INTERNET AND ITS APPLICATION

* **INTERNET stands for International network or internetworking.**
* **Internet means network of networks.**
* **Internet is a global collection of small individual networks connected by using wire or wireless medium and network devices to form a single large network and share data, information and resource between each other.**
* **Internet is a worldwide network or wide area network.**

# HISTORY OF INTERNET:-

* **Internet was first proposed by JCR Licklider of MIT (Massachusetts Institute of Technology) in 1962.**
* **His intention was to share military and scientific information between different organizations situated at different places in united state.**
* **In 1962-63 Leonard Kleinrock of University of California developed the concept of packet switching which was used as a backbone of data transmission.**
* **The first ever network of computers was installed at NRL (National Research Laboratory), England in 1968.**
* **In 1969, a more advanced network was established at Pentagon’s ARPA (Advanced Research Project Agency) connecting 4 high speed computers. This network was called as ARPAnet.**
* **In 1972, ARPAnet had 23 nodes connected two different organization of united state.**
* **In 1973, ARPAnet had first international node which was set at England and Norway.**
* **In 1974, Bob kahn and Vint cerf proposed the foundation of network transfer protocol which is standardized as TCP/IP for ARPAnet in 1983.**
* **In 1984, DNS (Domain Name System) was introduced.**
* **In 1991, WAIS (Wide Area Information Server) and GOPHER protocol was released.**
* **In 1992, Tim Berners Lee, WWW at CERN (Centre of European Research Network).**
* **Tim Berners Lee also defines URL and HTML.**
* **The first Internet browser “mosaic” released in 1993 by Mark Andreessen and his team at National Centre for supercomputing applications.**

# INTERNET BACKBONE:-

* **An internet backbone refers to one of the principal data routes between large interconnected networks and main routers on the internet.**
* **It is a very high speed data transmission line.**
* **A backbone is a larger transmission line that carries data gathered from smaller line that interconnected with it.**
* **The first internet backbone was named NSFNET.**
* **It was funded by the U.S. government by National Science Foundation (NSF) in 1987.**
* **Around the world, each country has at least one backbone network that operates at very high speed.**
* **Internet backbones are the largest data connections on the internet.**
* **Internet backbone is provided by telephone company or ISP (Internet Service Provider) ; e.g.:- BSNL, VSNL , JIO , AIRTEL, etc.**
* **They required high speed bandwidth connections and high performance servers or routers.**
* **Today these backbones are constructed of fiber optic cables.**
* **A backbone which is constructed by optical fiber cable are called as Optical Carrier(OC).**

# NETWORK TECHNOLOGY:-

* **Different network technologies can be used to create an internetwork.**
* **Different types of network technologies are:-**
	1. **Ethernet**
	2. **Token ring**
	3. **FDDI**

## Ethernet:-

* **Ethernet is a network technology used for connecting a number of computer system to form a local area network.**
* **It uses protocols to control the passing of information and to avoid simultaneous transmission by two or more system.**
* **It is the most widely installed local area network technology.**
* **Ethernet is an IEEE 802.3 standard.**
* **An Ethernet LAN typically uses co-axial cable or twisted pair cable.**
* **Ethernet is also used in wireless LANs.**
* **It uses bus topology to create a local area network that uses a single co-axial cable.**
* **The most commonly installed Ethernet systems are called 10 BASE-T and provide transmission speed up to 10 Mbps.**
* **Ethernet was developed by Xerox.**

## Token ring:-

* **It is a local area network in which all computers are connected in a ring or star topology.**
* **A bit or token passing scheme is used in order to prevent the collision of data between two or more computers that want to send messages at the same time.**
* **In this scheme a token revolves around the network of computers.**
* **A computer that gives the request first can get the token to transmit data through the channel and all other computer request for the token are on the queue.**
* **After sending data it leaves the token and assigns it to the first computer in the queue.**
* **If a computer that holds the token neither send data nor leave the token then the computers in the queue enters into starvation.**
* **Token ring is an IEEE 802.5 standard.**
* **This is the second most widely used protocol on local area networks after Ethernet.**

## FDDI:-

* **It stands for Fiber Distributed Data Interface.**
* **A FDDI network contains two token rings i.e. primary token and secondary token.**
* **It uses secondary token for possible backup in case of the primary ring fails.**
* **It uses two token rings because if the primary token ring fails then the secondary ring will complete the task.**
* **It uses a time token protocol.**
* **A token is assigned to a computer for a fixed time period with in which it either sends the data or leaves the token. So that starvation can be avoided.**
* **It is an IEEE 802.4 standard.**
* **It is used for long distance data transmission up to 200 km.**
* **The data transmission speed is about 200 mbps.**

# FEATURES OF INTERNET:-

* **Various features of internet are:-**
1. **Geographic distribution**
2. **Robust architecture**
3. **High speed (near light speed)**
4. **Universal access**
5. **Freedom of speech**

## Geographic distribution:-

* **Internet is globally distributed in a single large network.**
* **It spreads around the world and even beyond the world.**
* **A key attribute of the internet is that once we have connected to any part of it, we can communicate with all of it.**

## Robust architecture:-

* **Internet consists of large number of network computers and other devices.**
* **It has robust architecture.**
* **If any individual computer or network is damage or lost then it will not affect the other part of internet.**

## High speed:-

* **Internet is a high speed communication technique.**
* **The speed of the internet is 3/2 of the speed of light i.e. 2 \* 108 m/s.**

## Universal access:-

* **It is a universal access network.**
* **It is accessible to everyone from any location at any time.**

## Freedom of speech:-

* **Internet provides a platform for everyone to share their opinion with others.**
* **It provides freedom of speech to everyone through social networking site.**

