COMPUTER NETWORKS

QUESTION BANK

1. What is mean by data communication?

Data communication is the exchange of data (in the form of 1s and 0s) between two

devices via some form of transmission medium (such as a wire cable).

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

The most important criteria are performance, reliability and security. Performance of

the network depends on number of users, type of transmission medium, the capabilities of the connected h/w and the efficiency of the s/w.

Reliability is measured by frequency of failure, the time it takes a link to recover from the failure and the network's robustness in a catastrophe. **Security** issues include protecting data from unauthorized access and viruses.

3. What are the three fundamental characteristics determine the effectiveness of the data communication system?

The effectiveness of the data communication system depends on 3 fundamental characters:

Delivery: The system must deliver data to the correct destination.

Accuracy: The system must deliver data accurately.

Timeliness: The system must deliver data in a timely manner.

4. What are the advantages of distributed processing?

Advantages of distributed processing include security/encapsulation, distributed databases, faster problem solving, security through redundancy and collaborative processing.

5. Why are protocols needed?

In networks, communication occurs between the entities in different systems. Two

entities cannot just send bit streams to each other and expect to be understood. For communication, the entities must agree on a protocol. A protocol is a set of rules that govern data communication.

6. Why are standards needed?

Co-ordination across the nodes of a network is necessary for an efficient communication. If there are no standards, difficulties arise. A standard provides a model or basis for development to which everyone has agreed.

7. For n devices in a network, what is the number of cable links required for a mesh and ring topology?

Mesh topology – n (n-1)/2

Ring topology – n

8. What is the difference between a passive and an active hub?

An active hub contains a repeater that regenerates the received bit patterns before

sending them out. A passive hub provides a simple physical connection between the attached devices.

9. Distinguish between peer-to-peer relationship and a primary-secondary relationship.

Peer-to-peer relationship: All the devices share the link equally.

Primary-secondary relationship: One device controls traffic and the others must transmit through it.

10. Assume 6 devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device?

Number of cables=n (n-1)/2=6(6-1)/2=15

Number of ports per device=n-1=6-1=5

11. Group the OSI layers by function.

The seven layers of the OSI model belonging to three subgroups. Physical, datalink and network layers are the network support layers; they deal with the physical aspects of

moving data from one device to another. Session, presentation and application layers are the user support layers; they allow interoperability among unrelated software systems. The

transport layer ensures end-to-end reliable data transmission.

12. What are header and trailers and how do they get added and removed?

Each layer in the sending machine adds its own information to the message it receives

from the layer just above it and passes the whole package to the layer just below it. This information is added in the form of headers or trailers. Headers are added to the message at the layers 6,5,4,3, and 2. A trailer is added at layer2. At the receiving machine, the headers or trailers attached to the data unit at the corresponding sending layers are removed, and actions appropriate to that layer retaken.

13. The transport layer creates a communication between the source and destination. What are the three events involved in a connection?

Creating a connection involves three steps: connection establishment, data transfer and connection release.

14. What is the DC component?

Direct current is a zero-frequency signal with constant amplitude.

15. How does NRZ-L differ from NRZ-I?

In the NRZ-L sequence, positive and negative voltages have specific meanings: positive for 0 and negative for 1. in the NRZ-I sequence, the voltages are meaningless. Instead, the receiver looks for changes from one level to another as its basis for recognition of

UNIT-II

1.What are the responsibilities of data link layer?
Specific responsibilities of data link layer include the following.
a) Framing
b) Physical addressing c) Flow control
d) Error control

e) Access control

2. Mention the types of errors.

There are 2 types of errors

a) Single-bit error. b) Burst-bit error.

3. Define the following terms.

a) Single bit error: The term single bit error means that only one bit of a given data unit (such

as byte character/data unit or packet) is changed from 1 to 0 or from 0 to 1. b) Burst error: Means that 2 or more bits in the data unit have

changed from 1 to 0 from 0 to 1.

4. What is redundancy?

It is the error detecting mechanism, which means a shorter group of bits or extra bits may be

appended at the destination of each unit.

