MID EXAM PHASE-2 IMP QUESTIONS

Subject Name: ACN [4350706]

1 Explain Routing with its types.
2 Explain Initialization in Distance vector routing.
3 Explain RIP.
4 Differentiate Inter-domain and Intra domain Routing.
5 Explain types of links in OSPF.
6 List out TCP Services.
7 Explain User datagram of UDP(UDP Header).
8 Draw state transition diagram of TCP.
9 Explain general header in SCTP.
10 Explain TCP Connection(3-way handshaking).
11 Compare POP3 and IMAP.
12 Explain MIME.
13 Explain DNS in the internet.
14 Explain Http messages.
15 Explain FTP.

Q- Explain Initialization in Distance vector routing.

Answer:

In distance vector routing, the least-cost route between any two nodes is the route with minimum distance.

In this protocol, as the name implies, each node maintains a vector (table) of minimum distances to every node.

The table at each node also guides the packets to the desired node by showing the next stop in the route (next-hop routing).

Initialization

- **At the beginning, Each node can know only the distance between itself and its immediate neighbors, those directly connected to it.**
- **So each node can send a message to the immediate neighbors and find the distance between itself and these neighbors.**
- The distance for any entry that is not a neighbor is marked as infinite (unreachable).

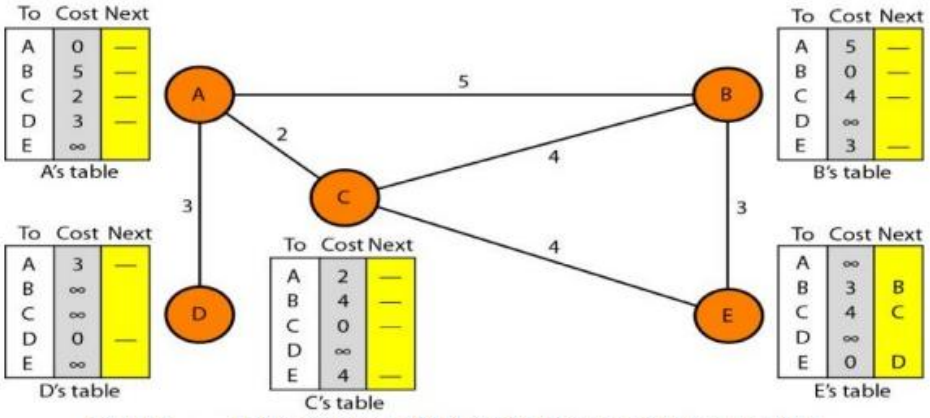


Figure Initialization of tables in distance vector routing

Q-Differentiate Intra- and Inter-domain Routing.

Answer:

S.No	Intradomain Routing	Interdomain Routing
1.	Routing algorithm works only	Routing algorithm works **within and**

	within domains.	**between** domains.
2.	It need to know only about other routers within their domain.	It need to know only about other routers within and between their domain.
3.	Protocols used in intradomain routing are known as Interior-gateway protocols.	Protocols used in interdomain routing are known as Exterior-gateway protocols.
4.	In this Routing, routing takes place within an autonomous network.	In this Routing, routing takes place between the autonomous networks.
5.	Intradomain routing protocols ignores the internet outside the AS(autonomous system).	Interdomain routing protocol assumes that the internet contains the collection of interconnected AS(autonomous systems).
6.	Popular Protocols of this routing: **RIP**(routing information protocol) and **OSPF**(open shortest path first).	Popular Protocols of this routing: **BGP**(Border Gateway Protocol)

Q. Explain RIP Protocol.

Answer:

- RIP stands for Routing Information Protocol.
- RIP is an **intra-domain** routing protocol.
- It is used **within** an autonomous system.
- RIP uses **hop count** metrics.
- It is an Open Standard Protocol.
- It is a **Classful** routing protocol.
- Administrative distance is 120
- Metric used by RIP : **Hop count**
- RIP can support maximum Hop counts - 15 hops
- Max routers configured : 16
- Load Balancing of 4 equal paths
- It is used for small organizations.

Advantages of RIP

- It is easy to configure
- It has less complexity

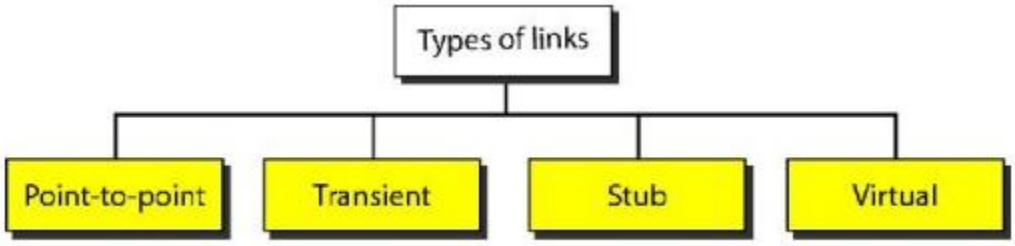
Disadvantages of RIP

The following are the disadvantages of RIP:

- In RIP, the route is chosen based on the hop count metric. If another route of better bandwidth is available, then that route would not be chosen.
- The RIP is a classful routing protocol, so **it does not support the VLSM** (Variable Length Subnet Mask). The classful routing protocol is a protocol that does not include the subnet mask information in the routing updates.
- **RIP supports maximum 15 hops only** which means that the maximum 16 hops can be configured in a RIP. It is used for small organizations.

Q- Explain types of links in OSPF.

There are four types of links in OSPF:



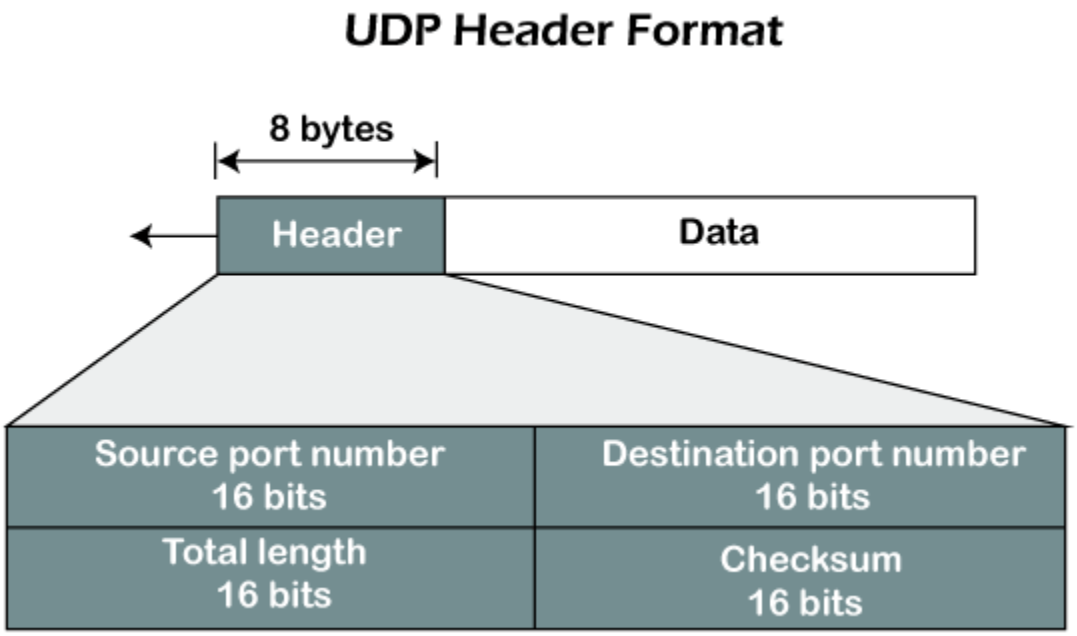
1. **Point-to-point link:** The point-to-point link directly connects the two routers without any host or router in between.
2. **Transient link:** When several routers are attached in a network, they are known as a transient link.
   (The transient link has two different implementations:
   Unrealistic topology: When all the routers are connected to each other, it is known as an unrealistic topology.

   Realistic topology: When some designated router exists in a network then it is known as a realistic topology.)

3. **Stub link:** It is a network that is connected to the single router. (Data enters to the network through the single router and leaves the network through the same router.)
4. **Virtual link:** If the link between the two routers is broken, the administration creates the virtual path between the routers.

Q- Explain significance of the fields of UDP(Explain UDP Header).

