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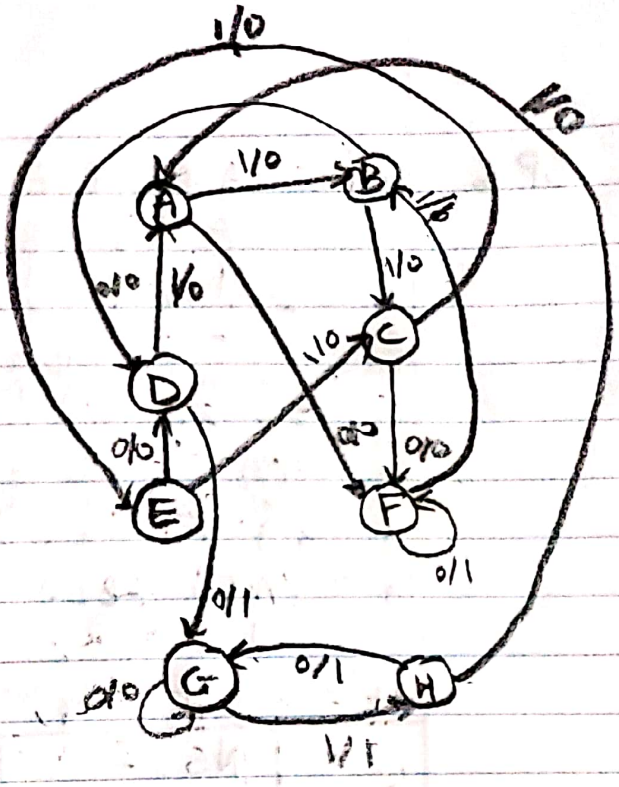
ECE-218
Homework 8

5.12) a) Partition method.

PS	NS x=0	NS x=1	Output x=0	Output 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	b	0	1
h	g	a	1	0



b) P_0 : (a b c d e f g h)

P_1 : (a b c e) (d h) (f) (g)

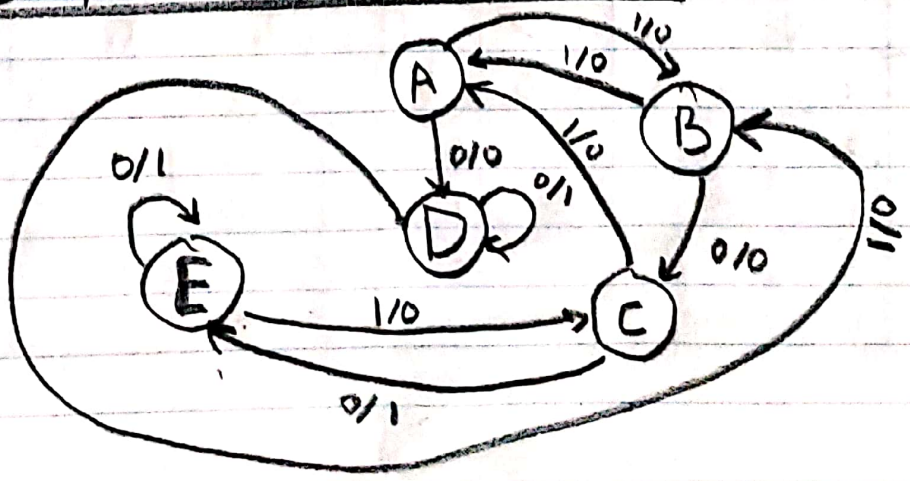
P_2 : (a c) (b e) (d h) (f) (g)

$\therefore P_3 = P_2$: ac = A; be = B; dh = C, f = D; g = E.

Reduced Table:

PS	NS x=0	NS x=1	Output x=0	Output x=1
A	D	B	0	0
B	C	A	0	0
C	E	A	1	0
D	D	B	1	1
E	E	B	0	1

c)



SP 6

$P_0 = (A\ B\ C\ D\ E\ F\ G)$

$P_1 = (A\ F)\ (B\ C\ D\ E\ G)$

2 1 2 1 1 2 2 2 2 2 2 1 2

$P_2 = (AF)\ (BG)\ (CDE)$

3 1 2 1 1 2 1 2 2 3 3 2 3 2

$P_3 = (A\ F)\ (B\ G)\ (C)\ (DE)$

4 1 4 1 1 2 1 2 3 2 4 2

$P_4 = (A\ F)\ (B\ G)\ (C)\ (D)\ (E)$

1 2 3 4 5

AF = a, F = b, D = c, BG = d & C = e

PS	NS, Z z=0	 z=1
a	b, 1	a, 1
b	c, 0	d, 1
c	e, 0	d, 1
d	a, 0	d, 1
e	d, 0	e, 1

SP 7

PS	NS, Z x=0	 x=1
A	A, 0	B, 0
B	C, 0	A, 1
C	C, 0	A, 0
D	X, X	X, X

A = 00, B = 01, C = 10 & D = 11

PS y_1 y_2	NS x=0	 x=1	Z x=0	 x=1	J_1 x=0	 x=1	K_1 x=0	 x=1	J_2 x=0	 x=1	K_2 x=0	 x=1
0 0	0 0	0 1	0	0	0	0	x	x	0	1	x	x
0 1	1 0	0 0	0	1	1	0	x	x	x	x	1	1
1 1	x x	x x	x	x	x	x	x	x	x x		x x	
1 0	1 0	0 0	0	0	x	x	0	1	0 0		x x	

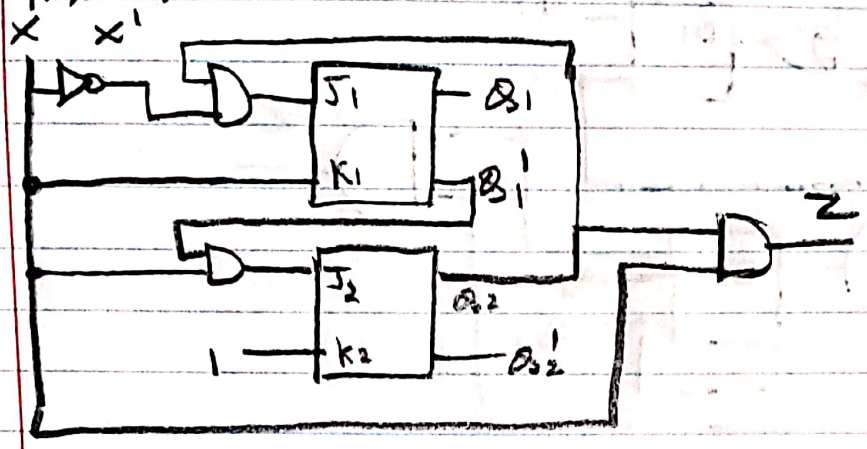
$z = xQ_2$

$J_1 = x'Q_2$

$K_1 = x$

$J_2 = xQ_1'$

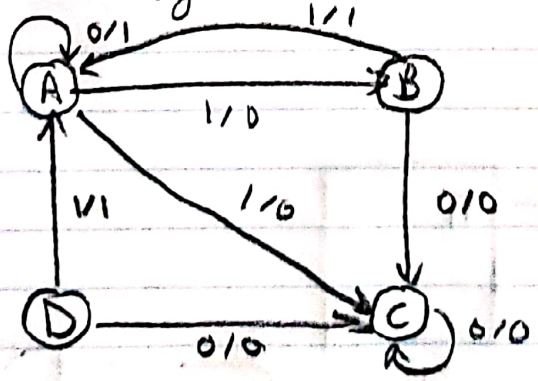
$K_2 = 1$



SP8

PS		NS		z		J_1		K_1		J_2		K_2	
Q_1	Q_2	x=0	x=1	x=0	x=1	x=0	x=1	x=0	x=1	x=0	x=1	x=0	x=1
A: 0	0	0	0 1	0	0	0	0	0	1	0	1	1	1
B: 0	1	1 0	0 0	0	1	1	0	0	1	0	1	1	1
C: 1	1	1 0	0 0	0	1	1	0	0	1	0	0	1	1
D: 1	0	0 0	0 0	0	0	0	0	0	1	0	0	1	1

State Diagram:



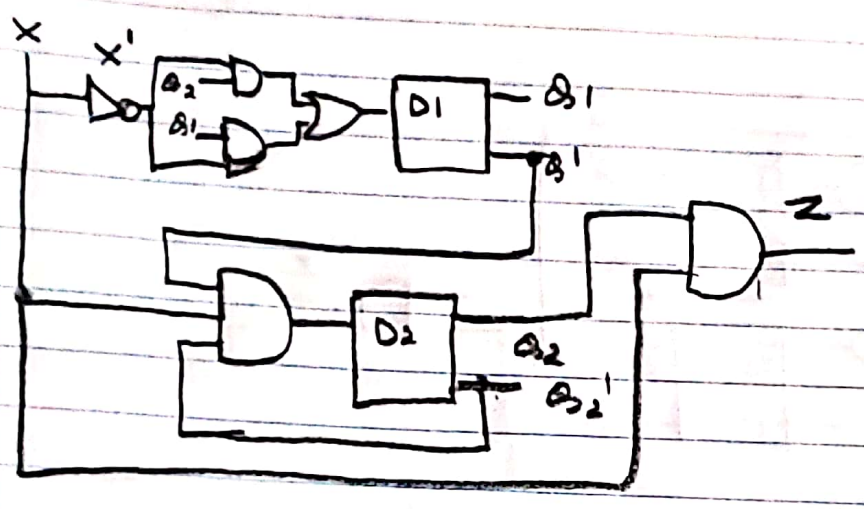
SP9

PS		NS		D_1		D_2		z	
Q_1	Q_2	x=0	x=1	x=0	x=1	x=0	x=1	x=0	x=1
A: 0	0	0 0	0 1	0	0	0	1	0	0
B: 0	1	1 0	0 0	1	0	0	0	0	1
C: 1	0	x x	x x	x	x	x	x	x	x
D: 1	1	1 0	0 0	1	0	0	0	0	0

$D_1 = x'Q_2 + x'Q_1$

$D_2 = xQ_1'Q_2'$

$z = xQ_2$



SP 10

PS		NS		T_1		T_2		z	
Q_1	Q_2	x=0	x=1	x=0	x=1	x=0	x=1	x=0	x=1
0	0	00	01	0	0	0	1	0	0
0	1	10	00	1	0	1	1	0	1
1	1	xx	xx	x	x	x	x	x	x
1	0	10	00	0	1	0	0	0	0

$T_1 = x'Q_2 + xQ_1$

$T_2 = xQ_1' + Q_1Q_2$

$z = xQ_2$