

CASE STUDY ON

Online Examination Management System

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INTRODUCTION

- The Online Examination Management System is a web-based application developed using Spring Boot to digitize the complete examination process for educational institutions.
- The system enables administrators to create and manage examinations by defining details such as exam title, academic year, date, duration, and question structure.
- Students can securely register, browse available examinations, and attempt time-bound assessments through an intuitive web interface.
- The application implements role-based authentication to ensure that only authorized administrators and registered students can access system functionalities.
- A structured examination workflow allows students to view exam details, answer multiple-choice questions with an automatic timer, and receive instant results after submission.
- Administrators can manage question banks, monitor student performance, and track examination activities across multiple academic years using centralized dashboards.

ABSTRACT

The Online Examination Management System is a web-based application designed to automate the entire examination process for educational institutions. Developed using the Spring Boot framework, with Hibernate/JPA for object-relational mapping and MySQL for data storage, the system provides a secure and efficient platform for managing online assessments.

The application supports role-based access, allowing administrators to create and manage examinations, add multiple-choice questions, and monitor student performance, while students can register, log in, attempt time-bound examinations, and view instant results. Automated evaluation ensures accurate and transparent result generation, reducing manual effort and human error.

By digitizing examination workflows, the system improves efficiency, enhances scalability, and provides a reliable solution for conducting academic assessments in a modern educational environment.

WHAT WE ARE GOING TO BUILD:CLIENT REQUIREMENTS

- The system should allow students to register, log in, and log out securely.
- The system should provide role-based access for administrators (teachers) and students.
- Administrators should be able to create, schedule, update, and delete examinations.
- Administrators should be able to add and manage multiple-choice questions for each exam.
- Students should be able to view available examinations based on their academic year.
- Examinations should be time-bound with an automatic countdown timer.
- The system should restrict students to a single attempt per examination.
- The system should support automatic evaluation of answers after submission.
- Students should be able to view instant results and assessment history.
- Administrators should be able to view and monitor results of all students.
- The system should store all examination data securely using a relational database.
- The application should be web-based and accessible via a browser.

WHAT WE ARE GOING TO BUILD: SOME TECHNICAL TERMS

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WHAT ARE THE TECHNOLOGIES AND TOOLS WE ARE GOING TO USE

- Framework: Spring Boot for building the backend application and managing server-side logic.
- Programming Language: Java for implementing application logic and controllers.
- Build Tool: Maven for dependency management and project build automation.
- ORM Tool: Hibernate / JPA for object-relational mapping and database interaction.
- Database: MySQL as a relational database for secure and persistent data storage.
- Frontend Technology: JSP, HTML, and CSS for designing dynamic and responsive web pages.
- Application Server: Embedded Apache Tomcat provided by Spring Boot.
- IDE: Eclipse for application development and debugging.
- Version Control (Optional): Git and GitHub for source code management.
- Web Browser: Google Chrome / Firefox / Edge for accessing the application.

