CCA- 102: Data Communications
ASSIGNMENT 2

1. What are the different types of networks?

   Answer: The different types of networks are:

   a. **LAN** (Local Area Network): LAN is a group of computers connected to each other in a small area such as building, office.
   b. **PAN** (Personal Area Network): PAN is a network arranged within an individual person, typically within a range of 10 meters. Connecting the computer devices of personal use.
   c. **MAN** (Metropolitan Area Network): A MAN is a network that covers a larger geographic area by interconnecting a different LAN to form a larger network.
   d. **WAN** (Wide Area Network): A WAN is a network that extends over a large geographical area such as states or countries.

2. Explain the difference between Shielded twisted pair (STP) and unshielded twisted pair (UTP).

   Answer: The difference between STP and UTP are as follows

Shielded twisted pair	Unshielded twisted pair
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 pair of insulated copper 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.
Used for connecting organizations over a long distance.	It is used for data transmission within short distance such as for home and office networks.
While STP is costlier than UTP	The cost of UTP is less
While in STP much more maintenance are needed	In UTP much more maintenance are not needed.

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

Answer: Baseband transmission utilizes digital signalling while broadband transmission uses analog signalling.

Bus and tree topologies, both work well with the broadband transmission. On the other hand, for the baseband transmission bus topology is suitable.

Baseband involves manchester and differential manchester encoding. In contrast, broadband does not make use of any digital encoding instead it uses PSK (Phase shift keying) encoding.

The signals can be travelled in both the direction in baseband transmission whereas in broadband transmission the signals can travel in only one direction.

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

Answer: A hub, switch, modem and router are all devices that connect to one or more computers or other computers, networked devices, or even other networks.

Hub	Hub is commonly used to connect segments of a LAN (Local Area Network). A hub contains multiple ports. When a packet arrives at one port, it is copied to the other ports so that all segments of the LAN can see all packets. Hub acts as a common connection point for devices in a network.
Modem	Modems are hardware devices that allow a computer or another device, such as a router or switch, to connect to the Internet. They convert or "modulate" an analog signal from a telephone or cable wire to digital data (1s and 0s) that a computer can recognize. Simply send traffic from point A to point B without further manipulation.
Router	A router is the smartest and most complicated of the four. Routers come in all shapes and sizes, from small, four-port broadband routers to large industrial-strength devices that drive the internet itself. A router is connected to at least two networks, commonly two LANs or WANs or a LAN and its Internet Service Provider network. The router is generally located at gateways, the places where two or more networks connect. Using headers and forwarding tables, router determines the best path to forward the packets.
Switch	A switch does what a hub does, but more efficiently. By paying attention to the traffic that comes across it, it learns which computers are connected to which port. Initially, a switch knows nothing, and simply sends on incoming messages to all ports.

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

Answer: Yes, when moved the NIC cards from one PC to another PC, the MAC address gets transferred as well that's because MAC addresses are hard-wired into the NIC circuitry, not the PC.

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

Answer: Hardware problems like defective cables or connectors can generate errors on the network equipment to which it is connected. Problems in these areas can also range from malfunctioning hard drives, broken NICs, and even hardware startups.

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

Answer: An anti-virus program must be installed on all servers and workstations to ensure protection.

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

Answer: A dynamic IP address is an IP address that can regularly change. An ISP 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 re-establish any network connections if we go on a vacation or move to a new location.

A static IP address is an IP address that doesn't change. Our static IP addresses usually stay the same 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.

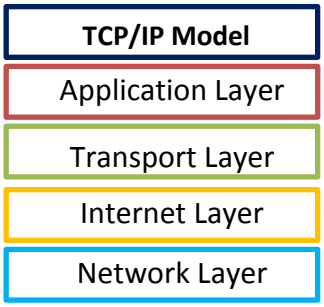
IPV4	**IPV6**
IPv4 is a 32-bit address and has a limited number of IP addresses	IPv6 is a 128-bit address and has a large number of IP addresses
IPv4 is a numeric address that consists of 4 fields which are separated by dot (.)	IPv6 is an alphanumeric address that consists of 8 fields, which are separated by colon
IPv4 has 5 different classes of IP address that includes Class A, Class B, Class C, Class D, and Class E	IPv6 does not contain classes of IP addresses.
It supports manual and DHCP configuration.	It supports manual, DHCP, auto-configuration, and renumbering.
In IPv4, security depends on the application. This IP address is not developed in keeping the security feature in mind.	In IPv6, IPSEC is developed for security purposes.
It does not provide encryption and authentication.	It provides encryption and authentication.
t consists of 4 octets.	It consists of 8 fields, and each field contains 2 octets. Therefore, the total number of octets in IPv6 is 16.

9. Discuss TCP/IP model in detail.

Answer: TCP/IP stands for Transmission Control Protocol/Internet Protocol and is a suite of communication protocols used to interconnect network devices on the internet. TCP/IP is also used as a communications protocol in a private computer network (an intranet or extranet). TCP/IP specifies how data is exchanged over the internet by providing end-to-end communications that identify how it should be broken into packets, addressed, transmitted, routed and received at the destination. TCP/IP requires little central management and is designed to make networks reliable with the ability to recover automatically from the failure of any device on the network.

The two main protocols in the IP suite serve specific functions. TCP defines how applications can create channels of communication across a network. It also manages how a

message is assembled into smaller packets before they are then transmitted over the internet and reassembled in the right order at the destination address. Common TCP/IP protocols include the Hypertext Transfer Protocol (HTTP) and File Transfer Protocol (FTP)



10. What is a Web Browser (Browser)? Give some examples of Browsers.

Answer: A web browser, or simply 'browser,' is an application used to access and view websites. Google, Yahoo, Bing, Mozilla Firefox, Google Chrome, etc

11. What is a Search engine? Give example.

Answer: 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!, MSN Search, Bing, Baidu, and DuckDuckGo.

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

Answer: The Internet is the combination of various networks. We can access the internet through any device with a network connection like mobile phones and computers. Therefore it has a vast and wide range of resources, information, and services to offer. It is governed by agencies just like Internet Assigned Numbers Authority (IANA) that establish universal protocols.

World Wide Web (WWW) is a resource of information space which is identified by URL that is uniform resource locator. Hence WWW is accessible by internet. Website content can largely be provided by the publisher, or interactively where users contribute content or the content depends on the users or their actions. Therefore, websites may be most informative, primarily for entertainment, or largely for commercial, governmental, or non-governmental organizational purposes.

The Internet has left a huge impact in our daily life. The most important use is that you can get information and education from the internet. It provides us with various sites and various blogs that give us informative content which helps us in studies. It helps people learn various things and people get knowledge which they implement in their daily life. It helps people connect with each other socially. It helps us to talk to people that are from far off places like in different state or foreign country. There are various apps that help us to share messages, photos and videos with different people that are living near or far off places. Other uses are Online Booking & Orders, Cashless Transactions, Online Banking & Trading, Research, Electronic Mail, Jobs search, Entertainment, E-Commerce, Navigation, etc.

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

Answer: The term Internet service provider (ISP) refers to a company that provides access to the Internet to both personal and business customers. ISPs make it possible for their customers to surf the web, shop online, conduct business, and connect with family and friends—all for a fee. Internet, ISPs may also provide software packages (such as browsers), e-mail accounts, and a personal Web site or home page. ISPs can host Web sites for businesses and can also build the Web sites themselves. ISPs are all connected to each other through network access points, public network facilities on the Internet backbone.

Examples of ISP in India are Bharat Sanchar Nigam Limited (BSNL), Airtel, Atria Convergence Technologies, Hathway and Jio.

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

Answer: The difference between MAC address, IP address and Port address are as follows.

MAC address	**IP address**	**Port address**
MAC address is a unique hardware identification number that is assigned to a NIC (Network Interface Controller/ Card).	IP address is a numerical label assigned to each device connected to a computer network that uses the Internet Protocol for communication.	A port is a numerical value that is assigned to an application in an endpoint of communication.
It consists of a 48 bit or 64-bit address, which is associated with the network adapter. MAC address can be in hexadecimal format. A MAC address is generally in six sets of two-digits/characters that are separated by colons.	IP Address is of 4 bytes or of 16 bytes. IPv4 is of 32 bits (4 bytes) size and for IPv6 is 128 bits (16 bytes).	Ports are represented by 16-bit numbers. 0 to 1023 are restricted port numbers are as they are used by well-known protocol services. 1024 to 49151 are registered port numbers means it can be registered to specific protocols by software corporations and in last 49152 to 65536 are used as private ports means they can be used by anybody.
The MAC address works on layer 2 and helps identify the devices within the same broadcast network (such as the router).	IP address is the address of the layer-3 IP protocol.	Port number is the address of the layer-4 protocols.
A MAC address of 2c549188c9e3 is typically displayed as 2C:54:91:88:C9:E3 or 2c-54-91-88-c9-e3	192.168.0.2, 172.16.0.2 are some of IP address examples.	80 for HTTP, 123 for NTP, 67 and 68 for DHCP traffic, 22 for SSH etc.

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

Answer: Go the setting icon as shown below --- Select History.