ARRAY AND SEARCHING – LAB 01

EC 4070

DATA STRUCTURES AND ALGORITHMS

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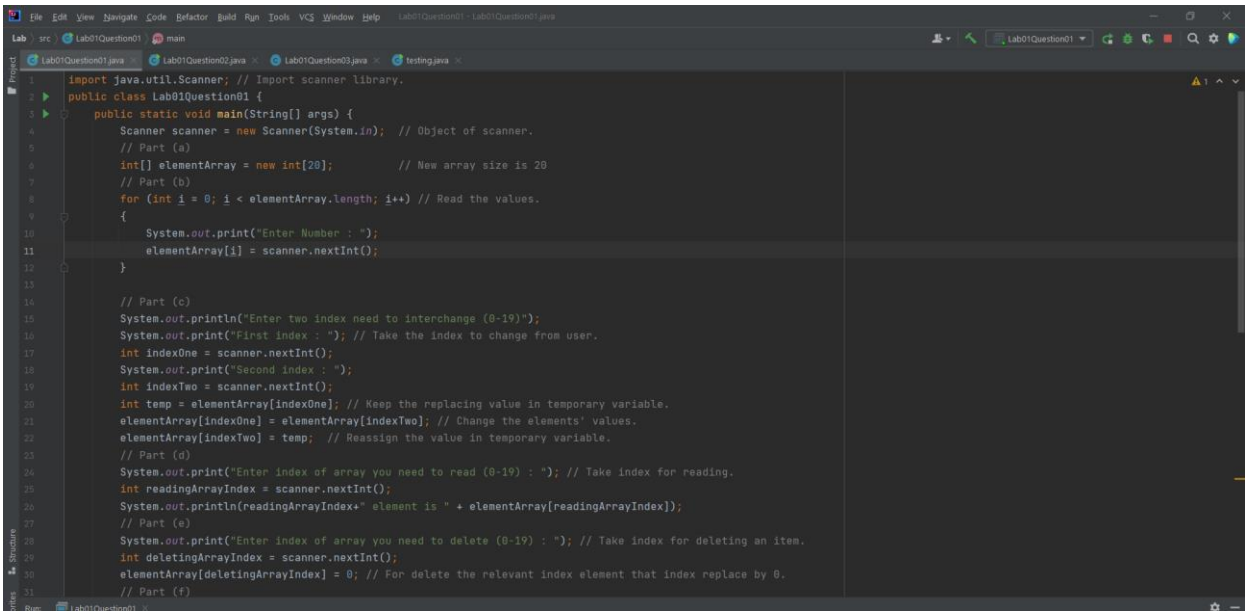
REGISTRATION NO. : **2019/E/166**

SEMESTER : **SEMESTER 04**

DATE ASSIGNED : **28 FABRUARY 2022**

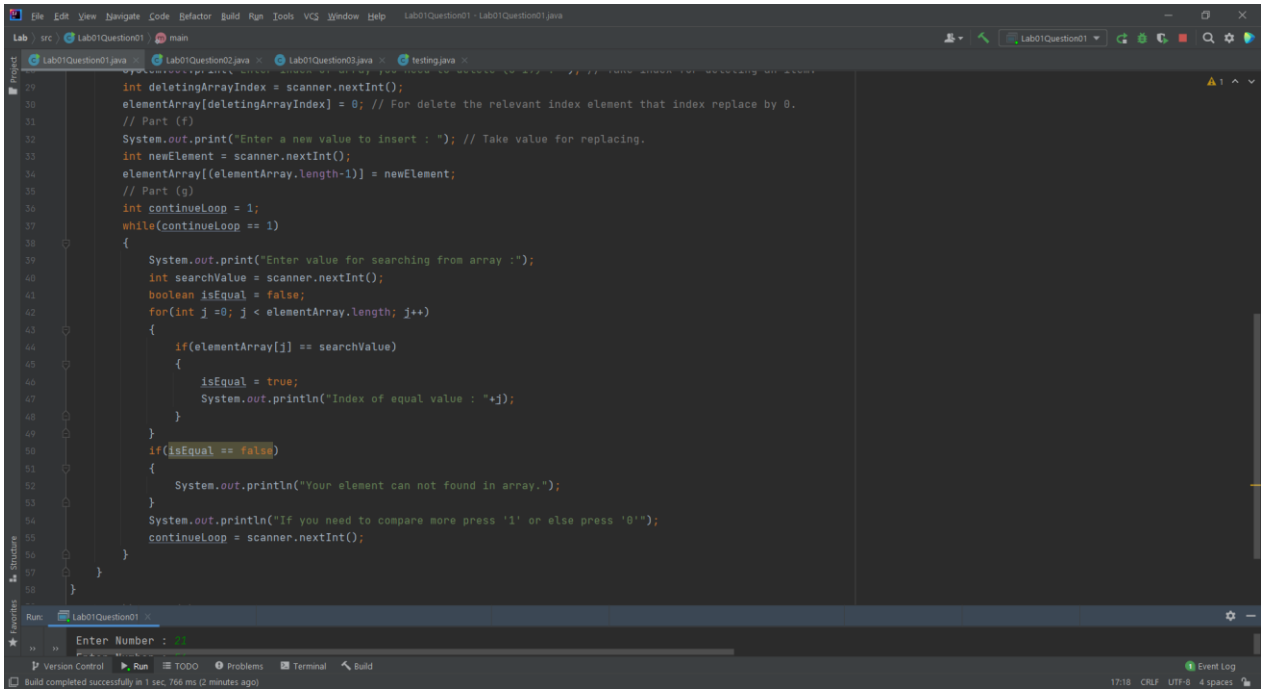
01.