# INTERNET ACCESS:-

* **It is a process that enables individual user or an organization to access internet.**
* **Various types of internet access are:-**
1. **Gateway access connection**
2. **Dial-up connection**
3. **Direct connection**
4. **Cable modem connection**
5. **DSL connection**
6. **ISDN connection**
7. **Wireless connection**

## Gateway access connection:-

* **Gateway access is an internet access.**
* **Gateway access is also known as level-one connection.**
* **The gateway allows the two different types of network to talk to each other.**
* **But, the users of the gateway internet have limited access to the internet. They might not be able to use all the tools available on internet.**
* **The local internet service provider normally defines this limitation.**
* **Good example of network with level one connectivity within India is that of VSNL (Videsh Sanchar Nigam Limited).**
* **All access to the internet from India is through VSNL gateway.**

## Dial-up access connection:-

* **It is also known as level two connection.**
* **This provides connection to internet through a dial up terminal connection.**
* **A dial up connection is an internet connection that uses telephone lines.**
* **Using phones lines we dial into an ISP to connect to line.**
* **When the line is connected to the internet, voice communication would not be available over it.**
* **The data transmission speed which is about 56 kbps.**
* **This type of connection is also known as remote modem access connection.**
* **This type of connection can further be divided into 3 categories:-**
	1. **Shell connection**
	2. **TCP/IP connection**
	3. **ISDN connection**
* **To access any of these dial up connection we need the followings:-**
1. **Computer**
2. **Modem**
3. **Telephone connection**
4. **Shell or TCP/IP or ISDN account from the ISP**
5. **Internet client software such as internet browser.**

## Direct access:-

* **Direct internet access is also known as leased line connection.**
* **It is also known as level-three connection.**
* **Taking internet connection directly from an ISP as a leased line is called as direct connection.**
* **In direct connection data can be send or receive directly to and from internet.**
* **Using leased line connection computer is directly connected to the internet using high speed transmission line.**
* **It is a secure and expensive internet connection.**
* **Direct access can be provided in one of the following two ways:-**
1. **Dial up IP direct access:-**
	* **It uses a modem and a telephone line to connect to internet.**
	* **It is also uses a special software to access internet.**
	* **It uses PPP (Point-to-Point Protocol) and SLIP (Serial Line Internet Protocol).**
2. **The second way is when a computer is connected to a LAN that has internet connectivity is called as LAN direct connection.**
* **It is used in universities, corporation, etc.**

## Cable modem connection:-

* **A cable modem is a type of network bridge and modem that provides bidirectional data communication through radio frequency channels on a HFC (Hybrid Fiber Coax) and RFoG (Radio Frequency over Glass) infrastructure.**
* **Cable modems are primarily used to deliver broadband internet access in the form of cable.**
* **Cable connections provide high speed data transfer downstream (from the internet to computer), but are slower when sending the data from computer to internet.**
* **Transfer rates are affected by the number of subscribers online simultaneously.**
* **All connections originate on one line per street, so signals degrade as more subscribers come online.**
* **Cable connection can be used by individual subscribers to connect one computer to one line or can be used to connect multiple computers to one line to the internet.**
* **Some of the features of cable internet connection are:-**
1. **Always connected**
2. **Bandwidth**
3. **File transfer capability**
4. **Signal integrity**
5. **Routing**

## DSL connection:-

* **It stands for Digital Subscriber Line.**
* **It is a broadband connection that transmits data over analog telephone lines.**
* **It provides both voice data and internet data transmission at a time using single telephone line.**
* **It divides the telephone line into 2 parts:- one part is used for voice data transmission and other part is used for internet data transmission.**
* **The data transmission speed is about 256 kbps to 40 Mbps.**
* **It is expensive.**
* **It is used to connect one computer per line or multiple computers per line.**
* **Various types of DSL connection are :-**
	1. **SDSL (Symmetric Digital Subscriber Line)**
	2. **ADSL (Asymmetric Digital Subscriber Line)**
	3. **HDSL (High-data rate Digital Subscriber Line)**
	4. **VDSL (Very-high-data rate Digital Subscriber Line)**

## ISDN connection:-

* **It stands for Integrated Service Digital Network.**
* **It is also a broadband internet connection that uses analog telephone line to transmit data digitally.**
* **It also provides both voice transmission and data transmission at a time.**
* **It is also used to connect one computer per line or multiple computers per line.**
* **It is generally used to provide faster speed on data transmission.**

## Wireless connection:-

* **A connection that does not use any cable or wire to transmit internet data through electro magnetic wave is called as wireless connection.**
* **It uses radio wave, micro wave, satellite, etc. for internet connectivity.**
* **It is used to connect a building or a campus, is called as WLAN.**
* **It uses an antenna to receive signal from ISP.**
* **The data transmission speed is faster but depends upon weather.**

# ISP:-

* **It stands for Internet Service Provider.**
* **It is an organization or a telephone company that provides network service to the users by taking some fee from the users.**
* **“The world” was the first commercial ISP in 1989.**
* **“Telerama” was founded to be the world’s 3rd ISP in 1991.**
* **An ISP buys upstream data from the government and provides downstream data to the end users by taking some fee.**
* **It is also called as IAP (Internet Access Provider).**
* **Examples of some ISP are BSNL (Bharat Sanchar Nigam Limited), VSNL (Videsh Sanchar Nigam Limited), MTNL (Mahanagar Telephone Nigam Limited), JIO, AIRTEL, etc.**
* **ISP works as an interface between user and internet.**
* **ISP uses a range of technologies to enable consumers to connect to their network.**
* **For home users the most popular options include dial-up, DSL (typically ADSL), broadband wireless access, cable modem and ISDN.**

INTERNET

UPSTREAM

IS

DOWNSTREAM

C3

HUB

C1

C2

C4

Fig 1. ISP

# INTERNET PROTOCOL:-

* **Protocol is a set of rules that governs network communication.**
* **Internet means network of networks that connect computers and network around the whole world as a single global network.**
* **Several rules are used in internet during exchange of data and information between devices of network is called as internet protocol.**
* **Protocol generally defines rules of how and when a device can send or receive the data.**
* **Several types of internet protocol used in the internet are:-**
1. **TCP/IP**
2. **EMAIL**
3. **FTP**
4. **HTTP**
5. **USENET**
6. **GOPHER**
7. **TELNET**
8. **WAIS**

## TCP/IP:-

* **It stands for Transmission Control Protocol/Internet Protocol.**
* **Both the protocols are combinely used for data transmission over the network.**
* **Internet protocol works at network layer of OSI model and TCP works at transport layer of OSI model.**
* **IP divides a message into smaller bits called as packets.**
* **Each packet with a sequence number of source and destination is send independently or separately.**
* **IP divides a message into smaller bits called as packets.**
* **Each packet with a sequence number of source and destination is send independently or separately.**
* **IP is responsible for system to system delivery of data.**
* **TCP is responsible for exact delivery of data.**
* **TCP is responsible for process to process delivery of data.**
* **TCP retransmits the failed packets.**
* **TCP makes the sequence of the packet and reconstruct the data into its original form.**

## FTP:-

* **It stands for File Transfer Protocol.**
* **This is used for transferring a file from one computer to another through internet.**
* **FTP commonly used for uploading a webpage to a web server so that it may be seen on the World Wide Web (WWW).**
* **A server computer that stores all the files is called as FTP server.**
* **An FTP client is a computer that takes service from the FTP server.**
* **FTP also works on client-server principle.**
* **It is an application layer protocol of OSI model.**

## HTTP:-

* **It stands for Hypertext Transfer Protocol.**
* **The protocol that is used to transfer web pages or HTML pages from one computer to another using internet is called HTTP.**
* **It is an application layer protocol.**
* **It is the protocol used by web server to allow web pages to be shown in a web browser.**
* **The address bar of the web browser has the prefix http:// in front of the address.**
* **It works on client-server principle.**
* **A web server which stores all the web documents is called as HTTP server.**
* **An HTTP client sends a request to HTTP server for transferring web pages called as HTTP client request.**
* **The HTTP server processed the client request and gives response to the requested client called as HTTP server response.**

## E-MAIL:-

* **It stands for Electronic-mail.**
* **It uses three different protocols:-**
1. **SMTP (Simple Mail Transfer Protocol)**
2. **IMAP (Internet Mail Access Protocol)**
3. **POP3 (Post Office Protocol 3)**
* **SMTP is a protocol used for sending mail, while IMAP & POP3 are used for receiving mail.**

## USENET:-

* **It is a news protocol.**
* **It uses NNTP (Network News Transfer Protocol).**
* **NNTP is used for serving Usenet posts.**
* **Usenet is similar to the forums that many websites have.**
* **Forum means a place or meeting where people can exchange and discuss ideas.**
* **Usenet is divided into several areas.**
* **Some of the forum that are included in Usenet are:- ‘comp.’ for discussion of computer related topics, ‘sci.’ for discussion of scientific subjects, etc.**

## GOPHER:-

* **It is an application layer protocol that provides the ability to extract and view web documents stored on remote web servers.**
* **It is used as a search tool.**
* **Gopher was designed to access a web server through the internet.**
* **This protocol is used to search documents or information from different websites.**
* **Gopher server is used to store all the documents in the server which can be served to gopher client.**
* **It is based on client-server principle in which gopher client will send request to gopher server then gopher server will processed the request and give response to the requested gopher client.**

## TELNET:-

* **It stands for Telecommunication Network.**
* **It is a protocol used for remote login to a distance computer.**
* **By using telnet the user can access remote information stored in a remote computer, for that there is a need of special program called as telnet client program.**
* **Using telnet client program a client login into a remote server through a user id and password.**
* **Example:- Teamviewers application, Anydesk application,etc.**

## WAIS:-

* **It stands for Wide Area Information Server.**
* **It is a protocol used to search document on internet from many websites ata atime.**
* **It makes an index of the searched document of the database.**
* **A WAIS database index created by a person.**
* **It provides or assigns ranking to each information accessed by the user that helps the user to choose the most popular items**
* **A WAIS client program is used to access information from WAIS database through WWW .**
* **It can work with other protocols like gopher, telnet, etc.**

# IP ADDRESS:-

* **It is a unique number assigned to every machine connected to a network for its identification.**
* **IP address is also called as internet address.**
* **It is a logical address of 32 bits or 4 bytes or 4 octets.**
* **An IP address has two parts, such as :-**
1. **Net ID:-**

It is used to identify networks.

1. **Host ID:-**

It is used to identify a machine connected to a network.

* **The 4 octets of an IP address are separated by dots (.).**
* **Example:- 122.16.5.7**
* **Each octet contains 1 byte or 8 bits with 28=256 (ranking from 0 to 255) unique values.**
* **The first octet represent total number of networks i.e. 256 networks.**
* **As per IPV4 IP addresses have the sizes of 32 bits or 4 bytes.**
* **As per IPV6 IP addresses have the sizes of 128 bits or 16 bytes.**
* **There are 232 number of unique IP addresses can be created in IPV4.**
* **The IP address 0.0.0.0 is called as default network IP address.**
* **The IP address 255.255.255.255 is called as broadcast IP address.**
* **The IP address 127.0.0.1 is called as loopback IP address.**
* **There are five classes of IP address are used. Such as:-**
1. **Class A IP address**
2. **Class B IP address**
3. **Class C IP address**
4. **Class D IP address**
5. **Class E IP address**

## Class A IP address:-

* **The class A IP address contains 126 networks from 1 to 126.**
* **It is used for large size organization like Google.**
* **It contains approximately half of the total IP address.**
* **In class A IP address, the first octet is used for net ID and the last three octets are used for host ID.**
* **The first bit of the first octet of class A IP address is always zero.**
* **Each network has 224-2 number of unique IP address.**
* **Example:- 126.17.255.190**

Host ID

Net ID

## Class B IP address:-

* **The class B IP address contains 64 networks ranking from 128 to 191.**
* **It is used for medium size organization.**
* **It contains ¼th of the total IP address.**
* **In class B IP address, the first two octets are used for net ID and the last two octets are used for host ID.**
* **The first two bits of first octet of class B IP address are 1 and 0 respectively.**
* **Each network has 216-2 number of unique IP address.**
* **Example:- 128.55.254.1**

Net ID

Host ID

## Class C IP address:-

* **The class C IP address contains 32 networks ranking from 192 to 223.**
* **It contains 1/8th of the total IP address.**
* **It is used for small size organization.**
* **In class C IP address, the first three octets are used for net ID and the last octet is used for host ID.**
* **The first three bits of the first octet of class C IP address are 1, 1 and 0 respectively.**
* **Each network has 28-2 number of unique IP address.**
* **Example:- 192.222.156.46**

Net ID

Host ID

## Class D IP address:-

* **The class D IP address contains 16 networks ranking from 224 to 239.**
* **It contains 1/16th of the total IP address.**
* **It is a special IP address used for multicasting.**
* **In class D IP address, all the four octets are used for host ID.**
* **The first 4 bits of the 1st octet are 1, 1, 1 and 0 respectively.**
* **Each network has 228 numbers of unique IP address.**
* **Example:- 224.255.254.173**

Host ID

## Class E IP address:-

* **The class E IP address contains 16 networks ranking from 240 to 255.**
* **It contains 1/16th of the total IP address.**
* **It is a special IP address used for experiment and research.**
* **In class E IP address, all the four octets are used for host ID.**
* **The first four bits of the 1st octet are 1, 1, 1 and 1 respectively.**
* **Each network has 228 numbers of unique IP address.**
* **Example:- 240.255.216.140**

# DOMAIN NAME:-

Host ID

* **Whenever we have to communicate with a computer on internet, we can do so by using its IP address.**
* **But it is practically impossible for a person to remember the IP address of all the computers to communicate with.**
* **Therefore a system has been developed which assigns names to some computers (web servers) and maintains a database of these names and corresponding IP address.**
* **These names are called domain names.**
* **Examples of some of the domain names are:-**
1. **Dheodisha.gov.in**
2. **Youtube.com**
* **Domain names are used to identify particular web server.**
* **For example; in the address,** [**http://india.gov.in/**](http://india.gov.in/) **the domain name is india.gov.in.**
* **Each domain names are assigned by the organization named ICANN (Internet Corporation for Assigned Names and Numbers).**
* **A domain name usually has more than one part:- top level domain name and sub-domain name.**
* **In the above example, .in is the top level domain name. .gov is the sub-domain of .in and India is the sub-domain of .gov.**
* **There are only a limited number of top level domains and these are divided into two categories:-**
1. **Generic top level domain**
2. **Country code top level domain**

## Generic top level domain:-

* **A domain name with three letter extension is called as generic top level domain.**
* **These domain names represent international level.**
* **Examples:-**
1. **.com – commercial business**
2. **.Edu – educational institutions**
3. **.gov – government agencies**
4. **.mil – military**
5. **.biz – business**

## Country code top level domain:-

* **A domain name with two letter extension is called as country code top level domain.**
* **These domain names represent country level.**
* **Examples:-**
1. **.in – India**
2. **.au – Australia**
3. **.ca – Canada**
4. **.nz – New Zealand**
5. **.pk – Pakistan**
6. **.jp – Japan**
7. **.us – united states of America**

## Alternative domain names:-

* **Each domain names are assigned by the organization named ICANN (Internet Corporation for Assigned Names and Numbers).**
* **ICANN approved several new extensions of domain name which are not specific to any country are called as alternative domain name.**
* **Example: - .info, .coop, .aero, etc.**

# DNS:-

* **It stands for Domain Name System.**
* **It is a server that maintains domain name and their corresponding IP address in a database.**
* **DNS maps domain name into its corresponding IP address.**
* **This process of mapping domain name into its corresponding IP address by DNS is called as domain name resolution.**

DNS

IP ADDRESS

DOMAIN NAME

# MAC:-

(Fig 2. Domain name resolution)

* **It stands for Media Access Control.**
* **Each NIC has a unique address assigned by its manufacturer.**
* **This address is known as MAC address of the card.**
* **It is used to uniquely identify an NIC by its MAC address.**
* **MAC address of an NIC is permanent and never changes.**
* **This address is a 12-digit hexadecimal or 48-bits number.**
* **MAC address are usually written in one of the following two formats:- MM:MM:MM:SS:SS:SS**

MM-MM-MM-SS-SS-SS

* **The first half (MM:MM:MM) of a MAC address contains manufacturer ID number and second half (SS:SS:SS) of a MAC address represents the serial number assigned to the NIC by its manufacturer.**
* **Example:- 00:0A:C9:14:C8:35**

Where 00:0A:C9 is the manufacturer ID and 14:C8:35 is the serial number.

# ARP:-

* **It stands for Address Resolution Protocol.**
* **It is a protocol that maps IP address into MAC address.**

ARP

MAC ADDRESS

IP ADDRESS

# RARP:-

* **It stands for Reverse Address Resolution Protocol.**
* **It is a protocol that maps MAC address into IP address.**

RARP

IP ADDRESS

MAC ADDRESS

# WEB PAGE:-

* **A web page is a web document display in a web browser.**
* **A web page is a page on internet written in HTML.**
* **Web means resource of information on internet.**
* **An HTML page or web page has .html or .htm extension.**
* **Web page may contain text, image, audio, video document.**
* **A web page can be displayed by using a web browser like Mozilla Firefox, internet explorer, Google chrome, etc.**
* **Example:- hello.html**

<HTML>

<HEAD>

<TITLE> HELLO WORLD </TITLE>

</HEAD>

<BODY>

WELCOME TO THE <BR> GURUKUL COLLEGE OF +2 SCIENCE

</BODY>

</HTML>

# WEBSITE:-

* **Website is a collection of web pages that are hyperlinked with each other.**
* **The first page of the web site is called as home page.**
* **All the web pages in a website are hyperlinked with each other so that by clicking on a hypertext a new page will be open.**
* **An address that is used to locate a particular website on internet is called website address.**
* **Example:-** [**www.google.com**](http://www.google.com/)

[www.odisharesult.nic.in](http://www.odisharesult.nic.in/) [www.yahoo.com](http://www.yahoo.com/) [www.facebook.com](http://www.facebook.com/)

* **According to use, following types of websites are available:-**
1. **Commercial website**
2. **Organization website**
3. **Educational website**
4. **Game sites**
5. **Employment website**
6. **News sites**
7. **Government websites**

# WEB SERVER:-

* **A web server is a computer that hosting one or more websites.**
* **“Hosting” means that all the web pages and their supporting files are available on that**

computer.

* **The web server will send any web page from the website to any user’s bbrowser as per the**

user request.

* **When the website is not responding, it actually means that the web server is not responding therefore the website is not available.**
* **When we say server is not responding it means that no websites on that web server are available.**
* **A web server is the collection of one or more than one websites.**

# WWW:-

* **It stands for World Wide Web.**
* **WWW is a collection of web pages, websites around the whole world.**
* **It was developed by Tim Berners Lee about 1992.**
* **To locate a particular website WWW must be used. (** [**http://www.google.com**](http://www.google.com/)**)**
* **It supports mainly HTTP, FTP, TELNET, GOPHER, WAIS protocols.**
* **It is a W3C recommendation.**
* **WWW is the exciting area of innovation and discovery.**
* **It contains a very large amount of information which can be accessible by the user.**
* **WWW can access each protocol on the web, but it has its own protocol which is known as HTTP.**

# WEB BROWSER:-

* **A web browser is a software program installed on computer, mobile phone or any other electronic device by using which we can easily access internet.**
* **Google chrome, Mozilla Firefox, opera mini, safari, etc. are the name of popular web browsers.**
* **A person requires a web browser to open a search engine.**
* **The most popular web browsers are internet explorer and Mozilla Firefox.**
* **Web browser is used to access web pages and websites.**
* **The first web browser was “mosaic”.**
* **Types of web browser:-**
1. **Internet explorer:-**
	* **It was developed by Microsoft INC. (International company).**
	* **It is the default web browser of Microsoft windows operating system.**
	* **It was written in visual basic (VB).**
	* **Internet explorer application is available in the website Microsoft.com.**
2. **Mozilla Firefox:-**
	* **It was developed by Mozilla corporation in 2004.**
	* **It was written in java script, C++, XUL (XML User-interface Language).**
	* **It runs on cross-platform.**
	* **Mozilla Firefox application is available in the website firefox.com.**
3. **Opera mini:-**
	* **It is a graphical web browser developed by opera software company, Norway in 1997.**
	* **It is also runs on cross platform.**
	* **It was written in C++, java and pike.**
	* **It is available in opera.com.**
4. **Safari:-**
	* **It is a graphical web browser developed by apple INC. in 2003.**
	* **It is used in iPhone operating system.**
	* **It was written in C++, objective C, swift language.**
5. **Google chrome:-**
	* **It is a graphical web browser developed by Google INC. in 2008.**
	* **It runs on Microsoft windows operating system and android operating system.**
	* **It is available in the website google.com/chrome.**
	* **It was written in java script.**

# SEARCH ENGINE:-

* **A search engine is also a program that can search for the entered keyboard text and bring the matches document and web page.**
* **Google, yahoo, Bing, DuckDuckGo etc. are the most popular search engine.**
* **It is not required for opening a web browser.**
* **The first search engine was “yandex”.**
* **The most popular search engine is Google.**
* **It is used to access or search entered keyboard text.**
* **A search engine operates on following steps:-**

Step-1: web crawling Step-2: indexing Step-3: searching

## Web crawling:-

* + **The process of retrieving information stored on different databases or websites by a web crawler or spider is called as web crawling.**

## Indexing:-

* + **It is a process of arranging information retrieved by the web crawler.**
	+ **The information arranged in index database according to their rank or use or view.**

## Searching:-

* + **It is a process to search required information from the index.**

# E-MAIL:-

* **It stands for Electronic mail.**
* **It is an electronic technology that is used to send or receive the document electronically.**
* **It is a high speed transmission mode.**
* **It can transfer text, audio, video, etc.**
* **Each user of an e-mail is assigned by a unique name for his or her e-mail account. This is known as e-mail address.**
* **It is generally of the form user\_name@domain\_name.**
* **For example:-** **aka2k8@gmail.com**
* **The user name and the domain name are separated by the special character @.**
* **E-mail address can be written in uppercase, lowercase or proper case.**
* **Spaces are not allowed in e-mail address.**
* **It uses different protocols like SMTP, IMAP, POP, etc.**

