Kill the Tree

Description

Given a tree with N vertices(vertices are numbered from 1 to N), where 1 is the root of the tree. The weight of the edges on the tree is 1.

Define $d(u, v)$ as the distance between vertex u and v.

Define a point w on tree T a "critical point", if $c(w) = \Sigma_{v \in T} d(w, v)$ is minimum $\forall v \in T$.

Now, for all $i \in [1, N]$, you must print the "critical points" of the subtree rooted at vertex i.

Input

The first line of the input contains a integer N denotes the number of verteices of the tree.

Then, $N - 1$ line follows, the i^{th} line contains two integers a_i, b_i, denotes the i^{th} edge on the tree.

- $1 \leq N \leq 2 \times 10^5$
- $1 \leq a_i, b_i \leq N$
- The input is a tree

Output

Output N lines.

On the i^{th} line, output the "critical points" of the subtree rooted at vertex i in assending order. Two integers in one line must be separated by exactly one space, and no trailing space is allowed.

Sample Input

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

Sample Output

```
2
2
3
4
```