

# **Online Exam Portal**

A

Project Report

Submitted for the partial fulfilment

of B.Tech. Degree

in

COMPUTER SCIENCE & ENGINEERING

by

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## **Declaration**

We hereby declare that this submission is our own work and that, to the best of our belief and knowledge, it contains no material previously published or written by another person or material which to a substantial error has been accepted for the award of any degree or diploma of university or other institute of higher learning, except where the acknowledgement has been made in the text. The project has not been submitted by us at any other institute for the requirement of any other degree.

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## **Certificate**

This is to certify that the project report entitled “Online Exam Portal” presented by Kunal Gupta, Raunak Ganju and Ayush Upadhyay in the partial fulfillment for the award of Bachelor of Technology in Computer Science and Engineering, is a record of work carried out by them under my supervision and guidance at the Department of Computer Science and Engineering at Institute of Engineering and Technology, Lucknow.

It is also certified that this project has not been submitted at any other Institute for the award of any other degrees to the best of my knowledge.

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## **Acknowledgement**

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## **Abstract**

In the contemporary educational landscape, there's a significant shift towards online learning methods adopted by educational institutions. Introducing an innovative online quiz application, we present an online Exam Portal designed to facilitate efficient assessment of students' knowledge. This portal streamlines the process of conducting quizzes online, eliminating the need for manual paper grading and saving valuable time. Its primary aim is to comprehensively evaluate candidates through an automated system, providing quick results. This platform offers flexibility for students to participate in quizzes at their convenience, without the requirement of traditional materials like paper and pen.

Suitable for both educational and corporate environments, this platform serves as a valuable tool for practice quizzes, accessible anytime, anywhere via its web-based interface. Notably, geographical location is inconsequential, allowing for global participation. Moreover, the system accommodates simultaneous testing for multiple students and instantly generates results upon completion. Administrators hold the authority to manage quizzes, questions, and categories, ensuring adaptability to diverse contexts. Through this portal, students not only gauge their current proficiency but also have opportunities for continuous improvement in their skills and knowledge.

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# **Chapter 1**

## **Introduction**

### **1.1 Introduction**

Online Exam Portal stands as a dedicated software crafted specifically for the facilitation of Online Quizzes, meticulously adhering to predefined time constraints. To access the portal, users are required to input their unique username and password, securely stored within the database. Before commencement of each Quiz session, a set of rules and regulations are presented to the participants, outlining crucial details such as the allotted time frame, the number of questions to be tackled, and the scoring methodology employed. Once the Quiz commences, participants are presented with a series of questions categorized under various disciplines such as General Knowledge, Verbal Reasoning, and Computer Science, each accompanied by four options for selection. Should the stipulated time elapse or upon the user's submission, the Quiz automatically concludes. The final score attained by the participant is promptly displayed and seamlessly integrated into the database alongside the respective username for comprehensive record-keeping and analysis.

### **1.2 Objective**

1. This platform streamlines knowledge assessment for users, minimizing the need for cumbersome paperwork.
2. Educational institutions benefit from the flexibility of conducting exams asynchronously, catering to diverse schedules and needs.
3. Upon exam completion, results are conveniently showcased through a user-friendly dashboard interface.

### **1.3 Motivation**

The rationale behind undertaking the project on Code Readability stems from the following key points:

**Time Saving:** The project necessitates minimal investment as it operates as an online service, offering predictions and suggestions on related information. There's no time wasted on physical logistics like travel or paper preparation, distribution, and manual administration to students.



**Convenience:** The platform is designed with user-friendliness in mind. It requires basic information input from users, granting them immediate access to the application .

**Importance:** Online examinations offer a blend of flexibility and security to the examination process. By uploading all questions into the system, the platform can randomize and present questions in varying orders to different students, significantly reducing the risk of cheating and ensuring a fair assessment environment.

#### **1.4 Scope**

- Stored Repository of exams
- Auto grading
- Flexible
- Time Saver
- Security
- Develop a system which allows the faculty to create, modify and store questions which can be grouped together to form sections and these sections can be grouped together to form/ examinations.

## **Chapter 2**

### **Literature Review**

**Design and implementation of an online self-training system for the Computer System Platform course. Published in: Advanced Computational Intelligence (ICACI), 2012 IEEE Fifth International Conference.in paragraph.**

In the proceedings of the 33rd Annual Frontiers in Education Conference, Z. M. Yuan, L. Zhang et al. introduced a novel web-based online examination system specifically designed for computer science education. This system aims to enhance the assessment process by leveraging web technologies to provide a flexible, scalable, and secure platform for administering exams. Key features include automated grading, real-time feedback, and support for a variety of question types, which collectively improve both the efficiency and effectiveness of the examination process in computer science courses.

**Literature Survey : Application architecture patterns, Data management, External API and Service Discovery in paragraph.**

The literature survey covers several critical areas essential for modern software development, including application architecture patterns, data management, external API integration, and service discovery. Application architecture patterns, such as microservices, serverless, and monolithic architectures, provide structured solutions to common design problems, each with its own advantages and trade-offs regarding scalability, maintainability, and deployment complexity. Data management focuses on efficient storage, retrieval, and manipulation of data, leveraging both relational databases and NoSQL solutions to meet varying requirements for performance and consistency. The integration of external APIs is crucial for extending functionality and interoperability, enabling applications to communicate and leverage services from third-party providers seamlessly. Finally, service discovery is a key component in dynamic and distributed systems, facilitating the automatic detection of services within a network to ensure efficient routing and load balancing. Collectively, these areas form the foundation for building robust, scalable, and efficient software systems in today's interconnected digital landscape.

**Mohammad A Sarrayrih<sup>1</sup>, Mohammed Ilyas (2013), "Challenges of Online Exam, Performances and Problems for Online University Examination". in paragraphs.**

In their 2013 study, "Challenges of Online Exam, Performances and Problems for Online University Examination," Mohammad A. Sarrayrih Mohammed Ilyas et al. Introduced the various obstacles associated with implementing online examinations in universities. The paper identifies several critical challenges, including technical issues like internet connectivity, software reliability, and system security, which can significantly affect the performance and integrity of online exams. Additionally, the

authors discuss the problems related to academic dishonesty, highlighting the difficulty of preventing cheating in a remote testing environment. They also examine the impact of these challenges on student performance, noting that technical glitches and the unfamiliarity of online platforms can cause anxiety and affect test outcomes. The study emphasizes the need for robust technical infrastructure, effective proctoring solutions, and user-friendly interfaces to mitigate these challenges and enhance the overall effectiveness of online university examinations.

