Introduction

CSE306

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DATA COMMUNICATIONS

- The term TELECOMMUNICATION means communication at a distance. The word DATA refers to information presented in whatever form is agreed upon by the parties creating and using the data.

- Data communications are the exchange of data between two devices via some form of transmission medium such as a wire cable or may be wireless.

Effectiveness of Data Communication

Four Fundamental Characteristics

- Delivery
- Accuracy
- Timeliness - -*real time*
- Jitter

POLL 1

Which of the following is NOT an example of fundamental characteristics of communication

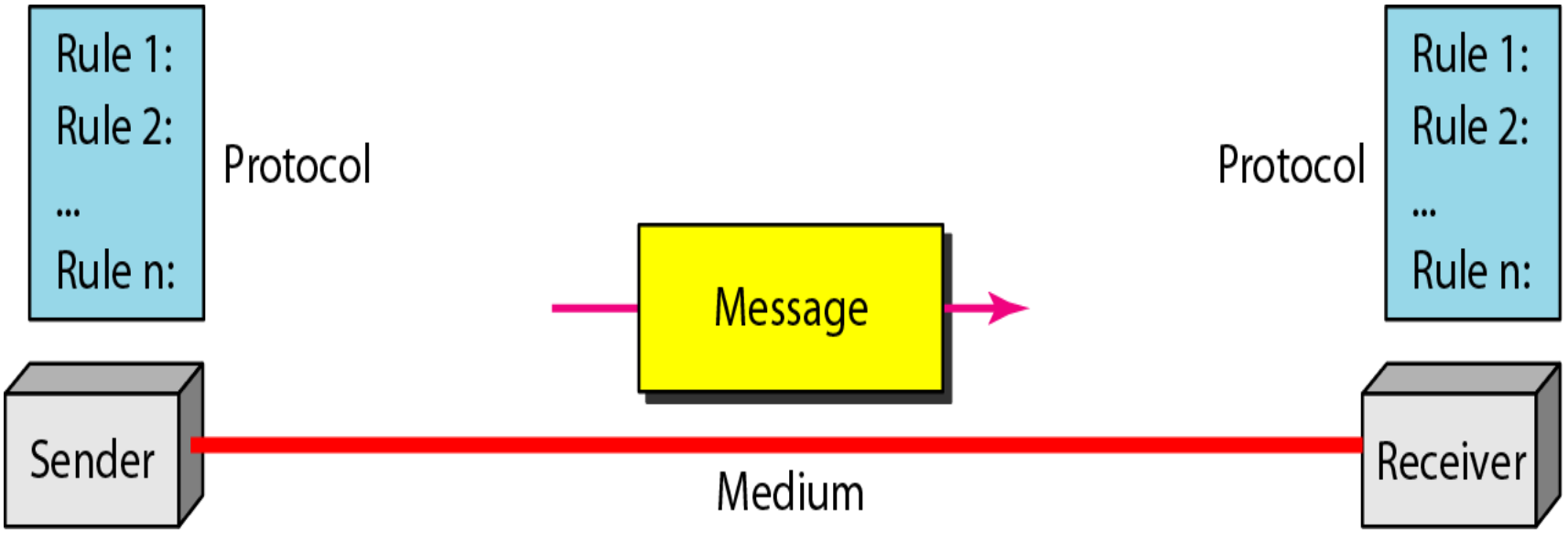
a) Accuracy

b) Delivery

c) Jitter

d) Compression

Components of a Data Communication System



