

## **ECE 255 Mid Term 1**

24 Oct 2001

1. Assume that you are looking at a hex dump of messages passing through a LAN segment.
  - A. How can you tell whether a given message frame is in Ethernet or 802.3 format?  
Ethernet: dest,source,protocol,data cs  
802.3: dest,source,length,dsap,ssap,ctl,data,fcs
  
  - B. Given that the message is in 802.3 format, how can you determine whether it is in SNAP format?
  
  - C. Why is there a maximum frame length for 802.3 messages?
  
  - D. Why is there a minimum frame length for 802.3 messages?
  
  - E. What are the two main subdivisions of the data link layer, and what are the main functions for each of these subdivisions?
  
  - F. What is the purpose of the SAP fields in the 802.3 format?

2. Service Models.

A. What are the four factors that must be present for a network service to be considered reliable?

B. Why is considered impossible for a datagram service to be a reliable service?

C. What is the difference between a protocol data unit and a service data unit?

3. Assume a packet number size of  $n$  and a communication channel that does not discard packets received out of order. Give a specific example of a protocol failure in which the transmitter has a window size of  $n/2+1$ . (Show a specific sequence of messages and acknowledgements that demonstrate a protocol failure.)

4. Routers, Bridges, Hubs, and Repeaters.

A. What protocol layer is used in the operation of each of the following devices:

i. Routers \_\_\_\_\_

ii. Bridges \_\_\_\_\_

iii. Hubs \_\_\_\_\_

iv. Repeaters \_\_\_\_\_

B. Which of the above devices establish the following:

i. Collision Domain

ii. Broadcast Domain

C. In what sense is a transparent bridge transparent?

D. Why do bridges frequently not have to deal with collisions on their ports?

E. Why is a bridge loop even worse than a router loop?

5. Assume that a transparent bridge with bridgeID of 35 has received the following configuration messages on each of its ports. Determine the configuration message finally used by this bridge and determine which ports are used as designated ports, root ports, and blocked ports. Configuration messages have contents (Root ID, cost, Transmitter ID).

Port 1: (42,5,67)

Port 2: (24,7,99)

Port 3: (24,7,89)

Port 4: (24,7,24)

Port 5: (24,8,25)

Port 6: (24,8,39)

Final configuration message \_\_\_\_\_

Blocked port(s): \_\_\_\_\_

Designated port(s): \_\_\_\_\_

Root port(s): \_\_\_\_\_

6. What trade-offs must be considered when setting the length of the max age for entries in the learning cache for a transparent bridge? What happens when it is too big or too small?



12. Show the configuration commands necessary to allow telnet connections to a router.

13. When the PPP configuration commands of question 11 were being entered, seemingly endless error messages started printing out. What command precipitated these messages, what caused them, and how do you make them stop until you finish your configuration?

```
R7#sh run
Building configuration...
```

```
Current configuration:
```

```
!
version 11.2
service password-encryption
no service udp-small-servers
no service tcp-small-servers
!
hostname R7
!
enable secret 5 $1$0uoo$GTxWHFKAOXX5YHPRdmDZz1
!
username R10 password 7 08044F6B5B4C50
no ip domain-lookup
!
interface Ethernet0
 ip address 10.10.3.7 255.255.255.240
!
interface Async1
 ip address 10.10.3.21 255.255.255.252
 encapsulation ppp
 async default routing
 async mode dedicated
 ppp authentication chap
!
router eigrp 255
 network 10.0.0.0
!
ip classless
ip route 0.0.0.0 0.0.0.0 10.10.3.5 permanent
!
line con 0
line 1
 no exec
 login
 rxspeed 115200
 txspeed 115200
line 2 16
line aux 0
line vty 0 4
 password 7 0223077E59535A
 login
!
end
```