

STUDY COURSE MATERIAL

COMPUTER

SESSION-2020-21

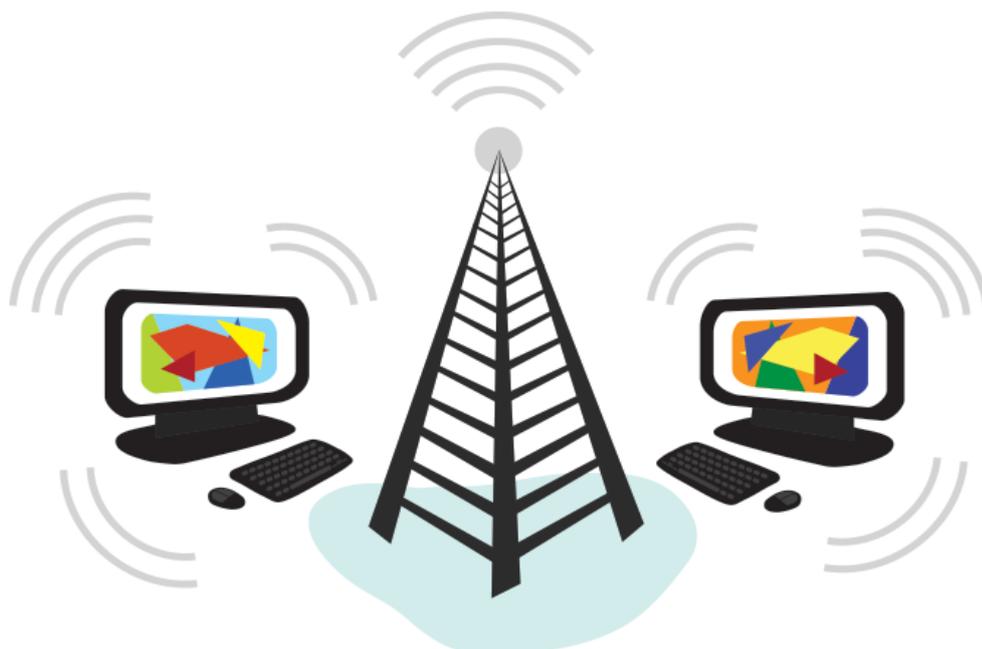
CLASS-X

TOPIC: INTERNET

DAY-1

TEACHING MATERIAL :- INTRODUCTION TO INTERNET

- ✚ The Internet is a global wide area network that connects computer systems across the world. It includes several high-bandwidth data lines that comprise the Internet "backbone." These lines are connected to major Internet hubs that distribute data to other locations, such as web servers and ISPs.
- ✚ In order to connect to the Internet, you must have access to an Internet service provider (ISP), which acts the middleman between you and the Internet. Most ISPs offer broadband Internet access via a cable, DSL, or fiber connection. When you connect to the Internet using a public Wi-Fi signal, the Wi-Fi router is still connected to an ISP that provides Internet access. Even cellular data towers must connect to an Internet service provider to provide connected devices with access to the Internet.



+ The Internet provides different online services. Some examples include:

- Web – a collection of billions of webpages that you can view with a web browser
- Email – the most common method of sending and receiving messages online
- Social media – websites and apps that allow people to share comments, photos, and videos
- Online gaming – games that allow people to play with and against each other over the Internet
- Software updates – operating system and application updates can typically be downloaded from the Internet



+ In the early days of the Internet, most people connected to the Internet using a home computer and a dial-up modem. DSL and cable modems eventually provided users with "always-on" connections. Now mobile devices, such as tablets and smartphones, make it possible for people to be connected to the Internet at all times. The Internet of Things has turned common appliances and home systems into "smart" devices that can be monitored and controlled over the Internet. As the Internet continues to grow and evolve, you can expect it to become an even more integral part of daily life

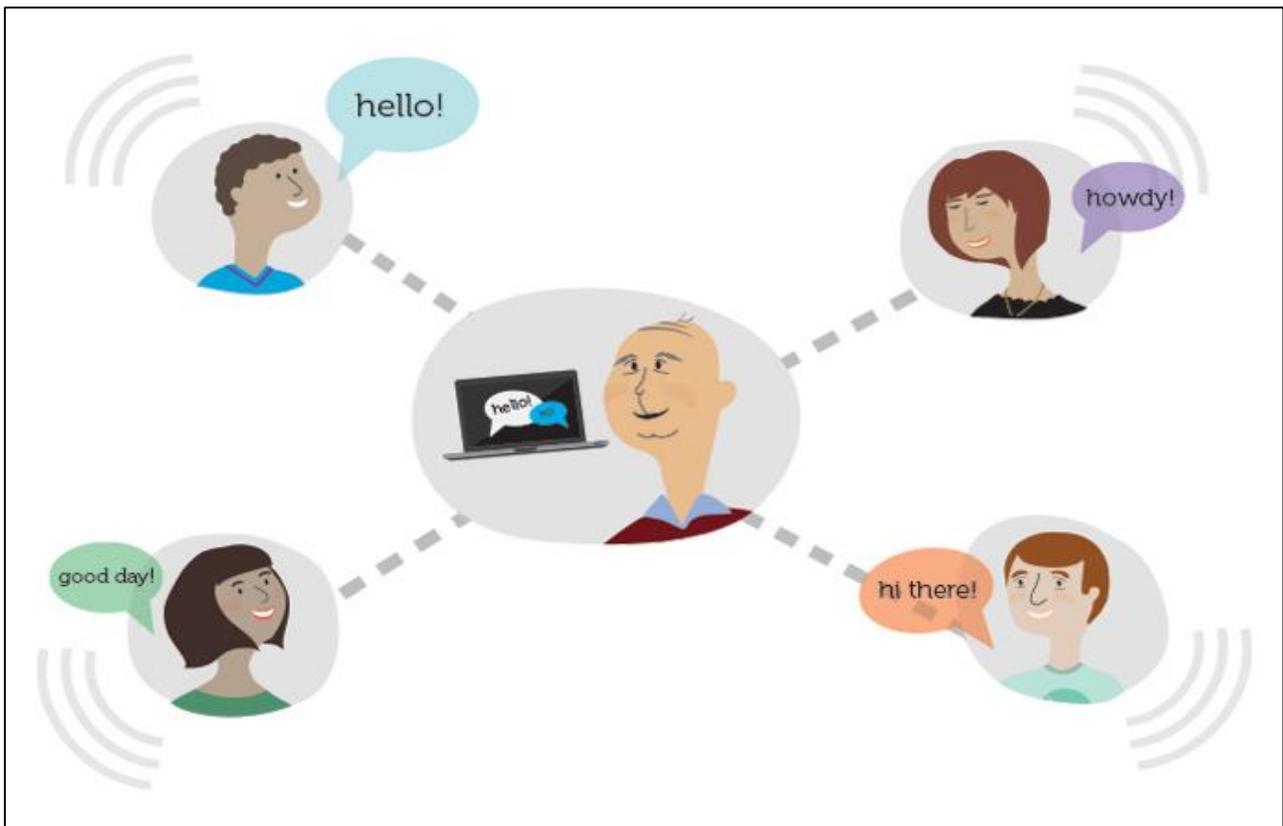
+ **TERMS RELATED TO INTERNET**

- ❖ The Internet and the WWW are not the same.
- ❖ The Internet is explored using a browser and the act of browsing the Internet is commonly referred to as surfing.
- ❖ Users browse websites and web pages by following hyperlinks that point to an address more commonly referred to as a URL.
- ❖ Finding information on the Internet is achieved by using a search engine.
- ❖ Files, pictures, songs, and video can be shared by downloading (receiving) and uploading (sending).

- ❖ The Internet utilizes the TCP/IP protocol and is accessed using a computer modem, broadband, 3G, 4G, or network that is connected through an ISP.
- ❖ With broadband, many computers and devices use Wi-Fi to connect to a router and share an Internet connection.
- ❖ The computer you're using to view this web page is considered a host and it's connected to our server to view this page

* How does the Internet work? *

- ✚ At this point you may be wondering, how does the Internet work? The exact answer is pretty complicated and would take a while to explain. Instead, let's look at some of the most important things you should know.
- ✚ It's important to realize that the Internet is a global network of physical cables, which can include copper telephone wires, TV cables, and fiber optic cables. Even wireless connections like Wi-Fi and 3G/4G rely on these physical cables to access the Internet.
- ✚ When you visit a website, your computer sends a request over these wires to a server. A server is where websites are stored, and it works a lot like your computer's hard drive. Once the request arrives, the server retrieves the website and sends the correct data back to your computer. What's amazing is that this all happens in just a few seconds!



Types of Internet service

- ✚ The type of Internet service you choose will largely depend on which Internet service providers (ISPs) serve your area, along with the types of service they offer. Here are some common types of Internet service.

Dial-up: This is generally the slowest type of Internet connection, and you should probably avoid it unless it is the only service available in your area. Dial-up Internet uses your phone line, so unless you have multiple phone lines you will not be able to use your landline and the Internet at the same time.

