Tutorial 4: Stack Application

Overview

- The goal of this tutorial is to familiarise yourself with the functionality of the abstract data type: stack
- First, we will develop a program that implements the functionality of a stack
- Then, we will extend the application to include a nice GUI that allows us to do push and pop operations on the stack as well as to display the content of the stack at any moment.

Tasks

1. **Develop the NetBeans project that demonstrates the functionality of the stack (look into the Stack lecture notes regarding the steps to be followed).**
   - **StackInterface.java**
   - **StackTester.java**
   - **MyStack.java**

2. **Complete main() method from StackTester.java to test the stack behaviour. Use print statements to show the stack is working correctly as follows:**
   - Create a MyStack type object representing a stack
   - Check if stack is empty
   - push some items into the stack (String type)
   - check if the stack is empty now
   - Pop some items + print them out
   - check if the stack is empty now
   - Fully empty the stack (pop any remaining items)
   - Pop an empty stack to see what happens

3. **Write the following <u>new</u> methods to the MyStack class that will extend the functions provided by our stack**
   - **emptyStack()** – removes ALL items that exist in the stack. Use pop() to remove one item at a time.
   - **displayStack()** – lists the content of the stack by parsing the arraylist. Returns a string with all the items from the stack.

<u>Note</u>: The headers of the methods emptyStack() and displayStack() need to be added to the StackInterface class

4. **Add new statements to the main() method from the StackTester class to test the functionality of the** emptyStack() and displayStack() **methods.**

5. **What changes in the Java code should be done if we want to store Integer type objects instead of String type objects, in our stack?**

Extra Homework

6. **Design a GUI class for our stack application. The GUI should consists of:**
   - an input area (JTextField) that allows the user to add an item to the stack
   - a Push button that adds the item into the stack
   - a Pop button that removes the top item from the stack
   - a listing area (JTextArea) where the current content of the stack is displayed
   - a Stack Display button that prints all the items from the stack
   - an Empty Stack button that empties the stack

   NOTE: Look at the tutorial + notes on NetBeans GUI

7. **Add functionalities to all buttons from the GUI and test your application**