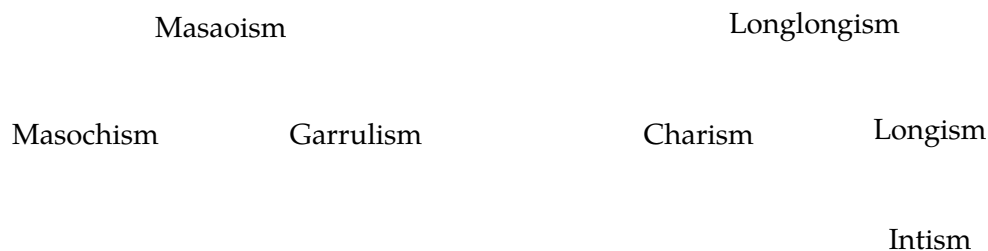## New cults   P70868_en

It is year 5000 A.D. Against all odds, mankind has survived, multiplied, and spread across the Solar System. New faiths, cults and alike coexist with religions that were considered traditional thousands of years ago. Among them, the cult to Masao, the legendary hero of the 21st century. (For his believers, now it is year 3017 A.M.) The problem is, the cult to Masao has so many factions and subfactions, that it is difficult to keep track of which was originated from which.

Consider the following example, which is just a tiny simplification, with two main trees of the cult to Masao:

Masaoism		Longlongism	
Masochism	Garrulism	Charism	Longism
			Intism

Among other relations, we can see that Garrulism was directly originated from Masaoism, Intism was originated from Longlongism after two steps, Charism and Longism belong to different branches of the same tree, and Masochism and Intism belong to different trees.

Please write a program that, given the origin of the factions of the cult to Masao, computes the relation among several pairs of factions.

Input

Input consists of several cases. Every case begins with a number m, followed by m pairs of names n_1 and n_2, which indicate that n_2 was directly originated from n_1. Next comes the number of queries of the case q, followed by q pairs of names s_1 and s_2, with $s_1 \neq s_2$. Assume $0 \leq m \leq 10^5$, that q is similar to m for the large private test cases, that the relations correctly define one or more trees, and that no tree has more than 10^4 levels.

Output

For every query pair, print the relation between s_1 and s_2. Suppose that a name not present in the description of the factions is an isolated tree by itself. Print a line with 10 dashes after the output for every case.

Sample input 1

```
5
Longism Intism
Masaoism Garrulism
Longlongism Charism
Masaoism Masochism
Longlongism Longism
4
Masaoism Garrulism
Intism Longlongism
Charism Longism
Masochism Intism

0
1
z y
```

Sample output 1

```
Masaoism is 1 level(s) above Garrulism
Longlongism is 2 level(s) above Intism
Charism and Longism : same tree, different branches
Masochism and Intism : different trees
----------
z and y : different trees
----------
```

Problem information

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