DSL: DSL service uses a broadband connection, which makes it much faster than dial-up. DSL connects to the Internet via a phone line but does not require you to have a landline at home. And unlike dial-up, you'll be able to use the Internet and your phone line at the same time.

Cable: Cable service connects to the Internet via cable TV, although you do not necessarily need to have cable TV in order to get it. It uses a broadband connection and can be faster than both dial-up and DSL service; however, it is only available where cable TV is available.

Satellite: A satellite connection uses broadband but does not require cable or phone lines; it connects to the Internet through satellites orbiting the Earth. As a result, it can be used almost anywhere in the world, but the connection may be affected by weather patterns. Satellite connections are also usually slower than DSL or cable.

3G and 4G: 3G and 4G service is most commonly used with mobile phones, and it connects wirelessly through your ISP's network. However, these types of connections aren't always as fast as DSL or cable. They will also limit the amount of data you can use each month, which isn't the case with most broadband plans



Hardware needed

Modem



Once you have your computer, you really don't need much additional hardware to connect to the Internet. The primary piece of hardware you need is a modem.

The type of Internet access you choose will determine the type of modem you need. Dial-up access uses a telephone modem, DSL service uses a DSL modem, cable access uses a cable modem, and satellite service uses a satellite adapter. Your ISP may give you a modem – often for a fee – when you sign a contract, which helps ensure that you have the right type of modem. However, if you would prefer to shop for a better or less expensive modem, you can choose to buy one separately

Router



ADVANTAGES OF INTERNET

Advantage of Internet



- 1) Information, knowledge, and learning
- 2) Connectivity, communication, and sharing
- 3) Address, mapping, and contact information
- 4) Banking, bills, and shopping
- 5) Selling and making money
- 6) Collaboration, work from home, and access to a global workforce

