Paper Code: BCA-107 **L T C**

3 1 4

Paper: Web Technologies

UNIT – I

Part 1:

World Wide Web: Introduction, Web page, home page, Web site, Static and dynamic website, client server computing concepts. Web client and web server, web browser, client side and server-side scripting languages.

Part 2:

HTML overview: Introduction to HTML, HTML Document structure tags, HTML comments, Text formatting, inserting special characters, anchor tag, adding images and Sound, lists types of lists, tables, frames and floating frames, Developing Forms, Image maps. [No. of Hrs: 11]

UNIT – I, Part 1:

History of the Internet and World Wide Web:-

A. **History of the Internet:-** The Internet had its roots during the **1960**'s as a project of the **United States government's Department of Defense**, to create a non-centralized network. This project was called **ARPANET** (Advanced Research Projects Agency Network), created by the Pentagon's Advanced Research Projects Agency established in 1969 to provide **a secure and survivable communications network** for organizations engaged in defense-related research.

- The Internet started off with research into what was then known as **packet switching** as early as the 1960s.
- Packet switching was thought of **a better and faster method to transfer data** than the hardware solution to the problem, i.e., the circuitry.
- The packet switching technology was essential to the development of ARPANET by the United States Military.
- ARPANET is considered the first known group of interconnected computers aka the internet. This system was used to transfer confidential data between the Military. This data sharing technology was then opened to **educational institutes** in the United States to allow them to access to the government's supercomputer, first at 56 kbit/s, then at 1.5 Mbit/s, and then at 45 Mbit/s. **Com Internet** service providers began to arise in the late **1980s** and the internet was **fully commercialized in the US by 1995.**

Benefits of ARPANET:

1. Email
2. Allows multiple users to share information at the same time via same communication paths (eg: phone lines)
3. Network operated with a technique called-**Packet Switching**-(packets are sent, contains data, address, error control info, sequencing info(to reassemble packets). **Less costly as compared to dedicated lines. No centralized control in the network. If one part fails, another alternative path works.**
4. **TCP (Transmission Control Protocol)** used as a protocol over ARPAnet, for message passing from Sender to Receiver.
5. Personal networks were used by the companies for inter and intra organization communication.
6. **IP (Internetworking Protocol)**- ARPA created network of network i.e IP-to intercommunicate.
7. So revised protocol was called **TCP/IP.**
8. Earlier TCP/IP used by universities and research institutions, later by military and then for commercial use.
9. **Services provided by the internet:-**
    - *i. Electronic Mail (e-mail)*
    - *ii. World Wide Web*
    - *iii. File Transfer Protocol (FTP)*
    - *iv. Chat Rooms*
    - *v. Mailing list*
    - *vi. Instant Messaging*
    - *vii. Chat*
    - *viii. News Groups*

B. History of World Wide Web:

The Internet is a global network of networks while the Web, also referred formally as World Wide Web (www) is collection of information which is accessed via the Internet.

The Internet is infrastructure while the Web is service on top of that infrastructure.

1. The World Wide Web (WWW) allows computer users to position and view multimedia-based documents (i.e., documents with text, graphics, animations, audios and/or videos) on almost any subject.
2. In 1990, Tim Berners-Lee of CERN (the European Laboratory for Particle Physics) developed the World Wide Web and several communication protocols that form the backbone of the WWW.
3. In the past, most computer applications ran on stand-alone computers. (i.e., computers that were not connected to one another) Today's applications can be written to communicate among the world's hundreds of millions of computers.
4. The Internet makes our work easier by mixing computing and communications technologies.

5. It makes information immediately and conveniently accessible worldwide.
6. It makes it possible for individuals and small businesses to get worldwide contact.
7. In the last decade, the Internet and World Wide Web have altered the way people communicate, conduct business and manage their daily lives. They are changing the nature of the way business is done.

Is World Wide Web and Internet same?

