



Department of Computer Science
COMP2421 (Second Semester – Spring 2022/2023)
Project#2 Due Date: 28 May 2023 (before midnight-by 23:59)

In this assignment you have to implement a **calculator** system that reads a number of equations from an input file to be evaluated. The file will contain an unspecified number of equations written in infix form. Your program should be able to read all equations in the file.

Example of input file:

$2 + (14 - 9) + 4 * [6 + (7 + 5) - 1]$

$2 + (14 - 9) + 4 [6 + (8 + 5) - 1]$

$2 + (14 - 9) + 4 * [6 + (7 + 5 - 1)]$

$2 + (5 - 3)$

Your application should be able to perform the following tasks:

1. **Read** the file containing the equations. The user should provide the name of the input file.
2. Check the validity of equations (either **valid or not**). The output of this option is as follows:
 - a. Equation No. 1 \rightarrow valid
 - b. Equation No. 2 \rightarrow invalid: there is no operator between 4[6
 - c. Equation No. 3 \rightarrow invalid: (is not closed
 - d. Equation No. 4 \rightarrow valid
3. Convert valid equations from **infix to prefix** and print the prefix expressions.
4. **Evaluate the prefix** expressions and print the results of each equation on a separate line:
 - a. Equation No. 1 \rightarrow 75
 - b. Equation No. 4 \rightarrow 4
5. **Print invalid** equations. This option should print all invalid equations from the input file.

6. Print all equations to a file (**output.txt**) indicating for each input equation if it is valid or not and if valid, print out the prefix expression and its result.
7. Exit.

Grading policy and general notes on the project:

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).

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.
3. **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"**.
4. **Input/output file name.** Make sure that the input/output file names are the same as in the specifications.
5. Include your full name, student ID, and section number in the beginning of your file.
6. Please do not compress the file, only the C-file is needed.
7. Files not following the naming convention in point 3 will not be marked.