WEB TECHNOLOGIES

B.Tech IT III YEAR II SEMESTER
UNIT – I

OVERVIEW:

This unit provides information about web technologies that relate to the interface between web servers and their clients. This information includes markup languages, programming interfaces and languages, and standards for document identification and display. The term "Web 2.0" (2004–present) is commonly associated with web applications that facilitate interactive information sharing, interoperability, user-centered design and collaboration on the World Wide Web. Examples of Web 2.0 include web-based communities, hosted services, web applications, social-networking sites, video-sharing sites, wikis, blogs and folksonomies. A Web 2.0 site allows its users to interact with other users or to change website content, in contrast to non-interactive websites where users are limited to the passive viewing of information that is provided to them.

OBJECTIVES

• Introduction to Web Technologies
• Explain how does client sever model work
• HTML & HTTP Protocol, Basic structure
• Lists & Tables
• Images & Hyper Links
• Forms & Frames
• Cascading Style Sheets(CSS)
Introduction to Web Technologies

WWW (World Wide Web) simply called as WEB is the collection of millions of web pages across thousands of computers.

A web page refers to any document on the web. Every web page is identified by a unique URL in the internet and it contains hyper text i.e different types of text such as plain text, graphics, animation, Audio, video etc.

Web technology relates to the interface between web servers and their clients. It includes markup languages, programming interfaces and languages, and standards for document identification and display.

A web application is any application that is specifically used through a web browser. Some examples of web applications include, ON Line Book Store, Shopping, Citrix Meta frame applications and any number of tools such as package tracking that are found on the Internet.

Accessing information on the Web

Information on the Web is stored in documents, using a language called HTML (HyperText Markup Language). Web clients must interpret HTML to be able to display the documents to a user. The protocol that governs the exchange of information between the Web server and Web client is named HTTP (HyperText Transfer Protocol).
External data in HTML documents

HTML documents can include graphics or other types of data by referencing an external file (for example, a GIF or JPEG file for a graphic). Not all these external formats are supported by all Web clients. When the document contains such data, the Web client can send a request to the Web server to provide the relevant graphic. If the Web client does not support the format, it does not request the information from the server.

Any Web Application we consider It follows Client – Server Technology

CLIENT / SERVER MODEL

Client server

Client/server describes the relationship between two computer programs in which one program, the client, makes a service request from another program, the server, which fulfills the request. Although programs within a single computer can use the client/server idea, it is a more important idea in a network. In a network, the client/server model provides a convenient way to interconnect programs that are distributed efficiently across different locations. Computer transactions using the client/server model are very common. For example, to check your bank account from your computer, a client program in your computer forwards your request to a server program at the bank. That program might in turn forward the request to its own client program that sends a request to a database server at another bank computer to retrieve your account balance. The balance is returned back to the bank data client, which in turn serves it back to the client in your personal computer, which displays the information for you.

Client server model diagram
**HTML**

**HTML, Hypertext Mark-up Language**, is the predominant markup language for developing web pages. It provides a means to describe the structure of text-based information in a document—by denoting certain text as links, headings, paragraphs, lists, etc.—and to supplement that text with interactive forms, embedded images, and other objects. HTML is written in the form of "tags" consisting minimally of "elements" surrounded by angle brackets. HTML can also describe, to some degree, the appearance and semantics of a document, and can include embedded scripting language code (such as JavaScript) that can affect the behavior of Web browsers and other HTML processors.

HTML is a language for describing web pages.

- HTML is a markup language
- A markup language is a set of markup tags
- The tags describe document content
- HTML documents contain HTML tags and plain text
- HTML documents are also called web pages

HTML markup tags are usually called HTML tags

- HTML tags are keywords (tag names) surrounded by **angle brackets** like `<html>`
- HTML tags normally **come in pairs** like `<b>` and `</b>`
- The first tag in a pair is the **start tag**, the second tag is the **end tag**
- The end tag is written like the start tag, with a **forward slash** before the tag name
- Start and end tags are also called **opening tags** and **closing tags**

`<tagname>content</tagname>`
**HTML Versions**

Since the early days of the web, there have been many versions of HTML:

<table>
<thead>
<tr>
<th>Version</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTML</td>
<td>1991</td>
</tr>
<tr>
<td>HTML+</td>
<td>1993</td>
</tr>
<tr>
<td>HTML 2.0</td>
<td>1995</td>
</tr>
<tr>
<td>HTML 3.2</td>
<td>1997</td>
</tr>
<tr>
<td>HTML 4.01</td>
<td>1999</td>
</tr>
<tr>
<td>XHTML 1.0</td>
<td>2000</td>
</tr>
<tr>
<td>HTML5</td>
<td>2012</td>
</tr>
<tr>
<td>XHTML5</td>
<td>2013</td>
</tr>
</tbody>
</table>

**Web Browsers**

The purpose of a web browser (such as Google Chrome, Internet Explorer, Firefox, Safari) is to read HTML documents and display them as web pages.

**HTML Page Structure**

Below is a visualization of an HTML page structure:

```html
<html>
  <head>
    <title>Welcome To WWW</title>
  </head>
  <body>
    <h1>This a heading</h1>
    <p>This is a paragraph.</p>
    <p>This is another paragraph.</p>
  </body>
</html>
```
Basic HTML Elements:

**<HTML>, <HEAD>, <BODY> Tags**

- Each HTML document is contained within the starting `<HTML>` & ending `</HTML>` tags.
- Each HTML document also includes a header section indicated by the `<HEAD>` tag which in turn contains elements like `<TITLE>`, `<META>` `<SCRIPT>` etc.
- Whatever the data we want to present must be written within `<BODY>` `</BODY>` tags.

**<META>**

This tag is mainly used to pass information about the web page to the external world, or to pass messages to the client such as the language of the document, last modified date etc. using the HTTP-EQUIV and CONTENT attribute pairs:

Example

```
<META HTTP-EQUIV="keywords" CONTENT="Biology, Chemistry">
<META HTTP-EQUIV="Last-Modified" CONTENT="Sep 06, 1996">
```

**HTML Paragraphs <p> tag**

HTML paragraphs are defined with the `<p>` tag.

Example

```
<p>This is a paragraph.</p>
<p>This is another paragraph.</p>
```

**<pre> Tag**

It is a *pre-formatted* tag : Displays as it is.

The data in html is displayed from left right and top to bottom irrespective of what ever format we write in program. Therefore to display as it is how we write in program we can use `<pre>` tag.
**HTML Headings**

HTML defines different types of headers using six header tags i.e. `<h1>` to `<h6>` tags.

The order of Font size is in decreasing order from h1 to h6

**Example**

```
<h1>HELLO</h1>
<h2>HELLO</h2>
<h3>HELLO</h3>
<h4>HELLO</h4>
<h5>HELLO</h5>
<h6>HELLO</h6>
```

![HTML Headings Example](image)

**<font> tag**

Specify the font size, font face and color of text:

```
<font size="3" color="red">This is some text!</font>
<font size="2" color="blue">This is some text!</font>
<font face="verdana" color="green">This is some text!</font>
```
### HTML Text Formatting Tags

<table>
<thead>
<tr>
<th>Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;b&gt;</code></td>
<td>Defines bold text</td>
</tr>
<tr>
<td><code>&lt;em&gt;</code></td>
<td>Defines emphasized text</td>
</tr>
<tr>
<td><code>&lt;i&gt;</code></td>
<td>Defines italic text</td>
</tr>
<tr>
<td><code>&lt;small&gt;</code></td>
<td>Defines smaller text</td>
</tr>
<tr>
<td><code>&lt;strong&gt;</code></td>
<td>Defines important text</td>
</tr>
<tr>
<td><code>&lt;sub&gt;</code></td>
<td>Defines subscripted text</td>
</tr>
<tr>
<td><code>&lt;sup&gt;</code></td>
<td>Defines superscripted text</td>
</tr>
<tr>
<td><code>&lt;strike&gt;</code></td>
<td>Defines striking text</td>
</tr>
<tr>
<td><code>&lt;del&gt;</code></td>
<td>Defines deleted text</td>
</tr>
<tr>
<td><code>&lt;u&gt;</code></td>
<td>Defines underline</td>
</tr>
</tbody>
</table>

