

ARRAY AND SEARCHING – LAB 01  
EC 4070  
DATA STRUCTURES AND ALGORITHMS

NAME : WIJAYAWARDHANA W.A.H.A.

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SEMESTER : SEMESTER 04

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01.

Code:-

```
File Edit View Navigate Code Refactor Build Run Tools VCS Window Help Lab01Question01 - Lab01Question01.java
Lab01Question01.java Lab01Question02.java Lab01Question03.java testing.java
1 import java.util.Scanner; // Import scanner library.
2 public class Lab01Question01 {
3     public static void main(String[] args) {
4         Scanner scanner = new Scanner(System.in); // Object of scanner.
5         // Part (a)
6         int[] elementArray = new int[20]; // New array size is 20
7         // Part (b)
8         for (int i = 0; i < elementArray.length; i++) // Read the values.
9         {
10             System.out.print("Enter Number : ");
11             elementArray[i] = scanner.nextInt();
12         }
13
14         // Part (c)
15         System.out.println("Enter two index need to interchange (0-19)");
16         System.out.print("First index : "); // Take the index to change from user.
17         int indexOne = scanner.nextInt();
18         System.out.print("Second index : ");
19         int indexTwo = scanner.nextInt();
20         int temp = elementArray[indexOne]; // Keep the replacing value in temporary variable.
21         elementArray[indexOne] = elementArray[indexTwo]; // Change the elements' values.
22         elementArray[indexTwo] = temp; // Reassign the value in temporary variable.
23
24         // Part (d)
25         System.out.print("Enter index of array you need to read (0-19) : "); // Take index for reading.
26         int readingArrayIndex = scanner.nextInt();
27         System.out.println(readingArrayIndex + " element is " + elementArray[readingArrayIndex]);
28
29         // Part (e)
30         System.out.print("Enter index of array you need to delete (0-19) : "); // Take index for deleting an item.
31         int deletingArrayIndex = scanner.nextInt();
32         elementArray[deletingArrayIndex] = 0; // For delete the relevant index element that index replace by 0.
33         // Part (f)
34     }
35 }
```

```
File Edit View Navigate Code Refactor Build Run Tools VCS Window Help Lab01Question01 - Lab01Question01.java
Lab01Question01.java Lab01Question02.java Lab01Question03.java testing.java
29 int deletingArrayIndex = scanner.nextInt();
30 elementArray[deletingArrayIndex] = 0; // For delete the relevant index element that index replace by 0.
31 // Part (f)
32 System.out.print("Enter a new value to insert : "); // Take value for replacing.
33 int newElement = scanner.nextInt();
34 elementArray[(elementArray.length-1)] = newElement;
35 // Part (g)
36 int continueLoop = 1;
37 while(continueLoop == 1)
38 {
39     System.out.print("Enter value for searching from array :");
40     int searchValue = scanner.nextInt();
41     boolean isEqual = false;
42     for(int j =0; j < elementArray.length; j++)
43     {
44         if(elementArray[j] == searchValue)
45         {
46             isEqual = true;
47             System.out.println("Index of equal value : "+j);
48         }
49     }
50     if(isEqual == false)
51     {
52         System.out.println("Your element can not found in array.");
53     }
54     System.out.println("If you need to compare more press '1' or else press '0'");
55     continueLoop = scanner.nextInt();
56 }
57 }
58 }
```

Run: Enter Number : 0

Build completed successfully in 1 sec. 766 ms (2 minutes ago)

