**CS4457 (SP2016) Computer Networks**

**Homework 2**

**Points: 8**

**Due: February 16, 2016 (3:30 p.m.)**

(1) (1 point) Alice has a video clip that Bob is interested in getting; Bob has another video clip that Alice is interested in getting. Bob creates a web page and runs an HTTP server. What command is used by Alice to get Bob's clip? What command is used by Alice so that Bob can get Alice's clip?

Server=bob

client=alice

Command by client to get server's clip:

*client could use a GET request to server's web page.* *The client would call the server's url using this format:*

*scheme:[//[user:password@]host[:port]][/]path[?query][#fragment]*

*where*

*scheme is likely www*

*user:password@ likely doesn't exist*

*host is servers name*

*port is the default 80*

*path is the path to the video*

*The request would specify that the client is looking for video content using the top-level MIME type.*

Command by client so that server can get clients clip:

client would likely use a PUT request to put its video on the server. The client would have to have appropriate authentication to do so. The client will have to specify its content type is video using MIME.

*The client would call the server's url using this format:*

*scheme:[//[user:password@]host[:port]][/]path[?query][#fragment]*

*where*

*scheme is likely www*

*user:password@ likely doesn't exist*

*host is servers name*

*port is the default 80*

*path is the path to the video*

(2) (0.5 point) FTP uses the services of TCP for exchanging control information and data transfer. Could FTP have used the services of UDP for either of these two connections? Explain.

Potentially yes, however, there would be numerous issues including

\* files could be corrupted in the transfer

\* there is no guarantee of the transfer

\* you could get corrupted commands across the control information connection

(3) (1 point) FTP uses two separate TCP connections for exchanging control information and data. Let’s assume a user is transferring 3 files (i.e. F1, F2, and F3) using FTP that can transfer files one at a time using independent data connections. Let’s further assume FTP is currently transferring F2. What do you think would happen to F2 if the control connection were severed before the FTP session? Would it affect the data transfer to F3?

If the control connection were severed before the FTP session ends and while transferring the F2 file, then the F2 file would not be properly sent across the system. Since the control connection no longer exists, the connection would not even start the F3 file transfer.

The F1 file would have already transferred correctly.

(4) (1 point) Both HTTP and FTP can retrieve a file from a server. Assume two files are transferred to a client, one being a file stored as a web page embedded in an HTML document and the other being a non-HTML file, which protocol should the client use to download the two files and why?

For the HTML document, the client should use HTTP because the HTTP protocol will be better able to understand the format of the HTML document.

For the non-HTML file, the client should use FTP because the file is more general.

(5) (1 point) Assume there is a server with the domain name [www.myHTTP.com](http://www.myHTTP.com/). (a) Show a possible HTTP request (similar to the one shown in class) that needs to retrieve the document **/usr/users/doc** from the HTTP server. The client accepts MIME version 1.1, GIF or JPEG images, but the document should not be more than 4 days old (assume the current date is Thursday, 05/17/2014). (b) Show a possible HTTP response (similar to the one shown in class) to (a) above for a successful request.

(6) (1 point) In SMTP, (6.1) a non-ASCII message of 1000 bytes is encoded using base64. How many bytes are in the encoded message? How many bytes are redundant? What is the ratio of redundant bytes to the total message? (6.2) Do the same problem shown in (6.1) using quoted-printable. We assume the message consists of 90% ASCII and 10% non-ASCII characters.

(7) (0.5 point) Encode the following in base64: 01010111 00001111 11110000

(8) (0.5 point) Encode the following message in quoted-printable: 01001111 10101111 01110001

(9) (0.5 point) Assume a TELNET client uses ASCII to represent characters, but the TELNET server uses EBCDIC to represent characters. How can the client log into the server when character representations are different?

(10) (1 point) In FTP, assume a client with user name John needs to store a video clip called **video1** on the directory **/top/videos/movies** on the server. Show the commands and response exchanged between the client and the server if the client chooses ephemeral port number 53012. You should show all the commands (from the client) and response (from the server) for the session starting from "server ready" to "server closing". You may assume the file is stored in pages with file type "image". Your answer should be similar to the one shown in class.

Use the following criteria to prepare and turn your homework in.

(1) Your homework can be generated using a word processor or by handwriting (but legible).

(2) Your homework should be submitted in class unless it is turned in late, which should be submitted via **collab** within three days from the due date in order to receive partial credit.

(3) Write down the following information on the first page of your homework: your name, homework number (i.e. homework 2), course number (i.e. CS4457), course title (i.e. Computer Networks), semester of the course (i.e. Spring, 2016), and your honor pledge.