

E: LISP Extravaganza

Source file name: `extravaganza.c`, `extravaganza.cpp`, `extravaganza.java`, or `extravaganza.py`
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LISP (an acronym for LIST Processing) is a family of programming languages with a long history and a distinctive, fully parenthesized notation. It is a favored programming language for artificial intelligence (AI) research, and today some of its general-purpose dialects include Common Lisp, Scheme, and Clojure.

In LISP, all program code is written as parenthesized lists. Although its syntax is simple and consistent, during the years it has been given nicknames such as *Lots of Irritating Superfluous Parentheses* and the likes. In this problem, you will have to deal with strings that are made of parentheses (i.e., ‘(’ and ‘)’), such as in LISP.

A string s of parentheses is *balanced* if s satisfies one of the following conditions:

- it is the empty string;
- it is the string (t) and t is a balanced string; or
- it is the string tu for some balanced strings t and u .

For instance, the strings $()$ and $((()())()())$ are balanced, while $))()$ and $((())()$ are not.

Deciding if a given string is balanced is quite simple for experienced programmers such as yourself. Hence, the problem to solve here is a little different: given a string s , can you compute the length of a longest balanced subsequence of s ? In the case of $()$, $((()())()())$, $))()$, and $((())()$ the answers are 2, 14, 4, and 6, respectively. In the first two cases the sequences are balanced; in the third case $()()$ and the fourth case $((())()$ are the longest balanced subsequences.

Input

The input consists of several test cases. The first line of the input contains a number $m \geq 0$ indicating the number of test cases; then m lines follow. Each test case is given in a single line comprising a natural number n and a string s ($1 \leq n \leq 50\,000$), separated by a blank, where n is the length of s and s contains parentheses only.

The input must be read from standard input.

Output

For each test case, in a single line, output the length of a longest balanced subsequence of s .

The output must be written to standard output.

Sample Input	Sample Output
4	2
2 ()	14
14 ((()())()())	4
5))()	6
7 ((())()	