

Unit : 7 Application Layer

* Explain Dynamic Host Configuration Protocol (DHCP).

⇒ DHCP is a network Protocol used to dynamically assign IP addresses.

DHCP is reduce or simplifies the process of network administration.

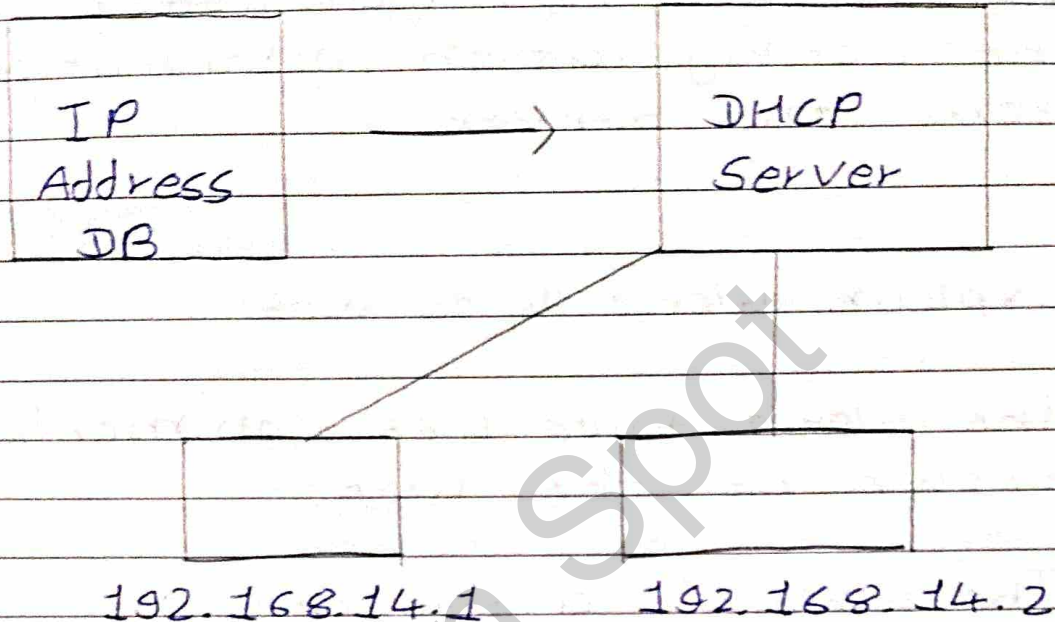
DHCP is automatically managing the allocation of IP address without manual support.

DHCP enables the dynamic assignment of IP address to devices on a network.

When a device connects to a network so, it can request an IP address from a DHCP server.

DHCP server is responsible for

managing the pool of available IP addresses.



The DHCP Server use 67 Port number and DHCP Client use 68 Port number.

DHCP Protocol use Client-Server Protocol that uses UDP services.

DHCP

- ~~DNS~~ Server : DHCP servers can also provide DNS server information to DHCP client.

This server is allowing them to resolve domain name to IP

addresses.

- DHCP Client: DHCP Client can be device that can receive the configuration information from the server.

* Explain World Wide Web.

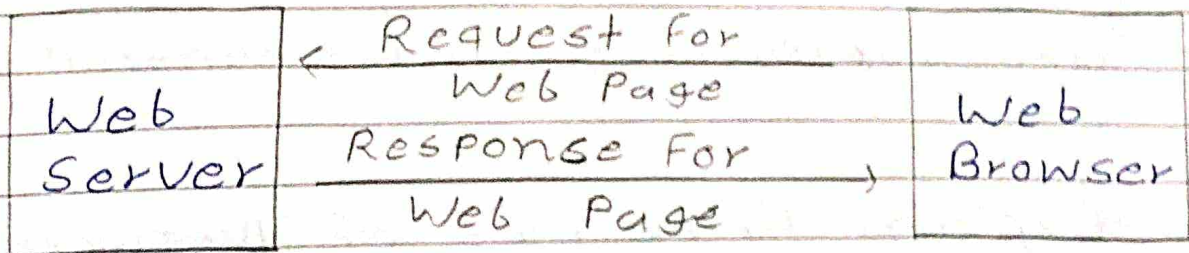
⇒ The World Wide Web commonly known as the web.

