

Library Management System – Documentation

The Library Management System is a database-driven project developed to manage the operations of a digital library efficiently. The primary objective of this system is to store and organize information about books, authors, library members, and the tracking of borrowed and overdue books. This system ensures that book loans are properly monitored and overdue notifications are triggered when necessary. The system is built using relational database tools such as PostgreSQL (or alternatively MySQL) and is managed through a user-friendly interface like pgAdmin or MySQL Workbench.

Tools Used

- PostgreSQL / MySQL
- pgAdmin / MySQL Workbench
- ERD Tool: dbdiagram.io / draw.io

Database Schema Design

1. Books

Stores details about each book such as title, genre, published year, and the number of copies.

2. Authors

Contains author details including name and birth year.

3. BookAuthors (Bridge Table)

Used to establish a many-to-many relationship between Books and Authors.

4. Members

Holds information of registered library members such as name, email, and join date.

5. Loans

Tracks borrowing activity including loan date, due date, and return date.

Database Views

1. BorrowedBooks View

Displays books that are currently borrowed and not yet returned.

2. OverdueBooks View

Displays books that are overdue (past due date and not returned).

Trigger for Due Date Check

A trigger is used to notify or restrict entries when a due date is already overdue at the time of insertion or update. In MySQL, it is implemented using the AFTER INSERT or AFTER UPDATE clause.

Reports

- Most Active Members Report: Shows members with the highest number of book loans.
- Most Borrowed Books Report: Shows books borrowed most frequently.

ER Diagram

Refer to the attached image or external diagram that visually represents the schema relationships.

Project Deliverables

- Entity-Relationship Diagram (ERD)
- SQL Schema and Test Data Dump
- Views and Trigger Scripts
- Analytical Reports
- Project Documentation

Future Enhancements

- Automated notifications via email or SMS for overdue books
- Late fee calculation and tracking
- Book reservation system
- Member borrowing limits

- Admin GUI and mobile interface

ER Diagram

The ER diagram below illustrates the relationship between various entities in the Library Management System. This includes entities like Books, Authors, Members, Loans, and their interconnections via primary and foreign keys.

