Landon Spitzer

Found of Computer Networks

Assignment 3 Report

Sender → Receiver

```
C:\Users\spitz\Computer Networks Assignment  3\ComputerNetworksAssignment3>python sender.py --receiver-port 12347 --listening-port 12345
--data "This is a whole bunch of data ................................................................"
Sender started.
Sent packet 0
Received ACK 0 for packet 0
Sent packet 1
Received ACK 1 for packet 1
Sent packet 2
Received ACK 2 for packet 2
Sent packet 16777215
Received ACK 16777215 for packet 16777215
Data transmission complete.
```

```
C:\Users\spitz\Computer Networks Assignment  3\ComputerNetworksAssignment3>python receiver.py --listen-port 12347
Receiver listening on port 12347...
Received packet 0, sending ACK...
Received packet 1, sending ACK...
Received packet 2, sending ACK...
Received last packet, sending final ACK...
```

Sender → Intermediate → Receiver (no impairments)

```
C:\Users\spitz\Computer Networks Assignment  3\ComputerNetworksAssignment3>python sender.py --receiver-port 12346 --listenin
g-port 12345 --data "Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam commodo nibh eget bibendum venenatis.
Aliquam congue tincidunt mi non consectetur."
Sender started.
Sent packet 0
Sent packet 0
Retransmitting packet 0
Sent packet 0
Retransmitting packet 0
Sent packet 0
Retransmitting packet 0
Received ACK 0 for packet 0
Sent packet 1
Received ACK 1 for packet 1
Sent packet 2
Received ACK 2 for packet 2
Sent packet 3
Received ACK 3 for packet 3
Sent packet 16777215
Received ACK 16777215 for packet 16777215
Data transmission complete.
```

```
C:\Users\spitz\Computer Networks Assignment  3\ComputerNetworksAssignment3>python intermediate.py --sender-port 12345 --rece
iver-port 12347 --listen-port 12346
Intermediate started.
Socket closed. Exiting...
```

```
C:\Users\spitz\Computer Networks Assignment  3\ComputerNetworksAssignment3>python receiver.py --listen-port 12347
Receiver listening on port 12347...
Received packet 0, sending ACK...
Received packet 1, sending ACK...
Received packet 2, sending ACK...
Received packet 3, sending ACK...
Received last packet, sending final ACK...
```

Sender → Intermediate → Receiver (loss, corruption, and reordering)

Only loss and corruption occurred in this case:

```
C:\Users\spitz\Computer Networks Assignment  3\ComputerNetworksAssignment3>python sender.py --receiver-port 12346 --listenin
g-port 12345 --data "Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam commodo nibh eget bibendum venenatis.
Aliquam congue tincidunt mi non consectetur.dkndklndkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkk"
Sender started.
Sent packet 0
Sent packet 0
Retransmitting packet 0
Sent packet 0
Retransmitting packet 0
Sent packet 0
Retransmitting packet 0
Sent packet 0
Retransmitting packet 0
Sent packet 0
Retransmitting packet 0
Received ACK 0 for packet 0
Sent packet 1
Received ACK 1 for packet 1
Sent packet 2
Received ACK 2 for packet 2
Sent packet 3
Received ACK 3 for packet 3
Sent packet 4
Received ACK 4 for packet 4
Sent packet 16777215
Received ACK 16777215 for packet 16777215
Data transmission complete.
```

```
C:\Users\spitz\Computer Networks Assignment  3\ComputerNetworksAssignment3>python intermediate.py --sender-port 12345 --rece
iver-port 12347 --listen-port 12346 --loss --corrupt --reorder
Intermediate started.

Data packet corrupted (simulated).
Original packet: b'\x00\x00\x00\x00\x0fcLorem ipsum dolor sit amet, consectetur adip'
Corrupted packet: b'\x00\x00\xff\x00\x0fcLo\x8dem \x96psum \x9bolor s\x96t amet, consectetur\xdfa\x9bip'
Difference: b'\x00\x00\xff\x00\x00\x00\x00\x00\xff\x00\x00\x00\xff\x00\x00\x00\x00\x00\xff\x00\x00\x00\x00\x00\xff\x00\x
00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\xff\x00\xff\x00\x00'

ACK lost (simulated).
Contents of dropped packet: b'\x00\x00\x00\x00s\xbc'

Socket closed. Exiting...
```

```
C:\Users\spitz\Computer Networks Assignment  3\ComputerNetworksAssignment3>python receiver.py --listen-port 12347
Receiver listening on port 12347...
Received packet 65280 with incorrect checksum, ignoring...
Received packet 0, sending ACK...
Received out-of-order packet 0, expected 1, resending 0
Received packet 1, sending ACK...
Received packet 2, sending ACK...
Received packet 3, sending ACK...
Received packet 4, sending ACK...
Received last packet, sending final ACK...
```

Another example ran with the same command, only reordering occurred here:

```
C:\Users\spitz\Computer Networks Assignment  3\ComputerNetworksAssignment3>python sender.py --receiver-port 12346 --listening-por
t 12345 --data "Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam commodo nibh eget bibendum venenatis. Aliquam co
ngue tincidunt mi non consectetur.dkndklndkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkk"
Sender started.
Sent packet 0
Received ACK 0 for packet 0
Sent packet 1
Received ACK 1 for packet 1
Sent packet 2
Received ACK 2 for packet 2
Sent packet 3
Received ACK 3 for packet 3
Sent packet 4
Received ACK 4 for packet 4
Sent packet 16777215
Received ACK 16777215 for packet 16777215
Data transmission complete.
```

```
C:\Users\spitz\Computer Networks Assignment  3\ComputerNetworksAssignment3>python intermediate.py --sender-port 12345 --rece
iver-port 12347 --listen-port 12346 --loss --corrupt --reorder
Intermediate started.

Data packet reordered (simulated).

Data packet reordered (simulated).
Socket closed. Exiting...
```

```
C:\Users\spitz\Computer Networks Assignment  3\ComputerNetworksAssignment3>python receiver.py --listen-port 12347
Receiver listening on port 12347...
Received packet 0, sending ACK...
Received packet 1, sending ACK...
Received packet 2, sending ACK...
Received packet 3, sending ACK...
Received packet 4, sending ACK...
Received last packet, sending final ACK...
```

Client sends file to Server:

```
C:\Users\spitz\Computer Networks Assignment  3\ComputerNetworksAssignment3>python client.py --listen-port 1234
5 --server-port 12500
Enter the filename: mockfile.pdf
Sender started.
Sent packet 0
Received ACK 0 for packet 0
Sent packet 16777215
Received ACK 16777215 for packet 16777215
Data transmission complete.
Sender started.
Sent packet 0
Received ACK 0 for packet 0
Sent packet 1
Received ACK 1 for packet 1
Sent packet 2
Received ACK 2 for packet 2
Sent packet 3
Received ACK 3 for packet 3
Sent packet 4
Received ACK 4 for packet 4
```

...

```
Received ACK 619 for packet 619
Sent packet 620
Received ACK 620 for packet 620
Sent packet 621
Received ACK 621 for packet 621
Sent packet 622
Received ACK 622 for packet 622
Sent packet 623
Received ACK 623 for packet 623
Sent packet 624
Received ACK 624 for packet 624
Sent packet 625
Received ACK 625 for packet 625
Sent packet 626
Received ACK 626 for packet 626
Sent packet 16777215
Received ACK 16777215 for packet 16777215
Data transmission complete.
```

```
C:\Users\spitz\Computer Networks Assignment  3\ComputerNetworksAssignment3python server.py --server-port 12500
Receiver listening on port 12500...
Received packet 0, sending ACK...
Received last packet, sending final ACK...
mockfile.pdf
Receiver listening on port 12500...
Received packet 0, sending ACK...
Received packet 1, sending ACK...
Received packet 2, sending ACK...
Received packet 3, sending ACK...
Received packet 4, sending ACK...
Received packet 5, sending ACK...
Received packet 6, sending ACK...
Received packet 7, sending ACK...
Received packet 8, sending ACK...
Received packet 9, sending ACK...
```

...

```
Received packet 611, sending ACK...
Received packet 612, sending ACK...
Received packet 613, sending ACK...
Received packet 614, sending ACK...
Received packet 615, sending ACK...
Received packet 616, sending ACK...
Received packet 617, sending ACK...
Received packet 618, sending ACK...
Received packet 619, sending ACK...
Received packet 620, sending ACK...
Received packet 621, sending ACK...
Received packet 622, sending ACK...
Received packet 623, sending ACK...
Received packet 624, sending ACK...
Received packet 625, sending ACK...
Received packet 626, sending ACK...
Received last packet, sending final ACK...
```