

## Alternating Bit Protocol Output

Annotations are in RED

Enter the number of messages to simulate: 15 ← Number of Messages Input  
Enter packet loss probability [enter 0.0 for no loss]: 0.1 ← Input for Packet Loss  
Enter packet corruption probability [0.0 for no corruption]: 0.3 ← Input for Packet Corruption  
Enter average time between messages from sender's layer5 [ > 0.0]: 5500 ← Input for avg time  
Enter TRACE: 2 ← Input for display trace

EVENT time: 10288.157227, type: 1, fromlayer5 entity: 0 ← Entity # indicating A or B (0 or 1)  
A: Sending: aaaaaaaaaaaaaaaaaa ♦ ← Message being sent to B from A  
TOLAYER3: packet being corrupted ← Indicating packet is being corrupted on the way to B

EVENT time: 10293.622070, type: 2, fromlayer3 entity: 1  
B: NACK -- retry. ← B detects packet corruption and sends NACK to A

EVENT time: 10295.803711, type: 2, fromlayer3 entity: 0  
A: got ack/nack, is corrupted: 0, seq: 1, expected: 0 ← A checks for corruption (is corrupted: 0 or 1) also includes seq # (0 or 1) expected sequence number # (0 or 1) to receive. 0 is ACK and 1 is ACK. In this case the received NACK triggers a resend from A to B.

EVENT time: 10297.824219, type: 2, fromlayer3 entity: 1  
B: ACK 0! ← B received the packet from A with sequence 0 uncorrupted and sends ACK back  
TOLAYER3: packet being corrupted ← In transit from B to A the message is corrupted  
B: GOT: aaaaaaaaaaaaaaaaaa ← Indicating that B received the message from A

EVENT time: 10302.291016, type: 2, fromlayer3 entity: 0  
A: got ack/nack, is corrupted: 1, seq: 0, expected: 0 ← A detects message is corrupted and resends  
TOLAYER3: packet being lost ← Packet is lost in transit from A to B.

EVENT time: 10802.291016, type: 0, timerinterrupt entity: 0 ← A timerinterrupt triggers and A resends to B

EVENT time: 10811.719727, type: 2, fromlayer3 entity: 1  
B: NACK -- retry. ← B received resent 'aaa...' message but has already received therefore NACKs.

EVENT time: 10819.182617, type: 2, fromlayer3 entity: 0  
A: got ack/nack, is corrupted: 0, seq: 0, expected: 0 ← A received NACK as re-ACK from the previous lost ACK from B to A confirming the reception of 'aaa...' message.

EVENT time: 19318.664062, type: 1, fromlayer5 entity: 0  
A: Sending: bbbbbbbbbbbbbbbbbbb ♦ ← A sends message to B

EVENT time: 19321.394531, type: 2, fromlayer3 entity: 1  
B: ACK 1! ← B receives message with sequence 1 and sends ACK to A  
TOLAYER3: packet being corrupted ← B message to A is corrupted  
B: GOT: bbbbbbbbbbbbbbbbbbb ← Indicating that B received the message from A

EVENT time: 19323.761719, type: 2, fromlayer3 entity: 0  
A: got ack/nack, is corrupted: 1, seq: 1, expected: 1 ← A detects message is corrupted and resends  
TOLAYER3: packet being lost ← Packet is lost in transit from A to B.

EVENT time: 19823.761719, type: 0, timerinterrupt entity: 0 ← A resends to B  
TOLAYER3: packet being lost ← Packet is lost in transit from A to B.

EVENT time: 20323.761719, type: 0, timerinterrupt entity: 0 ← A resends to B

EVENT time: 20330.009766, type: 2, fromlayer3 entity: 1  
B: NACK -- retry. ← B received resent 'bbb...' message but has already received therefore NACKs.

EVENT time: 20331.490234, type: 2, fromlayer3 entity: 0  
A: got ack/nack, is corrupted: 0, seq: 1, expected: 1 ← A received NACK as re-ACK from the previous lost ACK from B to A confirming the reception of 'bbb...' message. State changes to 0

EVENT time: 25466.013672, type: 1, fromlayer5 entity: 0  
A: Sending: ccccccccccccccccccc? ← Sending message from A to B

EVENT time: 25472.375000, type: 2, fromlayer3 entity: 1  
B: ACK 0! ← Received ACK message with sequence 0  
TOLAYER3: packet being lost ← Packet being lost from B to A  
B: GOT: ccccccccccccccccccc ← Indicating that B has received the 'cccc...' message

EVENT time: 25966.013672, type: 0, timerinterrupt entity: 0 ← A resends message after timer expires

EVENT time: 25967.072266, type: 2, fromlayer3 entity: 1  
B: NACK -- retry. ← B re-ACKs  
TOLAYER3: packet being lost ← B to A message lost

EVENT time: 26466.013672, type: 0, timerinterrupt entity: 0 ← Time expires, A resends

EVENT time: 26471.287109, type: 2, fromlayer3 entity: 1  
B: NACK -- retry. ← B re-ACKs  
TOLAYER3: packet being lost ← B to A message lost

EVENT time: 26966.013672, type: 0, timerinterrupt entity: 0

EVENT time: 26974.794922, type: 2, fromlayer3 entity: 1  
B: NACK -- retry.  
TOLAYER3: packet being lost

EVENT time: 27466.013672, type: 0, timerinterrupt entity: 0  
TOLAYER3: packet being lost

EVENT time: 27966.013672, type: 0, timerinterrupt entity: 0 ←A resends to B after time expires  
TOLAYER3: packet being corrupted←Corrupted packet from A to B

EVENT time: 27970.832031, type: 2, fromlayer3 entity: 1  
B: NACK -- retry. ←B re-ACKS

EVENT time: 27974.494141, type: 2, fromlayer3 entity: 0  
A: got ack/nack, is corrupted: 0, seq: 0, expected: 0 ←A receives re-ACK knowing 'ccc...' was received

EVENT time: 31379.087891, type: 1, fromlayer5 entity: 0  
A: Sending: ddddddddddddddddddd💎 ←A sends message to B

EVENT time: 31380.365234, type: 2, fromlayer3 entity: 1  
B: ACK 1! ←B receives and ACKs to A  
TOLAYER3: packet being corrupted  
B: GOT: ddddddddddddddddddd

EVENT time: 31385.982422, type: 2, fromlayer3 entity: 0  
A: got ack/nack, is corrupted: 1, seq: 1, expected: 1←Received corrupted ACK resends  
TOLAYER3: packet being corrupted←Resent message is corrupted

EVENT time: 31388.013672, type: 2, fromlayer3 entity: 1  
B: NACK -- retry.  
TOLAYER3: packet being corrupted←resent re-ACK is corrupted

EVENT time: 31395.755859, type: 2, fromlayer3 entity: 0  
A: got ack/nack, is corrupted: 1, seq: 1, expected: 1

EVENT time: 31402.447266, type: 2, fromlayer3 entity: 1  
B: NACK -- retry.  
TOLAYER3: packet being corrupted

EVENT time: 31407.919922, type: 2, fromlayer3 entity: 0  
A: got ack/nack, is corrupted: 1, seq: 1, expected: 1

EVENT time: 31413.306641, type: 2, fromlayer3 entity: 1  
B: NACK -- retry.

EVENT time: 31415.011719, type: 2, fromlayer3 entity: 0  
A: got ack/nack, is corrupted: 0, seq: 1, expected: 1←A finally receives re-ACK indicating 'ddd...' was receive

EVENT time: 41441.355469, type: 1, fromlayer5 entity: 0  
A: Sending: eeeeeeeeeeeeeeeeeee💎 ←A sending message to B

EVENT time: 41449.312500, type: 2, fromlayer3 entity: 1

B: ACK 0! ←Be receives message and sends ACK back

B: GOT: eeeeeeeeeeeeeeeeeee

EVENT time: 41453.703125, type: 2, fromlayer3 entity: 0

A: got ack/nack, is corrupted: 0, seq: 0, expected: 0 ←A receives ACK uncorrupted with expected sequence

EVENT time: 42081.441406, type: 1, fromlayer5 entity: 0

A: Sending: ffffffffffffffffff ♦ ←Sends message from A to B

EVENT time: 42091.289062, type: 2, fromlayer3 entity: 1

B: ACK 1! ←B ACKs with sequence 1 back to A

B: GOT: ffffffffffffffffff

EVENT time: 42094.035156, type: 2, fromlayer3 entity: 0

A: got ack/nack, is corrupted: 0, seq: 1, expected: 1 ←A receives ACK uncorrupted with correct sequence.

EVENT time: 45403.742188, type: 1, fromlayer5 entity: 0

A: Sending: gggggggggggggggggggg ♦ ← A sends to B

EVENT time: 45410.359375, type: 2, fromlayer3 entity: 1

B: ACK 0! ←B ACKs with sequence 0 to A

B: GOT: gggggggggggggggggggg

EVENT time: 45413.667969, type: 2, fromlayer3 entity: 0

A: got ack/nack, is corrupted: 0, seq: 0, expected: 0 ← A receives without errors

EVENT time: 53699.125000, type: 1, fromlayer5 entity: 0

A: Sending: hhhhhhhhhhhhhhhhhhh ♦ ← A sends to B

TOLAYER3: packet being corrupted

EVENT time: 53700.640625, type: 2, fromlayer3 entity: 1

B: NACK -- retry.

TOLAYER3: packet being corrupted

EVENT time: 53701.738281, type: 2, fromlayer3 entity: 0

A: got ack/nack, is corrupted: 1, seq: 0, expected: 1

EVENT time: 53703.886719, type: 2, fromlayer3 entity: 1

B: ACK 1! ← B receives message and ACKs back to A

TOLAYER3: packet being corrupted

B: GOT: hhhhhhhhhhhhhhhhhhh

EVENT time: 53705.468750, type: 2, fromlayer3 entity: 0

A: got ack/nack, is corrupted: 1, seq: 1, expected: 1





[illegible]

EVENT time: 91150.195312, type: 2, fromlayer3 entity: 1  
B: NACK -- retry.  
TOLAYER3: packet being corrupted

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EVENT time: 91155.390625, type: 2, fromlayer3 entity: 0
A: got ack/nack, is corrupted: 1, seq: 1, expected: 0
    TOLAYER3: packet being lost
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EVENT time: 91655.390625, type: 0, timerinterrupt entity: 0  
TOLAYER3: packet being corrupted

EVENT time: 91659.820312, type: 2, fromlayer3 entity: 1  
B: NACK -- retry.  
TOLAYER3: packet being lost

EVENT time: 92155.390625, type: 0, timerinterrupt entity: 0  
TOLAYER3: packet being corrupted

EVENT time: 92164.382812, type: 2, fromlayer3 entity: 1  
B: NACK -- retry.

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EVENT time: 92171.406250, type: 2, fromlayer3 entity: 0
A: got ack/nack, is corrupted: 0, seq: 1, expected: 0
  TOLAYER3: packet being lost
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EVENT time: 92671.406250, type: 0, timerinterrupt entity: 0

EVENT time: 92672.820312, type: 2, fromlayer3 entity: 1  
B: ACK 0! ← B receives message and ACKs back to A  
TOLAYER3: packet being lost  
B: GOT: mmmmmmmmmmmmmmmmmmmmmmmmmmmmm

EVENT time: 93171.406250, type: 0, timerinterrupt entity: 0  
TOLAYER3: packet being lost

EVENT time: 93671.406250, type: 0, timerinterrupt entity: 0  
TOLAYER3: packet being lost

EVENT time: 94171.406250, type: 0, timerinterrupt entity: 0

EVENT time: 94177.570312, type: 2, fromlayer3 entity: 1  
B: NACK -- retry.  
TOLAYER3: packet being corrupted

EVENT time: 94182.984375, type: 2, fromlayer3 entity: 0  
A: got ack/nack, is corrupted: 1, seq: 0, expected: 0

EVENT time: 94189.304688, type: 2, fromlayer3 entity: 1  
B: NACK -- retry.

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EVENT time: 94196.320312, type: 2, fromlayer3 entity: 0
A: got ack/nack, is corrupted: 0, seq: 0, expected: 0
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A: Sending: nnnnnnnnnnnnnnnnnnnnnn? ← A sends to B

EVENT time: 100415.085938, type: 2, fromlayer3 entity: 1  
B: ACK 1! ← B receives message and ACKs back to A  
B: GOT: nnnnnnnnnnnnnnnnnnnnnnnnnnnnn

EVENT time: 100422.046875, type: 2, fromlayer3 entity: 0  
A: got ack/nack, is corrupted: 0, seq: 1, expected: 1

EVENT time: 106268.328125, type: 1, fromlayer5 entity: 0  
A: Sending: oooooooooooooooooooooo  ← A sends to B

EVENT time: 106272.507812, type: 2, fromlayer3 entity: 1  
Simulator terminated at time 106272.507812  
after sending 15 msgs from layer5