Milestone 2: CS 6360 Library Management System

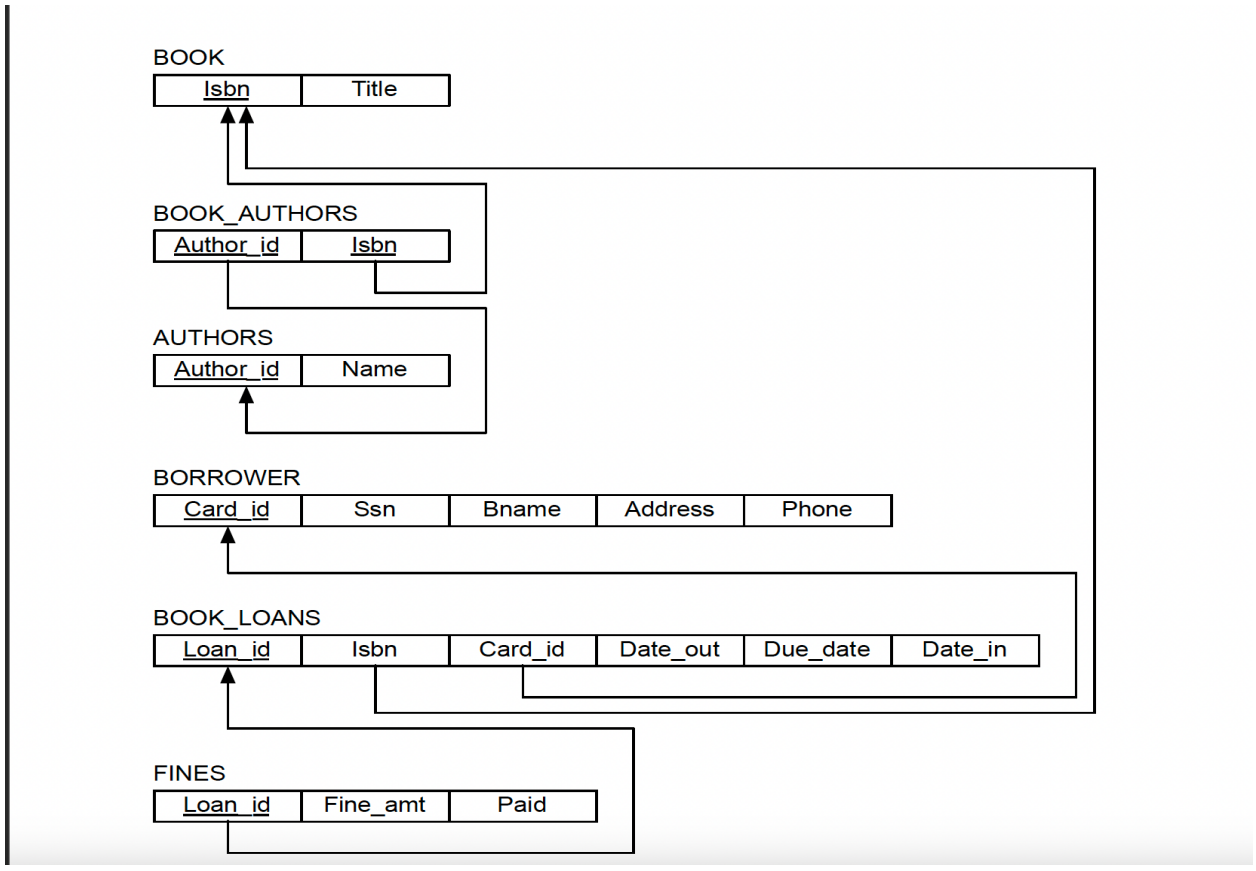
The Project is developed using the following technology/programming language:

- Programming Language: Python 3.10.8 (Clang 14.0.0)
- GUI Library: Tkinter (Version 8.6)
- SQL Database: MySQL (Version 8.0.31 Community)
- Web Development: HTML (templates), CSS
- Tools: Microsoft Visual Studio Code, MySQL Workbench, Terminal

System Architecture:

The following are the tables used for this system:

1. authors
2. book
3. book_author
4. book_loans
5. borrower
6. fines

1. 

The following provides explanation for each functionality:

1. Search Book:
    a. The library staff can search all the book by pressing the search button without any search string.
    b. The library staff can search the book by entering the Book Title or the ISBN or the Book Author.
    c. The substring search can be done using any of the above field (one or more characters).
    d. There is an additional column which list the book is available or not.

2. Check Out Book:
    a. The borrower can proceed to check out any required book.
    b. The borrower cannot proceed to check out the book if it is not available.
    c. The borrower cannot borrow more than 3 books.
    d. Once a book is issued to the borrower, it is placed in the record in the *book_loans* table with the current date.
    e. The *fines* table is also populated with the record with $0 as the fine.

3. Check In Book:
    a. The librarian can enter borrower ID (*Card_Id*), Borrower Name or the Book ISBN to check in the book.
    b. Any one of the results return the list of books which borrower checked out.
    c. Fine is calculated as soon as the book is checked in and updated on the *fines* table.

4. Fines:
    a. The librarian can see the fines by entering the borrower ID (*Card_Id*).
    b. The total due amount is shown, and the librarian will get an option to pay the fine and settle the dues.
    c. Once the librarian settles amount it will get updated in the database.

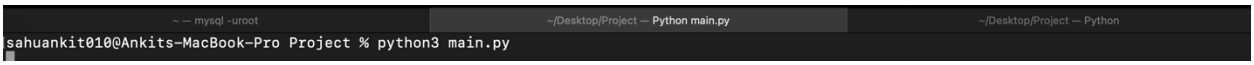
5. Adding new borrowers:
    a. The librarian can add a new borrowers can take details such as First Name, Last Name, SSN, Address, Phone.
    b. The system will generate an auto increment value for the Card_Id.

