## Introduction to HTML

- HTML stands for HyperText Markup Language. HTML is the basic building block of World Wide Web.
- HTML is the main markup language for describing the structure of web pages.
- We can create a static website by HTML only.
- HTML is a markup language rather than a programming language.
- HTML requires a text-editor & a web browser to execute the code.
- Web browsers access HTML documents from a webserver or from local storage and execute them into multimedia web pages.
- HTML is not case sensitive language.
- HTML is simple, easy & light-weight language.
- HTML files saves with the extension '.html' & '.htm' extensions.
- In HTML5 the root element is "HTML".
- The Code structure of HTML is Hierarchal structure.

## What does HYPERTEXT MARKUP LANGUAGE means ?

HTML is the combination of Hypertext and Markup language.

### HYPERTEXT

- Hypertext defines the link between the web pages.
- Hypertext is text displayed on a computer or other electronic device with references to other text that the user can immediately access, usually by a mouse click or key press.
- Hypertext simply means "Text within Text." A text has a link within it, is a hypertext. Whenever you click on a link which brings you to a new webpage, you have clicked on a hypertext.
- Hypertext is a way to link two or more web pages (HTML documents) with each other.
- We need a web browser to view the HTML pages. The web browsers do not display the HTML tags, but uses the tags to interpret the content of the web pages.

### MARKUP

- Markup language is used to define the text document within tag which defines the structure of web pages.

- Markup languages use sets of markup tags to characterize text elements within a document, which gives instructions to the web browsers on how the document should appear.
- A markup language is a computer language that is used to apply layout and formatting conventions to a text document. Markup language makes text more interactive and dynamic. It can turn text into images, tables, links, etc.

## History of HTML

- HTML was created by Berners-Lee in late 1991 but "HTML 2.0" was the first standard HTML specification which was published in 1995.
- HTML 4.01 was a major version of HTML and it was published in late 1999.
- Though HTML 4.01 version is widely used but currently we are having HTML-5 version which is an extension to HTML 4.01, and this version was published in 2012.

## What we can do with HTML ?

- We can publish documents online with text, images, lists, tables, etc.
- We can access web resources such as images, videos or other HTML document via hyperlinks.
- We can create forms to collect user inputs like name, e-mail address, comments, etc.
- We can include images, videos, sound clips, flash movies, applications and other HTML documents directly inside an HTML document.
- We can create offline version of your website that work without internet.
- We can store data in the user's web browser and access later on.
- We can find the current location of your website's visitor.

## Applications of HTML

There are so many applications that we can built with HTML that includes: -

a) Web pages development

b) Internet Navigation

c) Responsive UI

d) Offline Support

e) Game Development

## Browser Engine

- It is a core component of every web browser.
- The browser engine functions as an intermediary or a bridge between the user interface and the rendering engine.
- It queries and handles the rendering engine as per the inputs received from the user interface.

## Rendering Engine

- This component is responsible for rendering a specific web page requested by the user on their screen. It interprets HTML and XML documents along with images that are styled or formatted using CSS, and a final layout is generated, which is displayed on the user interface.
- The rendering engine used by Google(for google chrome) is "blink" , while the rendering engine used by Apple(Safari browser, plus all browsers hosted on the iOS App Store) is "Webkit".
- All Chrome variants except iOS now use Blink.
- Safari is a native application, Chrome is not. Safari, therefore, is extremely power efficient due to being made specifically for Macs.
- "Blink" Rendering engine generally used by linux browsers and is based on "Webkit".
- Opera used to works on its own rendering engine called "presto" and move in 2013 to "blink".
- EdgeHTML is used by Edge while "Gecko" is used by Mozilla.

## How does the browser render HTML

- When a web page is loaded, the browser first reads the TEXT HTML and constructs DOM Tree from it.
- Then it processes the CSS whether that is inline, embedded or external CSS and constructs the CSS Tree from it.
- After these trees are constructed, then it constructs the Render-Tree from it.

