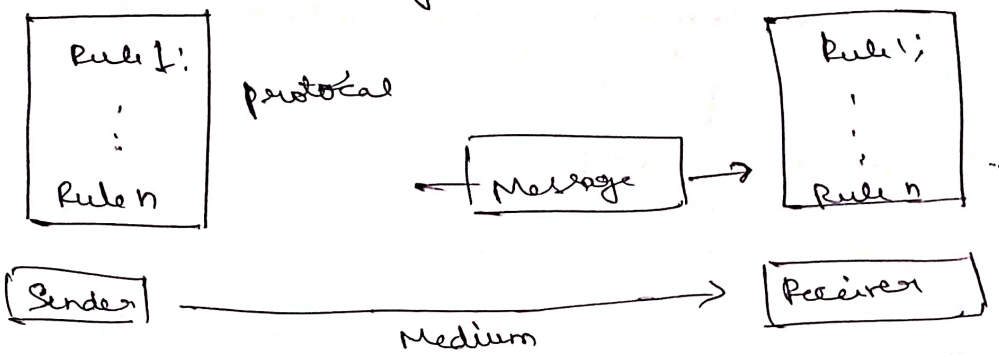
Shahul Hameed. S
CSE 'A' sec
1KN18CS097

UNIT-TEST-02

DC (18CS46)

(2) A data Communication system has 5 components.



1. Message: The message is the information to be communicated. Popular forms of information includes, texts, numbers, etc.

2. Sender: The sender is the device that sends the data message. It can be computer, telephone, handset, video camera.

3. Receiver: The receiver is the device that receives the data. It can be computer, telephone, handset, video camera at other end/receiver end.

4. Transmission Medium: The transmission medium is the physical path by which a message travels from sender to receiver.
Ex: fibre cables, coaxial cables, and radio waves.

5. protocal: A protocal is a set of rules that governs data communication. It represents an agreement between the communicating devices.

(1)

Transmission Impairment :-

Here, Signals travels through transmission media, which is not perfect this causes signal impairment.

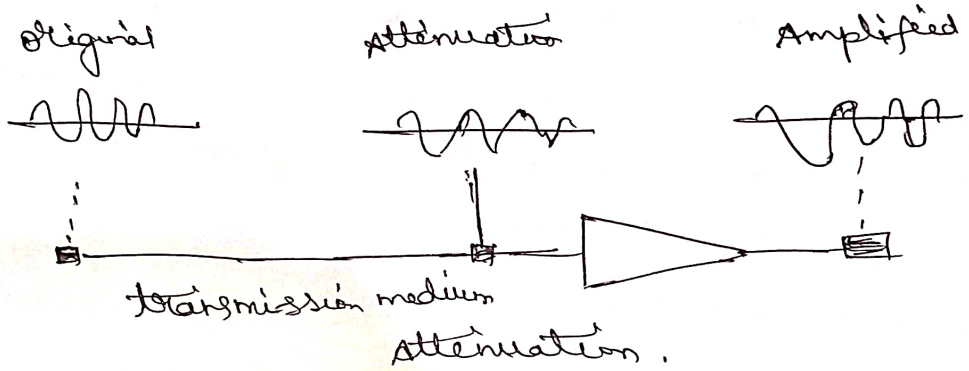
The signal at begining of the medium is not same as the signal at end of medium.

There causes of impairment.

(1) attenuation :-

As Signals travels through the medium, its strength decreases as length increases, this is attenuation. attenuation is relative to distance. as distance increases attenuation also increases.

Amplifiers are used to amplify the signal and compensate loss.



(2) Distortion :-

Signal changing its form or shape is called distortion. It occurs in composite signal made of different frequencies. signal - Components at the receiver have phases different from what they hat at the sender end.

(3) Noise :-

Noise is defined as unwanted data, Due to noise it is difficult to retrieve the orginal data.

