### Reescritura

Félix really likes to play with *strings*. Today he has discovered a way to transform *strings* and asks for your help to find out if he can transform a given *string* into another one.

The possible transformations are given by a set of rules with the following properties:

- The given rules are of the form  $c \to ab$ , where a, b, c are characters.
- Each rule  $c \to ab$ , can be applied to replace an occurrence of c with ab. For example, if you have the rule  $a \to bc$  we can transform the string abca into bcbca by applying the rule on the first character.
- These transformations can be applied successively. For example with  $a \to bc$ ,  $b \to mm$  from the string abca we can obtain bcbca, mmcbca, ammca, bcbcbc...
- We are assured that for each character c there is at most one rule of the form  $c \to ab$ .
- We are assured that the given rules do not form cycles. That is, for any character c, by applying the rules successively on the string containing only character c, we cannot get to any distinct string containing character c.

## Input and output

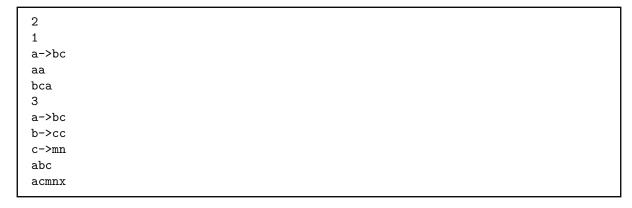
The first line of the input contains the number of cases T.

For each case there is a first line with n where n is the number of rules, followed by n rows where in the i-th row there is a rule given as a->bc where a, b, c are characters. A line follows with a string s and a string t.

For each case a line with "SI" or "NO" (without quotes) must be printed in case s can be converted into t by applying the given rules or not, respectively.

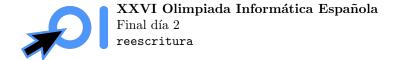
#### Example

Input:



Output:

SI			
NO			



# Constraints

$$1 \leq T \leq 100$$

$$1 \le n \le 59$$

The sum of the lengths of all s and t for all cases is at most  $3 \cdot 10^5$ .

All characters displayed are lowercase letters (a-z), uppercase letters (A-Z) or numbers (0-9).

## Subtasks

- 1. (17 points) Only a and b appear as characters.
- 2. (18 points) n = 1.
- 3. (31 points) Sum of lengths of s and t in each of the cases is at most 60.
- 4. (34 points) No additional restrictions.