The WWW is a system of interconnected document and resources that can be linked by hyperlinks and URLs.

WWW is based on technologies such as HTTP and HTML.

HTML is the markup language used to create web pages.

Web Pages are documents that can provide or include text, image, hyperlinks etc.



- Web Server :

Web server are software applications that store and serve web client to content to client.

Web server respond to HTTP requests from browsers and retrieve the requested resources.

- Web Browser :

Web browser are software applications that enables users to access and interact with web content.

- HTTP is the Protocol used for communication between web browser and web server.

HTTP defines how messages

are formatted and transmitted.

* Explain Principles of Networks Applications.

=> This are the basic Principles of networks applications,

1 Network Application Architectures:

Network Application Architecture provides different design and structures of a network applications.

There are many types of Architectures are used in Network application architectures like Client-Server, Peer-to-Peer or Three-tire etc.

2 Processes Communicating:

Processes Communication can provides communication between multiple processes in computer network.

3 The Interface between the Process and the Computer Network:

This is used to define how the process communicates with multiple processes in a computer network.

Multiple process communication interface is provided using a network stack.

4 Transport Services Available to Applications:

This service enables applications to communicate with each other over a computer network.

This transport service provides different services like TCP, UDP etc.

5 Transport Services Provided by the Internet.

Transport services provide data reliably between the application.

Transmission Control Protocol Provides Connection-Oriented transport Services.

User Datagram Protocol provides connection-less transport services.

6 Application-Layer Protocols :

Application-Layer Protocols Provides communication between application on devices.

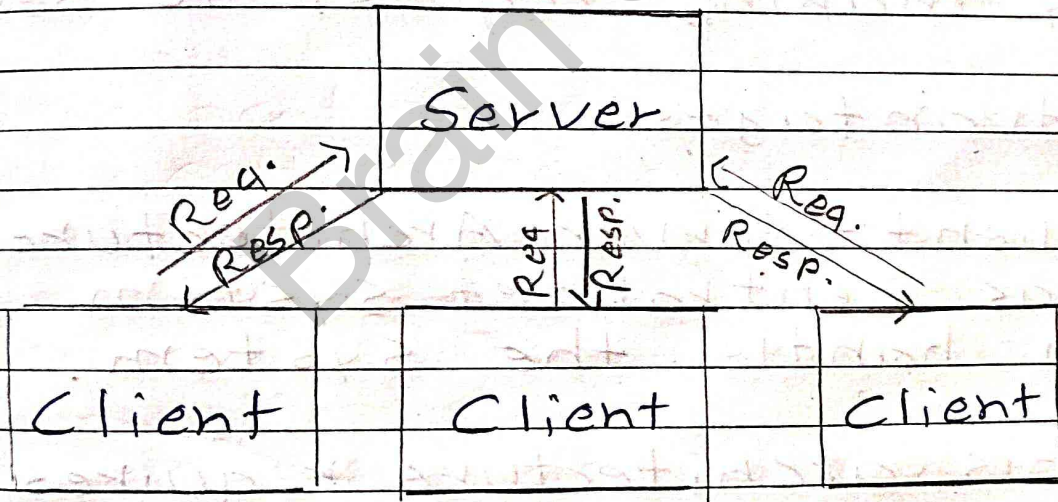
HTTP, HTTPS, FTP and SMTP are basic application-layer Protocols.

Assignment - 7

1 Draw and Explain Client - Server Architecture.

⇒ In Client-Server Architecture, Server can provide the service to the Client and Client can request the service to the server.

So, Server is called Service Provider and Client is called Services Requestor.