**F. Andrew, Darren Pullen and Colleen Harper (2009). "Case study of a computer based examination system" Australian Journal of Educational Technology, 25(4), 509- 523.10, page 125-135.**

In their 2009 paper, "Case Study of a Computer-Based Examination System," published in the Australian Journal of Educational Technology (25(4), 509-523), F. Andrew, Darren Pullen et al. delve into the implementation and evaluation of a computer-based examination system in an educational setting. The study, spanning pages 125-135, investigates the practical application of such a system, highlighting both its advantages and challenges. The authors find that computer-based exams offer numerous benefits, including improved efficiency in exam administration, immediate feedback for students, and enhanced data management capabilities. However, they also identify several challenges, such as technical difficulties, the need for robust IT support, and the importance of ensuring equitable access for all students. Through this case study, the authors demonstrate that while computer-based examination systems can significantly streamline the assessment process, careful planning and consideration of potential pitfalls are essential for successful implementation.

**Ayo, CK Akinyemi, IO Adebisi, AA & Ekong, U O 2007, "The prospects of e-examination implementation in Nigeria", Turkish Online Journal. in paragraph**

In their 2007 article, "The Prospects of E-Examination Implementation in Nigeria," published in the Turkish Online Journal, Ayo, CK, Akinyemi, IO, Adebisi, AA, and Ekong, UO explore the potential and challenges of adopting electronic examination systems in the Nigerian educational landscape. The authors discuss the numerous advantages of e-examinations, such as increased efficiency, reduced administrative costs, and the ability to provide immediate feedback to students. They also highlight the potential for improved security and reduced incidences of exam malpractice. However, the study points out significant challenges, including the need for substantial investment in technological infrastructure, the digital divide among students, and resistance to change from traditional examination methods. The authors emphasize the importance of strategic planning, stakeholder engagement, and gradual implementation to realize the full benefits of e-examinations in Nigeria. Their findings suggest that, despite the challenges, the prospects for e-examination implementation are promising with the right approach and resources.

**Qiao-fang Zhao and Yong-fei Li:** They have contributed significantly to the development of online examination systems. Their research, presented in the Proceedings of the 2nd International Conference on Computer and Information Application, outlines the necessity and benefits of separating teaching and testing through the implementation of web-based examination systems. By leveraging Java Web technologies, the authors developed a system that facilitates question management, paper generation, and online testing, thereby providing valuable support for educators and students alike. Their work underscores the importance of utilizing a combination of client-side and server-side programming techniques to create efficient and user-friendly online examination platforms.

## **Chapter 3**

### **Methodology**

#### **3.1 Application Architecture Patterns**

This chapter includes the details about my application architecture patterns. Here I am using three-tier architecture for developing full-stack applications.

##### **3.1.1 Three-Tier Architecture**

The three-tier architecture is a well-established framework for structuring software applications, widely employed in traditional client-server systems. It organizes applications into three logical and physical tiers, each serving a distinct purpose:

**The three tier is –**

##### **1. Presentation tier (User Interface):**

- This tier focuses on presenting information to users and gathering input from them.
- It includes components such as graphical user interfaces (GUIs) or other user interaction elements.
- The primary goal of the presentation tier is to ensure a seamless and intuitive user experience.

##### **2. Application tier:**

- Positioned as the middle tier, the application tier executes business logic and processes data.
- It handles tasks like data validation, implementing business rules, and interfacing with external services or databases.
- This tier acts as a mediator between the presentation and data tiers, managing the flow of information and business processes.

##### **3. Data tier:**

- At the base of the architecture, the data tier is responsible for storing and managing application data.

- It encompasses databases, file systems, or other storage mechanisms used for data persistence.
- The data tier guarantees data integrity, security, and efficient retrieval and manipulation of stored information.

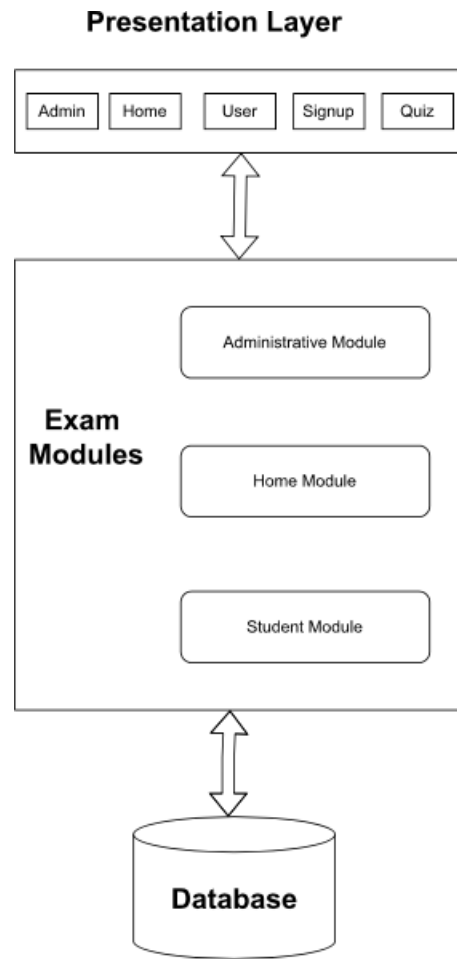


Figure 3.1: Three Tier Architecture

### Advantages

The primary advantage of the three-tier architecture lies in its systematic division of functionality, offering several benefits:

1. **Enhanced security:** The logical and physical separation between the presentation and data tiers mitigates security risks. With direct communication prevented, the application tier acts as an internal firewall, safeguarding against SQL injections and other malicious exploits.

2. **Scalability:** Each tier can be scaled independently as required, offering flexibility in resource allocation. This scalability ensures that resources can be allocated to specific tiers based on demand, optimizing performance, and accommodating varying workload requirements.
3. **Accelerated development:** The division of functionality enables parallel development by different teams, expediting the development process. This approach allows organizations to bring applications to market more swiftly. Additionally, developers can utilize the most advanced and suitable languages and tools for each tier, enhancing overall efficiency and quality.

## **3.2 Online quiz portal background**

This is a pioneering concept emerging from the realms of software engineering and computer science, leveraging advancements in computing technologies to facilitate skill development. Serving as a web application, E-Pariksha enhances the accessibility of remote students, enabling them to participate in examinations remotely. In today's digital landscape, numerous organizations globally conduct online exams with remarkable success, delivering results promptly through online platforms. While online examinations offer several advantages, such as the ability to evaluate remote candidates and automate assessments for multiple-choice questions, they also present certain drawbacks. One significant advantage is the automation of evaluations, particularly for multiple-choice questions, streamlining the grading process. However, a notable disadvantage is the lack of foolproof methods to verify the identity of exam takers, posing challenges in ensuring exam integrity and preventing impersonation.

## **3.3 Tools And Technologies Used**

### **3.3.1 Angular**

This is a comprehensive platform and framework designed for building single-page client applications. It utilizes HTML, CSS, JavaScript, and TypeScript, implementing essential functionalities as TypeScript libraries imported into applications.

### **3.3.2 Virtual-DOM**

Virtual-DOM is a JavaScript object containing all the necessary information to construct a DOM. When data changes occur, it calculates the differences between the virtual object and the actual DOM tree, optimizing rendering performance. It effectively manages client data.

### **3.3.3 Component**

Angular components, a subset of directives, are always associated with a template. Unlike other directives, only one component can be instantiated per element in a template. Components must belong to an Ng Module to be accessible to other components or applications. They handle HTML tag creation and exhibit Virtual-DOM processing capabilities, ensuring immediate updates upon data changes.

### **3.3.4 Java**

Java, an object-oriented programming language, prioritizes high abstraction and minimal implementation dependencies. Widely regarded as fast, secure, and reliable, Java serves as the core programming language for Jocasta's projects, leveraging Java frameworks and modules for software development.

### **3.3.5 Spring Boot**

Spring Boot simplifies the construction of self-contained, production-ready Spring-based applications. It offers streamlined configuration and unbiased support for the Spring platform and third-party libraries, enabling rapid project initiation. Most Spring Boot applications require minimal Spring configuration.

### **3.3.6 MVC**

The Model-View-Controller (MVC) architectural pattern divides an application into three logical components: Model, View, and Controller. Each component handles specific development aspects, contributing to scalable and extensible projects. MVC is a widely adopted industry-standard framework for web development.

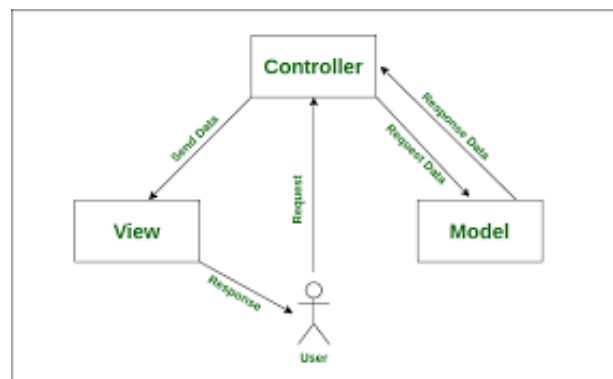


Figure 3.2 : Model-View-Controller



**Model:** Represents the data-related logic of the application, managing data transfer between the View and Controller or implementing business logic. For example, a customer object retrieves, manipulates, and updates data from the database.

**View:** Manages the UI logic of the application, including user interface components such as text boxes and dropdowns. For instance, the Customer view comprises UI elements that users interact with.

**Controllers:** Act as intermediaries between the Model and View components, processing business logic and incoming requests. They manipulate data using the Model component and interact with Views to render the final output. For example, the Customer controller handles interactions and inputs from the Customer View, updating the database using the Customer Model.

### **3.4 Database**

**MySQL:** It stands as the most widely embraced open-source database globally, owing to its robust support for diverse application development requirements. Within MySQL, users can harness a plethora of features, including stored procedures, triggers, functions, views, cursors, and ANSI-standard SQL, among others. One of MySQL's standout features lies in its unique storage-engine architecture, empowering database professionals to tailor the MySQL database server to suit specific application needs. This customization capability results in remarkable performance enhancements, as the database server can be optimized precisely for the demands of individual applications.

This Chapter explains the design aspect of the Online portal along with the implementation of the project along with the complex architecture of the system.

### **3.5 Design**

This section delves into the design phase of the Software Development Life Cycle (SDLC), encompassing various diagrams and the architectural framework of the Online portal.

#### **3.5.1 Decomposition diagram**

A decomposition diagram illustrates the breakdown of a complex entity, such as a process or organization, into lower-level components. It aids in understanding intricate processes by delineating them into simpler units or tasks. Currently, the decomposition diagram includes the allocation of quiz maker responses to the Admin.

**Function of Decomposition Diagram:** Functional decomposition facilitates the comprehension of a large process by breaking it down into smaller, manageable tasks or units.

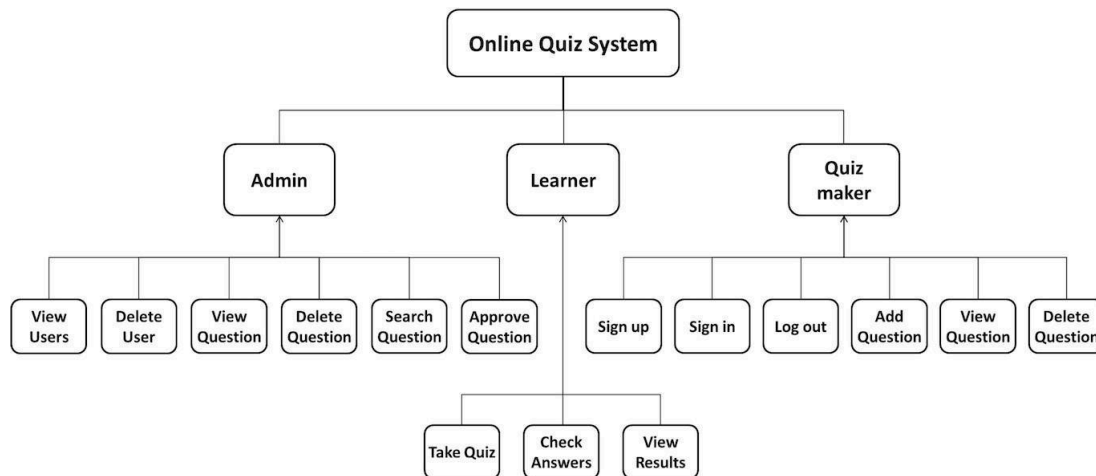


Figure 3.3: Decomposition diagram

### 3.5.2 Flow Diagram

A flow diagram visually represents the flow of data through a system or process, detailing inputs, outputs, and the process itself. It lacks control flow, decision rules, or loops.

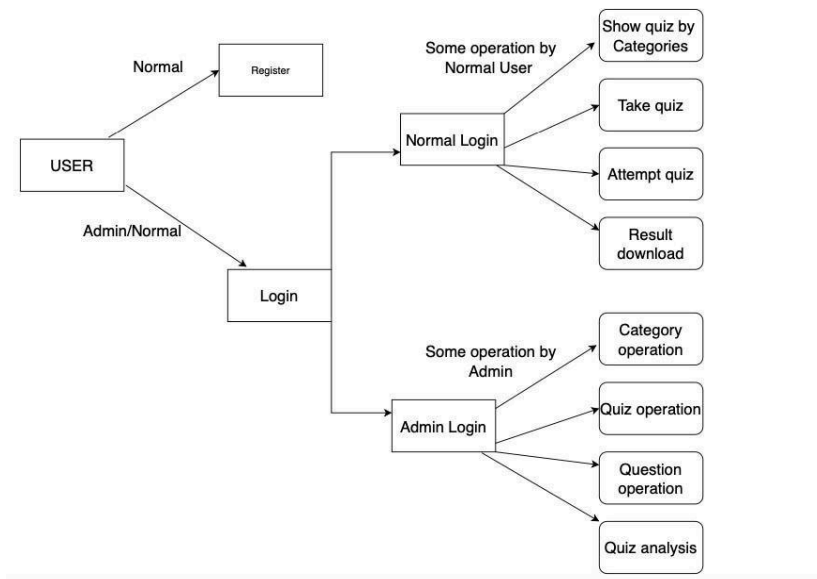


Figure 3.4: Flow Diagram

### 3.5.3 Use Case Diagram

The Use Case Diagram employs the Unified Modeling Language to illustrate interactions between users and the system. It delineates relationships between actors and use cases.

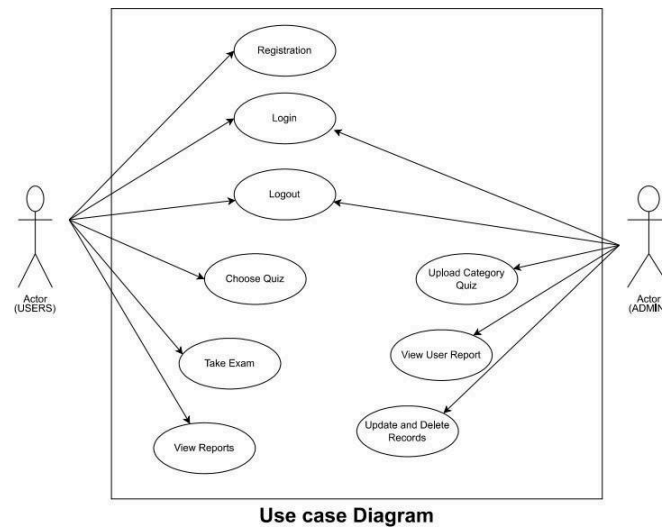


Figure 3.5: Use Case Diagram

### 3.5.4 Entity Relation diagram

An Entity Relationship Diagram (ERD) visualizes relationships among entities within an IT system. It aids in defining business processes and serves as the foundation for relational databases.

**Importance of ERDs:** ERDs serve as a visual reference for database design and help determine information system requirements. They remain useful even after the implementation of a relational database, providing insights for debugging or business process re-engineering.

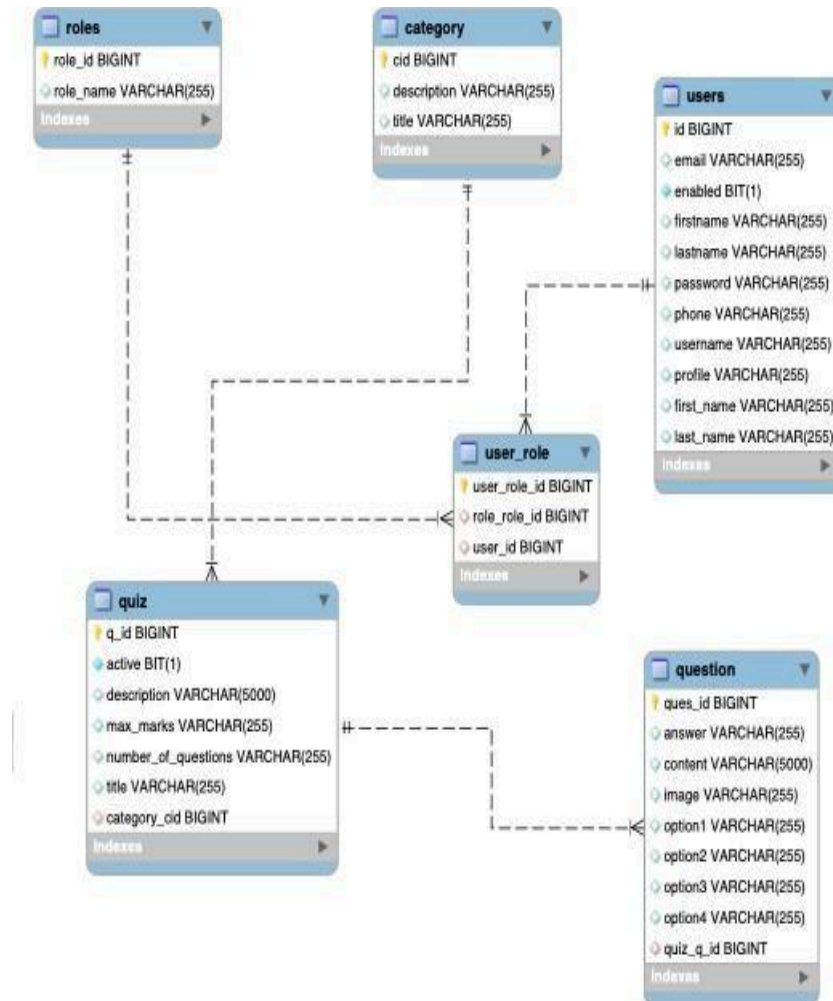


Figure 3.6: Entity Relation diagram

## 3.6 Implementation

In this section you can see some Implementation parts of the application and its modules.

