Ch-7

1. List some benefits of using computer network.

→ Networking of computers provides a communication link between the users, and provides access to information. Some benefits of using computer network are:

a) Resource sharing:- In an organization, resources such as printers, fax machines and scanners are generally not required by each person at all times. Such resources can be made available to different users of the organization on the network. It enhances optimal use of the resource, leads to easy maintenance, and saves cost too.

b) Sharing of Information:- In addition to sharing resources, networking ~~facilitates~~ facilitates sharing of information. Information stored on networked computers located at some or different physical locations, becomes ~~asse~~ accessible to the computers connected to the network.

c) As a communication Medium:- Networking helps in sending and receiving of e-mails from anywhere in the world. Data in the form of text, audio, video and pictures can be sent electronically.

d) For Back-up and Support:- Networked computers, in situation where there is a requirement of alway-on computer, can take over in case of failure of one computer.

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2. Why is communication protocol required in computer networks?

Ans: Communication protocols are used widely in networking, as they are set of protocols, formal rules that define how data is formatted, transmitted and interpreted between devices in network. They specify details such as data structure, timing, sequencing, error detection, and correction methods for effective communication. Connected devices would not be able to understand each other's signals without the communication protocol, leading to miscommunication, data corruption or loss. This is why communication protocols are needed, they ensure that information is consistently and accurately exchanged, which is vital for everything from sending an email to streaming video.

A useful framework for understanding how these rules are organised is the OSI (Open System Interconnection) model. This model divides network communications into seven distinct layers where each layer is responsible for specific functions.

In summary, communication protocols and models like the OSI are fundamental to building robust, efficient and interoperable networks.

3.

Feature	Circuit Switching	Packet Switching
Connection type	Dedicated communication path is established before transmission	Data are divided into packets that are sent independently
Resource Allocation	Reserves a fixed amount of bandwidth for entire time.	Resources are shared dynamically among multiple transmissions
Data Transmission	Data is transmitted in a continuous stream.	Data is broken into packets, which may take different routes
Latency.	Lower latency, but setup time increases delay.	Potentially higher latency due to varying packet travel time.
Fault Tolerance	If a link in the path fails, the entire session is disturbed.	If one path fails, packets can be re-routed dynamically.
Data order.	Data arrives in the same order it was sent	Packets may arrive out of order and need to be rearranged.
Examples:	Traditional telephone networks (PSTN)	Internet, VoIP, emails, online streaming and most modern networks.

4. For a two-story building with 15 computers on each floor, I would implement a Local Area Network (LAN) using a star topology.

Since the computers are all located within a confined area (a two-story building), a Local Area Network (LAN) is appropriate. LANs are designed to provide high-speed connectivity and efficient resource sharing within a limited geographical area. LANs offer low latency, high data transfer rates and ease of maintanence, which is ideal for our case for a two-story building.

For this condition, I would use star topology. In star topology, each computer is connected to a central device such as switch. In our scenario, each floor would have its own dedicated switch to which all 15 computers are connected. These switches are then interconnected via high-speed backbone or an additional central switch, creating a star-of-stars topology that seamlessly integrates the two floors. A failure in one device or cable does not affect the entire network, also, new devices can be added or old can be removed without disrupting the network.