HTML Notes

Basic Essentials

What is the Internet?

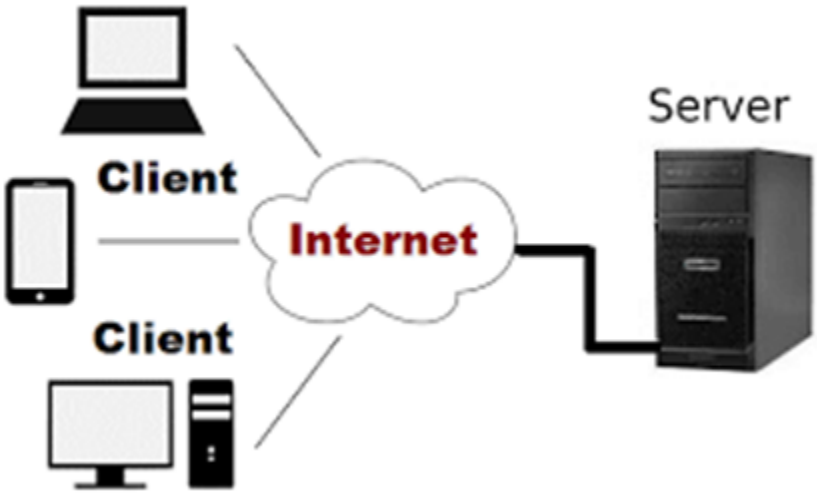
The Internet is a global network of interconnected computers and devices that communicate using standardized protocols, enabling the exchange of data, information, and services worldwide.

How does the internet work?

The Internet works by connecting computers and devices worldwide through a network infrastructure. In web development, the client-server model refers to how information is exchanged between users' devices (clients) and remote computers (servers) that host websites or web applications.

Client: The user's device (such as a computer or smartphone) that requests and receives web content or services from servers.

Server: A remote computer that stores website data, processes client requests, and sends back the requested information or resources.



The client-server interaction in web development typically follows these steps:

Request: The client sends an HTTP request to the server, specifying the resource (e.g., web page, image) it needs.

Processing: The server processes the request, executes necessary scripts, or accesses databases to generate the requested content.

Response: The server sends an HTTP response back to the client, containing the requested data (e.g., HTML, JSON, images).

Delivery: The client's web browser receives the response and renders the content for the user to interact with, completing the interaction.

What is an Operating System?

An operating system (OS) is software that manages computer hardware and provides services for computer programs. It acts as a bridge between users and hardware, controlling system resources, running applications, and facilitating communication between hardware components.

Examples: Windows, Linux, macOS, Android etc.…

What is Browser?

A browser is a software application that allows users to access and navigate the World Wide Web. It interprets HTML documents, displays web pages, and facilitates interaction with web content, such as clicking links, submitting forms, and running scripts.

Examples: Chrome, Firefox, Opera, Edge, UC Browser, Safari etc.…

Protocols?

A protocol is a set of rules, conventions, and procedures that govern how data is transmitted, received, and interpreted across a network,

Introduction to Web Development

Website is a set of web pages accessed from a single domain name or URL.

Web Development

Web development is the process of creating and maintaining websites or web applications. It involves various tasks such as web design, content creation, server-side scripting, client-side scripting, network security configuration, and more. Web development can range from creating simple static web pages to complex dynamic websites and web-based applications.

There are typically two main categories of web development:

Front-end Development:

This involves creating the user interface and user experience of a website or web application. Front-end developers work with technologies such as HTML, CSS, and JavaScript to design and implement the visual and interactive elements that users see and interact within their web browsers.

Back-end Development:

This focuses on the server side of web development. Back-end developers work with server-side languages such as Python, Ruby, PHP, or Node.js, along with databases like MySQL, PostgreSQL, or MongoDB, to handle

data storage, retrieval, and processing. They also manage the server configuration and ensure the proper functioning of the web application.

Database collection of organized data that is stored where it can be accessed and manipulated easily.

HTML

HTML stands for **Hypertext Markup Language.** It is the standard markup language used to create and structure content on web pages. It consists of elements and tags that define the structure and semantics of web documents. HTML is the foundation of web development and is used to format text, add images, create links, embed multimedia, and build the overall layout of a webpage.

