GALGOTIAS UNIVERSITY

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GALGOTIAS UNIVERSITY

SCHOOL OF COMPUTER SCIENCE

TITLE

Library Management System

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Library Management System

Creating a Library Management System in Java is a great way to understand object-oriented programming concepts This step-by-step tutorial will guide you through building a simple Library Management System Project in Java

Step 1: Setup Your Project

Step 2: Implement the Book Class

Step 3: Develop the LibraryManager Class

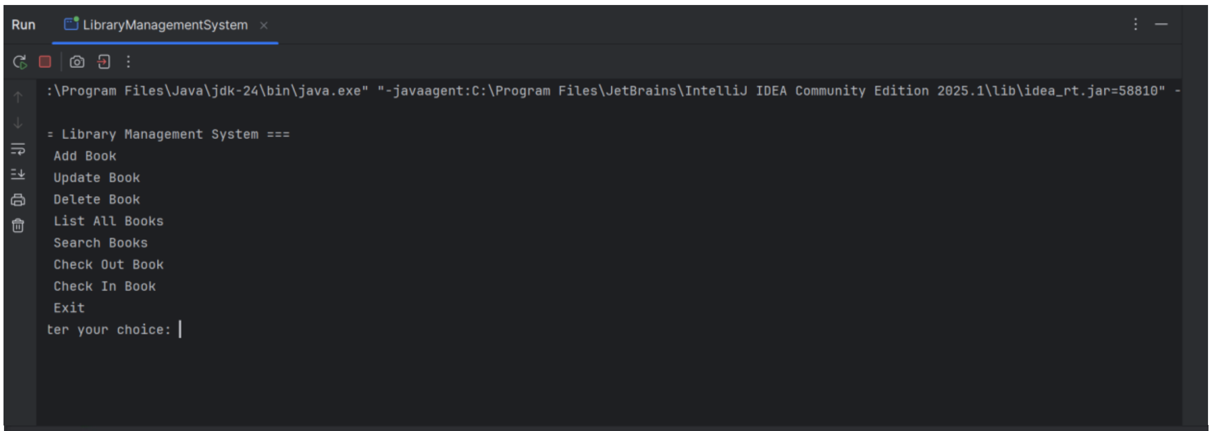
Step 4: Build the Main Class

Step 5: Running the Library Management System

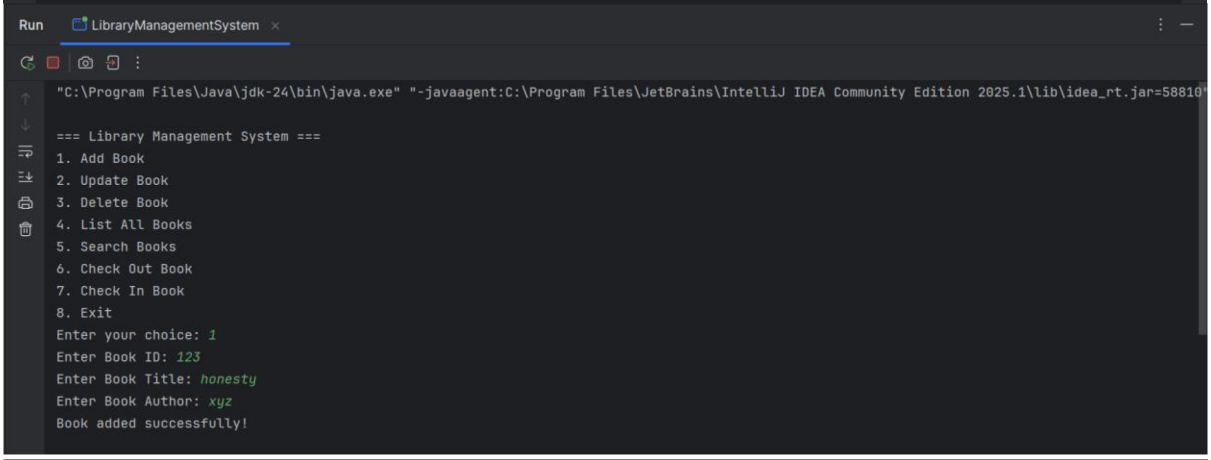
```java
import java.util.ArrayList;
import java.util.List;
import java.util.Scanner;
import java.util.stream.Collectors;

public class LibraryManagementSystem {

    // Book class
    static class Book {
        private int id;
        private String title;
        private String author;
        private boolean isBorrowed;

        public Book(int id, String title, String author) {
            this.id = id;
            this.title = title;
            this.author = author;
            this.isBorrowed = false;
        }

        public int getId() { return id; }
        public void setId(int id) { this.id = id; }
        public String getTitle() { return title; }
        public void setTitle(String title) { this.title = title; }
        public String getAuthor() { return author; }
        public void setAuthor(String author) { this.author = author; }
        public boolean isBorrowed() { return isBorrowed; }
        public void setBorrowed(boolean borrowed) { isBorrowed = borrowed; }

        @Override
        public String toString() {
            return "Book{" +
                    "id=" + id +
                    ", title='" + title + '\'' +
                    ", author='" + author + '\'' +
                    ", isBorrowed=" + isBorrowed +
                    '}';
        }
    }

    // LibraryManager class
    static class LibraryManager {
        private final List<Book> books = new ArrayList<>();

        public void addBook(Book book) {
            books.add(book);
            System.out.println("Book added successfully!");
        }

        public void updateBook(int id, String title, String author) {
            books.stream()
                    .filter(book -> book.getId() == id)
                    .findFirst()
                    .ifPresentOrElse(book -> {
                        book.setTitle(title);
                        book.setAuthor(author);
                        System.out.println("Book updated successfully!");
                    }, () -> System.out.println("Book not found."));
        }

        public void deleteBook(int id) {
            if (books.removeIf(book -> book.getId() == id)) {
                    System.out.println("Book deleted successfully!");
            } else {
                    System.out.println("Book not found!");
            }
        }

        public void listBooks() {
            if (books.isEmpty()) {
                    System.out.println("No books available.");
            } else {
                    books.forEach(System.out::println);
            }
        }

        public void searchBooks(String query) {
            List<Book> foundBooks = books.stream()
                    .filter(book ->
    book.getTitle().toLowerCase().contains(query.toLowerCase())
                            ||
    book.getAuthor().toLowerCase().contains(query.toLowerCase()))
                    .collect(Collectors.toList());
            if (foundBooks.isEmpty()) {
                    System.out.println("No books found matching the query.");
            } else {
                    foundBooks.forEach(System.out::println);
            }
        }

        public void checkOutBook(int id) {
            books.stream()
                    .filter(book -> book.getId() == id && !book.isBorrowed())
                    .findFirst()
                    .ifPresentOrElse(book -> {
                        book.setBorrowed(true);
                        System.out.println("Book checked out successfully!");
                    }, () -> System.out.println("Book is not available or already checked
    out."));
        }

        public void checkInBook(int id) {
            books.stream()
                    .filter(book -> book.getId() == id && book.isBorrowed())
                    .findFirst()
                    .ifPresentOrElse(book -> {
                        book.setBorrowed(false);
                        System.out.println("Book checked in successfully!");
```

```java
        }, () -> System.out.println("Book was not checked out."));
}

private Book inputBookDetails(Scanner scanner) {
    System.out.print("Enter Book ID: ");
    while (!scanner.hasNextInt()) {
        System.out.print("Invalid input. Enter numeric Book ID: ");
        scanner.next();
    }
    int id = scanner.nextInt();
    scanner.nextLine(); // consume newline

    System.out.print("Enter Book Title: ");
    String title = scanner.nextLine();

    System.out.print("Enter Book Author: ");
    String author = scanner.nextLine();

    return new Book(id, title, author);
}

public void start() {
    Scanner scanner = new Scanner(System.in);
    while (true) {
        System.out.println("\n=== Library Management System ===");
        System.out.println("1. Add Book");
        System.out.println("2. Update Book");
        System.out.println("3. Delete Book");
        System.out.println("4. List All Books");
        System.out.println("5. Search Books");
        System.out.println("6. Check Out Book");
        System.out.println("7. Check In Book");
        System.out.println("8. Exit");
        System.out.print("Enter your choice: ");

        int choice;
        while (!scanner.hasNextInt()) {
                System.out.print("Invalid input. Enter a number between 1 and 8: ");
                scanner.next();
            }
            choice = scanner.nextInt();
            scanner.nextLine(); // consume newline

            switch (choice) {
                case 1:
                    addBook(inputBookDetails(scanner));
                    break;
                case 2:
                    System.out.print("Enter Book ID to update: ");
                    int updateId = scanner.nextInt();
                    scanner.nextLine(); // consume newline
                    Book updatedBook = inputBookDetails(scanner);
                    updateBook(updateId, updatedBook.getTitle(), updatedBook.getAuthor());
                    break;
                case 3:
                    System.out.print("Enter Book ID to delete: ");
                    int deleteId = scanner.nextInt();
                    deleteBook(deleteId);
                    break;
                case 4:
                    listBooks();
                    break;
                case 5:
                    System.out.print("Enter search query (title or author): ");
                    String query = scanner.nextLine();
                    searchBooks(query);
                    break;
                case 6:
                    System.out.print("Enter Book ID to check out: ");
                    int checkoutId = scanner.nextInt();
                    checkOutBook(checkoutId);
                    break;
                    case 7:
                        System.out.print("Enter Book ID to check in: ");
                        int checkinId = scanner.nextInt();
                        checkInBook(checkinId);
                        break;
                    case 8:
                        System.out.println("Exiting the system...");
                        return;
                    default:
                        System.out.println("Invalid choice. Please select between 1 and 
8.");
                }
            }
        }
    }

    // Main method
    public static void main(String[] args) {
        LibraryManager manager = new LibraryManager();
        manager.start();
    }
}
```

