Project Report

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  Contribution: implemented the Reliable Data Transfer Protocol V2.2 receiver side

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  Contribution: implemented the Reliable Data Transfer Protocol V2.2 sender side

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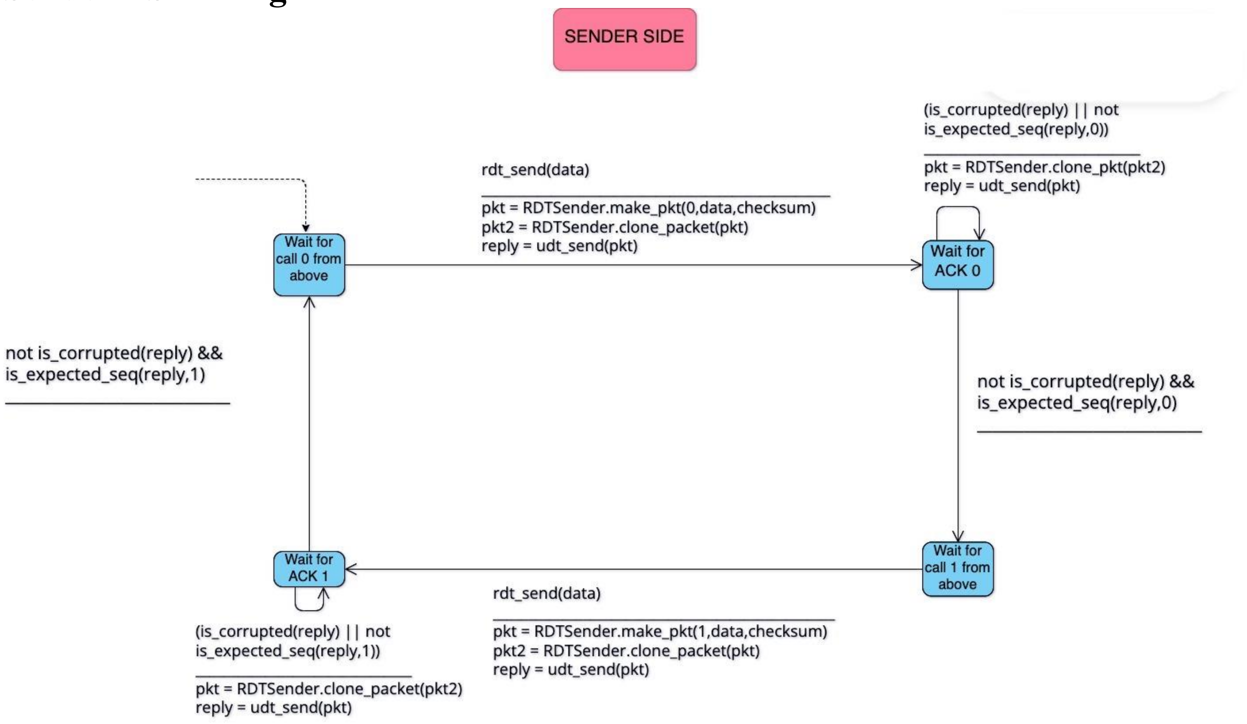
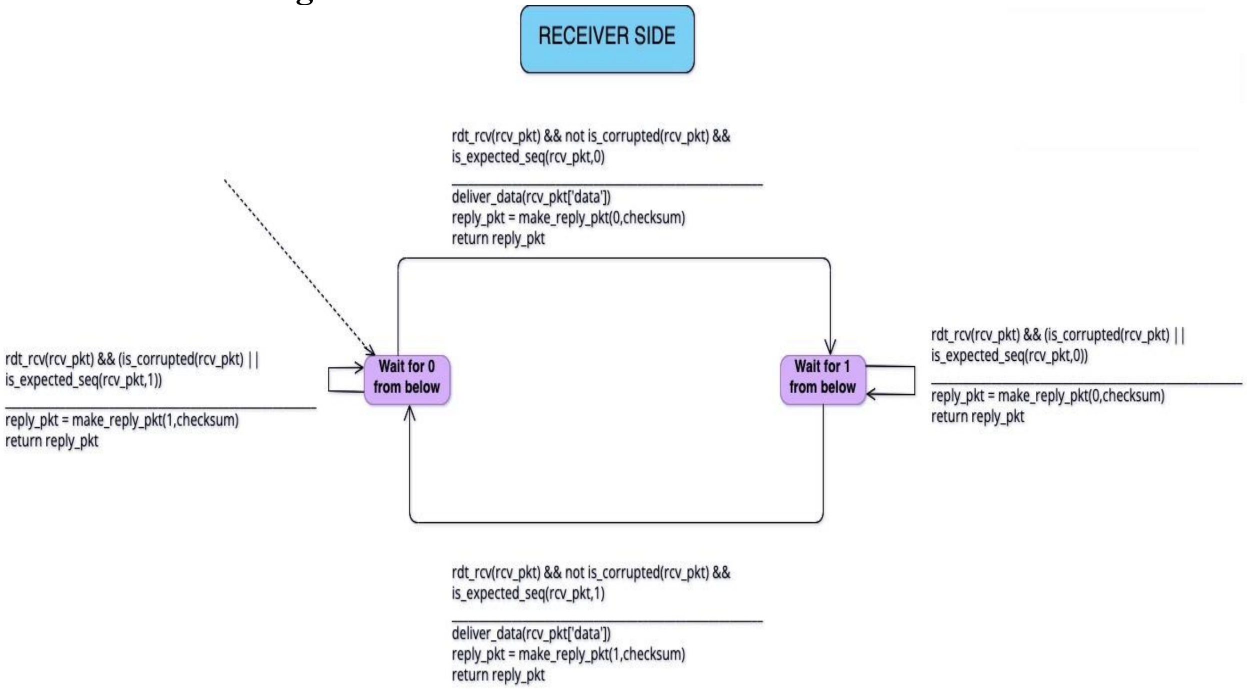
  Contribution: Made the project report

2. FSM Diagram:

Sender FSM Diagram:


SENDER SIDE
(is_corrupted(reply) || not is_expected_seq(reply,0))
pkt = RDTSender.clone_pkt(pkt2)
reply = udt_send(pkt)
rdt_send(data)
pkt = RDTSender.make_pkt(0,data,checksum)
pkt2 = RDTSender.clone_packet(pkt)
reply = udt_send(pkt)
Wait for call 0 from above
Wait for ACK 0
not is_corrupted(reply) && is_expected_seq(reply,1)
not is_corrupted(reply) && is_expected_seq(reply,0)
Wait for ACK 1
Wait for call 1 from above
rdt_send(data)
pkt = RDTSender.make_pkt(1,data,checksum)
pkt2 = RDTSender.clone_packet(pkt)
reply = udt_send(pkt)
(is_corrupted(reply) || not is_expected_seq(reply,1))
pkt = RDTSender.clone_packet(pkt2)
reply = udt_send(pkt)

Receiver FSM Diagram:


RECEIVER SIDE
rdt_rcv(rcv_pkt) && not is_corrupted(rcv_pkt) && is_expected_seq(rcv_pkt,0)
deliver_data(rcv_pkt['data'])
reply_pkt = make_reply_pkt(0,checksum)
return reply_pkt
rdt_rcv(rcv_pkt) && (is_corrupted(rcv_pkt) || is_expected_seq(rcv_pkt,1))
reply_pkt = make_reply_pkt(1,checksum)
return reply_pkt
Wait for 0 from below
Wait for 1 from below
rdt_rcv(rcv_pkt) && (is_corrupted(rcv_pkt) || is_expected_seq(rcv_pkt,0))
reply_pkt = make_reply_pkt(0,checksum)
return reply_pkt
rdt_rcv(rcv_pkt) && not is_corrupted(rcv_pkt) && is_expected_seq(rcv_pkt,1)
deliver_data(rcv_pkt['data'])
reply_pkt = make_reply_pkt(1,checksum)
return reply_pkt

3. Pseudo-code:

RDT Sender Side Pseudo-code:

```
SenderProcess:
    - __buffer: list()

    set_outgoing_data(buffer):
        __buffer = buffer

    get_outgoing_data():
        return __buffer


RDTSender:
    - sequence: string
    - net_srv: RDTReceiver
    - clone: dictionary

    __init__(net_srv):
        sequence = '0'
        net_srv = net_srv

    get_checksum(data):
        if length of data is not 1:
            raise ValueError("Input must be a single character")
        checksum = ASCII value of data
        return checksum

    clone_packet(packet):
        pkt_clone = {
            'sequence_number': packet['sequence_number'],
            'data': packet['data'],
            'checksum': packet['checksum']
        }
        return pkt_clone

    is_corrupted(reply):
        expected_checksum = reply['checksum']
        actual_checksum = ASCII code of clone['sequence_number']
        return actual_checksum is not equal to expected_checksum

    is_expected_seq(reply, exp_seq):
        return reply['ack'] is equal to exp_seq
    make_pkt(seq, data, checksum):
        packet = {
            'sequence_number': seq,
            'data': data,
            'checksum': checksum
        }
        return packet

    rdt_send(process_buffer):
        for data in process_buffer:
            checksum = get_checksum(data)
            pkt = make_pkt(sequence, data, checksum)
            clone = clone_packet(pkt)

            while True:
                print("Sender: Sending packet - Sequence: {pkt['sequence_number']}, Data: {pkt['data']}, Checksum: {pkt['checksum']}")
                reply = net_srv.udt_send(pkt)
                print("Sender: Received packet - Sequence: {reply['ack']}, Checksum: {reply['checksum']}")

                if not is_corrupted(reply) and is_expected_seq(reply, sequence):
                    sequence = '1' if sequence is '0' else '0'
                    break
                else:
                    print("Sender: Resending packet due to corruption or wrong sequence number.")
                    pkt = make_pkt(clone['sequence_number'], clone['data'], clone['checksum'])

        print('Sender Done!')
```

