1. Project Overview

This project is a simple web service (API) that lets you store books and reviews for those books. You can add books, list all books, add reviews to a book, and see all reviews for a book.

2. Tech Stack

- **Python + FastAPI**: The main programming language and web framework. FastAPI makes iteasy to build APIs and provides automatic documentation.
- **SQLite**: A lightweight database to store books and reviews. (You could use PostgreSQLinstead.)
- **SQLAlchemy**: A tool to talk to the database using Python code.
- **Alembic**: Handles database changes (migrations).
- **Redis (mocked with fakeredis)**: A fast, temporary storage (cache) to speed up some requests.
- **Pytest**: For automated testing.

3. How the API Works

The API has these main features (endpoints):

- `GET /books`: List all books in the system.
- `POST /books`: Add a new book (send title and author).
- `GET /books/{id}/reviews`: List all reviews for a specific book.
- `POST /books/{id}/reviews`: Add a review to a specific book (send reviewer and content).
- `POST /seed`: (For demo/testing) Add 10 fake books to the database.

4. Database & Caching

- **Database**: All books and reviews are stored in a database file (`app.db`).

- **Caching**: When you ask for all books, the system first checks the cache (Redis). If the data isthere, it returns it quickly. If not, it gets the data from the database and saves it in the cache for next time. If the cache is down, it just uses the database.

5. Testing

- The project includes tests to make sure the API works as expected. For example, it checks that you can add a book and that the cache works correctly.

6. How to Run the Project
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1. Open a terminal and go to the project folder.
2. Activate the Python environment: - On Windows: `venv\Scripts\activate`
3. Start the server:

- `uvicorn main:app --reload`

4. Open your browser and go to: http://127.0.0.1:8000/docs to see and try the API.

7. How to Use the API

- **Add a book:**

- Go to `/docs`, click `POST /books`, and enter a title and author.

- **List books:**

- Click `GET /books` to see all books.

- **Add a review:**

- Click `POST /books/{id}/reviews`, enter the book ID, reviewer name, and review content.

- **List reviews:**

- Click `GET /books/{id}/reviews` and enter the book ID.

- **Seed data:**

- Click `POST /seed` to add 10 fake books for testing.

8. Automated Tests

- To run tests, type `pytest` in the terminal. This checks that the API works correctly.