DATA COMMUNICATION AND COMPUTER NETWORK

PAPER – BCA-304

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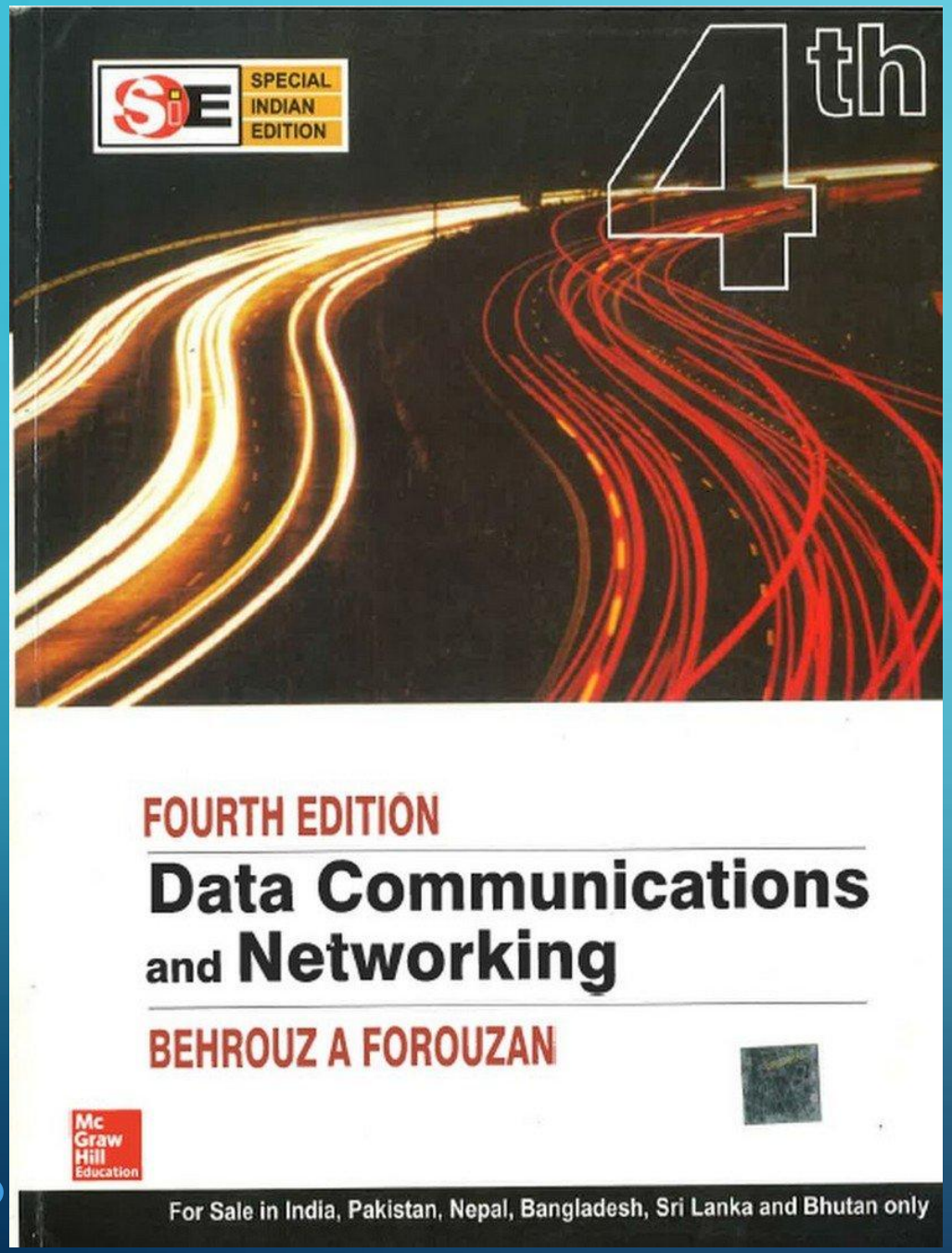
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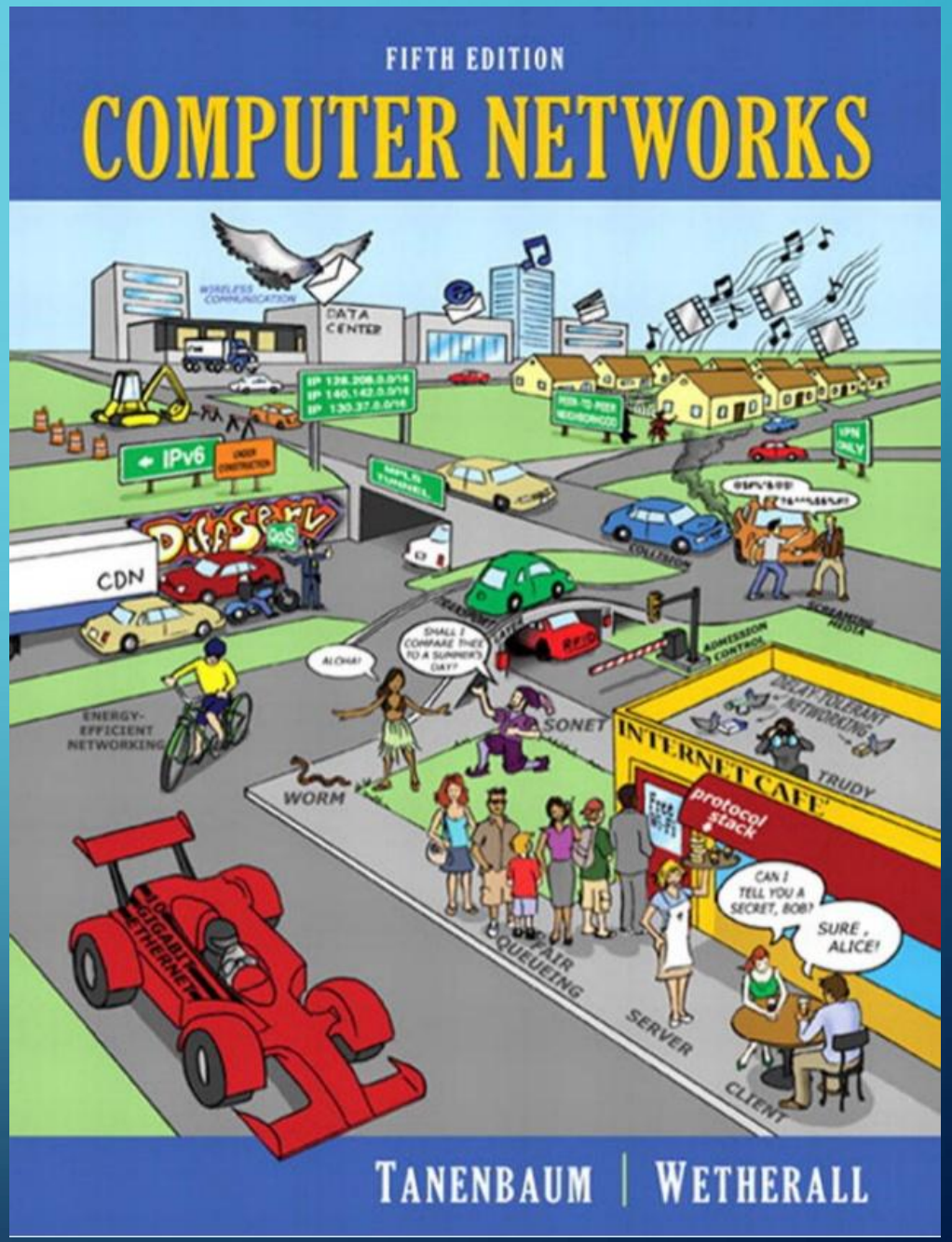
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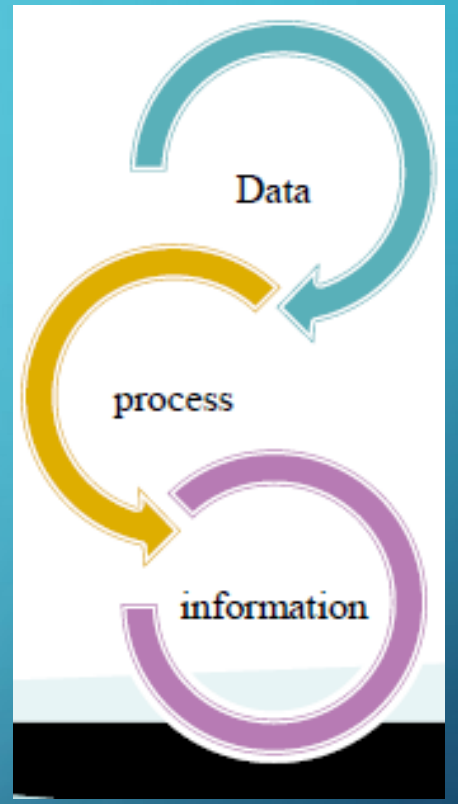
UNIT-I
BASIC OF DATA COMMUNICATION

WHAT IS DATA?

Data *consist on raw facts and figures. by using an object data can be easily get. While information is process foam of data. data is not certain while information is certain.*

When data is dent over physical medium it needs to first convert into electromagnetic ***signals****.*

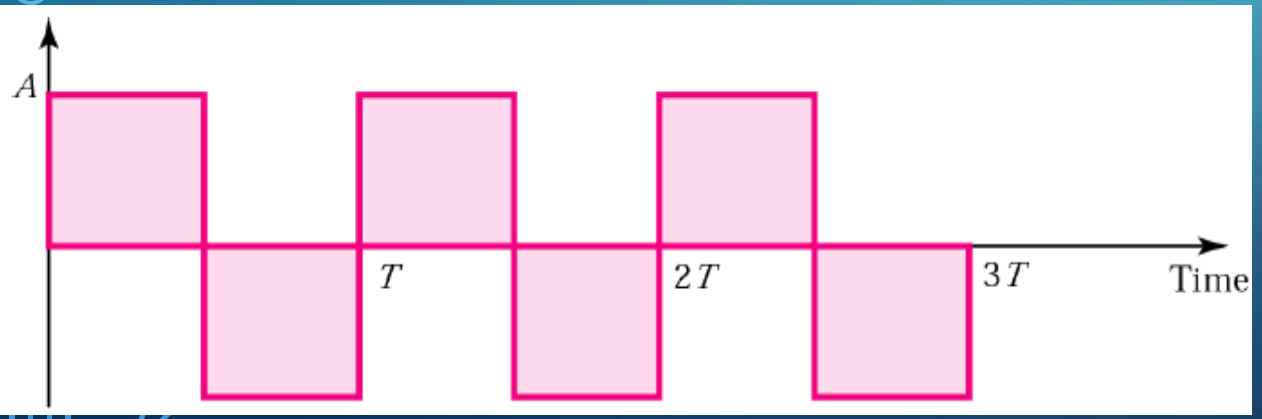


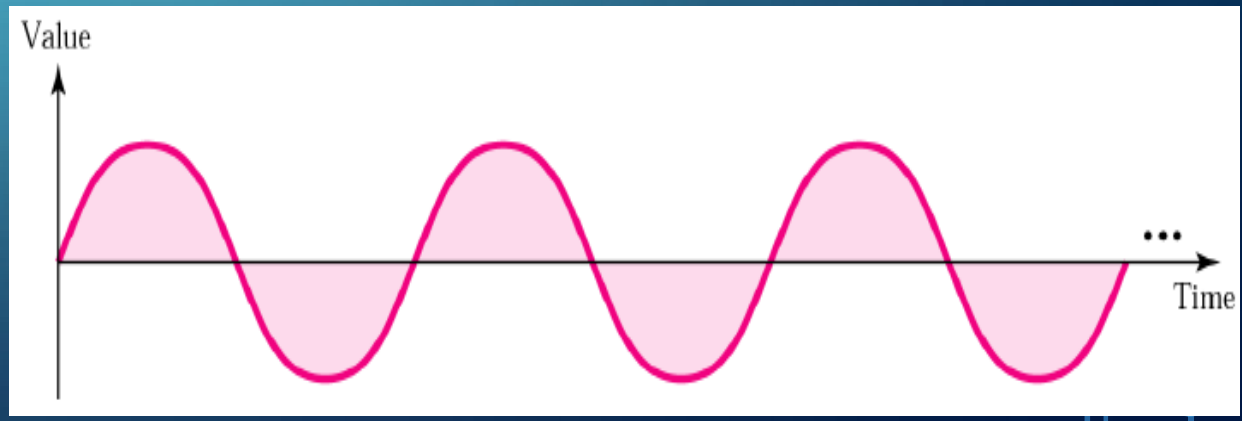
SIGNAL

- *Electronic or electromagnetic representation of data, possibly Analog or digital.*

Analog Signal –An analog signal is any continuous signals for which the time is variable of the signal.

Digital Signal – A digital signal is a physical signal that is a representation of a sequence of discrete values.





WHAT IS COMMUNICATION?

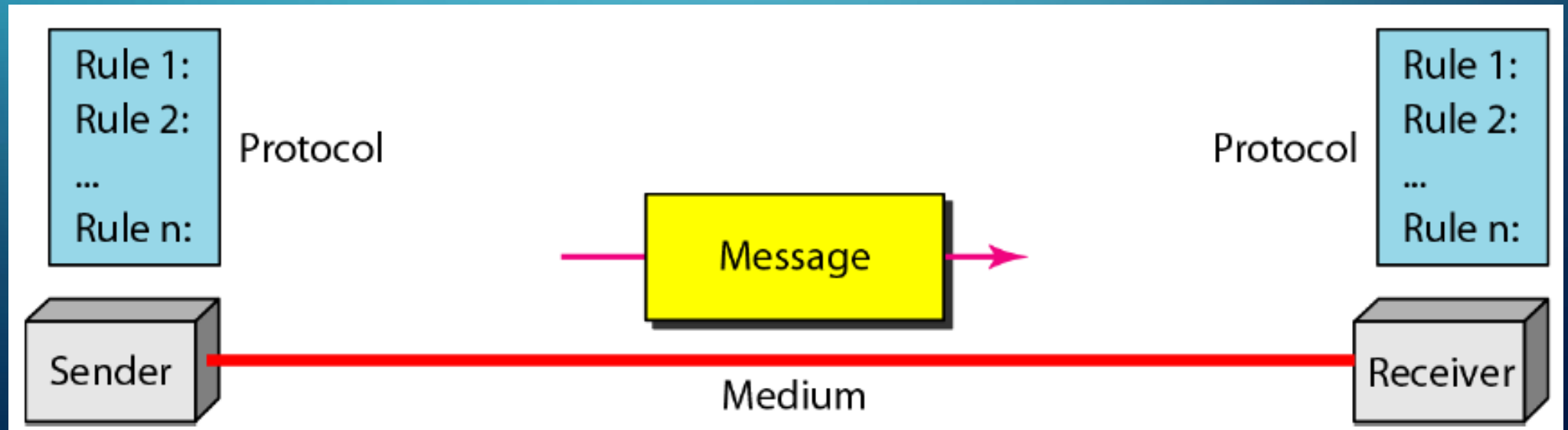
Communication is nothing but exchange of information between a person and a system.

WHAT IS DATA COMMUNICATION?

- *Electronically transmission of data from one place to another place by using a medium is called data communication.*
- *The purpose of data communications is to provide the rules and regulations that allow computers with different disk operating systems, languages, cabling and locations to share resources.*
- *The rules and regulations are called protocols and standards in data communications.*

ELEMENTS OF DATA COMMUNICATION

- *Message*
- *Sender*
- *Medium*
- *Receiver*
- *Protocol*



ELEMENTS OF DATA COMMUNICATION

- ***Message:-*** *Message is nothing but information or data which is to be sent from one point to the other. A message can be in the form of sound, text, number, picture, video or combination of them.*
- ***Sender:-*** *Sender is the device which sends the message.*
- ***Medium:-*** *It is the physical path over which the message travels from the sender to the receiver, it can be wired or wireless.*

ELEMENTS OF DATA COMMUNICATION

- ***Receiver:-*** *It is the device which receives the message.*
- ***Protocol:-*** *Protocol is defined as the set of rules which govern data communication. The connection of two devices takes place via the communication medium, but the actual communication between them will take place with the help of protocol.*

FUNDAMENTAL CHARACTERISTICS OF DATA COMMUNICATION

- *The effectiveness of a data communication system depend on four fundamental characteristics:*
  - *Delivery*
  - *Accuracy*
  - *Timelines*
  - *Jitter*

Delivery :- The data should be delivered to the correct destination. It should reach only to the intended.

FUNDAMENTAL CHARACTERISTICS OF DATA COMMUNICATION

Accuracy :- ***There is a possibility of data alternation or corruption when it is travelling over a communication medium. This will affect the accuracy of the received data. The data communication system should be such that it should deliver data accurately.***

Timelines:- ***For the audio and video data, the system should deliver the data in a timely manner i.e. deliver as it is produced without any time delay. Such a data delivery is called as real-time transmission of data.***

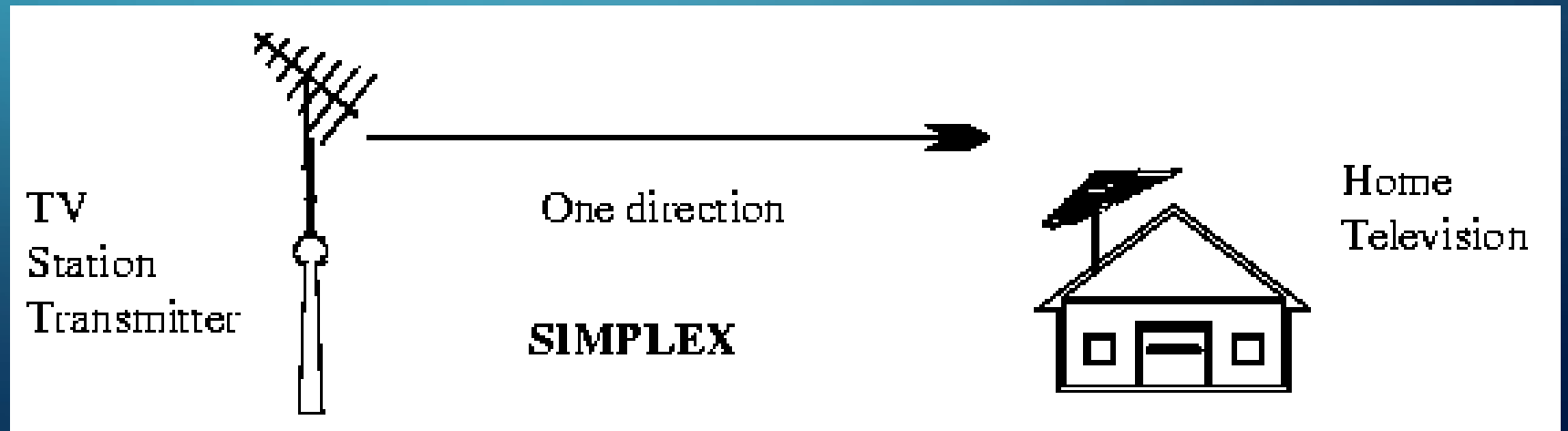
Jitter:- ***jitter refers to the variation in packet arrival time. It is the uneven delay in the delivery of audio or video packets.***

DATA COMMUNICATION MODES

Data communication modes define behavior of data flow during communication which is based on interval of time.

