Q) Add n number from user

```cpp
#include <iostream>

using namespace std;

int main()
{
  int n;
  cout << "enter number :" << endl;
  cin >> n;
  int i = 1;
  int num;
  int sum = 0;
start:
  if (i <= n)
  {
    cout << "enter num :" << endl;
    cin >> num;
    sum = sum + num;
    i = i + 1;
    goto start;
  }
  else
  {
    cout << "final ans num " << sum;
  }
  return 0;
}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter number :
4
enter num :
1
enter num :
2
enter num :
5
enter num :
8
final ans num 16
```

```cpp
#include <iostream>

using namespace std;



int main()
{
  int n;
  if (cin >> n) {
    cout << "abc"<<endl;
  }

    if (cout<<"xyz") {
      cout<<endl;
    cout << "lmn";
  }
  return 0;

}
```

```
PS C:\Users\home\Desktop\C++Code> .\a.exe
-1
abc
xyz
lmn
```

```cpp
#include <iostream>

using namespace std;

int main()
{
  int n=0;
  for(; ;){
    if(n<5){
      cout<<n<<endl;
      n=n+1;
    }
  }

}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
0
1
2
3
4
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int a=(5,3,2,1);
    cout<<a;
    return 0;
}
```

Output :

```
PS C:\Users\home\Desktop\C++Code> .\a.exe
1
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int a=10,b,c;
    b=a++;
    c=a;
    cout<<a<<" "<<b<<" "<<c;
    return 0;
}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
11 10 11
```

Comma operator

```cpp
#include <iostream>

using namespace std;

int main()
{
    int i, j;
  j = 10;
  i = (j+100, j + 100, 999 + j);
  cout << i;
  int a = (2, 5, 8);
  cout << endl << a;
  return 0;

}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
1009
8
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int i, j;
  j = 10;
  i = (j++, j + 100, 999 + j);
  cout << i;
  int a = (2, 5, 8);
  cout << endl << a;
  return 0;

}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
1010
8
```

==Prime number==

```cpp
#include <iostream>

using namespace std;

int main()
{

    int n;
    cout<<"enter number"<<endl;
    cin>>n;
    bool isPrime=true;
    for(int i=2;i<n;i++){
        if(n%i==0){
            isPrime=false;
            break;
        }

    }
    if(isPrime){
        cout<<"prime number";
    }
    else{
        cout<<"NOT prime number";
    }
    return 0;

}
```

Output

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter number
15
NOT prime number
```

Q) compiler vs interpreter

https://www.geeksforgeeks.org/difference-between-compiler-and-interpreter/

Q) short maximum and minimum

```cpp
#include <iostream>
#include<limits.h>

using namespace std;

int main()
{

    short a=32767;
    short b=10;

    short c=a+b;
    cout<<"value of short c :"<<c<<endl;
    return 0;

}
```

Note :-32767 mai 10 add karenge toh 10 mai se 1 kam ho jayega ,10 ki value 9 ho jayegi aur 32767 ma se -9 = 32759

32767 + 10=(-1) + (-32768) +(10)= -32759

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
value of short c :-32759
```

Q) wrap around property

```cpp
#include <iostream>
#include<limits.h>

using namespace std;

int main()
{
    int a = 2147483647;
    int b = 10;
    int c = a + b;

    cout << "value of short c :" << c;

}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
value of short c :-2147483639
```

Note :- 2147483647 +10= (-1) -2147483648 +10

                     =-2147483639

```cpp
#include <iostream>
#include <limits.h>

using namespace std;

int main()
{
  int n;
  cout << "enter value" << endl;
  cin >> n;
  for (int row = 0; row < n; row++)
  {
    for (int col = 0; col < n - row; col++)
    {
      if (row == 0 || col == 0 || col == n - (row + 1))

      {
        cout << "*";
      }
      else
      {
        cout << " ";
      }
    }
    cout << endl;
  }
}
```

```
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter value
5
*****
 *  *
 * *
 **
 *
```

```cpp
#include <iostream>
#include <limits.h>

using namespace std;

int main()
{
  int n;
  cout << "enter value" << endl;
  cin >> n;

  for(int row=0;row<n;row++){
    for(int col=0;col<n-(row+1);col++){
      cout<<" ";
    }
    for(int k=0;k<(2*row)+1;k++){
      cout<<"*";
    }
    cout<<endl;
  }
}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter value
4
   *
  ***
 *****
*******
```

```cpp
#include <iostream>
#include <limits.h>

using namespace std;

int main()
{
  int n;
  cout << "enter value" << endl;
  cin >> n;

  for(int row=0;row<n;row++){
    for(int col=0;col<n-(row+1);col++){
      cout<<" ";
    }
    for(int k=0;k<row+1;k++){
      cout<<"* ";
    }
    cout<<endl;
  }
}
```

```
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter value
5
    *
   * *
  * * *
 * * * *
* * * * *
```

```cpp
#include <iostream>

using namespace std;

int main(){
    int n;
    cout<<"enter number :"<<endl;
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<n-row;col++){
            cout<<"* ";
        }
         cout<<endl;
        for(int k=0;k<row+1;k++){
            cout<<" ";
        }

    }
}
```

```
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter number :
4
* * * *
 * * *
  * *
   *
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout << "enter number :" << endl;
    cin >> n;
    for(int row=0;row<n;row++){
        for(int space=0;space<row;space++){
            cout<<" ";
        }
        for(int col=0;col<n-row;col++){
            cout<<"* ";
        }
        cout<<endl;
    }
}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter number :
4
* * * *
 * * *
  * *
   *
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout << "enter number :" << endl;
    cin >> n;
    for (int row = 0; row < n; row++)
    {
        for (int col = 0; col < n - (row + 1); col++)
        {
            cout << " ";
        }
        for (int k = 0; k < row + 1; k++)
        {
            cout << "* ";
        }
        cout << endl;
    }
    for (int row1 = 0; row1 < n; row1++)
    {
        for (int col1 = 0; col1 < n - row1; col1++)
        {
            cout << "* ";
        }
        cout << endl;
        for (int space1 = 0; space1 < row1 + 1; space1++)
        {
            cout << " ";
        }
    }
}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter number :
4
   *
  * *
 * * *
* * * *
* * * *
 * * *
  * *
   *
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout << "enter number :" << endl;
    cin >> n;
    for (int row = 0; row < n; row++)
    {
        for (int col = 0; col < n - (row + 1); col++)
        {
            cout << " ";
        }

        for (int i = 0; i < 2 * row + 1; i++)
        {
            if (i == 0 || i == (2 * row + 1) - 1)
            {
                cout << "*";
            }
            else
            {
                cout << " ";
            }
        }
        cout << endl;
    }
}
```

```cpp
for (int row = 0; row < n; row++)
{
    for (int col = 0; col < row; col++)
    {
        cout << " ";
    }

    for (int j = 0; j < 2 * (n - row) - 1; j++)
    {
        if (j == 0 || j == 2 * (n - row) - 2)
        {
            cout << "*";
        }
        else
        {
            cout << " ";
        }
    }
    cout << endl;
}
}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter number :
4
   *
  * *
 *   *
*     *
*     *
 *   *
  * *
   *
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout << "enter number :" << endl;
    cin >> n;
    for(int row=0;row<n;row++){
        for(int col=0;col<n-(row+1);col++){
            cout<< " ";
        }

      for(int i=0;i<2*row+1;i++){
        if(i==0 || i==(2*row+1)-1 || row==n-1){
            cout<<"*";
        }
        else{
            cout<<" ";
        }
      }
       cout<<endl;
    }

    for(int row=0;row<n-1;row++){
        for(int col=0;col<row+1;col++){
            cout<<" ";
        }

        for(int k=0;k<(n+1)-(2*row);k++){
            if(k==0 || k==(n+1)-(2*row)-1){
                cout<<"*";
            }
            else{
                cout<<" ";
            }
        }
         cout<<endl;
    }
```

```
    }
```

PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter number :
4
```
      *
    * *
  *     *
*******
  *     *
    * *
      *
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout<<"enter n value : "<<endl;
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<n-row;col++){
            cout<<"*";
        }
        for(int k=0;k<2*row+1;k++){
            cout<<" ";
        }
        for(int j=0;j<n-row;j++){
            cout<<"*";
        }
        cout<<endl;
    }
    for(int row=0;row<n;row++){
        for(int col=0;col<row+1;col++){
            cout<<"*";
        }
        for(int k=0;k<2*(n-row)-1;k++){
            cout<<" ";
        }
        for(int j=0;j<row+1;j++){
            cout<<"*";
        }
        cout<<endl;
    }
}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter n value :
5
***** *****
****    ****
***      ***
**        **
*          *
*          *
**        **
***      ***
****    ****
***** *****
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout<<"enter n value : "<<endl;
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<2*row+1;col++){
            if(col % 2==1){
                cout<<"*";
            }
            else{
                cout<<row+1;
            }
        }
        cout<<endl;
    }

}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter n value :
4
1
2*2
3*3*3
4*4*4*4
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout<<"enter n value : "<<endl;
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<2*row+1;col++){
            if(col % 2==1){
                cout<<"*";
            }
            else{
                cout<<row+1;
            }
        }
        cout<<endl;
    }
    for(int row=0;row<n;row++){
        for(int col=0;col<2*(n-row)-1;col++){
            if(col % 2==1){
                cout<<"*";
            }
            else{
                cout<<n-row;
            }
        }
        cout<<endl;
    }
}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter n value :
4
1
2*2
3*3*3
4*4*4*4
4*4*4*4
3*3*3
2*2
1
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout<<"enter n value : "<<endl;
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<row+1;col++){
            cout<<row+1;
            if(col!=row){
                cout<<"*";
            }
        }
        cout<<endl;
    }
    //2nd part
    for(int row=0;row<n;row++){
        for(int col=0;col<n-row;col++){
            cout<<n-row;
            if(col!=n-row-1){
                cout<<"*";
            }
        }
        cout<<endl;
    }

}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter n value :
4
1
2*2
3*3*3
4*4*4*4
4*4*4*4
3*3*3
2*2
1
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout<<"enter number :";
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<row+1;col++){
            cout<<col+1;
        }
        int sum=row;
        for(int k=0;k<row;k++){
            cout<<sum;
            sum=sum-1;
        }
        cout<<endl;
    }
}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter number :5
1
121
12321
1234321
123454321
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout<<"enter number :";
    cin>>n;
    char ch=65;

    for(int row=0;row<n;row++){
        for(int col=0;col<row+1;col++){
            cout<<char(ch+col);
        }
        int sum=row;
        for(int k=0;k<row;k++){
            cout<<char(ch+sum-1);
            sum=sum-1;
        }
        cout<<endl;
    }
}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter number :5
A
ABA
ABCBA
ABCDCBA
ABCDEDCBA
```

2nd Approach

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout<<"enter number :";
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<row+1;col++){
            cout<<char('A'+col);
        }
        int sum=row;
        for(int k=0;k<row;k++){
            cout<<char('A'+sum-1);
            sum=sum-1;
        }
        cout<<endl;
    }
}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter number :5
A
ABA
ABCBA
ABCDCBA
ABCDEDCBA
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout<<"enter number :";
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<n;col++){
            if(row==0 || row==n-1 || col==0 || col==n-1){
                cout<<"*";
            }
            else{
                cout<<" ";
            }
            cout<<" ";
        }
        cout<<endl;
    }
}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter number :5
* * * * *
*       *
*       *
*       *
* * * * *
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout<<"enter number :";
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<n-row;col++){
            if(row==0 || col==0 || col==n-row-1){
                cout<<"*";
            }
            else{
                cout<<" ";
            }
        }
        cout<<endl;
    }
}
```

```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter number :5
*****
*   *
*  *
**
*
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout<<"enter number :";
    cin>>n;
    for(int row=0; row<n-1; row++){
        for(int col=0; col<n-row-1; col++ ){
            cout<<" ";
        }
        for(int col=0; col<2*row+1; col++){
            if(col==0||col==2*row){
                cout<<"*";
            }
            else{
                cout<<" ";
            }
        }

        cout<<endl;
    }
    for(int row=0;row<1;row++){
        for(int col=0;col<n;col++){
            cout<<"*";
            cout<<" ";
        }
    }
}
```



```
PS C:\Users\home\Desktop\C++Code> g++ .\f77.cpp
PS C:\Users\home\Desktop\C++Code> .\a.exe
enter number :5
    *
   * *
  *   *
 *     *
* * * * *
```

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;
  for(int row=0;row<n-1;row++){
    for(int col=0;col<2*row+1;col++){
        if(col==0){
            cout<<col+1;
        }
        else if(col==2*row){
            cout<<row+1;
        }
        else{
            cout<<" ";
        }
    }
    cout<<endl;
    }
  for(int row=0;row<1;row++){
    for(int col=0;col<n;col++){
        cout<<col+1;
        cout<<" ";
    }
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter n value :5
1
1 2
1   3
1     4
1 2 3 4 5
```

2nd Approach

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;

    for(int row=0;row<n;row++){
        for(int col=0;col<row+1;col++){
            if(row==0 ||row==n-1 ){
                cout<<col+1<<" ";
            }
            else if(col==0 || col==row){
                cout<<col+1<<" ";
            }

            else{
                cout<<"  ";
            }
        }
        cout<<endl;
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter n value :5
1
1 2
1   3
1     4
1 2 3 4 5
```

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;

    for(int row=0;row<1;row++){
    for(int col=0;col<n;col++){
        cout<<col+1;
        cout<<" ";
    }
    }
    cout<<endl;
    for(int row=0;row<n-1;row++){
     for(int col=0;col<n-2*row+2;col++){
        if(col==0){
            cout<<row+2;
        }
        else if(col==n-2*row+1){
            cout<<5;
        }
        else{
            cout<<" ";
        }
     }
     cout<<endl;
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter n value :5
1 2 3 4 5
2     5
3   5
4 5
5
```

2nd Approach

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;

    for(int row=0;row<n;row++){
        for(int col=0;col<n-row;col++){
            if(row==0 ||row==n-1 ){
                cout<<col+1+row<<" ";
            }
            else if(col==0 || col==n-row-1){
                cout<<col+1+row<<" ";
            }

            else{
                cout<<"  ";
            }
        }
        cout<<endl;
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter n value :5
1 2 3 4 5
2     5
3   5
4 5
5
```

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;

  for(int row=0;row<n;row++){
    for(int col=0;col<n-(row+1);col++){
        cout<<"  ";
    }
    for(int k=0;k<row+1;k++){
        cout<<k+1<<" ";
    }
    int sum=row;
    for(int j=0;j<row;j++){
        cout<<sum<<" ";
        sum=sum-1;
    }
    cout<<endl;
  }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter n value :5
        1
      1 2 1
    1 2 3 2 1
  1 2 3 4 3 2 1
1 2 3 4 5 4 3 2 1
```

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<2*n-(row+2);col++){
            cout<<"*";
        }
        for(int k=0;k<row+1;k++){
            cout<<row+1;
            if(k!=row){
                cout<<"*";
            }
        }
        for(int col=0;col<2*n-(row+2);col++){
            cout<<"*";
        }
        cout<<endl;
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter n value :5
********1********
*******2*2*******
******3*3*3******
*****4*4*4*4*****
****5*5*5*5*5****
```

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<row+1;col++){
            cout<<"*";
        }
        cout<<endl;
    }
    for(int row=0;row<n-1;row++){
        for(int col=0;col<n-row-1;col++){
            cout<<"*";
        }
        cout<<endl;
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter n value :5
*
**
***
****
*****
****
***
**
*
```

