Introduction to computer Network
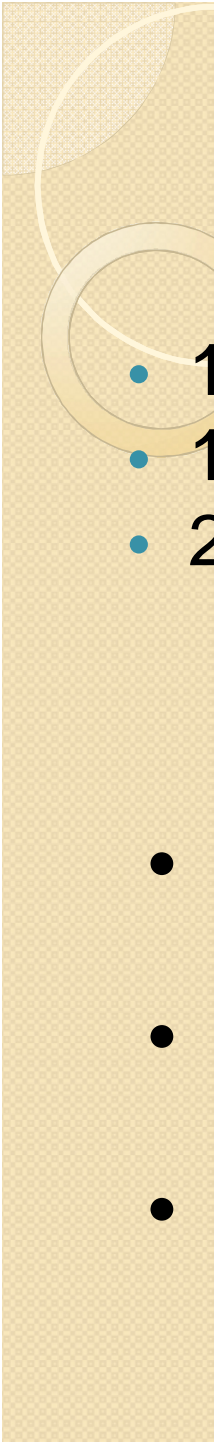
Section A

- 18th century ---- era of Industrial revolution
- 19th century ---- age of Steam Engine
- 20th century ----
  - Telephone networks
  - Radio
  - Television
  - Unprecedented growth of Computer Industry

- Earlier computer systems were highly centralized within a single large room like Glass Rooms.
- Visitors could stare at Great electronic Wonder Inside
- A medium sized company had one or two computers

COMPUTER AND COMMUNICATION HAD A PROFOUND INFLUENCE ON THE WAY COMPUTER SYSTEMS ARE ORGANIZED
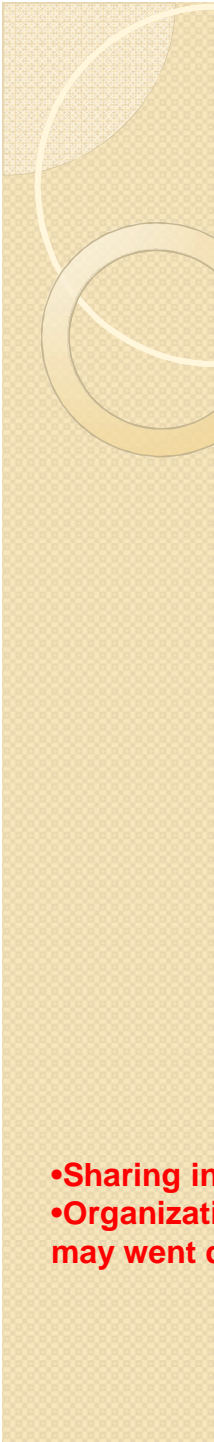
What is Computer Networks

- Collection of <u>Self Governed- independent computers interconnected</u> by a <u>single technology</u> is called Computer Network

- Two computers are said to be interconnected if <u>they are able to exchange information</u>

- Connection can be through a copper wire, fiber optics, microwaves, infrared or satellite

- Neither the Internet nor the WWW is a Computer Network.

Internet is Network of networks. & Web is a distributed system that runs on the top of the internet.

Uses of Computer Networks

A. Business Applications

B. Home Applications

C. Mobile Users

D. Social Issues

# (A) <u>Business Applications</u> of Networks(1)

1. <u>RESOURCE SHARING</u>: Goal is to make all programs, equipment, and especially data available to anyone on the network without regard to the physical location of the resource and the user.

  - **Example: group of office workers share a common printer.**

•Sharing information is more imp than sharing physical resources like printer, scanners etc.
•Organizations Trust Online Information over hardware resources like computers(because they get crashed or Servers may went down).

Business Applications of Networks(2)

Nancy

Client

Server

Network
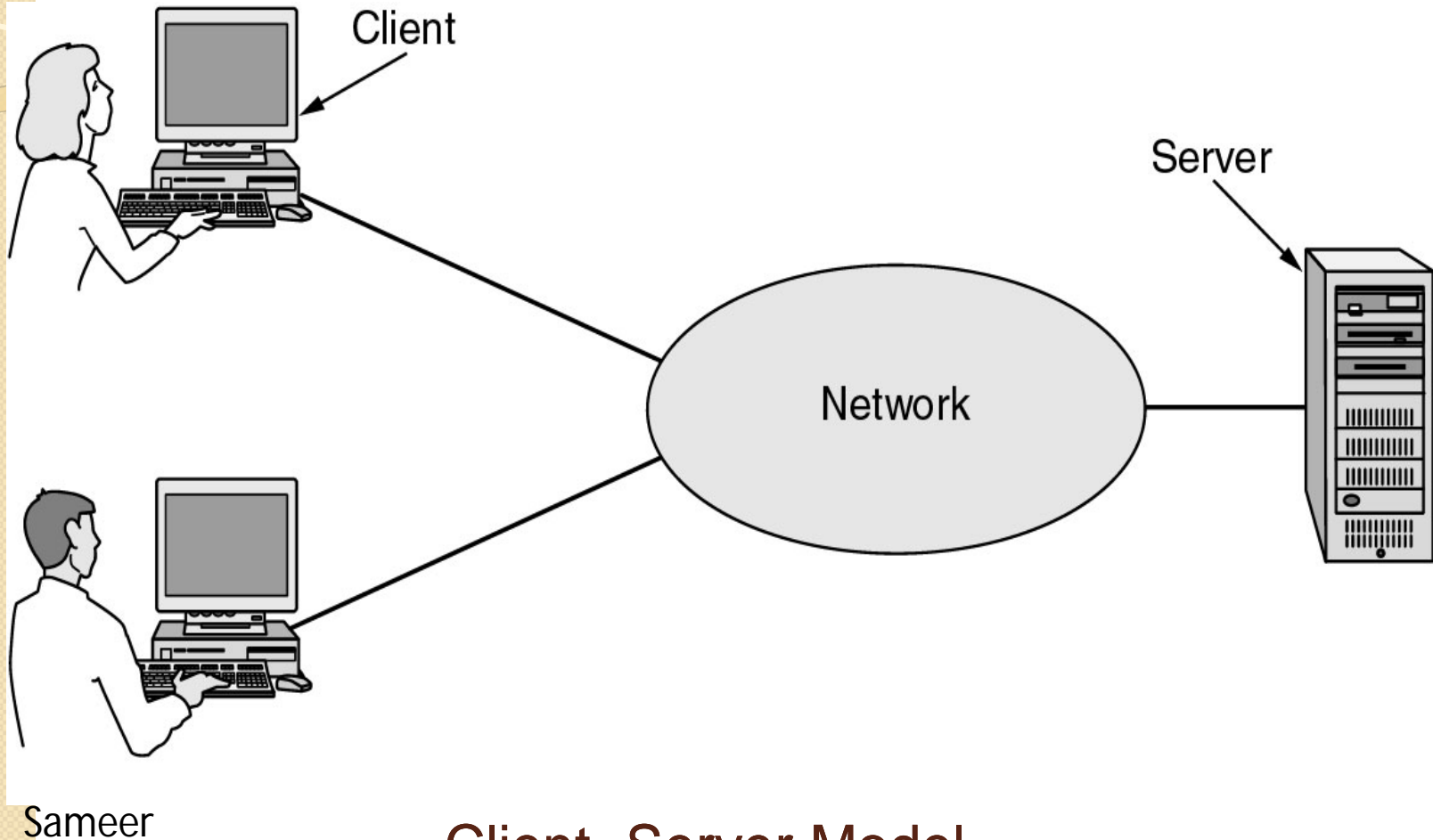
Sameer

Client- Server Model

Example

Both Nancy and Sameer works for Company X. Nancy wants to access some data about the employees who works at New Delhi. In this case the data is stored on Powerful Computers called Servers.
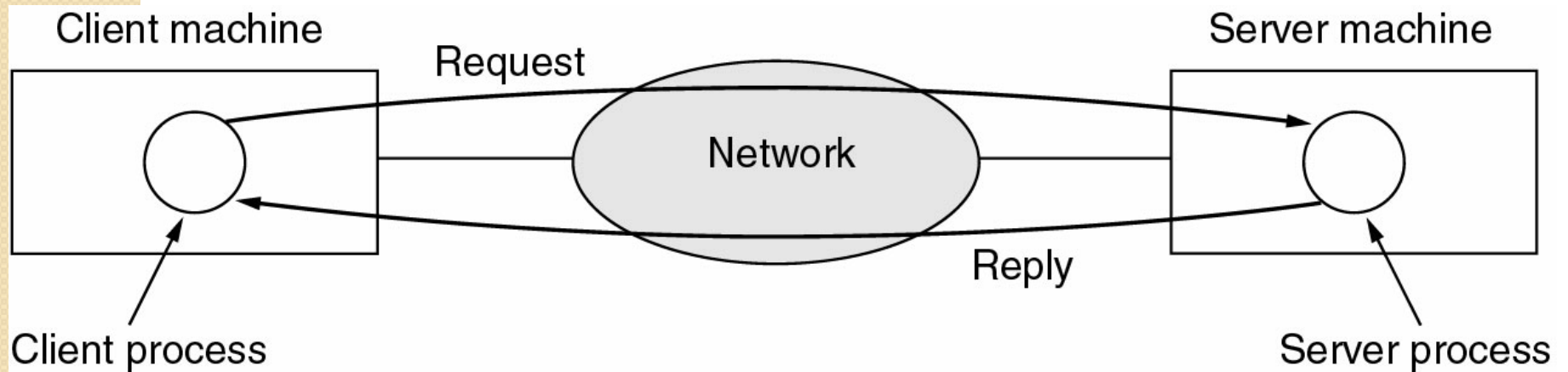
SERVER maintains all the database.

Employee uses CLIENT to access remote data.

This whole arrangement is called Client Server Model

Business Applications of Networks (2)

- The client-server model involves requests and replies.

Business Applications of Networks(3)

Computer Network provide POWERFUL

- **Communication Medium**
  - e-mail
  - Videoconferencing
  - e-commerce/ online shopping

(B) Home Network Applications

Why do people buy computers for home use?

Initially for word processing & Gaming, but **Biggest reason is Internet Access**

- Access to remote information
  - Surfing eBooks, filing tax, sports, travel etc
  - This all implies interaction between a person and remote database full of information

- Electronic commerce

- Person-to-person communication like chat rooms, Blogs etc

- Interactive entertainment like video on demand

Home Network Applications (2)

- **Person-to-person communication**
  - Email
  - Chatting, video calling, internet calls
  - Another person to person communication goes by the name <u>Peer-to-Peer Communication</u> . In this system there are no fixed clients and servers
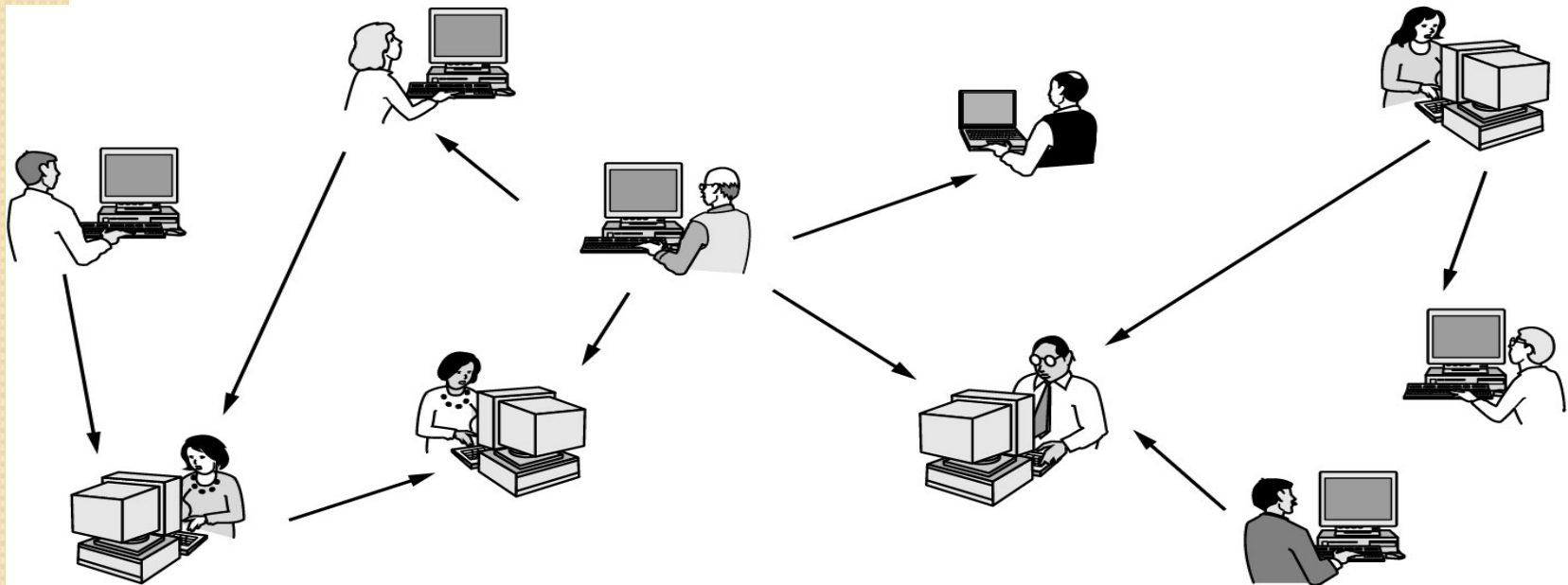
Home Network Applications (3)

- Some forms of e-commerce.

Tag	Full name	Example
B2C	Business-to-consumer	Ordering books on-line
B2B	Business-to-business	Car manufacturer ordering tires from supplier
G2C	Government-to-consumer	Government distributing tax forms electronically
C2C	Consumer-to-consumer	Auctioning second-hand products on-line
P2P	Peer-to-peer	File sharing

(C)Mobile Network Users

Wireless	Mobile	Applications
No	No	Desktop computers in offices
No	Yes	A notebook computer used in a hotel room
Yes	No	Networks in older, unwired buildings
Yes	Yes	Portable office; PDA for store inventory

- Why would anyone want wireless networks? (Common reason is **Portable Offices**)
- Combinations of fixed wireless networks and mobile wireless computing.

PDA's stand for Personal Digital Assistants,

(D) Network Hardware

- There are two important dimensions which stand into which all computer networks fit
  - Transmission Technology
  - Scale.

Types of transmission technology

- ## Broadcast links
  - Broadcast networks have a <u>single communication channel</u> that is <u>shared</u> by <u>all the machines</u> on the network. Short messages, called <u>packets</u> in certain contexts**,** <u>sent</u> by any machine <u>are received by all</u> the others. An <u>address field</u> within the packet specifies the <u>intended recipient</u>. Upon receiving a packet, a machine checks the address field. If the packet is intended for the receiving machine, that <u>machine processes the packet</u>; if the packet is intended for some <u>other</u> machine, it is just <u>ignored</u>. Eg. Sending SMS to groups.

- ## Point-to-point links
  - Point-to-point networks consist of <u>many connections</u> <u>between individual pairs</u> of machines. To go from <u>the source</u> <u>to the destination</u>, a packet on this type of network may have to <u>first visit one or more intermediate machines</u>.

Alternative criterion for classifying networks is Scale

Interprocessor distance	Processors located in same	Example
1 m	Square meter	Personal area network
10 m	Room	Local area network
100 m	Building	Local area network
1 km	Campus	Local area network
10 km	City	Metropolitan area network
100 km	Country	Wide area network
1000 km	Continent	Wide area network
10,000 km	Planet	The Internet

- Classification of interconnected processors by scale.

Applications

- E-mail
- Searchable Data (Web Sites)
- E-Commerce
- Internet Radio

Scope of Research

1. Security in computer networks

2. Bandwidth improvement for data communication over networks

3. Better Data rates