

## HATFD1020

Find the Majority Element in an Array

Write a program to find the majority element in an array (an element that appears more than  $n/2$  times).

For example, in the array [3, 3, 4, 2, 4, 4, 2, 4, 4], the output should be 4. Do not use any built-in functions for array manipulation or counting.

Instructions: Implement a manual count and comparison logic to find the majority element.

### Program:

```
def find_majority_element(arr):  
    candidate = None  
    count = 0  
  
    # First pass to find the candidate for majority element  
    for num in arr:  
        if count == 0:  
            candidate = num  
            count = 1  
        elif num == candidate:  
            count += 1  
        else:  
            count -= 1  
  
    # Second pass to confirm if the candidate is the majority element  
    count = 0  
    for num in arr:  
        if num == candidate:  
            count += 1  
  
    # Check if candidate appears more than n/2 times  
    if count > len(arr) // 2:  
        return candidate  
    else:
```

```
        return "No majority element found"

# Taking input from the user
user_input = input("Enter the elements of the array separated by spaces: ")
arr = [int(num) for num in user_input.split()]

# Finding and printing the majority element
result = find_majority_element(arr)
print("Majority Element:", result)
```

**output:1**

Enter the elements of the array separated by spaces: 2 2 2 2 5 5 2

Majority Element: 2

**output:2**

Enter the elements of the array separated by spaces: 7 8 7 7 8 7

Majority Element: 7

**output:3**

Enter the elements of the array separated by spaces: 5 5 4 4 6

Majority Element: No majority element found