Networking Comprehensive Exam
Spring 2005

Work any 3 of the following problems. Give *complete explanations* for each answer unless you are simply required to “fill in the blank” __________.

1. Enter either DV or LS after each of the following statements to indicate whether it applies *more* to distance vector or link-state routing:

   a. Each router has the topology of the entire AS. ____________

   b. Each router sends updates only to other routers that are directly connected to it. ____________

   c. Optimal routes may be computed using Dijkstra’s algorithm. ____________.

   d. Route updates are susceptible to oscillations. ____________.

   e. Route updates are asynchronous. ____________
2. Answer each of the following:

   a. Explain the difference between a bridge and a router.

   b. In the Internet what protocol is used to determine the MAC address that corresponds to a given IP address?

   c. The numeric IP address is determined from the human-readable destination address using what protocol?

   d. To resolve collisions the IEEE 802.3 standard uses the ___________________________ algorithm.

   e. If two Ethernet stations have a (first) collision, what is the probability that their transmissions will collide again on their next transmission attempt?
3. Using the figure below, create a routing table for the router on the upper left that has three labeled Ethernet interfaces.

a. First assign appropriate IP addresses to the remaining three labeled Ethernet interfaces:

i. Eth0 ____________________

ii. Eth1 ____________________

iii. Eth2 ____________________

iv. Eth3 90.60.1.2

b. Next, Using the IP addresses shown in the diagram, create a routing table for the upper left router. The routing table must contain exactly five rows with IP address, subnet mask, next and be sufficient to support communication among all IP addresses shown.
4. A datagram arrives at a router with the length field in the IPV4 header equal 3000. The router must forward the datagram across a network with MTU = 600.

   a. How many datagrams will be sent (assuming forwarding is permitted)?

   b. What will be the value of the length field in each datagram sent?

   c. What is this called?