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ECE 5600
Homework 1
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1.10
What are two reasons for using layered protocols? What is one possible disadvantage of using layered protocols?

1) Divides the problem into smaller subproblems
2) They are scalable, individually and can scale together (as in adding/modifying other layers)
Disadvantage) They could interfere with eachother if not done properly.

1.15
In some networks, the data link layer handles transmission errors by requesting that damaged frames be retransmitted. If the probability of a frame's being damaged is *p*, what is the mean number of transmissions required to send a frame? Assume that acknowledgments are never lost.

$$\sum_{k=1}^{\inf} kP_k = \sum_{k=1}^{\inf} k(1-p)p^{k-1} = \frac{1}{1-p}$$

1/(1-p)

1.17
What is the main difference between TCP and UDP?

UDP is connectionless and unreliable, TCP is connection-oriented.

1.20
When a file is transferred between two computers, two acknoledgement strategies are possible. In the first one, the file is chopped up into packets, which are indidiclally acknosedged by the receiveer, but the file transfer as a whole is not acknoledged. In the second one, the packets are not

acknowledged individually, but the entire file is acknowledged when it arrives. Discuess these two approaches.

For acknowledging each packet, the sender can know almost exactly when an errors occurs and can retransmit only that packet. That causes more time in transmitting acknowledgements, but can save time when error correcting.

The second method can save time during transmission, but when an error occurs we don't know where so we must retransmit the entire file.

1.24

Ethernet and wireless networks have some similiarities and some differences. Once propert of Ethernet is that only one frame at a time can be transmitted on an Ethernet. Does 802.11 share this property with Ethernet? Discuss your answer.

I'm not sure I quite understand what the question is asking, but assuming it's talking about the problem of not being able to talk over eachother, yes 802.11 shares this problem. If multiple computers tried to transfer a packet at the same time then data would be lost and corrupted to both receievers.

1.25

List two advantages and two disadvantages of having interantional standards for network protocols.

Advantages

1 – Relocating between countries doesn't require you to replace your network cards on computers.

2 – Network service providers can more simply service multiple countries.

Disadvantages:

1 – Since you can Google what the standard is, they are more easily hackable.

2 – It can slow down implementing new technologies because they would have to implemented on a much larger scale.

1.27
Suppose the algorithms used to implement the operations at layer k is changed. How does this impact the operations at layers $k – 1$ and $k + 1$?

Theoretically none, however it may change the amount of information being passed as headers and such in other layers.

1.28
Suppose there is a change in the service (set of operations) provided by layer k. How does this impact services at layers $k - 1$ and $k + 1$?

Theoretically none, however it may change the amount of information being passed as headers and such in other layers.