# C program to find the frequency of each element in the array

## Frequency of Element in C

Here, in this page we will discuss the program to find the frequency of element in C programming language. We are given with an array and need to print the frequency of each given element.

### Example

**Input** : arr[6] = [1, 2, 2, 3, 1, 2]
**Output** : 1 occurs 2 times
2 occurs 3 times
3 occurs 1 times

## Method Discussed :

- Method 1 : Using Extra Space
- Method 2 : Naive approach without extra space.
- Method 3 : Using Sorting Technique.

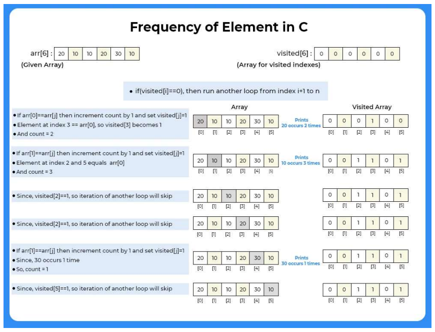
## Method 1:

In this method we will count the frequency of each elements using two for loops.

- To check the status of visited elements create a array of size n.
- Run a loop from index 0 to n and check if (visited[i]==1) then skip that element.
- Otherwise create a variable count = 1 to keep the count of frequency.
- Run a loop from index i+1 to n
- Check if(arr[i]==arr[j]), then increment the count by 1 and set visited[j]=1.
- After complete iteration of for loop print element along with value of count.

## Time and Space Complexity :

- Time Complexity : **O($n^2$)**
- Space Complexity : **O(n)**



- if(visited[i]==0), then run another loop from index i+1 to n

- If arr[0]==arr[j] then increment count by 1 and set visited[j]=1
- Element at index 3 == arr[0], so visited[3] becomes 1
- And count = 2

- If arr[1]==arr[j] then increment count by 1 and set visited[j]=1
- Element at index 2 and 5 equals arr[0]
- And count = 3

- Since, visited[2]==1, so iteration of another loop will skip

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- If arr[1]==arr[j] then increment count by 1 and set visited[j]=1
- Since, 30 occurs 1 time
- So, count = 1

- Since, visited[5]==1, so iteration of another loop will skip

### Code in C

Run

```
#include<stdio.h>

// Main function to run the program
int main()
{
    int arr[] = {10, 30, 10, 20, 10, 20, 30, 10};
    int n = sizeof(arr)/sizeof(arr[0]);

    int visited[n];

    for(int i=0; i<n; i++){

      if(visited[i]==0){
        int count = 1;
        for(int j=i+1; j<n; j++){
          if(arr[i]==arr[j]){
            count++;
            visited[j]=1;
          }
        }

        printf("%d occurs %d times\n", arr[i],
count);
      }
    }

   return 0;
```

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Output

```
10 occurs 4 times
30 occurs 2 times
20 occurs 2 times
```

## Method 2 :

In this method we will use the naive way to find the frequency of elements in the given integer array without using any extra space.

Method 2 : Code in C

Run

```
#include<stdio.h>

void countFrequency(int *arr, int size){

    for (int i = 0; i < size; i++){
        int flag = 0;
        int count = 0;

        // Counting of any element has to be delayed
to its last occurrence
        for (int j = i+1; j < size; j++){
            if (arr[i] == arr[j]){
                flag = 1;
                break;
            }
        }

        // The continue keyword is used to end the
current iteration
        // in a for loop (or a while loop), and
continues to the next iteration
        if (flag == 1)
            continue;

        for(int j = 0;j<=i;j++){
            if(arr[i]==arr[j])
                count +=1;
        }

        printf("%d : %d\n", arr[i], count);
    }
}

int main()
{
    int arr[] = {5, 8, 5, 7, 8, 10};
    int size = sizeof(arr)/sizeof(arr[0]);

    countFrequency(arr, size);

    return 0;
}
```

Output

```
5 : 2
7 : 1
8 : 2
10 : 1
```

## Method 3 :

In this method we will sort the array then, count the frequency of the elements.

### Time and Space Complexity :

- Time Complexity : **O(nlogn)**
- Space Complexity : **O(1)**

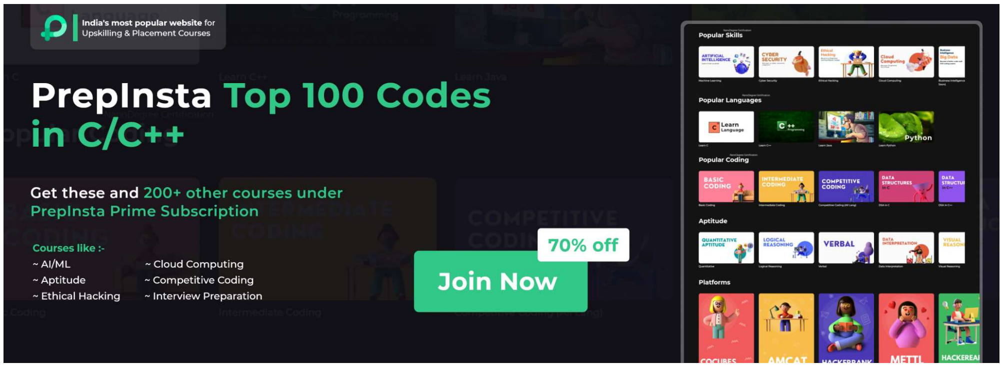
### Method 3 : Code in C

```
#include<stdio.h>

void countDistinct(int arr[], int n)
{
    //Sorting of the array
    for(int i=0; i<n; i++){
        for(int j=i+1; j<n; j++){ if(arr[i]>arr[j]){
                int temp = arr[i];
                arr[i] = arr[j];
                arr[j] = temp;
            }
        }
    }

    // Traverse the sorted array
    for (int i = 0; i < n; i++){
        int count = 1;

        // Move the index ahead whenever
        // you encounter duplicates
        while (i < n - 1 && arr[i] == arr[i + 1]){
            i++;
            count++;
        }

        printf("%d : %d\n", arr[i], count);
    }

}

// Driver program to test above function
int main()
{
    int arr[] = {5, 8, 5, 7, 8, 10};
    int n = sizeof(arr) / sizeof(arr[0]);
    countDistinct(arr, n);
    return 0;
}
```

Run

### Output

```
5 : 2
7 : 1
8 : 2
10 : 1
```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Isshita Ghosh_CSE_023 In method 1, when I am giving (10,20,30,20,50,50,40) The output is :

20 occurs 2 times

50 occurs 2 times

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