Lab 03

Stack, Arithmetic Expression Evaluation & Undo/Redo

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1. **Introduction:**

   In this lab, you will apply Stack on solving the problem of evaluating arithmetic expressions and undo/redo operation

2. **Objectives**

   - Know how, in reality, to use the data structure Stack for solving real problem.

3. **Problem statement:**

   - ***Problem 1:*** **Simple stack application**

   Write a program to

   i. Convert a decimal number and convert it to octal form.
   ii. Concatenate two stacks
   iii. Determine if the contents of one stack are identical to that of another

   - ***Problem 2:*** **Arithmetic Expression Evaluation**

   Given a string containing an infix-form arithmetic expression which contains

   - Single digit number (i.e. from 0 to 9)
   - Operators such as +, -, *, /
   - Parentheses.

   Write a program to evaluate and display on screen result of the expression.

   Instruction for Problem 2: (Follow instructions step-by-step)

   - Re-create, re-compile and re-run Java projects (postfix, infix).
   - Extend the program by allowing multiple digit numbers in expressions such as 123+56*78-1. You need to extract the token before determining what type it belongs to. For example you need to treat 123 as a single token but not 3 tokens (1, 2, and 3). *Hints*: just use a loop.
   - Extend the program by allowing not only constant numbers but also variables. You may ask user input variables' values when evaluating expression. You should start with a simple solution first, although it's not good. Don't try a highly complicated solution immediately.

4. **Undo and redo**

   Write a class SpecialArray that has

   - an array of 20 random values
   - a function to update the value at a position in the array.
   - a function to undo the updating
   - a function to redo the updating
   - a function to display content of the array

   Hint: use two stacks to store the array after each operation