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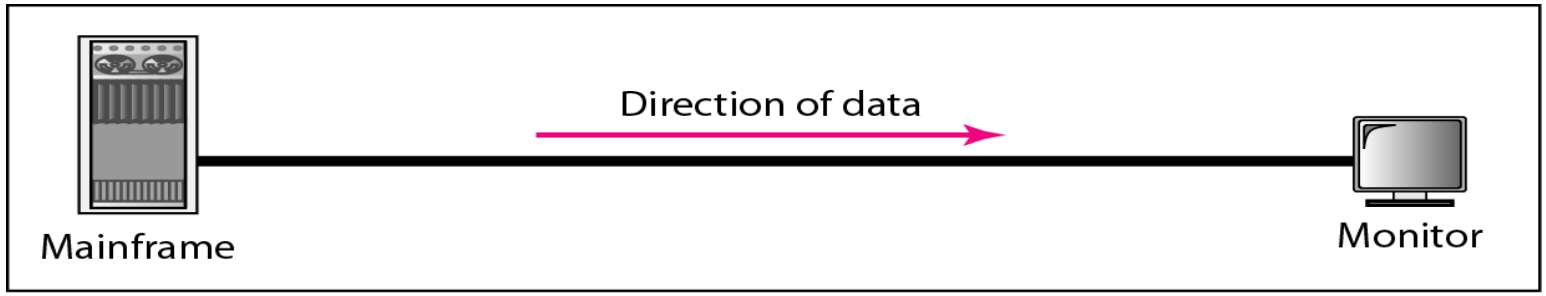
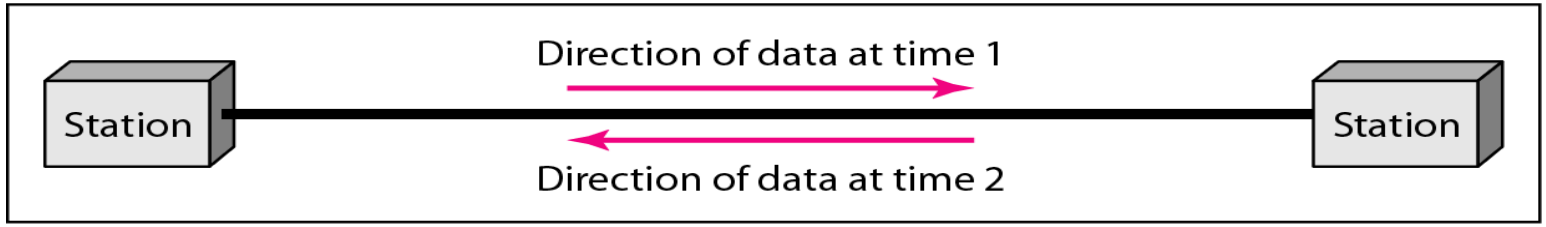
Five Components:

- Message- ***Text, Number, Image, Audio, Video***
- Sender
- Receiver
- Transmission Medium
- Protocol

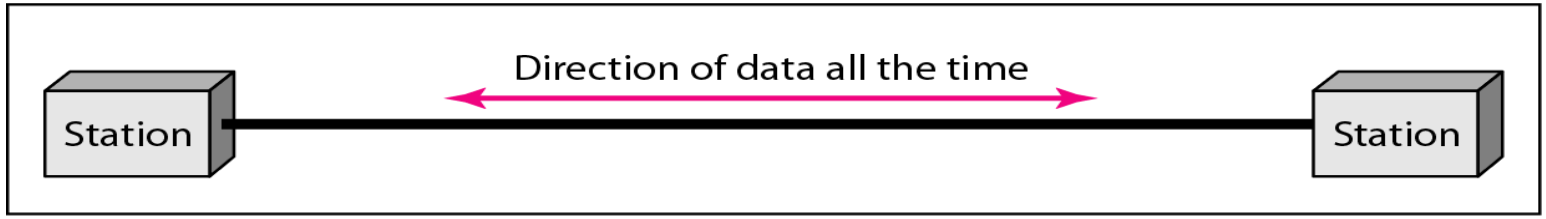
Data flow (Simplex, Half-duplex, and Full-duplex



a. Simplex



b. Half-duplex



c. Full-duplex

POLL 2

Bi-directional data communication possible only at two different time interval is associated with

a) Simplex

b) Half-Duplex

c) Duplex

d) None of the above

NETWORKS

- A network is a set of devices (often referred to as nodes) connected by communication 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.

- A link can be a cable, air, optical fiber, or any medium which can transport a signal carrying information.

POLL 3

A node is a representation of

a) PC

b) Printer

c) Laptop

d) All of the above

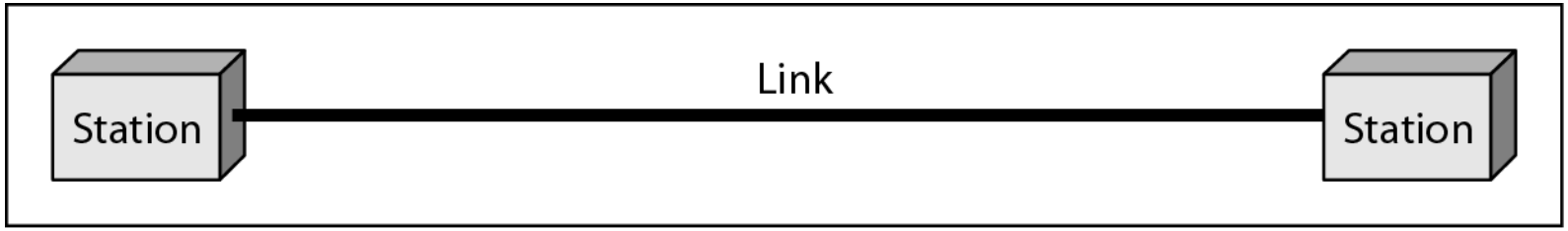
Network Criteria

- Performance
  - Depends on Network Elements- Transmit time, Response Time, Number of users, type of transmission medium, hardware, software.
  - Measured in terms of Delay and Throughput
- Reliability
  - Failure rate of network components.
  - Time to recover from a failure.
  - Measured in terms of availability/robustness
- Security
  - Data protection against corruption/loss of data due to:
    - Errors
    - Malicious users/ Unauthorized access.

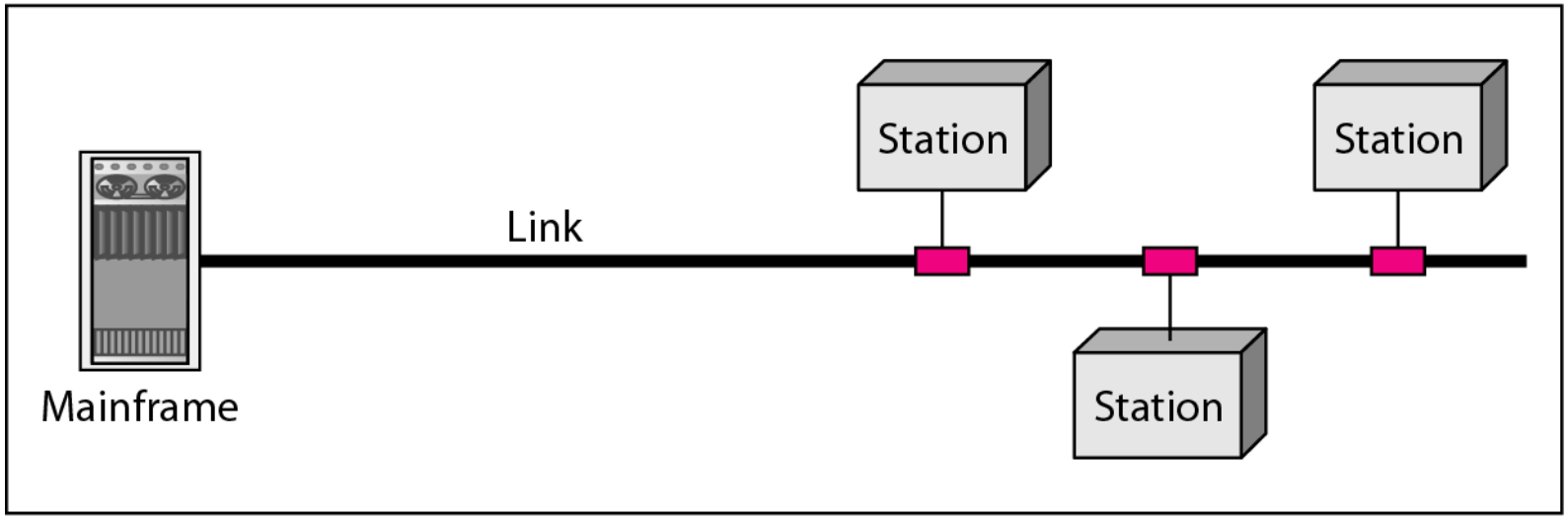
Physical Structures

- Type of Connection
  - Point to Point - single transmitter and receiver
  - Multipoint - multiple recipients of single transmission
- Physical Topology
  - Connection of devices
  - Type of transmission - unicast, mulitcast, broadcast

Types of connections: point-to-point and multipoint



a. Point-to-point



b. Multipoint

Uses of Computer Network

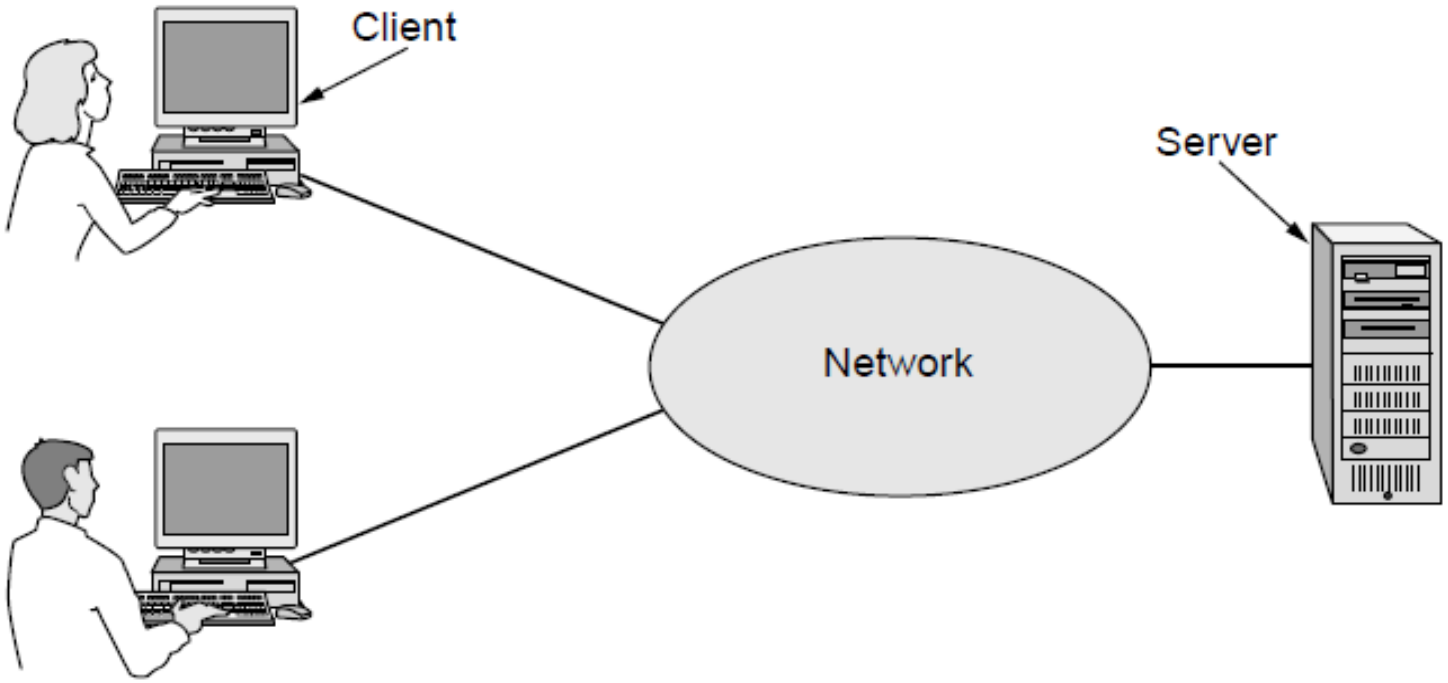
- Business Applications
- Home Applications
- Mobile Users
- Social Issues

Business Applications

- Resource sharing such as printers and storage devices

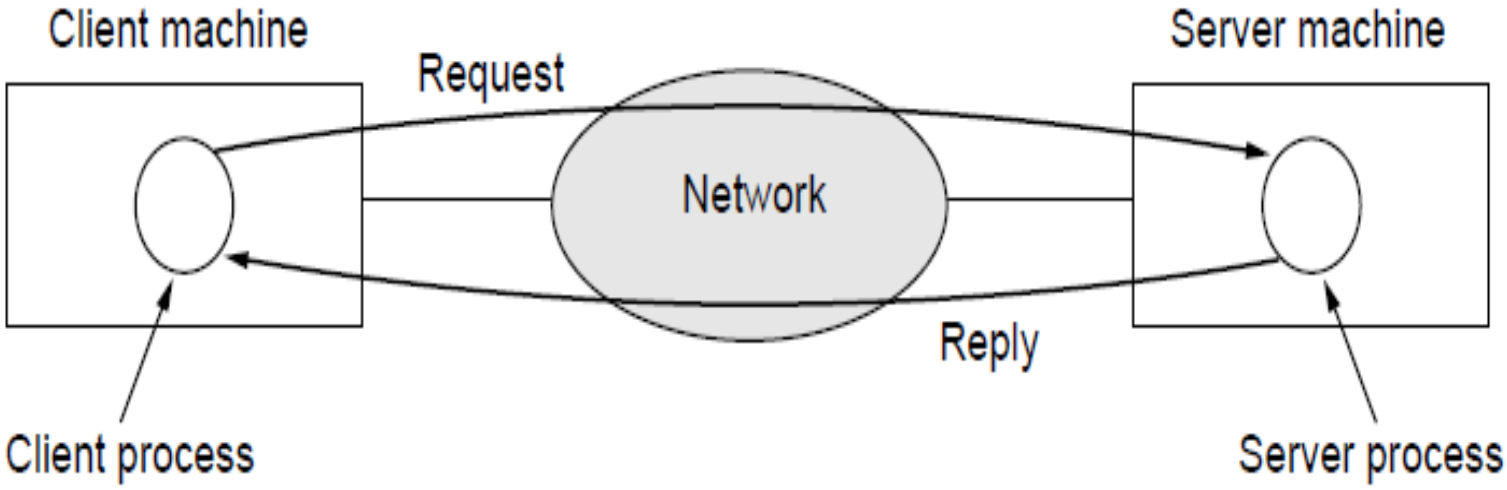
- Exchange of information by means of e-Mails and FTP

Business Applications (1)



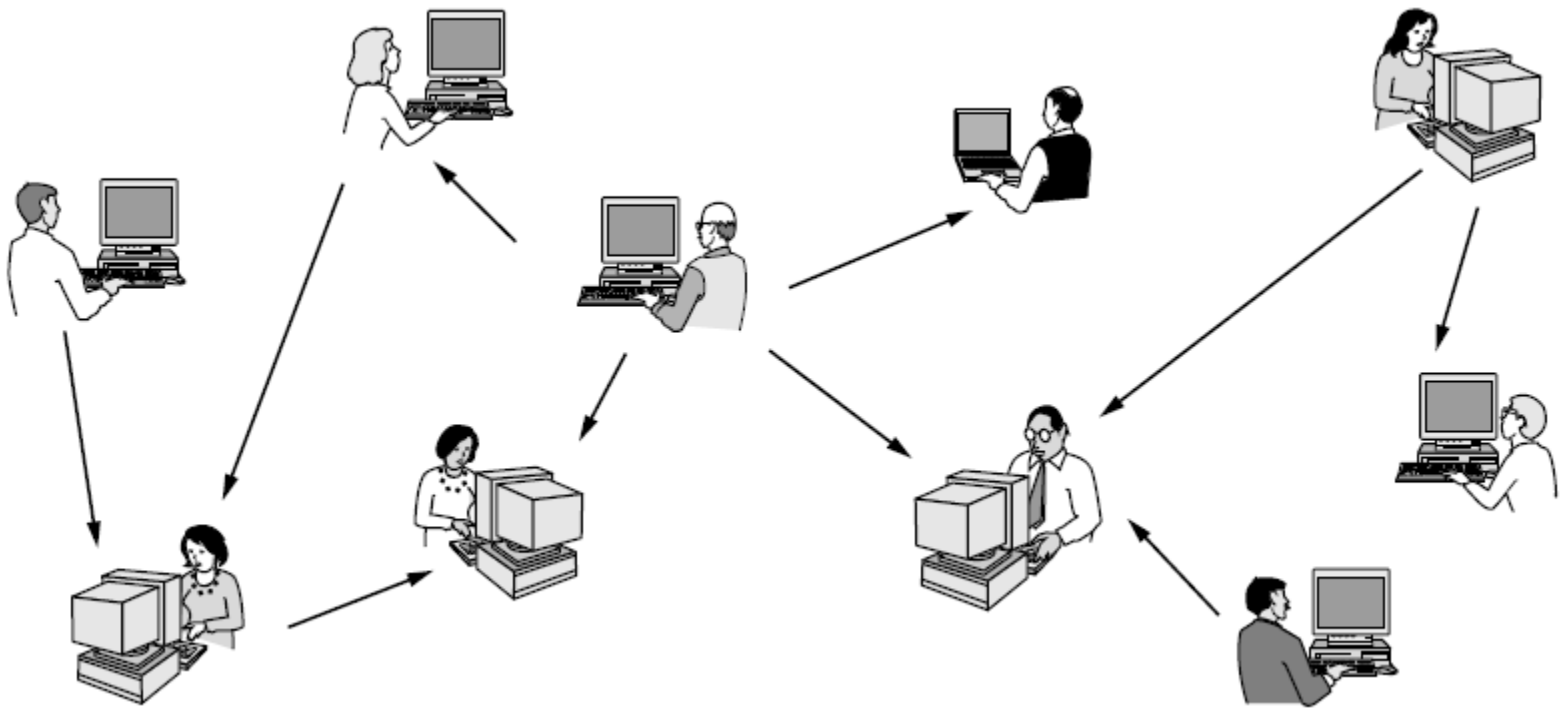
A network with two clients and one server

Business Applications (2)



The client-server model involves requests and replies

Home Applications (1)



In a peer-to-peer system there are no fixed clients and servers.

Home Applications (2)

Some forms of e-commerce

Tag	Full name	Example
B2C	Business-to-consumer	Ordering books online
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 online
P2P	Peer-to-peer	Music sharing

Mobile Users

Combinations of wireless networks and mobile

Wireless	Mobile	Typical applications
No	No	Desktop computers in offices
No	Yes	A notebook computer used in a hotel room
Yes	No	Networks in unwired buildings
Yes	Yes	Store inventory with a handheld computer

Social Issues

- Network neutrality
- Digital Millennium Copyright Act
- Profiling users
- Phishing

PROTOCOLS

- A protocol is synonymous with rule. It consists of a set of rules that govern data communications. It determines what is communicated, how it is communicated and when it is communicated.
- The key elements of a protocol are
  - Syntax
  - Semantics
  - Timing

Elements of a Protocol

- Syntax
  - Structure or format of the data
  - Indicates how to read the bits - field delineation
- Semantics
  - Interprets the meaning of the bits
  - Knows which fields define what action
- Timing
  - When data should be sent and what
  - Speed at which data should be sent or speed at which it is being received.

POLL 4

The Key elements of a Protocol is/are

a) Syntax

b) Semantic

c) Timing

d) All of the above

Types of Network

- **Wired Networks**
- high bandwidth
- low bandwidth variability
- can listen on wire
- high power machines
- high resource machines
- low delay
- connected operation

-No Mobility.

- **Mobile Networks**
- low bandwidth
- high bandwidth variability
- hidden terminal problem
- low power machines
- low resource machines
- higher delay
- disconnected operation

Mobility.


Any questions?