CMPUT 275 - Tangible Computing **Winter 2018**
Morning Problem: Cities

Description

An airline has given you a special student promotion that allows you to fly for free from many cities around the world. Unfortunately for you, they have set rather severe restrictions on which flights you can take:

- From each city included in the promotion, you can only fly to one particular destination.
- There are no free flights out of Edmonton because the airline knows you live here.

This looks rather useless at first, because you still have to pay for your outbound travel. But after looking at the list of available flights, you realise that you might be able to get back home to Edmonton for free! You might just have to take an indirect route...
For example, suppose the following flights are available:

- Vaduz to Tehran
- Doha to Tehran
- Tehran to St. John's
- St. John's to Edmonton

Then, you can fly back to Edmonton from Vaduz or Doha for free via Tehran and St. John's, a total of three flights. Getting back from Tehran would take two flights, and from St. John's would only take one.

Your job is to write a Python script called **cities.py** that reads a description of the available flights and a list of cities. For each city in this list, the script should calculate how many flights are required to get back from there to Edmonton.

Input

The input to the program will be provided on stdin.

The first line will contain a non-negative integer n, which is the number of flights available. There will be n following lines, each of the form

```
CITY1---CITY2
```

representing a flight from CITY1 to CITY2. The names of the cities can contains spaces and other special characters but not three consecutive hyphens, which are used to separate the two city names.

The next line will consist of a non-negative integer q, which specifies the number of "queries" to follow. Each of the next q lines will consist of the name of one city, and for each you must calculate and print the number of flights needed to get from there to Edmonton.

The input is guaranteed to meet the following requirements:

- If a city name appears as a query, there will be a way to get from there to Edmonton.
- There is only one flight departing any particular city. Of course, there could be many flights arriving at a city.

There are between 0 and 10000 cities and flights in the input.

Output

For each of the q query cities, print a single integer on its own line which is the number of flights needed to get from there to Edmonton. The total number of flights required to get to Edmonton over all queries will be at most 10000.

Sample Input 1

```
4
Vaduz---Tehran
St. John's---Edmonton
Tehran---St. John's
Doha---Tehran
5
Vaduz
Doha
Edmonton
St. John's
Tehran
```

Sample Output 1

```
3
3
0
1
2
```