1628. Design an Expression Tree With Evaluate Function Premium

Medium | Topics | Companies | Hint

Given the `postfix` tokens of an arithmetic expression, build and return *the binary expression tree that represents this expression.*

Postfix notation is a notation for writing arithmetic expressions in which the operands (numbers) appear before their operators. For example, the postfix tokens of the expression `4*(5-(7+2))` are represented in the array `postfix = ["4","5","7","2","+","-","*"]`.

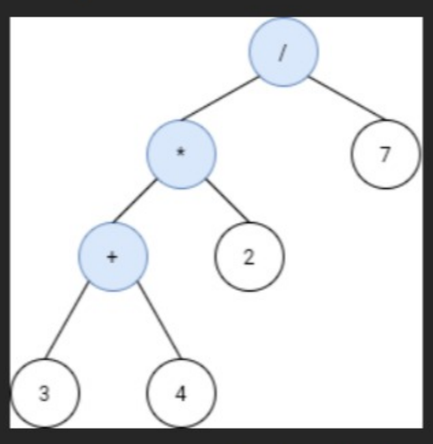
The class `Node` is an interface you should use to implement the binary expression tree. The returned tree will be tested using the `evaluate` function, which is supposed to evaluate the tree's value. You should not remove the `Node` class; however, you can modify it as you wish, and you can define other classes to implement it if needed.

A **binary expression tree** is a kind of binary tree used to represent arithmetic expressions. Each node of a binary expression tree has either zero or two children. Leaf nodes (nodes with 0 children) correspond to operands (numbers), and internal nodes (nodes with two children) correspond to the operators `'+'` (addition), `'-'` (subtraction), `'*'` (multiplication), and `'/'` (division).

It's guaranteed that no subtree will yield a value that exceeds 10^9 in absolute value, and all the operations are valid (i.e., no division by zero).

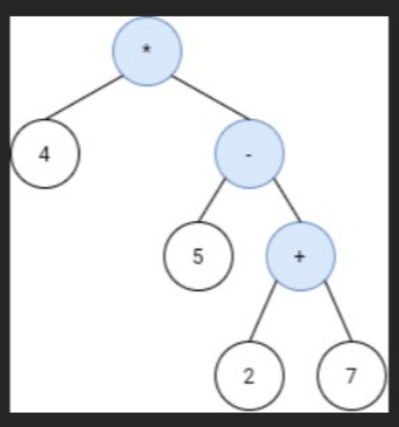
Follow up: Could you design the expression tree such that it is more modular? For example, is your design able to support additional operators without making changes to your existing `evaluate` implementation?

Example 1:




```
Input: s = ["3","4","+","2","*","7","/"]
Output: 2
Explanation: this expression evaluates to the above binary tree with expression ((3+4)*2)/7) = 14/7 = 2.
```

Example 2:




```
Input: s = ["4","5","2","7","+","-","*"]
Output: -16
Explanation: this expression evaluates to the above binary tree with expression 4*(5-(2+7)) = 4*(-4) = -16.
```

Constraints:

- `1 <= s.length < 100`
- `s.length` is odd.
- `s` consists of numbers and the characters `'+'`, `'-'`, `'*'`, and `'/'`.
- If `s[i]` is a number, its integer representation is no more than 10^5.
- It is guaranteed that `s` is a valid expression.
- The absolute value of the result and intermediate values will not exceed 10^9.
- It is guaranteed that no expression will include division by zero.

Seen this question in a real interview before? 1/5

Yes No

Accepted 27.2K | Submissions 33K | Acceptance Rate 82.4%

Topics

Array Math Stack Tree Design Binary Tree

Companies

0 - 6 months

Amazon 2

Hint 1

Apply the concept of Polymorphism to get a good design

Hint 2

Implement the Node class using NumericNode and OperatorNode classes.

Hint 3

NumericNode only maintains the value and evaluate returns this value.

Hint 4

OperatorNode Maintains the left and right nodes representing the left and right operands, and the evaluate function applies the operator to them.

Similar Questions

Minimum Flips in Binary Tree to Get Result	Hard
Evaluate Boolean Binary Tree	Easy

Discussion (5)