CCA-102: Data Communications

ASSIGNMENT-2

1. What are the different types of networks?

   Computer Network Types

   A computer network is a group of computers linked to each other that enables the computer to communicate with another computer and share their resources, data, and applications.

   A computer network can be categorized by their size. A **computer network** is mainly of **four types**:

   1.LAN(Local Area Network)
   2.PAN(Personal Area Network)
   3.MAN(Metropolitan Area Network)
   4.WAN(Wide Area Network)

LAN(Local Area Network)

- Local Area Network is a group of computers connected to each other in a small area such as building, office.
- LAN is used for connecting two or more personal computers through a communication medium such as twisted pair, coaxial cable, etc.

PAN(Personal Area Network)

- Personal Area Network is a network arranged within an individual person, typically within a range of 10 meters.
- Personal Area Network is used for connecting the computer devices of personal use is known as Personal Area Network.

MAN(Metropolitan Area Network)

- A metropolitan area network is a network that covers a larger geographic area by interconnecting a different LAN to form a larger network.
- Government agencies use MAN to connect to the citizens and private industries.
- In MAN, various LANs are connected to each other through a telephone exchange line.

WAN(Wide Area Network)

- A Wide Area Network is a network that extends over a large geographical area such as states or countries.
- A Wide Area Network is quite bigger network than the LAN.
- A Wide Area Network is not limited to a single location, but it spans over a large geographical area through a telephone line, fibre optic cable or satellite links.

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

UTP	STP
UTP stands for Unshielded Twisted Pair.	STP stands for Shielded Twisted Pair.
In UTP grounding cable is not necessary.	While in STP grounding cable is required.
Data rate in UTP is slow compared to STP.	Data rate in STP is high.
The cost of UTP is less.	While STP is costlier than UTP.
In UTP much more maintenance is not needed.	While in STP much more maintenance is needed.
In UTP noise is high compared to STP.	While in STP noise is less.
In UTP the generation of crosstalk is also high compared to STP.	While in STP generation of crosstalk is also less.
In UTP, attenuation is high in comparison to STP.	While in STP attenuation is low.
In UTP, speed offered is about 10 to up to 1000 Mbps.	While in STP speed offered is about 10 to up to 100 Mbps.
It is used for data transmission within short distance such as for home and office networks.	Generally used for connecting organizations over a long distance.
Electromagnetic interference is more in Unshielded Twisted Pair cable compared to Shielded Twisted Pair cable.	Shielded Twisted Pair cable reduces Electromagnetic interference because of the protective sheath.
UTP cables categories as specified by EIA- Category-1, Category-2, Category-3, Category-4, Category-5, Category-5e, Category-6, Category-6a and Category-7.	Shielded cables have commonly these configurations- Foil Shielded and Braid Shielded.
Usage-	Usage-

UTP

- Telephone wiring
- Local Area Networks and more.

STP

- Used in frigid temperatures.
- Used in case of lot of heat generation like for heavy industrial applications.
- Employed under high radiation conditions and more.

3. What is difference between baseband and broadband transmission?

Broadband systems use modulation techniques to reduce the effect of noise in the environment. Broadband transmission employs multiple channel unidirectional transmission using a combination of phase and amplitude modulation.

Baseband is a digital signal transmitted on the medium using one of the signal codes like NRZ, RZ Manchester biphase-M code, etc. called baseband transmission.

These are the following differences between Broadband and Baseband transmission.

Baseband transmission:

1. Digital signaling.
2. Frequency division multiplexing is not possible.
3. Baseband is the bi-directional transmission.
4. A short-distance signal traveling.
5. The entire bandwidth is for single signal transmission.
6. Example: Ethernet is using Basebands for LAN.

Broadband transmission:

1. Analog signaling.
2. The transmission of data is unidirectional.
3. Signal traveling distance is long.
4. Frequency division multiplexing is possible.
5. Simultaneous transmission of multiple signals over different frequencies.
6. Example: Used to transmit cable TV to premises.

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

Difference between Hub, Switch and Router

S. No	Hub	Switch	Router
1.	Hub belongs to layer 1 of an OSI model that means it is a physical layer device.	Switch belongs to layer 2 of an OSI model that means it is a data link layer device.	Router belongs to layer 3 of an OSI model that means it is a network layer device.

