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**SEC/GRP:FL_IOT_602/A**

Experiment – 3(AP)

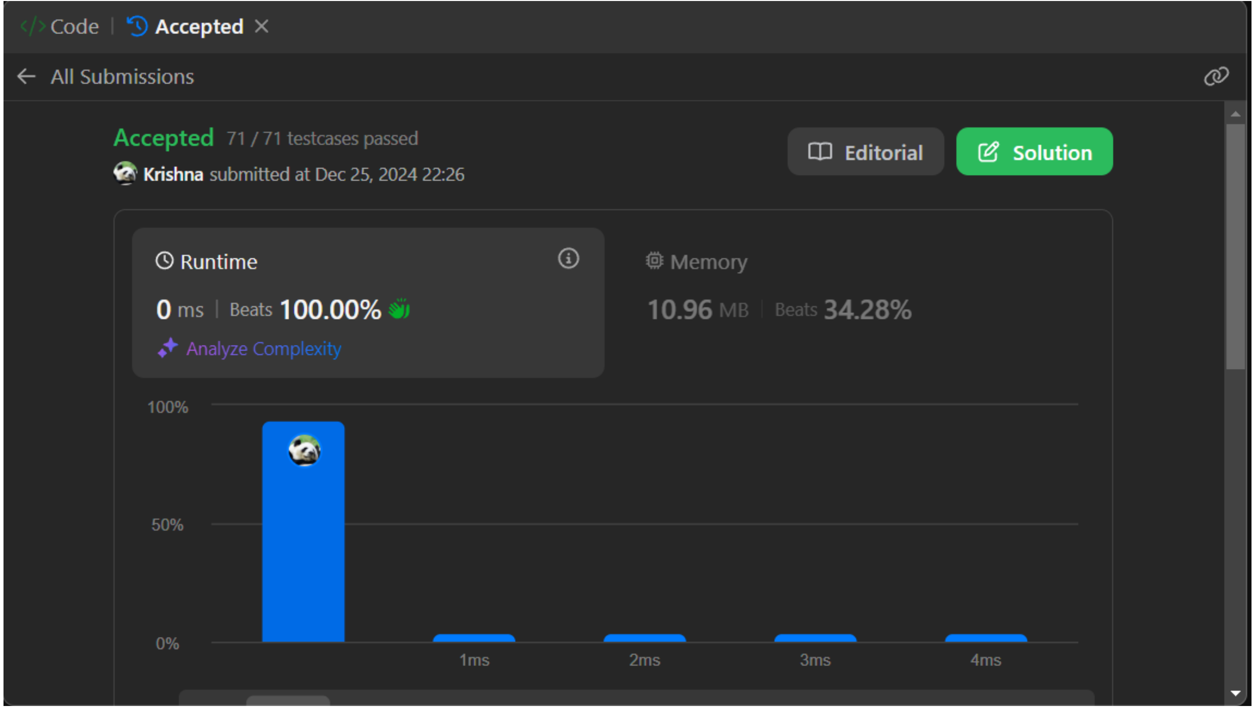
94.Binary Tree Inorder Traversal

```
class Solution {
public:
    vector<int> inorderTraversal(TreeNode* root) {
        if(root==nullptr)
        {
            return {};
        }

        vector<int>result;

        vector<int>lt=inorderTraversal(root->left);
        result.insert(result.end(),lt.begin(),lt.end());
        result.push_back(root->val);
        vector<int>rt=inorderTraversal(root->right);
        result.insert(result.end(),rt.begin(),rt.end());

        return result;
    }
};
```



Accepted 71 / 71 testcases passed

Krishna submitted at Dec 25, 2024 22:26

0 ms | Beats 100.00%

10.96 MB | Beats 34.28%

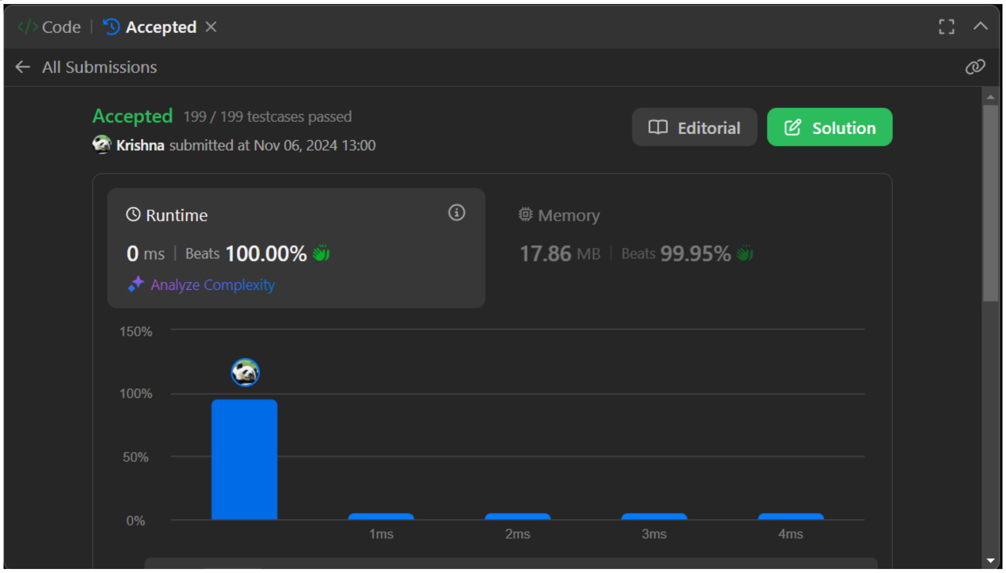
101.Symmetric Tree

```
class Solution {
public:

bool ismirror(TreeNode* r,TreeNode* l)
{
    if(r==nullptr && l==nullptr)
    {
        return true;
    }
    if(r==nullptr || l==nullptr)
    {
        return false;
    }

    return (r->val==l->val) && ismirror(r->right,l->left) && ismirror(r->left,l->right);
}


    bool isSymmetric(TreeNode* root) {
        return ismirror(root->right,root->left);
    }
};
```



