COSC 264  
Introduction to Computer Networking and the Internet

# Assignment

Partners:

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## Questions:

1. The protocol between sender and receiver as described above has (at least) one weakness: it has a deadlock. Please explain the notion of a deadlock in the context of networking protocols and describe the particular deadlock situation in our case. A guiding question is: what can go wrong and when in case certain packets are lost?
2. What is the magicno field good for?

The magicno field is used as a checksum to ensure that

1. How have you solved the issue with the bit errors? Please explain what you have added to the packet and add to the sender and receiver modules.
2. Please explain what the select() function is doing and why it is useful for the channel (and in another way for the sender).
3. Please explain how you have checked whether or not the file was transferred correctly (i.e., the receiver’s copy is identical to the transmitter’s copy).
4. We consider different packet loss probabilities of P {0.0, 0.01, 0.05, 0.1, 0.2, 0.3} and a source file of length M = 512 \* 100 = 51,200 bytes (you need to create such a file). For each value of P make ten repetitions of the file transfer and for each repetition record how man packets the sender has sent in total. Draw a graph that shows the different values of P on the x-axis and for each such value the average number of total packets (the average being taken over the ten repetitions) on the y-axis. Explain the results.
5. Assume the following:
   1. The probability to lose an individual packet (either a dataPacket or an acknowledgementPacket) is P,
   2. Packet loss events are statistically independent of each other.
   3. The size of the file to be transmitted requires N packets.

Please derive and justify an expression for the average total number of packets that need to be sent (including retransmissions) to transmit the entire file. Compare this to the (average) total number of packets you have observed in your experiments.

## Source Code:

### Type:

#### Packet

packet.py

### Programs:

#### Channel

channel.py

#### Receiver

receiver.py

#### Sender

sender.py