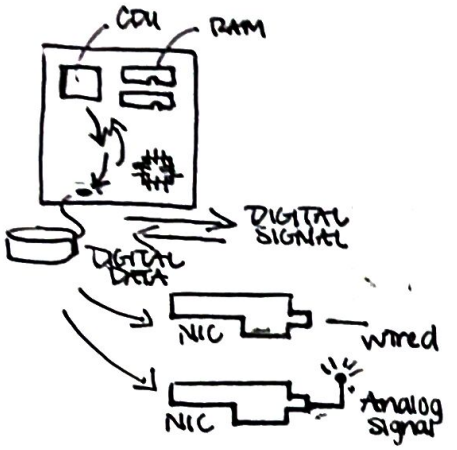
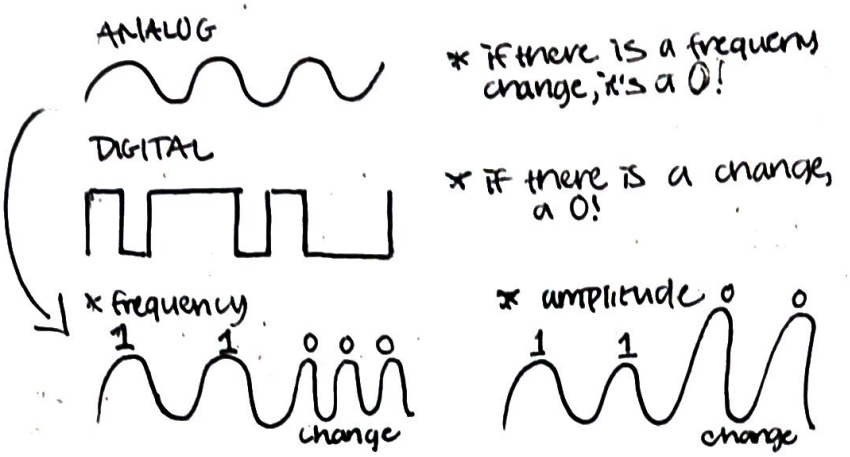
Cyber Notes
03/24

Analog Signal - sound
Common issue is SIGNAL - LOST





* if there is a frequency change, it's a 0!

* if there is a change, a 0!

If it is wireless, it is a signal! If it is inside a computer, it would be 1 and 0. on circuit tree

Numbering System

128	64	32	16	8	4	2	1
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

* 8 bits is equal to 1 byte!

Hex Base 16
Numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19
Letters: A, B, C, D, E, F, 1A, 1B, 1C, 1D, 1E, 1F

126.55.0.240	01111110 00110111 00000000 11110000
20.248.252.253	00010100 11111000 11111100 11110111
130.35.168.128	10000010 00100011 10101000 10000000

OSI Model breaks down communication to trouble shoot
7 layers

*There are rules for each layers.

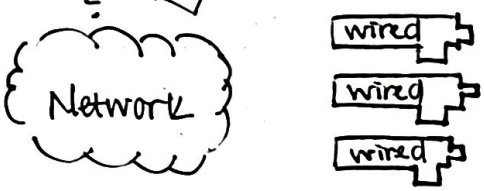
7	Application	FTP, SMTP, HTTP, SSH, DNS, HTTPS, DHCP
6	Presentation	Data Format Translation ≈ ASCII or unicode, Encryption, Compression
5	Session	Start/Maintain/Stop
4	Transport	"Reliability" TCP, UDP → "Flow Control", sequencing
3	Network	IPv4 IPv6 → "Packet", uses router
2	Data Link	"MAC" "frame" → media access control
1	Physical	bits 1,0 →

3 Main cables

Wire
~~twisted pair~~ } copper
~~coax~~
~~fiberoptic~~ } glass plastic

wireless
antenna

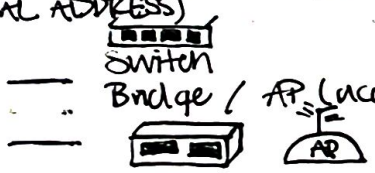
MAC → Physical, Unique, Hex #



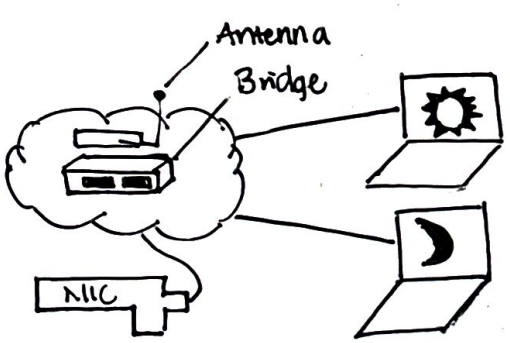
* ethernet is based on chaos theory

NIC: twisted pair, glass, antenna
Bridge: twisted pair, glass, antenna
Switch: twisted pair, glass, antenna
Access Point: antenna
} Devices

Data Link: "MAC", "frame", rules for sharing the media
(PHYSICAL ADDRESS)
1). Token (fairness)
2). Ethernet (chaos)



Network card can have twisted pair OR antenna, could be connected with access point



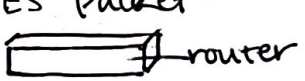
Bridges, Access Point, and Switches forward "frame"

IPv4: [X.X.X.X]
[129.9.32.1]

Presentation
1). Data Format Translation → ASCII
→ UTF (unicode)
2). Encryption
3). Compression

REMEMBER
1). FTP (20,21)
2). SMTP (25)
3). HTTP (80)
4). SSH (22)
5). DNS (53)
6). HTTPS (443)
7). DHCP (67, 68)
} Applications

Network (LOGICAL ADDRESS)
Router ROUTES "Packet" or information



Transport
"Reliability" (applies to TCP)
TCP, UDP → datagram (UNreliable)
↓
segment

TCP: hand shaking, email, and Sequencing

Network
IP address MUST be unique! or else the network would go crazy
IPv6 will add something on the back of NIC
IPv6 will also possibly use a MAC address, 126 bits!