

Web Programming

The Web and HTML

What Web is

- *World Wide Web or WWW or W3 or the Web is an interconnected system of public web pages accessible through the Internet.*
- Proposed by Tim Berners-Lee and created in CERN Physics lab in 1990
- World Wide Web Consortium became the standard of web

https://developer.mozilla.org/en-US/docs/Glossary/World_Wide_Web

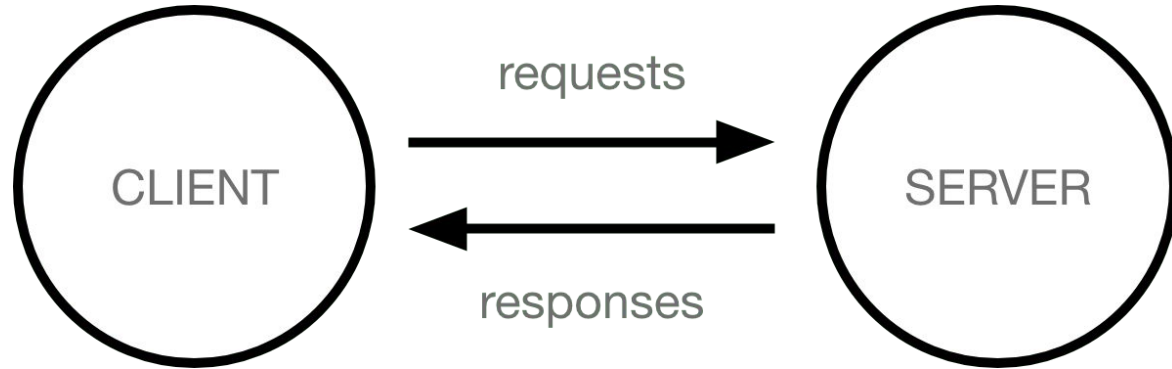
WWW

Components of Web:

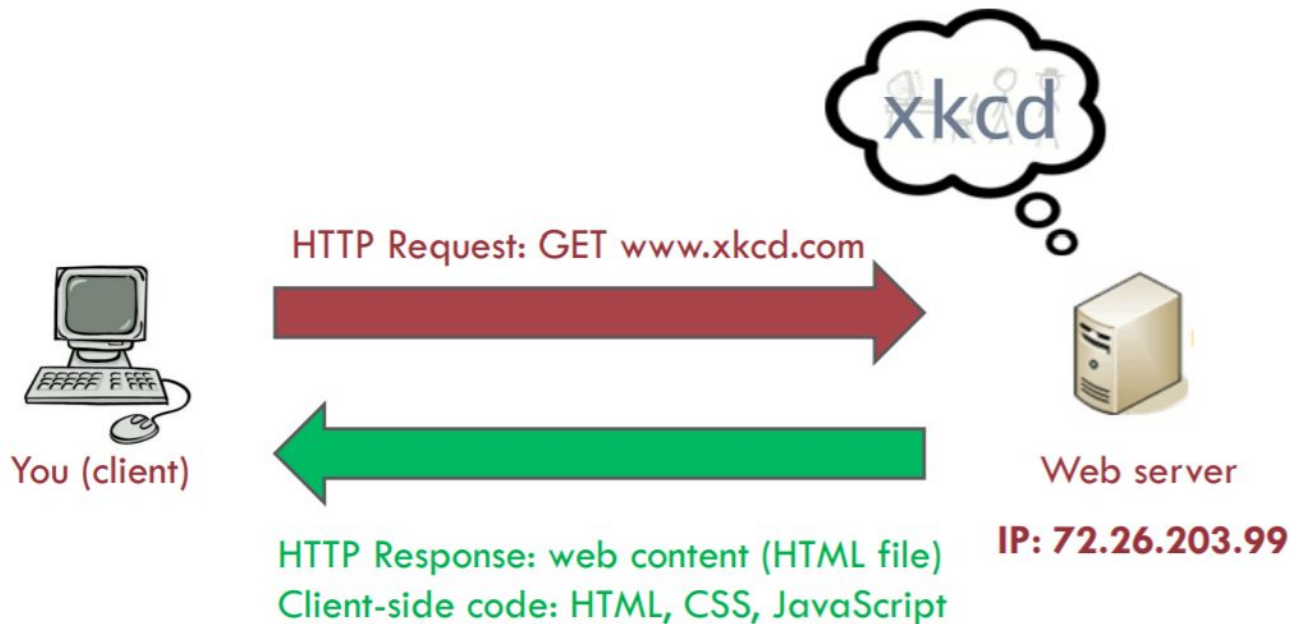
1. HTTP Protocol
2. URL (Uniform Resource Locator) or URI (Uniform Resource Identifier)
3. HTML (HyperText Markup Language)

