Name Jamil

Id 14923

Q1

Q1. Select the correct answer of the given ones. (10)

1) Interactive transmission of data independent of a time sharing system may be best suited to
   (a) Simplex lines **(b) half-duplex lines** (c) full-duplex lines (d) biflex lines

2) The loss in the signal power as of an Electromagnetic signal is called
   (a) Attenuation (b) propagation (c) scattering (d) interruption

3) Early detection of packet losses improves ____________ acknowledgment performance.
   (a) Odd (b) even (c) positive (d) negative

4) Additional signal introduced in the desired signal in producing hypes is called
   (a) Fading (b) noise

   (c) Scattering (d) dispersion

5) Token is a _____**three-byte frame**_______________ that rotates around the ring.

6) Ring may have up to _____**250**_______ (802.5) or ___**260**_________ (IBM) nodes.

7) FDDI can support a maximum of ____**500**__________ stations.

8) Error-correcting codes are ____**Probably not**____________ enough to handle all errors.

9) ACK is a small ______**Chunks**_____________ confirming reception of an earlier frame

10) Electronics are ______**Organized**__________ as compared to optics

Q2

Error correction:

Error detection is the detection of errors caused by noise or other impairments during transmission from the transmitter to the receiver.

Error detection:

Error correction is the detection of errors and reconstruction of the original, error-free data. A condition when the receiver's information does not match with the sender's information. During transmission, digital signals suffer from noise that can introduce errors in the binary bits travelling from sender to receiver. That means a 0 bit may change to 1 or a 1 bit may change to 0.

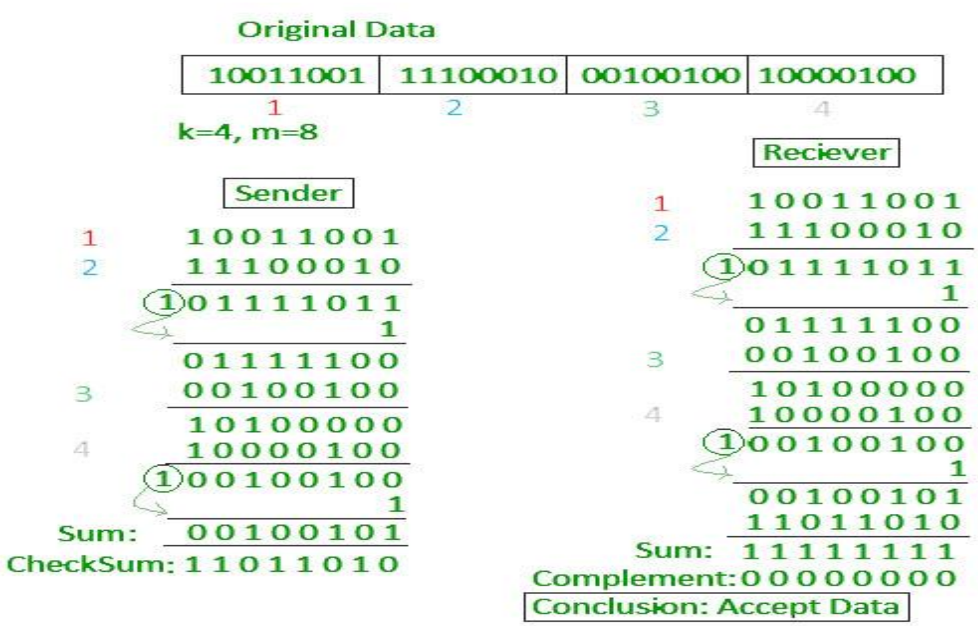
Techniques for error detection are:

1. **Checksum**
2. **Cyclic redundancy check**

1. Checksum:

- In checksum error detection scheme, the data is divided into k segments each of m bits.
- In the sender's end the segments are added using 1's complement arithmetic to get the sum. The sum is complemented to get the checksum.
- The checksum segment is sent along with the data segments.
- At the receiver's end, all received segments are added using 1's complement arithmetic to get the sum. The sum is complemented.
- If the result is zero, the received data is accepted; otherwise discarded.

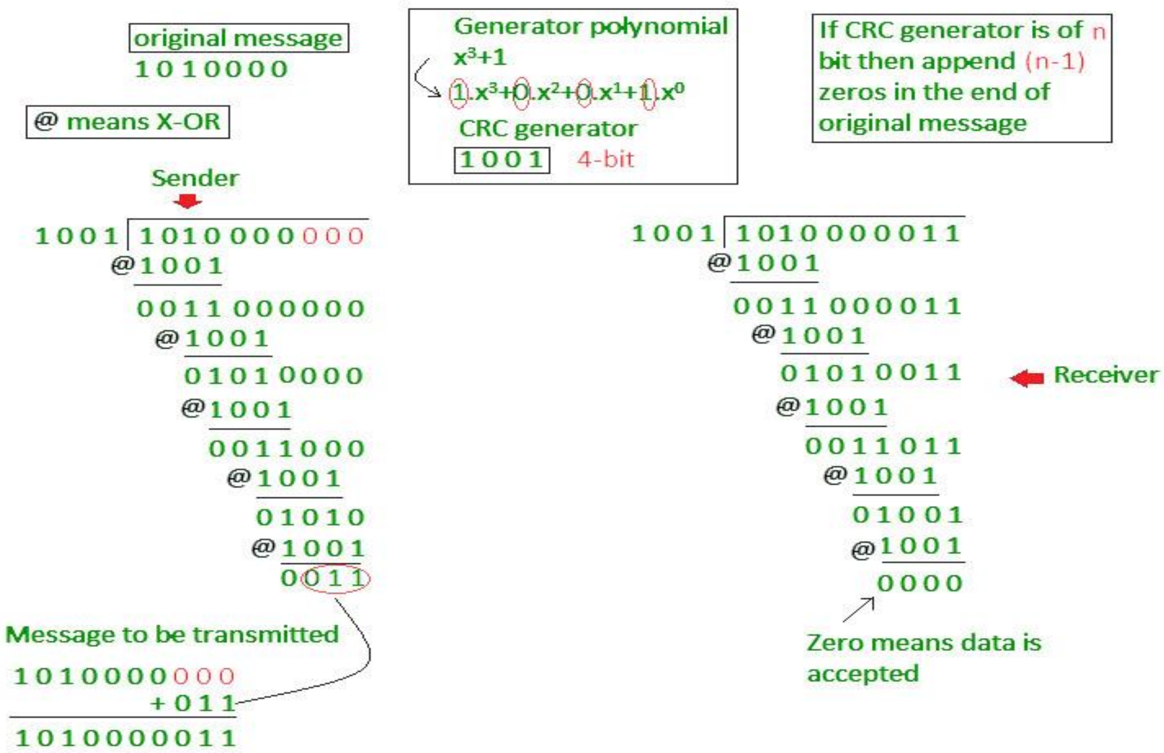
Example



2. Cyclic redundancy check (CRC):

- Unlike checksum scheme, which is based on addition, CRC is based on binary division.
- In CRC, a sequence of redundant bits, called cyclic redundancy check bits, are appended to the end of data unit so that the resulting data unit becomes exactly divisible by a second, predetermined binary number.
- At the destination, the incoming data unit is divided by the same number. If at this step there is no remainder, the data unit is assumed to be correct and is therefore accepted.
- A remainder indicates that the data unit has been damaged in transit and therefore must be rejected.

Example:



Q3

Encoding:

Encoding is the process of converting data into a format required for a number of information processing needs, including:

- Program compiling and execution
- Data transmission, storage and compression/decompression
- Application data processing, such as file conversion

Types of Encoding:

The four primary types of encoding.

1. **Visual,**
2. **Acoustic,**
3. **Elaborative,**
4. **Semantic**

1. Visual:

Visual encoding is the process of encoding images and visual sensory information. The creation of mental pictures is one way people use visual encoding. This type of information is temporarily stored in iconic memory, and then is moved to long-term memory for storage. The amygdala plays a large role in the visual encoding of memories.

2. Acoustic:

Acoustic encoding is the use of auditory stimuli or hearing to implant memories. This is aided by what is known as the phonological loop. The phonological loop is a process by which sounds are sub-vocally rehearsed (or “said in your mind over and over”) in order to be remembered.

3. Elaborative:

Elaborative encoding uses information that is already known and relates it to the new information being experienced. The nature of a new memory becomes dependent as much on previous information as it does on the new information. Studies have shown that the long-term retention of information is greatly improved through the use of elaborative encoding.

4. **Semantic**

Semantic encoding involves the use of sensory input that has a specific meaning or can be applied to a context. Chunking and mnemonics (discussed below) aid in semantic encoding; sometimes, deep processing and optimal retrieval occurs. For example, you might remember a particular phone number based on a person's name or a particular food by its color.