2.	Hub prefers half-duplex transmission method.	Switch prefers full-duplex transmission method.	It is full duplex in nature.
3.	It functions based on broadcasting.	It functions based on MAC addresses.	It functions based on IP addresses.
4.	Hub is commonly used to link components of a LAN	A switch is used by LAN.	A router is utilised by LAN as well as MAN.
4.	Hubs are not smart gadgets because they pass on everything obtained on one connection to all other connections.	A Switch is a smart and wise device as it gives a message to a specific device by scanning the address.	Routers are basically tiny computers that accomplish a variety of intelligent jobs. They can also help in building address tables that support routing decisions.
5.	In a hub, we need a single network to connect.	Here also, we require a single network to connect.	It demands a minimum of two networks to connect.
6.	It is inexpensive as compared to switch and router.	It is an expensive device than a hub.	It is a more expensive device than a hub and switch.

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

Yes, that's because MAC addresses are hard-wired into the NIC circuitry, not the PC. This also means that a PC can have a different MAC address when the NIC card was replace by another one

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

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

The best solution is to install anti-virus on all the computers in the network. This will protect each device from the other in case some malicious user tries to insert a virus into the servers or legitimate users.

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

Difference between Static and Dynamic IP address:

S.NO	Static IP Address	Dynamic IP address
1.	It is provided by ISP(Internet Service Provider).	While it is provided by DHCP (Dynamic Host Configuration Protocol).

S.NO	Static IP Address	Dynamic IP address
2.	Static ip address does not change any time, it means if a static ip address is provided then it can't be changed or modified.	While dynamic ip address change any time.
3.	Static ip address is less secure.	While in dynamic ip address, there is low amount of risk than static ip address's risk.
4.	Static ip address is difficult to designate.	While dynamic ip address is easy to designate.
5.	The device designed by static ip address can be trace.	But the device designed by dynamic ip address can't be trace.
6.	Static ip address is more stable than dynamic ip address.	While dynamic ip address is less stable than static ip address.
7.	The cost to maintain the static ip address is higher than dynamic ip address.	While the maintaining cost of dynamic ip address is less than static ip address.
8.	It is used where computational data is less confidential.	While it is used where data is more confidential and needs more security.

2. Discuss TCP/IP model in detail.

TCP/IP Reference Model is a four-layered suite of communication protocols. It was developed by the DoD (Department of Defence) in the 1960s. It is named after the two main protocols that are used in the model, namely, TCP and IP. TCP stands for Transmission Control Protocol and IP stands for Internet Protocol.

The four layers in the TCP/IP protocol suite are −

3. **Host-to- Network Layer −**It is the lowest layer that is concerned with the physical transmission of data. TCP/IP does not specifically define any protocol here but supports all the standard protocols.
4. **Internet Layer −**It defines the protocols for logical transmission of data over the network. The main protocol in this layer is Internet Protocol (IP) and it is supported by the protocols ICMP, IGMP, RARP, and ARP.
5. **Transport Layer −** It is responsible for error-free end-to-end delivery of data. The protocols defined here are Transmission Control Protocol (TCP) and User Datagram Protocol (UDP).

6. **Application Layer −** This is the topmost layer and defines the interface of host programs with the transport layer services. This layer includes all high-level protocols like Telnet, DNS, HTTP, FTP, SMTP, etc.

10. What is a Web Browser (Browser)? Give some example of browsers.

A web browser, or browser for short, is a computer software application that enables a person to locate, retrieve, and display content such as webpages, images, video, as well as other files on the World Wide Web.

- Google Chrome
- Mozilla Firefox
- Microsoft Edge
- Internet Explorer
- Safari

11. What is a search engine? Give example.

A search engine is a web-based tool that enables users to locate information on the World Wide Web. Popular examples of search engines are Google, Yahoo!, and MSN Search. Search engines utilize automated software applications (referred to as robots, bots, or spiders) that travel along the Web, following links from page to page, site to site. The information gathered by the spiders is used to create a searchable index of the Web.

Most of the time, people are confused between search engines and web browsers. For example, they mislead between Google and Chrome. They think Google and Chrome both are search engines or web browsers. But it is not correct. Google is a search engine, while Chrome is a web browser.

For the brief, Google, Yahoo, and Bing are popular search engines. This chapter will describe to you what is a search engine and its example as well.

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

The Internet is very much useful in our daily routine tasks. For example, it helps us to see our notifications and emails. Apart from this, people can use the internet for money transfers, shopping order online food, etc.