

Arrays and ArrayLists

Index

An index refers to an element's position within an array.

The index of an array starts from 0 and goes up to one less than the total length of the array.

Arrays

In Java, an array is used to store a list of elements of the same datatype.

Arrays are fixed in size and their elements are ordered.

Array creation in Java

In Java, an array can be created in the following ways:

- Using the `{}` notation, by adding each element all at once.
- Using the `new` keyword, and assigning each position of the array individually.

```
int[] marks = {50, 55, 60, 70, 80};
```

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

```
// Output: 50
```

```
System.out.println(marks[4]);
```

```
// Output: 80
```

```
// Create an array of 5 int elements
```

```
int[] marks = {10, 20, 30, 40, 50};
```

```
int[] age = {20, 21, 30};
```

```
int[] marks = new int[3];
```

```
marks[0] = 50;
```

```
marks[1] = 70;
```

```
marks[2] = 93;
```

Changing an Element Value

To change an element value, select the element via its index and use the assignment operator to set a new value.

Java ArrayList

In Java, an `ArrayList` is used to represent a dynamic list.

While Java arrays are fixed in size (the size cannot be modified), an `ArrayList` allows flexibility by being able to both add and remove elements.

```
int[] nums = {1, 2, 0, 4};  
// Change value at index 2  
nums[2] = 3;
```

```
// import the ArrayList package  
import java.util.ArrayList;  
  
// create an ArrayList called students  
ArrayList<String> students = new ArrayList<String>();
```

Modifying ArrayLists in Java

An `ArrayList` can easily be modified using built in methods.

To add elements to an `ArrayList`, you use the `add()` method. The element that you want to add goes inside of the `()`.

To remove elements from an `ArrayList`, you use the `remove()` method. Inside the `()` you can specify the index of the element that you want to remove.

Alternatively, you can specify directly the element that you want to remove.

```
import java.util.ArrayList;

public class Students {
    public static void main(String[] args) {

        // create an ArrayList called studentList, which
        // initially holds []
        ArrayList<String> studentList = new
        ArrayList<String>();

        // add students to the ArrayList
        studentList.add("John");
        studentList.add("Lily");
        studentList.add("Samantha");
        studentList.add("Tony");

        // remove John from the ArrayList, then Lily
        studentList.remove(0);
        studentList.remove("Lily");

        // studentList now holds [Samantha, Tony]

        System.out.println(studentList);
    }
}
```