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CHAPTER 1

BASICS OF COMPUTER COMMUNICATION

1.1. Introduction

Communication means to convey a message. If sender and receiver are close by, then they may communicate by speaking. If the distance is more, then you have to use the media.

1.2. Data Communication System

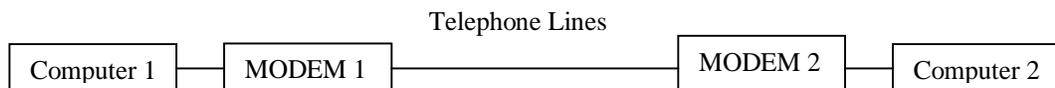
Fastest method of digital communication is Fascimile (FAX) messaging. In this, the original document is converted into a series of transmittable digital codes and at the receiving end, the digital information is converted back into a copy of the original document.

1.3. Fascimile (FAX)

In order to transfer an image from source to destination, one needs to perform the following functions:

- (a) Optical Scanning
- (b) Data conversion for transmission and reception
- (c) Ability to print a hard copy of the image at the receiving end.

Above method is used for a normal FAX machine, which does not use computer, but we can have FAX facility between computers also. To have FAX facility between the computers, computers must be connected via MODEM (modulator/demodulator). The purpose of MODEM is to convert the digital signal into the analog and vice versa.



Modulation – Converts digital signal into analog signals.

De-Modulation – Converts analog signal into digital signals.

The transmission over channel is measured in Baud (Bits per Second).

A modem is a device required for communication across a dial-up telephone connection or for long distance communication across a wire. Modem allows two-way communication because it contains a modulator for the signal being sent and demodulator for the signal being received.

Exercise - 1

Q.1 Fill in the blanks:

- (i) FAX stands for -----.(Fascimile)
- (ii) Data transmission rate is measured in -----.(Bauds)
- (iii) Baud stands for -----.(Bits per second)

Q.2 Short Notes:

- (i) FAX
- (ii) Data communication using modem.

CHAPTER 2

INTRODUCTION TO INTERNET

2.1. Internet

Internet: It is the Network of Networks.

- It is a global area network.
- Growing rapidly.
- Boundaries are not defined.
- Millions of computers and thousands of networks are connected all over the world.
- No platform and operating system restrictions.
- Network execution is based on TCP/IP.

2.2. Evolution of Internet

The term 'Internet' was born in the late 1960s. At that time, a project was founded by the U.S. Department of Defence called ARPANET (Advanced Research Projects Agency Network). The main purpose of Arpanet was to connect a number of computing facilities around the country.

In general, we connect many computers together to share information and resources (e.g. Hard Disk, FDD etc.). It is called a computer NETWORK. The Arpanet was a long distance computer network with a special requirement and later turn to the Internet.

- 1969 – 4 nodes ARPANET (Advance Research Project Agency Networks) experimented
- 1972 – ARPANET experimented with 50 Packed Switched Nodes (PSN)
- 1980 – TCP/IP implemented

2.3. Introduction to RFC

Soon after the Internet project began, they decided to keep all technical documents in computer files accessible over the ARPANET.

Initially, the researchers planned to issue reports in two steps. After the report was written, it would be made available to the other researchers for comments. After a short time, the author would incorporate all the comments and issue a final report. To implement the two steps, researchers established two series of reports. When a report was first issued, it was labeled as *Request For Comments* (RFC). After other researchers sent the author comments and the report was ready, it was labeled as *Internet Engineering Note* (IEN).

2.4. Use of Internet

- Send and receive electronic mail.
- Access information.
- Talk with other people (chatting).
- Play games.
- Read the daily news.
- Take part in ongoing discussion.
- Do research.
- Shopping.
- Listen to music, radio, concert and other live events.
- Study, learn and take classes.
- Watch video.
- Buy and sell stocks.
- Visit imaginary environment.
- Display maps and driving instruction.

2.5. Internet Society

- IAB (Internet Architecture Board) focuses on producing inter - communication standards.
- IETF (Internet Engineering Task Force) concerns itself with the technological developments.
- Inter NIC (Internet Network Information Center) is a group of people and computers that provide information about the Internet, the softwares and the services available and groups which supply services. Currently the Inter NIC is sponsored by AT&T and can be accessed on the web. To access the Inter NIC via the World Wide Web, contact URL: <http://www.internic.net>

2.6. Internet Services

- Information Search Services:
 - Archie
 - Veronica
 - WAIS
- Information Retrieval Services:
 - FTP
 - Gopher

Archie

- The purpose of Archie is to create a control index of files that are available of anonymous FTP sites around the Internet.

Veronica

- Veronica is an Internet service to search the Gopher sites for a document you want.
- It searches menu items on Gopher services

WAIS (Wide Area Information Server)

- It is the system that searches for your subject through documents on servers all over the world.

FTP (File Transfer Protocol)

FTP is used to transfer a data file from the disk on one computer to the disk on the other. FTP can copy a large volume of data efficiently.

How FTP Works?

FTP uses the client server approach. A user invokes an FTP program on the computer, instructs it to contact a remote computer.

Commonly used FTP Commands

C:\> ftp IP Address

ftp> pwd

pwd – List Remote directory

lpwd – List Local directory

get – Getting file from remote machine

Syntax: get filename

lcd – to change local directory

bye – to come out from ftp

open – Connect to remote computer or changing one machine to another without bye.

Syntax: open

put – To transfer the files from local machine to remote machine.

send first file second file – Rename name of first file to second file.

Gopher

- Gopher is an information-distributed service within Internet.

- Provides a menu-based interface to the resources available from the gopher servers.
- Its functionality is similar to FTP, but it can connect other Internet services using menus.

2.7. **Electronic Mail (E-MAIL)**

- This facility allows you to send messages to anyone on the Internet.
- Today e-mail is an important service on any computer network not just the Internet.
- It uses 2 protocols: POP (Post Office Protocol) and SMTP (Simple Mail Transfer Protocol).
- Uses new technology which is known as MIME (Multipurpose Internet Mail Extensions).

2.8. **Usenet**

- It is a system of discussion groups in which people all over the Net participate in the ongoing discussion.
- It is Internet newsgroup.

2.9. **IRC (Internet Relay Chat)**

- Developed in the late 1980's.
- IRC enables multiple people to talk simultaneously.
- It is also a client server program.

Exercise – 2**Exercise 2****Q.1 Fill in the blanks**

- (i) ARPANET stands for _____. (Advanced Research Projects Agency Network).
- (ii) RFC stands for _____. (Request For Comments)
- (iii) IEN stands for _____. (Internet Engineering Note)
- (iv) InterNIC stands for _____. (Internet Network Information Center)
- (v) FTP stands for _____. (File Transfer Protocol)
- (vi) Protocols used for e-mail are _____ (POP & SMTP)
- (vii) MIME stands for _____. (Multi purpose Internet Mail Extension)
- (viii) IRC stands for _____. (Internet Relay Chat)
- (ix) POP stands for _____. (Post Office Protocol)
- (x) SMTP stands for _____. (Simple Mail Transfer Protocol)

Q.2 Write short notes

- (i) Internet
- (ii) E-mail

CHAPTER 3

MORE ABOUT INTERNET

3.1. WWW (World Wide Web)

- World Wide Web is also known as WWW or W³ or simply Web.
- Web is a way of sharing information between the computers, independent of their platform.
- It provides a hypertext multimedia information retrieval system.
- It is graphical, fast, powerful, consistent and user friendly.

3.2. History of Web

- The web developed in 1989 at CERN, the European laboratory for particle physics.
- The specification that the CERN researchers developed is called Hyper Text Transfer Protocol (HTTP).
- Once the researchers at CERN established the specifications, people began to write web client and server softwares thereby making the web, a popular means of electronic navigation.
- Early web browsers were text based.
- With the emergence of Mosaic from NCSA (National Center for Supercomputing Applications) the graphical interface was developed.
- Now web is the popular interface for the Internet.

3.3. Who is on the Web? -

- Business: e.g. tata.com
- Computer support: e.g. ibm.com

- Entertainment: e.g. starwars.com
- Information: e.g. carasso.com
- Education: e.g. whitehouse.com
- People: e.g. Jungee.com

Likewise many websites are available on the net.

3.4. **Internet Address**

URL (Uniform Resource Locator)

- It is the means of locating another computer from the web.
- Each URL allows a web browser to access any file on any web server.

A standard URL consists of 3 parts

- Transfer format or protocol.
- Host name of the machine.
- Path to the file

Example: <http://www.veitonline.com/home.htm>

<ftp://microsoft.com>

http is a protocol

www is a service

veitonline.com is a host name

home.htm is the page under veitonline.com

ftp is a protocol that acts as a service

3.5. **Web Browsers**

Web browsers are the client softwares for the HTTP (Hyper Text Transfer Protocol). Popular web browsers are as follows:

- Netscape Navigator: by Netscape Communications, USA.
- Internet Explorer: by Microsoft Corporation, USA

- Mosaic: by NCSA (National Center for Supercomputing Applications).
- Hotjava: by Sunsoft, USA
- Cello: A free browser from Cornell University, USA

3.6. **Domain Names**

- Domain Name System (DNS) is used to access computers by names without the use of encrypted IP addresses.
- There are two types of domain names
 - (i) Depending upon the service (3 letters)
 - (ii) Depending upon the country (2 letters)

3 Letters Domain Names

- .com for commercial organizations e.g. Microsoft.com
- .edu for educational organizations e.g. Stanford.edu
- .gov for government agencies e.g. whitehouse.gov
- .int for international organizations e.g. nato.int
- .mil for military.

2 Letters Domain Names

- .in for India
- .jp for Japan
- .au for Australia
- .fr for France
- .us for United States of America
- .uk for United Kingdom.

3.7. Internet Service Provider (ISP)

To access the Internet, it is required to buy an Internet connection from an ISP. ISP is a company that provides Internet access to the public. For this service, the user has to pay a monthly or hourly fee.

Popular ISPs are VSNL(Videsh Sanchar Nigam Limited), MTNL (Mahanagar Telephone Nigam Limited), Mantra, Satyam, Datainfosys, Caltiger, Cheekoo etc. Caltiger and Cheekoo provide free Internet services.

3.8. Gateway Internet Access Service (GIAS)

- GIAS service provides mainly two types of accounts which are as follows:
 - Shell Account
 - TCP/IP Account

Shell Account

- Shell Account provides a menu based access to the Internet services such as e-mail, ftp, remote login (telnet) & text based browsing facility.
- The access is limited to text-based services.

TCP/IP Account

- TCP/IP Account provides full Internet access.
- Uses all the features of the user's computer including graphics, sound, animation etc.

3.9. Types of Connections

1. Modem Connections – Modem connections are as follows:

- PPP or SLIP - A PPP (Point-to-Point Protocol) or SLIP (Serial Line Internet Protocol) account is a dial up account. In this, modem connection makes your computer a part of the network attached to the net.
 - Client Access Account - Client Access Account makes a temporary connection to a server and allows you to read and respond to your message off line.
 - A Host-machine account - A Host-machine account allows you to log on as a dumb terminal. In this case, the information would be sent to a host computer on the Internet.
2. Direct Connections – In direct connection, a computer is attached to the Internet directly through the lease lines.

3.10. Gateways

Gateways provide communications between dissimilar e-mail systems by translating the message.

- User with 2 different e-mail packages can communicate with the help of gateways.

3.11. Standards for Messaging Gateways

Three standards are used for sending messages from one network to another network through gateways which are as follows:

- X.400
- SMTP/MIME
- X.500

X.400 and X.500 are the CCITT (Consultative Committee of International Telephone & Telegraph) standards for international e-mail handling. X.400 and X.500 are different from Internet e-mail

standards, but mail can be transferred from one system to the other via gateways. SMTP is Simple Mail Transfer Protocol and MIME is Multipurpose Internet Mail Extensions.

Exercise - 3

Exercise 3

Q.1 Fill in the blanks

- (i) Web was developed in _____. (1989)
- (ii) WWW stands for _____. (World Wide Web)
- (iii) HTTP stands for _____. (Hyper Text Transfer Protocol)
- (iv) First graphical web browser was _____ (Mosaic)
- (v) URL stands for _____. (Uniform Resource Locator)
- (vi) DNS stands for _____. (Domain Name System)
- (vii) ISP stands for _____. (Internet Service Provider)
- (viii) GIAS stands for _____. (Gateway Internet Access Service)
- (ix) PPP stands for _____. (Point to Point Protocol)
- (x) SLIP stands for _____. (Serial in Line Internet Protocol)

Q.2 Write short notes

- (i) WWW
- (ii) Internet address with example
- (iii) Web browser
- (iv) DNS
- (v) ISP

CHAPTER 4

CONNECTING TO INTERNET

4.1. Requirements For Internet Connection

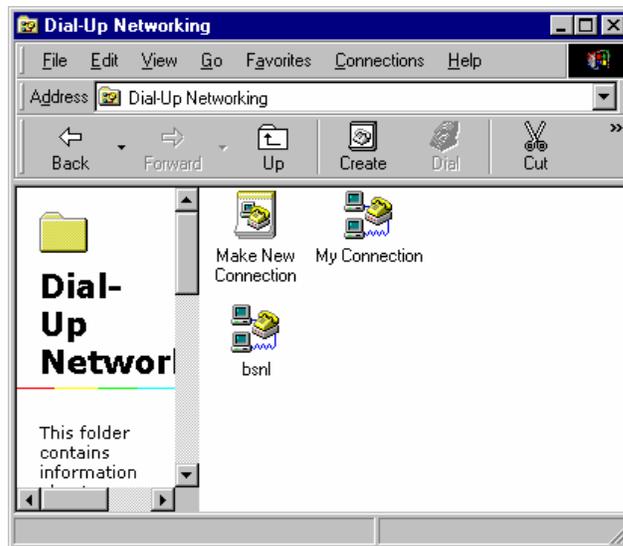
- Browser
- Modem
- Telephone Lines/leased line/ISDN (Integrated Services Digital Network)
- Account with ISP
- PC

Note: Modem is required for telephone line and device changes as per the lease line.

4.2. Making/Creating New Connection

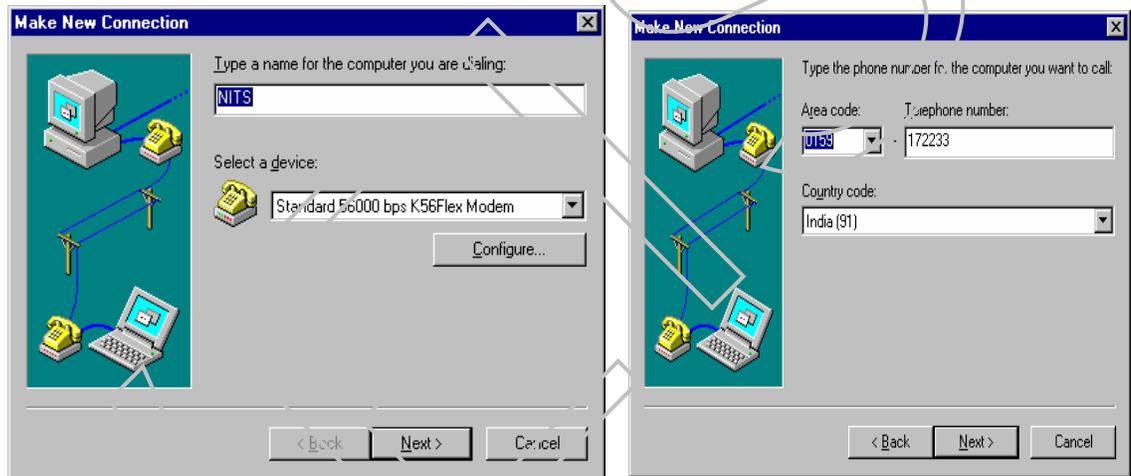
To create a new Internet connection, proceed as follows:

- Click My Computer on the desktop.
- Click Dial-up Networking icon. It is used to make the call and to get connected to the Internet Service Provider (ISP).
- Dial-up Networking dialog box appears. Click Make New Connection icon to make/create new connection.



Note : Make sure that the modem is connected and configured before making the new connection.

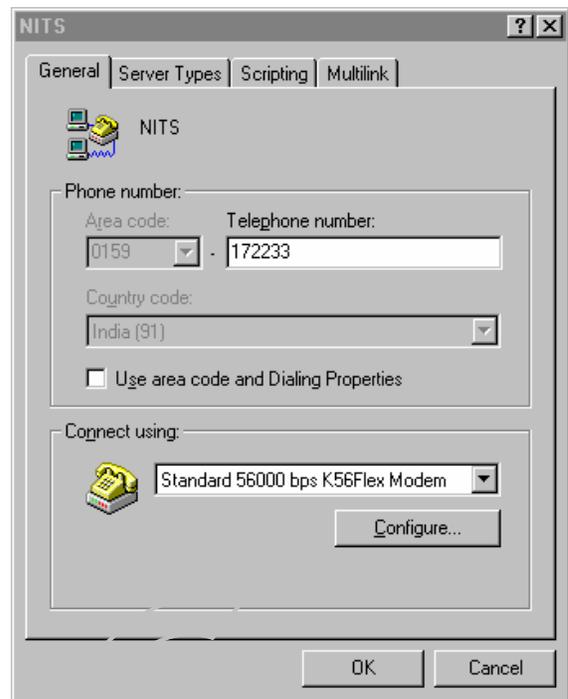
- Make New Connection dialog box appears.



Type the name for the computer you are dialing (any name for your understanding e.g. BSNL) and select the type of modem, then click Next.

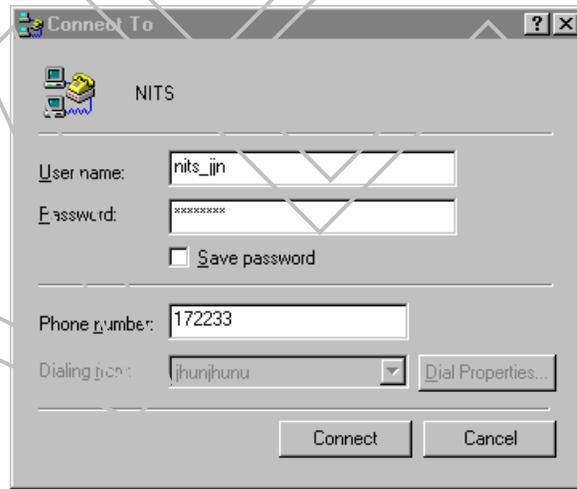
- Another dialog box appears. Fill up the Telephone number, Country code and click Next.
- Click Finish. You will find the connection in the Dial-up Networking.

- After creating the new connection, right click on that connection and click Properties and uncheck Use Area Code and Dialing Properties check box if it is checked.



4.3. Dialing the Internet

- Click My Computer on the desktop
- Click Dial-up Networking.
- Click the connection (e.g. BSNL), which you have made. Following screen will appear.



- Click Connect and you will be connected to the Internet. When connection is established, a symbol of two computers will be displayed on the task bar.
- To disconnect the connection, right click on that computer symbol and click Disconnect.

Exercise - 4

Q.1 Fill in the blanks

- (i) ISDN stands for _____. (Integrated Services Digital Network)
- (ii) When internet connection is established a symbol of _____ appears on the _____. (two computers, taskbar)
- (iii) To disconnect the internet connection _____ (right click the computer symbol on the task bar and click disconnect).

Q.2 Write short notes

- (i) Requirements for Internet connection.
- (ii) Making new Internet connection.
- (iii) Dialing the Internet

CHAPTER 5

PROTOCOLS

5.1. Protocol

By the term protocol, we mean the set of rules or standards designed to enable computers to connect with one another and to exchange information.

5.2. Important Internet Protocols

Name	Full Name	Purpose
DNS	Domain Name System	Translates domain names to IP numbers
FTP	File Transfer Protocols	Copies files between computers
HTTP	Hypertext Transfer Protocols	Distributes Web Data (hypertext)
IMAP	Internet Main Access Protocols	Accesses Mail and other messages
IP	Internet Protocols	Transports raw data packets
POP	Post Office Protocols	Gets messages from a mail server
PPP	Point-to-Point Protocols	Used to send TCP/IP over a serial transmission

		line (e.g. Telephone Line).
SLIP	Serial Line Internet Protocol	Permits a computer to use TCP/IP over a serial communication medium.
SMTP	Simple Mail Transfer Protocols	Send messages to a mail server
TCP	Transmission Control Protocol	Transmits information over the Internet, one small piece at a time.
TELNET	Telnet	Log on to a remote computer
UUCP	Unix to Unix Control Protocol	For copying files, mail from Unix

5.3. TCP/IP (Transmission Control Protocol/Internet Protocol)

TCP is responsible for making sure, that the commands get through to the other end and IP is used to link various physical networks into a single logical network. Internet is the worldwide connection of interconnecting different networks that uses Internet Protocol (IP) to link various physical networks into a single logical network. TCP/IP Protocol is required for the Internet connection.

The main features of TCP/IP Protocol are as follows:

- TCP/IP Protocol is ideal for different hardwares and softwares.
- Independent of networks' hardware.
- TCP/IP Protocol is standardized.

Exercise - 5

Q.1 Fill in the blanks

- (i) Protocol is a _____. (set of rules)
- (ii) Purpose of DNS is to _____. (convert domain names to IP numbers)
- (iii) IMAP stands for _____ (Internet Mail Access Protocol)
- (iv) Purpose of IP is _____. (to transport raw data packets)
- (v) Telnet is used to _____. (log on to a remote computer)
- (vi) UUCP stands for _____. (Unix to Unix Control Protocol)

Q.2 Write short notes

- (i) Protocols
- (ii) TCP/IP
- (iii) Telnet



CHAPTER 6

TERMINOLOGY

6.1. **Internet Address**

The unique number, which is assigned to a computer, is called its Internet address, which is abbreviated as IP address.

