code jam
hello, world!

Problem D. Technology Planning

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the Quick-Start Guide to get started.

| Small input 1 15 points | Solve D-small-1 |
| Small input 2 20 points | Solve D-small-2 |

Problem

You are playing a culture simulation game, in which your culture can develop various technologies. Some technologies depend upon others; if technology A depends upon technology B, you cannot develop B until you have developed A. Your culture can work on only one technology at a time.

In the game, you have goals which require particular technologies. You have decided to write a program to help you by planning out the order in which to develop technologies.

Input

The input to your program starts with the number of test cases, **T**, on a line by itself. **T** test cases follow. Each one consists of:

- One line with an integer, **M**, which is the number of technological dependencies.
- **M** lines, each one containing two technology names, separated by a colon (':'). The first technology depends on the second one.
- One line with an integer, **Q**, which is the number of goal technologies.
- **Q** lines, each naming a goal technology.

Each technology name is a sequence of alphanumeric characters (letters or numbers). Technology names are case-sensitive.

Output

The output for each case should start with a line of the form "Case #**C**: **D**", where **C** is the case number, starting from 1, and **D** is the smallest possible number of technologies that have to be researched. The next **D** lines should each contain one technology, in the order that they need to be researched.

If there are several possible correct orderings, any one of them is acceptable.

Limits

T ≤ 25
M ≥ 1
Q ≥ 1
There will be no cycles in the dependency graph.

Small dataset

M ≤ 10
Q ≤ 10.

Large dataset

M ≤ 100
Q ≤ 100.

Sample

Input	Output
4 9 Metalworking:Fire Pottery:Fire Iron:Metalworking Steel:Iron Battleships:Steel Alchemy:Fire Chemistry:Alchemy Explosives:Chemistry Battleships:Explosives 1 Battleships 9 Metalworking:Fire	Case #1: 8 Fire Metalworking Iron Steel Alchemy Chemistry Explosives Battleships Case #2: 3 Fire Pottery Metalworking Case #3: 1 d

```
Pottery:Fire
Iron:Metalworking
Steel:Iron
Battleships:Steel
Alchemy:Fire
Chemistry:Alchemy
Explosives:Chemistry
Battleships:Explosives
2
Metalworking
Pottery
2
b:a
c:b
1
d
1
A:a
1
A
```

```
Case #4: 2
a
A
```