Sage deBrum
CS430

HW#8

1. If host a sends a packet that is 30 bytes with that sequence number being 430, then the next packet's sequence number would be 460, since it is the sequence number plus the packet size.
2. If the first packet is lost, then the acknowledgement number would be for that first packet, so it would be 430.
3. TCP handles retransmissions of packets by resending the packet with oldest ACK from the sender, rather than retransmitting ones that might have already made it to the receiver, which makes it different from Go-Back-N. This makes it more like a selective repeat, despite how it is not perfectly selective repeat in that it works with the ACK of the oldest packet, rather than (potentially) a specific bunch of packets like in selective repeat.
4. In a TCP handshake, the three messages are
    a. From the sender (ex: client) to the receiver (ex: server) to tell the server that the client wants to establish a connection
    b. From the sender to the receiver to acknowledge that request and notify that it is ready to accept more requests
    c. From the sender to the receiver to acknowledge the server's readiness and notify the server that it will begin sending requests.

    There is an importance for all three of these messages. The first is important so that the server knows to be ready to serve requests to a specific process on the client's side. The second is important so the client knows that the server is ready. The third is important so that the server knows that it can have its allocated resources on standby for the client (otherwise, the client could have just left, which leaves the server's resources on standby when it could potentially be used elsewhere).
5. The difference between Reno and Tahoe, aside from how they are spelt, is mainly with how they handle congestion. Tahoe, upon seeing a timeout or triple duplicate ACK numbers, will halt itself and then do a slow start. Reno will do the same upon seeing a timeout, but a triple duplicate ACK will be dealt with differently by halving the data congestion window and increasing it from there.
6. The packet sent has a SEQ number of 3191800521 and an ACK number of 416869280. If the packet makes it to the receiver, then the receiver's packet would have a SEQ number of 416869280 (same as the ACK of the sender) and an ACK of 3191800522 (1 (byte sent) + the sequece number of the sender's last packet).
7. The slow start happens from transmission round = 1 to transmission round = 6.
8. At the 16th round, a triple duplicate ACK was seen so, being version Reno, the congestion window was halved.
9. At the 22nd round, a timeout was seen, so Reno operates just like Tahoe by completely stopping and performing a slow start (just as it did at the beginning of the connection).
10. To figure out what round the 70th segment was sent in, we need to see how much has been sent ateach interval from the beginning:

Congestion window - round - cumulative segments
(exponential increase of slow start)
1-1-1
2-2-3
4-3-7
8-4-15
16-5-31
32-6-63
(at this point it's a linear increase)
33-7-96
We can see that segment #70 happened after the 6th round (since cumulative segments was 63). Since the cumulative segments sent totaled 96 by the 7th round, then 70th segment, which lies between 63 and 96, would have been sent in the 7th round.