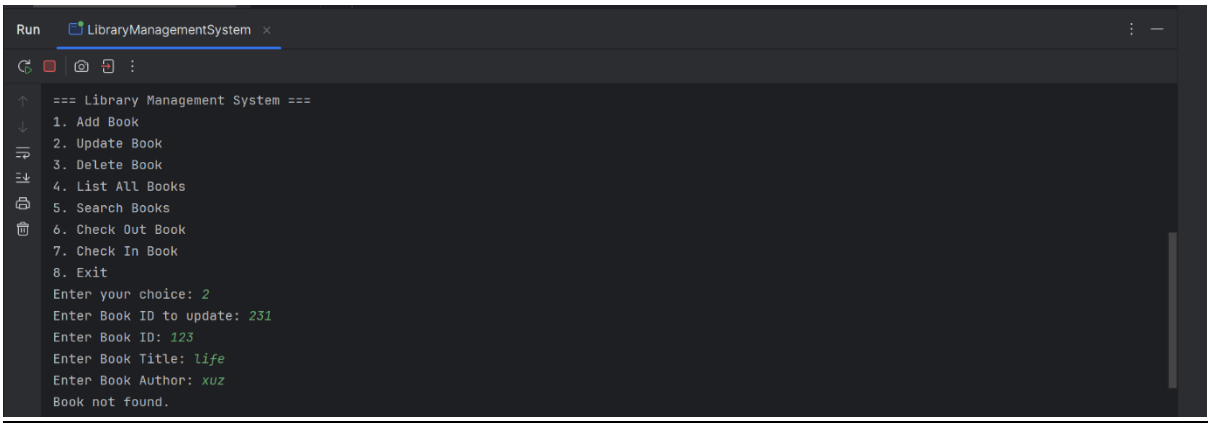
Output -



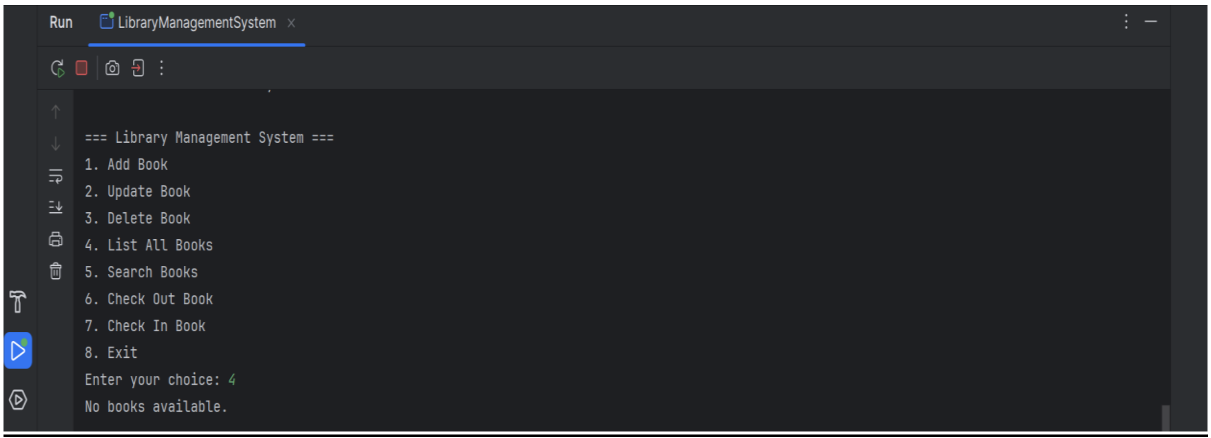
```
:\Program Files\Java\jdk-24\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2025.1\lib\idea_rt.jar=58810" -

= Library Management System ===
 Add Book
 Update Book
 Delete Book
 List All Books
 Search Books
 Check Out Book
 Check In Book
 Exit
ter your choice: 
```



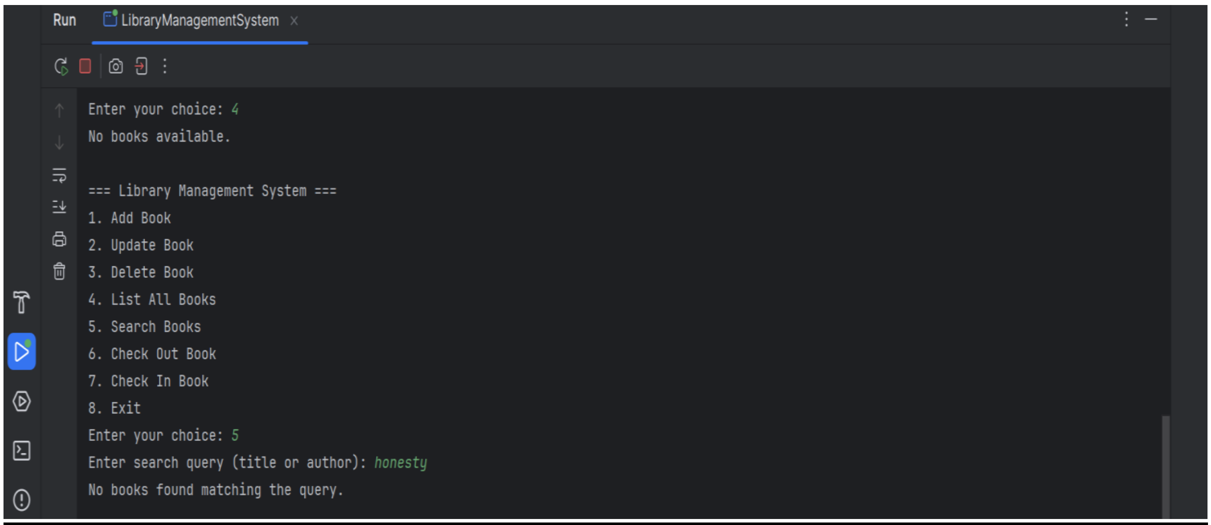
```
"C:\Program Files\Java\jdk-24\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2025.1\lib\idea_rt.jar=58810"

=== Library Management System ===
1. Add Book
2. Update Book
3. Delete Book
4. List All Books
5. Search Books
6. Check Out Book
7. Check In Book
8. Exit
Enter your choice: 1
Enter Book ID: 123
Enter Book Title: honesty
Enter Book Author: xyz
Book added successfully!
```



