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Lab VIII (Diseño secuencial II)

Realizar un contador en fisico que muestre la cuenta del 1-15 de forma ascendente y luego descendente utilizando dos display de 7 segmentos para presentar el valor numérico.

Anexe los siguientes items. Debe tener un push button para iniciar y uno para resetear (No dip, los push no debe ser retensivos, o sea, con un solo toque debe ser mas que suficiente para hacer su funcion)

1. Deben usar un 555
2. Hacer el diagrama Lógico
3. Tabla de verdad (flip flop JK)
4. K-maps y Diagrama de Estado
5. Fotos de la implementación
6. Video del circuito funcionando

Tabla Flip FLOP

ESTADO PRESENTE						ESTADO FUTURO					
	A	B	C	D	E		A	B	C	D	E
0	0	0	0	0	0	1	0	0	0	0	1
1	0	0	0	0	1	2	0	0	0	1	0
2	0	0	0	1	0	3	0	0	0	1	1
3	0	0	0	1	1	4	0	0	1	0	0
4	0	0	1	0	0	5	0	0	1	0	1
5	0	0	1	0	1	6	0	0	1	1	0
6	0	0	1	1	0	7	0	0	1	1	1
7	0	0	1	1	1	8	0	1	0	0	0
8	0	1	0	0	0	9	0	1	0	0	1
9	0	1	0	0	1	10	0	1	0	1	0
10	0	1	0	1	0	11	0	1	0	1	1
11	0	1	0	1	1	12	0	1	1	0	0
12	0	1	1	0	0	13	0	1	1	0	1
13	0	1	1	0	1	14	0	1	1	1	0
14	0	1	1	1	0	15	0	1	1	1	1
15	0	1	1	1	1	14	1	0	0	0	0
14	1	0	0	0	0	13	1	0	0	0	1
13	1	0	0	0	1	12	1	0	0	1	0
12	1	0	0	1	0	11	1	0	0	1	1
11	1	0	0	1	1	10	1	0	1	0	0
10	1	0	1	0	0	9	1	0	1	0	1
9	1	0	1	0	1	8	1	0	1	1	0
8	1	0	1	1	0	7	1	0	1	1	1
7	1	0	1	1	1	6	1	1	0	0	0
6	1	1	0	0	0	5	1	1	0	0	1
5	1	1	0	0	1	4	1	1	0	1	0
4	1	1	0	1	0	3	1	1	0	1	1
3	1	1	0	1	1	2	1	1	1	0	0
2	1	1	1	0	0	1	0	0	0	0	0

Salidas FLIP FLOP

JA	KA	JB	KB	JC	KC
0	X	0	X	0	X
0	X	0	X	0	X
0	X	0	X	0	X
0	X	0	X	1	X
0	X	0	X	X	0
0	X	0	X	X	0
0	X	0	X	X	0
0	X	1	X	x	1
0	X	X	0	0	X
0	X	X	0	0	X
0	X	X	0	0	X
0	X	X	0	1	X
0	X	X	0	X	0
0	X	X	0	X	0
0	X	X	0	X	0
1	X	x	1	x	1
X	0	0	X	0	X
X	0	0	X	0	X
X	0	0	X	0	X
X	0	0	X	1	X
X	0	0	X	X	0
X	0	0	X	X	0
X	0	0	X	X	0
X	0	0	X	X	0
X	0	1	X	x	1
X	0	X	0	0	X
X	0	X	0	0	X
X	0	X	0	0	X
X	0	X	0	0	X
X	0	X	0	1	X
x	1	x	1	x	1

JD	KD	JE	KE
0	X	1	X
1	X	X	1
X	0	1	X
X	1	X	1
0	X	1	X
1	X	X	1
X	0	1	X
X	1	X	1
0	X	1	X
1	X	X	1
X	0	1	X
X	1	X	1
0	X	1	X
1	X	X	1
X	0	1	X
X	1	X	1
0	X	1	X
1	X	X	1
X	0	1	X
X	1	X	1
0	X	1	X
1	X	X	1
X	0	1	X
X	1	X	1
0	X	1	X
1	X	X	1
X	0	1	X
X	1	X	1
0	X	0	X

Display izquierda

	A	B	C	D	E		A	B	C	D	E	F	G
0	0	0	0	0	0	1	0	1	1	0	0	0	0
1	0	0	0	0	1	2	1	1	0	1	1	0	1
2	0	0	0	1	0	3	1	1	1	1	0	0	1
3	0	0	0	1	1	4	0	1	1	0	0	1	1
4	0	0	1	0	0	5	1	0	1	1	0	1	1
5	0	0	1	0	1	6	1	0	1	1	1	1	1
6	0	0	1	1	0	7	1	1	1	0	0	0	0
7	0	0	1	1	1	8	1	1	1	1	1	1	1
8	0	1	0	0	0	9	1	1	1	1	0	1	1
9	0	1	0	0	1	10	1	1	1	1	1	1	0
10	0	1	0	1	0	11	0	1	1	0	0	0	0
11	0	1	0	1	1	12	1	1	0	1	1	0	1
12	0	1	1	0	0	13	1	1	1	1	0	0	1
13	0	1	1	0	1	14	0	1	1	0	0	1	1
14	0	1	1	1	0	15	1	0	1	1	0	1	1
15	0	1	1	1	1	14	0	1	1	0	0	1	1
16	1	0	0	0	0	13	1	1	1	1	0	0	1
17	1	0	0	0	1	12	1	1	0	1	1	0	1
18	1	0	0	1	0	11	0	1	1	0	0	0	0
19	1	0	0	1	1	10	1	1	1	1	1	1	0
20	1	0	1	0	0	9	1	1	1	1	0	1	1
21	1	0	1	0	1	8	1	1	1	1	1	1	1
22	1	0	1	1	0	7	1	1	1	0	0	0	0
23	1	0	1	1	1	6	1	0	1	1	1	1	1
24	1	1	0	0	0	5	1	0	1	1	0	1	1
25	1	1	0	0	1	4	0	1	1	0	0	1	1
26	1	1	0	1	0	3	1	1	1	1	0	0	1
27	1	1	0	1	1	2	1	1	0	1	1	0	1

Las salidas para identificarla bien

	A	B	C	D	E	F	G
1	0	1	1	0	0	0	0
2	1	1	0	1	1	0	1
3	1	1	1	1	0	0	1
4	0	1	1	0	0	1	1
5	1	0	1	1	0	1	1
6	1	0	1	1	1	1	1
7	1	1	1	0	0	0	0
8	1	1	1	1	1	1	1
9	1	1	1	1	0	1	1
10	1	1	1	1	1	1	0
11	0	1	1	0	0	0	0
12	1	1	0	1	1	0	1
13	1	1	1	1	0	0	1
14	0	1	1	0	0	1	1
15	1	0	1	1	0	1	1
14	0	1	1	0	0	1	1
13	1	1	1	1	0	0	1
12	1	1	0	1	1	0	1
11	0	1	1	0	0	0	0
10	1	1	1	1	1	1	0
9	1	1	1	1	0	1	1
8	1	1	1	1	1	1	1
7	1	1	1	0	0	0	0
6	1	0	1	1	1	1	1
5	1	0	1	1	0	1	1
4	0	1	1	0	0	1	1
3	1	1	1	1	0	0	1
2	1	1	0	1	1	0	1

Display izquierda

	A	B	C	D	E		A	B	C	D	E	F	G
0	0	0	0	0	0	1	1	1	1	1	1	1	0
1	0	0	0	0	1	2	1	1	1	1	1	1	0
2	0	0	0	1	0	3	1	1	1	1	1	1	0
3	0	0	0	1	1	4	1	1	1	1	1	1	0
4	0	0	1	0	0	5	1	1	1	1	1	1	0
5	0	0	1	0	1	6	1	1	1	1	1	1	0
6	0	0	1	1	0	7	1	1	1	1	1	1	0
7	0	0	1	1	1	8	1	1	1	1	1	1	0
8	0	1	0	0	0	9	1	1	1	1	1	1	0
9	0	1	0	0	1	10	0	1	1	0	0	0	0
10	0	1	0	1	0	11	0	1	1	0	0	0	0
11	0	1	0	1	1	12	0	1	1	0	0	0	0
12	0	1	1	0	0	13	0	1	1	0	0	0	0
13	0	1	1	0	1	14	0	1	1	0	0	0	0
14	0	1	1	1	0	15	0	1	1	0	0	0	0
15	0	1	1	1	1	14	0	1	1	0	0	0	0
16	1	0	0	0	0	13	0	1	1	0	0	0	0
17	1	0	0	0	1	12	0	1	1	0	0	0	0
18	1	0	0	1	0	11	0	1	1	0	0	0	0
19	1	0	0	1	1	10	0	1	1	0	0	0	0
20	1	0	1	0	0	9	1	1	1	1	1	1	0
21	1	0	1	0	1	8	1	1	1	1	1	1	0
22	1	0	1	1	0	7	1	1	1	1	1	1	0
23	1	0	1	1	1	6	1	1	1	1	1	1	0
24	1	1	0	0	0	5	1	1	1	1	1	1	0
25	1	1	0	0	1	4	1	1	1	1	1	1	0
26	1	1	0	1	0	3	1	1	1	1	1	1	0
27	1	1	0	1	1	2	1	1	1	1	1	1	0
							1	1	1	1	1	1	0

Salidas para identificarla bien

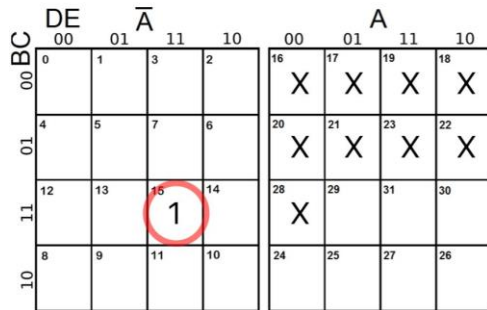
	A	B	C	D	E	F	G
1	1	1	1	1	1	1	0
2	1	1	1	1	1	1	0
3	1	1	1	1	1	1	0
4	1	1	1	1	1	1	0
5	1	1	1	1	1	1	0
6	1	1	1	1	1	1	0
7	1	1	1	1	1	1	0
8	1	1	1	1	1	1	0
9	1	1	1	1	1	1	0
10	0	1	1	0	0	0	0
11	0	1	1	0	0	0	0
12	0	1	1	0	0	0	0
13	0	1	1	0	0	0	0
14	0	1	1	0	0	0	0
15	0	1	1	0	0	0	0
14	0	1	1	0	0	0	0
13	0	1	1	0	0	0	0
12	0	1	1	0	0	0	0
11	0	1	1	0	0	0	0
10	0	1	1	0	0	0	0
9	1	1	1	1	1	1	0
8	1	1	1	1	1	1	0
7	1	1	1	1	1	1	0
6	1	1	1	1	1	1	0
5	1	1	1	1	1	1	0
4	1	1	1	1	1	1	0
3	1	1	1	1	1	1	0
2	1	1	1	1	1	1	0
	1	1	1	1	1	1	0

Tabla de como se representa cada bit

numero en binario que dara el flipflop			display izquierda		Display derecha	
		0		0	1	
		1		0	2	
		2		0	3	
		3		0	4	
		4		0	5	
		5		0	6	
		6		0	7	
		7		0	8	
		8		0	9	
		9		1	0	
		10		1	1	
		11		1	2	
		12		1	3	
		13		1	4	
		14		1	5	
		15		1	4	
		16		1	3	
		17		1	2	
		18		1	1	
		19		1	0	
		20		0	9	
		21		0	8	
		22		0	7	
		23		0	6	
		24		0	5	
		25		0	4	
		26		0	3	
		27		0	2	
		28		reset	reset	

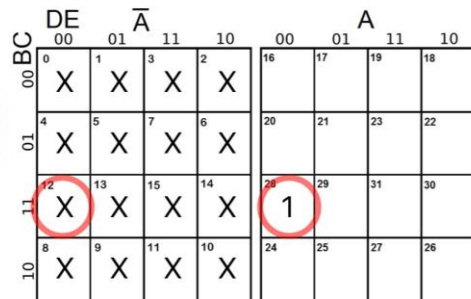
Kmaps y funciones de FLIP FLOP

JA Y KA



Select Answer: #1/1

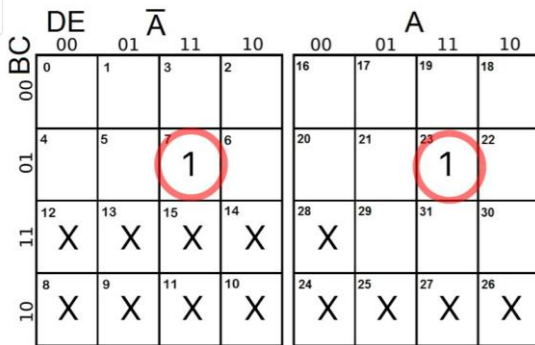
$$S = \bar{A}BCDE$$



Select Answer: #1/1

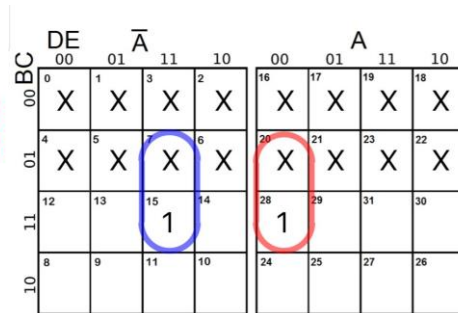
$$S = BCDE$$

JB Y KB



Select Answer: #1/1

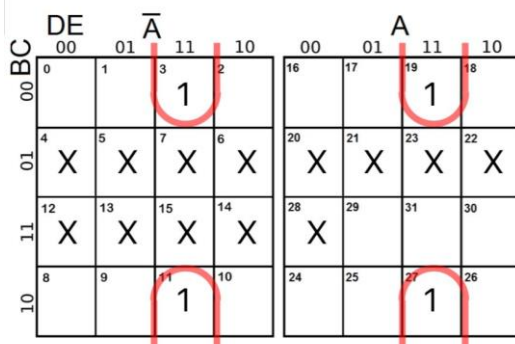
$$S = \bar{B}CDE$$



Select Answer: #1/1

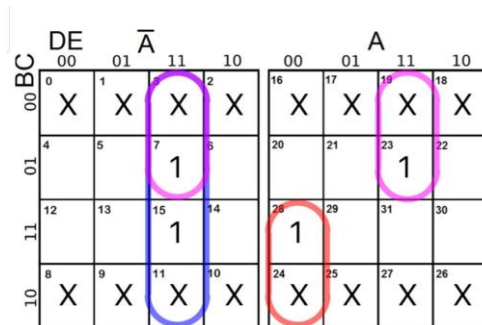
$$S = ACDE + \bar{A}CDE$$

JC Y KC



Select Answer: #1/1

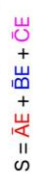
$$S = \bar{C}DE$$



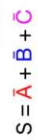
Select Answer: #1/1

$$S = ABDE + \bar{A}DE + BDE$$

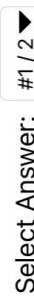
JD Y KD



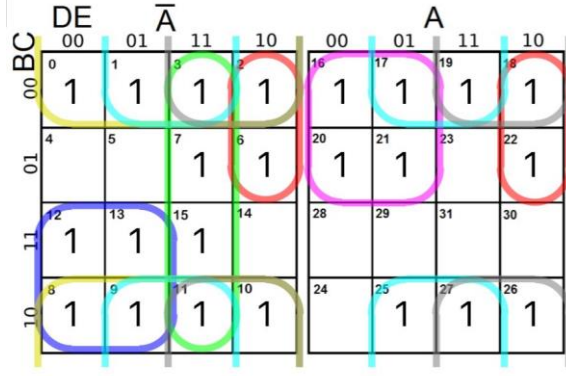
JE Y KE



Kmaps y funciones del display derecho

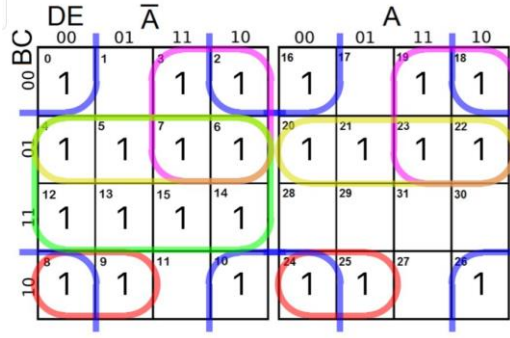


$$S = \bar{A}\bar{B}\bar{D}\bar{E} + \bar{A}B\bar{C}\bar{D} + A\bar{B}\bar{C}\bar{E} + B\bar{C}D\bar{E} + \bar{B}\bar{D}E + \bar{A}\bar{C}\bar{E} + \bar{A}\bar{B}\bar{D} + \bar{A}B\bar{E} + \bar{B}\bar{C}$$



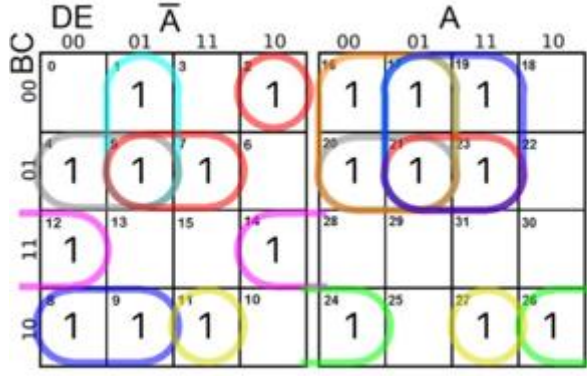
Select Answer: #1/2

$$S = \bar{B}\bar{D}\bar{E} + \bar{A}\bar{B}\bar{D} + \bar{A}\bar{D}\bar{E} + \bar{A}\bar{C} + \bar{C}\bar{E} + \bar{C}\bar{D}$$



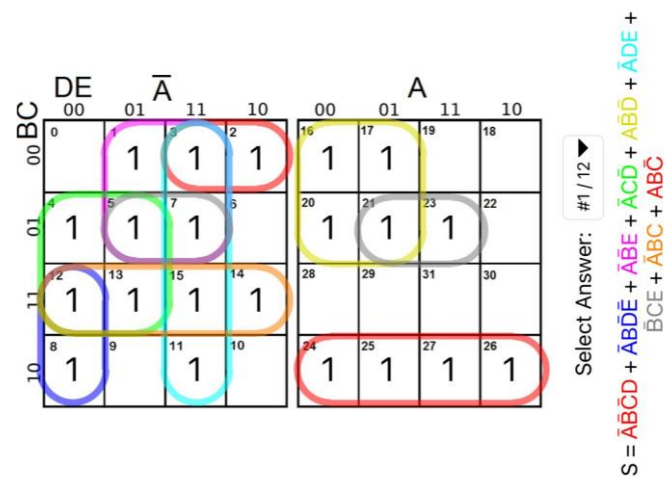
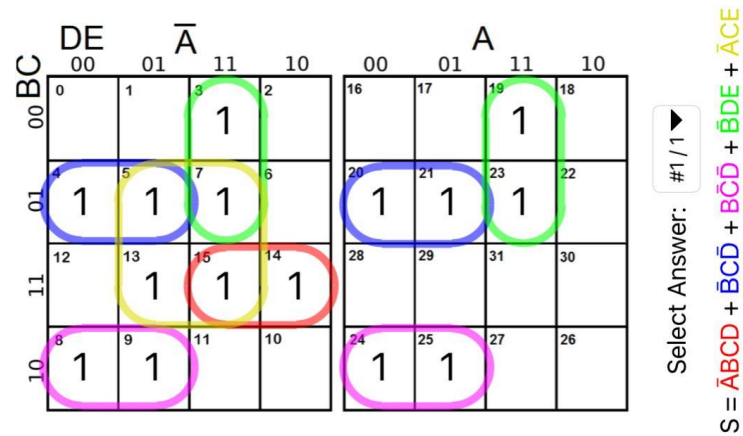
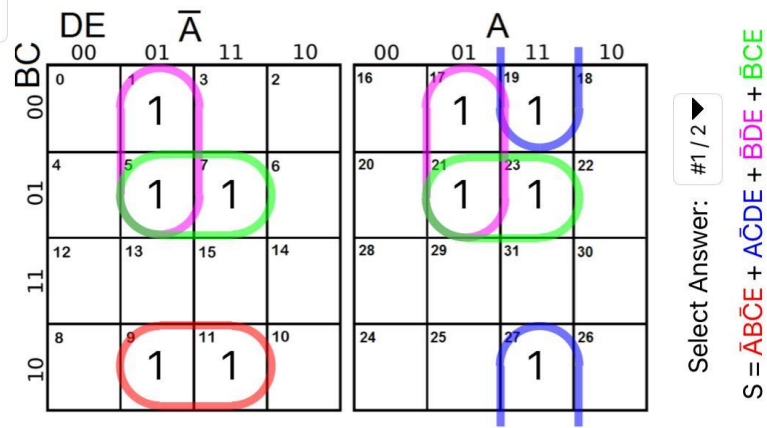
Select Answer: #1/1

$$S = \bar{B}\bar{C}\bar{D} + \bar{C}\bar{E} + \bar{B}\bar{D} + \bar{A}\bar{C} + \bar{B}\bar{C}$$



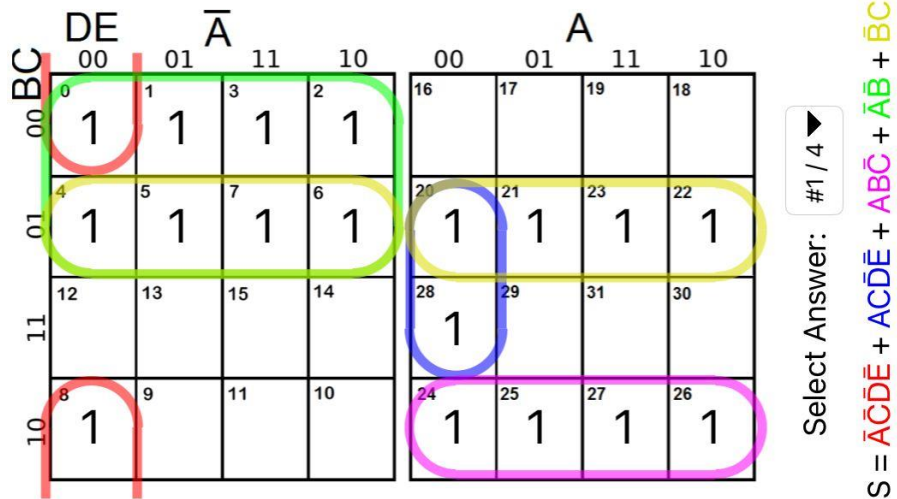
Select Answer: #1/2

$$= \bar{A}\bar{B}\bar{C}\bar{D}\bar{E} + \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}\bar{E} + \bar{A}\bar{B}\bar{C}\bar{E} + \bar{B}\bar{C}\bar{D}\bar{E} + \bar{B}\bar{C}\bar{D}\bar{E} + \bar{B}\bar{C}\bar{D}\bar{E} + \bar{B}\bar{C}\bar{D}\bar{E}$$

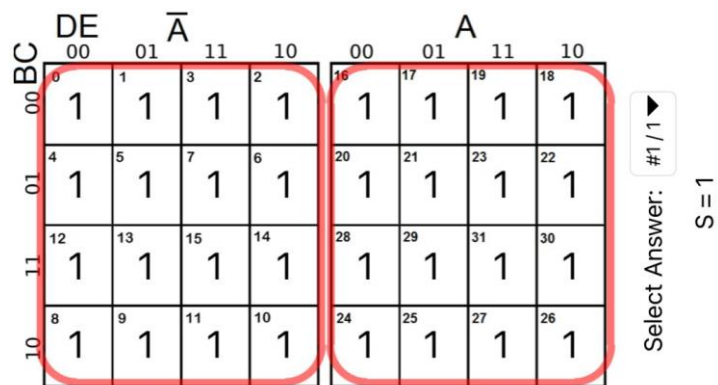


Funciones y Kmaps del display derecho:

A, D, E, F



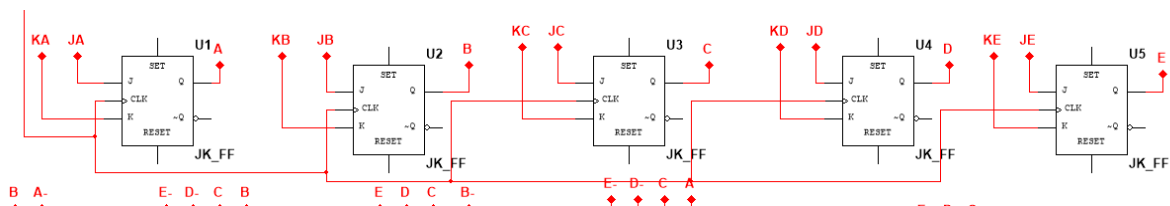
B, C



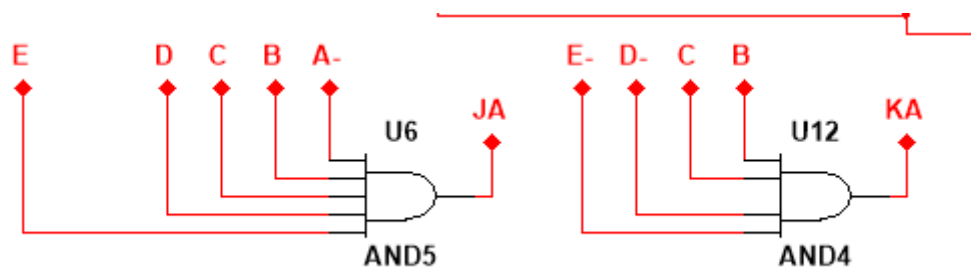
G = 0

FUNCIONES EN MULTISIM

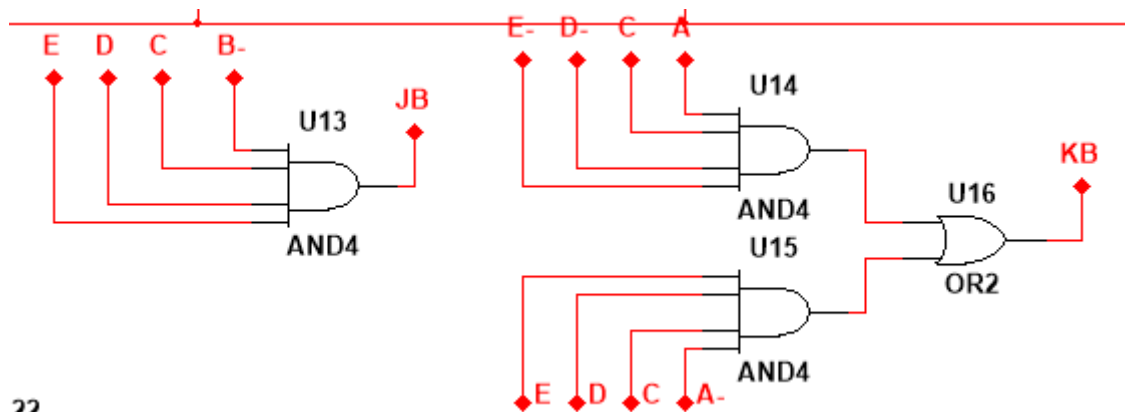
FLIP FLOP:



JA Y KA

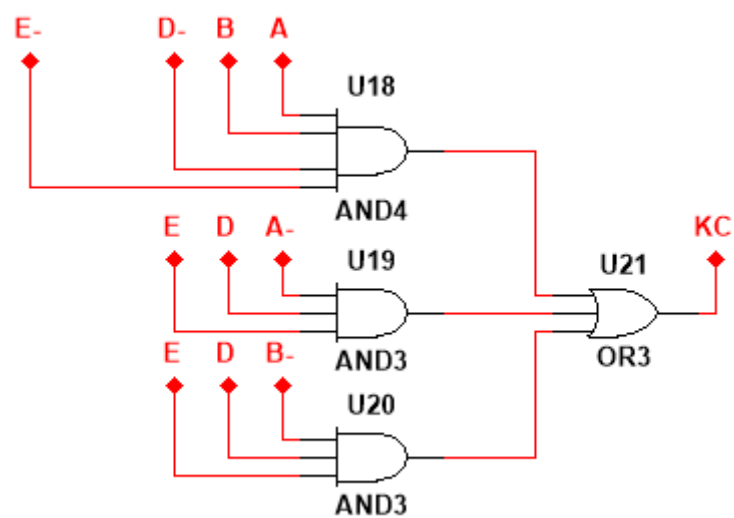
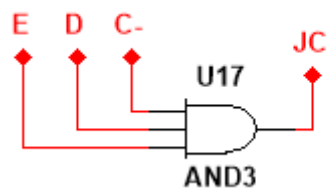


JB Y KB

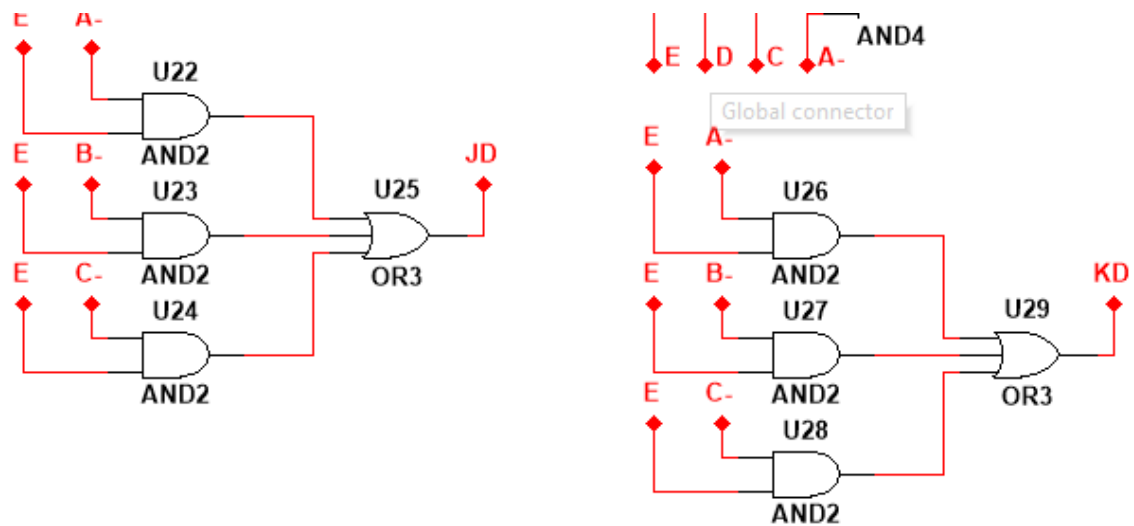


22

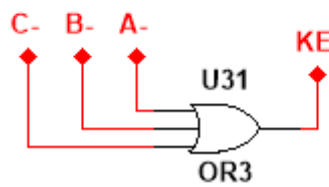
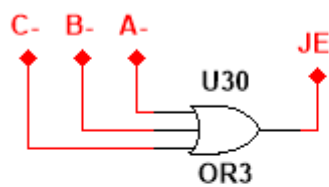
JC Y KC



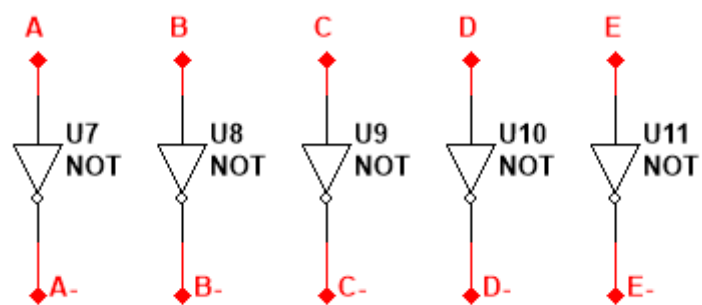
JD Y KD



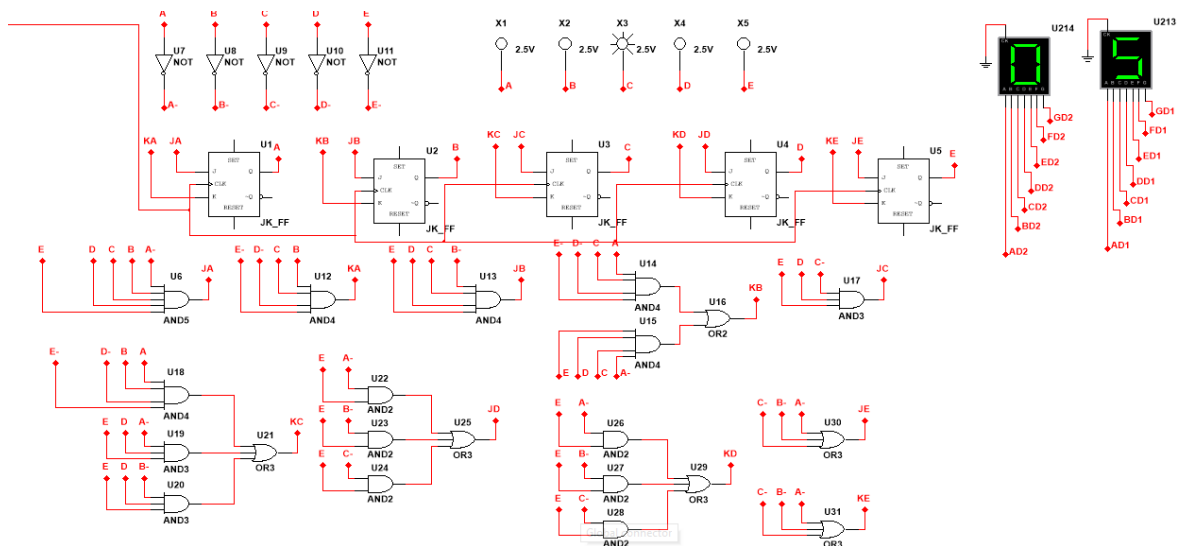
JE Y KE



FUNCIONES

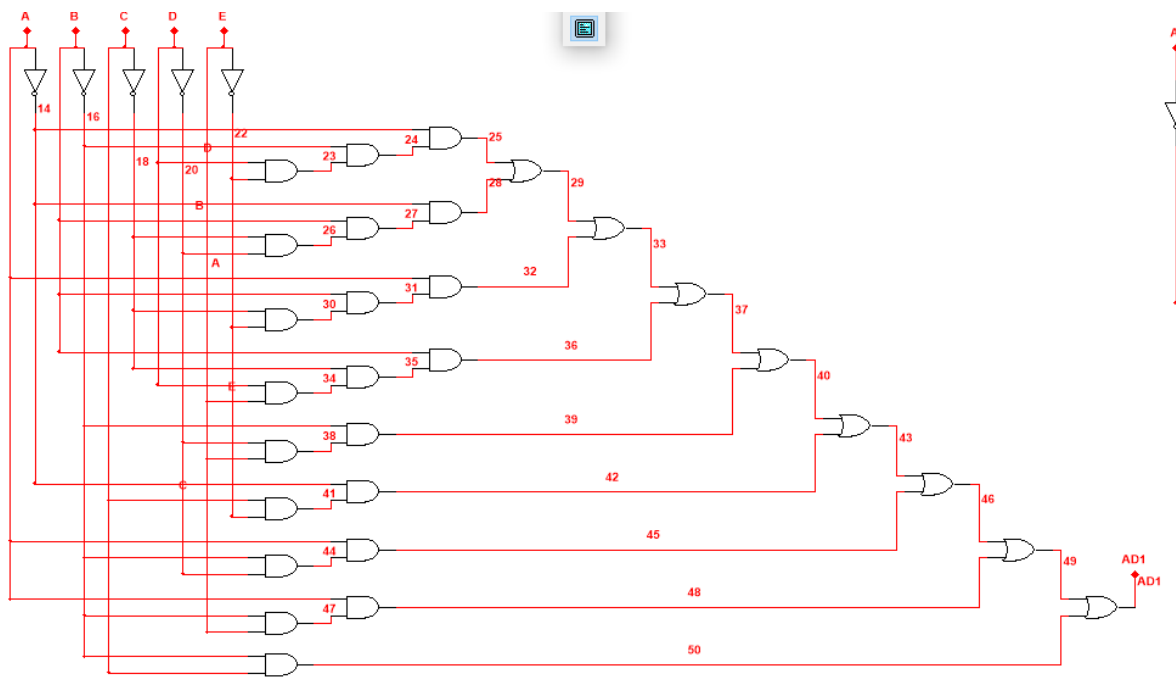


CIRCUITO COMPLETO

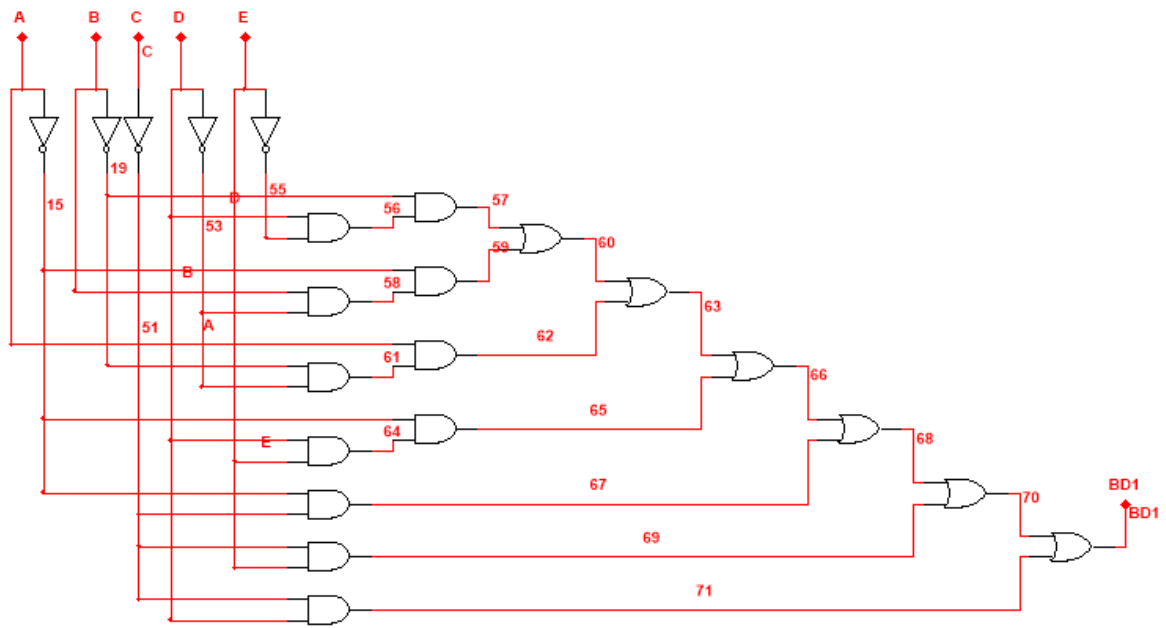


FUNCIONES DISPLAY IZQUIERDA:

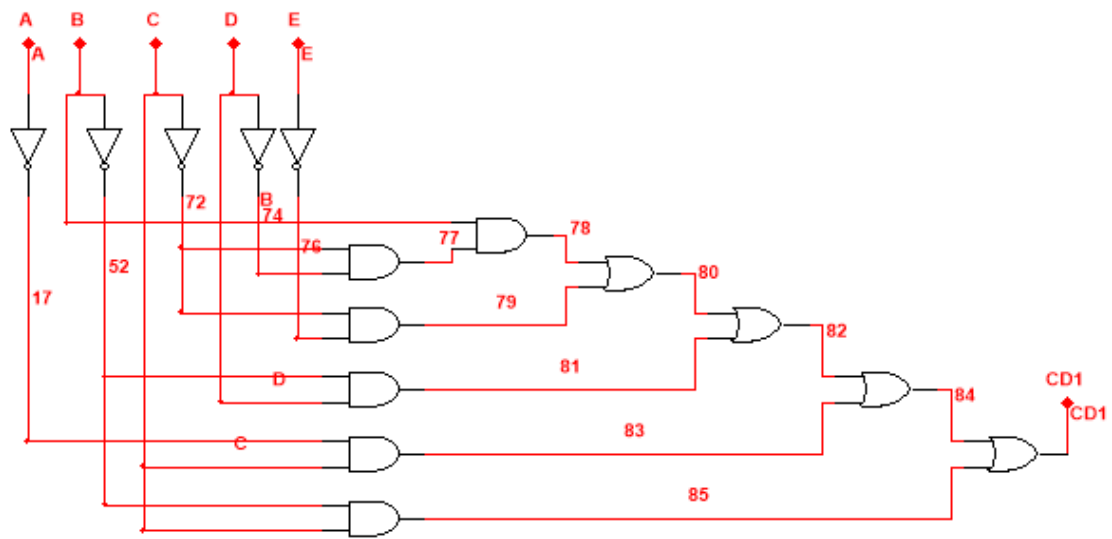
A



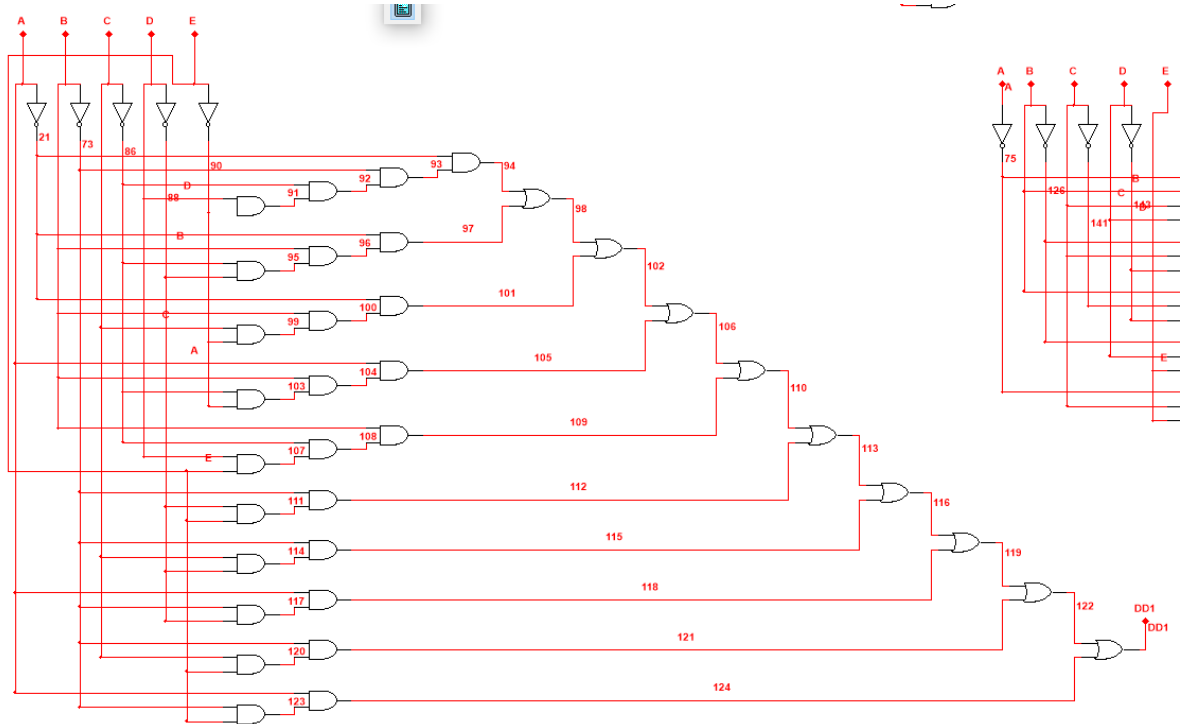
B



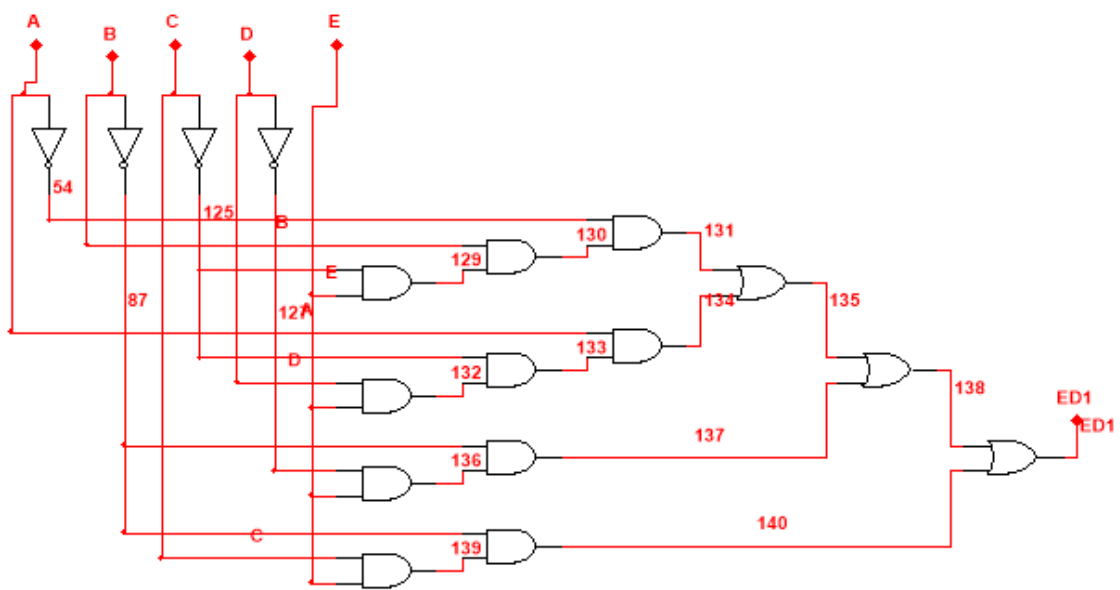
C



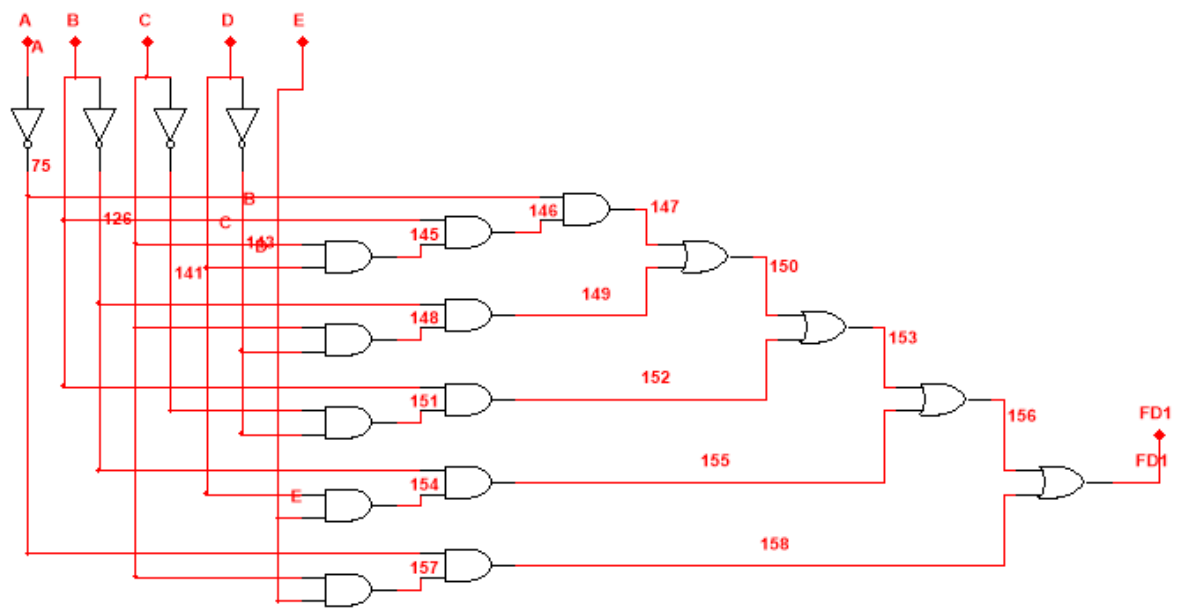
D



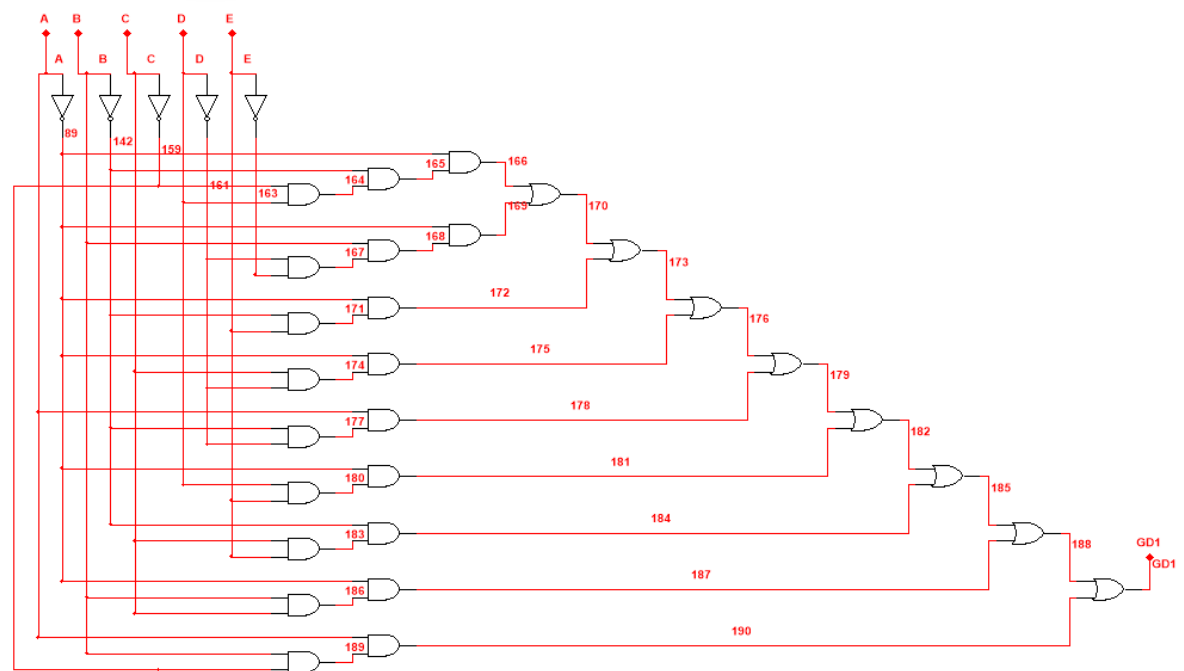
E



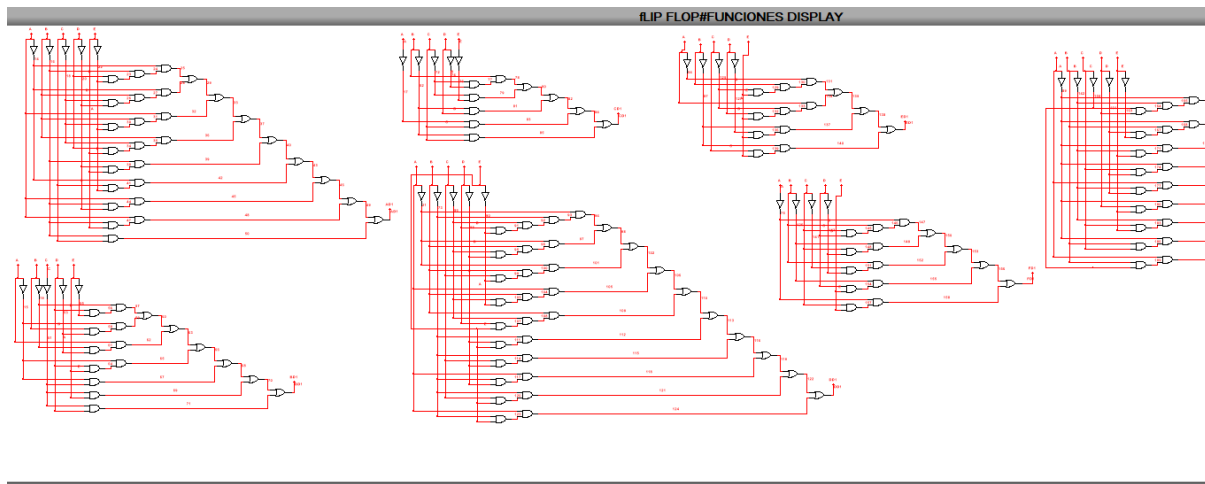
F



G

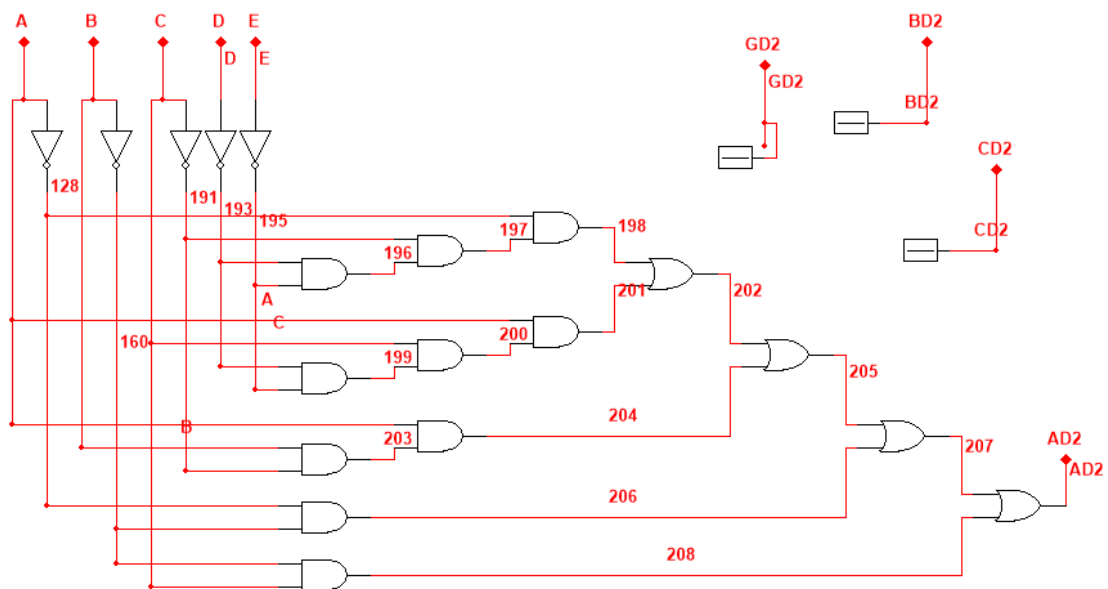


CIRCUITO COMPLETO:

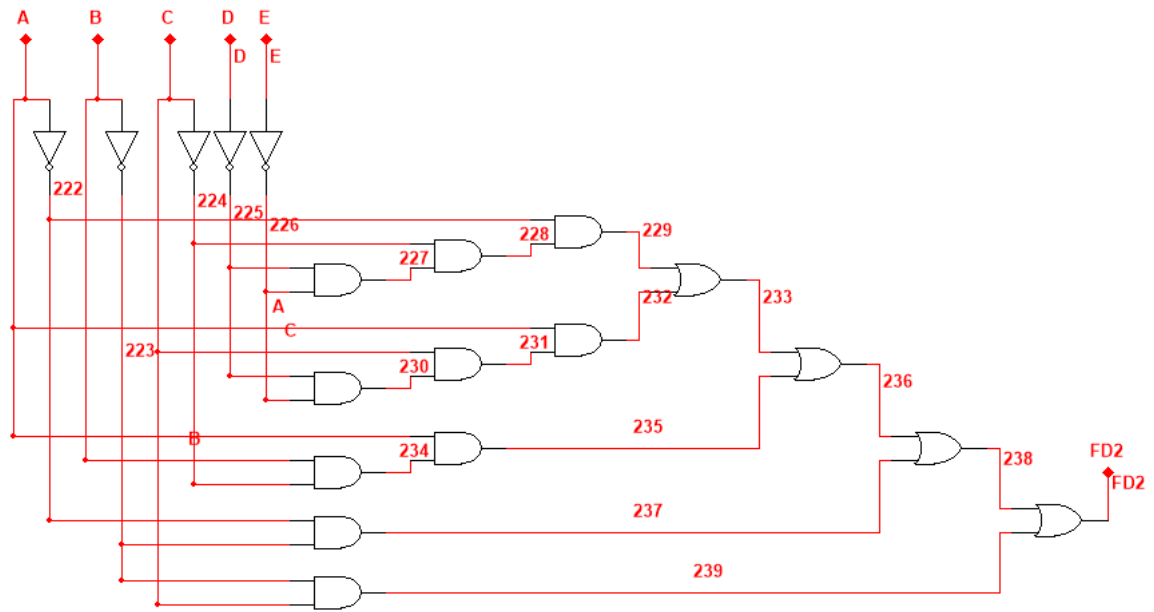


DISPLAY IZQUIERDA:

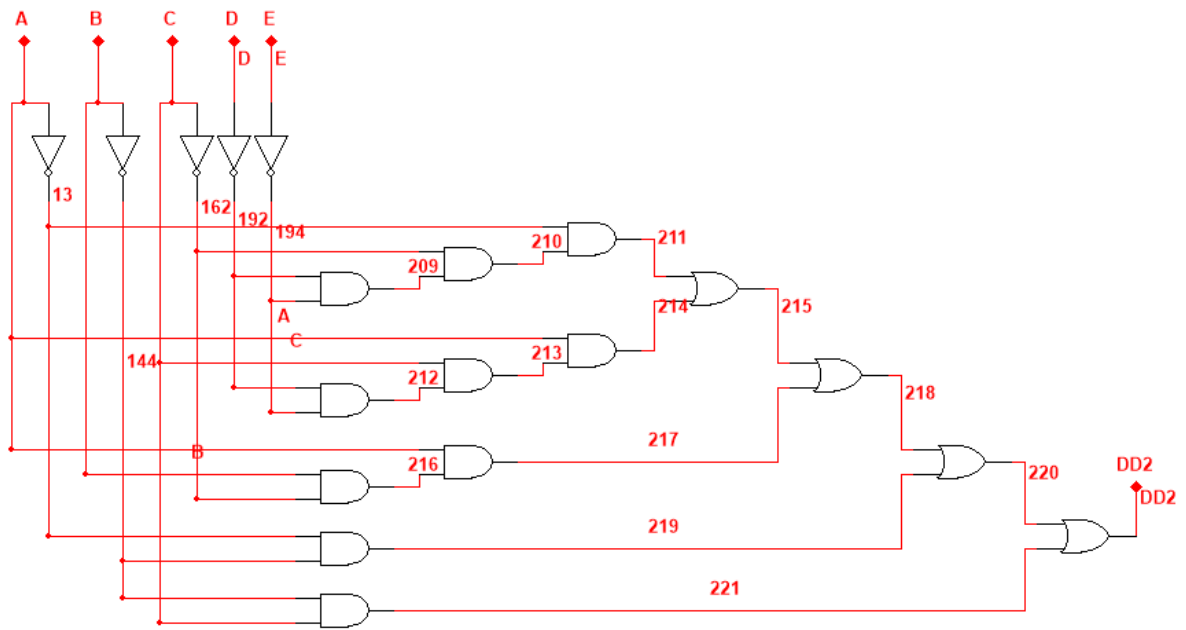
A, B, C, G



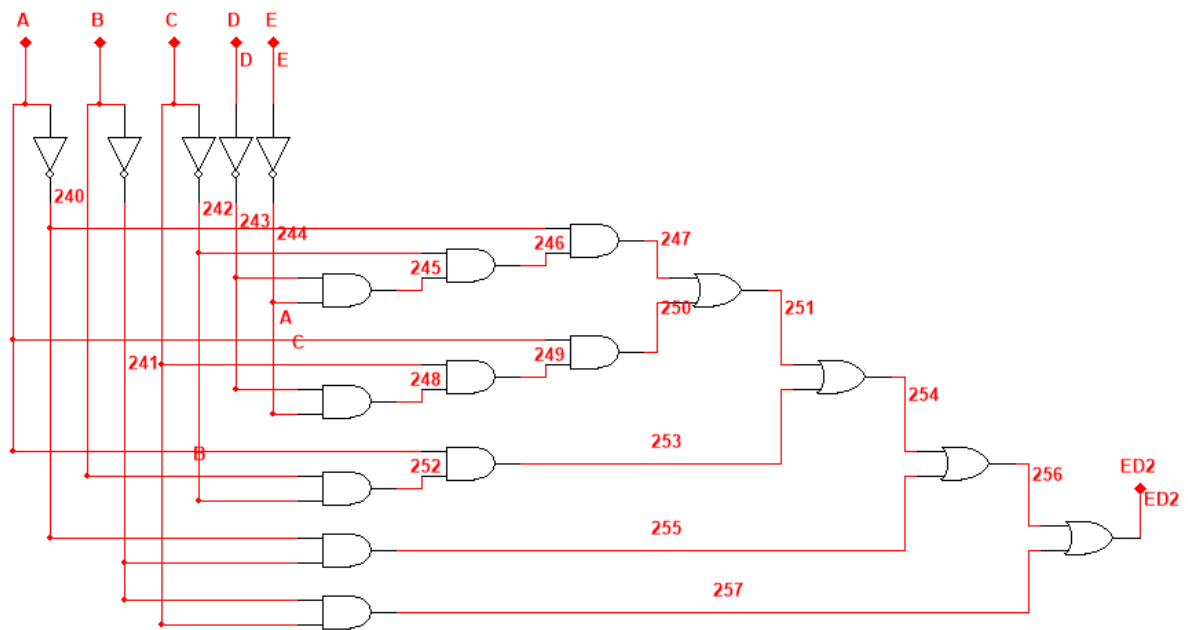
F



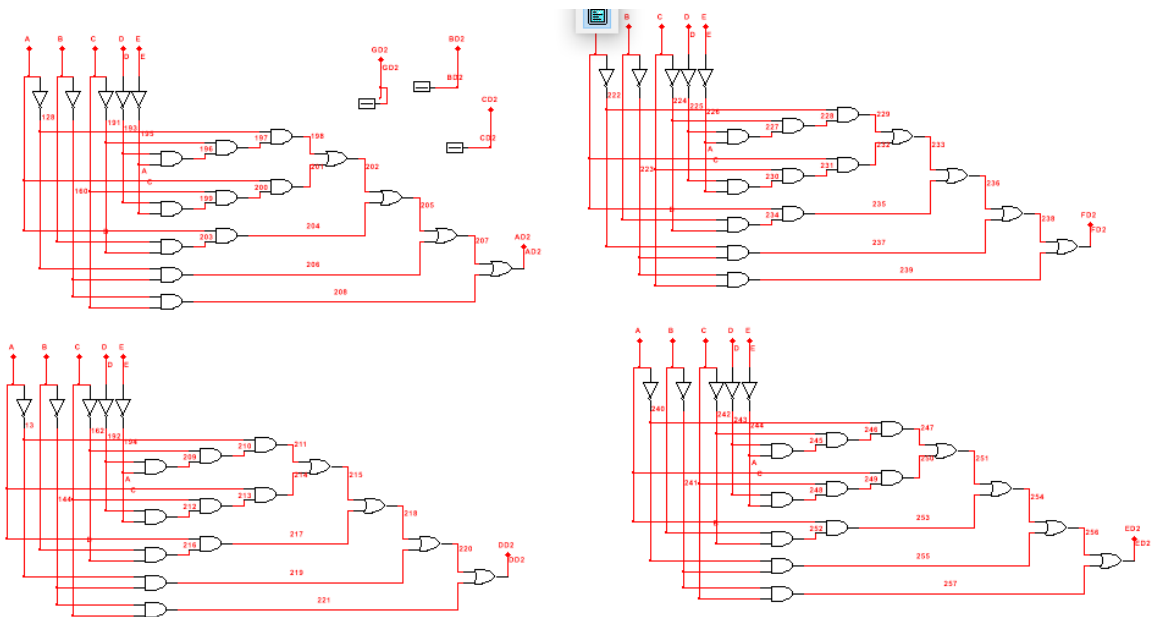
D



E



COMPLETO:



DISPLAY CONECTADO:

