Data Structure Assignment 1 – Infix/Postfix Expressions

Task 1: (I/O: 25 points, coding style: 5 points)

Please write a program to check whether the parenthesis of input strings is valid or not, where "0" is invalid and "1" is valid. All of the input data will be in infix expressions. You have to read the keyboard input till the end of the file (**Hint: while(scanf("%s", input)!=EOF) {}**), and the program must be implemented by stack, or you will get zero points.

Example:

input	output
((a+b)*(c/d))*(e-f)	1
(-a/c)*(d+e*(f/d+a)-b*(a/c)/(a+b+c)+a	0

Note: You must use C as your programming language. You should also have some comments and define the methods/functions below: "struct Stack", "createS()", "isFull()", "push()", "isEmpty()", "pop()". As mentioned above, they are related to your coding style points.

Task 2: (I/O: 35 points, coding style: 5 points)

Please write a program to convert infix expressions to postfix expressions, and calculate the values by postfix expressions. All of the input data will be in infix expressions, integers are between -9 and 9, and all of the operators include "+", "-", "*", "/", "(", and ")". You have to read the keyboard input till the end of the file (**Hint: while(scanf("%s", input)!=EOF) {}**), and round the results to the nearest full number (四捨五入取到整數位) . The program must be implemented by stack, or you will get zero points. [In our rule, -0.5≃-1]

Example:

input	output
3*2+7/(5*3)	32*753*/+ 6
5+(6/2-3)*2-9/3	562/3-2*+93/- 2
(9-2*3)-((1+8)*(9/5))	923*-18+95/*- -13

Note: In addition to the note stated above, you should add the functions: "toPostifx()", "calPostifx()".

Put the files below in the **folder** (folder name: studentID), and compress this **folder** as **"studentID.zip"**

1. Two source code files (filename: studentID_1.c, studentID_2.c)

2. One **report** with your coding environment (OS, IDE, …), problems you encountered, and references. (filename: studentID.pdf) **(20 points)**

All the file names are correct, or you'll get zero points. **(10 points)**

Deadline: 2018/10/16 23:59. **You must hand in the assignment on time, or you will get zero points**.

Warning: We encourage you to discuss assignments with each other. However, you have the responsibility to finish the assignments individually. Do not copy others' assignment, or you will get zero points.