## Environmental setup

In order to setup HTML environment, we have following software's: -

### Text Editor

- Text editor is used to write HTML code.
- Following text editors are suitable for writing HTML code :-
    - Atom (Download from -- https://atom.io/)
    - VS Code (Download from -- https://code.visualstudio.com/download)
    - Sublime Text Editor (Download from -- https://www.sublimetext.com/3)
    - Brackets etc. (Download from -- http://brackets.io/)

### Web Browser

- Google Chrome
- Mozilla Firefox -- Best for Development
- Opera etc.

### Required VS code HTML extension

- Live Server -- Ritwick Dey
- Auto Rename Tag -- Jun Han
- Auto Close Tag -- Jun Han
- VSCode icons -- VSCode icons team
- Auto Complete Tag -- Jun Han
- Auto Import -- Steoates

## Website Folder Structure

In order to make a website first we have to create website folder structure cause it will place our files properly and make our website response faster.

The folder structure of a website includes :-

- An image folder that contains only images.
- A folder for placing text fonts.
- A CSS stylesheet folder that contains our CSS files.
- Main file(index.html / index.php / index.jsp)

**Note :-** We just create these folders in order to make a website and remember that other files of html and javascript would not be inside the folder.

### Index.html

This file will generally contain your homepage content, that is, the text and images that people see when they first go to your site.

Using your text editor, create a new file called index.html and save it just inside your test-site folder.

## HTML tags

HTML tags are the keywords within a web page that define how your web browser must format and display the content.

HTML is written in the form of HTML elements consisting of markup tags. These markup tags are the fundamental characteristic of HTML. Every markup tag is composed of a keyword, surrounded by angle brackets, such as <html>, <head>, <body>, <title>, , and so on.

## Different categories of HTML tags

Mainly there are three types of HTML tags that includes: -

### Opening & Closing Tags

- Opening Tags
  - In HTML the starting tag is known as opening tag.
  - Example include: Paragraph( ), Bold(), Italic() etc.
- Closing Tags
  - In HTML the ending tag is known as closing tag.
  - Example include: Paragraph( ), Bold(), Italic() etc.

### Paired & Non-Paired Tags

- Paired Tags
  - The combination of opening & closing tag is known as paired tags.
  - Examples include: Paragraph( ), Bold(), Italic() etc.
- Non-Paired Tags
  - Those tags that has no closing tag is known as non-paired tags.
  - Example include: Input tag<input/>, Break tag(<br/>), Horizontal Rule(<hr/>) etc.

In between the start and end tags you can place appropriate contents.

### Self-Closing Tags / Empty Tags

- All non-paired tags are known as self-closing tags.
- Example include : Input tag, Break tag, Horizontal Rule tag etc.

## HTML Elements

- The term element refers to the opening tag, closing tag, and any attributes or content contained in between.
- An HTML element is an individual component of an HTML document. It represents semantics, or meaning. For example, the title element represents the title of the document.
- Most HTML elements are written with a start tag (or opening tag) and an end tag (or closing tag), with content in between. Elements can also contain attributes that defines its additional properties.
- All elements don't require the end tag or closing tag to be present. These are referred as empty elements, self-closing elements or void elements.

Example -- Elements without attribute

```
<p>Hello HTML</p>
```

Example -- Elements with attribute

```
<p align="center”>Hello HTML</p>
```

## HTML Attributes

- Attributes define additional characteristics or properties of the element such as width and height of an image. Attributes are always specified in the start tag (or opening tag) and usually consists of name/value pairs like name="value". Attribute values should always be enclosed in quotation marks.
- Both single and double quotes can be used to quote attribute values. However, double quotes are most common. In situations where the attribute value itself contains double quotes it is necessary to wrap the value in single quotes, e.g., value='John "Williams" Jr.'
- There are several attributes in HTML5 that do not consist of name/value pairs but consists of just name. Such attributes are called Boolean attributes. Examples of some commonly used Boolean attributes are checked, disabled, readonly, required, etc.
- Attribute values are generally case-insensitive, except certain attribute values, like the id and class attributes. However, World Wide Web Consortium (W3C) recommends lowercase for attributes values in their specification.
- Elements in HTML have attributes , these are additional values that configure the elements or adjust their behavior in various ways to meet the criteria the users want.
- HTML attributes (usually) have values and are written after a "=" after the name of the attribute.
- Attribute value pair is placed before the last ">" of an HTML start tag.

