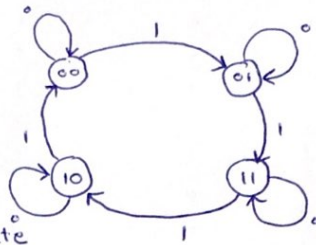


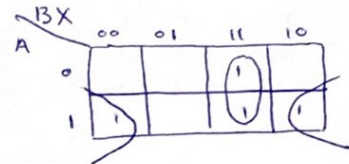
#1

{ DFF → Lr
input → x

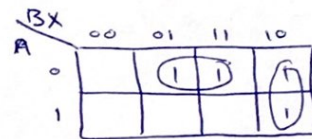


Present state		input x	Next state	
A(t)	B(t)		A(t+1)	B(t+1)
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	1
1	0	0	1	0
1	0	1	0	0
1	1	0	1	1
1	1	1	1	0

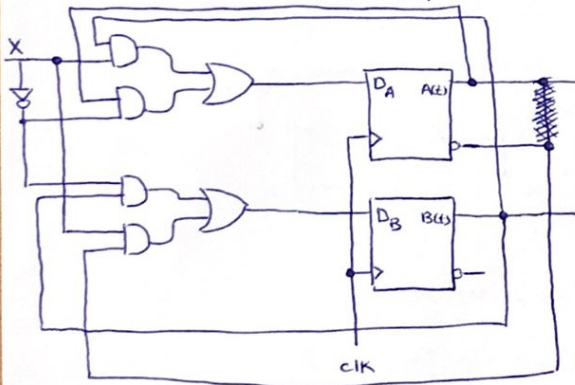
$$D_A = A(t+1)$$



$$A(t+1) = D_A = BX + \bar{A}\bar{X}$$



$$B(t+1) = D_B = \bar{A}X + B\bar{X}$$



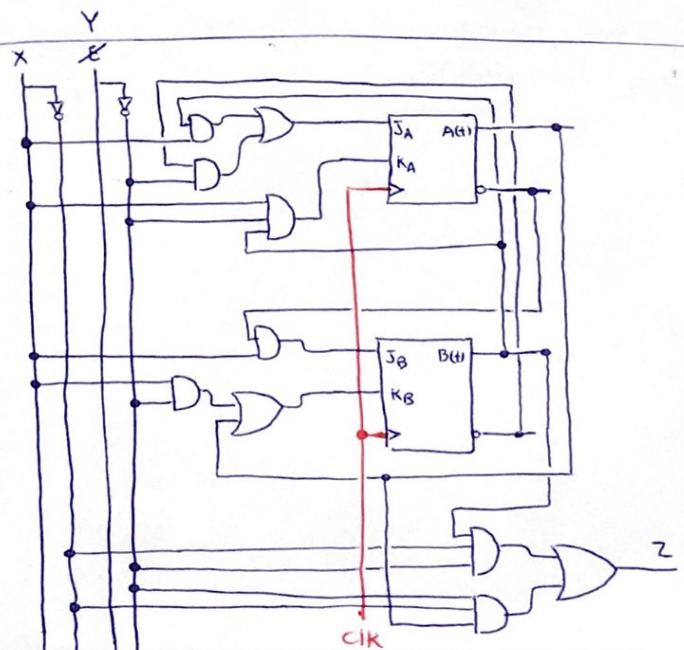
#2

{ $J_A = BX + \bar{B}\bar{Y}$, $K_A = \bar{B}X\bar{Y}$
 $J_B = \bar{A}X$, $K_B = A + X\bar{Y}$
 $Z = A\bar{X}\bar{Y} + B\bar{X}\bar{Y}$
input → x, Y output → Z

$$Q(t+1) = J\bar{Q} + \bar{K}Q$$

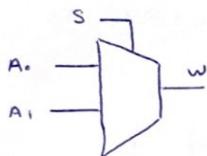
$$\begin{aligned} A(t+1) &= J_A\bar{A} + \bar{K}_A A = (BX + \bar{B}\bar{Y})\bar{A} + A(\bar{B}X\bar{Y}) \\ &= \bar{A}BX + \bar{A}\bar{B}\bar{Y} + \bar{A}B\bar{X}\bar{Y} + A\bar{B}X\bar{Y} \end{aligned}$$

$$\begin{aligned} B(t+1) &= J_B\bar{B} + \bar{K}_B B = \bar{A}X\bar{B} + B(A + X\bar{Y}) \\ &= \bar{A}X\bar{B} + AB + B\bar{A}X\bar{Y} + \bar{A}B\bar{X} + \bar{A}BY \end{aligned}$$

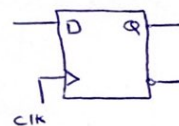


Present state				Next state		output
A(t)	B(t)	X	Y	A(t+1)	B(t+1)	Z
0	0	0	0	1	0	1
0	0	0	1	0	0	0
0	0	1	0	1	1	1
0	0	1	1	0	1	1
0	1	0	0	0	1	1
0	1	0	1	1	0	1
0	1	1	1	1	1	1
1	0	0	0	0	0	0
1	0	0	1	1	0	1
1	0	1	1	1	0	1
1	1	0	0	1	0	1
1	1	0	1	1	0	1
1	1	1	0	1	0	1
1	1	1	1	1	0	1

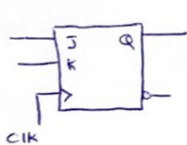
3



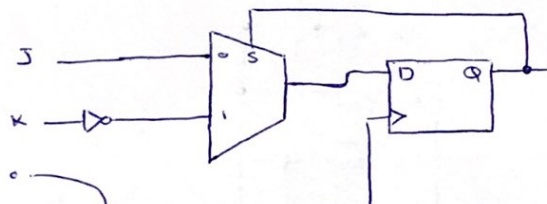
S	W
0	A ₀
1	A ₁



D	Q(t+1)
0	0
1	1



J	K	Q(t+1)
0	0	Q(t)
0	1	0
1	0	1
1	1	$\bar{Q}(t)$



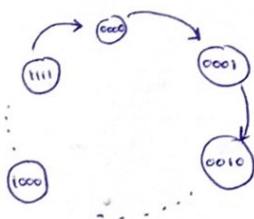
if $S = 0 \rightarrow Q(t) = 0 \xrightarrow{J \ K \ 0} Q(t) = 0$

if $S = 1 \rightarrow Q(t) = 1 \xrightarrow{J \ K \ 1} Q(t) = 0$

$D = J \rightarrow Q(t+1) = J$

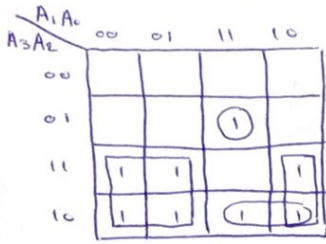
$D = \bar{K} \rightarrow Q(t+1) = \bar{K}$

4

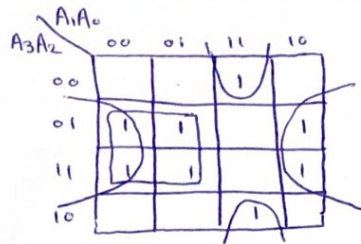


	Present state				Next state				FF. inputs			
	A ₃	A ₂	A ₁	A ₀	A ₃	A ₂	A ₁	A ₀	D ₃	D ₂	D ₁	D ₀
0:	0	0	0	0	0	0	0	1				
1:	0	0	0	1	0	0	1	0				
2:	0	0	1	0	0	0	1	1				
3:	0	0	1	1	0	1	0	0				
4:	0	1	0	0	0	1	0	1				
5:	0	1	0	1	0	1	1	0				
6:	0	1	1	0	0	1	1	1				
7:	0	1	1	1	1	0	0	0				
8:	1	0	0	0	1	0	0	1				
9:	1	0	0	1	1	0	1	0				
10:	1	0	1	0	1	0	1	1				
11:	1	0	1	1	1	1	0	0				
12:	1	1	0	0	1	1	0	1				
13:	1	1	0	1	1	1	1	0				
14:	1	1	1	0	1	1	1	1				
15:	1	1	1	1	0	0	0	0				

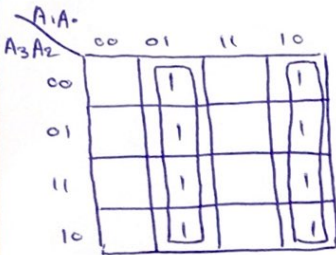
تقریر
 $A(t+1) = D_A$
 سقون سقون سقون سقون



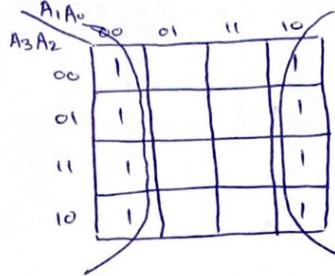
$$A_3(t+1) = D_3 = A_3 \bar{A}_1 + A_3 \bar{A}_2 A_1 + A_3 A_1 \bar{A}_0 + \bar{A}_3 A_2 A_1 A_0$$



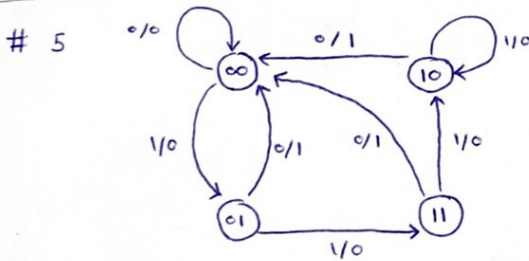
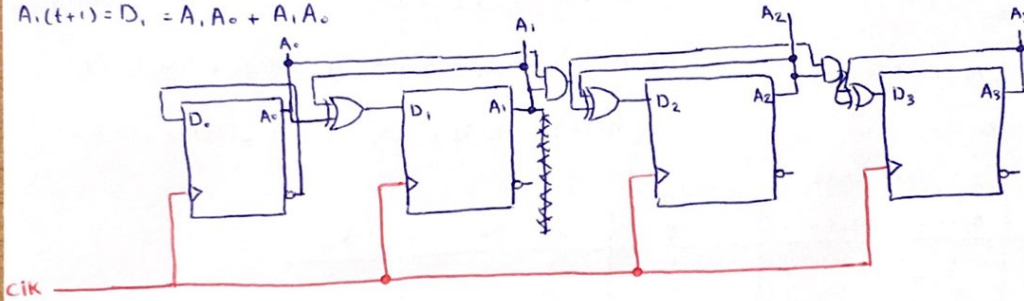
$$A_2(t+1) = D_2 = A_2 \bar{A}_1 + A_2 \bar{A}_0 + A_0 A_1 \bar{A}_2$$



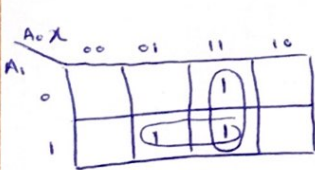
$$A_1(t+1) = D_1 = \bar{A}_1 A_0 + A_1 \bar{A}_0$$



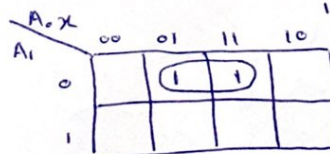
$$A_0(t+1) = D_0 = \bar{A}_0$$



$$FF \{ \bar{A}_0 \rightarrow D \rightarrow A(t+1) = D_A \}$$



$$A_1(t+1) = D_{A_1} = A_1 X + A_0 X$$

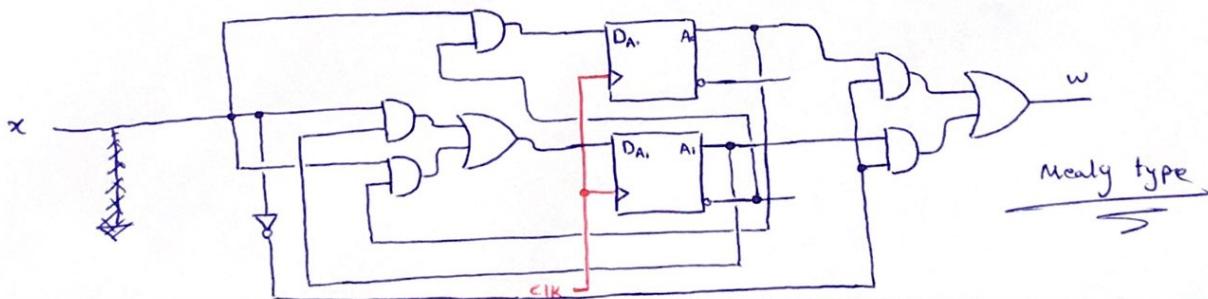


$$A_0(t+1) = D_{A_0} = \bar{A}_1 X$$

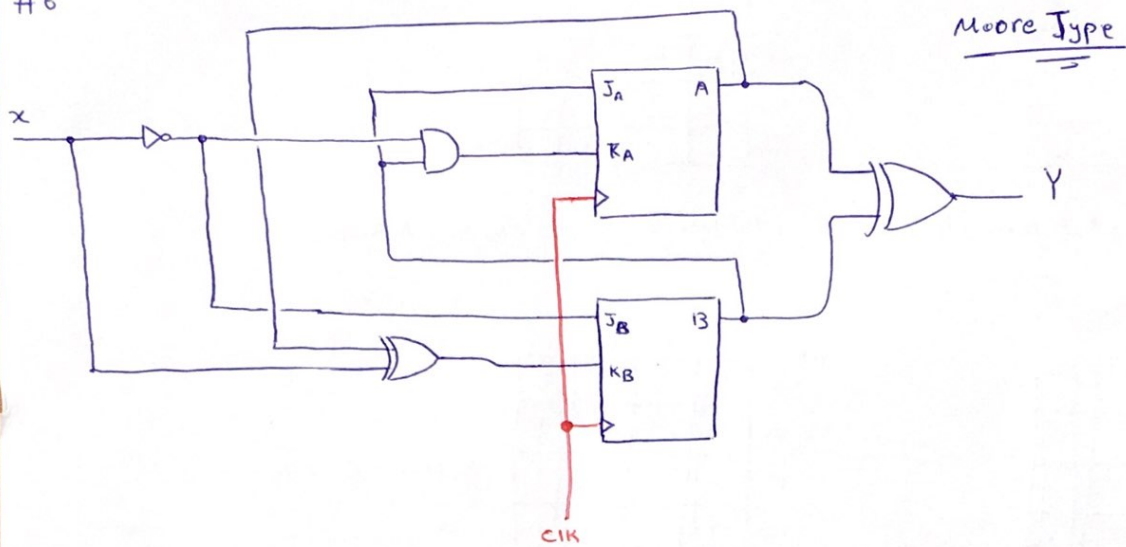
Present state		input	next state		output
$A_1(t)$	$A_0(t)$	x	$A_1(t+1)$	$A_0(t+1)$	w
0	0	0	0	0	0
0	0	1	0	1	0
0	1	0	0	0	1
0	1	1	1	1	0
1	0	0	0	0	1
1	0	1	1	0	0
1	1	0	0	0	1
1	1	1	0	0	0



$$w = A_0 \bar{X} + A_1 \bar{X}$$



#6



$$\begin{cases} J_A = B & K_A = B\bar{X} \\ J_B = \bar{X} & K_B = X \oplus A = X\bar{A} + \bar{X}A \\ Y = A \oplus B = \bar{A}B + \bar{B}A \end{cases}$$

$$Q(t+1) = J\bar{Q} + \bar{K}Q$$

$$\Rightarrow A(t+1) = J_A \bar{A} + \bar{K}_A A = B\bar{A} + A\bar{B} + AX$$

$$\Rightarrow B(t+1) = J_B \bar{B} + \bar{K}_B B = \bar{X}\bar{B} + B\bar{A}X + BAX$$

Present state			Next state		output				
A(t)	B(t)	X	A(t+1)	B(t+1)	Y	J _A	K _A	J _B	K _B
0	0	0	0	1	1	0	0	1	0
0	0	1	0	0	0	0	0	0	1
0	1	0	1	1	0	1	1	1	1
0	1	1	1	0	1	1	0	0	0
1	0	0	1	1	0	0	0	1	1
1	0	1	1	0	1	0	0	0	0
1	1	0	0	0	0	1	1	1	0
1	1	1	1	1	0	1	0	0	0

Q(t)	Q(t+1)	J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

بدول شریب

