



State diagram

2) State Table

PS	NS, output	
	I	I
	0	1
s_0	$(s_0, 0)$	$(s_1, 0)$
s_1	$(s_2, 0)$	$(s_1, 0)$
s_2	$(s_0, 0)$	$(s_3, 0)$
s_3	$(s_4, 1)$	$(s_1, 0)$
s_4	$(s_0, 0)$	$(s_3, 0)$
other	$(s_0, 0)$	$(s_0, 0)$

3) Transition & O/p table:

PS	NS		O/p	
	I		I	
	0	1	0	1
S_0	S_0	S_1	0	0
S_1	S_2	S_1	0	0
S_2	S_0	S_3	0	0
S_3	S_4	S_1	1	0
S_4	S_0	S_3	0	0
other	S_0	S_0	0	0

	Input (x)	Present State			Next State			Flip flop Inputs			Output(Y)
	x	C	B	A	C'	B'	A'	D_C	D_B	D_A	Y
0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	1	0	1	0	0	1	0	0
2	0	0	1	0	0	0	0	0	0	0	0
3	0	0	1	1	1	0	0	1	0	0	1
4	0	1	0	0	0	0	0	0	0	0	0
5	0	1	1	x	0	0	0	0	0	0	0
6	0	1	x	1	0	0	0	0	0	0	0
7	1	0	0	0	0	0	1	0	0	1	0
8	1	0	0	1	0	0	1	0	0	1	0
9	1	0	1	0	0	1	1	0	1	1	0
10	1	0	1	1	0	0	1	0	0	1	0
11	1	1	0	0	0	1	1	0	1	1	0
12	1	1	1	x	0	0	0	0	0	0	0
13	1	1	x	1	0	0	0	0	0	0	0

Handwritten Karnaugh Map for function D_A with variables BC and BA .

	BC	00	01	11	10
00		0	0	0	0
01		0	0	0	0
11		0	0	0	0
10		1	1	1	1

Groupings shown in the map:

- A vertical group of four cells in the first column ($BC = 00$), covering rows $00, 01, 11, 10$.
- A horizontal group of four cells in the last row ($BA = 10$), covering columns $00, 01, 11, 10$.

D_A

$$D_A = \overline{BC} + \overline{BA}$$

		BA			
πC		00	01	11	10
00		0	1	0	0
01		0	0	0	0
11		1	0	0	0
10		0	0	0	1

D_B

$$D_B = \pi C \bar{B} \bar{A} + \bar{\pi} \bar{C} \bar{B} A + \pi \bar{C} B \bar{A}$$

Truth Table for D_E :

		BA			
		00	01	11	10
C	00	0	0	1	0
	01	0	0	0	0
	11	0	0	0	0
	10	0	0	0	0

$$D_E = \bar{C} \bar{B} A$$

BA		00	01	11	10
AC	00	0	0	1	0
	01	0	0	0	0
	11	0	0	0	0
	10	0	0	0	0

Y

$$Y = \bar{A} \bar{C} B A = Q_C$$

X
↓
Input