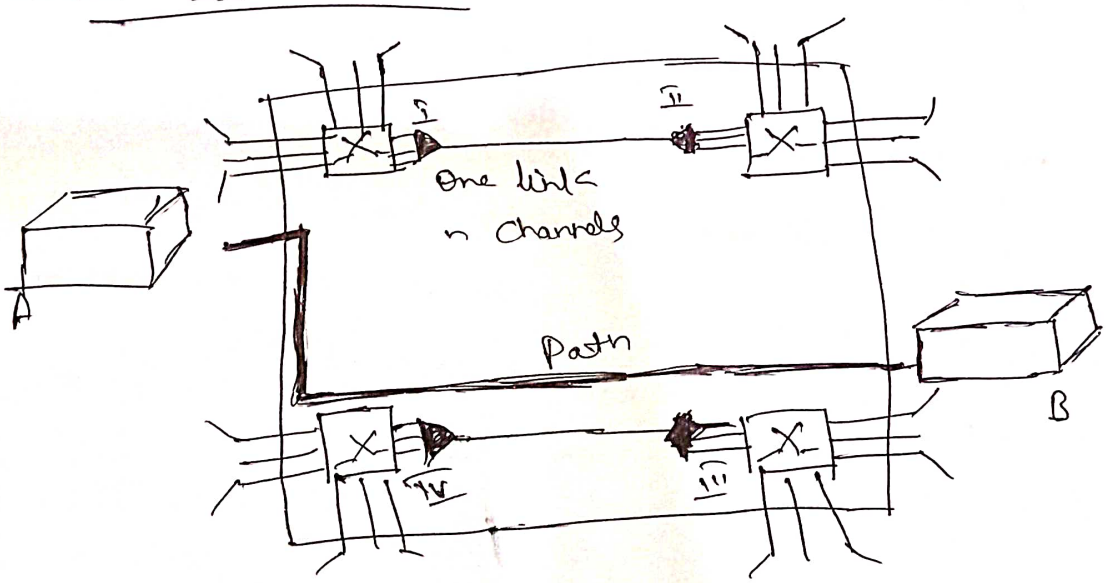
Noise, in otherwords external energy that corrupts a signal.

Shahul Hameed. S
1KN18CS097
CSE 'A' Sec
4th Sem

DC UT-02
(18CS46)

2a. Circuit Switched network consists of a set of switches connected by physical links. A fixed path is established b/w a source and a destination prior to transfer of packets. A connection b/w 2 stations is a dedicated path made of one or more links Here each connection uses only one dedicated channel Each link Here each is divided into 'n' channels by using FDM or TDM.

Circuit Switched network.



The virtual Setup procedure:

First determine a path through the network and Set parameters in the switches by exchanging connect request and connect-confirm messages.

A Connection-release procedure may also be required to terminate the connection.

3 phases:- (1) Connection-setup. (2) Data transfer. (3) Connection tear-down

(1) connection setup stage:-

Before the 2 parties can communicate, a dedicated circuit needs to be established. * The End Systems are connected through dedicated lines to the switches.

* Therefore connection setup means creating dedicated channels B/W the switches.

(2) Data transfer phase:- After the establishment of dedicated circuit the 2 parties can transfer the data.

(3) Connection tear-down:- when one of parties needs to disconnect, a signal is sent to each switch to release the resources.

Efficiency:- circuit switched networks is considered to be inefficient when compared to other switched networks.

Delay:- Circuit switched networks have minimum delay when compared to other 2 switched networks. Here the data is not delayed at each switch.

Shahul Hameed S
1KN18CS097
CSE 'A' Sec
4th Sem

DC (18CS46)

UT-03

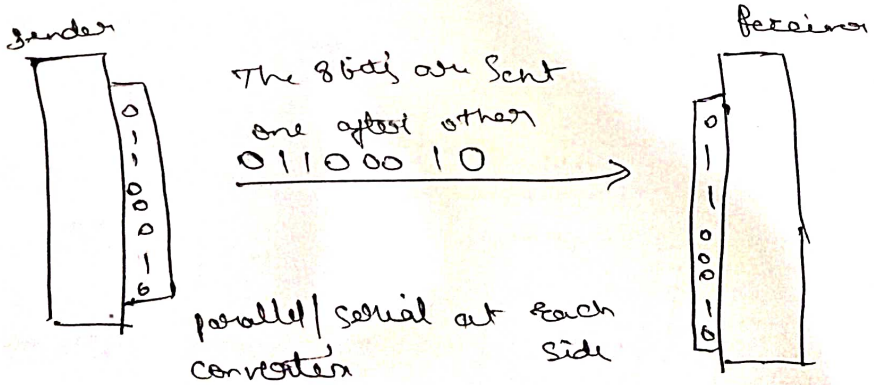
1b. (i) The duration of 1 bit before multiplexing is 1/1 Kbps or 0.001 sec (1 ms)

(ii) Since the rate of transmission of the link is 4 times the rate of connection or 4 Kbps

(iii) The duration of each time slot is one-four of the duration of each bit before multiplexing or 1/4 ms or 250 µs. The bit duration is the inverse of the data rate or 1/4 Kbps or 250 µs/1.

1a. Serial transmission:

One bit is sent with each clock-tick using only a single link.

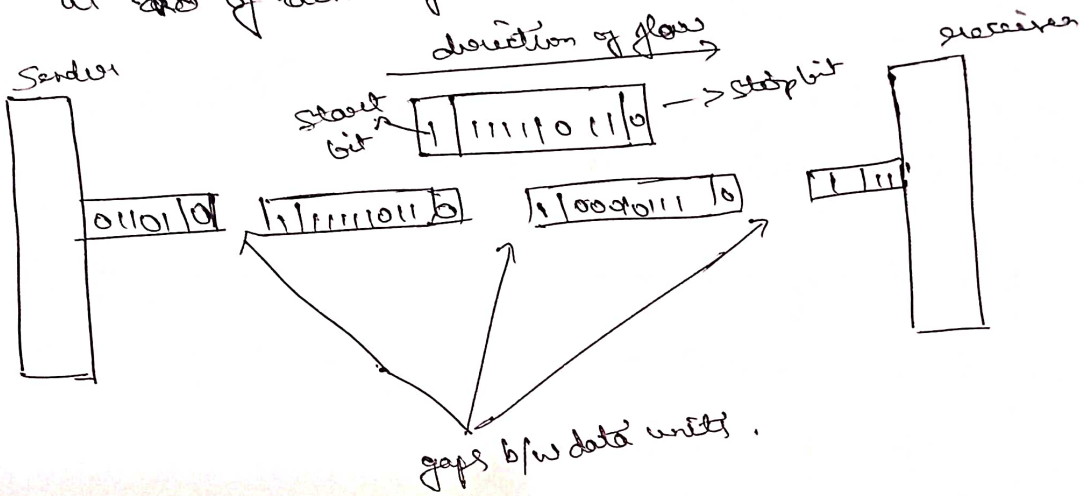


Serial transmission

Three types of Serial transmission:

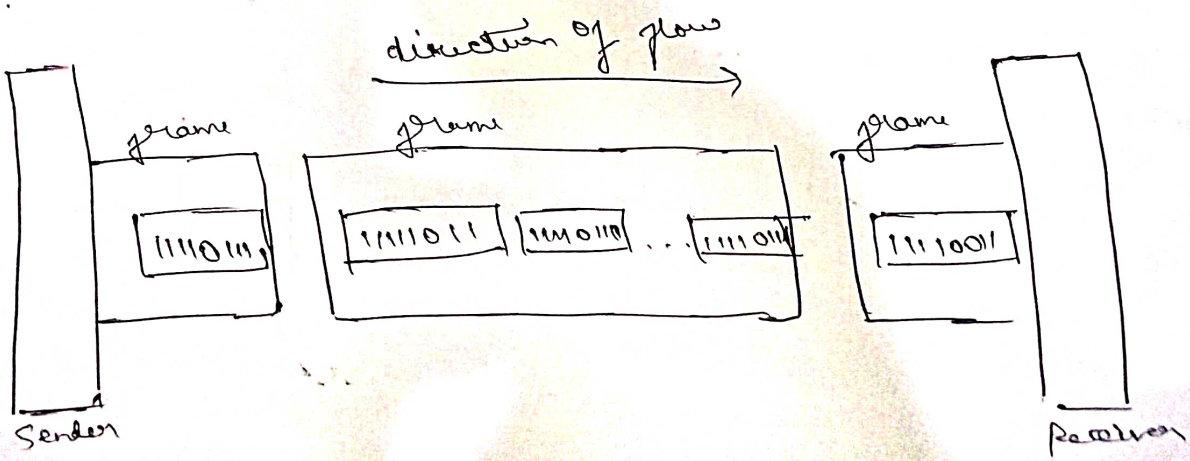
Asynchronous transmission: is so named because the timing of a signal is not important. prior to data transfer, both sender & receiver agree on pattern of information to be exchanged. Normally, patterns are based on grouping the bit stream into bytes.