6.2. **Browser**

Browser is a program that provides a way to look, read and even hear all the information on the World Wide Web. Browser can be either text based or graphics based. *Text based browsers allow only the display of text, while graphical browsers allow graphics to be displayed within the document. The top graphical browsers currently in the market are Internet Explorer and the Netscape Navigator.*

6.3. **Web Page**

The World Wide Web provides resources in order to access the information in the form of Internet documents, commonly called as Web Pages or Web Documents.

6.4. **Web Site**

A computer storage area that contains one or more web pages is called a Web site.

6.5. **Home Page**

A home page is the starting page. A home page can be on the local drive or on a web site on the World Wide Web.

6.6. Hyperlinks or Links

Web pages contain elements that will take you to the other web pages when you select them by clicking your mouse. These elements are called Hyperlinks or Links which contain the addresses that will connect you to the other web pages. There are two types of hyperlinks which are as follows:

- **Textual**: Textual hyperlinks include titles, headings and other text elements, which are shown as underlined text and they appear in a different colour.
- **Graphical**: Graphical links come in the form of Buttons, Pictures, Photographs or other images used in a web page. When you move the mouse pointer over a link, its shape will change into a hand, indicating that it is clickable.

6.7. Surfing

Surfing the web means, jumping from one web site to another web site.

6.8. Cookie

Information about your system that is collected by the Web Browser software and is sent to the web server that contains the web pages you are examining. *The cookie is often stored in a cookie folder on your hard drive so that the information is available to the web server next time you access the page. The server can then adjust the way the page is displayed to match your system's capabilities.*

6.9. Cache

Cache is an area of your computer hard disk, where web browser save the images, files and other items from the web pages. The browser can access the page more quickly by retrieving the information from the cache.

6.10. Downloading

Downloading means, copying a file from a remote computer to your computer. Click the DOWNLOAD button on the web site to download the particular web page.

Exercise - 6

Q.1 Fill in the blanks

- (i) Internet address is abbreviated as _____. (IP address)
- (ii) Graphical browsers are _____. (Internet Explorer, Netscape Navigator, Mosiac)
- (iii) Starting page of a web site is called _____. (home page)
- (iv) Web pages contain elements that will take you to the other web pages are called _____. (hyperlinks)
- (v) Surfing means _____. (jumping from one web site to another)

Q.2 Write short notes

- (i) Internet Address
- (ii) Browser
- (iii) Web site
- (iv) Hyperlinks
- (v) Cookie
- (vi) Cache

CHAPTER 7

SEARCH ENGINES

7.1. Search Engine

An automated search service, which allows an individual to find the information that is available on the remote computers is called a search engine. Automated search systems use computer programs to find the web pages that contain the information related to the given topic.

A computer program that can automatically contact other computers on the Internet, searches for specified information and reports the result, such a program is called a search tool or an indexing tool or a search engine.

7.2. Operation of Search Service

Each automated search service has a web site. Before any user invokes the search mechanism, a computer program contacts computers on the Internet, gathers a list of information, sorts the list and then stores the result on a local disk on the computer that runs a search server.

When a user invokes a search, the user runs a client program that contacts the server. The client sends a request that contains the name, that the user has entered. When the request arrives at the server, the server need not to contact all the computers on the Internet, instead the server consults the list of the file names on its local disk.

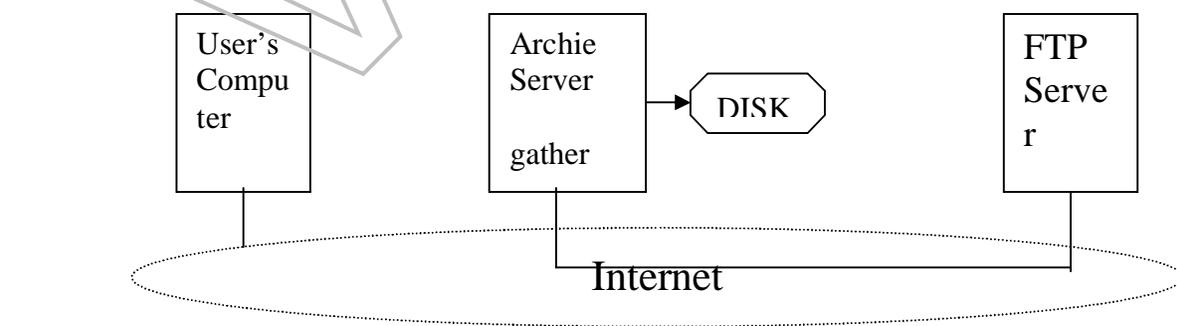
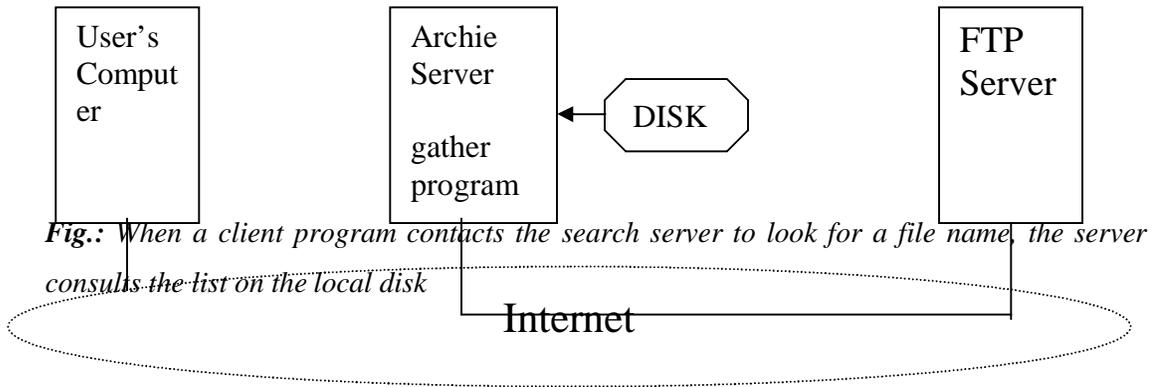


Fig.: Once each day, the archie program automatically contacts FTP sites and obtains a list of available files



7.3. List of Search Engines on the Web

<http://www.yahoo.com>

<http://www.altavista.com>

<http://www.lycos.com>

<http://www.hotbot.com>

<http://www.webcrawler.com>

YAHOO and ALTAVISTA are commonly used search engines.

7.4. USENET Search Engines

<http://www.dejanews.com/>

<http://www.reference.com/>

Exercise - 7

Q.1 Write short notes

- (i) Search engine
- (ii) Operation of search service.
- (iii) Search engine on the web.

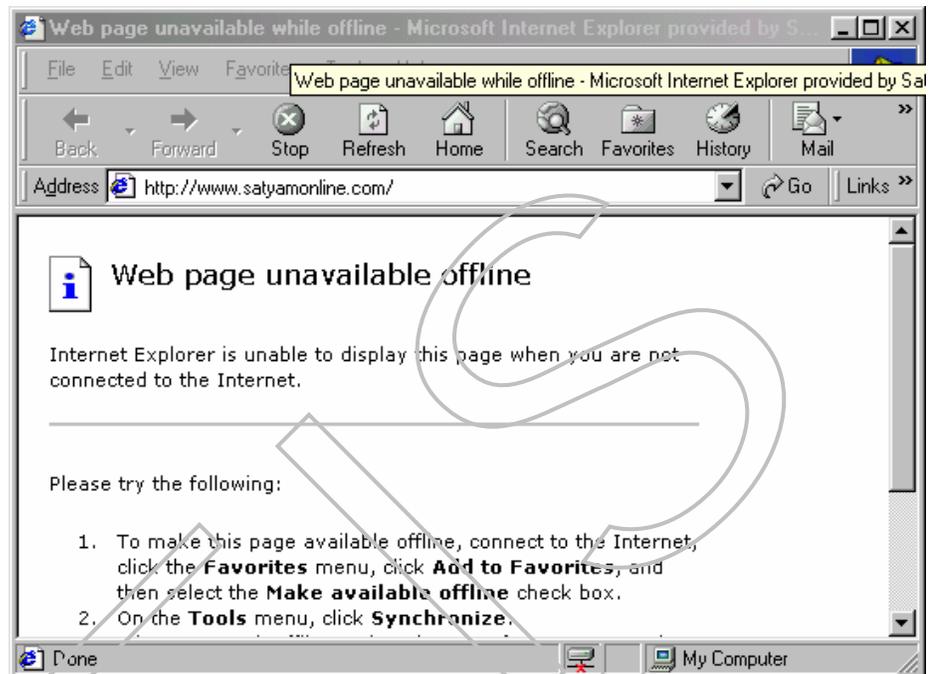
CHAPTER 8

INTERNET EXPLORER AND E-MAIL BASICS

8.1. Internet Explorer

Internet Explorer is a Web browser provided by the Microsoft Company.

Click Start button → Programs → Internet Explorer



To open the particular web site, give address of that web site in the Address column and press Enter.

8.2. E-Mail Basics

Microsoft Company has provided Outlook Express for E-Mail with Windows 98.

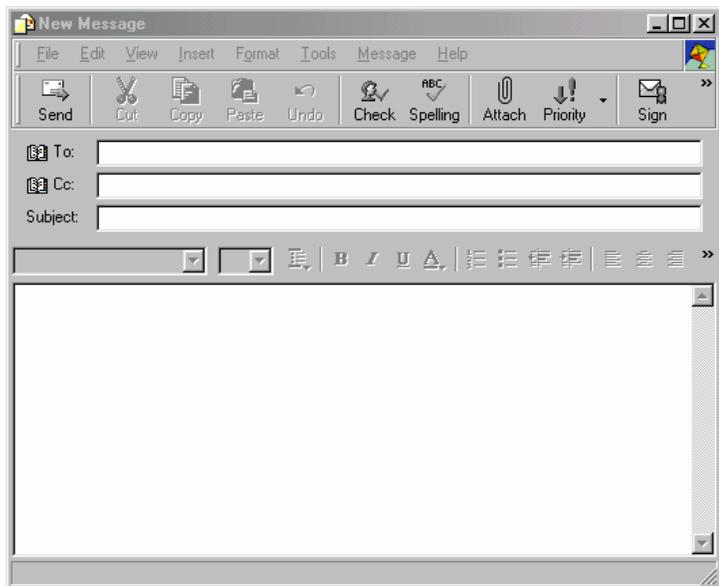
You will do most often with e-mail:

- Send mail
- Read incoming mail

- Reply to mail
- Delete mail

8.3. Header

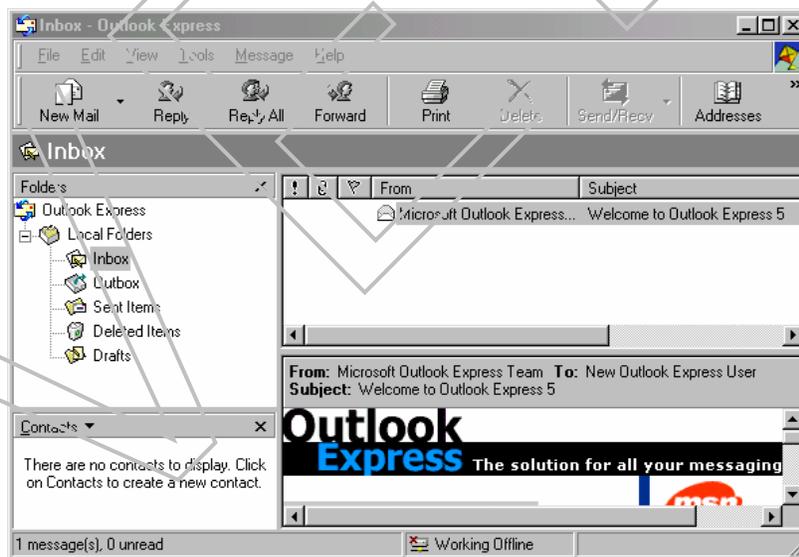
The row of information at the top of an e-mail message that include source and destination addresses, when it is sent.



