Name : Nitu Devi
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CCA - 102: Data Communication

Assignment

1. what are the different types of networks?

Ans ⇒ 11 types of Commputer networks:

1. Local area network (LAN) ⇒ A local area network type, or LAN, is the most common network type. It allows users to Connect within a short distance in a Common area. Once they Connect, users have access to the Same resources. For example, you laptop to The internet at your home and Print a documen from a Printer on the Same network.
2. Personal area network (PAN) ⇒ A Personal area network, or PAN; is a Small - Scale network that revolves aroun one Person or ~~desi~~ device. A PAN Con ects just a Few devices in a Small localized area. Rather than including many devices, PANs usually operate from one or two main

devices. For example, if you use the bluetooth to share a photo with a nearby device, you're using a PAN.

3. Wireless local area network (WLAN) ⇒

An wireless local area network, or WLAN, operates similarly to a LAN because it transmits data within a small area. It's rarely necessary to have a wired connection for devices that use a WLAN. While typically less secure and slightly weaker than other networks, a WLAN provides users with the flexibility to use their devices in various locations. For example, a user might connect a baby monitor to a WLAN to ensure the device remains operational wherever their child sleeps.

4. Campus area network (CAN) ⇒ A campus area network, or CAN, is a network used in educational environments such as universities or school districts while each department in a school might use its own LAN, all the school LANs could connect through a CAN.

Campus area networks Combine Several independent networks into one Cohesive unit. For example, The English and engineering departments at a university might Connect through a CAN to Communicate with each other directly.

5. Wide area network (WAN) => A wide area network, or a WAN, is an extensive network that's not Confined to geographical Space. Corporations and international Companies may use WANs to Provide a Common network with far-reaching Connectivity. for example => remote workers who use the internet to access information from their Company make use of a WAN.

6. Storage area network (SAN) => A storage area network, or a SAN, is a network that teams use to store mass amounts of Sensitive data. It Provides a way to Centralize data on a non-localized network that differs from the main operating one. One example of a SAN is if your team stores

Customer information on a seperate network to maintain the high speeds of your main network.

7. Passive optical local area network (POLAN) ⇒

A Passive optical local area network. or a POLAN, is a low-cost network that can link various locations to one central network. POLAN have the power to connect. multipe entities to one hub of information.
For example ⇒ if a school district's headquarters needs to connect with each schod in its district, it may implement a POLAN.

8. Enterprise Private network (EPN) ⇒ An enterprise Private network, or an EPN, is an exclusive network that businesses build and operate to share company resources at high speeds. EPNs are typically unique to a specific company which ensures the connection is secure. For example; a high-security technology Company might use an EPN to reduce the risk of data breaches.

9. Metropolitan area network (MAN) ⇒ A metropolitan area network, or a MAN, is a medium-sized network that's larger than a CAN. while a MAN is a costly network it Provides efficient Connectivity between devices across a wide geographical range. for example: a City government might operate with a MAN if it has offices ~~at~~ across the entire metropolitan area.

10. Virtual Private network (VPN) ⇒ A Virtual Private network, or VPN, is a Private network that's available Through The internet. This type of network functions Similarly to an EPN because it Provides a Secure, Private Connection. VPNs typically don't require the Same infrastructure as EPNs. Both The general Public and companies Can use VPNs to ensure Privacy and Security.

11. System-area network (SAN) ⇒ A System area network, or a SAN, is a broad local network that Provides Connections in clusters. The Various devices Connected to a SAN operate as a Single System.

SANs are newly developing networks that operate at high speeds.

Q2. Explain The Shielded twisted Pair (STP) and unshielded twisted Pair (UTP) ?

Ans ⇒ STP and UTP Cables

Shielded twisted Pair (STP) has the individual Pairs of wires wrapped in foil, which are then wrapped again for double Protection. Unshieled twisted Pair (UTP) has each Pair of wires twisted together. Those wires are then wrapped in tubing without any other Protection.

(UTP) ⇒ It is the type of twisted Pair Cable. It stands for Unshielded twisted Pair. Both Data and Voice are transmitted through UTP because its frequency range is suitable. In UTP grounding Cable is not necessary also in UTP much more maintenance is not needed therefore it is Costeffective.

