COSC 350.002 Assignment 1 Fall 2024
Due October 7 11:59 pm. All assignments are group assignments.

Upload the following files F1, F2, F3, F4 for your group to Blackboard. Please name all files exactly as indicated. Only submit one copy of these files for your group.

F1. GroupNameA1TCPClient.java (for example, if your group name is xyz, the file name is xyzA1TCPClient.java)
F2. GroupNameA1TCPServer.java
F3. GroupNameA1WS.pcap
F4. GroupNameA1WSAnswers.pdf

1. Write a Java TCP socket program consisting of one client C and one local server S (localhost) that work as specified below.
Use the Java code in the files TCPWebClient, TCPKRClient and TCPKRServer with modifications as needed.
Since we are testing behavior with no threads, the code should not have threads.
Do not use System.exit() in your code.
Code for the client and server should be separate and contained in the respective files F1 and F2. All your source code to compile and run should be in these two files. Do not submit .jar files.

The client C
1.1 makes a TCP socket connection to the local server S listening on port 33221
1.2 prints the message "enter the last two components in the domain name for a web server W as a string exactly in the form name.suf (for example, enter towson.edu for Towson University's web server W)"
1.3 sends W's domain name string entered by the user to the local server S (for example, C sends towson.edu to S).
1.4 uses the classes URI, URL and HttpURLConnection to connect to the domain's web server W using https
1.5 receives and prints each line of page content received from the web server W
1.6 sends each line of page content received from the web server W to the local server S

The local server S (localhost)
1.7 listens for and accepts the connection from C on port 33221
1.8 prints the web server W's domain name name.suf received from the client C (for example, S prints towson.edu)
1.9 prints each line of web server W's page content received from the client C

2. Run Wireshark (WS) and use your browser to make a request to 3gpp.org.
Stop the WS capture and save it in a .pcap file F3. Check that WS can open this file.
Use the specified frames to answer the questions below (double click on parts of packets in the frames to get more information if needed). Submit a file F4 that has your answers.
2.1 Give the WS frame number for a [SYN] TCP handshake packet sent to 3gpp.org.
2.1.1 Give the source IP address in this frame.
2.1.2 Is this source IP a public IP? Explain.
2.2 Give the WS frame number for a DNS query response frame with an Answers field that has an IP address for 3gpp.org.
2.2.1 Give the source MAC address in this frame. Whose MAC address is this? Explain.
2.2.2 Give the source IP address in this frame. Whose IP address is this? Explain.
2.2.3 Name each protocol that appears in this frame and name the layer each protocol belongs to (use the Internet TCP/IP model in which the layer names are application, transport, network, link, physical).