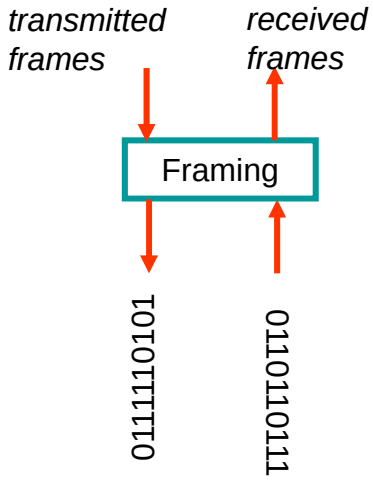
# Data Link Layer

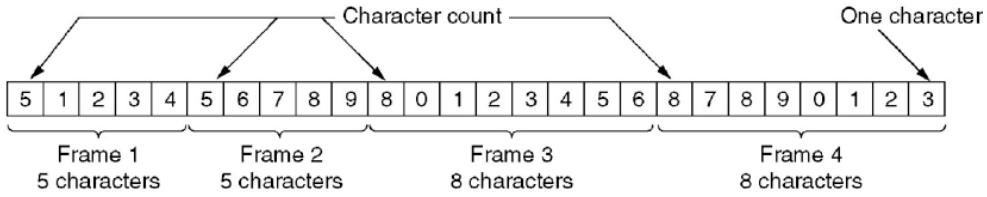
## Overview

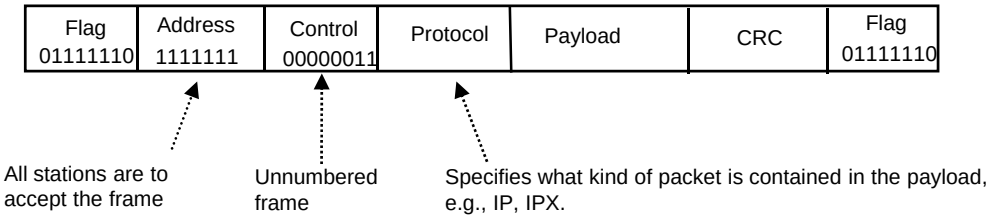
# Data Link Layer

- Service provided by physical layer
  - bit delivery
- Service provided to network layer
  - framing
  - error control
  - flow control
  - medium access (with shared medium)

# Framing




- Mapping stream of physical layer bits into frames
- Mapping frames into bit stream
- Frame boundaries can be determined using:
  - Character Counts
  - Flags
  - CRC Checks

# Error Control

- Digital transmission systems introduce errors
- Applications require certain reliability level
  - Data applications require error-free transfer
  - Voice & video applications tolerate some errors

- Error control
  - To ensure a data stream is transmitted to a certain level of accuracy

# Approaches

- Two basic approaches:
  - Error detection & retransmission
    - Error detection: parity check, CRC
    - Retransmission: automatic repeat request (ARQ)
  - Error Correction:
    - Forward error correction (FEC)

# Flow Control

- Regulating data flow so that slow receivers will not swamped by fast senders
  - Sliding window protocols
    - Stop and wait
    - Go Back N
    - Selective Repeat

# Medium Access

- Coordination function to determine who (&when) can access the medium
- Example:
  - The instructor is holding an office hour…

    Who asks the first questions? Who is the next?
    - Listen and wait → contention based
    - Polling based on an order → contention free

# Focus

- Error detection
- Retransmission protocols