

## Assignment - 1

Q-1

Explain the working of DNS System with Diagram.

- ⇒ DNS stands for "Domain Name System"
- ⇒ DNS is the internet's system for mapping alphabetic names to IP addresses.
- ⇒ Basically, it represents a system of interconnected servers that stores registered domain names and their mapped IP address.
- ⇒ The DNS is a distributed database across a hierarchy of networks of servers and provide ways for devices and software like browsers to query the DNS to get an IP address.

\* DNS (Domain Name Space):-

- Domain name space is represented by TREE structure.
  - Hierarchy is :-
- 
- ```

graph TD
    TD[Toplevel Domain] --> SD[Sub Domain]
    SD --> SS[SubSub Domain]
    SS --- SSSD[SubSubSub Domain]
    edu[edu] --> D[Domain]
    D --> ottawa[ottawa]
    ottawa --> CS[cs]
    ottawa --> MED[med]
    CS --> SS
    MED --> SURGERY[surgery]
    SURGERY --> SSSD
  
```

## \* Working of DNS:-

STEP:2 IDS forwards

The request for  
IP address of  
charusat.edu to  
Root level  
DNS

STEP:1 User types

charusat.edu.in  
in browser

Internal  
DNS server

STEP:3 RLDS do not  
have the answer so  
request is forwarded

RLDS

to Top level  
Domain server

STEP:4 TLDs Based on info. in the

TLDs

database knows that second -  
level Domain server has  
the answer

Internal  
OS

STEP:5

Obtained IP  
address is sent to IDS.

STEP:6

IDS gets the  
IP address and the user is  
directed to website.

Q-2

Draw and explain the HTTP message format.

- ⇒ HTTP stands for "HYPER TEXT TRANSFER PROTOCOL."
- ⇒ HTTP is primarily used to transfer the data over web.
- ⇒ HTTP is a state less protocol and uses port number: 80

\* HTTP message Format:-

- ⇒ There are two types of HTTP messages:-
- (1) Request
- (2) Response

Request  
Line

\* General format of Request message:-

|          |                                          |                    |    |         |    |                                          |                     |  |
|----------|------------------------------------------|--------------------|----|---------|----|------------------------------------------|---------------------|--|
| method   | SP                                       | URL                | SP | version | CR | if<br>header field name : SP value CR if | ] → Header<br>lines |  |
| cr       | if<br>header field name : SP value cr if | ] → entity<br>body |    |         |    |                                          |                     |  |
| cr<br>if | → Blank line                             | ] → entity<br>body |    |         |    |                                          |                     |  |

\* Explanation:-

- The first line of HTTP request message is the request line.

- ⇒ The subsequent lines are called header lines.
- ⇒ The request line has 3 fields:-
  - (1) method
  - (2) URL
  - (3) Version
- ⇒ The method field can take different values like GET, POST, etc.
- ⇒ Almost all HTTP request message uses GET method.
- ⇒ The GET method is used when browser requests an object.
- ⇒ POST method is used when user fills out a form

\* General format of Response Message :-

| version           | sp             | status code | sp    | phase            | cr lf | ↑ |
|-------------------|----------------|-------------|-------|------------------|-------|---|
| header field name | sp             | value       | cr lf | ] → Header lines |       |   |
| header field name | sp             | value       | cr lf | ] → entity body  |       |   |
| cr lf             | ] → Blank line |             |       |                  |       |   |

S - C

② → ③

190CS098

WALTER  
Page:  
Date:

⇒ Response message has 3 sections:-

(1) initial status line

(2) six header lines

(3) entity body

⇒ The entity body contains the requested object itself

⇒ The status line has 3 fields:-

(1) protocol version

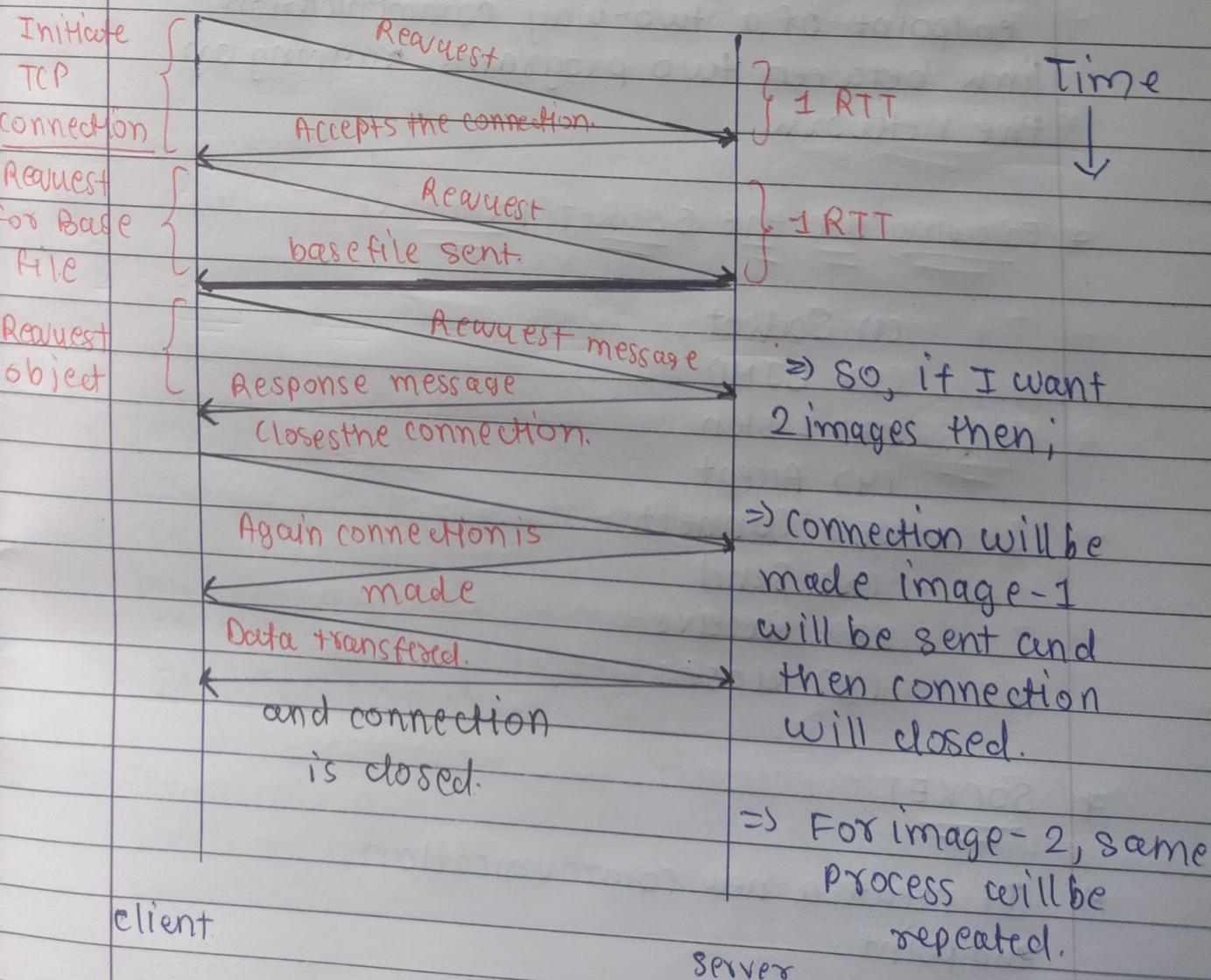
(2) status code

(3) Phrase

Q-3

## Draw Sequence Diagram of HTTP with non-persistence connection

- ⇒ A non-persistent connection is closed after the server sends the requested object to the client.
- ⇒ So, the connection is used exactly for one request and one response.
- ⇒ It takes 2 RTTs per object.
- ⇒ Non-persistent connection uses TCP protocol.



Q-5

What is socket? List out the socket primitives and explain each.

- ⇒ A socket is a communication end point of a computer system
- ⇒ whenever, two computer system shall communicate with each other, a connection between them is established.
- ⇒ This connection is established using sockets.
- ⇒ We can also say that a socket is one endpoint of a two-way communication link between two programs running on the network.

\* Following are the socket primitives:-

- (1) Socket
- (2) BIND
- (3) Listen
- (4) Accept
- (5) Connect
- (6) Send
- (7) Receive
- (8) Close

\* SOCKET:-

- ⇒ It creates a new communication end point

- ⇒ Basically, it creates a new socket of

certain type identified by an integer number and allocates system resources to it.

