

Database Design
CS 6360
University of Texas at Dallas

Project 1
Library Management System

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Overview:

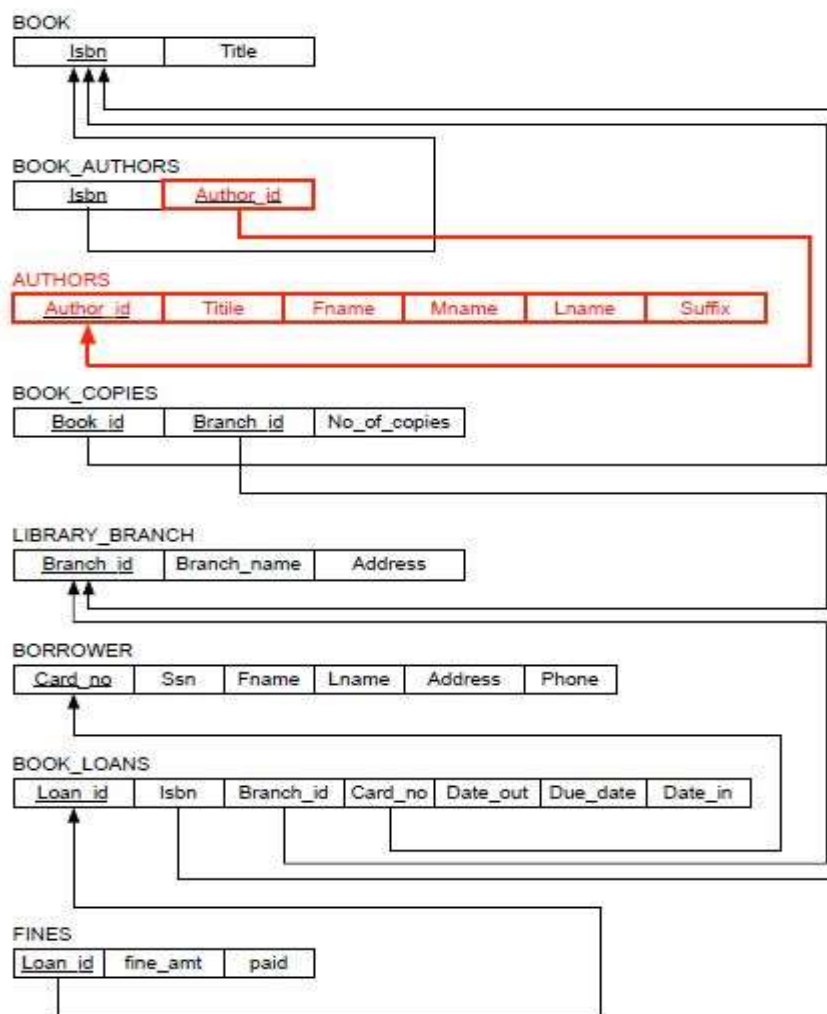
The Library Management System is a system which manages the library operations like Book Search, Book Check in, Book Check out, Adding a new user to the system etc.

We were given the Library Data in CSV format and I made the database using mysql.

The different tables in the database are as follows:

- Books
- Book_copies
- Book_loans
- Borrowers
- Library_branch

The database schema is shown in the figure below. As per the schema, I have made the foreign keys and primary keys.



After creating the database using mysql, I created the GUI using JAVA GUI Swing.

There are 5 major task that the application is performing.

- Book Search
- Checkout a book
- Checkin a book
- Pay a fine
- Add a new borrower

We will discuss all the features one by one.

a. Book Search

The book Search option is used to get the book informations like book title, author, library branch id etc.

The books can be searched using its ISBN number, Author Name or Title.

The search result looks as follows. Where I have searched using the ISBN number.

You can search books by last name of the author or any word from the book title.

