Study Questions Covering Weeks No. 5 Lectures

1. What are the motivations for internetworking?
2. What does internetworking mean?
3. What does internet mean?
4. What does internet consist of?
5. Is it possible for a router to connect more than two networks?
6. Why do organizations seldom use a single router to connect all of its network?
7. What are the three main factors which organizations considered when planning an internet?
8. How does a combination of hardware and software provides the illusion of a uniform network system?
9. What is the main goal of internetworking?
10. Which protocol in TCP/IP suite does specify the network addressing scheme?
11. What is the IP address?
12. What is the internet address?
13. What is the host's internet protocol address?
14. Are IP addresses understood by software?
15. Are IP addresses understood by hardware?
16. How many bits are there in an IPv4 address?
17. In IPv4, how many parts are the 32-bit IP address divided to?
    What is the name of each part?
18. Who does assign the prefix part in an IP address?
19. Who does assign the suffix part in an IP address?
20. How many classes are there in the IP address scheme?
    What is the main purpose of each of them?
21. Given an IP address, how can we determine its class?
22. Does the IP class scheme divide the 32-bit address space into equal size classes?
23. An IP address is a 32 bit number. Each address lies in one of five classes, i.e., class A, class B, class C, class D, and class E. Some of these addresses have special functions and never assigned to any host or network. State all these special addresses.
24. In classes A, B, and C, what is the maximum number of VALID network addresses in each class (i.e., do not count the special addresses)

25. In classes A, B, and C, what is the maximum number of VALID host addresses per network in each class (i.e., do not count the special addresses)
26. In classes A, B, and C, what is the maximum number of VALID IP addresses in each class (i.e., do not count the special addresses)
27. What does *dotted decimal notation* mean?
28. Why is *dotted decimal notation* used?
29. Do 129.97.100.100 and 129.96.100.100 belong to the same network? Why?
30. What is the range of values the first byte in a class A IP address?
31. What is the range of values the first byte in a class B IP address?
32. What is the range of values the first byte in a class C IP address?
33. What is the range of values the first byte in a class D IP address?
34. What is the range of values the first byte in a class E IP address?
35. Is it correct to say: "a computer may possess a multiple IP address".
    If yes, give an example.
36. What does multi-homed host mean?
37. Consider a computer with an IP address equal to 129.98.100.100.
    What is the *network address* of the network this computer is connected to?
38. Consider a computer with an IP address equal to 129.98.100.100.
    What is the *directed broadcast* address of the network this computer is connected to?
39. Consider a computer with an IP address equal to 129.98.100.100.
    What is the *limited broadcast* address of the network this computer is connected to?
40. What does directed broadcast mean?
41. What does limited broadcast mean?
42. What is the difference between directed broadcast and limited broadcast?
43. Consider a computer with an IP address equal to 129.98.100.100.
    What is the *loopback* address of this computer.
44. Is there any difference between using 127.98.100.100 and 127.98.10.10?
45. When does a programmer use loopback addressing?
46. Why does a programmer use loopback addressing?
47. Does a packet sent to a loopback address leave a computer?

48. For a given computer, how many loopback address can be used?
    From the functionality point of view, is there any difference between them?
49. Consider a computer with an IP address equal to 129.98.100.100.
    What is the *this computer* address of this computer.
50. When is *this computer* address used?
51. Is it wrong to use this computer address after knowing the computer IP address?
52. What is the difference between IP addresses and hardware addresses?
53. In principle, over 4 billion addresses exist in IPv4. These addresses are way far than the total number of computers and routers exist on earth. However, IP is running out of address. Explain.
54. When is subnet technique used?
55. Is the subnetting visible outside the network?
56. How does subnetting reduce the routing table space?
57. Why do organizations usually decide to do subnetting?
58. In a class A IP address, how many different subnet masks can be used?
59. For each possible subnet mask in a class A IP address, calculate how many subnetwork addresses are available and how many host address can be assigned inside each of these subnet addresses?
60. In a class B IP address, how many different subnet masks can be used?
61. For each possible subnet mask in a class B IP address, calculate how many subnetwork addresses are available and how many host address can be assigned inside each of these subnet addresses?
62. In a class C IP address, how many different subnet masks can be used?
63. For each possible subnet mask in a class C IP address, calculate how many subnetwork addresses are available and how many host address can be assigned inside each of these subnet addresses?
64. An organization is granted a class B address. The administration wants to create the maximum number of subnets with at least 500 hosts per subnet. Find the best mask for this situation.
65. An organization is granted a class B address. The administration wants to create at least 100 subnets with the maximum number of hosts per subnet. Find the best mask for this situation.
66. An organization is granted a class C address. The administration wants to create the maximum number of subnets with at least 30 hosts per subnet. Find the best mask for this situation.
67. An organization is granted a class C address. The administration wants to create at least 12 subnets with the maximum number of hosts per subnet. Find the best mask for this situation.
68. Many network administrators prefer byte-oriented masking. Why?
69. Does byte-oriented masking take advantage of the subnetting strength?

