GRAPH (BFS)

Problem – Maximum Level Sum of a Binary Tree

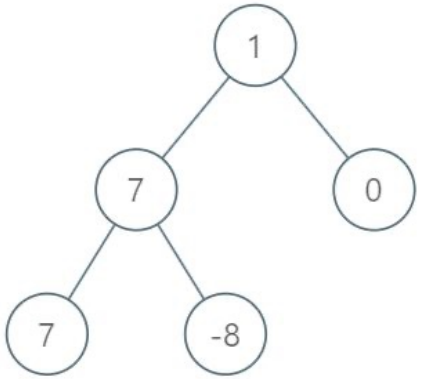
Medium

https://leetcode.com/problems/maximum-level-sum-of-a-binary-tree

Given the **root** of a binary tree, the level of its root is **1**, the level of its children is **2**, and so on.

Return the **smallest level** x such that the sum of all the values of nodes at level **x** is **maximal.**

Input: root = [1,7,0,7,-8,null,null]
Output: 2
Explanation:
Level 1 sum = 1.
Level 2 sum = 7 + 0 = 7.
Level 3 sum = 7 + -8 = -1.
So we return the level with the maximum sum which is level 2.



Solution – Maximum Level Sum of a Binary Tree

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```
int maxLevelSum(TreeNode* root) {
    std::queue<TreeNode*> nodes;
    int currentLevel = 0;
    int maxLevel = 1;
    int maxSum = INT_MIN;

    nodes.push(root);

    // traverse the graph
    while(!nodes.empty()) {
        int levelSum = 0;
        int levelSize = nodes.size();
        currentLevel++;

        // sum the values in current level
        for (int i = 0; i < levelSize; ++i) {
            TreeNode* node = nodes.front();
            levelSum += node->val;
            nodes.pop();

            if (node->left) nodes.push(node->left);
            if (node->right) nodes.push(node->right);
        }

        if (levelSum > maxSum) {
            maxLevel = currentLevel;
            maxSum = levelSum;
        }
    }

    return maxLevel;
}
```