

EduTest Portal Using Java with Spring Boot

Arun Sahani^{1,*}, Saumya Srivastava¹, Archana Dwivedi²

Abstract

The "EduTest Portal" is an innovative and comprehensive web-based platform developed to transform and modernize the traditional examination system. It utilizes modern technologies to provide a secure, efficient, and highly user-friendly environment for conducting online assessments. This platform is designed to overcome the common drawbacks of manual exam procedures, such as excessive paperwork, time consumption, human error in grading, and the high cost of administration. EduTest Portal offers a streamlined and automated process that benefits both educators and students by improving accuracy, transparency, and accessibility. Educational institutions can significantly reduce their administrative burden while also gaining access to useful performance analytics and real-time data for informed academic decision-making. The portal supports various question formats, user authentication, and timed assessments to maintain examination integrity. By promoting inclusivity and flexibility, it accommodates diverse learning needs and schedules. Overall, this project showcases the ability of EduTest Portal to revolutionize the assessment process and contribute meaningfully to the advancement of digital education.

Keywords: Digital examination system, JAVA, MYSQL, spring boot, database, REST API, email integration

INTRODUCTION

Traditional examination systems need professors to manually examine answer sheets, which is time-consuming and prone to mistakes. The EduTest Portal System addresses these challenges by providing an efficient, web-based exam administration solution. This approach allows students to take exams online in a simple and quick manner, with results available soon after the exam is done. The system ensures that students can log in with a valid user ID and password and complete the exam within a set time frame. The EduTest Portal System automates several components of the test process, saving time and effort on human grading. It also gives greater security and transparency than older approaches. Students can examine their results and certificates immediately after submitting their answers. This project intends to improve examination processes for educational institutions such as schools, colleges, and universities. The platform is user-friendly for both students and professors, resulting in an efficient and secure testing process. The system is meant to be accessible from any place, which makes it a great

alternative to modern schooling. There are several pages of questions in the EduTest Portal System, and students must either type their responses or choose the right answers by making the right selection. The primary goal of the EduTest Portal System's design was to cut down on the amount of time needed to administer student exams by hand. The goal of developing an EduTest Portal is to solve the problems with the current exam system and transform it. The system seeks to give students an effective, affordable, and easily accessible platform.

Additionally, the system seeks to offer flexibility in exam scheduling, immediate student feedback, and effective administrator grading.

*Author for Correspondence

Arun Sahani
E-mail: arunsahani4476@gmail.com

¹Student, Department of Computer Science and Engineering
Babu Banarasi Das Institute of Technology & Management
Lucknow, India

²Assistant Professor, Department of Computer Science and
Engineering, Babu Banarasi Das Institute of Technology &
Management Lucknow, India

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LITERATURE REVIEW

Teachers must manually review answer sheets in traditional test systems, which takes time and is prone to mistakes [1–3]. The EduTest Portal System offers a productive, web-based exam administration solution to address these problems. With this technology, students can take examinations online quickly and easily, and results are generated as soon as the test is over. The system makes sure that students can take the test within the allotted time and connect with a working user ID and password [4–6]. Many parts of the exam process are automated via the EduTest Portal System, which saves time and effort compared to human grading. In addition, it offers greater security and transparency than conventional techniques. After submitting their responses, students can check their results and certificates immediately. The system accepts a variety of question forms, including multiple-choice and true/false questions [7–11].

Redefining the conventional exam system and addressing its shortcomings are the driving forces behind the development of an EduTest Portal. The system intends to give students an effective, affordable, and easily accessible platform so they may take tests remotely from any area with an internet connection, especially during the COVID-19 epidemic. Exam schedule flexibility, immediate student input, and effective grading for administrators are further goals of the system [12–15].

Furthermore, the system attempts to combat cheating, which has a substantial negative influence on students' performance and learning, by incorporating functions like time limitations, question randomization, and limiting access to other resources during the examination. The overall goals of developing an EduTest Portal are to increase student performance and learning, encourage inclusion, and streamline and improve the exam administration process. After considering all of those factors, we produced appropriate project documentation that detailed each stage, including the frontend and backend components we use [16–18].

