Name: Shakhera khanom
ID: IT-18033
CT NO:-01

Question set

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b) Write down the application of communication and computer network. 03

c) Why learning data communication and computer network is important? Explain with example 04

d) what is the line configuration in computer network? 03

2. a) write down the effectiveness in data communication? write down network criteria. (3+3)

b) what is distributed processing? why we use it? what are the advantages of distributed processing? 04

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b) Describe Ring, Bus, and Star topology with their advantages and disadvantages. 07

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c) What is the purpose of using digital encoding schemes? 03

7. a) What is the Line coding? Mention the schemes of Line coding. convert the given digital data (10100110010) into digital signal using the technique

i. NRZ-L
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Question and Answer

Name: Shakhera khanom

ID: IT-18033

1. a) What do you mean by computer network? What is the role of IEEE in computer networking?

Answer:

Computer network: A computer network is a ~~go~~ group of computer system and other computing hardware devices that are liked together through communication channels to facilate communication and resource-sharing among a wide range of users. Networks are commonly categorized based on their characteristics

Every network includes :-

→ At least two computers server or client work-station

→ Network Interface card (NIC)

→ Connection medium, usually wire or cable or wireless or peripheral.

→ Network operating system software, such as unix

Role of IEEE in computer networking :-

IEEE, or the institute of electrical and electronics

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engineers, is an organization composed of engineers that issue and manages standards for electrical and electronic devices.

This includes networking devices, network interfaces, cavings and connect...

b) Write down the application of communication and computer network.

Answer:

The applications of communication and computer network is given below:

- Resource sharing such as printers and storage devices
- Exchange of information by means of e-mails and FTP
- Information sharing by using Web or Internet
- Interaction with other users using dynamic web pages.
- IP phones
- ve video conferences
- Parallel computing
- Instant messaging

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c) Why learning data communication and computer network is important? Explain with example

Answer:

The importance of learning data communication and computer network is given below:

1. Network Basic Understanding: A system of interconnected computers and computerized peripherals such as printers is called computer network. This interconnection among computers facilitates information sharing among them. Computers may connect to each other by either wired or wireless media.

2. Network Engineering: Networking engineering is a complicated task, which involves software, firmware, chip level engineering, hardware, and electric pulses. To ease network engineering, the whole networking concept is divided into multiple layers. Each layer is involved in some particular task and is independent of all other

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layers. But as a whole, almost all ~~networking~~ networking tasks depend on all of these layers. Layers share data between them and they depend on each other only to take input and send output.

3. Internet: A network of ~~w~~ networks is called an internetwork, or simply the internet. It is the largest network in existence on this planet. This internet hugely connects all WANs and it can have connection to LANs and Home networks. Internet uses TCP/IP protocol suite and uses IP as it's addressing protocol. Present day, internet widely implemented using IPv4. Because of shortage of address space, it is gradually migrating from IPv4 to IPv6. Internet enables its users to share and access enormous amount of information worldwide. It uses WWW, FTP, email services, audio and video streaming etc.

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d) what is line configuration in computer network?

Answer:

Line configuration refers to the way two or more communication devices attached to a link. Line configuration is also refferred to as a connection pathway that transfers data from one device to another. For communication to occur, two devices must be connected in same way to the same link at the same time. There are two possible line configurations

1. point-to-point
2. multipoint

2. a) Write down the effectiveness in data communication? Write down network criteria.

Answer:

Data communications are the exchange of data between two devices via some form of transmission medium such as ~~as~~ a wire cable. For data communications to occur, the communicating devices must be part of communication system

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made up of a combination of hardware (physical equipment) and software (programs). The effectiveness of a data communications system depends on four fundamental characteristics: delivery, accuracy, timeliness, and jitter.

1. Delivery: The system must deliver data to the correct destination. Data must be received by the intended device or user and only by ~~tat~~ that device or user.

2. Accuracy: The system must deliver the data accurately. Data that have been altered in transmission and left uncorrected are unusable.

3. Timeliness: The system must deliver data in a timely manner. Data delivered late are useless. In the case of vedio and audio, timely delivery means delivering data as they are produced, in the same order that they are produced, and without significant delay. This kind of delivery is called real-time transmission.

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4. Jitter: Jitter refers to the variation in the packet arrival time. It is the uneven delay in the delivery of audio or video packets. For example, let us assume that videos packets are sent every 30 m/s. If some of the packets arrive with 30-ms delay and others with 40-ms delay, an uneven quality in the video is the result.

A network must be able to meet a certain number of criteria. The most important of these are performance, reliability, and security.

1. Performance: Performance can be measured in many ways, including transit time and response time. Transit time is the amount of time required for a message to travel from one device to another. Response time is the elapsed time between an inquiry and a response. The performance of a network depends on a number of factors, including the number of users, the type of transmission medium, the capabilities of the

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connected hardware, and the efficiency of the software. Performance is often evaluated by two networking metrics: throughput and delay. we often need more throughput and less delay. However, these two criteria are often contradictory. If we try to send more data to the network, we may increase throughput but we increase the delay because of traffic congestion in the network.

2. Reliability: In addition to accuracy of delivery, network data from unauthorized access, protecting data from damage and development, and implementing policies and procedures for recovery from breaches and data losses.

3. Security: Network security issues include protecting data from unauthorized access, protecting data from damage and development, and implementing policies and procedures for recovery from breaches and data losses.

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b) What is distributed processing? Why we use it? What are the advantages of distributed processing?

Answer:

Distributed computing in simple words can be defined as a group of computers that are working together at the backend while appearing as one to the end-user. The individual computers working together in such groups operate concurrently and allow the whole system to keep working if one or some of them fail.

In a distributed system multiple computers can host different software components, but all the computers work to accomplish a common goal.

The computers in a distributed system or group can be physically located at the same place or close together, connected via a local network or connected by a Wide Area Network.

Distributed systems can also consist of different configurations or a combination of configurations such as personal computers, workstations and mainframes.

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Deploying, maintaining and troubleshooting distributing systems can be a complex and challenging task. The main reason behind their increasing acceptance is perhaps necessity as they allow scaling horizontally. For example, traditional databases that run on a single machine require users to ~~upr~~ upgrade the hardware to handle increasing traffic.

The advantages of distributed Processing :-

- ⇒ Scalability and modular Growth
- ⇒ Fault Tolerance and Redundancy
- ⇒ Low Lateney
- ⇒ Cost Effectiveness
- ⇒ Efficiency

Disadvantages of Distributed Processing :-

- ⇒ Complexity
- ⇒ Higher Inital Cost
- ⇒ Security Concerns

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c) what is ~~w~~ network / communication protocols? write down the features of protocols.

Answer:

A protocol is an agreed/admitted set of rules and procedures for exchanging data between two or more devices.

Features:

⇒ The sending devices shows it has finished sending the message.

⇒ The receiving device shows it has received the message.

⇒ The type of error checking to be used

⇒ Ethernet is used by most networks, but some network may use Token Ring protocol from IBM.

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3. a) Distinguish between physical media and wireless media.

Answer:

physical media:

⇒ Twisted pair cable - consists of two independently insulated wires twisted around each other.

⇒ Coaxial cable - consists of an insulated center wire grounded by a shield of braided wire

⇒ Fiber optic cable - contains hundreds of clear fiberglass or plastic fibers

⇒ ISDN line - a special digital telephone line that transmits and receives information at very high speeds.

wireless media:

⇒ microwave system - transmits data via high-frequency radio signals through the atmosphere.

⇒ satellite system - receive signals from the earth, amplify them, and then transmit back these signals to the appropriate locations on the earth

⇒ cellular technology - uses antennae resembling telephone towers to pick up radio signals within a specific area.

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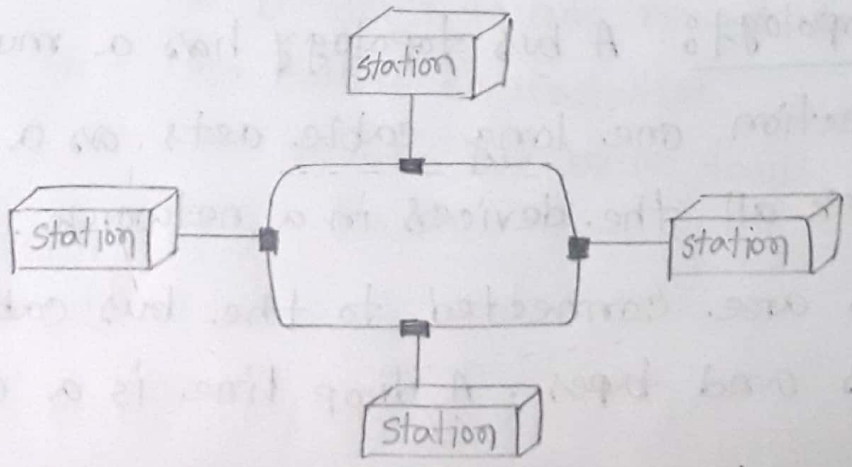
b) Describe Ring, Bus, and Star topology with their advantages and disadvantages.

Answer:

Topology : The topology of a network is the geometric representation of the relationship of all links and linking devices to one another. There are four basic topologies possible Ring, Bus, Star and mesh.

Ring Topology : In a ring topology, each devices has a dedicated point-to-point connection with only the two devices on either side of it. A signal is passed along the ring in one direction from devices to devices until it reaches it's destination.



A Ring topology connection

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Advantage of Ring topology :-

⇒ Easy to install an reconfigure

⇒ To add or delete a device require changing only two connection

⇒ fault isolation

⇒ Each device is ~~tix~~ linked to only it's immediate neighbors.

Disadvantage of Ring topology :-

⇒ unidirectional traffic

⇒ In a simple ring, a break in the ring can disable the entire network.

⇒ The weakness can be solved by using a dual ring or a switch capable of closing off the break.

Use of Ring topology :- Ring topology was prevalent when IBM introduced it's local area network.

Bus topology :- A bus topology has a multiple connection one long cable acts as a backbone to link all the devices in a network.

Nodes are connected to the bus cable by drop lines and taps. A drop line is a connection

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running between the device and the main cable

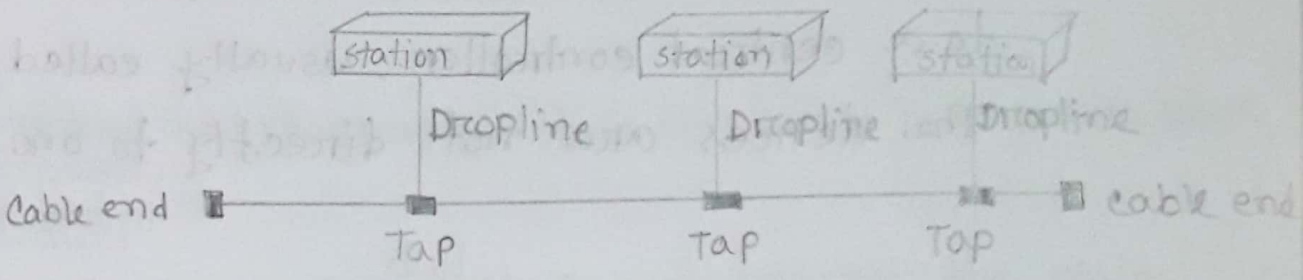

fig:- A bus topology connection

Advantage of Bus topology:-

- ⇒ Easy to install
- ⇒ less cabling
- ⇒ Inexpensive
- ⇒ Backbone cable flow data easily

Disadvantage of Bus topology:-

- ⇒ Difficult reconnection and fault isolation
- ⇒ Difficult to add new devices
- ⇒ cause degradation
- ⇒ If the backbone fault all connection fault.

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Star topology: In a star topology, each device has a dedicated point-to-point link only to a central controller, usually called a hub. The devices are not directly to one another.

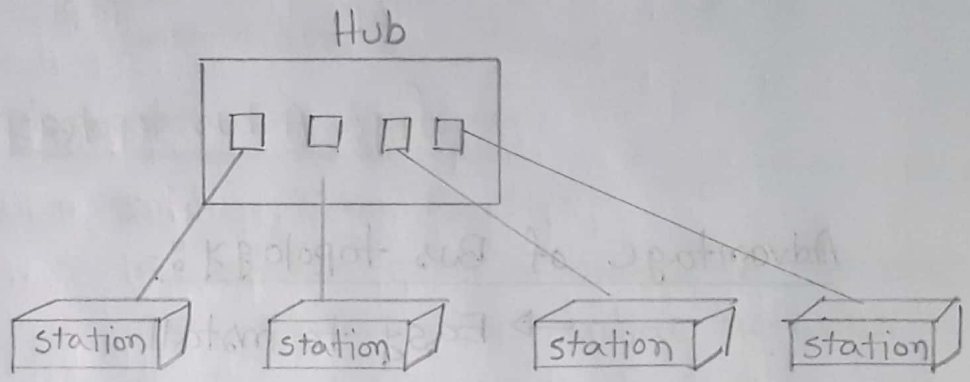

fig:- Star topology connection

Advantage of star topology:

- ⇒ Robustness
- ⇒ easy to installation
- ⇒ easy to configure
- ⇒ Less expensive than mesh
- ⇒ Less cabling

Disadvantage of star topology:

- ⇒ If hub goes down, the whole system is dead
- ⇒ more cabling than Bus and Ring topology

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Use of star topology :- The star topology is used in Local Area Network (LANs)

c) Define cryptography. How it works? Explain your Answer.

Answer:

Cryptography is a technique to encrypt the plain-text data which makes it difficult to understand and interpret. There are several cryptographic algorithms available present day as described below:

i. Secret key
ii. Public key
iii. message Digest

Secret key Encryption: Both sender and receiver have one secret key. This secret key is used to encrypt the data at sender's end. After the data is encrypted, it is sent on the public domain to the receiver. Because of receiver knows and has the secret key, the encrypted data packets can easily be decrypted. Example of secret key encryption in Data Encryption Standard (DES). In Secret

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key encryption, it is required to have a separate key for each host on the network - making it difficult to manage.

Public key Encryption: In this encryption system every user has its own Secret Key and it is not in the shared domain. The ~~see~~ secret key is never revealed on public domain. Along with secret key, every user has its own but public key. Public key is always made public and is used by senders to encrypt the data. When the user receives the encrypted data, he can easily decrypt it by using its own Secret Key. Example of public key encryption is Rivest-Shamir-Adleman (RSA)

Message Digest: In this method, actual data is not sent, instead a hash value is calculated and sent. The other end user, computes its own hash value and compares with the one just received. If both have values are matched then it is accepted otherwise rejected. Example of Message Digest is MD5 hashing. It is

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mostly used in authentication where user password is cross checked with the one saved on the server.

4. a) Discuss the similarities of OSI and TCP/IP reference models. Draw the block diagram of TCP/IP and OSI model.

Answer:

similarities between OSI and TCP/IP reference models:

- ~~Both~~

- Similar architecture: Both of the models share a similar architecture. This can be illustrated by the fact that both of them are constructed with layers.

- Share common application layers: Both of the models share a common "Application layer". However, this layer contains different services, which depends upon each models.

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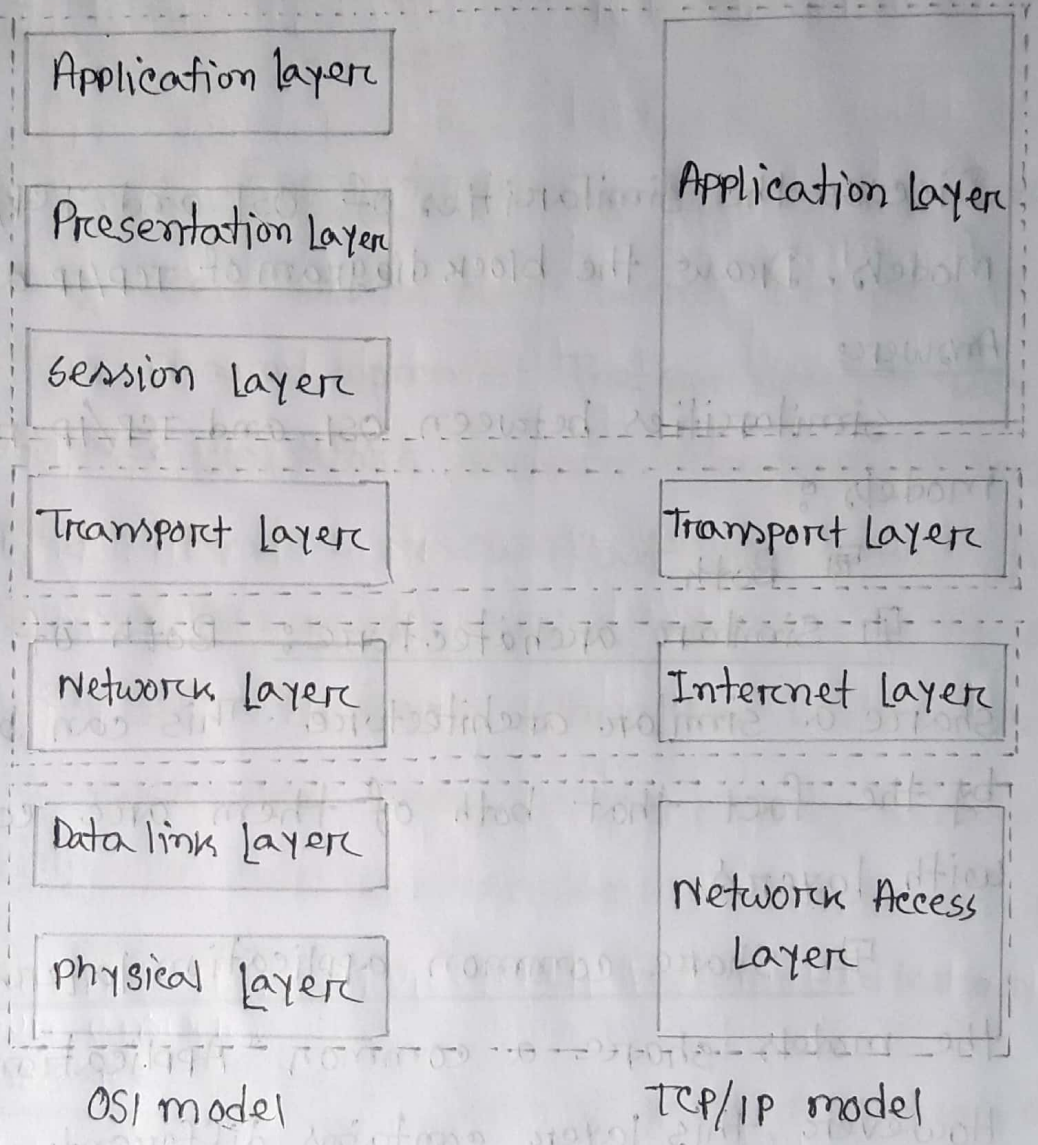

☒ Both models have comparable "transport" and "network" layers :- This can be defined by the fact that whatever "functions" are performed between the Presentation and Network layers of OSI model that similar or equal function are performed

at the "transport layer" of the TCP/IP model.

Both models are based on layered Protocols:-

The transport service can provide a reliable end-to-end byte stream.

The Internet is based on the "TCP/IP" model, which is equal or "simplified" implementation of the OSI model.

The TCP/IP inspired by the OSI model.

b) Briefly compare between circuit-switching and packet switching.

Answer:

Now compare the circuit switching and packet switching in below table.

Circuit switching	Packet switching
call set up is required	call set up is not required
Dedicated connection between two hosts	No dedicated connection between two hosts
Bandwidth available is fixed	Bandwidth available is variable

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It is Transparent	Not Transparent
Information take the same route between the connected Hosts.	Information could take different routes to reach the destination Hosts.
Information always arrives in order	Information could arrive at order.
congestion is call based	congestion is packet based.
It is Transparent	It is not Transparent

c) How network services help in our life? Explain your answer.

Answer:

Network services are given below:

- File services: file services include sharing and transferring files over the network.
- File sharing: One of the season which gave birth to networking was file sharing. File

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sharing enables it's users to share their data with other users. User can upload the file to a specific server, which is accessible by all intended users. As an alternative, user can make its file shared on its own computer and provides access to intended users.

- File Transfer: This is a activity to copy or move file from one computer to another computer or to multiple computers, with help of underlying network. Network enables its user to locate other users in the network and transfers files.

Communication Services

- Email: Electronic mail is a communication method and something a computer user cannot work without. This is the best of today's internet features. Email system has one or more email servers. All its users are provided with unique IDs. When a user sends email to ~~users~~ other user,

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it is actually transferred between users with help of email server.

• Social Networking : Recent technologies have made technical life social. The computer savvy peoples, can find other known peoples or friends, can connect with them, and can share thoughts, pictures, and videos.

• Internet Chat : Internet chat provides instant text transfer services between two hosts. Two or more people can communicate with each other using text based Internet Relay chat Services. These days, voice chat and video ~~ca~~ chat are very common.

• Discussion Boards : Discussion boards provide a ~~mechanism~~ mechanism to connect multiple peoples with same interests. It enables the users to put queries, questions, suggestions etc. which can seen by all other users. Other may respond as well.

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• **Remote Access:** This service enables user to access the data residing on the remote computer. This feature is known as Remote desktop. This can be done via some remote device, e.g. mobile phone or home computer.

Application Services

These are nothing but providing network based services to the users such as web services, database managing, and resource sharing

• **Resource sharing:** To use resource efficiently and economically, network provides a mean to share them. This may include servers, printers, and storage media etc.

• **Databases:** This application service is one of the most important services. It stores data and information, processes it, and enables the users to retrieve it efficiently by using queries. Databases help organizations to make decisions based on statistics.

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• **Web Services:** World Wide Web has become the synonym for internet. It is used to connect to the internet, and access files and information services provided by the internet servers.

Directory Services

• **Accounting:** In an organization, a number of users have their user names and passwords mapped to them. Directory Services provides means of storing this information in cryptic from and make available when requested.

• **Authentication and Authorization:** User credentials are checked to authenticate a user at the time of login and/or periodically. User accounts can be set into hierarchical structure and their access to resources can be controlled using authorization schemes.

• **Domain Name Services:** DNS is widely used and one of the essential services on which

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internet works. This system maps IP address to domain names, which are easier to remember and recall than IP addresses. Because network operates with the help of IP addresses and humans tend to remember website names, the DNS provides website's IP address which is mapped to its name from the back-end on the request of a website name from the user.

5. a) Can infrared be used for transmission?

Answer:

→ The infrared waves can be used for short range communication in networking (up to 45 km)

→ It is wireless communication so no physical medium is required to connect the transmitter and receiver.

→ Works on line of sight system i.e. the transmitting and receiving antennas should be in the sight of each other.

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→ No government license is ~~A~~ needed til now for this communication.

Example. used in television, stereos.

b) which transmission medium works at 2 Giga-bits per second?

Answer:

⇒ The fiber sends data at rate 2 giga-bites per second.

⇒ Cable consists of Hair like thin fiber which works on the principle of total internal reflection.

⇒ It transmits data with speed of light and works on bandwidth up to terahertz.

⇒ Transmitting medium is fiber of glass which is insulated on the outside.

⇒ Attenuation of signal is minimum speed of transmission is very high.

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c) what is the significance of the Twisting in Twisted pair cable? ~~wwi~~ write the advantage of optical fiber over twisted pair cable.

Answer:

Twisting ensures that both wires are equally, but inversely affected by external influences such as noise.

The main reason for twisting in a twisted pair cable is to cancel out any electromagnetic interference [EMI] that may be given out by external sources. These external sources could include crosstalk from other nearby pairs of cables or electromagnetic radiation given out by pairs of twisted cables that are not shielded (UTP- unshielded twisted pair). This method was created by Alexander Graham Bell.

UTP cables are most commonly seen in telephone systems and Ethernet networks. The way that they are arranged in outside telephone cables

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and even though they may be twisted in different ways, that signals may be disrupted.

There are several advantages that come with twisting cables together, and possible shielding them with a plastic cover:

⇒ Twisting cables forms a thin and more flexible cable that is easy to string up between walls.

⇒ Twisting means that more lines can be fed through the same ducts

⇒ An unshielded twisted pair costs a lot less per meter or foot than other types of cable.

⇒ This method prevents electrical noise from going into the cable or being emitted from it.

⇒ Crosstalk from other cables is minimized.

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Advantage of optical fiber over twisted-pair and co-axial cable are:-

i) Higher Bandwidth
ii) Less signal attenuation and other losses
iii) noise resistance
iv) Less weight
v) cheap in cost
vi) safety
vii) security
viii) flexibility
ix) Electromagnetic isolation
x) smaller in size but Great capacity.

d) compare satellite and cable medium for transmission.

Answer:

→ Delay given by satellite during its transmission is 3 micro seconds per km.

→ Delay given by cable wire is 5 micro seconds per km.

→ Satellite is broadcast media placed in the

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geo stationary orbit around the earth.

→ satellite is used in wireless communication system and cable is used in wired communication.

→ On security grounds cable is better than a satellite.

6. a) Differentiate between Analog signal and digital signal.

Answer:

Here are important differences between analog and digital signal:

Analog signal	Digital signal
An analog signal is a continuous signal that represents physical measurements	Digital signals are time separated signals which are generated using digital modulation.
It is denoted by sine waves	It is denoted by square waves.

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It uses a continuous range of values that help you to represent information	Digital signal uses discreate 0 and 1 to represent information
Temperature sensors, FM radio signals, photocells, Light sensor, Resistive touch screen are examples of Analog signals.	computers, CDs, DVDs are some examples of Digital signal
The Analog signal bandwidth is low	The digital signal bandwidth is high.
Analog signals are deterioriated by noise throughout transmission as well as write / read cycle.	Relatively a noise-immune system without deterioration during the transmission process and write/ read cycle
Analog hardware never offers flexible implementation.	Digital hardware offers flexibility in implementation.
It is suited for audio and video transmission	It is suited for computing and digital electronics.

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Processing can be done in real-time and consumes lesser band-width compared to a digital signal.	It never gives a guarantee that digital signal processing can be performed in real time.
Analog instruments usually have a scale which is cramped at lower end and gives considerable observational errors	Digital instruments never cause any kind of observational errors
Analog signal doesn't offer any fixed range	Digital signal has a finite number, i.e. 0 and 1.

b) What is manchester coding? Converts the binary code 11011001 into differentian manchester code with timing diagram?

Answer:

In telecommunication and data storage,

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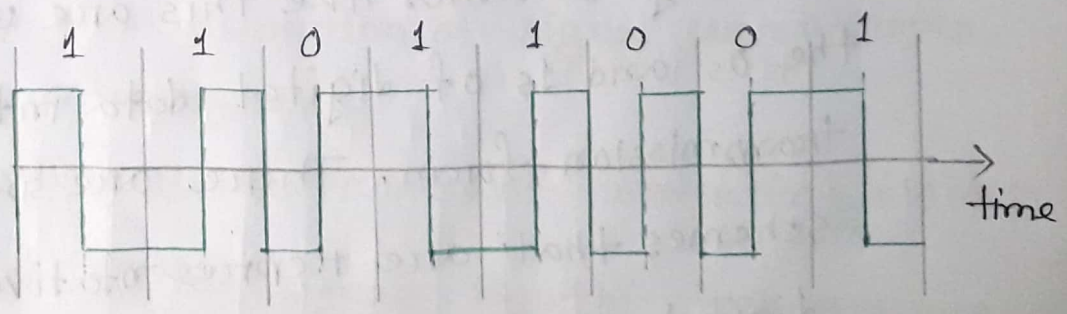
Manchester code is a line code in which the encoding of each data bit is either low then high, or high then low, for equal time. It is a self-clocking signal with no DC component.

As a result, electrical connections using a Manchester code are easily galvanically isolated

The state of a bit is determined according to the direction of the ~~transm~~ transition, In some system, the transition from high to low represents logic 0. In other systems, the transition from low to high represents logic 0 and the transition from high to low represents logic 1.

Differential Manchester:



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c) what is the purpose of using digital encoding schemes?

Answer:

To transmit digital data using digital signals, the 1s and 0s of the digital data must be converted to the proper physical form that can be transmitted over a wire or airwave. Thus, if you ~~with~~ wish to transmit a data value of 1, you could do this by transmitting a positive voltage on the medium. If you wish to transmit a data value of 0, you could transmit a zero voltage. You should also use the opposite scheme: a data value of 0 is positive voltage, and a data value of 1 is a zero voltage. Digital encoding schemes like this are used to convert the 0s and 1s of digital data into the appropriate transmission form. There are six digital encoding schemes that are representative of most digital encoding schemes:

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NRZ-L, NRZ-I, manchester, differential manchester, bipolar-AMI, and 4B/5B.

7. a) What is Line coding? Mention the schemes of Line coding.
Convert the given digital data (10100110010) into digital signal using the technique

i) NRZ-L
ii) NRZ-I
iii) Bipolar-AMI

Answer:

A line code is the code used for data transmission of a digital signal over a transmission line. This process of coding is chosen so as to avoid overlap and distortion of signal such as inter-symbol interference.

Line coding is the process of converting digital data to digital signals. By this technique we

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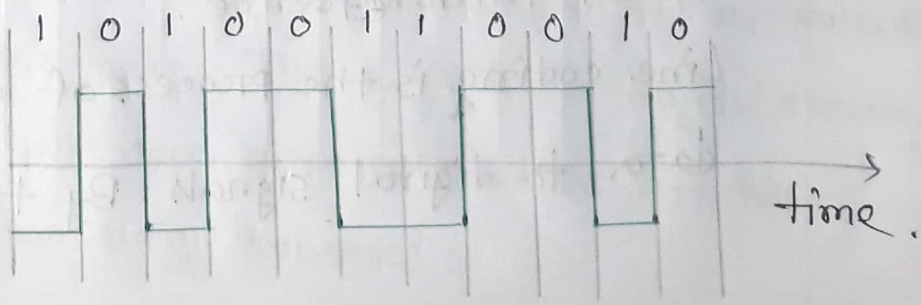
converts a sequence of bits to a digital signal. At the sender side digital data are encoded into a digital signal and at the receiver side the digital data are recreated by decoding the digital signal.

we can roughly divide line coding schemes into five categories:

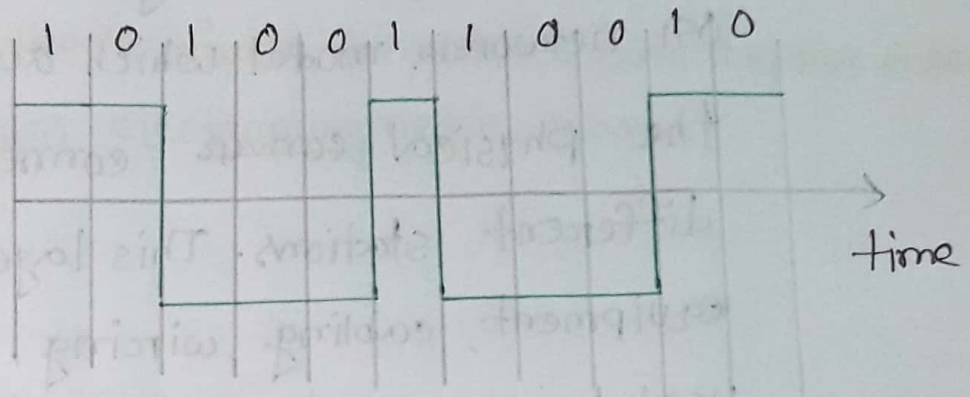
1. Unipolar (eg. NRZ scheme)
2. polar (eg. NRZ-L, NRZ-I, RZ and Biphase - manchester and differential manchester).
3. Bipolar (eg. AMI and ~~psed~~ pseudoternary)
4. Multilevel
5. Multitransition.

Convert to digital data to digital signal:

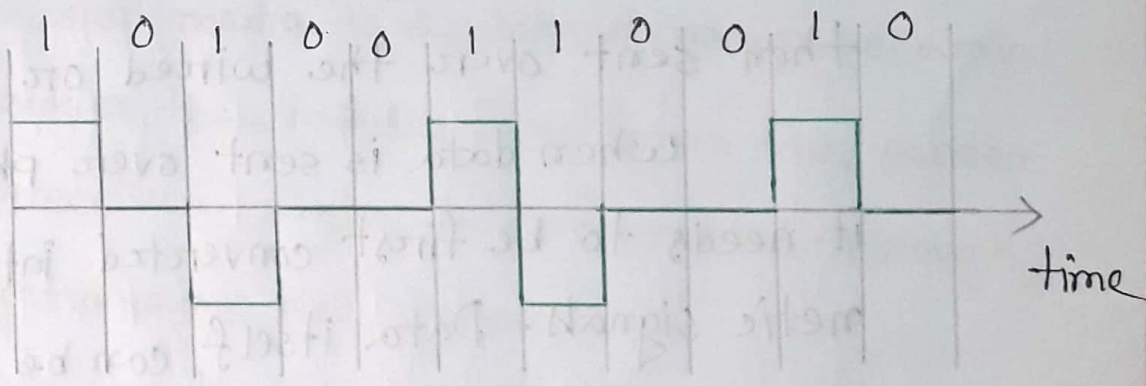
NRZ-L:



NRZ-I :



Bipolar - AMI :



b) Define physical layer. when data is sent over physical medium which signals it is converted into ?

Answer:

Physical layer in the OSI model plays the role of interacting with actual hardware and signaling

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mechanism. Physical layer is the only layer of OSI networks model which actually deals with the physical ~~convert~~ connectivity of two different stations. This layer defines the hardware equipment, cabling, wiring, frequencies, pulses used to represent binary signals etc. Physical layer converts then to electrical pulses, which represent binary data. This binary data is then sent over the wired or wireless media.

When data is sent over physical medium, it needs to be first converted into electromagnetic signals. Data itself can be analog such as human voice, or digital such as file on the disk. Both analog and digital data can be represented in digital or analog signals.

Digital signals: Digital siglans are discrete in nature and represent sequence of voltage pulses. Digital signals are used within the circuity of a computer system.

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Analog signals : Analog signals are in continuous wave form in nature and represented by continuous electromagnetic waves.

c) What is the role of transmission medium in a computer network?

Answer:

Transmission media is a communication channel that carries the information from the sender to the receiver. Data is transmitted through the electromagnetic signals.

The main functionality of the transmission media is to carry the information in the form of bits through LAN (Local Area Network)

It is a physical path between transmitted and receiver in data communication.

In a copper-based network, the bits in the form of electrical signals.

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In a fibre based network, the bits in the form of light pulses.

In (open system interconnection) OSI phase, transmission media supports the Layer 1. Therefore, it is considered to be a Layer 1 component.

The electrical signals can be sent through the copper wire, fibre optics, atmosphere, water, and vacuum.

The characteristics and quality of data transmission are determined by the characteristic of medium and signal.

Transmission media is of two types are wired media and wireless media. In wired media, medium characteristics are more important whereas, in wireless media, signal characteristics are more important.

Different transmission media have different properties such as bandwidth, delay, cost and ease of installation and maintenance.

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The transmission media is available in the lowest layer of the osi reference model, i.e. physical layer.

8. a) What is multiplexing? Why we use multiplexing?

Answer:

Multiplexing is a technique used to combine and send the multiple data streams over a single medium. The process of combining the data streams is known as multiplexing and hardware used for multiplexing is known as a multiplexer. ~~Combin~~ Multiplexing divides the high capacity medium into low capacity logical medium which is then shared by different streams. Communication is possible over the air (radio frequency) using a physical media (cable), and light (optical fiber). All mediums are capable of multiplexing.

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Why we use multiplexing:

The transmission medium is used to send the signal from sender to sender. The medium can only have one signal at a time.

~~It~~ If there are multiple signals to share one medium, then the medium must be divided into such a way that each signal is given some portion of the available bandwidth.

For example: If there are 10 signals and bandwidth of medium is 100 units, then the 10 unit is shared by each signal.

When multiple signals share the common medium, there is a possibility of of collision. multiplexing concept is used to avoid such collision.

Transmission services are very expensive.

Multiplexing technique is widely used in telecommunications is which several telephone

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calls are carried through a signal wire.

multiplexing ~~orig~~ originated in telegraphy in the early 1870s and is now widely used in communication.

Geoge Owen developed the telephone carrier multiplexing in 1910.

More than one signal can be sent over a ~~sig~~ single medium.

The bandwidth of a medium can be utilized effectively.

b) Compare the strengths and weaknesses of FDM and TDM

Answer:

Let's see the difference between TDM and FDM.

FDM	TDM
FDM stands for Frequency division multiplexing.	TDM stands for Time division multiplexing.
FDM works with only analog signals.	works with digital signals as well as analog signals.

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FDM has high conflict.	TDM has low conflict
It's wiring or chip is complex rather than simple.	Wiring or chip of TDM is simple.
FDM is inefficient	It is efficient
FDM, frequency sharing takes place.	In TDM, time sharing takes place.
FDM, Guard band is necessary.	In TDM, synchronization pulse is necessary.

c) What is wireless transmission? Explain different types of wireless transmission.

Answer:

Wireless transmission is a form of unguided media. Wireless communication involves no physical like established between two or more devices, communicating wirelessly. Wireless signals are

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spread over in the air and are received and interpreted by appropriate antennas. When an antenna is attached to electrical circuit of a computer or wireless device, it converts the digital data into wireless signals and spread all over within its frequency range. The receptor on the other end receives these signals and converts them back to digital data. A little part of electromagnetic spectrum can be used for wireless transmission.

Types of wireless transmission:

Different types of signals are used in communication between the devices for wireless transmission of data.

- Radio Frequency Transmission
- Infrared Transmission
- Microwave Transmission
- Lightwave Transmission

Radio Frequency Transmission:

Radio frequency is a form of electromagnetic

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transmission used in wireless communication. RF signals are easily ~~गर~~ generated, ranging 3kHz to 300 GHz. These are used in wireless communication because of their property to penetrate through objects and travel long distances.

Radio communication depends on the wavelength, transmitter power, receiver quality, type, size and height of the antenna.

Drawbacks:

→ These are frequency dependent

→ These have the relatively low bandwidth for data transmission.

Infrared Transmission:

Infrared radiations are electromagnetic radiations with longer wavelengths than visible light. These are usually used for short range communications. These signals do not

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pass through solid objects.

Examples like Television remote control, mobile data sharing.

Microwave Transmission:

Microwave are the form of electromagnetic transmission used in wireless communication systems. The wavelength of microwave ranges from one meter to one millimetre. The frequency varies from 300 MHz to 300 GHz. There are widely used for long distance communications and are relatively less expensive.

Drawbacks:

→ The microwave does not pass through buildings.

→ Bad weather affects the signal transmission.

→ These are frequency dependent.

Lightwave Transmission:

Light is a electromagnetic radiation with a

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wavelength ranging between infrared radiations and ultraviolet radiations. The wavelength ranges from 430 to 750 THz.

These are unguided optical signals such as lasers and are unidirectional

Drawbacks:

→ These signals cannot penetrate through rain and fog.

→ The laser beam gets easily diverted by air.

d) What is meant by switching in e networking?

Answers

Switching is process to forward packets ~~comm~~ coming in from one port to a port leading towards the destination. when data comes on a port it is called ingress, and when data leaves a port or goes out it is called egress. A communication system include number of switches and nodes.

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