COMPETITIVE CODING
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RAMAN CLASSES

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Problem : Program to find the Majority element in the array.

Topic	: **Arrays**
Difficulty	: **EASY**
Programming Language	: **C++**
Time to Spend	: **15 min.**

Problem Statement

Write a program in C++ to find all the duplicates elements in an array of size n in O(n) time complexity and O(1) space complexity. The elements are in between 0 and n-1.

Input :

9

2 3 2 1 2 3 3 2 2

Output :

2 2 3 3 2 2

Input Description :

The first line contains single integer ***n*** denoting the number of elements in the array.

The next line contains ***n*** space-separated integers denoting the given array.

Let Us Revise

In order to solve this problem, go through the following concepts.

1. Loop Statements
2. Maps

Problem Description

Given an array of integers, we need to find the majority element of the array.
So the million dollar question is what is majority element?

The majority element is the element of array which occur at least n/2 times in the array.

There can be at most 1 majority element in an array.

The majority element in above array is

2

Let Us Think

In order to solve this problem, let us think and analyse how to get started with this problem.

Try to think, what we need to know to about an element if it's a majority element or not?

Yes, the number of times it occurred in an array.

So the problems boils down to counting the occurrence of each unique element and finding out which one occurred more than n/2 times.

Let Us Think

Now you know the logic of code . Lets proceed with the coding part.

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Things we need to do in this problem :-

1. **Code to find the number of times the occurrence of unique element in the array.**

2. **Code to find which element occur more than n/2 times i.e. majority element.**

3. **Code to print -1 in case of no majority element.**

Let Us Code

1. **Code to find the number of times the occurrence of unique element in the array.**

Assuming the array is ‘a’ of size n and Unordered set as count

```
//code to count the occurrence of unoique elements in the array
for(int i=0;i<n;i++){
    count[a[i]]++;
}
```

2. Code to find which element occur more than n/2 times i.e majority element.

```
//code to find the majority element.
for(auto itr=count.begin();itr!=count.end();itr++){

    if((itr->second) > (n/2) ){       // Check if occurrence is > n/2 or not
        cout<<itr->first<<endl;
        flag=1;
        break;
    }
}
```

3. Code to print -1 in case of no majority element.

```
//Code to print -1 in case no majority element is found
if(flag==0){
    cout<<"-1"<<endl;
}
```

Tweak and try

Modify the code to find the majority element in O(1) space complexity.

Thank You !

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