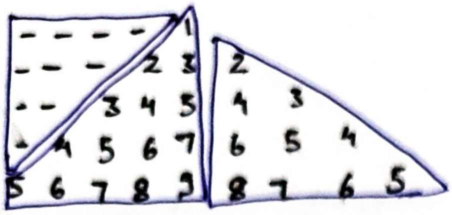
Numeric Full Pyramid :-



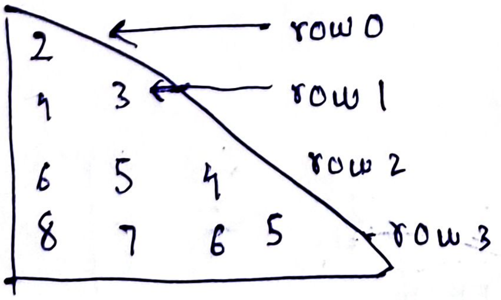
row 0 → 4
row 1 → 3
row 2 → 2
row 3 → 1
row 4 → 0

space

n-row-1

~~// spaces~~
~~for(int row = 0; row <n; row = row+1){~~
~~cout<<" ";~~
~~}~~
~~//numbers~~

for(



reverse k liye

$\boxed{2 * row}$

```
for (int row=0; row<n; row++ {
        // spaces
        for(int col=0; col<n-row-1; col++){
                cout<<"  ";
        }
        //numbers
        for (int col=0; col<row+1; col++){
                cout<< row+col+1;
        }
        //reverse counting
        int start =2*row;
        for (int col=0; col<row; col++){
                cout<<start;
                start = start-1;
        }
        cout<<endl;
}
2) _ _ _ _ 1  ——————→  row 0                 ●    1
   _ _ _ 1 _ 2          row 1                      3
   _ _ 1 _ _ _ 3        row 2                      5
   _ 1 _ _ _ _ _ 4      row 3                      7
   1 _ 2 _ 3 _ 4 _ 5      row 4             ___________
   _ _ _ _ _                                  2* n + 1
```

```
for (int row=0; row<n; row=row+1) {

        //spaces

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

        // numbers with spaces in b/w

        for (int col=0; col<2*n+1; col++){
                ~~cout <<~~
                // first row or last row
                ~~if (col= 0 || col == 2* row~~
                if (row==0 || row ==n-1){
                        if (col% 2==0){
                                // even
                                cout<< start;
                                start +=1;
                        }
                }
                else{
                        //odd
                        cout << " ";
                }
}
```

```
            // first col
            if (col==0){
                  cout << 1;
            }
            else if   (col == 2* row+1 -1){
                      cout << row+1;

            }
            else {
                cout <<"  ";

            }

        }
    }
    cout << endl;

}
```

Bitwise Operators

- AND
- OR
- NOT
- XOR

Bits

a	b	O/P
0	0	0
0	1	0
1	0	0
1	1	1

OR

a	b	O/P
0	0	0
0	1	1
1	0	1
1	1	1

NOT ~

a	~
0	1
1	0

XOR (^)

a	b	XOR
0	0	0
0	1	1
1	0	1
1	1	0

1)

```
int main(){
        bool a = false;
        bool b= false;
        cout << (~a);
        return 0;
}
```

O/P

-1
(2s compliment)

2)

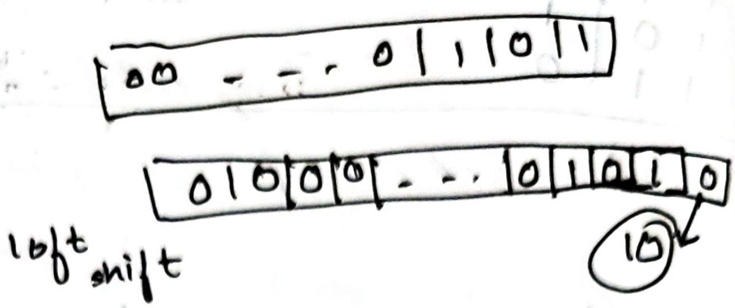
```
int main() {
        bool a= true;
        bool b = false;
        cout <<(a ^ b);
        return 0;
}
```

