ASSIGNMENT

Course: Certificate in Computer Application

Course Code: CCA-102

Topic: Data Communications

Centre: Unify CSC Academy, Demthring, Shillong

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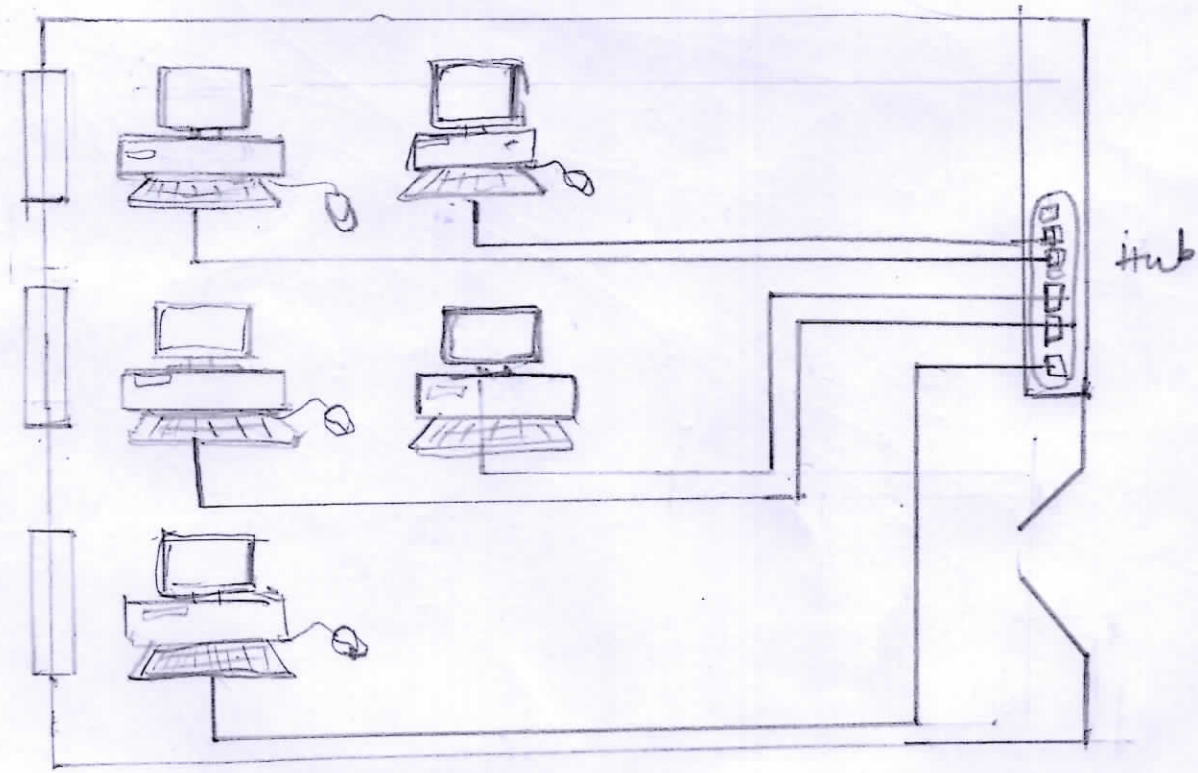
1. What are the different types of networks ?

Ans: The different types of networks are :-

1. Local Area Network (LAN)

A local area network (LAN) is usually privately owned and links the devices in a single office, building, or campus as shown in figure given below :



Depending on the needs of an organization and the type of technology used, a LAN can be as simple as two PCs and a printer in someone's home office ; or it can extend throughout a company and include audio and video peripherals.

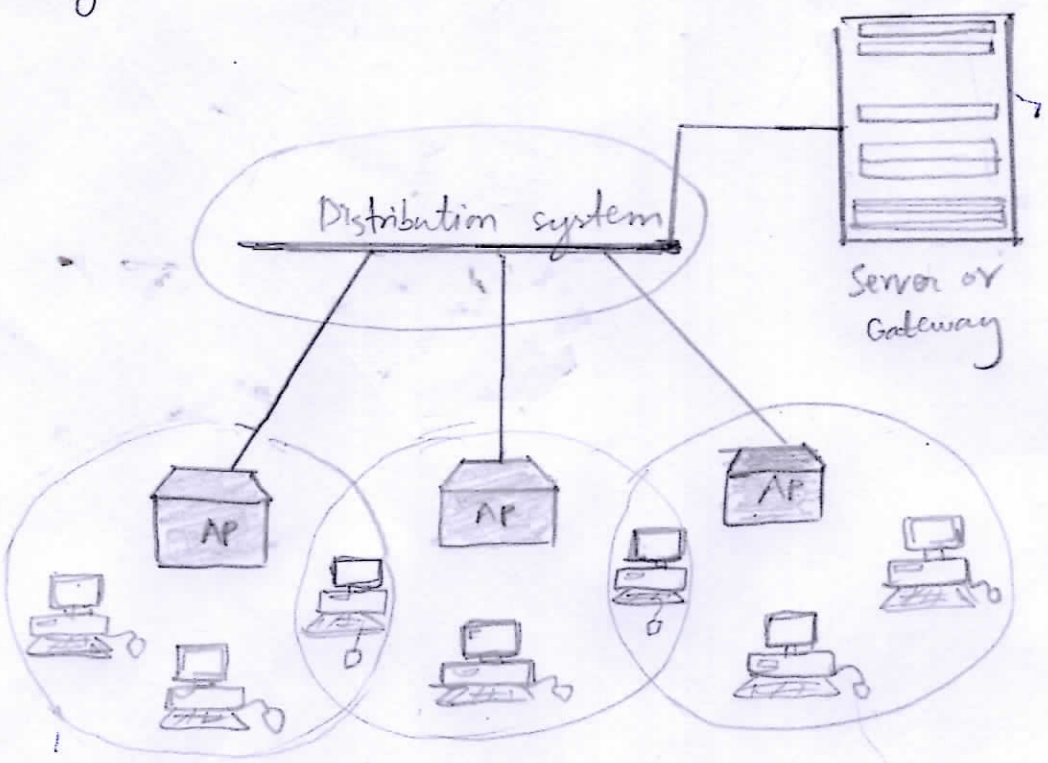
• Currently, LAN size is limited to a few kilometers.

- LANs are designed to allow resources to be shared between personal computers or workstations.
- The resources to be shared can include hardware (e.g. a printer), software (.eg., an application program), or data.
- One of the computers may be given a large capacity disk drive and may become a server to clients.
- Software can be stored on this central server and used as needed by the wholegroup.
- In addition to size, LANs are distinguished from other types of networks by their transmission media and topology.
- The most common LAN topologies are bus, ring, and star.
- Early LANs had data rates in the 4 to 16 megabits per second (Mbps) range. Today, however, speeds are normally 100 to 1000 Mbps.
- Ethernet (IEEE 802.3) is one example of LAN which has the following properties.

WLAN

- IEEE has identified the specifications for a wireless LAN, called IEEE 802.11, which covers the physical and data

link layers.

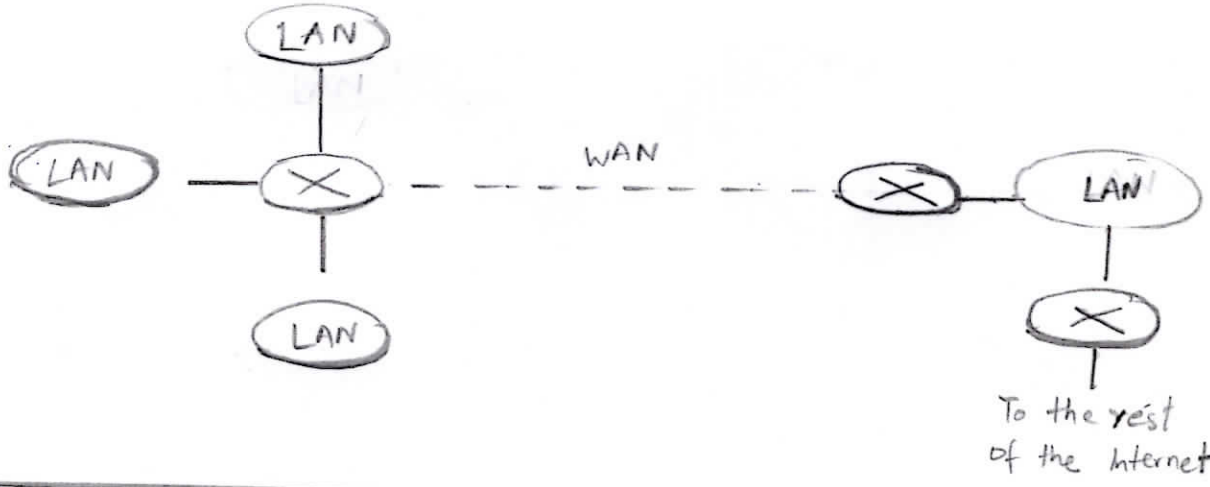


- A BSS without an AP is called an ad hoc network, a BSS with an AP is called an infrastructure network.

Wide Area Network (WAN)

- A wide area network (WAN) provides long-distance transmission of data, image, audio, and video information over large geographic areas that may comprise a country, a continent, or even the whole world.
- A WAN can be as complex as the backbones that connect the Internet or as simple as a dial-up line that connects a home computer to the Internet.

- We normally refer to the first as a switched WAN and to the second as a point WAN.
- The switched WAN connects the end systems, which usually comprise a router (internet-working connecting device) that connects to another LAN or WAN.
- The point-to-point WAN is normally a line leased from a telephone or cable TV provider that connects a home computer or a small LAN to an Internet service provider (ISP). This type of wan is often used to provide Internet access.



Q2. Explain the Shielded twisted pair (STP) and Unshielded twisted pair (UTP)

Ans:- Shielded Twisted Pair (STP)

Shielded Twisted Pair or STP are also a twisted pair cables but are required to be grounded, wants more maintenance, have high data transmission capacity and

are most costly then UTP.

Unshielded Twisted Pair (UTP)

Unshielded Twisted Pair or UTP are twisted pair cables and are used to transmit both data and voice as their frequency range is suitable for transmission. UTPs are most cost effective and are not needed to be grounded.

Following are some of the important differences between Unshielded Twisted Pair (UTP) and Shielded Twisted Pair.

Sr No.	Key	Unshielded Twisted Pair (UTP)	Shielded Twisted Pair (STP)
1.	Full for	UTP stands for Unshielded Twisted Pair	STP stands for Shielded Twisted Pair
2.	Grounding	Grounding cable is not required	Grounding cable is required.
3.	Data Transmission Rate	Data Transmission Rate is slower than STP.	Data Transmission Rate is very high.
4.	Cost	UTP cables are cheaper.	STP cables are expensive
5.	Maintenance	Low maintenance cost in case of UTP.	High maintenance cost in case of STP.

3. What is the difference between baseband and broadband transmission ?

Ans: These are following differences between Baseband and Broadband transmission :-

Baseband Transmission

1. In baseband transmission, the type of signalling used is digital.
2. Baseband Transmission is bidirectional in nature.
3. Signals can only travel over short distances.
4. It works well with bus topology.
5. In baseband transmission, Manchester and Differential Manchester encoding are used.
6. Frequency division multiplexing is not possible.
7. Entire bandwidth is for single signal transmission.
8. Example : Ethernet is using Basebands for LAN.

Broadband Transmission

1. In broadband transmission, the type of signalling used is analog.
2. Broadband Transmission is unidirectional in nature.
3. Signals can travel over long distances without being

attenuated.

4. It is used with a bus as well as tree topology.
5. Only PSK encoding is used.
6. Frequency division multiplexing possible.
7. Simultaneous transmission of multiple signals over different frequencies.
8. Example : Used to transmit cable TV to premises.

Q4. What is the difference between a hub, modem, router and a switch?

Ans: The differences between a hub, modem, router and a switch are:

Hubs: Unlike switches, hubs broadcast data to all ports, which is inefficient, so hubs are basically a multiport re

Modem: Stands for "modulating - demodulating". Modems are hardware devices that allow a computer or another device, such as a router or switch, to connect Internet. They convert or "modulate" an analog signal

from a telephone or cable wire to digital data (1s and 0 a computer can recognize. It simply send traffic from point A to point B without further manipulation and are responsible for sending data from one network to another.

Router: Work at Layer 3 (Network) of the OSI model, which deals with IP addresses. Typically, routers today will perform the functionality of both a router and a switch - that is, the router wi multiple ethernet ports that devices can plug into.

Switches: They use the MAC address of a device to send data only to the port the destination device is plugged into. Work at layer 2 (Data Link) of the OSI model, which deals with MAC addresses.

Q. 5. When you move the NIC cards from one PC to another PC, does the MAC address gets transferred as well?

Ans: Every NIC has a hardward address that's known as MAC, for Media Access Control. Where IP addresses are associated with TCP/IP (networking software), MAC addresses are linked to the hardware of network adapters.

A MAC address is given to a network adapter when it is manufactured. It is hard wired or hardcoded onto your computer's network interface card (NIC) and is unique to it. Something called the ARP (Address Resolution Protocol) transfers an IP address into a MAC address. The ARP is like a passport that takes data from an IP address through an actual piece of computer hardware. Therefore it remain static and doesn't changed.

Q.6. When troubleshooting computer network problems, what common-hardware-related problems can occur?

Ans:- When troubleshooting computer network problems, the common-hardware-related problems that can occure are:-

- Computer Freezing. The major reason for the hardware problem in a PC is overheating.
- System Error Blue Screen. The user often finds a blue screen when they start the computer
- RAM Faults & Error.
- Internet is slow; could be hard disk failing.
- Downloads take forever
- Attachments won't open.
- Noisy Computer.
- Liquid Spilled on PC.