8.4. Send E-mail

Click Mail Button  on the Standard toolbar or Tools → Mail & News on Menu bar, then click *Read Mail* option.

Following dialog box appears



Click *New Mail* button to send new message. Following dialog box appears

Type the e-mail address in **To** row.

To send the same mail to the other person, type the e-mail address of the other person in **Cc** row.

To attach a file with e-mail, click **Attach** button and specify the file.

Type the subject, in Subject row and message in e-mail text area and click **Send** button to send the mail.

E-Mail Text area

8.5. **Read Incoming Mail**

Click Inbox to read your incoming mail.

8.6. **Reply to Mail**

Select the mail for which you would like to reply and Click **Reply** button.

You will find the e-mail address of the receipt mail.

8.7. **Delete Mail**

Select the mail and click **Delete** button.

CHAPTER 9

NETWORKING

9.1. Network

Network is a collection of computers and peripherals linked together with a common method, so that they can share applications, data and resources such as printers, Modems, or CD-ROMS.

A network is the interconnection of computers located at different places. It is both software and hardware. The hardware consists of cables and interfaces that connect personal computers and peripheral together. The software manages the files and communication system. A network can be defined as a communication system because it lets you communicate with other users.

9.2. Features of Network

The network operating systems should have the following features:

- a) Compatibility: A network operating system must provide compatibility and flexibility to support a large number of hardwares.
- b) Internetworking: Bridging of different LANs together.
- c) Modularity: A set of PCs should get easily converted into a LAN, which can grow size of network by simply adding additional workstation.
- d) System Reliability and Maintenance: A network operating system should be powerful enough to withstand accident e.g. power failure.

9.3. Terminology Used in Networking

- (i) Server – A server is a computer on a network that runs software making it possible for other computers to share resources on the network.

- (ii) Nodes- Computers on the network are called nodes.
- (iii) Client or Workstation – A workstation is a computer that can use the resources made available by a server.
- (iv) Protocol – The set of rules that allows reliable transfer of data among all the network devices is collectively known as a protocol.

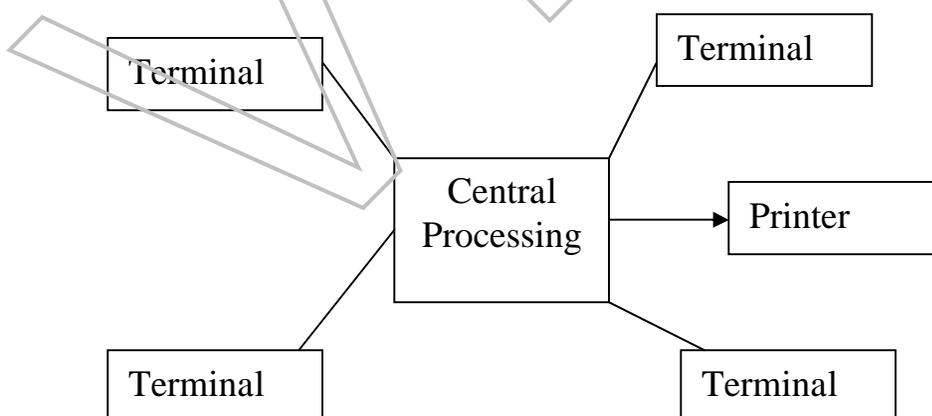
9.4. Types of Networks As Per Size

- (i) LAN (Local Area Network) – Limited within a building.
- (ii) MAN (Metropolitan Area Network) – Limited to a metropolitan city).
- (iii) WAN (Wide Area Network) – Connecting different cities all over the country.
- (iv) GAN (Global Area Network) – Unlimited.

9.5. Types of Networks As per Software Used

- (i) Hierarchical Network
- (ii) Peer-to-Peer Network
- (iii) Server-Client Network

9.6. Hierarchical Network



In this type of network, all users share the same central computer, memory, disk space and peripherals.

A hierarchical network is a single central computer to which multiple users are connected via terminals called “dumb” terminals because they lack local processing power. All users are connected to share a common CPU through timesharing. Timesharing means the amount of work done by the CPU for a given time period is divided among the users of the system. If more users are added, then the system becomes slow.

9.7. **Peer- to- Peer Network**

Network that allows personal computers to link together to share their resources is called peer- to- peer network. The main advantage is that all network users can use a single peripheral.

9.8. **Server- Client Network**

In the server client network, certain computers and devices on the network are dedicated to provide services to the network computers and others take the services.

9.9. **Local Area Network (LAN)**

LAN is used to share expensive resources such as disk files, printers etc.

9.10. **Advantages of LAN (Local Area Network)**

1. Inexpensive
2. Sharing of files, Printers, Programs.
3. Faster Transfer Rate.
4. E-mail across the computers connected to Network.

5. File level security.

Exercise - 9

Q.1 Fill in the blanks

- (i) Computers in the network are called _____. (nodes)
- (ii) A set of rules that allows reliable transfer of data among all network devices is called _____. (protocol)
- (iii) LAN stands for _____. (Local Area Network)
- (iv) The term “Dumb” is used for a computer, which has _____. (no processing capacity)

Q.2 Write short notes

- (i) Network
- (ii) Features of network
- (iii) Types of network as per size
- (iv) Types of network as per software used
- (v) Hierarchical network

Q.3 Explain different types of networks?

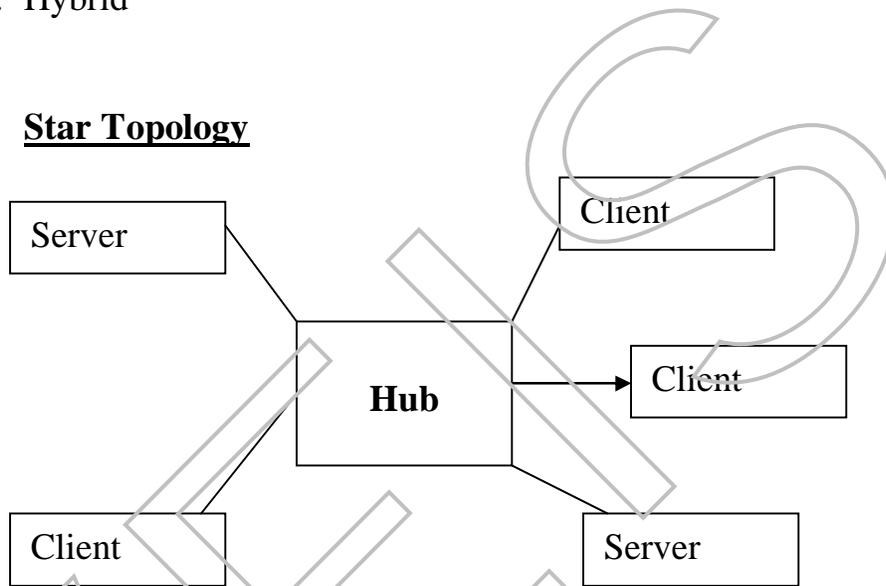
CHAPTER 10
NETWORK TOPOLOGIES

10.1. **Network Topology**

The topology of a network is the physical layout a network. Different types of network topologies are as follows.

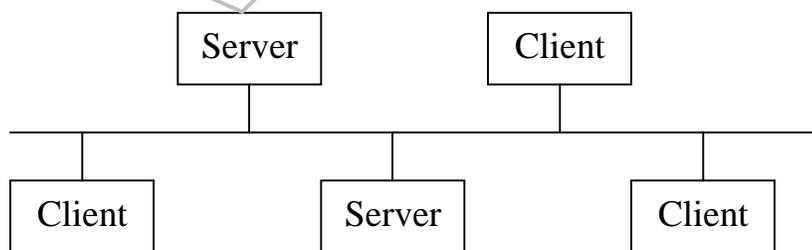
1. Star
2. Bus or Linear
3. Ring
4. Hybrid

10.2. **Star Topology**



Workstations and servers are connected to a centrally located device called hub. With a hub only one sender and one receiver is allowed at a time.

10.3. **Bus Topology**

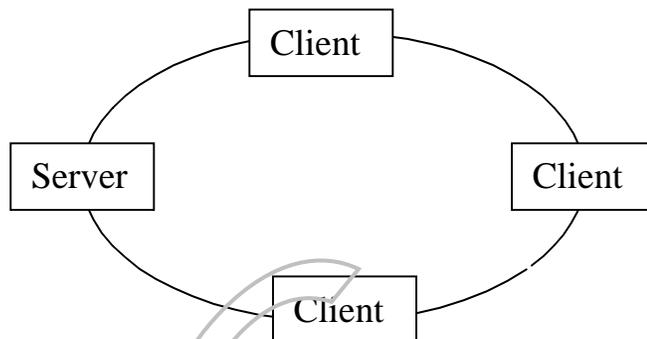


In a bus topology, all the workstations and the servers are connected to a single cable called the bus. In this, the messages are placed on the bus and the nodes recognize their address and accept the message with identical address.

10.4. Ring Topology

All the workstations and the servers are chained together to form a ring like structure. The computers

are connected together in the network rather than terminated. The resulting network forms a physical “ring”.



10.5. Hybrid Topology

This topology is a combination of star and bus or ring and bus topologies.

Exercise – 10

Q.1 Fill in the blanks

- (i) The physical layout of a network is called _____. (topology)
- (ii) The combination of different topologies is called _____ topology. (hybrid)
- (iii) Hub is used in _____ topology. (star)

Q.2 Write short notes

- (i) Network topology and its types
- (ii) Star topology
- (iii) Bus topology
- (iv) Ring topology

Q.3 Explain network topology and its different types?

CHAPTER 11

HARDWARE USED IN NETWORK

11.1. Network Interface Card (NIC)

NIC must be installed in each computer on the network. This card is inserted into a I/O slot inside the computer. They manage the flow of network information to and from the computer in which they reside. *The differences among various NICs are based on the type of computer for which they are designed to work. For example, IBM compatibles require one type of card, and Macintosh computers require another.*

11.2. Repeater

This device is a signal-amplifier / transmitter-receiver whose purpose is to amplify and re-clock a transmission signal between the two cable segments.

11.3. Hub

A hub is a multi-port repeater. In Ethernet technology, there are two types of hubs:

- **Active Hub** – In this, each of the ports is a repeater that amplifies the signal for each connection.
- **Passive Hub:** Do not amplify the signal at all.

(In Token Ring, technology, a hub is known as a Multi- Station Access Unit (MAU), and it acts as a physical ring that all the hosts are connected to. For Ethernet and token ring, there are strict restrictions for how many hubs can be connected.).

