# ASSIGNMENT-2

# Certificate in computer application

CCA-102

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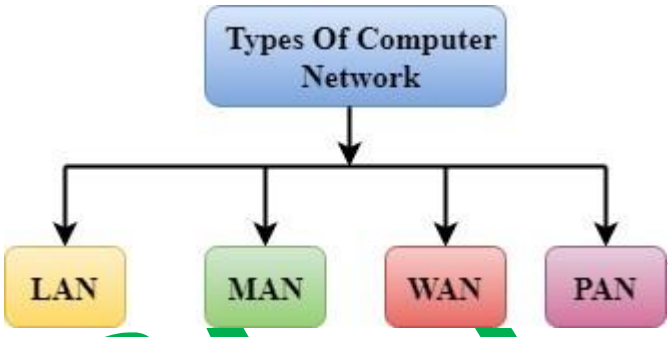
# CCA-102: Data Communications ASSIGNMENT

**Q1- 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)

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 network arranged within an individual person, typically within a range of 10 meters. ◦ Personal Area Network is used for connecting the computer devices of personal use is known as Personal Area Network.
- **Thomas Zimmerman** was the first research scientist to bring the idea of the Personal Area Network.
- Personal Area Network covers an area of **30 feet**. ◦ Personal computer 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.

**Wired Personal Area Network:** Wired Personal Area Network is created by using the USB.

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).

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

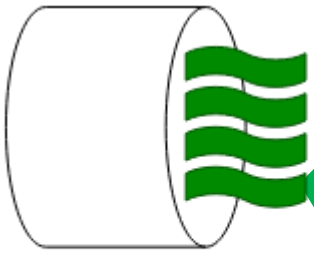
spans over a large geographical area through a telephone line, fibre optic cable or satellite links.

- 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.

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

**Ans- UTP:**

UTP is the type of twisted pair cable. It stands for Unshielded twisted pair. Both Data and voice both are transmitted through UTP because its frequency range is suitable. In UTP grounding cable is not necessary also in UTP much more maintenance are not needed therefore it is cost effective.



Unshielded Twisted Pair

**STP:**

STP is also the type of twisted pair which stands for Shielded twisted pair. In STP grounding cable is required but in UTP grounding cable is not required. in Shielded Twisted Pair (STP) much more maintenance are needed therefore it is costlier than Unshielded Twisted Pair (UTP).

## Q3- What is difference between baseband and broadband transmission?

**Ans- Broadband** system use modulation techniques to reduce the effect of noise in the environment. Broadband transmission employs multiple channel unidirectional transmission using combination of phase and amplitude modulation.

**Baseband** is a digital signal is transmitted on the medium using one of the signal codes like NRZ, RZ Manchester biphase-M code etc. is called baseband transmission.

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



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

**Ans-**

| Device | What is does |
|---|---|
| Modem: | Stands for "modulating-demodulating":<br><br>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.<br>Simply send traffic from point A to piont B without further manipulation. |
| Routers: | Are responsible for sending data from one network to another.<br><br>Work at Layer 3 (Network) of the OSI model, which deals with IP addresses.<br><br>Typically, routers today will perform the functionality of both a router and a switch - that is, the router will have multiple ethernet ports that devices can plug into. |
| Switches: | They use the MAC address of a device to send data only to the port the destination device is plugged into.<br><br>Work at Layer 2 (Data Link) of the OSI model, which deals with MAC addresses. |
| Hubs: | Unlike switches, hubs broadcast data to all ports, which is inefficient, so hubs are basically a multiport repeaters. |



**Q5- When you move the NIC cards from one PC to another PC, does the MAC address gets transferred as well?**

**Ans-** The Media Access Control address (MAC address) for any network adapter is hard coded into the card itself. Each manufacturer of network adapters has a group of characters assigned that refer specifically to that company. I believe that is the first 1/2 of the MAC address which is 12 hexadecimal characters long. But the MAC address is part and parcel of the network adapter, just as your internal organs are part of you. When you move to a new house, you take your liver with you. In the same way, when you move a NIC to a different computer, it takes its MAC address with it.

**Q6- When troubleshooting computer network problems, what common hardwarerelated problems can occur?**

**Ans-** We have to check the LAN DRIVER Has been installed.
Most of the time, the troubleshooting's comes from cables (Optical fibers included).

**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. This will protect each device from the other in case some malicious user tries to insert a virus into the servers or legitimate users.

