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D. Least Cost Bracket Sequence

time limit per test: 1 second memory limit per test: 64 megabytes

This is yet another problem on regular bracket sequences.

A bracket sequence is called regular, if by inserting "+" and "1" into it we get a correct mathematical expression. For example, sequences "(())()", "()" and "(())()" are regular, while "()", "(()" and "(())()" are not. You have a pattern of a bracket sequence that consists of characters "(", ")" and "(". You have to replace each character "(" with a bracket so, that you get a regular bracket sequence.

For each character "?" the cost of its replacement with " (" and ") " is given. Among all the possible variants your should choose the cheapest.

Input

The first line contains a non-empty pattern of even length, consisting of characters " (", ") " and "?". Its length doesn't exceed $5\cdot 10^4$. Then there follow m lines, where m is the number of characters "?" in the pattern. Each line contains two integer numbers a_i and b_i ($1 \le a_i$, $b_i \le 10^6$), where a_i is the cost of replacing the i-th character "?" with an opening bracket, and b_i — with a closing one.

Output

Print the cost of the optimal regular bracket sequence in the first line, and the required sequence in the second.

Print -1, if there is no answer. If the answer is not unique, print any of them.

Examples

input	Сору
(??) 1 2 2 8	
output	Сору
4 ()()	

→ Attention

The package for this problem was not updated by the problem writer or Codeforces administration after we've upgraded the judging servers. To adjust the time limit constraint, a solution execution time will be multiplied by 2. For example, if your solution works for 400 ms on judging servers, then the value 800 ms will be displayed and used to determine the verdict.

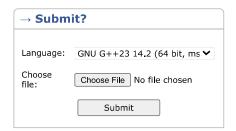
Codeforces Beta Round 3 Finished Practice

→ Virtual participation

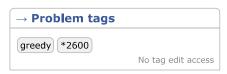
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Start virtual contest





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Submission	Time	Verdict
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