

Ans to the Ques No 1(a)

Q: What is data communication and computer network?

Ans: Data communication refers to the transmission of thin digital data between two or more computers and a computer network or data network is a telecommunication network that allows computers to exchange data. The physical connection between networked computing devices is established using either cable media or wireless media. The best known computer network is the internet.

b) Write down the applications of communication and computer network

Ans: The applications of communication and computer network is given below:

- i. Resource sharing such as printers and storage devices.

2. Exchange of information by means of e-Mail

and FTP.

3. Information sharing by using web or internet.

4. Interaction with other user by using dynamic web pages.

5. GPRS phones.

6. video conferences.

7. Parallel computing.

8. Instant messaging.

c) why learning data on communication and computer network is important? Explain with Example

Ans: The importance of learning data communication

and computer network is given below:

1. Network Basic understanding: A system of interconnected computers and computerized peripherals such as printer is called ..

computer network. This interconnection among computers and computerized peripheral computers facilitates information sharing among them. Computers may connect to each other by either wired or wireless media.

2. Network Engineering: Networking engineering is a complicated task, which involves software, firmware, chip level engineering, hardware, and electric pulses. To ease network engineering, the whole networking concept is divided into multiple layers. Each layer is involved in some particular task and is independent to all other layers.

3. Internet: A network of networks is called an internet work, or simply the internet. It is the largest network in existence on this planet. The internet

hugely connects all WANs and it can have connections to LANs and home networks. Internet uses TCP/IP Protocol Suite and Secured IP is as the IP addressing protocol. Present day, Internet is widely implemented using IPv4.

d) What is IPv4 addressing? What destination address is 255.255.255.255 for?

Ans: The IPv4 address is a 32-bit number that uniquely identifies network interface on a system as explained in How IP Address Apply to network interfaces. An IPv4 address is written in decimal digits.

255.255.255.255 - This address is reserved for network broadcast, or messages that should go to all computers on the network. 127.0.0.1 -

This is called the loopback address, meaning

your computer's way of identifying itself whether or not it has an assigned IP address.

Ans. to the Ques No-2

a) why do we need data communication?

Ans: Data communication incorporates a several

techniques and technologies with the primary objective of enabling any form of electronic communication.

These technologies include telecommunications, computer

networking. In data communication, communication are faster, computer facilities are made available

to many potential users. Standby facilities are

made available in the event of break down

peak load. Information is more readily available

to whomever may require it.

b) what are the five components of data communication system? Describe the characteristic of data communication.

Ans: The effectiveness of a data communication system depends on four fundamental characteristics.

1. Delivery: The intended destination only should receive the transmitted data, i.e., the data delivery should be correct.

2. Accuracy: The transmitted data must be delivered to the destination without any alteration. Other wise, it will be of no use.

3. Timeliness: The transmitted data must be delivered to the destination in time without any delay.

4. Jitter: The uneven delay in the arrival of audio and video packets at the destination is

called jitter. In real time transmission, it should be constant i.e. audio and video data packet.

The five components of data communication system are:-

1. message.

2. Sender

3. Receiver

4. Transmission medium.

5. protocol.

c) write the advantages and disadvantages of network
why in message switching better than circuit switching.

Ans:

Advantages:

- * sharing devices such as printers saves money.
- * site licences are likely to be cheaper than buying several stand alone licence.
- * files can easily be shared between users.

- * network users can communicate by email or instant messenger.
- * security is good - users can't see other user files unlike on stand alone machines.

Disadvantages:

- * Purchasing the network cabling and file server can be expensive.
- * Managing a large network is complicated.
- * If the file server breaks down, the files on the file server become inaccessible.
- * Both the circuit switching and message switching are the methods used to connect different devices with each other. It

Ans. to the Ques No - B

a) Describe about various LAN Technology.

Ans:

Ethernet: Ethernet is a widely-deployed LAN technology.

