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BCSE UG-3
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Computer Networks

Implementing Different Data Link Layer Protocols

OVERVIEW

Implement three data link layer protocols, Stop and Wait, Go Back N Sliding Window and Selective Repeat Sliding Window for flow control.

GOALS

Sender, Receiver and Channel all are independent processes. There may be multiple Transmitter and Receiver processes, but only one Channel process. The channel process introduces random delay and/or bit error while transferring frames. Define your own frame format or you may use IEEE 802.3 Ethernet frame format.

SPECIFICATIONS

- Frame format followed IEEE 802.3
- Language used : Python

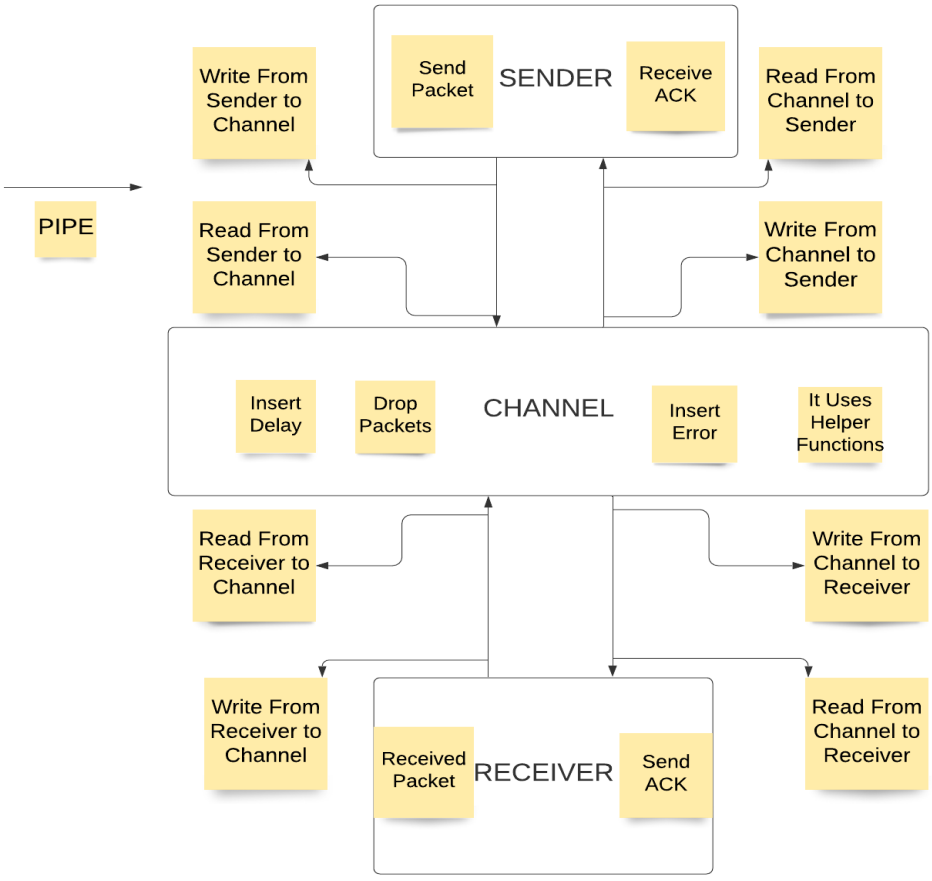
Premble	Frame Delimilater	Dest. Address	Sender Address	Seq. Number	Data Size	Data	ChkSum Code	Total
7	1	6	6	1	1	46	4	72

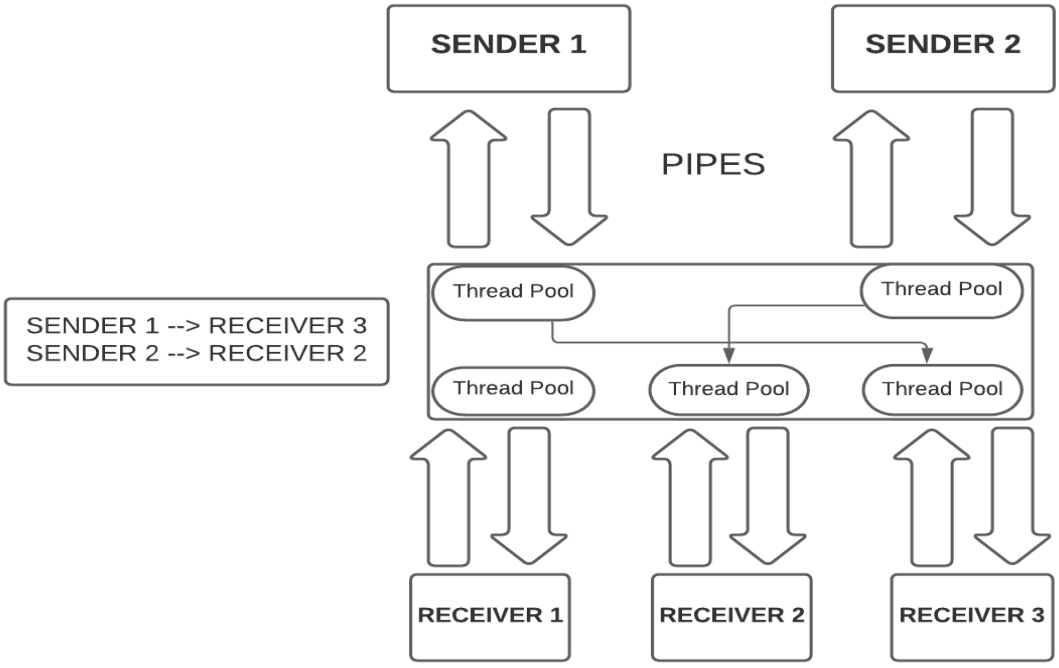
Note: All values in byte.

