

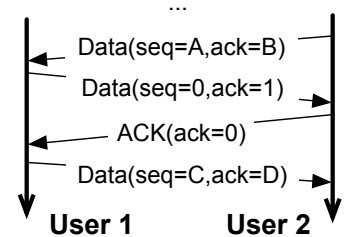
Telecommunications Systems

Integrated Master in Electrical Engineering and Computers

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Problems for the class of May 28, 2014

1. Consider the sequence of frame exchanges represented on the right. A Stop & Wait sliding window protocol with piggybacking was used, with 1 bit sequence numbers. There were no errors in the channel. What values should A, B, C and D have to define a valid exchange of frames? Justify your answer.



2. Node A uses a sliding window protocol of type Go-back-N to transmit 4 data frames to node B with a transmission window of 2 frames. Assume that the propagation time is much higher than the transmission time of the frame (i.e. one frame's duration) and that no errors occur. What will be the sequence of data frames ($Data(seq, ack)$) sent by A and acknowledgment frames ($ACK(ack)$) sent by B that will appear on the channel? The first frame is:

A ----- Data(0,7)-----> B

3. Assume that you use a sliding window protocol of type go-back-N in a satellite channel with a propagation delay of 600 ms between terminal 1 and terminal 2, which send data frames with a transmission time of 1 ms. What is the minimum size of the sending window which ensures that the sender never stops when there are no channel errors? Justify your answer.
4. The bit-map protocol is used in a network with 10 stations (station 1 to station 10). Each data frame has a transmission time equal to 1000 reservation slots. Assume that after the transmission of the last data frame, just before the reservation slots, stations 1, 3, 5 and 7 have frames to send. What will be the sequence of frames and reservation bits that will occur in the channel until all four stations transmit the packets?
5. A local network with 8 stations (station 1 to station 8) is using the Adaptive Tree-walk protocol. In the first transmission slot there is a collision between data frames from stations 1, 2, 3, 6 and 7. What will be the sequence of slots that will occur in the channel until the five stations transmit these data frames?