

Learning Management System

Course Name: Database Management System(MA518)

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Project Overview

This project aims to bridge the gap between traditional learning methods and technology by providing an innovative platform for instructors and students. By focusing on evaluation, the LMS enhances classroom engagement, ensures timely assessments, and collects valuable feedback for continuous improvement. The system is designed to be user-friendly, scalable, and efficient, meeting the demands of modern educational institutions.

Project Description

A Learning Management System (LMS) is a software application designed to streamline and enhance the process of learning and evaluation. It enables instructors to manage courses, users, and assessments while providing students with an interactive and efficient learning environment.

This project focuses on developing a feature-rich LMS with key functionalities for **evaluation and feedback management**. It includes three primary modules:

1. **Quiz Module**
2. **Assignment Module**
3. **Survey Module**

Each module is tailored to address specific needs of academic evaluation and engagement, making the system a comprehensive solution for modern learning environments.

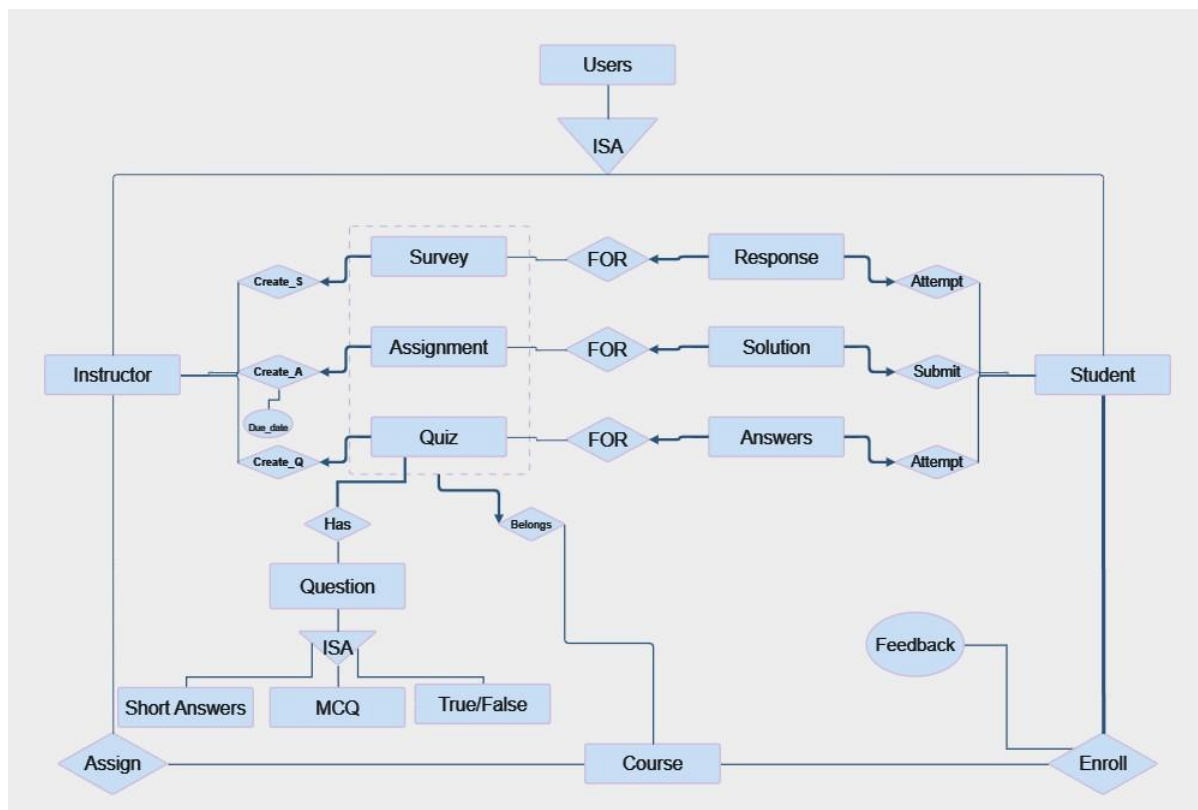
Project Objectives

The primary objectives of this project are as follows:

1. **Intuitive User Interface Development**
 - Design an accessible and user-friendly interface for both instructors and students, ensuring seamless interaction with the LMS across various devices.
2. **Advanced Quiz Functionality**
 - Build a robust quiz system that supports multiple question types (e.g., multiple-choice, true/false, short answers)
 - allows multiple attempts.
3. **Streamlined Assignment Management**
 - Enable instructors to set assignment deadlines, accept submissions in diverse file formats (e.g., PDF, PPT, TXT), and efficiently track student progress and compliance.
4. **Survey Module Integration**
 - Implement a survey feature to gather feedback after lectures, enabling timely analysis and fostering active student engagement.

System Design and Database Architecture

Entity-Relationship Diagram



This ER diagram represents the flow of key processes in a Learning Management System (LMS), which connects

Instructors, Students, and Courses through different activities such as **Assignments, Quizzes, and Surveys**.

