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1. a) what is Data communication ? why to learn Data communication & computer Network? 5
 - b) write the Application of communication & computer Network? 3
 - c) what is computer Network? type of computer Network? describe every type of computer Network. 16
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2. (a) what do you mean by PCN. describe briefly. 3
 - (b) write down different type of computer network. and describe every type of computer network. 8
 - (c) describe about internet work and internet service. 3

3. (a) Describe about various type of 6 LAN technologies.
- (b) what do you mean by network 8 topology. write type of topology and describe every type of topology.
4. (a) what do you mean by osi model? 6 layers of osi model and describe every model.
- (b) what is internet model? describe 6 different type of layers of internet model.
- (c) briefly describe about layered 2 tasks

5. a) Describe about computer network security? describe all categories of security threats.

(b) briefly describe about secret key Encryption, public key encryption and message digest.

(c) describe cryptography.

6. a) briefly describe about client server model?

(b) what is directory service? briefly
describe directory service.

(c) what is application protocol?

7. a) what is application layer? Explain 5
briefly.

- (A) Describe client server. 1
- (B) what do you mean by http ? 6
describe briefly.
- (C) what is FTP? describe FTP. 3

8. a) describe about Application services. 6

b) what is network services? Desc- 8.
reibe basic service of computer
network 2

Ans to The que no → 1(a)

Data communication: Data communication refers to the transmission of this digital data between two or more computers and a computer network or data network is a telecommunication network that allows computers to exchange data.

Important of learn Data communication & computer network:

Network:

(i) Network Basic understanding: A system of interconnected computers and computerized peripherals such as printers is called computer network.

(ii) Network Engineering: Networking engineering is a complicated task, which involves software, firmware, chip level engineering hardware and electric pulses.

(iii) internet: A network of networks is called an internetwork, or simply the internet. It is the largest network in existence on this planet. It is gradually migration from IPv4 to IPv6.

Ans to the que no 1(b)

Application of communication & computer network:

- (i) Resource sharing such as printers and storage devices.
- (ii) Exchange of information by means of e-mails and FTP.
- (iii) Information sharing by using web or internet.
- (iv) IP phones
- (v) video conferences

- (vi) parallel computing
- (vii) instant messaging.

Ans to The que no 1(c)

computer network: A system of interconnected computers and computerized peripherals such as printers is called computer network.

type of computer Networks

(i) Geographical span:

- o it may be spanned across your table among Bluetooth enabled devices, ranging not more than few meters.
- o It may be spanned across a whole city
- o it may be one network covering whole world.

(ii) Inter connectivity:

components of a network can be connected to each other differently in some fashion.

- a. Every single device can be connected to every other device on network, making the network mesh.
- b. All devices connected together with a single device, creating star like structure.

(iii) Administration:

from an administration'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

(iv) Network Architecture: There can be one or more system acting as servers,

other being client, requests the server to serve requests.

(v) Network Application: Resource sharing such as printers and storage devices.

- ip phones
- video conferences,
- parallel computing.
- instant messaging.

Ans to the que no 2(a)

DCN: DCN means dynamic circuit network.

DCN is Advanced computer networking technology that combines packet-switched communication based on the internet protocol, as used in the internet with circuit-switched

Technology that are characteristic of traditional telephone network system.

Ans to the que no 2(b)

Different type of computer Networks

- (i) personal area network
- (ii) Local Area Network.
- (iii) metropolitan Area Network.
- (iv) wide area network.

(i) personal area networks. A personal

area network (PAN) is smallest network which is very personal to user. This may include bluetooth enabled devices or infra-red enabled 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.

Local area network: A computer network

spanned inside a building and operated under single administrative system is generally termed as Local area network.

Usually LAN covers an organization's office, school, college, or university. Number of systems connected in LAN may vary from as least as two to as much as 16 million.

(iii) metropolitan area network:

The metropolitan area network (MAN) generally expands

Throughout city such as cable tv network, it can be in form of ethernet, token ring, ATM, or Fiber Distributed Data interface.

Metro Ethernet is service which provided by ISP's. This service enables the user to expand their local area network.

(iv) wide area network:

As the name suggests, the wide area network covers a wide area which may span across provinces and even a whole country. Generally, telecommunication networks are wide area network.

Ans to the que no 2(c)

Internet work and internet service:

A network of networks is called an internetwork, or simply internet. It is the largest network in existence on this planet.

