

Project Report

On

“Secured Online Exam Portal”

Submitted By

Chaitanya Deore 123B1F020

Arpita Patki 123B1F001

Shreedhar Bargaje 123B1F006

Vaishnavi Bhangre 123B1F007

Under the guidance of

Dr. Gulbakshee Dharmale



Department of Information Technology
Pimpri Chinchwad Education Trust's
Pimpri Chinchwad College of Engineering
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Abstract

The "Secured Online Exam Portal" is a comprehensive, full-stack database management system (DBMS) designed to facilitate secure and efficient examination processes for educational institutions. The platform provides two distinct sections for users: Teacher and Student, enabling tailored functionalities for both roles.

Teacher Section:

Teachers are empowered to create and manage multiple virtual classrooms, assign students to their respective classrooms, and generate customized tests. The portal facilitates seamless question uploads via Excel files, simplifying the test creation process. Additionally, real-time visibility of test results ensures prompt and efficient evaluation.

Student Section:

Students can access assigned tests immediately upon upload and can attempt each test only once. To proceed to the examination page, students are required to accept predefined guidelines, ensuring compliance. A built-in timer auto-submits the test upon expiration, ensuring accuracy and efficiency in test handling.

Security Features:

The portal incorporates robust security mechanisms to prevent malpractice during tests. Students receive a warning upon changing tabs, with subsequent tab changes leading to auto-submission of the test. This feature promotes honesty and integrity in examinations.

The "Secured Online Exam Portal" integrates technological innovation with educational requirements, ensuring a streamlined, secure, and user-friendly examination experience for both educators and students.

Introduction

The "Secured Online Exam Portal" is a modern, full-stack solution designed to address the challenges of conducting examinations in a digital environment. With a focus on user accessibility, exam security, and efficient management, this portal is tailored for educational institutions aiming to enhance their examination processes. It provides a distinct experience for teachers and students, with functionalities streamlined for each role. From creating and managing tests to ensuring a secure environment for exams, the platform harnesses advanced technology to deliver a user-friendly and reliable system.

Scope

The project encompasses the development of a secure online examination system with features catering to both educators and students. It includes:

- Teacher functionalities like creating multiple classrooms, assigning students, uploading test questions via Excel, and managing real-time test results.
- Student functionalities like test visibility, single-attempt participation, guideline compliance, and auto-submission upon timer expiration.
- Robust security measures to minimize cheating, such as tab-switch warnings and auto-submission after repeated violations.
- Scalability to handle multiple classrooms, tests, and students simultaneously, ensuring broad applicability across institutions.

Purpose

The purpose of this project is to streamline the examination process in educational institutions by replacing traditional methods with a secure and efficient digital alternative.

Key objectives include:

- Simplifying test creation and management for educators.
- Providing a seamless and intuitive interface for students to attempt examinations.
- Ensuring the integrity of online tests through advanced security mechanisms.
- Enhancing the overall examination experience for all stakeholders, reducing logistical challenges and promoting fairness.

Fundamental Requirements

Teacher Section:

1. Classroom Management:

- Ability to create multiple virtual classrooms.
- Option to assign students to specific classrooms.

2. Test Creation:

- Capability to create tests for assigned classrooms.
- Option to upload test questions in bulk via Excel file.
- Automated storage of test details in the database.

3. Result Handling:

- Instant visibility of test results for evaluation and record-keeping.
- Secure storage of results in the database.

Student Section:

1. Test Participation:

- Students can view assigned tests as soon as they are uploaded.
- Mandatory acceptance of guidelines to proceed with the test.
- Each test is accessible for only one attempt.

2. Exam Interface:

- a. Timer integration for countdown during the test.
- b. Auto-submission of test upon timer expiration.

3. Tab Switching Security:

- a. Warning displayed on the first tab change during the exam.
- b. Test auto-submission upon the third tab change.

General Features:

1. User Authentication:

- Secure login system for both teachers and students.
- Separate access privileges for teachers and students.

2. Responsive Interface:

- a. Frontend is designed using HTML, CSS, JavaScript, and Bootstrap for smooth user experience across devices.

3. Database Management:

- a. Use of MySQL for storing user details, classroom data, test information, and results.
- b. Efficient query handling for data retrieval and updates.

4. Routing and Backend Operations:

- a. Express.js for managing routing and HTTP requests.
- b. Node.js as the backend framework to ensure server-side scalability and performance.

Data Modelling Features

- Entities and their attributes :

- teacher : Stores details such as teacherId, username, password, status.
- student : Stores details such as studentId, username, password, status.
- manageclassroom : Contains information like teacherId and classroomId.
- classroom : Contains information like classroomId and studentId.
- exam : Includes examId, teacherId, classroomId, subject, number_of_questions, marks, duration, status_of_exam
- ongoing_exam : Contains information like studentId, examId, questionId, status.
- questions : Captures examId, questionId, question_text, optionA, optionB, optionC, optionD, correct_answer.
- exam_result : Stores examId, studentId, result

- Relationships :

- Teacher to ManageClassroom: One teacher can manage multiple classrooms (One-to-Many).
- ManageClassroom to Classroom: One classroom is linked with specific students (One-to-Many).
- Teacher to Exam: One teacher can create multiple exams (One-to-Many).
- Exam to Classroom: Exams are linked to specific classrooms (One-to-Many).
- Exam to Questions: Each exam consists of multiple questions (One-to-Many).
- Student to OngoingExam: Students participate in ongoing exams and answer questions (Many-to-Many).
- Student to ExamResult: Each student has a unique result for an exam (One-to-One).

