

3191. Maximum Score After Applying Operations on a Tree

Difficulty : Medium

<https://leetcode.com/problems/maximum-score-after-applying-operations-on-a-tree>

There is an undirected tree with n nodes labeled from 0 to $n - 1$, and rooted at node 0 . You are given a 2D integer array `edges` of length $n - 1$, where `edges[i] = [ai, bi]` indicates that there is an edge between nodes a_i and b_i in the tree.

You are also given a **0-indexed** integer array `values` of length n , where `values[i]` is the **value** associated with the i^{th} node.

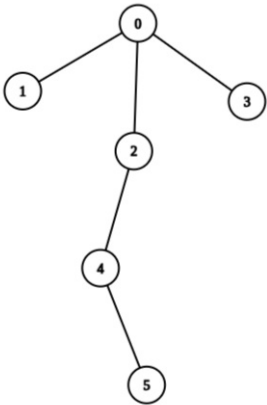
You start with a score of 0 . In one operation, you can:

- Pick any node i .
- Add `values[i]` to your score.
- Set `values[i]` to 0 .

A tree is **healthy** if the sum of values on the path from the root to any leaf node is different than zero.

Return the **maximum score** you can obtain after performing these operations on the tree any number of times so that it remains **healthy**.

Example 1:

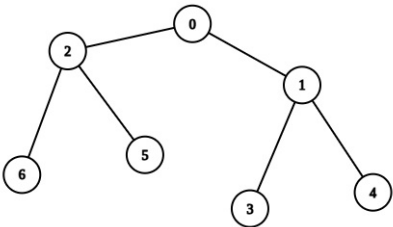


Input: `edges = [[0,1],[0,2],[0,3],[2,4],[4,5]]`, `values = [5,2,5,2,1,1]`

Output: 11

Explanation: We can choose nodes 1, 2, 3, 4, and 5. The value of the root is non-zero. Hence, the sum of values on the path from the root to any leaf is different than zero. Therefore, the tree is healthy. It can be shown that 11 is the maximum score obtainable after any number of operations on the tree.

Example 2:



Input: `edges = [[0,1],[0,2],[1,3],[1,4],[2,5],[2,6]]`, `values = [20,10,9,7,4,3,5]`

Output: 40

Explanation: We can choose nodes 0, 2, 3, and 4.

- The sum of values on the path from 0 to 4 is equal to 10.
- The sum of values on the path from 0 to 3 is equal to 10.
- The sum of values on the path from 0 to 5 is equal to 3.
- The sum of values on the path from 0 to 6 is equal to 5.

Therefore, the tree is healthy and the score is `values[0] + values[2] + values[3] + values[4] = 40`.

It can be shown that 40 is the maximum score obtainable after any number of operations on the tree.

Constraints:

- $2 \leq n \leq 2 \cdot 10^4$
- `edges.length == n - 1`
- `edges[i].length == 2`
- $0 \leq a_i, b_i < n$
- `values.length == n`
- $1 \leq values[i] \leq 10^9$
- The input is generated such that `edges` represents a valid tree.