7) Entertainment

8) Internet of Things

9) Cloud computing and cloud storage

ADVANTAGES OF INTERNET



1) Bullying, trolls, stalkers, and crime

2) Pornographic and violent images

3) Addiction, time waster, and causes distractions

4) Never being able to disconnect from work

5) Identity theft, hacking, viruses, and cheating

6) Spam and advertising

TEACHING MATERIAL: - TYPES OF NETWORK

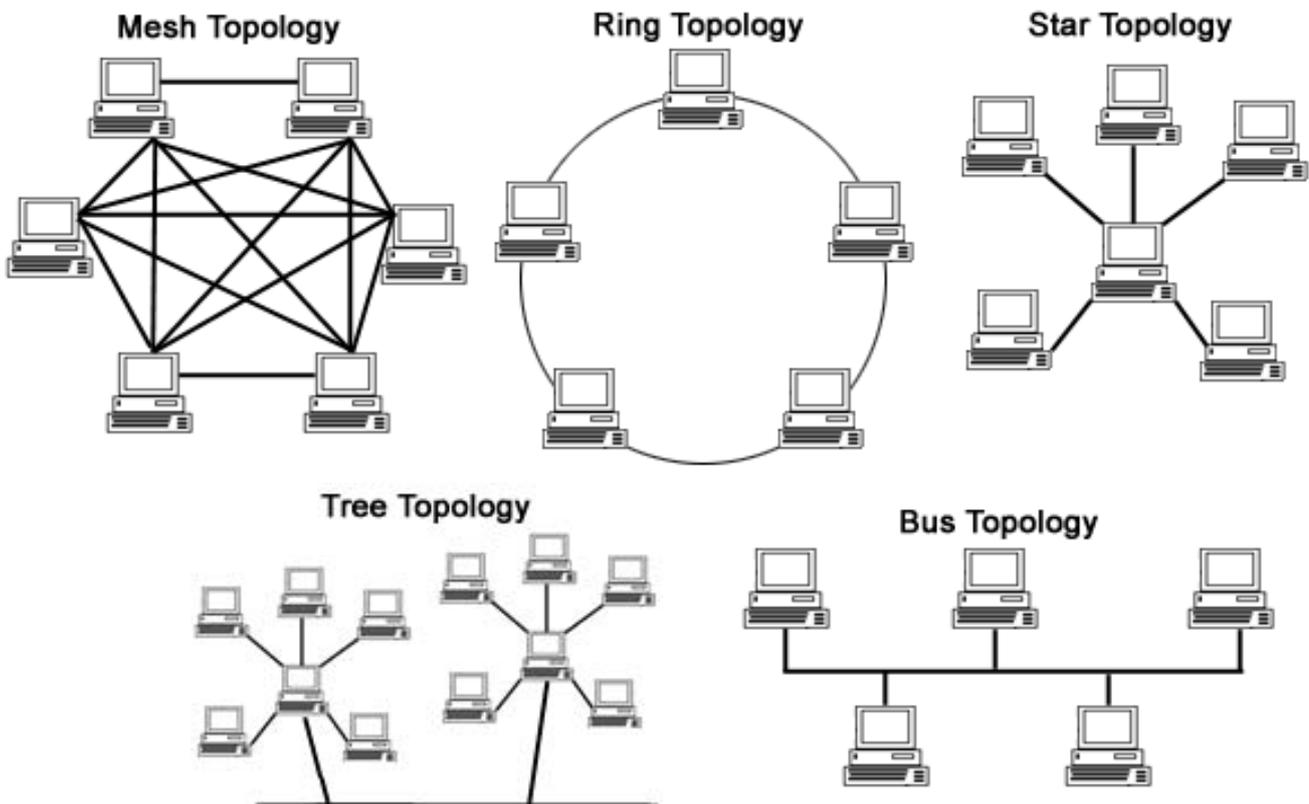
NETWORK

✚ A network is a collection of computers, servers, mainframes, network devices, peripherals, or other devices connected to one another to allow the sharing of data. An excellent example of a network is the Internet, which connects millions of people all over the world. To the right is an example image of a home network with multiple computers and other network devices all connected.

✚ Network topologies and types of networks

The term network topology describes the relationship of connected devices in terms of a geometric graph. Devices are represented as vertices, and their connections are represented as edges on the graph. It describes how many connections each device has, in what order, and in what sort of hierarchy.

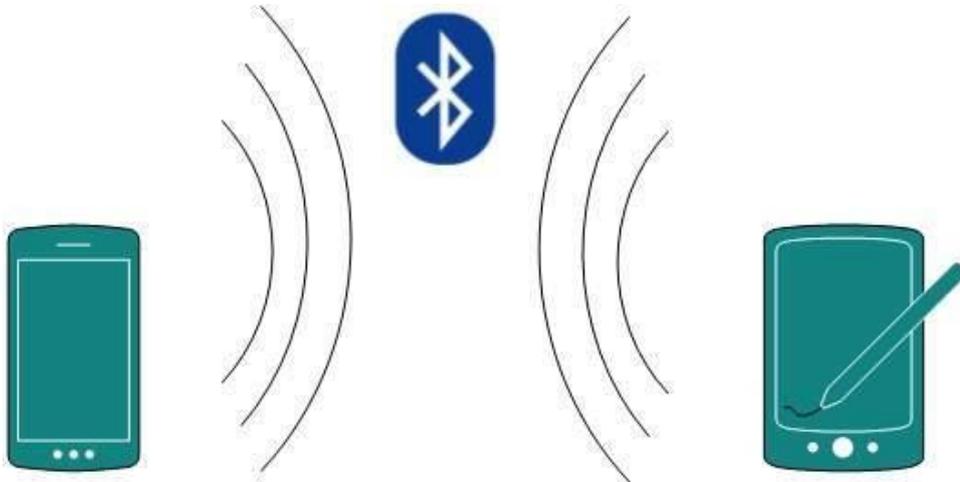
Typical network configurations include the bus topology, mesh topology, ring topology, star topology, tree topology and hybrid topology.



[TYPES OF NETWORK]

+ Personal Area Network

A Personal Area Network (PAN) is smallest network which is very personal to a user. This may include Bluetooth enabled devices or infra-red enabled devices. PAN has connectivity range up to 10 meters. PAN may include wireless computer keyboard and mouse, Bluetooth enabled headphones, wireless printers and TV remotes.

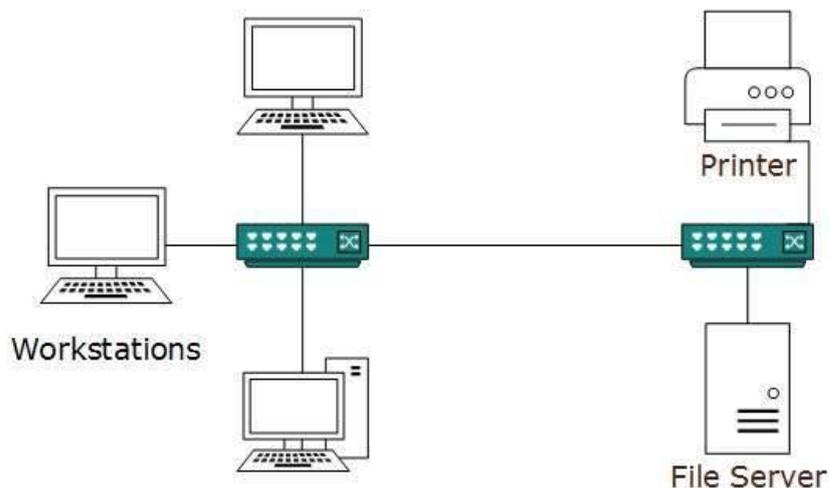


For example, Piconet is Bluetooth-enabled Personal Area Network which may contain up to 8 devices connected together in a master-slave fashion.

