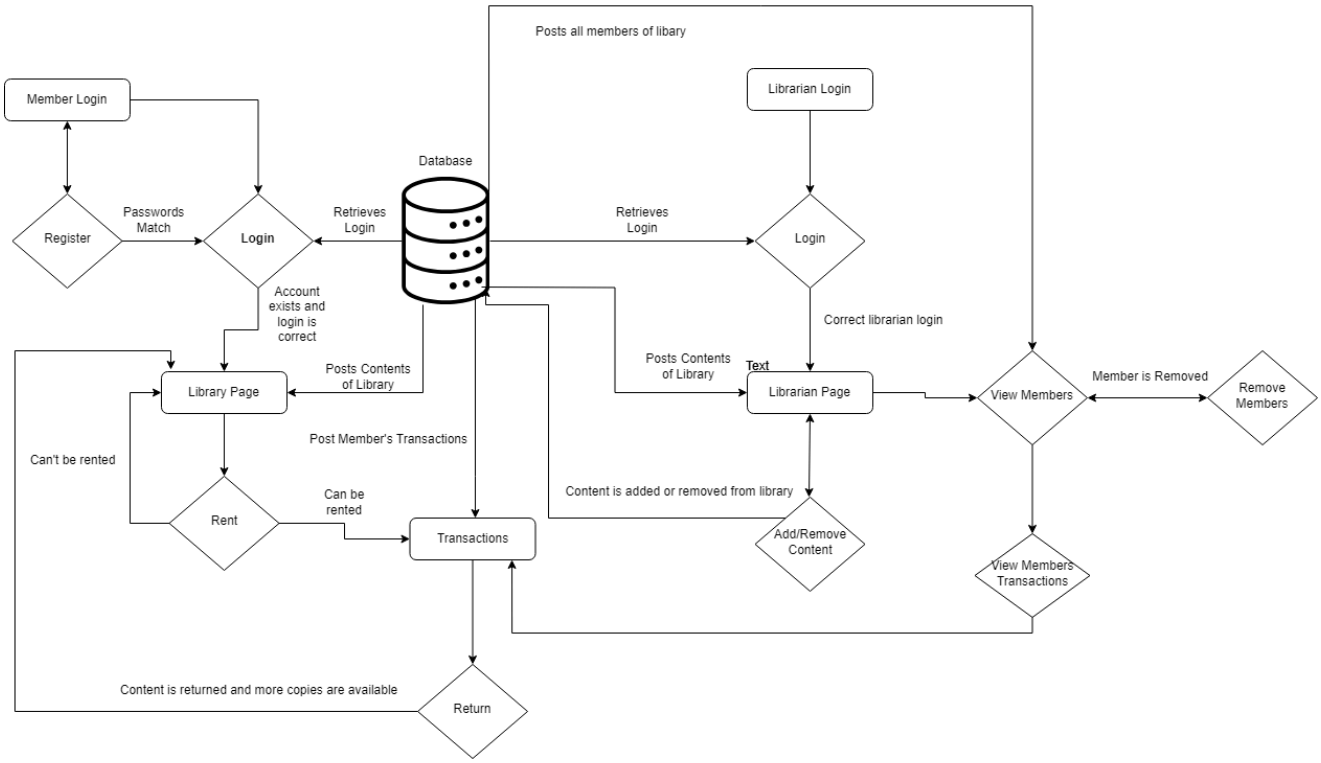
Introduction/Objective

Our project's main objective is to create a representation of an online library. Through utilizing SQL database and Java Swing, we're able to create an app that simulates how an online library would work. People can sign up to create an account for the library where they're able to look through the contents the library has to offer such as books, articles/journals, and movies to where they're able to rent or borrow the material for a given period of time. Librarians of the library are also able to add new content through the library for members to rent, and also view the transactions made from these members to better understand where all the content in the library is going towards.

