# Lab 5

## Objectives

- Programming experience using a Stack to solve problems in Java
- Programming experience implementing the Queue data structure

## Part1

In this part of the lab you will use a Stack to solve some problems.

1. Download the files for lab 5 into your Lab5 folder.
2. Compile and run `Lab5Tester.java`. You will see that not all of the tests that use a stack to reverse a string are passing.
3. Implement the method `reverseString` in Lab5Tester according to the documentation provided. Make sure to write additional tests to ensure your implementation is correct. You **MUST** use a stack in your implementation. Solutions that do not use a stack will be given a 0 grade.

   **NOTE:** The String class contains a collection of methods that will be helpful for this lab (in particular `length` and `charAt`) The documentation for the String class can be found at: https://docs.oracle.com/javase/8/docs/api/java/lang/String.html

   The `charAt` method gets a character (returns primitive type `char`) at an index in a String, very similar to how we index into an array to access an element at a specific index.

**CHECKPOINT** – Now might be a good time to check-in with the TA if you are failing any of the `reverseString` tests in `Lab5Tester.java`.

4. Implement the methods `doBracketsMatch` in `Lab5Tester` according to the documentation provided. Make sure to write additional tests to ensure your implementation is correct. You **MUST** use a stack in your implementation. Solutions that do not use a stack will be given a 0 grade.

**CHECKPOINT** – Now might be a good time to check-in with the TA if you are failing any of the `doBracketsMatch` tests in `Lab5Tester.java`.

## Part2

Now you will implement a queue.

1. Complete the implementation of the stubs provided in `QueueRefBased`.java according to the documentation in the Queue interface.
2. Uncomment the call to `testQueue()` in the `Lab5Tester` class. Compile and run `Lab5Tester.java`. Debug your `QueueRefBased` implementation until all tests pass.

**CHECKPOINT – LAB COMPLETE (Make sure to demonstrate your completed lab to the TA)**