Library Management System

System Architecture, Design Decisions & Assumptions.

1. **Intro**

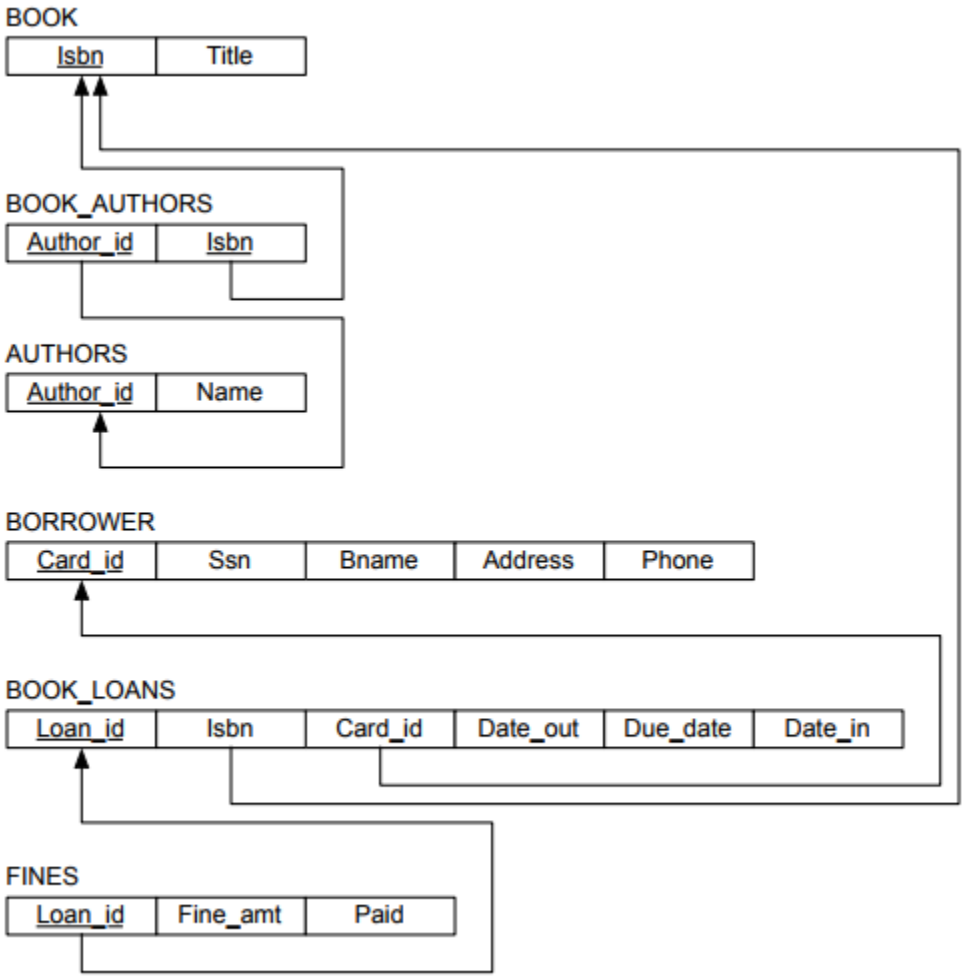
   Library Management System is a general-purpose project, which satisfies all the needs of a typical library system. The project involves the creation of a database host application that interfaces with a SQL database that implements a Library Management System.

   The package (Library Management System) is fully menu driven and provides quick and accurate information about all the books present in the library, the members who have lent the book, issued and return status of book and the availability of the book.

2. **Assumptions**
   - All book ids are taken as 10-character ISBN numbers (i.e. some contain alpha characters) though 13-character sequence is also given in the data provided.
   - All books that are loaned are returned on the specified 'date_in' provided in the table.
   - Update Fines does not update the fines table if there is a book that is not yet returned.
   - The digits part is 6-digit long. SSN is stored in the format 'xxx-xx-xxxx'.

3. **Database Design**
   - This project is developed and designed in Eclipse IDE Oxygen Release (4.5.0) and the database management system is handled by MySQL 5.7. The Library Management System Application has MySQL database for database management. The tables used are:
     1. BOOK
     2. BOOK_AUTHORS
     3. AUTHORS
     4. BOOK_COPIES
     5. BORROWER
     6. BOOK_LOANS
     7. FINES
   - In the Database, the table book has a book_id which has been made the primary key
   - In the book_authors table , the book_id and author_name form the primary key together. Also here we have splitted the author_name to Fname, Mname & Lname so that a user can search according to his convenience.
   - The table book_copies has book_id as its primary key
   - The table fines has loan_id as its primary key.

- The table borrower has card_no as its primary key. No borrower can have two cards. Also the card_no is auto incremented so that when we add a new borrower we give him a unique card_no everytime.
- The book_loans has loan_id as its primary key. This is also auto incremented so that each time a book is checked out from the library a new loan_id is generated.
- Schema Diagram



4. GUI Design

- GUI is designed using the window builder and java swings.
- The Gui consists of book search, book loans, borrow management, show fines and pay fines buttons. The user can click the buttons and perform the desired operation.
- If an error occurs because of the user's false input it is displayed on a screen
- In the Gui show fines and pay fines have been created. The show fines shows all the fines , paid and unpaid together as well as individually.
- The pay fines table has a facility to be clicked upon and pay the fine..