https://www.w3schools.com/

HTML Tutorial

HTML is the standard markup language for Web pages.

With HTML you can create your own Website.

HTML is easy to learn - You will enjoy it!

What is HTML?

HTML is the standard markup language for creating Web pages.

- HTML stands for Hyper Text Markup Language
- HTML describes the structure of a Web page
- HTML consists of a series of elements
- HTML elements tell the browser how to display the content
- HTML elements are represented by tags
- HTML tags label pieces of content such as "heading", "paragraph", "table", and so on
- Browsers do not display the HTML tags, but use them to render the content of the page

Example Explained

- The `<!DOCTYPE html>` declaration defines this document to be HTML5
- The `<html>` element is the root element of an HTML page
- The `<head>` element contains meta information about the document
- The `<title>` element specifies a title for the document
- The `<body>` element contains the visible page content
- The `<h1>` element defines a large heading
- The `<p>` element defines a paragraph

HTML Tags

HTML tags are element names surrounded by angle brackets:

<tagname>content goes here...</tagname>

- HTML tags normally come **in pairs** like `<p>` and `</p>`
- 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, but with a **forward slash** inserted before the tag name

Tip: The start tag is also called the **opening tag**, and the end tag the **closing tag**.

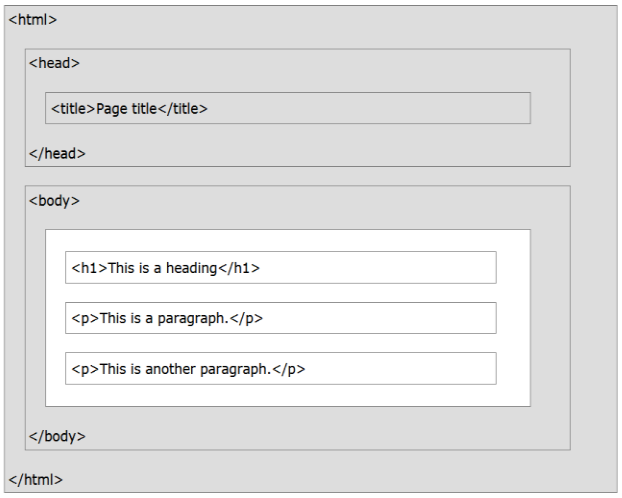
Web Browsers

The purpose of a web browser (Chrome, Edge, Firefox, Safari) is to read HTML documents and display them.

The browser does not display the HTML tags, but uses them to determine how to display the document:

HTML Page Structure

Below is a visualization of an HTML page structure:


<html>
<head>
<title>Page title</title>
</head>
<body>
<h1>This is a heading</h1>
<p>This is a paragraph.</p>
<p>This is another paragraph.</p>
</body>
</html>

Note: Only the content inside the <body> section (the white area above) is displayed in a browser.

The <!DOCTYPE> Declaration

The `<!DOCTYPE>` declaration represents the document type, and helps browsers to display web pages correctly.

It must only appear once, at the top of the page (before any HTML tags).

The `<!DOCTYPE>` declaration is not case sensitive.

The `<!DOCTYPE>` declaration for HTML5 is:

```
<!DOCTYPE html>
```

HTML Versions

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

Version	Year
HTML	1991
HTML 2.0	1995
HTML 3.2	1997
HTML 4.01	1999
XHTML	2000
HTML5	2014

HTML Editors

Write HTML Using Notepad or TextEdit

Web pages can be created and modified by using professional HTML editors.

However, for learning HTML we recommend a simple text editor like Notepad (PC) or TextEdit (Mac).

We believe using a simple text editor is a good way to learn HTML.

Follow the steps below to create your first web page with Notepad or TextEdit.

Step 1: Open Notepad (PC)

Windows 8 or later:

Open the **Start Screen** (the window symbol at the bottom left on your screen). Type **Notepad**.

Windows 7 or earlier:

Open **Start** > **Programs** > **Accessories** > **Notepad**

Step 1: Open TextEdit (Mac)

Open **Finder** > **Applications** > **TextEdit**

Also change some preferences to get the application to save files correctly. In **Preferences** > **Format** > choose **"Plain Text"**

Then under "Open and Save", check the box that says "Display HTML files as HTML code instead of formatted text".

Then open a new document to place the code.

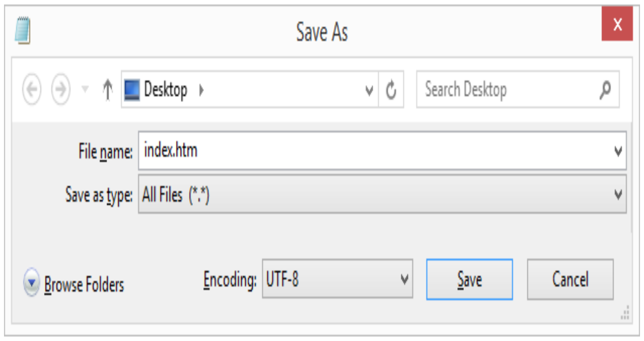
Step 2: Write Some HTML

Write or copy some HTML into Notepad.

Step 3: Save the HTML Page

Save the file on your computer. Select **File > Save as** in the Notepad menu.

Name the file **"index.htm"** and set the encoding to **UTF-8** (which is the preferred encoding for HTML files).



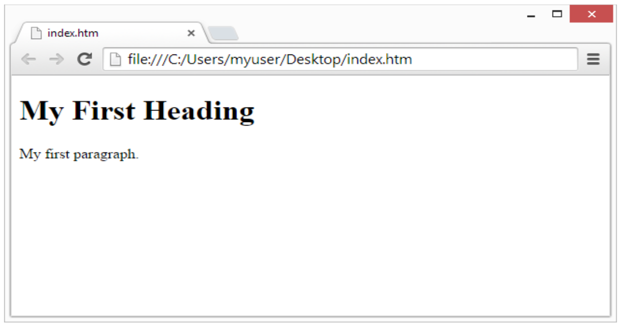
File name: index.htm
Save as type: All Files (*.*)
Encoding: UTF-8

You can use either .htm or .html as file extension. There is no difference, it is up to you.

Step 4: View the HTML Page in Your Browser

Open the saved HTML file in your favorite browser (double click on the file, or right-click - and choose "Open with").

The result will look much like this:



file:///C:/Users/myuser/Desktop/index.htm

My First Heading

My first paragraph.

W3Schools Online Editor

With our free online editor, you can edit the HTML code and view the result in your browser.

It is the perfect tool when you want to **test** code fast. It also has color coding and the ability to save and share code with others:

HTML Basic Examples

Don't worry if these examples use tags you have not learned.

You will learn about them in the next chapters.

HTML Documents

All HTML documents must start with a document type declaration: `<!DOCTYPE html>`.

The HTML document itself begins with `<html>` and ends with `</html>`.

The visible part of the HTML document is between `<body>` and `</body>`.

HTML Headings

HTML headings are defined with the `<h1>` to `<h6>` tags.

`<h1>` defines the most important heading. `<h6>` defines the least important heading:

HTML Paragraphs

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

HTML Links

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

Example
```
<a href="https://www.w3schools.com">This is a link</a>
```

The link's destination is specified in the `href` attribute.

Attributes are used to provide additional information about HTML elements.

You will learn more about attributes in a later chapter.

HTML Images

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

The source file (`src`), alternative text (`alt`), `width`, and `height` are provided as attributes:

Example
```
<img src="w3schools.jpg" alt="W3Schools.com" width="104"
height="142">
```

HTML Buttons

HTML buttons are defined with the `<button>` tag:

Example
```
<button>Click me</button>
```

HTML Lists

HTML lists are defined with the `<ul>` (unordered/bullet list) or the `<ol>` (ordered/numbered list) tag, followed by `<li>` tags (list items):

Example
```
<ul>
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ul>

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

HTML Elements

HTML Elements

An HTML element usually consists of a **start** tag and an **end** tag, with the content inserted in between:

```
<tagname>Content goes here...</tagname>
```

The HTML **element** is everything from the start tag to the end tag:

```
<p>My first paragraph.</p>
```

Start tag	**Element content**	**End tag**
<h1>	My First Heading	</h1>
<p>	My first paragraph.	</p>
<br>		

HTML elements with no content are called empty elements. Empty elements do not have an end tag, such as the <br> element (which indicates a line break).

Nested HTML Elements

HTML elements can be nested (elements can contain elements).

All HTML documents consist of nested HTML elements.

This example contains four HTML elements:

Example

```
<!DOCTYPE html>
<html>
<body>

<h1>My First Heading</h1>
<p>My first paragraph.</p>

</body>
</html>
```

Example Explained

The `<html>` element defines the **whole document**.

It has a **start** tag <html> and an **end** tag </html>.

Inside the <html> element is the `<body>` element.

```
<html>
<body>

<h1>My First Heading</h1>
<p>My first paragraph.</p>

</body>
</html>
```

The `<body>` element defines the **document body**.

It has a **start** tag <body> and an **end** tag </body>.

Inside the <body> element is two other HTML elements: `<h1>` and `<p>`.

```
<body>

<h1>My First Heading</h1>
<p>My first paragraph.</p>

</body>
```

The `<h1>` element defines a **heading**.

It has a **start** tag <h1> and an **end** tag </h1>.

The element **content** is: My First Heading.

```
<h1>My First Heading</h1>
```

The `<p>` element defines a **paragraph**.

It has a **start** tag <p> and an **end** tag </p>.

The element **content** is: My first paragraph.

```
<p>My first paragraph.</p>
```

Do Not Forget the End Tag

Some HTML elements will display correctly, even if you forget the end tag:

Example

```
<html>
<body>

<p>This is a paragraph
<p>This is a paragraph

</body>
</html>
```

The example above works in all browsers, because the closing tag is considered optional.

Never rely on this. It might produce unexpected results and/or errors if you forget the end tag.

Empty HTML Elements

HTML elements with no content are called empty elements.

`<br>` is an empty element without a closing tag (the `<br>` tag defines a line break):

Example

```
<p>This is a <br> paragraph with a line break.</p>
```

Empty elements can be "closed" in the opening tag like this: <br />.

HTML5 does not require empty elements to be closed. But if you want stricter validation, or if you need to make your document readable by XML parsers, you must close all HTML elements properly.

HTML Is Not Case Sensitive

HTML tags are not case sensitive: <P> means the same as <p>.

The HTML5 standard does not require lowercase tags, but W3C **recommends** lowercase in HTML, and **demands** lowercase for stricter document types like XHTML.

At W3Schools we always use lowercase tags.

HTML Attributes

Attributes provide additional information about HTML elements.

HTML Attributes

- All HTML elements can have **attributes**
- Attributes provide **additional information** about an element
- Attributes are always specified in **the start tag**
- Attributes usually come in name/value pairs like: **name="value"**

The href Attribute

HTML links are defined with the `<a>` tag. The link address is specified in the `href` attribute:

Example

```
<a href="https://www.w3schools.com">This is a link</a>
```

You will learn more about links and the `<a>` tag later in this tutorial.

The src Attribute

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

The filename of the image source is specified in the `src` attribute:

Example

```
<img src="img_girl.jpg">
```

The width and height Attributes

HTML images also have `width` and `height` attributes, which specifies the width and height of the image:

Example

```
<img src="img_girl.jpg" width="500" height="600">
```

The width and height are specified in pixels by default; so width="500" means 500 pixels wide.

You will learn more about images in our HTML Images chapter.

The alt Attribute

The `alt` attribute specifies an alternative text to be used, if an image cannot be displayed.

The value of the `alt` attribute can be read by screen readers. This way, someone "listening" to the webpage, e.g. a vision impaired person, can "hear" the element.

Example

```
<img src="img_girl.jpg" alt="Girl with a jacket">
```

The `alt` attribute is also useful if the image cannot be displayed (e.g. if it does not exist):

Example

See what happens if we try to display an image that does not exist:

```
<img src="img_typo.jpg" alt="Girl with a jacket">
```

The style Attribute

The `style` attribute is used to specify the styling of an element, like color, font, size etc.

Example

```
<p style="color:red">This is a paragraph.</p>
```

You will learn more about styling later in this tutorial, and in our CSS Tutorial.

The lang Attribute

The language of the document can be declared in the `<html>` tag.

The language is declared with the `lang` attribute.

Declaring a language is important for accessibility applications (screen readers) and search engines:

```
<!DOCTYPE html>
<html lang="en-US">
<body>

...

</body>
</html>
```

The first two letters specify the language (en). If there is a dialect, add two more letters (US).

The title Attribute

Here, a `title` attribute is added to the `<p>` element. The value of the title attribute will be displayed as a tooltip when you mouse over the paragraph:

Example

```
<p title="I'm a tooltip">
This is a paragraph.
</p>
```

We Suggest: Use Lowercase Attributes

The HTML5 standard does not require lowercase attribute names.

The title attribute can be written with uppercase or lowercase like **title** or **TITLE**.

W3C **recommends** lowercase in HTML, and **demands** lowercase for stricter document types like XHTML.

At W3Schools we always use lowercase attribute names.

We Suggest: Quote Attribute Values

The HTML5 standard does not require quotes around attribute values.

The `href` attribute, demonstrated above, *can* be written without quotes:

Bad

```
<a href=https://www.w3schools.com>
```

Good

```
<a href="https://www.w3schools.com">
```

W3C **recommends** quotes in HTML, and **demands** quotes for stricter document types like XHTML.

Sometimes it is **necessary** to use quotes. This example will not display the title attribute correctly, because it contains a space:

Example

```
<p title=About W3Schools>
```

Single or Double Quotes?

Double quotes around attribute values are the most common in HTML, but single quotes can also be used.

In some situations, when the attribute value itself contains double quotes, it is necessary to use single quotes:

```
<p title='John "ShotGun" Nelson'>
```

Or vice versa:

```
<p title="John 'ShotGun' Nelson">
```

Chapter Summary

- All HTML elements can have **attributes**
- The `title` attribute provides additional "tool-tip" information
- The `href` attribute provides address information for links
- The `width` and `height` attributes provide size information for images
- The `alt` attribute provides text for screen readers
- At W3Schools we always use **lowercase** attribute names
- At W3Schools we always **quote** attribute values

HTML Attributes

Below is an alphabetical list of some attributes often used in HTML, which you will learn more about in this tutorial:

Attribute	Description
alt	Specifies an alternative text for an image, when the image cannot be displayed
disabled	Specifies that an input element should be disabled
href	Specifies the URL (web address) for a link
id	Specifies a unique id for an element
src	Specifies the URL (web address) for an image
style	Specifies an inline CSS style for an element
title	Specifies extra information about an element (displayed as a tool tip)

A complete list of all attributes for each HTML element, is listed in our: HTML Attribute Reference.

HTML Headings

HTML Headings

Headings are defined with the `<h1>` to `<h6>` tags.

`<h1>` defines the most important heading. `<h6>` defines the least important heading.

Note: Browsers automatically add some white space (a margin) before and after a heading.

Headings Are Important

Search engines use the headings to index the structure and content of your web pages.

Users often skim a page by its headings. It is important to use headings to show the document structure.

`<h1>` headings should be used for main headings, followed by `<h2>` headings, then the less important `<h3>`, and so on.

Note: Use HTML headings for headings only. Don't use headings to make text **BIG** or **bold**.

Bigger Headings

Each HTML heading has a default size. However, you can specify the size for any heading with the `style` attribute, using the CSS `font-size` property:

Example

```
<h1 style="font-size:60px;">Heading 1</h1>
```

HTML Horizontal Rules

The `<hr>` tag defines a thematic break in an HTML page, and is most often displayed as a horizontal rule.

The `<hr>` element is used to separate content (or define a change) in an HTML page:

Example

```
<h1>This is heading 1</h1>
<p>This is some text.</p>
<hr>
<h2>This is heading 2</h2>
<p>This is some other text.</p>
<hr>
```

The HTML <head> Element

The HTML `<head>` element is a container for metadata. HTML metadata is data about the HTML document. Metadata is not displayed.

The `<head>` element is placed between the `<html>` tag and the `<body>` tag:

Example

```
<!DOCTYPE html>
<html>
```

```
<head>
  <title>My First HTML</title>
  <meta charset="UTF-8">
</head>

<body>
.
.
.
```

Note: Metadata typically define the document title, character set, styles, scripts, and other meta information.

How to View HTML Source?

Have you ever seen a Web page and wondered "Hey! How did they do that?"

View HTML Source Code:

Right-click in an HTML page and select "View Page Source" (in Chrome) or "View Source" (in Edge), or similar in other browsers. This will open a window containing the HTML source code of the page.

Inspect an HTML Element:

Right-click on an element (or a blank area), and choose "Inspect" or "Inspect Element" to see what elements are made up of (you will see both the HTML and the CSS). You can also edit the HTML or CSS on-the-fly in the Elements or Styles panel that opens.

HTML Tag Reference

W3Schools' tag reference contains additional information about these tags and their attributes.

You will learn more about HTML tags and attributes in the next chapters of this tutorial.

Tag	Description
<html>	Defines the root of an HTML document
<body>	Defines the document's body
<head>	A container for all the head elements (title, scripts, styles, meta information, and more)
<h1> to <h6>	Defines HTML headings
<hr>	Defines a thematic change in the content

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML Paragraphs

HTML Paragraphs

The HTML `<p>` element defines a **paragraph**:

Example

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

Note: Browsers automatically add some white space (a margin) before and after a paragraph.

HTML Display

You cannot be sure how HTML will be displayed.

Large or small screens, and resized windows will create different results.

With HTML, you cannot change the output by adding extra spaces or extra lines in your HTML code.

The browser will remove any extra spaces and extra lines when the page is displayed:

Example

```
<p>
This paragraph
contains a lot of lines
in the source code,
but the browser
ignores it.
</p>

<p>
This paragraph
contains         a lot of spaces
in the source         code,
but the        browser
ignores it.
</p>
```

Don't Forget the End Tag

Most browsers will display HTML correctly even if you forget the end tag:

Example

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

The example above will work in most browsers, but do not rely on it.

Note: Dropping the end tag can produce unexpected results or errors.

HTML Line Breaks

The HTML `<br>` element defines a **line break**.

Use `<br>` if you want a line break (a new line) without starting a new paragraph:

Example

```
<p>This is<br>a paragraph<br>with line breaks.</p>
```

The `<br>` tag is an empty tag, which means that it has no end tag.

The Poem Problem

This poem will display on a single line:

Example

```
<p>
  My Bonnie lies over the ocean.

  My Bonnie lies over the sea.

  My Bonnie lies over the ocean.

  Oh, bring back my Bonnie to me.
</p>
```

The HTML <pre> Element

The HTML `<pre>` element defines preformatted text.

The text inside a `<pre>` element is displayed in a fixed-width font (usually Courier), and it preserves both spaces and line breaks:

Example

```
<pre>
  My Bonnie lies over the ocean.

  My Bonnie lies over the sea.

  My Bonnie lies over the ocean.

  Oh, bring back my Bonnie to me.
</pre>
```

HTML Tag Reference

W3Schools' tag reference contains additional information about HTML elements and their attributes.

Tag	Description
<p>	Defines a paragraph
<br>	Inserts a single line break
<pre>	Defines pre-formatted text

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML Styles

Example

I am Red

I am Blue

I am Big

The HTML Style Attribute

Setting the style of an HTML element, can be done with the `style` attribute.

The HTML `style` attribute has the following **syntax**:

```
<tagname style="property:value;">
```

The ***property*** is a CSS property. The ***value*** is a CSS value.

You will learn more about CSS later in this tutorial.

Background Color

The CSS `background-color` property defines the background color for an HTML element.

This example sets the background color for a page to powderblue:

Example

```
<body style="background-color:powderblue;">

<h1>This is a heading</h1>
<p>This is a paragraph.</p>

</body>
```

Text Color

The CSS `color` property defines the text color for an HTML element:

Example

```
<h1 style="color:blue;">This is a heading</h1>
<p style="color:red;">This is a paragraph.</p>
```

Fonts

The CSS `font-family` property defines the font to be used for an HTML element:

Example

```
<h1 style="font-family:verdana;">This is a heading</h1>
<p style="font-family:courier;">This is a paragraph.</p>
```

Text Size

The CSS `font-size` property defines the text size for an HTML element:

Example

```
<h1 style="font-size:300%;">This is a heading</h1>
<p style="font-size:160%;">This is a paragraph.</p>
```

Text Alignment

The CSS `text-align` property defines the horizontal text alignment for an HTML element:

Example

```
<h1 style="text-align:center;">Centered Heading</h1>
<p style="text-align:center;">Centered paragraph.</p>
```

Chapter Summary

- Use the `style` attribute for styling HTML elements
- Use `background-color` for background color
- Use `color` for text colors
- Use `font-family` for text fonts
- Use `font-size` for text sizes
- Use `text-align` for text alignment

HTML Text Formatting

Text Formatting

This text is bold

This text is italic

This is $_{\text{subscript}}$ and $^{\text{superscript}}$

HTML Formatting Elements

In the previous chapter, you learned about the HTML **style attribute**.

HTML also defines special **elements** for defining text with a special **meaning**.

HTML uses elements like `<b>` and `<i>` for formatting output, like **bold** or *italic* text.

Formatting elements were designed to display special types of text:

- `<b>` - Bold text
- `<strong>` - Important text
- `<i>` - Italic text
- `<em>` - Emphasized text
- `<mark>` - Marked text
- `<small>` - Small text
- `<del>` - Deleted text
- `<ins>` - Inserted text
- `<sub>` - Subscript text
- `<sup>` - Superscript text

HTML <b> and <strong> Elements

The HTML `<b>` element defines **bold** text, without any extra importance.

Example

```
<b>This text is bold</b>
```

The HTML `<strong>` element defines **strong** text, with added semantic "strong" importance.

Example

```
<strong>This text is strong</strong>
```

HTML <i> and <em> Elements

The HTML `<i>` element defines *italic* text, without any extra importance.

Example

```
<i>This text is italic</i>
```

The HTML `<em>` element defines *emphasized* text, with added semantic importance.

Example

```
<em>This text is emphasized</em>
```

Note: Browsers display `<strong>` as `<b>`, and `<em>` as `<i>`. However, there is a difference in the meaning of these tags: `<b>` and `<i>` defines bold and italic text, but `<strong>` and `<em>` means that the text is "important".

HTML <small> Element

The HTML `<small>` element defines smaller text:

Example

```
<h2>HTML <small>Small</small> Formatting</h2>
```

HTML <mark> Element

The HTML `<mark>` element defines marked/highlighted text:

Example

```
<h2>HTML <mark>Marked</mark> Formatting</h2>
```

HTML <del> Element

The HTML `<del>` element defines deleted/removed text.

Example

```
<p>My favorite color is <del>blue</del> red.</p>
```

HTML <ins> Element

The HTML `<ins>` element defines inserted/added text.

Example

```
<p>My favorite <ins>color</ins> is red.</p>
```

HTML <sub> Element

The HTML `<sub>` element defines subscripted text.

Example

```
<p>This is <sub>subscripted</sub> text.</p>
```

HTML <sup> Element

The HTML `<sup>` element defines superscripted text.

Example

```
<p>This is <sup>superscripted</sup> text.</p>
```

HTML Text Formatting Elements

Tag	Description
<b>	Defines bold text
<em>	Defines emphasized text
<i>	Defines italic text
<small>	Defines smaller text
<strong>	Defines important text
<sub>	Defines subscripted text
<sup>	Defines superscripted text
<ins>	Defines inserted text
<del>	Defines deleted text
<mark>	Defines marked/highlighted text

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML Quotation and Citation Elements

Quotation

Here is a quote from WWF's website:

For nearly 60 years, WWF has been protecting the future of nature. The world's leading conservation organization, WWF works in 100 countries and is supported by more than one million members in the United States and close to five million globally.

HTML <q> for Short Quotations

The HTML `<q>` element defines a short quotation.

Browsers usually insert quotation marks around the `<q>` element.

Example
```
<p>WWF's goal is to: <q>Build a future where people live in
harmony with nature.</q></p>
```

HTML <blockquote> for Quotations

The HTML `<blockquote>` element defines a section that is quoted from another source.

Browsers usually indent `<blockquote>` elements.

Example
```
<p>Here is a quote from WWF's website:</p>
<blockquote cite="http://www.worldwildlife.org/who/index.html">
For 50 years, WWF has been protecting the future of nature.
The world's leading conservation organization,
WWF works in 100 countries and is supported by
1.2 million members in the United States and
close to 5 million globally.
</blockquote>
```

HTML <abbr> for Abbreviations

The HTML `<abbr>` element defines an abbreviation or an acronym.

Marking abbreviations can give useful information to browsers, translation systems and search-engines.

Example
```
<p>The <abbr title="World Health Organization">WHO</abbr> was
founded in 1948.</p>
```

HTML <address> for Contact Information

The HTML `<address>` element defines contact information (author/owner) of a document or an article.

The `<address>` element is usually displayed in italic. Most browsers will add a line break before and after the element.

Example
```
<address>
Written by John Doe.<br>
Visit us at:<br>
Example.com<br>
Box 564, Disneyland<br>
USA
</address>
```

HTML <cite> for Work Title

The HTML `<cite>` element defines the title of a work.

Browsers usually display `<cite>` elements in italic.

Example
```
<p><cite>The Scream</cite> by Edvard Munch. Painted in 1893.</p>
```

HTML <bdo> for Bi-Directional Override

The HTML `<bdo>` element defines bi-directional override.

The `<bdo>` element is used to override the current text direction:

Example
```
<bdo dir="rtl">This text will be written from right to left</bdo>
```

HTML Quotation and Citation Elements

Tag	Description
<abbr>	Defines an abbreviation or acronym
<address>	Defines contact information for the author/owner of a document
<bdo>	Defines the text direction
<blockquote>	Defines a section that is quoted from another source
<cite>	Defines the title of a work
<q>	Defines a short inline quotation

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML Comments

Comment tags are used to insert comments in the HTML source code.

HTML Comment Tags

You can add comments to your HTML source by using the following syntax:

```
<!-- Write your comments here -->
```

Notice that there is an exclamation point (!) in the opening tag, but not in the closing tag.

Note: Comments are not displayed by the browser, but they can help document your HTML source code.

With comments you can place notifications and reminders in your HTML:

Example

```
<!-- This is a comment -->

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

<!-- Remember to add more information here -->
```

Comments are also great for debugging HTML, because you can comment out HTML lines of code, one at a time, to search for errors:

Example

```
<!-- Do not display this image at the moment
<img border="0" src="pic_trulli.jpg" alt="Trulli">
-->
```

HTML Colors

HTML colors are specified using predefined color names, or RGB, HEX, HSL, RGBA, HSLA values.

Color Names

In HTML, a color can be specified by using a color name:

Tomato	Orange
DodgerBlue	MediumSeaGreen
Gray	SlateBlue
Violet	LightGray

HTML supports 140 standard color names.

Background Color

You can set the background color for HTML elements:

Example

```
<h1 style="background-color:DodgerBlue;">Hello World</h1>
<p style="background-color:Tomato;">Lorem ipsum...</p>
```

Text Color

You can set the color of text:

Hello World

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat.

Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat.

Example

```
<h1 style="color:Tomato;">Hello World</h1>
<p style="color:DodgerBlue;">Lorem ipsum...</p>
<p style="color:MediumSeaGreen;">Ut wisi enim...</p>
```

Border Color

You can set the color of borders:

Hello World

Hello World

Hello World

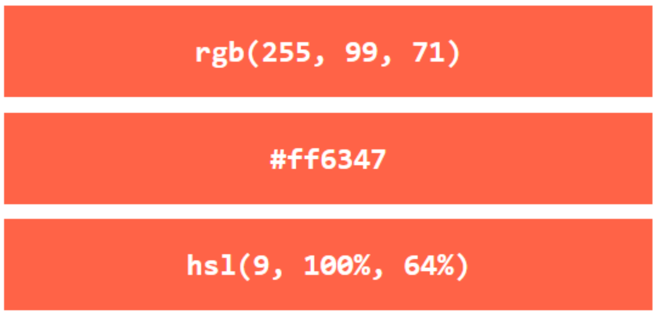
Example

