

# COMMUNICATION AND NETWORK CONCEPTS

## Abbreviations :

Abbreviation	Full Form
LAN	Local Area Network
WAN	Wide Area Network
MAN	Metropolitan Area Network
FTP	File Transfer Protocol
SMTP	Simple Mail Transfer Protocol
IMAP	Internet Mail Access Protocol
MODEM	Modulator And Demodulator
WWW	World Wide Web
RPC	Remote Procedure Call
NFS	Network File System
HTML	Hyper Text Markup Language
DHTML	Dynamic Hyper Text Markup Language
HTTP	Hypertext Transfer Protocol
TCP / IP	Transmission Control Protocol / Internet Protocol
SLIP	Serial Line Internet Protocol
PPP	Point To Point Protocol
SIM	Subscriber's Identification Module
3G	3 <sup>rd</sup> Generation of Mobile Communication Technology
SMS	Short Message Service
EDGE	Enhanced Data rates for Global Evolution
E-mail	Electronic mail
WLL	Wireless Local Loop
CDMA	Code Division Multiple Access
FRA	Fixed Radio Access
GSM	Global System For Mobiles
ARPANET	Advanced Research Project Agency Network
XML	Extensible Markup Language
URL	Uniform Resource Locator
ISP	Internet Service Provider
DNS	Domain Name System
VSNL	Videsh Sanchar Nigam Limited
MTNL	Mahanagar Telephone Nigam Limited
WAIS	Wide Area Information Server
TDM	Time Division Multiplexing
WDM	Wavelength Division Multiplexing
FDM	Frequency Division Multiplexing
DHTML	Dynamic Hyper Text Markup Language

**Network** - It is a collection of interconnected autonomous computers . An autonomous computer can not stop , start or control another computer.

### Network Goals and Applications-

- Resource sharing
- Reliability
- Better price performance ratio
- Speedup communication

### Evolution of networking-

**ARPAnet-** Advanced Research Project Agency Network.

It is the first network in history.

It was started in 1969 to connect computers at US defense and different universities.

Original ARPAnet was shut down in 1995.

**NSFnet-** National Science Foundation network.

It was started in 1980s.

It was started to make a high capacity network to be used strictly for academic and engineering research.

## NETWORKING TERMINOLOGY

**Internet or Internetwork** - It is a world wide network of computer networks.

**Gateway**- A device which is used to connect dissimilar networks.

**Backbone**- It is a central interconnecting structure that connects one or more networks just like a trunk of a tree or the spine of a human being.

### PROTOCOLS-

Protocols are the set of rules that govern the communication over a network and followed by all the computers in the network. Some important protocols are –

**HTTP** – Hypertext Transfer Protocol - It allows different types of computers / Networks to establish communication between them. It has two features – requests and responses.

**TCP – Transmission Control Protocol**- It is responsible for dividing the message or file into small packets (which are known as datagrams) on the source computer. It is also responsible for reassembling the received packets at destination computers. This protocol establishes reliable or unreliable connection between the source and destination.

**IP – Internet Protocol**. This protocol is responsible for handling the address of destination computer so that each packet is routed to its proper destination. IP Address is 32 bit address. IP Address is divided into Network Address and Host Address.

**FTP**- File Transfer Protocol- It is a protocol which is used by the computers on network to exchange files.

**SLIP**-Serial Line Internet protocol- it was the first protocol used for delivering IP packets over dial-up lines.

**PPP**-Point to point protocol- it was the protocol used for delivering IP packets over serial lines.

**Interspace**- It is a client/server software program that allows multiple users to communicate online with real time audio, video and text chat in dynamic 3 D environments.

### Elementary terminology of Network-

**Node/ workstation** - A computer becomes a node or workstation of a network when it is attached to a network.

**Server**- A computer that facilitates the sharing of data, software and hardware resources on the network is termed as server.

