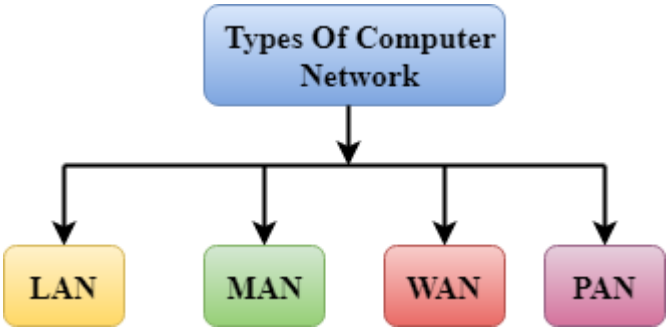
CCA-102: Data Communications

ASSIGNMENT

1. What are the different types of networks?

Ans. 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**:



- LAN(Local Area Network)
- PAN(Personal Area Network)
- MAN(Metropolitan Area Network)
- WAN(Wide Area Network)

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

Ans. **Shielded twisted pair cable (STP) has the individual pairs of wires wrapped in foil, which are then wrapped again for double protection.** Unshielded twisted pair cable (UTP) has each pair of wires twisted together. Those wires are then wrapped in tubing without any other protection.

3. What is difference between baseband and broadband transmission?

Ans. Baseband transmission is a data transmission technique in which one signal needs the whole bandwidth of the channel to transfer the data. In contrast, broadband transmission is a transmission technology in which many signals with different frequencies send data across a single channel at the same time.

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

Ans. **1. Hub :**

A Hub is just a connector that connects the wires coming from different sides. There is no signal processing or regeneration. It is an electronic device that operates only on physical layers of the OSI model.

It is also known as a repeater as it transmits signal to every port except the port from where signal is received. Also, hubs are not that intelligent in communication and processing information for 2nd and 3rd layer.

2. Switch :
Switch is a point to point communication device. It operates at the data link layer of OSI model. It uses switching table to find out the correct destination.

Basically, it is a kind of bridge that provides better connections. It is a kind of device that set up and stop the connections according to the requirements needed at that time. It comes up with many features such as flooding, filtering and frame transmission.

3. Router :
Routers are the multiport devices and more sophisticated as compared to repeaters and bridges. It contains a routing table that enables it to make decision about the route i.e. to determine which of several possible paths between the source and destination is the best for a particular transmission.

It works on the network layer 3 and used in LANs, MANs and WANs. It stores IP address and maintains address on its own.

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

Ans. **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?

Ans. Most common hardware related problems are **PaBX, LAN Card, WLAN Card and Wi-Fi AP if it is wireless, Cables, Switches, Routers and Wireless Controllers**. Most problems are hardware related, a faulty power cable or power supply unit. Sometimes RAM needs to be upgraded or VGA cable is not properly connected.

7. 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**.

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

Ans. When a device is assigned a static IP address, the address does not change. Most devices use dynamic IP addresses, which are assigned by the network when they connect and change over time.

Difference Between IPv4 and IPv6:

IPv4	IPv6
IPv4 has a 32-bit address length	IPv6 has a 128-bit address length
It Supports Manual and DHCP address configuration	It supports Auto and renumbering address configuration
In IPv4 end to end, connection integrity is Unachievable	In IPv6 end to end, connection integrity is Achievable
It can generate 4.29×10^9 address space	Address space of IPv6 is quite large it can produce 3.4×10^{38} address space
The Security feature is dependent on application	IPSEC is an inbuilt security feature in the IPv6 protocol
Address representation of IPv4 is in decimal	Address Representation of IPv6 is in hexadecimal
Fragmentation performed by Sender and forwarding routers	In IPv6 fragmentation performed only by the sender
In IPv4 Packet flow identification is not available	In IPv6 packet flow identification are Available and uses the flow label field in the header
In IPv4 checksum field is available	In IPv6 checksum field is not available
It has broadcast Message Transmission Scheme	In IPv6 multicast and anycast message transmission scheme is available
In IPv4 Encryption and Authentication facility not provided	In IPv6 Encryption and Authentication are provided
IPv4 has a header of 20-60 bytes.	IPv6 has header of 40 bytes fixed

IPv4	IPv6
IPv4 can be converted to IPv6	Not all IPv6 can be converted to IPv4
IPv4 consist of 4 fields which are separated by dot (.)	IPv6 consist of 8 fields, which are separated by colon (:)
IPv4's IP addresses are divided into five different classes. Class A , Class B, Class C , Class D , Class E.	IPv6 does not have any classes of IP address.
IPv4 supports VLSM(Variable Length subnet mask).	IPv6 does not support VLSM.
Example of IPv4: 66.94.29.13	Example of IPv6: 2001:0000:3238:DFE1:0063:0000:0000:FEFB

9. 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 (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 –

- **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.
- **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.
- **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).
- **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.

Ans. "A web browser, or simply 'browser,' is **an application used to access and view websites**. Common web browsers include Microsoft Edge, Internet Explorer, Google Chrome, Mozilla Firefox, and Apple Safari.

11. What is a search engine? Give example.

Ans. 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.

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

Ans. By utilizing the internet, **people are able to progress in almost all spheres of life**. As it's a worldwide organization of the computer network, it can link people from all over and create communities. It's a great way of providing and accessing information and is available almost all over the world.

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

Ans. An Internet Service Provider (ISP) is **a company such as AT&T, Verizon, Comcast, or Spectrum that provides Internet access to companies, families, and even mobile users**. ISPs use fiber-optics, satellite, copper wire, and other forms to provide Internet access to its customers. Some example of ISP in India are Airtel, Jio, Vi, BSNL etc.

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

Ans. **The primary use of a MAC address is to ensure the physical address of a given device/ computer. The IP address, on the other hand, defines a computer's logical address**. The MAC address primarily operates on the data link layer. The IP address primarily operates on the network layer.

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

Ans. **View & delete your Chrome browsing history**

1. On your Android phone or tablet, open the Chrome app .
2. At the top right, tap More. History. If your address bar is at the bottom, swipe up on the address bar. ...
3. To visit a site, tap the entry. To open the site in a new tab, touch and hold the entry. At the top right, tap More.