## Advantages of e-mail:-

* + **It is a faster medium of communication.**
	+ **It is less expensive because it only needs an internet connection.**
	+ **It is a more reliable medium of communication because there is no need of any stamp.**
	+ **It is a user friendly data transmission mode.**
	+ **It can send or receive e-document as an attachment and also which can be printable.**
	+ **The receiver does not need to be online to receive an e-mail.**

## Disadvantages of e-mail:-

* + **The receiver does not aware whether an e-mail comes to its inbox while he is offline.**
	+ **E-mail does not prevent from fraud.**
	+ **There may be a chance of sending unintended recipient due to wrong e-mail id.**
	+ **Junk e-mails or spam are the undesirable e-mails may be received by the receiver.**
	+ **There may be a chance of frustration when the receiver does not read the e-mail or give no response.**
	+ **It is fully dependent on internet.**
	+ **E-mail accounts can be hacked by the hackers.**

## E-mail protocols:-

* + **E-mail uses some set of rules (protocols) to properly transmit the information.**
	+ **They include SMTP, IMAP and POP.**

### SMTP:-

* + **It stands for Simple Mail Transfer Protocol.**
	+ **It was first proposed in 1982.**
	+ **It is a standard protocol used for sending e-mail efficiently and reliably over the internet from client to mail server or between the mail servers.**

### IMAP:-

* + **It stands for Internet Mail Access Protocol.**
	+ **It was proposed in 1986.**
	+ **There exist 5 versions of IMAP as: IMAP, IMAP2, IMAP3, IMAP2bis, IMAP4.**
	+ **It is a standard protocol that is used to receive mail from the mail server.**
	+ **It is a standard e-mail protocol that stores e-mail messages on a mail server but allows the end user to access the messages and make changes on the mail server whenever end user make any changes on its mail.**

### POP:-

* + **It stands for Post Office Protocol.**
	+ **There are several versions of POP, but the POP3 is the current standard.**
	+ **It is a standard e-mail protocol that has the same rule as IMAP, but it is generally used to support a single client.**

## Components of an e-mail:-

* **E-mail message comprises of different components: e-mail header ( from, date, to, subject, CC, BCC), greeting, text and signature.**

### E-mail header:-

1. **From:-**

This field indicates the sender’s address i.e. who send the e-mail.

1. **Date:-**

This field indicates the date when the e-mail was sent.

1. **To:-**

It indicates the receiver’s address i.e. to whom the e-mail is send.

1. **Subject:-**

This field indicates the purpose of e-mail.

1. **CC:-**

It stands for Carbon Copy. It includes those receivers addresses whom we want to keep informed but not exactly the intended receiver.

1. **BCC:-**

It stands for Black Carbon Copy/Blind Carbon Copy. It is used when we do not want one or more of the receivers to know that someone else was copied on the message.

## How to send an e-mail:-

We can send an e-mail message by using the following steps:-

**Step-1:**

Open the website where we have an e-mail account by using a web browser. [http://www.google.com](http://www.google.com/)

**Step-2:**

A login page will appear on the screen to login into the e-mail account. To login an e-mail account we have to insert our e-mail id and password.



|  |  |
| --- | --- |
|  |   |
| [http://www.gmail.com](http://www.gmail.com/)  |
| G **Gmail****Email ID: Password:**SIGN INSIGN UP |

### Step-3:

After sign in or login that particular e-mail account will open.



|  |
| --- |
| aka2k8@gmail.com  |
| Compose |
| Inbox 1923Sent 17Outbox 12Spam 234Setting |  |

### Step-4:

To send or write an e-mail click on the *compose* option then give the receiver’s e-mail id, write the e-mail, attach the file if any, then send.

|  |
| --- |
| From: aka2k8@gmail.com |
| To: triveniagrawal94@gmail.com |
| CC: ashishmtech2013@gmail.com |
| BCC: amitka85@gmail.com |
| Subject: MORNING WISHESHELLO: WISH YOU A VERY GOOD MORNING LIFESEND |

# SMS:-

* **SMS stands for Short Message Service.**
* **SMS is used to send text message to mobile phones.**
* **The message can typically be up to 160 characters in length.**
* **It was originally created for the phone that uses GSM (Global System for Mobile communication) but now all the major cell phone systems support it.**
* **Fortunately, text messages sent through SMS do not required the receiver’s phone to be ON in**

order for the message to be successfully transmitted.

* **The SMS service will hold the message at the sender side until the receiver turn on his/her phone.**

# VOICE MAIL:-

* **It is a communication service used to transfer voice message from one device to another device through internet.**
* **It uses VoIP (Voice over Internet Protocol).**
* **It can be used for both private communication as well as group communication.**

# CHATTING:-

* **On the internet, chatting is talking to other people who are using the internet at the same time as we are using.**
* **Usually, this “talking” means the exchange of type messages between individual users or**

group of users.

* **It is used for real time interaction between two or more online user through a chat messenger.**
* **It is an instant messaging system.**
* **Various types of web chat programs are AOL (America Online), gTalk, Whatsapp, facebook messenger, etc.**
* **Through chatting user can transfer audio, video, animation, text, image, etc.**

# IRC:-

* **It stands for Internet Relay Chat.**
* **It is a multiuser, multichannel and mass chatting system.**
* **It consists of more than one server and more than one client.**
* **It can create communication between multiple users and multiple servers.**
* **When the client of a server not directly connected to another client of another server then a server can be used as a mediator between these two servers.**
* **It is a global, distributed, real time chat system that operates over the internet.**
* **Once users are connected to an IRC server, they can converse with other users connected to any server in the IRC network.**
* **IRC provides group communication as well as personal communication.**
* **It also provides data transfer and file sharing facility as well.**
* **Popular ongoing IRC channels are #hottub, #riskybus.**
* **The most common IRC networks are IRCnet, EFnet.**
* **IRC is a chatting protocol.**
* **In IRC, channels are used as a group within a particular IRC network.**