It is of two types-

**Dedicated server**-A workstation which works purely as a server is called dedicated server.

**Non- Dedicated server**- A workstation which works as a server as well as workstation is called non-dedicated server. Its speed is slow and requires more memory.

**NIC- Network Interface Unit**- It is a device which is attached to each of the workstation and the server in the network and helps in establishing communication between these two.

**MAC Address**- The NIC manufacturer assigns a unique physical address to each NIC card. This address is known as MAC address.

## Data Transmission Switching Techniques / How the information is shared / Transferred in a NW

= Information transferred from one node to another node in a network is known as switching. Switching takes places in the following ways –

**Circuit Switching** - ex Telephone line. In this source is connected to destination from end to end via physical connection for communication of data.

**Message Switching** - ex E-mails. It uses store and forward technology for transfer of information. Source sends information that is received by its nearby switch office. This switch office sends the information to another switch office and that further forwards to another switch office until the whole information is reached at the switch office that is nearer to the destination. Then this switch office forwards information to the destination. The message is stored on the hard disk, so access speed is slow.

**Packet Switching** - This technique also uses store and forward technique but the data is broken into small fixed size which are known as packets. The packets are stored in the main memory, so the access speed is high.

### Data Communication Terminologies -

Data Channel – is a medium used to carry information / data from one point to another point.

Baud / Baud Rate – it the measurement unit of data carrying capacity of a data channel

bps It refers to the speed at which data transfer is measured. It is used to measure the speed of information through a high speed phone line or modem. bps is bits per second transmitted on a data channel.

Bps - Bytes per second transmitted.

Bandwidth – it is the difference between the highest and lowest frequencies of a transmission channel or width of allocated band of frequencies to a channel. It is measured in cycles per second. Its units are KHz, MHz, GHz etc.

**High bandwidth channel are called broadband channels.**

Low bandwidth channel are called narrowband channels.

Data transfer rates-It is the amount of information transferred per second by a communication channel. It is measured in bps, Bps or baud.

### Transmission Media / Channels of Communication-

Transmission media is used to establish connectivity between computers or networks.

Two Types of transmission media are –Guided and unguided media.

1. **Guided Media** - in this type connecting cables are the communication channels between the different works stations.

Name	Twisted Pair Cable	Coaxial Cable	Optical Fibre Cable
Identity	Ordinary Electrical Wire	Cable TV wire	A high speed wire having thin glass pipe in it.
Speed	100 – 1000 mbps	10 mbps	1000 mbps - gigabits
Distance	100 meters	500 meters	100 km
Cost	Cheapest	Cheaper	Costly
Types	STP & UTP	Thinnet / Thicknet	Singlenode / Multinode,

**Twisted Pair Cable-It is of two types.**

- a) Unshielded twisted pair (UTP)

#### **Characteristics of UTP**

- Low cost
- Easy to install

- High speed capacity
- High attenuation
- Effective to EMI
- 100 meter limit

### **Advantages of UTP**

- Easy installation
- Capable of high speed for LAN
- Low cost

### **Disadvantages of UTP**

- Short distance due to attenuation

#### b) Shielded twisted pair (STP)

### **Characteristics of STP**

- Medium cost
- Easy to install
- Higher capacity than UTP
- Higher attenuation, but same as UTP
- Medium immunity from EMI
- 100 meter limit

### **Advantages of STP:**

- Shielded
- Faster than UTP and coaxial

### **Disadvantages of STP:**

- More expensive than UTP and coaxial
- More difficult installation
- High attenuation rate

## **Coaxial Cable-**

### Characteristics of Coaxial Cable

- Low cost
- Easy to install
- Up to 10Mbps capacity
- Medium immunity form EMI
- Medium of attenuation

### **Advantages**

- Inexpensive
- Easy to wire
- Easy to expand
- Moderate level of EMI immunity

### **Disadvantages**

- Single cable failure can take down an entire network

## **Optic Cable-**

### **Characteristics Of Fiber Optic Cable:**

- Expensive
- Very hard to install
- Capable of extremely high speed

- Extremely low attenuation
- No EMI interference

#### **Advantages Of Fiber Optic Cable:**

- Fast
- Low attenuation
- No EMI interference

#### **Disadvantages Fiber Optics:**

- Very costly
- Hard to install

**2. Unguided Media** - in this there is no direct connection between the source / destination workstations and some waves are used to transmit the signal.

**Microwave-** These are similar to radio and TV signals and used for long distance communication. It consists of transmitter , receiver and atmosphere. Parabolic antennas are mounted on towers to send beam to other antennas. Higher the tower higher the range.

- It can communicate over the oceans.
- It is cheaper than digging trenches for laying cable.
- It is insecure medium.
- It is affected by weather.
- It offers freedom from land acquisition rights required for laying , repairing the cables.
- The cost of design , implementation and maintenance of microwave links is high.

**Radio Wave-** It contains transmitter and receiver. The transmitter takes some message , encode it onto sine wave and transmit it with radio waves. The receiver receives the radio wave , decode the message from sine wave it receives.

- It proves cheaper than digging trenches for laying cables.
- It is insecure medium.
- It is affected by weather.
- It offers mobility.
- It offers freedom from land acquisition rights required for laying , repairing the cables.

**Satellite-** In it the earth station consists of a satellite dish that functions as antenna and communication equipment to transmit and receive data from satellite passing overhead.

- Area coverage is quite large.
- High investment cost.
- Overcrowding of bandwidth.

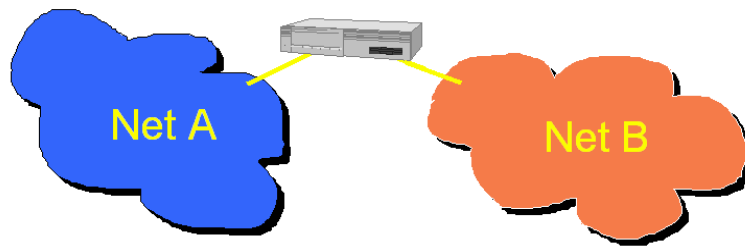
**Infrared waves-** these waves use infrared light to send data. TV remote , wireless speakers all uses these waves. These waves do not penetrate walls.

**Laser waves-**It is unidirectional like microwave but much higher speed than microwaves.It needs laser transmitter and photo sensor to send and receive data. It is adversely affected by weather.

### **NETWORK**

Connection of 2 or more distinct (possibly dissimilar) networks.

Requires some kind of network device to facilitate the connection.



## TYPES / MODELS OF NETWORKS

- LAN – Local Area Network
- MAN – Metropolitan Area Network
- WAN – Wider Area Network
- PAN- Personal Area Network

### **Local Area Network**

A local area network (LAN) supplies networking capability to a group of computers in an office building, a school, or a home. It connects computers that are physically close together ( 1m to 10 km) with high speed and multi-access.

### **Metropolitan Area Network**

A metropolitan area network (MAN) is a network that interconnects users with computer resources in a geographic area or region larger than that covered by even a large local area network (LAN) but smaller than the area covered by a wide area network (WAN) .

**Wider Area Network-It** is spreaded across countries. It is typically slower and less reliable than a LAN.It has higher error rates.

### **Technologies for WAN -**

- telephone lines
- leased lines
- Satellite communications
- microwave / radio wave links

**Personal Area Network-It** covers a range of 10 meters.It is used in wireless mouse keyboard etc.

## NETWORKING TECHNIQUES

**Peer to Peer** – Each node in the network is having its own resources / processing capabilities. It may share information among others. Nodes may not have to depend upon others for carrying out their work. Each node its own master i.e. has no boss. They are independent and work the way they like.

**Client Server (C/S)** – In this technique there is one dedicated boss that is known as server. Whole the network works under the server and it has full control on all the nodes. Boss is known as Master / Server. The other nodes which are controlled by Server are known as Slaves / Clients. Clients send request to the server and the server receives their requests and reply.

