Assignment - 3

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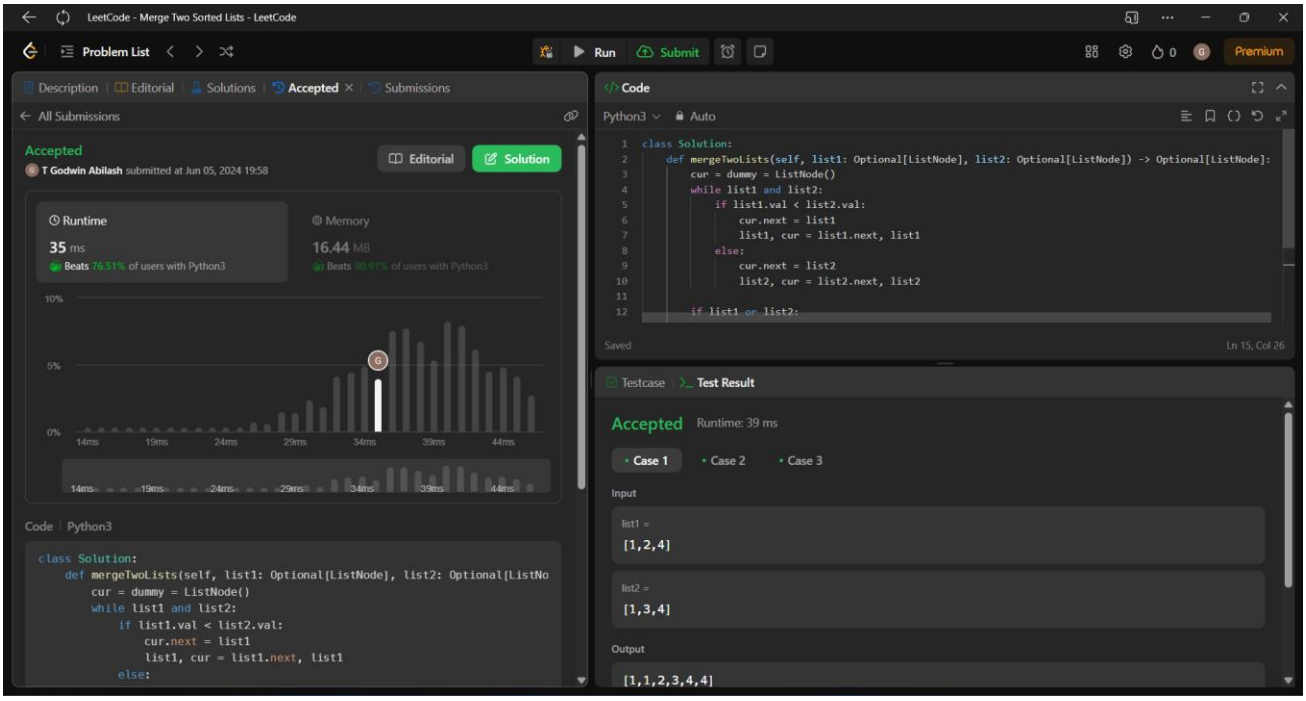
21. Merge Two Sorted List

Code:

```
class Solution:
    def mergeTwoLists(self, list1: Optional[ListNode], list2:
Optional[ListNode]) -> Optional[ListNode]:
        cur = dummy = ListNode()
        while list1 and list2:
            if list1.val < list2.val:
                cur.next = list1
                list1, cur = list1.next, list1
            else:
                cur.next = list2
                list2, cur = list2.next, list2
        if list1 or list2:
            cur.next = list1 if list1 else list2
        return dummy.next
```

Screenshot:



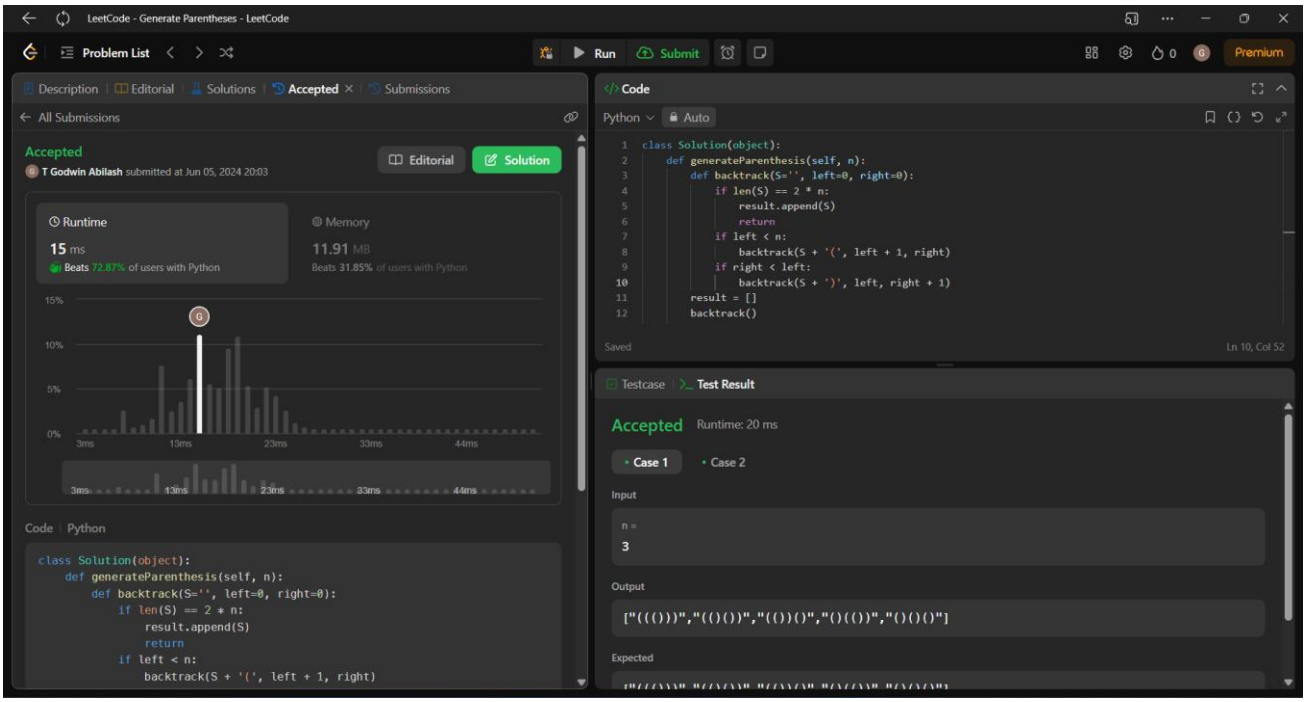
Time Complexity: O(n)

22. Generate Parenthesis

Code:

```
class Solution(object):
    def generateParenthesis(self, n):
        def backtrack(S='', left=0, right=0):
            if len(S) == 2 * n:
                result.append(S)
                return
            if left < n:
                backtrack(S + '(', left + 1, right)
            if right < left:
                backtrack(S + ')', left, right + 1)
        result = []
        backtrack()
        return result
```

Screenshot for I/O:



