IQRA NATIONAL UNIVERSITY, PESHAWAR, PAKISTAN

NETWORKS MANAGEMENT

Program: MSCS/PhDCS **FINAL-TERM EXAM** **Semester: Spring 2020**

Maximum Marks: 50 **Time Allowed: 6 Hours**

Q1.

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 _____negative_____ 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 ___ protocol _____ 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 _____intelligent_____ enough to handle all errors.
9) ACK is a small _____Control frame confirming reception of an earlier frame
10) Electronics are _____Organized as compared to optics

Q2:

Answer:

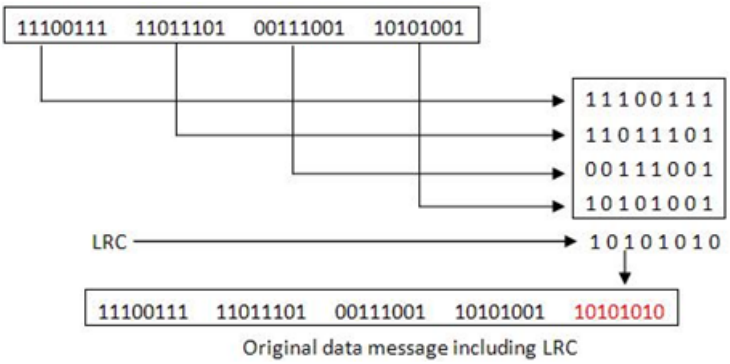
Error Correction codes are used to detect and correct the errors when data is transmitted from the sender to the receiver.

Error Correction can be handled in two ways:

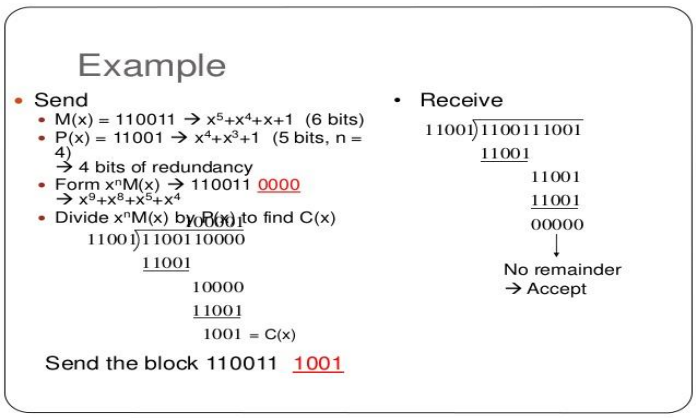
- Backward error correction: Once the error is discovered, the receiver requests the sender to retransmit the entire data unit.
- Forward error correction: In this case, the receiver uses the error-correcting code which automatically corrects the errors. A single additional bit can detect the error, but cannot correct it.

Longitudinal Redundancy Check

In longitudinal redundancy method, a BLOCK of bits are arranged in a table format (in rows and columns) and we will calculate the parity bit for each column separately. The set of these parity bits are also sent along with our original data bits.
This method can easily detect burst errors and single bit errors and it fails to detect the 2 bit errors occurred in same vertical slice.



Cyclic Redundancy Check (CRC)
A cyclic code is a linear (n, k) block code with the property that every cyclic shift of a codeword results in another code word. Here k indicates the length of the message at transmitter (the number of information bits). n is the total length of the message after adding check bits. (actual data and the check bits). n, k is the number of check bits.
The codes used for cyclic redundancy check there by error detection are known as CRC codes (Cyclic redundancy check codes).Cyclic redundancy-check codes are shortened cyclic codes. These types of codes are used for error detection and encoding.



Q3:

Answer:

An encoder is a sensor that translates physical motion into electrical data. That data can be used to determine the speed, acceleration, direction and position of a mechanical system. Encoders can track two different kinds of motion.

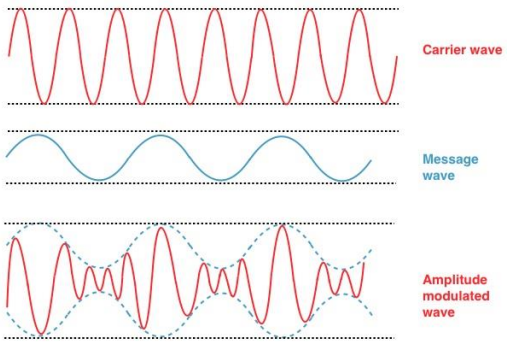
Linear encoders track motion in a straight line. Rotary encoders track changes in shaft rotation and are often attached to motors.

Types of encoding

- Visual
- Acoustic
- Elaborative
- Semantic

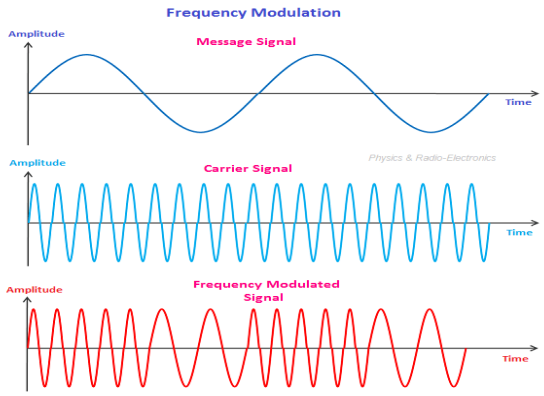
Amplitude Modulation

Amplitude Modulation(AM) is the modulation technique in which carrier amplitude varies based on analog baseband information signal to be transmitted using wireless. One of the application of amplitude modulation is radio. AM broadcast signals are mainly propagated by ground waves during the day and by sky waves at night time.