```
<h1 style="border:2px solid Tomato;">Hello World</h1>
<h1 style="border:2px solid DodgerBlue;">Hello World</h1>
<h1 style="border:2px solid Violet;">Hello World</h1>
```

Color Values

In HTML, colors can also be specified using RGB values, HEX values, HSL values, RGBA values, and HSLA values:

Same as color name "Tomato":

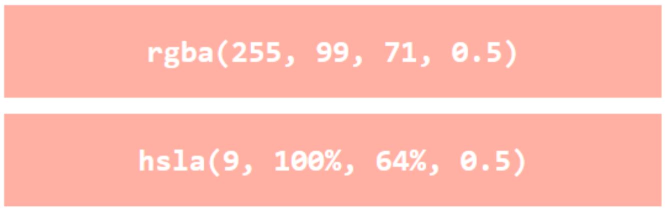


rgb(255, 99, 71)

#ff6347

hsl(9, 100%, 64%)

Same as color name "Tomato", but 50% transparent:



rgba(255, 99, 71, 0.5)

hsla(9, 100%, 64%, 0.5)

Example

```
<h1 style="background-color:rgb(255, 99, 71);">...</h1>
<h1 style="background-color:#ff6347;">...</h1>
<h1 style="background-color:hsl(9, 100%, 64%);">...</h1>

<h1 style="background-color:rgba(255, 99, 71, 0.5);">...</h1>
<h1 style="background-color:hsla(9, 100%, 64%, 0.5);">...</h1>
```

RGB Value

In HTML, a color can be specified as an RGB value, using this formula:

rgb(*red*, *green*, *blue*)

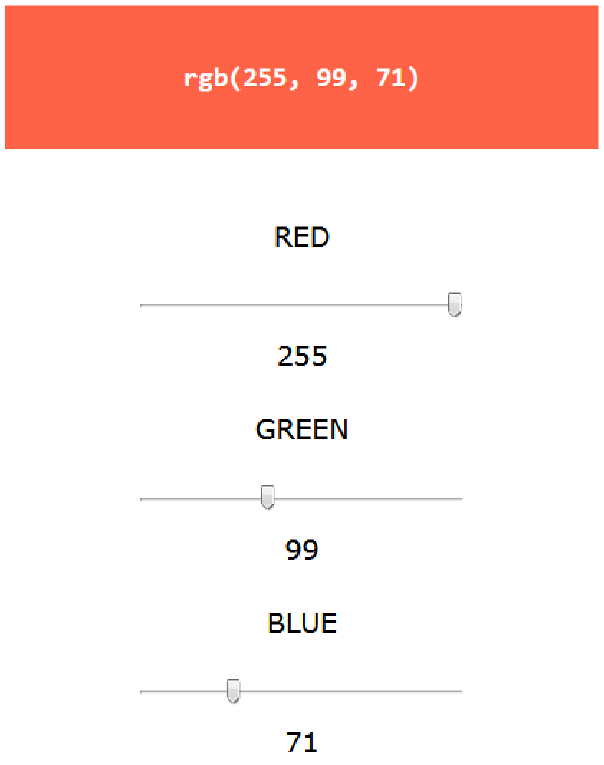
Each parameter (red, green, and blue) defines the intensity of the color between 0 and 255.

For example, rgb(255, 0, 0) is displayed as red, because red is set to its highest value (255) and the others are set to 0.

To display black, set all color parameters to 0, like this: rgb(0, 0, 0).

To display white, set all color parameters to 255, like this: rgb(255, 255, 255).

Experiment by mixing the RGB values below:



rgb(255, 99, 71)

RED

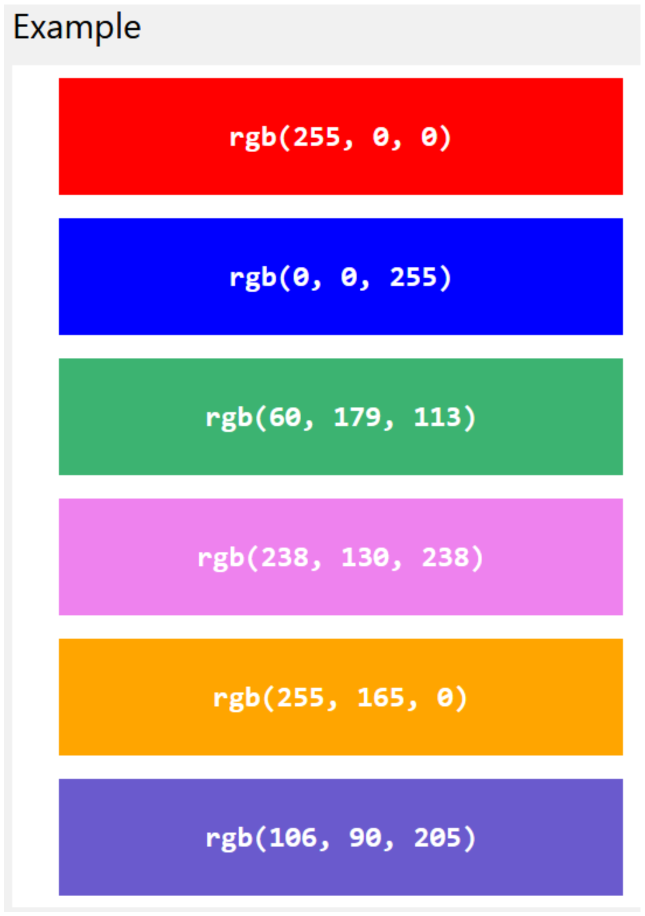
255

GREEN

99

BLUE

71



Example

rgb(255, 0, 0)

rgb(0, 0, 255)

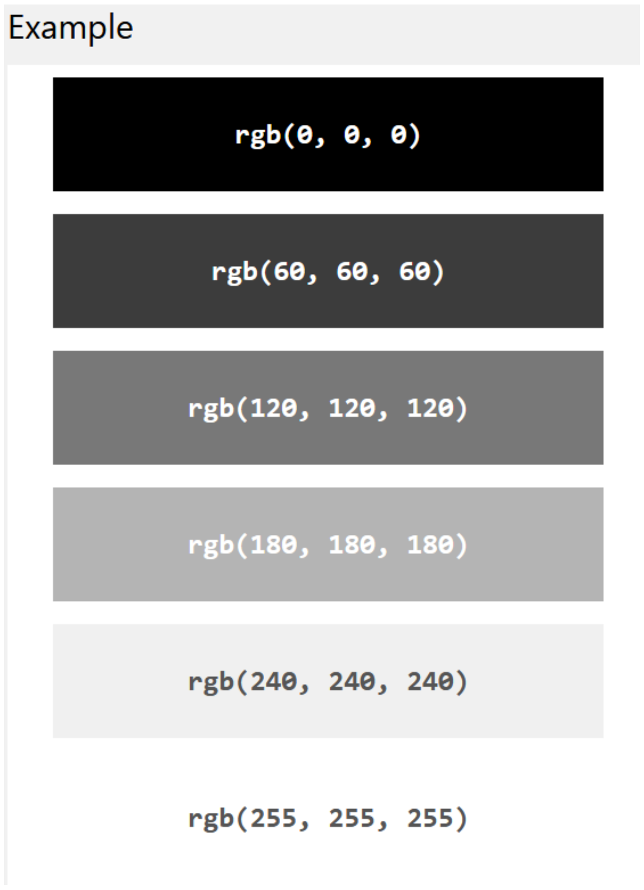
rgb(60, 179, 113)

rgb(238, 130, 238)

rgb(255, 165, 0)

rgb(106, 90, 205)

Shades of gray are often defined using equal values for all the 3 light sources:


Example

rgb(0, 0, 0)

rgb(60, 60, 60)

rgb(120, 120, 120)

rgb(180, 180, 180)

rgb(240, 240, 240)

rgb(255, 255, 255)

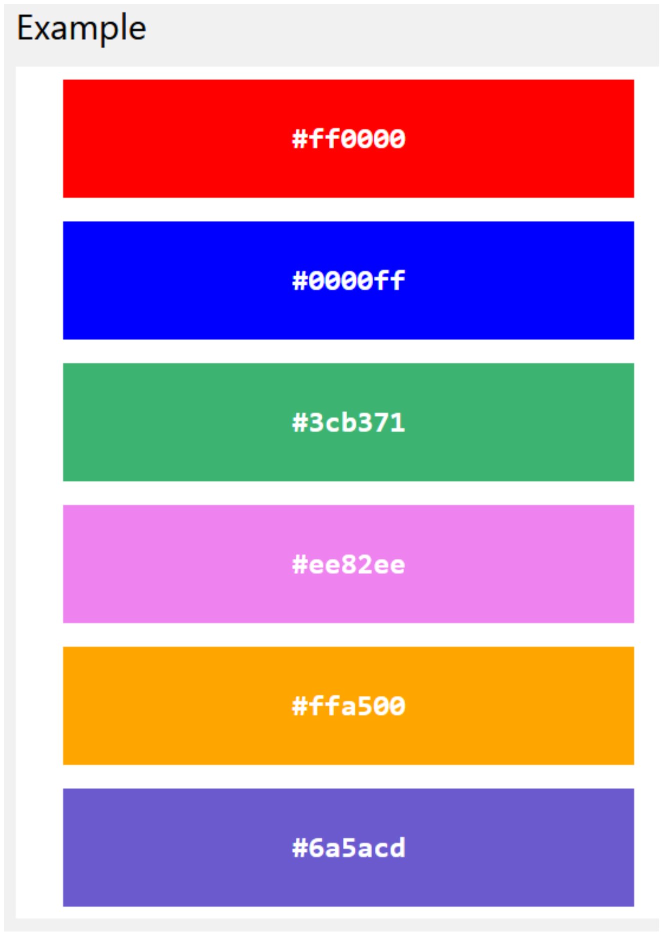
HEX Value

In HTML, a color can be specified using a hexadecimal value in the form:

#rrggbb

Where rr (red), gg (green) and bb (blue) are hexadecimal values between 00 and ff (same as decimal 0-255).

For example, #ff0000 is displayed as red, because red is set to its highest value (ff) and the others are set to the lowest value (00).


Example

#ff0000

#0000ff

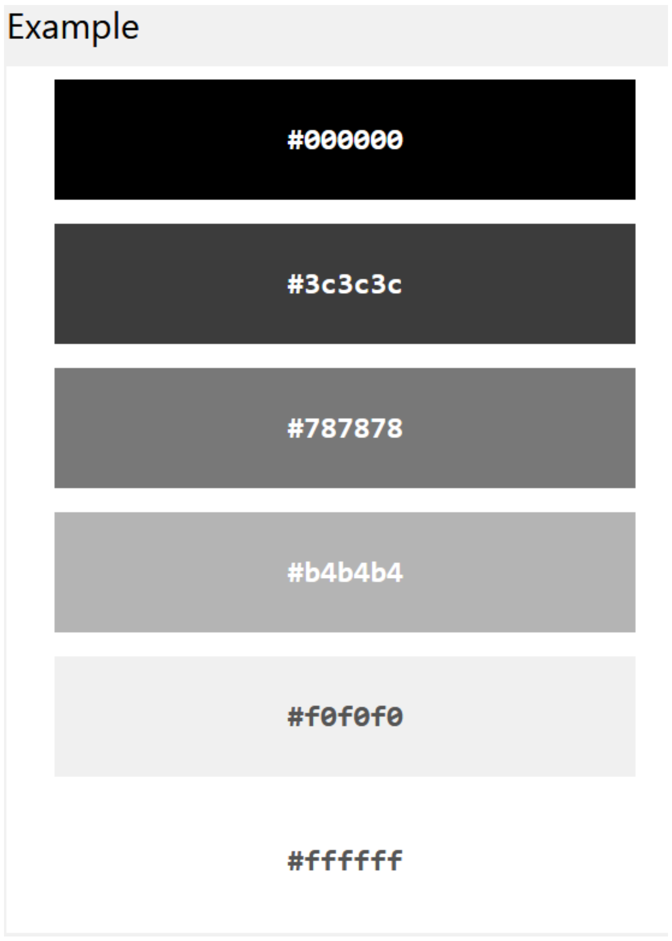
#3cb371

#ee82ee

#ffa500

#6a5acd

Shades of gray are often defined using equal values for all the 3 light sources:



HSL Value

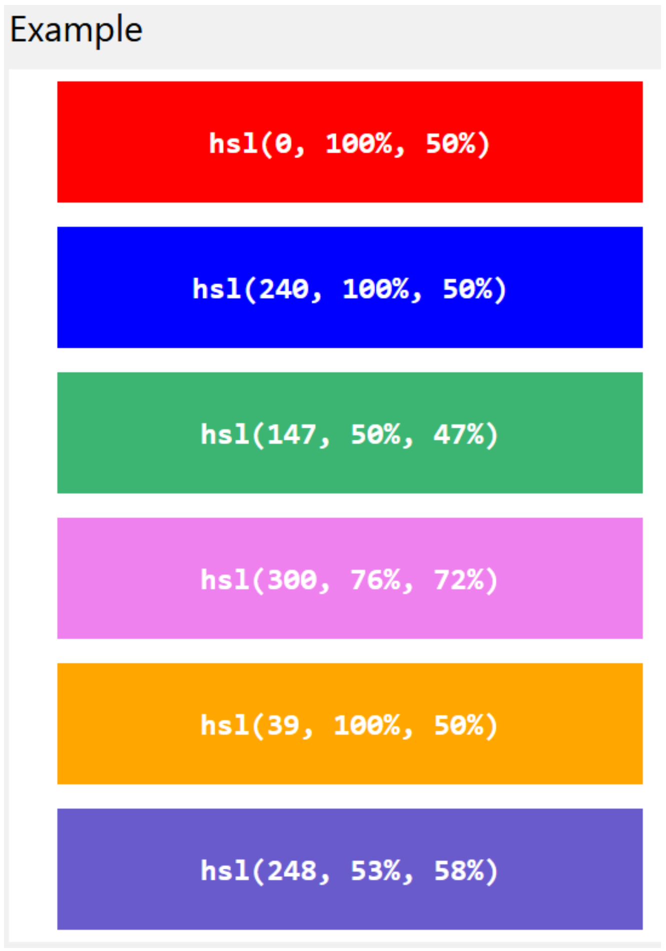
In HTML, a color can be specified using hue, saturation, and lightness (HSL) in the form:

hsl(*hue, saturation, lightness*)

Hue is a degree on the color wheel from 0 to 360. 0 is red, 120 is green, and 240 is blue.

Saturation is a percentage value, 0% means a shade of gray, and 100% is the full color.

Lightness is also a percentage, 0% is black, 50% is neither light or dark, 100% is white



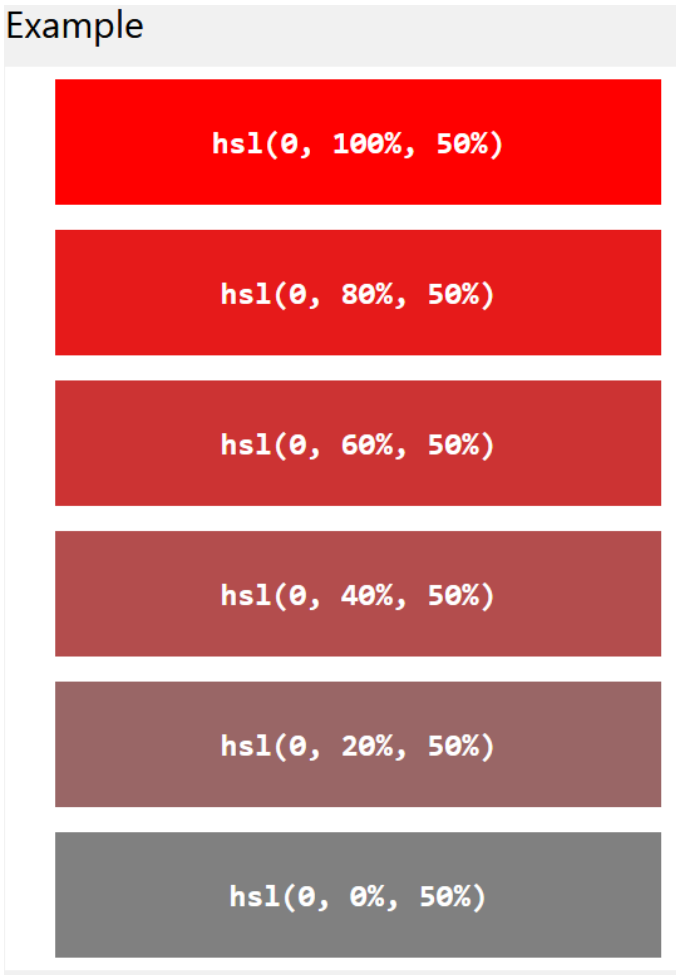
Saturation

Saturation can be described as the intensity of a color.

100% is pure color, no shades of gray

50% is 50% gray, but you can still see the color.

0% is completely gray, you can no longer see the color.

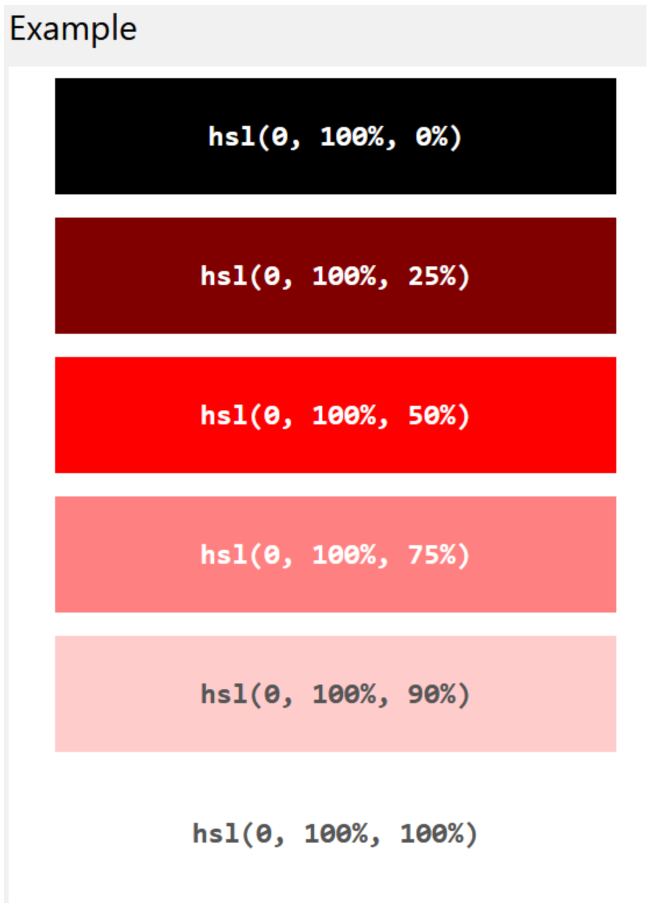


Example

```
hsl(0, 100%, 50%)
hsl(0, 80%, 50%)
hsl(0, 60%, 50%)
hsl(0, 40%, 50%)
hsl(0, 20%, 50%)
hsl(0, 0%, 50%)
```

Lightness

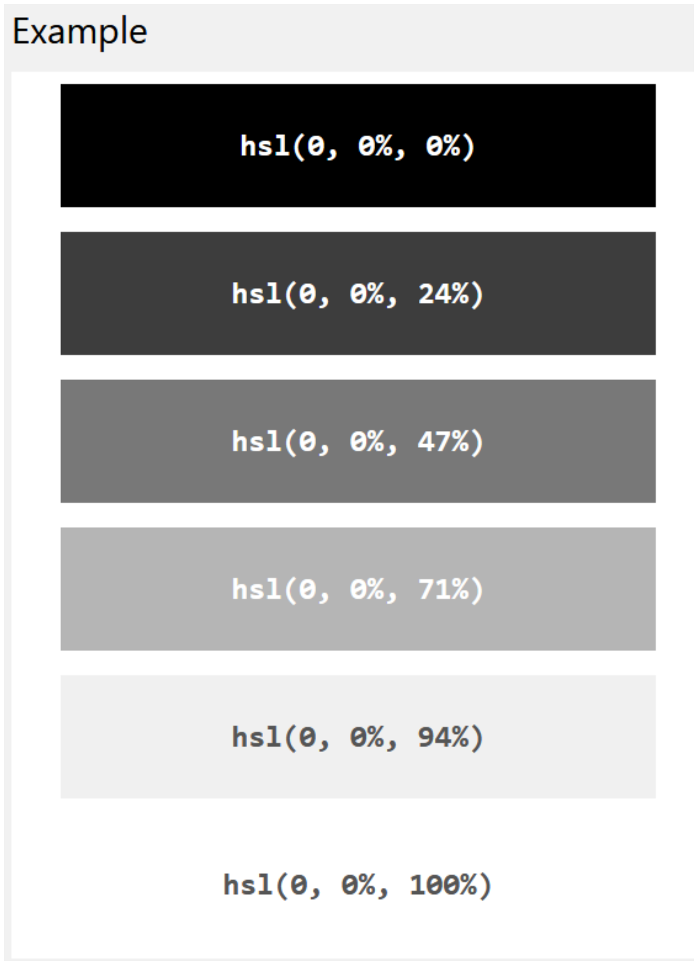
The lightness of a color can be described as how much light you want to give the color, where 0% means no light (black), 50% means 50% light (neither dark nor light) 100% means full lightness (white).



Example

```
hsl(0, 100%, 0%)
hsl(0, 100%, 25%)
hsl(0, 100%, 50%)
hsl(0, 100%, 75%)
hsl(0, 100%, 90%)
hsl(0, 100%, 100%)
```

Shades of gray are often defined by setting the hue and saturation to 0, and adjust the lightness from 0% to 100% to get darker/lighter shades:


Example

hsl(0, 0%, 0%)

hsl(0, 0%, 24%)

hsl(0, 0%, 47%)

hsl(0, 0%, 71%)

hsl(0, 0%, 94%)

hsl(0, 0%, 100%)

RGBA Value

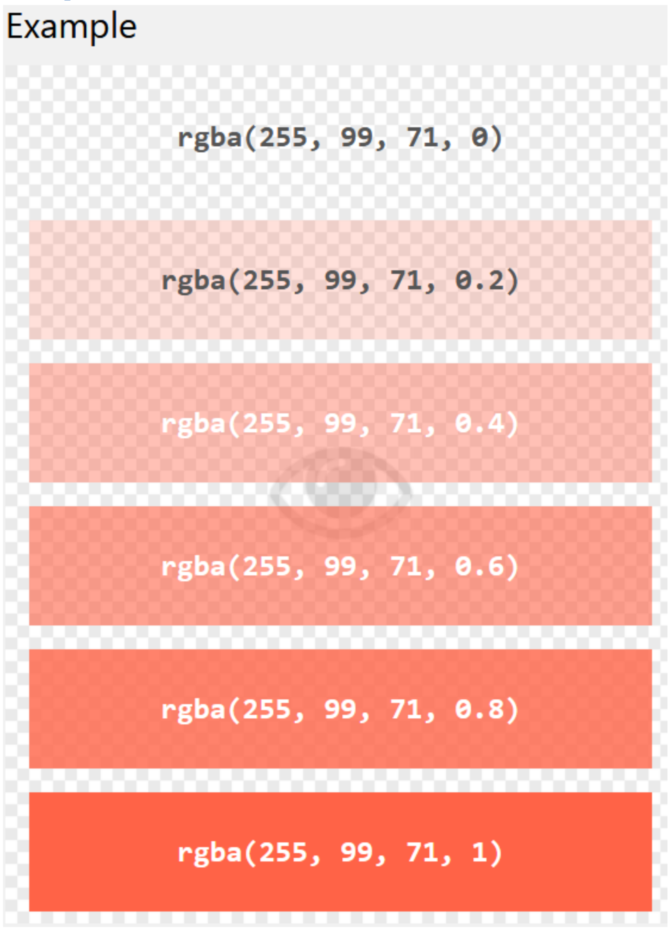
RGBA color values are an extension of RGB color values with an alpha channel - which specifies the opacity for a color.

An RGBA color value is specified with:

rgba(*red, green, blue, alpha*)

The alpha parameter is a number between 0.0 (fully transparent) and 1.0 (not transparent at all):

Example


Example

rgba(255, 99, 71, 0)

rgba(255, 99, 71, 0.2)

rgba(255, 99, 71, 0.4)

rgba(255, 99, 71, 0.6)

rgba(255, 99, 71, 0.8)

rgba(255, 99, 71, 1)

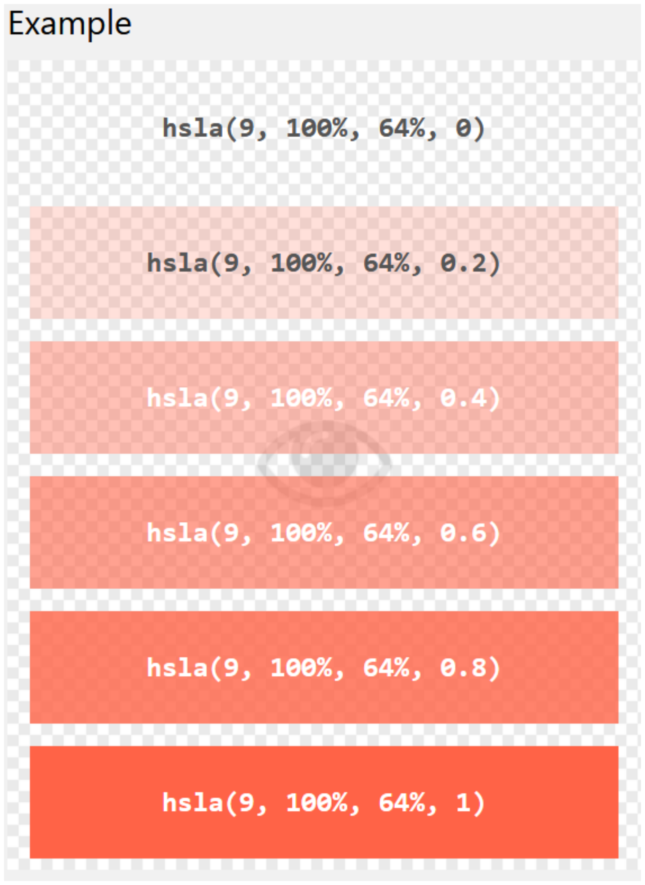
HSLA Value

HSLA color values are an extension of HSL color values with an alpha channel - which specifies the opacity for a color.

An HSLA color value is specified with:

hsla(*hue, saturation, lightness, alpha*)

The alpha parameter is a number between 0.0 (fully transparent) and 1.0 (not transparent at all):



HTML Styles - CSS

Styling HTML with CSS

CSS stands for **C**ascading **S**tyle **S**heets.

CSS describes **how HTML elements are to be displayed on screen, paper, or in other media**.

CSS **saves a lot of work**. It can control the layout of multiple web pages all at once.

CSS can be added to HTML elements in 3 ways:

- **Inline** - by using the style attribute in HTML elements
- **Internal** - by using a `<style>` element in the `<head>` section
- **External** - by using an external CSS file

The most common way to add CSS, is to keep the styles in separate CSS files. However, here we will use inline and internal styling, because this is easier to demonstrate, and easier for you to try it yourself.

Tip: You can learn much more about CSS in our CSS Tutorial.

Inline CSS

An inline CSS is used to apply a unique style to a single HTML element.

An inline CSS uses the style attribute of an HTML element.

This example sets the text color of the `<h1>` element to blue:

Example

