Department of Computer Science

COMP2421 - Data Structures and Algorithms
(First Semester – Fall 2023/2024)

Project#1 Due Date: 20 December 2023 (by mid-night)

In this project, you will implement an expression tree to evaluate given binary arithmetic expressions. Your program must read expressions from a file containing a single equation on each line. The equations are written as infix expressions. For each line the program should print the value resulting from evaluating the expression. Your program should support the following operations: + - * / % ( ). White spaces or special characters are ignored.

Example input:

```
3+5*(10-2)
1+1+1+1*8
100/3/2
100%3
```

In this case, the output should contain the following:

```
43
11
16
1
```

You should use an array implementation of your Stack library that you will use in this work.

Your application should be able to show the following information through a proper menu of the application:

1. Read equations
2. Print equations
3. Evaluate using Expression tree
4. Print postfix expressions

5. Save to output file (postfix and results)
6. Exit

The deadline of this assignment will be on **December 20th, 2023. LATE SUBMISSIONS** will not be accepted for any reason. Please make sure that your application is running properly on your laptop before the discussion. Project discussions will be decided later.

Grading policy:

1. Your application should have all functionalities working properly. **Twenty** marks will be graded for the functionality of the project;
2. The following notes will make up the remaining 10 marks of the grade:
    a. There has to be adequate documentation and comments in the code (i.e., functions, loops, etc.);
    b. Your code should follow the code convention (i.e., spaces, indentations, etc.); and
    c. Your application should contain a menu to allow the user to select which option (s) he would like to run.

Notes and submission instructions:

1. **This is individual work**. It should represent your own efforts. It is fine to discuss your work and to ask your colleagues, but you are not allowed to copy/paste the work of others or give your work to anyone else. You are not allowed to post/copy from other websites and/or social media and this will be considered as cheating.
2. Any **plagiarized** code will not be marked and will end up in a zero grade.
3. You are responsible for the submitted code.
4. **Document format**. Please submit only the code file (**c** file) containing the code of your project. Please rename it as follows: "**P2_YourStudentID_FirstNameLastName_SectionNo.c**".
5. **Input/output file name**. Make sure that the input/output file names are the same as in the specifications.
6. Include your full name, student ID, and section number in the beginning of your file.

7. Please do not compress the file, only the C-file is needed.
8. Files not following the convention in point 2 will not be marked.

Good luck!