

## Exercise 2: E-commerce Platform Search Function

### Scenario:

You are working on the search functionality of an e-commerce platform. The search needs to be optimized for fast performance.

//EcommerceSearch.java

```
import java.util.*;

public class EcommerceSearch {

    // 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 String toString() {
            return productId + " - " + productName + " ("
+ category + ") ";
        }
    }

    // Linear Search
```

```
    public static Product linearSearch(Product[]
products, int targetId) {
        for (Product product : products) {
            if (product.productId == targetId) {
                return product;
            }
        }
        return null;
    }

    // Binary Search
    public static Product binarySearch(Product[]
products, int targetId) {
        int left = 0, right = products.length - 1;
        while (left <= right) {
            int mid = (left + right) / 2;
            if (products[mid].productId == targetId) {
                return products[mid];
            } else if (products[mid].productId <
targetId) {
                left = mid + 1;
            } else {
                right = mid - 1;
            }
        }
        return null;
    }

    // Main Method
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
```

```
Product[] products = {
    new Product(103, "Shoes", "Footwear"),
    new Product(101, "T-shirt", "Clothing"),
    new Product(105, "Phone", "Electronics"),
    new Product(102, "Laptop", "Electronics"),
    new Product(104, "Backpack", "Accessories")
};

System.out.println("Welcome to the E-commerce
Search Engine!");
System.out.print("Enter the Product ID to search:
");
int searchId = scanner.nextInt();

// Linear Search
System.out.println("\nLinear Search Result:");
Product result1 = linearSearch(products,
searchId);
System.out.println(result1 != null ? result1 :
"Product not found");

// Sort for binary search
Arrays.sort(products, Comparator.comparingInt(p
-> p.productId));

// Binary Search
System.out.println("\nBinary Search Result:");
Product result2 = binarySearch(products,
searchId);
System.out.println(result2 != null ? result2 :
"Product not found");
```

```

        scanner.close();
    }
}

```

Output:

The screenshot shows an IDE with the following components:

- EXPLORER:** Shows the project structure with files `EcommerceSearch.class`, `EcommerceSearch.java`, and `EcommerceSearch$Pr...`.
- EDITOR:** Displays the `EcommerceSearch.java` file with the following code:
 

```

3 public class EcommerceSearch {
33     public static Product binarySearch(Product[] products, int searchId) {
44     }
45     return null;
46 }
47
48 // Main Method
49 Run | Debug
50 public static void main(String[] args) {
51     Scanner scanner = new Scanner(System.in);
52
53     Product[] products = {
54         new Product(productId:103, productName:"Laptop", price:1200),
55         new Product(productId:101, productName:"Smartphone", price:800),
56         new Product(productId:105, productName:"Tablet", price:400),
57         new Product(productId:102, productName:"Smartwatch", price:200),
58         new Product(productId:104, productName:"Wireless Earbuds", price:150);
59     };
60
61     System.out.println(x:"Welcome to the E-commerce Search Engine!");
62     System.out.print(s:"Enter the Product ID to search: ");
63     int searchId = scanner.nextInt();
64
65     // Linear Search
66     System.out.println(x:"\nLinear Search Result:");

```
- TERMINAL:** Shows the execution of the program.
 

```

PS C:\Users\TRAINING-16\Desktop\JAVA FSE 2025\Week - 1\Algorithms_Data Structures\Exercise - 2 E-commerce Platform Search Function> javac EcommerceSearch.java
PS C:\Users\TRAINING-16\Desktop\JAVA FSE 2025\Week - 1\Algorithms_Data Structures\Exercise - 2 E-commerce Platform Search Function> java EcommerceSearch
Welcome to the E-commerce Search Engine!
Enter the Product ID to search: 106

Linear Search Result:
Product not found

Binary Search Result:
Product not found
PS C:\Users\TRAINING-16\Desktop\JAVA FSE 2025\Week - 1\Algorithms_Data Structures\Exercise - 2 E-commerce Platform Search Function> javac EcommerceSearch.java
PS C:\Users\TRAINING-16\Desktop\JAVA FSE 2025\Week - 1\Algorithms_Data Structures\Exercise - 2 E-commerce Platform Search Function> java EcommerceSearch
Welcome to the E-commerce Search Engine!
Enter the Product ID to search: 102

Linear Search Result:
102 - Laptop (Electronics)

Binary Search Result:
102 - Laptop (Electronics)
PS C:\Users\TRAINING-16\Desktop\JAVA FSE 2025\Week - 1\Algorithms_Data Structures\Exercise - 2 E-commerce Platform Search Function>

```