LMS System Architecture

Tables created and involved in the application are:

- **BOOKS** : contains details of the book namely ISBN10, ISBN13, Title, Cover, Publisher, Pages, Total_Copies, Copies_Borrowed
- **AUTHORS** : It contains the details of the author namely Author_ID and Name
- **BOOK_AUTHORS**: It consists of BookAuthor_Id, Author_Id, ISBN10, ISBN13 columns.
- **BORROWER**: It contains all the details of the Borrower. It consists of FNAME, LNAME, BNAME, EMAIL, ADDRESS, SSN, PHONE etc.
- **BOOK_LOANS**: It is used to check_in and check_out operations. It consists of LOAN_ID, ISBN10, ISBN13, CARD_ID, DATE_OUT, DATE_IN and DUE_DATE.
- **FINES** – It is used to keep track of all the fines.

Description:

- **Search**

    In Library Management system when the user redirects from Home to search where he/she can search for a book by entering ISBN13 or ISBN10 or Title of the book or Author name text into the field provided and it fetches all the records from the stored procedure in the Database. If the text matches any of the columns i.e., either ISBN10 or ISBN13 or Title or Author then all such records will be displayed so that a person can choose a book to check_out.

- **Check Out**

    On clicking Check Out button which is present against each search row, we will be redirected to Check Out section where the ISBN13 value is auto_generated from the search page and after entering CARD_ID we click on submit, and a new record will be inserted into BOOK_LOANS table where LOAN_ID is auto incremented and the DATE_OUT will be the current date and the DUE_DATE will be set to the 14 days from the current date.

- **Check In**

    On going to Check In section directly after Check Out it would auto-populate ISBN13 from check_out and then we need to enter CARD_ID,borrower name(optional) and on clicking submit, we will be redirected to a page where we enter the CHECK_IN date and on clicking submit ,book gets checked_in successfully. The date entered will be updated into the BOOK_LOANS table under the column DATE_IN.

- **Users**

    A new user can be added using Borrowers page. We can provide all the fields like First Name, Last Name, SSN, Email, Address, Phone etc. On clicking submit a new record will be inserted into BORROWER table. If we try to add a user with an SSN that already exists in borrower table , an error gets displayed as SSN needs to be unique.

- **Fines**

    Refresh – button present on the Fines page, on clicking this button, Fines table will be updated i.e., new records with LOAN_ID whose DATE_IN is NULL in BOOK_LOANS table, will be inserted into FINES table with FINE_AMOUNT as (CURRENT DATE – DUE_DATE) * 0.25. And the existing records where FINES.PAID is still NULL, the fine amount will be updated accordingly.

    Using this we can search whether a user has a fine or not by entering the Card Number and the borrower name. Fine details will be displayed if a fine does exist, and the user can pay fines by clicking on "Pay Now" button against their record.