Data Structures and Algorithms

SuperSet ID:6412063

Exercise 6: Library Management System

Code:

class Book {

    int bookId;

    String title;

    String author;

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

        this.bookId = bookId;

        this.title = title;

        this.author = author;

    }

    public String toString() {

        return "Book ID: " + bookId + ", Title: \"" + title + "\", Author: " + author;

    }

}

import java.util.Arrays;

import java.util.Comparator;

public class LibrarySystem {

    public static Book linearSearch(Book[] books, String targetTitle) {

        for (Book book : books) {

            if (book.title.equalsIgnoreCase(targetTitle)) {

                return book;

            }

        }

        return null;

    }

    public static Book binarySearch(Book[] books, String targetTitle) {

        int left = 0, right = books.length - 1;

        while (left <= right) {

            int mid = left + (right - left) / 2;

            int comparison = books[mid].title.compareToIgnoreCase(targetTitle);

            if (comparison == 0) {

                return books[mid];

            } else if (comparison < 0) {

                left = mid + 1;

            } else {

                right = mid - 1;

            }

        }

        return null;

    }

    public static void displayBooks(Book[] books) {

        for (Book book : books) {

            System.out.println(book);

        }

    }

    public static void main(String[] args) {

        Book[] books = {

            new Book(1, "The Alchemist", "Paulo Coelho"),

            new Book(2, "To Kill a Mockingbird", "Harper Lee"),

            new Book(3, "1984", "George Orwell"),

            new Book(4, "Pride and Prejudice", "Jane Austen"),

            new Book(5, "Harry Potter", "J.K. Rowling")

        };

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

        displayBooks(books);

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

        Book result1 = linearSearch(books, "1984");

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

        Arrays.sort(books, Comparator.comparing(book -> book.title));

        System.out.println("\nBinary Search: 'Harry Potter'");

        Book result2 = binarySearch(books, "Harry Potter");

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

    }

}

Output:

A white background with black text

Description automatically generated