**Q8- Define Static IP and Dynamic IP? Discuss the difference between IPV4 and IPV6.**

**Ans- Difference between Static and Dynamic IP address:**

| S.NO | STATIC IP ADDRESS | DYNAMIC IP ADDRESS |
|---|---|---|
| 1. | It is provided by ISP(Internet Service Provider). | While it is provided by DHCP (Dynamic Host Configuration Protocol). |

| S.NO | STATIC IP ADDRESS | DYNAMIC IP ADDRESS |
|---|---|---|
| 2. | Static ip address does not change any time, it means if a static ip address is provided then it can't be changed or modified. | While dynamic ip address change any time. |
| 3. | Static ip address is less secure. | While in dynamic ip address, there is low amount of risk than static ip address's risk. |
| 4. | Static ip address is difficult to designate. | While dynamic ip address is easy to designate. |
| 5. | The device designed by static ip address can be trace. | But the device designed by dynamic ip address can't be trace. |

| | | |
|---|---|---|
| | | While dynamic ip address is less stable than static ip address. |
| 6. | Static ip address is more stable than dynamic ip address. | |
| | | While the maintaining cost of dynamic ip address is less than static ip address. |
| 7. | The cost to maintain the static ip address is higher than dynamic ip address. | |
| | | While it is used where data is more confidential |
| 8. | It is used where computational data is less confidential. | and needs more security. |



**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 (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 highlevel protocols like Telnet, DNS, HTTP, FTP, SMTP, etc.
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**Q10- What is a Web Browser (Browser)? Give some example of browsers.**

**Ans-**

## Web Browser

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

The primary function of a web browser is to render HTML, the code used to design or "mark up" webpages. Each time a browser loads a web page, it processes the HTML, which may include text, links, and references to images and other items, such as cascading style sheets and JavaScript functions. The browser processes these items, then renders them in the browser window.

Early web browsers, such as Mosaic and Netscape Navigator, were simple applications that rendered HTML, processed form input, and supported bookmarks. As websites have evolved, so have web browser requirements. Today's browsers are far more advanced, supporting multiple types of HTML (such as XHTML and HTML 5), dynamic JavaScript, and encryption used by secure websites.

The capabilities of modern web browsers allow web developers to create highly interactive websites. For example, Ajax enables a browser to dynamically update information on a webpage without the need to reload the page. Advances in CSS allow browsers to display a responsive website layouts and a wide array of visual effects. Cookies allow browsers to remember your settings for specific websites.

While web browser technology has come a long way since Netscape, browser compatibility issues remain a problem. Since browsers use different rendering engines, websites may not appear the same across multiple browsers. In some cases, a website may work fine in one browser, but not function properly in another. Therefore, it is smart to install multiple browsers on your computer so you can use an alternate browser if necessary.

**Q11- 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. Search engines utilize automated software applications (referred to as robots, bots, or spiders) that travel along the Web, following links from page to page, site to site. The information gathered by the spiders is used to create a searchable index of the Web.

**How do search engines work?**

Every search engine uses different complex mathematical formulas to generate search results. The results for a specific query are then displayed on the SERP. Search engine algorithms take the key elements of a web page, including the page title, content and keyword density, and come up with a ranking for where to place the results on the pages. Each search engine's algorithm is unique, so a top ranking on Yahoo! does not guarantee a prominent ranking on Google, and vice versa. To make things more complicated, the algorithms used by search engines are not only closely guarded secrets, they are also constantly undergoing modification and revision. This means that the criteria to best optimize a site with must be surmised through observation, as well as trial and error — and not just once, but continuously.

Gimmicks less reputable SEO firms tout as the answer to better site rankings may work at best for only a short period before the search engine's developers become wise to the tactics and change their algorithm. More likely, sites using these tricks will be labeled as spam by the search engines and their rankings will plummet.

Search engines only "see" the text on web pages, and use the underlying HTML structure to determine relevance. Large photos, or dynamic Flash animation mean nothing to search engines, but the actual text on your pages does. It is difficult to build a Flash site that is as friendly to search engines; as a result, Flash sites will tend not to rank as high as sites developed with well coded HTML and CSS (Cascading Style Sheets — a complex mechanism for adding styles to website pages above and beyond regular HTML). If the terms you want to be found by do not appear in the text of your website, it will be very difficult for your website to yield high placement in the SERPs.

## Q12- What is the Internet & WWW? What are the uses of internet in our daily life?

**Ans-** Today, the internet has become unavoidable in our daily life. Appropriate use of the internet makes our life easy, fast and simple. The internet helps us with facts and figures, information and knowledge for personal, social and economic development. There are many

uses of the internet, however, the use of the internet in our daily life depends on individual requirements and goals.

## 1. USES OF THE INTERNET IN EDUCATION

The Internet is a great platform for students to learn throughout their lifetime. They can use the internet to learn new things and even acquire degrees through online education programs. Teachers can also use the internet to teach students around the world.

## 2. INTERNET USE TO SPEED UP DAILY TASKS

The Internet is very much useful in our daily routine tasks. For example, it helps us to see our notifications and emails. Apart from this, people can use the internet for money transfers, shopping order online food, etc.

## 3. USE OF THE INTERNET FOR SHOPPING

With the help of the internet, anybody can order products online. The increase in online shopping has also resulted in companies offering a huge discount for their customers.