The basic structure of HTML

The basic structure of an HTML document consists of the following elements:

```
<!DOCTYPE html>
<html>
     <head>
          <title>Title of the Page</title>
     </head>
     <body>
          <!-- All content of the webpage -->
          <h1>Heading 1</h1>
           <p>This is Paragraph.</p>
     </body>
</html>
```

<! DOCTYPE html>: Declaration that specifies the HTML version being used (HTML5 in this case).
<html>: The root element that wraps all content on the page.
<head>: Contains meta-information about the document, such as title, metadata, stylesheets, and scripts.
<title>: Sets the title of the web page displayed in the browser tab.
<body>: Contains the main content of the web page, including text, images, links, forms, and other elements.

Tag in HTML

A tag in HTML is a specific syntax used to define elements within an HTML document. Tags are enclosed in angle brackets (**<>**) and typically come in pairs: an opening tag and a closing tag. Opening tags indicate the beginning of an element, while closing tags signify the end of that element.

In HTML, there are several types of tags, each serving a specific purpose in structuring and formatting web content. Here are the main types of tags:

Attributes

Attributes are additional information about the tag like “src” in img tag tell what image to show.

Opening and Closing Tags (Pair Tags):

These are paired tags used to define the start (**<tag>**) and end (**</tag>**) of an element. Examples include **<p>** for paragraphs, **<h1>** to **<h6>** for headings.

```
<h1>Heading 1</h1>

<p>This is Paragraph.</p>
```

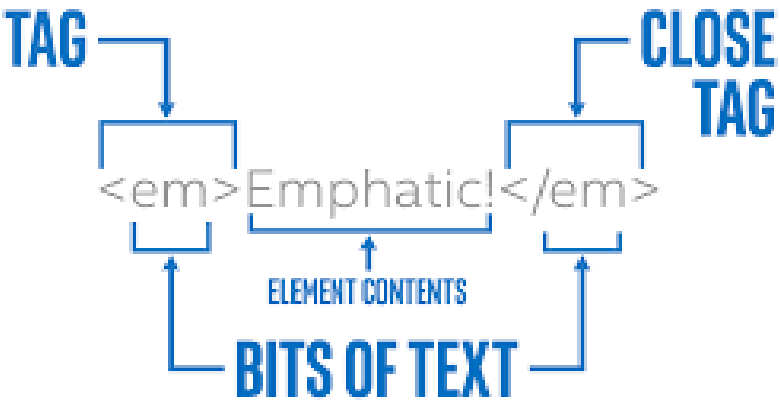
Self-Closing Tags:

Some tags do not require a closing tag because they don't enclose content. Instead, they self-close with a slash before the closing angle bracket. Examples include **
** for line breaks, **<img>** for images.

```
<br>
<img src="image-path" alt="alternative text" />
```

Difference between tag and element

Tags are the specific syntax used in HTML to define elements, whereas **elements** refer to the entire structure created using these tags, including the opening and closing tags along with the content they enclose.



Headings in HTML

Headings in HTML are used to define the hierarchy and structure of textual content on a web page. HTML provides six levels of headings, from **<h1>** (most important) to **<h6>** (least important), with **<h1>** typically used for the main heading or title of a page.

```
<h1>Heading 1</h1>
<h2>Heading 2</h2>
<h3>Heading 3</h3>
<h4>Heading 4</h4>
<h5>Heading 5</h5>
<h6>Heading 6</h6>
```

Text Formatting

Text formatting refers to the process of styling and arranging text to enhance readability and visual appeal. In HTML, text formatting is achieved using various tags and attributes to modify the appearance of text elements.

1. ** or <b>**: Makes text bold for emphasis.

```
<strong>Important Notice</strong> Output: Important Notice
```

2. ** or <i>**: Italicized text for emphasis.

```
<em>Emphasized text</em> Output: Emphasized text
```

3. **<u>**: Underlines text.

```
<u>Underlined text</u> Output: Underlined text
```

4. **<del>** : Strikes through text.

```
    <del>Deleted text</del> Output: Deleted text
```

5. **<sup>**: Renders text in superscript.

```
    X<sup>2</sup> Output: X²
```

6. **<sub>**: Renders text in subscript.

```
    H<sub>2</sub>O Output: H₂O
```

7. **<small>**: Reduces text size for smaller text content.

```
<small>Small text</small> Output: Small text
```

8. **<mark>**: Highlights text for reference or to denote significance.

```
<mark>mark text</mark> Output:  mark text
```

9. **<pre>**: Preformatted text with preserved spacing and line breaks.

```
     <pre>
         This is
         preformatted text.
    </pre>
    Output:
    This is
    preformatted text.
```

What is Attribute?

