select any schools and monitor the teachers and students.

**Exam Creation:** Techer can create question for the exam with proper numbering format.

**Exam Evaluation:** Teachers can evaluate also is this system.

**Quick Result:** Students can easily see their result by logging in the system.

**Analysis:** Teachers and students can analysis their weakness and skills because of the Bloom's Taxonomy Model.

### 3.2 System Design

**Architecture Design**: Determine the most suitable system architecture, considering scalability, performance, and future expansion. Consider using a multi-tier architecture with separate layers for presentation, business logic, and data storage.

**User Interface Design**: Create wireframes, mockups, and prototypes to design a visually appealing and user-friendly interface.

**Database Design:** Design a well-structured and normalized database schema to store teacher and student information as well as the exam and result information. Consider using techniques like indexing and data partitioning for efficient data retrieval.

**System Integration**: Identify and plan the integration of API for processing the flow.

### 3.3 System Specification

**Functional Requirements:** Clearly define the desired functionalities of the website, such as user registration and login, student search with advanced filters, result listing submission by teachers, messaging system for communication and administrative features like user management and analytics.

**Non-Functional Requirements:** Specify non-functional requirements such as performance benchmarks (e.g., page load time, response time), scalability (handling increasing user traffic and data), security measures (data encryption, secure authentication), and usability guidelines (user-friendly interface, intuitive workflows).

**System Constraints:** Consider any limitations or constraints, such as budget, technology stack, compliance requirements, or compatibility with existing systems if applicable.

**System Testing:** Define comprehensive testing strategies, including unit testing, integration testing, system testing, and user acceptance testing. Plan for both functional and non-functional testing to ensure the website performs as expected and meets user requirements.

By conducting thorough analysis, designing a well-structured system, and specifying detailed requirements, the house rent website can be developed to provide a reliable, user-friendly, and efficient platform for property search and rental management.

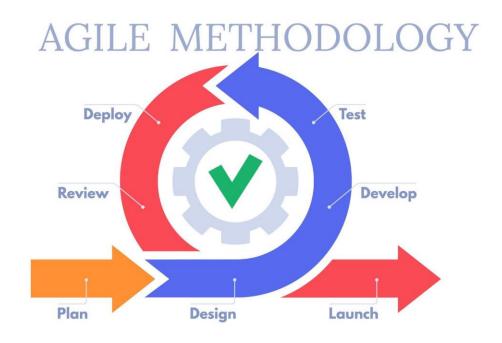


Figure 3.1: Agile Model

### 3.4 Use Case and Diagram

**Admin Use Cases**:

Manage School: Admin can add, update and delete school.

Manage Class: Admin can manage all the classes in school.

**Manage Section:** Admin can manage all the sections in a class.

**Manage Student:** Admin can register and delete students. Admin can also modify the information of the students.

**Manage Teacher:** Admin can register and delete teachers. Admin can also modify the information of the teachers.

Manage Subject: Admin can manage the subjects of the class.

**Manage Career Prospectus:** Admin can manage the career prospectus according to the Bloom's Taxonomy Model.

### **Teacher Use Cases:**

Manage Exam: Teacher can create and manage the exams.

**Question Design**: Teacher can design question for the exam.

**Evaluate Exam:** Teacher can evaluate the exam.

**Monitor Result:** Teacher can monitor the results of the students.

### **Student Use Cases:**

**View Result**: Student can view the result of the exam.

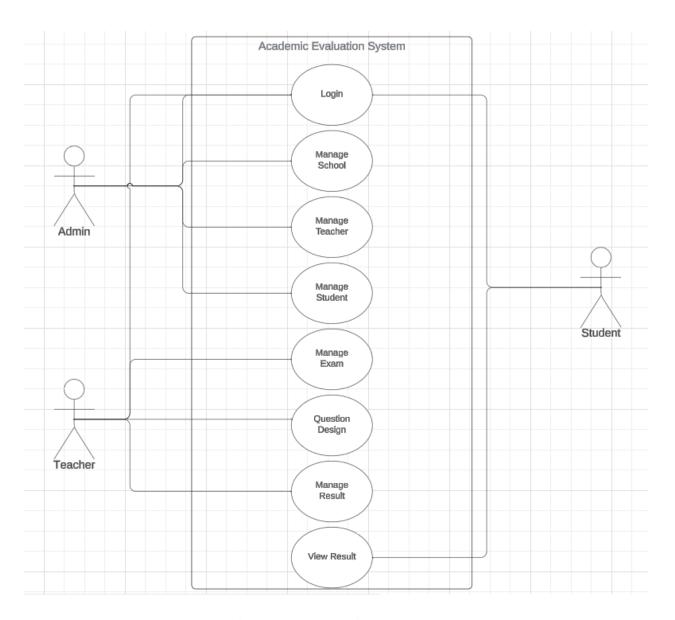


Figure 3.2: Use Case Diagram

## 3.5 ER Diagram

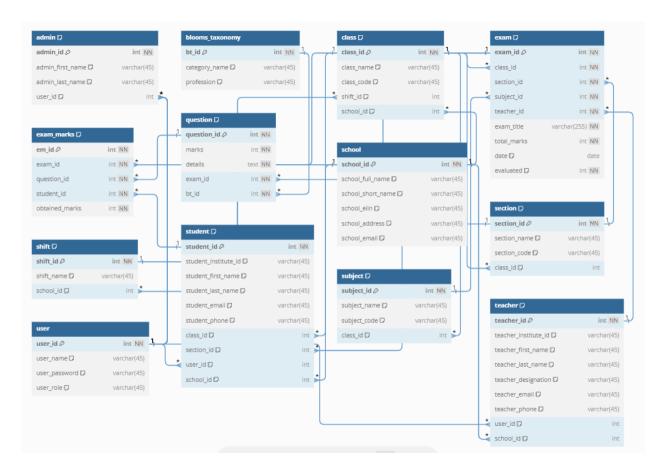


Figure 3.3: ER Diagra

## **CHAPTER 4**

## **DESIGN SPECIFICATION**

## 4.1 Login

## **Academic Evaluation System**





Figure 4.1: Login

### 4.2 Admin Dashboard

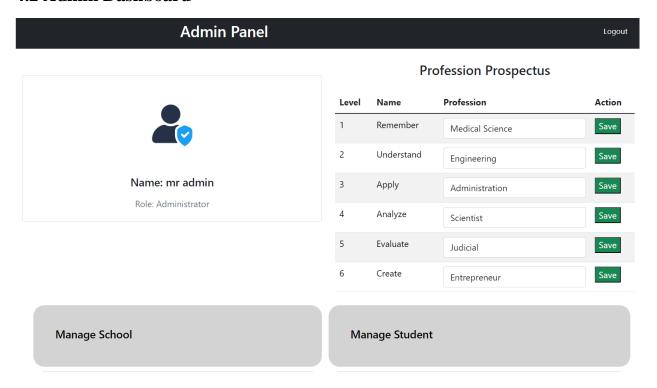


Figure 4.2: Admin Dashboard

## 4.3 Register Student

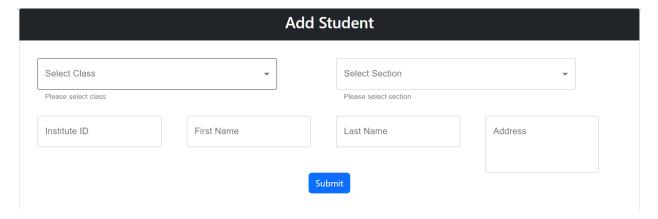


Figure 4.3: Register Student

## **4.4 Register Teacher**

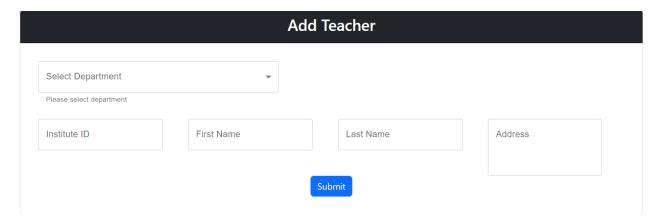


Figure 4.4: Register Teacher

### 4.5 Teacher Dashboard

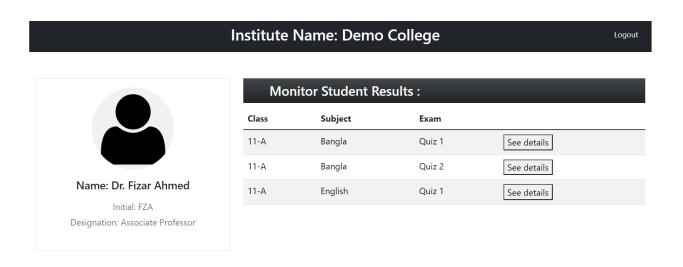


Figure 4.5: Teacher Dashboard 1



Figure 4.6 Teacher Dashboard 2

