

## Problem I. Best parentheses

- Time Limit: 2 sec

### Problem Statement

A string consisting only of parentheses '(' and ')' is called *balanced* if it satisfies one of the following conditions.

- It is an empty string.
- It is a concatenation of two non-empty balanced strings.
- It is a concatenation of '(',  $a$ , and ')', for some balanced string  $a$ .

You are given  $n$  characters  $s_1, \dots, s_n$  of parentheses and  $n$  integers  $c_1, \dots, c_n$ . Then, you have to choose zero or more integers  $t_1, \dots, t_k$  so that they satisfy the following conditions.

- $1 \leq t_1 < t_2 < t_3 < \dots < t_k \leq n$ .
- The concatenation of  $s_{t_1}, s_{t_2}, \dots, s_{t_k}$  is a balanced string.

Note that the above conditions are always satisfied if you choose zero integers.

Your task is to maximize  $\sum_{i=1}^k c_{t_i}$ .

### Input

The input consists of a single test case of the following format.

```
 $n$   
 $s_1 s_2 \dots s_n$   
 $c_1 c_2 \dots c_n$ 
```

The first line consists of an integer  $n$  ( $1 \leq n \leq 300,000$ ). The second line consists of  $n$  characters  $s_1 s_2 \dots s_n$ , each of which is either '(' or ')'. The third line consists of  $n$  integers  $c_1 c_2 \dots c_n$  ( $|c_i| \leq 10^9$ ).

### Output

Output in a line the maximum possible value of  $\sum_{i=1}^k c_{t_i}$  by choosing zero or more integers  $t_1, \dots, t_k$ .

Sample Input 1	Sample Output 1
5 ( ) ( ( ) 3 -9 -2 1 0	3
Sample Input 2	Sample Output 2
6 ) ( ) ( ) ( ) -3 1 -4 1 -5 9	0