Ethernet shares media. Network which uses carrier

sense multi access/collision detection (CSMA/CD)

technology to detect collisions. On the

occurrence of ethernet in collision, all its nodes, roll

back wait for some random amount of time

and then re-transmit the data

Fast-Ethernet: To encompass need of fast emerging

software and hardware technologies, Ethernet extended

itself on fast-Ethernet. It can run on UTP,

optical fiber, and wireless too. It can provide

speed up to 100 MBPS. This standard is named as

100 Base-T in IEEE - 802.3 using cat-5 twisted pair cable. It uses CSMA/CD technique for wired media sharing among the Ethernet hosts and CSMA/CD technique for wireless Ethernet LAN.

Giga Ethernet: After being interested in 1995, Fast-Ethernet introduced. Giga-Ethernet provides speed up to 1000 mbits/second. IEEE 802.3ah standardize Giga-Ethernet over UTP using cat-5, cat-5e and cat-6 cables. IEEE 802.3ah defines Giga-Ethernet over fiber.

Virtual LAN:

It uses Ethernet which in turn work 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. But even switches cannot divide a network into separate broadcast domains.

b) Define OSI model and Explain the layer in it.

Ans: open system interconnect is an open standard for all communication system. OSI model is established by ISO. This model has seven layers.

1. Application layer: This layer is responsible for providing interface to the application user. This layer encompasses protocols which directly interact with the user.
2. Presentation layer: This layer defines how data in the native format of remote device should be

Presented in the native format of host. Should be

Reed

3. Session layer: This layer maintains session

between remote hosts. For example, once user

authentication is done, the remote host maintain
this session for a while and does not ask for
authentication again in that time span.

4. Transport layer: This layer is responsible for
end to end delivery between hosts.

5. Network layer: This layer is responsible for
address assignment and uniquely add routing
host in a network.

6. Data link layer: This layer is responsible
for reading and writing data from form and
onto the line. Link errors are detected at
this layer. Frame to frame switch is

7. Physical layer: This layer in defines the hardware, cabling wiring, power output, pulse rate etc.

almost everything will handle it.

Q) Define internet

Ans: Internet is a protocol suite, also known as internet suite. This defines internet model which

contains four layered architecture. OSI Model is

general communication model but internet model is

what the internet uses for all its communication. The

internet is independent of its underlying network

architecture so in its model this model has the

following layers.

1. Application layer: This layer defines the protocol

which enables user to interact with the network.

For example, - FTP, HTTP, etc.

2. Transport layers: This layer defines how data should flow between hosts.

3. Internet layer: IP works on this layer. This layer facilitates host addressing and recognition. This layer defines routing.

4. Link layers: This layer provides mechanism of sending and receiving actual data. Unlike its OSI model counter-part, this layer is independent of underlying network architecture and hardware.

Ans to the que No-4

a) write down about application layer model.

Ans: Application layer is the top most layer in OSI and TCP/IP layered model. This layer exists in both layered model because of its significance of interacting with user and user application. 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 individual and reflected. Because this layer is on the top of the layer stack it does not derive any other layers. Application layer takes the help of transport and all layers below it to communicate or transfer its data.

to the remote host. When an application layer protocol wants to communicate with its peer application layer protocol on a remote host, it hands over the data + information to the transport layer. The transport layer does the rest with the help of all the layers below it.

4b) Briefly describe the function of application layer in OSI model.

Ans: The application layer is the top most layer of OSI model. It provides services directly to user application. It enables the access the network. It provides user interfaces and support for services such as email, remote file access and transferred, shared database management, and

other types of distributed information services.

- ① File transfer: It allows a user to access, retrieve and manage files in a remote computer.
2. Mail services: It provides the basis for email forwarding and storage facilities.
3. Directory services: It provides distribution database sources and access for global information about various objects and receive

c) Describe the function of application layer in TCP/IP model.

~~and of now is called TCP/IP model~~

Ans: The application layer is the highest abstraction layer of the TCP/IP model that provides the interfaces and protocols needed by the users. If combined the functions of the session layer, the presentation layer and the application layer of the OSI model, the functions of the application layer are:

1. It facilitates the user to use the services of the network.
2. It is used to develop the network-based applications.
3. It provides user services like user login.
4. It is also concerned with error handling and recovery of the message as a whole.

Qd) which protocols are used by application layer
in TCP/IP model?

Ans: Application layer uses a number of protocols
the main among which are followed:

1. HTTP - It is the underlying protocol for world wide web. It defines how hyper media messages are formatted and transmitted.
2. FTP - It is a client-server based protocol for transfer of files between client and server over the network.
3. SMTP - It lays down the rules and semantics for sending and receiving electronic mails.

iv) DNS - It is a naming system for devices in networks. It provides services for translating domain names to IP address.

v) TELNET - It provides bi-directional text oriented services for remote login to the hosts over the network.

vi) SNMP - It focuses in managing, monitoring the network and organizing information about the network devices.

Ques. (Q1) How to the above No-5 part forward.

a) Define internet model and describe about its layers.

Ans. - Internet uses TCP/IP protocol suite, also known as internet suite. This defines internet model which contains four layered architecture or model in general communication model but internet model is what the internet uses for all its communication. The internet is independent of its underlying network architecture so in its model this model has the following layer:

1. Application layer; This layer defines the protocol which enables user to interact with the network. For example FTP, HTTP etc.
2. Transport layer; This layer defines how data should follow between hosts.

B. Internet layer: Internet Protocol (IP) - works on

this layer. This layer facilitates host addressing and recognition. This layer defines a routing.

4. Link layer: This layer provides mechanism of sending and receiving output data.

5 b) Write down about computer network security.

Ans: During initial days of internet, its use was limited to military and universities for research and development purpose.

Later when all networks merged together and formed internet, the data started to travel through public transit network.

Common people may send the data that can be highly sensitive such as their network.

Security threads can be divided into the

following categories:-

+ Introduction:

1. Interruption: Interruption in a security thread in which availability of resources is attacked. For example, a user is unable to access its web server.
2. Privacy breach: In this thread, the privacy of a user is compromised someone who is not authorized person is accessing or intercepting data sent or received by the original authenticated user.
3. Integrity: This type of thread includes any alteration or modification in the original context of communication. The attacker intercepts and receive the data sent by the sender.
4. Authenticity: This thread occurs when attacker or a security violator, passes off as a genuine.

& person and acc. ence the resources or
communicates with other genuine user.

5) write down about cryptography and its techniques

Ans: - cryptography is a technique to encrypt the plain text data which makes it difficult to understand and interpret. There are several cryptography algorithms available present day as described below:

i. Secret Key: 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 receiver because the receiver knows, and has the secret key, the encrypted data packets can easily be decrypted with secret key.

2. Public Key Encryption: In this encryption, every user has its own secret key and it is not in the shared domain. The secret key is never released on public domain. Along with the secret key, every user has its own but public key. Public key is always public and used by sender to encrypt data.

3. Message Digest: In this method actual data is not sent, instead a hash value is calculated and sent. The other end user, compares its own hash value and compares with the one just received. If both hash values are matched, then it is accepted otherwise rejected.

Ans. to the question No. 6

a) Describe about Hyper text transfer protocol:

Ans: The 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 initial a TCP connection to render on port no. When the server accepts the client request the client is authorized to access web pages. To access HTTP version

i) HTTP 1.0 sends non persistent HTTP. At most one object can be sent over a

single request by client.

ii. HTTP 1.1. - uses persistent HTTP. In this version multiple objects can be sent over a single TCP connection.

b) Describe network services.

Ans: In computer networking a network service is an application running on the network application layer and above, that provides data storage, manipulation or other capacity which is often implemented using a client server or peer to peer architecture based on application layer network protocol. Each server component running on one or more computer can both be run on the same machine clients and servers will often have a user interface and sometimes other have associated with it.

Q) write down about Directory Services.

Ans: There services are mapping between Name and its value, which can be variable value or fixed. This software system helps to store the information, organize it, and it provides means of accessing it.

i. Accounting: In an organization, a number of users have their user names and Passwords mapped to them. Directory services provide means of storing this information encrypted form and make available when requested.

ii. Authentication and Authorization: User credentials are checked to authenticate a user at the time of login and/or. Privileges over account can be set.

into hierarchical structure and their access to resources can be controlled using file authorization schemes.

- III. Domain Name Service: DNS is widely used and one of the essential services on maps IP address to domain names, which are easier to remember and recall the IP address. Because network operates with the help of IP address human tend to remember which website IP address which is mapping to its name from the backend on the request of a website name from the user.

Ans to the Ques No-7 id 001

a) Describe client server model.

Two remote application process can communicate mainly in two different fashion:

i. Peer to Peer: Both remote processes are executing at same level and they exchange data using same shared resource.

ii. client-server: One remote process can act on a client and request same resource from another application process acting on server.

In client server model, any process can act as server or client & it is not the type of machine, size of the machine, or its computing power which makes it server, it is the ability of serving request that makes a

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machine as a server. A system can act as a server and client simultaneously. That is, one process is acting as server and another as a client. This may also happen that both client and server process reside on the same machine.

7b) Describe the communication process of client-server model.

Ans: Two process in client-server model can interact in various ways:-

1. Sockets: In this paradigm, the process acting as server opens a socket, using a well-known port and waits until some client request comes.

The second process acting as a client process

'request finds'. When the request ID reaches to server. It is served. It can either be an information sharing or resource request.

II. Remote Procedure Call:- This is a mechanism where one process interact with another by means of procedure calls. One process call procedure lying on remote host. The process on remote host is said to be server. Both process are allocated stub.

- I) The client process calls the client stub. It passes all parameters pertaining to program local to it.
- II) All parameters are then packed at and a system call is made to send them to other side of the network.
- III) Kernel sends the data over the network and the other end receives it.
- IV) The remote host passes data to the server stub where it is marshalled.

V. The parameters are passed to the procedure and the procedure is executed.

VI. The result is sent back to the client in the same manner.

Ans. to the ques No - 8

a) What are application protocols?

Ans: Communication on the Internet network is governed by various protocols. These protocols or rules spell out how the participants in various network processes should behave. Application protocol is such a protocol. Application protocol govern various processes, such as the process for downloading a web page, or for sending email. The application protocol directs how

these processes are done

8 b) describe Domain Name System.

The Domain name system (DNS) works on client server model. It uses UDP protocol for transport layer communication. DNS uses hierarchical domain based naming scheme. The DNS server is configured with fully qualified Domain names e.g. DN and email address mapped with their Pre-Private Internet Protocol address. A DNS server is requested with DN and it responds back with the IP address mapped with it. DNS uses UDP port 53.

8 e) - Describe simple mail protocol.

Ans: The simple mail transfer Protocol (SMTP) is used to transfer electronic mail from one user to another user. This task is done by means of email client software (User Agents) the user interface. User Agents help the user to type and format the email and store it until internet format is available. When an email is submitted to send, the sending process is handled by message transfer agent which uses SMTP to forward the email to another message transfer agent. Which in turn only send the emails, the sender never normally emails. SMTP uses TCP Port 25 or 587.

Q) Describe the file transfer protocol.

Ans: The file transfer protocol (FTP) is the most widely used protocol for file transfer. FTP uses TCP/IP for communication and it works on TCP port 21. FTP works a client/server model where a client requests a file from server and server sends request to source back to the client, FTP uses TCP Port 20 for exchanging control information and the actual data is sent over TCP Port 21. When the client request the server for a file, when the server receives a request. After the transfer is complete, the server closes the connection. For a second file, client request again and the server response a new TCP connection.