## 4. INTERNET FOR RESEARCH & DEVELOPMENT

The Internet plays a pivotal role in research and development as it is propelled through internet research. The benefit of the internet is enjoyed by small businessmen to big universities.

## 5.BUSINESS PROMOTION AND INNOVATION

The Internet is also used to sell products by using various e-Commerce solutions. The result is new services and businesses starting every day thereby creating job opportunities and reducing unemployment.

## 6.COMMUNICATION

Without a doubt, the internet is the most powerful medium of communication at present. It connects people across different parts of the world free and fast.

## 7. DIGITAL TRANSACTIONS

The internet facilitates internet banking, mobile banking, and e-wallets. Since all digital transactions are stored in a database, it helps the government to track income tax details or income reports in the ITR.

## 8. MONEY MANAGEMENT

The internet can also be used to manage money. Now, there are many websites, applications, and other tools that help us in daily transactions, transfers, management, budget, etc.

## 9. TOUR & TRAVEL

| S.NO | MAC ADDRESS | IP ADDRESS |
|---|---|---|
| 1. | MAC Address stands for Media Access Control Address. | IP Address stands for Internet Protocol Address. |
| 2. | MAC Address is a six byte hexadecimal address. | IP Address is either four byte (IPv4) or six byte (IPv6) address. |
| 3. | A device attached with MAC Address can retrieve by ARP protocol. | A device attached with IP Address can retrieve by RARP protocol. |
| 4. | NIC Card's Manufacturer provides the MAC Address. | Internet Service Provider provides IP Address. |
| 5. | MAC Address is used to ensure the physical address of computer. | IP Address is the logical address of the computer. |
| 6. | MAC Address operates in the data link layer. | IP Address operates in the network layer. |

| | | | |
|---|---|---|---|
| | | IP Address identifies the connection of the device on the network. | During tour and travel, the use of the internet is highly effective as it serves as a guide. People browse the internet before they start visiting |
| 7. | MAC Address helps in simply identifying the device. | | |
| 8. | MAC Address of computer cannot be changed with time and environment. | IP Address modifies with the time and environment. | MAC Address can't be found easily IP Address can be found by third party. |
| 9. | the places. by third party. | | Tour bookings can also be done using the internet. |

The influence of the internet in our daily life is huge. It has opened us a magical world of information and we would have never seen the world as it is without the internet. Considering its scope and importance, it would be hard to imagine a world without the internet.

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

**Ans-** A company that provides subscribers with access to the Internet. BSNL, Airtel, Vodafone etc. are some examples of ISP in India.

| Rank | ISP | Narrowband | Broadband | Total |
|---|---|---|---|---|
| 1 | Jio | 0 | 138,615,904 | 138,615,904 |
| 2 | Airtel | 32,008,751 | 62,294,731 | 94,303,482 |
| 3 | Vodafone | 21,736,495 | 45,975,013 | 67,711,508 |
| 4 | Idea Cellular | 8,589,570 | 29,614,167 | 38,203,737 |
| 5 | BSNL | 10,915,589 | 21,242,487 | 32,158,076 |
| 6 | Reliance Communications | 10,697,647 | 5,523,074 | 16,220,721 |
| 7 | Aircel | 7,142,722 | 9,073,153 | 16,215,875 |
| 8 | Tata Teleservices | 4,690,205 | 4,316,099 | 9,006,304 |
| 9 | Telenor India | 7,969,328 | 331,339 | 8,300,667 |
| 10 | MTNL | 484,517 | 1,408,903 | 1,893,420 |

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

**Ans-** Both MAC Address and IP Address are used to uniquely identify a machine on the internet. MAC address is provided by the chip maker while IP Address is provided by the Internet Service Provider.

Following are the important differences between MAC Address and IP Address.

| Sr. No. | Key | MAC Address | IP Address |
|---|---|---|---|
| 1 | Definition | MAC Address stands for Media Access Control Address. | IP Address stands for Internet Protocol Address. |
| 2 | Usage | MAC Address ensure that physical address of the computer is unique. | IP Address is a logical address of the computer and is used to uniquely locate computer connected via a network. |
| 3 | Format | MAC Address is of six byte hexadecimal address. | IP Address is of 4 bytes or of 16 bytes. |
| 4 | Access Protocol | MAC Address can be retrieved using ARP protocol. | IP Address can be retrieved using RARP protocol. |

| | | | |
|---|---|---|---|
| 5 | Provider | Chip maker manufacturer provides the MAC Address. | Internet Service Provider, ISP provides the IP Address. |

**Q15- How do we view my Internet browser's history?**

**Ans-** If you are using Windows, Linux, or macOS, there are quick shortcut key combinations that allow you to view your history.

**Windows and Linux users:** CTRL

**Apple users:** Command + Shift + H

Once one of the above shortcut keys is pressed, a history section similar to the example below should appear. In the following screenshot, browsing history is being viewed in Google Chrome

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