Day 02

18 March 2025 08:28 AM

Logical operators :-

②	③	①
&&	||	! ← unary.
and	or	not

Non zero → True
zero → false

if($\cancel{-3}$)
Hello ✓
else
Bye

cond ↓ a	! a
T	F
F	T

printf("%d", !5); → 0
↑
F ✗

printf("%d", !0); → 1

a	b	a && b	a || b
T	F	F	T
F	T	F	T
T	T	T	T
F	F	F	F

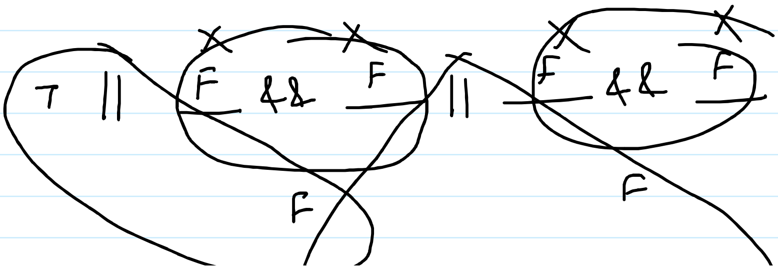
printf("%d", 5 && 4); → 1
T T

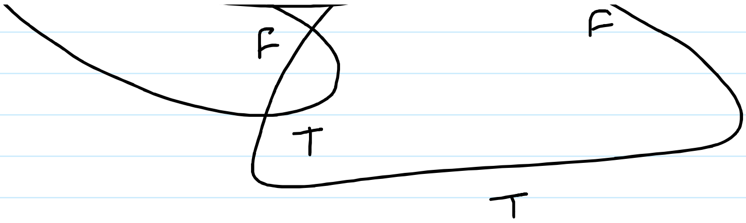
printf("%d", 5 || 0); → 1
T F

Short circuit :-

T || $\underline{X}$ ← short circuit

F && $\underline{X}$





int a = 0, b = 0;
if (a++ && b++)
    printf ("True");
else
    printf ("False");
printf ("%d %d", a, b); → False 1 0

a = ~~0~~ 1, b = ~~0~~ 1;
if (++a && b++)
    $\underset{1}{}$ "True"; $\underset{0}{}$
else
    "False"; ✓
printf ("%d %d", a, b); → False 1 1

Comma operator :→

$\underline{5, 6, 7}$ →

high → ()

It works left to Right and return right most value.

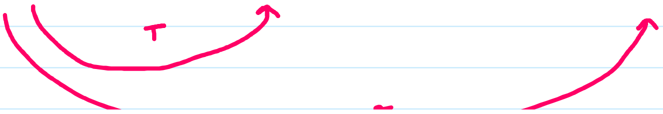
=
low → ,

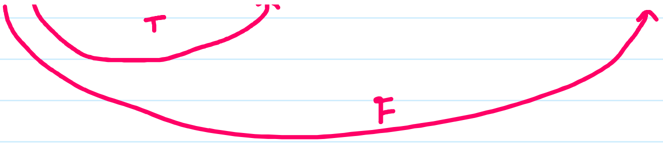
int a;   a $\boxed{5}$
✗ a = 5, 6, 7, 8;
printf ("%d", a); → 5

int a;
✓ a = (5, 6, 7, 8);
printf ("%d", a); → $\boxed{8}$

Conditional operator (? :)   Ternary operator

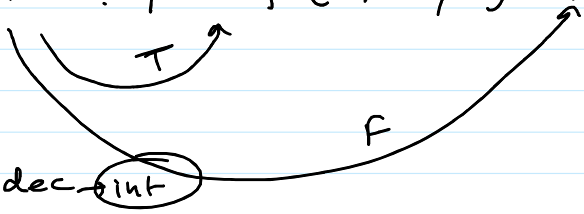
Condition ? True statement : False statement;





max of 2 numbers

```
a>b ? printf("%d", a) : printf("%d", b);
```



Binary → dec int

Bitwise operators :→

&	|	^	<<	>>	~
and	or	xOR	left shift	Right shift	Bitwise not

$(175)_{10} \longrightarrow (10101111)_2$

256	128	64	32	16	8	4	2	1
	1	0	1	0	1	1	1	1

$$\begin{array}{r} 175 \\ -128 \\ \hline 47 \\ -32 \\ \hline 15 \\ -8 \\ \hline 7 \\ -4 \\ \hline 3 \\ -2 \\ \hline 1 \\ -1 \\ \hline 0 \end{array}$$

