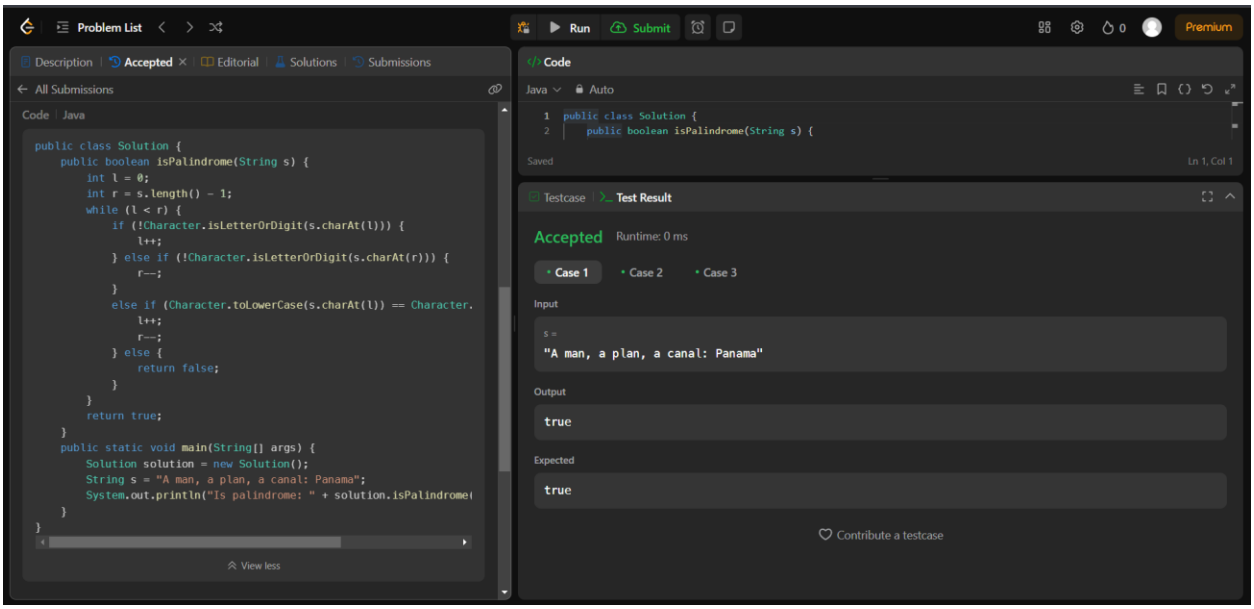
Maha Gowri S **21/11/24**

1.VALID PALINDROME:

Code:

```
public class Solution {
    public boolean isPalindrome(String s) {
        int l = 0;
        int r = s.length() - 1;
        while (l < r) {
            if (!Character.isLetterOrDigit(s.charAt(l))) {
                l++;
            } else if (!Character.isLetterOrDigit(s.charAt(r))) {
                r--;
            }
            else if (Character.toLowerCase(s.charAt(l)) ==
Character.toLowerCase(s.charAt(r))) {
                l++;
                r--;
            } else {
                return false;
            }
        }
        return true;
    }
    public static void main(String[] args) {
        Solution solution = new Solution();
        String s = "A man, a plan, a canal: Panama";
        System.out.println("Is palindrome: " + solution.isPalindrome(s));
    }
}
```

OUTPUT:

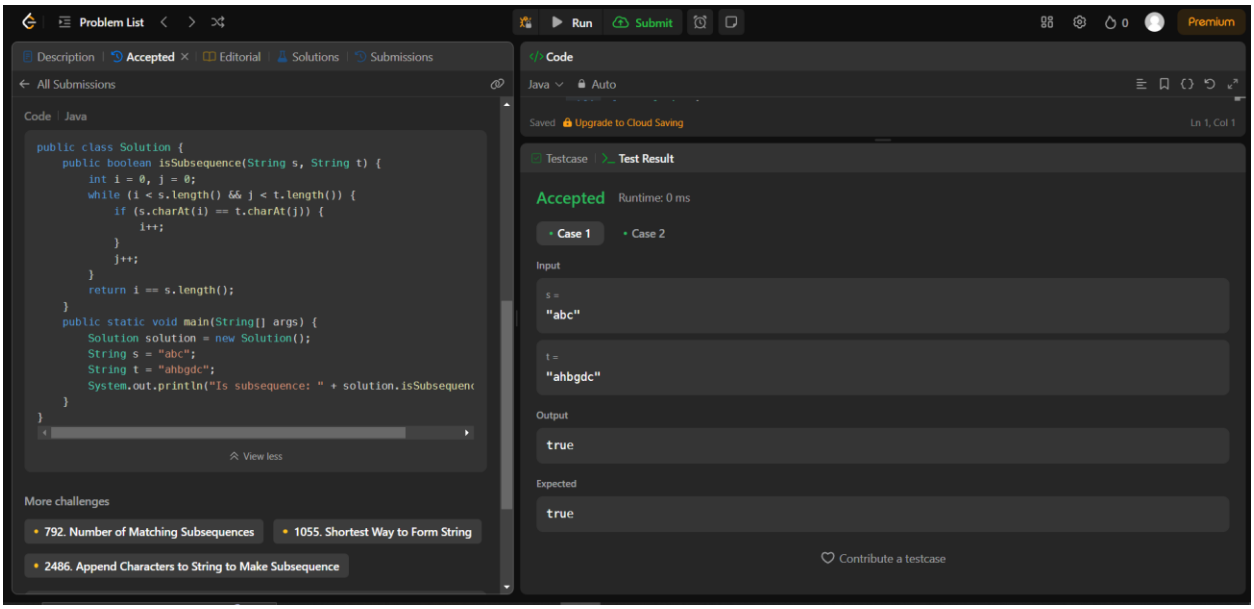


2.IS SUBSEQUENCE:

Code:

```
public class Solution {
    public boolean isSubsequence(String s, String t) {
        int i = 0, j = 0;
        while (i < s.length() && j < t.length()) {
            if (s.charAt(i) == t.charAt(j)) {
                i++;
            }
            j++;
        }
        return i == s.length();
    }
    public static void main(String[] args) {
        Solution solution = new Solution();
        String s = "abc";
        String t = "ahbgdc";
        System.out.println("Is subsequence: " + solution.isSubsequence(s, t));
    }
}
```

OUTPUT:

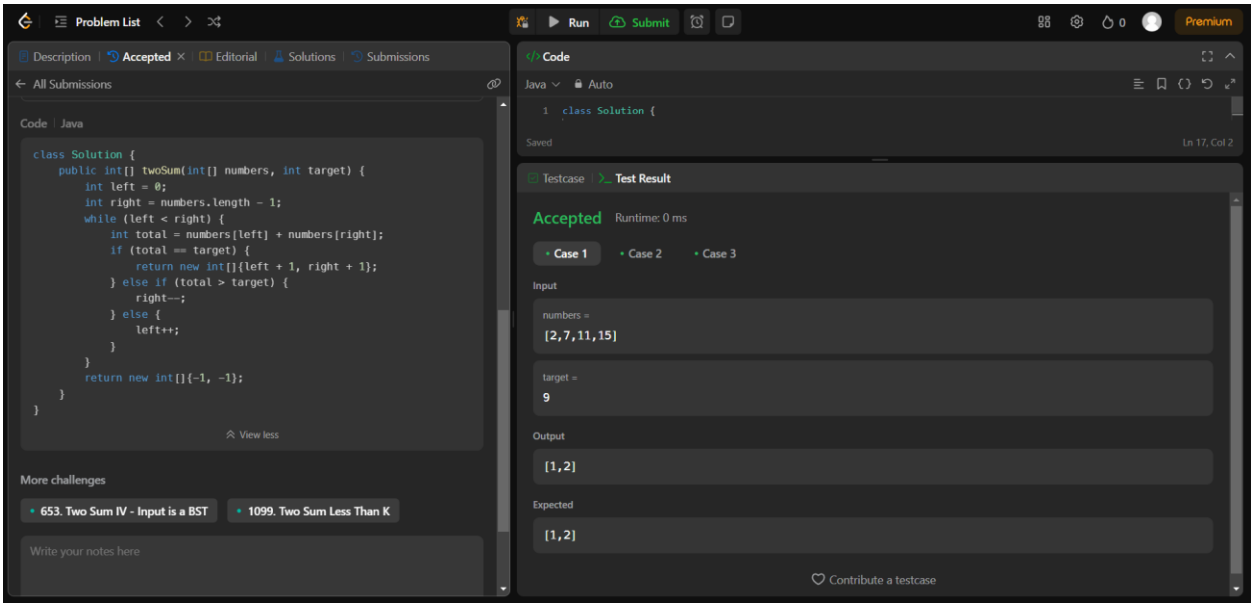


3.TWO SUM II -INPUT ARRAY IS SORTED

CODE:

```
class Solution {
    public int[] twoSum(int[] numbers, int target) {
        int left = 0;
        int right = numbers.length - 1;
        while (left < right) {
            int total = numbers[left] + numbers[right];
            if (total == target) {
                return new int[]{left + 1, right + 1};
            } else if (total > target) {
                right--;
            } else {
                left++;
            }
        }
        return new int[]{-1, -1};
    }
}
```

OUTPUT:

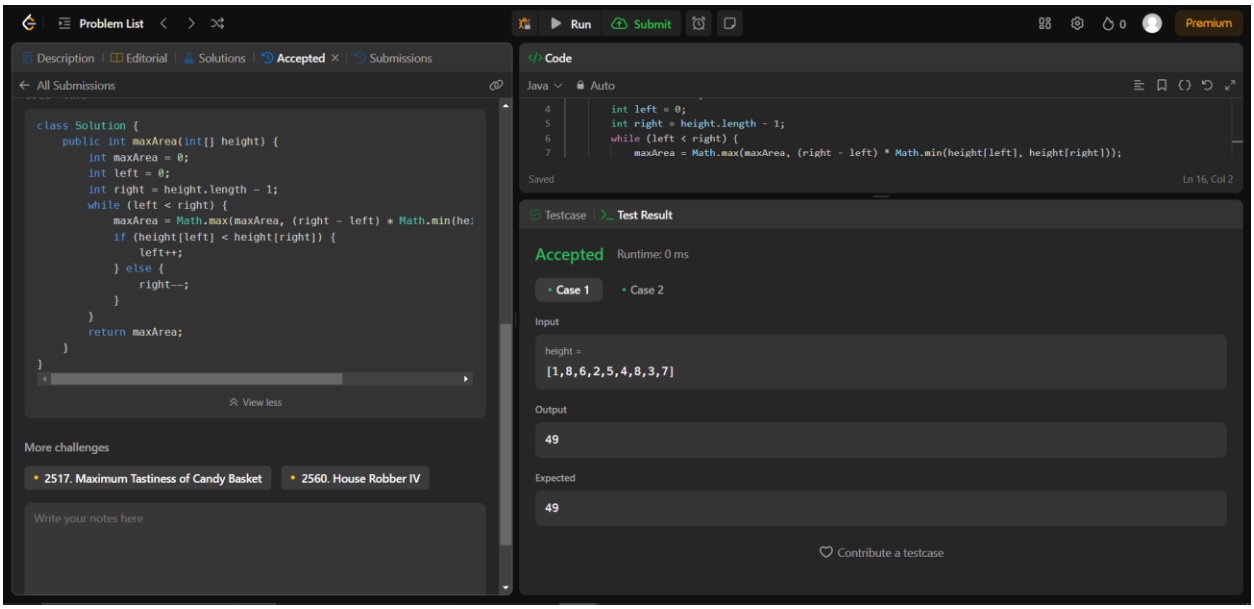


4.CONTAINER WITH MOST WATER:

CODE:

```
class Solution {
    public int maxArea(int[] height) {
        int maxArea = 0;
        int left = 0;
        int right = height.length - 1;
        while (left < right) {
            maxArea = Math.max(maxArea, (right - left) * Math.min(height[left],
height[right]));
            if (height[left] < height[right]) {
                left++;
            } else {
                right--;
            }
        }
        return maxArea;
    }
}
```

OUTPUT:



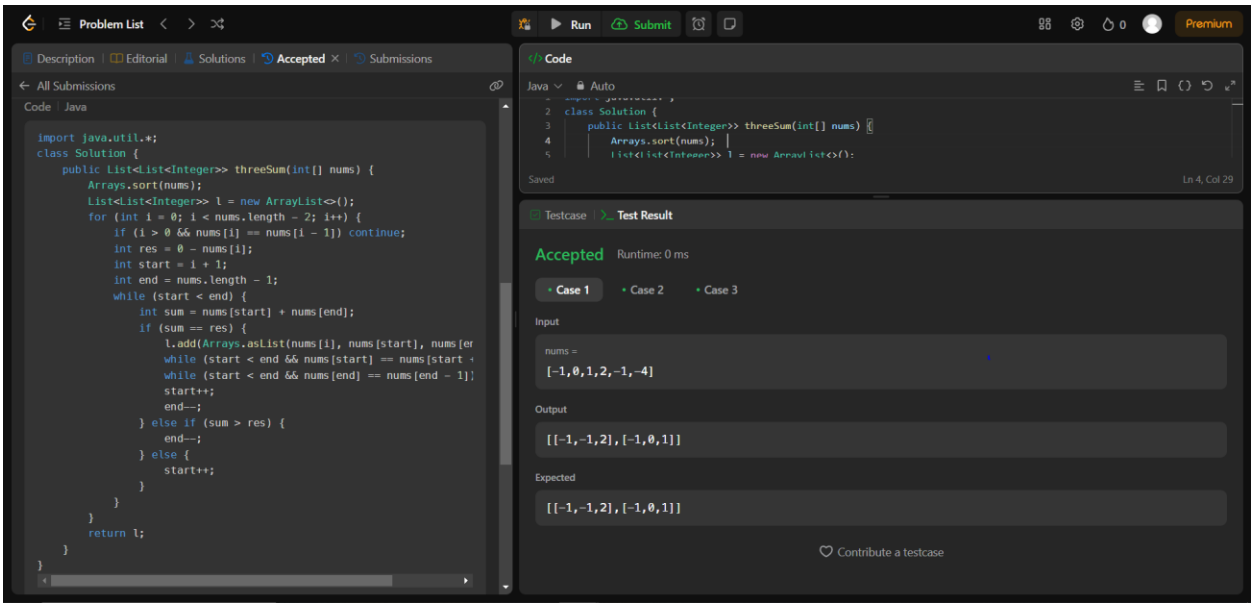
5.3SUM:

CODE:

```
import java.util.*;
class Solution {
    public List<List<Integer>> threeSum(int[] nums) {
        Arrays.sort(nums);
        List<List<Integer>> l = new ArrayList<>();
        for (int i = 0; i < nums.length - 2; i++) {
            if (i > 0 && nums[i] == nums[i - 1]) continue;
            int res = 0 - nums[i];
            int start = i + 1;
            int end = nums.length - 1;
            while (start < end) {
                int sum = nums[start] + nums[end];
                if (sum == res) {
                    l.add(Arrays.asList(nums[i], nums[start], nums[end]));
                    while (start < end && nums[start] == nums[start + 1]) start++;
                    while (start < end && nums[end] == nums[end - 1]) end--;
                    start++;
                    end--;
                } else if (sum > res) {
                    end--;
                } else {
```

```
                start++;
            }
        }
    }
    return l;
  }
}
```