SERVER 3

SERVER 1

C 1

SERVER 2

C 2

C 7

C 6

C 5

C 4

C 3

SERVER 4

C 9

C 8

(Fig 2. IRC network)

# VIDEO CONFERENCING/ITS:-

* **Video conferencing means to conduct a conference between two or more participants at different sites by using computer networks to transmit audio and video data.**
* **This is also known as ITS (Internet Telephony System).**
* **It uses VoIP (Voice over Internet Protocol), which converts voice signal into digital signal at sender sites and digital signal into voice signal at receiver sites.**
* **Each participant has a video camera, microphone and speaker mounted on his/her computer for video conferencing.**
* **Two distance users can speak, see and listen to each other through internet by using a video conferencing.**
* **Two participants can connected with each other through internet by using a video chat application or software like Whatsapp, messenger, etc.**
* **It consists of following components:-**
1. **End devices**
2. **Proxy/gate keeper**
3. **Gateway**

**URL:-**

* **It stands for Uniform Resource Locator.**
* **An address or a path used to locate a particular information or resource on internet is called as URL.**
* **URL is a string of characters used to identify a resource over a network uniquely.**
* **It provides a complete link or path for a resource on network by using a web browser.**
* **Example:-** [**http://www.google.com:/information\_technology**](http://www.google.com/information_technology)

## Parts of an URL:-

* **A URL consists of following parts:-**

Service protocol://site name or domain name:[port number]/path?query

### Service protocol:-

* **It is the first part of a URL.**
* **It provides a particular service to extract resources on internet.**
* **It is followed by ://.**
* **Example of service protocol are http://, ftp://, etc.**

### Site name/Domain name:-

* **It is the second part of URL.**
* **It provides the site name or domain name of the website from which we want to extract information.**
* **It is followed by :.**

### Port number:-

* **It is a unique number used for the service to be used in the internet.**
* **The default port number is 1234.**
* **It is optional.**
* **It is followed by forward slash (/).**

### Path or query:-

* **It is the last part of the URL.**
* **It provides the information about the file resources we want to search.**
* **Example of searching information about URL :-**

HTTP://www.google.com:(80)/information\_technology?URL

* **Query section is preceded by ?.**

# MOBILE COMMUNICATION:-

* **Wireless mobile communication is a fastest communication technique having millions of user around the world.**
* **Cellular phones are becoming the essential part of our everyday life and business.**
* **Cellular system provides bidirectional voice and data communication around the world.**
* **Cellular system design provides the reusability of frequency spectrum.**
* **A particular frequency can be used over a specific location called as cell and the coverage area is divided into non-overlapping cells.**
* **In 1st generation of cellular system analog communication system are used, but from second generation digital communication system or technique are used.**
* **The following are the various types of the evolution of mobile communication techniques:-**
1. **First generation (1G)**
2. **Second generation (2G)**
3. **Third generation (3G)**
4. **Fourth generation (4G)**
5. **Fifth generation (5G)**

## First generation (1G):-

* + **1G mobile network uses analog signal to transmit voice calls between sender and receiver by using frequency modulation technique for radio transmission.**
	+ **It uses FDMA (Frequency Division Multiple Access) technique with channel capacity of 30 kHz.**
	+ **The data transmission speed of 1G is up to 2.9 kbps.**
	+ **1G mobile network can not convert voice signal or analog signal to digital mode.**
	+ **There is no facility for transmission of image, video, etc.**
	+ **1G mobile network does not provide global roaming service.**
	+ **1G mobile network provides low data transmission capacity and poor voice quality.**

## Second generation (2G):-

* + **The second generation of wireless mobile communication started around 1990.**
	+ **2G mobile communication was based on low band digital data signaling.**
	+ **This generation offers additional service like SMS (Short Message Service) , picture message service, etc.**
	+ **In this generation two types of digital modulation schemes are used : TDMA (Time Division Multiple Access) and CDMA (Code Division Multiple Access).**
	+ **The frequency band of 2G mobile communication technique is 850 to 1900 MHz.**
	+ **The most popular 2G wireless technology is known as GSM (Global System for Mobile communication).**
	+ **The data transmission speed of 2G is up to 171.2 kbps.**
	+ **2G communication technique is used for both voice, data signal transmission.**
	+ **CDMA technology is used in 2G for providing clearer voice quality.**
	+ **Based upon the CDMA a new telephone technology was introduced, called as WLL (Wireless in Local Loop).**

## Third generation (3G):-

* + **3G represents third generation of mobile communication.**
	+ **It uses various wireless technologies like CDMA 2000, EDGE, HSDPA, etc.**
	+ **3G mobile communication system provides multimedia service through mobile phones.**
	+ **IMT-2000 (Internet Mobile Telecommunication-2000) is the official name for 3G to provide wireless access to global telecommunication system.**
	+ **Data bandwidth in 3G is 2 Mbps to 21 Mbps.**
	+ **Peak upload rate in 3G is 5 Mbps.**
	+ **Peak download rate in 3G is 21 Mbps.**
	+ **3G provides the facility like web browsing, e-mail, video conferencing, etc.**

## Fourth generation:-

* + **The fourth generation mobile communication system is introduced in the year 2010.**
	+ **4G connections will be faster than the 3G connections.**
	+ **It uses various wireless technologies like LTE, Wi-MAX, Wi-Fi, etc.**
	+ **Data bandwidth in 4G is 2Mbps to 1Gbps.**
	+ **Peak upload rate in 4G is 100Mbps.**
	+ **Peak download rate in 4G is 1Gbps.**
	+ **4G provides high quality service with ant time and any where facility.**

