Unit 1 : Web Programming

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COURSE: BACHELOR OF COMPUTER APPLICATIONS (BCA)

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NAME OF THE SUBJECT: WEB PROGRAMMING

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COLLEGE: KAMANI SCIENCE COLLEGE, AMRELI

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Topics

- Static and Dynamic Web
- Client side & Server Side Scripting
- Introduction to other server side language
- Webserver (IIS & Apache)
- HTTP & HTTPS protocol
- FTP
- Web Hosting, Virtual Host, Multi-Homing
- Distributed Web Server Overview
- Document Root
- JSON
- Introduction to JSON
- Installation & Configuration
- Resource Types
- JsonSerializable
- JSON Functions : json_decode, json_encode

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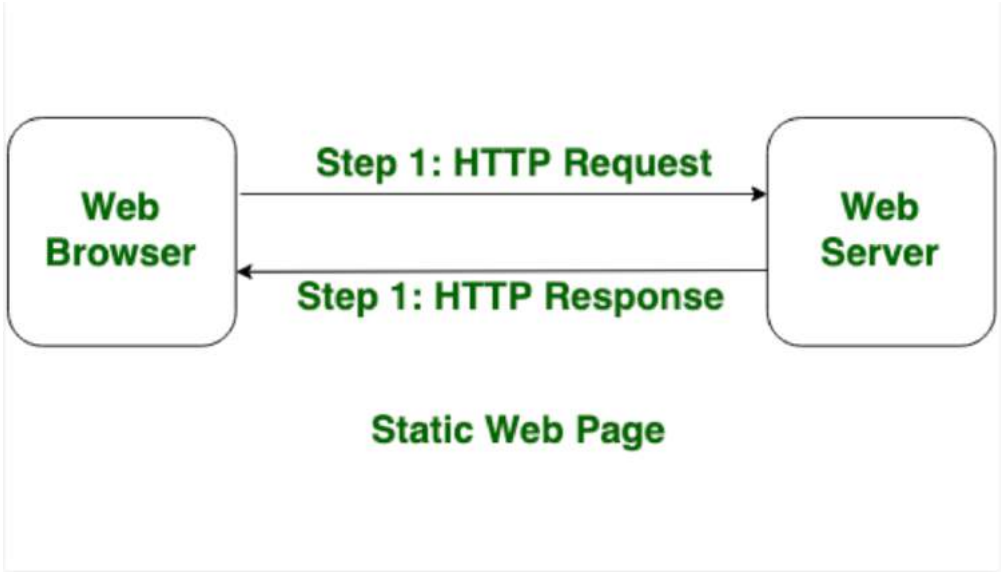
Static web page

- Static Web pages are very simple.
- It is written in languages such as HTML, JavaScript, CSS.
- For static web pages when a server receives a request for a web page, then the server sends the response to the client without doing any additional process.
- These web pages are seen through a web browser.
- In static web pages, Pages will remain the same until someone changes it manually.



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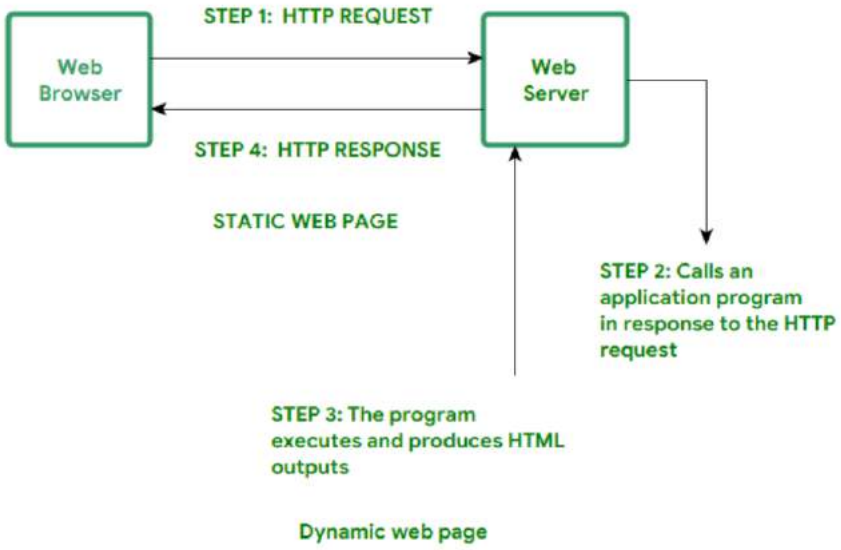
Dynamic Web Pages