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<2*row+1;col++){
            if(col==0 || col==2*row){
                cout<<"*";
            }
            else if(col>0 && col<=row){
                cout<<col;
            }
            else {
                cout<<2*row-col;
            }
        }
        cout<<endl;
    }
    return 0;
}
```

```
PS E:\C++Code> .\a.exe
enter n value :4
*
*1*
*121*
*12321*
```

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<2*row+1;col++){
            if(col==0 || col==2*row){
                cout<<"*";
            }
            else if(col>0 && col<=row){
                cout<<col;
            }
            else {
                cout<<2*row-col;
            }
        }
        cout<<endl;
    }
    for(int row=0;row<n-1;row++){
        for(int col=0;col<2*n-(2*row+3);col++){
            if(col==0 || col==2*n-(2*row+4)){
                cout<<"*";
            }
            else if(col>0 && col<=n-2*row-2){
                cout<<col;
            }
            else{
                cout<<2*n-(2*row+4)-col;
            }
        }

    }
        cout<<endl;
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter n value :5
*
*1*
*121*
*12321*
*1234321*
*12321*
*121*
*1*
*
```

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<2*row+1;col++){
            if(col==0 || col==2*row){
                cout<<"*";
            }
            else if(col>0 && col<=row){
                cout<<col;
            }
            else {
                cout<<2*row-col;
            }
        }
        cout<<endl;
    }
    for(int row=0;row<n-1;row++){
        for(int col=0;col<2*n-(2*row+3);col++){
            if(col==0 || col==2*n-2*(row+2)){
                cout<<"*";
            }
            else if(col>0 && col<=n-2*(row+1)){
                cout<<col;
            }
            else{
                cout<<2*n-2*(row+2)-col;
            }
        }

        cout<<endl;
    }
    return 0;
}
```

```
enter n value :6
*
*1*
*121*
*12321*
*1234321*
*123454321*
*1234321*
*12321*
*321*
*1*
*
```

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;
     int sum=1;
    for(int row=0;row<n;row++){

        for(int col=0;col<row+1;col++){
            cout<<sum;
            if(col!=row){
                cout<<"*";
            }
          sum=sum+1;
        }
        cout<<endl;
    }
   return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter n value :5
1
2*3
4*5*6
7*8*9*10
11*12*13*14*15
```

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;
    for(int row=0;row<n;row++){
        for(int col=0;col<row+1;col++){
            cout<<"*";
        }
        for(int col=0;col<2*n-2*row-1;col++){
            cout<<" ";
        }
          for(int col=0;col<row+1;col++){
            cout<<"*";
        }
        cout<<endl;
    }
      //2nd part
    for(int row=0;row<n;row++){
        for(int col=0;col<n-row;col++){
            cout<<"*";
        }
        for(int col=0;col<2*row+1;col++){
            cout<<" ";
        }
          for(int col=0;col<n-row;col++){
            cout<<"*";
        }
        cout<<endl;
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter n value :5
*            *
**          **
***        ***
****      ****
***** *****
***** *****
****      ****
***        ***
**          **
*            *
```

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;
  for(int row=0;row<n;row++){
    for(int col=0;col<n-row-1;col++){
        cout<<" ";
    }
    int k=0;
    for(;k<row+1;k++){
        cout<<row+k+1;
    }
    int sum=2*row;
    for(int j=0;j<row;j++){
        cout<<sum;
        sum=sum-1;
    }
    cout<<endl;
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter n value :5
    1
   232
  34543
 4567654
567898765
```

```cpp
#include<iostream>
using namespace std;

int main (){
    int n;
    cout<<"enter n value :";
    cin>>n;
  for(int row=0;row<n;row++){
    int col=0;
    for(;col<n-row-1;col++){
        cout<<" ";
     }
     for(int k=0;k<row+1;k++){
        if(row==0 || row==n-1){
        cout<<k+1<<" ";
    }
    else if(k==0){
        cout<<k+1<<" ";
    }
    else if(k==row){
        cout<<row+1;
    }
    else{
        cout<<"   ";
    }
     }

    cout<<endl;
   }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter n value :5
    1
   1 2
  1   3
 1     4
1 2 3 4 5
```

```cpp
#include<iostream>
using namespace std;

int main (){

    //right shift operator
    int a = -31;
    a = a >> 1;
    cout <<" a : "<< a<<endl;

    int b = 15;
    b = b >> 1;
    cout <<" b : "<< b<<endl;

    //left shift operator
    int c = -31;
    c = c << 1;
    cout <<" c : "<< c<<endl;

    int d = 30;
    d = d << 1;
    cout <<" d : "<< d<<endl;

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
 a : -16
 b : 7
 c : -62
 d : 60
```

Note : left shift operator multiply by 2 ,positive and negative number.(num*2^n)

: right shift operator divide by 2,if number is positive and number negative hai toh add 1 hoga uske baad divide hoga 2 se. (num/2^n)

```cpp
#include<iostream>

using namespace std;

int main (){

    int a = 4;
    cout << (++a)*(++a);
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
36
```

Note : two time increment than multiply

Q)write a function to display area of circle

```cpp
#include <iostream>

using namespace std;

double getAreaOfCircle(int r){
    double ans =3.14*r*r;
    return ans;
}
int main()
{
    int r;
    cout<<"enter the value of r :"<<endl;
    cin>>r;
    double result= getAreaOfCircle(r);
    cout<<"Area Of Circle is "<<result;
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter the value of r :
5
```

Q)find number is odd or even

```cpp
#include <iostream>

using namespace std;

bool getEvenOrOdd(int n){
    bool flag=true;
    if(n%2==0){
     return true;
    }
    return false;
}
int main()
{
    int n;
    cout<<"enter the value of n :"<<endl;
    cin>>n;
    bool result= getEvenOrOdd(n);
    if(result){
        cout<<n<<" is even number"<<endl;
    }
    else{
        cout<<n<<" is odd number"<<endl;
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter the value of n :
7
7 is odd number
```

Q)print factorial

```cpp
#include <iostream>

using namespace std;

int getfactorial(int n){
    int sum=1;
    for(int i=1;i<=n;i++){
     sum=sum*i;
    }
    return sum;
}
int main()
{
    int n;
    cout<<"enter the value of n :"<<endl;
    cin>>n;
    int result= getfactorial(n);
    cout<<"factorial of n "<<"is "<<result<<endl;

    return 0;
}
```

```
PS E:\C++Code> .\a.exe
enter the value of n :
5
factorial of n is 120
```

```cpp
#include <iostream>

using namespace std;

int getfactorial(int n){
    int sum=1;
    int m=n ;
    for(int i=1;i<=n;i++ ){
     sum=sum*m;
     m--;
    }
    return sum;
}
int main()
{
    int n;
    cout<<"enter the value of n :"<<endl;
    cin>>n;
    int result= getfactorial(n);
    cout<<"factorial of n "<<"is "<<result<<endl;

    return 0;
}
```

```
PS E:\C++Code> .\a.exe
enter the value of n :
4
factorial of n is 24
```

Q)check number is prime or not

```cpp
#include <iostream>

using namespace std;

bool checkPrime(int n){

    for(int i=2;i<n;i++){
        if(n%i==0){
            return false;
            break;
        }
    }

    return true;
}
int main()
{
    int n;
    cout<<"enter the value of n :"<<endl;
    cin>>n;
    bool check =checkPrime(n);
    if(check){
        cout<<n<<" is  prime number "<<endl;
    }
    else{
        cout<<n<<" is Not  prime number "<<endl;
    }
    return 0;
}
```

```
PS E:\C++Code> .\a.exe
enter the value of n :
7
7 is  prime number
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout << "enter number :" << endl;
    cin >> n;

    while (n != 0)
    {
        int rem = n % 10;
        cout << rem << ",";
        n = n / 10;
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter number :
623
3,2,6,
```

