

# Introduction to Programming Part 2

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# Arrays

- An array is a group of like-typed variables that are referred to by a common name.
- Array can contains primitives data types as well as objects of a class depending on the definition of array. In case of primitives data types, the actual values are stored in contiguous memory locations.
- In case of objects of a class, the actual objects are stored in heap segment.

40	55	63	17	22	68	89	97	89
0	1	2	3	4	5	6	7	8

<- Array Indices

**Array Length = 9**

**First Index = 0**

**Last Index = 8**

- Arrays are regarded as objects in Java. They are inherited from class Object using the new operator.

- Syntax:

```
elemType[ ] arrayName = new elemType[arraySize]
```

- When an array is created each element of the array is set to the initial value of its type.
- For example:
  - Zero for numeric type
  - False for Boolean type
  - Null for reference type

```
// Java program to illustrate creating an array
// of integers, puts some values in the array,
// and prints each value to standard output.

class GFG
{
    public static void main (String[] args)
    {
        // declares an Array of integers.
        int[] arr;

        // allocating memory for 5 integers.
        arr = new int[5];

        // initialize the first elements of the array
        arr[0] = 10;

        // initialize the second elements of the array
        arr[1] = 20;

        //so on...
        arr[2] = 30;
        arr[3] = 40;
        arr[4] = 50;

        // accessing the elements of the specified array
        for (int i = 0; i < arr.length; i++)
            System.out.println("Element at index " + i +
                               " : "+ arr[i]);
    }
}
```

- Compiler throws **ArrayIndexOutOfBoundsException** to indicate that array has been accessed with an illegal index. The index is either negative or greater than or equal to size of array.

```
class GFG
{
    public static void main (String[] args)
    {
        int[] arr = new int[2];
        arr[0] = 10;
        arr[1] = 20;

        for (int i = 0; i <= arr.length; i++)
            System.out.println(arr[i]);
    }
}
```

Runtime error

```
Exception in thread "main" java.lang.ArrayIndexOutOfBoundsException: 2
    at GFG.main(File.java:12)
```

# References

- <https://www.geeksforgeeks.org/arrays-in-java/>