ASSIGNMENT -5

NAME : Pradyumna Kumar Das UID:22BCS13175

1. Find the Difference

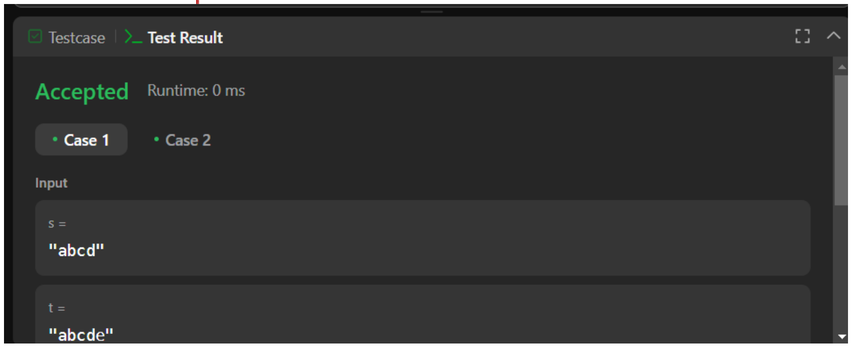
You are given two strings s and t.

String t is generated by random shuffling string s and then add one more letter at a random position.

Return the letter that was added to t.

SOLUTION:

```
class Solution {
    public char findTheDifference(String s, String t) {
        char miss = 0;
        int len = t.length();

        for(int i = 0; i < len; i++) {
            if(i < s.length()) {
                miss ^= s.charAt(i);
            }
            miss ^= t.charAt(i);
        }
        return miss;
    }
}
```



Accepted Runtime: 0 ms

Case 1 Case 2

Input

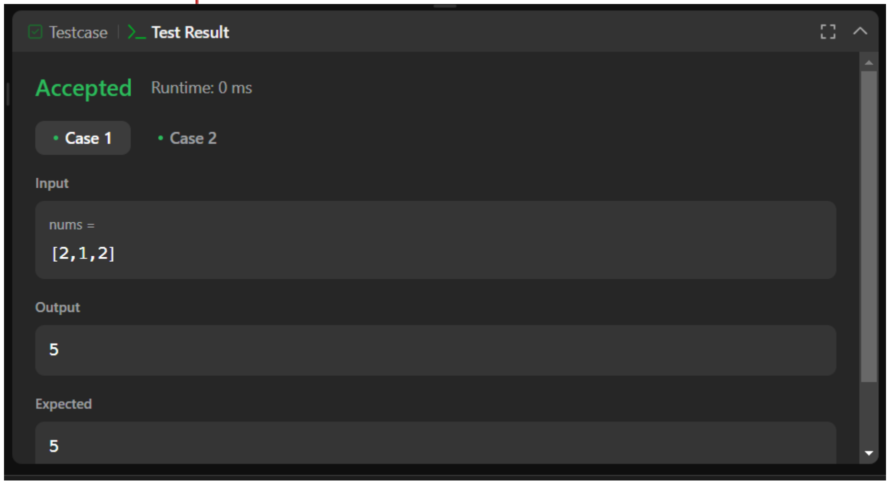
```
s =
"abcd"
t =
"abcde"
```

2. Largest Perimeter Triangle

   Given an integer array nums, return the largest perimeter of a triangle with a non-zero area, formed from three of these lengths. If it is impossible to form any triangle of a non-zero area, return 0.

