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

import java.util.\*;

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;

}

public String toString() {

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

}

}

public class EcommerceSearchSystem {

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

for (Product p : products) {

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

return p;

}

}

return null;

}

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

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

while (low <= high) {

int mid = (low + high) / 2;

int compare = products[mid].productName.compareToIgnoreCase(key);

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

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

else high = mid - 1;

}

return null;

}

public static void main(String[] args) {

Product[] inventory = {

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

new Product(2, "Shampoo", "Beauty"),

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

new Product(4, "Jeans", "Clothing"),

new Product(5, "Book", "Stationery")

};

String searchItem = "Mobile";

Product linearResult = linearSearch(inventory, searchItem);

System.out.println("🔍 Linear Search: " + (linearResult != null ? linearResult : "Product not found"));

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

Product binaryResult = binarySearch(inventory, searchItem);

System.out.println("🔍 Binary Search: " + (binaryResult != null ? binaryResult : "Product not found"));

}

}

**Output:**

