

# CSC111 Lab

## Arrays – Lab I

### ---- Lab 10 ---

An Array (المصفوفة) is a variable that can hold a collection of variables. Instead of declaring many variables with different names you can use an array to contain all those variables. (Like a house with many identical rooms)

In Java, if you want to declare an array you need to decide the type, name, and length or size of the array. For example, an array **arr** with size **n** of integers is declared as follows:

```
int arr[] = new int[n];
```

The length of the array is **n** or **arr.length**. Both are correct. (Note: array length is always an integer)

Array index starts at **zero** (not one). First element of the array **arr** of size **n** is **arr [0]** and Last element is **arr[n-1]**

For example, we will declare arr as an array of integers with 30 elements:

```
int arr[] = new int[30];
```

First element is arr[0]

Second element is arr[1]

.....

.....

Last element is arr[29]

Any element of the array can be assigned a value just like a normal variable. For example to assign element arr[0] the value 209 we write:

```
arr[0] = 209;
```

and if we want to print it we write:

```
System.out.println(arr[0]);
```

## Create a project Lab10.

**Q1)** Write a Java program that will read **n** integers from the user and store them in an array called **arr**. Then do the following:

1. print all the elements of **arr** in the order they were entered.
2. print the elements of the array in reverse.
3. Print the odd numbers only
4. Print the even indices only

Name your class **ReadArray**

### Sample Run:

```
Please enter how many numbers: 7
Please enter the numbers: 2 4 9 2 -4 -12 3
The numbers in order: 2 4 9 2 -4 -12 3
The numbers in reverse: 3 -12 -4 2 9 4 2
The odd numbers only: 9 3
The even indices only: 2 9 -4 3
```

```
import java.util.Scanner;
public class ReadArray {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Please enter how many numbers: ");
        int n = input.nextInt();
        int arr[] = new int[n];
        System.out.print("Please enter the numbers:");

        // Reading
        for (int i=0; i< n; i++)
            arr[i] = input.nextInt();

        // Printing in order
        System.out.print("The numbers in order:");
        for (int i=0 ; i < n; i++)
            System.out.print(arr[i]+" ");

        // Printing in reverse
        System.out.print("The numbers in reverse:");
        for (int i= n-1 ; i>=0 ;i-- )
            System.out.print(arr[i]+" ");

    }
}
```

**Q2)** Write a Java program that will read several integers (not more than a 50 integers) ending with -1. Read and store those numbers in an array **ar**.

After that, you should do the following:

1. Display how many integers were entered (excluding -1)
2. Print all elements of the array in order
3. Print the elements of **ar** in reverse
4. Print the first half of the array. (The first half of the numbers)
5. Add all the integers in the array and display their Average.

Name your class **halfArray**

**Sample Run:**

```
Please enter the integers: 74 3 2 88 -3 -22 8 -1
The number of integers that have been read is 7
The array elements in order: 74 3 2 88 -3 -22 8
The array elements in reverse: 8 -22 -3 88 2 3 74
The first half of array elements: 74 3 2
Average of all numbers: 21.428571428571427
```

**Q3)** Write a Java program that will read several integers from the user ending with -1 and store them in an array **ar** with Max\_Size = 50.

Then, read a number **x** and check if it is in **ar** or not. If it is in the array then print the a message stating that it is in the array and its location, otherwise, print a message stating that its not one of the elements in the array.

Call your class **arraySearch**.

**Sample Run:**

```
Please enter the numbers: 5 99 3 10 8 109 -1
Please enter the search number: 4
Sorry 4 is not in the Array.
```

**Sample Run:**

```
Please enter the numbers: 5 99 3 10 8 109 -1
Please enter the search number: 99
The number 99 is at Index 1
```