

CSE 3302: Programming Languages

Spring 2020

Lab 05 – RPN Calculator using Python

100 points

Due on 4/23/2019 [before 11:59 pm]

INSTRUCTIONS

1. Do NOT plagiarize.
2. No group work. All work should be your own.
3. Do not discuss your work with other students in the class.
4. You CANNOT borrow code from online sources.
5. Turn in your program using Canvas. Do not email your program to the TA or the instructor.
6. Name your document as [netid]_LAB5.py where netid is your UTA netid. If you do not know your netid, check what it is using NetID Self Service. Your 1000 number is NOT your netid. If your file name is wrong, your assignment may not be graded.
7. All code should be your own. You may not copy code from the slides, book, others, or the internet unless specified. You are not allowed to use in-built functions other than the ones taught in class for functional programming.
8. There is a 5% bonus available for turning in the assignment 2 days early.
9. Write an explanation of your code for each line using comments. If the explanation is not clear, you will NOT receive full credit.
10. The code should have you name, 1000 number, the date you turn in your assignment, and OS used as the first 4 lines in order.
11. It is suggested to use Python 3.6.2. You can download it for free at python.org. Please let the GTA know BEFOREHAND if you are using a different version.
12. You can only use os package. No other packages are allowed
13. Input is RPN
14. Output is the calculated result of the expression

Use Python to create a simple calculator that accepts Reverse Polish Notation (RPN) and displays the final answer (Intermediate steps or results need not be displayed). It only accepts 4 operators +, -, *, /. You should convert the algebraic notation to RPN before using it as input to your program. The input will be provided in a text file called input_RPN.txt. There will be one RPN expression in each line. Your code should be able to read in the file and print the result for each RPN in a new line.

Example of RPN: - If you want to compute the answer for the algebraic notation $4 + 2$, your RPN will be `4 2 +` and your output should be 6. This is a simple expression. More complex algebraic notations will be used to test your program like the one below.

Example algebraic notation: $(4 + 2 * 5) / (1 + 3 * 2)$

Translated into RPN: `4 2 5 * + 1 3 2 * + /`

Extra credit (10 points)

- A) Your code will take in an algebraic expression and convert it to RPN and evaluate the RPN. Print the RPN and the result in separate lines. If you are implementing extra credit, your file should be name as `netid_EC.py`. The input file name will be `input_RPN_EC.txt` and it will have algebraic expressions.
- B) Add more operators (unary subtraction, or modulo division, etc.). You must document what operators you are adding. Add which ones to comments and make sure to include that as well in your submission so the GTA knows to test using the extra scenarios.

Note: - Your code should be able to read the input file from the same folder (which has your .py file). Do not hard code the path to the file in your laptop/desktop. Use `os` to get the path and read the input file. Also, please take special care to process the line-ending character correctly; for example, if you write the program on a Mac it should work correctly when graded using Windows and vice versa.