COSC 350 Assignment 1 Spring 2020

Upload the files F1, F2, F3, F4 for your group (named exactly as indicated) via Blackboard:

F1. GroupNameA1TCPClient.java

F2. GroupNameA1TCPServer.java

F3. GroupNameA1WS.pcap

F4. GroupNameA1WSAnswers.pdf

1. Write a Java TCP socket program that consists of one client C and one local server S (localhost).

Modify and use the code in the files posted on Blackboard: TCPWebClient18.java and TCPKRClient.java for the client C and TCPKRServer.java for the server S.

Submit your socket code in the files F1 and F2 (named as above).

1.1 The client C

1.1.1 makes a TCP socket connection to S listening on port 20120

1.1.2 sends the message “request” to S

1.1.3 prints the message “local host connected” when it receives the message “connected” from S

1.1.4 asks the user to enter a web server name as a string: www.name.suf (for example, www.lbl.gov)

1.1.5 uses the class HttpURLConnection to connect to the web server www.name.suf on port 443

1.1.6 prints the IP address of the web server

1.1.7 prints each line of page text received from the web server

1.1.8 prints the message “delay=” followed by the value of T=T2-T1 in milliseconds, where T2 is C’s system time after the last line of page text is displayed and T1 is C’s system time at C after the user enters the web server name.

1.1.9 sends a message with the web server’s IP address followed by value of the delay T above to S

1.1.10 prints the message “done”.

1.2 The local server S (localhost)

1.2.1 listens for and accepts the connection from C on port 20120

1.2.2 sends the message “connected” to C when it gets the message “request” from C

1.2.3 prints the message “ip address=” followed by the IP address of the web server, and the message ”delay=” followed by the delay T (all on the same line), when it gets the ip address of the web server and the delay T from C.

2. Run Wireshark (WS) and use a web browser to make a request to http://www.traceroute.org. Stop the WS capture and save it in a .pcap file named F3 that WS itself can open. Find the frames in the WS capture that are needed to answer the questions below (click on parts of packets in the frames to get more information if needed). Submit a file F4 (named as above) that has all your answers.

2.1 Of the WS frames corresponding to the packets sent by the web server at http://www.traceroute.org, find the first WS frame that WS has labeled as “HTTP/1.1 200 OK”.

2.1.1 Indicate the WS frame number, and the source IP address and destination port number in this frame. Explain the significance of this specific IP address and this specific port number.

2.1.2 Indicate in order each protocol that appears in this frame.

2.1.3 How many bytes are used to indicate the HTTP Status Code in this frame? Explain carefully the relation between the actual values of these bytes and the decimal value indicated by WS for the HTTP Status Code.

2.1.4 What is the decimal value of the HTTP Content-Length field in this frame? Indicate the number of HTTP Content-Length bytes that are carried in each of the individual TCP segments included by WS in this frame, and explain carefully how you found your answers.

2.2 Find the WS frame that WS has labeled as “Standard query response” with type A to resolve the DNS request to resolve www.traceroute.org.

2.2.1 Indicate the WS frame number, and the source IP address and source port number in this frame. Explain why this specific IP address and port number are used.

2.2.2 Indicate in order each protocol that appears in this frame.

2.2.3 What is the significance of calling this DNS response type A, and what is the significance of the field called Class in this DNS response?

2.2.4 What is significance of the Time to Live field in the part of the frame labeled by WS as DNS Answers? How many bytes are used to indicate the value of this field? Explain carefully the relation between the actual values of these bytes and the decimal value indicated by WS for the Time to Live field.