```
<h1 style="color:blue;">This is a Blue Heading</h1>
```

Internal CSS

An internal CSS is used to define a style for a single HTML page.

An internal CSS is defined in the `<head>` section of an HTML page, within a `<style>` element:

Example

```
<!DOCTYPE html>
<html>
<head>
<style>
body {background-color: powderblue;}
h1   {color: blue;}
p    {color: red;}
</style>
</head>
<body>

<h1>This is a heading</h1>
<p>This is a paragraph.</p>

</body>
</html>
```

External CSS

An external style sheet is used to define the style for many HTML pages.

With an external style sheet, you can change the look of an entire web site, by changing one file!

To use an external style sheet, add a link to it in the `<head>` section of the HTML page:

Example

```
<!DOCTYPE html>
<html>
<head>
  <link rel="stylesheet" href="styles.css">
</head>
```

```
<body>

<h1>This is a heading</h1>
<p>This is a paragraph.</p>

</body>
</html>
```

An external style sheet can be written in any text editor. The file must not contain any HTML code, and must be saved with a .css extension.

Here is how the "styles.css" looks:

```
body {
  background-color: powderblue;
}
h1 {
  color: blue;
}
p {
  color: red;
}
```

CSS Fonts

The CSS `color` property defines the text color to be used.

The CSS `font-family` property defines the font to be used.

The CSS `font-size` property defines the text size to be used.

Example

```
<!DOCTYPE html>
<html>
<head>
<style>
h1 {
  color: blue;
  font-family: verdana;
  font-size: 300%;
}
p  {
  color: red;
  font-family: courier;
  font-size: 160%;
}
</style>
</head>
<body>
<h1>This is a heading</h1>
<p>This is a paragraph.</p>

</body>
</html>
```

CSS Border

The CSS `border` property defines a border around an HTML element:

Example

```
p {
  border: 1px solid powderblue;
}
```

CSS Padding

The CSS `padding` property defines a padding (space) between the text and the border:

Example

```
p {
  border: 1px solid powderblue;
  padding: 30px;
}
```

CSS Margin

The CSS `margin` property defines a margin (space) outside the border:

Example

```
p {
  border: 1px solid powderblue;
  margin: 50px;
}
```

The id Attribute

To define a specific style for one special element, add an `id` attribute to the element:

```
<p id="p01">I am different</p>
```

then define a style for the element with the specific id:

Example

```
#p01 {
  color: blue;
}
```

Note: The id of an element should be unique within a page, so the id selector is used to select one unique element!

The class Attribute

To define a style for special types of elements, add a `class` attribute to the element:

```
<p class="error">I am different</p>
```

then define a style for the elements with the specific class:

Example

```
p.error {
  color: red;
}
```

External References

External style sheets can be referenced with a full URL or with a path relative to the current web page.

This example uses a full URL to link to a style sheet:

Example

```
<link rel="stylesheet"
href="https://www.w3schools.com/html/styles.css">
```

This example links to a style sheet located in the html folder on the current web site:

Example

```
<link rel="stylesheet" href="/html/styles.css">
```

This example links to a style sheet located in the same folder as the current page:

Example

```
<link rel="stylesheet" href="styles.css">
```

You can read more about file paths in the chapter HTML File Paths.

Chapter Summary

- Use the HTML `style` attribute for inline styling
- Use the HTML `<style>` element to define internal CSS
- Use the HTML `<link>` element to refer to an external CSS file
- Use the HTML `<head>` element to store <style> and <link> elements
- Use the CSS `color` property for text colors
- Use the CSS `font-family` property for text fonts
- Use the CSS `font-size` property for text sizes
- Use the CSS `border` property for borders
- Use the CSS `padding` property for space inside the border
- Use the CSS `margin` property for space outside the border

HTML Style Tags

Tag	Description
<style>	Defines style information for an HTML document
<link>	Defines a link between a document and an external resource

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML Links

Links are found in nearly all web pages. Links allow users to click their way from page to page.

HTML Links - Hyperlinks

HTML links are hyperlinks.

You can click on a link and jump to another document.

When you move the mouse over a link, the mouse arrow will turn into a little hand.

Note: A link does not have to be text. It can be an image or any other HTML element.

HTML Links - Syntax

Hyperlinks are defined with the HTML `<a>` tag:

```
<a href="url">link text</a>
```

Example

```
<a href="https://www.w3schools.com/html/">Visit our HTML
tutorial</a>
```

The `href` attribute specifies the destination address (https://www.w3schools.com/html/) of the link.

The **link text** is the visible part (Visit our HTML tutorial).

Clicking on the link text will send you to the specified address.

Note: Without a forward slash at the end of subfolder addresses, you might generate two requests to the server. Many servers will automatically add a forward slash to the end of the address, and then create a new request.

Local Links

The example above used an absolute URL (a full web address).

A local link (link to the same web site) is specified with a relative URL (without https://www....).

Example

```
<a href="html_images.asp">HTML Images</a>
```

HTML Links - The target Attribute

The `target` attribute specifies where to open the linked document.

The `target` attribute can have one of the following values:

- `_blank` - Opens the linked document in a new window or tab
- `_self` - Opens the linked document in the same window/tab as it was clicked (this is default)
- `_parent` - Opens the linked document in the parent frame
- `_top` - Opens the linked document in the full body of the window
- *framename* - Opens the linked document in a named frame

This example will open the linked document in a new browser window/tab:

Example

```
<a href="https://www.w3schools.com/" target="_blank">Visit
W3Schools!</a>
```

Tip: If your webpage is locked in a frame, you can use `target="_top"` to break out of the frame:

Example

```
<a href="https://www.w3schools.com/html/" target="_top">HTML5
tutorial!</a>
```

HTML Links - Image as Link

It is common to use images as links:

Example

```
<a href="default.asp">
  <img src="smiley.gif" alt="HTML tutorial"
style="width:42px;height:42px;border:0;">
</a>
```

Note: `border:0;` is added to prevent IE9 (and earlier) from displaying a border around the image (when the image is a link).

Link Titles

The `title` attribute specifies extra information about an element. The information is most often shown as a tooltip text when the mouse moves over the element.

Example

```
<a href="https://www.w3schools.com/html/" title="Go to
W3Schools HTML section">Visit our HTML Tutorial</a>
```

External Paths

External pages can be referenced with a full URL or with a path relative to the current web page.

This example uses a full URL to link to a web page:

Example

```
<a href="https://www.w3schools.com/html/default.asp">HTML
tutorial</a>
```

This example links to a page located in the html folder on the current web site:

Example

```
<a href="/html/default.asp">HTML tutorial</a>
```

This example links to a page located in the same folder as the current page:

Example

```
<a href="default.asp">HTML tutorial</a>
```

You can read more about file paths in the chapter HTML File Paths.

Chapter Summary

- Use the `<a>` element to define a link
- Use the `href` attribute to define the link address
- Use the `target` attribute to define where to open the linked document
- Use the `<img>` element (inside <a>) to use an image as a link

HTML Link Tags

Tag	Description
<a>	Defines a hyperlink

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML Link Colors

HTML Link Colors

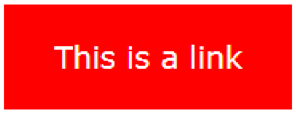
By default, a link will appear like this (in all browsers):

- An unvisited link is underlined and blue
- A visited link is underlined and purple
- An active link is underlined and red

You can change the default colors, by using CSS:

```
<style>
a:link {
  color: green;
  background-color: transparent;
  text-decoration: none;
}

a:visited {
  color: pink;
  background-color: transparent;
  text-decoration: none;
}

a:hover {
  color: red;
  background-color: transparent;
  text-decoration: underline;
}

a:active {
  color: yellow;
  background-color: transparent;
  text-decoration: underline;
}
</style>
```

A links can also be styled as a button, by using CSS:



Example

```
<style>
a:link, a:visited {
  background-color: #f44336;
  color: white;
  padding: 15px 25px;
  text-align: center;
  text-decoration: none;
  display: inline-block;
}

a:hover, a:active {
  background-color: red;
}
</style>
```

To learn more about CSS, go to our CSS Tutorial.

HTML Link Tags

Tag	Description
<a>	Defines a hyperlink

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML Link Bookmarks

HTML Links - Create a Bookmark

HTML bookmarks are used to allow readers to jump to specific parts of a Web page.

Bookmarks can be useful if your webpage is very long.

To make a bookmark, you must first create the bookmark, and then add a link to it.

When the link is clicked, the page will scroll to the location with the bookmark.

Example

First, create a bookmark with the `id` attribute:

```
<h2 id="C4">Chapter 4</h2>
```

Then, add a link to the bookmark ("Jump to Chapter 4"), from within the same page:

```
<a href="#C4">Jump to Chapter 4</a>
```

Or, add a link to the bookmark ("Jump to Chapter 4"), from another page:

Example

```
<a href="html_demo.html#C4">Jump to Chapter 4</a>
```

Chapter Summary

- Use the `id` attribute (id="*value*") to define bookmarks in a page
- Use the `href` attribute (href="#*value*") to link to the bookmark

HTML Link Tags

Tag	Description
<a>	Defines a hyperlink

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML Images

Images can improve the design and the appearance of a web page.

Example

```
<img src="pic_trulli.jpg" alt="Italian Trulli">
```

Example

```
<img src="img_girl.jpg" alt="Girl in a jacket">
```

Example

```
<img src="img_chania.jpg" alt="Flowers in Chania">
```

HTML Images Syntax

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

The `<img>` tag is empty, it contains attributes only, and does not have a closing tag.

The `src` attribute specifies the URL (web address) of the image:

```
<img src="url">
```

The alt Attribute

The `alt` attribute provides an alternate text for an image, if the user for some reason cannot view it (because of slow connection, an error in the src attribute, or if the user uses a screen reader).

The value of the `alt` attribute should describe the image:

Example

```
<img src="img_chania.jpg" alt="Flowers in Chania">
```

If a browser cannot find an image, it will display the value of the `alt` attribute:

Example

```
<img src="wrongname.gif" alt="Flowers in Chania">
```

Note: The **`alt`** attribute is required. A web page will not validate correctly without it.

Image Size - Width and Height

You can use the `style` attribute to specify the width and height of an image.

Example

```
<img src="img_girl.jpg" alt="Girl in a jacket"
style="width:500px;height:600px;">
```

Alternatively, you can use the `width` and `height` attributes:

Example

```
<img src="img_girl.jpg" alt="Girl in a jacket" width="500"
height="600">
```

The **`width`** and **`height`** attributes always defines the width and height of the image in pixels.

Note: Always specify the width and height of an image. If width and height are not specified, the page might flicker while the image loads.

Width and Height, or Style?

The `width`, `height`, and `style` attributes are valid in HTML.

However, we suggest using the `style` attribute. It prevents styles sheets from changing the size of images:

Example

```
<!DOCTYPE html>
<html>
```

```
<head>
<style>
img {
  width: 100%;
}
</style>
</head>
<body>

<img src="html5.gif" alt="HTML5 Icon" width="128" height="128">
<img src="html5.gif" alt="HTML5 Icon"
style="width:128px;height:128px;">

</body>
</html>
```

Images in Another Folder

If not specified, the browser expects to find the image in the same folder as the web page.

However, it is common to store images in a sub-folder. You must then include the folder name in the `src` attribute:

Example

```
<img src="/images/html5.gif" alt="HTML5 Icon"
style="width:128px;height:128px;">
```

Images on Another Server

Some web sites store their images on image servers.

Actually, you can access images from any web address in the world:

Example

```
<img
src="https://www.w3schools.com/images/w3schools_green.jpg"
alt="W3Schools.com">
```

You can read more about file paths in the chapter HTML File Paths.

Animated Images

HTML allows animated GIFs:

Example

```
<img src="programming.gif" alt="Computer Man"
style="width:48px;height:48px;">
```

Image as a Link

To use an image as a link, put the `<img>` tag inside the `<a>` tag:

Example

```
<a href="default.asp">
  <img src="smiley.gif" alt="HTML tutorial"
style="width:42px;height:42px;border:0;">
</a>
```

Note: `border:0;` is added to prevent IE9 (and earlier) from displaying a border around the image (when the image is a link).

Image Floating

Use the CSS `float` property to let the image float to the right or to the left of a text:

Example

```
<p><img src="smiley.gif" alt="Smiley face"
style="float:right;width:42px;height:42px;">
The image will float to the right of the text.</p>

<p><img src="smiley.gif" alt="Smiley face"
style="float:left;width:42px;height:42px;">
The image will float to the left of the text.</p>
```

Tip: To learn more about CSS Float, read our CSS Float Tutorial.

HTML Screen Readers

A screen reader is a software program that reads the HTML code, converts the text, and allows the user to "listen" to the content. Screen readers are useful for people who are visually impaired or learning disabled.

Chapter Summary

- Use the HTML `<img>` element to define an image
- Use the HTML `src` attribute to define the URL of the image
- Use the HTML `alt` attribute to define an alternate text for an image, if it cannot be displayed
- Use the HTML `width` and `height` attributes to define the size of the image
- Use the CSS `width` and `height` properties to define the size of the image (alternatively)

- Use the CSS `float` property to let the image float

Loading images takes time. Large images can slow down your page. Use images carefully.

HTML Image Tags

Tag	Description
`<img>`	Defines an image
`<map>`	Defines an image-map
`<area>`	Defines a clickable area inside an image-map
`<picture>`	Defines a container for multiple image resources

For a complete list of all available HTML tags, visit our HTML Tag Reference.

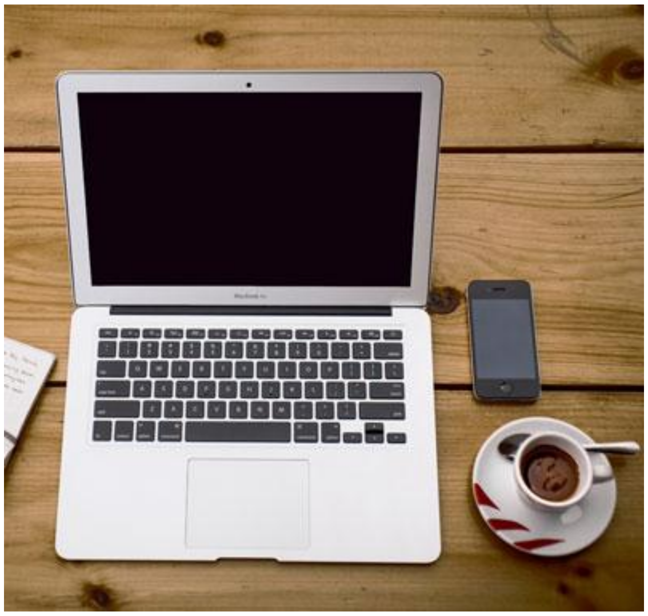
HTML Image Maps

With image maps, you can add clickable areas on an image.

Image Maps

The `<map>` tag defines an image-map. An image-map is an image with clickable areas.

Click on the computer, the phone, or the cup of coffee in the image below:



Example

```
<img src="workplace.jpg" alt="Workplace" usemap="#workmap">

<map name="workmap">
  <area shape="rect" coords="34,44,270,350" alt="Computer"
href="computer.htm">
  <area shape="rect" coords="290,172,333,250" alt="Phone"
href="phone.htm">
  <area shape="circle" coords="337,300,44" alt="Coffee"
href="coffee.htm">
</map>
```

How Does it Work?

The idea behind an image map is that you should be able to perform different actions depending on where in the image you click.

To create an image map you need an image, and a map containing some rules that describe the clickable areas.

The Image

The image is inserted using the `<img>` tag. The only difference from other images is that you must add a `usemap` attribute:

```
<img src="workplace.jpg" alt="Workplace"
usemap="#workmap">
```

The `usemap` value starts with a hash tag `#` followed by the name of the image map, and is used to create a relationship between the image and the image map.

Note: You can use any image as an image map.

The Map

Then add a `<map>` element.

The `<map>` element is used to create an image map, and is linked to the image by using the `name` attribute:

```
<map name="workmap">
```

The `name` attribute must have the same value as the `usemap` attribute.

Note: You may insert the `<map>` element anywhere you like, it does not have to be inserted right after the image.

The Areas

Then add the clickable areas.

A clickable area is defined using an `<area>` element.

Shape

You must define the shape of the area, and you can choose one of these values:

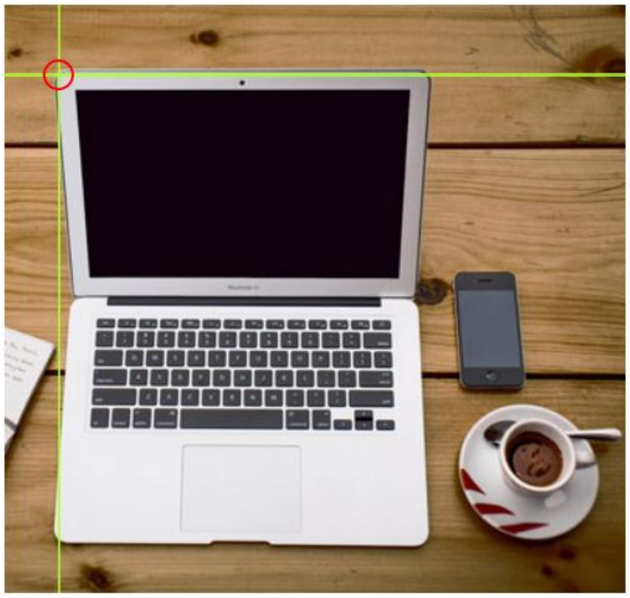
- `rect` - defines a rectangular region
- `circle` - defines a circular region
- `poly` - defines a polygonal region
- `default` - defines the entire region

Coordinates

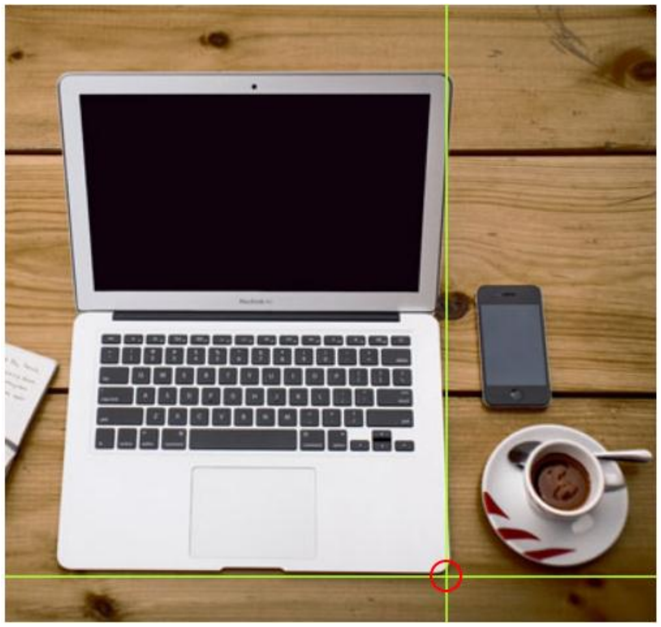
You must define some coordinates to be able to place the clickable area onto the image.

The coordinates come in pairs, one for the x-axis and one for the y-axis.

The coordinates `34, 44` is located 34 pixels from the left margin and 44 pixels from the top:



The coordinates `270, 350` is located 270 pixels from the left margin and 350 pixels from the top:



Now you have enough data to create a clickable rectangular area:

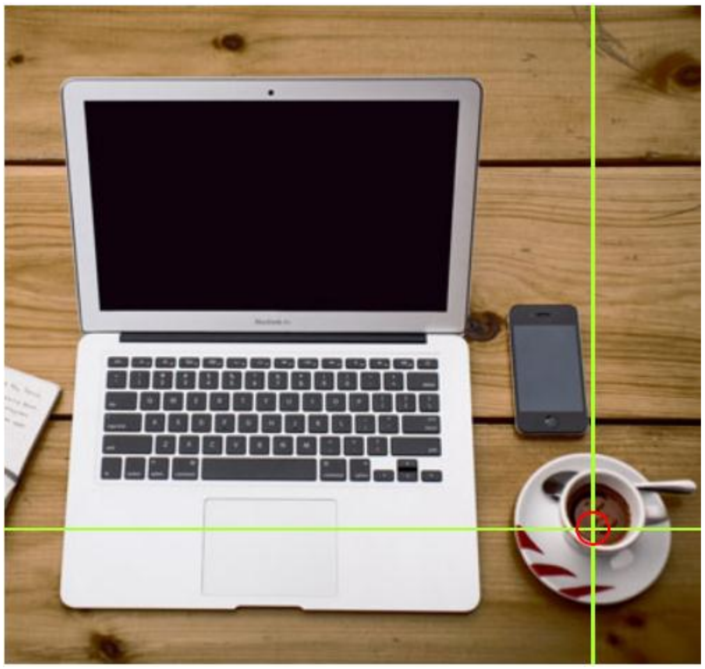
```
<area shape="rect" coords="34, 44, 270, 350"
href="computer.htm">
```

This is the area that becomes clickable and will send the user to the page computer.htm:

Circle

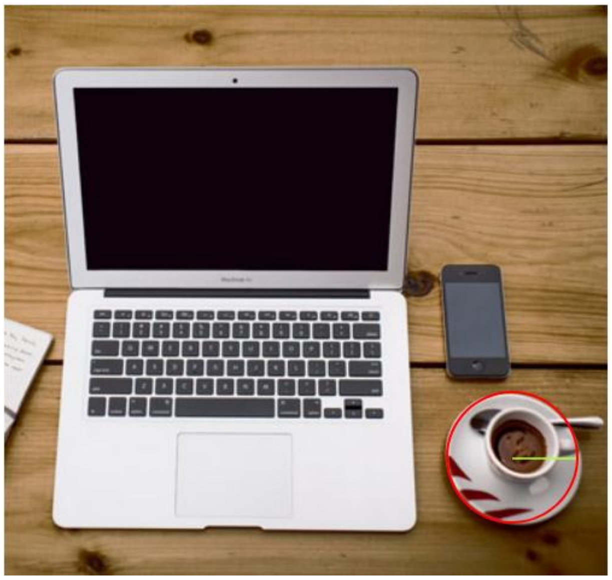
To add a circle area, first locate the coordinates of the center of the circle:

`337, 300`



Then specify the radius of the circle:

`44` pixels



Now you have enough data to create a clickable circular area:

```
<area shape="circle" coords="337, 300, 44"
href="coffee.htm">
```

This is the area that becomes clickable and will send the user to the page coffee.htm:

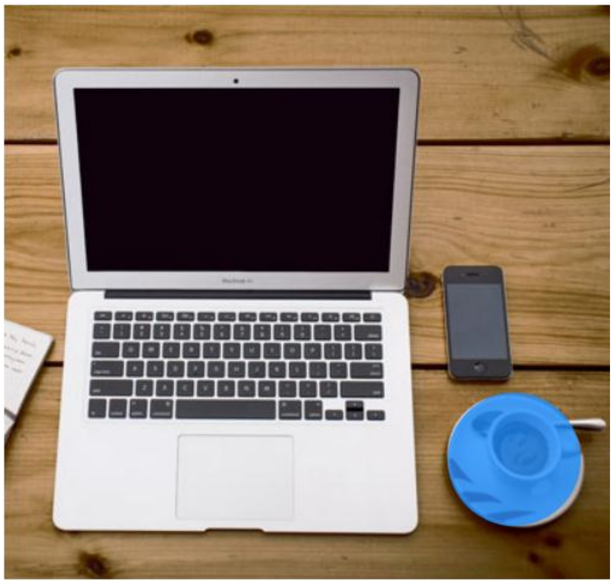


Image Map and JavaScript

A clickable area does not have to be a link to another page, it can also trigger a JavaScript function.

Add a `click` event on the `<area>` element to execute a JavaScript function:

Example

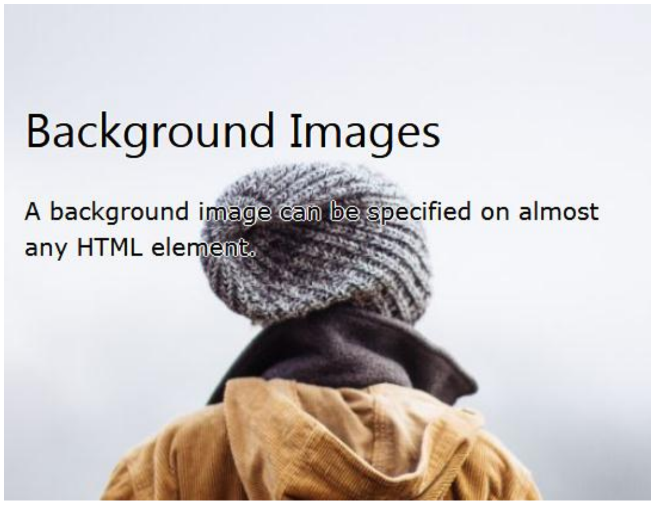
You can use the `onclick` attribute to execute a JavaScript function when the area is clicked

```
<area shape="circle" coords="337,300,44" onclick="myFunction()">
```

Chapter Summary

- Use the HTML `<map>` element to define an image-map
- Use the HTML `<area>` element to define the clickable areas in the image-map
- Use the HTML `<img>`'s element `usemap` attribute to point to an image-map

HTML Background Images


Background Images
A background image can be specified on almost any HTML element.

To add a background image in HTML, use the CSS property **`background-image`**.

Background Image on a HTML element

To add a background image on an HTML element, you can use the `style` attribute:

Example

Add a background image on a HTML element:

```
<div style="background-image: url('img_girl.jpg');">
```

You can also specify the background image in the `<style>` *element*:

Example

Specify the background image in the style element:

```
<style>
div {
  background-image: url('img_girl.jpg');
}
</style>
```

Background Image on a Page

If you want the entire page to have a background image, then you must specify the background image on the `<body>` element:

Example

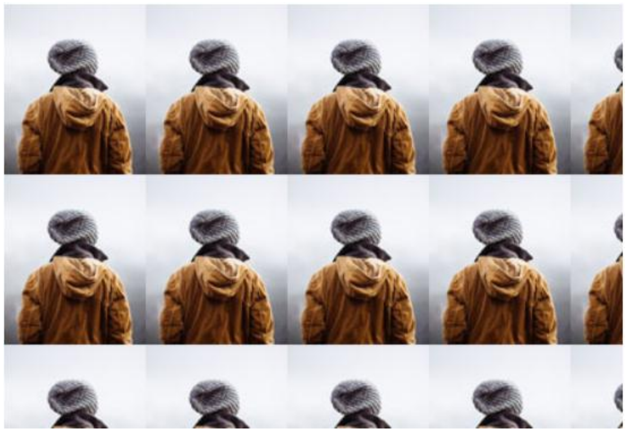
Add a background image on a HTML page:

```
<style>
body {
  background-image: url('img_girl.jpg');
}
</style>
```

Background Repeat

If the background image is smaller than the element, the image will repeat itself, horizontally and vertically, until it has reach the end of the element.

To explain, see what happens when we use a small image as a background inside a large div element:



The `background-image` property will try to fill the div element with images until it has reach the end.

Example

```
<style>
body {
  background-image: url('example_img_girl.jpg');
}
</style>
```

To avoid the background image from repeating itself, use the `background-repeat` property.

Example

```
<style>
body {
  background-image: url('example_img_girl.jpg');
  background-repeat: no-repeat;
}
</style>
```

Background Cover

If you want the background image cover the entire element, you can set the `background-size` property to `cover`.

Also, to make sure the entire element is always covered, set the background-attachment property to fixed:

As you can see, the image will cover the entire element, with no stretching, the image will keep its original proportions.

Example

```
<style>
body {
  background-image: url('img_girl.jpg');
  background-repeat: no-repeat;
  background-attachment: fixed;
  background-size: cover;
}
</style>
```

Background Stretch

If you want the background image stretch to fit the entire image in the element, you can set the `background-size` property to `100% 100%`:

Try resizing the browser window, and you will see that the image will stretch, but always cover the entire element.

Example

