

Following are the design considerations for the Library Web Application:

#### Database Schema Design Considerations:

##### Book Table:

- 1) ISBN is made 13 characters long since it can be 10 or 13 characters long. Current Application uses 10 characters long ISBN but the provision is made for future upgrade.
- 2) Title is allowed to have maximum 1000 characters.
- 3) Cover is included in the table for future upgrade of showing cover image and is 300 characters long.
- 4) Pages is included in the table for future upgrade of showing total pages and is number of length 4 as no book possibly will have more than 9999 pages.
- 5) Publisher is included in the table for future upgrade of showing publisher and is 50 characters long.

##### Author Table:

- 1) The application supports maximum of 9,99,99,99,999 authors.
- 2) Author name is saved as full name with maximum of 75 characters.
- 3) Author name is decomposed as title, first name, middle name, last name and suffix.
- 4) First name and middle name can be maximum of 25 characters each.
- 5) Last name is allowed to be 50 characters long as it may contain all the last part of names except first name and middle name. For Eg: "A. C. Bhaktivedanta Swami Prabhupada" : here first name is A. Middle name is C. And last name is Bhaktivedanta Swami Prabhupada.
- 6) Title is 10 character long and it may include Dr. , etc.

##### Book\_Author table:

It stores 1 to N mapping of books to authors.

##### Book Copies Table:

Note: The book\_copies table is renamed as branch\_copy table.

- 1) Branch ID is allowed to be maximum of 99 and has to be number.
- 2) Number of copy is number and maximum of 999. It indicates total number of copies of that ISBN at that branch.
- 3) Remaning\_copy: This indicates the number of copies of that ISBN left at that branch. Also, it is updated everytime when book is checked out and check in.

##### Borrower:

- 1) Each borrower is allowed to have only one card\_no and it is restricted by SSN. Card\_No is auto generated in the format "ID" + "000001".

- 2) First Name and last Name are each maximum of 25 characters.
- 3) Address is maximum of 100 characters.
- 4) Phone is 15 characters to include '-' as it is following format '12-345-6789'.
- 5) Email is 50 characters long.

Library\_Branch Table:

It stores library branch id (MAX:99), name(Length:50) and address (Length:100).

Book\_Loan Table:

- 1) Loan\_ID is of length 10 and it is number. Each check\_out will result in generation of loan\_id.
- 2) For each Loan\_id date\_out with today's date is generated and due\_date is also autogenerated with today's date +14 days.
- 3) Every time book is checked in, date\_in is updated with today's date.

Fine:

- 1) Fine\_amount is calculated at rate of 0.25 cents per day when borrower turns in book after the due\_date with paid flag as 0.
- 2) Whenever borrower pays fine, paid flag is updated to 1.
- 3) Only tuples of book\_loan with date\_in greater than due\_date or past due\_date have entries in fine table.

GUI design Considerations:

- 1) Users are allowed to search for book considering exact match, contains or starts with any combination of ISBN, title and author.
- 2) If no books are found, message is displayed.
- 3) Also, if user search for title starting with 'Reason' and author name starting with 'John', it will show results satisfying both conditions.
- 4) By default, Exact match is selected.
- 5) On each search, maximum of 10 rows are allowed and page numbers are calculated on basis of total number of search results.
- 6) Only books that have enough copies in particular library branch has option of check out.
- 7) On check\_out screen, title and remaining copies are not editable.
- 8) Each borrower is allowed maximum of 3 books. If borrower tries to exceed that limit, message is shown.
- 9) To check in book, user can search for book considering exact match, contains or starts with any combination of ISBN, card\_id and borrower.
- 10) User has to ticked the books, that are being checked in.
- 11) Fine page prepopulates all the borrowers that has paid fine or will pay in future.

- 12) Refresh button will update fine amount with respect to current date.
- 13) User can search for borrower using search box.
- 14) Also, user can sort on basis of Card ID, borrower name and fine paid or not.
- 15) Borrowers who have pending fine amount will have 'Not Paid' and pay button next to it.
- 16) All the borrowers who have paid fine will have fine amount disabled and will not have pay button next to it.