

# Mawlana Bhashani Science And Technology University

Assingment No : 01

Assingment Name : DCN Tutorial and Application

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1. a) what is Data communication?

b) why to learn Data communication and computer network?

c) write down the application of communication and computer network.

d) what is computer network?

2. a) write down the classification of computer networks?

b) write about the Application of Network?

c) write down a short note about Internet work.

3. a) write down short notes:

i) PAN    ii) LAN    iii) MAN    iv) WAN

b) Discuss about LAN network

c) OSI model

4. a) what is Message Digest?

b) write down short note:

i) Bus topology    ii) star    iii) Tree    iv) mesh    v) ring    vi) hybrid

5. a) what is ring topology?  
b) what is Application layer?  
c) Discuss about Application layers in briefly.

6. a) what is sockets?  
b) Discuss about communication with diagram.  
c) write about Remote procedure call.

7. a) what is Domain name system.  
b) Write about short note:  
i. Mail transfer protocol ii. file transfer  
Protocol iii. post office protocol

8. a) what is Database?  
b) write down the form of communication service.  
c) write about file service and Application service.

Answer to the Question no : 1 (a)

Data communication refers to the transmission of this digital data between two or more computers and a computer network or data network is a telecommunications network that allows computers to exchange data. The physical connection between networked computing devices is established using either cable media or wireless media.

Answer to the Question no : 1 (b)

Network basic Understanding:

A system of interconnected computers and computerized peripherals such as prints is called computer network. This interconnection among computers facilitates information sharing among them. Computers may connect each other.

Network Engineering:

Network 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 of all other layers.

### Internet:

A network of networks is called internetwork. It is the largest network in existence on this planet. The Internet hugely connects all WANs and it can have connection to LANs and Home networks. Internet uses TCP/IP protocol suite and uses IP as its addressing protocol.

Internet uses very high speed backbone of fiber optics. To inter-connect various continents, fibers are laid under sea known to us as submarine communication cable.

### Answer to the Question no: 1 (c)

computer system and peripherals are connected to form a network. They provide numerous advantages.

- Resource sharing such as prints and storage devices.
- Exchange of information by means of e-mails and FTP.
- Information sharing by using Web or Internet.
- Interaction with other users using dynamic web pages.
- IP phones.
- Video conferences.
- Parallel computing
- Instant messaging.

### Answer to the Question no: 1 (d)

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

## Answer to the Question no: 2(a)

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

### Geographical span:

- \* It may be spanned across your table among Bluetooth enabled devices. Ranging not more than few meters.
- \* It may be spanned across a whole building including intermediate devices to connect all floors.
- \* 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.

### Inter-connectivity:

- \* Every single device can be connected every other device on network, making the network mesh.
- \* All devices can be connected to a medium but geographically disconnected, e.g. bus like structure.

- \* Each device connected to its left and right peers only, creating linear structure.
- \* All devices connected together with a single device, creating star like structure.

### 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. A network can be public which is accessed by all.

### Network Architecture:

There can be one or more systems acting as servers other being client, requests the server to serve requests. Server takes and processes request on behalf of clients.

Two systems can be connected point to point or in back-to-back fashion. They both reside at the same level and called peers.

There can be hybrid network which architecture of both the above types.

### Answer to the Question no: 2(b)

Computer systems and peripherals are connected to form a network. They provide numerous advantages:

1. Resource sharing such as printers and storage devices.
2. Exchange of information by means of e-mails and FTP.
3. Information sharing by using Web or Internet
4. Interaction with other users using dynamic web pages.
5. IP phones
6. Video conference
7. Parallel computing
8. Instant messaging.

### Answer to the Question No: 2(c)

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Answer to the Question no : 3 (a)

PAN:

A personal Area Network is small network which is very personal to a 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 keyboards, wireless mouse, Bluetooth enabled head-phones, wireless printers and TV remotes. For example Piconet is Bluetooth-enabled Personal Area Network which may contain up to 8 devices connected together in a master-slave fashion.

