# Design and Analysis of Algorithms Assignment - 9

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**Roll No: 60**

**Batch : B-3**

## Las Vegas and Monte Carlo Algorithms

### 1. Las Vegas Algorithm

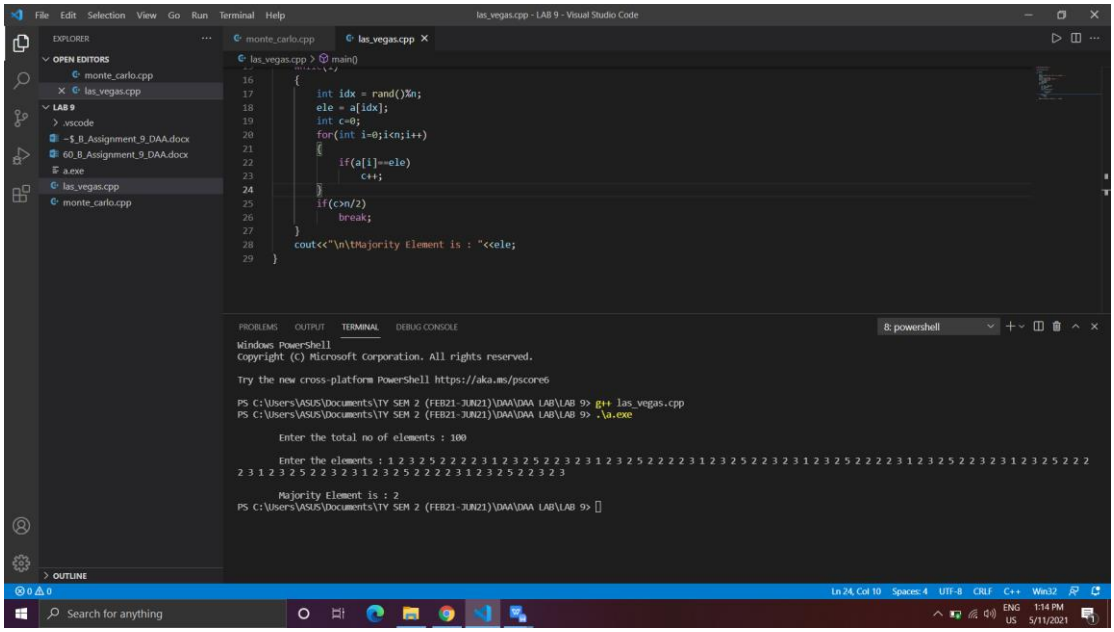
**CODE :**

```
#include<bits/stdc++.h>


using namespace std;
int main()
{
    int n;
    cout<<"\n\tEnter the total no of elements : ";
    cin>>n;
    int *a = new int[n];
    cout<<"\n\tEnter the elements : ";
    for(int i=0;i<n;i++)
        cin>>a[i];
    int cnt=0,ele;
    while(1)
    {
        int idx = rand()%n;
        ele = a[idx];
        int c=0;
```

```
        for(int i=0;i<n;i++)
        {
            if(a[i]==ele)
                c++;
        }
        if(c>n/2)
            break;
    }
    cout<<"\n\tMajority Element is : "<<ele;
}
```

## O/P:




*Time Complexity: O(nlogn)*

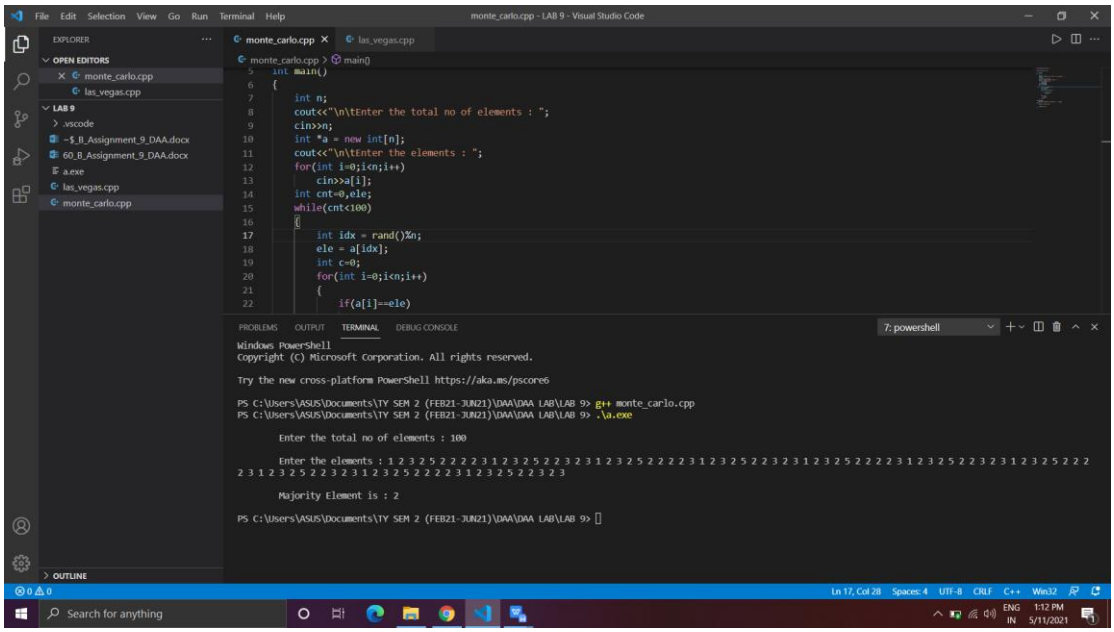
*Space Complexity: O(1)*

## 2. Monte Carlo Algorithm

**CODE :**

```
#include<bits/stdc++.h>
using namespace std;
int main()
{
    int n;
    cout<<"\n\tEnter the total no of elements : ";
    cin>>n;
    int *a = new int[n];
    cout<<"\n\tEnter the elements : ";
    for(int i=0;i<n;i++)
        cin>>a[i];
    int cnt=0,ele;
    while(cnt<100)
    {
        int idx = rand()%n;
        ele = a[idx];
        int c=0;
        for(int i=0;i<n;i++)
        {
            if(a[i]==ele)
                c++;
        }
        if(c>n/2)
            break;
        cnt++;
    }
if(cnt<100)
    cout<<"\n\tMajority Element is : "<<ele;
else
    cout<<"\n\tFailure";
    cout<<"\n\n";
}
```

## O/P:




*Time Complexity: O(E)*

*Space Complexity: O(1)*