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

**Program:**

Product.java:

package com.search;

public class Product {

int productId;

String productName;

String category;

public Product(int id,String name,String category) {

this.productId=id;

this.productName=name;

this.category=category;

}

public String toString() {

return productId+" - "+productName+" - "+category;

}

}

SearchUtility.java:

package com.search;

import java.util.\*;

public class SearchUtility {

public static Product linearSearch(Product[] products,int targetId) {

for (Product p:products) {

if (p.productId==targetId) {

return p;

}

}

return null;

}

public static Product binarySearch(Product[] products,int targetId) {

int l=0,r=products.length-1;

while (l<=r) {

int m=l+(r-l)/2;

if (products[m].productId==targetId)

return products[m];

else if (products[m].productId<targetId)

l=m+1;

else

r=m-1;

}

return null;

}

public static void sortById(Product[] products) {

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

}

}

Main.java:

package com.search;

public class Main {

public static void main(String[] args) {

Product[] products={new Product(103,"Laptop","Electronics"),

new Product(101,"Shoes","Fashion"),

new Product(105,"Book","Education"),

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

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

int searchId=104;

Product foundLinear=SearchUtility.*linearSearch*(products,searchId);

System.***out***.println("Linear Search Result: "+(foundLinear!=null?foundLinear:"Not Found"));

SearchUtility.*sortById*(products);

Product foundBinary=SearchUtility.*binarySearch*(products,searchId);

System.***out***.println("Binary Search Result: "+(foundBinary!=null?foundBinary:"Not Found"));

}

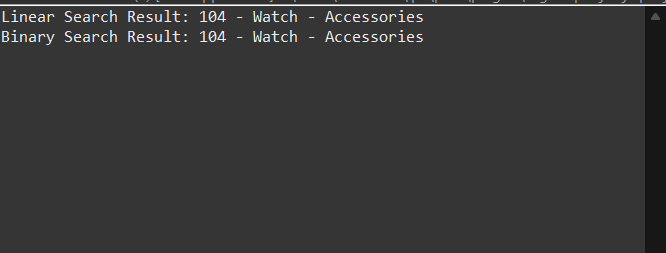
}

**Analysis:**

**Linear Search :** Linear Search has the time complexity of O(n) and it is suitable for short arrays.

**Binary Search :** Binary Search has the time complexity of O(log n) and it is suitable for short and long arrays.

**Output:**

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