

Questions

- 1) a. What is LAN? What are the topologies of LAN? — (3)
 - b. Describe security threats along with its categories. — (5)
 - c. How can you prevent security threats. — (6)
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- 2) a. What is application layer. — (3)
 - b. Differentiate between client-server and peer-to-peer network. — (5)
 - c. Describe the communication method in Remote Procedure call. — (6)

- ③ a. what is data communication & computer network and why do learn? — (5)
- b. classify computer networks and describe each briefly — (5)
- c. briefly discuss about Personal Area Network. — (4)

- 4) a. Describe and differentiate between MAN and WAN. — (7)
- b. Why does DNS use UDP, not TCP. — (4)
- c. Differentiate between the HTML and HTTP. — (3)

5) a. Define Network Topology. Explain
the different network topologies — (6)

b. How DHCP servers assign IP address
to a host? — (5)

c. Define FTP and its data structure
— (3)

6) a. Write down the layered architecture
of Network Model. — (6)

b. Show diagrammatic comparison of
the TCP/IP and OSI model — (5)

c. What are the differences between
HTTP and HTTPS. — (3)

- 7) a. Describe OSI model. — (6)
- b. Draw a diagram of protocols in client - server network. — (5)
- c. Distinguish between physical and logical address. — (3)
- 8) a. Write down the TCP model for respective layers. — (5)
- b. Characteristics of TCP model. — (4)
- c. Write the basic principles of an autonomous system. — (5)

Ans do the Q. No. 1 (a).

LAN: Local Area Network (LAN) is a data communication network connecting various terminals or computers within a building or a limited geographical area. Examples: Ethernet, Token Ring, wireless LAN using IEEE 802.11.

LAN has following topologies:

1. Star topology
2. Bus topology
3. Ring topology
4. Mesh topology
5. Hybrid topology
6. Tree topology

Ans to Q. No. 1 (b)

A security threat is an effort to obtain illegal admittance to one's organization's network, to take one's data without their knowledge, or execute other malicious intent.

Security threats can be divided into

the following categories:

1. Interception: is a security threat in which availability of resources is attacked.

2. Privacy Breach: someone who is not the authorized person is accessing or intercepting data sent or received by the original authenticated user.

3. Integrity: includes any alteration or modification in the original context of communication.

4. Authenticity: This threat occurs when an attacker or a security violator poses as a genuine person and accesses the resources or communicates with other genuine user.

Ans to the Q. No. 1(c)

To secure data the most widely used technique is cryptography. It is a technique to encrypt the plain-text data which makes it difficult to understand and interpret. The available cryptographic

algorithms are:

1. Secret key encryption: Both senders and receivers have one secret key. This secret key is used to encrypt the data at senders end. After the data is encrypted, it is sent on the public domain to the receiver. Because the receiver knows the key, the encrypted data packets can easily be decrypted.

2. Public key encryption: Every user has its own secret key and it is not in the shared domain. Also every user has its own but by public key. Public key is always made public and is used by the senders to encrypt the data. When

the user receives the encrypted data, he can easily decrypt it by using his own secret key.

3. Message digest: Actual data is not sent. A hash value is calculated and inserted in the message. The other end user computes its hash value and compares it with the one just received.

Ans do the Q. No. 2(a)

An Application layer is the top most layer in OSI and TCP/IP layered model.

This layer exists in both layered models because of its significance, of

interaction with user and user applications. This layer is for application which are involved in communication system. A user may or may not directly interact with the applications. Application layer is where the actual communication is initiated and reflected.

Ans do the Q. No. 2(b)

Difference between client-server and peer-to-peer network:

client - server

1. There is a specific client and server connected to the server.

Peer - to - Peer

1. Client and server are not distinguished; each node acts as client and server.

2. Focus on sharing the information.

2. focused on communication.

3. The data is stored in a centralized server.

3. Each peer has its own data.

4. Client-server are expensive to implement.

a. Peer-to-peer are less expensive to implement.

5. Client server is more stable and scalable.

5. Peer-to-peer suffers from degradation if number of peers increased with the system.

Ans to The Q. No. 2.(e)

This is a mechanism where one process interacts with another by means of procedure calls. Their communication happens in the following way:

- The client processes calls the client stub. It passes all the parameters pertaining to program local to it.
- All parameters are then packed and made to statement. A system call is made to send them to the other side of the network.
- Kernel sends that the data over the network and the other end receives it.

- The remote board passes data to the server stub where it is unmarshalled.
- The parameters are passed to the procedure and the procedure is then executed.
- The result is sent back to the client in the same manner.

Ans to the Q. No. 3(a)

Data communication refers to the transmission of digital data between two or more computers and a computer network or data network, i.e., a telecommunication network that allows computers to exchange data.

