CN Tutorial-5

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1.What are the responsibilities of data link layer?
The data link layer is responsible for multiplexing data streams,data frame detection, medium access, and error control. It ensures reliable point-to-point and point-to-multipoint connections in a communication network.

2.Mention the types of errors.
Single bit error− In the received frame, only one bit has been corrupted, i.e. either changed from 0 to 1 or from 1 to 0.
Multiple bits error− In the received frame, more than one bits are corrupted.
Burst error− In the received frame, more than one consecutive bits are corrupted.

3.Define physical addressing.
The Data Link layer adds a header to the frame in order to define physical address of the sender or receiver of the frame, if the frames are to be distributed to different systems on the network.

4.DefineSingle bit error.
Single bit error− In the received frame, only one bit has been corrupted, i.e. either changed from 0 to 1 or from 1 to 0.

5.DefineBurst error.
Burst error− In the received frame, more than one consecutive bits are corrupted.

6.What is redundancy?
The central concept in detecting or correcting errors is redundancy

7.List out the available detection methods.
Parity Check
Checksum
cyclic redundancy check

8.Write short notes on VRC.
Vertical redundancy check (VRC) is an error-checking method used on an eight-bit ASCII character. In VRC, a parity bit is attached to each byte of data, which is then tested to determine whether the transmission is correct. VRC is considered an unreliable error-detection method because it only works if an even number of bits is distorted.

9.Write short notes on LRC.
LRC verifies the accuracy of stored and transmitted data using parity bits. It is a redundancy check applied to a parallel group of bit streams. The data to be transmitted is divided into transmission blocks into which additional check data is inserted. This term is also known as a horizontal redundancy check.

10.Write short notes on CRC.
Cyclic Redundancy Check (CRC) involves binary division of the data bits being sent by a predetermined divisor agreed upon by the communicating system. The divisor is generated using polynomials.
11.Write short notes on CRC generator.
CRC (Cyclic Redundancy Check) is used as an error detection code in Ethernet frames. This method attaches the residue of a modulo-2 division to the message in the sender side and

recalculates the residue in the receiver side. The agreed-upon divisor is called the generator.

12.Write short notes on CRC checker.
A cyclic redundancy check (CRC) is an error-detecting code commonly used in digital networks and storage devices to detect accidental changes to raw data.

13.Give the essential properties for polynomial.
A CRC is called an n-bit CRC when its check value is n bits long. For a given n, multiple CRCs are possible, each with a different polynomial. Such a polynomial has highest degree n, which means it has n + 1 terms. In other words, the polynomial has a length of n + 1; its encoding requires n + 1 bits.

14.Define checksum.
a digit representing the sum of the correct digits in a piece of stored or transmitted digital data, against which later comparisons can be made to detect errors in the data.

15.What are the steps followed in checksum generator?

Step-01:

At sender side,

- If m bit checksum is used, the data unit to be transmitted is divided into segments of m bits.
- All the m bit segments are added.
- The result of the sum is then complemented using 1's complement arithmetic.
- The value so obtained is called as checksum.

Step-02:

- The data along with the checksum value is transmitted to the receiver.

Step-03:

At receiver side,

- If m bit checksum is being used, the received data unit is divided into segments of m bits.
- All the m bit segments are added along with the checksum value.
- The value so obtained is complemented and the result is checked.
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16.List out the steps followed is checksum checker side.
Case-01: Result = 0

If the result is zero,

- Receiver assumes that no error occurred in the data during the transmission.
- Receiver accepts the data.

Case-02: Result ≠ 0

If the result is non-zero,

- Receiver assumes that error occurred in the data during the transmission.

•Receiver discards the data and asks the sender for retransmission.

17.Write short notes on error correction.
Error correction involves ascertaining the exact number of bits that has been corrupted and the location of the corrupted bits.
The receiver performs necessary checks based upon the additional redundant bits. If it finds that the data is free from errors, it removes the redundant bits before passing the message to the upper layers.

18.Mention the types of error correcting methods.
Backward error correction
forward error correction

19.What is the purpose of hamming code?
Hamming code is a block code that is capable of detecting up to two simultaneous bit errors and correcting single-bit errors.

20.Define flow control.
flow control is the process of managing the rate of data transmission between two nodes to prevent a fast sender from overwhelming a slow receiver. It provides a mechanism for the receiver to control the transmission speed, so that the receiving node is not overwhelmed with data from transmitting node.

21.What is a buffer?
Buffer is a region of memory used to temporarily hold data while it is being moved from one place to another. A buffer is used when moving data between processes within a computer.

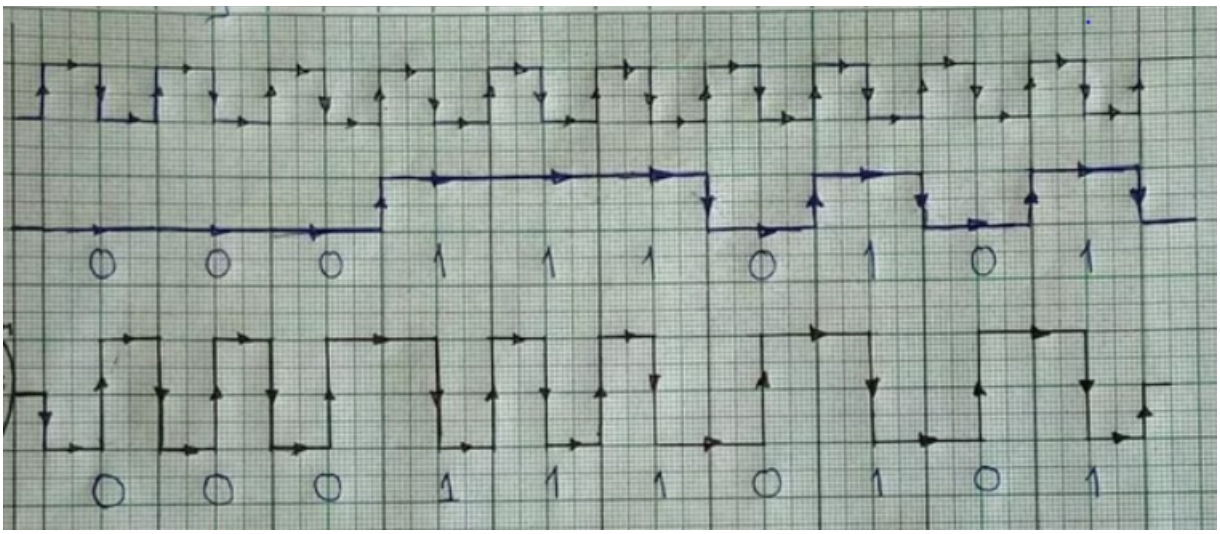
22.Mention the categories of flow control.
Feedback based Flow Control

Rate based Flow Control

23.Define block coding and give its purpose?
Block coding refers to the technique of adding extra bits to a digital word in order to improve the reliability of transmission.
Block coding provides redundancy to ensure synchronization and to provide inherent error detecting. In general, block coding changes a block of m bits into a block of n bits, where n is larger than m.

24.What is byte stuffing?
Byte stuffing is a process that transforms a sequence of data bytes that may contain 'illegal' or 'reserved' values (such as packet delimiter) into a potentially longer sequence that contains no occurrences of those values.

25.Sketch the Manchester encoding for the bit steam 0001110101.



26.Name the protocols used for CSMA.
Persistent CSMA
Non-Persistent CSMA
P-Persistent CSMA
CSMA/CD

27.Wireless network and mobile networks are not identical explain.
Cellular networks are based on mobile phones/devices using cellular signals to connect to the internet. Wifi uses radiofrequency waves to provide high-speed internet access to connected devices.
Cellular networks are based on mobile phones and use networks spread over a wide area. WiFi is a wireless network technology following IEEE 802.11 standards.

28.What is importance of hamming distance?
The key significance of the hamming distance is that if two codewords have a Hamming distance of d between them, then it would take d single bit errors to turn one of them into the other.

29.What is Manchester Encoding?
Manchester encoding is a synchronous clock encoding technique used by the physical layer of the Open System Interconnection [OSI] to encode the clock and data of a synchronous bit stream. The binary data to be transmitted over the cable are not sent as NRZ

30.What is the importance of variable sized sliding window in TCP?
The sliding window method ensures that traffic congestion on the network is avoided. The application layer will still be offering data for transmission to TCP without worrying about the network traffic congestion issues as the TCP on sender and receiver side implement sliding windows of packet buffer.

31.Explain Aloha protocol.
ALOHA is a multiple access protocol for transmission of data via a shared network channel. It operates in the medium access control sublayer (MAC sublayer) of the open systems interconnection (OSI) model. Using this protocol, several data streams originating from multiple nodes are transferred through a multi-point transmission channel.

32.Give the significance of termination.
To prevent a protocol from looping

33.What is IEEE 802.4 Standard?
Token Bus (IEEE 802.4) is a standard for implementing token ring over the virtual ring in LANs. The physical media has a bus or a tree topology and uses coaxial cables. A virtual ring is created with the nodes/stations and the token is passed from one node to the next in a sequence along this virtual ring.

34.Define Syndrome?
syndrome is a problem in computer networking caused by poorly implemented TCP flow control.

35.What are the various ARQ Retransmission strategies?
Stop – and – Wait ARQ
Go – Back – N ARQ
Selective Repeat ARQ

36.What is media sharing? State types of media sharing
Media sharing sites allow you to upload your photos, videos and audio to a website that can be accessed from anywhere in the world. You can then share that media with the world or just a select group of friends.
Video,docs,pdfs,photos..etc

37.State different IEEE 802 protocol.
IEEE 802- Overview and Architecture.

- IEEE 802.1- Bridging and Management.
- IEEE 802.2 - Logical Link Control [In Hiburnation]
- IEEE 802.3- CSMA/CD Access Method (Ethernet)
- IEEE 802.5 - Token Ring Access Method.
- IEEE 802.11 - Wireless Local Area Networks (WLAN

38.Define throughput.
Throughput is the amount of a product or service that a company can produce and deliver to a client within a specified period of time. The term is often used in the context of a company's rate of production or the speed at which something is processed.