The screenshot shows a Java Swing window titled 'Check Out', 'Check In', and 'Logout'. It contains three input fields for 'ISBN10', 'Author Name', and 'Title'. The 'ISBN10' field is filled with '1562927736'. Below the input fields are two buttons: 'Search' and 'Check Out'. The 'Search' button is highlighted. Below the buttons is a table displaying the search results.

Title	ISBN10	Author Name	Branch ID	Branch Name	Total	Available
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	5	Audelia Road	1	0
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	3	Grauwylar Park	1	1
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	4	Highland Hills	1	1
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	2	Lakewood	0	0
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	1	Oak Lawn	1	1

b. Checkout a book

The checkout option gives facility to borrow a book for a particular borrower. When we checkout a book, we can see that, the availability of the book decreases by one. Also, we can see the checked out book under the “ show borrowed book” option.

I have shown the screenshot of the checkout option.

Title	ISBN10	Author Name	Branch ID	Branch Name	Total	Available
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	5	Audella Road	1	0
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	3	Grauwylar Park	1	0
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	4	Highland Hills	1	1
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	2	Lakewood	0	0
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	1	Oak Lawn	1	1

Check Out

Check In

Logout

ISBN	Title	Branch ID	Date Out	Date Due	Fine
1562927736	The Adventures Of Mig...	3	2016-03-27	2016-04-10	0.0

Show Borrowed Books

Check In

Pay Fine

2016-27-03

Also, there is an option which manages the restriction that one user can borrow only 3 book. I have attached the screenshot for the same below.

Check Out

Check In

Logout

ISBN10

1562927736

Check Out

Message

Can borrow maximum of 3 books! Limit reached!

OK

Title	ISBN10	Author Name	Branch ID	Branch Name	Total	Available
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	5	Audelia Road	1	0
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	3	Grauwylar Park	1	0
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	4	Highland Hills	1	0
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	2	Lakewood	0	0
The Adventures Of ...	1562927736	Gwendolyn Mitchell...	1	Oak Lawn	1	0

c. **Book Checkin**

This option manages the feature which gives user the option to give the borrowed book. Once we checkin the book, the book details will be restored to the main book system.

d. **Pay a fine**

When the user does not return the book within 14 days, there is a fine for the user. So, there is an option to pay a fine in case there is a fine due for the user.

The screenshot displays a library management application window. At the top, there are three tabs: 'Check Out', 'Check In' (which is selected), and 'Logout'. Below the tabs is a table with the following data:

ISBN	Title	Branch ID	Date Out	Date Due	Fine
1562927736	The Adventures Of Mig...	3	2016-03-27	2016-04-10	0.0
1562927736	The Adventures Of Mig...	4	2016-03-10	2016-03-17	2.5
1562927736	The Adventures Of Mig...	1	2016-03-27	2016-04-10	0.0

Below the table, a yellow message box with a red 'X' icon in the top right corner is displayed. It contains an information icon (i) and the text 'Pay fine before returning book!' with an 'OK' button below it.

At the bottom of the window, there are three buttons: 'Show Borrowed Books', 'Check In', and 'Pay Fine'. The date '2016-27-03' is displayed in the bottom right corner.

e. **Add a new borrower**

There is an option to add a new borrower and which generate loan ID. The fields first name, last name, SSN and Address can not be empty.

Message

 First Name, Last Name, SSN and Address are mandatory!!!

