PRINT LAST NAME:_____

Examination 3

CEN 4500C Computer Network Fundamentals
April 22, 1998

Instructions

1. **Failure to follow these instructions will result in deduction of points**
2. This is a closed-book, 50-minute examination.
3. You may use one 8.5" by 11" sheet of notes for reference.
4. Answer any three (3) questions, and no more.
5. Each question is worth fifteen (15) points.
6. Start the answer to each question on a new page (i.e., do **not** put the answer to more than one question on the same page).
7. Show your work. No work, no credit.
8. Assemble your answers in numerical order of the questions when you submit them.
9. **Do not turn the page and start until the proctor tells you to start.**
10. **Leave a 1" square in the upper left corner for a staple.**
11. **Read and sign the following statement.** You may write this on your exam and sign it there if you wish to take the exam questions home with you today. Do not discuss this exam with anyone in this course who has not yet taken this exam.

On my honor, I have neither given nor received unauthorized aid on this examination, and I will not discuss the contents of this examination with any student who has not yet taken this examination.

Signed:

1. (a) (8) Define and compare: amplifier, router, bridge, repeater. What are they, how are they used, what are their salient features?
   (b) (3) What is a half-bridge? How and why is one used?
   (c) (4) Describe and compare two types of routing that are done with bridges.

2. (a) (3) What is segmentation and reassembly? Why are these needed in internetworks? When is segmentation done?
   (b) (4) In IP, where and how is reassembly done? Include in your description all the information from the IP header that is used in reassembly, and how.
   (c) (3) What is the DNF flag? How and why is it used? Include error conditions.
   (d) (5) What is the difference between an IRP and an ERP? Why are both desirable in an internetwork? Give an example of each, highlighting why their differences are appropriate to the task each performs.

3. (a) (4) What are the three main types of ICMP messages? Give and example of each type.
   (b) (1) How are ICMP messages delivered in a network?
   (c) (4) When an ICMP error message is generated, where is it sent? What is included as the message body? Why?
   (d) (6) What are the differences between ARP and RARP? Include their purpose, users and implementation.

4. (a) (4) In TCP, how are the PSH and URG flags used - what is their effect? What other field(s) are used in conjunction with them and how?
   (b) (4) How are FIN and RST flags used? What other field(s) are used in conjunction with them and how?
   (c) (5) Describe normal operation of the 3-way handshake, including header fields used and how they are used.
   (d) (2) Why is the IP TTL field important for TCP?

5. (a) (3) In the IP header, what sizes are the length and the offset fields? What constraints does this impose on IP operation?
   (b) (4) What are the minimum and maximum IPv4 header sizes? Where do these constraints derive from?
   (c) (5) What is the pseudoheader? Where and how is it used? Why use it?
   (d) (3) What type of redundancy check is used by IP? Why? What does it cover?