Problem 1483: Kth Ancestor of a Tree Node

Problem Information

Difficulty: Hard
Acceptance Rate: 36.65%
Paid Only: No
Tags: Binary Search, Dynamic Programming, Bit Manipulation, Tree, Depth-First Search, Breadth-First Search, Design

Problem Description

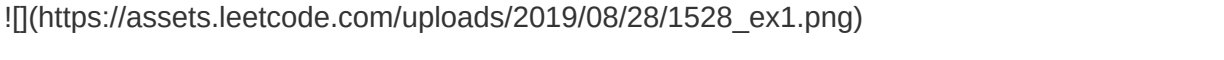
You are given a tree with `n` nodes numbered from `0` to `n - 1` in the form of a parent array `parent` where `parent[i]` is the parent of `ith` node. The root of the tree is node `0`. Find the `kth` ancestor of a given node.

The `kth` ancestor of a tree node is the `kth` node in the path from that node to the root node.

Implement the `TreeAncestor` class:

* `TreeAncestor(int n, int[] parent)` Initializes the object with the number of nodes in the tree and the parent array. * `int getKthAncestor(int node, int k)` return the `kth` ancestor of the given node `node`. If there is no such ancestor, return `-1`.

Example 1:



Input ["TreeAncestor", "getKthAncestor", "getKthAncestor", "getKthAncestor"] [[7, [-1, 0, 0, 1, 1, 2, 2]], [3, 1], [5, 2], [6, 3]] **Output** [null, 1, 0, -1] **Explanation** TreeAncestor treeAncestor = new TreeAncestor(7, [-1, 0, 0, 1, 1, 2, 2]); treeAncestor.getKthAncestor(3, 1); // returns 1 which is the parent of 3 treeAncestor.getKthAncestor(5, 2); // returns 0 which is the grandparent of 5 treeAncestor.getKthAncestor(6, 3); // returns -1 because there is no such ancestor

Constraints:

* `1 <= k <= n <= 5 * 104` * `parent.length == n` * `parent[0] == -1` * `0 <= parent[i] < n` for all `0 < i < n` * `0 <= node < n` * There will be at most `5 * 104` queries.

Code Snippets

C++:

```
class TreeAncestor {
public:
TreeAncestor(int n, vector<int>& parent) {

}

int getKthAncestor(int node, int k) {

}
};

/**
* Your TreeAncestor object will be instantiated and called as such:
* TreeAncestor* obj = new TreeAncestor(n, parent);
* int param_1 = obj->getKthAncestor(node,k);
*/
```

Java:

```
class TreeAncestor {

public TreeAncestor(int n, int[] parent) {

}

public int getKthAncestor(int node, int k) {

}
}

/**
* Your TreeAncestor object will be instantiated and called as such:
* TreeAncestor obj = new TreeAncestor(n, parent);
* int param_1 = obj.getKthAncestor(node,k);
```

```
*/
```

Python3:

```
class TreeAncestor:

def __init__(self, n: int, parent: List[int]):


def getKthAncestor(self, node: int, k: int) -> int:



# Your TreeAncestor object will be instantiated and called as such:
# obj = TreeAncestor(n, parent)
# param_1 = obj.getKthAncestor(node,k)
```