In the name of god

University of Isfahan

Faculty of Computer Engineering

Calculator project

Data Structure - Dr. Fatemi

Autumn 2023

Topic: Stack

Project goals:

- Work with stack data structures
- Getting to know infix and suffix expressions

Project description:

In this project, we are going to simulate the performance of a calculator. Operationaddition, subtraction,

Multiplication, division, power and parenthesesmust be implemented.

Be careful that the input numbers can be of the type decimal and negative, and your program should

support checker and negative numbers.

Given that the calculator must also support parentheses of expressions, calculate the parentheses and precedence of expressions with the help of the data stack structure.

You have to implement the data stack building class yourself and using ready-made classes is not allowed!

If the input expression is correct in terms of mathematical logic, your calculator should calculate the output according to the priority of mathematical operations.

Tip: One of the ways to calculate expressions is to convert them into postfix form.

Input:

A mathematical expression consists of rational numbers, parentheses and desired operators, which are given as a string.

Output:

An expression that is the result of the given mathematical expressions or an error message if there is an error.

Example 1:
Input:

(1+3) * 2^2

Output:
16

Example 2:
Input:

(2.3+3.7)^(4/2)

Output:
36

Example 3:
Input:

(5*2)+

Output:
Error

The cause of the error is the existence of an operator without an operand.

Example 4:
Input:

)(3+9+7)*3

Output:
Error

The cause of the error is the presence of the wrong parentheses at the beginning of the statement.

Example 5:
Input:

(17+6)*(2)/0

Output:
Error

The cause of the error is division by zero.

Privileged items:

- Adding engineering calculator operators and entering math functions will add extra points to your project.
- Identifying the cause of the error in the event of an error will include additional points for your project.

How to send:

First, upload your code and files in the form of a Zip file in the exercise defined in Quera, then upload your entire code in the form of a file in the second exercise to make sure it compiles.

Additional notes:

- The project must be implemented by a single person.
- Clean code is mandatory, and if you do not implement the principles, 30% of your grade will be deducted.
- Your final score will be determined in the presentation, and if you do not participate in the presentation, your score will be zero.
- If you were not able to fully answer the questions during the delivery for any reason, in addition to the project score, your practice score will be revised.