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Krishna submitted at Nov 06, 2024 13:00

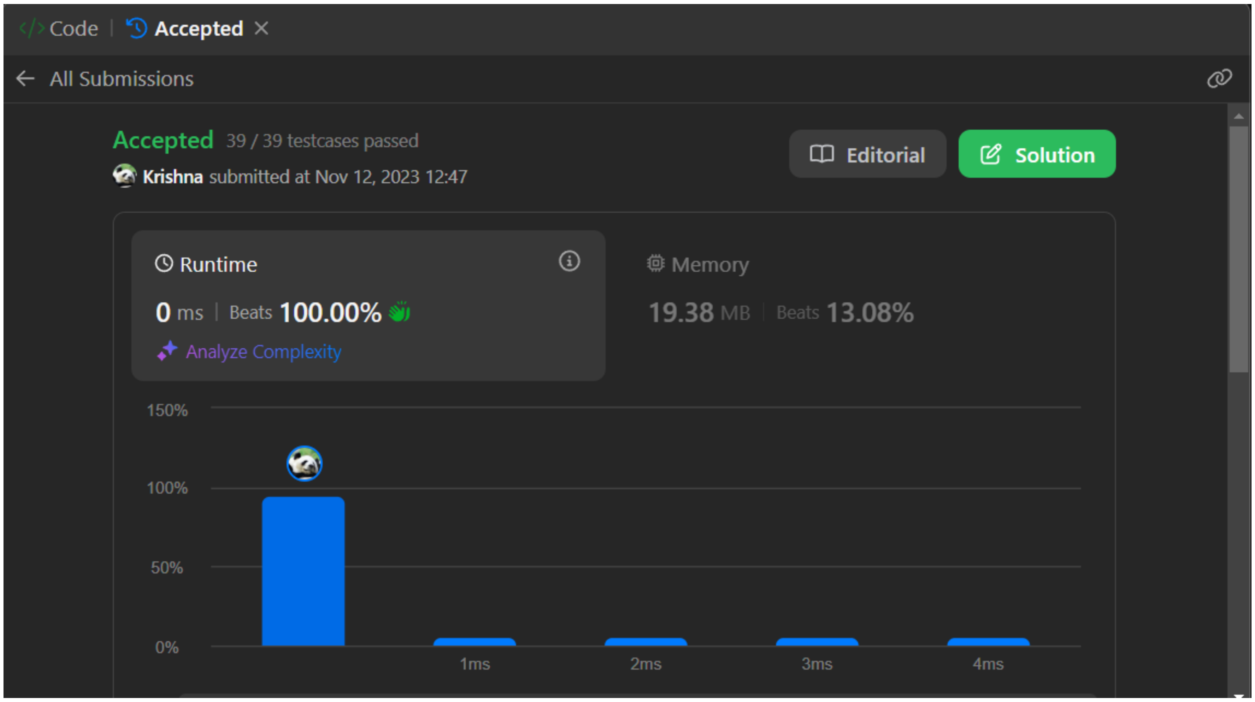
0 ms | Beats 100.00%

17.86 MB | Beats 99.95%

104.Maximum Depth of Binary Tree

```
class Solution {
public:
    int maxDepth(TreeNode* root) {
        if(root==nullptr)
        {
            return 0;
        }
        int lh=maxDepth(root->left);
        int rh=maxDepth(root->right);

        return 1+max(lh,rh);
    }
};
```



