2020-2021

CCA FINAL ASSIGNMENT REPORT

CCA-102: Data Communication ASSIGNMENT

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PROJECT REPORT

Submitted in partial fulfillment of require for the award

Of certificate of computer application

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COMPUTER APPLICATION

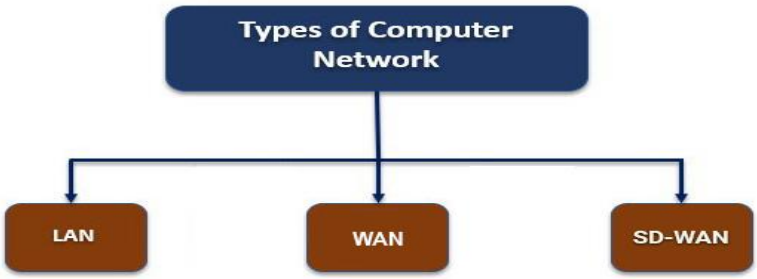
2020-2021

CCA-102: Data Communications

ASSIGNMENT

1. **What are the different types of networks?**

A computer network is a group of computers connected with each other through a transmission medium such as cable, wire etc. In this guide, we will discuss the types of computer networks in detail.



There are mainly three types of computer networks based on their size:

1. Local Area Network (LAN)
2. Metropolitan Area Network (MAN)
3. Wide area network (WAN)

LOCAL AREA NETWORK

1. Local area network is a group of computers connected with each other in small places such as school, hospital, apartment etc.
2. LAN is secure because there is no outside connection with the local area network thus the data which is shared is safe on the local area network and can't be accessed outside.
3. LAN due to their small size are considerably faster, their speed can range anywhere from 100 to 100Mbps.
4. LANs are not limited to wire connection; there is a new evolution to the LANs that allows local area network to work on a wireless connection.

Metropolitan Area Network (MAN)

MAN network covers larger area by connections LANs to a larger network of computers. In Metropolitan area network various Local area networks are connected with each other through telephone lines. The size of the Metropolitan area network is larger than LANs and smaller than WANs (wide area networks), a MANs covers the larger area of a city or town.

Wide area network (WAN)

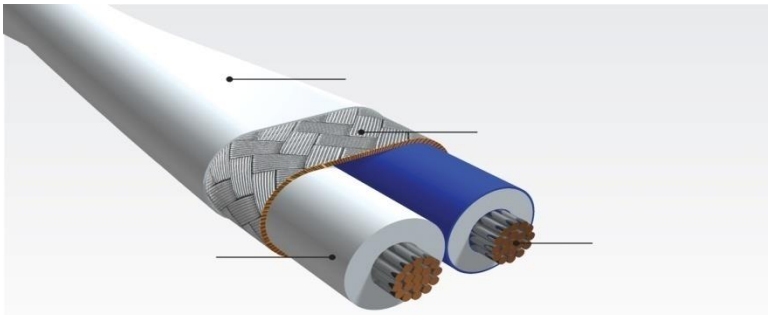
Wide area network provides long distance transmission of data. The size of the WAN is larger than LAN and MAN. A WAN can cover country, continent or even a whole world. Internet connection is an example of WAN. Other examples of WAN are mobile broadband connections such as 3G, 4G etc.

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

Unshielded twisted-pair (UTP) cable is the most prevalent type of telecommunication medium in use today. Its frequency range is suitable for transmitting both data and voice. Therefore, these are most commonly used in telephone systems.

A twisted pair consists of two insulated conductors (usually copper) in a twisted configuration. Color bands are used in plastic insulation for identification. In addition, colors also identify the specific conductors in a cable and to indicate which wires belong in pairs and how they relate to other pairs in a larger bundle.

Shielded twisted-pair (STP) cable has an additional braided mesh coating or metal foil that wraps each set of insulated conductors. The metal casing intercepts the penetration of **electromagnetic noise**. It also can eradicate a phenomenon called crosstalk, which is the unwanted effect of one circuit (or channel) on another circuit (or channel).



3. What is difference between baseband and broadband transmission?

S.NO	BROADBAND TRANSMISSION	BASEBAND TRANSMISSION
1.	In broadband transmission, the type of signaling used is digital.	In baseband transmission, the type of signaling used is analog
2.	Baseband Transmission is bidirectional in nature.	Baseband Transmission is unidirectional in nature.
3.	Signals can only travel over short distances.	Signals can be travelled over long distances without being attenuated.
4.	It works well with bus topology.	It is used with a bus as well as tree topology
5.	In broadband transmission, Manchester and Differential Manchester encoding are used.	Only PSK encoding is used

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

1. Repeater – A repeater operates at the physical layer. Its job is to regenerate the signal over the same network before the signal becomes too weak or corrupted so as to extend the length to which the signal can be transmitted over the same network. An important point to be noted about repeaters is that they do not amplify the signal. When the signal becomes weak, they copy the signal bit by bit and regenerate it at the original strength. It is a 2 port device.

