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Wisdom & Virtue

MIRPUR UNIVERSITY OF SCIENCE AND TECHNOLOGY (MUST), MIRPUR
DEPARTMENT OF SOFTWARE ENGINEERING



Computer Networks

Lecture [2a] : Modes of Network and Network Criteria

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Topics discussed in Today's Lectures

- Data Representation Forms
- Modes of Communication
- What is Computer Network



Data Representation Forms

- Information today comes in different forms such as text, numbers, images, audio, and video.

In data communications,

- **Text** is represented as a bit pattern, a sequence of bits (0s or 1s) named as Codes
 - Different sets of bit patterns have been designed to represent text symbols
 - Each set is called a code, and the process of representing symbols is called coding
 - Popular text coding schemes are Unicode, American Standard Code for Information Interchange (ASCII)
- **Numbers** are also represented by bit patterns
 - However, a code such as ASCII is not used to represent numbers
 - Number is directly converted to a binary number to simplify mathematical operations



Data Representation (Contd...)

- **Image** is composed of a matrix of **pixels** (picture elements)
 - Each pixel is a **small dot**
 - The size of the pixel depends on the **resolution**
 - For example, an image can be divided into 1000 pixels or 10,000 pixels
 - In the case of 10,000 pixels, there is a **better representation** of the image (better resolution), but more memory is needed to store the image
 - For an image made of only black and-white dots, a 1-bit pattern is enough to represent a pixel i.e. 0 shows **Black** and 1 represents **White**
 - Color image are shown by method known as **RGB** (Red, Green, Blue) and **YCM** (Yellow, Cyan, and Magenta)



Data Representation (Contd...)

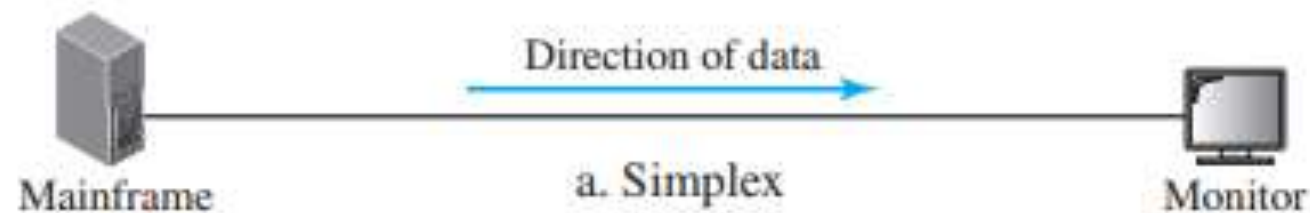
- **Audio** refers to the recording or broadcasting of **sound or music**
 - Audio is by nature different from text, numbers, or images
 - It is **continuous**, not discrete
 - When we use a **microphone** to change voice to an **electric signal**, we create a continuous signal
- **Video** refers to the recording or broadcasting of a picture or movie
 - Video can either be produced as a **continuous entity** (e.g., by a TV camera), or
 - It can be a combination of images, each a discrete entity, arranged to convey the idea of **motion**



Modes of Communication (Data Flow)

□ Simplex Mode

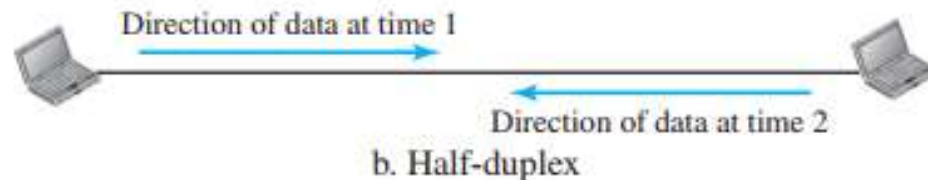
- In simplex mode, the communication is unidirectional, as on a one-way street
- **Flow of data in only one direction**
- Sender transmit the data and receiver(s) only receive it
- For example: TV and radio broadcast.
- Keyboards and traditional monitors are examples of simplex devices
 - Keyboard can only introduce input; the monitor can only accept output



Modes of Communication (Data Flow)

□ Half-Duplex

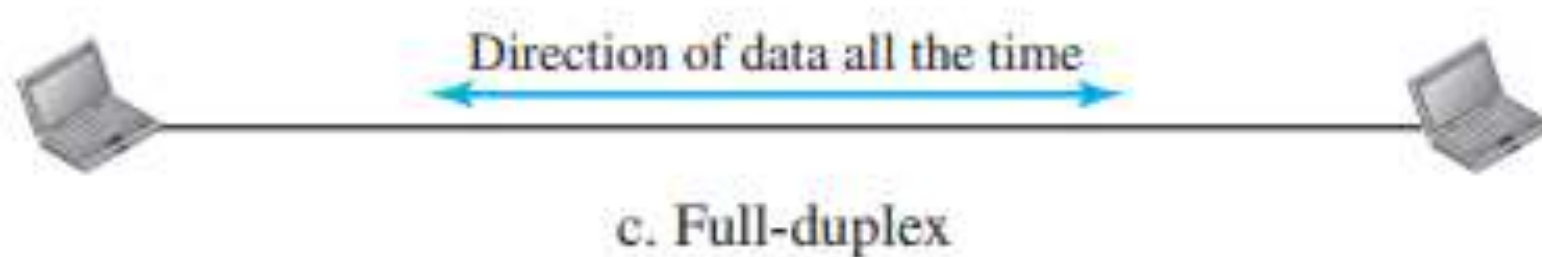
- In half-duplex mode, each station can both transmit and receive, but **not at the same time**
- When one device is sending, the other can only receive, and vice versa
- Flow of data in both directions between sender and receiver but only one can transmit at one time
- For Example: Walkie-talkies
- This mode is used in cases where there is no need for communication in both directions at the same time
- This mode is like a one-lane road with traffic allowed in both directions
 - When cars are traveling in one direction, cars going the other way must wait



Modes of Communication (Data Flow)

□ Duplex

- In full-duplex mode (also called duplex), 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
- Flow of data in both directions b/n sender and receiver both can transmit/receive at one time
- For example: Phone Call



References

Chapter 1

Data Communication and Networking (5th Edition)
By Behrouz A. Forouzan



THANKS

