Unit: 1

Web Programming

- Static and Dynamic Web
- Client side & Server side Scripting
- Introduction to other Server side languages
- Webserver (IIS & Apache)
- Web Hosting, Virtual Host, Multi-Homing
- Distributed Web Server Overview,

PHP Basic

- Introduction to PHP
- PHP configuration in IIS & Apache Web server
- Understanding of PHP.INI file
- Understanding of PHP .htaccess file
- PHP variable
- Static & Global variables
- GET & POST method
- PHP Operators
- Conditional Structure & Looping Structure
- Array

Web Programming. Or Web Development

- Programming is the intricate **art of telling a computer what to do**.
- It is giving written instructions in a logical manner that the computer can understand.
- **Programming allows you to make new software**
- Web site programming is the same you write applications or web pages that are used by a web browser.
- Web programming refers to the writing, markup and coding involved in Web development, which includes Web content, Web client and server scripting and network security.
- **Web development** refers to building website and deploying on the web. Web development requires use of scripting languages both at the server end as well as at client end.
- The most common languages used for Web programming are XML, HTML, JavaScript, Perl 5 and PHP etc….

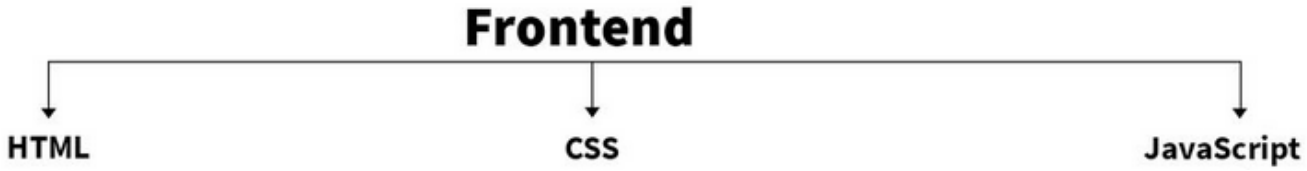
The word Web Development is made up of two words, that is:

- **Web:** It refers to websites, web pages or anything that works over the internet.
- **Development:** Building the application from scratch

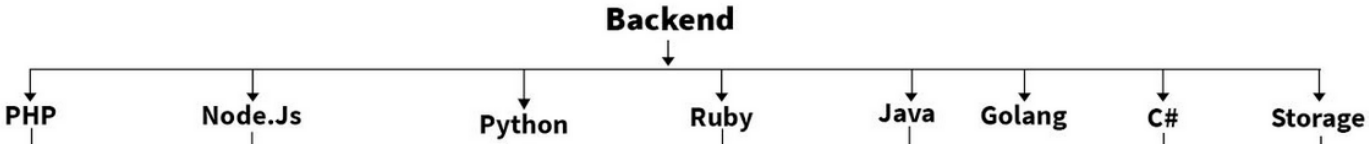
Web Development can be classified into two ways:

- Frontend Development
- Backend Development

Frontend Development: The part of a website that the user interacts directly is termed as front end. It is also referred to as the 'client side' of the application.



Backend Development: Backend is the server side of a website. It is the part of the website that users cannot see and interact. It is the portion of software that does not come in direct contact with the users. It is used to store and arrange data.



Static and Dynamic Web Pages

What is a web page?

- A web page is a hypertext document provided by a website and displayed to a user in a web browser. Websites usually consist of many web pages, which may display different types of content (e.g., text, images, video) which may be organized into various sections. Any individual, organization, or company can own and manage a website and multiple web pages.

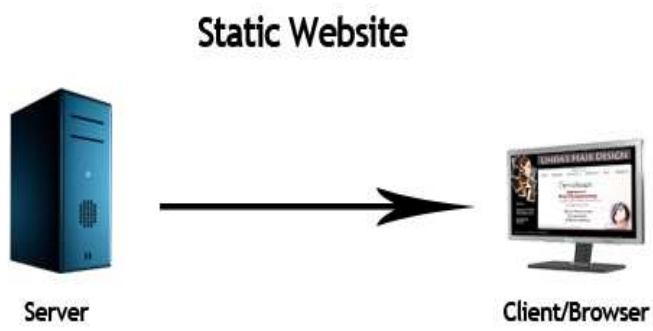
There are two types of web pages : (i) Static Web Pages, (ii) Dynamic Web Pages

What is a static web page?

- These are simple web pages (typically written in languages like JavaScript, HTML, CSS, etc.) and stored in a web server.
- In the case of static web pages, as soon as a server receives a request for a page, it immediately sends a response to the client with no additional processing.
- In static websites, the displayed content remains the same
- These pages contain no alterations or modification based on any user input.
- Hence the name- static web pages. You don't necessarily need any prior experience with database design and web programming to create and maintain a static website.

Examples of static content

- HTML pages
- Images
- Audio files
- Videos
- Static online forms
- Downloads (software, documents, excel sheets, etc.)



Advantages of static websites

1. They take less time to build and deploy than dynamic websites.
2. With some minor modifications, you can use the basic structure for your site's static pages so they look similar but aren't exactly duplicates.
3. Static websites tend to be more secure.
4. Static websites usually load faster, so it is easier for search engines to rank them.
5. Building static websites doesn't require complex software.
6. Less costly to build.
7. The layout and design of every page on a static website can be changed.
8. Static websites are easier to restore after a crash or DDoS attack by simply redeploying the codebase.

Disadvantages of static websites

1. It can be difficult and time-consuming to update static websites, especially for large content.
2. It may be difficult to expand a static website once its initial structure has been established.
3. Static websites may end up with stagnant content because of the effort needed to update them. This might make the company/brand feel outdated.
4. It is not possible to create interactions or experiences for users in the case of static websites.

What is a dynamic web page?

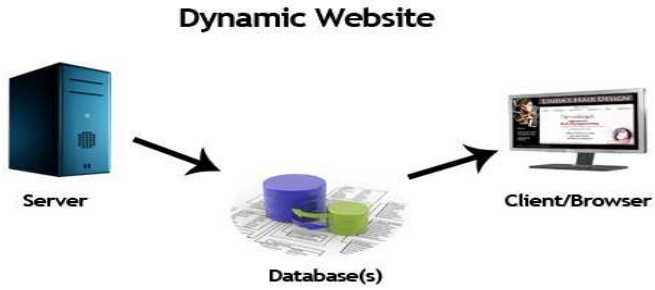
- A dynamic website generates web pages in real-time.
- Such pages are usually written in languages like CGI, AJAX, ASP or ASP.NET, and they usually take more time to load than static web pages.
- In dynamic website all information that changes frequently, e.g., weather updates, stock prices, etc…
- Dynamic website combine both client-side and server-side programming techniques.
- Dynamic web pages usually contain application programs for various services and require server-side resources like databases.
- A dynamic website accesses content from a CMS (Content Management System), which means that the website reflects any changes made in the database content.

Advantages of dynamic websites

1. They enable user interaction and provide more website functionality.
2. A dynamic site lets you request and store information from different sources in an organized way.
3. They display content based on the user's requirements.
4. These type of websites enable additional website flexibility by allowing connection to a Content Management System (CMS).
5. Multiple users are allowed to adjust the content.
6. The cost of making adjustments and changes is less (versus a static website).
7. Dynamic websites are more likely to attract recurring customers and visitors.

Examples of dynamic content

- Database
- Real-time data (stock prices, weather forecasts, health data, etc.)
- User account info
- Translated web pages
- Video and voice messaging apps



Differences between Static Web Page and Dynamic Web Page.

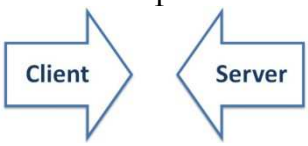
Sr. No.	Key	Static Web Page	Dynamic Web Page
1	Definition	Static web pages are generally simple HTML written pages which serve as response from browser to server in which all the information and data is static in nature and it does not get changed until someone changed it manually.	On other hand Dynamic webpages are the pages written in some more complex language such as ASP.NET in which data is rendered after some interpretation and capacity to produce distinctive content for different calls.
2	Complexity	As mentioned in above point as data in static web pages is static and do not require any interpretation before rendering so static web pages are simple in complexity.	Dynamic web pages on other hand does the interpretation process which make data dynamic in nature and due to which dynamic web pages become complex in complexity as compare to static web pages.
3	Language used	Static web pages are generally written in simpler languages such as HTML, JavaScript, CSS, etc.	On other Dynamic web pages are written in more complex languages such as CGI, AJAX, ASP, ASP.NET, etc.
4	Rendered Data	For static web pages data do not changes until someone changes it manually and hence data is static in nature.	On other hand for Dynamic web page data is first interoperate at server side and due to which it does not remain same on every call and this makes data dynamic in nature..

Sr. No.	Key	Static Web Page	Dynamic Web Page
5	Time	Static web pages due to static data take less time to get load.	While Dynamic web pages due to dynamic data take comparatively more time as compare to static web pages.
6	Database	In Static web pages generally no involvement of database for data redecoration.	On other hand in case of Dynamic web page database is used for data redecoration.