## Outputs:-

```
32      System.out.print("Enter a new value to insert : "); // Take value for replacing.
33      int newElement = scanner.nextInt();
34      elementArray[(elementArray.length-1)] = newElement;
35      // Part (g)
36      int continueLoop = 1;
37      while(continueLoop == 1)
38      {
39          System.out.print("Enter value for searching from array :");
40          int searchValue = scanner.nextInt();
41          boolean isEqual = false;
42          for(int j =0; j < elementArray.length; j++)
43          {
44              if(elementArray[j] == searchValue)
45              {
46                  isEqual = true;
47                  break;
48              }
49          }
50          if(isEqual)
51          {
52              System.out.print("Element found at index : ");
53              for(int k =0; k < elementArray.length; k++)
54              {
55                  if(k == j)
56                  {
57                      System.out.print(k);
58                  }
59                  else
60                  {
61                      System.out.print(", ");
62                  }
63              }
64              System.out.print("\n");
65          }
66          else
67          {
68              System.out.print("Element not found in array.\n");
69          }
70          System.out.print("If you need to compare more press '1' or else press '0'\n");
71          continueLoop = scanner.nextInt();
72      }
73  }
```

Run: Lab01Question01 x

C:\Users\HIRUSHA\.jdk\openjdk-17.0.2\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA\bin\instrumented\idea\_rt.jar=17000:C:\Program Files\JetBrains\IntelliJ IDEA\bin\plugin\idea-plugin.jar" -Dfile.encoding=UTF-8

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 : 84

Version Control Run TODO Problems Terminal Build

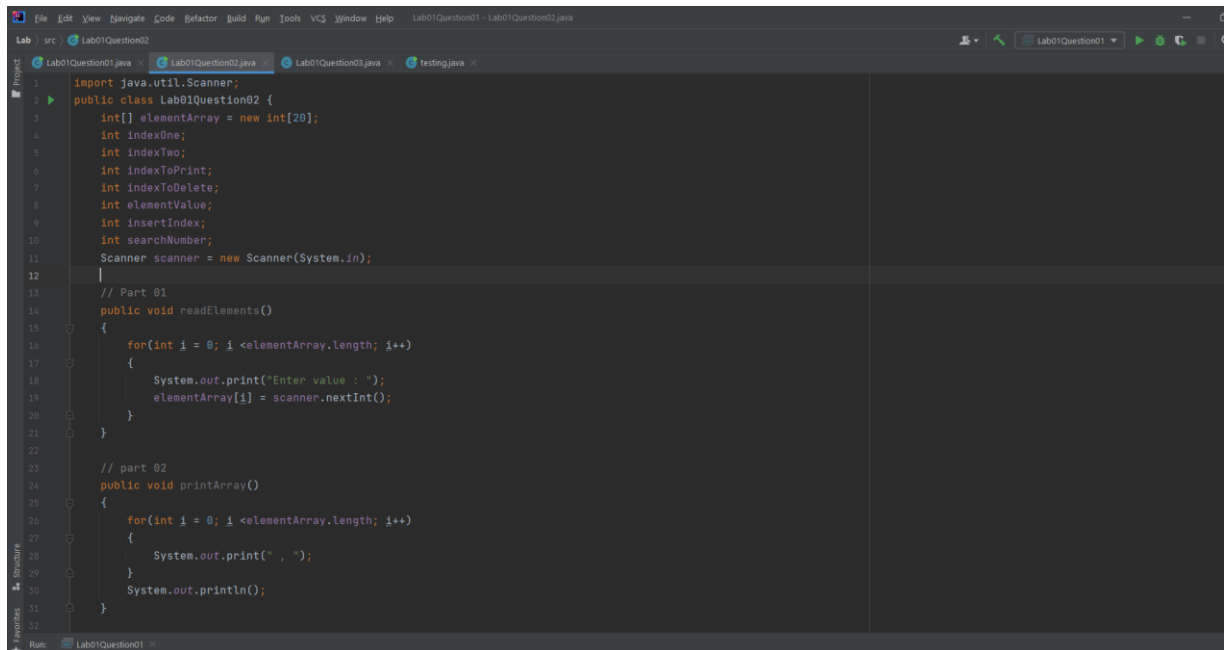
Build completed successfully in 1 sec 766 ms (2 minutes ago)

```
22      elementArray[indexOne] = elementArray[indexTwo]; // Change the elements' values.
23      elementArray[indexTwo] = temp; // Reassign the value in temporary variable.
24  }
```