Data Dictionary

| Table Name | Field Name | Data Type | Description |
|-----------------|-------------|----------------------|--|
| Teacher | teacherId | INT (Primary Key) | Unique identifier for each teacher. |
| | username | VARCHAR | Username for the teacher's account. |
| | password | VARCHAR | Encrypted password for authentication. |
| | status | VARCHAR | Status of the teacher account (e.g., active/inactive). |
| Student | studentId | INT (Primary Key) | Unique identifier for each student. |
| | username | VARCHAR | Username for the student's account. |
| | password | VARCHAR | Encrypted password for authentication. |
| | status | VARCHAR | Status of the student account (e.g., active/inactive). |
| ManageClassroom | teacherId | INT (Foreign Key) | Reference to teacherId in the Teacher table. |
| | classroomId | INT (Primary Key) | Unique identifier for classrooms managed by teachers. |

| | | | |
|--------------------|---------------------|----------------------|--|
| Classroom | classroomId | INT (Primary Key) | Unique identifier for each classroom. |
| | studentId | INT (Foreign Key) | Reference to studentId in the Student table. |
| Exam | examId | INT (Primary Key) | Unique identifier for each exam. |
| | teacherId | INT (Foreign Key) | Reference to teacherId in the Teacher table. |
| | classroomId | INT (Foreign Key) | Reference to classroomId in the Classroom table. |
| | subject | VARCHAR | Subject associated with the exam. |
| | number_of_questions | INT | Total number of questions in the exam. |
| | marks | INT | Maximum marks for the exam. |
| | duration | TIME | Time duration allowed for the exam. |
| OngoingExam | status_of_exam | VARCHAR | Status of the exam (e.g., ongoing/completed). |
| | studentId | INT (Foreign Key) | Reference to studentId in the Student table. |

| | | | |
|-------------------|----------------|-------------------------|---|
| Questions | examId | INT (Foreign Key) | Reference to examId in the Exam table. |
| | questionId | INT (Foreign Key) | Reference to questionId in the Questions table. |
| | status | VARCHAR | Status of the question for the student (e.g., attempted). |
| | examId | INT (Foreign Key) | Reference to examId in the Exam table. |
| | questionId | INT (Primary Key) | Unique identifier for each question. |
| | question_text | TEXT | Text of the question. |
| | optionA | VARCHAR | First option for the question. |
| | optionB | VARCHAR | Second option for the question. |
| | optionC | VARCHAR | Third option for the question. |
| ExamResult | optionD | VARCHAR | Fourth option for the question. |
| | correct_answer | VARCHAR | Correct answer for the question. |
| | examId | INT (Foreign Key) | Reference to examId in the Exam table. |

| | | |
|-----------|-------------------------|--|
| studentId | INT (Foreign Key) | Reference to studentId in the Student table. |
| result | INT | Marks obtained by the student for the exam. |

Relational Database Design

1. Teacher Table

- **Fields:**

- teacherId (Primary Key)
- username
- password
- status (e.g., active/inactive)

2. Student Table

- **Fields:**

- studentId (Primary Key)
- username
- password
- status (e.g., active/inactive)

3. ManageClassroom Table

- **Fields:**

- teacherId (Foreign Key referencing Teacher table)
- classroomId (Primary Key)

4. Classroom Table

- **Fields:**

- classroomId (Primary Key)
- studentId (Foreign Key referencing Student table)

5. Exam Table

- **Fields:**

- examId (Primary Key)
- teacherId (Foreign Key referencing Teacher table)
- classroomId (Foreign Key referencing Classroom table)
- subject
- number_of_questions
- marks
- duration
- status_of_exam (e.g., ongoing/completed)

6. OngoingExam Table

- **Fields:**

- studentId (Foreign Key referencing Student table)
- examId (Foreign Key referencing Exam table)
- questionId (Foreign Key referencing Questions table)
- status (e.g., attempted/not attempted)

7. Questions Table

- **Fields:**

- examId (Foreign Key referencing Exam table)
- questionId (Primary Key)
- question_text
- optionA
- optionB
- optionC
- optionD
- correct_answer

8. ExamResult Table

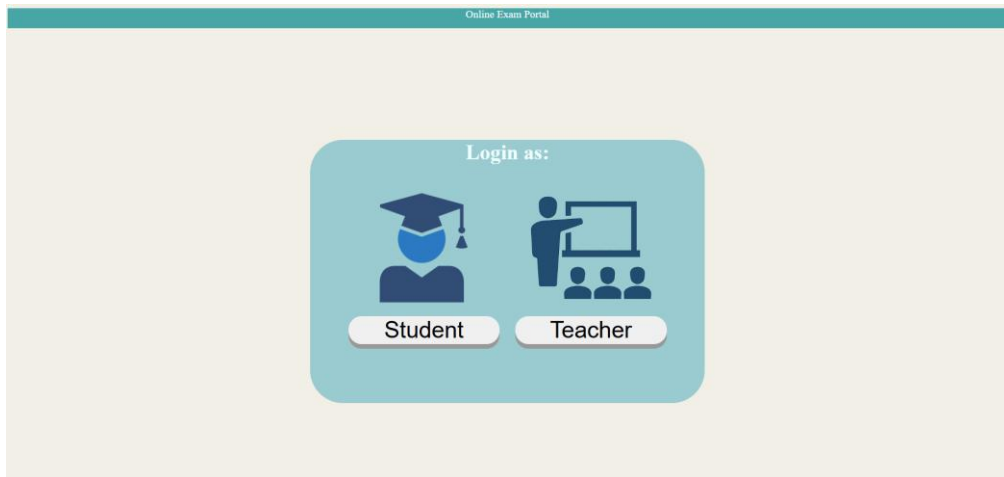
- **Fields:**

- examId (Foreign Key referencing Exam table)
- studentId (Foreign Key referencing Student table)
- result (e.g., marks scored by the student)