### 3.6.1 Home

It's the first entry page that represents the home page of the application in working face.

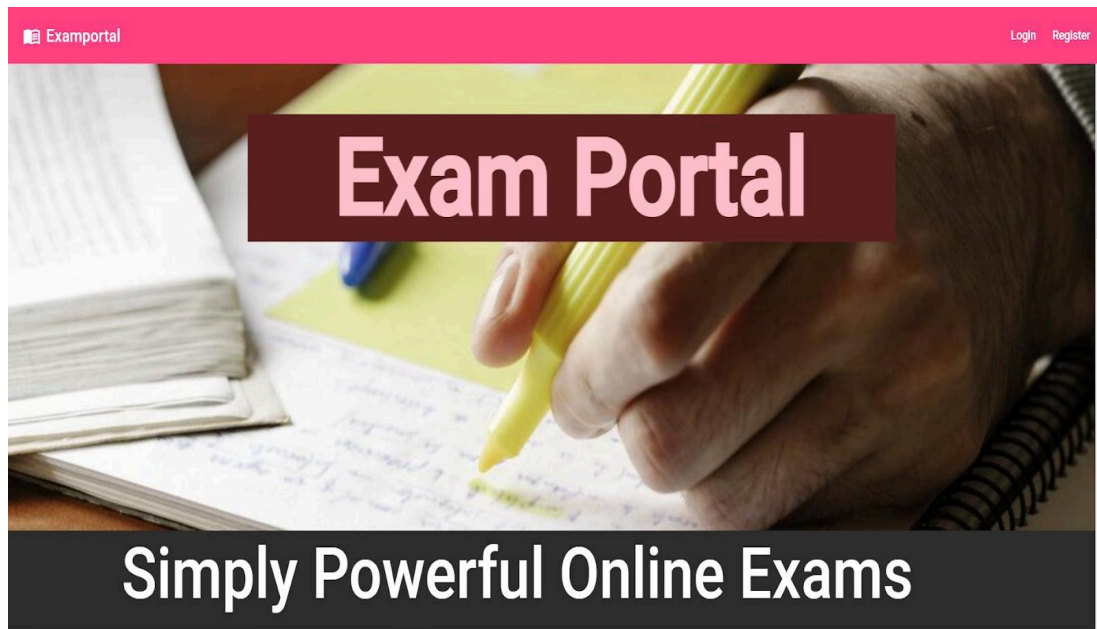


Figure 3.7: screenshot of the Home page

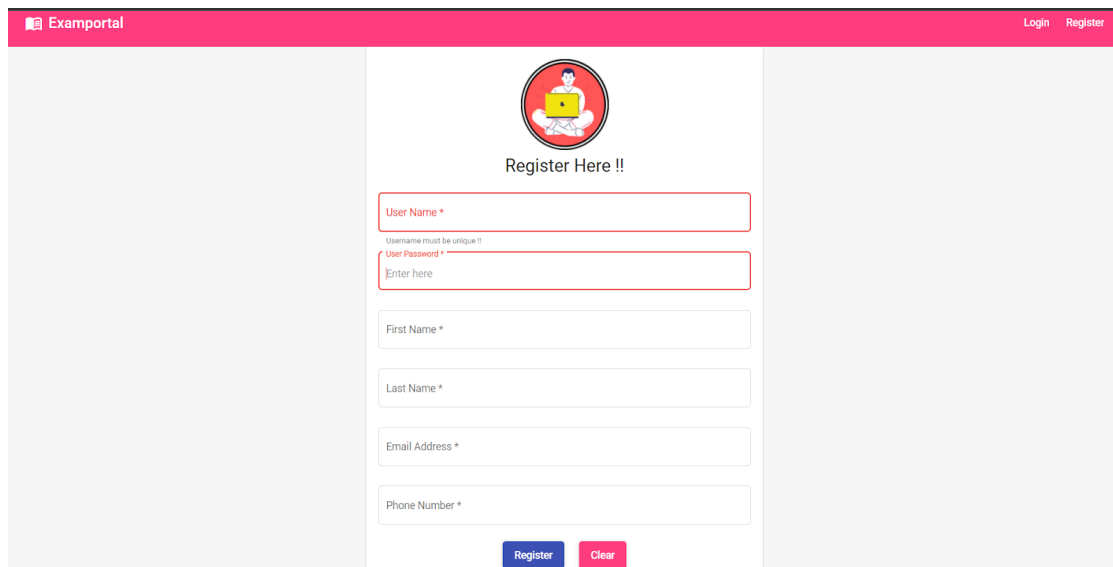
Next Steps:

**Login:** User can login and the system will open the next window according to the role.

**Registration:** if the user is not registered then needs to register on the registration page.

### 3.6.2 Registration

In this registration form, the User And Admin can register themselves. The system will provide proper authentication while entering the data into the registration form.



The screenshot shows a registration form titled "Register Here !!". At the top, there is a pink header bar with the text "Examportal" on the left and "Login Register" on the right. Below the header, there is a circular icon of a person sitting cross-legged with a laptop. The form contains the following fields: "User Name \*" (with a red border and a red asterisk), "User Password \*" (with a red border, a red asterisk, and a red note "Username must be unique !!"), "First Name \*", "Last Name \*", "Email Address \*", and "Phone Number \*". At the bottom of the form, there are two buttons: "Register" (blue) and "Clear" (pink).