OK

First Name

Last Name

Address

City

State

Phone Number

Email ID

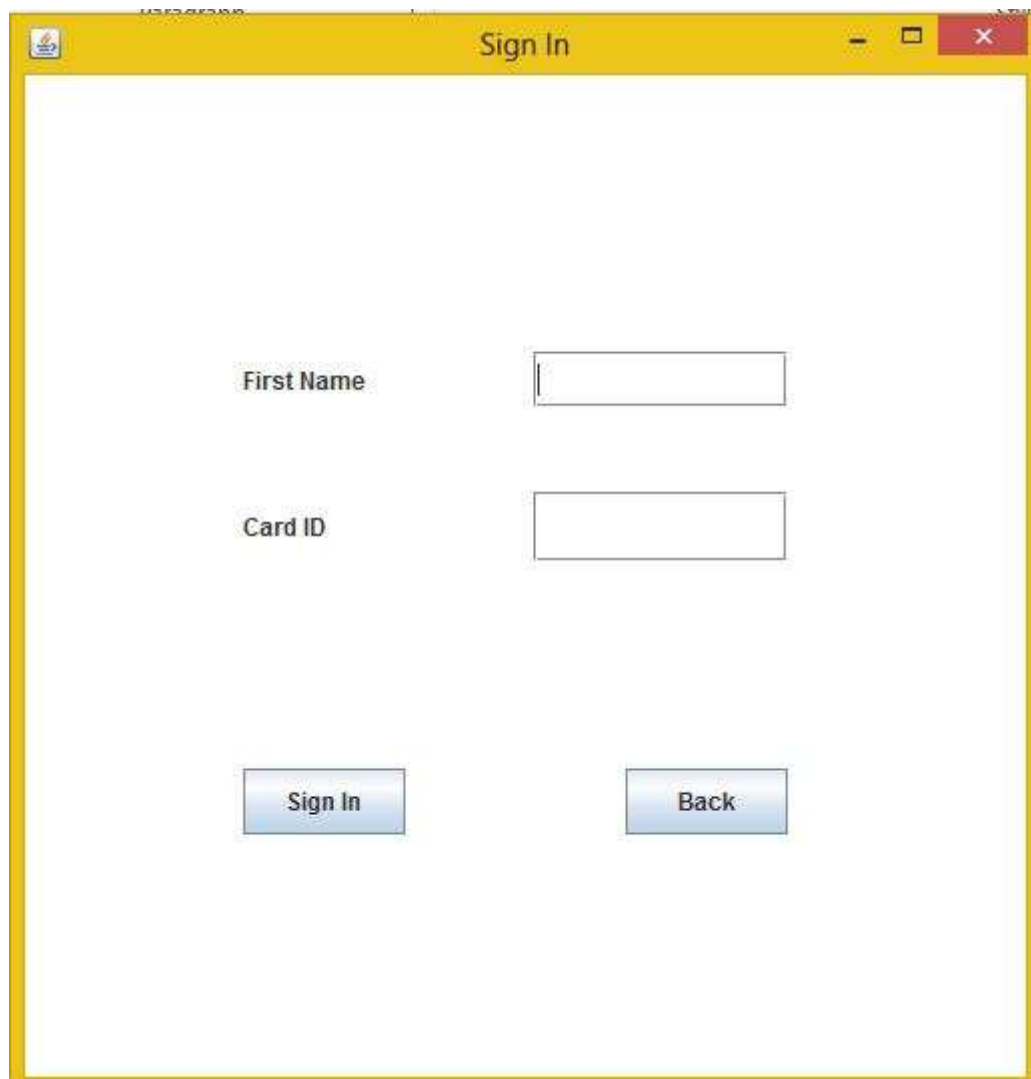
Sign Up Back

Design decisions, Assumptions and Constraints:

1. I have made my SQL database by importing the data csv file into the sql. So, if we want to import the database into other system, we have to change the path of the csv file.
2. If you are using your own database, the names of the tables and every columns, and the data types for every column should be same as that of the database created and used by me.
3. The book table in the schema has only 2 fields in that. But, as per the file provided to us, I have made the book table with all the fields provided in the file.
4. Also, in addition to the design provided in the statement, I have implemented login and logout options.

I have assumed that the login works with user's first name and ID. Also, the First name and ID should be exactly same as that is given to the file table borrowers.

I have attached the screenshot for login page.



The screenshot shows a window titled "Sign In" with a yellow border. Inside the window, there are two input fields. The first field is labeled "First Name" and the second field is labeled "Card ID". Below these fields, there are two buttons: "Sign In" and "Back".

For example, First name: Mark

Card ID: ID000001

It will login into the system and show all the details of the user's checked out or borrowed books and the fines they have to pay.