LAN:

A computer network spanned 'inside a building' inside and operated under single administrative system is generally termed as Local Area Network. Usually LAN covers an organization offices schools colleges or universities. Number of systems connected in LAN may vary from as least as two to as much as 16 million.

LAN provides a useful way of sharing the resources between end users. The resources such as printer, file servers, scanners and internet are easily sharable among computers.

LAN users either Ethernet or token-ring technology. Ethernet is most employed LAN technology and users star topology while Token-ring rarely seen.

### MAN:

The Metropolitan Area Network generally expands throughout a city such as cable TV network. It can be in the form of Ethernet, token-ring or Fiber Distributed Data Interface.

Metro Ethernet is a service a service which is provided by ISPs. This service enables its users to expand their local area networks. For example MAN can help an organization to connect all of its offices in a city. MAN provides uplink for LAN to WANs or internet.

WAN:

As the name suggest, 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. These network provide connectivity to MANs and LANs. WANs use very expensive network equipment. WAN may use advance technologies such as Asynchronous Transfer mode, Frame Relay and synchronous optical network. WAN may be managed by multiple administration.

Answer to the question no: 3 (b)

Let us go through various LAN techn in brief :

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 uses carrier sense multi Access Detection technology to detect collisions. On the occurrence of collisions in Ethernet, all its hosts roll back, wait for some random amount of time, and then re-transmit the data.

Traditional Ethernet uses 10 BASE-T specifications. The number 10 depicts 10 MBPS speed. BASE stands for baseband and T stands for thick Ethernet. 10 Base Ethernet provides transmission speed up to 10MBPS and uses coaxial cable or Cat-5 twisted pair cable with RJ-45

### Fast-Ethernet:

To encompass need of fast emerging software and hardware technologies Ethernet extends itself as Fast-Ethernet. It can run on UTP, optical fiber, and wirelessly too. It can provide speed up to 100 MBPS. This standard is named as 100BASE-T in IEEE 802.3 using Cat-5 Twisted Pair cable.

## Giga Ethernet:

After being introduced in 1995, Fast-Ethernet could enjoy its high speed status only for 3 years till Giga-Ethernet introduced. Giga-Ethernet provides speed up to 1000 mbits/seconds.

## 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 switch to Ethernet has removed single collision domain issue and each device connects to switch works in its separate collision domain. But even switch cannot divide network into separate broadcast domains.

### Answers to the Question no: 3 (c)

Open system interconnect is an open standard for all communication systems. OSI model is established by International standard organization. This model has seven layers.

Application Layer  
Presentation Layer  
Session Layer  
Transport Layer  
Network Layer  
Data Link Layer  
Physical Layer

#### Application Layer:

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

#### Presentation Layer:

This layer defines how data in the native format of remote host should be presented in the native format of host.

#### Session Layer:

This layer maintains sessions between remote hosts.

### Transport layer:

This layer is responsible for end-to-end delivery between hosts.

### Network layer:

This layer is responsible for address assignment and uniquely addressing hosts in a network.

### Data Link Layer:

This layer is responsible for reading and writing data from and onto the line. Link errors are detected at this layer.

### Physical layer:

This layer defines the hardware, cabling, power output pulse rate etc.

Answer to the Question no: 4(a)

Message Digest:

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

Answer to the Question no: 4(b)

Bus Topology:

Bus Topology may have problem while multiple hosts sending data at the same time. Bus topology either uses CS 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. But failure of the shared communication line can make all other devices stop functioning.

### Star Topology:

All hosts in star topology are connected to a central device known as hub device, using a point-to-point connection. The hub device can be device any of the following:

- \* Layer-1 device such as hub or repeater
- \* Layer-2 device such as switch or bridge
- \* Layer-3 device such as router or gateway

### 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 or may also have hosts which are in point-to-point connection to few hosts only. Hosts mesh topology also work as relay for other hosts which do not have direct point-to-point links.

