Study Questions Covering Weeks No. 6 Lectures

1. What does address resolution mean?
2. What does ARP stand for?
3. Address resolution is local to a network. Explain.
4. A computer never resolves the address of a computer on a remote network.
   How are remote network IP addresses resolved?
5. List names of three different groups of address resolution algorithms.
6. Explain the basic idea of table lookup address resolution schemes.
7. What are the advantages of table lookup address resolution schemes?
8. What are the disadvantages of table lookup address resolution schemes?
9. Explain the basic idea of close-form computation address resolution schemes.
10. What are the advantages of close-form computation address resolution schemes?
11. What are the disadvantages of close-form computation address resolution schemes?
12. Explain the basic idea of message exchange address resolution schemes.
13. What are the advantages of message exchange address resolution schemes?
14. What are the disadvantages of message exchange address resolution schemes?
15. In message exchange address resolution schemes, what messages are exchanged?
16. In message exchange address resolution schemes, where is the address resolution request sent to?
17. What is the advantages of sending the address resolution requests to one, or more, special address resolution server?
18. What is the disadvantages of sending the address resolution requests to one, or more, special address resolution server?
19. What is the advantages of sending the address resolution requests to all hosts simultaneously?
20. What is the disadvantages of sending the address resolution requests all hosts simultaneously?
21. In which situation table lookup address resolution schemes are used?
22. In which situation close-form computation address resolution schemes are used?
23. In which situation message exchange address resolution schemes are used?

24. What is the main problem with message exchange schemes?
25. How can the traffic overhead in message exchange address resolution schemes be reduced?
26. Why is message exchange information cached?
27. Explain the basic idea behind caching message exchange information?
28. In TCP/IP protocol, what is the ARP message format?
29. In which layer is ARP protocol located?
30. What does *best-effort* mean?
31. IP provides a best-effort service. Explain.
32. If the checksum in the IP datagram is not verified, what should the receiver do? Why?
33. What does ICMP stand for?
34. Where is ICMP protocol located?
35. IP and ICMP protocols are co-dependent. Explain.
36. When is a source quench message sent?
37. If a host received a source quench message, what should it do?
38. When is a time exceeded message sent?
    Mention two different situations?
39. When is a destination unreachable message sent?
    Mention three different situations?
40. When is a redirect message sent?
41. When is a parameter problem message sent?
42. When are echo request/reply messages sent?
43. When are timestamp request/reply messages sent?
44. When are address mask request/reply messages sent?
45. When are information mask request/reply messages sent?
46. What is the difference between echo request/reply messages and timestamp request/reply messages?
47. What is the difference between address mask request/reply messages and information mask request/reply messages?

48. How are ICMP messages transported?
49. How many encapsulation are an ICMP message faced?
    State these levels of encapsulation, if any.
50. Who is the destination of an ICMP message?
51. How can ICMP avoid an infinite error message loop?
52. How can ICMP messages be used to test reachability?
53. How can ICMP messages be used to trace routes?
54. Ping is a Unix command. How does it utilize ICMP protocol?
55. Traceroute is a Unix command. How does it utilize ICMP protocol?
56. Traceroute is a Unix command. It prints all the routers along a path to a given destination. How?
57. How can ICMP messages be used to discover the path MTU?
58. Why does a host try to find the path MTU?
59. How can managing multiple local networks become a serious headache?
60. Mention seven service features provided by TCP protocol to applications.
61. Why is TCP protocol called an end-to-end transport protocol?
62. Why is the adaptive retransmission scheme used in TCP protocol?
63. What is *buffer size advertisement* mean?
64. When is the *buffer size advertisement* called *closed window*?
65. Why is startup/shutdown connection a difficult task?
66. Mention four different scenarios for releasing a connection?
    Support your answer with an example for each case.
67. The one-way-disconnection may lead to data loss. Explain.
    Support your answer with an example.
68. What are the steps the TCP protocol does to prevent congestion?
69. What is the minimum size of the TCP header?
70. What is the maximum size of the TCP header?
71. If the value of H.LEN. is 0111, how many bytes of option are included in the segment?

72. The CODE BITS in a TCP segment is six bits. We can have 64 different combinations of bits. How many of these combinations do you think are valid?

73. TCP opens a connection using an initial sequence number of 14534. The other party opens the connection with an initial sequence number of 21732. Show the three TCP segments during the connection establishment.

74. TCP is sending data at 1 megabyte per second. If the sequence number starts with 7000, how long does it take before the sequence number goes back to zero?

75. The following is a dump of a TCP header in hexadecimal format.
05320017 00000001 00000000 500207FF 00000000

    (a) What is the source port number?

    (b) What is the destination port number?

    (c) What is the sequence number?

    (d) What is the acknowledgment number?

    (e) What is the length of the header?

    (f) What is the value of the code bits?

    (g) What is the window size?