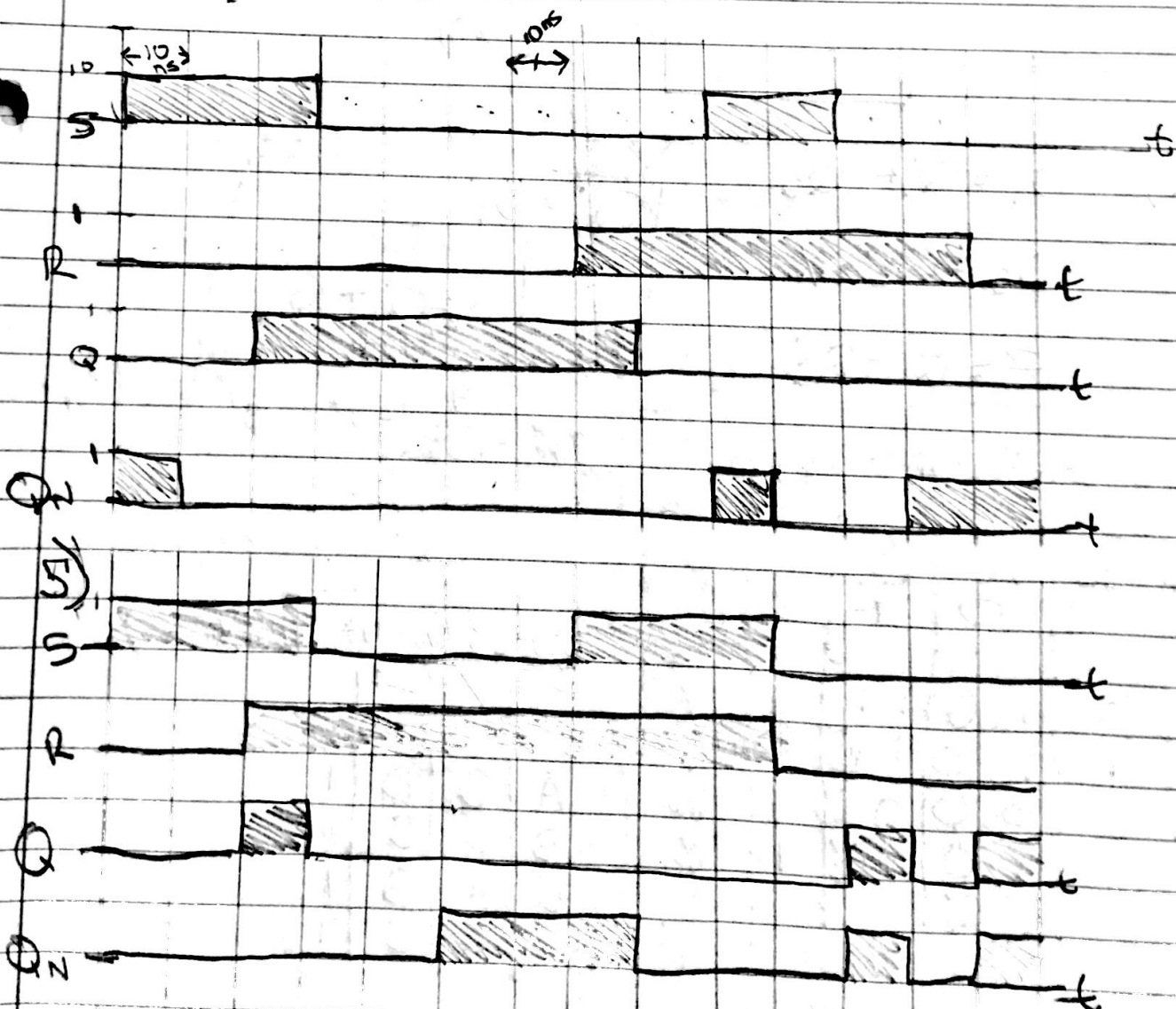


Keegan Haghshenas  
 November 30<sup>th</sup>, 2017  
 Digital Logic Design  
 Chapter 7 HW

Chapter 7: 4, 5, 6, 12, 14, 15, 16, 18, 20

4)

S	R	Q	Q <sub>N</sub>
0	0	last Q	last Q <sub>N</sub>
0	1	0	1
1	0	1	0
1	1	0	0

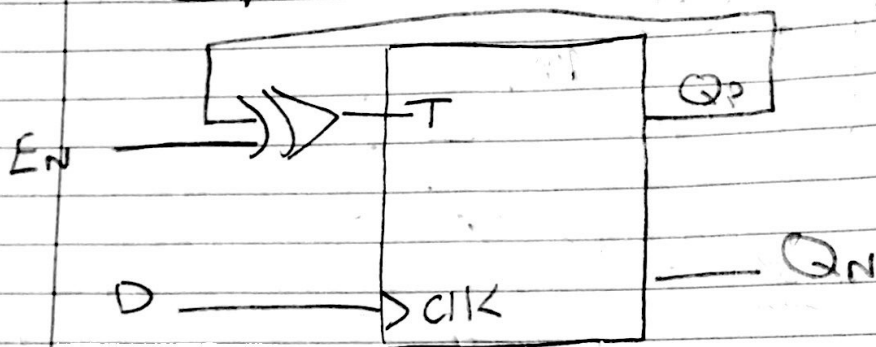


6) conversion table:

D	Q	Q+	T
0	0	0	0
0	1	0	1
1	0	1	1
1	1	1	0

$$T = D'Q + DQ'$$

$$T = D'Q + DQ'$$



12)  $D_1 = Q_1' + Q_2$

$D_2 = Q_2' \cdot X$

$Z = Q_1 + Q_2$

Excitation / Transition Tbl:

$Q_1$	$Q_2$	$X$	$Z$
0	0	1	0
0	1	1	0
1	0	0	0
1	1	1	0
$Q_1' Q_2'$			

$Q_1' = D_1$

$\rightarrow Q_1' + Q_2$

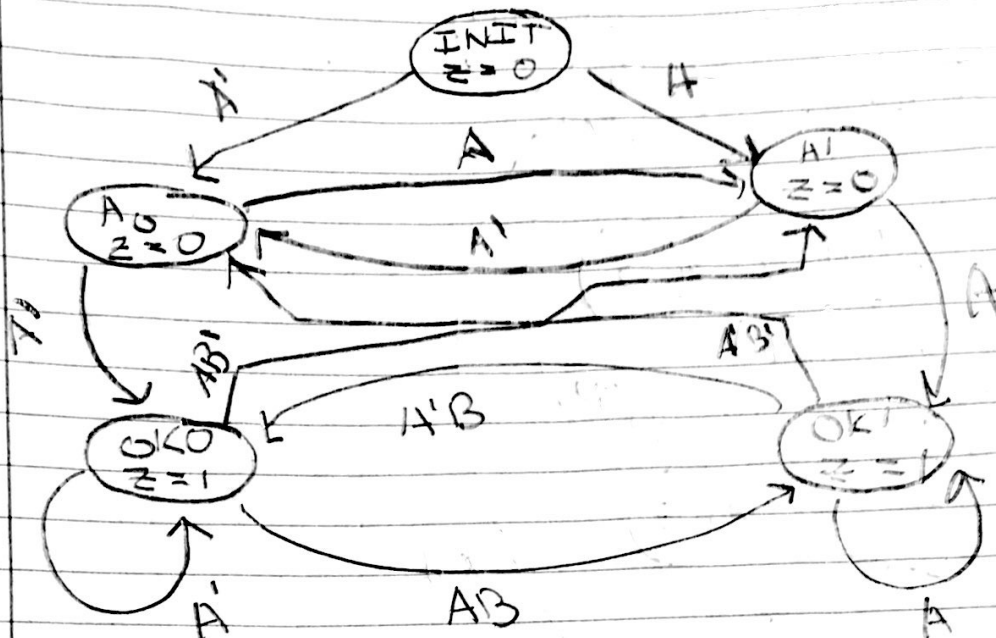
$Q_2' = D_2$

$\rightarrow Q_2' \cdot X$

State & Output Table

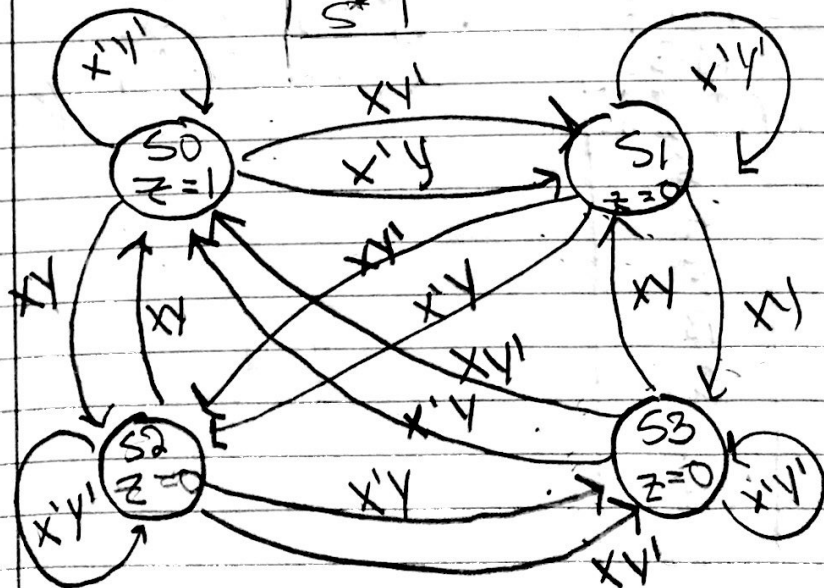
S	X	Z
A	C	D
B	C	C
C	A	B
D	C	C

14) using table 7-5:

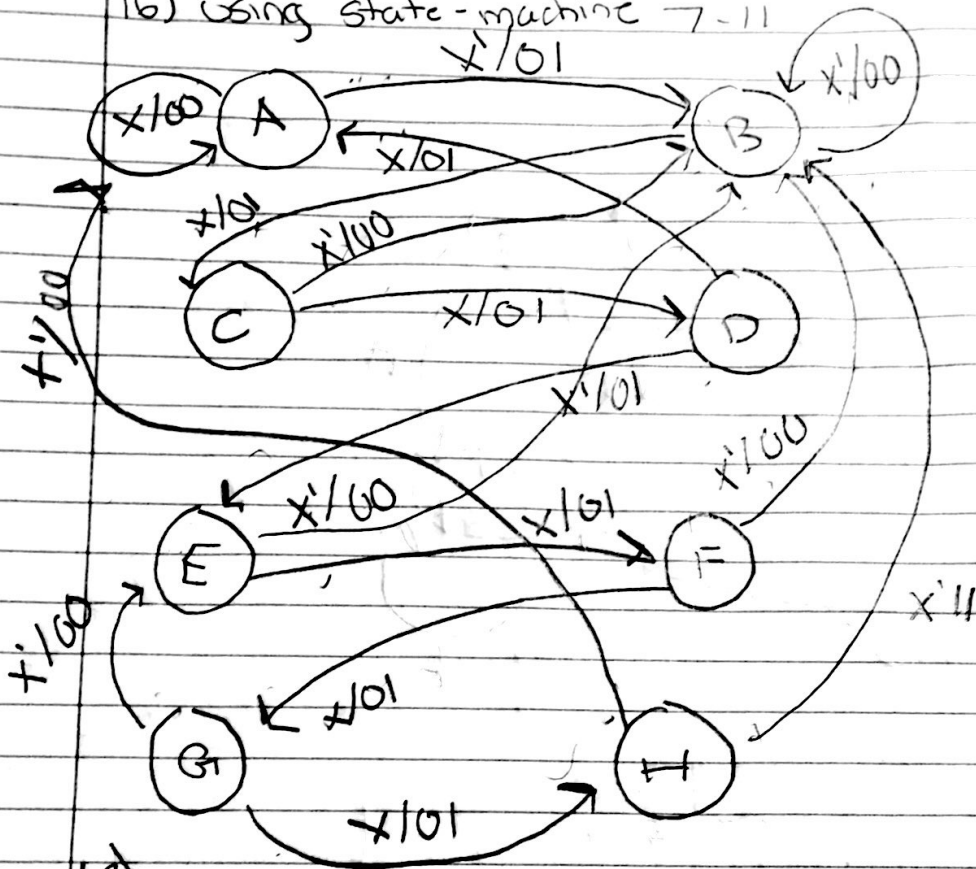


15)

X\Y	00	01	11	10	Z
S <sub>0</sub>	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>1</sub>	1
S <sub>1</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>2</sub>	0
S <sub>2</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>0</sub>	S <sub>3</sub>	0
S <sub>3</sub>	S <sub>3</sub>	S <sub>0</sub>	S <sub>1</sub>	S <sub>0</sub>	0



16) using state-machine 7-11



18)

$$D_1 = (Q_1 \oplus Q_0) \oplus (Q_1' \cdot Q_2')$$

$$Q_2^* = D_2$$

$$L_2 = (Q_1 \oplus Q_0) \cdot (Q_1' \cdot Q_2')$$

$$D_1 = Q_2; D_0 = Q_1$$

$$Q_1^* = D_1 \rightarrow Q_2$$

$$Q_0^* = D_0 \rightarrow Q_1$$

Excitation table				State Table			
PS	NS			PS	NS		
$Q_2 Q_1 Q_0$	$Q_2^* Q_1^* Q_0^*$			$Q_2 Q_1 Q_0$	$Q_2^* Q_1^* Q_0^*$		
000	100			A	E		
001	000			B	A		
010	101			C	F		
011	001			D	B		
100	010			E	C		
101	110			F	G		
110	111			G	H		
111	011			H	D		

20)

$$EN_1 = Y$$

$$EN_2 = Q_1 Y X'$$

$$Z = Q_2 \cdot X'$$

$$Q_1^* = EN \cdot Q_1' + EN' \cdot Q_1$$

$$= Y Q_1' + Y' Q_1$$

$$Q_2^* = EN_2 \cdot Q_2' + 1 \cdot Q_2$$

Excitation Table:

PS	NS			
	XY=00	01	11	10
Q <sub>1</sub> Q <sub>2</sub>				
00	00	10	10	00
01	00	10	10	00
10	00	11	10	00
11	00	11	10	00
EN <sub>1</sub> EN <sub>2</sub>				

Excitation Table

PS	NS			
	XS=00	01	11	10
Q <sub>1</sub> Q <sub>2</sub>				
00	00	01	11	10
01	01	11	11	01
10	10	01	00	10
11	11	00	01	11
Q <sub>1</sub> <sup>*</sup> Q <sub>2</sub> <sup>*</sup>				

State Table

PS	NS			
	XY=00	01	11	10
Q <sub>1</sub> Q <sub>2</sub>				
00	A(0)	C(0)	C(0)	A(0)
01	B(0)	D(0)	D(0)	B(0)
10	C(0)	B(0)	A(0)	C(0)
11	D(0)	A(0)	B(0)	D(0)
Q <sub>1</sub> <sup>*</sup> Q <sub>2</sub> <sup>*</sup> (Z)				