The goal of this project is to make exams easier for educational establishments such as colleges, universities, and schools. It provides an easy-to-use platform for instructors and students, guaranteeing a safer and more effective testing procedure. The system is a perfect fit for contemporary schooling because it is made to be accessible from anywhere [19].

USE CASE DIAGRAM

Use case diagrams are the common modeling language. A collection of scenarios make up a use case. It characterizes a user-system interaction. The relationship between actors and use cases is shown in a use case diagram. Use cases and actors are the two primary parts of a use case diagram. Students and lecturers are the actors in our system (Figure 1).

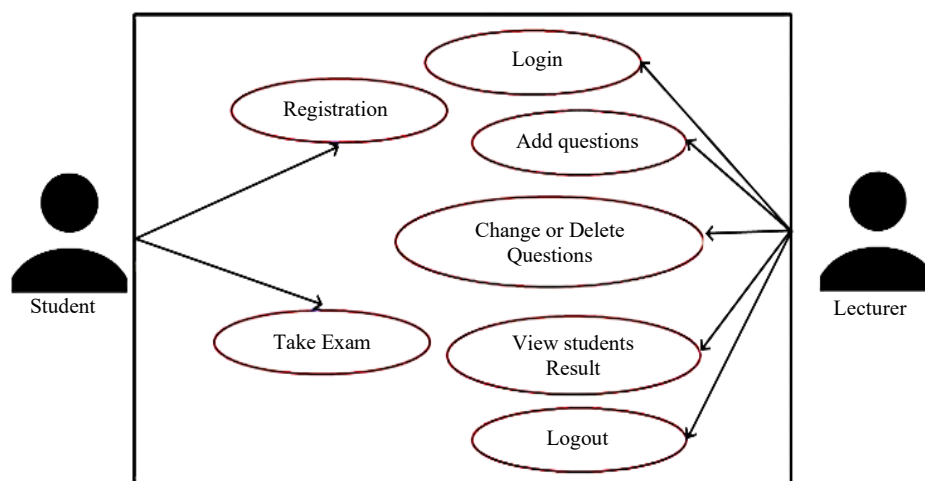


Figure 1. Use case diagram.

INTERFACE DESIGN AND USER INTERACTION FLOW

A comprehensive overview of the graphical interface elements, layout structure, and interactive components designed to facilitate smooth navigation and user experience within the EduTest Portal is discussed below:

Admin Login Module

It is a secure authentication system allowing authorized administrators to log in and access backend functionalities of the EduTest Portal (Figure 2).

Admin Dashboard Overview and Functional Capabilities

It is a centralized control panel where administrators can manage users, exams, system settings, and access performance analytics and logs (Figure 3).

Verified Student Management Interface

It is the section enabling administrators to review and approve registered students before they are allowed to take exams on the platform (Figure 4).

Upload Individual or Bulk Questions Efficiently

It is the feature designed for admins or instructors to upload exam questions either individually or in bulk using structured input formats (Figure 5).

Student Login Module and Authentication Workflow

It is a secure login portal for students to authenticate and gain access to upcoming or ongoing exams, past results, and other academic data (Figure 6).

The Exam is Currently in Progress with Timer and Navigation Controls

It is a dynamic interface displaying ongoing examination content with a timer, navigation controls, and real-time answer-saving functionality to ensure test continuity (Figure 7).

METHODOLOGY

A methodical strategy is necessary while creating an online exam portal to guarantee that the system is effective, dependable, and easy to use. This is a broad approach that you can use. Determine the portal's goal, target audience, exam categories, and system technical specifications. Create a strategy: Make a plan that describes the portal's features, capabilities, and layout. A procedure for creating and managing exams, authentication, security precautions, and reporting should all be part of this. Choose a platform that fits your needs and price range.

Welcome to our online [EDUTEST](#) Portal

Admin Login

Enter Your User Id*

Enter Your Password*

Login

Forget Password

Figure 2. Admin login page.