Project High-Level Design

[Click to View HLD Diagram]



ER Diagram and Database Design

Entities

Books	Books' details and attributes like BookID, Title, Author, ISBN, Availability etc.
Articles	Articles' details and attributes like ArticleID, Title, Author, Availability, Volume, Issue, Total Copies, etc.
Movies	Movie attributes like MovieID, Title, Director, Year of Release, etc.
Transactions	Includes Transaction Dates, IDs, Type, Due Dates, and foreign keys to the member ID and product ID
Librarians	Includes Librarian name, ID, and email address
Members	Includes member ID, Name, and email address

Entity Tables

Books

Field	Type
BookID	int
Genre	varchar(50)
Title	varchar(100)
Author	varchar(100)
ISBN	varchar(20)
TotalCopies	int
AvailableCopies	int

Articles

Field	Type
ArticleID	int
Author	varchar(100)
Title	varchar(100)
Volume	int
AvailableCopies	int
TotalCopies	int
Issue	varchar(20)

Librarians

Field	Type
LibrarianID	int
Email	varchar(100)
FirstName	varchar(50)
LastName	varchar(50)
UserName	varchar(100)
PasswordHash	int

Members

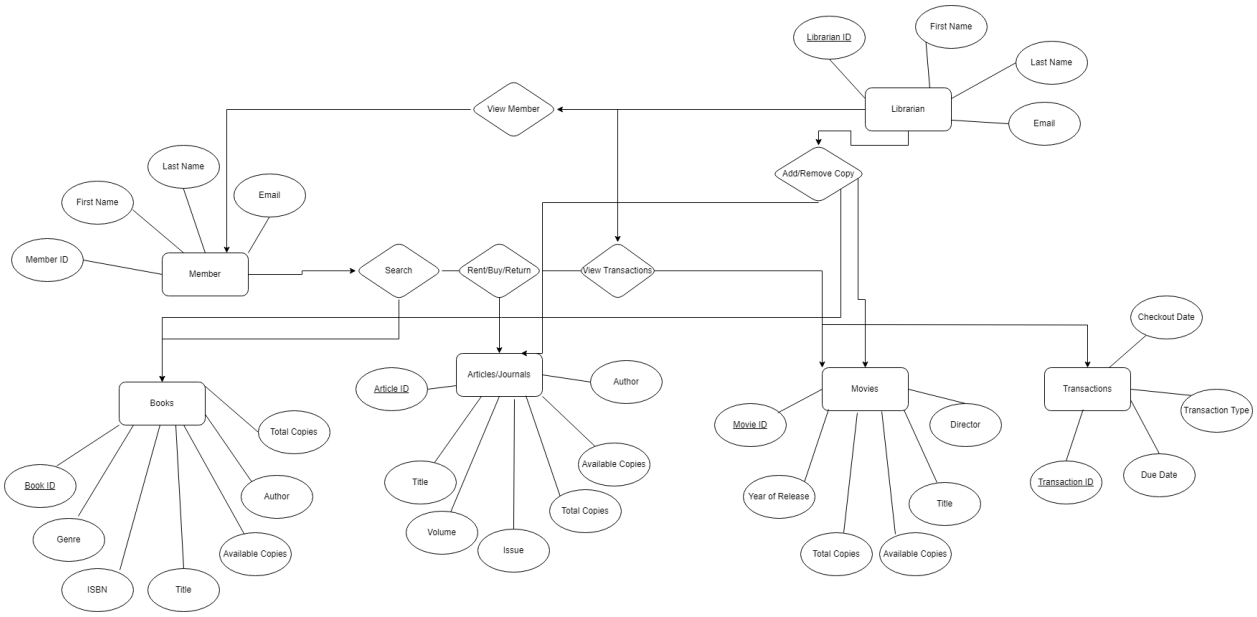
Field	Type
MemberID	int
FirstName	varchar(50)
LastName	varchar(50)
Email	varchar(100)
UserName	varchar(100)
PasswordHash	int

Movies

Field	Type
MovieID	int
Title	varchar(100)
Director	varchar(100)
ReleaseYear	int
AvailableCopies	int
TotalCopies	int

