

# Basics of Internet

08 June 2023 08:26

## Rules to Complete this Journey

1. Be Consistent
2. Be Disciplined
3. Fix your time for completing the assignment
4. Always keep your motivation maintained
5. Never Leave Backlogs
6. Use Internet and other resources for help.

## What is internet ?

— **Interconnected network of computers around the world is called Internet.** We use fibre optic cables to bring Internet to us. Even undersea cables are being implanted to make a connection with the whole world. There are some aspects of Internet which are defined below.

1. **Server:** It is a special computer system in network which is responsible **for storing data into it and giving it** to the user according to their needs and call. Generally a server is kept **always online and connected to the network.** It is used to **serve all the request** which are being made by the client. It's main purpose is to provide data and information to the client.
2. **Client:** It is a computer system which is connected to the network, and **it makes a request to server to fetch data.** Generally **Clients are not kept always online or connected to the network.** It's main purpose is to request data and information from the server.
3. **IP Address:** Every **computer system including all client and server present on the network will have its own unique address** which is called IP Address. It is basically a numerical code. To **access anything on the Internet we need it's IP address.**
4. **ISP:** ISP stands for Internet Service Provider, those **companies which provide us network and internet are called ISPs.** A **request made by client first goes to the ISP,** then after that **ISP will move forward the user's request to DNS.** Examples of ISPs are Airtel, Jio, Vi, BSNL etc.
5. **Domain:** It is the **name of the website or page or we can say that it is the link of any page** present on the internet. We need IP address of a page to access it but it's a very complex thing to remember all the IP addresses of different pages. That's why **domain names are needed for convenience in request making to the ISPs.** We can use **nslookup.io** to get IP addresses of different websites and pages.
6. **DNS:** It is a computer system which have **a dictionary of domain names with their IP addresses.** ISPs move forward the user's request to DNS which gives the exact IP address of a domain name (like google.com). It returns the IP address to the ISP and then ISP returns the IP address to the client. It allows a client to directly connect to a server computer by providing it's IP address.

## What is Web Development ?

— Building websites and webapps for the internet is called Web Development. A website

basically is a code of HTML, CSS and JavaScript. HTML is used for giving a skeleton structure to different elements of a web page, CSS is used for customizing (personalizing) these elements and styling but JavaScript is used for creating actual logic and functionality of a web page.

- The combination of HTML, CSS and JavaScript is called Frontend which is present at the client side and the logic or data present in the server is called Backend.

## What is request response cycle and How a website loads ?

- There are several stages involved in completely loading our desired website in a browser which are explained below in some points.
  1. First a user makes a request through his client computer.
  2. This request is being received by the Internet Service Provider.
  3. ISP fetches the IP address of the webpage from the DNS and gives back it to the user.
  4. Now with the help of this IP address a user gets connected directly to the server of that website.
  5. Now there will be a direct communication between client and server.
  6. Server will send a packet of code which will have some HTML, CSS & JavaScript.
  7. The browser present at the client side will render this code packet and completely load the website. We can right click on the page and select Inspect and View Page Source option in a browser to actually see the code of that website.
- All these steps plays a crucial role in loading of a website and this is called a Request Response Cycle.

# HTML - 1

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## What is HTML ?

- HTML stands for Hyper Text Markup Language. A markup language is a language which is used for defining a structure of the page. It is used for giving structure, styling and formatting to a webpage. Currently HTML 5 is the latest and stable version of HTML which is being used in the industry.
- It is one of the easiest to learn thing in the world of programming. We can use Inspect and View Page Source option in a browser to view the HTML code of any particular page. It is not treated as a hardcore programming language because it's very simple and don't have complex things in it. It is not a case sensitive language.