Data flow is the flow of data between two points. The direction of the data flow can be described as –

Simplex: *Data flows in only one direction on the data communication line (medium). Examples are radio and television broadcasts.*



DATA COMMUNICATION MODES

Half Duplex: *data flows in both directions but only one direction at a time on the data communication line.*

For example, a conversation on walkie-talkies is a half-duplex data flow.

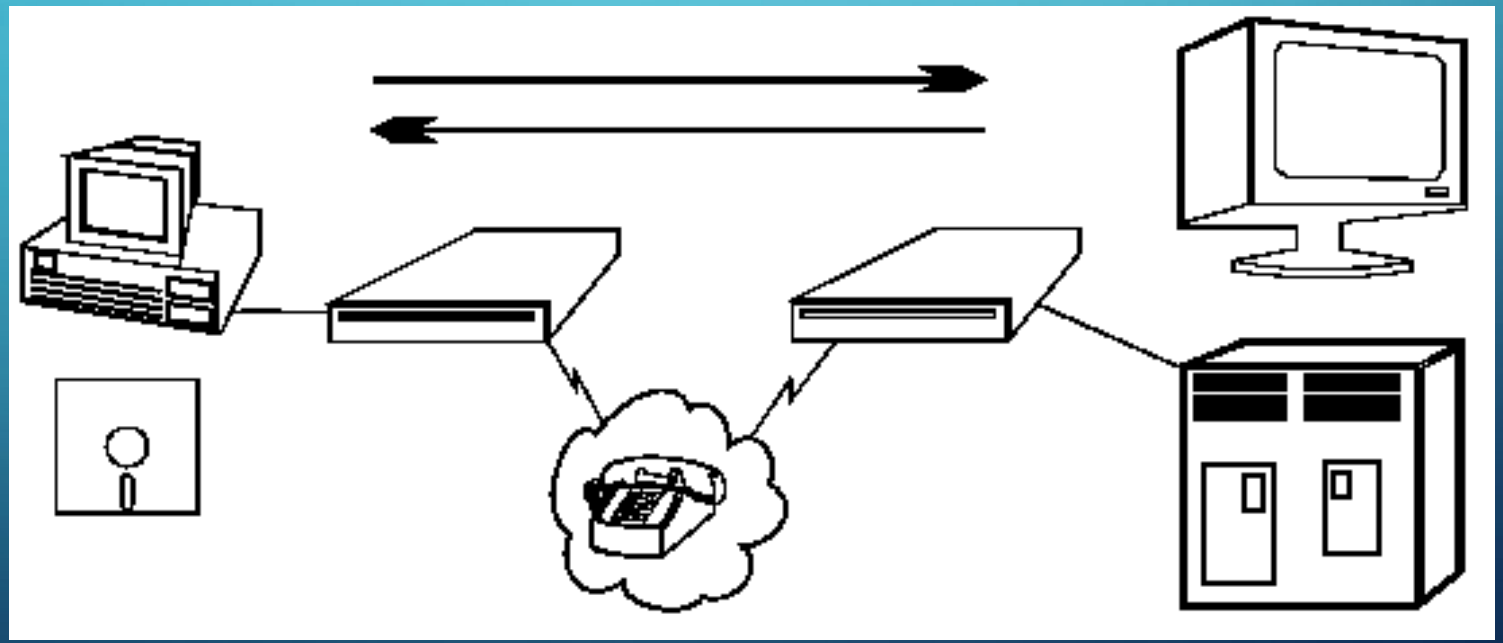
Each person takes turns talking. If both talk at once - nothing occurs!

DATA COMMUNICATION MODES

Full Duplex: *Data flows in both directions simultaneously.*

Modems are configured to flow data in both directions.

Bi-directional both directions simultaneously!



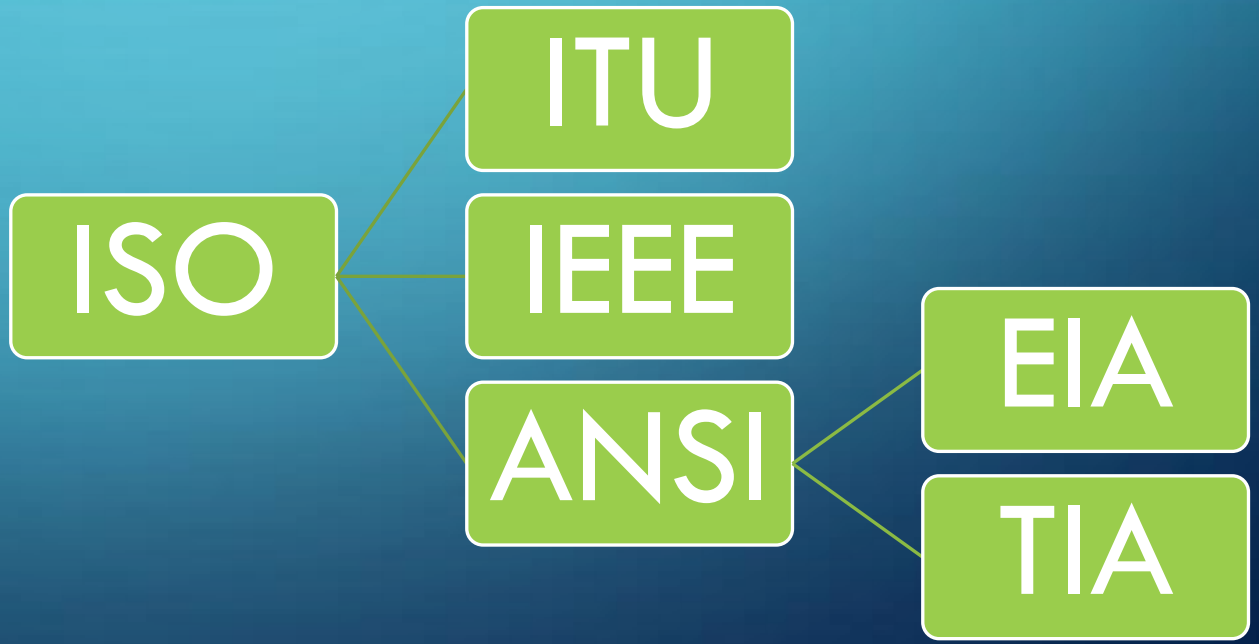
STANDARDS

- *Standard provides guidelines to the manufacturer, venders or the government agencies and other service providers to ensures the kind of interconnectivity necessary in today's market place and in international communications.*
- *so, standard is nothing but agreed upon rules.*

CATEGORIES OF STANDARDS

- *De-facto – by convention or by fact*
- *De-jure – by law or by government*

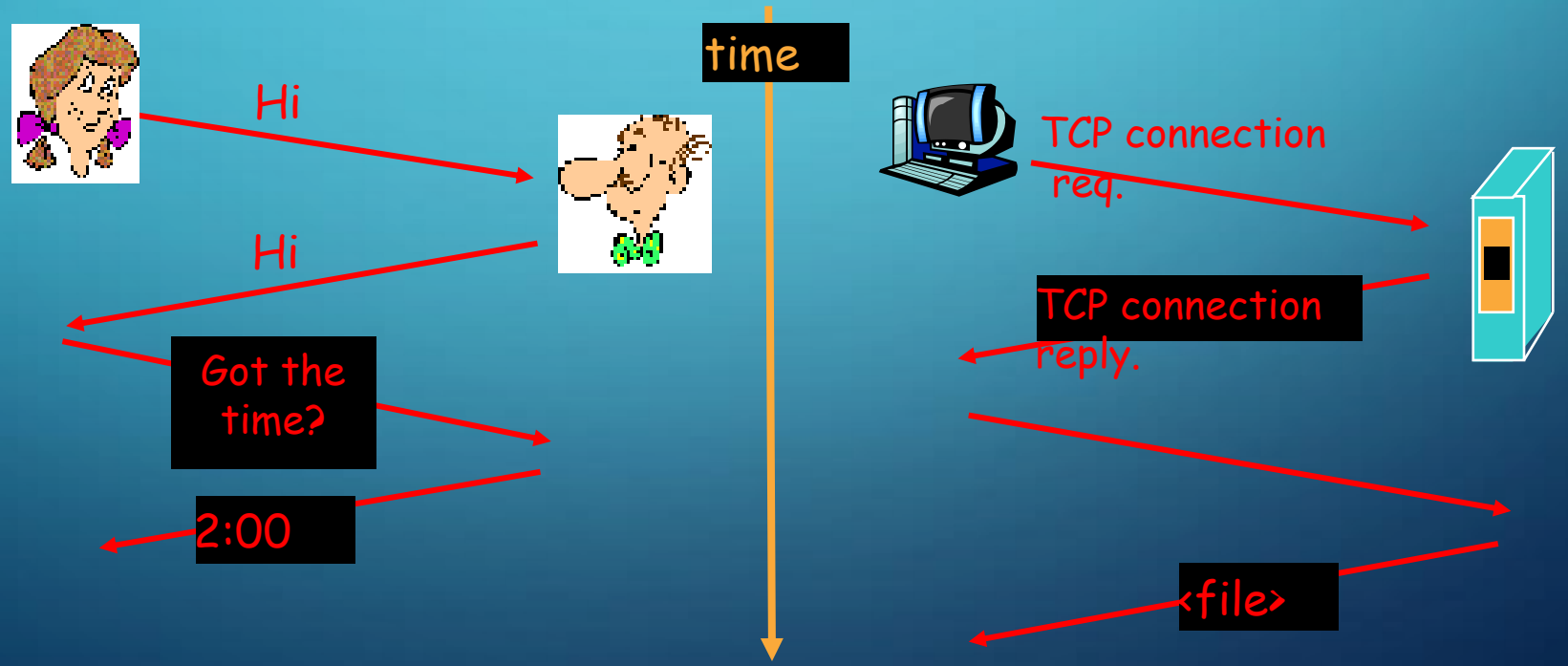
Standard Organizations



PROTOCOL

- *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 and timing.



ELEMENTS OF 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

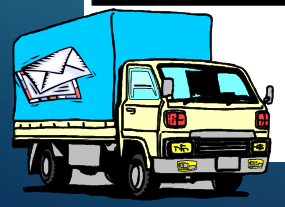
Timing

When data should be sent and what

Speed at which data should be sent or speed at which it is being received.

LAYERING

An example from the everyday life



Hierarchy?

Services

WHY LAYERED COMMUNICATION?

- *To reduce complexity of communication task by splitting it into several layered small tasks*
- *Functionality of the layers can be changed as long as the service provided to the layer above stays unchanged*
- *makes easier maintenance & updating*
- *Each layer has its own task*
- *Each layer has its own protocol*

REFERENCE MODELS

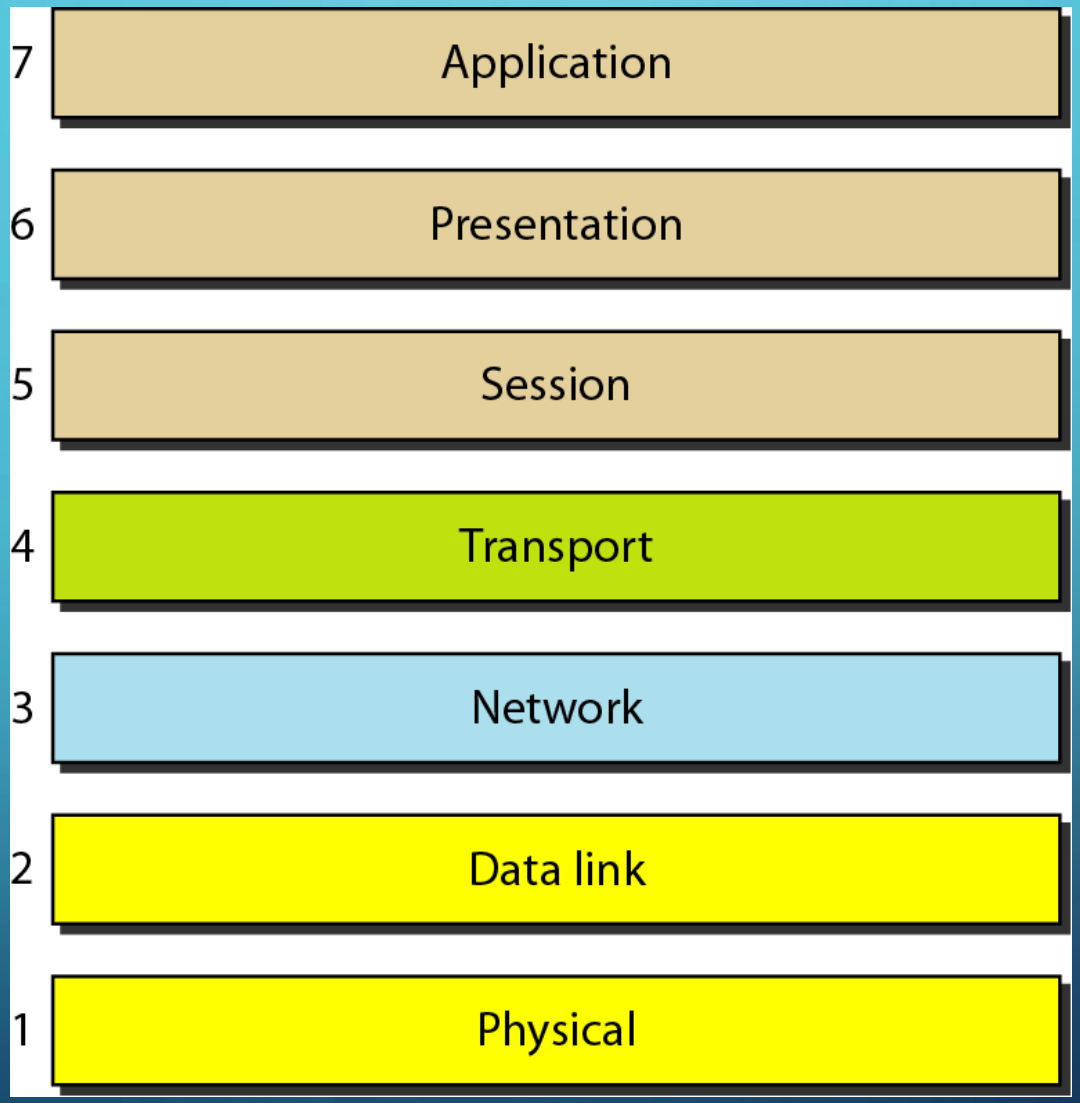
- OSI reference model
- TCP/IP

OSI REFERENCE MODEL

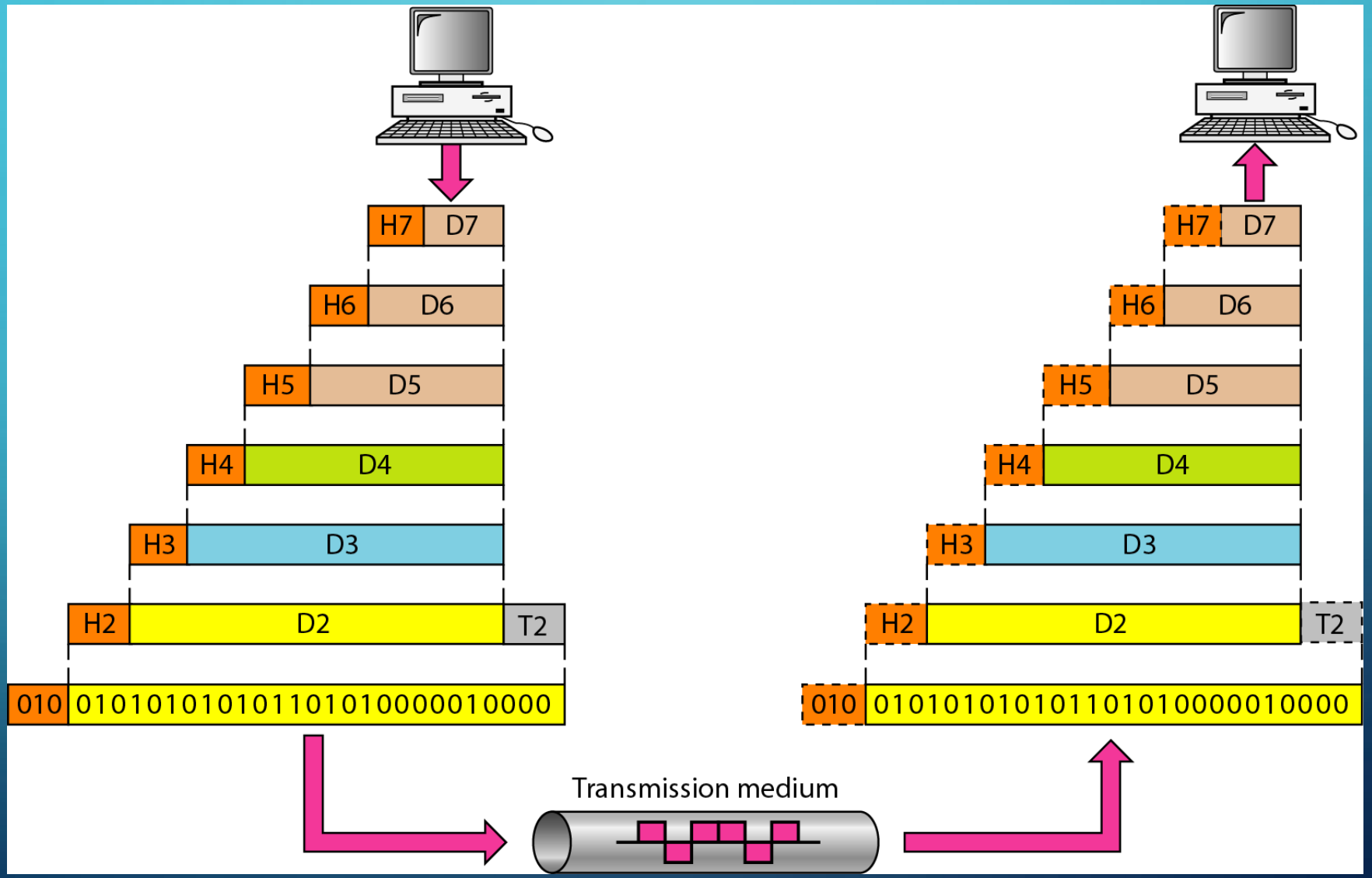
- *Open System Interconnection*
- *7 layers*

1. *Crate a layer when different abstraction is needed*
2. *Each layer performs a well define function*
3. *Functions of the layers chosen taking internationally standardized protocols*
4. *Number of layers – large enough to avoid complexity*

SEVEN LAYERS OF THE OSI MODEL



EXCHANGE USING OSI MODEL



THE INTERACTION BETWEEN LAYERS IN THE OSI MODEL