CCA-102: Data Communications

ASSIGNMENT

Q1. What are the different types of networks?

Ans: The different types of network are

- LAN (Local Area Network)
- PAN (Personal Area Network)
- MAN (Metropolitan Area Network)
- 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.
- It is less costly as it is built with inexpensive hardware such as hubs, network adapters, and Ethernet cables.
- The data is transferred at an extremely faster rate in Local Area Network
- Local Area Network provides higher security.

PAN (Personal Area Network)

- Personal Area Network is a internet arranged with a individual person, typically within a range of 10 metres.
- Personal Area Network is used for connecting the computer devices of personal used is known as Personal Area Network.
- **Thomas Zimmerman** was the first research scientist to bring the idea of of the Personal Area Network.
- Personal Area Network covers an area of **30 feet.**
- Personal computer is a devices that are used to develop the personal area network are the laptop, mobile phones, media player and play stations.

There are two types of Personal Area Network:

- Wired Personal Area Network
- Wireless Personal Area Network

Wireless Personal Area Network: Wireless Personal Area Network is developed by simply using wireless technologies such as WIFI, Bluetooth. It is a low range network.

Wire Personal Area Network: wired personal Area Network is created by using the USB.

Examples of of Personal Area Network:

- **Body Area Network:** Body Area network is a network that moves with a person. For example, a mobile network moves with a person. Suppose a person establishes a network connection and then creates a connection with another devices to share the information.

- **Offline network:** An offline network can be created inside the home, so it is also known as a **home network**. A home network is designed to integrate the devices such as printers, computer, television but they are not connected to the internet.
- **Small Home Office:** It is used to connect a variety of devices to the internet and to a corporate network using a VPN

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.
- The most widely used protocols in MAN are RS- 232, Frame Relay, ATM ISDN, oc-3, ADSL, etc.
- It has a higher range than Local Area Network(LAN).

Uses of Metropolitan Area Network:

- MAN is used in communication between the banks in a city.
- It can be used in an Airline reservation.
- It can be used in a college within a city.
- It can also be used for communication in the military.

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.
- The internet is one of the biggest WAN in the world.
- A Wide Area Network is widely used in the field of business, government, and education.

Examples of Wide Area Network:

- **Mobile Broadband:** A 4g network is widely used across a region or country.
- Last mile: A telecom company is used to provide the internet services to the customers in hundreds of cities by connecting their home with fiber.
- **Private Network:** A bank provides a private network that connects the 44 offices. This network is made by using the telephone leased line provided by the telecom company.

Advantages of Wide Area Network:

- **Geographical area:** A wide Area Network provides a large geographical area.
- **Centralized data**: in case of WAN network, data is centralized. Therefore, we do not need to buy the emails, files or back up servers.
- **Get updated files**: software companies work on the live server. Therefore, the programming gets the updated files within seconds.
- **Exchange messages:** In a WAN network , Messages are transmitted fast.
- Sharing of software and resource:
- In WAN network, we can share the software and other resource like a hard drive, RAM.
- **Global business:** we can do the business over the internet globally.

- **High bandwidth:** If we used the leased lines for our company then this gives the high bandwidth.

Disadvantages of Wide Area Network:

- **Security issue**: A WAN network has more security issues as compared to LAN and MAN network as all the technologies are combined together that creates the security problem.
- **Needs Firewall and antivirus software:** The data is transferred on the internet which can be changed or hacked or hackers, so the firewall needs to be used.
- **High setup cost**: An installation cost of the WAN network is high as it involves the purchasing of routers, switches.
- **Troubleshooting problems:** It covers a large area so fixing the problem is difficult.

Q2. Explain the shielded twisted pair and (STP) and unshielded twisted pair (UTP).

Ans: Shielded twisted pair (STP): A shielded twisted pair is a type of twisted pair cable that contains an extra wrapping foil or copper braid jacket to protect the cable from defects like cuts, losing bandwidth, noise, and signal to the interference. It is a cable that usually used underground, and therefore it is costly than UTP. It support the higher data transmission rates across the long distance. We can also say it is a cable with metal sheath or coating that surround each pair of the insulated conductor to protect the wire from external users and prevent electromagnetic noise from penetrating.

Unshielded twisted pair (UTP): UTP is an unshielded twisted pair cable used in computer and telecommunications mediums. Its frequency range is suitable for transmitting both data and voice via a UTP cable. Therefore it is widely used in the telephone, computers, etc. It is a pair of insulted coppers wires twisted together to reduce noise generated by external interference. It is a wire with no additional shielding, like aluminium foil, to protect its data from the exterior.

Q3. What is difference between baseband and broadband transmission?

