

1. Application Domain: Library Management

2. Application Name: Library Database System

3. Description:

A library database in which data is recorded about a library's catalog, patrons, staff, and borrowing activity. The system stores information about books, including their identifying details and classification by genre. Books are written by one or more authors, and each author may have written multiple books. The system also stores members who can borrow books, and employees who process and manage borrowing transactions. The system records each book borrowing and return activity so that the library can track which member currently has a copy of a book, when it is due, and whether it has been returned. The database supports catalog browsing, member borrowing history, and reporting such as overdue items.

4. Requirements Statements:

The Library Database System is intended to help manage a library's books, members, employees, and borrowing activity in a clear and organized way. The system will allow library staff to add, update, remove, and view information about books, topics, members, and employees. Employees will be able to check books out to members and record when books are returned, making it easy to track due dates, availability, and overdue items. The system will also support common searches and reports, such as finding books by title, author, or topic, viewing a member's current checkouts and borrowing history, and identifying books or topics that are borrowed most often. The database will be integrated into a Java application that provides access to these features. The primary users of the system are library employees who manage the catalog and borrowing transactions, while members are supported through book searches and borrowing history lookups.

5. Consider a LIBRARY database in which data is recorded about a library system.

The data requirements are summarized as follows:

Functional Requirements:

- The system shall allow users to add, edit, delete, and list books in the library catalog.
- The system shall allow users to add, edit, delete, and list topics and associate topics with books.

- The system shall allow users to add, edit, delete, and list members.
- The system shall allow users to add, edit, delete, and list employees.
- The system shall allow an employee to check out a book to a member by creating a record that includes checkout date and due date.
- The system shall allow an employee to return a book by updating the corresponding checkout record with a return date/status.

The system shall support queries including:

- Search books by title, author, or topic.
- List all books currently checked out by a specific member.
- List all overdue checkouts.
- List borrowing history for a member.
- Report most borrowed books/topics .

Core Relationships:

- A Book has one or more Authors, and an Author can write one or more Books.
- A Book is classified under one or more Topics, and a Topic can include many Books.
- A Member can have zero or more checkouts, and each checkout belongs to exactly one Member.
- Each checkout is processed by one Employee, and an Employee may process many checkouts.
- Each checkout references the borrowed Book.

6. Entities:

- a. Book (catalog item)
- b. Author (writes books)
- c. Member (borrows books)
- d. Employee (manages and processes borrowing activity)
- e. Topic (category/genre)
- f. Checkout (tracks book loans and returns)