Word Ladder

Timelimit: 4 sec

Problem description

A word ladder is a sequence of words $w_1, \ldots, w_n$ such that w_{i+1} and w_i are identical except for a single character substitution.

For example: "hello, bello, cello, celli" is a word ladder.

You are given a set of words U and a pair $u, v \in U$. Find the length of the shortest word ladder that consists only of words in U, starts with u and ends with v.

Input

A number n ($2 \leq n \leq 50000$) followed by n words, the words in U. All words have length 5 and consist of lowercase letters.

Then a number m ($1 \leq m \leq 20$), the number of queries. This is followed by m queries. Each query consists of the words u and v.

Output

You should output m lines with m numbers d_i, where d_i is the length of the shortest word ladder for the ith query or -1 if no word ladder for the ith query exists.

Sample input/output

Input	Output
6 hallo hello bello cello benjo celli 4 hallo bello hallo benjo cello hallo benjo benjo	2 -1 2 0