

Instructor: Dr. Clark

September 19, 2002

CS 3251
Fall 2002 - First Exam

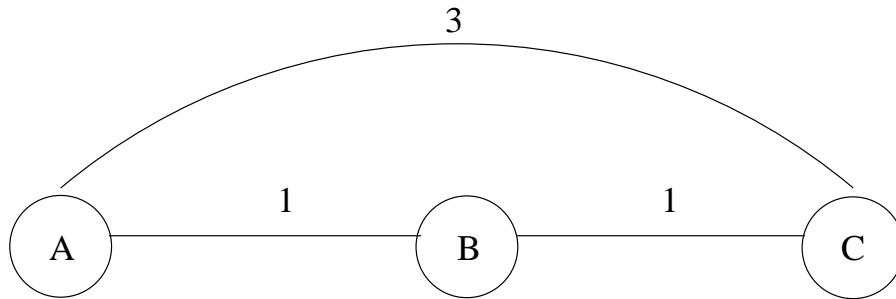
Problem	Possible	Score
1	16	
2	20	
3	24	
4	20	
5	20	
Total	100	

This test is closed book and closed notes. Answer the questions in the space provided. When answering questions, please state any and all assumptions you are making. You may use a calculator. For questions involving calculation, indicate your final answer by circling it.

Part 1: IP (16 points)

1. **(8 pts)** All Internet network hosts have two addresses: a Datalink (MAC) address and a IP address. What is the difference and why are both required?

2. **(8 pts)** As IP packets are forwarded by a standard IP router, which fields of the header are (or may be) changed? Be specific.

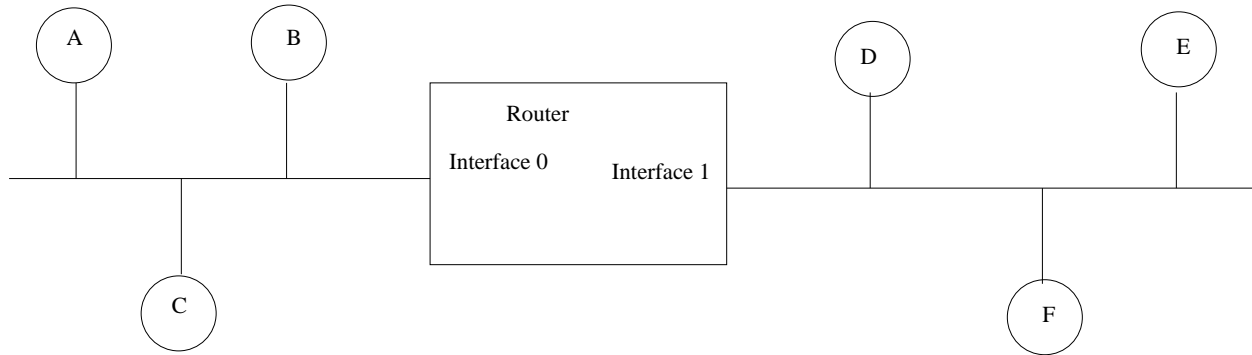
Part 2: Routing (20 points)

1. (10 pts) For the above network, give the complete, final *Distance Tables* and *Distance Vectors* for all three nodes once steady state is reached. Assume Poison Reverse IS NOT in use.

2. (10 pts) Give the final *Distance Tables* and *Distance Vectors* if Poison Reverse IS in use.

Part 4 (20 points)

The following network shows 6 end hosts and 1 router. The two networks are Ethernet. Each device supports the protocols IP, ARP and RIP. Assume for this problem that all devices have just been turned on and NO PACKETS OF ANY KIND HAVE BEEN SENT. All ARP and Routing tables are initially empty.



Host *A* is to send a IP data packet to host *E*. For each protocol given (IP, ARP, RIP) list all of the messages required before and during the transfer of this single data packet from *A* to *E*. There are lots of messages that could be sent. You should provide the minimum required.

For each packet give: (1) the protocol, (2) the purpose of the packet, (3) the source IP address, (4) the destination IP address, (5) the source MAC address and (6) the destination MAC address. Rather than using actual addresses, use the notation MAC(*A*) to indicate *A*'s MAC address and IP(*A*) to indicate *A*'s IP address.

Part 5 (20 points)

Consider the the same network as part 4. Assume that the MTU for the *A,B,C* network is 600 bytes and the MTU for the *D,E,F* network is 400 bytes. The packet Host *A* wants to send to host *E* is 1400 bytes. Assume *A* sends packets using the maximum size possible for successful delivery.

Give the values for the Total Length Field, the Offset Field and the More Flag of the IP headers as they transit each LAN.

First LAN

Fragment	Total Length	Offset	More Flag
1			
2			
3			
4			
5			
6			

Second LAN

Fragment	Total Length	Offset	More Flag
1			
2			
3			
4			
5			
6			