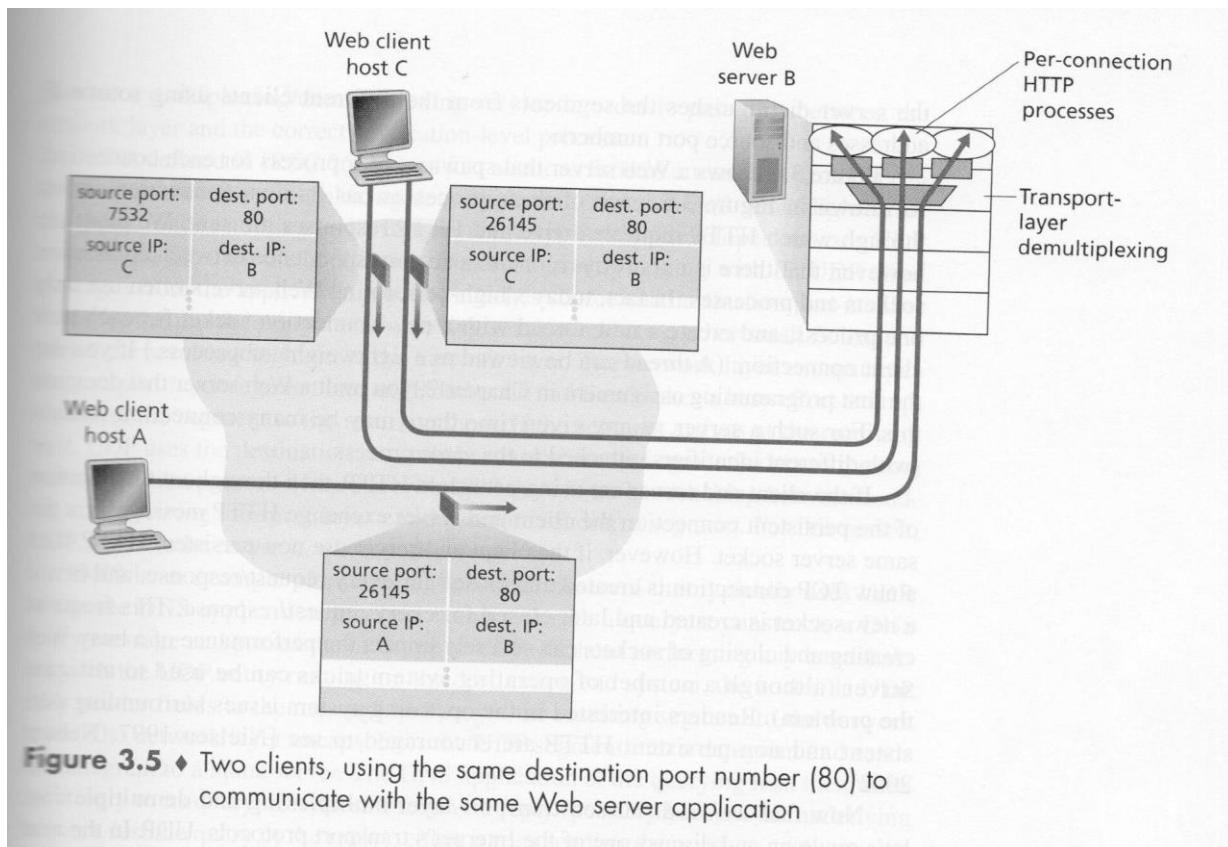


1. How is a UDP socket fully identified? What about a TCP socket? What is the difference between the full identification of both sockets?

2. Consider the figure below. What are the source and destination port values in the segments flowing from the server back to the clients' processes? What are the IP addresses in the network-layer datagrams carrying the transport-layer segments?



3. UDP and TCP use 1s complement for their checksums. Suppose you have the following three 8-bit bytes: 00100011, 01001110, 01010100. What is the 1s complement of the sum of these 8-bit bytes? (Note that although UDP and TCP use 16-bit words in computing the checksum, for this problem you are being asked to consider 8-bit sums.) Show all work. With the 1s complement scheme, how does the receiver detect errors? Is it possible that a 1-bit error will go undetected? How about a 2-bit error?

4. Consider the reliable data transfer 3.0 protocol. If the network connection between the sender and receiver can **reorder** messages (that is, that two messages propagating in the medium between the sender and the receiver can be reordered), then will the alternating-bit protocol (that is, only using 0 and 1 to denote the sequence numbers of messages) work correctly? If not, draw a diagram showing that. Your diagram should have the sender on the left and the receiver on the right, with the time axis running down the page, showing data and acknowledgement message exchange. Don't forget the sequence number associated.