## HTML Elements & Tags

- There are different elements in a HTML file and there are some standard and basic elements in HTML which browser recognizes is called HTML Elements. We use tags to create these elements. A tag is a container for some content or other tags.
- There are 2 basic types of tags in HTML are
  1. **Single Tag:** Those tags which does not have any closing tag is called a single. And if there is no closing tag then no content can be used with this single tag. Example: `<img>`, `<br>`, `<meta>` etc. They can be used in two different ways `<br/>`, `<hr/>` etc. But using a slash before the closing angular bracket is a recommended practice. They are also called Self closing tags.
  2. **Double or Paired Tags:** Those tags which have an opening tag and a closing tag. We can have some content between opening and closing tag. Example: `<b>`, `<i>`, `<h1>`, etc.
- First tag without the slash is called opening tag and tag with slash is called closing tag. And the object between opening and closing tags is called content. Tags and Content are collectively called Element. Some common HTML elements are
  1. **Paragraphs:** It is used to create paragraphs inside a html file. Every paragraph starts with a new line. It can contain different elements like images and other files. It's syntax is `<p>abcd</p>`.
  2. **Headings:** It is used to create headings in a html file. There are 6 levels of heading inside a html file. `<h1>` is the biggest heading and `<h6>` is the smallest heading. All these headings will have their size fixed, we can change these using CSS. It's syntax in `<h1>abcd</h1>`.
  3. **Images:** It is used to insert images in a html file. It's syntax is `<img>` and it is not created in pairs it's a single html tag.
  4. **Bold:** `<b>Content</b>`
  5. **Underline:** `<u>Content</u>`
  6. **Italic:** `<i>Content</i>`
  7. **<br>**: This is used to break the line. It's a single tag not a paired one.
  8. **<hr>**: It is used to give a visible break line. It's also a single tag.
- There are many other tags in HTML like for bold, italic and underlining the text. There are a

total of 110 to 115 tags which are currently functional in HTML 5, excluding the depreciated and obsolete ones.

## A Simple HTML Program

- This is simple basic program in which we used paragraph tags to display some text. Please note that HTML ignores all the whitespaces which are other than the first whitespace. Putting tags inside tags is called Nesting.

```
<p>This is me Narayan</p>

<p>Be Consistent & Disciplined</p>

<p><b>Narayan Bhardwaj</b></p>
```

- Note: Inspect feature in a chromium based browsers allows us to change the website's code only locally on our system. This feature will help us while we learn CSS. We can see instant changes by using inspect instead of changing the whole html file and then saving it and then opening it in a browser.

## HTML Boilerplate Code

- A boilerplate code is a predefined code for all programs in a specific language. It means that we have to write every time those part of code while creating a new file or program. All programming languages have some boilerplate code, similarly HTML also have some boilerplate code.

```
<!DOCTYPE HTML>

<html lang="en">

  <head>

    <title>HTML Boilerplate</title>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width,
initial scale=1.0">

  </head>

  <body>

    <p>This html file has the boilerplate code of HTML.</p>

  </body>

</html>
```

## Basic Elements of a HTML code

1. **<!DOCTYPE HTML>**: This tag declares the file type of document and states that HTML 5 is being used all over the file.
2. **<html>**: This is the tag inside which all other tags will be written. It is a good practice to add language attribute to it, which will improve our SEO and website ranking.
3. **<head>**: This tag stores all the meta data inside it like character set, display options and title of the page which is being displayed on browser's tab. It is also used for linking CSS and other

files to our HTML file. Elements inside this tag is not directly visible on our webpage.

4. **<title>**: This tag is used to declare the title of the web page, which is going to show on browser's tab.
5. **<meta charset="UTF-8">**: This tag comes inside the <head> tag which defines the character set which we are going to use.
6. **<meta name="viewport" content="width=device-width, initial scale=1.0">**: This tag explains how the webpage will look on different devices. By using this tag you can ensure that your webpage looks good on all devices and that users can view your content clearly and comfortably.
7. **<body>**: Basically an HTML file is divided into compartments first one is under <head> tag in this tag content present is not directly visible on our webpage. But the content which we want to show on our webpage will be created inside <body> tag.

# HTML - 2

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## Lists in HTML

— A list is a sequence of elements. Generally Lists have bullet points which can be numerical or dotted. There are two types of lists are there in HTML.

1. **Unordered List:** The type of list does not get affected by the position of elements in a list is called unordered list. These type of list are made with dotted bullet points. Syntax of Unordered list is

```
<ul>
    <li>Bread</li>
    <li>Butter</li>
    <li>Jam</li>
</ul>
```

2. **Ordered List:** This list which have a specific sequence for all elements, this is done by numbering the elements. This type of list are made with numbered or alphabetic bullet points. We can add type, reversed and many other attributes to <ol> tag for specifying bullet type. Basic Syntax of ordered list is

```
<ol>
    <li>Bread</li>
    <li>Butter</li>
    <li>Jam</li>
</ol>
<ol type="a">
    <li>Bread</li>
    <li>Butter</li>
    <li>Jam</li>
</ol>
```

## Attributes

- Those specific and unique words which are used to add some information to the tag are called Attributes. Every attribute must be assigned a value. The value can be in single or double inverted commas.
- Some of the examples of attributes are like charset, name, content which are used with <meta> tag, type attribute which is used with <ol> tag, lang attribute which is used with <html> tag.