Code:-



```java
import java.util.Scanner; // Import scanner library.
public class Lab01Question01 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);  // Object of scanner.
        // Part (a)
        int[] elementArray = new int[20];          // New array size is 20
        // Part (b)
        for (int i = 0; i < elementArray.length; i++) // Read the values.
        {
            System.out.print("Enter Number : ");
            elementArray[i] = scanner.nextInt();
        }

        // Part (c)
        System.out.println("Enter two index need to interchange (0-19)");
        System.out.print("First index : "); // Take the index to change from user.
        int indexOne = scanner.nextInt();
        System.out.print("Second index : ");
        int indexTwo = scanner.nextInt();
        int temp = elementArray[indexOne]; // Keep the replacing value in temporary variable.
        elementArray[indexOne] = elementArray[indexTwo]; // Change the elements' values.
        elementArray[indexTwo] = temp;  // Reassign the value in temporary variable.
        // Part (d)
        System.out.print("Enter index of array you need to read (0-19) : "); // Take index for reading.
        int readingArrayIndex = scanner.nextInt();
        System.out.println(readingArrayIndex+" element is " + elementArray[readingArrayIndex]);
        // Part (e)
        System.out.print("Enter index of array you need to delete (0-19) : "); // Take index for deleting an item.
        int deletingArrayIndex = scanner.nextInt();
        elementArray[deletingArrayIndex] = 0; // For delete the relevant index element that index replace by 0.
        // Part (f)
```



```java
        int deletingArrayIndex = scanner.nextInt();
        elementArray[deletingArrayIndex] = 0; // For delete the relevant index element that index replace by 0.
        // Part (f)
        System.out.print("Enter a new value to insert : "); // Take value for replacing.
        int newElement = scanner.nextInt();
        elementArray[(elementArray.length-1)] = newElement;
        // Part (g)
        int continueLoop = 1;
        while(continueLoop == 1)
        {
            System.out.print("Enter value for searching from array :");
            int searchValue = scanner.nextInt();
            boolean isEqual = false;
            for(int j =0; j < elementArray.length; j++)
            {
                if(elementArray[j] == searchValue)
                {
                    isEqual = true;
                    System.out.println("Index of equal value : "+j);
                }
            }
            if(isEqual == false)
            {
                System.out.println("Your element can not found in array.");
            }
            System.out.println("If you need to compare more press '1' or else press '0'");
            continueLoop = scanner.nextInt();
        }
    }
}
```

```
Enter Number : 21
```

Outputs:-

```
        System.out.print("Enter a new value to insert : "); // Take value for replacing.
        int newElement = scanner.nextInt();
        elementArray[(elementArray.length-1)] = newElement;
        // Part (g)
        int continueLoop = 1;
        while(continueLoop == 1)
        {
            System.out.print("Enter value for searching from array :");
            int searchValue = scanner.nextInt();
            boolean isEqual = false;
            for(int j =0; j < elementArray.length; j++)
```

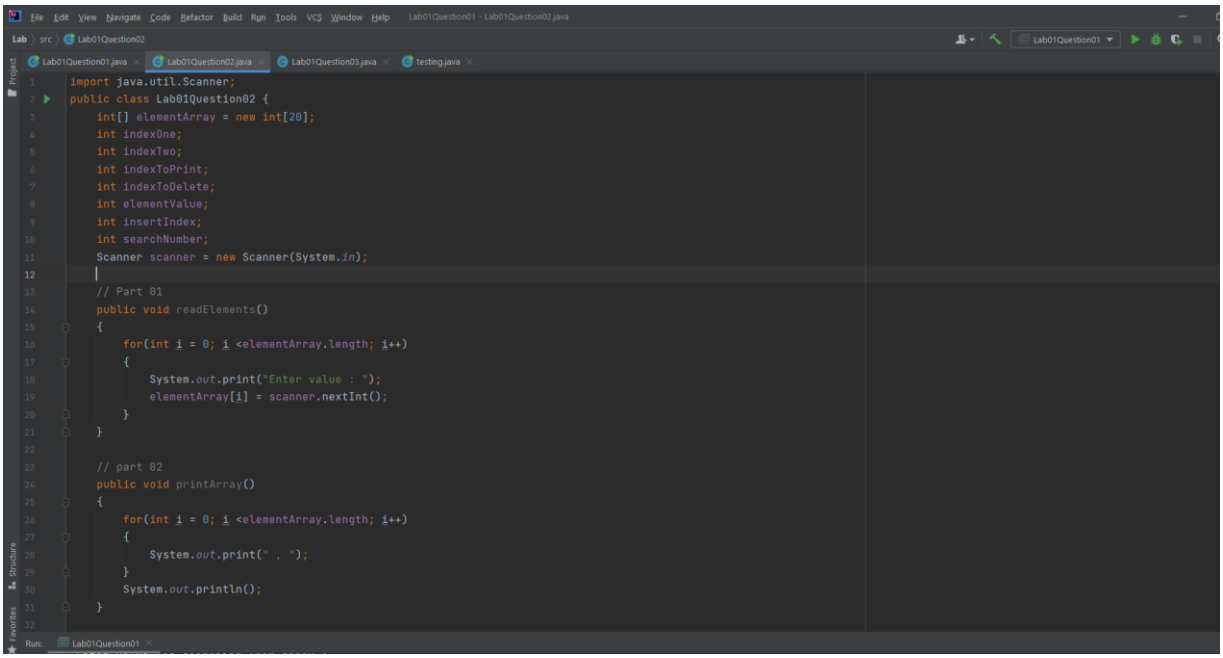
```
Run: Lab01Question01
C:\Users\HIRUSHA\.jdks\openjdk-17.0.2\bin\java.exe "-javaagent:C:\Program Files\JetBrains\Intell
Enter Number : 88
Enter Number : 98
Enter Number : 65
Enter Number : 45
Enter Number : 34
Enter Number : 23
Enter Number : 67
Enter Number : 89
Enter Number : 54
Enter Number : 68
Enter Number : 76
Enter Number : 45
Enter Number : 78
Enter Number : 21
Enter Number : 56
Enter Number : 89
```

```
        elementArray[indexOne] = elementArray[indexTwo]; // Change the elements' values.
        elementArray[indexTwo] = temp;  // Reassign the value in temporary variable.
```

```
Run: Lab01Question01
Enter Number : 89
Enter Number : 66
Enter Number : 54
Enter Number : 27
Enter Number : 59
Enter two index need to interchange (0-19)
First index : 3
Second index : 18
Before interchange : 3 element 65 18 element 27
After interchange : 3 element 27 18 element 65
Enter index of array you need to read (0-19) : 12
12 element is 54
Enter index of array you need to delete (0-19) : 8
Enter a new value to insert : 128
Enter value for searching from array :54
Index of equal value : 12
Index of equal value : 17
If you need to compare more press '1' or else press '0'
1
Enter value for searching from array :789
Your element can not found in array.
If you need to compare more press '1' or else press '0'
0

Process finished with exit code 0
```

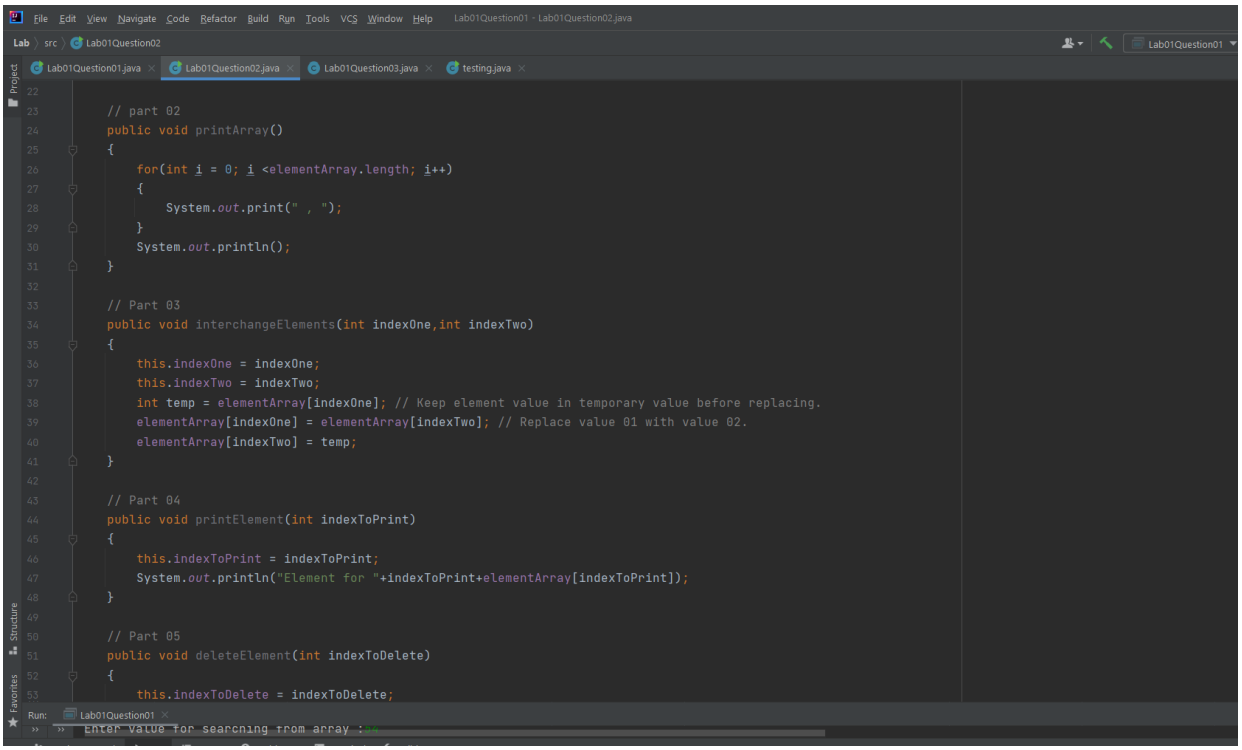
02.



```java
import java.util.Scanner;
public class Lab01Question02 {
    int[] elementArray = new int[20];
    int indexOne;
    int indexTwo;
    int indexToPrint;
    int indexToDelete;
    int elementValue;
    int insertIndex;
    int searchNumber;
    Scanner scanner = new Scanner(System.in);

    // Part 01
    public void readElements()
    {
        for(int i = 0; i <elementArray.length; i++)
        {
            System.out.print("Enter value : ");
            elementArray[i] = scanner.nextInt();
        }
    }

    // part 02
    public void printArray()
    {
        for(int i = 0; i <elementArray.length; i++)
        {
            System.out.print(" , ");
        }
        System.out.println();
    }
```