5. List out the available detection methods.

There are 4 types of redundancy checks are used in data communication. a) Vertical redundancy checks (VRC).

b) Longitudinal redundancy checks (LRC). c) Cyclic redundancy checks (CRC).

d) Checksum.

6. Write short notes on VRC.

The most common and least expensive mechanism for error detection is the vertical

redundancy check (VRC) often called a parity check. In this technique redundant bit called a parity bit, is appended to every data unit so, that the total number of 0’s in the unit (including the parity bit) becomes even.

7. Write short notes on LRC.

In longitudinal redundancy check (LRC), a block of bits is divided into rows and a

redundant row of bits is added to the whole block.

8. Write short notes on CRC.

The third and most powerful of the redundancy checking techniques is the cyclic

redundancy checks (CRC) CRC is based on binary division. Here sequence of redundant bits, called the CRC remainder is appended to the end of data unit.

9. Write short notes on CRC generator.

A CRC generator uses a modulo-2 division.

a) In the first step, the 4 bit divisor is subtracted from the first 4 bit of the dividend.

b) Each bit of the divisor is subtracted from the corresponding bit of the dividend without

disturbing the next higher bit.

10. Write short notes on CRC checker.

A CRC checker functions exactly like a generator. After receiving the data appended

with the CRC it does the same modulo-2 division. If the remainder is all 0's the CRC is dropped and the data accepted. Otherwise, the received stream of bits is discarded and the dates are resent.

11. Give the essential properties for polynomial.

A polynomial should be selected to have at least the following properties.

a) It should not be

b) It should be divisible by(x+1).

12. Define checksum.

The error detection method used by the higher layer protocol is called checksum.

Checksum is based on the concept of redundancy.

13. What are the steps followed in checksum generator?

The sender follows these steps

a) The units are divided into k sections each of n bits.

b) All sections are added together using 2's complement to get the sum.

c) The sum is complemented and become the checksum. d) The checksum is sent with the data.

14. List out the steps followed is checksum checker side.

The receiver must follow these steps

a) The unit is divided into k section each of n bits.

b) All sections are added together using 1's complement to get the sum.

c) The sum is complemented. d) If the result is zero.

15. Write short notes on error correction.

It is the mechanism to correct the errors and it can be handled in 2 ways.

a) When an error is discovered, the receiver can have the sender retransmit the entire data unit.

b) A receiver can use an error correcting coder, which automatically corrects certain errors.

UNIT III

1. What are the network support layers and the user support layers? Network support layers:

The network support layers are Physical layer, Data link layer and Network layer.

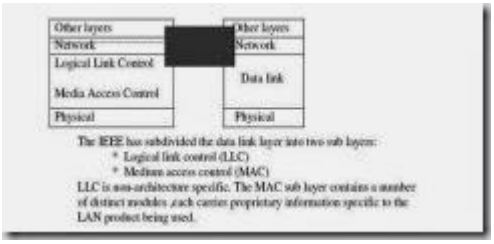
These deals with electrical specifications, physical connection, transport timing and reliability.

User support layers:

The user support layers are: Session layer, Presentation layer, Application layer.

These allow interoperability among unrelated software system.

2. With a neat diagram explain the relationship of IEEE Project to the OSI model?



3. What are the functions of LLC?

The IEEE project 802 model takes the structure of an HDLC frame and divides it into 2 sets of functions. One set contains the end user portion of the HDLC frame - the logical address, control information, and data. These functions are handled by the IEEE

802.2 logical link control (LLC) protocol.

4. What are the functions of MAC?

MAC sub layer resolves the contention for the shared media. It contains

synchronization, flag, flow and error control specifications necessary to move information from one place to another, as well as the physical address of the next station to receive and route a packet.

5. What is protocol data unit?

Control field

Information field

6. What are headers and trailers and how do they get added and removed?

The control data added to the beginning of a data is called headers. The control data added to the end of a data is called trailers. At the sending machine, when the message passes through the layers each layer adds the headers or trailers. At the receiving machine, each layer removes the data meant for it and passes the rest to the next layer.

7. What are the responsibilities of network layer?

The network layer is responsible for the source-to-destination delivery of packet

across multiple network links. The specific responsibilities of network layer include the following:

Logical addressing. Routing.