1. Users:

- **Users** are divided into two roles: **Instructors** and **Students**.

2. Instructor's Role:

- Instructors are responsible for generating course materials like **Surveys, Assignments, and Quizzes**.
- They create quizzes by adding **Questions** and assignments are provided with a **Due Date**.

3. Student's Role:

- **Students** interact with the system by enrolling in **Courses**, once enrolled, they can attempt **Surveys, Quizzes, and submit Assignments**
- Students attempt **Quizzes** by answering the associated **Questions**, and similarly, they respond to **Surveys** and submit solutions for **Assignments**.

4. Evaluation:

- **Responses to Surveys, Answers to Quizzes, and Solutions to Assignments** are tracked for each student.
- The **Questions** are connected **Quizzes**, showing their importance in student evaluation.

Database Schema and Table Structure

The database contains a total of 14 tables, which are as follows:

Tables_in_lms
assignment_solution
courses
create_assignment
create_quiz
create_survey
enrollment
instructor
marks
question
question_answer
quiz_question_link
student
survey_response
users

Below are the schemas of some of the tables:

```
MariaDB [lms]> describe users;
```

Field	Type	Null	Key	Default	Extra
Email_id	varchar(255)	NO	PRI	NULL	
Password_	varchar(255)	NO		NULL	
Name	varchar(255)	NO		NULL	
Role	enum('Instructor','Student')	YES		NULL	

4 rows in set (0.012 sec)

```
MariaDB [lms]> describe create_quiz;
```

Field	Type	Null	Key	Default	Extra
quiz_id	int(11)	NO	PRI	NULL	auto_increment
Instructor_id	int(11)	YES	MUL	NULL	
Course_id	varchar(255)	YES	MUL	NULL	
quiz_name	varchar(255)	YES		NULL	

4 rows in set (0.011 sec)

```
MariaDB [lms]> describe quiz_question_link;
```

Field	Type	Null	Key	Default	Extra
quiz_id	int(11)	NO	PRI	NULL	
Question_id	int(11)	NO	PRI	NULL	

2 rows in set (0.013 sec)

```
MariaDB [lms]> describe question_answer;
```


Field	Type	Null	Key	Default	Extra
Question_id	int(11)	NO	PRI	NULL	
Student_id	int(11)	NO	PRI	NULL	
answer	text	YES		NULL	

3 rows in set (0.012 sec)

Project Features and Functionality

User Registration and Authentication

Learning Management System [Customer Support](#) [Contact Sales](#) [Log in](#) [Get started as Instructor](#) [Get started as Student](#)



Free Education for Everyone Free

Stay on top of your learning with a platform that offers real-time evaluations, assignments, and personalized feedback.

[Get started free](#)

- ✓ Engage, learn, and succeed with our LMS
- ✓ From quizzes to assignments, our platform provides everything you need
- ✓ Leverage custom modules to deliver a great user experience

[Is this page relevant to you?](#)

This is the **homepage** of our project, where new users can register as either instructors or students, and existing users can log in.

Learning Management System [Contact Sales](#) [Log in](#) [Sign up](#)

"Join our Learning Community"

- ✓ Sign up to access courses, assignments, and interactive quizzes
- ✓ designed to help you succeed.
- ✓ Let's start your learning journey!

* Name (required)
Your name

* Email (required)
s.ashok@iitg.ac.in

* Password (required)

[Get started free](#)

By signing up, you agree to our [terms of service](#) and [privacy policy](#).

This is the **signup** page for the instructor.

Learning Management System [Contact Sales](#) [Log in](#) [Sign up](#)

"Join our Learning Community"

- ✓ Sign up to access courses, assignments, and interactive quizzes
- ✓ designed to help you succeed.
- ✓ Let's start your learning journey!

* Name (required)
Ankur Raj

* Email (required)
r.ankur@iitg.ac.in

* Password (required)

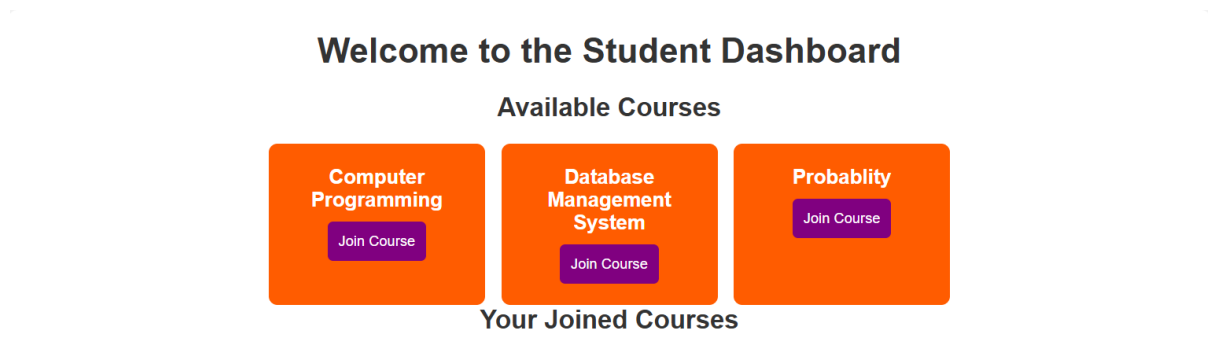
[Get started free](#)

By signing up, you agree to our [terms of service](#) and [privacy policy](#).

