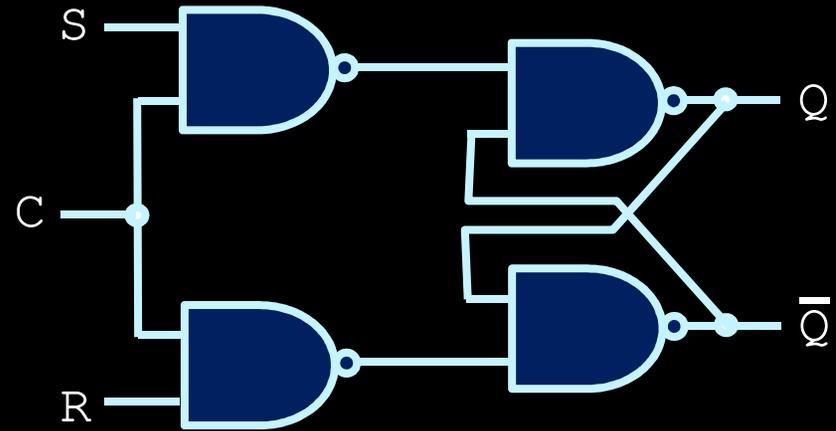


# Quiz 4

# Question 1

- What are the output values in  $Q$  given the following inputs on  $S$ ,  $R$  and  $C$ ?



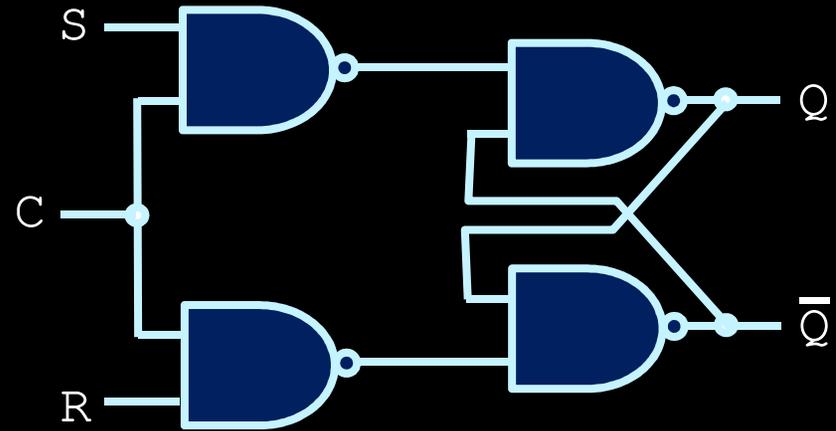
Time



S	R	C	Q
0	0	1	Z
1	0	1	1
1	0	0	1
0	0	0	1
0	1	0	1
0	1	1	0

## Question 2

- What are the output values for  $\bar{Q}$  given the following inputs on S, R and C?



Time

S	R	C	Q	$\bar{Q}$
0	0	1	Z	Z
1	0	1	1	0
1	0	0	1	0
0	0	0	1	0
0	1	0	1	0
0	1	1	0	1

# Question 3

- How many states does this FSM have?

11



# Question 4

- How many flip flops does this FSM need?

4



# Question 5

Which states does this FSM go through if the user inputs the following:

- 10 cents
- 10 cents
- 5 cents
- 10 cents
- 5 cents
- 5 cents
- 5 cents



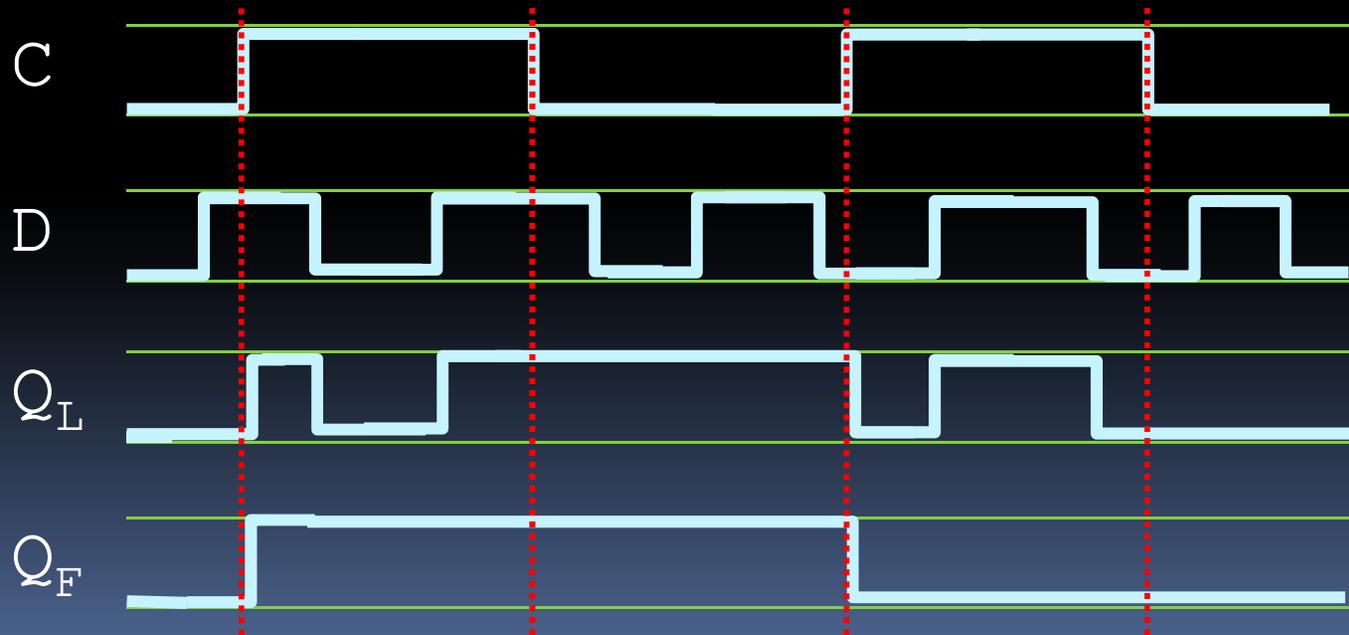
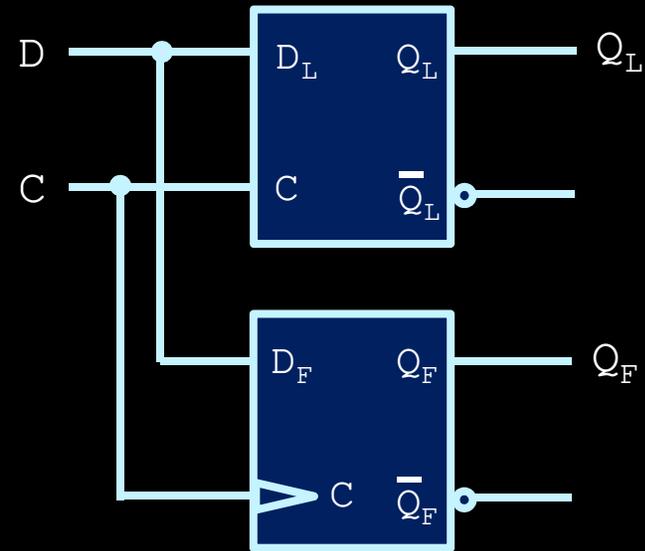
**Zero -> Ten -> Twenty -> Twenty-Five->  
Thirty-Five-> Forty -> Forty-Five -> Fifty**



# Group Questions

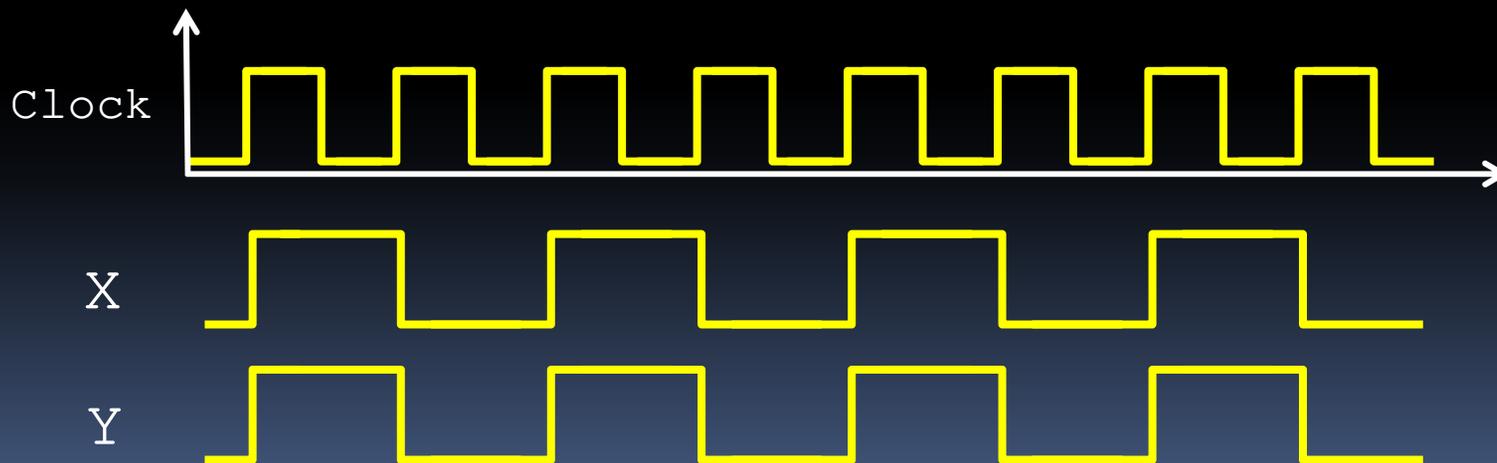
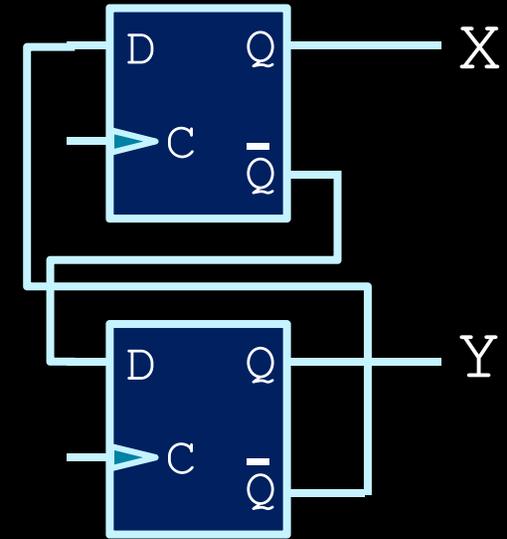
# Question 1

- Given the circuit on the right and the input waveform below, what will the outputs be on  $Q_L$  and  $Q_F$ ?



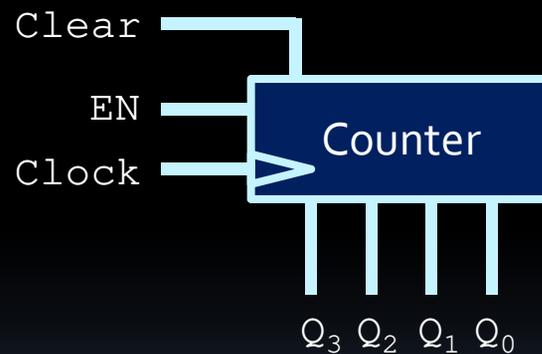
## Question 2

- Assuming the Q outputs of both flip-flops start off low, what will the value of X & Y be over the next few clock cycles?
  - also assume positive edge trigger.



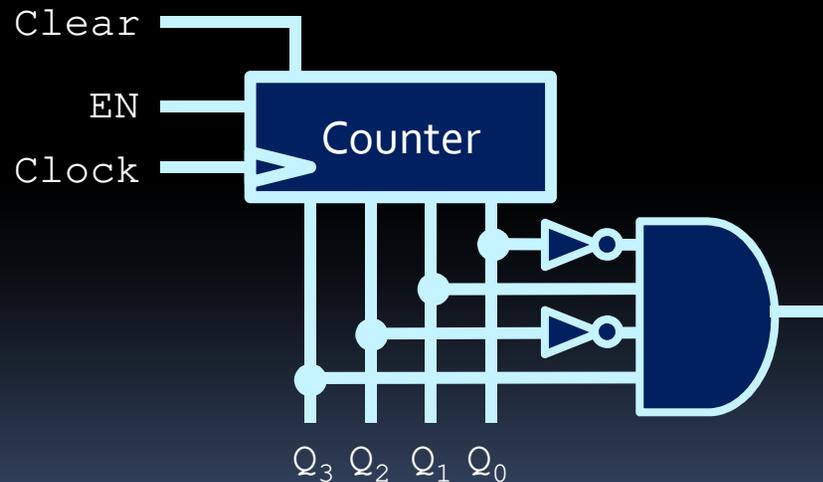
## Question 3 & 4:

- Assume that you have access to a counter circuit:



## Question 3

- How do you make a signal that goes high after 10 clock cycles?



# Question 4

- How do you make a signal that goes high every 10 clock cycles?

