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

**Source code:**

import java.util.Arrays;

public class ECommerceSearchExample {

static class Product {

int productId;

String productName;

String category;

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

this.productId = productId;

this.productName = productName;

this.category = category;

}

@Override

public String toString() {

return "Product{" +

"productId=" + productId +

", productName='" + productName + '\'' +

", category='" + category + '\'' +

'}';

}

}

static Product linearSearch(Product[] products, int targetId) {

for (Product product : products) {

if (product.productId == targetId) {

return product;

}

}

return null;

}

static Product binarySearch(Product[] products, int targetId) {

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

while (left <= right) {

int mid = (left + right) / 2;

if (products[mid].productId == targetId) {

return products[mid];

} else if (products[mid].productId < targetId) {

left = mid + 1;

} else {

right = mid - 1;

}

}

return null;

}

public static void main(String[] args) {

Product[] products = {

new Product(105, "Laptop", "Electronics"),

new Product(102, "Shoes", "Fashion"),

new Product(109, "Coffee Mug", "Home"),

new Product(101, "Smartphone", "Electronics"),

new Product(108, "T-Shirt", "Fashion")

};

Arrays.sort(products, (p1, p2) -> Integer.compare(p1.productId, p2.productId));

int searchId = 109;

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

Product result1 = linearSearch(products, searchId);

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

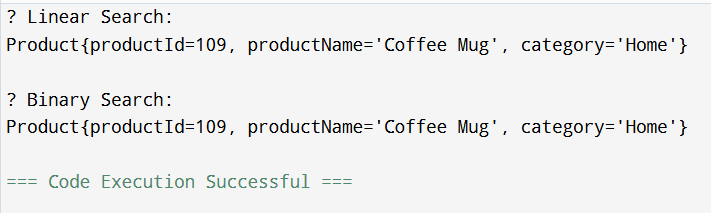
System.out.println("\n Binary Search:");

Product result2 = binarySearch(products, searchId);

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

} }

**Output :**

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