

2 Mark Questions

1. Define Network.

A network is a set of devices connected by physical media links. A network is recursively a connection of two or more nodes by a physical link or two or more networks connected by one or more nodes.

2. What is a Link?

At the lowest level, a network can consist of two or more computers directly connected by some physical medium such as coaxial cable or optical fiber. Such a physical medium is called as Link.

3. What is a node?

A network can consist of two or more computers directly connected by some physical medium such as coaxial cable or optical fiber. Such a physical medium is called as Links and the computer it connects is called as Nodes.

4. What is a gateway or Router?

A node that is connected to two or more networks is commonly called as router or Gateway. It generally forwards message from one network to another.

5. What is point-point link?

If the physical links are limited to a pair of nodes it is said to be point-point link.

6. What is Multiple Access?

If the physical links are shared by more than two nodes, it is said to be Multiple Access.

7. What are the advantages of Distributed Processing?

- a. Security/Encapsulation
- b. Distributed database
- c. Faster Problem solving
- d. Security through redundancy
- e. Collaborative Processing

8. What are the criteria necessary for an effective and efficient network?

- a. Performance

It can be measured in many ways, including transmit time and response time.

- b. Reliability

It is measured by frequency of failure, the time it takes a link to recover from a failure, and the network's robustness.

- c. Security

Security issues includes protecting data from unauthorized access and viruses.

9. Name the factors that affect the performance of the network.

- a. Number of Users
- b. Type of transmission medium

- c. Hardware
- d. Software

10. Name the factors that affect the reliability of the network.

- a. Frequency of failure
- b. Recovery time of a network after a failure

11. Name the factors that affect the security of the network.

- a. Unauthorized Access
- b. Viruses

12. What is Protocol?

A protocol is a set of rules that govern all aspects of information communication.

13. What are the key elements of protocols?

The key elements of protocols are

- a. Syntax

It refers to the structure or format of the data, that is the order in which they are presented.

- b. Semantics

It refers to the meaning of each section of bits.

- c. Timing

Timing refers to two characteristics: When data should be sent and how fast they can be sent.

14. What are the key design issues of a computer Network?

- a. Connectivity
- b. Cost-effective Resource Sharing
- c. Support for common Services
- d. Performance

15. Define Bandwidth and Latency

Network performance is measured in Bandwidth (throughput) and Latency (Delay). Bandwidth of a network is given by the number of bits that can be transmitted over the network in a certain period of time. Latency corresponds to how long it takes a message to travel from one end of a network to the other. It is strictly measured in terms of time.

16. Define Routing

The process of determining systematically how to forward messages toward the destination nodes based on its address is called routing.

17. What is a peer-peer process?

The processes on each machine that communicate at a given layer are called peer-peer process.

18. When a switch is said to be congested?

It is possible that a switch receives packets faster than the shared link can accommodate and stores in its memory, for an extended period of time, then the switch will eventually run out of buffer space, and some packets will have to be dropped and in this state is said to congested state.

19. What is semantic gap?

Defining a useful channel involves both understanding the applications' requirements and recognizing the limitations of the underlying technology. The gap between what applications expects and what the underlying technology can provide is called semantic gap.

20. What is Round Trip Time?

The duration of time it takes to send a message from one end of a network to the other and back, is called RTT.

21. Define the terms Unicasting, Multicasting and Broadcasting.

If the message is sent from a source to a single destination node, it is called Unicasting.

If the message is sent to some subset of other nodes, it is called Multicasting.

If the message is sent to all the m nodes in the network it is called Broadcasting.

22. What is Multiplexing?

Multiplexing is the set of techniques that allows the simultaneous transmission of multiple signals across a single data link.

23. Name the categories of Multiplexing.

- a. Frequency Division Multiplexing (FDM)
- b. Time Division Multiplexing (TDM)
 - i. Synchronous TDM
 - ii. ASynchronous TDM Or Statistical TDM.
- c. Wave Division Multiplexing (WDM)

24. What is FDM?

FDM is an analog technique that can be applied when the bandwidth of a link is greater than the combined bandwidths of the signals to be transmitted.

25. What is WDM?

WDM is conceptually the same as FDM, except that the multiplexing and demultiplexing involve light signals transmitted through fiber optics channel.

26. What is TDM?

TDM is a digital process that can be applied when the data rate capacity of the transmission medium is greater than the data rate required by the sending and receiving devices.

27. What is Synchronous TDM?

In STDM, the multiplexer allocates exactly the same time slot to each device at all times, whether or not a device has anything to transmit.