How the web works

The web provides you with web page(s) when you view it on your devices. The process happens in a Client-Server architecture. Clients are typically an internet-connected device such as your tablet, computer, laptop, etc. provided with web browser. Servers on the other hand, are computers that store the web pages, images, data, etc. and serve them to the client whenever requested



Web Client and Web Server



Tools and Frameworks

There are many tools and frameworks you could use to develop a web page or application, but the basic stuffs you need are only

1. Text Editor, to edit your code
2. Web Browser, to view the result of your code
3. Knowledge of HTML, CSS, and JavaScript

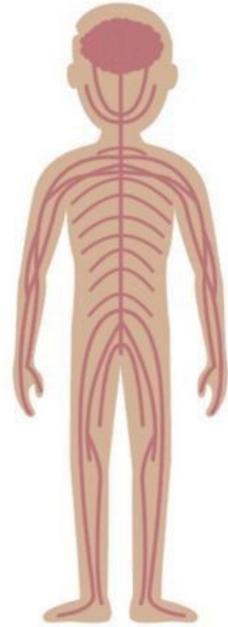


But why those three?

HTML

JS

CSS

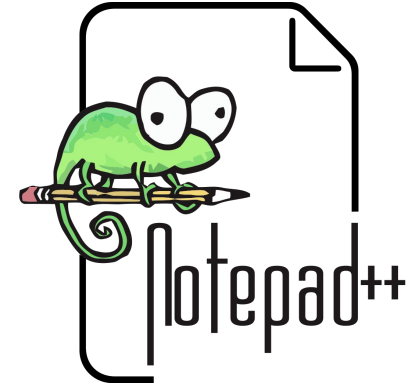
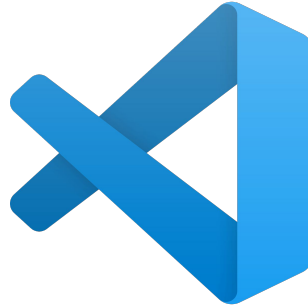


Popular Browsers

1. Google Chrome
2. Mozilla Firefox
3. Safari
4. Microsoft Edge
5. Brave
6. Opera
7. Chromium
8. IceWeasel
9. Konqueror
10. etc.

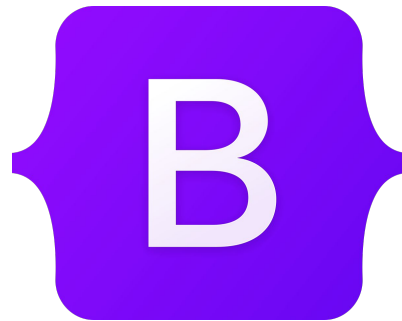
Popular Text Editors

1. Visual Studio Code
2. Sublime Text
3. Brackets
4. Notepad++
5. Vim
6. Neovim
7. Emacs
8. Gedit
9. Notepad
10. REPL IT
11. etc.



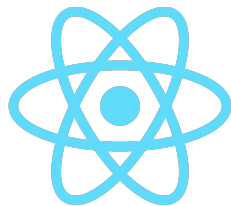
Popular Web Libraries

1. Bootstrap
2. jQuery
3. Moment.js
4. etc.



Popular Web Frameworks

1. React
2. Angular
3. Svelte
4. Vue.js
5. etc.



Download VS Code

Let's use VS Code as our editor (<https://code.visualstudio.com/Download>)

(or if you prefer the online, use <https://replit.com/>)

Hello World using HTML (HyperText Markup Language)

```
<html>  
  <head>  
    <title>My First Web Page</title>  
  </head>  
  <body>  
    <h1>Hello World</h1>  
  </body>  
</html>
```

