

Lecture 17: Coding, Error Detection and Correction

Errors and Losses

- Physical layers use encoding to protect link layer from chip errors
- All or nothing: if chip errors exceed layer 1 robustness, you lose the whole packet (bad CRC)
- We can use these techniques at higher layers as well: *erasure coding*
 - Encoding data of length L as k symbols: any n of the k symbols can regenerate the original data ($n \geq L$).

Cyclic Redundancy Check (CRC), revisited

- Distill n bits of data into a c bit CRC, $c \ll n$
- Can't detect all errors (2^{-c} chance another packet's CRC matches)
- CRCs are designed to detect certain forms of errors more than others
 - Assured to detect bursts of bit errors shorter than c
 - E.g., flip one bit, there will be a different CRC value