### 4.6 Student Dashboard

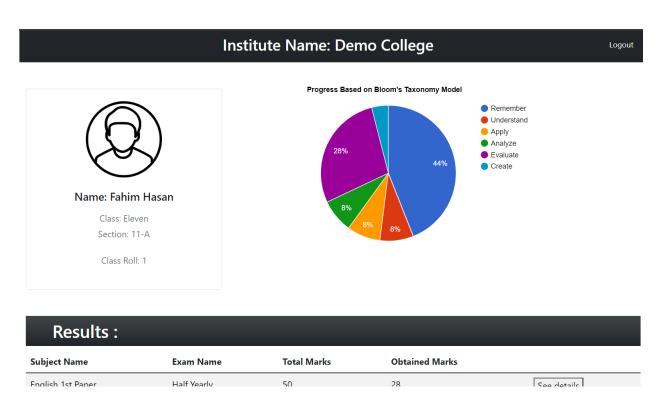


Figure 4.7: Student Dashboard 1

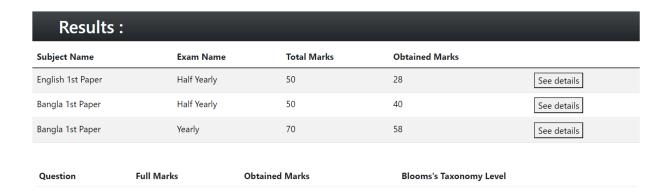


Figure 4.8: Student Dashboard 2

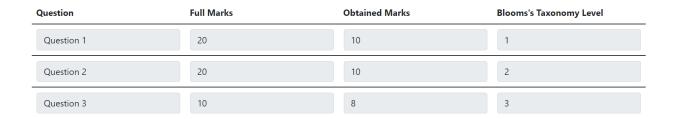


Figure 4.9: Student Dashboard 3

## 4.7 Question Design

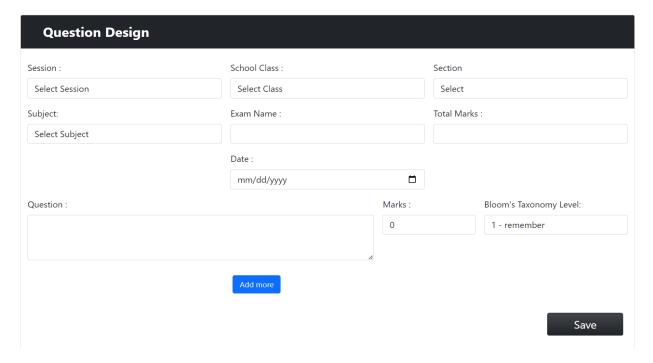


Figure 4.10: Question Design

## 4.8 View Question

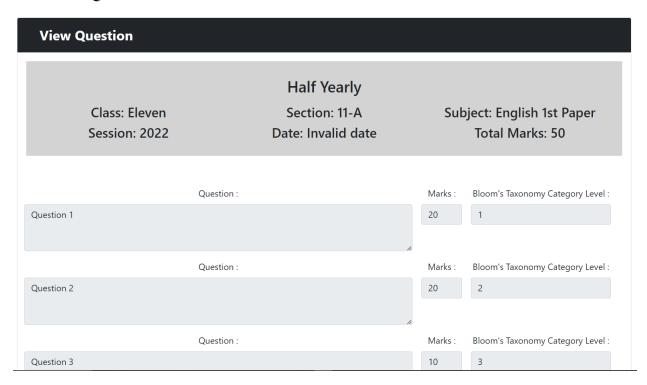


Figure 4.11: View Question

## 4.9 Mark Entry

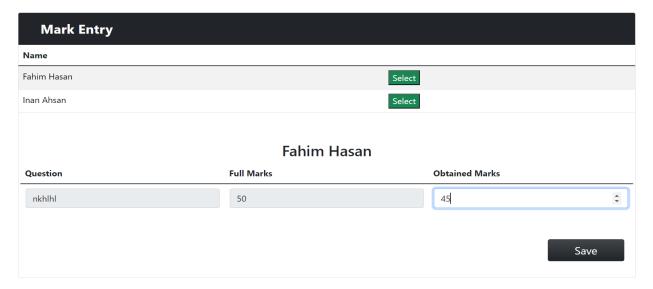


Figure 4.12: Mark Entry

### 4.10 View Result

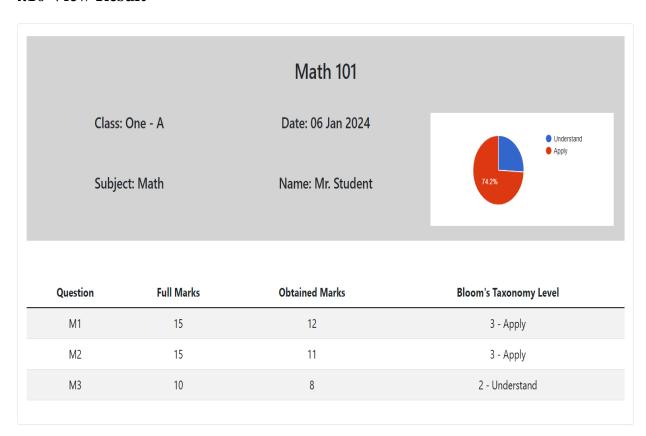


Figure 4.13: View Result

## 4.11 Mobile App Student Dashboard

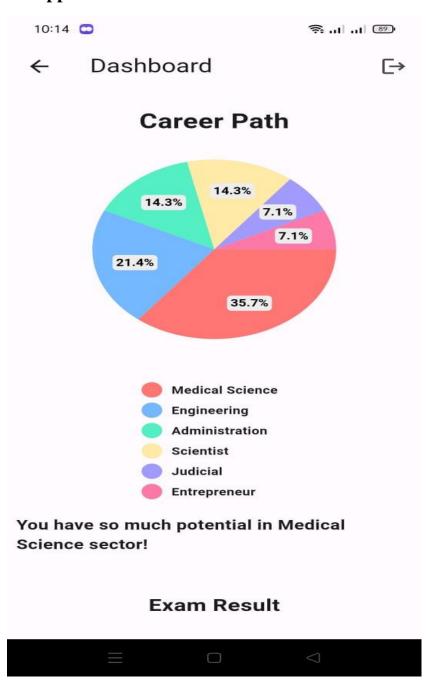


Figure 4.14: Mobile App Student Dashboard 1

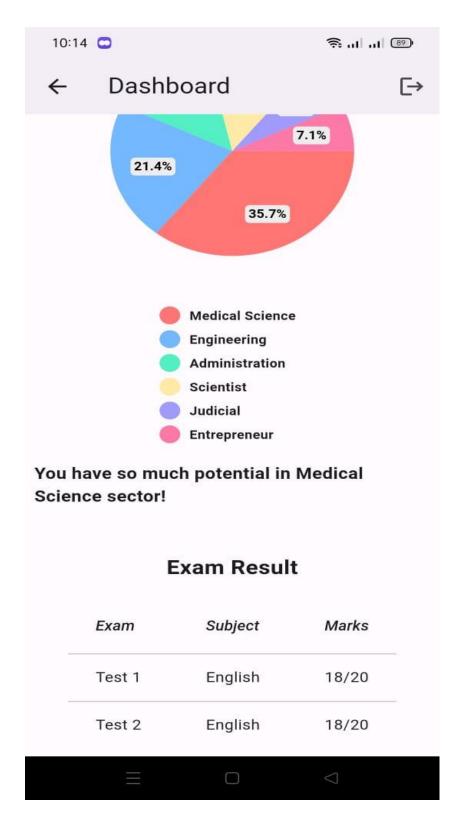


Figure 4.15: Mobile App Student Dashboard 2

### CHAPTER 5

### **IMPLEMENTATION**

### **5.1 Implementation of Database**

In my project, I utilized MySQL to handle the project's data, leveraging the diverse capabilities provided by this database.

### **5.2 MySQL Database**

MySQL stands as a well-known open-source relational database management system created by Oracle Corporation. First, I have planned an ER-Diagram for my project and then built my database according to it.

### 5.3 Back End

I have used NodeJS for the server side. NodeJS is a runtime environment developed in JavaScript. It is a platform that runs JavaScript code beyond the confines of a web browser. It empowers developers to script server-side applications using JavaScript, facilitating the creation of swift and scalable network applications.

### 5.4 Front End

For front end, I have used a popular JavaScript library which is React. It is a JavaScript library employed in constructing user interfaces, enabling the development of dynamic web applications with interactive features by effectively handling the application's view layer. React operates on a component-based structure, simplifying the creation of intricate user interfaces by assembling encapsulated components.

