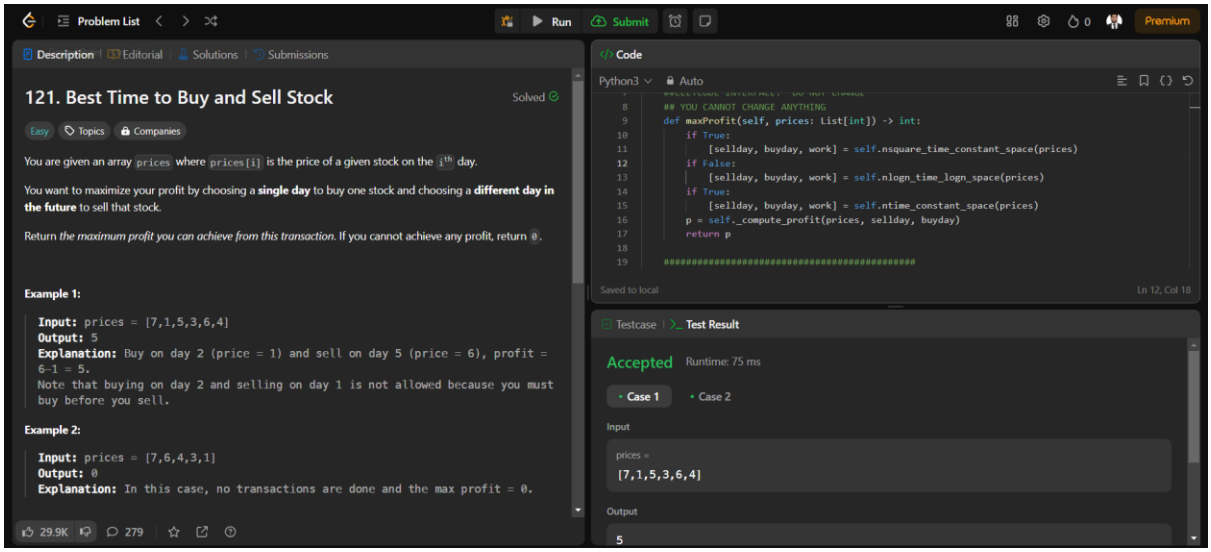
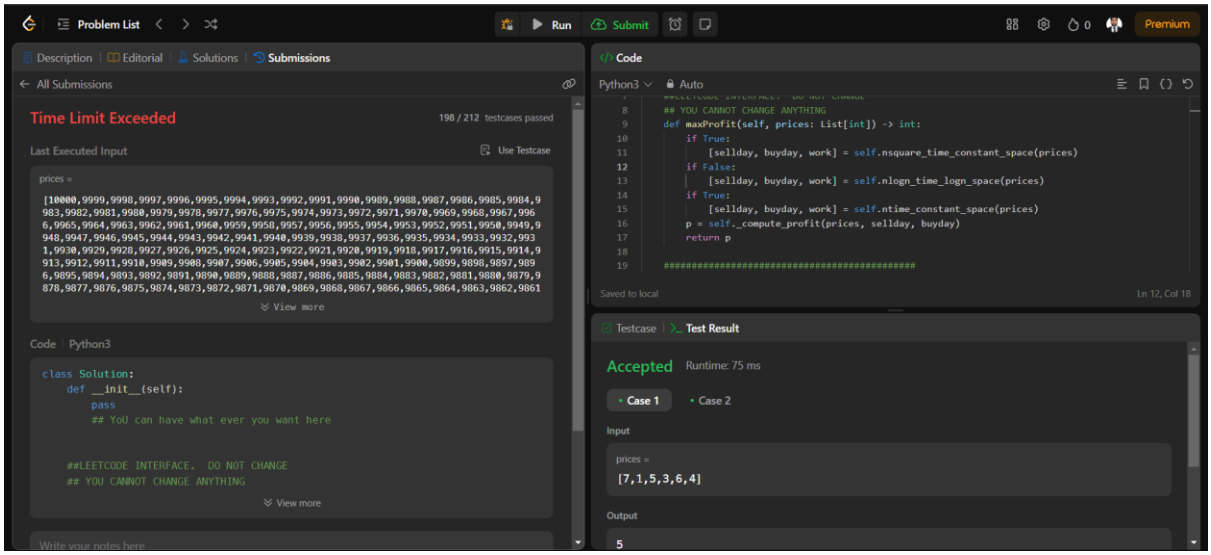
Homework – 5