The reasons we should learn this:

1. Network basic understanding:

A network of interconnected computers and computerized peripherals such as printers is called computer network. This interconnection among computers facilitates information sharing among them.

2. Network engineering:

To ease network engineering, the whole networking concept is divided into multiple layers. Each layer is involved in some particular task and is independent of all other layers. But as a whole almost all networking tasks depends on all of these layers.

Q. 3: What is Internet?

A network of networks is called an ~~Internet~~ ~~computer~~ ~~is~~ ~~called~~ ~~an~~ ~~Internet~~ ~~network~~ ~~is~~ ~~the~~ ~~largest~~ ~~network~~ ~~in~~ ~~existence~~ ~~on~~ ~~this~~ ~~planet~~. It enables users to share and access enormous amount of information worldwide. It uses ~~information~~ ~~is~~ ~~available~~ ~~now~~, ~~FTP~~, ~~email~~, ~~services~~, ~~audio~~, ~~video~~, ~~streaming~~ ~~etc.~~

Ans to the Q. No. 3(b)

Computer networks are classified based on various factors. They includes:

1. Geographical span:

Geographically a network can be spanned in one of the following categories:

- It may be spanned across a whole city.

- It may be spanned across multiple cities or provinces.

- It may be one network covering whole world.

- 2. Inter-connectivity:
Computers components of a network can be connected to each other in some fashion:

- Every single device can be connected to every other device on network, making the network mesh.

- Each device is connected to its left and right peers only, creating linear-structure.

- All devices connected together with

a single device, creating static like structure

3. Administration:

From an administrator's point of view, a network can be private network which belongs a single autonomous system and cannot be accessed outside its physical or logical domain.

4. Network-architecture:

Computer networks can be discriminate into various types such as client-server, peer-to-peer or hybrid depending upon their architecture.

Answer the Q. No. 3(c)

A personal Area network (PAN), is a small local network which is very

personal to a user. They may include

bluetooth enabled devices or infra-red enable devices. PAN has connectivity range up to 10 meters. PAN may include wireless computer keyboard and mouse, Bluetooth enabled headphones, wireless printers and TV remotes.

Ans do the Q.No. 9(a)

Metropolitan Area Network (MAN):

covers the largest area than LAN, such as: small towns, city etc. MAN connects 2 or a lot of computers that are not apart however resides within the same or completely different cities.

Wide Area Network (WAN):

WAN covers the largest area than MAN.

Has such as - country / countries etc. PSTN

Or satellite medium size used for WAN.

Differences between MAN and WAN:

| MAN | WAN |
|--|--|
| 1. MAN might not be owned by one organization. | 1. WAN also might not be owned by one organization |
| 2. There is moderate propagation delay in MAN. | 2. There is long propagation delay |
| 3. The transmission speed is fast. | 3. Transmission speed is low. |
| 4. Supports a bandwidth of data. | 4. Supports a bandwidth for transfer of low range of data. |
| 5. Cost of installation is moderate. | 5. Cost of installation is higher than MAN. |

Ans to the Q. No. 4 (b)

CAN use UDP because it is fast and reliable. DNS uses UDP and not TCP because:

1. UDP is much faster. TCP is slow as it requires 3-way handshake. The load on DNS servers is also an important factor.

DNS servers (since they use UDP) don't have

to keep connections.

2. DNS requests are generally very small

and fit in well with UDP segments.

3. UDP is not reliable but reliability can be added on application layer by using a timeout and retransmit.

Application layer can add reliability by using a timeout and retransmit.

The application layer can add reliability by using a timeout and retransmit.

of retransmission to add a reliability to TCP.

TCP can't drop packets.

Ans do the Q. No. 4(c)

Differences between HTML and HTTP:

HTML

HTTP

1. It is a well-known markup language used of data communication for web page development the worldwide web.
2. Written using HTML elements which consist of exchange or transmission of tags, primarily and far hyperlinked opening tag and a closing tag.
3. HTTP is a great means of data communication for web page development the worldwide web.

Ans do the Q. No. 5(a)

A network topology via the arrangement with which computers, say, devices or network devices are connected to each other.

Different topologies are:

Point-to-point topology:

It includes two nodes which are directly connected to wires or some other medium like optical fiber. It is easy to implement and maintain.

Bus Topology:

It is a network type in which every computer and network is connected to a single cable. It transmits data only in one direction.

Star topology:

All the computers are connected to a single hub through a cable. This hub is the central node and all other nodes are connected to the central node.

Tree topology:

It has a root node and all other nodes are connected to it forming a hierarchy. It should at least have three levels to the hierarchy.

Hybrid topology:

It is a two different types of topologies which are a mixture of two or more topologies.

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the DHCPDISCOVER message, which contains the source address as 0.0.0.0 to every node on the network (including servers). When a DCHP server receives the message, it reduces the DHCPOFFER message to the requested host which contains the requested server address and new IP address to the node.

□ DHCPOFFER: If there are multiple servers on the network, host receives multiple DHCPOFFER message. It is up to the host to select a particular message.

□ DHCPREQUEST: The requested host sends the offer message, it again broadcasts the DHCPREQUEST

message on the network with the address of the server whose offer message is accepted by the host.

DHCPRELEASE: Finally, if the host decides to go some off-line to move to other network, it sends DCHPRELEASE message packed to the server indicating that it wants to disconnect.

Q. No. 5(e)

file transfer protocol (FTP) is an application layer protocol which moves files between local and remote file systems.

FTP follows three types of data-structure

1. file-structure: In the file-structure

1. There is no internal structure and the file is considered to be continuous sequence of data bytes.

2. Record structure: In record structure the file is made up of sequential records.

3. Page-structure: In page-structure the file is made up of independent index pages.

(Q) Ans to the Q.No. 6(a)

In layered architecture of network model one whole network process is divided into small tasks. Each small task is then assigned to a particular layer which works dedicatedly to process the task only. Every layer does only specific

specific attack with plasma

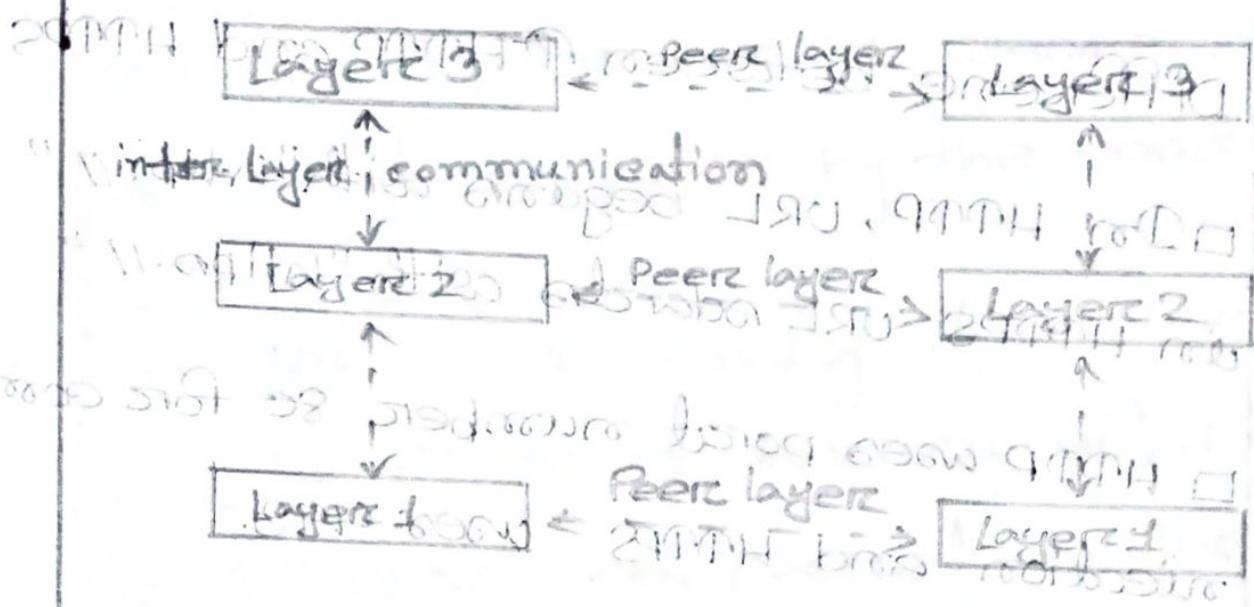


Fig: Layered-architecture

Ans do the Q. No. 6 (b) bro

The diagram comparison of TCP/IP and OSI.

| OSI Model | TCP/IP model |
|----------------------|-------------------|
| Application Layer | Application Layer |
| Presentation Layer | Transport Layer |
| Session Layer | Session Layer |
| Internet Layer | Transport Layer |
| Network Access Layer | Network Layer |
| | Data Link Layer |
| | Physical Layer |

Ans to the Q. No. 6(c)

Difference between HTTP and HTTPS.

- In HTTP, URL begins with "http:// " whereas in HTTPS URL starts with "https:// "
- HTTP uses port number 80 for communication and HTTPS uses 443.
- HTTP is considered to be less secure and HTTPS is secure.

Ans to the Q. No. 7(a)

Open system interconnection (OSI) is an open standard for all communication systems. OSI model is established by international standard organization (ISO).

This model has seven layers:

1. Application layer: This layer is responsible for providing interface to the application user.

2. Presentation layer: Defines how data in the native format of remote host should be presented in the native format of host.

