

# Split The Array

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🌐 Platform	GeeksForGeeks
🔧 difficulty	Easy
🏷️ tags	ArrayVector
💻 language	C++
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🔗 link	<a href="https://www.geeksforgeeks.org/problems/split-the-array0238/1">https://www.geeksforgeeks.org/problems/split-the-array0238/1</a>
✅ Completion	✔️

## Intuition

The task requires finding groups based on certain properties of the elements of the array. The key observation here is that for the problem's conditions, the XOR of all elements in a group plays a crucial role. If the XOR of all elements in the array is non-zero, no valid groups can be formed. If the XOR of all elements is zero, the problem becomes finding valid partitions of the array, and there is a direct formula for this case.

## Approach

1. First, calculate the XOR of all elements in the array.
2. If the XOR is non-zero, return 0 because no valid groups exist.
3. If the XOR is zero, the number of valid groups can be calculated using the formula for the number of subsets of the array minus two (for the empty set and the set that contains all elements) divided by 2 to avoid over-counting identical groups.

## Complexity

### Time Complexity:

- $O(n)$  where  $n$  is the number of elements in the array. This is due to the XOR computation that requires a single pass through the array.

### Space Complexity:

- $O(1)$  since only a few extra variables are used regardless of the size of the input array.

## Code

```
class Solution {
    int mod = 1e9 + 7;
public:
    int countgroup(vector<int>& arr) {
        int xorVal = 0;
        for(auto &elem: arr) xorVal ^= elem;

        if(xorVal) return 0;
```

```
        return (((1ll<<arr.size()) - 2) / 2) % mod;
    }
};
```