logic

* n digits can code 2^n elements.
* BCD uses 4 bits to represent $\{0:9\}$.
* (1101 $\not{0}111$ 0010.1000 0000 0010) is not BCD, 1101 does not represents BCD.
* when the result of adding 2 numbers is >9, we add 6 (0110) to the result.
* $A_{BCD} - B_{BCD} = A_{BCD} + 9\text{'s} \, Comp(B)_{BCD} + 1$.

* اذا بقي carry من آخر عملية الطرح بنكتبها .
* الارقام $\{ 15:10 \}$ من $\{ -1, -2, 8,9 \}$ Excess3 6 24216 BCDG غير مستخدمه .

* ASCII Code is composed of 7 bits.
* 128 character, 94 printable, 34 non-printable.
* usually stored as a byte, where the extra bit is used for other purposes.

* A Boolean fn is described by an algebric expression
* in truth table: the number of rows = 2^n.
* the binary combinations are obtained from the binary nums $\rightarrow 0 : 2^n - 1$.
* digital logic circuits ⟶ Combinational logic circuits
  ⟶ sequential logic circuits

* minterms are called products because they are the logical AND.
* maxterms are called sums because they are the logical OR.

* SoP ⟶ (OR) of the minterms.
* PoS ⟶ (AND) of the maxterms.

* in Knaps the cells are ordered in Gray Code.
* The grid is toroidally connected, rectangular groups can wrap across the edges
* Combine cells into groups each of 2^n.
* Do not add new groups if all cells are included in others.
* don't care (X) ⟶ input sequence for which the fn output does not matter.
  ⟶ input that is known never to occur is a Can't_happen.

logic gates:

* Not - Inverter

one input, one output

$f = \overline{X}$
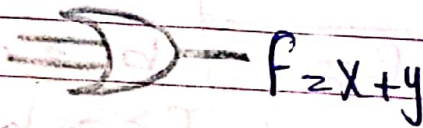
X	f
0	1
1	0

* buffer

one input, one output

$f = X$

X	f
0	0
1	1

* OR

two or more inputs, one output

$f = X + y$

X	y	f
0	0	0
0	1	1
1	0	1
1	1	1

* And

two or more inputs, one output

$f = X \cdot y$

X	y	f
0	0	0
0	1	0
1	0	0
1	1	1

Amon2M

Sat | Sun | Mon | Tue | Wed | Thu | Fri

* NOR

two or more inputs, one output

X	y	f
0	0	1
0	1	0
1	0	0
1	1	0

$$F = \overline{(x+y)}$$
((معكوس OR))

* NAND

two or more inputs , one output

X	y	f
0	0	1
0	1	1
1	0	1
1	1	0

$$F = \overline{(xy)}$$
((معكوس AND))

* XOR

two or more inputs , one output

X	y	f
0	0	0
0	1	1
1	0	1
1	1	0

$$F = x\bar{y} + \bar{x}y$$
$$= x \oplus y$$
odd ← عدد ال 1

* XNOR

two or more inputs , one output

X	y	f
0	0	1
0	1	0
1	0	0
1	1	1

$$F = xy + \bar{x}\bar{y}$$

$$= \overline{(x \oplus y)}$$
even ← عدد ال 1
و الصفر ← 1

Amor2M