

Library Management

MC112 project

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1. Introduction

The Library Management System (LMS) is a software solution designed to automate and streamline the operations of a library. Its primary goal is to efficiently manage the catalog of books, track their availability, handle patron registrations, and facilitate the borrowing and returning of books. The LMS enhances the overall productivity of library staff and provides a convenient experience for library users.

2. Implementation

The Library Management System has been implemented using Java programming language. It consists of three main classes: Book, Patron, and Library, each serving a specific purpose within the system.

Book Class: This class represents a book entity with attributes such as title, author, checkout status, and due date. It provides methods to access and modify these attributes, enabling efficient management of book objects within the system.

Patron Class: The Patron class encapsulates information about library patrons, including their name and unique identification. It facilitates the registration of patrons and retrieval of patron details when required.

Library Class: The Library class acts as the central component of the system, orchestrating interactions between books, patrons, and library operations. It utilizes collections such as HashMap and Array List to store books and patrons, respectively. The class contains methods to perform various operations such as adding/removing books, checking in/out books, adding patrons, searching for books, and displaying the library catalog.

The implementation follows object-oriented principles, ensuring modularity, encapsulation, and reusability of code components. User interaction is facilitated through a menu-driven interface, allowing users to easily navigate and utilize the system functionalities.

3. Output

```
1. Add Book
2. Remove Book
3. Checkout Book
4. Checkin Book
5. Add Patron
6. Search Book
7. Display Books
8. Exit
Enter your choice: 1
Enter title: THE GIRL IN ROOM 105
Enter author: Hemant chohan
Book added successfully.
```

```
1. Add Book
2. Remove Book
3. Checkout Book
4. Checkin Book
5. Add Patron
6. Search Book
7. Display Books
8. Exit
Enter your choice: 2
Enter title: THE GIRL IN ROOM 105
Book removed successfully.
```

The Library Management System provides a robust set of features that enable efficient management of library resources. Upon execution, the system presents users with a menu displaying various options, including adding/removing books, checking in/out books, adding patrons, searching for books, and displaying the library catalog.

providing the title and author information. Similarly, they can remove existing books by specifying the title of the book to be removed.

Checking In/Out Books: The system facilitates the borrowing and returning of books by patrons. Users can check out books by providing the title of the book, patron ID, and due date. Likewise, they can check in books by specifying the title of the book to be returned.

```
1. Add Book
2. Remove Book
3. Checkout Book
4. Checkin Book
5. Add Patron
6. Search Book
7. Display Books
8. Exit
Enter your choice: 4
Enter title: MOSHAD
Book checked in successfully.
```

```
1. Add Book
2. Remove Book
3. Checkout Book
4. Checkin Book
5. Add Patron
6. Search Book
7. Display Books
8. Exit
Enter your choice: 3
Enter title: MOSHAD
Enter patron ID: 202303045
Enter due date: 17/05/2024
Book checked out successfully.
```

Adding Patrons: Library staff can register new patrons by entering their name and unique identification. This feature enables the management of patron accounts and facilitates tracking of borrowed books.

```
1. Add Book
2. Remove Book
3. Checkout Book
4. Checkin Book
5. Add Patron
6. Search Book
7. Display Books
8. Exit
Enter your choice: 5
Enter patron name: Arjun
Enter patron ID: 202303045
Patron added successfully.
```

Searching for Books: Users can search for books in the library catalog based on the title or author's name. The system retrieves matching books and displays their details, including title, author, and availability status.

```
1. Add Book
2. Remove Book
3. Checkout Book
4. Checkin Book
5. Add Patron
6. Search Book
7. Display Books
8. Exit
Enter your choice: 6
Enter search query (title or author): moshad
Title: MOSHAD, Author: -, Status: Available
```

Conclusion

The Library Management System represents an essential tool for libraries to modernize their operations and improve service delivery. By automating routine tasks and providing intuitive features, the system streamlines library management processes and empowers staff to focus on more strategic initiatives. With its modular design and user-friendly interface, the LMS is well-suited for libraries of varying sizes and complexities, making it a valuable asset in the digital age.

If book is not available then code will print this output

1. Add Book
2. Remove Book
3. Checkout Book
4. Checkin Book
5. Add Patron
6. Search Book
7. Display Books
8. Exit

Enter your choice: 3

Enter title: MOSHAD

Enter patron ID: 202303045

Enter due date: 18/05/2024

Book not available for checkout.