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

import java.util.Arrays;

import java.util.Comparator;

public class Main {

    public static void main(String[] args) {

        Product[] products = {

            new Product("P003", "Shoes", "Fashion"),

            new Product("P001", "Laptop", "Electronics"),

            new Product("P004", "Phone", "Electronics"),

            new Product("P002", "T-shirt", "Fashion")

        };

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

        Product found1 = linearSearch(products, "Laptop");

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

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

        System.out.println("\nBinary Search:");

        Product found2 = binarySearch(products, "Laptop");

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

    }

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

        for (Product product : products) {

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

                return product;

            }

        }

        return null;

    }

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

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

        while (left <= right) {

            int mid = (left + right) / 2;

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

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

            if (cmp < 0) right = mid - 1;

            else left = mid + 1;

        }

        return null;

    }

}

class Product {

    String productId;

    String productName;

    String category;

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

        this.productId = productId;

        this.productName = productName;

        this.category = category;

    }

    public String toString() {

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

    }

}

Output:

