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CS 3590 Data Communications & Networking
Assignment #1 Fall 2015

Q.1. Review Question # 2.3
What is a protocol?

A protocol is a set of rules or conventions. In Data Communications, these rules determine the formatting used for blocks of data, specifying Syntax, Semantics, and Timing.

Q.2. Review Question # 2.9
Which version of IP is the most prevalent today?

IPv4 was the most prevalent as-of 1996, when IPv6 was standardized. IPv6 is described by the textbook as a more advanced protocol, designed for faster internet speeds than IPv4 is capable of handling. The primary decision behind this improved protocol was actually the need for additional unique addresses. With the rapid growth of computing and the increasing availability of computing devices which connect to the Internet, it quickly became clear that a 32-bit address would not provide a sufficient quantity of unique numbers with which to identify computers. The book goes on to mention that, while IPv6 is currently being used as a standard, it will take years (and potentially decades) for all computers to use the updated protocol.

Q.3. Problem Question # 2.3
List the major disadvantages with the layered approach to protocols.

Data and processing overhead. Due to the communication required between layers, the actual size of the IP packet at the network level is quite a bit larger than the originally prepared user data.

Q.4. Problem Question # 2.7
A TCP segment consisting of 1500 bits of data and 160 bits of header is sent to the IP layer, which appends another 160 bits of header. This is then transmitted through two networks, each of which uses a twenty four bit packet header. The destination network has a maximum packet size of 800 bits. How many bits, including headers, are delivered to the network layer protocol destination?

800 bits (max. packet size at destination) - 320 (TCP and IP headers) - 48 (2 * Network headers) = 432 bits remaining for application data.

1500 - 432 = 1068 (1st full packet sent)
1068 - 432 = 636 (2nd full packet sent)
636 - 432 = 204 (3rd full packet sent, with 204 bits left over)

final packet size: 320 + 48 + 204 = **572 bits**

800 + 800 + 800 + 572 = **2,972 total bits sent**, using a total of four packets