**E-commerce Platform**

**SearchDemo.java**

import java.util.Arrays;

import java.util.Comparator;

public class SearchDemo {

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

        for (Product product : products) {

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

                return product;

            }

        }

        return null;

    }

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

        int low = 0, high = products.length - 1;

        while (low <= high) {

            int mid = (low + high) / 2;

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

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

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

            else high = mid - 1;

        }

        return null;

    }

    public static void main(String[] args) {

        Product[] products = {

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

            new Product(2, "Shirt", "Clothing"),

            new Product(3, "Mouse", "Electronics"),

            new Product(4, "Book", "Education"),

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

        };

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

        Product result1 = linearSearch(products, "Book");

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

        System.out.println("\nSorting for Binary Search...");

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

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

        Product result2 = binarySearch(products, "Book");

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

    }

}

**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 + "]";

    }

}

