**WEEK -1  
DATA STRUCTURES AND ALORITHM**

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

PROJECT NAME: ECommerceSearchExample

CLASS NAME: Product  
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;

}

public String toString() {

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

}

}

CLASS NAME: ProductSearch  
ProductSearch.java:  
import java.util.Arrays;

import java.util.Comparator;

public class ProductSearch {

// 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 (Assumes Sorted Array)

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

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

while (left <= right) {

int mid = (left + right) / 2;

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

if (cmp == 0)

return products[mid];

else if (cmp < 0)

left = mid + 1;

else

right = mid - 1;

}

return null;

}

// Main method to test

public static void main(String[] args) {

Product[] products = {

new Product(101, "Shampoo", "Personal Care"),

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

new Product(103, "Book", "Stationery"),

new Product(104, "Pen", "Stationery"),

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

};

// Linear Search

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

Product result1 = linearSearch(products, "Pen");

System.out.println(result1 != null ? "Found: " + result1 : "Not Found");

// Sort products for Binary Search

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

// Binary Search

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

Product result2 = binarySearch(products, "Pen");

System.out.println(result2 != null ? "Found: " + result2 : "Not Found");

}

}

**OUTPUT:**