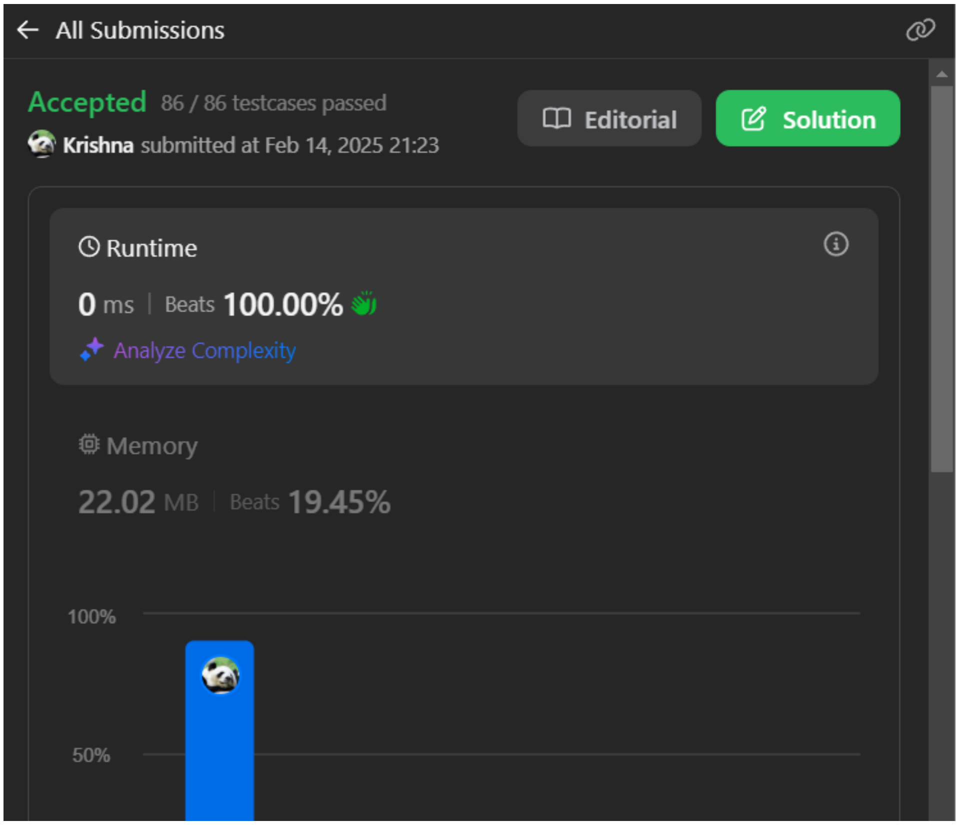
Accepted 39 / 39 testcases passed
Krishna submitted at Nov 12, 2023 12:47

Runtime
0 ms | Beats 100.00%

Memory
19.38 MB | Beats 13.08%

98.Validate Binary Search Tree

```
class Solution {
public:
  bool solve(TreeNode* root, long long minVal, long long maxVal) {
      if(!root) return true;
      if(root->val >= maxVal || root->val <= minVal) return false;
      return solve(root->left, minVal, root->val) && solve(root->right, root->val, maxVal);
   }
   bool isValidBST(TreeNode* root) {
      return solve(root, LLONG_MIN, LLONG_MAX);
   }
};
```



Accepted 86 / 86 testcases passed

Krishna submitted at Feb 14, 2025 21:23

0 ms | Beats 100.00%

22.02 MB | Beats 19.45%

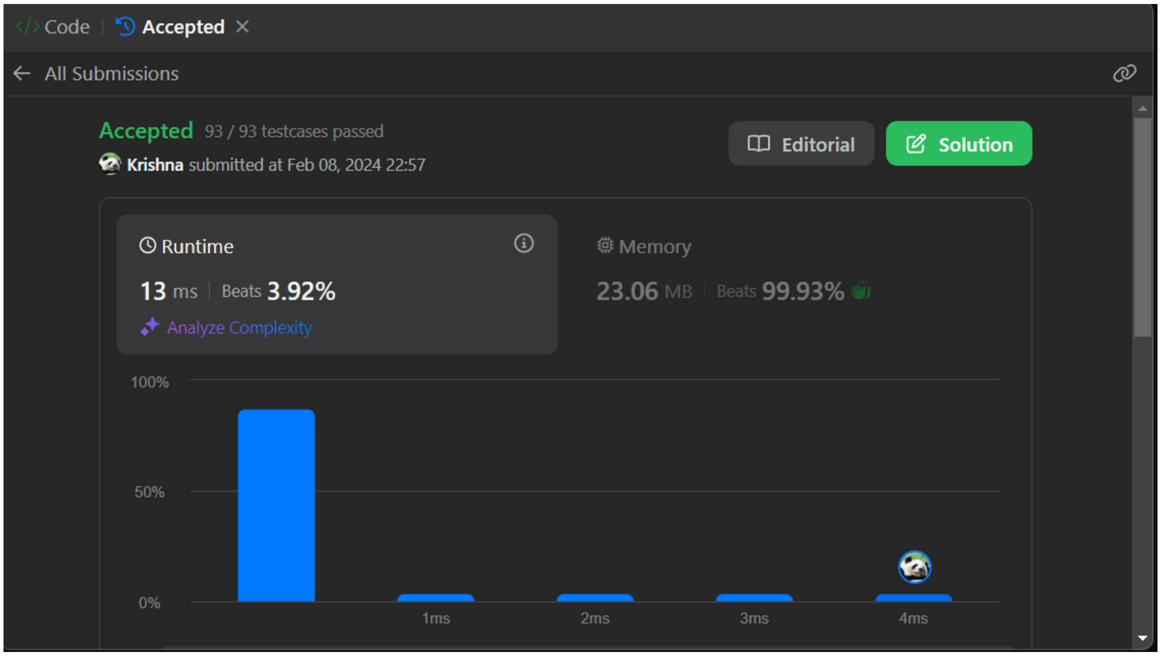
230.Kth Smallest Element in a BST

```
class Solution {
public:
    int kthSmallest(TreeNode* root, int& k) {
        if(root==nullptr)
        {
            return INT_MAX;
        }
        int leftans=kthSmallest(root->left,k);

        if(k==0)
        {
            return leftans;
        }

        if(--k==0)
        {
            return root->val;
        }

        return kthSmallest(root->right,k);
    }
};
```



