

Assignment #6 for Computer Networks (CNT 4004) for Fall 2018

Due November 15, 2018 at the start of class

This assignment primarily covers material from chapters 6 and 7 (with the exception of material related to data center networking in chapter 6 – we will cover this later) of the textbook and from class lecture. Each problem is worth 10 points.

Problem #1

Answer the following questions coming from your Chapter 6 reading.

- a) What is the correct term for a Layer 2 “packet”?
- b) Where is the link layer implemented?
- c) What is another term for “adapter”?
- d) What is the simplest form of error detection?
- e) Can single bit parity detect if three bits are in error?
- f) What type of arithmetic does CRC use
- g) What is a “broadcast link”?
- h) Protocols for regulating transmission on a shared broadcast link are called what?
- i) What are the three categories of multiple access protocols (according to the book)?
- j) Ethernet’s CSMA/CD protocol has roots in what protocol?

Problem #2

Answer the following questions coming from your Chapter 6 reading.

- a) What problem (or question does BEB solve)?
- b) What is the definition of efficiency for CSMA/CD?
- c) Name two standards for “taking turn protocols”
- d) Do LAN switches recognize IP addresses and use routing protocols?
- e) How are switch tables built? (answer is two words)
- f) Does a Layer-2 frame have a trailer? If so, what is it used for?

- g) Through 30+ years of changes to Ethernet, what has remained as an enduring constant?
- h) How do LAN switches eliminate collisions?
- i) Are switches “plug and play”? Are routers?
- j) What protocol effectively blends Virtual Circuit (VC) techniques into a routed datagram network?

Problem #3

Answer the following questions coming from your Chapter 7 reading.

- a) What key part of a wireless network has not counterpart in a wired network? Give two examples of this key part.
- b) What is SNR? Describe it briefly. What is the unit of measure of SNR?
- c) The higher the SNR the _____ the BER. Fill in the blank (one word).
- d) Give the maximum data rate (the “speed”) for 802.11a, 802.11b, 802.11g, 802.11n, and 802.11ac. Be ready to memorize this if you intend to take the CompTIA Network+ certification exam.
- e) What does AP stand for (in the context of Wi-Fi)? What does SSID stand for?
- f) What are the non-overlapping channels for IEEE 802.11b?
- g) What does “associate” mean in the context of Wi-Fi?
- h) What does a Beacon frame contain? Who (or what) sends a Beacon frame?
- i) “Typically, the devices chooses the AP whose beacon frame is received with the _____.” (fill in the blank with multiple words)
- j) What does “CA” in CSMA/CA stand for?

Problem #4

Answer the following questions coming from your Chapter 7 reading.

- a) Why does Wi-Fi (IEEE 802.11) use link-level acknowledgement?
- b) What are DIFS and SIFS the abbreviation for?
- c) What scheme does the IEEE 802.11 MAC protocol have to help avoid collisions even in the presence of hidden terminals?
- d) What does Address 3 of an IEEE 802.11 frame contain?

e) Bluetooth and Zigbee are called _____ Area Networks, at least by the textbook (fill-in the blank with one word).

f) Answer true or false for the following statement. “Zigbee is targeted at higher-powered, higher data-rate, higher-duty-cycle applications than Bluetooth.”

g) “The 4G systems being deployed today are based on _____ technology, feature an _____ core network, and provide integrated _____ and _____ at multi-Megbit speeds.” (fill in each blank with one word).

h) What roles does the Mobile Switching Center (MSC) play in a cellular network?

i) There are two IP addresses associated with a mobile IP host. What are they?

j) Finish the follow sentence with regards to GSM, “A handoff occurs when a mobile station ____.” (more than one word)

Problem #5

Do Review Questions R4 and R9 (pages 507 and 508) in the text book. For R9 give the answer in decimal (not just power of 2).

Problem #6

Do Review Questions R10 and R11 (page 508) in the text book. For R11, might there be a benefit to sending the ARP reply with a broadcast MAC address (think carefully!). Explain it.

Problem #7

Do Problem P26 (page 513) in the text book.

Problem #8

Do Problem P27 (page 514) in the text book.

Problem #9

Do Review Questions R1 and R4 (page 583) in the text book.

Problem #10

Do Problem P6 (page 585) in the text book. The problem is referring to the steps given on page 539 of the text book.