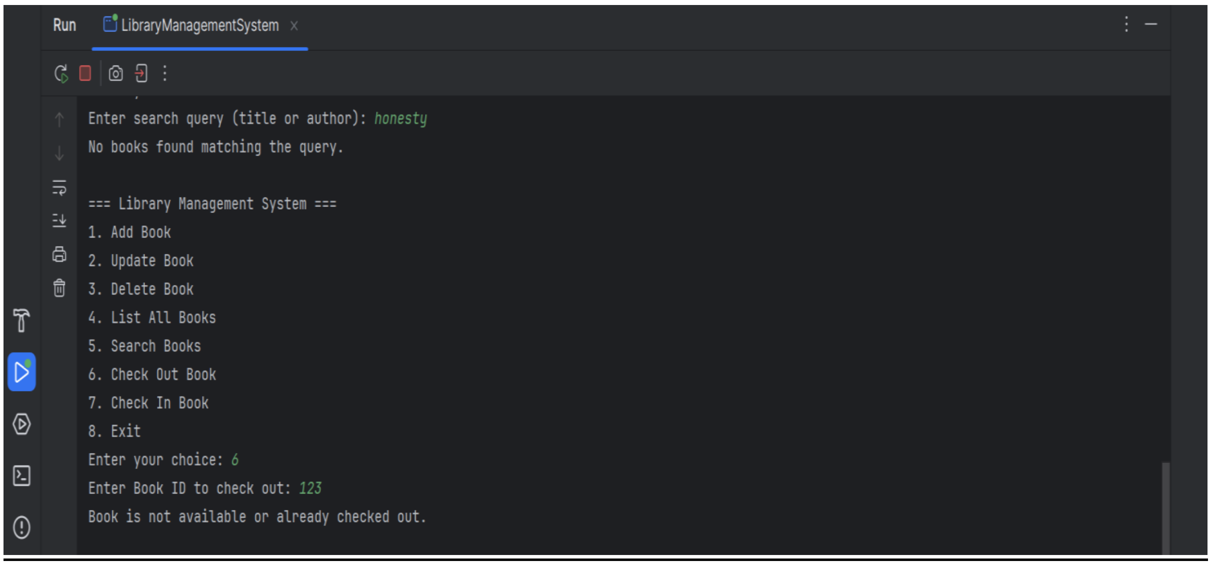
```
=== Library Management System ===
1. Add Book
2. Update Book
3. Delete Book
4. List All Books
5. Search Books
6. Check Out Book
7. Check In Book
8. Exit
Enter your choice: 2
Enter Book ID to update: 231
Enter Book ID: 123
Enter Book Title: life
Enter Book Author: xuz
Book not found.
```



```
=== Library Management System ===
1. Add Book
2. Update Book
3. Delete Book
4. List All Books
5. Search Books
6. Check Out Book
7. Check In Book
8. Exit
Enter your choice: 4
No books available.
```



```
Enter your choice: 4
No books available.

=== Library Management System ===
1. Add Book
2. Update Book
3. Delete Book
4. List All Books
5. Search Books
6. Check Out Book
7. Check In Book
8. Exit
Enter your choice: 5
Enter search query (title or author): honesty
No books found matching the query.
```



```
Enter search query (title or author): honesty
No books found matching the query.

=== Library Management System ===
1. Add Book
2. Update Book
3. Delete Book
4. List All Books
5. Search Books
6. Check Out Book
7. Check In Book
8. Exit
Enter your choice: 6
Enter Book ID to check out: 123
Book is not available or already checked out.
```