



Introduction to Computer Applications

CHAPTER 4-5

Data communication Computer Networking and Internet

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Overview

- ❖ Data Communication

- ❖ Network

- ❖ Network Criteria

- ❖ Types of Networks

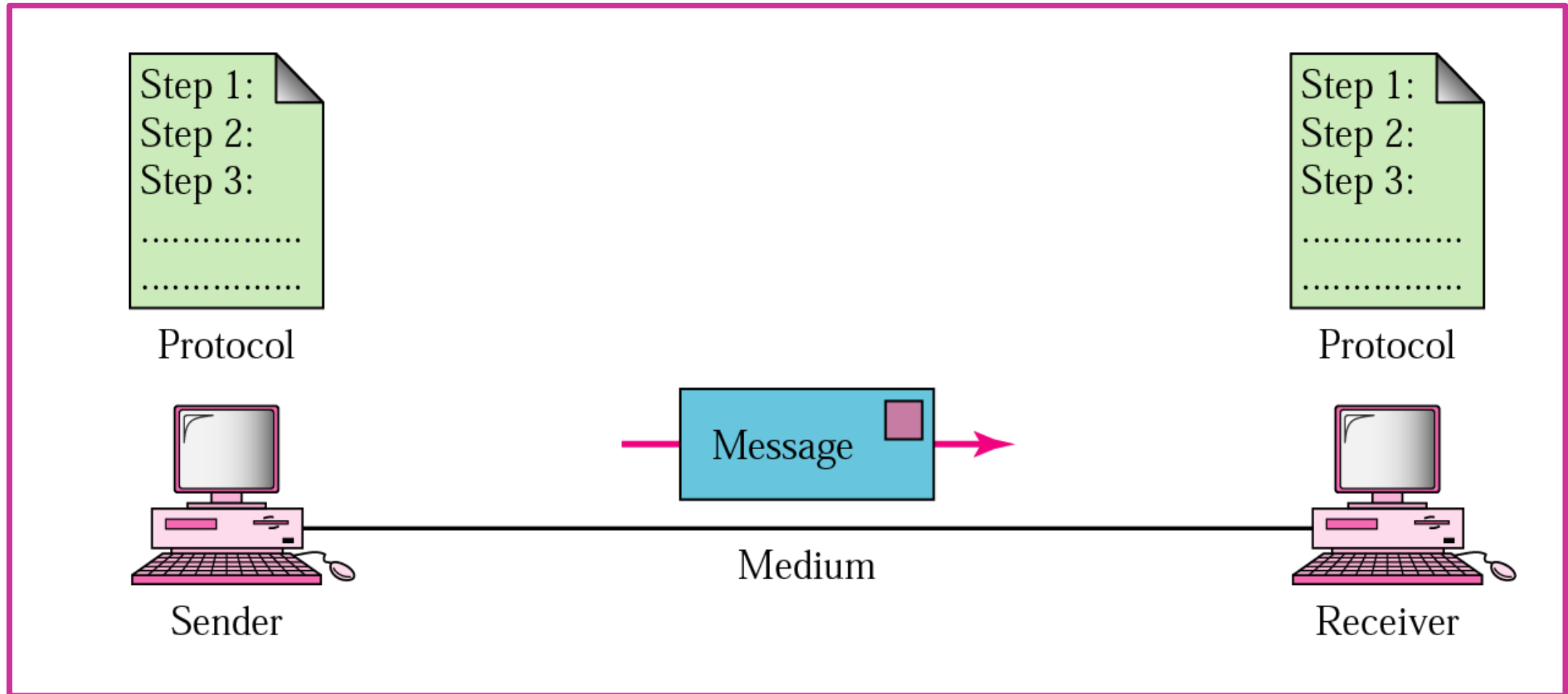
- ❖ Internet

- ❖ E-mail

Data Communication

- ❖ “Data Communication is the exchange of information from one entity to another using a transmission medium”.
- ❖ The word data refers to facts, concepts and instructions presented in whatever form is agreed upon by the parties creating and using the data.
- ❖ **In the context of Computer information Systems**
- ❖ Data is represented by binary information units (or bits) produced and consumed in the form of 0's and 1's.
- ❖ **“Data Communication is the exchange of data (in the form of 0's and 1's) between devices (computers) via some form of transmission medium(such as a **wire** cable or **wireless**)”.**

Components of a Data communication system



Components of a Data Communication System

❖ **Message**

- Message is the information /data to be communicated.
- Popular forms of information is text, audio, image and video.

❖ **Sender**

- Sender can be any device that has the ability to send information.
- It can be a computer, mobile phone etc.

❖ **Receiver**

- A receiver can be any device that has the ability to receive information.

Continued...

❖ **Transmission medium**

- Transmission medium is the physical pathway by which a message travels **from sender to receiver**.
- Transmission medium can be wired(e.g. coaxial cable , twisted pair cable, fiber optic) or wireless (e.g. radio waves, micro waves etc.)

