**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 + "]";

}

}

**ProductSearch.java:**

import java.util.Arrays;

import java.util.Comparator;

public class ProductSearch {

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

for (Product p : products) {

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

return p;

}

}

return null;

}

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

int low = 0;

int high = products.length - 1;

while (low <= high) {

int mid = (low + high) / 2;

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

if (cmp == 0) {

return products[mid];

} else if (cmp < 0) {

high = mid - 1;

} else {

low = mid + 1;

}

}

return null;

}

public static void sortProductsByName(Product[] products) {

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

}

}

**SearchTest.java:**

public class SearchTest {

public static void main(String[] args) {

Product[] products = {

new Product(10567, "Blender", "Home Appliances"),

new Product(11984, "Notebook", "Stationery"),

new Product(13250, "Headphones", "Electronics"),

new Product(10893, "Backpack", "Bags"),

new Product(14721, "Sneakers", "Footwear")

};

Product result1 = ProductSearch.linearSearch(products, "Headphones");

System.out.println("Linear Search Result: " + result1);

ProductSearch.sortProductsByName(products);

Product result2 = ProductSearch.binarySearch(products, "Headphones");

System.out.println("Binary Search Result: " + result2);

}

}

**OUTPUT:**