RDT Receiver Side Pseudo-code:

```
ReceiverProcess:
    - __buffer: list()

    deliver_data(data):
        append data to __buffer

    get_buffer():
        return __buffer
```

```
RDTReceiver:
    - sequence: string

    __init__():
        sequence = '0'

    is_corrupted(packet):
        computed_checksum = packet['checksum']
        expected_checksum = get_ASCII_code(packet['data'])
        return computed_checksum is not equal to expected_checksum

    is_expected_seq(rcv_pkt, exp_seq):
        return rcv_pkt['sequence_number'] is equal to exp_seq

    make_reply_pkt(seq, checksum):
        reply_pkt = {
            'ack': seq,
            'checksum': checksum
        }
        return reply_pkt

    rdt_rcv(rcv_pkt):
        print("Receiver: Received packet - Sequence: {rcv_pkt['sequence_number']}, Data:
{rcv_pkt['data']}, Checksum: {rcv_pkt['checksum']}")

        if not is_corrupted(rcv_pkt) and is_expected_seq(rcv_pkt, sequence):
            deliver_data(rcv_pkt['data'])
            reply_pkt = make_reply_pkt(sequence, get_ASCII_code(sequence))
            sequence = '1' if sequence is '0' else '0'
            print(f"Receiver: Acknowledgment sent - Sequence: {reply_pkt['ack']}, Checksum:
{reply_pkt['checksum']}")
            return reply_pkt

        if is_corrupted(rcv_pkt):
            print("Receiver: Packet ignored due to corruption.")
        if not is_expected_seq(rcv_pkt, sequence):
            print("Receiver: Packet ignored due to wrong sequence number.")
        prev_sequence = '0' if sequence is '1' else '1'
        reply_pkt = make_reply_pkt(prev_sequence, get_ASCII_code(prev_sequence))
        return reply_pkt
```

4. Changes to Skeleton Code:

• Modified `is_corrupted` Method in `RDTReceiver` Class:
- Reason: Completed the implementation of the ‘is_corrupted’ method by comparing the computed checksum with the expected checksum derived from the received packet's data. This is essential for determining whether the received packet is corrupted or not.

• Updated `rdt_rcv` Method to include print statements in `RDTReceiver` Class:
- Reason: Added print statements in the ‘rdt_rcv’ method to provide information about the received packet, including its sequence number, data, and checksum. This enhances visibility and understanding of the receiver's operation.

• Updated `rdt_rcv` Method to include acknowledgment sequence update in `RDTReceiver` Class:
- Reason: Modified the ‘rdt_rcv’ method to update the sequence number in the receiver based on the received packet's sequence number. This ensures that the receiver keeps track of the expected sequence number for the next incoming packet.

• Modified “is_expected_seq” Method in “RDTReceiver” Class:
- Reason: The `is_expected_seq` method is modified to compare the sequence number in the received packet with the expected sequence to Check if the received reply from receiver has the expected sequence number.

• Adjusted the ‘make_reply_pkt’ method to use the correct sequence number in ‘RDTReceiver’ Class:
- Reason: In the ‘rdt_rcv’ method, when creating the reply packet, the ‘make_reply_pkt’ method is used with the correct sequence number. This ensures that the acknowledgment sent in the reply packet corresponds to the correct sequence.

• Added `clone` Attribute in `RDTSender` Class:
- Reason: Introduced a `clone` attribute to keep a copy of the outgoing packet. This is used to compare the received acknowledgment with the original packet to determine corruption and check for the expected sequence number.

• Modified `get_checksum` Method in `RDTSender` Class:
- Reason: Implemented the `get_checksum` method to calculate the checksum of the outgoing data by calculating the ASCII code of the input character 'data'. It ensures that the sender can correctly compute the checksum for the data it sends.