SYSTEM REQUIREMENTS

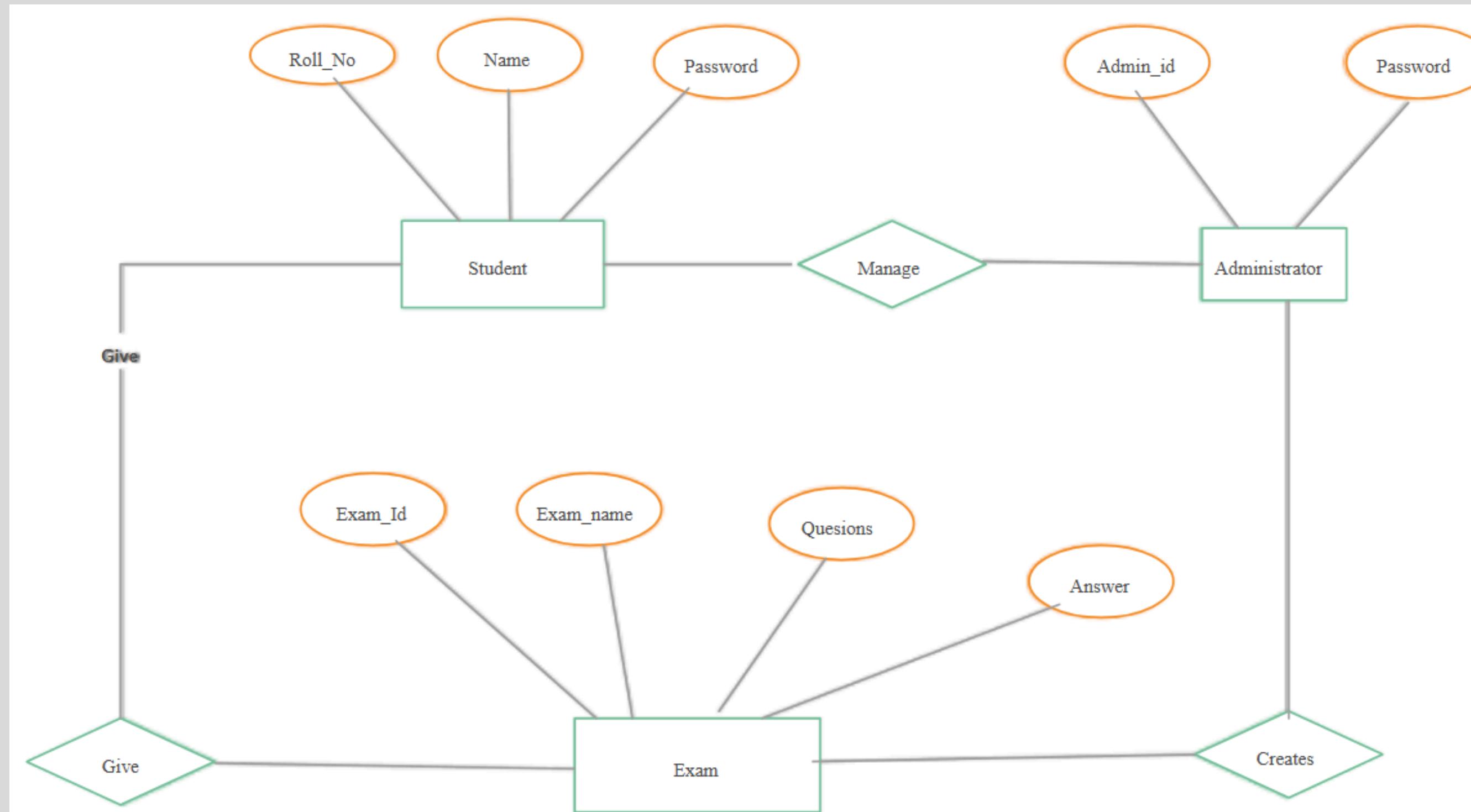
SOFTWARE REQUIREMENT:

- Operating System: Windows / Linux / macOS
- Java Development Kit (JDK): JDK 8 or above
- Backend Framework: Spring Boot
- Database Management System: MySQL 8.0 or compatible version
- ORM Framework: Hibernate / JPA
- Web Server: Embedded Apache Tomcat
- Build Tool: Maven
- IDE: Eclipse / Spring Tool Suite (STS)
- Web Browser: Google Chrome / Mozilla Firefox / Microsoft Edge
- Version Control (Optional): Git and GitHub