Frequency modulation

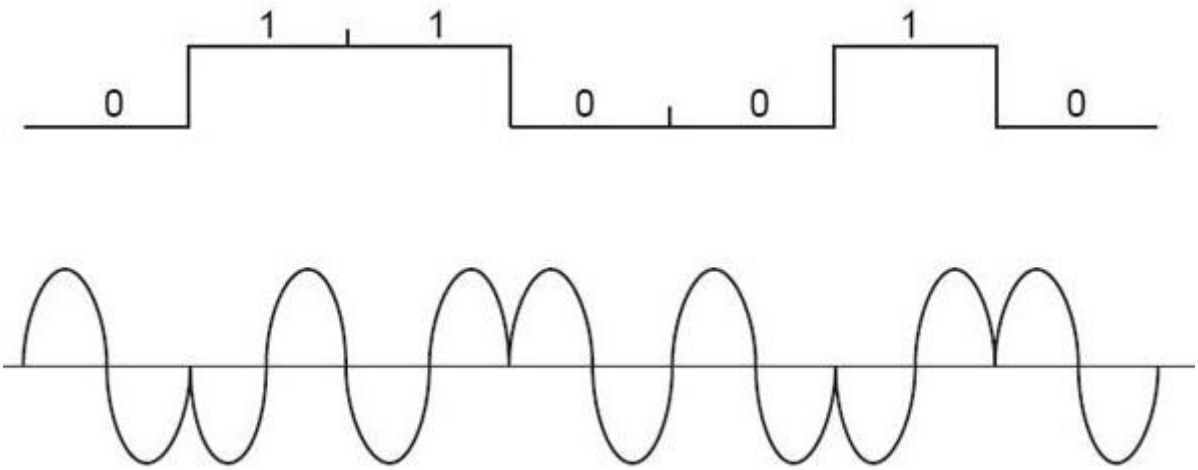
Frequency modulation (FM) Frequency Modulation(FM) is the modulation technique in which carrier frequency varies based on analog baseband information signal to be transmitted using wireless device. Frequency modulation is considered to be superior compare to the Amplitude modulation due to better noise immunity and its ability to reject the interfering signals due to the capture effect.



Phase modulation (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.

The phase of a carrier signal is modulated to follow the changing signal level (amplitude) of the message signal. The peak amplitude and the frequency of the carrier signal are maintained constant, but as the amplitude of the message signal changes, the phase of the carrier changes correspondingly.



Q4:

Ethernet is the traditional technology for connecting devices in a wired local area network (LAN) or wide area network (WAN), enabling them to communicate with each other via a protocol -- a set of rules or common network language. Ethernet describes how network devices can format and transmit data so other devices on the same local or campus area network segment can recognize, receive and process the information. An Ethernet cable is the physical, encased wiring over which the data travels.

Token Ring is a Computer Network technology used to build local area networks. It uses a special three-byte frame called a *token* that travels around a logical *ring* of workstations or servers. This token passing is a channel access method providing fair access for all stations, and eliminating the collisions of contention-based access methods.

There were several other earlier implementations of token-passing networks.

Comparison Between Ethernet and Token Ring

The fowling are explaining that which one is better

Token Ring access is more deterministic, compared to Ethernet's contention-based CSMA/CD

Ethernet supports a direct cable connection between two network interface cards by the use of a crossover cable or through auto-sensing if supported. Token Ring does not inherently support this feature and requires additional software and hardware to operate on a direct cable connection setup.

Token Ring eliminates collision by the use of a single-use token and early token release to alleviate the down time. Ethernet alleviates collision by carrier sense multiple access and by the use of an intelligent switch; primitive Ethernet devices like hubs can precipitate collisions due to repeating traffic blindly.

Token Ring network interface cards contain all of the intelligence required for speed auto detection, routing and can drive themselves on many Multi station Access Units (MAUs) that operate without power (most MAUs operate in this fashion, only requiring a power supply for LEDs). Ethernet network interface cards can theoretically operate on a passive hub to a degree, but not as a large LAN and the issue of collisions is still present.

Token Ring employs 'access priority' in which certain nodes can have priority over the token.

Un switched Ethernet does not have provisioning for an access priority system as all nodes have equal contest for traffic.

I think the Ethernet is better than token ring because of
if one node is damage in token ring the communication will be destroy.

Q5.

Reliable Transmission of Short Packets through Queues and Noisy Channels under Latency and Peak-Age Violation Guarantees

Communication latency is, however, not only determined by the blocklength, but also by the contribution of the queuing delays accrued in the presence of a data stream. Queuing delays are inherently random and designs that only control the average latency are not suitable to capture the stringent performance requirements of mission-critical applications. Instead, solutions for URLLC should ensure that the overall delay is below a tolerable threshold with a sufficiently large probability. Given the critical role of queuing delays in guaranteeing URLLC latency performance, we provide in this paper a joint coding-queuing analysis of the probability that the overall steady-state delay, including both queuing and transmission, exceeds a desired level for a given reliability constraint.

Our analysis pertains a point-to-point link serving a single flow of data. The following are natural generalizations: (i) a point-to-point link serving multiple independent flows of information, possibly with different reliability, freshness, and latency requirements or priorities as in ; (ii) a broadcast scenario with common information to be sent to all receivers; (iii) a broadcast scenario where independent information flows are to be sent to different receivers; (iv) the multiple-access case, where multiple sensors send information to a common destination; (v) the multi-hop setting where the objective is to maintain low end-to-end latency and high end-to-end data freshness.

References

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