## MODE OF COMMUNICATIONS (FULL DUPLEX VS HALF DUPLEX)

**Full-Duplex** services support the transfer of data in both directions.



**Half-Duplex** services support the transfer of data in a single direction.



## NEED / BENEFITS OF A NETWORK

- To share resources in network

- Decrease costs of transfer
- Increase speed in transferring
- Improves communication

## NETWORK TOPOLOGIES-

Topologies refer to the techniques / ways of inter connecting computers or networks. Means how the computers and networks are connected to each other. These can be connected in the following ways –

### **Ring Topology**

- i) Communication is one way in this topology. The speed is slow.
- ii) Only one node communicates at a time.
- iii) Short cable length required as compared to star top.
- iv) One node failure causes whole system fails.
- v) Network reconfiguration is difficult.
- vi) No wiring closets space required.

### **Bus / Serial Topology**

- i) All nodes are connected to a straight wire (thinnet of coaxial cable). Speed is slow.
- ii) Communication is both directional but at a time data can pass only in one direction. At the other end of the bus the signal is discarded.
- iii) If one node is unserviceable, network pass of that node becomes unserviceable.
- iv) Fault diagnose is difficult.
- v) Short cable length and simple wiring layout.
- vi) Easy to extend.
- vii) Nodes must be intelligent.
- viii) Reconfiguration is necessary when extended using \repeaters.

### **Star / Radial Topology**

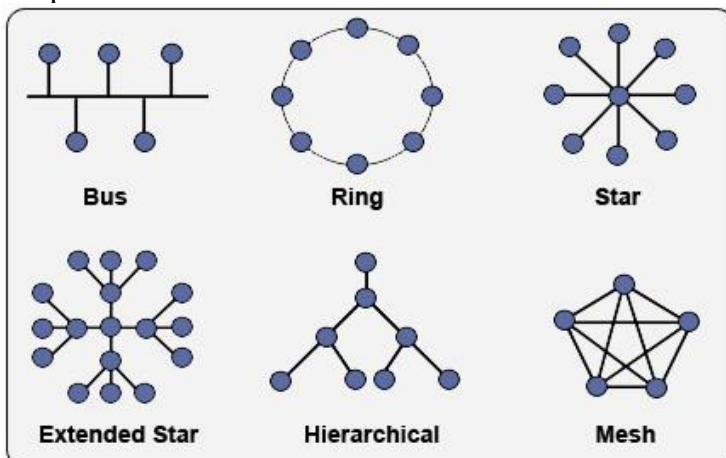
- i) Nodes are attached to a HUB / SWITCH
- ii) Network is faster.
- iii) It is most widely used topology
- iv) If one node becomes unserviceable, the other nodes in the network are not affected all other nodes carry on receiving information. Only that node is out of network.
- v) Long cable length is required.
- vi) Difficult to expand.
- vii) If central node fails the whole system will be fail.

Mesh Topology

Tree Topology

Point to Point

Graph



**80:20 RULE:** This rule says in a properly designed small to medium sized network environment , 80 % of the traffic on a given network segment is local and not more than 20% of the network traffic should need to move across a backbone.

### **NETWORKING DEVICES**

- i) **Hub-** device used to connect no of computers.
- ii) **Active hub-** pass the signals from one comp to another with amplification
- iii) **Passive hub-** pass the signals from one comp to another without amplification.
  