28. List the layers of OSI

- a. Physical Layer
- b. Data Link Layer
- c. Network Layer
- d. Transport Layer
- e. Session Layer
- f. Presentation Layer
- g. Application Layer

29. Which layers are network support layers?

- a. Physical Layer
- b. Data link Layer and
- c. Network Layers

30. Which layers are user support layers?

- a. Session Layer
- b. Presentation Layer and
- c. Application Layer

31. Which layer links the network support layers and user support layers?

The Transport layer links the network support layers and user support layers.

32. What are the concerns of the Physical Layer?

Physical layer coordinates the functions required to transmit a bit stream over a physical medium.

- a. Physical characteristics of interfaces and media
- b. Representation of bits
- c. Data rate
- d. Synchronization of bits
- e. Line configuration
- f. Physical topology
- g. Transmission mode

33. What are the responsibilities of Data Link Layer?

The Data Link Layer transforms the physical layer, a raw transmission facility, to a reliable link and is responsible for node-node delivery.

- a. Framing
- b. Physical Addressing

- c. Flow Control
- d. Error Control
- e. Access Control

34. What are the responsibilities of Network Layer?

The Network Layer is responsible for the source-to-destination delivery of packet possibly across multiple networks (links).

- a. Logical Addressing
- b. Routing

35. What are the responsibilities of Transport Layer?

The Transport Layer is responsible for source-to-destination delivery of the entire message.

- a. Service-point Addressing
- b. Segmentation and reassembly
- c. Connection Control
- d. Flow Control
- e. Error Control

36. What are the responsibilities of Session Layer?

The Session layer is the network dialog Controller. It establishes, maintains and synchronizes the interaction between the communicating systems.

- a. Dialog control
- b. Synchronization

37. What are the responsibilities of Presentation Layer?

The Presentation layer is concerned with the syntax and semantics of the information exchanged between two systems.

- a. Translation
- b. Encryption
- c. Compression

38. What are the responsibilities of Application Layer?

The Application Layer enables the user, whether human or software, to access the network. It provides user interfaces and support for services such as e-mail, shared database management and other types of distributed information services.

- a. Network virtual Terminal
- b. File transfer, access and Management (FTAM)
- c. Mail services
- d. Directory Services

39. What are the two classes of hardware building blocks?

Nodes and Links

40. What are the different link types used to build a computer network?

- a. Cables

- b. Leased Lines
- c. Last-Mile Links
- d. Wireless Links

41. What are the categories of Transmission media?

- a. Guided Media
 - i. Twisted –Pair cable
 - 1. Shielded TP
 - 2. Unshielded TP
 - ii. Coaxial Cable
 - iii. Fiber-optic cable
- b. Unguided Media
 - i. Terrestrial microwave
 - ii. Satellite Communication

42. What are the types of errors?

- a. Single-Bit error
In a single-bit error, only one bit in the data unit has changed
- b. Burst Error
A Burst error means that two or more bits in the data have changed.

43. What is Error Detection? What are its methods?

Data can be corrupted during transmission. For reliable communication errors must be deducted and Corrected. Error Detection uses the concept of redundancy, which means adding extra bits for detecting errors at the destination. The common Error Detection methods are

- a. Vertical Redundancy Check (VRC)
- b. Longitudinal Redundancy Check (VRC)
- c. Cyclic Redundancy Check (VRC)
- d. Checksum

44. What is Redundancy?

The concept of including extra information in the transmission solely for the purpose of comparison. This technique is called redundancy.

45. What is VRC?

It is the most common and least expensive mechanism for Error Detection. In VRC, a parity bit is added to every data unit so that the total number of 1s becomes even for even parity. It can detect all single-bit errors. It can detect burst errors only if the total number of errors in each data unit is odd.

46. What is LRC?

In LRC, a block of bits is divided into rows and a redundant row of bits is added to the whole block. It can detect burst errors. If two bits in one data unit are damaged and bits in exactly the same positions in another data unit are also damaged, the LRC checker will not detect an error. In LRC a redundant data unit follows n data units.

47. What is CRC?

CRC, is the most powerful of the redundancy checking techniques, is based on binary division.

48. What is Checksum?

Checksum is used by the higher layer protocols (TCP/IP) for error detection

49. List the steps involved in creating the checksum.

- a. Divide the data into sections
- b. Add the sections together using 1's complement arithmetic
- c. Take the complement of the final sum, this is the checksum.

50. What are the Data link protocols?

Data link protocols are sets of specifications used to implement the data link layer. The categories of Data Link protocols are

1. Asynchronous Protocols
2. Synchronous Protocols
 - a. Character Oriented Protocols
 - b. Bit Oriented protocols

51. Compare Error Detection and Error Correction:

The correction of errors is more difficult than the detection. In error detection, checks only any error has occurred. In error correction, the exact number of bits that are corrupted and location in the message are known. The number of the errors and the size of the message are important factors.