7. In a network that contains two servers and twenty workstations, where is the best place to install an Anti-virus program?

Ans: In a network that contains two servers and twenty workstations, the best place to install an anti-virus program is desktop.

Almost every antivirus vendor offers a software solution ~~to run on~~ designed to run on a PC desktop. Desktop protection, the first virus-protection model, is still the most popular. For strong protection, you must implement desktop solutions, then keep them up-to-date, which can be challenging for several reasons. First, keeping many desktops updated and current is difficult even with automated tools. Missing or bypassing a workstation is easy, and one weak link can harm the rest of the network. Second, when you place anti-virus products on desktops, end users can disable the protection. Third, virus scanners ~~can~~ loaded on desktops can severely affect local performance.

8. Define Static IP and Dynamic IP? Discuss the difference between IPV4 and IPV6.

Ans: Static IP (Internet Protocal) addresses - A static IP

address ~~is~~ is an IP address that doesn't change. Our static IP addresses usually stay the same ~~a~~ unless our network architecture changes or our devices are out of commission. Static IP addresses are typically used for servers or other important networking equipment. They're popular within business settings because they ensure that the devices connected to them keep a consistent address. They also work well for a remote access solutions.

A static IP address is assigned to a device by an ISP. Typically, static IP addresses add to the cost of your internet service.

Dynamic IP addresses – A dynamic IP address is an IP address that can regularly change. An ISP (Internet services provider) will buy a large number of dynamic IP addresses and assign them to their customer's devices. Dynamic IP addresses are often reassigned. Reassigning IP addresses helps internet providers save money and ensure a higher level of security. It also means that they don't need to take the time to reestablish any network connections if we go on a vacation or move to a new location.

Dynamic IP addresses are more common for consumer equipment and personal use. A dynamic IP adress is assigned to a device by our ISP's (Internet Services Provider) Dynamic

Host Configuration Protocol (DHCP) servers. The DHCP server typically uses network routers to assign addresses to devices.

The major differences between IPV4 and IPv6 are :-

IPv4 (Internet Protocol Version 4)	IPv6 (Internet Protocol Version 6)
Encryption and authentication is not provided in IPv4.	Encryption and authentication is provided in IPv6.
Header of IPv4 is 20-60 bytes	Header of IPv6 is fixed at 40 bytes.
Checksum field is available in IPv4.	Checksum field is not available in IPv6.
Packet flow identification is not available in IPv4.	Packet flow identification is available in IPv6. Flow label field is available in the header
IPv4 addresses are usually represented in dot-decimal notation, consisting of four decimal numbers, each ranging from 0 to 255, separated by dots.	An IPv6 address is represented as eight groups of four hexadecimal digits, each group representing 16 bits.
Sender and forwarding routers performs fragmentation in IPv4.	Fragmentation is performed only by the sender in IPv6
In IPv4, security features relies on application	In IPv6, there is an inbuilt security feature named IPSEC.

End-to end connection integrity cannot be achieved in IPv4.	End to end connection integrity can be done in IPv6.
IPv4 supports DHCP and Manual address configuration.	IPv6 supports renumbering and auto address configuration.
IPv4 addresses are 32-bit long.	IPv6 addresses are 128 bits long.
The address space in IPv4 is 4.29 x 109	The address space in IPv6 is 3.4 x 1038.
IPv4 has a broadcast message transmission scheme.	Multicast and Anycast message transmission scheme is available in IPv6.

Q9. Discuss TCP/IP model in detail.

Ans: TCP/IP Model helps you ~~to to~~ determine how a specific computer should be connected to the internet and how data should be transmitted between them. It helps you to create a virtual network when multiple computer networks are connected together. The purpose of TCP/IP model is to allow communication over large distances.

TCP/IP stands for Transmission Control Protocol/Internet Protocol. TCP/IP stack is specifically designed as a model to offer highly reliable and end-to-end byte stream over an unreliable internetwork.

Below, are the essential characteristics of TCP/IP protocol:

- Support for a flexible TCP/IP architecture.
- Adding more system to a network is easy.
- In TCP/IP protocols suite, the network remains ~~until~~ intact until the source, and destination machines were functioning properly.
- TCP is a connection-oriented protocol.
- TCP offers reliability and ensures that data which arrives out of sequence should put back into order.
- TCP allows you to implement flow control, so sender never overpowers a receiver with data.

The functionality of the TCP/IP model is divided into four layers, and each includes specific protocols.

