08/29/22: Layer 2 - The Data Link Layer.

Cyclic Redundancy check (CRC):-

Pseudo Code for CRC:-

```
def CRC ( Msg, Polynomial):
        Msg ⟶ Binary
        CRC length = bit length (Polynomial) - 1

        t = msg . "0" * CRC length
        d = t
        while len(d) > CRC length
```

Example problem:-

$$Msg = \text{" ? "}.$$
$$Polynomial = 0 \times 3.$$

$$= 00111111.$$

```
        = 00111111.
11 ⟌ 00111111 0
     11 1 111 0
     00 1 1 1 1 0
      0 0 1 1 0
      11 00
      11
      00
```

08/31/22. Ethernet Collision Avoidance (CSMA/CD).

carrier Sense Multiple Access Collision Avoidance
Algorithm :

1.) Build a Frame to transmit.

2) If someone is currently transmitting
   a.) Wait till they stop.

3.) Transmit your frame.
   a.) If there is no collision detected, you are done.
4.) If there is a collision, then I am the transmission, so everyone knows a collision happened.
5.) Wait a random amount of time *, then go to step 2

"Exponential Backoff" Algorithm:-

1.) Let $m = 0$, $n = $ bitrate $^{-1}$ (secs per bit)

2) while the transmission still hasn't gone through:
   a.) Let $k = $ random integer btw 0 and $(2^m - 1)$, inclusive.
   b.) wait for $k * n * 512$ secs.
   c.) Try transmitting again.

   d.) $m += 1$.

Wifi :-

→ when we have RTS (request to send), then we can send the msg.

→ when we hear CTS (clear to send) then we can send the msg.

→ when we hear RTS & CTS at the same time, then we don't send the msg.

Frame : A frame is a sequence of bytes all sent together holding a chunk of info, and some error-correction.