CSCI 3171 NETWORK COMPUTING
Fall 2021
Assignment No. 2

Date Given: Wednesday, October 6th, 2021
Due (on Brightspace): Wednesday, October 20th, 2021, 11.59 PM

Write the answers to the questions in a word or similar text-based document, convert the document to PDF and submit ONE PDF file on Brightspace. On top of the document, clearly write your full name and Banner ID.

For research type questions, **cite your sources** at the end of the answer. For instance, for Questions 2 and 3, some sources have been given to you. Cite them at the end of your answer. If you used additional sources, cite them as well.

Question 1 <TCP/IP Addressing Question> The network shown below has the following sessions that have been set up concurrently:
- Telnet session from A to X (Client is A and Server is X).
- SSH session from X to A (Client is X and server is A).
- HTTP session from A to X (Client is A and server is X).
- FTP session from X to A (Client is X and server is A).

Write the frame formats **on each network** showing all the significant addresses for the following messages:
a) Telnet request message from A to X
b) Telnet reply message from X to A
c) SSH request message from X to A
d) SSH reply message from A to X
e) HTTP request message from A to X
f) HTTP reply message from X to A
g) FTP request message from X to A
h) FTP reply message from A to X

i) If a second SSH session is set up from X to A (Client is X and server is A) what would be the message format on each network?

The address notation is (A = IP address, a = MAC address) (and similar for the other nodes).
Use the following representation for the frame format:
Source MAC addr, Destination MAC addr, Source IP addr, Destination IP addr, Source Port addr, Destination Port addr, DATA

(A,a)
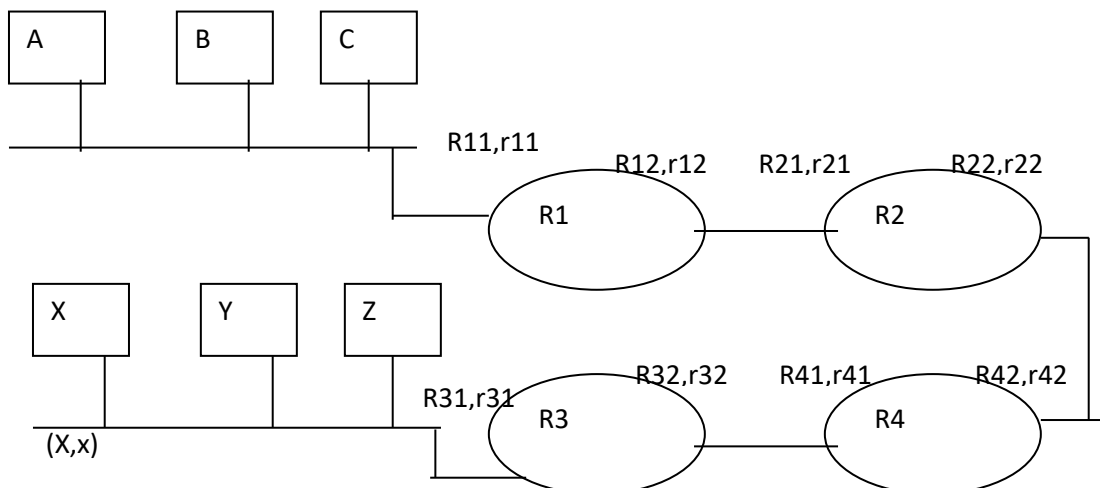
Question 2 <HTTP Analysis Question> Suppose a client-to-server HTTP GET message is the following:

```
GET /kurose_ross/interactive/quotation4.htm HTTP/1.1
Host: gaia.cs.umass.edu
Accept: text/plain, text/html, image/jpeg, image/gif, audio/mpeg,
audio/vnf.wave, video/mp4, video/wmv, application/*, */*
Accept-Language: en-us, en-gb;q=0.6, en;q=0.5, fr, fr-ch, da, ar, cs
If-Modified-Since: Mon, 07 Oct 2019 18:08:57 -0700
User Agent: Mozilla/5.0 (Windows NT 6.1; WOW64) AppleWebKit/535.11 (KHTML,
like Gecko) Chrome/17.0.963.56 Safari/535.11
```

Answer the following questions (briefly):

a) What is the name of the file that is being retrieved in this GET message?

b) What version of HTTP is the client running?

For the following questions, you may need to read up additional resources on the web. A few resources are the following:

RFC 2616: https://www.w3.org/Protocols/rfc2616/rfc2616-sec14.html#sec14.2

Media Types: https://en.wikipedia.org/wiki/Media_type

Tech Blog on User Agents: https://techblog.willshouse.com/2012/01/03/most-common-user-agents/

c) What formats of text, images, audio, and video does the client browser prefer to receive?
d) What do the strings "application/*" and "*/*" signify in the Accept: header?
e) What languages is the browser indicating that it is willing to accept?
f) What is the meaning of the "relative quality factor," q, associated with the various version of English?
g) What is the client's preferred version of English? What is the browser's least preferred version of English?
h) Does the browser sending the HTTP message prefer Swiss French over traditional French? Explain.
i) Does the client already have a (possibly out-of-date) copy of the requested file? If so, when did it receive the file?
j) What is the type of client browser and the client's operating system?

Question 3 <Research Question> As we discussed in the lectures, the details of protocols are available in the form of RFC (Request for Comment) documents on the Internet Engineering Task Force's website: https://www.ietf.org/standards/rfcs/
Using the RFC Search page, read up the RFC corresponding to *any one application layer protocol (other than HTTP, SMTP or DNS)* and write a brief report (approximately 2 pages, single-spaced, 12-point font size) summarizing the important features of the protocol as outlined in the RFC.

What to submit: You need to submit **only one PDF file** that contains the answers to all the questions. Answer your questions in a text document, convert it to PDF and upload the PDF file. Ensure that **your name and Banner ID** is visible at the top of the document.

Late Submission Penalty: The assignment is due on Wednesday (October 20th) at 11.59 PM. Late submissions up to 5 hours (4.59 AM on Thursday) will be accepted without penalty. After that, there will be a 10% late penalty per day on the mark obtained. For example, if you submit the assignment on Thursday at 12 noon and your score is 8/10, it will be reduced to 7.2/10. Submissions past five days after the grace submission time will not be accepted.