# Experiment 5

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**Problems Solved –**

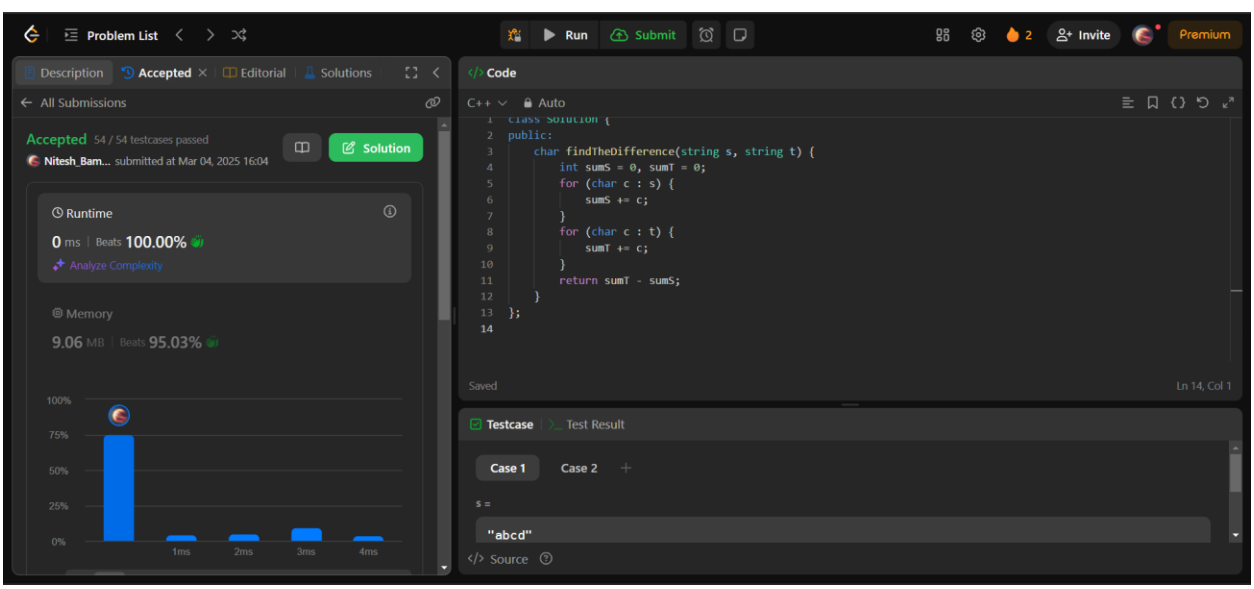
**389.**Find the difference
**976.**Largest Perimeter Triangle
**414.**Third Maximum Number
**451.**Sort Characters By Frequency
**452.**Minimum Number of Arrows to Burst Balloons
**881.**Boats to Save People
**973.**K Closest Points to Origin
**1338.**Reduce Array Size to The Half

## 389. Find the Difference

**Aim - Given two strings s and t, where t is formed by shuffling s and adding one extra character, find the extra character.**

***CODE:-***

```
class Solution {
public:
    char findTheDifference(string s, string t) {
        int sumS = 0, sumT = 0;
        for (char c : s) {
            sumS += c;
        }
        for (char c : t) {
            sumT += c;
        }
        return sumT - sumS;
    }
};
```

