January 2021 CSE204: Data Structures and Algorithms I Sessional

Offline on Stack and Queue

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1. Problem Description: Weight 70%
   You are given an input arithmetic expression which contains the following operators "+, -.*, /" and operands. It has parenthesis '()' as well. Pls. note that "–" can be used as either unary or binary operator. For example, (-3), (4-1) both are valid. Check whether the input expression is valid. If it is valid evaluate the expression also. If it is not valid print that 'Not valid'. (You can go for integer operands. But, decimal number can be used as operand also.) (Hints- Use stack.)

   Sample Input 1:
   (9*3-(7*8+((-4)/2)))

   Sample Output 1: Valid expression, Computed value: -27

   Sample Input 2:
   (9*3-(7*8+((-4/2)))

   Sample Output 2: Not valid.
   [Because, (-4 needs to be closed with ')"]

   Sample Input 2:
   (9*3-(7*8+((4/2)))

   Sample Output 2: Not valid
   [Because there is a missing parenthesis]

2. Problem Description: Weight 30%
   Given a string **String_old** denoting a stream of lowercase alphabets. You have to make new string **String_new**. **String_new** is formed such that we have to find first non-repeating character each time a character is inserted to the stream and append it at the end to **String_new**. If no non-repeating character is found then append **'#'** at the end of **String_new.** (Hints- Use queue.)

   Sample Input: String_old = "abcabc"

   Sample Output:
   String_new = "aaabc#"

Special Instructions:

Write ***readable, re-usable, well-structured, quality*** code. This includes but is not limited to writing appropriate functions for implementation of the required algorithms, meaningful naming of the variables, suitable comments where required, proper indentation etc.

Please **DO NOT COPY** solutions from anywhere (your friends, seniors, internet etc.). Any form of plagiarism (irrespective of source or destination), will result in getting -100% marks in the offline. Also, be informed that for repeated offence of plagiarism, the departmental policies suggest stricter measures.

Submission Guideline:

1. Create a directory with your 7 digit student id as its name
2. Put the source files only into the directory created in step 1
3. Zip the directory (compress in .zip format; .rar, .7z or any other format is not acceptable)
4. Upload the .zip file on Moodle.

For example, if your student id is 1805xxx, create a directory named 1805xxx. Put only your source files(.c, .cpp, .java, .h, etc.) into 1805xxx. Compress 1805xxx into 1805xxx.zip and upload the 1805xxx.zip on Moodle.

Failure to follow the above-mentioned submission guideline may result in upto 10% penalty.

Submission Deadline: March 26, 2021 11:55 PM