Transactions

Field	Type
TransactionID	int
TransactionDate	date
TransactionType	varchar(20)
MediaType	varchar(20)
DueDate	date
MemberID	int
BookID	int
ArticleID	int
MovieID	int



[Click to view ER Diagram]

Normalization of Tables

Project Normalization

Members/Librarian:

- Primary Key: MemberID/LibrarianID
- Non-key attributes: FirstName, LastName, Email
- All non-key attributes are fully functionally dependent on the primary key (MemberID/LibrarianID).
- No transitive dependencies.

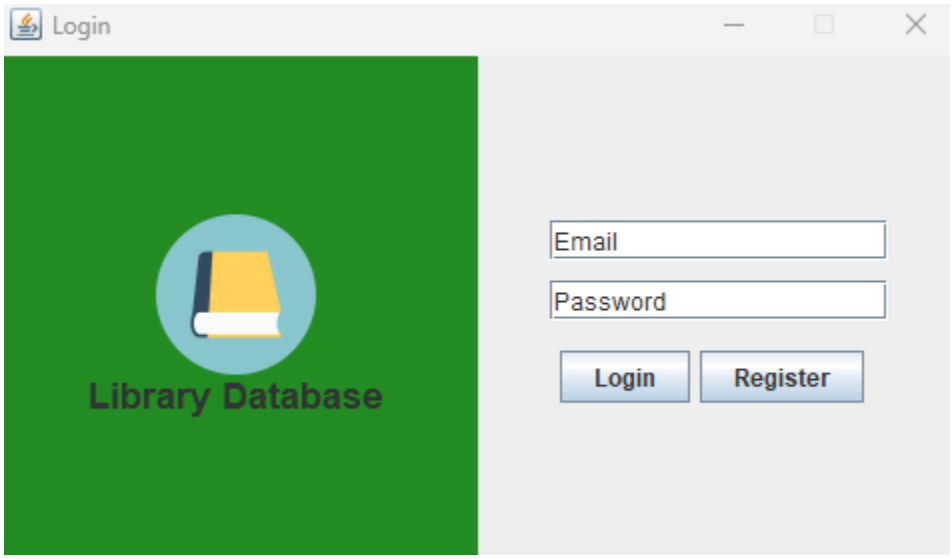
Books (Similar to Movie and Journal/Article Tables):

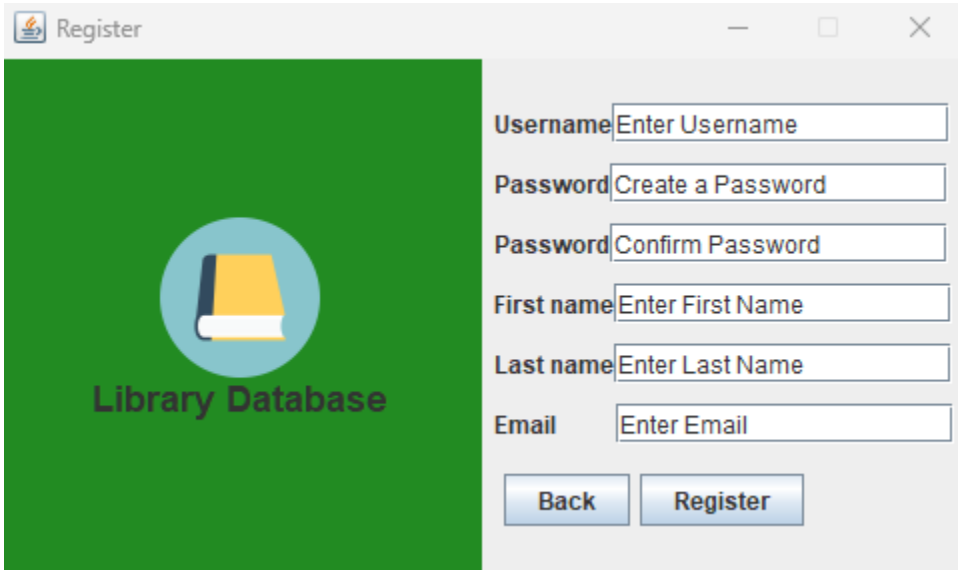
- Primary Key: BookID
- Non-key attributes: Genre, Title, Author, ISBN, TotalCopies, AvailableCopies
- All non-key attributes are fully functionally dependent on the primary key (BookID).
- No transitive dependencies.