- Server:

Server is a program or services that provides services or resources to client.

Servers wait for incoming request from client and respond to the requests.

Servers can handle the multiple client request.

- Client:

Client is a program or device that can request service or resources from the server.

Client initiate communication by making request to server.

- Advantages:

Client-Server Architecture has centralized system to handle the system.

This architecture requires less maintenance cost and data recovery is possible.

- Disadvantages:

Clients are prone to viruses which is uploaded into the

server.

Data Packets may be change or modified during the transmission.

2 What is HTTP?

HTTP stands for HyperText Transfer Protocol

HTTP is a protocol which is used to access the data into the world wide web.

Using HTTP, we can transfer the data like text, hypertext, audio, video etc.

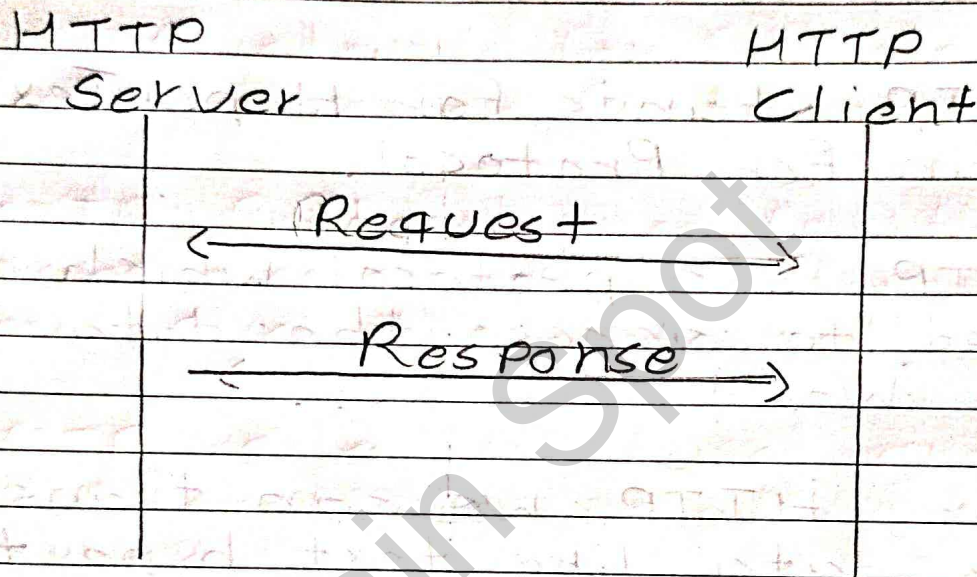
HTTP is similar to the File Transfer Protocol but HTTP is simple than FTP.

HTTP required only one connection to transfer the data.

HTTP is connection-less Protocol which means we not need to create connection between

Client and Server.

HTTP Client can request to the HTTP Server and HTTP Server can response to the HTTP Client.



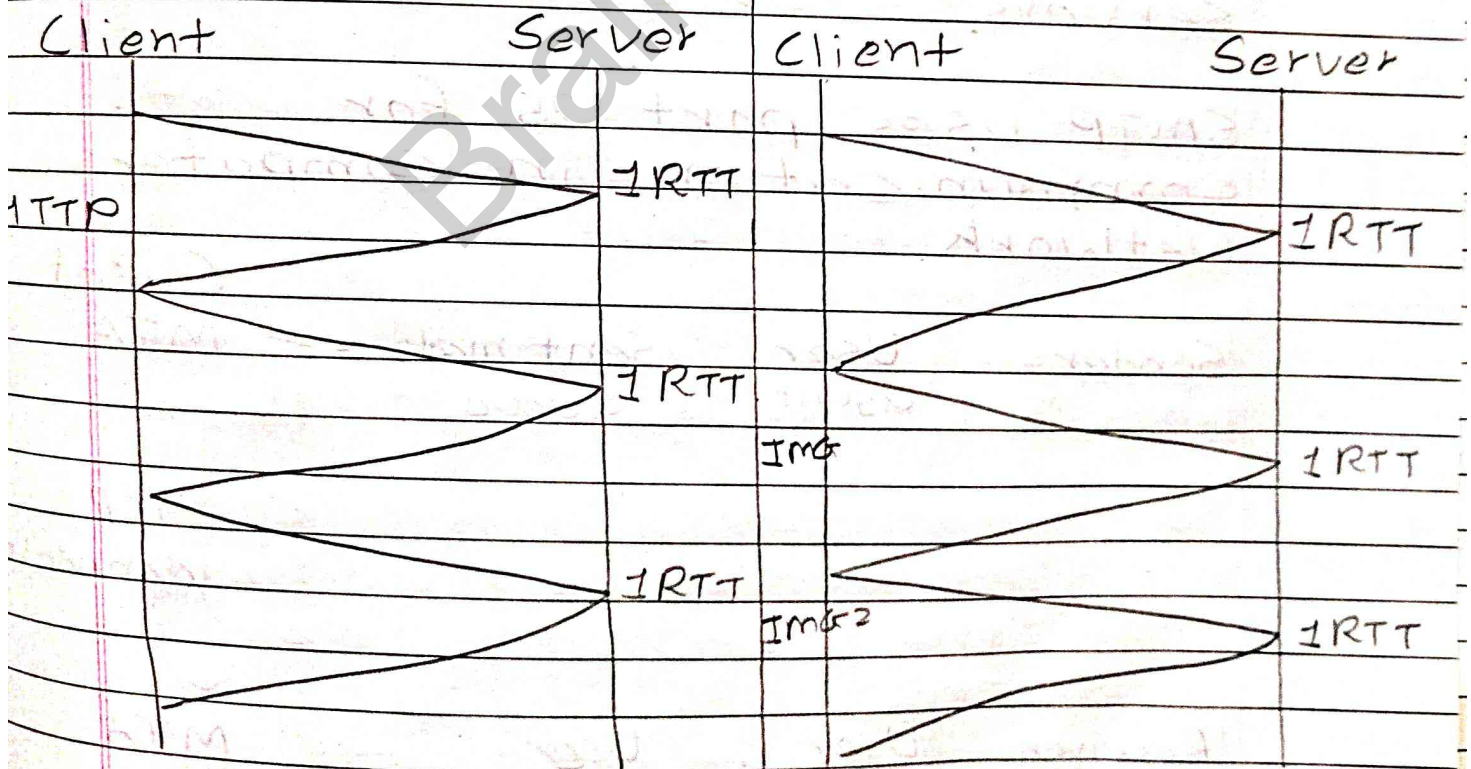
There two type of HTTP message : Request and Response.

Request and Response has same type of message structure.

The Request message send by client and Response message send by the server.

-> Differentiate its Persistent and non-persistent types with request-response behavior of HTTP.

Persistent HTTP	Non-Persistent
1 Use HTTP Version 1.1.	Use HTTP Version 1.0.
2 It Required 1 RTT For all referenced Object.	It Requires 2 RTT & for Object.
3 Less Overhead	More Overhead



3 Explain the working of Electronic mail protocols SMTP, IMAP and POP3 in brief with suitable diagram.

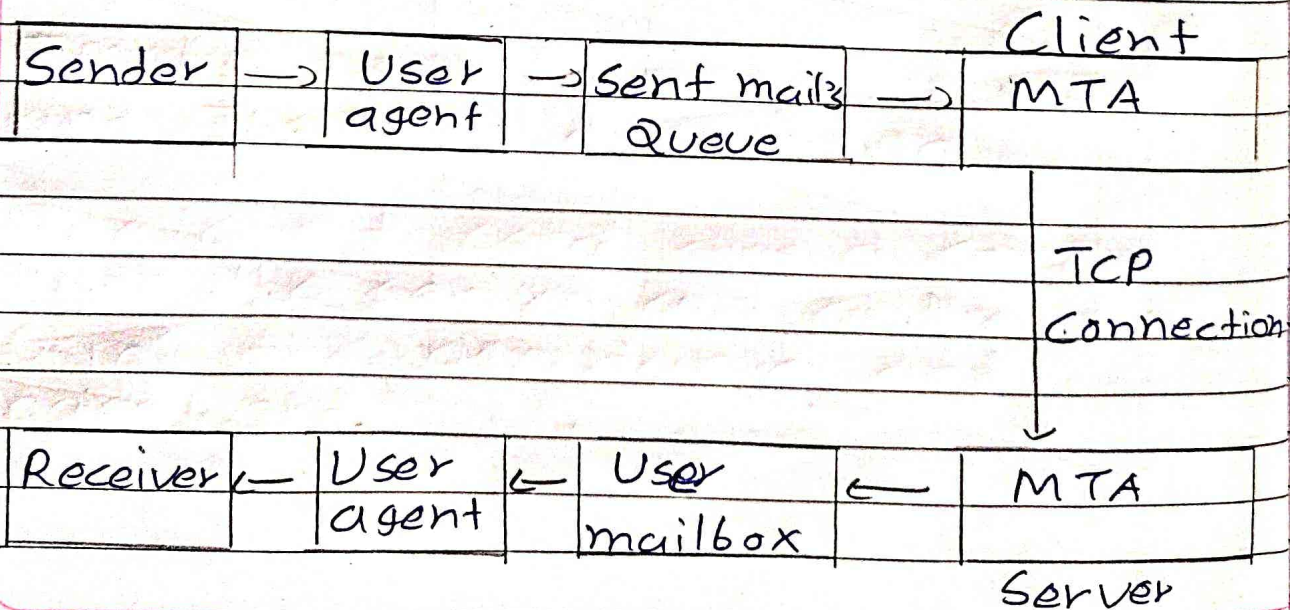
=> SMTP:

SMTP stands for Simple Mail Transfer Protocol.

SMTP Protocol used for the transmission of electronic mail over the internet.

SMTP is a text based protocol that exchanges emails between servers.

SMTP uses port 25 for communication in computer network.



The SMTP communication starts with a client connecting to a server.

SMTPS uses TLS or SSL ~~en~~ encryption to secure the communication between the client and server.

SMTP supports various authentication mechanisms to ensure that only authorized user can send the mail.

SMTP operate on the client-server model in which client sends mail to email server.

→ IMAP:

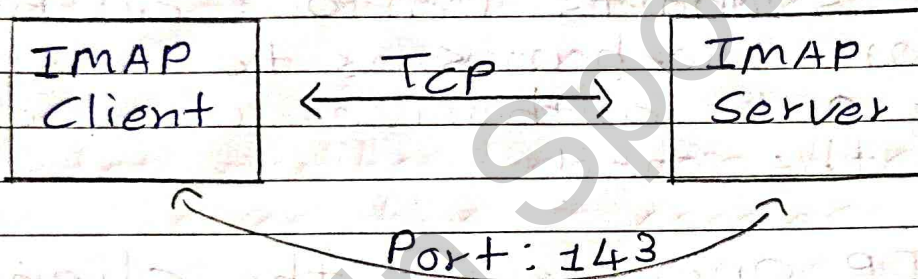
IMAP stands for Internet Message Access Protocols.

IMAP is used by email clients to retrieve and send messages in the form of mail.

IMAP is designed for managing emails on a mail ~~ex~~ server.

IMAP Operates on client-server model which is similar to POP3.

In IMAP client connects to the server and used various command to manage emails.



IMAP Client and IMAP Server is used TCP connection.

IMAP Operates on 143 port number for unencrypted communication.

IMAPs Used Port 993 For SSL and TLS for encryption.

The client establishes a connection with the server and authenticates using the username and password.

-> POP3 :

POP3 stands for Post Office Protocol, Version 3.