- iv) **Switch-**device used to segment networks into different sub networks called subnets or LAN segments. It is responsible for transforming data in a specific way and forwarding packets between LAN segments.
- v) **Repeater-** device used to amplify and restore signals for long distance transmission. It should be used if the distance between two segments is 80 or more than 80 meters.
- vi) **Bridges-** device which establishes an intelligent connection between two local networks with the same standard but with different types of cables. Data not destined for a device on the other network is prevented from passing over the bridge.
- vii) **Router-** device that is used to separate different segments in a network to improve performance and reliability. A router works like a bridge but can handle different protocols.
- viii) **Gateways-** device which connects dissimilar networks.It is actually a node on a network which serves as entrance to another network.
- ix) **RJ45 Connector (Registered Jack – 45)** is an 8 wire connector , which is commonly used to connect computers on a LAN especially Ethernets.
- x) **NIC – Network Interface Card** –it is an interpreter that helps establish communication between server and workstation.It is also called TAP(Terminal Access Point)
- xi) **MAC address-** it refers to the physical address assigned by NIC manufacturer.
- xii) **Modem-** converts analog to digital signals and vice versa and allows to connect and communicate with other computers via telephone lines.
- xiii) **Ethernets -** it is a LAN architecture which uses either bus or star topology and supports data transfer rates upto 10 Mbps.
- xiv) **Ethernet Card-** Every computer on the network has a special card to transmit data which is called Ethernet card.
- xv) **Wi-Fi Card-** It is an external or internal LAN adapter which allows to set up workstation or home office without considering the availability of hardline network access.

### **WIRELESS / MOBILE Computing**

Wireless communication – It is simply data communication without the use of land lines.  
Mobile computing- It means that the computing device is not continuously connected to the base or central network.

### **WIRELESS / MOBILE Computing Technologies-**

- **GSM** – It was established in Europe in the mid 1980s.
- It uses narrowband TDMA , which allows 8 simultaneous calls on the same radio frequency.
  
- **CDMA-**It uses a spread – spectrum technique, where data is sent in small pieces over a number of discrete frequencies . Each user’s signals is spread over the entire bandwidth by unique spreading code. At the receiver end , the same unique code is used to recover the signal.
- **WLL-** It is a system that connects the subscriber to the public switch telephone network using radio signals .It provides much better bandwidth than traditional sytems.It supports high quality data transmission.



- **GPRS-** General Packet Radio Service-It is a technology for radio transmission of small packets of data , especially between mobile devices and internet.

- **1G,2G,3G,4G Networks-**

1G- These network were conceived and designed purely for voice calls with almost no considerations of data services

2G- These are the first digital cellular systems launched early 1990s , offering improved sound quality , better security and higher total capacity.

2.5G- these are the enhanced versions of 2G networks proving data rates upto 144 kbits/s.

3G- These are newer cellular networks that have data rate of 384kbit/s and more.

4G-It is a mobile multimedia, anytime anywhere , global mobility support , integrated wireless solution and customized personal service network system.

- **SMS-** It is the transmission of short text messages to/from a mobile phone , fax machine and/or IP address.
- **Chat-** Online textual talk in real time is called chatting.
- **Video Conferencing -** A two way videophone conversation among multiple participants is called video conferencing. It includes sounds, video, talking and viewing. We need Internet connection, PC Camera and its Software, videophone Software (Net Meeting) for video conferencing.

#### **Protocol for Chat and Video conferencing-**

**For chat – IRC(Internet Relay Chat)** is a simple text based conferencing protocol involving no. of users spread over a number of interconnected servers.

**For Video Conferencing- (1) H.323 Protocol-**It provides multimedia communication services like real time audio, video and data communications over packet based networks.

**(2) SIP(Session Initiation Protocol)-**It is an IP telephony signaling protocol used to establish , modify and terminate VOIP telephone calls. It works with IPv4 and IPv6.

- VoIP- This technology enables voice communication over the internet through the compression of voice into data packets .
- Connecting wirelessly to internet- It can be done by two ways-
  - Wi-Fi – It refers to wireless fidelity , which lets you to connect to the internet without a direct line from your PC to the ISP.for it we need broadband connection, wireless router, laptop or desktop.
  - WiMax- It is wireless digital communication system which provides wireless access upto 30 miles for fixed stations and 3-10 miles for mobile stations.

