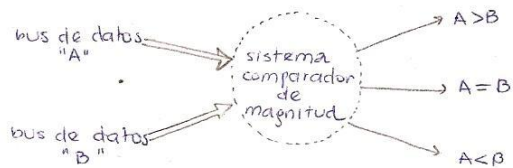


2010-03-09

comparador de magnitud

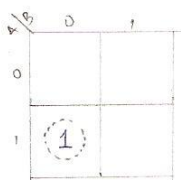
Un comparador de magnitud, es un circuito lógico-combinacional, que compara la magnitud por los bits para determinar la igualdad, mayor o menor

\* Visión de sistemas

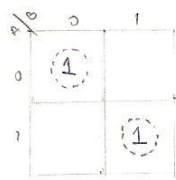


\* computación: Análisis

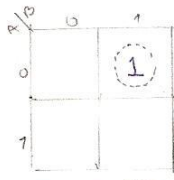
A	B	$F_{A>B}$	$F_{A=B}$	$F_{A<B}$
0	0	0	1	0
0	1	0	0	1
1	0	1	0	0
1	1	0	1	0



$F_{A>B} = A\bar{B}$

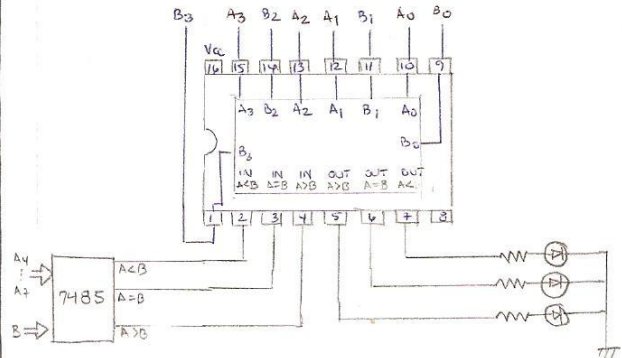
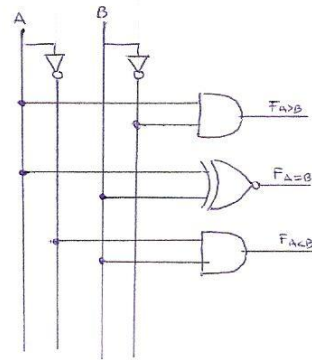


$F_{A=B} = \bar{A}\bar{B} + AB$   
 $F_{A=B} = A \oplus B$



$F_{A<B} = \bar{A}B$

\* Diseño



sumador completo de 3 bit

Es un circuito lógico combinatorial, que calcula la suma de dos variables

\* visión de sistemas



donde:

- A y B = datos de entrada
- C: carry de entrada
- Fs: Función de suma
- Fc: Función de carry

suma

- 0 + 0 = 0
- 1 + 0 = 1
- 0 + 1 = 1
- 1 + 1 = 0 lleva 1

\* computación: Análisis

A	B	C	$F_s$	$F_c$
0	0	0	1	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

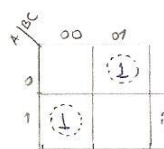
$F_s = A(\bar{B}\bar{C} + BC) + \bar{A}(\bar{B}C + B\bar{C})$

$F_s = A(\bar{B} \oplus C) + \bar{A}(B \oplus C)$

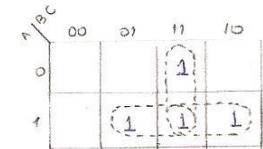
$M = B \oplus C$

$F_s = A\bar{M} + \bar{A}M$

$F_s = A \oplus B \oplus C$

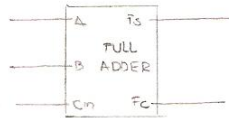
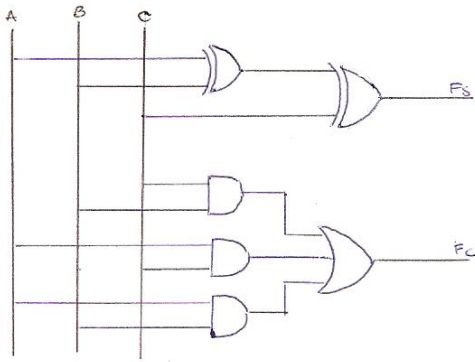


$F_s = \bar{A}\bar{B}C + \bar{A}B\bar{C} + A\bar{B}C + ABC$

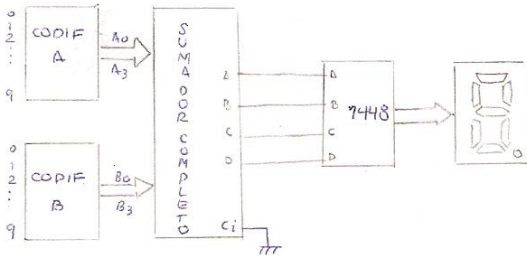
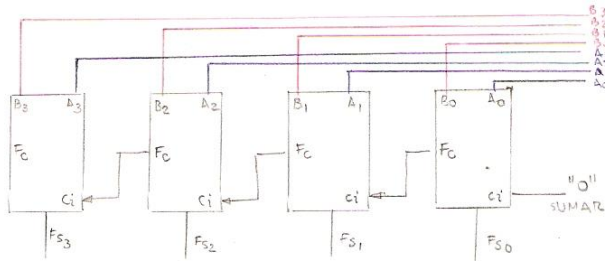


