Design Document for Library Management System

Objective of the Design:

To design an application that can function as a Library Management System, which can be used to manage the common transactions performed by the librarian

Description of the System Architecture: (Also includes the design assumptions made)

- ➔ Since the application is going to be used only by the librarians (i.e., not anywhere outside the library), I have implemented the application as a desktop app.
- ➔ The entire application has been build using JAVA.
- ➔ The GUI (Graphical User Interface) has been implemented by JavaFx. JavaFx provides a cool and attractive user interface when compared to Swings.
- ➔ DBMS Used: Mysql
- ➔ Hibernate (on top of JPA, JAVA Persistence API) has been used for Object Relational Mapping (ORM).
- ➔ Each table of our schema has a corresponding hibernate entity mapped using annotations.
- ➔ The test data has been loaded from tsv(Tab separated valued) file to the tables using LOAD queries after normalization.
- ➔ Applications Used for Development: Eclipse, Mysql Database, JavaFx Scene builder.
- ➔ Database Schema contains the following tables

Book: Contains information about all the available books.

Authors: Contains information about all the authors.

Book_Authors: Maps every book to its authors

Borrower: Contains information about borrowers.

Book_Loans: Contains information about the books checked out by the borrowers.

Fines: used to store information related to fines applicable to transactions stored in book_loan table.

- ➔ The entire system consists of a single window with multiple tabs, each dedicated to a function. In total, there are 4 tabs.,
  1) Checkout: Used for searching the books based on ISBN, Title and/or Author.
  2) Checkin: Used for checking in the borrowed books
  3) Borrower: Used for creating new Borrowers

4) Fines: Used for Fine management.

Design Decisions and Assumptions:

- ➔ We have assumed that there is only one copy of Book in the library. Therefore, only one borrower can check out any book at a time.
- ➔ ISBN, Title, and Author fields were selected as search criteria for searching books.
- ➔ To checkout a book, the particular book entry in the search results has to be clicked. After which, a dialog box will be shown with the details of the book prompting the user to enter the card no.
- ➔ The card Id is assumed to be six-digit number. Even if the card id is a single digit number, it must be left padded with appropriate zeros.
- ➔ No borrower can check out more than 3 books.
- ➔ Every borrower must submit the following fields mandatorily., viz., Firstname, Lastname, SSN, Street, City, State, Phone, Email. The ssn must be submitted as a 9-digit valid number and the phone must be submitted as valid 10 digit number.
- ➔ To check in a book, the librarian must first search the book loans taken by the borrower. The librarian can use either/ all of the ISBN, Card Id, Borrower name to search for the book loans. Then the librarian has to check out the corresponding entry to do a check-in.
- ➔ A button has been provided in the “fine” tab to update / refresh the fines for all the outstanding book loans.
- ➔ The librarian is expected to click this button at least once every day.
- ➔ The librarian can also view the fines associated with any borrower by providing his/her card number.
- ➔ The fines can also be filtered using the provided filter based on whether it has been already paid or not.