```
<style>
body {
  background-image: url('img_girl.jpg');
  background-repeat: no-repeat;
  background-attachment: fixed;
  background-size: 100% 100%;
}
</style>
```

Learn More CSS

From the examples above you have learned that background images can be styled by using the CSS background properties.

To learn more about CSS background properties, study our CSS Background Tutorial.

HTML Picture Element

The picture element allows us to display different pictures for different devices or screen sizes.

The HTML <picture> Element

HTML5 introduced the `<picture>` element to add more flexibility when specifying image resources.

The `<picture>` element contains a number of `<source>` elements, each referring to different image sources. This way the browser can choose the image that best fits the current view and/or device.

Each `<source>` element have attributes describing when their image is the most suitable.

Example

Show different images on different screen sizes:

```
<picture>
  <source media="(min-width: 650px)" srcset="img_food.jpg">
  <source media="(min-width: 465px)" srcset="img_car.jpg">
  <img src="img_girl.jpg">
</picture>
```

Note: Always specify an `<img>` element as the last child element of the `<picture>` element. The `<img>` element is used by browsers that do not support the `<picture>` element, or if none of the `<source>` tags matched.

When to use the Picture Element

There are two main purposes for the `<picture>` element:

1. Bandwidth

If you have a small screen or device, it is not necessary to load a large image file. The browser will use the first `<source>` element with matching attribute values, and ignore any of the following elements.

2. Format Support

Some browsers or devices may not support all image formats. By using the `<picture>` element, you can add images of all formats, and the browser will use the first format it recognizes and ignore any of the following.

Example

The browser will use the first image format it recognizes:

```
<picture>
  <source srcset="img_avatar.png">
  <source srcset="img_girl.jpg">
  <img src="img_beatles.gif" alt="Beatles" style="width:auto;">
</picture>
```

Note: The browser will use the first `<source>` element with matching attribute values, and ignore any following `<source>` elements.

HTML Tables

HTML Table Example

Company	Contact	Country
Alfreds Futterkiste	Maria Anders	Germany
Centro comercial Moctezuma	Francisco Chang	Mexico
Ernst Handel	Roland Mendel	Austria
Island Trading	Helen Bennett	UK
Laughing Bacchus Winecellars	Yoshi Tannamuri	Canada
Magazzini Alimentari Riuniti	Giovanni Rovelli	Italy

Defining an HTML Table

An HTML table is defined with the `<table>` tag.

Each table row is defined with the `<tr>` tag. A table header is defined with the `<th>` tag. By default, table headings are bold and centered. A table data/cell is defined with the `<td>` tag.

Example

```
<table style="width:100%">
  <tr>
    <th>Firstname</th>
    <th>Lastname</th>
    <th>Age</th>
  </tr>
  <tr>
    <td>Jill</td>
    <td>Smith</td>
    <td>50</td>
  </tr>
  <tr>
    <td>Eve</td>
    <td>Jackson</td>
    <td>94</td>
  </tr>
</table>
```

Note: The `<td>` elements are the data containers of the table. They can contain all sorts of HTML elements; text, images, lists, other tables, etc.

HTML Table - Adding a Border

If you do not specify a border for the table, it will be displayed without borders.

A border is set using the CSS `border` property:

Example

```
table, th, td {
  border: 1px solid black;
}
```

Remember to define borders for both the table and the table cells.

HTML Table - Collapsed Borders

If you want the borders to collapse into one border, add the CSS `border-collapse` property:

Example

```
table, th, td {
  border: 1px solid black;
  border-collapse: collapse;
}
```

HTML Table - Adding Cell Padding

Cell padding specifies the space between the cell content and its borders.

If you do not specify a padding, the table cells will be displayed without padding.

To set the padding, use the CSS `padding` property:

Example

```
th, td {
  padding: 15px;
}
```

HTML Table - Left-align Headings

By default, table headings are bold and centered.

To left-align the table headings, use the CSS `text-align` property:

Example

```
th {
  text-align: left;
}
```

HTML Table - Adding Border Spacing

Border spacing specifies the space between the cells.

To set the border spacing for a table, use the CSS `border-spacing` property:

Example

```
table {
  border-spacing: 5px;
}
```

Note: If the table has collapsed borders, `border-spacing` has no effect.

HTML Table - Cells that Span Many Columns

To make a cell span more than one column, use the `colspan` attribute:

Example

```
<table style="width:100%">
  <tr>
    <th>Name</th>
    <th colspan="2">Telephone</th>
  </tr>
  <tr>
    <td>Bill Gates</td>
    <td>55577854</td>
    <td>55577855</td>
  </tr>
</table>
```

HTML Table - Cells that Span Many Rows

To make a cell span more than one row, use the `rowspan` attribute:

Example

```
<table style="width:100%">
  <tr>
    <th>Name:</th>
    <td>Bill Gates</td>
  </tr>
  <tr>
    <th rowspan="2">Telephone:</th>
    <td>55577854</td>
  </tr>
  <tr>
    <td>55577855</td>
  </tr>
</table>
```

HTML Table - Adding a Caption

To add a caption to a table, use the `<caption>` tag:

Example

```
<table style="width:100%">
  <caption>Monthly savings</caption>
  <tr>
    <th>Month</th>
    <th>Savings</th>
  </tr>
  <tr>
    <td>January</td>
    <td>$100</td>
  </tr>
  <tr>
```

```
    <td>February</td>
    <td>$50</td>
  </tr>
</table>
```

Note: The `<caption>` tag must be inserted immediately after the `<table>` tag.

A Special Style for One Table

To define a special style for a special table, add an `id` attribute to the table:

Example

```
<table id="t01">
  <tr>
    <th>Firstname</th>
    <th>Lastname</th>
    <th>Age</th>
  </tr>
  <tr>
    <td>Eve</td>
    <td>Jackson</td>
    <td>94</td>
  </tr>
</table>
```

Now you can define a special style for this table:

```
table#t01 {
  width: 100%;
  background-color: #f1f1c1;
}
```

And add more styles:

```
table#t01 tr:nth-child(even) {
  background-color: #eee;
}
table#t01 tr:nth-child(odd) {
  background-color: #fff;
}
table#t01 th {
  color: white;
  background-color: black;
}
```

Chapter Summary

- Use the HTML `<table>` element to define a table
- Use the HTML `<tr>` element to define a table row
- Use the HTML `<td>` element to define a table data
- Use the HTML `<th>` element to define a table heading
- Use the HTML `<caption>` element to define a table caption
- Use the CSS `border` property to define a border
- Use the CSS `border-collapse` property to collapse cell borders
- Use the CSS `padding` property to add padding to cells
- Use the CSS `text-align` property to align cell text
- Use the CSS `border-spacing` property to set the spacing between cells
- Use the `colspan` attribute to make a cell span many columns
- Use the `rowspan` attribute to make a cell span many rows
- Use the `id` attribute to uniquely define one table

HTML Table Tags

Tag	Description
<table>	Defines a table
<th>	Defines a header cell in a table
<tr>	Defines a row in a table
<td>	Defines a cell in a table
<caption>	Defines a table caption
<colgroup>	Specifies a group of one or more columns in a table for formatting
<col>	Specifies column properties for each column within a <colgroup> element
<thead>	Groups the header content in a table
<tbody>	Groups the body content in a table
<tfoot>	Groups the footer content in a table

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML Lists

HTML List Example

An Unordered List:

- Item
- Item
- Item
- Item

An Ordered List:

1. First item
2. Second item
3. Third item
4. Fourth item

Unordered HTML List

An unordered list starts with the `<ul>` tag. Each list item starts with the `<li>` tag.

The list items will be marked with bullets (small black circles) by default:

Example

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

Unordered HTML List - Choose List Item Marker

The CSS `list-style-type` property is used to define the style of the list item marker:

Value	Description
disc	Sets the list item marker to a bullet (default)
circle	Sets the list item marker to a circle
square	Sets the list item marker to a square
none	The list items will not be marked

Example - Disc

```
<ul style="list-style-type:disc;">
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ul>
```

Example - Square

```
<ul style="list-style-type:square;">
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ul>
```

Example - None

```
<ul style="list-style-type:none;">
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ul>
```

Ordered HTML List

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

The list items will be marked with numbers by default:

Example

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

Ordered HTML List - The Type Attribute

The `type` attribute of the `<ol>` tag, defines the type of the list item marker:

Type	Description
type="1"	The list items will be numbered with numbers (default)
type="A"	The list items will be numbered with uppercase letters
type="a"	The list items will be numbered with lowercase letters
type="I"	The list items will be numbered with uppercase roman numbers
type="i"	The list items will be numbered with lowercase roman numbers

Numbers:

```
<ol type="1">
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ol>
```

Uppercase Letters:

```
<ol type="A">
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ol>
```

Lowercase Letters:

```
<ol type="a">
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ol>
```

Uppercase Roman Numbers:

```
<ol type="I">
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ol>
```

Lowercase Roman Numbers:

```
<ol type="i">
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ol>
```

HTML Description Lists

HTML also supports description lists.

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

The `<dl>` tag defines the description list, the `<dt>` tag defines the term (name), and the `<dd>` tag describes each term:

Example

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

Nested HTML Lists

List can be nested (lists inside lists):

Example

```
<ul>
  <li>Coffee</li>
  <li>Tea
    <ul>
      <li>Black tea</li>
      <li>Green tea</li>
    </ul>
  </li>
  <li>Milk</li>
</ul>
```

Note: List items can contain new list, and other HTML elements, like images and links, etc.

Control List Counting

By default, an ordered list will start counting from 1. If you want to start counting from a specified number, you can use the `start` attribute:

Example

```
<ol start="50">
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ol>
```

Horizontal List with CSS

HTML lists can be styled in many different ways with CSS.

One popular way is to style a list horizontally, to create a navigation menu:

Example

```
<!DOCTYPE html>
<html>
<head>
<style>
ul {
  list-style-type: none;
  margin: 0;
  padding: 0;
  overflow: hidden;
  background-color: #333333;
}

li {
  float: left;
}

li a {
  display: block;
  color: white;
  text-align: center;
  padding: 16px;
  text-decoration: none;
}

li a:hover {
  background-color: #111111;
}
</style>
</head>
```

```
<body>

<ul>
  <li><a href="#home">Home</a></li>
  <li><a href="#news">News</a></li>
  <li><a href="#contact">Contact</a></li>
  <li><a href="#about">About</a></li>
</ul>

</body>
</html>
```

Tip: You can learn much more about CSS in our CSS Tutorial.

Chapter Summary

- Use the HTML `<ul>` element to define an unordered list
- Use the CSS `list-style-type` property to define the list item marker
- Use the HTML `<ol>` element to define an ordered list
- Use the HTML `type` attribute to define the numbering type
- Use the HTML `<li>` element to define a list item
- Use the HTML `<dl>` element to define a description list
- Use the HTML `<dt>` element to define the description term
- Use the HTML `<dd>` element to describe the term in a description list
- Lists can be nested inside lists
- List items can contain other HTML elements
- Use the CSS property `float:left` or `display:inline` to display a list horizontally

HTML List Tags

Tag	Description
<ul>	Defines an unordered list
<ol>	Defines an ordered list
<li>	Defines a list item
<dl>	Defines a description list
<dt>	Defines a term in a description list
<dd>	Describes the term in a description list

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML Block and Inline Elements

Every HTML element has a default display value depending on what type of element it is.

The two display values are: block and inline.

Block-level Elements

A block-level element always starts on a new line and takes up the full width available (stretches out to the left and right as far as it can).

The <div> element is a block-level element.

Example

```
<div>Hello World</div>
```

Block level elements in HTML:

<address>

<article>

<aside>

<blockquote>

<canvas>

<dd>

<div>

<dl>

<dt>

<fieldset>

<figcaption>

<figure>

<footer>

<form>

<h1>-<h6>

<header>

<hr>

<li>

<main>

<nav>

<noscript>

<ol>

<p>

<pre>

<section>

<table>

<tfoot>

<ul>

<video>

Inline Elements

An inline element does not start on a new line and only takes up as much width as necessary.

This is an inline <span> element inside a paragraph.

Example

```
<span>Hello World</span>
```

Inline elements in HTML:

<a>

<abbr>

<acronym>

<b>

<bdo>

<big>

<br>

<button>

<cite>

<code>

<dfn>

<em>

<i>

<img>

<input>

<kbd>

<label>

<map>

<object>

<output>

<q>

<samp>

<script>

<select>

<small>

<span>

<strong>

<sub>

<sup>

<textarea>

<time>

<tt>

<var>

The <div> Element

The `<div>` element is often used as a container for other HTML elements.

The `<div>` element has no required attributes, but `style`, `class` and `id` are common.

When used together with CSS, the `<div>` element can be used to style blocks of content:

Example

```
<div style="background-color:black;color:white;padding:20px;">
  <h2>London</h2>
  <p>London is the capital city of England. It is the most populous
city in the United Kingdom, with a metropolitan area of over 13
million inhabitants.</p>
</div>
```

The <span> Element

The `<span>` element is often used as a container for some text.

The `<span>` element has no required attributes, but `style`, `class` and `id` are common.

When used together with CSS, the `<span>` element can be used to style parts of the text:

Example

```
<h1>My <span style="color:red">Important</span> Heading</h1>
```

HTML Grouping Tags

Tag	Description
[<div>](#)	Defines a section in a document (block-level)
[<span>](#)	Defines a section in a document (inline)

For a complete list of all available HTML tags, visit our [HTML Tag Reference](#).

HTML The class Attribute

Using The class Attribute

The HTML `class` attribute is used to define equal styles for elements with the same class name.

So, all HTML elements with the same `class` attribute will get the same style.

Here we have three `<div>` elements that point to the same class name:

Example

```
<!DOCTYPE html>
<html>
<head>
<style>
.cities {
  background-color: black;
  color: white;
  margin: 20px;
  padding: 20px;
}
</style>
</head>
<body>

<div class="cities">
  <h2>London</h2>
  <p>London is the capital of England.</p>
</div>

<div class="cities">
  <h2>Paris</h2>
  <p>Paris is the capital of France.</p>
</div>

<div class="cities">
  <h2>Tokyo</h2>
  <p>Tokyo is the capital of Japan.</p>
</div>

</body>
</html>
```

Using The class Attribute on Inline Elements

The HTML `class` attribute can also be used on inline elements:

Example

```
<!DOCTYPE html>
<html>
<head>
<style>
span.note {
  font-size: 120%;
  color: red;
}
</style>
</head>
<body>

<h1>My <span class="note">Important</span> Heading</h1>
<p>This is some <span class="note">important</span> text.</p>

</body>
</html>
```

Tip: The `class` attribute can be used on **any** HTML element.

Note: The class name is case sensitive!

Tip: You can learn much more about CSS in our CSS Tutorial.

Select Elements With a Specific Class

In CSS, to select elements with a specific class, write a period (.) character, followed by the name of the class:

Example

Use CSS to style all elements with the class name "city":

```
<style>
.city {
  background-color: tomato;
  color: white;
  padding: 10px;
}
</style>

<h2 class="city">London</h2>
<p>London is the capital of England.</p>

<h2 class="city">Paris</h2>
<p>Paris is the capital of France.</p>

<h2 class="city">Tokyo</h2>
<p>Tokyo is the capital of Japan.</p>
```

Multiple Classes

HTML elements can have more than one class name, each class name must be separated by a space.

Example

Style elements with the class name "city", also style elements with the class name "main":

```
<h2 class="city main">London</h2>
<h2 class="city">Paris</h2>
<h2 class="city">Tokyo</h2>
```

In the example above, the first `<h2>` element belongs to both the "city" class and the "main" class.

Different Tags Can Share Same Class

Different tags, like `<h2>` and `<p>`, can have the same class name and thereby share the same style:

Example

```
<h2 class="city">Paris</h2>
<p class="city">Paris is the capital of France</p>
```

Using The class Attribute in JavaScript

The class name can also be used by JavaScript to perform certain tasks for elements with the specified class name.

JavaScript can access elements with a specified class name by using the `getElementsByClassName()` method:

Example

When a user clicks on a button, hide all elements with the class name "city":

```
<script>
function myFunction() {
  var x = document.getElementsByClassName("city");
  for (var i = 0; i < x.length; i++) {
    x[i].style.display = "none";
  }
}
</script>
```

Don't worry if you don't understand the code in the example above.

You will learn more about JavaScript in our HTML JavaScript chapter, or you can study our JavaScript Tutorial.

HTML The id Attribute

Using The id Attribute

The `id` attribute specifies a unique id for an HTML element (the value must be unique within the HTML document).

The id value can be used by CSS and JavaScript to perform certain tasks for the element with the specific id value.

In CSS, to select an element with a specific id, write a hash (#) character, followed by the id of the element:

Example

Use CSS to style an element with the id "myHeader":

```
<style>
#myHeader {
  background-color: lightblue;
  color: black;
  padding: 40px;
  text-align: center;
}
</style>

<h1 id="myHeader">My Header</h1>
```

Tip: The id attribute can be used on **any** HTML element.

Note: The id value is case-sensitive.

Note: The id value must contain at least **one** character, and must **not** contain whitespace (spaces, tabs, etc.).

Difference Between Class and ID

An HTML element can only have one unique id that belongs to that single element, while a class name can be used by multiple elements:

Example

```
<style>
/* Style the element with the id "myHeader" */
#myHeader {
  background-color: lightblue;
  color: black;
  padding: 40px;
  text-align: center;
}

/* Style all elements with the class name "city" */
.city {
  background-color: tomato;
  color: white;
  padding: 10px;
}
</style>

<!-- A unique element -->
<h1 id="myHeader">My Cities</h1>

<!-- Multiple similar elements -->
<h2 class="city">London</h2>
<p>London is the capital of England.</p>

<h2 class="city">Paris</h2>
<p>Paris is the capital of France.</p>

<h2 class="city">Tokyo</h2>
<p>Tokyo is the capital of Japan.</p>
```

Tip: You can learn much more about CSS in our CSS Tutorial.

Bookmarks with ID and Links

HTML bookmarks are used to allow readers to jump to specific parts of a Web page.

Bookmarks can be useful if your webpage is very long.

To make a bookmark, you must first create the bookmark, and then add a link to it.

When the link is clicked, the page will scroll to the location with the bookmark.

Example

First, create a bookmark with the `id` attribute:

```
<h2 id="C4">Chapter 4</h2>
```

Then, add a link to the bookmark ("Jump to Chapter 4"), from within the same page:

```
<a href="#C4">Jump to Chapter 4</a>
```

Or, add a link to the bookmark ("Jump to Chapter 4"), from another page:

Example

```
<a href="html_demo.html#C4">Jump to Chapter 4</a>
```

Using The id Attribute in JavaScript

JavaScript can access an element with a specified id by using the `getElementById()` method:

Example

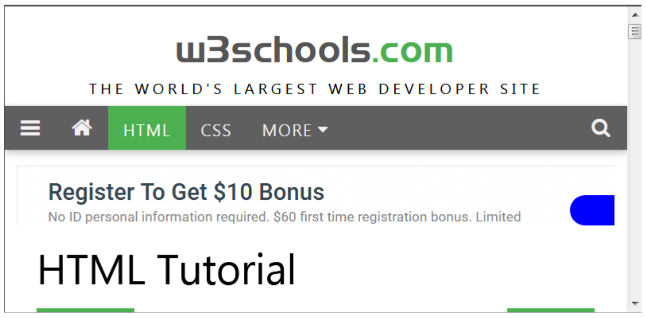
Use the id attribute to manipulate text with JavaScript:

```
<script>
function displayResult() {
  document.getElementById("myHeader").innerHTML = "Have a nice
day!";
}
</script>
```

Tip: Study JavaScript in the HTML JavaScript chapter, or in our JavaScript Tutorial.

HTML Iframes

An iframe is used to display a web page within a web page.


w3schools.com
THE WORLD'S LARGEST WEB DEVELOPER SITE
HTML
CSS
MORE
Register To Get $10 Bonus
No ID personal information required. $60 first time registration bonus. Limited
HTML Tutorial

Iframe Syntax

An HTML iframe is defined with the `<iframe>` tag:

```
<iframe src="URL"></iframe>
```

The `src` attribute specifies the URL (web address) of the inline frame page.

Iframe - Set Height and Width

Use the `height` and `width` attributes to specify the size of the iframe.

The height and width are specified in pixels by default:

Example
```
<iframe src="demo_iframe.htm" height="200"
width="300"></iframe>
```

Or you can use CSS to set the height and width of the iframe:

Example
```
<iframe src="demo_iframe.htm"
style="height:200px;width:300px;"></iframe>
```

Iframe - Remove the Border

By default, an iframe has a border around it.

To remove the border, add the `style` attribute and use the CSS `border` property:

Example
```
<iframe src="demo_iframe.htm" style="border:none;"></iframe>
```

With CSS, you can also change the size, style and color of the iframe's border:

Example
```
<iframe src="demo_iframe.htm" style="border:2px solid
red;"></iframe>
```

Iframe - Target for a Link

An iframe can be used as the target frame for a link.

The `target` attribute of the link must refer to the `name` attribute of the iframe:

Example
```
<iframe src="demo_iframe.htm" name="iframe_a"></iframe>

<p><a href="https://www.w3schools.com"
target="iframe_a">W3Schools.com</a></p>
```

HTML iframe Tag

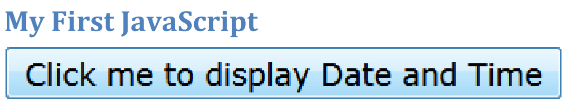
Tag	Description
<iframe>	Defines an inline frame

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML JavaScript

JavaScript makes HTML pages more dynamic and interactive.

Example



The HTML <script> Tag

The `<script>` tag is used to define a client-side script (JavaScript).

The `<script>` element either contains script statements, or it points to an external script file through the `src` attribute.

Common uses for JavaScript are image manipulation, form validation, and dynamic changes of content.

To select an HTML element, JavaScript most often uses the `document.getElementById()` method.

This JavaScript example writes "Hello JavaScript!" into an HTML element with id="demo":

Example

```
<script>
document.getElementById("demo").innerHTML = "Hello JavaScript!";
</script>
```

Tip: You can learn much more about JavaScript in our JavaScript Tutorial.

A Taste of JavaScript

Here are some examples of what JavaScript can do:

JavaScript can change HTML content

```
document.getElementById("demo").innerHTML = "Hello JavaScript!";
```

JavaScript can change HTML styles

```
document.getElementById("demo").style.fontSize = "25px";
document.getElementById("demo").style.color = "red";
document.getElementById("demo").style.backgroundColor = "yellow";
```

JavaScript can change HTML attributes

```
document.getElementById("image").src = "picture.gif";
```

The HTML <noscript> Tag

The `<noscript>` tag is used to provide an alternate content for users that have disabled scripts in their browser or have a browser that doesn't support client-side scripts:

Example

```
<script>
document.getElementById("demo").innerHTML = "Hello JavaScript!";
</script>

<noscript>Sorry, your browser does not support JavaScript!</noscript>
```

HTML Script Tags

Tag	Description
<script>	Defines a client-side script
<noscript>	Defines an alternate content for users that do not support client-side scripts

---

HTML File Paths

Path	Description
<img src="picture.jpg">	picture.jpg is located in the same folder as the current page
<img src="images/picture.jpg">	picture.jpg is located in the images folder in the current folder
<img src="/images/picture.jpg">	picture.jpg is located in the images folder at the root of the current web
<img src="../picture.jpg">	picture.jpg is located in the folder one level up from the current folder

HTML File Paths

A file path describes the location of a file in a web site's folder structure.

File paths are used when linking to external files like:

- Web pages
- Images
- Style sheets
- JavaScripts

Absolute File Paths

An absolute file path is the full URL to an internet file:

Example

```
<img src="https://www.w3schools.com/images/picture.jpg"
alt="Mountain">
```

The <img> tag is explained in the chapter about HTML Images.

Relative File Paths

A relative file path points to a file relative to the current page.

In this example, the file path points to a file in the images folder located at the root of the current web:

Example

```
<img src="/images/picture.jpg" alt="Mountain">
```

In this example, the file path points to a file in the images folder located in the current folder:

Example

```
<img src="images/picture.jpg" alt="Mountain">
```

In this example, the file path points to a file in the images folder located in the folder one level above the current folder:

Example

```
<img src="../images/picture.jpg" alt="Mountain">
```

Best Practice

It is best practice to use relative file paths (if possible).

When using relative file paths, your web pages will not be bound to your current base URL. All links will work on your own computer (localhost) as well as on your current public domain and your future public domains.

HTML Head

The HTML <head> Element

The `<head>` element is a container for metadata (data about data) and is placed between the `<html>` tag and the `<body>` tag.

HTML metadata is data about the HTML document. Metadata is not displayed.

Metadata typically define the document title, character set, styles, scripts, and other meta information.

The following tags describe metadata: `<title>`, `<style>`, `<meta>`, `<link>`, `<script>`, and `<base>`.

The HTML <title> Element

The `<title>` element defines the title of the document, and is required in all HTML documents.

The `<title>` element:

- defines a title in the browser tab
- provides a title for the page when it is added to favorites
- displays a title for the page in search engine results

A simple HTML document:

Example

```
<!DOCTYPE html>
<html>

<head>
  <title>Page Title</title>
</head>

<body>
The content of the document......
</body>

</html>
```

The HTML <style> Element

The `<style>` element is used to define style information for a single HTML page:

Example

```
<style>
  body {background-color: powderblue;}
  h1 {color: red;}
  p {color: blue;}
</style>
```

The HTML <link> Element

The `<link>` element is used to link to external style sheets:

Example

```
<link rel="stylesheet" href="mystyle.css">
```

Tip: To learn all about CSS, visit our CSS Tutorial.

The HTML <meta> Element

The `<meta>` element is used to specify which character set is used, page description, keywords, author, and other metadata.

Metadata is used by browsers (how to display content), by search engines (keywords), and other web services.

Define the character set used:

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

Define a description of your web page:

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

Define keywords for search engines:

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

Define the author of a page:

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

Refresh document every 30 seconds:

```
<meta http-equiv="refresh" content="30">
```

Example of `<meta>` tags:

Example

```
<meta charset="UTF-8">
<meta name="description" content="Free Web tutorials">
<meta name="keywords" content="HTML,CSS,XML,JavaScript">
<meta name="author" content="John Doe">
```

Setting The Viewport

HTML5 introduced a method to let web designers take control over the viewport, through the `<meta>` tag.

The viewport is the user's visible area of a web page. It varies with the device, and will be smaller on a mobile phone than on a computer screen.

You should include the following `<meta>` viewport element in all your web pages:

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

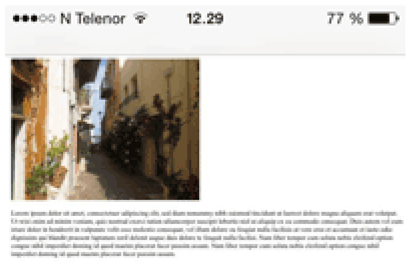
A `<meta>` viewport element gives the browser instructions on how to control the page's dimensions and scaling.

The width=device-width part sets the width of the page to follow the screen-width of the device (which will vary depending on the device).

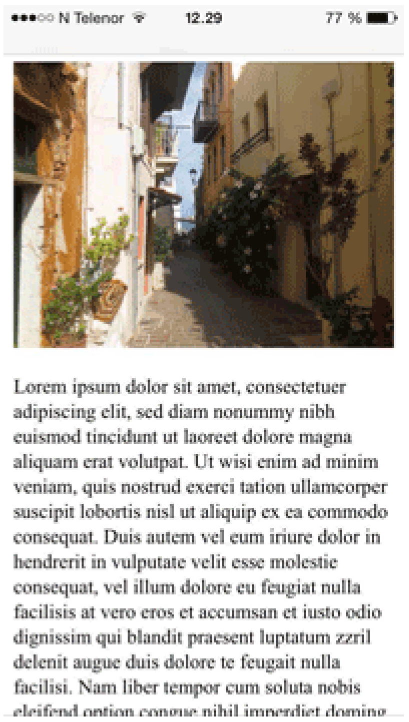
The initial-scale=1.0 part sets the initial zoom level when the page is first loaded by the browser.

Here is an example of a web page *without* the viewport meta tag, and the same web page *with* the viewport `<meta>` tag:

Tip: If you are browsing this page with a phone or a tablet, you can click on the two links below to see the difference.



Without the viewport meta tag



Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi. Nam liber tempor cum soluta nobis eleifend option congue nihil imperdiet doming

With the viewport meta tag

The HTML <script> Element

The `<script>` element is used to define client-side JavaScripts.

This JavaScript writes "Hello JavaScript!" into an HTML element with id="demo":

Example

