

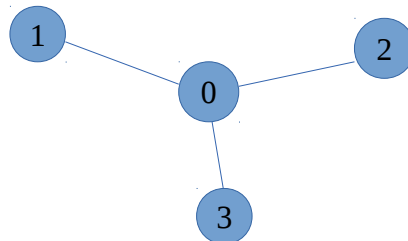
Choke Point

Time limit: 1 sec

Every strategist understands the important of choke points. A choke point is a location where military units are forced to pass to go to some places. Defending a choke point is a key to winning in a war. However, different choke points have different important. Some choke points are more valuable than others. We are considering an area full of choke points for an upcoming war. There are n choke points in this location, numbered from 0 to $n-1$. There are exactly $n-1$ bidirectional roads that connect these choke points. It is guaranteed that we can go from any choke point to another choke points by going through some of these roads and passing through the choke points along the way.



We define the important of a choke point as follows. First, we say that a pair of choke points A and B *depends on* the choke point P when going to B from A requires us to pass the choke point P. The important of a choke point X is the number of pairs of two distinct choke points that depends on X.



From the example below, the important of choke points 1 is 3 because pair (1,0), (1,2) and (1,3) depends on 1. Be noted that we don't count the pair (1,1). However, the important of choke point 0 is 6 because the pairs (0,1), (0,2), (0,3), (1,2), (1,3) and (2,3) depends on choke point 0.

Given the information about the choke points, find the important of every choke point.

Input

- The first line of input contains an integers n , the number of choke points ($1 \leq n \leq 100,000$)
- The next $n-1$ line gives information about the roads. Each line contains two integer

a, b indicating that there is a bidirectional road connecting choke point a and b. ($0 \leq a < b < n$)

Output

The output must contain exactly n lines. Each line gives the important of each choke point, starting from choke point 0 to n-1.

Example

Input	Output
4	6
0 1	3
0 2	3
0 3	3

Subtask

- 50% of test case has $n \leq 1,000$