EIUSUBTREE

Given a tree which has n nodes, numbered from 0 to n-1. Node 0 is the root of the tree. Each node has its weight which is an integer number. Write a program to calculate the weight of all subtrees, which is the total weight of all the subtree's nodes.

Input

The first line contains the number of nodes n ($1 \leq n \leq 10^5$).

The second line contains n integers which are the weight of node 0 to node (n-1) respectively.

Each of the next n-1 lines contains 2 integers u, v representing an edge between u and v.

Output

Print out the maximum weight of all subtrees.

Sample

Input	Output
6 1 5 0 2 -5 1 1 0 2 0 2 3 2 4 2 5	5