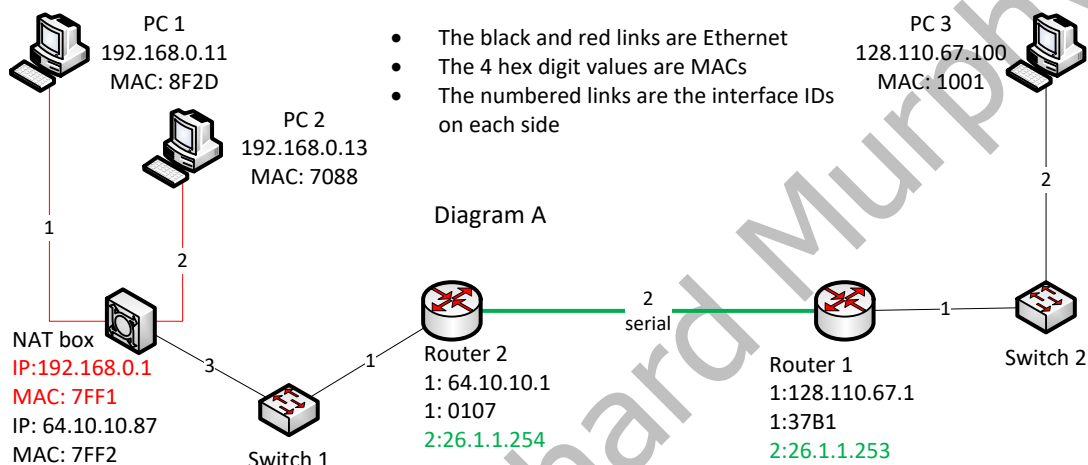


CS 3873 Computer Networks
Exam III
Spring 2020

Name: _____

Instructions: No phone or Internet use unless approved. Total points =100.

If you write your solution in a different place, be sure to put the problem number next to it.



1. This question involves link layer and network layer behavior. Refer to Diagram A above. PC 1 sends a UDP datagram to PC 3. Complete the table below for each link in the network (include the link number(s)).

Link	Source IP		Dest. IP	
	Source MAC		Dest MAC	
	Source Port		Dest. Port	
Link	Source IP		Dest. IP	
	Source MAC		Dest MAC	
	Source Port		Dest. Port	
Link	Source IP		Dest. IP	
	Source MAC		Dest MAC	
	Source Port		Dest. Port	
Link	Source IP		Dest. IP	
	Source MAC		Dest MAC	
	Source Port		Dest. Port	

You may define the starting source port and destination ports. Note that the NAT box has a built-in switch for the red links.

Indicate in the table which links carry ARP datagrams. (20 points)

2. Again looking at diagram A, could the prefix used by PC 3 be a /26? (5 points)
3. Describe in a few sentences the purpose of the Spanning Tree protocol for Ethernet (10 points)

4. Assume that switch 1 in diagram has just been turned on and that no devices attached to it have sent any data. PC 2 sends a frame addressed to 7FF1. What does switch 1 do?

Next PC 2 sends a datagram addressed to PC 3. Assuming that PC 2 already has an arp entry for PC 3, what does switch 1 do when it sees this datagram? (10 points)

5. The Ethernet address space is (5 points):
 - a. Hierarchical with only 2 layers
 - b. Flat
 - c. Twice as large as the IP address space
 - d. Is undefined in the standard and left to the adapter vendors
6. Define each term in the acronym CSMA/CD (10 points)

7. Consider a switch with two different VLANs defined in its configuration. If PC 1 is on VLAN 10 and PC 2 is on VLAN 20, provide the answer to these questions (10 points)(true/false):
- a. PC 1 and PC 2 have the same default gateway.
 - b. PC 1 can send datagrams directly to PC 2 because they are on the same physical switch.
 - c. The subnet prefix used on VLAN 10 can be different than that used on VLAN 20.
 - d. A router is needed for PC 1 to communicate with PC 2.
 - e. A 802.1Q trunk port is needed to connect the switch to a router.
8. BGP is a "path vector" protocol, where the most important metric used to select routes is the list of Autonomous Systems that must be crossed to reach a destination. If my router is in AS Y and I receive a network prefix with the AS path list "6481 101 Y 47 806", what does this indicate? Will this route be installed in the routing table?(5 points)
9. Write a brief description of how the Address Resolution Protocol works (10 points).
10. Refer to the following network diagram (Problem 18 network) when answering these questions (15 points). Assume each router knows about directly attached networks.
- a. Can a machine on the 192.168.100.0 network reach a machine on the 10.10.128.0 network?
 - b. Can a machine on the 192.168.100.0 network request and receive a web page from a server somewhere on the Internet?

- c. If router interfaces always use the smallest usable host number on a network, what is the IP address of the R3 interface to 70.60.200.64/27?
- d. Is the R3 interface to the link between R2 and R3 pingable from R1?
- e. If a machine on the 10.10.128.0 network pings a machine on the Internet, does the response datagram take the same path back to this machine within this network?

CAVEATS

ANY EVIDENCE OF COLLABORATION OR PLAGIARISM WILL RESULT IN A ZERO GRADE ON THIS EXAM AND A REFERRAL FOR ACADEMIC DISHONESTY.

YOU MAY CONTACT ME IF YOU DO NOT UNDERSTAND A QUESTION.

BLACKBOARD ONLY ALLOWS 1 SUBMISSION AND NO LATE SUBMISSIONS, SO CHECK YOUR WORK AND DO NOT WAIT UNTIL THE LAST MINUTE TO SUBMIT.

Problem 18 network