### Tree Topology:

This topology divides the network into multiple levels of network mainly in LANs a network is bifurcated into tree types of network devices. The lowermost is access layer where computers are attached. The middle layer is known as distribution layer, which works as mediator between upper layers and lower layers. The highest layer is known as core layer and is central point to the network, root of the tree from which all nodes fork.

### Hybrid Topology:

A network structure contains more than one topology is said to be hybrid topology. Hybrid topology inherits merits and demerits of all the incorporating topologies. The combining topologies may contain attributes of Star, Ring Bus and Daisy-chain topologies. Most WANs are connected by means of Dual-ring topology.

Answer to the question no: 5 (a)

### Ring topology:

Each host machine connects to exactly two other machines, creating a circular network structure. When one host tries to communicate or send message to a host which is not adjacent to it, the data travels through all intermediate hosts. To connect one more host in the existing structure the administrator may need only one more extra cable.

Answer to the question no: 5 (b)

### Application layers:

Application layer is the most top layer in OSI and TCP/IP layered model. This layer exists in both layered models because of its significance of interacting with user and user applications. This layer is involved in applications which are involved in communication system.

A user may or may not directly interacts with the applications. Application layer protocol on remote host.

Answer to the Question no: 5 (a)

Application Layer  
Presentation Layer  
Session Layer  
Transport Layer  
Network Layer  
Data Link Layer  
Physical 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 the rest with the help of all the layers below it.

There's an ambiguity in understanding Application layer and its protocol. Not every user application can be put into Application layer, except those applications which interact with the communication system. For example, designing software or text-editor.

Answer to the Question no: 6(a)

Sockets:

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 also opens a socket but instead of waiting for an incoming request, the client process request first.

Answer to the Question no: 6(b)

Two processes in client-server model can interact in various ways:

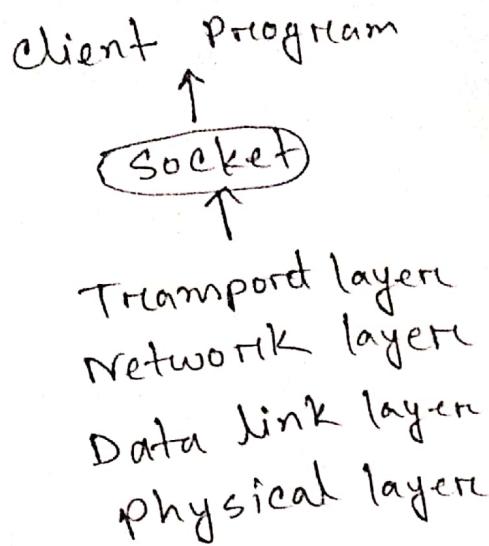
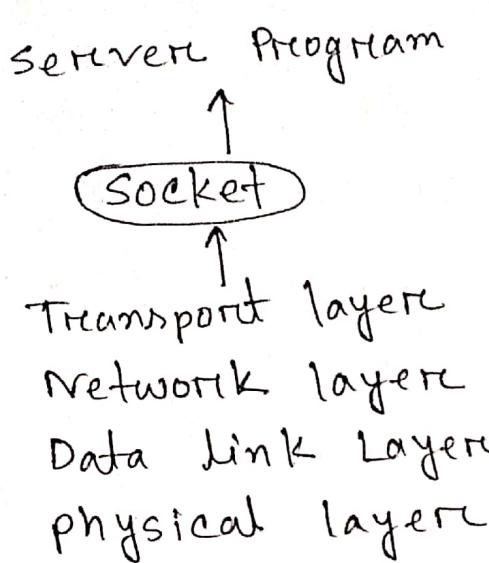
- sockets
- Remote Procedure calls (RPC)

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

On the other hand, when we use a web browser, which is actually using Hyper Text Transfer protocol to interact with the network, HTTP is Application Layer protocol.

Another example is file transfer protocol which helps a user to transfer text based or binary files across the network. A user can use this protocol in either GUI based software like filezilla or use FTP in command line mode.

Hence, irrespective of which software you use, it is the protocol which is considered at Application Layer used by that software. DNS is a protocol which helps user application protocol such as HTTP to accomplish its work.



when the request is reached to server. It is served. It can either be an information sharing or resource request.

Answer to the Question no: 6(c)

This is a mechanism where one process interacts with another by means of procedure calls. One process calls the procedure lying on remote host. The process on report host is said to be server. Both processes are allocated stubs. This communication

happens in the following way:

- the client process calls the client stub. It passes all the parameters pertaining to program local to it.
- All parameters are then packed and a system call is made to send them to other side of the network.
- kernel sends the data over the network and the other end receives it.
- the remote host passes data to the procedure and the procedure is then executed.
- The result is sent back to the client in the same manner.

### Answer to the Question no: 7(a)

#### Domain Name:

The Domain name system 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 and email addresses mapped with their respective Internet protocol address.

### Answer to the Question no: 7(b)

#### Mail Transfer Protocol:

The simple Mail transfer protocol is used to transfer electronic mail from one user to another. This task is done by means of email client software the user is using. User Agents help the user to type and format the mail and store it until internet is available. When an email is submitting to send , the

sending process is handled by message transfer Agent which is normally comes in built in email client software.

message Transfer Agent uses SMTP to forward the mail to another message Transfer Agent, while SMTP is used by and were to only send the emails.

client software uses Internet user Internet message Access protocol or pop protocols to receive emails.

### File Transfer protocol:

The file transfer protocol 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 if

information and the actual data is sent over TCP port 21.

The client requests the server for a file. When the server receives a request for a file, it opens a TCP connection for the client and transfers the file. After the transfer is complete, the server closes the connection. For a second file, client requests again and the server responds a new TCP connection.

### Post office Protocol:

The post office protocol version 3 is a simple mail retrieval protocol used by user agents to retrieve mails from mail servers. When a client needs to retrieve mails from servers, it opens a connection with the server on TCP port 110. User can then access his mails and download them to the local computer. POP3 works in two modes. The most

armmen made the defence ministry to do  
what the smaller firms wanted.  
However, after many new developments in  
local machinery, the demand met.  
Local meat, fish and other items  
will from small units and given  
the market an option to purchase with  
lower and small efforts.

Answers to the Question no 8 (Q)

Database: It stores data and information  
processes it and enables the users to  
retrieve it effectively by using  
queries. Database help organizations  
to make decisions based on  
statistics.

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### Answers to the Question no: 8 (b)

#### Email:

Electronic mail is a communication method and something a computer user cannot work without. This is the basic of today's internet features. Email system has one or more email services. All its users are provided with unique IDs. When a user sends email to others user. It is actually transferred between users with help of email servers.

#### Social Networking:

Recent technologies have made technical life social. The computer savvy peoples, can find other known peoples or friends can connect with them and can share thoughts, pictures, and videos.

#### Internet chat:

Internet chat provides instant text transfer services between two hosts. Two or more people can

communicate with each other using text based Internet relay chat service.

### Discussion Boards:

Discussion boards provide a mechanism to connect multiple people with same interests. It enables the users to put queries, questions etc. which can be seen by all other users. Others may respond as well.

### Remote Access:

This service enables user to access the data residing on the remote computer. This feature is known as remote desktop. This can be done via some remote device mobile phone or home computer.

### Answer to the Question no: 8 (c)

File service include sharing and transferring files over the network.

#### File sharing:

One of the reason which gave birth to networking was file sharing. File sharing enables its users to share their data with other users who can upload the file to a specific server, which is accessible by all intended users. As an alternative user can make its file shared on its own computer and provides access to intended users.

#### File Transfer:

This is: an activity to copy or move files from one computer to another computer or to multiple computers, with help of underlying network. Network enables its users to locate other users in the network and transfer files.

## Application Services:

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

## Resource sharing:

To use resource efficiently and economically, network providers mean to share them. This may include service printers and storage media etc.

## Databases:

This application service is one of the most important services. It stores data and information process it and enables the users 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.