11.4 Bridge

A bridge, like a repeater, is used to connect similar and dissimilar media together without breaking into the separate networks.

11.5. **Router**

Routers join multiple networks together.

11.6. **Gateway**

A gateway includes the functions of routers and bridges but in addition can also translate the instruction of the sending network into the equivalent instruction of the receiving network. A gateway is also used while transferring raw data as well as specific instructions and it also knows how data is to be managed once it is received onto the network.

Exercise - 11

Q.1 Fill in the blanks

- (i) Hardware used in LAN are _____. (NIC, repeater, bridge, hub)
- (ii) NIC stands for _____. (Network Interface Card)
- (iii) A multiport repeater is called _____. (Hub)

Q.2 Write short notes

- (i) NIC
- (ii) Hub
- (iii) Bridge
- (iv) Router
- (v) Repeater
- (vi) Gateway

CHAPTER 12

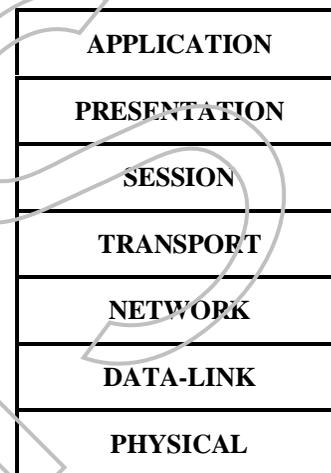
OSI MODEL OF ISO

12.1. Introduction

Open System Interconnect (OSI) model has been developed by the International Standards of Organization (ISO) (*ISO is an international body of experts who define a variety of different technical standards*). OSI model is used to describe the structure and the functions of data communication protocols.

It has seven layers. These are as follows:

- (i) Physical
- (ii) Data-Link
- (iii) Network
- (iv) Transport
- (v) Session
- (vi) Presentation
- (vii) Application



Note: To remember the OSI model sequences remember “**P**lease **D**o **N**ot **T**hrow **S**pecial **P**izza **A**way”.

12.2. Physical

Describes the electrical and electronic components for handling network data. It describes processes that handle the data as streams of binary bits flowing through hardware.

12.3. **Data Link**

Describes processes for detecting and correcting low level data errors during transfer of data.

12.4. **Network**

Describes processes for routing data between network addresses and verifies that the messages sent are complete and accurate.

12.5. **Transport**

Includes functions for establishing appropriate connections, initiating data transmission and releasing the connection after a transmission is completed.

12.6. **Session**

Includes processes for controlling the transfer of data, handling transmission and transport errors and managing records of transmissions sent.

12.7. **Presentation**

Control rules for formatting the data transmissions. This layer includes specification for encoding and decoding character sets.

12.8. **Application**

Provides the network services for the applications.

12.9. **IEEE Network Standards**

IEEE (Institute of Electrical and Electronics Engineers) has developed following set of LAN standards and their access methods:

<u>LAN Standards / Type</u>	<u>Access Method</u>
802.3: Bus type LAN	CSMA/CD
802.4: Bus type LAN	Token Passing
802.5: Ring type LAN	Token Passing
802.6: Metropolitan Area Network	Uses fiber optic cable

CSMA/CD Protocol: Carrier Sense Multiple Access with Collision Detection.

Exercise - 12

Q.1 Fill in the blanks

- (i) OSI stands for _____. (Open System Interconnect)
- (ii) ISO stands for _____. (International Standards of Organisation)
- (iii) OSI model is used to describe the _____ and _____. (structure, functions of data communication protocols)
- (iv) Data link describes the process for _____ and _____ errors during transfer of data. (detecting, correcting)
- (v) IEEE stands for _____. (Institute of Electrical and Electronics Engineers)
- (vi) LAN standards have been developed by _____. (IEEE)
- (vii) CSMA\CD stands for _____. (Carrier Sense Multiple Access with Collision Detection)

Q.2 Write short notes

- (i) Layers of OSI model
- (ii) OSI model

Q.3 Explain OSI model with seven layers.

CHAPTER 13

CABLES USED FOR NETWORKING

13.1 Cable Transmission Rates

Cable that transmits only one signal is called a baseband abbreviated as base. Cables that can handle simultaneous transmissions of different signals by sending them at different frequencies are called broadband cables. Baseband cable is used for networking.

Data transmission speed is expressed in megabits per second (*megabits is one million data bits*). 10 Base cable is common type, which indicates that the cable is of base band type and is capable of transmitting data at the rate of 10 megabits per second (*10 Mbits/s*).

13.2. Coding of Cables

Cables are described by a numerical value indicating the maximum length, in hundreds of metres of any signal segment that you can use without degrading the electronic signals.

Cable 10Base2 indicates that the cable is baseband type, handles the data at the rate of 10 megabits per second and can be used upto a maximum length of 200 metres without degrading the signals.

If the cable is twisted-pair type, the letter T is added. Thus, 10BaseT (*pronounced as Ten-Base-T*) describes baseband, twisted pair cable that handles the data at the rate of 10 Mbits/sec.

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13.3. Types of Cables

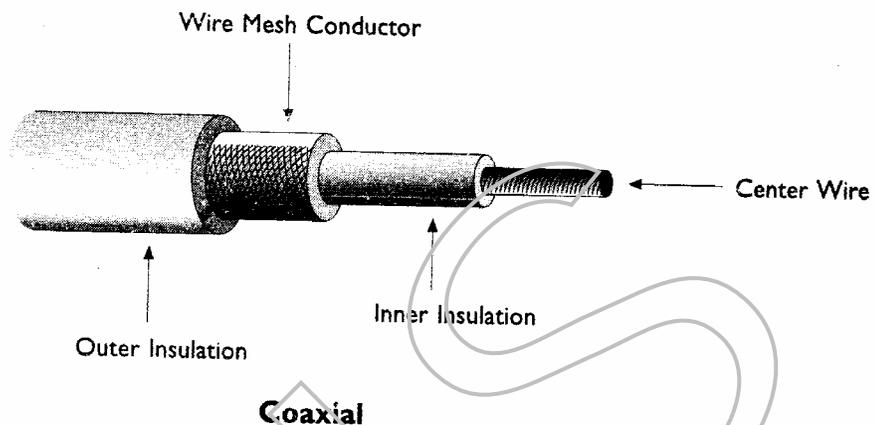
Cables are classified as per their physical construction. The most common types of cables are as follows:

- (i) Coaxial

- (ii) Twisted Pair
- (iii) OFC (Optical Fiber Cable)

13.4. Coaxial

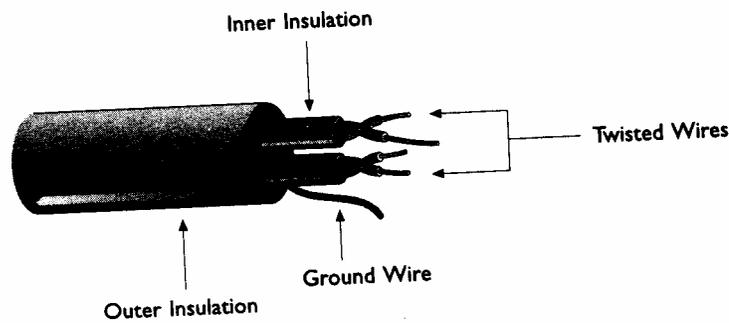
This cable consists of an inner wire surrounded by a layer of insulating material, a conducting layer of wire mesh and a plastic covering. The types of coaxial cables are as follows:



- (i) Thin Coaxial Cable: Type RG-58 cable (10base2). This is used in baseband transmission. This is 50 ohm cable. It can connect many local area networks that are limited to a single office or small building and it is relatively inexpensive and easy to handle.
- (ii) Thick Coaxial Cable: Type RG-11 (10base5) cable. This is used in broadband transmission. This is a coaxial cable that is much thicker, can withstand more rugged surroundings, and as its descriptive type indicates, can be used with much longer segment length.

13.5. Twisted Pair

Twisted pair cable looks like a telephone cable. It consists of two pairs of wires twisted together. There are two types of twisted-pair cables:



- (i) Unshielded Twisted-Pair (UTP) - UTP is suitable for data transmission on a computer network.
- (ii) Shielded Twisted-Pair (STP) - STP is of superior quality and includes extra insulation to prevent electrical interference to avoid degrading of the signal.

Twisted-pair cable is less expensive than coaxial. However, coaxial has a reputation for greater durability because in older designs central wire of coaxial was more durable and better protected by the surrounding insulation and outer casing than twisted-pair. To see the difference in design for yourself, compare a cable TV wire(coax) to the wire between a desk telephone and the wall (twisted-pair).

In these older designs, twisted-pair wires were thinner than coaxial, more subject to breaks and line problems when the cable got twisted or creased. The outer casing was thinner, too. But more modern construction has produced very durable Twisted-Pair cable. These improvements in cable manufacturing have made twisted-pair cable as reliable and durable as coaxial at speeds up to 100 Mbits/s.

Categories of UTP Cables

CATEGORY 1: Ordinary telephone cable used to carry voice and not the data.

CATEGORY 2: Certified to carry data up to 4 Mbits/s using four twisted pairs.

CATEGORY 3: Certified to carry data up to 10 Mbits/s using four twisted pairs.

CATEGORY 4: Certified to carry data up to 16 Mbits/s using four twisted pairs.

CATEGORY 5: Certified to carry data up to 100 Mbits/s using four twisted pairs of copper wire.

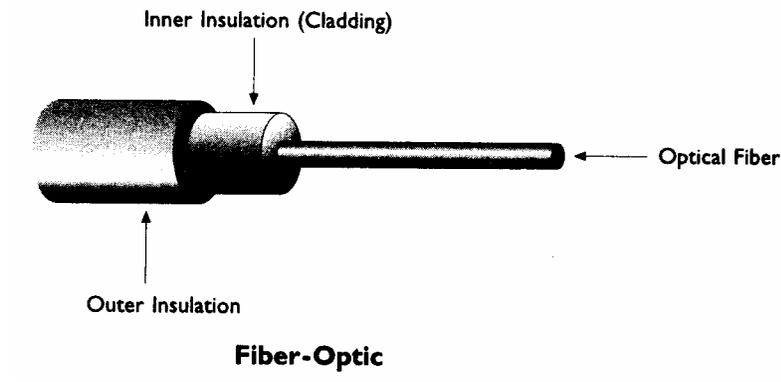
The newer, faster LAN standards use UTP cable. 100VG (Voice Grade) LAN uses category 3,4 or 5 cable. Fast Ethernet uses one of the two types -category 5 cable: 100Base T4, which includes telephone grade pairs of wires or 100 Base TX, which incorporates data-grade pairs of wires.

13.6 **OFC (Optical Fiber Cable)**

Fiber-optic cable is becoming more common as the demand for transmission speed is increasing. This type of cable consists of a thin glass or plastic filament, as wide as a human hair protected by a thick plastic cladding and an external plastic sheath. Fiber-optic cable uses a laser beam instead of an electromagnetic wave to transmit a signal.

