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

import java.util.\*;

public class ProductSearchExample {

// Inner Product class

static 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 void display() {

System.out.println("ID: " + productId + ", Name: " + productName + ", Category: " + category);

}

}

// Linear Search by product name

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

for (Product p : products) {

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

return p;

}

}

return null;

}

// Binary Search by product name (array must be sorted)

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

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

while (low <= high) {

int mid = (low + high) / 2;

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

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

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

else high = mid - 1;

}

return null;

}

public static void main(String[] args) {

Product[] products = {

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

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

new Product(103, "Watch", "Accessories"),

new Product(104, "Phone", "Electronics"),

new Product(105, "Bag", "Travel")

};

System.out.println("🔍 Linear Search for 'Watch':");

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

if (found1 != null) found1.display();

else System.out.println("Product not found");

// Sort for binary search

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

System.out.println("\n🔍 Binary Search for 'Phone':");

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

if (found2 != null) found2.display();

else System.out.println("Product not found");

}

}

OUTPUT:

A screenshot of a computer program

AI-generated content may be incorrect.