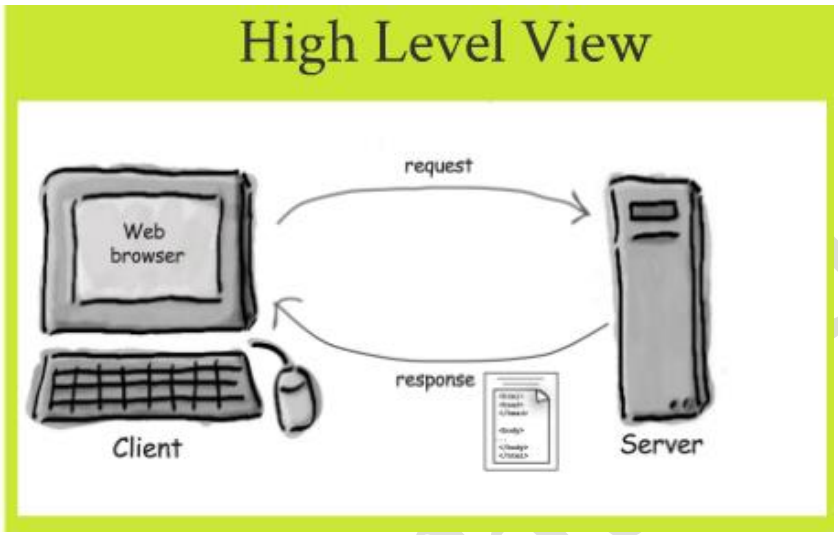
- World Wide Web: The most widely used part of the Internet is the World Wide Web (often abbreviated "WWW" or called "the Web").
- The Internet is not synonymous with World Wide Web.
- The Internet is a massive network of networks, a networking infrastructure. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the Internet.
- The **World Wide Web, or simply Web, is a way of accessing information over the medium of the Internet. It is an information-sharing model that is built on top of the Internet.**

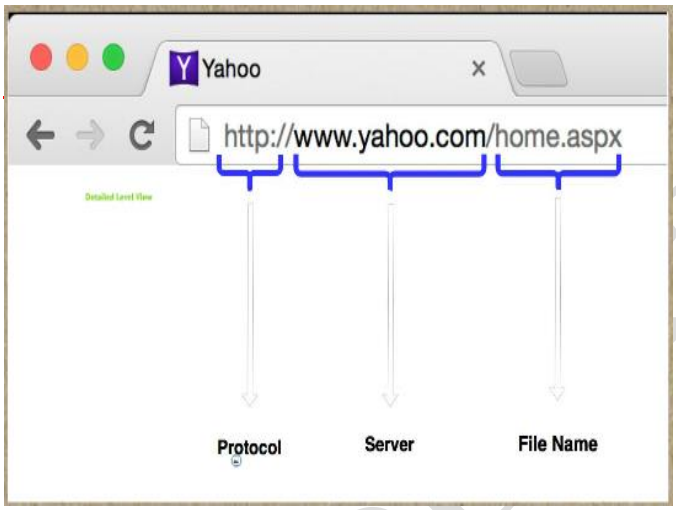
The internet is like the highway and the Web is like a car that lets one travel from place to place. The World Wide Web (WWW) can be viewed as a huge distributed system consisting of millions of clients and servers for accessing linked documents. Servers maintain collections of documents, while clients provide users an easy to-use interface for presenting and accessing those documents.

