

M2.1 Generics in Java's Classes

Generic types are useful with collections, which are classes that hold things.

You have probably used the `ArrayList` class, defined in the `java.util` package. This is an example of a collection class. An `ArrayList` is a class that holds other objects. `ArrayList` provides methods that allow you to add and remove elements to and from the collection.

If you use an `ArrayList` object without generics, you can add objects of varying types. For example:

```
ArrayList holdsStuff = new ArrayList();
holdsStuff.add(new String("Hello"));
holdsStuff.add(Integer.valueOf(4));
```

If you use an `ArrayList` like this, you have to *cast* elements when taking them out of the list, since the list can hold any type of object.

```
Integer i = (Integer) holdsStuff.get(1);

// any type of Object could be at position 1, so it must be cast in order t
o be saved in a variable
```

It is almost always more useful to use generics to specify what type of object will belong in an `ArrayList`. For example:

```
ArrayList<String> stringList = new ArrayList<String>();
stringList.add("Hello");
stringList.add("Goodbye");

ArrayList<Integer> numberList = new ArrayList<Integer>();
numberList.add(Integer.valueOf(4));
numberList.add(Integer.valueOf(5));
```

The benefits of using generics in this way are:

- the compiler ensures you do not accidentally add something to the list that's not the type you intended
- when you remove an object from the list, you don't have to cast it- Java already knows its type because you specified that only one type could go in the list (this also ensures you won't accidentally cast an object to the wrong type)
- it more often fits the logical design of the problem- it's rare to want to hold different types of items in the same collection; most often, we are collecting items of all the same type

It is recommended to always use generics in this way with Java's collection classes.

[Go to the Next Page: M2.2 Using Generics in Your Own Classes](https://ccsf.instructure.com/courses/47904/pages/m2-dot-2-using-generics-in-your-own-classes)

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