DATABASE MANAGEMENT SYSTEM

MINI PROJECT
USER REQUIREMENT SPECIFICATION FOR
LIBRARY MANAGEMENT SYSTEM

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Application Description

The Library Management System is a software application designed to automate and manage the operations of a library. It provides a user-friendly interface for librarians to efficiently handle tasks such as adding books, adding borrowers, borrowing and returning books, listing books and borrowers, managing waitlists, and more. The system ensures accurate book tracking, borrower information management, and timely notifications for borrowers on waitlists.

User Requirement Specifications

The User Requirement Specification outlines the following high-level requirements for the Library Management System:

1) Add Book:
Librarians can add new books to the system by providing the title and author information.

2) Add Borrower:
Librarians can add new borrowers to the system by providing their names.

3) Borrow Book:
Librarians can process book borrowings by specifying the book ID, borrower ID, and borrow date.

4) Return Book:
Librarians can process book returns by specifying the book ID and return date.

5) List Books:
Librarians can view a list of all books in the library, including availability status and borrower information.

6) List Borrowers:
Librarians can view a list of all borrowers in the system.

7) Show Waitlist:
Librarians can view the waitlist for books, showing the borrowers who are waiting for a specific book.

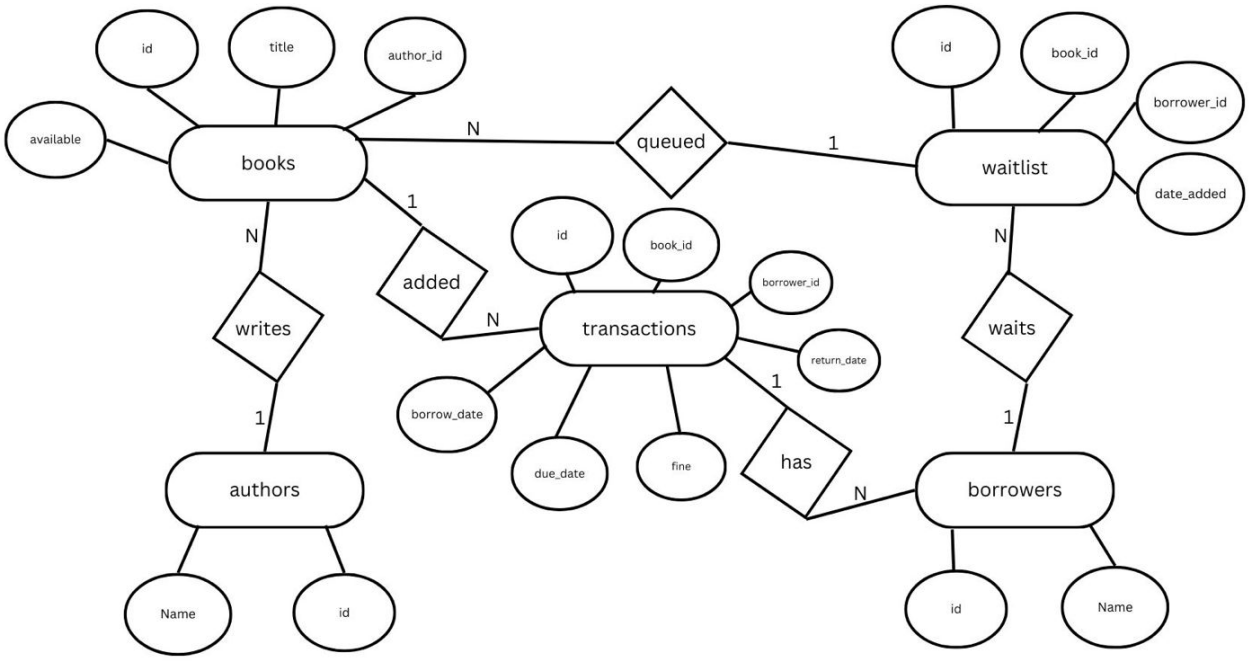
8) Switch User:
Librarians can switch users or create new users with different privileges.

List of Functionalities

- Add Book
- Add Borrower
- Borrow Book
- Return Book
- List Books
- List Borrowers
- Show Waitlist
- Switch User

Conceptual Model Design with ER Diagram

The Entity-Relationship (ER) Diagram depicts the relationships between entities in the system:



Relational Schema

The Relational Schema describes the structure of the database tables:
- Authors (id, name)
- Books (id, title, author_id, available)
- Borrowers (id, name)
- Transactions (id, book_id, borrower_id, borrow_date, due_date, return_date, fine)
- Waitlist (id, book_id, borrower_id, date_added)

SQL Queries

Set Operations
- Union, Intersection, and Difference queries to combine or extract data from multiple tables.

Joins (All Types)
- Inner Join, Left Join, Right Join, and Full Outer Join queries for retrieving data from related tables.

Aggregate Functions
- Queries using aggregate functions (e.g: COUNT, GROUP_CONCAT, MAX) for summarizing and analyzing data.

Nested and Complex Queries
- Complex queries involving nested SELECT statements for advanced data retrieval.

Procedures and Triggers

Procedures
- AddBook: Adds a new book, automatically creating the author if not existent.

Triggers
- update_available_status: Updates the availability status of a book after a new transaction is inserted.