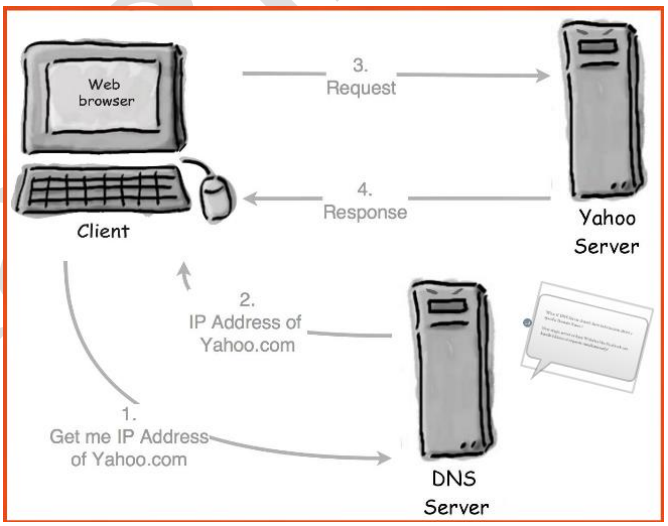
Overview of WWW

- The WWW is essentially a huge client-server system with millions of servers distributed worldwide.
- Each server maintains a collection of documents; each document is stored as a file (although documents can also be generated on request).
- A server accepts requests for fetching a document and transfers it to the client. A client interacts with Web servers through a special application known as a browser.

- A browser is responsible for properly displaying a document. Also, a browser accepts input from a user mostly by letting the user select a reference to another document, which it then subsequently fetches and displays.







- It **refers to a huge database** of internet resources such as web pages, newsgroups, programs, images etc. It helps to locate information on World Wide Web.
- A web search engine is **a software system** that is designed to search for information on the World Wide Web. The search results are generally presented in a line of results often referred to as **search engine results pages (SERPs).** The information may be a mix of web pages, images, and other types of files.
- Search engines use automated software (known as robots or spiders) to follow links on Websites, harvesting information as they go. When someone submits a query to a search engine, the engine returns a list of sites, ranking them on their relevance to the keywords used in the search.
- User can search for any information by passing query in form of keywords or phrase. It then searches for relevant information in its database and return to the user.

- A **browser** (firefox, **internet explorer**, chrome) is a program to display websites. A **search engine** (google, bing, yahoo) is a particular website that provides you with **search** results
- **Example of Search engines: Google, Bing, Yahoo search, Ask, AOL, WOW etc.**

Search Engine Components

Generally, there are three basic components of a search engine as listed below:

1. Web Crawler
2. Database
3. Search Interfaces

- **Web crawler**

  It is also known as spider or bots. It is a software component that traverses the web to gather information.
- **Database**

  All the information on the web is stored in database. It consists of huge web resources.
- **Search Interfaces**

  This component is an interface between user and the database. It helps the user to search through the database.

Search Engine Working

Web crawler, database and the search interface are the major component of a search engine that actually makes search engine to work. Search engines make use of Boolean expression AND, OR, NOT to restrict and widen the results of a search. Following are the steps that are performed by the search engine:

- The search engine looks for the keyword in the index **for predefined database** instead of going directly to the web to search for the keyword.
- It then uses software to search for the information in the database. This software component is known as web crawler.

- Once web crawler finds the pages, the search engine then shows the relevant web pages as a result. These retrieved web pages generally include title of page, size of text portion, first several sentences etc.

These search criteria may vary from one search engine to the other. The retrieved information is ranked according to various factors such as frequency of keywords, relevancy of information, links etc.

- User can click on any of the search results to open it.

Following are the several search engines available today:

Search Engine	Description
Google	**It was originally called BackRub. It is the most popular search engine globally.**
Bing	**It was launched in 2009 by Microsoft. It is the latest web-based search engine that also delivers Yahoo's results.**
Ask	**It was launched in 1996 and was originally known as Ask Jeeves. It includes support for match, dictionary, and conversation question.**
AltaVista	**It was launched by Digital Equipment Corporation in 1995. Since 2003, it is powered by Yahoo technology.**
AOL.Search	**It is powered by Google.**
LYCOS	**It is top 5 internet portal and 13th largest online property according to Media Matrix.**
Alexa	**It is subsidiary of Amazon and used for providing website traffic information.**

WEB Browsers and their versions

WEB Browsers:

- A **browser** is your access to the internet, and a **search engine** allows you to **search** the internet once you have access. You have to use a **browser** to get to a **search engine**.
- A web browser is **the program you use to view pages and navigate the World Wide Web**. A wide array of web browsers is available for just about every platform you can imagine.
- Microsoft Internet Explorer, for example, is included with Windows and Safari is included with Mac OS X. Mozilla Firefox, Netscape Navigator, and Opera are all available for free.

