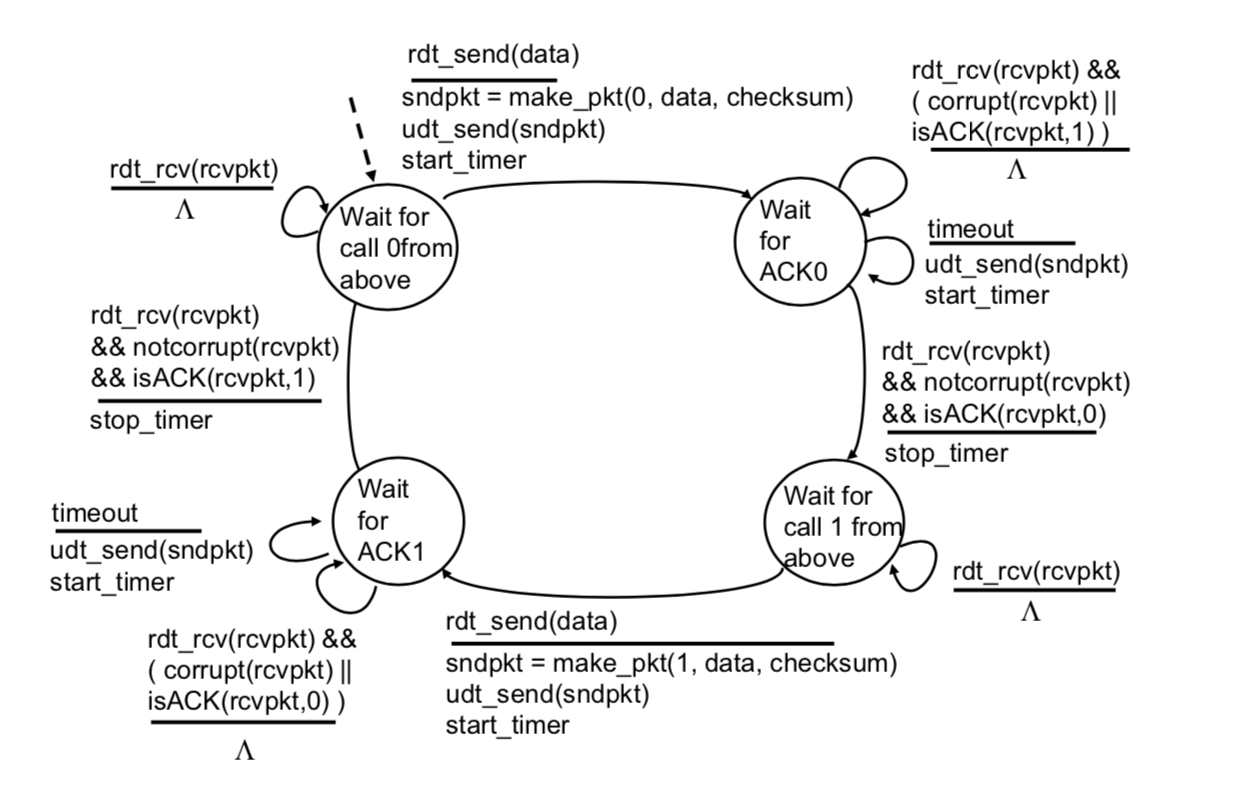
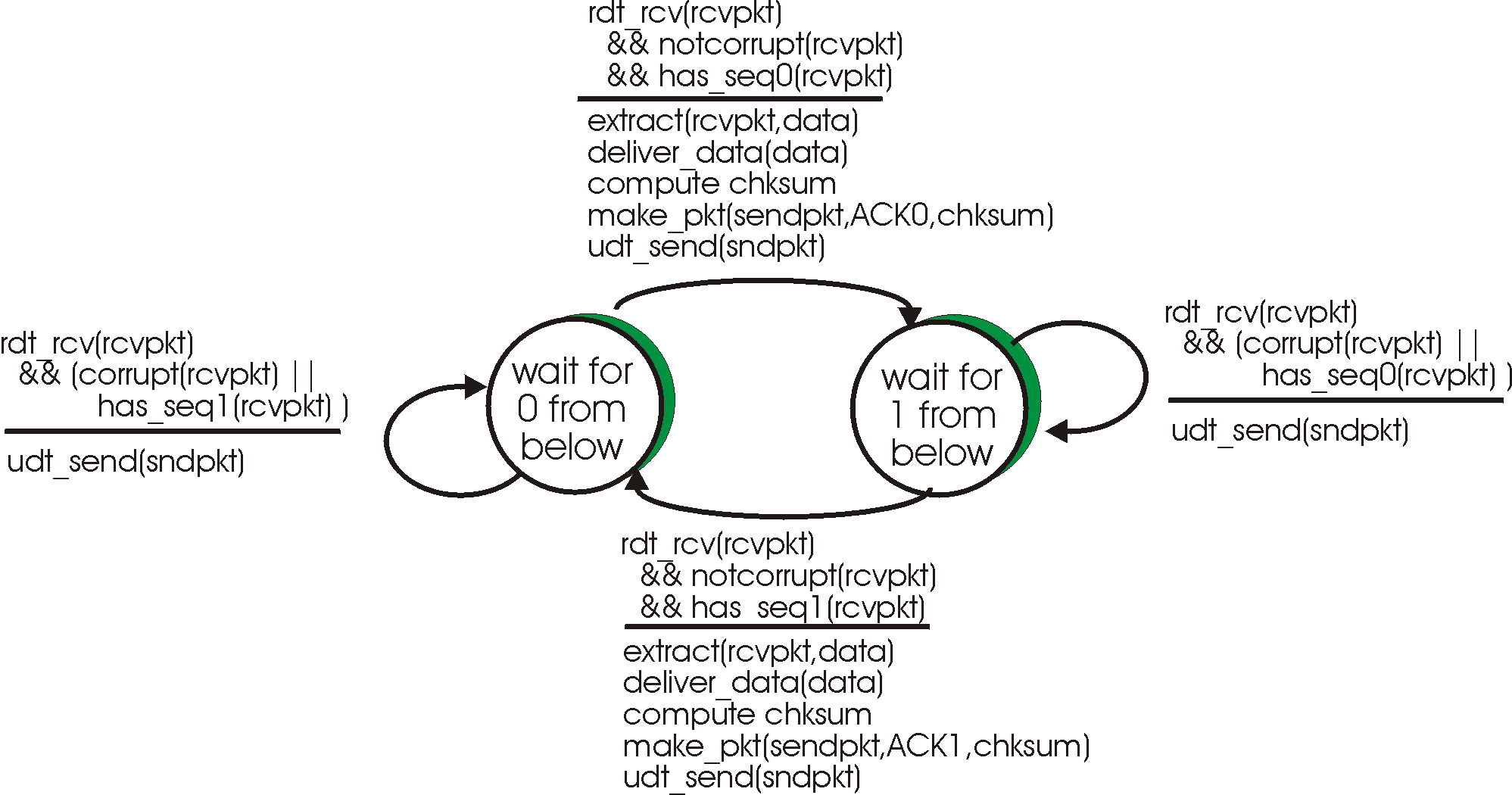
**Stop-Wait Summary Doc**

*Design*

Sender FSM:

Receiver FSM:

*General Design Procedure:*

I started by implementing this as a unidirectional implementation based on the FSMs above. The sender and receiver struct both kept track of the last packet sent and the last ack returned, respectively. For new packets, the sender would set the seqnum to the opposite (0 or 1) of the last packet sent and the receiver would expect the seqnum opposite to the ack num of the last ack returned. If the receiver received an out of order or corrupted packet it would return a NAK by resending the last ack returned.

*Sample Output*

Key:

Corrupted ACK/NACK Packet Event

Corrupted ACK/NACK Packet Response

Lost ACK/NACK Packet Event

Lost ACK/NACK Packet Response

Corrupted Data Packet Event

Corrupted Data Packet Response

Lost Data Packet Event

Lost Data Packet Response

Output:

----- Network Simulator Version 1.1 --------

Enter the number of messages to simulate: 11

Enter packet loss probability [enter 0.0 for no loss]:0.1

Enter packet corruption probability [0.0 for no corruption]:0.3

Enter average time between messages from sender's layer5 [ > 0.0]:1000.0

Enter TRACE:2

EVENT time: 696.571045, type: 1, fromlayer5 entity: 0

[696.571045 A\_output() Seq: 0] --> Sending new packet to B

EVENT time: 701.979919, type: 2, fromlayer3 entity: 1

[701.979919 B\_input() Seq: 0] --> B received valid packet from A. Sending Ack: 0

