# CS & IT ENGINEERING



DIGITAL LOGIC Sequential Circuit ASYNCHRNOUS COUNTER

Lecture No.



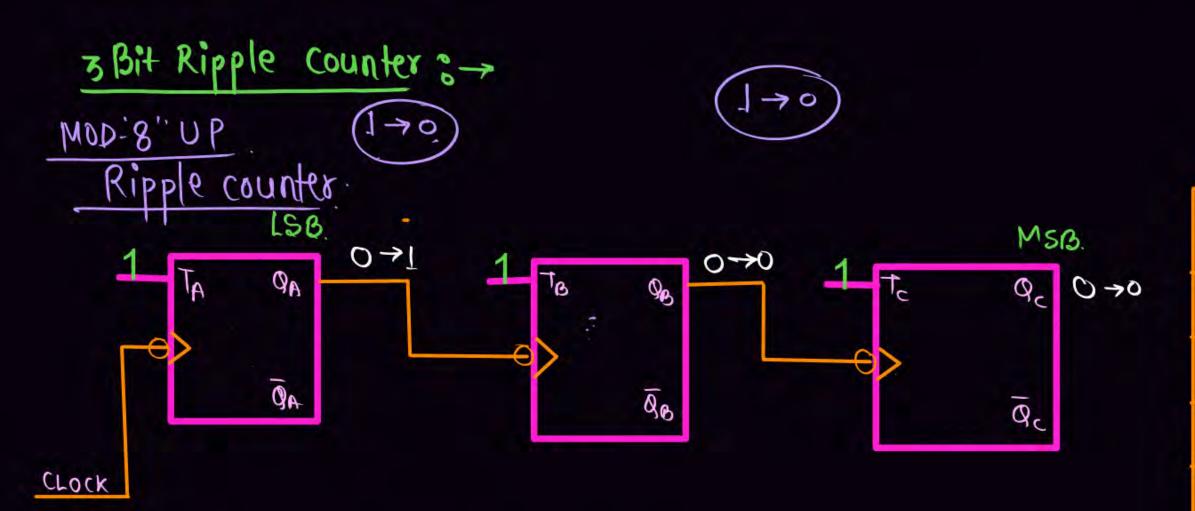
By- CHANDAN SIR

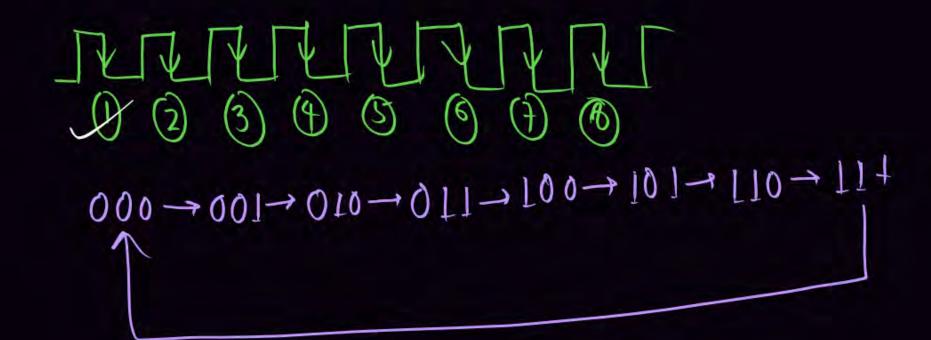


TOPICS TO BE COVERED **01 ASYNCHRNOUS COUNTER** 

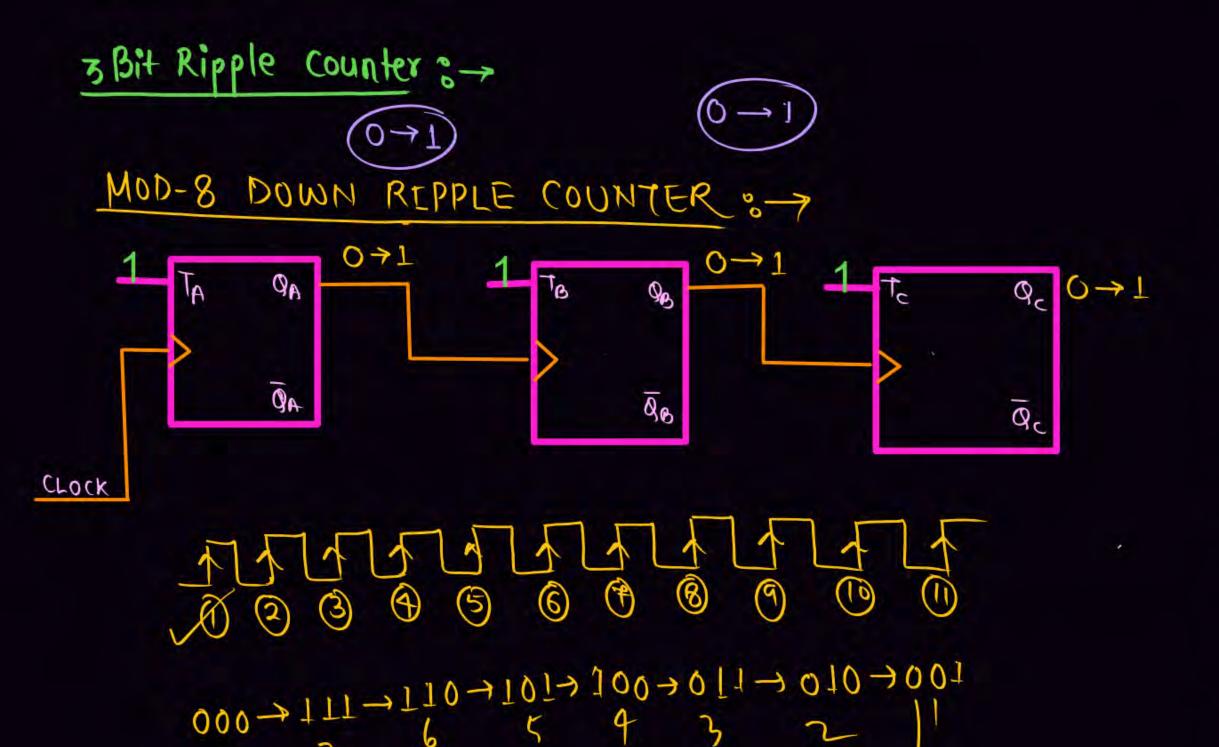
**02 Practice** 

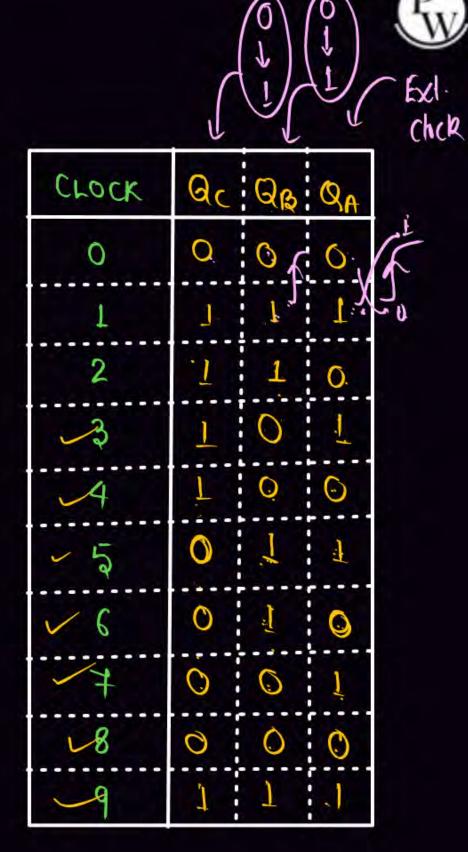
03 Discussion





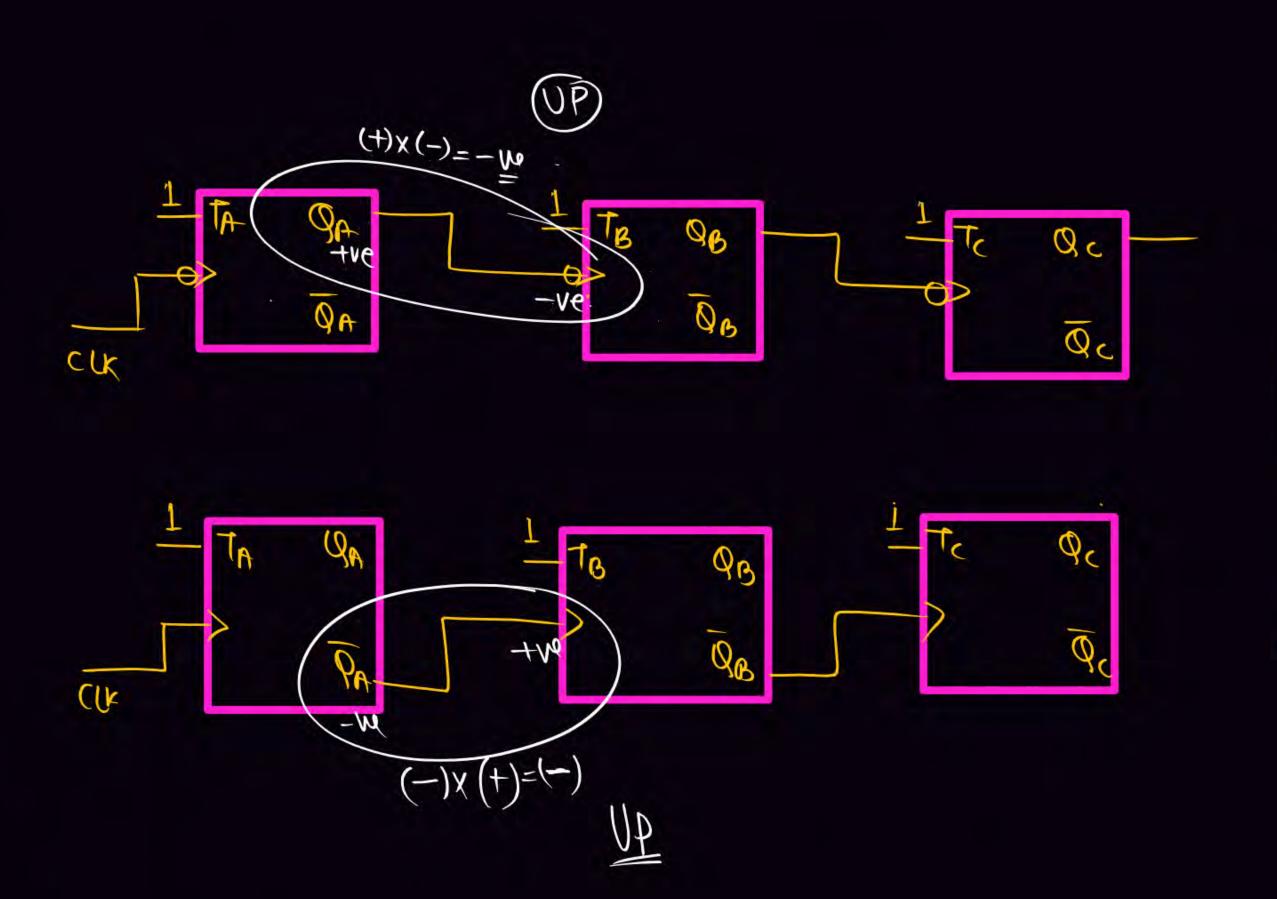




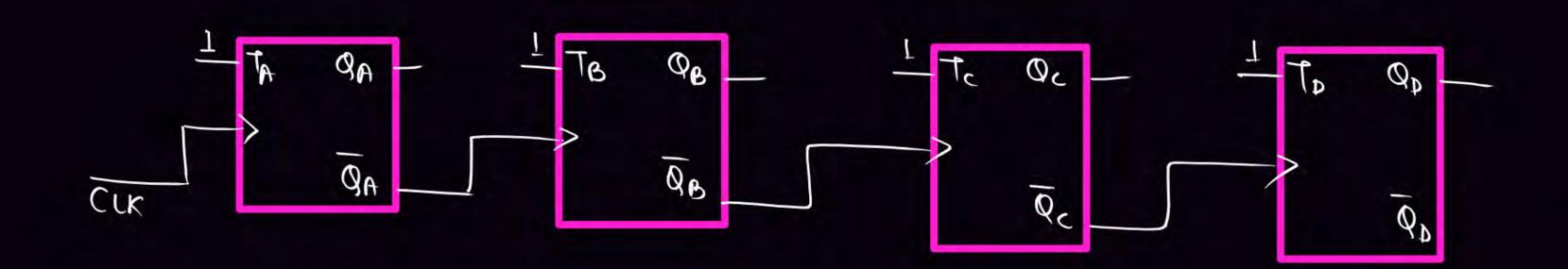






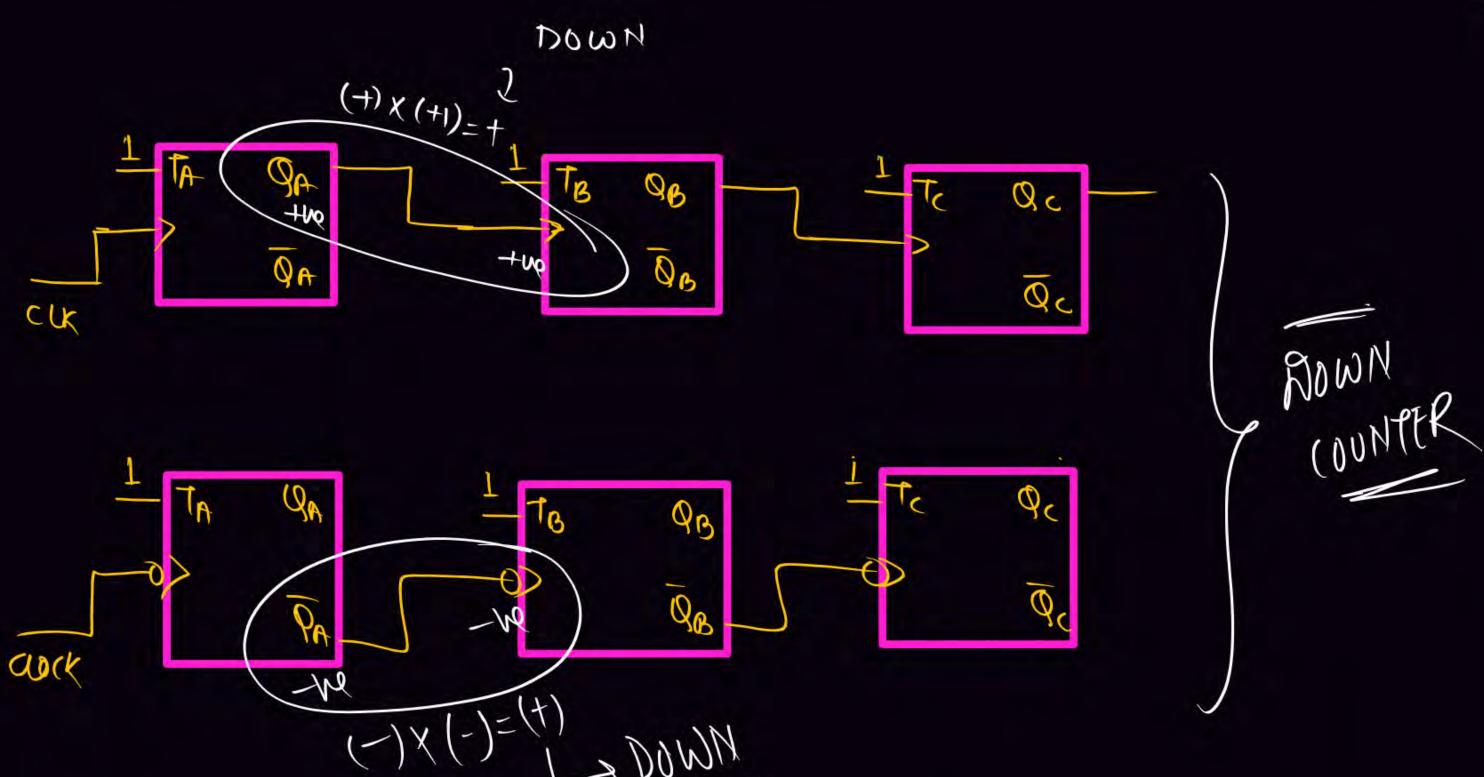


Q Besign a Mod 16 UP Ripple counter in which Q will be taken as clock?



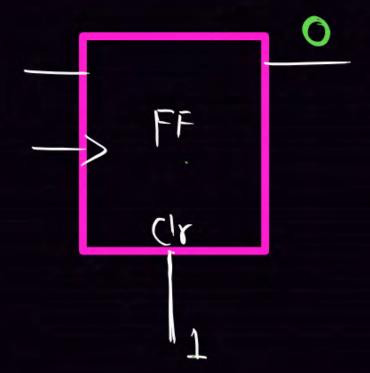
MOD-16 UP Ripple Lauréer



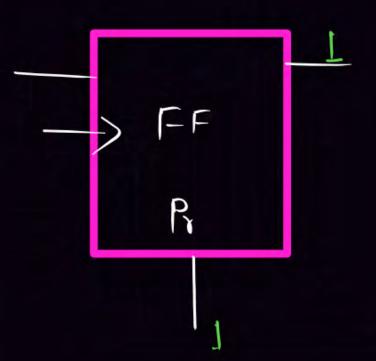




Reset (clear)



Preset.



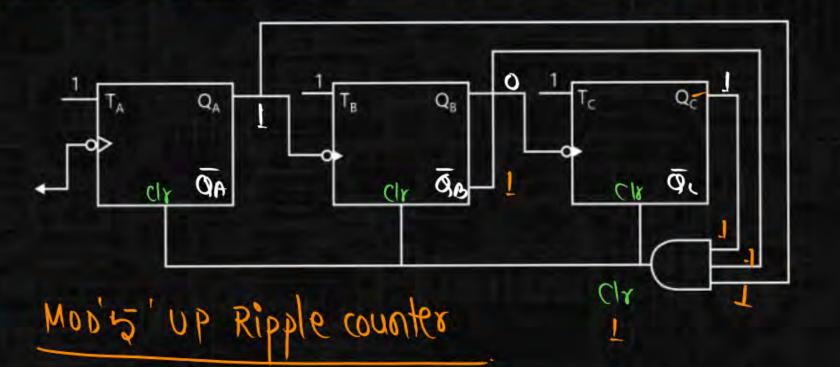


Feedback reduces the number of states.









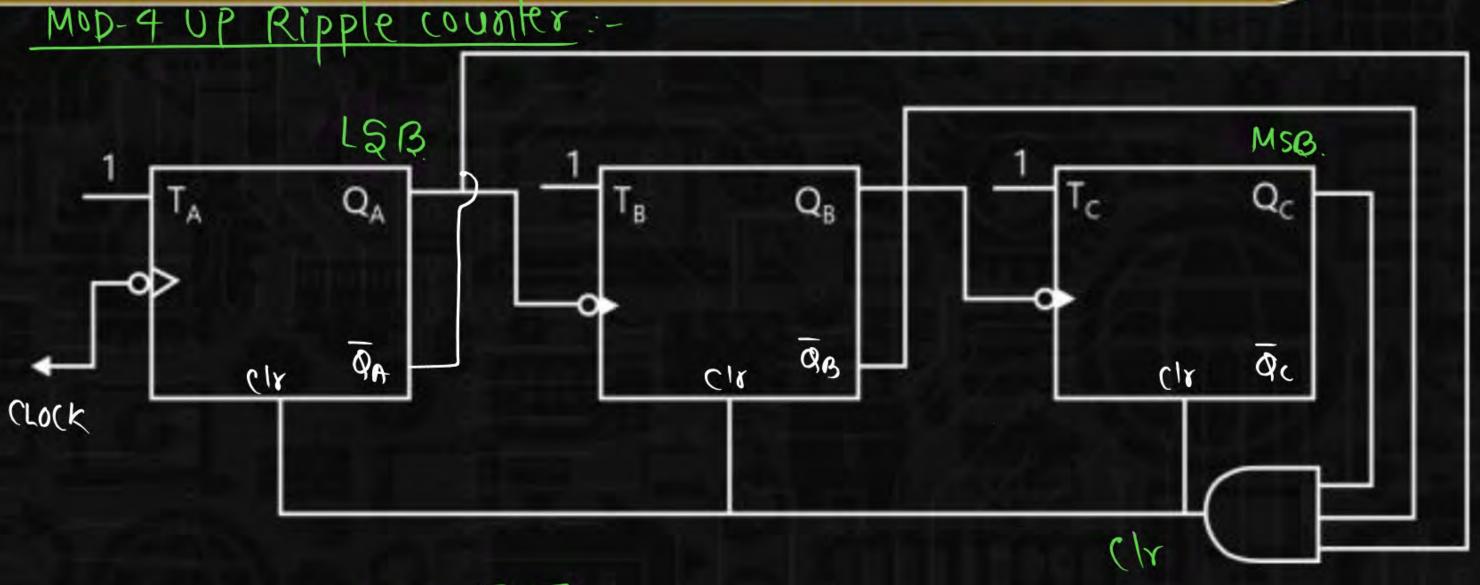
61	
(1/2=	Q Q QA
	of old att

000-001-010-	1011-1100	,

			:	
CLOCK	$Q_{c}$	O <sub>D</sub>	Q4	Clr=QcQp
0	0	0	0	0
_1	0	Ó	1	0
_2	0	1	0	0
-3	0	1	7	0
V 4	Ţ	0	0	0
V5	J10	80	200	100
6	0	0		0
7	0	1	0	0
В	9	1	1	0
9	1	δ	Ó	Ò

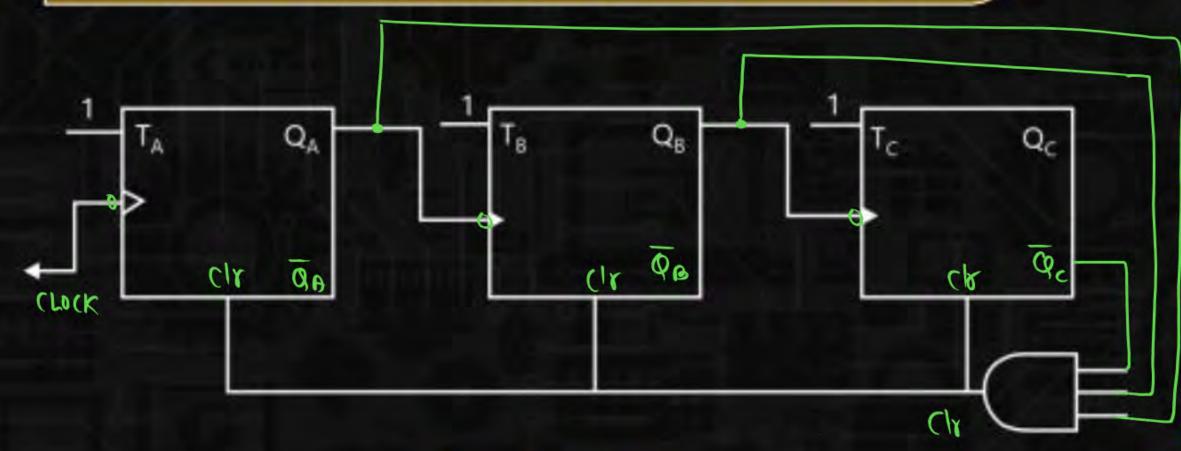
## FEEDBACK REDUCES THE NUMBER OF STATES





## **ASYNCHRONOUS COUNTER**



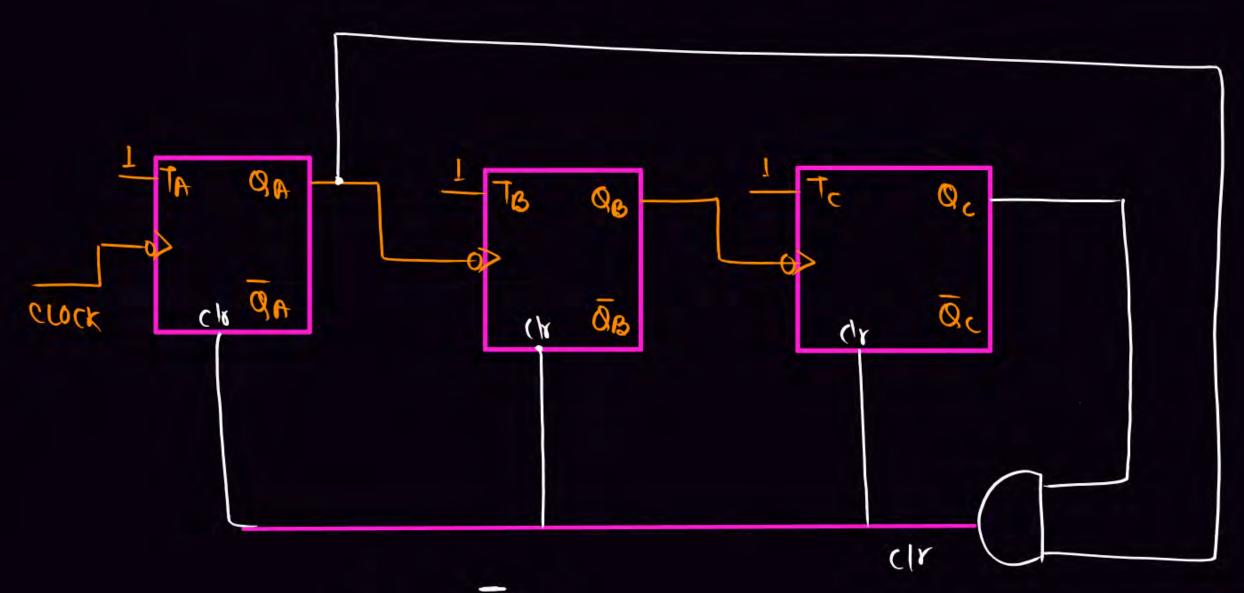


Chr=QcQBQA	
$0 T 1 \Rightarrow W00(3)$	UP Ripple
	conter

CLK		
0		
1		
2		
3	1	
4		
5		
6	70	
7		
8		

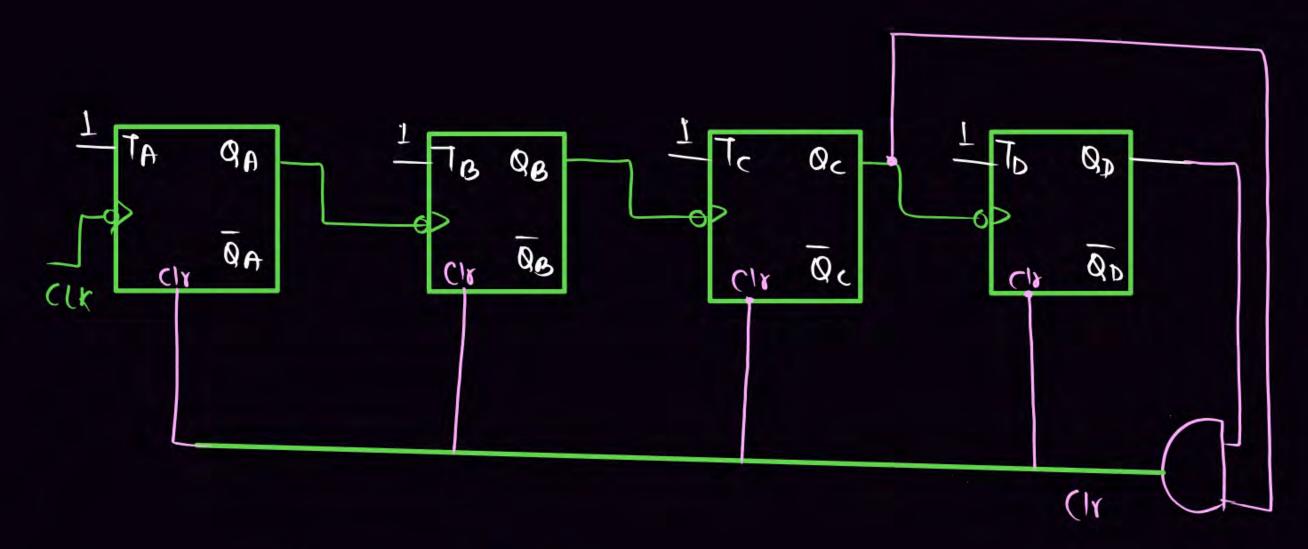
# MOD-5 UP Ripple counter: 3-7





$$(1 - 9.980)$$
= 101=(5)

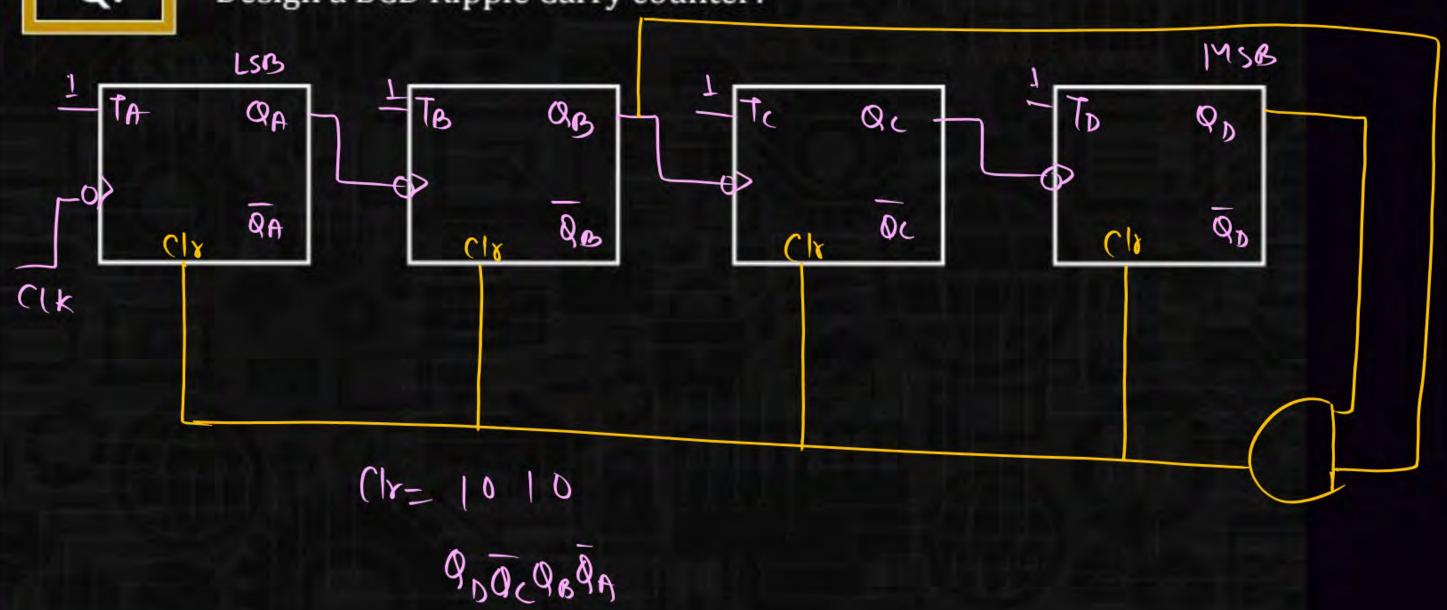








### Q. Design a BCD Ripple Carry counter?

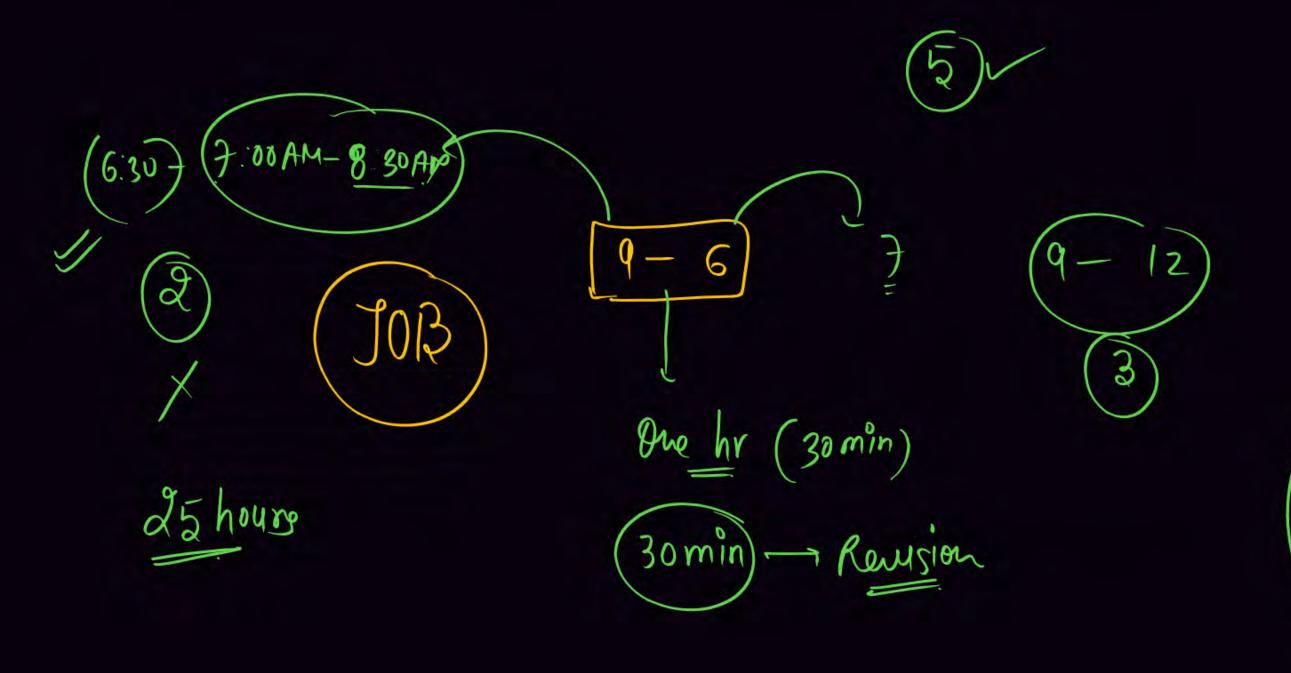




A Design a MOD-13 UP Ripple counter?

A Design a MOD-23 UP Ripple counter?

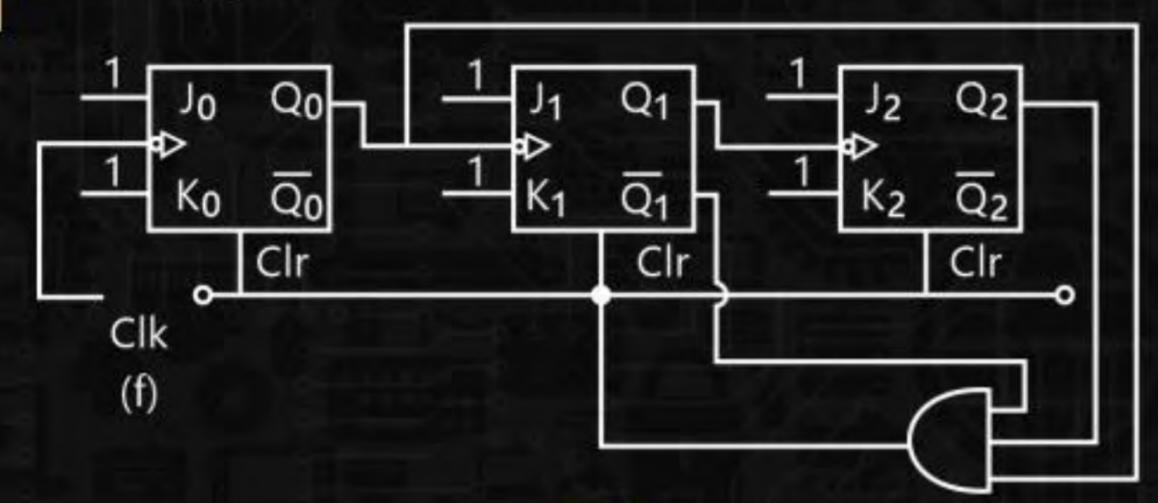




Saturday

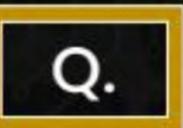


Q. Which type of counter is shown below?



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

- B. 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