+ Local Area Network

A computer network spanned inside a building and operated under single administrative system is generally termed as Local Area Network (LAN). Usually, LAN covers an organization' offices, schools, colleges or universities. Number of systems connected in LAN may vary from as least as two to as much as 16 million.

LAN provides a useful way of sharing the resources between end users. The resources such as printers, file servers, scanners, and internet are easily sharable among computers.



LANs are composed of inexpensive networking and routing equipment. It may contains local servers serving file storage and other locally shared applications. It mostly operates on private IP addresses and does not involve heavy routing. LAN works under its own local domain and controlled centrally.

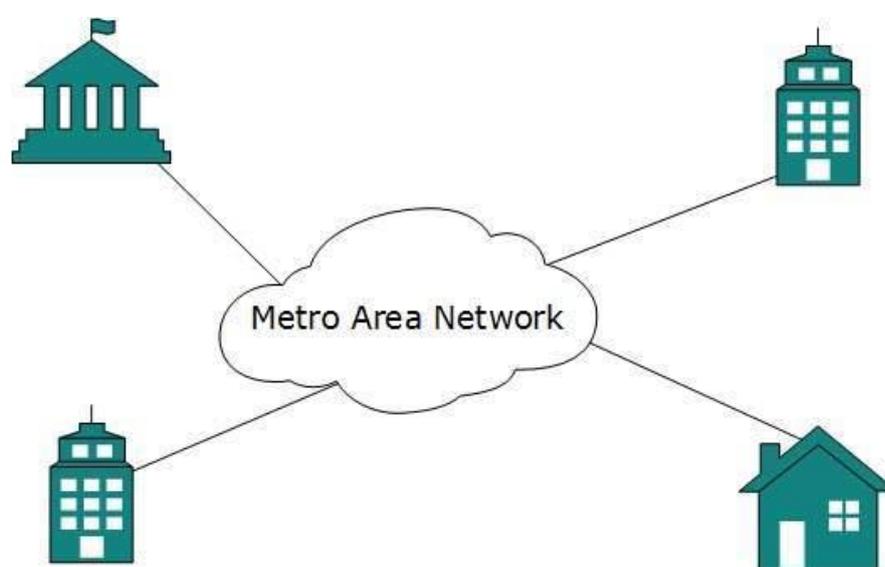
LAN uses either Ethernet or Token-ring technology. Ethernet is most widely employed LAN technology and uses Star topology, while Token-ring is rarely seen.

LAN can be wired, wireless , or in both forms at once.

+ Metropolitan Area Network

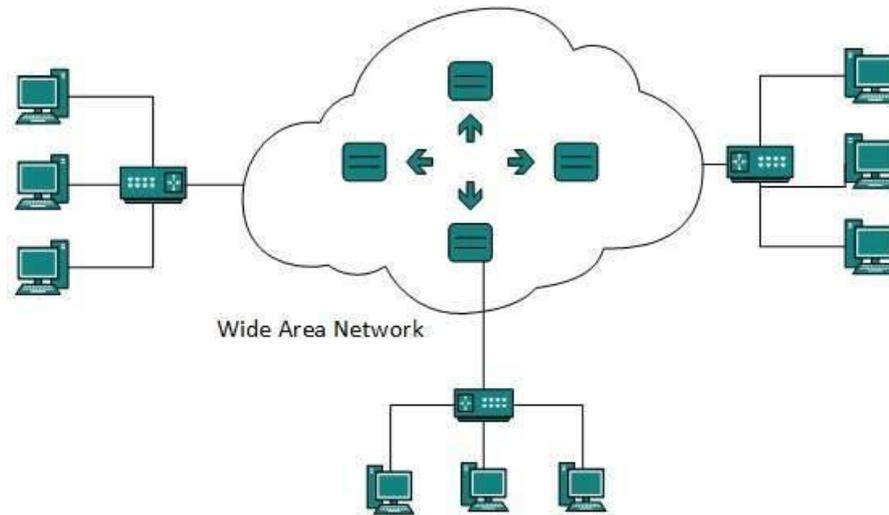
The Metropolitan Area Network (MAN) generally expands throughout a city such as cable TV network. It can be in the form of Ethernet, Token-ring, ATM, or Fiber Distributed Data Interface (FDDI).

