COSC 350.002 Assignment 2 Fall 2024
Due Nov 12, 2024 11:59 pm.
Note: GroupName below refers to your group name. The NTP files needed and UDPServerThreads.java are posted on Blackboard. Do not make changes to NTPMessage.java.
Submit only 4 files: GroupNameA2.pcapng, GroupNameA2Answers.pdf, GroupNameNTPClient.java, GroupNameNTPServer.java

1. Start Wireshark and capture packets. Use NTPClient.java and NTPMessage.java to connect to pool.ntp.org. Stop Wireshark and save the capture in a file named GroupNameA2.pcapng. Save the answers to the questions below in a file GroupNameA2Answers.pdf. Submit only these 2 files. Do not submit any code.
   Use the NTP reply in your Wireshark capture to answer questions below.

1.1 Is this reply from a primary NTP server? Explain your answer by using relevant fields in the reply.

1.2 At what time was the NTP response received by the client? Is this the destination timestamp or the receive timestamp? Explain your answer.

2. Write a Java UDP socket program with a client GroupNameNTPClient.java and a local NTP server GroupNameNTPServer.java that communicate via localhost and do the following. Use the code in NTPClient.java, NTPServer.java and UDPServerThreads.java modified as needed.
   NTP server:

2.1 The main server thread listens in a loop on port 1000 for requests from NTP clients

2.2 When a NTP request arrives, it prints “starting client thread”, starts a new thread, generates a random integer d between 1 and 10000, prints “d=” followed by the value of d, delays for d milliseconds, and sends the NTP reply to the client

2.3 Prints the message “stopping client thread” and stops the client thread
   NTP client:

2.4 Prints the message “sending request” and sends an NTP request to the local NTP server

2.5 Prints the NTP reply received from the local NTP server.