DIGITAL CIRCUITS
SE E&TC, ELTX

Prof. S. V. Shelke

AIM: Study of Counter ICs (IC 74LS90/74LS93)

Design and Implement MOD-N and MOD-NN using IC-74LS90 and draw Timing diagram

EQUIPMENTS REQUIRED:

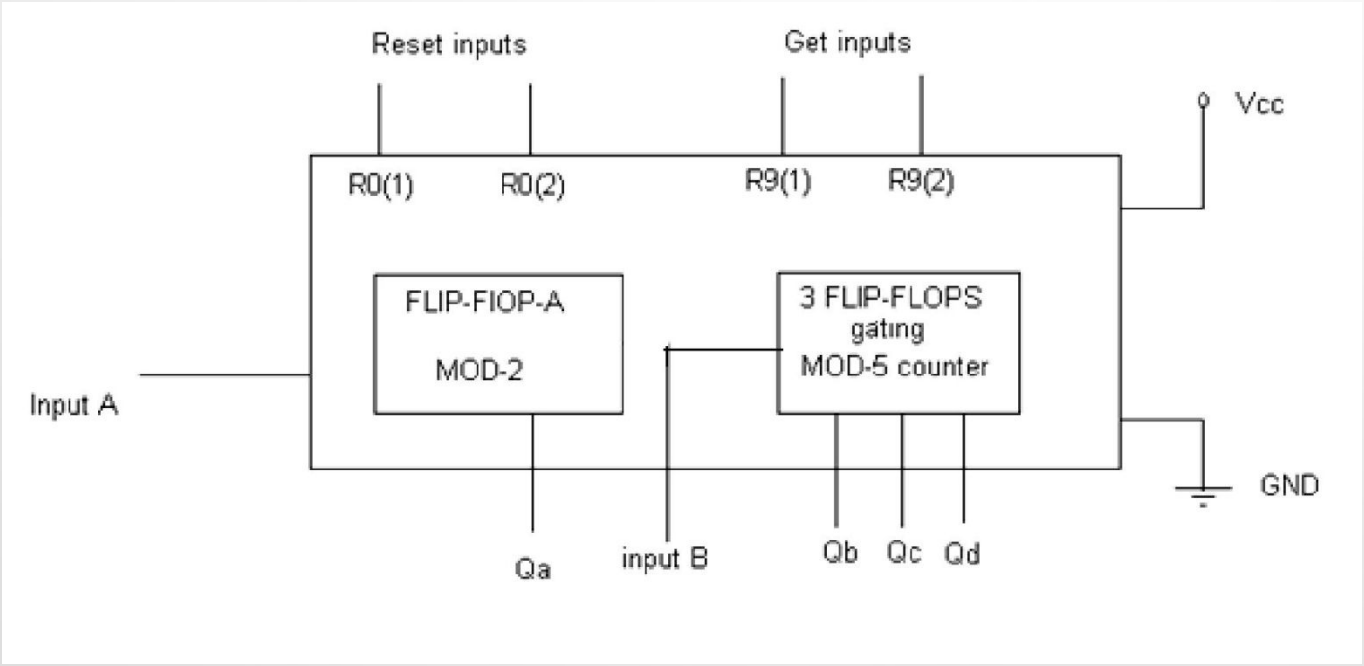
1. **Power supply**
2. **LED Bank**
3. **Breadboard**
4. **Required ICs**
5. **Connecting wires**

THEORY:

A counter is the most versatile system in digital systems. A counter driven by a clock can be used as an instrument for measuring time and so period of frequency.

I] Design & Implement MOD-N and MOD-NN using IC 74LS90 and draw its Timing Diagram.

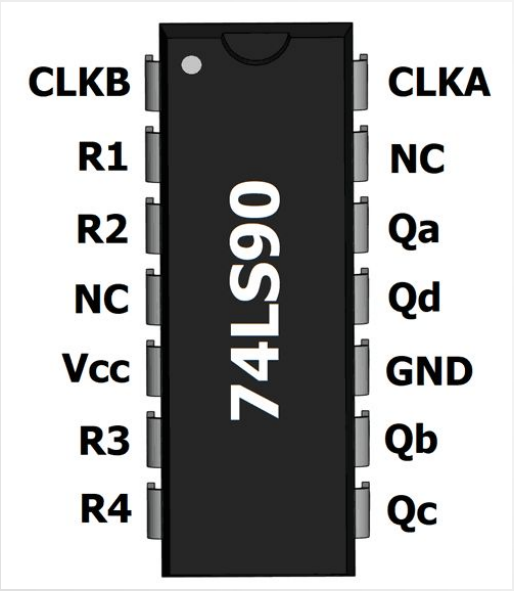
IC 7490 –RIPPLE COUNTER (DECADE COUNTER):-
IC 7490 is a TTL MSI decade counter. It contains 4 master slaves Flip-Flops.
This IC can work in 3 modes i.e. MOD-2, MOD-5, and MOD-10. A Decade counter
is also called as BCD counter since it can count only up to 9 only.



Block diagram of IC7490

Internal Structure of IC 7490

IC 7490 is a 14 pin IC. Following table gives the description of different pins. Pin Description.



Qd is MSB and QA is LSB

Pin Name	Description
Input B	Negative edge triggered clock to internal MOD-5 Counter.
R_0 (1), R0 (2)	Gated 0 reset inputs. When both '1' all outputs are 0.
R_9 (1),R_9(2)	When both '1'output is set to 9.
Vcc	+5v DC
Q_B, QC, QD	Outputs of internal MOD-5 counter with Q_D as MSB.
GND	Logic ground.
Q_A	Output of internal MOD-2 counter or FLIP-FLOP-A.
Input A	Negative edge triggered clock input to Flip-Flop-A.

Procedure:

MOD-2 counter operation:

a) Give clock input to input-A.

b) Connect set & reset inputs to Ground, they are active High.

c) Observe the output at flip-flop-A i.e.QA.

d) Other pins are don’t care.

MOD-5 counter operation:

a) Give clock input to input-B.

b) Connect set & reset inputs to Ground ,they are active High.

c) Observe the output at outputs of MOD-5 part i.e. QB,QC and QD where QD is the MSB

d) Other pins are don’t care.

MOD-10 counter operation :

a) Give clock input to input-A.

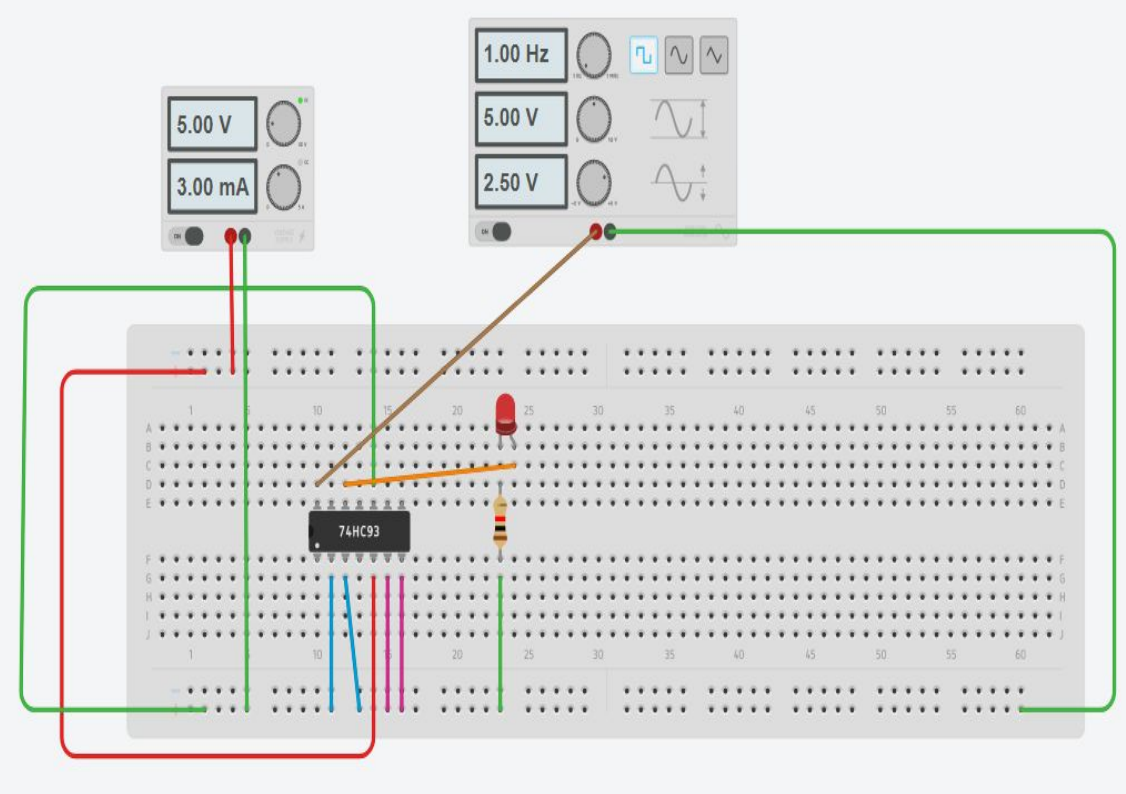
b) Connect QA to input B, for 10 states all 4 flip-flops are active high

c) Connect set & reset inputs to Ground since they are active High.

d) Observe all the 4 outputs i.e. at QA, QB, QC and QD where QD is MSB.

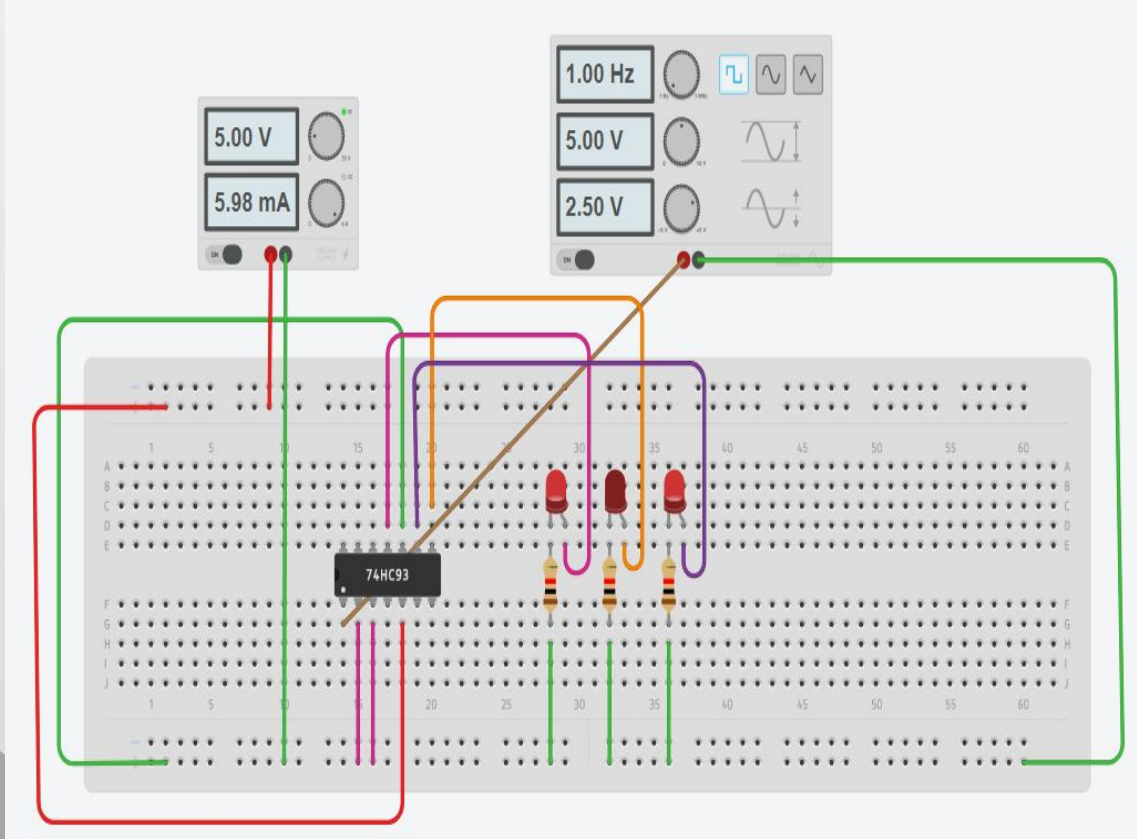
IMPLEMENTATION OF PRACTICAL ON TINKERCAD

METHOD	LINK
MOD 2 counter using IC 7493	https://www.tinkercad.com/things/jx9rahbooGp-grand-snaget-habbi/editel?tenant=circuits



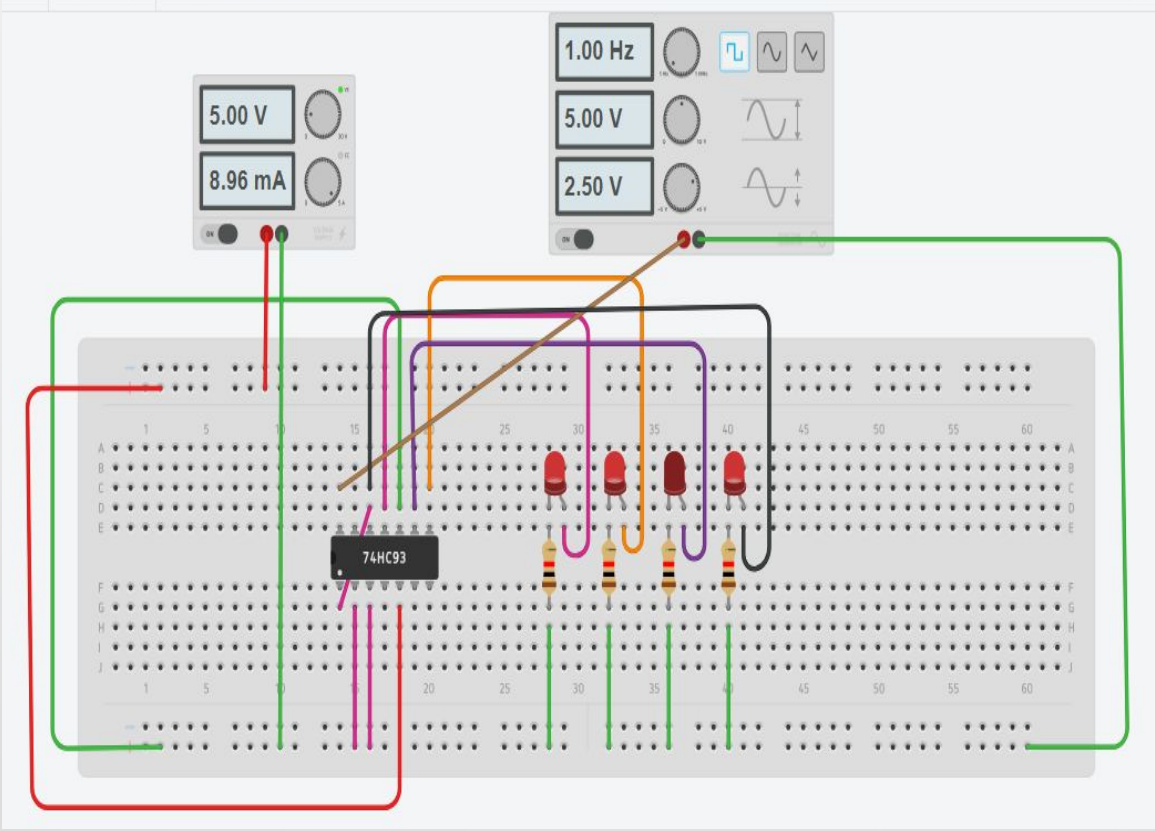
IMPLEMENTATION OF PRACTICAL ON TINKERCAD

METHOD	LINK
MOD 8 counter using IC7493	https://www.tinkercad.com/things/2t0sjSxiB8I-super-gaaris/editel?tenant=circuits



IMPLEMENTATION OF PRACTICAL ON TINKERCAD

METHOD	LINK
MOD 16 counter using IC7493	https://www.tinkercad.com/things/fACepruGAmN-copy-of-mod-8/editel?tenant=circuits



THANK YOU