8. What is a virtual circuit?

A logical circuit made between the sending and receiving computers. The connection

is made after both computers do handshaking. After the connection, all packets follow the same route and arrive in sequence.

9. What are data grams?

In datagram approach, each packet is treated independently from all others. Even

when one packet represents just a place of a multi packet transmission, the network treats it although it existed alone. Packets in this technology are referred to as datagram.

10. What are the two types of implementation formats in virtual circuits?

Switched virtual circuit

Permanent virtual circuit.

11. What is meant by switched virtual circuit?

Switched virtual circuit format is comparable conceptually to dial-up line in circuit switching. In this method, a virtual circuit is created whenever it is needed and exits only for the duration of specific exchange.

12. What is meant by Permanent virtual circuit?

Permanent virtual circuits are comparable to leased lines in circuit switching. In this

method, the same virtual circuit is provided between two uses on a continuous basis. The circuit is dedicated to the specific uses.

13. Define Routers.

Routers relay packets among multiple interconnected networks. They Route packets

from one network to any of a number of potential destination networks on internet routers operate in the physical, data link and network layer of OSI model.

14. What is meant by hop count?

The pathway requiring the smallest number of relays, it is called hop-count routing, in

which every link is considered to be of equal length and given the value one.

15. How can the routing be classified?

The routing can be classified as,

Adaptive routing

Non-adaptive routing.

UNIT IV

1. What is function of transport layer?

The protocol in the transport layer takes care in the delivery of data from one

application program on one device to an application program on another device. They act as a link between the upper layer protocols and the services provided by the lower layer.

2. What are the duties of the transport layer?

The services provided by the transport layer

End-to- end delivery

Addressing

Reliable delivery Flow control Multiplexing

3. What is the difference between network layer delivery and the transport layer delivery?

Network layer delivery	Transport layer delivery
The network layer is responsible for the the source-to-destination delivery of packet across multiple network links.	The transport layer is responsible for source-to-destination delivery of the entire message.

4. What are the four aspects related to the reliable delivery of data?

The four aspects are,

Error control Sequence control Loss control Duplication control

5. What is meant by segment?

At the sending and receiving end of the transmission, TCP divides long transmissions

into smaller data units and packages each into a frame called a segment.

6. What is meant by segmentation?

When the size of the data unit received from the upper layer is too long for the network layer datagram or data link layer frame to handle, the transport protocol divides it

into smaller usable blocks. The dividing process is called segmentation.

7. What is meant by Concatenation?

The size of the data unit belonging to a single session are so small that several can fit together into a single datagram or frame, the transport protocol combines them into a single data unit. The combining process is called concatenation.

8. What are the types of multiplexing?

The types of multiplexing are,

Upward multiplexing

Downward multiplexing

9. What are the two possible transport services? Two basic types of transport services are, Connection service

Connectionless services

10. The transport layer creates the connection between source and destination. What are the three events involved in the connection?

For security , the transport layer may create a connection between the two end ports.

A connection is a single logical path between the source and destination that is associated with all packets in a message. Creating a connection involves three steps:

Connection establishment

Data transfer & Connection release.

11. What are the techniques used in multiplexing? The three basic techniques of multiplexing are, Frequency-division multiplexing

Time-division multiplexing

Wave-division multiplexing

12. What is meant by congestion?

Congestion in a network occur if user send data into the network at a rate greater than that allowed by network resources.

13. Why the congestion occur in network?

Congestion occur because the switches in a network have a limited buffer size to store arrived packets.

14. How will the congestion be avoided?

The congestion may be avoided by two bits

BECN - Backward Explicit Congestion Notification

FECN - Forward Explicit Congestion Notification

15. What is the function of BECN BIT?

The BECN bit warns the sender of congestion in network. The sender can respond to this warning by simply reducing the data rate.

UNIT – V

1. What is the purpose of Domain Name System?

Domain Name System can map a name to an address and conversely an address to name.

2. Discuss the three main division of the domain name space.

Domain name space is divided into three different sections: generic domains, country

domains & inverse domain.

