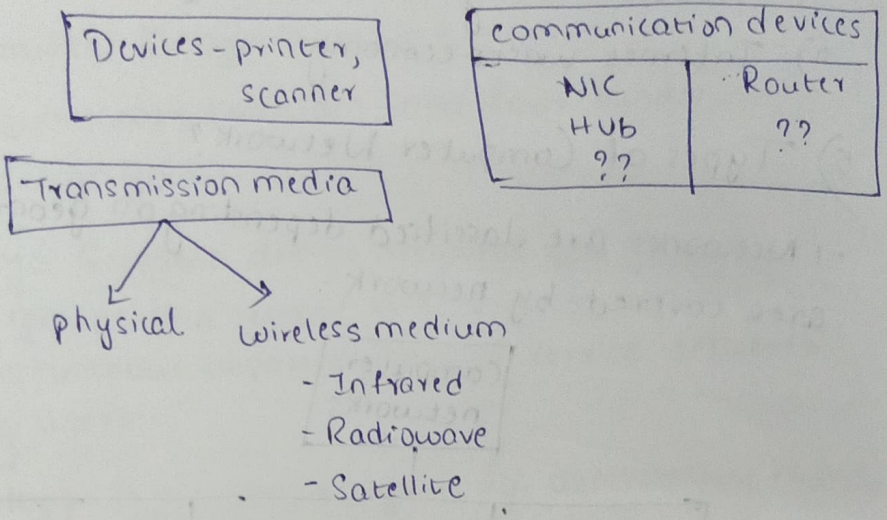
Computer Networks:

1) Defination of Computer Networks?

-7 A Computer network is a collection of computers and devices connected together via communication devices and transmissio media.

Ex:- it may connect computers, printers and scanners.



2) Needs for Networking?

1) Recource sharing - Through a network, data, s/w & h/w resources can be shared irrespective of the physical location of the resources and user.

2) Reliability - A file can have its copies on two or more computers of the network.

3) Cost - Sharing resources reduces the cost.

4) Communication - Information can be exchanged at a very fast speed.

3) Technical requirements of Computer Network?

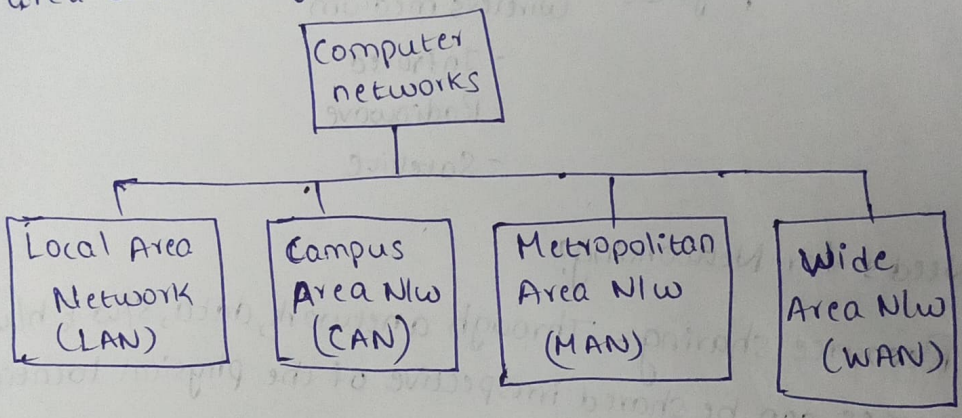
1) Applications to run on the network.
2) Internet connection requirement
3) Addressing ~~Instructions~~ restrictions.
4) It should support next version I.P.V.6
5) other protocols to run on the network
6) Cable requirement, network management
7) Redundancy, network services required.

4) Network requirements?

1) Stay all the time
2) It should be reliable
3) Quick response time
4) Secure
5) Easy to modify
6) Troubleshooting should be easy.
7) Internet waste economy.

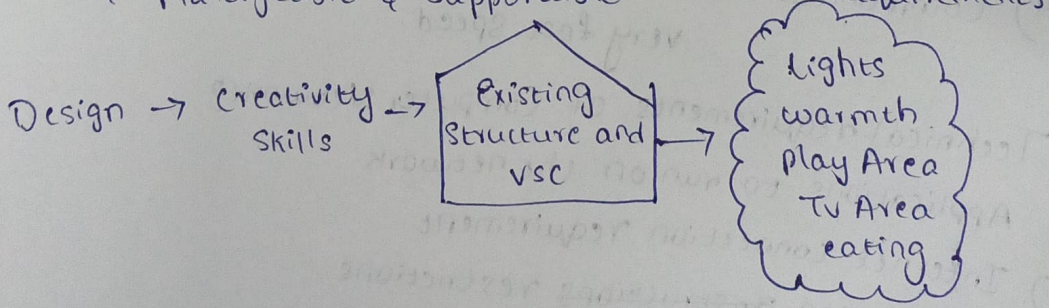
5) Types of Computer Network?

→ Networks are classified depending on geographical area covered by network.



6) Design methodology?

→ Network should be ADJUST & SCALABLE - new services.
→ Network based economy
→ Network Security.
→ Manageable & Supportable



7) Steps required to design a good network?

1) Verify business goals and technical requirement
2) features and functions to meet step-1.
3) Network readiness.
4) Testing
5) Create a project.

8) Fundamental Design Goals in network?

→ these requirements translate into four fundamental network design goals.

1) Scalability:- Scalable design networks can grow to include new user groups and remote sites and can support new applications without impacting level of service delivered to existing users.

2) Availability:- A network designed for availability is one that delivers consistent, reliable perform-ance, 24 hours a day, 7 days a week.
→ In addition to failure of a single link or piece of equipment should not significantly impact network performance.

3) Security:- Security is a feature that must be designed into the Network, not added on after the net-work is complete.
→ Planning the location of Security devices, filters and firewall features is critical to safeguarding network resources.

4) Manageability:- No matter how good the initial network design is, the available network staff must be able to manage and support the network.
→ A network that is too complex or difficult to maintain cannot function effectively and efficiently.

9) Design Principles applicable to Network?

→ Cisco has devolped the Plan-Design-Implement-Operate-Optimize (PDIOO) network.

1) Plan phase: The detailed network requirements are identified, and the existing network is reviewed.

2) Design phase: The Network is designed according to the initial requirements and additional data gathered during analysis of existing network. The design is refined with client.

3) Implement phase: Network is built according to the approved design.

4) Operate phase: The Network is operational and is being monitored. This phase is the ultimate phase of design.

5) Optimize phase: The issues are detected and corrected, Before or after the problem arises or failure has occured. Redisgn may be considered is too many problems arises.

6) Retirement phase: This phase is necessary when part of the network is outdated or is no longer required.

10) Benefits of PDIOO cycle?

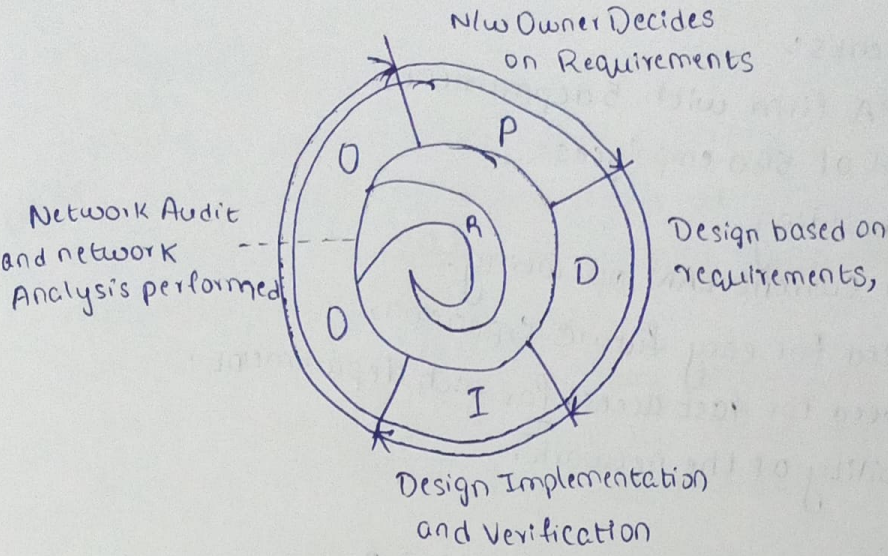
→ Lowering the total cost of network ownership.
→ Increasing network availability.
→ Improving business agility.
→ Speeding access to applications and services.

11) Requirements related to Business Issues?

Bussiness requirements.

→ Budget
→ Schedule
→ Shifting from old application to new
→ people
→ Install, operate, training needed.
→ legal issues (any restrictions to use data)
→ History.
→ Policies.

12) PDIOO Life Cycle Diagram.



13) Design Documentation?

→ The design should be documented throughout the process.

Documentation should include following items:

→ All the agreed-to requirements and constraints.

→ The state of existing network, if any

→ Preliminary design options and a brief review of why the final design was chosen.

→ Final design details.

→ Results of any ~~pilot~~ pilot or prototype testing.

→ Deployment plans, schedules, and other implementation details.

→ Monitoring requirements

→ Any other pertinent information.

14) List the Network Design task?

→ Determine the requirements.

→ Analyze the existing network if one exists.

→ Prepare the preliminary design.

→ Deploy the network.

→ monitor and redesign if necessary.

→ Maintain documentation (as the part of all task)

15) List the requirements needed for LAN small business?

Requirements:-

→ A CPA firm with 5 departments.

→ Total of 560 empolyees.

→ One building
  * No current LAN operating.
  * Need for easy future expansion.
  * Need for fast access for each department.

→ Reliability of the network.

16) Differentiate b/w LAN, WAN, MAN ?

LAN	WAN	MAN
→ LAN stands for Local Area Network	→ WAN stands for wide Area network	→ MAN stands for Metropolitan area Network.
→ Operates in small areas such as the same building/campus.	→ Operates in larger areas such as country or continent.	→ Operates in large areas such as city.
→ LAN's ownership is private.	→ While WAN also might not be owned by one organization.	→ MAN's ownership can be private or public.
→ The transmission speed of a LAN is high.	→ whereas the transmission speed of a WAN is low.	→ while the transmissio of MAN is average.
→ propagation delay is short in LAN	→ long propagation delay in WAN	→ moderate propagation delay in MAN
→ design and maintenance are easy.	→ design and maintenance are also difficult LAN as well as MAN	→ design and maintenan are difficult than LAN.
→ more fault tolerance in LAN.	→ less fault tolerance.	→ also less fault tolerance.

17) Different types of Ethernet with differentiation?

1) Fast Ethernet:-

→ This is quite a high-speed internet which can transmit or receive data at about 100Mbps.
→ This type of network is usually supported by a twisted pair or CAT5 Cable.
→ If a laptop, camera or any other device is connected to a network, they operate at 10/100 Base Ethernet and 100 Base on the fiber side of link.

2) Gigabit Ethernet:

→ The need for higher data rate resulted in the design of the Gigabit Ethernet (1000 Mbps).
→ The IEEE Committee calls the Standard 802.3z.
→ All configurations of gigabit Ethernet are point to point.
→ point to point, b/w 2 computers or one computer-to-switch
→ supports 2 different modes of operation:
  1) full duplex mode
  2) half duplex mode.
→ Full duplex is used when computers are connected by a switch. No collision is there so CSMA/CD is not used.
→ half duplex is used when computers are connected by hub.

3) Switched Ethernet:

→ the hub connecting the stations of the classic Ethernet is replaced by switch.
→ the switch connects the high-speed backplane bus to all stations in the LAN. The switch-box contains no. of ports, typically within range of 4-48.

4) Ten-Gigabit Ethernet: (10Gbps)

→ 10Gb Ethernet acheive maximum rates up to 10 gigabits/sec (10Gbps).
→ It is also known as 10GE, 10GbE / 10GigE. It is defined by IEEE 802.3ae-2002 standard.
→ 10GE is thousand times faster than standard Ethernet and supports only full duplex communication.

Two different types of fibers:

→ 1) Multimode fiber having 0.85μ frequency is used for medium distances.

→ 2) Single mode fiber having 1.5μ frequency is used for long distances.

18) How ATM is evolved as ATM LANE?

→ LAN Emulation, also known as LANE, is an Asynchronous Transfer Mode (ATM) technology that enables Local Area Network (LAN) traffic such as Ethernet frames to be carried over an ATM network.

19) Advantages of Ethernet over Token-ring?

→ Ethernet provides a low-cost form of networking, but comes with increased risk of communication error.

→ Token Ring instills the control needed in the network, but has higher cost associated with it.

20) Discuss about Inter Switching?

→ Each port on switch deliver dedicated channel to the device or devices attached to that port, increase total Bandwidth & also Bandwidth individual.

→ One WS - 100 Mbps.

→ 5 WS - each 20 mbps.
- through hub.

→ Server - 200 mbps.

∴ WS - workstation