   SOLUTION:

```
class Solution {
    public int largestPerimeter(int[] nums) {
        Arrays.sort(nums);
        int n=nums.length;
        for(int i=n-1;i>=2;i--){
            if(nums[i-2]+nums[i-1]>nums[i]){
                return nums[i-2]+nums[i-1]+nums[i];
            }
        }
        return 0;
    }
}
```



Accepted Runtime: 0 ms

Input

```
nums =
[2,1,2]
```

Output

```
5
```

Expected

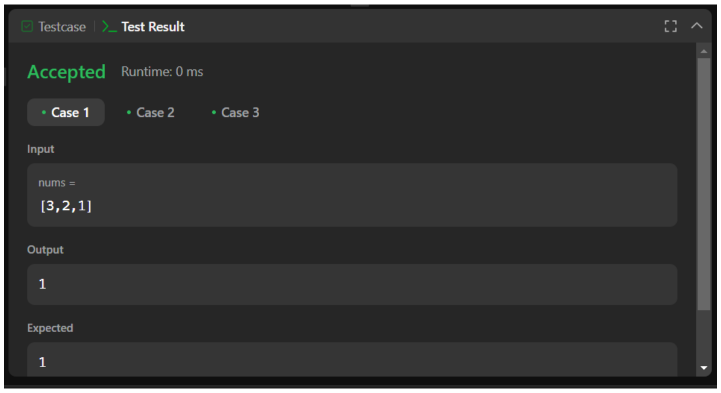
```
5
```

3. Third Maximum Number

Given an integer array nums, return *the* ***third distinct maximum*** *number in this array. If the third maximum does not exist, return the* ***maximum*** *number*.

SOLUTION:

```
import java.util.*;

class Solution {
    public int thirdMax(int[] nums) {
        Set<Integer> s = new HashSet<>();
        for (int n : nums) s.add(n);

        if (s.size() < 3) return Collections.max(s);

        s.remove(Collections.max(s));
        s.remove(Collections.max(s));

        return Collections.max(s);
    }
}
```



```
Accepted   Runtime: 0 ms

Input
nums =
[3,2,1]

Output
1

Expected
1
```

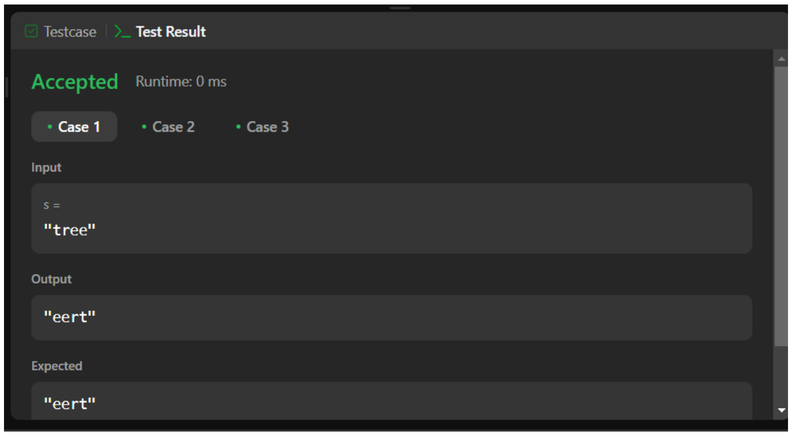
4. Given a string s, sort it in **decreasing order** based on the **frequency** of the characters. The **frequency** of a character is the number of times it appears in the string.

Return *the sorted string*. If there are multiple answers, return *any of them*.

SOLUTION:

```
class Solution {
    public String frequencySort(String s) {
        Map<Character , Integer> mp = new HashMap<>();
        StringBuilder st = new StringBuilder();
        for(char c : s.toCharArray())
        {
            mp.put(c , mp.getOrDefault(c,0)+1);


        }


       List<Map.Entry<Character,Integer>> lst  = new
    ArrayList<>(mp.entrySet());
```

```
        lst.sort((entry1 ,entry2)->
      entry2.getValue().compareTo(entry1.getValue()));
        for(Map.Entry<Character,Integer> entry: lst)
        {
st.append(Character.toString(entry.getKey()).repeat(entry.getValue()));
        }

return st.toString();

    }
}
```