OUTPUT:



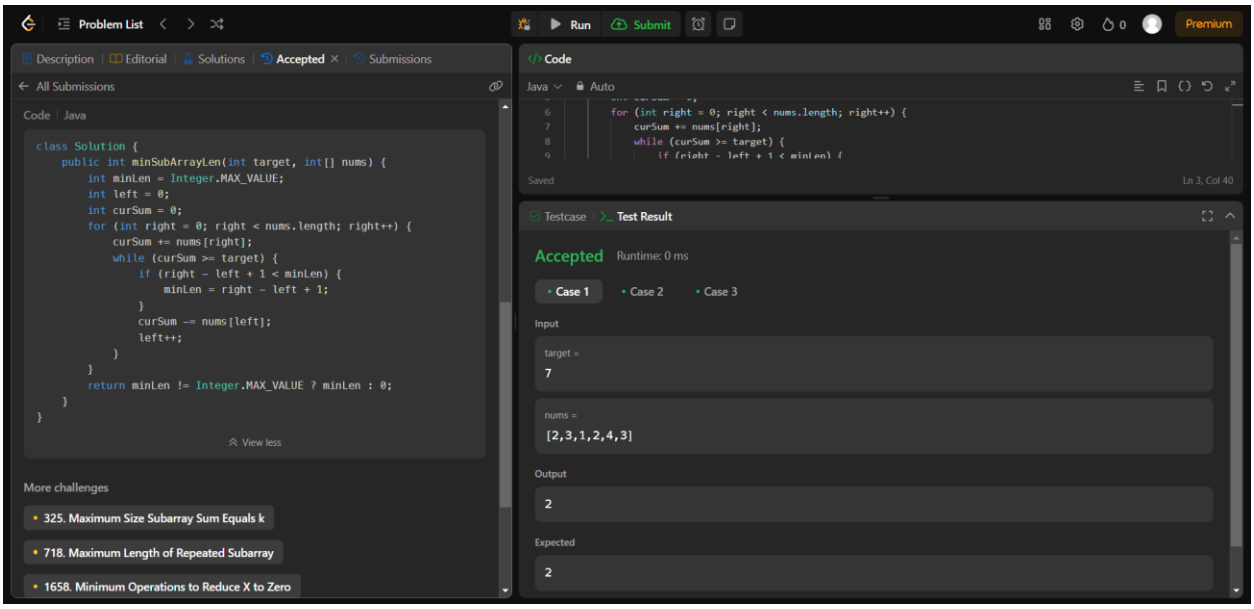
6.MINIMUM SIZE SUBARRAY SUM:

CODE:

```
class Solution {
    public int minSubArrayLen(int target, int[] nums) {
        int minLen = Integer.MAX_VALUE;
        int left = 0;
        int curSum = 0;
        for (int right = 0; right < nums.length; right++) {
            curSum += nums[right];
            while (curSum >= target) {
                if (right - left + 1 < minLen) {
                    minLen = right - left + 1;
                }
                curSum -= nums[left];
```

```
            left++;
        }
    }
    return minLen != Integer.MAX_VALUE ? minLen : 0;
  }
}
```

OUTPUT:



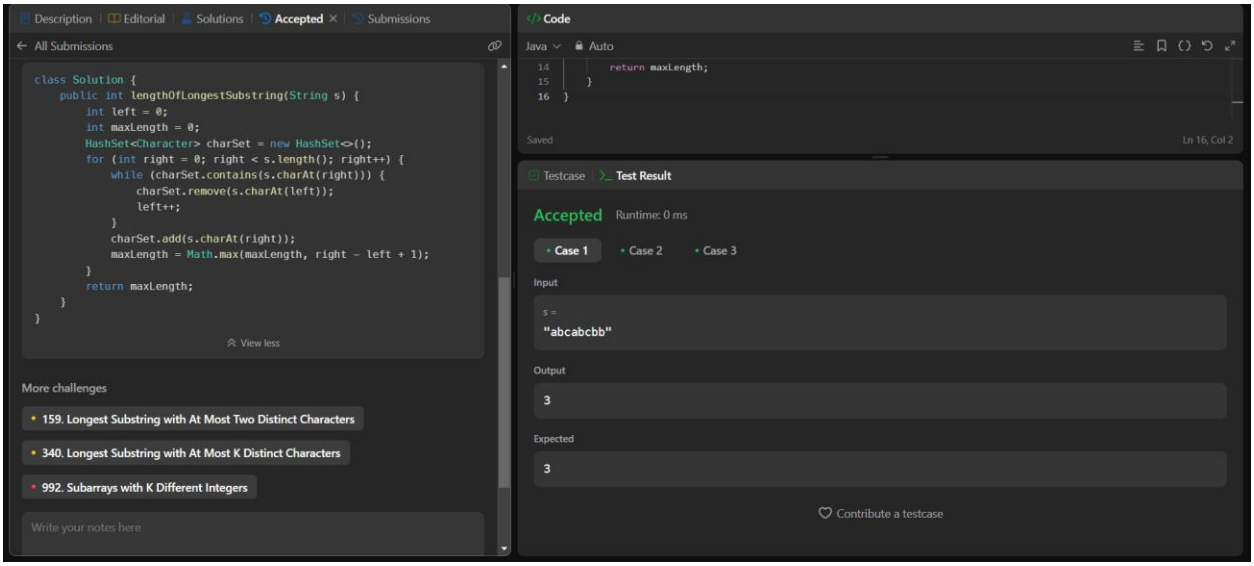
7.LONGEST SUBSTRING WITHOUT REPEATING CHARACTERS:

CODE:

```
class Solution {
    public int lengthOfLongestSubstring(String s) {
        int left = 0;
        int maxLength = 0;
        HashSet<Character> charSet = new HashSet<>();
        for (int right = 0; right < s.length(); right++) {
            while (charSet.contains(s.charAt(right))) {
                charSet.remove(s.charAt(left));
                left++;
            }
            charSet.add(s.charAt(right));
            maxLength = Math.max(maxLength, right - left + 1);
        }
```

```
        return maxLength;
    }
}
```

OUTPUT:



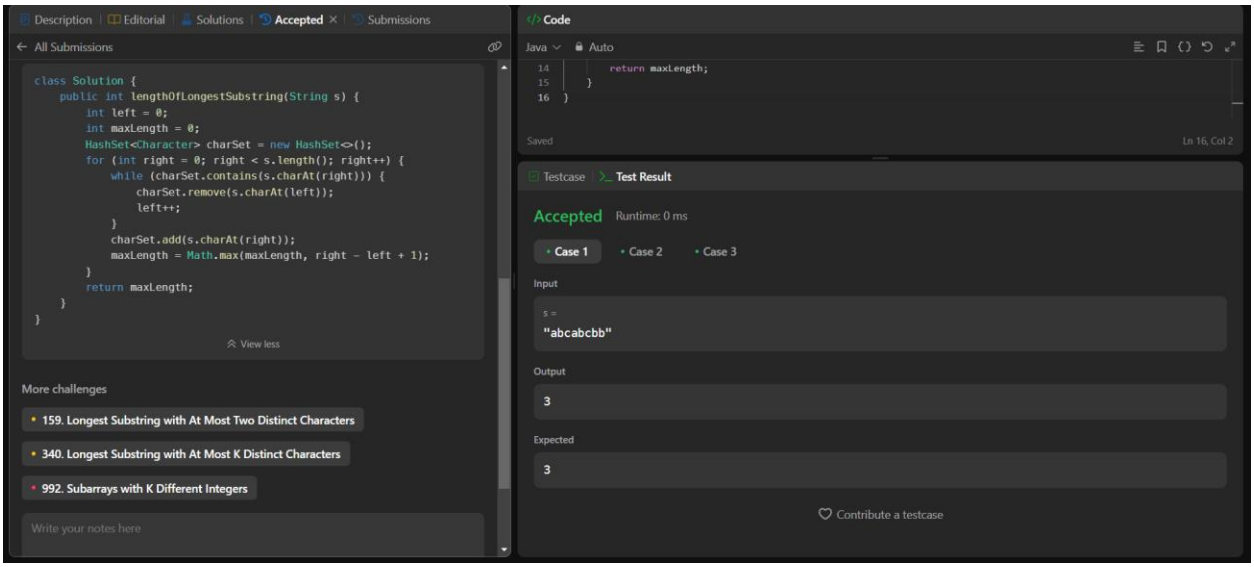
8.SUBSTRING WITH CONCATENATION OF ALL WORDS:

CODE:

```
class Solution {
    public List<Integer> findSubstring(String s, String[] words) {
        final Map<String, Integer> counts = new HashMap<>();
        for (final String word : words) {
            counts.put(word, counts.getOrDefault(word, 0) + 1);
        }
        final List<Integer> indexes = new ArrayList<>();
        final int n = s.length(), num = words.length, len = words[0].length();
        for (int i = 0; i < n - num * len + 1; i++) {
            final Map<String, Integer> seen = new HashMap<>();
            int j = 0;
            while (j < num) {
                final String word = s.substring(i + j * len, i + (j + 1) * len);
                if (counts.containsKey(word)) {
                    seen.put(word, seen.getOrDefault(word, 0) + 1);
                    if (seen.get(word) > counts.getOrDefault(word, 0)) {
                        break;
                    }
                } else {
```

```
                break;
            }
            j++;
        }
        if (j == num) {
            indexes.add(i);
        }
    }
    return indexes;
  }
}
```

OUTPUT:



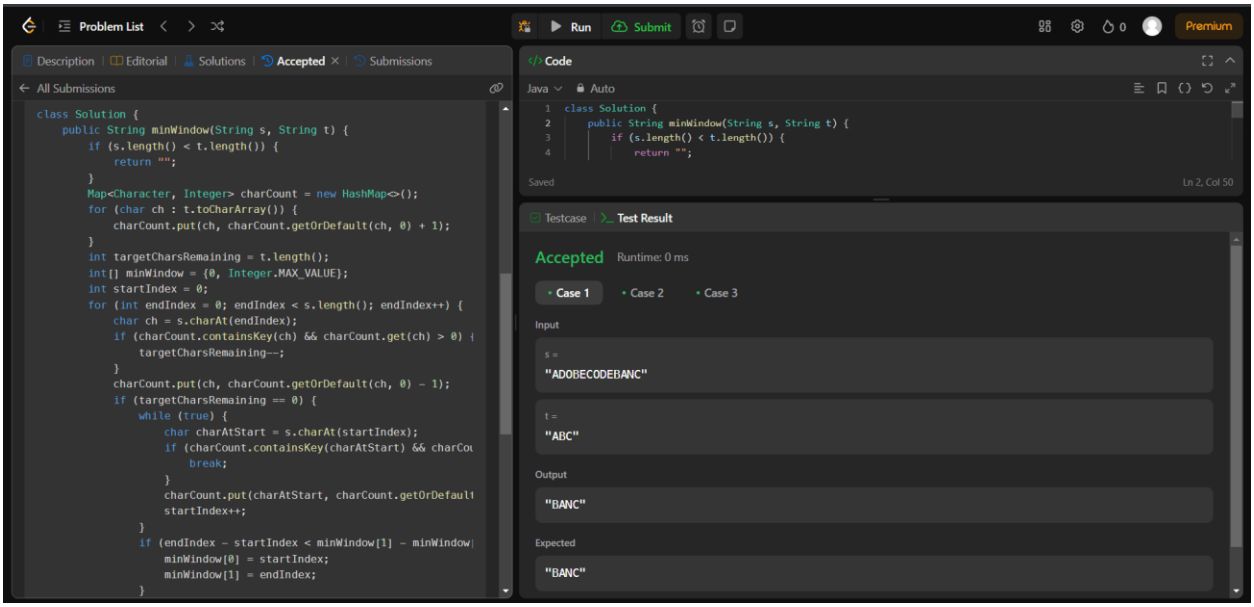
9.MINIMUM WINDOW SUBSTRING:

CODE:

```
class Solution {
    public String minWindow(String s, String t) {
        if (s.length() < t.length()) {
            return "";
        }
        Map<Character, Integer> charCount = new HashMap<>();
        for (char ch : t.toCharArray()) {
            charCount.put(ch, charCount.getOrDefault(ch, 0) + 1);
        }
        int targetCharsRemaining = t.length();
        int[] minWindow = {0, Integer.MAX_VALUE};
```

```
        int startIndex = 0;
        for (int endIndex = 0; endIndex < s.length(); endIndex++) {
            char ch = s.charAt(endIndex);
            if (charCount.containsKey(ch) && charCount.get(ch) > 0) {
                targetCharsRemaining--;
            }
            charCount.put(ch, charCount.getOrDefault(ch, 0) - 1);
            if (targetCharsRemaining == 0) {
                while (true) {
                    char charAtStart = s.charAt(startIndex);
                    if (charCount.containsKey(charAtStart) && charCount.get(charAtStart) ==
0) {
                        break;
                    }
                    charCount.put(charAtStart, charCount.getOrDefault(charAtStart, 0) + 1);
                    startIndex++;
                }
                if (endIndex - startIndex < minWindow[1] - minWindow[0]) {
                    minWindow[0] = startIndex;
                    minWindow[1] = endIndex;
                }
                charCount.put(s.charAt(startIndex),
charCount.getOrDefault(s.charAt(startIndex), 0) + 1);
                targetCharsRemaining++;
                startIndex++;
            }
        }
        return minWindow[1] >= s.length() ? "" : s.substring(minWindow[0],
minWindow[1] + 1);
    }
}
```

OUTPUT:

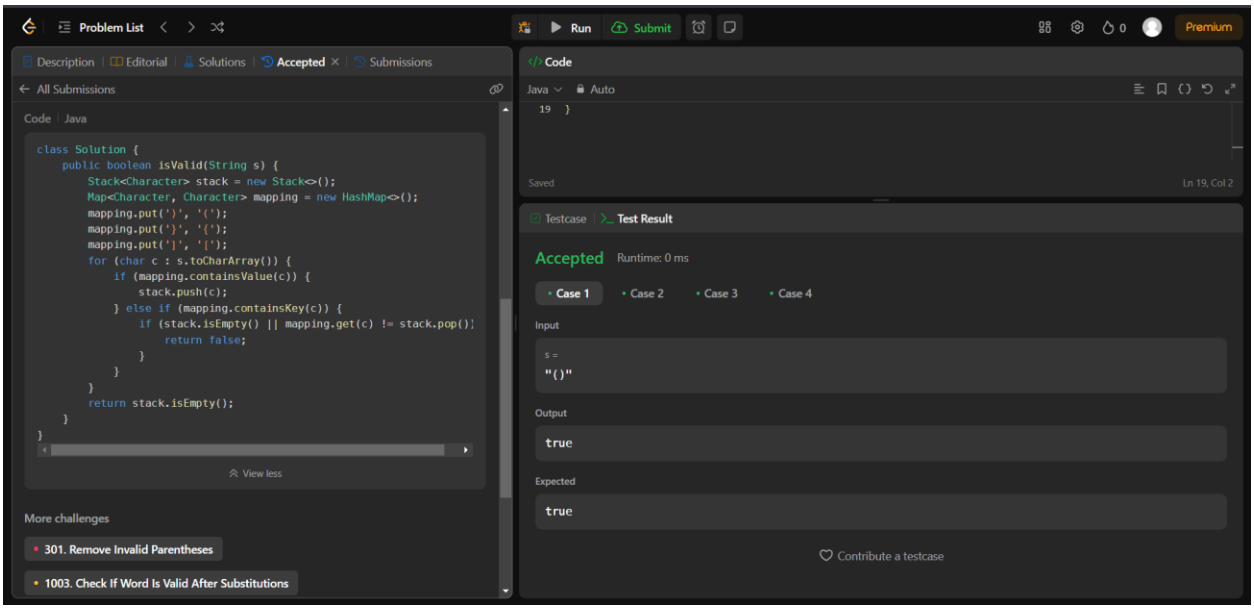


10.VALID PARENTHESES:

CODE:

```
class Solution {
    public boolean isValid(String s) {
        Stack<Character> stack = new Stack<>();
        Map<Character, Character> mapping = new HashMap<>();
        mapping.put(')', '(');
        mapping.put('}', '{');
        mapping.put(']', '[');
        for (char c : s.toCharArray()) {
            if (mapping.containsValue(c)) {
                stack.push(c);
            } else if (mapping.containsKey(c)) {
                if (stack.isEmpty() || mapping.get(c) != stack.pop()) {
                    return false;
                }
            }
        }
        return stack.isEmpty();
    }
}
```

OUTPUT:

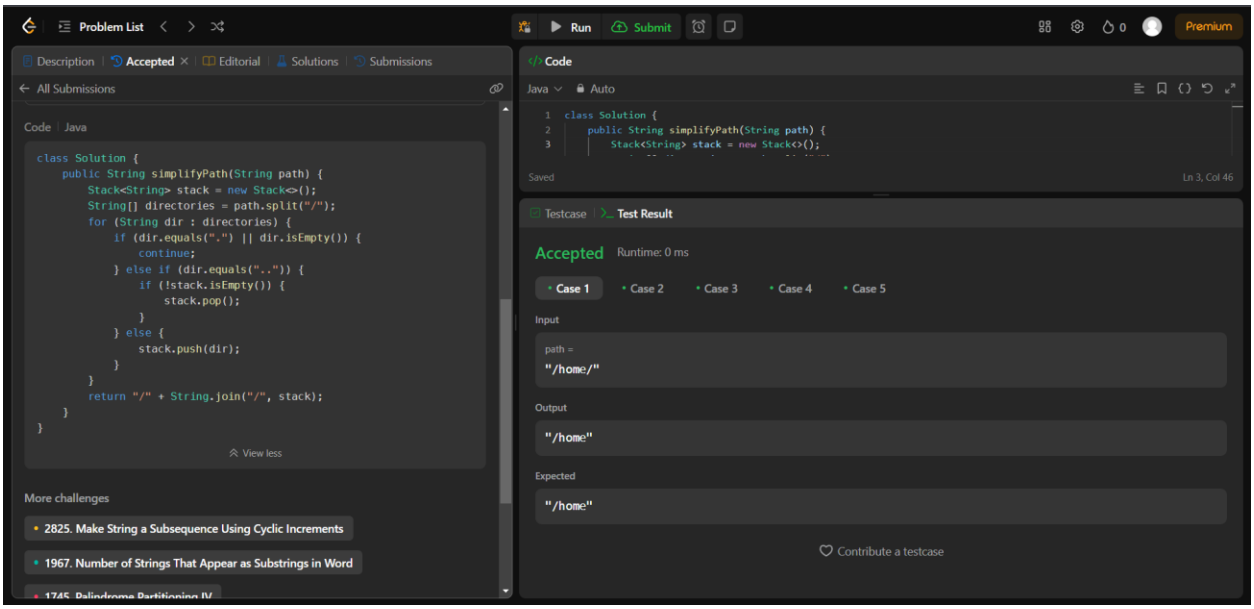


11.SIMPLIFY PATH:

CODE:

```
class Solution {
    public String simplifyPath(String path) {
        Stack<String> stack = new Stack<>();
        String[] directories = path.split("/");
        for (String dir : directories) {
            if (dir.equals(".") || dir.isEmpty()) {
                continue;
            } else if (dir.equals("..")) {
                if (!stack.isEmpty()) {
                    stack.pop();
                }
            } else {
                stack.push(dir);
            }
        }
        return "/" + String.join("/", stack);
    }
}
```

OUTPUT:



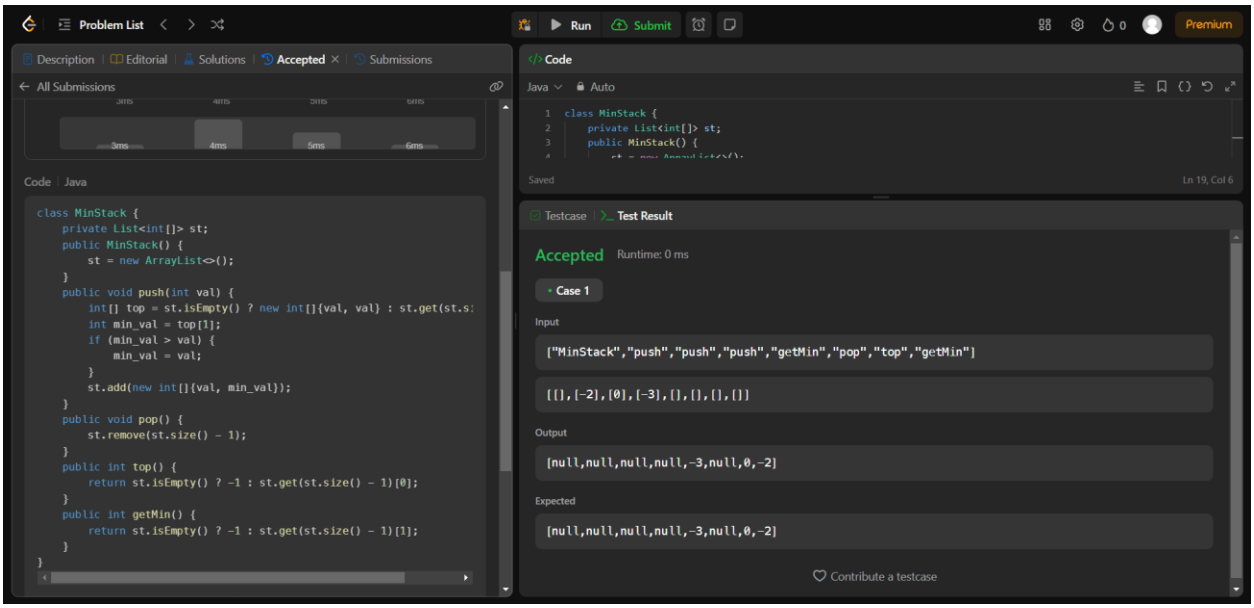
12.MIN STACK:

CODE:

```
class MinStack {
    private List<int[]> st;
    public MinStack() {
        st = new ArrayList<>();
    }
    public void push(int val) {
        int[] top = st.isEmpty() ? new int[]{val, val} : st.get(st.size() - 1);
        int min_val = top[1];
        if (min_val > val) {
            min_val = val;
        }
        st.add(new int[]{val, min_val});
    }
    public void pop() {
        st.remove(st.size() - 1);
    }
    public int top() {
        return st.isEmpty() ? -1 : st.get(st.size() - 1)[0];
    }
    public int getMin() {
        return st.isEmpty() ? -1 : st.get(st.size() - 1)[1];
    }
```

}

OUTPUT:



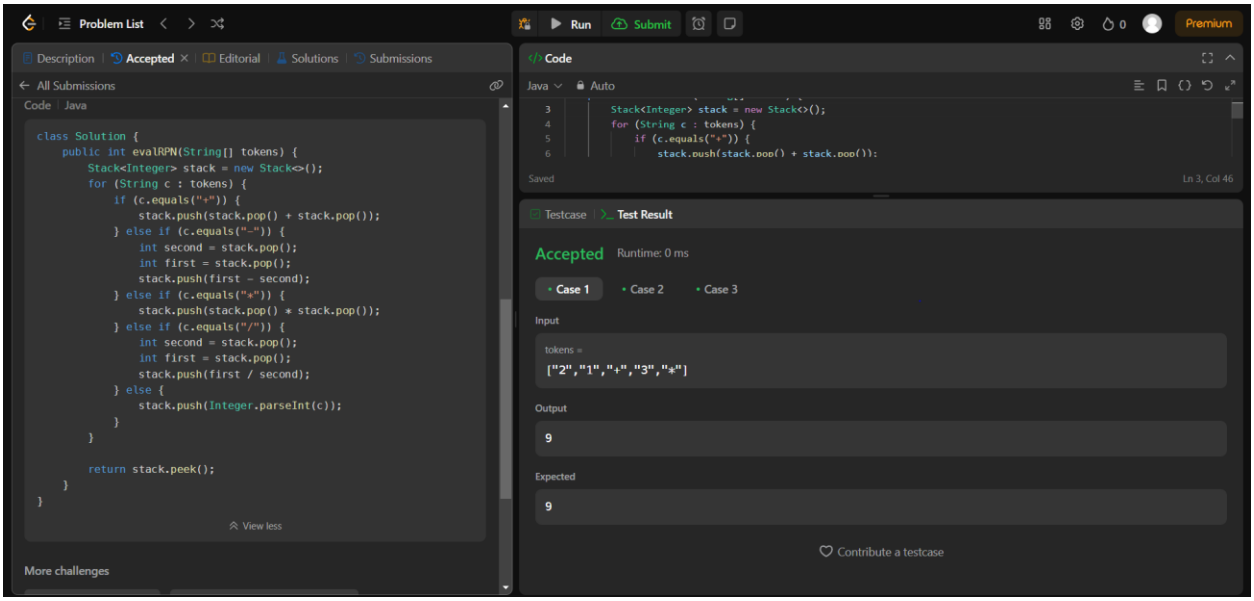
13.EVALUATE REVERSE POLISH NOTATION:

CODE:

```
class Solution {
    public int evalRPN(String[] tokens) {
        Stack<Integer> stack = new Stack<>();
        for (String c : tokens) {
            if (c.equals("+")) {
                stack.push(stack.pop() + stack.pop());
            } else if (c.equals("-")) {
                int second = stack.pop();
                int first = stack.pop();
                stack.push(first - second);
            } else if (c.equals("*")) {
                stack.push(stack.pop() * stack.pop());
            } else if (c.equals("/")) {
                int second = stack.pop();
                int first = stack.pop();
                stack.push(first / second);
            } else {
                stack.push(Integer.parseInt(c));
            }
        }
```

```
        return stack.peek();
    }
}
```

OUTPUT:



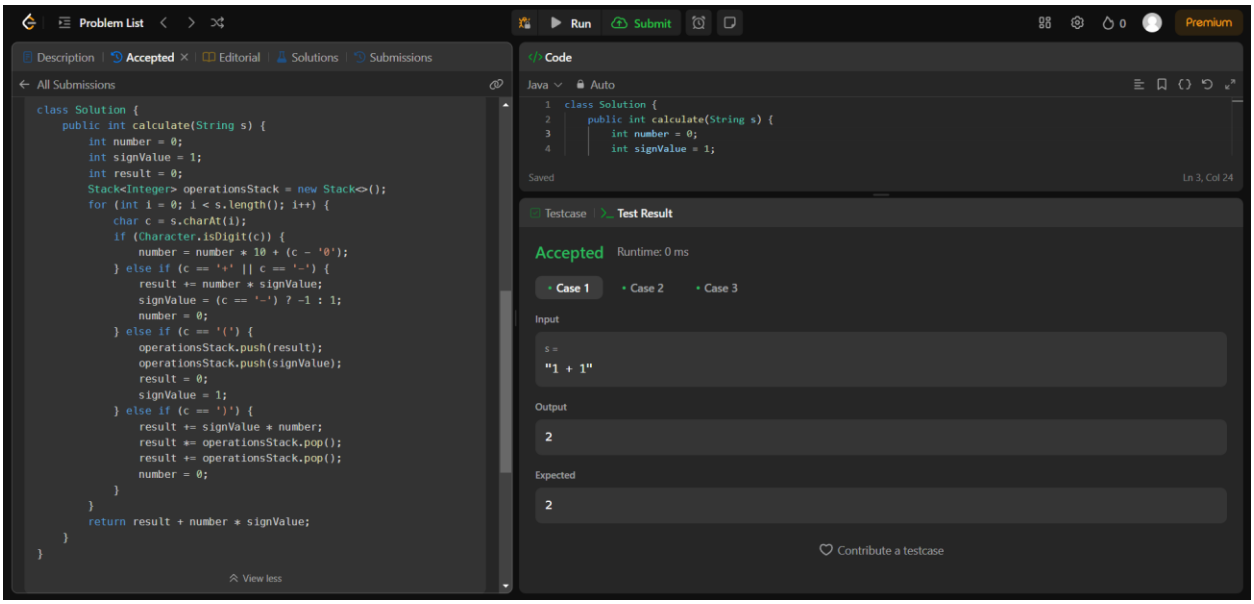
14.BASIC CALCULATOR:

CODE:

```
class Solution {
    public int calculate(String s) {
        int number = 0;
        int signValue = 1;
        int result = 0;
        Stack<Integer> operationsStack = new Stack<>();
        for (int i = 0; i < s.length(); i++) {
            char c = s.charAt(i);
            if (Character.isDigit(c)) {
                number = number * 10 + (c - '0');
            } else if (c == '+' || c == '-') {
                result += number * signValue;
                signValue = (c == '-') ? -1 : 1;
                number = 0;
            } else if (c == '(') {
                operationsStack.push(result);
                operationsStack.push(signValue);
                result = 0;
```

```
            signValue = 1;
        } else if (c == ')') {
            result += signValue * number;
            result *= operationsStack.pop();
            result += operationsStack.pop();
            number = 0;
        }
    }
    return result + number * signValue;
  }
}
```

OUTPUT:



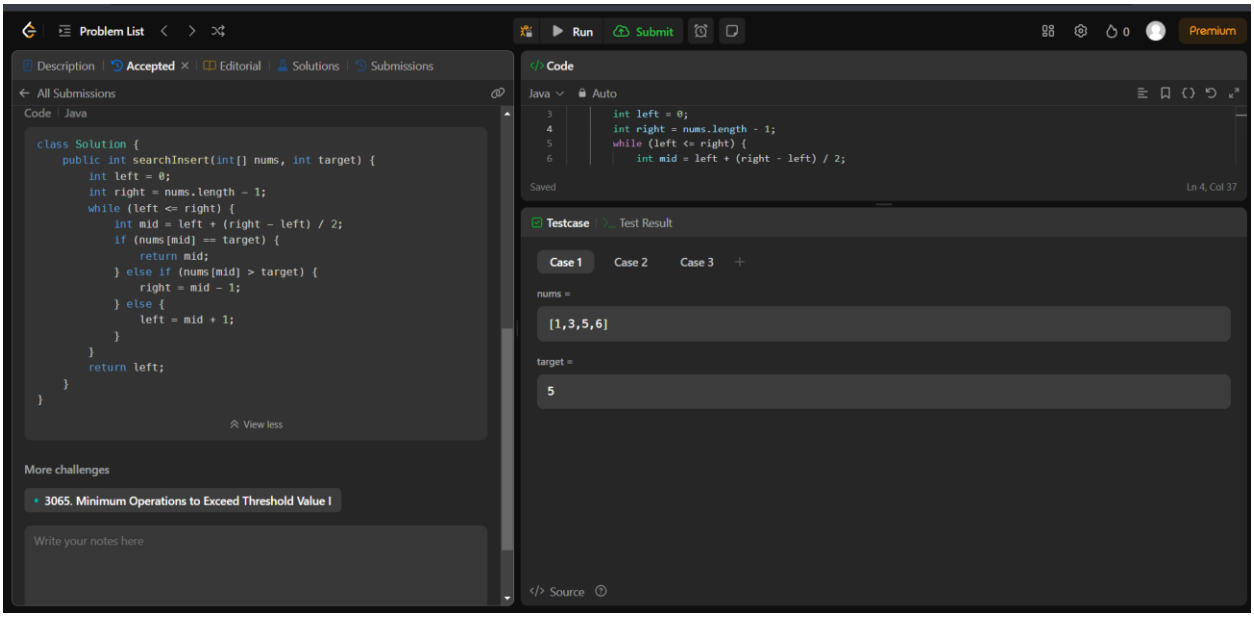
15.SEARCH INSERT POSITION:

CODE:

```
class Solution {
    public int searchInsert(int[] nums, int target) {
        int left = 0;
        int right = nums.length - 1;
        while (left <= right) {
            int mid = left + (right - left) / 2;
            if (nums[mid] == target) {
                return mid;
            } else if (nums[mid] > target) {
                right = mid - 1;
```

```
        } else {
            left = mid + 1;
        }
    }
    return left;
  }
}
```

OUTPUT:



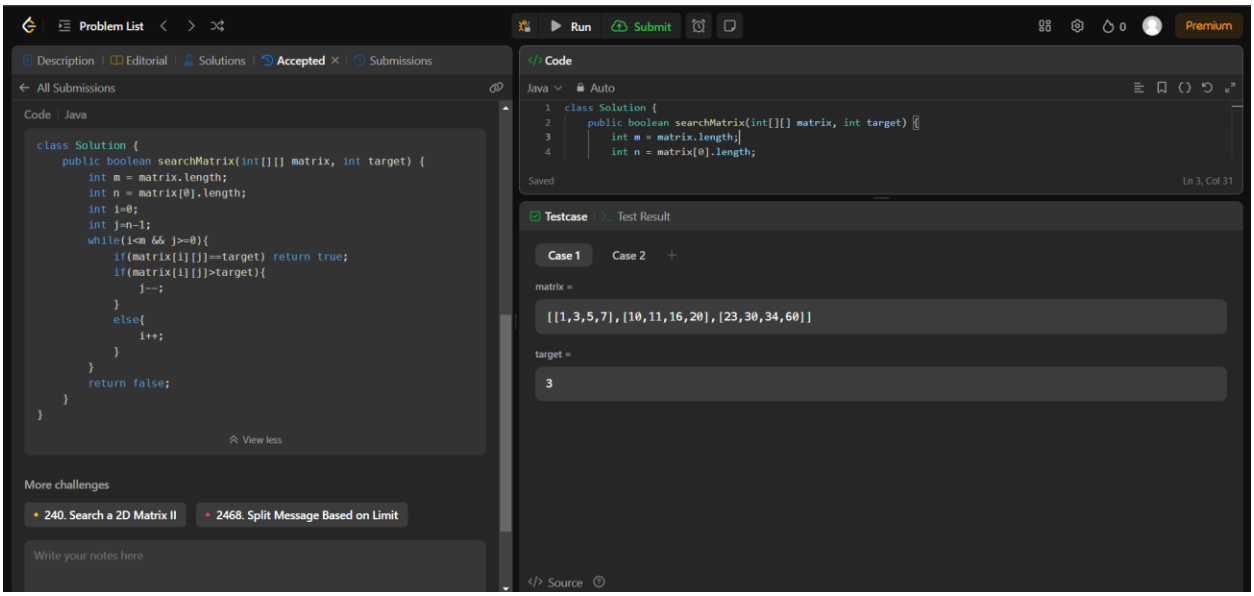
16.SEARCH A 2D MATRIX:

CODE:

```
class Solution {
    public boolean searchMatrix(int[][] matrix, int target) {
        int m = matrix.length;
        int n = matrix[0].length;
        int i=0;
        int j=n-1;
        while(i<m && j>=0){
            if(matrix[i][j]==target) return true;
            if(matrix[i][j]>target){
                j--;
            }
            else{
                i++;
            }
```

```
        }
        return false;
    }
}
```

OUTPUT:

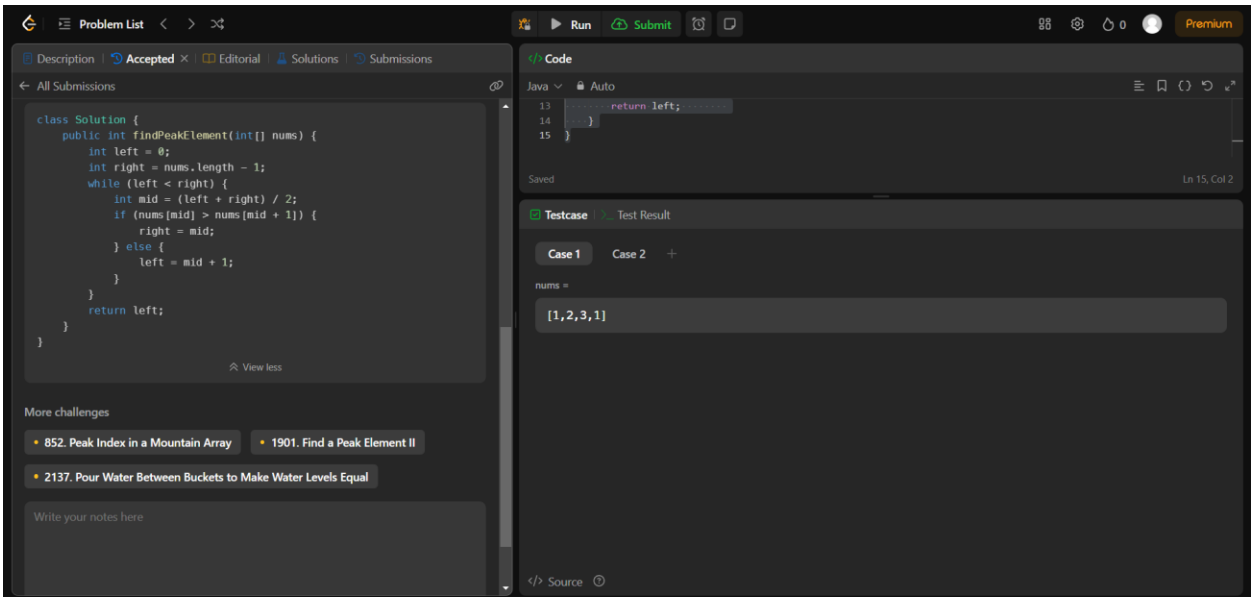


17.FIND PEAK ELEMENT:

CODE:

```
class Solution {
    public int findPeakElement(int[] nums) {
        int left = 0;
        int right = nums.length - 1;
        while (left < right) {
            int mid = (left + right) / 2;
            if (nums[mid] > nums[mid + 1]) {
                right = mid;
            } else {
                left = mid + 1;
            }
        }
        return left;
    }
}
```

OUTPUT:



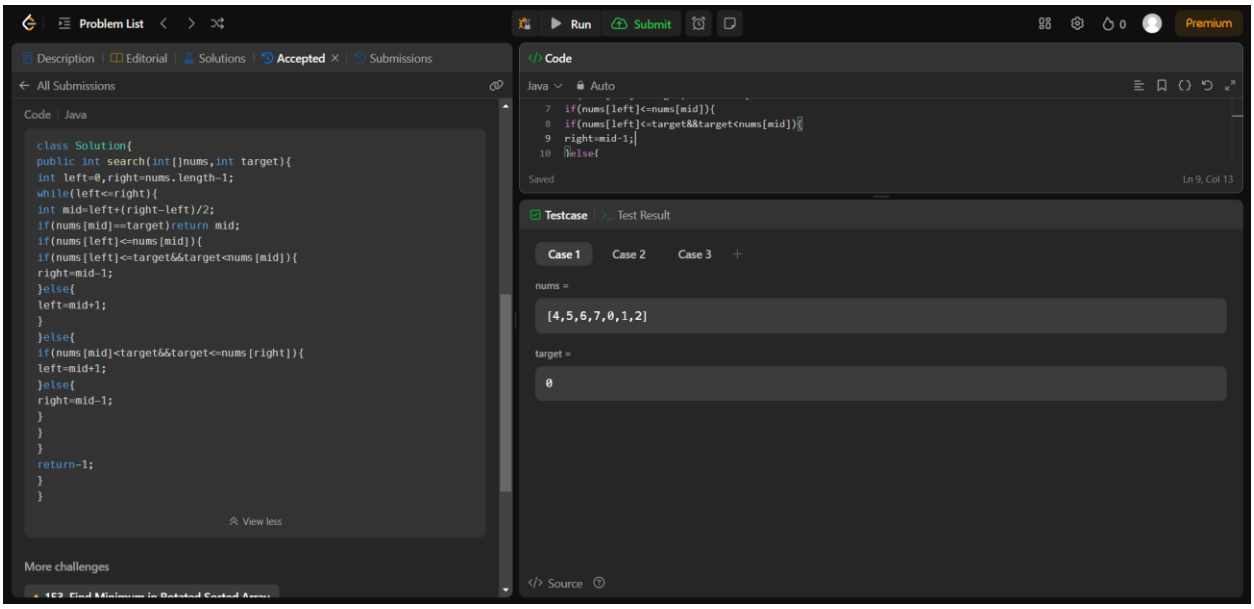
18.SEARCH IN ROTATED SORTED ARRAY:

CODE:

```
class Solution{
public int search(int[]nums,int target){
int left=0,right=nums.length-1;
while(left<=right){
int mid=left+(right-left)/2;
if(nums[mid]==target)return mid;
if(nums[left]<=nums[mid]){
if(nums[left]<=target&&target<nums[mid]){
right=mid-1;
}else{
left=mid+1;
}
}else{
if(nums[mid]<target&&target<=nums[right]){
left=mid+1;
}else{
right=mid-1;
}
}
}
return-1;
}
```

}

OUTPUT:



19.FIND FIRST AND LAST POSITION OF ELEMENT SORTED IN ARRAY:

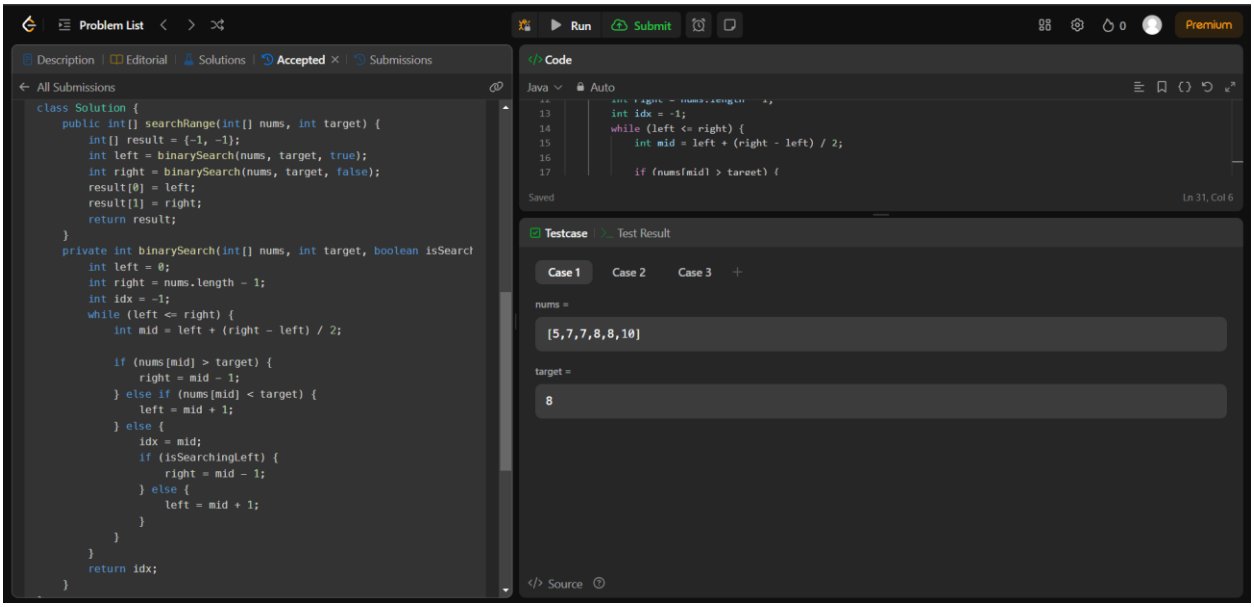
CODE:

```
class Solution {
    public int[] searchRange(int[] nums, int target) {
        int[] result = {-1, -1};
        int left = binarySearch(nums, target, true);
        int right = binarySearch(nums, target, false);
        result[0] = left;
        result[1] = right;
        return result;
    }
    private int binarySearch(int[] nums, int target, boolean isSearchingLeft) {
        int left = 0;
        int right = nums.length - 1;
        int idx = -1;
        while (left <= right) {
            int mid = left + (right - left) / 2;

            if (nums[mid] > target) {
                right = mid - 1;
            } else if (nums[mid] < target) {
                left = mid + 1;
```

```
        } else {
            idx = mid;
            if (isSearchingLeft) {
                right = mid - 1;
            } else {
                left = mid + 1;
            }
        }
    }
    return idx;
  }
}
```

OUTPUT:



20.FIND MINIMUM IN ROTATED SORTED ARRAY:

CODE:

```
class Solution {
    public int findMin(int[] nums) {
        int left = 0;
        int right = nums.length - 1;
        while (left < right) {
            int mid = left + (right - left) / 2;
            if (nums[mid] <= nums[right]) {
                right = mid;
            } else {
```

```
            left = mid + 1;
        }
    }
    return nums[left];
  }
}
```

OUTPUT: