

Chapter 4

Web Technology

Web Page

Web pages are developed with the help of HTML. HTML stands for Hyper Text Markup Language. It is called language of the internet.

Communication on the web

There are different forms of communication on the internet like sending e-mail, accessing web pages etc. Web pages are accessed using HTTP protocol. Internet protocol provides the basics for communication. Communication on the internet can be classified into two, Client to server and server to server. Authentication and security are essential for communication. Authentication is the process of identifying a computer (server). Security prevents loss of data.

i) Client to Server communication

Client to Server communication does not require authentication, but certain applications like e-mail, e-banking etc. require user name and password. These communications are done in a secure manner. In such situation HTTPS (Hyper Text Transfer Protocol Secure) is used. It works using SSL (Secure Socket Layer) which ensures security. When a request is sent by browser the server returns SSL certificate. It is then verified by browser, and it then starts communication. This communication takes place in encrypted form.

ii) Server to Server communication

Server to Server communication takes place in e-commerce (online shopping). In such communication confidential information is sent and received. A payment gateway acts as a bridge between server and bank server.

Web Server

A web server is a computer that processes request and distributes information. They are often used to host (store) webpages (websites). It delivers different services such as www, e-mail, blog etc. A web server is a powerful computer, usually installed in a data center. A data center is used to house computer and associated components.

They are used for storing and processing data.

A web server software is a program that uses client-server model and HTTP to distribute information to users. Some of the commonly used web server packages are Apache Server, Microsoft Internet Information Server (IIS), Google Web Server etc.

Ports

Hardware ports are used to connect external devices like keyboard, mouse, monitor etc. software ports are used to connect client computer to server computer. They are also used to identify different services such as file transfer, e-mail etc. Software ports are given unique numbers. A port number is a 16-bit number.

Some of the commonly used ports and services are

Port Number	Service
20 & 21	FTP (File Transfer Protocol)
25	SMTP (Simple Mail Access Protocol)
53	DNS (Domain Name System)
80	HTTP (Hypertext Transfer Protocol)
110	POP3 (Post Office Protocol)
443	HTTPS (HTTP Secure)

DNS Server

DNS Server is used to resolve (convert) domain name into IP. The process of translating domain name to IP address is called name resolution. The internet contains thousands of interconnected DNS servers. When you type a URL in your browser, the browser contacts the DNS server to find IP address. The DNS database is arranged in a hierarchical manner.

The different steps used in resolving the IP address by DNS are as follows

- 1) The browser first searches the local memory for the corresponding IP address.
- 2) If it is not found it searches the system's cache.
- 3) If it is not found it searches the DNS server of local ISP.

- 4)It seaches from root till it find's the IP address.
- 5)The ISP returns the IP address to the browser.
- 6)The browser connects using the IP address if not it displays error message.

Web designing

The first step in setting a web site is planning the web pages.Any text editor can be used to design web pages.Several softwares are also available for designing web designing.Some of the commonly used software are Adobe dream weaver,Microsoft Expression Web etc.

Static and dynamic web pages

A static web pages contains the same content each time the page is loaded,while the content of dynamic web page changes .Web pages created using HTML are usually static.Dynamic web pages are executed using server side application programs installed on web server.Technologies like PHP,ASP,JSP etc are used to create dynamic web pages.

Difference between Static and Dynamic web page

The main difference between static and dynamic web pages are ,

Static web page	Dynamic web page
The content is fixed.	The content changes.
They does not use database.	They use database to change conents.
They are executed on browser.	They are executed on server and displays reult on browser(client).
Easy to develop and less expensive.	Difficult to develop and expensive.

Scripts

The program code written inside HTML pages are called scripts. The commonly used scripting languages are java script, VB script, PHP, perl etc. The **<script>** and **</script>** tag are used in HTML to embedd scripts .

Different types of scripting languages

Scripts are of two types **Client side script** and **Server side script**.

Client side scripts are self contained on HTML page and do not rely on external database. They are executed by the browser. Java script is the most common client side scripting language. They are often used to validate user input, enhance web pages etc. Some of the popular client side scripting languages are VB Script, Action script, DART etc.

Server side script runs on a server. They accepts data, process data and generates documents. Server side scripts are used to create dynamic web pages. They can access database. Some of the popular server side scripting languages are Perl, ASP, JSP, PHP etc.

Difference between Client side and Server side script

Client side scripts	Server side scripts
They are executed by the browser(Client).	They are executed by the web server.
Used for validating user inputs.	Used for processing data.
They are used to create static web pages.	They are used to create dynamic web pages
Depends on browser type.	Does not depend on browser.

Scripting languages

A script is a program executed on the web page. The languages that are used to create scripts are called scripting languages. Some of the popular scripting languages are Java Script, VB Script, PHP..etc.

Java Script

Java script is a client side scripting language used to create interactive web pages. It was developed by Netscape. It is an interpreted language. It is executed by most web browsers. It is mainly used to validate forms. A java script file has the extension ‘.js’.

AJAX

AJAX stands for Asynchronous JavaScript and XML. It is a technology used to update parts of web pages without reloading the whole page. It is used to create dynamic and interactive web applications. For example Google Map is based on AJAX technology. AJAX mainly consists of two languages Java Script and XML.

VB Script

VB Script is a scripting language developed by Microsoft. It is based on Visual Basic programming language. It can be used for Client side as well as Server side scripting.

PHP

PHP stands for Hypertext Preprocessor. It is a server side scripting language. PHP codes are inserted inside HTML code. PHP codes are executed by the web server. It supports database programming. It runs on various platforms (Windows, Unix, Linux etc.). The advantages of PHP are

- It runs on different platforms.
- It is compatible with different servers.
- It supports different databases.
- It is an open source language.
- It is easy to learn.

ASP(Active Server Page)

ASP is a server side scripting language used to create interactive web pages. An ASP file has **‘.asp’** extension. An asp file contains text, HTML tags and scripts. The advantages of ASP are,

- The code written in text mode.
- It does not need any server side installation.
- ASP applications are very small.
- ASP components can be modified without effecting server functions.

JSP(Java Server Page)

JSP is a server side scripting language developed by Sun Microsystems. JSP pages are compiled into servlets before they are used. A JSP file has **‘.jsp’** extension.

CSS(Cascading Style Sheet)

CSS is a style sheet language used for describing the appearance of document written in markup language such as HTML. It can be used to control the colour of text, style of font etc. The advantages of CSS are

- Easy to read and maintain code.
- Ability to change appearance by changing a single file.
- Greater control over web elements .

HTML(Hyper Text Markup Language)

HTML is used to create web pages. The commands used in HTML are called tags. Tags begin with opening angle bracket(< >) and end with closing angle bracket(</ >).

Tags in HTML are of two types, **Empty tag** and **Container tags**.

Empty tag: An empty tag is also known as single tag. For example <p>, <hr> etc.

Container tags: Container tags are also known as paired tags. For example, <u></u>, <body> </body> etc. They always appear as pairs.

Attributes

The additional information supplied with HTML tags are called attributes. For example Face, Size are attributes of Font tag.

Structure of HTML page

An HTML page begins with `<HTML>` and `</HTML>`. The source code is written using a text editor (Notepad, Text Pad, Notepad++ etc.). The files are saved with extension **.htm** or **.html**. The HTML documents are viewed in a web browser such as Internet Explorer, Firefox, Safari etc.

The basic structure of an HTML document is as follows

```
<HTML>
```

```
    <HEAD>
```

Head section

```
    </HEAD>
```

```
    <BODY>
```

Body section

```
    </BODY>
```

```
</HTML>
```

HTML Tag

An HTML document begins with `<HTML>` tag and ends with `</HTML>`. The `<HTML>` tag helps to identify an HTML document.

Attributes of HTML tag

Lang: The lang tag is used to specify the language used in the web page.

Dir: The Dir tag specifies the direction in which text should be displayed in web browser. Normally it is displayed from left to right. This attribute has two values **ltr (Left to Right)** and **rtl (Right to Left)**.

Example:

```
<HTML Lang="Fr" Dir="rtl">
```

Language is set to French and Direction of text to Right to Left.

Note:HTML is not case sensitive(upper and lower case are treated same).

<HEAD> Tag

The <HEAD> tag defines head section of HTML document.

<TITLE> Tag

The <TITLE> tag defines the title of the HTML document.

```
<TITLE> Title Text </TITLE>
```

Note:The <TITLE> Tag is placed inside <HEAD> tag.

<BODY> Tag

The <BODY> Tag defines the body section of HTML document.

Attributes of BODY Tag

The main attributes of <BODY> tag are,

1)**Bgcolor**:-It specifies the background color of the document.

Note:-The colour name can be directly specified(Like green,blue etc) or we can use hexadecimal number(Like #0000-Black,#FFFFFF-White etc).

2)**Background**:-It specifies the background image for the document.

3)**Text**:-It specifies the colour of Text displayed on the document.Default colour is black.

4)**Link**:-It specifies the colour of unvisited link.The default colour is blue.

5)**Alink**:-It specifies the colour of active link.The default colour is green.

6)**Vlink**:-It specifies the colour of visited link.The default colour is purple.

7)**Leftmargin**:-Specifies the left margin from where the text in the body appears.

8)**Topmargin**:-Specifies the top margin from where the text in the body appears.

Headings in HTML

HTML allows to insert headings into a web page. HTML supports headings from **<H1>** to **<H6>**. Important attributes of these tags are,

Left:-Aligns text to left margin.

Right:-Aligns text to right margin.

Center:-Aligns text to center of the page.

Example:-

```
<HTML>

  <HEAD>

    <TITLE>

      Headings in HTML

    </TITLE>

  </HEAD>

  <BODY>

    <H1>Heading1</H1>

    <H2>Heading2</H2>

    <H3>Heading3</H3>

    <H4>Heading4</H4>

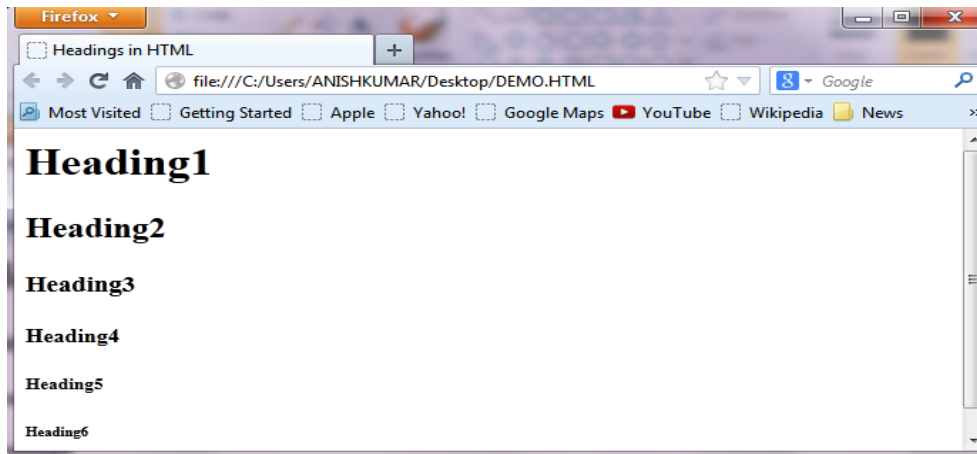
    <H5>Heading5</H5>

    <H6>Heading6</H6>

  </BODY>

</HTML>
```

Output:



<P>Tag

The <P> tag is used for paragraph separation in an HTML document.

Attributes of <P> tag

The Align attribute of <P> tag is used to set the alignment of text in the paragraph. It has three values: left, right, center or justify.

**
 Tag**

The
 tag is used to insert a line break.

**Difference between <P> and
 tag**

The <P> tag inserts a blank line immediately after it (ie, the next content appears after a blank line) but
 tag does not insert a blank line after the line break.

<HR> Tag

The <HR> tag is used to create a horizontal line in HTML.

Attributes of <HR> Tag

- 1)**Size**:-It specifies the thickness of the line.
- 2)**Width**:-It specifies the width of the line.
- 3)**Align**:-It specifies the alignment of the line (Left, Right and Center).

4)**Color:-**Specifies colour of the line.

5)**Noshade:-**It specifies if line should have shadow effect or not.

<CENTER> tag

The **<CENTER>** Tag is used to center the content to the center of the web page.

<CENTER> Contents **</CENTER>**

Text formatting tags

The text formatting tag is used to format text in a web page. The important text formatting tags are, bold, italics and underline etc.

** tag:-**This tag displays the content in bold face.

<I>tag:-This tag displays the content in italics.

<U>:-This tag underlines the content.

<S> and <STRIKE> Tag

The **<S>** and **<STRIKE>** Tag displays the text in strike through style.

Example:**<STRIKE>** hello **</STRIKE>**

Output:-~~hello~~

<BIG>Tag

The **<BIG>** tag is used to increase the size of text.

<SMALL> Tag

The **<SMALL>** tag decreases the size of the text.

Note:-The size of text will be less than the current font.

** Tag**

The **** tag will display text with **strong** emphasis(usually appears as bold).

** Tag**

The tag displays the enclosed text with emphasis(italics text).

<SUB> and <SUP> Tags

The <SUB> tag defines the subscript and <SUP> tag defines the superscript.

Example 1:-

^H

₂

^S

^O

₄

Output:- H_2SO_4

Example 2:-

^N

₂

⁺

^H

₂

⁼

^{2NH}

₃

Output:- $\text{N}_2 + \text{H}_2 = 2\text{NH}_3$

<BLOCKQUOTE> and <Q> Tag

The <blockquote> tag is used for indicating long quotations(ie, quotation that span multiple lines).The <Q> tag is used to quote the text.

<PRE> Tag

The <PRE> tag defines preformatted text ie, it displays text in exactly the characters and line spacing written in the source document.

<ADDRESS> tag

The <ADDRESS> tag defines the contact information for the author/owner of a document(article). The information may include name, phone number, e-mail address etc.

<MARQUEE> Tag

The <MARQUEE> tag defines the text that scrolls across the user's display.

Attributes of <MARQUEE> tag

The important attributes of <MARQUEE> tag are,

- 1) **Height and Width**:- It determines the size of marquee area.
- 2) **Hspace and Vspace**:- It defines the space between marquee and the surrounding text.
- 3) **Scrollamount and Scrolldelay**:- These attributes control the speed and smoothness of scrolling marquee.
- 4) **Behaviour**:- It defines the type of scrolling. It has three values scroll, slide and alternate.
- 5) **Loop**:- It specifies how many times the marquee text must scroll. The default value is endless.
- 6) **Direction**:- It specifies the direction of scroll.

<DIV> Tag

The <DIV> tag defines a division or a section in an HTML document.

Attributes of <DIV> tag

Align:-It defines horizontal alignment.It can have values left,right ,center and justify.

Id:-It assigns an identifier to the tag.

Style:-It is used to render colour,font etc.

** Tag**

The tag allows to define size,colour,style of text.

Attributes of Tag

Face:-It specifies the font name.

Size:-It specifies the font size.The default value is 3.

It defines color to the text.

Escape Sequences

The & symbol is used to indicate escape sequence.

Symbols	Character Code
&	&
<	<
>	>
©	©
®	®

Comments in HTML

Comments helps to understand code and increases readability of the code.Comments in HTML are placed between <!-- - and - ->.

Inserting images in a webpage

The tag is used to insert image in a web page.

Attributes of tag are,

- 1)**Src**:-It specifies the name of image.
- 2)**Align**:-It controls alignment of the image(TOP,MIDDLE or BOTTOM).
- 3)**Width**:-It specifies the width of the image.
- 4)**Height**:-It specifies the height of the image.
- 5)**Alt**:-It defines the text to be displayed if the browser cannot display the image.
- 6)**Vspace and Hspace**:-Controls the vertical and horizontal spacing between images in the web page.

Conclusion:-

- The role of a router is to route and transport data packets using internet.
- TCP/IP protocol is flexible and handle messages ,video,e-commerce etc.
- Cascading Style Sheet(CSS) provides uniform style style to an entire web page.
- Software ports are used to identify various services such as e-mail,file transfer etc.
- HTML was created by Tim Berners Lee.
- Tags are not case sensitive.
- The default font size is 3.
- Popular server Operating Systems are Redhat,SUSE,Debian,Ubuntu etc.
- DNS returns IP address of domain name.
- A software port consists of 16 bits.
- An HTML document has two parts head section and body section.
- The default colour of Alink is green.
- The default colour of Vlink is purple.
- The ALT attribute in tag is used to define text that should be displayed if the image cannot be displayed by the browser.
- The main attributes of tag are FACE and SIZE.
- The default alignment of an image in HTML is left.