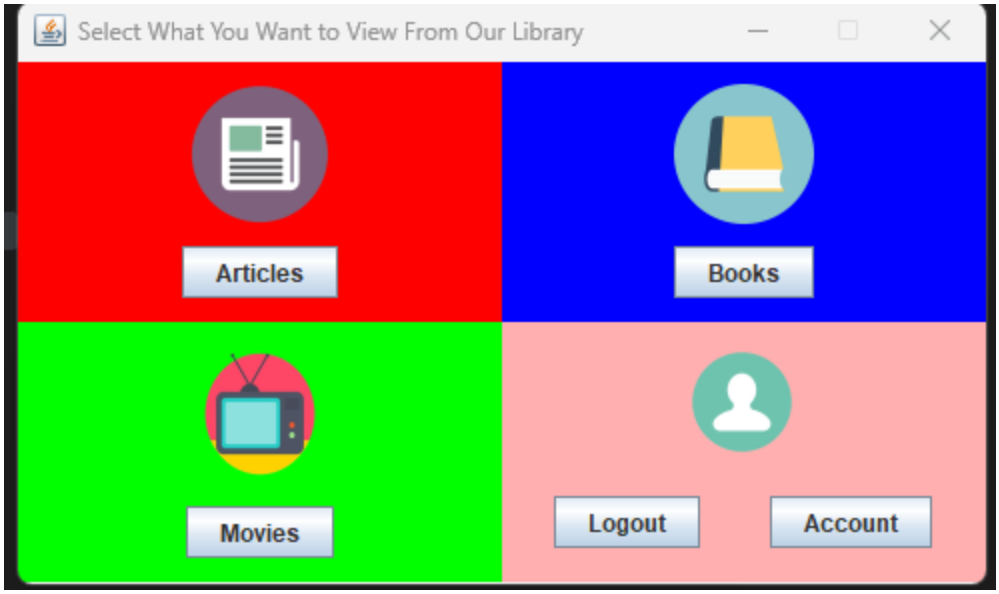
Transactions:

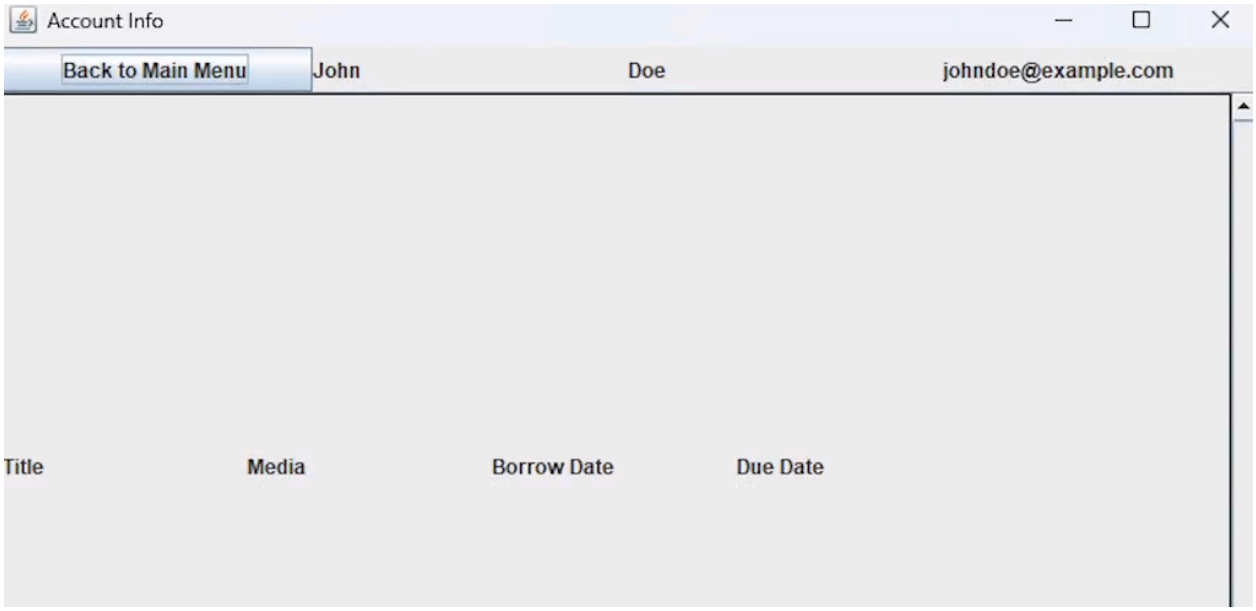
- Primary Key: TransactionID
- Non-key attributes: TransactionDate, TransactionType, DueDate, MemberID, BookID, ArticleID, MovieID, JournalID
- MemberID, BookID, ArticleID, MovieID, JournalID are all foreign keys referencing other tables' primary keys.
- No transitive dependencies.

