Problem Radio

Input file	`stdin`
Output file	`stdout`

Consider a network of N radios, linked together by $N-1$ communication channels. We model the radios and the communication channels as a tree. Each radio can be in one of three states: without signal (`NS`), with signal (`S`), or deactivated (`D`). Once a radio is in state `S` or `D`, it stays in that state permanently — on the other hand a radio in state `NS` can still change state.

Every day the following occurs simultaneously: every radio in state `S` will attempt to transmit to every other radio to which it is directly linked by a communication channel. Consider any radio r in state `NS`, and suppose it received t transmissions today. If $t = 0$, then r remains in state `NS` tomorrow. If $t = 1$, then r enters state `S` permanently starting tomorrow. If $t > 1$, then r enters state `D` permanently starting tomorrow.

Note that no matter the current state of the network, there will eventually be a day from which no radio ever changes state again. Call this final state of the network the *stable state*.

Little Steve has Q queries of form: "Suppose M radios $x_1, \ldots, x_M$ are initially in state `S`, and all other radios are in state `NS`. How many radios will be in state `S` when the network reaches its stable state?" Can you answer Little Steve's queries?

Input data

The first line of the input contains N. The next $N-1$ lines contain pairs (x, y), which denote the communication channels between the radios. The next line contains Q. The next Q lines encode the queries. Each line contains M followed by $x_1, \ldots, x_M$.

Output data

Output the answers to the queries, each on a different line.

Restrictions

- Each query is independent.
- $N \leq 200\,000$.
- $Q \leq 30\,000$.
- Let $\sum M$ denote the sum of M over all queries in the input.
- $\sum M \leq 300\,000$.

#	Points	Restrictions
1	2	$M = 1$
2	12	$N \leq 1000, Q \leq 1000$
3	6	Radio i and radio $i + 1$ are always linked, $1 \leq i < N$.
4	11	At most one radio is linked to three or more other radios.
5	19	$M \leq 2$
6	13	$M \leq 3$
7	18	$M \leq 10$
8	19	No further restrictions.

Examples

Input file	Output file
6 1 2 1 3 1 4 2 5 1 6 5 3 5 4 6 5 6 3 4 1 5 3 3 5 1 4 3 6 2 1 2 4 6	4 5 5 6 2
7 1 2 2 3 3 4 4 5 5 6 6 7 3 3 1 2 5 4 7 6 1 5 5 1 2 3 5 6	7 6 6

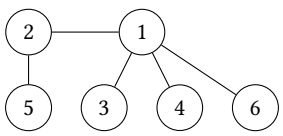
Input file	Output file
15 1 2 2 3 2 4 2 5 1 6 3 7 2 8 2 9 3 10 3 11 11 12 10 13 13 14 13 15 15 13 3 6 9 2 11 8 5 14 13 15 10 4 1 10 8 9 5 11 2 10 6 12 15 4 11 6 13 4 12 9 11 7 2 3 15 5 11 14 2 15 6 7 12 9 8 3 10 4 2 4 5 10 2 5 7 10 8 15 9 1 14 3 6 14 1 12 15 10 2 3 3 11 15 10 15 3 8 4 6 5 2 11 14 9 4 5 9 4 7 11 12 5 2 3 14 8 7 4 6 1 11 12 8 13 11 3 4 9 7 1 10 2 12 14 4 10 9 6 5 8 7 1 8 5 12 10 15 4 5 11 3 14 10 6	15 10 13 12 2 14 12 15 13 11 15 15 12 10 13

Explanations

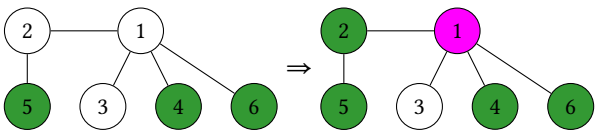
In the following drawing, an uncoloured vertex is in state `NS`, a green vertex is in state `S` and a pink vertex is in state `D`.