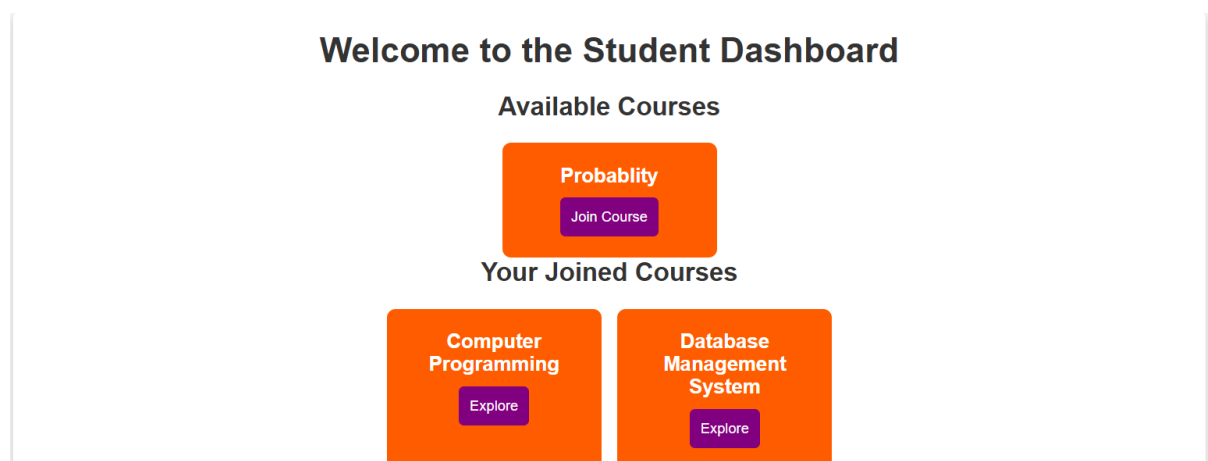
This is the **signup** page for students.

Student Dashboard

This is the student's dashboard, where students can see the available courses.

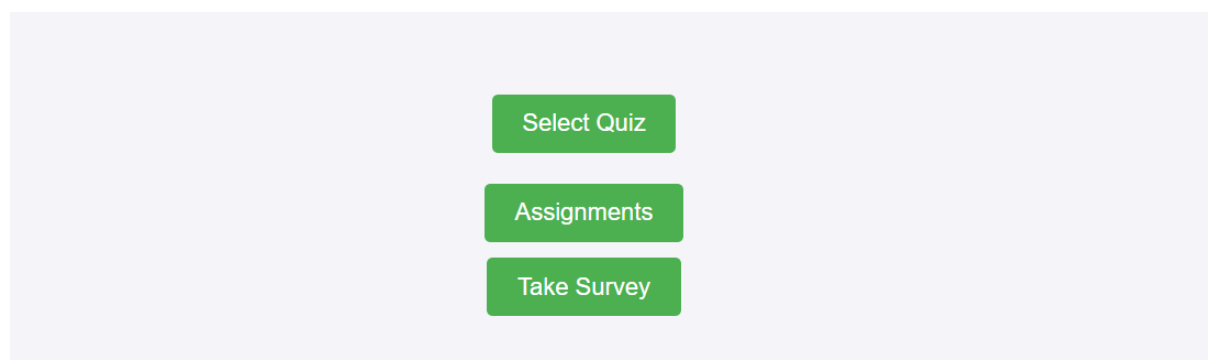


By clicking the 'Join Course' button, students enroll in a course, and it will appear under 'Your Joined Courses' on the same page. Students can then explore the content of the courses they are enrolled in.

