**Data structures and Algorithms**

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

**PROGRAM:**

Product.java

package ecommerce;

public class Product {

int productId;

String productName;

String category;

public Product(int id, String name, String category) {

this.productId = id;

this.productName = name;

this.category = category;

}

public String toString() {

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

}

}

**Linear Search.java**

package ecommerce;

public class LinearSearch {

public static Product searchByName(Product[] products, String name) {

for (Product p : products) {

if (p.productName.equalsIgnoreCase(name)) {

return p;

}

}

return null;

}

}

**Binary Search.java**

package ecommerce;

import java.util.Arrays;

import java.util.Comparator;

public class BinarySearch {

public static Product searchByName(Product[] products, String name) {

Arrays.sort(products, Comparator.comparing(p -> p.productName.toLowerCase()));

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

while (left <= right) {

int mid = (left + right) / 2;

int cmp = products[mid].productName.compareToIgnoreCase(name);

if (cmp == 0) return products[mid];

else if (cmp < 0) left = mid + 1;

else right = mid - 1;

}

return null;

}

}

**Main.java**

package ecommerce;

public class Main {

public static void main(String[] args) {

Product[] products = {

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

new Product(102, "Shirt", "Apparel"),

new Product(103, "Phone", "Electronics"),

new Product(104, "Book", "Education"),

new Product(105, "Shoes", "Footwear")

};

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

Product result1 = LinearSearch.searchByName(products, "Phone");

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

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

Product result2 = BinarySearch.searchByName(products, "Phone");

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

}

}

**OUTPUT**:

A screenshot of a computer

AI-generated content may be incorrect.