Birla Institute of Technology and Science Pilani (Rajasthan)

ECE F343 Communication Networks
Second Semester 2025-26
Due date : 28/02/2026 Assignment –1

Q.1) Write a program that implements message flow from the top layer to the bottom layer of the 7-layer protocol model. Your program should include a separate protocol function for each layer. Protocol headers are sequence up to 64 characters. Each protocol function has two parameters: a message passed from the higher layer protocol (a char buffer) and the size of the message. This function attaches its header in front of the message, prints the new message on the standard output, and then invokes the protocol function of the lower-layer protocol. Program input is an application message (a sequence of 80 characters or less).

Note:
This question is intended to provide a conceptual understanding of how encapsulation works across layers in the OSI model. A simplified implementation is sufficient. You are not required to implement the full real-world functionality of each layer; instead, base your design on the basic functions and responsibilities of the layers that have been discussed in class so far.

Q.2) Before starting the following questions, it is expected to go through the Wireshark tutorial shared with you, and familiarize yourself with its working and capabilities. Now based on the tutorial, answer the following questions.

Q.2a) What protocols are listed in the Wireshark “protocol” column in your trace file? Make a list of such protocols, identify the layer to which they belong, and briefly explain (in 1-2 lines) the function of each protocol.

Q.2b) Read about HTTTP protocol and its working (Reference: Section 2.1, 8.1 in Garcia). Now in your experiment, determine how long did it take from when the HTTP GET message was sent until the HTTP OK reply was received? (By default, the value of the Time column in the packet-listing window is the amount of time, in seconds, since Wireshark tracing began. (If you want to display the Time field in time-of-day format, select the Wireshark View pull down menu, then select Time Display Format, then select Time-of-day.)

Q.2c) What is the Internet address of the gaia.cs.umass.edu (also known as www-net.cs.umass.edu)? What is the Internet address of the computer that sent the HTTP GET message (i.e., your computer)?

To answer the following two questions, you’ll need to select the TCP packet containing the HTTP GET request (hint: this is packet number 286. Remember that this “packet number” is assigned by Wireshark for listing purposes only; it is NOT a packet number contained in any real packet header.)

Q.2d) Expand the information on the HTTP message in the Wireshark “Details of selected packet” window (see Figure 2 of the Tutorial sheet) so you can see the fields in the HTTP GET request message. What type of Web browser issued the HTTP request? The answer is shown at the right end of the information following the “User-Agent:” field in the expanded HTTP message display. [This field value in the HTTP message is how a web server learns what type of browser you are using.]

Q.2e) Expand the information on the Transmission Control Protocol (TCP is a transport layer protocol, reference: Section 8.5 in Garcia) for this packet in the Wireshark "Details of selected packet" window so you can see the fields in the TCP segment carrying the HTTP message. What is the destination port number (the number following "Dest Port:" for the TCP segment containing the HTTP request) to which this HTTP request is being sent?

Q.2f) Print the two HTTP messages (GET and OK) referred to in question 2 above. To do so, select Print from the Wireshark File command menu, and select the "Selected Packet Only" and "Print as displayed" radial buttons, and then click OK.

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