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MSIA HW #8

1a) JK → $Q(t+1) = Q(t)K'(t) + Q'(t)J(t)$

$y_1(t+1) = (y_1(y_0'y_1'x_1')) + y_1'(y_0 + x_0')$

$\boxed{y_1(t+1) = y_1(y_0 + y_1 + x_1') + y_1'(y_0 + x_0')}$ → $y_1 + y_0 + x_0'$

T → $Q(t+1) = Q(t) \oplus T(t)$

$y_0(t+1) = y_0 \oplus (x_1'y_0' + y_1'x_0)$

$A \oplus B = AB' + A'B$

$\boxed{y_0(t+1) = y_0(x_1'y_0' + y_1'x_0)' + y_0'(x_1'y_0' + y_1'x_0)}$

$\boxed{z = y_1'y_0'}$

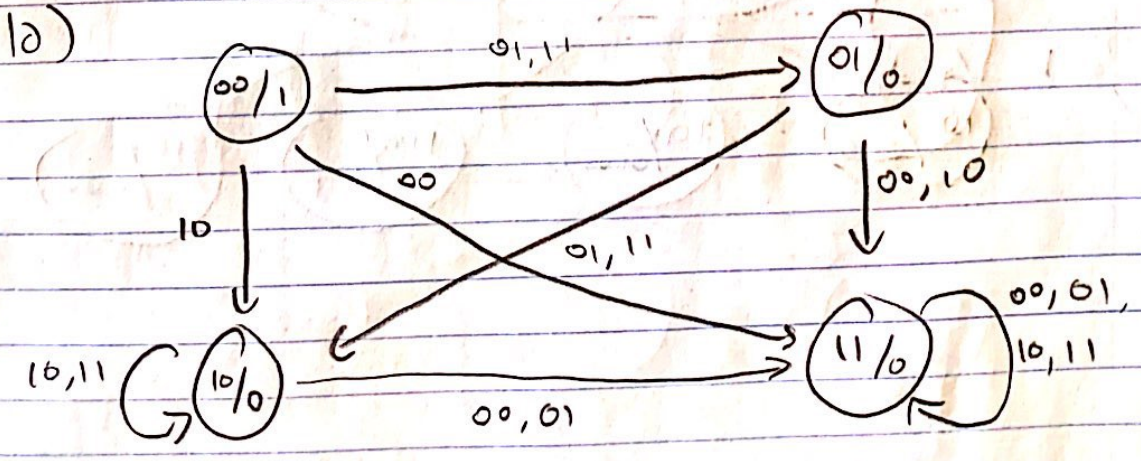
1b)

PS	Input $x_1(t)x_0(t)$				Output
$y_1(t)\ y_0(t)$	00	01	10	11	z
0 0	1 1	0 1	1 0	0 1	1
0 1	1 1	1 0	1 1	1 0	0
1 0	1 1	1 1	1 0	1 0	0
1 1	1 1	1 1	1 1	1 1	0
	$y_1(t+1)y_0(t+1)$				
	NS				

1 1 0 1
1 0 1 0
1 1 0 0
1 1 1 1

1c) Moore

1d)



2a) $T2 = Q_0 + (Q_2 \oplus Q_1)'$

$T2 = Q_0 + (Q_2Q_1' + Q_2'Q_1)'$

$T2 = Q_0 + (Q_2Q_1')'(Q_2'Q_1)'$

$T2 = Q_0 + (Q_2' + Q_1)(Q_2 + Q_1')$

$\boxed{T2 = Q_0 + (Q_1Q_2) + (Q_1'Q_2')}$

$\boxed{T1 = Q_1 + Q_0}$

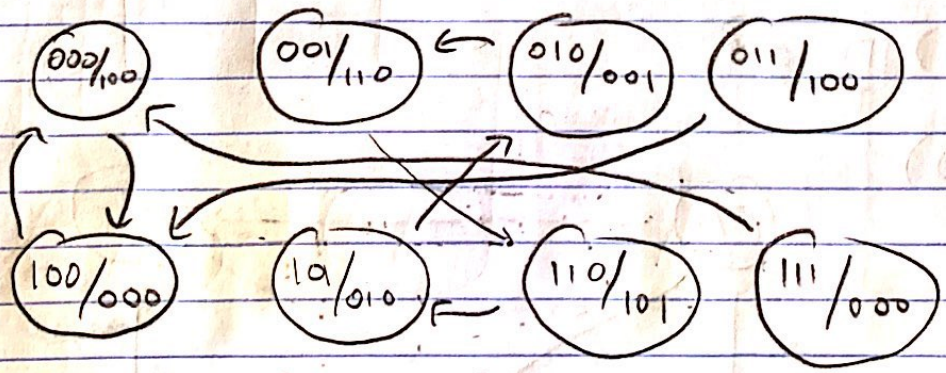
$T0 = Q_0 + (Q_2 \oplus Q_1)$

$\boxed{T0 = Q_0 + (Q_2Q_1' + Q_2'Q_1)}$

2b)

PS	NS/output	T-inputs
$Q_2Q_1Q_0$	$Q_2(t+1)Q_1(t+1)Q_0(t+1)$	T2T1T0
000	100	100
001	110	111
010	001	011
011	100	111
100	000	100
101	010	111
110	101	011
111	000	111

2c)

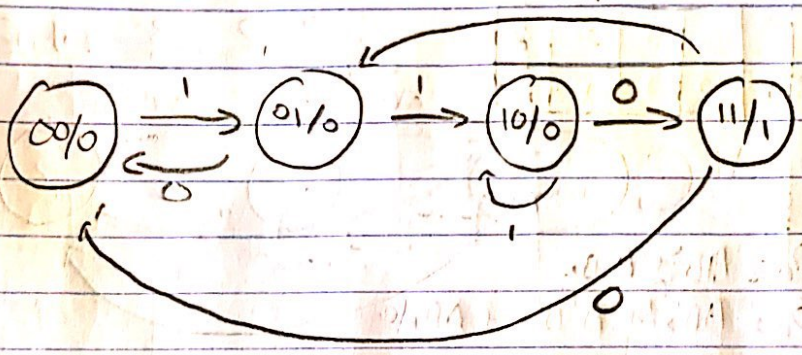


3) 001

4a) Input: $x(t) \in \{0,1\}$

Output: $z(t) \in \{0,1\}$

Function: $z(t) = \begin{cases} 1 \text{ if } x(t-3,t) = 110 \\ 0 \text{ otherwise} \end{cases}$



4b)

	Input		
PS	$x(t)=0$	$x(t)=1$	z
00	00	01	0
01	00	10	0
10	11	10	0
11	00	01	1
	NS		

4c) $D_A \rightarrow$ left, $D_B \rightarrow$ right

PS		Input	NS				
A	B	x	A	B	D_A	D_B	z
0	0	0	0	0	0	0	0
0	0	1	0	1	0	1	0
0	1	0	0	0	0	0	0
0	1	1	1	0	1	0	0
1	0	0	1	1	1	1	0
1	0	1	1	0	1	0	0
1	1	0	0	0	0	0	1
1	1	1	0	1	0	1	1

4c) D_A:

A \ Bx	00	01	11	10
0	0	0	1	0
1	1	1	0	0

$D_A = B$

D_B:

A \ Bx	00	01	11	10
0	0	1	0	0
1	1	0	1	0

$D_B = Bx' + B'x$

z:

A \ Bx	00	01	11	10
0	0	0	0	0
1	0	0	1	1

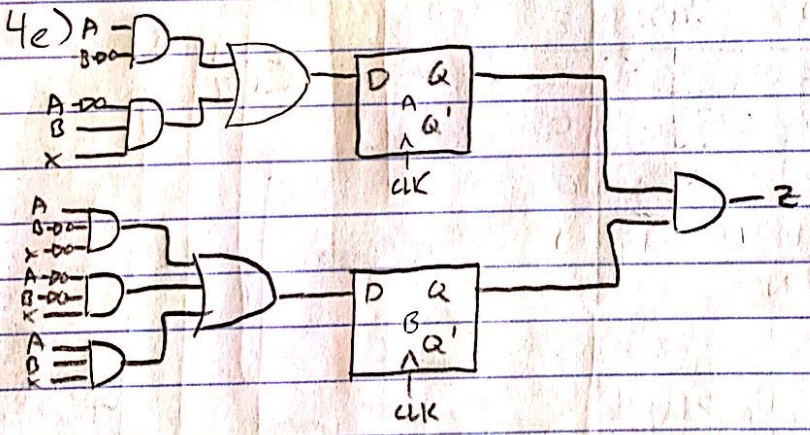
$z = AB$

4d) $D_A = AB' + A'Bx$

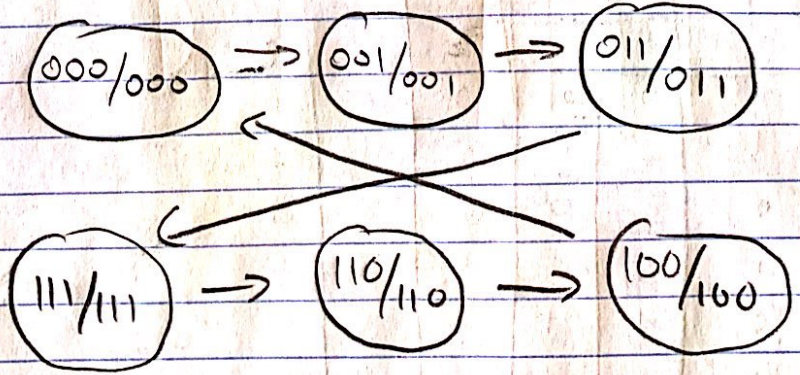
$D_B = AB'x' + A'B'x + ABx$

$z = AB$

4e)



5a)



5b)

PS	NS	output
$Q_2Q_1Q_0$	$Q_2(t+1)Q_1(t+1)Q_0(t+1)$	z
000	001	000
001	011	001
011	111	011
111	110	111
110	100	110
100	000	100

5c) T_2:

Q_2 \ Q_0Q_1	00	01	11	10
0	0	1	X	0
1	X	1	1	0

T_1:

Q_2 \ Q_0Q_1	00	01	11	10
0	0	1	1	X
1	X	1	1	0

T_0:

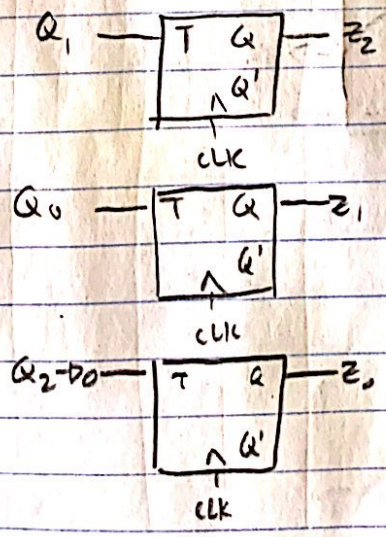
Q_2 \ Q_0Q_1	00	01	11	10
0	1	1	1	X
1	X	0	0	0

5d) $T_2 = Q_1$

$T_1 = Q_0$

$T_0 = Q_2'$

5e)

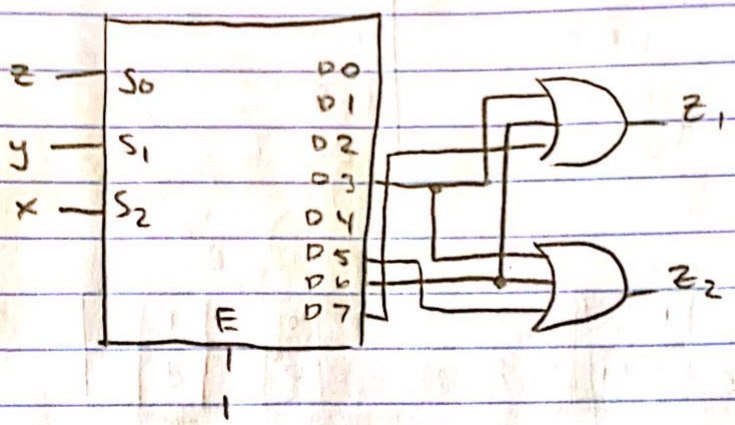


6) $z_1 = xyz + xyz' + x'yz$

$z_2 = xy'z + xyz' + x'yz$

$z_1 = \Sigma m(3,6,7)$

$z_2 = \Sigma m(3,5,6)$



7)