

Problem F: Forgotten Fragments

Time limit: 5 seconds



LICE wakes up from her dream, convinced that there is more to Wonderland than it seems. The memory is already faint, so she decides to go back to sleep before the dream fades completely.

Alice identified n important dream fragments numbered 1 to n . When she goes back to sleep she will be able to move between fragments via $n - 1$ connections that hold all fragments together. However, the evil Queen of Hearts will send her deck of guards to the fragment where Alice starts her dream and make it impossible for the rest of the dream. Alice has just enough time to revisit the events at the starting fragment and escape to a neighbouring fragment before the guards arrive. Then, Alice can move freely between fragments and revisit them as long as she does not go to the starting fragment again.

After Alice wakes up again, she can reason about fragments she revisited but forgets the rest. Each fragment contains a clue and there is a consistent train of thought to unravel the true meaning of Wonderland. She will follow the clues until they lead to a fragment she did not revisit. For example, if she revisited fragments numbered 1, 2, 3, 5, and 6, she can follow the truth until the clue of the 3rd fragment.

How much of the true meaning of Wonderland can Alice unravel? Since Alice does not know where her dream will start, find the answer for all possible starts.

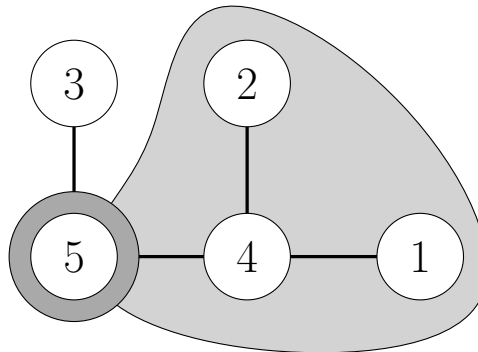


Figure F.1: Visualization of Sample Input 1. The dream starts in the fragment 5. Alice escapes to the subtree marked in gray to revisit clues 1, 2, 4, and 5. She cannot reach clue number 3 and only deciphers the meaning of the first two clues.

Input

The input consists of:

- One line with an integer n ($2 \leq n \leq 2 \cdot 10^5$), the number of dream fragments.
- $n - 1$ lines with two integers u, v ($1 \leq u, v \leq n, u \neq v$), representing a connection between the dream fragments with the u th clue and v th clue.

It is guaranteed that each dream fragment is connected directly or indirectly to every other dream fragment.

Output

Output a line with n integers a_1, \dots, a_n ($1 \leq a_i \leq n$).

The value a_i should be the number of clues Alice can decipher if she starts her dream at the fragment with number i .

Sample Input 1		Sample Output 1	
5		5	5 5 5 1 2
3	5		
5	4		
2	4		
4	1		
Sample Input 2		Sample Output 2	
5		3	5 5 5 1
1	4		
1	5		
2	5		
3	5		