• Modified `make_pkt` Method to use the clone's values in `RDTSender` Class:
- Reason: In the 'rdt_send' method, when resending a packet, the 'make_pkt' method is used with values from the clone to recreate the packet correctly.

• Modified `is_corrupted` Method in `RDTSender` Class:
- Reason: Implemented the `is_corrupted` method to check if the received acknowledgment is corrupted. It compares the expected checksum with the actual checksum calculated from the data.

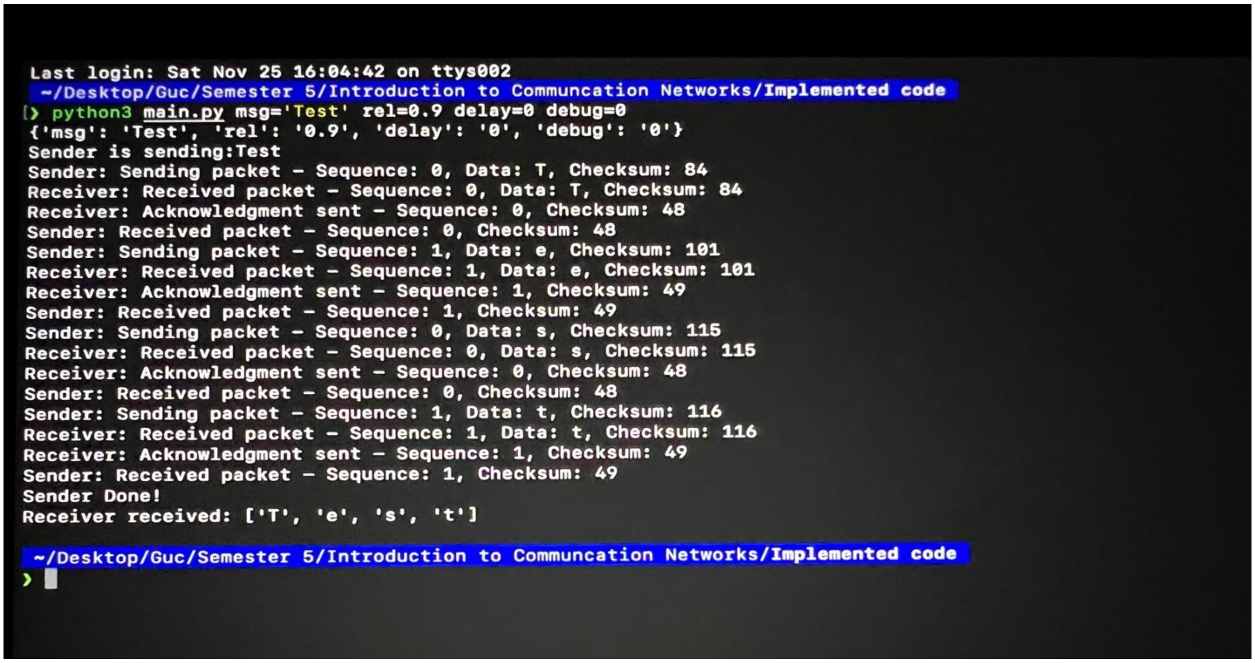
• Modified `is_expected_seq` Method in `RDTSender` Class:
- Reason: Updated the `is_expected_seq` method to check if the acknowledgment received from the receiver has the expected sequence number. This ensures that the sender can verify if the acknowledgment matches the sequence number it expects.

• Adjusted `rdt_send` Method in `RDTSender` Class:
- Reason: Modified the `rdt_send` method to include the necessary logic for handling acknowledgments. The sender now enters a loop, resending the packet until a correct acknowledgment is received. This ensures reliability in the face of corruption or incorrect sequence numbers.

5. Test Cases and Results:

• Test Case 1:

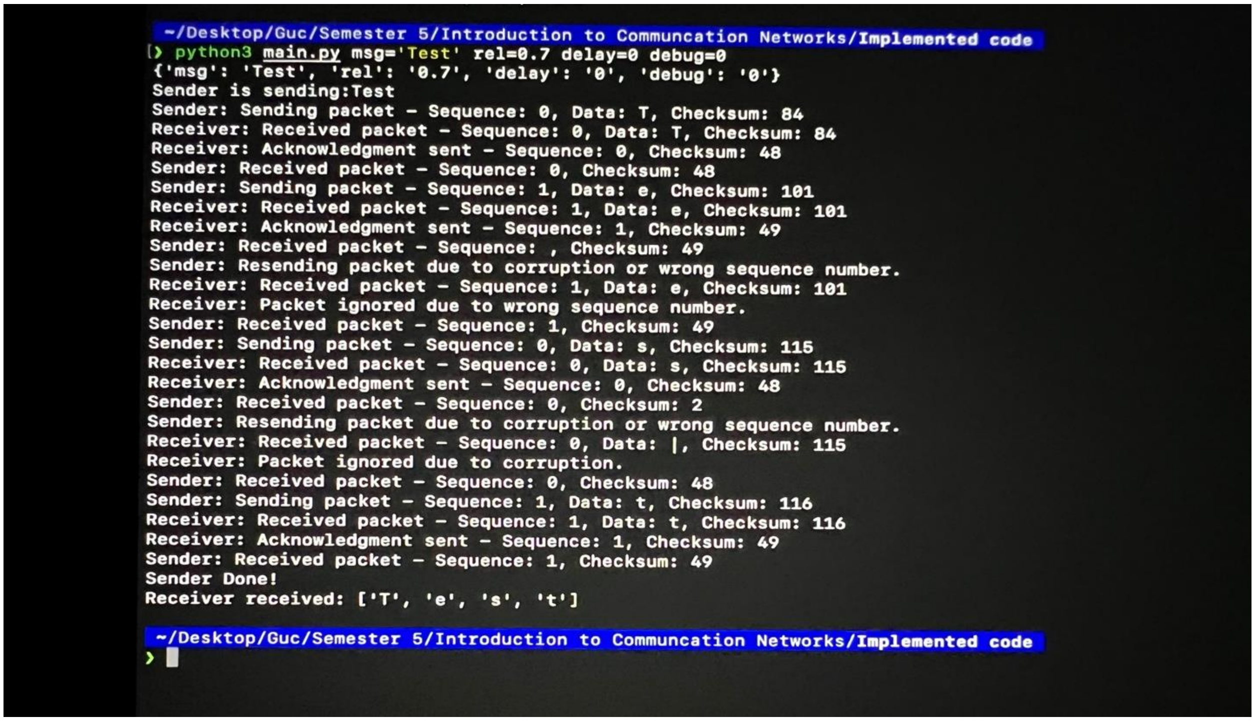
Input: `msg='Test' rel=0.9 delay=0 debug=0`
Screenshot:



```
Last login: Sat Nov 25 16:04:42 on ttys002
 ~/Desktop/Guc/Semester 5/Introduction to Communcation Networks/Implemented code
❯ python3 main.py msg='Test' rel=0.9 delay=0 debug=0
{'msg': 'Test', 'rel': '0.9', 'delay': '0', 'debug': '0'}
Sender is sending:Test
Sender: Sending packet - Sequence: 0, Data: T, Checksum: 84
Receiver: Received packet - Sequence: 0, Data: T, Checksum: 84
Receiver: Acknowledgment sent - Sequence: 0, Checksum: 48
Sender: Received packet - Sequence: 0, Checksum: 48
Sender: Sending packet - Sequence: 1, Data: e, Checksum: 101
Receiver: Received packet - Sequence: 1, Data: e, Checksum: 101
Receiver: Acknowledgment sent - Sequence: 1, Checksum: 49
Sender: Received packet - Sequence: 1, Checksum: 49
Sender: Sending packet - Sequence: 0, Data: s, Checksum: 115
Receiver: Received packet - Sequence: 0, Data: s, Checksum: 115
Receiver: Acknowledgment sent - Sequence: 0, Checksum: 48
Sender: Received packet - Sequence: 0, Checksum: 48
Sender: Sending packet - Sequence: 1, Data: t, Checksum: 116
Receiver: Received packet - Sequence: 1, Data: t, Checksum: 116
Receiver: Acknowledgment sent - Sequence: 1, Checksum: 49
Sender: Received packet - Sequence: 1, Checksum: 49
Sender Done!
Receiver received: ['T', 'e', 's', 't']

 ~/Desktop/Guc/Semester 5/Introduction to Communcation Networks/Implemented code
❯ 
```