TCP/IP is a layered server architecture system in which each layer is defined according to a specific function to perform. All these four TCP IP layers work collaboratively to transmit the data from one layer to another.

- Application Layer
- Transport Layer
- Internet Layer
- Network Interface

Q10. What is a Web Browser (Browser)? Give some examples of browsers.

Ans:- Web Browser is a common term which is frequently used by people while discussing the internet. However, the exact definition of a web browser is known by few only.

Web Browser Definition: A software application used to access information on the World Wide Web is called a Web Browser. When a user requests some information, the web browser fetches the data from a web server and then displays the webpage on the user's screen.

Common web browsers include Microsoft Internet Explorer, Google Chrome, Mozilla Firefox, and Apple Safari; ... For example, Ajax enables a browser to dynamically update information on a webpage without the need to reload the page.

Q11. What is a search engine? Give example.

Ans:- A search engine is a software accessed on the Internet that searches a database of information according to the user's query. The engine provides a list of results that best match what the user is trying to find. Today, there are many different search engines available on the Internet, each with its own abilities and features. The first search engine ever developed is considered Archie, which was used

to search for FTP files, and the first text-based search engine is considered Veronica. Currently, the most popular and well-known search engine is Google. Other popular search engines include AOL, Ask.com, Baidu, Bing, DuckDuckGo, and Yahoo.

Q12. What is the Internet & WWW? What are the uses of internet in our daily life?

Ans:- The Internet is a global network of billions of computers and other electronic devices. With the Internet, its possible to access almost any information, communicate with anyone else in the world, and do much more.

You can do all of this by connecting a computer to the Internet, which is also called going online. When someone says a computer is online, it's just another way of saying it's connected to the Internet.

The World Wide Web, usually called the web for short, is a collection of different websites ~~that~~ you can access through the Internet. A website is made up of related text, images, and other resources. Websites can resemble other forms of media, like newspaper articles or television programs, or they can be interactive in a way that's unique to computers.

The purpose of a website can be almost anything: a news

platform, an advertisement, an online library, a forum for sharing images, or an educational site like us.

The uses of the Internet in our daily life is depending on desires and goals.

1. Activities in our daily life are decided after the use of the Internet. Internet innovated our daily life. We spend lots of time on the web.
2. The Internet provides us useful data, information, and knowledge for personal, social, and economic development and it is up to us to utilize our time on the world wide web in a productive manner. The Internet is a revolution in information technology.
3. You can do online courses and improve your writing, communication, business, and online marketing skills. Online shopping, social media, emails, chatting are common things that we do daily.

Q.13: What is an Internet Service Provider ? Give some examples of ISP in India.

Ans: ISP is an acronym that stands for Internet Service Provider. An Internet Service Provider is a company that provides Internet access to organizations and home users.

An ISP provides you with Internet access, ~~to~~ usually for a fee. Without an ISP, you wouldn't be able to shop online;

access Facebook, or read this page. Connecting to the Internet requires specific telecommunications, networking, and routing equipment. ISPs allow users access to networks that contain the required equipment, enabling users to establish Internet connectivity.

ISPs are responsible for making sure you can access the Internet, routing Internet traffic, resolving domain names, and maintaining the network infrastructure that makes Internet access possible.

While the core function of an ISP is to provide Internet access, many ISPs do much more. ISPs also offer services like web hosting, domain name registration, and email services.

Internet service providers in India are as follows:

- BSNL
- MTNL
- Bharti Airtel
- Hathway Cable.

Q 14. Discuss the difference between MAC address, IP address and port address.

Ans: Difference between the Mac Address, IP Address & Port Address.

Mac Address stands for Media Access Control Address	Internet Protocal address (IP address) used to identify a host in network	Port number is used to identify an processes/ services on your system.

MAC Adress is a six byte hexadecimal address	IPv4 is of 32 bits (4 bytes) size and for IPv6 is 128 bits (16 bytes)	The Port number is 16 bits numbers.
A device attached with MAC Address can retrieve by ARP protocol.	IP address is the address of the layer-3 IP protocol	Port number is the address of the layer-4 protocols.
NIC Card's Manufacture provides the MAC Address.	IP address is provided by admin of system or network administrator.	Port number for application is provided by kernel of OS.
MAC Address is used to ensure the physical address of a computer	IP config command can be used to find IP address.	Netstat command can be used to find Network Statistics Including Available TCP Ports.

Q15. How do we view my Internet browser's history?

Ans:- To view your browsing history in any chrome window, use the keyboard shortcut Ctrl + H, or navigate to the URL chrome://history. Or, click the Menu button, which is located near the top-right side of the browser window, and choose History, then History again.