Online Exam Portal Interface

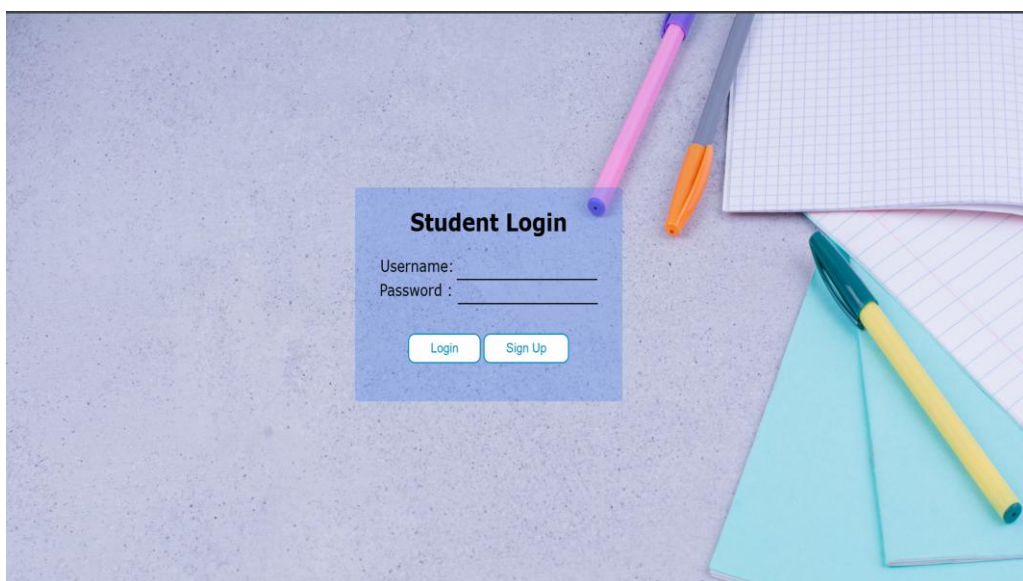
1. Login as page:

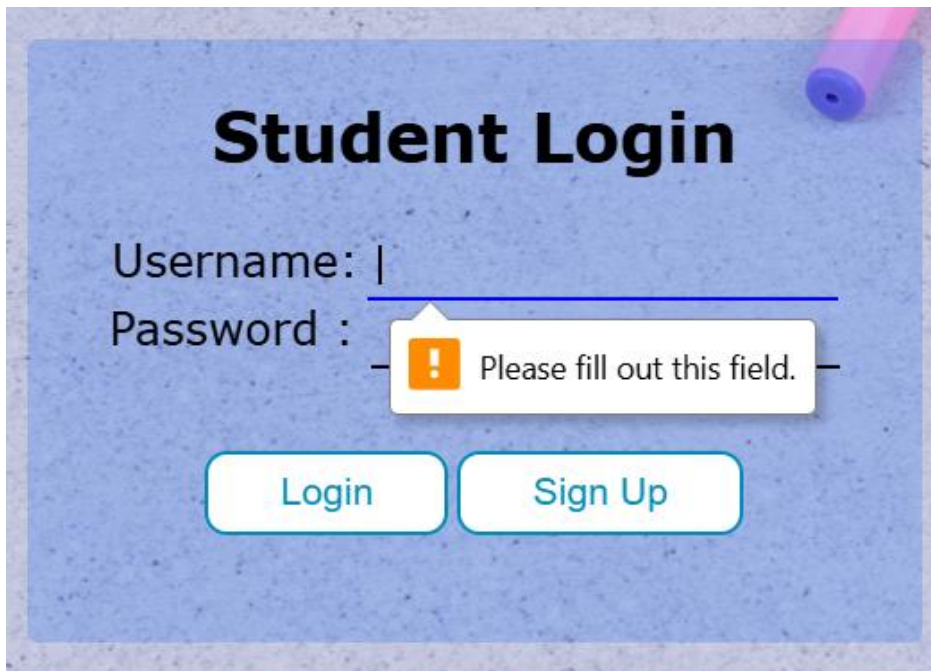
In this page user gets an option to use the portal according to their role i.e student or teacher.



2. Student Login page:

In this page student can login or signup , if you enter wrong password you get a message too.






Student Login

Username: |

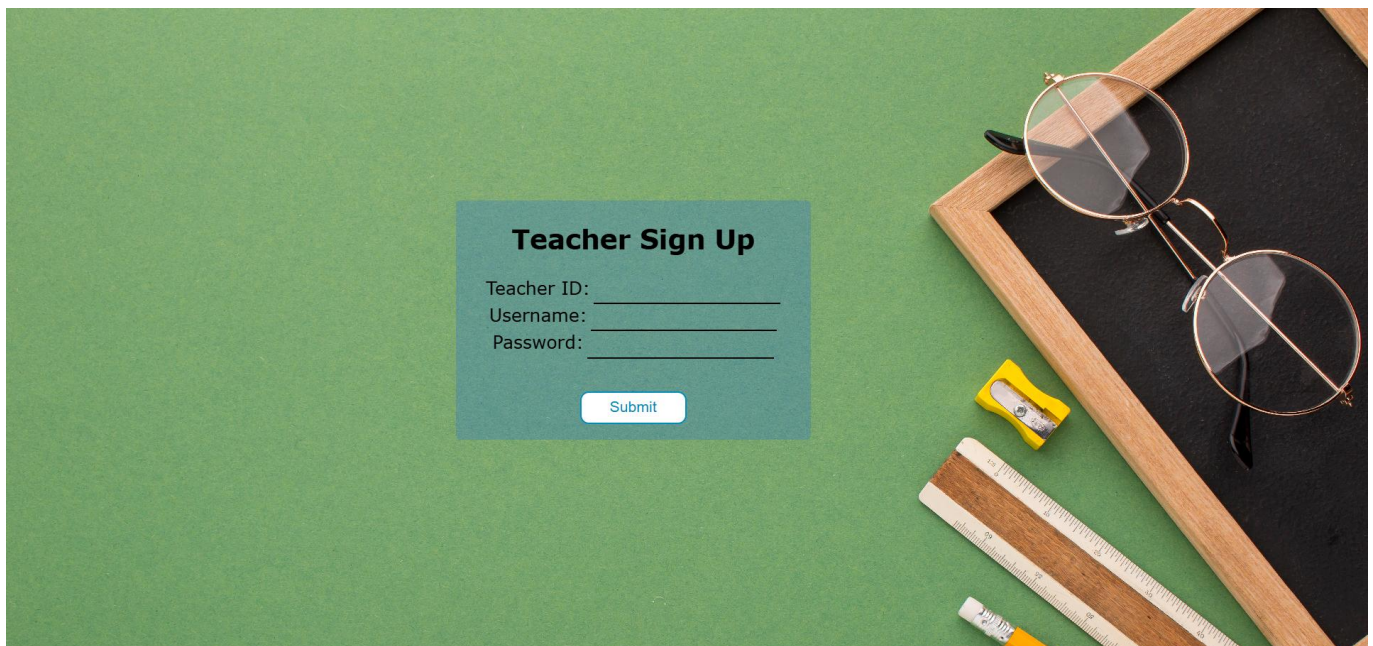
Password : |

 Please fill out this field.

