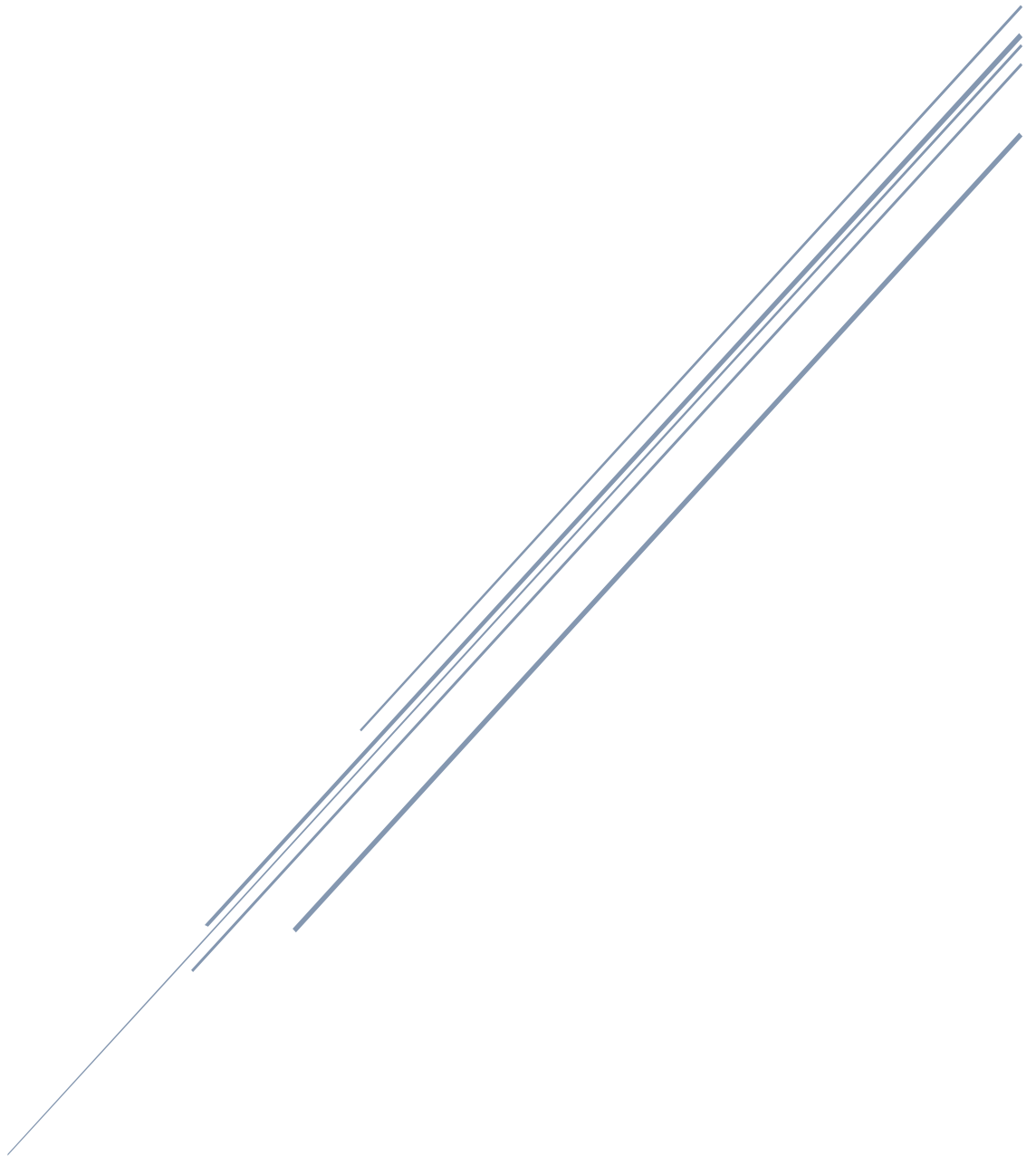# COMS3200

Assignment 2

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Question 1

Frame length = 1500 bytes = 12,000 bits

Data rate = 10Mbps = 10,000,000 bits/s

Propagation delay = 5 us/km

      For 100 km = 500us

3 bits allocated for 8 sequence numbers = 0 >7

Selective repeat means only half can be used at once

> 4 seq numbers

> 4 packets in transit at once

Time to send one frame = 12,000/10,000,000 = 0.0012 s

Time for ACK received = 2*propagation delay = 1000us = 0.001 s

"efficiency = window_size*transmission_delay_of_one_frame/(transmission_delay_of_one_frame+2*one_way_propagation_delay)"

Efficiency = 4*0.0012/(0.0012+0.001)

Efficiency = 2.1818

Therefore efficiency is 100%

"throughput = link_capacity*efficiency"

Throughput = 10Mbs*100%

Throughput = 10Mbs

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Question 2

Frame length = 1500 bytes = 12,000 bits

Data rate = 10Mbps = 10 000 000 bits/s

Propagation delay = 5us/km

      For 10,000 km = 0.05 s

3 bits allocated for 8 sequence numbers = 0 >7

Go-back-n means all except one can be used at once.

> 7 sequence numbers

> 7 packets in transit at once

Time to send one frame = 12,000/10,000,000 = 0.0012 s

"efficiency = window_size*transmission_delay_of_one_frame/(transmission_delay_of_one_frame+2*one_way_propagation_delay)"

Efficiency = 7*0.0012/(0.0012+0.1)

Efficiency = 0.083

Therefore efficiency is approximately 8%

"throughput = link_capacity*efficiency"

Throughput = 10Mbs*8%

Throughput = 8Mbs

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Question 3

Note: Red text indicate differences to questions 1 and 2 due to new variables.

Question 1.3

Frame length = 1500 bytes = 12,000 bits

Data rate = 10Mbps = 10,000,000 bits/s

Propagation delay = 5 us/km

  For 100 km = 500us

7 bits allocated for 128 sequence numbers = 0 >128

Selective repeat means only half can be used at once

> 64 sequence numbers

> 64 packets in transit at once

Time to send one frame = 12,000/10,000,000 = 0.0012 s

Time for ACK received = 2*propagation delay = 1000us = 0.001 s

"efficiency = window_size*transmission_delay_of_one_frame/(transmission_delay_of_one_frame+2*one_way_propagation_delay)"

Efficiency = 64*0.0012/(0.0012+0.001)

Efficiency = 34.909

Therefore efficiency is 100%

"throughput = link_capacity*efficiency"

Throughput = 10Mbs*100%

Throughput = 10Mbs

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Question 2.3

Frame length = 1500 bytes = 12,000 bits

Data rate = 10Mbps = 10 000 000 bits/s

Propagation delay = 5us/km

For 10,000 km = 0.05 s

7 bits allocated for 128 sequence numbers = 0 >128

Go-back-n means all except one can be used at once.

> 127 sequence numbers

> 127 packets in transit at once

Time to send one frame = 12,000/10,000,000 = 0.0012 s

"efficiency = window_size*transmission_delay_of_one_frame/(transmission_delay_of_one_frame+2*one_way_propagation_delay)"

Efficiency = 127*0.0012/(0.0012+0.1)

Efficiency = 1.506

Therefore efficiency is approximately 100%

"throughput = link_capacity*efficiency"

Throughput = 10Mbs*100%

Throughput = 10Mbs

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Question 4

Note: Red text was provided in assignment sheet.

Source MAC Address	Destination MAC Address	Source IP Address (or Host)	Destination IP Address (or Host)	Protocol(s)	Contents
M6	*(Broadcast)	Not Applicable	Not Applicable	ARP	Who owns 134.73.1.254?
M6	M4	B	NS	DNS/UDP/IP	What's the IP address for Server2.dept.org.com?
M2	M3	NS	B	DNS/UDP/IP	IP address is 134.254.2.10
M6	M4	B	Server 2	TCP/IP	SYN
M8	M7	Server 2	B	TCP/IP	SYN/ACK
M6	M4	B	Server 2	TCP/IP	ACK
M6	M4	B	Server 2	TCP/IP	Request
M8	M7	Server 2	B	TCP/IP	Response
M6	M4	B	Server 2	TCP/IP	FIN
M8	M7	Server 2	B	TCP/IP	FIN/ACK
M6	M4	B	Server 2	TCP/IP	ACK

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