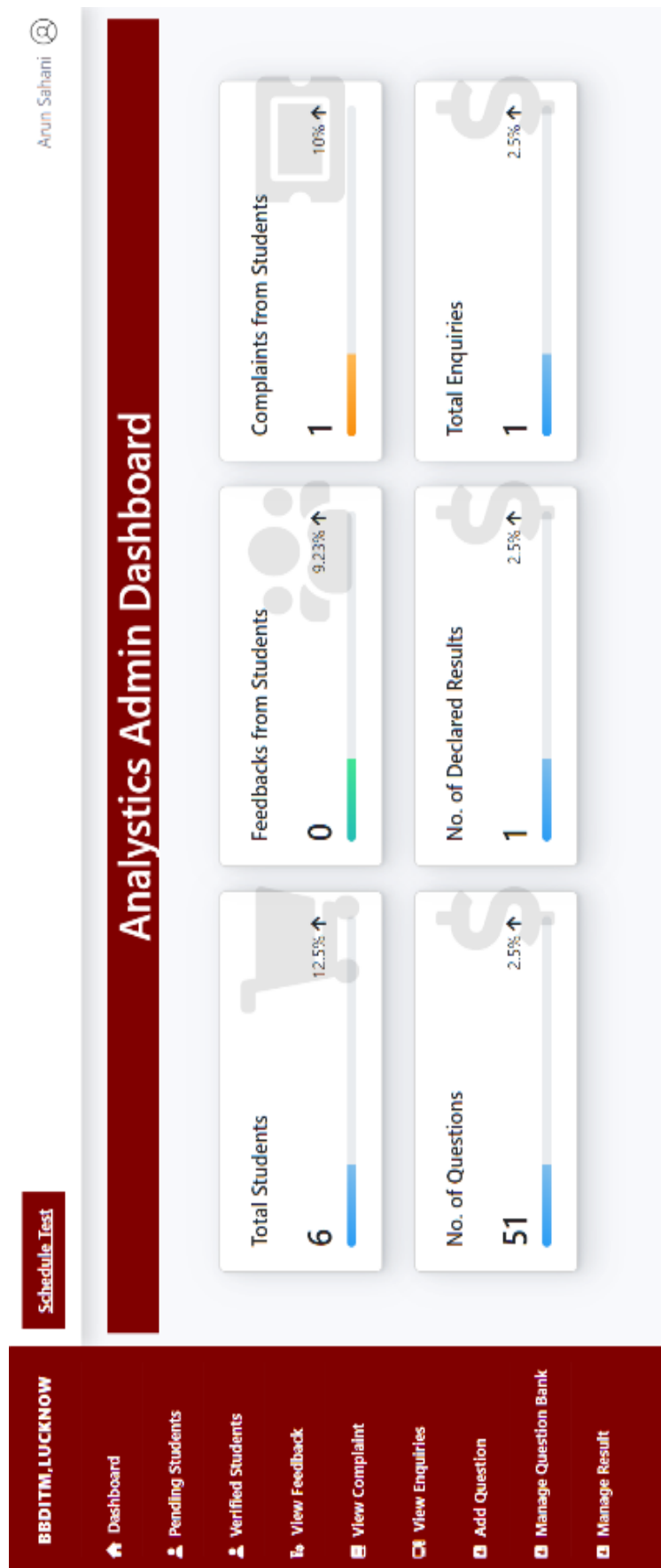


Figure 3. Admin dashboard page.

- [Dashboard](#)
- [Pending Students](#)
- [Verified Students](#)
- [View Feedback](#)
- [View Complaint](#)
- [View Enquiries](#)
- [Add Question](#)
- [Manage Question Bank](#)

MANAGE ALL VERIFIED STUDENT

10 ▼ entries per page

Name ▲	Enrollment No. ▲	Email Id ▲	Contact No. ▲	View More ▲
Arun Sahani	2200540109004	arunsahani4476@gmail.com	12345	View More
Nischay Tiwari	2200540109012	rt876043@gmail.com	98745631	View More
Rakesh	123	arunsahani7446@gmail.com	6390772327	View More
Shailesh kumar	6392179953	ankitgp9956@gmail.com	6392179952	View More

Showing 1 to 4 of 4 entries

Figure 4. Verified student page.

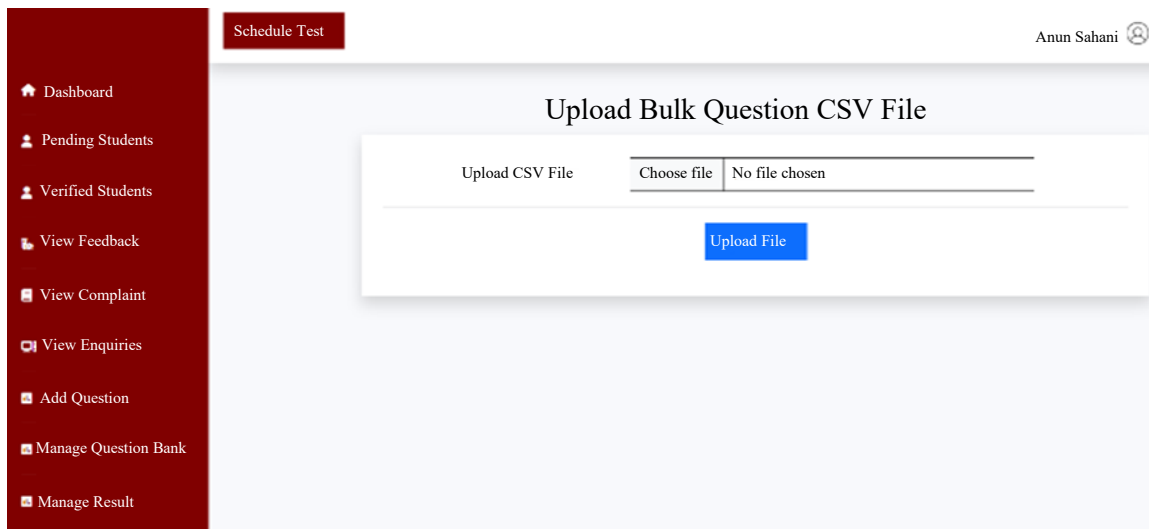


Figure 5. Upload question/Bulk Question.

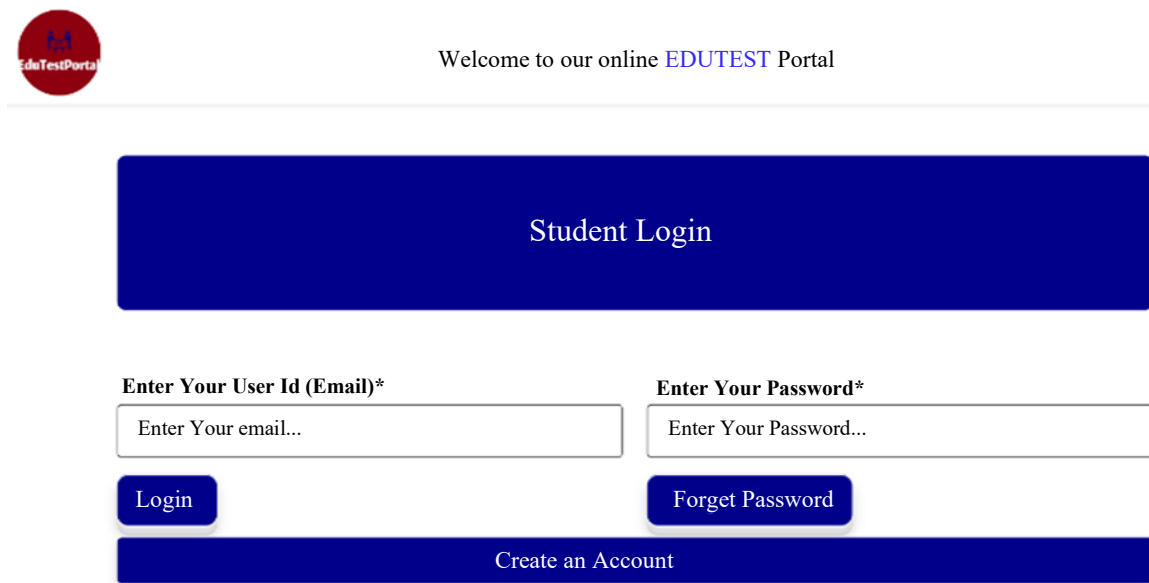


Figure 6. Student login page.

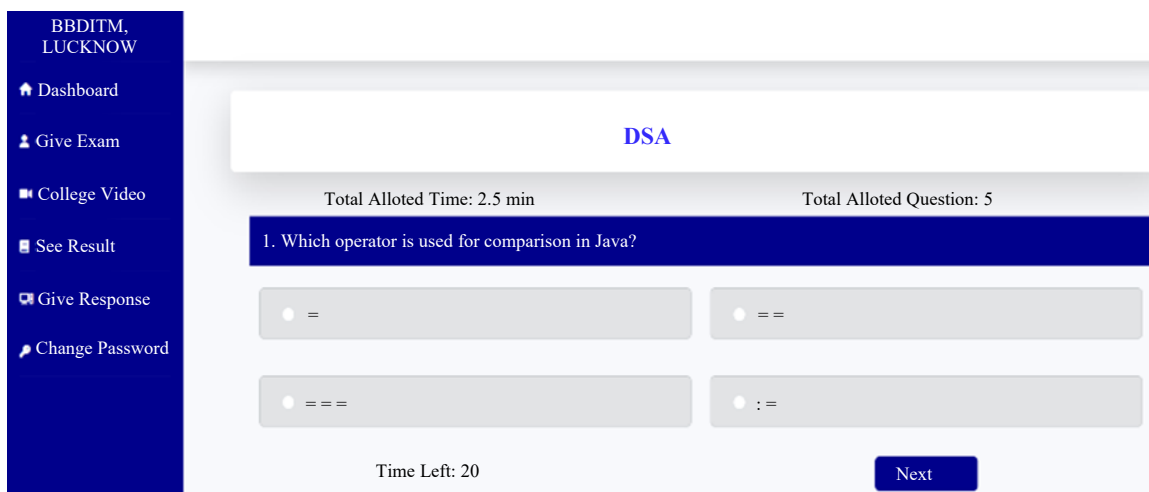


Figure 7. Exam running page.

There are other platforms on the market, including Canvas, Blackboard, and Moodle. Establish and oversee the exam's content in an organized manner, taking into account the quantity, kinds, and level of difficulty of the questions. Verify the exam's content.

- *JAVA*: A popular programming language for making a wide range of applications, including online apps, is Java applications. There are a few popular tools and frameworks for creating Java web apps. Springtime: A well-liked framework for creating Java web apps is called Spring. It offers several features, including web MVC, dependency injection, and security.
- *Applets*: Are tiny programs created to make Websites more interactive. They are downloaded via Web Runner and run by the Internet user who is cybersurfed.
- *Hibernate*: This object-relational mapping technology enables programmers to associate database tables with Java classes.
- *MVC*: A web application framework called Struts adheres to the Model-View-Controller (MVC) architectural paradigm. It offers several tools for creating web apps, including form validation and handling.
- *HTML*: HTML or HyperText Markup Language, is the backbone of the internet because it provides a common framework for arranging and presenting digital content.
- *CSS*: Cascading Style Sheets, or CSS, is a very flexible language for web development that provides a large number of selectors and properties for applying styles and precisely targeting HTML elements. Because of its adaptability, a range of components needed for modern web design may be included, like media queries for flexible layouts that adapt to different screen sizes and devices.
- *SPRINGBOOT*: The robust framework known as SPRINGBOOT was created to make creating enterprise Java applications easier. It is a component of the broader Spring Framework ecosystem, which is well-known for its powerful features for creating applications that are secure, scalable, and maintainable. Because it simplifies configuration, minimizes boilerplate code, and creates a production-ready environment with little work, Spring Boot is very popular.

Spring Boot Workflow

1. *Start a Project*: Use the Spring Initializer (a web-based tool or IDE plugin) to generate a Spring Boot project with the desired dependencies.
2. *Configure Properties*: Add application-specific settings in the application. Properties or application file.
3. *Build Components*: Develop controllers, services, repositories, and other components using Spring's annotations like `@RestController`, `@Service`, and `@Repository`.
4. *Run the Application*: Use the main method to launch the application via the embedded server.
5. *Dependency Injection*: Spring injects dependencies into classes using `@Autowired`, constructor injection, or `@Bean`.

REST API for EduTest Portal

Exam Portal's REST (Representational State Transfer) API is a web service that facilitates data transmission between clients and servers over the HTTP protocol. GET, POST, PUT, and DELETE are common HTTP methods used by RESTful APIs to communicate with resources. These APIs are made to be scalable, stateless, and cacheable. Because REST APIs offer a standardized and adaptable method of accessing data across various platforms and devices, they can be utilized to create sophisticated applications. They are now a well-liked option for creating cutting-edge web services and applications.