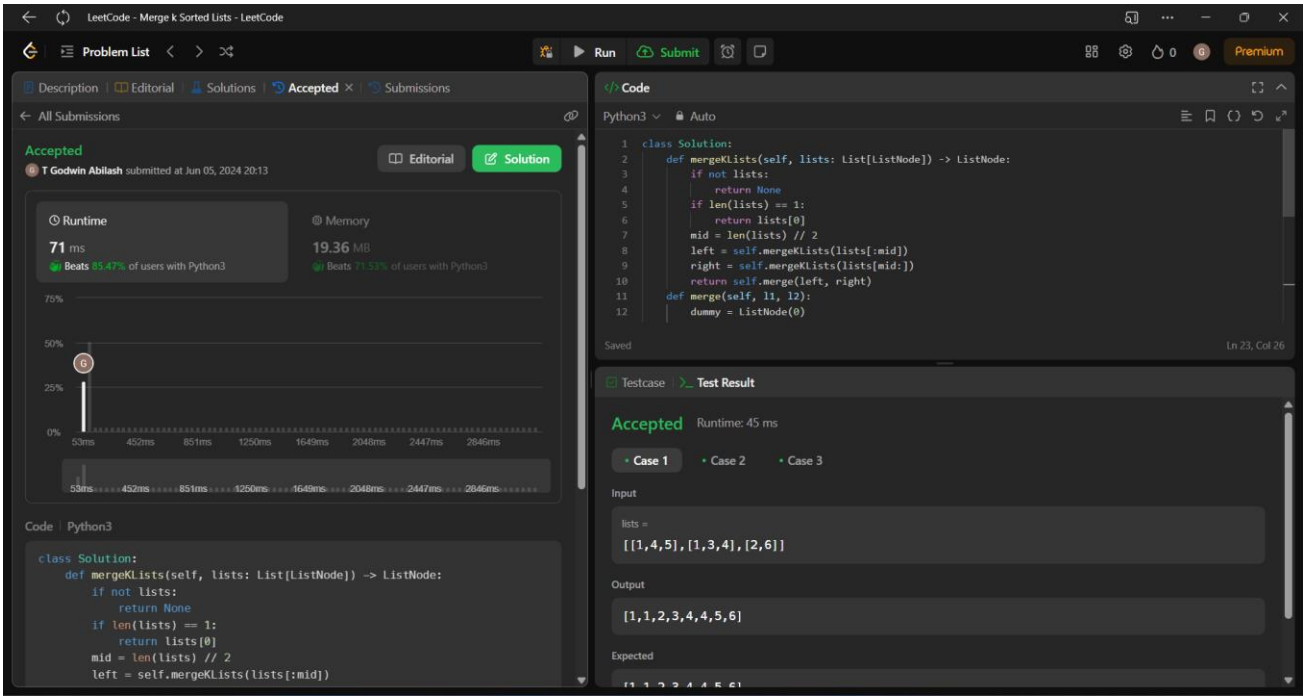
Time Complexity: O(n)

23. Merge K Sorted Lists

Code:

```
class Solution:
    def mergeKLists(self, lists: List[ListNode]) -> ListNode:
        if not lists:
            return None
        if len(lists) == 1:
            return lists[0]
        mid = len(lists) // 2
        left = self.mergeKLists(lists[:mid])
        right = self.mergeKLists(lists[mid:])
        return self.merge(left, right)
    def merge(self, l1, l2):
        dummy = ListNode(0)
        curr = dummy
        while l1 and l2:
            if l1.val < l2.val:
                curr.next = l1
                l1 = l1.next
            else:
                curr.next = l2
                l2 = l2.next
            curr = curr.next
        curr.next = l1 or l2
        return dummy.next
```

Screenshot:



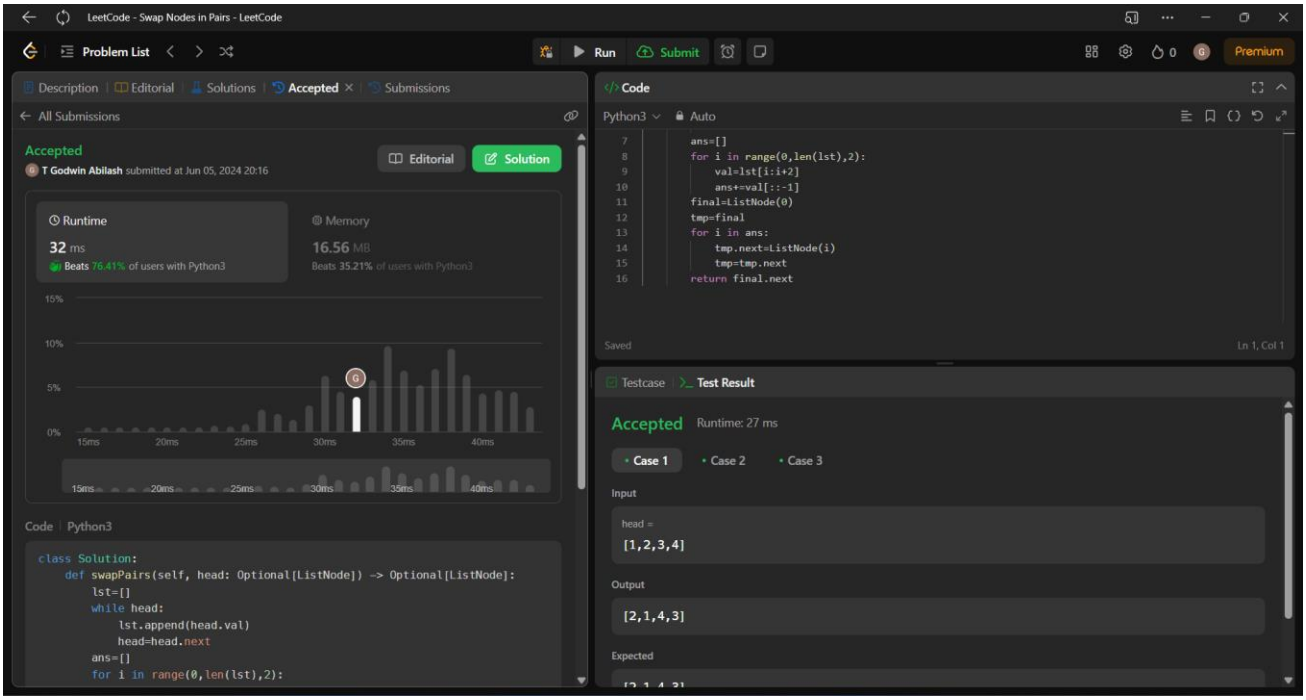
Time Complexity: O(n)

24. Swap Nodes in Pairs

Code:

```
class Solution:
    def swapPairs(self, head: Optional[ListNode]) -> Optional[ListNode]:
        lst=[]
        while head:
            lst.append(head.val)
            head=head.next
        ans=[]
        for i in range(0,len(lst),2):
            val=lst[i:i+2]
            ans+=val[::-1]
        final=ListNode(0)
        tmp=final
        for i in ans:
            tmp.next=ListNode(i)
            tmp=tmp.next
        return final.next
```

Screenshot:



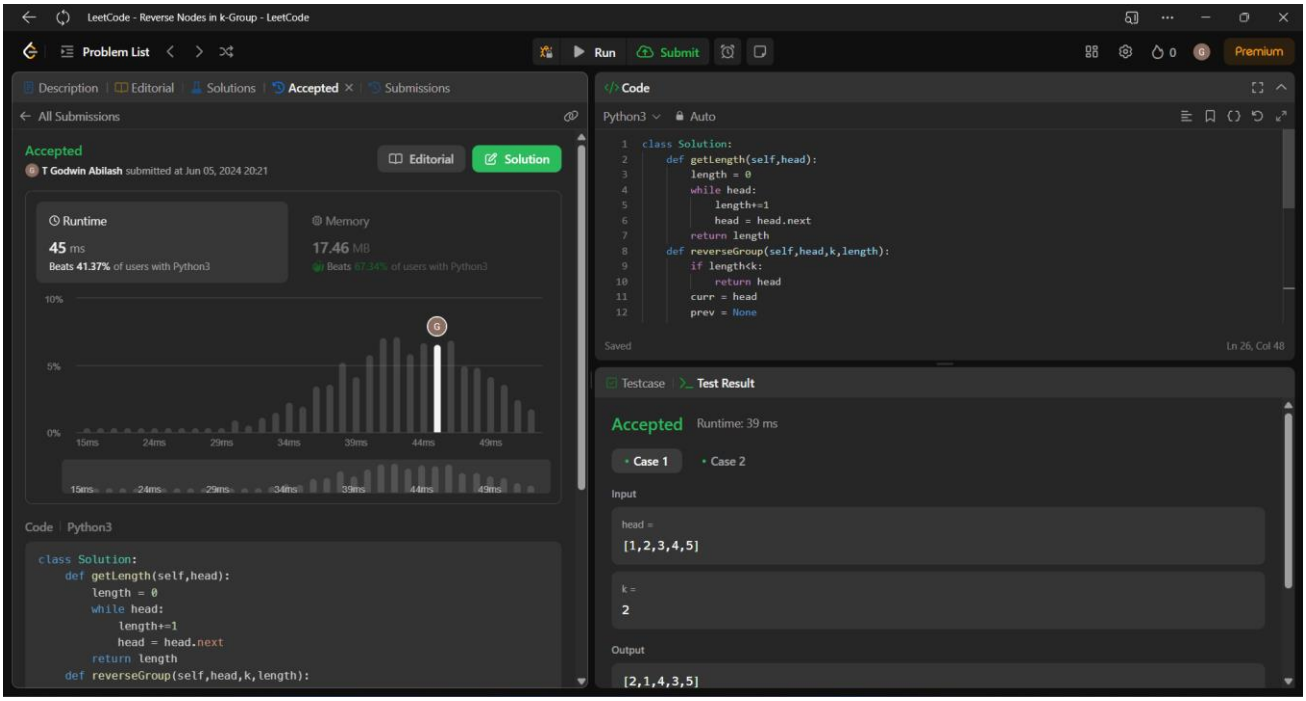
Time Complexity: O(n)

