Homework Assignment #1

0) Read/review Chapters 1-3 of the textbook. Read Chapter 6 sections 1 and 2.

1) Suppose that you have created an empty stack, call it S, of characters. Suppose you then perform the following operations on S in the order shown.

   Push ‘s’, Push ‘a’, Push ‘d’, Pop and print the character that was popped.
   Push ‘r’, Pop and print.
   Push ‘r’, Pop and print, Pop and print, Pop and print.

List the order in which the characters are printed.

2) Assume that you want to implement the stack ADT by using a linked list of integers. The node structure is partially defined as follows:

   class IntNode {
       private int data;
       private IntNode link;
   }

   The stack pointer has been declared using the statement: IntNode sp;

   a) Write the Java statement(s) needed to push the integer 55 on the stack.

   b) Write the Java statement(s) needed to pop an element off the stack and print it to the terminal. Make sure to check to see if the stack is empty.

3) Do exercise R-6.1 on page 252 of the textbook.

4) If we implemented the stack from Problem (3) with an array, what is the current value of the stack pointer if the problem started with array position 0?

5) Suppose we perform the following operations, in the order listed, on an initially empty queue, Q.

   Insert an object A into Q; Insert an object B into Q, Remove an object from Q and print.
   Insert an object C into Q; Insert an object D into Q, Remove an object from Q and print.
   Remove an object from Q and print; Remove an object from Q and print.
   Remove an object from Q and print.

   In what order will the objects be printed?
6) Do exercise R-6.7 on page 252 of the textbook.

**Submission information:**

This assignment is due at the start of class on Wednesday, September 2\textsuperscript{nd}. Submission to Canvas required.