Features:

- Cost-effective: UTP Cables are relatively

inexpensive compared to other types of network cables.

- Easy to install : UTP cables are easy to install and terminate, which makes them a popular choice for small and medium-sized networks.

- Vulnerable to the interference : UTP Cables are Vulnerable to interference from nearby sources of electromagnetic radiation, such as power lines, motors, and other electrical equipment. This can cause signal degradation and data loss.

- Limited distance : UTP cables have a limited distance over which they can reliably transmit data, typically upto 100 meters.

(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 is needed therefore it is costlier than Unshielded Twisted Pair (UTP).

Features :

- Enhanced Protection : STP cables are shielded with a layer of metal foil or braided copper mesh, which provides additional protection against electromagnetic interference
- Better Performance : STP cables can transmit data over longer distances and at higher speeds than UTP cables, making them ideal for high-bandwidth applications.
- More complex to install : STP cables are more complex to install and terminate than UTP cables, which can increase installation costs and require specialized skills.
- More expensive : STP cables are more expensive than UTP cables due to the additional shielding and manufacturing costs involved.

Q3: what is difference between baseband and broadband transmission?

Ans ⇒ (I) Baseband :

1. It refers to a communication channel in which information is carried in digital for
2. Communication is bi-directional which means the same channel is used to transmit and receive signals.
3. Every device on a baseband system share the same channel.
4. Baseband LANs are inexpensive and easier to intstall and maintain.
5. Baseband LANs have a limited distance reach which is no more than a couple miles.

(II) Broadband :

1. The signals are modulated as radiofrequen analog waves that use different frequency ranges.
2. Communication is unidirectional meaning two

different channels are needed in order to send and receive signals.

3. Multiple independent channels can carry analog or digital information through FDM.
4. Broadband systems are generally more expensive because of the additional hardware involved.
5. Broadband LANs span much longer distances than baseband (up to tens of kilometers).

Q4. What is the difference between 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 ⇒ It is a Point communication device. It operats at the data link layer of OSI model. It uses switching table to find out the correct destination.

Basically, it is 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, fitering and frame transmission.

3. Router ⇒ Router 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 which of 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.

4. Modem ⇒ Stands for 'modulating-demodulating'. modems are hardware devices that allow

a computer or another device, such as a router or switch, to connect to the Internet. They Conver or 'Modulate' an onto 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.

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

Ans⇒ Yes, if we move the NIC cards from one PC to another PC, then the MAC address also gets transferred, because the MAC address is hardwired into the NIC circuit, not the Personal Computer. This also means that a PC can have a different MAC address when another one replaces the NIC card 35.

Q6. When troubleshooting computer network problems, what common hardware-related problems can occur?

Ans⇒ Business networks are complex, and many things can go wrong that disrupt

network performance. End users often complain about what appears to be poor application performance, and there can be many possible reasons for these hiccups. Here are nine of the most common network issues to troubleshooting.

1. Slow network: Users complain the network too slow. There can be many reasons why a network that provided adequate performance in the past is ~~not~~ now frustrating its users.

2. Weak wi-fi signal: wi-fi signal strength may be adequate almost everywhere, but it could be weak or nonexistent in other areas. Rearranging an office area can result in a weak wireless connection, where signal strength had been adequate before the move. For example, a large metal object, like a file cabinet, can block the wi-fi signal.

3. Physical connectivity issues: A network connection can suddenly break because of physical connectivity issues. A common problem is when a network cable becomes damaged or knocked loose. Cables might be added or removed from a switch, and one of the other cables might accidentally get disconnected.

4. Excessive CPU usage : Task Manager is the first thing to use to find which application is using a high proportion of system resources, such as CPU, memory or disk space. This basic troubleshooting step may not reveal a problem since some applications may be performing complex calculations, receiving high - speed video or interacting with large databases. A virus may also consume resources, so make sure antivirus software is up to date.

5. Slow DNS lookups : The DNS matches the common name used to match server or service names with the internet address that routes a network request. For commonly used names, the matchup is probably already stored in the system's DNS cache, and the lookup is quick. For less commonly used names, the matchup may be stored in a more distant cache, such as the root server of the top-level name, such as .com, .org or a national root, such as .uk.

6. Duplicate and static IP addresses : On a network, no two systems can share the same internet addresses. If there are duplicate internet addresses, no neither system can access the network reliably.

The addresses for most network devices are assigned when Dynamic Host Configuration Protocol (DHCP) boots up the systems on the local networks. DHCP maintains a pool of address assigned to the local network, assigning a different address from the pool to each system.

7. Exhausted IP addresses: Internet addresses are in limited supply. Each Service Provider is given a supply based on the expected number necessary. Most familiar are the IPv4 addresses which were originally thought to be adequate so every system could be allocated one. But, with the proliferation of cellphones and other devices, it's been ~~not~~ necessary to move to IPv6 with 128-bit addresses for some networks.

8. Can't connect to Printer: when users can't connect to a Printer, the first step is to check simple things like whether the Printer is plugged in, turned on and has paper. Also, make sure the Printer appears on Devices and Printers on windows. If it does, click to check whether the file is queued.

9. VLAN and VPN Problems: Check for Virtual LAN (VLAN) misconfiguration issues. Review the configuration on each switch, carefully comparing configurations to ensure compatability of switch configuration.
The most common VPN Problem is a failure to connect. First, check to see if you're successfully logging in to the VPN service, and make sure your account is up to date and you're entering your correct credentials. Next, check firewall settings. You need to open some ports. check if that is the Problem by temporarily shutting down your firewall. Finally, restart your system.

Q7⇒ In a network that contains two servers and twenty workstations, where is the best place to install an Anti-virus program?

Ans⇒ Antivirus should be on each computer, if you implement server and node base antivirus that will be best for controlling. There are no special ~~and~~ Problems just because you are two server and 20 Computer.

Q8 Define Static IP and Dynamic IP? Discuss The difference between IPV4 and IPV6.

Ans ⇒ Static IP

1. It is Proved by ISP (Internet service Provider). static ip adress does not change any time. it means if a static ip address is Provided then it can't be changed or modified.

2. Static ip address is less secure.

3. Static ip address is difficult to designde.

4. The device designed by Static ip address can be trace.

5. Static ip address is more stable than dynamic ip address.

6. The cost to maintain hi ~~stable~~ Static ip address is higher than dynamic ip address.

7. It is used where computational data is less confidential.

Dynamic IP address

1. while it is provided by DHCP (Dynamic Host configuration Protocal). while dynamic ip address change any time.
2. while in dynamic ip address, there is less amount of risk than static ip address's risk.
3. while dynamic ip address is easy to designate.
4. But the device designed by dynamic ip address can't be trace.
5. while dynamic ip address is less stable than static ip address.
6. while the maintaining cost of dynamic ip address is less than static ip address.
7. while it is used where data is more confidential and needs more security.

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.

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.

Q9 Discuss TCP/IP model in detail.

Ans => The transmission control protocol/internet protocol (TCP/IP) model finds its origins in the ARPANET reference model. The architecture of TCP has evolved from studies in methods for connecting multiple packet-switched networks. The central aim of the TCP/IP model is to enable the sending of data packets to one application on a single computer. The TCP/IP model is an internet-capable set of protocols.

The TCP/IP model sets out how packets exchange information through the web. This set of communication protocols determines how data is to be broken, addressed, transferred, routed and received for sharing. The server-client model is the communication model for this set.

The TCP/IP model describes how to construct communication lines for applications.

History of TCP/IP Model

At first, TCP was designed to meet the

the data communication needs of the US Department of Defense, also referred to as DoD. This finding began in the late 1960s when ARPA entered into a cooperation with US universities and industry research groups to design open standard Protocols and establish multi-supplier networks. The initial host for most communication Protocols created by ARPANET was Network Control Program (NCP).

In 1975, a two-network TCP/IP test was conducted between Stanford and University College London. In 1982 The United States DoD declared TCP/IP as The standard for all military computer networking.

The TCP/IP model has four layers:

- Application layer
- Transport layer
- Network layer
- Physical layer.

Q10 what is a web Browser? Give Some example of browsers.