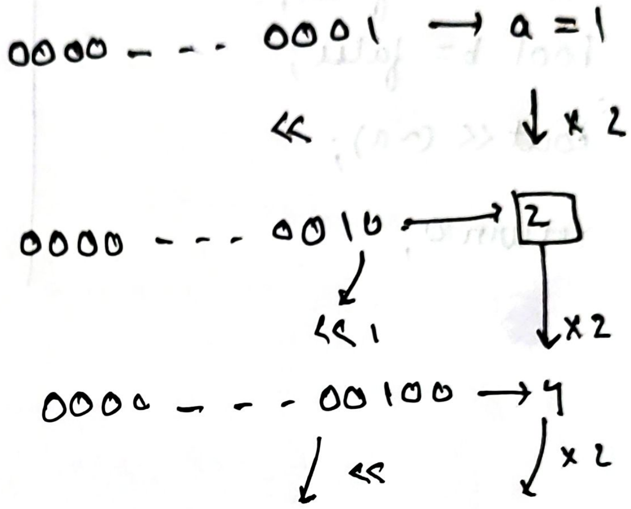
4

3 or 4 → 7

left shift and right shift operators:-

<<   >>





```
int a = 12;
a = a << 1;
cout << a << endl;
```

O/P

24

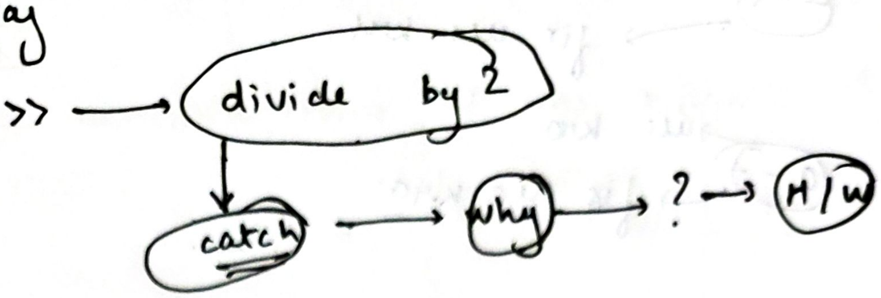
Right shift

```
int a = 24
a = a >> 1;
cout << a;
```

O/P

12

Can i say



Pre / Post → Increment / Decrement operator

++a

↓

pehle hi a को increment करलो uske baad use krlete ho .

```
int a= 5
cout<< ++a;
```

a = 6

a++

↓

pehle use krlo बाद में increment करलेना

1)

```
int a= 6
c= ++a +1;
cout c;
```

8

2)

```
main(){

    int a=6
    int c = a++ +1;
        cout<< c;
}
```

7

--a → dec kro
→ fir use kro

a-- → use kro
→ fir dec kro

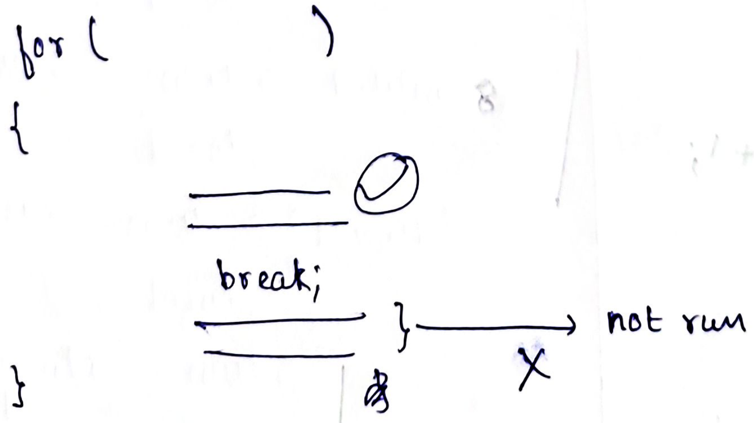
```
int a= 5;
cout << (++a) * (++a) << endl;
```