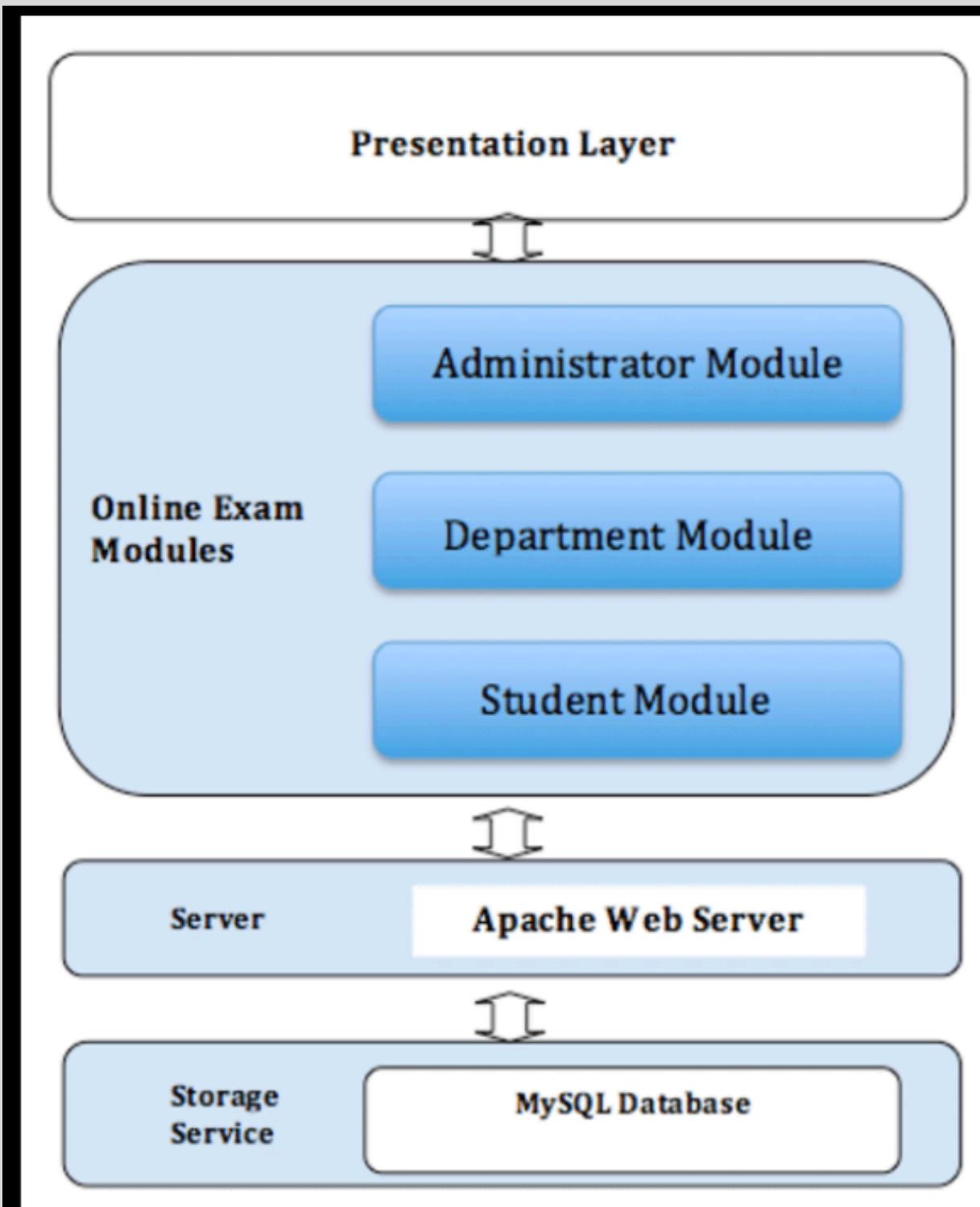
PROJECT MODULE

- Admin (Teacher) Module
- Student Module
- Exam Management Module
- Question Management Module
- Result Management Module

ER DIAGRAM



ARCHITECTURE DIAGRAM



ADMIN MODULE

The Admin (Teacher) Module is responsible for managing the complete examination lifecycle in the Online Examination Management System. Administrators can securely log in to the system using authenticated credentials and access a centralized dashboard for examination control. This module allows administrators to create, schedule, update, and delete examinations by specifying details such as exam title, academic year, date, duration, total questions, and total marks. Administrators can also add and manage multiple-choice questions for each examination, ensuring proper validation before submission.

The Admin module provides functionality to monitor student performance by viewing results of all students across different examinations. It enables administrators to track scores, percentages, and submission timestamps, ensuring transparency and accuracy in evaluation. By centralizing exam and result management, this module ensures efficient administration and smooth execution of online assessment.

STUDENT MODULE

The Student Module provides functionality for students to securely access and participate in online examinations. Students can register by providing their academic and personal details and log in using authenticated credentials to access the system.

