

SUBJECT – DE&MP

BRANCH-ELECTRICAL

SEMESTER-5th SEM

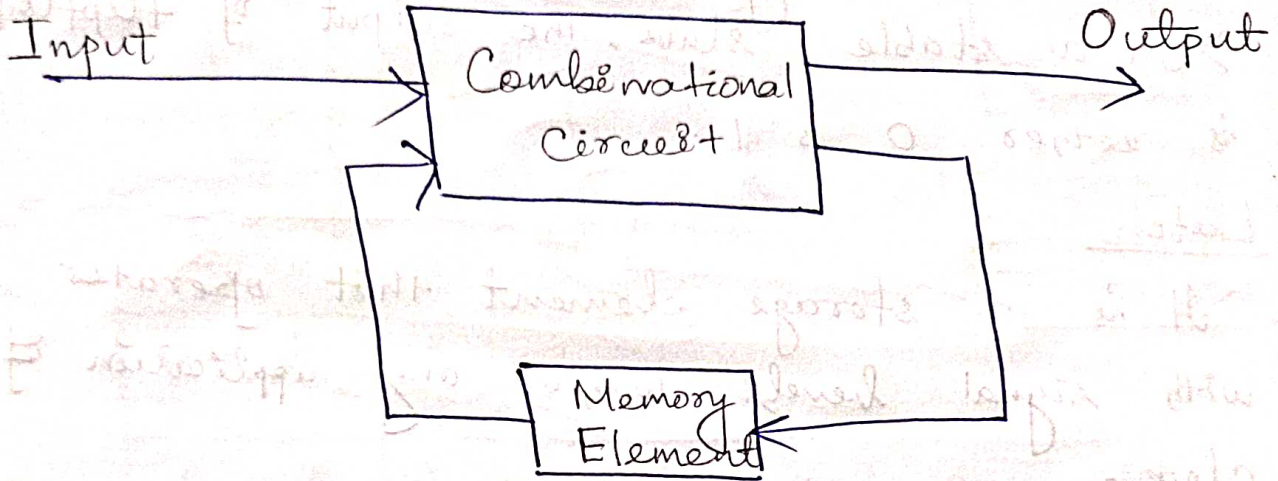
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Lect.(Electronics)

Sequential Logic Circuits

Block diagram



- It consists of a combinational circuit to which storage elements are connected to form a feedback path.
- The storage elements are capable of storing binary information.
- The binary information stored in these elements at any given time is defined as the state of the sequential circuit at that time.
- The output of the sequential circuit depends on the external inputs and state of the storage element.
- So the output of a sequential circuit depends not only on the present inputs, but also on the past output stored in memory.

Flip flop

A flipflop is a binary storage device capable of storing one bit of information.

→ In a stable state, the output of flipflop is either 0 or 1.

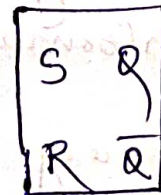
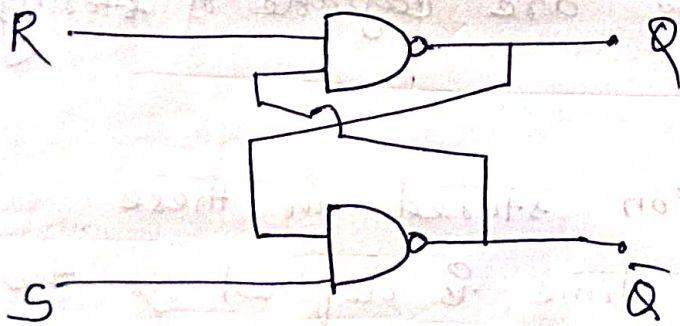
Latch

It is a storage element that operates with signal levels without any application of clock.

→ Latches are said to be level sensitive device.

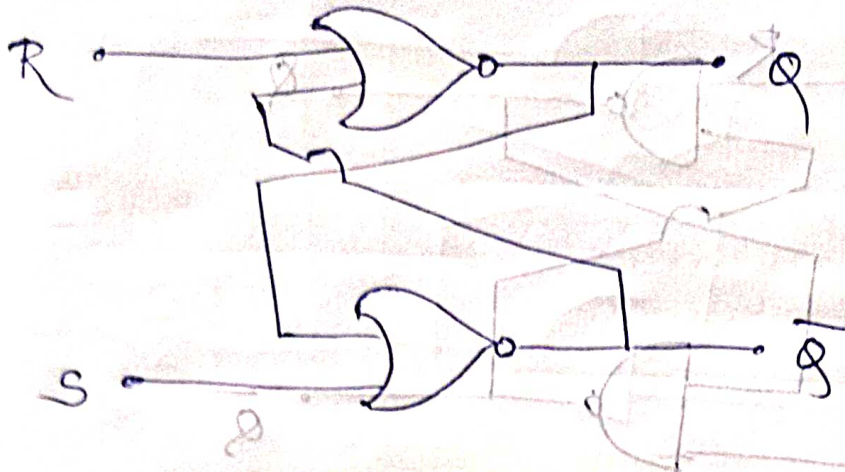
→ Latches are the building block of Flipflop.

SR NAND latch



S	R	output(Q)
0	0	X (Invalid)
0	1	0 (Reset)
1	0	1 (Set)
1	1	No change.

SR NOR latch



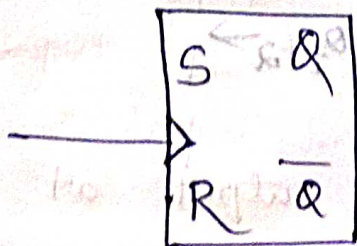
S	Q
R	\bar{Q}

S	R	Output Q
0	0	No change
0	1	0 (Reset)
1	0	1 (Set)
1	1	X (Invalid)

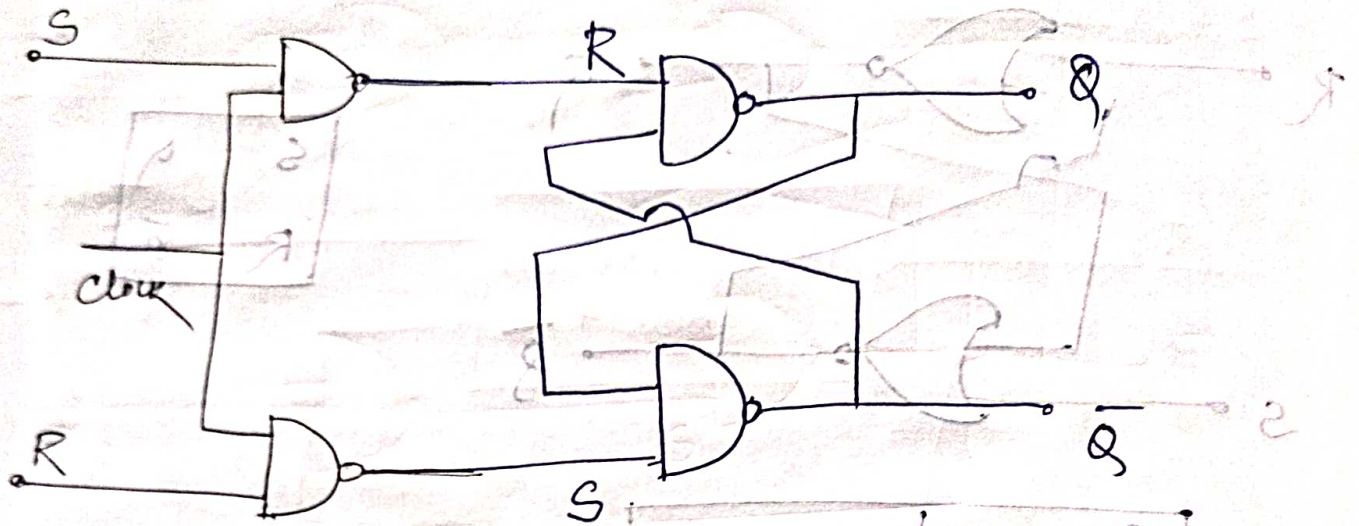
R	Q
0	0
1	0
0	1
1	1

SR Flip flop

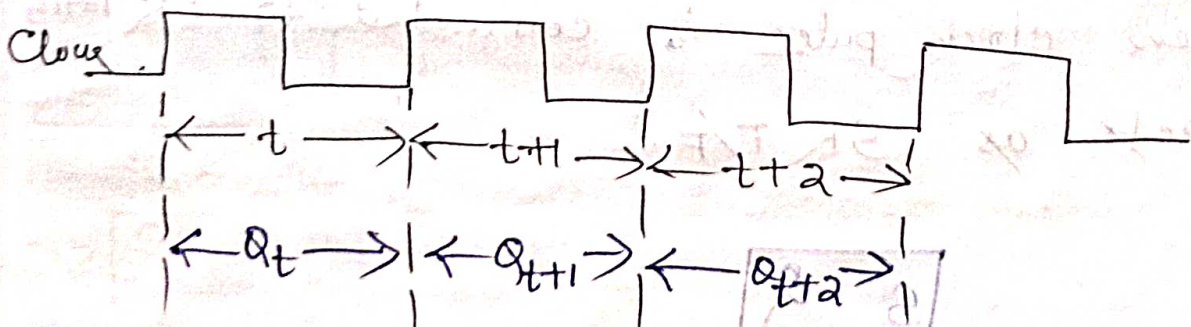
When clock pulse is connected to SR latch, it acts as SR F/F.



SR NAND flip flop

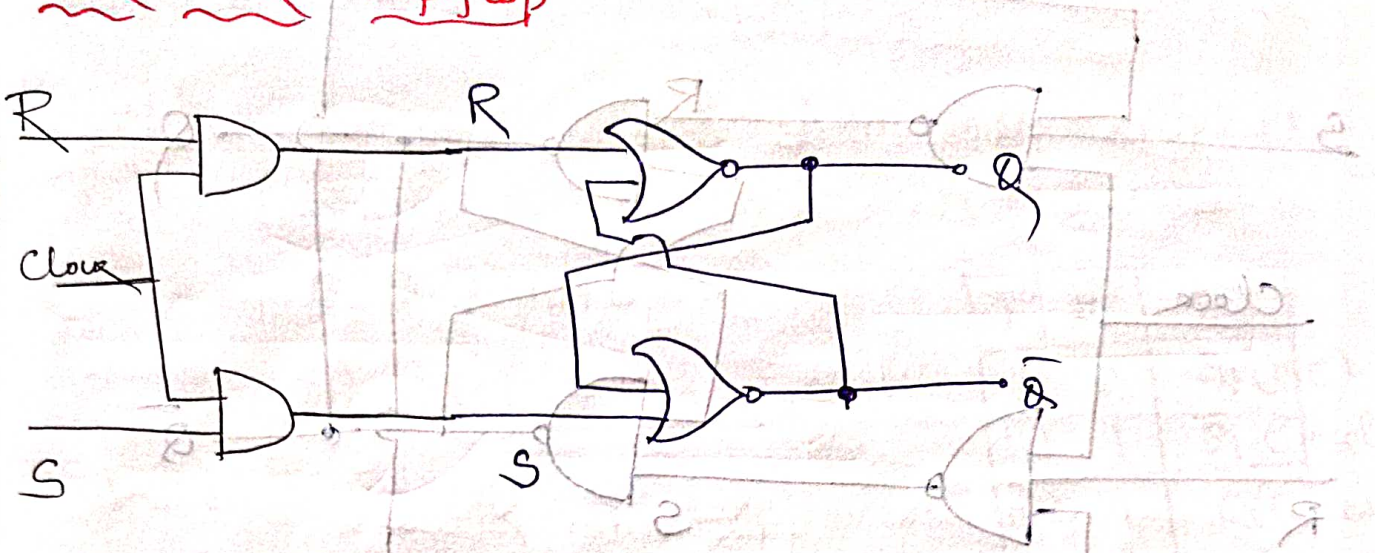


S	R	Output (Q_{t+1})	Next state Q/P
0	0	Q_t (No change)	time controlled Q/P
0	1	0 (Reset)	no output at time 't'
1	0	1 (Set)	
1	1	X (Invalid)	



So in case of SR \uparrow/\downarrow , output at Q_{t+1} is the output is the time past output Q_t . So the time controlled Q/P.

SR NOR flip flop

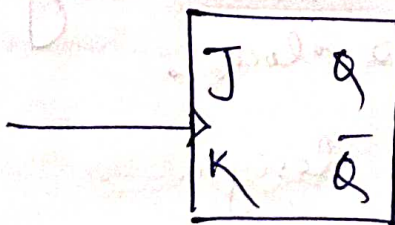


S	R	Output (Q_{t+1})
0	0	Q_t (No change)
0	1	0 (Reset)
1	0	1 (Set)
1	1	X (Invalid)

	0	1
0	0	0
1	1	0
0	0	1
1	1	1

JK Flip flop

It is used to change the invalid output to valid output (toggle).



→ It is also known as modified SR flip flop.