

CS 4347.001 Database Systems

Database Project Phase One

Team 9

Project details:

Project Name: Library Management System

Team Name: Vibecoders

Team Members:

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Problem Statement: (Manitrddy)

Managing a library is not easy. There are thousands of books and many members with different needs. Old paper systems or outdated software often cause mistakes and delays. It is hard to know which books are available in real time. Members and staff may also lose track of loans and returns. Our project will build a Library Management System to solve these problems. It will help members register on their own, make borrowing and returning clear, and give staff and admins the tools they need to manage the library better.

Target user: (Jia)

The target users of our Library Management System include library members such as students, researchers, and community readers who need to register accounts, search for books, borrow, and renew items online. In addition, library staff, including librarians, assistants, and technicians, will use the system to manage book records, monitor loans, and maintain accurate data. Administrators are also target users, as they require tools for managing staff and member accounts, assigning roles, and overseeing overall system operations.

List of Relations: (Roma)

Book

- Title
- Author

- ISBN (unique)
- Genre
- Published Date
- Description
- Status (checked out, on hold, etc)
- # of Copies
- Version (Hardcover, audiobook, large print, etc)

Library Members

- User/Card # (unique)
- Name
- DOB
- Phone Number (unique)
- Email (unique)
- Address
- Book Status (books checked out/overdue/renewed/on hold)
- **Genre/Classification**
 - Age Category (kids, teens, adult, etc)

Subclasses:

- Fiction
- Non-fiction
- Romance
- Mystery
- Fantasy
- Sci-Fi
- Thriller/Horror
- Comic

Staff

- Name
- Staff ID (unique)
- Contact Info
- Hire Date

Subclasses:

- Librarian
- Assistant
- Technician
- Administration

Loan

- Due Date
- User

- Book
- Status
- Loan ID (unique)

Web interface: (Hai)

Login Page

- **Role-based login (staff, member, admin).**
- **Inputs:** Email, Password.
- **Outcome:** Authenticates user and redirects to their role home.

Book Management Form (for staff)

- **Purpose:** Maintain book records.
- **Inputs:** Title, Author, Publisher, Year, ISBN, Category, Status, Version.
- **Actions:** Add, Update, Delete book entries.
- **Outcome:** Updates the **Book** table and reflects changes in the book list.

Member Registration Form

- **Purpose:** Create and maintain member records.
- **Inputs:** Name, Email, DOB, Phone, Address, Password.
- **Actions:** Register new member, Edit member details.
- **Outcome:** Inserts/updates rows in the **Member** table.

Loan Transaction Form

- **Purpose:** Record borrowing and returns.
- **Inputs:** Member, Book, Loan Date, Due Date, Return Date.
- **Actions:** Create new loan, mark book returned.
- **Outcome:** Inserts/updates the **Loan** table and updates **Book** status

Book Search Interface (for members)

- **Purpose:** Find books and view availability.
- **Inputs:** Search (title/author/ISBN), Category filter, Availability filter.
- **Actions:** Submit search, View book details, (after login) View borrowing history.
- **Outcome:** Generates query results (book list) without modifying tables.

Admin Interfaces (admin)

- **User & Role Management Form**

- **Inputs:** Name, Email, Role (Member/Staff/Admin), Status (Active/Disabled), Temporary Password.
- **Actions:** Create user, Change role, Activate/Deactivate, Reset password.
- **Outcome:** Updates **User/Staff** and role assignments (access control).

Data: (Jia)

To populate the relations in our Library Management System, we plan to use both externally sourced data and manually created sample data:

Book Relation

- We will use publicly available book datasets such as the Open Library API and Google Books API
- From these sources, we will collect sample data for attributes such as Title, Author, ISBN, Genre, Published Date, and Description.
- Additional fields like Status, Number of Copies, and Version will be created manually to simulate realistic library operations.

Library Members Relation

- Member data is primarily generated by users themselves when they create an account through the registration form.
- During registration, users must enter their name, email address, birthday, phone number, address, and password.
- The system automatically assigns a unique User/Card #.
- Email address and phone number must be unique to prevent duplication.

Staff Relation

- Staff entries will be manually created to ensure coverage of all subclasses (Librarian, Assistant, Technician, Administration).
- Each record will include a unique Staff ID, Name, Contact Info, and Hire Date.

Loan Relation

- Loan data will be manually created for a few. New users can borrow books too.
- Each transaction will be assigned a unique Loan ID.