Testcase | Test Result

Accepted Runtime: 0 ms

Case 1 Case 2 Case 3

Input

```
s =
"tree"
```

Output

```
"eert"
```

Expected

```
"eert"
```

5. Minimum Number of Arrows to Burst Balloons

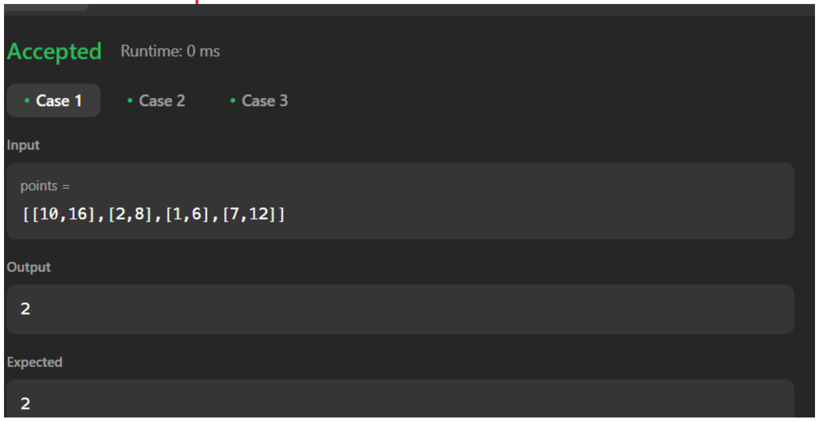
There are some spherical balloons taped onto a flat wall that represents the XY-plane. The balloons are represented as a 2D integer array points where points[i] = [x_{start}, x_{end}] denotes a balloon whose **horizontal diameter** stretches between x_{start} and x_{end}. You do not know the exact y-coordinates of the balloons.

Arrows can be shot up **directly vertically** (in the positive y-direction) from different points along the x-axis. A balloon with x_{start} and x_{end} is **burst** by an arrow shot at x if $x_{start} <= x <= x_{end}$. There is **no limit** to the number of arrows that can be shot. A shot arrow keeps traveling up infinitely, bursting any balloons in its path.

Given the array points, return *the **minimum** number of arrows that must be shot to burst all balloons*.

SOLUTION:

```
class Solution {
    public int findMinArrowShots(int[][] segments) {
        Arrays.sort(segments, (a, b) -> Integer.compare(a[1], b[1]));
        int ans = 0, arrow = 0;
        for (int i = 0; i < segments.length; i ++) {
            if (ans == 0 || segments[i][0] > arrow) {
                ans ++;
                arrow = segments[i][1];
            }
        }
        return ans;
    }
}


        return false ;


    }
}
```


Accepted Runtime: 0 ms

```
Input
points =
[[10,16],[2,8],[1,6],[7,12]]
Output
2
Expected
2
```

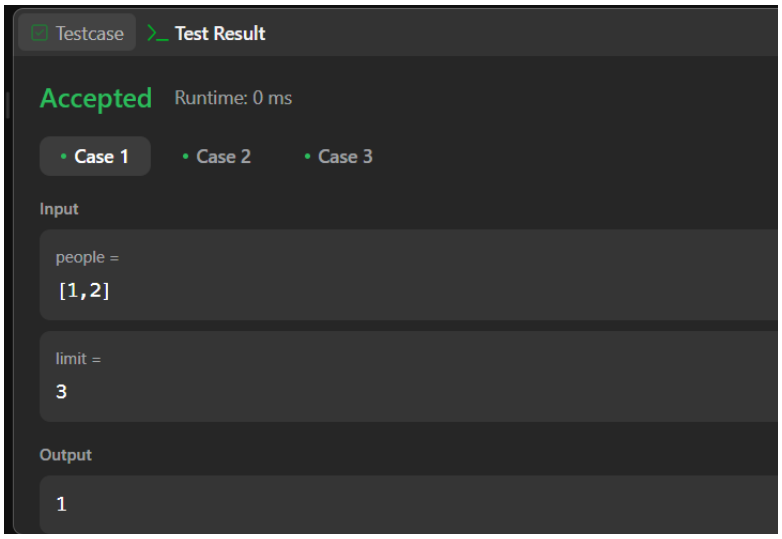
6. Boats to Save People

You are given an array people where people[i] is the weight of the ith person, and an **infinite number of boats** where each boat can carry a maximum weight of limit. Each boat carries at most two people at the same time, provided the sum of the weight of those people is at most limit.

