Name of the Experiment:

DESIGN AND IMPLEMENTATION OF MOD-10 COUNTER.

Objectives:

1) used in digital electronics for counting purpose.

Theory:

Counter: A counter is a device which stores (and sometimes displays) the number of times a particular event or process has occurred, often in relationship to a clock signal. Counters are used in digital electronics for counting purpose, they can Count specific event happening in the circuit. Not only counting, a counter can follow the certain sequence based on our design like any random sequence 0, 1, 2, 3, 4 .... They can also be designed with the help of flip-flops.

Counters are sequential circuit that count the number of pluses can be either in binary code or BCD form. The main properties of a counter are timing, sequencing, and counting.

A decade counter counts ten different states and then reset to its initial states. A simple decade counter will count from 0 to 9. ~~but~~

Apparatus:

i) 2 JK Flip-Flops (IC 7476)
ii) NAND gate (IC 7400)
iii) Connecting wiers
iv) Breadboard
v) Trainer board

Pin Configuration of IC 7476:

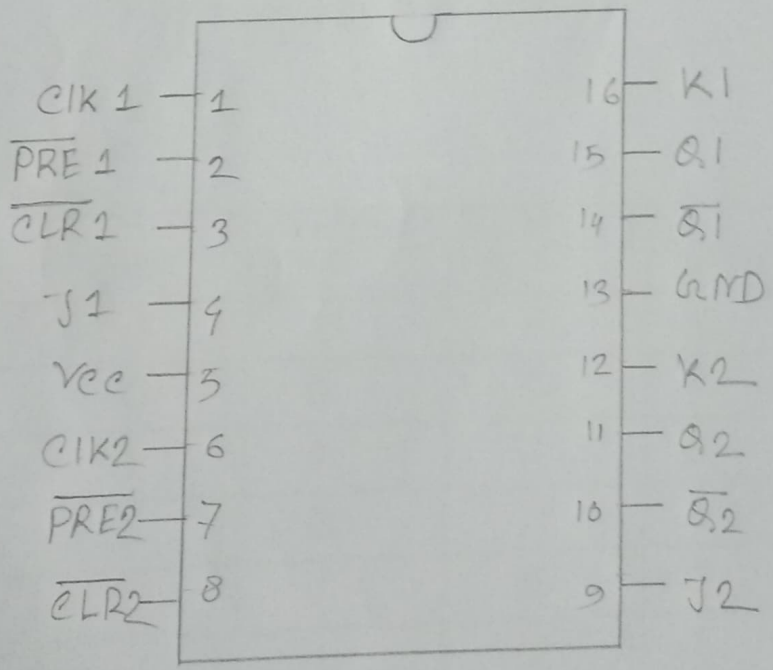

Figure: IC 7476 Pin diagram

Circuit Diagram:

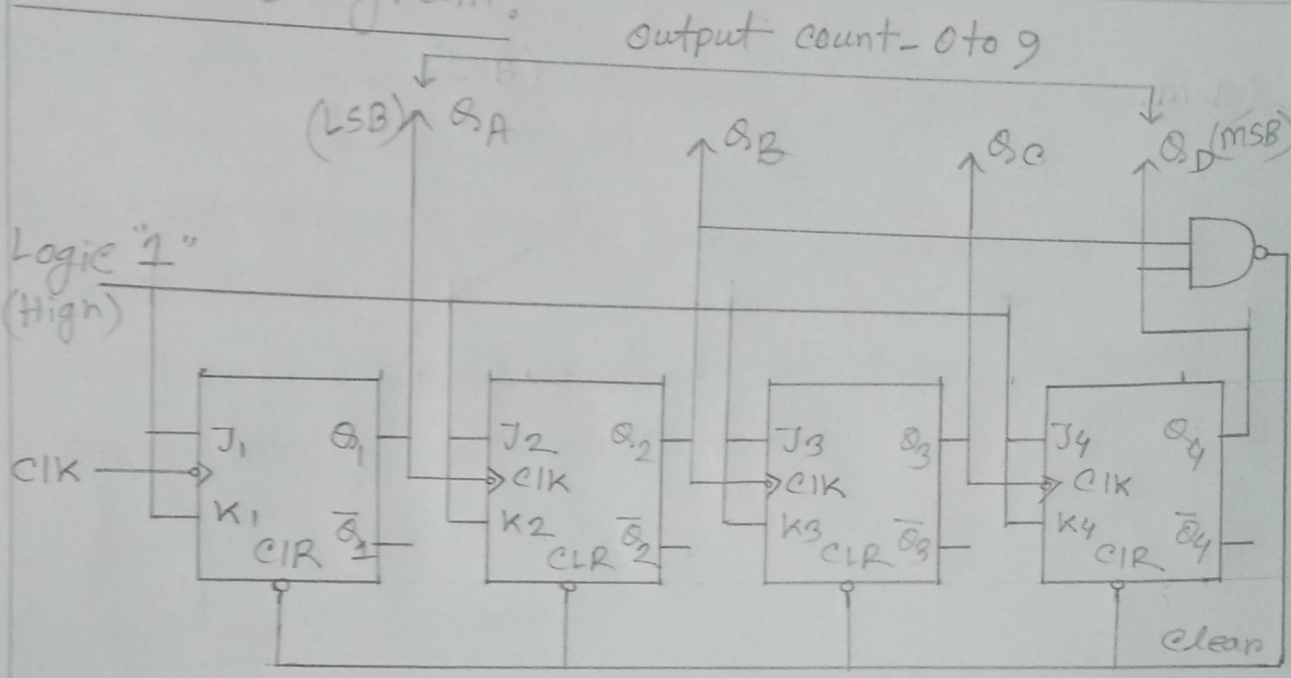

Fig: Mod-10 Counter

Truth Table:

Clock count	Output pattern bit				Decimal value
	Q_D	Q_C	Q_B	Q_A	
1	0	0	0	0	0
2	0	0	0	1	1
3	0	0	1	0	2
4	0	0	1	1	3
5	0	1	0	0	4
6	0	1	0	1	5
7	0	1	1	0	6
8	0	1	1	1	7
9	1	0	0	0	8
10	1	0	0	1	9
11	Counter Resets its output back to Zero				

working procedure:

1) implemented the circuit diagram according to the circuit diagram.
2) Logic inputs were given according to the truth table.
3) observed the output of logic circuit and verify with truth table.

Result and discussion:

From the circuit, when the clock-pluse was sent to first flip-flop then Q0 is 1 but Q1, Q2, Q3 were 0. Again another pluse set, then it was in the next state, So on by this process, the circuit counted from 0 to 9. After 9 it returned the next state 0. The states are 0 to 9.

~~working~~ precaution:

1) Check the power supply.
2) Check the Vcc and ground of all IC's.
3) The wires were connected carefully.
4) The circuit was powered on before it was completed.
5) The implementation was according to the circuit diagram.