\* BIND :-

- ⇒ It basically attach a Local Address to a socket
- ⇒ It is typically used on server Side
- ⇒ It associates a socket with specified local IP address and port number

\* LISTEN :-

- It shows the willingness to accept the connections.
- It is used on Server Side.
- It causes a TCP socket to enter listening state

\* ACCEPT ! :-

- It blocks the caller until a connection attempt arrives.
- It is used on server Side
- It accepts a received incoming attempt to create a new TCP connection

\* CONNECT :-

- It actively attempts to establish connection.
- It is used on client side.
- Basically, it assigns a free local port number to a socket.

\* SEND :-

- It sends some data over the connection.
- It is used for sending data.

\* RECEIVE :-

- It receives some data from the connection.
- It is used for receiving data.

\* CLOSE :-

- It releases/ closes the connection.
- It causes the system to release resources allocated to a socket.
- The connection is also terminated.

Q-6 Explain the traversing of packet with respect to OSI reference model. Consider the scenario as two end systems are connected through switch.

⇒ Suppose, Computer A need to send some data to another computer B.

⇒ Both the computers are connected via switch.

⇒ The application layer is where the user interface exists.

⇒ From application layer, the data is passed to Presentation layer.

⇒ Presentation layer will add some presentation header to the data.

⇒ Presentation layer will pass the new data to Session layer.

⇒ Session layer manages the data flow so, it will also add some extra information like header.

⇒ Session layer passes the data to transport layer.

⇒ In transport layer, the data is broken into smaller pieces and it adds the header.

⇒ Now, data at transport layer is called SEGMENT

- ⇒ Now, the data segment is sequenced so that it can be put together at receiver side.
- ⇒ Every segment is passed to Network layer.
- ⇒ Network layer adds the logical address for routing over the internet.
- ⇒ At network layer, data is called packet.
- ⇒ Each packet has network header and upper layer information.
- ⇒ Network layer adds IP header and sends the packets to data link layer.
- ⇒ At data link layer, data is called frame.
- ⇒ The Data link layer encapsulates each frame which contains the hardware address (MAC) of both source and destination computers.
- ⇒ It also adds FCS (frame check sequence) field at the end for error checking.
- ⇒ The frames are passed to physical layer where they are converted to 0's and 1's.
- ⇒ Then, the data is passed on to router or a gateway depending on the topology.

- ⇒ The above whole process is called encapsulation
- ⇒ In our case, the data is received by switch.
- ⇒ Now, switch is a layer 2 device.
- ⇒ Once, the data is received by switch and the synchronization is completed, the whole frame is passed to data link layer
- ⇒ From datalink layer, it will get the MAC Address of destination computer.
- ⇒ On the basis of obtained MAC address, the data will be sent again to physical layer and then to the destination machine.
- ⇒ The receiving computer will synchronize the digital signal and once the whole frame is received, it is passed to Data link layer.
- ⇒ The datalink layer will do a CRC on frame.
- ⇒ If the result gets match, it will take all the necessary information and will pass - on to network layer.
- ⇒ At network layer, IP address is checked and if it matches, data is passed to transport layer.

③ → ④

19 DC SOQS

~ WALTERS ~  
Page:  
Date:

- => Transport layer rebuilds the data stream and acknowledges the source that it received all the segments.
- => The data is handed to upper layers, where the data is brought back to original condition and is published on the interface.

Q-7

Write difference between Symmetric connection Release and asymmetric connection Release.

### Symmetric

- ⇒ If one host disconnects connection, then it cannot send the data but can receive the data.
- ⇒ So, the connection must be disconnected by both sides.
- ⇒ Data loss can be effectively avoided.
- ⇒ Symmetric release treats the connection as two separate unidirectional connections.
- ⇒ Each host should terminate the connection from their side.

### Asymmetric

- ⇒ If one host terminates connection, then in both direction communication will be terminated.
- ⇒ If one host disconnects, connection is terminated.
- ⇒ Data loss can evidently happen.
- ⇒ It is analogous to working of Telephone System.
- ⇒ Only one host can terminate the connection and the whole connection terminates.

Q-9