Using light, offers important advantages over electromagnetic wave, the light signal can travel faster and more reliably. *This is because the light signal is not subjected to electrical impedance from copper wires and can pulsate at faster rates than electric frequencies. In addition, the light signal is not immune to external electrical interference.*

Fiber optic cable can send reliable signals as far as 10 kilometers, at speed approaching 100,000 Mbits/s. Both the 100VG LAN and fast Ethernet standards support special two-strand fiber-optic cable, called 100BaseFX cable.

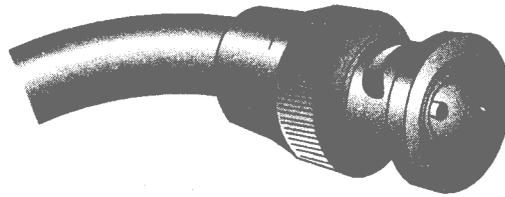
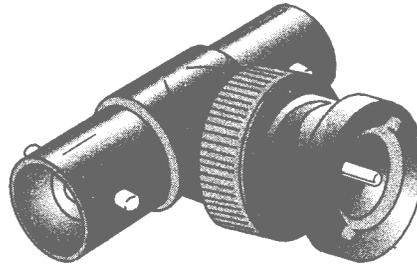


13.7. Cable Connectors

Cables are connected to the workstations by special connectors. Connectors are specific to the type of cable being used.

- (i) Coaxial Connectors - Coaxial cable requires a connector called a BNC (Bayonet Connector) plug.

A special BNC T-connector is used to join workstations. One end of T-connector is attached to the network interface card, other end is connected to the coaxial cable and the third end may be connected to the coaxial cable or capped with terminator (resistor plug) which is a small cap that absorbs the signal and prevents distortion.

**BNC (Bayonet Connector) Plug****BNC T-Connector**

(ii) Twisted Pair Connectors

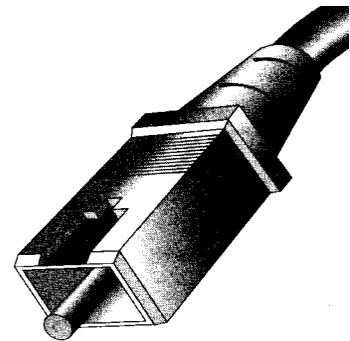
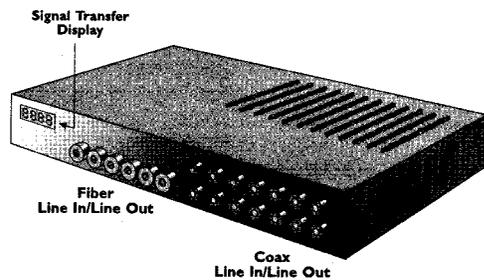
Twisted-pair cables use connectors that look like plugs commonly found on telephone wires in the homes. These connectors are called RJ connectors. They are built for different specifications for different types of twisted-pair cables. These are RJ-11, used for telephone wires and RJ-45, used for computer network and can handle cables with as many as eight wires.

**RJ-11 Connector**

(iii) Fiber-Optic Connectors -

Fiber-optic cable comes equipped with its own connectors. These connectors fit into special receptacles and lock in place. If you are connecting a workstation with equipment that is not compatible with fiber-optic cable, then you must attach the workstation to a

conversion device called a fiber-line driver. This device takes the light signal and converts it to an electrical signal and vice versa.



Fiber-Optic Connector

Exercise 13

Q.1 Fill in the blanks

- (i) A cable that transmits only one signal is called _____. (base band)
- (ii) A cable that handles different signals at a time is called _____. (broad band)
- (iii) _____ cables are used for LAN. (base band)
- (iv) Data transmission speed is expressed in _____. (mega bits per second)
- (v) Cable 10base2 indicates that _____. (cable is base band, handles 10 megabits/sec and can be used upto a length of 200 metres without loss of signal)
- (vi) UTP stands for _____. (Unshielded Twisted Pair)
- (vii) STP stands for _____. (Shielded Twisted Pair)
- (viii) OFC stands for _____. (Optical Fiber Cable)
- (ix) In OFC, signal travels in the form of _____. (light)
- (x) Twisted pair connectors used for network are _____. (RJ-45)

Q.2 Write short notes

- (i) Coding of cables
- (ii) Types of cables
- (iii) Twisted pair cable
- (iv) Coaxial cable
- (v) OFC

Q.3 Explain

- (i) Different types of cables.
- (ii) Different types of cable connectors.

CHAPTER 14

TYPES OF LAN

14.1. Types of LAN

Types of LAN are as follows:

- (i) Ethernet
- (ii) Arcnet
- (iii) Token Ring
- (iv) Fiber Distributed Data Interface (FDDI).

14.2. Ethernet

Xerox and DEC originally developed the Ethernet. *The topology of an Ethernet cable system is a linear bus with CSMA/CD (carrier sense multiple access/collision detection) access method.* Ethernet can use both coaxial and twisted-pair cables. Coaxial cable can be RG-11 (also called thick Ethernet), using a transceiver to connect to the workstations or RG-58 (also called thin Ethernet), using T-connectors to link workstations directly. Thin Ethernet is good for small local networks.

14.3. Rules to Use Thin Coaxial Cable

- The longest allowable cable segment between nodes is 300 feet.
- The shortest distance between T-connectors is 1.5 feet.
- The maximum number of nodes on a network without repeaters is 30.
- The total cable length along a network without repeaters cannot exceed 607 feet.
- Upto four repeaters can be used, joining a maximum of five cables and 138 nodes.

- The total cable length along the entire network with repeaters cannot exceed 3035 feet.
- Uses 0.2-inch diameter, 50 ohm RG-58 A/U co-axial cable.
- Data transfer rate is 10 Mb/sec.
- Maximum length of cable segment is 200 meters.
- T-type connectors are used to connect the cable to network interface cards.
- Total network cable span is 1000 meters with the use of 4 numbers of repeaters at the cable segment length.
- Up to 30 LAN workstations can be supported per segment

Following component s are used in this type of cabling:

- (iii) *Network Interfacing Card (NIC): The card should have a BNC type connector attached to the back*
- (iv) *Repeater*
- (v) *BNC T-connector: T-connector is attached to the BNC connector on the back of the Ethernet card. The T-connector provides two-cable connectors for signal "IN" and signal "OUT" and one connector to connect with NIC.*
- (vi) *BNC Barrel Connectors: These are used to join two cable segments together.*
- (vii) *BNC Terminators: Each cable segment must be terminated at both ends with a 50-ohm BNC terminator.*

Note: It is possible to combine a Thick and Thin Ethernet cabling system. This is usually done to save money on cable, since thin Ethernet is usually cheaper than thick. Thick cable may be used to extend the distance between two thin Ethernet cable trunks by using a repeater.

14.4. **Rules to Use Thick Coaxial Cables**

- The longest allowable cable segment between nodes is 300 feet.
- The shortest distance between transreceiver is 8 feet.
- The maximum number of nodes on a network without repeaters is 100.
- The total cable length along a network without repeaters cannot exceed 1640 feet.

- Upto four repeaters can be used, joining a maximum of 488 nodes.
- When using repeaters to join cables, upto five cables can be joined but only three can have computers attached to them. The other cables must be empty and used only to extend the overall length of the network.
- The total cable length along the entire network with repeaters cannot exceed 8200 feet.
 - Uses 50 ohm 0.4 in. diameter RG-11 co-axial cable.
 - Common bus topology is used.
 - Data transfer rate is 10 Mb/sec.
 - Maximum length of cable segment is 500 meters.
 - Total network span is 2500 meters with 04 repeaters.
 - Up to 500 LAN stations can be supported on the network.
 - Up to 100 LAN stations can be attached to a single segment.

Following components are used in the type of cabling:

- (i) Network Interface Card (NIC). The card should have a female connector for the attachment of transceiver cable.
- (ii) Repeater: To boost the signals.
- (iii) Tran receiver: The transreceiver is the junction box on the thick Ethernet cable where workstation can be attached. It has three connectors. Two are the thick Ethernet "IN" & "OUT" connectors, and the third connector is used to attach the workstation to the transreceiver using Tran receiver cable
- (iv) Transreceiver cable.
- (v) N-series Male Connectors: These are thick Ethernet cable connectors to be installed on both ends of the cable.
- (vi) N-series Barrel Connectors: These are used to join two cable segments together.
- (vii) N-series Terminators: Each cable segment must be terminated at both ends with 50 ohms N-series terminator.

14.5. **Rules to Use Twisted Pair Cables**

- Maximum segment length 100 metres.
- Maximum number of segments: 1024
- Maximum number of repeaters: 4

14.6. **Hardware Requirement for Twisted Pair Ethernet Cable Network**

- (i) Network Interface Card (NIC)
- (ii) Twisted pair Ethernet cable: UTP with RJ-45 connector is most often used because it is inexpensive, flexible and easily installed.
- (iii) Hub: The hub is used for star-configured, twisted pair network.

14.7. **Arcnet**

Arcnet is a base band token passing network system that offers flexible topologies. This uses coaxial, twisted-pair or fiber optic cables.

Arcnet combines the star and linear bus topologies to form hybrid topology.

14.8. **Token Ring**

- It is a proprietary of IBM (International Business Machine).
- Standard IEEE 802.5
- Token passing accessing scheme is used.
- Forms ring topology.
- It uses MAU (Multi-station Access Unit).

14.9. **Fiber Distributed Data Interface (FDDI)**

In this fiber optic cables are used. This is used where high performance is required.

<u>Cable Type</u>	<u>Compatible with ...</u>			
	<u>Ethernet</u>	<u>Token Ring</u>	<u>Arcnet</u>	<u>FDDI</u>
Coaxial	Yes	No	Yes: on later system	No
STP	Yes	Yes	Yes	No
UTP	Yes	Yes	Yes	No
Fiber-optic	No	Yes	Yes-some later versions	Yes

Exercise - 14**Q.1 Fill in the blanks**

- (i) FDDI stands for _____. (Fiber Distributed Data Interface)
- (ii) The maximum number of nodes on a network without repeaters using thin Ethernet can be _____. (30)
- (iii) The maximum number of nodes on a network without repeaters using thick Ethernet can be _____. (100)
- (iv) MAU stands for _____. (Multi-station Access Unit)

Q.2 Write short notes

- (i) Types of LAN
- (ii) Rules to use twisted pair cables
- (iii) Hardware requirement for twisted pair Ethernet cable network

CHAPTER 15

FUNDAMENTALS OF NETWORKING

15.1. Network Protocols

- NetBIOS (Network Basic Input Output System): It is used for communication in client-server applications.
- NetBEUI (NetBIOS Extended User Interface): A simple network transport layer developed to support NetBIOS installation. NetBEUI is not routable and so it is not suitable for large networks. It is the fastest transport protocol available for windows.
- TCP/IP (Transmission Control Protocol / Internet Protocol): A suite of protocols upon which global network is based is TCP/IP. A TCP is a transport layer protocol that implements guaranteed packet delivery using the Internet Protocol.

