Sliding Window Terms

- **Sender**
  - LAR - Sequence number of last acknowledgement received, defines lower extreme of window
  - LFS - Sequence number of last frame sent, defines upper extreme of window
  - Window is from [LAR+1, LFS], that is all frames that have been sent but not yet acked
  - SWS - Bound on sliding window size
Frame Sequence Number in Window

CASE 1: Usual Case
LAR ≤ LFS

LAR ≤ LFS && seqNo > LAR && seqNo ≤ LFS

In this case, we are not using the full window of 4.

CASE 2: Sequence Number Wrap Around
LAR > LFS

LAR > LFS && (seqNo > LAR || seqNo ≤ LFS)

On Sender with SWS = 4, [0,7] sequence numbers
Sliding Window Terms

- Receiver
  - NFE - Next frame expected
  - LFR - Sequence number of largest consecutive frame received
  - LAF - Sequence number of largest acceptable frame
  - RWS - Max receive window size
  - LFR = NFE - 1
  - LAF = NFE + RWS - 1
Frame Sequence Number in Window

CASE 1: Usual Case
NFE + RWS - 1 >= NFE
NFE + RWS - 1 >= NFE && seqNo >= NFE && seqNo <= NFE + RWS - 1

Remember NFE is just LFR + 1 and LAF is just NFE + RWS - 1.

Green sequence numbers are in window and grey are outside.

CASE 2: Sequence Number Wrap Around
NFE + RWS - 1 < NFE
NFE + RWS - 1 < NFE && (seqNo >= NFE || seqNo <= NFE + RWS - 1)

On Receiver with RWS = 4, [0,7] sequence numbers
Frame Not in Window On Receiver

- Send ack that acknowledges NFE - 1
- This tells the sender that we have successfully received all frames up to NFE - 1 = LFR.
- Will happen when ack is lost and needs to be resent
Circular Send / Receive Window

- Implement send and receive queue as circular array or list
- Index in to sender’s send queue using sequence number % SWS
- Index in to receiver’s receive queue using sequence number % RWS
- Used in book’s code for SWP