



# 103. Binary Tree Zigzag Level Order Traversal

## 103 Binary Tree Zigzag Level Order Traversal

- **Breadth-first Search** + Queue + Tree
- **Breadth-first Search** + Stack + Tree

### Description

 Discuss

 Pick One

Given a binary tree, return the *zigzag level order* traversal of its nodes' values. (ie, from left to right, then right to left for the next level and alternate between).

For example:

Given binary tree `[3,9,20,null,null,15,7]` ,

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

return its zigzag level order traversal as:

```
[
  [3],
  [20,9],
  [15,7]
]
```

### 1. Thought line

### 2. Breadth-first Search + Queue + Tree

```
/**
 * Definition for a binary tree node.
 * struct TreeNode {
 *     int val;
 *     TreeNode *left;
 *     TreeNode *right;
 *     TreeNode(int x) : val(x), left(NULL), right(NULL) {}
 * };
 */
class Solution {
public:
    vector<vector<int>> zigzagLevelOrder(TreeNode* root) {
        vector<vector<int>> result;
```

```

queue<TreeNode*> que;
if (root!=nullptr) que.emplace(root);
bool flag = true;
while (!que.empty() || que.front()!=nullptr){
    queue<TreeNode*> tempQue;
    vector<int> tempVec;
    while (!que.empty()){
        if (flag)
            tempVec.push_back(que.front()->val);
        else
            tempVec.insert(tempVec.begin(), que.front()->val);
        if (que.front()->left!=nullptr ) tempQue.push(que.front()->left);
        if (que.front()->right!=nullptr) tempQue.push(que.front()->right);
        que.pop();
    }
    if(!tempVec.empty()) result.push_back(tempVec);
    else break;
    if(!tempQue.empty()) que.swap(tempQue);
    else break;
    flag = !flag;
}
return result;
}
};

```

### 3. Breadth-first Search + Stack + Tree