**Library Management System User Documentation**

**Introduction**

The Library Management System is a software application designed to help libraries manage their book inventory, track borrowing and returning of books by patrons, and manage author and patron information efficiently.

**Application Overview**

The Library Management System consists of several classes that interact to perform various tasks. These classes include:

1. **Book**: Represents a book in the library, containing information such as title, author, ISBN, publisher, and status.
2. **Author**: Represents an author who has written one or more books, including their name, date of birth, and a list of books they have written.
3. **Patron**: Represents a library patron who can borrow and return books, containing information such as name, address, phone number, and a list of borrowed books.
4. **Library**: Manages books, authors, and patrons, providing methods to search for books, borrow and return books, and add new books, authors, and patrons.

**Class Diagram**

Below is the class diagram illustrating the relationships between the classes:

A screenshot of a computer

Description automatically generated

**Classes and Their Functionality**

**1. Book**

* **Attributes**:
  1. title: string
  2. author: Author
  3. ISBN: string
  4. publisher: string
  5. numberOfCopies: int
  6. status: Status (enum)
* **Methods**:
  1. getTitle(): Retrieves the title of the book.
  2. getAuthor(): Retrieves the author of the book.
  3. getISBN(): Retrieves the ISBN of the book.
  4. getPublisher(): Retrieves the publisher of the book.
  5. getNumberOfCopies(): Retrieves the number of copies available.
  6. getStatus(): Retrieves the status of the book.
  7. borrowBook(): Allows a patron to borrow the book.
  8. returnBook(): Allows a patron to return the book.

**2. Author**

* **Attributes**:
  1. name: string
  2. dateOfBirth: Date
  3. booksWritten: List<Book>
* **Methods**:
  1. getName(): Retrieves the name of the author.
  2. getDateOfBirth(): Retrieves the date of birth of the author.
  3. getBooksWritten(): Retrieves the list of books written by the author.
  4. addBook(): Adds a book written by the author.

**3. Patron**

* **Attributes**:
  1. name: string
  2. address: string
  3. phoneNumber: string
  4. borrowedBooks: List<Book>
* **Methods**:
  1. getName(): Retrieves the name of the patron.
  2. getAddress(): Retrieves the address of the patron.
  3. getPhoneNumber(): Retrieves the phone number of the patron.
  4. getBorrowedBooks(): Retrieves the list of books borrowed by the patron.
  5. borrowBook(): Allows the patron to borrow a book.
  6. returnBook(): Allows the patron to return a book.

**4. Library**

* **Attributes**:
  1. books: List<Book>
  2. authors: List<Author>
  3. patrons: List<Patron>
* **Methods**:
  1. searchBooksByTitle(): Searches for books by title.
  2. searchBooksByAuthor(): Searches for books by author.
  3. searchBooksByISBN(): Searches for books by ISBN.
  4. borrowBook(): Allows a patron to borrow a book.
  5. returnBook(): Allows a patron to return a book.
  6. addBook(): Adds a new book to the library.
  7. addAuthor(): Adds a new author to the library.
  8. addPatron(): Adds a new patron to the library.

**Getting Started**

To start using the Library Management System, follow these steps:

1. Launch the application by executing the main program file.
2. Access the user interface to perform various tasks such as adding books, searching for books, borrowing books, and returning books.
3. Use the provided functionalities to manage your library efficiently.