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

**CODE:**

import java.util.Arrays;

import java.util.Comparator;

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 + ")";

}

}

class SearchUtils {

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

for (Product product : products) {

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

return product;

}

}

return null;

}

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

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

int left = 0;

int right = products.length - 1;

while (left <= right) {

int mid = (left + right) / 2;

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

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

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

else right = mid - 1;

}

return null;

}

}

public class Main {

public static void main(String[] args) {

Product[] products = {

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

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

new Product(103, "Air Cooler", "Electronics"),

new Product(104, "T-shirt", "Clothing"),

new Product(105, "Watch", "Accessories")

};

String searchName = "Air Cooler";

Product result1 = SearchUtils.linearSearch(products, searchName);

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

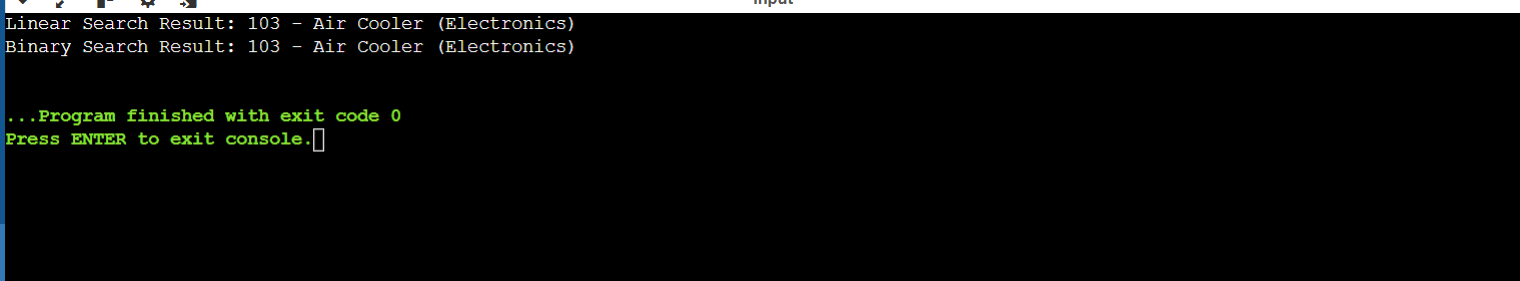
Product result2 = SearchUtils.binarySearch(products, searchName);

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

}

}

**OUTPUT:**

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**Exercise 7: Financial Forecasting**

**CODE:**

public class Main {

public static double futureValue(double presentValue, double rate, int years) {

if (years == 0) {

return presentValue;

} else {

return futureValue(presentValue, rate, years - 1) \* (1 + rate);

}

}

public static void main(String[] args) {

double presentValue = 10000;

double rate = 0.08;

int years = 5;

double result = futureValue(presentValue, rate, years);

System.out.printf("Future Value after %d years: ₹%.2f\n", years, result);

}

}

**OUTPUT:**

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