**Ecommerce Platform Search**

**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 + ")";

}

}

**LinearSearch.java**

public class LinearSearch {

public static Product search(Product[] products, int productId) {

for (Product p : products) {

if (p.productId == productId) {

return p;

}

}

return null;

}

}

**BinarySearch.java**

import java.util.Arrays;

import java.util.Comparator;

public class BinarySearch {

public static Product search(Product[] products, int productId) {

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

while (left <= right) {

int mid = left + (right - left) / 2;

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

return products[mid];

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

left = mid + 1;

} else {

right = mid - 1;

}

}

return null;

}

public static void sortById(Product[] products) {

Arrays.sort(products, Comparator.comparingInt(p -> p.productId));

}

}

**SearchTest.java**

public class SearchTest {

public static void main(String[] args) {

Product[] products = {

new Product(103, "Shoes", "Footwear"),

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

new Product(104, "Watch", "Accessories"),

new Product(102, "Phone", "Electronics")

};

// Linear Search Test

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

Product result1 = LinearSearch.search(products, 104);

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

// Binary Search Test

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

BinarySearch.sortById(products);

Product result2 = BinarySearch.search(products, 104);

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

}

}

**Output**