Characteristics of AM, FM and PM with mathematical equations

AM

A continuous-wave goes on continuously without any intervals and it is the baseband message signal, which contains the information. This wave has to be modulated.

Mathematical Equation:

A modulating signal $m(t)=10\cos(2\pi\times 103t)m(t)=10\cos(2\pi\times 103t)$ is amplitude modulated with a carrier signal $c(t)=50\cos(2\pi\times 105t)c(t)=50\cos(2\pi\times 105t)$. Find the modulation index, the carrier power, and the power required for transmitting AM wave.

Solution

Given, the equation of modulating signal as

$$M(t)=10\cos(2\pi\times 103t)\ m(t)=10\cos(2\pi\times 103t)$$

We know the standard equation of modulating signal as

$$m(t)=Am\cos(2\pi fmt)m(t)=Am\cos(2\pi fmt)$$

By comparing the above two equations, we will get

Amplitude of modulating signal as $Am=10voltsAm=10volts$

and Frequency of modulating signal as

$$fm=103Hz=1KHzfm=103Hz=1KHz$$

Given, the equation of carrier signal is

$$c(t)=50\cos(2\pi\times 105t)c(t)=50\cos(2\pi\times 105t)$$

The standard equation of carrier signal is

$$c(t)=Ac\cos(2\pi fct)c(t)=Ac\cos(2\pi fct)$$

By comparing these two equations, we will get

Amplitude of carrier signal as $Ac=50voltsAc=50volts$
and Frequency of carrier signal as $fc=105Hz=100KHzfc=105Hz=100KHz$

We know the formula for modulation index as

μ=AmAcμ=AmAc

Substitute, AmAm and AcAc values in the above formula.

μ=1050=0.2μ=1050=0.2

Therefore, the value of modulation index is 0.2 and percentage of modulation is 20%.

The formula for Carrier power, Pc=Pc= is

Pc=Ac22RPc=Ac22R

Assume R=1ΩR=1Ω and substitute AcAc value in the above formula.

Pc=(50)22(1)=1250WPc=(50)22(1)=1250W

Therefore, the Carrier power, PcPc is 1250 watts.

We know the formula for power required for transmitting AM wave is

⇒Pt=Pc(1+μ22)⇒Pt=Pc(1+μ22)

Substitute PcPc and μμ values in the above formula.

Pt=1250(1+(0.2)22)=1275WPt=1250(1+(0.2)22)=1275W

Therefore, the power required for transmitting AM wave is 1275 watts.

FM

Frequency modulation (FM) is the encoding of information in a carrier wave by varying the instantaneous frequency of the wave. The term and technology are used in computing, signal processing and telecommunications.

Equation:

Let the carrier be $x_c(t) = X_c \cdot \cos(\Omega_c t)$, and the modulating signal be $x_m(t) = \beta \cdot \sin(\Omega_m t)$

Then $x(t) = X_c \cdot \cos[\Omega_c t + \beta \cdot \sin(\Omega_m t)]$

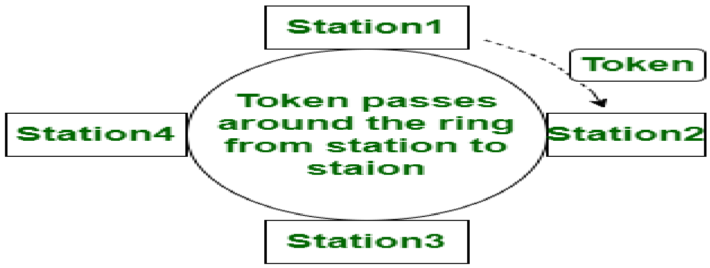
PM

Phase modulation (PM) is a modulation pattern for conditioning communication signals for transmission. It encodes a message signal as variations in the instantaneous phase of a carrier wave. Phase modulation is one of the two principal forms of angle modulation, together with frequency modulation.