$(110100)_2 \longrightarrow (52)_{10}$

32	16	8	4	2	1
1	1	0	1	0	0

11001
16 8 4 2 1

bits

a	b	a&b	a|b	a^b
1	0	0	1	1
0	1	0	1	1
1	1	1	1	0
0	0	0	0	0

```
printf("%d", 5&3);
```
$\boxed{1}$

$$\begin{array}{r} 101 \\ \& \; 011 \\ \hline 001 \end{array} \rightarrow$$

5&4 → 4

5|3 → 7

$$\begin{array}{r} 101 \\ \& \; 100 \\ \hline \end{array}$$

5 | 3 → 7

```
 4   1 0 1
     1 0 0
    ------
     1 0 0 →

 |   1 0 1
     0 1 1
    ------
     1 1 1 →
```

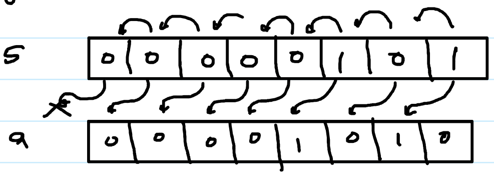
5 ^ 3 → 6 ✓

```
   1 0 1
 ^ 0 1 1
  ------
   1 1 0 →
```

Double

<< → Left shift and fill with zero

```
int a;
a = 5 << 1;
printf("%d", a); → 10
```

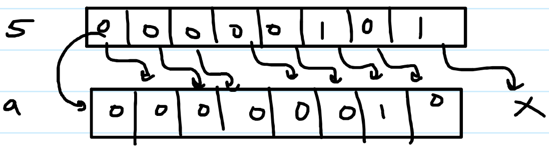


```
a = 5 << 3;              40 << 20 << 10 << 5
printf("%d", a); → 40
```

Half

>> Right shift and fill with sign bit

```
a = 5 >> 1;
printf("%d", a); [2]
```



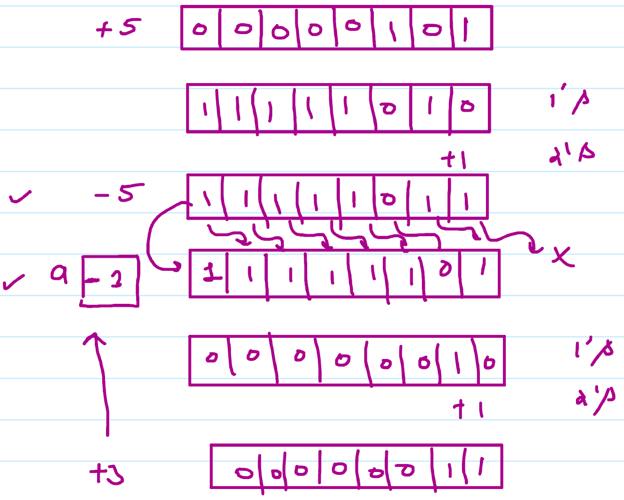
```
a = -5 >> 1;
printf("%d", a); -3
```

~~2.5~~ ← 5/2

2

~~-2.5~~ ← -5/2

-3

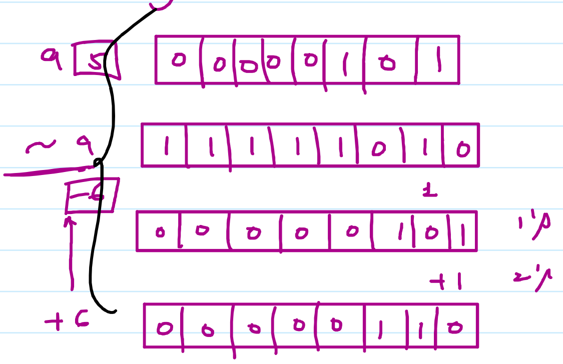


(Add one then sign change)

~ → Bitwise not (1's Complement)