## Anchor Elements

- Those tags in HTML which are used to add links in a HTML page is called Anchor element or tag. It is generally used with a href attribute to specify the link on which we want to go. href

stands for hypertext reference and it can be used for both absolute and relative links. Syntax of anchor tag is

```
<a href="https://www.google.com">Click here<a>
```

— There are two types of link which are generally used.

1. **Absolute Link:** An absolute link is an **link to specific page** on the internet.
2. **Relative Link:** A relative link is a link to file **which is present in the current domain or directory.**

```
./assets/icon.png
```

OR

```
assets/icon.png
```

## Image Element

— Those tags which are used to **add an image to our html file** are called image tags. It works with **2 basic attributes** which are **src** (can be used with absolute and relative link) and **alt**. Must note that is not a pair tag, it's a single tag. We can also use height and width attribute with `<img>` tag. Syntax of image tag is

```

```

## Comments

— Those parts of the HTML code **which can't be parsed is called Comments.** It is used to provide the extra information about the written code. Syntax of Comments in HTML is

```
<!--Narayan-->
```

## HTML Entities

- A piece of text which begins with ampersand (&) and ends with a semicolon (;) is called a **HTML Entity.** They are **used to display reserved characters** (which would otherwise be treated as HTML code), and invisible characters (like non breaking spaces). You can also use them in place of other characters which are difficult to type with keyboard.
- We have to look for entity code on mdn for different characters, we can also use with their uni codes by converting them into decimals prefixed with an `&#` and postfixed with a semicolon (;).
- Example: `&amp;` for `&`, `&lt;` for `<`, `&gt;` for `>`, `&nbsp;` for non-breaking space, `&quot;` for `"`, `&#9703;` and many others.

## Favicon

— Favicon is **a small icon appearing before the title** of the website on the tab.

```
<link rel="icon" href="image.ico">
```

# HTML - 3

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## Inline vs Block

— All the elements in HTML can be divided into two types of elements, Inline and Block elements.

1. **Inline Elements:** Those elements which only occupy necessary width which is required and does not start with a new line are called Inline Elements. You can have multiple inline elements in a single line. Example: Anchor Tag, Image Tag etc.
2. **Block Elements:** Those elements which take the full width of the line without considering how much space the elements will need and always start with a new line are called Block Elements. Example: Heading tag, paragraph tag,

## Div Element

— This is also called Content Division Element. It is a container to create a group of different elements together. It is a block element. It is mostly used with CSS, we will see the use of `<div>` when we will learn CSS. Syntax of div is

```
<div>Content</div>
```

## Span Element

— This element is very similar to div element which is used to group different elements but it's an inline element. It's mostly used with CSS, we will see the use of `<span>` when we will learn CSS. Syntax of span is

```
<span>content</span>
```

## Sub and Sup Tag

— These tags are used to create subscript and superscript. Let's understand their syntax with the help of examples

$H_2O = H<sub>2</sub>O$

$A^2 = A<sup>2</sup>$

## Semantic Markups

— These are some meaningful tags which express their functionality just by their names. Tags in HTML can be categorised into two types

1. **Semantic Tags:** Those tags which express their meaning and functionality just by their names. Example: Heading Tag, Image Tag, Paragraph tag, Header, Footer, Section Tags etc.
2. **Non Semantic Tag:** Those tags which we can't get their function by their names. Example: div and span tags.

— There are some advantages of Semantic markups which are as follows

1. It gives a meaningful and structured layout to our webpage.
2. Helps in improving Search Engine Optimization (SEO).



3. It makes our webpage readable and able to use screen readers.
4. It improves the overall user experience (UX).

— There are some examples of Semantic Tags which are given below

1. **Header Tag:** It is used to represent the top most section of our website which have heading. Let's understand it with an example.

```
<header>Narayan Bhardwaj</header>
```

2. **Main Tag:** We used to display main content of our website like text or something else which is much more present as compared to other parts of our website.

```
<main>content</main>
```

3. **Navigation Tag:** Those tags which are used to navigate to other webpages of the same website is called navigation tag. These links will be created with the help of anchor tag.

```
<nav>content</nav>
```

4. **Article:** This tag is used to represent an article on our webpage.

```
<article> </article>
```

5. **Section:** This tag is also used to group other elements of our webpage. It functions like div or span tag.

```
<section> </section>
```

6. **Aside:** This tag is used to mention link of other indirectly related content. The links will be created with the use of anchor tag.

```
<aside> </aside>
```

## Emmet

— It is a toolkit which helps in writing code in HTML and CSS by providing some shortcuts to write code. Some of the common emmet abbreviation are as follows

1. **Child:** We can generate different parent and child element by using > (greater than) symbol. It is used to nest different tags and elements.

```
div > img
```

2. **Siblings:** We can generate different elements one after one another by using siblings method of emmet.

```
img+a+div
```

3. **Multiplication:** It is used to generate multiple copies of same element.

```
ul > li*5
```

4. **Boilerplate code:** We can directly type the ! (exclamation mark) to generate boilerplate code for html.