Q4

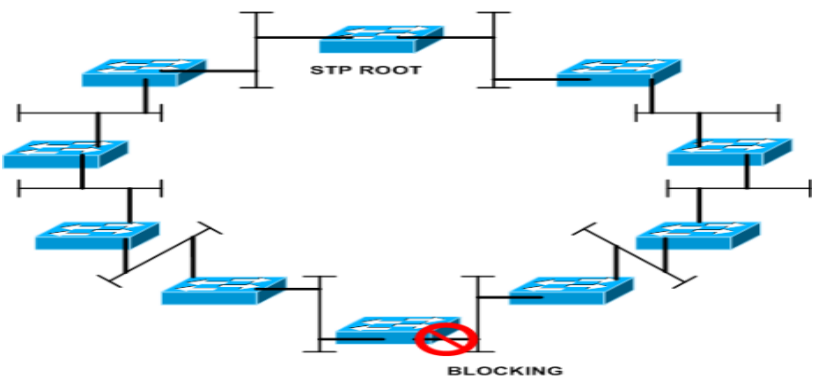
Token Ring:

In the token ring a token ring passes over a physical ring. Token ring is defined by IEEE 802.5 standard. In token ring, there is a station and a special frame called token. A station in token ring can transmit data frame if it contains a token. After the successful transmission of data frame token are pointed (issued). Token ring is a Star shaped topology and handles priority in which some nodes may give priority to the token.



Ethernet

EEE 802.3 defines the Ethernet. It uses CSMA/CD mechanism. It means that if many stations exist at the same time to talk, all stations will be closed. To resume them, wait for a random time. Unlike token ring it doesn't employ any priorities. And it is less costly than token ring network.



Which one is better in your opinion and why?

Token Ring is single access, meaning there is only one token. Thus, at any given time only one station is able to use the LAN.

Ethernet is a shared access medium, where all stations have equal access to the network at the same time

Ethernet is batter then token ring Because Ethernet is fast in a Speed.

Q5

Research Paper

A review of highly reliable flexible encapsulation technologies towards rollable and foldable OLEDs

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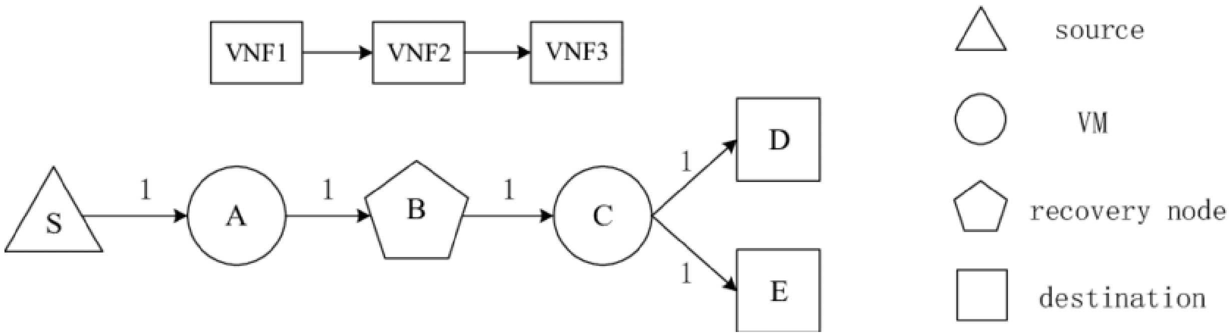
Published online: 15 Nov 2019

Concept and review

As the demand for flexible, rollable, and foldable displays grows, various state-of-the-art component technologies, including thin-film transistors (TFTs), electrodes, thin-film encapsulations (TFEs), and touch screen panels, have been developed based on organic light-emitting diodes (OLEDs) with flexible organic layers. Developing highly reliable flexible OLEDs is essential to realize flexible displays, but the flexible encapsulation technology still has technical difficulties and issues to be addressed. This review covers the recent developments in encapsulation technologies, particularly their material and structural designs, for highly reliable, flexible OLEDs. The solution concepts for the existing technical hurdles in flexible encapsulations are addressed. Among the various advanced flexible encapsulation technologies developed so far, neutral-axis engineering with a thin metal layer and a crack arrester is introduced.In the emerging Fourth Industrial Revolution, Internet of things (IoT) will be widely used by people in their daily lives as smart devices provide added convenience. The display technologies for these smart devices have become increasingly important to the market and consumers.

As the demand for flexible, rollable, and foldable displays continues to grow, realizing highly reliable and flexible organic light-emitting diodes (OLEDs) still requires further advances. Thin-film encapsulation (TFE), in particular, is considered a crucial core technology because it is concerned with both reliability and flexibility. As the TFE technology advances from brittle glass lid encapsulation, the primary focus is on improving the barrier performance by increasing the number of pairs of organic/inorganic layers or increasing the thickness of each layer.

Diagram:



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