```
<script>
function myFunction {
  document.getElementById("demo").innerHTML = "Hello
JavaScript!";
}
</script>
```

Tip: To learn all about JavaScript, visit our JavaScript Tutorial.

The HTML <base> Element

The `<base>` element specifies the base URL and base target for all relative URLs in a page:

Example

```
<base href="https://www.w3schools.com/images/"
target="_blank">
```

Omitting <html>, <head> and <body>?

According to the HTML5 standard; the `<html>`, the `<body>`, and the `<head>` tag can be omitted.

The following code will validate as HTML5:

Example

```
<!DOCTYPE html>
<title>Page Title</title>

<h1>This is a heading</h1>
<p>This is a paragraph.</p>
```

Note:

W3Schools does not recommend omitting the `<html>` and `<body>` tags. Omitting these tags can crash DOM or XML software and produce errors in older browsers (IE9).

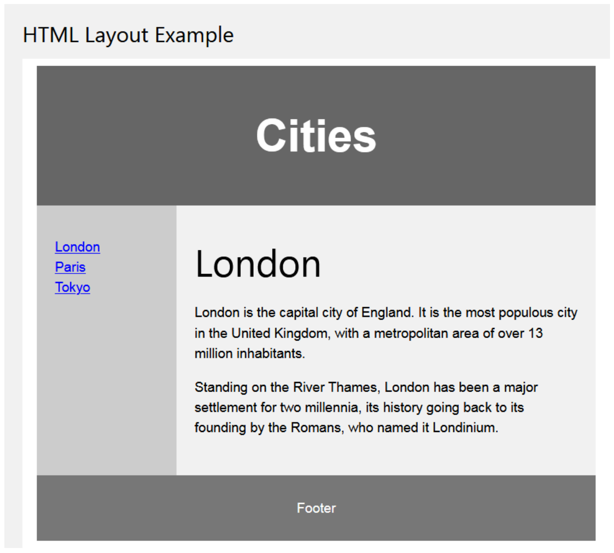
However, omitting the `<head>` tag has been a common practice for quite some time now.

HTML head Elements

Tag	Description
<head>	Defines information about the document
<title>	Defines the title of a document
<base>	Defines a default address or a default target for all links on a page
<link>	Defines the relationship between a document and an external resource
<meta>	Defines metadata about an HTML document
<script>	Defines a client-side script
<style>	Defines style information for a document

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML Layouts


HTML Layout Example

Cities

London
Paris
Tokyo

London

London is the capital city of England. It is the most populous city in the United Kingdom, with a metropolitan area of over 13 million inhabitants.

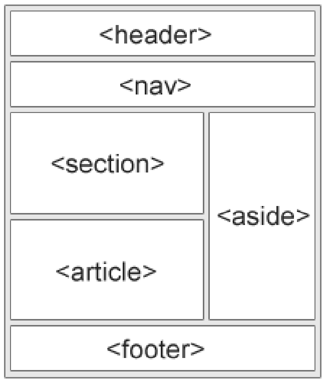
Standing on the River Thames, London has been a major settlement for two millennia, its history going back to its founding by the Romans, who named it Londinium.

Footer

HTML Layout Elements

Websites often display content in multiple columns (like a magazine or newspaper).

HTML offers several semantic elements that define the different parts of a web page:



- <header> - Defines a header for a document or a section
- <nav> - Defines a container for navigation links
- <section> - Defines a section in a document
- <article> - Defines an independent self-contained article
- <aside> - Defines content aside from the content (like a sidebar)
- <footer> - Defines a footer for a document or a section
- <details> - Defines additional details
- <summary> - Defines a heading for the <details> element

HTML Layout Techniques

There are five different ways to create multicolumn layouts. Each way has its pros and cons:

- HTML tables (not recommended)
- CSS float property
- CSS flexbox
- CSS framework
- CSS grid

Which One to Choose?

HTML Tables

The <table> element was not designed to be a layout tool! The purpose of the <table> element is to display tabular data. So, do not use tables for your page layout! They will bring a mess into your code. And imagine how hard it will be to redesign your site after a couple of months.

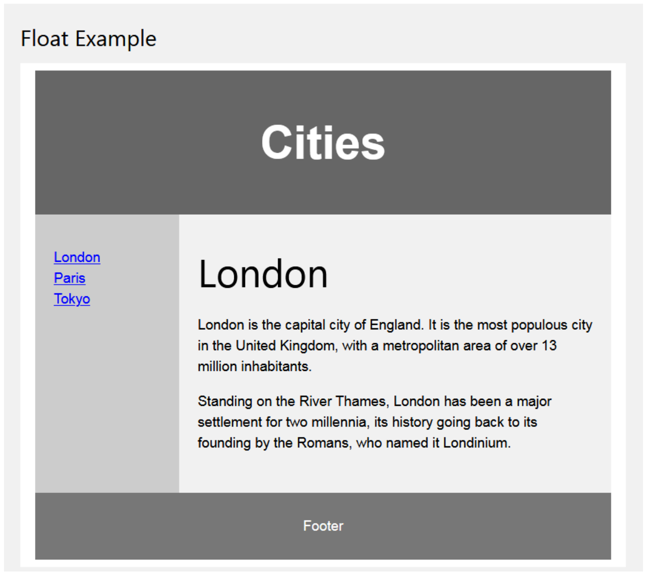
Tip: Do NOT use tables for your page layout!

CSS Frameworks

If you want to create your layout fast, you can use a framework, like W3.CSS or Bootstrap.

CSS Floats

It is common to do entire web layouts using the CSS float property. Float is easy to learn - you just need to remember how the float and clear properties work. **Disadvantages:** Floating elements are tied to the document flow, which may harm the flexibility. Learn more about float in our CSS Float and Clear chapter.


Float Example

Cities

London
Paris
Tokyo

London

London is the capital city of England. It is the most populous city in the United Kingdom, with a metropolitan area of over 13 million inhabitants.

Standing on the River Thames, London has been a major settlement for two millennia, its history going back to its founding by the Romans, who named it Londinium.

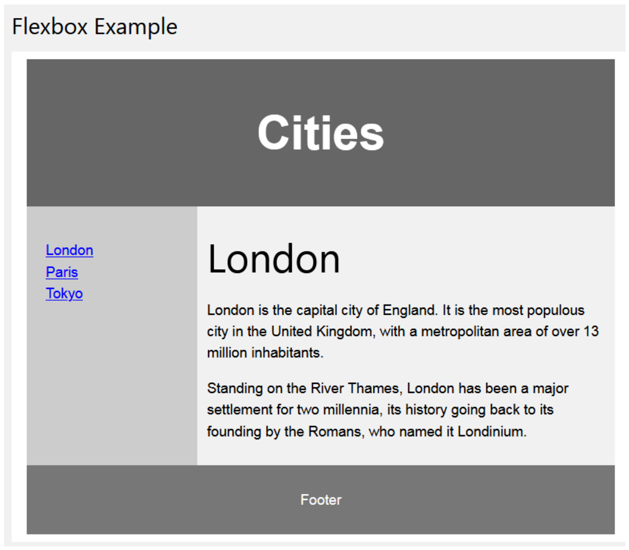
Footer

CSS Flexbox

Flexbox is a new layout mode in CSS3.

Use of flexbox ensures that elements behave predictably when the page layout must accommodate different screen sizes and different display devices. **Disadvantages:** Does not work in IE10 and earlier.

Learn more about flexbox in our CSS Flexbox chapter.


Flexbox Example

Cities

London
Paris
Tokyo

London

London is the capital city of England. It is the most populous city in the United Kingdom, with a metropolitan area of over 13 million inhabitants.

Standing on the River Thames, London has been a major settlement for two millennia, its history going back to its founding by the Romans, who named it Londinium.

Footer

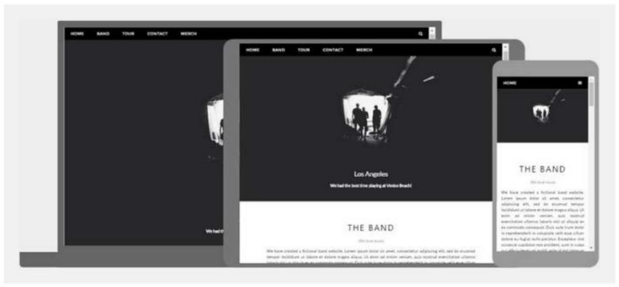
CSS Grid View

The CSS Grid Layout Module offers a grid-based layout system, with rows and columns, making it easier to design web pages without having to use floats and positioning.

Disadvantages: Does not work in IE nor in Edge 15 and earlier.

Learn more about CSS grids in our CSS Grid View chapter.

HTML Responsive Web Design



What is Responsive Web Design?

Responsive Web Design is about using HTML and CSS to automatically resize, hide, shrink, or enlarge, a website, to make it look good on all devices (desktops, tablets, and phones):

Note: A web page should look good on **any device**!

Setting The Viewport

When making responsive web pages, add the following `<meta>` element in all your web pages:

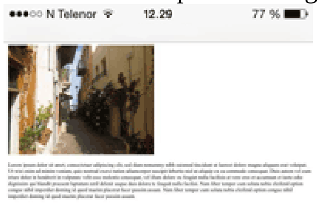
Example

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

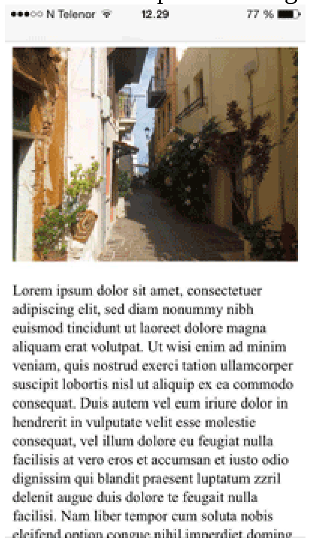
This will set the viewport of your page, which will give the browser instructions on how to control the page's dimensions and scaling.

Here is an example of a web page *without* the viewport meta tag, and the same web page *with* the viewport meta tag:

Without the viewport meta tag:



With the viewport meta tag:



Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi. Nam liber tempor cum soluta nobis eleifend option congue nihil imperdiet doming

Tip: If you are browsing this page on a phone or a tablet, you can click on the two links above to see the difference.

Responsive Images

Responsive images are images that scale nicely to fit any browser size.

Using the width Property

If the CSS `width` property is set to 100%, the image will be responsive and scale up and down:

Example

```
<img src="img_girl.jpg" style="width:100%;">
```

Notice that in the example above, the image can be scaled up to be larger than its original size. A better solution, in many cases, will be to use the `max-width` property instead.

Using the max-width Property

If the `max-width` property is set to 100%, the image will scale down if it has to, but never scale up to be larger than its original size:

Example

```
<img src="img_girl.jpg" style="max-width:100%;height:auto;">
```

Show Different Images Depending on Browser Width

The HTML `<picture>` element allows you to define different images for different browser window sizes.

Resize the browser window to see how the image below change depending on the width:

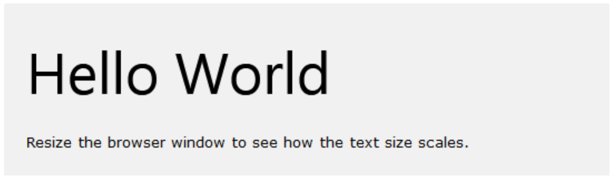
Example

```
<picture>
  <source srcset="img_smallflower.jpg" media="(max-width:
600px)">
  <source srcset="img_flowers.jpg" media="(max-width: 1500px)">
  <source srcset="flowers.jpg">
  <img src="img_smallflower.jpg" alt="Flowers">
</picture>
```

Responsive Text Size

The text size can be set with a "vw" unit, which means the "viewport width".

That way the text size will follow the size of the browser window:



Example

```
<h1 style="font-size:10vw">Hello World</h1>
```

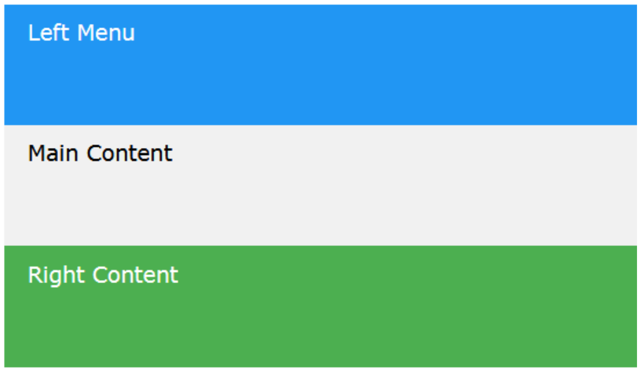
Viewport is the browser window size. 1vw = 1% of viewport width. If the viewport is 50cm wide, 1vw is 0.5cm.

Media Queries

In addition to resize text and images, it is also common to use media queries in responsive web pages.

With media queries you can define completely different styles for different browser sizes.

Example: resize the browser window to see that the three div elements below will display horizontally on large screens and stacked vertically on small screens:



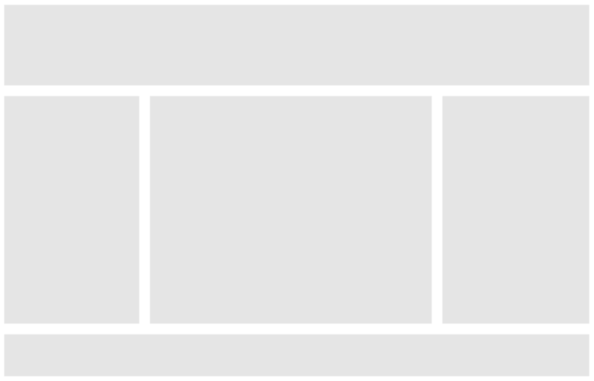
Example

```
<style>
.left, .right {
  float: left;
  width: 20%; /* The width is 20%, by default */
}

.main {
  float: left;
  width: 60%; /* The width is 60%, by default */
}

/* Use a media query to add a breakpoint at 800px: */
@media screen and (max-width: 800px) {
  .left, .main, .right {
    width: 100%; /* The width is 100%, when the viewport is 800px or
smaller */
  }
}
</style>
```

Tip: To learn more about Media Queries and Responsive Web Design, read our RWD Tutorial.

Responsive Web Page - Full Example

A responsive web page should look good on large desktop screens and on small mobile phones.



Responsive Web Design - Frameworks

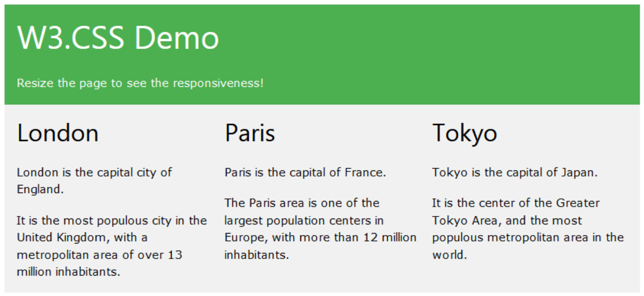
There are many existing CSS Frameworks that offer Responsive Design.

They are free, and easy to use.

Using W3.CSS

A great way to create a responsive design, is to use a responsive style sheet, like W3.CSS

W3.CSS makes it easy to develop sites that look nice at any size; desktop, laptop, tablet, or phone:



W3.CSS Demo

Resize the page to see the responsiveness!

London

London is the capital city of England.

It is the most populous city in the United Kingdom, with a metropolitan area of over 13 million inhabitants.

Paris

Paris is the capital of France.

The Paris area is one of the largest population centers in Europe, with more than 12 million inhabitants.

Tokyo

Tokyo is the capital of Japan.

It is the center of the Greater Tokyo Area, and the most populous metropolitan area in the world.

```
<!DOCTYPE html>
<html>
<meta name="viewport" content="width=device-width,
initial-scale=1">
<link rel="stylesheet"
href="https://www.w3schools.com/w3css/4/w3.css">
<body>

<div class="w3-container w3-green">
  <h1>W3Schools Demo</h1>
  <p>Resize this responsive page!</p>
</div>

<div class="w3-row-padding">
  <div class="w3-third">
    <h2>London</h2>
    <p>London is the capital city of England.</p>
    <p>It is the most populous city in the United Kingdom,
    with a metropolitan area of over 13 million inhabitants.</p>
  </div>

  <div class="w3-third">
    <h2>Paris</h2>
    <p>Paris is the capital of France.</p>
    <p>The Paris area is one of the largest population centers in
Europe,
    with more than 12 million inhabitants.</p>
  </div>

  <div class="w3-third">
    <h2>Tokyo</h2>
    <p>Tokyo is the capital of Japan.</p>
    <p>It is the center of the Greater Tokyo Area,
    and the most populous metropolitan area in the world.</p>
  </div>
</div>

</body>
</html>
```

Bootstrap

Another popular framework is Bootstrap, it uses HTML, CSS and jQuery to make responsive web pages.

Example

```
<!DOCTYPE html>
<html lang="en">
<head>
<title>Bootstrap Example</title>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-
scale=1">
<link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/boots
trap.min.css">
<script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.2.0/jquery.min.j
s"></script>
<script
src="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/js/bootstra
p.min.js"></script>
</head>
<body>

<div class="container">
 <div class="jumbotron">
   <h1>My First Bootstrap Page</h1>
 </div>
 <div class="row">
   <div class="col-sm-4">
     ...
   </div>
   <div class="col-sm-4">
     ...
   </div>
   <div class="col-sm-4">
   ...
   </div>
 </div>
</div>


</body>
</html>
```

To learn more about Bootstrap, go to our Bootstrap Tutorial.

HTML Computer Code Elements

Computer Code

```
<code>
x = 5;<br>
y = 6;<br>
z = x + y;
</code>
```

HTML <kbd> For Keyboard Input

The HTML `<kbd>` element represents user input, like keyboard input or voice commands.

Text surrounded by `<kbd>` tags is typically displayed in a monospace font:

Example

```
<p>Save the document by pressing <kbd>Ctrl + S</kbd></p>
```

Result:

Save the document by pressing `Ctrl + S`

HTML <samp> For Program Output

The HTML `<samp>` element represents output from a program or computing system.

Text surrounded by `<samp>` tags is typically displayed in a monospace font:

Example

```
<p>If you input wrong value, the program will return
<samp>Error!</samp></p>
```

Result:

If you input wrong value, the program will return `Error!`

HTML <code> For Computer Code

The HTML `<code>` element defines a fragment of computer code.

Text surrounded by `<code>` tags is typically displayed in a monospace font:

Example

```
<code>
x = 5;
y = 6;
z = x + y;
</code>
```

Result:

```
x = 5; y = 6; z = x + y;
```

Notice that the `<code>` element does not preserve extra whitespace and line-breaks.

To fix this, you can put the `<code>` element inside a `<pre>` element:

Example

```
<pre>
<code>
x = 5;
y = 6;
z = x + y;
</code>
</pre>
```

Result:

```
x = 5;
y = 6;
z = x + y;
```

HTML <var> For Variables

The HTML `<var>` element defines a variable.

The variable could be a variable in a mathematical expression or a variable in programming context:

Example

```
Einstein wrote: <var>E</var> = <var>mc</var><sup>2</sup>.
```

Result:

Einstein wrote: $E = mc^2$.

HTML Computer Code Elements

Tag	Description
<code>	Defines programming code
<kbd>	Defines keyboard input
<samp>	Defines computer output
<var>	Defines a variable
<pre>	Defines preformatted text

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML Entities

Reserved characters in HTML must be replaced with character entities.

Characters that are not present on your keyboard can also be replaced by entities.

HTML Entities

Some characters are reserved in HTML.

If you use the less than (<) or greater than (>) signs in your text, the browser might mix them with tags.

Character entities are used to display reserved characters in HTML.

A character entity looks like this:

&*entity_name*;

OR

&#*entity_number*;

To display a less than sign (<) we must write: **&lt;** or **&#60;**

Advantage of using an entity name: An entity name is easy to remember.
Disadvantage of using an entity name: Browsers may not support all entity names, but the support for numbers is good.

Non-breaking Space

A common character entity used in HTML is the non-breaking space: **&nbsp;**

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). This is handy when breaking the words might be disruptive.

Examples:

- § 10
- 10 km/h
- 10 PM

Another common use of the non-breaking space is to prevent browsers from truncating spaces in HTML pages.

If you write 10 spaces in your text, the browser will remove 9 of them. To add real spaces to your text, you can use the **&nbsp;** character entity.

The non-breaking hyphen (&#8209;) lets you use a hyphen character (-) that won't break.

Some Other Useful HTML Character Entities

Result	Description	Entity Name	Entity Number
	non-breaking space	&nbsp;	&#160;
<	less than	&lt;	&#60;
>	greater than	&gt;	&#62;
&	ampersand	&amp;	&#38;
"	double quotation mark	&quot;	&#34;
'	single quotation mark (apostrophe)	&apos;	&#39;
¢	cent	&cent;	&#162;
£	pound	&pound;	&#163;
¥	yen	&yen;	&#165;
€	euro	&euro;	&#8364;
©	copyright	&copy;	&#169;
®	registered trademark	&reg;	&#174;

Note: Entity names are case sensitive.

Combining Diacritical Marks

A diacritical mark is a "glyph" added to a letter.

Some diacritical marks, like grave (̀) and acute (́) are called accents.

Diacritical marks can appear both above and below a letter, inside a letter, and between two letters.

Diacritical marks can be used in combination with alphanumeric characters to produce a character that is not present in the character set (encoding) used in the page.

Here are some examples:

Mark	Character	Construct	Result
̀	a	a&#768;	à
́	a	a&#769;	á
	a	a&#770;	â
˜	a	a&#771;	ã
̀	O	O&#768;	Ò
́	O	O&#769;	Ó
	O	O&#770;	Ô
˜	O	O&#771;	Õ

You will see more HTML symbols in the next chapter of this tutorial.

HTML Symbols

HTML Symbol Entities

HTML entities were described in the previous chapter.

Many mathematical, technical, and currency symbols, are not present on a normal keyboard.

To add such symbols to an HTML page, you can use an HTML entity name.

If no entity name exists, you can use an entity number, a decimal, or hexadecimal reference.

Example

```
<p>I will display &euro;</p>
<p>I will display &#8364;</p>
<p>I will display &#x20AC;</p>
```

Will display as:

```
I will display €
I will display €
I will display €
```

Some Mathematical Symbols Supported by HTML

Char	Number	Entity	Description
∀	&#8704;	&forall;	FOR ALL
∂	&#8706;	&part;	PARTIAL DIFFERENTIAL
∃	&#8707;	&exist;	THERE EXISTS
∅	&#8709;	&empty;	EMPTY SETS
∇	&#8711;	&nabla;	NABLA
∈	&#8712;	&isin;	ELEMENT OF
∉	&#8713;	&notin;	NOT AN ELEMENT OF
∋	&#8715;	&ni;	CONTAINS AS MEMBER
∏	&#8719;	&prod;	N-ARY PRODUCT
∑	&#8721;	&sum;	N-ARY SUMMATION

Full Math Reference

Some Greek Letters Supported by HTML

Char	Number	Entity	Description
Α	&#913;	&Alpha;	GREEK CAPITAL LETTER ALPHA
Β	&#914;	&Beta;	GREEK CAPITAL LETTER BETA
Γ	&#915;	&Gamma;	GREEK CAPITAL LETTER GAMMA
Δ	&#916;	&Delta;	GREEK CAPITAL LETTER DELTA
Ε	&#917;	&Epsilon;	GREEK CAPITAL LETTER EPSILON
Ζ	&#918;	&Zeta;	GREEK CAPITAL LETTER ZETA

Full Greek Reference

Some Other Entities Supported by HTML

Char	Number	Entity	Description

©	&#169;	&copy;	COPYRIGHT SIGN
®	&#174;	&reg;	REGISTERED SIGN
€	&#8364;	&euro;	EURO SIGN
™	&#8482;	&trade;	TRADEMARK
←	&#8592;	&larr;	LEFTWARDS ARROW
↑	&#8593;	&uarr;	UPWARDS ARROW
→	&#8594;	&rarr;	RIGHTWARDS ARROW
↓	&#8595;	&darr;	DOWNWARDS ARROW
♠	&#9824;	&spades;	BLACK SPADE SUIT
♣	&#9827;	&clubs;	BLACK CLUB SUIT
♥	&#9829;	&hearts;	BLACK HEART SUIT
♦	&#9830;	&diams;	BLACK DIAMOND SUIT

Full Currency Reference

Full Arrows Reference

Full Symbols Reference

HTML Encoding (Character Sets)

To display an HTML page correctly, a web browser must know which character set to use.

What is Character Encoding?

ASCII was the first **character encoding standard** (also called character set). ASCII defined 128 different alphanumeric characters that could be used on the internet: numbers (0-9), English letters (A-Z), and some special characters like ! $ + - ( ) @ < > .

ISO-8859-1 was the default character set for HTML 4. This character set supported 256 different character codes.

ANSI (Windows-1252) was the original Windows character set. ANSI is identical to ISO-8859-1, except that ANSI has 32 extra characters.

Because ANSI and ISO-8859-1 were so limited, HTML 4 also supported 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.

The HTML charset Attribute

To display an HTML page correctly, a web browser must know the character set used in the page.

This is specified in the `<meta>` tag:

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

If a browser detects ISO-8859-1 in a web page, it defaults to ANSI.

Differences Between Character Sets

The following table displays the differences between the character sets described above:

Numb	ASCII	ANSI	8859	UTF-8	Description
32					space
33	!	!	!	!	exclamation mark
34	"	"	"	"	quotation mark
35	#	#	#	#	number sign
36	$	$	$	$	dollar sign
37	%	%	%	%	percent sign
38	&	&	&	&	ampersand
39	'	'	'	'	apostrophe
40	(	(	(	(	left parenthesis
41	)	)	)	)	right parenthesis

42	*	*	*	*	asterisk
43	+	+	+	+	plus sign
44	,	,	,	,	comma
45	-	-	-	-	hyphen-minus
46	.	.	.	.	full stop
47	/	/	/	/	solidus
48	0	0	0	0	digit zero
49	1	1	1	1	digit one
50	2	2	2	2	digit two
51	3	3	3	3	digit three
52	4	4	4	4	digit four
53	5	5	5	5	digit five
54	6	6	6	6	digit six
55	7	7	7	7	digit seven
56	8	8	8	8	digit eight
57	9	9	9	9	digit nine
58	:	:	:	:	colon
59	;	;	;	;	semicolon
60	<	<	<	<	less-than sign
61	=	=	=	=	equals sign
62	>	>	>	>	greater-than sign
63	?	?	?	?	question mark
64	@	@	@	@	commercial at
65	A	A	A	A	Latin capital letter A
66	B	B	B	B	Latin capital letter B
67	C	C	C	C	Latin capital letter C
68	D	D	D	D	Latin capital letter D
69	E	E	E	E	Latin capital letter E
70	F	F	F	F	Latin capital letter F
71	G	G	G	G	Latin capital letter G
72	H	H	H	H	Latin capital letter H
73	I	I	I	I	Latin capital letter I
74	J	J	J	J	Latin capital letter J
75	K	K	K	K	Latin capital letter K
76	L	L	L	L	Latin capital letter L
77	M	M	M	M	Latin capital letter M
78	N	N	N	N	Latin capital letter N
79	O	O	O	O	Latin capital letter O
80	P	P	P	P	Latin capital letter P
81	Q	Q	Q	Q	Latin capital letter Q
82	R	R	R	R	Latin capital letter R
83	S	S	S	S	Latin capital letter S
84	T	T	T	T	Latin capital letter T
85	U	U	U	U	Latin capital letter U
86	V	V	V	V	Latin capital letter V
87	W	W	W	W	Latin capital letter W
88	X	X	X	X	Latin capital letter X
89	Y	Y	Y	Y	Latin capital letter Y
90	Z	Z	Z	Z	Latin capital letter Z
91	[	[	[	[	left square bracket
92	\	\	\	\	reverse solidus
93	]	]	]	]	right square bracket
94	^	^	^	^	circumflex accent
95	_	_	_	_	low line

96	`	`	`	`	grave accent
97	a	a	a	a	Latin small letter a
98	b	b	b	b	Latin small letter b
99	c	c	c	c	Latin small letter c
100	d	d	d	d	Latin small letter d
101	e	e	e	e	Latin small letter e
102	f	f	f	f	Latin small letter f
103	g	g	g	g	Latin small letter g
104	h	h	h	h	Latin small letter h
105	i	i	i	i	Latin small letter i
106	j	j	j	j	Latin small letter j
107	k	k	k	k	Latin small letter k
108	l	l	l	l	Latin small letter l
109	m	m	m	m	Latin small letter m
110	n	n	n	n	Latin small letter n
111	o	o	o	o	Latin small letter o
112	p	p	p	p	Latin small letter p
113	q	q	q	q	Latin small letter q
114	r	r	r	r	Latin small letter r
115	s	s	s	s	Latin small letter s
116	t	t	t	t	Latin small letter t
117	u	u	u	u	Latin small letter u
118	v	v	v	v	Latin small letter v
119	w	w	w	w	Latin small letter w
120	x	x	x	x	Latin small letter x
121	y	y	y	y	Latin small letter y
122	z	z	z	z	Latin small letter z
123	{	{	{	{	left curly bracket
124	|	|	|	|	vertical line
125	}	}	}	}	right curly bracket
126	~	~	~	~	tilde
127	DEL				
128		€			euro sign
129		•	•	•	NOT USED
130		‚			single low-9 quotation mark
131		ƒ			Latin small letter f with hook
132		„			double low-9 quotation mark
133		…			horizontal ellipsis
134		†			dagger
135		‡			double dagger
136		ˆ			modifier letter circumflex accent
137		‰			per mille sign
138		Š			Latin capital letter S with caron
139		‹			single left-pointing angle quotation mark
140		Œ			Latin capital ligature OE
141		•	•	•	NOT USED
142		Ž			Latin capital letter Z with caron
143		•	•	•	NOT USED
144		•	•	•	NOT USED
145		‘			left single quotation mark
146		’			right single quotation mark
147		“			left double quotation mark
148		”			right double quotation mark

149	•			bullet
150	–			en dash
151	—			em dash
152	˜			small tilde
153	™			trade mark sign
154	š			Latin small letter s with caron
155	›			single right-pointing angle quotation mark
156	œ			Latin small ligature oe
157	•	•	•	NOT USED
158	ž			Latin small letter z with caron
159	Ÿ			Latin capital letter Y with diaeresis
160				no-break space
161	¡	¡	¡	inverted exclamation mark
162	¢	¢	¢	cent sign
163	£	£	£	pound sign
164	¤	¤	¤	currency sign
165	¥	¥	¥	yen sign
166	¦	¦	¦	broken bar
167	§	§	§	section sign
168	¨	¨	¨	diaeresis
169	©	©	©	copyright sign
170	ª	ª	ª	feminine ordinal indicator
171	«	«	«	left-pointing double angle quotation mark
172	¬	¬	¬	not sign
173				soft hyphen
174	®	®	®	registered sign
175	¯	¯	¯	macron
176	°	°	°	degree sign
177	±	±	±	plus-minus sign
178	²	²	²	superscript two
179	³	³	³	superscript three
180	´	´	´	acute accent
181	µ	µ	µ	micro sign
182	¶	¶	¶	pilcrow sign
183	·	·	·	middle dot
184	¸	¸	¸	cedilla
185	¹	¹	¹	superscript one
186	º	º	º	masculine ordinal indicator
187	»	»	»	right-pointing double angle quotation mark
188	¼	¼	¼	vulgar fraction one quarter
189	½	½	½	vulgar fraction one half
190	¾	¾	¾	vulgar fraction three quarters
191	¿	¿	¿	inverted question mark
192	À	À	À	Latin capital letter A with grave
193	Á	Á	Á	Latin capital letter A with acute
194	Â	Â	Â	Latin capital letter A with circumflex
195	Ã	Ã	Ã	Latin capital letter A with tilde
196	Ä	Ä	Ä	Latin capital letter A with diaeresis
197	Å	Å	Å	Latin capital letter A with ring above
198	Æ	Æ	Æ	Latin capital letter AE
199	Ç	Ç	Ç	Latin capital letter C with cedilla

200	È	È	È	Latin capital letter E with grave	227	ã	ã	ã	Latin small letter a with tilde
201	É	É	É	Latin capital letter E with acute	228	ä	ä	ä	Latin small letter a with diaeresis
202	Ê	Ê	Ê	Latin capital letter E with circumflex	229	å	å	å	Latin small letter a with ring above
203	Ë	Ë	Ë	Latin capital letter E with diaeresis	230	æ	æ	æ	Latin small letter ae
204	Ì	Ì	Ì	Latin capital letter I with grave	231	ç	ç	ç	Latin small letter c with cedilla
205	Í	Í	Í	Latin capital letter I with acute	232	è	è	è	Latin small letter e with grave
206	Î	Î	Î	Latin capital letter I with circumflex	233	é	é	é	Latin small letter e with acute
207	Ï	Ï	Ï	Latin capital letter I with diaeresis	234	ê	ê	ê	Latin small letter e with circumflex
208	Đ	Đ	Đ	Latin capital letter Eth	235	ë	ë	ë	Latin small letter e with diaeresis
209	Ñ	Ñ	Ñ	Latin capital letter N with tilde	236	ì	ì	ì	Latin small letter i with grave
210	Ò	Ò	Ò	Latin capital letter O with grave	237	í	í	í	Latin small letter i with acute
211	Ó	Ó	Ó	Latin capital letter O with acute	238	î	î	î	Latin small letter i with circumflex
212	Ô	Ô	Ô	Latin capital letter O with circumflex	239	ï	ï	ï	Latin small letter i with diaeresis
213	Õ	Õ	Õ	Latin capital letter O with tilde	240	ð	ð	ð	Latin small letter eth
214	Ö	Ö	Ö	Latin capital letter O with diaeresis	241	ñ	ñ	ñ	Latin small letter n with tilde
215	×	×	×	multiplication sign	242	ò	ò	ò	Latin small letter o with grave
216	Ø	Ø	Ø	Latin capital letter O with stroke	243	ó	ó	ó	Latin small letter o with acute
217	Ù	Ù	Ù	Latin capital letter U with grave	244	ô	ô	ô	Latin small letter o with circumflex
218	Ú	Ú	Ú	Latin capital letter U with acute	245	õ	õ	õ	Latin small letter o with tilde
219	Û	Û	Û	Latin capital letter U with circumflex	246	ö	ö	ö	Latin small letter o with diaeresis
220	Ü	Ü	Ü	Latin capital letter U with diaeresis	247	÷	÷	÷	division sign
221	Ý	Ý	Ý	Latin capital letter Y with acute	248	ø	ø	ø	Latin small letter o with stroke
222	Þ	Þ	Þ	Latin capital letter Thorn	249	ù	ù	ù	Latin small letter u with grave
223	ß	ß	ß	Latin small letter sharp s	250	ú	ú	ú	Latin small letter u with acute
224	à	à	à	Latin small letter a with grave	251	û	û	û	Latin small letter with circumflex
225	á	á	á	Latin small letter a with acute	252	ü	ü	ü	Latin small letter u with diaeresis
226	â	â	â	Latin small letter a with circumflex	253	ý	ý	ý	Latin small letter y with acute

254	þ	þ	þ	Latin small letter thorn
255	ÿ	ÿ	ÿ	Latin small letter y with diaeresis

The ASCII Character Set

ASCII uses the values from 0 to 31 (and 127) for control characters.

ASCII uses the values from 32 to 126 for letters, digits, and symbols.

ASCII does not use the values from 128 to 255.

The ANSI Character Set (Windows-1252)

ANSI is identical to ASCII for the values from 0 to 127.

ANSI has a proprietary set of characters for the values from 128 to 159.

ANSI is identical to UTF-8 for the values from 160 to 255.

The ISO-8859-1 Character Set

8859-1 is identical to ASCII for the values from 0 to 127.

8859-1 does not use the values from 128 to 159.

8859-1 is identical to UTF-8 for the values from 160 to 255.

The UTF-8 Character Set

UTF-8 is identical to ASCII for the values from 0 to 127.

UTF-8 does not use the values from 128 to 159.

UTF-8 is identical to both ANSI and 8859-1 for the values from 160 to 255.

UTF-8 continues from the value 256 with more than 10 000 different characters.

For a closer look, study our Complete HTML Character Set Reference.

The @charset CSS Rule

You can use the CSS `@charset` rule to specify the character encoding used in a style sheet:

Example

Set the encoding of the style sheet to Unicode UTF-8:

```
@charset "UTF-8";
```

Read more about the CSS @charset Rule in our CSS Reference.

HTML Uniform Resource Locators

A URL is another word for a web address.

A URL can be composed of words (w3schools.com), or an Internet Protocol (IP) address (192.68.20.50).

Most people enter the name when surfing, because names are easier to remember than numbers.

URL - Uniform Resource Locator

Web browsers request pages from web servers by using a URL.

A Uniform Resource Locator (URL) is used to address a document (or other data) on the web.

A web address like https://www.w3schools.com/html/default.asp follows these syntax rules:

```
scheme://prefix.domain:port/path/filename
```

Explanation:

- **scheme** - defines the **type** of Internet service (most common is **http or https**)
- **prefix** - defines a domain **prefix** (default for http is **www**)
- **domain** - defines the Internet **domain name** (like w3schools.com)
- **port** - defines the **port number** at the host (default for http is **80**)

- **path** - defines a **path** at the server (If omitted: the root directory of the site)
- **filename** - defines the name of a document or resource

Common URL Schemes

The table below lists some common schemes:

Scheme	Short for	Used for
http	HyperText Transfer Protocol	Common web pages. Not encrypted
https	Secure HyperText Transfer Protocol	Secure web pages. Encrypted
ftp	File Transfer Protocol	Downloading or uploading files
file		A file on your computer

URL Encoding

URLs can only be sent over the Internet using the ASCII character-set. If a URL contains characters outside the ASCII set, the URL has to be converted.

URL encoding converts non-ASCII characters into a format that can be transmitted over the Internet.

URL encoding replaces non-ASCII characters with a "%" followed by hexadecimal digits.

URLs cannot contain spaces. URL encoding normally replaces a space with a plus (+) sign, or %20.

Try It Yourself

Hello Günter

Submit

If you click "Submit", the browser will URL encode the input before it is sent to the server.

A page at the server will display the received input.

Try some other input and click Submit again.

ASCII Encoding Examples

Your browser will encode input, according to the character-set used in your page.

The default character-set in HTML5 is UTF-8.

Character	From Windows-1252	From UTF-8
€	%80	%E2%82%AC
£	%A3	%C2%A3
©	%A9	%C2%A9
®	%AE	%C2%AE
À	%C0	%C3%80
Á	%C1	%C3%81
Â	%C2	%C3%82
Ã	%C3	%C3%83
Ä	%C4	%C3%84
Å	%C5	%C3%85

For a complete reference of all URL encodings, visit our URL Encoding Reference.

HTML and XHTML

XHTML is HTML written as XML.

What Is XHTML?

- XHTML stands for E**X**tensible **H**yper**T**ext **M**arkup **L**anguage
- XHTML is almost identical to HTML
- XHTML is stricter than HTML
- XHTML is HTML defined as an XML application
- XHTML is supported by all major browsers

Why XHTML?

Many pages on the internet contain "bad" HTML.

This HTML code works fine in most browsers (even if it does not follow the HTML rules):

```
<html>
<head>
 <title>This is bad HTML</title>

<body>
 <h1>Bad HTML
 <p>This is a paragraph
</body>
```

Today's market consists of different browser technologies. Some browsers run on computers, and some browsers run on mobile phones or other small devices. Smaller devices often lack the resources or power to interpret "bad" markup.

XML is a markup language where documents must be marked up correctly (be "well-formed").

If you want to study XML, please read our XML tutorial.

XHTML was developed by combining the strengths of HTML and XML.

XHTML is HTML redesigned as XML.

The Most Important Differences from HTML:

Document Structure

- XHTML DOCTYPE is **mandatory**
- The xmlns attribute in <html> is **mandatory**
- <html>, <head>, <title>, and <body> are **mandatory**

XHTML Elements

- XHTML elements must be **properly nested**
- XHTML elements must always be **closed**
- XHTML elements must be in **lowercase**
- XHTML documents must have **one root element**

XHTML Attributes

- Attribute names must be in **lower case**
- Attribute values must be **quoted**
- Attribute minimization is **forbidden**

<!DOCTYPE ....> Is Mandatory

An XHTML document must have an XHTML DOCTYPE declaration.

A complete list of all the XHTML Doctypes is found in our HTML Tags Reference.

The <html>, <head>, <title>, and <body> elements must also be present, and the xmlns attribute in <html> must specify the xml namespace for the document.

This example shows an XHTML document with a minimum of required tags:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml">

<head>
 <title>Title of document</title>
</head>

<body>
 some content
</body>

</html>
```

XHTML Elements Must Be Properly Nested

In HTML, some elements can be improperly nested within each other, like this:

```
<b><i>This text is bold and italic</b></i>
```

In XHTML, all elements must be properly nested within each other, like this:

```
<b><i>This text is bold and italic</i></b>
```

XHTML Elements Must Always Be Closed

This is wrong:

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

This is correct:

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

Empty Elements Must Also Be Closed

This is wrong:

```
A break: <br>
A horizontal rule: <hr>
An image: <img src="happy.gif" alt="Happy face">
```

This is correct:

```
A break: <br />
A horizontal rule: <hr />
An image: <img src="happy.gif" alt="Happy face" />
```

XHTML Elements Must Be In Lower Case

This is wrong:

```
<BODY>
<P>This is a paragraph</P>
</BODY>
```

This is correct:

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

XHTML Attribute Names Must Be In Lower Case

This is wrong:

```
<table WIDTH="100%">
```

This is correct:

```
<table width="100%">
```

Attribute Values Must Be Quoted

This is wrong:

```
<table width=100%>
```

This is correct:

```
<table width="100%">
```

Attribute Minimization Is Forbidden

Wrong:

```
<input type="checkbox" name="vehicle" value="car" checked />
```

Correct:

```
<input type="checkbox" name="vehicle" value="car"
checked="checked" />
```

Wrong:

```
<input type="text" name="lastname" disabled />
```

Correct:

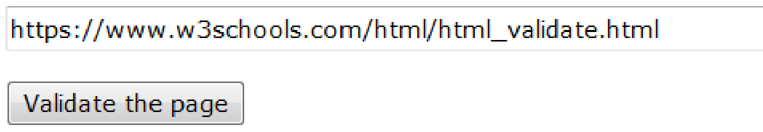
```
<input type="text" name="lastname" disabled="disabled" />
```

How to Convert from HTML to XHTML

1. Add an XHTML <!DOCTYPE> to the first line of every page
2. Add an xmlns attribute to the html element of every page
3. Change all element names to lowercase
4. Close all empty elements
5. Change all attribute names to lowercase
6. Quote all attribute values

Validate HTML With The W3C Validator

Put your web address in the box below:



https://www.w3schools.com/html/html_validate.html

HTML Forms

HTML Form Example

The <form> Element

The HTML `<form>` element defines a form that is used to collect user input:

```
<form>
.
form elements
.
</form>
```

An HTML form contains **form elements**.

Form elements are different types of input elements, like text fields, checkboxes, radio buttons, submit buttons, and more.

The <input> Element

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

The `<input>` element can be displayed in several ways, depending on the **type** attribute.

Here are some examples:

Type	Description
<input type="text">	Defines a one-line text input field
<input type="radio">	Defines a radio button (for selecting one of many choices)
<input type="submit">	Defines a submit button (for submitting the form)

You will learn a lot more about input types later in this tutorial.

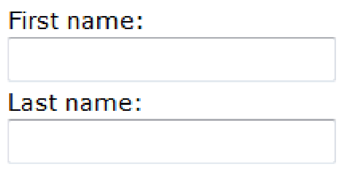
Text Input

`<input type="text">` defines a one-line input field for **text input**:

Example

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

This is how it will look like in a browser:



Note: The form itself is not visible. Also note that the default width of a text field is 20 characters.

Radio Button Input

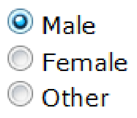
`<input type="radio">` defines a **radio button**.

Radio buttons let a user select ONE of a limited number of choices:

Example

```
<form>
  <input type="radio" name="gender" value="male" checked>
Male<br>
  <input type="radio" name="gender" value="female"> Female<br>
  <input type="radio" name="gender" value="other"> Other
</form>
```

This is how the HTML code above will be displayed in a browser:



The Submit Button

`<input type="submit">` defines a button for **submitting** the form data to a **form-handler**.

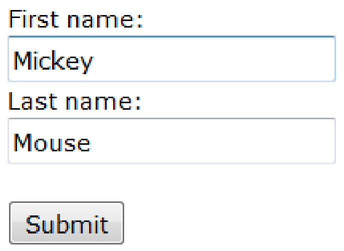
The form-handler is typically a server page with a script for processing input data.

The form-handler is specified in the form's **action** attribute:

Example

```
<form action="/action_page.php">
  First name:<br>
  <input type="text" name="firstname" value="Mickey"><br>
  Last name:<br>
  <input type="text" name="lastname" value="Mouse"><br><br>
  <input type="submit" value="Submit">
</form>
```

This is how the HTML code above will be displayed in a browser:



The Action Attribute

The `action` attribute defines the action to be performed when the form is submitted.

Normally, the form data is sent to a web page on the server when the user clicks on the submit button.

In the example above, the form data is sent to a page on the server called "/action_page.php". This page contains a server-side script that handles the form data:

```
<form action="/action_page.php">
```

If the `action` attribute is omitted, the action is set to the current page.

The Target Attribute

The `target` attribute specifies if the submitted result will open in a new browser tab, a frame, or in the current window.

The default value is "`_self`" which means the form will be submitted in the current window.

To make the form result open in a new browser tab, use the value "`_blank`":

Example

```
<form action="/action_page.php" target="_blank">
```

Other legal values are "`_parent`", "`_top`", or a name representing the name of an iframe.

The Method Attribute

The `method` attribute specifies the HTTP method (**GET** or **POST**) to be used when submitting the form data:

Example

```
<form action="/action_page.php" method="get">
```

or:

Example

```
<form action="/action_page.php" method="post">
```

When to Use GET?

The default method when submitting form data is GET.

However, when GET is used, the submitted form data will be **visible in the page address field**:

```
/action_page.php?firstname=Mickey&lastname=Mouse
```

Notes on GET:

- Appends form-data into the URL in name/value pairs
- The length of a URL is limited (2048 characters)
- Never use GET to send sensitive data! (will be visible in the URL)
- Useful for form submissions where a user wants to bookmark the result
- GET is better for non-secure data, like query strings in Google

When to Use POST?

Always use POST if the form data contains sensitive or personal information. The POST method does not display the submitted form data in the page address field.

Notes on POST:

- POST has no size limitations, and can be used to send large amounts of data.
- Form submissions with POST cannot be bookmarked

The Name Attribute

Each input field must have a `name` attribute to be submitted.

If the `name` attribute is omitted, the data of that input field will not be sent at all.

This example will only submit the "Last name" input field:

Example

```
<form action="/action_page.php">
 First name:<br>
 <input type="text" value="Mickey"><br>
 Last name:<br>
 <input type="text" name="lastname" value="Mouse"><br><br>
 <input type="submit" value="Submit">
</form>
```

Grouping Form Data with <fieldset>

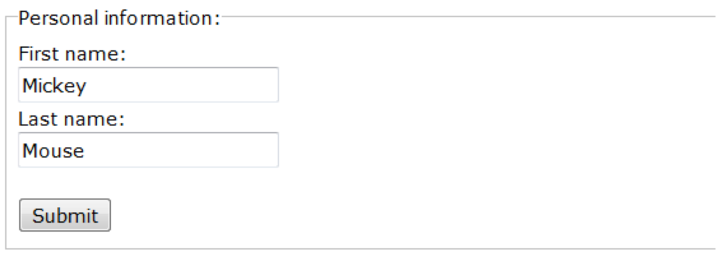
The `<fieldset>` element is used to group related data in a form.

The `<legend>` element defines a caption for the `<fieldset>` element.

Example

```
<form action="/action_page.php">
 <fieldset>
  <legend>Personal information:</legend>
  First name:<br>
  <input type="text" name="firstname" value="Mickey"><br>
  Last name:<br>
  <input type="text" name="lastname" value="Mouse"><br><br>
  <input type="submit" value="Submit">
 </fieldset>
</form>
```

This is how the HTML code above will be displayed in a browser:



Here is the list of all `<form>` attributes:

Attribute	Description
accept-charset	Specifies the charset used in the submitted form (default: the page charset).
action	Specifies an address (url) where to submit the form (default: the submitting page).
autocomplete	Specifies if the browser should autocomplete the form (default: on).
enctype	Specifies the encoding of the submitted data (default: is url-encoded).
method	Specifies the HTTP method used when submitting the form (default: GET).
name	Specifies a name used to identify the form (for DOM usage: document.forms.name).
novalidate	Specifies that the browser should not validate the form.
target	Specifies the target of the address in the action attribute (default: _self).

You will learn more about the form attributes in the next chapters.

HTML Form Elements

This chapter describes all HTML form elements.

The <input> Element

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

The `<input>` element can be displayed in several ways, depending on the `type` attribute.

Example

```
<input name="firstname" type="text">
```

If the `type` attribute is omitted, the input field gets the default type: "text".

All the different input types are covered in the next chapter.

The <select> Element

The `<select>` element defines a **drop-down list**:

Example

```
<select name="cars">
 <option value="volvo">Volvo</option>
 <option value="saab">Saab</option>
 <option value="fiat">Fiat</option>
 <option value="audi">Audi</option>
</select>
```

The `<option>` elements defines an option that can be selected.

By default, the first item in the drop-down list is selected.

To define a pre-selected option, add the `selected` attribute to the option:

Example

```
<option value="fiat" selected>Fiat</option>
```

Visible Values:

Use the `size` attribute to specify the number of visible values:

Example

```
<select name="cars" size="3">
  <option value="volvo">Volvo</option>
  <option value="saab">Saab</option>
  <option value="fiat">Fiat</option>
  <option value="audi">Audi</option>
</select>
```

Allow Multiple Selections:

Use the `multiple` attribute to allow the user to select more than one value:

Example

```
<select name="cars" size="4" multiple>
  <option value="volvo">Volvo</option>
  <option value="saab">Saab</option>
  <option value="fiat">Fiat</option>
  <option value="audi">Audi</option>
</select>
```

The <textarea> Element

The `<textarea>` element defines a multi-line input field (**a text area**):

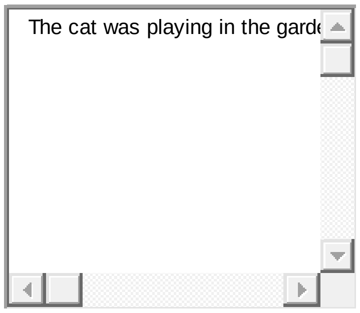
Example

```
<textarea name="message" rows="10" cols="30">
The cat was playing in the garden.
</textarea>
```

The `rows` attribute specifies the visible number of lines in a text area.

The `cols` attribute specifies the visible width of a text area.

This is how the HTML code above will be displayed in a browser:


The cat was playing in the garde

You can also define the size of the text area by using CSS:

Example

```
<textarea name="message" style="width:200px; height:600px;">
The cat was playing in the garden.
</textarea>
```

The <button> Element

The `<button>` element defines a clickable **button**:

Example

```
<button type="button" onclick="alert('Hello World!')">Click
Me!</button>
```

This is how the HTML code above will be displayed in a browser:

Note: Always specify the **type** attribute for the button element. Different browsers may use different default types for the button element.

HTML5 Form Elements

HTML5 added the following form elements:

- `<datalist>`
- `<output>`

Note: Browsers do not display unknown elements. New elements that are not supported in older browsers will not "destroy" your web page.

HTML5 <datalist> Element

The `<datalist>` element specifies a list of pre-defined options for an `<input>` element.

Users will see a drop-down list of the pre-defined options as they input data.

The `list` attribute of the `<input>` element, must refer to the `id` attribute of the `<datalist>` element.

Example

```
<form action="/action_page.php">
  <input list="browsers">
  <datalist id="browsers">
    <option value="Internet Explorer">
    <option value="Firefox">
    <option value="Chrome">
    <option value="Opera">
    <option value="Safari">
  </datalist>
</form>
```

HTML5 <output> Element

The `<output>` element represents the result of a calculation (like one performed by a script).

Example

Perform a calculation and show the result in an `<output>` element:

```
<form action="/action_page.php"
  oninput="x.value=parseInt(a.value)+parseInt(b.value)">
  0
  <input type="range"  id="a" name="a" value="50">
  100 +
  <input type="number" id="b" name="b" value="50">
  =
  <output name="x" for="a b"></output>
  <br><br>
  <input type="submit">
</form>
```

HTML Form Elements

Tag	Description
<form>	Defines an HTML form for user input
<input>	Defines an input control
<textarea>	Defines a multiline input control (text area)
<label>	Defines a label for an <input> element
<fieldset>	Groups related elements in a form
<legend>	Defines a caption for a <fieldset> element
<select>	Defines a drop-down list
<optgroup>	Defines a group of related options in a drop-down list
<option>	Defines an option in a drop-down list
<button>	Defines a clickable button
<datalist>	Specifies a list of pre-defined options for input controls
<output>	Defines the result of a calculation

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML Input Types

This chapter describes the different input types for the <input> element.

HTML Input Types

Here are the different input types you can use in HTML:

- `<input type="button">`
- `<input type="checkbox">`
- `<input type="color">`
- `<input type="date">`
- `<input type="datetime-local">`
- `<input type="email">`
- `<input type="file">`
- `<input type="hidden">`
- `<input type="image">`
- `<input type="month">`
- `<input type="number">`
- `<input type="password">`
- `<input type="radio">`
- `<input type="range">`
- `<input type="reset">`
- `<input type="search">`
- `<input type="submit">`
- `<input type="tel">`
- `<input type="text">`
- `<input type="time">`
- `<input type="url">`
- `<input type="week">`

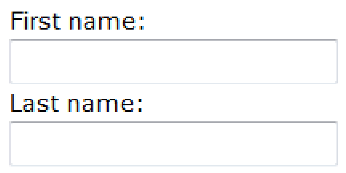
Input Type Text

`<input type="text">` defines a **one-line text input field**:

Example

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

This is how the HTML code above will be displayed in a browser:



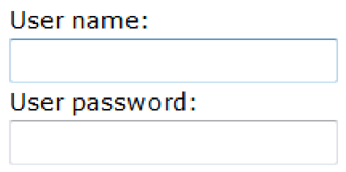
Input Type Password

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

Example

```
<form>
  User name:<br>
  <input type="text" name="username"><br>
  User password:<br>
  <input type="password" name="psw">
</form>
```

This is how the HTML code above will be displayed in a browser:



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

Input Type Submit

`<input type="submit">` defines a button for **submitting** form data to a **form-handler**.