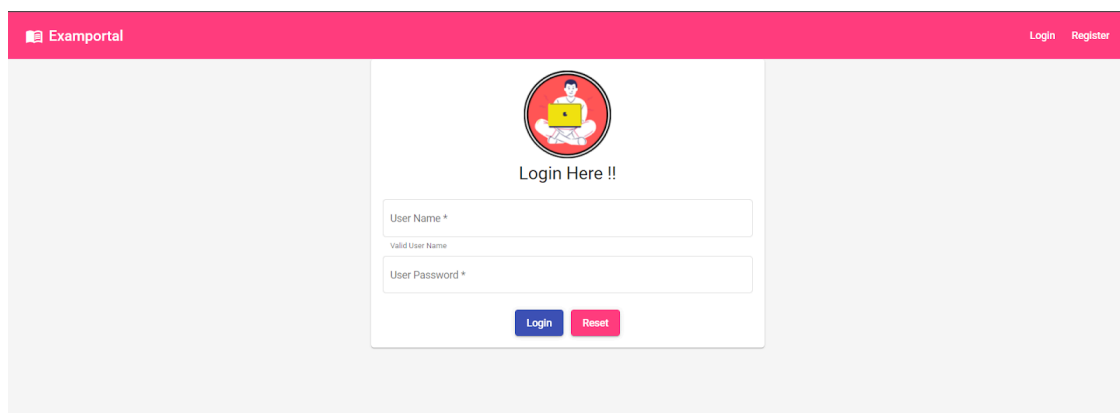
Figure 3.8: Registration

Next Steps:

Login: After registration, the user can login with the registered username and password. The system will open the next page according to the user's role.

### 3.6.3 LogIn

The login system of the Application system will ask the user to provide the username and password according to that user will get the access as User or admin.



The screenshot shows a login form titled "Login Here !!". At the top, there is a pink header bar with the text "Examportal" on the left and "Login Register" on the right. Below the header, there is a circular icon of a person sitting cross-legged with a laptop. The form contains the following fields: "User Name \*" (with a red asterisk), "Valid User Name" (a small text label), and "User Password \*" (with a red asterisk). At the bottom of the form, there are two buttons: "Login" (blue) and "Reset" (pink).

Figure 3.9: screenshot of the LogIn page

Next Steps:

- As an Admin: if the user is recognized as an admin by the system then the admin page will open.
- As an User: if the user is recognized as an Normal User by the system then the student page will open.

### 3.6.4 LogIn As an Admin

If the system finds the user an admin then the admin access page is going to open where admin can perform their task efficiently

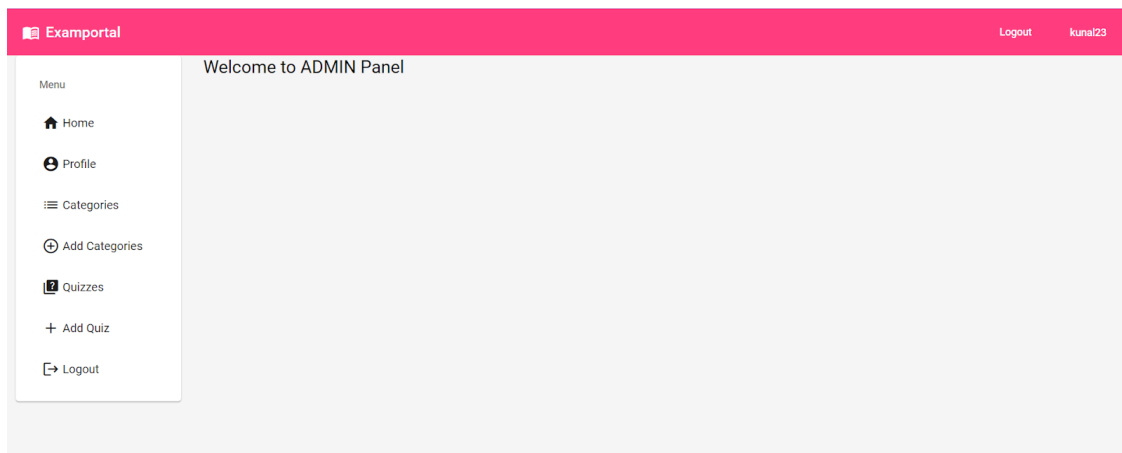


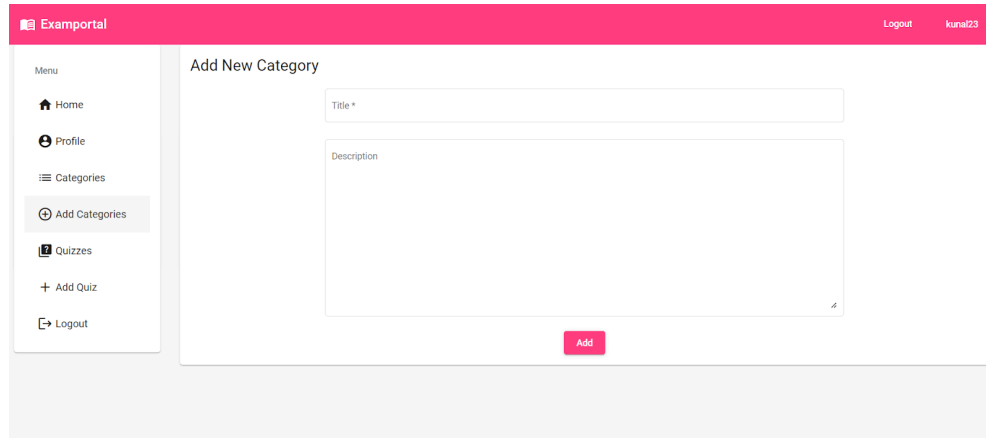
Figure 3.10: screenshot of the Admin Page

Next Steps:

- **Category Operations:** In this page the admin can perform category operations like add, delete, update.
- **Quizzes Operations:** In this page the admin can perform Quizzes operations of different categories.
- **Questions Operations:** In this page the admin can perform Questions operations of different Quizzes.

### 3.6.5 LogIn As an Admin - Category Operations

Next step: Admin can add , Delete , Update Category of Quizzes.



The screenshot shows the 'Add New Category' form in the Examportal admin interface. The form has a pink header bar with 'Examportal' on the left and 'Logout' and 'kunal23' on the right. A sidebar menu on the left contains links to Home, Profile, Categories, Add Categories (highlighted), Quizzes, Add Quiz, and Logout. The main content area is titled 'Add New Category' and contains two input fields: 'Title \*' and 'Description'. A pink 'Add' button is located at the bottom right of the form.