Metro Ethernet is a service which is provided by ISPs. This service enables its users to expand their Local Area Networks. For example, MAN can help an organization to connect all of its offices in a city.



+ Wide Area Network

As the name suggests, the Wide Area Network (WAN) covers a wide area which may span across provinces and even a whole country. Generally, telecommunication networks are Wide Area Network. These networks provide connectivity to MANs and LANs. Since they are equipped with very high speed backbone, WANs use very expensive network equipment. WAN may use advanced technologies such as Asynchronous Transfer Mode (ATM), Frame Relay, and Synchronous Optical Network (SONET). WAN may be managed by multiple administration.



DAY-3

TEACHING MATERIAL: - OTHER TYPES OF NETWORK

Other Types of Networks

✚ Apart from above mentioned here, are some other important types of networks:

- WLAN (Wireless Local Area Network)
- Storage Area Network
- System Area Network
- Home Area Network
- POLAN- Passive Optical LAN
- Enterprise private network
- Campus Area Network
- Virtual Area Network

Let's see all of them in detail:

✚ **WLAN**

WLAN (Wireless Local Area Network) helps you to link single or multiple devices using wireless communication within a limited area like home, school, or office building. It gives users an ability to move around within a local coverage area which may be connected to the network. Today most modern day's WLAN systems are based on IEEE 802.11 standards.

✚ 2) Storage-Area Network (SAN)

A Storage Area Network is a type of network which allows consolidated, block-level data storage. It is mainly used to make storage devices, like disk arrays, optical jukeboxes, and tape libraries.

✚ 3) System-Area Network

System Area Network is used for a local network. It offers high-speed connection in server-to-server and processor-to-processor applications. The computers connected on a SAN network operate as a single system at quite high speed.

✚ 4) Passive Optical Local Area Network

POLAN is a networking technology which helps you to integrate into structured cabling. It allows you to resolve the issues of supporting Ethernet protocols and network apps.

POLAN allows you to use optical splitter which helps you to separate an optical signal from a single-mode optical fiber. It converts this single signal into multiple signals.

✚ 5) Home Area Network (HAN):

A Home Area Network is always built using two or more interconnected computers to form a local area network (LAN) within the home. For example, in the United States, about 15 million homes have more than one computer.

This type of network helps computer owners to interconnect with multiple computers. This network allows sharing files, programs, printers, and other peripherals.

✚ 6) Enterprise Private Network :

Enterprise private network (EPN) networks are build and owned by businesses that want to securely connect numerous locations in order to share various computer resources.

✚ 7) Campus Area Network (CAN):

A Campus Area Network is made up of an interconnection of LANs within a specific geographical area. For example, a university campus can be linked with a variety of campus buildings to connect all the academic departments.

✚ 8) Virtual Private Network:

A VPN is a private network which uses a public network to connect remote sites or users together. The VPN network uses "virtual" connections routed through the internet from the enterprise's private network or a third-party VPN service to the remote site.

It is a free or paid service that keeps your web browsing secure and private over public WiFi hotspots.



TEACHING MATERIAL: - WEB

+ What is the Web?

The World Wide Web—usually called the Web for short—is a collection of different websites you can access through the Internet. A website is made up of related text, images, and other resources. Websites can resemble other forms of media—like newspaper articles or television programs—or they can be interactive in a way that's unique to computers.

The purpose of a website can be almost anything: a news platform, an advertisement, an online library, a forum for sharing images, or an educational site like us



World Wide Web (WWW)

- + The World Wide Web (WWW) is combination of all resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP).
- + A broader definition comes from the World Wide Web Consortium (W3C):
- + "The World Wide Web is the universe of network-accessible information, an embodiment of human knowledge."
- + The Web, as it's commonly known, is often confused with the internet. Although the two are intricately connected, they are different things. The internet is, as its name implies, a network -- a vast, global network that incorporates a multitude of lesser networks. As such, the internet consists of supporting infrastructure and other

technologies. In contrast, the Web is a communications model that, through HTTP, enables the exchange of information over the internet.

- ✚ Tim Berners-Lee is the inventor of the Web and the director of the W3C, the organization that oversees its development. Berners-Lee developed hypertext, the method of instant cross-referencing that supports communications on the Web, making it easy to link content on one web page to content located elsewhere. The introduction of hypertext revolutionized the way people used the internet.
- ✚ In 1989, Berners-Lee began work on the first World Wide Web server at CERN. He called the server "httpd" and dubbed the first client "WWW." Originally, WWW was just a WYSIWYG hypertext browser/editor that ran in the NeXTStep environment.
- ✚ The World Wide Web has been widely available since 1991.

web page

A web page or webpage is a document, commonly written in HTML, that is viewed in an Internet browser. A web page can be accessed by entering a URL address into a browser's address bar. A web page may contain text, graphics, and hyperlinks to other web pages and files.

