Library Management System - V2

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Problem Statement

The Library Management System - V2 is a multi-user application designed to manage e-books across various sections in an online library. The system supports two roles: a librarian and a general user. The system allows librarians to manage e-books and sections. They can issue e-books, grant or revoke access. A general user can request and access e-books.

Approach

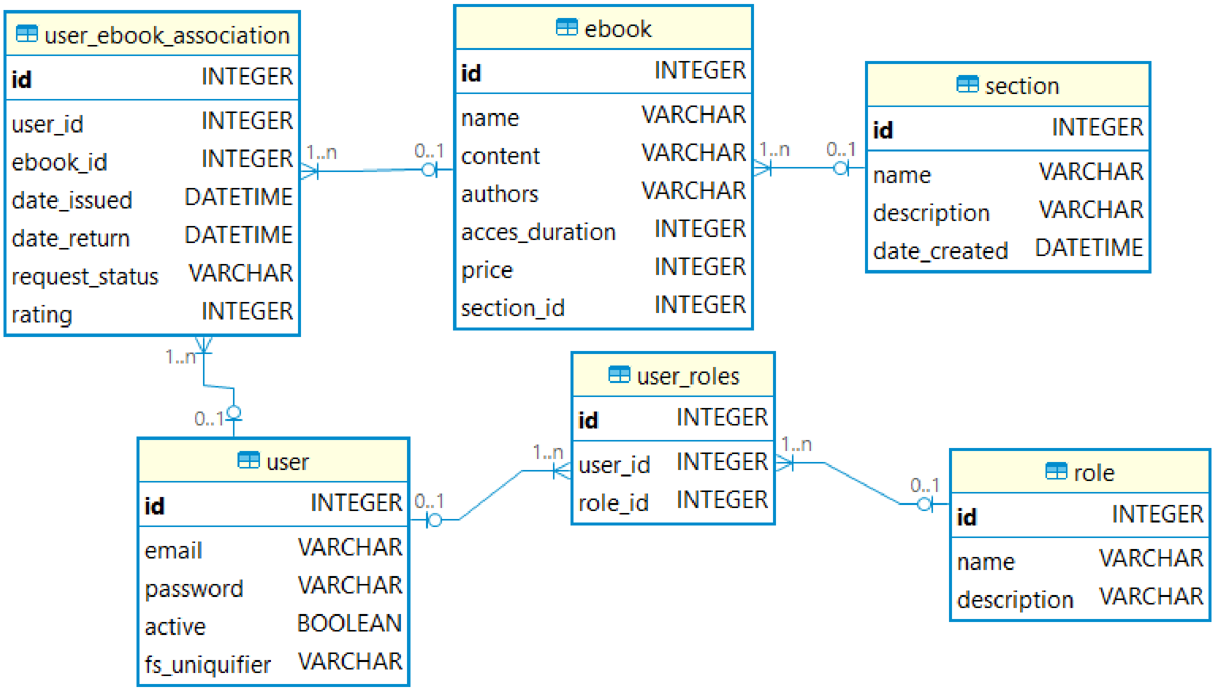
I developed a multi-user application using the Model View Controller (MVC) architecture. The model includes entities such as User, Roles, UserRoles, Ebook, Section, and UserEbookAssociation. There is a one-to-many relationship between Section and Ebook, and a many-to-many relationship between User and Ebooks, represented by UserEbookAssociation.

The View, or frontend, uses VueJS components for dynamic and interactive user interfaces. The Backend, built with Flask, processes user requests, handles application logic, and manages API endpoints using Flask-RESTful. I implemented token-based authentication to protect api endpoints.

Frameworks and Libraries Used

- **Frontend:**
  - Vue.js (Vue CLI) for building the user interface
  - Bootstrap for styling and responsive design
- **Backend:**
  - Flask for creating RESTful APIs
  - Flask-RESTful for API resource management
  - Flask-SQLAlchemy for ORM (Object-Relational Mapping)
  - Flask-Security for authentication and role-based access control
  - SQLite for database storage
  - Redis for caching and task queue
  - Celery for handling background tasks
  - MailHog for email testing

ER Diagram



API Resource Endpoints

1. **Section Management:**
   - `GET /api/sections`: Get list of all sections
   - `GET /api/sections/:section_id`: Get section
   - `POST /api/sections`: Create a new section
   - `PUT /api/sections/:id`: Update a section
   - `DELETE /api/sections/:id`: Delete a section
2. **E-book Management:**
   - `POST /api/ebooks`: Create a new e-book
   - `GET /api/ebooks`: Get list of all ebooks
   - `GET /api/ebooks/:ebook_id`: Get ebook
   - `PUT /api/ebooks/:ebook_id`: Update an e-book
   - `DELETE /api/ebooks/:ebook_id`: Delete an e-book

Presentation Video

You can view the project presentation video using the following link:

https://drive.google.com/file/d/1tT4yiH_6I5ScDcH3pUVo6sX-DQF74203/view?usp=sharing