BSSPC '19 P10 - Tree Subsets

Problem Statement

You are given a rooted tree with N ($1 \leq N \leq 10^5$) nodes. The nodes are numbered from 1 to N, and the root of the tree is labelled 1.

Each vertex has a weight attached, namely v_i ($-10^5 \leq v_i \leq 10^5$) for the vertex labelled i.

Write a program to find the maximal weight sum that can be achieved by selecting a subset of nodes from the tree, with the added restriction that a node and its parent cannot be simultaneously selected.

Input Specification

The first line contains the number of vertices N.

The next line contains N integers containing weights $v_1, \ldots, v_n$.

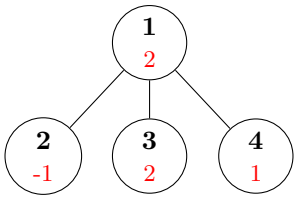
For the next $(N-1)$ lines are two integers i, j where $1 \leq i, j \leq N$. This represents an edge from vertex i and vertex j.

Output Specification

Output the maximal sum as a single integer.

Sample 1

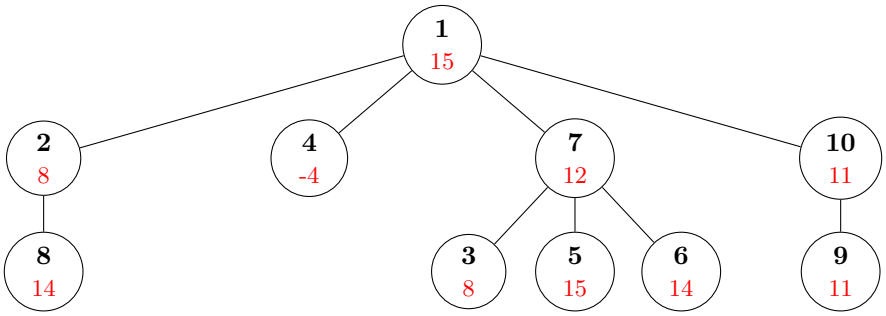
Input	Output
4 2 -1 2 1 1 2 1 3 1 4	3



We pick vertices 3 and 4 for a total weight of $2 + 1 = 3$.

Sample 2

Input	Output
10 15 8 8 -4 15 14 12 14 11 11 7 1 1 2 7 3 1 4 7 5 7 6 2 8 10 9 1 10	77



We pick vertices 1, 3, 5, 6, 8, 9 with a total value of 77.