

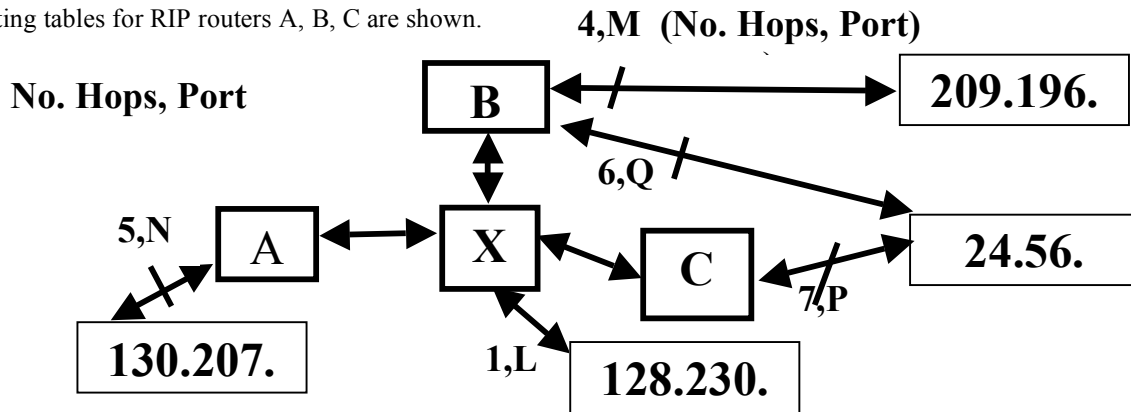
**ECE3076 QUIZ 2 ANSWERS**  
**July 13, 2006 Noon-1:45 p.m.**

**RULES.**

- i This quiz is **not** open book. One 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 90 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, Distance Vector, RIP (Bellman-Ford Algorithm) (16 points)**

The routing tables for RIP routers A, B, C are shown.



Router A Table		
Prefix	Distance	Port
128.230.	2	X
130.207.	5	N
209.196.	6	X
24.56.	9	X

Router B Table		
Prefix	Distance	Port
128.230.	2	X
130.207.	7	X
209.196.	4	M
24.56.	6	Q

Router C Table		
Prefix	Distance	Port
128.230.	2	X
130.207.	7	X
209.196.	6	X
24.56.	7	P

Construct the Routing Table for Router X

Router X Table		
Prefix	Distance	Port
128.230.	<b>1</b>	<b>L</b>
130.207.	<b>6</b>	<b>A</b>
209.196.	<b>5</b>	<b>B</b>
24.56.	<b>7</b>	<b>B</b>

Using Poison Reverse (max = 15), construct the Updates sent from Router X to A,B,C.

Update, X to A Table	
Prefix	Distance
128.230.	<b>1</b>
130.207.	<b>15</b>
209.196.	<b>5</b>
24.56.	<b>7</b>

Update X to B Table	
Prefix	Distance
128.230.	<b>1</b>
130.207.	<b>6</b>
209.196.	<b>15</b>
24.56.	<b>15</b>

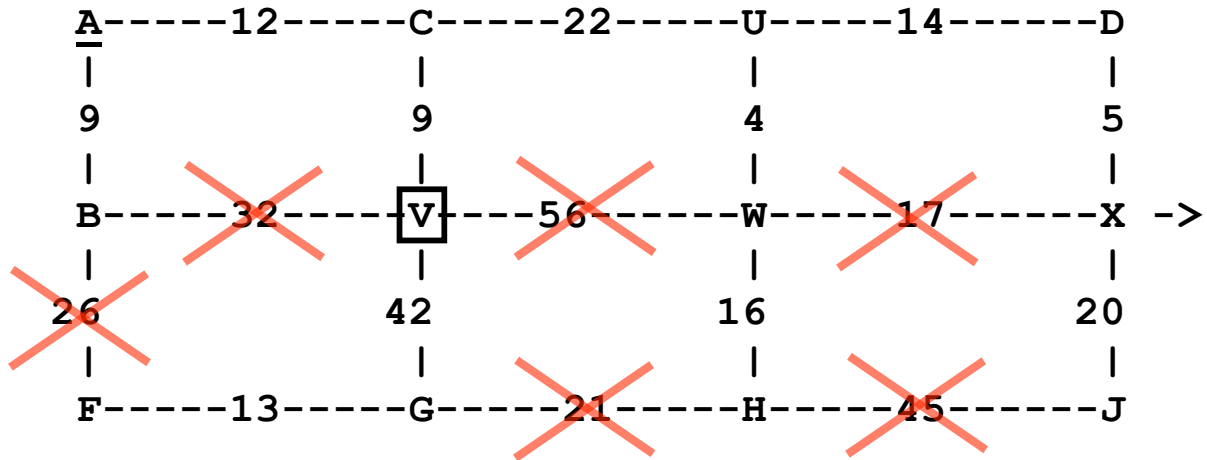
Update X to C Table	
Prefix	Distance
128.230.	<b>1</b>
130.207.	<b>6</b>
209.196.	<b>5</b>
24.56.	<b>7</b>