TOLAYER3: packet being corrupted

EVENT time: 706.738098, type: 2, fromlayer3 entity: 0

[706.738098 A\_input() Ack: 0] --> ACK from B is corrupted/invalid. Ignoring

EVENT time: 726.571045, type: 0, timerinterrupt entity: 0

[726.571045 A\_timerintterupt()] --> Resending packet 0 from A

EVENT time: 736.099182, type: 2, fromlayer3 entity: 1

[736.099182 B\_input() Seq: 0] --> B received corrupted/unordered packet from A. Resending Ack: 0

EVENT time: 745.802429, type: 2, fromlayer3 entity: 0

[745.802429 A\_input() Ack: 0] --> Recieved valid ACK from B

EVENT time: 1966.186157, type: 1, fromlayer5 entity: 0

[1966.186157 A\_output() Seq: 1] --> Sending new packet to B

EVENT time: 1975.974609, type: 2, fromlayer3 entity: 1

[1975.974609 B\_input() Seq: 1] --> B received valid packet from A. Sending Ack: 1

TOLAYER3: packet being lost

EVENT time: 1996.186157, type: 0, timerinterrupt entity: 0

[1996.186157 A\_timerintterupt()] --> Resending packet 1 from A

EVENT time: 2003.139526, type: 2, fromlayer3 entity: 1

[2003.139526 B\_input() Seq: 1] --> B received corrupted/unordered packet from A. Resending Ack: 1

EVENT time: 2004.153198, type: 2, fromlayer3 entity: 0

[2004.153198 A\_input() Ack: 1] --> Recieved valid ACK from B

EVENT time: 3866.870605, type: 1, fromlayer5 entity: 0

[3866.870605 A\_output() Seq: 0] --> Sending new packet to B

EVENT time: 3876.321533, type: 2, fromlayer3 entity: 1

[3876.321533 B\_input() Seq: 0] --> B received valid packet from A. Sending Ack: 0

EVENT time: 3877.538330, type: 2, fromlayer3 entity: 0

[3877.538330 A\_input() Ack: 0] --> Recieved valid ACK from B

EVENT time: 5315.140625, type: 1, fromlayer5 entity: 0

[5315.140625 A\_output() Seq: 1] --> Sending new packet to B

TOLAYER3: packet being corrupted

EVENT time: 5325.117676, type: 2, fromlayer3 entity: 1

[5325.117676 B\_input() Seq: 1] --> B received corrupted/unordered packet from A. Resending Ack: 0

EVENT time: 5333.584961, type: 2, fromlayer3 entity: 0

[5333.584961 A\_input() Ack: 0] --> ACK from B is corrupted/invalid. Ignoring

EVENT time: 5345.140625, type: 0, timerinterrupt entity: 0

[5345.140625 A\_timerintterupt()] --> Resending packet 1 from A

EVENT time: 5348.423828, type: 2, fromlayer3 entity: 1

[5348.423828 B\_input() Seq: 1] --> B received valid packet from A. Sending Ack: 1

TOLAYER3: packet being corrupted

EVENT time: 5350.829102, type: 2, fromlayer3 entity: 0

[5350.829102 A\_input() Ack: 1] --> ACK from B is corrupted/invalid. Ignoring

EVENT time: 5375.140625, type: 0, timerinterrupt entity: 0

[5375.140625 A\_timerintterupt()] --> Resending packet 1 from A

EVENT time: 5376.500488, type: 2, fromlayer3 entity: 1

[5376.500488 B\_input() Seq: 1] --> B received corrupted/unordered packet from A. Resending Ack: 1

EVENT time: 5383.807617, type: 2, fromlayer3 entity: 0

[5383.807617 A\_input() Ack: 1] --> Recieved valid ACK from B

EVENT time: 6415.539551, type: 1, fromlayer5 entity: 0

[6415.539551 A\_output() Seq: 0] --> Sending new packet to B

EVENT time: 6424.482422, type: 2, fromlayer3 entity: 1

[6424.482422 B\_input() Seq: 0] --> B received valid packet from A. Sending Ack: 0