Results/Application Screenshots

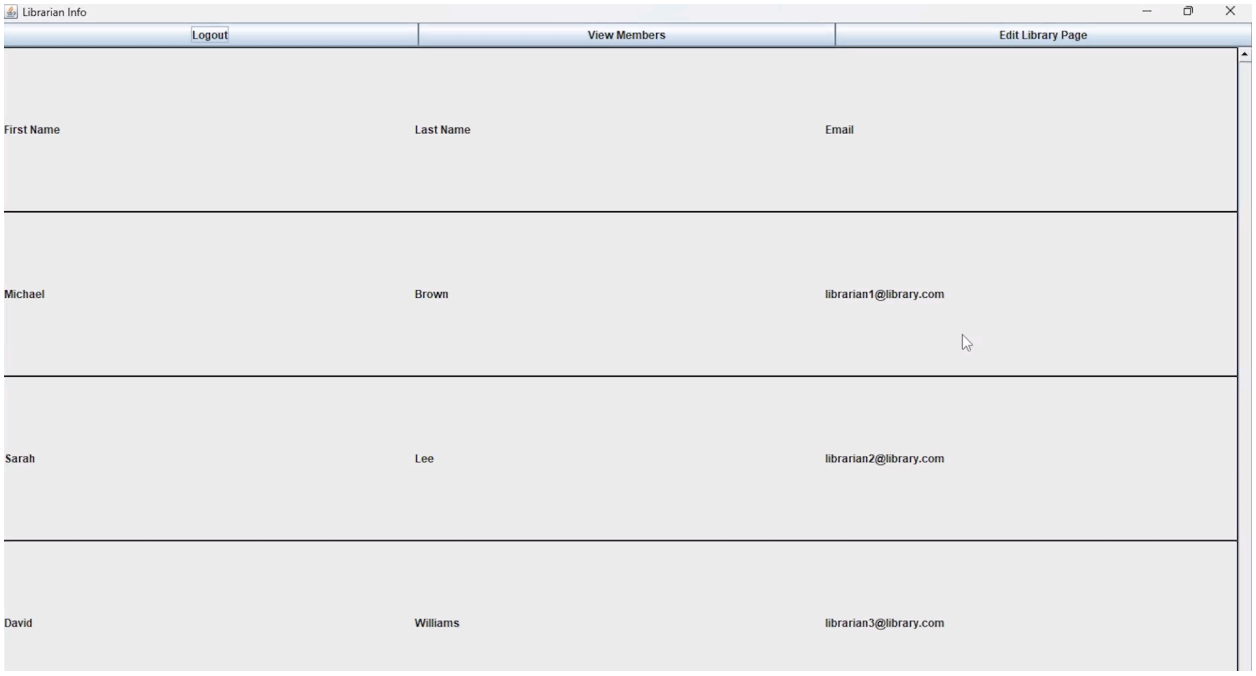


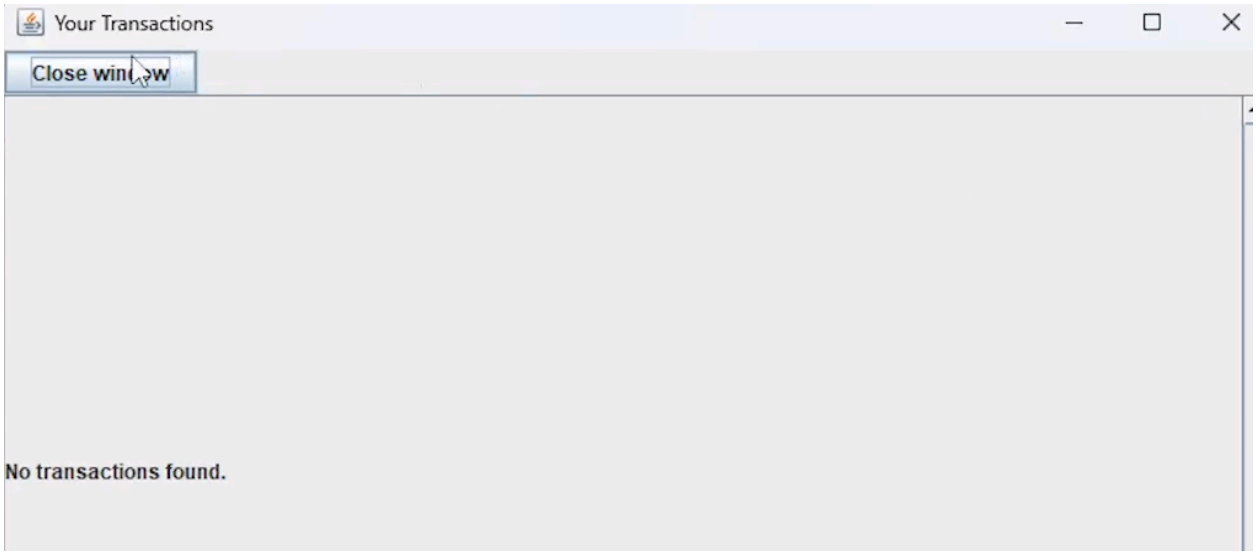


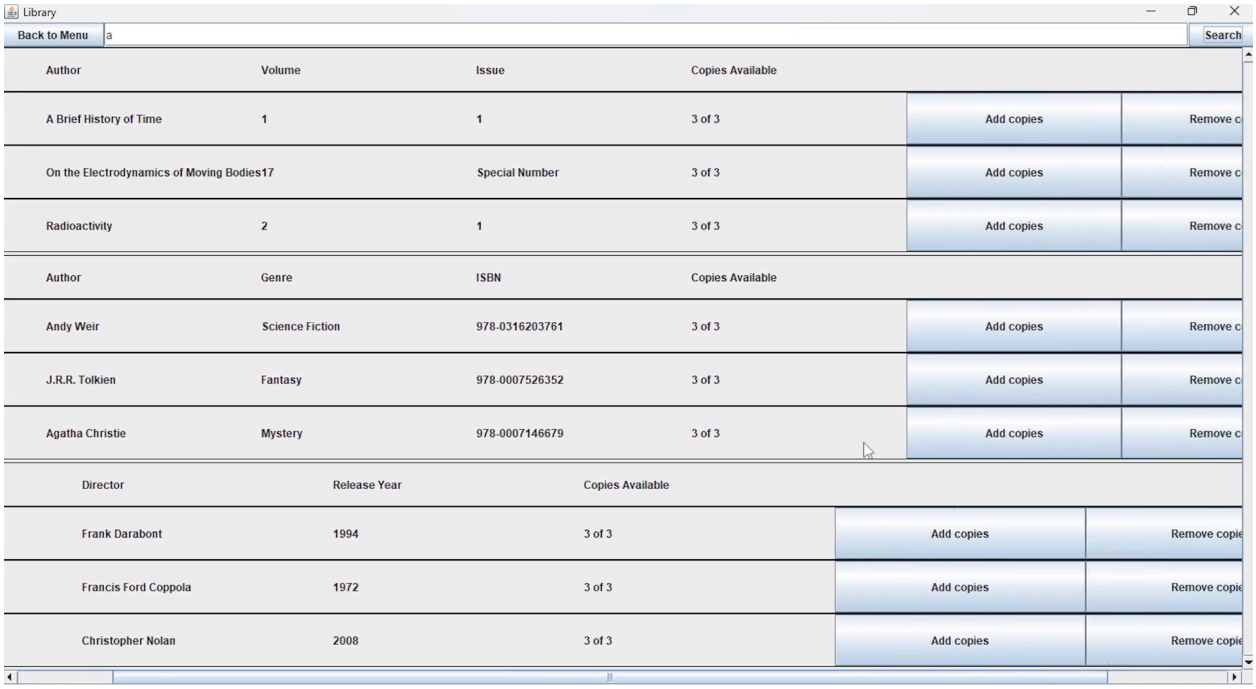

Select What You Want to View From Our Library
Articles
Books
Movies
Logout
Account


Account Info
Back to Main Menu
John
Doe
johndoe@example.com
Title
Media
Borrow Date
Due Date


Movies
Back to Main Menu
a
Search
Title
Director
Release Year
Copies Available
The Shawshank Redemption
Frank Darabont
1994
3 of 3
Borrow
The Godfather
Francis Ford Coppola
1972
3 of 3
Borrow
The Dark Knight
Christopher Nolan
2008
3 of 3
Borrow


Librarian Info
Logout
View Members
Edit Library Page
First Name
Last Name
Email
Michael
Brown
librarian1@library.com
Sarah
Lee
librarian2@library.com
David
Williams
librarian3@library.com


Your Transactions
Close window