Login Sign Up

3. Teacher Login Page

In this page student can login or signup , if you enter wrong password you get a message too.



Teacher Sign Up

Teacher ID: _____

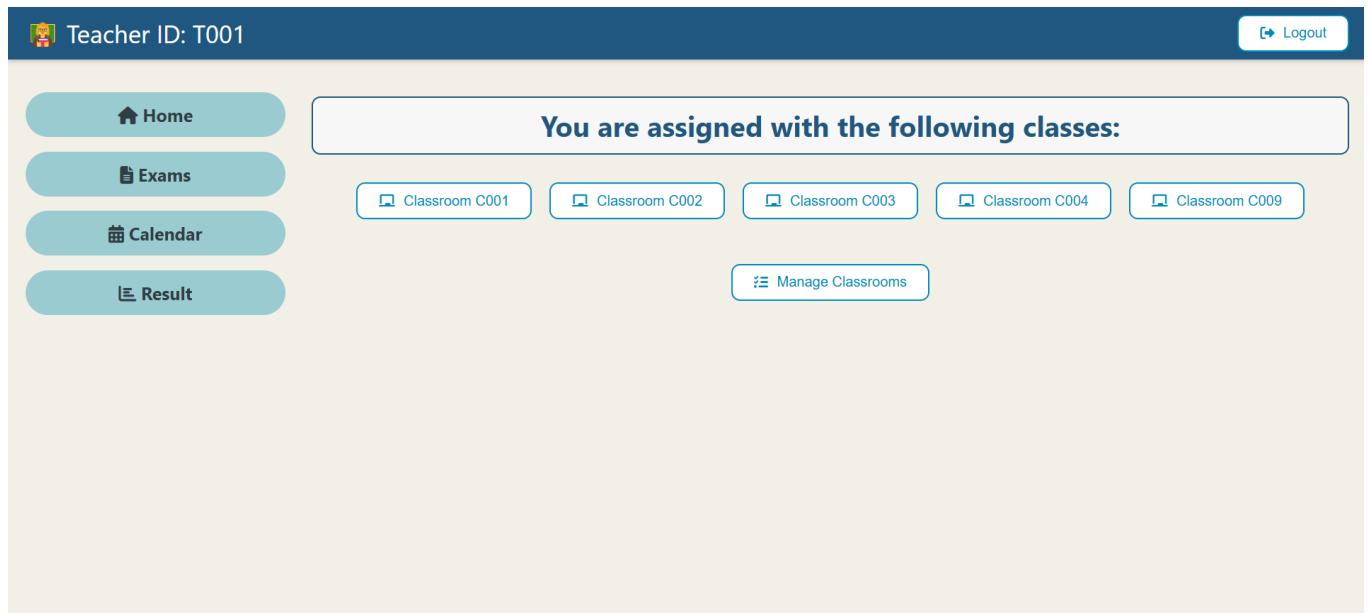
Username: _____

Password: _____

Submit

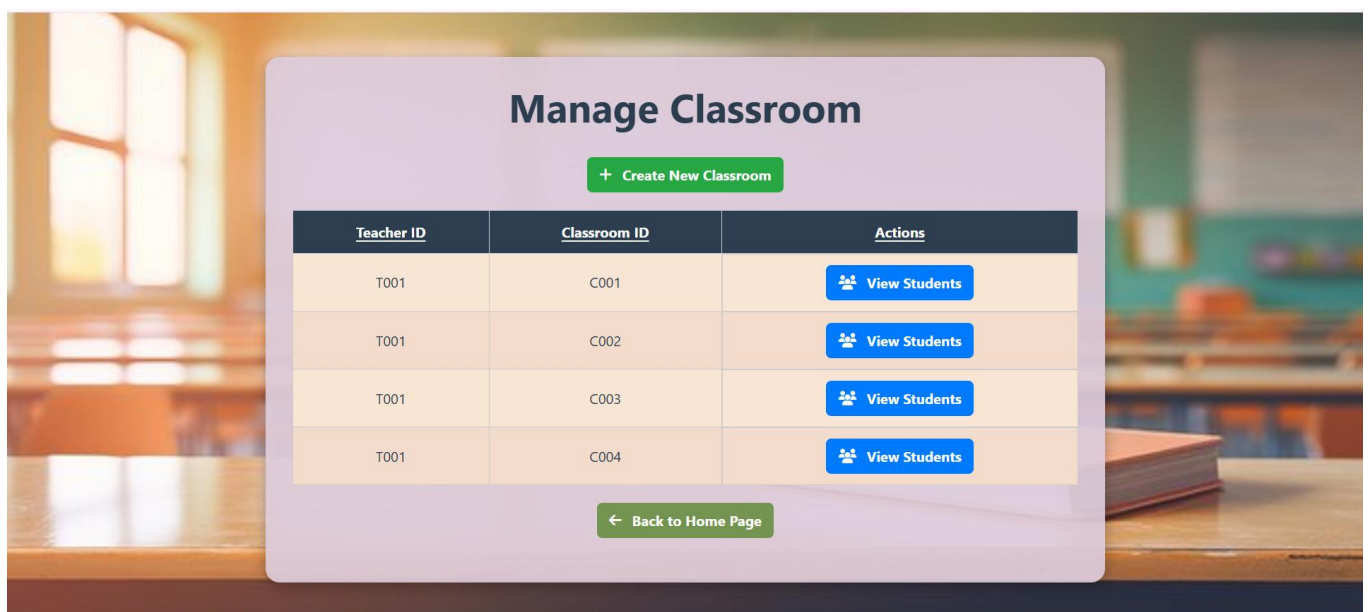
4. Teacher Home Page

In this page teacher can see all classrooms and access to them.



