CHRIST (Deemed to be University)

Department of Computer Science

MSc – Artificial Intelligence and Machine Learning

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Course: Java Programming **Component:** Lab Practical CIA 2

Description:

- This is the code for a library management system which does the basic functions of adding, removing, displaying, borrowing and returning a book.
- It contains 3 classes - book, library and main.
- The book classes is used to store the details of book id, title, availability etc. and the library class is used to perform the said functionalities.
- The main class is used to enter the book details, and it uses a menu driven approach wherein the user would find it more systematic to borrow and return a book, and the librarian would find it easier to add and remove a book.

Program:

```
import java.util.ArrayList;

import java.util.List;

import java.util.Scanner;


class Book {

   private int bookId;

   private String title;

   private String author;

   private boolean isAvailable;


   public Book(int bookId, String title, String author) {

      if (bookId <= 0) throw new IllegalArgumentException("Book ID must be positive.");

      this.bookId = bookId;

      this.title = title;

      this.author = author;

      this.isAvailable = true;

   }
```

```
    public int getBookId() {
        return bookId;
    }

    public String getTitle() {
        return title;
    }

    public boolean isAvailable() {
        return isAvailable;
    }

    public void borrow() {
        isAvailable = false;
    }

    public void returnBook() {
        isAvailable = true;
    }

    public void displayInfo() {
        System.out.println("ID: " + bookId + ", Title: " + title + ", Author: " + author + ", Available: " +
isAvailable);
    }
}

class Library {
    private List<Book> books = new ArrayList<>();

    public void addBook(Book book) {
        books.add(book);
        System.out.println("Added: " + book.getTitle());
    }
```

```
    public void removeBook(int bookId) {
        books.removeIf(book -> book.getBookId() == bookId);
        System.out.println("Removed book with ID: " + bookId);
    }

    public Book findBook(int bookId) {
        for (Book book : books) {
            if (book.getBookId() == bookId) {
                return book;
            }
        }
        return null;
    }

    public void displayLibraryInfo() {
        System.out.println("Library Books:");
        for (Book book : books) {
            book.displayInfo();
        }
    }
}

public class LibraryManagementSystem {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Library library = new Library();
        String userInput;

        while (true) {
            System.out.println("\n--- Library Management System ---");
            System.out.println("1. Add Book");
```

```
System.out.println("2. Remove Book");
System.out.println("3. Display Books");
System.out.println("4. Borrow Book");
System.out.println("5. Return Book");
System.out.println("6. Exit");
System.out.print("Choose an option: ");
userInput = scanner.nextLine();

switch (userInput) {
   case "1":
      System.out.print("Enter Book ID: ");
      int addId = Integer.parseInt(scanner.nextLine());
      System.out.print("Enter Title: ");
      String title = scanner.nextLine();
      System.out.print("Enter Author: ");
      String author = scanner.nextLine();
      library.addBook(new Book(addId, title, author));
      break;

   case "2":
      System.out.print("Enter Book ID to remove: ");
      int removeId = Integer.parseInt(scanner.nextLine());
      library.removeBook(removeId);
      break;

   case "3":
      library.displayLibraryInfo();
      break;

   case "4":
      System.out.print("Enter Book ID to borrow: ");
      int borrowId = Integer.parseInt(scanner.nextLine());
```

```
                Book borrowBook = library.findBook(borrowId);
                if (borrowBook != null && borrowBook.isAvailable()) {
                    borrowBook.borrow();
                    System.out.println("You borrowed: " + borrowBook.getTitle());
                } else {
                    System.out.println("Book not available or does not exist.");
                }
                break;

            case "5":
                System.out.print("Enter Book ID to return: ");
                int returnId = Integer.parseInt(scanner.nextLine());
                Book returnBook = library.findBook(returnId);
                if (returnBook != null) {
                    returnBook.returnBook();
                    System.out.println("You returned: " + returnBook.getTitle());
                } else {
                    System.out.println("Book does not exist.");
                }
                break;

            case "6":
                System.out.println("Exiting the system.");
                scanner.close();
                return;

            default:
                System.out.println("Invalid option. Please try again.");
        }
    }
}
```

Output:

//Adding a book

```
--- Library Management System ---
1. Add Book
2. Remove Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 1
Enter Book ID: 1
Enter Title: Book1
Enter Author: Joel
Added: Book1

--- Library Management System ---
1. Add Book
2. Remove Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 1
Enter Book ID: 2
Enter Title: Book2
Enter Author: Joseph
Added: Book2

--- Library Management System ---
1. Add Book
2. Remove Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 1
Enter Book ID: 3
Enter Title: Book3
Enter Author: Motha
Added: Book3
```

//Displaying the books available for the user to borrow

```
--- Library Management System ---
1. Add Book
2. Remove Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 3
Library Books:
ID: 1, Title: Book1, Author: Joel, Available: true
ID: 2, Title: Book2, Author: Joseph, Available: true
ID: 3, Title: Book3, Author: Motha, Available: true
```

//Removing a book

```
--- Library Management System ---
1. Add Book
2. Remove Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 2
Enter Book ID to remove: 1
Removed book with ID: 1

--- Library Management System ---
1. Add Book
2. Remove Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 3
Library Books:
ID: 2, Title: Book2, Author: Joseph, Available: true
ID: 3, Title: Book3, Author: Motha, Available: true
```

//Borrowing a book

```
--- Library Management System ---
1. Add Book
2. Remove Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 4
Enter Book ID to borrow: 2
You borrowed: Book2

--- Library Management System ---
1. Add Book
2. Remove Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 3
Library Books:
ID: 2, Title: Book2, Author: Joseph, Available: false
ID: 3, Title: Book3, Author: Motha, Available: true
```

//Returning the book

```
--- Library Management System ---
1. Add Book
2. Remove Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 5
Enter Book ID to return: 2
You returned: Book2

--- Library Management System ---
1. Add Book
2. Remove Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 3
Library Books:
ID: 2, Title: Book2, Author: Joseph, Available: true
ID: 3, Title: Book3, Author: Motha, Available: true
```

//Exit

```
--- Library Management System ---
1. Add Book
2. Remove Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 6
Exiting the system.
```