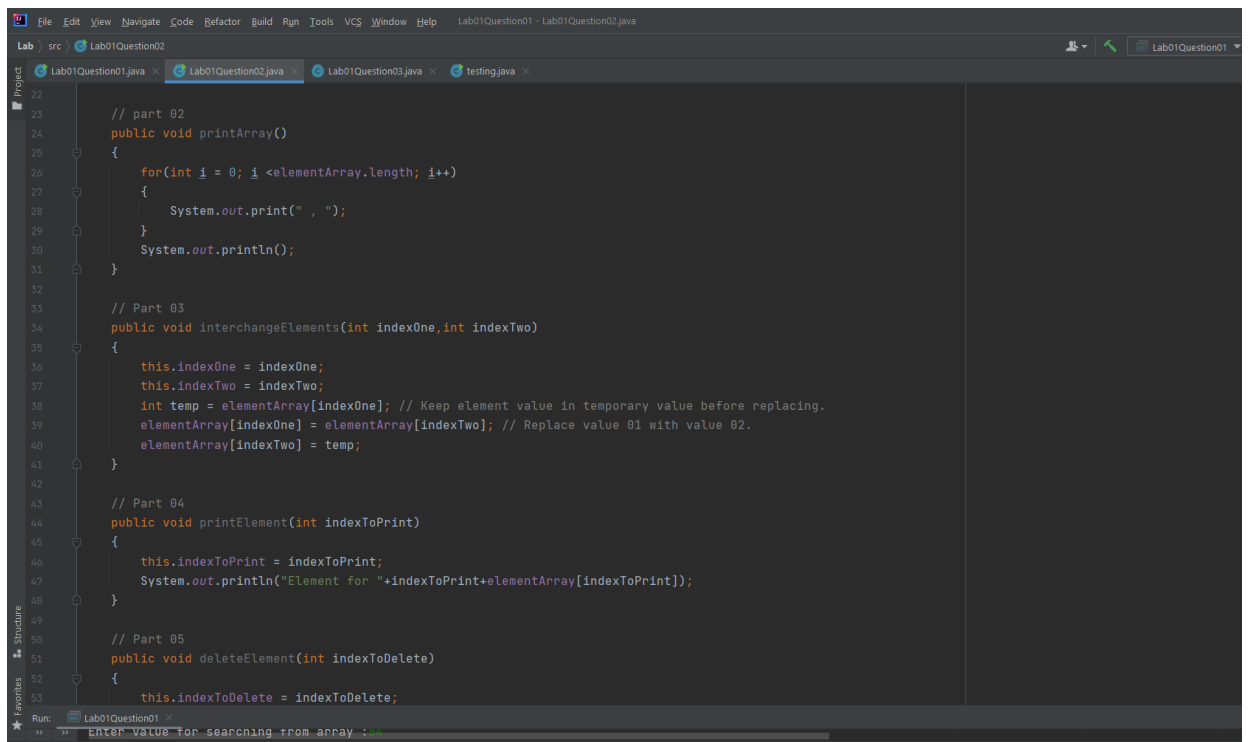
Run: Lab01Question01 x

Enter Number : 89  
Enter Number : 66  
Enter Number : 54  
Enter Number : 27  
Enter Number : 89  
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

