Library Management System: Data-Related Operations

Introduction

This document outlines the data-related operations for a Library Management System designed to enhance the process of managing libraries. The system encompasses a wide range of functionalities, including book and user management, loan management, and advanced search capabilities. These operations are crucial for maintaining efficient library services and ensuring user satisfaction.

Operations

1. Book Management

- Access and Cataloging: Books will be cataloged in the system database, including their titles, genres, authors, publication years, and publishers. This enables easy access and organization of the library's collection.

- Tracking and Organizing: Books will be tracked for their current status (available, checked out, reserved, etc.), location within the library, and historical circulation data. Organizing books by various categories and locations ensures efficient use of library space and resources.

2. User Management

- Registration: Users (library visitors) can register to become library card holders, providing their personal information to create a profile in the system.

- Profile Management: Users can update their personal information, view their borrowing history, and manage their preferences.

- Borrowing Activities: The system records and manages the activities related to borrowing books, including current loans, history, and renewals.

3. Loan Management

- Efficiency in Borrowing and Returning: The system automates the process of borrowing and returning books, including tracking due dates, managing renewals, and handling overdue items.

- Renewal Processes: Users can renew their borrowed items through the system, subject to library policies and availability of the items.

- Fines and Penalties: The system calculates and manages fines for overdue items, providing users with payment options and reminders.

4. Advanced Search

- Search Capabilities: Users can search for books using various parameters such as author, title, genre, and year of publication. This feature is designed to help users find specific items in the library's collection efficiently.

User Roles and Permissions

- **Library Visitors -** Can view the library catalog and use advanced search features. They have the option to register as library card holders.
- **Library Card Holders -** Can borrow books, place reservations on books and library rooms, and access their borrowing history. They benefit from both book management and advanced search features.
- **Librarians -** Responsible for checking out and checking in books, changing the status of books and rooms, and managing sections of the library. They play a key role in book management, loan management, and supporting advanced search functionalities.
- **Library Admins -** Can perform all librarian tasks plus manage user profiles, including adding or removing library card holders. They also manage the library's catalog by adding or deleting books and are responsible for overarching user and loan management.

Reporting and Analytics

- User Activities and Preferences: Generate reports on borrowing patterns, popular genres, and frequently borrowed authors to inform future library acquisitions and services.

- Inventory Management: Reports on book status (e.g., available, checked out, reserved) to assist in inventory management and decision-making for purchasing new books.

- Loan and Fine Management: Analyze data on loan durations, renewal rates, and fine collections to optimize library policies and improve user satisfaction.

- System Usage: Evaluate the usage of advanced search features and other system functionalities to continuously improve the user interface and system capabilities.

Common Queries

- **List all books -** To be performed automatically by the system for users and librarians to view the full catalog of the library. By default should be ordered by groups of counts the book has been checked out and waitlisted by readers, which will serve as a popularity metric. Additionally will be extended to options to sort by title (Alphabetically) and by publishing year (Recent)

- **Find book by title -** Simplest search operation, selects a book from books table with title matching the given value

- **Get books by publisher -** Part of the advanced search option, lets users select a book with the same publisher

- **Get books with number of pages limitation -** Part of advanced search, finds books based on the page limitation set by the user

- **Get audiobooks with duration limitation -** Part of advanced search, finds audiobooks based on the duration limitation set by the user

- **Get books checked out by the user (reader) -** Part of inventory and loan management operations, performed by librarians, library managers and users (iff same user), retrieves all the book ids that were checked out by the given user, also return information such as checkout start time and expected date of return

- **List all readers with active overdues -** Part of loan management operations, lists all readers that have a checked out books, which's expected date of return was earlier than the current date

- **Categorize books by genre -** Part of advanced search, selects all books when genre is provided

- **Get users whose library card is about to expire -** Used by library managers, returns the list of readers for whom the card expiration date is within next month of the current date

- **Get books with available audiobooks/ebooks -** Selects the books for which there is an audiobook/ebook available

- **Get history of books read by user -** Returns the list of books, which at some point of time were checked out by specific user, can be used for creating history lists

- **Get all waitlisted books -** Returns the list of all books which are currently on hold by users and are waiting to be dispatched (IE hold.active_status = True)