Mohammad Ali Jinnah University

Chartered by Government of Sindh - Recognized by HEC

Lab Assignment 1

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Id: FA19-BSSE-0014

Subject: Data Structures and Algorithms Lab (CS 2511)

Lab Title: Linear Search

Section: AM

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Lab Tasks

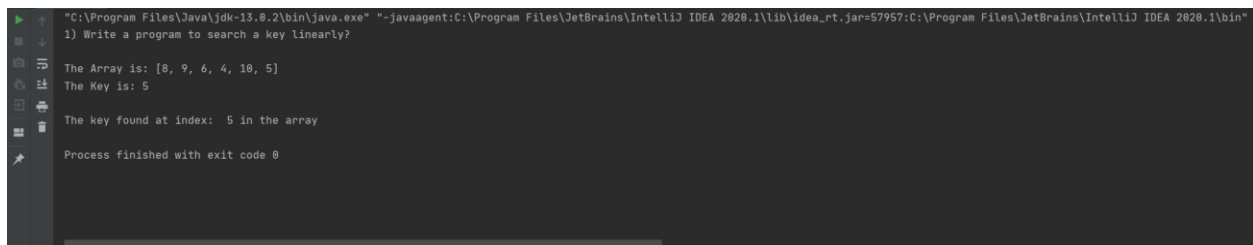1) **Write a program to search a key linearly?**

Code:

```java
import java.util.Arrays;
public class Task1 {
    public static void main(String[] args) {
        System.out.println("1) Write a program to search a key linearly?\n");
        // Varabile
        int Array[] = {8,9,6,4,10,5};
        int key = 5;
        boolean flag = true;
        int i;

        System.out.println("The Array is: "+ Arrays.toString(Array));
        System.out.println("The Key is: "+key+"\n");

        for(i = 0; i< Array.length; i++){
            if(key == Array[i]){
                flag = true;
                break;
            }
        }

        System.out.println("The key"+(!flag ? " not found":" found at index:  "+i)+" in the array");
    }
}
```

Output:

```
"C:\Program Files\Java\jdk-13.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2020.1\lib\idea_rt.jar=57957:C:\Program Files\JetBrains\IntelliJ IDEA 2020.1\bin"
1) Write a program to search a key linearly?

The Array is: [8, 9, 6, 4, 10, 5]
The Key is: 5

The key found at index:  5 in the array

Process finished with exit code 0
```

2) **Write a program to find maximum & minimum number from an array?**

Code:

```java
import java.util.Arrays;
import java.util.Scanner;

public class Ex2 {
    public static void main(String[] args) {
        System.out.println("2) Write a program to find maximum & minimum number from an array ?\n");

        int i;
        int max,min;
        Scanner myObj = new Scanner(System.in);

        System.out.print("Enter the length of the array: ");
        int arrayLength = myObj.nextInt();

        int Array[] = new int[arrayLength];

        for(i = 0; i < arrayLength; i++){
            System.out.print("Enter the value of "+i+" index: ");
            Array[i] = myObj.nextInt();
        }

        System.out.println("\nThe Array is: "+ Arrays.toString(Array));


        max = Array[0];
        min = Array[0];

        for(i = 0; i< arrayLength; i++){
            if(Array[max] < Array[i]){
                max = i;
            }
            else if(Array[min] > Array[i]){
                min = i;
            }
        }

        System.out.println("\nThe max Value is "+Array[max]+" at index: "+max+" in the array");
        System.out.println("The min Value is "+Array[min]+" at index: "+min+" in the array");


    }
}
```

Output:

```
"C:\Program Files\Java\jdk-13.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA
2) Write a program to find maximum & minimum number from an array ?

Enter the length of the array: 5
Enter the value of 0 index: 1
Enter the value of 1 index: 2
Enter the value of 2 index: 3
Enter the value of 3 index: 4
Enter the value of 4 index: 5

The Array is: [1, 2, 3, 4, 5]

The max Value is 5 at index: 4 in the array
The min Value is 1 at index: 0 in the array

Process finished with exit code 0
```

3) Write a program to find the occurrence of the key in the array?