#### **Internetworking Terms and Concepts-**

**WWW – World Wide Web** is a protocol that allows to access documents containing text , images , audio and video on the internet.Its attributes are user friendly , multimedia documents, hypertext and hyperlinks,interactive , frames.

**Web Page –** A document on the net is called a web page.

**URL –** Each web page has a distinct address that is called URL. Uniform Resource Locator.

The format is

type://address/path

where type represents type of server like ftp or http , address represents address of server and path represents location of file on the server. for example <http://encycle.msn.com/getinfo>

**DNS- Domain Name System** – The character based naming system by which servers are identified is called DNS.

**Hypertext** – The webpage contents containing audio, video, text, graphic and even link to some other page.

**Hyperlink** – Link to some other page in a web page is called Hyperlink.

**Telnet** – . It is a program that is used to log on to remote computer systems.

**Web Browser**- It is a program that is used to navigate through the web pages and display their contents. Ex Internet Explorer, Netscape Navigator and Mozilla etc

**Web Server** – A www server that responds to the requests made by web browsers.

**Web Site** – A location on a web server is called a web site. It contains web pages and has a unique address. This address is called URL. like [www.microsoft.com](http://www.microsoft.com)

**Web Hosting** – It is a means of hosting web server application on a computer system through which electronic content on the internet is readily available to any web browser client. Some web hosting services are-

- Free hosting
- Virtual or shared hosting
- Dedicated hosting
- Co-location hosting

**Web 2.0**- It refers to the added features and applications that make the web more interactive, support easy online- information exchange and inter- operability .Some feature of it are blogs , wikis , video sharing websites , social networking sites etc.

**HTML** – Hypertext Markup Language – used to develop web pages. It tells the browser how to display a webpage. It has predefined tags. It is case insensitive. Some of HTML Tags are <html>,<title>,<br>,<b> etc.

**XML**- Extensible markup language- It is a markup language for documents containing structured information. It gives the facility to define tags and structured relationship between them. It is case sensitive.

**DHTML**- Dynamic Hypertext Markup Language- It refers to web content that changes every time. It is a combination of HTML, style sheets and scripts that allows documents to be animated.

**Web Scripting**- It is a list of commands that are embedded in the web page normally and are interpreted and executed by a certain program or scripting engine. Two types of scripting are-

- **Client side scripting**- it enables the user to interact within a webpage.
  - It is used in online games, to get data from browser etc.
  - It is browser dependent.
  - Services are secure as they do not have access to files and databases.
  - some examples of client side scripting are VBScript , JavaScript , PHP .
- **Server side scripting**- It enables the completion or carrying out a task at the server end and then sending the result to the client. It is used in password protection, form processing etc.
  - **It is browser independent.**
  - **It has access to files and databases but have security considerations.**
  - Some examples are- PHP,Perl , ASP , JSP etc.

**Network Security Concepts-**

## **Problems encountered under Network Security:**

1. Physical Security Holes- Individual can get unauthorized access to computer and temper files.(done by hackers)
2. Software security holes-Badly written programs which are doing those things which should not be done.
3. Inconsistent Usage holes- Assembling a combination of HW and SW such that the system is seriously damaged from security point of view.

## **Protection Methods:**

**Authentication** – It is termed as password protection as the authorized user is asked to provide a valid password and if he/she is able to do this, he/she is considered to be an authentic user.

**Authorization** – It determines whether the service provider has granted access to the web service to the requester. It is performed by asking the user a legal login-id. If the user is able to provide a legal login-id he/she is considered authorized user.

**Encrypted Smart card:-** Passwords in the remote login session generally pass over the network in encrypted format which can be recorded by hacker and use later to corrupt or harm files .To encounter such threats encrypted smart cars are used.

It is a hand held card which generates a token that a computer can recognize. Every time a new and different token is generated, which even cracked or hacked cannot be used later.

**Biometric Systems** – It is one of the most secure level of authorization.It involves some unique aspect of a person's body such as retina /fingerprints to establish user's identity.