## Understanding HTML 5

— This term HTML 5 is essentially a buzzword that refers to a set of modern web technologies. This includes the HTML Living Standard, along with JavaScript, APIs to enhance storage, multimedia and hardware access.

- HTML Standard is a document that tells to the browser how HTML should work.

## Video Tag

- This tag is used to insert a video in a html file. They can contain one or more sources with different video formats. It has some attributes like autoplay, controls, loop, muted, height, width, poster and preload. It requires a closing tag.

```
<video controls>
```

```
<source src=" " type=" ">
```

```
<source src=" " type=" ">
```

Your browser does not support inserting a video.

```
</video>
```

- It can be used with more attributes like

```
<video width="320px" height="240px" controls autoplay  
poster="thumbnail.jpeg" preload="auto">
```

```
<source src="video.mp4" type="video/mp4">
```

```
<source src="video.ogg" type="video/ogg">
```

Your browser does not support inserting a video.

```
</video>
```

- It can embed video which we have a direct link to it. For those video If we don't have any direct link like YouTube Videos we can use iframe tag to embed those videos as well. The text written after the source will be displayed if the browser does not support it.

## Audio Tag

- This tag is used to insert a audio file in a html file. It is very similar to the video tag. It can be used with same attributes like Video Tag.

```
<audio controls>
```

```
<source src="" type=" ">
```

```
<source src=" " type=" ">
```

Your browser does not support inserting a audio.

```
</audio>
```

- The text written after the source will be displayed if the browser does not support it.

# HTML - 4

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## HTML Tables

- Tables are used to represent real life table data. There are different parts of a table which are rows and columns. Horizontal lines are called rows and vertical lines are known as columns. The main row of a table in which we write heading is called it's header. We can say table is a combination of rows and columns. Syntax for creating a table is given below

```
<table>

  <caption>Table Title</caption>

  <tr>

    <th> </th>

    <th> </th>

  </tr>

  <tr>

    <td> </td>

    <td> </td>

  </tr>

  <tr>

    <td> </td>

    <td> </td>

  </tr>

  <tr>

    <td> </td>

    <td> </td>

  </tr>

  </table>
```

- <caption> tag is used to caption the table, <tr> tag is used to create rows inside a table. <th> tag is used to create the heading inside the table and <td> tag is used to create data cells inside the table. We can use border attribute with table tag and assign it's value to black to create borders, but it's not a recommended way

## s in Tables

- There are three main tables tags used as a semantic tags inside the table which are explained below.

1. **<thead>**: This is used to group all the headers created in a table.

2. **<tbody>**: This tag is used to **group the main body or data** of a table.
3. **<tfoot>**: This is used to **create footer of the table** which is not frequently used.

## Colspan & Rowspan attributes

- These **attributes can be used with td and th tag to span them over multiple rows and columns.** They have numerical value which represents the number of rows and columns.

```
<table>

  <caption> </caption>

  <thead>

    <tr>

      <th rowspan="2"> </th>

      <th colspan="2"> </th>

    </tr>

    <tr>

      <th> </th>

      <th> </th>

    </tr>

  </thead>

</table>
```

## Forms in HTML

- Forms are **used to collect data from user. We use action attribute with form tag to describe what actions need to be done after a form is submitted. Value of this attribute will be the location of a JavaScript file or any file** which will perform some actions with the data which is submitted. We can use absolute and relative link with action attribute.
- A form can have many elements which we are going to discuss further.

```
<form action="">

</form>
```

## Input Elements in Form

- It is the **most important element inside a form which is used to take input from the user. There are many (about 25) types of input elements by which we can create different elements by using type attribute with input element.** It is a self-closing tag or single tag. This will only create a input box in which we can enter anything

```
<input>
```

- Now we will use type attribute with the input tag.

```
<input type="text"> for inputting text box
```

- `<input type="password">` for inputting password
- `<input type="number">` for inputting numbers
- `<input type="time">` for inputting time
- `<input type="color">` for inputting colour
- `<input type="date">` for inputting date
- email, file (we can use accept attribute to specify the file type), image, checkbox, radio buttons, range, submit, reset, button, url and there are many more values of type attribute.
- Different value of type attribute in input element can create different input elements.