The internet hugely connected all WAN's and it can have connection to LAN's and Home network's.

internet services:

- (i) web sites
- (ii) E-mail
- (iii) instant messaging
- (iv) marketing
- (v) Resource sharing.
- (vi) networking.

Ans to the que no 3(a)

Various type of LAN technologies:

Ethernet: Ethernet is a widely deployed LAN technology. This technology was invented by Bob Metcalfe and D.R. Boggs in the year 1970.

Ethernet shares media. Network which uses shared media has high probability of data collision. Ethernet connector is network interface and equipped with 48 bits MAC address. This helps other Ethernet devices to identify and communicate with remote device in Ethernet.

Fast-Ethernet: To encompass need of fast emerging software and hardware

thechnology. Ethernet extends itself as fast Ethernet. it can run on utp optical fibers and wireless too. Fast Ethernet on fiber is defined under 100 BASE-FX standard which provides speed up to 100 MBPS on fiber.

Giga-Ethernet: After being introduced in 1995, Fast ethernet could enjoy its high-speed status only for 3 years till giga-ethernet introduced.

virtual LAN: LAN uses Ethernet which in turn works on shared media. Shared media in ethernet create one single broadcast domain and one single collision domain. introduction of switches to ethernet has removed single collision domain issue and each device connected to switch

works in its separate collision domain.

Ans to The que no 3(b)

Network topology: A network topology is the arrangement with which computer system or network device are connected to each other.

Type of topology:

In case of bus.

(i) Bus topology:

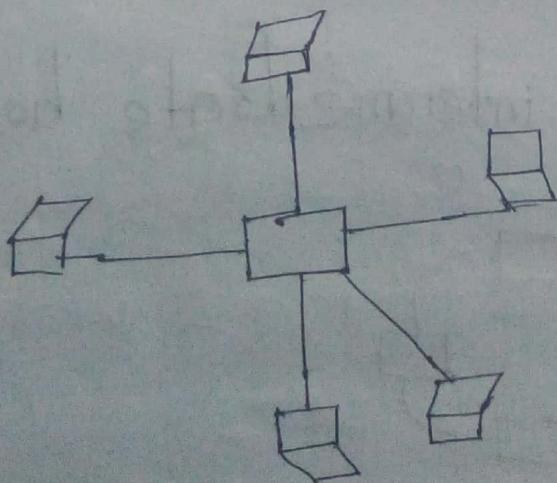
In case of Bus.

topology, all devices share single communication line or cable. Bus topology may have problem while multiple hosts sending data at the

same time therefore; Bus topology either uses CSMA/CD technology or recognizes one host as Bus master to solve the issue.

It is one of the simple forms of networking where a failure of a device does not affect the other devices.

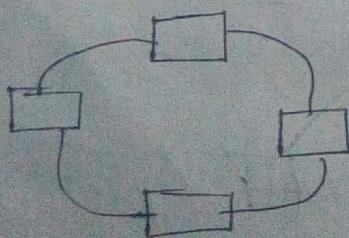
Star topology: All hosts in star topology are connected to a central device, known as hub device, using a point to point connection.



- (i) Layer-1 device such as hub or repeater.
- (ii) Layer-2 device such as switch or bridge.
- (iii) Layer-3 device such as router or gateway.

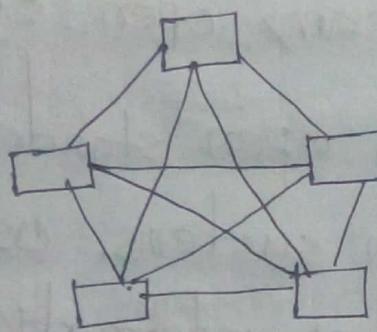
Ring topology:

In ring topology, each host machine connects to exactly two other machine, creating a circular network structure. When one host tries to communication or send message to a host which is not adjacent to it, the data travels through all intermediate hosts.