A web page is often used to provide information to viewers, including pictures or videos to help illustrate important topics. A web page may also be used as a method to sell products or services to viewers. Multiple web pages make up a website, like our Computer Hope website.

When you click a link provided by a search engine, you are accessing a web page. The Internet consists of millions of web pages, with more being added every day.

✚ **When was the first web page created?**

The first web page was created at CERN by Tim Berners-Lee on August 6, 1991. You can visit and browse the first website and the first web page at the info.cern.ch address.

Web pages are formatted in a language called Hypertext Markup Language (HTML). It is this language that allows users to click through pages on the Web via links. The Web uses HTTP protocol to transmit data and share information. Browsers such as Internet Explorer, Google Chrome or Mozilla Firefox are used to access Web documents, or Web pages, which are connected via links.

The Web is just one of the ways that information is shared over the Internet; others include email, instant messaging and File Transfer Protocol (FTP)



Web site

A Web site is a related collection of World Wide Web (WWW) files that includes a beginning file called a home page. A company or an individual tells you how to get to their Web site by giving you the address of their home page. From the home page, you can get to all the other pages on their site. For example, the Web site for IBM has the home page address of <http://www.ibm.com>. (The home page address actually includes a specific file name like `index.html` but, as in IBM's case, when a standard default name is set up, users don't have to enter the file name.) IBM's home page address leads to thousands of pages. (But a Web site can also be just a few pages.)

Since site implies a geographic place, a Web site can be confused with a Web server. A server is a computer that holds the files for one or more sites. A very large Web site may be spread over a number of servers in different geographic locations. IBM is a good example; its Web site consists of thousands of files spread out over many servers in world-wide locations. But a more typical example is probably the site you are looking at, whatis.com. We reside on a commercial space provider's server with a number of other sites that have nothing to do with Internet glossaries.

A synonym and less frequently used term for Web site is "Web presence." That term seems to better express the idea that a site is not tied to specific geographic location, but is "somewhere in cyberspace." However, "Web site" seems to be used much more frequently



Protocol

Sometimes referred to as an access method, a protocol is a standard used to define a method of exchanging data over a computer network, such as local area network, Internet, Intranet, etc.

✚ Each protocol has its own method of how to handle data in the following situations.

- 1) How data is formatted when sent.
- 2) What to do with data once received.
- 3) How data is compressed.
- 4) How to check for errors in the data.

Likely the most important protocol is TCP/IP (transmission control protocol/Internet protocol) which is used to govern the communications of every computer connected to the Internet. HTTP (Hypertext Transfer Protocol), which is used to transmit data over the world wide web (Internet), is "carried" by TCP/IP. Below is a list of the various protocols currently listed in the Computer Hope dictionary.

✚ What is the Internet Protocol (IP)?

The Internet Protocol (IP) is a protocol, or set of rules, for routing and addressing packets of data so that they can travel across networks and arrive at the correct destination. Data traversing the Internet is divided into smaller pieces, called packets. IP information is attached to each packet, and this information helps routers to send packets to the right place. Every device or domain that connects to the Internet is assigned an IP address, and as packets are directed to the IP address attached to them, data arrives where it is needed.

Once the packets arrive at their destination, they are handled differently depending on which transport protocol is used in combination with IP. The most common transport protocols are TCP and UDP.

✚ What is a network protocol?

In networking, a protocol is a standardized way of doing certain actions and formatting data so that two or more devices are able to communicate with and understand each other.

To understand why protocols are necessary, consider the process of mailing a letter. On the envelope, addresses are written in the following order: name, street address, city, state, and zip code. If an envelope is dropped into a mailbox with the zip code written first, followed by the street address, followed by the state, and so on, the post office won't deliver it. There is an agreed-upon protocol for writing addresses in order for the postal system to work. In the same way, all IP data packets must present certain information in a certain order, and all IP addresses follow a standardized format.

+ What is an IP address? How does IP addressing work?

An IP address is a unique identifier assigned to a device or domain that connects to the Internet. Each IP address is a series of characters, such as '192.168.1.1'. Via DNS resolvers, which translate human-readable domain names into IP addresses, users are able to access websites without memorizing this complex series of characters. Each IP packet will contain both the IP address of the device or domain sending the packet and the IP address of the intended recipient, much like how both the destination address and the return address are included on a piece of mail.