we send 1 start bit at the begining of each byte & stop bit at end of each byte.



Synchronous transmission:

we send one bit after the other without stop or start bit or gaps. The receiver is responsible for grouping the bits. the bit-stream is combined into longer "frames", which may contain multiple bytes.



Isochronous:

Synchronization b/w ~~characters~~ character is not enough the entire stream of bits must be synchronized. The isochronous transmission guarantees that the data arrive at a fixed rate. In real-time audio/video, jitter is not acceptable. Therefore, synchronous transmission fails.

Unit Test-04

(18CS46)

Shahul Hameed. S
1KN18CS097
CSE 'A' Sec
4th sem

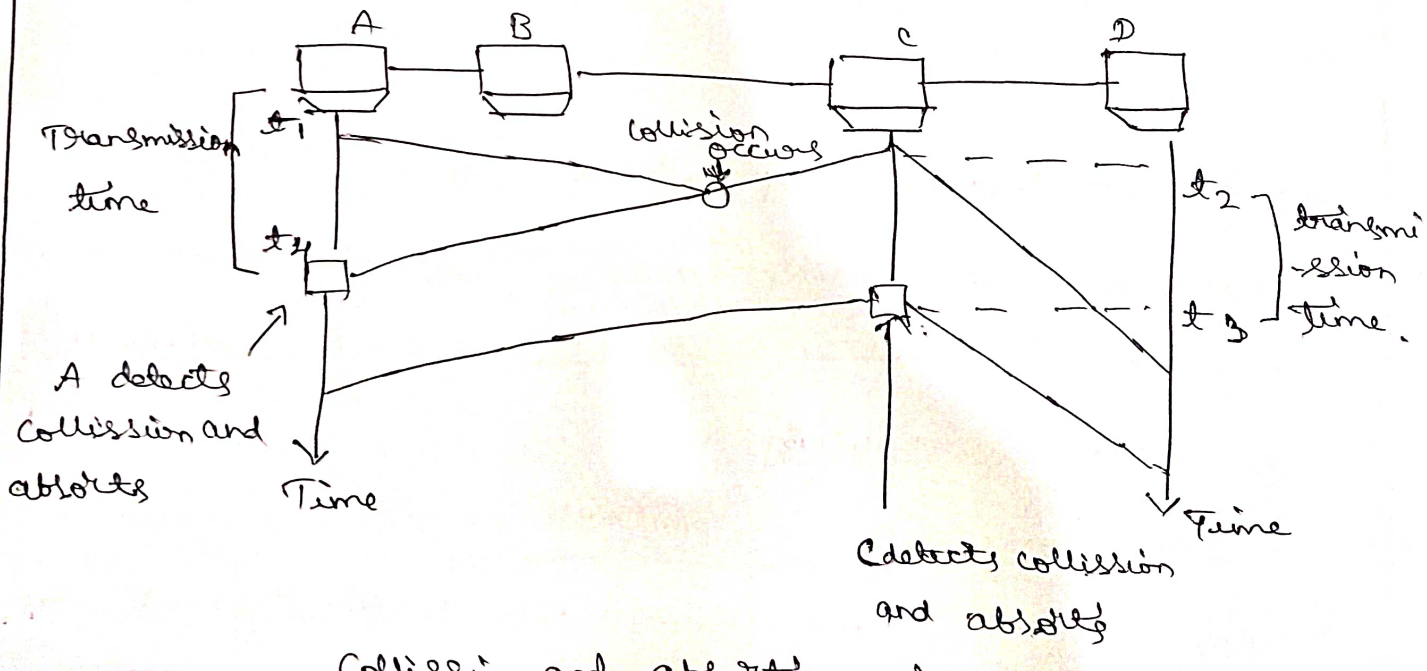
① Analyze the need for Access control protocols. Explain the working of CSMA/CD with suitable diagrams.

> need for a access control protocols are.

Each station follows a procedure that answers the following questions.

1. when can the station access the medium?
2. what can the station do if the medium is busy?
3. How can the station determine the success or failure of the transmission?
4. what can the station do if there is a collision?

working of CSMA/CD



Collission and abborations in CSMA/CD.

① A station sends the frame and then monitors the medium to see if the transmission was successful or not.

② If the transmission was unsuccessful, the frame is sent again.

* At time t_1, station A has executed its procedure and starts sending the bits of its frame.
* At time t_2, station C has executed its procedure and starts sending the bits of its frame.
* The collision occurs some time after time t_2
* Station C detects a collision at time t_3, when it receives the first bit of A's frame, station C immediately abort transmission.
* Station A detects collision at time t_4 when it receives the first bit of C's frame. Station A also immediately aborts transmissions.
* Station A transmits for the duration $t_4 - t_1$
  Station C transmits for the duration $t_3 - t_2$

(2) Analyze Channelization. Explain CDMA with an example.

> Channelization is a multiple-access method. This available bandwidth of a link is shared b/w different station in time, frequency or through code.

CDMA (Code division multiple Access)

* CDMA simply means communication with different codes.
* CDMA differs from FDMA because only one channel

occupies the entire bandwidth of the link.

* CDMA differs from TDMA because all stations can send data simultaneously; there is no time sharing.

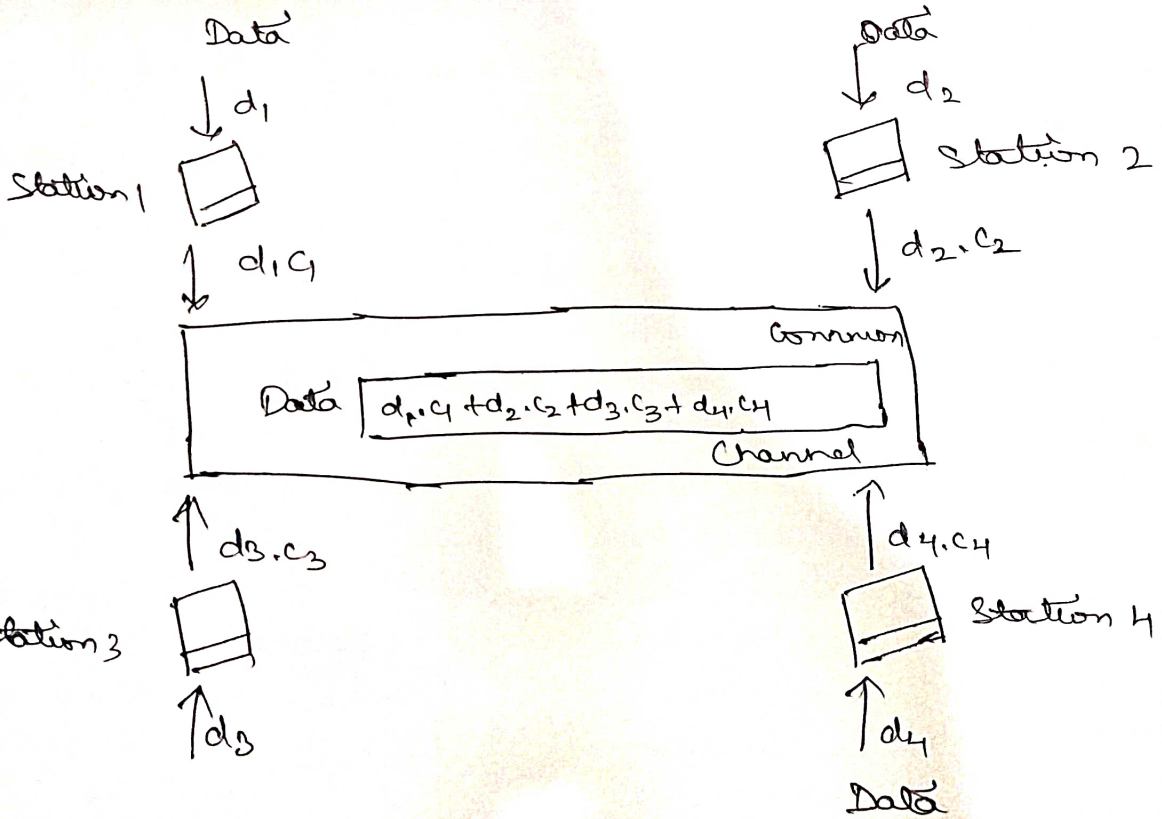
Eg 1: In a large room with many people, 2 people can talk privately in English if nobody else understands english. Another 2 people can talk in chinese if they are the only ones who understand chinese and so-on.