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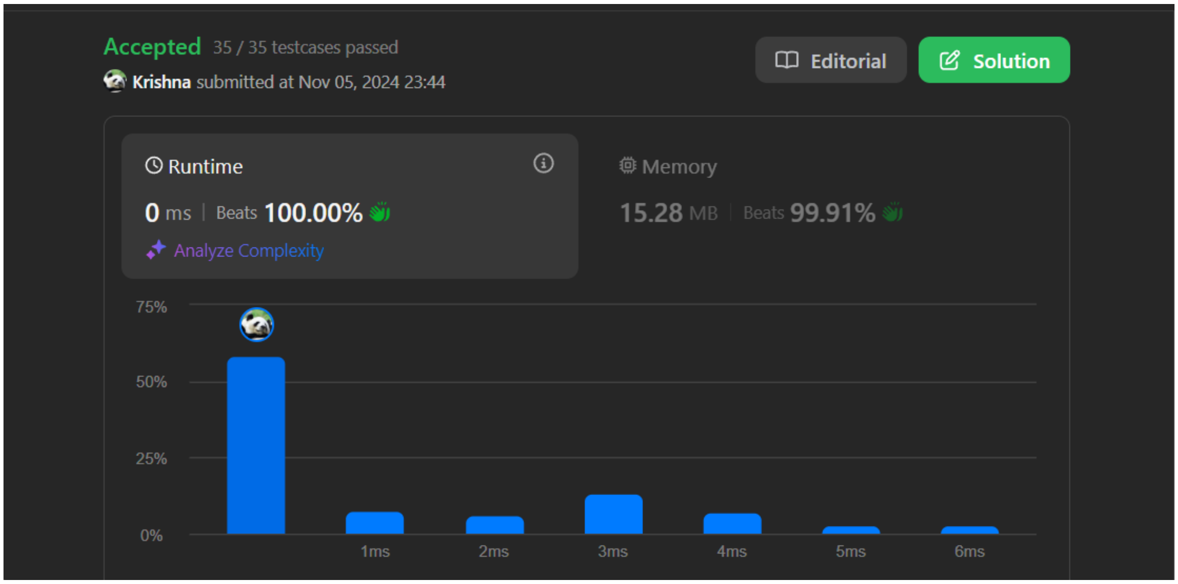
Krishna submitted at Feb 08, 2024 22:57

13 ms | Beats 3.92%

23.06 MB | Beats 99.93%

102. Binary Tree Level Order Traversal

```
class Solution {
public:
    vector<vector<int>> levelOrder(TreeNode* root) {
    vector<vector<int>>ans;
    if(root==nullptr) return ans;
    queue<TreeNode*>q;
    q.push(root);
    while(!q.empty())
    {
        vector<int>level;
        int n=q.size();
        for(int i=0;i<n;i++)
        {
            TreeNode* node=q.front();
            q.pop();
            if(node->left != nullptr) q.push(node->left);
            if(node->right != nullptr) q.push(node->right);
            level.push_back(node->val);
        }
        ans.push_back(level);
    }
return ans;
    }
};
```