❖ **Protocol**

- Protocol is the set of rules which governs data communication.
- It represents an agreement between the communicating devices.
- Without a protocol two devices may be connected but not

Characteristics of a Data Communication System

- The effectiveness of a data communication system depends on three fundamental characteristics:
 - Delivery/Transport
 - Accuracy/Truthfulness
 - Timeliness

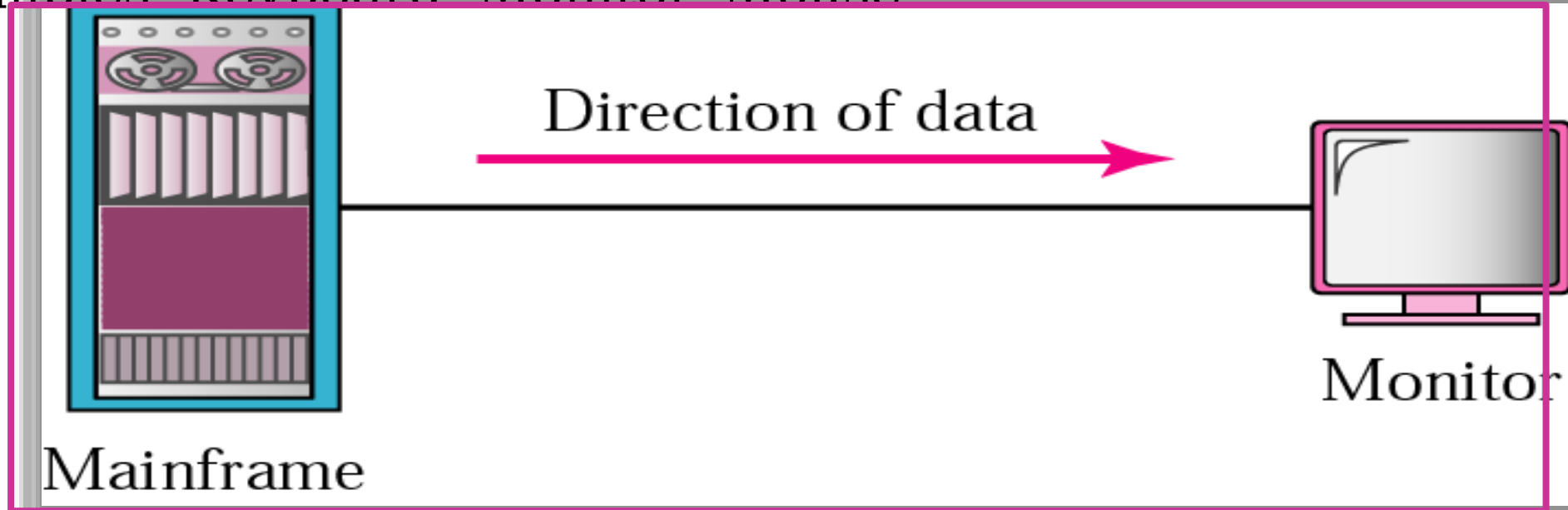
Transmission Mode

❖ The term Transmission Mode is used to define the **direction** of **signal flow** between two linked devices.

- Simplex
- Half-duplex
- Full-duplex

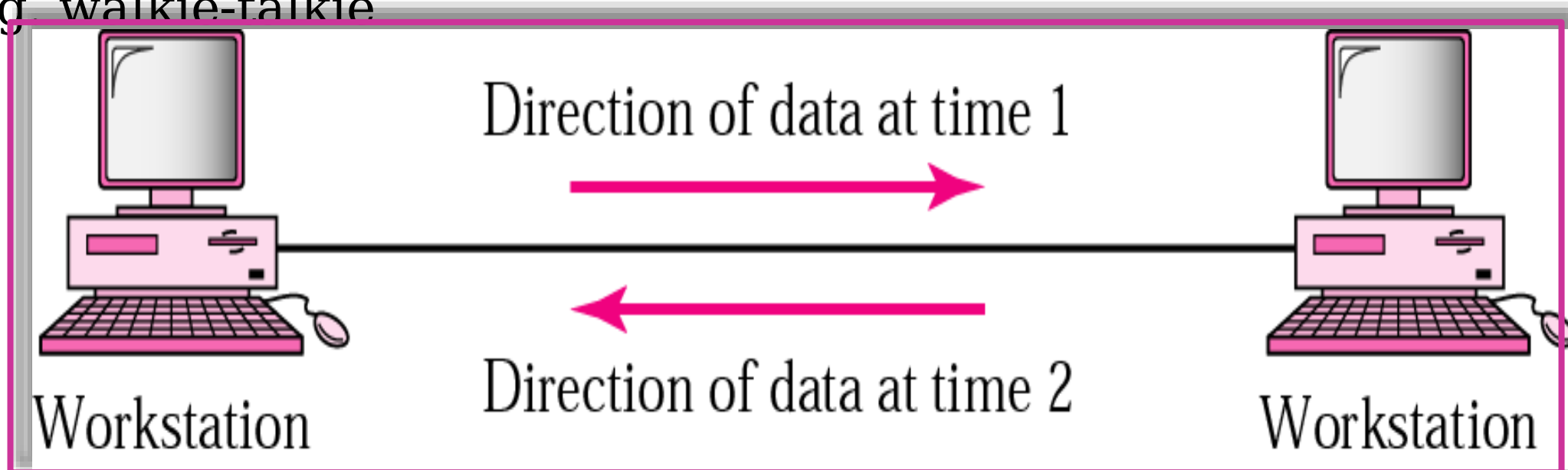
Simplex Mode

- ❖ In simplex mode the communication is uni-directional as on a one-way street.
- ❖ Only one of the two stations on a link can transmit, the other can only receive.
- ❖ Examples: Keyboard Monitor Mouse