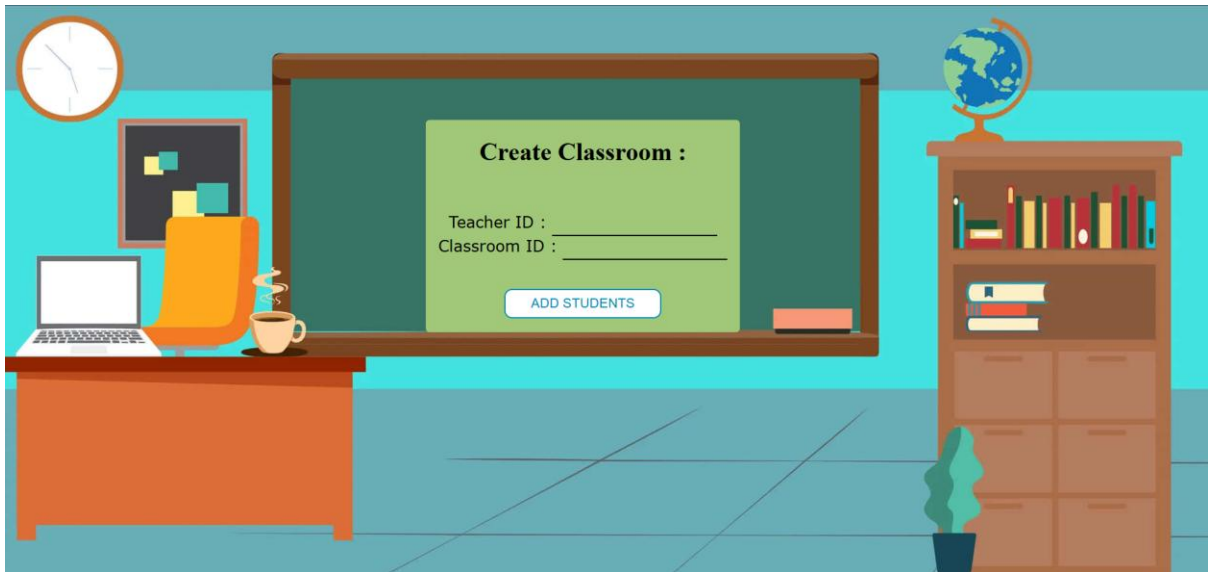
5. Manage Classroom

From here a teacher can access to all students of classrooms and has the option to create a new classroom.



6. Create Classroom

From here a teacher can create a classroom.



7. Add Students to the classroom

This page permits a teacher to add students into a classroom.

Teacher: T001

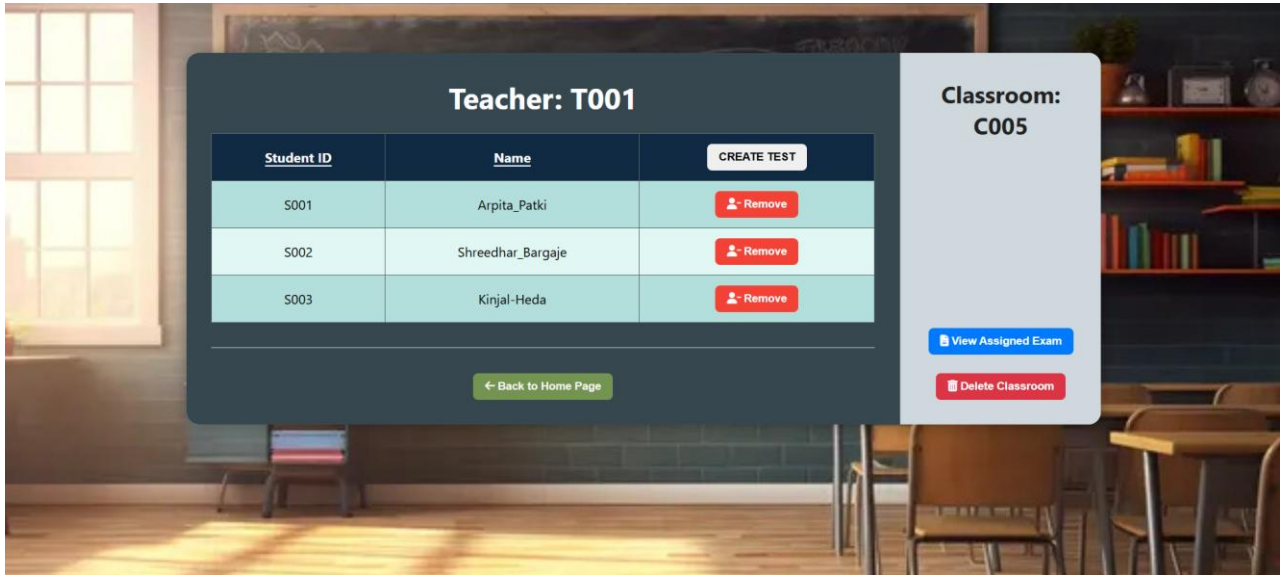
Classroom: C005

| Student ID | Name | Action |
|------------|-------------------|----------------------|
| S001 | Arpita_Patki | <button>Add</button> |
| S002 | Shreedhar_Bargaje | <button>Add</button> |
| S003 | Kinjal-Heda | <button>Add</button> |

✓ Done

8. View Classroom for teacher

This page allows teacher to see all the students in the classroom and gives the permission to remove them as per the need and also gives options to view exams and delete classroom.



9. Create an exam by teacher for whole classroom

A teacher can fill the required information for exam conduction.

The screenshot shows a 'Create an Exam' form. It contains several input fields for the teacher to fill out: Exam ID, Teacher ID, Classroom ID, Subject, No. of Questions, Marks, Duration, and Status. A 'Submit' button is located at the bottom of the form.

Create an Exam

Exam ID

Teacher ID

Classroom ID

Subject

No. of Questions

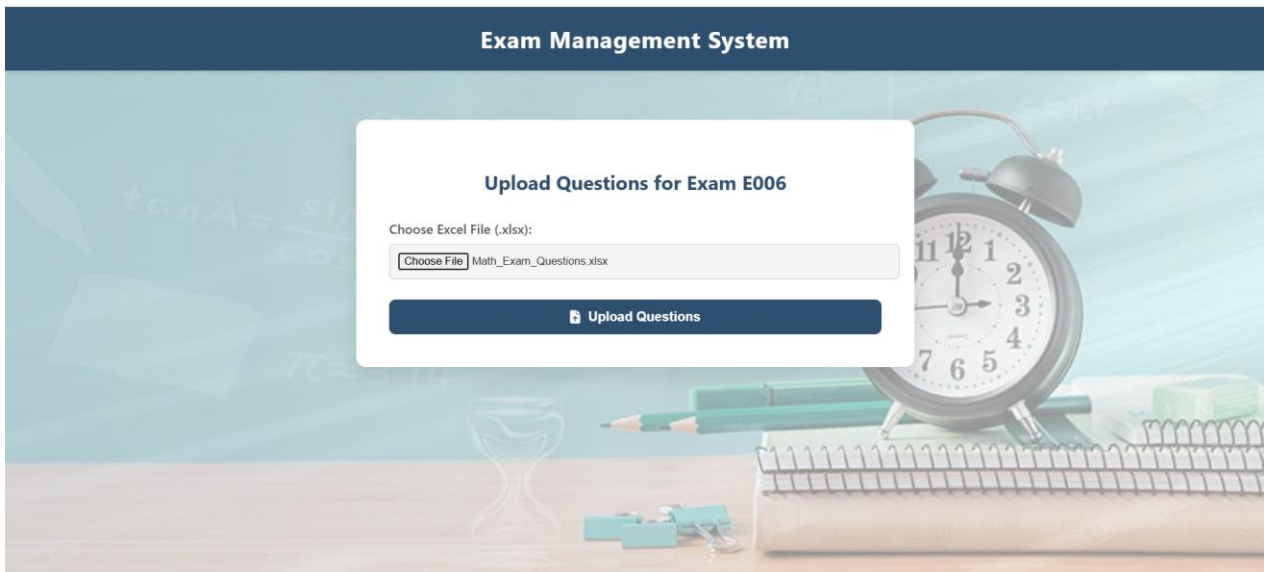
Marks

Duration

Status

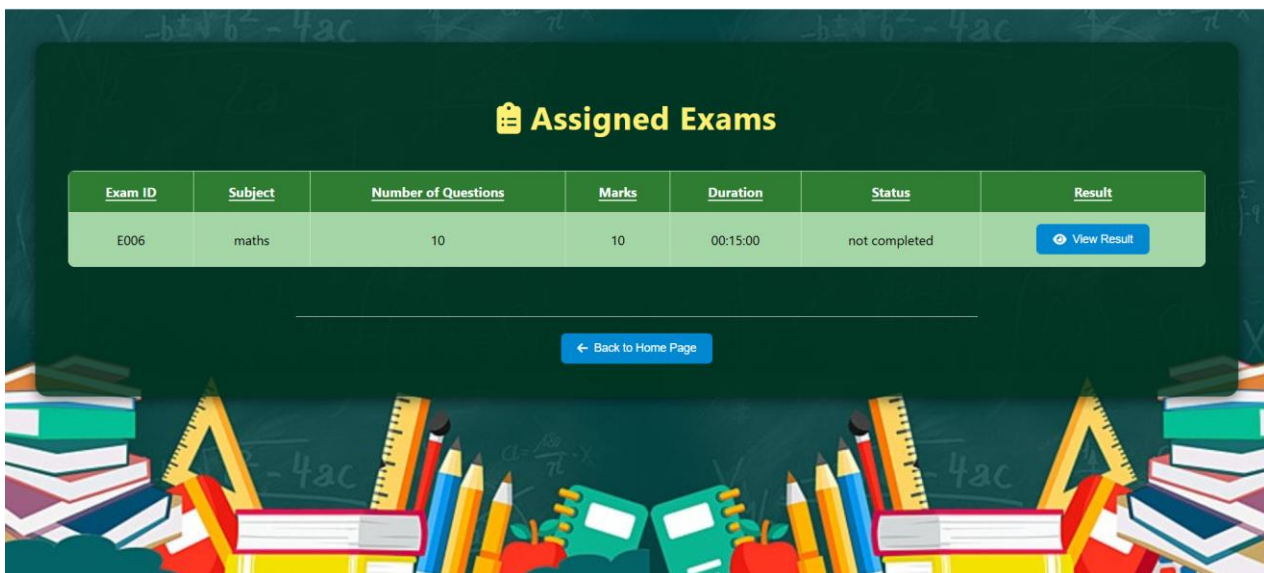
10. Upload questions of exam through excel file

A teacher can upload the questions in excel file format.