Accepted 35 / 35 testcases passed

Krishna submitted at Nov 05, 2024 23:44

Runtime

0 ms | Beats 100.00%

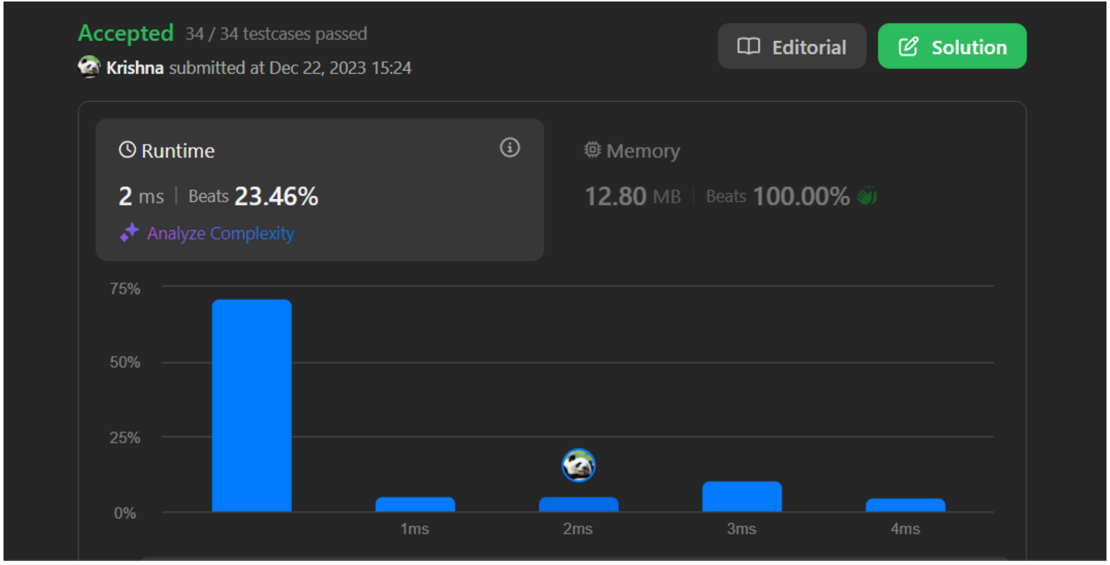
Analyze Complexity

Memory

15.28 MB | Beats 99.91%

107.Binary Tree Level Order Traversal II

```
class Solution {
public:
    vector<vector<int>> getSkyline(vector<vector<int>>& buildings) {
        vector<vector<int>> ans;
        multiset<int> pq{0};
        vector<pair<int, int>> points;
        for(auto b: buildings){
            points.push_back({b[0], -b[2]});
            points.push_back({b[1], b[2]});
        }
        sort(points.begin(), points.end());
        int ongoingHeight = 0;
        for(int i = 0; i < points.size(); i++){
            int currentPoint = points[i].first;
            int heightAtCurrentPoint = points[i].second;
            if(heightAtCurrentPoint < 0){
                pq.insert(-heightAtCurrentPoint);
            } else pq.erase(pq.find(heightAtCurrentPoint));
            auto pqTop = *pq.rbegin();
            if(ongoingHeight != pqTop){
                ongoingHeight = pqTop;
                ans.push_back({currentPoint, ongoingHeight});
            }
        }
 reverse(ans.begin(),ans.end());
return ans;
    }
};
```



Accepted 34 / 34 testcases passed

Krishna submitted at Dec 22, 2023 15:24

Runtime

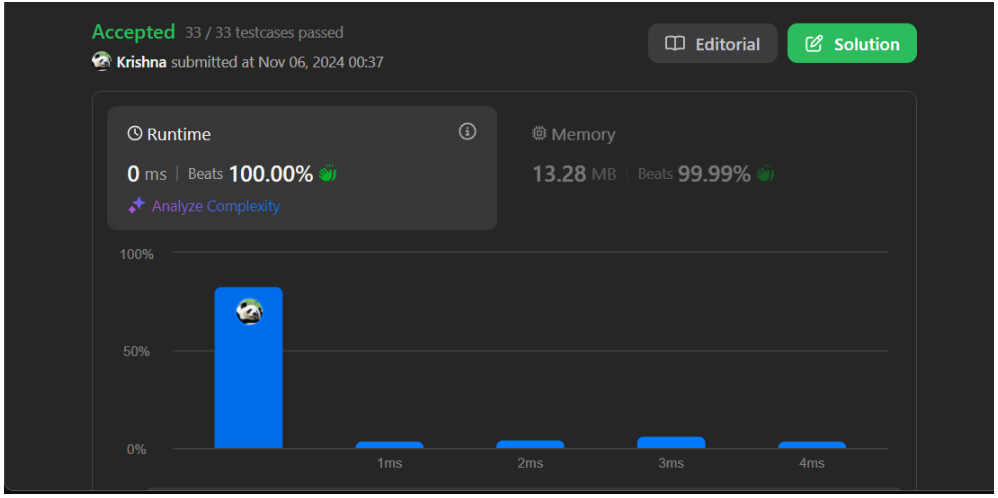
2 ms | Beats 23.46%

Memory

12.80 MB | Beats 100.00%

103.Binary Tree Zigzag Level Order Traversal

```
class Solution {
public:
    vector<vector<int>> zigzagLevelOrder(TreeNode* root) {
       vector<vector<int>>res;
       if(!root)
       {return res;}
       queue<TreeNode*>q;
       q.push(root);
       while(!q.empty()) {
        vector<int>ans;
        int  n=q.size();
        int c=0;
        for(int i=0;i<n;i++) {
            TreeNode* temp=q.front();
            q.pop();
            ans.push_back(temp->val);
            if(temp->left) q.push(temp->left);
            if(temp->right) q.push(temp->right);
        }
        if(c%2!=0)  {
            reverse(ans.begin(),ans.end());
        }
         res.push_back(ans);
            c++;
       }
       return res;
    }
};
```



