



LIBRARY DATABASE

INFO 3240

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DAVID ABULAFIA (1949 -)

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AMIR DAN ACZEL (1950 - 2015)

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NEIL KENSINGTON ADAM (1891 - 1973)

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FRED ADAMS (1921 - 2014)

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WILLIAM J. ADAMS

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ARTHUR WILSON ADAMSON (1919 - 2003)

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AESOP (c. 620 - 564 BCE)

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SERGI AGUILAR

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LEON BATTISTA ALBERTI (1404 - 1472)

INTRODUCTION

My dad has a collection of over 2,000 books. For the past years, he has been trying to organize these books around his studio, trying to keep track of new additions to his collection. The image above is the first page of the word document where he stores and categorizes the data of his books. I have decided to create a database for him for the following reasons. (1) To facilitate the addition of new books to his collection. (2) Keep better track of each book of his collection. (3) Facilitate the finding and arrangement of books in his studio.

THE DATABASE

Overview of Database.

Due to the requirements of this project, I have extended the original scope of my database. The database I will create is one that could be applicable for a library and its operations, not simply a large book collection. In order to reach the goal of 8 entities for the database, I have added entities that are particular to that of a library's daily operations. These include the possibility for borrowing and reserving books, as well as an entity for the person engaging in these operations.

Entities.

- Books
- Authors
- AuthorBooks
- BooksCategories
- Reservations
- Borrowings
- Categories
- Users
- Fines

TENTATIVE ERD:

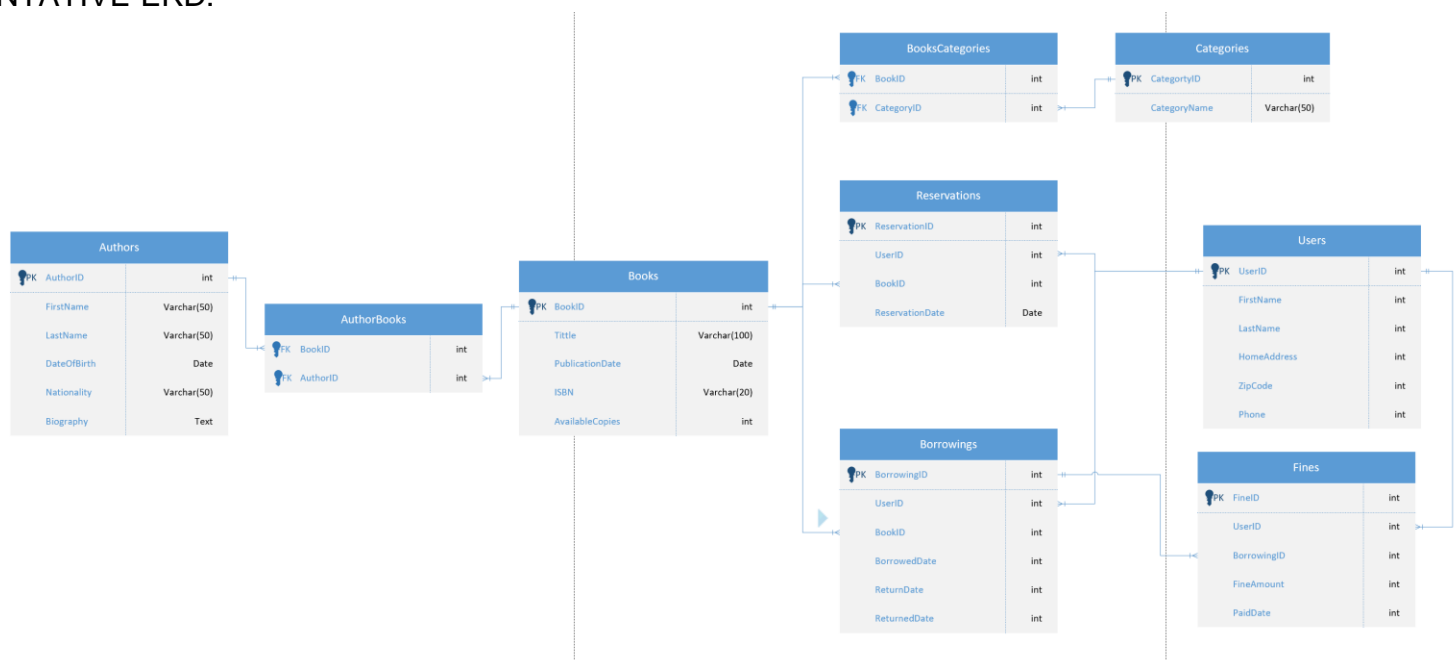


Figure 1

BUSINESS RULES AND ENTITY DESCRIPTION

1. Users:

- The Users entity represents the users of the library system.
- Each user is identified by a unique UserID.
- The entity stores information about users, including their first name, last name, home address, ZIP code, and phone number.
- Users can borrow books, make reservations, and have fines associated with their borrowing activities.

