DCSCI/CSC 2720: Data Structures
Lab 8

Instructor: Shiraj Pokharel

Due : 48 hours after release
Late Submission deadline (with 25% penalty) 24 hours after due date

Answer the below questions. You must submit your responses as a SINGLE Jupyter Notebook, where each program is put in separate Jupyter Notebook cells within that SINGLE Jupyter Notebook. Do NOT submit Colab links. Failure to comply with this simple requirement will result in a score of Zero. Please, be careful not to be assigned a Zero score this way.

Few Rules to be followed, else will receive a score of ZERO

(1) Your submissions will work exactly as required.

(2) Your files shall not be incomplete or worse corrupted such that the file does not compile at all. Make sure you submit a file that compiles.

(3) Your submission will show an output. Should you recive a Zero for no output shown do not bother to email me with "but the logic is perfect" !

Note that your program's output must **exactly** match the specs(design , style) given here for each problem to pass the instructor's test cases .
Design refers to how well your code is written (i.e. is it clear, efficient, and elegant), while *Style* refers to the readability of your code (commented, correct indentation, good variable names).

This week we will explore on ways to design a simple calculator that simplifies calculations and returns an answer to the expression.

Below is how the expression is represented. This expression is also known as an "post-fix" **string** expression

3 5 + 1 -

Please remember, there are space(s) between operands/operators in the expression. So your solution needs to think of this aspect.

You will solve the problem as stated below:-

(1) [100 points]
Design a simple calculator that helps you solve the expression given. To solve the problem a Stack will help - for which - You can use the collections.deque data structure provided in Python.
"Deques are a generalization of stacks and queues (the name is pronounced "deck" and is short for "double-ended queue")"
URL reference here:
https://docs.python.org/3/library/collections.html#collections.deque

Please be reminded that you need to design the calculator and not use in-built math methods from the programming language library to solve the expression. Doing So would lead to a straight score of Zero ! Also at the end of the program as a comment mention the time and space complexity of your solution. Time and space complexity is worth 15 points each !

Very Very Important :

(1) Your code should be well commented which explains all the steps you are performing to solve the problem. A submission without code comments will immediately be deducted 15 points !

(2) As a comment in your code, please write your test-cases on how you would test your solution assumptions and hence your code.
A submission without test cases (as comments) will immediately be deducted 15 points ! Please Remember : Although, written as comments - You will address your test cases in the form of code and not prose :)