**EXERCISE 2:**

**E-commerce Platform Search Function**

**code**

**Product.java**

**package** ecomm;

**public** **class** Product {

**private** **int** productId;

**private** String productName;

**private** String category;

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

**this**.productId = productId;

**this**.productName = productName;

**this**.category = category;

}

**public** **int** getProductId() {

**return** productId;

}

**public** String getProductName() {

**return** productName;

}

**public** String getCategory() {

**return** category;

}

**public** String toString() {

**return** "Product ID: " + productId + ", Name: " + productName + ", Category: " + category;

}

}

ProductSearch.java

**package** ecomm;

**import** java.util.Arrays;

**import** java.util.Comparator;

**public** **class** ProductSearch {

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

**for** (Product p : products) {

**if** (p.getProductName().equalsIgnoreCase(targetName)) {

**return** p;

}

}

**return** **null**;

}

**public** **static** Product binarySearch(Product[] sorted, String targetName) {

**int** low = 0;

**int** high = sorted.length - 1;

**while** (low <= high) {

**int** mid = (low + high) / 2;

**int** cmp = sorted[mid].getProductName().compareToIgnoreCase(targetName);

**if** (cmp == 0) **return** sorted[mid];

**if** (cmp < 0) low = mid + 1;

**else** high = mid - 1;

}

**return** **null**;

}

**public** **static** Product[] sortByName(Product[] products) {

Product[] copy = Arrays.*copyOf*(products, products.length);

Arrays.*sort*(copy, Comparator.*comparing*(Product::getProductName, String.***CASE\_INSENSITIVE\_ORDER***));

**return** copy;

}

}

**Main.java**

**package** ecomm;

**public** **class** Main {

**public** **static** **void** main(String[] args) {

Product[] catalog = {

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

**new** Product(35, "Mug", "Kitchen"),

**new** Product(62, "Phone", "Electronics"),

**new** Product(88, "Mouse", "Electronics")

};

System.***out***.println("🔍 Linear Search for 'Phone':");

Product result1 = ProductSearch.*linearSearch*(catalog, "Phone");

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

System.***out***.println("\n🔍 Binary Search for 'Phone':");

Product[] sortedCatalog = ProductSearch.*sortByName*(catalog);

Product result2 = ProductSearch.*binarySearch*(sortedCatalog, "Phone");

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

}

}

**Output:**