Program Structures and Algorithms

Buying and Selling of Stocks

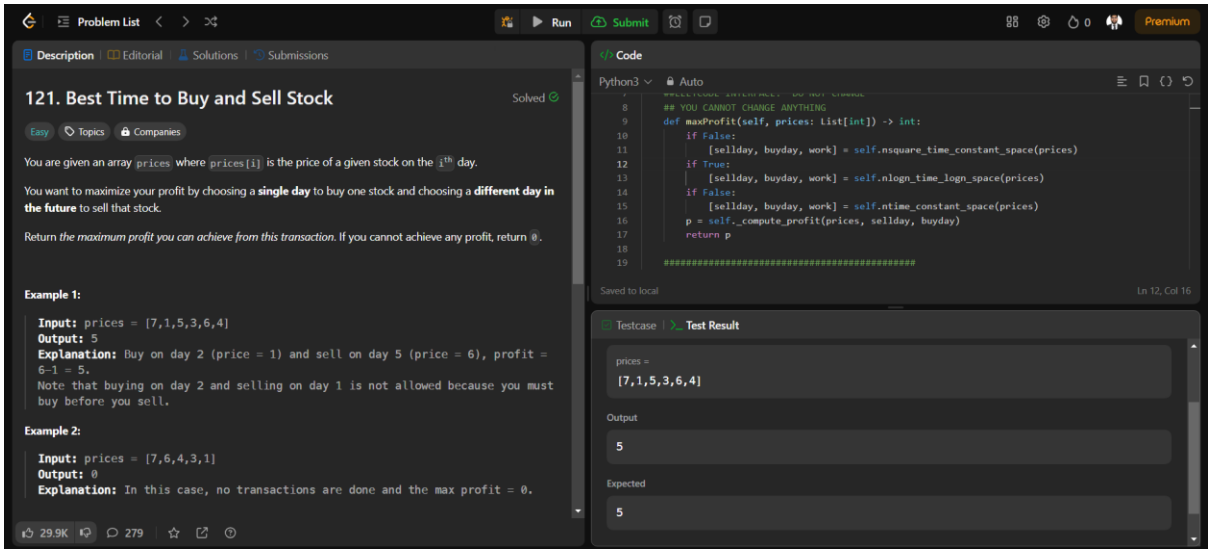
Part – 1: nsquare_time_constant_space

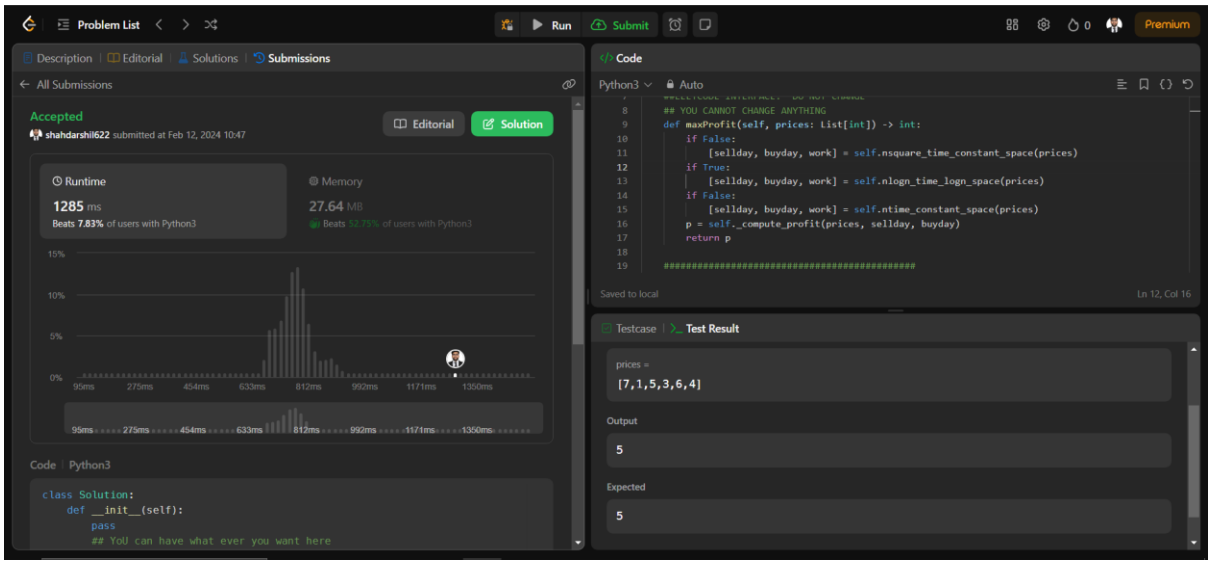




```python
def _nsquare_time_constant_space(self,a):
    length = len(a)
    sellday = 0
    buyday = 0
    work = 0
    maxprofit = 0
    for i in range(length):
        for j in range(i+1,length):
            if((a[j]-a[i])>=0 and (a[j]-a[i])>=maxprofit):
                maxprofit = a[j]-a[i]
                sellday = j
                buyday = i
                work+=1
    return [sellday,buyday,work]
```

