DSA Tutorial

Stacks

20-27 January 2025

Theory

Discuss the *LIFO* property of `Stacks` and different ADT methods along with their time complexity :

- `push`
- `pop`
- `top` / `peek`

Implementation

- Make sure that the students can understand `Stack` as a linked list of integers.
- How to reduce the time complexity of calculating stack size from $O(n)$ to $O(1)$? A possible solution : Create a *struct*, with members `stack` and `size`, have the original linked list's head stored in `stack` and update the `size` variable when performing `push` or `pop`.

Questions

Valid Parenthesis

Given a string s containing just the bracket characters, determine if the input string is valid.

More information : Leetcode

Expression Evaluation

You are given an array of strings tokens that represents an arithmetic expression in Reverse Polish Notation. More information : Leetcode

Ideally, spend 15 minutes discussing the theory. Then discuss both the problems and their pseudo code (10 minutes they can think, explain the idea and pseudo code in 10 minutes for each problem), otherwise, if possible, discuss just the ideas and the reasoning behind using stacks (We can work with just the three operations that stacks have).