ITI1100Z

Professor Qi Hao

Assignment # 5

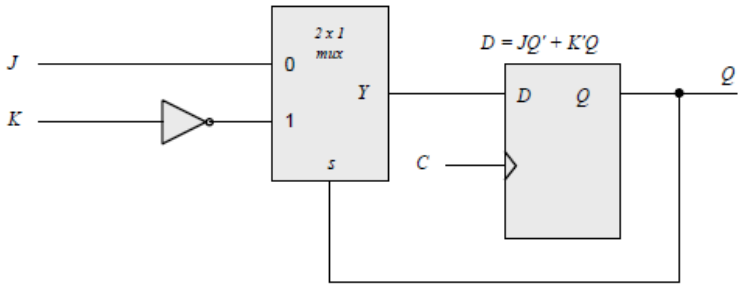
Due by 5:00pm July 10, 2017. You can drop finished assignment in locked box #80 for ITI1100Z in the first floor in SITE.

From the textbook Chapter five pages from pages 246 to 249 in the 5th edition or pages 315 to 317 in the 6th edition, solve the following problems:

5.2, 5.6, 5.9, 5.10, 5.12

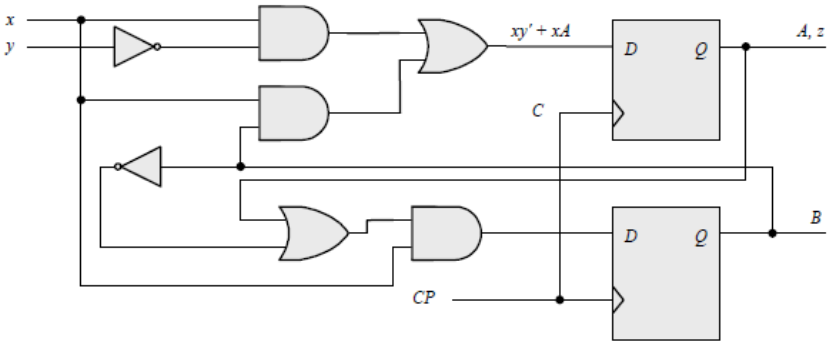
5.2

Total 5 points



5.6

Total 9 points



3 points

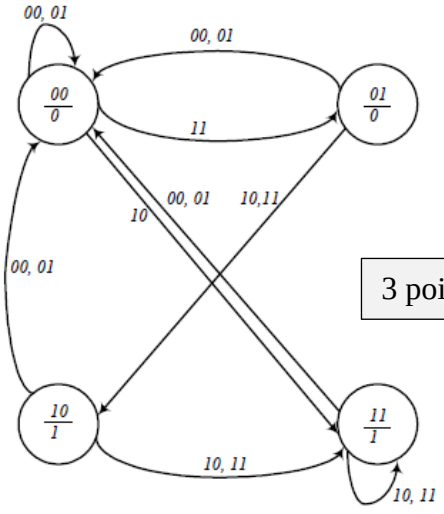
(b)

$A(t+1) = xy' + xB$
$B(t+1) = xA + xB'$
$z = A$

3 points

Present state		Inputs		Next state		Output
A	B	x	y	A	B	z
0	0	0	0	0	0	0
0	0	0	1	0	0	0
0	0	1	0	1	1	0
0	0	1	1	0	1	0
0	1	0	0	0	0	0
0	1	0	1	0	0	0
0	1	1	0	1	0	0
0	1	1	1	1	0	0
1	0	0	0	0	0	1
1	0	0	1	0	0	1
1	0	1	0	1	1	1
1	0	1	1	1	1	1
1	1	0	0	0	0	1
1	1	0	1	0	0	1
1	1	1	0	1	1	1
1	1	1	1	1	1	1

(c)