Attributes in HTML provide additional information or properties to HTML elements, helping define their behavior, appearance, or functionality. Attributes are specified within the opening tag of an element and are written as name-value pairs, separated by an equal sign (=).

Examples: href, id, class, src, align, height, width etc.…

Links in HTML

In HTML, links are created using the <a> (anchor) tag, allowing users to navigate to different web pages, resources, or sections within the same page. Here's an overview of how links are used in HTML:

External Link: In external links navigate from one page to another page.

```
<a href="about.html">About Us</a>
```

Internal Link: In the internal link navigate from one section to another section by using the id of that section.

```
 <a href="#section-id">Jump to Section</a>

<div id="section-id">Section content is here……. </div>
```

Attribute target: open new link on specific target

Img Tag

The **<img>** tag in HTML is used to insert images into a web page. It is a self-closing tag, meaning it does not have a closing tag and is written with an optional **alt** attribute to provide alternative text for the image. Here's an example of how the **<img>** tag is used:

```
<img src="image.jpg" alt="about the image" height="50px" width="50px" />
```

src: Specifies the URL or file path of the image (**image.jpg** in this case).
alt: Provides alternative text that describes the image. This is important for accessibility purposes and is displayed if the image fails to load.

Additionally, you can add other attributes to the **<img>** tag for further customization, such as **width** and **height** to set the dimensions of the image.

List in HTML

A list in HTML is a structured way to organize and display information, such as items, terms, or categories.

There are main types of lists: ordered lists.

1. **Ordered List**
2. **Unordered List**

Ordered List (ol): In an ordered list data is arranged in the numbered list. Used for lists where the order of items matters.

```
<ol>
     <li>Item 1</li>
     <li>Item 2</li>
     <li>Item 3</li>
</ol>
Output will be
1.  Item1
2.  Item2
3.  Item3
```

The format can be changed in order by **type** attribute list number to alphabets, Roman counting and can be reversed by **reversing** its order. Also, define the starting point by the **start** attribute in ol.

Unordered List (ul): In an unordered list data is arranged in a bullet list. Used for lists where the order of items does not matter.

```
<ul>
     <li>Item 1</li>
```

```
        <li>Item 2</li>
        <li>Item 3</li>
    </ul>
      Output will be
     • Item1
     • Item2
     • Item3
```

The format can be changed in order by **type** attribute list bullets to circle, disc, and square but cannot be reversed and cannot be defined as the starting point.

Table in HTML

The **<table>** tag in HTML is used to define a table, which is a structured representation of data in rows and columns. Here is a detailed overview of the <table> tag and its attributes:

Table Structure:

<table>: Defines the table container**.**

<tr>: Defines a table row.

<th>: Defines a table header cell (column title).

<td>: Defines a table data cell (contains the actual data).

<thead>: Defines the table header (contains the <tr> and <th> elements).

<tbody>: Defines the table body (contains the <tr> and <td> elements).

```
<table>
  <thead>
    <tr>
        <th>ID</th>
        <th>Name</th>
        <th>City</th>
    </tr>
  </thead>
  <tbody>
    <tr>
        <td>1</td>
        <td>Ali</td>
        <td td>Lodhran</td>
    </tr>
     <tr>
        <td>1</td>
        <td>Ahmad</td>
        <td>Multan</td>
    </tr>
  </tbody>
</table>
```

ID	Name	City
1	Ali	Lodhran
2	Ahmad	Multan

Attributes:

colspan: Specifies the number of columns the cell spans.

rowspan: Specifies the number of rows the cell spans.

Iframe Tag:

The **<iframe>** tag in HTML is used to embed another HTML document or a resource (such as a web page, image, or video) within an existing HTML document. This creates a nested browsing context, allowing the embedded content to be displayed within a frame on the parent page.

It is used to embed third-party content (e.g., YouTube videos, social media feeds, Google Maps) on the webpage.

```
    <iframe src="url" width="800" height="600" frameborder="1"
scrolling="yes"></iframe>
```

Semantic Tags

Semantic HTML tags are used to define the structure and meaning of web page content, making it more readable and accessible to search engines, screen readers, and other tools.

Here are some common semantic HTML tags:

1. **header:** Defines the header section of a document or section.

2. **nav:** Defines a navigation menu or links.

3. **main:** Defines the main content section of a document.

4. **section:** Defines a self-contained section of related content.

5. **article:** Defines an independent piece of content, such as a blog post or news article.