UDP Header Format



In UDP, the **header size is 8 bytes**.

The UDP header contains four fields:

- **Source port number:** It is 16-bit information that identifies which port is going t send the packet.
- **Destination port number:** It identifies which port is going to accept the information. It is 16-bit information which is used to identify application-level service on the destination machine.
- **Length:** It is 16-bit field that specifies the entire length of the UDP packet that includes the header also. The minimum value would be 8-byte as the size of the header is 8 bytes.

- **Checksum:** It is a 16-bits field, and it is an optional field. This checksum field checks whether the information is accurate or not as there is the possibility that the information can be corrupted while transmission.

Q- List TCP Services.

TCP Services

- Stream Delivery Service.
- Sending and Receiving Buffers.
- Bytes and Segments.
- Full Duplex Service
- Connection Oriented Service.
- Reliable Service.
- Flow control
- Error control
- Congestion control
- Multiplexing

Q- Explain TCP Connection (TCP 3-way handshake).

❖ TCP Connection (A 3-way handshake)

Handshake refers to the process to establish connection between the client and server.

To transmit a packet, TCP needs a three way handshake before it starts sending data.

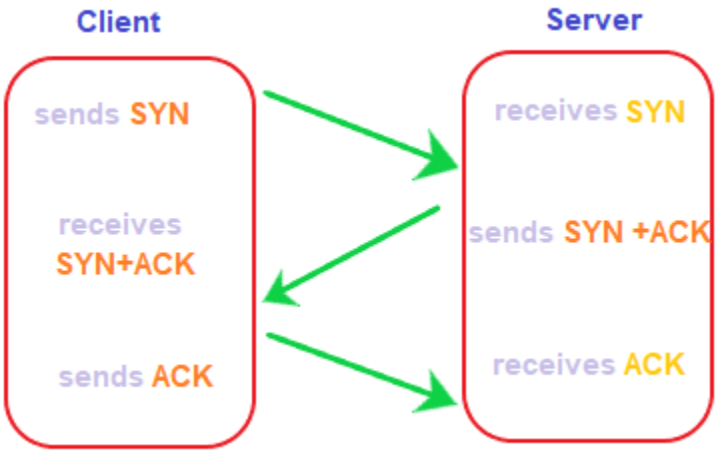
The diagram shows 3 steps for successful connection.

A 3-way handshake is commonly known as SYN-SYN-ACK and requires both the client and server response to exchange the data.

SYN means **synchronize Sequence Number** and ACK means **acknowledgment**.

Each step is a type of handshake between the sender and the receiver.

TCP connection showing the three handshakes is shown below:



Step 1: SYN

SYN is a segment sent by the client to the server. It acts as a **connection request** between the client and server. It informs the server that the client wants to establish a connection.

Step 2: SYN-ACK

It is an SYN-ACK segment or an SYN + ACK segment sent by the server. The ACK segment informs the client that the server has received the connection request and it is ready to build the connection.

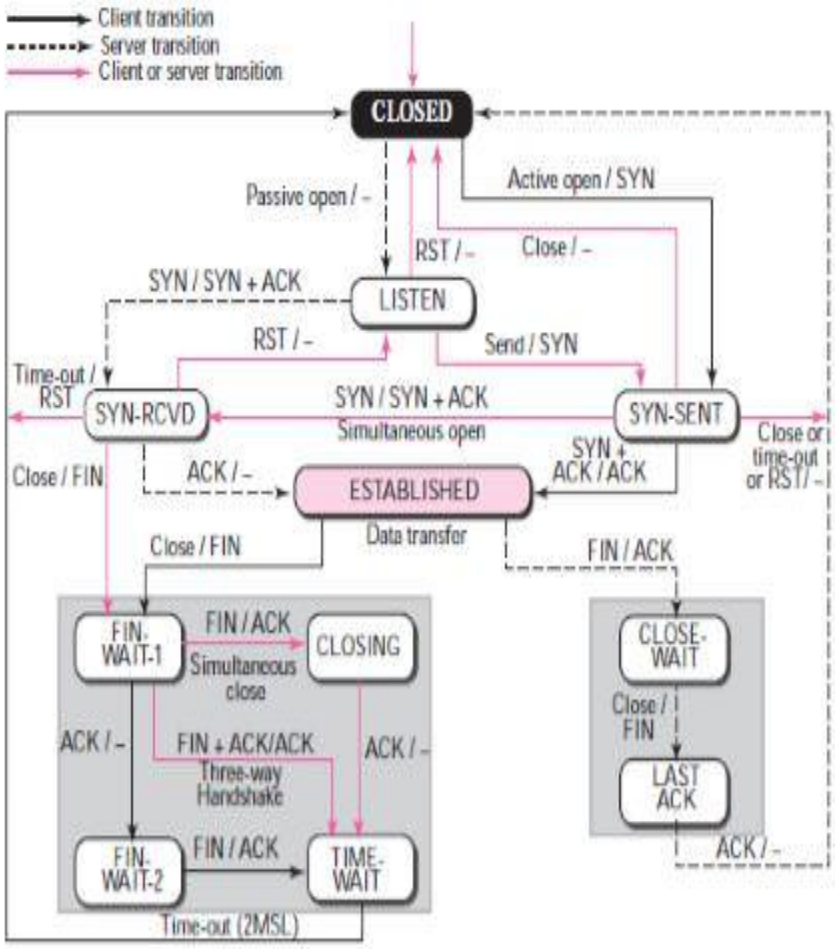
(The SYN segment informs the sequence number with which the server is ready to start with the segments.)

Step 3: ACK

ACK (Acknowledgment) is the last step before establishing a successful TCP connection between the client and server. The ACK segment is sent by the client as the response of the received ACK and SN from the server. It results in the establishment of a reliable data connection.

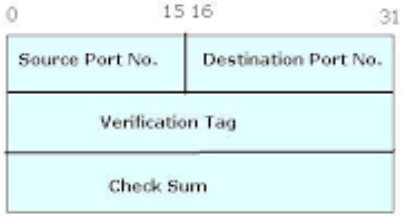
After these three steps, the client and server are ready for the data communication.

Q- Draw State transaction diagram.



Q- Explain general header in SCTP.

❖ SCTP common header Format



SCTP Common Header Format

The **Stream Control Transmission Protocol (SCTP)** has a simpler basic packet structure. Each consists of two basic sections:

❖ **Common header**

All SCTP packets require the common header section.

Source port

This field identifies the sending port.

Destination port

This field identifies the receiving port that hosts use to route the packet to the appropriate endpoint/application.

Verification tag

A 32-bit random value created during initialization to distinguish stale packets from a previous connection.

Checksum

It is used for error detection.

Q- Compare POP3 and IMAP4

➢ ***Difference between POP3 and IMAP***

Key	POP3	IMAP
Full Form	POP3 stands for Post Office Protocol 3	IMAP stands for Internet Message Access Protocol.
Complexity	POP3 is simple and only mails can be downloaded from your inbox to local computer.	IMAP is complex and allows to see all the folders on the mail server.
Ports	POP3 listens on 110 and POP with SSL, POP3DS listens on 995 port.	IMAP listens on 143 and IMAP with SSL, IMAPDS listens on 993 port
Multiaccess	POP3 supports single device to access the mail at a time.	IMAP supports multiple devices which can access the mail at a time.
Download	In POP3, mail to be downloaded first then can be read.	In IMAP, mail can be partially read before complete download.

Key	POP3	IMAP
Mail Organize	Mails cannot be organized on mail server using POP3.	IMAP allows to organize mails on mail server.
Update Email	Mails cannot be created/updated/deleted on mail server using POP3.	IMAP allows to create/update/delete mails on mail server.
Search Content	Mail content cannot be searched on mail server using POP3. To search, mail to be downloaded first.	Mail content can be searched on mail server using IMAP.
Download	All message are downloaded at once.	Mail message header can be previewed before a message is to be downloaded.
Change	Using local email software, a mail can be updated.	A mail can be updated via a web interface or email software.

Q- Explain Domain Name System (DNS) in the internet.

- DNS stands for **Domain Name System.**
- **DNS is a service that translates the domain name into IP addresses**.

