

# 094. Binary Tree Inorder Traversal

## 094 Binary Tree Inorder Traversal

- Hash Table + tree
- Stack + tree

### Description

Given a binary tree, return the *inorder* traversal of its nodes' values.

For example:

Given binary tree `[1,null,2,3]` ,

```
  1
   \
    2
   /
  3
```

return `[1,3,2]` .

### 1. Thought line

(1) Stack

inorder: left  $\rightarrow$  root  $\rightarrow$  right.

Stack 思路:

1. 对  $\forall$  node

↳ 找到最左点, 并将一路经过的点加入 toVisit

↳ 当最左点为空时, 取 toVisit.top(), 压入, 去其右子树

$\Rightarrow$  Cur: starts from Root

rootJumped: starts from empty.

$\Rightarrow$  To each node: Cur

(1) If Cur = nullptr:

- Visit rootJumped.top() // Go to Cur's parent node
- Replace "Cur = rootJumped.top()"
- Push Cur  $\rightarrow$  val into Result
- Go to Right Child to start over // Inorder: left child  $\rightarrow$  node  $\rightarrow$  right child

(2) If Cur  $\neq$  NULL

- Push Cur into rootJumped // Cur is exist as a root node
- Go to Cur's left child to start over

## 2. Stack+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<int> inorderTraversal(TreeNode* root) {
        stack<TreeNode*> rootJumped;
        vector<int> result;
        TreeNode* cur = root;
        while(cur || !rootJumped.empty()){
            if (cur){
                rootJumped.push(cur);
                cur = cur->left;
            }
            else{
                cur = rootJumped.top();
                rootJumped.pop();
                result.push_back(cur->val);
                cur = cur->right;
            }
        }
    }
};
```

```
};  
    }  
    }  
    return result;  
}
```