2024

Title: Library Management System Proposal

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[COMPANY NAME] | [Company address]

Stakeholders

Identifying people who are interested in the project, **Such as**

- Library Staff
- Library Member
- System
- Admin

Actors and Goals:

Primary actors:

Library Member: This actor can search for books, check out books, renew borrowed items, view borrowing history, and receive notifications.

Library Staff: The library staff can manage the catalog, monitor inventory, assist members with check-in/check-out, and generate reports.

Secondary actors:

Admin: This actor can add, remove, or update catalog entries, member information, and manage system settings.

System: Responsible for managing the automated processes of catalog management, member registration, check-in/check-out, search and discovery, and notifications.

Use Cases

Admin

- **Add Book to Catalog:** Admins can add new books to the library catalog, providing details such as title, author, genre, and availability.
- **Register Member:** Admins have the ability to register new members to the library, collecting necessary information such as name, contact details, and borrowing privileges.
- **Add/Modify Catalog Entry:** Admins can add new entries to the catalog or modify existing ones, ensuring accurate and up-to-date information for library resources.

- **Add/Modify Member Information:** Admins can add or modify member information, updating details such as contact information, borrowing limits, and membership status.
- **Automate Check-in/Check-out Process:** Admins can implement automation for routine tasks such as book check-in/check-out, reducing manual efforts and increasing efficiency.
- **Generate Reports:** Admins have the ability to generate reports on library operations, including book circulation, overdue items, and popular titles, aiding in decision-making and resource allocation.
- **Manage System Settings:** Admins can manage system settings such as notification preferences, fine policies, and user access levels, customizing the system to meet the library's needs.

Member

- **Search for Books:** Members can search for books in the library catalog based on titles, authors, or genres, facilitating discovery of relevant resources.
- **Place Hold on Book:** Members can place holds on unavailable books, receiving notifications when the books become available for pickup.
- **View Borrowing History:** Members can view their borrowing history, including past checkouts, due dates, and return status, aiding in tracking and managing borrowed items.
- **Renew Books:** Members have the ability to renew borrowed books online, extending the borrowing period if the items are not overdue or renewal limits are not exceeded.
- **Receive Notifications:** Members receive notifications for various events such as hold availability, upcoming due dates, and overdue items, ensuring timely communication and reminders.
- **Manage Account:** Members can manage their account settings, including updating contact information, changing password, and adjusting notification preferences, enhancing user control and experience.

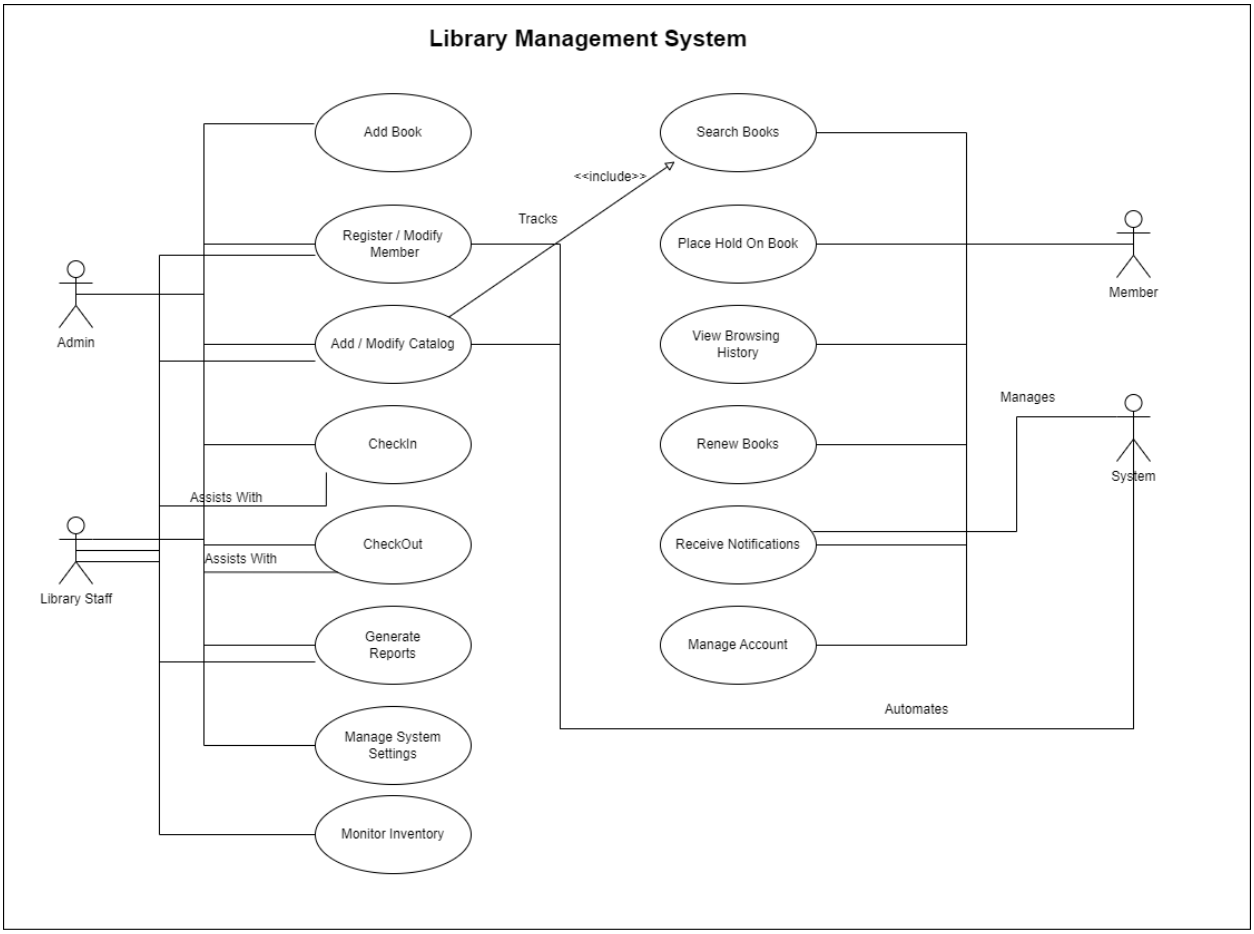
Library Staff

- **Manage Catalog Entries:** Library staff can manage catalog entries, adding new books, updating existing records, and removing outdated entries as necessary.
- **Monitor Inventory:** Library staff can monitor inventory levels, ensuring accurate tracking of library assets and minimizing instances of misplaced or lost items.
- **Assist with Check-in/Check-out:** Library staff can assist members with book check-in/check-out processes, providing guidance and support as needed.
- **Generate Reports:** Library staff have access to tools for generating reports on library operations, including book circulation, inventory status, and member activity, facilitating data-driven decision-making.
- **Manage Member Accounts:** Library staff can manage member accounts, including registration, updating member information, and addressing account-related inquiries or issues.
- **System Administration:** Library staff have administrative privileges to manage system settings, user accounts, and access permissions, ensuring smooth operation and security of the library management system.

