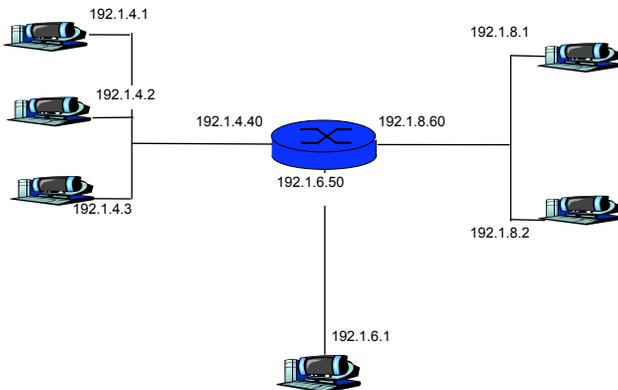


COMP211 Class Test: Thursday 4 December 2014, 10am, Lab

You will be asked 10 out of the following 30 questions (specific numbers will be different):

- What is the name of a packet in each of the following layers?
 - Transport Layer
 - Network Layer
 - Link Layer
- What is the difference between routing and forwarding?
- Discuss the difference between VC networks and datagram networks. Which approach does the Internet follow?
- Draw a diagram illustrating the architecture of a router.
- We discussed 3 types of switching fabrics. Briefly describe each of them.
- Describe how packet loss can occur at input ports of routers.
- Describe how packet loss can occur at output ports of routers.
- What is HOL blocking? Does it occur in input ports or output ports?
- Consider sending a 3100 byte datagram into a link that has an MTU of 320 bytes. How many fragments are generated?
- What is the 32-bit binary equivalent to the IP address 225.1.3.51?
- Consider a router that interconnects three subnets: A, B, and C. Suppose all of the interfaces in each of these subnets are required to have the prefix 223.200.0.0/20. Suppose subnet A is required to support 2000 interfaces, and subnet B and C are each required to support 1000 interfaces. Provide network addresses for A,B and C (in the form a.b.c.d/x) that satisfy these constraints.
- Do routers have IP addresses? If so, how many?
- Given the following network, complete the forwarding tables:



Router:

Destination Subnet	Next Router	Number of Hops	Interface
192.1.4.0/24			
192.1.6.0/24			
192.1.8.0/24			

Host 192.1.8.1:

Destination Subnet	Next Router	Number of Hops
192.1.4.0/24		
192.1.6.0/24		
192.1.8.0/24		

14. Suppose there are 5 routers between a source host and a destination host. Over how many interfaces will an IP datagram travel if it is sent from the source host to the destination host? How many forwarding tables will be looked up in the process?
15. Suppose an application generates chunks of 20 byte of data every 20msec and each chunk gets encapsulated in a TCP segment and then an IPv4 datagram. What percentage of each datagram will be application data?
16. Is it necessary that every AS uses the same Intra-AS routing protocol? Why or why not?
17. Why are there different protocols for Inter-AS and Intra-AS routing?
18. Define and contrast the following terms: *prefix* and *BGP-route*.
19. How big is the MAC address space? The IPv4 address space? The IPv6 address space?
20. Compute the CRC bits defined by the generator 1011 and the data bit string 110101.
21. An Ideal Multiple Access Protocol should have 4 characteristics. List them.
22. Sketch the operation of Slotted ALOHA.
23. Why is an ARP query sent within a broadcast frame? Why is an ARP response sent within a frame with specific destination MAC address?
24. At which layer do routers operate? Switches? Repeaters?
25. What is a CSMA?
26. What is a CDMA?
27. Consider CSMA/CD with exponential backoff. After the fifth collision, what is the probability that a node chooses $K=4$?
28. Is it true that at high load channel partitioning multiple access protocols are more efficient than random access multiple access protocols? Why or why not?
29. What are the maximum distances of two nodes connected by 100Mbps Ethernet using a twisted pair cable? What about Ethernet over fiber?
30. Which multiple access protocol is used in 802.11 wireless LANs? Briefly explain its functionality.