Ans: Difference between baseband and broadband transmission are as follow:

Baseband	**Broadband**
It refers to a communications channel in which information is carried in digital form.	The signals are modulated as radiofrequency analog waves that use different frequency ranges.
Communication is bi-directional which means the same channel is used to transmit and receive signals.	Communication is unidirectional meaning two different channels are needed in order to send and receive signals.
Every device on a baseband system shares the same channel.	Multiple independent channels can carry analog or digital information through FDM
Baseband LANs are inexpensive and easier to install and maintain.	Broadband systems are generally more expensive because of the additional hardware is involved.
Baseband LANs have a limited distance reach which is no more than a couple miles.	Broadband LANs span much longer distances than baseband (up to tens of kilometres).

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

Ans: 1. Hub:

A hub is a device that allows several network devices to connect together to exchange data on a single network however, they have no management component. Network hubs are also known as repeaters. They are less 'intelligent' than switches. Unlike switch, which forward data to the intended devices, hubs merely sends the data packets to all its ports. So as the name repeaters suggest, it only repeats the data from an incoming port to all the devices; this leads to frequent collisions between packets.

2. Modem:

A modem is short for a modulator- demodulator. Its function is to facilitate the transmission of data, by converting an analogue signal to code and decoding digital information.

3. Router:

A network routers direct the data packets along networks. A router has a minimum of two networks, usually LANs or WANs and its ISP. However, unlike a modem, it cannot work single standing, however is able to connect to multiple nodes.

4.Swicth:

A switch is a network that connect segments on a signal network. It connects many devices together on the same network, sending data to a devices that needs or requests it. A switch is able to improve the performance of a network by increasing network capacity.

Switch	Router	Modem	Hub
Joins several computers together within one local area network. They cannot join multiple networks and are incapable of sharing an internet connection.	Joins multiple area networks (LAN and WAN). Serving as "middle man" or intermediate destinations for network traffic. Using the IP they forward data to specific destination.	Modems, router connect home PCs to the internet.	Connects a network of personal computers together so they can be joined through a central hub.

Q5. When you move the NIC cards from one PC, does the MAC address gets transferred as well?

Ans: Yes, that is because MAC addresses are hardwires into the NIC circuity, not the PC. This also means that a PC can have a different MAC address when another one replaced the NIC card.

Q6. When troubleshooting computer network problems, what common hardware- related problems can accur?

Ans: A large percentage of a network is made up hardware. Problem is these areas can range from malfunctioning hard drives, broken NICs and even hardware startups.

Q7. In a network that contains two servers and twenty workstations, where is the best place to install an anti-virus program?

Ans: The best solution is to install anti-virus on all the computers in the network.

Q8. Define static IP and Dynamic IP? Discuss the difference between IPV4 and IPV6.

Ans: Static IP: A computer on the internet can have a static IP address, which meant stays the same overtime, or a dynamic IP address, which mean the address can change overtime.

Dynamic IP: A Dynamic IP is a temporary address for devices connected to a network that continually changes over time.

Different between IPV4 and IPV6:

IPV4 and IPV6 are internet protocol version 6. IP version 6 is the new version of internet protocol, which is way better than IP version 4 in terms of complexity and efficiency.

Q9. Discuss TCP/ IP model in detail.

Ans: TCP/IP Reference Model is a four_ layered suite of communication protocols. It was developed by the DoD (Development of Defence) in the 1960s. It is named after the two main protocol that are used in the model namely, TCP and IP. TCP stand transmission control protocol and IP stand for internet protocols.

Q10. What is a web Browser (Browser)? Give some example of Browsers.

Ans: A web Browser is an application used to access and view websites.

Some example of browsers includes Microsoft Edge, internet explorer, Google chrome, Mozilla firefox and apple safari.

Q11. What is search engine? Give example.

Ans: A search engine is a web based tool that enables users to locate information on the world wide web (WWW).

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

Ans: Internet is a vast network that connects computer all over the world. Through the internet, people can share information and communicate from anywhere with an internet connection.

World Wide Web (WWW) is an interconnected system of public webpages accessible through the internet.

Uses of internet in our daily life. This is very much useful in our daily routine task. For example, it helps us to see our notification and emails. A part from this, people can use the internet for money transfer, shopping, order online food, etc.

Q13. What is an Internet Service Provider? Give some example of ISP in India.

Ans: An internet Services Provider is an organization that provides services for accessing using or participation in the internet.

Examples of ISP in India are: Airtel, BSNL etc.

Q14. Discuss the difference between MAC address, IP address and Port address.

Ans: A MAC address is assigned to the network interface card by the manufactured and in used for communication within the local area network. It is globally unique address.

An IP address is used for communication within the local area network and the communication between internet. It is uniquely identifies the connection of the network with that device takes part in a network.

Port address of the service within the system. A port number uniquely identifies a network based application on the computer.

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

Ans: In the lower-left corner of the browser window, tap and hold the back arrow. The page that opens contain your browser history.