**Exercise 2: E-commerce Platform Search Function**

**CODE:**

**Product.java**

public class Product {

int productId;

String productName;

String category;

public Product(int productId, String productName, String category) {

this.productId = productId;

this.productName = productName;

this.category = category;

}

@Override

public String toString() {

return productId + " - " + productName + " (" + category + ")";

}

}

**SearchUtils.java**

public class SearchUtils {

public static Product linearSearch(Product[] products, int id) {

for (Product p : products) {

if (p.productId == id) return p;

}

return null;

}

public static Product binarySearch(Product[] products, int id) {

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

while (left <= right) {

int mid = (left + right) / 2;

if (products[mid].productId == id) return products[mid];

else if (products[mid].productId < id) left = mid + 1;

else right = mid - 1;

}

return null;

}

}

**Main.java**

import java.util.Arrays;

import java.util.Comparator;

public class Main {

public static void main(String[] args) {

Product[] products = {

new Product(101, "Laptop", "Electronics"),

new Product(205, "Shirt", "Clothing"),

new Product(303, "Book", "Education"),

new Product(150, "Phone", "Electronics"),

new Product(199, "Shoes", "Footwear")

};

System.out.println(" Linear Search:");

Product result1 = SearchUtils.linearSearch(products, 150);

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

Arrays.sort(products, Comparator.comparingInt(p -> p.productId));

System.out.println("\n Binary Search:");

Product result2 = SearchUtils.binarySearch(products, 150);

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

}

}

**OUTPUT:**