Array concept

```cpp
#include <iostream>

using namespace std;

int main()
{
    string name[]={"abc","xyz","lmn"};
    for(int i=0;i<3;i++){
        cout<<name[i]<<" ";
    }
    cout<<endl;
    cout<<name[1]<<endl;
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
abc xyz lmn
xyz
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int digit[]={6,5,2,4};
    int ans=0;
    for(int i=0;i<4;i++){
        ans=ans*10+digit[i];
    }
   cout<<ans<<" ";
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
6524
```

Q) Find number of set bits

```cpp
#include <iostream>

using namespace std;

int main()
{
    int n;
    cout<<"enter a value :"<<endl;
    cin>>n;
    int ans=0;
    while (n!=0)
    {
        if(n & 1){
         ans++;
        }
        n=n>>1;
    }
    cout<<"set of bits :"<<ans<<" ";
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter a value :
5
set of bits :2
```

Q) Decimal to Binary

```cpp
#include <cmath>
#include <iostream>
using namespace std;

int decmailToBinary(int n) {
  int ans = 0;
  int i = 0;
  while (n != 0) {
    int digit = n & 1;
    ans = (digit * pow(10, i)) + ans;
    n = n >> 1;
    i++;
  }
  return ans;
}

int main() {
  int n;
  cout << "enter number :";
  cin >> n;
  int ans = decmailToBinary(n);
   cout << ans;
}
```

```
> sh -c make -s
> ./main
enter number :10
1010>
```

2nd Approach

main.cpp

`main.cpp > ƒ decmailToBinary`

```cpp
1   #include <cmath>
2   #include <iostream>
3   using namespace std;
4
5   int decmailToBinary(int n) {
6       int ans = 0;
7       int i = 0;
8       while (n != 0) {
9           int digit = n % 2;
10          ans = (digit * pow(10, i)) + ans;
11          n = n / 2;
12          i++;
13      }
14      return ans;
15  }
16  int main() {
17      int n;
18      cout << "enter number :";
19      cin >> n;
20      int ans = decmailToBinary(n);
21      cout << ans;
22  }
```

Console

```
> sh -c make -s
> ./main
enter number :5
101>
```

Q) binary to decimal

```cpp
#include <cmath>
#include <iostream>
using namespace std;

int binaryToDecimal(int n){
    int decimal=0;
    int i=0;
    while (n)
    {
        int bit=n%10;
        decimal=decimal+bit*pow(2,i);
        n=n/10;
        i++;
    }
    return decimal;
}

int main() {
  int n;
  cout << "enter number :";
  cin >> n;
  int ans = binaryToDecimal(n);
   cout << ans;
}
```

```
PS E:\C++Code> .\a.exe
enter number :101
5
```

2nd Approach (using bitwise operator)

```cpp
#include <cmath>
#include <iostream>
using namespace std;

int binaryToDecimal(int n){
    int decimal=0;
    int i=0;
    while (n)
    {
        int bit=n & 1;
        decimal=decimal+bit*pow(2,i);
        n=n/10;
        i++;
    }
    return decimal;
}

int main() {
  int n;
  cout << "enter number :";
  cin >> n;
  int ans = binaryToDecimal(n);
   cout << ans;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter number :101
5
```

Q) int a=5;

   cout<<(!a);

   output : 0

Logical NOT	!	Returns true if the operand is false or zero	int a = 3;
			
			!a;
			
			// returns false

```cpp
#include <cmath>
#include <iostream>
using namespace std;

int fun(int =0,int=0);
int main() {
    cout<<fun(5);

    return 0;
}
int fun(int x,int y){
    return x+y;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
5
```

```cpp
#include <cmath>
#include <iostream>
using namespace std;


int main() {
    int a=-5;
    int k=(a++,++a);
    cout<<k;
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
-3
```

```cpp
#include <cmath>
#include <iostream>
using namespace std;


int main() {
    if(~0==1){
        cout<<"YES";
    }
    else{
        cout<<(~0)<<endl;
        cout<<"No";
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
-1
No
```

One's Complement	~	Changes binary digits 1 to 0 and 0 to 1	int b = 3;
			(~b);
			//returns -4

TA | Geetanjali chawla Yesterday at 19:47
@Anandkumar bitwise negation padho
-11 hi ayega

Bhavya (He/Him) Yesterday at 19:52
10 ko 32 bit mei represent kaise kre batao
000000........1010
uske baad har bit ko paltao
uske baad ye representation hai
in memory
uske baad actual number 2s complement se aayega

Anandkumar OP Yesterday at 20:15
.solved thanks
✅ 1

```cpp
#include <cmath>
#include <iostream>
using namespace std;


int main() {

    int a=10,b=5,c=5;
    int d;
    cout<<(b+c==a)<<endl;;
    d=b+c==a;
    cout<<d;
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
1
1
```

```c
#include <stdio.h>

int main()
{
int a = 10, b = 5, c = 3;

b != !a;

c = !!a;

printf("%d\t%d", b, c);

}
```

A	5 1	
B	0 3	
C	5 3	
D	1 1	

```cpp
#include <cmath>
#include <iostream>
using namespace std;

int main()
{
    int a;
    switch (a)
    {
        cout<<"apache";
    }
    cout<<"herohonda";
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
herohonda
```

Note : CASE or Default statements is missing ,still compiler accepts .but without CASE statements nothing will be printed inside of SWITCH.

```cpp
#include <cmath>
#include <iostream>
using namespace std;

int main()
{
    int a;
    switch (a);
    {
        cout<<"apache"<<endl;
    }
    cout<<"herohonda";
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
apache
herohonda
```

Note : a semicolon at the end of switch(a); so that cout <<apache is out of switch.

Note : you can not use float, double, or string inside switch or switch case. We can use only int and char in switch.

```cpp
#include <cmath>
#include <iostream>
using namespace std;

int main()
{
    int n;cin>>n;
    int8_t sum=0;
    for(int i=1;i<=n;++i){
        sum+=i;
    }
    cout<<(int)sum<<endl;
    return 0;
        return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
3
6
```

Note : int8_t =signed integer type with width of exactly 8, 16, 32 and 64 bits respectively

```cpp
#include <iostream>
using namespace std;

int main()
{
  // heart star pattern
  int size;
  cin>>size;

  for (int i = size / 2; i < size; i += 2) {
    // print first spaces
    for (int j = 1; j < size - i; j += 2) {
      cout << " ";
    }
    // print first stars
    for (int j = 0; j < i; j++) {
      cout << "*";
    }
    // print second spaces
    for (int j = 0; j < size - i ; j++) {
      cout << " ";
    }
    // print second stars
    for (int j = 0; j < i ; j++) {
      cout << "*";
    }
    cout << endl;
  }
  //lower part
  //inverted pyramid
  for (int i = 0; i < size; i++) {
    for (int j = 0; j < i; j++) {
      cout << " ";
    }
    for (int j = 0; j <2*size-2*i-1; j++) {
      cout << "*";
    }
    cout << "\n";
  }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
6
  ***    ***
***** *****
***********
 *********
  *******
   *****
    ***
     *
```

```cpp
#include <iostream>
using namespace std;

int main()
{
// heart star pattern
    int size;
    cin>>size;

    for (int row = size / 2; row < size; row += 2) {
        // print first spaces
        for (int col = 1; col < size - row; col += 2) {
            cout << " ";
        }
        // print first stars
        for (int col = 0; col < row; col++) {
            cout << "*";
        }
        // print second spaces
        for (int col = 0; col < size - row ; col++) {
            cout << " ";
        }
        // print second stars
        for (int col = 0; col < row ; col++) {
            cout << "*";
        }
        cout << endl;
    }
    //lower part
    //inverted pyramid
    for (int row = 0; row < size; row++) {
        for (int col = 0; col < row; col++) {
            cout << " ";
        }
        for (int col = 0; col <2*size-2*row-1; col++) {
            cout << "*";
        }
        cout << "\n";
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
6
  ***     ***
***** *****
***********
 *********
  *******
   *****
    ***
     *
```

```cpp
#include <iostream>
using namespace std;

int main()
{
    char operation;
    float num1, num2;
    cout << "Enter an operator (+, -, *, /): ";
    cin >> operation;
    cout << "Enter two numbers: " << endl;
    cin>> num1 ;
    cout<<endl;
    cin>> num2;
    cout<<endl;

    switch (operation) {
        case '+':
            cout << num1 << " + " << num2 << " = " << num1 + num2;break;
        case '-':
            cout << num1 << " - " << num2 << " = " << num1 - num2;break;
        case '/':
            cout << num1 << " * " << num2 << " = " << num1 * num2;break;
        case '*':
            cout << num1 << " / " << num2 << " = " << num1 / num2;break;
        default:
            // operator is doesn't match any case constant (+, -, *, /)
            cout << "Error! The operator is not correct";
            break;
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
Enter an operator (+, -, *, /): +
Enter two numbers:
5

6

5 + 6 = 11
```

