I. Best parentheses

Problem ID: I

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

- $1 \leq t_1 < t_2 < t_3 < \cdots < t_k \leq n$
- The concatenation of $s_{t_1}, s_{t_2}, \ldots, s_{t_k}$ 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
$s_1 s_2 \cdots s_n$
$c_1\ c_2\ \cdots\ c_n$

The first line consists of an integer n. The second line consists of n characters $s_1 s_2 \cdots s_n$, each of which is either '`(` or '`)`'. The third line consists of n integers $c_1\ c_2\ \cdots\ c_n$.

- $1 \leq n \leq 3 \times 10^5$
- $s_i \in \{$ `(` , `)` $\}$
- $|c_i| \leq 10^9$

Output

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

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