+ IPv4 vs. IPv6

The fourth version of IP (IPv4 for short) was introduced in 1983. However, just as there are only so many possible permutations for automobile license plate numbers and they have to be reformatted periodically, the supply of available IPv4 addresses has become depleted. IPv6 addresses have many more characters and thus more permutations; however, IPv6 is not yet completely adopted, and most domains and devices still have IPv4 addresses.

+ What is TCP/IP?

The Transmission Control Protocol (TCP) is a transport protocol, meaning it dictates the way data is sent and received. A TCP header is included in the data portion of each packet that uses TCP/IP. Before transmitting data, TCP opens a connection with the recipient. TCP ensures that all packets arrive in order once transmission begins. Via TCP, the recipient will acknowledge receiving each packet that arrives. Missing packets will be sent again if receipt is not acknowledged.

TCP is designed for reliability, not speed. Because TCP has to make sure all packets arrive in order, loading data via TCP/IP can take longer if some packets are missing.

TCP and IP were originally designed to be used together, and these are often referred to as the TCP/IP suite. However, other transport protocols can be used with IP.

Protocols exist for several different applications. Examples include wired networking (e.g., Ethernet), wireless networking (e.g., 802.11ac), and Internet communication (e.g., IP). The Internet protocol suite, which is used for transmitting data over the Internet, contains dozens of protocols. These protocols may be broken up into four categories:

Link layer - PPP, DSL, Wi-Fi, etc.

Internet layer - IPv4, IPv6, etc.

Transport layer - TCP, UDP, etc.

Application layer - HTTP, IMAP, FTP, etc.

DAY-5

TEACHING MATERIAL: - APPLICATIONS OF INTERNET



APPLICATIONS

1. Electronic Mail (email)

The first major use of the internet is Email. People thronged to Email for sharing information, data files, Photos, Videos, Business communications, and any other files instantaneously with others. This had enabled faster communication between people and improve business efficiency. Email has reduced the usage of paper considerably and reduced load on physical mail systems.

Though other latest collaboration tools provide many rich features, they are not able to de-popularize Email and it still rules the official and personal communication. There are many free Email websites offering mail services and practically every individual has an Email address and connected by Email. Email concepts paved the way for developing many innovative tools for improved collaboration.



2. FTP File Transfer

This is the second major use case for the internet in the early days. FTP is the file transfer protocol that enables data exchange between two stakeholders over internet media in a secure way. The data exchange may occur between two business entities or customers with business and vice versa. Normally E-mail restricts the size of a file that can be shared and also it is not secured to share sensitive and confidential data across public networks. FTP concept is still in use even today in mobile apps for files downloading.

3. Search Engines

These engines locate the information one seeks, available in whichever server across the globe (world wide web). Google, Yahoo, and MSN are the renowned search engines in use today. One can search on anything in this site and the search question can be in any format. In fact, People have started using the word Google as a generic verb synonymous to search.



4. E-Commerce

The Internet enables the selling of goods and services in online mode. There are many e-commerce platform vendors like Amazon, Ola who aggregate several products/services available in the market and sell them through their portal to customers. Products are procured by platform vendors, stored in their warehouses, packed and distributed by them in their own brand. Customers get a good discount and they don't have to visit physical stores.

5. Online Banking

Called as Net banking, it allows doing banking transactions at ease sitting at home or while on mobile. Footfalls in the bank branches have come down appreciably with almost all the services are available in net banking 24x7. Any amount of money can be transferred instantaneously through this facility. E-Banking supports Electricity bills, Telephone bills, and other services payment.

6. Cashless Transactions

Bill Payment at merchandise outlets through debit cards, credit cards, UPI gateway are on the increase. Cash circulation gets reduced in the system to the extent of the growth of these transactions. It's growing by more than 50% every year and it is expected to grow by 10 times over the next 5 years.

7. Education

The Internet offers a wealth of educational material on any subject with structured navigation and search facilities. One can seek any reading material and the internet will get it for them from any server in any part of the world and people need not have to go to libraries to go through books. Those who cannot attend physical (face to face) class can take an online course where they get connected to the teacher, in the other part of the world, in video mode and get taught on the subject backed up other audiovisual tools.



8. Collaboration

Online chat tools like messenger, Skype, and other video conferencing tools help people to get connected 24 x7 and have a hassle-free business and personal discussion. This avoids unwanted travel by people and save their time for productive use. The Internet has also facilitated work from home with seamless connectivity to the office and avoid daily commuting.

9. Social Networking

Internet connects people online and enables them to form social groups. Information, Ideas, views, and opinions on any social/political issues are exchanged. The political and social organization makes use of this platform in promoting their interest among the public.

VIDEO