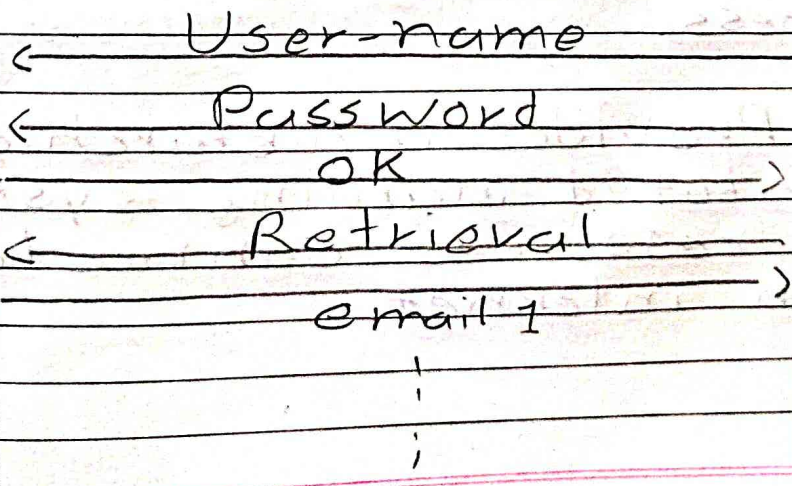
POP3 is used to retrieve emails from a mail server to a local client device.

POP3 allows email clients to download messages and manage them locally.

POP3 clients have to share the user name and password for the connection to establish.

POP3 operates at a client-server model which is similar to IMAP.

POP3 Server	POP3 Client
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POP3 uses port 110 for the unencrypted communication.

POP3S is used port 995 for the SSL/TLS encryption.

The client establishes a connection with server and authentication is performed using username and password.

After authentication the client retrieves the messages.

4 Write a short note on DNS.

=> DNS stands for Domain Name System which is a fundamental protocol in computer network.

DNS translates human-readable domain names into the IP address.

It provides a hierarchical and distributed naming system for resources connected with internet.

DNS Resolves domain names to IP address which is used by computer to identify each other.

There are three types of Domain.

- ci) Generic Domain
- cii) Country Domain
- ciii) Inverse Domain

ci) Generic Domain :

Ex. .org (Nonprofit Organization),
.com (Commercial),
.net (Similar to Commercial),
.edu (Educational) etc.

cii) Country Domain :

Ex. .in (India), .us, .uk etc.

ciii) Inverse Domain: For Find the Domain name using IP, we have to use inverse domain.

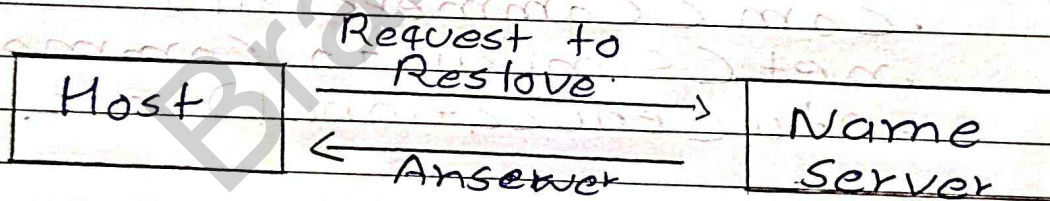
There are Various types of DNS Server.

ci) Root DNS Server: Provide information about top-level domains.

cii) TLD DNS Server: Provide or Handles top-level domain.

ciii) Authoritative DNS: Store information about particular Domain

civ) Recursive DNS: Resolve query on behalf of clients.



IF host Provides any domain name than ~~ma~~ name server can provides the answer or IP Address.

DNS Resolves and servers cache information for a specified Time or Time to Live.

DNS enabling users to access website using human-readable domain name.

Dynamic DNS is a mechanism that allows to assigned IP address in dynamically with domain name.

Brain Spot