1251 Repeated Substitution with Sed

Do you know "sed," a tool provided with Unix? Its most popular use is to substitute every occurrence of a string α contained in the input string (actually each input line) with another string β. More precisely, it proceeds as follows.

1. Within the input string, every non-overlapping (but possibly adjacent) occurrences of α are marked. If there is more than one possibility for non-overlapping matching, the leftmost one is chosen.

2. Each of the marked occurrences is substituted with β to obtain the output string; other parts of the input string remain intact.

For example, when α is "aa" and β is "bca", an input string "aaxaaa" will produce "bcaxbcaa", but not "aaxbcaa" nor "bcaxabca". Further application of the same substitution to the string "bcaxbcaa" will result in "bcaxbcbca", but this is another substitution, which is counted as the second one.

In this problem, a set of substitution pairs (α_i, β_i) $(i = 1, 2, \ldots, n)$, an initial string γ, and a final string δ are given, and you must investigate how to produce δ from γ with a minimum number of substitutions. A single substitution (α_i, β_i) here means simultaneously substituting all the non-overlapping occurrences of α_i, in the sense described above, with β_i.

You may use a specific substitution (α_i, β_i) multiple times, including zero times.

Input

The input consists of multiple datasets, each in the following format.

n
α_1 β_1
α_2 β_2
$\vdots$
α_n β_n
γ
δ

n is a positive integer indicating the number of pairs. α_i and β_i are separated by a single space. You may assume that $1 \le |\alpha_i| < |\beta_i| \le 10$ for any i ($|s|$ means the length of the string s), $\alpha_i \neq \alpha_j$ for any $i \neq j$, $n \le 10$ and $1 \le |\gamma| < |\delta| \le 10$. All the strings consist solely of lowercase letters. The end of the input is indicated by a line containing a single zero.

Output

For each dataset, output the minimum number of substitutions to obtain δ from γ. If δ cannot be produced from γ with the given set of substitutions, output '-1'.

Sample Input

```
2
a bb
b aa
```

```
a
bbbbbbbb
1
a aa
a
aaaaa
3
ab aab
abc aadc
ad dee
abc
deeeeeeec
10
a abc
b bai
c acf
d bed
e abh
f fag
g abe
h bag
i aaj
j bbb
a
abacfaabe
0
```

Sample Output

```
3
-1
7
4
```