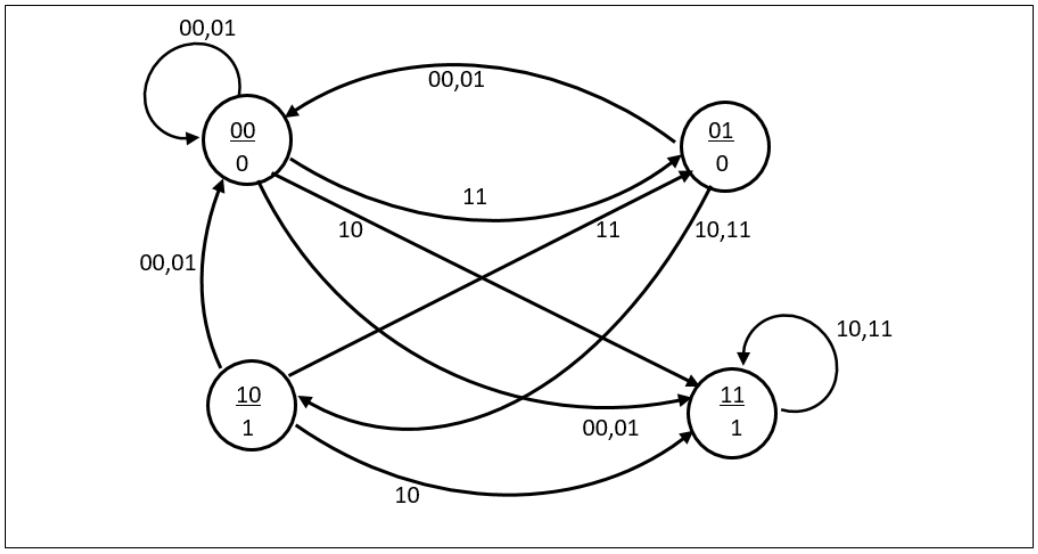
3 points

Note: 5.6 (b) and (c) are wrong. Correct answers are:

b)

Present state		Inputs		Next state		Output
A	B	X	Y	A	B	Z
0	0	0	0	0	0	0
0	0	0	1	0	0	0
0	0	1	0	1	1	0
0	0	1	1	0	1	0
0	1	0	0	0	0	0
0	1	0	1	0	0	0
0	1	1	0	1	0	0
0	1	1	1	1	0	0
1	0	0	0	0	0	1
1	0	0	1	0	0	1
1	0	1	0	1	1	1
1	0	1	1	0	1	1
1	1	0	0	0	0	1
1	1	0	1	0	0	1
1	1	1	0	1	1	1
1	1	1	1	1	1	1

c)



5.9

Total 6 points

$J_A = x \qquad K_A = B$

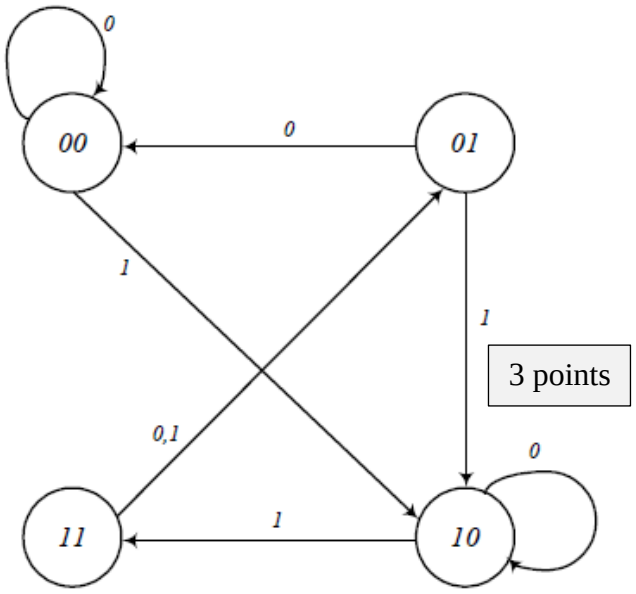
$J_B = x \qquad K_B = A'$

3 points

$A(t+1) = J_A A' + K_A' A = xA' + B'A$

$B(t+1) = J_B B' + K_B' B = xB' + AB$

x	A	B	$xA' + B'A$	$xB' + AB$
0	0	0	0	0
0	0	1	0	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	1
1	0	1	1	0
1	1	0	1	1
1	1	1	0	1



3 points

Note: 5.9 error correction

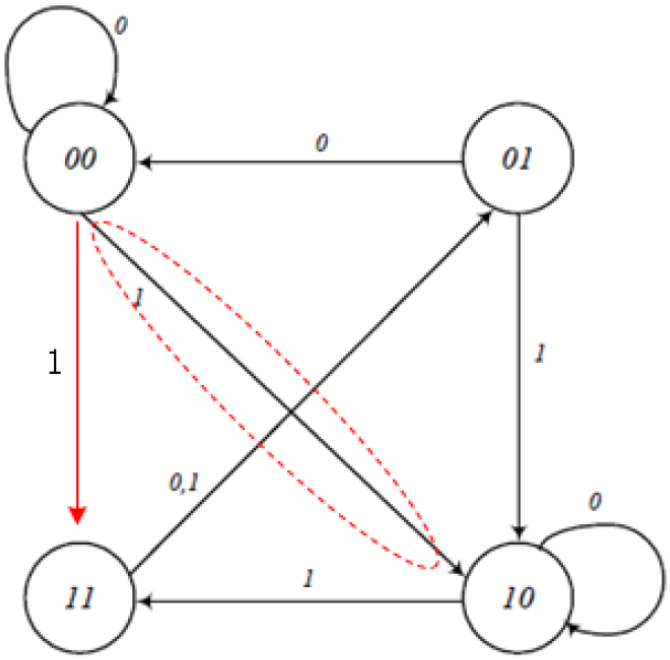
$J_A = x \qquad K_A = B$

$J_B = x \qquad K_B = A'$

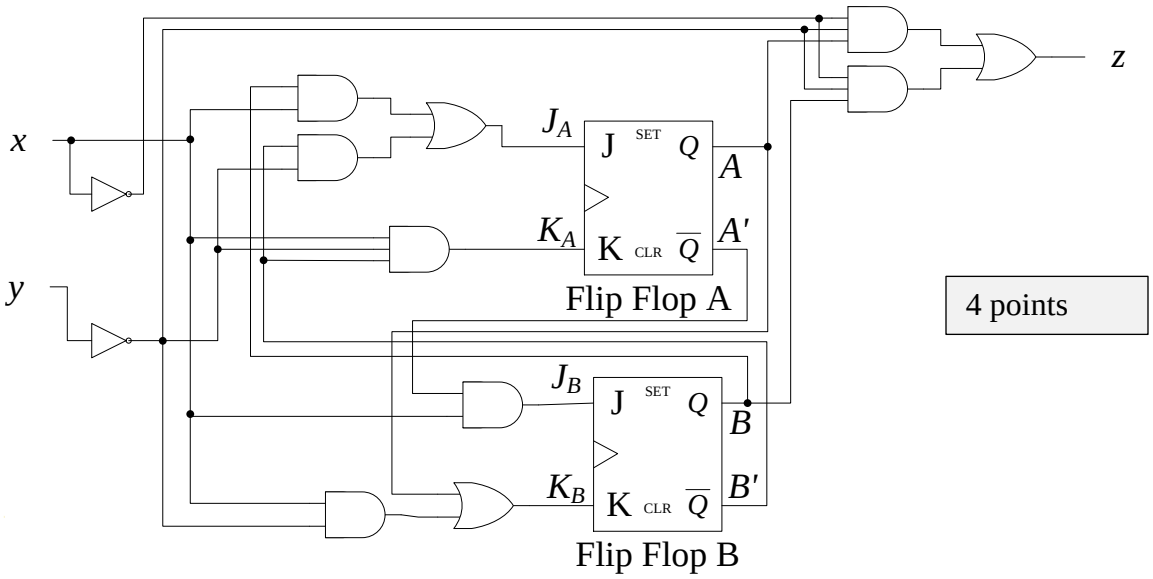
$A(t+1) = J_A A' + K_A' A = xA' + B'A$

$B(t+1) = J_B B' + K_B' B = xB' + AB$

x	A	B	$xA' + B'A$	$xB' + AB$
0	0	0	0	0
0	0	1	0	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	1
1	0	1	1	0
1	1	0	1	1
1	1	1	0	1



5.10 **(a)**



4 points

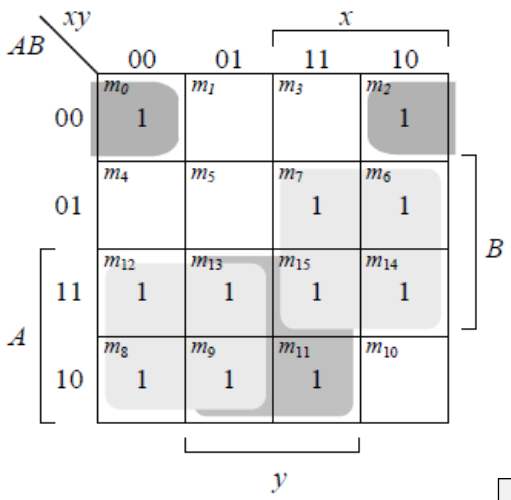
Total 12 points

(b)

Present state A	B	*Inputs* x	y	*Next state* A	B	*Output* z	*FF Inputs* J_A	K_A	J_A	J_B
0	0	0	0	1	0	0	1	0	0	0
0	0	0	1	0	0	0	0	0	0	0
0	0	1	0	1	1	0	1	1	1	1
0	0	1	1	0	1	0	0	0	1	0
0	1	0	0	0	1	1	0	0	0	0
0	1	0	1	0	1	0	0	0	0	0
0	1	1	0	1	0	0	1	0	1	0
0	1	1	1	1	1	0	1	0	1	0
1	0	0	0	1	0	0	1	0	0	1
1	0	0	1	1	0	0	0	0	0	1
1	0	1	0	0	0	0	1	1	0	1
1	0	1	1	1	0	0	0	0	0	1
1	1	0	0	1	0	1	0	0	0	1
1	1	0	1	1	0	0	0	0	0	1
1	1	1	0	1	0	0	1	0	0	1
1	1	1	1	1	0	1	1	0	0	1

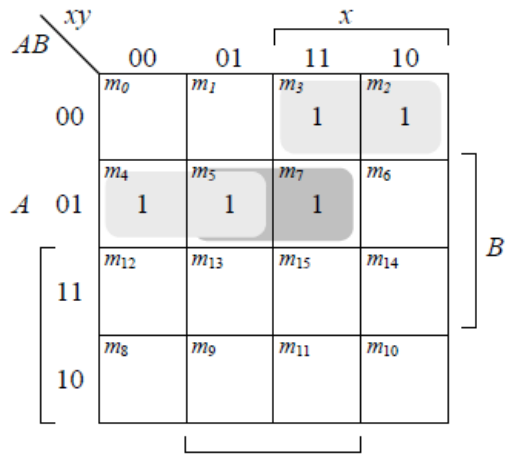
4 points
(2 points for next state/output)
(2 points for FF inputs)

(c)



$A(t+1) = Ax' + Bx + Ay + A'B'y'$

2 points



$B(t+1) = A'B'x + A'B'(x' + y)$

2 points

Note: 5.10 (c) Error Correction: $B(t+1) = A'xy + A'B'x + A'Bx'$, or $B(t+1) = A'B'x + A'B(x' + y)$

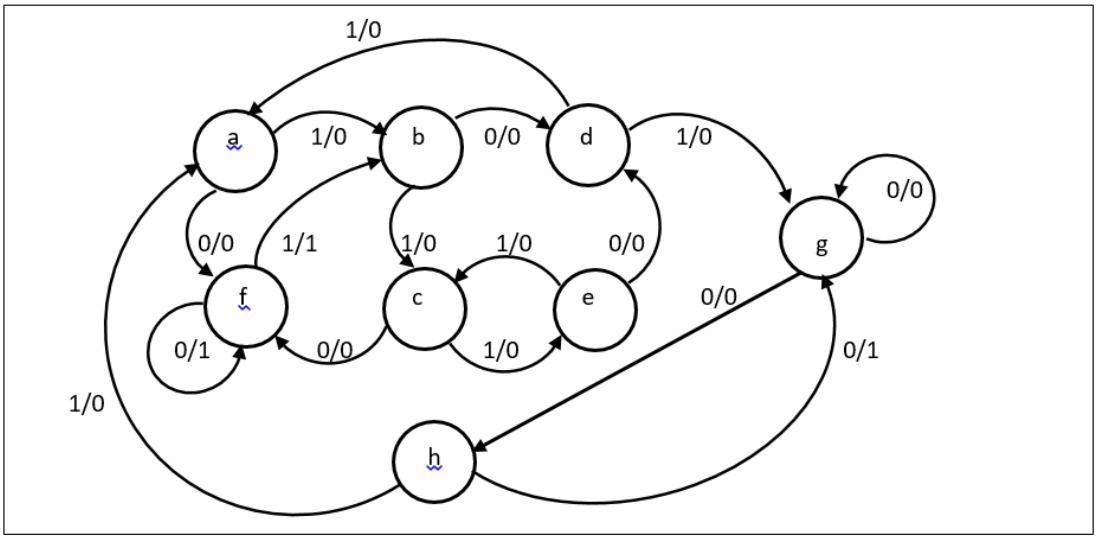
5.12

Total
8 points

Present state	Next state 0	Next state 1	Output 0	Output 1
a	*f*	*b*	0	0
b	*d*	*a*	0	0
d	*g*	*a*	1	0
f	*f*	*b*	1	1
g	*g*	*d*	0	1

Note: 5.12 correct answers are:

a)



Total
2.5 points

b)

	Next state		Output	
Present state	X = 0	X = 1	X = 0	X = 1
a	f	b	0	0
*b	d	c	0	0
c	f	e	0	0
d	g	a	1	0
*e	d	c	0	0
f	f	b	1	1
g	g	h	0	1
h	g	a	1	0

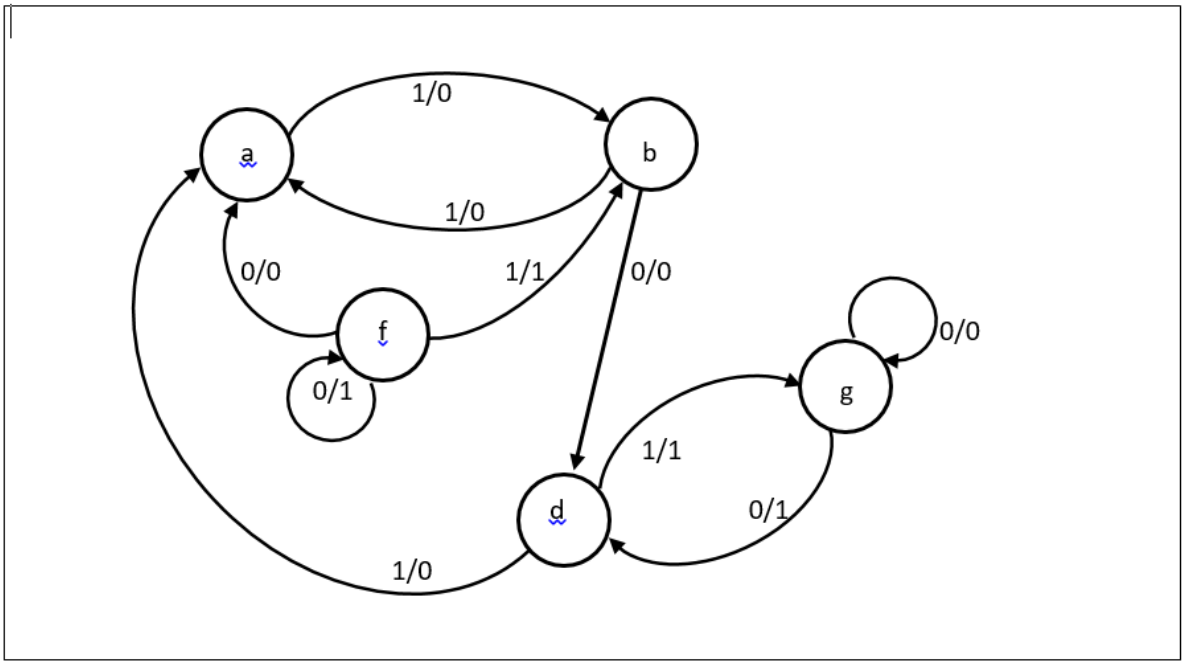
	Next state		Output	
Present state	X = 0	X = 1	X = 0	X = 1
*a	f	b	0	0
b	d	c	0	0
c	f	b	0	0
d	g	a	1	0
f	f	b	1	1
g	g	h	0	1
h	g	a	1	0

Total
3 points

	Next state		Output	
Present state	X = 0	X = 1	X = 0	X = 1
a	f	b	0	0
b	d	a	0	0
*d	g	a	1	0
f	f	b	1	1
g	g	h	0	1
*h	g	a	1	0

	Next state		Output	
Present state	X = 0	X = 1	X = 0	X = 1
a	f	b	0	0
b	d	a	0	0
d	g	a	1	0
f	f	b	1	1
g	g	d	0	1

c)



Total
2.5 points