4637 - Repeated Substitution with Sed

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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,..., 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

&vellip#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), $\alpha_i \ne \alpha_j$ for any $i \ne j$, $n \le 10$ 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
deeeeeeeec
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
```

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