

1. Define Computer Network, DataCommunication ,Telecommunication, LAN, MAN, WAN and PAN?

Computer Networks are a system of interconnected computers which connect with each other to share data and communicate with each other

Data communication is the transfer of data between devices

Telecommunications is the transmission of data over a distance

LAN = Local Area Network, a computer network in cover a small area, eg a University network

MAN = Metropolitan Area Network, old network concept that is a computer network that covers a city area

WAN = Wide Area Network, Computer network covers a wide geographical area such as a country

PAN = Personal Area Network, A computer network that connects devices close to a person

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LAN to LAN is a connection between two or more LANs. This can be done using a variety of technologies, one such is a virtual private network (VPN).

LAN to WAN is a connection between a LAN and a WAN. This is done using a router.

Microcomputer to LAN is a connection between a microcomputer (such as a personal computer) and a LAN. This is typically done using a network adapter, a piece of hardware on the computer that has the job of connecting a computer to network and communicating.

Satellite and Microwave Network are two types of WANs that use wireless technologies to transmit data over long distances. Satellite networks use satellites to transmit data between different points on Earth, while microwave networks use microwaves to transmit data between towers that are spaced apart by a few miles.

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Data can be stored or generated information that exists on a computer, data itself cannot move between computers or networks, a signal (Analog or Digital) is needed to transmit this data.

- Analog signals are continuous signals that can take on any value within a range. For example, the voltage that is used to transmit sound waves is an analog signal.
- Digital signals are discrete signals that can only take on a certain number of values. For example, the bits that are used to transmit data in computers are digital signals (1 and 0)
- Digital signals are more resistant to noise inference.
- Digital signals are easier to store and process. Digital signals can be easily stored and processed by computers. This makes them ideal for applications such as telecommunications, data storage, and signal processing.

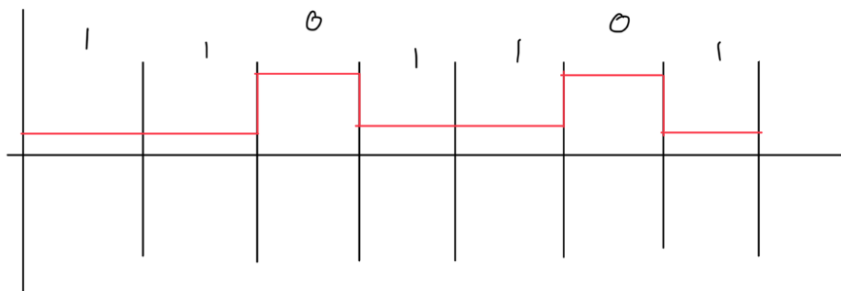
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- Baud rate is the number of times per second that a signal changes in a second. It is measured in bauds (Bd). For example, a baud rate of 1200 means that the signal changes state 1200 times per second.
- Bits per second (bps) is the number of bits that are transmitted per second. It is a measure of the data rate. For example, a bps of 1200 means that 1200 bits are transmitted per second.

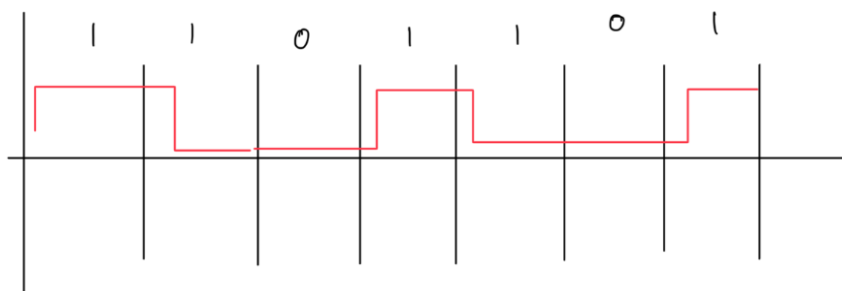
The main difference between baud rate and bits per second is that baud rate is a measure of the number of times that a signal changes state, while bits per second is a measure of the number of bits that are transmitted. It is only true in some transmission types that Bd equals the data rate, in differential Manchester this is halved, where 10 Bd would equal 5 bits per second

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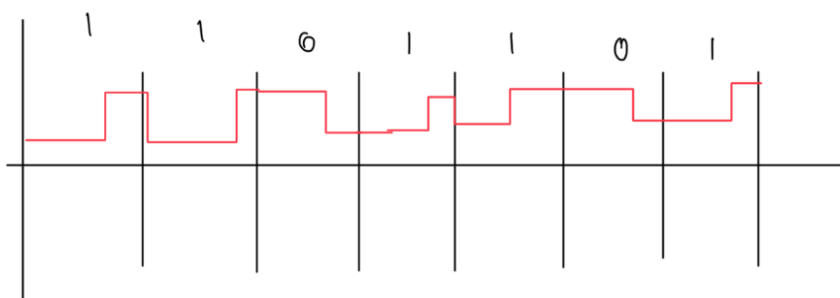
NRZ-L



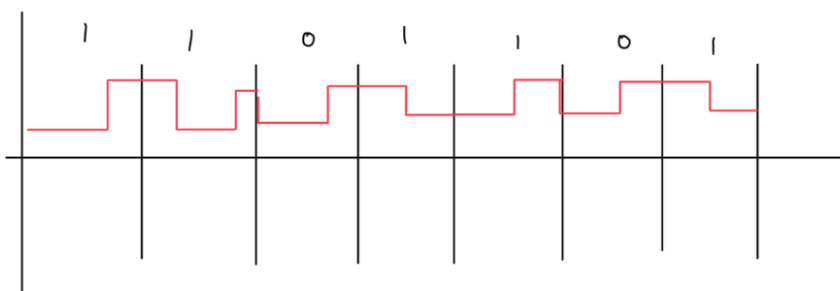
NRZI



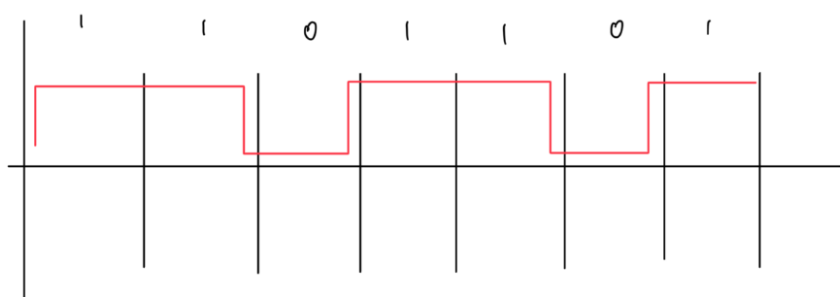
Manchester - No change = Bit Change



Differential Manchester - No Start Change = 1



Bipolar AMI - 1 need above 0 voltage



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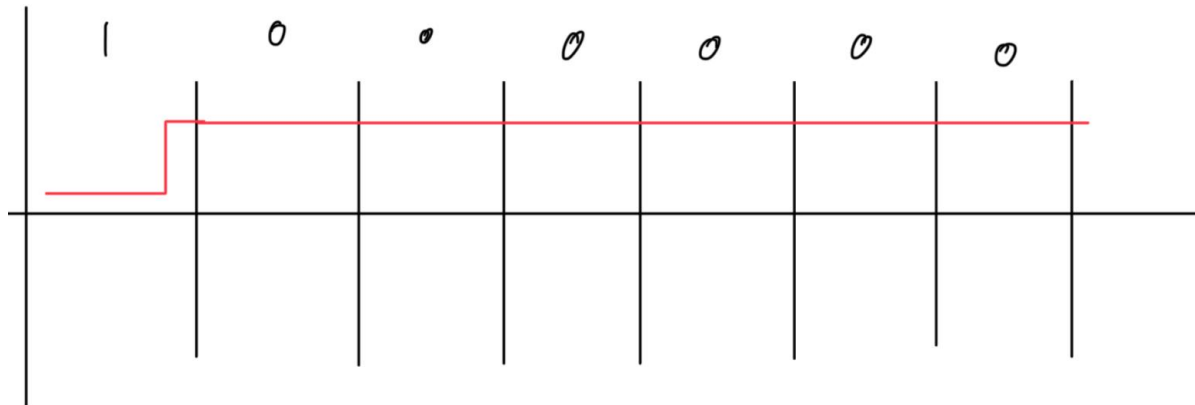
That would be multiple cycles per second, I would need a bigger canvas to show this properly

7

4B/5B encoding potentially

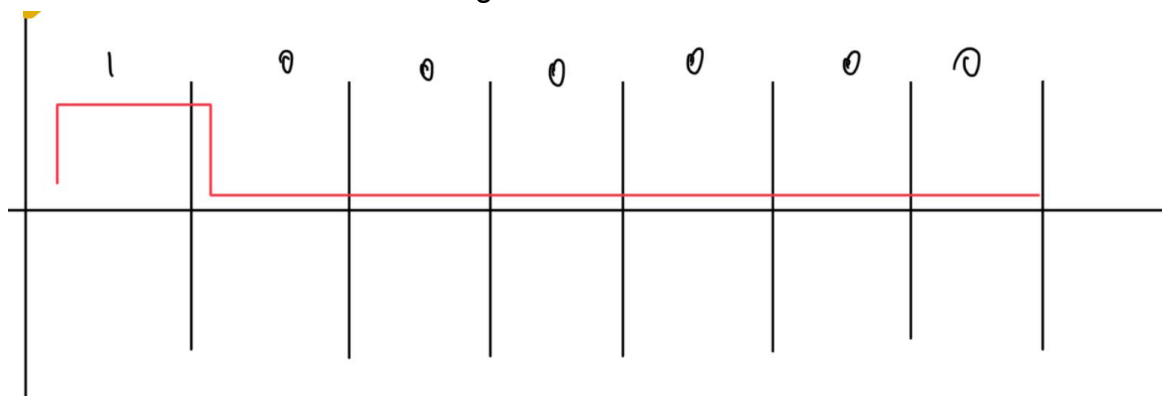
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Example signal where after initial change there was no voltage change



NRZI

And to create the same bit reading in Differential Manchester



Diff Manchester

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I do not know how this would be done yet

10

What is the baud rate of a digital signal that employs differential Manchester and has a data transfer rate of 2000 bps?

- The bps would be half of the baud rate, so 4000 Bd's

What is the data transfer rate in bps of a signal that is encoded using phase modulation with 8 different phase angles and a baud rate of 2000?

- Don't know

If quadrature amplitude modulation is used to transmit a signal with a baud rate of 8000, what is the corresponding bit rate?

- 32000 bps, each signal change to represent 4 bits