# E. Centroids

time limit per test: 4 seconds memory limit per test: 512 megabytes input: standard input

output: standard output

Tree is a connected acyclic graph. Suppose you are given a tree consisting of n vertices. The vertex of this tree is called *centroid* if the size of each connected component that appears if this vertex is removed from the tree doesn't exceed  $\frac{n}{2}$ .

You are given a tree of size n and can perform no more than one edge replacement. *Edge replacement* is the operation of removing one edge from the tree (without deleting incident vertices) and inserting one new edge (without adding new vertices) in such a way that the graph remains a tree. For each vertex you have to determine if it's possible to make it centroid by performing no more than one edge replacement.

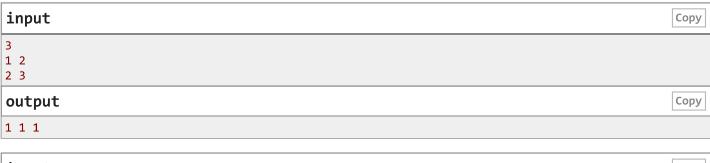
### Input

The first line of the input contains an integer n ( $2 \le n \le 400\ 000$ ) — the number of vertices in the tree. Each of the next n - 1 lines contains a pair of vertex indices  $u_i$  and  $v_i$  ( $1 \le u_i$ ,  $v_i \le n$ ) — endpoints of the corresponding edge.

## Output

Print n integers. The i-th of them should be equal to 1 if the i-th vertex can be made centroid by replacing no more than one edge, and should be equal to 0 otherwise.

#### **Examples**



input	Сору
5	
1 2	
1 3	
1 4	
1 5	
output	Сору
1 0 0 0 0	

#### Note

In the first sample each vertex can be made a centroid. For example, in order to turn vertex 1 to centroid one have to replace the edge (2,3) with the edge (1,3).