**Superset ID:**  6125132  
**Name:** Podugu Vinay Kumar

**Week-1: Data Structures and Alogorithms**

**Exercise 2: Implementing the Singleton Pattern**

**Input Code:**

**Product.java:**

package search;

public class Product {

private String productId;

private String productName;

private String category;

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

this.productId = productId;

this.productName = productName;

this.category = category;

}

public String getProductId() {

return productId;

}

public String getProductName() {

return productName;

}

public String getCategory() {

return category;

}

@Override

public String toString() {

return productName + " (ID: " + productId + ", Category: " + category + ")";

}

}

**Search\_Inventory.java:**

package search;

import java.util.Arrays;

import java.util.Comparator;

public class search\_inventory {

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

for (int i = 0; i < products.length; i++) {

if (products[i].getProductName().equalsIgnoreCase(targetName)) {

return i;

}

}

return -1;

}

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

Arrays.*sort*(products, Comparator.*comparing*(product::getProductName));

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

while (left <= right) {

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

int compare = products[mid].getProductName().compareToIgnoreCase(targetName);

if (compare == 0) return mid;

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

else right = mid - 1;

}

return -1;

}

}

**Main .java:**

**package** search;

**public** **class** main {

**public** **static** **void** main(String[] args) {

product[] products = {

**new** product("P001", "Laptop", "Electronics"),

**new** product("P002", "Shoes", "Fashion"),

**new** product("P003", "Camera", "Electronics"),

**new** product("P004", "Watch", "Accessories"),

**new** product("P005", "Phone", "Electronics")

};

String target = "Camera";

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

**int** indexLinear = search\_inventory.*linearSearch*(products, target);

**if** (indexLinear != -1)

System.***out***.println("Found at index:\n " + indexLinear + " → " + products[indexLinear]);

**else**

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

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

**int** indexBinary = search\_inventory.*binarySearch*(products, target);

**if** (indexBinary != -1)

System.***out***.println("Found at index: \n" + indexBinary + " → " + products[indexBinary]);

**else**

System.***out***.println("\n Product not found");

}

}  
**Output:**