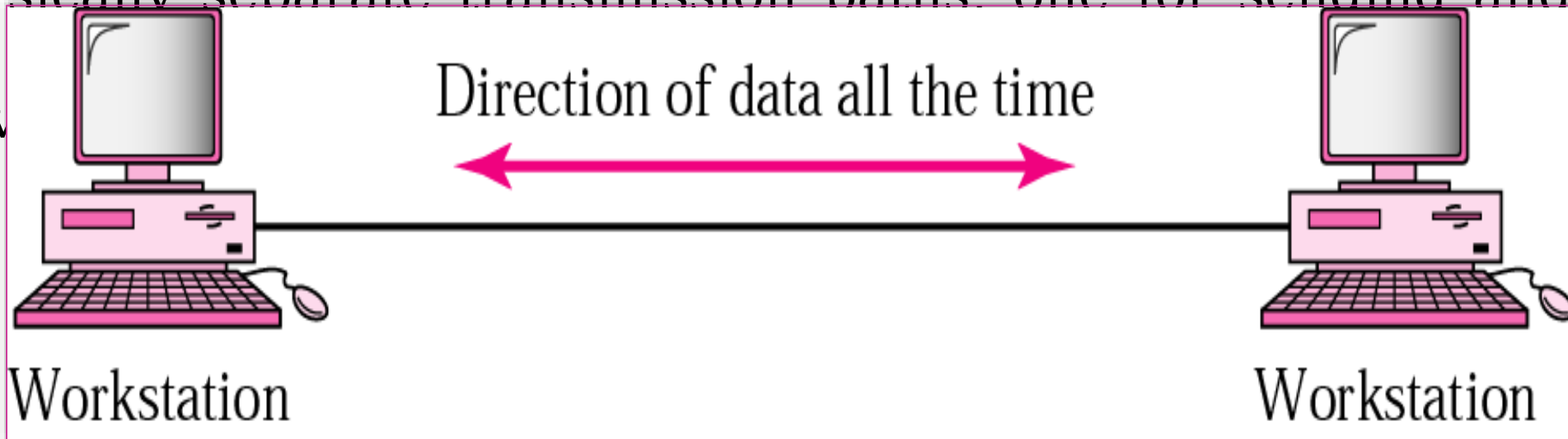
Half Duplex

- ❖ In half-duplex mode, each station can both transmit and receive but not at the same time.
- ❖ When one device is sending, the other can only receive.
- ❖ The half-duplex mode is like a one-lane road with two-directional traffic.
- ❖ The entire capacity of the communication channel is taken over by whichever of the two devices is transmitting at the time.
- ❖ e.g. walkie-talkie



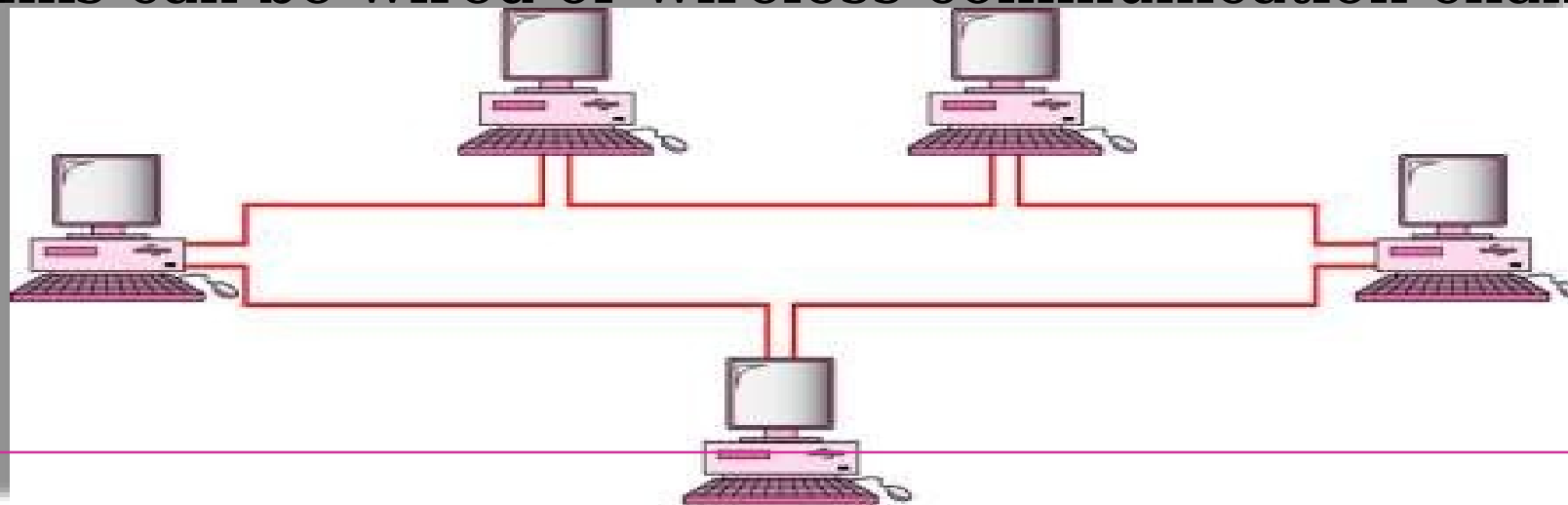
Full duplex

- ❖ In full-duplex mode both stations can transmit and receive simultaneously.
- ❖ The full duplex mode is like a two-way street with traffic flowing in both directions at the same time.
- ❖ In full duplex mode signals going in either direction share the capacity of the link.
- ❖ This sharing can occur in two ways either the link must contain two physically separate transmission paths one for sending and the other for receiving signals

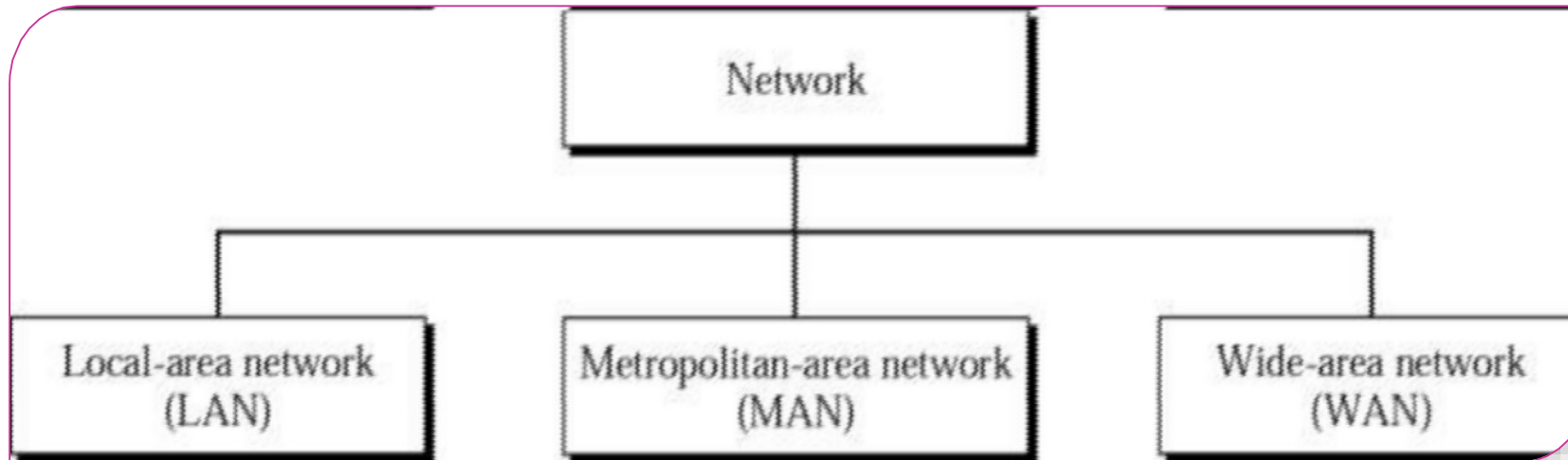


Computer Network

- ❖ A network is a set of devices (often referred to as nodes) connected by media links.
- ❖ A node can be a computer, printer or any other device capable of sending and/or receiving data generated by other nodes on the network.
- ❖ Media links can be wired or wireless communication channels.



