

**CS 3251  
Spring 2008 - Midterm Exam**

Problem	Possible	Score
1	20	
2	20	
3	20	
4	20	
5	20	
Total	100	

This test is closed book and closed notes. Answer the questions in the space provided. When answering questions, please state any and all assumptions you are making.



**Part 2: Addressing and Routing (20 points)**

1. **(10 pts)** How are datalink layer addresses assigned and how are they used? How are IP addresses assigned and how are they used? Why are both needed?

2. **(10 pts)** What is CIDR? What does the acronym mean? Describe the significance of CIDR and how it affects the use of IP today.

**Part 3: Network Programming (20 points)**

1. (10 pts) What is meant by the term “byte ordering”? Why is this important for network application development?

2. (10 pts) Consider the following UDP application pseudo-code fragments. Imagine that the client has successfully executed the the *sendto()* call and is now blocked **forever** on the *recvfrom()* call. List several possible explanations for this situation. Explain your answers for full credit.

```
// Client
socket ();
sendto ();
recvfrom ();
```

```
// Server
socket ();
while (TRUE) {
    recvfrom ();
    sendto ();
}
```

**Part 4: ARP (20 points)**

Consider the network given on the board. The two network segments are broadcast Ethernet bus networks.

Host *A* needs to send a IP data packet to host *E*. Provide the ARP message and IP data message flow that is necessary to support and deliver this data packet. Assume that all ARP tables are initially empty. Assume that all routing tables are populated correctly. There are lots of messages that could be sent. You should provide the minimum required.

**For each packet give:** (1) the protocol - ARP or IP, (2) the purpose of the packet, (3) the source IP address, (4) the destination IP address, (5) the source MAC address and (6) the destination MAC address. Rather than using actual addresses, use the notation  $MAC(A)$  to indicate *A*'s MAC address and  $IP(A)$  to indicate *A*'s IP address.

1. (10 pts) For 10 points, answer the above questions assuming the intermediate device is a *switch*.

2. (10 pts) For 10 points, answer the above questions assuming the intermediate device is a *router*.