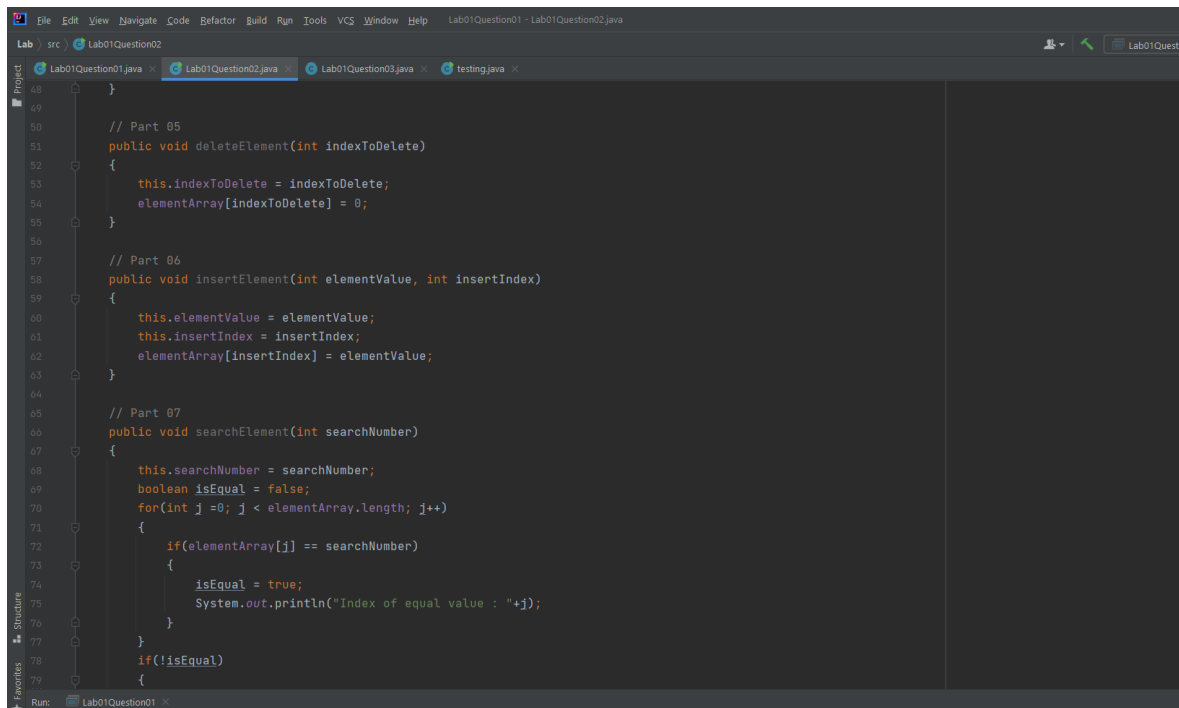
02.



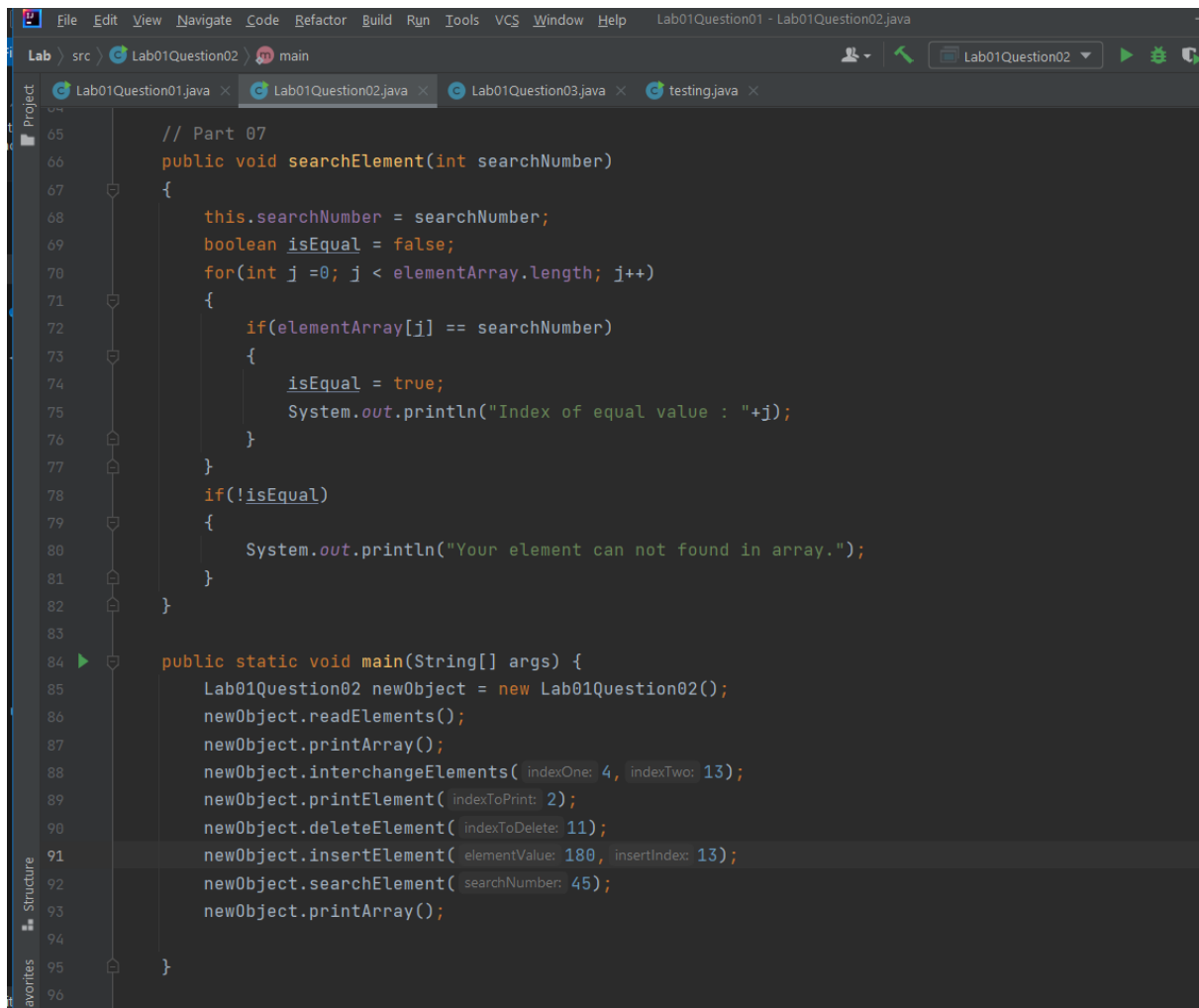
```
1 import java.util.Scanner;
2 public class Lab01Question02 {
3     int[] elementArray = new int[20];
4     int indexOne;
5     int indexTwo;
6     int indexToPrint;
7     int indexToDelete;
8     int elementValue;
9     int insertIndex;
10    int searchNumber;
11    Scanner scanner = new Scanner(System.in);
12
13    // Part 01
14    public void readElements()
15    {
16        for(int i = 0; i < elementArray.length; i++)
17        {
18            System.out.print("Enter value : ");
19            elementArray[i] = scanner.nextInt();
20        }
21    }
22
23    // part 02
24    public void printArray()
25    {
26        for(int i = 0; i < elementArray.length; i++)
27        {
28            System.out.print(" ");
29        }
30        System.out.println();
31    }
32}
```



```
22
23 // part 02
24 public void printArray()
25 {
26     for(int i = 0; i < elementArray.length; i++)
27     {
28         System.out.print(" ");
29     }
30     System.out.println();
31 }
32
33 // Part 03
34 public void interchangeElements(int indexOne,int indexTwo)
35 {
36     this.indexOne = indexOne;
37     this.indexTwo = indexTwo;
38     int temp = elementArray[indexOne]; // Keep element value in temporary value before replacing.
39     elementArray[indexOne] = elementArray[indexTwo]; // Replace value 01 with value 02.
40     elementArray[indexTwo] = temp;
41 }
42
43 // Part 04
44 public void printElement(int indexToPrint)
45 {
46     this.indexToPrint = indexToPrint;
47     System.out.println("Element for "+indexToPrint+elementArray[indexToPrint]);
48 }
49
50 // Part 05
51 public void deleteElement(int indexToDelete)
52 {
53     this.indexToDelete = indexToDelete;
```



```
48 }
49
50 // Part 05
51 public void deleteElement(int indexToDelete)
52 {
53     this.indexToDelete = indexToDelete;
54     elementArray[indexToDelete] = 0;
55 }
56
57 // Part 06
58 public void insertElement(int elementValue, int insertIndex)
59 {
60     this.elementValue = elementValue;
61     this.insertIndex = insertIndex;
62     elementArray[insertIndex] = elementValue;
63 }
64
65 // Part 07
66 public void searchElement(int searchNumber)
67 {
68     this.searchNumber = searchNumber;
69     boolean isEqual = false;
70     for(int j =0; j < elementArray.length; j++)
71     {
72         if(elementArray[j] == searchNumber)
73         {
74             isEqual = true;
75             System.out.println("Index of equal value : "+j);
76         }
77     }
78     if(!isEqual)
79     {
```