Fancy pattern #2

```cpp
#include <iostream>
using namespace std;

int main()
{
    int n;
    cout<<"enter a number :"<<endl;
    cin>>n;
    int count=1;
    for(int row=0;row<n;row++){
        for(int col=0;col<row+1;col++){
            cout<<count<<" ";
            count++;
        }
        cout<<endl;
    }
    int start=count-n;
    for(int row=0;row<n;row++){
        int k=start;
        for(int col=0;col<n-row;col++){
            cout<<k<<" ";
            k++;
        }
        start=start-(n-row-1);
        cout<<endl;
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter a number :
4
1
2 3
4 5 6
7 8 9 10
7 8 9 10
4 5 6
2 3
1
```

Floyd's Triangle pattern

```cpp
#include <iostream>
using namespace std;

int main()
{
    int n;
    cout<<"enter a number :"<<endl;
    cin>>n;
    int count=1;
    for(int row=0;row<n;row++){
        for(int col=0;col<row+1;col++){
            cout<<count<<" ";
            count++;
        }
        cout<<endl;
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter a number :
7
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
16 17 18 19 20 21
22 23 24 25 26 27 28
```

Pascal's triangle patterns

```cpp
#include <iostream>
using namespace std;

int main()
{
    int n;
    cout<<"enter a number :"<<endl;
    cin>>n;
    int count=1;
    for(int row=1;row<=n;row++){
        int count=1;
        for(int col=1;col<=row;col++){
          cout<<count<<" ";
        count=count*(row-col)/col;
        }
        cout<<endl;
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter a number :
5
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
```

Q check prime number or not

```cpp
#include <iostream>
#include<cmath>
using namespace std;

bool checkprime(int n){

  for(int i=2;i<sqrt(n);i++){
      if(n%i==0){
       return false;
      }
    }
    return true;
}
int main()
{
    int n;
    cout<<"enter a number :"<<endl;
    cin>>n;
    if(checkprime(n)){
      cout<<"prime number";
    }
    else{
      cout<<"Not prime number";
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter a number :
149
prime number
```

Print 1 to n prime number

```cpp
#include <iostream>
#include<cmath>
using namespace std;

bool checkprime(int n){

  for(int i=2;i<n;i++){
      if(n%i==0){
       return false;
      }
    }
    return true;
}
int main()
{
    int n;
    cout<<"enter a number :"<<endl;
    cin>>n;
    for(int i=2;i<=n;i++){
      bool isIPrime=checkprime( i);
      if(isIPrime){
        cout<<i<<" ";
      }
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter a number :
15
2 3 5 7 11 13
```

Reverse integer (leetcode Q=07)

```cpp
#include <iostream>
#include<limits.h>
using namespace std;

int main()
{
    int n;
    cout<<"enter a number :"<<endl;
    cin>>n;

    if(n<=INT_MIN){
        return 0;
    }

    bool neg=false;
    if(n<0){
        neg=true;
        n=-n;
    }

    int ans=0;
    while(n>0){
        if(ans>INT_MAX/10){
            cout<<"answer is greater than INT_MAx ";
        }
        int digit=n%10;
        ans=ans*10+digit;
        n=n/10;
    }

    if(neg){
        cout<< -ans;
    }
    else{
        cout<< ans;
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter a number :
-589
-985
PS E:\C++Code> .\a.exe
enter a number :
264
462
```

Q) set kth bit (gfg question)

Set kth bit 🔖   🐞

Basic   Accuracy: **72.71%**   Submissions: **32K+**   Points: **1**

📦 **Stand out from the crowd. Prepare with Complete Interview**
         Preparation   ☑

Given a number **N** and a value **K**. From the right, set the Kth bit in the
binary representation of N. The position of Least Significant Bit(or last
bit) is 0, the second last bit is 1 and so on.

Example 1:

```
Input:
N = 10
K = 2
Output:
14
Explanation:
Binary representation of the given number
10 is: 1 0 1 0, number of bits in the
```

```cpp
1 ▸ ⌨// } Driver Code Ends
6   class Solution
7 ▾ {
8   public:
9       int setKthBit(int n, int k)
10 ▾    {
11          int mask=1<<k;
12          int ans =n | mask ;
13          return ans;
14      }
15
16  };
17
18
19
20  ⌨// } Driver Code Ends
```

💡   Custom Input

2469. Convert the Temperature

Hint ⊙

Easy   ⊘   👍 350   👎 222   ☆   ♻

🔒 Companies

You are given a non-negative floating point number rounded to two decimal places celsius, that denotes the **temperature in Celsius**.

You should convert Celsius into **Kelvin** and **Fahrenheit** and return it as an array ans = [kelvin, fahrenheit].

Return *the array* ans. Answers within 10^{-5} of the actual answer will be accepted.

Note that:

- Kelvin = Celsius + 273.15

- Fahrenheit = Celsius * 1.80 + 32.00

```
1   class Solution {
2   public:
3       vector<double> convertTemperature(double celsius) {
4           double k=celsius +273.15;
5           double f=celsius *1.80+32.00;
6
7           vector<double> v;
8           v.push_back(k);
9           v.push_back(f);
10          return v;
11      }
12  };
```

```cpp
#include <iostream>
#include<vector>
#include<cmath>
using namespace std;


vector<double> convertTemperature(double celsius) {
        double k=celsius +273.15;
        double f=celsius *1.80+32.00;

        vector<double> v;
        v.push_back(k);
        v.push_back(f);
        return v;
    }
int main()
{
    double celsius=36.50;
    vector<double>ans;
    ans=convertTemperature(celsius);
   for (auto ans2 : ans) {
        cout<<ans2;
        cout<<",";
    }


}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
309.65,97.7,
```

```cpp
#include <iostream>
using namespace std;

int main()
{
    int arr[5];
    cout<<"enter array value "<<endl;
    //taking input
    for(int i=0;i<5;i++){
        cin>>arr[i];
    }
    //print double value of array

      for(int i=0;i<5;i++){

          cout<<2*arr[i]<<" ";

    }
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter array value
1 2 3 4 5
2 4 6 8 10
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int arr[10];
    int n;
    cout<<"how many number want to add  "<<endl;
    cin>>n;
    cout<<"enter array value "<<endl;
    //taking input
    for(int i=0;i<n;i++){
        cin>>arr[i];
    }
    //print double value of array
    cout<<"print double values "<<endl;
     for(int i=0;i<n;i++){
        cout<<2*arr[i]<<" ";
    }
}
```

```
PS E:\C++Code> .\a.exe
how many number want to add
5
enter array value
2 3 4 5 6
print double values
4 6 8 10 12
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int arr[]={2,5,6,8,7};
    for(int i=0;i<5;i++){
        arr[i]=1;
    }
    cout<<"value print ";
     for(int i=0;i<5;i++){
        cout<<arr[i]<<" ";
    }
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
value print 1 1 1 1 1
```

Memset function

```cpp
#include <cmath>
#include <cstring>
#include <iostream>
using namespace std;


int main() {
    
    char c2 []={'2','5','h'};
    memset(c2, '1',sizeof(c2));
    cout<<c2<<endl;

    int arr [5];
    memset(arr, 0,sizeof(arr));
    cout<<"value print ";
    for(int i=0;i<5;i++){
        cout<<arr[i]<<" ";
    }
    return 0;
}
```

```
> sh -c make -s
> ./main
111
value print 0 0 0 0 0 >
```

- **str[]:** Pointer to the object to copy the character.
- **ch:** The character to copy. It can be a character, a normal value as well a boolean value.
- **n:** Number of bytes to copy. (0,-1) पे करे के रखना

Return value: The memset() function returns str, the pointer to the destination string.