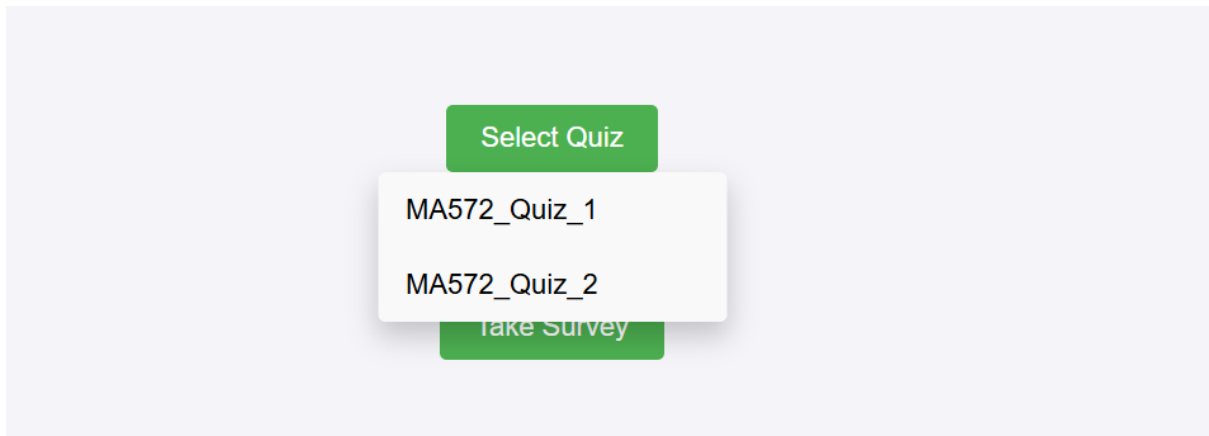


Course Content

After clicking the explore button of a particular joined course it will redirect them in this page, where they can attempt available quizzes, assignments and survey.



While hovering the cursor upon the 'Select Quiz' button, it will show all the available quizzes for that course.



Upon clicking a specific quiz, users will be redirected to the quiz page to begin answering the questions.

Quiz Questions

What is the role of the application logic layer in a three-tier architecture?

Your answer here...

Which of the following best defines a database? (A) A collection of programs (B)A type of software (C) A collection of data (D)A type of computer