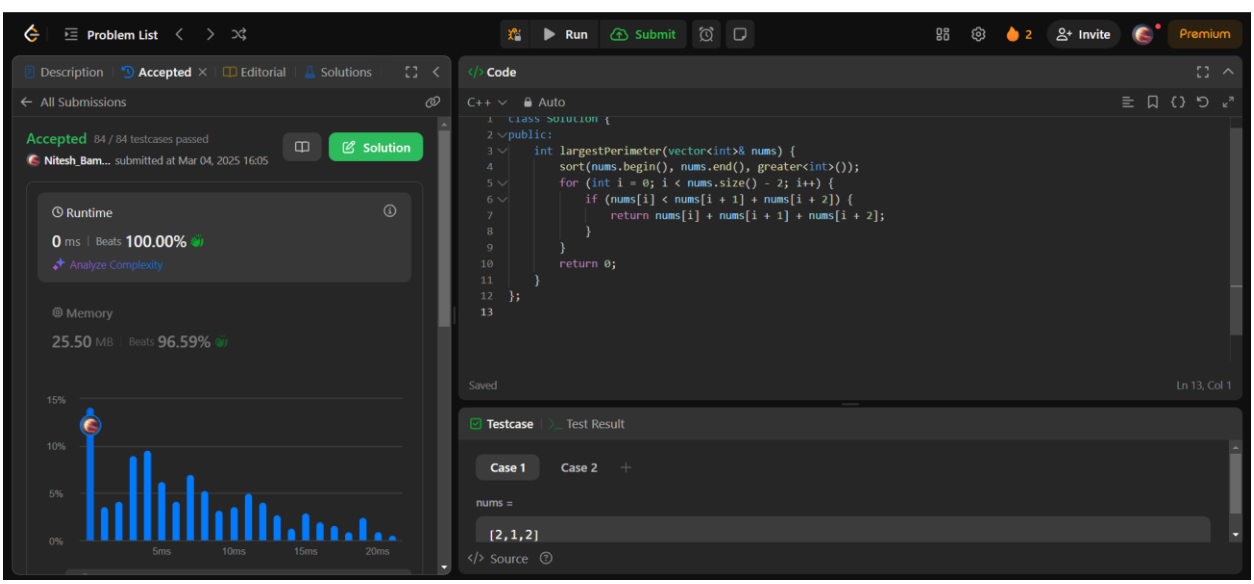


## 976. Largest Perimeter Triangle

**Aim - Given an array of positive integers, return the largest perimeter of a triangle that can be formed using three of these numbers. If no valid triangle can be formed, return 0.**

***CODE:-***

```
class Solution {
public:
    int largestPerimeter(vector<int>& nums) {
        sort(nums.begin(), nums.end(), greater<int>());
        for (int i = 0; i < nums.size() - 2; i++) {
            if (nums[i] < nums[i + 1] + nums[i + 2]) {
                return nums[i] + nums[i + 1] + nums[i + 2];
            }
        }
        return 0;
    }
};
```

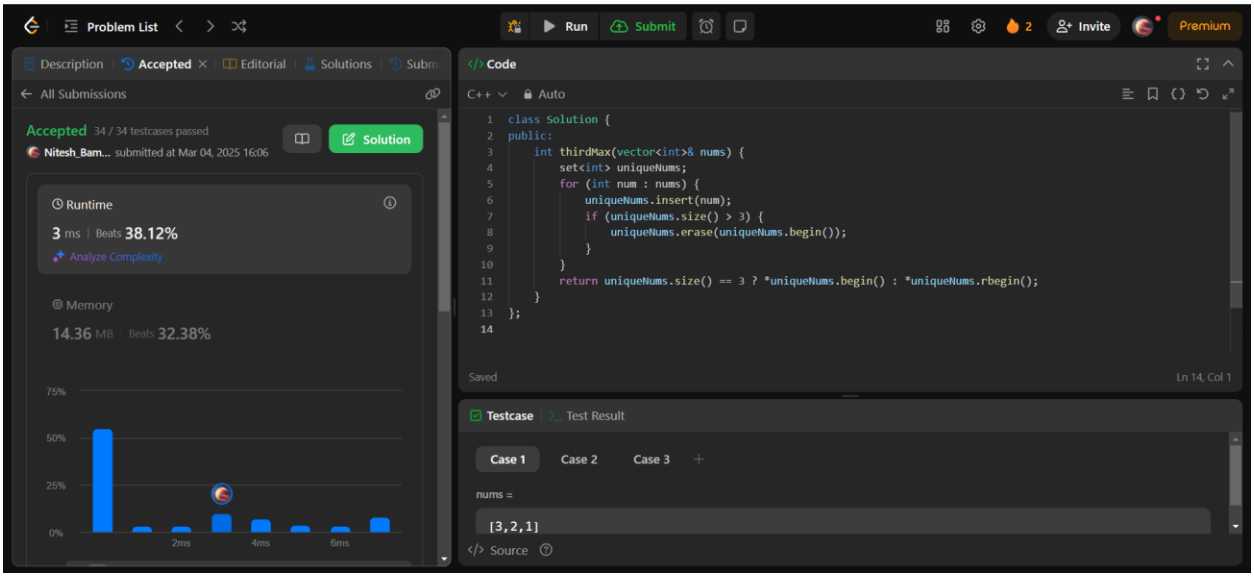


## 414. Third Maximum Number

**Aim - Given an integer array nums, return the third largest unique number. If it does not exist, return the maximum number.**

***CODE:-***

```
class Solution {
public:
    int thirdMax(vector<int>& nums) {
        set<int> uniqueNums;
        for (int num : nums) {
            uniqueNums.insert(num);
            if (uniqueNums.size() > 3) {
                uniqueNums.erase(uniqueNums.begin());
            }
        }
        return uniqueNums.size() == 3 ? *uniqueNums.begin() : *uniqueNums.rbegin();
    }
};
```



## 451. Sort Characters By Frequency

## Aim - Given a string s, sort it in decreasing order based on the frequency of characters.

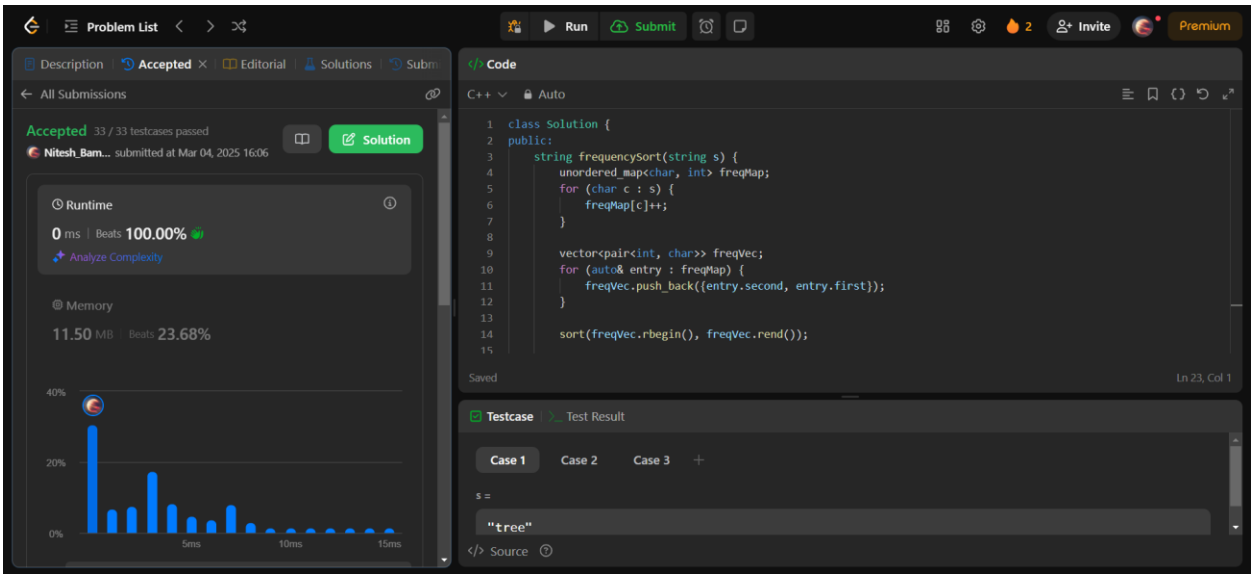
***CODE:-***

```
class Solution {
public:
    string frequencySort(string s) {
        unordered_map<char, int> freqMap;
        for (char c : s) {
            freqMap[c]++;
        }

        vector<pair<int, char>> freqVec;
        for (auto& entry : freqMap) {
            freqVec.push_back({entry.second, entry.first});
        }

        sort(freqVec.rbegin(), freqVec.rend());

        string result;
        for (auto& entry : freqVec) {
            result.append(entry.first, entry.second);
        }
        return result;
    }
};
```




## 452. Minimum Number of Arrows to Burst Balloons

## Aim - Given an array of balloon intervals, return the minimum number of arrows needed to burst all balloons.

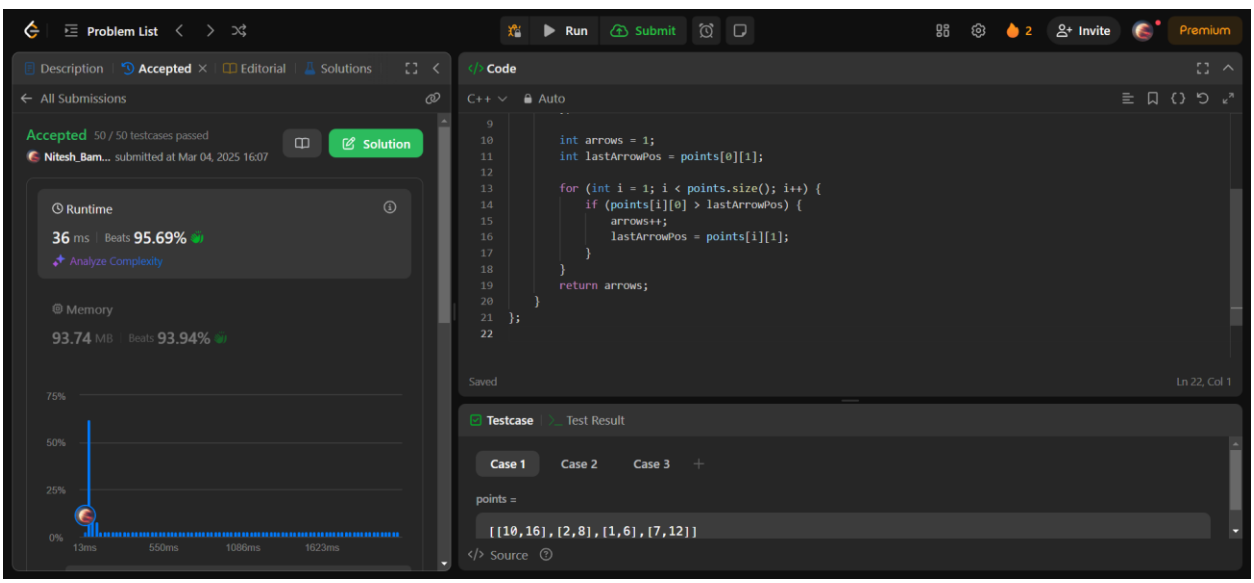
***CODE:-***

```
class Solution {
public:
    int findMinArrowShots(vector<vector<int>>& points) {
        if (points.empty()) return 0;

        sort(points.begin(), points.end(), [](vector<int>& a, vector<int>& b) {
            return a[1] < b[1];
        });

        int arrows = 1;
        int lastArrowPos = points[0][1];
```

```
        for (int i = 1; i < points.size(); i++) {
            if (points[i][0] > lastArrowPos) {
                arrows++;
                lastArrowPos = points[i][1];
            }
        }
        return arrows;
    }
};
```

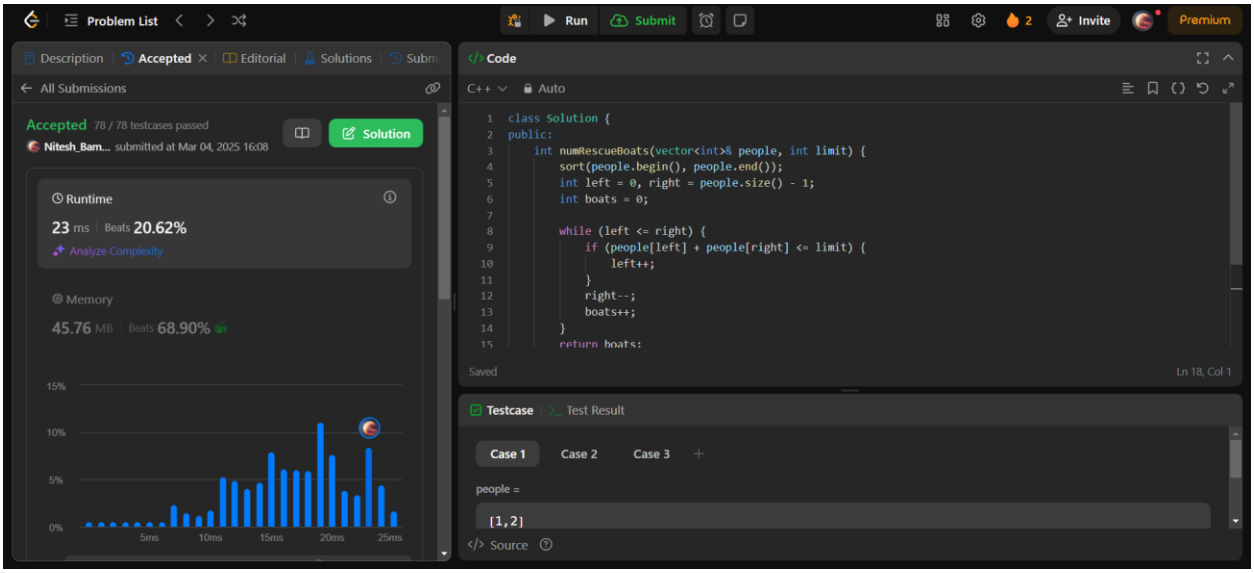


## 881. Boats to Save People

**Aim - Given people's weights and a boat limit, return the minimum number of boats needed to carry everyone. Each boat can carry at most two people.**

***CODE:-***

```
class Solution {
public:
    int numRescueBoats(vector<int>& people, int limit) {
        sort(people.begin(), people.end());
        int left = 0, right = people.size() - 1;
        int boats = 0;
        while (left <= right) {
            if (people[left] + people[right] <= limit) left++;
            right--, boats++;
        }
        return boats;
    }
};
```



## 973. K Closest Points to Origin

## Aim - Given an array of points and an integer k, return the k closest points to the origin (0,0).

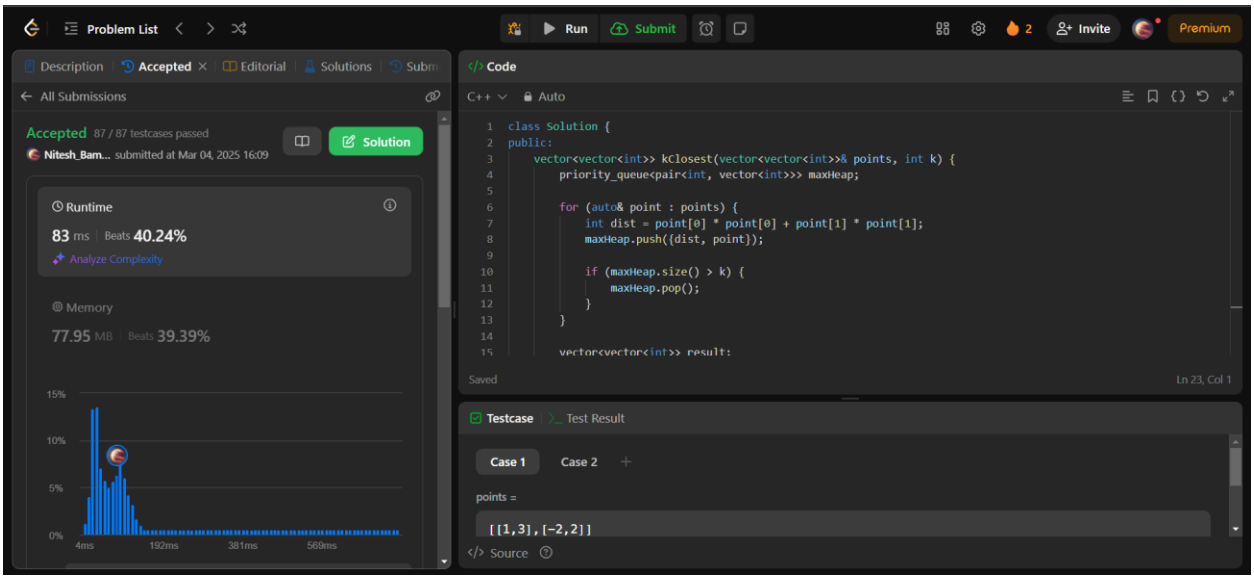
***CODE:-***

```
class Solution {
public:
    vector<vector<int>> kClosest(vector<vector<int>>& points, int k) {
        priority_queue<pair<int, vector<int>>> maxHeap;

        for (auto& point : points) {
            int dist = point[0] * point[0] + point[1] * point[1];
            maxHeap.push({dist, point});

            if (maxHeap.size() > k) {
                maxHeap.pop();
            }
        }

        vector<vector<int>> result;
        while (!maxHeap.empty()) {
            result.push_back(maxHeap.top().second);
            maxHeap.pop();
        }
        return result;
    }
};
```




## 1338. Reduce Array Size to The Half

**Aim - Given an array, remove the minimum number of elements such that at least half of the elements are removed. Return the minimum number of elements to remove.**

***CODE:-***

```
class Solution {
public:
    int minSetSize(vector<int>& arr) {
        unordered_map<int, int> freq;
        for (int num : arr) {
            freq[num]++;
        }

        vector<int> counts;
        for (auto& entry : freq) {
            counts.push_back(entry.second);
```

```
        }

        sort(counts.rbegin(), counts.rend());

        int removed = 0, halfSize = arr.size() / 2, setSize = 0;
        for (int count : counts) {
            removed += count;
            setSize++;
            if (removed >= halfSize) {
                break;
            }
        }
        return setSize;
    }
};
```