After logging in, students can view available examinations based on their academic year. The module allows students to start examinations within the scheduled time and attempt questions through a time-bound examination interface with an automatic countdown timer.

Each student is restricted to a single attempt per examination to maintain exam integrity. Upon submission, the system automatically evaluates the answers and displays instant results, including scores and percentages. Students can also view their assessment history, enabling them to track their academic performance over time.

EXAM MANAGEMENT MODULE

The Exam Management Module is responsible for handling all operations related to the creation and maintenance of examinations within the system. This module allows administrators to define examination details such as exam title, academic year, date, duration, total number of questions, and total marks.

Administrators can create new examinations, update existing exam details, and delete examinations when required. All examinations are displayed in a structured tabular format, enabling easy management and quick access.

The module ensures that examinations are properly scheduled and associated with their respective academic years. It also integrates seamlessly with the Question Management and Result Management modules, providing a smooth and organized examination workflow.

QUESTION MANAGEMENT MODULE

The Question Management Module enables administrators to create and manage questions for each examination. Administrators can add multiple-choice questions by providing the question text, four answer options, and the correct answer.

This module ensures proper validation so that incomplete or incorrect question entries are not submitted. Each question is associated with a specific examination, maintaining organized and structured question banks. The module supports easy updating and deletion of questions, allowing administrators to modify assessments when required.

RESULT MANAGEMENT MODULE

The Result Management Module is responsible for evaluating examinations and managing student performance data. After a student submits an exam, the system automatically evaluates the answers and calculates the total score and percentage.

Students can view their individual results immediately after submission, while administrators can access results of all students for monitoring and analysis. The module maintains a complete history of examination results, including scores and submission timestamps, ensuring transparency, accuracy, and reliable record keeping.

DATA DICTIONARY

HOME PAGE

The screenshot shows a web-based application interface. At the top, a blue header bar contains the text "Academic Assessment Management Platform". Below the header, there are three light blue rectangular buttons with rounded corners, each containing a link: "Student Portal Access", "Faculty Portal Access", and "Student Enrollment". The main content area features three white rectangular boxes with blue borders and rounded corners, arranged horizontally. Each box contains a title and a descriptive paragraph. The first box is titled "Academic Notice" and states: "New cohort of First Year students must complete enrollment procedures prior to portal access". The second box is titled "Assessment Guidelines" and states: "For supplementary examinations, utilize your existing authentication credentials". The third box is titled "Technical Support" and states: "Students experiencing authentication difficulties should consult their respective academic advisors".

Academic Assessment Management Platform

Student Portal Access

Faculty Portal Access

Student Enrollment

Academic Notice

New cohort of First Year students must complete enrollment procedures prior to portal access

Assessment Guidelines

For supplementary examinations, utilize your existing authentication credentials

Technical Support

Students experiencing authentication difficulties should consult their respective academic advisors

REGISTER PAGE

Student Enrollment Portal

Academic Email Address:

Full Legal Name:

Academic Year:

First Year

Gender Identity:

Male Female

Residential Address:

Authentication Code:

Academic Profile Image:

No file chosen

Complete Enrollment

LOGIN PAGE (STUDENT)

Academic Assessment Management Platform

Student Portal Authentication

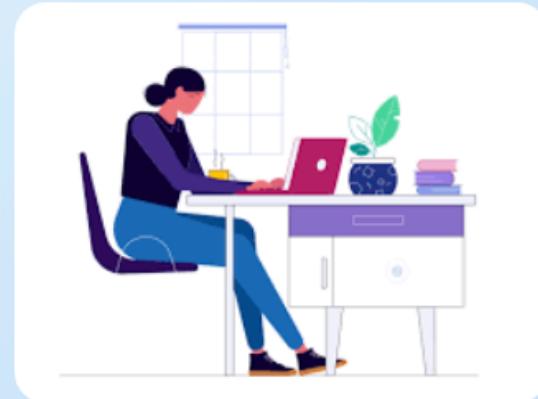
Student Identification:

Authentication Code:

Maintain session credentials

Access Portal

-----New Student? [Complete Enrollment](#)-----



LOGIN PAGE (ADMIN)