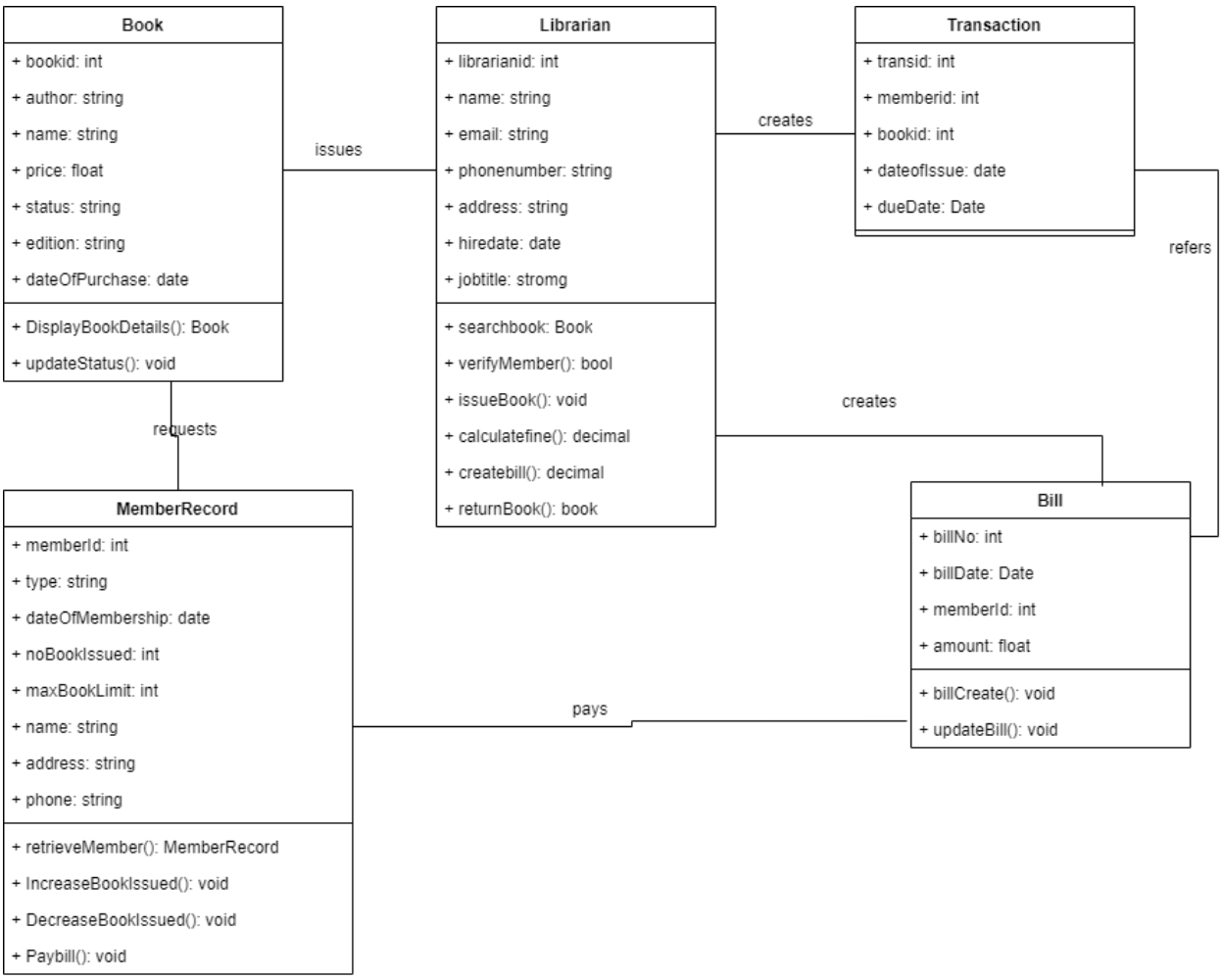
System

- **Automate Catalog Management:** The system automates catalog management processes, ensuring efficient handling of book entries, updates, and removals.
- **Track Member Registration:** The system tracks member registration information, maintaining a database of member details for reference and management purposes.
- **Integrate Barcode Scanners:** The system integrates with barcode scanners for efficient book check-in/check-out processes, reducing manual efforts and errors.
- **Manage Notifications:** The system manages notifications to members for various events such as hold availability, due dates, and overdue items, facilitating timely communication and reminders.
- **Ensure Data Security:** The system ensures data security and privacy measures are in place to protect sensitive member and catalog information from unauthorized access or breaches.

