Assignment 4
(**Due date: 10/15/2009, Thursday, in class**)

Your name:	Grade:

Important notice on how to submit and grade this assignment:

- Provide your solutions in the **same order** as the questions appear on the assignment; otherwise, **missed or misplaced** solutions will **NOT** be graded.
- **How to Grade:**
  - The total score for the assignment is **100** points.
  - **An extra 5%** will be added to the **TYPEWRITTEN** submissions.
  - **3 points will be deducted** from your total score if you **missed any ONE** of the following (this is a *cumulative penalty*, e.g., 9 points will be taken for 1 missed name and 2 missed required blank lines):
    - **Your name** and **assignment number** on the top of each solution sheet/paper,
    - At least **one blank line** between solutions of adjacent questions.

1. Summarize the distinction between a repeater and a bridge.

2. What is a router?

3. What is the purpose of tier-1 and tier-2 ISPs? What is the purpose of access ISPs?

4. What is the DNS?

5. Why is SSH considered superior to telnet?

6. In what way do the P2P and multicast approaches to Internet radio broadcast differ from N-unicast?

7. What is the difference between HTML and XML?

8. What layers of the Internet software hierarchy are used at a router?

9. What are some differences between a transport layer based on the TCP protocol and another based on the UDP protocol?

10. How does the Internet software ensure that messages are not relayed within the Internet forever?

11. What are two common ways that malware gains access to a computer system?

12. What problems are associated with legal attempts to protect against network security problem?

13. What advantage does public-key encryption have over more traditional encryption techniques?

14. What does a browser cache, and why is caching used?

15. What are the four parts of a URL, and what punctuation is used to separate the parts?

16. What is MIME and why was MIME invented?

17. List the three basic types of analog modulation.

18. What are the four basic types of multiplexing?

19. What is circuit switching, and what are its chief characteristics?

20. In a packet switching system, how does a sender transfer a large file?

21. How large is the maximum Ethernet frame, including the CRC?

22. Name three wireless PAN technologies, and give a short description of each.

23. Why must a wireless computer associate with a specific base station?

24. Name the four generations of cellular technology.

25. What is GSM?

26. How many satellite are used in GPS, and how accurate is a GPS system?

27. In the original classful address scheme, was it possible to determine the class of an address from the address itself? Explain.

28. If an ISP assigned you a /28 address block, how many computers could you assign an address?

29. What is the primary motivation for a change from IPv4 to IPv6?

30. Do applications need to exchange UDP control messages before exchanging data? Explain.

31. Calculate the size of the largest possible UDP message. (Hint: the entire UDP message must fit in an IP datagram: IP packet size = 65535B, and IP header=5x4=20B)

32. List the main features of TCP.

33. List the major security problems on the Internet.

34. List at least four basic security techniques.

35. Briefly describe the difference between CSMA/CD and CSMA/CA.

36. What is a proxy server and what are its benefits?

37. Why is the CSMA/CD protocol not applicable in a wireless network?

38. Describe the steps followed by a machine that wants to transmit a message in a