CS & IT ENGINEERING



COUNTER Part-05

Lecture No.

09



By- CHANDAN SIR





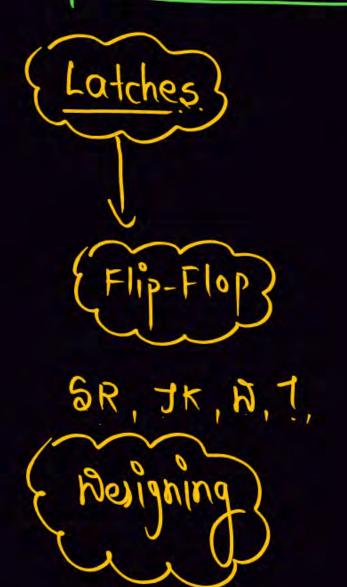
TOPICS TO BE COVERED **01 ASYNCHRNOUS COUNTER**

02 Synchronous Counter

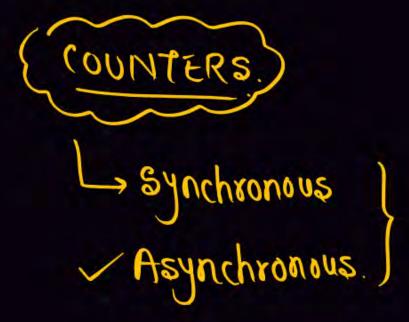
03 Discussion



Sequential circuit







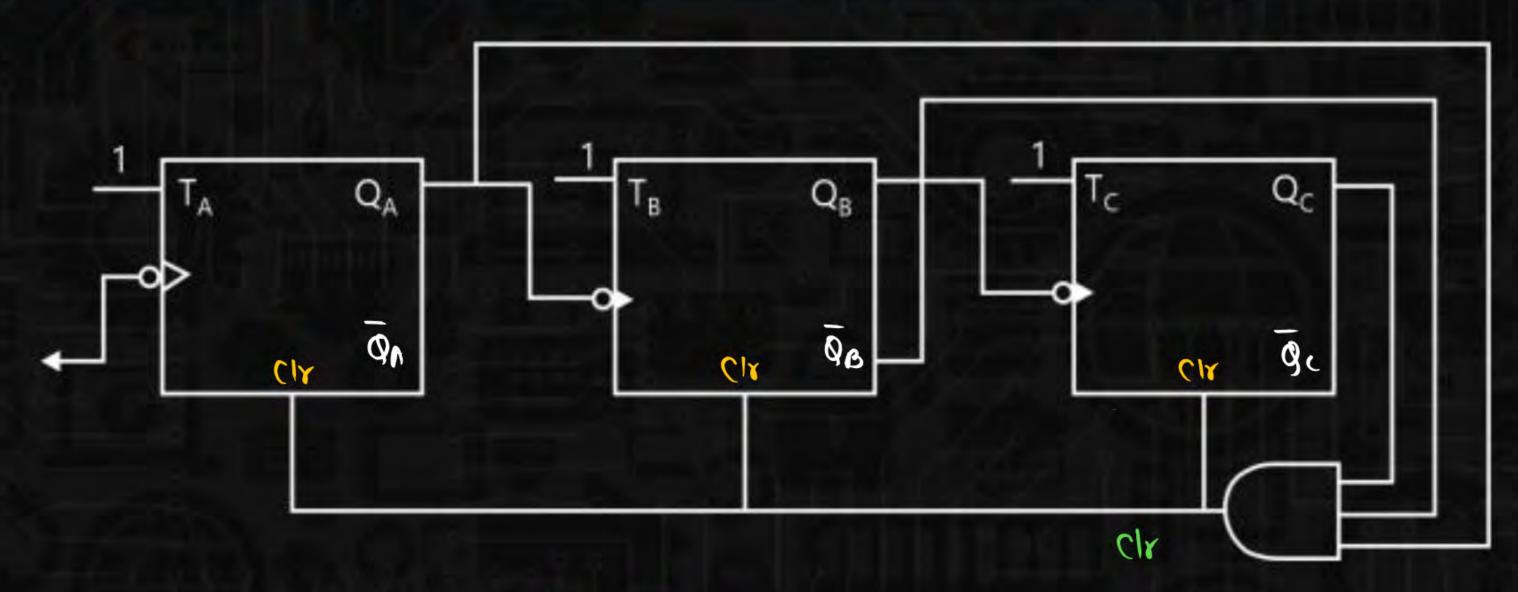


Asynchronous Counter Ripple counter M0D-8UP Ripple counter TA Qc Q.

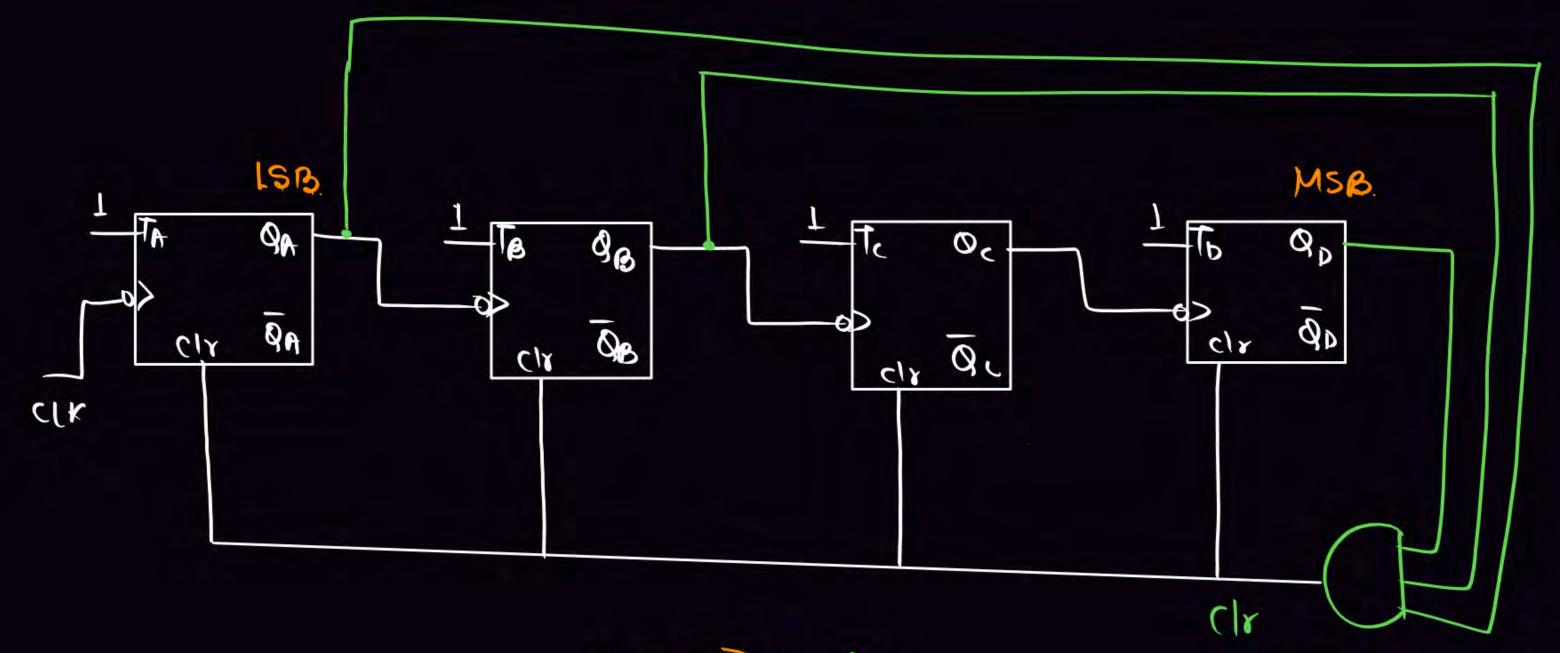
clk

FEEDBACK REDUCES THE NUMBER OF STATES









(1r= 909, 9B BA

1011 -> MOD-11 UP Ripple wunter

ASYNCHRONOUS COUNTER



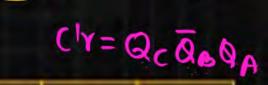
OB

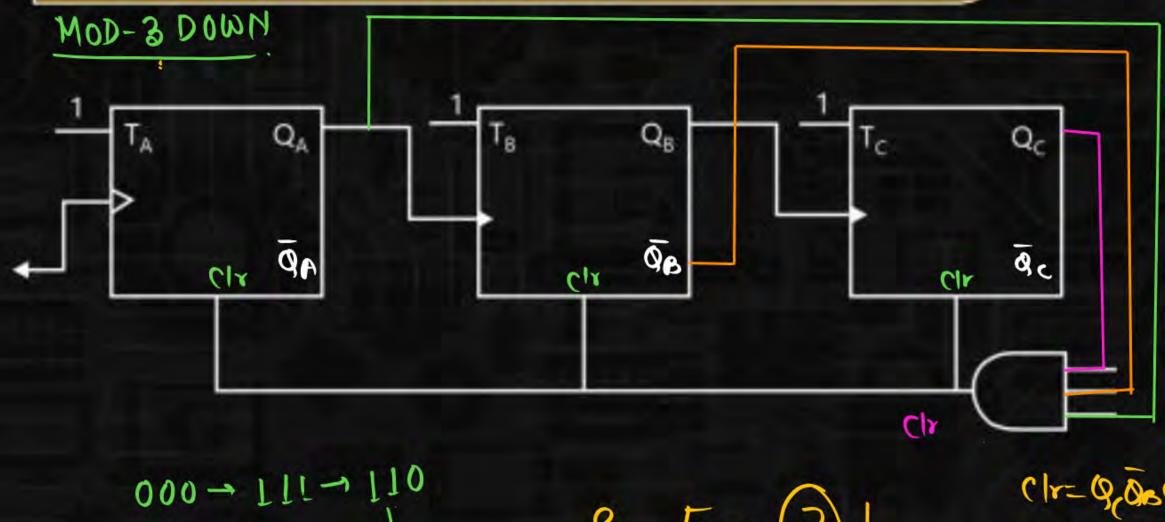
ON



clr

10





	0	0	0	0
I	1	L	1	1
I	2	1	1	0
I	3	No	80	٥۔در
	4	1	1	J
٩	5			
	6		1	
	7			
			1	

Q_c

000 -	1117	110

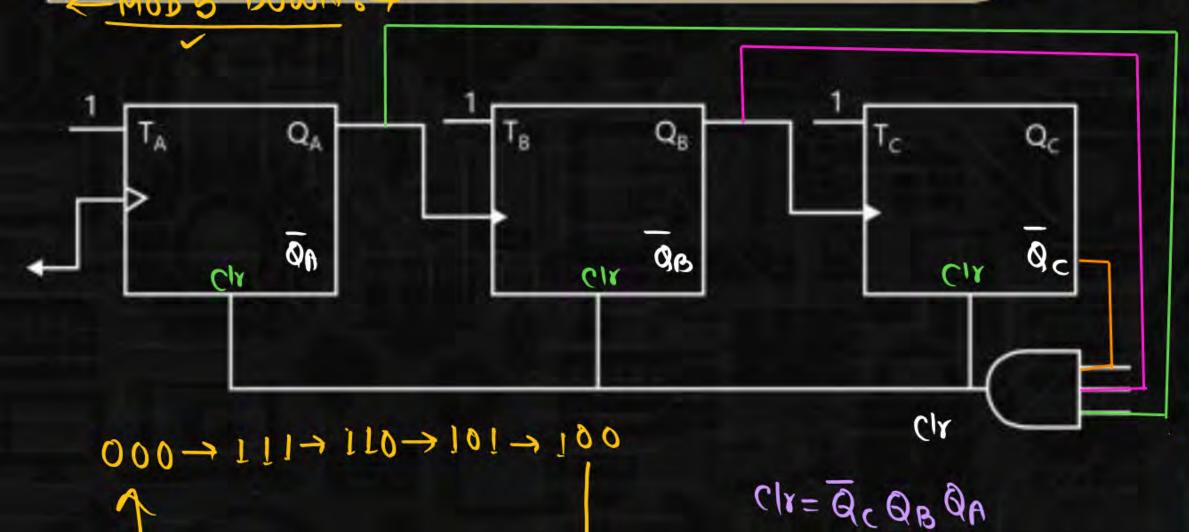
	8-5	5 = (3)
(full-1	$) \rightarrow = 0$	OWN

ASYNCHRONOUS COUNTER

FULL-UP = DOWN 8-3=5)



Ch-QCQBQA



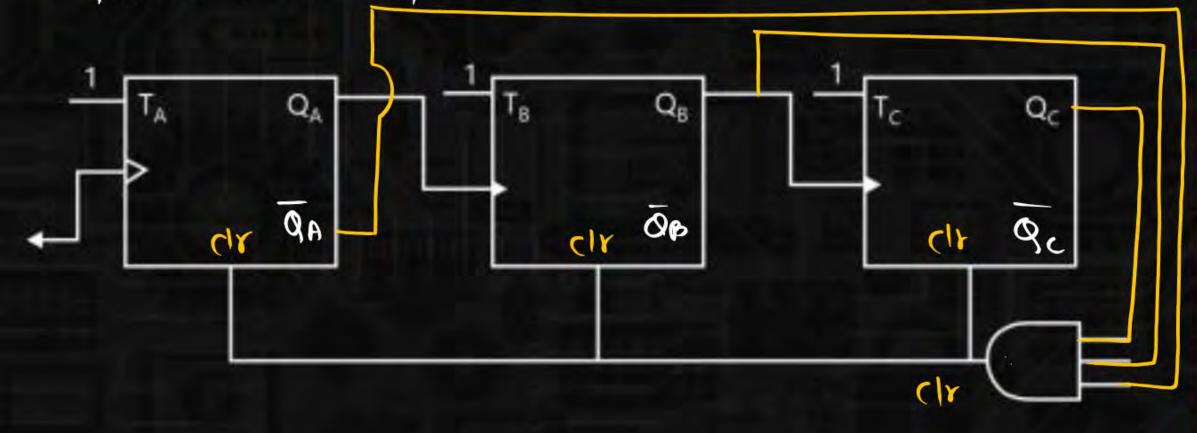
CLK	٩c	ap	BA	CIY
0	0	0	0	0
1	L	1	.1	0
2	1	1	0	0
3	1	0	1	0
4	1	0	0	0
5	80	₹0	*	10
6	T	1	7	Ó
7	4	1	Ó	O
8				

8	g _e	gn
0	1	1

ASYNCHRONOUS COUNTER



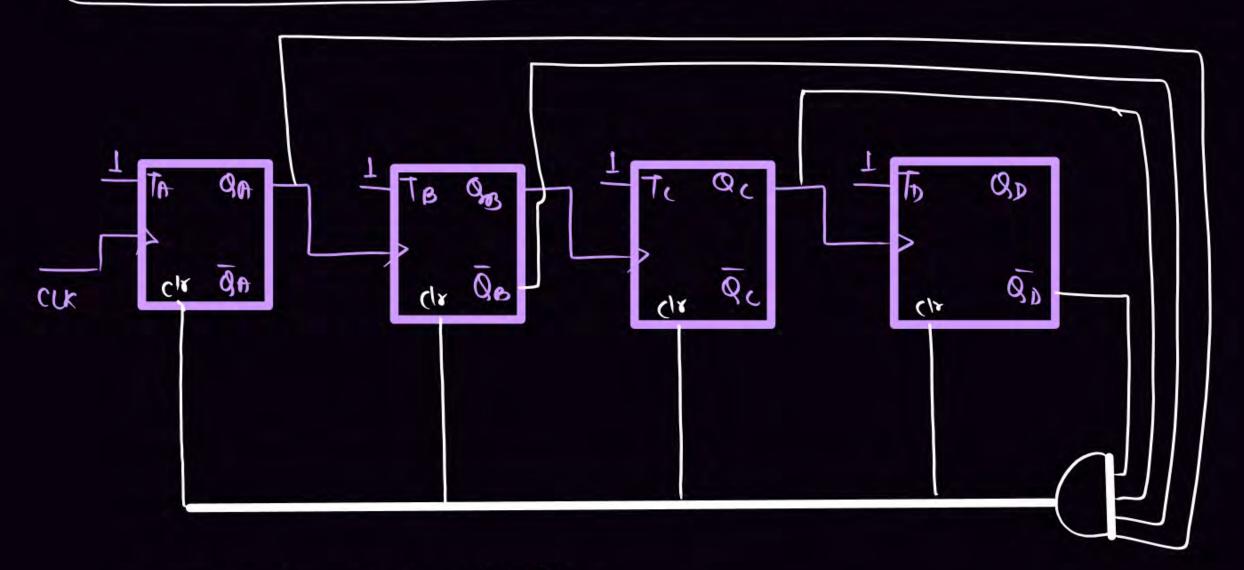
MOD-a' DOWN Ripple counter.



CLK		
0		
1		
2		
3		
4		
5		
6	9	
7		
8		

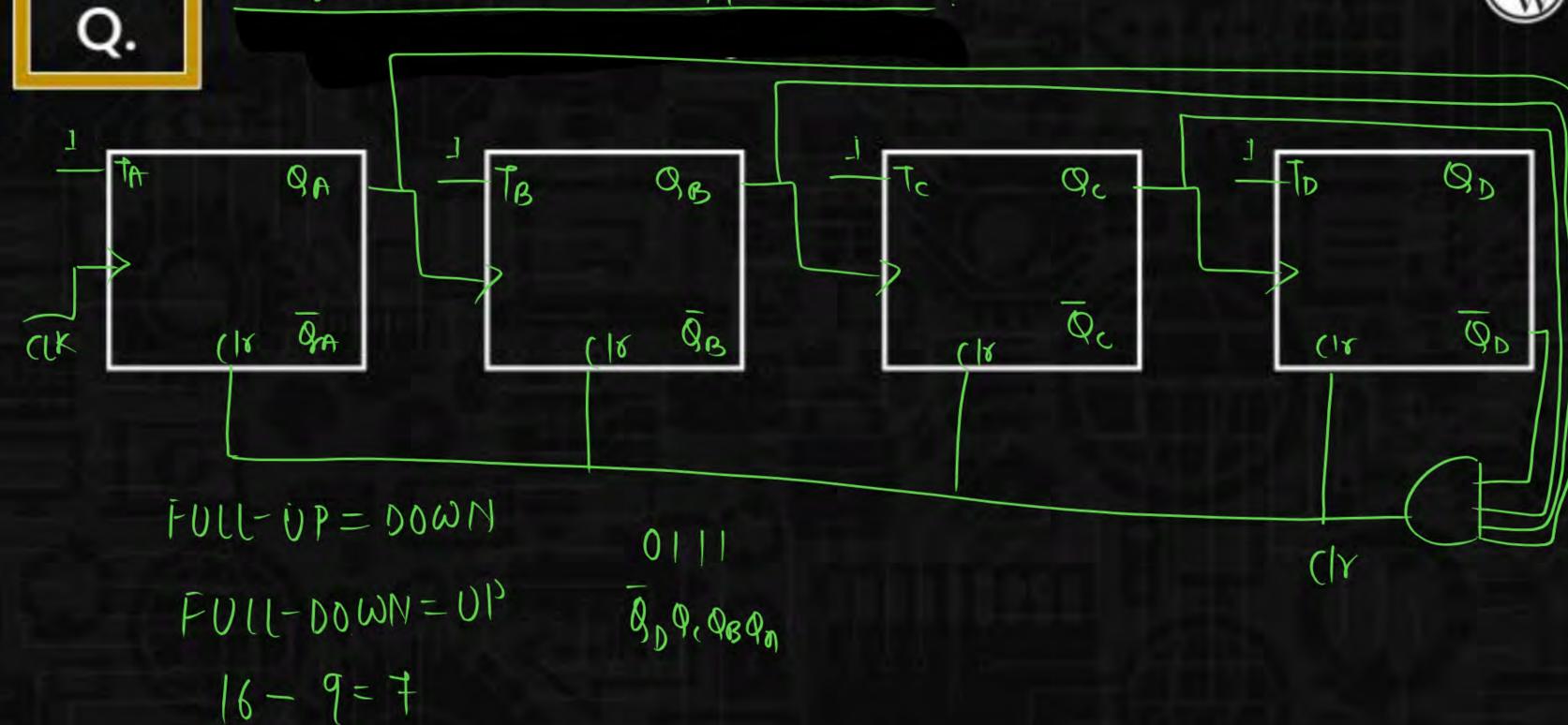
MOD" LI DOWN RIPPLE COUNTER 8-7





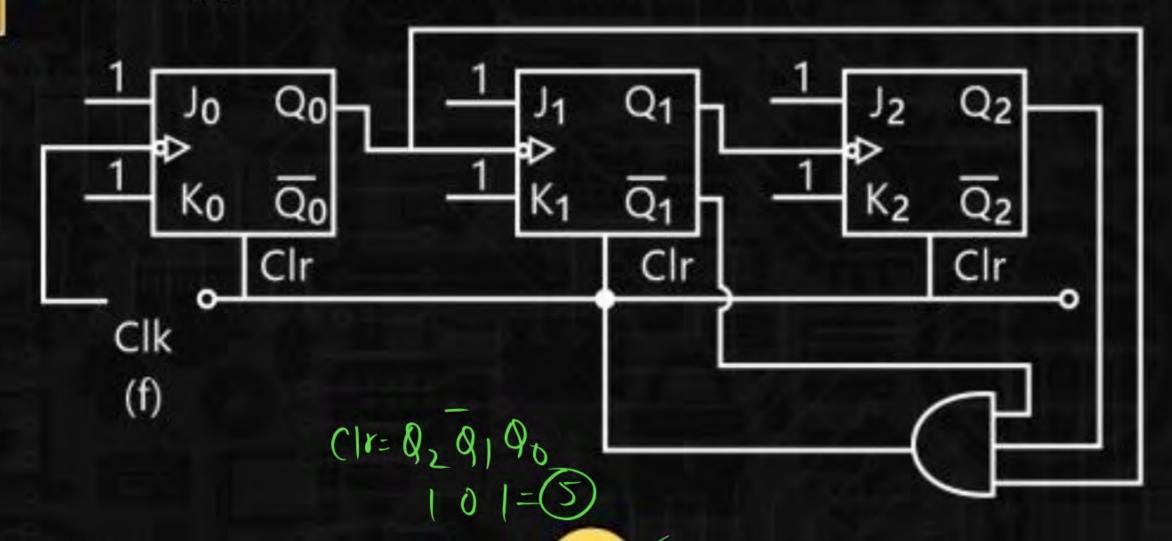
Besign a MOD-9 DOWN Ripple counter?







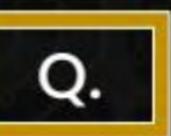
Q. Which type of counter is shown below?



- A. mod 5 down counter
- c. mod 6 up counter

mod 5 up counter

D. mod 6 down counter

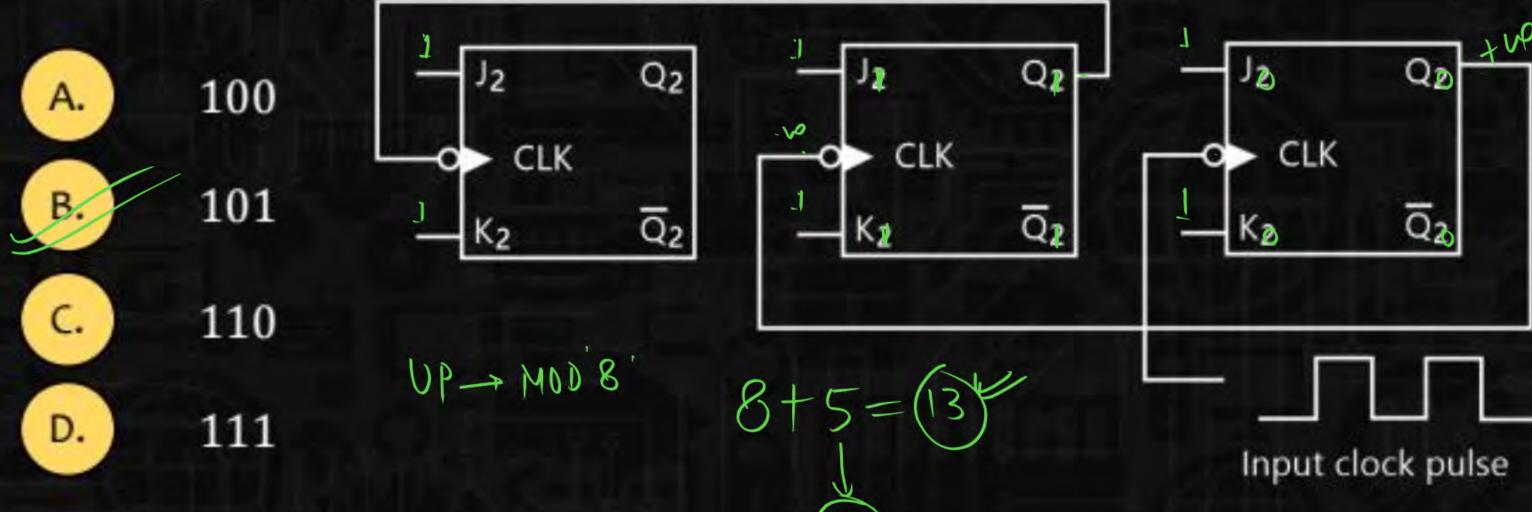


Consider the following counter



If counter starts at 000, what will be the count after 13 clock

pulses?





8th
$$0 \rightarrow 000$$

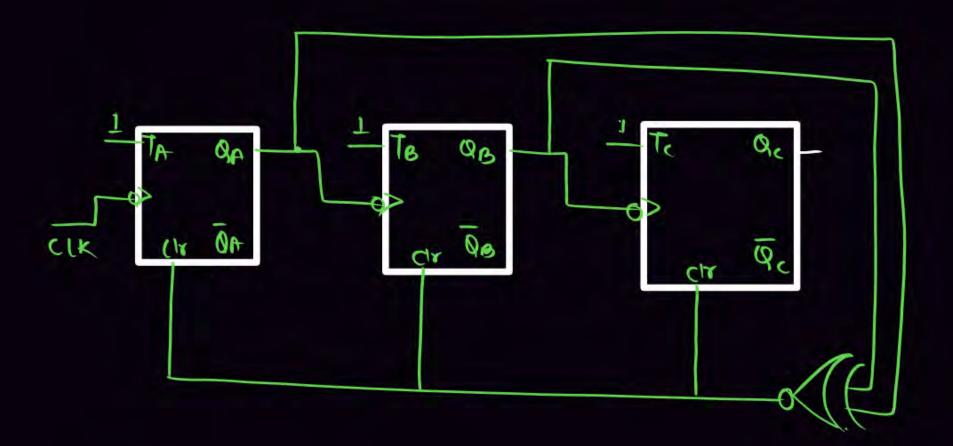
 $9th \cdot 1 \rightarrow 000$
 $10^{t} 2 \rightarrow 010$
 $11^{th} 3 \rightarrow 011$
 $12^{th} 4 \rightarrow 100$
 $13^{th}, 5 \rightarrow 100$
 $14^{th} 6 \rightarrow 110$
 $15^{t} 7 \rightarrow 111$



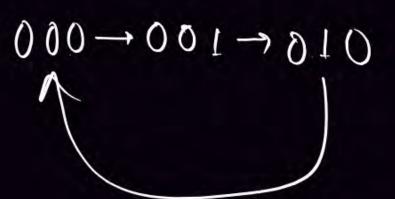
"n" bit Ripple counter

1cm> U. Shatt

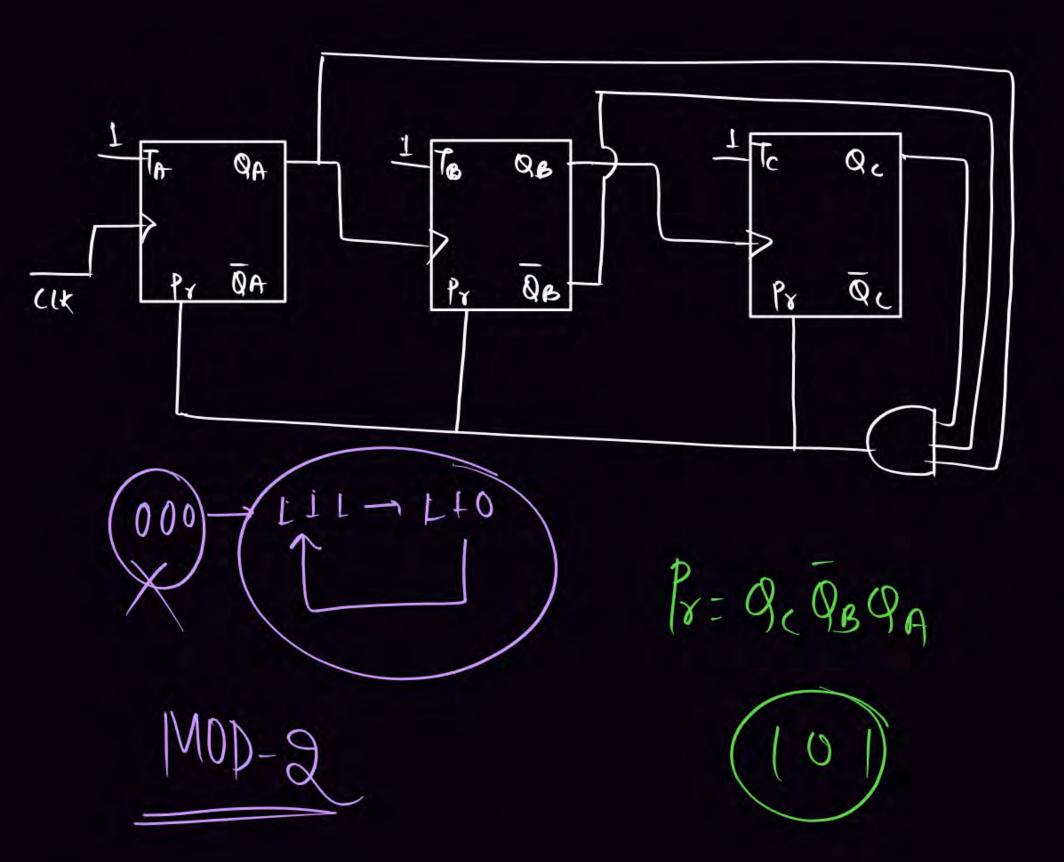
$$\frac{1}{\sqrt{f_{crk}}} = \frac{1}{n \cdot r_{pdff}}$$



MOD-3



			:	
(lk	Q _c	Org	Q _A	Clr= 960
0	8	D	D	K I
1	0	0	T	0
2	0	1	0	0
3	Ø	2	ر ر ا	1° 1
4				••••••
,				



Pr = Q (QBQ) Pw CK QCQBQA Pr 0 0 0 0 0 0 0

6



