Project Proposal: Library Booking System

Database CS A

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Problem Background / Domain Description

Libraries often face issues in managing room and facility reservations. Manual systems such as spreadsheets or paper-based logs lead to overlapping bookings, missing entries, and lack of real-time updates. Staff need a faster way to manage available rooms and equipment, while members want an easier method to book and view available time slots.

The Library Booking System is designed as a centralized digital platform that handles library resources, user registrations, and reservation data. It provides a structured process to prevent double-bookings, reduce human errors, and improve transparency between librarians and members.

The system stores structured data on books, members, staff, and borrowing details. Each entity links to support accurate tracking and reporting.

System Objectives

1. Manage library facilities and user reservations in a structured database system.
2. Prevent scheduling conflicts by checking room or facility availability before booking.
3. Provide easy access for librarians to monitor, edit, or cancel reservations.
4. Allow members to search for available slots or facilities based on time and type.
5. Generate simple usage reports to help analyze booking trends and resource utilization.
6. Maintain clear relationships between books, members, and staff using a relational database design.

Users / Actors

1. Librarian

   - Manages library rooms and facilities.
   - Handles user accounts, bookings, and reports.
   - Reviews and approves or cancels reservations.

2. Member

   - Registers as a user.
   - Books available rooms or facilities.
   - Views and manages their own reservations.

3. Guest

   - Can browse available facilities and schedules.
   - Must register as a member to make a booking.

Use Cases / Main Features

CRUD for Facilities: Create, view, update, and delete library rooms or resources.

CRUD for Members: Manage member records and contact information.

Booking Management: Create or cancel reservations, verify availability, and avoid overlaps.

Search Functionality: Search books, rooms, or members using multiple filters.

Report Generation: View summaries of bookings and usage statistics.

Fine Management: Record, calculate, and track fines for overdue returns.

Scope and Limitations

Scope:

The system focuses on managing library facilities, bookings, and basic reporting functions. It will be developed as a backend-driven application with database integration. Core operations include CRUD functionalities and a booking system that handles user interactions and librarian control.
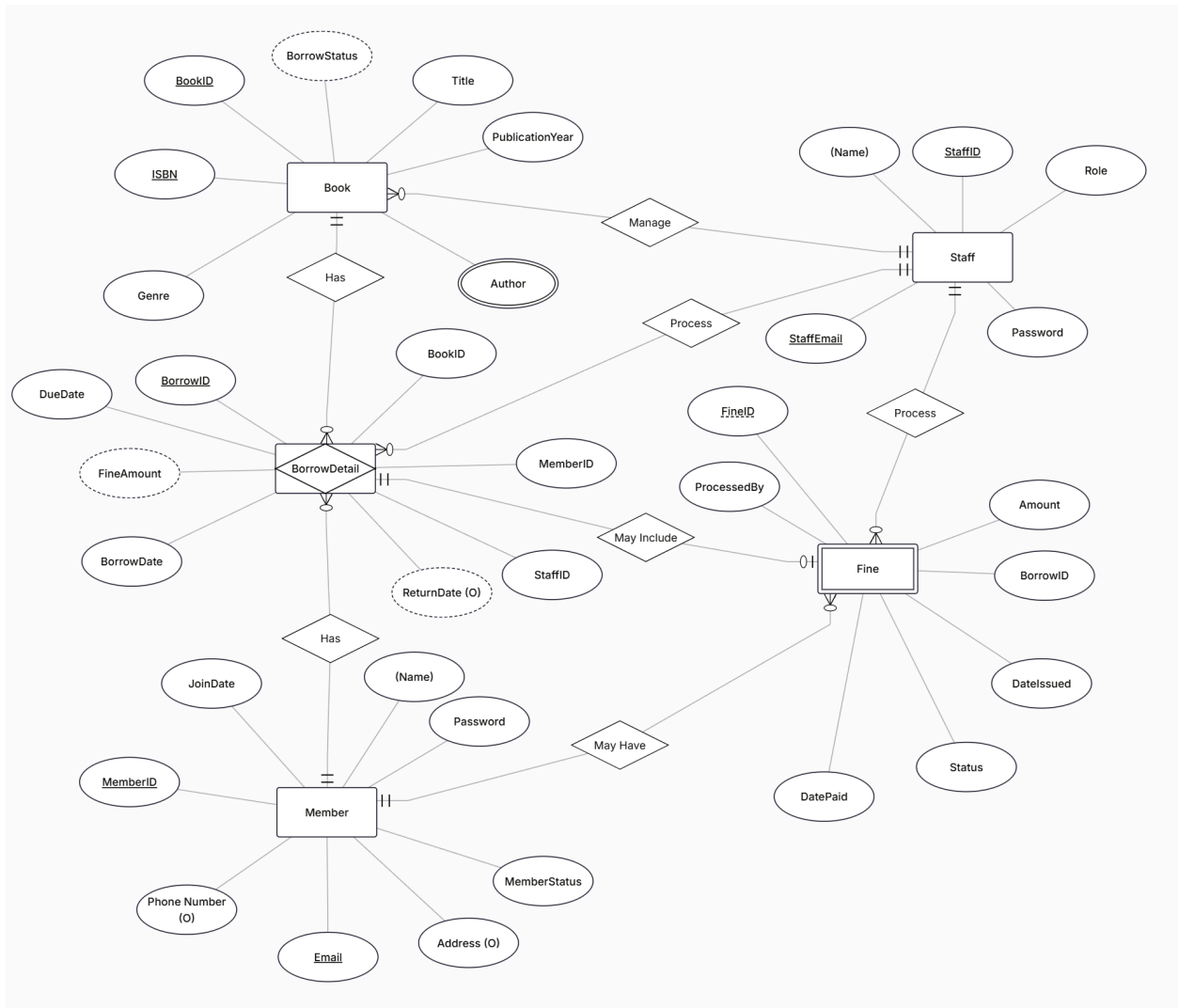
Limitations:
- The prototype does not include fine payments, notifications, or advanced scheduling algorithms.
- No calendar integration or real-time messaging is provided.
- User authentication will be basic for testing purposes only.

Entity Relationship Diagram (ERD)

The system uses a relational database to manage library operations.

The diagram below shows the key entities and their connections.

The database design includes five main entities: Book, Member, Staff, BorrowDetail, and Fine. Each entity has attributes and relationships that reflect library operations, from managing books and members to processing loans and fines.

Entity Summary:
Book – Book details including ID, title, author, genre, publication year, and borrow status.
Member – User information such as ID, name, contact details, and membership status.
Staff – Staff accounts with login credentials and assigned roles.
BorrowDetail – Borrowing records linking books, members, and staff, including borrow and return dates.

Fine – Penalty tracking for overdue books, recording amount, status, and processing staff.