49

Break and continue Keywords:-

```
for (int i=0; i<n; i++)
{
        cout <<"Babbar";
        break;
}
cout <<"Hi";
```

5
Babbar
Hi



```
for (i =0; i<5; i++)
{
        continue;
        cout << i;
}
```

O/P

Variable scoping :-

```
int   main(){

      // variable scoping

      // decleration
      int a;
      //initialisation
      int b = 5;
      // updation
      b = 10;
```

~~int b~~ =

```
      if (true){
            cout << b << endl;
      }
      cout << b <<endl;
}
```

O/P
10
10

Note → variable should not be redefined.

global variable

→ which can be access anywhere in same file.

Operator Precedence :-

→ Apply Brackets

$a + b * c/d + c$

$(a+((b * c)/d)+ e)$

Switch case:- (readibility is more)

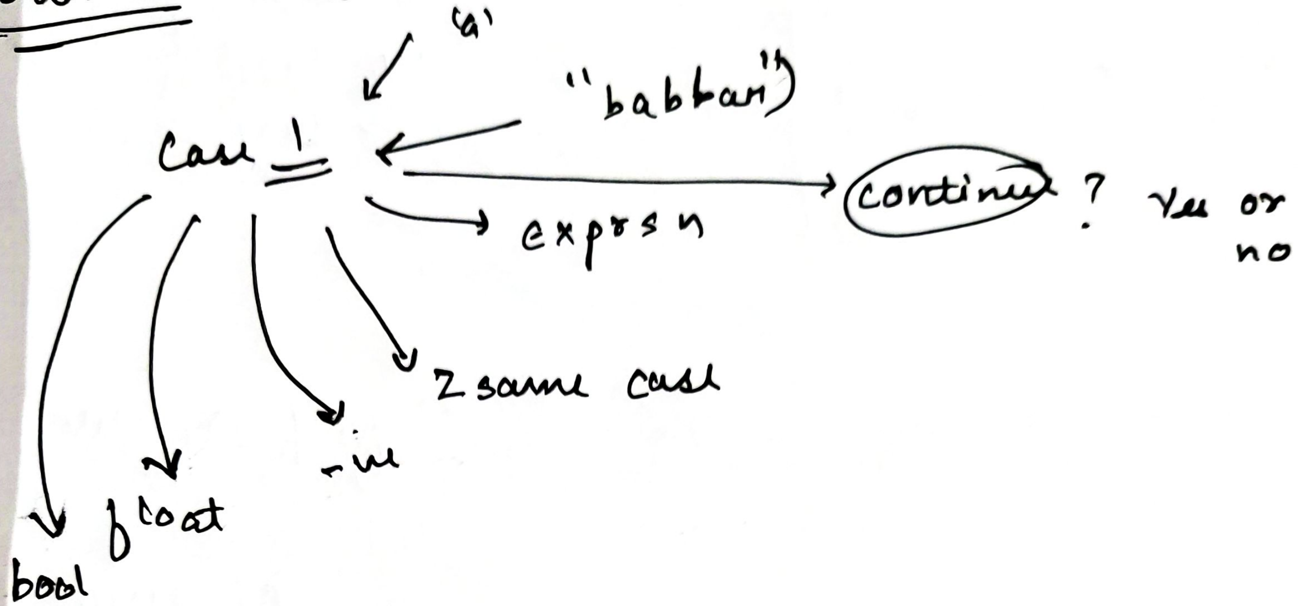
```
        i/o
switch (val)
{
      case 1 :  cout << "Love";
                break;
      case 2 :  cout << "Bahhar";
                break;
      case 3 :  cout << "Ramesh"
                break;
      default : cout << "Suresh";

}
```

O/P

```
Enter the value
1
Love
```

H.W.

Switch case



2) a = 4a
a = 2a } – Toh kya koi frk pdega ?

3) why using global variable is bad ?