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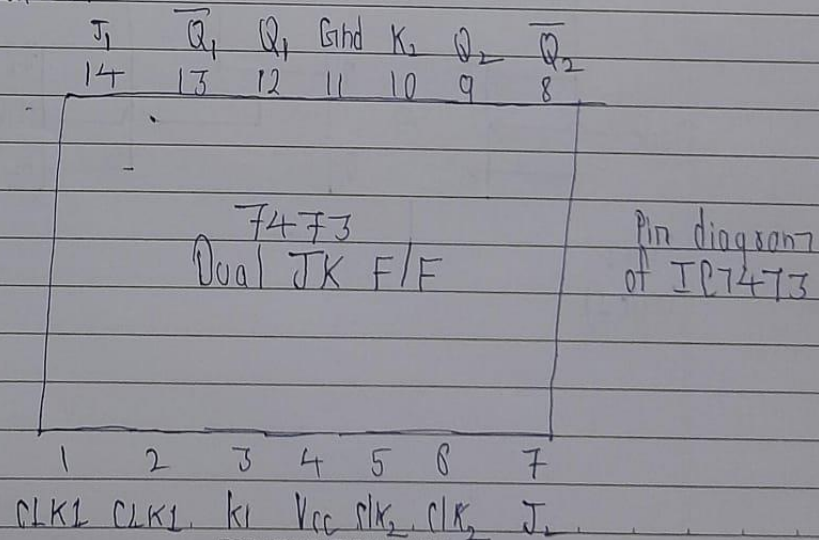
Exp. 8

Aim: To design and implement asynchronous counter using J.K flip-flop for MOD-4 (UP) and MOD-4 (DOWN)

Apparatus: Breadboard, connecting wires, LED Board, 5 volts, power supply, function generator

Theory:

A counter is a device which stores the number of times a particular event or process has occurred, often in relationship to a clock signal. In asynchronous counter, we don't use universal clock, only first flip is driven by main clock and the clock input of rest of the following flip-flop is driven by output of previous flip-flops. It is also called as a ripple counter.



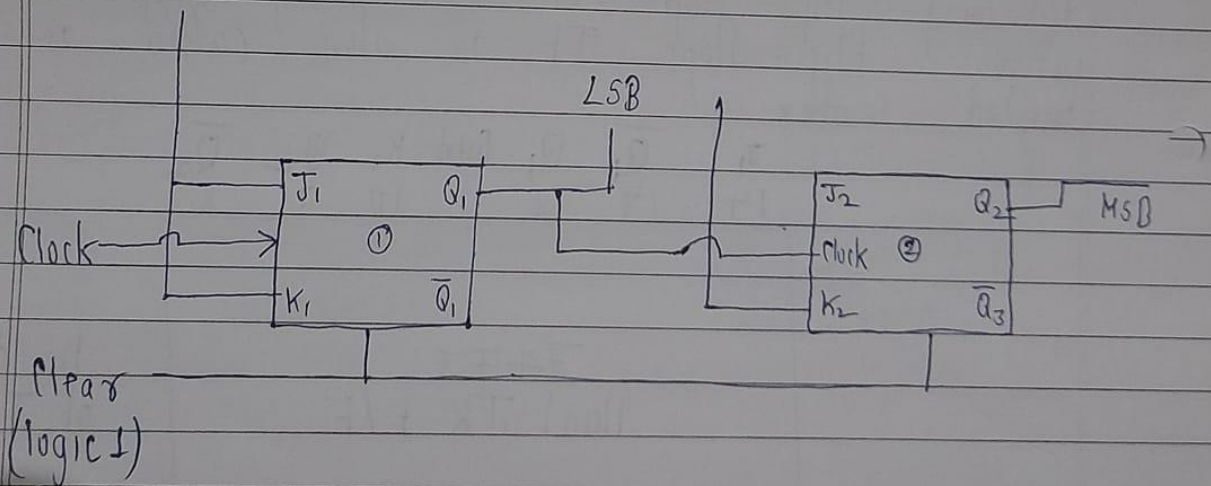
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This device (Dual Master J-K flip-flops) contains 2 independently positive pulse triggered JK flip flops with complementary outputs. The J and K data is processed by the flip-flops after a common clock pulse.

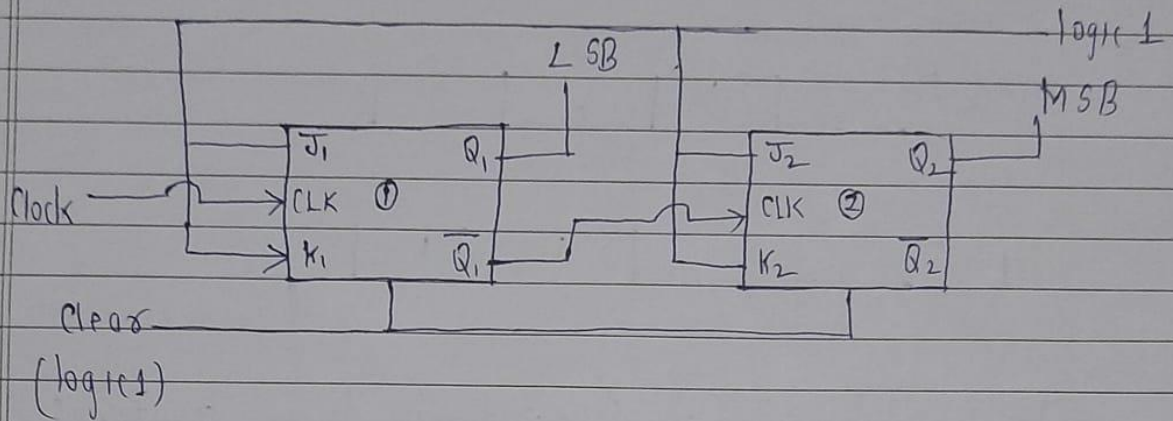
### \* MOD-4 Asynchronous up and down counter

In up counter, it starts counting from low to high, whereas in a down counter, it starts counting from high to low. There is no universal clock, we only use the first flip flop which is driven by the main clock.

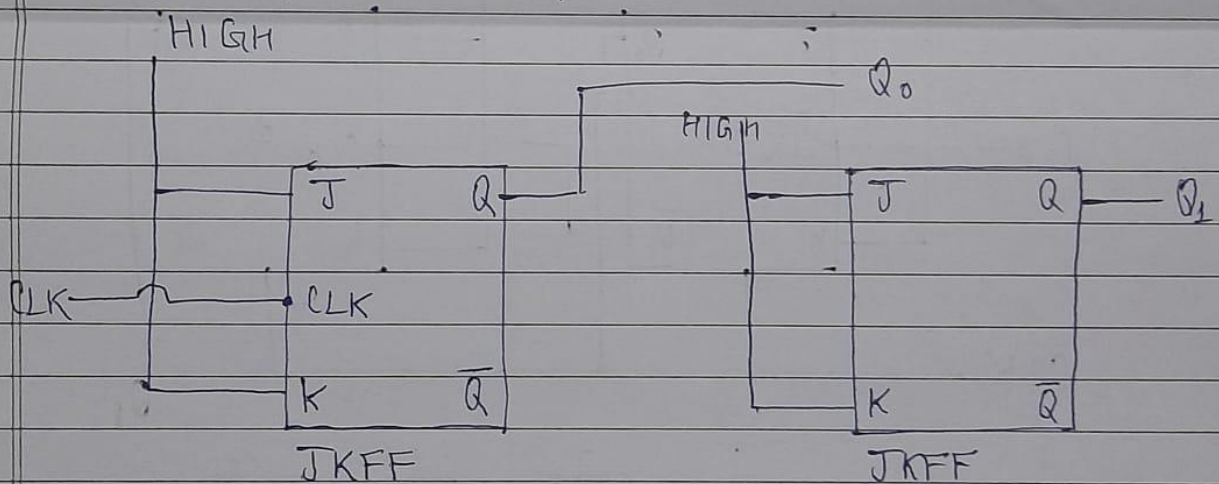
Circuit diagram of MOD-4 :-



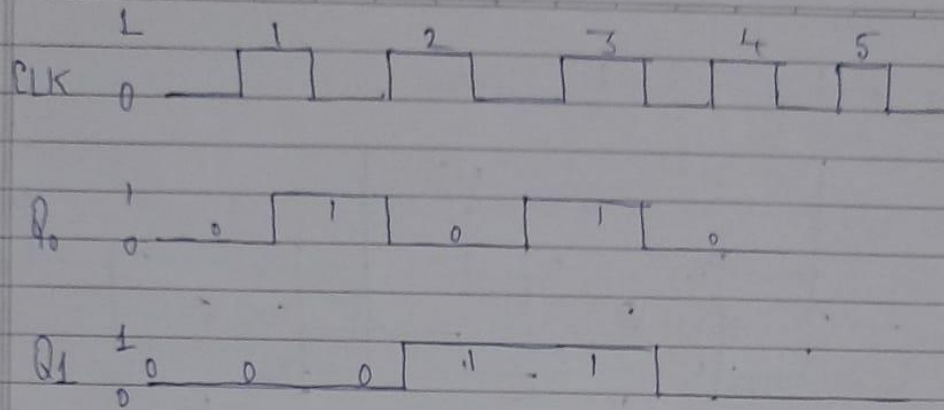
Circuit diagram of down MOD-4



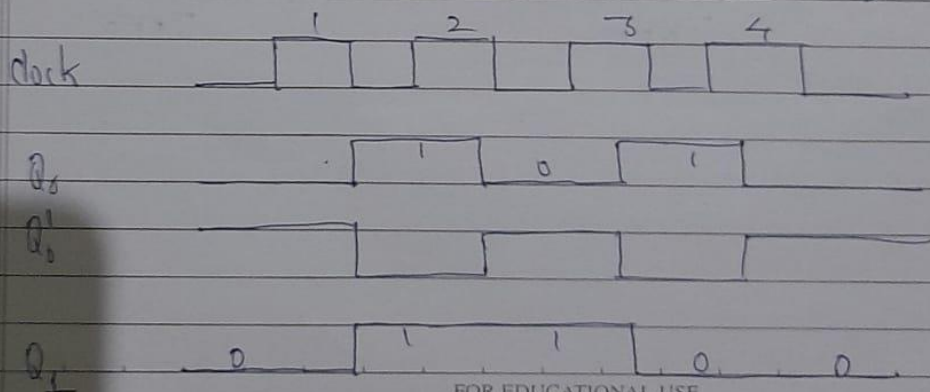
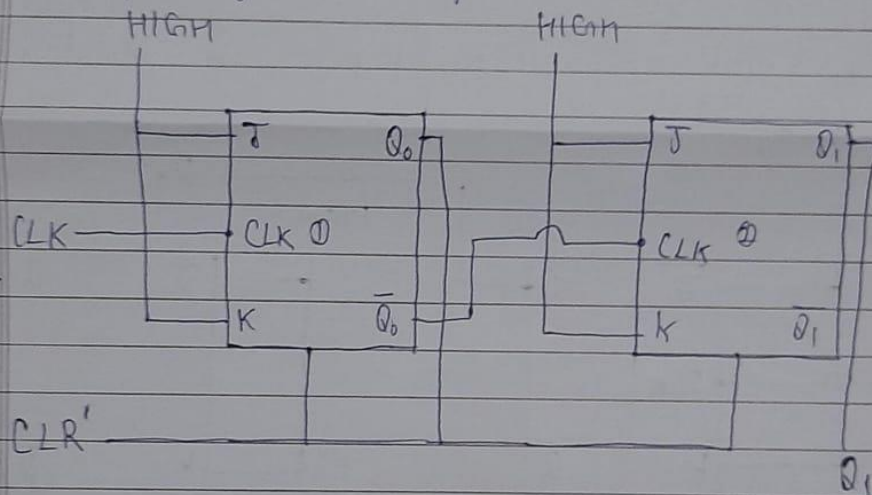
Timing diagram of Asynchronous up counter :-







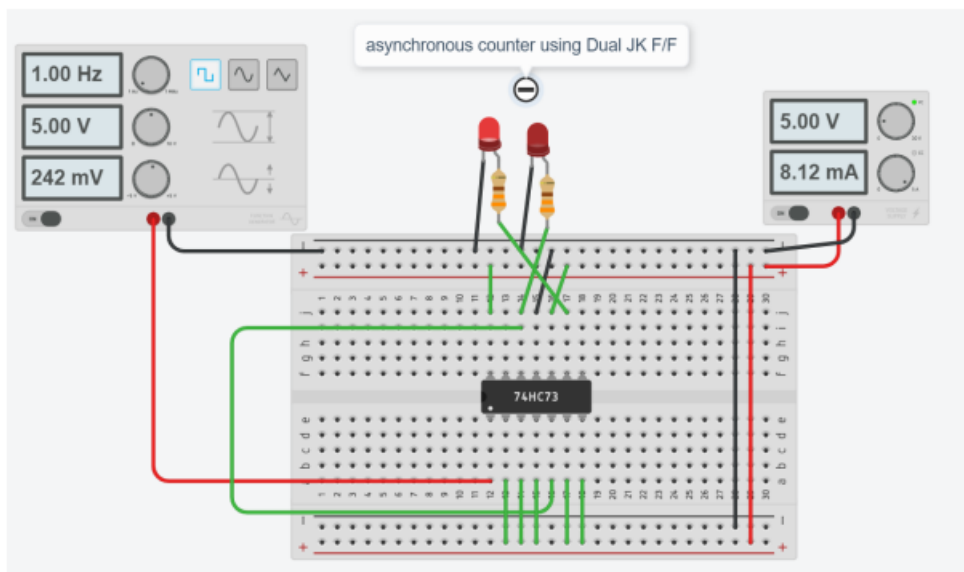
Timing diagram of Asynchronous down counter :-



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Conclusion :- I have understood the concept of asynchronous counter.

## ASYNCHRONOUS COUNTER USING DUAL JK F/F



## ASYNCHRONOUS INVERTED COUNTER USING DUAL JK F/F