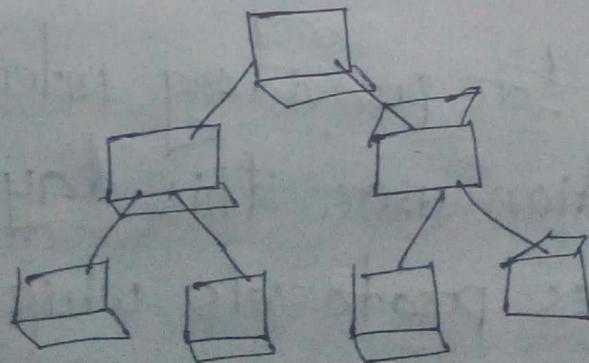


Mesh topology: in this type of topology, a host is connected to one or multiple hosts.

This topology has hosts in point-to-point connection with every other host.



tree topology: Also known as hierarchical topology. This is the most common form of network topology in use presently.



Hybrid topology: Hybrid topology is combination various type of topology.

Ans to the que no 4(a)

OSI model: OSI means open system interconnect is an open standard for all communication systems. OSI model is established by international standard organization (ISO) to.

layer of osi model:

(i) Application layer: This Layer is responsible for providing interface to application user. This layer encompasses protocols which directly interact with user.

(ii) Presentation Layer: This layer defines how data in the native format of remote host should be presented in the native format host.

(iii) Session Layer: This layer maintains session between remote hosts.

(iv) Transport Layer: This layer is responsible for end-to-end delivery between hosts.

(v) Network Layer: This layer is responsible for address assignment.

(vi) Data Link Layer.

(vii) Physical Layer: This layer defines the hardware, cabling, switching, power output, pulse rate etc.

Ans to the que no 4(b)

Internet model: Internet model which contains four layer architecture. OSI MODEL is general communication model but internet model is what the internet uses all its communication.

Layer of internet model:

Application Layer

Transport Layer

Internet Layer

Link Layer

- (i) Application layer: This layer defines the protocol which enables user to interact with the network for example, FTP, HTTP etc.
- (ii) Transport Layer: This layer defines how data should flow between hosts. Major protocol at this layer is transmission control protocol (TCP).
- (iii) Internet layer: Internet protocol (IP) works on this layer. This layer facilitates host addressing and recognition.
- (iv) Link layer: This layer provides mechanism of sending and receiving actual data. Unlike its OSI model counterpart.

Ans to The que no 4(c)

In Layered architecture of Network model, one whole network is divided into small tasks. Each to small task is than assigned to a particular layer which works dedicatedly to process the task only. Every layer does only specific work. The lower layer does the same things.

Ans to The que no - 5(a)

Computer network security: Network security consists of the policies adopted to prevent the monitor unauthorized access, misuse, modification or denial

of a computer network and network accessible resource is called Network security.

Categories of computer network security:

o interruption: interruption is a security threat in which availability of resources is attacked. for example a user is unable to access it's web-server or The web-server is hijacked.

o privacy-Breach: in this threat, the privacy of user is compromised. someone, who is not the authorized person is accessing or intercepting data sent

integrity: this type of threat includes any alteration or modification in the original content communication.

• Authenticity: This threat occurs when an attacker or a security violator poses as genuine person and arrives the resource or communication with other genuine users.

Ans to the que no 5(b)

secret key Encryption: Both sender and receiver have one secret key.

This secret key is used to encrypt the data at sender's end. After the data is encrypted, it is sent on the public domain to the receiver. Because the receiver knows and has the secret key. The encrypted data packets can easily be decrypted.

public key Encryption:

in this encryption system,
every user has its own secret key and it is
not in the shared domain. the secret
key is never revealed on public domain.

Example of public key encryption is
Rivest - Shamir - Adleman (RSA).

message digest: In the method actual
data is not sent, instead a hash value
is calculated and sent. the other end user