Types of Network

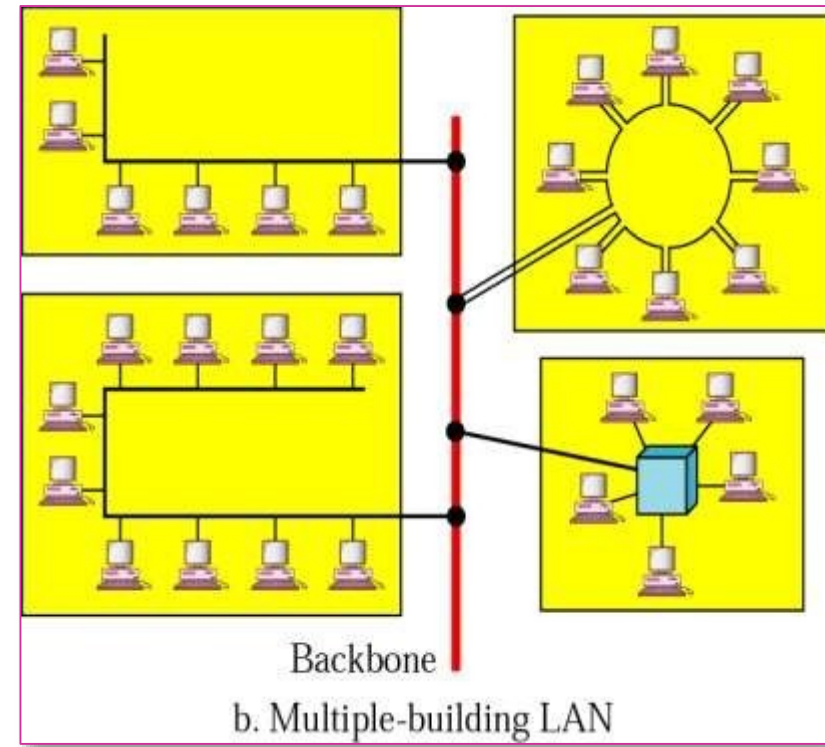
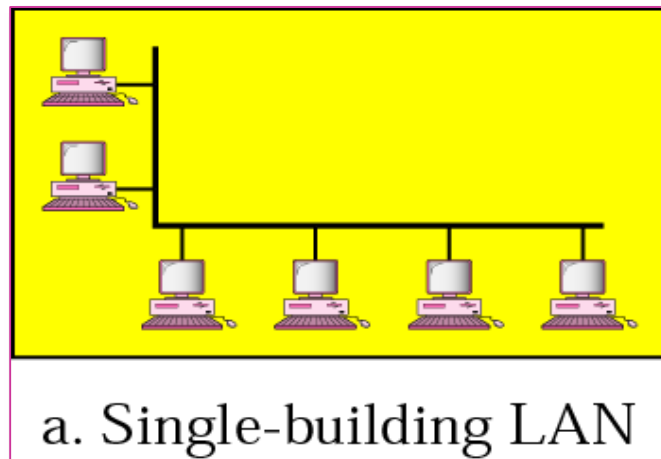


- ❖ In to which category a network falls is determined by its size, its ownership, the distance it covers and its physical architecture.

LAN(Local Area Network)

- ❖ A local Area network is usually privately owned network.
- ❖ It usually links the devices in a single office, building or campus.
- ❖ LAN size is limited to a few kilometers.
- ❖ LAN's are designed to allow resources to be shared between personal computers or work stations.
- ❖ In addition to size, LANs are distinguished from other types of networks by their **size, transmission media** and **topology**.
- ❖ Most common topologies: Bus, Ring & Star.

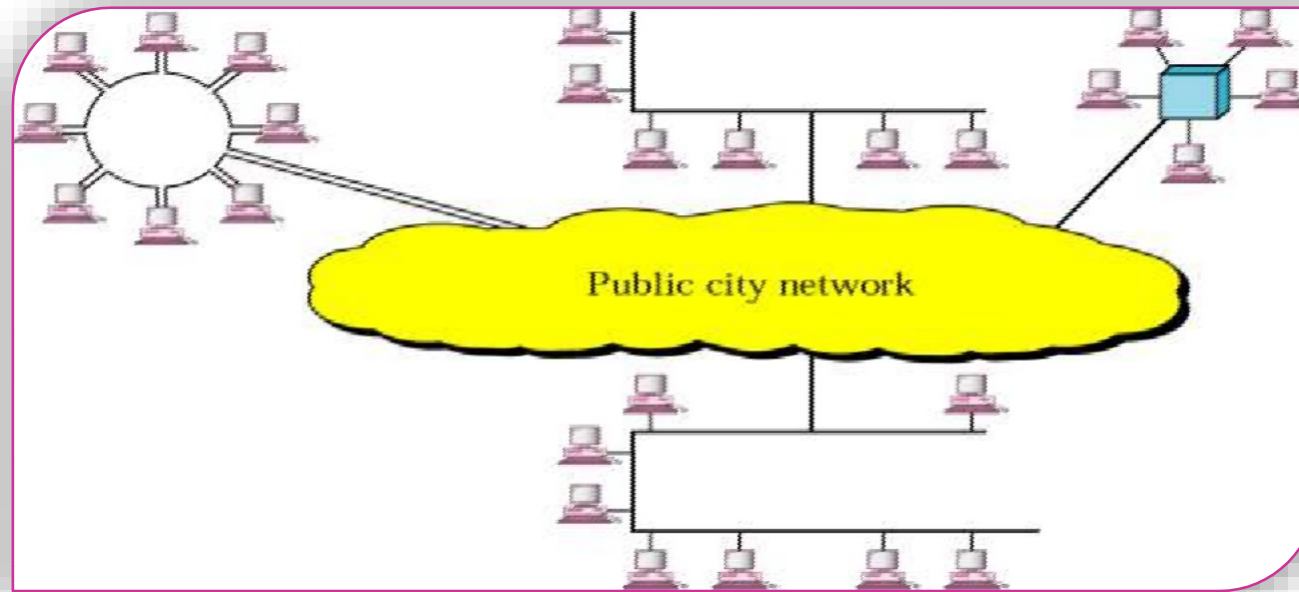
LAN(Local Area Network)



MAN(Metropolitan Area Network)

- ❖ A MAN is designed to extend over an entire city.
- ❖ It may be a single network such as cable television network or it may be a means of connecting a number of LANs in to a larger network so that resources may be shared LAN-to-LAN.
- ❖ A MAN may be wholly owned and operated by a private company such as local telephone company.

