Library Management System Documentation

Overview

The Library Management System is a software application that helps in managing a library's resources including books, authors, and patrons. It allows users to search for books by various criteria, borrow and return books, and manage information related to authors and patrons.

Classes

1. Library

The Library class is the central component that manages books, authors, and patrons. It provides methods to search for books, borrow and return them.

2. Book

The Book class represents a book in the library. It contains information such as the title, author, ISBN, publisher, and the number of available copies. It implements the Borrowable interface for borrowing and returning functionality.

3. Person

The Person class serves as the base class for the Author and Patron classes. It contains attributes such as name, address, phone number, and date of birth, common to both authors and patrons.

This class provides methods to retrieve and modify the information related to a person, such as getting the name, address, phone number, and date of birth.

4. Author

The Author class represents the authors of the books. It contains information about the authors and the list of books they have written.

5. Patron

The Patron class represents the patrons of the library. It contains information about the patrons and the list of books they have borrowed.

6. Borrowable

The Borrowable interface defines the methods for borrowing and returning books.

7. Status

The Status enum defines the various states that a book can have in the library, including AVAILABLE, CHECKED_OUT, and OVERDUE.

How to Start/Access the Application

To access the Library Management System, follow these steps:

Open the application.

Once the application is launched, make your way to the Demo file.

Users can perform various actions such as searching for books, borrowing, and returning books using the provided interface.

Class Diagram

Below is the class diagram illustrating the relationships between the different classes in the Library Management System:

Relationships

- Each Library can have multiple Persons and each Person can belong to multiple Libraries. Many to many.

- Each Library can have multiple Books and each Book can be belong to multiple Libraries. Many to many.

- Each Person can only be one Patron and one Patron can only be one Person. One to one.

- Each Author can have multiple Books but each Book only has one Author (usually) One to many.

Library

- books: ArrayList<Book>
- authors: ArrayList<Author>
- patrons: ArrayList<Patron>

+ Library(ArrayList<Book>, ArrayList<Author>, ArrayList<Patron>)
+ getBooks(): ArrayList<Book>
+ getAuthors(): ArrayList<Author>
+ getPatrons(): ArrayList<Patron>
+ setBooks(ArrayList<Book>): void
+ searchByTitle(String): Book
+ searchByAuthor(String): ArrayList<Book>
+ searchByISBN(String): Book
+ toString(): String

M - M

Person

- name: String
- address: String
- phoneNumber: String
- dateOfBirth: String

+ Person(String, String, String, String)
+ getName(): String
+ getAddress(): String
+ getPhoneNumber(): String
+ getDateOfBirth(): String
+ setName(String): void
+ setAddress(String): void
+ setPhoneNumber(String): void
+ setDateOfBirth(String): void
+ toString(): String

Book

- title: String
- author: Author
- ISBN: String
- publisher: String
- numberOfCopies: int
- status: Status

+ Book(String, Author, String, String, int, Status)
+ getTitle(): String
+ getAuthor(): Author
+ getISBN(): String
+ getPublisher(): String
+ getNumberOfCopies(): int
+ getStatus(): Status
+ setTitle(String): void
+ setAuthor(Author): void
+ setISBN(String): void
+ setPublisher(String): void
+ setNumberOfCopies(int): void
+ setStatus(Status): void
+ toString(): String
+ borrowBook(Patron): void
+ returnBook(Patron): void

M - M

1 - M

1 - 1

Author

- listOfBooksWritten: ArrayList<Book>

+ Author(String, String, String, String)
+ Author(String, String, String, String, ArrayList<Book>)
+ getListOfBooksWritten(): ArrayList<Book>
+ getName(): String
+ getAddress(): String
+ getPhoneNumber(): String
+ getDateOfBirth(): String
+ setName(String): void
+ setAddress(String): void
+ setPhoneNumber(String): void
+ setDateOfBirth(String): void
+ setListOfBooksWritten(ArrayList<Book>): void
+ addBook(Book): void
+ removeBook(Book): void
+ toString(): String

Patron

-listOfBooksBorrowed: ArrayList<String>

+ Patron(name: String, address: String, phoneNumber: String, dateOfBirth: String)
+ Patron(name: String, address: String, phoneNumber: String, dateOfBirth: String, listOfBooksBorrowed: ArrayList<String>)
+ getListOfBooksBorrowed(): ArrayList<String>
+ setListOfBooksBorrowed(listOfBooksBorrowed: ArrayList<String>): void
+ addBook(bookTitle: String): void
+ removeBook(bookTitle: String): void
+ toString(): String