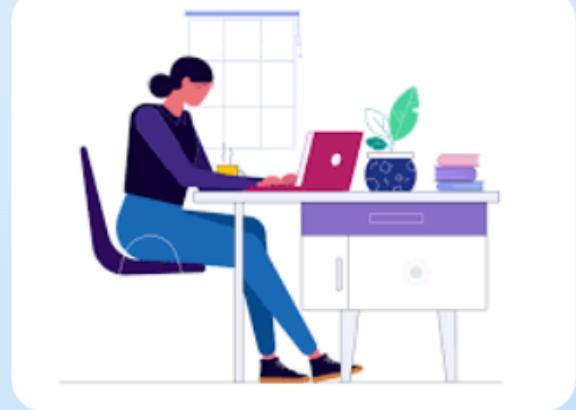
Academic Assessment Management Platform

Faculty Portal Authentication

Faculty Identification:

Authentication Code:

Access Portal



ACADEMIC DASHBOARD (STUDENT)

Student Academic Portal

Academic Dashboard - Aditi Anand



Assessment Center

Access assigned academic evaluations and commence examination procedures



Assessment Results

View your academic performance and examination scores

SCHEDULED ASSESEMENT

View Scheduled Assessments

Scheduled Assessments for Current Academic Year

Assessment ID	Assessment Title	Assessment Date	Duration	Total Questions	Assessment Type	Total Marks	Academic Year	Status	Action
152	English	2025-12-03	1 hour	20 questions	MCQ	30 marks	Second Year	Not Attempted	<button style="background-color: green; color: white; padding: 5px 10px; border-radius: 5px;">Start Assessment</button>
202	English	2025-12-03	1 hour	20 questions	MCQ	30 marks	Second Year	Not Attempted	<button style="background-color: green; color: white; padding: 5px 10px; border-radius: 5px;">Start Assessment</button>

[End Session](#)

EXAM PAGE

Online Examination Management System

English

Duration: 1 hour

Time Left: 00:50

Q1. What is Spring Boot mainly used for?

- A) Database management
- B) Frontend design
- C) Simplifying Spring application development
- D) Writing SQL queries

Submit Exam

SCORE PAGE

Exam Completed Successfully!

Your Score

1/1

100.0%

Submission Time: 2025-12-19T13:46:20.075465700

Total Questions: 1

Correct Answers: 1

Incorrect Answers: 0

[View All Results](#) [Back to Home](#)

ADMIN PAGE

Faculty Dashboard

☰

Assessment Configuration

Design and schedule comprehensive academic evaluations with customized parameters

☰

Assessment Management

Review active assessments, analyze performance metrics, and administer evaluation protocols

☰

Student Results

Monitor student performance and analyze assessment outcomes across all evaluations

☰

Session Termination

Securely conclude portal session

SCHEDULE ASSESEMENT

Schedule Assessment

Assessment Title

Assessment Date
 (Calendar icon)

Assessment Duration

Total Questions

Assessment Type

Total Marks

Academic Year

Create Assessment

RESULT PAGE

Academic Assessment Management Platform

[Return to Dashboard](#)

Assessment Results

ASSESSMENT ID	ASSESSMENT TITLE	ASSESSMENT DATE	DURATION	SCORE	TOTAL QUESTIONS	PERCENTAGE	PERFORMANCE
152	English	2025-12-03	1 hour	1	1	100.0%	Excellent
152	English	2025-12-03	1 hour	1	1	100.0%	Excellent
152	English	2025-12-03	1 hour	1	1	100.0%	Excellent
202	English	2025-12-03	1 hour	0	0	Nan%	Excellent
152	English	2025-12-03	1 hour	1	1	100.0%	Excellent
152	English	2025-12-03	1 hour	1	1	100.0%	Excellent
152	English	2025-12-03	1 hour	1	1	100.0%	Excellent
152	English	2025-12-03	1 hour	1	1	100.0%	Excellent
152	English	2025-12-03	1 hour	1	1	100.0%	Excellent
152	English	2025-12-03	1 hour	1	1	100.0%	Excellent
152	English	2025-12-03	1 hour	1	1	100.0%	Excellent

THE END
THANK YOU