Name Space:

- Label:

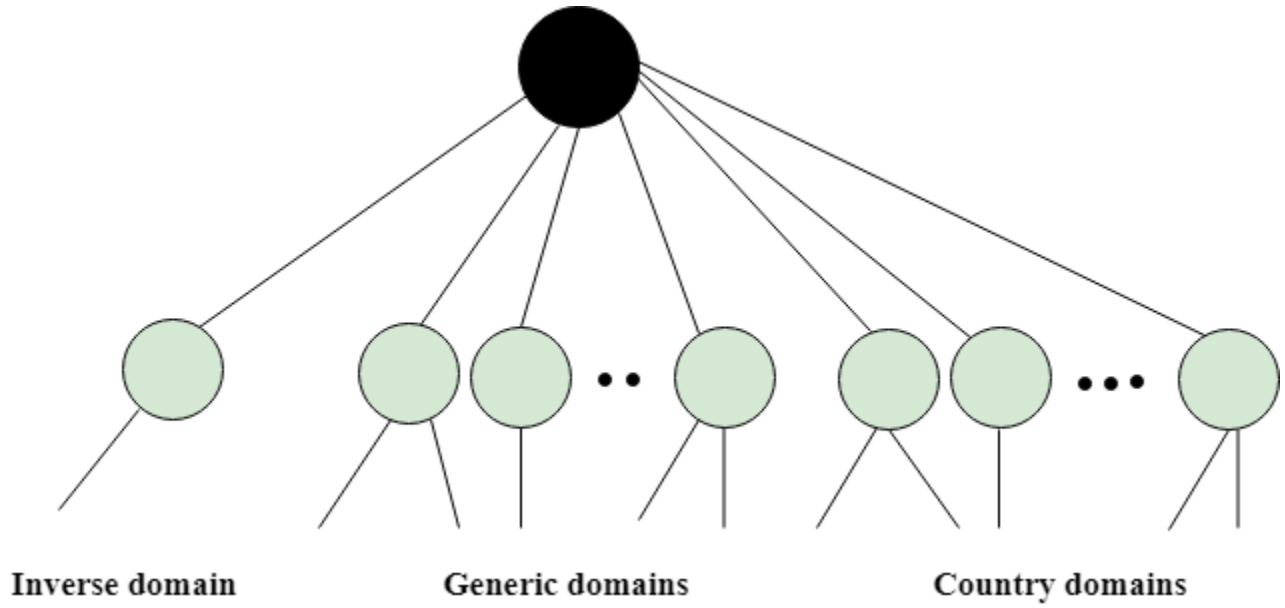
Each node in the tree has a label, which is a string with a maximum of 63 characters. The root label is a null string (empty string).

- Domain Name:

Each node in the tree has a domain name. A full domain name is a sequence of labels separated by dots (.).

The domain name space is divided into three different sections: (DNS IN THE INTERNET)

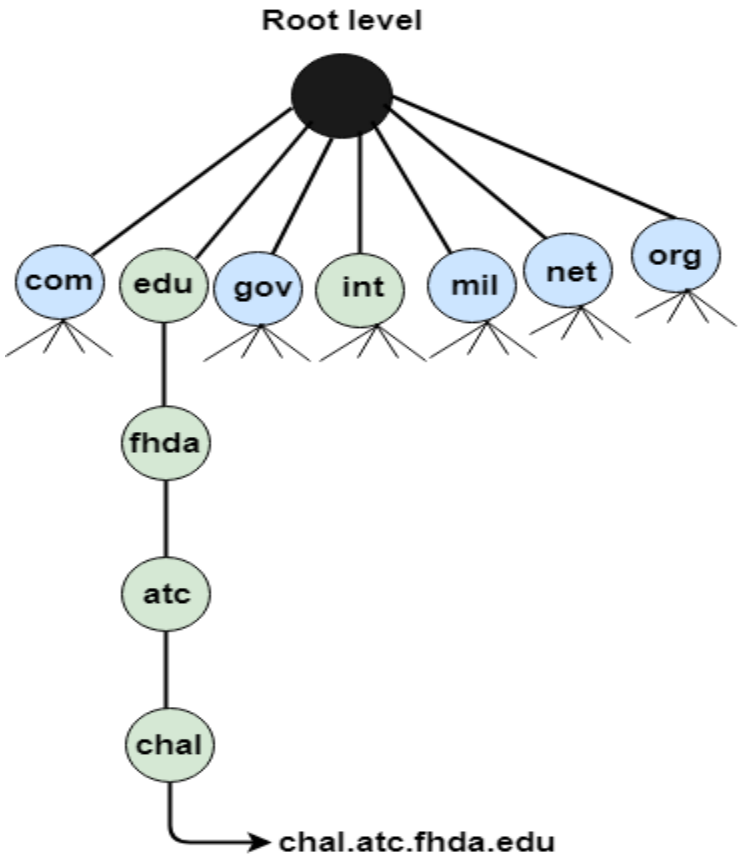
1. Generic domains
2. Country domains
3. Inverse domain



