Lab 03

Stack & Arithmetic Expression Evaluation

Revised by Tran Thanh Tung

1. **Introduction:**

    In this lab, you will apply Stack on solving the problem of evaluating arithmetic expressions.

2. **Objectives**

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

    b. Gain knowledge about string processing.

3. **Problem statement:**

    a. *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

    b. *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.

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

    a. Re-create, re-compile and re-run Java projects (postfix, infix).

    b. 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.

    c. 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.