6. **aside:** Defines content that is related to the main content.

7. **footer:** Defines the footer section of a document or section.

Media Tags

Audio, Video, and Img tags are known as media tags because by these tags we can show audio, video, and any picture shown on the web page.

The audio and video tags are supported in HTML5. The src attribute is required for both tags for the file path.

Audio Tag (<audio>): Used to embed audio content, such as music or podcasts. Supports various audio formats, including MP3, WAV, and OGG.

```
<audio>
    <source src="audio.mp3" controls loop muted autoplay />
</audio>
```

Video Tag (<video>): Used to embed video content, such as movies or clips. Supports various video formats, including MP4, WebM, and OGG.

```
<video>
   <source src="video.mp4" controls loop muted autoplay />
</video>
```

Common Attributes of Audio/Video:

controls: Displays audio/video controls, such as play, pause, and volume.

src: Specifies the URL of the audio/video file.

autoplay: Automatically starts playing the audio/video when the page loads.

loop: Loops the audio/video playback.

muted: Mutes the audio/video by default.

Form in HTML

The **<form>** tag in HTML is used to create a form for user input. It's a container element that holds various form elements like input fields, checkboxes, radio buttons, and buttons. Form main purpose to get data from the user and give a response according to that data.

Form Elements:

<input> – Used for various input types like text, checkbox, file, etc

```
    <input type="text" placeholder="Enter name" />
```

<textarea> – Multiline text input.

```
     <textarea rows="4" cols="50">Enter your message...</textarea>
```

<select> – Dropdown list.

```
     <select>
         <option>Red</option>
         <option>Blue</option>
    </select>
```

<label> – Associates text with a form element.

```
    <label for="email">Email:</label> <input type="email"
id="email">
```

<button> – Clickable button

```
    <button type="submit">Submit</button>
```

The main element is input, here are all the input types in HTML, along with a short description:

1. **text:** Single-line text input.
2. **password:** Single-line text input, characters are masked.
3. **email:** Single-line text input, email address format.
4. **tel:** Single-line text input, telephone number format.
5. **number:** Number input, allows numeric values only.
6. **date:** Date input, allows date selection.
7. **time:** Time input, allows time selection.
8. **datetime-local:** Date and time input, allows date and time selection.
9. **month:** Month input, allows month selection.
10. **week:** Week input, allows week selection.
11. **url:** Single-line text input, URL format.
12. **search:** Single-line text input, search query format.
13. **color:** Color input, allows color selection.
14. **checkbox:** Checkboxes, allow multiple selections.

```
Cricket: <input type="checkbox" value="cricket" />

Hockey: <input type="checkbox" value="Hockey" />

Football: <input type="checkbox" value="Football" />
```

15. **radio:** The radio type of input in HTML is used to create a radio button, which allows users to select one option from a group of options, name attribute specifies the name of the radio button group. All radio buttons with

the same name attribute are part of the same group and only one option is selectable from the same named group.

```
Male: <input type="radio" name="gender" value="male" />

Female: <input type="radio" name="gender" value="female" />
```

From the above example, you can select only one option male or female

16. **file:** The file type in HTML is used to create a file upload input field, which allows users to select a file from their device to upload to a server. The accept attribute can be used to specify the types of files that can be uploaded.

```
<input type="file" id="file" name="file" accept="image/*" />
```

- type="file" specifies that the input field is for file uploads.

- accept="image/*" specifies that only image files can be uploaded.

17. **hidden:** Hidden inputs are not visible to users; they are used to collect data for internal use of the application.

18. **range:** Slider input, allows numeric value selection within a range.

20. **reset:** Reset button, resets form values.

21. **submit:** Submit button, submit form data.

22. **button:** The button, allows custom button functionality.

Form Validation in HTML

HTML provides several attributes and elements for form validation, making it easier to ensure user input data meets specific requirements.

Here are some key aspects of form validation in HTML:

required – Makes a field mandatory.

```
<input type="text" required>  // not submit the empty value
```

type – Ensures valid input type.

```
<input type="email" required />
```

minlength – Sets the minimum length of input.

```
 <input type="password" minlength="8" />
```

maxlength – Sets the maximum length of input.

```
<input type="text" maxlength="20" />
```

min – Sets the minimum number value.

```
<input type="number" min="18" />
```

max – Sets the maximum number value.

```
<input type="number" max="100" />
```

pattern – Validates input using a regex.

```
<input type="text" pattern="[A-Za-z]{3,10}" />
```