Accepted 33 / 33 testcases passed

Krishna submitted at Nov 06, 2024 00:37

Runtime

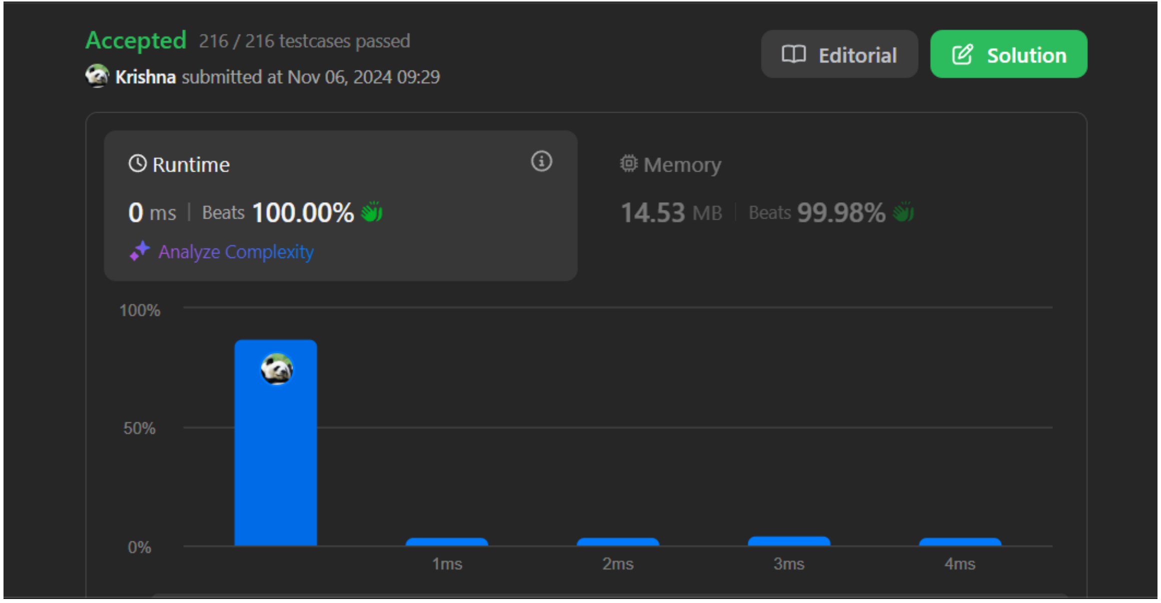
0 ms | Beats 100.00%

Memory

13.28 MB | Beats 99.99%

## 199.Binary Tree Right Side View

```
class Solution {
public:
  vector<int> rightSideView(TreeNode* root) {
   if (!root) return {};
    vector<int> result;
    queue<TreeNode*> q;
    q.push(root);
    while (!q.empty()) {
      int levelSize = q.size();
      for (int i = 0; i < levelSize; ++i) {
        TreeNode* node = q.front();
        q.pop();
        if (i == levelSize - 1) {
          result.push_back(node->val);
        }
        if (node->left) {
          q.push(node->left);
        }
        if (node->right) {
          q.push(node->right);
        }
      }
    }
    return result;
  }
};
```