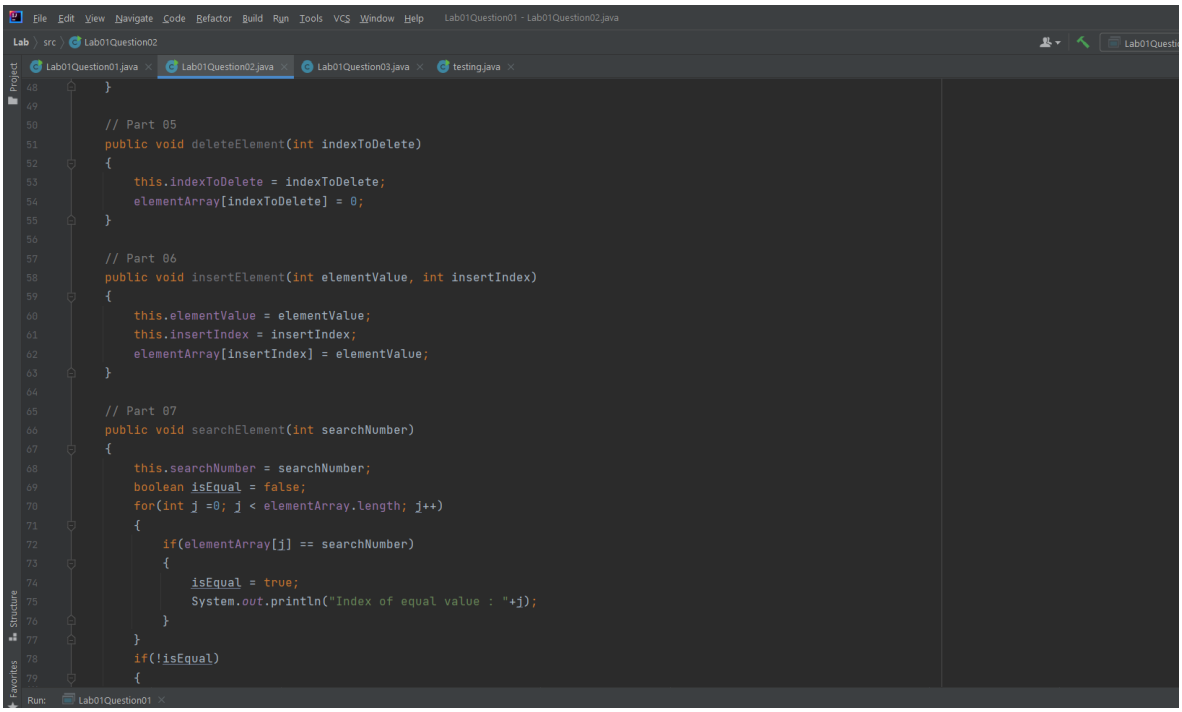
```java
    // part 02
    public void printArray()
    {
        for(int i = 0; i <elementArray.length; i++)
        {
            System.out.print(" , ");
        }
        System.out.println();
    }

    // Part 03
    public void interchangeElements(int indexOne,int indexTwo)
    {
        this.indexOne = indexOne;
        this.indexTwo = indexTwo;
        int temp = elementArray[indexOne]; // Keep element value in temporary value before replacing.
        elementArray[indexOne] = elementArray[indexTwo]; // Replace value 01 with value 02.
        elementArray[indexTwo] = temp;
    }

    // Part 04
    public void printElement(int indexToPrint)
    {
        this.indexToPrint = indexToPrint;
        System.out.println("Element for "+indexToPrint+elementArray[indexToPrint]);
    }

    // Part 05
    public void deleteElement(int indexToDelete)
    {
        this.indexToDelete = indexToDelete;
```

Enter value for searcning from array :

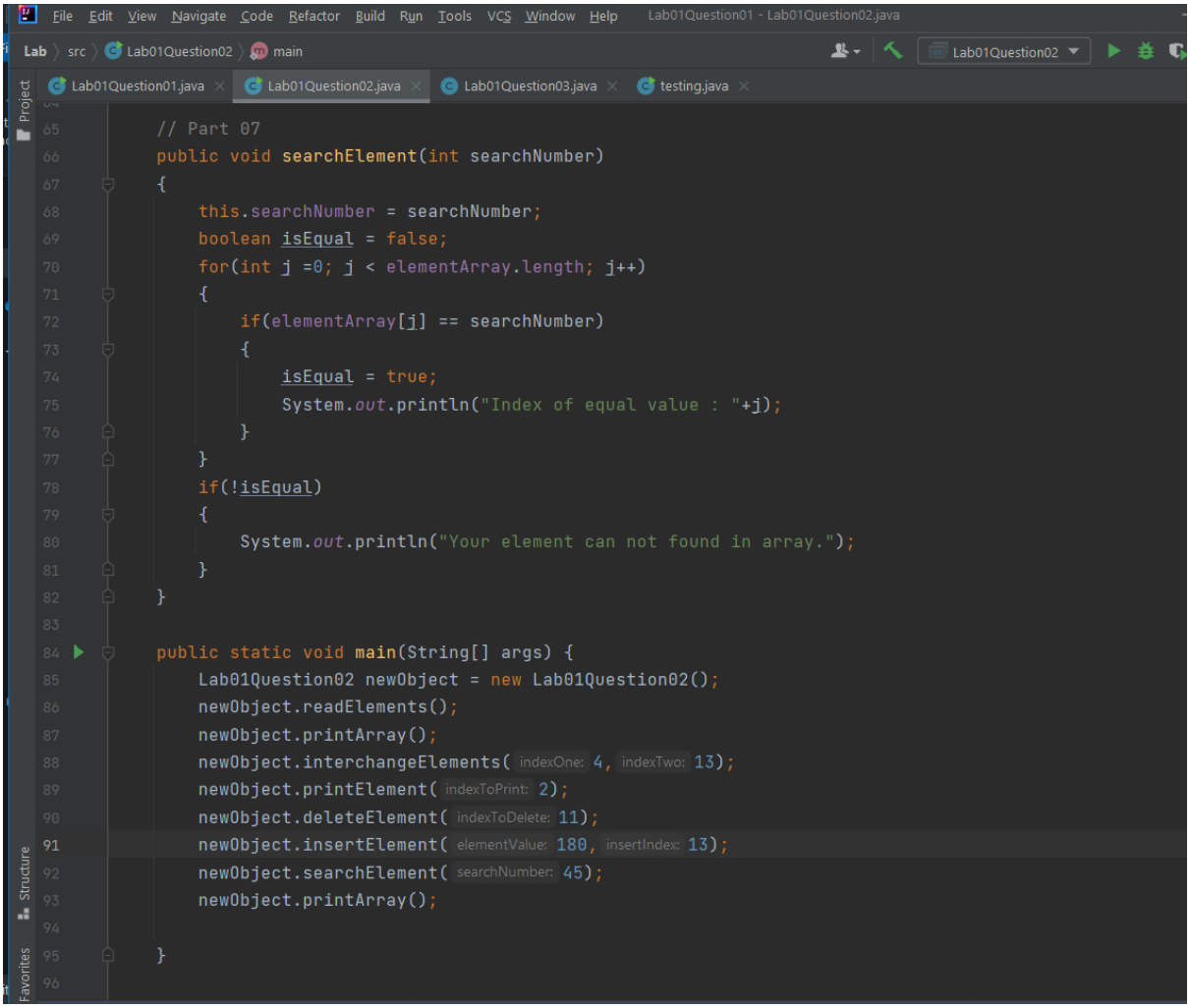


```
    }

    // Part 05
    public void deleteElement(int indexToDelete)
    {
        this.indexToDelete = indexToDelete;
        elementArray[indexToDelete] = 0;
    }

    // Part 06
    public void insertElement(int elementValue, int insertIndex)
    {
        this.elementValue = elementValue;
        this.insertIndex = insertIndex;
        elementArray[insertIndex] = elementValue;
    }

    // Part 07
    public void searchElement(int searchNumber)
    {
        this.searchNumber = searchNumber;
        boolean isEqual = false;
        for(int j =0; j < elementArray.length; j++)
        {
            if(elementArray[j] == searchNumber)
            {
                isEqual = true;
                System.out.println("Index of equal value : "+j);
            }
        }
        if(!isEqual)
        {
```



```
    // Part 07
    public void searchElement(int searchNumber)
    {
        this.searchNumber = searchNumber;
        boolean isEqual = false;
        for(int j =0; j < elementArray.length; j++)
        {
            if(elementArray[j] == searchNumber)
            {
                isEqual = true;
                System.out.println("Index of equal value : "+j);
            }
        }
        if(!isEqual)
        {
            System.out.println("Your element can not found in array.");
        }
    }

    public static void main(String[] args) {
        Lab01Question02 newObject = new Lab01Question02();
        newObject.readElements();
        newObject.printArray();
        newObject.interchangeElements( indexOne: 4, indexTwo: 13);
        newObject.printElement( indexToPrint: 2);
        newObject.deleteElement( indexToDelete: 11);
        newObject.insertElement( elementValue: 180, insertIndex: 13);
        newObject.searchElement( searchNumber: 45);
        newObject.printArray();

    }
```

