Introduction
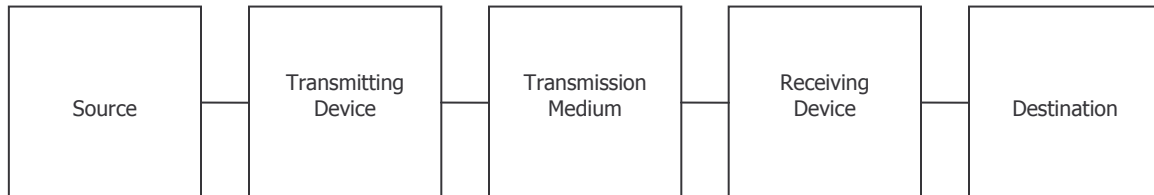
Not a course in network protocols. Most of this course's discussion will be in the physical layer.

Data Communications Model

Source		Transmitting Device		Transmission Medium		Receiving Device		Destination

- **Source –** Generates data
- **Transmitting device** – takes data and converts it into an electromagnetic signal that can be transmitted. This might include a conversion from digital to analog form – modulation of some sorts.
- **Transmission medium** – Varies in complexity. Could be anything from a single wire or air (radio signals) to a network – either WAN or LAN.
- **Receiving Device –** Demodulates the signal. Might do some sort of error checking or even error correction.

WAN (Wide Area Network)
Two methods used for transmission of data:

1. **Circuit Switching**
   a. "Plain old telephone system" - physical circuit that is connected and remains connected for the duration of the conversation – until one side terminates the connection.
   b. This is not advantageous when there are great lapses of time between transmissions.
2. **Packet Switching**
   a. The message (however large) is broken into *smaller chunks of data* called **packets** which get sent and then received separately. Each can (but won't necessarily) take a different route in getting to its final destination.
   b. Depending on the route taken, packets might be received in a different order than they were sent. It is the job of the receiver, then, to reassemble the packets in the proper order. Often packets will be assigned a sequence number used to facilitate this behavior.

LAN (Local Area Network)
Topologies (ways the network is laid out) –

1. **Star** – Every device is connected to a central device.

2. **Bus** – all the nodes are connected to a bus
3. **Ring** – All the nodes are connected in a ring

The protocol used differs based on the topology. In a ring topology, a token is used. A device cannot transmit unless it "has the token." This guarantees that you will be able to transmit data within a certain time frame.

Bus and Star use broadcast

CSMA/CD – Carrier sense multiple access with collision detection

Anyone that has information to send can send it at any time.