```
EVENT time: 18.705740,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     aaaaaaaaaaaaaaaaaaaa
- Sending Message:                    aaaaaaaaaaaaaaaaaaaa     ack# = 0     seq# = 0
- Started timer


EVENT time: 24.170835,  type: 2, fromlayer3  entity: 1
- B side received packet:                  aaaaaaaaaaaaaaaaaaaa     ack# = 0     seq# = 0
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                   ACK                ack# = 0     seq# = 0
        TOLAYER3: packet being corrupted


EVENT time: 29.402449,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:     ACK                ack# = 0     seq# = 999999
- A side received corrupt packet :(


EVENT time: 35.124840,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     bbbbbbbbbbbbbbbbbbbb
- Sending Message:                    bbbbbbbbbbbbbbbbbbbb     ack# = 1     seq# = 1
        TOLAYER3: packet being lost.


EVENT time: 37.680447,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     cccccccccccccccccccc
- Sending Message:                    cccccccccccccccccccc     ack# = 2     seq# = 2
        TOLAYER3: packet being corrupted


EVENT time: 38.705742,  type: 0, timerinterrupt    entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
        - Sending Message:                 aaaaaaaaaaaaaaaaaaaa     ack# = 0     seq# = 0
            TOLAYER3: packet being lost.
        - Sending Message:                 bbbbbbbbbbbbbbbbbbbb     ack# = 1     seq# = 1
        - Sending Message:                 cccccccccccccccccccc     ack# = 2     seq# = 2


EVENT time: 42.147713,  type: 2, fromlayer3  entity: 1
- B side received packet:                  Zccccccccccccccccccc     ack# = 2     seq# = 2
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                   ACK                ack# = 0     seq# = 0
        TOLAYER3: packet being corrupted


EVENT time: 46.394402,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     dddddddddddddddddddd
- Sending Message:                    dddddddddddddddddddd     ack# = 3     seq# = 3
```

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              TOLAYER3: packet being lost.


EVENT time: 51.166374,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ZCK              ack# = 0    seq# = 0
- A side received corrupt packet :(


EVENT time: 51.576138,  type: 2, fromlayer3  entity: 1
- B side received packet:                bbbbbbbbbbbbbbbbbb    ack# = 1    seq# = 1
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK              ack# = 1    seq# = 1
              TOLAYER3: packet being corrupted


EVENT time: 53.202408,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    eeeeeeeeeeeeeeeeee
- Sending Message:                       eeeeeeeeeeeeeeeeee    ack# = 4    seq# = 4


EVENT time: 57.152939,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ZCK              ack# = 1    seq# = 1
- A side received corrupt packet :(


EVENT time: 58.705742,  type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
        - Sending Message:               aaaaaaaaaaaaaaaaaa    ack# = 0    seq# = 0
              TOLAYER3: packet being lost.
        - Sending Message:               bbbbbbbbbbbbbbbbbb    ack# = 1    seq# = 1
              TOLAYER3: packet being corrupted
        - Sending Message:               cccccccccccccccccc    ack# = 2    seq# = 2
        - Sending Message:               dddddddddddddddddd    ack# = 3    seq# = 3
              TOLAYER3: packet being lost.
        - Sending Message:               eeeeeeeeeeeeeeeeee    ack# = 4    seq# = 4


EVENT time: 59.039051,  type: 2, fromlayer3  entity: 1
- B side received packet:                cccccccccccccccccc    ack# = 2    seq# = 2
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK              ack# = 2    seq# = 2
              TOLAYER3: packet being corrupted


EVENT time: 63.197636,  type: 2, fromlayer3  entity: 1
- B side received packet:                eeeeeeeeeeeeeeeeee    ack# = 4    seq# = 4
- B side received a packet with a greater
  sequence number than expected. Expected
```

          TOLAYER3: packet being corrupted

EVENT time: 64.617668, type: 2, fromlayer3 entity: 0
- A side received from Lower Layer: ZCK   ack# = 2   seq# = 2
- A side received corrupt packet :(

EVENT time: 69.035599, type: 2, fromlayer3 entity: 1
- B side received packet: Zbbbbbbbbbbbbbbbbbbb   ack# = 1   seq# = 1
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 2   seq# = 2

EVENT time: 70.867599, type: 2, fromlayer3 entity: 0
- A side received from Lower Layer: ZCK   ack# = 2   seq# = 2
- A side received corrupt packet :(

EVENT time: 70.910789, type: 2, fromlayer3 entity: 1
- B side received packet: cccccccccccccccccccc   ack# = 2   seq# = 2
- B side received a packet with a lower
  sequence number than expected. Expected
  3, got 2.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 2   seq# = 2

EVENT time: 72.217178, type: 2, fromlayer3 entity: 1
- B side received packet: eeeeeeeeeeeeeeeeeeee   ack# = 4   seq# = 4
- B side received a packet with a greater
  sequence number than expected. Expected
  3, got 4.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 2   seq# = 2

EVENT time: 72.839478, type: 1, fromlayer5 entity: 0
- A side received message from upper layer: ffffffffffffffffff
- Sending Message: ffffffffffffffffff   ack# = 5   seq# = 5

EVENT time: 73.456062, type: 1, fromlayer5 entity: 0
- A side received message from upper layer: gggggggggggggggggggg

```
- Sending Message:                       ggggggggggggggggggggg      ack# = 6      seq# = 6
         TOLAYER3: packet being lost.


EVENT time: 75.686882,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                  ack# = 2     seq# = 2
- A side received valid packet.
** 3 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
       - Message in window, already sent:      dddddddddddddddddddd      ack# = 3     seq# = 3
       - Message in window, already sent:      eeeeeeeeeeeeeeeeeeee      ack# = 4     seq# = 4
       - Message in window, already sent:      ffffffffffffffffffff      ack# = 5     seq# = 5
       - Message in window, already sent:      ggggggggggggggggggggg     ack# = 6     seq# = 6

EVENT time: 76.283989,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:   hhhhhhhhhhhhhhhhhhhh
- Sending Message:                       hhhhhhhhhhhhhhhhhhhh      ack# = 7     seq# = 7
         TOLAYER3: packet being lost.


EVENT time: 78.458145,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:   iiiiiiiiiiiiiiiiiiii
- Sending Message:                       iiiiiiiiiiiiiiiiiiii      ack# = 8     seq# = 8
         TOLAYER3: packet being lost.


EVENT time: 82.230896,  type: 2, fromlayer3  entity: 1
- B side received packet:                ffffffffffffffffffff      ack# = 5     seq# = 5
- B side received a packet with a greater
  sequence number than expected. Expected
  3, got 5.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                  ack# = 2     seq# = 2
         TOLAYER3: packet being lost.


EVENT time: 82.674294,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:   jjjjjjjjjjjjjjjjjjjj
- Sending Message:                       jjjjjjjjjjjjjjjjjjjj      ack# = 9     seq# = 9
         TOLAYER3: packet being lost.


EVENT time: 85.082962,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                  ack# = 2     seq# = 2
- A side received valid packet.
** 3 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
```

```
EVENT time: 94.315727,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:        ACK                ack# = 2    seq# = 2
- A side received valid packet.
** 3 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 95.686882,  type: 0, timerinterrupt    entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
      - Sending Message:                   dddddddddddddddddddd    ack# = 3    seq# = 3
      - Sending Message:                   eeeeeeeeeeeeeeeeeeee    ack# = 4    seq# = 4
      - Sending Message:                   ffffffffffffffffffff    ack# = 5    seq# = 5
         TOLAYER3: packet being lost.
      - Sending Message:                   gggggggggggggggggggg    ack# = 6    seq# = 6
      - Sending Message:                   hhhhhhhhhhhhhhhhhhhh    ack# = 7    seq# = 7
         TOLAYER3: packet being corrupted
      - Sending Message:                   iiiiiiiiiiiiiiiiiiii    ack# = 8    seq# = 8
         TOLAYER3: packet being lost.
      - Sending Message:                   jjjjjjjjjjjjjjjjjjjj    ack# = 9    seq# = 9

EVENT time: 97.658607,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    kkkkkkkkkkkkkkkkkkkk
- Sending Message:                   kkkkkkkkkkkkkkkkkkkk    ack# = 10   seq# = 10

EVENT time: 98.703918,  type: 2, fromlayer3  entity: 1
- B side received packet:                   dddddddddddddddddddd    ack# = 3    seq# = 3
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                   ACK                ack# = 3    seq# = 3

EVENT time: 103.457977,  type: 2, fromlayer3  entity: 1
- B side received packet:                   eeeeeeeeeeeeeeeeeeee    ack# = 4    seq# = 4
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                   ACK                ack# = 4    seq# = 4

EVENT time: 108.551895,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:        ACK                ack# = 3    seq# = 3
- A side received valid packet.
** 4 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
```

```
        - Message in window, already sent:        eeeeeeeeeeeeeeeeeeee     ack# = 4     seq# = 4
        - Message in window, already sent:        ffffffffffffffffffff     ack# = 5     seq# = 5
        - Message in window, already sent:        gggggggggggggggggggg     ack# = 6     seq# = 6
        - Message in window, already sent:        hhhhhhhhhhhhhhhhhhhh     ack# = 7     seq# = 7
        - Message in window, already sent:        iiiiiiiiiiiiiiiiiiii     ack# = 8     seq# = 8
        - Message in window, already sent:        jjjjjjjjjjjjjjjjjjjj     ack# = 9     seq# = 9
        - Message in window, already sent:        kkkkkkkkkkkkkkkkkkkk     ack# = 10    seq# = 10

EVENT time: 109.442078,  type: 2, fromlayer3  entity: 1
- B side received packet:                       gggggggggggggggggggg      ack# = 6     seq# = 6
- B side received a packet with a greater
  sequence number than expected. Expected
  5, got 6.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                      ACK                ack# = 4     seq# = 4

EVENT time: 111.297134,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:     ACK                ack# = 4     seq# = 4
- A side received valid packet.
** 5 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
        - Message in window, already sent:        ffffffffffffffffffff     ack# = 5     seq# = 5
        - Message in window, already sent:        gggggggggggggggggggg     ack# = 6     seq# = 6
        - Message in window, already sent:        hhhhhhhhhhhhhhhhhhhh     ack# = 7     seq# = 7
        - Message in window, already sent:        iiiiiiiiiiiiiiiiiiii     ack# = 8     seq# = 8
        - Message in window, already sent:        jjjjjjjjjjjjjjjjjjjj     ack# = 9     seq# = 9
        - Message in window, already sent:        kkkkkkkkkkkkkkkkkkkk     ack# = 10    seq# = 10

EVENT time: 113.437668,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     llllllllllllllllllll
- Sending Message:                      llllllllllllllllllll     ack# = 11    seq# = 11
          TOLAYER3: packet being lost.

EVENT time: 117.304016,  type: 2, fromlayer3  entity: 1
- B side received packet:                       hhhhhhhhhhhhhhhhhhhh      ack# = 7     seq# = 999999
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                      ACK                ack# = 4     seq# = 4

EVENT time: 119.658302,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     mmmmmmmmmmmmmmmmmmmm
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- Sending Message:                        mmmmmmmmmmmmmmmmmmmm      ack# = 12    seq# = 12
        TOLAYER3: packet being lost.

EVENT time: 120.785316,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                ack# = 4     seq# = 4
- A side received valid packet.
** 5 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 125.261879,  type: 2, fromlayer3  entity: 1
- B side received packet:                jjjjjjjjjjjjjjjjjjjj    ack# = 9     seq# = 9
- B side received a packet with a greater
  sequence number than expected. Expected
  5, got 9.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                ack# = 4     seq# = 4
        TOLAYER3: packet being lost.

EVENT time: 129.817047,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                ack# = 4     seq# = 4
- A side received valid packet.
** 5 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 131.297134,  type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
      - Sending Message:                 ffffffffffffffffff    ack# = 5     seq# = 5
          TOLAYER3: packet being corrupted
      - Sending Message:                 gggggggggggggggggggg  ack# = 6     seq# = 6
          TOLAYER3: packet being corrupted
      - Sending Message:                 hhhhhhhhhhhhhhhhhhhh  ack# = 7     seq# = 7
          TOLAYER3: packet being corrupted
      - Sending Message:                 iiiiiiiiiiiiiiiiiiii  ack# = 8     seq# = 8
      - Sending Message:                 jjjjjjjjjjjjjjjjjjjj  ack# = 9     seq# = 9
          TOLAYER3: packet being corrupted
      - Sending Message:                 kkkkkkkkkkkkkkkkkkkk  ack# = 10    seq# = 10
          TOLAYER3: packet being corrupted
      - Sending Message:                 llllllllllllllllllll  ack# = 11    seq# = 11
      - Sending Message:                 mmmmmmmmmmmmmmmmmmmm  ack# = 12    seq# = 12
          TOLAYER3: packet being lost.

EVENT time: 134.087784,  type: 2, fromlayer3  entity: 1
- B side received packet:                kkkkkkkkkkkkkkkkkkkk   ack# = 10    seq# = 10
- B side received a packet with a greater
  sequence number than expected. Expected
  5, got 10.
  Discarding packet...
```

```
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                          ACK                     ack# = 4     seq# = 4
          TOLAYER3: packet being corrupted

EVENT time: 134.724152,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:      nnnnnnnnnnnnnnnnnnnn
- Packet 13 buffered in sending buffer.

EVENT time: 135.236816,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                     ack# = 999999      seq# = 4
- A side received corrupt packet :(

EVENT time: 139.988739,  type: 2, fromlayer3  entity: 1
- B side received packet:                 Zffffffffffffffffff      ack# = 5     seq# = 5
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                     ack# = 4     seq# = 4

EVENT time: 141.196960,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:      oooooooooooooooooooo
- Packet 14 buffered in sending buffer.

EVENT time: 148.249649,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:      pppppppppppppppppppp
- Packet 15 buffered in sending buffer.

EVENT time: 148.811859,  type: 2, fromlayer3  entity: 1
- B side received packet:                 Zgggggggggggggggggggg     ack# = 6     seq# = 6
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                     ack# = 4     seq# = 4

EVENT time: 149.111435,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                     ack# = 4     seq# = 4
- A side received valid packet.
** 5 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 150.395721,  type: 2, fromlayer3  entity: 1
- B side received packet:                 Zhhhhhhhhhhhhhhhhhhhh      ack# = 7     seq# = 7
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                     ack# = 4     seq# = 4

EVENT time: 151.297134,  type: 0, timerinterrupt    entity: 0
```

```
- TIMEOUT - timer restarted,
  all packets in window resent
        - Sending Message:                    fffffffffffffffffff      ack# = 5      seq# = 5
        - Sending Message:                    ggggggggggggggggggg      ack# = 6      seq# = 6
            TOLAYER3: packet being corrupted
        - Sending Message:                    hhhhhhhhhhhhhhhhhhh      ack# = 7      seq# = 7
        - Sending Message:                    iiiiiiiiiiiiiiiiiii      ack# = 8      seq# = 8
        - Sending Message:                    jjjjjjjjjjjjjjjjjjj      ack# = 9      seq# = 9
        - Sending Message:                    kkkkkkkkkkkkkkkkkkk      ack# = 10     seq# = 10
        - Sending Message:                    lllllllllllllllllll      ack# = 11     seq# = 11
        - Sending Message:                    mmmmmmmmmmmmmmmmmmm      ack# = 12     seq# = 12
            TOLAYER3: packet being corrupted

EVENT time: 155.642853,  type: 2, fromlayer3  entity: 1
- B side received packet:                 iiiiiiiiiiiiiiiiiii     ack# = 8     seq# = 8
- B side received a packet with a greater
  sequence number than expected. Expected
  5, got 8.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                 ack# = 4     seq# = 4


EVENT time: 156.713440,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:     ACK                 ack# = 4     seq# = 4
- A side received valid packet.
** 5 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 163.684784,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    qqqqqqqqqqqqqqqqqqq
- Packet 16 buffered in sending buffer.


EVENT time: 164.586594,  type: 2, fromlayer3  entity: 1
- B side received packet:                 Zjjjjjjjjjjjjjjjjjj     ack# = 9     seq# = 9
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                 ack# = 4     seq# = 4
          TOLAYER3: packet being lost.


EVENT time: 165.844330,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:     ACK                 ack# = 4     seq# = 4
- A side received valid packet.
** 5 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 170.383362,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    rrrrrrrrrrrrrrrrrrr
- Packet 17 buffered in sending buffer.
```

```
EVENT time: 171.297134,  type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
        - Sending Message:                    ffffffffffffffffffff   ack# = 5     seq# = 5
        - Sending Message:                    gggggggggggggggggggg   ack# = 6     seq# = 6
        - Sending Message:                    hhhhhhhhhhhhhhhhhhhh   ack# = 7     seq# = 7
        - Sending Message:                    iiiiiiiiiiiiiiiiiiii   ack# = 8     seq# = 8
        - Sending Message:                    jjjjjjjjjjjjjjjjjjjj   ack# = 9     seq# = 9
             TOLAYER3: packet being lost.
        - Sending Message:                    kkkkkkkkkkkkkkkkkkkk   ack# = 10    seq# = 10
             TOLAYER3: packet being corrupted
        - Sending Message:                    llllllllllllllllllll   ack# = 11    seq# = 11
        - Sending Message:                    mmmmmmmmmmmmmmmmmmmm   ack# = 12    seq# = 12

EVENT time: 172.349716,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                ack# = 4     seq# = 4
- A side received valid packet.
** 5 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 173.909042,  type: 2, fromlayer3  entity: 1
- B side received packet:             Zkkkkkkkkkkkkkkkkkkk    ack# = 10   seq# = 10
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                ack# = 4     seq# = 4
          TOLAYER3: packet being corrupted

EVENT time: 175.808777,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    ssssssssssssssssssss
- Packet 18 buffered in sending buffer.

EVENT time: 176.322769,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ZCK                ack# = 4     seq# = 4
- A side received corrupt packet :(

EVENT time: 176.905426,  type: 2, fromlayer3  entity: 1
- B side received packet:             llllllllllllllllllll    ack# = 11   seq# = 11
- B side received a packet with a greater
  sequence number than expected. Expected
  5, got 11.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                ack# = 4     seq# = 4
          TOLAYER3: packet being corrupted

EVENT time: 179.009201,  type: 2, fromlayer3  entity: 0
```

- A side received from Lower Layer: ZCK   ack# = 4   seq# = 4
- A side received corrupt packet :(

EVENT time: 181.283447, type: 2, fromlayer3 entity: 1
- B side received packet: ffffffffffffffffffff   ack# = 5   seq# = 5
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 5   seq# = 5
          TOLAYER3: packet being lost.

EVENT time: 184.605209, type: 2, fromlayer3 entity: 1
- B side received packet: Zgggggggggggggggggggg   ack# = 6   seq# = 6
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 5   seq# = 5

EVENT time: 186.142715, type: 2, fromlayer3 entity: 0
- A side received from Lower Layer: ACK   ack# = 5   seq# = 5
- A side received valid packet.
** 6 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
        - Message in window, already sent: gggggggggggggggggggg   ack# = 6   seq# = 6
        - Message in window, already sent: hhhhhhhhhhhhhhhhhhhh   ack# = 7   seq# = 7
        - Message in window, already sent: iiiiiiiiiiiiiiiiiiii   ack# = 8   seq# = 8
        - Message in window, already sent: jjjjjjjjjjjjjjjjjjjj   ack# = 9   seq# = 9
        - Message in window, already sent: kkkkkkkkkkkkkkkkkkkk   ack# = 10   seq# = 10
        - Message in window, already sent: llllllllllllllllllll   ack# = 11   seq# = 11
        - Message in window, already sent: mmmmmmmmmmmmmmmmmmmm   ack# = 12   seq# = 12
        - Sending NEW buffered message: nnnnnnnnnnnnnnnnnnnn   ack# = 13   seq# = 13
               TOLAYER3: packet being lost.

EVENT time: 186.201691, type: 2, fromlayer3 entity: 1
- B side received packet: hhhhhhhhhhhhhhhhhhhh   ack# = 7   seq# = 7
- B side received a packet with a greater
  sequence number than expected. Expected
  6, got 7.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ZCK   ack# = 5   seq# = 5
          TOLAYER3: packet being corrupted

```
EVENT time: 189.919907,  type: 2, fromlayer3  entity: 1
- B side received packet:                    iiiiiiiiiiiiiiiiiiii     ack# = 8     seq# = 8
- B side received a packet with a greater
  sequence number than expected. Expected
  6, got 8.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                           ACK                 ack# = 5     seq# = 5
          TOLAYER3: packet being lost.

EVENT time: 191.882996,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                 ack# = 999999     seq# = 5
- A side received corrupt packet :(

EVENT time: 193.972565,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    tttttttttttttttttttt
- Packet 19 buffered in sending buffer.

EVENT time: 194.791580,  type: 2, fromlayer3  entity: 1
- B side received packet:                    jjjjjjjjjjjjjjjjjjjj     ack# = 9     seq# = 9
- B side received a packet with a greater
  sequence number than expected. Expected
  6, got 9.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                           ACK                 ack# = 5     seq# = 5
          TOLAYER3: packet being lost.

EVENT time: 201.330811,  type: 2, fromlayer3  entity: 1
- B side received packet:                    kkkkkkkkkkkkkkkkkkkk     ack# = 10    seq# = 10
- B side received a packet with a greater
  sequence number than expected. Expected
  6, got 10.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                           ACK                 ack# = 5     seq# = 5
          TOLAYER3: packet being lost.

EVENT time: 205.438553,  type: 2, fromlayer3  entity: 1
- B side received packet:                    llllllllllllllllllll     ack# = 11    seq# = 11
- B side received a packet with a greater
  sequence number than expected. Expected
  6, got 11.
  Discarding packet...
```

```
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                    ack# = 5     seq# = 5
          TOLAYER3: packet being lost.

EVENT time: 206.142715,  type: 0, timerinterrupt    entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
        - Sending Message:                  gggggggggggggggggggg    ack# = 6     seq# = 6
            TOLAYER3: packet being lost.
        - Sending Message:                  hhhhhhhhhhhhhhhhhhhh    ack# = 7     seq# = 7
        - Sending Message:                  iiiiiiiiiiiiiiiiiiii    ack# = 8     seq# = 8
        - Sending Message:                  jjjjjjjjjjjjjjjjjjjj    ack# = 9     seq# = 9
            TOLAYER3: packet being lost.
        - Sending Message:                  kkkkkkkkkkkkkkkkkkkk    ack# = 10    seq# = 10
            TOLAYER3: packet being corrupted
        - Sending Message:                  llllllllllllllllllll    ack# = 11    seq# = 11
        - Sending Message:                  mmmmmmmmmmmmmmmmmmmm    ack# = 12    seq# = 12
        - Sending Message:                  nnnnnnnnnnnnnnnnnnnn    ack# = 13    seq# = 13

EVENT time: 207.885330,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    uuuuuuuuuuuuuuuuuuuu
- Packet 20 buffered in sending buffer.

EVENT time: 212.720001,  type: 2, fromlayer3  entity: 1
- B side received packet:                    Zmmmmmmmmmmmmmmmmmmm    ack# = 12    seq# = 12
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                    ack# = 5    seq# = 5

EVENT time: 213.864334,  type: 2, fromlayer3  entity: 1
- B side received packet:                    ffffffffffffffffffff    ack# = 5     seq# = 5
- B side received a packet with a lower
  sequence number than expected. Expected
  6, got 5.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                    ack# = 5    seq# = 5

EVENT time: 216.282700,  type: 2, fromlayer3  entity: 1
- B side received packet:                    gggggggggggggggggggg    ack# = 6     seq# = 6
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                    ack# = 6    seq# = 6
```

```
EVENT time: 219.297546,  type: 2, fromlayer3  entity: 1
- B side received packet:                  hhhhhhhhhhhhhhhhhhhh      ack# = 7     seq# = 7
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                         ACK                  ack# = 7     seq# = 7


EVENT time: 220.438263,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                  ack# = 5     seq# = 5
- A side received valid packet.
** 6 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 224.057510,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    vvvvvvvvvvvvvvvvvvvv
- Packet 21 buffered in sending buffer.


EVENT time: 225.030594,  type: 2, fromlayer3  entity: 1
- B side received packet:                  iiiiiiiiiiiiiiiiiiii      ack# = 8     seq# = 8
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                         ACK                  ack# = 8     seq# = 8


EVENT time: 226.062958,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    wwwwwwwwwwwwwwwwwwww
- Packet 22 buffered in sending buffer.


EVENT time: 226.142715,  type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
      - Sending Message:                   gggggggggggggggggggg      ack# = 6     seq# = 6
          TOLAYER3: packet being lost.
      - Sending Message:                   hhhhhhhhhhhhhhhhhhhh      ack# = 7     seq# = 7
      - Sending Message:                   iiiiiiiiiiiiiiiiiiii      ack# = 8     seq# = 8
      - Sending Message:                   jjjjjjjjjjjjjjjjjjjj      ack# = 9     seq# = 9
      - Sending Message:                   kkkkkkkkkkkkkkkkkkkk      ack# = 10    seq# = 10
      - Sending Message:                   llllllllllllllllllll      ack# = 11    seq# = 11
          TOLAYER3: packet being lost.
      - Sending Message:                   mmmmmmmmmmmmmmmmmmmm      ack# = 12    seq# = 12
      - Sending Message:                   nnnnnnnnnnnnnnnnnnnn      ack# = 13    seq# = 13


EVENT time: 228.570892,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                  ack# = 5     seq# = 5
- A side received valid packet.
** 6 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
```

```
EVENT time: 228.901932,  type: 2, fromlayer3  entity: 1
- B side received packet:                    Zkkkkkkkkkkkkkkkkkk     ack# = 10   seq# = 10
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                           ACK                    ack# = 8    seq# = 8
          TOLAYER3: packet being corrupted


EVENT time: 233.026901,  type: 2, fromlayer3  entity: 1
- B side received packet:                    llllllllllllllllll     ack# = 11   seq# = 11
- B side received a packet with a greater
  sequence number than expected. Expected
  9, got 11.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                           ACK                    ack# = 8    seq# = 8


EVENT time: 236.722610,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:     ACK                         ack# = 6    seq# = 6
- A side received valid packet.
** 7 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
      - Message in window, already sent:      hhhhhhhhhhhhhhhhhhhh    ack# = 7    seq# = 7
      - Message in window, already sent:      iiiiiiiiiiiiiiiiiiii    ack# = 8    seq# = 8
      - Message in window, already sent:      jjjjjjjjjjjjjjjjjjjj    ack# = 9    seq# = 9
      - Message in window, already sent:      kkkkkkkkkkkkkkkkkkkk    ack# = 10   seq# = 10
      - Message in window, already sent:      llllllllllllllllll    ack# = 11   seq# = 11
      - Message in window, already sent:      mmmmmmmmmmmmmmmmmmmm    ack# = 12   seq# = 12
      - Message in window, already sent:      nnnnnnnnnnnnnnnnnnnn    ack# = 13   seq# = 13
      - Sending NEW buffered message:            oooooooooooooooooo     ack# = 14   seq# = 14

EVENT time: 241.037369,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:     ACK                         ack# = 7    seq# = 7
- A side received valid packet.
** 8 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
      - Message in window, already sent:      iiiiiiiiiiiiiiiiiiii     ack# = 8    seq# = 8
      - Message in window, already sent:      jjjjjjjjjjjjjjjjjjjj     ack# = 9    seq# = 9
```

```
        - Message in window, already sent:        kkkkkkkkkkkkkkkkkkkk     ack# = 10    seq# = 10
        - Message in window, already sent:        llllllllllllllllllll     ack# = 11    seq# = 11
        - Message in window, already sent:        mmmmmmmmmmmmmmmmmmmm     ack# = 12    seq# = 12
        - Message in window, already sent:        nnnnnnnnnnnnnnnnnnnn     ack# = 13    seq# = 13
        - Message in window, already sent:        oooooooooooooooooooo     ack# = 14    seq# = 14
        - Sending NEW buffered message:                pppppppppppppppppppp     ack# = 15    seq# = 15


EVENT time: 242.952332,  type: 2, fromlayer3  entity: 1
- B side received packet:                          mmmmmmmmmmmmmmmmmmmm     ack# = 12    seq# = 12
- B side received a packet with a greater
  sequence number than expected. Expected
  9, got 12.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                ack# = 8     seq# = 8


EVENT time: 245.346100,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    xxxxxxxxxxxxxxxxxxxx
- Packet 23 buffered in sending buffer.


EVENT time: 245.477234,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    yyyyyyyyyyyyyyyyyyyy
- Packet 24 buffered in sending buffer.


EVENT time: 246.623703,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:        ACK                ack# = 8     seq# = 8
- A side received valid packet.
** 9 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
        - Message in window, already sent:        jjjjjjjjjjjjjjjjjjjj     ack# = 9     seq# = 9
        - Message in window, already sent:        kkkkkkkkkkkkkkkkkkkk     ack# = 10    seq# = 10
        - Message in window, already sent:        llllllllllllllllllll     ack# = 11    seq# = 11
        - Message in window, already sent:        mmmmmmmmmmmmmmmmmmmm     ack# = 12    seq# = 12
        - Message in window, already sent:        nnnnnnnnnnnnnnnnnnnn     ack# = 13    seq# = 13
        - Message in window, already sent:        oooooooooooooooooooo     ack# = 14    seq# = 14
        - Message in window, already sent:        pppppppppppppppppppp     ack# = 15    seq# = 15
        - Sending NEW buffered message:                qqqqqqqqqqqqqqqqqqqq     ack# = 16    seq# = 16
            TOLAYER3: packet being lost.


EVENT time: 248.081589,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:        ZCK                ack# = 8     seq# = 8
- A side received corrupt packet :(
```

```
EVENT time: 251.665848,  type: 2, fromlayer3  entity: 1
- B side received packet:                hhhhhhhhhhhhhhhhhhhh    ack# = 7    seq# = 7
- B side received a packet with a lower
  sequence number than expected. Expected
  9, got 7.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                    ack# = 8    seq# = 8

EVENT time: 252.188599,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    zzzzzzzzzzzzzzzzzzzz
- Packet 25 buffered in sending buffer.

EVENT time: 252.635300,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                    ack# = 8    seq# = 8
- A side received valid packet.
** 9 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 253.793549,  type: 2, fromlayer3  entity: 1
- B side received packet:                iiiiiiiiiiiiiiiiiiii    ack# = 8    seq# = 8
- B side received a packet with a lower
  sequence number than expected. Expected
  9, got 8.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                    ack# = 8    seq# = 8

EVENT time: 256.917908,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    aaaaaaaaaaaaaaaaaaaa
- Packet 26 buffered in sending buffer.

EVENT time: 257.067383,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    bbbbbbbbbbbbbbbbbbbb
- Packet 27 buffered in sending buffer.

EVENT time: 260.607605,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                    ack# = 8    seq# = 8
- A side received valid packet.
** 9 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 260.967804,  type: 2, fromlayer3  entity: 1
- B side received packet:                Zkkkkkkkkkkkkkkkkkkk     ack# = 10   seq# = 10
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                    ack# = 8    seq# = 8
```

```
                    TOLAYER3: packet being lost.

EVENT time: 266.623718,  type: 0, timerinterrupt    entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
        - Sending Message:                      jjjjjjjjjjjjjjjjjjjj    ack# = 9    seq# = 9
            TOLAYER3: packet being corrupted
        - Sending Message:                      kkkkkkkkkkkkkkkkkkkk    ack# = 10   seq# = 10
            TOLAYER3: packet being lost.
        - Sending Message:                      llllllllllllllllllll    ack# = 11   seq# = 11
        - Sending Message:                      mmmmmmmmmmmmmmmmmmmm    ack# = 12   seq# = 12
        - Sending Message:                      nnnnnnnnnnnnnnnnnnnn    ack# = 13   seq# = 13
        - Sending Message:                      oooooooooooooooooooo    ack# = 14   seq# = 14
            TOLAYER3: packet being lost.
        - Sending Message:                      pppppppppppppppppppp    ack# = 15   seq# = 15
        - Sending Message:                      qqqqqqqqqqqqqqqqqqqq    ack# = 16   seq# = 16

EVENT time: 266.763336,  type: 2, fromlayer3  entity: 1
- B side received packet:                 llllllllllllllllllll     ack# = 11   seq# = 11
- B side received a packet with a greater
  sequence number than expected. Expected
  9, got 11.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                    ack# = 8    seq# = 8

EVENT time: 269.046051,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                    ack# = 8    seq# = 8
- A side received valid packet.
** 9 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 269.708801,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    cccccccccccccccccccc
- Packet 28 buffered in sending buffer.

EVENT time: 272.397247,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    dddddddddddddddddddd
- Packet 29 buffered in sending buffer.

EVENT time: 273.382233,  type: 2, fromlayer3  entity: 1
- B side received packet:                 mmmmmmmmmmmmmmmmmmmm     ack# = 12   seq# = 12
- B side received a packet with a greater
  sequence number than expected. Expected
  9, got 12.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
```

```
- B side sent ACK:                          ACK                 ack# = 8    seq# = 8


EVENT time: 275.997803,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:         ACK                 ack# = 8    seq# = 8
- A side received valid packet.
** 9 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 280.302887,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:         ACK                 ack# = 8    seq# = 8
- A side received valid packet.
** 9 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 280.538635,  type: 2, fromlayer3  entity: 1
- B side received packet:                   nnnnnnnnnnnnnnnnnnnn    ack# = 13   seq# = 13
- B side received a packet with a greater
  sequence number than expected. Expected
  9, got 13.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                          ACK                 ack# = 8    seq# = 8
         TOLAYER3: packet being corrupted


EVENT time: 282.580597,  type: 2, fromlayer3  entity: 1
- B side received packet:                   hhhhhhhhhhhhhhhhhhhh    ack# = 7    seq# = 7
- B side received a packet with a lower
  sequence number than expected. Expected
  9, got 7.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                          ACK                 ack# = 8    seq# = 8


EVENT time: 286.623718,  type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
      - Sending Message:                    jjjjjjjjjjjjjjjjjjjj    ack# = 9    seq# = 9
      - Sending Message:                    kkkkkkkkkkkkkkkkkkkk    ack# = 10   seq# = 10
      - Sending Message:                    llllllllllllllllllll    ack# = 11   seq# = 11
         TOLAYER3: packet being corrupted
      - Sending Message:                    mmmmmmmmmmmmmmmmmmmm    ack# = 12   seq# = 12
         TOLAYER3: packet being lost.
      - Sending Message:                    nnnnnnnnnnnnnnnnnnnn    ack# = 13   seq# = 13
      - Sending Message:                    oooooooooooooooooooo    ack# = 14   seq# = 14
      - Sending Message:                    pppppppppppppppppppp    ack# = 15   seq# = 15
      - Sending Message:                    qqqqqqqqqqqqqqqqqqqq    ack# = 16   seq# = 16
         TOLAYER3: packet being lost.
```

```
EVENT time: 287.430176,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:        ACK                    ack# = 8     seq# = 8
- A side received valid packet.
** 9 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 289.418091,  type: 2, fromlayer3  entity: 1
- B side received packet:                  iiiiiiiiiiiiiiiiiiii     ack# = 8     seq# = 8
- B side received a packet with a lower
  sequence number than expected. Expected
  9, got 8.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                         ACK                    ack# = 8     seq# = 8
          TOLAYER3: packet being corrupted


EVENT time: 290.616821,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    eeeeeeeeeeeeeeeeeee
- Packet 30 buffered in sending buffer.


EVENT time: 292.874481,  type: 2, fromlayer3  entity: 1
- B side received packet:                  jjjjjjjjjjjjjjjjjjjj     ack# = 9     seq# = 9
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                         ACK                    ack# = 9     seq# = 9
          TOLAYER3: packet being corrupted


EVENT time: 295.734436,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    fffffffffffffffffff
- Packet 31 buffered in sending buffer.


EVENT time: 295.774292,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:        ZCK                    ack# = 8     seq# = 8
- A side received corrupt packet :(


EVENT time: 301.245117,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:        ACK                    ack# = 8     seq# = 8
- A side received valid packet.
** 9 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 302.487274,  type: 2, fromlayer3  entity: 1
- B side received packet:                  kkkkkkkkkkkkkkkkkkkk     ack# = 10    seq# = 10
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
```

```
- B side sent ACK:                      ACK              ack# = 10   seq# = 10


EVENT time: 306.203918,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:     ZCK              ack# = 8    seq# = 8
- A side received corrupt packet :(


EVENT time: 306.623718,  type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
      - Sending Message:                jjjjjjjjjjjjjjjjjjjj   ack# = 9    seq# = 9
      - Sending Message:                kkkkkkkkkkkkkkkkkkkk   ack# = 10   seq# = 10
      - Sending Message:                llllllllllllllllllll   ack# = 11   seq# = 11
          TOLAYER3: packet being lost.
      - Sending Message:                mmmmmmmmmmmmmmmmmmmm   ack# = 12   seq# = 12
          TOLAYER3: packet being corrupted
      - Sending Message:                nnnnnnnnnnnnnnnnnnnn   ack# = 13   seq# = 13
          TOLAYER3: packet being corrupted
      - Sending Message:                oooooooooooooooooooo   ack# = 14   seq# = 14
      - Sending Message:                pppppppppppppppppppp   ack# = 15   seq# = 15
      - Sending Message:                qqqqqqqqqqqqqqqqqqqq   ack# = 16   seq# = 16

EVENT time: 307.660828,  type: 2, fromlayer3  entity: 1
- B side received packet:               mmmmmmmmmmmmmmmmmmmm     ack# = 12   seq# = 12
- B side received a packet with a greater
  sequence number than expected. Expected
  11, got 12.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                      ACK              ack# = 10   seq# = 10


EVENT time: 308.025513,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    gggggggggggggggggggg
- Packet 32 buffered in sending buffer.


EVENT time: 310.967010,  type: 2, fromlayer3  entity: 1
- B side received packet:               nnnnnnnnnnnnnnnnnnnn     ack# = 13   seq# = 13
- B side received a packet with a greater
  sequence number than expected. Expected
  11, got 13.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                      ACK              ack# = 10   seq# = 10


EVENT time: 314.943695,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:     ACK              ack# = 9    seq# = 999999
- A side received corrupt packet :(
```

```
EVENT time: 320.107056,  type: 2, fromlayer3  entity: 1
- B side received packet:                    oooooooooooooooooooo     ack# = 14    seq# = 14
- B side received a packet with a greater
  sequence number than expected. Expected
  11, got 14.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                 ack# = 10    seq# = 10

EVENT time: 321.153900,  type: 2, fromlayer3  entity: 1
- B side received packet:                    pppppppppppppppppppp     ack# = 15    seq# = 15
- B side received a packet with a greater
  sequence number than expected. Expected
  11, got 15.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                 ack# = 10    seq# = 10
          TOLAYER3: packet being corrupted

EVENT time: 323.192474,  type: 2, fromlayer3  entity: 1
- B side received packet:                    Zjjjjjjjjjjjjjjjjjjj     ack# = 9     seq# = 9
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                 ack# = 10    seq# = 10
          TOLAYER3: packet being lost.

EVENT time: 324.792267,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                 ack# = 10    seq# = 10
- A side received valid packet.
** 11 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
      - Message in window, already sent:      llllllllllllllllllll     ack# = 11    seq# = 11
      - Message in window, already sent:      mmmmmmmmmmmmmmmmmmmm     ack# = 12    seq# = 12
      - Message in window, already sent:      nnnnnnnnnnnnnnnnnnnn     ack# = 13    seq# = 13
      - Message in window, already sent:      oooooooooooooooooooo     ack# = 14    seq# = 14
      - Message in window, already sent:      pppppppppppppppppppp     ack# = 15    seq# = 15
      - Message in window, already sent:      qqqqqqqqqqqqqqqqqqqq     ack# = 16    seq# = 16
      - Sending NEW buffered message:             rrrrrrrrrrrrrrrrrrrr     ack# = 17    seq# = 17
          TOLAYER3: packet being lost.
      - Sending NEW buffered message:             ssssssssssssssssssss     ack# = 18    seq# = 18
```

TOLAYER3: packet being corrupted

EVENT time: 326.165863, type: 1, fromlayer5 entity: 0
- A side received message from upper layer: hhhhhhhhhhhhhhhhhhhh
- Packet 33 buffered in sending buffer.

EVENT time: 330.796448, type: 2, fromlayer3 entity: 1
- B side received packet: lllllllllllllllllllll   ack# = 11   seq# = 11
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 11   seq# = 11

EVENT time: 331.902588, type: 2, fromlayer3 entity: 1
- B side received packet: mmmmmmmmmmmmmmmmmmmmm   ack# = 12   seq# = 12
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 12   seq# = 12

EVENT time: 333.037750, type: 2, fromlayer3 entity: 0
- A side received from Lower Layer: ACK   ack# = 10   seq# = 10
- A side received valid packet.
** 11 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 335.188293, type: 2, fromlayer3 entity: 1
- B side received packet: nnnnnnnnnnnnnnnnnnnnn   ack# = 13   seq# = 13
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 13   seq# = 13
          TOLAYER3: packet being lost.

EVENT time: 337.638184, type: 2, fromlayer3 entity: 0
- A side received from Lower Layer: ACK   ack# = 10   seq# = 10
- A side received valid packet.
** 11 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 338.034851, type: 2, fromlayer3 entity: 1
- B side received packet: ppppppppppppppppppppp   ack# = 15   seq# = 15
- B side received a packet with a greater
  sequence number than expected. Expected
  14, got 15.
  Discarding packet...
- B side sending ACK for packet with highest

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   in-order sequence number
- B side sent ACK:                          ACK                   ack# = 13    seq# = 13

EVENT time: 343.901520,  type: 2, fromlayer3  entity: 1
- B side received packet:                   qqqqqqqqqqqqqqqqqqqq      ack# = 16    seq# = 16
- B side received a packet with a greater
  sequence number than expected. Expected
  14, got 16.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                          ACK                   ack# = 13    seq# = 13
        TOLAYER3: packet being corrupted


EVENT time: 344.268127,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                   ack# = 10   seq# = 10
- A side received valid packet.
** 11 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 344.472473,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    iiiiiiiiiiiiiiiiiiii
- Packet 34 buffered in sending buffer.


EVENT time: 344.792267,  type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
      - Sending Message:                   llllllllllllllllllll    ack# = 11    seq# = 11
          TOLAYER3: packet being corrupted
      - Sending Message:                   mmmmmmmmmmmmmmmmmmmm    ack# = 12    seq# = 12
          TOLAYER3: packet being lost.
      - Sending Message:                   nnnnnnnnnnnnnnnnnnnn    ack# = 13    seq# = 13
          TOLAYER3: packet being corrupted
      - Sending Message:                   oooooooooooooooooooo    ack# = 14    seq# = 14
      - Sending Message:                   pppppppppppppppppppp    ack# = 15    seq# = 15
      - Sending Message:                   qqqqqqqqqqqqqqqqqqqq    ack# = 16    seq# = 16
      - Sending Message:                   rrrrrrrrrrrrrrrrrrrr    ack# = 17    seq# = 17
          TOLAYER3: packet being lost.
      - Sending Message:                   ssssssssssssssssssss    ack# = 18    seq# = 18

EVENT time: 346.976349,  type: 2, fromlayer3  entity: 1
- B side received packet:                   jjjjjjjjjjjjjjjjjjjj      ack# = 9     seq# = 9
- B side received a packet with a lower
  sequence number than expected. Expected
  14, got 9.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                          ACK                   ack# = 13    seq# = 13
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EVENT time: 348.194092,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     jjjjjjjjjjjjjjjjjjjjj
- Packet 35 buffered in sending buffer.


EVENT time: 348.394226,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK               ack# = 999999     seq# = 10
- A side received corrupt packet :(


EVENT time: 349.306641,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    kkkkkkkkkkkkkkkkkkkk
- Packet 36 buffered in sending buffer.


EVENT time: 349.812653,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK               ack# = 11   seq# = 11
- A side received valid packet.
** 12 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
      - Message in window, already sent:        mmmmmmmmmmmmmmmmmmmm      ack# = 12    seq# = 12
      - Message in window, already sent:        nnnnnnnnnnnnnnnnnnnn      ack# = 13    seq# = 13
      - Message in window, already sent:        oooooooooooooooooooo      ack# = 14    seq# = 14
      - Message in window, already sent:        pppppppppppppppppppp      ack# = 15    seq# = 15
      - Message in window, already sent:        qqqqqqqqqqqqqqqqqqqq      ack# = 16    seq# = 16
      - Message in window, already sent:        rrrrrrrrrrrrrrrrrrrr      ack# = 17    seq# = 17
      - Message in window, already sent:        ssssssssssssssssssss      ack# = 18    seq# = 18
      - Sending NEW buffered message:              tttttttttttttttttttt    ack# = 19    seq# = 19
          TOLAYER3: packet being corrupted

EVENT time: 350.157288,  type: 2, fromlayer3  entity: 1
- B side received packet:                  kkkkkkkkkkkkkkkkkkkk     ack# = 10   seq# = 10
- B side received a packet with a lower
  sequence number than expected. Expected
  14, got 10.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK               ack# = 13   seq# = 13


EVENT time: 353.041290,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK               ack# = 12   seq# = 12
- A side received valid packet.
** 13 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
```

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    the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
        - Message in window, already sent:      nnnnnnnnnnnnnnnnnnnn    ack# = 13    seq# = 13
        - Message in window, already sent:      oooooooooooooooooooo    ack# = 14    seq# = 14
        - Message in window, already sent:      pppppppppppppppppppp    ack# = 15    seq# = 15
        - Message in window, already sent:      qqqqqqqqqqqqqqqqqqqq    ack# = 16    seq# = 16
        - Message in window, already sent:      rrrrrrrrrrrrrrrrrrrr    ack# = 17    seq# = 17
        - Message in window, already sent:      ssssssssssssssssssss    ack# = 18    seq# = 18
        - Message in window, already sent:      tttttttttttttttttttt    ack# = 19    seq# = 19
        - Sending NEW buffered message:            uuuuuuuuuuuuuuuuuuuu    ack# = 20    seq# = 20

EVENT time: 354.545380,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     llllllllllllllllllll
- Packet 37 buffered in sending buffer.


EVENT time: 355.623932,  type: 2, fromlayer3  entity: 1
- B side received packet:                       Zllllllllllllllllllll     ack# = 11    seq# = 11
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                          ACK                     ack# = 13    seq# = 13
          TOLAYER3: packet being lost.


EVENT time: 360.106476,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     mmmmmmmmmmmmmmmmmmmm
- Packet 38 buffered in sending buffer.


EVENT time: 361.889709,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                     ack# = 13    seq# = 13
- A side received valid packet.
** 14 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
        - Message in window, already sent:      oooooooooooooooooooo    ack# = 14    seq# = 14
        - Message in window, already sent:      pppppppppppppppppppp    ack# = 15    seq# = 15
        - Message in window, already sent:      qqqqqqqqqqqqqqqqqqqq    ack# = 16    seq# = 16
        - Message in window, already sent:      rrrrrrrrrrrrrrrrrrrr    ack# = 17    seq# = 17
        - Message in window, already sent:      ssssssssssssssssssss    ack# = 18    seq# = 18
        - Message in window, already sent:      tttttttttttttttttttt    ack# = 19    seq# = 19
        - Message in window, already sent:      uuuuuuuuuuuuuuuuuuuu    ack# = 20    seq# = 20
        - Sending NEW buffered message:            vvvvvvvvvvvvvvvvvvvv    ack# = 21    seq# = 21

EVENT time: 361.970581,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     nnnnnnnnnnnnnnnnnnnn
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- Packet 39 buffered in sending buffer.

EVENT time: 364.766754,  type: 2, fromlayer3  entity: 1
- B side received packet:                    nnnnnnnnnnnnnnnnnnn    ack# = 13   seq# = 13
- B side received a packet with a lower
  sequence number than expected. Expected
  14, got 13.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                           ACK                 ack# = 13   seq# = 13

EVENT time: 368.461945,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    oooooooooooooooooooo
- Packet 40 buffered in sending buffer.

EVENT time: 368.983612,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                 ack# = 999999     seq# = 13
- A side received corrupt packet :(

EVENT time: 371.321045,  type: 2, fromlayer3  entity: 1
- B side received packet:                    oooooooooooooooooooo    ack# = 14   seq# = 14
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                           ACK                 ack# = 14   seq# = 14

EVENT time: 372.587799,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                 ack# = 13   seq# = 13
- A side received valid packet.
** 14 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 379.763428,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    pppppppppppppppppppp
- Packet 41 buffered in sending buffer.

EVENT time: 379.853912,  type: 2, fromlayer3  entity: 1
- B side received packet:                    pppppppppppppppppppp    ack# = 15   seq# = 15
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                           ACK                 ack# = 15   seq# = 15
        TOLAYER3: packet being lost.

EVENT time: 380.950745,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                 ack# = 13   seq# = 13
```

```
- A side received valid packet.
** 14 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 381.889709,  type: 0, timerinterrupt    entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
        - Sending Message:                    oooooooooooooooooooo    ack# = 14    seq# = 14
        - Sending Message:                    pppppppppppppppppppp    ack# = 15    seq# = 15
        - Sending Message:                    qqqqqqqqqqqqqqqqqqqq    ack# = 16    seq# = 16
        - Sending Message:                    rrrrrrrrrrrrrrrrrrrr    ack# = 17    seq# = 17
            TOLAYER3: packet being lost.
        - Sending Message:                    ssssssssssssssssssss    ack# = 18    seq# = 18
        - Sending Message:                    tttttttttttttttttttt    ack# = 19    seq# = 19
        - Sending Message:                    uuuuuuuuuuuuuuuuuuuu    ack# = 20    seq# = 20
            TOLAYER3: packet being corrupted
        - Sending Message:                    vvvvvvvvvvvvvvvvvvvv    ack# = 21    seq# = 21
            TOLAYER3: packet being lost.

EVENT time: 382.379333,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    qqqqqqqqqqqqqqqqqqqq
- Packet 42 buffered in sending buffer.

EVENT time: 382.883423,  type: 2, fromlayer3  entity: 1
- B side received packet:                 jjjjjjjjjjjjjjjjjjjj    ack# = 9    seq# = 9
- B side received a packet with a lower
  sequence number than expected. Expected
  16, got 9.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                ack# = 15    seq# = 15
          TOLAYER3: packet being corrupted

EVENT time: 383.390289,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                ack# = 13    seq# = 13
- A side received valid packet.
** 14 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 390.379578,  type: 2, fromlayer3  entity: 1
- B side received packet:                 kkkkkkkkkkkkkkkkkkkk    ack# = 10    seq# = 10
- B side received a packet with a lower
  sequence number than expected. Expected
  16, got 10.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                ack# = 15    seq# = 15
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EVENT time: 391.513428,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                ack# = 14    seq# = 14
- A side received valid packet.
** 15 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
      - Message in window, already sent:     pppppppppppppppppppp    ack# = 15    seq# = 15
      - Message in window, already sent:     qqqqqqqqqqqqqqqqqqqq    ack# = 16    seq# = 16
      - Message in window, already sent:     rrrrrrrrrrrrrrrrrrrr    ack# = 17    seq# = 17
      - Message in window, already sent:     ssssssssssssssssssss    ack# = 18    seq# = 18
      - Message in window, already sent:     tttttttttttttttttttt    ack# = 19    seq# = 19
      - Message in window, already sent:     uuuuuuuuuuuuuuuuuuuu    ack# = 20    seq# = 20
      - Message in window, already sent:     vvvvvvvvvvvvvvvvvvvv    ack# = 21    seq# = 21
      - Sending NEW buffered message:           wwwwwwwwwwwwwwwwwwww     ack# = 22    seq# = 22

EVENT time: 391.902069,  type: 2, fromlayer3  entity: 1
- B side received packet:                 Zmmmmmmmmmmmmmmmmmmm     ack# = 12    seq# = 12
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK               ack# = 15    seq# = 15

EVENT time: 392.263153,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    rrrrrrrrrrrrrrrrrrrr
- Packet 43 buffered in sending buffer.

EVENT time: 394.379547,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ZCK               ack# = 15    seq# = 15
- A side received corrupt packet :(

EVENT time: 398.716187,  type: 2, fromlayer3  entity: 1
- B side received packet:                 Znnnnnnnnnnnnnnnnnnn     ack# = 13    seq# = 13
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK               ack# = 15    seq# = 15

EVENT time: 403.621887,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                ack# = 15    seq# = 15
- A side received valid packet.
** 16 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
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   window have been sent to B side...
       - Message in window, already sent:      qqqqqqqqqqqqqqqqqqq      ack# = 16    seq# = 16
       - Message in window, already sent:      rrrrrrrrrrrrrrrrrrr      ack# = 17    seq# = 17
       - Message in window, already sent:      sssssssssssssssssss      ack# = 18    seq# = 18
       - Message in window, already sent:      ttttttttttttttttttt      ack# = 19    seq# = 19
       - Message in window, already sent:      uuuuuuuuuuuuuuuuuuu      ack# = 20    seq# = 20
       - Message in window, already sent:      vvvvvvvvvvvvvvvvvvv      ack# = 21    seq# = 21
       - Message in window, already sent:      wwwwwwwwwwwwwwwwwww      ack# = 22    seq# = 22
       - Sending NEW buffered message:             xxxxxxxxxxxxxxxxxxx      ack# = 23    seq# = 23

EVENT time: 408.179504,  type: 2, fromlayer3  entity: 1
- B side received packet:                 ooooooooooooooooooo      ack# = 14    seq# = 14
- B side received a packet with a lower
  sequence number than expected. Expected
  16, got 14.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                 ack# = 15    seq# = 15

EVENT time: 409.684082,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                 ack# = 15    seq# = 15
- A side received valid packet.
** 16 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 411.501801,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     sssssssssssssssssss
- Packet 44 buffered in sending buffer.

EVENT time: 412.601624,  type: 2, fromlayer3  entity: 1
- B side received packet:                 ppppppppppppppppppp      ack# = 15    seq# = 15
- B side received a packet with a lower
  sequence number than expected. Expected
  16, got 15.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                 ack# = 15    seq# = 15

EVENT time: 414.110596,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                 ack# = 15    seq# = 15
- A side received valid packet.
** 16 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 419.326660,  type: 2, fromlayer3  entity: 1
- B side received packet:                 qqqqqqqqqqqqqqqqqqq      ack# = 16    seq# = 16
- B side received valid packet.
  Sending pkt to upper layer.
```

- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 16   seq# = 16

EVENT time: 419.575531, type: 2, fromlayer3 entity: 0
- A side received from Lower Layer: ACK   ack# = 15   seq# = 15
- A side received valid packet.
** 16 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 420.767181, type: 1, fromlayer5 entity: 0
- A side received message from upper layer: tttttttttttttttttttt
- Packet 45 buffered in sending buffer.

EVENT time: 423.621887, type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
        - Sending Message: qqqqqqqqqqqqqqqqqqqq   ack# = 16   seq# = 16
        - Sending Message: rrrrrrrrrrrrrrrrrrrr   ack# = 17   seq# = 17
        - Sending Message: ssssssssssssssssssss   ack# = 18   seq# = 18
        - Sending Message: tttttttttttttttttttt   ack# = 19   seq# = 19
             TOLAYER3: packet being corrupted
        - Sending Message: uuuuuuuuuuuuuuuuuuuu   ack# = 20   seq# = 20
        - Sending Message: vvvvvvvvvvvvvvvvvvvv   ack# = 21   seq# = 21
        - Sending Message: wwwwwwwwwwwwwwwwwwww   ack# = 22   seq# = 22
        - Sending Message: xxxxxxxxxxxxxxxxxxxx   ack# = 23   seq# = 23

EVENT time: 425.354095, type: 2, fromlayer3 entity: 0
- A side received from Lower Layer: ACK   ack# = 15   seq# = 15
- A side received valid packet.
** 16 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 426.932861, type: 2, fromlayer3 entity: 1
- B side received packet: Zssssssssssssssssssss   ack# = 18   seq# = 18
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 16   seq# = 16

EVENT time: 428.671967, type: 1, fromlayer5 entity: 0
- A side received message from upper layer: uuuuuuuuuuuuuuuuuuuu
- Packet 46 buffered in sending buffer.

EVENT time: 430.918976, type: 2, fromlayer3 entity: 0
- A side received from Lower Layer: ACK   ack# = 16   seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect

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  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
      - Message in window, already sent:        rrrrrrrrrrrrrrrrrr     ack# = 17    seq# = 17
      - Message in window, already sent:        ssssssssssssssssss     ack# = 18    seq# = 18
      - Message in window, already sent:        tttttttttttttttttt     ack# = 19    seq# = 19
      - Message in window, already sent:        uuuuuuuuuuuuuuuuuu     ack# = 20    seq# = 20
      - Message in window, already sent:        vvvvvvvvvvvvvvvvvv     ack# = 21    seq# = 21
      - Message in window, already sent:        wwwwwwwwwwwwwwwwww     ack# = 22    seq# = 22
      - Message in window, already sent:        xxxxxxxxxxxxxxxxxx     ack# = 23    seq# = 23
      - Sending NEW buffered message:              yyyyyyyyyyyyyyyyyy     ack# = 24    seq# = 24

EVENT time: 432.421204,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                   ack# = 16    seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 434.021973,  type: 2, fromlayer3  entity: 1
- B side received packet:                 Zlllllllllllllllll     ack# = 11    seq# = 11
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                   ack# = 16    seq# = 16

EVENT time: 438.685089,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                   ack# = 16    seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 439.332092,  type: 2, fromlayer3  entity: 1
- B side received packet:                 nnnnnnnnnnnnnnnnnnnn     ack# = 13    seq# = 999999
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                   ack# = 16    seq# = 16

EVENT time: 443.399719,  type: 2, fromlayer3  entity: 1
- B side received packet:                 oooooooooooooooooo     ack# = 14    seq# = 14
- B side received a packet with a lower
  sequence number than expected. Expected
  17, got 14.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                   ack# = 16    seq# = 16

EVENT time: 447.736298,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:      vvvvvvvvvvvvvvvvvv
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- Packet 47 buffered in sending buffer.

EVENT time: 447.913910,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                 ack# = 16   seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 448.389648,  type: 2, fromlayer3  entity: 1
- B side received packet:                 pppppppppppppppppppp     ack# = 15   seq# = 15
- B side received a packet with a lower
  sequence number than expected. Expected
  17, got 15.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                 ack# = 16   seq# = 16

EVENT time: 450.918976,  type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
      - Sending Message:                  rrrrrrrrrrrrrrrrrrrr     ack# = 17   seq# = 17
      - Sending Message:                  ssssssssssssssssssss     ack# = 18   seq# = 18
         TOLAYER3: packet being lost.
      - Sending Message:                  tttttttttttttttttttt     ack# = 19   seq# = 19
         TOLAYER3: packet being lost.
      - Sending Message:                  uuuuuuuuuuuuuuuuuuuu     ack# = 20   seq# = 20
         TOLAYER3: packet being corrupted
      - Sending Message:                  vvvvvvvvvvvvvvvvvvvv     ack# = 21   seq# = 21
      - Sending Message:                  wwwwwwwwwwwwwwwwwwww     ack# = 22   seq# = 22
      - Sending Message:                  xxxxxxxxxxxxxxxxxxxx     ack# = 23   seq# = 23
      - Sending Message:                  yyyyyyyyyyyyyyyyyyyy     ack# = 24   seq# = 24

EVENT time: 452.354980,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                 ack# = 16   seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 455.916321,  type: 2, fromlayer3  entity: 1
- B side received packet:                 qqqqqqqqqqqqqqqqqqqq     ack# = 16   seq# = 16
- B side received a packet with a lower
  sequence number than expected. Expected
  17, got 16.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                 ack# = 16   seq# = 16

EVENT time: 460.482574,  type: 1, fromlayer5  entity: 0
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- A side received message from upper layer:      wwwwwwwwwwwwwwwwwww
- Packet 48 buffered in sending buffer.

EVENT time: 462.099121,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                 ack# = 16    seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 462.399445,  type: 2, fromlayer3  entity: 1
- B side received packet:                  ssssssssssssssssss     ack# = 18    seq# = 18
- B side received a packet with a greater
  sequence number than expected. Expected
  17, got 18.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                 ack# = 16    seq# = 16

EVENT time: 463.386658,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     xxxxxxxxxxxxxxxxxxx
- Packet 49 buffered in sending buffer.

EVENT time: 464.853729,  type: 2, fromlayer3  entity: 1
- B side received packet:                  Zttttttttttttttttttt     ack# = 19    seq# = 19
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                 ack# = 16    seq# = 16

EVENT time: 465.257294,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                 ack# = 16    seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 465.523834,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     yyyyyyyyyyyyyyyyyyy
- Packet 50 buffered in sending buffer.

EVENT time: 470.918976,  type: 0, timerinterrupt    entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
      - Sending Message:                     rrrrrrrrrrrrrrrrrr     ack# = 17    seq# = 17
          TOLAYER3: packet being lost.
      - Sending Message:                     ssssssssssssssssss     ack# = 18    seq# = 18
      - Sending Message:                     tttttttttttttttttt     ack# = 19    seq# = 19
      - Sending Message:                     uuuuuuuuuuuuuuuuuu     ack# = 20    seq# = 20
          TOLAYER3: packet being corrupted
      - Sending Message:                     vvvvvvvvvvvvvvvvvv     ack# = 21    seq# = 21
```

```
        TOLAYER3: packet being corrupted
    - Sending Message:                          wwwwwwwwwwwwwwwwwww    ack# = 22    seq# = 22
        TOLAYER3: packet being corrupted
    - Sending Message:                          xxxxxxxxxxxxxxxxxxx    ack# = 23    seq# = 23
    - Sending Message:                          yyyyyyyyyyyyyyyyyyy    ack# = 24    seq# = 24

EVENT time: 473.793976,  type: 2, fromlayer3  entity: 1
- B side received packet:                       uuuuuuuuuuuuuuuuuuu    ack# = 20    seq# = 20
- B side received a packet with a greater
  sequence number than expected. Expected
  17, got 20.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                ack# = 16    seq# = 16

EVENT time: 474.913727,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK               ack# = 16    seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 477.450897,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK               ack# = 16    seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 478.363037,  type: 2, fromlayer3  entity: 1
- B side received packet:                       vvvvvvvvvvvvvvvvvvv    ack# = 21    seq# = 21
- B side received a packet with a greater
  sequence number than expected. Expected
  17, got 21.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                ack# = 16    seq# = 16

EVENT time: 480.118408,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    zzzzzzzzzzzzzzzzzzz
- Packet 51 buffered in sending buffer.

EVENT time: 483.144379,  type: 2, fromlayer3  entity: 1
- B side received packet:                       ooooooooooooooooooo    ack# = 14    seq# = 14
- B side received a packet with a lower
  sequence number than expected. Expected
  17, got 14.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
```

```
- B side sent ACK:                        ACK              ack# = 16    seq# = 16


EVENT time: 487.266724,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK              ack# = 16    seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 490.128174,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    aaaaaaaaaaaaaaaaaaaa
- Packet 52 buffered in sending buffer.


EVENT time: 490.283142,  type: 2, fromlayer3  entity: 1
- B side received packet:                 pppppppppppppppppppp     ack# = 15    seq# = 15
- B side received a packet with a lower
  sequence number than expected. Expected
  17, got 15.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK              ack# = 16    seq# = 16
          TOLAYER3: packet being lost.


EVENT time: 490.918976,  type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
      - Sending Message:                  rrrrrrrrrrrrrrrrrrrr     ack# = 17    seq# = 17
      - Sending Message:                  ssssssssssssssssssss     ack# = 18    seq# = 18
          TOLAYER3: packet being corrupted
      - Sending Message:                  tttttttttttttttttttt     ack# = 19    seq# = 19
      - Sending Message:                  uuuuuuuuuuuuuuuuuuuu     ack# = 20    seq# = 20
      - Sending Message:                  vvvvvvvvvvvvvvvvvvvv     ack# = 21    seq# = 21
          TOLAYER3: packet being corrupted
      - Sending Message:                  wwwwwwwwwwwwwwwwwwww     ack# = 22    seq# = 22
      - Sending Message:                  xxxxxxxxxxxxxxxxxxxx     ack# = 23    seq# = 23
      - Sending Message:                  yyyyyyyyyyyyyyyyyyyy     ack# = 24    seq# = 24


EVENT time: 494.029510,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK              ack# = 16    seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 495.501587,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    bbbbbbbbbbbbbbbbbbbb
- Packet 53 buffered in sending buffer.


EVENT time: 496.193756,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK              ack# = 16    seq# = 16
- A side received valid packet.
```

```
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 498.695740,  type: 2, fromlayer3  entity: 1
- B side received packet:                    qqqqqqqqqqqqqqqqqqq      ack# = 16    seq# = 16
- B side received a packet with a lower
  sequence number than expected. Expected
  17, got 16.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                   ack# = 16    seq# = 16

EVENT time: 506.711700,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                   ack# = 16    seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 507.348480,  type: 2, fromlayer3  entity: 1
- B side received packet:                    sssssssssssssssssss     ack# = 18    seq# = 18
- B side received a packet with a greater
  sequence number than expected. Expected
  17, got 18.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                   ack# = 16    seq# = 16

EVENT time: 508.817200,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                   ack# = 16    seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 509.332733,  type: 2, fromlayer3  entity: 1
- B side received packet:                    ttttttttttttttttttt     ack# = 19    seq# = 19
- B side received a packet with a greater
  sequence number than expected. Expected
  17, got 19.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                   ack# = 16    seq# = 16
          TOLAYER3: packet being lost.

EVENT time: 510.918976,  type: 0, timerinterrupt    entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
      - Sending Message:                     rrrrrrrrrrrrrrrrrrr     ack# = 17    seq# = 17
      - Sending Message:                     sssssssssssssssssss     ack# = 18    seq# = 18
```

```
               TOLAYER3: packet being corrupted
       - Sending Message:                        ttttttttttttttttttttt     ack# = 19    seq# = 19
       - Sending Message:                        uuuuuuuuuuuuuuuuuuuuu     ack# = 20    seq# = 20
       - Sending Message:                        vvvvvvvvvvvvvvvvvvvvv     ack# = 21    seq# = 21
       - Sending Message:                        wwwwwwwwwwwwwwwwwwwww     ack# = 22    seq# = 22
               TOLAYER3: packet being lost.
       - Sending Message:                        xxxxxxxxxxxxxxxxxxxxx     ack# = 23    seq# = 23
       - Sending Message:                        yyyyyyyyyyyyyyyyyyyyy     ack# = 24    seq# = 24

EVENT time: 512.155823,  type: 2, fromlayer3  entity: 1
- B side received packet:                    uuuuuuuuuuuuuuuuuuuuu      ack# = 999999      seq# = 20
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                   ACK                ack# = 16    seq# = 16
         TOLAYER3: packet being corrupted

EVENT time: 514.096375,  type: 2, fromlayer3  entity: 1
- B side received packet:                    wwwwwwwwwwwwwwwwwwwww     ack# = 22    seq# = 22
- B side received a packet with a greater
  sequence number than expected. Expected
  17, got 22.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                   ACK                ack# = 16    seq# = 16

EVENT time: 515.035706,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    cccccccccccccccccccc
- Packet 54 buffered in sending buffer.

EVENT time: 516.722473,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    dddddddddddddddddddd
- Packet 55 buffered in sending buffer.

EVENT time: 516.810608,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:     ZCK                ack# = 16    seq# = 16
- A side received corrupt packet :(

EVENT time: 518.617310,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:     ACK                ack# = 16    seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 519.945923,  type: 2, fromlayer3  entity: 1
- B side received packet:                    xxxxxxxxxxxxxxxxxxxxx     ack# = 23    seq# = 23
- B side received a packet with a greater
  sequence number than expected. Expected
```

```
  17, got 23.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                      ACK                  ack# = 16   seq# = 16


EVENT time: 524.406982,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                  ack# = 16   seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 525.757690,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    eeeeeeeeeeeeeeeeeee
- Packet 56 buffered in sending buffer.


EVENT time: 526.194458,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    fffffffffffffffffff
- Packet 57 buffered in sending buffer.


EVENT time: 529.231140,  type: 2, fromlayer3  entity: 1
- B side received packet:                qqqqqqqqqqqqqqqqqqq     ack# = 16   seq# = 16
- B side received a packet with a lower
  sequence number than expected. Expected
  17, got 16.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                      ACK                  ack# = 16   seq# = 16

EVENT time: 530.918945,  type: 0, timerinterrupt    entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
      - Sending Message:                      rrrrrrrrrrrrrrrrrrr     ack# = 17   seq# = 17
          TOLAYER3: packet being lost.
      - Sending Message:                      sssssssssssssssssss     ack# = 18   seq# = 18
      - Sending Message:                      ttttttttttttttttttt     ack# = 19   seq# = 19
      - Sending Message:                      uuuuuuuuuuuuuuuuuuu     ack# = 20   seq# = 20
      - Sending Message:                      vvvvvvvvvvvvvvvvvvv     ack# = 21   seq# = 21
      - Sending Message:                      wwwwwwwwwwwwwwwwwww     ack# = 22   seq# = 22
          TOLAYER3: packet being corrupted
      - Sending Message:                      xxxxxxxxxxxxxxxxxxx     ack# = 23   seq# = 23
      - Sending Message:                      yyyyyyyyyyyyyyyyyyy     ack# = 24   seq# = 24


EVENT time: 535.792419,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    ggggggggggggggggggg
- Packet 58 buffered in sending buffer.


EVENT time: 536.076477,  type: 2, fromlayer3  entity: 1
```

```
- B side received packet:                 rrrrrrrrrrrrrrrrrr     ack# = 17    seq# = 17
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                    ack# = 17    seq# = 17
         TOLAYER3: packet being corrupted

EVENT time: 538.105896,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     hhhhhhhhhhhhhhhhhhhh
- Packet 59 buffered in sending buffer.

EVENT time: 538.708252,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                    ack# = 16    seq# = 16
- A side received valid packet.
** 17 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 541.659119,  type: 2, fromlayer3  entity: 1
- B side received packet:                 ssssssssssssssssss     ack# = 18    seq# = 18
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                    ack# = 18    seq# = 18
         TOLAYER3: packet being lost.

EVENT time: 542.613708,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     iiiiiiiiiiiiiiiiiiii
- Packet 60 buffered in sending buffer.

EVENT time: 545.811890,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                    ack# = 999999     seq# = 17
- A side received corrupt packet :(

EVENT time: 548.638184,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     jjjjjjjjjjjjjjjjjjjj
- Packet 61 buffered in sending buffer.

EVENT time: 549.760376,  type: 2, fromlayer3  entity: 1
- B side received packet:                 Zttttttttttttttttt     ack# = 19    seq# = 19
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                    ack# = 18    seq# = 18

EVENT time: 550.918945,  type: 0, timerinterrupt    entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
```

```
          - Sending Message:                         rrrrrrrrrrrrrrrrrrr      ack# = 17     seq# = 17
          - Sending Message:                         sssssssssssssssssss      ack# = 18     seq# = 18
          - Sending Message:                         ttttttttttttttttttt      ack# = 19     seq# = 19
          - Sending Message:                         uuuuuuuuuuuuuuuuuuu      ack# = 20     seq# = 20
          - Sending Message:                         vvvvvvvvvvvvvvvvvvv      ack# = 21     seq# = 21
          - Sending Message:                         wwwwwwwwwwwwwwwwwww      ack# = 22     seq# = 22
          - Sending Message:                         xxxxxxxxxxxxxxxxxxx      ack# = 23     seq# = 23
          - Sending Message:                         yyyyyyyyyyyyyyyyyyy      ack# = 24     seq# = 24

EVENT time: 551.383118,  type: 2, fromlayer3  entity: 1
- B side received packet:                    uuuuuuuuuuuuuuuuuuu      ack# = 20    seq# = 20
- B side received a packet with a greater
  sequence number than expected. Expected
  19, got 20.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                      ACK                   ack# = 18    seq# = 18

EVENT time: 556.519409,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                   ack# = 18    seq# = 18
- A side received valid packet.
** 19 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
          - Message in window, already sent:       ttttttttttttttttttt      ack# = 19     seq# = 19
          - Message in window, already sent:       uuuuuuuuuuuuuuuuuuu      ack# = 20     seq# = 20
          - Message in window, already sent:       vvvvvvvvvvvvvvvvvvv      ack# = 21     seq# = 21
          - Message in window, already sent:       wwwwwwwwwwwwwwwwwww      ack# = 22     seq# = 22
          - Message in window, already sent:       xxxxxxxxxxxxxxxxxxx      ack# = 23     seq# = 23
          - Message in window, already sent:       yyyyyyyyyyyyyyyyyyy      ack# = 24     seq# = 24
          - Sending NEW buffered message:             zzzzzzzzzzzzzzzzzzz      ack# = 25     seq# = 25
               TOLAYER3: packet being corrupted
          - Sending NEW buffered message:             aaaaaaaaaaaaaaaaaaa      ack# = 26     seq# = 26

EVENT time: 556.762695,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    kkkkkkkkkkkkkkkkkkk
- Packet 62 buffered in sending buffer.

EVENT time: 557.538208,  type: 2, fromlayer3  entity: 1
- B side received packet:                    vvvvvvvvvvvvvvvvvvv      ack# = 21    seq# = 21
- B side received a packet with a greater
  sequence number than expected. Expected
  19, got 21.
  Discarding packet...
```

```
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                         ACK                ack# = 18    seq# = 18


EVENT time: 558.753845,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:        ACK                ack# = 18    seq# = 18
- A side received valid packet.
** 19 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 562.293030,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     lllllllllllllllllll
- Packet 63 buffered in sending buffer.


EVENT time: 565.427673,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     mmmmmmmmmmmmmmmmmmm
- Packet 64 buffered in sending buffer.


EVENT time: 566.878479,  type: 2, fromlayer3  entity: 1
- B side received packet:                  wwwwwwwwwwwwwwwwwww      ack# = 22    seq# = 22
- B side received a packet with a greater
  sequence number than expected. Expected
  19, got 22.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                         ACK                ack# = 18    seq# = 18


EVENT time: 568.657288,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:        ACK                ack# = 18    seq# = 18
- A side received valid packet.
** 19 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 570.493713,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:        ACK                ack# = 18    seq# = 18
- A side received valid packet.
** 19 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 571.388184,  type: 2, fromlayer3  entity: 1
- B side received packet:                  xxxxxxxxxxxxxxxxxxx      ack# = 23    seq# = 23
- B side received a packet with a greater
  sequence number than expected. Expected
  19, got 23.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                         ACK                ack# = 18    seq# = 18


EVENT time: 574.917542,  type: 2, fromlayer3  entity: 0
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- A side received from Lower Layer:        ACK                ack# = 18   seq# = 18
- A side received valid packet.
** 19 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 576.519409,  type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
        - Sending Message:                    tttttttttttttttttttt    ack# = 19   seq# = 19
        - Sending Message:                    uuuuuuuuuuuuuuuuuuuu    ack# = 20   seq# = 20
        - Sending Message:                    vvvvvvvvvvvvvvvvvvvv    ack# = 21   seq# = 21
        - Sending Message:                    wwwwwwwwwwwwwwwwwwww    ack# = 22   seq# = 22
        - Sending Message:                    xxxxxxxxxxxxxxxxxxxx    ack# = 23   seq# = 23
        - Sending Message:                    yyyyyyyyyyyyyyyyyyyy    ack# = 24   seq# = 24
        - Sending Message:                    zzzzzzzzzzzzzzzzzzzz    ack# = 25   seq# = 25
        - Sending Message:                    aaaaaaaaaaaaaaaaaaaa    ack# = 26   seq# = 26

EVENT time: 580.374939,  type: 2, fromlayer3  entity: 1
- B side received packet:              yyyyyyyyyyyyyyyyyyyy     ack# = 24   seq# = 24
- B side received a packet with a greater
  sequence number than expected. Expected
  19, got 24.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                     ACK                ack# = 18   seq# = 18
         TOLAYER3: packet being lost.

EVENT time: 581.636230,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    nnnnnnnnnnnnnnnnnnnn
- Packet 65 buffered in sending buffer.

EVENT time: 586.891174,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    oooooooooooooooooooo
- Packet 66 buffered in sending buffer.

EVENT time: 588.541931,  type: 2, fromlayer3  entity: 1
- B side received packet:              rrrrrrrrrrrrrrrrrrrr     ack# = 17   seq# = 17
- B side received a packet with a lower
  sequence number than expected. Expected
  19, got 17.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                     ACK                ack# = 18   seq# = 18

EVENT time: 590.022583,  type: 2, fromlayer3  entity: 1
- B side received packet:              uuuuuuuuuuuuuuuuuuuu     ack# = 20   seq# = 999999
- B side received corrupted packet.
```

- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 18   seq# = 18
        TOLAYER3: packet being corrupted

EVENT time: 596.059448, type: 2, fromlayer3 entity: 0
- A side received from Lower Layer: ACK   ack# = 18   seq# = 18
- A side received valid packet.
** 19 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 596.519409, type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
        - Sending Message: tttttttttttttttttttt   ack# = 19   seq# = 19
            TOLAYER3: packet being lost.
        - Sending Message: uuuuuuuuuuuuuuuuuuuu   ack# = 20   seq# = 20
            TOLAYER3: packet being lost.
        - Sending Message: vvvvvvvvvvvvvvvvvvvv   ack# = 21   seq# = 21
            TOLAYER3: packet being lost.
        - Sending Message: wwwwwwwwwwwwwwwwwwww   ack# = 22   seq# = 22
        - Sending Message: xxxxxxxxxxxxxxxxxxxx   ack# = 23   seq# = 23
        - Sending Message: yyyyyyyyyyyyyyyyyyyy   ack# = 24   seq# = 24
        - Sending Message: zzzzzzzzzzzzzzzzzzzz   ack# = 25   seq# = 25
            TOLAYER3: packet being lost.
        - Sending Message: aaaaaaaaaaaaaaaaaaaa   ack# = 26   seq# = 26
            TOLAYER3: packet being lost.

EVENT time: 596.519470, type: 2, fromlayer3 entity: 1
- B side received packet: vvvvvvvvvvvvvvvvvvvv   ack# = 21   seq# = 21
- B side received a packet with a greater
  sequence number than expected. Expected
  19, got 21.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 18   seq# = 18
        TOLAYER3: packet being lost.

EVENT time: 598.445984, type: 2, fromlayer3 entity: 1
- B side received packet: wwwwwwwwwwwwwwwwwwww   ack# = 22   seq# = 22
- B side received a packet with a greater
  sequence number than expected. Expected
  19, got 22.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 18   seq# = 18

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EVENT time: 599.757324,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     pppppppppppppppppppp
- Packet 67 buffered in sending buffer.


EVENT time: 601.882629,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ZCK                ack# = 18   seq# = 18
- A side received corrupt packet :(


EVENT time: 603.342651,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                ack# = 18   seq# = 18
- A side received valid packet.
** 19 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 608.359253,  type: 2, fromlayer3  entity: 1
- B side received packet:                   xxxxxxxxxxxxxxxxxxxx     ack# = 23   seq# = 23
- B side received a packet with a greater
  sequence number than expected. Expected
  19, got 23.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                ack# = 18   seq# = 18
        TOLAYER3: packet being corrupted


EVENT time: 610.601074,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ZCK                ack# = 18   seq# = 18
- A side received corrupt packet :(


EVENT time: 612.935608,  type: 2, fromlayer3  entity: 1
- B side received packet:                   yyyyyyyyyyyyyyyyyyyy     ack# = 24   seq# = 24
- B side received a packet with a greater
  sequence number than expected. Expected
  19, got 24.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                ack# = 18   seq# = 18


EVENT time: 616.519409,  type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
     - Sending Message:                       tttttttttttttttttttt     ack# = 19   seq# = 19
     - Sending Message:                       uuuuuuuuuuuuuuuuuuuu     ack# = 20   seq# = 20
     - Sending Message:                       vvvvvvvvvvvvvvvvvvvv     ack# = 21   seq# = 21
     - Sending Message:                       wwwwwwwwwwwwwwwwwwww     ack# = 22   seq# = 22
     - Sending Message:                       xxxxxxxxxxxxxxxxxxxx     ack# = 23   seq# = 23
         TOLAYER3: packet being lost.
     - Sending Message:                       yyyyyyyyyyyyyyyyyyyy     ack# = 24   seq# = 24
```

```
        TOLAYER3: packet being lost.
    - Sending Message:                          zzzzzzzzzzzzzzzzzzzz      ack# = 25    seq# = 25
    - Sending Message:                          aaaaaaaaaaaaaaaaaaaa      ack# = 26    seq# = 26

EVENT time: 618.974365,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    qqqqqqqqqqqqqqqqqqqq
- Packet 68 buffered in sending buffer.


EVENT time: 621.942566,  type: 2, fromlayer3  entity: 1
- B side received packet:                 ssssssssssssssssssss     ack# = 18   seq# = 18
- B side received a packet with a lower
  sequence number than expected. Expected
  19, got 18.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                 ack# = 18   seq# = 18


EVENT time: 622.689270,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                 ack# = 18   seq# = 18
- A side received valid packet.
** 19 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 624.531677,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    rrrrrrrrrrrrrrrrrrrr
- Packet 69 buffered in sending buffer.


EVENT time: 628.784302,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                 ack# = 18   seq# = 18
- A side received valid packet.
** 19 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 631.126282,  type: 2, fromlayer3  entity: 1
- B side received packet:                 tttttttttttttttttttt     ack# = 19   seq# = 19
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                 ack# = 19   seq# = 19


EVENT time: 635.608582,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                 ack# = 19   seq# = 19
- A side received valid packet.
** 20 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
```

```
      window have been sent to B side...
           - Message in window, already sent:        uuuuuuuuuuuuuuuuuuu     ack# = 20    seq# = 20
           - Message in window, already sent:        vvvvvvvvvvvvvvvvvvvv     ack# = 21    seq# = 21
           - Message in window, already sent:        wwwwwwwwwwwwwwwwwww     ack# = 22    seq# = 22
           - Message in window, already sent:        xxxxxxxxxxxxxxxxxxxx     ack# = 23    seq# = 23
           - Message in window, already sent:        yyyyyyyyyyyyyyyyyyyy     ack# = 24    seq# = 24
           - Message in window, already sent:        zzzzzzzzzzzzzzzzzzz      ack# = 25    seq# = 25
           - Message in window, already sent:        aaaaaaaaaaaaaaaaaaaa     ack# = 26    seq# = 26
           - Sending NEW buffered message:              bbbbbbbbbbbbbbbbbbb     ack# = 27    seq# = 27

EVENT time: 636.806885,  type: 2, fromlayer3  entity: 1
- B side received packet:                      uuuuuuuuuuuuuuuuuuu      ack# = 20    seq# = 999999
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                      ACK                  ack# = 19    seq# = 19
          TOLAYER3: packet being lost.


EVENT time: 639.832458,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     sssssssssssssssssss
- Packet 70 buffered in sending buffer.


EVENT time: 639.970459,  type: 2, fromlayer3  entity: 1
- B side received packet:                      Zvvvvvvvvvvvvvvvvvvv      ack# = 21    seq# = 21
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                      ACK                  ack# = 19    seq# = 19


EVENT time: 641.055542,  type: 2, fromlayer3  entity: 1
- B side received packet:                      Zwwwwwwwwwwwwwwwwwww      ack# = 22    seq# = 22
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                      ACK                  ack# = 19    seq# = 19


EVENT time: 644.310425,  type: 2, fromlayer3  entity: 1
- B side received packet:                      xxxxxxxxxxxxxxxxxxxx      ack# = 23    seq# = 23
- B side received a packet with a greater
  sequence number than expected. Expected
  20, got 23.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                      ACK                  ack# = 19    seq# = 19
          TOLAYER3: packet being lost.


EVENT time: 649.130005,  type: 2, fromlayer3  entity: 0
```

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- A side received from Lower Layer:        ACK                    ack# = 19    seq# = 19
- A side received valid packet.
** 20 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 651.665771,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     tttttttttttttttttttt
- Packet 71 buffered in sending buffer.


EVENT time: 653.164490,  type: 2, fromlayer3  entity: 1
- B side received packet:                        yyyyyyyyyyyyyyyyyyyy      ack# = 24    seq# = 24
- B side received a packet with a greater
  sequence number than expected. Expected
  20, got 24.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                    ack# = 19    seq# = 19
          TOLAYER3: packet being lost.


EVENT time: 655.608582,  type: 0, timerinterrupt    entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
        - Sending Message:                        uuuuuuuuuuuuuuuuuuuu      ack# = 20    seq# = 20
            TOLAYER3: packet being lost.
        - Sending Message:                        vvvvvvvvvvvvvvvvvvvv      ack# = 21    seq# = 21
        - Sending Message:                        wwwwwwwwwwwwwwwwwwww      ack# = 22    seq# = 22
        - Sending Message:                        xxxxxxxxxxxxxxxxxxxx      ack# = 23    seq# = 23
        - Sending Message:                        yyyyyyyyyyyyyyyyyyyy      ack# = 24    seq# = 24
        - Sending Message:                        zzzzzzzzzzzzzzzzzzzz      ack# = 25    seq# = 25
            TOLAYER3: packet being corrupted
        - Sending Message:                        aaaaaaaaaaaaaaaaaaaa      ack# = 26    seq# = 26
        - Sending Message:                        bbbbbbbbbbbbbbbbbbbb      ack# = 27    seq# = 27
            TOLAYER3: packet being corrupted


EVENT time: 655.872192,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:        ACK                    ack# = 19    seq# = 19
- A side received valid packet.
** 20 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 659.140808,  type: 2, fromlayer3  entity: 1
- B side received packet:                        rrrrrrrrrrrrrrrrrrrr      ack# = 17    seq# = 17
- B side received a packet with a lower
  sequence number than expected. Expected
  20, got 17.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                    ack# = 19    seq# = 19
```

```
EVENT time: 660.642700,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    uuuuuuuuuuuuuuuuuuuu
- Packet 72 buffered in sending buffer.


EVENT time: 663.167969,  type: 2, fromlayer3  entity: 1
- B side received packet:                   Zssssssssssssssssss    ack# = 18   seq# = 18
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                          ACK                  ack# = 19   seq# = 19


EVENT time: 664.782715,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                  ack# = 19   seq# = 19
- A side received valid packet.
** 20 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 671.323975,  type: 2, fromlayer3  entity: 1
- B side received packet:                   tttttttttttttttttttt    ack# = 19   seq# = 19
- B side received a packet with a lower
  sequence number than expected. Expected
  20, got 19.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                          ACK                  ack# = 19   seq# = 19
        TOLAYER3: packet being corrupted


EVENT time: 673.908813,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                  ack# = 19   seq# = 19
- A side received valid packet.
** 20 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 675.608582,  type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
      - Sending Message:                    uuuuuuuuuuuuuuuuuuuu    ack# = 20   seq# = 20
      - Sending Message:                    vvvvvvvvvvvvvvvvvvvv    ack# = 21   seq# = 21
        TOLAYER3: packet being corrupted
      - Sending Message:                    wwwwwwwwwwwwwwwwwwww    ack# = 22   seq# = 22
      - Sending Message:                    xxxxxxxxxxxxxxxxxxxx    ack# = 23   seq# = 23
      - Sending Message:                    yyyyyyyyyyyyyyyyyyyy    ack# = 24   seq# = 24
        TOLAYER3: packet being corrupted
      - Sending Message:                    zzzzzzzzzzzzzzzzzzzz    ack# = 25   seq# = 25
      - Sending Message:                    aaaaaaaaaaaaaaaaaaaa    ack# = 26   seq# = 26
        TOLAYER3: packet being lost.
      - Sending Message:                    bbbbbbbbbbbbbbbbbbbb    ack# = 27   seq# = 27
```

```
EVENT time: 675.908691,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    vvvvvvvvvvvvvvvvvvvvv
- Packet 73 buffered in sending buffer.


EVENT time: 678.893616,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ZCK              ack# = 19   seq# = 19
- A side received corrupt packet :(


EVENT time: 679.576660,  type: 2, fromlayer3  entity: 1
- B side received packet:                 uuuuuuuuuuuuuuuuuuuuu    ack# = 20   seq# = 20
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK              ack# = 20   seq# = 20
        TOLAYER3: packet being corrupted


EVENT time: 681.084229,  type: 2, fromlayer3  entity: 1
- B side received packet:                 Zvvvvvvvvvvvvvvvvvvvv    ack# = 21   seq# = 21
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK              ack# = 20   seq# = 20


EVENT time: 682.955566,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:    wwwwwwwwwwwwwwwwwwww
- Packet 74 buffered in sending buffer.


EVENT time: 687.260498,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ZCK              ack# = 20   seq# = 20
- A side received corrupt packet :(


EVENT time: 687.862915,  type: 2, fromlayer3  entity: 1
- B side received packet:                 wwwwwwwwwwwwwwwwwwww    ack# = 22   seq# = 22
- B side received a packet with a greater
  sequence number than expected. Expected
  21, got 22.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK              ack# = 20   seq# = 20


EVENT time: 690.231323,  type: 2, fromlayer3  entity: 1
- B side received packet:                 xxxxxxxxxxxxxxxxxxxx    ack# = 23   seq# = 23
- B side received a packet with a greater
  sequence number than expected. Expected
  21, got 23.
  Discarding packet...
```

```
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                ack# = 20   seq# = 20


EVENT time: 691.390442,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                ack# = 20   seq# = 20
- A side received valid packet.
** 21 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
        - Message in window, already sent:      vvvvvvvvvvvvvvvvvvvv    ack# = 21   seq# = 21
        - Message in window, already sent:      wwwwwwwwwwwwwwwwwwww    ack# = 22   seq# = 22
        - Message in window, already sent:      xxxxxxxxxxxxxxxxxxxx    ack# = 23   seq# = 23
        - Message in window, already sent:      yyyyyyyyyyyyyyyyyyyy    ack# = 24   seq# = 24
        - Message in window, already sent:      zzzzzzzzzzzzzzzzzzzz    ack# = 25   seq# = 25
        - Message in window, already sent:      aaaaaaaaaaaaaaaaaaaa    ack# = 26   seq# = 26
        - Message in window, already sent:      bbbbbbbbbbbbbbbbbbbb    ack# = 27   seq# = 27
        - Sending NEW buffered message:             cccccccccccccccccccc    ack# = 28   seq# = 28

EVENT time: 694.757019,  type: 2, fromlayer3  entity: 1
- B side received packet:                 yyyyyyyyyyyyyyyyyyyy    ack# = 24   seq# = 24
- B side received a packet with a greater
  sequence number than expected. Expected
  21, got 24.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                ack# = 20   seq# = 20

EVENT time: 696.968872,  type: 2, fromlayer3  entity: 1
- B side received packet:                 rrrrrrrrrrrrrrrrrrrr    ack# = 17   seq# = 17
- B side received a packet with a lower
  sequence number than expected. Expected
  21, got 17.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                        ACK                ack# = 20   seq# = 20

EVENT time: 700.885559,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     xxxxxxxxxxxxxxxxxxxx
- Packet 75 buffered in sending buffer.


EVENT time: 701.197815,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:       ACK                ack# = 20   seq# = 20
```

```
- A side received valid packet.
** 21 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 702.672546,  type: 2, fromlayer3  entity: 1
- B side received packet:                    Zsssssssssssssssssss     ack# = 18   seq# = 18
- B side received corrupted packet.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                 ack# = 20   seq# = 20


EVENT time: 704.670593,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:     ACK                 ack# = 20   seq# = 20
- A side received valid packet.
** 21 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 711.124695,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:     ACK                 ack# = 20   seq# = 20
- A side received valid packet.
** 21 MESSAGES HAVE BEEN SENT SUCCESSFULLY **


EVENT time: 711.390442,  type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
       - Sending Message:                    vvvvvvvvvvvvvvvvvvvv     ack# = 21   seq# = 21
       - Sending Message:                    wwwwwwwwwwwwwwwwwwww     ack# = 22   seq# = 22
       - Sending Message:                    xxxxxxxxxxxxxxxxxxxx     ack# = 23   seq# = 23
           TOLAYER3: packet being lost.
       - Sending Message:                    yyyyyyyyyyyyyyyyyyyy     ack# = 24   seq# = 24
       - Sending Message:                    zzzzzzzzzzzzzzzzzzzz     ack# = 25   seq# = 25
           TOLAYER3: packet being lost.
       - Sending Message:                    aaaaaaaaaaaaaaaaaaaa     ack# = 26   seq# = 26
           TOLAYER3: packet being corrupted
       - Sending Message:                    bbbbbbbbbbbbbbbbbbbb     ack# = 27   seq# = 27
           TOLAYER3: packet being lost.
       - Sending Message:                    cccccccccccccccccccc     ack# = 28   seq# = 28

EVENT time: 711.783264,  type: 2, fromlayer3  entity: 1
- B side received packet:                    tttttttttttttttttttt     ack# = 19   seq# = 19
- B side received a packet with a lower
  sequence number than expected. Expected
  21, got 19.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                    ACK                 ack# = 20   seq# = 20


EVENT time: 718.475342,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:     ACK                 ack# = 20   seq# = 20
```

- A side received valid packet.
** 21 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 718.543274, type: 1, fromlayer5 entity: 0
- A side received message from upper layer: yyyyyyyyyyyyyyyyyyyy
- Packet 76 buffered in sending buffer.

EVENT time: 719.325439, type: 1, fromlayer5 entity: 0
- A side received message from upper layer: zzzzzzzzzzzzzzzzzzzz
- Packet 77 buffered in sending buffer.

EVENT time: 721.401489, type: 2, fromlayer3 entity: 1
- B side received packet: uuuuuuuuuuuuuuuuuuuu   ack# = 20   seq# = 20
- B side received a packet with a lower
  sequence number than expected. Expected
  21, got 20.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 20   seq# = 20
        TOLAYER3: packet being corrupted

EVENT time: 723.563660, type: 2, fromlayer3 entity: 0
- A side received from Lower Layer: ACK   ack# = 20   seq# = 20
- A side received valid packet.
** 21 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 724.580017, type: 2, fromlayer3 entity: 0
- A side received from Lower Layer: ACK   ack# = 20   seq# = 20
- A side received valid packet.
** 21 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 730.381348, type: 2, fromlayer3 entity: 1
- B side received packet: vvvvvvvvvvvvvvvvvvvv   ack# = 21   seq# = 21
- B side received valid packet.
  Sending pkt to upper layer.
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK: ACK   ack# = 21   seq# = 21

EVENT time: 731.390442, type: 0, timerinterrupt   entity: 0
- TIMEOUT - timer restarted,
  all packets in window resent
      - Sending Message: vvvvvvvvvvvvvvvvvvvv   ack# = 21   seq# = 21
      - Sending Message: wwwwwwwwwwwwwwwwwwww   ack# = 22   seq# = 22
          TOLAYER3: packet being lost.
      - Sending Message: xxxxxxxxxxxxxxxxxxxx   ack# = 23   seq# = 23
          TOLAYER3: packet being corrupted

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        - Sending Message:                              yyyyyyyyyyyyyyyyyyyy    ack# = 24    seq# = 24
        - Sending Message:                              zzzzzzzzzzzzzzzzzzzz    ack# = 25    seq# = 25
        - Sending Message:                              aaaaaaaaaaaaaaaaaaaa    ack# = 26    seq# = 26
           TOLAYER3: packet being lost.
        - Sending Message:                              bbbbbbbbbbbbbbbbbbbb    ack# = 27    seq# = 27
        - Sending Message:                              cccccccccccccccccccc    ack# = 28    seq# = 28

EVENT time: 732.282654,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                ack# = 20    seq# = 999999
- A side received corrupt packet :(

EVENT time: 735.263245,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     aaaaaaaaaaaaaaaaaaaa
- Packet 78 buffered in sending buffer.

EVENT time: 735.820557,  type: 2, fromlayer3  entity: 1
- B side received packet:                       xxxxxxxxxxxxxxxxxxxx     ack# = 23    seq# = 23
- B side received a packet with a greater
  sequence number than expected. Expected
  22, got 23.
  Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                       ACK                ack# = 21    seq# = 21

EVENT time: 737.492859,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                ack# = 21    seq# = 21
- A side received valid packet.
** 22 MESSAGES HAVE BEEN SENT SUCCESSFULLY **
- Updating sending window...
- Updated ACKS, restarted timer to reflect
  the oldest packet in the sending window.
- A side making sure all packets in sending
  window have been sent to B side...
        - Message in window, already sent:       wwwwwwwwwwwwwwwwwwww    ack# = 22    seq# = 22
        - Message in window, already sent:       xxxxxxxxxxxxxxxxxxxx    ack# = 23    seq# = 23
        - Message in window, already sent:       yyyyyyyyyyyyyyyyyyyy    ack# = 24    seq# = 24
        - Message in window, already sent:       zzzzzzzzzzzzzzzzzzzz    ack# = 25    seq# = 25
        - Message in window, already sent:       aaaaaaaaaaaaaaaaaaaa    ack# = 26    seq# = 26
        - Message in window, already sent:       bbbbbbbbbbbbbbbbbbbb    ack# = 27    seq# = 27
        - Message in window, already sent:       cccccccccccccccccccc    ack# = 28    seq# = 28
        - Sending NEW buffered message:            dddddddddddddddddddd    ack# = 29    seq# = 29
           TOLAYER3: packet being lost.

EVENT time: 744.785461,  type: 2, fromlayer3  entity: 1
- B side received packet:                       yyyyyyyyyyyyyyyyyyyy     ack# = 24    seq# = 24
- B side received a packet with a greater
  sequence number than expected. Expected
```

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   22, got 24.
   Discarding packet...
- B side sending ACK for packet with highest
  in-order sequence number
- B side sent ACK:                      ACK                 ack# = 21   seq# = 21

EVENT time: 744.826416,  type: 2, fromlayer3  entity: 0
- A side received from Lower Layer:      ACK                 ack# = 21   seq# = 21
- A side received valid packet.
** 22 MESSAGES HAVE BEEN SENT SUCCESSFULLY **

EVENT time: 746.562134,  type: 1, fromlayer5  entity: 0
- A side received message from upper layer:     bbbbbbbbbbbbbbbbbbbb
- Packet 79 buffered in sending buffer.

EVENT time: 748.833496,  type: 2, fromlayer3  entity: 1
```