Tree game

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

There is a tree consisting of n nodes and $n - 1$ edges. Two players play a game on this tree. The first player plays red, the second player — blue. Initially, each player has exactly one node of his color. All other nodes are neutral. Players take turns, with the first player starting first. One move goes like this:

1. The player chooses any neutral node that is a neighbor of one of his vertices.
2. The selected node is painted in the color of that player.
3. Also all neighbors of the selected node that belong to another player are repainted in the color of player who made move.

If a player cannot make a move, he skips it. They keep playing as long as at least one player still has a move. **Note that players are not allowed to skip moves.**

It can be shown that the game will eventually end. In the end of the game, each player counts the number of nodes in his color. The one with the most nodes wins.

Adilkhan and Batyrkhan played this game for some time. Adilkhan was the first player, and Batyrkhan was the second. At one point, they got bored playing so they asked you and your friend Daniyar to continue the game instead of them. You will play as Adilkhan, and Daniyar will play as Batyrkhan. **At the same time, they guarantee that it is Adilkhan's turn now.**

Adilkhan and Batyrkhan played for fun, so they did not make moves in the most optimal way. But you and your friend Daniyar are determined to win so both of you play in the most optimal way.

Such events were repeated for q consecutive days. Specifically, Adilkhan and Batyrkhan started playing, played the game to some unfinished state, and passed the game on to you and your friend Daniyar. And every day, you wrote down the final score of the game on paper.

What q scores you have on paper?

Input

The first line of the input contains one integer n ($3 \le n \le 10^5$) — the number of nodes in the tree.

Then $n - 1$ lines follow, each of them contains two integers (u_i, v_i) ($1 \le u_i, v_i \le n$, $u_i \ne v_i$) — pair of nodes connected by an edge in the tree.

Next line contains one integer q ($1 \le q \le 10^5$) — the number of days.

The state of the game on the i-th day is given by two lines.

The first line starts with an integer r_i followed by r_i integers $(p_{i,1}, \ldots, p_{i,r_i})$ — number of red nodes and their numbers ($1 \le p_{i,j} \le n$).

The second line in a similar format starts with an integer b_i followed by b_i integers $(q_{i,1}, \ldots, q_{i,b_i})$ — number of blue nodes and their numbers ($1 \le q_{i,j} \le n$).

It is guaranteed that $r_i + b_i$ given nodes are different and this state is obtained as a result of the game between Adilkhan and Batyrkhan. It is guaranteed that the sum $r_i + b_i$ over all days does not exceed 3×10^5.

Output

Print exactly q lines. In the i-th line print, the final score of the i-th game is in the format $a : b$, where a corresponds to the number of red vertices and b corresponds to the number of blue vertices.

Scoring

This task contains 7 subtasks.

Subtask	Additional restrictions	Points	Required subtasks
0	Examples	0	—
1	$u_i = 1, v_i = i + 1$, Adilkhan and Batyrkhan did not make moves	9	—
2	$u_i = i, v_i = i + 1$, Adilkhan and Batyrkhan did not make moves	13	—
3	$n, q \leq 10$	11	0
4	$q = 1$, Adilkhan and Batyrkhan did not make moves	14	—
5	Adilkhan and Batyrkhan did not make moves	20	1, 2, 4
6	$q = 1$	17	4
7	—	16	3, 5, 6

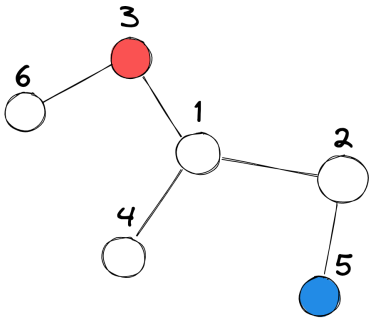
In subtasks 1, 2, 4, and 5, it is guaranteed that on all days Adilkhan and Batyrkhan did not make any moves. That means you and Daniyar play game on your own from the beginning. In these subtasks, on all days, $r_i = b_i = 1$.

Examples

standard input	standard output
6 1 3 1 4 3 6 1 2 2 5 4 1 3 1 5 3 3 1 2 0 1 6 1 4 2 6 3 2 2 5	5:1 6:0 1:5 5:1
5 1 2 2 3 3 4 4 5 3 1 2 1 5 1 1 1 4 2 5 4 2 2 1	4:1 1:4 4:1

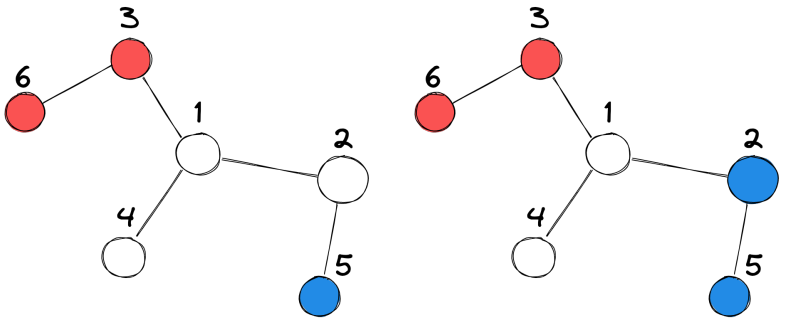
Note

On the first day of the first example.



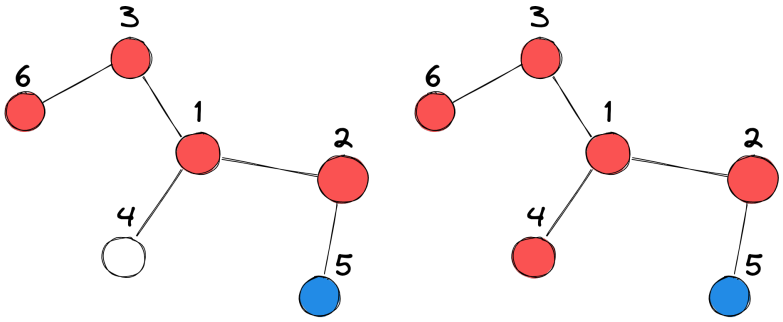
Initial state of the game

It is optimal for you to choose a 6 node for the move. Daniyar must move to on 2 node on his move.



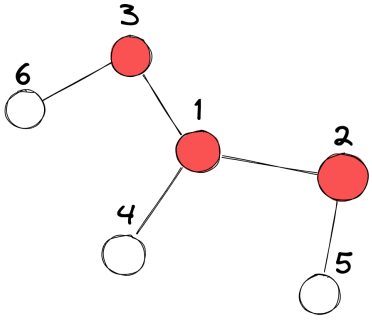
You moved to 6 node, Daniyar moved to 2 node

Now you can move to 1 node and win back 2 node from Daniyar. Daniyar will skip moves until the end of the game because he is not able to make any move.



You moved to 1 node, Daniyar skips move, you moved to 4 node and the game is over with the score 5 : 1

It is also possible in the game that Daniyar has no node of his color at all. In this case, Daniyar will skip all moves and the game will end with the score 6 : 0.



On the second day of the first example

This can happen if Adilkhan and Batyrkhan started from the top 3 and 2, and Adilkhan on the first move chose the 1 node.