~ → Bitwise not (1's Complement)

a = 5;
printf("%d", ~a); → $\boxed{-6}$



a = -5;   1+1 → 2
2
10

printf("%d", ~a); $\boxed{4}$ ✓

-5+1 → +4

swap 2 num

temp = a
a = b
b = temp
	a = a+b
	b = a-b
	a = a-b

a = a*b
b = a/b
a = a/b
	a = a^b
	b = a^b
	a = a^b ✓

Table of Precedence & Associativity

Rank	Operators	Associativity/Descriptions
1.		left to right
	( )	Function call
	[ ]	Array element reference
	->	Structure operator
	.	Structure operator
2.		Right to left
	-	Unary minus
	+	Unary plus
	++	Increment
	--	Decrement
	!	Logical not
	~	One's complement
	*	Value of address
	&	Address of
	sizeof	Sizeof
	(type)	Typecasting
3.		Left to right
	*	Multiplication
	/	Division
	%	Modulus
4.		Left to right
	+	Addition
	-	Subtraction
5.		Left to right
	<<	Left Shift
	>>	Right Shift
6.		Left to right
	<	Less than
	<=	Less than equal
	>	Greater than
	>=	Greater than equal
7.		Left to right

	==	Equality (conditions)
	!=	Not Equal
8.		Left to right
	&	Bitwise AND
9.		Left to right
	^	Bitwise XOR
10.		Left to right
	|	Bitwise OR
11.		Left to right
	&&	Logical AND
12.		Left to right
	||	Logical OR
13.		Right to left
	? :	Conditional Operator
14.		Right to left
	= *= /= %= += -= &= ^= |= <<= >>=	Assignment operators
15.		Left to right
	,	Comma operator

Condition :→

✓ 1. if else

✓ 2. Nested if else

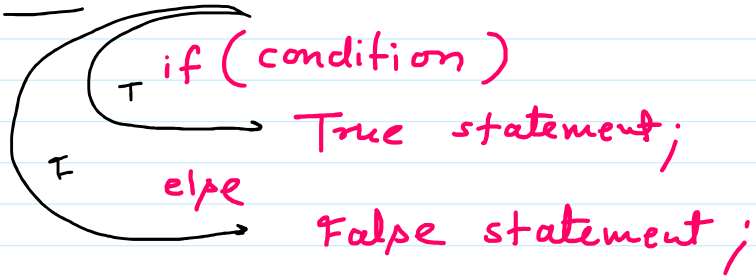
✓ 3. only if

4. else if else

5. switch

6. conditional operator (? :)

① if else :→



if (condition)
True statement;
else
False statement;

max of 2 nums

a , b

```
if (a>b)
        printf ("%d", a);
else
        printf ("%d", b);
```

```
if ( printf( " Hello India " )   )
{
}
```

② Nested if else :→

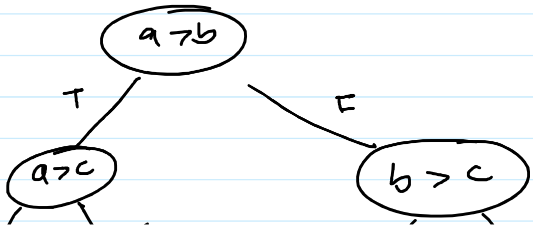
```
     if (condition 1)
  T  {
              if (condition 2)
                    True  statement;
              else
                    False statement;
     }
else
    {
              if (condition 3)
                    True  statement;
              else
                    False  statement;
    }
```

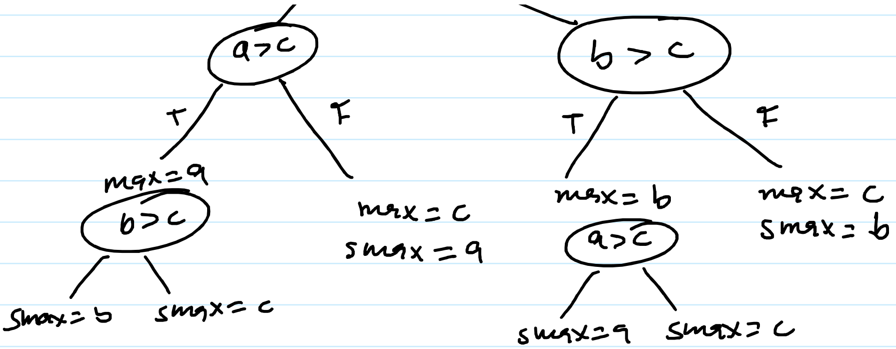
max of 3 numbers :-   a, b, c

```
          if (a>b)
        T  {
                    if (a>c)
                          max = a;
   F                else
                          max = c;
           }
          else
           {        if (b>c)
                          max = b;
                    else
                          max = c;
           }
          printf ("%d ", max);
```