15.2. Features of TCP/IP

- TCP/IP is scalable for use in small and large networks. In large networks, it provides routing service.
- It is supported by all network operating systems.
- TCP/IP is designed to be fault tolerant and is able to dynamically reroute the packets if networks become unavailable.
- TCP/IP requires an IP address and a subnet mask.

15.3. IP Address

The IP address uniquely identifies your computer on the network. The IP address is a four-field, 32 bit address, separated by periods. Part of the address is used to identify the network address and part of the address is used to identify the host or local computer's address.

15.4. Classes of IP Addresses

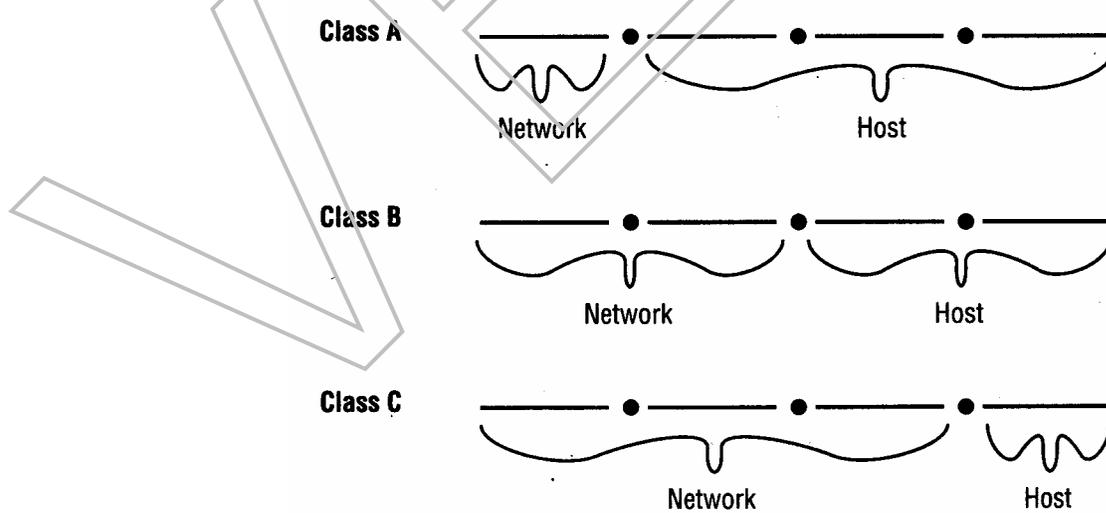
IP address is a 32-bit address divided into 4 octals. There are three main classes of IP addresses which are class A, class B and class C. Depending on the class you use, different parts of the address show the network portion of the address and the host address.

In class A, the first bit of the first octal is always zero(0). The first octal is used for network ID and the last three octals are used for host ID. For the same network, network ID is same but host ID for computer is unique. In class A type of network, $2^7 = 128 - 2$ networks are possible and $2^{24} - 2$ hosts are possible. It is suitable for big networks as 126 different networks with $2^{24} - 2$ computers in a single network can be connected.

In class B, the first 2 bits of first octal are always 10 (one zero). First 2 octals are used for network ID and the last two octals are used for host ID.

In class C, the first 3 bits of first octal are always 110 (one one zero). First 3 octals are used for network ID and the last octal is used for host ID.

All zeros (0.0.0.0) and all 255s (255.255.255.255) are not used because these are used for broadcast purpose. In class A, IP addresses 127.0.0.1 is used for loop back.



<u>Network Class</u>	<u>Address Range of first field.</u>	<u>Number of networks available</u>	<u>Number of host nodes supported</u>
A	1-126	$126 = (2^7 - 2)$	$1,67,77,214 = (2^{24} - 2)$
B	128-191	$16,384 = (2^{14} - 2)$	$65,534 = (2^{16} - 2)$
C	192-233	$20,97,152 = (2^{21} - 2)$	$254 = (2^8 - 2)$

Note: IP addresses are also available in class D and E for future use.

15.5. Subnet Mask

The subnet mask is used to specify, which part of the IP address is the network address and which part of the IP address is the host address. By default following subnet masks are applied:

Class A – 255.0.0.0

Class B – 255.255.0.0

Class C – 255.255.255.0

255 is used to identify the network address. For example, in class B network address 167.147.1.2, 167.147 is the network address and 1.2 is the host address.

Exercise - 15

Q.1 Fill in the blanks

- (i) NetBIOS stands for _____. (Network Basic Input Output System)
- (ii) NetBEUI stands for _____. (NetBIOS Extended User Interface)

- (iii) NetBIOS is used for communication in _____ applications. (server-client)
- (iv) NetBEUI is suitable for _____ networks. (small)
- (v) TCP/IP configuration requires _____ and _____. (IP address, Subnet mask)
- (vi) Ip address is _____ bit address. (32)
- (vii) In class-C IP address, starting bits of first octal are _____. (110)
- (viii) IP address 127.0.0.1 is used for _____. (loop back)
- (ix) Subnet mask is used to specify _____. (which part of the IP address is the network address and which part is the host address)

Q.2 Write short notes

- (i) Network protocols
- (ii) Features of TCP/IP
- (iii) IP address
- (iv) Subnet mask

Q.3 Explain IP address and its different classes.

CHAPTER 16

CONNECTING WINDOWS 98 WITH NETWORK

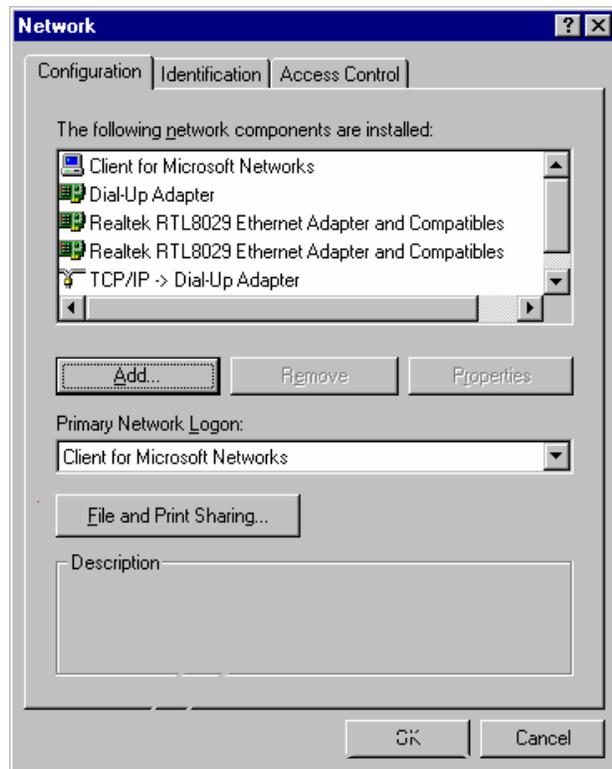
16.1. Preliminary Preparation

Before configuring your system for network, your system should have the following:

- (a) Network card should be installed on the machine
- (b) Computer must be connected to each other through cable.
- (c) Network card driver should be installed to communicate with the machine.
- (d) Assign the network password through Password icon from the Control Panel. The networking password can be up to 14 characters long.

16.2. Adding Network Adapter

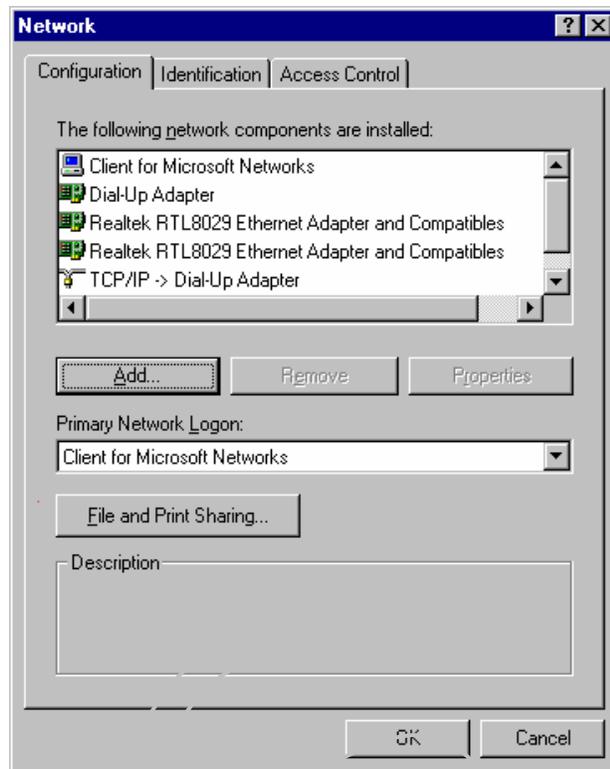
- Click Start → Settings → Control Panel
- OR
- Click My Computer → Control Panel
- Click Network icon.
- Network dialog box appears. Click Configuration tab.



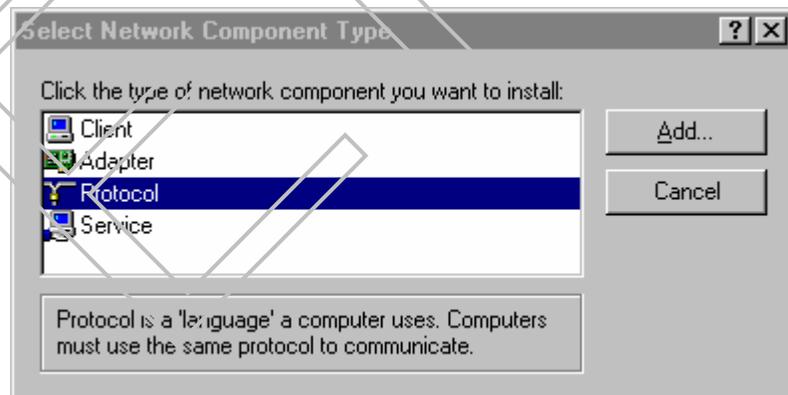
- Click Add button.
- Select Network Component Type dialog box appears. Select Adapter and click Add button.
- Select Network Adapter dialog box appears. Select Manufacturer and Network Adapter and click OK.

16.3. Adding NetBEUI and TCP/IP Protocol

- Click Start → Settings → Control Panel
- OR
- Click My Computer → Control Panel
- Click Network icon.
- Network dialog box appears. Click Configuration tab.

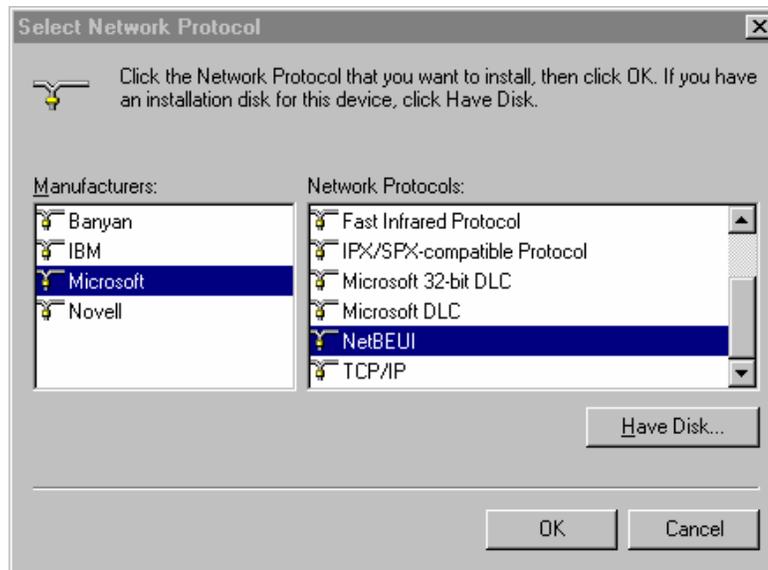


- Click Add button.
- Select Network Component Type dialog box appears. Select Protocol and click Add button.



