

# Computer Communication and Networks

(Lecture-05)



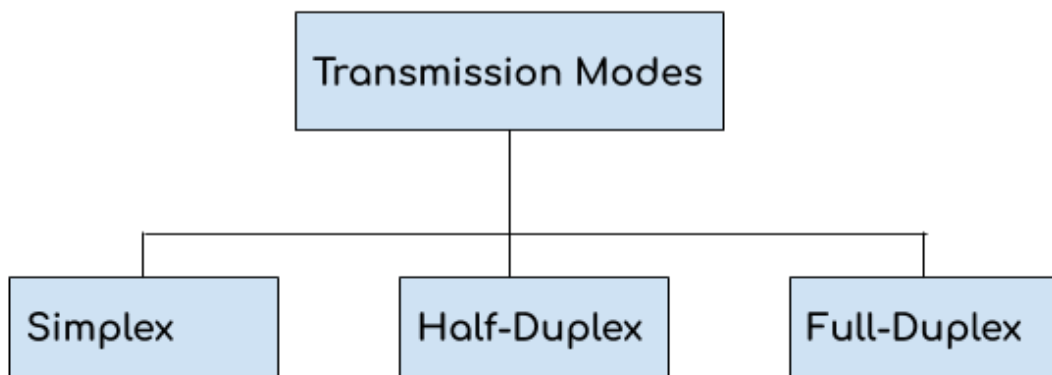
**DR. KASHIF LAEEQ**

PhD (CS), M.Phil. (CS), MCS (CS), M.Sc. (Math)  
Member of IACSIT, IEEE, IEEEP, IJSER, ACM Research Group  
Professor, Dept. of Computer Science  
Federal Urdu University, Karachi

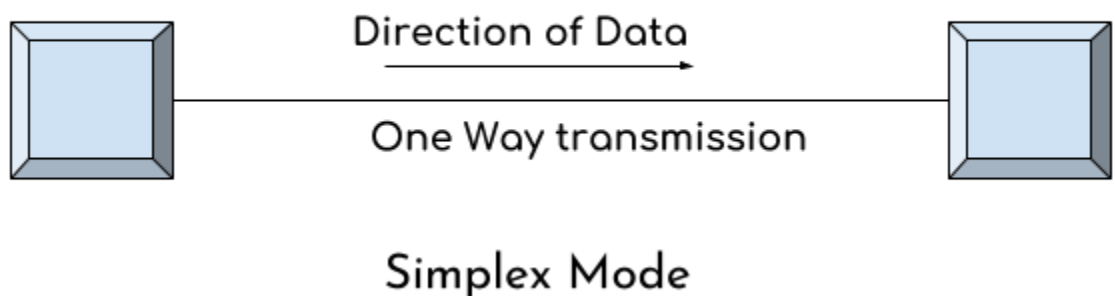
## Computer Network Transmission Modes

The data is transmitted from one device to another device through a transmission mode. The transmission mode decides the direction of data in which the data needs to travel to reach the receiver system or node. The transmission mode is divided in three categories:

1. Simplex
2. Half-Duplex
3. Full-Duplex



### 1. Simplex Mode



1. In simplex mode the data transmits in one direction only, from one system to another system.

2. The sender device that sends data can only send data and cannot receive it. On the other hand the receiver device can only receive the data and cannot send it.

3. Television is an example of simplex mode transmission as the broadcast sends signals to our TV but never receives signals back from our TV. This is a unidirectional transmission.

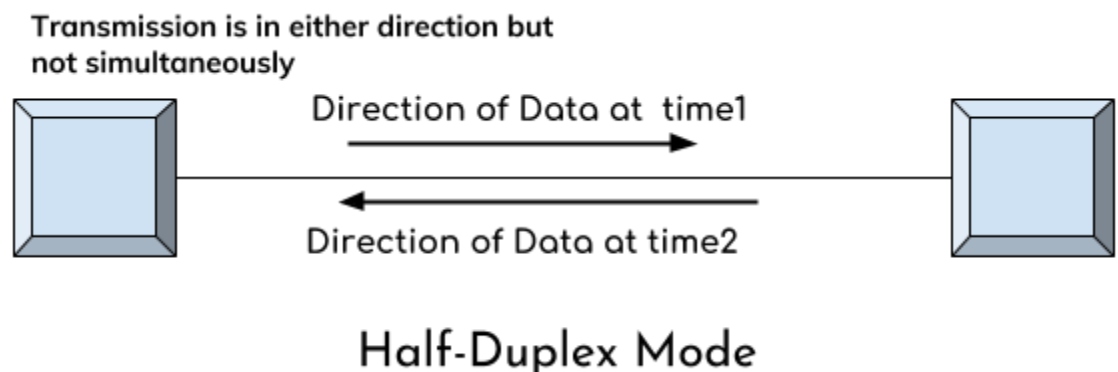
### **Advantages of Simplex Mode:**

The full capacity of the transmission medium is utilized as the transmission is one way and cannot have traffic issues.

### **Disadvantages of Simplex Mode:**

No bidirectional communication is possible. Two devices cannot communicate with each other using simplex mode of transmission.

## **2. Half-Duplex Mode**



1. In half duplex mode transmission can be done both ways which means if two systems are connected with half-duplex mode of transmission, they both can send and receive data but not at the same time.

2. If one device is sending data then other device cannot send data until it receives the data which is already in transmission. You can say that the communication is not simultaneous.

3. The radio communication device that our soldiers use at the battle fields are the examples of half duplex mode transmission as they send message and then say over and then the person on other hand send his message and this way they communicate but not simultaneously like we used to do on mobile.

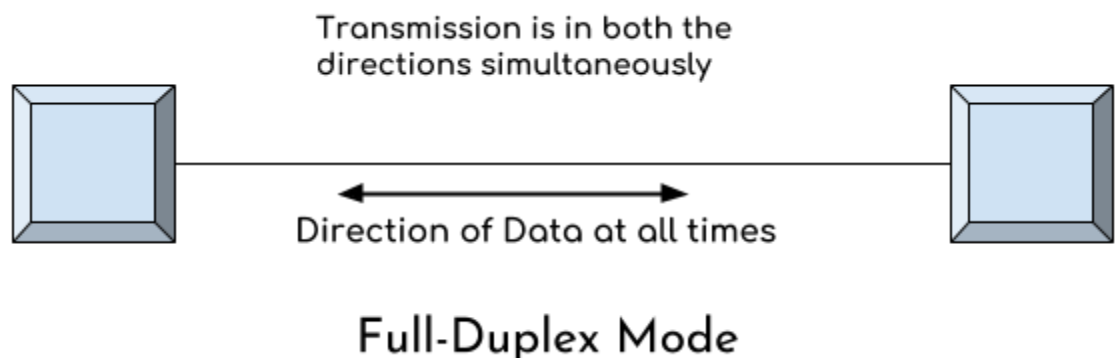
#### **Advantages of Half-Duplex mode:**

- Both devices can send and receive data.
- Whole bandwidth can be utilized as at a time only one signal transmits.

#### **Disadvantages of Half-Duplex mode:**

The disadvantage in half duplex mode is that the other device cannot send data until it receives the data which is already in transmission, this can cause delays to the communication.

### **3. Full Duplex Mode**



1. In full duplex mode both the connected devices can send and receive data simultaneously. The mobile phone we use is an example of full duplex mode where we can communicate simultaneously.
2. Both the devices can send and receive the data at the same time.

### **Advantages of Full Duplex mode:**

No delays in communication as both can send and receive data simultaneously.

### **Disadvantages of Full Duplex mode:**

No proper bandwidth utilization as the same line is used for sending and receiving data at the same time.