w.A.P to find max and second max of 3 nums

a, b, c





```
#include<stdio.h>
int main()
{
    int a,b,c,max,smax;
    printf("Enter 3 nums:");
    scanf("%d%d%d",&a,&b,&c);
    if(a>b)
    {
        if(a>c)
        {
            max=a;
            if(b>c)
                smax=b;
            else
                smax=c;
        }
        else
        {
            max=c;
            smax=a;
        }
    }
    else
    {
        if(b>c)
        {
            max=b;
            if(a>c)
                smax=a;
            else
                smax=c;
        }
        else
        {
            max=c;
            smax=b;
        }
    }
    printf("max = %d\nSecond max = %d",max,smax);
    return 0;
}
```

only if :-

if (condition)
True statement

a, b, c, d

a, b, c, d

① max of 2 nus

1 cond   2 stmt

↓

② max of 3

3 cond   4 stmt

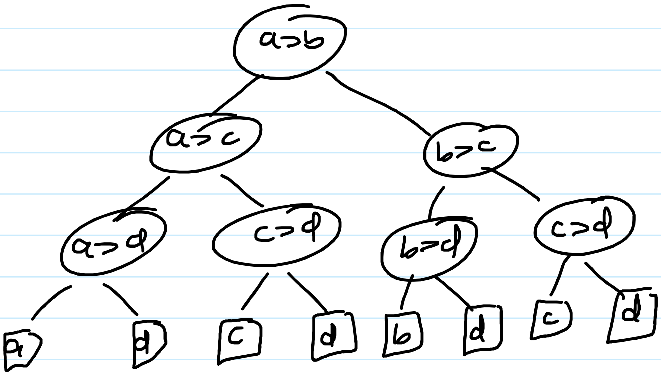
↓

③ max of 4

7 cond   8 stmt

④ max of 5

15 cond & 16 stmt



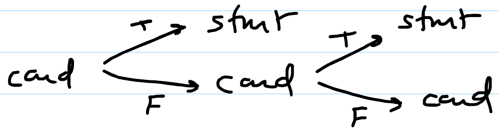
max of 4 nums using only if

a, b, c, d

```
max = a;
if (b > max)
        max = b;              max of 2 nums
if ( c > max)
        max = c;              max of 3 nums
if( d> max)
        max = d;              max of 4 nums
```

```
#include<stdio.h>
int main()
{
    int a,b,c,d,max;
    printf("Enter 4 nums:");
    scanf("%d%d%d%d",&a,&b,&c,&d);
    max=a;
    if(b>max)
        max=b;      //max of 2 nums
    if(c>max)
        max=c;      //max of 3 nums
    if(d>max)
        max=d;      //max of 4 nums
    printf("%d",max);
    return 0;
}
```

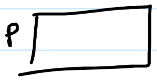
else if elpe :→



print Grade of a student

conditions are →

1. per >= 90 ⟶ A
2. per>=70 & <90 ⟶ B
3. per >= 50 & <70 ⟶ C
4. per < 50 ⟶ D



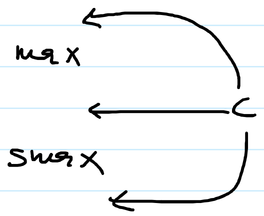
```
if ( p >= 90)
        printf ("Grade A");
elpe if (p>=70)
        printf (" Grade B");
else if (p >=50)
        printf ("Grade C");
else
        prinrf ("Grade D");
```

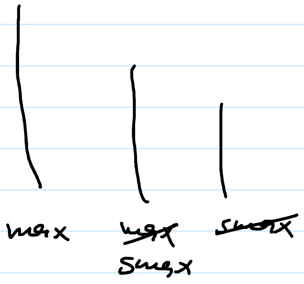
max , smax of 3 nums

```
a, b,

if(a>b)
{
    max= a;
    smax = b;
}
else
{
    max = b;
    smax = a;
}

if ( c > max )
{
    smax = max ;
    max = c;
}
```





```
    smax = max;
    max = c;
}
else if(c>smax)
    smax = c;
```

max ~~max~~ ~~smax~~
smax

```
#include<stdio.h>
int main()
{
    int a,b,c,smax,max;
    printf("Enter 3 nums:");
    scanf("%d%d%d",&a,&b,&c);
    if(a>b)
    {
        max=a;
        smax=b;
    }
    else{
        max=b;
        smax=a;
    }
    if(c>max)
    {
        smax=max;
        max=c;
    }
    else if(c>smax)
        smax=c;
    printf("Max = %d\nSecond Max = %d",max,smax);
    return 0;
}
```

W.A.P to print name of a day.