computes its own hash value. Example of
message digest is MD5 hashing. it is

mostly used in authentication where user

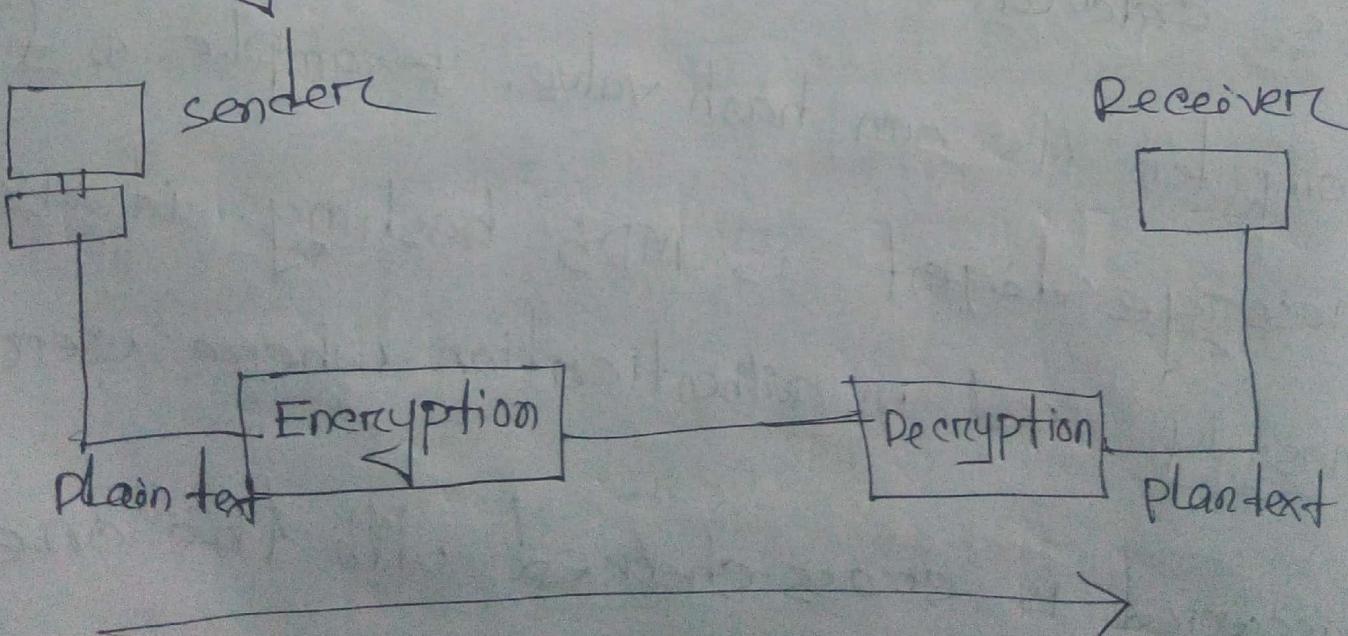
password is cross checked with the one

saved on the server.

Ans to The que no 5(c)

Cryptography:

Cryptography is a technique to encrypt the plain text data which makes it difficult to understand and interpreted. There are several cryptographic algorithms available present day.



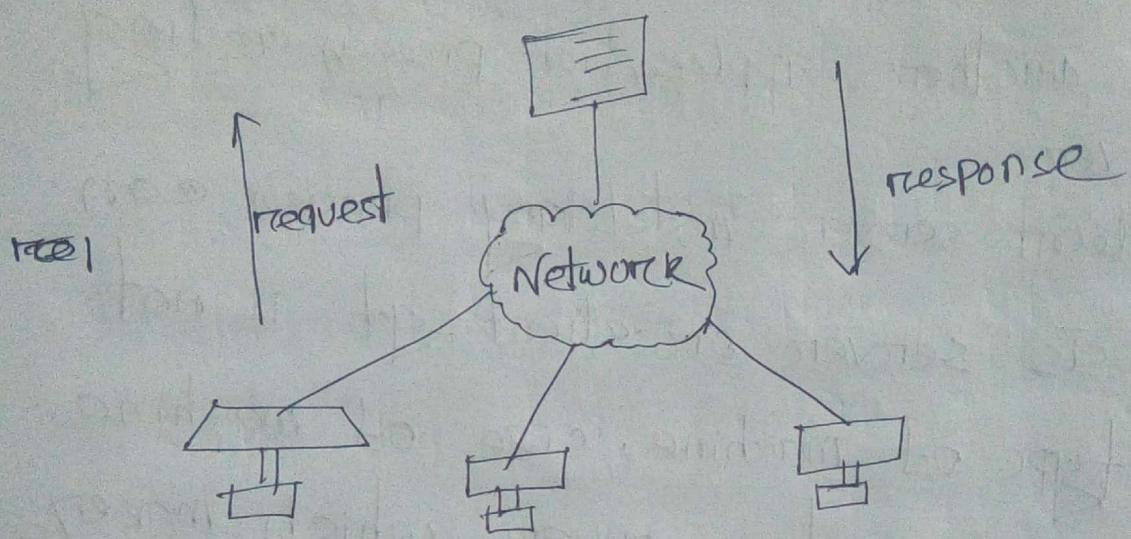
Ans to the que no 6(a)

client server: one remote process acting

as a client and request some resource from another application process acting as a server.