First example

The tree in this example is

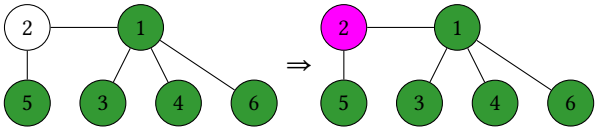


First query. In this case, the tree undergoes the following sequence of states:



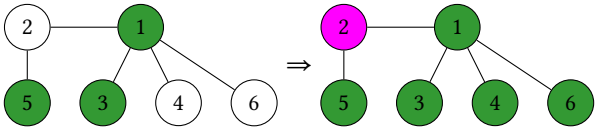
So the answer is 4, due to vertices 2, 4, 5, 6.

Second query. The tree undergoes the following sequence of states.



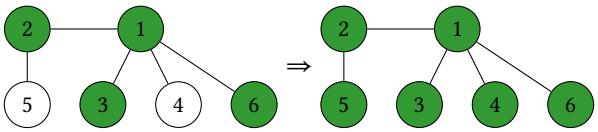
So the answer is 5, due to vertices 1, 3, 4, 5, 6.

Third query. The tree undergoes the following sequence of states.



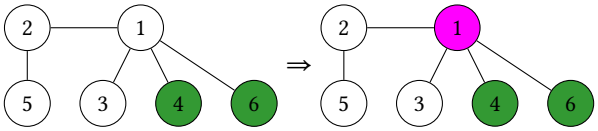
So the answer is 5, due to vertices 1, 3, 4, 5, 6.

Fourth query. The tree undergoes the following sequence of states.



So the answer is 6, due to vertices 1, 2, 3, 4, 5, 6.

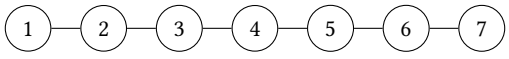
Fifth query. The tree undergoes the following sequence of states.



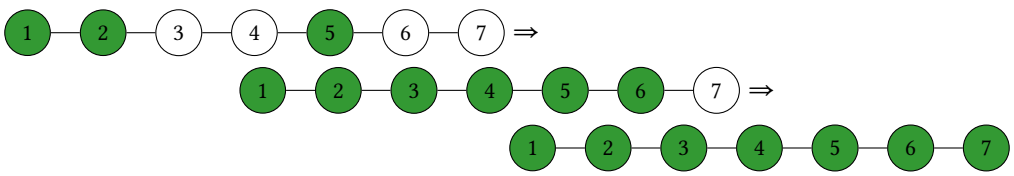
So the answer is 2, due to vertices 4, 6.

Second example

The tree in this example is

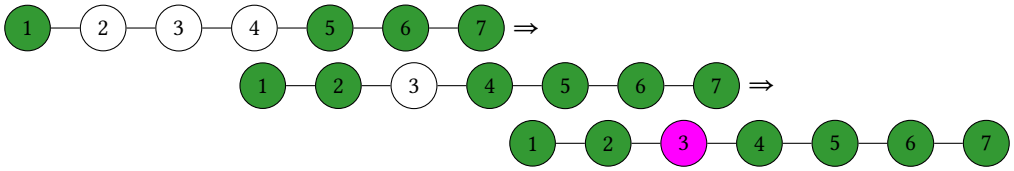


First query. The tree undergoes the following sequence of states.



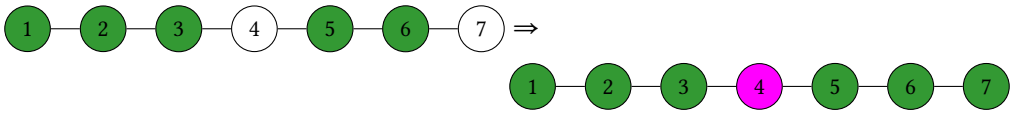
So the answer is 7, due to vertices 1, 2, 3, 4, 5, 6, 7.

Second query. The tree undergoes the following sequence of states.



So the answer is 6, due to vertices 1, 2, 4, 5, 6, 7.

Third query. The tree undergoes the following sequence of states.



So the answer is 6, due to vertices 1, 2, 3, 5, 6, 7.