Lab Assignment 8

CS 301 – Data Structures

Problem 1

You are given a string `str` (represented as `char`-array) with different types of parentheses, namely '`(`', '`)`', '`{`', '`}`', '`[`', and '`]`'. Implement a linear time algorithm that uses a stack to determine if `str` represents a string with proper nesting of parentheses. For example, "`([]{})`" should return `true`, and "`([)]`" should return false.

Problem 2

You are given two strings S and T (represented as `char`-array). They can contain letters ('`a`' to '`z`') and the symbol '`#`'. Both represent inputs into an empty text editor where '`#`' represents a backspace. Implement an algorithm that determines, in linear time, if S and T result in equal strings when both are typed into empty text editors. For example, if $S =$ `ab#c` and $T =$ `ad#c`, your algorithm should return `true`, and if $S =$ `a#c` and $T =$ `b`, your algorithm should return `false`.

Implementation

You are given a file *Lab8.java* (which you can download from canvas). The file contains a class `Lab8` with the two functions `problem1` and `problem2`. Implement your solutions in the corresponding functions. **Do not make any changes outside of these two functions (e. g. by adding helper functions); such changes will be undone.** Do not output anything to the terminal.

The program already implemented in the file *Lab8.java* randomly generates test cases. This file contains a small number of test cases. The seed of the random number generator is set to ensure the same test cases whenever to program is executed. Note that the purpose of the tests is for you to avoid major mistakes. **Passing all given tests *does not* imply that your algorithm is correct, especially that is has the expected runtime.**

Submission

For your submission, upload the file *Lab8.java* with your implementation to canvas.

This is an individual assignment. Therefore, a submission is required from each student.