Client-side vs Server-side Programming Languages.

Basic Background

- Web development is all about communication and data exchange. This communication takes place via two parties over the HTTP protocol.



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.

Working of Client side

- The user opens his web browser (client)
- The user starts browsing (for example http://google.com)
- The client forwards this request to the server, for accessing their web page.
- The server then acknowledges the request and replies back to the client program. (An access link to that web page)
- The client then receives the page source and renders it(Into a viewable/under a stable website)
- Now the user types into the search bar
- The client then submits data to the server
- The server processes the data and replies back with a related search result
- The client again renders it back for the user's view
- The user gets access to the requested link.

Client-side Uses

- Makes interactive web pages
- Make stuff work dynamically
- Interact with temporary storage
- Works as an interface between user and server
- Sends requests to the server

- Retrieval of data from Server
- Interact with local storage
- Provides remote access for client-server program

Client-side Languages Example

- JavaScript
- VBScript
- HTML (Structure)
- CSS (Designing)
- AJAX
- jQuery etc.

Server-side Programming

- It is the general name for the kind of program that runs directly on the server.
- Or we can say that server-side programming must deal with dynamic content. It runs on the server. Most web pages are not static since they deal with searching databases.
- Web browsers communicate with web servers using the **H**yper**T**ext **T**ransfer **P**rotocol (HTTP).
- When you click a link on a web page, submit a form, or run a search, an **HTTP request** is sent from your browser to the target server.
- Server side web development uses specific tools and frameworks to build dynamic programs that generates dynamic web sites.
- It provides an interface to users to make requests, give instructions to the server to process.
- Server side coding is also responsible for user authentication, and data security.
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Server-side Uses

- It processes the user input
- Displays the requested pages
- Structure of web applications
- Interaction with servers/storages
- Interaction with databases
- Querying the database
- Encoding of data into HTML
- Operations over databases like delete, update.

Server-side Languages Example

- PHP
- ASP.NET (C# OR Visual Basic)
- C++
- Java and JSP
- Python
- Ruby on Rails and so on.

Basis	Client-side Scripting	Server-side Scripting
Primary Function	The primary function of client-side scripting is to provide the requested output to the end-user	The primary function of server-side scripting is to manipulate and give access to the required database as per request.
Uses	The client-side is used as the front end, where the user gets to see what we have browsed.	The server-side is used as a back-end where data is processed and is not visible to the client user.
Code allowance	On the client side, the user is allowed to access the code written after verifying the user's need.	Server-side scripting allows the back-end developer to hide the source code from the user.
Processing	The client-side does not need any interaction with the server.	Server-side scripting on the other hand is all about communicating with the servers.
Function	Used for the visibility and getting out the required data from servers database	Used for the customization or modification of the data to change the website dynamically.
Dependability	Client-side scripting depends upon the user's browser version.	Serve-side does not depend on the client.
Security	This way of scripting is less secure than Server-side scripting because of the accessibility of code provided to the client.	Server-side scripting is considered as a more secure way while working on a web application
Connectivity	The client-side does not connect to the database at the webserver.	The server-side helps connect with the database, which is already stored in the server database.
File Access	It does have any access to the files present in the web servers. But we have an option to upload files from the front end	It has total access to the files which are stored in the web database server.
Occurrence	It occurs when the browser process all the codes, and then it reacts according to the client's query.	It only acts after the client initiates the browsing request.
Running	It runs on the end-users system.	It runs on the webserver.
Languages	HTML, JavaScript, CSS are used to display the request	PHP, Python, Ruby, nodejs are some of the programming languages used at server-side

web server

- The term *web server* can refer to hardware or software, or both of them working together.
- A web server is software and hardware that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to client requests made over the World Wide Web.
- The main job of a web server is to display website content through storing, processing and

delivering webpages to users.

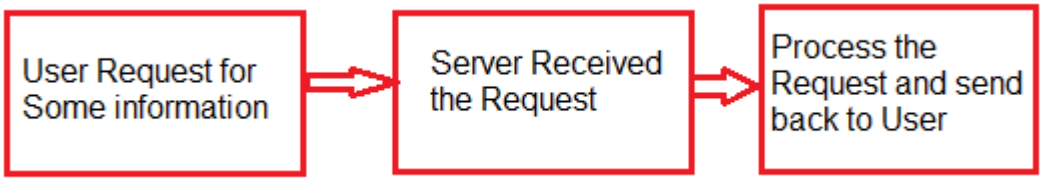
- On the hardware side, a web server is a computer that stores web server software and a website's component files (for example, HTML documents, images, CSS stylesheets, and JavaScript files)
- A web server connects to the Internet and supports physical data interchange with other devices
- On the software side, a web server includes several parts that control how web users access hosted files.
- this is an *HTTP server*. An HTTP server is software that understands URLs (web addresses) and HTTP (the protocol your browser uses to view webpages).
- web servers also support SMTP (Simple Mail Transfer Protocol) and FTP (File Transfer Protocol), used for email, file transfer and storage.

