Problem 2019: The Score of Students Solving Math Expression

Problem Information

Difficulty: Hard
Acceptance Rate: 33.70%
Paid Only: No
Tags: Array, Hash Table, Math, String, Dynamic Programming, Stack, Memoization

Problem Description

You are given a string `s` that contains digits `0-9`, addition symbols `'+'`, and multiplication symbols `'*'` **only** , representing a **valid** math expression of **single digit numbers** (e.g., `3+5*2`). This expression was given to `n` elementary school students. The students were instructed to get the answer of the expression by following this **order of operations** :

1. Compute **multiplication** , reading from **left to right** ; Then, 2. Compute **addition** , reading from **left to right**.

You are given an integer array `answers` of length `n`, which are the submitted answers of the students in no particular order. You are asked to grade the `answers`, by following these **rules** :

* If an answer **equals** the correct answer of the expression, this student will be rewarded `5` points; * Otherwise, if the answer **could be interpreted** as if the student applied the operators **in the wrong order** but had **correct arithmetic** , this student will be rewarded `2` points; * Otherwise, this student will be rewarded `0` points.

Return _the sum of the points of the students_.

Example 1:

Input: s = "7+3*1*2", answers = [20,13,42] **Output:** 7 **Explanation:** As illustrated above, the correct answer of the expression is 13, therefore one student is rewarded 5 points:

[20,_**13**_ ,42] A student might have applied the operators in this wrong order: ((7+3)*1)*2 = 20. Therefore one student is rewarded 2 points: [_**20**_ ,13,42] The points for the students are: [2,5,0]. The sum of the points is 2+5+0=7.

Example 2:

Input: s = "3+5*2", answers = [13,0,10,13,13,16,16] **Output:** 19 **Explanation:** The correct answer of the expression is 13, therefore three students are rewarded 5 points each: [**_13_** ,0,10,**_13_** ,**_13_** ,16,16] A student might have applied the operators in this wrong order: ((3+5)*2 = 16. Therefore two students are rewarded 2 points: [13,0,10,13,13,**_16_** ,**_16_**] The points for the students are: [5,0,0,5,5,2,2]. The sum of the points is 5+0+0+5+5+2+2=19.

Example 3:

Input: s = "6+0*1", answers = [12,9,6,4,8,6] **Output:** 10 **Explanation:** The correct answer of the expression is 6. If a student had incorrectly done (6+0)*1, the answer would also be 6. By the rules of grading, the students will still be rewarded 5 points (as they got the correct answer), not 2 points. The points for the students are: [0,0,5,0,0,5]. The sum of the points is 10.

Constraints:

* `3 <= s.length <= 31` * `s` represents a valid expression that contains only digits `0-9`, `'+'`, and `'*'` only. * All the integer operands in the expression are in the **inclusive** range `[0, 9]`. * `1 <=` The count of all operators (`'+'` and `'*'`) in the math expression `<= 15` * Test data are generated such that the correct answer of the expression is in the range of `[0, 1000]`. * Test data are generated such that value never exceeds 109 in intermediate steps of multiplication. * `n == answers.length` * `1 <= n <= 104` * `0 <= answers[i] <= 1000`

Code Snippets

C++:

```
class Solution {
public:
int scoreOfStudents(string s, vector<int>& answers) {

}
};
```

Java:

```
class Solution {
public int scoreOfStudents(String s, int[] answers) {

}
}
```

Python3:

```
class Solution:
def scoreOfStudents(self, s: str, answers: List[int]) -> int:
```