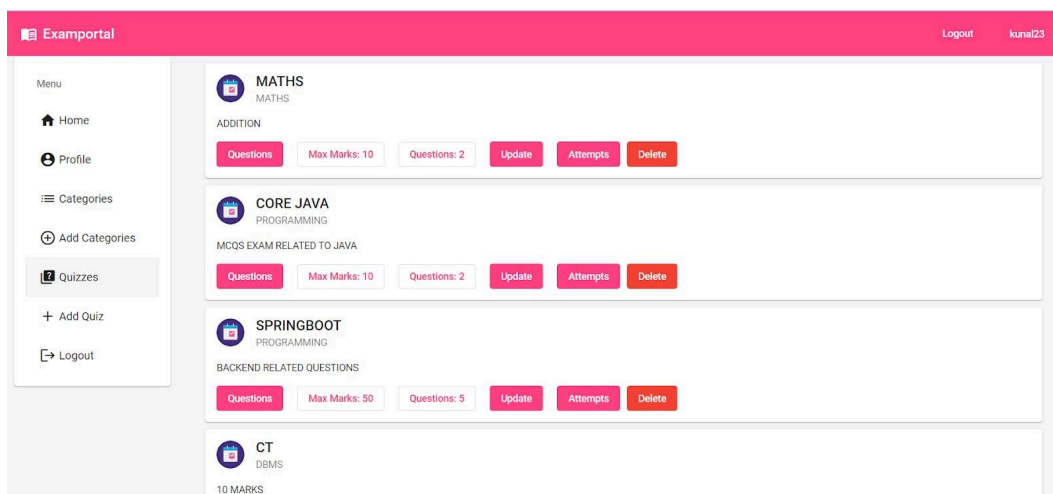
Figure 3.11: LogIn As an Admin - Category Operations

Next Steps:

- **Quizzes Operations:** Admin can add, delete, update operations with Quizzes.
- **Questions Operations:** Also can add, delete, update operations with Questions of the Quizzes.

### 3.6.6 LogIn As an Admin - Quiz Operations

Next step: Admin can Add , Delete , Update Quizzes of different categories.



The screenshot shows the Quiz Operations page in the Examportal admin interface. The page has a pink header bar with 'Examportal' on the left and 'Logout' and 'kunal23' on the right. A sidebar menu on the left contains links to Home, Profile, Categories, Add Categories, Quizzes (highlighted), Add Quiz, and Logout. The main content area displays a list of quizzes with the following details:

Category	Topic	Max Marks	Questions	Update	Attempts	Delete
MATHS	ADDITION	10	2	Update	Attempts	Delete
CORE JAVA	PROGRAMMING	10	2	Update	Attempts	Delete
SPRINGBOOT	PROGRAMMING	50	5	Update	Attempts	Delete
CT	DBMS	10 MARKS				

Figure 3.12: LogIn As an Admin - Quiz Operations



Next Steps:

- **Questions Operations:** Can add, delete, update operations with Questions of the Quizzes.

### 3.6.7 LogIn As an Admin - Question Operations

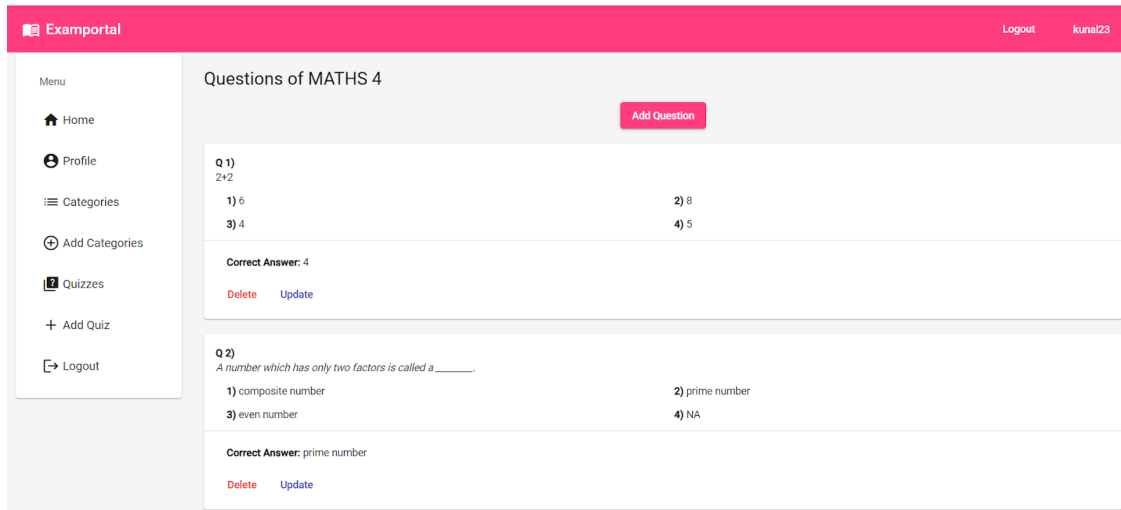


Figure 3.13: LogIn As an Admin - Question Operations

Next step: Admin can add , Delete , Update questions of different Quizzes of different categories.

