



UNIVERSIDAD DE  
**Belgrano**  
BUENOS AIRES - ARGENTINA



# ORGANIZACION DE COMPUTADORAS

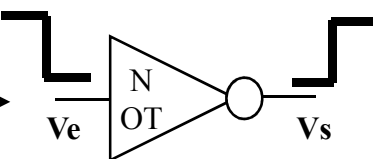
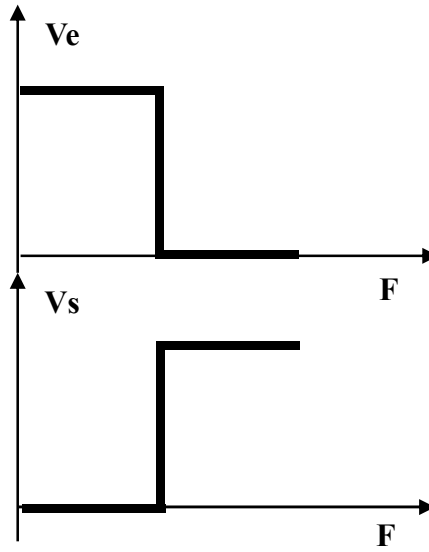
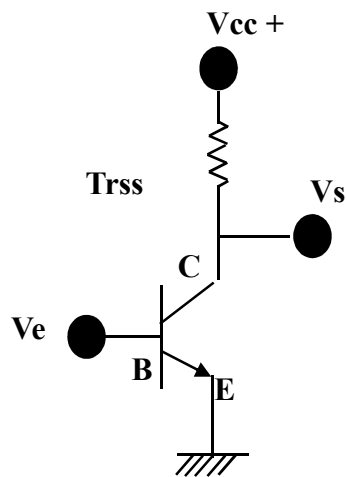
## UNIDAD 7

### Circuitos Lógicos

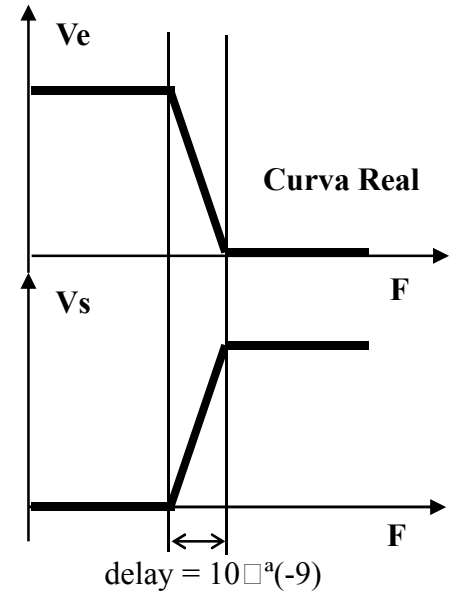
(501-560)

LOGICA DIGITAL

COMPUERTA NOT

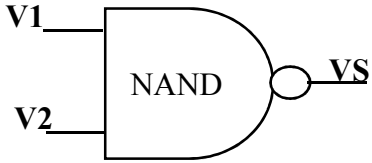
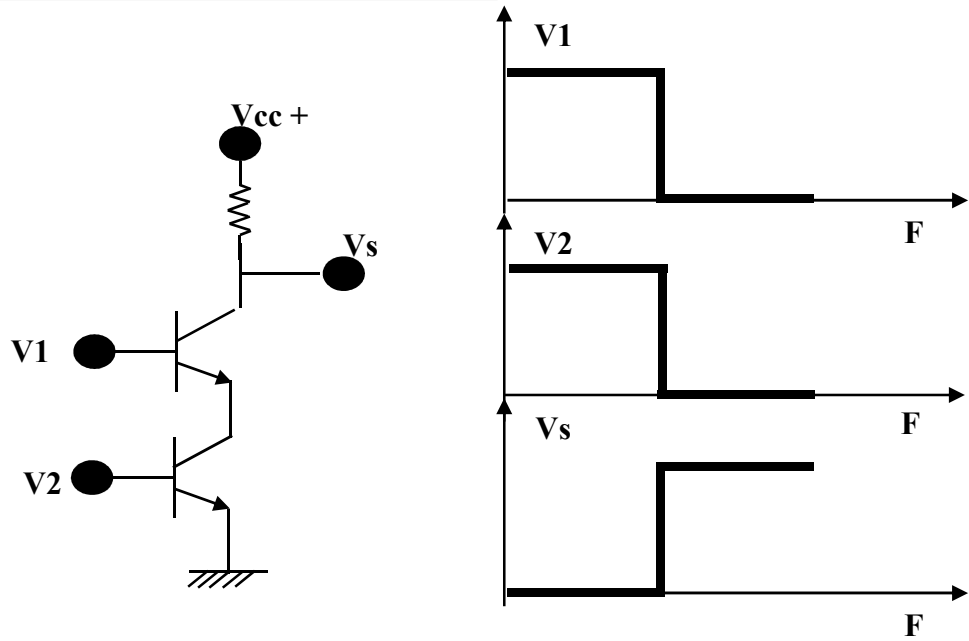


Ve	Vs (A=noX)
0	1
1	0



LOGICA DIGITAL

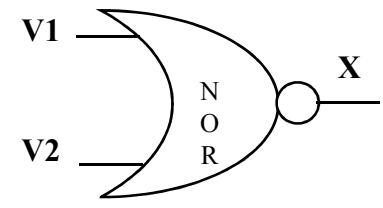
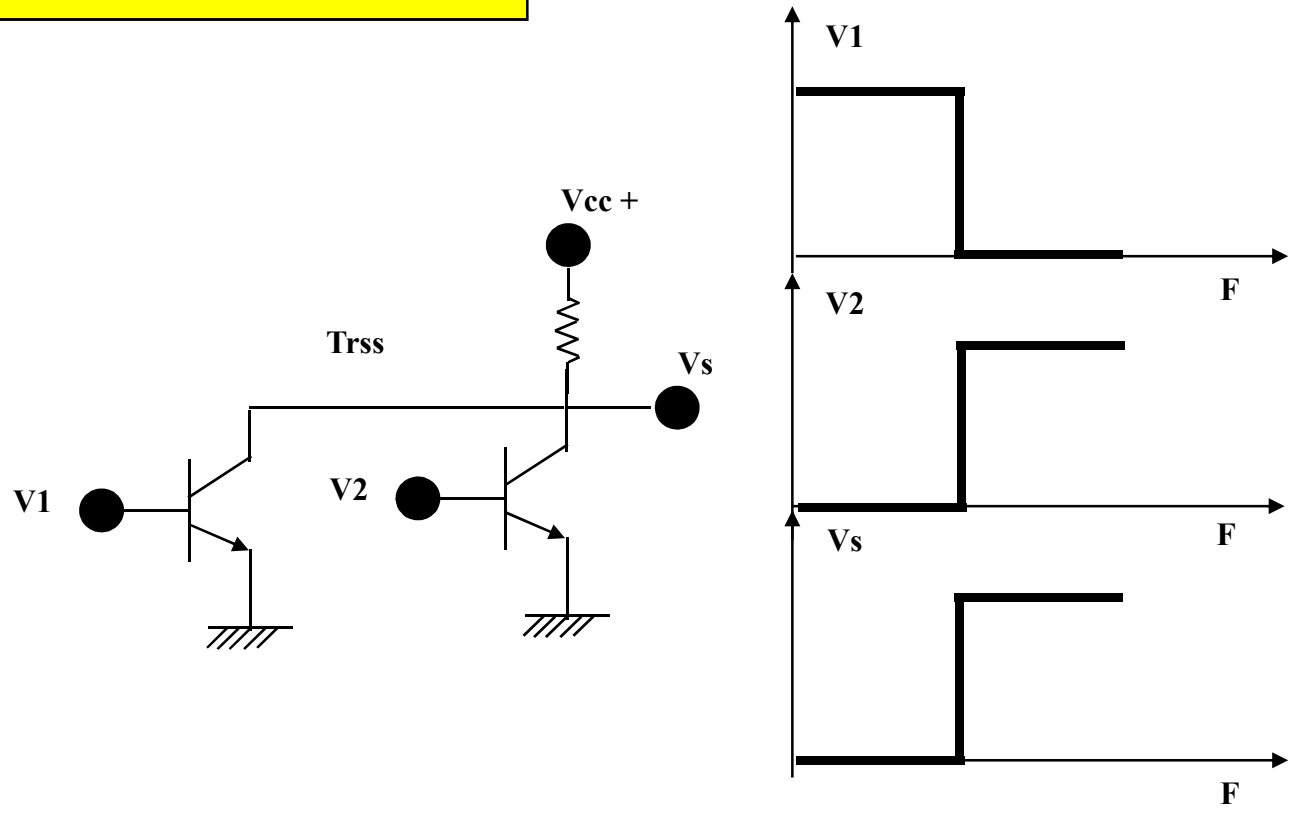
COMPUERTA NAND



