

Synchronous Sequential Circuits -

In a synchronous sequential circuit, all the state variables representing the internal state of the circuit change their state simultaneously with a given input clock signal to achieve the next state.

All the state variable changes are synchronized with a universal clock signal.

Since all the internal state changes are in the strict control of a master clock source, they are less prone to failure or to a race condition and hence are more reliable.

Timings of the internal state changes are in our control.

Asynchronous sequential circuits -

In an asynchronous circuit, all the state variables may not change their state simultaneously to achieve the next steady internal state. In other words, the state variables are not synchronized.

~~Inverter~~ SECTION-4 ANS-1

XOR gate can act as an inverter as well as a buffer. If one fixes one input of the XOR gate to logic high it works as an inverter.

$$1 \text{ XOR } 1 = 0$$

$1 \text{ XOR } 0 = 1$ so, if one input of the XOR gate is fixed to logic 1, the output is the logical inversion of the second input.

Now if one input of the XOR gate is fixed to logic zero it works as a buffer.

$$0 \text{ XOR } 1 = 1$$

$0 \text{ XOR } 0 = 0$, so if one input of inverter is fixed to logic 0, the output is same as the second input.