- Dynamic Web Pages are written in languages such as PHP, JAVA, ASP, ASP.NET, Python, etc.
- In dynamic web pages, the Content of pages is different for different visitors.
- It takes more time to load than the static web page.
- Dynamic web pages are used where the information is changed frequently, for example, stock prices, weather information, etc.



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Static v/s Dynamic web page

Static web Page	Dynamic web Page
In static web pages, Pages will remain same until someone changes it manually.	In dynamic web pages, Content of pages are different for different visitors.
Static Web Pages are simple in terms of complexity.	Dynamic web pages are complicated.
In static web pages, Information are change rarely.	In dynamic web page, Information are change frequently.
Static Web Page takes less time for loading than dynamic web page.	Dynamic web page takes more time for loading.
In Static Web Pages, database is not used.	In dynamic web pages, database is used.

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Static web Page	Dynamic web Page
Static web pages are written in languages such as: HTML, JavaScript, CSS, etc.	Dynamic web pages are written in languages such as: PHP, Java, ASP, ASP.NET, Python etc.
Static web pages does not contain any application program .	Dynamic web pages contains application program for different services.
Static web pages require less work and cost in designing them.	Dynamic web pages require comparatively more work and cost in designing them.

Client Side Scripting

- Client-side scripting is performed to generate a code that can run on the client end (browser) without needing the server side processing.
- Basically, these types of scripts are placed inside an HTML document.
- The client-side scripting can be used to examine the user's form for the errors before submitting it and for changing the content according to the user input.

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Server Side Scripting

- Server-side scripting is a technique of programming for producing the code which can run software on the server side.
- In simple words any scripting or programming that can run on the web server is known as server-side scripting.
- The operations like customization of a website, dynamic change in the website content, response generation to the user's queries, accessing the database, and so on are performed at the server end.

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Client v/s Server side scripting

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 used	PHP, ASP .NET, Ruby on Rails, ColdFusion, Python, etcetera.	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

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Webserver : IIS and Apache

Apache	IIS
Apache is free.	IIS is packaged with Windows.
Apache can run on almost any OS including UNIX, Apple OS X, and on most Linux Distributions.	IIS only runs on Windows.
Apache comes from the community itself.	IIS has a dedicated staff to answer most problems while support.
Apache optimized for the most of the OS including UNIX, Apple's OS X, Linux.	IIS is optimized for Windows because they are from the same company.
The original Apache web server is based upon HTTP code largely credited for revolutionizing the entire World Wide Web. As an open-source software product, the earlier days saw it being used to mainly work with Unix and Unix-like platforms, even though it could be tweaked to work within the Windows environment.	Since Windows NT 4.0 launched, Microsoft IIS has been available as an optional feature on Windows Server operating systems. At the time, IIS 3.0, was a basic application and didn□t really get its push as a true platform until IIS 4.0. The Microsoft server took off with the release of Windows Server 2003 and IIS 6.0, which was far more superior to previous editions. With the recent release of Windows Server 2008, IIS 7.0 was introduced, unleashing power and performance that would make it one of the most effective web servers on the market.