### HTML "Computer Output" Tags

<table>
<thead>
<tr>
<th>Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;code&gt;</code></td>
<td>Defines computer code text</td>
</tr>
<tr>
<td><code>&lt;kbd&gt;</code></td>
<td>Defines keyboard text</td>
</tr>
<tr>
<td><code>&lt;samp&gt;</code></td>
<td>Defines sample computer code</td>
</tr>
<tr>
<td><code>&lt;var&gt;</code></td>
<td>Defines a variable</td>
</tr>
<tr>
<td><code>&lt;pre&gt;</code></td>
<td>Defines preformatted text</td>
</tr>
</tbody>
</table>
HTML Citations, Quotations, and Definition Tags

<table>
<thead>
<tr>
<th>Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;abbr&gt;</td>
<td>Defines an abbreviation or acronym</td>
</tr>
<tr>
<td>&lt;address&gt;</td>
<td>Defines contact information for the author/owner of a document</td>
</tr>
<tr>
<td>&lt;bdo&gt;</td>
<td>Defines the text direction</td>
</tr>
<tr>
<td>&lt;blockquote&gt;</td>
<td>Defines a section that is quoted from another source</td>
</tr>
<tr>
<td>&lt;q&gt;</td>
<td>Defines an inline (short) quotation</td>
</tr>
<tr>
<td>&lt;cite&gt;</td>
<td>Defines the title of a work</td>
</tr>
<tr>
<td>&lt;dfn&gt;</td>
<td>Defines a definition term</td>
</tr>
</tbody>
</table>

Attributes

Every Tag is associated with set of Attributes an attribute defines the characteristic of a particular tag.

An Attribute is represented as a name value pair with in a tag
A tag can contain any no of attributes separated by space

Example

The attributes of body tag are

```html
<body bgcolor=red text= green>
```

bgcolor represent the background color of the document and text represent the foreground color of the document.

HTML Lists

Lists are used to display the list of elements in an order

Basically HTML supports Three types of lists Ordered List , Un Ordered List Definition List

HTML Unordered Lists

An unordered list starts with the `<ul>` tag. Each list item starts with the `<li>` tag.
The list items are marked with bullets (typically small black circles).

Example

```html
<ul>
<li>Coffee</li>
<li>Milk</li>
</ul>
```

How the HTML code above looks in a browser:

- Coffee
- Milk

**HTML Ordered Lists**

An ordered list starts with the `<ol>` tag. Each list item starts with the `<li>` tag.

The list items are marked with numbers.

Example

```html
<ol>
<li>Coffee</li>
<li>Milk</li>
</ol>
```

How the HTML code above looks in a browser:

1. Coffee
2. Milk

**HTML Description Lists**

A description list is a list of terms/names, with a description of each term/name.

The `<dl>` tag defines a description list.

The `<dl>` tag is used in conjunction with `<dt>` (defines terms/names) and `<dd>` (describes each term/name):
Example

```html
<dl>
  <dt>Coffee</dt>
  <dd>- black hot drink</dd>
  <dt>Milk</dt>
  <dd>- white cold drink</dd>
</dl>
```

How the HTML code above looks in a browser:

Coffee
  - black hot drink
Milk
  - white cold drink

**HTML Links**

**Linking or Navigating from one page to another**

Html supports three types of Hyper Links

- Text Hyper Link (Text a Link)
- Graphical HyperLink (Image as a link)
- Link with in single document or Internal Link

HTML links are defined with the `<a>` tag.

Example

**Text Hyper Link**

```html
<a href="http://www.w3schools.com">Click</a>
```

**Graphical Hyper Link**

```html
<a href="Pictures.html"> <img src ="flower.gif" ></a>
```

**Internal Link**

```html
<h1><a name="seealso">See also</a></h1>
```
Or:

```html
<h1 id="seealso">See also</h1>
```

then link to it:
The compulsory attribute for <a> tag is **HREF** to specify linking page.

### HTML Images

HTML images are defined with the `<img>` tag.

**Example**

```html
<img src="flower.jpg" alt="W3Schools.com" width="104" height="142">
```

The compulsory attribute for `<a>` tag is **src** to specify URL of the image.

**alt** stands for Alternate Text – If the browser is not supporting Images it display the value of **ALT**.

**height** and **width** specify the height and width of the image.

### HTML Tables

Tables are defined with the `<table>` tag.

A table is divided into rows using `<tr>`, and each row is divided into data cells using `<td>` tag. **td** stands for "table data," and holds the content of a data cell. A `<td>` tag can contain text, links, images, lists, forms, other tables, etc.

**Example**

```html
<caption> Time Table </caption>

<table border="1">
<tr>
<td>row 1, cell 1</td>
<td>row 1, cell 2</td>
</tr>
<tr>
<td>row 2, cell 1</td>
</tr>
```

<Caption>tag is used to display Heading of the table.

Important attributes of Table are

- **Height**: To specify height of the table
- **Width**: To specify width of the table
- **Border**: To specify border of the table
- **Bgcolor**: To specify background color to the table or to the row or to the column
- **Colspan**: To combine two columns
- **Row span**: To combine two rows
- **Cell spacing**: To give space between the cells
- **Cell Padding**: space between the data and the border

**HTML FORMS**

HTML forms are used to pass data to a server.

An HTML form can contain input elements like text fields, checkboxes, radio-buttons, submit buttons and more. A form can also contain select lists, textarea, fieldset, legend, and label elements.

The `<form>` tag is used to create an HTML form:

The most important form element is the `<input>` element.

The `<input>` element is used to select user information.

An `<input>` element can vary in many ways, depending on the type attribute. An `<input>` element can be of type text field, checkbox, password, radio button, submit button, and more.
Text Fields

<input type="text"> defines a one-line input field that a user can enter text into:

<form>
First name: <input type="text" name="firstname"><br>
Last name: <input type="text" name="lastname">
</form>

How the HTML code above looks in a browser:

First name: ROSE
Last name: LILLY

<input type="password"> defines a password field:

<form>
Password: <input type="password" name="pwd">
</form>

How the HTML code above looks in a browser:

Password: ********

The characters in a password field are masked (shown as asterisks or circles).

Radio Buttons

<input type="radio"> defines a radio button. Radio buttons let a user select ONLY ONE of a limited number of choices:

<form>
<input type="radio" name="sex" value="male">Male<br>
<input type="radio" name="sex" value="female">Female
</form>

How the HTML code above looks in a browser:
Check Box

<input type="checkbox"> defines a checkbox. Checkboxes let a user select ZERO or MORE options of a limited number of choices.

<form>
<input type="checkbox" name="vehicle" value="Bike"> I have a bike<br>
<input type="checkbox" name="vehicle" value="Car"> I have a car
</form>

How the HTML code above looks in a browser:

☐ I have a bike
☐ I have a car

Submit Button

<input type="submit"> defines a submit button.

A submit button is used to send form data to a server. The data is sent to the page specified in the form's action attribute. The file defined in the action attribute usually does something with the received input:

<form name="input" action="html_form_action.asp" method="get">
Username: <input type="text" name="user">
<input type="submit" value="Submit">
</form>

How the HTML code above looks in a browser:

Username: Submit

If you type some characters in the text field above, and click the "Submit" button, the browser will send your input to a page called "html_form_action.asp". The page will show you the received input.
HTML FRAMES

Frames in HTML

To divide a web page into different partitions we use Frames

Two tags called `<frameset>` `</frameset>` and `<frame>` are used for creating frames and loading pages into those frames.

Ex:

```html
<frameset rows="60%,*">

  <frame src="first.html"/>

  <frame src="second.html"/>

</frameset>
```

`<frameset>` tag is a

- A container tag, requires a closing `</frameset>` tag
- Determines the frame types and sizes on the page
- Two frame types:
  - Columns
  - Rows

rows and cols are the attributes of the `<frameset>`

rows is used to divide the frame **horizontally** based on value given.

cols is used to divide the frame **vertically** based on value given.

- In the frameset document, the `<frameset>` element takes the place of the `<body>` element
**<frame> tag is used to**

- Load a web page into a frame using `src` attribute
- Use the `name` attribute to name a frame, then target the frame name with hyperlinks
- The syntax for naming a frame is as follows:

  `<frame src="url" name="framename"/>

- The following code names a frame:

  `<frame src="james.html" name="authors"/>

- The following code targets this frame:

  `<a href="james.html" target="authors"> Visit James </a>

- If a user clicks the Visit James link, the James page will open in the Authors frame

Ex1:

```html
<frameset rows="40%,60%">
  <frame src="top.htm" name="top">
  <frame src="bottom.htm" name="bottom">
</frameset>
```

Ex2:

```html
<frameset rows="16%,84%">
  <frame src="top.htm" name="top">
  <frameset cols="50%,50%">
    <frame src="left.htm" name="left">
    <frame src="right.htm" name="right">
  </frameset>
</frameset>
```
Cascading Style Sheets

Cascading Style Sheets (CSS) is a style sheet language used for describing the look and formatting of a document written in a markup language.

CSS stands for cascading style sheets. Cascading style sheets provide the ability to change the appearance of text (such as fonts, colors, spacing) on Web pages. Using CSS, you can also position elements on the page, make certain elements hidden, or change the appearance of the browser, such as changing the color of scroll bars in Microsoft Internet Explorer.

For applying styles to different HTML elements, we use CSS

Basic Structure of a Styles

- Each definition contains:
  - A property
  - A colon
  - A value
  - A semicolon to separate two or more style properties
  - Can include one or more values

Example:

```css
h1 {font-size:12pt; color:red}

body
{
  background-color:#d0e4fe;
}

h1
{
  color:orange;
  text-align:center;
}

p
{
  font-family:"Times New Roman";
  font-size:20px;
}
```
HTML supports three types of Style Sheets

- External style sheet
- Internal or Embedded styles
- Inline styles

**External or Embedded Style Sheet**

An external style sheet is ideal when the style is applied to many pages. With an external style sheet, you can apply unique style properties to different pages a site.

Each page must link to the style sheet using the `<link>` tag. The `<link>` tag goes inside the head section:

```html
<head>
<link rel="stylesheet" type="text/css" href="mystyle.css">
</head>
```

An external style sheet can be written in any text editor. The file should not contain any html tags. Your style sheet should be saved with a `.css` extension. An example of a style sheet file is shown below:

Ex: mystyle.css

```css
hr {color:sienna;}
p {margin-left:20px;}
body {background-image:url("images/back40.gif");}
```

**Internal or Embedded Style Sheet**

An internal style sheet should be used when a single document has a unique style. You define internal styles in the head section of an HTML page, by using the `<style>` tag, like this:

```html
<head>
<style>
hr {color:sienna;}
p {margin-left:20px;}
body {background-image:url("images/back40.gif");}
</style>
</head>
```
**Inline Styles**

To use inline styles you use the style attribute in the relevant tag. The style attribute can contain any CSS property. The example shows how to change the color and the left margin of a paragraph:

```html
<p style="color:sienna;margin-left:20px;">This is a paragraph.</p>
```

**Note:**
- If we represent style as an attribute it is called Inline Style Sheet
- If we represent style as a tag it is called Embedded style Sheet
- If we represent styles in a separate file and link that to a web page it is called External style sheet

**Important Questions :**

1. a) Explain the purpose of cascading style sheets.
   b) Design and create the page(s) for accepting the values of name and marks in a table then displays them in the descending order of the marks.

2. Explain the following input components in HTML forms with proper syntax of the corresponding HTML tags.
   a) Text Input
   b) Selectable list with multiple selection option
   c) Radio Buttons.

3. Write HTML code to create a frame with a table contents on the left side of the window, and have each entry in the table of contents. Use internal linking to scroll down the document frame to the appropriate subsection.