

## Lab 1 – Generic type, bag ADT

### Aim

Understand java generic type and bag ADT.

### Resources

All Java files you need are found on Learning Mall.

### Tips

Check lecture notes for lecture 4 to understand Bag collection before starting.

### Bag Implementation – convert *IntArrayBag* to *ArrayBag*

At this Lab session, we are going to convert the *IntArrayBag* class to an *ArrayBag* class.

Download ***IntArrayBag.java*** file from Learning Mall. An *IntArrayBag* is a collection of *int* numbers. The same number may appear multiple times in a bag.

Download ***ArrayBag.java*** file from Learning Mall. An *ArrayBag* is a generic collection of references to objects (objects has the same type). The same object may appear multiple times in a bag.

Have a look of the declaration of this class.

```
public class ArrayBag<E> implements Cloneable
```

**Task 1:** We talked about the two constructors in *IntArrayBag* class. In *ArrayBag* class, we will create two constructors as well. Please use the same idea in *IntArrayBag* class, to finish the implementation of the second constructor in *ArrayBag*.

**Task 2:** Implement a *grab()* method in *ArrayBag* class, which takes no parameter, returns a random element from the bag.

Note: make sure you check the condition that the bag is not empty.

**Task 3:** Have a read of *remove()* method in *IntArrayBag*. Implement the same method in *ArrayBag*.

Note: the element can be null. Check the *countOccurrences()* method, use the same idea to deal with null in *remove()* method.

## Test:

Download ***ArrayBagTest.java*** file to test your *grab()* method. The output should be similar like this:

```
run:
Help me write a story.
Please type 4 first names, separated by space. Press the <return> key after the final entry:
Tim James Anna Hannah

Please type 4 adjective that describe a good or bad mood, such as 'happy',, separated by space. Press the <return> key after the final entry:
happy sad blue excited

Please type 4 single word activities such as 'reading',, separated by space. Press the <return> key after the final entry:
cooking reading laughing sleeping

Hannah is laughing and s/he feels happy.
Hannah is sleeping and s/he feels blue.
BUILD SUCCESSFUL (total time: 44 seconds)
```

Use *addMany()* method to add more elements in your bags, test your *remove()* method.

Note: If you cannot finish all the tasks, please do them as homework.