☐ Option A

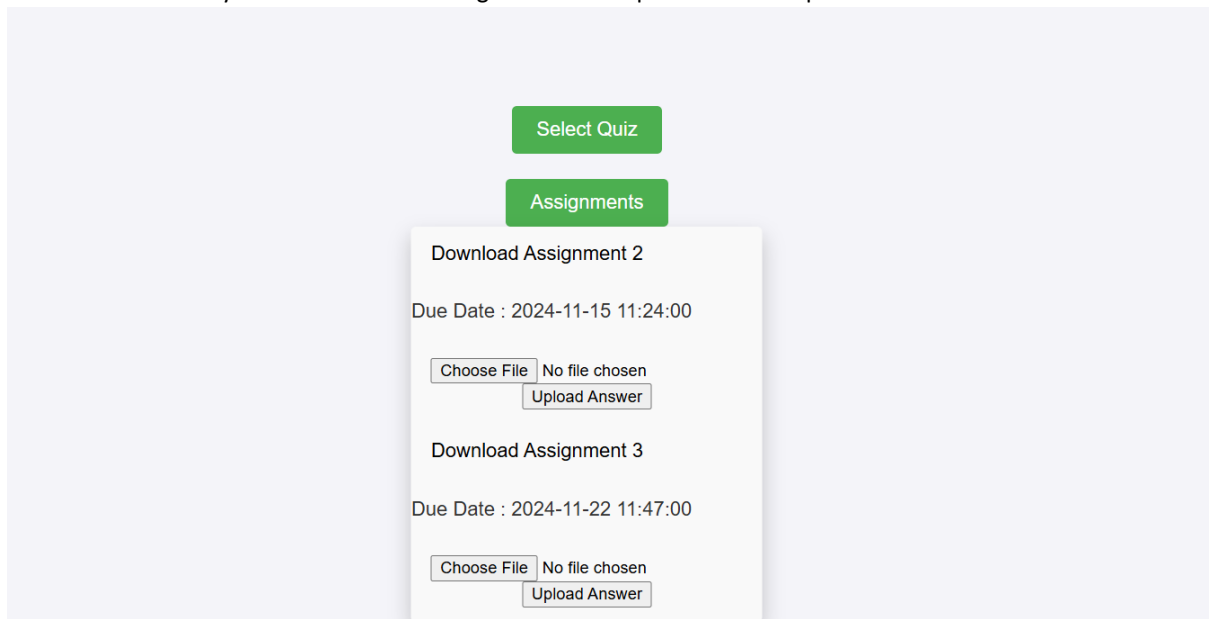
☐ Option B

☐ Option C

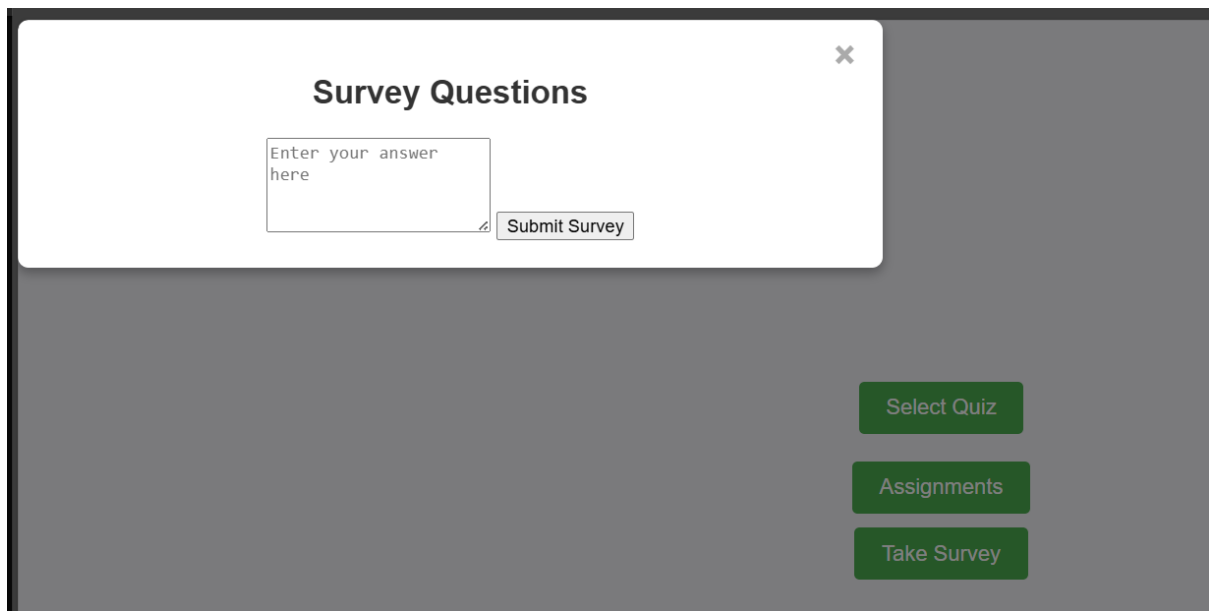
☐ Option D

Submit Answers

Hovering the cursor over the 'Assignments' button allows students to view the available assignments along with their due dates. They can download the assignments and upload their completed answers.

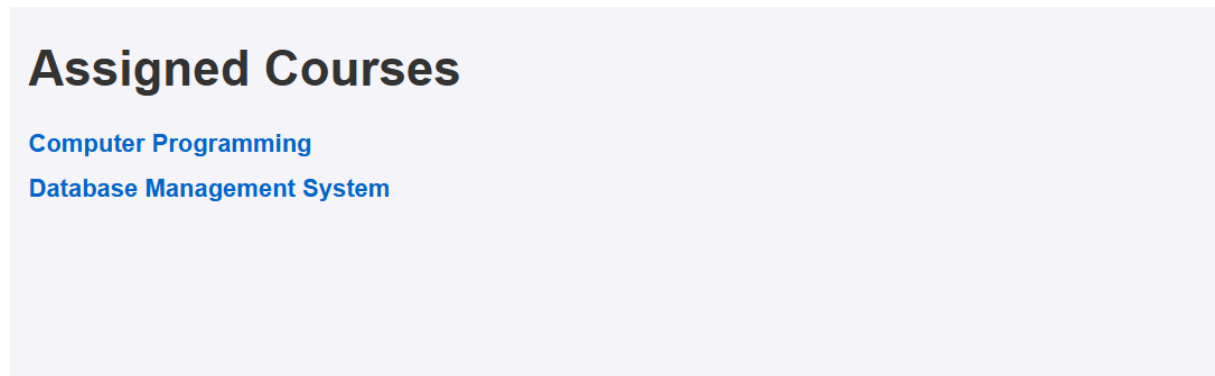


By clicking the 'Survey' button, they can answer the survey.

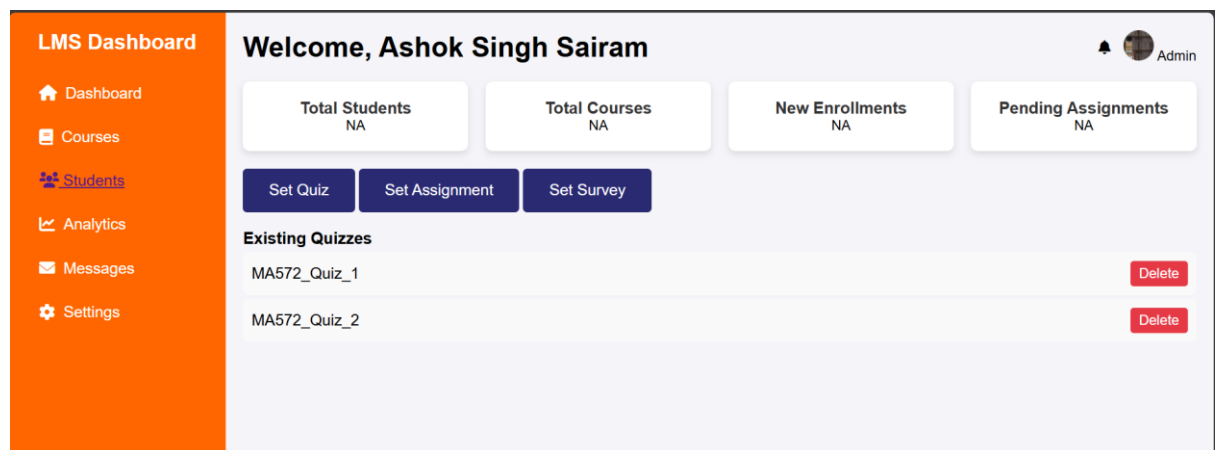


Instructor Dashboard

Below is the instructor's dashboard, where they can view the courses they are assigned to teach.

