1. (1 point) What are two reasons for using layered protocols? What is one possible disadvantage of using layered protocols?

Layered protocols provide a structural and conceptual advantage due to their modularity and inherent ease for discussion. However, they may encounter issues such as redundant functionalities and the potential for a layer to rely on information from another layer, which violates the intent of the layered structure.

2. (2 points) This problem explores propagation delay and transmission delay in data networking. Consider two hosts, A and B, connected by a single link of rate R bps. Suppose that the two hosts are separated by m meters, and suppose the propagation speed along the link is s meters/sec. Host A is to send a packet of size L bits to Host B.
a) Express the propagation delay d_{prop}, in terms of m and s.

d_{prop} = m/s

b) Determine the transmission time of the packet, d_{trans}, in terms of L and R.

$d_{trans} = L/R$

c) Ignoring processing and queuing delays, obtain an expression for the end-to-end delay.

$D_{end - end} = d_{trans} + d_{prop}$

d) Suppose s = 2.5 x 10^8, L = 120 bits, and R = 56 kbps. Find the distance m so that d_{prop} equals d_{trans}.

m/2.5 x 10^8 = 120 bits/56 * 10^3 bps
m = (3750000/7) meters

3. (1 point) Which of the URLs meet the same origin policy against
http://www.example.com/local/index.html
~~a) http://help.example.com/local/index.html~~
b) http://www.example.com/dir/index.html?q=100
~~c) ftp://www.example.com/dir/index.html~~
~~d) http://www.example.com:8080/local/index.html~~

B

4. (1 point) Find the value of the A-type record of the domain cs.utdallas.edu and its TTL in the authoritative answer. Briefly explain how you find the answers.

cs.utdallas.edu. 3600	IN	A	3.133.32.155
cs.utdallas.edu. 3600	IN	A	3.21.250.42

I used the command `dig` and then provided “cs.utdallas.edu” as a parameter. The information necessary for this problem was found under “;; ANSWER SECTION:”.

5. (4 points) In this assignment, you will develop a simple Web server in Python 3 (using socket programming) that is capable of processing only one request. Specifically, your Web server will (i) create a connection socket when contacted by a client (browser); (ii) receive the HTTP request from this connection; (iii) parse the request to determine the specific file being requested; (iv) get the requested file from the server’s file system; (v) create an HTTP response message consisting of the requested file preceded by header lines; and (vi) send the response over the TCP connection to the requesting browser. If a browser requests a file that is not present in your server, your server should return a “404 Not Found” error message.
It is suggested to set the server to listen on the 8080 port (not the default 80 port). The submitted zip file should include (1) the python script, (2) a README.txt to explain how to execute the code, and (3) screen shots when running the server and loading local webpages on your machine (4) optional, other files (such as html files) that you include.