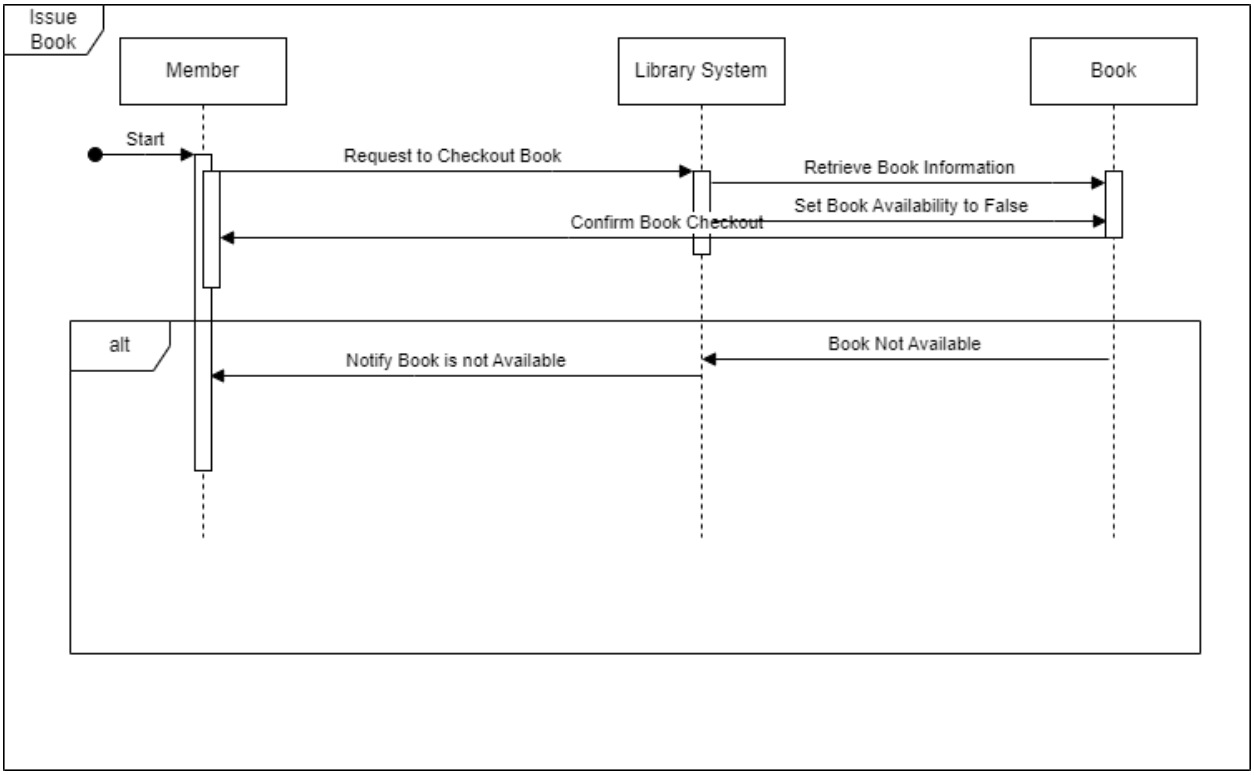
Use Case Diagram



Class Diagram

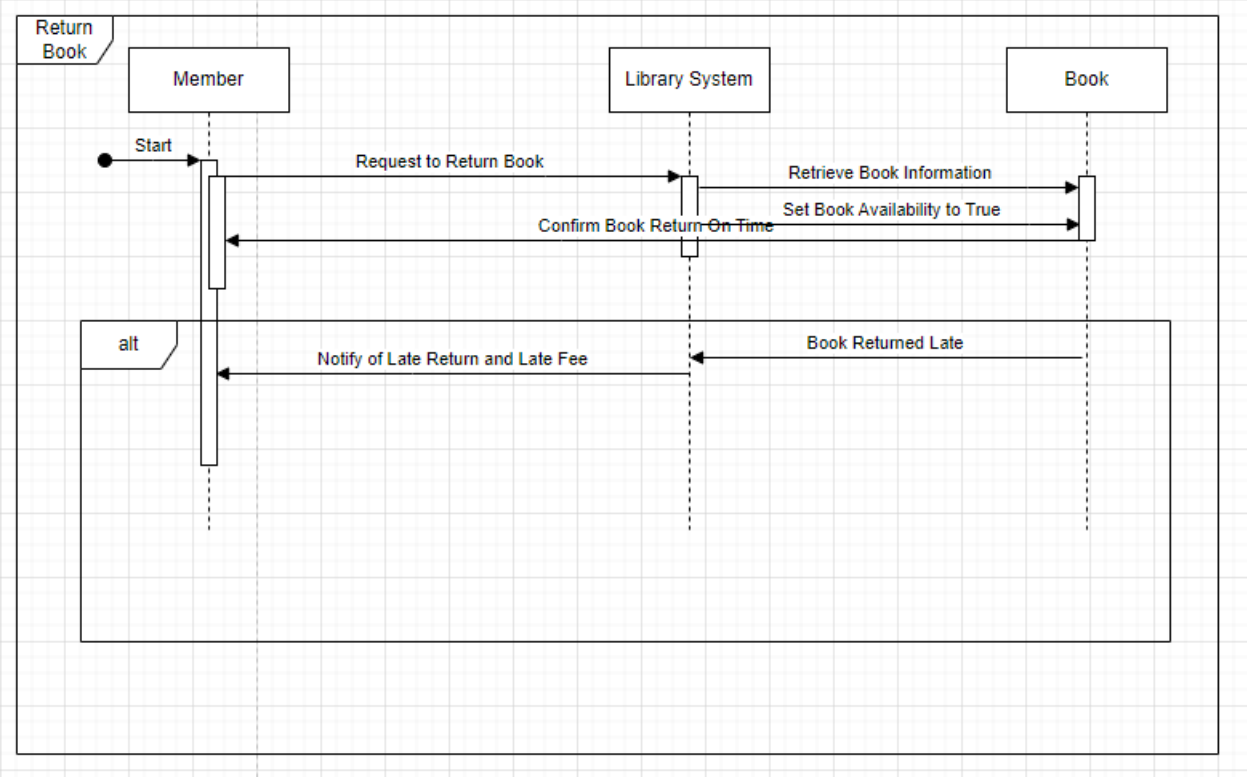


Sequence Diagram



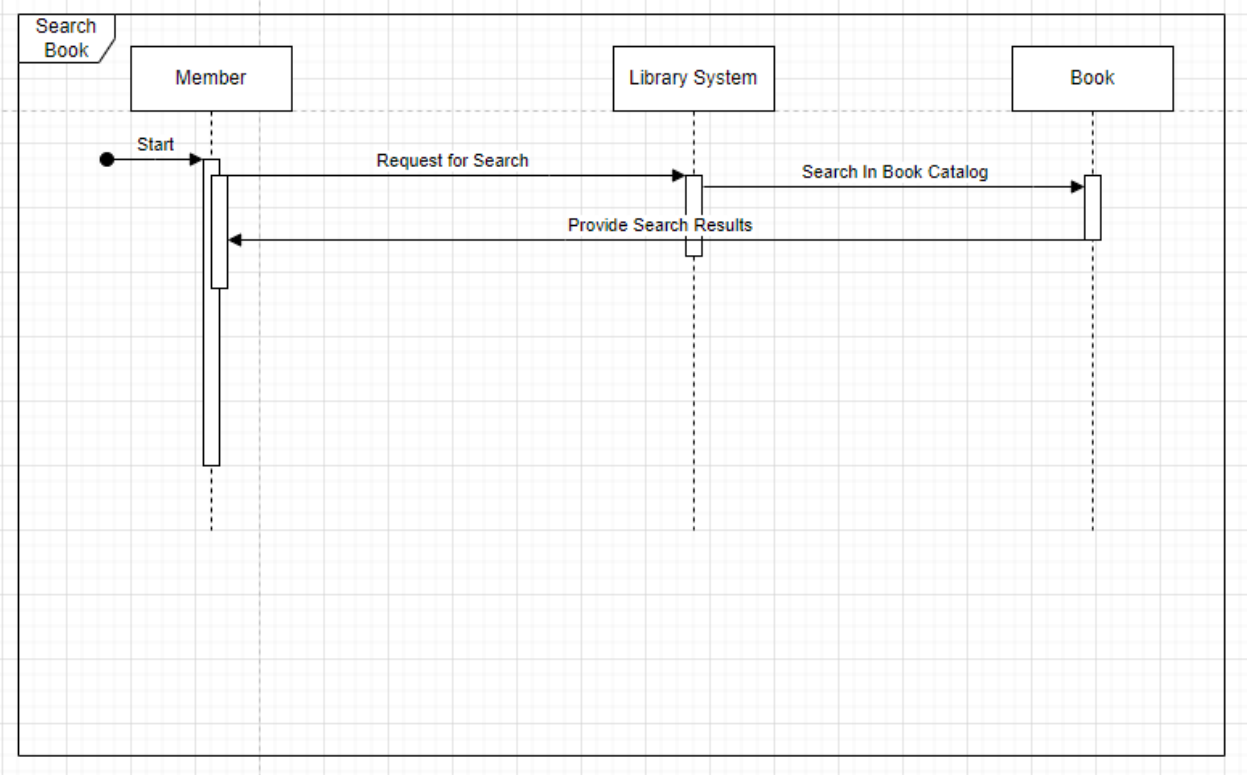
Request to Checkout Book:

- **Purpose:** This sequence diagram depicts the process of a user requesting to check out a book from the library management system.
- **Steps:**
    - The sequence starts with the user initiating a request to check out a book.
    - The system receives the request and verifies the availability of the requested book.
    - If the book is available, the system proceeds with the checkout process, updating the book's availability status and recording the transaction.
    - The system confirms the successful checkout to the user.
- **End Result:** The user successfully checks out the requested book from the library.



Request to Return Book:

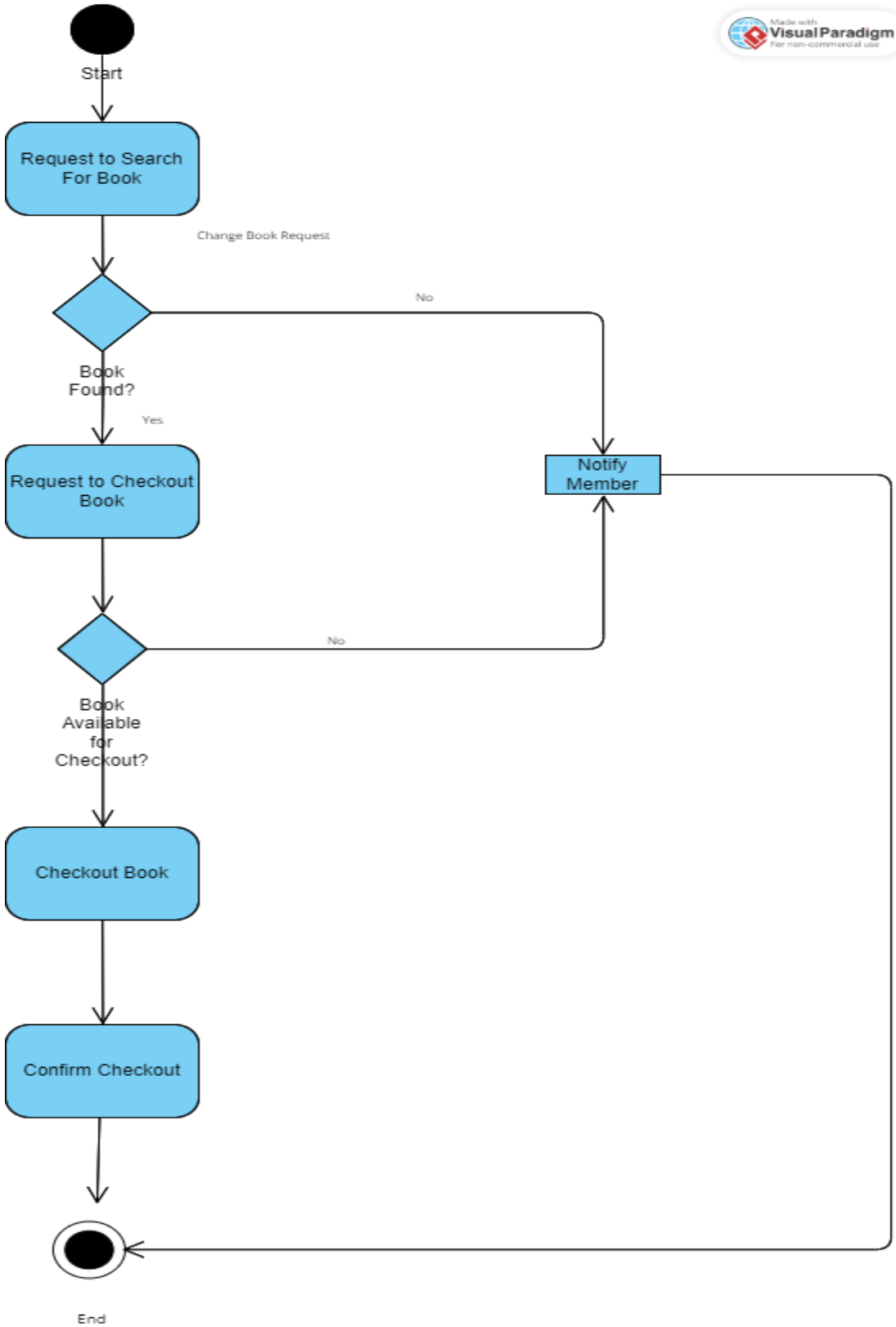
- **Purpose:** This sequence diagram illustrates the process of a user returning a book to the library management system.
- **Steps:**
    - The sequence begins with the user initiating a request to return a book.
    - The system retrieves information about the returned book and checks if it is returned on time or late.
    - If the book is returned on time, the system updates its availability status and confirms the return to the user.
    - If the book is returned late, the system calculates the late fee, updates the book's status, and notifies the user of the late return and fee.
- **End Result:** The user successfully returns the book to the library, either on time or with a late fee.



