*Decimal: 0 → 9 $(n)_{10}$ *Binary: 0 → 1 0B,(n)$_2$ *Octal: 0 → 7 $(n)_8$ *Hex: 0 → 15 0X,(n)$_{16}$

*Conversion to decimal:
- $(1011)_2 \rightarrow (1\times2^3+0\times2^2+1\times2^1+1\times2^0) = 11$
- $(2A7B)_{16} \rightarrow (2\times16^3+10\times16^2+7\times16^1+11\times16^0) = 10875$

Decimal: 0 1 2 3 ... 9 10 11 12 ... 19 20 21 ... 99 100

Hex: 0 1 2 ... F → 10 11 ... 1F 20 ... 99 9A 9F A0 ... FF 100

Binary: 0 1 10 11 100

*1 bit in Hex = 4 bits in binary

A = (1010)
F = (1111) } Nibble
0 = (0000)

$(A2F3)_{Hex} = (1010\ 0010\ 1111\ 0011)_2$

0X3B ⇒ | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | (7 6 5 4 3 2 1 0)

0XA2 ⇒ | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |

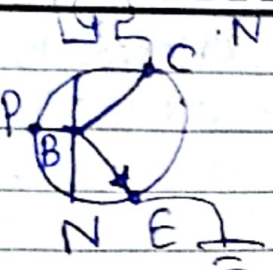
Unsigned → $(162)_{10}$: 0 ... 255

Signed → $(-94)_{10}$: -128 ... 0 ... 127

$(-1\times2^7)+(1\times2^5)+(1\times2^1)$
$-128+32+2 = -94$

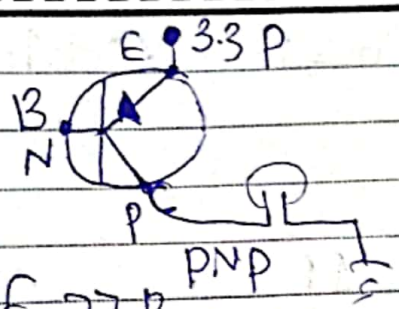
*Voltage, Current, Resistance.
*Ohm's law.
*Series, parallel connection.