Accepted 216 / 216 testcases passed

Krishna submitted at Nov 06, 2024 09:29

Runtime

0 ms | Beats 100.00%

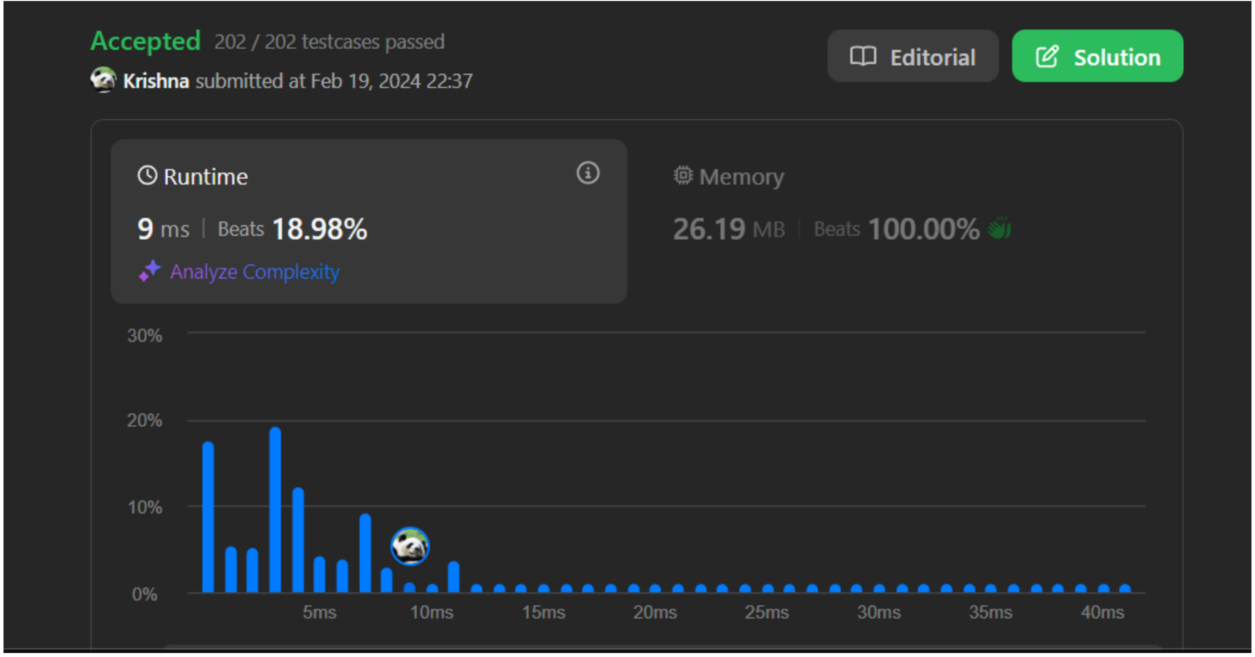
Memory

14.53 MB | Beats 99.98%

106.Construct Binary Tree from Inorder and Postorder Traversal

```
class Solution {
public:
   TreeNode* buildTree(vector<int>& inorder, vector<int>& postorder) {
      return buildTreeHelper(inorder, postorder, 0, inorder.size() - 1, postorder.size() - 1);
   }

private:
   TreeNode* buildTreeHelper(vector<int>& inorder, vector<int>& postorder, int inStart, int inEnd, int postIndex) {
      if (inStart > inEnd) return nullptr;
      TreeNode* root = new TreeNode(postorder[postIndex]);
      int inIndex = 0;
      for (int i = inStart; i <= inEnd; ++i) {
         if (inorder[i] == root->val) {
            inIndex = i;
            break;
         }
      }
      root->right = buildTreeHelper(inorder, postorder, inIndex + 1, inEnd, postIndex - 1);
      root->left = buildTreeHelper(inorder, postorder, inStart, inIndex - 1, postIndex - (inEnd - inIndex) - 1);
      return root;
   }
};
```



Accepted 202 / 202 testcases passed

Krishna submitted at Feb 19, 2024 22:37

Runtime

9 ms | Beats 18.98%

Memory

26.19 MB | Beats 100.00%

513.Find Bottom Left Tree Value

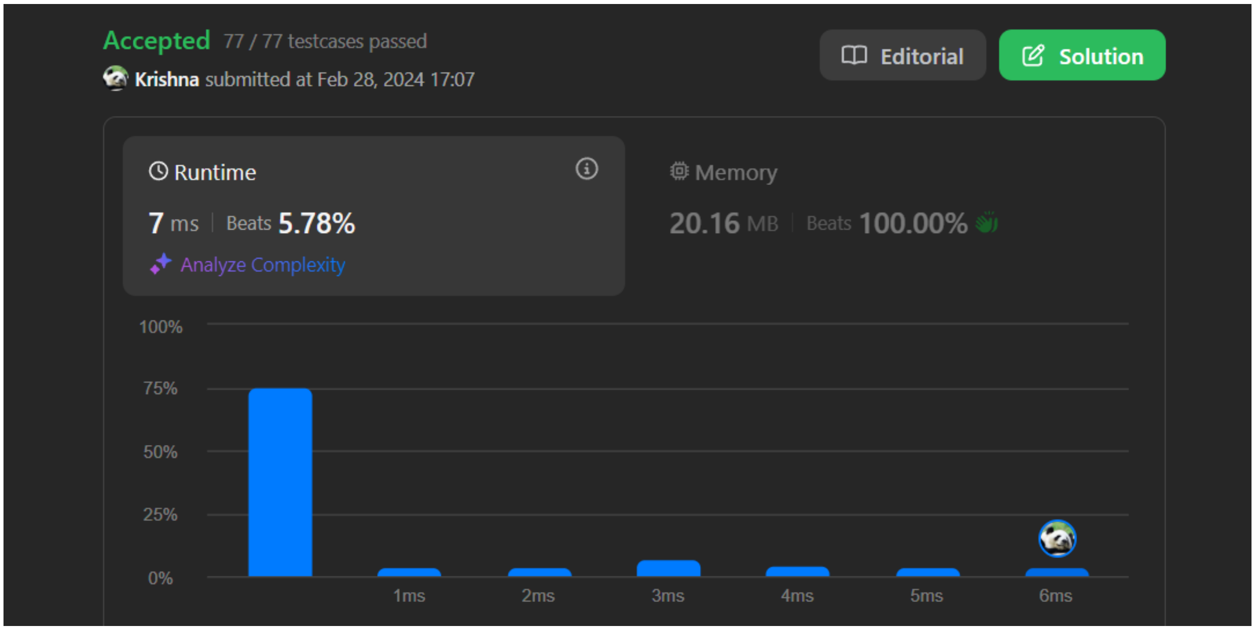
```
class Solution {
public:
   int findBottomLeftValue(TreeNode* root) {
      if (!root) return -1;

      queue<TreeNode*> q;
      q.push(root);
      int result = -1;

      while (!q.empty()) {
         int size = q.size();
         result = q.front()->val;
         for (int i = 0; i < size; ++i) {
            TreeNode* node = q.front();
            q.pop();

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

      return result;
   }
};
```



Accepted 77 / 77 testcases passed

Krishna submitted at Feb 28, 2024 17:07

124. [Binary Tree Maximum Path Sum]

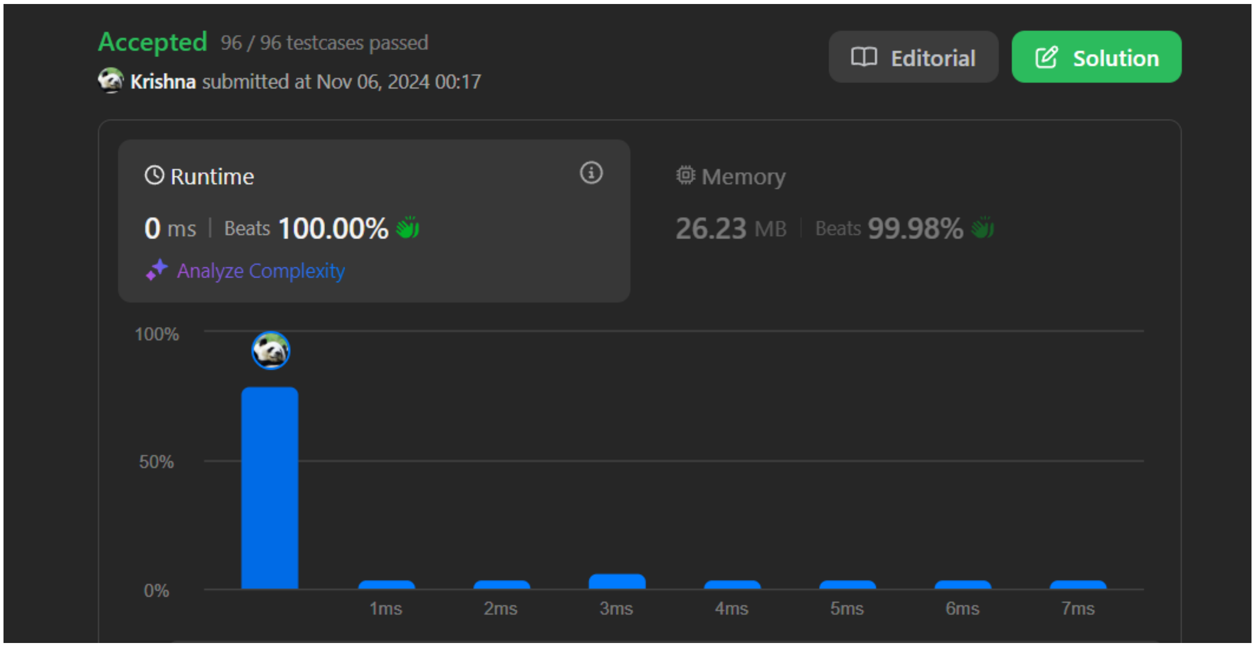
```
class Solution {
public:
    int maxPathSum(TreeNode* root) {
        int maxSum = INT_MIN;
        maxGain(root, maxSum);
        return maxSum;
    }

private:
    int maxGain(TreeNode* node, int& maxSum) {
        if (!node) return 0;

        int leftGain = max(maxGain(node->left, maxSum), 0);
        int rightGain = max(maxGain(node->right, maxSum), 0);

        int priceNewpath = node->val + leftGain + rightGain;
        maxSum = max(maxSum, priceNewpath);

        return node->val + max(leftGain, rightGain);
    }
};
```



Accepted 96 / 96 testcases passed

Krishna submitted at Nov 06, 2024 00:17

Runtime

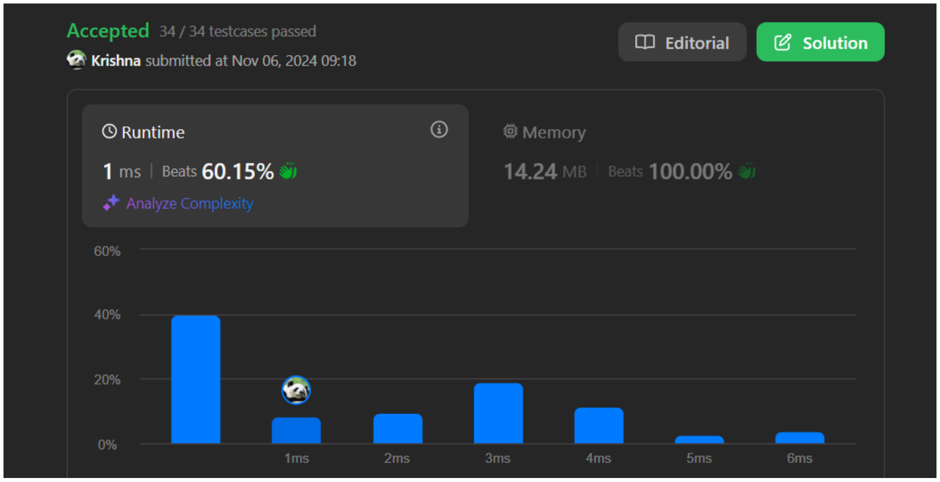
0 ms | Beats 100.00%

Memory

26.23 MB | Beats 99.98%

987.Vertical Order Traversal of a Binary Tree

```
class Solution {
public:
   vector<vector<int>> verticalTraversal(TreeNode* root) {
      if (!root) return {};
      map<int, map<int, multiset<int>>> nodes;
      queue<pair<TreeNode*, pair<int, int>>> q;
      q.push({root, {0, 0}});
      while (!q.empty()) {
         auto p = q.front();
         q.pop();
         TreeNode* node = p.first;
         int x = p.second.first, y = p.second.second;
         nodes[x][y].insert(node->val)
         if (node->left) {
            q.push({node->left, {x - 1, y + 1}});
         }
         if (node->right) {
            q.push({node->right, {x + 1, y + 1}});
         }
      }
      vector<vector<int>> result;
      for (auto& p : nodes) {
         vector<int> col;
         for (auto& q : p.second) {
            col.insert(col.end(), q.second.begin(), q.second.end());
         }
         result.push_back(col);
      }
      return result;
   }
};
```



Accepted 34 / 34 testcases passed

Krishna submitted at Nov 06, 2024 09:18

Runtime

1 ms | Beats 60.15%

Memory

14.24 MB | Beats 100.00%