In the text a B indicates bytes (8 bits) and b indicates bits.
When referring to data, 1KB is 1024 Bytes of data (8192 bits)
When referring to transmission rates (bandwidth), 1Kbps = 1,000 bits per second

Turn in the following problems:

1) (2 pts) Text Book Chapter 1, Problem 3

Calculate the total time required to transfer a 1000-KB file in the following cases, assuming an RTT of 50 ms, a packet size of 1 KB data, and an initial 2 × RTT of "handshaking" before data is sent:

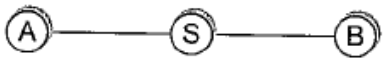
(a) The bandwidth is 1.5 Mbps, and data packets can be sent continuously.

(b) The bandwidth is 1.5 Mbps, but after we finish sending each data packet we must wait one RTT before sending the next.

(c) The bandwidth is "infinite," meaning that we take transmit time to be zero, and up to 20 packets can be sent per RTT.

2) (2 pts) Text Book Chapter 1, Problem 20

Hosts A and B are each connected to a switch S via 100-Mbps links as in Figure 1.21. The propagation delay on each link is



20 μs. S is a store-and-forward device; it begins retransmitting a received packet 35 μs after it has finished receiving it. Calculate the total time required to transmit 10,000 bits from A to B

(a) As a single packet.

(b) As two 5000-bit packets sent one right after the other.

3) (2 pts) Text Book Chapter 1, Problem 24

Consider a network with a ring topology, link bandwidths of 100 Mbps, and propagation speed 2×10^8 m/s. What would the circumference of the loop be to exactly contain one 1500-byte packet, assuming nodes do not introduce delay? What would the circumference be if there was a node every 100 m, and each node introduced 10 bits of delay?

4) (2 pts) Chapter 2 Text Book Problem 8

Suppose you want to send some data using the BISYNC framing protocol and the last 2 bytes of your data are DLE and ETX. What sequence of bytes would be transmitted immediately prior to the CRC?

5) (2 pts) Chapter 2 Text Book Problem 18

Suppose we want to transmit the message 11100011 and protect it from errors using the CRC polynomial $x^3 + 1$.

(a) Use polynomial long division to determine the message that should be transmitted.

(b) Suppose the leftmost bit of the message is inverted due to noise on the transmission link. What is the result of the receiver's CRC calculation? How does the receiver know that an error has occurred?