

ECE3076, Computer Networks, QUIZ 2 - Answers

Fall 2009

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RULES.

- i This quiz is **not** open book. One new and one old original sheet of hand-written notes may be used. Simple calculators are ok.
- ii Answer all questions and show all work to receive full credit. Use back of sheets only if necessary.
- iii All sub-questions have the weight shown (2, 3, or 4 %). Put answers in tables or right-side blank areas.
- iv Please do not ask the proctors any questions during the exam about exam questions. Part of the test is understanding the question, as written, without supplemental information. If you feel additional data is needed to solve the problem, make (and state) an assumption and then work the problem.
- v. This is a time-limited test. All papers must be turned in 45 minutes after the start

Honor Code - I affirm that I will obey the rules of the Georgia Tech Honor Code*.

Signature _____

*Basically, I will not cheat, and I will report any observed cheating.

Question 1 – IP Fragments. A 3000-byte IP datagram arrives at a link with a 1100 byte MTU, and must be fragmented. Fill in the table below to show the values of the Datagram Length, ID, FragFlag (MF), and Offset in the resulting fragments

Original

Datagram Length	ID	FragFlag (MF)	Offset
3000	59862314	0	0

Fragments (2 points/answer)

Datagram Length	ID	FragFlag (MF)	Offset
1100	59862314	1	0
1100	59862314	1	135
840	59862314	0	270

Question 2. Network Blocks Complete the following table showing the lowest and highest IP addresses in dotted-decimal. "Number of Hosts" should exclude the "network address" and the "network broadcast address" (2 points/answer)

Network Identifier	Lowest Address (dotted decimal)	Highest Address (dotted decimal)	Network Mask (dotted decimal)	Max. Number of Hosts*
209.185.0.0/16	209.185.0.0	209.185.255.255	225.225.0.0	65,534
209.185.208.0/20	209.185.208.0	209.185.223.255	225.225.240.0	4094
209.185.208.0/24	209.185.208.0	209.185.208.255	225.225.225.0	254

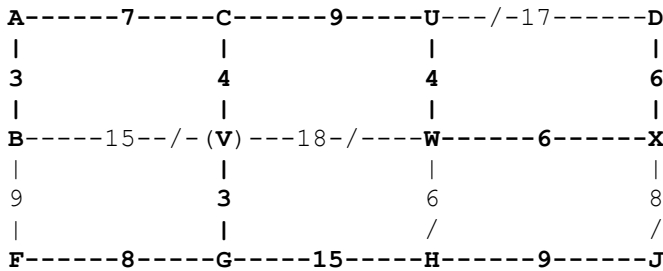
A Company is assigned a block of addresses by IANA - **209.185.0.0 / 20**. Divide this into three subnets capable of having 2000 hosts, 1000 hosts and 600 hosts. Show the IP address blocks in CIDR notation below (4 points/answer).

2000-host subnet 209.185.0.0 / 211000-host subnet 209.185.8.0 / 22600-host subnet 209.185.12.0 / 22

Question 4. Dijkstra Routing, Link State, OSPF

Every router (A, B, ..., J) has advertised the costs (delays) to all the other nodes. Based on all the advertisement messages, the network topology and link costs can be mapped. The letters below represent the nodes (routers) on the network. The numbers represent costs (delay-times) on the links between them.

These nodes are all routers and for simplicity routes have the same cost in both directions.



Routing Table for V
(2 points/answer*)

W -	<u> C </u>
U -	<u> C </u>
B -	<u> C </u>
D -	<u> C </u>

Using Dijkstra's technique, calculate the cost values of routes from node "V". List Permanent Dijkstra Nodes in the order that they were added to the tree: (* zero points unless (a) and (b) indicate the you can apply Dijkstra's algorithm.)

- a. G, c, F|A, A|F, U, B, W, H, X, J, D (10 points if totally correct)
- b. Make bold the links that are on the sink tree for node V (e.g., V-G above). (see above)

Question 5. Steps to Get on the Internet. What is the highest level protocol used and what (or whose) Ethernet Address is initially used for the destination MAC address for the following operations. (3 points/ half answer):

Highest Protocol*, Ethernet Address

- | | |
|---|---|
| a. Get www.google.com Web page. | e. <u> HTTP </u> , <u> GW ROUTER </u> |
| b. Get Ethernet address to use for www. google.com | d. <u> ARP </u> , <u> BROADCAST </u> |
| c. Get IP address of www. google.com | c. <u> DNS </u> , <u> GW ROUTER </u> |
| d. Get Ethernet address to use for DNS server | b. <u> ARP </u> , <u> BROADCAST </u> |
| e. Get IP address and other configuration parameters. | a. <u> DHCP </u> , <u> BROADCAST </u> |

GW = Gateway, Default, or Local

Assume the DNS server and google.com are not on local subnet. * HTTP, DNS, DHCP, TCP, UDP, IP, ARP, Ethernet