* CDMA is based on coding theory.
* Each station is assigned a code, which is a sequence of numbers called chips.

C_1	C_2	C_3	C_4
(+1 +1 +1 +1)	(+1 −1 +1 −1)	(+1 +1 −1 −1)	(+1 −1 −1 +1)

* These sequence were carefully selected and are called orthogonal sequence.

Implementation



For Example, Suppose station 1 and 2 are talking to each other.

→ station 2 wants to hear what station - 1 is saying

→ station 2 multiplies the data on the channel by c_1 the code of station - 1

$(c_1 \cdot c_1) = 4$, $(c_2 \cdot c_1) = 0$ $(c_3 \cdot c_1) = 0$ and $(c_4 \cdot c_1) = 0$

Therefore, station-2 devides the result by 4 to get the data from station - 1

$$\text{Data} = (d_1 c_1 + d_2 \cdot c_2 + d_3 \cdot c_3 + d_4 \cdot c_4) c_1$$

$$= d_1 c_1 + d_2 \cdot c_2 \cdot c_1 + d_3 \cdot c_3 \cdot c_1 + d_4 c_4 \cdot c_1$$

$$= 4 d_1$$

∴

Unit Test - 05

DC (18CS46)

Shanul Hameed.S
1KN18CS097
CSE 'A' Sec
4th Sem

① Explain in detail cellular telephony.

> It is designed to provide communication b/w moving units called mobile stations (MS) or b/w one mobile - station and other stationary unit called a land unit. A service provider is responsible for locating and tracking a caller assigning a channel to the call and transferring the channel from base - station to the base - station as caller moves out - of - range. Each cellular service - area is divided into small regions called cells. Cells contains an antenna. Each cell is controlled by AC powered network - station called the base station (BS). Each BS is controlled by a switching office and a mobile - Switching - Center MSC coordinates communication b/w all the base station and the telephone central office. MSC is a computerized center that is responsible for connecting calls recording calls info. and also billing.

② Explain 10 Gigabit Ethernet implementation.

> IEEE created 10 Gigabit Ethernet under the name 802.3ae.

Goals are :-

→ upgrage the data rate to 10Gbps.

→ Make it compatible with standard, Fast and Gigabit Ethernet.

→ use the same 48-bit address.

→ use the same frame format.

→ Keep the same minimum and maximum frame-length.

→ Make Ethernet compatible with technologies such as frame relay & ATM.

Implementation:-

- It operates only in full duplex mode.
- This means there is no need for contention; CSMA/CD is not used.
- These four implementations are the most common

(1) 10 GBase -SR (2) 10GBase-LR

(3) 10GBase-EW (4) 10GBase-X4.

Implementation	Medium	Medium length	No. of wires	Encoding
10G Base-SR	Fiber 850nm	300m	2	64B66B
10GBase-LR	Fiber 1310nm	10km	2	64B66B
10GBase-EW	Fiber 1350nm	40km	2	SONET
10GBase-X4	Fiber 1310nm	300m-10km	2	8B10B