A FIELD PROJECT REPORT ON

# “ONLINE EXAMINATION’’

Submitted in partial fulfilment of the requirements for the award of the degree

BACHELOR OF TECHNOLOGY

in

# (COMPUTER SCIENCE ENGINEERING)

Submitted by

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## Department of COMPUTER SCIENCE ENGINEERING

Vignan’s Foundation for Science, Technology and Research (Deemed to be University)

Vadlamudi, Guntur, Andhra Pradesh-522213, India March – 2025



# CERTIFICATE

This is to certify that the field project entitled “ONLINE EXAMINATION” being submitted by (M.Hema sai & 231FA04200), ( B.pradeep& 231FA04573), (k.Rohit & 231FA04B29), and (J.pavithra & 231FA04C12) in partial fulfilment of Bachelor of Technology in the Department of COMPUTER SCIENCE ENGINEERING, Vignan’s Foundation For Science Technology & Research (Deemed to be University), Vadlamudi, Guntur District, Andhra Pradesh, India, is a bonafide work carried out by them under my guidance and supervision.

Dr. S.V Phani Kumar Mr.T.Narasimha Rao

Head of the Department

CSE Guide DECLARATION

We hereby declare that our project work described in the field project titled “ONLINE EXAMINATION” which is being submitted by us for the partial fulfilment in the department of COMPUTER SCIENCE ENGINEERING, Vignan’s Foundation for Science, Technology and Research (Deemed to be University), Vadlamudi, Guntur, Andhra Pradesh, and the result of investigations are carried out by us under the guidance of (Name of the Guide)

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# “ONLINE EXAMINATION”

1. Introduction
   1. Problem Definition

The traditional examination system has long been the backbone of educational assessment in schools, colleges, and certification bodies. However, it comes with several critical challenges that make it inefficient in modern-day learning environments. Some of these challenges include:

* + - Manual Effort and Time Consumption: Setting up an examination manually involves printing and distributing question papers, invigilating students, collecting answer scripts, and manually evaluating responses. This process is highly labor-intensive and time-consuming.
    - Errors in Result Computation: Due to human involvement, there is always a risk of calculation mistakes in grading, leading to unfair evaluations and errors in ranking students.
    - Security Issues: Paper-based examinations are vulnerable to question leaks, cheating, and unauthorized access to test papers before the exam. Maintaining exam integrity is a complex challenge.
    - Limited Accessibility: In many cases, students must travel to examination centers, which can be inconvenient for those residing in remote areas.
    - Delayed Result Processing: Since answer sheets are graded manually, it can take days or even weeks to publish final results, causing delays in academic progression.

Need for an Online Examination System

To overcome these challenges, an automated, secure, and efficient examination system is required. The online examination system aims to:

* + - Reduce manual workload by automating the examination process.
    - Provide instant results with accurate ranking.
    - Enhance security to prevent cheating and unauthorized access.
    - Support students with low internet connectivity by optimizing performance.
    - Ensure fair evaluation with minimal human intervention.

The goal is to streamline the assessment process, ensuring that it is efficient, accurate, and accessible to all students.

* 1. Existing System

Several online examination platforms exist today, but they are often limited in functionality, security, and accessibility. Some common drawbacks of existing systems include:

1. Dependency on High-Speed Internet
   * + Most online examination platforms require a stable and high-speed internet connection to function properly.
     + Students in rural or low-bandwidth areas struggle to access these systems, leading to exam failure due to network disruptions.
2. Limited Access Control and Role Management
   * + In many platforms, only a single administrator is allowed to manage exam papers.
     + This creates bottlenecks in exam scheduling and limits flexibility in large educational institutions.
3. Weak Security Measures
   * + Many existing systems lack robust authentication mechanisms, making them vulnerable to unauthorized logins.
     + Poor encryption techniques lead to data leaks, exposing sensitive exam information.
4. Absence of Automated Grading & Ranking
   * + Some platforms lack automated result generation, requiring manual grading.
     + Students do not receive instant feedback, delaying academic progress.
5. No Mechanism for Student Feedback

 Many platforms do not include a feedback mechanism, preventing students from reporting issues or suggesting improvements.

The existing solutions fail to fully address the growing need for a scalable, secure, and feature-rich online examination system.

1.3 Proposed System

To address the limitations of the existing systems, this project introduces an advanced Online Examination System with the following features:

1. Multi-User Role Access

The system supports three main roles:

* + - Admin: Manages teacher accounts, student data, and feedback submissions.
    - Teacher: Creates and manages examinations, evaluates results, and reviews student performance.
    - Student: Takes exams, views past performances, and provides feedback.

1. Security & Authentication
   * + Encrypted user credentials ensure secure logins.
     + Role-based access control (RBAC) prevents unauthorized access to exams.
     + One-time attempt restriction prevents students from retaking the same exam unless permitted by the teacher.
2. Automated Exam Management
   * + Teachers can add/remove/edit question papers dynamically.
     + The system automatically evaluates multiple-choice answers.
     + Instant results are generated with performance ranking.
3. Optimized for Low Internet Connectivity

 The platform is lightweight and efficient, ensuring that users with slow internet connections can still access and complete exams smoothly.

1. Student Feedback System
   * + Students can submit feedback about exams and report issues.
     + Admins can review and act on suggestions for system improvement.

This proposed system ensures a fast, secure, and accessible online examination process, making assessments more efficient and fair.

1.4 Literature Review

Online examinations have become a crucial part of modern education, and several studies have explored their benefits, limitations, and security challenges.

1. Research on Online Exam Efficiency

Studies indicate that automated online examination systems can reduce manual workload by more than 60%, allowing educators to focus on teaching rather than administrative tasks. Instant result computation has also been found to improve student learning outcomes.

1. Security Challenges in E-Assessment

A survey on e-learning security highlights that poor authentication is one of the leading causes of online exam fraud. Researchers suggest implementing:

* Two-factor authentication (2FA)
* Session time limits
* Encrypted database storage to enhance security.

1. Role-Based Access in Education Technology

Studies show that role-based access control (RBAC) significantly improves system security by limiting unauthorized access. Our proposed system applies RBAC to ensure that students, teachers, and admins have restricted access based on their role.

1. Performance of Web-Based Examination Platforms

A comparative study of web-based examination systems found that lightweight applications with minimal graphics perform better in low-bandwidth environments. This aligns with our approach of optimizing the system for students with limited internet access.

5. Feedback Mechanism in E-Learning

Research emphasizes the importance of student feedback in improving education platforms. Our system includes a built-in feedback module, allowing students to report issues, suggest improvements, and provide exam-related feedback.

Conclusion of Literature Review

By analyzing previous studies, we have incorporated best practices from existing research into our proposed system. Our solution enhances efficiency, security, accessibility, and feedback mechanisms, making it an ideal online examination system for modern education.

1. System Requirements

This chapter outlines the hardware and software requirements necessary to deploy and run the Online Examination System efficiently. It also details the Software Requirements Specification (SRS), which defines the system's functional and nonfunctional aspects.

* 1. Hardware & Software Requirements

The Online Examination System is designed to function smoothly on standard computing hardware and is optimized for use in low-bandwidth environments.

2.1.1 Hardware Requirements

The hardware requirements vary depending on the role in the system:

1. Server-Side Requirements *(For Hosting the System)*

The server is responsible for handling database queries, user authentication, and exam processing.

|  |  |  |
| --- | --- | --- |
| Component | Minimum Requirement | Recommended Requirement |
| Processor | Intel Core i3 (or equivalent) | Intel Core i5/i7 (or higher) |
| RAM | 4GB | 8GB or more |
| Storage | 20GB HDD (for database & files) | 50GB SSD (for better performance) |
| Network | Minimum 1 Mbps | 10 Mbps (for smooth performance) |
| Operating System | Windows Server / Linux | Ubuntu 20.04 LTS / Windows Server |

1. Client-Side Requirements *(For Students, Teachers, and Admins)*

Since the system is web-based, it runs without requiring any high-end hardware. Users need only a basic computer or smartphone with an internet connection.

|  |  |  |
| --- | --- | --- |
| Component | Minimum Requirement | Recommended Requirement |
| Processor | Any Dual-Core CPU (1.6 GHz) | Intel Core i3 or higher |
| RAM | 2GB | 4GB or more |
| Storage | At least 500MB free space | 1GB free space |
| Display | 1024x768 resolution | 1920x1080 resolution |
| Internet | Minimum 512 Kbps | 2 Mbps or more |

2.1.2 Software Requirements

The system requires a server setup and a web browser for clients.

|  |  |
| --- | --- |
| Software Component | Required Version |
| Operating System | Windows, Linux (Ubuntu, CentOS) |
| Web Server | Apache (XAMPP/WAMP) |
| Database | MySQL 5.7 or higher |
| Programming Languages | PHP 7.4+, JavaScript, HTML5, CSS3 |
| Backend Framework | PHP with MySQL |

1. Server-Side Software Requirements
2. Client-Side Software Requirements

|  |  |
| --- | --- |
| Software Component | Required Version |
| Web Browser | Chrome, Firefox, Edge (latest) |
| JavaScript Enabled | Required |
| Device Compatibility | Desktop, Laptop, Tablet, Mobile |

* 1. Software Requirements Specification (SRS)

The Software Requirements Specification (SRS) outlines the system's functional and non-functional requirements.

2.2.1 Functional Requirements

These define the specific operations the system must perform.

1. User Authentication and Authorization
   * Secure login/logout system with role-based access (Admin, Teacher, Student).
   * Password encryption to protect user credentials.
   * Automatic session timeout for inactive users.
2. Examination Management
   * Teachers can create, edit, and delete exams.
   * Questions can be multiple-choice, true/false, or subjective.
   * Students can attempt an exam only once, unless reset by the teacher.
   * Automated timer-based exam sessions to enforce time limits.
3. Answer Evaluation and Results Processing
   * Automatic grading of multiple-choice questions.
   * Teachers manually review and grade subjective answers.
   * Students receive instant results upon submission.
   * Ranking system to compare student performance.
4. Feedback and Communication
   * Students can submit feedback after an exam.
   * Teachers can review feedback and improve questions.
   * Admins manage and monitor system feedback.
5. Security Features
   * Encrypted database storage to prevent data leaks.
   * IP logging and access control for secure exam sessions.
   * Restrict multiple logins from different locations to prevent cheating.

2.2.2 Non-Functional Requirements

These define the quality attributes of the system, such as security, performance, and scalability.

1. Security Requirements
   * Secure Authentication: Users must log in using encrypted passwords.  Data Encryption: All user information is stored securely in MySQL.
   * Access Control: Role-based access ensures that users cannot perform unauthorized actions.
2. Performance Requirements
   * Response Time: System should load exams within 3 seconds on a stable internet connection.
   * Concurrent Users: Should support at least 500 students taking exams simultaneously.
   * Exam Completion: The system should process answers and generate results instantly.
3. Scalability Requirements
   * The system should be able to handle a growing number of users without performance degradation.
   * Database optimization should ensure smooth operations as exam data grows.
4. Availability Requirements
   * The system should have 99.9% uptime, ensuring minimal downtime for students and teachers.
   * Should include backup mechanisms to prevent data loss.

1. System Design

The System Design phase outlines the architecture, structure, and interactions between different components of the Online Examination System. This section details the system modules and provides an overview of the Unified Modeling Language (UML) diagrams, which visually represent how the system functions.

3.1 Modules of System

The Online Examination System consists of multiple interconnected modules, each handling a specific function. The major modules are:

1. User Management Module

This module is responsible for user registration, login authentication, and role-based access control.

Admin: Can manage all users (Teachers and Students).

Teachers: Can create exams and manage students.

Students: Can take exams and view results.

1. Examination Module

Handles the creation, management, and execution of online exams.

Teachers create and schedule exams.

Students attempt the exams based on availability.

The system automatically enforces time limits.

1. Question Bank Module

Stores predefined questions and answer sets for multiple subjects.

Supports Multiple-Choice Questions (MCQs), True/False, and Subjective Questions.

Allows teachers to edit, add, and remove questions.

1. Answer Evaluation Module

Processes the answers submitted by students.

MCQs and True/False questions are graded automatically.

Subjective questions are reviewed and graded by teachers.

Instant result generation and ranking for students.

1. Feedback and Report Generation Module

Manages student feedback, exam history, and system reports.

Students can provide feedback on exams.

Teachers and admins can generate performance reports.

1. Security and Access Control Module

Ensures secure authentication and prevents unauthorized access.

Role-based access: Students, Teachers, and Admins have different permissions.

One-time login restriction: Prevents multiple logins from different devices.

Data encryption and backup management for system security.

3.2 UML Diagrams

UML diagrams provide a visual representation of system functionality. The key diagrams used in the system design are:

1. Use Case Diagram

Illustrates the interactions between users (Admin, Teacher, and Student) and the system.

Actors:

Admin: Manages users, exams, and system settings.

Teacher: Creates exams, evaluates subjective answers, and views results.

Student: Takes exams, views results, and provides feedback.

Use Cases:

User Authentication (Login/Logout)

Exam Creation and Management

Answer Submission and Evaluation

Result Processing and Ranking

Feedback Submission

1. Class Diagram

Defines the structure of the system, showing classes, attributes, and their relationships.

Main Classes and Attributes:

User (UserID, Name, Email, Role, Password)

Exam (ExamID, Subject, Duration, TotalMarks, TeacherID)

Question (QuestionID, ExamID, QuestionType, Marks, CorrectAnswer)

Answer (AnswerID, StudentID, ExamID, QuestionID, SubmittedAnswer)

Result (ResultID, StudentID, ExamID, Score, Rank)

Feedback (FeedbackID, StudentID, ExamID, Message, Date)

1. Sequence Diagram

Shows the flow of interactions between users and the system during an exam.

Exam Process Flow:

Student logs in and selects an available exam.

System verifies the student's credentials.

The exam starts, and questions are displayed.

Student submits answers.

System evaluates answers and generates results.

Student views their result and ranking.

1. Activity Diagram

Represents the step-by-step workflow of the examination process.

Student Exam Attempt Workflow:

Start → Student logs in.

Check Exam Availability → Display available exams.

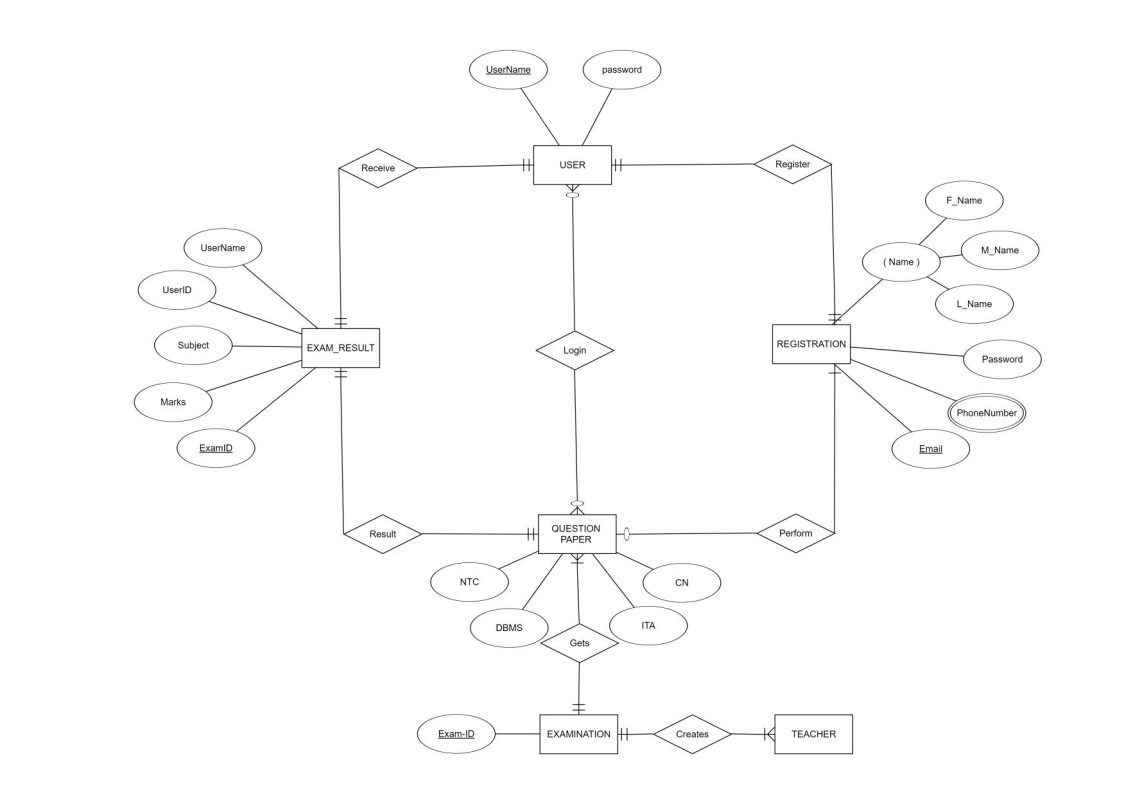
Attempt Exam → Answer questions.

Submit Answers → System records responses.

Evaluation → Automatic grading for MCQs; teacher grades subjective answers.

Result Generation → Display result and ranking.

End



1. Implementation

The Implementation phase involves the development and deployment of the Online Examination System based on the system design. This section covers the sample code for core functionalities and the test cases used to validate the system’s correctness, performance, and security.

4.1 Sample Code

Here, we provide sample code snippets for key functionalities, including user authentication, exam creation, and answer evaluation.

1. User Authentication (Login System in PHP)

This script validates user login and manages session handling.

<?php

session\_start(); include("config.php");

if ($\_SERVER["REQUEST\_METHOD"] == "POST") {

$email = mysqli\_real\_escape\_string($conn, $\_POST['email']);

$password = mysqli\_real\_escape\_string($conn, $\_POST['password']);

$query = "SELECT \* FROM users WHERE email='$email'";

$result = mysqli\_query($conn, $query);

$user = mysqli\_fetch\_assoc($result);

if ($user && password\_verify($password, $user['password'])) {

$\_SESSION['user\_id'] = $user['id'];

$\_SESSION['role'] = $user['role'];

if ($user['role'] == 'admin') {

header("Location: admin\_dashboard.php");

} elseif ($user['role'] == 'teacher') {

header("Location: teacher\_dashboard.php");

} else {

header("Location: student\_dashboard.php");

}

} else {

echo "Invalid email or password!";

}

}

?>

2. Exam Creation (Teacher Panel - PHP & MySQL)

Allows teachers to create an exam by adding questions to the database.

<?php

include("config.php");

if ($\_SERVER["REQUEST\_METHOD"] == "POST") {

$exam\_name = $\_POST['exam\_name'];

$subject = $\_POST['subject'];

$duration = $\_POST['duration'];

$query = "INSERT INTO exams (exam\_name, subject, duration) VALUES

('$exam\_name', '$subject', '$duration')";

if (mysqli\_query($conn, $query)) { echo "Exam Created Successfully!";

} else {

echo "Error: " . mysqli\_error($conn);

}

}

?>

3. Automatic Answer Evaluation (MCQs in PHP & MySQL)

This script checks answers submitted by students and calculates scores.

<?php

include("config.php"); session\_start();

$student\_id = $\_SESSION['user\_id'];

$exam\_id = $\_POST['exam\_id'];

$score = 0;

foreach ($\_POST['answers'] as $question\_id => $submitted\_answer) {

$query = "SELECT correct\_answer FROM questions WHERE id='$question\_id'";

$result = mysqli\_query($conn, $query);

$row = mysqli\_fetch\_assoc($result);

if ($submitted\_answer == $row['correct\_answer']) {

$score += 1;

}

}

mysqli\_query($conn, "INSERT INTO results (student\_id, exam\_id, score) VALUES

('$student\_id', '$exam\_id', '$score')"); echo "Your Score: " . $score;

?>

4.2 Test Cases

To ensure the reliability and efficiency of the Online Examination System, multiple test cases are executed across different functionalities.

1. User Authentication Testing

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Case ID | Description | Input | Expected Output | Status |
| TC-01 | Valid User Login | Correct Email & Password | Redirect to dashboard | ✅  Pass |
| TC-02 | Invalid User Login | Incorrect Email or Password | Error Message Displayed | ✅  Pass |
| TC-03 | SQL Injection Test | ' OR 1=1;-- as input | Block Unauthorized Access | ✅  Pass |

1. Exam Management Testing

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Case ID | Description | Input | Expected Output | Status |
| TC-04 | Create Exam | Valid Subject, Name & Duration | Exam Added to Database | ✅  Pass |
| TC-05 | Exam Time  Restriction | Student submits late | "Time Expired"  Message | ✅  Pass |

1. Answer Evaluation Testing

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Case ID | Description | Input | Expected Output | Status |
| TC-06 | MCQ Answer Submission | Correct Option Selected | Score Incremented | ✅  Pass |
| TC-07 | Incorrect Answer Submission | Wrong Option Selected | No Score Increment | ✅  Pass |
| TC-08 | SQL Injection Attempt | ' OR '1'='1'-- | Blocked Submission | ✅  Pass |

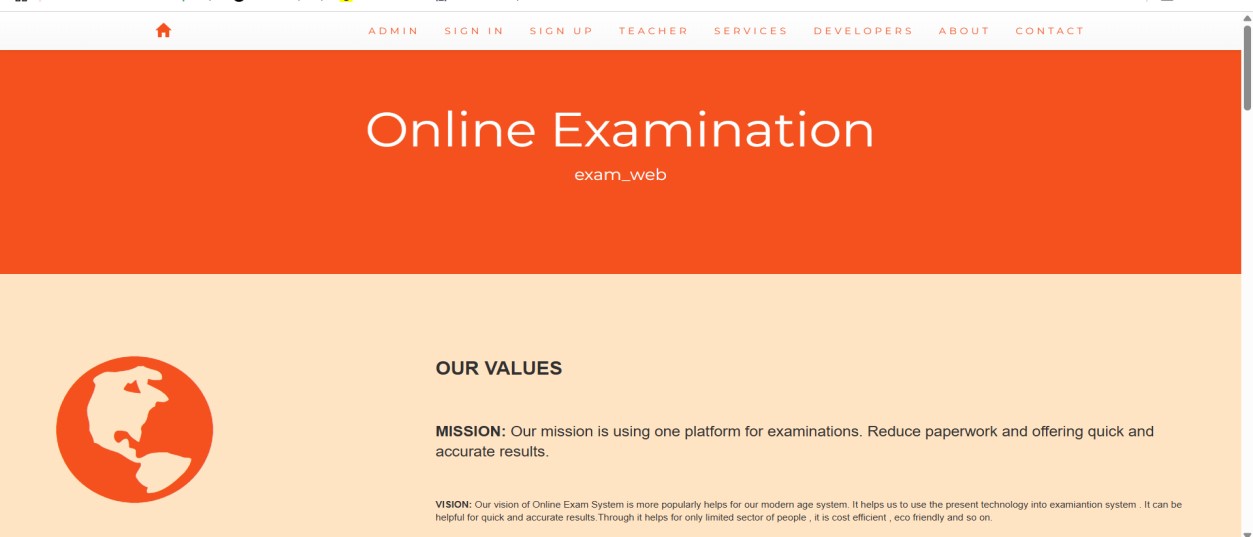
1. Performance & Security Testing

|  |  |  |  |
| --- | --- | --- | --- |
| Test Case ID | Description | Expected Outcome | Status |
| TC-09 | 100 Concurrent Exam Attempts | System handles load smoothly | ✅  Pass |
| TC-10 | Unauthorized Data Access | Blocked access to sensitive data | ✅  Pass |
| TC-11 | Encryption of User Passwords | Passwords stored as encrypted hash | ✅  Pass |

