Problem M
Deformed Balance
Time limit: 2 seconds

In this problem, a concatenation of two strings T and U is denoted by $T + U$.

A string consisting only of parentheses (opening parentheses '`(`' or closing parentheses '`)`') is *balanced* if and only if it is one of the following.

- An empty string.
- The concatenation of two non-empty balanced strings.
- The concatenation "`(`" $+ T +$ "`)`", where T is a balanced string.

For example, "`()`" and "`(()())`" are balanced, while "`()(`" and "`(((`" are not.

A string is *deformed* if and only if it is one of the following.

- The string "`)`".
- The concatenation $T +$ "`)`" $+ U$, where T and U are deformed strings.
- The concatenation "`(`" $+ T +$ "`(`", where T is a deformed string.

For example, "`()(`" and "`))()(`" are deformed, while "`()`" and "`(()`" are not.

A string T *has a deformed balance* if T is deformed and the concatenation $T +$ "`)`" is balanced. For example, the string "`()(`" has a deformed balance.

You are given a string S of length n consisting only of parentheses. Under the given input constraints, it can be shown that there exist strings X and Y such that the concatenation $X + S + Y$ has a deformed balance. Determine the minimum possible value of $|X| + |Y|$ (the sum of the lengths of X and Y).

Input

The first line of input contains one integer t ($1 \le t \le 10\,000$) representing the number of test cases. After that, t test cases follow. Each of them is presented as follows.

The first line of each test case contains an integer n ($1 \le n \le 10^6$).

The second line contains a string S of length n, consisting only of '`(`' or '`)`'.

The sum of n across all test cases in one input file does not exceed 10^6.

Output

For each test case, output the minimum possible value of $|X| + |Y|$ such that the concatenation $X + S + Y$ has a deformed balance.

Sample Input #1	Sample Output #1
3 3 ()(1) 7 (())())	0 2 4

Explanation for the sample input/output #1

For the first test case, the given string already has a deformed balance.

For the second test case, setting both X and Y to "(" yields the concatenation "()(", which has a deformed balance. The value of $|X| + |Y|$ is 2.

For the third test case, it suffices to set X to "(((" and Y to an empty string to attain the minimum value of $|X|+|Y|$.