V1	V2	X
0	0	1
0	1	1
1	0	1
1	1	0

LOGICA DIGITAL

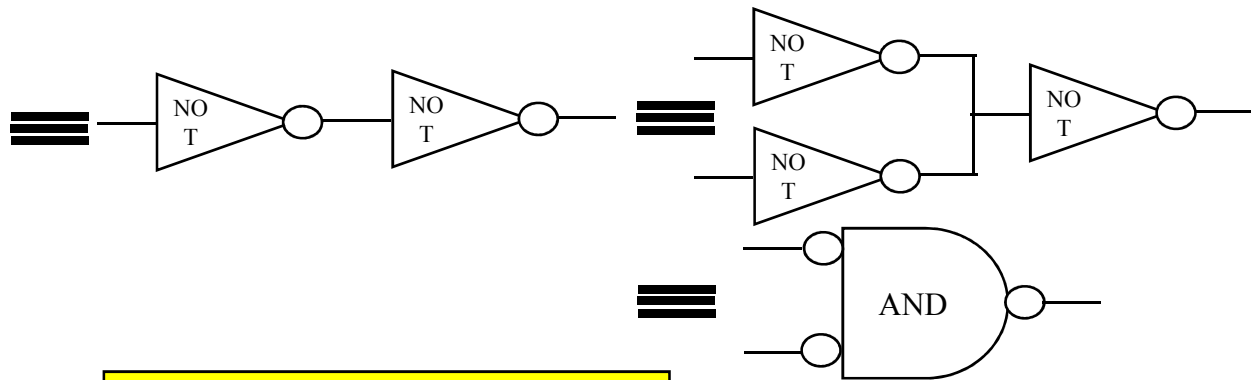
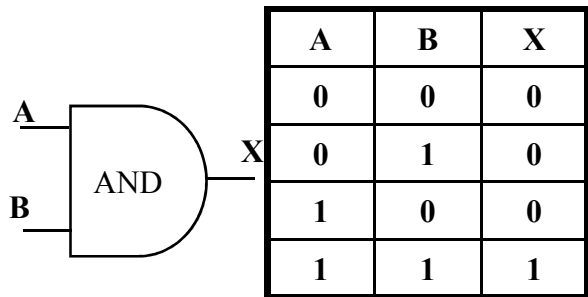
COMPUERTA NOR