3.3v



NPN

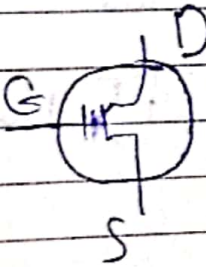
B ⟩⟩ E



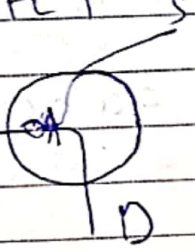
E+ ⟩⟩ B−

* Very small I needed to work.
* Current dependent

MOSFET



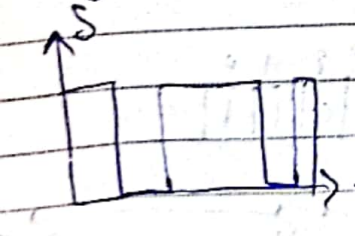
N-Channel



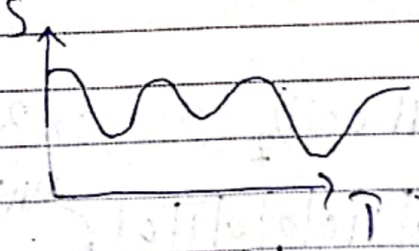
P-channel

* Voltage dependent

Digital / logic

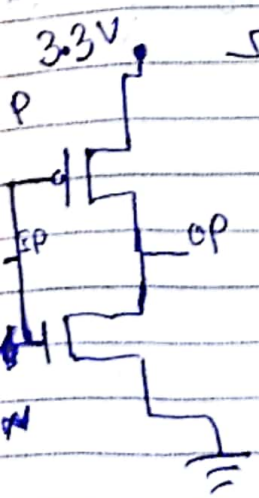


Analog



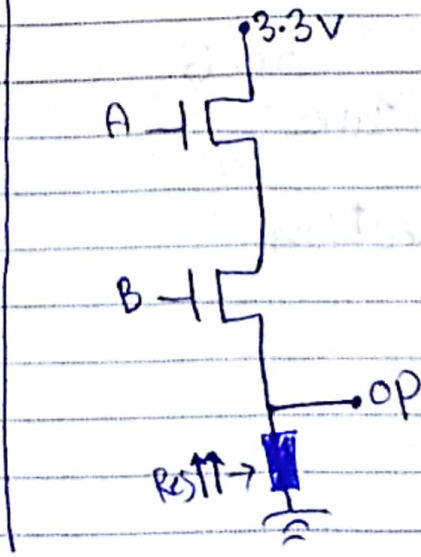
* Not gate:

IP	OP
0	1
1	0

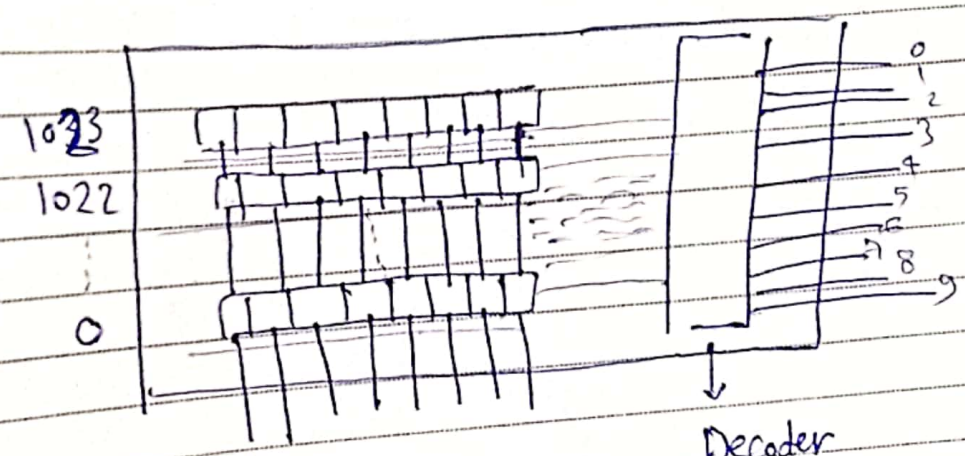


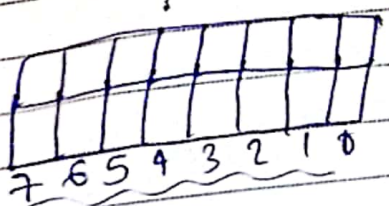
* AND

A	B	OP
0	0	0
0	1	0
1	0	0
1	1	1



*Volatile: RAM → تزول بياناتها بفصل الكهرباء
*non_volatile: (SDCards, Flash, EEPROM, HDD) → تبقى بياناتها حتى بعد فصل الكهرباء
↳ مفنطة





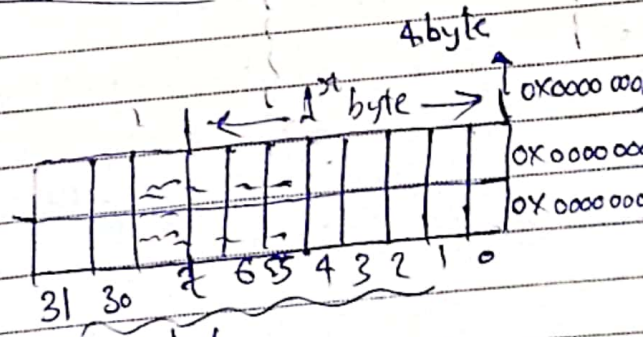
0x0001 } 1byte
0x0000 } كلمة

8bit Data Bus

Add. Bus: 16 bit
غالبًا

* 8-bit

* installation ✓



DataBus : 32 bit

32-bit ✗

009