Problem I. Infernape

Input file:	`standard input`
Output file:	`standard output`
Time limit:	7 seconds
Memory limit:	512 megabytes

Monkeys live on the trees, right? Infernape probably too. There is a tree with n vertices (a tree is a connected undirected graph without cycles) and q independent queries. Vertices are numbered with integers from 1 to n.

In each query, there are k Infernape in the vertices of the tree (k may be different for different queries). The i-th of them sits in the vertex v_i and has power r_i. Infernape heats all vertices which are in the distance less than or equal to its power from v_i. The distance between two vertices is the number of edges on the shortest path between them. The powers are non-negative, so each Infernape always heats its own vertex. Your task is to answer how many vertices are heated by at least $k-1$ Infernape.

Input

The first line contains one integer n ($2 \le n \le 100\,000$) — the number of vertices in the tree.

The i-th of the next $n-1$ lines describes the i-th edge of the tree and contains two integers a_i and b_i ($1 \le a_i, b_i \le n$) — the endpoints of this edge.

It's guaranteed that the edges describe a correct tree.

The next line contains one integer q ($1 \le q$) — the number of queries.

Each of the following q blocks describes one query.

Each block starts with a line with a single integer k ($2 \le k \le 300\,000$) — the number of Infernape in the current query.

Nextly, each block contains k lines. The i-th of them contains two integers v_i and r_i ($1 \le v_i \le n$, $0 \le r_i \le n-1$) — the index of the vertex at which the i-th Infernape sits and the power of this Infernape.

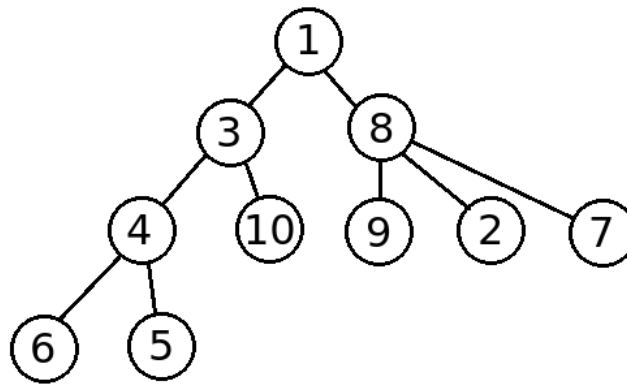The sum of k over all queries in one test doesn't exceed $300\,000$.

Output

Output q lines. The i-th of them should contain the number of vertices heated by at least all but one Infernape in the i-th query.
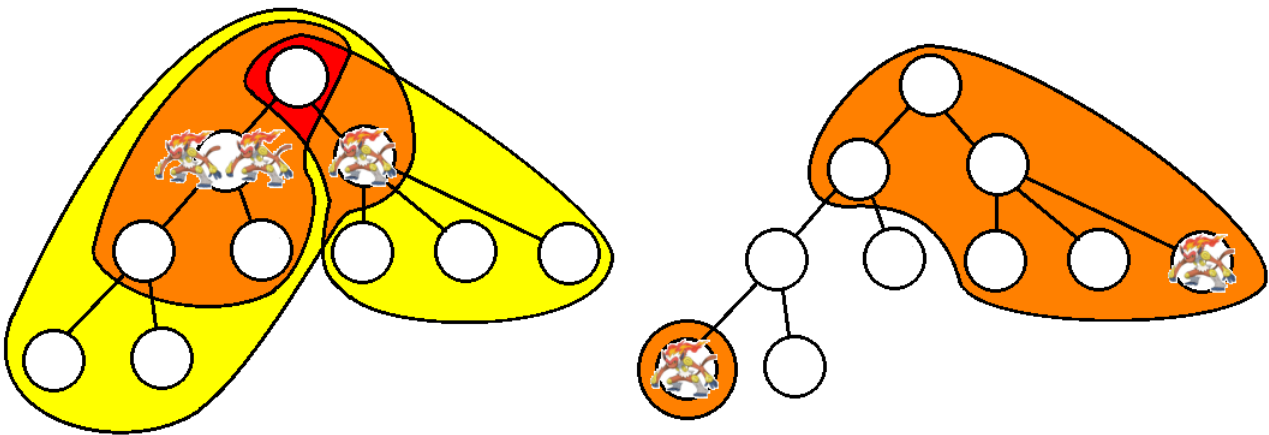
Example

standard input	standard output
10	5
1 3	7
6 4	
9 8	
1 8	
3 4	
2 8	
10 3	
4 5	
8 7	
2	
3	
8 1	
3 1	
3 2	
2	
7 3	
6 0	

Note

Here's how the tree in the sample test looks like:

And here is how the queries look like:

The red area is heated by all Infernape while the orange one is heated by all but one.