Problem J
VAN DINSKY

Input File: J.IN
Output File: standard output
Program Source File: J.C, J.CPP, J.JAVA

You must help would-be painter Vincent van Dinsky mix colors for his paintings. His master gave him a book of color mixing rules plus a color palette, and told him to produce the set of colors that are required for a painting, by experimenting until he finds the minimum number of color mixes that is required for each color in the painting.

Notes:

- all colors are named using the characters `a-z0-9` (lowercase)
- a color mixing rule is made by three colors written on the same line, meaning "color1 mixed with color2 gives color3" – e.g. "`yellow cyan green`"
- mr. van Dinsky is not willing to do random color mixing experiments – if he doesn't find in the book what is the result of mixing `yellow` with `green`, he will never attempt to do this operation. He is also very bad at logic inference – e.g. if the book says that yellow+cyan=green, yellow+magenta=red and red+cyan=black, he will not assume that green+magenta=black (unless the book explicitly tells what is the result of mixing green & magenta). On the other hand – he is fully aware that it doesn't matter what color you start with – mixing yellow & green is the same as mixing green & yellow.

For an input that contains, in order

- all the color mixing rules in the book
- an empty line
- one or several data sets (painting tasks), made of two lines each:
    - all the colors available initially on the palette
    - all the colors required for the painting

you should produce an output that contains one line for each painting (i.e. each data set); on that line, for each color in the painting, the minimum number of color mixes that will produce the desired color (starting from the colors available initially on the palette; the result is '`-1`' if it's impossible to obtain the desired color)

You can assume that the input is correct, there are less than `50000` color mixing rules in the rule book and less than `1000` colors

Sample input	Sample output
cyan yellow green **cyan magenta blue** **yellow magenta red** **red green black** **<done/>** **cyan yellow magenta pink** **cyan black pink red brown** **cyan yellow red** **blue black**	`0 3 0 1 -1` `-1 2`