- **Test Case 2:**

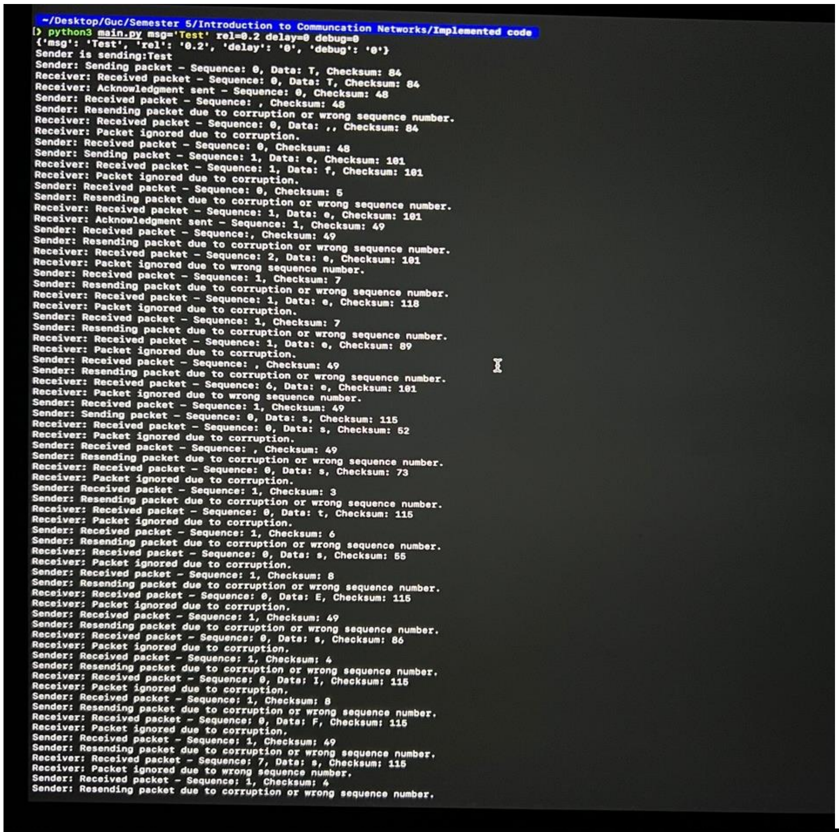
Input: `msg='Test' rel=0.7 delay=0 debug=0`
`Screenshot:`



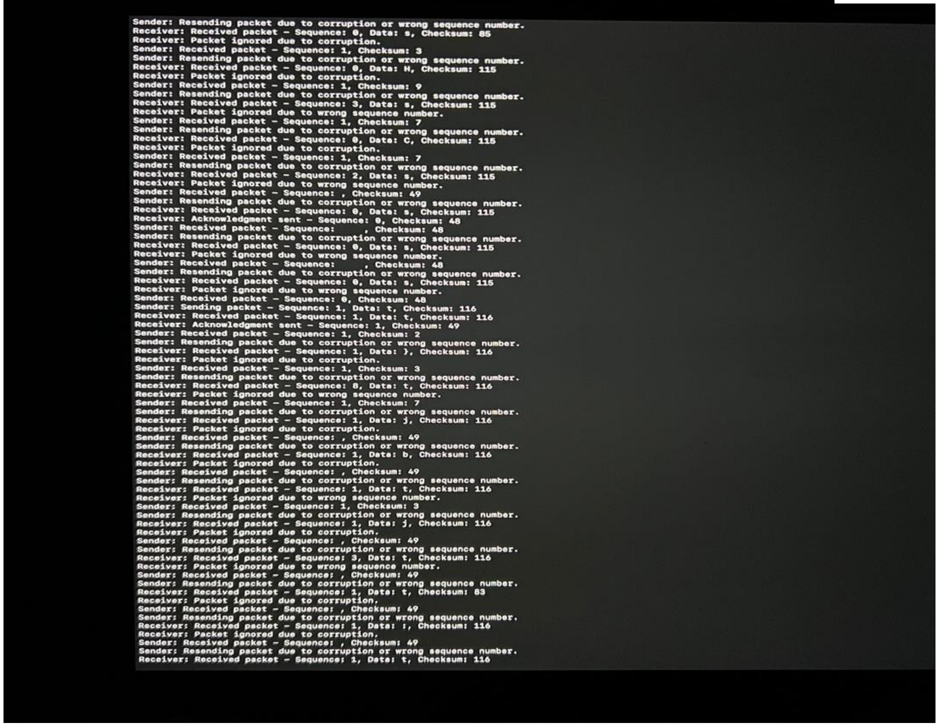
```
 ~/Desktop/Guc/Semester 5/Introduction to Communcation Networks/Implemented code
[> python3 main.py msg='Test' rel=0.7 delay=0 debug=0
{'msg': 'Test', 'rel': '0.7', 'delay': '0', 'debug': '0'}
Sender is sending:Test
Sender: Sending packet - Sequence: 0, Data: T, Checksum: 84
Receiver: Received packet - Sequence: 0, Data: T, Checksum: 84
Receiver: Acknowledgment sent - Sequence: 0, Checksum: 48
Sender: Received packet - Sequence: 0, Checksum: 48
Sender: Sending packet - Sequence: 1, Data: e, Checksum: 101
Receiver: Received packet - Sequence: 1, Data: e, Checksum: 101
Receiver: Acknowledgment sent - Sequence: 1, Checksum: 49
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: e, Checksum: 101
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: 1, Checksum: 49
Sender: Sending packet - Sequence: 0, Data: s, Checksum: 115
Receiver: Received packet - Sequence: 0, Data: s, Checksum: 115
Receiver: Acknowledgment sent - Sequence: 0, Checksum: 48
Sender: Received packet - Sequence: 0, Checksum: 2
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: |, Checksum: 115
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 0, Checksum: 48
Sender: Sending packet - Sequence: 1, Data: t, Checksum: 116
Receiver: Received packet - Sequence: 1, Data: t, Checksum: 116
Receiver: Acknowledgment sent - Sequence: 1, Checksum: 49
Sender: Received packet - Sequence: 1, Checksum: 49
Sender Done!
Receiver received: ['T', 'e', 's', 't']

 ~/Desktop/Guc/Semester 5/Introduction to Communcation Networks/Implemented code
>
```