3. Session layer: Maintains sessions between remote hosts.

4. Transport Layer: Responsible for end-to-end delivery between hosts.

5. Network Layer: responsible for address assignment and uniquely addressing nodes in a network.

6. Data Link Layer: responsible for reading and creating data from and onto the link.

7. Physical Layer: defines the hardware cabling, wiring, power output, pulse rate.

Ans to the Q. No. 7(b)

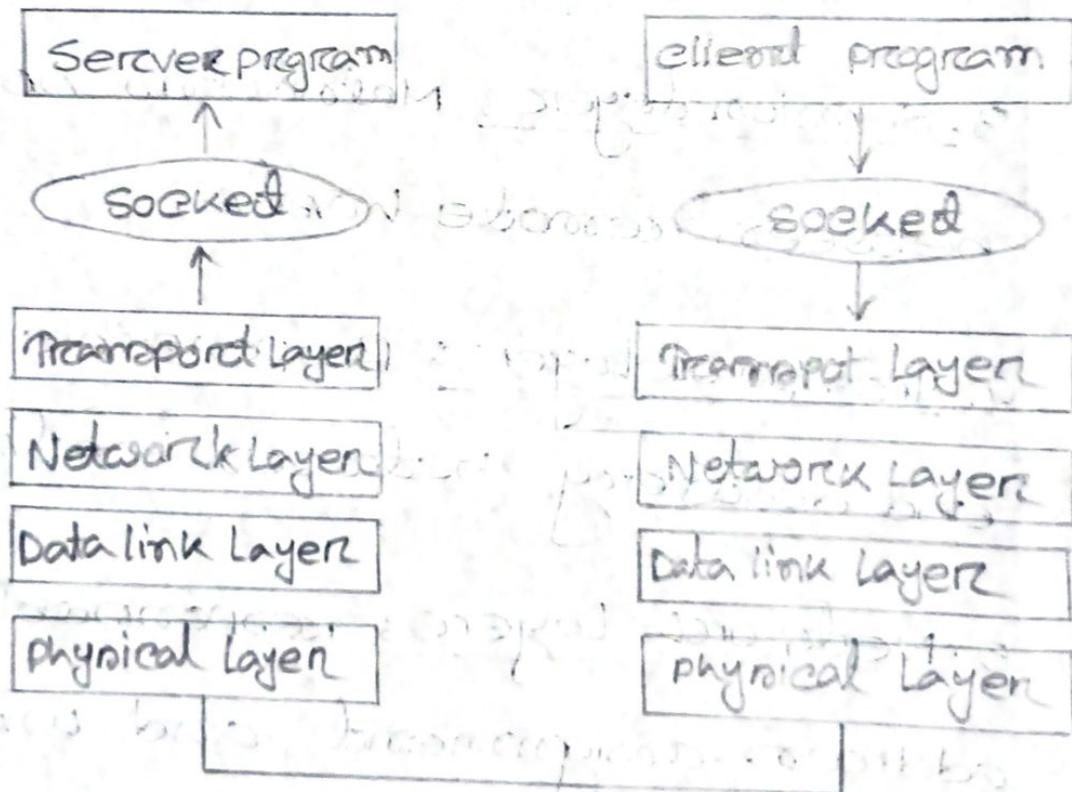


Fig: Sockets in client-server network

Ans do the Q. No. 7(c)

Difference between physical and logical address:

| Logical address | Physical address. |
|--|---|
| 1. User can view the logical can never view logical address of a program. | physical address of program. |
| 2. Generated by CPU. | 2. Location in a memory unit |
| 3. The user can use logical address to access indirectly the physical address. | 3. User can only access physical address. |

Ans do the Q. No. 8(a)

TCP/IP model:

- Transport layer: TCP, UDP
- Application layer: HTTP, FTP, Telnet, SMTP, DNS, BGP, DHCP etc.

- Transport Layer: TCP, UDP
- Internet Layer: IP
- Network Interface Layer: CSMA/CD

HDLC, LAP-B, LAP-D

□ Media/Hardware layer: Ethernet (twisted pair, broadband coaxial, optical fiber), radio, infrared etc.

Characteristics of PEP model are:

Ama do - the Q. No. 8(b)

Characteristics of PEP model are:

Follows:

a. PEP/DP has 4 layers

b. PEP/DP is more reliable

c. PEP/DP uses both session and

and presentation layers in the application layer is divided.

- d. TCP/IP follows a horizontal approach
- e. TCP/IP does not have very strict boundaries.

Ans to the Q. No. 8(c)

End-to-End principle:

- Final decision should always be made by the users.
- Trying to complement these decisions by ~~intelligence~~ outside the network is redundant.
- Control functions should thus be delegated as much as possible outside the network.
- In other words, the network does

the routine and the end-system does the control.

IP over everything:

- Internet is built by layering a unique 'Internetworking protocol' on top of various network technologies.
- Consequence: very simple to adopt new technologies in the internet.
- Another advantage: world-wide addressing