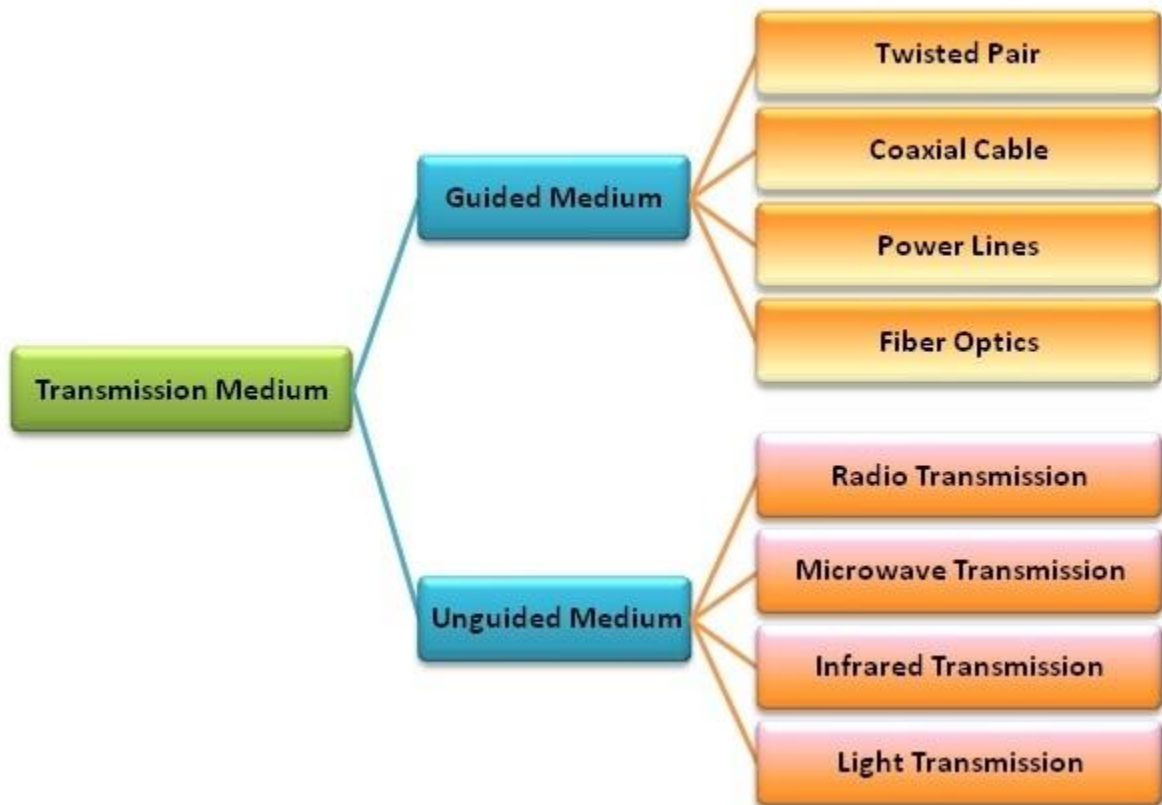
## **Types of Transmission Media**

The transmission medium can be defined as a pathway that can transmit information from a sender to a receiver. Transmission media are located below the physical layer and are controlled by the physical layer. Transmission media are also called communication channels.

Transmission media are of two types –

- Guided Transmission Medium
- Unguided Transmission Medium

The following chart categorizes transmission media –



## Guided Transmission Medium

Guided transmission media are also called **bounded media** or **wired media**. They comprise cables or wires through which data is transmitted. They are called guided since they provide a physical conduit from the sender device to the receiver device. The signal traveling through these media are bounded by the physical limits of the medium.

The most popular guided media are –

- Twisted pair cable
- Coaxial cable
- Power lines
- Fiber optics

## **Unguided Transmission Medium**

Unguided transmission media are also called wireless media. They transport data in the form of electromagnetic waves that do not require any cables for transmission. These media are bounded by geographical boundaries. These type of communication is commonly referred to as wireless communications.

Unguided signals can travel in three ways –

- Ground propagation
- Sky propagation
- Line – of – sight propagation

The commonly used unguided transmissions are –

- Radio transmission
- Microwave transmission
- Infrared transmission
- Light transmission

Infrared waves are those between the frequencies 300GHz and 400THz in the electromagnetic spectrum. Their wavelengths are shorter than microwaves but longer than visible light. Infrared propagation is line of sight.

They cannot penetrate walls and sun's infrared rays interfere with these rays. So cannot be used for long – range communication. As their usage is confined within closed space, they do not need any government permissions for their applications.

### **Applications of Infrared Waves in Communications**

- Remote controls for television, stereos and other home appliances.
- Wireless LANs
- Wireless modem, keyboard, mouse, printer etc
- Fire detectors

- Night vision systems
- Intrusion detection systems
- Motion detectors

## **Difference between Wired Media and Wireless Media**

<b>Wired Media</b>	<b>Wireless Media</b>
The signal energy is contained and guided or propagated inside a solid medium.	The signal energy propagates in the structure of unguided electromagnetic waves in the air.
It can be used for point to point communication.	It can be used for radio advertising in all directions.
It makes discrete network topologies.	It makes continuous network topology.
This capacity can be further increased by inserting more cables for transmission.	In this capacity of transmission cannot be increased beyond the limit.
It is expensive, time-consuming and difficult to install.	Its installation is less time-consuming.
Examples are twisted pair, Co-axial cable, and Optical fiber.	An example is Radio & Infrared Waves.

**End of Lecture-5**