SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECB231 – DIGITAL ELECTRONICS

II YEAR/ III SEMESTER

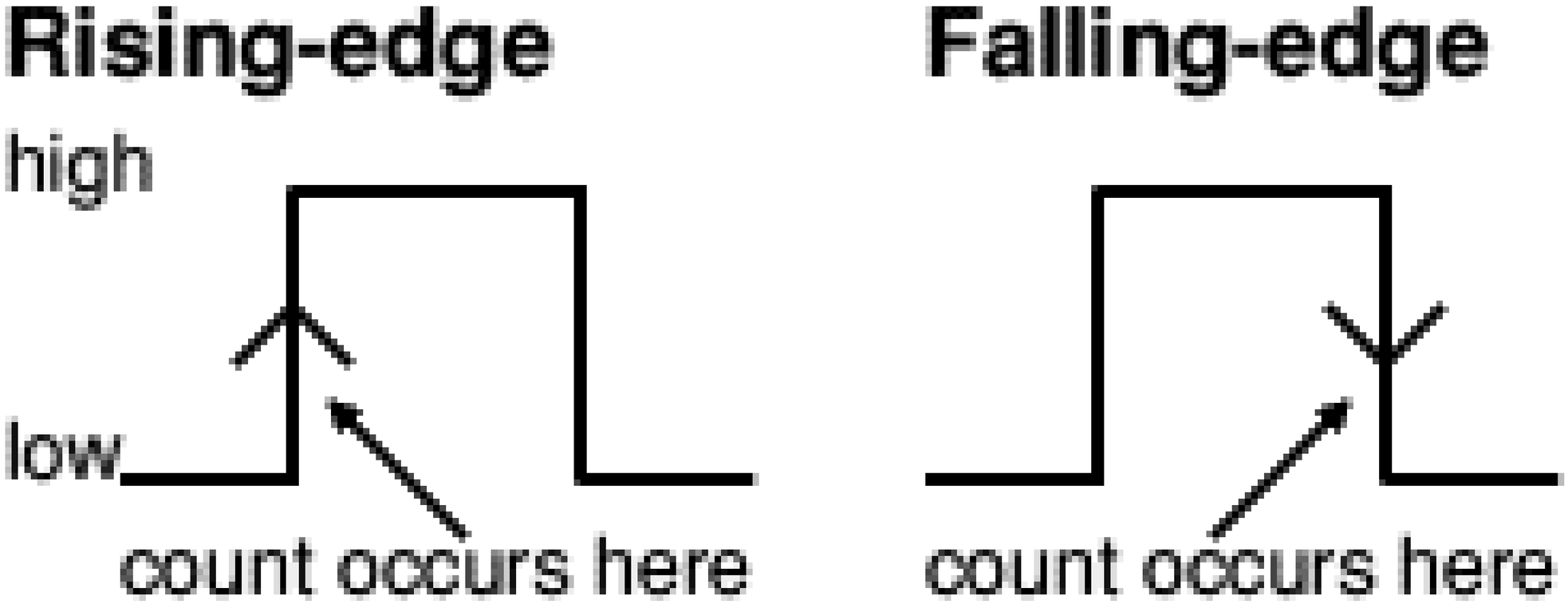
UNIT 3 – SEQUENTIAL CIRCUITS

TOPIC – FLIP FLOP –SR ,D FLIP FLOP

FLIP FLOP

A flip flop is an electronic circuit with two stable states that can be used to store binary data. The stored data can be changed by applying varying inputs. Flip-flops and latches are fundamental building blocks of digital electronics systems used in computers, communications, and many other types of systems.

EDGE TRIGGERING



Level Triggering	Edge Triggering
1. It is of two types – High level triggering – Low level triggering	1. It is of two types : – Positive edge triggering – Negative edge triggering
2. The latch or flip-flop circuits which change their outputs only corresponding to active high or low levels are called as level triggered latches or flip-flops.	2. Those flip-flops which change their outputs only corresponding to the positive or negative edge of the clock input are called as edge triggered flip-flops.

TYPES OF FLIP FLOP

1.SR FF

R=Reset and S=Set

2.D FF

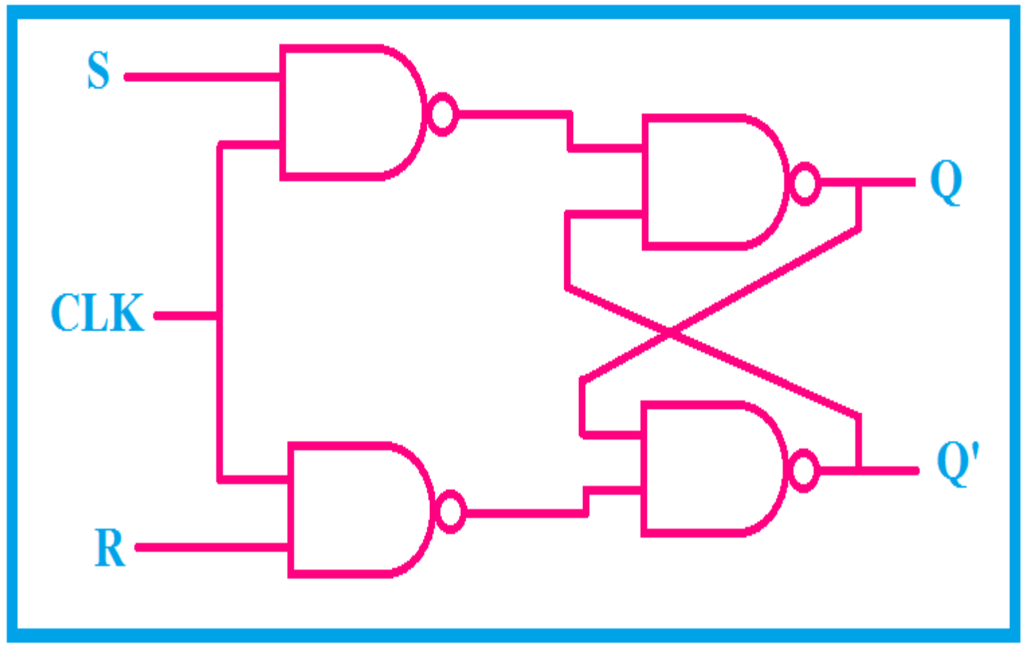
D means Delay

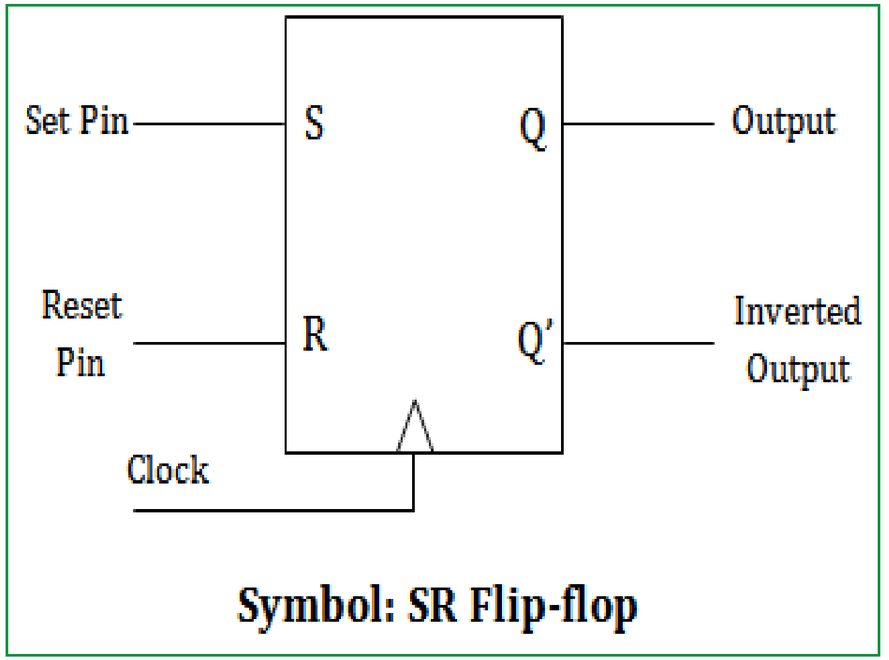
3.T FF

T means Toggle

4.JK FF

SR FLIP FLOP





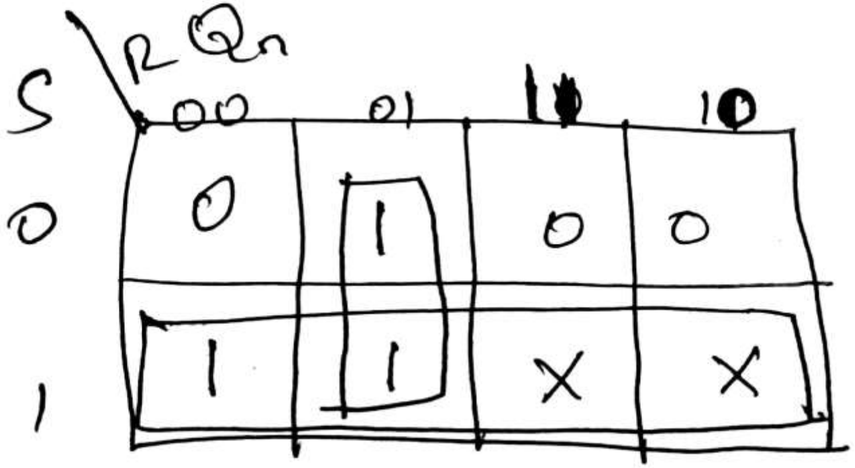
Symbol: SR Flip-flop

SR FLIP FLOP –TRUTH TABLE

S	R	Q_n	Q_{n+1}	State
0	0	0	0	No change (NC)
0	0	1	1	
0	1	0	0	Reset
0	1	1	0	
1	0	0	1	Set
1	0	1	1	
1	1	0	X	Indeterminate
1	1	1	X	
X	X	0	0	No change (NC)
X	X	1	1	

SR FLIP FLOP

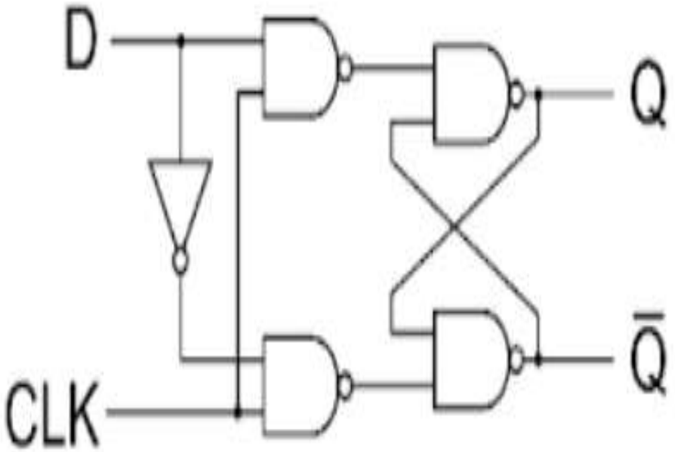
Characteristics Equation

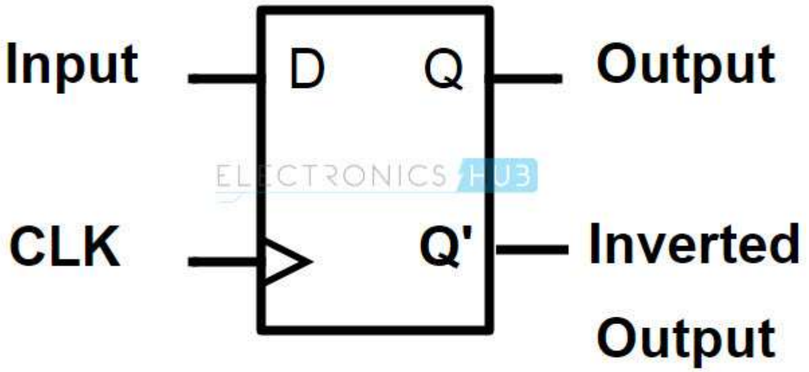


$$Q_{n+1} = S + \bar{R} Q_n$$

SR FLIP FLOP

D FLIP FLOP

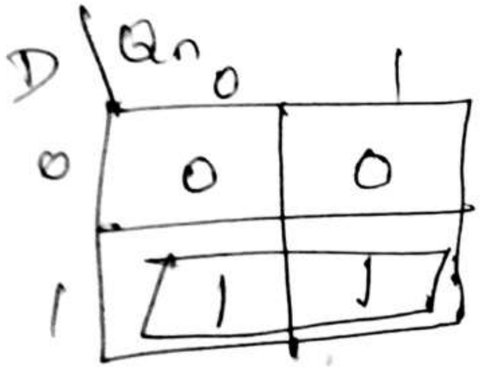

D
Q
$\bar{Q}$
CLK


Input
D
Q
Output
ELECTRONICS HUB
CLK
Q'
Inverted
Output

D FLIP FLOP –TRUTH TABLE

D	Qn	Qn+1
0	0	0
0	1	0
1	0	1
1	1	1
0	X	0
0	X	1

Characteristic Equation



$$Q_{n+1} = D$$

Excitation table

Q_n	Q_{n+1}	D
0	0	0
0	1	1
1	0	0
1	1	1

APPLICATIONS OF FLIP FLOPS:

Flip flops have a wide variety of applications. They are:

- ✓ REGISTERS
- ✓ FREQUENCY DIVIDERS
- ✓ DIGITAL COUNTERS

ASSESSMENTS

1.What is Latch?
2.List the types of latches.
3.Difference between level trigger and edge triggering.

THANK YOU