13-th Bulgarian National Olympiad in Informatics

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Problem 4. Groupoid.

A set of *N* elements (2 <= *N* <= 7) is called a groupoid if a binary operation * is defined which takes any two elements from the set as inputs and returns a single element belonging to the same set. We denote the elements of the groupoid by the first *N* small letters of the alphabet. In general case the operation * is neither associative, nor commutative. Write a program, that determines if it is possible to put brackets in a given expression of elements from the groupoid, so that the computed result would be equal to a (the first element in the groupoid).

For an example, if the operation * in a groupoid of 3 elements is defined by

*	a	b	c
a	b	b	a
b	c	b	a
c	a	c	c

then the expression b*b*a can be presented as (a*(b*a)) = a, but also ((b*b)*a) = c.

Input data. The number *N* of the elements is written at the first row of the input file `INPUT4.TXT`. The next *N* rows describe the binary operation by a table form. At the last row it is written an expression containing up to 100 characters without brackets.

Output `OUTPUT4.TXT` must contain a possible distribution of brackets.

An Example:

INPUT4.TXT	OUTPUT4.TXT
3 bba cba acc b*b*a	(b*(b*a))

Source: Matematika i informatika, journal published by Bulgarian Ministry of Education, n. 3-4, 1997, pp. 82-87.

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