

Keegan Hughes

DLD Hw 9:

D PS	NS				
$q_3 q_2 q_1 q_0$	$Q_3 Q_2 Q_1 Q_0$	$J_3 K_3$	$J_2 K_2$	$J_1 K_1$	$J_0 K_0$
0 0 0 0	0 0 0 1	0 X	0 X	0 X	1 X
0 0 0 1	0 0 1 0	0 X	0 X	1 X	X 1
0 0 1 0	0 0 1 1	0 X	0 X	X 0	1 X
0 0 1 1	0 1 0 0	0 X	1 X	X 1	X 1
0 1 0 0	0 1 0 1	0 X	X 0	0 X	1 X
0 1 0 1	0 1 1 0	0 X	X 0	1 X	X 1
0 1 1 0	0 1 1 1	0 X	X 0	X 0	1 X
0 1 1 1	1 0 0 0	1 X	X 1	X 1	X 1
1 0 0 0	1 0 0 1	X 0	0 X	0 X	1 X
1 0 0 1	0 0 0 0	X 1	0 X	0 X	X 1
1 0 1 0	0 0 0 0	X 1	0 X	X 1	0 X
1 0 1 1	0 0 0 0	X 1	0 X	X 1	X 1
1 1 0 0	0 0 0 0	X 1	X 1	0 X	0 X
1 1 0 1	0 0 0 0	X 1	X 1	0 X	X 1
1 1 1 0	0 0 0 0	X 1	X 1	X 1	0 X
1 1 1 1	0 0 0 0	X 1	X 1	X 1	X 1

$q_3 q_2$ J_3

$q_1 q_0$	00	01	11	10
0	0	0	X	X
1	0	0	X	X
2	0	1	X	X
3	0	0	X	X

$q_3 q_2$ J_2

$q_1 q_0$	00	01	11	10
0	0	X	X	0
1	0	X	X	0
2	1	0	X	0
3	0	X	X	0

$q_3 q_2$ J_1

$q_1 q_0$	00	01	11	10
0	0	0	0	0
1	1	1	0	0
2	X	X	0	0
3	0	0	0	0

$q_3 q_2$ J_0

$q_1 q_0$	00	01	11	10
0	1	1	0	1
1	X	X	X	X
2	X	X	X	X
3	1	1	0	0

$q_3 q_2$ K_3

$q_1 q_0$	00	01	11	10
0	X	X	1	0
1	X	X	1	1
2	X	X	1	1
3	X	X	1	1

$q_3 q_2$ K_2

$q_1 q_0$	00	01	11	10
0	X	0	1	X
1	X	0	1	X
2	X	1	1	X
3	X	0	1	X

$q_3 q_2$ K_1

$q_1 q_0$	00	01	11	10
0	X	X	X	X
1	X	X	X	X
2	1	1	1	1
3	0	0	1	1

$q_3 q_2$ K_0

$q_1 q_0$	00	01	11	10
0	X	X	X	X
1	1	1	1	1
2	1	1	1	1
3	X	X	X	X

$$J_3 = q_2 q_1 q_0$$

$$K_3 = q_2 + q_1 + q_0$$

$$J_2 = q_3' q_1 q_0$$

$$K_2 = q_3 + q_1 q_0$$

$$J_1 = q_3' q_0$$

$$K_1 = q_3 + q_0$$

$$J_0 = q_3' + q_2' q_1$$

$$K_0 = 1$$

PS $q_3 q_2 q_1 q_0$	NS $Q_3 Q_2 Q_1 Q_0$	$J_3 K_3$	$J_2 K_2$	$J_1 K_1$	$J_0 K_0$
0 1 1 0	0 1 1 1	0 X	X 0	X 0	1 X
0 1 1 1	1 0 0 0	1 X	X 1	X 1	X 1
1 0 0 0	1 0 0 1	X 0	0 X	0 X	1 X
1 0 0 1	1 0 1 0	X 0	0 X	1 X	X 1
1 0 1 0	1 0 1 1	X 0	0 X	X 0	1 X
1 0 1 1	1 1 0 0	X 0	1 X	X 1	X 1
1 1 0 0	1 1 0 1	X 0	X 0	0 X	1 X
1 1 0 1	1 1 1 0	X 0	X 0	1 X	X 1
1 1 1 0	1 1 1 1	X 0	X 0	X 0	1 X
1 1 1 1	0 1 1 0	X 1	X 0	X 0	X 1
0 0 0 0	0 1 1 0	0 X	1 X	1 X	0 X
0 0 0 1	0 1 1 0	0 X	1 X	1 X	X 1
0 0 1 0	0 1 1 0	0 X	1 X	X 0	0 X
0 0 1 1	0 1 1 0	0 X	1 X	X 0	X 1
0 1 0 0	0 1 1 0	0 X	X 0	1 X	0 X
0 1 0 1	0 1 1 0	0 X	X 0	1 X	X 1

$q_3 q_2$ J_3

$q_1 q_0$	00	01	11	10
00	0	0	X	X
01	0	0	X	X
11	0			X
10	0	0	X	X

$q_3 q_2$ J_2

$q_1 q_0$	00	01	11	10
00	1	X	X	0
01	1	X	X	0
11		X	X	
10	1	X	X	0

$q_3 q_2$ J_1

$q_1 q_0$	00	01	11	10
00	1	1	0	0
01	X	1	1	1
11	X	X	X	X
10	X	X	X	X

$q_3 q_2$ J_0

$q_1 q_0$	00	01	11	10
00	0	0	1	1
01	X	X	X	X
11	X	X	X	X
10	0	1	1	1

$q_3 q_2$ $1K_3$

q_3	00	01	11	10
q_2	00	x	x	0
	01	x	0	0
	11	x	0	0
	10	x	0	0

$q_3 q_2$ $1K_2$

q_3	00	01	11	10
q_2	00	x	0	0
	01	x	0	0
	11	x	0	0
	10	x	0	0

$q_3 q_2$ $1K_1$

q_3	00	01	11	10
q_2	00	x	x	x
	01	x	x	x
	11	x	x	x
	10	x	x	x

$q_3 q_2$ $1K_0$

q_3	00	01	11	10
q_2	00	x	x	x
	01	x	x	x
	11	x	x	x
	10	x	x	x

$$J_3 = q_3 q_2 q_1 q_0$$

$$J_2 = q_3 + q_1 q_0$$

$$J_1 = q_0 + q_3$$

$$J_0 = q_3 + q_2 q_1$$

$$1K_3 = q_3 q_2 q_1 q_0$$

$$1K_2 = q_3 q_1 q_0$$

$$1K_1 = q_3 q_2 q_0 + q_3 q_2 q_1$$

$$1K_0 = 1$$

3) PS NS

$q_3 q_2 q_1 q_0$	$q_3 q_2 q_1 q_0$
0000	0000
0001	0010
0010	0100
0100	1000
1000	0001
0000	0001
0011	0001
0101	0001
0110	0001
0111	0001
1001	0001
1010	0001
1011	0001
1100	0001
1101	0001
1110	0001
1111	0001

$q_3 q_2$

q_3	00	01	11	10
q_2	00	0	1	0
	01	0	0	0
	11	0	0	0
	10	0	0	0

$$= D_3$$

$q_3 q_2$

q_3	00	01	11	10
q_2	00	0	0	0
	01	0	0	0
	11	0	0	0
	10	0	0	0

$$= D_2$$

$q_3 q_2$

q_3	00	01	11	10
q_2	00	0	0	0
	01	0	0	0
	11	0	0	0
	10	0	0	0

$$= D_1$$

$q_3 q_2$

q_3	00	01	11	10
q_2	00	0	0	0
	01	0	0	0
	11	0	0	0
	10	0	0	0

$$= D_0$$

$$D_3 = q_3 q_2 q_1 q_0$$

$$D_2 = q_3 q_2 q_1 q_0$$

$$D_1 = q_3 q_2 q_1 q_0$$

$$D_0 = q_3 + q_1 q_0 + q_2 q_1 q_0 + q_2 q_0 + q_3 q_1$$

$$SR$$

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

4) PS

$q_3 q_2 q_1 q_0$	NS	$S_3 R_3$	$S_2 R_2$	$S_1 R_1$	$S_0 R_0$
0000	0000	0 X	0 X	0 X	1 0
0001	0011	0 X	0 X	1 0	X 0
0011	0111	0 X	1 0	X 0	X 0
0111	1111	1 0	X 0	X 0	X 0
1111	1110	X 0	X 0	X 0	0 1
1110	1100	X 0	X 0	0 1	0 X
1100	1000	X 0	0 1	0 X	0 X
1000	0000	0 1	0 X	0 X	0 X
0010	0000	0 X	0 X	0 1	0 X
0100	0000	0 X	0 1	0 X	0 X
0101	0000	0 X	0 1	0 X	0 1
0110	0000	0 X	0 1	0 1	0 X
1001	0000	0 1	0 X	0 X	0 1
1010	0000	0 1	0 X	0 1	0 X
1011	0000	0 1	0 X	0 1	0 1
1101	0000	0 1	0 1	0 X	0 1

$S_3 =$

$q_3 q_2$	$q_1 q_0$	00	01	11	10
00	00	0	0	X	0
01	00	0	0	0	0
11	00	0	1	0	0
10	00	0	0	X	0

$S_2 =$

$q_2 q_1$	q_0	00	01	10	11
00	00	0	0	0	0
01	00	0	0	0	0
10	00	0	0	0	0
11	00	0	0	0	0

$S_1 =$

$q_1 q_0$	q_2	00	01	10	11
00	00	0	0	0	0
01	00	0	0	0	0
10	00	0	0	0	0
11	00	0	0	0	0

$S_0 =$

q_0	$q_1 q_2$	00	01	10	11
00	00	0	0	0	0
01	00	0	0	0	0
10	00	0	0	0	0
11	00	0	0	0	0

$R_3 =$

$q_3 q_2$	$q_1 q_0$	00	01	10	11
00	00	0	0	0	0
01	00	0	0	0	0
10	00	0	0	0	0
11	00	0	0	0	0

$R_2 =$

$q_2 q_1$	q_0	00	01	10	11
00	00	0	0	0	0
01	00	0	0	0	0
10	00	0	0	0	0
11	00	0	0	0	0

$R_1 =$

$q_1 q_0$	q_2	00	01	10	11
00	00	0	0	0	0
01	00	0	0	0	0
10	00	0	0	0	0
11	00	0	0	0	0

$R_0 =$

q_0	$q_1 q_2$	00	01	10	11
00	00	0	0	0	0
01	00	0	0	0	0
10	00	0	0	0	0
11	00	0	0	0	0

$$S_3 = q_2' q_1' q_0'$$

$$S_2 = q_3' q_1' q_0'$$

$$S_1 = q_3' q_2' q_0'$$

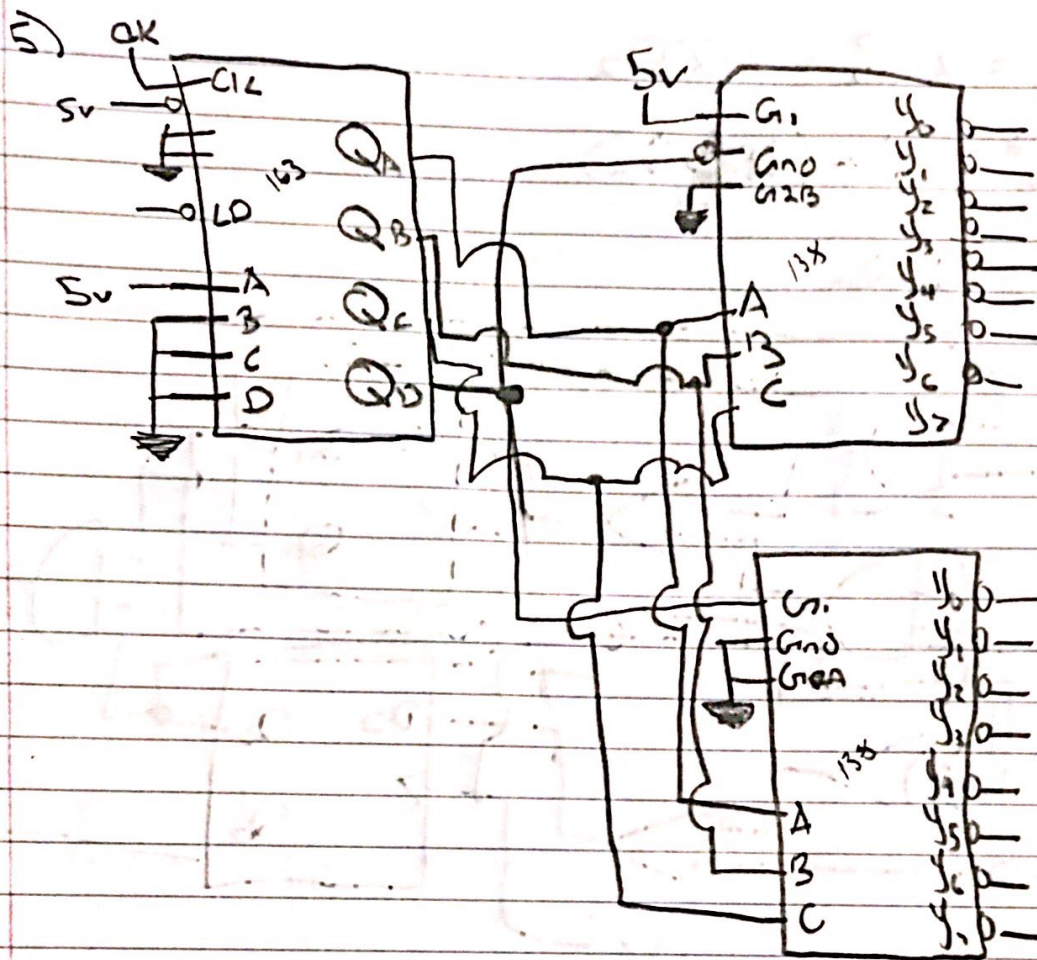
$$S_0 = q_3' q_2' q_1'$$

$$R_3 = q_2' + q_1' q_0'$$

$$R_2 = q_1' + q_3' q_0'$$

$$R_1 = q_0' + q_3' q_2'$$

$$R_0 = q_3 + q_2 q_1'$$



6) 7.46:

A = 00

B = 01

C = 10

D = 11

$Q_1 Q_2$	X	Z
00	0	0
01	1	0
10	0	1
11	0	0

Q_1

$Q_1 Q_2$	X	Z
00	0	0
01	1	0
10	0	1
11	0	0

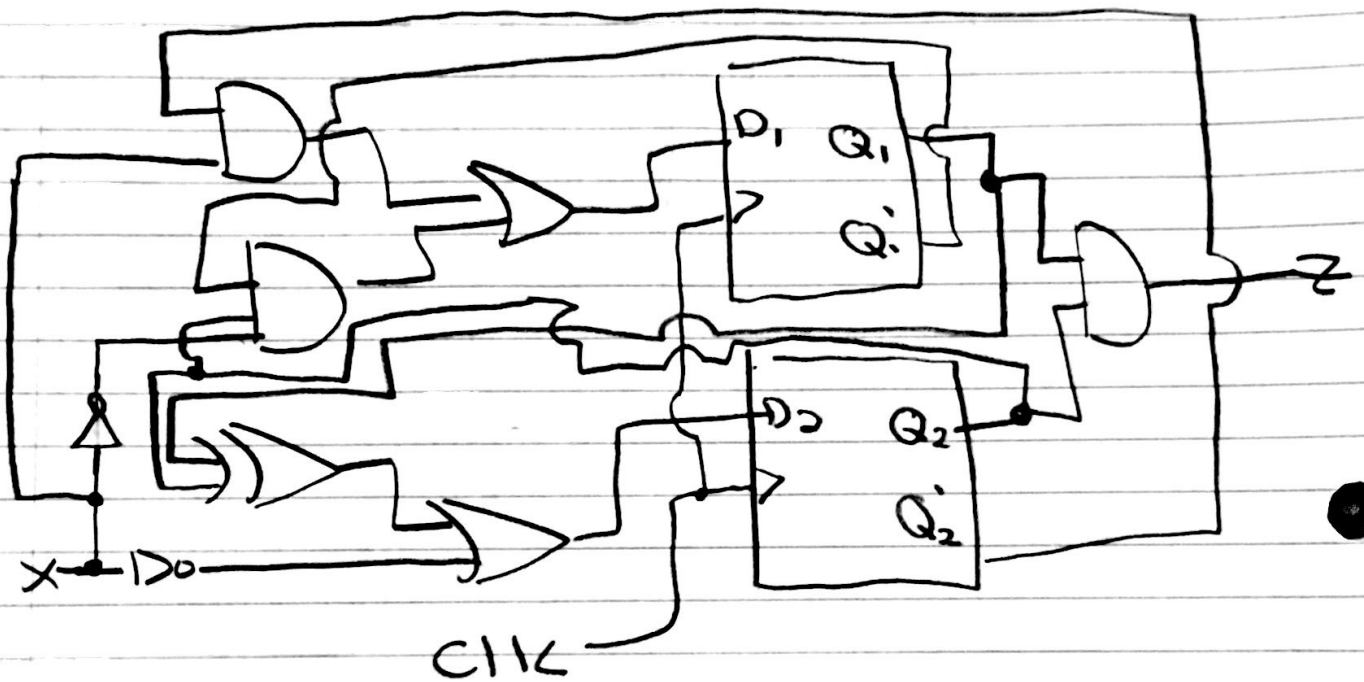
Q_2

$Q_1 Q_2$	X	Z
00	0	0
01	1	0
10	0	1
11	0	0

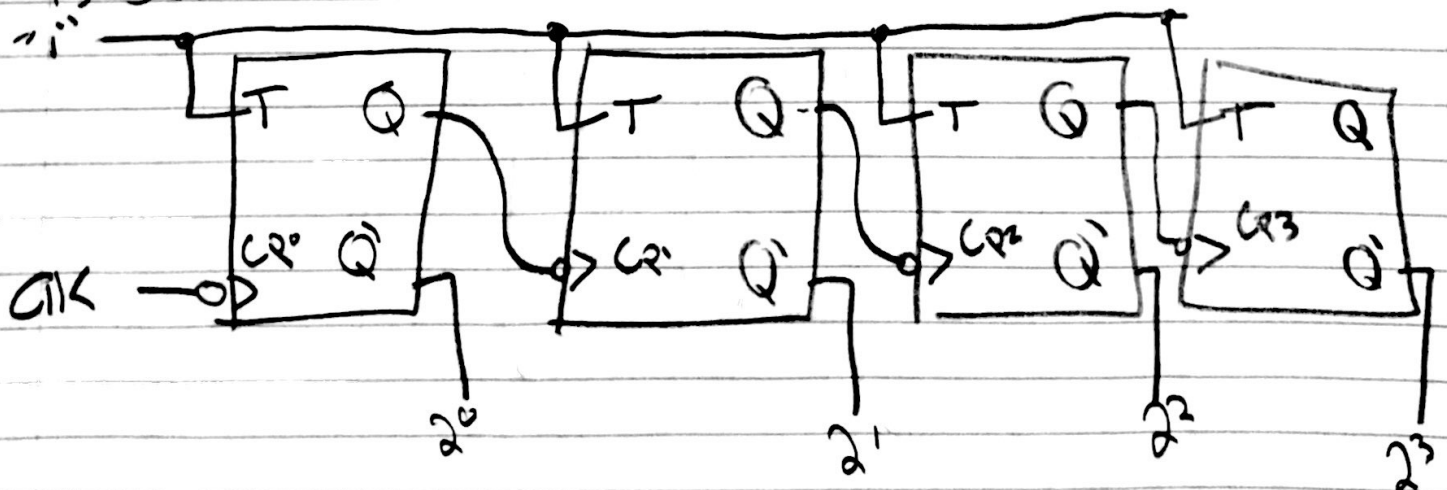
$$Q_1^* = XQ_2 + X'Q_1Q_2$$

$$Q_2^* = X' + (Q_1 \oplus Q_2)$$

$$Z = Q_1Q_2$$



7) 8026:



8.27:

