Tree Queries

Time Limit: 1 second

Given an undirected, unweighted tree of **N** vertices rooted at **1**, you have to answer **Q** queries. Each query is of the type : **v d**. Count the number of vertices in the subtree of **v** which are at a distance of **d** from **v**. Note that distance between nodes $\boldsymbol{u}$ and $\boldsymbol{v}$ is defined as the number of edges on the path from $\boldsymbol{u}$ to $\boldsymbol{v}$.

Input

The first line contains **N** & **Q** denoting the number of vertices and queries.
Next N - 1 lines contain $\mathbf{u_i}$ $\mathbf{v_i}$ denoting i^{th} undirected edge.
Next Q lines contain the query : **v d** denoting the vertex and the distance.

Output

Q lines each containg the answer to the query i.e. the number of vertices **u** in the subtree of **v** such that dist(u, v) = **d**.

Constraints

- $1 \leq N \leq 10^5$
- $1 \leq Q \leq 2 \text{ x } 10^5$
- $1 \leq u_i, v_i \leq N$
- $0 \leq d \leq 10^9$

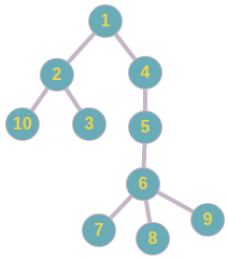

Figure 1: Graph for the first sample case

Sample Cases

Input :

10 8
1 2
2 3
2 10
1 4
4 5
5 6
6 7
6 8
6 9
2 1
1 5
8 0
4 3
1 3
5 2
4 0
1 4

Output :

2
0
1
3
1
3
1
3
