Data Transmission and Networks

Modes of Data Transmission

Learning Objectives

- Describe the characteristics and uses of Serial and Parallel transmission of data.
- Describe the characteristics of Simplex, Duplex and Half Duplex data transmission.

Data transmission

- Data needs to be transmitted between devices in a computer system.
- Data is transmitted in the form of bits.
- So an 8 bit byte, which stands for a single character, will be transmitted in 8 parts, one signal for each bit.

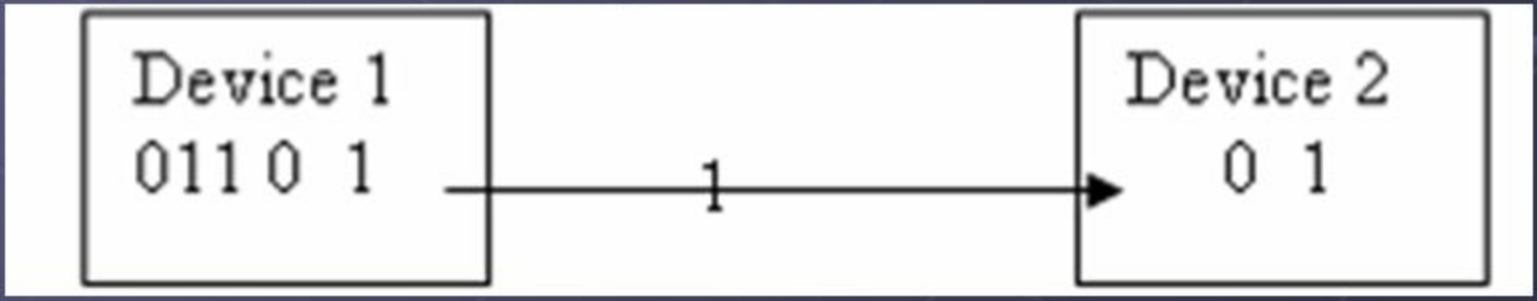
Modes of Transmission

- There are five possible different modes of transmission.
- They fall into groups:
  1. Serial / Parallel
  2. Simplex / Half Duplex / Duplex

Serial transmission of data

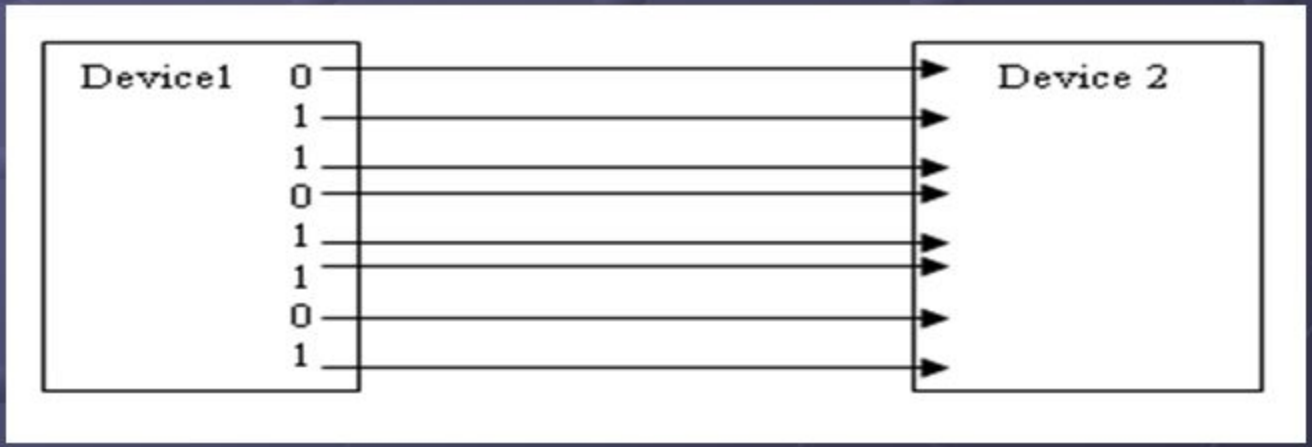
- One bit transmitted at a time using a single wire.
- Advantage:
  - Simple and reliable because the next bit is not transmitted until the current one has arrived at its destination. So little or no chance of the bits arriving out or order and can be used over long distances – see parallel transmission on the next slide for more explanation of this.
- Disadvantage:
  - Slow, because only one bit can be transmitted at a time.

e.g. 01101101 being transmitted.



Parallel Transmission Diagram

- Bits sent at the same time using more than one wire.
  - Usually 8, so a whole byte can be sent at once.
- Advantage:
  - Faster because all the bits are travelling at the same time.
- Disadvantage:
  - Due to fine tolerances (resistances) in the transmission, it is less reliable as the bits can become muddled up (as they may arrive out of order).
    - The longer the wires the more effect these fine tolerances (resistances) would have.



Simplex mode

- Data can only travel in one direction.
- Used if only one direction is necessary.
  - e.g. Television picture which is passed to a television receiver aerial, but there is no way to send data in the other direction.
    - N.B. Not modern interactive digital television.

Half duplex mode

- Data can pass in both directions, but only in one direction at a time.
- Used if both directions are necessary but not at the same time.
  - e.g. CB radio system in which each handset can either be set to receive mode or send mode.

Duplex mode

- Data can pass in both directions at the same time.
- Used if both directions are necessary at the same time.
  - e.g. A telephone conversation as both users can speak and be heard at the same time.

Plenary

- Can you explain the difference between **Serial** and **Parallel** transmission of data?
  - **Serial**
    - One bit transmitted at a time using a single wire.
  - **Parallel**
    - Bits sent at the same time using more than one wire.

Plenary

- Can you explain **Simplex**, **Duplex** and **Half Duplex** data transmission?
  - **Simplex**
    - Data can only travel in one direction.
  - **Duplex**
    - Data can pass in both directions at the same time.
  - **Half Duplex**
    - Data can pass in both directions, but only in one direction at a time.