Problem H. Edge Weight Assignment

Time limit   1000 ms
Mem limit   262144 kB

You have unweighted tree of n vertices. You have to assign a **positive** weight to each edge so that the following condition would hold:

- For every two different leaves v_1 and v_2 of this tree, [bitwise XOR](#) of weights of all edges on the simple path between v_1 and v_2 has to be equal to 0.

Note that you can put **very large** positive integers (like $10^{(10^{10})}$).

It's guaranteed that such assignment always exists under given constraints. Now let's define f as **the number of distinct weights** in assignment.
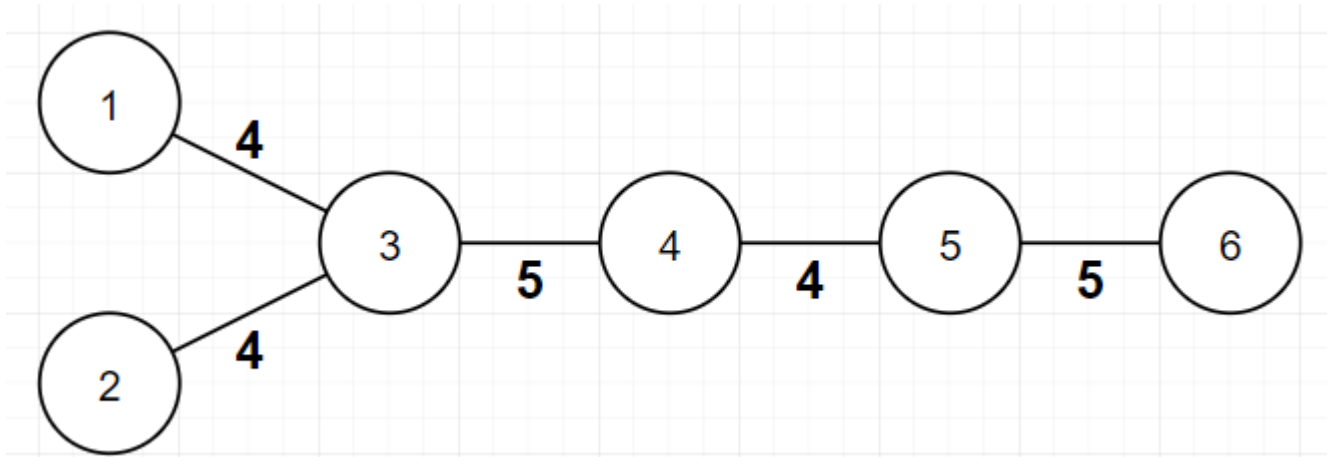
In this example, assignment is valid, because bitwise XOR of all edge weights between every pair of leaves is 0. f value is 2 here, because there are 2 distinct edge weights(4 and 5).
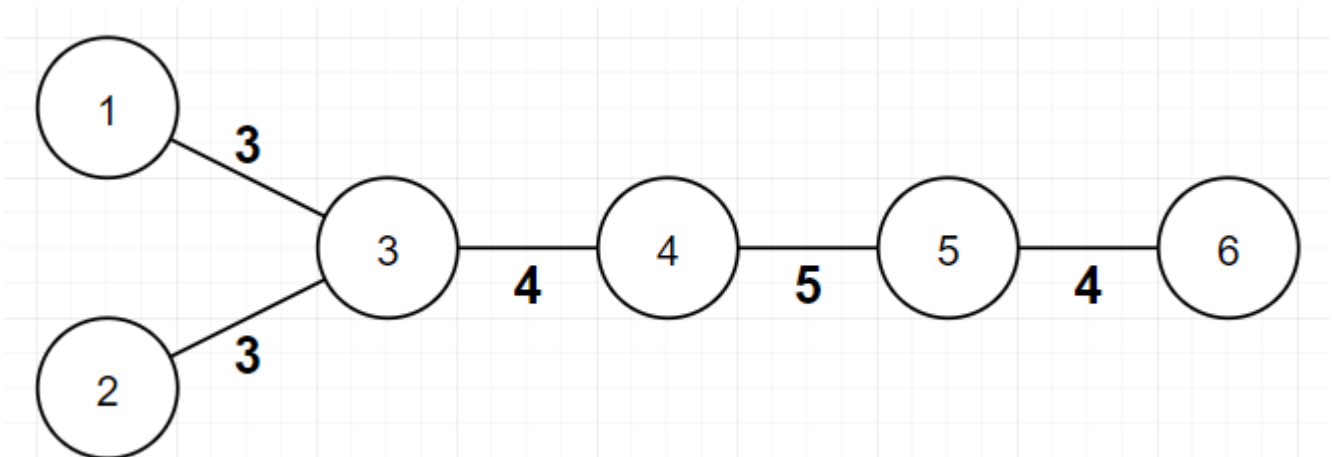
In this example, assignment is invalid, because bitwise XOR of all edge weights between vertex 1 and vertex 6 $(3, 4, 5, 4)$ is not 0.

