**Exercise 6: Library Management System**

**Book.java**

public class Book {

private String bookId;

private String title;

private String author;

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

this.bookId = bookId;

this.title = title;

this.author = author;

}

public String getTitle() {

return title;

}

public void display() {

System.***out***.println("ID: " + bookId + ", Title: " + title + ", Author: " + author);

}

}

**LinearSearch.java**

public class LinearSearch {

public static Book searchByTitle(Book[] books, String title) {

for (Book book : books) {

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

return book;

}

}

return null;

}

}

**BinarySearch.java**

import java.util.Arrays;

import java.util.Comparator;

public class BinarySearch {

public static void sortByTitle(Book[] books) {

Arrays.sort(books, Comparator.comparing(Book::getTitle, String.CASE\_INSENSITIVE\_ORDER));

}

public static Book searchByTitle(Book[] books, String title) {

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;

}

}

**Main.java**

public class Main {

public static void main(String[] args) {

Book[] library = {

new Book("B001", "Java Programming", "James Gosling"),

new Book("B002", "Data Structures", "Robert Lafore"),

new Book("B003", "Design Patterns", "Erich Gamma"),

new Book("B004", "Algorithms", "Thomas Cormen")

};

System.*out*.println(" Linear Search for 'Design Patterns':");

Book linearResult = LinearSearch.*searchByTitle*(library, "Design Patterns");

System.*out*.println(linearResult != null ? "Found: " : "Not found.");

if (linearResult != null) linearResult.display();

System.*out*.println("\nSorting for Binary Search...");

BinarySearch.*sortByTitle*(library);

System.*out*.println(" Binary Search for 'Java Programming':");

Book binaryResult = BinarySearch.*searchByTitle*(library, "Java Programming");

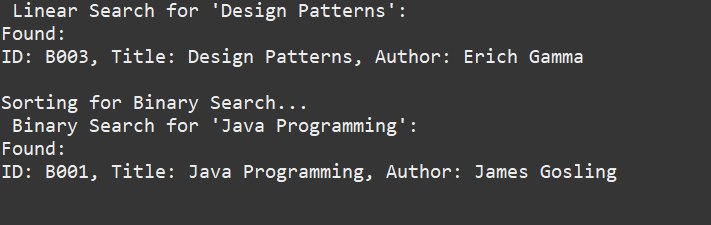
System.*out*.println(binaryResult != null ? "Found: " : "Not found.");

if (binaryResult != null) binaryResult.display();

}

}

**Output:**

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