- **Test Case 3:**

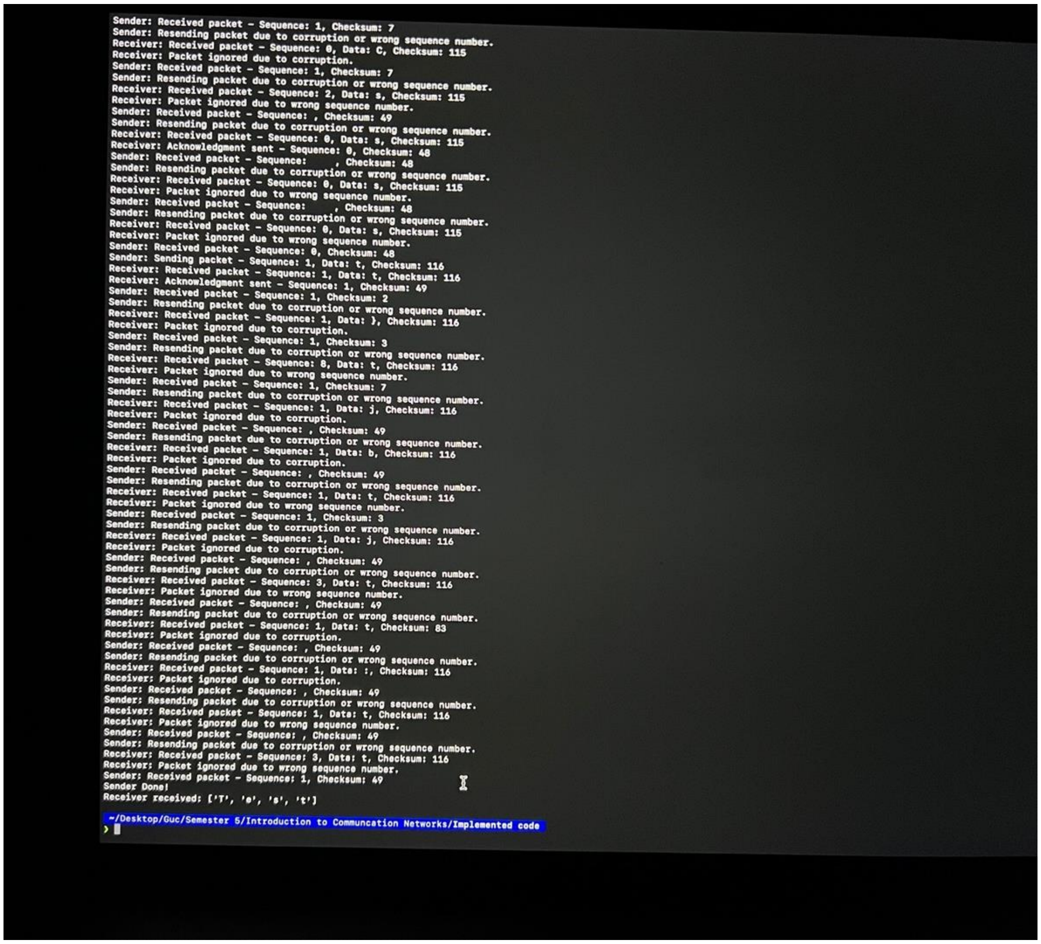
Input: `msg='Test' rel=0.2 delay=0 debug=0`
Screenshots:



```
~/Desktop/Guc/Semester 5/Introduction to Communcation Networks/Implemented code
❯ python3 main.py msg='Test' rel=0.2 delay=0 debug=0
{'msg': 'Test', 'rel': '0.2', 'delay': '0', 'debug': '0'}
Sender is sending:Test
Sender: Sending packet - Sequence: 0, Data: T, Checksum: 84
Receiver: Received packet - Sequence: 0, Data: T, Checksum: 84
Receiver: Acknowledgment sent - Sequence: 0, Checksum: 48
Sender: Received packet - Sequence: , Checksum: 48
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: ,, Checksum: 84
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 0, Checksum: 48
Sender: Sending packet - Sequence: 1, Data: e, Checksum: 101
Receiver: Received packet - Sequence: 1, Data: f, Checksum: 101
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 0, Checksum: 5
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: e, Checksum: 101
Receiver: Acknowledgment sent - Sequence: 1, Checksum: 49
Sender: Received packet - Sequence:, Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 2, Data: e, Checksum: 101
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: 1, Checksum: 7
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: e, Checksum: 118
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 7
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: e, Checksum: 89
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 6, Data: e, Checksum: 101
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: 1, Checksum: 49
Sender: Sending packet - Sequence: 0, Data: s, Checksum: 115
Receiver: Received packet - Sequence: 0, Data: s, Checksum: 52
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: s, Checksum: 73
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 3
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: t, Checksum: 115
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 6
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: s, Checksum: 55
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 8
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: E, Checksum: 115
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: s, Checksum: 86
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 4
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: I, Checksum: 115
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 8
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: F, Checksum: 115
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 7, Data: s, Checksum: 115
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: 1, Checksum: 4
Sender: Resending packet due to corruption or wrong sequence number.
```



```
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: s, Checksum: 85
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 3
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: H, Checksum: 115
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 9
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 3, Data: s, Checksum: 115
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: 1, Checksum: 7
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: C, Checksum: 115
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 7
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 2, Data: s, Checksum: 115
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: s, Checksum: 115
Receiver: Acknowledgment sent - Sequence: 0, Checksum: 48
Sender: Received packet - Sequence:      , Checksum: 48
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: s, Checksum: 115
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence:      , Checksum: 48
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: s, Checksum: 115