**Question 2– Routing, Link State, OSPF** (16 points)

Every router (A, B, ..., J) has advertised the costs (delays) to all the other nodes. For example, node V broadcasts the following route advertisement message: "V, B:29, G:12, U:22, W:26" (In practice, only link states that have changed since the last broadcast are included in the message.)

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 routes have the same cost in both directions.



A. Using Dijkstra's technique, calculate the minimum cost values of routes from node "V" to the following.

A-[ 21 ], F-[ 55 ], D-[ 45 ], X-[ 50 ], J-[ 70 ]

B. Cross out (X) the links that are not on the sink tree for node V.

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

Node V Table	
Destination	Port
A	C
F	G
D	C
J	C

**Question 3 – Routing** (12 points)

Which routing protocol would most likely be found on:

- a. An Internet backbone connecting Autonomous Systems?           BGP
- b. On the Georgia Tech OIT backbone and within the ECE network?           OSPF
- c. On a small network at home?           None or RIP

**Question 4.** Based on the following routing table (first two columns), on which port should a IP datagram be forwarded if the destination is 10.25.63.65 ? This is easy if you calculate the largest IP matched (right column). (10 points)

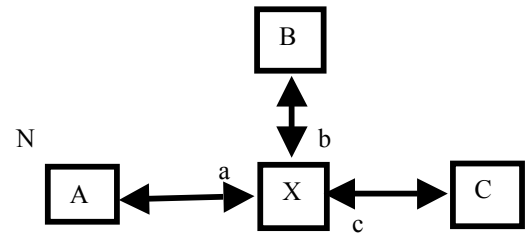
Sub-net	Physical Port		Largest IP Matched
10.25.0.0 / 17	eth0	x	<b>10.25.127.255</b>
10.25.48.0 / 21	eth1		<b>10.25.55.255</b>
10.25.62.0 / 23	eth2	x	<b>10.25.63.255</b>
10.25.63.128 / 25	eth3		<b>10.25.63.255</b>

Forward on port eth2

**Question 5.** Aggregate the following routing table into two lines. Put them in the correct order (so that the first match will be the correct one). (8 points)

Sub-net	Physical Port
10.25.16.0 / 23	A
10.25.18.0 / 24	B
10.25.19.0 / 24	A

Sub-net	Physical Port
<b>10.25.18.0 / 24</b>	<b>B</b>
<b>10.25.16.0 / 22</b>	<b>A</b>



**Question 6.** Ethernet Switch - Learning (20 points)

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

Frame ( source - destination)	Which hosts see it	What line is added to forwarding table
A - B	<b>B and C</b>	<b>A - a</b>
B - A	<b>A</b>	<b>B - b</b>
C - A	<b>A</b>	<b>C - c</b>
A - C	<b>C</b>	<b>None</b>

**Question 7.** Network Configuration (18 points)

What four items of information are needed by a host before it can operate normally on the network:

1. Host IP Address 2. Network Mask 3. Default Router IP Address 4. DNS IP Address

If these are not configured manually, what protocol can be used to get them over the network? DHCP

Before sending an IP datagram over Ethernet, what protocol is used to find the right Ethernet address? ARP

What Ethernet address is used for a host not on the local network? Default Router IP Address

How does a host find out its own Ethernet address? Built in the Network Adapter Card

If a host knows its own IP address, what does it need to figure out its Network IP and Broadcast IP? Network Mask

**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.