Example --

```
<p align="center”>Hello HTML</p>
```

Here, align="center" is the attribute of HTML.

## Custom Attributes

- The data-* attributes is used in order to create custom attribute in HTML5.
- The data-* attributes gives us the ability to embed custom data attributes on all HTML elements.
- The data-* attributes are new in HTML5.

Syntax

```
<element data-attributeName = "attributeValue"/>
```

Example

```
<p data-caption="hello">Hello Paragraph</p>
```

## DOCTYPES

- A doctype or document type declaration is an instruction which tells the web browser about the markup language in which the current page is written.
- The Doctype is not an element or tag, it lets the browser know about the version of or standard of HTML or any other markup language that is being used in the document.
- A DOCTYPE declaration appears at the top of a web page before all other elements.
- The DOCTYPE for HTML5 is case-insensitive and can be written as shown below :-

Syntax of Doctype –

```
< !DOCTYPE html >
```

Example -- Doctype declaration for HTML5

```
<!DOCTYPE html>
<html>
    <head>
        <title>HTML Doctypes</title>
    </head>
     <body>
        <p>HTML is easy to learn.</p>
    </body>
 </html>
```

## HTML Charset

- The web browser displays the alphabets, numbers and some other symbols correctly. This is all possible because of the required character set that web browser uses.
- The character set or character encoding has different character encoding standards which assign some numbers to these character set which can be used in the internet.
- Some most common charsets that are frequently used described below :-

### ASCII

- American Standard Code for Information Interchange (ANSII) created this character encoding.
- This character encoding are used in C/C++ programming.
- It has 128 alphanumeric characters consisting of alphabets(A-Z) and (a-z) and some special symbols like + – * / ( ) @ etc.

### ANSI(Windows-1252)

- American National Standards Institute (ANSI) created character encoding supported 256 characters.
- It is used as default character set in Microsoft Windows.

### ISO-8859-1

- It is used as default character set of HTML4 and also supports 256 characters.
- The International Standards Organization (ISO) defines the standard character sets for different alphabets/languages.
- It contains numbers, upper and lowercase English letters, and some special characters.
- ISO-8859-1 was the default character set for HTML 4.But because ISO-8859-1 were so limited, HTML 4 also supported UTF-8.

### UTF-8

- UTF-8 (Unicode) covers almost all of the characters and symbols in the world.
- The default character set for HTML5 is UTF-8.

## Syntax of HTML

- The syntax of a language is how it works.
- The building blocks of HTML are called elements, and the building blocks of elements are tags. When they are put together, they make a website - sort of like atoms and subatomic particles.

In HTML syntax following tags were used :-

```
<!DOCTYPE html>
<html lang="en">
    <head>
        <title>Document</title>
    </head>
<body>

</body>
</html>
```



**Explanation**

**<!DOCTYPE html>**

- The very first line in every web document should contain a <!DOCTYPE html> declaration.
- It instructs the web browser that this document is an HTML5 document.
- It is case-insensitive.

**<head>...</head>**

- The <head> element is a container for the tags that provides information about the document,
- for example, <title> tag defines the title of the document.

**<body>...</body>**

- The <body> element contains the document's actual content (paragraphs, links, images, tables, and so on) that is rendered in the web browser and displayed to the user.

**NOTE :-**

- The <html>, <head>, and <body> tags make up the basic skeleton of every web page.
- Content inside the <head> and </head> are invisible to users with one exception: the text between <title> and </title> tags which appears as the title on a browser tab.

## DOCTYPE declaration in HTML

- The HTML document type declaration, also known as DOCTYPE, is the first line of code required in every HTML or XHTML document.
- The DOCTYPE declaration is an instruction to the web browser about what version of HTML the page is written in.
- A DOCTYPE declaration appears at the top of a web page before all other elements.
- The doctype declaration is usually the very first thing defined in an HTML document (even before the opening <html> tag); however the doctype declaration itself is not an HTML tag.
- Doctypes for earlier versions(i.e. 4.01) of HTML were longer because the HTML language was SGML-based and therefore required a reference to a DTD, but they are obsolete now.
- The DOCTYPE for HTML5 is very short, concise, and case-insensitive.

## Types - DOCTYPE declaration in HTML

Following are the types of doctype declaration used in html are listed below :-

**Strict DTD (for HTML 4.01)**

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN"
"http://www.w3.org/TR/html4/strict.dtd">
```

**Transitional DTD (for HTML 4.01)**

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
```

**Frameset DTD (for HTML 4.01)**

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Frameset//EN"
"http://www.w3.org/TR/html4/frameset.dtd">
```

**DTD for HTML5 and beyond**

```
<!DOCTYPE html>
```

## Creating and executing an HTML document

We have to follow some steps in order to create and execute html file :-

### Step 1 -- Creating HTML File

In order to create an HTML file we have open a text editor(e.g., VS Code, Sublime , Notepad++ etc.) and go to the "file" menu and choose "new file" option.

### Step 2 -- Write Some HTML Code

With the help of "Step 1" a new file is created and in that file write the following code.

Example

```
<!DOCTYPE html>
<html lang="en">
    <head>
      <title>A simple HTML document</title>
    </head>
    <body>
      <p>Hello World!<p>
    </body>
</html>
```

### Step 3 -- Saving The file

Now save the file on desktop and save it with "file_name.html" or "file_name.htm".

### Step 4 -- Executing the file

- In order to execute HTML files in the browser navigate the HTML file and double click on it then it will open in your default Web browser. Then choose your default browser and select "ok".
- Also we can open the browser and drag our HTML file inside that browser in order to run.

## Line breaks in HTML

- A line break ends the line you are currently on and resumes on the next line.
- The HTML <br> element produces a line break in text (carriage-return). The <br> tag does not have an end tag.
- It is useful for writing a poem or an address, where the division of lines is significant.
- The <br> element is used to insert a line break or carriage-return within a parent element such as a paragraph without breaking out of the parent container.

**Example**

```
<!DOCTYPE html>
<html lang="en">
<head>
   <title>Document</title>
</head>
<body>
      <p>
                  Hello <br>
                  HTML <br>
                  You <br>
                  Awesome.
        </p>
</body>
</html>
```

**OUTPUT**

Hello
HTML
You
Awesome.

## Line spacing in HTML

A common character entity used in HTML is the non-breaking space:   A non-breaking space is a space that will not break into a new line. Two words separated by a non-breaking space will stick together (not break into a new line).

Following ways are used for spacing between words :-

**By using "space" key**

- To add a regular space, click where you want to add the space and press the spacebar. Normally, HTML will only display one space between words, no matter how many times you press the space bar.

**By using " "**

- This is called a non-breaking space because it prevents a line break at its location.
- " " is an HTML5 special entity.
- We can also use " " to force a space.

**By using " " & " "**

- We can add longer space by using :-
    -  (for two spaces)
    -  (for four spaces)

Example

```
<!DOCTYPE html>
<html lang="en">
<head>
   <title>Document</title>
</head>
<body>

   <p>For One Space</p>
   <p>For One Space</p>
   <p>For two Space</p>
   <p>For Four Space</p>

</body>
</html>
```

**HTML comments**

- Comments in HTML are typically used to explain the markup.
- It will helps us and others to select or find the specific section in the document quickly and easily at the time of editing the source code.
- Comments are simply ignored, they are not displayed by the browsers.
- An HTML comment begins with <!--, and ends with -->

Example

```
<!DOCTYPE html>
<html lang="en">
<head>
    <title>Document</title>
</head>
<body>

  <!-- Hey i'm comment in HTML and will not be executed by browser -->

  <p>HTML is used for creating web page structure.</p>

</body>
</html>
```