P17. ShellSort

(Time Limit: 3 seconds)

He made each turtle stand on another one's back

And he piled them all up in a nine-turtle stack.

And then Yertle climbed up. He sat down on the pile.

What a wonderful view! He could see 'most a mile!

King Yertle wishes to rearrange his turtle throne to place his highest-ranking nobles and closest advisors nearer to the top. A single operation is available to change the order of the turtles in the stack: a turtle can crawl out of its position in the stack and climb up over the other turtles to sit on the top.

Given an original ordering of a turtle stack and a required ordering for the same turtle stack, your job is to determine a minimal sequence of operations that rearranges the original stack into the required stack.

Input

The first line of the input consists of a single integer K giving the number of test cases. Each test case consist on an integer n giving the number of turtles in the stack. The next n lines specify the original ordering of the turtle stack. Each of the lines contains the name of a turtle, starting with the turtle on the top of the stack and working down to the turtle at the bottom of the stack. Turtles have unique names, each of which is a string of no more than eighty characters drawn from a character set consisting of the alphanumeric characters, the space character and the period ('.'). The next n lines in the input gives the desired ordering of the stack, once again by naming turtles from top to bottom. Each test case consists of exactly $2n + 1$ lines in total. The number of turtles (n) will be less than or equal to two hundred.

Output

For each test case, the output consists of a sequence of turtle names, one per line, indicating the order in which turtles are to leave their positions in the stack and crawl to the top. This sequence of operations should transform the original stack into the required stack and should be as short as possible. If more than one solution of shortest length is possible, any of the solutions may be reported.

Print a blank line after each test case.

Sample Input

2

3

Yertle

Duke of Earl

Sir Lancelot

Duke of Earl

Yertle

Sir Lancelot

9

Yertle

Duke of Earl

Sir Lancelot

Elizabeth Windsor

Michael Eisner

Richard M. Nixon

Mr. Rogers

Ford Perfect

Mack

Yertle

Richard M. Nixon

Sir Lancelot

Duke of Earl

Elizabeth Windsor

Michael Eisner

Mr. Rogers

Ford Perfect

Mack

Sample Input

Duke of Earl

Sir Lancelot

Richard M. Nixon

Yertle

P18. Always Late

(Time Limit: 3 seconds)

Ajmat：Have you noticed one member of team 13 comes late in almost every contest?

Nejhum：You mean the team of Mahbub, Moazzem and Yeamin? What's the problem with them?

Ajmat：All of them lives far away from BUET, and they always avoid the shortest path to BUET.

Nejhum：Are you kidding? Why would they do so? A computer science student won't ever do that.

Ajmat：They always avoids the shortest path. They believe that they always face the worst traffic jam on their shortest way to BUET.

Nejhum：That sounds crazy!

Ajmat：They are more crazy than you think they are. They always try to use the path whose length is smaller than or equal to that of any path to BUET except the shortest one. And for that, they sometimes visit the same junction more than once.

Nejhum：But they are not using the longest path. Then why are they late almost everyday?

Ajmat：That's because they have to spend a lot of time to find out which of the paths meet their criteria. Perhaps they don't know how to find out the second-shortest path.

Nejhum：I think we should solve this real problem in today's contest, instead of solving imaginary ones.

Ajmat：Let's try.

Input

The first line of each test case contains two integers: n (the number of junctions, $1 < n < 100$) and r (the number of bi-directional roads connecting these junctions). The junctions are numbered with 0, 1, . . . $n-1$. Each of the next r lines (one for each road) contains three integers: two junction-numbers that the corresponding road connects and the length of the road in kilometers. The next line contains an integer q, the number of queries. Each of the next q lines contains two junction-numbers. There is a blank line after the q queries. There is at most 1 road between each junction pair. A road always connects two different junctions. Length of a road is not less than 1km and not more than 100km.

Input is terminated by EOF.

Output

For each set of output, print the set # (1, 2, …) followed by q lines, one for each query, each containing the length of the second-shortest path between the corresponding junctions. However, for the unsolvable queries, print a '?'.

Sample Input

```
4 3
0 1 12
```

0 2 20

1 2 15

3

0 1

0 2

0 3

4 3

0 1 11

0 2 20

1 2 15

3

0 1

0 2

0 3

Sample Output

Set #1

35

27

?

Set #2

33

26

?