Time Complexity: O(N) [For traverse from begin to end of the object]
Auxiliary Space Complexity: O(1)

```cpp
#include <iostream>

using namespace std;

int main()
{
    int  arr[10];
  cout<<"value print ";
      for(int i=0;i<10;i++){
         cout<<arr[i]<<" ";
     }
     return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp          Garbage Value
PS E:\C++Code> .\a.exe
value print 6422224 6422280 6422476 1990511808 -914233446 -2 6422280 1990487853 4200960 6422352
```

Q linear search array

```cpp
#include <iostream>

using namespace std;
bool findKey(int arr[],int size,int key){

    for(int i=0;i<size;i++){
        if(arr[i]==key){
            return true;
        }
    }
    return false;
}
int main()
{
    int arr[5]={5,8,9,6,7};
    int size=5;
    int key;
    cout<<"enter key :"<<endl;
    cin>>key;
    if(findKey(arr,size,key)){
        cout<<"Found"<<endl;
    }
    else{
        cout<<"Not Found"<<endl;
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter key :
1
Not Found
PS E:\C++Code> .\a.exe
enter key :
9
Found
```

Q) find maximum and minimum number in array

```cpp
#include <iostream>
#include<limits.h>

using namespace std;

int main()
{
    int arr[5]={5,8,9,6,7};
    int size=5;
    //find maximum number
    int max=INT_MIN;
    for(int i=0;i<size;i++){
        if(arr[i]>max){
            max=arr[i];
        }
    }
    cout<<"maximum number is :"<<max<<endl;

    //find minimum number
    int min=INT_MAX;
    for(int i=0;i<size;i++){
        if(arr[i]<min){
            min=arr[i];
        }
    }
     cout<<"minimum number is :"<<min<<endl;
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
maximum number is :9
minimum number is :5
```

Q_Extreme print

```cpp
#include <iostream>
#include<limits.h>

using namespace std;

int main()
{
    int arr[5]={5,8,9,6,7};
    int size=5;
    int start=0;
    int end=size-1;
    while (start<=end)
    {
        if(start==end){
            cout<<arr[start]<<" ";
        }
        else{
            cout<<arr[start]<<" ";
            cout<<arr[end]<<" ";
        }
        start++;
        end--;
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
5 7 8 6 9
```

Q) reverse array

```cpp
#include <iostream>
#include<limits.h>

using namespace std;

int main()
{
    int arr[5]={10,20,30,40,50};
    int size=5;
    int start=0;
    int end=size-1;
    while (start<=end)
    {
        swap(arr[start],arr[end]);
        start++;
        end--;
    }
    //print reverse array value
    for(int i=0;i<size;i++){
        cout<<arr[i]<<" ";
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
50 40 30 20 10
```

```cpp
#include <iostream>
#include<vector>

using namespace std;

int main()
{
    vector<int>arr;
    arr.push_back(5);
    arr.push_back(9);
    for(int i=0;i<arr.size();i++){
        cout<<arr[i]<<" ";
    }
    cout<<endl;
    cout<<"--------------"<<endl;

    vector<int>arr2(5,-8);
     for(int i=0;i<arr2.size();i++){
        cout<<arr2[i]<<" ";
    }
    cout<<endl;
    cout<<"--------------"<<endl;

     vector<int>arr3{2,5,8,9,3};
     for(int i=0;i<arr3.size();i++){
        cout<<arr3[i]<<" ";
    }
    cout<<endl;
    cout<<"--------------"<<endl;

    cout<<"enter n value "<<endl;
    int n;
    cin>>n;
    vector<int>arr4(n);
    for(int i=0;i<arr4.size();i++){
        cout<<arr4[i]<<" ";
    }
    cout<<endl;
    cout<<"--------------"<<endl;

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
5 9
--------------
-8 -8 -8 -8 -8
--------------
2 5 8 9 3
--------------
enter n value
5
0 0 0 0 0
--------------
```

Q)find unique elements

```cpp
#include <iostream>
#include<vector>

using namespace std;
int findUnique( vector<int>arr){
    int ans=0;
    for(int i=0;i<arr.size();i++){
        ans=ans^arr[i];
    }
    return ans;
}
int main()
{
    int n;
    cout<<"enter size value :"<<endl;
    cin>>n;

    vector<int>arr(n);
     cout<<"enter vector elements :"<<endl;
    for(int i=0;i<arr.size();i++){
        cin>>arr[i];
    }
    int unique=findUnique(arr);
    cout<<"Unique element is "<<unique<<endl;
    return 0;
}
```

```
PS E:\C++Code> .\a.exe
enter size value :
5
11 22 11 22 33
Unique element is 33
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter size value :
5
enter vector elements :
1 2 3 2 1
Unique element is 3
```

Q)union of two array

```cpp
#include <iostream>
#include<vector>

using namespace std;

int main()
{
    int arr[]={1,2,3,4};
    int brr[]={5,6,7,8};
    int size=4;

    vector<int>ans;
    //insert arr value to ans
    for(int i=0;i<size;i++){
        ans.push_back(arr[i]);
    }

    //insert brr value to ans
    for(int i=0;i<size;i++){
        ans.push_back(brr[i]);
    }

    //print union of two array
     for(int i=0;i<ans.size();i++){
        cout<<ans[i]<<" ";
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
1 2 3 4 5 6 7 8
```

Q) Intersection of 2 array's

```cpp
#include <iostream>
#include<vector>

using namespace std;

int main()
{
    vector<int>arr{1,2,3,4,3,3,3,3,3};
    vector<int>brr{2,3,3,3,3};

    vector<int>ans;
    for(int i=0;i<arr.size();i++){
        int element=arr[i];
        for(int j=0;j<brr.size();j++){
            if(element==brr[j]){
                brr[j]=-1;
                ans.push_back(element);
                break;
            }
        }
    }

    //print
    cout<<"Intersection of 2 array :"<<endl;
    for(int i=0;i<ans.size();i++){
        cout<<ans[i]<<" ";
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
Intersection of 2 array :
2 3 3 3 3
```

Q)Union of unique value (without duplicate)

```cpp
#include <iostream>
#include<vector>
#include<limits.h>
using namespace std;

int main()
{
    vector<int>arr{1,2,3,4,5,2,5};
    vector<int>brr{2,3,5,6,2,3};

    vector<int>ans;
      for(int i=0;i<arr.size();i++){
        for(int j=i+1;j<arr.size();j++){
            if(arr[i]==arr[j]){
                arr[i]=INT_MIN;
            }
        }
    }

     for(int i=0;i<arr.size();i++){
        if(arr[i]!=INT_MIN){
            ans.push_back(arr[i]);
        }
    }

    for(int j=0;j<ans.size();j++){
        for(int k=0;k<brr.size();k++){
            if(ans[j]==brr[k]){
                brr[k]=INT_MIN;
            }
        }
    }

    for(int i=0;i<brr.size();i++){
        if(brr[i]!=INT_MIN){
            ans.push_back(brr[i]);
        }
    }
```

```cpp
    //print
    cout<<" Union of 2 array :"<<endl;
    for(int i=0;i<ans.size();i++){
        cout<<ans[i]<<" ";
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
Union  of 2 array :
1 3 4 2 5 6
```