Code:

```java
import java.util.Arrays;
import java.util.Scanner;

public class Task3 {
    public static void main(String[] args) {
        System.out.println("3)\tWrite a program to find the occurrence of the key in the array?\n");

        boolean flag = true;
        int i,count=0;

        Scanner myObj = new Scanner(System.in);

        System.out.print("Enter the length of the array: ");
        int arrayLength = myObj.nextInt();

        int Array[] = new int[arrayLength];

        for(i = 0; i < arrayLength; i++){
            System.out.print("Enter the value of "+i+" index: ");
            Array[i] = myObj.nextInt();
        }

        System.out.print("Enter the value you wants to Search: ");
        int key = myObj.nextInt();

        System.out.println("\nThe Array is: "+ Arrays.toString(Array));

        for(i = 0; i< Array.length; i++){
            if(key == Array[i]){
```

```
            count++;
            flag = true;
        }
    }

    System.out.println("The key "+(!flag ? "not": count+" time ")+"occurrence in the array");


    }
}
```

Output:

```
"C:\Program Files\Java\jdk-13.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA
3)  Write a program to find the occurrence of the key in the array?

Enter the length of the array: 5
Enter the value of 0 index: 1
Enter the value of 1 index: 2
Enter the value of 2 index: 1
Enter the value of 3 index: 3
Enter the value of 4 index: 1
Enter the value you wants to Search: 1

The Array is: [1, 2, 1, 3, 1]
The key 3 time occurrence in the array

Process finished with exit code 0
```

4) Write a program to calculate the sum of the elements on an array?

Code:

```java
import java.util.Scanner;
public class Task4 {
  public static void main(String[] args) {
    System.out.println("4)\tWrite a program to calculate the sum of the elements on an array? \n");
    int i;
    int sum = 0;
    Scanner myObj = new Scanner(System.in);
    System.out.print("Enter the length of the array: ");
    int arrayLength = myObj.nextInt();
    int arr2[] = new int[arrayLength];

    for(i = 0; i<arrayLength;i++){
      System.out.print("Enter the value of "+i+" index: ");
      arr2[i] = myObj.nextInt();
    }

    for(i = 0; i< arrayLength; i++){
      sum += arr2[i];
    }

    System.out.println("The Sum of all the values is "+sum+" in the array");


  }
}
```

Output:

```
"C:\Program Files\Java\jdk-13.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA
4)  Write a program to calculate the sum of the elements on an array?

Enter the length of the array: 5
Enter the value of 0 index: 1
Enter the value of 1 index: 2
Enter the value of 2 index: 3
Enter the value of 3 index: 4
Enter the value of 4 index: 5
The Sum of all the values is 15 in the array

Process finished with exit code 0
```

5) Write a program in which user will input the array and the key for searching?

Code:

```java
import java.util.Arrays;
import java.util.Scanner;

public class Task5 {
    public static void main(String[] args) {
        int i, key;
        boolean flag = false;

        System.out.print("5) Write a program in which user will input the array and the key for searching?\n");

        Scanner myObj = new Scanner(System.in);
        System.out.print("Enter the length of the array: ");
        int arrayLength = myObj.nextInt();
        int Array[] = new int[arrayLength];

        for(i = 0; i<arrayLength;i++){
            System.out.print("Enter the value of "+i+" index: ");
            Array[i] = myObj.nextInt();
        }

        System.out.print("Enter the value you wants to Search: ");
        key = myObj.nextInt();


        System.out.println("\nThe Array is: "+ Arrays.toString(Array));
        System.out.println("Key to found: "+key+"\n");

        for(i = 0; i< arrayLength; i++){
            if(key == Array[i]){
                flag = true;
                break;
            }
        }

        System.out.println("The key"+(!flag ? " not found":" found at index: "+i)+" in the array");

    }
}
```

Output:

```
"C:\Program Files\Java\jdk-13.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA
5) Write a program in which user will input the array and the key for searching?
Enter the length of the array: 5
Enter the value of 0 index: 1
Enter the value of 1 index: 2
Enter the value of 2 index: 3
Enter the value of 3 index: 4
Enter the value of 4 index: 5
Enter the value you wants to Search: 5

The Array is: [1, 2, 3, 4, 5]
Key to found: 5

The key found at index: 4 in the array

Process finished with exit code 0
```