

IS 450 Test Four

12/12/05

Show your work.

Please work independently.

Have photo ID ready when you turn the test in.

1. (10 points): Suppose you're designing an application layer protocol in which it would be inconvenient to impose a maximum message size. Given just this piece of information, would TCP or UDP seem a better choice? Why?

2. (10 points): Recall that an Ethernet frame is 22 bytes of preamble & header, payload, and then 4 bytes of CRC. An IPv6 datagram is 40 bytes of header followed by the payload. A UDP datagram is 8 bytes of header followed by payload.

Suppose an application sends a UDP datagram containing 50 bytes of data. Show the resulting Ethernet frame and the positions of each of the three headers, the data, and the Ethernet CRC within the frame.

3. (10 points): Explain how hierarchy is used to simplify IP routing.

4. (10 points): Suppose that Bob and Carol communicate in a (hopefully) secure manner, and that Trudy is attempting to eavesdrop on their communications. Which would have a larger impact on communications security: Bob and Carol doubling their key lengths, or Trudy doubling her computation power? Why?

Note: by doubling computation power I mean doubling the number of operations done per second by the computer, i.e., making the computer twice as fast.

5. (10 points): What's the largest TCP segment that can fit in a single Ethernet frame? Explain how you arrived at the size. Does your answer assume IPv4 or IPv6?

6. (10 points): On p. 368 of the text, Comer lists four styles of interaction supported by UDP: 1-to-1, 1-to-many, many-to-1, and many-to-many. Which of these are also supported by TCP? For each that is, give an example. For each that is not, briefly explain why not.