What the Browser Does? The core purpose of a web browser is to connect to web servers, request documents, and then properly format and display those documents.

- Web browsers can also display files on your local computer, download files that are not meant to be displayed. Each web page is a file written in a language called the Hypertext Markup Language (HTML) that includes the text of the page, a description of its structure, and links to other documents, images, or other media.
- A web browser (commonly referred to as a browser) **is a software application** for retrieving, presenting, and traversing information resources on the World Wide Web.
- An *information resource* is identified by a Uniform Resource Identifier (URI/URL) and may be a web page, image, video or other piece of content
- This process begins when the user inputs a Uniform Resource Locator (URL), for example *http://en.wikipedia.org/*, into the browser. The prefix of the URL, the Uniform Resource locator, determines how the URL will be interpreted.
- The most commonly used kind of URI starts with http: and identifies a resource to be retrieved over the Hypertext Transfer Protocol (HTTP).
- Many browsers also support a variety of other prefixes, such as https: for HTTPS, ftp: for the File Transfer Protocol, and file: for local files.

Web Browser functions:

Our dependency on the Internet has massively increased. Stated below are functions of web browsers and how are they useful:

- The main function is to retrieve information from the World Wide Web and making it available for users
- Visiting any website can be done using a web browser. When a URL is entered in a browser, the web server takes us to that website
- Supports the use of search engines.
- Supports data requests.
- Ensures security of a website.
- Opens a website page.
- Maximizing search results: as per user's request best similar data is fetched by browser.
- It makes Internet surfing easy as once we reach a website, we can easily check the hyperlinks and get more and more useful data online
- Browsers user internal cache which gets stored and the user can open the same webpage time and again without losing extra data
- Multiple webpages can be opened at the same time on a web browser
- Options like back, forward, reload, stop reload, home, etc. are available on these web browsers, which make using them easy and convenient
- When the user inputs any URL (uniform resource locator) in the web browser, the user is navigated to that website by the browser quickly.
- Examples:

1. **Google Chrome**

   Google Chrome is a web browser application that has quite a lot of users today, even though this web browser only appeared a few years after the existence of Mozilla. However, with a variety of features and high-level security, it is now a web browser that is around 60% of internet users worldwide.

2. **Mozilla Firefox**

   Furthermore, there is Mozilla Firefox, this is a web browser developed by the Mozilla foundation by having hundreds of volunteers developing it. The popularity and the large number of Mozilla users around the world are said to be the second largest after Chrome.

Basis for comparison	Search engine	Web browser
Basic	Maintains the information about the web pages stored in the Internet.	Used for searching the information on the web and displaying it over the user's computer.
Intended to	Information gathering regarding several URL's.	Display the web page of the current URL.
Database	Contains its own database	No database is present

Basis for comparison	Search engine	Web browser
Examples	Google, Yahoo, Bing, DuckDuckgo, Baidu Internet Explorer.	Mozilla Firefox, Netscape Navigator, and Google Chrome.

Web sites:

A site or website is a central location of web pages that are related and accessed by visiting the home page of the website using a browser.