In client server model any process can act as server or client. It is not the type of machine, size of machine or its computing power which makes it a server. It is the ability of serving request that makes a machine server. A system to can act as server and client simultaneously. That is one process is acting as a client. This may also happen that both client

and server process reside on the
some machine.



Ans to The que no 6(c)

directory service: These services are
mapping between name and its value
which can be variable value or
fixed in this software system.

helps to store the information organized and provides various means of accessing it.

Accounting: give an organization a number of users have their user names and passwords mapped to them. Directory services provide means of storing this information available when requested.

Authentication and Authorization user credentials are checked to authenticate a user at the time of login and periodically. User accounts can be set into hierarchical structure and their access to resources can be

controlled using authorization.

DNS is widely used one of the essential services on which internet works. This system maps IP addresses to domain names, which are easier to remember and recall than IP addresses. Because network operators with the help of IP addresses.

Ans to the que no 6(c)

Application protocol: There are several protocols can be broadly divided into two categories.

(i) protocols which are used by users for example Email.

(ii) protocols which helps and support protocols used by users for example DNS.

A few of application layer: domain name system, simple mail transfer protocol etc

Ans to the que no 7(a)

The 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 and user application.

A user may or may not interact with the application

Application layer is where the actual communication is initiated and ~~rest~~ /
Because this layer is on the top
of the layer stack it does not
serve any other layer.
when an application layer protocol
wants to communicate with its peer
application layer protocol on
remote host it hands over the
data or information to the transport
layer. The transport layer does not
The rest, with the help of all
the layers.

Aim to the que no 7(b)

HTTP HTTP means hyper text transfer protocol is the foundation of world wide web. Hyper text is well organized documentation system which uses hyperlinks to link the pages in the text documents. HTTP works on client server model. When a user wants to access any HTTP page on the internet, the client machine at user end initiates a TCP connection to server on port 80. When the server accepts the client request, the client authorized to access web pages.

To access web pages, a client

normally user web browsers, who are responsible for initiating, maintaining and closing tcp connection. HTTP is stateless protocol, which means the server maintains no information about earlier requests by client.

(i) HTTP 1.0 uses non persistent HTTP.

At most one object can be sent over a single tcp connection.

(ii) HTTP 1.1 uses persistent HTTP.

In this version, multiple objects

can be sent over a single tcp connection.

Ans to the que no 7(c)

FTP: FTP means file transfer protocol.
FTP is the most widely used protocol for file transfer over the network. FTP uses TCP/IP for communication and it works on TCP port 21. FTP works on client/server model where a client requests file from server and server sends requested resource back to the client.

FTP uses out-of-band controlling. FTP user TCP port 20 for exchanging controlling information and the actual data is sent over TCP port 21.

Aim to the que no 8(a)

Application services: There are nothing but providing network based services to the users such as web services, database managing, and resource sharing.

Resource sharing: to use resources effectively and economically, network provides a mean to share them. This may include servers, printers etc.

Databases: This application service is one of the most important service. it stores data and information, processes it and enables the user to

retrieve it efficiently by using queries.

web services: world wide web has

become the synonym for internet it is used to connect to the internet, and access files and information servers provided by internet servers.

Amt to the que no 8(b)

Network services: computer system and computerized systems help human beings to work efficiently and explore the unthinkable. whe these devices are connected together to form a network, the capabilities are enhanced multiple times.

computer network service:

Directory Services: These services
are mapping between name and value
which can be variable value or
fixed. and provides various means
of accessing it.

- (i) Accounting
- (ii) Authentication and Authorization.
- (iii) Domain name services.

File services:

File services include
sharing and transferring files over
the network.

(i) File sharing: one of the reason which gave birth to networking was file sharing. File sharing enables the users to share their data with other users.

(ii) file transfer: This is an activity to copy or move file from one computer to another computer or to multiple computers with help of underlying network.

Communication services:

- (i) Email.
- (ii) social networking.
- (iii) internet chat.
- (iv) discussion boards.
- (v) Remote access.

Application services: These are nothing

but providing network based services to the user such as web services, database managing and resource sharing.

- (i) Resource sharing.
- (ii) databases
- (iii) web services.