

## Project Report: Quiz Management System

### Modern Application Development - I

## Author

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I am a student at IIT Madras, deeply passionate about developing real-world web applications that solve practical problems. This project allowed me to bridge the gap between theoretical knowledge and hands-on implementation by integrating backend logic with frontend design. Tackling challenges such as managing complex database relationships and real-time score tracking has strengthened my understanding of full-stack development and reinforced my problem-solving skills.

## Project Description

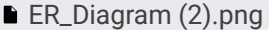
The **Quiz Management System** is a web-based platform that facilitates the creation, management, and participation in quizzes. The system includes key functionalities such as:

- **Role-Based Access:**
  - **Admin Dashboard:** Create and manage subjects, chapters, quizzes, and questions.
  - **User Dashboard:** Attempt quizzes and track scores.
- **Quiz Workflow:**
  - Admins can create subjects, chapters, quizzes, and questions.
  - Users can attempt quizzes with real-time scoring and instant feedback.
- **Performance Analysis:**
  - Users can view their scores and performance through charts.
  - Admins can monitor quiz attempts and track subject-wise top scores.
- **Database Management:**
  - CRUD operations for quizzes, questions, and user scores

## Technologies Used

- **Flask:** Backend framework for routing and templating.
- **SQLAlchemy:** ORM for database management (SQLite).
- **Jinja2:** Dynamic HTML templating.
- **Matplotlib:** Score visualization through charts.
- **HTML/Bootstrap/CSS:** Frontend design and styling.
- **SQLite:** Lightweight relational database.

# Database Schema Design

ER Diagram: 

## Routes Overview

### User Routes:

- `/login, /register` → Authentication
- `/user_dashboard/<user_id>` → List available quizzes
- `/start_quiz/<quiz_id>` → Quiz interface
- `/score/<user_id>` → Score tracking

### Admin Routes:

- `/admin_dashboard` → Manage subjects and chapters
- `/add_quiz, /add_question` → Quiz and question creation
- `/quiz_management` → CRUD operations for quizzes
- `/admin_summary` → Analytics dashboard


## Architecture and Features

### Project Structure:

`app.py` : Main application logic  
`controller.py` : Routing logic  
`models.py` : Database models  
`/templates/` : HTML templates  
`/static/` : CSS, Images, Charts

### Key Features:

- **Dynamic Dashboards:**
  - Users can view upcoming quizzes, scores, and performance charts.
  - Admins can manage content and view analytics.
- **Search Functionality:**
  - Filter subjects, quizzes, or keywords for easy access.
- **Data Integrity with Cascading Deletes:**
  - Deleting a subject automatically removes its associated chapters and quizzes to maintain database consistency.

Video Link here :  2025-03-30 13-04-48.mkv