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HTTP v/s HTTPS

Parameter	HTTP	HTTPS
Protocol	It is hypertext transfer protocol.	It is hypertext transfer protocol with secure.
Security	It is less secure as the data can be vulnerable to hackers.	It is designed to prevent hackers from accessing critical information. It is secure against such attacks.
Port	It uses port 80 by default	It was use port 443 by default.
Starts with	HTTP URLs begin with http://	HTTPs URLs begin with https://
Used for	It's a good fit for websites designed for information consumption like blogs.	If the website needs to collect the private information such as credit card number, then it is a more secure protocol.
Scrambling	HTTP does not scramble the data to be transmitted. That's why there is a higher chance that transmitted information is available to hackers.	HTTPS scrambles the data before transmission. At the receiver end, it descrambles to recover the original data. Therefore, the transmitted information is secure which can't be hacked.

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Parameter	HTTP	HTTPS
Protocol	It operates at TCP/IP level.	HTTPS does not have any separate protocol. It operates using HTTP but uses encrypted TLS/SSL connection.
Domain Name Validation	HTTP website do not need SSL.	HTTPS requires SSL certificate.
Data encryption	HTTP website doesn't use encryption.	HTTPS websites use data encryption.
Search Ranking	HTTP does not improve search rankings.	HTTPS helps to improve search ranking.
Speed	Fast	Slower than HTTP
Vulnerability	Vulnerable to hackers	It Is highly secure as the data is encrypted before it is seen across a network.

FTP

- FTP stands for File transfer protocol.
- FTP is a standard internet protocol provided by TCP/IP used for transmitting the files from one host to another.
- It is mainly used for transferring the web page files from their creator to the computer that acts as a server for other computers on the internet.
- It is also used for downloading the files to computer from other servers.
- Although transferring files from one system to another is very simple and straightforward, but sometimes it can cause problems. For example, two systems may have different file conventions. Two systems may have different ways to represent text and data. Two systems may have different directory structures. FTP protocol overcomes these problems by establishing two connections between hosts. One connection is used for data transfer, and another connection is used for the control connection.

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Web Hosting

- Web hosting is the place where all the files of your website live. It is like the home of your website where it actually lives.
- A good way to think about this is if the domain name was the address of your house, then web hosting is the actual house that address points to. All websites on the internet, need web hosting.
- When someone enters your domain name in a browser, the domain name is translated into the IP address of your web hosting company's computer. This computer contains your website's files, and it sends those files back to the users' browsers.

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Virtual Host

- Virtual hosting is a method for hosting multiple domain names (with separate handling of each name) on a single server (or pool of servers).
- This allows one server to share its resources, such as memory and processor cycles, without requiring all services provided to use the same host name. This is often used for shared web hosting as many customers can be hosted on single server, making it a cost effective solution.

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Multi Homing

- Multi-homing is a method of configuring one computer, called the host, with more than one network connection and IP address. The multi-homed method provides enhanced and reliable Internet connectivity without compromising efficient performance.
- With more and more Internet-connected devices, an organization's workforce is no longer sequestered to a single location. Instead, an organization may have employees connecting to their internal network and accessing sensitive data from across the globe. Because of this, old access security measures are no longer enough and must be replaced with safeguards that allow employees and other verified users safe and secure access from anywhere, at any time, from any device.

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Distributed Web Server

- In distributed architecture, components are presented on different platforms and several components can cooperate with one another over a communication network in order to achieve a specific objective or goal.
- In this architecture, information processing is not confined to a single machine rather it is distributed over several independent computers.
- A distributed system can be demonstrated by the client-server architecture which forms the base for multi-tier architectures; alternatives are the broker architecture such as CORBA, and the Service-Oriented Architecture (SOA).
- There are several technology frameworks to support distributed architectures, including .NET, J2EE, CORBA, .NET Web services, AXIS Java Web services, and Globus Grid services.
- Middleware is an infrastructure that appropriately supports the development and execution of distributed applications. It provides a buffer between the applications and the network.
- It sits in the middle of system and manages or supports the different components of a distributed system. Examples are transaction processing monitors, data convertors and communication controllers etc.

