110. Balanced Binary Tree

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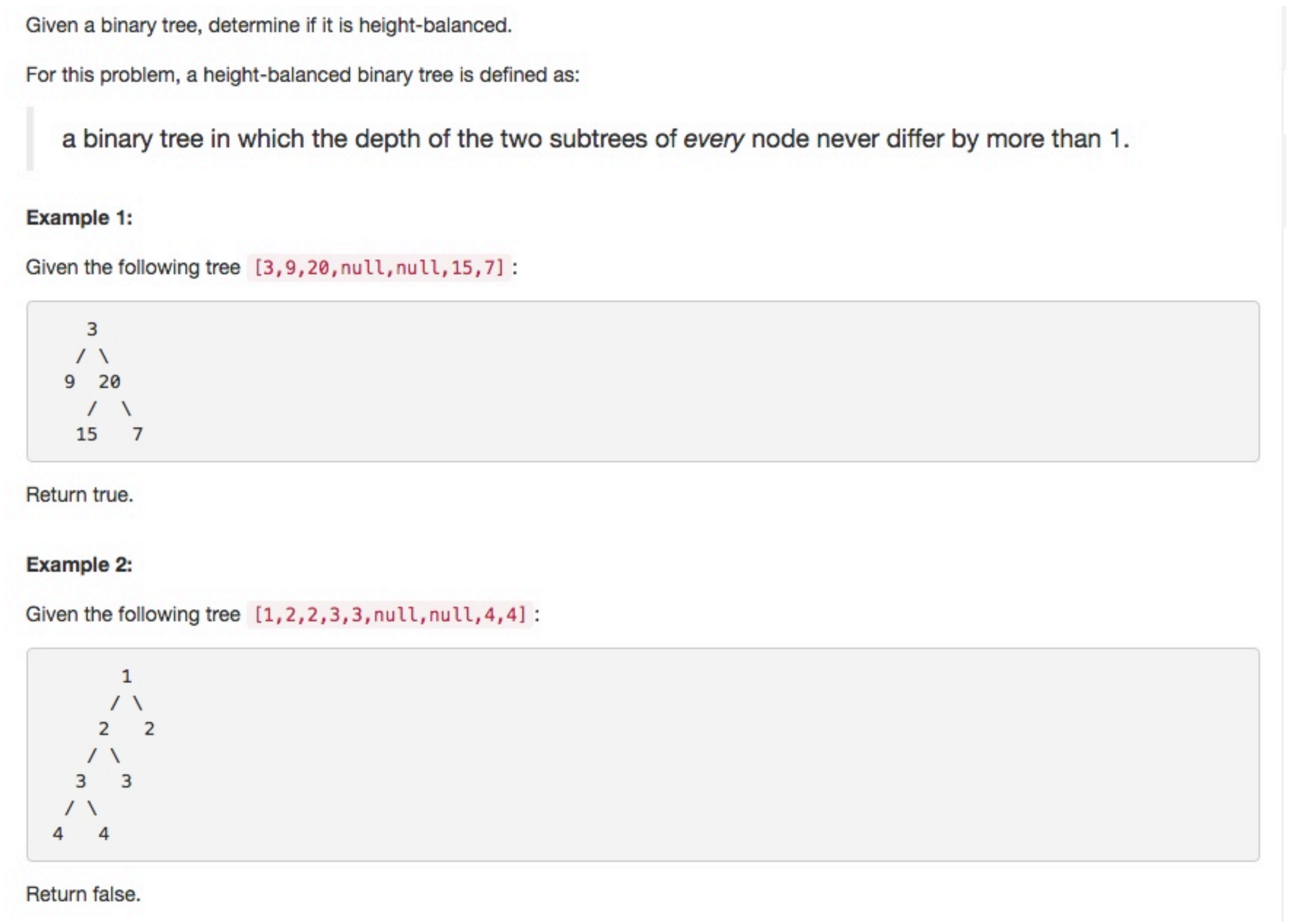
- **Depth-first Search** + Tree

Description



Given a binary tree, determine if it is height-balanced.

For this problem, a height-balanced binary tree is defined as:

> a binary tree in which the depth of the two subtrees of *every* node never differ by more than 1.

Example 1:

Given the following tree `[3,9,20,null,null,15,7]`:

```
    3
   / \
  9  20
    /  \
   15   7
```

Return true.

Example 2:

Given the following tree `[1,2,2,3,3,null,null,4,4]`:

```
       1
      / \
     2   2
    / \
   3   3
  / \
 4   4
```

Return false.

1. Thought line

- Height-balanced BST

2. Depth-first Search + Tree

```
/**
 * Definition for a binary tree node.
 * struct TreeNode {
 *     int val;
 *     TreeNode *left;
```

```cpp
 *     TreeNode *right;
 *     TreeNode(int x) : val(x), left(NULL), right(NULL) {}
 * };
 */
class Solution {
private:
    int findHeight(TreeNode* node){
        if (!node) return 0;
        return 1+max(findHeight(node->left), findHeight(node->right));
    }
public:
    bool isBalanced(TreeNode* root) {
        if (root==nullptr) return true;
        int leftHight = findHeight(root->left);
        int rightHight = findHeight(root->right);
        bool current = (abs(leftHight - rightHight)<=1)?true:false;
        return current && isBalanced(root->left) && isBalanced(root->right);
    }
};
```