User Manual

Library Management application is divided into four different modules, each with separate tabs. Library application is having admin to authenticate the credentials.

**‘*Book Search And Availability’***helps to search books and get the book information using different filter criteria. To search book effectively and to make search painless, total four different criteria are provided. Librarian is always free to choose any number of filtering criteria to filter the book out. Also, filtering is results if librarian wants to put only a part of word in any field without entering full text.

***‘Borrower Management’***is the tab to enter the new borrower’s entry in database when card number is generated for borrower to Check out any book. It is considered that no two borrowers would have First Name, Last Name and Address same when checked all together. Also, First name and Last name will accept only alphabets. State will be 2 characters long and phone number must be 10 digits (No Manual formatting required. Fields will do auto formatting of texts after their entry.)

On the basis of Search result acquired in the ‘*Book Search And Availability’* tab, a librarian can provide a particular book to particular Card Holder by entering this information along with his/her currently working branch id using **‘*Book Loans’******– ‘Check Out’***sub tab.

To check in any book or books returned by a card holder (one card holder at a time can return more than one books),in **‘*Book Loans’ – ‘Check In’***sub tab, alibrarian can simply search checked out information using any criteria he wants and can select multiple records from result set to check in books for particular card holder. Note: Even if the search result in result set may contain check out information of multiple card holders (when lesser filtering criteria are applied), but librarian is only able select a check out records for single card holder at a time. Librarian can easily select ‘*Date In*’ for the result set from a small calendar that appears after clicking on *‘Date In’* cell, by default the ‘*Date In*’ column will be populated with the current date.

***‘Fines’***tab eases to check and to update the fine payment made by any card holder. Manual ‘Update Fines’ button to get updated fines. Search is in similar fashion as above – A part of borrower name or card number is also going to provide search result. Fine payment can be made partially if there are fines on more than one book but must be fully paid for single book. Also, In similar way to Check In result set, Fines result set may contain fines information of multiple card holders, but librarian is only able accept multiple fine payments of only single card holder at a time. Notification message also confirms the total amount that card holder is currently paying. And total fine can be seen in bottom side of result set indicating ‘Total Fine’. Even if there is option to see the fines on ‘*Not yet Returned’* Books, it can’t be paid until the book has been returned. ‘Cancel’ button cancels the all selections made by a librarian.

Design Decisions

Application has *3 tiers* – UI, Business Logic and Data Layer to adopt with and to accommodate changes in requirement easily. Three tiers make the application loosely couples and can be independently handled. For *Constants*, a separate class has been assigned to avoid frequent changes in requirement resulting in looking into Business logic. *LINQ* is implemented for comparatively light weight database operations (operations involving one or maximum two tables at a time).For faster data retrieval (like search, update operations involving multiple table data) and modularization of logic, *Stored Procedures* are employed to track operation correctness effectively. *Entity Framework* is implemented to ease the database interaction without concerning about database tables and consisting columns. *Trigger* is used to reduce application interference in database to calculate ‘No of Issued Copies’. To increase user friendliness and to avoid message box popping every time, error messages/notifications are shown on same window itself, except for a payment confirmation in ‘*Fines*’ tab. Branch Id made mandatory to update or insert any new data, as this same application can be run on any branch. ‘*tblBOOK\_AUTHORS’* (Book\_Authors) table has been normalized keeping new entry if there are multiple authors. Extra table *’tblUsers’* is maintaining librarian’s credentials. . *Fines* resultset made such that it shows only those entries on those card holders that have any due fine. (By Default filtering of previously paid fines.)

Technical Dependencies

Application is built on Microsoft’s Windows Dot Net Platform using *Visual Studio 2010* and *MS SQL Server 2008*.It requires Dot NET framework to run on any machine. It also uses *ADO.NET Entity Framework* and *LINQ* for database operations.

Bonus Feature Details

1. *Book\_Authors* table have extra column of *Role,* This criterion is implemented to filter out on books using *Role.*
2. *Fines* are searchable by Borrower name, Card Number and also fines can be paid partially.
3. *Check Out* will be prohibited if borrower has any unpaid fines and has not returned that book yet to return. Also, check out will fail, if Borrower tries to check out same copy which he already holds.
4. *Check In* columnallows librarian to select date from Date Picker appeared when clicked on cell, no manual and no particular formatted date entry is required.
5. Each search has multiple criteria to filter the result out .

Selection check boxes in grid can accept only selection of same card holder records (Automatically deselects previous selection if two different card holders’ records selected.)

Option is made to check *Fines* on ‘*Not Yet Returned’* Books.