Nova Southeastern University
College of Engineering and Computing

Assignment 1

CISC 650 Computer Networks

Fall 2019

Due Date: 9/8/2019 11:59PM ET

Total Points: 100

Notes:

1. Please include your name in EVERY document you submit.

2. Please sign and submit the "Certification of Authorship" form (located in Blackboard) along with your solutions.

Part 1. Textbook reading

Chapter 1, Chapter 2

Part 2. Textbook questions

Chapter 1. [30 points]

1.1 What is a network protocol?

1.2 Briefly discuss what a peer-peer model is. Did you use some of the P2P applications? If so show your experience with them.

1.3. Compare and contrast Internet services provided by DSL and coaxial cable networks.

1.4 What are the major disadvantages with the layered approach to protocols?

1.5 Suppose we wish to send a packet from a source host to a destination host over a fixed route in a packet-switched network. Show the delay components in the end-to-end delay. Which of them are variable? Why?

1.6 Suppose all links in a circuit-switched network use TDM with 8 slots and have a bit rate of 100Kbps. Also suppose it takes 500msec to establish an end-to-end circuit before a host starts transmission. How long does it take for Host A to transmit a file of 10,000 bits to Host B in this network?

Chapter 2 [40 points]

2.1 Why Skype is a hybrid of client-server and P2P architectures?

2.2 What are the two major services provided at the transport layer? What are their differences?

2.3 Why does the HTTP protocol run on top of TCP rather than on UDP?

2.4 Suppose you need to send one message to two different users: user1@example.com and user2@example.com. In terms of the SMTP commands, is there any difference between sending one separate message per user and sending only one message with multiple (two) recipients? Please explain.

2.5 What are the two major types of queries for DNS name resolution? Explain.

2.6 Install and compile the Python programs TCPClient and UDPClient (refer to Chapter 2 of the textbook) on one host and TCPServer and UDPServer on another host.

a. Suppose you run TCPClient before you run TCPServer. What happens? Why?
b. Suppose you run UDPClient before you run UDPServer. What happens? Why?
c. What happens if you use different port numbers for the client and server sides?

Note: if you prefer Java programming, please use the attached file for TCP Client/Server and UDP Client/Server, and answer the same questions.

2.7 Consider a HTTP client that wants to retrieve a remote file at a given URL. The IP address of the HTTP server is initially unknown. What transport and application-layer protocols besides HTTP are needed in this scenario?

Part 3. Practical assignment [30 points]

See the instructions in the "Wireshark_Intro.pdf" file for details on how to download and run a powerful network monitoring tool (a.k.a network sniffer) – Wireshark. Answer the questions listed in the file based on your experience with Wireshark. Please include necessary screenshots in your submission.