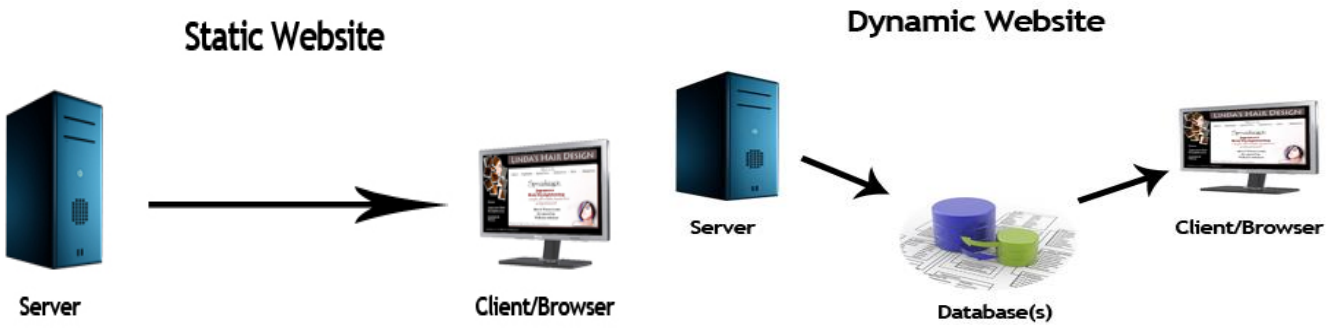
- A website (also written as web site) is a collection of web pages and related content that is identified by a common domain-name and published on at least one web server. Examples are wikipedia.org, google.com, and amazon.com.
- All **publicly accessible websites** collectively constitute the World Wide Web. There are also **private websites** that can only be accessed on a private network, such as a company's internal website for its employees.

Static and dynamic websites: A static website is a basic website with fixed content while the dynamic websites are advanced websites that provide different content according to client requests.

A static website is one that has web pages stored on the server in the format that is sent to a client web browser. It is primarily coded in Hypertext Markup Language (HTML); Cascading Style Sheets (CSS) are used to control appearance beyond basic HTML. Shows same info to all the visitors. It sends exactly the same response for every request.

A dynamic website is one that changes or customizes itself frequently and automatically. Server-side dynamic pages are generated "on the fly" by computer code that produces the HTML (CSS are responsible for appearance and thus, are static files). There are a wide range of software systems, such as CGI, Java Servlets and Java Server Pages (JSP), Active Server Pages and ColdFusion (CFML) that are available to generate dynamic web systems and dynamic sites. It may generate different HTML for each of the request.

Dynamic web pages are used where the information is changed frequently, for example, stock prices, weather information, etc.



Types/Categories of Websites:- There are billions of websites on the Internet today that can be broken into one of the following types of website categories.

Type of Website	Description	Examples
Malware Website	A site created specifically to attack visitors' computers on their first visit to a website by downloading a file (usually a trojan horse). These websites rely on unsuspecting users with poor anti-virus protection in their computers.	
Blog (weblog)	Sites generally used to post online diaries which may include discussion forums. Many bloggers use blogs like an editorial section of a newspaper to express their ideas on anything ranging from politics to religion to video games to parenting, along with anything in between. Some bloggers are professional bloggers and they are paid to blog about a certain subject, and they are usually found on news sites.	WordPress
Celebrity website	A website the information in which revolves around a celebrity or public figure. These sites can be official (endorsed by the celebrity) or fan-made (run by a fan or fans of the celebrity without implicit endorsement).	jimcarrey.com
Comparison shopping website	A website providing a vertical search engine that shoppers use to filter and compare products based on price, features, reviews, and other criteria.	Shopping.com
Crowdfunding website	Platform to fund projects by the pre-purchase of products or by asking audience members to make a donation.	Kickstarter
Click-to-donate site	A website that allows the visitor to donate to charity simply by clicking on a button or answering a question correctly. An advertiser usually donates to the charity for each correct answer generated.	The Hunger Site, Freerice

Content site	A site the business of which is the creation and distribution of original content	wikiHow.com, About.com
E-commerce website	A site offering goods and services for online sale and enabling online transactions for such sales.	Amazon.com
Government website	A website made by the local, state, department, or national government of a country. Usually, these sites also operate websites that are intended to inform tourists or support tourism.	USA.gov, Naenara, GOV.UK
Online game website	Websites where users can play online games	Browser games, OGame, Travian,
Media-sharing site	A site that enables users to upload and view media such as pictures, music, and videos	YouTube, DeviantArt
Microblog website	A short and simple form of blogging. Microblogs are limited to certain numbers of characters and work similarly to a status update on Facebook.	Twitter
News site	Similar to an information site, but dedicated to dispensing news, politics, and commentary.	cnn.com bbc.com/news
Personal website	Websites about an individual or a small group (such as a family) that contains information or any content that the individual wishes to include. Such a personal website is different from a *celebrity website*, which can be very expensive and run by a publicist or agency.	
Search engine	A website that indexes material on the Internet or an intranet (and lately on traditional media such as books and newspapers) and provides links to information as a response to a query.	Google Search, Bing, DuckDuckGo, Ecosia
Social networking service	A site where users could communicate with one another and share media, such as pictures, videos, music, blogs, etc. with other users. These may include games and web applications.	YouTube, Facebook, Instagram, Pi

