

CIS 457 Data Communication: Homework 2

The following are selected from the end of Chapter 2 problem set beginning at page 166 of the textbook. **Some questions require you read the textbook, the answer may not be found from lecture (notes).** The problem numbers are shown in the parentheses.

1. (3 points) (R16) Suppose Alice, with a Web-based email account (such as Hotmail or Gmail) sends a message to Bob, who accesses his mail from his mail server using IMAP. Discuss how the message gets from Alice's host to Bob's host. Be sure to list the series of application-layer protocols that are used to move the message between the two hosts.
2. (2 points) (R21) In BitTorrent, suppose Alice provides chunks to Bob throughout a 30-second interval. Will Bob necessarily return the favor and provide chunks to Alice in the same interval? Why or why not?
3. (P6) Obtain the HTTP/1.1 specification (RFC2616). Answer the following questions and **also include the relevant sentences from RFC2616** in each answer.
 - (a) (2 points) Explain the mechanism used for signalling between the client and server to indicate that a persistent connection is being closed. Can the client, the server, or both signal the close of a connection?
 - (b) (2 points) What encryption services are provided by HTTP?
 - (c) (2 points) Can a client open three or more simultaneous connections with a given server?
 - (d) (2 points) Either a server or a client may close a transport connection between them if either one detects the connection has been idle for some time. Is it possible that one side starts closing a connection while the other side is transmitting data via this connection? Explain.
4. (P7 & P8) Suppose without your Web browser you click on a link to obtain a web page. The IP address for the associated URL is not cached in your local host, so a DNS lookup is necessary to obtain the IP address. Suppose that n DNS servers are visited before your host receives the IP address from DNS; the successive visit incur a round-trip time of $RTT_1, RTT_2, \dots, RTT_n$. Further, suppose that the Web page associated with the link references **eight** very small objects on the same server. Let RTT_0 denote the RTT between the local host and the server containing the objects. Neglecting transmission times, how much time elapses with:
 - (a) (3 points) Non-persistent HTTP with no parallel TCP connections?
 - (b) (3 points) Non-persistent HTTP with the browser configured for six parallel connections?
 - (c) (3 points) Persistent HTTP (and pipelined)?

Write your answer in the table similar to the following

	DNS Lookup	HTML page retrieval	8 objects retrieval
(a) Non-Persistent			
(b) Non-Persistent & Parallel			
(c) Persistent & Pipelined			