## Placeholder attribute

- This attribute is also used with the input tag in HTML. It is used to show a text inside the box which describes what to enter inside the box.

```
<input type="text" placeholder="Enter your name here">
```

## Label Names

- This tag represents a caption for the input box or an element in HTML.

```
<label>
```

```
    Username <input type="text" placeholder="Enter Your Username here.">
```

```
</label>
```

```
<label>
```

```
    Password <input type="password" placeholder="Enter Your Password here.">
```

```
</label>
```

- We can also add label in a more classical way by using for attribute with label tag and id attribute with input tag. The value of for attribute inside label tag will be the value of id or name attribute in the input tag.

```
<label for="username"> Enter Your Username: </label>
```

```
<input type="text" id="username" placeholder="enter user name">
```

## Button Element

- It is used to create a button in HTML which submits the data as a default behaviour. There are three types of button in HTML which are given below

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

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

```
<button type="reset"> </button>
```

- Buttons can also be created using input element. We have to use value attribute here to show some text over button because input element is a single tag or self-closing tag.

```
<input type="button" value="Click me">
```

```
<input type="submit">

<input type="submit" value="click to submit">

<input type="reset">

<input type="reset" value="click to reset">
```

## Name Attribute

- It is used to give a name to the form control. Submitted with the form as a part of name/value pair. It means that at the time of submission inputted data must be linked with the name.
- Value is the inputted data and name is the attribute which defines that what is inputted into the input box. Value of name attribute is used to access the inputted data. This attribute is used to access data in the backend.

```
<input type="text" placeholder="enter username" id="uname"
name="uname">
```

## Class Attribute

- This is often used to point out a class name is CSS. It's good to give same class names to different elements but it's not recommended to give same name or id to different elements.

## ID Attribute

- This is used to define the id of each element in HTML. This ID is used to refer the element.

## Checkbox Input Element

- It is used to create a checkbox with the help of input tag. We can check multiple checkboxes on a webpage. If we have to group all these checkboxes we have to keep the value of name attribute same on every checkbox.

```
<input type="checkbox" name="cbox" id="boxc">

<label for="boxc"> I am 18 +. </label>
```

- This will create a unchecked checkbox, the code below will create a checked checkbox. Please note that these checkbox only parses on and off condition but if we have to parse actual data through it, then we have to explicitly create a value attribute in input tag and give the desired value to it.

```
<input type="checkbox" name="cbox" id="boxc" value="Science"
checked >

<label for="boxc"> Science</label>
```

## Radio Input Element

- It is used to create options, when we have to select only one option. If we have to group all these radio element we have to keep the value of name attribute same on every radio element.
- Please note that these radio element only parses on and off condition but if we have to parse actual data through it, then we have to explicitly create a value attribute in input tag and give the desired value to it.

```
<input type="radio" name="fruit" id="apple">
```

```
<label for="apple">Apple</label>
```

## Range Input Element

- If we have to give user option to input between some specified range, then we use range input element.

```
<input type="range" min="0" max="100" name="vol" id="volume"
step="10" value="70">
```

```
<label for="volume">Volume</label>
```

- min and max attributes defines the minimum and maximum input value, whereas step attribute defines how much to increase at a time. We can use value attribute to preset the range at a certain level.

## Dropdowns (Select Element)

- It is used to create a dropdown list in which a user can select only one option.

```
<select name="city" id="cityname">
  <option>Select your city</option>
  <option value="samastipur">Samastipur</option>
  <option value="muzaffarpur">Muzaffarpur</option>
  <option value="darbhanga">Darbhanga</option>
</select>
```

- When we have to preselect some option we can use selected attribute with option tag and we can also create an option which will work as placeholder with using value attribute with option tag.

## Text Area

- It is used to create a text where a user can input it's text. We can create placeholder inside the text area.

```
<label for="text">We value your feedback.</label>

<textarea name="feedback" id="text" placeholder="enter your
feedback"> <textarea>
```

- The default size of a text area is equal to 2 rows and 10 columns, we can alter this by using rows and columns attribute to the textarea element. We can also prewrite something by writing it between the opening and closing text area tag.

```
<label for="text">We value your feedback.</label>

<textarea name="feedback" id="text" rows="5" columns="10"> Hey!
<textarea>
```