19/05/15

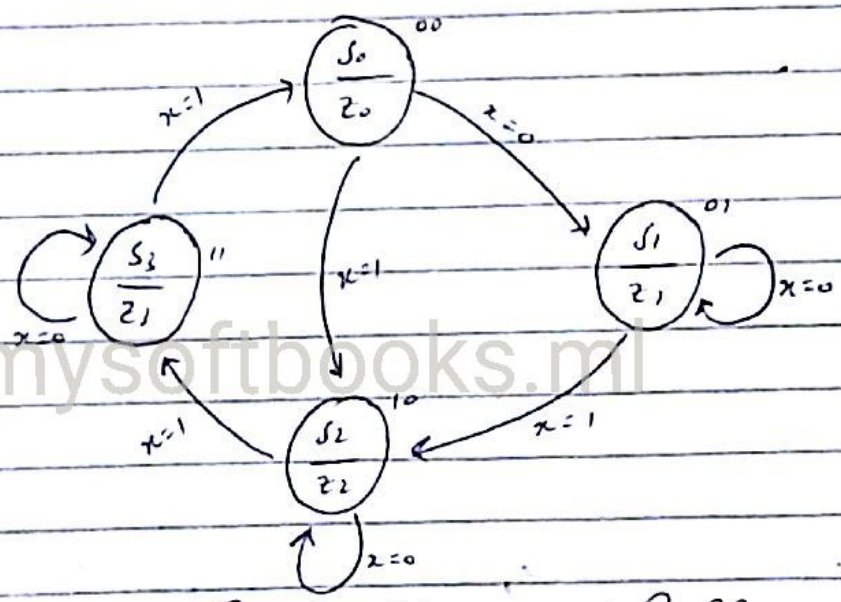
(Lee 9.10) **State Machines:-**

- A machine works on different states at a time
- It may give us different outputs at same input & same state

For example:-

Cycle of a state machine would be like:-

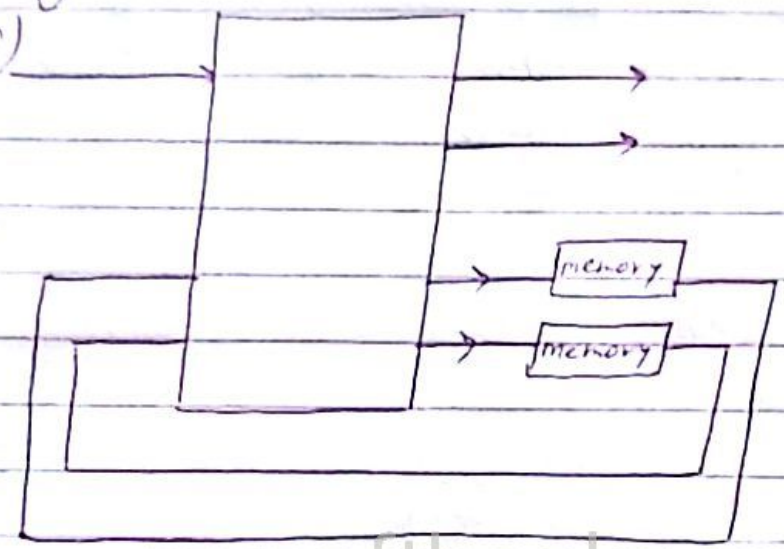
- S = States
- Z = Outputs



State Tables:-

input (x)	Present State	Next State
0	S_0	S_1
1	S_0	S_2
0	S_1	S_1
1	S_1	S_2
0	S_2	S_2
1	S_2	S_3
0	S_3	S_3
1	S_3	S_0

Block Diagram :-

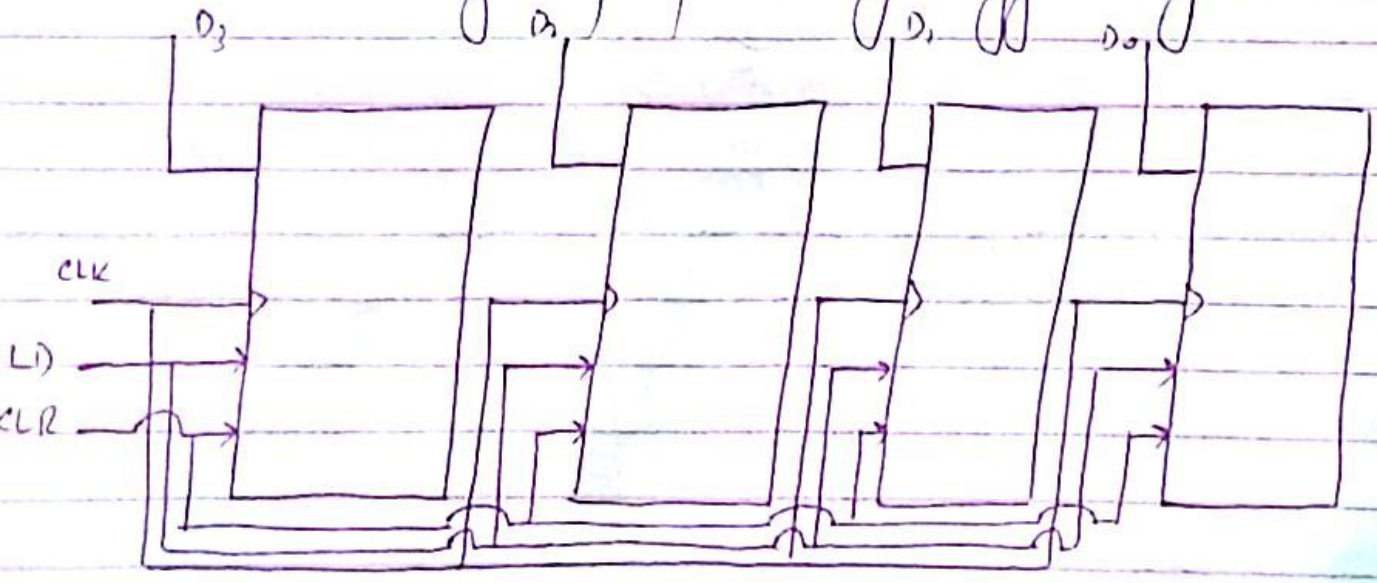


where A & B are block variables.

Registers :-

- They are used to store the data.
- They are edge triggered circuits.

— : Block Diagram for positive edge triggered Register. —



Inputs in this circuit are:-

i) D_0, D_1, D_2, D_3
ii) CLK = Clock input to Trigger
iii) LD = Load input
iv) CLR = To clear the stored data.

- when CLK and LD will be 1 then data will be stored on registers.
- when CLK and CLR will be 1 then data will clears from registers.

Clock (CLK) has two Types:-

i) Synchronous Clock (Synchronized)
ii) A-Synchronous Clock (Not-Synchronized)

Types of Regulators:-

There are the four types of Regulators.

i) Sin → Sout
ii) Sin → Pout
iii) Pin → Sout
iv) Pin → Pout

{S = Series
P = parallel}

Block Diagram for Registers-

Rules:-

- For Sin → Sout

  Output of one will become input of other. We cannot find out output at middle

- For Sin → Pout

  Output of one will become input of other & we can also check output at any point.

- For Pin → Sout

  We can input at any point but output will be checked at the end.

- For Pin → Pout:-

  We can give input at any time & also check output at any point.

Universal Register-

A register having all four above properties is called Universal Register.

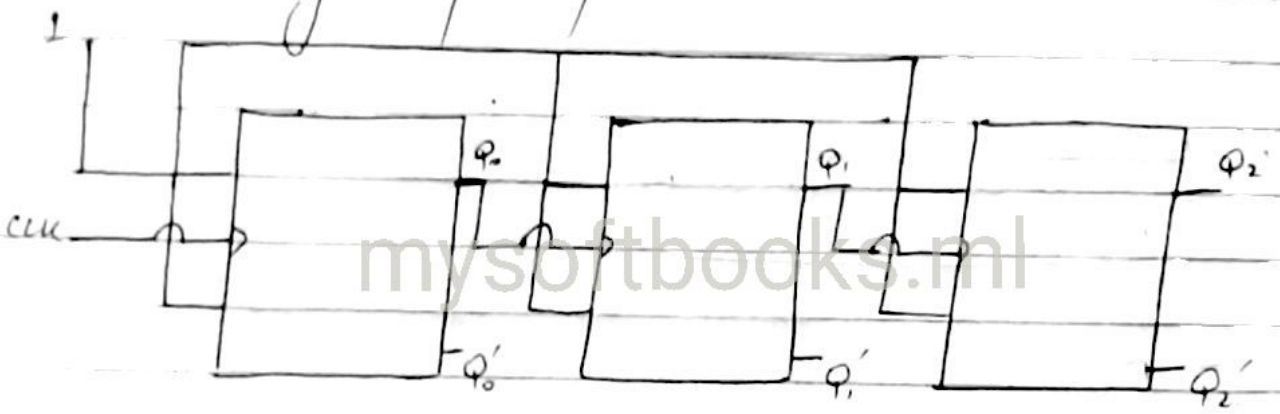
:- Counters :-

- We will use T-flip flop in counters.

Up-Counter :-

- It will start from '0' & will go upward.

Block Diagram for Up-Counter :-



Up-Counter. It is also called Ripple Counter.

Down-Counter :-

- In down counters, instead of attaching Q to the clock of next block, we will attach Q'.

Two additional inputs used in counters are as follows :-

1) PST > It is used to pre-set the value.
2) CLR > It is used to clear the value.

Block diagram for Counter (Count 0 to 5):—