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Experiment no 7

Aim: To implement the circuit and to verify the truth table

Component :- IC7474, IC7476, power supply, CRO

Theory :-

Basically, Flip-Flops are the bistable multivalue that stores logic 1 and 0. Shift register, memory and counters are ~~but~~ built by using Flip-Flops. Sequential circuit (machine) outputs depends on the present state and ~~if~~ input applied at that instant.

Types of Flip Flops.

1. SR Flip Flop
2. JK Flip Flop
3. D Flip Flop
4. T Flip Flop.

1. SR Flip Flop.

The most common flip-flop is the SR flip-flop. This simple flip-flop circuit has a set input (S) and a reset input (R) S —> active, Q —> high.

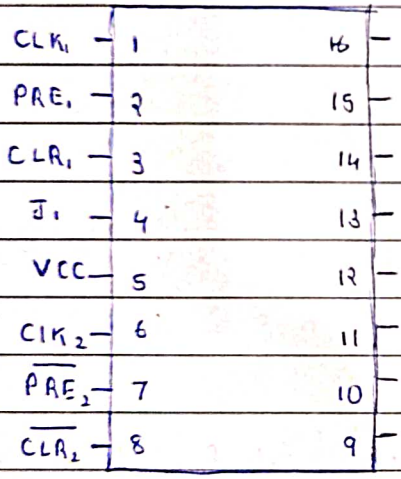
Once the outputs are established, the wiring of the circuit is ~~mani~~ maintained until 'S' or 'R' go high, or power is turned off.

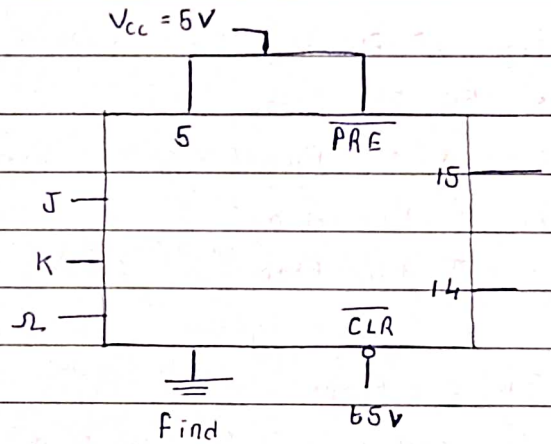
2. J-K Flip Flop.

Due to the undefined state in the SR flip-flops. The input condition of J=K=1 given an output inverting the output state. However the outputs are the same when one tests the circuit practically. In simple words, If J and K data input are different, then Q takes the value of J at the next clock edge. If J and K are both low, then no change occurs.

Truth Table:

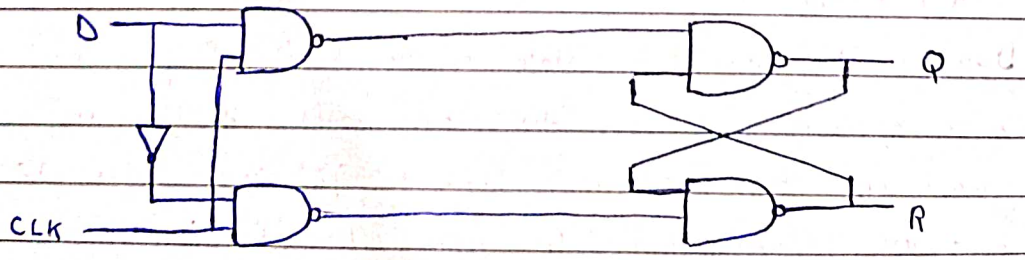
Input					Outputs	
Present	Clear	Clk	J	K	Q	$\bar{Q}$
L	H	X	X	X	H	L
H	L	X	X	X	L	H
L	L	X	X	X	H	H
H	H	⎍	L	L	Q_0	$\bar{Q}_0$
H	H	⎍	L	H	L	H
H	H	⎍	H	L	H	L
H	H	⎍	H	H	Toggle.	





3) D Flip-Flop.

D flip-flop is a better alternative that is very popular with digital electronics. They are commonly used for counters and shift-registers and input synchronization.

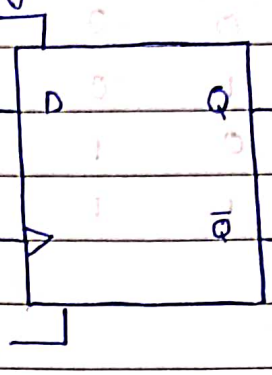


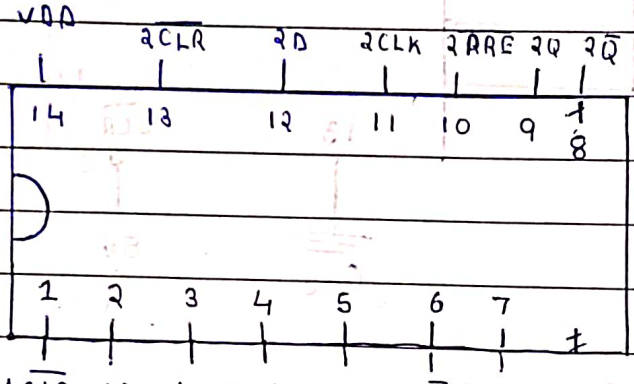
In the D flip-flop, the output can only be changed at the clock edge.

Truth Table.

Inputs				Outputs	
PRE	CLR	CLK	D	Q	$\overline{Q}$
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H	H
H	H	L	L	L	H
H	H	L	H	H	L
H	H	L	X	Q_0	$\overline{Q}_0$

Symbol:-

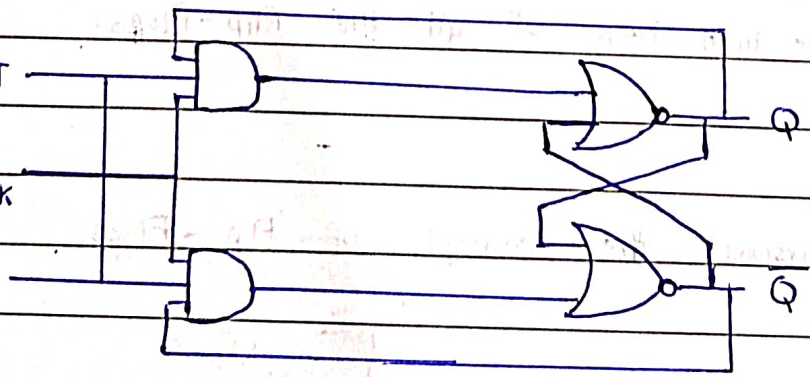




7474 Flip Flop.

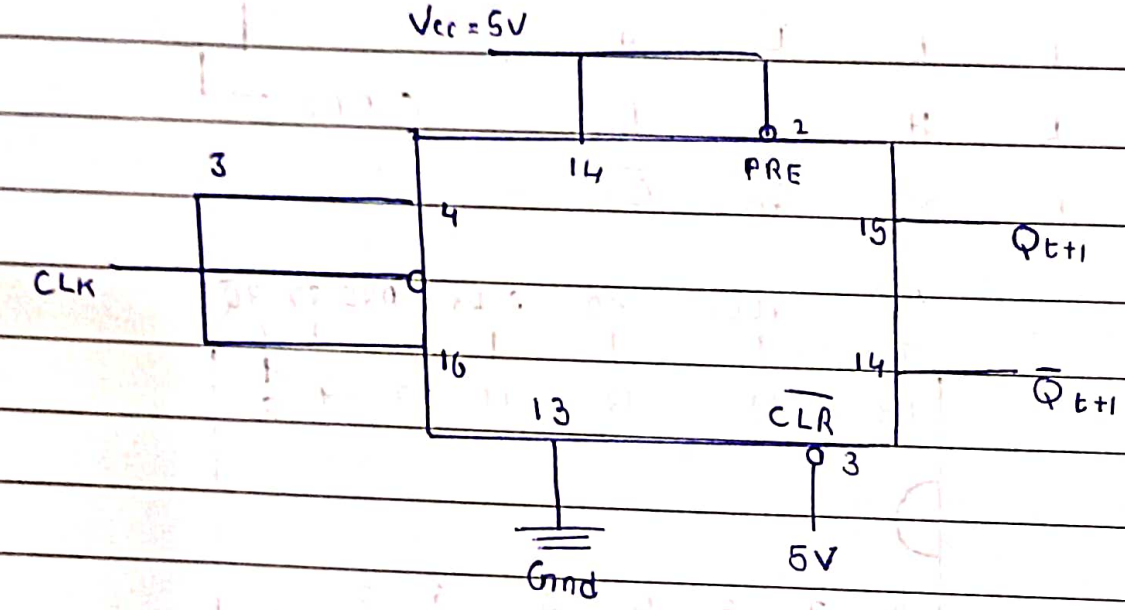
4) T Flip-Flop

A Flip-Flop is like a JK Flip-Flop. These are basically single-input versions of JK Flip-Flop. It has only one input along with the clock input.



Truth Table :-

T	Q	Q(t+1)
0	0	0
1	0	1
0	1	1
1	1	0



Application of Flip Flops :-

- Counters
- Frequency Dividers.
- Shift Registers.
- Storage Registers.

Procedure :-

1. Do the connections as per the circuit.
2. Verify the truth table of all the Flip-Flops.

Conclusion.

I have understood the concept of Flip-Flops.

27/11/23

SR & D Flip Flop using DIP switch