```cpp
class Solution {
public:
    vector<double> averageOfLevels(TreeNode* root) {
        auto averages = vector<double>();
        auto q = queue<TreeNode*>();
        q.push(root);
        while (!q.empty()) {
            double sum = 0;
            int size = q.size();
            for (int i = 0; i < size; i++) {
                auto node = q.front();
                q.pop();
                sum += node->val;
                auto left = node->left, right = node->right;
                if (left != nullptr) {
                    q.push(left);
                }
                if (right != nullptr) {
                    q.push(right);
                }
            }
            averages.push_back(sum / size);
        }
        return averages;
    }
};
```