

Heights

Given a tree with N vertices. Let $H[i]$ be the height of the tree if vertex i was the root of the tree.

Compute $H[i]$ for all i from 1 to N .

Input:

First line contains N , number of vertices.

Next line $N-1$ lines contain 2 integers u, v denoting an edge between vertices u and v .

Output:

Output all $H[i]$ in order in one line with a space after each.

Constraints:

$1 \leq N \leq 10^5$

$1 \leq u, v \leq N$

It is guaranteed that the set of edges will form a tree.

Time: 1 sec

Sample Input:

```
5
1 2
1 3
3 4
3 5
```

Sample Output:

```
2 3 2 3 3
```