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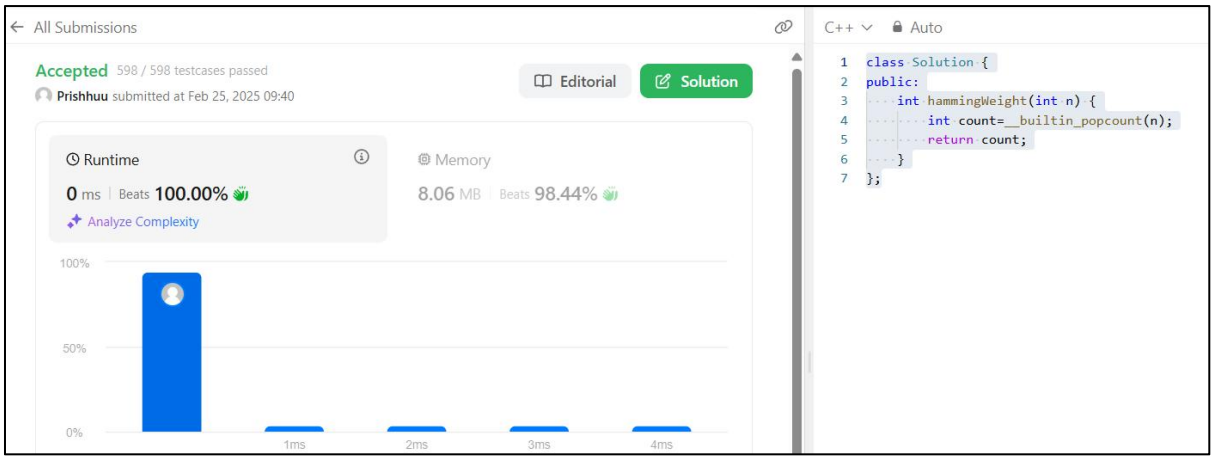
22BCS16931
BCS_FL_IOT-603 (A)

1. *191.Number of 1 bits:*

CODE:

```
class Solution {
public:
    int hammingWeight(int n) {
        int count=__builtin_popcount(n);
        return count;
    }
};
```

OUTPUT:



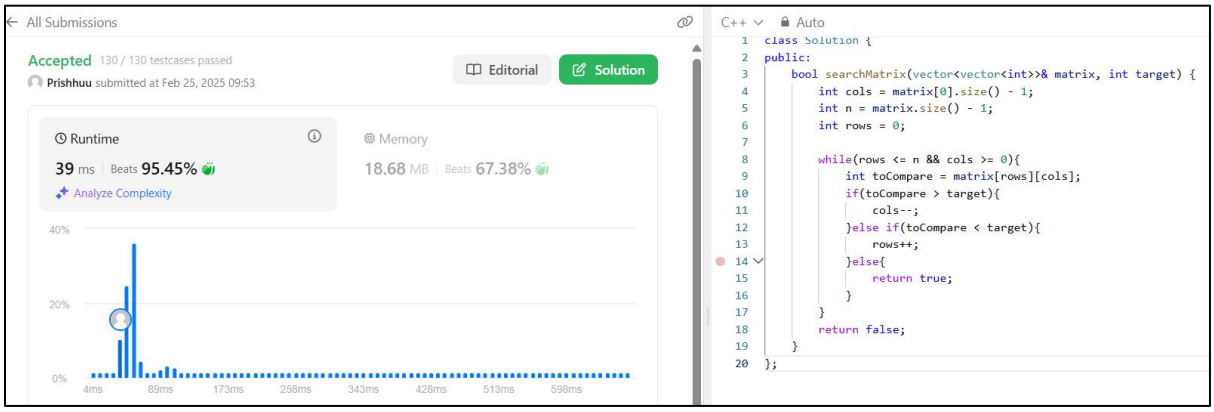
2. *240. Search a 2D Matrix II:*

CODE:

```
class Solution {
public:
    bool searchMatrix(vector<vector<int>>& matrix, int target) {
        int cols = matrix[0].size() - 1;
        int n = matrix.size() - 1;
        int rows = 0;

        while(rows <= n && cols >= 0){
            int toCompare = matrix[rows][cols];
            if(toCompare > target){
                cols--;
            }else if(toCompare < target){
                rows++;
            }else{
                return true;
            }
        }
        return false;
```

```
    }
};
```

OUTPUT:



3. *53.Max Subarray:*

CODE:

```
class Solution {
public:
    int maxSubArray(vector<int>& nums) {
        int maxSum = nums[0];
        int currentSum = nums[0];

        for (int i = 1; i < nums.size(); i++) {
            currentSum = max(nums[i], currentSum + nums[i]);
            maxSum = max(maxSum, currentSum);
        }

        return maxSum;
    }
};
```

OUTPUT:

4. *56. Merge Intervals:*

CODE:

```
class Solution {
public:
    vector<vector<int>> merge(vector<vector<int>>& intervals) {
        sort(intervals.begin(), intervals.end());
        int k = 0;

        for (int i = 1; i < intervals.size(); i++) {
            if (intervals[k][1] >= intervals[i][0]) {
                intervals[k][1] = max(intervals[k][1], intervals[i][1]);
            } else {
                k++;
                intervals[k] = intervals[i];
            }
        }

        intervals.resize(k + 1);
        return intervals;
    }
};
```

OUTPUT

5. *493.Reverse Pairs*

CODE:

```
class Solution {
public:
    int mergeAndCount(vector<int>& nums, int left, int mid, int right) {
        int count = 0, j = mid + 1;

        for (int i = left; i <= mid; i++) {
            while (j <= right && nums[i] > 2LL * nums[j]) {
                j++;
            }
            count += (j - (mid + 1));
        }

        vector<int> temp;
        int i = left, k = mid + 1;
        while (i <= mid && k <= right) {
```

```
            if (nums[i] <= nums[k]) {
                temp.push_back(nums[i++]);
            } else {
                temp.push_back(nums[k++]);
            }
        }
        while (i <= mid) temp.push_back(nums[i++]);
        while (k <= right) temp.push_back(nums[k++]);

        for (int i = left; i <= right; i++) {
            nums[i] = temp[i - left];
        }

        return count;
    }

    int mergeSortAndCount(vector<int>& nums, int left, int right) {
        if (left >= right) return 0;
        int mid = left + (right - left) / 2;
        int count = mergeSortAndCount(nums, left, mid) +
                    mergeSortAndCount(nums, mid + 1, right) +
                    mergeAndCount(nums, left, mid, right);
        return count;
    }

    int reversePairs(vector<int>& nums) {
        return mergeSortAndCount(nums, 0, nums.size() - 1);
    }
};
```

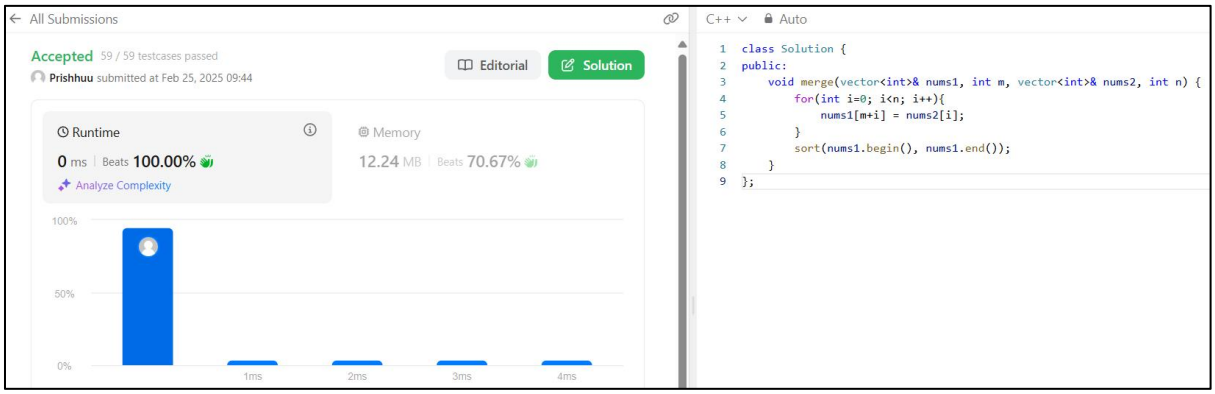
OUTPUT:

6. *88. Merge Sorted Array*

CODE:

```
class Solution {
public:
    void merge(vector<int>& nums1, int m, vector<int>& nums2, int n) {
        for(int i=0; i<n; i++){
            nums1[m+i] = nums2[i];
        }
        sort(nums1.begin(), nums1.end());
    }
};
```

OUTPUT:

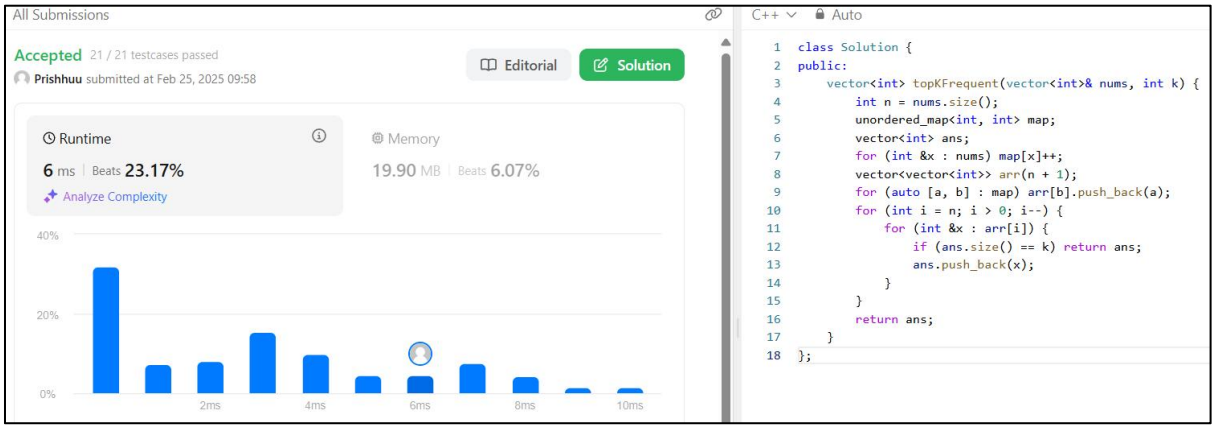


7. *347. Top K Frequent Element:*

CODE:

```
class Solution {
public:
    vector<int> topKFrequent(vector<int>& nums, int k) {
        int n = nums.size();
        unordered_map<int, int> map;
        vector<int> ans;
        for (int &x : nums) map[x]++;
        vector<vector<int>> arr(n + 1);
        for (auto [a, b] : map) arr[b].push_back(a);
        for (int i = n; i > 0; i--) {
            for (int &x : arr[i]) {
                if (ans.size() == k) return ans;
                ans.push_back(x);
            }
        }
        return ans;
    }
};
```

OUTPUT:

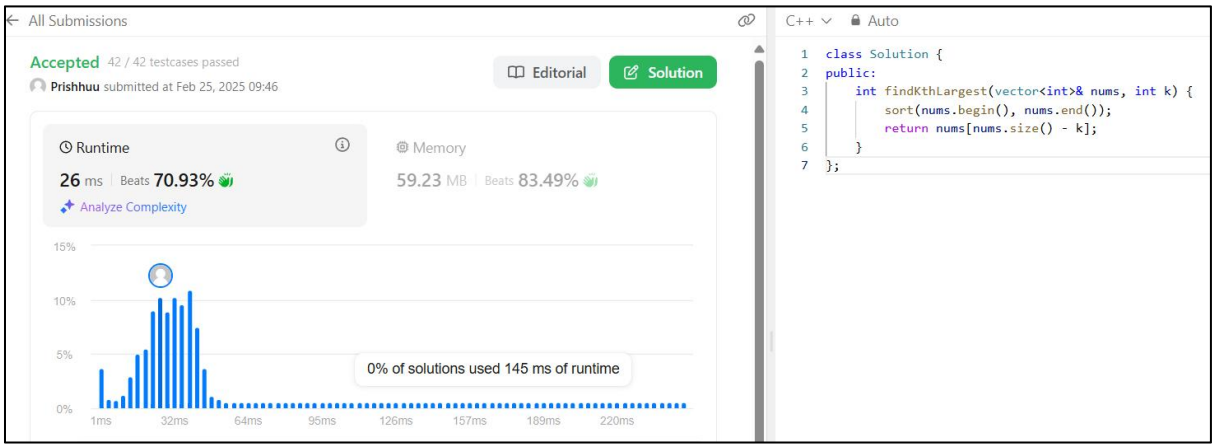


8. 215. Kth Largest Element in an Array:

CODE:

```
class Solution {
public:
    int findKthLargest(vector<int>& nums, int k) {
        sort(nums.begin(), nums.end());
        return nums[nums.size() - k];
    }
};
```

OUTPUT:

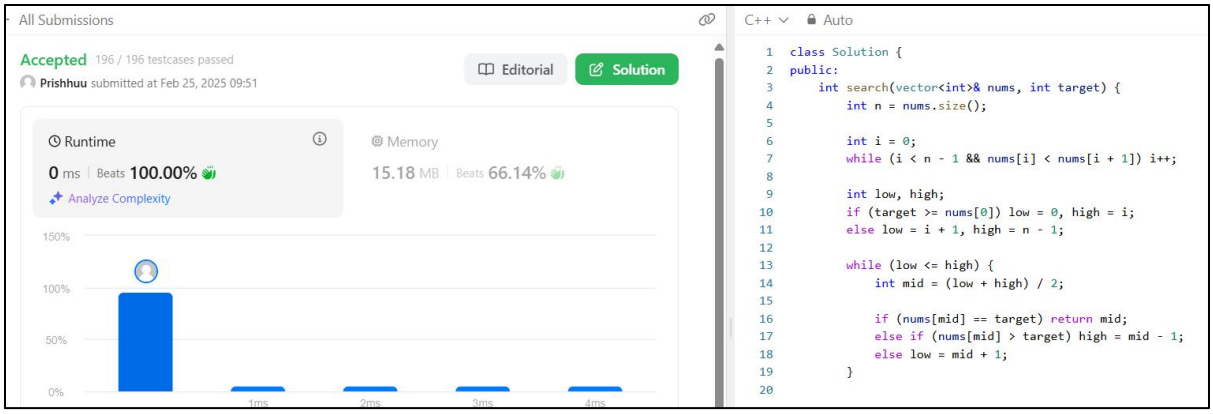


9. 33. Search in Rotated Sorted Array:

CODE:

```
class Solution {
public:
    int search(vector<int>& nums, int target) {
        int n = nums.size();

        int i = 0;
        while (i < n - 1 && nums[i] < nums[i + 1]) i++;

        int low, high;
        if (target >= nums[0]) low = 0, high = i;
        else low = i + 1, high = n - 1;

        while (low <= high) {
            int mid = (low + high) / 2;

            if (nums[mid] == target) return mid;
            else if (nums[mid] > target) high = mid - 1;
            else low = mid + 1;
        }

        return -1;
    }
};
```

OUTPUT:



10.<u>162. Find Peak Element:</u>

CODE:

```
class Solution {
public:
    int findPeakElement(vector<int>& nums) {
        if(nums.size() == 1) return 0;
        int l = 1;
        int h = nums.size() - 2;
        if(nums[0] > nums[1]) return 0;
        if(nums[nums.size() - 1] > nums[nums.size() - 2]) return nums.size() - 1;
        while(l <= h){
            int mid = (l+h)/2;

            if(nums[mid] > nums[mid+1] && nums[mid] > nums[mid-1]){
                return mid;
            }
            else if(nums[mid] < nums[mid+1]){
                l = mid + 1;
            } else {
                h = mid - 1;
            }
        }
        return -1;
    }
};
```

OUTPUT: