

Library Book Management Database

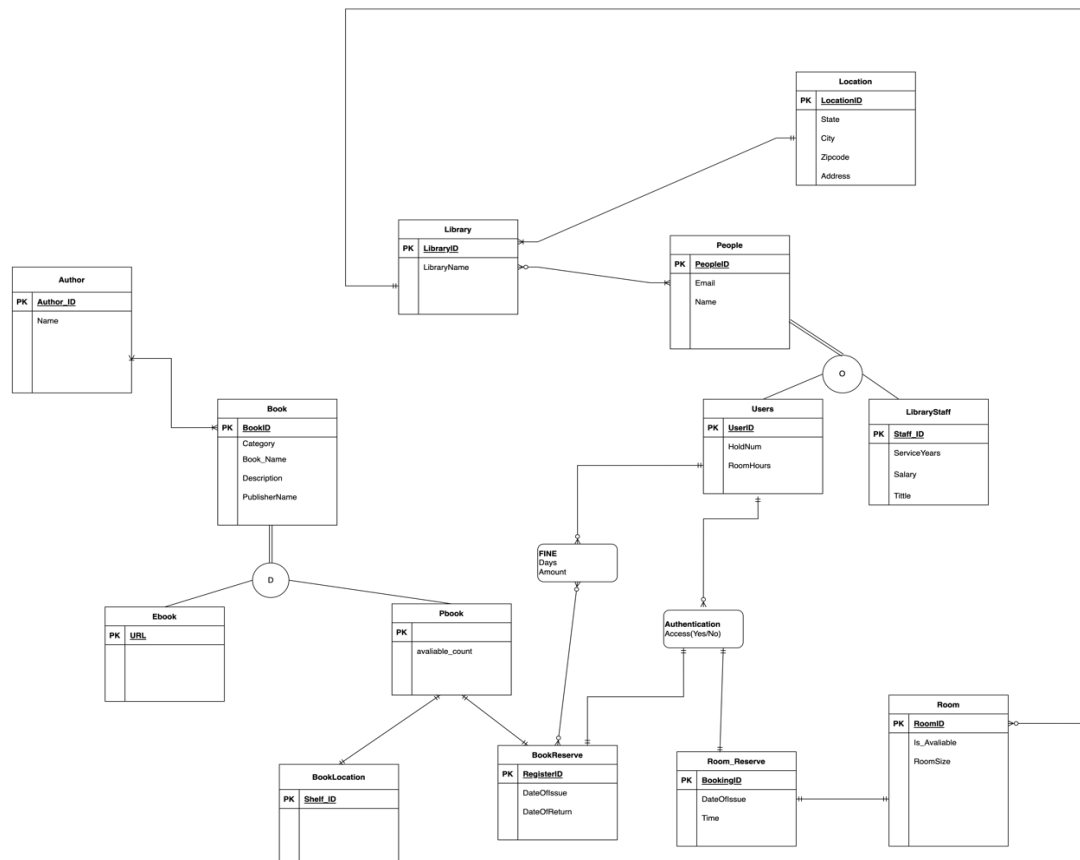
Group-5

GitHub Link: - https://github.com/YanrongHuang/DAMG6210_Group5

1. The Library Management system (LMS) is designed to address the problems as follow:
 - Any library patron should be able to search for books by title, author, subject category, and publication date.
 - The system should be able to keep track of information such as who took which book.
 - The number of books a member can check out should be limited to three (3).
 - Members should be allowed to make reservations for books.
 - When reserved books become available, as well as when the book is not returned by the due date, the system should be able to send notifications.
 - The library is only accessible to University students and personnel.

P2:-

ER Diagram



2. Entities and their Attributes:

- **Library Entity:** it has LibraryID and LibraryName. LibraryID is the primary key for Library entity.
- **Book Entity:** it has BookID, Category, Book_Name, Description, and PublisherName. BookID is the primary key for Book entity.
- **Ebook Entity:** it has URL. URL is the primary key for Ebook entity.
- **Pbook Entity:** it has available_count.
- **Author Entity:** it has Author_ID and Name. Author_ID is the primary key for Author entity.
- **BookLocation Entity:** it has Shelf_ID. Shelf ID is the primary key for BookLocation entity.
- **BookReserve Entity:** it has RegisterID, DataOfIssue and DataOfReturn. RegisterID is the primary key for BookReserve entity.
- **Location Entity:** it has LocationID, State, City, Zipcode and Address. LocationID is the primary key for Location Entity.
- **People Entity:** it has PeopleID, Email and Name. PeopleID is the primary key for People entity.
- **Users Entity:** it has UserID, HoldNum and RoomHours. UserID is the primary key for Users entity.

