1. **Project Description:**

**Purpose**

My project is meant to track and manage all the books in a library. Each user will have their own ID and can borrow, return, and view the status of all the books within the library and view and pay their fines. Librarians will also have their own ID, and will be able to view which user is currently borrowing each book, view the users’ fines, and view the user’s mailing information.

**Business Rules**

1. Users cannot view other users’ information
2. Librarians cannot change any information pertaining to the user
3. Only Librarians can add books to the library
4. Each copy of a book can only be checked out once (i.e. 2 users cannot borrow the same copy at the same time)
5. Users cannot borrow a book when their fine is greater than $10
6. Fines are $1 a week after the 2-week borrowing period

**Deliverables**

1. Users can view all the books, borrow unreserved books, return their books, and manage their fines
2. Librarians can view relevant information of each user (Status of their fines, which books they have borrowed, and mailing information)
3. Books can be sorted by various genres and availability
4. Books can be searched by author
5. Librarians can fine all users who are late

2. **Entity identification:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| User | Author | Book | BookCopy | Borrowed |
| UserID (Number) | AuthID (Number) | BookID (Number) | CopyID (Number) | BorrowedID (Number) |
| Address (Long Text) | AuthFirstName (Short Text) | Title (Short Text) | Availability (Yes/No) | UserID (Number) |
| UserFirstName (Short Text) | AuthLastName (Short Text) | AuthID (Number) |  | CopyID (Number) |
| UserLastName (Short Text) |  | Genre (Short Text) |  | BorrowDate (Date/Time) |
| FineBalance (Number) |  | Quantity (Number) |  | IsLate (Yes/No) |

3. **ERD Creation**:

**Graphical user interface, application

Description automatically generated**

4. **Data Dictionary:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| USER Table | | | | | | |
| Column Name | Column Description | Data Type | Length | Primary Key | Nullable | Unique |
| User\_ID | For the unique identification of User | Number | Integer | Yes | No | Yes |
| User\_Fname | User First Name | Short Text | 255 | No | No | No |
| User\_Lname | User Last Name | Short Text | 255 | No | No | No |
| Address | User Address | Short Text | 255 | No | No | No |
| State | User State | Short Text | 2 | No | No | No |
| Zipcode | User Zipcode | Short Text | 5 | No | No | No |
| Phone | User Phone Number | Short Text | 15 | No | No | No |
| FineBalance | Total amount the User owes | Currency | 20 | No | No | No |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| BOOK | | | | | | |
| Column Name | Column Description | Data Type | Length | Primary Key | Nullable | Unique |
| BookID | Unique Identifier for the Book | Number | Long Integer | Yes | No | Yes |
| Title | 6 | Short Text | 255 | No | No | No |
| AuthID | Foreign Key from Author Table | Number | Long Integer | No | No | No |
| Genre | Genre of the Book | Short Text | 255 | No | No | No |
| Quantity | Number of copies of the book | Number | Integer | No | No | No |

6. **Queries**:

* This selects the titles and IDs of all the books of the fantasy genre

SELECT BOOKID, BOOK.Title FROM BOOK WHERE Genre = "Fantasy"

* This statement can be used to select all the data pertaining to an individual user.

SELECT \* FROM Users WHERE UserID = 1

7. **Complex Transaction**:

* This statement can be used to return the UserID, UserFirstName, UserLastName, CopyID, and IsLate where the UserID is the same in both the USER table and the BORROWED table and IsLate is true, that is then put in order by the UserID.

SELECT USER.UserID, BORROWED.UserID, USER.UserFirstName, USER.UserLastName, BORROWED.CopyID, BORROWED.IsLate FROM USER INNER JOIN BORROWED ON USER.UserID = BORROWED.UserID WHERE IsLate =true ORDER BY USER.UserID

8. **XML/CSV Export**:

<?xml version="1.0" encoding="UTF-8"?>

<dataroot xmlns:od="urn:schemas-microsoft-com:officedata" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="BOOK.xsd" generated="2022-04-27T15:17:42">

<BOOK>

<BookID>1</BookID>

<Title>The Way of Kings</Title>

<AuthID>1</AuthID>

<Genre>Fantasy</Genre>

<Quantity>6</Quantity>

</BOOK>

<BOOK>

<BookID>2</BookID>

<Title>Words of Radiance</Title>

<AuthID>1</AuthID>

<Genre>Fantasy</Genre>

<Quantity>5</Quantity>

</BOOK>

<BOOK>

<BookID>3</BookID>

<Title>Oathbringer</Title>

<AuthID>1</AuthID>

<Genre>Fantasy</Genre>

<Quantity>5</Quantity>

</BOOK>

<BOOK>

<BookID>4</BookID>

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<AuthID>1</AuthID>

<Genre>Fantasy</Genre>

<Quantity>3</Quantity>

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<BOOK>

<BookID>5</BookID>

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<Genre>Fantasy</Genre>

<Quantity>2</Quantity>

</BOOK>

<BOOK>

<BookID>6</BookID>

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<AuthID>2</AuthID>

<Genre>Fantasy</Genre>

<Quantity>4</Quantity>

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<BOOK>

<BookID>7</BookID>

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<AuthID>2</AuthID>

<Genre>Fantasy</Genre>

<Quantity>5</Quantity>

</BOOK>

<BOOK>

<BookID>8</BookID>

<Title>The Dragon Reborn</Title>

<AuthID>2</AuthID>

<Genre>Fantasy</Genre>

<Quantity>5</Quantity>

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<BOOK>

<BookID>9</BookID>

<Title>The Shadow Rising</Title>

<AuthID>2</AuthID>

<Genre>Fantasy</Genre>

<Quantity>5</Quantity>

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<BOOK>

<BookID>10</BookID>

<Title>The Fires of Heaven</Title>

<AuthID>2</AuthID>

<Genre>Fantasy</Genre>

<Quantity>5</Quantity>

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<BookID>11</BookID>

<Title>Lord of Chaos</Title>

<AuthID>2</AuthID>

<Genre>Fantasy</Genre>

<Quantity>5</Quantity>

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<BOOK>

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<AuthID>2</AuthID>

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<Quantity>5</Quantity>

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<Quantity>2</Quantity>

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<Genre>Thriller</Genre>

<Quantity>2</Quantity>

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<Title>Just Breathe</Title>

<AuthID>5</AuthID>

<Genre>Romance</Genre>

<Quantity>2</Quantity>

</BOOK>

</dataroot>

9. **Security**:

I have already taken measures to ensure the security of this particular database. By creating different levels of access, I prevent base level users from manipulating the data in the already created tables. While nothing can be done about users creating new tables due to a flaw in Access itself, pre-existing tables are safe from the potential tampering of a user.

Table

Description automatically generatedTable

Description automatically generated Table

Description automatically generated