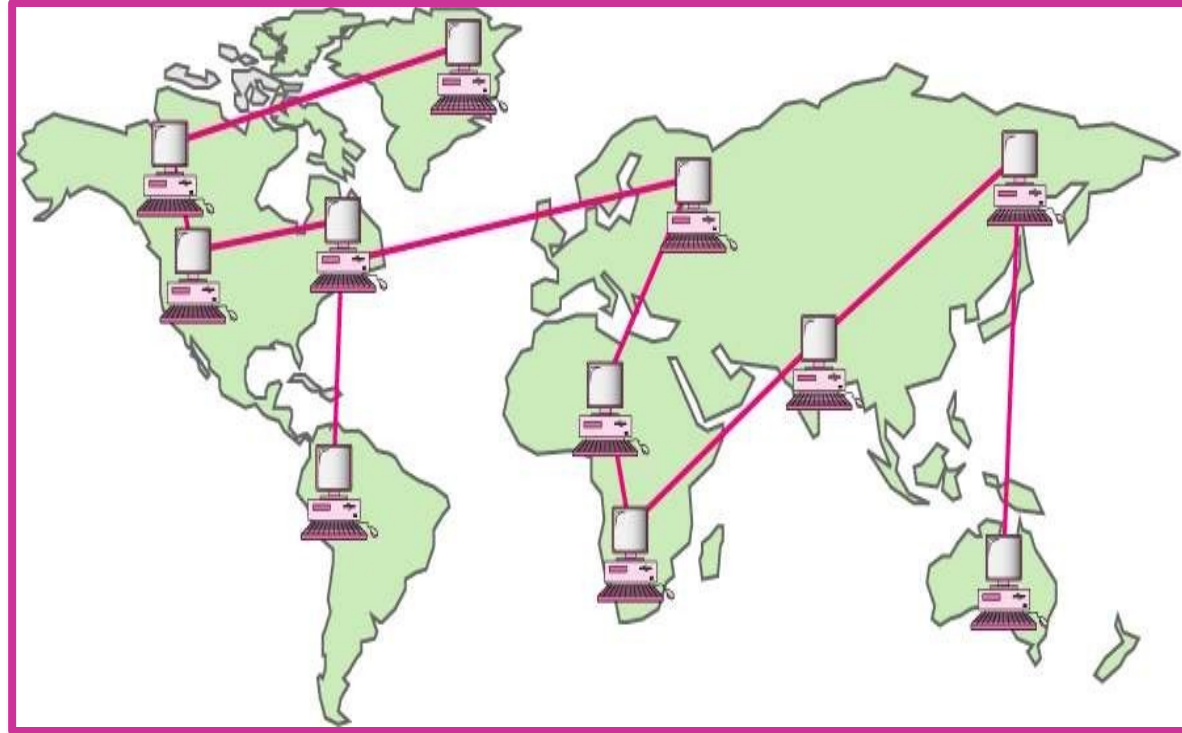
MAN(Metropolitan Area Network)



WAN(Wide Area Network)

- ❖ A WAN provides long distance transmission of voice, data, image and video information over **large geographic areas**.
- ❖ The area a WAN covers may comprise a country, a continent or even the whole world.
- ❖ WANs may utilize public, leased or private communication devices and media and can therefore span an unlimited number of miles.
- ❖ Usually a WAN lacks a single owner, in fact it has many stock holders.
- ❖ A WAN that is wholly owned and used by a single company is often referred to as enterprise network.

WAN(Wide Area Network)



Internet

- ❖ When two or more networks are connected, they became an **internetwork** or **internet**.
- ❖ The term **InterNet** has been coined from two terms, ***Interconnection*** and ***Network***.
- ❖ These networks are formed by educational, commercial, nonprofit, government and military organization.
- ❖ Internet or simply “the Net” is an **international network** connecting more than

World Wide Web (WWW)

- ❖ WWW stands for "World Wide Web."
- ❖ Web is a collection of hypertext documents which consists of pages that
can be accessed using a Web browser.
- ❖ Each page has its own unique address known as Universal Resource Locator (URL).
- ❖ The Hyper-Text Transfer Protocol (HTTP) is the method used to transfer Web pages to your computer.
- ❖ With hypertext, a word or phrase can contain a link to another Web site.
- ❖ These links are known as [hyperlinks](#).

