

一、题目说明

题目94. Binary Tree Inorder Traversal, 给一个二叉树, 返回中序遍历序列。题目难度是Medium!

二、我的解答

用递归遍历, 学过数据结构的应该都可以实现。

```
class Solution{
public:
    vector<int> inorderTraversal(TreeNode* root){
        if(root != NULL){
            if(root->left !=NULL)inorderTraversal(root->left);
            res.push_back(root->val);
            if(root->right !=NULL)inorderTraversal(root->right);
        }
        return res;
    }
private:
    vector<int> res;
};
```

Runtime: 4 ms, faster than 61.00% of C++ online submissions for Binary Tree Inorder Traversal.
Memory Usage: 10.5 MB, less than 5.00% of C++ online submissions for Binary Tree Inorder Traversal.

三、优化措施

用非递归算法, 需要一个栈, 代码如下:

```
class Solution{
public:
    //iteratively
    vector<int> inorderTraversal(TreeNode* root){
        stack<TreeNode*> st;
        TreeNode* p = root;
        if(p != NULL){
            while(p !=NULL) {
                st.push(p);
                p = p->left;
            }

            while(!st.empty()){
                p = st.top();
                st.pop();
                res.push_back(p->val);

                if(p->right !=NULL) {
                    p = p->right;
                    while(p !=NULL) {
                        st.push(p);
                        p = p->left;
                    }
                }
            }
        }
    }
};
```

```
        }  
    }  
}  
}  
return res;  
}  
private:  
    vector<int> res;  
};
```

性能:

Runtime: 4 ms, faster than 60.93% of C++ online submissions for Binary Tree Inorder Traversal.
Memory Usage: 9.2 MB, less than 89.00% of C++ online submissions for Binary Tree Inorder Traversal.