# Worksheet 5: Generic Stacks

In this worksheet, you are going to introduce generics into the general **Stack** implementations covered in the course so far. Specifically, you will modify your array-based and link-based steack implementations to implement a new genericised Stack interface provided with this worksheet.

You should then test your code by modifying the main methods you wrote on the previous worksheet to use the new genericised version of the stacks.

Main methods should be written in files of the form W5Qx.java where x is the question number. For Q1 and Q2, please submit updated versions of ArrayStack.java and LinkedStack.java.

Submit questions: Q1, Q2, Q5 and Q6

1. Create a class called ArrayStack that implements the new generic Stack interface using an array based approach.

2. Create a class called LinkedStack that implements the new generic Stack interface using a linked-based approach.

3. Write a main method that performs the following operations (use ArrayStack):

   Push(13.2), Push(4.2), Push(3.0), Push(2.6), Pop(), Pop(), Push(1.2), Pop(), Pop(), Push(5.4), Push(6.9)

   After you have performed all these operations add some code that pops the remaining values from the stack and prints out the total.

4. Write a main method that performs the following operations (use LinkedStack):

   Push(2), Pop(), Push(4), Push(3), Pop(), Push(6), Push(12), Pop(), Push(5), Push(9), Pop(), Push(3)

   After you have performed all these operations add some code that pops the remaining values from the stack and prints out the average of the values that were in the stack.

5. Write a method called **reverse()** that uses a stack to reverse a string (HINT: Look at question 3 from worksheet 3). This method should return the reversed string. You can access the individual characters in a string by using the **charAt(i)** method, and you can get the length of a string by using the **length()** method. Test your answer by writing a main program that asks the user to input a string and then print the input string out in reverse.

   Example output:

Input a string: HAPPY
Reverse is: YPPAH

6. In the course notes, you will find a slide on parenthesis matching (Lecture 4). Implement this algorithm. Test your answer on the following string:

   SEQ(PAR(boil kettle, wash cup), add teabag, WAIT({kettle boiled}, add water, add milk)