

Stacks-3

Assignment Questions



1. Baseball game. [Leetcode 682]

You are keeping the scores for a baseball game with strange rules. At the beginning of the game, you start with an empty record.

You are given a list of strings operations, where operations[i] is the ith operation you must apply to the record and is one of the following:

An integer x.

Record a new score of x.

'+'.

Record a new score that is the sum of the previous two scores.

'D'.

Record a new score that is the double of the previous score.

'C'.

Invalidate the previous score, removing it from the record.

Return the sum of all the scores on the record after applying all the operations.

The test cases are generated such that the answer and all intermediate calculations fit in a 32-bit integer and that all operations are valid.

Example 1:

Input: ops = ["5", "2", "C", "D", "+"]

Output: 30

Explanation:

"5" - Add 5 to the record, record is now [5].

"2" - Add 2 to the record, record is now [5, 2].

"C" - Invalidate and remove the previous score, record is now [5].

"D" - Add $2 * 5 = 10$ to the record, record is now [5, 10].

"+" - Add $5 + 10 = 15$ to the record, record is now [5, 10, 15].

The total sum is $5 + 10 + 15 = 30$.

Example 2:

Input: ops = ["5", "-2", "4", "C", "D", "9", "+", "+"]

Output: 27

Explanation:

"5" - Add 5 to the record, record is now [5].

"-2" - Add -2 to the record, record is now [5, -2].

"4" - Add 4 to the record, record is now [5, -2, 4].

"C" - Invalidate and remove the previous score, record is now [5, -2].

"D" - Add $2 * -2 = -4$ to the record, record is now [5, -2, -4].

"9" - Add 9 to the record, record is now [5, -2, -4, 9].

"+" - Add $-4 + 9 = 5$ to the record, record is now [5, -2, -4, 9, 5].
 "+" - Add $9 + 5 = 14$ to the record, record is now [5, -2, -4, 9, 5, 14].
 The total sum is $5 + -2 + -4 + 9 + 5 + 14 = 27$.

Example 3:

Input: ops = ["I", "C"]

Output: 0

Explanation:

"I" - Add 1 to the record, record is now [1].
 "C" - Invalidate and remove the previous score, record is now [].
 Since the record is empty, the total sum is 0.

Constraints:

$1 \leq \text{operations.length} \leq 1000$

operations[i] is "C", "D", "+", or a string representing an integer in the range $[-3 * 10^4, 3 * 10^4]$.

For operation "+", there will always be at least two previous scores on the record.

For operations "C" and "D", there will always be at least one previous score on the record.

2. Remove nodes from a linked list. [Leetcode 2487]

You are given the head of a linked list.

Remove every node which has a node with a greater value anywhere to the right side of it.

Return the head of the modified linked list.

Example 1:

Input: head = [5,2,13,3,8]

Output: [13,8]

Explanation: The nodes that should be removed are 5, 2 and 3.

- Node 13 is to the right of node 5.
- Node 13 is to the right of node 2.
- Node 8 is to the right of node 3.

Example 2:

Input: head = [1,1,1,1]

Output: [1,1,1,1]

Explanation: Every node has value 1, so no nodes are removed.

Constraints:

The number of the nodes in the given list is in the range [1, 105].

$1 \leq \text{Node.val} \leq 105$

3. Maximal rectangle. [Leetcode 85]

Given a rows x cols binary matrix filled with 0's and 1's, find the largest rectangle containing only 1's and return its area.

Example 1:

Input: matrix = [[“1”, “0”, “1”, “0”, “0”], [“1”, “0”, “1”, “1”, “1”], [“1”, “1”, “1”, “1”, “1”], [“1”, “0”, “0”, “1”, “0”]]

Output: 6

Explanation: The maximal rectangle is shown in the above picture.

Example 2:

Input: matrix = [[“0”]]

Output: 0

Example 3:

Input: matrix = [[“1”]]

Output: 1