No transactions found.


Library
Back to Menu
a
Search
Author
Volume
Issue
Copies Available
A Brief History of Time
1
1
3 of 3
Add copies
Remove c
On the Electrodynamics of Moving Bodies17
Special Number
3 of 3
Add copies
Remove c
Radioactivity
2
1
3 of 3
Add copies
Remove c
Author
Genre
ISBN
Copies Available
Andy Weir
Science Fiction
978-0316203761
3 of 3
Add copies
Remove c
J.R.R. Tolkien
Fantasy
978-0007526352
3 of 3
Add copies
Remove c
Agatha Christie
Mystery
978-0007146679
3 of 3
Add copies
Remove c
Director
Release Year
Copies Available
Frank Darabont
1994
3 of 3
Add copies
Remove copie
Francis Ford Coppola
1972
3 of 3
Add copies
Remove copie
Christopher Nolan
2008
3 of 3
Add copies
Remove copie

Contributions/Work done by each member

1. Mohammad (mothman0406), 017331418: Wrote the SQL queries and code that the project is built on (the tables, entities, attributes, and overall database structure) as well as normalization of all the tables.
2. Benjamin (bfiloteo), 015649335: Coded all the components, layouts, and design of the GUI (frontend). Additionally coded the navigation functionality behind navigating through the GUIs.
3. Aramina (DestinedArts), 015495623: Coded all the functionality: Members can search, borrow/return books, view their account and stuff they borrowed, and register new members. Librarians viewing and removing members, seeing transactions of members. Connecting to the database using mysql connector and writing SQL queries for Java to read it. Wrote all the SQL sample data examples.

References/ Any additional sources?

Anys references and sources were cited in comments within portions of code.