## Fifth generation:-

* + **5G represents the fifth generation of mobile communication.**
	+ **5G mobile communication system uses IPV6 network.**
	+ **It is also called as WWWW (Wireless World Wide Web).**
	+ **It is the future generation for mobile communication.**
	+ **It uses advanced LTE technique.**
	+ **The downloading speed is about 1Gbps and uploading speed is about 512 mbps.**
	+ **It will provide very high speed data transmission.**

# SOME WIRELESS MOBILE COMMUNICATION TECHNOLOGIES:-

**CDMA:-**

* **It stands for Code Division Multiple Access.**
* **It is used in 2nd generation (2G) and 3rd generation (3G) wireless communication.**
* **CDMA uses spread spectrum technology to break up speech into small, digitized segments and encode them to identify each call.**
* **CDMA technology are used for providing clearer voice quality with less background noise .**
* **CDMA distinguishes between multiple transmission carried simultaneously on a single wireless signal.**
* **Based upon the CDMA a new telephone technology was introduced which is called as WLL (Wireless in Local Loop).**

# WLL:-

* **It stands for Wireless in Local Loop.**
* **It is a new telephone technology which was introduced based upon the CDMA.**
* **This technology is used in the 2nd generation of mobile communication.**
* **In this technology the voice is transmitted through radio signals within a range of 30 to 35 km.**
* **Using CDMA each phone was given a code to send or receive voice and data signal.**
* **In CDMA technique the spectrum technology break up the speech into small, digitized segments and encode them to identify each call.**
* **CDMA distinguishes between multiple transmissions carried simultaneously on a single wireless signal.**

# GSM:-

* **It stands for Global System for Mobile communication.**
* **It is the most popular 2G wireless technology.**
* **It uses the TDMA (Time Division Multiple Access) scheme.**
* **In this technology each frequency is divided using TDMA scheme into eight timeslots and allows eight simultaneous calls on the same frequency.**
* **The protocol allows large number of users to access one radio frequency by allocating timeslots to multiple voice or data calls.**
* **The net data rate in GSM is around 14.4 kbps.**

# Wi-Fi:-

* **Wi-Fi stands for Wireless Fidelity.**
* **Wi-Fi technology is used in 4th generation of mobile communication.**
* **Wi-Fi is a universal wireless networking technology that uses radio frequencies to transfer data.**
* **Wi-Fi allows high-speed internet connections without the use of cables.**
* **It is also 10 times faster than a regular dial-up connection.**
* **To access Wi-Fi , we need Wi-Fi enabled devices (laptops, mobile, etc.).**
* **These Wi-Fi enabled devices can send and receive data wirelessly in any location equipped with Wi-Fi access.**

# Wi-MAX:-

* **Wi-MAX stands for Worldwide interoperability for Microwave Access.**
* **Wi-MAX technology is used in 4th generation of mobile communication.**
* **Wi-MAX would operate as similar as Wi-Fi, but at higher speeds over greater distances and for a greater number of users.**
* **Wi-MAX has the ability to provide service even in areas that are difficult for wired infrastructure to reach.**
* **Wi-MAX is one of the hottest broadband wireless technologies around today.**
* **Wi-MAX systems are expected to deliver broadband access services to residential and enterprise customers in an economic way.**
* **Wi-MAX is a standardized wireless version of Ethernet intended primarily as an alternative to wire technologies (such as cable modems, DSL, etc.) to provide broadband access to customer premises (house).**

# LTE:-

* **It stands for Long Term Evolution.**
* **LTE technology is used in 4th generation of mobile communication.**
* **LTE was evolved from the Universal Mobile Telecommunication System (UMTS), which in turn evolved from the Global System for Mobile Communications (GSM).**
* **LTE technology is mainly used for the mobile network system.**
* **Current application under this technology can provide services like; web browsing, video conferencing, cloud computing, game services, etc.**

# GPRS:-

* **It stands for General Packet Radio System.**
* **This technology is used in 3rd generation of mobile communication.**
* **GPRS is also known as GSM-IP (Global System Mobile Communications – Internet Protocol).**
* **This technology keeps the users of this system online, allows to make voice calls, and access internet on-the-go.**
* **GPRS is a packet-based wireless communication services that offers data speed up to 144kbps.**

# EDGE:-

* **It stands for Enhanced Data rates for Global Evolution.**
* **It is used in 3rd generation of mobile communication.**
* **It is a high-speed wireless data service technology that can deliver speeds of up to 384kbps using all GSM channels.**
* **This service allows the possibility of the delivery of multimedia and other broadband facilities to the mobile phones and computer users.**

# UMTS:-

* **It stands for Universal Mobile Telecommunications Service.**
* **It is used in 3rd generation of mobile communication.**
* **It is used to provide packet-based wireless broadband service.**
* **It is used for the transmission of text, digitized voice, video and multimedia at data rates up to 2Mbps.**

# TDMA:-

* **TDMA stands for Time Division Multiple Access.**
* **It is a scheme used in the most popular GSM technology.**
* **It is mainly used in 2nd generation of mobile communication.**
* **In GSM technology each frequency is divided using TDMA scheme into eight timeslots and allows eight simultaneous calls on the same frequency.**
* **The protocol used by this scheme allows large number of users to access one radio frequency by allocating timeslots to multiple voice or data calls.**

# FDMA:-

* **FDMA stands for Frequency Division Multiple Access.**
* **It is used in 1st generation of mobile communication.**
* **By using this scheme, each frequency band allocated for wireless cellular telephone communication is divided into 30 channels.**
* **Each channel can be used to carry a voice signal at a time, so by using FDMA scheme we can carry multiple voice signals over a single frequency band at a time.**
* **By the use of FDMA, each channel can be assigned to only one user at a time.**