# Exercise 3

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Switch tables

o Why does the switch table have a TTL?

   o Needs to remove MACs after a while to prevent overflows

   o Attention: If the switch interconnects other switches, the table quickly fills with MAC-port bindings (sometimes 250 entries per port possible -> can already lead to problems)

   o TTL has to balance the advantage of fast forwarding with the need for a small switching table

Ethernet services

o   Framing:
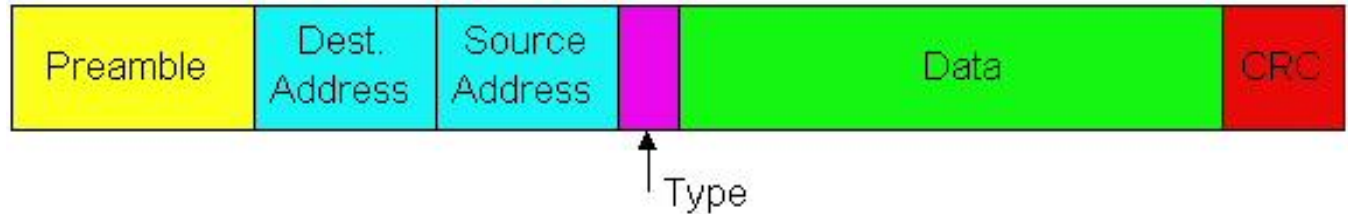
o   Reliable delivery: unreliable, no ACKs/NACKs

o   Flow control: Avaliable but depends a bit on the standard. Uses pause frames to signal overflow. Imagine a switch having 24 100MBit/s ports but only 1GBit/s upload.

o   Error detection/correction: CRC check at receiver, if error is detected, frame is simply dropped

o   Media access: CSMA/CD or none (if it is really a star in FastEthernet), but because Ethernet is originally a BUS technology, it supports CSMA/CD
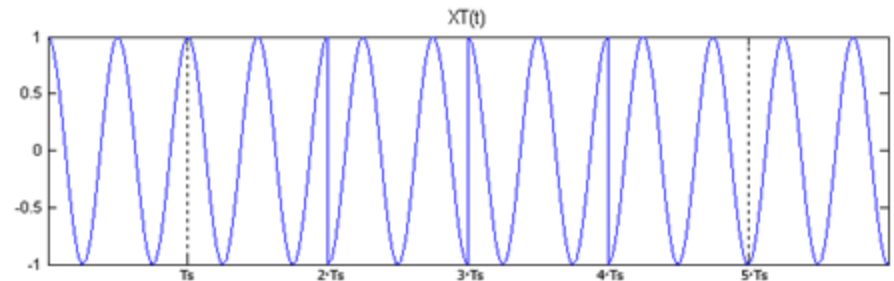
SNR and BER

o How are SNR and BER connected? How can decreasing the transmission rate increase the throughput? Why is the slowest transmission rate BPSK not using amplitude modulation anymore?

o If the signal is good, the bit error rate is low (the signal is clear so it is easy to understand). If the signal quality is decreasing, BER is going up. Mathematical connection is based on the algorithm.

o If the signal is getting worse, it can be beneficial to switch to a clearer modulation allowing less max throughput but with the SNR a better throughput.

QAM & BPSK

o Amplitude modulation is much more error prone

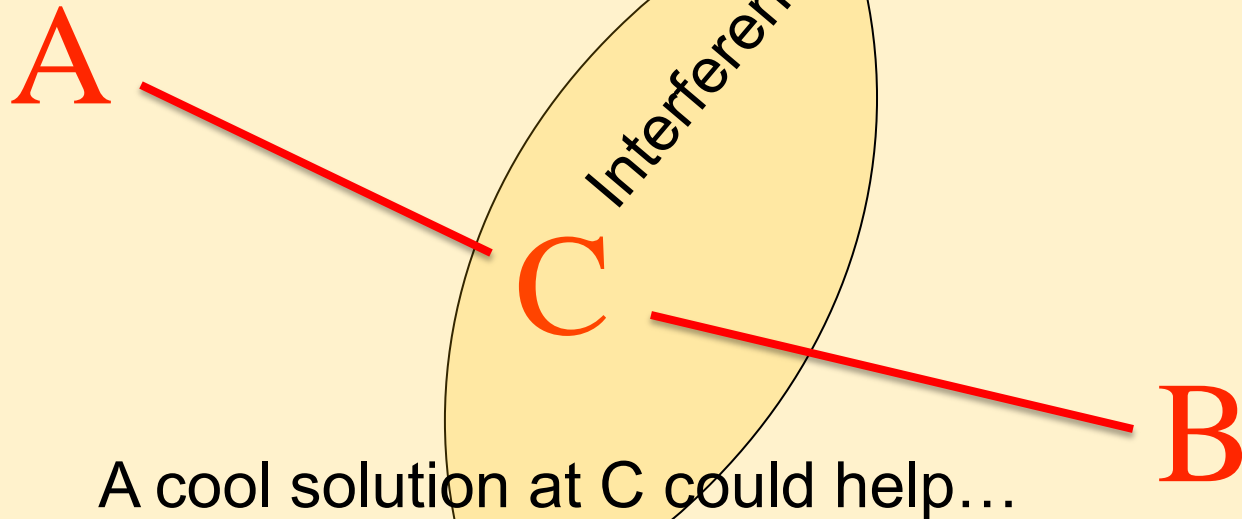o QAM: Two, 90° shifted, waves are amplitude modulated, you can imagine two orthogonal waves
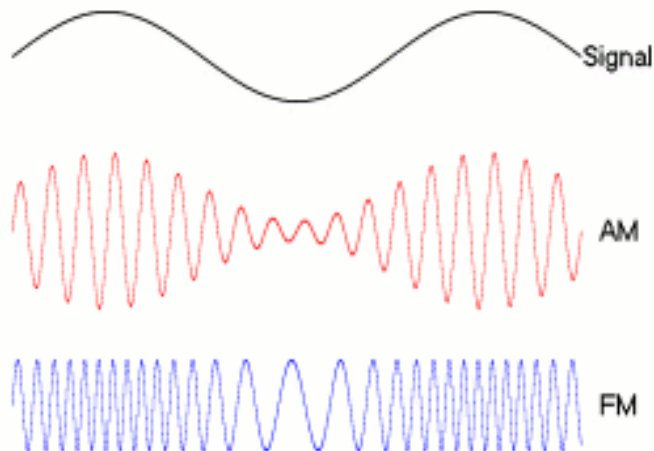
BPSK: very similar to frequency modulation

Hidden terminal problem

o Why can a host B, hidden to either A or C, nevertheless infer with the A-C link?

A

C

Interference

B

A cool solution at C could help…

PPP byte stuffing

o Draw a general PPP frame. How does the binary data "0011 1001 1111 1001 0101" change if it is add to the frame.

1	1	1	1 or 2	variable length	2 or 4	1
01111110	11111111	00000011	protocol	info	check	01111110

flag   control   flag

address

0011 1001 1111 1001 0101

Byte stuffing

001110011111100111111010010101