Data communication

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CCA-102: DATA COMMUNICATIONS ASSIGNMENT

1. WHAT ARE THE DIFFERENT TYPES OF NETWORKS?

a. *Local area network (LAN)…*

b. *Personal area network (PAN)…*

c. *Wireless local area network (WLAN)…*

d. *Campus area network (CAN)…*

e. *Metropolitan area network (MAN)…*

f. *Wide area network (WAN)…*

g. *Storage area network (SAN)…*

h. *Passive optical local area network (POLAN)*

2. Explain the Shield twisted pair (STP) and unshielded twisted pair (UTP)

STP.

Shielded twisted pair cabling acts as a conducting shield by covering the four pairs of signal-carrying wires as a means to reduce electromagnetic interference. There are a variety of different types of STP cables, such as a foil twisted pair (FTP) and a shielded foil twisted pair (S/FTP).

UTP:

UTP cable is a type of copper cable widely used for networking purposes. UTP cables consist of pairs of insulated wires that are twisted together to reduce interference and crosstalk. They are commonly used in Ethernet networks for transmitting data signals.

3. Explain the shield twisted pair (STP) and Unshielded twisted pair (UTP)

Basis of Comparison	Baseband Transmission	Broadband Transmission
Type of Signal	In baseband transmission, the type of signalling used is digital.	In broadband transmission, the type of signalling used is analogy.
Direction Type	Baseband Transmission indirections.	Broadband Transmission is unidirectional in nature.
Signal Transmission	The signal can be sent in both directions.	Sending of signal in one direction only.
Distance covered by the	Signals can only travel over short	Signals can be travelled over

Basis of Comparison	Baseband Transmission	Broadband Transmission
Signal	Distances. For long distances, attenuation is required.	Long distances without being attenuated.
Data Streams	It can only transfer one data stream at a time in bi-directional mode.	It can send multiple signal waves at once but in one direction only.
Installation Maintenance	Baseband transmission is easy to install and maintain.	Broadband transmission is difficult to install and maintain.
Cost	This transmission is cheaper design.	This transmission is expensive to design.

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

Routers-connects a modem to different computer networks, ensuring that Internet traffic goes to the right networks. Switches-connect devices within a single network, transfer incoming and outgoing internet traffic between the connected devices. Gateway-regulate traffic between two or more dissimilar networks.

The key difference between hubs, switches and bridges is that hubs operate at Layer 1 of the OSI model, while bridges and switches work with MAC addresses at Layer 2. Hubs broadcast incoming

traffic on all ports, whereas bridges and switches only route traffic toward their addressed destination.

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?

Some network problems can arise from faulty hardware, such as routers, switches, firewalls, and even from unexpected usage patterns, like network bandwidth spikes, changes in app configuration, or security breaches.

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

In a network that contains two serves and twenty workstations, the best place to install an Anti-virus is on the server. This is because the server is the main port for all the network traffic, and so it is

more important to ensure that the server is free of and virus other security risks.

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

Static IP addresses:

A computer on the Internet can have a static IP address, which means it says the same over time, or a dynamic IP address, which means the address, can change over time.

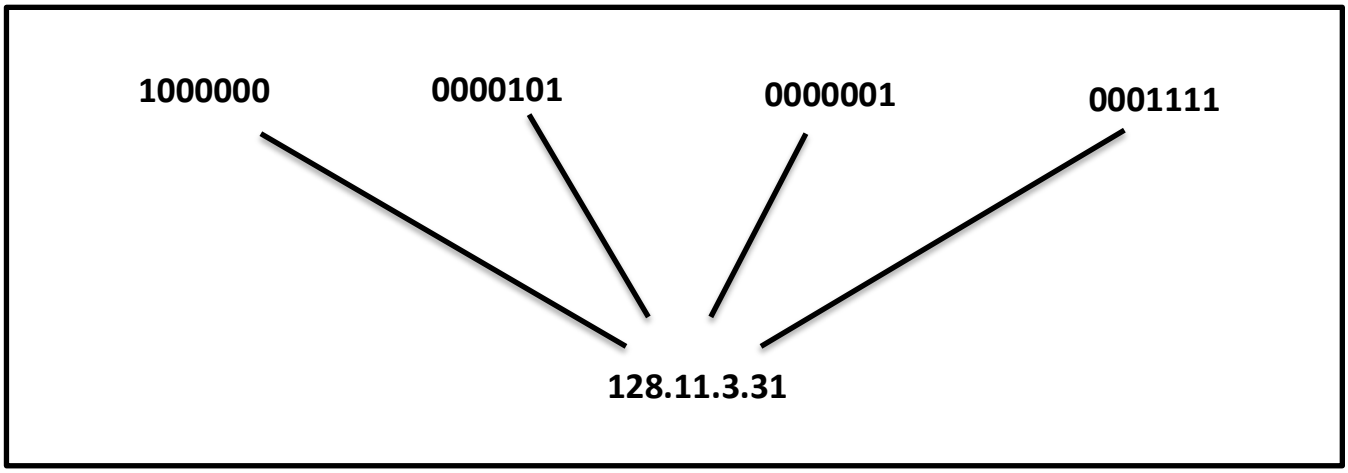
Dynamic IP:

A dynamic IP address is a temporary address for device connected to a network that continually changes over time. An Internet Protocol (IP) address is a number used by computers to identify host and network interfaces, as well as different locations on a network.

DIFFERENCE BETWEEN IPV4 ANDIPV6.

IPv4:

IPv4 address consists of two things that are the network address and the host address. It stands for Internet Protocol version four. It was introduced in 1981 by DARPA and was the first deployed version in 1982 for production on SATNET and on the ARPANET in January 1983. IPv4 addresses are 32-bit integers that have to be expressed in Decimal Notation. It is represented by 4 numbers separated by dots in the range of 0-255, which have to be converted to 0 and 1, to be understood by Computers. For Example, An IPv4 Address can be written as 189.123.123.90. IPv4 Address Format IPv4 Address Format is a 32-bit Address that comprises binary digits separated by a dot (.).

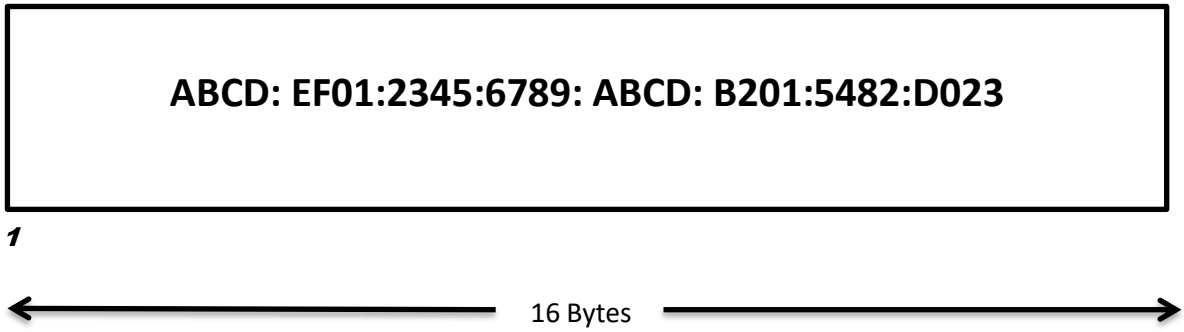


IPv6:

IPv6 is based on IPv4 and stands for Internet Protocol version 6. It was first introduced in December 1995 by Internet Engineering Task Force. IP version 6 is the new version of Internet Protocol, which is way better than IP version 4 in terms of complexity and efficiency. IPv6 is written as a group of 8 hexadecimal numbers separated by colon (☺. It can be written as 128 bits of 0s and 1s.

IPv6 Address Format:

IPv6 Address Format is a 128-bit IP address, which is written in a group of 8 hexadecimal numbers separated by colon (:).