52. What is Forward Error Correction:

Forward error correction is the process in which the receiver tries to guess the message by using redundant bits.

53. Define Retransmission:

Retransmission is a technique in which the receiver detects the occurrence of an error and asks the sender to resend the message. Resending is repeated until a message arrives that the receiver believes is error-free.

54. What are Data Words?

In block coding, we divide our message into blocks, each of k bits, called datawords. The block coding process is one-to-one. The same dataword is always encoded as the same codeword.

55. What are Code Words?

"r" redundant bits are added to each block to make the length $n = k + r$. The resulting n-bit blocks are called codewords. $2^n - 2^k$ codewords that are not used. These codewords are invalid or illegal.

56. What is a Linear Block Code?

A linear block code is a code in which the exclusive OR (addition modulo-2) of two valid codewords creates another valid codeword.

57. What are Cyclic Codes?

Cyclic codes are special linear block codes with one extra property. In a cyclic code, if a codeword is cyclically shifted (rotated), the result is another codeword.

58. Define Encoder:

A device or program that uses predefined algorithms to encode, or compress audio or video data for storage or transmission use. A circuit that is used to convert between digital video and analog video.

59. Define Decoder

A device or program that translates encoded data into its original format (e.g., it decodes the data). The term is often used in reference to MPEG-2 video and sound data, which must be decoded before it is output.

60. What is Framing?

Framing in the data link layer separates a message from one source to a destination, or from other messages to other destinations, by adding a sender address and a destination address. The destination address defines where the packet has to go and the sender address helps the recipient acknowledge the receipt.

61. What is Fixed –Size Framing?

In fixed-size framing, there is no need for defining the boundaries of the frames. The size itself can be used as a delimiter.

62. Define Character Stuffing.

In byte stuffing (or character stuffing), a special byte is added to the data section of the frame when there is a character with the same pattern as the flag. The data section is stuffed with an extra byte. This byte is usually called the escape character (ESC), which has a predefined bit pattern. Whenever the receiver encounters the ESC character, it removes it from the data section and treats the next character as data, not a delimiting flag.

63. What is Bit Stuffing?

Bit stuffing is the process of adding one extra 0 whenever five consecutive 1s follow a 0 in the data, so that the receiver does not mistake the pattern 0111110 for a flag.

64. What is Flow Control?

Flow control refers to a set of procedures used to restrict the amount of data that the sender can send before waiting for acknowledgment.

65. What is Error Control ?

Error control is both error detection and error correction. It allows the receiver to inform the sender of any frames lost or damaged in transmission and coordinates the retransmission of those frames by the sender. In the data link layer, the term error control refers primarily to methods of error detection and retransmission.

66. What Automatic Repeat Request (ARQ)?

Error control is both error detection and error correction. It allows the receiver to inform the sender of any frames lost or damaged in transmission and coordinates the retransmission of those frames by the sender. In the data link layer, the term error control refers primarily to methods of error detection and retransmission. Error control in the data link layer is often implemented simply: Any time an error is detected in an exchange, specified frames are retransmitted. This process is called automatic repeat request (ARQ).

67. What is Stop-and-Wait Protocol?

In Stop and wait protocol, sender sends one frame, waits until it receives confirmation from the receiver (okay to go ahead), and then sends the next frame.

68. What is Stop-and-Wait Automatic Repeat Request?

Error correction in Stop-and-Wait ARQ is done by keeping a copy of the sent frame and retransmitting of the frame when the timer expires.

69. What is usage of Sequence Number in Reliable Transmission?

The protocol specifies that frames need to be numbered. This is done by using sequence numbers. A field is added to the data frame to hold the sequence number of that frame. Since we want to minimize the frame size, the smallest range that provides unambiguous communication. The sequence numbers can wrap around.

70. What is Pipelining ?

In networking and in other areas, a task is often begun before the previous task has ended. This is known as pipelining.

71. What is Sliding Window?

The sliding window is an abstract concept that defines the range of sequence numbers that is the concern of the sender and receiver. In other words, the sender and receiver need to deal with only part of the possible sequence numbers.

72. What is Piggy Backing?

A technique called piggybacking is used to improve the efficiency of the bidirectional protocols. When a frame is carrying data from A to B, it can also carry control information about arrived (or lost) frames from B; when a frame is carrying data from B to A, it can also carry control information about the arrived (or lost) frames from A.

Big Questions

SRI SAI RAM ENGINEERING COLLEGE, CHENNAI – 44.

DEPARTMENT OF COMPUTER APPLICATIONS

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1. With neat diagram Explain the OSI Layers
2. Explain in detail about the Internet Architecture.
3. Explain the error Detection methods
4. Explain the Framing Protocols
5. Explain the protocols used for Reliable transmission in a Network.