Output:-

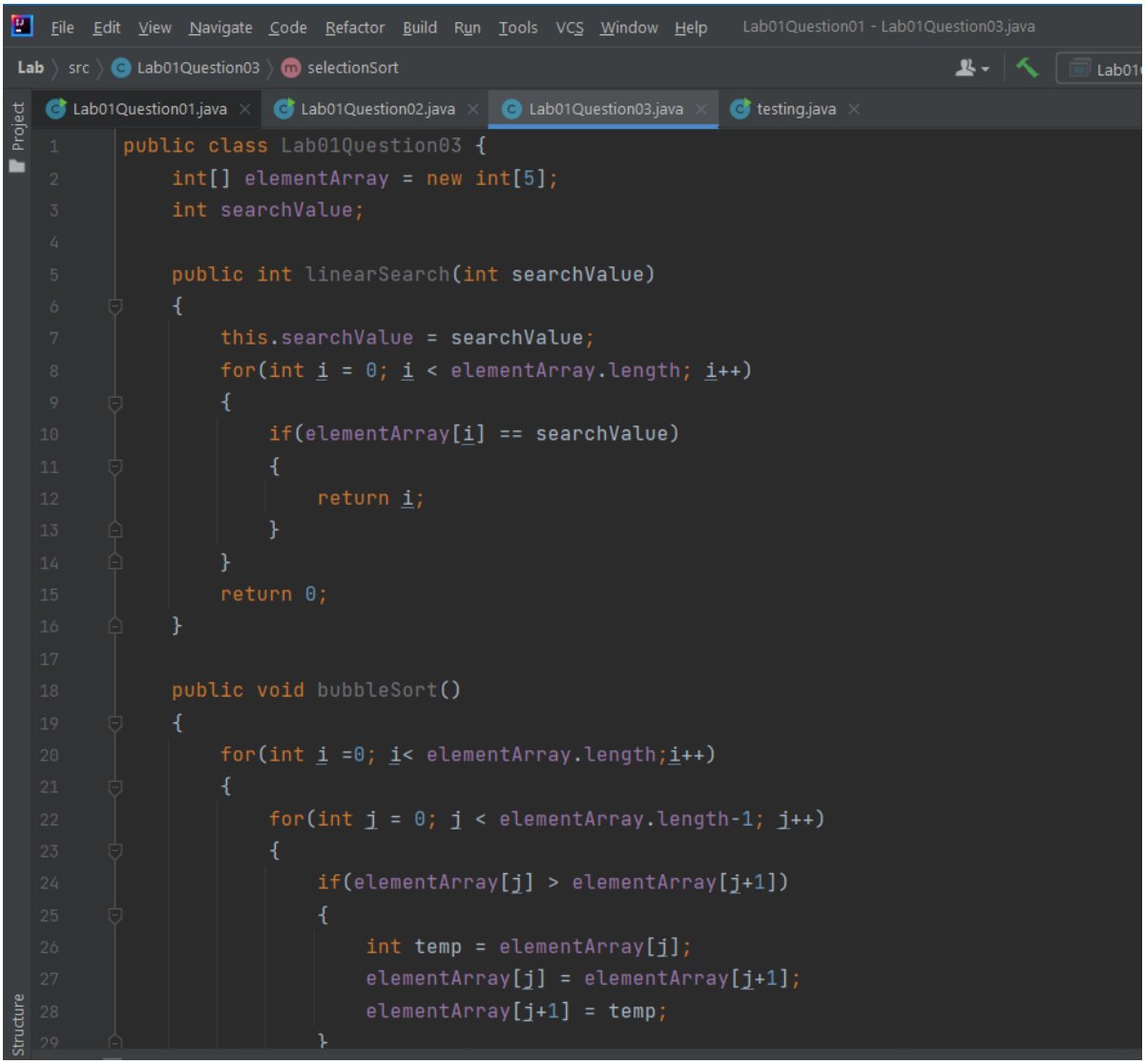
```
        newObject.interchangeElements( indexOne: 4, indexTwo: 13);
        newObject.printElement( indexToPrint: 2);
        newObject.deleteElement( indexToDelete: 11);
        newObject.insertElement( elementValue: 180, insertIndex: 13);
```

Run: Lab01Question02

```
Enter value : 45
Enter value : 78
Enter value : 65
Enter value : 69
Enter value : 90
Enter value : 98
Enter value : 85
Enter value : 37
Enter value : 99
Enter value : 93
Enter value : 78
Enter value : 67
Enter value : 90
Enter value : 15
Enter value : 67
Enter value : 88
Enter value : 35
Enter value : 79
Enter value : 91
Enter value : 34
45 , 78 , 65 , 69 , 90 , 98 , 85 , 37 , 99 , 93 , 78 , 67 , 90 , 15 , 67 , 88 , 35 , 79 , 91 , 34 ,
Element for 2 : 65
Index of equal value : 0
45 , 78 , 65 , 69 , 15 , 98 , 85 , 37 , 99 , 93 , 78 , 0 , 90 , 180 , 67 , 88 , 35 , 79 , 91 , 34 ,

Process finished with exit code 0
```

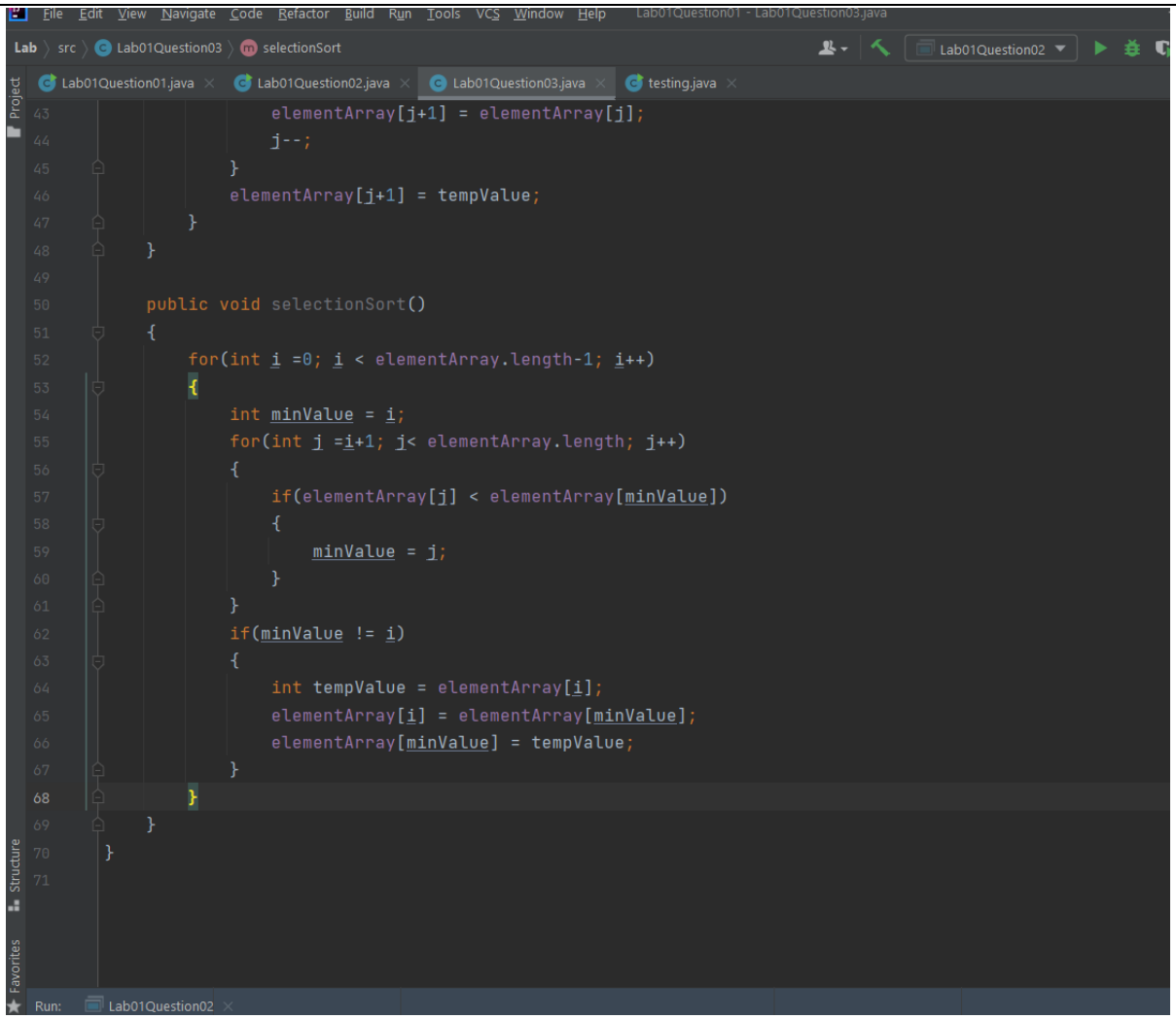
03.




```java
public class Lab01Question03 {
    int[] elementArray = new int[5];
    int searchValue;

    public int linearSearch(int searchValue)
    {
        this.searchValue = searchValue;
        for(int i = 0; i < elementArray.length; i++)
        {
            if(elementArray[i] == searchValue)
            {
                return i;
            }
        }
        return 0;
    }

    public void bubbleSort()
    {
        for(int i =0; i< elementArray.length;i++)
        {
            for(int j = 0; j < elementArray.length-1; j++)
            {
                if(elementArray[j] > elementArray[j+1])
                {
                    int temp = elementArray[j];
                    elementArray[j] = elementArray[j+1];
                    elementArray[j+1] = temp;
                }
```


File Edit View Navigate Code Refactor Build Run Tools VCS Window Help
Lab01Question01 - Lab01Question03.java
Lab > src > Lab01Question03 > selectionSort
Lab01Question02
Lab01Question01.java
Lab01Question02.java
Lab01Question03.java
testing.java
Project
Structure
Favorites
Run:
Lab01Question02
43 elementArray[j+1] = elementArray[j];
44 j--;
45 }
46 elementArray[j+1] = tempValue;
47 }
48 }
49
50 public void selectionSort()
51 {
52 for(int i =0; i < elementArray.length-1; i++)
53 {
54 int minValue = i;
55 for(int j =i+1; j< elementArray.length; j++)
56 {
57 if(elementArray[j] < elementArray[minValue])
58 {
59 minValue = j;
60 }
61 }
62 if(minValue != i)
63 {
64 int tempValue = elementArray[i];
65 elementArray[i] = elementArray[minValue];
66 elementArray[minValue] = tempValue;
67 }
68 }
69 }
70 }
71