**Firewall** – The system designed to prevent unauthorized access to / from a private network is called Firewall. It can be hardware or software or combination of both. All messages entering or leaving the internet pass through firewall, which examine each message and block those messages which do not meet specified criteria.

Several firewall techniques are -

- Packet filter
- Application gateway
- Circuit level gateway
- Proxy server

## **Related Terms:**

**Cookies** – These are the text files which contain information about the activities done by you on internet. It is a message sent by web server to the web browser so that it can keep track of user's activities on a specific web site. These are not harmful for the computer and not used for spreading virus.

**Crackers** – These are the malicious programmers who break into secure systems.

**Hackers** – The persons who are interested in gaining knowledge about computer system and possibly using this knowledge for playful pranks.

**Cyber law** – it is a generic term which refers to all the legal and regulatory aspects of internet and World Wide Web.

**India's IT(2000) Act:-** India's Information Technology Act 2000 notified on 17 Oct,2000. It aims to provide the legal infrastructure for e-commerce in India by governing the transactions through the internet and other electronic medium.

**Intellectual Property (IP)** – It may be defined as a product of the intellect that has commercial value , including copyrighted property such as literary or artistic work and ideational property.

**IPR Issues:-** It reflects the idea that its subject matter is the product of the mind or the intellect. These could be in the form of Patents, Trademarks, Copyright etc. These rights safeguard the creators and other producers of intellectual goods and services by granting them certain time limited rights to control the use made of those productions.

**Cyber Crime:-** It is an unlawful act where in the computer is either a tool or a target or both. These are committed in an electronic medium on internet.

Types of Cyber crime-

1. Tampering with computer source documents.
2. Hacking
3. Publishing of information which is obscene in electronic form
4. Child pornography
5. Accessing protected system
6. Breach of confidentiality and privacy.

## **Viruses :-**

**Viruses: -** It is a malicious program which requires a host and is designed to make a system sick just like a real virus.

Three types of viruses are

- File infectors- attach themselves to the program files
- Boot sector viruses- install themselves on the beginning tracks of hard disk.
- Macro virus- infect data files.

### **Characteristic of a virus**

- Able to replicate
- Requires a host program as a carrier
- Activated by external action

### **Damages caused by virus**

- Destroy file allocation table and lead to the corruption of entire file system which results in the need to fully reinstall and reload the system.
- Create bad sectors on the disk , destroying parts of program and files
- Decrease the space on hard disk by duplicating files
- Format the hard disk
- Destroy specific executable files and alter data in the data files
- Cause the system to hang

**Trojan horses: It** is code hidden in a program such as game or spreadsheet that looks safe to run but has hidden side effects.

### **Damages caused by Trojan Horses-**

- Same as viruses
- Destroy, damage and alter information in the background.
- Does not require host program as a carrier.
- Spread through e mail and exchange of disks and information between computers.

**Worm: It** is a program designed to replicate. These programs run independently and travel from computer to computer across network connection.

### **Their characteristics are**

- Able to replicate
- It is self-contained and does not require host
- Activated by creating process
- It can replicate across communication links.

### **Damages caused by Worms-**

- Most worms disrupt services and create management problems.
- Scan passwords and other info and send back to attacker.
- These can install viruses or Trojan horses that can cause damage to the system

**Spam** : Refers to electronic junk mail or junk newsgroup postings.

**Avoiding Spam:**

- Create a filter that finds and does something to e-mail that you suspect as Spam.
- Not to register yourself with true id

**Virus protection**

- Never use a foreign disk without scanning for virus.
- Always scan files downloaded from internet.
- Write protect your disks.
- Use licensed SW
- Password protect your PC
- Make regular backups
- Install and use antivirus SW
- Keeping antivirus SW up-to-date

**E Commerce**-E-commerce (electronic commerce or EC) is the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the internet. These business transactions occur either as business-to-business, business-to-consumer, consumer-to-consumer or consumer-to-business. The terms e-commerce and e-business are often used interchangeably. The term e-tail is also sometimes used in reference to transactional processes for online shopping.