Generic domain: Define registered hosts according to their generic behavior, uses generic suffixes.

Country domain: Uses two characters to identify a country as the last suffix.

Inverse domain: Finds the domain name given the IP address.

3. Discuss the TCP connections needed in FTP.

FTP establishes two connections between the hosts. One connection is used for data

transfer, the other for control information. The control connection uses very simple rules of communication. The data connection needs more complex rules due to

the variety of data types transferred.

4. Discuss the basic model of FTP.

The client has three components: the user interface, the client control process, and the

client data transfer process. The server has two components: the server control process and the server data transfer process. The control connection is made between the control processes. The data connection is made between the data transfer processes.

5. What is the function of SMTP?

The TCP/IP protocol supports electronic mail on the Internet is called Simple Mail

Transfer (SMTP). It is a system for sending messages to other computer users based on e- mail addresses. SMTP provides mail exchange between users on the same or different computers.

6. What is the difference between a user agent (UA) and a mail transfer agent

(MTA)?

The UA prepares the message, creates the envelope, and puts the message in the

envelope. The MTA transfers the mail across the Internet.

7. How does MIME enhance SMTP?

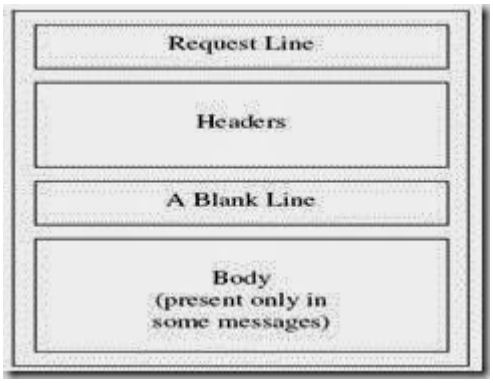
MIME is a supplementary protocol that allows non-ASCII data to be sent through

SMTP. MIME transforms non-ASCII data at the sender site to NVT ASCII data and deliverers it to the client SMTP to be sent through the Internet. The server SMTP at the receiving side receives the NVT ASCII data and delivers it to MIME to be transformed back to the original data.

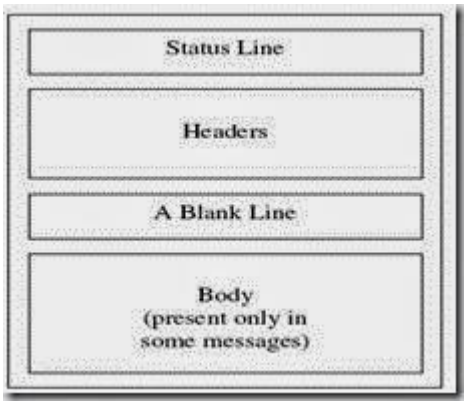
8. Why is an application such as POP needed for electronic messaging?

Workstations interact with the SMTP host which receives the mail on behalf of every

9. Give the format of HTTP request message.



10. Give the format of HTTP response message.



11. Write down the three types of WWW documents.

The documents in the WWW can be grouped into three broad categories: static,

dynamic and active.

Static: Fixed-content documents that are created and stored in a server. **Dynamic:** Created by web server whenever a browser requests the document. **Active:** A program to be run at the client side.

12. What is the purpose of HTML?

HTML is a computer language for specifying the contents and format of a web

document. It allows additional text to include codes that define fonts, layouts, embedded graphics and hypertext links.

13. **Define CGI**.

CGI is a standard for communication between HTTP servers and executable programs. It is used in crating dynamic documents.

14. Name four factors needed for a secure network. Privacy: The sender and the receiver expect confidentiality.

Authentication: The receiver is sure of the sender's identity and that an imposter has not

sent the message.

Integrity: The data must arrive at the receiver exactly as it was sent.

Non-Reputation: The receiver must able to prove that a received message came from a specific sender.

15. How is a secret key different from public key?

In secret key, the same key is used by both parties. The sender uses this key and an

encryption algorithm to encrypt data; the receiver uses the same key and the corresponding

decryption algorithm to decrypt the data.In public key, there are two keys: a private key and a public key. The private key is

kept by the receiver. The public key is announced to the public.