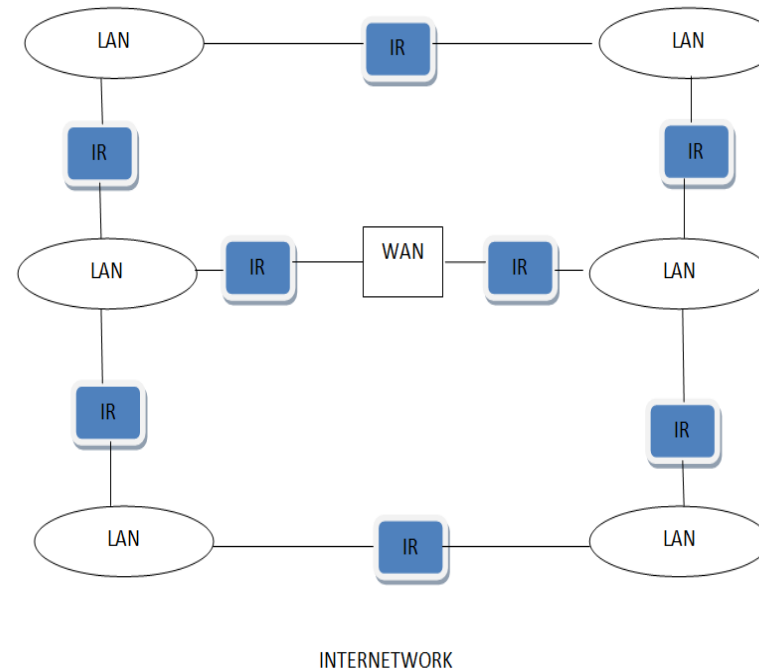
WHAT IS INTERNET ?

➤ The **Internet** is a global system of interconnected computer networks that use the standard Internet protocol suite (TCP/IP) to link several billion devices worldwide.



What Is Internet?

- ❖ Inter Network or Internet is a combination of two or more networks.
- ❖ Inter network can be formed by joining two or more individual networks by means of various devices such as routers, gateways and bridges.



Advantages and Disadvantages of Internet

Advantages

- ✓ **Sharing Information**
- ✓ **Collection of Information**
- ✓ **News**
- ✓ **Searching Jobs**
- ✓ **Advertisement**
- ✓ **Communication**
- ✓ **Entertainment**
- ✓ **Online Education**

Disadvantages

- ✓ **Viruses**
- ✓ **Security Problems**
- ✓ **Immorality**
- ✓ **Accuracy of Information**
- ✓ **Wastage of times**

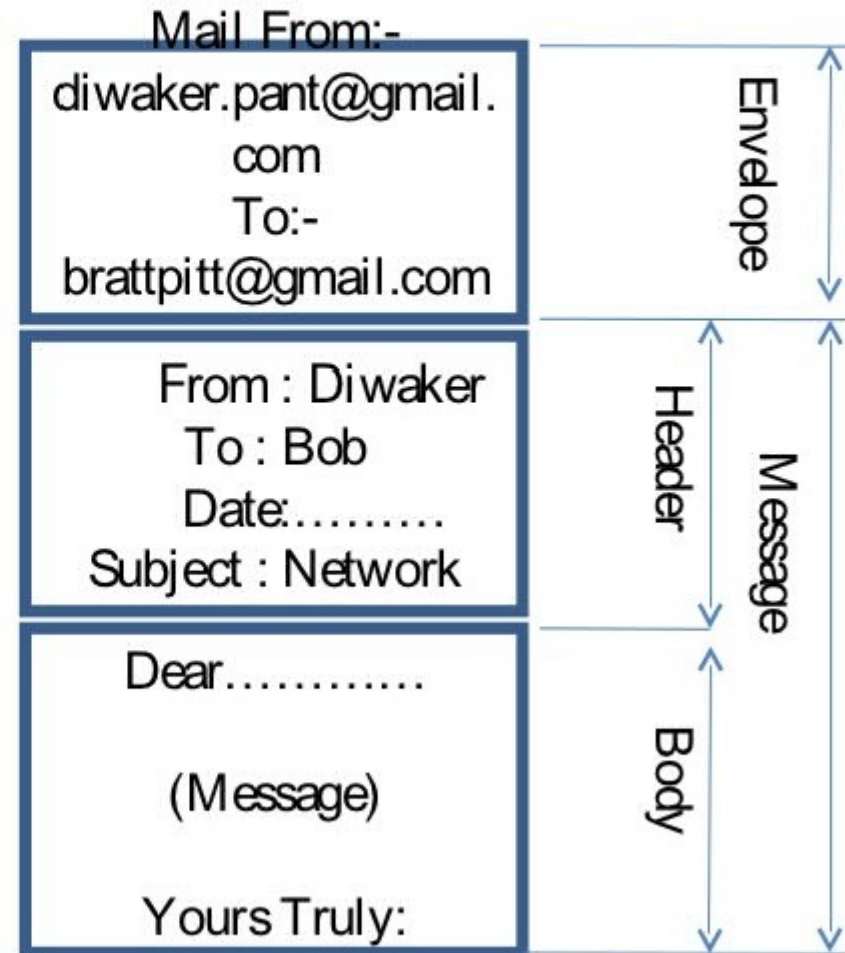
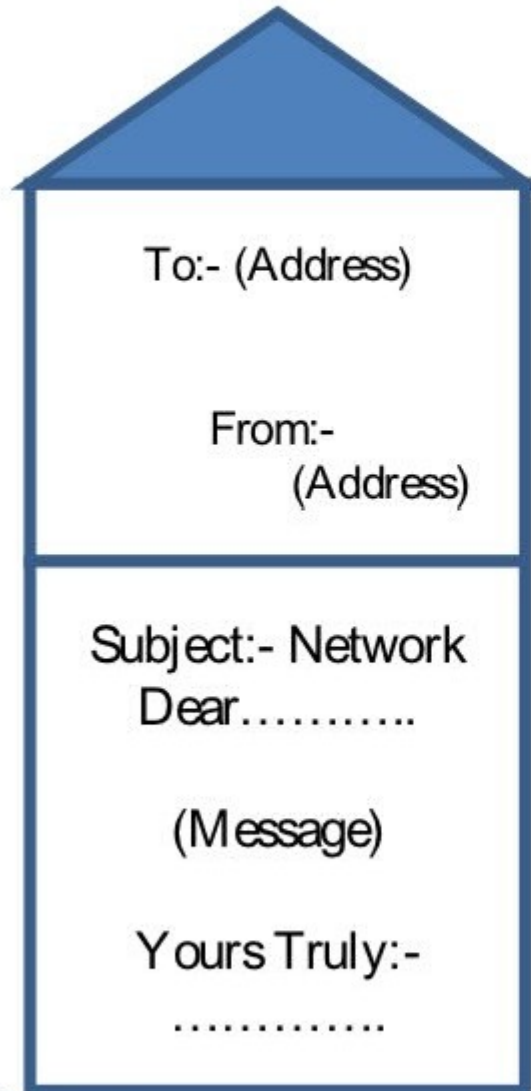
Applications

