State assignment

PS	NS X=0	NS 1	Output 0	Output 1
S_0	S_1	S_2	0	0
S_1	S_3	S_2	0	0
S_2	S_1	S_4	0	0
S_3	S_5	S_2	0	0
S_4	S_1	S_6	0	0
S_5	S_5	S_2	1	0
S_6	S_1	S_6	0	1

G1: group In-neighbours (common next state)

G2: " out-neighbours (common PS)

Low priority

G3: group states that have same output for 1 input

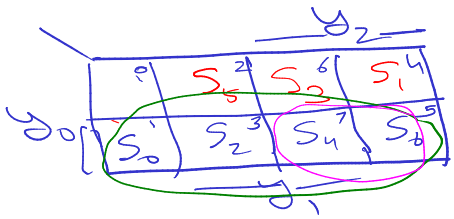
G1: (S_0, S_2, S_4, S_6) (S_0, S_1, S_3, S_5) (S_3, S_5) (S_4, S_6)

G2: (S_1, S_2), (S_3, S_2), (S_1, S_4), (S_5, S_2) ×2, (S_1, S_6) ×2

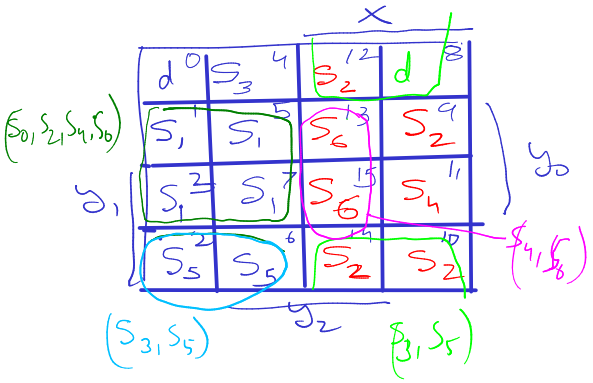
State assignment map

$4 < 7 \text{ states} \le 8 = 2^3$ 3-ff $y_2\, y_1\, y_0$

	X	y_2	y_1	y_0
S_0	0	0	0	1
S_1	0	1	0	0
S_2	0	0	1	1
S_3	0	1	1	0
S_4	0	1	1	1
S_5	0	0	1	0
S_6	0	1	0	1



Next state map



	X	y_2	y_1	y_0
S_0	1	0	0	1
S_1	1	1	0	0
S_2	1	0	1	1
S_3	1	1	1	0
S_4	1	1	1	1
S_5	1	0	1	0
S_6	1	1	0	1

PS	NS X=0	NS 1	Output 0	Output 1
S_0=000	S_1	S_2	0	0
S_1=100	S_3	S_2	0	0
S_2=011	S_1	S_4	0	0
S_3=110	S_5	S_2	0	0
S_4=111	S_1	S_6	0	0
S_5=010	S_5	S_2	1	0
S_6=101	S_1	S_6	0	1

State assigned table

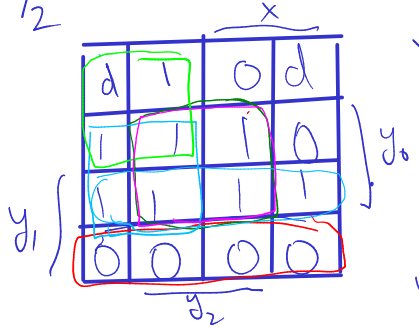
PS $y_2 y_1 y_0$	NS $Y_2 Y_1 Y_0$ X=0	NS $Y_2 Y_1 Y_0$ X=1
S_0=000	100	011
S_1=100	110	011
S_2=011	001	111
S_3=110		

Guideline 1: In-neighbors or common next state

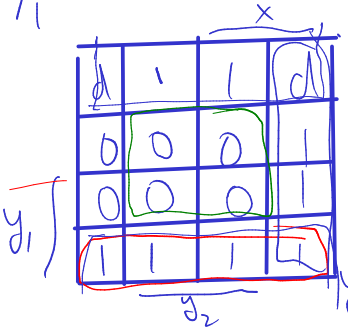
G2: out-neighbours or common Present state

(S_2, S_5) 011, 010 (S_1, S_6) 100, 101

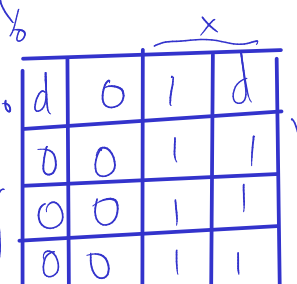
Y_2



Y_1



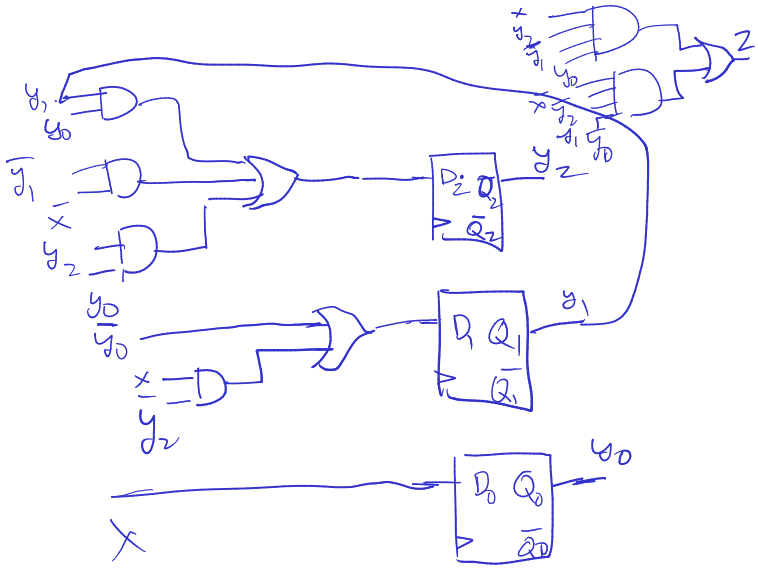
Y_0



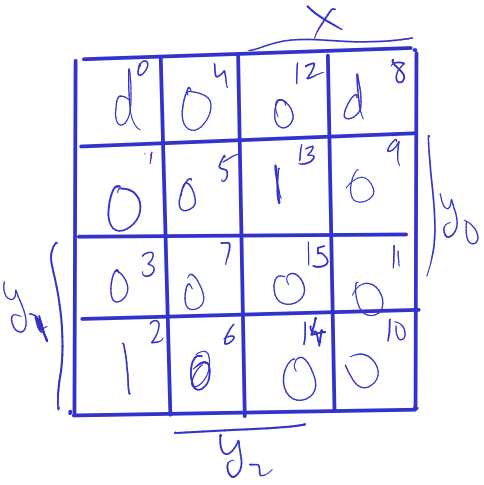
$$D_2 = Y_2 = y_1 y_0 + \bar{y}_1 \bar{x} + y_2 y_0$$

$$D_1 = Y_1 = \bar{y}_0 + x \bar{y}_2$$

$$D_0 = Y_0 = x$$



2



$$Z = x y_2 \bar{y}_1 y_0 + \bar{x} \bar{y}_2 y_1 \bar{y}_0$$

	x	y_2	y_1	y_0
S_0	0	0	0	1
S_1	0	1	0	0
S_2	0	0	1	1
S_3	0	1	1	0
S_4	0	1	1	1
S_5	0	0	1	0
S_6	0	1	0	1

PS	NS		Output Z	
	X = 0	1	0	1
S_0=001	S_1	S_2	0	0
S_1=100	S_3	S_2	0	0
S_2=011	S_1	S_4	0	0
S_3=110	S_5	S_2	0	0
S_4=111	S_1	S_6	0	0
S_5=010	S_5	S_2	1	0
S_6=101	S_1	S_6	0	1