- Select Network Protocol dialog box appears. Select the Manufacturer as Microsoft and Network Protocol as NetBEUI and click OK.

-



- Repeat the same procedure for adding TCP/IP.

16.4. Adding Services

- Click Start → Settings → Control Panel
- OR
- Click My Computer → Control Panel
- Click Network icon.
- Network dialog box appears. Click Configuration tab.
- Click Add button.
- Select Network Component Type dialog box appears. Select Service and click Add button.
- Select Network Service dialog box appears. Select File and printer sharing for Microsoft Networks and click OK.

16.5. Binding Protocols

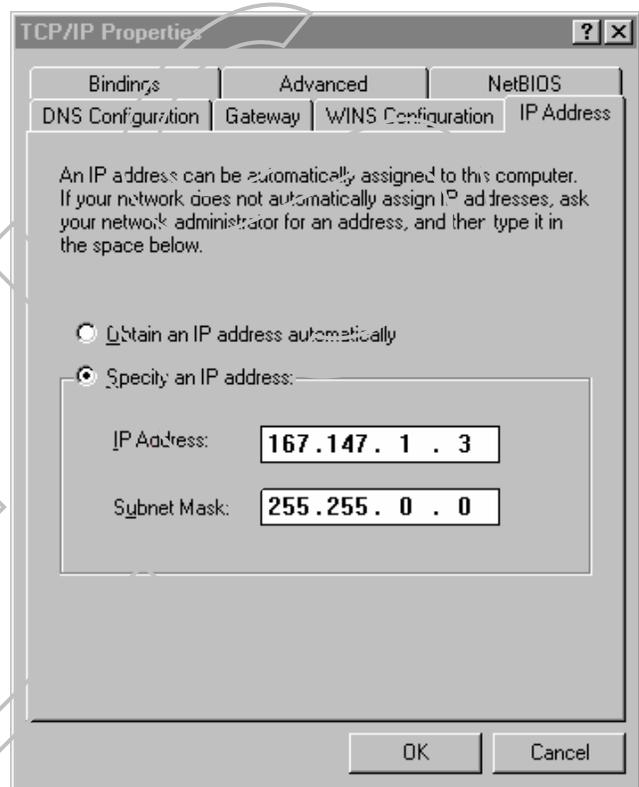
Once you have added the protocols, you have to bind them with the network adapter. To bind

- Select the particular network adapter (NetBEUI or TCP/IP) from the Network dialog box. Click Properties button.

- (NetBEUI or TCP/IP)Properties dialog box appears. Click Binding tab and check the boxes of installed protocols, if not checked.

16.6. Configuring TCP/IP

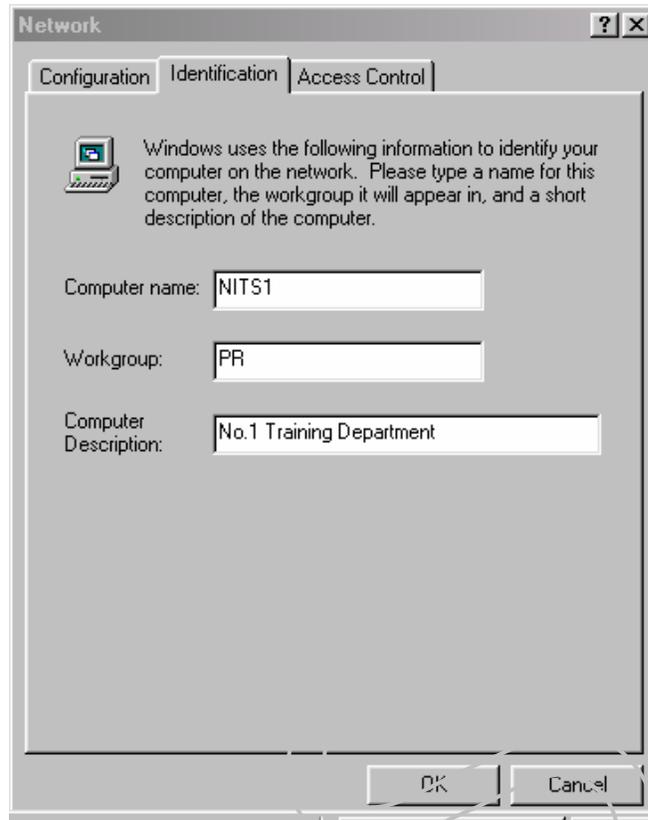
- Select TCP/IP protocols in the Network dialog box.
- Click Properties.
- TCP/IP Properties dialog box appears. Click the IP Address tab.
- Click, Specify an IP address radio button and specify the IP number manually.
- Click OK.



16.7. Identification of Network

- Click Identification tab in Network dialog box.

- Fill up the following information regarding network and computer:



Computer Name – Computer Name as your workstation will appear on the network. It can be up to 20 characters long.

Workgroup – Keep similar type of workstations in a group.

Computer Description – It is used for convenient to help in identifying the machine.

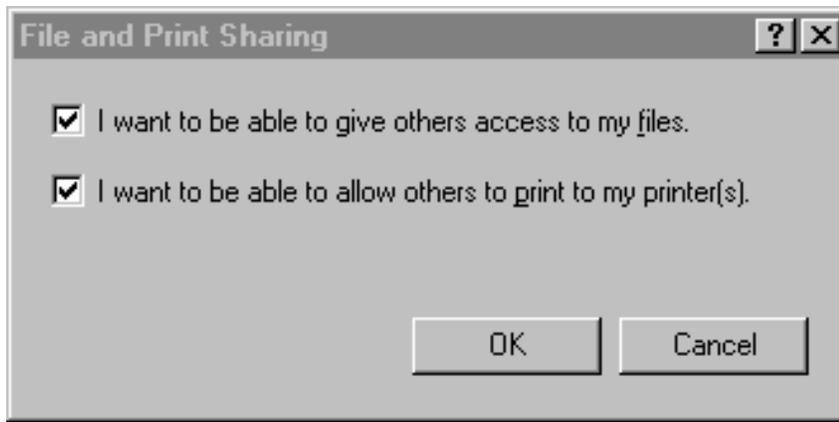
- Click OK.

16.8. File and Print Sharing

To allow others to access files and printers

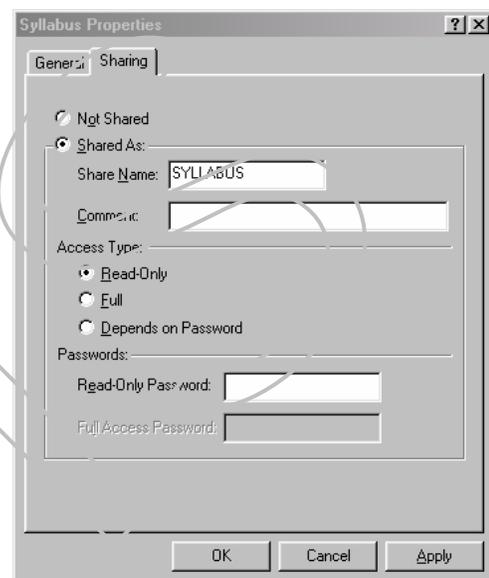
- Click File and Print Sharing command button in Network dialog box.
- File and Print Sharing dialog box appears. Check “I want to be able to give others access to my files” and “I want to be able to allow others to print to my printer(s)” check boxes.

After configuration reboot the system.



16.9. Sharing Files and Printers under Windows 98

- Right click a directory or drive which you would like to share.
- Properties dialog box appears. Click Sharing tab.
- Select the radio button Share As and type the Share Name. By default drive or directory name appears automatically as Share Name.
- Select the particular access type radio button.
- Click OK.



Access Types

It has three access types, which are as follows:

- (i) Read Only – Allow users to access read only.
- (ii) Full – Allow user to read and modify.
- (iii) Depends on password – Ask user to enter the password.

16.10. Mapping Network Drive

- Right click the Network Neighborhood on the desktop.
- Select Open to open the network.
- Click other computer in the network whose directory you want to map.
- Right click the Network directory (shared) which you want to map as network drive and click Map Network Drive.
- Click OK.
- It will automatically take the next available drive and will display the path like [\\VEITONLINE2\Syllabus](#) indicating that the syllabus directory is in computer VEITONLINE2 and mapped as E network drive (for example). The mapped network drive will be available in My Computer icon when opened.

16.11. Testing the Network

You can test the network by PING utility.

Syntax: PING [IP Address]

Example: PING 167.147.1.2

16.12 Connecting 02 Ethernet Adapters via twisted pair cable

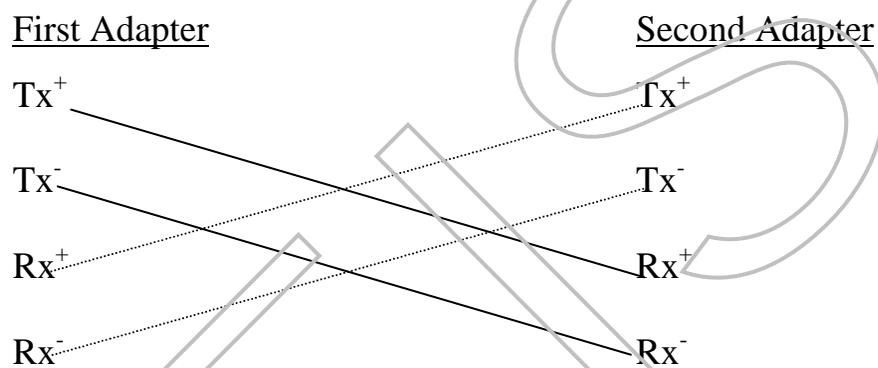
- DTE to DTE Connectors

Cross connect the twisted-pair cable if you connect one Ethernet adapter to another Ethernet adapter without a repeater or concentrator or hub in between. You cross connect by rewiring the wires clamped to one of the twisted pair cable connectors so that it follows the pin configuration as follows:

<u>First Adapter</u>		<u>Second Adapter</u>
Pin No. – 1	to	Pin No. – 3
Pin No. – 2	to	Pin No. – 6
Pin No. – 3	to	Pin No. – 1
Pin No. – 6	to	Pin No. – 2

or

The signal-to-signal configuration is shown below.



Note: Do not cross connect the twisted pair cable if you are connecting an Ethernet adapter to a concentrator or hub.

Exercise - 16

Q.1 Write short notes

- (i) Adding TCP/IP
- (ii) Binding protocols
- (iii) Configuring TCP/IP
- (iv) Identification of network
- (v) Sharing files
- (vi) Mapping network drive