SQL Library Project
Design Document
Milestone 2
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- **Description:** This SQL programming project involves the creation of a database host application that interfaces with a backend SQL database implementing a Library Management System. Users of the system are understood to be librarians (not book borrowers).

- **Database used**: MySQL database
  A schema is created. Database is named as 'Library'.
  Tables created for this project are mentioned below.

Book	ISBN, Title, Cover, Publisher, Pages, Is_Available
Book_Authors	Author_id, ISBN
Authors	Author_id, Author
Borrower	Card_no, SSN, FirstName, LastName, Email, Address, City, State, Phone
Book_loans	Loan_id, ISBN, Card_no, Date_out, Due_date, Date_in
Fines	Loan_id, Fine_amt, Paid

The data is normalized by splitting the columns of books.csv and borrowers.csv and removing the null values from each table and correlating them. Inserting the data into tables is done through code in java class called 'DBConnection.java'.

- **Programming Languages**

1. Java 8
2. JFrame for frontend
3. MySQL 8.0.31

- **Libraries/dependencies used:**

1. mysql-connector-java-8.0.13 (jar file)
2. Rs2xml.jar

- **IDEs/Code Editors used:**
  Eclipse IDE and MySQL 8.0.31

- **Proposed GUI Interface:**
  - ***Search a book:*** A search box to enter full or partial string match of ISBN/BookName/Author Name of a book by the user(librarian)and it displays the following details of the book.
    ISBN, Title of the book, Author and its availability.
    Initially, when this table is created, it is assumed that all the books are available. As the borrower checks out the book, the availability gets updated.
  - ***Book Loans:*** If the book is available, it should be able to be checked out. The necessary details for this are Card_no of the borrower which is stored in the database and a unique Loan_id is generated for each entry. Date_out will be stored as the current date and the due date is calculated 14 days from teh date_out. Date_in is initially set to null until the book is checked back in. If the book is not available, it should throw an error message.

    Another feature that should be is to allow a borrower to borrow only 3 books, else throw an error message. Both the features are implemented.
    Once the book is checked out, a tuple is created in the book_loans table for each book that is checked out.

  - ***Check in for loaned books:*** This is another window from which we can search for the books loaned. Required data will be book.book_id, borrower.card_no or borrower.name. This should allow the user to check in the book.

  - ***Charging fines:*** Fines need to be charged in two ways depending upon the late books that have be returned and late books that are still out. This should also allow the users to enter the payment of fines to update if the fee is payed by the student or not.

    $0.25 should be charged for each day after the end of due date and should sum up until the book has been returned.

  - ***Borrowers(new students):*** This should allow the user to generate a unique card_no for a new borrower. Person's details like First Name, Last Name, SSN, Email, Address, City, State, Phone will be the attributes in this step. All the details are mandatory, a unique SSN should be provided by each user to be added as a borrower and generate a new borrower/card_no.
    Once all the data is provided, a new tuple is created in the table.

    The user is redirected to home page after every process flow is completed.