2920. Maximum Points After Collecting Coins From All Nodes

Description

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

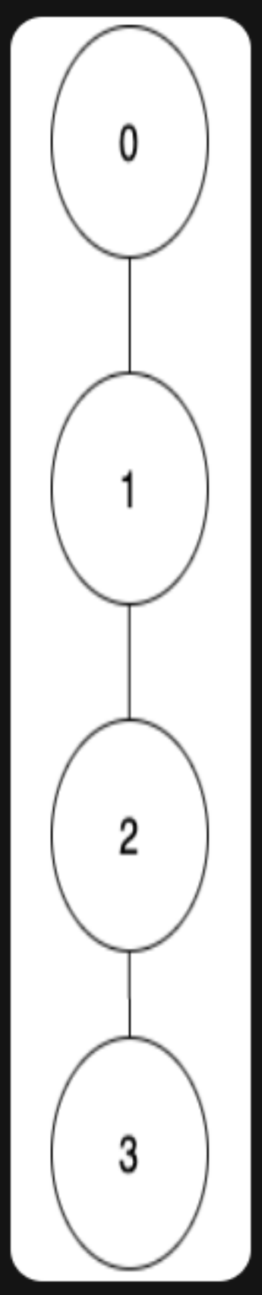
Starting from the root, you have to collect all the coins such that the coins at a node can only be collected if the coins of its ancestors have been already collected.

Coins at $node_i$ can be collected in one of the following ways:

- Collect all the coins, but you will get `coins[i] - k` points. If `coins[i] - k` is negative then you will lose `abs(coins[i] - k)` points.
- Collect all the coins, but you will get `floor(coins[i] / 2)` points. If this way is used, then for all the $node_j$ present in the subtree of $node_i$, `coins[j]` will get reduced to `floor(coins[j] / 2)`.

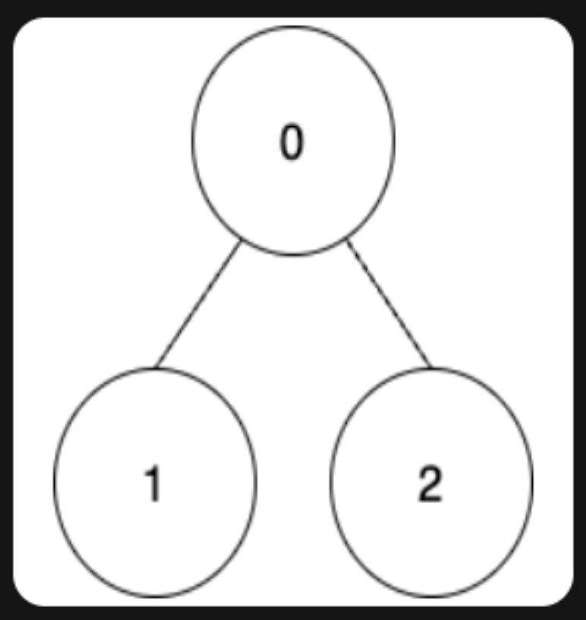
Return *the **maximum points** you can get after collecting the coins from **all** the tree nodes.*

Example 1:



```
Input: edges = [[0,1],[1,2],[2,3]], coins = [10,10,3,3], k = 5
Output: 11
Explanation:
Collect all the coins from node 0 using the first way. Total points = 10 - 5 = 5.
Collect all the coins from node 1 using the first way. Total points = 5 + (10 - 5) = 10.
Collect all the coins from node 2 using the second way so coins left at node 3 will be floor(3 / 2) = 1. Total points = 10 + floor(3 / 2) = 11.
Collect all the coins from node 3 using the second way. Total points = 11 + floor(1 / 2) = 11.
It can be shown that the maximum points we can get after collecting coins from all the nodes is 11.
```

Example 2:



```
Input: edges = [[0,1],[0,2]], coins = [8,4,4], k = 0
Output: 16
Explanation:
Coins will be collected from all the nodes using the first way. Therefore, total points = (8 - 0) + (4 - 0) + (4 - 0) = 16.
```

Constraints:

- `n == coins.length`
- $2 <= n <= 10^5$
- $0 <= coins[i] <= 10^4$
- `edges.length == n - 1`
- `0 <= edges[i][0], edges[i][1] < n`
- $0 <= k <= 10^4$