# Data Communication & Networking

## Unit : 1

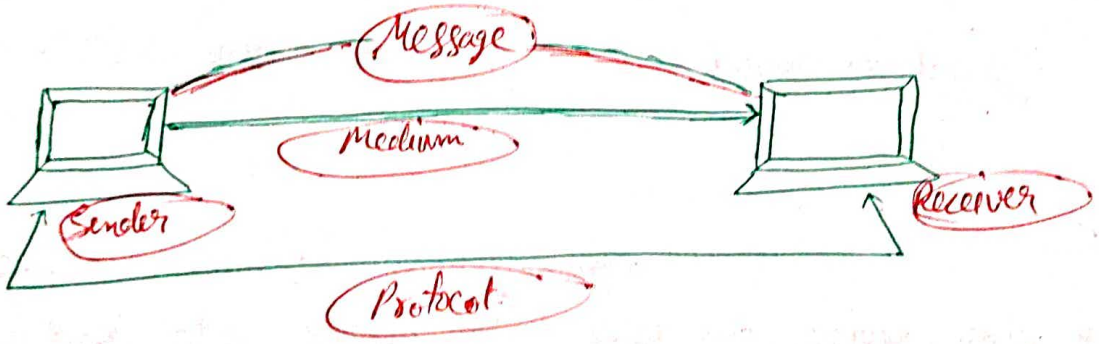
### * Data Communication :

Data communication is the process of sending & receiving digital data between two or more computers via transmission medium such as a wire cable or wireless.

### Components of data Communication :

It has five components -

1) Message 2) Sender 3) Receiver 4) Transmission Medium
5) Protocol




1) **Message :** A message is a piece of / like as information that is transfer from one person to another. It has a text file, audio file, video file etc.

2) **Sender :** It is a device that send data message. It can be a computer, mobile, telephone, video camera etc.

3) **Receiver :** It is a device that receive data message. It can be computer, mobile, telephone, video camera etc.

4) **Transmission Medium / Communication Channel :**

Transmission medium are the medium that connected two or more workstation / system. System are connected by wired media or wireless media.

5) Protocol: The set of rules that govern the communication b/w computers. These rules are followed by both sender and receiver.

Types of Data Communication:-

i) Simplex ii) Half Duplex iii) Full Duplex

ii) Simplex: It is a one-way communication, in which one device only receives and another is send only.

Ex: Keyboard to computer, listing music using speaker, IOT.

iii) Half Duplex:

It is a two way communication, in which both the device can send and receive data but not at the same time. i.e. when one device is sending data then another device is only receiving and vice-versa.

Ex: Walkie - Talkie.

iv) Full-Duplex:

It is also a two way communication, in which both the device can send and receive data at the same time.

Ex: Mobile phones, Cordless etc.

## * Internet:

It is a network of networks that is used to interlinked many different types of computers all over the world.

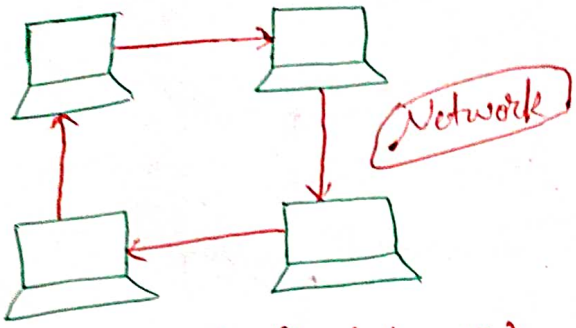



Fig: LAN (Local Area N/w)

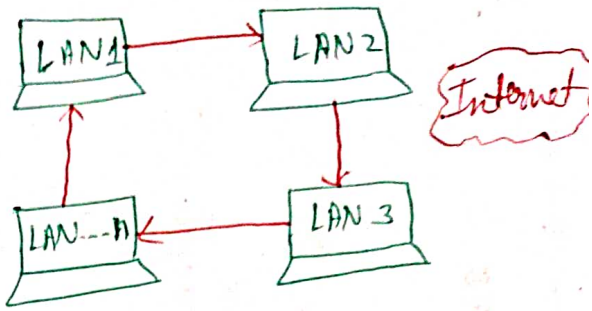



Fig: WAN (Wide Area N/w)

## · ARPANET / ARPA:

[Advanced Research Projects Agency Network]

→ It was developed by US Department of Defense (ARPA) in 1968.

→ It was a WAN (Wide Area N/w)

→ It was the first packet switching N/w.

→ In present days, we are knowns as W.W.W. (world wide web)

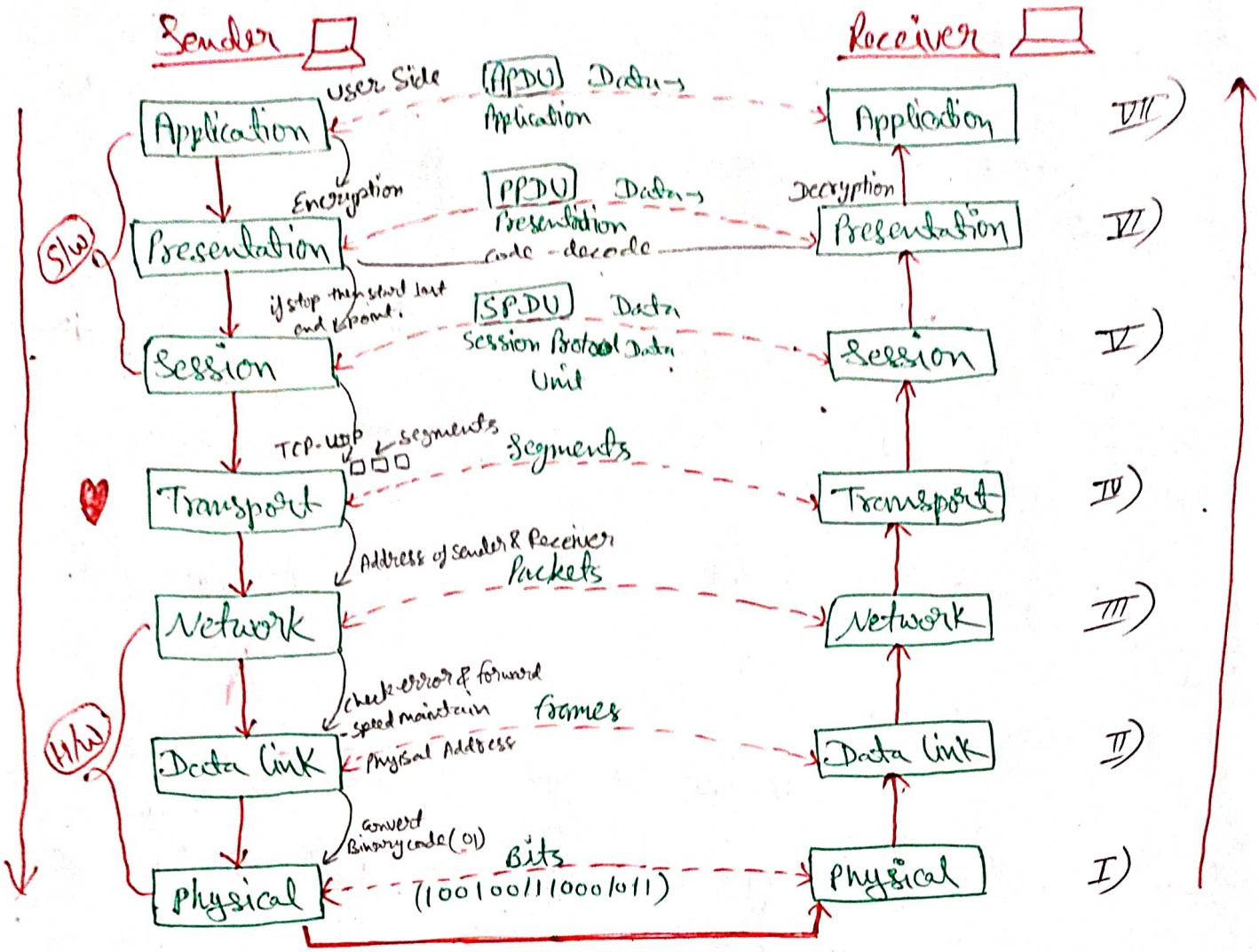
## * OSI Model:

→ OSI stand for "Open System Interconnection" model.

→ It has been developed by "ISO (International Organization for Standardization) in 1984.

→ It is 7 layer architecture where each layer having specific functionality.

→ All these layers work combined to transmit the data from one n/w to another n/w across the globe.




Aaj Phir Se Test Nahi Dena Padega

## ⇒ Application Layer : Layer-7

→ It is a very top of the OSI model of layers.

→ This layer produce data, which has to be transferred over the n/w.

→ This layer also serves as a window for the application services to access the network.

Ex: Browser, Skype messenger etc.

→ func$^n$. of Application layers are -

a) N/w Virtual Terminal

b) File Transfer Access & Management — permission to file transfer, access & retrieve

c) Mail Services provide email forwarding & storage

d) Directory Services Given database sources likes Email, HTTP, telnet, SMTP etc.

## ⇒ Presentation Layer: Layer → 6

→ It is also known as Translation Layer.

→ The data from the application layer is extracted here and manipulated as per the required format to transmit over the network.

→ Functions of presentation layer are -

a) Translation (encoding methods)

b) Encryption - Decryption (send this code for secure data)

c) Compression (compress the bits of data)

## ⇒ Session Layer: Layer → 5

→ This layer is responsible for established of connection, maintenance of session, authentication, ensure security.

i.e. It helps in established the connection b/w sender & receiver and the ensure security them.

→ Functions:

a) ~~Synccy~~ Synchronization (add some checkpoints & if error come→checkpoint then transmit again)

b) Dialog Controller - allows two system to start communication (half Duplex & full duplex)

## ⇒ Transport Layer: Layer → 4

→ The data in the transport layer is referred to as segments.

→ It is responsible for the End to End delivery of the complete message.

→ functions:

a) Segmentation and Reassembly

b) Service point Addressing: In order to deliver the message to correct process, transport layer header includes a type of address called service point address or port address.

## ⇒ Network layer: Layer → 3

→ N/w layer works for the transmission of data from one host to the other located in different networks.

→ It also takes care of packets routing i.e. selection of shortest path to transmit packet from the no. of routes available.

→ Functions:

a) Routing  b) Logical Addressing

## ⇒ Data - Link Layer: Layer → 2

→ This layer is responsible for the node to node delivery of message.

→ The main func^n of these layer is to make sure data transfer is error free from one node to another.

→ When a packet arrives in a n/w, it's responsibility of DataLink layer to transmit it to host using MAC address. (Media Access Control)

→ Functions:

a) Framing  b) Physical Addressing  c) Error Control  4) Flow Control

## ⇒ Physical layer: Layer → 1

{Hub, Repeater, Modem are physical layer Devices}

→ It is a lowest layer of OSI model.

→ It's responsible for the actual physical connection b/w devices.

→ This layer contains information in bits.

→ It's responsible for transmitting individual bits from one node to another next node.

→ When this layer receive signal, it convert into 0 and 1 form and send them to Data link layer.

→ Functions:

a) Bit Synchronization

b) Physical Topologies