CODE

Firstly, multiprocessing pipes are created which communicates between the sender and channel, and between channel and receiver. For each sender and receiver, two unidirectional pipes are created. The receiver can receive messages from one sender at a time. The type of data link layer Protocols can be chosen by the user, and hence the window Size. The sender chooses a random receiver.

FLOW OF THE CODE





FINAL CODE STRUCTURE

There may be more than one sender and receiver. Just for simplicity it is shown with just one each.

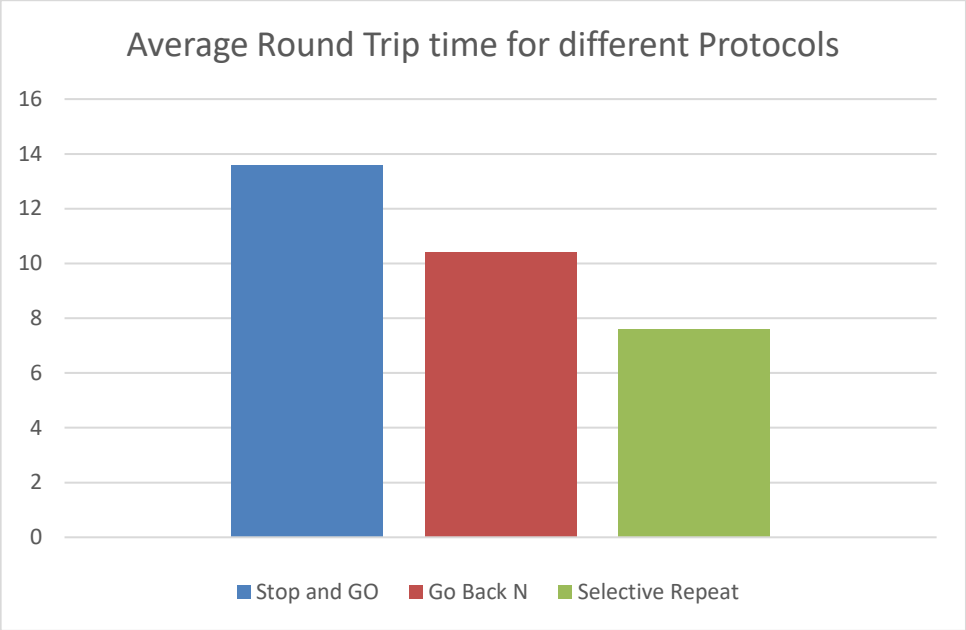
SENDER RECEIVER STATS

Number of Total Frames required to Send a Particular Input Text

Name of Process	Number of frames sent approximately	Number of frames required if only delay is inserted	Number of frames required if both delay, dropout error introduced
Stop and Go	100	144	252
Go Back N	100	153	248
Selective Repeat	100	123	188

Time Taken to Send a Particular Input Text

Name of Process	Number of frames sent approximately	Time Taken (in Minutes)
Stop and Go	100	13.6
Go Back N	100	10.4
Selective Repeat	100	7.6



WORKING OF CODE

All the code was made to run for 2 senders and 3 receivers.

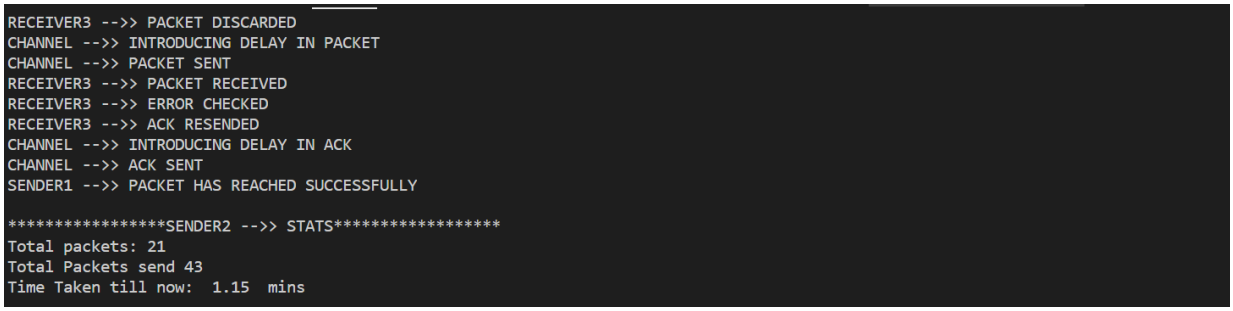
Stop AND Go :

```
SENDER2 -->> PACKET HAS REACHED SUCCESSFULLY
SENDER2 -->> PACKET 21 SENT TO CHANNEL
CHANNEL -->> PACKET SENT
RECEIVER1 -->> PACKET RECEIVED
RECEIVER1 -->> ERROR CHECKED
RECEIVER1 -->> ACK SENT FROM RECEIVER
CHANNEL -->> ACK SENT
SENDER2 -->> PACKET HAS REACHED SUCCESSFULLY

**********SENDER2 -->> STATS**********
Total packets: 21
Total Packets send 45
Time Taken till now:  1.13  mins
```

Go Back N :

N used here is 4.



Selective Repeat :