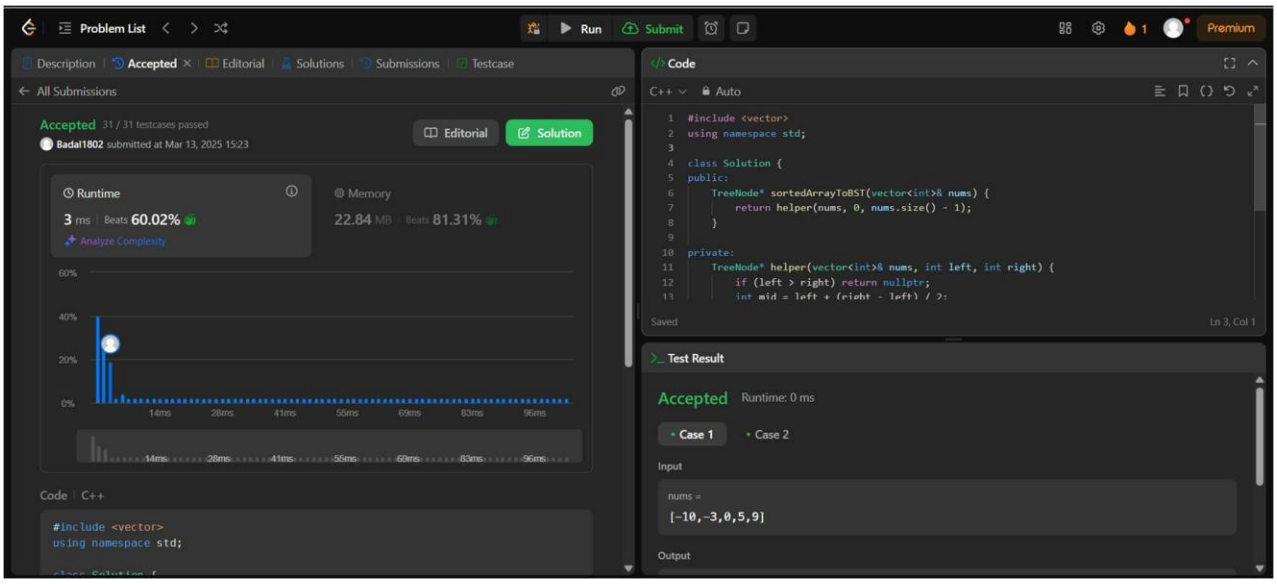
Assignment 6

108.Convert Sorted Array to Binary Search Tree

CODE:

```
#include      <vector>
using namespace std;
class Solu on {
public:
   TreeNode* sortedArrayToBST(vector<int>& nums) {
return helper(nums, 0, nums.size() - 1);
   }
private:
   TreeNode* helper(vector<int>& nums, int le , int right)
{        if (le > right) return nullptr;         int mid = le +
(right - le ) / 2;
      TreeNode* root = new TreeNode(nums[mid]);
root->le = helper(nums, le , mid - 1);         root-
>right = helper(nums, mid + 1, right);         return
root;
   }
};
```

OUTPUT:



191.Number of 1 Bits

CODE: class Solu on {

public: int

hammingWeight(int n) {

int count = 0; for(int i =

31; i >= 0; i--){ if(((n

>> i) & 1) == 1)

count++;

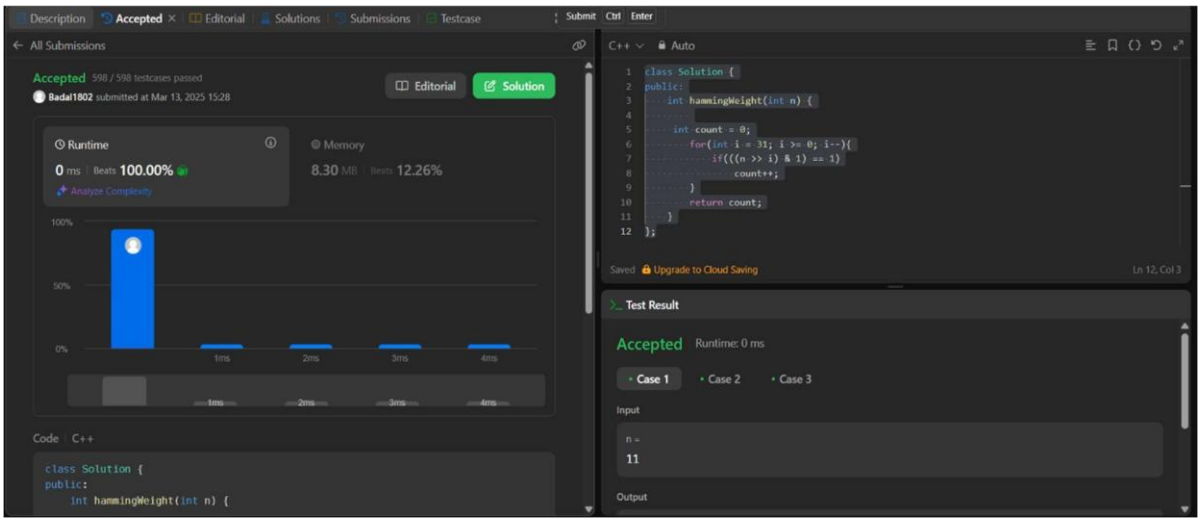
}

return count;

}

};

OUTPUT:



912.Sort an Array

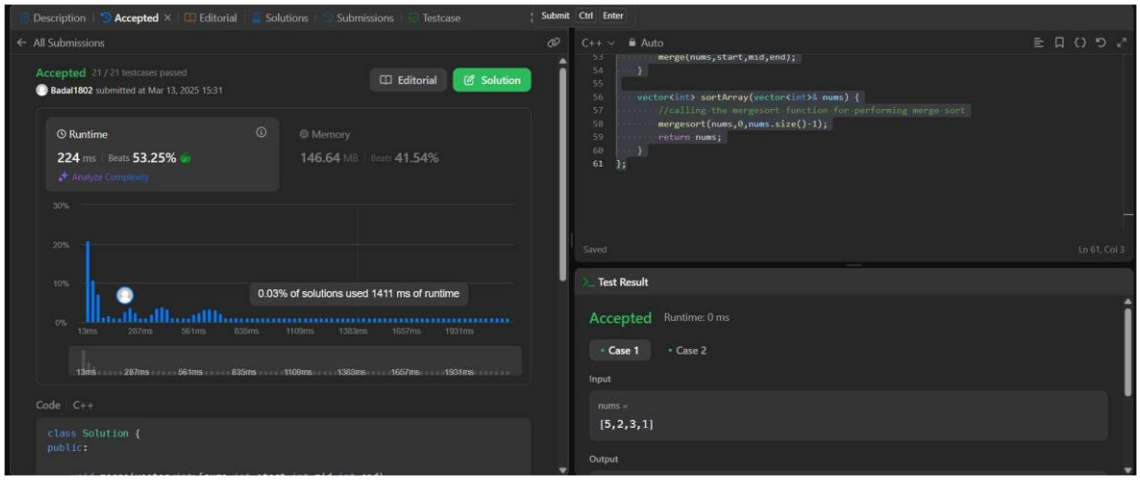
CODE:

```
class Solu on { public:     void
merge(vector<int>&nums,int start,int mid,int end)
   {
       vector<int>temp(end-start+1);
int le =start,right = mid+1,index =0;
while(le <=mid && right<=end)
       {
          if(nums[le ]<=nums[right])
          {
             temp[index]=nums[le ];
index++,le ++;
          }
else
          {
             temp[index]=nums[right];
index++,right++;
```

```
            }
        }
        //if le array remains
while(le <=mid)
        {
            temp[index]=nums[le ];
index++,le ++;
        }
        //if right array remains
while(right<=end)
        {
            temp[index]=nums[right];
            index++,right++;
        }
        //put the values in the original
array         index = 0;
while(start<=end)
        {
            nums[start] = temp[index];
start++,index++;
        }
    }

    void mergesort(vector<int>&nums,int start,int end)
    {
        if(start==end)
return;

        int mid = start+(end-start)/2;
        //le side
mergesort(nums,start,mid);
```

```
        //rightside
mergesort(nums,mid+1,end);
        //merge
        merge(nums,start,mid,end);
    }

    vector<int> sortArray(vector<int>& nums) {
        //calling the mergesort func on for performing merge sort
mergesort(nums,0,nums.size()-1);         return nums;
    }
};
```

OUTPUT:



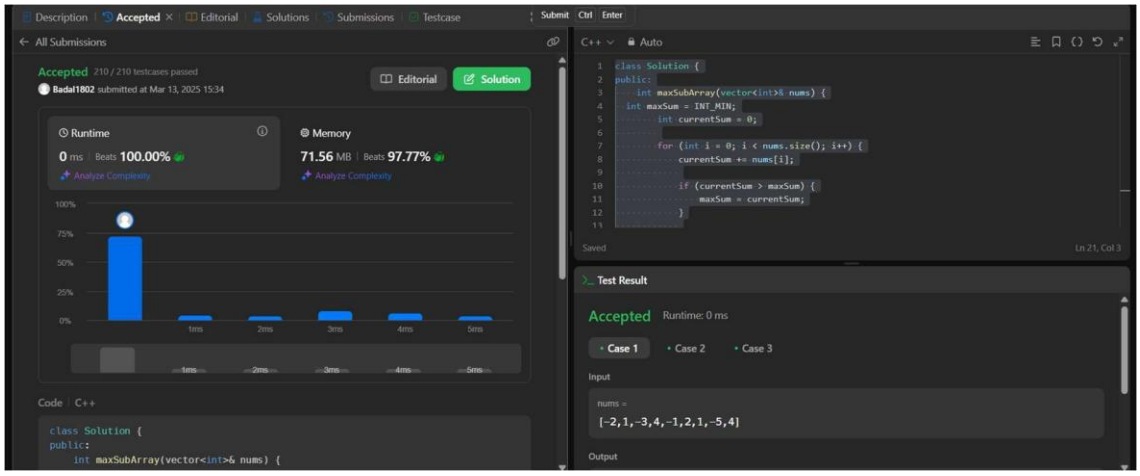
53.Maximum Subarray

CODE:

```
class Solu on {
public:
    int maxSubArray(vector<int>& nums)
{   int maxSum = INT_MIN;
        int currentSum = 0;         for (int
i = 0; i < nums.size(); i++) {
```

```
currentSum += nums[i];            if
(currentSum > maxSum) {
maxSum = currentSum;
            }
            if (currentSum < 0) {
currentSum = 0;
            }
        }
        return maxSum;
    }
};
```

OUTPUT:



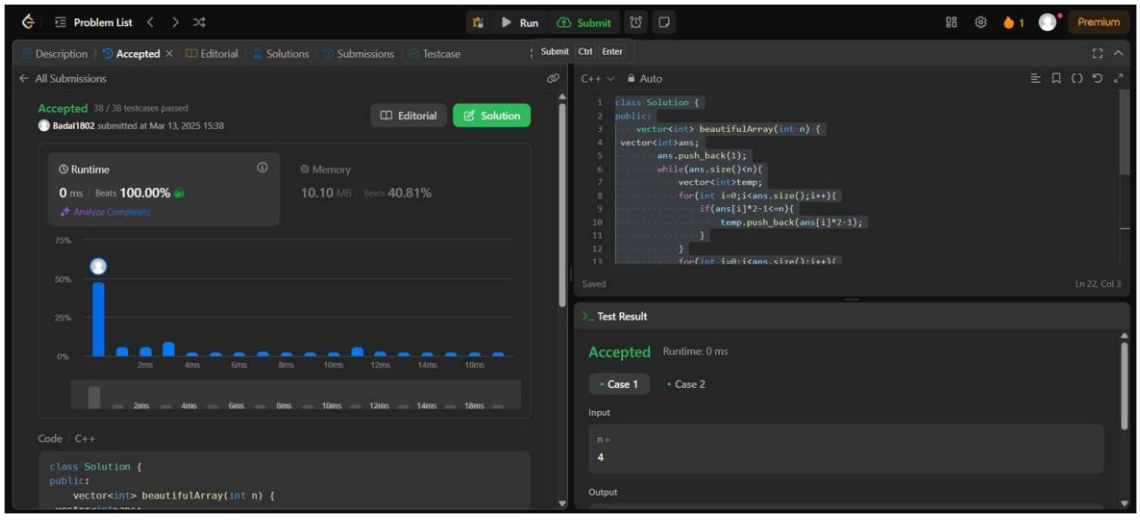
932.Beau ful Array

CODE:

```
class Solu on {
public:
    vector<int> beau fulArray(int n) {
vector<int>ans;        ans.push_back(1);
while(ans.size()<n){
vector<int>temp;            for(int
```

```
i=0;i<ans.size();i++){
if(ans[i]*2-1<=n){
temp.push_back(ans[i]*2-1);
            }
          }
          for(int i=0;i<ans.size();i++){
if(ans[i]*2<=n){
temp.push_back(ans[i]*2);
            }
          }
          ans=temp;
        }
        return ans;
    }
};
```

OUTPUT:

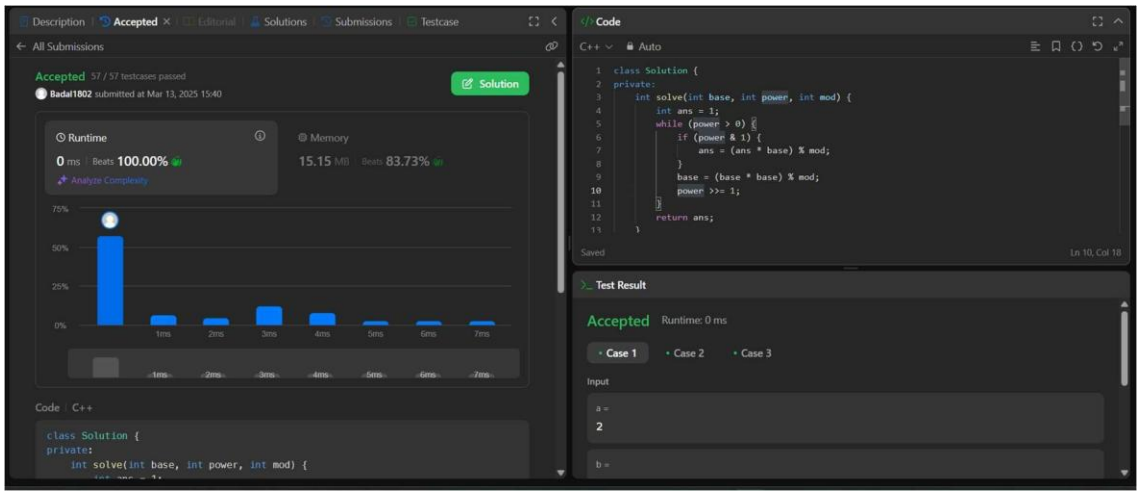


372.Super Pow

CODE:

```
class Solu on {
private:
   int solve(int base, int power, int mod) {
int ans = 1;         while (power > 0) {
if (power & 1) {                 ans = (ans *
base) % mod;
           }
           base = (base * base) % mod;
power >>= 1;

       }
       return ans;
   }


public:
   int superPow(int a, vector<int>& b)
{        a%=1337;         int n = b.size();
int m = 1140;         int expi = 0;
for(int i : b){             expi =
(expi*10+i)%m;
       }
       if (expi == 0) {
expi = m;
       }
       return solve(a,expi,1337);
   }
};
```

OUTPUT:



218.[The Skyline Problem]

CODE:

```
class Solu on {
public:
   vector<vector<int>> getSkyline(vector<vector<int>>&
buildings) { int edge_idx = 0;        vector<pair<int, int>> edges;
priority_queue<pair<int, int>> pq;        vector<vector<int>>
skyline;

      for (int i = 0; i < buildings.size();
++i) {            const auto &b =
buildings[i];
edges.emplace_back(b[0], i);
edges.emplace_back(b[1], i);
      }

      std::sort(edges.begin(), edges.end());

      while (edge_idx < edges.size()) {            int
curr_height;            const auto &[curr_x, _] =
edges[edge_idx];            while (edge_idx < edges.size()
&&                  curr_x == edges[edge_idx].first) {
```

```
const auto &[_, building_idx] = edges[edge_idx];
const auto &b = buildings[building_idx];                if
(b[0] == curr_x)                    pq.emplace(b[2], b[1]);
            ++edge_idx;
        }
        while (!pq.empty() && pq.top().second <= curr_x)
            pq.pop();
        curr_height = pq.empty() ? 0 : pq.top().first;
if (skyline.empty() || skyline.back()[1] != curr_height)
skyline.push_back({curr_x, curr_height});
      }
      return skyline;
   }
};
```

OUTPUT: