

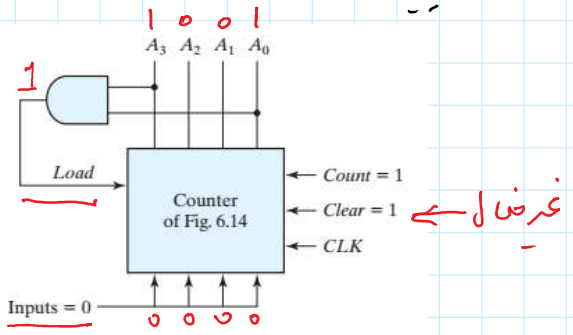
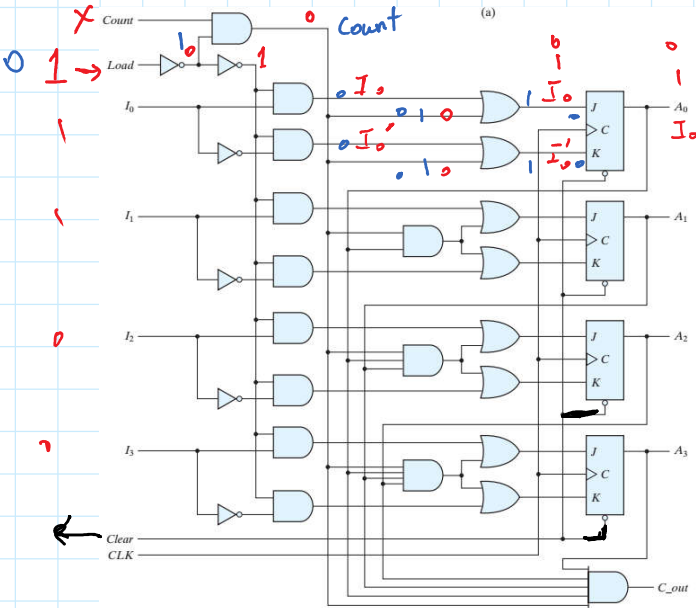
Counters-Synchronous-cont

Tuesday, June 2, 2020 3:57 PM

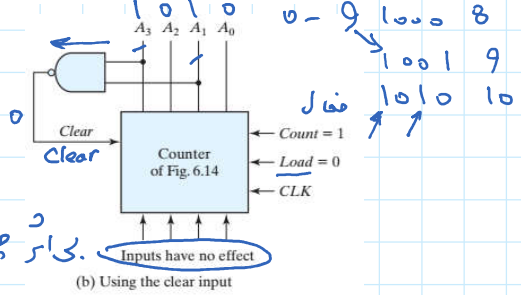
با کتبه
 Clear
 Clock
 با
 load
 شمارش
 Count-Enable
 فعال
 r;

Clear	Clock	load	Count
0 فعال	X	X	X
1 غیر فعال	↑	1 فعال	X
1	↑	0 غیر فعال	1
1	↑	0	0

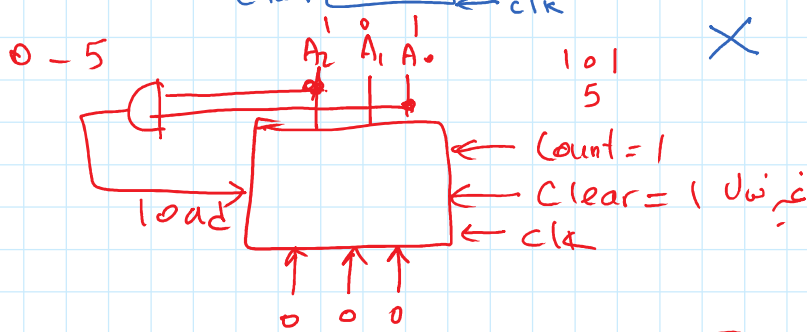
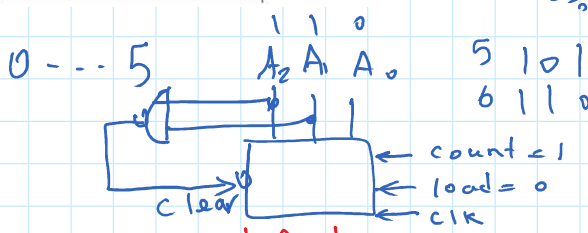
شمارنده به صفر با یک بار شمارش
 اطلاعات وارد شمارنده می شود
 می نهد می شمارد
 شمارنده استیپه (بلاک غیر)



(a) Using the load input



(b) Using the clear input

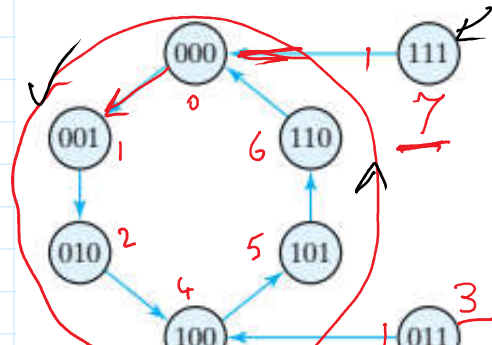


در شمارنده با یک بار شمارش
 یا غیر فعال

شمارنده با حالات بزرگ استیپه

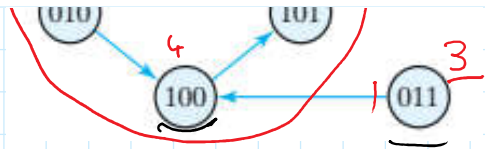
حالت فعلی			حالت بعدی		
A	B	C	A	B	C
0	0	0	0	0	1
→	0	0	1	0	0
→	0	1	0	0	0
→	1	0	0	0	1
→	1	0	1	1	0

J k



1 0 0
1 0 1
1 1 0

1 1 0
0 0 0



Present State			Next State			Flip-Flop Inputs					
A _t	B	C	A _{t+1}	B	C	J _A	K _A	J _B	K _B	J _C	K _C

0 0 0 → 1 0 0 1
 1 0 0 → 2 0 1 0
 2 0 1 → 4 1 0 0
 4 1 0 → 5 1 0 1
 5 1 0 → 6 1 1 0
 6 1 1 → 0 0 0 0

$J_A = \sum 2$
 $d = \sum (4, 5, 6, 3, 7)$

$K_A = \sum 6$
 $d = \sum (0, 1, 2, 3, 7)$

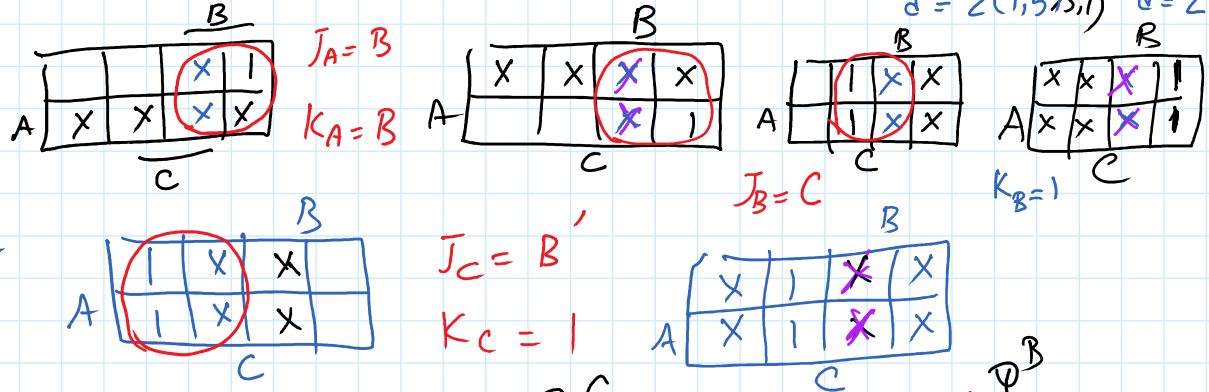
Q _t	Q _{t+1}	J	k
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

$J_B = \sum 1, 5$
 $d = \sum (2, 6, 3, 7)$

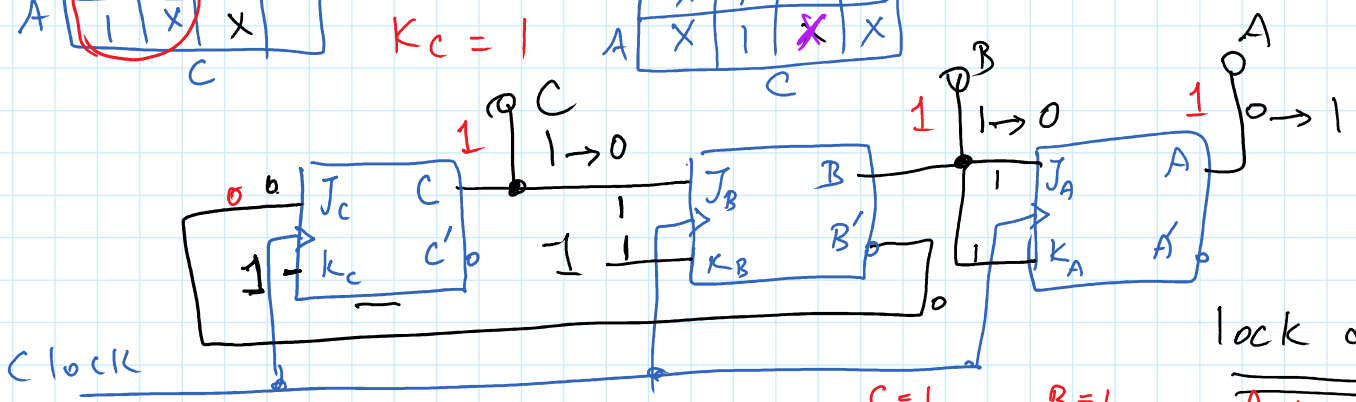
$J_C = \sum 0, 4$
 $d = \sum (1, 5, 3, 7)$

$K_B = \sum 2, 6$
 $d = \sum (0, 1, 4, 5, 3, 7)$

$K_C = \sum (1, 5)$
 $d = \sum (0, 2, 4, 6, 3, 7)$



011 → 000
 111 → 000

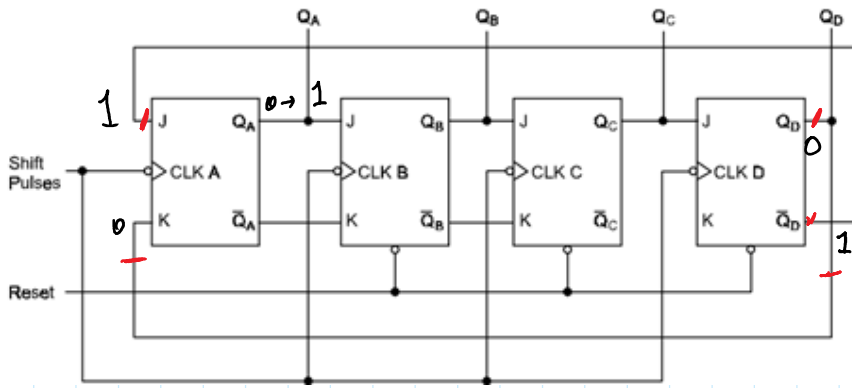


lock down

A B C	A	B	C	C=1	B=1	A=1
3 0 1 1	1	1	1	J=0, K=1	J=1, K=1	J=1, K=1
4 1 0 0	0	0	0	C=0	B _{t+1} = B'	A _{t+1} = A'

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 k_mirzaee@yahoo.com

تا بهستم تیرماه مهلت ایدیل
 سید، دقتن: تیرماه ← ایدیل

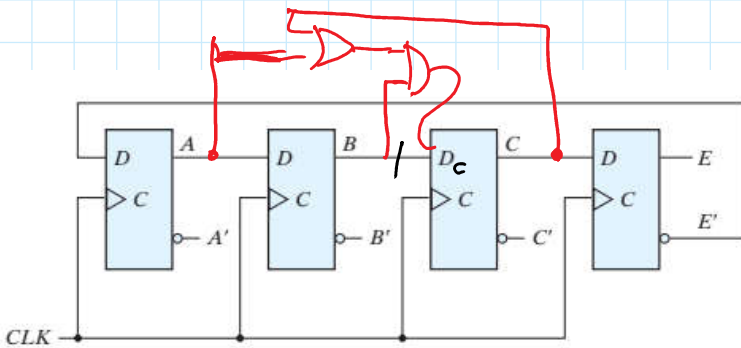


Johnson

Twisted-Ring Counter

Ring 4 FF → 4 0
 Johnson 8 CLK → 8 CLK
 4 FF → 2⁴

State	Q _D	Q _C	Q _B	Q _A	Binary equivalent	Output decoding
1	0	0	0	0	0	$\bar{A}\bar{B}$ → $\bar{A}\bar{B}$
2	0	0	0	1	1	$\bar{A}B$ → $\bar{A}B$
3	0	0	1	1	3	$\bar{B}C$ → $\bar{B}C$
4	0	1	1	1	7	$\bar{C}D$ → $\bar{C}D$
5	1	1	1	1	15	AD → AD
6	1	1	1	0	14	$\bar{A}B$ → $\bar{A}B$
7	1	1	0	0	12	$\bar{B}C$ → $\bar{B}C$
8	1	0	0	0	8	$\bar{C}D$ → $\bar{C}D$



Sequence number	Flip-flop outputs				AND gate required for output
	A	B	C	E	
1	0	0	0	0	$A'E'$
2	1	0	0	0	AB'
3	1	0	0	0	BC'
4	1	1	1	0	CE'
5	1	1	1	1	AE
6	0	1	1	1	$A'B$
7	0	0	1	1	$B'C$
8	0	0	0	1	$C'E$

$$D_C = (A + C)B$$