path-in-a-grid-with-obstacles-elimination

6223. Height of Binary Tree After Subtree Removal Queries

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Back to Contest (/contest/weekly-contest-317/)

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Total Accepted:	0
Total Submissions:	1
Difficulty:	Hard

You are given the `root` of a **binary tree** with `n` nodes. Each node is assigned a unique value from `1` to `n`. You are also given an array `queries` of size `m`.

You have to perform `m` **independent** queries on the tree where in the i^{th} query you do the following:

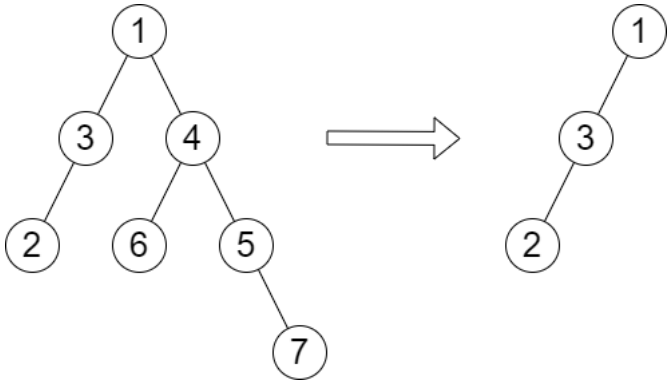
- **Remove** the subtree rooted at the node with the value `queries[i]` from the tree. It is **guaranteed** that `queries[i]` will **not** be equal to the value of the root.

Return *an array* `answer` *of size* `m` *where* `answer[i]` *is the height of the tree after performing the* i^{th} *query*.

Note:

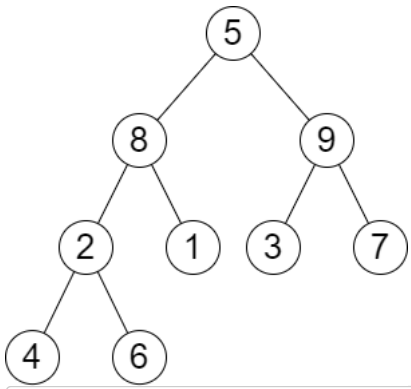
- The queries are independent, so the tree returns to its **initial** state after each query.
- The height of a tree is the **number of edges in the longest simple path** from the root to some node in the tree.

Example 1:




```
Input: root = [1,3,4,2,null,6,5,null,null,null,null,null,7], queries = [4]
Output: [2]
Explanation: The diagram above shows the tree after removing the subtree rooted at node with value 4.
The height of the tree is 2 (The path 1 -> 3 -> 2).
```

Example 2:




```
Input: root = [5,8,9,2,1,3,7,4,6], queries = [3,2,4,8]
Output: [3,2,3,2]
Explanation: We have the following queries:
- Removing the subtree rooted at node with value 3. The height of the tree becomes 3 (The path 5 -> 8 -> 2 -> 4).
- Removing the subtree rooted at node with value 2. The height of the tree becomes 2 (The path 5 -> 8 -> 1).
- Removing the subtree rooted at node with value 4. The height of the tree becomes 3 (The path 5 -> 8 -> 2 -> 6).
- Removing the subtree rooted at node with value 8. The height of the tree becomes 2 (The path 5 -> 9 -> 3).
```

Constraints:

- The number of nodes in the tree is `n`.
- `2 <= n <= 10^5`
- `1 <= Node.val <= n`
- All the values in the tree are **unique**.
- `m == queries.length`
- `1 <= m <= min(n, 10^4)`
- `1 <= queries[i] <= n`
- `queries[i] != root.val`

JavaScript

```
let dep, L, R, n, cnt;
const treeQueries = (root, queries) => {
    n = 0, cnt = 0, dep = [], L = [], R = [];
    dfs(root, 0);
    let pre = Array(n + 2).fill(0), suf = Array(n + 2).fill(0), res = [];
    for (let i = 1; i <= n; i++) pre[i] = Math.max(pre[i - 1], dep[i]);
    for (let i = n; i > 0; i--) suf[i] = Math.max(suf[i + 1], dep[i]);
    for (const q of queries) res.push(Math.max(pre[L[q] - 1], suf[R[q] + 1]));
    return res;
};

const dfs = (cur, d) => {
    let idx = cur.val;
    n = Math.max(idx, n);
    while (dep.length < n) {
        dep.push(0);
        L.push(0);
        R.push(0);
    }
    cnt++;
    dep[cnt] = d;
    L[idx] = cnt;
    if (cur.left) dfs(cur.left, d + 1);
    if (cur.right) dfs(cur.right, d + 1);
    R[idx] = cnt;
};
```

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