COURSEWARE

ArrayList

Contents

Overview

`ArrayList` is a type of collection in Java.

It is an implementation of the `List` interface, backed by an array (`[]`).

This makes your array *resizeable*, as opposed to just using a standard array (which cannot be resized).

Since `ArrayList` is an implementation of `List`, we should *code to the interface* when initialising one:

▶ ArrayList

ArrayList in action

Let's see how an `ArrayList` works by making one for a list of sandwiches:

▶ Sandwiches

`add()`

Let's add a few elements into our `sandwiches ArrayList`:

▶ ArrayList add()

`get()`

Each element in an `ArrayList` is assigned a unique *index* (starting at `0`) based on its position, much like in a normal array.

We can access an item in the `ArrayList` by using the `get()` method and passing in the *index* of the element:

▶ ArrayList get()

`set()`

We can modify an `ArrayList` element by passing the *index* of the element to the `set()` method, along with whatever we want it to be set to:

▶ ArrayList set()

`remove()`, `size()` and `clear()`

We can remove one element from the `ArrayList` with the `remove()` method (passing in the index of the element), or all of them with the `clear()` method.

We can also count the number of elements in the `ArrayList` with the `size()` module, since they automatically resize (unlike normal arrays):

▶ ArrayList remove(), size() and clear()

Iterate through an `ArrayList`

We can use a *for-loop* to iterate through an `ArrayList`, passing in the `size()` method to specify how many times the loop should run:

▶ ArrayList for-loop

This can also be accomplished with an *enhanced for-loop*:

▶ ArrayList enhanced for-loop

Elements are objects

Elements in an `ArrayList` are actually objects, so if we wanted a list of `int`s, we would need to use the wrapper class `Integer`:

▶ ArrayList objects

Sorting

Since an `ArrayList` is a type of collection, we can use methods from the Java `Collections` class with it, such as the `sort()` method:

▶ ArrayList sorting

Tutorial

There is no tutorial for this module.

Exercises

Try out using `ArrayList` yourself:

- create a new `ArrayList`
- `add()` several elements
- print out the entire `ArrayList`
- iterate through the `ArrayList` and print out each element (with both normal and enhanced for-loops)
- `get()` specific elements
- `set()` different elements
- `remove()` elements
- `sort()` the `ArrayList` (try this with several object types)
- try using the `reverse()`, `swap()` and `clear()` methods.