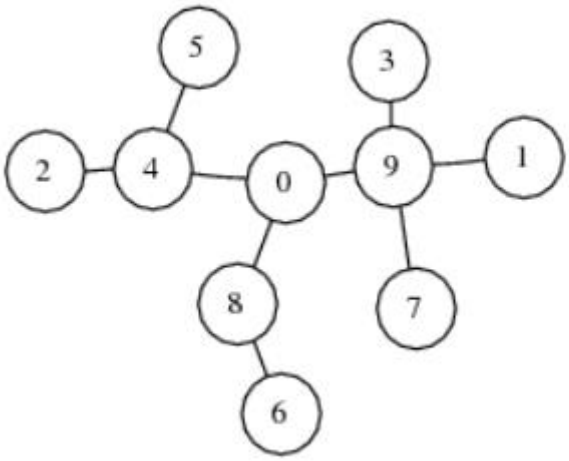
City Connection

All submissions for this problem are available.

A network consisting of N cities and roads connecting them is given. Cities are labeled with distinct integers within range [0..(N-1)].

Roads connect cities in such a way that each pair of distinct cities is connected either by a direct road or along a path consisting of direct roads or not connected at all. The minimum number of direct roads that must be traversed is called distance between these two cities.

For example, consider the following network consisting of ten cities and nine roads:



Cities 2 and 4 are connected directly, so the distance between them is 1. Cities 4 and 7 are connected by a path consisting of the roads 4-0, 0-9 and 9-7; hence the distance between them is 3.
One of the cities is capital, and the goal is to count the number of cities positioned away from it at each of distances 1,2,3,...,N-1.

If city number 1 is the capital, then the cities positioned at various distances from the capital would be as follows:

9 is at a distance of 1;
0,3,7 are at a distance of 2;
8,4 are at a distance of 3;
2,5,6 are at a distance of 4

Given a non empty zero-indexed array T consisting of N integers describing a network of N cities and N-1 roads, returns an array consisting of N-1 integers, specifying the number of cities positioned at each distance 1,2,...N-1.

Array T describes a network of cities as follows:
If T[P] = Q and P = Q, then P is the capital;
If T[P] = Q and P is not equal to Q, then there is a direct road between cities P and Q.

For Example:

Input:

First line of input is number of cities and next line is N number which defines connection of cities
Example:
10
9 1 4 9 0 4 8 9 0 1

Output:
1 3 2 3 0 0 0 0 0

Constraint
N is an integer within the range [1...,100000];
Each element of array T is an integer within the range [0..N-1];
It may be possible that two cities may not be connected