25. Reverse Nodes in k-Group

Code:

```
class Solution:
    def getLength(self,head):
        length = 0
        while head:
            length+=1
            head = head.next
        return length
    def reverseGroup(self,head,k,length):
        if length<k:
            return head
        curr = head
        prev = None
        next = None
        count = 0
        while curr and count<k:
            next = curr.next
            curr.next = prev
            prev = curr
            curr = next
            count+=1
        if next:
            head.next = self.reverseGroup(next,k,length-k)
        return prev
    def reverseKGroup(self, head: Optional[ListNode], k: int) -> Optional[ListNode]:
        length = self.getLength(head)
        return self.reverseGroup(head,k,length)
```

Screenshot:



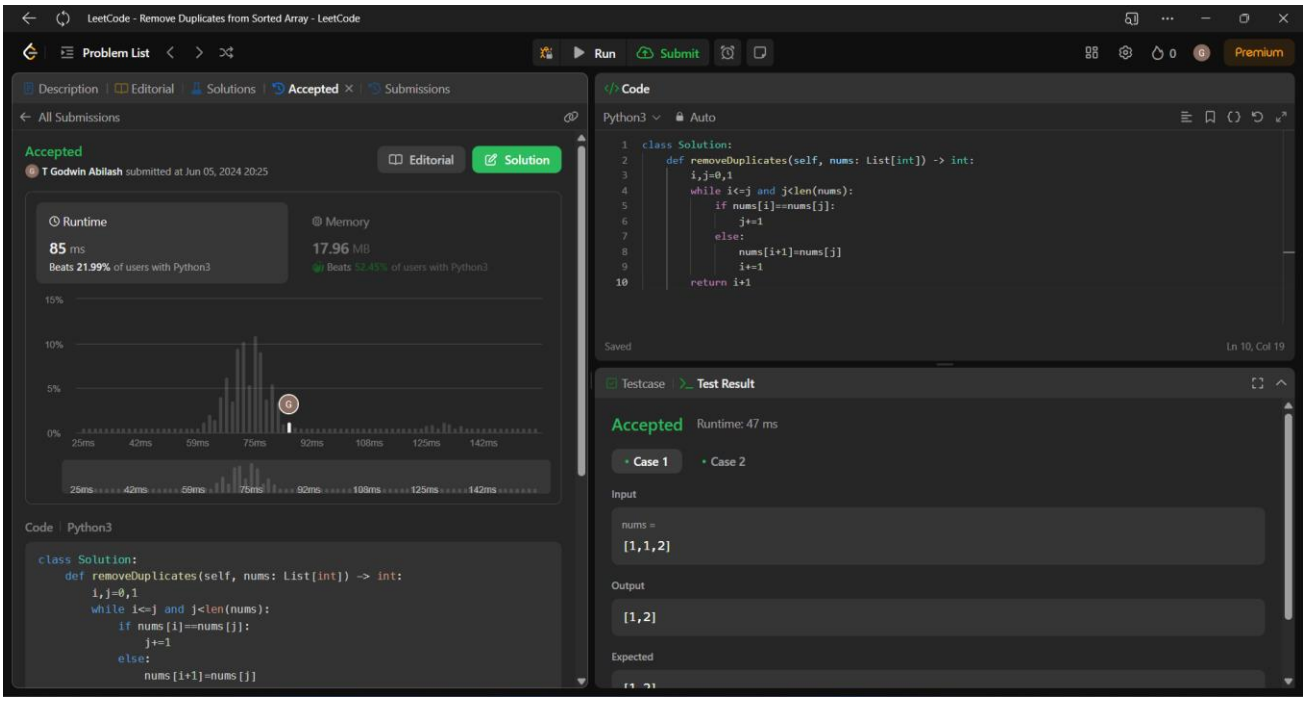
Time Complexity: O(n)