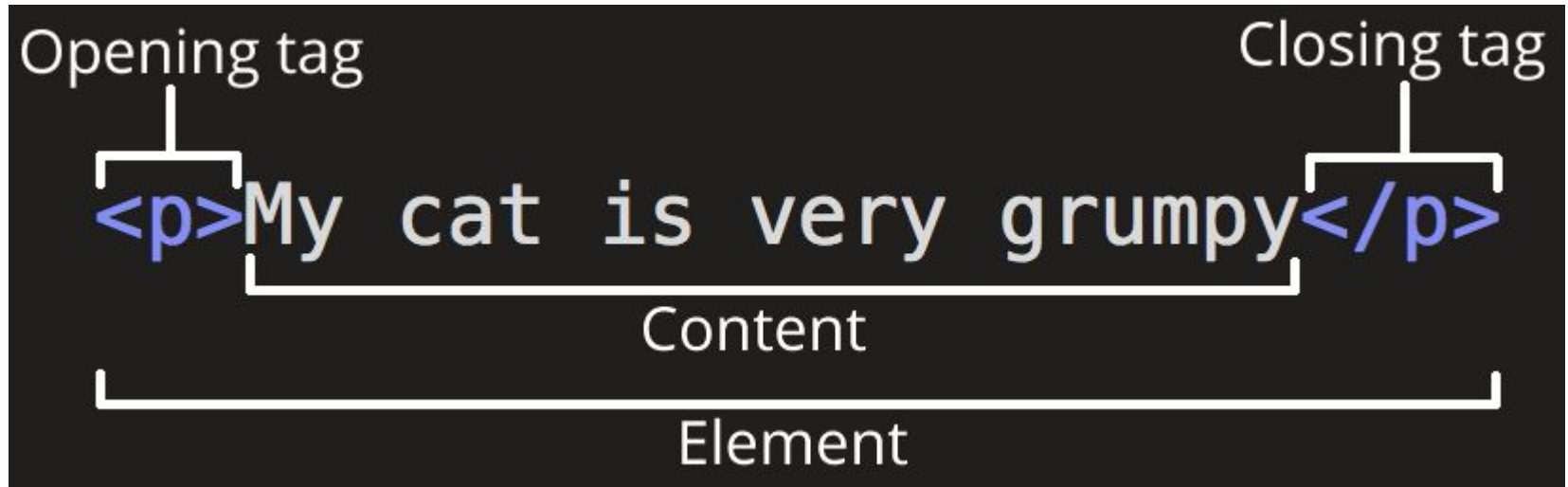
How to run?

Save the file name with anything you want, just make sure the extension is `.html` (e.g. `home.html`), then open the file in the web browser

HTML (HyperText Markup Language)

Standard markup language for the web. It defines the basic structure of the web page. It consists of elements (which consist of tags, attributes, and contents)

Anatomy of HTML



Attribute

Sometimes tags are not enough to be used to design our web pages. As an example, we use image tag directly, but we do not know which image to put and what size the image (width or length) to put on our page.

Attributes are the characteristics of the tag that help us in defining additional characteristics for our HTML tag.

```

```

Starting up

To create HTML web page, we need to use a text editor and web browser. To start creating an HTML page, create a new file and save it as “index.html” in your designated folder. To show the result, we just need to right click on the file then open with a web browser.

HTML5

HTML has been there since a long time, and as other languages, it evolves. Now it is named HTML5. Before HTML5, we cannot embed media tags such as video and audio easily without Flash player. Another thing is we have more easy-to-use new tags, and so on.

<https://www.geeksforgeeks.org/difference-between-html-and-html5/>

Complete basic structure of HTML 5

```
<!-- this is a comment, !DOCTYPE is to tell web browser that the file is html5 file -->
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Document</title>
</head>
<body>

</body>
</html>
```

Meta tag

Defines the metadata of the html document. The contents will not be shown on the page, but it is still parseable. The main usage of the meta tag is to put the description of our web pages, the author, encoding, etc. Meta tag will also help us in Search Engine Optimization (SEO) to make our web page visible in search engine results pages.

Meta

Meta tags are put inside <head> tag of the html document

```
<meta charset="UTF-8">
```

```
<meta name="description" content="Free Web tutorials">
```

```
<meta name="keywords" content="HTML, CSS, JavaScript">
```

```
<meta name="author" content="John Doe">
```

Before we go on

HTML tags usually follow several conventions:

1. Use lowercase letters in the tags
2. Use double quotes or single quotation marks for attributes
3. Every open tag must be closed with the same tag (except several standalone tags)

Comments

Along our journey in creating web pages, it is important to make sure we know what we did, and we could use comments in our HTML file. Comments, as in other languages, are useful to tell ourselves what part of the code does and means. To add comments, simply use the `<!-- -->` comment pairs. Comments will not be displayed in our web page.

example

```
<!-- this part is the main information of our web page -->  
<h1>This is important</h1>  
<h2>This is kinda important</h2>
```