no	name
1	mon
2	Tues
3	wed
4	thes
5	fri
6	sat
7	sun
other	invalid Input

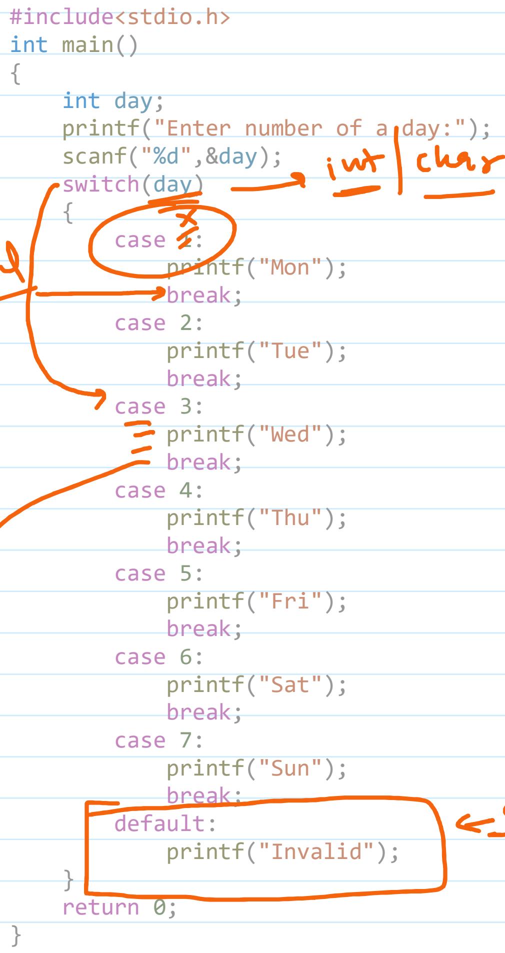
<ins>else if else</ins>

day $\boxed{5}$

```
if ( day == 1)
        mon
else if(day==2)
        Tue
    :
else if(day==7
        sunday
else
        Invalid Input
```

switch case :→

```
switch (number)
{
        case value :
                statement ;
                break;
          :
          :
        default :
                statement ;
}
```



```
#include<stdio.h>
int main()
{
    int day;
    printf("Enter number of a day:");
    scanf("%d",&day);
    switch(day)
    {
        case 1:
            printf("Mon");
            break;
        case 2:
            printf("Tue");
            break;
        case 3:
            printf("Wed");
            break;
        case 4:
            printf("Thu");
            break;
        case 5:
            printf("Fri");
            break;
        case 6:
            printf("Sat");
            break;
        case 7:
            printf("Sun");
            break;
        default:
            printf("Invalid");
    }
    return 0;
}
```

optional

int | char

int x = 1

float | string
X X

case st ... end :

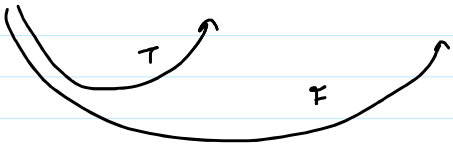
space

case 1 ... 10 :

default

Conditional operator :→

a>b ? printf(a) : printf(b)



```
#include<stdio.h>
int main()
{
    int a,b;
    printf("Enter 2 nums:");
    scanf("%d%d",&a,&b);
    a>b ? printf("%d",a) : printf("%d",b);
    return 0;
}
```

Nested :→

max of 3 nums → a, b, c

max = a>b ? (a>c ? a : c) : (b>c ? b : c);

T

F

max of 4 nums :→

a, b, c, d

F

max = a>b ? (a>c ? (a>d ? a:d) : (c>d ? c:d)) : (b>c ? (b>d ? b:d) : (c>d ? c:d));

is leap year :→ y □

```
if (y % 100 == 0)
{
        if (y % 400 == 0)
                leap
        else
                Not leap
}
else
{
        if (y % 4 == 0)
                leap
        else
                not leap
}
```

y%100 != 0

if else :-

if (year % 400 == 0 || y % 4 == 0 && y % 100 != 0) ✓

leap

else

not leap

```
if( y%100 == 0 && y%400 == 0) ✓

if ( y%100 != 0 && y%4 == 0) ✓

if ( y%400 == 0 || y%100 != 0 && y%4 == 0)
                              leap
else
                              not
```

H.W

W.A.P to calculate bill Amount.

	units	per unit
✓	1 — 100	0.80 ₹
✓	101 — 300	1.50 ₹
	301 — 500	2.00 ₹
	501 above	3.00 ₹

Services charge 100

350 unit

100 → 0.80 → 80

200 → 1.50 → 300

50 → 2 → 100

480