2. Hub – A hub is basically a multiport repeater. A hub connects multiple wires coming from different branches, for example, the connector in star topology which connects different stations. Hubs cannot filter data, so data packets are sent to all connected devices. In other

words, of all hosts connected through Hub remains one. Also, they do not have intelligence to find out best path for data packets which leads to inefficiencies and wastage.

3. Switch – A switch is a multiport bridge with a buffer and a design that can boost its efficiency (a large number of ports imply less traffic) and performance. A switch is a data link layer device. The switch can perform error checking before forwarding data that makes it very efficient as it does not forward packets that have errors and forward good packets selectively to correct port only. In other words, switch divides.

4. Routers – A router is a device like a switch that routes data packets based on their IP addresses. Router is mainly a Network Layer device. Routers normally connect LANs and WANs together and have a dynamically updating routing table based on which they make decisions on routing the data packets. Router divide broadcast domains of hosts connected through it.

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

   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 another one replaced the NIC card.

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

   Network Troubleshooting

   In this tutorial, we are only concerned about the computer networking fault diagnosis and rectification.

   Based on the type of issue, we will discuss its troubleshooting steps and tips.

   Basic Network Problems

   Cable Problem: The cable which is used to connect two devices can get faulty, shortened or can be physically damaged.

   Connectivity Problem: The port or interface on which the device is connected or configured can be physically down or faulty due to which the source host will not be able to communicate with the destination host.

   Configuration Issue: Due to a wrong configuration, looping the IP, routing problem and other configuration issues, network fault may arise and the services will get affected.

   Software Issue: Owing to software compatibility issues and version mismatch, the transmission of IP data packets between the source and destination is interrupted.

   Traffic overload: If the link is over utilized then the capacity or traffic on a device is more than the carrying capacity of it and due to overload condition the device will start behaving abnormally.

7. **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.

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

IPV4 and IPV6 are internet protocol version 4 and 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.

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1-IPv4 was the first version of IP. It was deployed for production in the ARPANET in 1983. Today it is most widely used IP version. It is used to identify devices on a network using an addressing system.

The IPv4 uses a 32-bit address scheme allowing to store 2^32 addresses which is more than 4 billion addresses. Till date, it is considered the primary Internet Protocol and carries 94% of Internet traffic.

2-Ipv6- is the most recent version of the Internet Protocol. Internet Engineer Taskforce initiated it in early 1994. The design and development of that suite is now called IPv6.

This new IP address version is being deployed to fulfill the need for more Internet addresses. It was aimed to resolve issues which are associated with IPv4. With 128-bit address space, it allows 340 unique address space. IPv6 also called (Internet Protocol next generation).

9. Discuss TCP/IP model in detail.

TCP/IP Model helps you to determine how a specific computer should be connected to the internet and how data should be transmitted between them. It helps you to create a virtual network when multiple computer networks are connected together. The purpose of TCP/IP model is to allow communication over large distances.

TCP/IP stands for Transmission Control Protocol/ Internet Protocol. TCP/IP Protocol Stack is specifically designed as a model to offer highly reliable and end-to-end byte stream over an unreliable internetwork.

The functionality of the TCP IP model is divided into four layers, and each includes specific protocols.

TCP/IP is a layered server architecture system in which each layer is defined according to a specific function to perform.

All these four TCP/IP layers work collaboratively to transmit the data from one layer to another.

1- Application Layer.
2- Transport Layer.
3- Internet Layer.
4- Network Interface.

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 web pages, images, video, as well as other files on the World Wide Web.

Browsers work because very web page, image, and video on the web has its own unique Uniform Resource Locator (URL), allowing the browser to identify the resource

1- Google Chrome

Chrome, created by internet giant Google, is the most popular browser in the USA, perceived by its computer and smart phone users as fast, secure, and reliable. There are also many options for customization in the shape of useful extensions and apps that can be downloaded for free from the Chrome Store.

