Student ID_____

**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 b, 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:

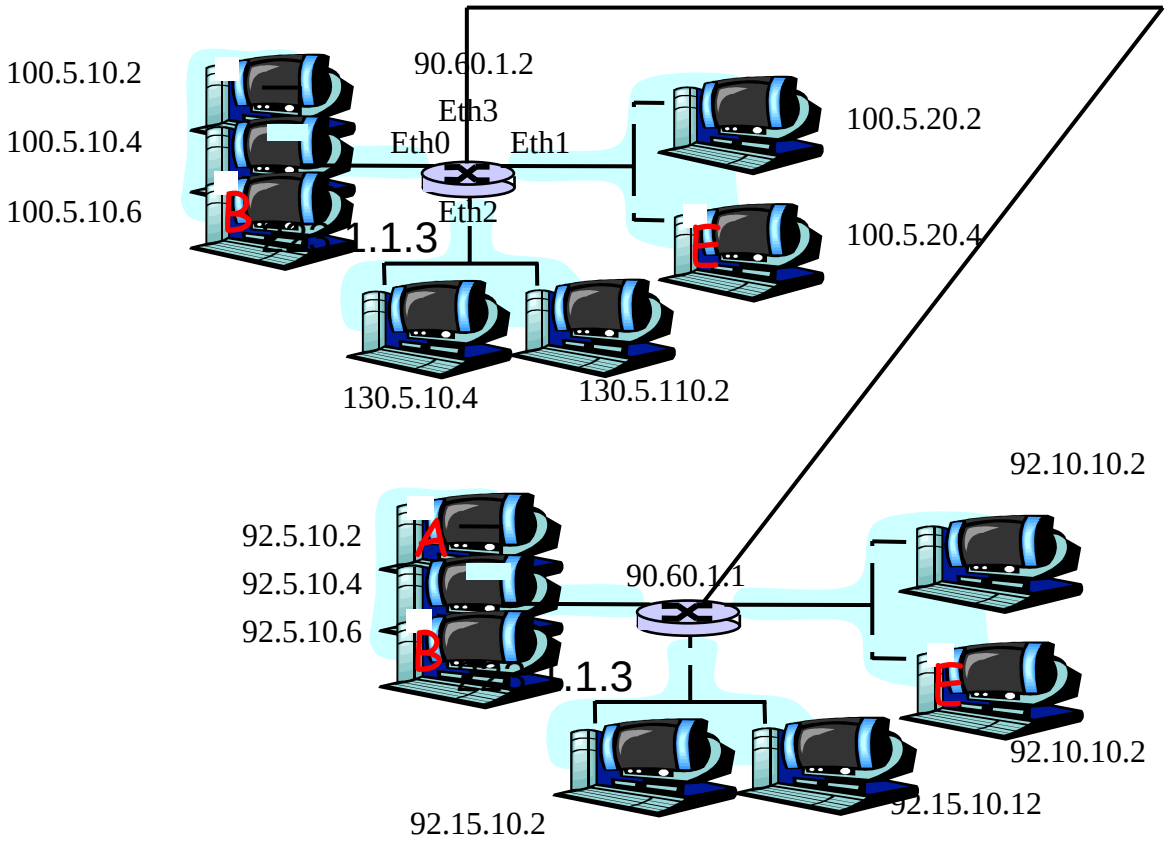
      i. Eth0 _____

      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.



| Destination Network | Subnet Mask | Next |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

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?