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Document Root

- The document root is a directory (a folder) that is stored on your host's servers and that is designated for holding web pages.
- When someone else looks at your web site, this is the location they will be accessing.
- In order for a website to be accessible to visitors, it must be published to the correct directory, the "document root."
- You might think that there would only be one directory in your space on your host's servers, but often hosts provide services beyond just publishing a website. In this case, they are likely to set up every account with several directories, since each service would require its own.

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JSON

- JSON stands for **J**ava**S**cript **O**bject **N**otation
- JSON is a lightweight format for storing and transporting data
- JSON is often used when data is sent from a server to a web page
- JSON is "self-describing" and easy to understand.
- The JSON format is syntactically identical to the code for creating JavaScript objects.
- Because of this similarity, a JavaScript program can easily convert JSON data into native JavaScript objects.
- **The JSON syntax is derived from JavaScript object notation syntax, but the JSON format is text only. Code for reading and generating JSON data can be written in any programming language.**

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Recourse Type: JSON Data(scalar)

- JSON data is written as name/value pairs, just like JavaScript object properties.
- **JSON names require double quotes. JavaScript names do not.**
- A name/value pair consists of a field name (in double quotes), followed by a colon, followed by a value:
- "firstName":"some_text"

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Recourse Type: JSON Objects

- JSON objects are written inside curly braces.
- Just like in JavaScript, objects can contain multiple name/value pairs:
- {"firstName":"some_text", "lastName":"some_text"}

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Recourse Type: JSON Array

- JSON arrays are written inside square brackets.
- Just like in JavaScript, an array can contain objects:
- "employees":[
- {"firstName":" some_text ", "lastName":" some_text "},
- {"firstName":" some_text ", "lastName":" some_text "},
- {"firstName":" some_text ", "lastName":" some_text "}
-]

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Converting a JSON Text to a JavaScript Object

- A common use of JSON is to read data from a web server, and display the data in a web page.
- For simplicity, this can be demonstrated using a string as input.
- First, create a JavaScript string containing JSON syntax:

Code

```
<p id="demo"></p>
var text = '{ "employees" : [' +
'{ "firstName":" some_text " , "lastName":" some_text " },' +
'{ "firstName":" some_text " , "lastName":" some_text " },' +
'{ "firstName":" some_text " , "lastName":" some_text " } ]}';
var obj = JSON.parse(text);
<script>
        document.getElementById("demo").innerHTML =
        obj.employees[1].firstName + " " + obj.employees[1].lastName;
</script>
```

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JSON Serialization and deserialization

- JSON is a format that encodes objects in a string. Serialization means to convert an object into that string, and deserialization is its inverse operation (convert string -> object).
- When transmitting data or storing them in a file, the data are required to be byte strings, but complex objects are seldom in this format. Serialization can convert these complex objects into byte strings for such use. After the byte strings are transmitted, the receiver will have to recover the original object from the byte string. This is known as deserialization.
- Say, you have an object:
- {foo: [1, 4, 7, 10], bar: "baz"}
- serializing into JSON will convert it into a string:
- '{"foo":[1,4,7,10],"bar":"baz"}'

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PHP json_decode() and json_encode()

- JSON is a standard text-based format, similar but more lightweight than XML. It holds anonymous data that may be parsed into variables.
- It is often used to read server data and output it in a webpage.
- JSON can be handled by using inbuilt PHP functions.
- **For example**, a PHP object might be turned into JSON format file using PHP json_encode() function. For the opposite transformation, use PHP json_decode().

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Assignment Questions (IMP)

1. JSON stands for ?
2. HTTP stands for ?
3. Which function is used to convert json object to array ?
4. What is root directory in xampp ?
5. Attempt Any One Question:
6. Difference: Client side scripting language V/s Server side scripting language.
7. Explain FTP.
8. Explain Web server.
9. What is JSON ? explain json_encode() and json_decode().
10. Explain types of web hosting
11. Difference Between : Static V/s Dynamic Web.

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