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I am a passionate developer with a keen interest in Flask, Machine Learning, and Computer Architecture. I love building web applications, robotics projects, and digital systems, always eager to learn and solve challenging problems.

Description

The Quiz Master App is a Flask-based multi-user quiz platform where teachers can create, manage, and assign quizzes, while students can attempt quizzes and track their scores. It uses Flask-SQLAlchemy for database management and Matplotlib/Pandas for performance analysis. The frontend is built with Bootstrap and Jinja2, ensuring a responsive and dynamic UI.

Technologies used

Backend:

- Flask (Python web framework)
- Flask-Migrate (Database migrations)
- Flask-SQLAlchemy (ORM for database management)
- Flask-Login (User authentication)
- Flask-Bcrypt (Password hashing)
- SQLite (Database)

Frontend:

- Jinja2 (Templating engine for Flask)
- Bootstrap (CSS framework for styling)
- JavaScript (For interactive elements)

Other Tools & Libraries:

- Pandas & Matplotlib (For data processing and visualization)
- APIs (Handling routes in controllers folder)
- Virtual Environment (myenv) (To manage dependencies)

DB Schema Design

- **Users** (*id* [PK, AUTO_INCREMENT], username [UNIQUE, NOT NULL], email_address [UNIQUE, NOT NULL], full_name [NOT NULL], password_hash [NOT NULL], qualification, dob, role [DEFAULT 'user', NOT NULL])
- **Subjects** (*id* [PK, AUTO_INCREMENT], name [UNIQUE, NOT NULL], description)
- **Chapters** (*id* [PK, AUTO_INCREMENT], name [UNIQUE, NOT NULL], description, subject_id [FK → Subjects, NOT NULL])

- **Quizzes** (*id* [PK, AUTO_INCREMENT], *title* [NOT NULL], *chapter_id* [FK → Chapters, NOT NULL], *date_of_quiz* [NOT NULL], *time_duration* [NOT NULL], *remark*)
- **Questions** (*id* [PK, AUTO_INCREMENT], *quiz_id* [FK → Quizzes, NOT NULL], *question_statement* [NOT NULL], *option1*, *option2*, *option3*, *option4*, *correct_option* [NOT NULL])
- **Scores** (*id* [PK, AUTO_INCREMENT], *quiz_id* [FK → Quizzes], *user_id* [FK → Users], *time_stamp_of_attempt* [DEFAULT CURRENT_TIMESTAMP, NOT NULL], *total_scored* [NOT NULL], *total_questions*)

API Design

The Quiz Master App includes APIs for user authentication, quiz management, and result tracking. The `api_controllers.py` file handles API endpoints using Flask's Flask-RESTful and Flask-SQLAlchemy for database operations. Authentication is implemented using JWT tokens, while quizzes and results are managed through structured API requests. The API follows REST principles, supporting CRUD operations for quizzes, questions, and user scores.

Architecture and Features

The Quiz Master App is structured with `app.py` as the entry point. Routes, APIs, and form handling reside in `controllers/`, while `models/` defines the database structure. Static files are in `static/`, templates in `templates/`, and migrations in `migrations/` for database updates. The project runs within the `myenv` virtual environment for dependency management, ensuring modularity and scalability.

The Quiz Master App is a Flask-based system where teachers create quizzes categorized by subjects and chapters, and students attempt them with real-time scoring. Flask-Login handles authentication, Flask-WTForms manages validation, and Flask-SQLAlchemy stores data. RESTful APIs and AJAX enable seamless updates, while `data_process.py` handles result analysis. The UI uses Bootstrap for responsiveness, and an admin panel allows quiz and user management. The modular architecture ensures easy scalability.

Video

https://drive.google.com/file/d/1tUxF4TBnxbuzuWAuLxxvVzAxjZI-qlcu/view?usp=drive_link