Ans ⇒ A web browser is a Software application that is used to access the

world wide web (www) or as Known by everyone on the internet. It is an interface between us and the information available on the web. This information might be pictures, audio, videos, or some other files that are shown on our screens through a web-page.
The web browser can be called a client program as it requests the webserver for the information demanded by the user.
Common web browsers include Microsoft Edge, 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 'markup' webpages" (Tech Terms, 2014).

Q11 what is a Search engine? give example.

Ans=> Also known as a web or internet Search engine, a search engine is a computer program that collects and organizes content from all over the internet. The user enters a query composed of keywords or phrases, and the

Search engine responds by providing a list of results that best match the user's query. The results can take the form of links to websites, images, videos, or other online data.

Examples of Search Engines

To better understand the mechanics and practical use of search engines, let's take a look at some of the most commonly-used ones.

1. Google ⇒ It is the biggest search engine in the world by far. It handles over 5 billion searches each day and has a market share of over 90% at the time of writing (August 2019). Developed originally by Larry Page and Sergey Brin in 1997, Google has become so successful that it has become synonymous with search engine services, even entering the dictionary as a verb, with people using expressions such as: "I googled it" when they've searched for something online.

2. Bing ⇒ The origins of Microsoft's Bing can be found in the technology company's earlier search engines, MSN Search. Bing was launched in 2009 with high hopes that it would usurp its rival Google, but despite attracting many fans, things haven't quite worked out that way. Even so, Bing is the third largest search engine worldwide after Google and Baidu. It is available in 40 different languages.

3. Yahoo! ⇒ Yahoo! Search is another big player in the search engine world. However, for much of its history it has supplied the user interface but relied on other to power the searchable index and web crawling. From 2001 to 2004, it was powered by Inktomi and then Google. From 2004, Yahoo! Search was independent until a deal was struck with Microsoft in 2009 whereby Bing would power the index and crawling.

4. Ask.Com ⇒ Originally known as Ask Jeeves, Ask.Com is a little different from Google and Bing as it uses a question and answer format for a number

of years, Ask.Com was focused on becoming a direct rival to the big search engines, but nowadays, answers are supplied from its vast archive and users contributions, along with the help of an unnamed and outsourced third-Party Search Provider.

5. Baidy ⇒ Founded in the year 2000 by Robin Li and Eric xu, Baidu is the most Popular search engine in china and the fourth most visited website in the world, according to Alexa rankings Baidu has its origins in RankDex, a search engine previously developed by Robin li in 1996. As well as its Chinese Search engine, Baidu also offers a mapping service called Baidu Maps and more than 55 other internet-related services.

6. Aol.Com ⇒ Aol, now styled as Aol. and originally known as America Online, was a big Player in the early days of the internet revolution, providing a dial-up service for millions of Americans in the late 1990's. Despite Aol's decline as broadband gradually replaced dial-up, the Aol search engine is still used by a significant

minority of Searchers. On June 23, 2015, AOL was acquired by Verizon Communicat

7. Duck Duck Go ⇒ Duck Duck Go (DDG) has a number of features that distinguish it from its main Competitors. It has a strong focus on protecting Searchers' Privacy, so rather than profiling users and Presenting them with personalized results, it provides the same search results for any given search term. There's also an emphasis on providing quality rather than quantity when it comes to search results. DDG's interface is very clean and not overladen with adverts.

8. Wolfram Alpha ⇒ Wolfram Alpha markets itself as a Computational Knowledge engine. Instead of answering the queries of searchers with a list of links, it responds with mathmatical and scientific answers for their questions, using externally sourced "curated data". Wolfram Alpha was launched in 2009 and has become a valuable tool for academics and researches.

9. Yandex ⇒ Launched in 1997, yandex is Russia's largest search engine and the country's fourth most popular website. Outside of Russia, the search engine also has a major presence in Ukraine, Belarus, Kazakhstan, and other countries of the Commonwealth of independent states. As well as search, Yandex offers many other internet-related products and services, including maps and navigation, music, eCommerce, mobile applications, and online advertising.

10. Internet Archive ⇒ The internet Archive Provide free public access to a wide range of digital materials A nonprofit digital library based in San Francisco, it's a great tool for tracing the history domains and seeing how they have evolved over the years. Besides websites, you can also find software applications and games, movies/videos, music, moving images, and a huge collection of public domain books. The internet Archive also campaings for a free and open internet.