TOLAYER3: packet being lost

EVENT time: 6445.539551, type: 0, timerinterrupt entity: 0

[6445.539551 A\_timerintterupt()] --> Resending packet 0 from A

EVENT time: 6453.713379, type: 2, fromlayer3 entity: 1

[6453.713379 B\_input() Seq: 0] --> B received corrupted/unordered packet from A. Resending Ack: 0

TOLAYER3: packet being corrupted

EVENT time: 6455.033691, type: 2, fromlayer3 entity: 0

[6455.033691 A\_input() Ack: 0] --> ACK from B is corrupted/invalid. Ignoring

EVENT time: 6475.539551, type: 0, timerinterrupt entity: 0

[6475.539551 A\_timerintterupt()] --> Resending packet 0 from A

TOLAYER3: packet being lost

EVENT time: 6505.539551, type: 0, timerinterrupt entity: 0

[6505.539551 A\_timerintterupt()] --> Resending packet 0 from A

EVENT time: 6512.487793, type: 2, fromlayer3 entity: 1

[6512.487793 B\_input() Seq: 0] --> B received corrupted/unordered packet from A. Resending Ack: 0

EVENT time: 6519.674805, type: 2, fromlayer3 entity: 0

[6519.674805 A\_input() Ack: 0] --> Recieved valid ACK from B

EVENT time: 6560.355957, type: 1, fromlayer5 entity: 0

[6560.355957 A\_output() Seq: 1] --> Sending new packet to B

EVENT time: 6564.231934, type: 2, fromlayer3 entity: 1

[6564.231934 B\_input() Seq: 1] --> B received valid packet from A. Sending Ack: 1

TOLAYER3: packet being corrupted

EVENT time: 6573.921875, type: 2, fromlayer3 entity: 0

[6573.921875 A\_input() Ack: 1] --> ACK from B is corrupted/invalid. Ignoring

EVENT time: 6590.355957, type: 0, timerinterrupt entity: 0

[6590.355957 A\_timerintterupt()] --> Resending packet 1 from A

EVENT time: 6596.763184, type: 2, fromlayer3 entity: 1

[6596.763184 B\_input() Seq: 1] --> B received corrupted/unordered packet from A. Resending Ack: 1

EVENT time: 6600.675781, type: 2, fromlayer3 entity: 0

[6600.675781 A\_input() Ack: 1] --> Recieved valid ACK from B

EVENT time: 6833.072266, type: 1, fromlayer5 entity: 0

[6833.072266 A\_output() Seq: 0] --> Sending new packet to B

EVENT time: 6837.543457, type: 2, fromlayer3 entity: 1

[6837.543457 B\_input() Seq: 0] --> B received valid packet from A. Sending Ack: 0

EVENT time: 6845.238281, type: 2, fromlayer3 entity: 0

[6845.238281 A\_input() Ack: 0] --> Recieved valid ACK from B

EVENT time: 7057.309082, type: 1, fromlayer5 entity: 0

[7057.309082 A\_output() Seq: 1] --> Sending new packet to B

TOLAYER3: packet being corrupted

EVENT time: 7058.700195, type: 2, fromlayer3 entity: 1

[7058.700195 B\_input() Seq: 1] --> B received corrupted/unordered packet from A. Resending Ack: 0

TOLAYER3: packet being corrupted

EVENT time: 7068.648926, type: 2, fromlayer3 entity: 0

[7068.648926 A\_input() Ack: 0] --> ACK from B is corrupted/invalid. Ignoring

EVENT time: 7087.309082, type: 0, timerinterrupt entity: 0

[7087.309082 A\_timerintterupt()] --> Resending packet 1 from A

EVENT time: 7091.484375, type: 2, fromlayer3 entity: 1

[7091.484375 B\_input() Seq: 1] --> B received valid packet from A. Sending Ack: 1

EVENT time: 7099.360352, type: 2, fromlayer3 entity: 0

[7099.360352 A\_input() Ack: 1] --> Recieved valid ACK from B

EVENT time: 7549.153809, type: 1, fromlayer5 entity: 0

[7549.153809 A\_output() Seq: 0] --> Sending new packet to B

TOLAYER3: packet being lost

EVENT time: 7579.153809, type: 0, timerinterrupt entity: 0

[7579.153809 A\_timerintterupt()] --> Resending packet 0 from A

TOLAYER3: packet being corrupted

EVENT time: 7585.957031, type: 2, fromlayer3 entity: 1

[7585.957031 B\_input() Seq: 0] --> B received corrupted/unordered packet from A. Resending Ack: 1