Q)find pair of sum

```cpp
#include <iostream>
#include<vector>
#include<limits.h>
using namespace std;

int main()
{

    int n;
    cout<<"enter size :"<<endl;
    cin>>n;
    vector<int>pair(n);
    cout<<"enter value :"<<endl;
    for(int i=0;i<pair.size();i++){
        cin>>pair[i];
    }

    for(int i=0;i<pair.size();i++){
        for(int j=i+1;j<pair.size();j++){
            if(pair[i]+pair[j]==9){
                cout<<"("<<pair[i]<<","<<pair[j]<<")"<<endl;
            }
        }
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter size :
7
enter value :
1 3 5 7 2 4 6
(3,6)
(5,4)
(7,2)
```

Q)find pair of triplet sum

```cpp
#include <iostream>
#include<vector>
#include<limits.h>
using namespace std;

int main()
{

    int n;
    cout<<"enter size :"<<endl;
    cin>>n;
    vector<int>pair(n);
    cout<<"enter value :"<<endl;
    for(int i=0;i<pair.size();i++){
        cin>>pair[i];
    }

    for(int i=0;i<pair.size();i++){
        for(int j=i+1;j<pair.size();j++){
            for(int k=j+1;k<pair.size();k++){
                if(pair[i]+pair[j]+pair[k]==9){
                cout<<"("<<pair[i]<<","<<pair[j]<<","<<pair[k]<<")"<<endl;
                }
            }
        }

    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
enter size :
7
enter value :
1 3 5 7 2 4 6
(1,3,5)
(1,2,6)
(3,2,4)
```

Q) sort 0's and 1's

```cpp
#include <iostream>
#include<vector>
#include<limits.h>
using namespace std;

int main()
{
    vector<int>arr{0,1,0,1,1,0,1,0,1,0};
    int start=0;
    int end=arr.size()-1;
    int i=0;
    while(start<=end){
        if(arr[i]==0){
            swap(arr[start],arr[i]);
            start++;
            i++;
        }
        else{
            swap(arr[end],arr[i]);
            end--;
        }
    }

        //print
    cout<<" sort 0's and 1's :"<<endl;
    for(int i=0;i<arr.size();i++){
        cout<<arr[i]<<" ";
    }

    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
 sort 0's and 1's :
0 0 0 0 0 1 1 1 1 1
```

```cpp
#include <iostream>

using namespace std;

int main()
{
    int arr[3][3];
    int row=3;
    int col=3;

    //row wise input
    for(int i=0;i<row;i++){
        for(int j=0;j<col;j++){
            cin>>arr[i][j];
        }
        cout<<endl;
    }

    //print row wise
    cout<<"row-wise :"<<endl;
     for(int i=0;i<row;i++){
        for(int j=0;j<col;j++){
            cout<<arr[i][j]<<" ";
        }
        cout<<endl;
    }

    //print column wise
    cout<<"column-wise :"<<endl;
     for(int i=0;i<row;i++){
        for(int j=0;j<col;j++){
            cout<<arr[j][i]<<" ";
        }
        cout<<endl;
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
1 2 3

4 5 6

7 8 9

row-wise :
1 2 3
4 5 6
7 8 9
column-wise :
1 4 7
2 5 8
3 6 9
```

Q)print row –wise sum

```cpp
#include <iostream>

using namespace std;

void printRowWiseSum(int arr[][3],int row,int col){

    //print row wise sum
    cout<<"row wise sum :"<<endl;
    for(int i=0;i<row;i++){
        int sum=0;
        for(int j=0;j<col;j++){
            sum=sum+arr[i][j];
        }
        cout<<sum;
        cout<<endl;
    }
}
int main()
{
    int arr[3][3];
    int row=3;
    int col=3;

    //row wise input
    for(int i=0;i<row;i++){
        for(int j=0;j<col;j++){
            cin>>arr[i][j];
        }
    }

    printRowWiseSum(arr,row,col);
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
1 2 3
4 5 6
7 8 9
row wise sum :
6
15
24
```

Q)column wise sum

```cpp
#include <iostream>

using namespace std;

void printRowWiseSum(int arr[][3],int row,int col){

   //print column wise sum
    cout<<"column wise sum :"<<endl;
    for(int i=0;i<row;i++){
      int sum=0;
      for(int j=0;j<col;j++){
        sum=sum+arr[j][i];
      }
      cout<<sum;
      cout<<endl;
   }
}
int main()
{
   int arr[3][3];
   int row=3;
   int col=3;

   //row wise input
   for(int i=0;i<row;i++){
      for(int j=0;j<col;j++){
         cin>>arr[i][j];
      }
   }

   printRowWiseSum(arr,row,col);
   return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
1 2 3
4 5 6
7 8 9
column wise sum :
12
15
18
```

Q) find key in 2'D array

```cpp
#include <iostream>

using namespace std;

bool findkey(int arr[][3],int row,int col,int key){
    for(int i=0;i<row;i++){
        for(int j=0;j<col;j++){
            if(arr[i][j]==key){
                return true;
            }
        }
    }
    return false;
}
int main()
{
    int arr[3][3];
    int row=3;
    int col=3;

    //row wise input
    for(int i=0;i<row;i++){
        for(int j=0;j<col;j++){
            cin>>arr[i][j];
        }
    }

    int key=7;
    if(findkey(arr,row,col,key)){
        cout<<"true";
    }
    else{
        cout<<"false";
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
1 2 3
4 5 6
7 8 9
true
```

Q)find maximum number in 2'D array

```cpp
#include <iostream>
#include <limits.h>
using namespace std;

int findMax(int arr[][3],int row,int col){
    int maxi=INT_MIN;
    for(int i=0;i<row;i++){
        for(int j=0;j<col;j++){
            if(arr[i][j]>maxi){
                maxi=arr[i][j];
            }
        }
    }
    return maxi;
}
int main()
{
    int arr[3][3]={
        {1,2,3},
        {4,5,6},
        {7,8,9}
    };
    int row=3;
    int col=3;

    int maximum=findMax(arr,row,col);
    cout<<"maximum number is :"<<maximum;
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
maximum number is :9
```

Q)find minimum number in 2'D array

```cpp
#include <iostream>
#include <limits.h>
using namespace std;

int findMinimum(int arr[][3],int row,int col){
    int mini=INT_MAX;
    for(int i=0;i<row;i++){
        for(int j=0;j<col;j++){
            if(arr[i][j]<mini){
                mini=arr[i][j];
            }
        }
    }
    return mini;
}
int main()
{
    int arr[3][3]={
        {1,2,3},
        {4,5,6},
        {7,8,9}
    };
    int row=3;
    int col=3;

    int minimum=findMinimum(arr,row,col);
    cout<<"minimum number is :"<<minimum;
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
minimum number is :1
```

Q) Transpose 2'D array

```cpp
#include <iostream>

using namespace std;

void transpose(int arr[][3],int row,int col,int transposeArray[][3]){
    for(int i=0;i<row;i++){
        for(int j=0;j<col;j++){
            transposeArray[j][i]=arr[i][j];
        }
    }
}
void print(int transposeArray[][3],int row,int col){
    for(int i=0;i<row;i++){
        for(int j=0;j<col;j++){
            cout<<transposeArray[i][j]<<" ";
        }
        cout<<endl;
    }
}
int main()
{
    int arr[3][3]={
        {1,2,3},
        {4,5,6},
        {7,8,9}
    };
    int row=3;
    int col=3;

    int transposeArray[3][3];
    transpose(arr,row,col,transposeArray);
    print(transposeArray,row,col);
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
1 4 7
2 5 8
3 6 9
```

