codecademy

# 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.

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

System.out.println(marks[0]);
// Output: 50

System.out.println(marks[4]);
// Output: 80
```

## 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.

```
// Create an array of 5 int elements
int[] marks = {10, 20, 30, 40, 50};
```

## 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[] age = {20, 21, 30};

int[] marks = new int[3];
marks[0] = 50;
marks[1] = 70;
marks[2] = 93;
```

## 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.

```
// 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);
  }
}
```