6419. Make Costs of Paths Equal in a Binary Tree

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User Accepted:	0
User Tried:	0
Total Accepted:	0
Total Submissions:	0
Difficulty:	Medium

You are given an integer `n` representing the number of nodes in a **perfect binary tree** consisting of nodes numbered from `1` to `n`. The root of the tree is node `1` and each node `i` in the tree has two children where the left child is the node `2 * i` and the right child is `2 * i + 1`.

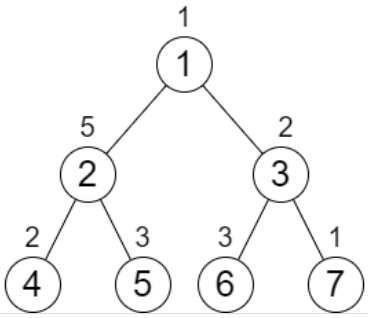
Each node in the tree also has a **cost** represented by a given **0-indexed** integer array `cost` of size `n` where `cost[i]` is the cost of node `i + 1`. You are allowed to **increment** the cost of **any** node by `1` **any** number of times.

Return *the **minimum** number of increments you need to make the cost of paths from the root to each **leaf** node equal*.

Note:

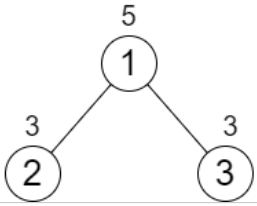
- A **perfect binary tree** is a tree where each node, except the leaf nodes, has exactly 2 children.
- The **cost of a path** is the sum of costs of nodes in the path.

Example 1:




```
Input: n = 7, cost = [1,5,2,2,3,3,1]
Output: 6
Explanation: We can do the following increments:
- Increase the cost of node 4 one time.
- Increase the cost of node 3 three times.
- Increase the cost of node 7 two times.
Each path from the root to a leaf will have a total cost of 9.
The total increments we did is 1 + 3 + 2 = 6.
It can be shown that this is the minimum answer we can achieve.
```

Example 2:




```
Input: n = 3, cost = [5,3,3]
Output: 0
Explanation: The two paths already have equal total costs, so no increments are needed.
```

Constraints:

- `3 <= n <= 10^5`
- `n + 1` is a power of `2`
- `cost.length == n`
- `1 <= cost[i] <= 10^4`

JavaScript

```javascript
let n, res, a;
const minIncrements = (N, cost) => {
    n = N, res = 0, a = cost;
    DFS(1);
    return res;
};

const DFS = (i) => {
    if (!ok(i)) return 0;
    let lsum = DFS(left(i)), rsum = DFS(right(i)), more = Math.max(lsum, rsum), less = Math.min(lsum, rsum);
    res += more - less;
    return more + a[i - 1];
};

const left = (i) => 2 * i;
const right = (i) => 2 * i + 1;
const ok = (i) => i >= 1 && i <= n;
```

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