

**ECE3076a,b QUIZ 2**  
**Nov. 10, 2008**

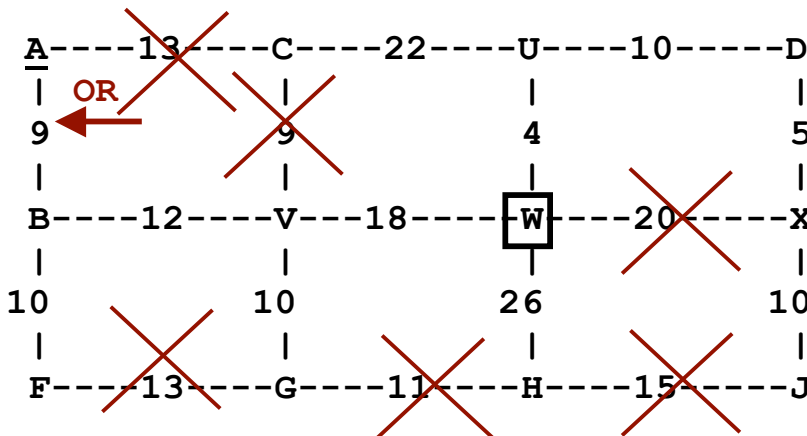
**RULES.**

- i This quiz is **not** open book. One new original sheet of hand-written notes may be used. Calculators are ok.
- ii Answer all questions and show all work to receive full credit. Use back of sheets only if necessary.
- iii 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.
- iv This is a time-limited test. All papers must be turned in 45 minutes after the start. If you find you are taking more than 10 minutes on a particular problem, move on and come back to that problem after finishing the others.
- v The Georgia Tech Honor Code applies (see last page).

**Question 1– 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 (no networks) and for simplicity links have the same cost in both directions.



A. Using Dijkstra's technique, calculate the Sink Tree for node W. Cross out (X) the links that are not on the sink tree for node W.

B. Fill in the Routing Table for Node W (indicate Port by the node to which it connects).

C. List the nodes in the order they were added to the Sink Tree, and the Cost (at left).

**B. Routing Table**

Node W Table	
Destination	Port
F	V
A	V (or U)*
J	U
C	U
D	U

\*not both

C. Node List and Cost (as added to tree)

- 1. U , 4
- 2. D , 14
- 3. V , 18
- 4. X , 19
- 5. C(H) , 26
- 6. H(C) , 26
- 7. G , 28
- 8. J , 29
- 9. B , 30
- 10. A , 39
- 11. F , 40

**Question 2.** Based on the following routing table (first two columns), on which port should a IP datagram be forwarded if the destination is 72.17.71.156 ? Calculate the network mask and the largest IP matched (right column).

Sub-net	Physical Port	Net Mask (dot-decimal)	Largest IP Matched
72.17.0.0 / 16	eth0	<b>255.255.0.0</b>	<b>72.17.255.255</b>
72.17.64.0 / 21	eth1	<b>255.255.248.0</b>	<b>72.17.71.255</b>
72.17.70.0 / 23	eth2	<b>255.255.254.0</b>	<b>72.17.71.255</b>
72.17.71.0 / 25	eth3	<b>255.255.255.128</b>	<b>72.17.71.127</b>

*72.17.39.156 fits in the 1st 3 sub-nets, so route to the largest (most bits) prefix, the /23.*

**Forward on port eth2**

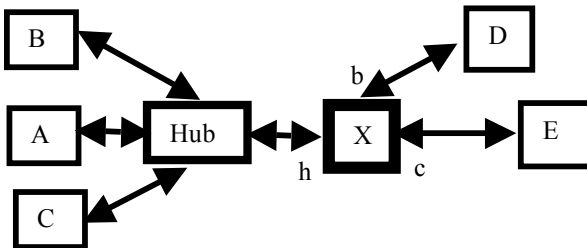
**Question 3.** You are assigned a block of IP addresses for your company: **209.162.64.0/22**. Divide this block into four equal sized subnets. How many hosts can be on each subnet? 256 - 2 = 254

Show the parameters of the four subnets below.

Sub-net ID	Net Mask	Broadcast Address	Lowest Address for a host
<b>209.162.64.0 / 16</b>	<b>255.255.255.0</b>	<b>209.162.64.255</b>	<b>209.162.64.1</b>
<b>209.162.65.0 / 21</b>	<b>255.255.255.0</b>	<b>209.162.65.255</b>	<b>209.162.65.1</b>
<b>209.162.66.0 / 23</b>	<b>255.255.255.0</b>	<b>209.162.66.255</b>	<b>209.162.66.1</b>
<b>209.162.67.0 / 25</b>	<b>255.255.255.0</b>	<b>209.162.67.255</b>	<b>209.162.67.1</b>

**Question 4.** Ethernet Switch - Learning

Assume the Ethernet switch X's forwarding table is empty. Show any lines added to the forwarding table (Host - Port, like "A - r") after each of the following frames are sent, and which hosts see the frame(A, B, C, D and/or E).



Frame ( source -> destination)	Which hosts see it	Line added, Host - Port
A -> E	B C D E	A - h
E -> A	A B C	E - c
D -> C	A B C E	D - b
A -> D	B C D	-
B -> E	A C E	B - h

What hosts are in the largest Collision Domain?

A B C

**Question 5.** Network Techniques (words or acronyms)

For what size areas of the Internet are the following routing protocols normally used (Global, Campus, Lab) :

BGP, [ Global ]

RIP, [ Lab ]

OSPF? [ Campus ]

A router with NAT changes which IP and port in an inbound datagram (source or destination)? [ Destination ]

Used to make an Ethernet network with only one collision domain. [ Hub ]

ARP can be used when the the (a) IP address is known (a) [ IP ]

to find the (b) Mac address. (b) [ Mac ]

**Honor Code** - I affirm that I have obeyed the rules of the Georgia Tech Honor Code\*.

Signature \_\_\_\_\_

\*Basically, I did not cheat, and I reported any observed cheating. A grade will not be recorded if there is no signature.