2. Books:

- The Books entity represents the collection of books in the library.
- Each book is identified by a unique BookID.
- The entity stores information about books, including the book's title, publication date, ISBN (International Standard Book Number), and the number of available copies.
- Books can be borrowed by users and can be associated with multiple authors and categories.

3. Authors:

- The Authors entity represents the authors of the books in the library.
- Each author is identified by a unique AuthorID.
- The entity stores information about authors, including their first name, last name, date of birth, nationality, and biography.
- Authors can have multiple books associated with them through the AuthorsBooks relationship.

4. Categories:

- The Categories entity represents the categories or genres of books.
- Each category is identified by a unique CategoryID.
- The entity stores information about categories, including the category name.
- Books can be associated with multiple categories through the BooksCategories relationship.

5. Borrowings:

- The Borrowings entity represents the borrowing transactions in the library.
- Each borrowing is identified by a unique BorrowingID.
- The entity stores information about borrowings, including the user who borrowed the book, the book that was borrowed, the borrowing date, return date, and returned date (if applicable).
- Borrowings are associated with users and books through foreign key references.

6. Reservations:

- The Reservations entity represents the book reservation transactions in the library.
- Each reservation is identified by a unique ReservationID.
- The entity stores information about reservations, including the user who made the reservation and the book that was reserved.
- Reservations are associated with users and books through foreign key references.

7. Fines:

- The Fines entity represents fines associated with late returns or other penalties in the library.
- Each fine is identified by a unique FineID.
- The entity stores information about fines, including the user who incurred the fine, the borrowing associated with the fine, the fine amount, and the paid date (if paid).
- Fines are associated with users and borrowings through foreign key references.

DATA.

STEVEN STROGATZ

1509. **Strogatz, S.** 2019. *Infinite Powers: How Calculus Reveals the Secrets of the Universe.*
An Eamon Dolan Book, Houghton Mifflin Harcourt Publishing Company, New York, NY.
[Brodart-10]

- I will get the data for the Book, Author, Publisher, and Category tables from the pdf catalogue my dad gave me.
- I will create dummy data for the Reservation, Loans, and Member tables. These are the three extensions to my database.

IMPLICATIONS AND APPLICATIONS OF THE DATABASE

Benefits:

The library database offers numerous benefits for managing a library, including:

1. **Efficient book and member management:** The database allows for easy tracking of books, members, and their interactions, including loans and reservations.
2. **Improved accuracy:** The use of a database reduces the risk of errors and inconsistencies when managing large amounts of data.
3. **Reporting and analysis:** The database allows easy generation of reports and analysis of the library's operations, enabling informed decision-making.
4. **Improved member services:** The database can help improve member services by providing accurate information on book availability, reservations, and loans.

Potential Queries

1. **List of Overdue Books:** This query can be used to find all books that are currently overdue, along with the member who borrowed the book and the date the book was due to be returned. This query can help the library staff to follow up with members who have overdue books and improve the return rate of borrowed books.
2. **List of Popular Books:** This query can be used to find the most popular books in the library based on the number of times they have been borrowed. This information can help the library staff to make informed decisions about which books to purchase or stock more copies of.
3. **List of Available Books in a Specific Category:** This query can be used to find all the available books in a specific category, along with the number of copies available. This information can help the library staff to assist members in finding books in their preferred category.



C# & USER INTERFACE

1. **Dashboard:** The dashboard could provide a summary of key metrics such as the number of available books, overdue books, and the most popular books in the library. It could also include quick links to common tasks such as adding a new book or creating a loan.
2. **Book Search:** The book search interface could allow users to search for books by title, author, or category. It could also include advanced filters such as publication date or publisher. Once a book is selected, the user can view additional information such as the book's availability, description, and related books.
3. **User Management:** The user management interface could allow staff to view and edit member information such as their contact details, borrowing history, and outstanding loans.
4. **Borrowing and Reservation Management:** The borrowing and reservation management interface could allow staff to view and manage the loans and reservations for each book. They could view the details of each loan or reservation and perform actions such as extending a loan or cancelling a reservation.
5. **Reporting and Analytics:** The reporting and analytics interface could allow staff to view and download reports on key library metrics such as the number of books borrowed, the most popular categories, and the top borrowing members. It could also include data visualizations such as charts and graphs to help staff understand the data.

UI platform that allows the user to add new books to the database.

POTENTIAL EXTENTION

1. **INCLUDE MUSIC:** My dad also has a very big CD Music collection. Instead of making a database for a library, I could join music and books by an entity called shelves. This database would be personalized for only the books and CDs that my dad has and not create fake entities like Members, Loans, and Reservations. The database would take a different turn, and would be more for storage purposes.