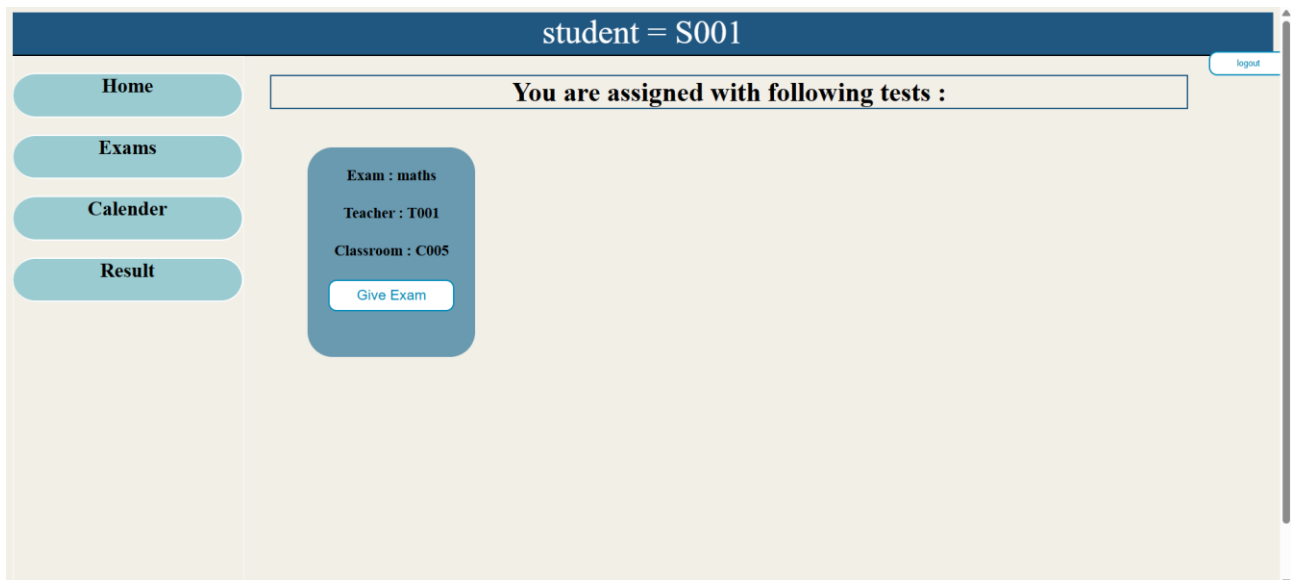
11. Teacher can view assigned exams

Teacher can see all the exams assigned to that class.



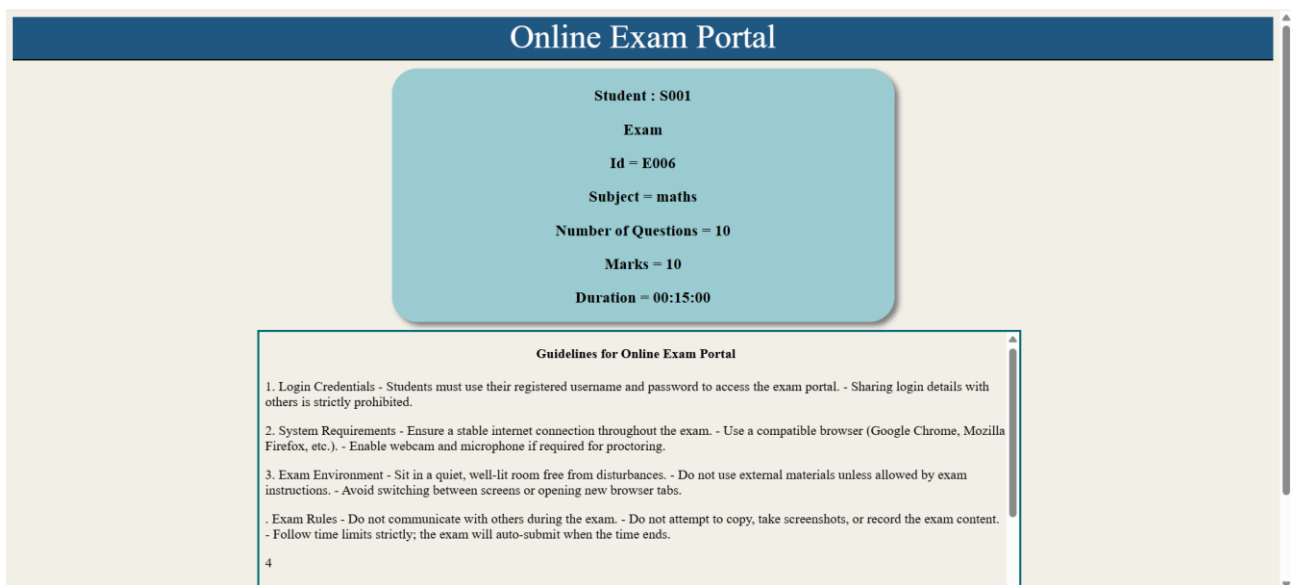
12. Student Home Page

A student can see all the exams assigned to him/her.



13. Guidelines for student of exam with exam details.

On this page a student is provided with exam details, guidelines and terms and conditions.



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14. Terms and Conditions for student

Terms & Conditions for Students

1. Integrity & Fair Play - Students must attempt the exam honestly, without cheating or unauthorized assistance. - Any detected malpractice may result in exam disqualification or disciplinary action.

2. Privacy & Data Usage - The portal may record webcam, audio, and screen activity for monitoring purposes. - Personal data will be kept confidential and used only for exam administration.

3. Liability - The institution is not responsible for any loss of progress due to internet failure, device malfunction, or power outage. - Students must ensure their devices meet technical requirements before the exam.

4. Exam Termination - The exam may be automatically terminated in cases of multiple rule violations. - If disqualified, reattempts are subject to institutional policies.

5. Acceptance of Terms - By starting the exam, students agree to abide by these terms and conditions.

☒ Terms and Conditions

Start Exam

15. Exam Page

In this page a student is allowed to give exam with options provided to go on previous question and to go on next question, to submit the exam after completion or else on the completion of clock it will be auto submitted.

Online Exam Portal

Exam: maths

Clock : 00:14:56

Question 1 of 15

What is the value of π (pi) up to two decimal places?