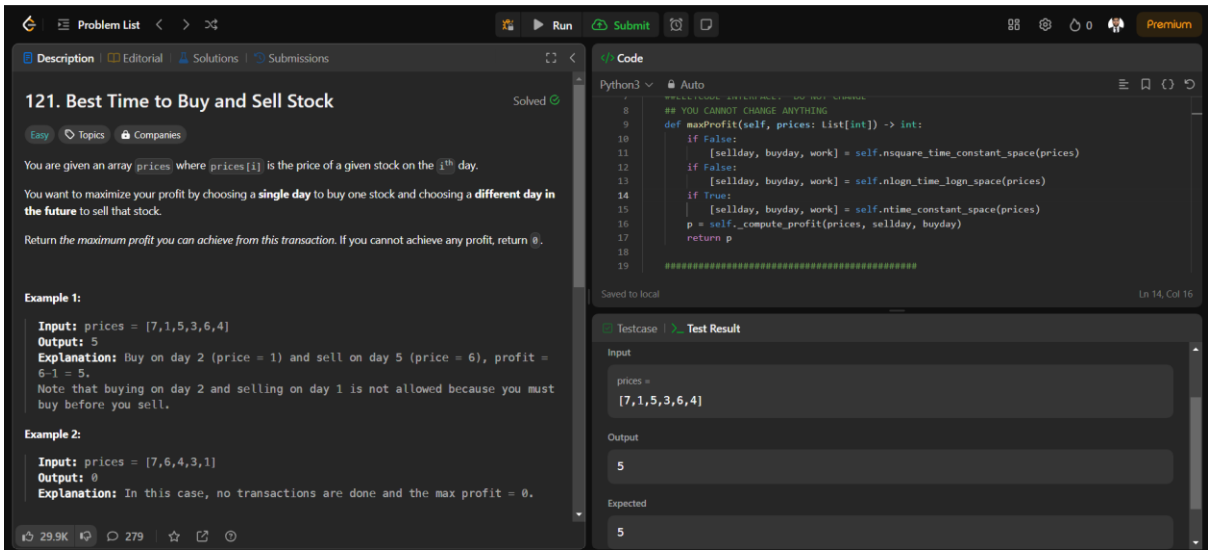
Part – 2: nlogn_time_logn_space

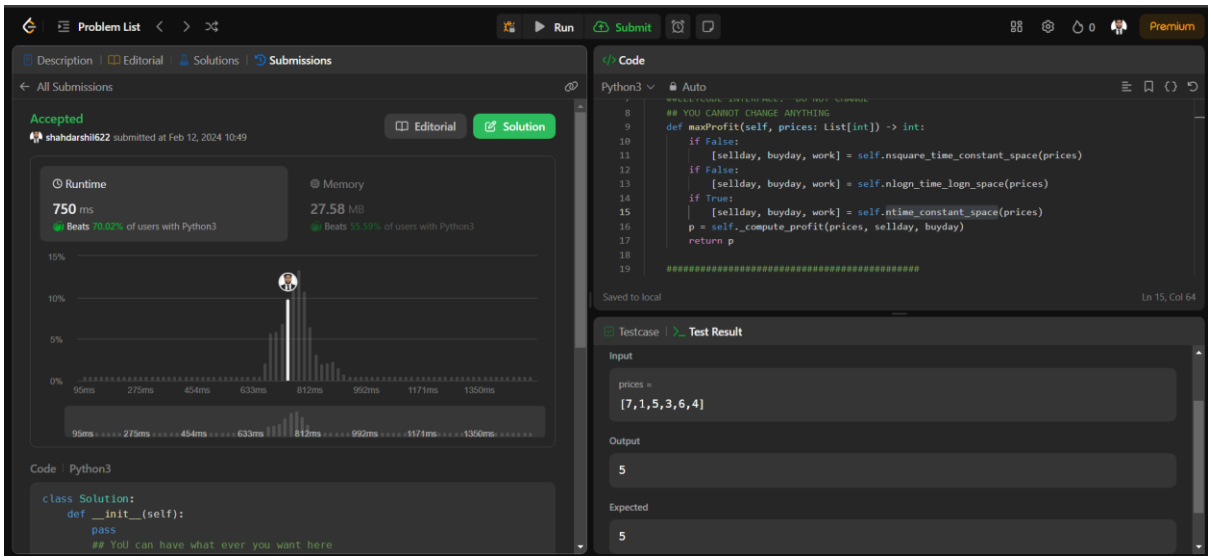




```python
def _nlogn_time_logn_space(self,a):
    def maxProfitFinder(a,start,end):

        if (start >= end) :
            return start,start,0

        mid = (start+end) // 2

        sellday_right_array,buyday_right_array,profit_right_array = maxProfitFinder(a,mid+1,end)
        sellday_left_array, buyday_left_array,profit_left_array = maxProfitFinder(a,start,mid)

        maxprofit_cross_array = max(a[mid+1:end+1])
        minprofit_cross_array = min(a[start:mid+1])

        buyday_cross_profit = a.index(minprofit_cross_array,start,mid+1)
        sellday_cross_profit = a.index(maxprofit_cross_array,mid+1,end+1)

        cross_profit = maxprofit_cross_array - minprofit_cross_array

        if (profit_left_array >= profit_right_array and profit_left_array >= cross_profit) :
            return (sellday_left_array, buyday_left_array, profit_left_array)

        if (profit_right_array >=cross_profit and profit_right_array >= profit_left_array) :
            return sellday_right_array,buyday_right_array,profit_right_array

        if (cross_profit >= profit_left_array and cross_profit >= profit_right_array) :
            return sellday_cross_profit, buyday_cross_profit, cross_profit

        return start,start,0

    sellday,buyday,max_profit = maxProfitFinder(a,0,len(a)-1)

    return [sellday,buyday,(len(a) * math.log(len(a)))]
```

Part 3 - ntime_constant_space






```python
    def _ntime_constant_space(self,a):
        sell = 1
        buy = 0
        sellday=0
        buyday=0
        work=0
        maxprofit=0
        while(sell<len(a)):
            if((a[sell]-a[buy])>=0 and (a[sell]-a[buy])>=maxprofit):
                maxprofit = a[sell]-a[buy]
                sellday = sell
                buyday = buy
                work+=1
            if((a[sell]-a[buy])<0):
                buy = sell
            sell+=1
        return [sellday,buyday,work]
```