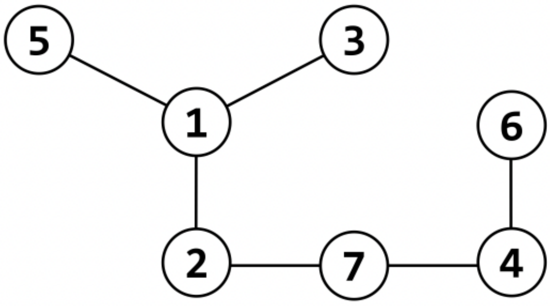
Problem B. Query on a Tree

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 mebibytes

You are given a tree where vertices are labeled with integers $1, 2, \ldots, N$.

For a subset of vertices $S \subseteq \{1, 2, \ldots, N\}$, we say two vertices (u, v) are *connected under* S if there exists a path that only passes through the vertices in S. Note that this includes endpoints of the path, so $u, v \in S$ should hold.

For example, consider the following tree and the set $S = \{1, 2, 3, 4, 5, 6\}$.



In this case, $(1, 2)$, $(3, 5)$ and $(4, 6)$ are connected under S, while $(1, 6)$ and $(2, 7)$ are not connected under S.

Let *strength*(S) be the number of pairs of vertices (u, v) such that $u \neq v$ and (u, v) are connected under S. You are given Q queries, where each query contains a set S. For each query, you should compute the quantity *strength*(S).

Input

The first line contains a single integer N, the number of vertices ($2 \leq N \leq 250\,000$).

Each of the next $N - 1$ lines contains two space-separated integers a and b: the vertices connected by an edge ($1 \leq a, b \leq N$). Together, the edges form a tree.

The next line contains a single integer Q, the number of queries ($1 \leq Q \leq 100\,000$).

Each of the next Q lines contains a query, denoted by space-separated integers. A query starts with an integer K, the size of the set ($1 \leq K \leq N$). It is followed by K distinct integers from 1 to N in arbitrary order: the vertices of set S.

The sum of K in each test case is at most $1\,000\,000$.

Output

For each of the Q queries, print a single line with the integer *strength*(S) as defined above.

Example

standard input	*standard output*
7 1 2 1 3 1 5 2 7 4 6 4 7 6 1 1 2 1 2 4 1 2 3 4 5 1 2 4 6 7 6 1 2 3 4 5 6 7 1 2 3 4 5 6 7	0 1 3 10 7 21