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: 0, Checksum: 48
Sender: Sending packet - Sequence: 1, Data: t, Checksum: 116
Receiver: Received packet - Sequence: 1, Data: t, Checksum: 116
Receiver: Acknowledgment sent - Sequence: 1, Checksum: 49
Sender: Received packet - Sequence: 1, Checksum: 2
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: }, Checksum: 116
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 3
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 8, Data: t, Checksum: 116
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: 1, Checksum: 7
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: j, Checksum: 116
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: b, Checksum: 116
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: t, Checksum: 116
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: 1, Checksum: 3
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: j, Checksum: 116
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 3, Data: t, Checksum: 116
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: t, Checksum: 83
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: :, Checksum: 116
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: t, Checksum: 116
```



```
Sender: Received packet - Sequence: 1, Checksum: 7
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: C, Checksum: 115
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 7
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 2, Data: s, Checksum: 115
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: s, Checksum: 115
Receiver: Acknowledgment sent - Sequence: 0, Checksum: 48
Sender: Received packet - Sequence:     , Checksum: 48
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: s, Checksum: 115
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence:     , Checksum: 48
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 0, Data: s, Checksum: 115
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: 0, Checksum: 48
Sender: Sending packet - Sequence: 1, Data: t, Checksum: 116
Receiver: Received packet - Sequence: 1, Data: t, Checksum: 116
Receiver: Acknowledgment sent - Sequence: 1, Checksum: 49
Sender: Received packet - Sequence: 1, Checksum: 2
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: }, Checksum: 116
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: 1, Checksum: 3
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 8, Data: t, Checksum: 116
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: 1, Checksum: 7
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: j, Checksum: 116
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: b, Checksum: 116
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: t, Checksum: 116
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: 1, Checksum: 3
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: j, Checksum: 116
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 3, Data: t, Checksum: 116
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: t, Checksum: 83
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: :, Checksum: 116
Receiver: Packet ignored due to corruption.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 1, Data: t, Checksum: 116
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: , Checksum: 49
Sender: Resending packet due to corruption or wrong sequence number.
Receiver: Received packet - Sequence: 3, Data: t, Checksum: 116
Receiver: Packet ignored due to wrong sequence number.
Sender: Received packet - Sequence: 1, Checksum: 49
Sender Done!
Receiver received: ['T', 'e', 's', 't']

 ~/Desktop/Guc/Semester 5/Introduction to Communcation Networks/Implemented code
❯ 
```