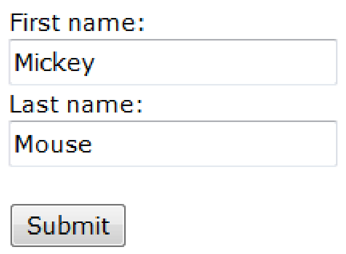
The form-handler is typically a server page with a script for processing input data.

The form-handler is specified in the form's `action` attribute:

Example

```
<form action="/action_page.php">
  First name:<br>
  <input type="text" name="firstname" value="Mickey"><br>
  Last name:<br>
  <input type="text" name="lastname" value="Mouse"><br><br>
  <input type="submit" value="Submit">
</form>
```

This is how the HTML code above will be displayed in a browser:



If you omit the submit button's value attribute, the button will get a default text:

Example

```
<form action="/action_page.php">
  First name:<br>
  <input type="text" name="firstname" value="Mickey"><br>
  Last name:<br>
  <input type="text" name="lastname" value="Mouse"><br><br>
  <input type="submit">
</form>
```

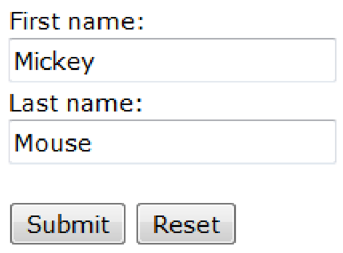
Input Type Reset

`<input type="reset">` defines a **reset button** that will reset all form values to their default values:

Example

```
<form action="/action_page.php">
  First name:<br>
  <input type="text" name="firstname" value="Mickey"><br>
  Last name:<br>
  <input type="text" name="lastname" value="Mouse"><br><br>
  <input type="submit" value="Submit">
  <input type="reset">
</form>
```

This is how the HTML code above will be displayed in a browser:



If you change the input values and then click the "Reset" button, the form-data will be reset to the default values.

Input Type Radio

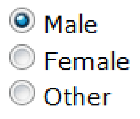
`<input type="radio">` defines a **radio button**.

Radio buttons let a user select ONLY ONE of a limited number of choices.

Example

```
<form>
  <input type="radio" name="gender" value="male" checked>
Male<br>
  <input type="radio" name="gender" value="female"> Female<br>
  <input type="radio" name="gender" value="other"> Other
</form>
```

This is how the HTML code above will be displayed in a browser:



Input Type Checkbox

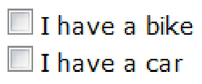
`<input type="checkbox">` defines a **checkbox**.

Checkboxes let a user select ZERO or MORE options of a limited number of choices.

Example

```
<form>
  <input type="checkbox" name="vehicle1" value="Bike"> I have a
bike<br>
  <input type="checkbox" name="vehicle2" value="Car"> I have a car
</form>
```

This is how the HTML code above will be displayed in a browser:



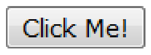
Input Type Button

`<input type="button">` defines a **button**:

Example

```
<input type="button" onclick="alert('Hello World!')" value="Click
Me!">
```

This is how the HTML code above will be displayed in a browser:



HTML5 Input Types

HTML5 added several new input types:

- color
- date
- datetime-local
- email
- month
- number
- range
- search
- tel
- time
- url
- week

New input types that are not supported by older web browsers, will behave as `<input type="text">`.

Input Type Color

The `<input type="color">` is used for input fields that should contain a color.

Depending on browser support, a color picker can show up in the input field.

Example

```
<form>
  Select your favorite color:
```

```
  <input type="color" name="favcolor">
</form>
```

Input Type Date

The `<input type="date">` is used for input fields that should contain a date.

Depending on browser support, a date picker can show up in the input field.

Example

```
<form>
  Birthday:
  <input type="date" name="bday">
</form>
```

You can also use the `min` and `max` attributes to add restrictions to dates:

Example

```
<form>
  Enter a date before 1980-01-01:
  <input type="date" name="bday" max="1979-12-31"><br>
  Enter a date after 2000-01-01:
  <input type="date" name="bday" min="2000-01-02"><br>
</form>
```

Input Type Datetime-local

The `<input type="datetime-local">` specifies a date and time input field, with no time zone.

Depending on browser support, a date picker can show up in the input field.

Example

```
<form>
  Birthday (date and time):
  <input type="datetime-local" name="bdaytime">
</form>
```

Input Type Email

The `<input type="email">` is used for input fields that should contain an e-mail address.

Depending on browser support, the e-mail address can be automatically validated when submitted.

Some smartphones recognize the email type, and add ".com" to the keyboard to match email input.

Example

```
<form>
  E-mail:
  <input type="email" name="email">
</form>
```

Input Type File

The `<input type="file">` defines a file-select field and a "Browse" button for file uploads.

Example

```
<form>
  Select a file: <input type="file" name="myFile">
</form>
```

Input Type Month

The `<input type="month">` allows the user to select a month and year.

Depending on browser support, a date picker can show up in the input field.

Example

```
<form>
  Birthday (month and year):
  <input type="month" name="bdaymonth">
</form>
```

Input Type Number

The `<input type="number">` defines a **numeric** input field.

You can also set restrictions on what numbers are accepted.

The following example displays a numeric input field, where you can enter a value from 1 to 5:

Example

```
<form>
  Quantity (between 1 and 5):
  <input type="number" name="quantity" min="1" max="5">
</form>
```

Input Restrictions

Here is a list of some common input restrictions:

Attribute	Description
checked	Specifies that an input field should be pre-selected when the page loads (for type="checkbox" or

	type="radio")
disabled	Specifies that an input field should be disabled
max	Specifies the maximum value for an input field
maxlength	Specifies the maximum number of character for an input field
min	Specifies the minimum value for an input field
pattern	Specifies a regular expression to check the input value against
readonly	Specifies that an input field is read only (cannot be changed)
required	Specifies that an input field is required (must be filled out)
size	Specifies the width (in characters) of an input field
step	Specifies the legal number intervals for an input field
value	Specifies the default value for an input field

You will learn more about input restrictions in the next chapter.

The following example displays a numeric input field, where you can enter a value from 0 to 100, in steps of 10. The default value is 30:

Example

```
<form>
  Quantity:
  <input type="number" name="points" min="0" max="100"
step="10" value="30">
</form>
```

Input Type Range

The `<input type="range">` defines a control for entering a number whose exact value is not important (like a slider control). Default range is 0 to 100. However, you can set restrictions on what numbers are accepted with the `min`, `max`, and `step` attributes:

Example

```
<form>
  <input type="range" name="points" min="0" max="10">
</form>
```

Input Type Search

The `<input type="search">` is used for search fields (a search field behaves like a regular text field).

Example

```
<form>
  Search Google:
  <input type="search" name="googlesearch">
</form>
```

Input Type Tel

The `<input type="tel">` is used for input fields that should contain a telephone number.

Example

```
<form>
  Telephone:
  <input type="tel" name="phone" pattern="[0-9]{3}-[0-9]{2}-[0-
9]{3}">
</form>
```

Input Type Time

The `<input type="time">` allows the user to select a time (no time zone).

Depending on browser support, a time picker can show up in the input field.

Example

```
<form>
  Select a time:
  <input type="time" name="usr_time">
</form>
```

Input Type Url

The `<input type="url">` is used for input fields that should contain a URL address.

Depending on browser support, the url field can be automatically validated when submitted.

Some smartphones recognize the url type, and adds ".com" to the keyboard to match url input.

Example

```
<form>
  Add your homepage:
  <input type="url" name="homepage">
</form>
```

Input Type Week

The `<input type="week">` allows the user to select a week and year.

Depending on browser support, a date picker can show up in the input field.

Example
```
<form>
  Select a week:
  <input type="week" name="week_year">
</form>
```

HTML Input Type Attribute

Tag	Description
<input type="">	Specifies the input type to display

HTML Input Attributes

The value Attribute

The `value` attribute specifies the initial value for an input field:

Example
```
<form action="">
  First name:<br>
  <input type="text" name="firstname" value="John">
</form>
```

The readonly Attribute

The `readonly` attribute specifies that the input field is read only (cannot be changed):

Example
```
<form action="">
  First name:<br>
  <input type="text" name="firstname" value="John" readonly>
</form>
```

The disabled Attribute

The `disabled` attribute specifies that the input field is disabled.

A disabled input field is unusable and un-clickable, and its value will not be sent when submitting the form:

Example
```
<form action="">
  First name:<br>
  <input type="text" name="firstname" value="John" disabled>
</form>
```

The size Attribute

The `size` attribute specifies the size (in characters) for the input field:

Example
```
<form action="">
  First name:<br>
  <input type="text" name="firstname" value="John" size="40">
</form>
```

The maxlength Attribute

The `maxlength` attribute specifies the maximum allowed length for the input field:

Example
```
<form action="">
  First name:<br>
  <input type="text" name="firstname" maxlength="10">
</form>
```

With a **`maxlength`** attribute, the input field will not accept more than the allowed number of characters.

The **`maxlength`** attribute does not provide any feedback. If you want to alert the user, you must write JavaScript code.

Note: Input restrictions are not foolproof, and JavaScript provides many ways to add illegal input. To safely restrict input, it must be checked by the receiver (the server) as well!

HTML5 Attributes

HTML5 added the following attributes for **`<input>`**:

- autocomplete
- autofocus
- form
- formaction
- formenctype
- formmethod
- formnovalidate
- formtarget
- height and width
- list
- min and max
- multiple

- pattern (regexp)
- placeholder
- required
- step

and the following attributes for `<form>`:

- autocomplete
- novalidate

The autocomplete Attribute

The `autocomplete` attribute specifies whether a form or input field should have autocomplete on or off.

When autocomplete is on, the browser automatically completes the input values based on values that the user has entered before.

Tip: It is possible to have autocomplete "on" for the form, and "off" for specific input fields, or vice versa.

The `autocomplete` attribute works with `<form>` and the following `<input>` types: text, search, url, tel, email, password, datepickers, range, and color.

Example

An HTML form with autocomplete on (and off for one input field):

```
<form action="/action_page.php" autocomplete="on">
  First name:<input type="text" name="fname"><br>
  Last name: <input type="text" name="lname"><br>
  E-mail: <input type="email" name="email"
autocomplete="off"><br>
  <input type="submit">
</form>
```

Tip: In some browsers you may need to activate the autocomplete function for this to work.

The novalidate Attribute

The `novalidate` attribute is a `<form>` attribute.

When present, novalidate specifies that the form data should not be validated when submitted.

Example

Indicates that the form is not to be validated on submit:

```
<form action="/action_page.php" novalidate>
  E-mail: <input type="email" name="user_email">
  <input type="submit">
</form>
```

The autofocus Attribute

The `autofocus` attribute specifies that the input field should automatically get focus when the page loads.

Example

Let the "First name" input field automatically get focus when the page loads:

```
First name:<input type="text" name="fname" autofocus>
```

The form Attribute

The `form` **attribute** specifies one or more forms an `<input>` element belongs to.

Example

An input field located outside the HTML form (but still a part of the form):

```
<form action="/action_page.php" id="form1">
  First name: <input type="text" name="fname"><br>
  <input type="submit" value="Submit">
</form>

Last name: <input type="text" name="lname" form="form1">
```

The formaction Attribute

The `formaction` attribute specifies the URL of a file that will process the input control when the form is submitted.

The formaction attribute overrides the action attribute of the `<form>` element.

The formaction attribute is used with `type="submit"` and `type="image"`.

Example

An HTML form with two submit buttons, with different actions:

```
<form action="/action_page.php">
  First name: <input type="text" name="fname"><br>
  Last name: <input type="text" name="lname"><br>
  <input type="submit" value="Submit"><br>
  <input type="submit" formaction="/action_page2.php"
  value="Submit as admin">
</form>
```

The formenctype Attribute

The `formenctype` attribute specifies how the form data should be encoded when submitted (only for forms with method="post").

The `formenctype` attribute overrides the enctype attribute of the `<form>` element.

The `formenctype` attribute is used with `type="submit"` and `type="image"`.

Example

Send form-data that is default encoded (the first submit button), and encoded as "multipart/form-data" (the second submit button):

```
<form action="/action_page_binary.asp" method="post">
  First name: <input type="text" name="fname"><br>
  <input type="submit" value="Submit">
  <input type="submit" formenctype="multipart/form-data"
  value="Submit as Multipart/form-data">
</form>
```

The formmethod Attribute

The `formmethod` attribute defines the HTTP method for sending form-data to the action URL.

The `formmethod` attribute overrides the method attribute of the `<form>` element.

The `formmethod` attribute can be used with `type="submit"` and `type="image"`.

Example

The second submit button overrides the HTTP method of the form:

```
<form action="/action_page.php" method="get">
  First name: <input type="text" name="fname"><br>
  Last name: <input type="text" name="lname"><br>
  <input type="submit" value="Submit">
  <input type="submit" formmethod="post" value="Submit using
POST">
</form>
```

The formnovalidate Attribute

The `formnovalidate` attribute overrides the novalidate attribute of the `<form>` element.

The `formnovalidate` attribute can be used with `type="submit"`.

Example

A form with two submit buttons (with and without validation):

```
<form action="/action_page.php">
  E-mail: <input type="email" name="userid"><br>
  <input type="submit" value="Submit"><br>
  <input type="submit" formnovalidate value="Submit without
validation">
</form>
```

The formtarget Attribute

The `formtarget` attribute specifies a name or a keyword that indicates where to display the response that is received after submitting the form.

The `formtarget` attribute overrides the target attribute of the `<form>` element.

The `formtarget` attribute can be used with `type="submit"` and `type="image"`.

Example

A form with two submit buttons, with different target windows:

```
<form action="/action_page.php">
  First name: <input type="text" name="fname"><br>
  Last name: <input type="text" name="lname"><br>
  <input type="submit" value="Submit as normal">
  <input type="submit" formtarget="_blank"
  value="Submit to a new window">
</form>
```

The height and width Attributes

The `height` and `width` attributes specify the height and width of an `<input type="image">` element.

Always specify the size of images. If the browser does not know the size, the page will flicker while images load.

Example

Define an image as the submit button, with height and width attributes:

```
<input type="image" src="img_submit.gif" alt="Submit" width="48"
height="48">
```

The list Attribute

The `list` attribute refers to a `<datalist>` element that contains pre-defined options for an <input> element.

Example

An <input> element with pre-defined values in a <datalist>:

```
<input list="browsers">

<datalist id="browsers">
  <option value="Internet Explorer">
  <option value="Firefox">
  <option value="Chrome">
  <option value="Opera">
  <option value="Safari">
</datalist>
```

The min and max Attributes

The `min` and `max` attributes specify the minimum and maximum values for an `<input>` element.

The `min` and `max` attributes work with the following input types: number, range, date, datetime-local, month, time and week.

Example

<input> elements with min and max values:

```
Enter a date before 1980-01-01:
<input type="date" name="bday" max="1979-12-31">

Enter a date after 2000-01-01:
<input type="date" name="bday" min="2000-01-02">

Quantity (between 1 and 5):
<input type="number" name="quantity" min="1" max="5">
```

The multiple Attribute

The `multiple` attribute specifies that the user is allowed to enter more than one value in the `<input>` element.

The `multiple` attribute works with the following input types: email, and file.

Example

A file upload field that accepts multiple values:

```
Select images: <input type="file" name="img" multiple>
```

The pattern Attribute

The `pattern` attribute specifies a regular expression that the `<input>` element's value is checked against.

The `pattern` attribute works with the following input types: text, search, url, tel, email, and password.

Tip: Use the global title attribute to describe the pattern to help the user.

Tip: Learn more about regular expressions in our JavaScript tutorial.

Example

An input field that can contain only three letters (no numbers or special characters):

```
Country code: <input type="text" name="country_code"
pattern="[A-Za-z]{3}" title="Three letter country code">
```

The placeholder Attribute

The `placeholder` attribute specifies a hint that describes the expected value of an input field (a sample value or a short description of the format).

The hint is displayed in the input field before the user enters a value.

The `placeholder` attribute works with the following input types: text, search, url, tel, email, and password.

Example

An input field with a placeholder text:

```
<input type="text" name="fname" placeholder="First name">
```

The required Attribute

The `required` attribute specifies that an input field must be filled out before submitting the form.

The `required` attribute works with the following input types: text, search, url, tel, email, password, date pickers, number, checkbox, radio, and file.

Example

A required input field:

```
Username: <input type="text" name="usrname" required>
```

The step Attribute

The `step` attribute specifies the legal number intervals for an `<input>` element.

Example: if step="3", legal numbers could be -3, 0, 3, 6, etc.

Tip: The step attribute can be used together with the max and min attributes to create a range of legal values.

The `step` attribute works with the following input types: number, range, date, datetime-local, month, time and week.

Example

An input field with a specified legal number intervals:

```
<input type="number" name="points" step="3">
```

HTML Form and Input Elements

Tag	Description
<form>	Defines an HTML form for user input
<input>	Defines an input control

For a complete list of all available HTML tags, visit our HTML Tag Reference.

HTML5 Introduction

What is New in HTML5?

The DOCTYPE declaration for HTML5 is very simple:

```
<!DOCTYPE html>
```

The character encoding (charset) declaration is also very simple:

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

HTML5 Example:

```
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<title>Title of the document</title>
</head>

<body>
Content of the document......
</body>

</html>
```

The default character encoding in HTML5 is UTF-8.

New HTML5 Elements

The most interesting new HTML5 elements are:

New **semantic elements** like `<header>, <footer>, <article>,` and `<section>.`

New **attributes of form elements** like number, date, time, calendar, and range.

New **graphic elements**: `<svg>` and `<canvas>.`

New **multimedia elements**: `<audio>` and `<video>.`

In the next chapter, HTML5 Support, you will learn how to "teach" older browsers to handle "unknown" (new) HTML elements.

New HTML5 APIs (Application Programming Interfaces)

The most interesting new APIs in HTML5 are:

- HTML Geolocation
- HTML Drag and Drop
- HTML Local Storage
- HTML Application Cache
- HTML Web Workers
- HTML SSE

Tip: HTML Local storage is a powerful replacement for cookies.

Removed Elements in HTML5

The following HTML4 elements have been removed in HTML5:

Removed Element	Use Instead
<acronym>	<abbr>
<applet>	<object>
<basefont>	CSS
<big>	CSS
<center>	CSS
<dir>	<ul>
<font>	CSS
<frame>	
<frameset>	
<noframes>	
<strike>	CSS, <s>, or <del>
<tt>	CSS

In the chapter HTML5 Migration, you will learn how to easily migrate from HTML4 to HTML5.

HTML History

Since the early days of the World Wide Web, there have been many versions of HTML:

Year	Version
1989	Tim Berners-Lee invented www
1991	Tim Berners-Lee invented HTML
1993	Dave Raggett drafted HTML+
1995	HTML Working Group defined HTML 2.0
1997	W3C Recommendation: HTML 3.2
1999	W3C Recommendation: HTML 4.01
2000	W3C Recommendation: XHTML 1.0
2008	WHATWG HTML5 First Public Draft
2012	WHATWG HTML5 Living Standard
2014	W3C Recommendation: HTML5
2016	W3C Candidate Recommendation: HTML 5.1
2017	W3C Recommendation: HTML5.1 2nd Edition
2017	W3C Recommendation: HTML5.2

From 1991 to 1999, HTML developed from version 1 to version 4.

In year 2000, the World Wide Web Consortium (W3C) recommended XHTML 1.0. The XHTML syntax was strict, and the developers were forced to write valid and "well-formed" code.

In 2004, W3C's decided to close down the development of HTML, in favor of XHTML.

In 2004, WHATWG (Web Hypertext Application Technology Working Group) was formed. The WHATWG wanted to develop HTML, consistent with how the web was used, while being backward compatible with older versions of HTML.

In 2004 - 2006, the WHATWG gained support by the major browser vendors.

In 2006, W3C announced that they would support WHATWG.

In 2008, the first HTML5 public draft was released.

In 2012, WHATWG and W3C decided on a separation:

WHATWG wanted to develop HTML as a "Living Standard". A living standard is always updated and improved. New features can be added, but old functionality cannot be removed.

The WHATWG HTML5 Living Standard was published in 2012, and is continuously updated.

W3C wanted to develop a definitive HTML5 and XHTML standard.

The W3C HTML5 Recommendation was released 28 October 2014.

The W3C HTML5.1 2nd Edition Recommendation was released 3 October 2017.

The W3C HTML5.2 Recommendation was released 14 December 2017.

HTML5 Browser Support

You can teach older browsers to handle HTML5 correctly.

HTML5 Browser Support

HTML5 is supported in all modern browsers.

In addition, all browsers, old and new, automatically handle unrecognized elements as inline elements.

Because of this, you can "teach" older browsers to handle "unknown" HTML elements.

You can even teach IE6 (Windows XP 2001) how to handle unknown HTML elements.

Define Semantic Elements as Block Elements

HTML5 defines eight new **semantic** elements. All these are **block-level** elements.

To secure correct behavior in older browsers, you can set the CSS **display** property for these HTML elements to **block**:

```
header, section, footer, aside, nav, main, article, figure {
  display: block;
}
```

Add New Elements to HTML

You can also add new elements to an HTML page with a browser trick.

This example adds a new element called `<myHero>` to an HTML page, and defines a style for it:

Example

```
<!DOCTYPE html>
<html>
<head>
<script>document.createElement("myHero")</script>
<style>
myHero {
  display: block;
  background-color: #dddddd;
  padding: 50px;
  font-size: 30px;
}
</style>
</head>
<body>

<h1>A Heading</h1>
<myHero>My Hero Element</myHero>

</body>
</html>
```

The JavaScript statement `document.createElement("myHero")` is needed to create a new element in IE 9, and earlier.

Problem With Internet Explorer 8

You could use the solution described above for all new HTML5 elements.

However, **IE8 (and earlier) does not allow styling of unknown elements!**

Thankfully, Sjoerd Visscher created the HTML5Shiv! The HTML5Shiv is a JavaScript workaround to enable styling of HTML5 elements in versions of Internet Explorer prior to version 9.

You will require the HTML5Shiv to provide compatibility for IE Browsers older than IE 9.

Syntax For HTML5Shiv

The HTML5Shiv is placed within the **`<head>`** tag.

The HTML5Shiv is a javascript file that is referenced in a **`<script>`** tag.

You should use the HTML5Shiv when you are using the new HTML5 elements such as: **`<article>`, `<section>`, `<aside>`, `<nav>`, `<footer>`.**

You can download the latest version of HTML5shiv from github or reference the CDN version at https://oss.maxcdn.com/libs/html5shiv/3.7.0/html5shiv.js

Syntax

```
<head>
  <!--[if lt IE 9]>
    <script src="/js/html5shiv.js"></script>
  <![endif]-->
</head>
```

HTML5Shiv Example

If you do not want to download and store the HTML5Shiv on your site, you could reference the version found on the CDN site.

The HTML5Shiv script must be placed in the `<head>` element, after any stylesheets:

Example

```
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<!--[if lt IE 9]>
  <script
src="https://oss.maxcdn.com/libs/html5shiv/3.7.0/html5shiv.js"></s
cript>
<![endif]-->
</head>
<body>

<section>

<h1>Famous Cities</h1>

<article>
<h2>London</h2>
<p>London is the capital city of England. It is the most populous city
in the United Kingdom, with a metropolitan area of over 13 million
inhabitants.</p>
</article>

<article>
<h2>Paris</h2>
<p>Paris is the capital and most populous city of France.</p>
</article>

<article>
<h2>Tokyo</h2>
<p>Tokyo is the capital of Japan, the center of the Greater Tokyo
Area, and the most populous metropolitan area in the world.</p>
</article>

</section>

</body>
</html>
```

HTML5 New Elements

New Elements in HTML5

Below is a list of the new HTML5 elements, and a description of what they are used for.

New Semantic/Structural Elements

HTML5 offers new elements for better document structure:

Tag	Description
<article>	Defines an article in a document
<aside>	Defines content aside from the page content
<bdi>	Isolates a part of text that might be formatted in a different direction from other text outside it
<details>	Defines additional details that the user can view or hide
<dialog>	Defines a dialog box or window
<figcaption>	Defines a caption for a <figure> element
<figure>	Defines self-contained content
<footer>	Defines a footer for a document or section
<header>	Defines a header for a document or section
<main>	Defines the main content of a document
<mark>	Defines marked/highlighted text
<meter>	Defines a scalar measurement within a known range (a gauge)
<nav>	Defines navigation links
<progress>	Represents the progress of a task

<rp>	Defines what to show in browsers that do not support ruby annotations
<rt>	Defines an explanation/pronunciation of characters (for East Asian typography)
<ruby>	Defines a ruby annotation (for East Asian typography)
<section>	Defines a section in a document
<summary>	Defines a visible heading for a <details> element
<time>	Defines a date/time
<wbr>	Defines a possible line-break

Read more about HTML5 Semantics.

New Form Elements

Tag	Description
<datalist>	Specifies a list of pre-defined options for input controls
<output>	Defines the result of a calculation

Read all about old and new form elements in HTML Form Elements.

New Input Types

New Input Types	New Input Attributes
• color	• autocomplete
• date	• autofocus
• datetime	• form
• datetime-local	• formaction
• email	• formenctype
• month	• formmethod
• number	• formnovalidate
• range	• formtarget
• search	• height and width
• tel	• list
• time	• min and max
• url	• multiple
• week	• pattern (regexp)
	• placeholder
	• required
	• step

Learn all about old and new input types in HTML Input Types.

Learn all about input attributes in HTML Input Attributes.

HTML5 - New Attribute Syntax

HTML5 allows four different syntaxes for attributes.

This example demonstrates the different syntaxes used in an `<input>` tag:

Type	Example
Empty	<input type="text" value="John" **disabled**>
Unquoted	<input type="text" **value=John**>
Double-quoted	<input type="text" **value="John Doe"**>
Single-quoted	<input type="text" **value='John Doe'**>

In HTML5, all four syntaxes may be used, depending on what is needed for the attribute.

HTML5 Graphics

Tag	Description
<canvas>	Draw graphics, on the fly, via scripting (usually JavaScript)
<svg>	Draw scalable vector graphics

Read more about HTML5 Canvas.

Read more about HTML5 SVG.

New Media Elements

Tag	Description
<audio>	Defines sound content
<embed>	Defines a container for an external (non-HTML) application
<source>	Defines multiple media resources for media elements (<video> and <audio>)

<track>	Defines text tracks for media elements (<video> and <audio>)
<video>	Defines video or movie

Read more about HTML5 Video.

Read more about HTML5 Audio.

HTML5 Semantic Elements

Semantics is the study of the meanings of words and phrases in a language.

Semantic elements = elements with a meaning.

What are Semantic Elements?

A semantic element clearly describes its meaning to both the browser and the developer.

Examples of **non-semantic** elements: `<div>` and `<span>` - Tells nothing about its content.

Examples of **semantic** elements: `<form>`, `<table>`, and `<article>` - Clearly defines its content.

Browser Support

HTML5 semantic elements are supported in all modern browsers.

In addition, you can "teach" older browsers how to handle "unknown elements".