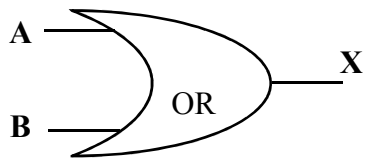
V1	V2	X
0	0	1
0	1	0
1	0	0
1	1	0

LOGICA DIGITAL

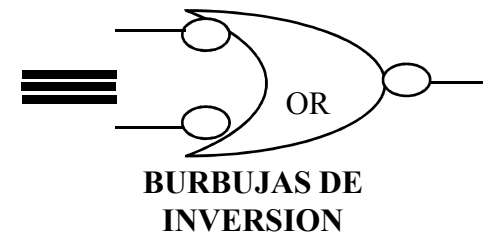
COMPUERTA AND



COMPUERTA OR



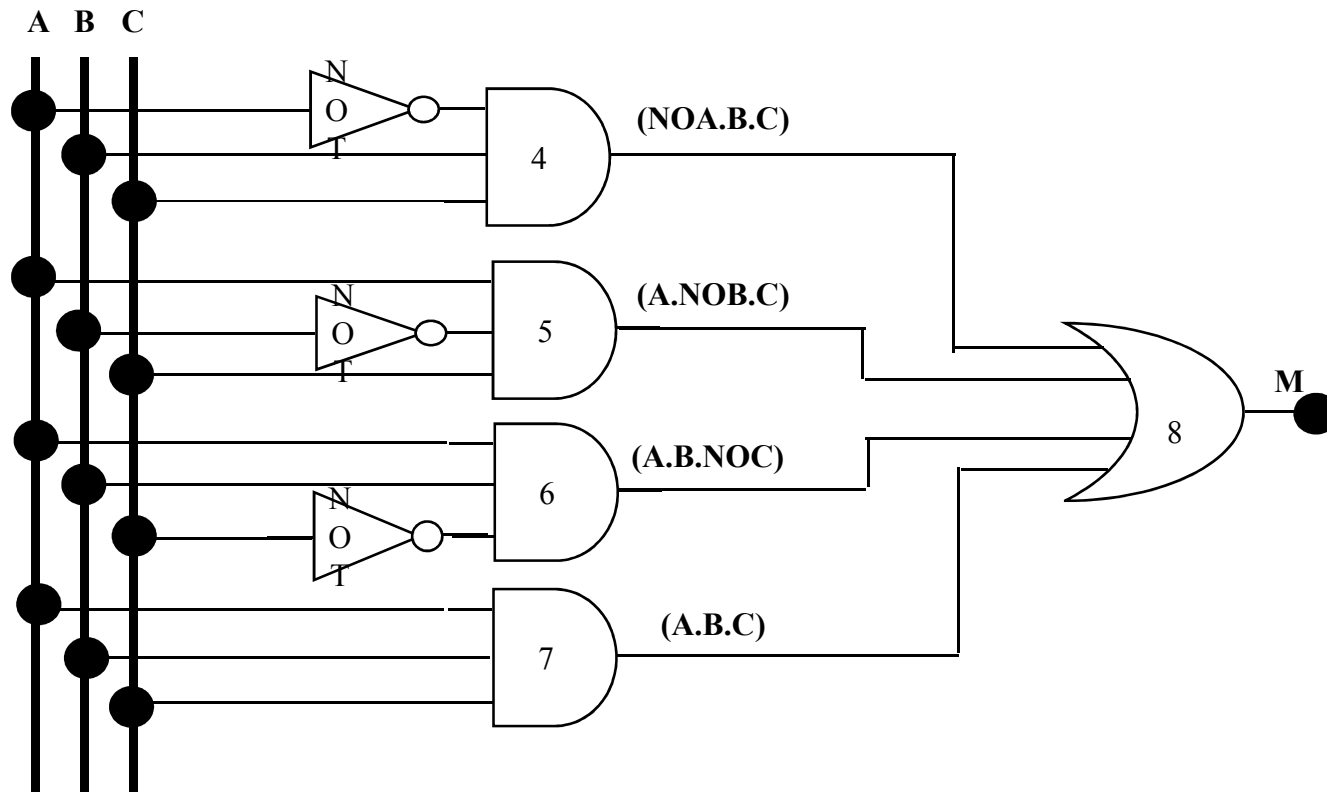
V1	V2	X
0	0	0
0	1	1
1	0	1
1	1	1



**LOGICA DIGITAL – ALGEBRA DE BOOLE -**

$$M=f(A,B,C)$$

$$M=ABC+(NOA)BC+A(NO B)C+AB(NOC)$$

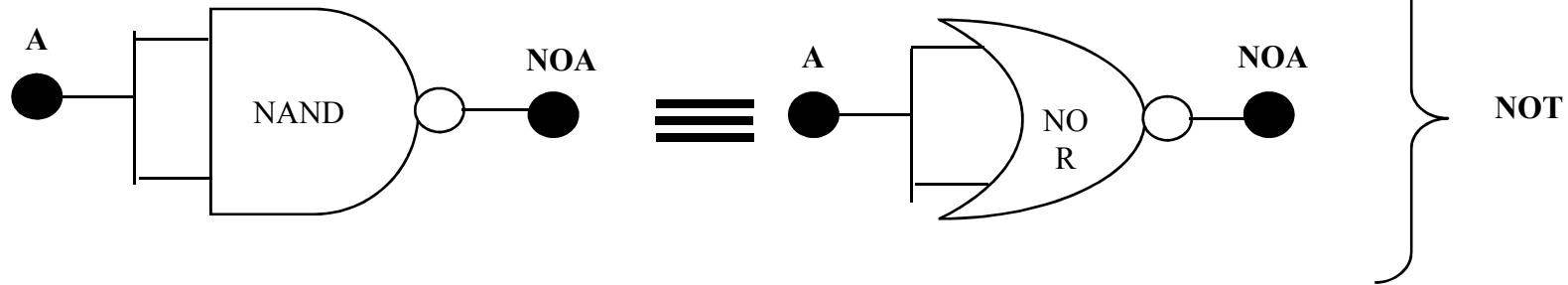


A	B	C	M
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

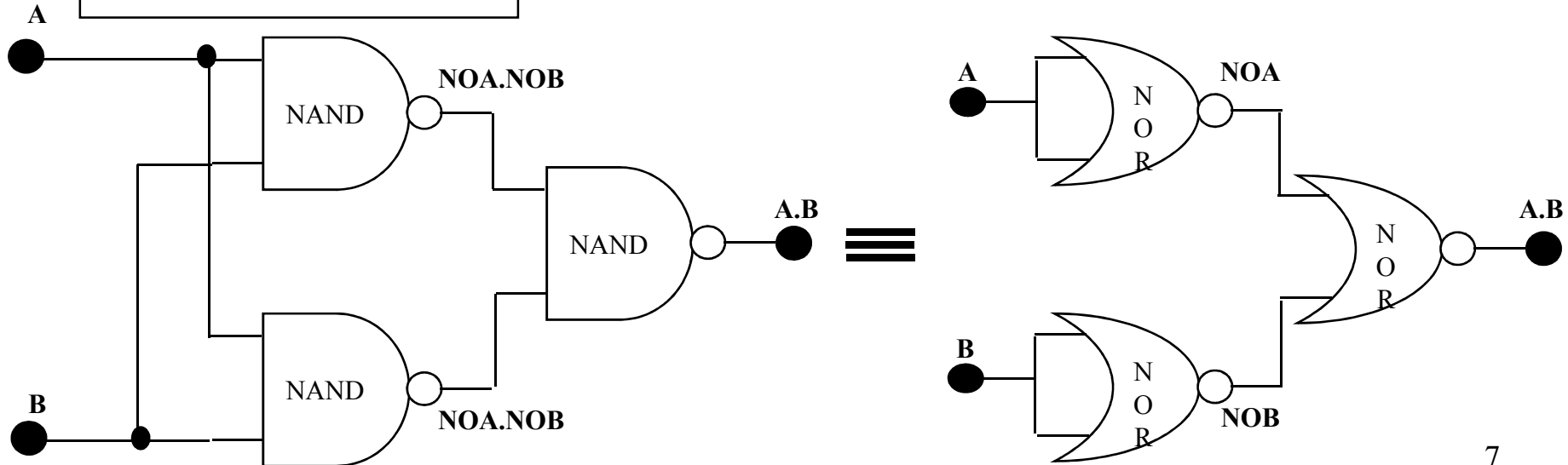
LOGICA DIGITAL – ALGEBRA DE BOOLE –

EQUIVALENCIA DE COMPUERTAS

**NAND – NOR } NOT**



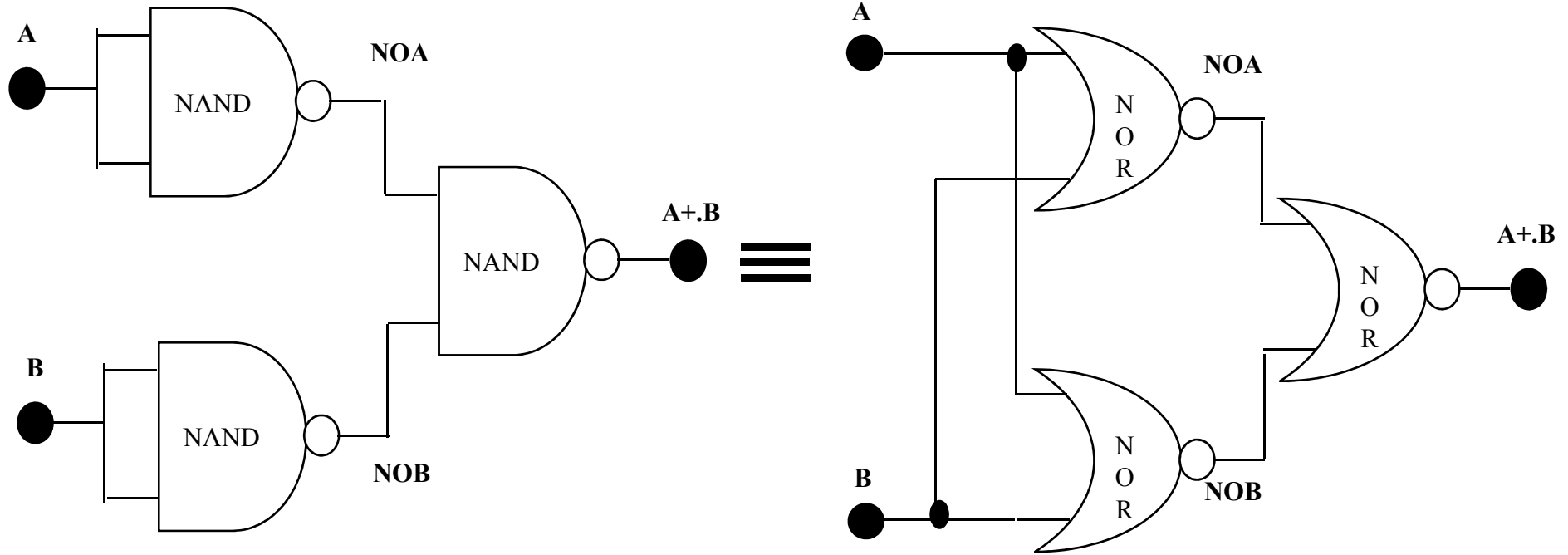
**F=A.B NAND - NOR**



LOGICA DIGITAL – ALGEBRA DE BOOLE -

EQUIVALENCIA DE COMPUERTAS

$F=A+B$  NAND - NOR





LOGICA DIGITAL – ALGEBRA DE BOOLE -

EQUIVALENCIA DE CIRCUITOS -LEYES

a. Ley de Identidad.

$$\text{AND } 1.A=A$$

$$\text{OR } 0+A=A$$

b. Ley del Elemento Neutro.

$$\text{AND } 0A=0$$

$$\text{OR } 1+A=1$$

c. Ley de Idempotencia.

$$\text{AND } A.A=A$$

$$\text{OR } A+A=A$$

d. Ley de Inverso.

$$\text{AND } A.(NOA)=0$$

$$\text{OR } A+(NOA)=1$$

e. Ley Conmutativa.

$$\text{AND } A.B=B.A$$

$$\text{OR } A+B=B+A$$

f. Ley Asociativa.

$$\text{AND } (A.B).C=A.(B.C)$$

$$\text{OR } (A+B)+C=A+(B+C)$$

g. Ley Distributiva.

$$\text{AND } A+B.C=(A+B).(A+C)$$

$$\text{OR } A(B+C)=AB+AC$$

h. Ley de Absorción.

$$\text{AND } A.(A+B)=A$$

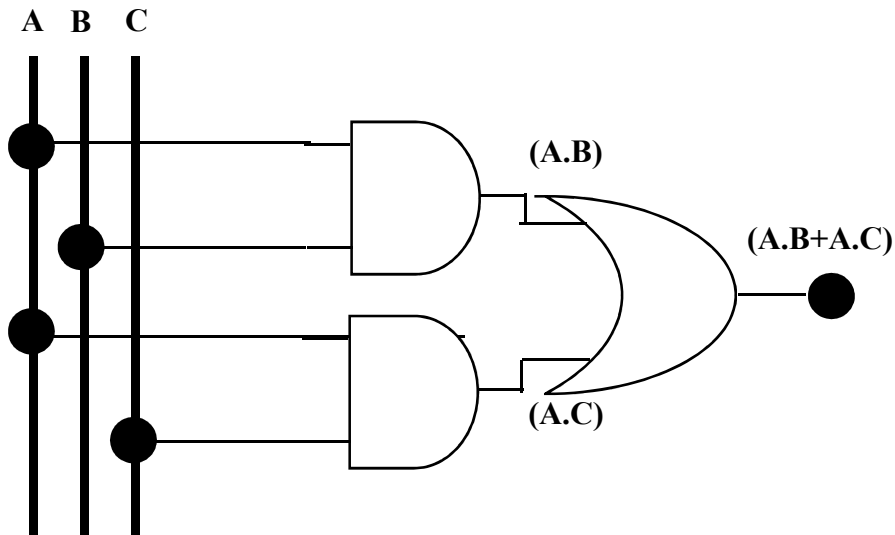
$$\text{OR } A+A.B=A$$

i. Ley de De Morgan (Se extiende a tres variables)

