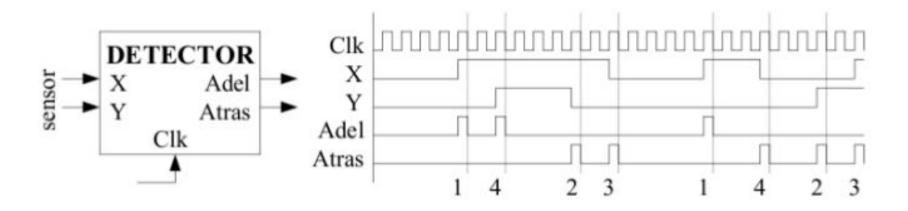
Auxiliar 2: Circuitos Secuenciales

CC4301 - Arquitectura de Computadores

Profesor: Luis Mateu Auxiliar: José Astorga

25 Marzo 2020

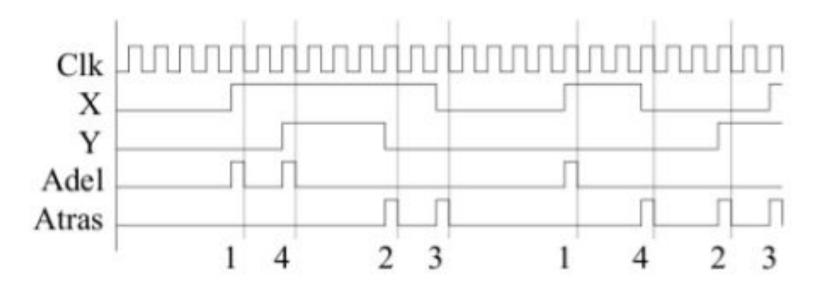
P1.a Examen 2016: **DETECTOR**



P1.a Examen 2016: **DETECTOR**

- I. Un paso hacia adelante, colocando un 1 en la salida de ADEL.
 - A. Cuando X e Y iguales, si cambia X. (1)
 - B. Cuando X e Y distintos, si cambia Y. (4)
- II. Un paso hacia atrás, colocando un 1 en la salida ATRAS.
 - A. Cuando X e Y iguales, si cambia Y. (3)
 - B. Cuando X e Y distintos, si cambia X. (2)
- III. Si no registró movimiento, colocando ambas líneas en 0.

Diagrama de Tiempo



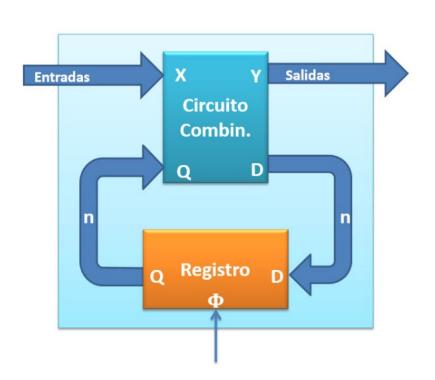


Diagrama de Estados

Estado	STEEL STORY

Diagrama de Estados

Estado	(X)	(Y)
A	0	0
В	1	0
\mathbf{C}	1	1
D	0	1

1571

X Y / Del Atrás

Stado	(X)	(Y)
A	0	0
В	1	0
\mathbf{C}	1	1
D	0	1
	'	

A

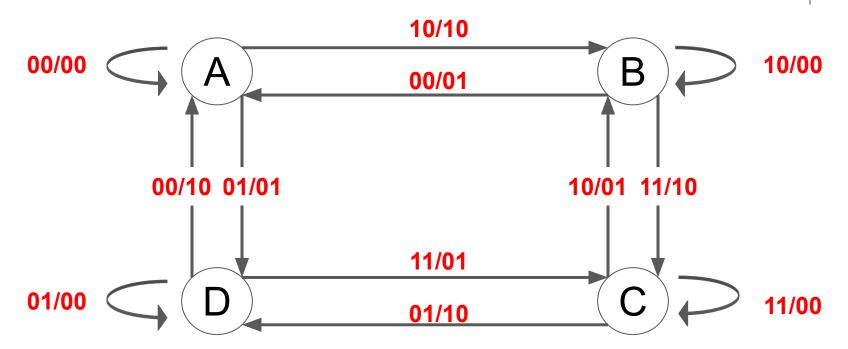
B



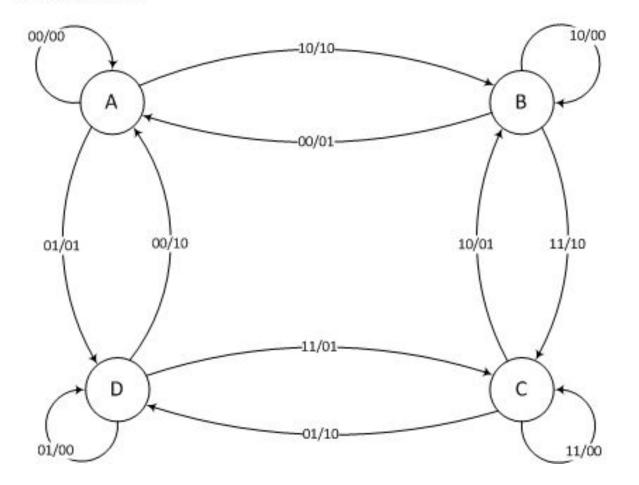


XY/Del Atrás

Estado	(X)	(Y)
A	0	0
В	1	0
\mathbf{C}	1	1
D	0	1

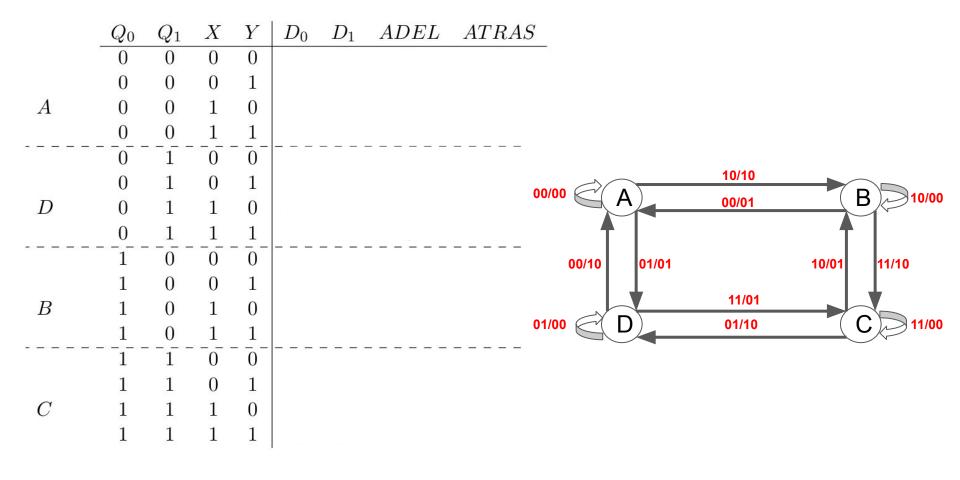


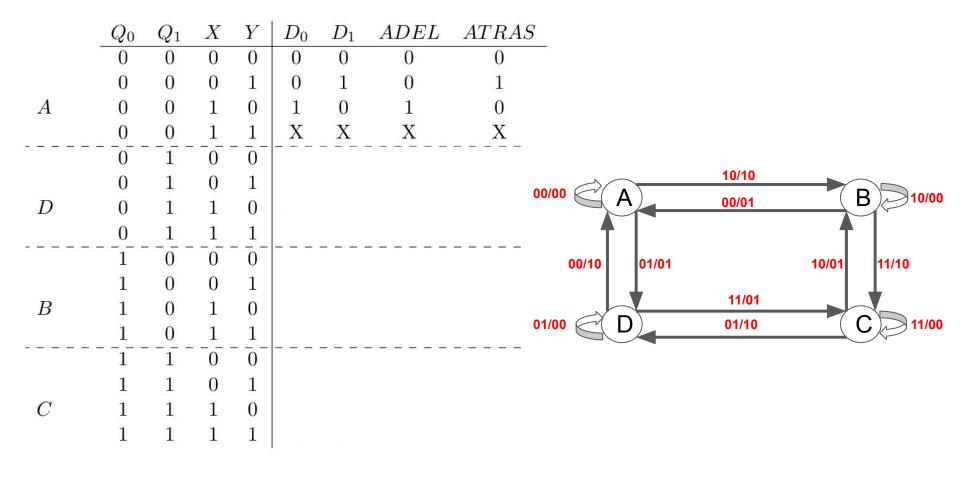
X Y/Adel Atras

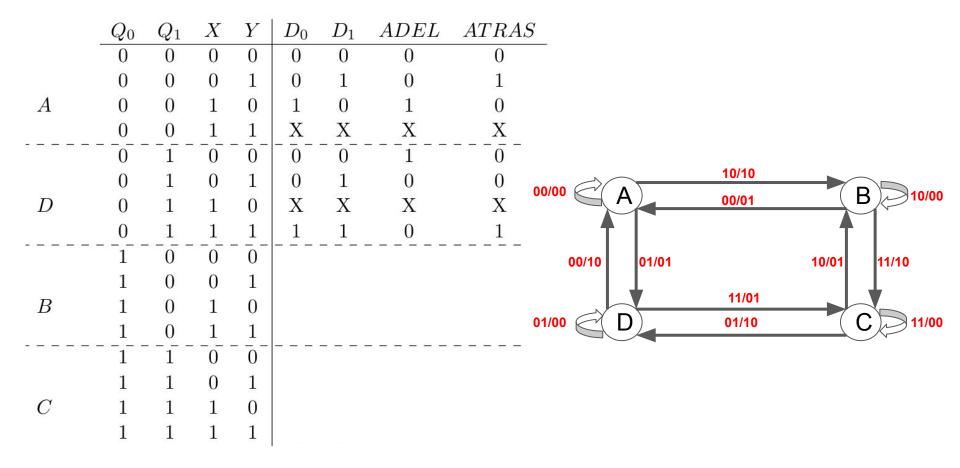


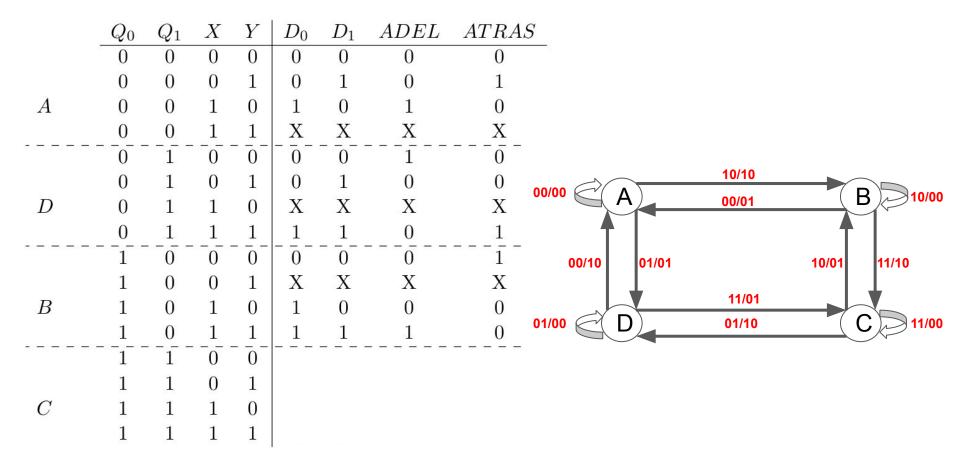
Codificación de Estados

	(X)	(Y)
Estado	Q_0	Q_1
A	0	0
В	1	0
\mathbf{C}	1	1
D	0	1









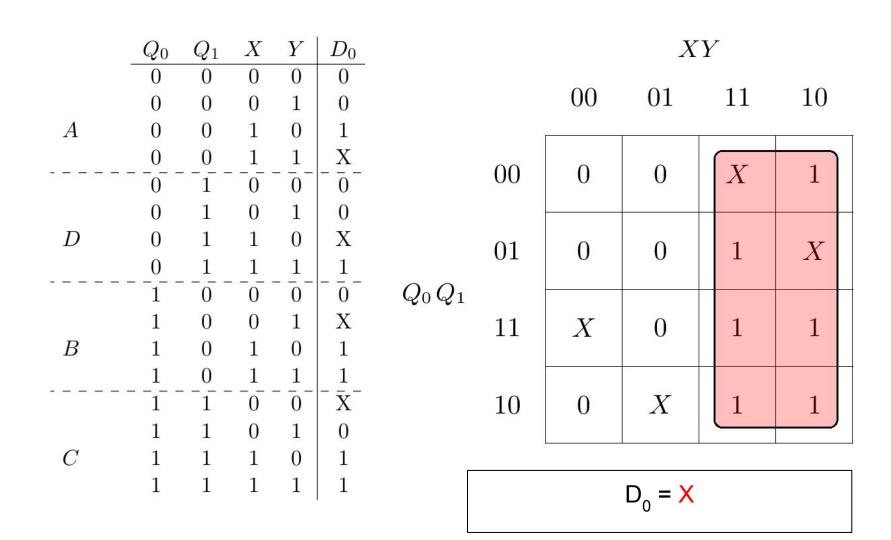
	Q_0	Q_1	X	Y	D_0	D_1	ADEL	ATRA	S_{-}
	0	0	0	0	0	0	0	0	
	0	0	0	1	0	1	0	1	
A	0	0	1	0	1	0	1	0	
	0	0	1	1	X	X	\mathbf{X}	\mathbf{X}	
	0	1	0	0	_ 0_	0	1	0	
	0	1	0	1	0	1	0	0	00/00 Δ Δ 20/01 R 10/00
D	0	1	1	0	\mathbf{X}	\mathbf{X}	X	\mathbf{X}	00/00 A 00/01 B 10/00
	0	1	1	1	1	1	0	1	† †
	1	-0	0	0	_ 0 _	0	0		00/10 01/01 10/01 11/10
	1	0	0	1	\mathbf{X}	\mathbf{X}	X	X	
B	1	0	1	0	1	0	0	0	11/01
	1	0	1	1	1	1	1	0	01/00 D 01/10 C 11/00
	1	1	0	0	\bar{X}	_ X	_X	_X -	
	1	1	0	1	0	1	1	0	
C	1	1	1	0	1	0	0	1	
	1	1	1	1	1	1	0	0	

	Q_0	Q_1	X	Y	D_0	D_1	ADEL	ATRAS
	0	0	0	0	0	0	0	0
	0	0	0	1	0	1	0	1
A	0	0	1	0	1	0	1	0
	0	0	1	1	X	X	\mathbf{X}	X
	0	1	0	0	0	0	1	0
	0	1	0	1	0	1	0	0
D	0	1	1	0	X	X	\mathbf{X}	\mathbf{X}
	0	1	1	1	1	1	0	1
	1	0	0	0	0	0	0	1
	1	0	0	1	X	X	\mathbf{X}	\mathbf{X}
B	1	0	1	0	1	0	0	0
	1	0	1	1	1	1	1	0
	1	1	0	0	\bar{X}	\bar{X}	<u>x</u>	X
	1	1	0	1	0	1	1	0
C	1	1	1	0	1	0	0	1
	1	1	1	1	1	1	0	0

	$\frac{Q_0}{0}$	Q_1	$\frac{X}{0}$	$\frac{Y}{0}$	D_0				X	Y	
	0	0	0	1	0			00	01	11	10
A	0	0	1	0	1						
	0	0	1	1	X						
\$ 1 225-225-225-225-2	0	1	0	0	_ 0_		00				
	0	1	0	1	0						
D	0	1	1	0	X						
	0_	1	_1_	_ 1_	1		01				
	1	0	0	0	0	Q_0Q_1					
	1	0	0	1	X	Q0Q1					
B	1	0	1	0	1		11				
	1	0	1	1	1						
	1	1	0	0	\bar{X}		10				
	1	1	0	1	0		10				
C	1	1	1	0	1						γ:
	1	1	1	1	1						

	Q_0	Q_1	X	Y	D_0				X	Y	
A	0 0 0	0 0 0	$0 \\ 0 \\ 1$	0 1 0	$\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$			00	01	11	10
	0 -	- <u>0</u> -	$-\frac{1}{0}$	$-\frac{1}{0}$	$-\frac{X}{0}$		00	0	0	X	1
D	$0 \\ 0 \\ 0$	1 1 1	$egin{array}{c} 0 \ 1 \ 1 \end{array}$	$\begin{array}{c} 1 \\ 0 \\ 1 \end{array}$	0 X 1		01	0	0	1	X
В	1 1 1 1	0 0	$\begin{array}{c} 0 \\ 0 \\ 1 \end{array}$	$\begin{bmatrix} - & - & - \\ 0 & 1 \\ 0 & \end{bmatrix}$	7 0 X 1	Q_0Q_1	11	X	0	1	1
	- <u>1</u> - 1 - 1 1	$-\frac{0}{1}$	$\begin{bmatrix} 1 \\ 0 \end{bmatrix}$	$-\frac{1}{0}$	$\begin{bmatrix} -\frac{1}{X} - \\ 0 \end{bmatrix}$		10	0	X	1	1
C	1 1	1 1	1 1	0	$egin{array}{c} 1 \\ 1 \end{array}$						

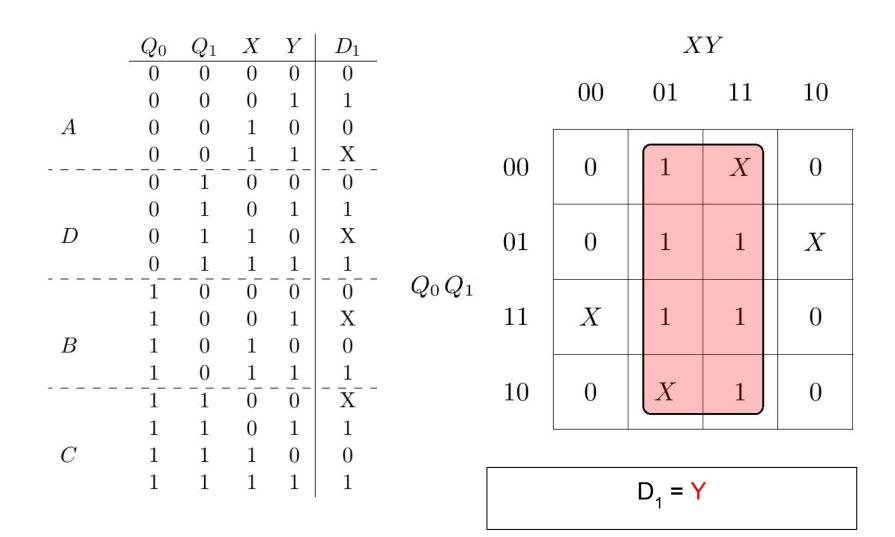
	Q_0	Q_1	X		D_0				X	Y	
A	0 0 0	0 0 0	0 0 1	$\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$	0 0 1			00	01	11	10
	0 -	$-\frac{0}{1}$	$-\frac{1}{0}$	$-\frac{1}{0}$	$-\frac{X}{0}$		00	0	0	$\int X$	1
D	$0 \\ 0 \\ 0$	1 1 1	0 1 1	$egin{array}{c c} 1 & \\ 0 & \\ 1 & \end{array}$	0 X 1		01	0	0	1	X
В	1 1 1	0 0 0	0 0 1	$\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$	X 1	Q_0Q_1	11	X	0	1	1
	$-\frac{1}{1}$ 1	$\begin{array}{c} -0 \\ -1 \\ 1 \end{array}$	$\begin{bmatrix} -1 \\ 0 \end{bmatrix}$	$\begin{bmatrix} 1 \\ 0 \end{bmatrix}$	$-\frac{1}{X}$		10	0	X	1	1
C	1	1 1	1 1	$\begin{bmatrix} 0 \\ 1 \end{bmatrix}$	1 1				1		



	Q_0	Q_1	X	Y	D_1				X	Y	
	0	$0 \\ 0$	$0 \\ 0$	0 1	$\begin{bmatrix} 0 \\ 1 \end{bmatrix}$			00	01	11	10
A	0	0	1	0	0						
	0	_0_	_1_	_ 1	_ X		00				
	0	1	0	0	0		00				
	0	1	0	1	1						
D	0	1	1	0	X		01				
	0	_ 1	_1_	_ 1	11	0.0					
	1	0	0	0	0	$Q_0 Q_1$					
	1	0	0	1	X		11				
B	1	0	1	0	0			,			
	_ 1	_0_	_1_	_ 1_	1		10				
	1	1	0	0	_ X _		10				
	1	1	0	1	1						
C	1	1	1	0	0						
	1	1	1	1	1						

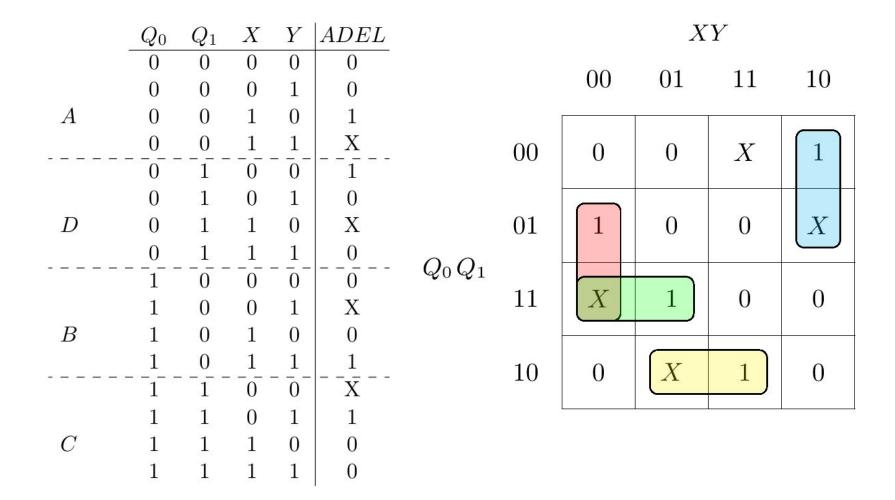
	Q_0	Q_1	X	Y	D_1				X	Y	
4	0	0 0 0	0 0	0 1 0	0 1			00	01	11	10
A	$-\frac{0}{0}$	0 <mark>0</mark> - 1	$\begin{array}{c} 1 \\ -\frac{1}{0} \end{array}$	$-\frac{0}{0}$	$\begin{bmatrix} 0 \\ -\frac{X}{0} \end{bmatrix}$		00	0	1	X	0
D	0 0 0	1 1 1	0 1 1	$\begin{matrix} 1 \\ 0 \\ 1 \end{matrix}$	1 X 1		01	0	1	1	X
	1 1	0 0	0	$\begin{bmatrix} - & - \\ 0 & 1 \end{bmatrix}$	 X	$Q_0 Q_1$	11	X	1	1	0
B	1 1 - 1	0 - 0 - 1	$\begin{bmatrix} 1 \\ -\frac{1}{0} \end{bmatrix}$	$0 \\ -\frac{1}{0} -$	$-\frac{0}{X}$		10	0	X	1	0
C	1 1 1	1 1 1	0 1 1	1 0 1	1 0 1		,				

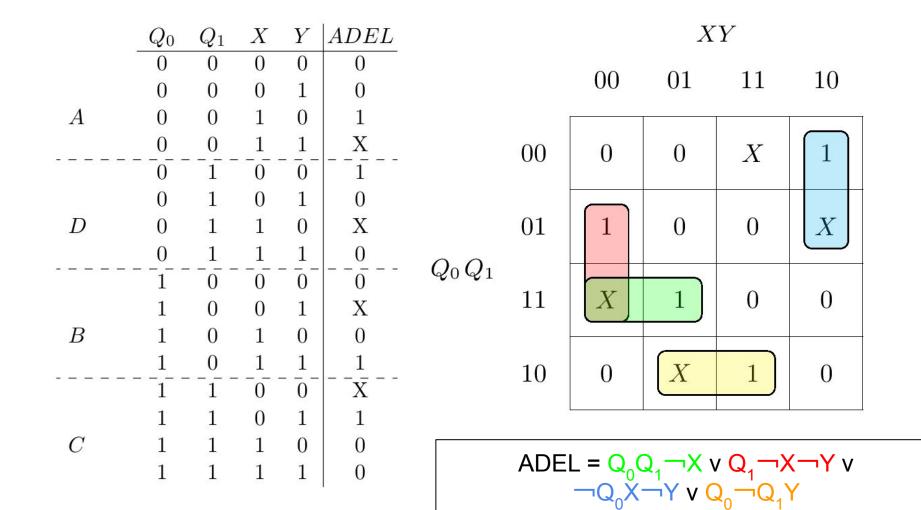
	Q_0	Q_1	X	Y	D_1				X	Y	
	0	0	0	0	0 1			00	01	11	10
A	$-\frac{0}{0}$	$\begin{bmatrix} 0 \\ -\frac{0}{1} \end{bmatrix}$	$\begin{bmatrix} 1 \\ -\frac{1}{0} \end{bmatrix}$	$0 \\ -\frac{1}{0} -$	$\begin{bmatrix} 0 \\ X \\ -\frac{X}{0} \end{bmatrix}$		00	0	1	X	0
D	0	1 1	0 1	1 0	1 X		01	0	1	1	X
	$-\frac{0}{1}$	$-\frac{1}{0}$ - 0	$\begin{bmatrix} -\frac{1}{0} \\ 0 \end{bmatrix}$	$-\frac{1}{0}$	$\begin{bmatrix} -\frac{1}{0} \\ X \end{bmatrix}$	$Q_0 Q_1$	11	X	1	1	0
B	1 1	0	1 1	0	$\begin{bmatrix} X \\ 0 \\ 1 \end{bmatrix}$				0000		
	1 1	1 1	0	$\begin{bmatrix} - & - & - \\ 0 & 1 \end{bmatrix}$	- X - 1		10	0	$\bigcup X$	1	0
C	1 1	$1 \\ 1$	1 1	$0 \\ 1$	$\begin{bmatrix} 0 \\ 1 \end{bmatrix}$						



	Q_0	Q_1	X	Y	ADEL				X	Y	
	0	0	0	0	0			00	01	11	10
	0	0	0	1	0			00	01	11	10
A	0	0	1	0	1						72
	0	0	1	1	X		00				
	0	1	0	0	1						
	0	1	0	1	0						
D	0	1	1	0	X		01				
	0	1	1	1	0	0.0					
	1	-0	0	0	0	Q_0Q_1					
	1	0	0	1	X		11				
B	1	0	1	0	0						
	1	0	1	1	1		10				
	1	1^{-}	0	_ 0_	_ X		10				
	1	1	0	1	1						355
C	1	1	1	0	0						
	1	1	1	1	0						

	Q_0	Q_1	X	$Y \mid$	ADEL				X	Y	
	0	0	0	$\begin{bmatrix} 0 \\ 1 \end{bmatrix}$	0 0			00	01	11	10
A	$\begin{array}{c} 0 \\ - \begin{array}{c} 0 \\ - \end{array}$	$\begin{bmatrix} 0 \\ -\frac{0}{1} \end{bmatrix}$	$\begin{array}{c} 1 \\ -\frac{1}{0} \end{array}$	$\begin{bmatrix} 0 \\ -\frac{1}{0} \end{bmatrix}$	1 X 1		00	0	0	X	1
D	0	1 1	0 1	1 0	0 X		01	1	0	0	X
	$-\frac{0}{1}$	$-\frac{1}{0} - \frac{1}{0}$	$\begin{array}{c} 1 \\ 0 \\ 0 \end{array}$	$-\frac{1}{0} - \frac{1}{1}$	0 X	$Q_0 Q_1$	11	X	1	0	0
<i>B</i>	1 _ 1 	0	1 1	0 1	0		10	0	X	1	0
C	1 1 1	1 1 1	0 0 1	$\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$	X 1 0						
	1	1	1	1	0						

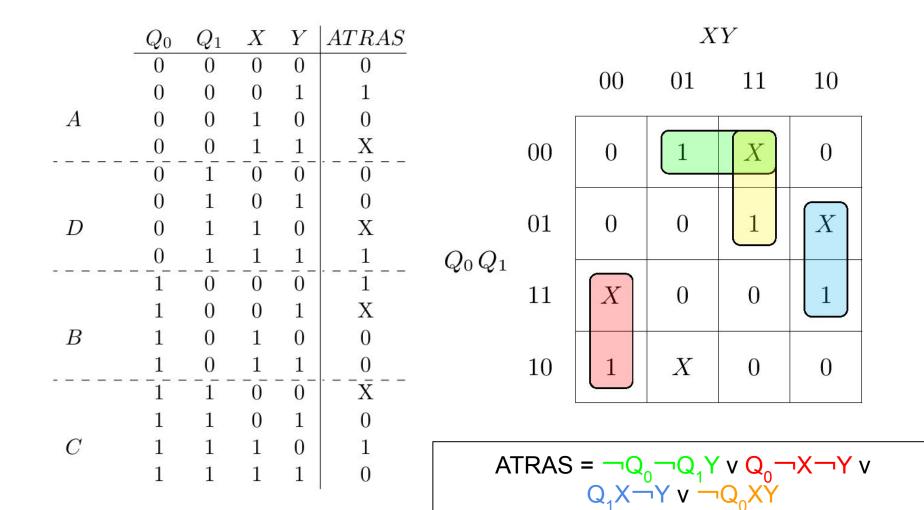




	Q_0	Q_1	X	Y	ATRAS				X	Y	
	0	0	0	0 1	0 1			00	01	11	10
A	0	0	1	0	0						
	0	0 -	1	1	X		00				
	0	1	0	0	0						
	0	1	0	1	0		01				
D	0	1	1	0	X		01				
	0_	_1_	1	_ 1_	11	$Q_0 Q_1$					
	1	0	0	0	1	1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1					
	1	0	0	1	X		11				
B	1	0	1	0	0		10				
	1	0	1	1	0						
	1	1	0	0	_ X						
	1	1	0	1	0						
C	1	1	1	0	1						
	1	1	1	1	0						

	Q_0	Q_1	X	Y	ATRAS				X	Y	
	0	0	0	0	0 1			00	01	11	10
A	0	$0 \\ 0$	1 1	$0 \\ 1$	0 X		00	0	4	V	0
	0 -	1	0	0-	$-\frac{1}{0}$		00	0	1	X	0
D	0	1	0	1	0	Q_0Q_1	01 11	0	0	1	X
	0	$\frac{1}{1}$	1 1	0 1	X 1						71
	1		0	0-	1 1			X	0	0	$\begin{array}{ c c c c } & & & & & & & & & & & & & & & & & & &$
D	1	0	0	1	X		**	71	O .	U	1
B	$\frac{1}{1}$	$0 \\ 0$	1 1	0 1	$\begin{bmatrix} 0 \\ 0 \end{bmatrix}$		10	1	X	0	0
	1	1	0	- 0	X						
C	1	1	0	1	0						
	$\frac{1}{1}$	1 1	1 1	0 1	$\begin{vmatrix} 1 \\ 0 \end{vmatrix}$						

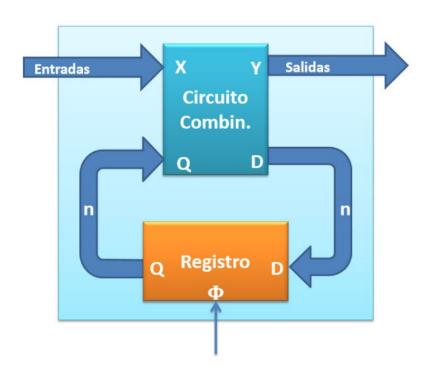
	Q_0	Q_1	X	Y	ATRAS				X	Y	
	0	0	0	0	0			00	01	11	10
	0	0	0	1	1			00	01		10
A	0	0	1	0	0						8
	_ 0	_0_	_1_	1_	X		00	0	1	X	0
	0	1	0	0	0						
	0	1	0	1	0						
D	0	1	1	0	X		01	0	0	$\begin{bmatrix} 1 \end{bmatrix}$	X
	0	1	1	1	1	Q_0Q_1	9				-
	1	0	0	0	1	40 41	11	$\bigcap X$	0	0	1
	1	0	0	1	X		11	1	U	U	
B	1	0	1	0	0		3				
	1	0	1	1	0		10	1	X	0	0
	1	1	0	0	_ X						
	1	1	0	1	0						
C	1	1	1	0	1						
	1	1	1	1	0						



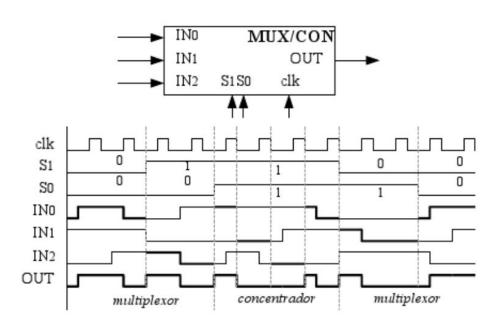
Resumen

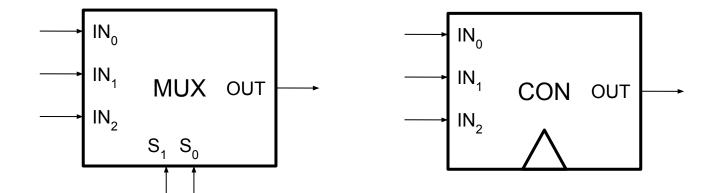
- $D_0 = X$
- $D_1 = Y$
- ADEL = $Q_0Q_1 \neg X \lor Q_1 \neg X \neg Y \lor \neg Q_0 X \neg Y \lor Q_0 \neg Q_1 Y$
- ATRAS = $\mathbf{Q}_0 \mathbf{Q}_1 \mathbf{Y} \mathbf{V} \mathbf{Q}_0 \mathbf{X} \mathbf{Y} \mathbf{V} \mathbf{Q}_1 \mathbf{X} \mathbf{Y} \mathbf{V} \mathbf{Q}_0 \mathbf{X} \mathbf{Y}$

Ahora a construir el circuito ...



P2: P1.b Control 1, 2006





 $S_1 S_2 IN_0 IN_1 IN_2 / OUT$

A

B

C

