Study Questions Covering Weeks No. 4 Lectures

1. What are the WAN building blocks?
2. Sketch a packet switch and describe its connectors.
3. How can a WAN be built?
   Sketch an example to clarify your answer.
4. How can a WAN grow up?
5. List three different ways to grow up a WAN?
6. What are the differences between
   (a) An interior WAN switch
   (b) An exterior WAN switch
7. Discuss the Store and Forward paradigm.
8. What does each of the following terms mean
   (a) Flat addressing
   (b) Two-part addressing
9. Give an example for a network which use
   (a) Flat addressing
   (b) Two-part addressing
10. What does the term default routing mean?
11. What are the various ways to generate a routing table?
    Write down the advantages/disadvantages of each group of schemes.
12. What are the differences between a static and a dynamic routing schemes?
    Give an example from each group of schemes.
13. In router, what does the term *shortest* mean?
14. Write down the Dijkstra's Shortest Path algorithm.
15. In lecture, we trace the Dijkstra algorithm, step by step, to find the shortest bath between node 3 and the rest of the nodes. Redo the same thing for
    (a) Node 1
    (b) Node 2
    (c) Node 4
    (d) Node 5
    (e) Node 6
    (f) Node 7

16. Write down the basic idea of the Shortest Path First scheme.
17. SPF can adapt itself to hardware failures. Explain.
18. Write down the Distance Vector routing algorithm.
19. What are the various network ownership?
    State the advantages and the disadvantages of each of them.
20. Make a comparison between private, public, and virtual private networks.
21. Both private, and virtual private networks can use public carrier. State the difference between the used public carrier in each case.
22. What does the word "public" in the term "public network" mean?
23. State two different service types which networks can offer.
    Give a network example for each service.
24. Make a comparison between connection-oriented and connectionless services.
25. What does the term "Virtual Circuit" mean?
26. Make a comparison between permanent and switched virtual circuits.
27. What does each of the following terms mean? State the units of each term.
    (a) Throughput
    (b) Bandwidth
    (c) Utilization
    (d) Network delay
    (e) Expected network delay
    (f) Delay-throughput product
    (g) Delay-bandwidth product
28. What is the relationship between
    (a) Throughput and bandwidth
    (b) Delay-throughput product and delay-bandwidth product
    (c) Utilization and expected network delay
29. In connectionless network service, what are the delivery issues which the sender and receiver must solve?
30. What should the sender and the receiver do to handle the out-of-order delivery problem?
31. How does the receiver know that the arrived packet is out-of-order?
32. What should the receiver do if the arrived packet is out-of-order?
33. What should the receiver do if the arrived packet is in order?
34. What should the sender and the receiver do to handle the duplicated packets problem?
35. How does the receiver know that the arrived packet is duplicated?
36. What should the receiver do if the arrived packet is duplicated?

37. What should the receiver do if it detects a transmission error?

38. What should the sender and the receiver do to handle the lost/damaged packets problem?

39. Explain the acknowledgment mechanism used to handle the lost/damaged packets problem.

40. What is the main purpose of flow control schemes?

41. List names of two techniques used to handle data overrun.

42. Explain the stop-and-go protocol.

43. Would it be sufficient to use a half-duplex physical channel for stop-and-go protocol?

44. In sliding window protocol, what should the receiver do?

45. In sliding window protocol, what should the sender do?

46. Compare between stop-and-go and sliding window protocols.

47. sliding window protocol can increase throughput dramatically, if it is compared with stop-and-go protocol.
    Explain and support your answer with an example.

48. What is the main cause of congestion?

49. How can a network avoid congestion?

50. What are the reasons for using layered protocols?

51. What does protocol family mean?

52. What does protocol suite mean?

53. What does protocol stack mean?

54. While layer n carries on a conversation with layer n on another machine, no data are directly transferred from layer n on on machine to layer n on another machine. Discuss and give an example from the real life to support your discussion.

55. What does each of the following terms mean:
    (a) Network layers
    (b) Layer interface
    (c) Layer protocol
    (d) Network Architecture

56. Are layer interfaces part of the network architecture? Why?

57. Is it possible for layer n to talk directly to layer $n-2$ in the same machine? Why?

58. Is it possible for layer n in one machine to talk directly to layer $n-1$ in the another machine? Why?

59. How many layers in the:
    (a) ISO OSI reference model
    (b) TCP/IP reference model
60. List the layer names of the following reference models
    (a) ISO OSI reference model
    (b) TCP/IP reference model
61. Describe briefly the function of each layer in the following reference models
    (a) ISO OSI reference model
    (b) TCP/IP reference model
62. Compare between the ISO OSI and TCP/IP reference models. In which they are the same and in which they are differ.
63. Which of the OSI layers handles each of the following:
    (a) Byte stuffing
    (b) CRC checking
    (c) CRC generation
    (d) The amount of volts used to represent 0 and 1
    (e) Dividing input date into frames
    (f) Controlling access to a common channel
    (g) Processing acknowledgment frames sent back by the receiver
    (h) Solving the problem caused by damaged frames
    (i) Solving the problem caused by lost frames
    (j) Solving the problem caused by duplicated frames
    (k) Determining the route
    (l) Controlling congestion
    (m) Assuring reliable transfer
    (n) making authentication
    (o) Data representation
64. criticize the OSI model and protocols.
65. criticize the TCP/IP model and protocols.
66. When was ARPA created?
67. When was ARPANET started?
68. What is ARPANET?
69. What does ARPANET stand for?

70. When was ARPANET converted to an operational network?
71. The initial ARPANET protocols were not suitable for running over multiple networks.
    What was invented to ease this problem?
72. What does TCP/IP stand for?
73. TCP and IP are two protocols in the TCP/IP suite.
    Is there any other protocols in the TCP/IP suite other than them?
74. List names of five different protocols in the TCP/IP suite?
75. Who did implement TCP/IP protocols?
76. What does DNS stand for?
77. Why was DNS created?
78. When was ARPANET shutdown for good?
79. What are the TCP/IP main features?
80. Was TCP/IP developed for a specific computer hardware?
    If yes, give an example to support your answer.
81. Was TCP/IP developed for a specific physical network hardware?
    If yes, give an example to support your answer.
82. Was TCP/IP developed for a specific operating system?
    If yes, give an example to support your answer.
83. There is no universal agreement about how to describe TCP/IP with a layered model. Give an example of:
    (a) 4 layers TCP/IP reference model
    (b) 5 layers TCP/IP reference model
84. Give names of two protocols in the internet layer in the TCP/IP suite.
85. Give names of two protocols in the transport layer in the TCP/IP suite.
86. Give names of five protocols in the application layer in the TCP/IP suite.
87. What does ICMP stand for?
88. What does UDP stand for?
89. What does FTP stand for?
90. What does SMTP stand for?
91. What does HTTP stand for?
92. What does NFS stand for?

93. Each layer has its own independent data structure, and its own terminology to describe this data structure.
    Specify in which layer each of the following data structures is used:
    (a) Stream
    (b) Segment
    (c) Message
    (d) Packet
    (e) Datagram
    (f) Frame

94. Both stream and message data structures are used in the application layer.
    With which protocol each of them is used?

95. Both segment and packet data structures are used in the transport layer.
    With which protocol each of them is used?