Return *the minimum number of boats to carry every given person*.

SOLUTION:

```
class Solution {
    public int numRescueBoats(int[] people, int limit) {
        int boatCount = 0;
        Arrays.sort(people);

        int left = 0;
        int right = people.length - 1;

        while(left <= right){
            int sum = people[left] + people[right];
            if(sum <= limit){
                boatCount++;
                left++;
                right--;
            }
            else{
                boatCount++;
                right--;
            }
        }
        return boatCount;
    }
}
```



```
Accepted   Runtime: 0 ms
Case 1   Case 2   Case 3
Input
people =
[1,2]
limit =
3
Output
1
```

7. K Closest Points to Origin

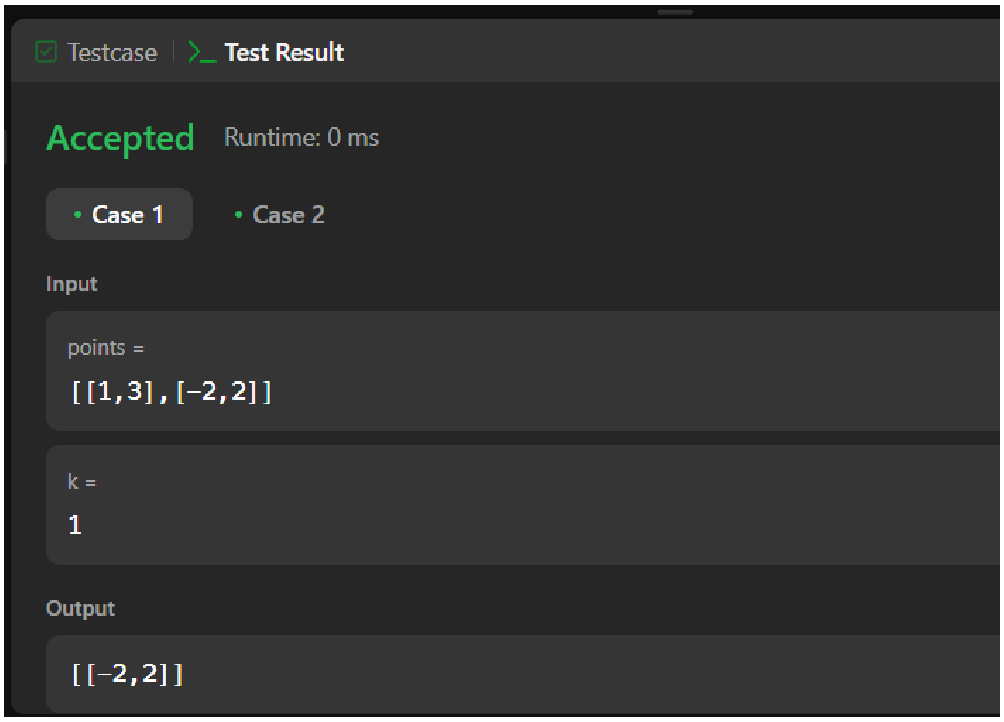
Given an array of points where points[i] = [xi, yi] represents a point on the X-Y plane and an integer k, return the k closest points to the origin (0, 0).

The distance between two points on the X-Y plane is the Euclidean distance (i.e., √(x1 - x2)2 + (y1 - y2)2).

You may return the answer in any order. The answer is guaranteed to be unique (except for the order that it is in).