Q) print vector of vector

```cpp
#include <iostream>
#include <vector>
using namespace std;


int main()
{
    vector<vector<int> >arr;
    vector<int>a={1,2,5};
    vector<int>b={8,3,4,8};
    vector<int>c={9,10};

    arr.push_back(a);
    arr.push_back(b);
    arr.push_back(c);

    //print vector of vector
    for(int i=0;i<arr.size();i++){
        for(int j=0;j<arr[i].size();j++){
            cout<<arr[i][j]<<" ";
        }
        cout<<endl;
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
1 2 5
8 3 4 8
9 10
```

```cpp
#include <iostream>
#include <vector>

using namespace std;

int main()
{
    int row=5;
    int col=5;
    vector<vector<int> >arr(row,vector<int>(col,-8));

    //print vector of vector
    for(int i=0;i<arr.size();i++){
        for(int j=0;j<arr[i].size();j++){
            cout<<arr[i][j]<<" ";
        }
        cout<<endl;
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
-8 -8 -8 -8 -8
-8 -8 -8 -8 -8
-8 -8 -8 -8 -8
-8 -8 -8 -8 -8
-8 -8 -8 -8 -8
```

Q)The above code uses the Boyer-Moore Voting Algorithm to find the majority element in the given vector of integers. Majority element is that element which appears more than n/2 times. However, there is a bug in the code that causes it to return an incorrect result for some inputs. Your task is to identify and fix the bug.

```cpp
#include <iostream>
#include <vector>

using namespace std;
int majorityElement(vector<int> &nums)
{
    int candidate, count = 0;
    for (int i = 0; i < nums.size(); i++) {
        if (count == 0) {
            candidate = nums[i];
        }
        if (nums[i] == candidate) {
            count++;
        }
        else {
            count--;
        }
    }
    /* Sure, the bug in the given code is that it does not check if the candidate
element is actually the majority element. To fix the bug, we need to add a second
pass through the array to count the occurrences of the candidate element and
check if it appears more than n/2 times, where n is the size of the array.*/
    count = 0;
    for (int i = 0; i < nums.size(); i++) {
        if (nums[i] == candidate) {
            count++;
        }
    }
    if (count > nums.size() / 2) {
        return candidate;
    } else {
        return -1; //or any other value that indicates no majority element exists
    }
}
int main()
{
    vector<int> nums = {2,2,2,2,5,5,5};
    cout << "The majority element is: " << majorityElement(nums) << endl;
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
The majority element is: 5
```

```cpp
#include <iostream>
#include <vector>

using namespace std;
void moveNegative(int arr[], int n){
    int i=0, j=n-1;
    while(i<j){
        while(arr[i]>0 && i<j){ // swap when a positive element is encountered
            i++;
        }

        while(arr[j]<0 && i<j){ // swap when a negative element is encountered
            j--;
        }

        if(i<j){ // swap only when i is less than j
            swap(arr[i], arr[j]); // swap the elements
        }

    }
}
int main(){
    int n = 6;
    int arr[n] = {2, -3, -1, 5, -4,3};
    moveNegative(arr, n);
    for(int i=0;i<n;i++){
        cout<<arr[i]<<" ";
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
2 3 5 -1 -4 -3
```

Description   Editorial   Solutions (9.3K)   Submissions

75. Sort Colors   Hint ⊙

Medium   ✓   👍 14.7K   👎 528   ☆   ↻

🔒 Companies

Given an array nums with n objects colored red, white, or blue, sort them **in-place** so that objects of the same color are adjacent, with the colors in the order red, white, and blue.

We will use the integers 0, 1, and 2 to represent the color red, white, and blue, respectively.

You must solve this problem without using the library's sort function.

Example 1:

```
Input: nums = [2,0,2,1,1,0]
Output: [0,0,1,1,2,2]
```

```cpp
class Solution {
public:
    void sortColors(vector<int>& nums) {
        int m=0;
        int l=0;
        int h=nums.size()-1;
        while(m<=h){
            if(nums[m]==0){
                swap(nums[l],nums[m]);
                m++,l++;
            }
            else if(nums[m]==1){
                m++;
            }
            else{
                swap(nums[m],nums[h]);
                h--;
            }
        }
    }
};
```

Q) sort 0,1,2

```cpp
#include<iostream>
#include<vector>

using namespace std;

void abc( vector<int> &arr){
    int l=0;
    int m=0;
    int h=arr.size()-1;
    while(m<=h){
        if(arr[m]==0){
            swap(arr[l],arr[m]);
            l++,m++;
        }
        else if(arr[m]==1){
            m++;
        }
        else{
            swap(arr[m],arr[h]);
            h--;
        }
    }
}
int main(){

    vector<int> arr={0,1,2,0,2,1};
    abc(arr);
    for(auto i: arr){
        cout<<i<<" ";
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
0 0 1 1 2 2
```

Q)dutch national flag (positive & negative)

```cpp
#include<iostream>
#include<vector>
using namespace std;

 void moveAllNegative(vector<int> &arr){
    int l=0;
    int h=arr.size()-1;

    while(l<h){
        if(arr[l]<0){
            l++;
        }
        else if(arr[h]>0){
            h--;
        }
        else{
            swap(arr[l],arr[h]);
        }
    }
 }
int main(){
    vector<int>arr={-2,1,5,7,-8,2};
    moveAllNegative(arr);
    for(auto i: arr){
     cout<<i<<" ";
    }
    return 0;
}
```

```
PS E:\C++Code> g++ .\f7.cpp
PS E:\C++Code> .\a.exe
-2 -8 5 7 1 2
```

287. Find the Duplicate Number

Medium   ✓   👍 19K   👎 2.8K   ☆   ⎔

🔒 Companies

Given an array of integers `nums` containing `n + 1` integers where each integer is in the range `[1, n]` inclusive.

There is only **one repeated number** in `nums`, return *this repeated number*.

You must solve the problem **without** modifying the array `nums` and uses only constant extra space.

Example 1:

```
Input: nums = [1,3,4,2,2]
Output: 2
```

`i C++ ∨`   • Auto

```cpp
class Solution {
public:
    int findDuplicate(vector<int>& nums) {
        while(nums[0]!=nums[nums[0]]){
            swap(nums[0],nums[nums[0]]);
        }
        return nums[0];
    }
};
```

Q)find missing elements(visited method)

```cpp
#include<iostream>
#include<vector>

using namespace std;

void findMissing( vector<int> &arr){
    for(int i=0;i<arr.size();i++){
     int index=abs(arr[i]);
     if(arr[index-1]>0){
         arr[index-1]*=-1;
     }
    }
}

void print( vector<int> &arr){
    for(int i=0;i<arr.size();i++){
        if(arr[i]>0){
            cout<<i+1<<" ";
        }
    }
}

int main(){

    vector<int> arr={1,3,3,3,3,3};
    findMissing(arr);
    print(arr);
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
2 4 5 6
```

Q)find missing elements by sorting and swap

```cpp
#include<iostream>
#include<vector>

using namespace std;

void findMissing( vector<int> &arr){
   int i=0;
   int n=arr.size();
   while(i<n){
     int index=arr[i]-1;
     if(arr[i]!=arr[index]){
         swap(arr[i],arr[index]);
     }
     else{
         i++;
     }
   }
}

void print( vector<int> &arr){
    for(int i=0;i<arr.size();i++){
      cout<<arr[i]<<" ";
    }
    cout<<endl;
    cout<<"mising elements :"<<endl;
     for(int i=0;i<arr.size();i++){
      if(arr[i]!=i+1){
        cout<<i+1<<" ";
      }
    }
}

int main(){

    vector<int> arr={4,4,3,2};
    findMissing(arr);
    print(arr);
    return 0;
}
```

```
PS E:\C++Code> g++ .\f77.cpp
PS E:\C++Code> .\a.exe
4 2 3 4
mising elements :
1
```