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LONG Questions

Question # 1: What is information networks, describe it uses and benefits?

Information Network:

An information network is a set of two or more computers connected. The main reason is to share information and other resources. It is also called computer network. The information network uses two important technologies. These are computing and telecommunications. Telecommunication is a process of transferring information over a distance via radio waves, optical signals or transmission line. The computer in a network are connected with one another through cables, satellite or phone lines.

Uses Information Network:

Following are some important uses of computer networks:

- Networks are used to access shared programs and data simultaneously.
- Networks are used to share peripheral devices such as printers and hard disks etc.
- One copy of software can be shared over a network by many users.
- Some networks are used for communication and provide tools for teleconferencing and video conferencing.
- Network are used to send email along with big attachments of file etc.

Benefits of Information Network:

Following are the key benefits of information networks:

- Increase in Productivity

  The computer makes exchange of information easier and faster. It provides an easy access to data. It increases productivity and efficiency.

- Cost Saving

  Networking allows costly equipment be shared with many users. Shared resources are used more often and more efficiently.

- Less Disk Storage

Without networking, the software used on the computer must be present of each computer's hard disk. It is difficult and time consuming to install, configure and main software on each computer.

- Easy Maintenance

    Networking also software and data to be shared with many users. Software install on server. All user access the server to use the software and data easy.

Question # 2: Explain different network models in detail?

The design of computer, devices and media in a network is called the network architecture. It is also known as the network model. There are two models of computer networks. These are as follows,

- Peer-to-Peer Model

    Every computer in peer to peer model has same status. There is no central server computer to operate other computers. The files and peripheral devices are distributed across several computers. Each computer in a peer-to-peer network can both use and provide the hardware, data or programs located on any other computer in the network. Usually, only one computer on the network is connected to peripherals.

Advantages	Disadvantages
✓ Expensive server and hardware and software are not required. ✓ Each computer is independent of other computers in the network. ✓ It is suitable for small office of ten or less computers. ✓ It is easy to setup and maintain.	✓ There is no central place for storing data. ✓ It is slower in speed. ✓ Heavy use can slow down the network speed. ✓ It also provides less security of data.

- Client Server Model

    In this model, a special type of computer is used. This computer is called server computer controls the whole network. It is used to store data, files and databases shared among different computers in the network. It may also have a quality printer with it for sharing. Server is more powerful computer as compared to other computers in the network are called Clients. Client server model is also called dedicated server model. A dedicated server is to perform some particular tasks. For example, file server is used to store and manage files. Print server is used to manage printers and printing jobs. A database server stores and provides access to database. Similarly, a network server manages network resources.

Advantages	Disadvantages
✓ It provides strong central security to ensure that network resources are not accessed by unauthorized users. ✓ It reduces the volume of data traffic on the network. ✓ A server based network can support a large number of users.	✓ It is expensive model. Because server costly. ✓ Network administrator is usually required for maintenance of the network. ✓ The operations stop across the network when server goes down.

Question # 3: Explain star and mesh network in detail?

Star Topology:

In star topology, all computers are communicating with central device known as hub or switch. If two computers want to share data, the sender computer sends data to the hub or switch. If two computers want to share data, the sender computer sends data to the hub or switch. The hub or switch sends it to the receiving computer. Each computer on a star network communicates with a central hub or switch and also provides a central connection point.

Advantages	Disadvantages
✓ It is easy to maintain and modify in a star network. ✓ It is usually easy to troubleshoot a star network. ✓ Adding or removing some computers can be done without making any problem in the network. ✓ Finding problems or faults becomes are simple using hub or switch. ✓ One computer failure does not bring down the whole network. ✓ It is more flexible as compared to another topology.	✓ If central hub or switch fails, the entire network breaks down. ✓ It needs a large amount of cable to connect different computers. ✓ It is much costly and expensive topology, you purchase hub and cables.

Mesh Topology:

In a mesh topology, every computer or device in network is directly connected to every other device or computer in the network. A message can have sent on many possible paths or way (exist in LAN or WAN) from source to destination. Mesh topology provides good performance and reliability. However, the complexity and difficulty of creating a mesh network increases as number of nodes on the network increases. For example, a three or four node mesh network is relatively easy to create, whereas it is impractical to set up a mesh network of 50 nodes. Mesh networks are not used much in local area networks (LAN). It is mostly used in wide area networks where reliability is important and the number of devise being connected together is fairly small.

Advantages	Disadvantages
✓ Use of specific or dedicated link guarantees that each connection can carry its own data load. It avoids the networks traffic problem. ✓ Mesh network has fault tolerance due to multiple links ✓ Due to multiple links, mesh network can maintain quality communication even under high network traffic. If one link or cable is unusable; it does not harm the entire system or network. ✓ Troubleshooting of the network easy as compared to other networks. If data is not communicated between two computers, it means that there is some fault in direct link between them.	✓ It is very expensive to build mesh network. ✓ It is difficult to build or install and reconfigure.

Question # 4: Explain Bus and Ring network in detail?

Bus Topology:

Bus topology is much simple form of network. It is used for a small number of computers. All network nodes are connected to a communication wire known as Bus. Wire can be either a network device. The terminator is used at the end of a bus to absorb signals. If a computer wants to send data to other computer in the network, it sends the data and destination address via the bus. The data and address move from one computer to the other. Each computer read the destination address. If it matches with the destination address of the computer, the computer keeps the data otherwise the data moves the next computer.

Advantages	Disadvantages
✓ It is easy to install and configure. ✓ BUS is simple and easy to establish and maintain. ✓ It requires minimum amount of cable to connect computers. ✓ It is not expensive. ✓ We can easily use to extend a bus. It allows many computers to join network. ✓ If one node or computer fails, it does not affect remaining network.	✓ It is difficult to troubleshoot or to find problems in network. ✓ It supports only limited numbers of computers. ✓ If you add more computers increases, network speed will slow down.

Ring Topology:

In this topology, every computer is connected to the next computer with the last one connected to the first computer like a circular chain. Every computer is connected to next computer in the ring. Each computer retransmits. Every computer receives message from the previous computer and transmit it to the next computer till the destination computer receives the message in one direction. Since network use token passing technique. A short electronic message or special signal that travels around the communication medium is called token. Token is used to send and receive data over network. When a computer wishes to send data it.

- ✓ Gets the token.
- ✓ Changes it status from free to busy.
- ✓ Puts the data on the token.
- ✓ Add address of destination computer and send it.

Advantages	Disadvantages
✓ It provides the fastest mean of data communication. ✓ It costs less than star topology. ✓ All computers have equal access in network, token pass to every computer.	✓ Failure of one computer breaks down the entire network. ✓ It is more difficult to troubleshoot or find problems in network. ✓ To add or remove computers affect the entire network.

Question # 5: Differentiate between LAN, MAN and WAN?

LAN:

A network of several personal computers through Ethernet card at a measured limit is called LAN. LAN is the most common type of network are used now a day in offices and campuses. LAN stands for Local Area Network. The central node is a special device called a network hub. All links are made up to UTP cables. The maximum recommended length

of a UTP connection in LAN is 100 meters. A computer should be more than 100 meters away from hub. Most LANs are used to connect computers in a single building or group of buildings. Hundreds or thousands of computers may be connected through LAN. There are many types of LANs. Ethernet is the most common for PCs. That is why most LANs are used to connect computer in a single building, campus, office or room etc. All computers into LAN can communicate with each other at a high speed. The speed to communications between any two devices on an Ethernet LAN can be 2 to 1000 million bit per second (Mbps). LAN can transmit data in a limited distance.

Important points to remember for LAN:

- ✓ LAN is used to connect computers at one place, office or building.
- ✓ Connection in a LAN is permanent (Not temporary) by making wires.
- ✓ LAN has minimum possibility of data transmission error.
- ✓ LAN covers small or limited area.
- ✓ LAN is not very costly.

MAN:

The size of metropolitan area network (MAN) is between LAN and WAN. A metropolitan area network (MAN) is a communication network that covers a geographical area of the size of a city or town. A MAN typically includes one or more LAN's but cover a small geographical area than WAN. A MAN acts as a high-speed network. Mobile phones systems often use MAN.

Examples of MAN:

- ✓ Network connecting different branches or offices of a company in a same city.
- ✓ The Cable network in a city to provide signal for channels.
- ✓ The network connecting different campuses of a college in a city.

Important Points to remember for MAN:

- ✓ MAN, typically includes one or more LANs.
- ✓ It covers a smaller geographic area than WAN.
- ✓ It usually in managed by a single network provider.
- ✓ It is more expensive than LAN.
- ✓ It is difficult to maintain as compared to LAN.

WAN:

A wide area network is a network of geographically distinct computers and terminals. A type of network which covers relatively a large is known which covers relatively a large area is known as WAN. WAN is used to connect computers in many different cities, countries and continents. Telephone lines are used in the connection of Wan. Another way to connect them are leased lines or satellites. WAN ca reach the parts of the world that is not possible with LANs. The mainframe and minicomputers used in WAN are designed to access by terminal. A personal computer must appeal as terminal to communicate with large computers in WAN.

Examples of WAN:

- ✓ The network connecting the ATMs of a bank located in different cities.
- ✓ Internet connects millions of users all over the world to share information.
- ✓ The network connecting NADRA offices in different cities of Pakistan.

Important Points to Remember for WAN:

- ✔ WAN is used to share only data information.
- ✔ The connection in WAN is not permanent.
- ✔ WAN is used to connect computers anywhere in world.
- ✔ WAN is more expensive.
- ✔ WAN can cover maximum distance.
- ✔ Speed up to 45 Mbps mostly 1 Mbps.

Question # 6: What is network protocol? Discuss different LAN protocols in detail?

Network Protocol:

Network protocol or communication protocol are a set of formals polices and rules for exchanging information on a network. Any device in a network cannot do communication without protocol. Network protocols deal with the following issues:

- ✔ How sending computer sends the data?
- ✔ How the destination computer will receive the data?
- ✔ How the data will be represented?
- ✔ How the errors will be handled?

LAN Protocols:

Different LAN protocol are as follows:

- **Ethernet**

  Ethernet is the protocol which is capable of handling a large amount of data that is why it is most commonly used protocol. It consists of high-speed network cable and bus network topology. That is why it is relatively simple and cheaper. It is inexpensive and easy to install and manage. All computers in Ethernet use the same cable to send and receive data. They must follow the same rules for communication. If two or more computers transmit data at the same time, the message can be lost. A computer checks if the cable is in use before transmitting data. The computer waits if the cable is being used. It starts transmitting data when the cables are free. This process is also known as CSMA/CD.

- **Token Ring**

  Token ring protocol is also a LAN protocol. It permits network devise to retrieve the network by passing signal called token. Token is of three bytes and it travels in a circle that is why it is called token ring. Token is just like ticket or permit. A device can transmit data over the network only if it has a token. Only a single token is used in one network. That is why no collision can occur. But the data transmission rate is slow. When computer want to send a message, it: -

  - ✔ Get the token from network.
  - ✔ Puts the data in the picking token.
  - ✔ Adds the destination address of receiving computer.

- **ARC net:**

  ARC is both a topology and networking technology. ARC is short form of attached resource computer network. It uses twisted-pair wire or coaxial cable. The original ARC net protocol was very slow and introduced in 1997.

  ARC net uses star, bus or a combination of these network topologies. It supports coaxial cable, twisted-pair and fibre-optic media. It can connect up to 255 nodes or computers in a star topology at speed of 2.5 Mbps using twisted-pair or co-axial cable. The 20 Mbps and 100 Mbps version of ARC net have also been introduced.

ARC net uses a token-passing scheme. It is slightly different from that used by Token Ring. A single "token" passes around the network from node to node, and no node is allowed to use the network unless it has the token.

Question # 7: Explain the services of functions of internet in detail?

Services of Internet:

Internet provides various facilities and uses for users. The most commonly used internet services include e-mail, Telnet, Newsgroup, Mailing list, rooms Gopher and World Wide Web.

- ### World Wide Web (www)

  WWW is the first main application of internet. It is also called web. It is basically, the ocean of information in which millions of documents containing information on different aspects are linked together. WWW is a collection of documents and websites placed at different locations interlinked over internet. A website representing different web pages containing desire data or information.

- ### Email

  Email means Electronic Mail. It is a message distributed by internet from one computer to another. Email is the transfer or exchange of data, messages and files via Internet. Messages can be in the form of text, graphics, sounds, and video clips. It is very fast way transferring messages anywhere in the world in a short time.

- ### Telnet

  TELNET is a network protocol and it is used form one computer to login to another computer or connect to a remote computer which is at long distance, normally we dial to connect on internet. A computer can act like a node or terminal directly connected to the remote computer just like team viewer software to remotely login or access to another computer. With telnet and IP address to connect to remote computer directly and get its resources.

- ### File Transfer Protocol

  File Transfer Protocol is used on Internet for sending files like audio, video, graphics and data files can be uploaded or downloaded using this protocol.

  There are two types of file transfer. These are uploading and downloading.

  - ✓ The processing of transferring a file from a remote computer to a local computer is called downloading.
  - ✓ Similarly, the process of transferring a file from a local computer to a remote computer is called uploading.

- ### Extranet

  An extranet is a collection of two or more intranets. It is defined for the mutual co-operation between the companies that owned the intranets. Some authorized users from another platform can access this network. It is a collection of two or more intranets. An organization can implement security measure to provide some limited access to the employers of other organotin using the extranet. If UBL bank allow ABL bank user to enter in to network and access limited resource to get is called extranet.

Question # 8: What is OSI Model? Explain its different layers?

OSI model consists of seven layers that are as follows:

1. **_Application Layer_**

   The application layer is the top most layer of OSI model. It deals with the end-user application programs. This layer serves as the interface between the user and the network. This layer deals with networking application. It provides services directly to user application. It enables the user to access the network. It proves user interfaces and support for services such as email, remote file access and transfer, shred ta base management, and other type of distributed information services.

2. **_Presentation Layer_**

   The presentation layer is responsible for data translation. Presentation layer translates data between the formats the network requires and the formats the computer required. Different computer use different codes for representing data inside the computer. Presentation layer manages these coding schemes during transmission of data like converting ASCII to EBCID.

3. **_Session Layer_**

   Session layer between sender and application programs running or receiver computer is called session. The session layer open or establishes, manages, and terminates or close user connections. A session is a transfer or exchange of messages between computers. It is used to synchronize user tasks. Synchronization involves the use of checkpoints in data stream. If data is lost, only the data from the last checkpoint is retransmitted. Suppose we want to send 100 pages of data. Check point can be used after each 10 pages.

4. **_Transport Layer_**

   The transport layer ensures the error free transmission of data. The transport layer controls the flow or speed of data. This layer breaks up the data from the sending host and then reassembles it in the receiver. It ensures that messages are delivered error free. It divides large messages into small packets for efficient transmission. It is also used to insure reliable data transport across the network. These packets are reassembled, checked for errors and acknowledged at receiving side. If here are errors in transmission the data is retransmitted.

5. **_Network Layer_**

   The network layer is concerned with addressing and route defining of data. It is the network layer, which determines the best route between source and destination. It is also responsible for establishing, maintain, and terminating network connections. It manages the transfer of data form sour e to destination computer. Network layers determine logical path between sender and the receiver. There are many be many networks between two computers this layer manages to send data from source computer to destination computer. Router work on network layer. The main functions of layer are:

   ✓ To make routing decision
   ✓ To arrange data into packets and then perform sequencing and error control of these packets.
   ✓ To hold all communications between the network.

6. **_Data Link Layer_**

   The data link layer deals with the flow of data from one device to another. The data Link Layer is used for flow control and framing data, it is also responsible for the reliability of the physical link established at layer. It performs physical addressing. It combines bits into bytes into frames. Data Link Layer access to media using MAC address.

7. **_Physical Layer_**

The physical layer deals with physical flow of bits. The physical layer is the bottom layer of the OSI model. This is the physical media through which the data, represented as electronic signals, is sent from the source host or computer to the destination host or computer. It sends stream of bits and represents how the data is transmitted over the network and what controls signals are used. Its main function is to control how a stream of bits is sent and received over the physical medium.

- ✓ What type of cable is being used as communication medium?
- ✓ How many ins a connector have at source and will have at the destination.
- ✓ The physical layer describes the characteristics and type of transmission medium like guided or unguided.
- ✓ How data will be synchronizing.
- ✓ Physical layer describes the number of bits that will be sent in every second.