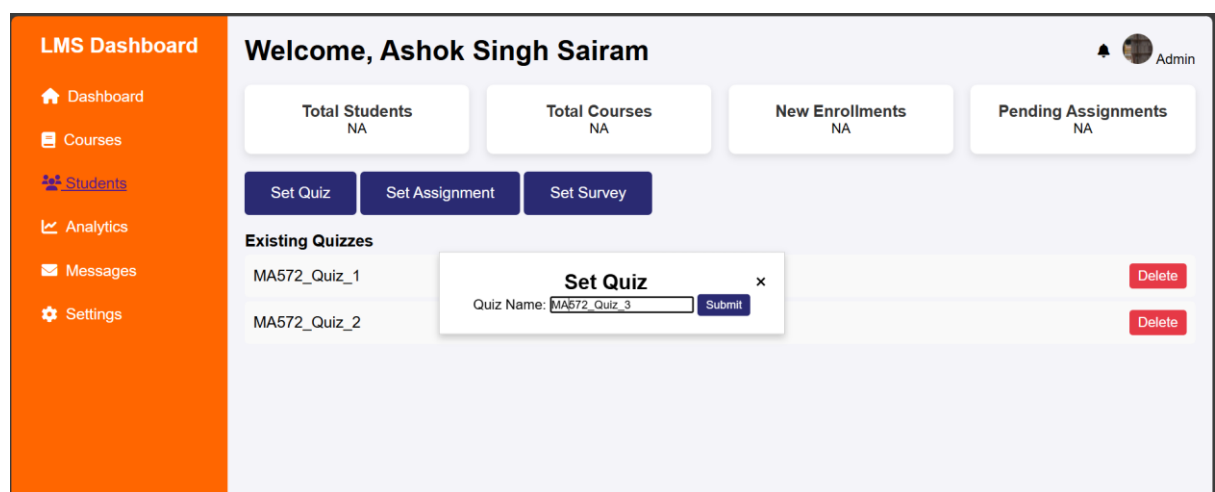


By clicking on a specific course, the instructor will be redirected to the course page, which is shown below.



In this page they can see the existing quizzes and the options to set Quiz, Upload Assignments and Set surveys.

Clicking the 'Set Quiz' button opens a modal window where the quiz name can be entered.



After clicking the 'Submit' button, the instructor will be redirected to the next page, where they can add questions for the quiz.

Select Questions for Quiz

☐ What is the role of the application logic layer in a three-tier architecture? *(Short Answers)*

☐ Give an example of logical data independence with respect to relational databases. *(Short Answers)*

☐ A super key uniquely identifies a tuple in a relation, and this is not true for any subset of the key. *(T/F)*

☐ Name the four type of anomalies that are associated with storing redundant information in a database. *(Short Answers)*

☐ Which of the following best defines a database? (A) A collection of programs (B) A type of software (C) A collection of data (D) A type of computer *(MCQ)*

☐ Which of the following is a correct syntax to select all columns from a table named "Customers"? (A) SELECT * FROM Customers (B) SELECT Customers (C) SELECT all FROM Customers (D) GET * FROM Customers *(MCQ)*

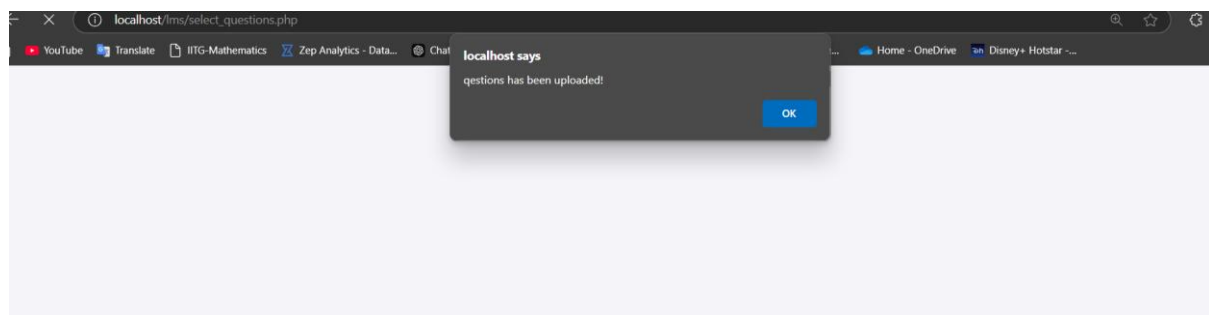
☐ In an ER diagram, an entity set that does not have sufficient attributes to form a primary key is marked as: (A) Weak entity (B) Strong entity (C) Derived entity (D) Composite entity *(MCQ)*

