

Is it well known in Poland?

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

This problem might be well-known in some countries, but how do other countries learn about such problems if nobody poses them?

Little Cyan Fish (Xiao Qingyu) and Huge Nucleus Kernel (Da Heren) are two inseparable friends.

In the year 2020, during his training for the National Olympiad, Little Cyan Fish endeavored to solve a fascinating problem from Potyczki Algorytmiczne 2010.

Two termites are eating an old wooden fence. This fence consists of planks of possibly different heights. Termites have already eaten some of them, and they thought that they should make their meal more interesting. They have decided to play a game and eat the planks in turns, one by one. During one turn, a termite may choose to eat only a plank which is next to a plank that has already been consumed.

Assuming that each termite chooses the planks in such a way, that during the whole game the sum of heights of all planks eaten by her is as big as possible, compute the amount of wood that each of them will have eaten.

Task author: Tomasz Idziaszek.

The problem intrigued Little Cyan Fish, leaving a profound impression on him.

Years later, when Huge Nucleus Kernel needed to prepare a task for a competition, he shared it with Little Cyan Fish. Little Cyan Fish was astounded as it reminded him of that captivating problem. To inspire more people to attempt and solve this intriguing problem, Little Cyan Fish and Huge Nucleus Kernel decided to include it in a Universal Cup Contest.

Little A and Little B are engaged in a game. They are presented with a rooted tree forest, where each vertex u carries a positive integer value A_u .

Little A and Little B alternate turns, with Little A starting the game. The current player must choose exactly one tree root to eliminate, thereby gaining its node value. The subtree of the eliminated root forms a new rooted tree, and the children of the eliminated root become the new tree roots.

The game concludes when all vertices have been removed. The score of a player is the sum of the vertices values they have eliminated.

Both players aim to optimize their scores, employing the best strategies. Determine the final score of Little A.

The initial scenario provides a single tree with n vertices. The vertices are numbered from 1 to n , with vertices 1 being the root.

Input

The first line contains an integer n ($2 \leq n \leq 10^5$) indicating the size of the tree.

The second line contains n integers $a_1, a_2, \dots, a_n$ ($1 \leq a_i \leq 10^9$) where a_i indicates the value of the vertex i .

For the following $(n - 1)$ lines, the i -th line contains two integers u_i and v_i ($1 \leq u_i, v_i \leq n$, $u_i \neq v_i$) indicating an edge connecting vertices u_i and v_i .

Output

Output a single line contains a single integer, indicating the answer.

Example

standard input	standard output
5 1 5 3 2 4 1 2 1 3 2 4 2 5	7