National University of Singapore
School of Computing
CS2105: Introduction to Computer Networks
Semester 1, 2018/2019

Tutorial 3

These questions will be discussed during the next week's discussion group meetings. Please be prepared to answer these questions during the session in class. Some of the questions are taken from the textbook, so please bring it along for reference.

1. Launch your browser and open its network diagnostic tool (e.g. press F12 if you use Chrome on Windows, or Cmd + Opt + I for Mac). Then click the "Network" tab to observe the network communication while you load the following URL in your browser: `http://tiny.cc/nc4xiy`

   Enter your choice and press the "Submit" button.

   (a) Look at the entry named "formResponse". What is the HTTP request method issued?

   (b) Briefly explain when HTTP POST and GET methods are used.

2. **[KR, Chapter 2, P21]** Suppose that your department has a local DNS server for all computers in the department. You are an ordinary user (i.e., not a network/system administrator). Can you determine if an external web site was likely accessed from a computer in your department a couple of seconds ago? Explain.

3. **[Modified from KR, Chapter 2, P31]** You are given 4 programs: `TCPEchoClient`, `UDPEchoClient`, `TCPEchoServer` and `UDPEchoServer`. Compile/run them on `sunfire`.

   (a) Suppose you run `TCPEchoClient` before you run `TCPEchoServer`. What happens and why?

   (b) Suppose you run `UDPEchoClient` before you run `UDPEchoServer`. What happens and why?

4. **[KR, Chapter 3, R7]** Suppose a process in Host C has a UDP socket with port number 6789. Suppose both Host A and Host B each sends a UDP segment to Host C with destination port number 6789. Will both of these segments be directed to the same socket at Host C? If so, how will the process at Host C know that these two segments originated from two different hosts?

5. **[KR, Chapter 3, R8]** Suppose that a Web server runs in Host C on port 80. Suppose this Web server uses persistent connections, and is currently receiving requests from two different Hosts, A and B. Are all of the requests being sent through the same socket at Host C? If they are being passed through different sockets, do both of these sockets have port 80? Discuss and explain.

6. **[Modified from KR, Chapter 3, P4]**

   (a) Suppose you have the following 2 bytes: `01011100` and `01100101`. What is the 1s complement of the sum of these 2 bytes?

   (b) Suppose you have the following 2 bytes: 11011010 and 01100101. What is the 1s complement of the sum of these 2 bytes?

(Note: UDP and TCP use 16-bit words in computing their checksums. For simplicity you are asked to consider 8-bit checksums in this problem).

7. **[Modified from KR, Chapter 3, P5]** Suppose that UDP receiver computes the checksum for the received UDP segment and finds that it matches the value carried in the checksum field. Can the receiver be absolutely certain that no bit errors have occurred? You may use Q6 as an example to explain.

8. Why is it that UDP takes 1s complement of the sum as checksum, i.e., why not just use sum? (Hint: How can the receiver detect erros with the 1s complement scheme?)