Q12 what is the internet & www? what are the uses of internet in our daily life?

Ans⇒ The internet is generally defined as a global networking systems, which is available on most electronic devices nowadays. In today's technological era, it has become an essential part of our life. Many leading companies run their operations on the internet. With the significant use and benefits of the internet, companies, and individuals are making their daily work more productive, comfortable, and faster.

www world wide web

The world wide web also known as the web, www or w3 - refers to all the public websites or pages that users can access on their local computers and other devices through the internet. These pages and documents are interconnected by means of hyperlinks that users click on for information.

The uses of the internet

Various uses of the internet can be seen

in many day-to-day activities in different areas or regions. It would not be wrong if we say that the internet has innumerable uses. Some of the most common uses of the internet can be found in the following areas:

1. Uses of Internet in Education

The use of the Internet is widely seen in the field of education. Most of the computational devices nowadays are equipped with the internet, which enables people to find any specific information in a few minutes using search engines or websites. Apart from this, the desired information can be found in multiple formats like images, videos, documents, etc., which makes the study very easy.

2. Uses of Internet in Business

Most businesses and organizations these days depend on the internet in one way or another. Typically, businesses take advantage of the Internet to store employees' details and other operational data within databases over the network.

3. Use of Internet in Banking

The Internet has changed the way of banking a lot these days. People can avail of online banking with internet access and perform various tasks like checking their account details, statements, transferring money, applying for ATM, changing ATM PIN, turning on/off international transactions, setting limits, raising complaints, contacting to bank's customer support personnel, etc.

4. Uses of Internet in Emails

Email, short for electronic mail, is one of the traditional uses of the internet. It is considered one of the first communication mediums on the internet that enabled people to transfer information and data files from one computational device to another.

5. Uses of the Internet is Social Media

The use of social media or social networking sites is considered one of the most important uses of the internet. These site enable people from

all over the world to connect together. With Social networking, People can create Social groups and grow their community to share ideas, information, create ads, run campaigns, promote business, etc.

6. Uses of Internet in Recharge and Bill Payments

In Previous days, People had to go to the retailer to get their mobile recharged. Similarly the only way to Pay bils like electricity, Piped gas, water, etc., was through their respective official Center. However, recharge and bill Payments are available on the internet these days.

7. Uses of Internet in Enteitainment

The Internet has become the most useful medium of entertainment. There is a wide variety of content on the Internet for People of different ages. We can take advantage of the internet and listen to Songs online, watch videos or movies, read Jokes and Stories, etc. The best Part is that we can even download entertaining content into our devices to enjoy them i

the near future.

Q13 What is an Internet Service Provide? Give some example of ISP in India?

Ans The term Internet Service Provide (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.

ISPs many also Provide other Services, including email services, domain registration, web hosting and browser Packages. An ISP may also be referred to as an information Service Provider, a Storage Service Provider, an internet network Service Provider (INSP), or any Combination of these three based on the Services offered by the Company.

Q14. Dicuss The difference between MAC address IP address and Port address.

Ans → The main difference between MAC addresses, IP addresses and Port addresses are:

MAC addresses → Identify devices on a local ~~no~~ networks, while IP addresses identify devices globally:

Function: MAC addresses identify devices on a local network, such as computers, Smartphones, and gaming consoles. IP addresses identify devices on the internet, such as computers, mobile phones and IoT devices.

Uniqueness: MAC addresses are unique to each device on a local network. IP addresses are unique world wide.

Changeability: MAC addr addresses are usually fixed and can't be changed unless the device's network interface is replaced.

Use

MAC addresses are used to identify data packets at the data link layer.

IP addresses are used for routing and transmitting data packets over the internet.

Port addresses

Identify the sender and receiver of a message, and the application on the devices.

- Function: Port numbers identify the protocol that a network should use to direct incoming traffic.

Representation: Port numbers are 16-bit no.

Usage: Port numbers are used to identify specific processes to which a network should forward messages.

Q15 How do we view my internet browsers history?

Ans → By viewing your browsing history, you can choose to delete specific sites, or return to a webpage that you've already visited.

1. In internet Explorer, Select the favorites button
2. Select the History tab, and choose how you want your history by Selecting a