

Project Report

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- I am currently a student at the diploma level.
- **Note:** To run the application install flask, flask_sqlalchemy. And run the “app.py” file using the “python” command on the terminal.

Description

It is a multi-user app (one requires an administrator and other users) that acts as an exam preparation site for multiple courses.

Technologies used

1. **Flask:** for request handling, rendering templates, defining views/routes to the application
2. **Flask SQLAlchemy:** defining models, doing query operations on the database, committing changes to the database.
3. **Jinja:** for templating, provides more flexibility to the html document.
4. **Sqlite:** for database tables

DB Schema Design

1. Admin Table

- id: Integer (Primary Key)
- username: String (Unique, Not Null)
- password: String (Not Null)
- Purpose: Stores administrator credentials, allowing secure access to admin functionalities.

2. User Table

- **id: Integer (Primary Key)**
- **username: String (Unique, Not Null)**
- **password: String (Not Null)**
- **full_name: String (Not Null)**
- **qualification: String (Optional)**
- **dob: DateTime (Optional)**
- **Purpose: Stores user information for authentication and participation in quizzes.**

3. Subject Table

- **id: Integer (Primary Key)**
- **name: String (Unique, Not Null)**
- **description: Text (Optional)**
- **Relationships: One-to-Many with Chapter**
- **Purpose: Represents different subjects that contain multiple chapters.**

4. Chapter Table

- **id: Integer (Primary Key)**
- **name: String (Not Null)**
- **description: Text (Optional)**
- **subject_id: Integer (Foreign Key -> subjects.id, Not Null)**
- **Relationships: One-to-Many with Quiz and Question**
- **Purpose: Stores chapter-wise information under subjects.**

5. Quiz Table

- **id: Integer (Primary Key)**
- **chapter_id: Integer (Foreign Key -> chapters.id, Not Null)**
- **title: String (Not Null)**

- **date_of_quiz:** Date (Optional)
- **time_duration:** Time (Optional)
- **remarks:** Text (Optional)
- **subject_id:** Integer (Foreign Key -> subjects.id, Optional)
- **Relationships:** One-to-Many with Question and Score
- **Purpose:** Represents quizzes associated with different chapters.

6. Question Table

- **id:** Integer (Primary Key)
- **quiz_id:** Integer (Foreign Key -> quizzes.id, Not Null)
- **chapter_id:** Integer (Foreign Key -> chapters.id, Not Null)
- **question_statement:** Text (Not Null)
- **option1, option2, option3, option4:** String (Not Null)
- **correct_option:** Integer (Not Null)
- **Relationships:** One-to-Many with Score
- **Purpose:** Stores quiz questions along with multiple-choice options.

7. Score Table

- **id:** Integer (Primary Key)
- **quiz_id:** Integer (Foreign Key -> quizzes.id, Not Null)
- **user_id:** Integer (Foreign Key -> users.id, Not Null)
- **question_id:** Integer (Foreign Key -> questions.id, Not Null)
- **selected_option:** Integer (Not Null)
- **is_correct:** Boolean (Default: False)
- **score_value:** Integer (Default: 0)
- **timestamp:** DateTime (Default: datetime.utcnow)

- **Relationships:** Unique constraint on (user_id, quiz_id, question_id)
- **Purpose:** Tracks user quiz scores, responses, and correctness.

API Design

The Quiz Platform API is designed to manage a complete quiz system, including user authentication, subject and chapter management, quiz creation, question handling, and performance tracking.

The Authentication & User Management section includes endpoints for user registration (/register) and login (/login), allowing users to sign up with details. Similarly, an admin login (/admin).

The Subject Management module provides the ability to add (/add_subject) and delete (/delete_subject/<int:subject_id>) subjects. Further, the Chapter Management endpoints allow adding (/add_chapter/<int:subject_id>) and deleting (/delete_chapter/<int:chapter_id>) chapters within a subject.

The Quiz Management section enables admins or authorized users to create (/add_quiz) quizzes linked to specific chapters, specifying quiz title, date, and duration.

Users can retrieve quiz details using /quiz_info/<int:quiz_id>. Within the Question Management module, questions can be added (/add_question) to a quiz, each containing multiple-choice options with a defined correct answer.

If necessary, questions can also be removed (/delete_question/<int:question_id>). The Score & Performance section facilitates users in tracking their quiz scores via /scores. Lastly, admins can retrieve platform statistics and top scores using /adminsummary.

Architecture and Features

Architecture Following the recommended flask app structure.

1. The “model.py” containing the database schema related definitions is divided into a separate module from the “app.py” which contains all the views.

2. Templates folder is used to serve the html files.

- 3. Static folder contains the css.**
- 4. The “Instance” folder has the database defined.**
- 5. pycache contains the required python libraries used to build the application.**

Features

An admin is created in the model at the start.

The flask app opens at the main page. Where person can

- a. User login: username and password are required fields in form. User should exist in the database or he/she can register himself/herself.**
- b. Admin login: username and password are required fields in form. Admin cannot register , id is created at the start itself. If incorrect password or username is given a prompt is displayed for correct details.**
- c. Register user: first name, username and password are required in form. Username should not exist in the database.**

Quiz Participation

- Users can attempt quizzes based on subjects and chapters.**
- Each quiz has a time duration and a scheduled date**

Search & Navigation

- Users can search for subjects, chapters, and quizzes.**
- Search functionality matches strings at the backend.**

Score Tracking & Performance Analysis

- Users get real-time feedback after answering questions.**
- The Score table records their selected answers and correctness.**
- Single predefined admin manages all quiz-related data.**
- Admin can add, edit, or delete subjects, chapters, quizzes, and questions.**

Quiz & Question Management

- **Create/Edit/Delete quizzes with time limits.**
- **Create/Edit/Delete questions with multiple-choice options.**
- **Prevents negative values for quiz duration and scores.**

Data Integrity & Constraints

- **Cascade Deletion:**
 - **Deleting a subject removes its chapters, quizzes, and questions.**
 - **If a quiz is removed, all its questions and scores are also deleted.**
- **Unique Constraints:**
 - **Users cannot submit duplicate scores for the same question.**

Video

<https://drive.google.com/file/d/14Y0ZCWKz1jiEUGxfndqmntlN8oi0zWfW/view?usp=sharing>