TaskMaster - Todo Web Application - Project Documentation

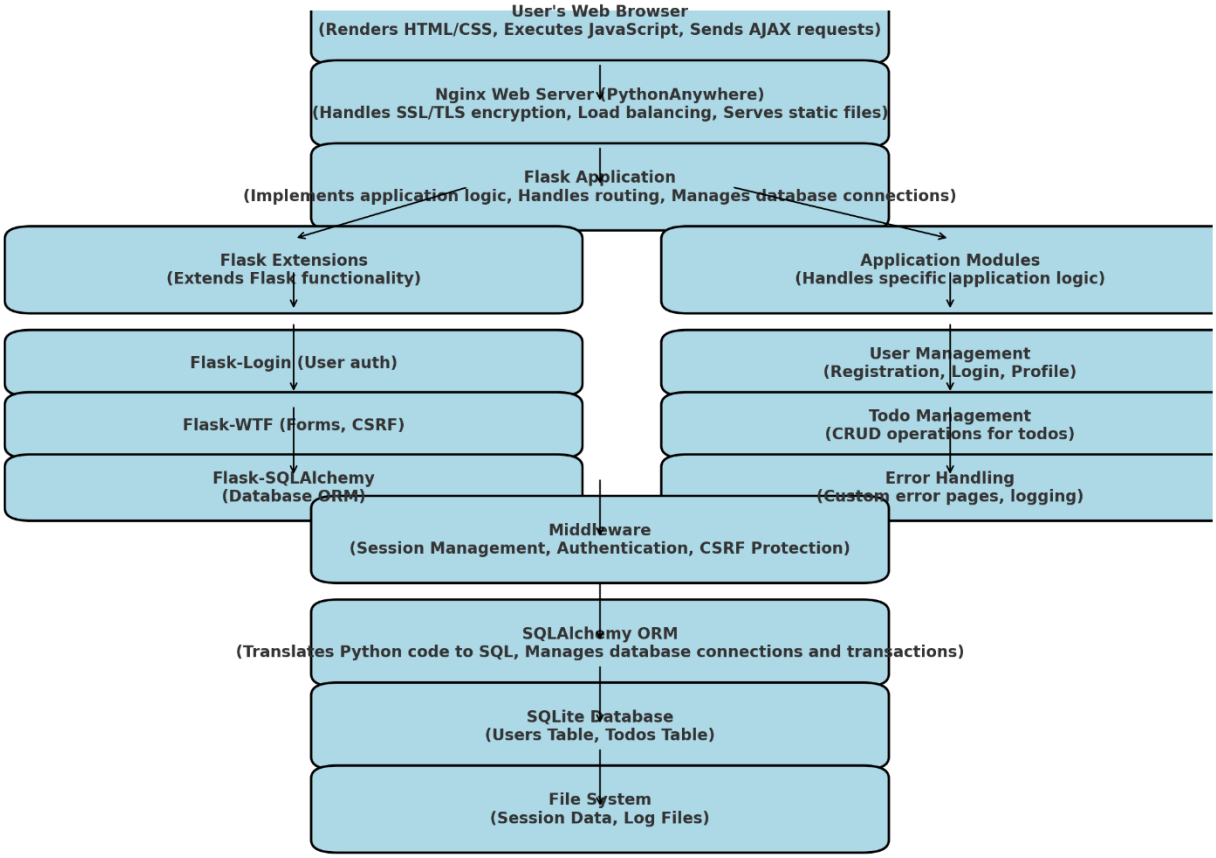
1. High-Level Description

The Todo Web Application is a task management system designed to help users organize their daily activities efficiently. Built using Flask, a Python web framework, this application allows users to create, read, update, and delete tasks in a user-friendly interface. The app features user authentication, ensuring that each user's tasks remain private and secure.

Key features include:

- User registration and login
- Task creation with title and description
- Task completion tracking
- Task editing and deletion
- Persistent sessions for improved user experience

2. Whiteboard Architecture Diagram



Description of the Diagram

The application follows a typical three-tier architecture:

1. Presentation Layer:
    - HTML/CSS/JavaScript for the frontend
    - Flask templates for dynamic content rendering
2. Application Layer:
    - Flask web server
    - Python business logic
    - Flask-Login for session management
3. Data Layer:
    - SQLite database
    - SQLAlchemy ORM for database interactions

Processes and Services

1. Web Server (Flask):
    - Handles HTTP requests and responses
    - Routes requests to appropriate functions
2. Authentication Service:
    - Manages user registration, login, and logout
    - Utilizes Flask-Login for session handling
3. Task Management Service:
    - Handles CRUD operations for tasks
    - Interacts with the database through SQLAlchemy
4. Database Service (SQLite):
    - Stores user information and tasks
    - Provides data persistence

3. Design Decisions and Justifications

1. Choice of Flask Framework:
    - Lightweight and easy to set up
    - Provides necessary features without unnecessary complexity
    - Large community and extensive documentation
2. SQLite Database:
    - Serverless database, ideal for small to medium-scale applications
    - Easy to deploy and requires no additional setup
    - Suitable for applications with concurrent users but not extremely high traffic
3. SQLAlchemy ORM:
    - Abstracts database operations, making it easier to work with different databases if needed in the future

    - Provides a Pythonic way to interact with the database
4. Flask-Login for Session Management:
    - Simplifies user session handling
    - Integrates well with Flask and provides necessary security features
5. Filesystem Session Storage:
    - Allows for persistent sessions across app restarts
    - Simple to implement and suitable for the application's scale

4. System Requirements and Testability

Functional Requirements:

1. User Registration
    - Testable by creating new accounts and verifying database entries
2. User Authentication
    - Testable by logging in with correct and incorrect credentials
3. Task Creation
    - Testable by adding new tasks and verifying their appearance in the user's task list
4. Task Updating
    - Testable by modifying existing tasks and verifying changes
5. Task Deletion
    - Testable by removing tasks and confirming their absence from the task list
6. Task Completion Toggling
    - Testable by marking tasks as complete/incomplete and verifying status changes

Non-Functional Requirements:

- Performance
    - Response time should be under 2 seconds for all operations
    - Testable using performance testing tools like Apache JMeter
- Security
    - Passwords should be hashed before storage
    - Testable by inspecting database contents and attempting unauthorized access
- Usability
    - Interface should be intuitive and responsive
    - Testable through user testing and feedback
- Reliability
    - Application should handle errors gracefully
    - Testable by simulating various error conditions and observing system response
- Scalability
    - Should support up to 1000 concurrent users
    - Testable through load testing with tools like Locust

5. Deployment and Access

The application is deployed and accessible online at https://aqsaakhan.pythonanywhere.com/.

For demonstration purposes, you can use the following credentials:

- Username: aqsaanwar
- Password: 12345

The source code is available in the Git repository: https://github.com/aqsaakhan/ToDo-Webapp

6. Future Improvements

1. Implement task categories or tags for better organization
2. Add due dates and reminders for tasks
3. Develop a mobile app version for increased accessibility
4. Implement data backup and export features
5. Add user profile customization options