Experiment 6

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Subject Code: 22CSP-351
Subject Name: AP Lab-II

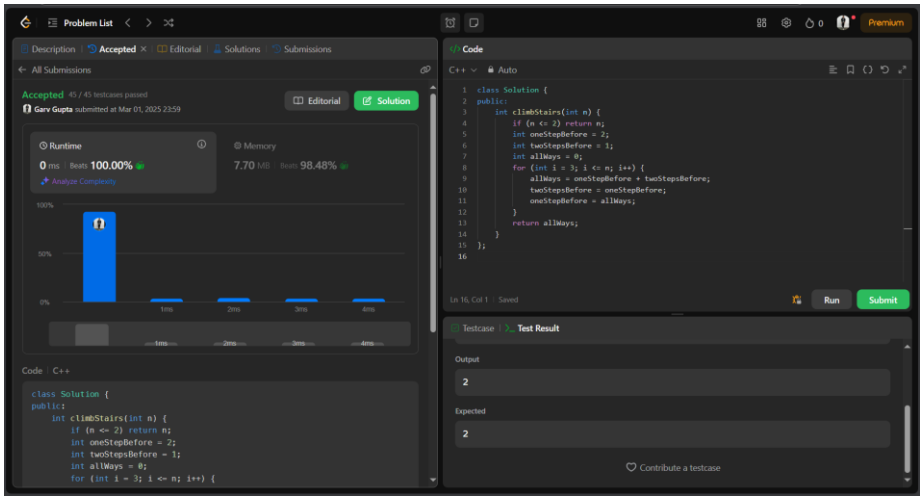
A. Climbing Stairs

1. **Aim:** You are climbing a staircase. It takes n steps to reach the top. Each time you can either climb 1 or 2 steps. In how many distinct ways can you climb to the top?

2. Code

```
class Solution {
public:
    int climbStairs(int n) {
        if (n <= 2) return n;
        int oneStepBefore = 2;
        int twoStepsBefore = 1;
        int allWays = 0;
        for (int i = 3; i <= n; i++) {
            allWays = oneStepBefore + twoStepsBefore;
            twoStepsBefore = oneStepBefore;
            oneStepBefore = allWays;
        }
        return allWays;
    }
};
```

3. Output:



4. **Link:** https://leetcode.com/problems/climbing-stairs/submissions/1559536796

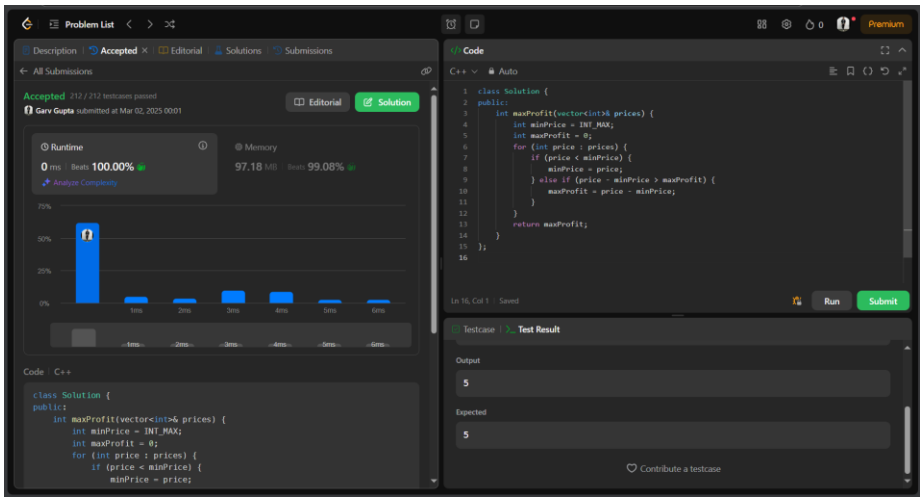
B. Best Time to Buy and Sell a Stock

1. **Aim:** You are given an array prices where prices[i] is the price of a given stock on the ith day. You want to maximize your profit by choosing a single day to buy one stock and choosing a different day in the future to sell that stock. Return the maximum profit you can achieve from this transaction. If you cannot achieve any profit, return 0.

2. Code

```
class Solution {
public:
    int maxProfit(vector<int>& prices) {
        int minPrice = INT_MAX;
        int maxProfit = 0;
        for (int price : prices) {
            if (price < minPrice) {
                minPrice = price;
            } else if (price - minPrice > maxProfit) {
                maxProfit = price - minPrice;
            }
        }
        return maxProfit;
    }
};
```

3. Output:



4. **Link:** https://leetcode.com/problems/best-time-to-buy-and-sell-stock/submissions/1559538562

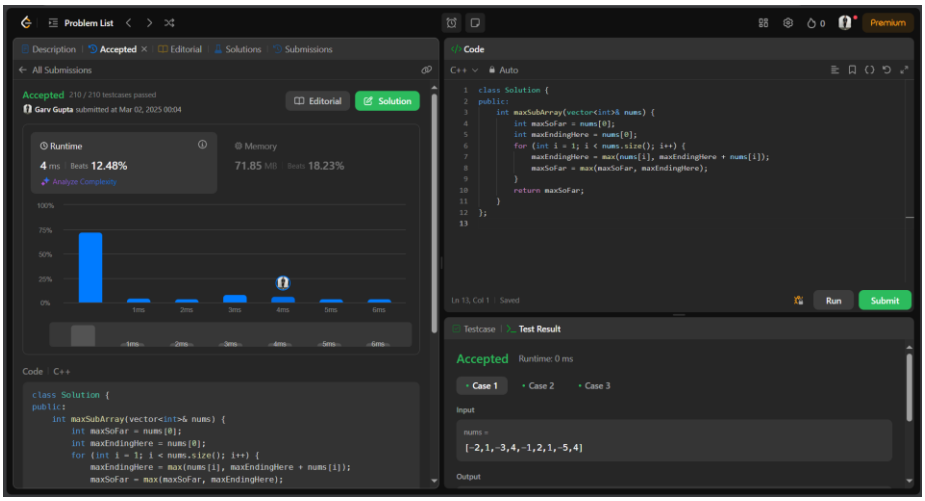
C. Maximum Subarray

1. **Aim:** Given an integer array nums, find the subarray with the largest sum, and return its sum.

2. Code

```
class Solution {
public:
    int maxSubArray(vector<int>& nums) {
        int maxSoFar = nums[0];
        int maxEndingHere = nums[0];
        for (int i = 1; i < nums.size(); i++) {
            maxEndingHere = max(nums[i], maxEndingHere + nums[i]);
            maxSoFar = max(maxSoFar, maxEndingHere);
        }
        return maxSoFar;
    }
};
```

3. **Output:**



4. **Link:** https://leetcode.com/problems/maximum-subarray/submissions/1559541702