- **number Systems :**

1-Decimal (base 10): {0,1,2,3,4,5,6,7,8,9}

Ex:245,999,345

2-Binary(base2): {0,1}

Ex:1001,1110,1111 // it can also be written(0B1001)

3-Octal(base8): {0,1,2,3,4,5,6,7}

Ex:777,567,134

4-Hexadecimal (base 16):{0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F}

Ex: A98,56D3 // it can also be written(0XA98)

- **Convert from any base to decimal :**

(XYWZ) if we have this number in base (n)

So the number in decimal will be

=n^0*Z+n^1*W+n^2*Y+n^3*X

Ex: 111001

number in decimal =2^0*1+2^1*0+2^2*0+2^3*1+2^4*1+2^5*1=57

Ex: A64B

number in decimal=16^0*11+16^1*4+16^2*6+16^3*10=42571

Note: number in hexadecimal can represents in 4 bit in binary called(nibble)

Ex: A2F3 >>>>1010001011110011

- 8 bit binary (one byte) can handle to 256:

If the number is unsigned it can be from (0>>>>>255).

If the number is signed it can be from (-128>>>>127).

- The most significant bit(MSB)represents the sign

MSB=1 the sign is negative

MSB=0 the sign is positive

Ex: if we have 10100010

Unsigned:2^0*0+2^1*1+2^2*0+2^3*0+2^4*0+2^5*1+2^6*0+2^7*1=162

Signed :2^0*0+2^1*1+2^2*0+2^3*0+2^4*0+2^5*1+2^6*0-2^7*1=-94 (as we put the number in the MSB with its sign)

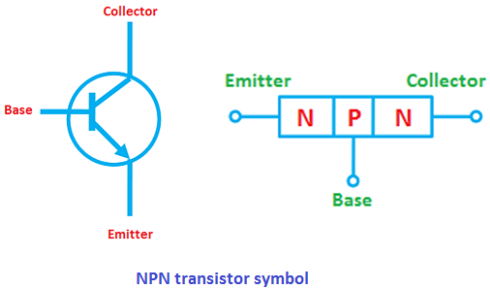
##

➢ Transistor :

it can be used as switch

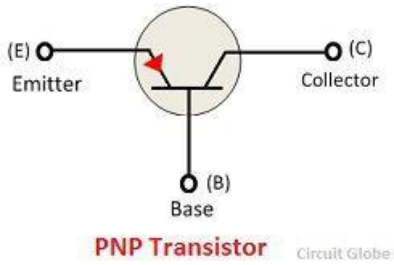
Has 2 types :

NPN:



NPN transistor symbol

PNP:



PNP Transistor Circuit Globe

B(+)>>>>E(-)

B(-)<<<<<E(+)

To use it there must be a current from base to emitter .

➢ MOSFET:

To use it we must put a voltage in gate so the current flows between source and drain.

Voltage difference between G&S

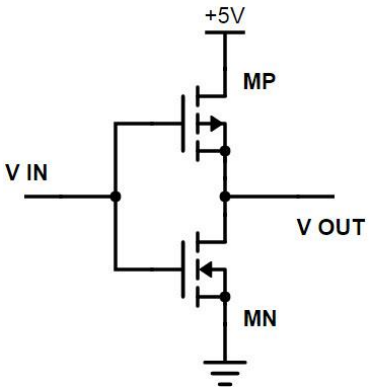
Must be positive.

Voltage difference between

G&S Must be positive.

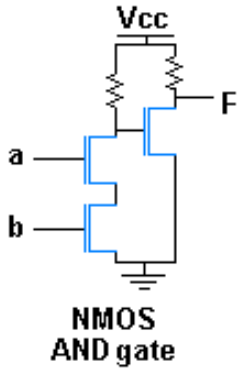
- **NOT Gate:** using MOSFET

Input	output
0	1
1	0



- **AND Gate:**

Input A	input B	output
0	0	0
0	1	0
1	0	0
1	1	0



➢ Volatile &NonVolatile memory:

Volatile(RAM): the data loss when there is a power cut.

Non Volatile: the data remains after the power cut.(HDD,FLASH,EEPROM)

1kilo byte=1024byte

1Mega byte=1024 kilobyte

1Gigabyte=1024 Megabyte

1Terabyte=1024 Gigabyte

Address bus : we put on it the address we want to search for.

Data bus : we get the data that we want from it.