**Library Management System**

**Book.java**

public class Book {

    private int bookId;

    private String title;

    private String author;

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

        this.bookId = bookId;

        this.title = title;

        this.author = author;

    }

    public int getBookId() {

        return bookId;

    }

    public String getTitle() {

        return title;

    }

    public String getAuthor() {

        return author;

    }

    @Override

    public String toString() {

        return "Book{" +

                "ID=" + bookId +

                ", Title='" + title + '\'' +

                ", Author='" + author + '\'' +

                '}';

    }

}

**Library.java**

import java.util.Arrays;

import java.util.Comparator;

public class Library {

    private Book[] books;

    public Library(Book[] books) {

        this.books = books;

    }

    // Linear Search

    public Book linearSearchByTitle(String title) {

        for (Book b : books) {

            if (b.getTitle().equalsIgnoreCase(title)) {

                return b;

            }

        }

        return null;

    }

    // Binary Search (list must be sorted by title)

    public Book binarySearchByTitle(String title) {

        Arrays.sort(books, Comparator.comparing(Book::getTitle));

        int low = 0, high = books.length - 1;

        while (low <= high) {

            int mid = (low + high) / 2;

            int cmp = books[mid].getTitle().compareToIgnoreCase(title);

            if (cmp == 0)

                return books[mid];

            else if (cmp < 0)

                low = mid + 1;

            else

                high = mid - 1;

        }

        return null;

    }

    // Utility to display all books

    public void displayBooks() {

        for (Book b : books) {

            System.out.println(b);

        }

    }

}

**Main.java**

public class Main {

    public static void main(String[] args) {

        Book[] books = {

                new Book(101, "The Hobbit", "J.R.R. Tolkien"),

                new Book(102, "Pride and Prejudice", "Jane Austen"),

                new Book(103, "1984", "George Orwell"),

                new Book(104, "To Kill a Mockingbird", "Harper Lee")

        };

        Library library = new Library(books);

        System.out.println("Available Books:");

        library.displayBooks();

        System.out.println("\nLinear Search: Searching for '1984'");

        Book result1 = library.linearSearchByTitle("1984");

        System.out.println(result1 != null ? result1 : "Book not found");

        System.out.println("\nBinary Search: Searching for 'To Kill a Mockingbird'");

        Book result2 = library.binarySearchByTitle("To Kill a Mockingbird");

        System.out.println(result2 != null ? result2 : "Book not found");

    }

}