What are the minimum and the maximum possible values of f for the given tree? Find and print both.

Input

The first line contains integer n ($3 \leq n \leq 10^5$) — the number of vertices in given tree.

The i-th of the next $n - 1$ lines contains two integers a_i and b_i ($1 \leq a_i < b_i \leq n$) — it means there is an edge between a_i and b_i. It is guaranteed that given graph forms tree of n vertices.

Output

Print two integers — the minimum and maximum possible value of f can be made from valid assignment of given tree. Note that it's always possible to make an assignment under given constraints.

Sample 1

Input	Output
6 1 3 2 3 3 4 4 5 5 6	1 4

Sample 2

Input	Output
6 1 3 2 3 3 4 4 5 4 6	3 3

Sample 3

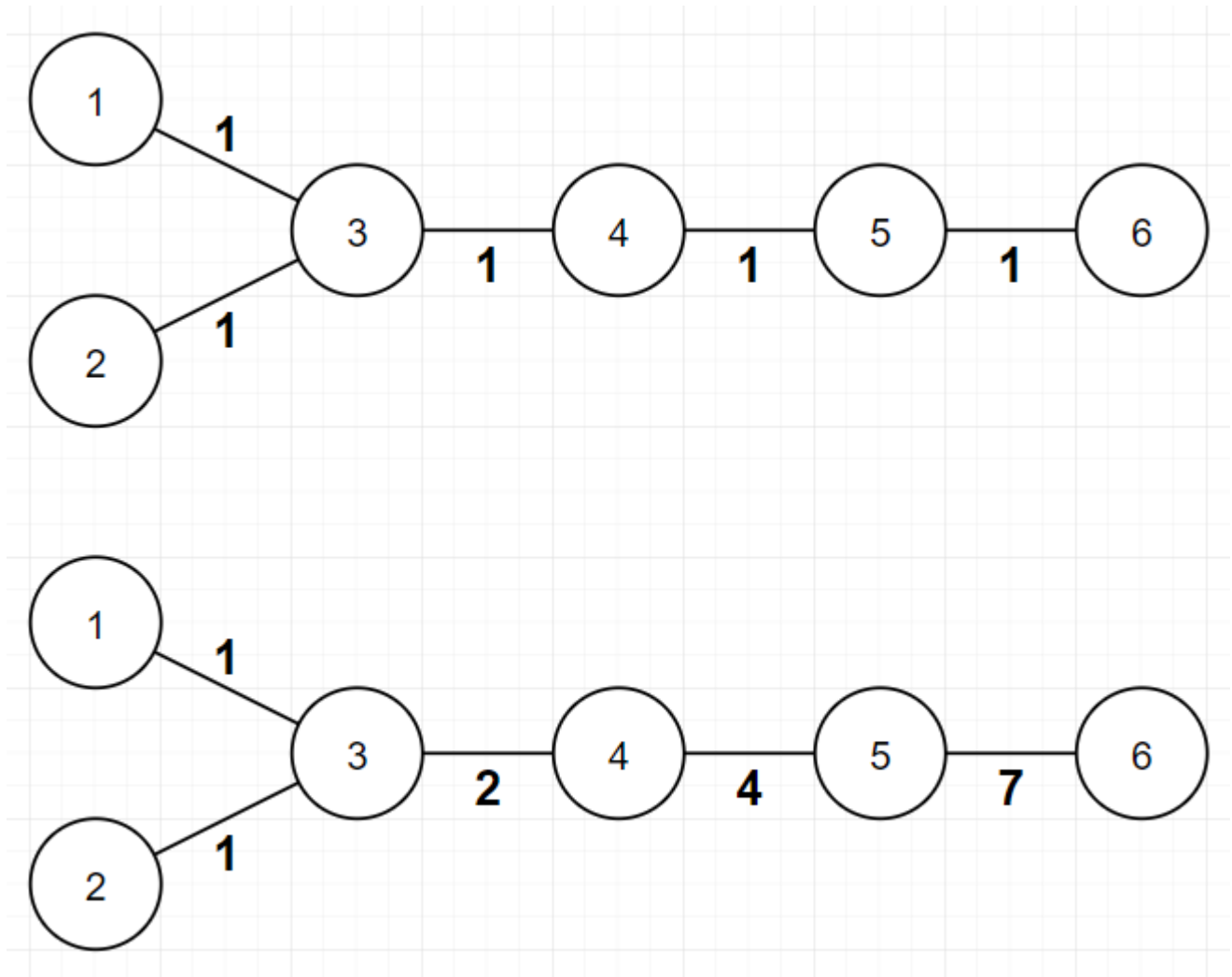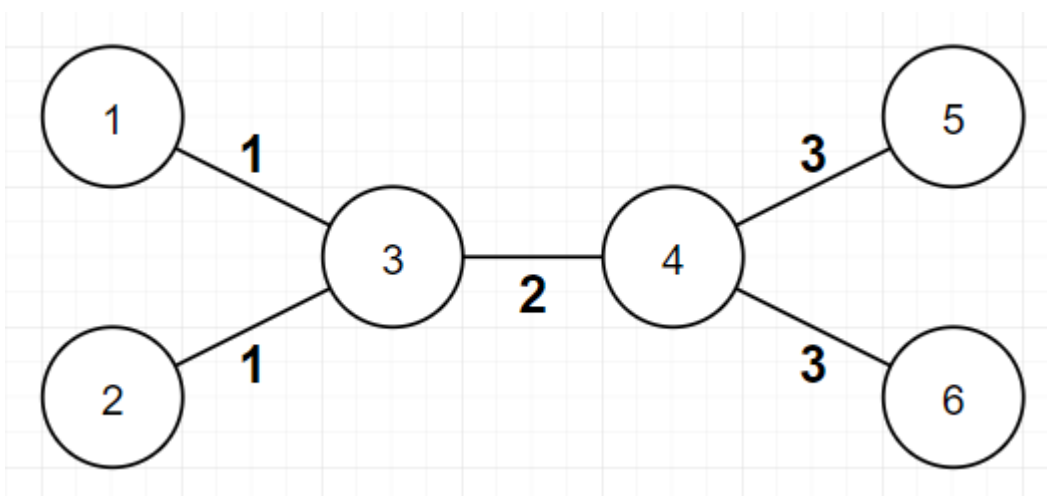| Input	Output
7 1 2 2 7 3 4 4 7 5 6 6 7	1 6

Note

In the first example, possible assignments for each minimum and maximum are described in picture below. Of course, there are multiple possible assignments for each minimum and

maximum.

In the second example, possible assignments for each minimum and maximum are described in picture below. The f value of valid assignment of this tree is always 3.

In the third example, possible assignments for each minimum and maximum are described in picture below. Of course, there are multiple possible assignments for each minimum and maximum.