DIFFERENCE BETWEEN IPV4 AND IPV6:

IPv4	IPv6
IPv4 has a 32-bit address length	*IPv6 has a 128-bit address length*
It support Manual and DHCP address configuration	*In 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 x 109 address space	*The address space of IPv6 is quite large it can produce 3.4x1038 address space*
The security feature is dependent on the application	*IPSEC is an inbuilt security feature in the IPv6 protocol*
Address representation of	*Address Representation of IPv6is in hexadecimal*

IPv4 is in decimal	
Fragmentation performed by sender and forwarding routers	*In IPv6 fragmentations 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 a broadcast Message Transmission Scheme	*In IPv6 multicast and any cast 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 a header of 40 bytes fixed*
IPv4 can be converted to IPv6	*Not all IPv6 can be converted to IPv4*
IPv4 consists of 4 fields which are separated by addresses dot (.)	*IPv6 consist of 8 fields, which are separated by a colon (:)*
IPv4's IP addresses are divided into five different classes. Class A, Class B, Class C, Class D,	*IPv6 does not have any classes of the IP address.*

Class E.	
IPv4 supports VLSM (Variable Length subnet mask).	*IPv6 does not support VLSM.*
Example of IPv4: 66.94.29.13	*2001:0000:3238:DFEI:0063:0000:0000:FEFB*

9. Discuss TCP/IP model in detail.

Transmission Control Protocol (TCP) *is a communications standard that enables application programs and computing devices to exchange message over a network. It is designed to send packets across the internet and ensure the successful delivery of data and message over networks. TCP is one of the basic standards that define the rules of the internet and is included within the standards define by the Internet Engineering Task Force (IETF). It is one of the most commonly used protocols within digital network communications and ensures end-to-end data delivery.*

TCP organizes data so that it can be transmitted between a server and a client. It guarantees the integrity of the data being communicated over a network. Before it transmits data, TCP establishes a connection between a source and its destination, which it ensures remains live until communication beings. It then breaks large amounts of data into smaller packets, while ensuring data integrity is in place throughout the process. As a result, high-level protocols that need to transmit data all use TCP protocol. Examples include peer-to-peer sharing methods like File Transfer Protocol (FTP), Secure Shell (SSH), and Telnet. It is also used to send and receive email through Internet Message Access Protocol (IMAP), Post Office Protocol (POP), and Simple Mail Transfer Protocol

(SMTP), and for web access through the Hypertext Transfer Protocol (HTTP).

An alternative to TCP in networking is the User Datagram Protocol (UDP), which is used to establish low-latency connections between applications and decrease transmissions time. TCP can be an expensive network tool as it includes absent or corrupted packets and protects data delivery with controls like acknowledgments, connection start up, and flow control.UDP does not provide error connection or packet sequencing nor does it signal a destination before it delivers data, which makes it less reliable but less expensive. As such, it is a good option for time-sensitive situations, such as Domain Name System (DNS) lookup, Voice over internet Protocol (VoIP), and streaming media.

10. What is a Web Browser 9Browser)? Give some example of browser

A web browser is a type of software that allows you to find and view websites on the Internet. Even if you didn't know it, you're using a web browser right now to read this page! There are many different web browsers, but some of the most common ones include Google Chrome, Safari, and Mozilla Firefox.

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. …

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

Internet :

The internet is a global network of interconnected computers, servers, phones, and smart appliances that communicate with each other using the transmission control protocol (TCP) standard to enable a fast exchange of information and files, along with other types of services.

WWW:

World-Wide Web (also called WWW or W3) is a hypertext-based information system. Any word in a hypertext document can be specified as a pointer to a different hypertext document where more information pertaining to that word can be found.

What are the uses of internet in our daily life?

- ✦ *Uses of the Internet in Education. …*
- ✦ *Internet Use to Speed up Daily Tasks. …*
- ✦ *Use of the Internet for Shopping. …*
- ✦ *Internet for Research & Development. …*
- ✦ *Business Promotion and Innovation. …*
- ✦ *Communication. …*
- ✦ *Digital Transactions. …*
- ✦ *Money Management.*

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

The examples of some internet service providers are Hath way, BSNL, Tata teleservices, Verizon, Reliance Jio, ACT Fibernet and more working in India as well as worldwide. Internet service providers or ISPs are responsible for providing services for using the Internet.

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

MAC addresses are used to identify a node's unique address, whereas IP addresses are primarily used to identify a node's connectivity to a network. The MAC address is a hardware-based, burnt-in, or physical address, whereas the IP address is a software-based or logical address.

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

On your computer, open Chrome.

In the address bar, enter @history.

Press tab or space. You can also click Search History. In the suggestions.

Enter keywords for the page you previously visited.

Select the page from the list.