Problem 8: DOES NOT REACT
17 Points

Problem ID: `react`

Rank: 3

Introduction

You thought OChem was hard? In the imaginary field of Binary Chemistry (otherwise known as BChem), scientists study the relationships between two families of elements: Right Elements and Left Elements. Elements from the same family will react with each other, but elements from opposite families will not (so Rights will not interact with Lefts). You're starting your career in BChem at a local laboratory; you're in charge of discovering new reactions between elements. You're given a handy reference sheet with currently known reactions to help you out, but that's when you realize: none of the elements' families are labeled—just their known reactions. Hopefully it's not too late to switch laboratories...

Your task is to create a program that will determine if two elements will react, given a list of known reactions.

Program Input

The first line of the input from STDIN will contain a positive integer `T` denoting the number of test cases that follow. Each test case will have the following input:

- A first line containing the two target elements in the format: `<X> and <Y>`
- A second line containing a single non-negative integer `n` denoting the number of known reactions that follow.
- The next `n` lines each consist of a single known reaction in the following format:

`<A> <REACTS WITH/DOES NOT REACT WITH> <B>`

Example Input:

```
4
Fecrothil and Agloetium
4
Dospusten REACTS WITH Ostuysium
Ostuysium DOES NOT REACT WITH Fecrothil
Dospusten DOES NOT REACT WITH Fecrothil
Ostuysium DOES NOT REACT WITH Agloetium

Ostuysium and Dospusten
0

Ost and Fec
8
Dos REACTS WITH Dron
Spo DOES NOT REACT WITH Dos
Agloe REACTS WITH Spo
Dos REACTS WITH Fec
Agloe DOES NOT REACT WITH Skio
Dron DOES NOT REACT WITH Agloe
Dron REACTS WITH Skio
Skio REACTS WITH Ost

Agloetium and Spoenyx
5
Fecrothil REACTS WITH Agloetium
Dospusten REACTS WITH Ostuysium
Ostuysium DOES NOT REACT WITH Fecrothil
Dospusten DOES NOT REACT WITH Agloetium
Ostuysium REACTS WITH Spoenyx
```

Program Output

For each test case, your program should output the reactivity of the two elements based on the
following criteria:

- Your output should be in the following format:
`<X> <REACTS WITH/DOES NOT REACT WITH> <Y>`
    - If not enough information is given to determine the two elements' reactivity, your
      program should output `UNKNOWN`

Example Output:

```
Fecrothil REACTS WITH Agloetium
UNKNOWN
Ost REACTS WITH Fec
Agloetium DOES NOT REACT WITH Spoenyx
```

Problem Constraints

$T \leq 100$

$0 \leq n \leq 1.175 \times 10^4$

Assume every reaction involves a unique pair of elements.