

Synonyms

In this task, your job will be to write a program that can decide whether two words are synonyms or not. You will get a synonym dictionary describing pairs of synonymous words. Afterwards, you will answer several queries asking whether given two words are synonyms or not.

Use the following rules to decide:

1. If the pair of words is declared synonymous in the input, then they are synonyms.
2. Being synonyms doesn't depend on order, e.g. if *big* is a synonym for *large* then *large* is a synonym for *big*.
3. We can derive the synonymous relationship indirectly: if *big* is a synonym for *large* and *large* is a synonym for *huge* then *big* is a synonym for *huge*.
4. If two words differ only by case, they are synonyms, e.g. *same* is a synonym for both *SAmE* and *SAME*.
5. If none of the above rules can be used to decide whether two words are synonyms, then they are not.

Input

Input starts with a number of test cases T ($0 \leq T \leq 100$). Each test case begins with a line containing a single number N ($0 \leq N \leq 100$) — the length of a synonym dictionary. On each of the following N lines, there is exactly one pair of synonyms separated by a single space. Next line contains a single number Q ($0 \leq Q \leq 100$) — number of queries. Each of the following lines contains a pair of query words separated by a single space.

Each word consists only of English alphabet letters (`[a-zA-Z]`) and is at most 20 characters long.

Output

For each pair of query words output either string synonyms or different.

Sample input

```
2
4
big large
large huge
small little
```

apple banana

6

same same

big huge

huge big

apple peach

big tall

peach PEACH

5

wood FOReSt

meadoW PrAirle

WOOD Lumber

lumber forest

lumber forest

2

wood LUMBER

mEADOW fire

Sample output

synonyms

synonyms

synonyms

different

different

synonyms

synonyms

different

Explanation of the sample problem

In the first test-case there are 6 queries:

1. Words are the same.
2. Words are derived synonyms.
3. Symmetric to 2nd query.
4. No rule can be used to derive the synonym pair.
5. No rule can be used to derive the synonym pair, even though they are synonyms in English.
6. Words differ only in case.

2nd test case:

1. Defined as synonyms by 3rd rule. The case does not matter.
2. Different.

You can download the example from above as a file(s):

- [example input](#)
- [example output](#)

You can also test your code on the bigger file:

- [bigger example input](#)
- [bigger example output](#)

Goal

Solve the problem for the [test input file](#) and send us the solution.