70. What does CIDR mean?
71. What is the main purpose of CIDR?
72. In a CIDRized address, how can we identify the network number?
73. The CIDR mask is 32-bit long. How can we compress its value in fewer bits?
74. What is the mask value for only one class C address?
75. Both subnetting and CIDR techniques use same idea. What is the main difference between them?
76. Why is CIDR called a classless routing?
77. How does the IP protocol overcome the network heterogeneity?
78. What is the IP datagram?
79. The IP datagram is a *universal* packet that can be transfered across the underlying hardware intact format. Discuss.
80. The IP datagram is a *virtual* packet that can be transfered across the underlying hardware intact format. Discuss.
81. In IPv4, what is the minimum length of an IP datagram header?
82. In TCP/IP suite, what is the IP datagram header format?
83. What is the main purpose of the *TIME-TO-LIVE* field in the IP datagram?
84. What are the differences between WAN routing and TCP/IP routing?
85. What are the three columns in the TCP/IP routing table?
86. What is the main purpose of the mask entry in the TCP/IP routing table? deci mal notation) ? n otation) ?
87. What is the internet transmission paradigm?
88. When a host wants to send data to another host, what should this host do?
89. When an intermediate router receives a datagram, what should this router do?
90. When a final router receives a datagram, what should this router do?
91. How can a datagram be transmitted across a physical network that does not understand the datagram format?
92. What does IP datagram encapsulation mean?
93. How can a computer identify the content of the data area in a given hardware frame?
94. When an intermediate router forwards a datagram across another network, a new frame is created. Why?

95. What is the survival time of a given datagram?
96. What is the survival time of a given frame?
97. What does MTU stand for?
98. What does MTU mean?
99. Is it possible to forward a datagram across a network which has an MTU smaller than the datagram size?
100. Is it possible to forward a datagram across a network which has an MTU greater than the datagram size?
101. How can a router send a datagram over a network which has an MTU smaller than the datagram size?
102. When is an IP datagram fragmented?
103. In IPv4, who is responsible for reassemble a fragmented IP datagram?
104. In which situation is a fragment refragmented again? Give an example.
105. If a fragment is lost, what should the receiver do? Why?
106. A receiver may receive fragments from different IP datagrams. How can it reconstruct them without mixing them up?
107. What is the main purpose of the identification fields in the IP datagram?
108. When can a receiver consider that a fragment is lost?
109. How many bits are there in an IPv6 addressing scheme?
110. How many bits are there in an IPv4 addressing scheme?
111. What is the IPv6 datagram format?
112. What is the IPv6 datagram header format?
113. Although the IPv6 base datagram header is twice as large as an IPv4 datagram header, it contains less information. Why?
114. In IPv6, what are the main purpose of the multiple headers?
115. How does IPv6 handle multiple headers?
116. In IPv6 base header, there is no field for fragmentation information. Why?
117. In IPv6, how can the receiver know that the received datagram is a fragment or not?
118. In IPv6, who does perform fragmentation?
119. In IPv4, who does perform fragmentation?

120. In IPv6, who does reassemble IP datagram fragments?

121. In IPv4, who does reassemble IP datagram fragments?

122. What are the IPv6 Destination Addressing Types?

123. What are the IPv4 Destination Addressing Types?

124. In IPv6, there is no header checksum. Why?

125. In IPv6, what field is equivalent to the IPv4 TIME-TO-LIVE?

126. What does anycast mean?

127. When is anycast useful?

128. What is the colon hexadecimal notation?

129. In IPv6, what is the *zero compression* means?

130. How are IPv4 addresses mapped into the IPv6 address space?