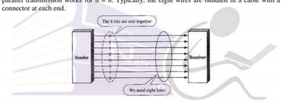
4.3 TRANSMISSION MODES

The transmission of binary data across a link can be accomplished in either parallel or serial mode. In parallel mode, multiple bits are sent with each clock tick. In serial mode, 1 bit is sent with each clock tick. While there is only one way to send parallel data, there are three subclasses of serial transmission: asynchronous, synchronous, and isochronous.

PARALLEL TRANSMISSION

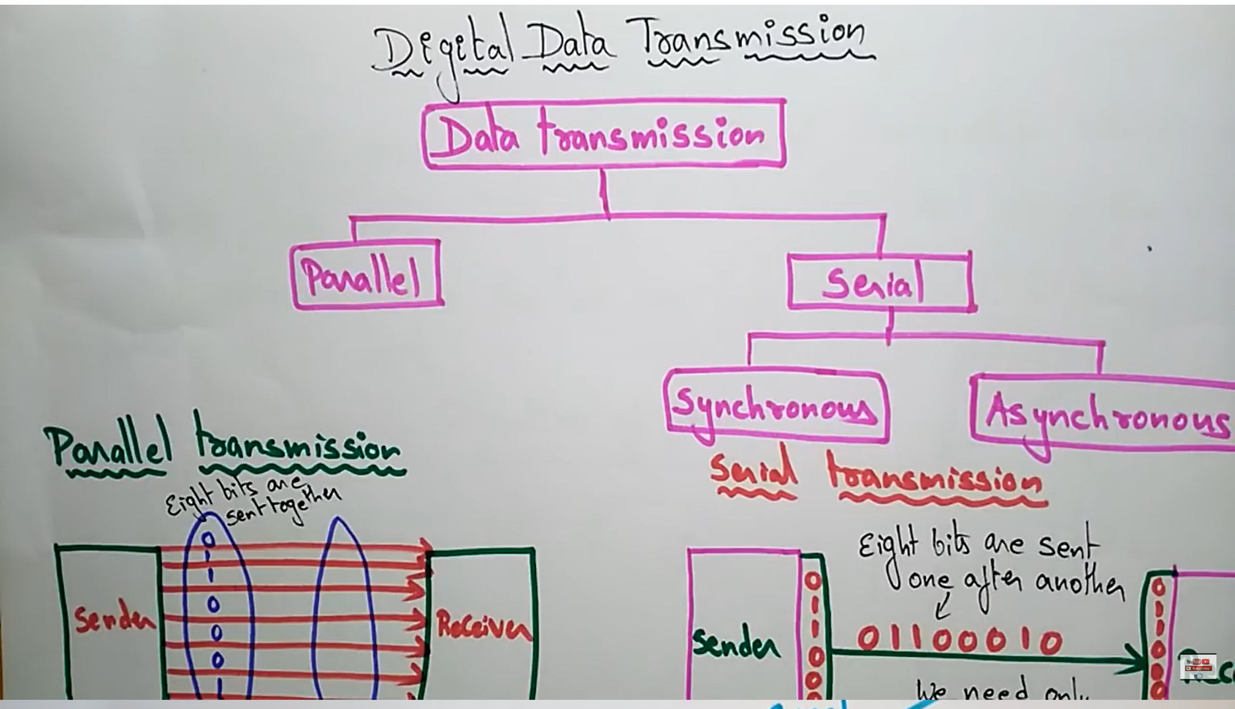
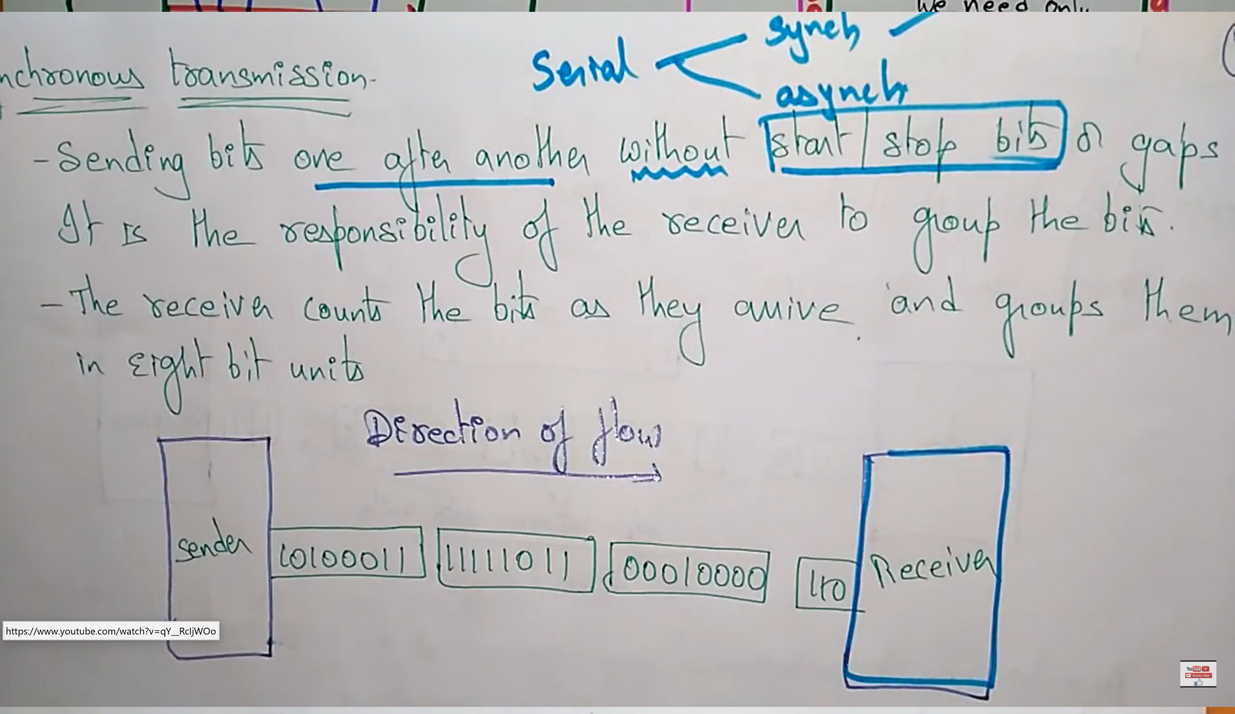
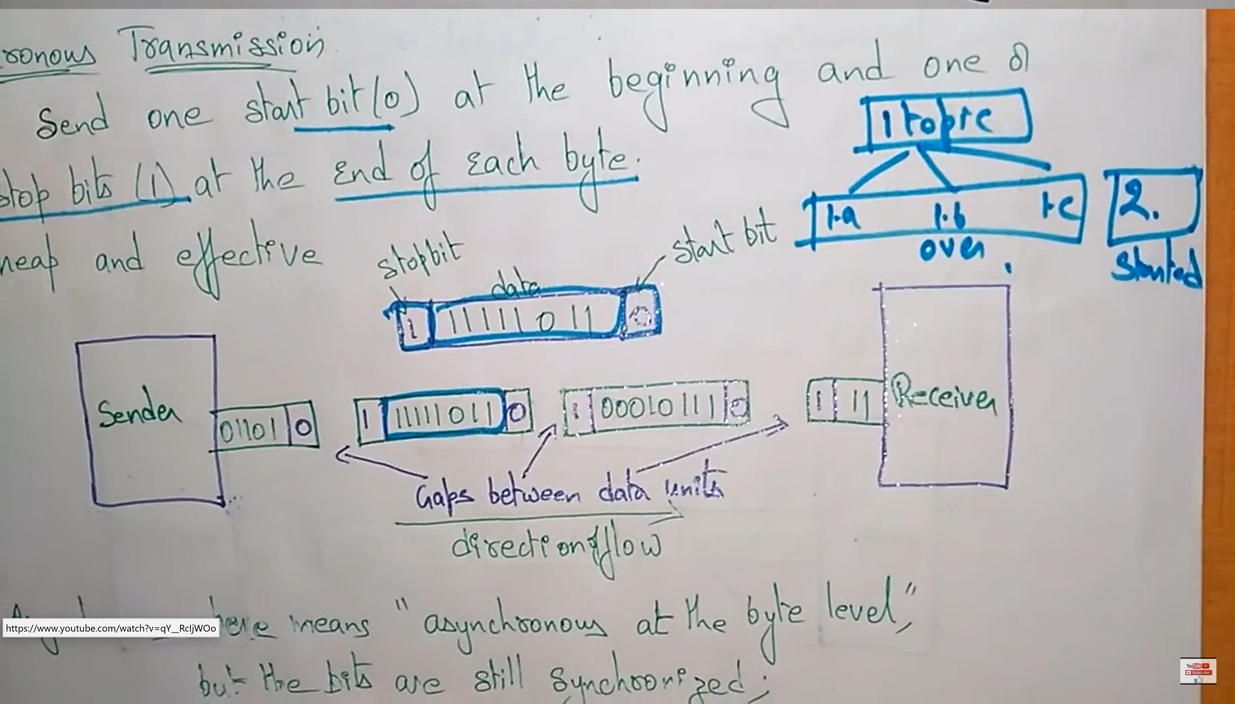
Binary data, consisting of 1s and 0s, may be organized into groups of n bits each. Computers produce and consume data in groups of bits. By grouping, we can send data n bits at a time instead of 1. This is called **parallel transmission**.

The mechanism for parallel transmission is a conceptually simple one: Use n wires to send n bits at one time. That way each bit has its own wire, and all n bits of one group can be transmitted with each clock tick from one device to another. The following figure shows how parallel transmission works for n = 8. Typically, the eight wires are bundled in a cable with a connector at each end.



The advantage of parallel transmission is speed. All else being equal, parallel transmission can increase the transfer speed by a factor of n over serial transmission.

But there is a significant disadvantage: cost. Parallel transmission requires n communication lines just to transmit the data stream. Because this is expensive, parallel transmission is usually limited to short distances.

SERIAL TRANSMISSION

In **serial transmission** one bit follows another, so we need only one communication channel rather than n to transmit data between two communicating devices.