TOLAYER3: packet being corrupted

EVENT time: 7593.611816, type: 2, fromlayer3 entity: 0

[7593.611816 A\_input() Ack: 1] --> ACK from B is corrupted/invalid. Ignoring

EVENT time: 7609.153809, type: 0, timerinterrupt entity: 0

[7609.153809 A\_timerintterupt()] --> Resending packet 0 from A

TOLAYER3: packet being corrupted

EVENT time: 7610.199707, type: 2, fromlayer3 entity: 1

[7610.199707 B\_input() Seq: 0] --> B received corrupted/unordered packet from A. Resending Ack: 1

EVENT time: 7614.461426, type: 2, fromlayer3 entity: 0

[7614.461426 A\_input() Ack: 1] --> ACK from B is corrupted/invalid. Ignoring

EVENT time: 7639.153809, type: 0, timerinterrupt entity: 0

[7639.153809 A\_timerintterupt()] --> Resending packet 0 from A

TOLAYER3: packet being lost

EVENT time: 7669.153809, type: 0, timerinterrupt entity: 0

[7669.153809 A\_timerintterupt()] --> Resending packet 0 from A

TOLAYER3: packet being corrupted

EVENT time: 7677.999512, type: 2, fromlayer3 entity: 1

[7677.999512 B\_input() Seq: 0] --> B received corrupted/unordered packet from A. Resending Ack: 1

EVENT time: 7684.130371, type: 2, fromlayer3 entity: 0

[7684.130371 A\_input() Ack: 1] --> ACK from B is corrupted/invalid. Ignoring

EVENT time: 7699.153809, type: 0, timerinterrupt entity: 0

[7699.153809 A\_timerintterupt()] --> Resending packet 0 from A

EVENT time: 7705.677246, type: 2, fromlayer3 entity: 1

[7705.677246 B\_input() Seq: 0] --> B received valid packet from A. Sending Ack: 0

TOLAYER3: packet being corrupted

EVENT time: 7715.153320, type: 2, fromlayer3 entity: 0

[7715.153320 A\_input() Ack: 0] --> ACK from B is corrupted/invalid. Ignoring

EVENT time: 7729.153809, type: 0, timerinterrupt entity: 0

[7729.153809 A\_timerintterupt()] --> Resending packet 0 from A

EVENT time: 7735.189941, type: 2, fromlayer3 entity: 1

[7735.189941 B\_input() Seq: 0] --> B received corrupted/unordered packet from A. Resending Ack: 0

EVENT time: 7741.451660, type: 2, fromlayer3 entity: 0

[7741.451660 A\_input() Ack: 0] --> Recieved valid ACK from B

EVENT time: 9466.698242, type: 1, fromlayer5 entity: 0

[9466.698242 A\_output() Seq: 1] --> Sending new packet to B

TOLAYER3: packet being corrupted

EVENT time: 9468.742188, type: 2, fromlayer3 entity: 1

[9468.742188 B\_input() Seq: 1] --> B received corrupted/unordered packet from A. Resending Ack: 0

TOLAYER3: packet being lost

EVENT time: 9496.698242, type: 0, timerinterrupt entity: 0

[9496.698242 A\_timerintterupt()] --> Resending packet 1 from A

EVENT time: 9505.847656, type: 2, fromlayer3 entity: 1

[9505.847656 B\_input() Seq: 1] --> B received valid packet from A. Sending Ack: 1

EVENT time: 9509.123047, type: 2, fromlayer3 entity: 0

[9509.123047 A\_input() Ack: 1] --> Recieved valid ACK from B

EVENT time: 11000.929688, type: 1, fromlayer5 entity: 0

[11000.929688 A\_output() Seq: 0] --> Sending new packet to B

EVENT time: 11003.459961, type: 2, fromlayer3 entity: 1

Simulator terminated at time 11003.459961

after sending 11 msgs from layer5

10 successful ACKs were recieved from the reciever

Process finished with exit code 0