### 3.6.8 LogIn As an User

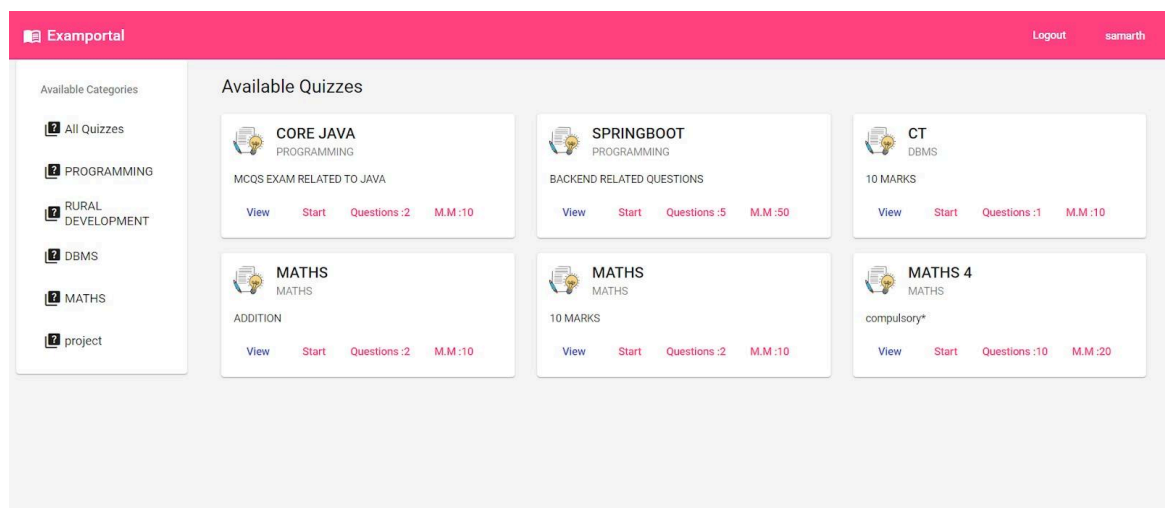


Figure 3.14: LogIn As an User

Next step

- As we can see in this page we have multiple quizzes of multiple categories so now users can attempt the quiz according to their interest and test knowledge.
- Select Any one Quiz

### 3.6.9 Attempt Quiz

Next step: Now User is able to see a number of questions there and every question has 4 options 1, 2, 3, 4, and the page has one automatic timer also after finishing that timer the quiz will submit automatically.

Examportal Logout samarth

instructions

On Going Quiz **MATHS 4**

**Q 1)**  
A number which has only two factors is called a \_\_\_\_\_.

☐ composite number ☐ prime number  
☐ even number ☐ NA

**Q 2)**  
2+2

☐ 6 ☐ 8  
☐ 4 ☐ 5

Submit Quiz

**Progress**  
Quiz will automatically submitted when timer reaches to 0:0  
3 min : 55 sec

Figure 3.6.9: Attempt Quiz

Next Steps:

- Submit the quiz before the timer runs out.

## **CHAPTER 4**

### **RESULT**

Next step: User can see the result of the given quiz.

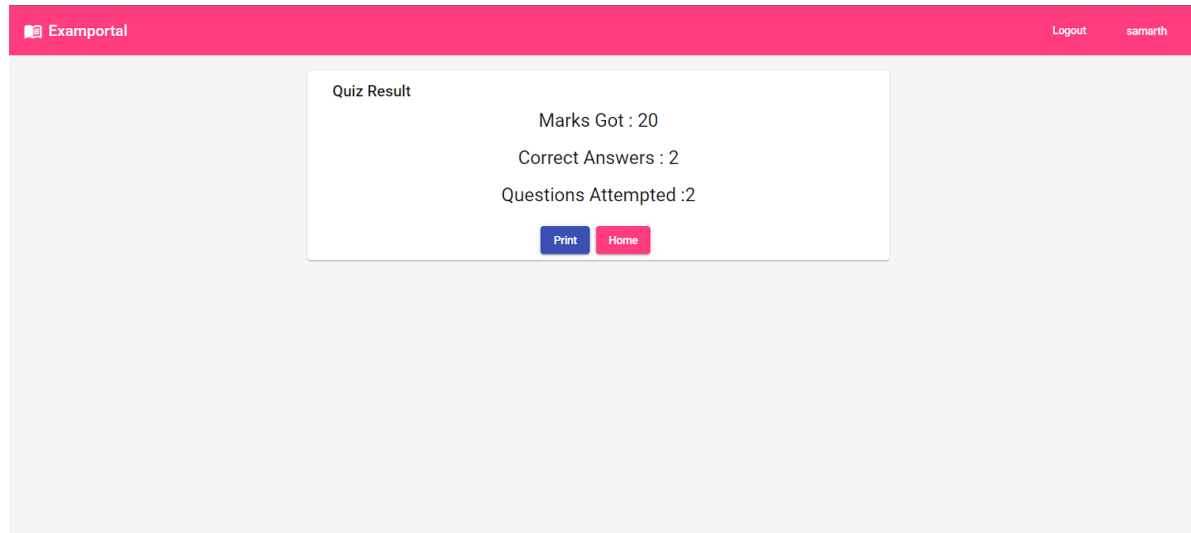


Figure 4.1: Result

Correct Answers:

This section shows the number of questions you answered correctly during the exam. It helps you gauge your accuracy and understanding of the content covered.

Question Attempted:

In this section you will get to know about the total number of questions you have attempted in the following test .

Marks Obtained:

The total marks obtained out of the maximum possible score are displayed in this section. It gives you a clear indication of your overall achievement in the exam.

## **Chapter 5**

### **Conclusion**

In conclusion, the Online Examination Portal project stands as a transformative innovation in the educational sector, ushering in a new era of digital assessment. This platform harnesses the power of modern web technologies to deliver a robust, efficient, and user-centric solution for conducting examinations remotely. It provides an intuitive interface that simplifies the examination process for both students and educators, ensuring a smooth and stress-free experience.

The project, serving as an intern project, aimed to develop an online portal for skill development accessible to the internship company for monitoring interns' skill sets. Leveraging Java, Spring Boot, and AngularJS, the project focused on creating a web portal allowing users to access examination pages upon registration and authentication. Users, identified as either regular users or admins, were granted respective privileges such as attempting exams or administering quizzes and monitoring student performance.

## **Future Work:**

Future enhancements for the project include:

Some other future works -

The development of the Online Examination Portal's homepage focuses on user-friendly navigation and a variety of quiz categories. Enhanced security features, such as live camera monitoring and ID access verification, ensure the integrity of exams. These measures provide confidence in the fairness and authenticity of the examination process. Integrating coding exams from platforms like GeeksforGeeks (GfG) and HackerRank allows students to practice and test their programming skills. This ensures access to high-quality, relevant content that aligns with industry standards. The integration broadens the portal's range of assessment tools, catering to computer science students.

Effective communication and support are vital components of the portal, featuring live chat, email support, and comprehensive FAQs. These tools ensure that any issues or queries are addressed promptly, enhancing the user experience. Seamless interaction between users and support staff is prioritized. The portal offers paid quizzes through a secure payment gateway, providing access to premium content and advanced quizzes. The user-friendly and secure payment system ensures smooth transactions. This feature not only generates revenue but also offers valuable educational resources to users.

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