		nterest, LinkedIn[7]

Website, Webpage Vs Home Page?

Website	Web Page	Home Page
A Website (or site) is a collection of web pages and other resources such as images, video, files, text, and code. Web pages cannot exist without a website. Contains web pages	It is part of a website	It is the first web page you see when you visit a website **Home Page is the first web page that you see when visiting someone's site. Usually, this web page links to all the other web pages and you can navigate easily to the one you want.**
A collection of multiple topics/info, it's a group of interlinked documents/web pages and also well structured.	Shares Specific Information	Usually redirects to specific web pages for more info
It exists even if you delete some web page	Doesn't exist without a website	Doesn't exist without a website
The url is the shortest possible (https://buycompanyname.com)	The url is longer (https://buycompanyname.com/contact-us/)	The url is the exact same as the website.

Like your book, eg facebook,Instagram,twitter are social media websites example.		

Domain names

What is a Domain Name?

- Domain name is the address of your website that people type in the browser URL bar to visit your website.
  In simple terms, if your website was a house, then your domain name will be its address.
- The Internet is a giant network of computers connected to each other through a global network of cables. Each computer on this network can communicate with other computers.
- To identify them, each computer is assigned an IP address. It is a series of numbers that identify a particular computer on the internet. A typical IP address looks like this:

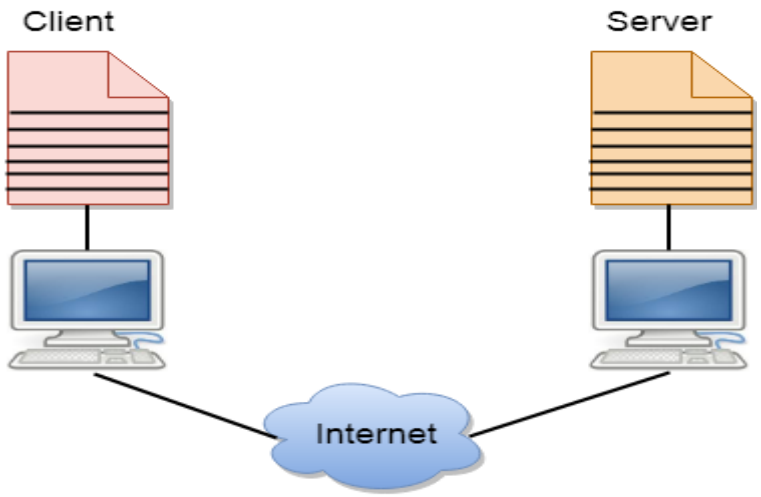
  66.249.66.1
- Now an IP address like this is quite difficult to remember. Imagine if you had to use such numbers to visit your favourite websites.
- Domain names were invented to solve this problem.
- Now if you want to visit a website, then you don't need to enter a long string of numbers. Instead, you can visit it by typing an easy to remember domain name in your browser's address bar.

Client server computing concepts- Web client and Web server

Client and Server model

- A client and server networking model, is a model in which computers such as servers provide the network services to the other computers such as clients to perform a user based tasks. This model is known as client-server networking model.

