IOI Training Camp 2017 Practice Test 4

Odd Even Tree

You are given a tree with N nodes. For each vertex, output the number of distinct even and odd length paths passing through the vertex.
Paths A and B are considered distinct if either A or B contains some edge that the other does not contain. Empty paths are also valid paths.

Input

The first line contains one integer: N.
Next N-1 line contains 2 integers u, v which denotes that there is an edge between u and v.

Output

For nodes 1 to N, output two space separated integers in a newline: Number of odd length paths passing through the vertex, followed by Number of even length paths passing through the vertex.

Constraints

- $1 \leq N \leq 10^5$
- $1 \leq u, v \leq N$

Sample Input 1

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

Sample Output 1

```
3 3
3 3
2 2
2 2
```

Limits

Time: 2 seconds

Memory: 256 MB