- ❏ **E-mail**
- ❏ **Searchable Data (Web Sites)**
- ❏ **E-Commerce**
- ❏ **News Groups**
- ❏ **Internet Telephony (VoIP)**
- ❏ **Video Conferencing**
- ❏ **Chat Groups**
- ❏ **Instant Messengers**
- ❏ **Internet Radio**

WHAT IS E-MAIL

- **Electronic mail**, often abbreviated as **Email**, is a method of exchanging digital messages, designed primarily for human use.
- E-mail systems are based on a *store & forward* model in which E-mail server systems accept, forward, deliver and store messages on behalf of users, who only need to connect to the e-mail infrastructure.

COMPARISION WITH POSTAL MAIL



WHY TO USE E-MAIL

- ▶ We can send a message anytime anywhere.
- ▶ We can send the same message to several peoples at same time.
- ▶ We can forward the information to coworkers without retyping it.
- ▶ We can send the messages around the world as easily as to friend in the next cabin .



WHY TO USE E-MAIL..

- ▶ We can save the time, E-mail is very fast, usually taking no more time than a few minutes to be received.
- ▶ We can mail Electronic documents and recipients can then edit and return revised versions.
- ▶ It is very fast as compare to postal mail.

STRUCTURE OF E-MAIL

An electronic mail message consists of two components

- ▶ **Message header** The message header contains control information, including an originator's email address and one or more recipient addresses. Usually additional information is added, such as a subject header field.
- ▶ **Message body** which is the email's content.

HEADER FIELD

The message header should include at least the following fields:

- ▶ **From** The e-mail addresses, and optionally the name of the author or sender.
- ▶ **To:** The e-mail address of the message's recipient(s). Indicates primary recipients (multiple allowed), for secondary recipients see Cc: and Bcc.
- ▶ **Bcc:** Blind carbon copy; addresses added to the SMTP delivery list but not (usually) listed in the message data, remaining invisible to other recipients.
- ▶ **Cc:** Carbon copy; Many e-mail clients will mark e-mail in your inbox differently depending on whether you are in the To: or Cc: list.

HEADER FIELD

- ▶ **Date**: The local time and date when the message was written, automatically attached while sending.
- ▶ **Subject**: A brief summary of the topic of the message.
- ▶ **Message-ID**: Also an automatically generated field; used to prevent multiple delivery .
- ▶ **Attachment**: Attachment contain the name of files . That you want to send. example a word document.

E-MAIL ADDRESS

- ▶ To deliver mail ,a system must use an addressing system with unique addresses
- ▶ Address consist two parts :
 1. Local part
 2. Domain name
- ▶ These are separated by @ sign.

E-MAIL ADDRESS

- Like a postal address, an **e-mail address** specifies the **destination** of an electronic message.
- An **Internet** e-mail address looks like this: **user name@domain name**
- The **user name** is a unique name that identifies the **recipient**.
The **domain name** is the address.
Many people can share the same domain name.

