1. Write a program to find the largest number and it's location from a given list of integers.

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

using namespace std;


int main()

{

   int n;

   cin>>n;

   int ar[n];


   for(int i=1;i<=n;i++){

      cin>>ar[i];

   }


   int max = ar[1];


   for(int i=2;i<=n;i++){

      if(max<ar[i]){

         max = ar[i];

      }

   }
```

```
    for(int i=1;i<=n;i++){
        if(ar[i]==max)
        {
            cout<<max<<endl;
            cout<<i<<endl;
        }
    }
    return 0;
}
```

2. Write a program to calculate the roots of the quadratic equation ax2 + bx + c = 0 where a, b and c are known.

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

using namespace std;


int main()

{

   double a,b,c;

   cout<<"a: ";

   cin>>a;

   cout<<"b: ";

   cin>>b;

   cout<<"c: ";

   cin>>c;


   double x = (b*b-(4*a*c));

   if(x>=0)

   {

      double r1 = (-b+sqrt(x))/(2*a);

      double r2 = (-b-sqrt(x))/(2*a);


      cout<<"root1: "<<r1<<endl;
```

```
        cout<<"root2: "<<r2<<endl;
    }
    else{
        double img = sqrt(-x)/(2*a);
        double r1 = -b/(2*a);

        cout<<"root1: "<<r1<<"+"<<img<<"i"<<endl;
        cout<<"root2: "<<r1<<"-"<<img<<"i"<<endl;
    }
    return 0;
}
```

3. Write a program to create an array of n elements to read the marks of n students and then count how many students passed [pass marks ≥ 40] in the examination.

```
#include<bits/stdc++.h>
using namespace std;
int main()
{
   int n;
   cin>>n;
   int ar[n];
  for(int i=1;i<=n;i++){
      cin>>ar[i];
   }
   int count =0;
   for(int j=1;j<=n;j++){
      if(ar[j]>=40)
      {
         count++;
      }
   }
   cout<<count<<" "<<"students passed"<<endl;
   return 0;
}
```

4. Write a program to create an array of n elements and then insert an element to the list.

```
#include<bits/stdc++.h>
using namespace std;

int main()
{
   int n,a,pos;
   cout<<"n = ";
   cin>>n;

   int ar[n];
   cout<<"Enter "<<n<<" array elements: ";
   for(int i=0;i<n;i++){
      cin>>ar[i];
   }
   cout<<"Before Insert: ";
   for(int i=0;i<n;i++){
      cout<<ar[i]<<" ";
   }
   cout<<endl;
    cout<<"Enter new element: ";
    cin>>a;
    cout<<"Enter position: ";
    cin>>pos;
```

```
    if(pos>=0 && pos<=n)
    {
       for(int i=n-1;i>=pos;i--)
       {
          ar[i+1]=ar[i];
       }
       ar[pos]=a;
       n++;
       cout<<"After Insert: "<<endl;
       for(int j=0;j<n;j++){
         cout<<ar[j]<<" ";
       }
    }
    return 0;
}
```

5. Write a program to create an array of n elements and then delete an element from the list.

```
#include<bits/stdc++.h>
using namespace std;

int main()
{
   int n,a,pos;
   cout<<"n = ";
   cin>>n;

   int ar[n];
   cout<<"Enter "<<n<<" array elements: ";
   for(int i=0;i<n;i++){
      cin>>ar[i];
   }
   cout<<"Before Delete: ";
   for(int i=0;i<n;i++){
      cout<<ar[i]<<" ";
   }
   cout<<endl;

    cout<<"Enter the element index 0 to "<<n-1<<" to delete: ";
    cin>>pos;
```

```
    if(pos>=0 && pos<n)
    {
       for(int i=pos;i<n-1;i++)
       {
          ar[i]=ar[i+1];
       }
       n--;
       cout<<"After Delete: "<<endl;
       for(int j=0;j<n;j++){
         cout<<ar[j]<<" ";
       }
    }
    else{
      cout<<"Invalid index";
    }
    return 0;
}
```

6. Write a program to sort n numbers using Bubble Sort algorithm.

```
#include<bits/stdc++.h>
using namespace std;

int main()
{
    int n,temp;
    cout<<"n = ";
    cin>>n;
    int ar[n];
    cout<<"Enter Array elements: ";
    for(int i=0;i<n;i++){
      cin>>ar[i];
    }
    cout<<"Before Sorting: ";

    for(int i=0;i<n;i++){
      cout<<ar[i]<<" ";
    }
     cout<<endl;

    for(int i=0;i<n-1;i++){
      for(int j=0;j<n+i-1;j++){
         if(ar[j]>ar[j+1])
         {
```

```
            temp = ar[j];
            ar[j]=ar[j+1];
            ar[j+1]=temp;
        }
      }
    }
    cout<<"After Sorting: ";

    for(int i=0;i<n;i++){
      cout<<ar[i]<<" ";
    }
    return 0;
}
```

7. Write a program to search an element from a list of n numbers using Linear Search algorithm

```
#include<bits/stdc++.h>
using namespace std;

int main()
{
    int n,t;
    cout<<"n = ";
    cin>>n;
    int ar[n];
    cout<<"Enter Array elements: ";
    for(int i=0;i<n;i++){
      cin>>ar[i];
    }
    cout<<"Enter element: ";
    cin>>t;

    for(int i=0;i<n;i++){
      if(ar[i]==t){
         cout<<"Element found"<<endl;
         break;
      }
    }
    return 0;
}
```

8. Write a program to search an element from a list of n numbers using Binary Search algorithm.

```
#include <iostream>

int binarySearch(int arr[], int n, int target) {
   int left = 0;
   int right = n - 1;

   while (left <= right) {
      int mid = left + (right - left) / 2;

      if (arr[mid] == target) {
         return mid;
      } else if (arr[mid] < target) {
         left = mid + 1;
      } else {
         right = mid - 1;
      }
   }

   return -1;
}

int main() {
   int n;
```

```
    std::cout << "Enter the number of elements: ";
    std::cin >> n;

    int arr[n];

    std::cout << "Enter the elements in sorted order:\n";
    for (int i = 0; i < n; ++i) {
        std::cin >> arr[i];
    }

    int target;
    std::cout << "Enter the element to search for: ";
    std::cin >> target;

    int result = binarySearch(arr, n, target);

    if (result != -1) {
        std::cout << "Element found at index " << result << std::endl;
    } else {
        std::cout << "Element not found in the list." << std::endl;
    }

    return 0;
}
```