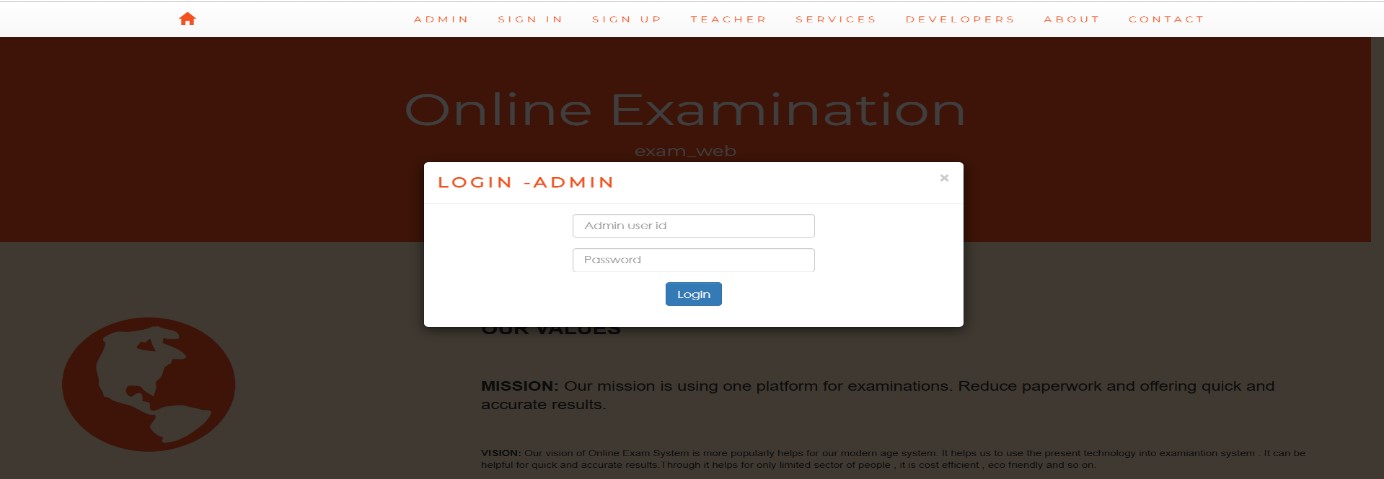
1. Results

5.1 Output Screens

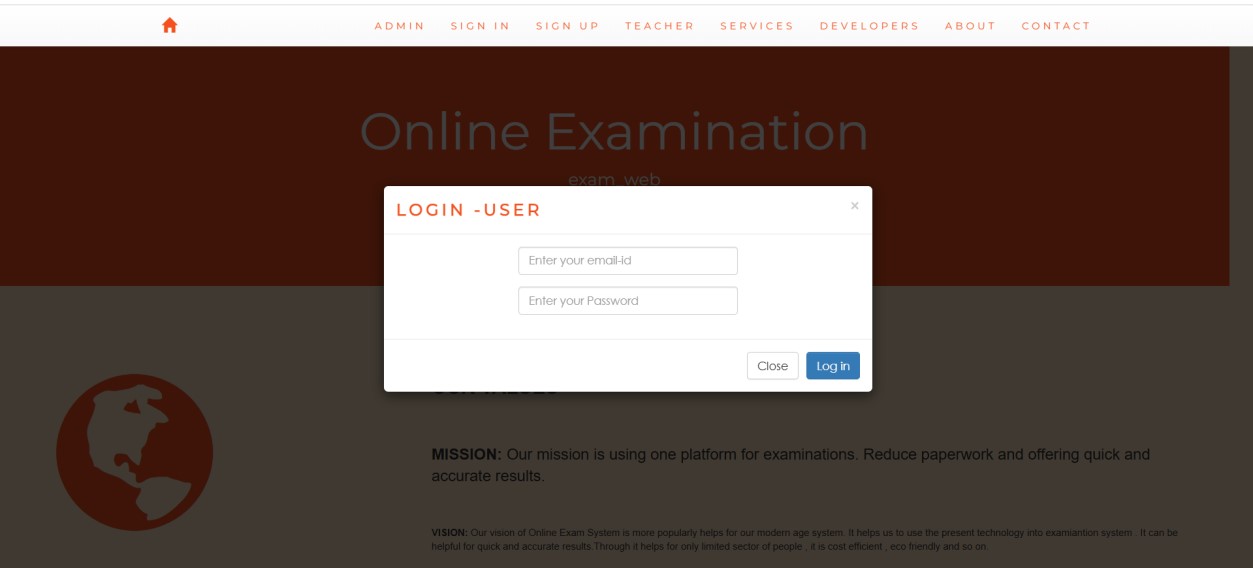
## LANDING SLIDE



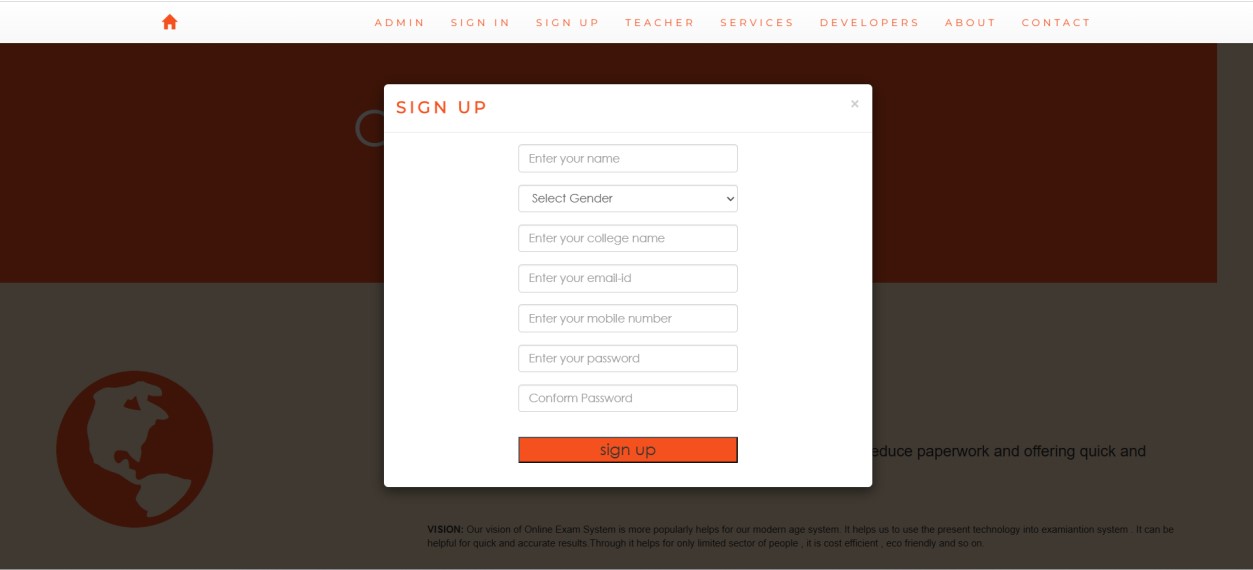
## ADMIN LOGIN PAGE



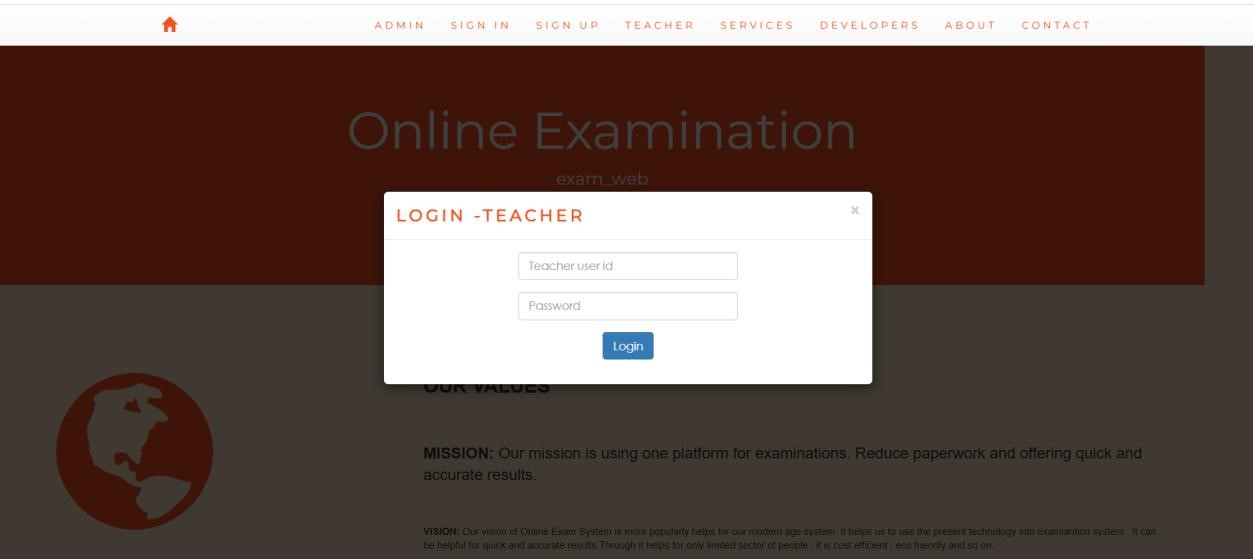
USER LOGIN



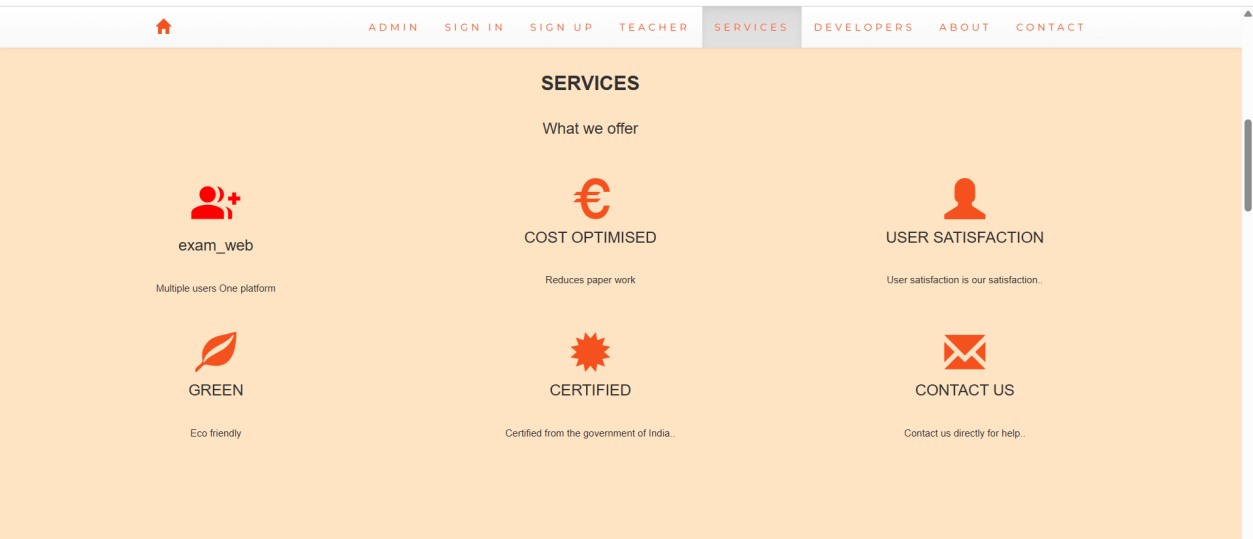
## SIGN UP PAGE



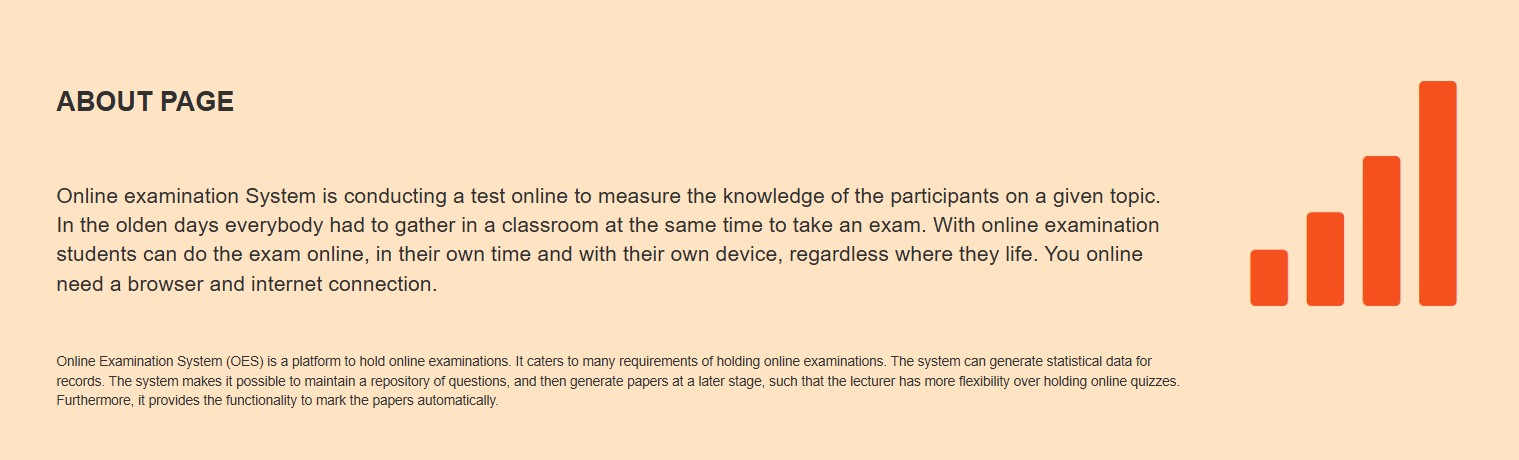
## TEACHER LOGIN



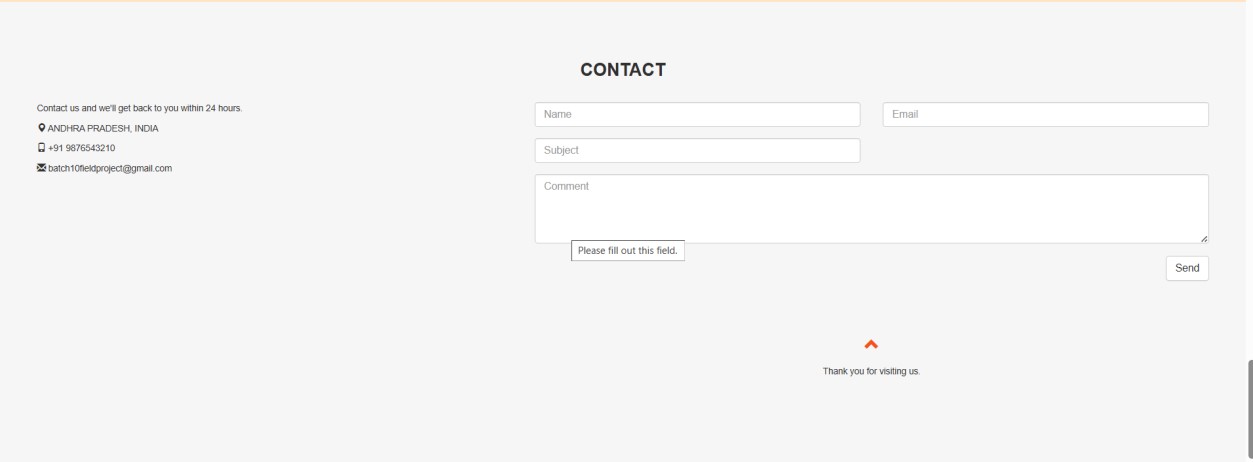
## SERVICES



## ABOUT PAGE



## CONTACT PAGE



1. Conclusion

The Online Examination System successfully overcomes the limitations of traditional paper-based exams by providing a secure, scalable, and efficient platform for conducting assessments. The system integrates user authentication, exam management, automatic evaluation, and result generation to streamline the examination process.

Key Achievements

* + Automated Evaluation & Instant Results: Reduces the burden of manual grading by automating the assessment process.
  + Multi-Role User Management: Admins, teachers, and students have distinct functionalities, ensuring smooth system operations.
  + Secure Authentication & Data Encryption: Protects sensitive information using hashed passwords and role-based access control.
  + Scalability & Performance Optimization: Can handle multiple concurrent users without performance degradation.
  + Accessibility & User-Friendly Interface: Designed to work efficiently even in low-internet environments, making it suitable for students in remote areas.

Future Enhancements

* + AI-Based Proctoring: Integrating facial recognition and behavior analysis to prevent cheating.
  + Mobile Application Development: Extending the system for better accessibility on mobile devices.
  + Integration with Learning Management Systems (LMS): To provide a more comprehensive educational experience.

This system improves efficiency, security, and accessibility, making it an ideal solution for educational institutions and corporate training programs.

1. References
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   5. Online Examination System Best Practices
      * Open Source Community Discussions on Exam Platforms & E-learning Tools

Project Link:

## https://github.com/sai996350/online-exam