$$\text{AND } NO(A.B)= NOA+NOB$$

**LOGICA DIGITAL – ALGEBRA DE BOOLE -**

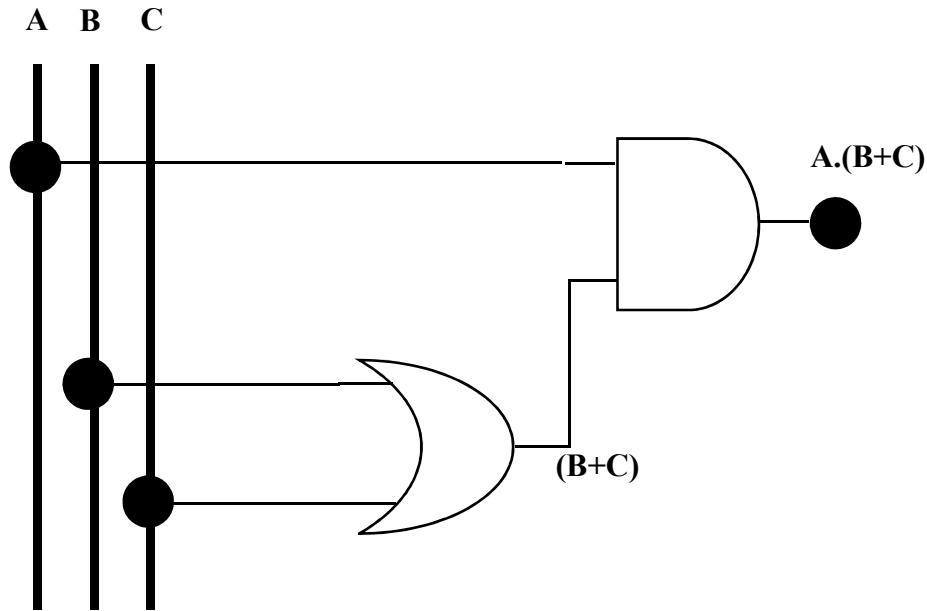
**$F=A.B+A.C$**



A	B	C	A.B	A.C	A.B+A.C
0	0	0	0	0	0
0	0	1	0	0	0
0	1	0	0	0	0
0	1	1	0	0	0
1	0	0	0	0	0
1	0	1	0	1	1
1	1	0	1	0	1
1	1	1	1	1	1

LOGICA DIGITAL – ALGEBRA DE BOOLE -

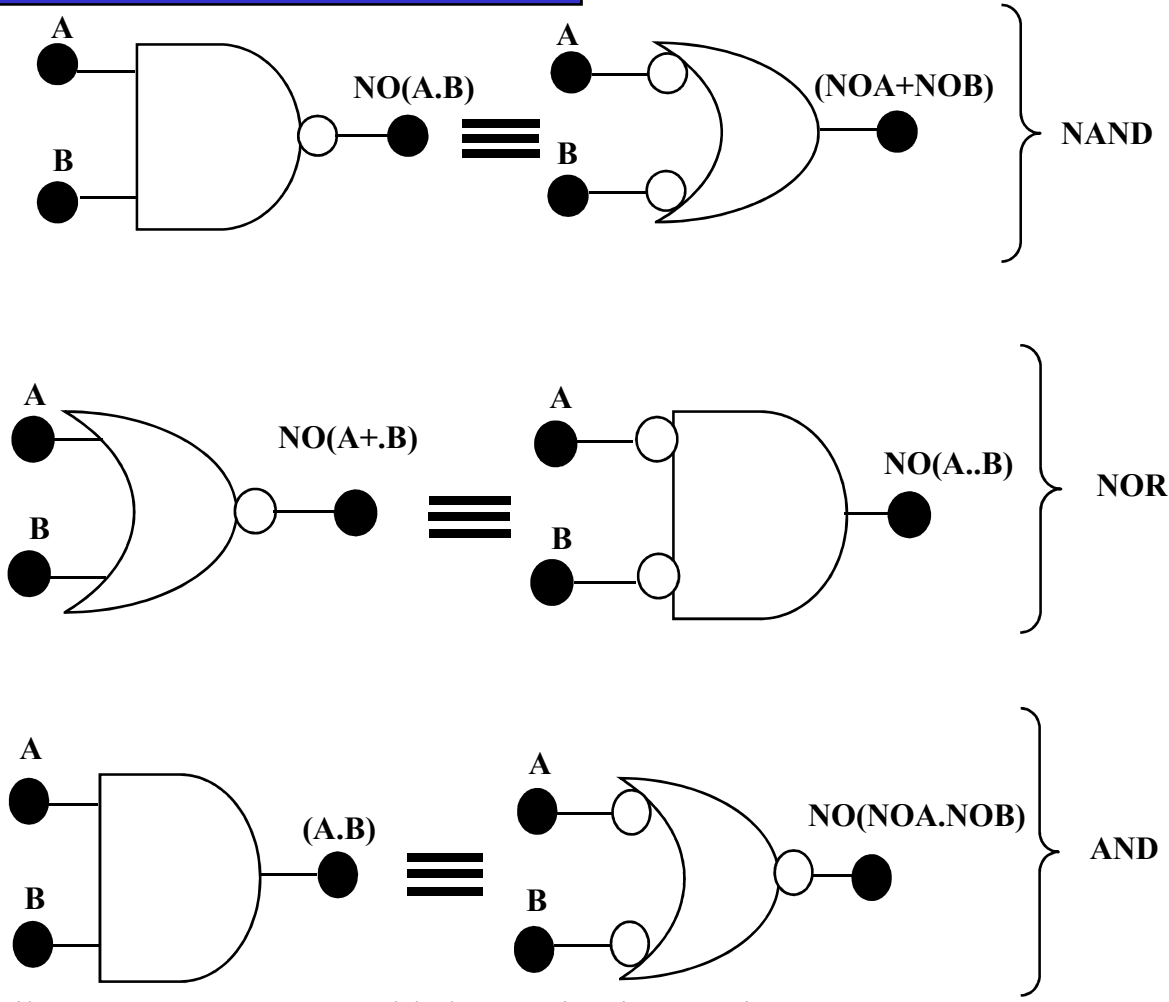
$F=A.B+A.C=A.(B+C)$  aplic distributiva



A	B	C	B+C	A.(B+C)
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	1	0
1	0	0	0	0
1	0	1	1	1
1	1	0	1	1
1	1	1	1	1

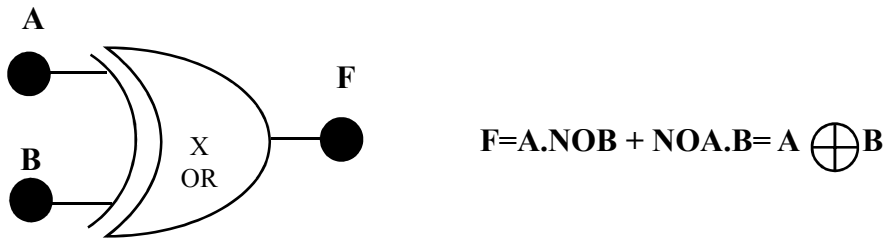
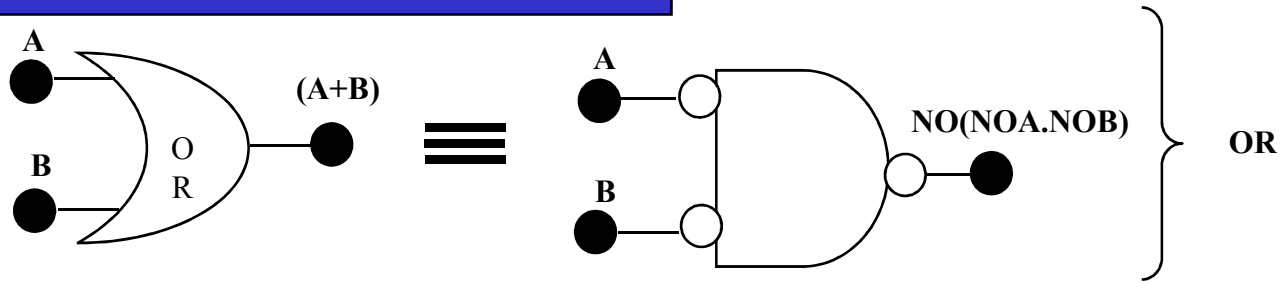
LOGICA DIGITAL

SIMBOLOS ALTERNATIVOS

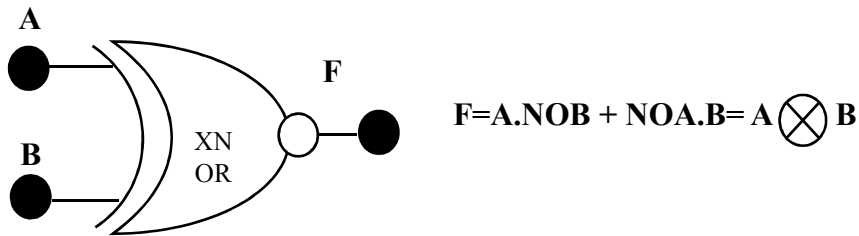


LOGICA DIGITAL

SIMBOLOS ALTERNATIVOS



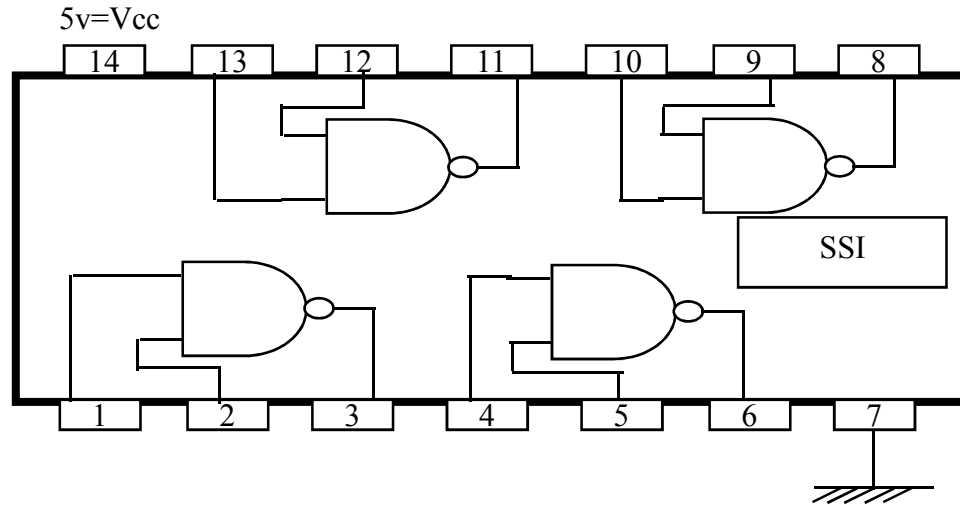
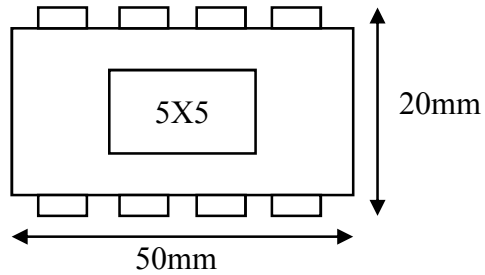
A	B	F
0	0	0
0	1	1
1	0	1
1	1	0



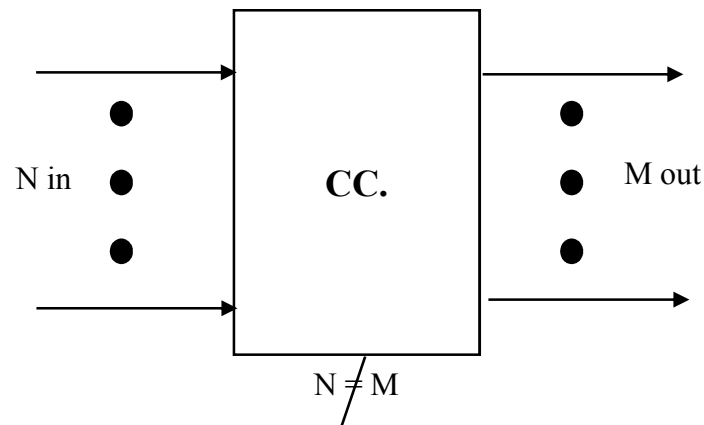
A	B	F
0	0	1
0	1	0
1	0	0
1	1	1

CIRCUITOS DIGITALES BASICOS

CIRCUITO INTEGRADO

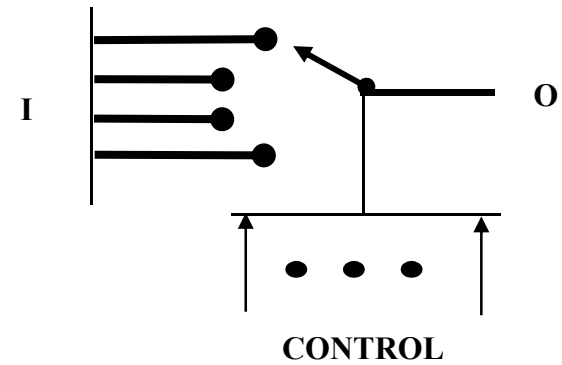
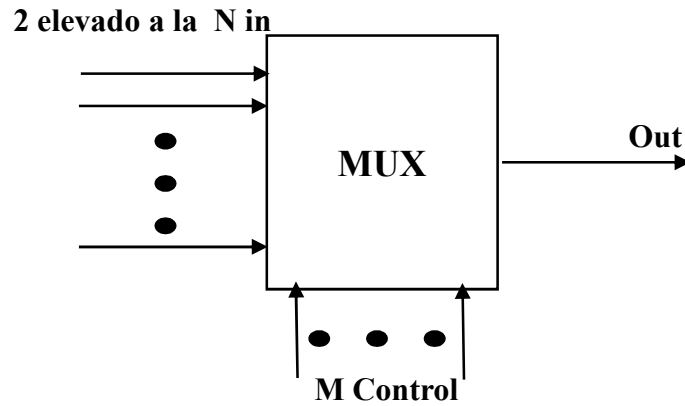


CIRCUITO COMBINACIONAL



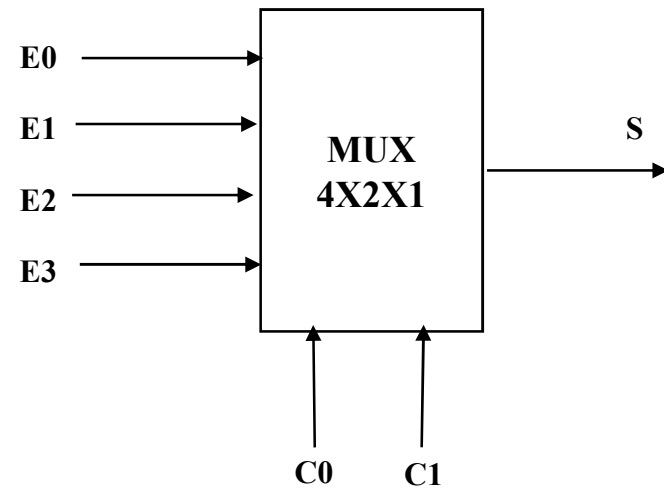
CIRCUITOS DIGITALES BASICOS

MULTIPLEXORES

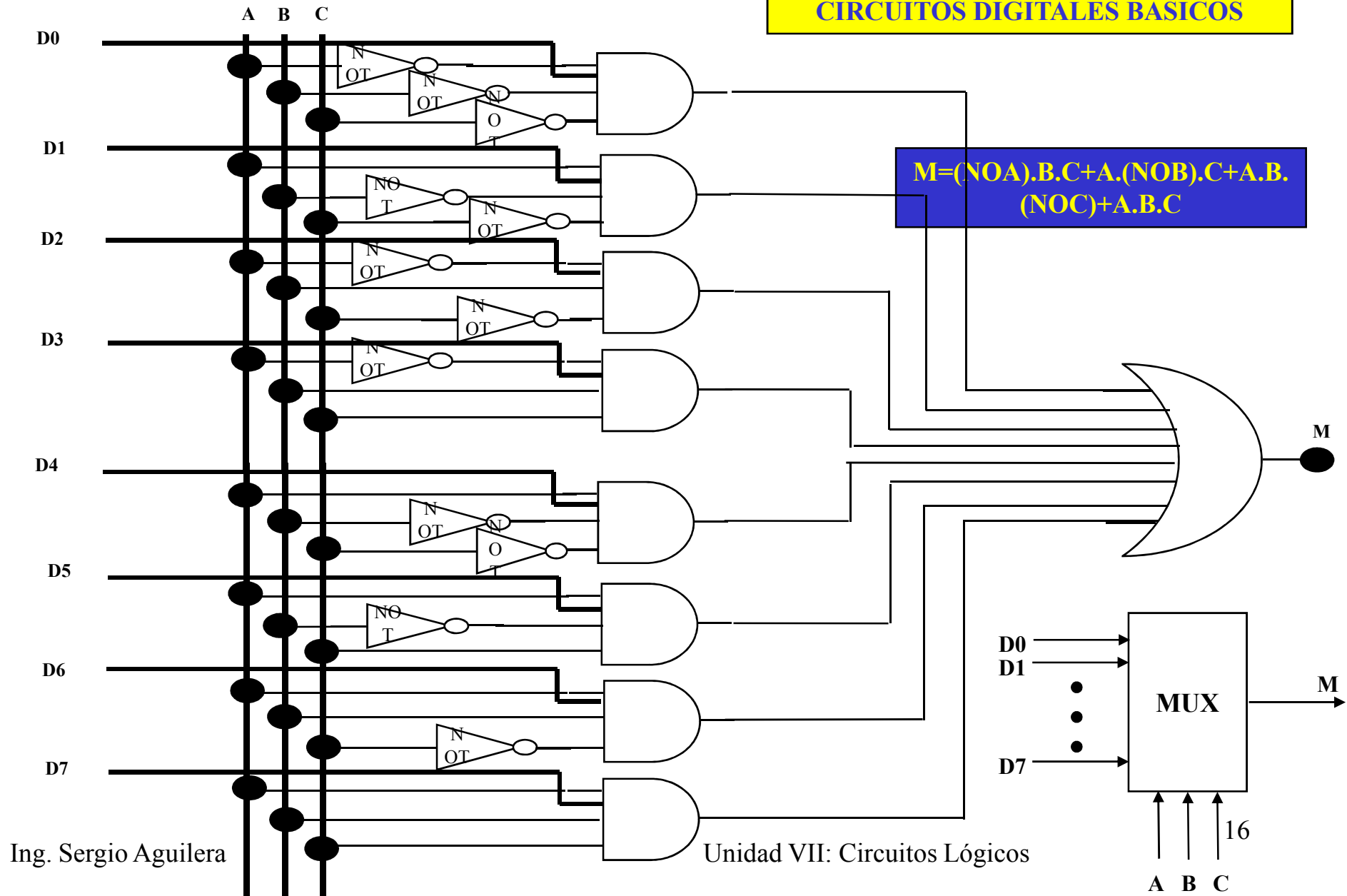


EJEMPLO DE MUX

DECIMAL	C0	C1	S
0	0	0	E0
1	0	1	E1
2	1	0	E2
3	1	1	E3



CIRCUITOS DIGITALES BASICOS

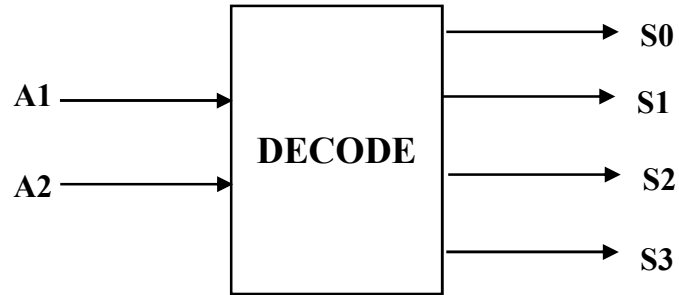


Ing. Sergio Aguilera

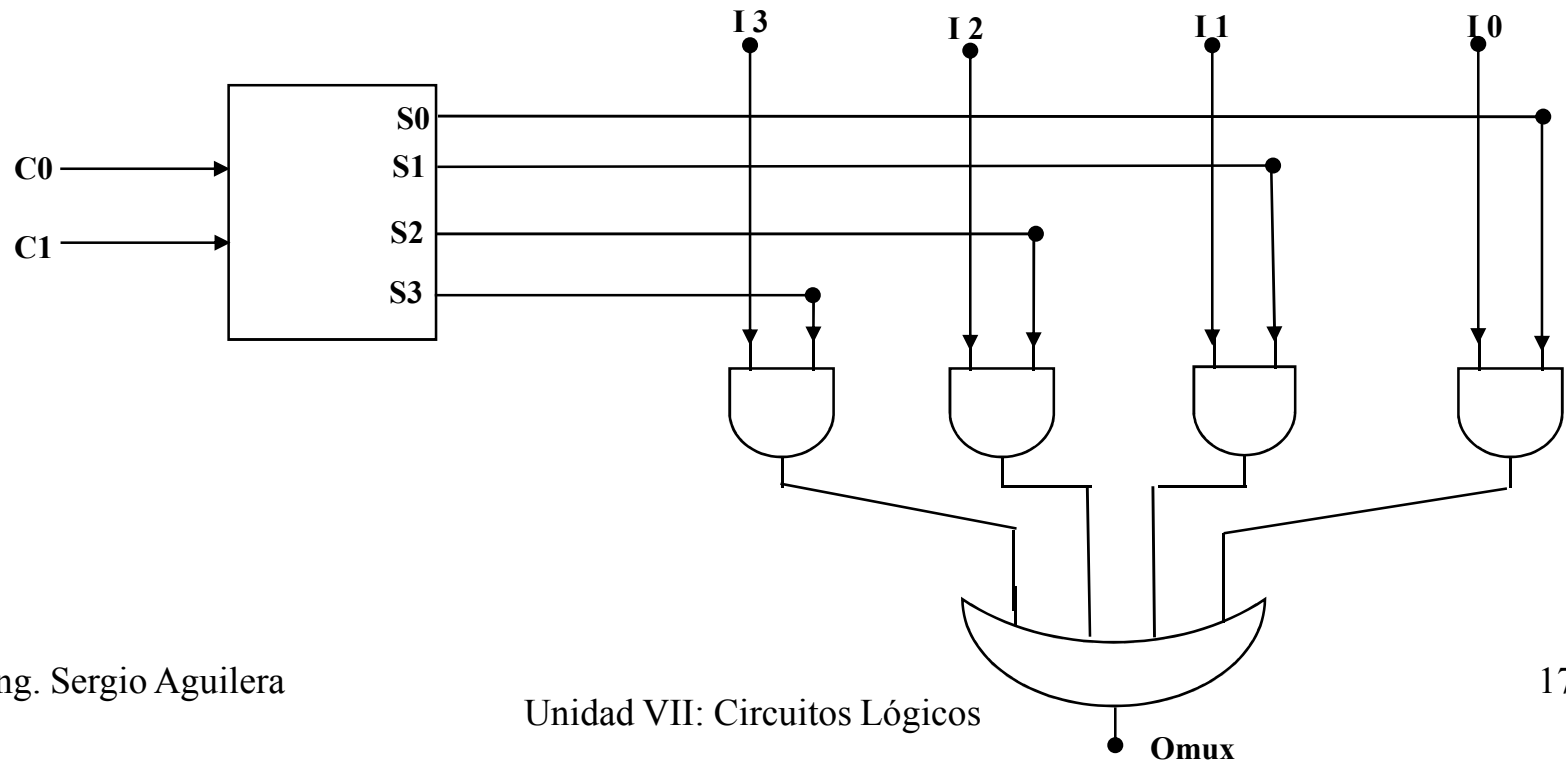
Unidad VII: Circuitos Lógicos



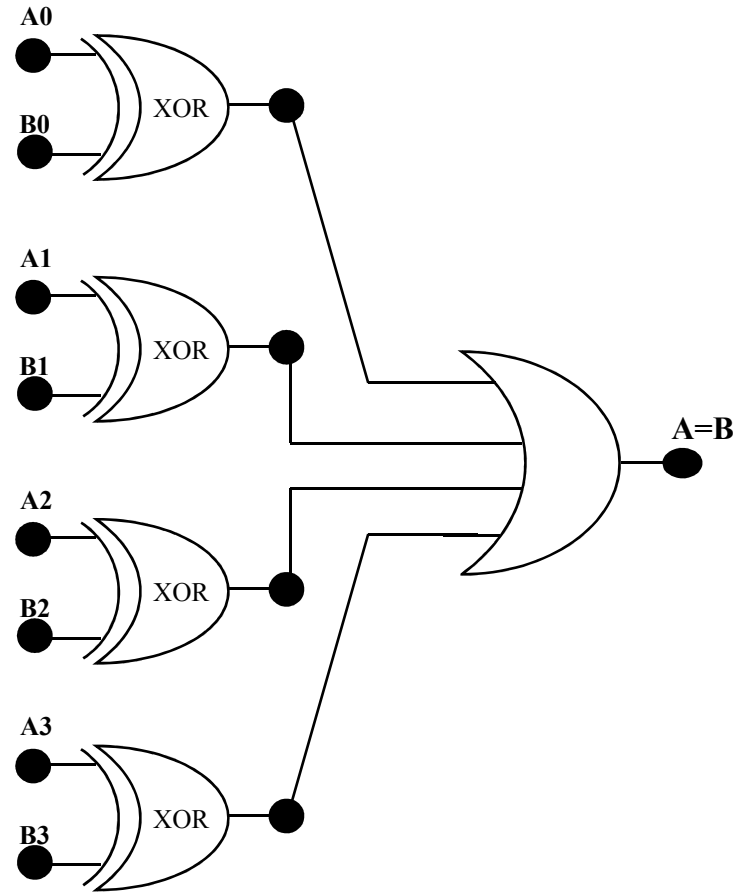
**DECODE 2X4**



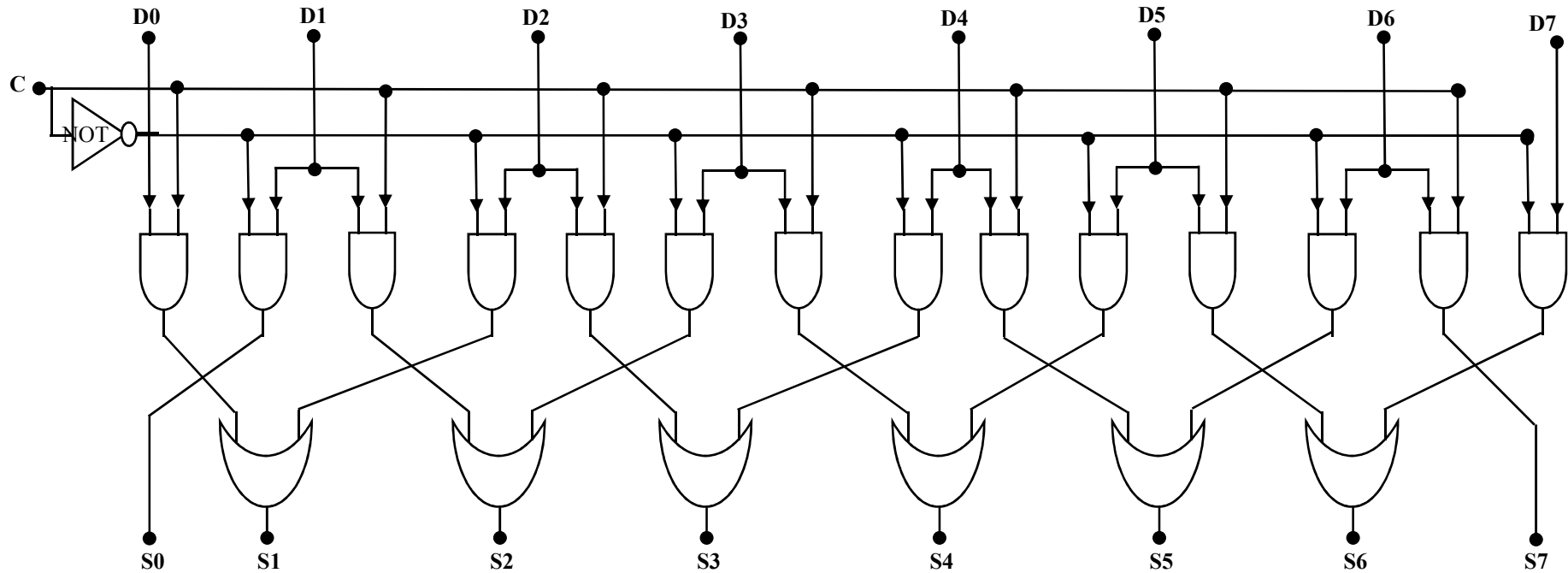
A1	A2	S3	S2	S1	S0	DECIMAL
0	0	0	0	0	1	0
0	1	0	0	1	0	1
1	0	0	1	0	0	2
1	1	1	0	0	0	3



COMPARADOR A=B



CIRCUITO DE DESPLAZAMIENTO

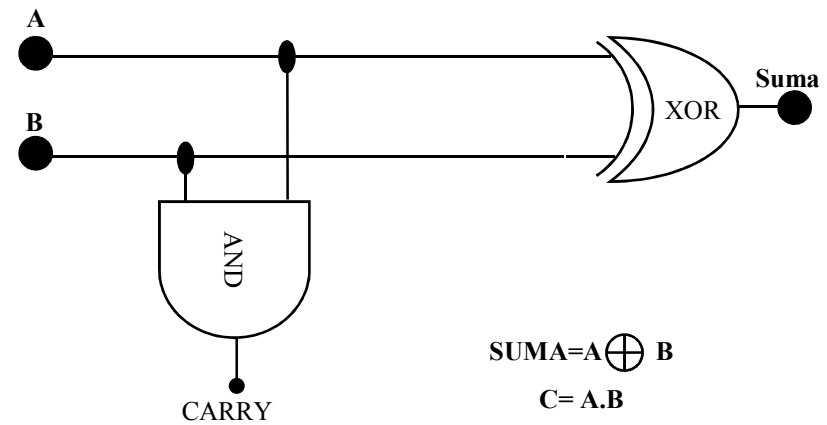


SI C=1 ... DESPLAZAMIENTO HACIA LA DERECHA

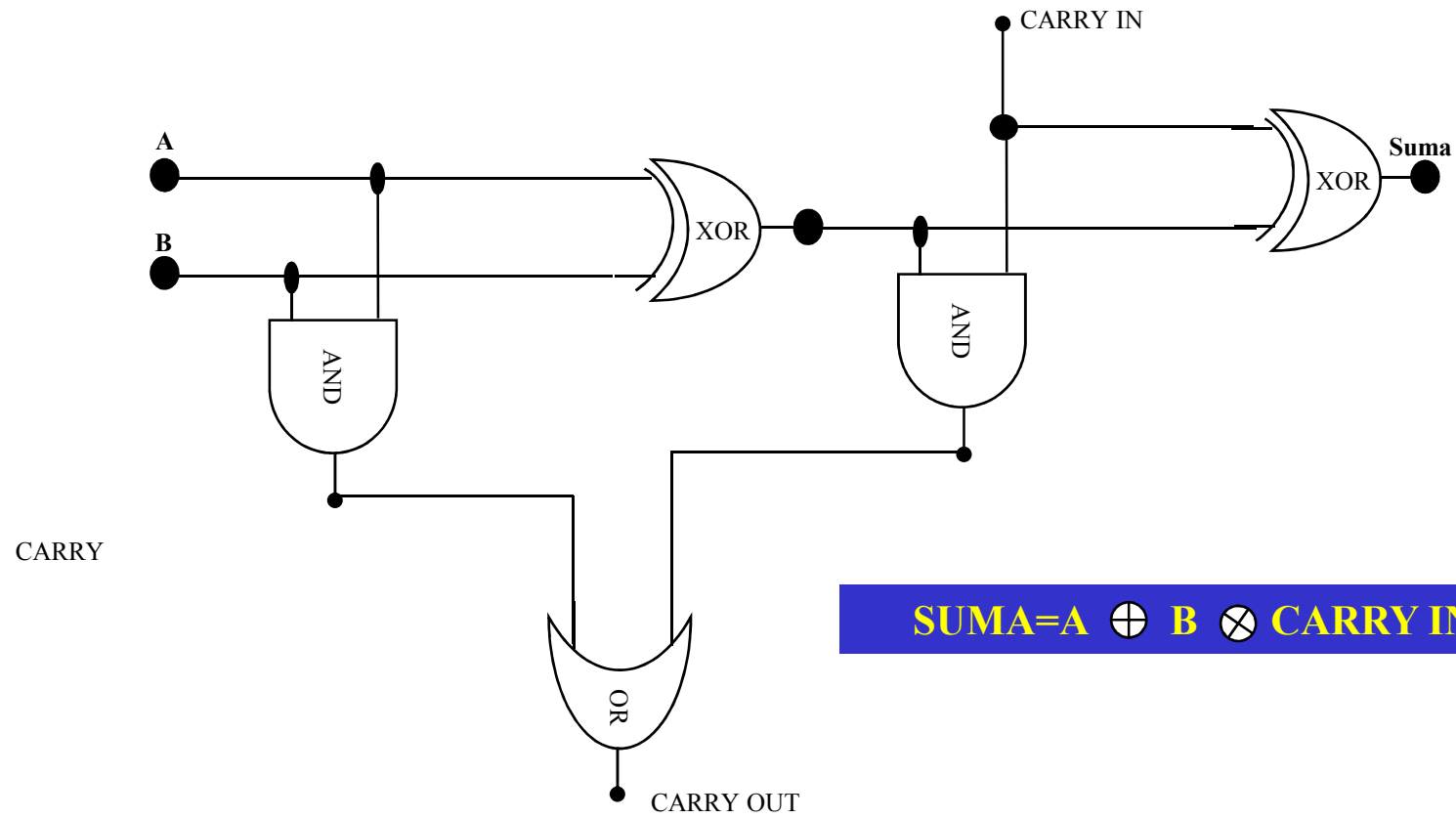
SI C=0 ... DESPLAZAMIENTO HACIA LA IZQUIERDA

SEMISUMADOR

A	B	SUMA	CARRY
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1



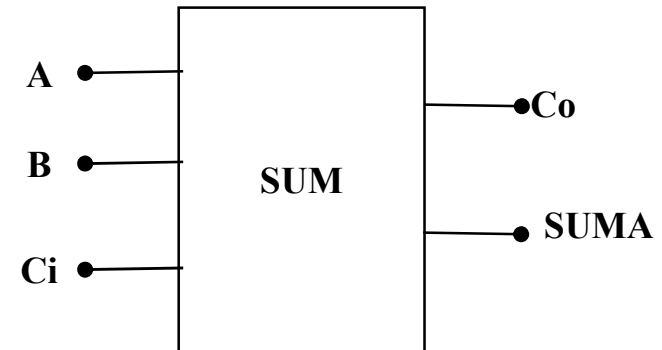
SUMADOR COMPLETO



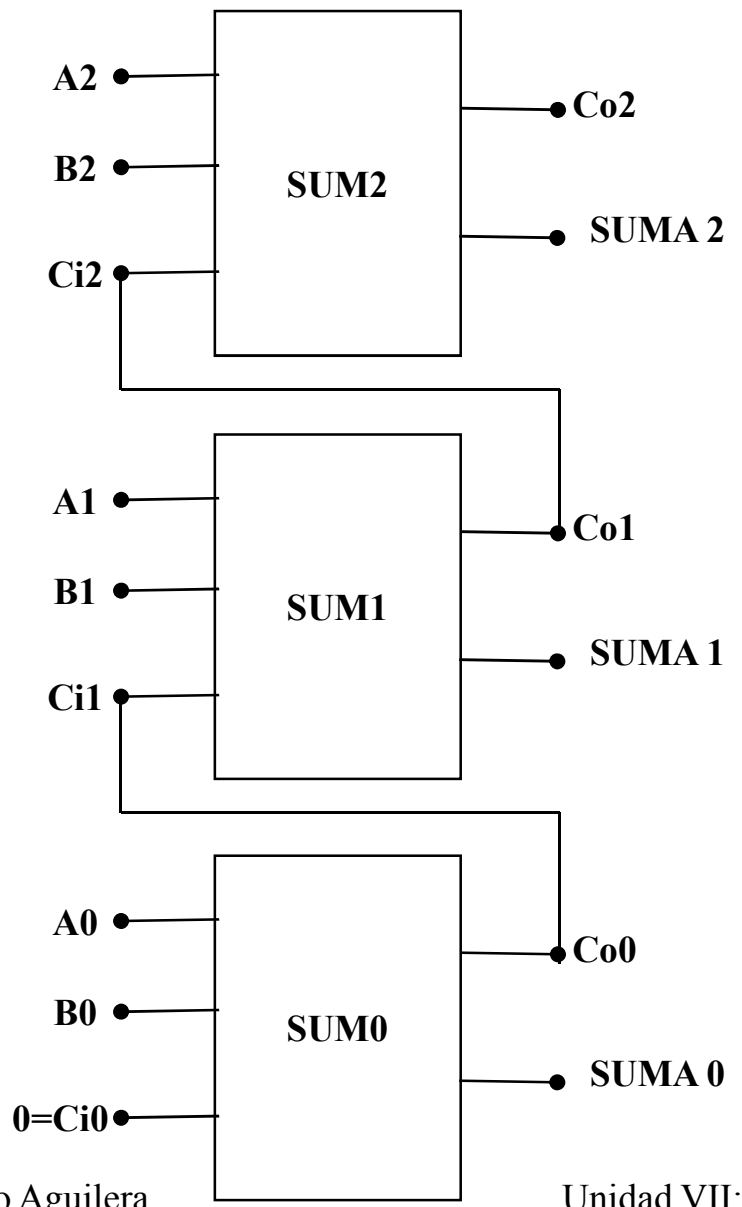
$SUMA = A \oplus B \oplus CARRY\ IN$

**SUMADOR COMPLETO**

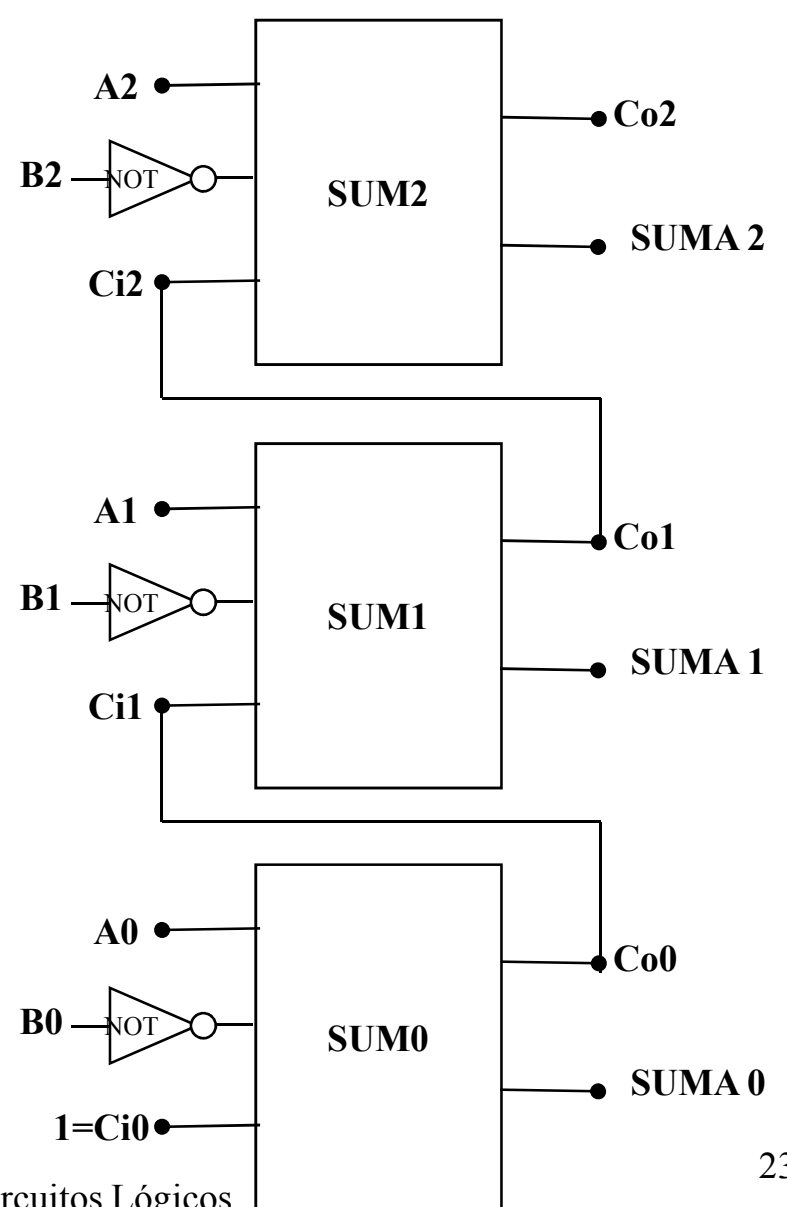
A	B	CARRY IN	SUMA	CARRY OUT
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1



**SUMADOR DE 2 NUMEROS DE 3 BITS**



**RESTADOR DE 2 NUMEROS DE 3 BITS**



**BIBLIOGRAFIA DE REFERENCIA**

- ❖ · Estructuras y Diseño de Computadoras (La Interfaz hardware/Software). David. Patterson y John Hennessy. 4ta Edición. Ed. Reverte. Barcelona, 2011.
- ❖ · Organización y Arquitectura de Computadores. Willams Stallings. Prentice-Hall. 2006. 7ed.
- ❖ · Organización y Arquitectura de Computadoras. Jaime Martinez Garza, Jorege Agustín Olvera Rodríguez. Prentice-Hall. 1era Edición. 2000.
- ❖ · Manual de Actualización y reparación de PCs, 12 edición. Scott Mueller. Que, Prentice Hall, 2001.
- ❖ · Organización de Computadores, un enfoque estructurado, 7 edición. Andrew Tanenbaun. Prentice Hall, 2001.
- ❖ · ESTRUCTURA INTERNA DE LA PC. Gastón C. Hillar. Ed. Hasa. 4ta. Edición. Bs.As.Feb. 2004.
- ❖ · ORGANIZACIÓN Y ARQUITECTURA DE COMPUTADORES. Willams Stallings. Prentice-Hall. 2000.
- ❖ · CIENCIAS DE LA COMPUTACION. Brookshear. Addison Wesley.
- ❖ · REDES DE ORDENADORES. Andrew Tannenbaum. Prentice Hall.



**FIN DEL UNIDAD 7**

**LOGICA DE  
CIRCUITOS**

