Project Report: Quiz Master Management System

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### ****Introduction****

As a student at IIT Madras, I embarked on my web development journey with great enthusiasm, eager to create my own applications. Over time, I have gained the skills necessary to bring my ideas to life, allowing me to develop functional and dynamic web applications. This project, the **Quiz Master Management System**, is a culmination of my learning, integrating various web development technologies to provide an efficient and user-friendly quiz platform.

### ****Project Overview****

The **Quiz Master Management System** is designed to streamline quiz management processes. Admins have the ability to **create, update, delete, and retrieve** subjects, chapters, and quiz questions. Additionally, they can monitor user activity, search for specific records, and analyze quiz performance through graphical insights. Users, on the other hand, can take quizzes, view their results, and track their progress with interactive statistics.

## Technical Implementation

## Architecture

The application follows a Model-View-Controller (MVC) pattern to ensure code maintainability and separation of concerns:

* **Models**: Define database schema using SQLAlchemy ORM
* **Views**: Implement user interfaces with Jinja2 templates and Bootstrap
* **Controllers**: Handle request routing and business logic in Flask

## Technology Stack

* **Backend Framework**: Flask (Python)
* **Database**: SQLite with SQLAlchemy ORM
* **Frontend**: HTML, CSS, Bootstrap
* **Template Engine**: Jinja2
* **Additional Libraries**: Datetime for scheduling, Functional components for analytics

## Database Design

The application uses a relational database with six primary entities:

* **User**: Stores authentication details and role information
* **Subject**: Contains academic subject metadata
* **Chapter**: Organizes content within subjects
* **Quiz**: Holds assessment parameters including duration and scheduling
* **Question**: Stores individual assessment items with multiple-choice options
* **Score**: Tracks user performance metrics

## Key Features

## Administrator Interface

* Subject and chapter management with CRUD operations
* Quiz creation with scheduling capabilities
* Question bank development
* User management and performance analytics
* Search functionality across multiple entities

## User Experience

* Dashboard displaying upcoming quizzes
* Interactive quiz-taking interface
* Performance tracking with historical data
* Visual analytics for progress monitoring

**Key Features**

* User Management: Dual interfaces for admins and regular users with role-based access control
* Quiz Engine: Create, manage, and take timed quizzes with multiple-choice questions
* Performance Analytics: Track user progress and quiz statistics through visual representations
* Responsive Design: Mobile-friendly interface ensuring accessibility across devices
* Search Functionality: Efficiently find subjects, quizzes, and user information

**Project Video Link:**

<https://drive.google.com/file/d/1LDDh_ivhoCg-27zGUY6ODwzk8nYwtVOr/view?usp=sharing>