CE 150/L – Winter 2019

Chapter 2 Sample Questions

1. A single host can run multiple network application programs, e.g., a Web browser, an e-mail client, etc. How can different application programs running on the same host be uniquely identified?

2. Given your answer for (1), explain how multiplexing and de-multiplexing at the transport layer works.

3. For each of the Web requests below, list the sequence of steps to resolve the Web server's name. Assume names are not initially cached and name resolution is done iteratively.

   i. Web client at att.com is requesting an object from www.ucsc.edu.

   ii. Web client at att.com is requesting an object from *www.comcast.com*.

4. HTTP uses TCP as its underlying transport protocol.

   i. Why do you thing the designers of HTTP picked TCP as its transport protocol?

   ii. What is the consequence of using TCP when considering delay?

5. We saw in class that both HTTP and DNS use caching to improve performance.

   i. Explain how caching improves the performance of HTTP.

   ii. Explain how caching improves the performance of DNS.

   iii. What is the main problem with caching? Explain.

6. A Web page has 7 embedded objects. Assume that the time to transmit the page and each of its embedded objects is 20ms while the propagation delay and service time within the network combined amount to approximately 150ms.

   What is the total time perceived by the user between clicking on a link and having the entire object rendered if the user's browser employs:

   i. Non-persistent HTTP.

   ii. Persistent HTTP.

   Show your work!

7. The Internet4All NGO is committed to interconnect 15,000 K-12 schools to the Internet this year. Due to budget constraints, the schools can only afford connecting to the Internet through a 15Mbps link while the schools' local area networks use 100Mbps links. You were hired by the Department of Education to help design the solution to mitigate the mismatch between the access link and the local area network.

Assume that the delay to retrieve an object from the Internet is on average 3 seconds, while the delay to get an object of similar size residing in the LAN is 20ms. In order to improve access time, you then decide to install a Web cache in the village's network whose hit rate is 50%.

i. What's the average delay to access an object?
ii. Compare it to the initial "cache-less" configuration.