Request to Search for Book:

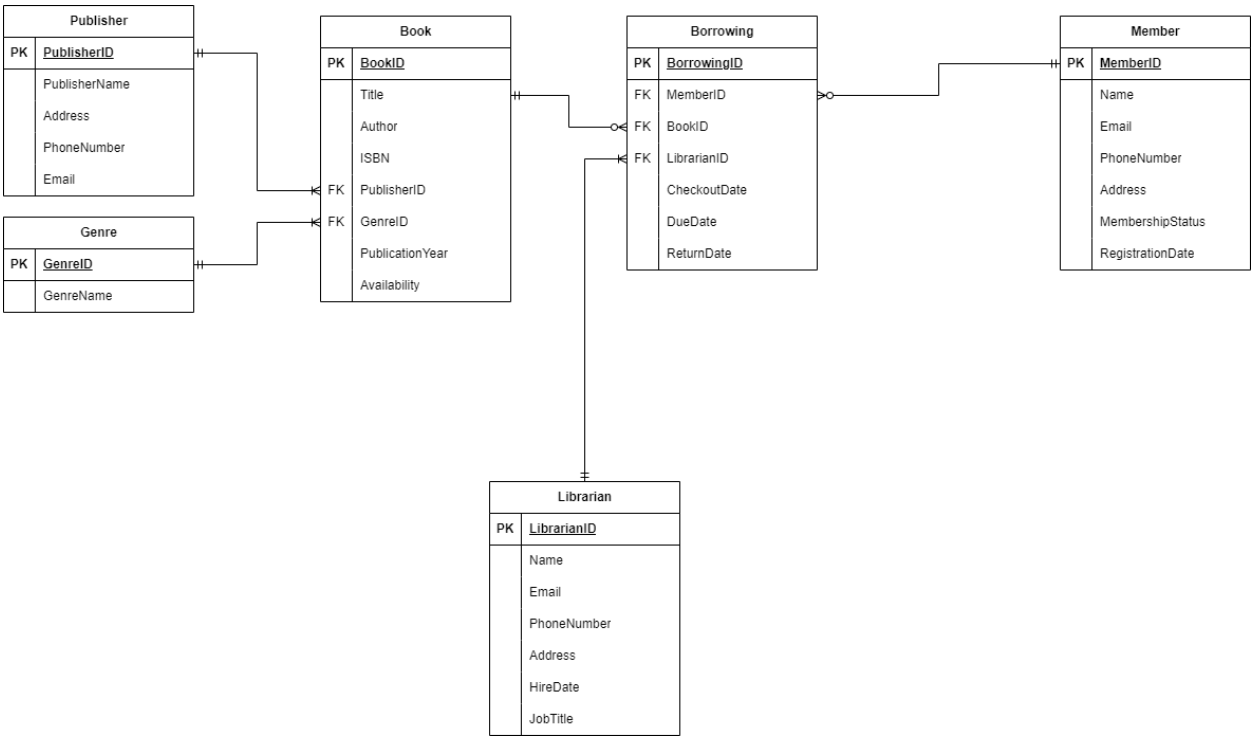
- **Purpose:** This sequence diagram outlines the process of a user searching for a book in the library management system.
- **Steps:**
    - The sequence starts with the user initiating a request to search for a book.
    - The system receives the search request and retrieves relevant information from the library catalog.
    - The system presents the search results to the user, including details such as book titles, authors, and availability.
- **End Result:** The user receives the search results and can view available books matching their search criteria.

Activity Diagram

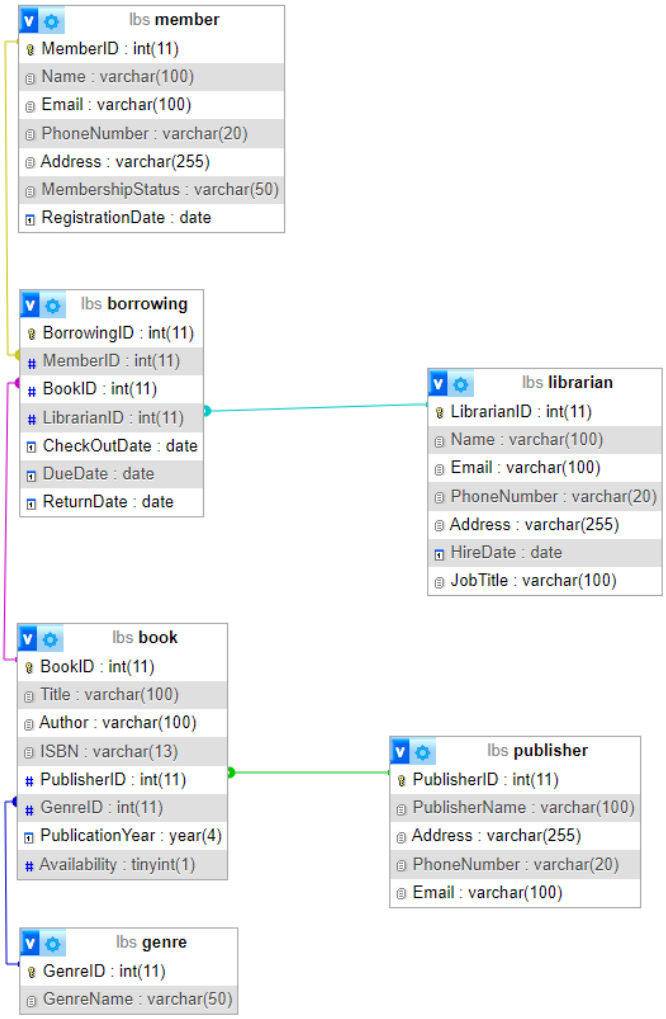

Start
Request to Search For Book
Change Book Request
No
Book Found?
Yes
Request to Checkout Book
Notify Member
No
Book Available for Checkout?
Checkout Book
Confirm Checkout
End

The library management system activity diagram depicts the sequential flow of key activities within the system: users initiate actions such as searching for books, checking books in and out, managing member accounts, and generating reports. The process begins with user requests and system responses, covering actions such as verifying book availability, processing transactions, updating member information, and generating reports based on user inputs. Each activity flows logically from one to the next, ultimately concluding with the completion of the user's action or system process, providing a concise overview of the system's functionality and interactions.

ERD (Entity Relationship Diagram)



Relational Schema



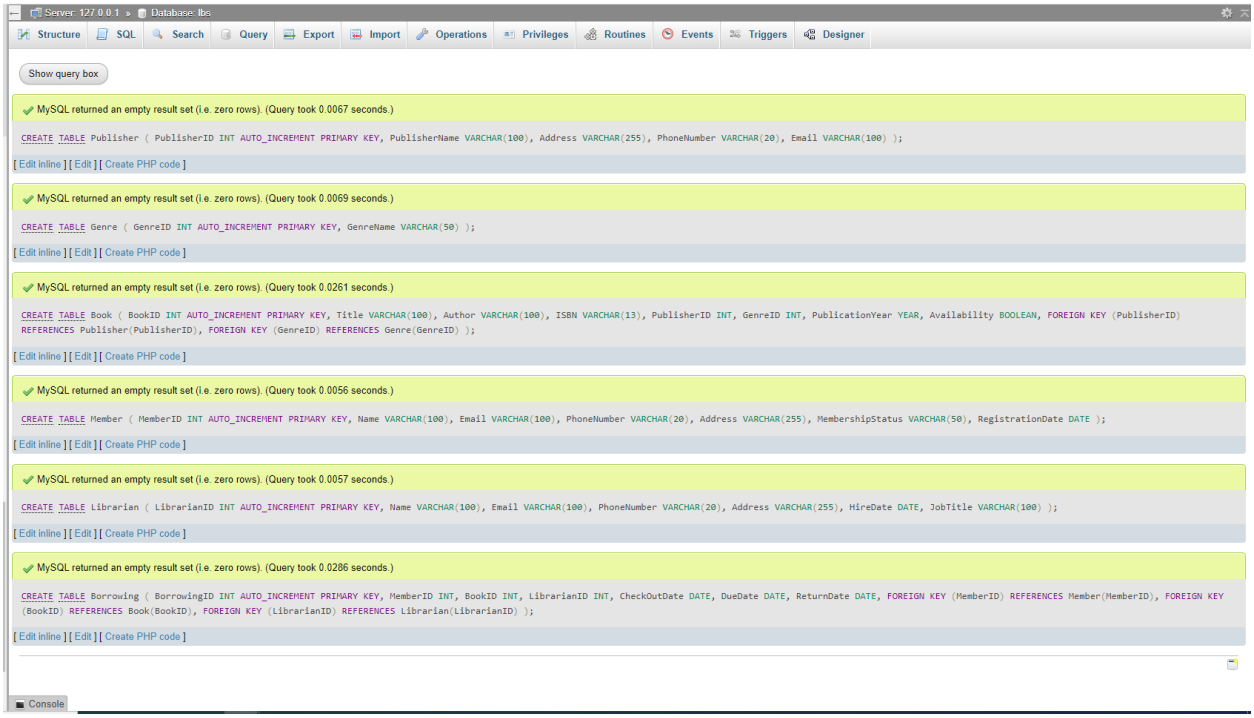
Scripts to create table with sample data to insert in the tables

```
CREATE TABLE Publisher (
    PublisherID INT AUTO_INCREMENT PRIMARY KEY,
    PublisherName VARCHAR(100),
    Address VARCHAR(255),
    PhoneNumber VARCHAR(20),
    Email VARCHAR(100)
);
```

```
CREATE TABLE Genre (
    GenreID INT AUTO_INCREMENT PRIMARY KEY,
    GenreName VARCHAR(50)
);
CREATE TABLE Book (
    BookID INT AUTO_INCREMENT PRIMARY KEY,
    Title VARCHAR(100),
    Author VARCHAR(100),
    ISBN VARCHAR(13),
    PublisherID INT,
    GenreID INT,
    PublicationYear YEAR,
    Availability BOOLEAN,
    FOREIGN KEY (PublisherID) REFERENCES Publisher(PublisherID),
    FOREIGN KEY (GenreID) REFERENCES Genre(GenreID)
);
CREATE TABLE Member (
    MemberID INT AUTO_INCREMENT PRIMARY KEY,
    Name VARCHAR(100),
    Email VARCHAR(100),
    PhoneNumber VARCHAR(20),
    Address VARCHAR(255),
    MembershipStatus VARCHAR(50),
```

```
    RegistrationDate DATE
);
CREATE TABLE Librarian (
    LibrarianID INT AUTO_INCREMENT PRIMARY KEY,
    Name VARCHAR(100),
    Email VARCHAR(100),
    PhoneNumber VARCHAR(20),
    Address VARCHAR(255),
    HireDate DATE,
    JobTitle VARCHAR(100)
);
CREATE TABLE Borrowing (
    BorrowingID INT AUTO_INCREMENT PRIMARY KEY,
    MemberID INT,
    BookID INT,
    LibrarianID INT,
    CheckOutDate DATE,
    DueDate DATE,
    ReturnDate DATE,
    FOREIGN KEY (MemberID) REFERENCES Member(MemberID),
    FOREIGN KEY (BookID) REFERENCES Book(BookID),
    FOREIGN KEY (LibrarianID) REFERENCES Librarian(LibrarianID)
);
```

Evidence of Tables Creation



INSERT INTO Publisher (PublisherName, Address, PhoneNumber, Email)

VALUES ('Penguin Random House', '1745 Broadway, New York, NY 10019', '+1 (212) 782-9000', 'info@penguinrandomhouse.com');

INSERT INTO Publisher (PublisherName, Address, PhoneNumber, Email)

VALUES ('HarperCollins Publishers', '195 Broadway, New York, NY 10007', '+1 (212) 207-7000', 'info@harpercollins.com');

INSERT INTO Publisher (PublisherName, Address, PhoneNumber, Email)

VALUES ('Simon & Schuster', '1230 Avenue of the Americas, New York, NY 10020', '+1 (212) 698-7000', 'info@simonandschuster.com');

INSERT INTO Publisher (PublisherName, Address, PhoneNumber, Email)

VALUES ('Macmillan Publishers', '120 Broadway, New York, NY 10271', '+1 (212) 226-7521', 'info@macmillan.com');

INSERT INTO Publisher (PublisherName, Address, PhoneNumber, Email)

VALUES ('Hachette Book Group', '1290 Avenue of the Americas, New York, NY 10104', '+1 (212) 364-1100', 'info@hachettebookgroup.com');

INSERT INTO Genre (GenreName)

VALUES ('Fiction');

INSERT INTO Genre (GenreName)

VALUES ('Non-Fiction');

INSERT INTO Genre (GenreName)

VALUES ('Mystery');

INSERT INTO Genre (GenreName)

VALUES ('Science Fiction');

INSERT INTO Genre (GenreName)

VALUES ('Thriller');

INSERT INTO Librarian (Name, Email, PhoneNumber, Address, HireDate, JobTitle)

VALUES ('John Smith', 'john@example.com', '123-456-7890', '123 Main St, Cityville', '2022-01-15', 'Head Librarian');

INSERT INTO Librarian (Name, Email, PhoneNumber, Address, HireDate, JobTitle)

VALUES ('Emily Brown', 'emily@example.com', '987-654-3210', '456 Elm St, Townsville', '2022-02-20', 'Assistant Librarian');

INSERT INTO Librarian (Name, Email, PhoneNumber, Address, HireDate, JobTitle)

VALUES ('Michael Johnson', 'michael@example.com', '111-222-3333', '789 Oak St, Villagetown', '2022-03-10', 'Library Clerk');

INSERT INTO Librarian (Name, Email, PhoneNumber, Address, HireDate, JobTitle)

VALUES ('Sarah Wilson', 'sarah@example.com', '444-555-6666', '321 Pine St, Hamletville', '2022-04-05', 'Library Assistant');

INSERT INTO Librarian (Name, Email, PhoneNumber, Address, HireDate, JobTitle)

VALUES ('David Lee', 'david@example.com', '777-888-9999', '567 Maple St, Metropolis', '2022-05-15', 'Library Technician');