Advantages of E commerce-

- 24X7 available
- Comparison of products is easy.
- Wide range of products for customer
- Time saving
- Cost saving

Disadvantages:

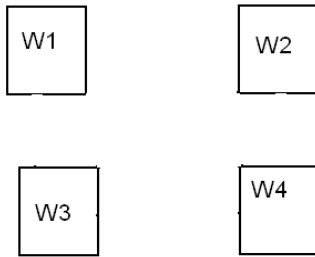
- Inability to Identify Scams
- Delay in Receiving Goods
- Security Issues
- Credit Card Fraud

Some of E commerce sites are flipcart, Amazon , Snapdeal etc.

# PRACTICE QUESTIONS

## QUESTION PATTERN (4 Nos Question)

**Q1.** A company in Reliance has 4 wings of buildings as shown in the diagram:



Center to center distances between various Buildings:

W3 to W1	50m
W1 to W2	60m
W2 to W4	25m
W4 to W3	170m
W3 to W2	125m
W1 to w4	90m

Number of computers in each of the wing:

W1	150
W2	15
W3	15
W4	25

Computers in each wing are networked but wings are not networked. The company has now decided to connect the wings also.

- i) Suggest a most suitable cable layout of the connection between the wings.
- ii) Suggest the most suitable wing to house the server of this company with a suitable reason.
- iii) Suggest the placement of the following devices with justification:
  - 1) Internet connecting device/modem
  - 2) Switch / Hub
- iv) The company is planning to link its head office situated in India with the offices at Reliance. Suggest an economic way to connect it; the company is ready to compromise on the speed of connectivity. Justify your answer.

**Q2.** Knowledge supplement Organization has set up its new center at Mangalore for its office and web based activities. It has 4 Blocks of buildings as shown in the diagram below:



Center to center distance between various blocks

Number of Computers

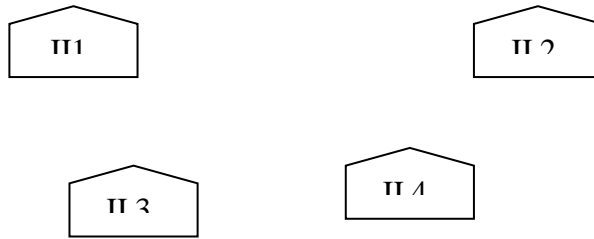
Block A to Block B	50 m
Block B to Block C	150 m
Block C to Block D	25 m

Block A to Block D	170 m
Block B to Block D	125 m
Block A to Block C	90 m

Block A	25
Block B	50
Block C	125
Block D	10

- i. Suggest a most suitable cable layout of connections between the Blocks.
- ii. Suggest the most suitable places (i.e. Block) to house the server of this organization with a suitable reason.
- iii. Suggest the placement of the following devices with justification:
  - a. Repeater
  - b. Hub/Switch
- iv. The organization is planning to link its head office situated in City in a hilly region where cable connection is not feasible, suggest an economic way to connect it with reasonably high speed?

**Q3.** Indian Industries has the following four buildings in Chennai. Distance between various wings is given below:



Wings Layout Plans

Wing II 1 to Wing II 3	70m
Wing II 1 to Wing II 2	20m
Wing II 1 to Wing II 4	115m
Wing II 3 to Wing II 4	30m
Wing II 2 to Wing II 3	25m

No of Computers in each Wing

Wing II 1	35
Wing II 2	25
Wing II 3	80
Wing II 4	60

- i) Suggest suitable CABLE LAYOUTS FOR THESE BUILDINGS.
- ii) Name the wing where the Server is to be installed. Justify your answer.
- iii) Suggest the placement of Hub/Switch in the network.
- iv) Mention an economic technology to provide Internet accessibility to all wings.