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

**Myclass.java**

package ecommercesearch;

public class Myclass{

    public static void main(String[] args) {

        Product[] products = {

            new Product(1, "Laptop", "Electronics"),

            new Product(2, "Shoes", "Footwear"),

            new Product(3, "Watch", "Accessories"),

            new Product(4, "Keyboard", "Electronics"),

            new Product(5, "Phone", "Electronics"),

            new Product(6, "Backpack", "Accessories")

        };

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

        Product found1 = SearchUtil.linearSearch(products, "Phone");

        System.out.println(found1 != null ? found1 : "Product not found.");

        SearchUtil.sortProducts(products);

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

        Product found2 = SearchUtil.binarySearch(products, "Backpack");

        System.out.println(found2 != null ? found2 : "Product not found.");

    }

}

**Product.java**

package ecommercesearch;

public class Product {

    private final int productId;

    private final String productName;

    private final String category;

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

        this.productId = productId;

        this.productName = productName;

        this.category = category;

    }

    public String getProductName() {

        return productName;

    }

    @Override

    public String toString() {

        return "Product [ID=" + productId + ", Name=" + productName + ", Category=" + category + "]";

    }

}

SearchUtil.java

package ecommercesearch;

import java.util.Arrays;

import java.util.Comparator;

public class SearchUtil {

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

        for (Product product : products) {

            if (product.getProductName().equalsIgnoreCase(targetName)) {

                return product;

            }

        }

        return null;

    }

    public static void sortProducts(Product[] products) {

        Arrays.sort(products, Comparator.comparing(Product::getProductName));

    }

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

        int left = 0;

        int right = products.length - 1;

        while (left <= right) {

            int mid = (left + right) / 2;

            int compare = products[mid].getProductName().compareToIgnoreCase(targetName);

            if (compare == 0) {

                return products[mid];

            } else if (compare < 0) {

                left = mid + 1;

            } else {

                right = mid - 1;

            }

        }

        return null;

    }

}

