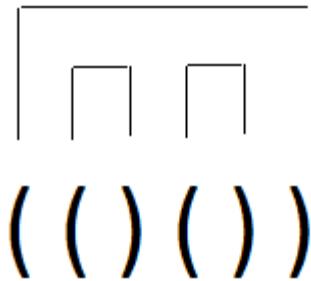


Problem I: Matching Parentheses

Filename: `parens`

Time limit: 2 seconds

Parentheses are used for many purposes. However, when there are too many of them, extra lines may have to be drawn to clarify for the reader which pairs of parentheses match. Consider the following diagram:



For each pair of matching parentheses, three line segments are drawn: two vertical ones, lined up with the two matching parentheses, and a horizontal one, connecting the two vertical line segments.

The typesetter is concerned with the amount of extra ink necessary to draw these line segments. We assume that each horizontal segment between characters at position x and position y is $|x - y|$ units long. The height of each vertical line segment depends on the nesting depth of the pair of parentheses. Parentheses with nothing nested inside of them have corresponding vertical line segments that are 1 unit long. For all other pairs of parentheses, if the maximum height of any vertical lines drawn for some set of nested parentheses (inside the set) is h , then the height of the two vertical line segments drawn for the parentheses will be $h+1$.

In the example above, the lines associated with the two inner pairs of parentheses have length 3 each ($1 + 1 + 1$). The larger set of three lines have lengths 2, 5 and 2, respectively. Thus, the total length of the lines drawn to show which parentheses match for this example is $3 + 3 + 9 = 15$.

Problem

Given a set of matching parentheses, calculate the total length in units of the line segments that need to be drawn to show which parentheses match.

Input

The first line will contain a single integer **c**, the number of test cases.

Each test case will consist of a single string **s**, on a line by itself. Each of these strings will only consist of '(' and ')' characters such that there are an equal number of each character appearing in **s**, and no prefix of **s** will contain more ')' characters than '(' characters.

Output

For each input case, on a line by itself, output the total length in units of the line segments needed to be drawn to show which parentheses match.

Input Bounds and Corresponding Credit

40 Points	60 Points
<ul style="list-style-type: none">• $1 \leq c \leq 20$• $1 \leq s \leq 10$	<ul style="list-style-type: none">• $1 \leq c \leq 20$• $1 \leq s \leq 10^5$

Samples

Input	Output
2	15
(() ())	28
((()))	