SOLUTION:

```
class Solution {
    static class Point implements Comparable<Point> {
        int x;
        int y;
        int disSq;
        int idx;

        public Point(int x, int y, int disSq, int idx) {
            this.x = x;
            this.y = y;
            this.disSq = disSq;
            this.idx = idx;
        }

        @Override
        public int compareTo(Point p2) {
            return this.disSq - p2.disSq; // Ascending order
        }
    }

    public int[][] kClosest(int[][] points, int k) {
        PriorityQueue<Point> pq = new PriorityQueue<>();

        for (int i = 0; i < points.length; i++) {
            int disSq = points[i][0] * points[i][0] + points[i][1] * points[i][1];
            pq.add(new Point(points[i][0], points[i][1], disSq, i));
        }

        int[][] result = new int[k][2];

        for (int i = 0; i < k; i++) {
            Point p = pq.remove();
            result[i][0] = p.x;
            result[i][1] = p.y;
        }

        return result;
    }
}
```



```
Accepted   Runtime: 0 ms

• Case 1   • Case 2

Input

points =
[[1,3],[-2,2]]

k =
1

Output

[[-2,2]]
```

8. Reduce Array Size to The Half

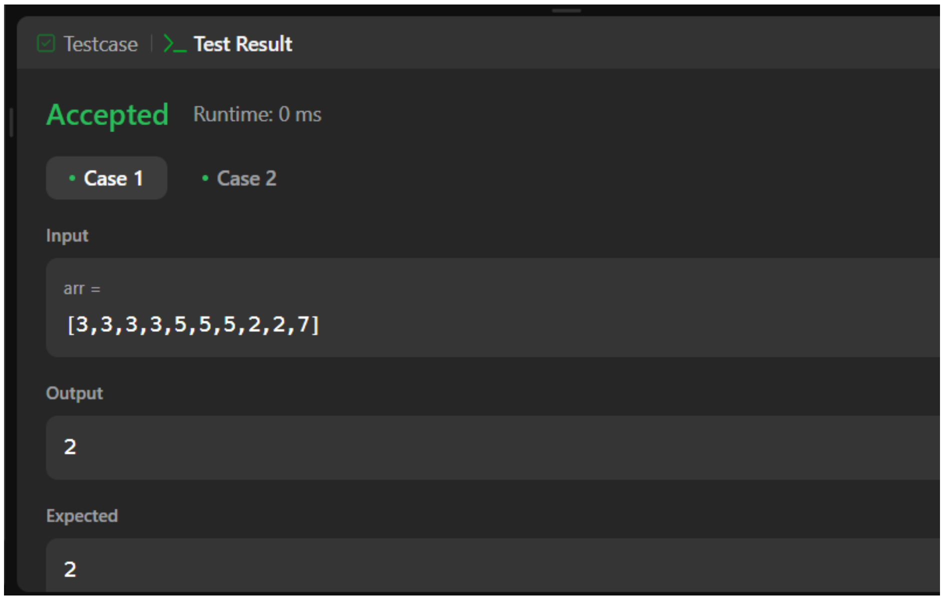
   You are given an integer array arr. You can choose a set of integers and remove all the occurrences of these integers in the array.

   Return the minimum size of the set so that at least half of the integers of the array are removed.

   SOLUTION:

```
class Solution {
   public int minSetSize(int[] arr) {
      HashMap<Integer, Integer> map = new HashMap<>();
      PriorityQueue<Integer> pq = new
    PriorityQueue<>(Collections.reverseOrder());

      for(int n:arr){
         map.put(n, map.getOrDefault(n,0)+1);
      }

      if(map.size()==1) return 1;
      for(int n:map.values()){
         pq.add(n);
      }
      int size=0;
      int count=0;
      while(!pq.isEmpty()){
         int a = pq.poll();
         size+=a;
         if(size >= arr.length/2) {
```

```
                    count++;
                    return count;
                }
                else count++;

            }
            return count;
        }
    }
```



```
Accepted   Runtime: 0 ms

Input
arr =
[3,3,3,3,5,5,5,2,2,7]

Output
2

Expected
2
```