$F_c = BC + AB$

Circuitos electrónicos

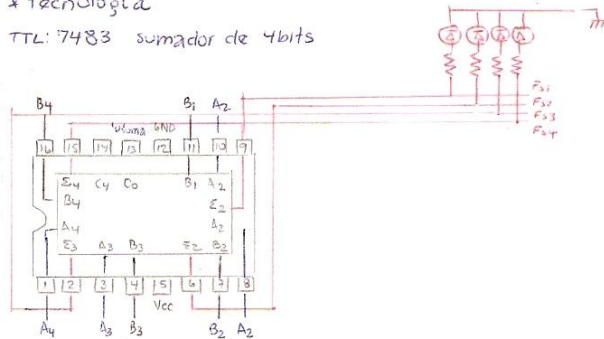


Diseñar un sumador completo de 4bit



\* Tecnología

TTL: 7483 sumador de 4bits



Resta Binaria

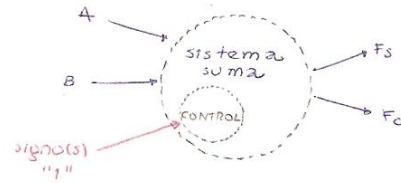
$$\begin{array}{r} A = 7 = 0111 \\ B = 5 = 0101 \\ \hline A - B = 2 \end{array}$$

sol: complemento a 2

$$\begin{array}{l} A = 0111 \\ B = 0101 \longrightarrow B^i = 1010 \text{ complemento a uno} \\ B^{ii} = \begin{array}{r} 1010 \\ 1 \\ \hline 1011 \end{array} \text{ complemento a dos} \end{array}$$

$$\begin{array}{r} A = 0111 \\ B^i = 1011 \\ \hline A - B = 0010 = 2 // \end{array}$$

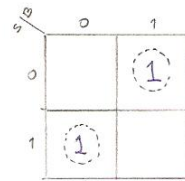
\* visión de sistemas



\* computación: analisis

	S	B	F
suma	0	1	0
	0	1	1
resta	1	0	1
	1	1	0

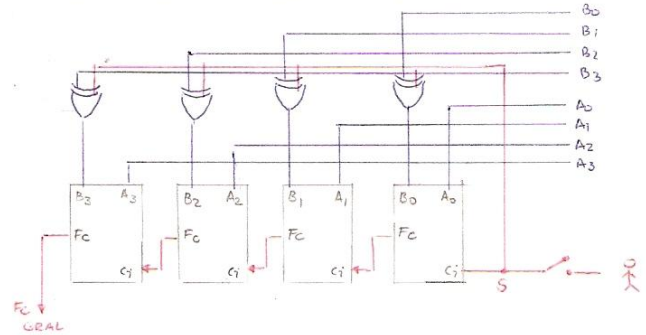
complemento a uno  $\rightarrow$  el usuario indica el signo y el complemento a dos



$$F = S\bar{B} + SB$$

$$F = S \oplus B$$

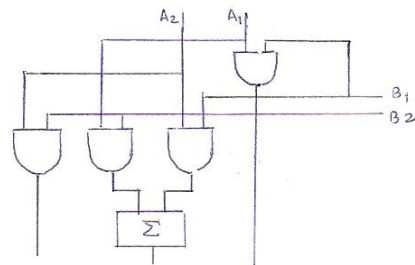
Diseñar sumador/restador 4 bits



Tecnología: TTL { C.I. 7483 Full adder  
C.I. 7486 control signo

Multiplicación

$$\begin{array}{r} A = 3 = 0011 = 11 \\ B = 2 = 0010 = 10 \\ \hline \begin{array}{r} A_2 A_1 \times \\ B_2 B_1 \\ \hline B_1 A_2 \quad B_1 A_1 + \\ B_2 A_2 \quad B_2 A_1 \\ \hline B_2 A_2 \quad B_1 A_2 + B_2 A_1 \quad B_1 A_1 \end{array} \end{array}$$



\* Tecnología: TTL { 7408  
7483

Circuitos electrónicos

Multiplicación

$$\begin{array}{r}
 A_3 \ A_2 \ A_1 \ X \\
 \underline{B_3 \ B_2 \ B_1} \\
 B_1 A_3 \ B_1 A_2 \ B_1 A_1 \ + \\
 B_2 A_3 \ B_2 A_2 \ B_2 A_1 \\
 \underline{B_3 A_3 \ B_3 A_2 \ B_3 A_1} \\
 B_3 A_3 \ B_2 A_3 + B_3 A_2 \ B_1 A_3 + B_2 A_2 \ B_1 A_2 + B_2 A_1 \ B_1 A_1 \\
 \underline{+ B_3 A_1}
 \end{array}$$

