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*, *SAME* and also *same* (itself).
5. If none of the above rules can be used to decide whether two words are synonyms, then they are not.

Note, that the input size (see below) is quite low. Therefore you don't need to produce the most effective algorithm possible - sure, it's nice if you do so, but *far* more important is, that your code is correct and you deliver it on time.

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 PrAirIe
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.

2^{nd} 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 (https://drive.google.com/open?id=1uv7I0b3ToOvJ1L60yAanA4UrkGgwR2A7)
- example output (https://drive.google.com/open?id=1q4hAY6-MurTwb8-1chx9D5TAyd0VclmP)

You can also test your code on the bigger file:

- bigger example input (https://drive.google.com/open?id=1CTQZAeTsTJz4SCbzCmz2EaW4tJMGqCDJ)
- bigger example output (https://drive.google.com/open?id=19yn8CI2UqFfVrRVgtcFCE-ubatEp0Zpo)

Goal

Solve the problem for the test input file (https://drive.google.com/open?id=14ad4U4Q82kmH5NBGG5nQhjntSQ2kzTGY) and send us the solution.

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