Generic Domains

- It defines the registered hosts according to their generic behavior.
- Each node in a tree defines the domain name, which is an index to the DNS database.
- It uses three-character labels, and these labels describe the organization type.

Label	Description
com	Commercial Organizations
edu	Educational institutions
gov	Government institutions
mil	Military groups
net	Network Support centers
org	Nonprofit Organizations



Country Domain

- The format of country domain is same as a generic domain, but it uses two-character country abbreviations (e.g., us for the United States) in place of three character organizational abbreviations.
- For e.g.

  .us - for the United States

  .in-India

  .br- brazil

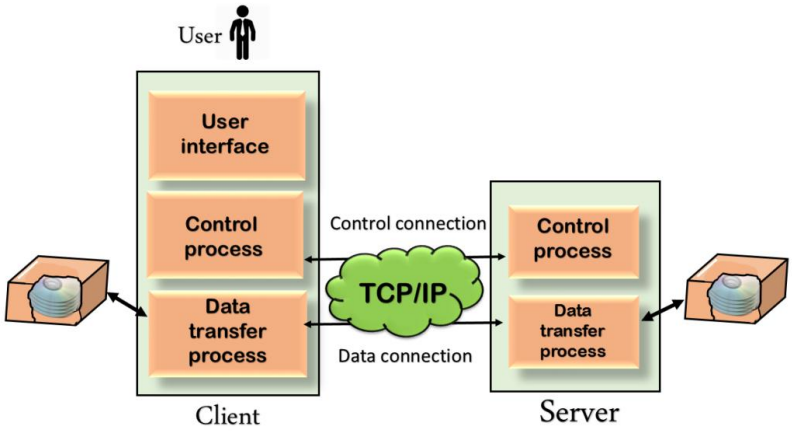
Inverse Domain

- The inverse domain is used for mapping an address to a name. When the server has received a request from the client, and the server contains the files of only authorized clients. To determine whether the client is on the authorized list or not, it sends a query to the DNS server and ask for mapping an address to the name.

Q- Explain the working of FTP Protocol./Explain FTP Protocol.

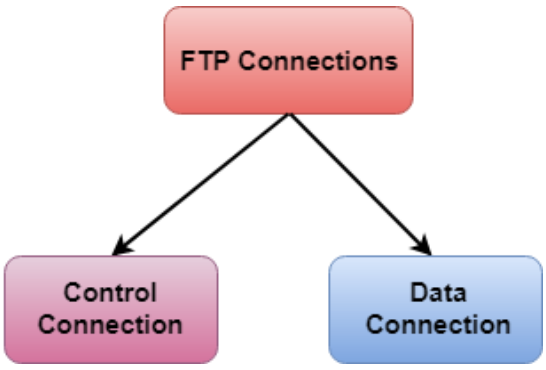
- **FTP stands for File transfer protocol.**
- FTP is used for transmitting the files from one host to another. It provides the sharing of files.
- **It transfers the data more reliably and efficiently**.

Mechanism of FTP/ working of FTP



- The above figure shows the basic model of the FTP.
- The FTP client has three components: the user interface, control process, and data transfer process.
- The server has two components: the server control process and the server data transfer process.

There are two types of connections in FTP:



- **Control Connection:**

  The control connection uses **very simple** rules for communication. Through control connection, we can transfer a line of command or line of response at a time.

  The control connection is made between the control processes.

  The control connection remains connected during the entire interactive FTP session.

- **Data Connection:**

The Data Connection uses **very complex** rules as data types may vary.

The data connection is made between data transfer processes.

The data connection opens when a command comes for transferring the files and closes when the file is transferred.

Q- Explain MIME.