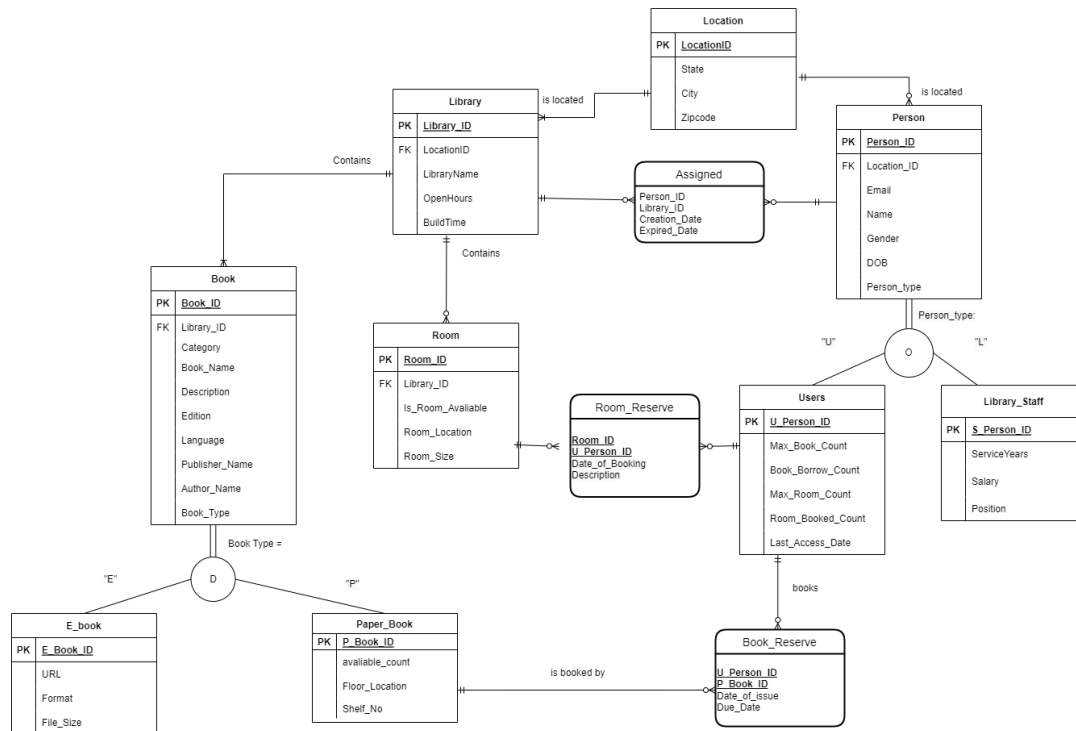
- Library Staff Entity: it has Staff_ID, ServiceYears, Salary and Title. Staff_ID is the primary key for Library Staff Entity.
- Room_Reserve Entity: it has BookingID, DateOfIssue and Time. BookingID is the primary key for Room_Reserve entity.
- Room Entity: it has RoomID, is_Available and RoomSize. RoomID is the primary key for Room entity.

3. Here are our key database design decisions of the LMS, including why an entity is included and how that entity is related to other entities:

- The system manages multiple libraries, the identifier for the library is LibraryID and LibraryName is another attribute of the library. The libraries are distributed in different locations and include different people. Only one location can exist for one library. Libraries may have any number of people.
- Library includes either users or library staffs. A person can be both user and staff. The identifier for user is UserID, and the identifier for library staff is Staff ID.
- There are many books in the library and the book identifier is BookID. One book can have more than one author, but has at least one author. Books in the libraries have forms of electronic resources Ebook and physical books Pbook. One physical book must have only one book location which identifier is Shelf_ID.
- User can reserve books, be fined for late return books and reserve study rooms through the library. Users can reserve multiple books and rooms, but each reservation has a unique identifier. The identifier of reserving books is RegisterID and the identifier of reserving rooms is BookingID.

P3: - FINAL ERD

Below are the changes from Initial ERD to Final ERD



Changes made after P2: -

1. In Library entity add LocationID, OpenHours, BuildTime as new attributes and set LocationID to foreign key.
2. In Person entity add Gender, DOB as new attributes.
3. Add associate entity named Assigned between Library entity and Person Entity. In Assigned entity we have Person_ID, Library_ID, Creation_Date and Expired_Date four attributes and set Person_ID, Library_ID to primary key. Assigned entity means if the person assigned to a Library, this person could access this library and use its service.
4. In Location entity delete Address attribute.
5. In Book entity add Library_ID as foreign key and add Edition, Language, Author_Name as new attribute.
6. Delete Author entity to simplify the ER diagram.
7. In subtype E_Book entity add Format and File_Size as new attribute.
8. In subtype P_Book entity add Floor_Location and Shelf_No as new attribute to replace BookLocation entity to simplify the ER diagram.

9. Make Room_Reserve as associate entity between Room and Users. Room_Reserve entity has Room_ID and U_Person_ID as primary key. Also have Date_of_Booking attributes to record date and Description attribute to record the reason why user book.
10. Make Book_Reserve as associate entity between Book and Users. Book_Reserve entity has P_Book_ID and U_Person_ID as primary key. Also have Date_of_issue attributes to record date and Due_Date attribute to record when the book should be returned.

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