Normalize and Pre-process data:

1. books.csv is imported as a **book** table in mysql with columns ISBN, ISBN10, title, cover, publisher, and page. Primary Key is ISBN.

2. Then a table book_author is created from book having ISBN (books) as isbn and a new column author_id (auto increment).
3. Also, a table **authors** is created with author_id (auto increment), and Name (author name) as columns. Primary key is author_id.
4. A table is created for **book_loans** having LoanID, ISBN, Card_ID, Date_out, Due_Date, and Date_In as columns. LoanID is value generated by code (auto increment) and is primary key of the table.
5. A **borrower** is table is created having columns Card_Id, Ssn, FName, LName, Address, Phone. Primary key is combination of (Card_Id, Ssn).
6. A new table for **fines** is also created with columns Loan_Id, Fine_Amt, and Paid. The primary key is Loan_Id.

Screenshots



```
mysql> show tables;
+----------------------+
| Tables_in_library_db |
+----------------------+
| authors              |
| book                 |
| book_author          |
| book_loans           |
| borrower             |
| fines                |
+----------------------+
6 rows in set (0.00 sec)
```

```
mysql> select * from book_loans;
+--------+--------------+---------+------------+------------+------------+
| LoanID | ISBN         | Card_ID | Date_out   | Due_Date   | Date_In    |
+--------+--------------+---------+------------+------------+------------+
|      1 | 9781563892462 |       1 | 2022-11-28 | 2022-12-12 | 2022-11-29 |
|      3 | 9780345442390 |      12 | 2022-11-29 | 2022-12-13 | 2022-11-29 |
|      6 | 9780785276890 |      11 | 2022-11-29 | 2022-12-13 | 2022-11-29 |
|      7 | 9780399145087 |     123 | 2022-11-29 | 2022-12-13 | NULL       |
|      8 | 9781565926738 |    1001 | 2022-11-29 | 2022-12-13 | 2022-11-29 |
|      9 | 9780743442626 |    1001 | 2022-11-29 | 2022-12-13 | 2022-11-29 |
|     11 | 9780307201522 |    1001 | 2022-11-29 | 2022-12-13 | 2022-11-29 |
|     12 | 9780563384519 |    1001 | 2022-11-29 | 2022-12-13 | NULL       |
|     13 | 9780399135781 |    1001 | 2022-11-29 | 2022-12-13 | NULL       |
+--------+--------------+---------+------------+------------+------------+
9 rows in set (0.00 sec)

mysql> select * from fines;
+---------+----------+------+
| Loan_Id | Fine_Amt | Paid |
+---------+----------+------+
|       6 |     0.00 | 0    |
|       7 |     0.00 | 0    |
|       8 |     0.00 | 1    |
|       9 |     0.00 | 0    |
|      11 |     0.00 | 0    |
|      12 |     0.00 | 0    |
|      13 |     0.00 | 0    |
+---------+----------+------+
7 rows in set (0.00 sec)
```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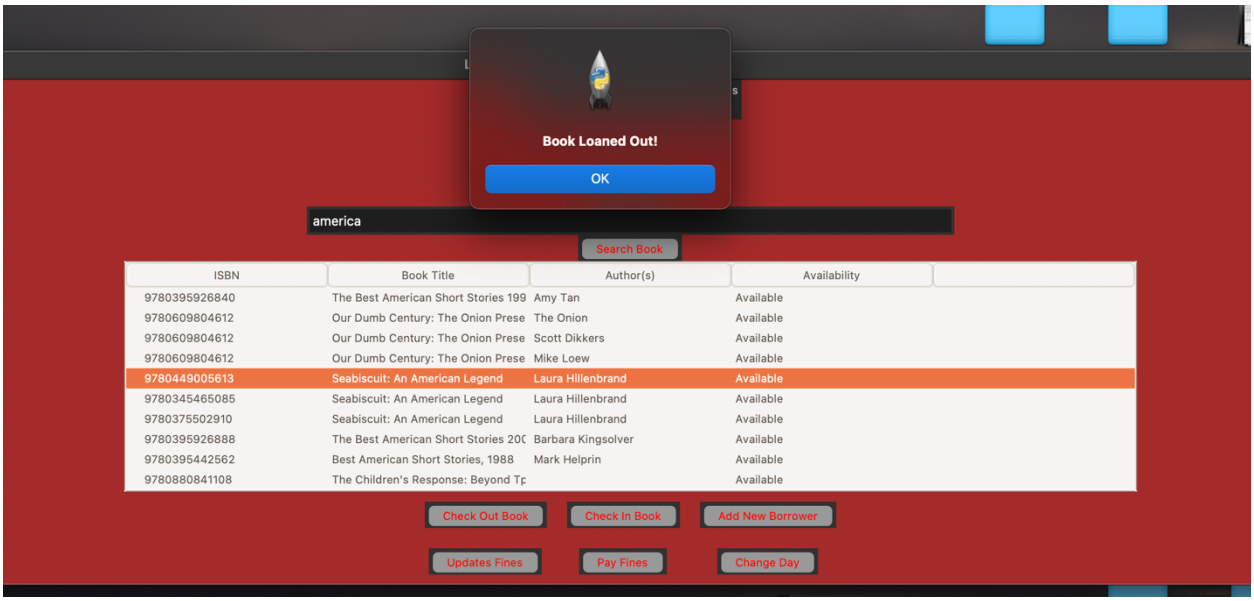
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