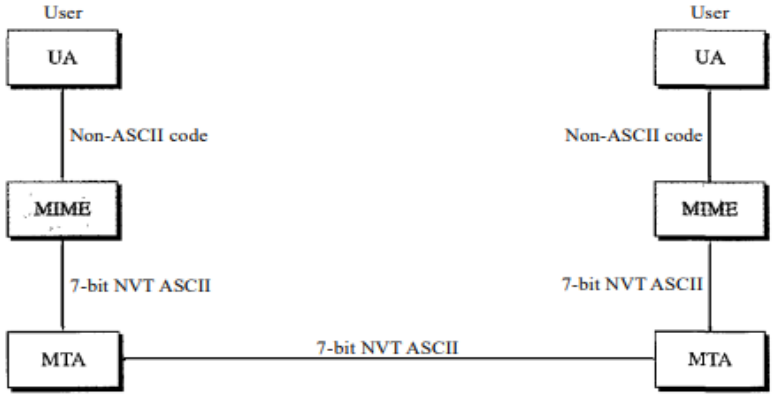
➢ **MIME**

- MIME stands for **Multipurpose Internet Mail Extensions**.
- It is used to extend the capabilities of e-mail protocol SMTP.
- It is capable of sending various types of files in a message, such as text, pictures, audio, video files.

Features of MIME Protocol

1. It supports multiple attachments in a single e-mail.
2. It supports the non-ASCII characters.
3. It supports unlimited e-mail length.
4. It supports multiple languages.

- **MIME** is a supplementary protocol that **allows non-ASCII data to be sent through e-mail**.(Need of MIME-Function)
- MIME transforms non-ASCII data at the sender site to NVT ASCII data and delivers them to the client MTA to be sent through the Internet. The message at the receiving side is transformed back to the original data.
- Thus **MIME transforms non-ASCII data (stream of bits) to ASCII data and vice versa**.



Working diagram of MIME Protocol

Q- Explain HTTP transaction/Working of HTTP/HTTP message.

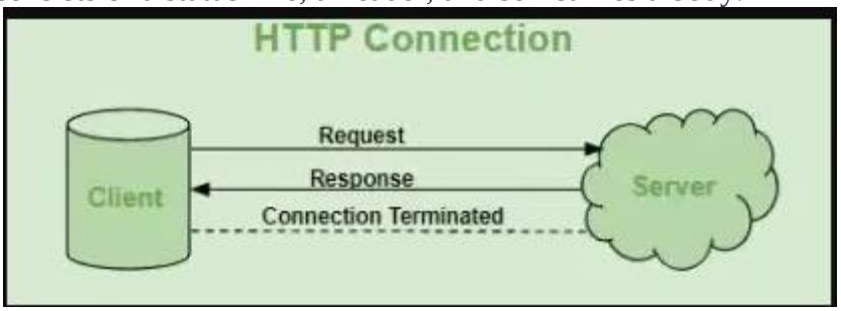
HTTP transaction:

HTTP uses the services of TCP on well-known port 80.

HTTP is a stateless protocol. HTTP transaction between client and server is shown in below fig.

Messages:

HTTP uses Request and Response messages.
The formats of the request and response messages are similar,
A request message consists of a request line, a header, and sometimes a body.
A response message consists of a status line, a header, and sometimes a body.



First of all, whenever we want to open any website then **first open a web browser** after **than** we will **type the URL of that website** (e.g., www.facebook.com).

This **URL is now sent to Domain Name Server (DNS)**. Then DNS first check records for this URL in their database, **then DNS will return the IP address** to the web browser corresponding to this URL. Now the **browser is able to send requests to the actual server**.

After the **server sends data to the client**, the connection will be closed. If we want something else from the server we should have to re-establish the connection between the client and the server.

Q- Routing with types

When a device has multiple paths to reach a destination, it always selects one path by preferring it over others. This selection process is termed as Routing.

Intra- and Inter-domain Routing Types:

Routing inside an autonomous system is referred to as intra domain routing. Routing between autonomous systems is referred to as inter domain routing.

Routing Information Protocol (RIP) is an implementation of the distance vector protocol. Open Shortest Path First (OSPF) is an implementation of the link state protocol. Border Gateway Protocol (BGP) is an implementation of the path vector protocol.