26. Remove Duplicate from Sorted Array

Code:

```
class Solution:
    def removeDuplicates(self, nums: List[int]) -> int:
        i,j=0,1
        while i<=j and j<len(nums):
            if nums[i]==nums[j]:
                j+=1
            else:
                nums[i+1]=nums[j]
                i+=1
        return i+1
```

Screenshot:



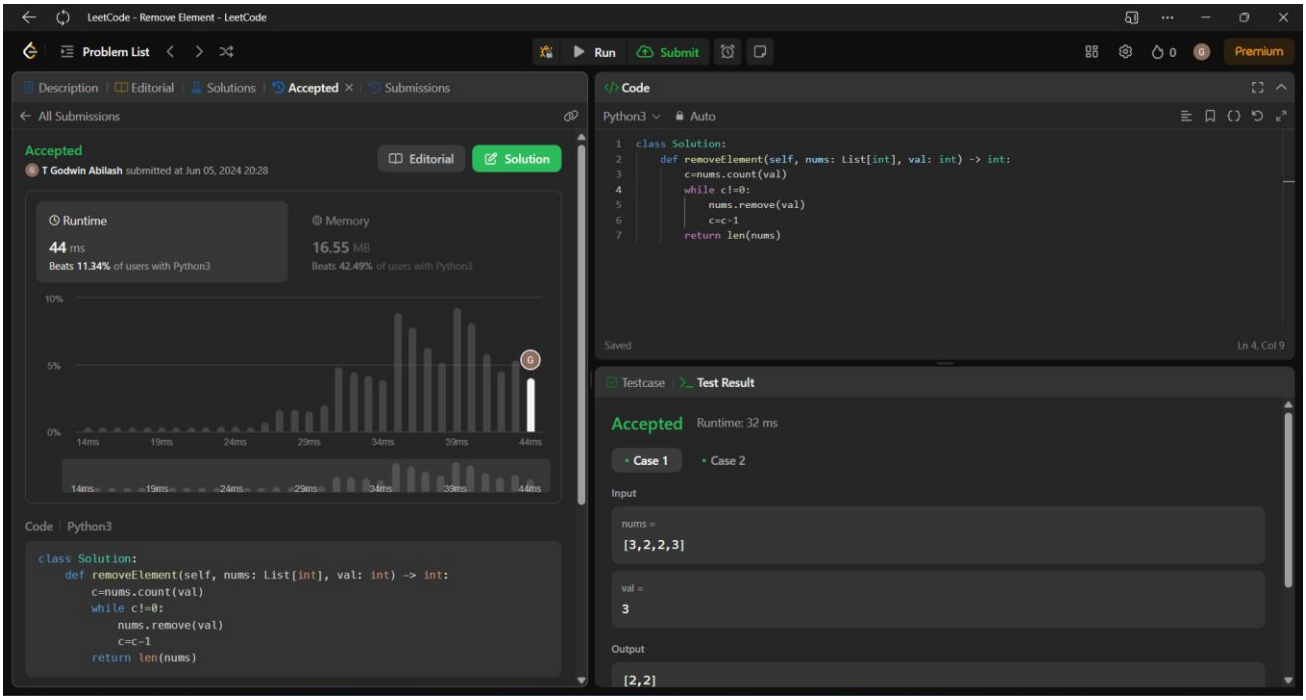
Time Complexity: O(n)