☐ According to dependency theory, it is always bad if a relation has more than one key. *(T/F)*

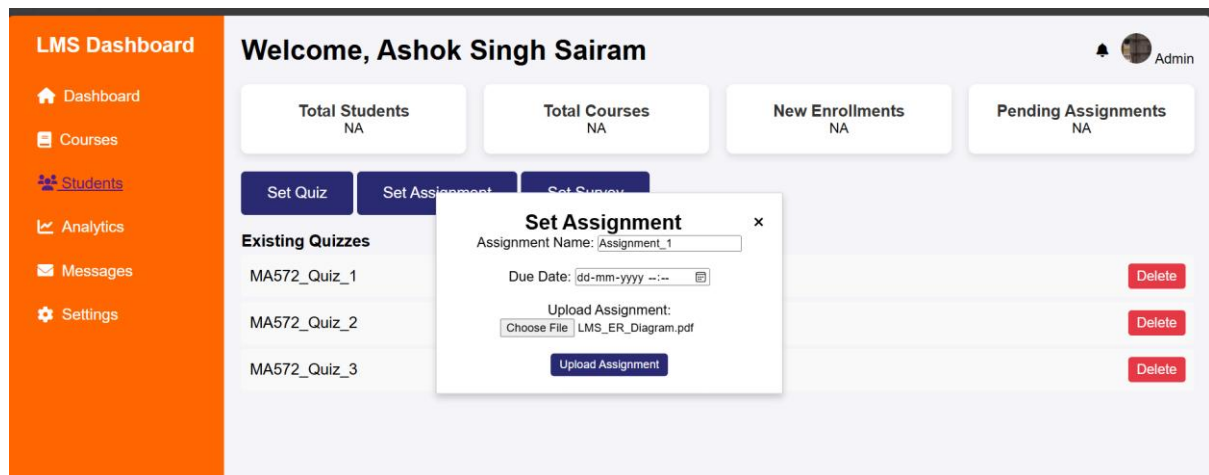
☐ An extensible hash table always squares the number of buckets when it has to grow *(T/F)*

☐ A Cartesian product of two relations is the same as their union. TRUE/FALSE. *(T/F)*

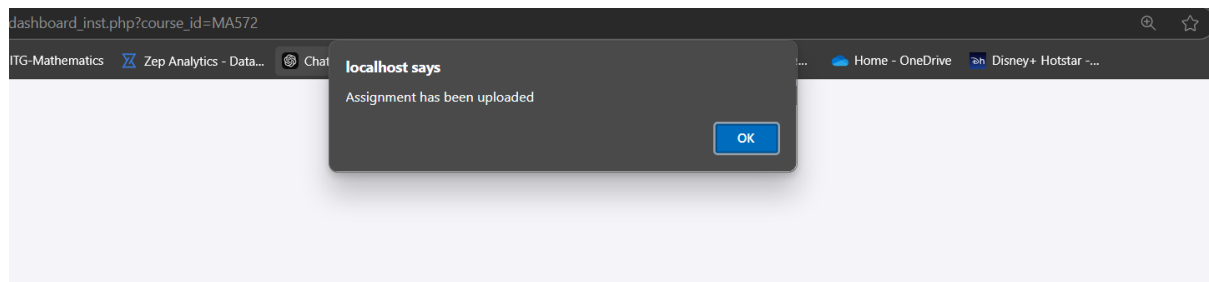
Once the 'Add to Quiz' button is clicked, the quiz will be saved in the database and will also appear on the student's side making it accessible for students to attempt.



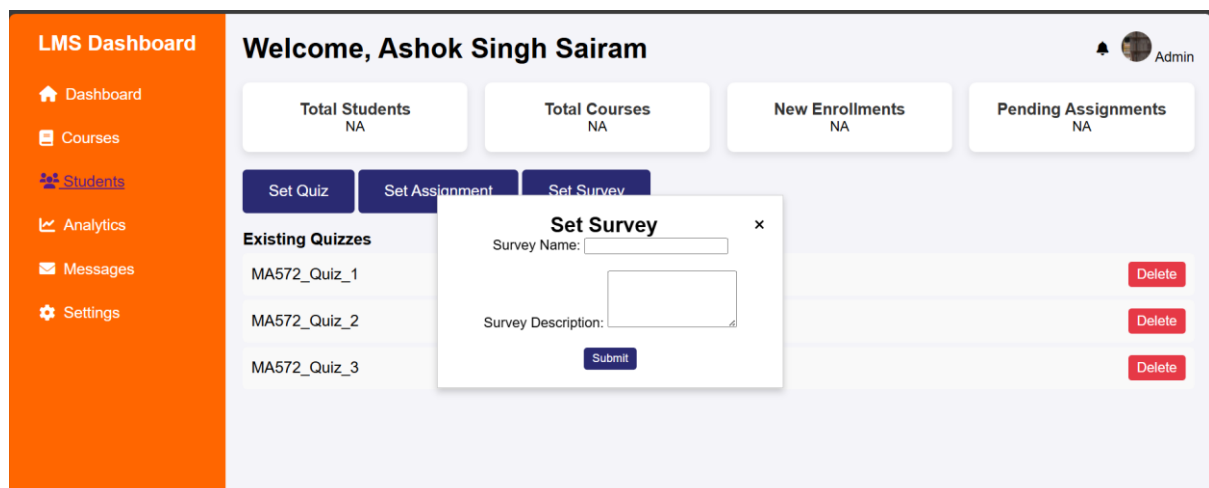
Clicking the 'Set Assignment' button opens a modal window where the instructor can enter the assignment name, set the due date-time, and upload the assignment file (PDF/PPT).