Heading

Heading is used to show important information in our web page. HTML has several heading levels starting from 1 up to 6 with 1 as the most important heading

```
<h1>This is important</h1>  
<h2>This is kinda important</h2>  
<h6>This is the least important</h6>
```

This is important

This is kinda important

This is the least important

Header Group

Sometimes we want to group the heading tags into a part. To do this, use

```
<hgroup></hgroup>
```

```
<hgroup>  
  <h1>this is h1 heading</h1>  
  <h2>this is h2 heading</h2>  
</hgroup>
```

Paragraph

To add paragraph into our web page, we could use `<p></p>` tag

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

Line Breaks

There will be certain cases where we need to add newline (or “Enter” as we would usually say) in our HTML page. To add this newline, we could utilize the tag `
` or `
`

```
<h1>This is heading</h1>  
<hr/>  
Line 1<br/>  
Line 2
```

This is heading

Line 1

Line 2

Horizontal Rule

Also, sometimes we would want to add a separating line in our HTML page. To add this line, we could use `<hr>` or `<hr/>` tag

```
<h1>This is heading</h1>  
<hr/>  
Line 1<br/>  
Line 2
```

This is heading

Line 1

Line 2

This is the
<hr/> tag
result



Try this

```
<p>
```

```
Computing is the first faculty in PresUniv
```

```
Computing consists of 5 study programs
```

```
First is Informatics
```

```
Second is Information System
```

```
Third is Visual Communication Design
```

```
Fourth is Interior Design
```

```
Fifth is Master of Information Technology
```

```
</p>
```

What happened?

Take a look at the result, the text will all be in one line instead of multiple lines as in the HTML script. To overcome this kind of problem, use the `<pre>` tag.

`<pre>` tag is the tag to make a preformatted text on our page. The result will be as similar as the script, but the content will be displayed with a fixed-width font (usually Courier) and it keeps the line breaks and spaces

Solution

```
<pre>
```

```
Computing is the first faculty in PresUniv
```

```
Computing consists of 5 study programs
```

```
First is Informatics
```

```
Second is Information System
```

```
Third is Visual Communication Design
```

```
Fourth is Interior Design
```

```
Fifth is Master of Information Technology
```

```
</pre>
```


Text Formatting

Tag	Function
 or 	To make text into bold . The strong is used to give the sense of importance in the text
<i> or 	To make text into <i>italic</i> . The <i>em</i> is used to give more emphasize in the text
<u> or <ins>	To make text with <u>underline</u> . The <u>ins</u> is actually used to tell that the text is inserted
<s> or 	To give a text the striketrough . The del is used to tell that the text is deleted
<mark>	To mark or highlight a text. Usually in yellow color
<big> and <small>	As expected, to make text bigger or smaller than the one in the same part
<sub> and <sup>	To create text with subscript or superscript such as H ₂ O or “e = m c ² ”

Text Formatting

Tag	Function
<code></code>	To contain or mark a section of a text
<code><q></code>	To put the text into quotation marks
<code><abbr title="title"></code>	To tell that the text is abbreviation. The title attribute is to let the user see the title of the abbr. if hovered
<code><cite></code>	To define that the text is a citation from other sources. Usually in italic
<code><code></code>	To create a “source code”-like text
<code><kbd></code>	To make a text look like a keyboard shortcut
<code><var></code>	To make a text look like a variable in program or in mathematical notation
<code><samp></code>	Similar to <code><code></code> , it shows the text like a program

Several Examples of text formatting tags

This is bold text

This is bold, strong text

This is italic text

This is italic, emphasized text

This is underlined text

This is inserted text

I ~~s~~hate love programming!

HTML is a ~~Programming~~ Markup Language

Human lies, but ~~mark~~Code does not

Elephant is big, and ant is small

Water in Chemistry: H₂O

Oppenheimer and Einstein :) $e = mc^2$

Computing tagline is <q>Be Strong, One, Determination</q>

Although <abbr title="Blue Screen of Death">BSOD</abbr>
has a different meaning in computer

Computer Scientist likes to use the term <cite>algorithm</cite>

<code>

```
int a = 2;
```

</code>

Use this to help your friend <kbd>Ctrl + Alt + Del</kbd>

I love math! Look at this:

<var>y = x² + 1</var>

<samp>

```
# python code snippets <br/>
```

```
print("hello world")
```

</samp>

Result

This is bold text

This is bold, strong text

This is italic text

This is italic, emphasized text

This is underlined text

This is inserted text

I ~~hate~~ love programming!

HTML is a ~~Programming~~ Markup Language

Human lies, but **Code** does not

Elephant is **big**, and ant is small

Water in Chemistry: H₂O

Oppenheimer and Einstein :) $e = mc^2$

Computing tagline is “Be Strong, One, Determination”
Although BSOD has a different meaning in computer
Computer Scientist likes to use the term *algorithm*

```
int a = 2;
```

Use this to help your friend Ctrl + Alt + Del

I love math! Look at this: $y = x^2 + 1$

```
# python code snippets  
print("hello world")
```

Symbols and Entities

Result	Description	Entity Name	Entity Number
	non-breaking space	 	
<	less than	<	<
>	greater than	>	>
&	ampersand	&	&
"	double quotation mark	"	"
'	single quotation mark (apostrophe)	'	'
¢	cent	¢	¢
£	pound	£	£
¥	yen	¥	¥
€	euro	€	€
©	copyright	©	©
®	registered trademark	®	®

Check here: https://www.w3schools.com/html/html_symbols.asp

Let's try!

```
We are on a            far far space<br/>
1 &lt; 2 <br/>
x &lt;= 5 and x &gt; 3, what number is it? <br/>
Thomas & friends is a cartoon <br/>
1 &yen; = Rp. 104.2 <br/>
&copy; PresUniv Computing
```

We are on a far far space

 $1 < 2$

$x \leq 5$ and $x > 3$, what number is it?

Thomas & friends is a cartoon

1 ¥ = Rp. 104.2

© PresUniv Computing

HTML Semantics

Semantic means “related to language or logic”. In HTML semantics mean the tag name represents the direct meaning of what it does. HTML semantics fall into three groups

1. Sectioning elements
2. Grouping elements
3. Text-level semantics

Sectioning Elements

Tag	Function
<code><main></code>	To define the main content of page (no more than 1 main content in a page). This tag is used to pack all other tags
<code><nav></code>	To wrap major navigation links, usually located on top of pages
<code><section></code>	To define a generic section of document, e.g. contact section, news section
<code><article></code>	To define a specific / self-contained piece of the content on the page. More specific than <code><section></code>
<code><aside></code>	To define a “side” component of a web page. Usually used as part to put ads or something not related to the main content
<code><header></code>	To use as header or introduction to a content (in <code><article></code>)
<code><footer></code>	To use as container to store other information, usually located on the bottom of a page

Sectioning Point of View

Look at the image to see the sectioning point of view

Although, do not take this as standard!

BUT, using these semantics will help your web pages being

Processed well in the SEO!



Let's try!

```
<main>
  <header>
    <h1>Welcome to Web Programming Recipe!</ h1>
  </header>
  <nav>
    <span>Home</ span>
    <span>HTML</ span>
    <span>CSS</ span>
    <span>JavaScript</ span>
  </nav>
  <section>
    <p>
      Web Programming is a fundamental topics to prepare you
      to be able to develop a web-based software
    </p>
  </section>
  <aside>
    <p>
      Ads: Join PUMA Computing!
    </p>
  </aside>
  <footer>
    Contact Computing: @pucomputing
  </footer>
</main>
```

Welcome to Web Programming Recipe!

Home HTML CSS JavaScript

Web Programming is a fundamental topics to prepare you to be able to develop a web-based software

Join PUMA Computing!

Contact Computing: @pucomputing

Grouping Elements

Tag	Function
<code><div></code>	To group a content. It means nothing except as division. Use this if you cannot think of anything else
<code><p></code>	To make a paragraph
<code><blockquote></code>	To mark up a text that is quoted from other sources
<code><figure></code> and <code><figcaption></code>	Combined to annotate illustrations, diagrams, or photos
<code><details></code> and <code><summary></code>	The details is used to give a clickable section of text and summary is to give the text summary
<code><address></code>	To mark up contact information

Let's try!

```
<div>
  This is one division of a page
</div>
<p>
  But this is a paragraph with a quote from someone:<br/>
  <blockquote>To Be Or Not To Be</blockquote>
</p>
<details>
  <summary>Click this to see what we learn in Web Programming</summary>
  HTML<br/>
  CSS<br/>
  JavaScript<br/>
</details>
<h4>This is a random image</h4>
<figure>
  
  <figcaption>Fig.1 - Random Image Online.</figcaption>
</figure>
<address>
  Jl. Ki Hajar Dewantara no 1, Jababeka. Bekasi. 17530
</address>
```

This is one division of a page

But this is a paragraph with a quote from someone:

To Be Or Not To Be

► Click this to see what we learn in Web Programming

This is a random image



Fig.1 - Random Image Online.

Jl. Ki Hajar Dewantara no 1, Jababeka. Bekasi. 17530

This is one division of a page

But this is a paragraph with a quote from someone:

To Be Or Not To Be

▼ Click this to see what we learn in Web Programming

HTML

CSS

JavaScript

This is a random image



Fig.1 - Random Image Online.

Jl. Ki Hajar Dewantara no 1, Jababeka. Bekasi. 17530

List in HTML

Sometimes we need to create a list on our webpage. To do that we could use one of the following type:

1. Unordered list
2. Ordered list

List (Ordered and Unordered)

To make a list, we could use `` or `` tag followed by `` inside. Use `` to make ordered list, and `` to make the unordered one.

To Buy later

```
<ul>
  <li>Bread</li>
  <li>Milk</li>
  <li>Ham</li>
  <li>Broccoli</li>
  <li>Tofu</li>
</ul>
```

To Buy later

- Bread
- Milk
- Ham
- Broccoli
- Tofu

List (Ordered and Unordered)

To Buy later

```
<ol>  
  <li>Bread</li>  
  <li>Milk</li>  
  <li>Ham</li>  
  <li>Broccoli</li>  
  <li>Tofu</li>  
</ol>
```

To Buy later

1. Bread
2. Milk
3. Ham
4. Broccoli
5. Tofu

Unordered List - disc (default)

```
Default is type="disc"  
<ul type="disc">  
  <li>Bread</li>  
  <li>Milk</li>  
</ul>
```

- Bread
- Milk

Unordered List - circle

```
<ul type="circle">  
  <li>Bread</li>  
  <li>Milk</li>  
</ul>
```

- Bread
- Milk

Unordered List - square

```
<ul type="square">  
  <li>Bread</li>  
  <li>Milk</li>  
</ul>
```

- Bread
- Milk

Ordered List - Arabic Numerals (default)

```
Default is type="1", number  
<ol type="1">  
  <li>Bread</li>  
  <li>Milk</li>  
</ol>
```

Default is type="1", number

1. Bread
2. Milk

Ordered List - Uppercase Letters

```
type="A", uppercase letters
<ol type="A">
  <li>Bread</li>
  <li>Milk</li>
</ol>
```

type="A", uppercase letters

- A. Bread
- B. Milk

Ordered List - Lowercase Letters

```
type="a", lowercase letters  
<ol type="a">  
  <li>Bread</li>  
  <li>Milk</li>  
</ol>
```

type="a", lowercase letters

- a. Bread
- b. Milk

Ordered List - Uppercase Roman

```
type="I", uppercase Roman letters
<ol type="I">
  <li>Bread</li>
  <li>Milk</li>
</ol>
```

type="I", uppercase Roman letters

- I. Bread
- II. Milk

Ordered List - Lowercase Roman

```
type="i", lowercase Roman letters
<ol type="i">
  <li>Bread</li>
  <li>Milk</li>
</ol>
```

type="i", lowercase Roman letters

- i. Bread
- ii. Milk

Hyperlink (Anchor)

- Use `<a>` to provide link to other pages
- Attributes:
 - `href` : determine the location of link / file (yes it is possible)
 - `target` : determine where to open the link
- Link color will change depending on the conditions:
 - Blue: unopened
 - Purple: visited
 - Red: active link

```
<a href="https://puis.president.ac.id">PUIS</a>
```

Hyperlink Targets

`_self`: open in same window (default)

`_blank`: open in new window or tab

`_parent`: open in parent frame (using iframe)

`_top`: open in full body of window

```
<a href="https://puis.president.ac.id" target=" blank">PUIS</a>  
<a href="https://puis.president.ac.id" target="_top">PUIS</a>
```

Bonus

`<meter>`: to show meter tag such as 2 out of 10

Disk Usage 

`<progress>`: to show progress bar percentage

Download Progress 

And yes, HTML supports emojis now

https://www.w3schools.com/charsets/ref_emoji.asp

References

www.w3.org

[https://developer.mozilla.org/en-US/docs/Learn/Getting_started_with_the_web/How the Web works](https://developer.mozilla.org/en-US/docs/Learn/Getting_started_with_the_web/How_the_Web_works)

<https://www.techtarget.com/whatis/definition/HTTP-Hypertext-Transfer-Protocol>

<https://developer.mozilla.org/en-US/docs/Web/HTTP/Overview>

<https://code.visualstudio.com/Download>