Examples of web server uses

- sending and receiving emails;
- downloading requests for File Transfer Protocol (FTP) files; and
- building and publishing webpages

Internet Information Services (IIS)

- The term "IIS" stands for Internet Information Services, which is a general-purpose webserver that runs on the Windows operating system.
- An IIS web server accepts requests from remote client computers and returns the appropriate response.
- This basic functionality allows web servers to share and deliver information across local area networks (LAN), such as corporate intranets, and wide area networks (WAN), such as the Internet.
- A web server provides the users with information in several different forms, such as File exchanges as a download, uploads, Images files, HTML pages, and text documents.



How IIS works

- IIS works through a variety of standard languages and protocols.
- HTML is used to create elements such as text, buttons, image placements, direct interactions/behaviors and hyperlinks.
- The Hypertext Transfer Protocol (HTTP) is the basic communication protocol used to exchange information between web servers and users. HTTPS -- HTTP over Secure Sockets Layer (SSL) -- uses Transport Layer Security or SSL to encrypt the communication for added data security.
- The File Transfer Protocol (FTP), or its secure variant, FTPS, can transfer files.
- Additional supported protocols include the Simple Mail Transfer Protocol (SMTP), to send and receive email

IIS works with ASP.NET

- The ASP.NET Core framework is the latest generation of Active Server Page (ASP), a server-side script engine that produces interactive webpages.
- A request comes in to the IIS server from the web, which sends the request to the ASP.NET Core application, which processes the request and sends its response back to the IIS server and the client who originated the request.
- Examples of applications written on ASP.NET Core include blog platforms and content management systems (CMS).

Apache web Server

- Apache is the most widely used Web Server application in Unix-like operating systems but can be used on almost all platforms such as Windows, OS X, OS/2, etc.
- The word, Apache, has been taken from the name of the Native American tribe '*Apache*', famous for its skills in warfare and strategy making.
- Apache HTTP Server is a free and open-source web server that delivers web content through the internet
- Apache is Developed and maintained by Apache Software Foundation, Apache is open source software and available for free. And It's fast, reliable, and secure.

Features of Apache Web Server

- Handling of static files
- Loadable dynamic modules
- Auto-indexing
- .htaccess
- Compatible with IPv6
- Supports HTTP/2
- FTP connections
- Perl, PHP, Lua scripts
- Session tracking
- URL rewriting
- Geolocation based on IP address

How does Apache Web Server Work?

- Apache functions as a way to communicate over networks from client to server using the TCP/IP protocol.
- Apache can be used for a wide variety of protocols, but the most common is HTTP/S. HTTP/S or Hyper Text Transfer Protocol (S stands for Secure) is one of the main protocols on the web
- Hypertext Transfer Protocol Secure is usually through port 443 with the unsecured protocol being through port 80.
- The Apache server is configured via config files in which modules are used to control its behavior.
- By default, Apache listens to the IP addresses configured in its config files.

Features Of IIS & Apache

Feature	IIS	Apache
Supported OS	Windows	Linux, Unix, Windows, Mac OS
User support & fixes	Corporate support	Community Support
Cost	Free, but bundled with Windows	Completely free
Development	Closed, proprietary	Open source
Security	Excellent	Good
Performance	Good	Good

S.No	IIS Web Server	Apache Tomcat Server
1	IIS webserver is operating system dependent. It runs in only windows environment.	Apache webserver is operating system independent. i.e., Apache can run on almost any OS including UNIX, Apple's OS X, and on most Linux Distributions.
2	IIS is developed by Microsoft.	Apache is developed by Apache Foundation .
3	IIS server runs in user space and Kernal space.	Apache server runs in user space only.
4	IIS is not Open Source.	Apache webserver is open source. i.e., Apache is known to be open source because the source code is available for configuration as per our requirements, its a linux based product.
5	IIS is both webserver and application server.	Apache tomcat server is only webserver.
6	IIS has a dedicated staff to answer most problems.	Support for Apache comes from the community itself.