CIS2168 006 Assignment 4
Stack of integers Using Linked List

1. Objectives

This assignment will help you to:

- Learn how to program using the linked list data structure
- Understand how linked lists work
- Learn how to program using the stack data structure
- Understand how stacks work

2. Overview

You write a Java application simulating collections of simple integers in **`int`** type. You will use singly linked lists to store the **`int`** values. But the manner in which these values are inserted, deleted, and accessed is the same as a stack data structure. You must revise the class StackIntLinked I gave you as required such that it is a fully functional Stack for only `int` values. You must also write another class StackIntLinkedTest that uses the class StackIntLinked and completes a number of stack operations.

3. Implementation Requirements

- When you revise StackIntLinked class, you **cannot change the definition** of the nested class Node.
    - This requirement means that you **cannot use Java generics** in your StackIntLinked class.
- Your revised StackIntLinked class must use a single linked list to store all **`int`** values.
- The class StackIntLinkedTest must present to the user a text-based menu, which includes these operations
    - Create an empty stack
    - Insert an **`int`** value to the stack
    - Remove the top stack element from the stack
    - View the top **`int`** value without removing the top element
    - Check if the stack is empty
    - Get the total number of **`int`** values in the stack
    - Display all elements in the stack, either in the order from top to bottom or from bottom to the top.
        - Your program must inform the user where is the top or bottom of the stack.
        - Your program must separate adjacent numbers using something such as blanks when displaying the numbers.
    - Quit from the program
- Your revised StackIntLinked class must have methods that support all the operations that the class StackIntLinkedTest can perform.

4. Major Steps

a. Understand the related classes I gave you in previous lectures.
    i. SimpleLinkedList.java, SimpleLinkedListTest.java
    ii. LinkedStack.java
b. Revise the class StackIntLinked. Add necessary data fields and methods.
c. Write the class StackIntLinkedTest.
    i. First use fixed values
    ii. Then add the menu

5. Detailed Hints

- Make sure that you add the data fields and the following methods to the class StackIntLinked:
    - push(…), pop(), peek(), empty()
    - howMany(): get the number of elements in the stack
- Make sure that you have the following in your class StackIntLinkedTest
    - A switch statement for handling the text-based menu options.
    - Create an object of the class StackIntLinked
    - Call different methods in the class StackIntLinked for different operations
- You can implement displaying all elements in the stack as this:
    - Add a toString() method in your StackIntLinked class.

6. Submission Requirements & Grading

This assignment is **due by 11:50PM, Thursday, October 1, 2015**.

Please see the file CIS2168 006 Assign4 Submission Requirements.pdf for more details.