2846. Minimum Edge Weight Equilibrium Queries in a Tree

Description

There is an undirected tree with `n` nodes labeled from `0` to `n - 1`. You are given the integer `n` and a 2D integer array `edges` of length `n - 1`, where `edges[i] = [u_i, v_i, w_i]` indicates that there is an edge between nodes `u_i` and `v_i` with weight `w_i` in the tree.

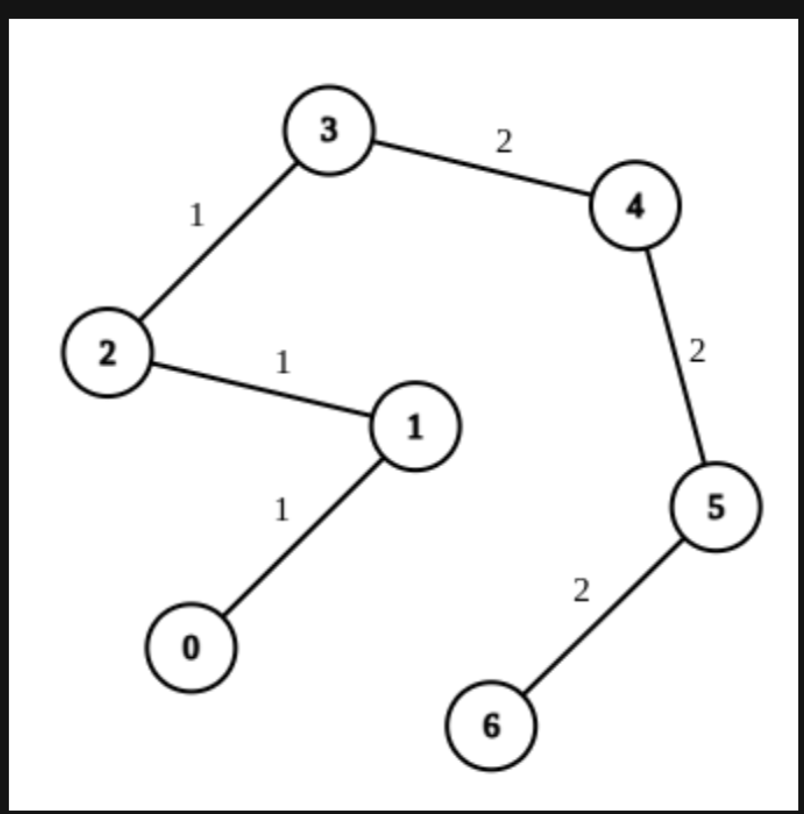
You are also given a 2D integer array `queries` of length `m`, where `queries[i] = [a_i, b_i]`. For each query, find the **minimum number of operations** required to make the weight of every edge on the path from `a_i` to `b_i` equal. In one operation, you can choose any edge of the tree and change its weight to any value.

Note that:

- Queries are **independent** of each other, meaning that the tree returns to its **initial state** on each new query.
- The path from `a_i` to `b_i` is a sequence of **distinct** nodes starting with node `a_i` and ending with node `b_i` such that every two adjacent nodes in the sequence share an edge in the tree.

Return *an array* `answer` *of length* `m` *where* `answer[i]` *is the answer to the* `i^th` *query.*

Example 1:




```
Input: n = 7, edges = [[0,1,1],[1,2,1],[2,3,1],[3,4,2],[4,5,2],[5,6,2]], queries = [[0,3],[3,6],[2,6],[0,6]]
Output: [0,0,1,3]
Explanation: In the first query, all the edges in the path from 0 to 3 have a weight of 1. Hence, the answer is 0.
In the second query, all the edges in the path from 3 to 6 have a weight of 2. Hence, the answer is 0.
In the third query, we change the weight of edge [2,3] to 2. After this operation, all the edges in the path from 2 to 6 have a weight of 2. Hence, the answer is 1.
In the fourth query, we change the weights of edges [0,1], [1,2] and [2,3] to 2. After these operations, all the edges in the path from 0 to 6 have a weight of 2. Hence, the answer is 3.
For each queries[i], it can be shown that answer[i] is the minimum number of operations needed to equalize all the edge weights in the path from a_i to b_i.
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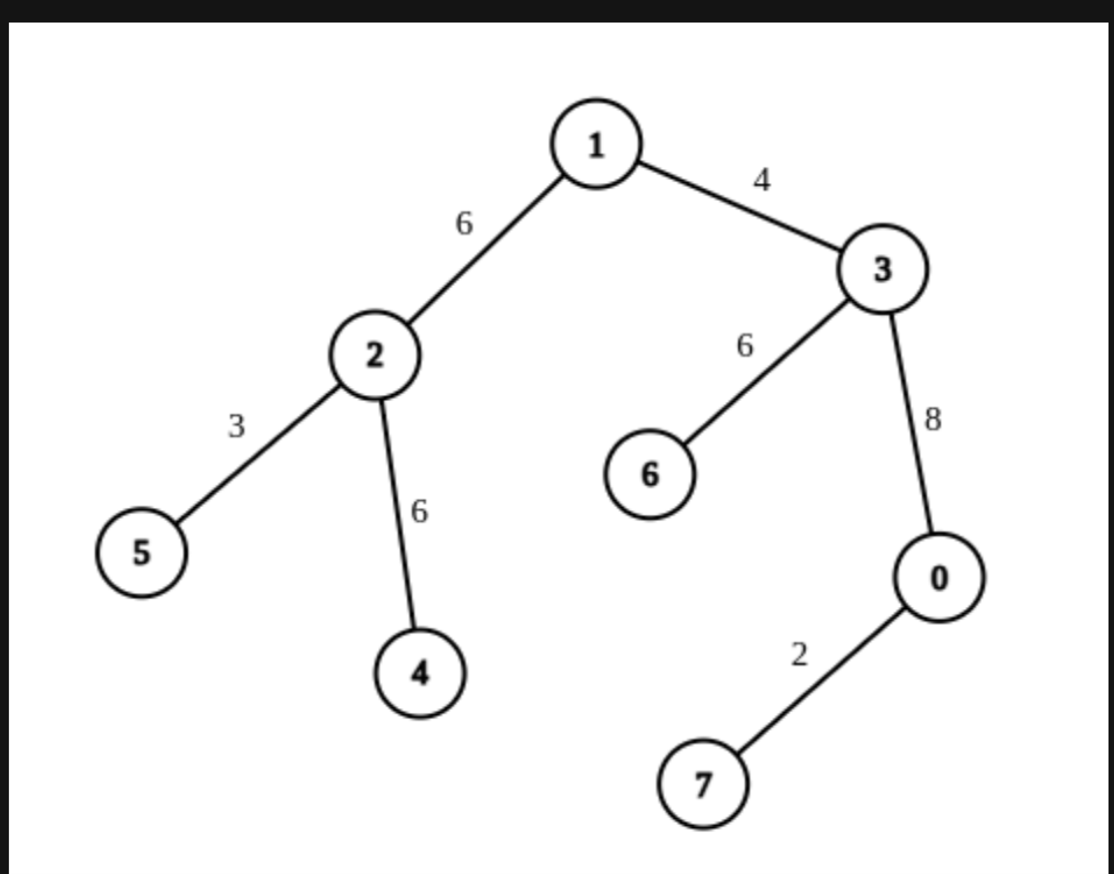
Example 2:




```
Input: n = 8, edges = [[1,2,6],[1,3,4],[2,4,6],[2,5,3],[3,6,6],[3,0,8],[7,0,2]], queries = [[4,6],[0,4],[6,5],[7,4]]
Output: [1,2,2,3]
Explanation: In the first query, we change the weight of edge [1,3] to 6. After this operation, all the edges in the path from 4 to 6 have a weight of 6. Hence, the answer is 1.
In the second query, we change the weight of edges [0,3] and [3,1] to 6. After these operations, all the edges in the path from 0 to 4 have a weight of 6. Hence, the answer is 2.
In the third query, we change the weight of edges [1,3] and [5,2] to 6. After these operations, all the edges in the path from 6 to 5 have a weight of 6. Hence, the answer is 2.
In the fourth query, we change the weights of edges [0,7], [0,3] and [1,3] to 6. After these operations, all the edges in the path from 7 to 4 have a weight of 6. Hence, the answer is 3.
For each queries[i], it can be shown that answer[i] is the minimum number of operations needed to equalize all the edge weights in the path from a_i to b_i.
```

Constraints:

- $1 <= n <= 10^4$
- `edges.length == n - 1`
- `edges[i].length == 3`
- `0 <= u_i, v_i < n`
- `1 <= w_i <= 26`
- The input is generated such that `edges` represents a valid tree.
- $1 <= queries.length == m <= 2 * 10^4$
- `queries[i].length == 2`
- `0 <= a_i, b_i < n`