27. Remove Element

Code:

```
class Solution:
    def removeElement(self, nums: List[int], val: int) -> int:
        c=nums.count(val)
        while c!=0:
            nums.remove(val)
            c=c-1
        return len(nums)
```

Screenshot:



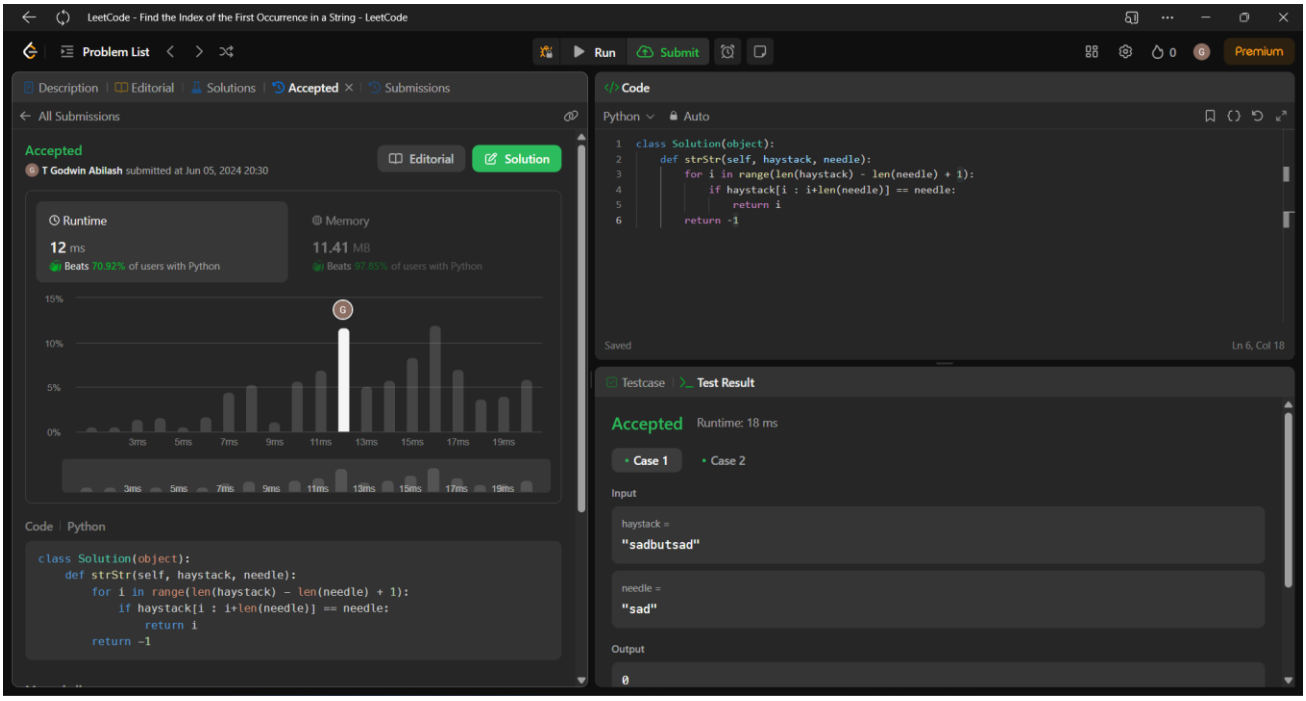
Time Complexity: O(n)

28. Find the Index of the First Occurrence in a String

Code:

```
class Solution(object):
    def strStr(self, haystack, needle):
        for i in range(len(haystack) - len(needle) + 1):
            if haystack[i : i+len(needle)] == needle:
                return i
        return -1
```

Screenshot:



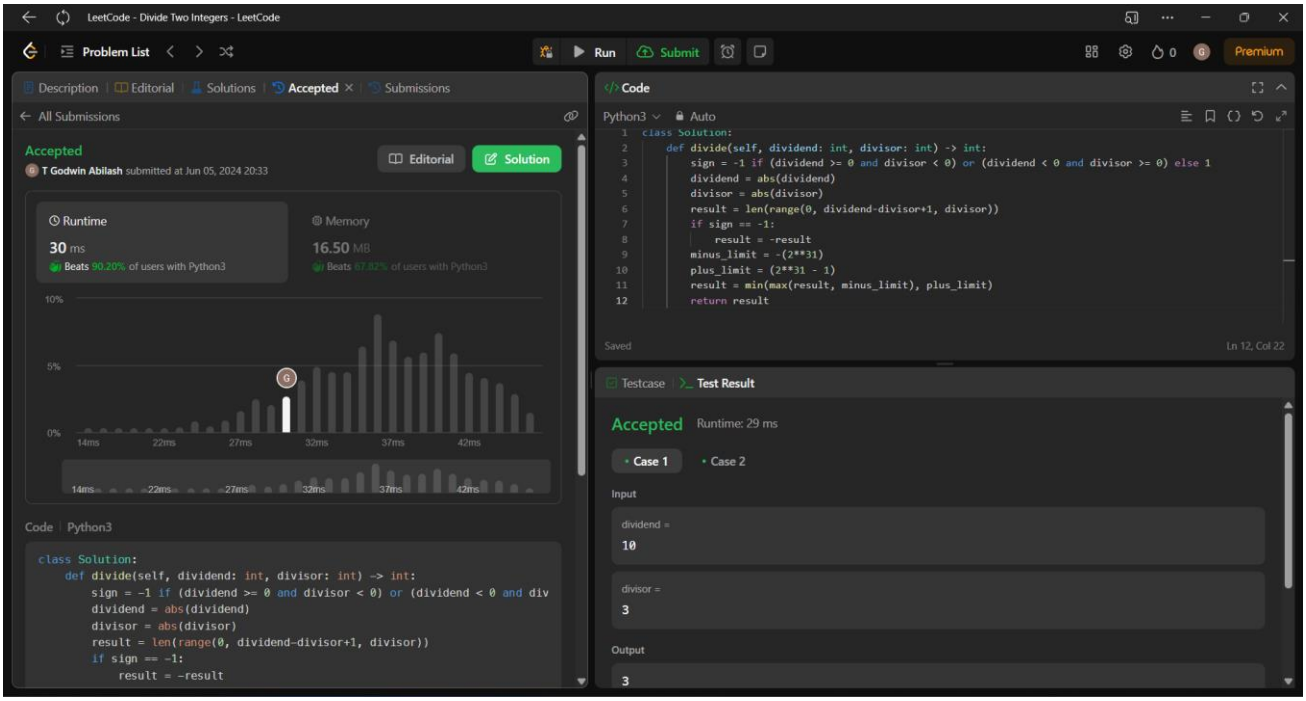
Time Complexity: O(n)

29. Divide Two Integers

Code:

```
class Solution:
    def divide(self, dividend: int, divisor: int) -> int:
        sign = -1 if (dividend >= 0 and divisor < 0) or (dividend < 0 and
divisor >= 0) else 1
        dividend = abs(dividend)
        divisor = abs(divisor)
        result = len(range(0, dividend-divisor+1, divisor))
        if sign == -1:
            result = -result
        minus_limit = -(2**31)
        plus_limit = (2**31 - 1)
        result = min(max(result, minus_limit), plus_limit)
        return result
```

Screenshot:



Time Complexity: O(n)

30. Substring with Concatenation of All Words

Code:

```
class Solution:
    def calc(self ,i):
        cnt = 0
        ind = i
        while (ind < i+self.pl):
            news = self.s[ind : ind + self.n]
            if news in self.dic :
                self.dic[news] -= 1
                if self.dic[news] == 0 :
                    cnt += 1
                ind += self.n
            else :
                return False
        if cnt == len(self.dic) :
            return True
        else :
            return False
    def findSubstring(self, s: str, words: List[str]) -> List[int]:
        self.s = s
        self.n = len(words[0])
        d = {}
        for x in words :
            if x in d :
                d[x] += 1
            else :
                d[x] = 1
        self.pl = len(words)*len(words[0])
        ans = []
        i = 0
        while(i< len(s) - self.pl + 1):
            self.dic = {x : d[x] for x in d}
            if self.calc(i) :
                ans += [i]
                i += 1
            else :
                i += 1
        return ans
```

Screenshot: