Soluciones del examen de Diseño Lógico – Febrero 2007

Ejercicio 1

	00	01	11	10	00	01	11	10
a	c	**a**	b	--		0		
b	--	a	**b**	d			1	
c	**c**	f	d	e	0			
d	**d**	a	**d**	**d**	0		0	0
e	f	**e**	b	**e**		1		1
f	**f**	**f**	d	--	0	0		

Minimización:

a ~ b
c ~ f

Nuevos estados:

α : a y b
β : c y f
Λ : d
μ : e

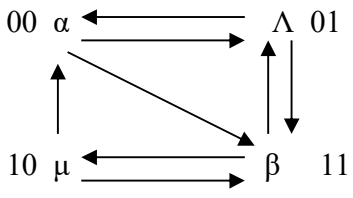
b	✓				
c	~~b-d~~ a-f	~~a-f~~ ~~b-d~~ d-e			
d	~~b-d~~ c-d	X	~~a-f~~ ~~c-d~~		
e	X	~~a-c~~ ~~d-c~~	c-f ~~f-e~~ d-b	X	
f	~~b-d~~ ~~c-f~~	~~a-f~~ ~~b-d~~	✓	~~a-f~~ ~~d-b~~	X
	a	**b**	**c**	**d**	**e**

Nueva tabla:

	00	01	11	10	00	01	11	10
α	β	**α**	**α**	Λ	--	0	1	--
β	**β**	**β**	Λ	μ	0	0	--	--
Λ	**Λ**	α	**Λ**	**Λ**	0	--	0	0
μ	β	**μ**	α	**μ**	--	1	--	1

Eliminación de Carreras:

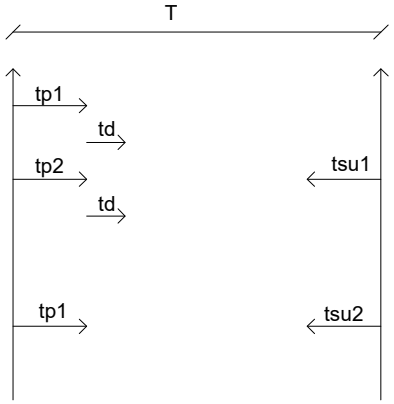
	00	01	11	10	00	01	11	10
α - 00	~~β~~ μ	**α**	**α**	Λ	--	0	1	--
β – 11	**β**	**β**	Λ	μ	0	0	--	--
Λ - 01	**Λ**	α	**Λ**	**Λ**	0	--	0	0
μ -10	β	**μ**	α	**μ**	--	1	--	1



Eliminación de espurios:

	00	01	11	10	00	01	11	10
00	10	**00**	**00**	01	0	**0**	**1**	X
01	**01**	00	**01**	**01**	**0**	0	**0**	**0**
11	**11**	**11**	01	10	**0**	**0**	0	x
10	11	**10**	00	**10**	0	**1**	1	**1**

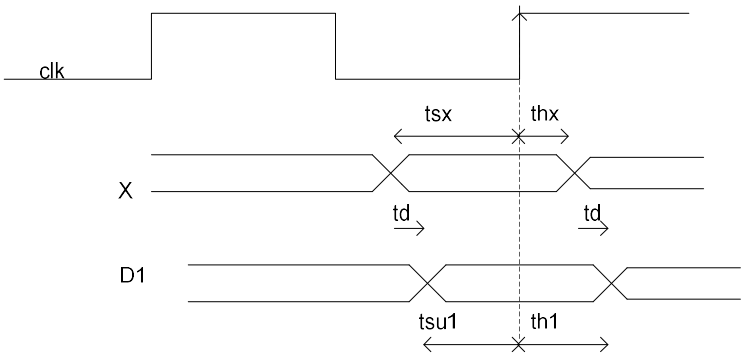
Ejercicio 2



$T_1 \geq máx\{tp1_{max}, tp2_{max}\} + td_{max} + tsu1$

$T_2 \geq tp1_{max} + tsu2$

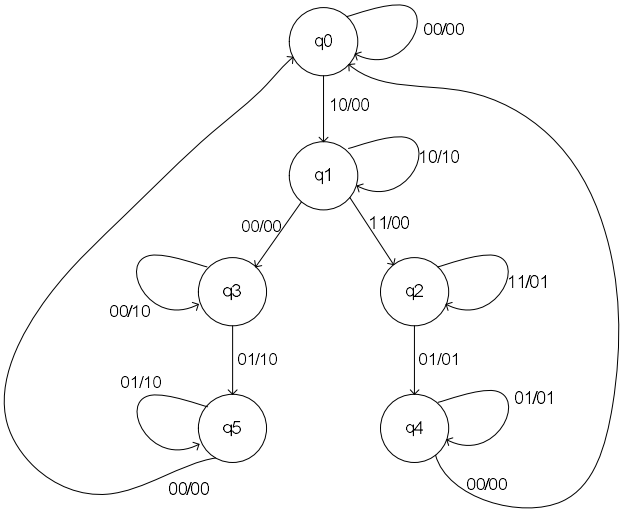
$T = máx\{T_1, T_2\}$



$tsx \geq td_{max} + tsu1$

$thx \geq th1 - td_{min}$

Problema 1



S1S2	00	01	11	10	00	01	11	10
0	0			1	00			00
1	3		2	1	00		00	00
2		4	2			01	01	
3	3	5			10	10		
4	0	4			00	01		
5	0	5			00	10		

Minimización de estados

1	~~0 3~~				
2	✓	X			
3	X	X	~~4 5~~		
4	✓	~~0 3~~	✓	X	
5	✓	~~0 3~~	X	X	X
	0	1	2	3	4

(0,2) (0,4) (0,5)
(2,4)

a = (0,2,4) 00
b = (1) 01
c = (3) 11
d = (5) 10

S1S2	00	01	11	10	00	01	11	10
a	a	a	a	b	00	01	01	00
b	c		a	b	00		00	00
c	c	d			10	10		
d	a	d			00	10		

	00	01	11	10	00	01	11	10
00	00	00	00	01	00	01	01	00
01	11		00	01	00		00	00
11	11	10			10	10		
10	00	10			00	10		

y1y0\S1S2	00	01	11	10
00	0	0	0	0
01	1		0	0
11	1	1		
10	0	1		

D1 = y0./S1 + y1.S2

	00	01	11	10
00	0	0	0	1
01	1		0	1
11	1	0		
10	0	0		

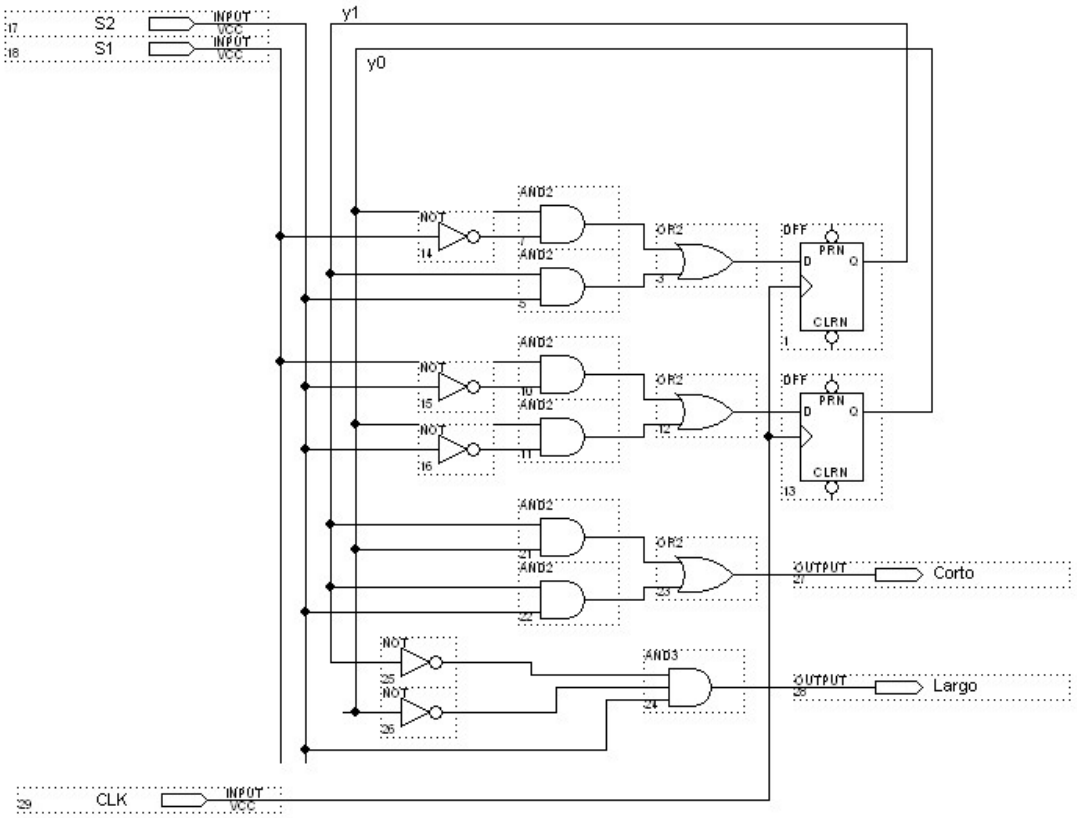
D0 = S1./S2 + y0./S2

	00	01	11	10
00	0	0	0	0
01	0		0	0
11	1	1		
10	0	1		

corto = y1.y0 + y1.S2

	00	01	11	10
00	0	1	1	0
01	0		0	0
11	0	0		
10	0	0		

largo = /y1./y0.S2


S2
INPUT
VCC
S1
INPUT
VCC
y1
y0
NOT
AND2
OR2
DFF
PRN
D
Q
CLRN
OUTPUT
Corto
Largo
AND3
CLK
INPUT
VCC

S O L U C I Ó N

PROBLEMA 2

MODULE: CHECKSUM
INPUTS: X[7..0], Start
OUTPUTS: Z[7..0], Cant[7:0]
MEMORY: CHK[7..0], CONT[7..0]

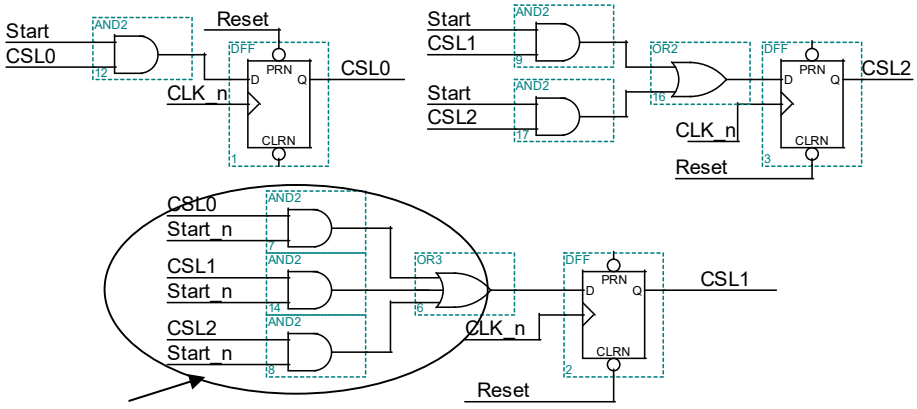
0. → (Start, /Start) / (0, 1)

1. Z = X . Start
   CONT ← 0
   CHK ← X
   → (Start, /Start) / (2, 1)

2. Z = X . Start + CHK . /Start
   CONT ← INC (CONT)
   CANT = CONT . /Start
   CHK ← CHK + X
   → (Start, /Start) / (2, 1)

ENDSEQUENCE
CONTROLRESET(0)
END

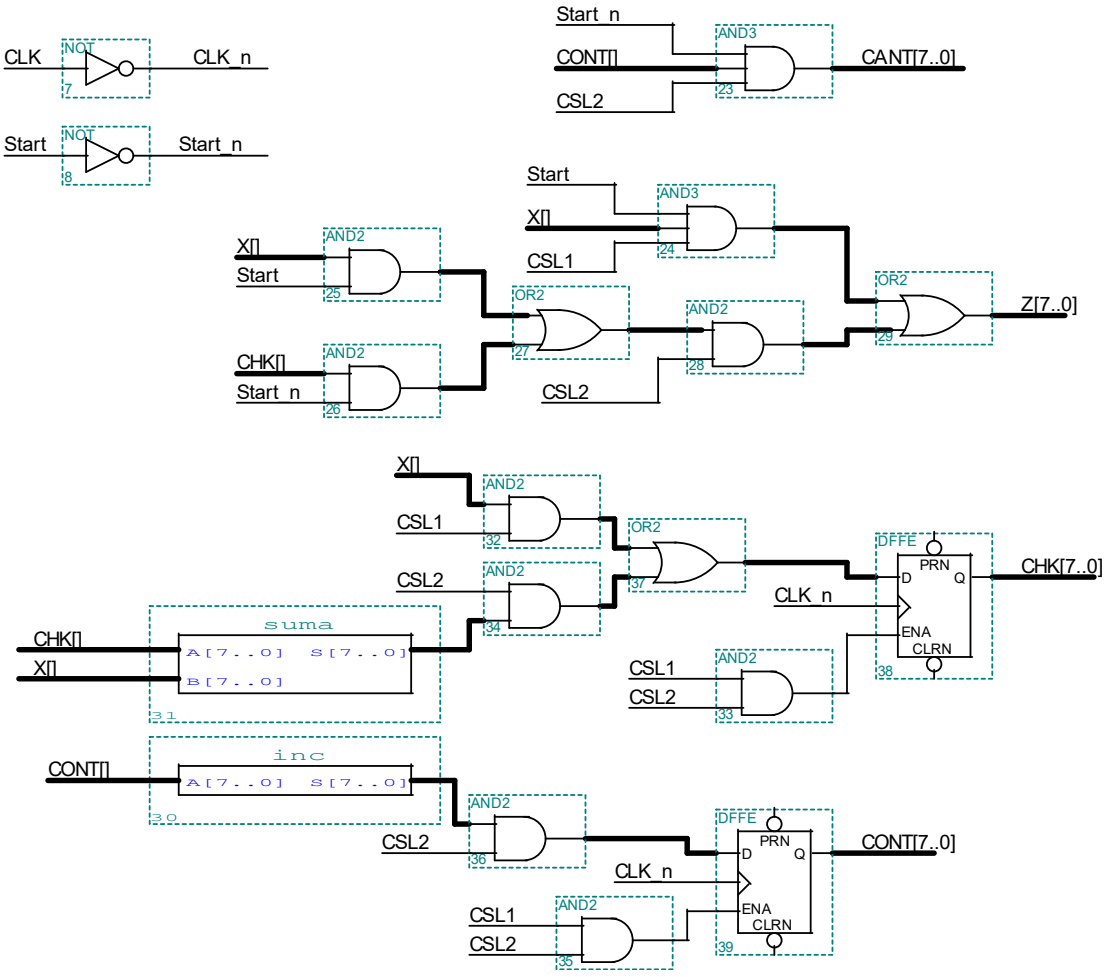
BLOQUE DE CONTROL



Que es lo mismo que **Start_n**

S O L U C I Ó N

BLOQUE DE DATOS



Con la solución dada, las transiciones de dan en los flancos de bajada.
Sustituyendo CLK_n por CLK, se darían en los flancos de subida.