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HW 3

R7

Yes, both of the segments from Host A and Host B will be directed to the same socket in Host C. A UDP socket is fully identified by the tuple (Destination IP Address, Destination Port Number), so the segments sent by Hosts A and B will both be sent to the process in Host C identified by port number 6789. Host C can differentiate between the two segments by the segments 'return address', fully identified by (Source IP Address, Source Port Number).

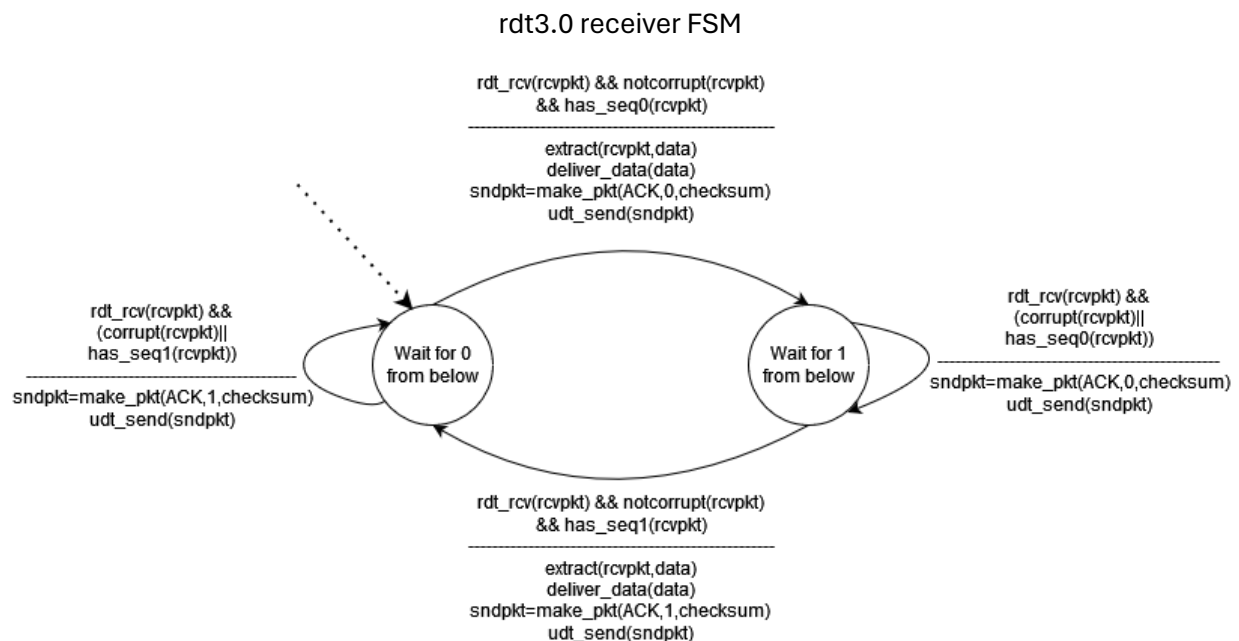
R11

Yes, a timer is still necessary in rdt 3.0 even if the round-trip delay between the sender and receiver is known to the sender. This is because it is still necessary to distinguish between ACK loss and packet loss. Knowing the round-trip delay between the sender and receiver is an advantage because it allows the sender to know for certain if an ACK or a packet has been lost, but it is still necessary to determine when packets have been lost for sure in order to properly trigger retransmission.

P3a

$$\begin{aligned} 01010011 + 01100110 &= 10111000 \\ 10111000 + 01110100 &= 100101100 \\ \text{Therefore: } 01010011 + 01100110 + 01110100 &= 100101100 \end{aligned}$$

P8



The rdt3.0 receiver FSM is the same as the FSM for rdt2.2. This is because rdt3.0 aims to solve packet loss issues by implementing a timer on the sender's side to detect if an acknowledgement is received within a given time period. This does not require the receiver to do anything differently.

P24

- a. True, the sender can receive ACKs for packets that fall outside of its current window in the SR protocol. The SR protocol requires individual acknowledgements to be sent by the receiver for each packet, so if the sender's window has moved on by the time an ACK gets to it, the ACK will be out of order and outside the current window.
- b. True, the sender can receive ACKs for packets that fall outside of its current window in the GBN protocol. This may occur in basically the same circumstance as (a) when the receiver's ACKs for a given packet window do not reach the sender in time. Then, the sender will resend the same packets and if the original ACKs make it back to the sender then its window will advance. If the ACKs for the duplicate packets also make it back to the sender then these will be outside of its current window.
- c. True, in the alternating bit protocol only a single bit (0 or 1) is used to keep track of which packet is being sent and acknowledged. This means there is only one unacknowledged packet at a time, which is the same as the SR protocol with a window size equal to 1.
- d. True, the GBN protocol with a window size of 1 can only send one packet at a time. This means that each packet must stop and wait to be acknowledged before the next one can be sent. This is the same behavior as the alternating bit protocol.