Token

An application that creates a distinct access token for a client or user to authenticate and grant access to the API's resources is known as a token generator. Usually, the client's identity and access rights are represented by a randomly generated string of characters in the access token. After successful authentication, the token is issued by the token generator, which also verifies the token throughout ensuing requests to make sure the user is authorized to access the resource. Modern API architectures

frequently use token-based authentication, which can improve security by doing away with the need to send private data over the network, such as passwords. It will generate the token whenever any user logs in to the system and it will save it in the database.

- If the password and username are not right then it will return the message invalid credentials.
- The above API will reflect the details of the current user who has accessed the portal.
- Throughout the one login period it will be there; on logout it will automatically delete from the database.
- If the both username and password are not correct it will return the message user not found. It will help to show the profile of the user and he or she can update or change the details.
- This will generate and validate the token of the login user.

Purpose and Requirements

Define the portal's goals explicitly, identify the intended users (students and lecturers) and outline the types of examinations and the necessary technical specifications, such as hardware and software needs.

Planning and Design

Develop a detailed plan that includes functionalities like exam creation and administration, user authentication, security measures, reporting capabilities, and user interface design. Utilize frameworks such as Spring Boot for backend operations and Bootstrap for a responsive design.

Platform Selection

Select a suitable platform (such as Moodle, Blackboard, or a custom solution using Java frameworks) that meets the budgetary and functional requirements of the system.

Content Development

Create exam content with a focus on relevance and appropriate difficulty levels. Systematically arrange questions and confirm their accuracy and reliability.

Pilot Testing

Execute pilot testing with a small user group to verify functionality, encompassing exam creation, authentication processes, and security protocols.

User Training and Support

Offer tutorials, webinars, and documentation to educate users on the system's capabilities, promoting seamless integration.

Implementation and Monitoring

Roll out the portal and oversee its performance. Consistently refresh exam content and resolve technical challenges.

Continuous Improvement

Collect user feedback and assess system performance to enhance features and strengthen security.

RESULTS

Websites that discuss the latest developments in technology are quite rare. As a result, fewer people are aware of these issues. The world is getting smarter, and it is important to keep up with the continuous advancement. Additionally, the need for workers in technology field is growing.

Technical problems: Making sure the platform is dependable and technically sound is one of the biggest obstacles in creating an EduTest Portal. The user experience and the accuracy of the test results can be adversely affected by problems like sluggish loading speeds, system crashes, and security breaches.

Cheating: Because students can readily access outside resources during an online exam, cheating may be a possibility. Preventing cheating by using proctoring and safe authentication methods.

We will be able to update and inform users on the most recent advancements in technology and associated research through our website. Students studying tech-related subjects would greatly benefit from this website. We will do our best to explain all the most recent advancements in clear and concise language. Our target customers are primarily students who do not have much time to read or learn about subjects outside of their studies, therefore we will be making an effort to keep the features straightforward while still covering all the essentials. Everyone, but especially students, must always stay up to date with technology advancements in order to be relevant. These days, it appears that the best and newest technology is created quite quickly.

CONCLUSION

EDUTEEST portal can make it easier for people to access education and training programs, regardless of their location or schedule. Higher completion rates and greater participation may result from this. It will result in more accurate and trustworthy evaluations of student performance by lowering mistakes and inconsistencies in the grading process. By automating processes like exam creation, administration, and grading, online tests can save time and money. In addition to incorporating security measures like biometric authentication, anti-cheating tools, and data encryption to guarantee the integrity of the exam results, this can free up resources that could be used for other business or educational objectives. Give pupils immediate feedback so they may pinpoint their areas of weakness and modify their study techniques accordingly.

Future Work

Mobile Compatibility: Create a mobile application or make the current portal mobile-friendly. Gadgets to improve usability and accessibility for consumers who would rather take tests on their tablets or smartphones. We will be able to update and inform users on the most recent advancements in technology and associated research through our website. Students studying tech-related subjects would greatly benefit from this website. We will do our best to discuss all of the most recent advancements in clear and concise language.

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