ii) Conversion of SR to D FlipFlop

D	Q_N	Q_{N+1}	S	R
0	0	0	0	X
0	1	0	0	1
1	0	1	1	0
1	1	1	X	0

Excitation Functions

$R = D'$

$S = D$

S:

D, Q_N		
	0	0
	1	X

R:

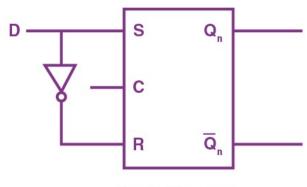| D, Q_N		
	X	1
	0	0

Logic Diagram

Applications of Flip-Flops

In this article, we have summed up the different types of flip-flops that we use in digital electronic circuits. You can find the various applications of the flip-flops below:

- Frequency dividers
- Counters
- Storage registers
- Shift registers
- Data storage
- Bounce elimination switch
- Latch
- Data transfer
- Memory
- Registers

Practice Questions on Flip-Flops

1. We can construct a basic S-R flip-flop by cross-coupling which of these basic logic gates?

A. OR or AND gates

B. XNOR or XOR gates

C. NAND or NOR gates

D. NOR or AND gates

Answer – C. NAND or NOR gates

2. The sequential circuits are of how many types?

A. 5

B. 4

C. 3

D. 2

Answer – D. 2

3. Which of these operations are faster as compared to the other options?

A. Sequential Circuits

B. Combinational Circuits

C. Flip-flops

D. Latches

Answer: B. Combinational Circuits

4. The sequential circuits are also known as:

A. Latch

B. Flip-flop

C. Adder

D. Strobe

Answer – A. Latch

Frequently Asked Questions

Q1) **How many flip-flop types are there? What are they?**

There are four basic types of flip-flops. They are:

- Latch or Set-Reset (SR) flip-flop
- JK flip-flop
- T (Toggle) flip-flop
- D (Delay or Data) flip-flop

Q2) **Is SR flip-flop and RS flip-flop the very same?**

Theoretically, the RS and SR flip-flops are the same. Whenever both inputs of S & R are fairly high, the output happens to be indeterminate. In PLC, as well as other programming environments, we need to allocate determinate outputs to all of the conditions of a flip-flop. Thus, the SR and the RS flip-flops are designed.

Q3) **Why is the NAND gate used in a flip-flop?**

The word flip-flop means that we can easily "FLIP" it either into a given logic state or "FLOP" it back into another one. We use the basic RS Flip Flop NAND gate circuit to store the information, and thus, it supplies feedback from both the outputs back to the inputs.

Q4) **What is the primary difference between the SR latch and the SR flip-flop?**
The primary difference between a flip-flop and a latch is a clocking or gating mechanism. A flip flop is synchronous and known as a gated or clocked SR latch.

Q5) **What is a clock in a flip-flop?**
The clock pulses in flip-flops refer to the time-varying voltage signal that is applied so as to control the operation (or triggering) of a flip-flop. For example, if we have a clock pulse with a 1 Hz frequency, the voltage that it would supply would oscillate between A and B Volts (A and B refer to any DC voltages), and this type of change appears every half of a second.

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