## **5.5 Testing Implementation**

Feature testing enhances an existing system by adding or modifying new functionality. Ensures that the home rental website is useful, reliable, effective and secure. By testing different scenarios, feature testing improves both the user experience and the performance of a web application.

### 5.5.1 To be Tested.

Table 5.1: To be Tested.

Feature	Priority	Description
Log In	1	All users must be authenticated by the login.
Log Out	2	After using, user needs to logout.
Manage School	1	School must be managed by the admin.
Create Exam	1	Exam must be created by the teacher.
Evaluate Exam	1	Exams which are created, must be evaluated by the teacher.

### **5.6 Testing Plan**

### • **Test Approach:** Black-box Testing

- The take a look at approach for the site can involve black-container testing, focusing at the outside behavior and capability without considering the internal code implementation.
- Black-box checking out allows testers to assess the device's capability from a consumer's angle, verifying inputs, outputs, and expected outcomes based on described specifications and necessities.

### • **Test Approach:** Agile Testing

- Adopting an agile trying out approach may be useful for the website improvement.
   Agile trying out emphasizes iterative and incremental improvement, with checking out activities integrated at some stage in the improvement lifecycle.
- Agile checking out allows quick remarks loops, continuous collaboration, and early defect detection, making sure that the evolved features are very well examined and proven in shorter iterations.

## **5.7 Testing Schedule**

Table 5.2: Testing schedule.

Phase	Duration	
Plan create	7 days	
Unit test	During development time	
Component test	During development time	
Integration test	7 days	
User interfaces test	7 days	
Loading testing	7 days	
Performance testing	7 days	
Accessibility testing	7 days	

## **5.8 Testing Environment**

- Hardware: Determine the hardware resources wished for checking out, which includes servers, workstations, gadgets, and community gadget, to replicate the production environment appropriately.
- Software: Install and configure the specified software program components, along with working structures, web servers, databases, browsers, and checking out equipment, to support the testing technique.

- Test Data: Prepare a complete set of check data that covers various situations, consisting of exclusive assets types, condo agreements, user profiles, and transactional records.
- Test Environment Setup: Create separate test environments, such as improvement, staging, and production-like environments, to ensure remoted trying out and prevent interference with stay structures.
- Five. Network Configuration: Configure network settings to mimic actual-global community conditions, which includes bandwidth, latency, and safety protocols, to assess the performance and reliability of the website.
- Security Measures: Implement vital safety features, which includes firewalls, get admission to controls, and encryption, to protect touchy information and make certain compliance with privacy guidelines in the course of testing.
- Test Tools and Frameworks: Set up checking out equipment and frameworks that
  facilitate test case control, check execution, illness monitoring, and overall
  performance monitoring to streamline the testing system.
- Test Automation Infrastructure: Establish an infrastructure for take a look at automation, including take a look at automation frameworks, scripts, and test execution environments, to boom checking out efficiency and insurance.
- Monitoring and Logging: Implement tracking and logging mechanisms to tune gadget conduct, performance metrics, and log occasions for debugging and evaluation functions at some stage in testing.
- Collaboration and Communication: Utilize collaboration and conversation tools
  to facilitate powerful communication amongst testers, developers, and
  stakeholders, ensuring seamless collaboration and difficulty resolution.

• Documentation: Document the testing environment setup, including hardware and software program configurations, community settings, and dependencies, to make sure reproducibility and facilitate expertise transfer.

### **CHAPTER 6**

### CONCLUSION AND FUTURE SCOPE

### **6.1 Discussion and Conclusion**

Finally, it is an internet-primarily based system designed for implementing the Bloom's Taxonomy on Academic Evaluation. Teachers and students in together can take today's education system into the next level. Evolving is necessary in every sector. It will increase the interest of research and practical knowledge of our students. So, my project can be a good solution for this. Regular updates are vital to hold the machine up to date because the challenge progresses, assembly the evolving wishes of users.

### **6.2 Future Scope**

The future scope of my website includes:

- **↓** Implementation of reviews and ratings.
- **♣** Development of a mobile application with advanced features.
- **♣** Bulk entry of students and teachers by admin.
- ♣ Automatic recommended Bloom's Taxonomy Level while designing question.
- **↓** Image upload option in question design module.
- Online examination system.
- Implementation of Advanced search filters.
- ♣ Integration of AI chatbot.

By adding these, my project can continue to evolve and adapt to meet the changing needs of users, improving user experience, functionality.

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## **Plagiarism Report:**

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