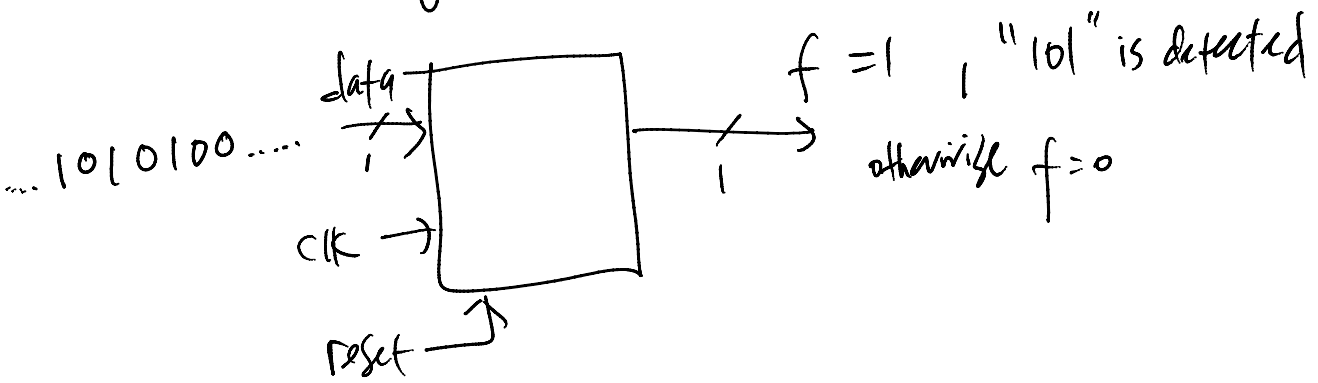
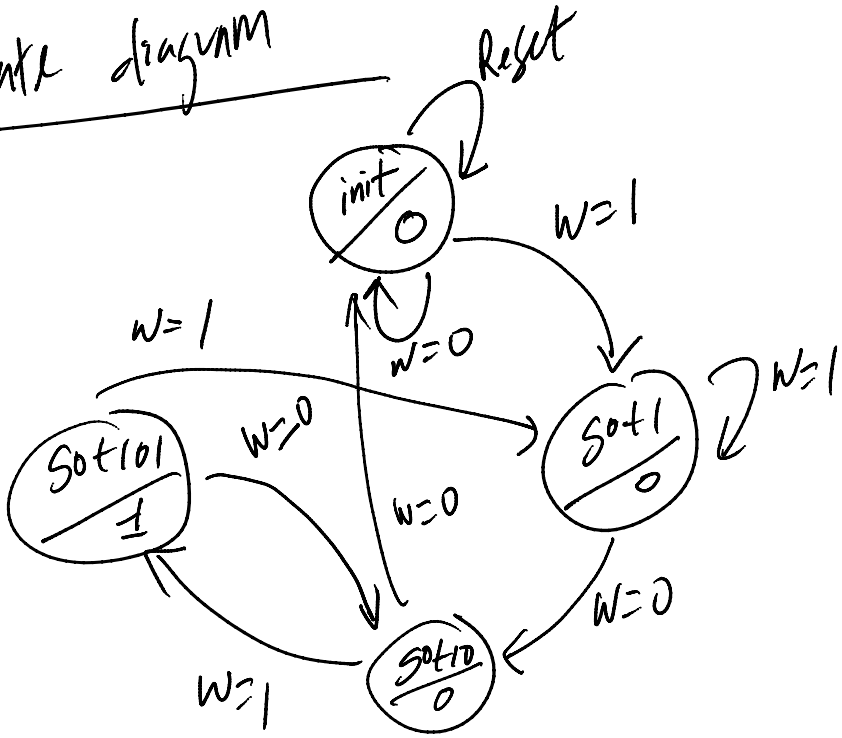
Monday, April 06, 2009
2:08 PM

Sequence detector

bits coming in serially (one bit at a time...)



State diagram



Monday, April 06, 2009
2:08 PM

State table

Present State	Next State W=0	Next State W=1	Output
init	init	got1	0
got1	got10	got1	0
got10	init	got101	0
got101	got10	got1	1

Encode

init = "00"
got1 = "01"
got10 = "10"
got101 = "11"

Present State y_1y_0	Next State W=0 Y_1Y_0	Next State W=1 Y_1Y_0	Output f
00	00	01	0
01	10	01	0
10	00	11	0
11	10	01	1

Y_1

y_1y_0 \ W	0	1
00	0	0
01	1	0
11	1	0
10	0	1

$Y_1 = \bar{W}y_0 + Wy_1\bar{y}_0$

Y_0

y_1y_0 \ W	0	1
00	0	1
01	0	1
11	0	1
10	0	1

$Y_0 = W$

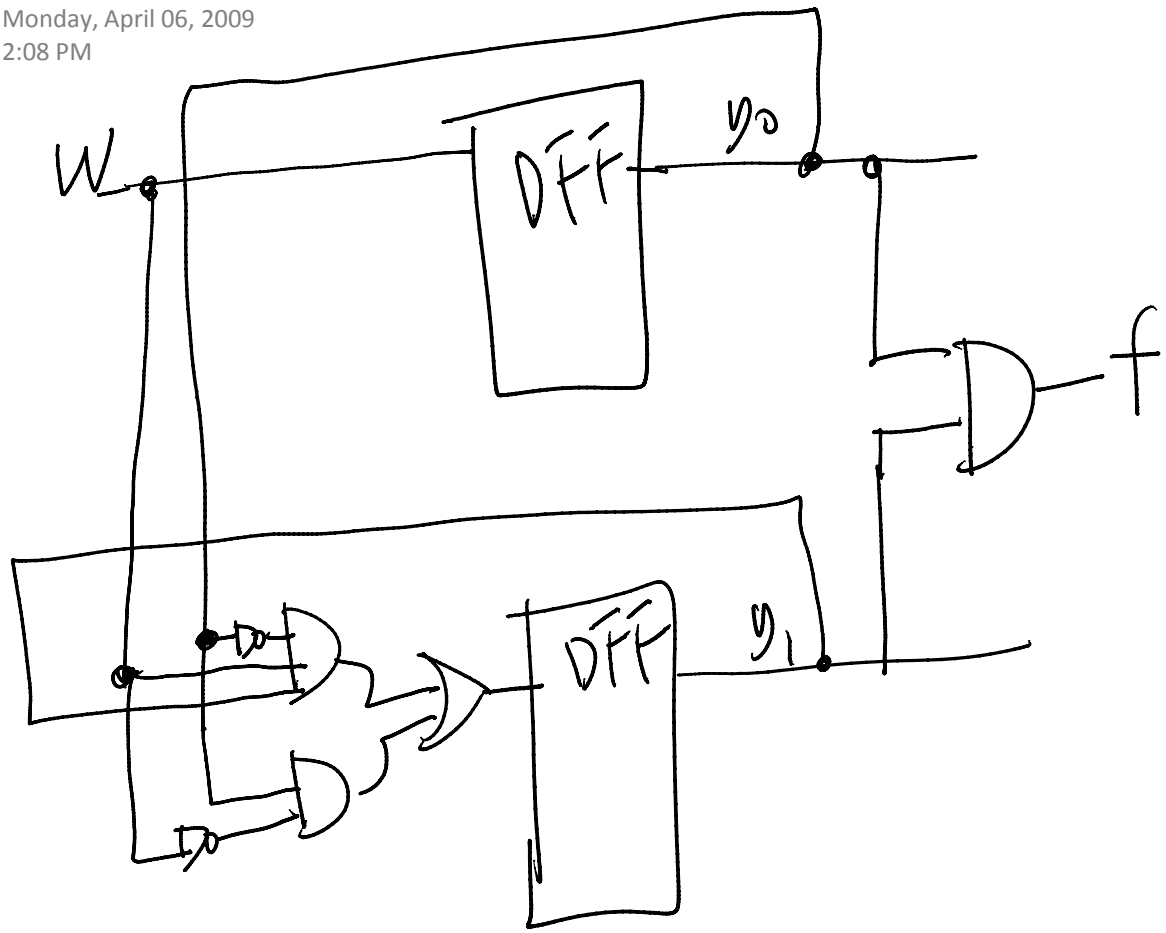
f

y_0 \ y_1	0	1
0	0	0
1	0	1

$f = y_0y_1$

3

Monday, April 06, 2009
2:08 PM

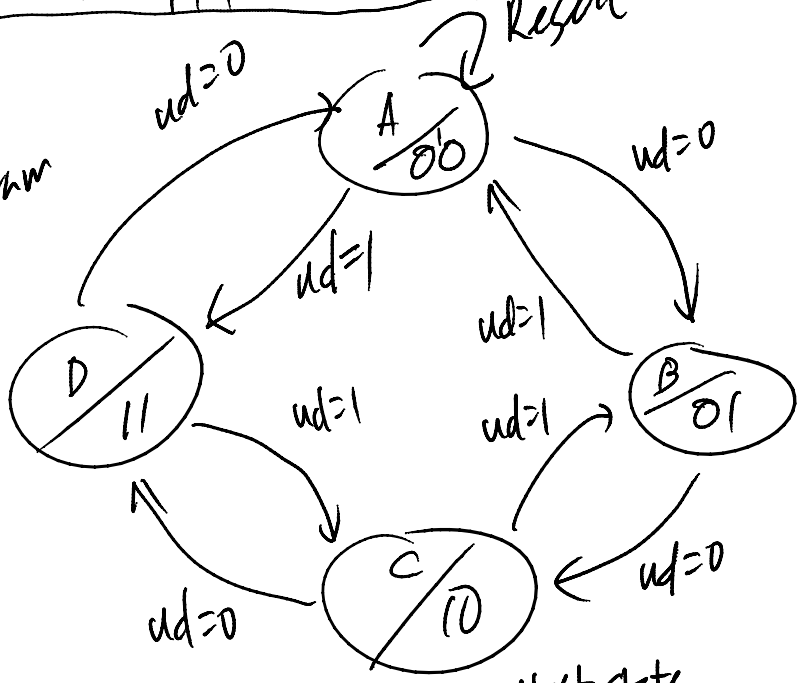


Monday, April 06, 2009
2:08 PM

two-bit up/down counter

ud=0 counts up
ud=1 counts down

state diagram



state table

Present State	Next state ud=0	Next state ud=1	Output
A	B	D	00
B	C	A	01
C	D	B	10
D	A	C	11

Decoded state table

A = "00"
B = "01"
C = "10"
D = "11"

Present State $y_1 y_0$	Next State ud=0 $Y_1 Y_0$	Next State ud=1 $Y_1 Y_0$	output $f_1 f_0$
00	01	11	00
01	10	00	01
10	11	01	10
11	00	10	11

Monday, April 06, 2009
2:08 PM

V_{l_0}

y_1y_0 \ ud	0	1
00	1	1
01	0	0
11	0	0
10	1	1

$$V_{l_0} = \overline{y_0}$$

V_{l_1}

y_1y_0 \ ud	0	1
00	0	1
01	1	0
11	0	1
10	1	0

$$V_{l_1} = ud \oplus y_0 \oplus y_1$$

f_1

y_0 \ y_1	0	1
0	0	1
1	0	1

$$f_1 = y_1$$

f_0

y_0 \ y_1	0	1
0	0	0
1	1	1

$$f_0 = y_0$$

Monday, April 06, 2009
2:08 PM

two-bit up/down counter