☐ 3.12

☐ 3.14

☐ 3.16

☐ 3.18

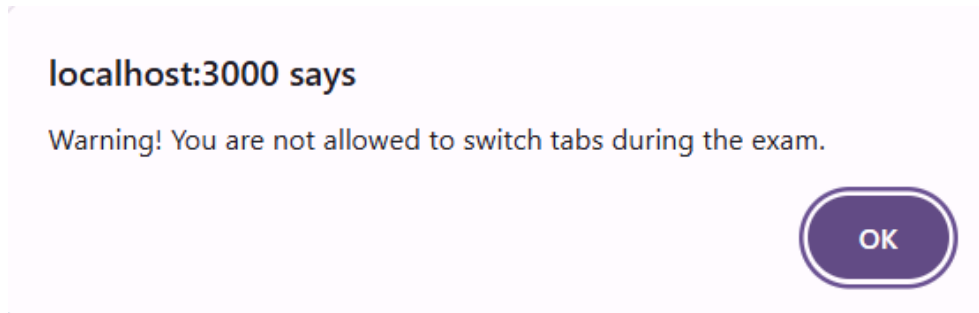
Previous

Next

Submit

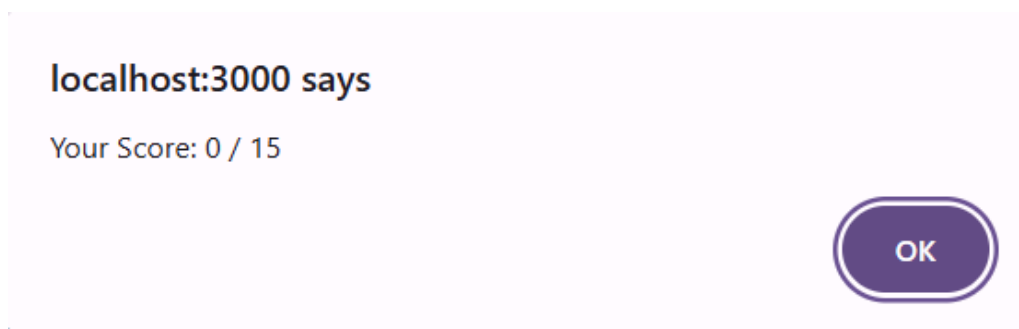
16. When user tries to change the tab

This alert box shows the warning for user to not try to copy or any mischief activities in between the exams.

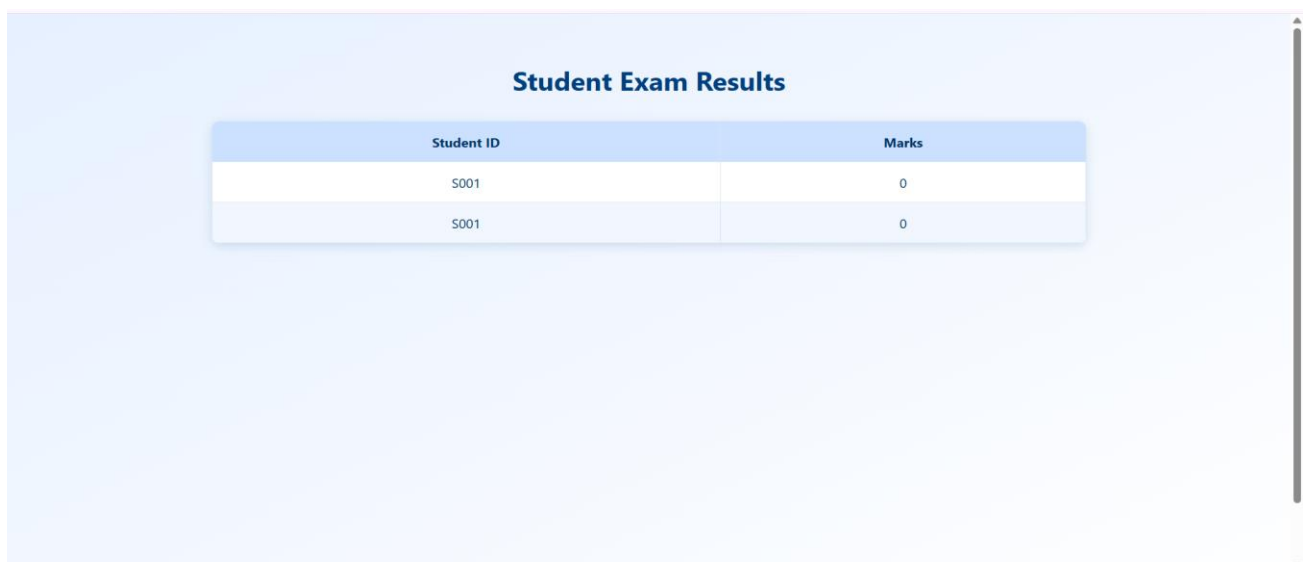


17. After three attempts auto submit

After three attempts of tab changing the exam will be autosubmitted.



18. Teacher can view the result

A screenshot of a web application showing "Student Exam Results". It features a table with two columns: "Student ID" and "Marks". The table has two rows of data, both showing "S001" and "0". The page has a light blue background and a vertical scrollbar on the right.

| Student ID | Marks |
|------------|-------|
| S001 | 0 |
| S001 | 0 |

Conclusion

The "Secured Online Exam Portal" exemplifies the integration of modern technology with educational requirements, offering a scalable and secure solution for conducting examinations in a digital era. By addressing the needs of both teachers and students, the portal fosters a streamlined and efficient process for creating, managing, and participating in tests. Key highlights such as tab-switching security, automated result handling, and responsive design ensure both fairness and accessibility.

Through its well-defined architecture, the system enhances productivity for educators and convenience for students, while maintaining a robust security framework. The use of cutting-edge technologies, including MySQL, Node.js, and Express.js, coupled with an intuitive front-end design, guarantees a user-friendly experience.

As educational institutions increasingly embrace digital solutions, the "Secured Online Exam Portal" serves as a pioneering example of how examinations can be transformed to meet the demands of a digital-first world. It ensures integrity, efficiency, and scalability, aligning seamlessly with the goals of modern education.

Also this project gave us the chance to learn many new things and to use our knowledge for the welfare of the community.