

## 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 you 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  $b_i$  ( $1 \leq a_i, b_i \leq 10^6$ ), 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	Copy
(??)	
1 2	
2 8	
output	Copy
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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### → Submit?

Language: GNU G++23 14.2 (64 bit, ms)

 Choose file: [Choose File](#) No file chosen

[Submit](#)

### → Last submissions




Submission	Time	Verdict
<a href="#">322952206</a>	Jun/05/2025 10:31	Accepted

### → Problem tags

greedy \*2600

No tag edit access

### → Contest materials

- [Codeforces Beta Round #3](#) 
- [Tutorial #1 \(en\)](#) 
- [Tutorial #2 \(ru\)](#) 

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