

### Practical Lab Session: Week 4

For this practical lab session, please first ensure you have viewed the **Week 4** video sessions **4.1**, **4.2** and **4.3**. Within these sessions, you should attempt the development exercises presented as **Challenges** during this lab session. Please ensure you complete the set of challenges prior to the next lab session and upload screenshots of your results to the Progress Management section on Blackboard as directed.

#### Session 4.2 Challenge: Adding functionality to the Bag class

- Revisit your `BagInterface` class and add the specification of a new void method `display()` that prints a representation of the Bag content
- Provide an implementation of `display()` in both the `ArrayBag` and `LinkedBag` classes, using a recursive approach for each.
- Test your implementation by modifying the `BagTest` class so that the line of code that prints the contents of the Bag (the first line of the `bagStatusReport()` method) calls the new `display()` method rather than an implicit call to `toString()`
- Run the `BagTest` application twice – once for an instance of `ArrayBag` and once for an instance of `LinkedBag`

Note: an example of the output from the program is provided in the video session.

#### Session 4.3 Challenge: Demonstration of Bad Recursion

- In the Recursion project, add a new class `Fibonacci` in a file `Fibonacci.java`. Implement the method `fibonacci(n)` that takes a single integer parameter and returns the corresponding Fibonacci term, calculated using recursion.
- In `main()`, call the method with `fibonacci(20)`. Now, prove that the number of calls to `fibonacci(n)` for descending values of n to 1 themselves form a Fibonacci sequence, such that...  
`fibonacci(20)` is called **1** time  
`fibonacci(19)` is called **1** time  
`fibonacci(18)` is called **2** times  
`fibonacci(17)` is called **3** times  
`fibonacci(16)` is called **5** times  
`fibonacci(15)` is called **8** times, etc...

Note: an example of the output from the program is provided in the video session.