**○** Contests **②** Rank

# **Unique Colors**



Problem Submissions Leaderboard Discussions

Leaderboard

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Submissions: 84

Max Score: 100

More

Difficulty: Advanced

You are given an unrooted tree of n nodes numbered from 1 to n. Each node i has a color,  $c_i$ .

Let d(i,j) be the number of different colors in the path between node i and node j. For each node i, calculate the value of  $sum_i$ , defined as follows:

$$sum_i = \sum_{j=1}^n d(i,j)$$

Your task is to print the value of  $sum_i$  for each node  $1 \leq i \leq n$ .

#### **Input Format**

The first line contains a single integer, n, denoting the number of nodes.

The second line contains n space-separated integers,  $c_1, c_2, \ldots, c_n$ , where each  $c_i$  describes the color of node i. Each of the n-1 subsequent lines contains 2 space-separated integers, a and b, defining an undirected edge between nodes a and b.

#### Constraints

- $1 \le n \le 10^5$
- $1 \leq c_i \leq 10^5$

#### **Output Format**

Print n lines, where the  $i^{th}$  line contains a single integer denoting  $sum_i$ .

### Sample Input

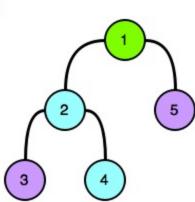
```
5
1 2 3 2 3
1 2
2 3
2 4
1 5
```

#### Sample Output

```
10
9
11
9
12
```

## Explanation

The Sample Input defines the following tree:



Each  $sum_i$  is calculated as follows:

1. 
$$sum_1 = d(1,1) + d(1,2) + d(1,3) + d(1,4) + d(1,5) = 1 + 2 + 3 + 2 + 2 = 10$$

2. 
$$sum_2 = d(2,1) + d(2,2) + d(2,3) + d(2,4) + d(2,5) = 2 + 1 + 2 + 1 + 3 = 9$$

3. 
$$sum_3 = d(3,1) + d(3,2) + d(3,3) + d(3,4) + d(3,5) = 3 + 2 + 1 + 2 + 3 = 11$$

4. 
$$sum_4 = d(4,1) + d(4,2) + d(4,3) + d(4,4) + d(4,5) = 2 + 1 + 2 + 1 + 3 = 9$$

5. 
$$sum_5 = d(5,1) + d(5,2) + d(5,3) + d(5,4) + d(5,5) = 2 + 3 + 3 + 3 + 1 = 12$$