- The application programs using the client-server model should follow the given below strategies:



- An application program is known as a client program, running on the local machine that requests for a service from an application program known as a server program, running on the remote machine.
- A client program runs only when it requests for a service from the server while the server program runs all time as it does not know when its service is required.
- A server provides a service for many clients not just for a single client. Therefore, we can say that client-server follows the many-to-one relationship. Many clients can use the service of one server.
- Services are required frequently, and many users have a specific client-server application program. For example, the client-server application program allows the user to access the files, send e-mail, and so on. If the services are more customized, then we should have one generic application program that allows the user to access the services available on the remote computer.

Client

A client is a program that runs on the local machine requesting service from the server. A client program is a finite program means that the service started by the user and terminates when the service is completed.

Server

A server is a program that runs on the remote machine providing services to the clients. When the client requests for a service, then the server opens the door for the incoming requests, but it never initiates the service.

A server program is an infinite program means that when it starts, it runs infinitely unless the problem arises. The server waits for the incoming requests from the clients. When the request arrives at the server, then it responds to the request.

Based on	Client	Server
Basic functionality	Client relies on the services of server, and generates requests for various services.	Server authorizes the client's requests and facilitates them with the requested services.
Configuration	The configuration of client systems is simple. Their tasks are limited to generating requests. It has a basic hardware configuration.	The configuration of the server is more complex and sophisticated. Server has advanced hardware configuration.
Efficiency	The efficiency of client is limited.	The performance of server is high, and they are highly efficient.
Tasks	The common tasks for client are simple and mostly include requesting services.	The complex tasks like fulfilling client requests, storing and processing large datasets, data analysis are common for server.
Switch off	The client systems can be switch off without any fear.	Switching off servers may be disastrous for client systems that continuously request the services.
Login Support	There can be single user logins.	Server support multiple user login and request processing simultaneously.
Examples	Examples of clients are smartphones, desktops, laptops, etc.	Examples of servers are web servers, file servers, database servers, etc.

Client Side and Server-Side Scripting Languages.

Server

The Server is responsible for serving the web pages depending on the client/end-user requirement. It can be either static or dynamic.

Client

A client is a party that requests pages from the server and displays them to the end-user. In general, a client program is a web browser.

A script is generally a series of program or instruction, which has to be executed on other program or application. As we know that the web works in a client-server environment. The client-side script executes the code to the client side which is visible to the users while a server-side script is executed in the server end which users cannot see.

- **Client-side scripting** involves code that is executed by the viewer's browser, using scripting languages like JavaScript. This scripting is responsible for rendering changes to the webpage as a response to actions taken within it, such as mouse clicks or keyboard use.
- **Server-side scripting**, on the other hand, refers to code that is executed by the server before sending the content to the viewer's browser. This affects the webpage when it is loaded or visited, like with login pages, submission forms, and shopping carts.

BASIS FOR COMPARISON	SERVER-SIDE SCRIPTING	CLIENT-SIDE SCRIPTING
Basic	Works in the back end which could not be visible at the client end.	Works at the front end and script are visible among the users.
Processing	Requires server interaction.	Does not need interaction with the server.
Languages involved	PHP, ASP.net, Ruby on Rails, ColdFusion, Python, etc.	HTML, CSS, JavaScript, etc.
Affect	Could effectively customize the web pages and provide dynamic websites.	Can reduce the load to the server.
Security	Relatively secure.	Insecure

Using both types of scripting allow modern websites to adapt to each user's view of the page while reducing the server's load time.

Exercise for practice:

1. Fill in the blanks in each of the following statements:

a) The two most popular web browsers are ……. and ……...

b) A browser is used to view files on the …….

c) The location of a file on the Internet is called its ……

d) The element in a web page that, when clicked, causes a new web page to load is called a ……; when your mouse passes over this element, the mouse pointer changes into a …….. in IE7 and FF2.

e) IE7 and FF2 keep of a list of visited URLs called the ----------

f) You can save an image from a web page by right clicking the image and selecting …… in IE7 or in FF2.

2. Spell out the following acronyms, and include a brief description of each:

a) HTTP

b) FTP

c) URL

d) PDF

e) ISP

f) WWW