Once the 'Upload Assignment' button is clicked, the quiz will be saved in the database and will also appear on the student's side making it accessible for students to attempt.



Clicking the 'Set Survey' button opens a modal window where the instructor can enter the survey name and provide a description for the survey.



Clicking the 'Students' button redirects to a page where instructors can view the students' names, roll numbers, quiz answers, and assignment solutions uploaded by them.

The screenshot shows the LMS Dashboard with a sidebar on the left containing links to Dashboard, Courses, Students (highlighted), Analytics, Messages, and Settings. The main content area is titled 'Students Enrolled in Course' and 'Students Enrolled in "MA572"'. It displays three student profiles, each with a 'View Quiz Answers' button and a link to 'Download Solution for Assignment 2'.

Name	Roll Number	View Quiz Answers	Download Solution for Assignment 2
Pratulla Kumar Saha	2024005	[View Quiz Answers]	[Download Solution for Assignment 2]
Ankur Raj	2024006	[View Quiz Answers]	[Download Solution for Assignment 2]
Suvromy Pal	2024007	[View Quiz Answers]	[Download Solution for Assignment 2]

Clicking the 'View Quiz Answers' button redirects to a page where the instructor can view the answers for each quiz attempted by the specific student.

The screenshot shows the 'Answers for Course Quizzes' page. It lists two quizzes: MA572_Quiz_1 and MA572_Quiz_2. For MA572_Quiz_1, four questions are shown with their respective answers. The third question is marked as an MCQ.

Answers for Course Quizzes

MA572_Quiz_1

What is the role of the application logic layer in a three-tier architecture?
 Answer: ual;

Give an example of logical data independence with respect to relational databases.
 Answer: uiaeuhi

In an ER diagram, an entity set that does not have sufficient attributes to form a primary key is marked as: (A) Weak entity (B) Strong entity (C) Derived entity (D) Composite entity MCQ
 Answer: A

A Cartesian product of two relations is the same as their union. TRUE/FALSE.
 Answer: No answer provided

MA572_Quiz_2

What is the role of the application logic layer in a three-tier architecture?

Answer: No answer provided

MA572_Quiz_2

What is the role of the application logic layer in a three-tier architecture?

Answer: ual;

Which of the following best defines a database? (A) A collection of programs (B) A type of software (C) A collection of data (D) A type of computer MCQ

Answer: No answer provided

MA572_Quiz_3

Give an example of logical data independence with respect to relational databases.

Answer: uiaeuhi

A Cartesian product of two relations is the same as their union. TRUE/FALSE.

Answer: No answer provided

The instructor can download the assignment solution file uploaded by the student.

Future Scope and Proposed Enhancements

1. Real-Time Classroom Features

- Enable instructors to conduct live quizzes during lectures to enhance engagement and assess student understanding.
- Add a real-time survey feature to gather immediate feedback from students.

2. Interactive Quiz and Assessment Features

- Implement dynamic quizzes that adjust difficulty based on user performance.
- Develop a robust question bank system for managing and generating questions efficiently.

3. Personalized Learning Experiences

- Utilize AI to provide tailored learning paths based on student progress.
- Introduce tools to monitor student performance and offer customized recommendations.

4. Advanced Collaboration and Engagement Tools

- Incorporate shared whiteboards and live discussion features for enhanced interaction.
- Facilitate group projects and peer reviews with dedicated collaboration tools.

5. Mobile Platform Optimization

- Design a responsive, mobile-friendly interface for seamless access on smartphones and tablets.
- Add offline access to essential learning materials for flexibility.

Final Thoughts and Key Insights

Project Highlights:

- Successfully developed a functional and efficient Learning Management System (LMS) tailored to the needs of educators and learners.
- Incorporated essential features such as user registration, course creation, resource sharing, and performance tracking.
- Designed a scalable database architecture to manage user information, course content, and academic records effectively.
- Delivered a seamless user experience with an intuitive interface and streamlined navigation.

Key Takeaways:

- ❖ Gained insights into the significance of thorough requirement analysis and consistent project monitoring.
- ❖ Addressed challenges related to optimizing performance while maintaining user-friendly design.
- ❖ Learned the importance of debugging and refining the system through iterative testing cycles.
- ❖ Understood the critical role of teamwork and effective communication in achieving project milestones.