

Assignment #9

No late assignments accepted!

ECE 487 (Data Communications Networks) **Section B1**

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Your Last Name: _____ Your First Name: _____

Your Student ID: _____

Due: Tuesday, March 31, 2020, 4:00 PM (online submission)

1. Show the shortest form of the following IPv6 addresses. **(2 points)**

a) 0000:00AA:0000:0000:0000:0000:119A:A231

b) 2340:0000:0000:119A:0000:0000:0000:0A01

2. Show the original (unabbreviated) form of the following IPv6 addresses. **(2 points)**

a) 0:AA::0

b) 123::1:2

3. Consider an IPv4 packet is forwarded by routers in the Internet. For the following fields of the IPv4 header, please select one from "never change", "may change", and "always change". **(5 points)**

Field	Never change?	May change?	Always change?
Total length			
Identification			
Flags			
Time to live			
Header checksum			

4. In an IPv4 packet, the M bit is 1, the value of HLEN is 5 (in decimal), the value of total length is 620 (in decimal), and the fragmentation offset value is 300 (in decimal). What are the index of the first (data) byte and the index of the last (data) byte in this packet? Is this the last fragment, the first fragment, or a middle fragment? **(3 points)**

5. For Question 4, consider that the packet is fragmented by a router to three fragments with equal size. For each fragment, give the values of Total Length, M bit, and Fragmentation Offset. **(3 points)**

6. An IPv4 packet arrives at a router with the following information as the first 20 bytes in the packet (in hexadecimal format)

45 04 00 A0 01 02 00 A0 10 01 ?? ?? 0A 0C 0E 05 0C 06 07 09

in which a "?" means a hexadecimal digit to be determined by you. **(5 points)**

a) Are there any options in the header?

b) Is the packet fragmented?

c) What is the size of data in the packet (not including header)?

d) Which higher layer protocol is used for the encapsulated data in the packet?

e) Please fill the four hexadecimal digits marked as "?".