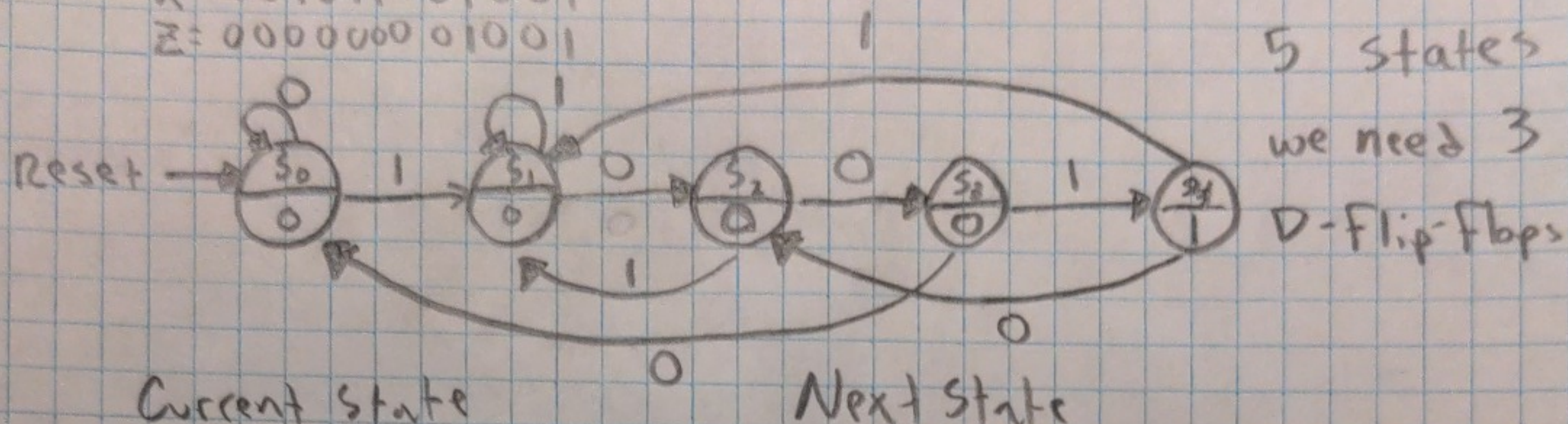


- 1) Design a Sequence Recognizer that will recognize the sequence 1001 by designing a FSM

$X = 101011001001$

$Z = 000000001001$



Current State					Next State							
State	Q_2	Q_1	Q_0	X	State	Q_2	Q_1	Q_0	Z	D_2	D_1	D_0
S_0	0	0	0	0	S_0	0	0	0	0	0	0	0
S_0	0	0	0	1	S_1	0	0	1	0	0	0	1
S_1	0	0	1	0	S_2	0	1	0	0	0	1	0
S_1	0	0	1	1	S_3	0	1	1	0	0	1	1
S_2	0	1	0	0	S_1	0	0	1	0	0	0	1
S_2	0	1	0	1	S_3	0	1	1	0	0	1	1
S_3	0	1	1	0	S_0	0	0	0	0	0	0	0
S_3	0	1	1	1	S_4	1	0	0	1	1	0	0
S_4	1	0	0	0	S_2	0	1	0	1	0	1	0
S_4	1	0	0	1	S_1	0	0	1	1	0	0	1
X	1	0	1	0	X				X	X	X	X
X	1	0	1	1					X	X	X	X
X	1	1	0	0					X	X	X	X
X	1	1	0	1					X	X	X	X
X	1	1	1	0					X	X	X	X
X	1	1	1	1					X	X	X	X

Z

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

$$Z = Q_2 Q_0 X$$

Chris Hunt

HW 6

ENGR 271

1) Cont.

D_2

		$Q_2 Q_1$			
		00	01	11	10
$Q_0 X$	00	0	0	x	x
	01	0	0	x	x
	11	0	1	x	x
	10	0	0	x	x

$$D_2 = Q_1 Q_0 X$$

D_1

		$Q_2 Q_1$			
		00	01	11	10
$Q_0 X$	00	0	1	x	1
	01	0	0	x	0
	11	0	0	x	x
	10	1	0	x	x

$$D_1 = Q_1 \bar{Q}_0 \bar{X} + Q_2 \bar{Q}_0 \bar{X} + \bar{Q}_1 Q_0 \bar{X}$$

D_0

		$Q_2 Q_1$			
		00	01	11	10
$Q_0 X$	00	0	1	x	0
	01	1	1	x	1
	11	1	0	x	x
	10	0	0	x	x

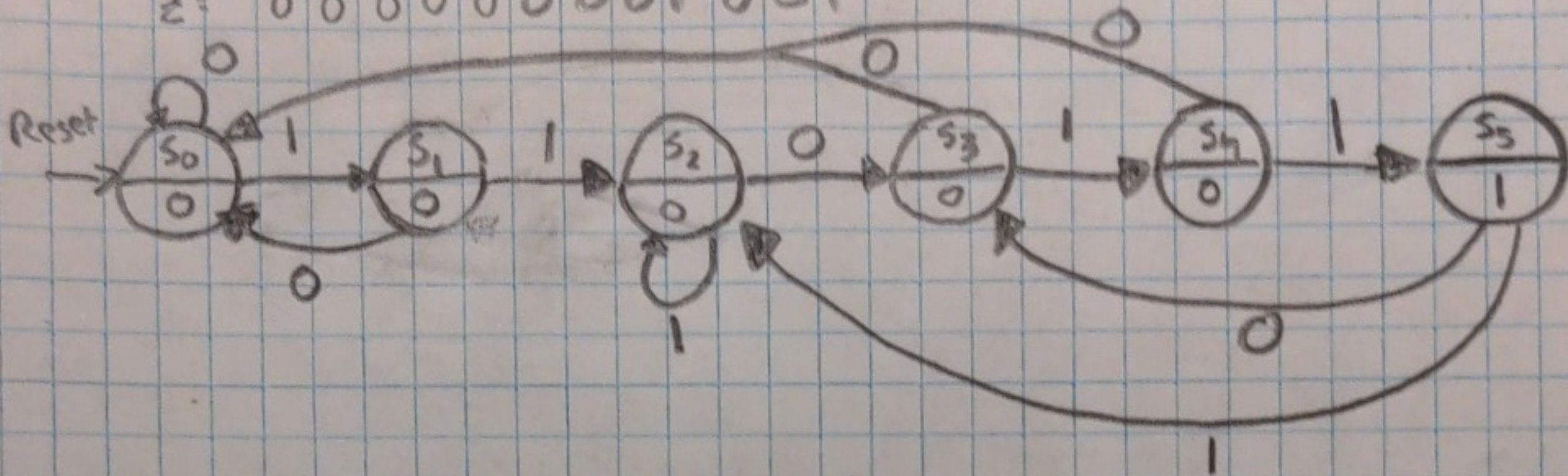
$$D_0 = \bar{Q}_0 X + \bar{Q}_2 Q_1 \bar{Q}_0 + \bar{Q}_1 Q_0 X$$

2) Design a sequence recognizer that will recognize the sequence 11011.

$X = 101011011011$
 $Z = 000000001001$

6 states

need 3 DFF's



Current					Next							
State	Q_2	Q_1	Q_0	X	State	Q_2	Q_1	Q_0	Z	D_2	D_1	D_0
S_0	0	0	0	0	S_0	0	0	0	0	0	0	0
S_0	0	0	0	1	S_1	0	0	1	0	0	0	1
S_1	0	0	1	0	S_0	0	0	0	0	0	0	0
S_1	0	0	1	1	S_2	0	1	0	0	0	1	0
S_2	0	1	0	0	S_3	0	1	1	0	0	1	1
S_2	0	1	0	1	S_2	0	1	0	0	0	1	0
S_3	0	1	1	0	S_0	0	0	0	0	0	0	0
S_3	0	1	1	1	S_4	1	0	0	0	1	0	0
S_4	1	0	0	0	S_0	0	0	0	0	0	0	0
S_4	1	0	0	1	S_5	1	0	1	0	1	0	1
S_5	1	0	1	0	S_3	0	1	1	1	0	1	1
S_5	1	0	1	1	S_2	0	1	0	1	0	1	0
X	1	1	0	0								
X	1	1	0	1								
X	1	1	1	0								
X	1	1	1	1								

$Z = Q_2 Q_0$

$Q_2 Q_0$	00	01	11	10
00	0	0	X	0
01	0	0	X	0
11	0	0	X	1
10	0	0	X	1

$$Z = Q_2 Q_0$$

2)

$Q_2 Q_1$

D_2

$Q_0 X$

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

$$D_2 = Q_2 \bar{Q}_0 X + Q_1 Q_0 X$$

$Q_2 Q_1$

D_1

$Q_0 X$

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

$$D_1 = Q_1 \bar{Q}_0 + \bar{Q}_1 Q_0 X + Q_2 Q_0 \bar{X}$$

$Q_2 Q_1$

D_0

$Q_0 X$

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

$$D_0 = Q_1 \bar{Q}_0 \bar{X} + \bar{Q}_1 \bar{Q}_0 X + Q_2 Q_0 \bar{X}$$