

Arrays

Java Fundamentals

Libre Education



Arrays

An array is a data structure that can hold multiple values of the same data type. It is therefore considered as a container object.

Declaring An Array

When declaring an array, like any variable the data type has to be specified as well as the maximum number of values that the array can contain.

Syntax

```
1 data_type[] array_name = new data_type[number_of_values];
```

Example

```
1 int[] arr = new int[5]; // An array that can hold 5 int values
```

Indexes

Each position in the array is called an index. Indexes differ from regular counting as they start from 0. So an array that can hold 5 values would have a starting index of 0 and an ending index of 4.

Assigning Values

Assigning values to a specific index

Syntax

```
1 array_name[index] = value;
```

Example

```
1 int[] arr = new int[5];  
2 arr[0] = 4; // Assigning a value to the first (0) index  
3 arr[1] = 8; // Assigning a value to the second (1) index  
4 arr[2] = 7; // Assigning a value to the third (2) index
```

Assigning values at declaration

When assigning values at declaration, the number of values assigned becomes the number of values the array can contain.

Syntax

```
1 data_type[] array_name = {value, value, value};
```

Example

```
1 int[] arr = {4, 8, 7, 2, 3};  
2 // An array that can hold 5 values, with 5 values assigned to each index
```

Accessing Values

To access a specific value in an array, the value is referred to by stating the array name and the index at which the value is located.

Syntax

```
1 array_name[index];
```

Example

```
1 int[] arr = {4, 8, 7, 2, 3};  
2 System.out.println(arr[2]);  
3 // Output: 7
```

Manipulating Arrays

There are many manipulations that can be applied to arrays as well many methods (functions). The following is a list of the most common methods and manipulations made to arrays.

Convert an array to string

```
1 int[] arr = {4, 8, 7};  
2 String stringArr = Arrays.toString(arr);  
3 System.out.println(stringArr);  
4 // Output: [4, 8, 7]
```

Sort in ascending order

```
1 int[] arr = {8, 2, 5, 1};
2 Arrays.sort(arr);
3 System.out.println(Arrays.toString(arr));
4 // Output: [1, 2, 5, 8]
```

Check if an array contains a value

```
1 String[] stringArr = {"a", "b", "c"};
2 boolean containsValue = Arrays.asList(stringArr).contains("a");
3 System.out.println(containsValue);
4 // Output: true
```

Multi-Dimensional Arrays

Multi-dimensional arrays can be considered as an array of arrays where elements can themselves be an array.

Two dimensional arrays

When using two dimensional arrays it can often be easier to think of the array as a grid where the first bracket specifies the row and the second bracket specifies the column thus giving the “coordinates” of a specific value.

Syntax

```
1 data_type [][] array_name = {1D_Array, 1D_Array, 1D_Array};
```

Example

```
1 int[][] twoDimArr = { {7, 4, 1} ,
2                       {2, 5, 9, 3} };
3
4 System.out.println(twoDimArr[1][0]);
5 // Output: 2
6 System.out.println(Arrays.toString(twoDimArr[1]));
7 // Output: [2, 5, 9]
```

Note

Using just one bracket will refer the whole array. E.g. array_name[index]

Other Resources

1. The Java Tutorials (docs.oracle.com/javase/tutorial/java/nutsandbolts/arrays.html)
2. TutorialsPoint (www.tutorialspoint.com/java/java_arrays.htm)
3. Java Programming - WikiBooks (en.wikibooks.org/wiki/Java_Programming/Arrays)
4. Princeton (introcs.cs.princeton.edu/java/14array)
5. ZetCode (zetcode.com/lang/java/arrays)
6. w3Resource (www.w3resource.com/java-tutorial/java-arrays.php)