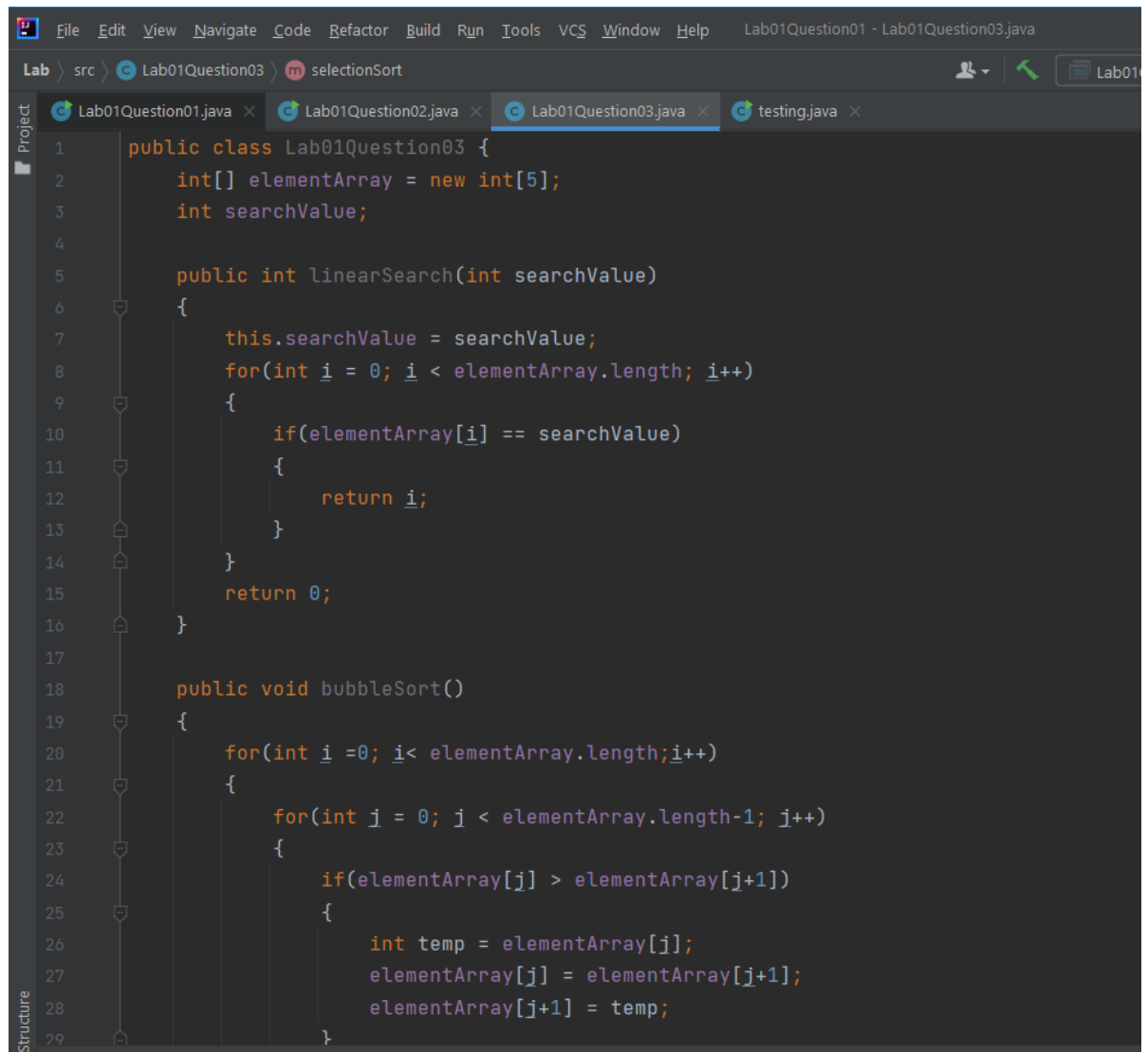
```
65 // Part 07
66 public void searchElement(int searchNumber)
67 {
68     this.searchNumber = searchNumber;
69     boolean isEqual = false;
70     for(int j =0; j < elementArray.length; j++)
71     {
72         if(elementArray[j] == searchNumber)
73         {
74             isEqual = true;
75             System.out.println("Index of equal value : "+j);
76         }
77     }
78     if(!isEqual)
79     {
80         System.out.println("Your element can not found in array.");
81     }
82 }
83
84 public static void main(String[] args) {
85     Lab01Question02 newObject = new Lab01Question02();
86     newObject.readElements();
87     newObject.printArray();
88     newObject.interchangeElements( indexOne: 4, indexTwo: 13);
89     newObject.printElement( indexToDelete: 2);
90     newObject.deleteElement( indexToDelete: 11);
91     newObject.insertElement( elementValue: 180, insertIndex: 13);
92     newObject.searchElement( searchNumber: 45);
93     newObject.printArray();
94 }
95 }
96 }
```

## Output:-

```
88      newObject.interchangeElements( indexOne: 4, indexTwo: 13);
89      newObject.printElement( indexToPrint: 2);
90      newObject.deleteElement( indexToDelete: 11);
91      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.



```
File Edit View Navigate Code Refactor Build Run Tools VCS Window Help Lab01Question01 - Lab01Question03.java
Lab > src > Lab01Question03 > selectionSort
Project
Lab01Question01.java x Lab01Question02.java x Lab01Question03.java x testing.java x
1 public class Lab01Question03 {
2     int[] elementArray = new int[5];
3     int searchValue;
4
5     public int linearSearch(int searchValue)
6     {
7         this.searchValue = searchValue;
8         for(int i = 0; i < elementArray.length; i++)
9         {
10             if(elementArray[i] == searchValue)
11             {
12                 return i;
13             }
14         }
15         return 0;
16     }
17
18     public void bubbleSort()
19     {
20         for(int i = 0; i < elementArray.length; i++)
21         {
22             for(int j = 0; j < elementArray.length-1; j++)
23             {
24                 if(elementArray[j] > elementArray[j+1])
25                 {
26                     int temp = elementArray[j];
27                     elementArray[j] = elementArray[j+1];
28                     elementArray[j+1] = temp;
29                 }
30             }
31         }
32     }
33 }
```

The screenshot shows an IDE window with the following components:

- Menu Bar:** File, Edit, View, Navigate, Code, Refactor, Build, Run, Tools, VCS, Window, Help.
- Tab Bar:** Lab01Question01 - Lab01Question03.java, Lab01Question02, testing.java.
- Project Explorer:** src > Lab01Question03 > selectionSort.
- Code Editor:** Contains the following Java code:

```
43         elementArray[j+1] = elementArray[i];
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 }
```
- Run Bar:** Run: Lab01Question02.