2- Apple Safari

Safari is the default on Apple computers and phones, as well as other Apple devices. It's generally considered to be an efficient browser, its slick design being in keeping with the ethos of Apple. Originally developed for Macs, Safari has come to be a significant force in the mobiles market, due to the domination of I Phones and I Pads. Unlike some of the other browsers listed, Safari is exclusive to Apple

3- Microsoft Internet Explorer and Edge

Although it has been discontinued, Internet Explorer is worthy of a mention as it was the go-to browser in the early days of the internet revolution with usage share rising to 95% in 2003. However, its relatively slow start-up speed meant that many users turned to Chrome and Firefox in the years that followed. In 2015, Microsoft announced that Microsoft Edge would replace Internet Explorer as the default browser on Windows 10, making Internet Explorer

4- Mozilla Firefox

Unlike Chrome, Safari, Internet Explorer, and Microsoft Edge, Firefox is an open-source browser, created by community members of the Mozilla Foundation. It is perhaps the most customizable of the main browsers with many add-ons and extensions to choose from. In late 2003, it had a u .s. A.

5- Opera

Another web browser worthy of mention is Opera, which is designed for Microsoft Windows, Android, I O S, m a c O S , and Linux operating systems. It has some interesting features and is generally considered to be a reliable option by many users. Many of its earlier features have gone on to be incorporated into rival browsers. It also has a distinct user interface. At the time of writing, Opera has a usage of just 2.28% but remains influential, albeit from the fringes.

11. What is a search engine? Give example.

A **search engine** is **software** accessed on the **INTERNET** that searches a **DATABASE** of information according to the user's **QUERY**. The engine provides a list of results that best match what the user is trying to find. Today, there are many different search engines available on the Internet, each with its own abilities and features. The first search engine ever developed is considered **ARCHIE**, which was used to search for **FTP** files, and the first text-based search engine is considered **VERONICA**. Currently, the most popular and well-known search engine is **GOOGLE**. Other popular search engines include **AOL, ASK.COM, BAIDU, BING,DUCKDUCKGO and YAHOO.**

1. Google

Google Search Engine is the best search engine in the world and it is also one of most popular products from Google. Almost 70 percent of the Search Engine market has been acquired by Google. The tech giant is always evolving and looking to improve the search engine algorithm to provide best results to the end-user. Although Google appears to be the biggest search engine, as of 2015 YouTube is now more popular than Google (on desktop computers).

2. Bing

Bing is Microsoft's answer to Google and it was launched in 2009. Bing is the default search engine in Microsoft's web browser. At Bing, they are always striving to make it a better search engine but it's got a long way to go to give Google competition. Microsoft's search

engine provides different services including image, web and video search along with maps. Bing introduced Places (Google's equivalent is Google My Business), this is a great platform for business to submit their details to optimize their search results.

3. Yahoo

Yahoo & Bing compete more with each other than with Google. A recent report on netmarketshare.com tells us that Yahoo have a market share of 7.68 percent. Although a leader as a free email provider, this is declining significantly though with their recent acknowledgement that User Details & Passwords where hacked last year.

4. Baidu

Baidu is the most used search engine in China and was founded in Jan, 2000 by Chinese Entrepreneur, Eric Xu. This web search is made to deliver results for website, audio files and images. It provides some other services including maps, news, cloud storage and much more.

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

The internet is the wider network that allows computer networks around the world run by companies, governments, universities and other organisations to talk to one another.

WWW-The World Wide Web (WWW), commonly known as the Web, is an information system where documents and other web resources are identified by Uniform Resource Locators (URLs, such as https://example.com/), which may be interlinked by hypertext, and are accessible over the Internet.

The Internet innovated our daily life. ... Positive use of the Internet makes our lives easy and simple. The Internet provides us useful data, information, and knowledge for personal, social, and economic development and it is up to us to utilize our time on the World Wide Web in a productive manner

1- online booking
2- constructive communication
3- Uses of the internet in effective education
4- Uses of the internet in the research.
5- online banking
6- Job searching.

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

Internet service provider (ISP) - is an organization that provides services for accessing, using, or participating in the Internet. Internet service providers can be organized in various forms, such as commercial, community-owned, non-profit, or otherwise privately owned.

Give some example ISP:

1- AIRTEL
2- RELIANCE
3- JIO
4- BSNL

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

MAC Address stands for Media Access Control Address.	IP Address stands for Internet Protocol Address
MAC Address is a six byte hexadecimal	IP Address is either four byte (IPv4) or six

address.	byte (IPv6) address.
A device attached with MAC Address can retrieve by ARP protocol.	A device attached with IP Address can retrieve by RARP protocol.
NIC Card's Manufacturer provides the MAC Address.	Internet Service Provider provides IP Address.
MAC Address is used to ensure the physical address of computer.	IP Address is the logical address of the computer

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

In a Microsoft Edge browser window, open the history menu using the keyboard shortcut ctrl+H. You can also access this menu with the following steps;

First of all-ON YOUR COMPUTER-OPEN CHROME

2Then-AT THE TOP RIGHT, CLICK MORE.

3-CLICK HISTORY

This menu allows you to view the pages you've visited in chronological order.