INSERT INTO Member (Name, Email, PhoneNumber, Address, MembershipStatus, RegistrationDate)

VALUES ('Alice Johnson', 'alice@example.com', '123-456-7890', '123 Main St, Cityville', 'Active', '2022-01-15');

INSERT INTO Member (Name, Email, PhoneNumber, Address, MembershipStatus, RegistrationDate)

VALUES ('Bob Smith', 'bob@example.com', '987-654-3210', '456 Elm St, Townsville', 'Active', '2022-02-20');

INSERT INTO Member (Name, Email, PhoneNumber, Address, MembershipStatus, RegistrationDate)

VALUES ('Emma Davis', 'emma@example.com', '111-222-3333', '789 Oak St, Villagetown', 'Active', '2022-03-10');

INSERT INTO Member (Name, Email, PhoneNumber, Address, MembershipStatus, RegistrationDate)

VALUES ('Grace Wilson', 'grace@example.com', '444-555-6666', '321 Pine St, Hamletville', 'Active', '2022-04-05');

INSERT INTO Member (Name, Email, PhoneNumber, Address, MembershipStatus, RegistrationDate)

VALUES ('James Brown', 'james@example.com', '777-888-9999', '567 Maple St, Metropolis', 'Active', '2022-05-15');

INSERT INTO Book (Title, Author, ISBN, PublisherID, GenreID, PublicationYear, Availability)

VALUES ('To Kill a Mockingbird', 'Harper Lee', '9780061120084', 2, 1, 1960, true);

INSERT INTO Book (Title, Author, ISBN, PublisherID, GenreID, PublicationYear, Availability)

VALUES ('1984', 'George Orwell', '9780451524935', 4, 1, 1949, true);

INSERT INTO Book (Title, Author, ISBN, PublisherID, GenreID, PublicationYear, Availability)

VALUES ('The Great Gatsby', 'F. Scott Fitzgerald', '9780743273565', 5, 1, 1925, true);

INSERT INTO Book (Title, Author, ISBN, PublisherID, GenreID, PublicationYear, Availability)

VALUES ('Pride and Prejudice', 'Jane Austen', '9780486284736', 3, 1, 1813, true);

INSERT INTO Book (Title, Author, ISBN, PublisherID, GenreID, PublicationYear, Availability)

VALUES ('Harry Potter and the Sorcerer"s Stone', 'J.K. Rowling', '9780590353427', 1, 2, 1997, true);

INSERT INTO Borrowing (MemberID, BookID, LibrarianID, CheckOutDate, DueDate, ReturnDate)

VALUES (1, 1, 1, '2023-01-10', '2023-01-24', NULL);

INSERT INTO Borrowing (MemberID, BookID, LibrarianID, CheckOutDate, DueDate, ReturnDate)

VALUES (2, 2, 2, '2023-02-15', '2023-03-01', NULL);

INSERT INTO Borrowing (MemberID, BookID, LibrarianID, CheckOutDate, DueDate, ReturnDate)

VALUES (3, 3, 3, '2023-03-20', '2023-04-03', NULL);

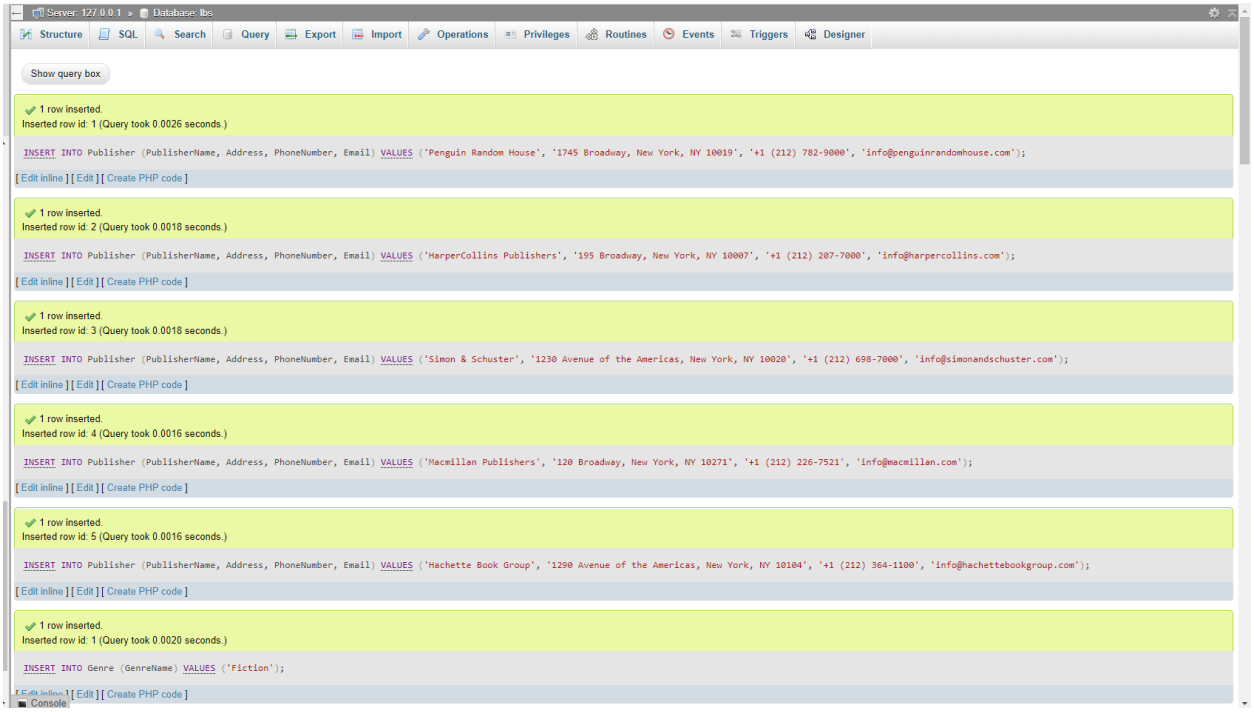
INSERT INTO Borrowing (MemberID, BookID, LibrarianID, CheckOutDate, DueDate, ReturnDate)

VALUES (4, 4, 4, '2023-04-25', '2023-05-09', NULL);

INSERT INTO Borrowing (MemberID, BookID, LibrarianID, CheckOutDate, DueDate, ReturnDate)

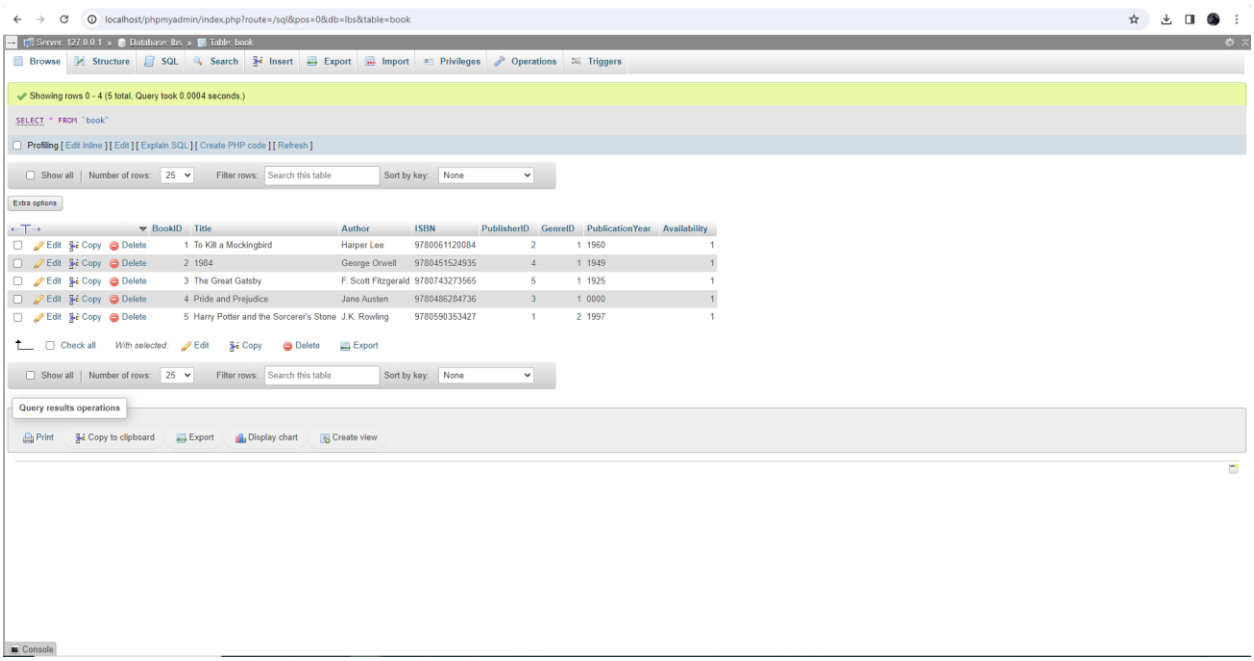
VALUES (5, 5, 5, '2023-05-30', '2023-06-13', NULL);

Evidence of Record Insertion

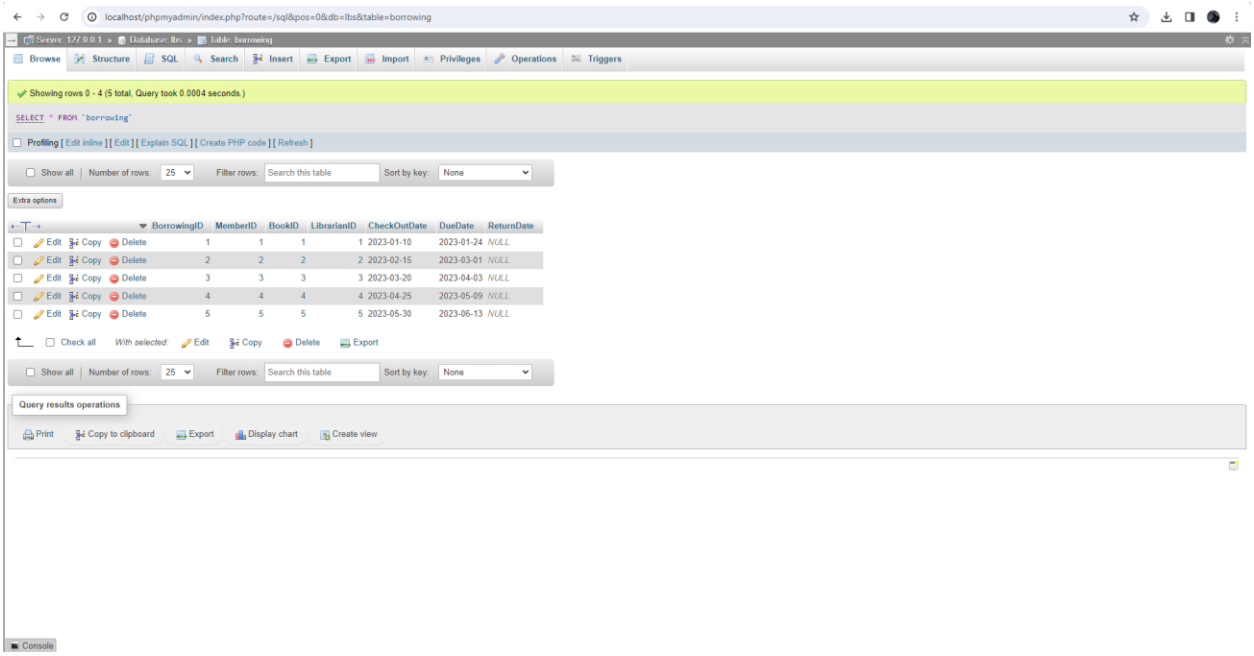


Evidence of Data in the Tables

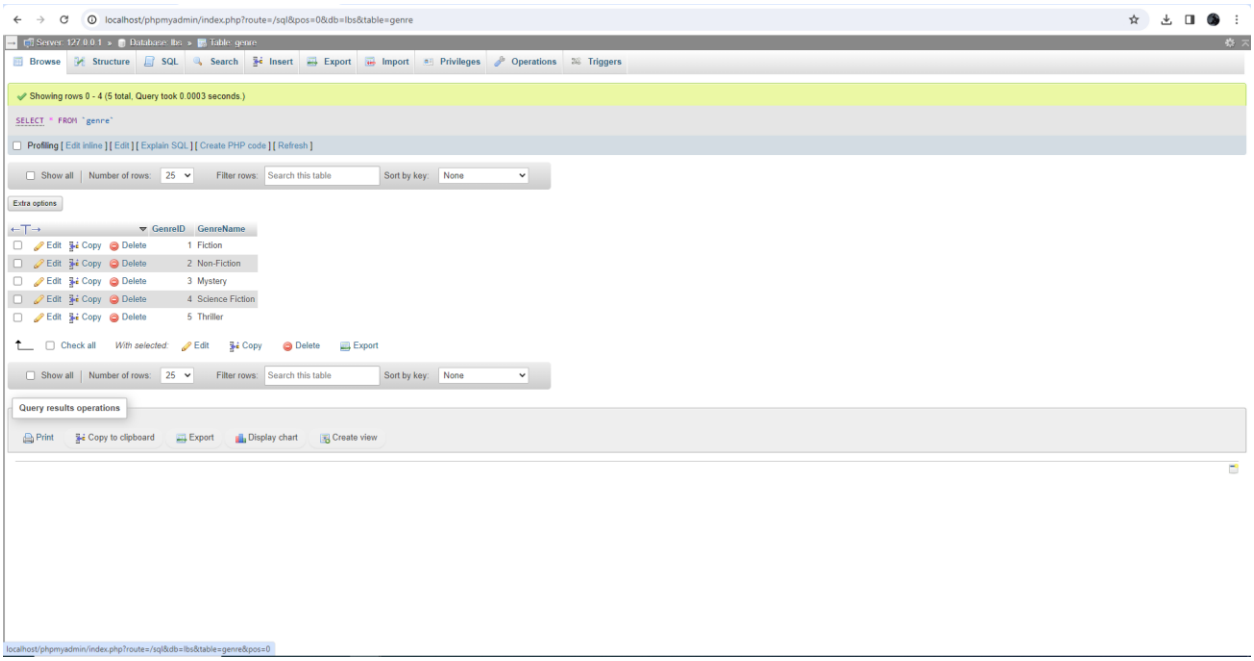
Book



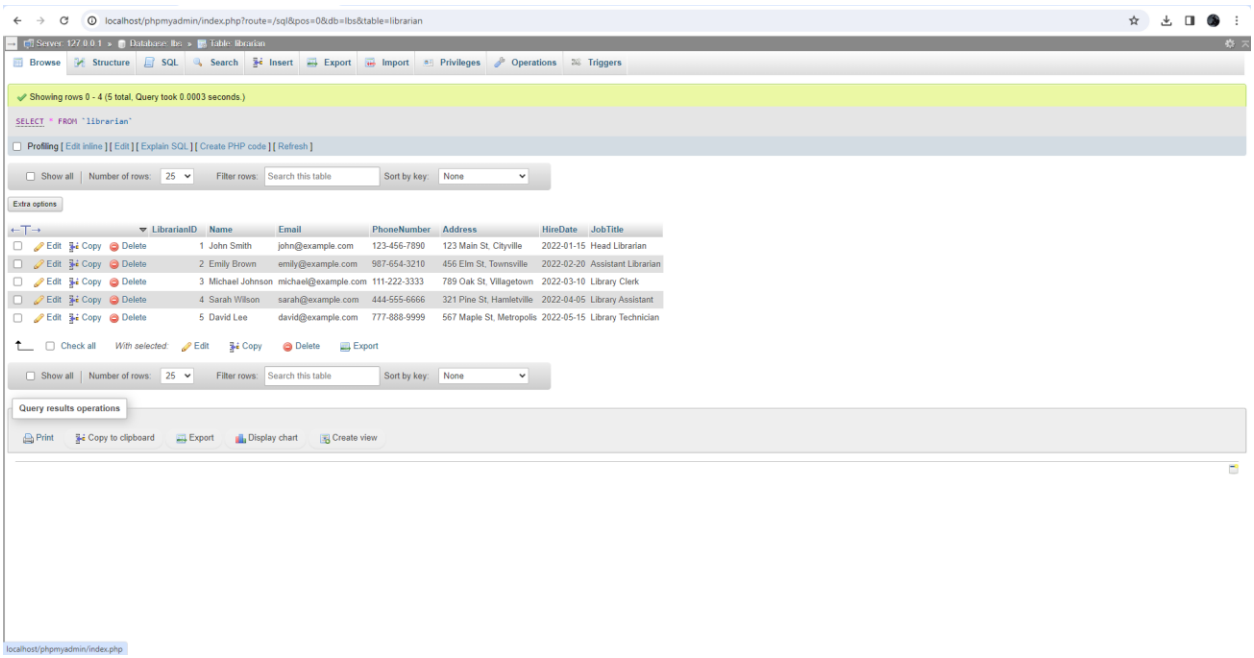
Borrowing



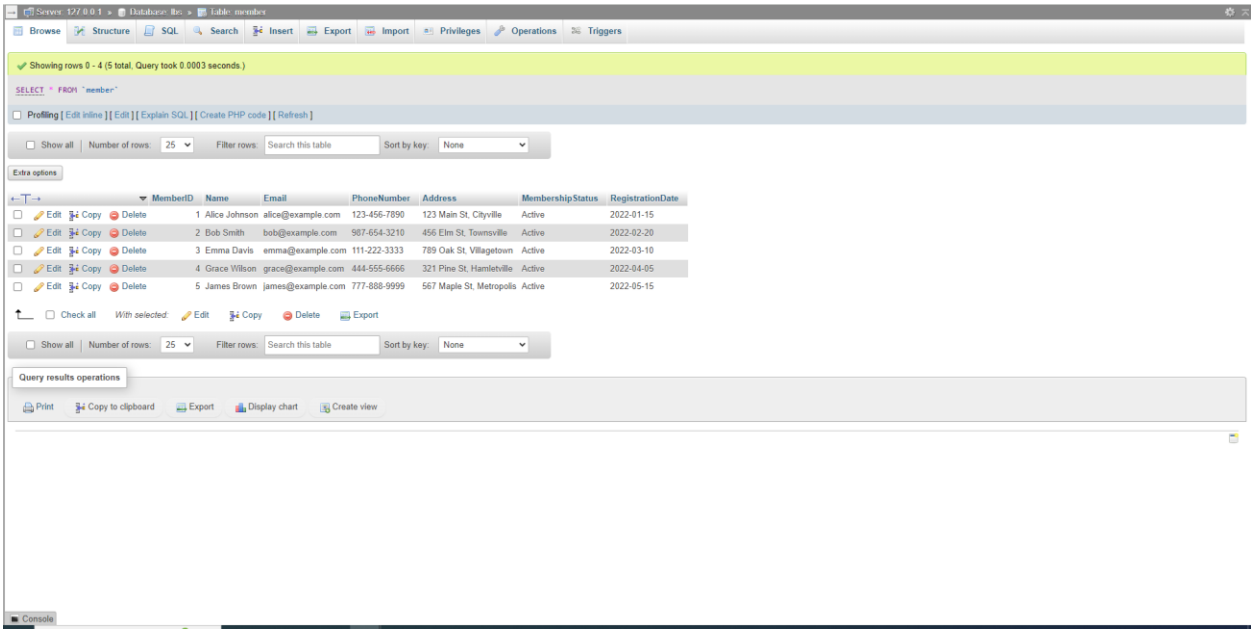
Genre



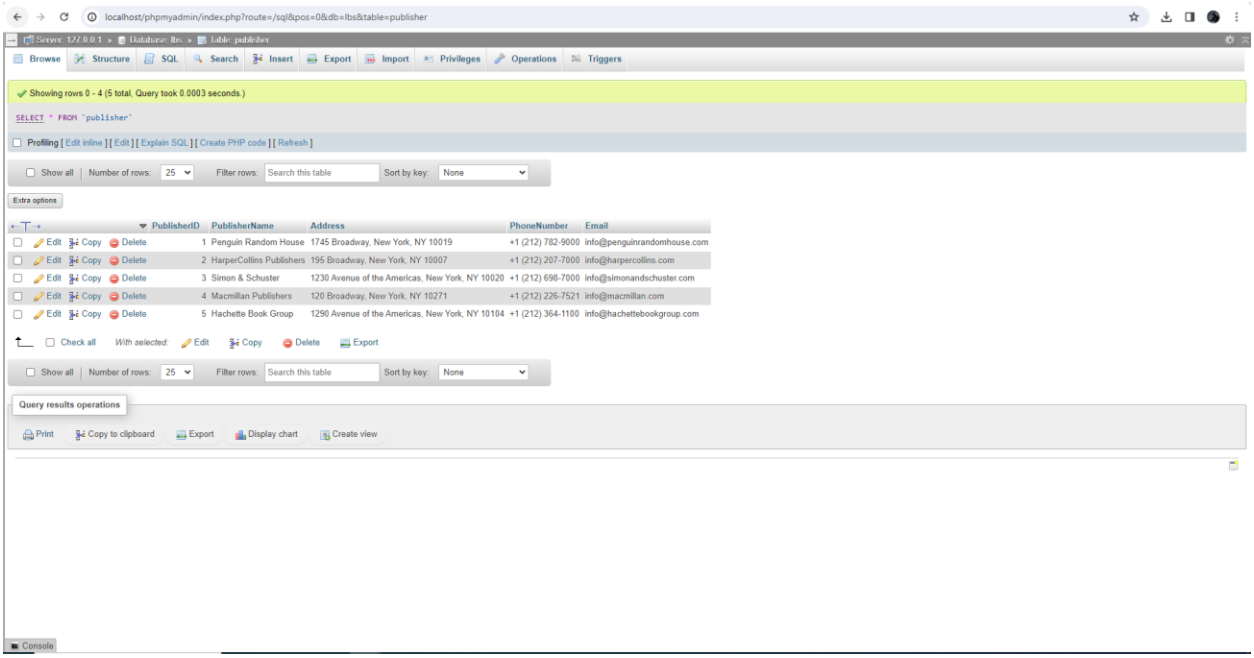
Librarian



Member



Publisher


localhost/phpmyadmin/index.php?route=/sql&pos=0&db=lbs&table=publisher
Server: 127.0.0.1 » Database: lbs » Table: publisher
Browse
Structure
SQL
Search
Insert
Export
Import
Privileges
Operations
Triggers
Showing rows 0 - 4 (5 total, Query took 0.0003 seconds.)
SELECT * FROM `publisher`
Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]
Show all | Number of rows: 25 Filter rows: Search this table Sort by key: None
Extra options
PublisherID PublisherName Address PhoneNumber Email
Edit Copy Delete 1 Penguin Random House 1745 Broadway, New York, NY 10019 +1 (212) 782-9000 info@penguinrandomhouse.com
Edit Copy Delete 2 HarperCollins Publishers 195 Broadway, New York, NY 10007 +1 (212) 207-7000 info@harpercollins.com
Edit Copy Delete 3 Simon & Schuster 1230 Avenue of the Americas, New York, NY 10020 +1 (212) 698-7000 info@simonandschuster.com
Edit Copy Delete 4 Macmillan Publishers 120 Broadway, New York, NY 10271 +1 (212) 226-7521 info@macmillan.com
Edit Copy Delete 5 Hachette Book Group 1290 Avenue of the Americas, New York, NY 10104 +1 (212) 364-1100 info@hachettebookgroup.com
Check all With selected: Edit Copy Delete Export
Show all | Number of rows: 25 Filter rows: Search this table Sort by key: None
Query results operations
Print Copy to clipboard Export Display chart Create view
Console