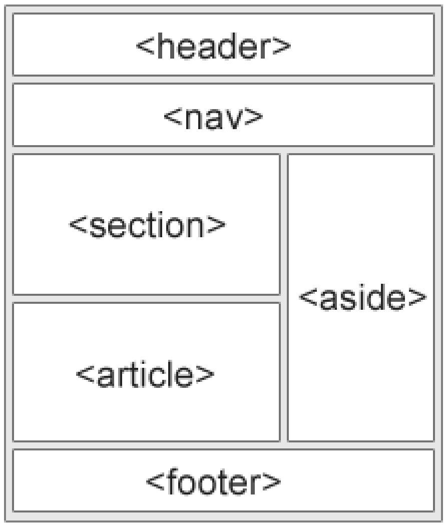
Read about it in HTML5 Browser Support.

New Semantic Elements in HTML5

Many web sites contain HTML code like: <div id="nav"> <div class="header"> <div id="footer">
to indicate navigation, header, and footer.

HTML5 offers new semantic elements to define different parts of a web page:

- <article>
- <aside>
- <details>
- <figcaption>
- <figure>
- <footer>
- <header>
- <main>
- <mark>
- <nav>
- <section>
- <summary>
- <time>



HTML5 <section> Element

The `<section>` element defines a section in a document.

According to W3C's HTML5 documentation: "A section is a thematic grouping of content, typically with a heading."

A home page could normally be split into sections for introduction, content, and contact information.

Example

```
<section>
  <h1>WWF</h1>
  <p>The World Wide Fund for Nature (WWF) is....</p>
</section>
```

HTML5 <article> Element

The `<article>` element specifies independent, self-contained content.

An article should make sense on its own, and it should be possible to read it independently from the rest of the web site.

Examples of where an `<article>` element can be used:

- Forum post

- Blog post
- Newspaper article

Example

```
<article>
 <h1>What Does WWF Do?</h1>
 <p>WWF's mission is to stop the degradation of our planet's
natural environment,
 and build a future in which humans live in harmony with
nature.</p>
</article>
```

Nesting <article> in <section> or Vice Versa?

The`<article>` element specifies independent, self-contained content.

The `<section>` element defines section in a document.

Can we use the definitions to decide how to nest those elements? No, we cannot!

So, on the Internet, you will find HTML pages with `<section>` elements containing `<article>` elements, and `<article>` elements containing `<section>` elements.

You will also find pages with `<section>` elements containing `<section>` elements, and `<article>` elements containing `<article>` elements.

Example for a newspaper: The sport `<article>` in the sport **section**, may have a technical **section** in each `<article>`.

HTML5 <header> Element

The `<header>` element specifies a header for a document or section.

The `<header>` element should be used as a container for introductory content.

You can have several `<header>` elements in one document.

The following example defines a header for an article:

Example

```
<article>
 <header>
  <h1>What Does WWF Do?</h1>
  <p>WWF's mission:</p>
 </header>
 <p>WWF's mission is to stop the degradation of our planet's
natural environment,
 and build a future in which humans live in harmony with
nature.</p>
</article>
```

HTML5 <footer> Element

The `<footer>` element specifies a footer for a document or section.

A `<footer>` element should contain information about its containing element.

A footer typically contains the author of the document, copyright information, links to terms of use, contact information, etc.

You may have several `<footer>` elements in one document.

Example

```
<footer>
 <p>Posted by: Hege Refsnes</p>
 <p>Contact information: <a
href="mailto:someone@example.com">
 someone@example.com</a>.</p>
</footer>
```

HTML5 <nav> Element

The `<nav>` element defines a set of navigation links.

Notice that NOT all links of a document should be inside a `<nav>` element. The `<nav>` element is intended only for major block of navigation links.

Example

```
<nav>
 <a href="/html/">HTML</a> |
 <a href="/css/">CSS</a> |
 <a href="/js/">JavaScript</a> |
 <a href="/jquery/">jQuery</a>
</nav>
```

HTML5 <aside> Element

The `<aside>` element defines some content aside from the content it is placed in (like a sidebar).

The `<aside>` content should be related to the surrounding content.

Example

```
<p>My family and I visited The Epcot center this summer.</p>

<aside>
 <h4>Epcot Center</h4>
```

```
  <p>The Epcot Center is a theme park in Disney World, Florida.</p>
</aside>
```

HTML5 <figure> and <figcaption> Elements

The purpose of a figure caption is to add a visual explanation to an image.

In HTML5, an image and a caption can be grouped together in a `<figure>` element:

Example

```
<figure>
  <img src="pic_trulli.jpg" alt="Trulli">
  <figcaption>Fig1. - Trulli, Puglia, Italy.</figcaption>
</figure>
```

The **`<img>`** element defines the image, the **`<figcaption>`** element defines the caption.

Why Semantic Elements?

With HTML4, developers used their own id/class names to style elements: header, top, bottom, footer, menu, navigation, main, container, content, article, sidebar, topnav, etc.

This made it impossible for search engines to identify the correct web page content.

With the new HTML5 elements (**`<header>`** **`<footer>`** **`<nav>`** **`<section>`** **`<article>`**), this will become easier.

According to the W3C, a Semantic Web: "Allows data to be shared and reused across applications, enterprises, and communities."

Semantic Elements in HTML5

Below is an alphabetical list of the new semantic elements in HTML5.

The links go to our complete HTML5 Reference.

Tag	Description
<article>	Defines an article
<aside>	Defines content aside from the page content
<details>	Defines additional details that the user can view or hide
<figcaption>	Defines a caption for a <figure> element
<figure>	Specifies self-contained content, like illustrations, diagrams, photos, code listings, etc.
<footer>	Defines a footer for a document or section
<header>	Specifies a header for a document or section
<main>	Specifies the main content of a document
<mark>	Defines marked/highlighted text
<nav>	Defines navigation links
<section>	Defines a section in a document
<summary>	Defines a visible heading for a <details> element
<time>	Defines a date/time

HTML5 Migration

Migration from HTML4 to HTML5

This chapter is entirely about how to **migrate** from **HTML4** to **HTML5**.

This chapter demonstrates how to convert an HTML4 page into an HTML5 page, without destroying anything of the original content or structure.

You can migrate from XHTML to HTML5, using the same recipe.

Typical HTML4	Typical HTML5
<div id="header">	<header>
<div id="menu">	<nav>
<div id="content">	<section>
<div class="article">	<article>
<div id="footer">	<footer>

A Typical HTML4 Page

Example

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01
Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">
<html lang="en">
<head>
<meta http-equiv="Content-Type" content="text/html;charset=utf-
8">
<title>HTML4</title>
<style>
body {
 font-family: Verdana,sans-serif;
 font-size: 0.9em;
}

div#header, div#footer {
 padding: 10px;
 color: white;
 background-color: black;
}

div#content {
 margin: 5px;
 padding: 10px;
 background-color: lightgrey;
}

div.article {
 margin: 5px;
 padding: 10px;
 background-color: white;
}

div#menu ul {
 padding: 0;
}

div#menu ul li {
 display: inline;
 margin: 5px;
}
</style>
</head>
<body>

<div id="header">
 <h1>Monday Times</h1>
</div>

<div id="menu">
 <ul>
  <li>News</li>
  <li>Sports</li>
  <li>Weather</li>
 </ul>
</div>

<div id="content">
 <h2>News Section</h2>
 <div class="article">
  <h2>News Article</h2>
  <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Pellentesque in porta lorem. Morbi condimentum est nibh, et
consectetur tortor feugiat at.</p>
 </div>
 <div class="article">
  <h2>News Article</h2>
  <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Pellentesque in porta lorem. Morbi condimentum est nibh, et
consectetur tortor feugiat at.</p>
 </div>
</div>

<div id="footer">
 <p>&amp;copy; 2016 Monday Times. All rights reserved.</p>
</div>

</body>
</html>
```

Change to HTML5 Doctype

Change the **doctype**:

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

to the HTML5 doctype:

Example

```
<!DOCTYPE html>
```

Change to HTML5 Encoding

Change the **encoding** information:

```
<meta http-equiv="Content-Type" content="text/html;charset=utf-
8">
```

to HTML5 encoding:

Example

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

Add The HTML5Shiv

The new HTML5 semantic elements are supported in all modern browsers. In addition, you can "teach" older browsers how to handle "unknown elements".

However, IE8 and earlier, does not allow styling of unknown elements. So, the HTML5Shiv is a JavaScript workaround to enable styling of HTML5 elements in versions of Internet Explorer prior to version 9.

Add the HTML5Shiv:

Example

```
<!--[if lt IE 9]>
  <script
src="https://oss.maxcdn.com/libs/html5shiv/3.7.0/html5shiv.js"></s
cript>
<![endif]-->
```

Read more about the **HTML5Shiv** in HTML5 Browser Support.

Change to HTML5 Semantic Elements

The existing CSS contains id's and classes for styling the elements:

```
body {
  font-family: Verdana,sans-serif;
  font-size: 0.9em;
}

div#header, div#footer {
  padding: 10px;
  color: white;
  background-color: black;
}

div#content {
  margin: 5px;
  padding: 10px;
  background-color: lightgrey;
}

div.article {
  margin: 5px;
  padding: 10px;
  background-color: white;
}

div#menu ul {
  padding: 0;
}

div#menu ul li {
  display: inline;
  margin: 5px;
}
```

Replace with equal CSS styles for HTML5 semantic elements:

```
body {
  font-family: Verdana,sans-serif;
  font-size: 0.9em;
}

header, footer {
  padding: 10px;
  color: white;
  background-color: black;
}

section {
  margin: 5px;
  padding: 10px;
  background-color: lightgrey;
}

article {
  margin: 5px;
  padding: 10px;
  background-color: white;
}

nav ul {
  padding: 0;
}

nav ul li {
  display: inline;
  margin: 5px;
}
```

Finally, change the elements to HTML5 semantic elements:

Example

```
<body>

<header>
  <h1>Monday Times</h1>
</header>

<nav>
  <ul>
    <li>News</li>
    <li>Sports</li>
    <li>Weather</li>
  </ul>
</nav>

<section>
  <h2>News Section</h2>
  <article>
    <h2>News Article</h2>
    <p>Lorem ipsum dolor sit amet..</p>
  </article>
  <article>
    <h2>News Article</h2>
    <p>Lorem ipsum dolor sit amet..</p>
  </article>
</section>

<footer>
  <p>&copy; 2014 Monday Times. All rights reserved.</p>
</footer>

</body>
```

The Difference Between <article> <section> and <div>

There is a confusing (lack of) difference in the HTML5 standard, between `<article>` `<section>` and `<div>`.

In the HTML5 standard, the `<section>` element is defined as a block of related elements.

The `<article>` element is defined as a complete, self-contained block of related elements.

The `<div>` element is defined as a block of children elements.

How to interpret that?

In the example above, we have used `<section>` as a container for related `<article>`.

But, we could have used `<article>` as a container for articles as well.

Here are some different examples:

<article> in <article>:

```
<article>

<h2>Famous Cities</h2>

<article>
  <h2>London</h2>
  <p>London is the capital city of England.</p>
</article>

<article>
  <h2>Paris</h2>
  <p>Paris is the capital and most populous city of France.</p>
</article>

<article>
  <h2>Tokyo</h2>
  <p>Tokyo is the capital of Japan.</p>
</article>

</article>
```

<div> in <article>:

```
<article>

<h2>Famous Cities</h2>

<div class="city">
  <h2>London</h2>
  <p>London is the capital city of England.</p>
</div>

<div class="city">
  <h2>Paris</h2>
  <p>Paris is the capital and most populous city of France.</p>
</div>

<div class="city">
  <h2>Tokyo</h2>
  <p>Tokyo is the capital of Japan.</p>
</div>

</article>
```

<div> in <section> in <article>:

```
<article>

<section>
  <h2>Famous Cities</h2>

  <div class="city">
    <h2>London</h2>
    <p>London is the capital city of England.</p>
  </div>

  <div class="city">
    <h2>Paris</h2>
    <p>Paris is the capital and most populous city of France.</p>
  </div>

  <div class="city">
    <h2>Tokyo</h2>
    <p>Tokyo is the capital of Japan.</p>
  </div>
```

```
</section>

<section>
 <h2>Famous Countries</h2>

 <div class="country">
  <h2>England</h2>
  <p>London is the capital city of England.</p>
</div>

 <div class="country">
  <h2>France</h2>
  <p>Paris is the capital and most populous city of France.</p>
</div>

 <div class="country">
  <h2>Japan</h2>
  <p>Tokyo is the capital of Japan.</p>
 </div>
</section>

</article>
```

HTML5 Style Guide and Coding Conventions

HTML Coding Conventions

Web developers are often uncertain about the coding style and syntax to use in HTML.

Between 2000 and 2010, many web developers converted from HTML to XHTML.

With XHTML, developers were forced to write valid and "well-formed" code.

HTML5 is a bit more sloppy when it comes to code validation.

Be Smart and Future Proof

A consistent use of style makes it easier for others to understand your HTML.

In the future, programs like XML readers may want to read your HTML.

Using a well-formed-"close to XHTML" syntax can be smart.

Always keep your code tidy, clean and well-formed.

Use Correct Document Type

Always declare the document type as the first line in your document:

```
<!DOCTYPE html>
```

If you want consistency with lower case tags, you can use:

```
<!doctype html>
```

Use Lower Case Element Names

HTML5 allows mixing uppercase and lowercase letters in element names.

We recommend using lowercase element names because:

- Mixing uppercase and lowercase names is bad
- Developers normally use lowercase names (as in XHTML)
- Lowercase look cleaner
- Lowercase are easier to write

Bad:
```
<SECTION>
 <p>This is a paragraph.</p>
</SECTION>
```

Very Bad:
```
<Section>
 <p>This is a paragraph.</p>
</SECTION>
```

Good:
```
<section>
 <p>This is a paragraph.</p>
</section>
```

Close All HTML Elements

In HTML5, you don't have to close all elements (for example the `<p>` element).

We recommend closing all HTML elements.

Bad:
```
<section>
 <p>This is a paragraph.
 <p>This is a paragraph.
</section>
```

Good:
```
<section>
  <p>This is a paragraph.</p>
  <p>This is a paragraph.</p>
</section>
```

Close Empty HTML Elements

In HTML5, it is optional to close empty elements.

Allowed:
```
<meta charset="utf-8">
```

Also Allowed:
```
<meta charset="utf-8" />
```

However, the closing slash (/) is REQUIRED in XHTML and XML.

If you expect XML software to access your page, it is a good idea to keep the closing slash!

Use Lower Case Attribute Names

HTML5 allows mixing uppercase and lowercase letters in attribute names.

We recommend using lowercase attribute names because:

- Mixing uppercase and lowercase names is bad
- Developers normally use lowercase names (as in XHTML)
- Lowercase look cleaner
- Lowercase are easier to write

Bad:
```
<div CLASS="menu">
```

Good:
```
<div class="menu">
```

Quote Attribute Values

HTML5 allows attribute values without quotes.

We recommend quoting attribute values because:

- Developers normally quote attribute values (as in XHTML)
- Quoted values are easier to read
- You MUST use quotes if the value contains spaces

Very bad:

This will not work, because the value contains spaces:

```
<table class=table striped>
```

Bad:
```
<table class=striped>
```

Good:
```
<table class="striped">
```

Image Attributes

Always add the `alt` attribute to images. This attribute is important when the image for some reason cannot be displayed. Also, always define image width and height. It reduces flickering because the browser can reserve space for the image before loading.

Bad:
```
<img src="html5.gif">
```

Good:
```
<img src="html5.gif" alt="HTML5"
style="width:128px;height:128px">
```

Spaces and Equal Signs

HTML5 allows spaces around equal signs. But space-less is easier to read and groups entities better together.

Bad:
```
<link rel = "stylesheet" href = "styles.css">
```

Good:
```
<link rel="stylesheet" href="styles.css">
```

Avoid Long Code Lines

When using an HTML editor, it is inconvenient to scroll right and left to read the HTML code.

Try to avoid code lines longer than 80 characters.

Blank Lines and Indentation

Do not add blank lines without a reason.

For readability, add blank lines to separate large or logical code blocks.

For readability, add two spaces of indentation. Do not use the tab key.

Do not use unnecessary blank lines and indentation. It is not necessary to indent every element:

Unnecessary:

```
<body>

  <h1>Famous Cities</h1>

  <h2>Tokyo</h2>

  <p>
    Tokyo is the capital of Japan, the center of the Greater Tokyo
Area,
    and the most populous metropolitan area in the world.
    It is the seat of the Japanese government and the Imperial Palace,
    and the home of the Japanese Imperial Family.
  </p>

</body>
```

Better:

```
<body>

<h1>Famous Cities</h1>

<h2>Tokyo</h2>
<p>Tokyo is the capital of Japan, the center of the Greater Tokyo
Area,
and the most populous metropolitan area in the world.
It is the seat of the Japanese government and the Imperial Palace,
and the home of the Japanese Imperial Family.</p>

</body>
```

Table Example:

```
<table>
  <tr>
    <th>Name</th>
    <th>Description</th>
  </tr>
  <tr>
    <td>A</td>
    <td>Description of A</td>
  </tr>
  <tr>
    <td>B</td>
    <td>Description of B</td>
  </tr>
</table>
```

List Example:

```
<ul>
  <li>London</li>
  <li>Paris</li>
  <li>Tokyo</li>
</ul>
```

Omitting <html> and <body>?

In HTML5, the `<html>` tag and the `<body>` tag can be omitted.

The following code will validate as HTML5:

Example

```
<!DOCTYPE html>
<head>
  <title>Page Title</title>
</head>

<h1>This is a heading</h1>
<p>This is a paragraph.</p>
```

However, we do not recommend omitting the `<html>` and the `<body>` tag.

The `<html>` element is the document root. It is the recommended place for specifying the page language:

```
<!DOCTYPE html>
<html lang="en-US">
```

Declaring a language is important for accessibility applications (screen readers) and search engines.

Omitting `<html>` or `<body>` can crash DOM and XML software.

Omitting `<body>` can produce errors in older browsers (IE9).

Omitting <head>?

In HTML5, the <head> tag can also be omitted.

By default, browsers will add all elements before `<body>` to a default `<head>` element.

You can reduce the complexity of HTML by omitting the `<head>` tag:

Example

```
<!DOCTYPE html>
<html>
<title>Page Title</title>

<body>
  <h1>This is a heading</h1>
  <p>This is a paragraph.</p>
</body>

</html>
```

However, we do not recommend omitting the `<head>` tag.

Omitting tags is unfamiliar to web developers. It needs time to be established as a guideline.

Meta Data

The `<title>` element is required in HTML5. Make the title as meaningful as possible:

```
<title>HTML5 Syntax and Coding Style</title>
```

To ensure proper interpretation and correct search engine indexing, both the language and the character encoding should be defined as early as possible in a document:

```
<!DOCTYPE html>
<html lang="en-US">
<head>
  <meta charset="UTF-8">
  <title>HTML5 Syntax and Coding Style</title>
</head>
```

Setting The Viewport

HTML5 introduced a method to let web designers take control over the viewport, through the `<meta>` tag.

The viewport is the user's visible area of a web page. It varies with the device, and will be smaller on a mobile phone than on a computer screen.

You should include the following `<meta>` viewport element in all your web pages:

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

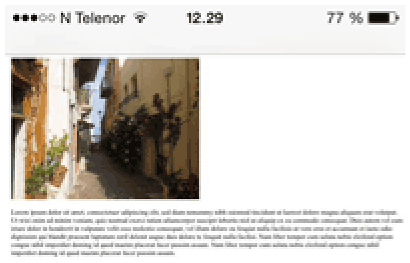
A `<meta>` viewport element gives the browser instructions on how to control the page's dimensions and scaling.

The width=device-width part sets the width of the page to follow the screen-width of the device (which will vary depending on the device).

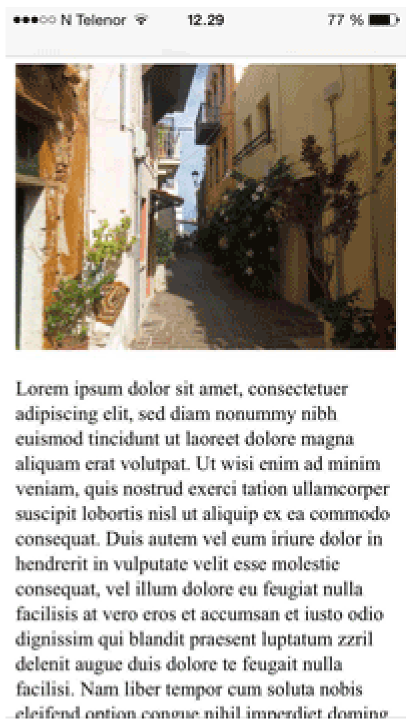
The initial-scale=1.0 part sets the initial zoom level when the page is first loaded by the browser.

Here is an example of a web page *without* the viewport meta tag, and the same web page *with* the viewport meta tag:

Tip: If you are browsing this page with a phone or a tablet, you can click on the two links below to see the difference.



[Without the viewport meta tag]



Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi. Nam liber tempor cum soluta nobis eleifend option congue nihil imperdiet doming

With the viewport meta tag

HTML Comments

Short comments should be written on one line, like this:

```
<!-- This is a comment -->
```

Comments that spans more than one line, should be written like this:

```
<!--
  This is a long comment example. This is a long comment example.
  This is a long comment example. This is a long comment example.
-->
```

Long comments are easier to observe if they are indented two spaces.

Style Sheets

Use simple syntax for linking to style sheets (the type attribute is not necessary):

```
<link rel="stylesheet" href="styles.css">
```

Short rules can be written compressed, like this:

```
p.intro {font-family: Verdana; font-size: 16em;}
```

Long rules should be written over multiple lines:

```
body {
  background-color: lightgrey;
  font-family: "Arial Black", Helvetica, sans-serif;
  font-size: 16em;
  color: black;
}
```

- Place the opening bracket on the same line as the selector
- Use one space before the opening bracket
- Use two spaces of indentation
- Use semicolon after each property-value pair, including the last
- Only use quotes around values if the value contains spaces
- Place the closing bracket on a new line, without leading spaces
- Avoid lines over 80 characters

Loading JavaScript in HTML

Use simple syntax for loading external scripts (the type attribute is not necessary):

```
<script src="myscript.js">
```

Accessing HTML Elements with JavaScript

A consequence of using "untidy" HTML styles can result in JavaScript errors.

These two JavaScript statements will produce different results:

Example

```
var obj = getElementById("Demo")

var obj = getElementById("demo")
```

Visit the JavaScript Style Guide.

Use Lower Case File Names

Some web servers (Apache, Unix) are case sensitive about file names: "london.jpg" cannot be accessed as "London.jpg".

Other web servers (Microsoft, IIS) are not case sensitive: "london.jpg" can be accessed as "London.jpg" or "london.jpg".

If you use a mix of upper and lower case, you have to be extremely consistent.

If you move from a case insensitive to a case sensitive server, even small errors will break your web!

To avoid these problems, always use lower case file names.

File Extensions

HTML files should have a **.html** or **.htm** extension.

CSS files should have a **.css** extension.

JavaScript files should have a **.js** extension.

Differences Between .htm and .html

There is no difference between the .htm and .html extensions. Both will be treated as HTML by any web browser or web server.

The differences are cultural:

.htm "smells" of early DOS systems where the system limited the extensions to 3 characters.

.html "smells" of Unix operating systems that did not have this limitation.

Technical Differences

When a URL does not specify a filename (like https://www.w3schools.com/css/), the server returns a default filename. Common default filenames are index.html, index.htm, default.html and default.htm.

If your server is configured only with "index.html" as default filename, your file must be named "index.html", not "index.htm."

However, servers can be configured with more than one default filename, and normally you can set up as many default filenames as needed.

Anyway, the full extension for HTML files is .html, and there's no reason it should not be used.

HTML5 Canvas

The HTML `<canvas>` element is used to draw graphics on a web page.

The graphic to the left is created with `<canvas>`. It shows four elements: a red rectangle, a gradient rectangle, a multicolor rectangle, and a multicolor text.

What is HTML Canvas?

The HTML `<canvas>` element is used to draw graphics, on the fly, via JavaScript.

The `<canvas>` element is only a container for graphics. You must use JavaScript to actually draw the graphics.

Canvas has several methods for drawing paths, boxes, circles, text, and adding images.

Browser Support

The numbers in the table specify the first browser version that fully supports the `<canvas>` element.

Canvas Examples

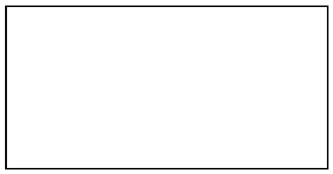
A canvas is a rectangular area on an HTML page. By default, a canvas has no border and no content.

The markup looks like this:

```html
<canvas id="myCanvas" width="200" height="100"></canvas>
```

Note: Always specify an `id` attribute (to be referred to in a script), and a `width` and `height` attribute to define the size of the canvas. To add a border, use the `style` attribute.

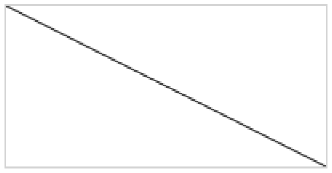
Here is an example of a basic, empty canvas:



Example

```
<canvas id="myCanvas" width="200" height="100"
style="border:1px solid #000000;">
</canvas>
```

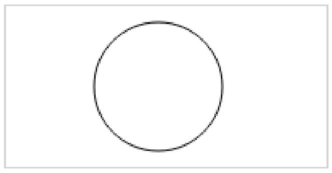
Draw a Line



Example

```
var c = document.getElementById("myCanvas");
var ctx = c.getContext("2d");
ctx.moveTo(0, 0);
ctx.lineTo(200, 100);
ctx.stroke();
```

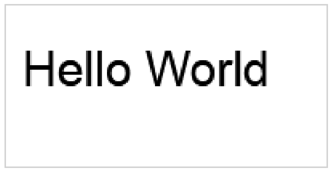
Draw a Circle



Example

```
var c = document.getElementById("myCanvas");
var ctx = c.getContext("2d");
ctx.beginPath();
ctx.arc(95, 50, 40, 0, 2 * Math.PI);
ctx.stroke();
```

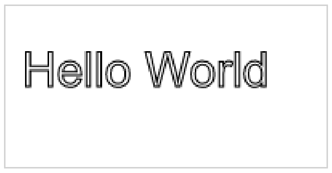
Draw a Text



Example

```
var c = document.getElementById("myCanvas");
var ctx = c.getContext("2d");
ctx.font = "30px Arial";
ctx.fillText("Hello World", 10, 50);
```

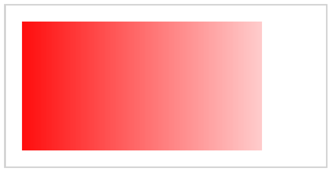
Stroke Text



Example

```
var c = document.getElementById("myCanvas");
var ctx = c.getContext("2d");
ctx.font = "30px Arial";
ctx.strokeText("Hello World", 10, 50);
```

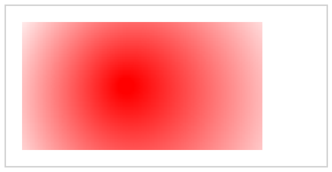
Draw Linear Gradient



Example

```
var c = document.getElementById("myCanvas");
var ctx = c.getContext("2d");

// Create gradient
var grd = ctx.createLinearGradient(0, 0, 200, 0);
grd.addColorStop(0, "red");
grd.addColorStop(1, "white");

// Fill with gradient
ctx.fillStyle = grd;
ctx.fillRect(10, 10, 150, 80);
```

Draw Circular Gradient



Example

```
var c = document.getElementById("myCanvas");
var ctx = c.getContext("2d");

// Create gradient
var grd = ctx.createRadialGradient(75, 50, 5, 90, 60, 100);
grd.addColorStop(0, "red");
grd.addColorStop(1, "white");
```

```
// Fill with gradient
ctx.fillStyle = grd;
ctx.fillRect(10, 10, 150, 80);
```

Draw Image

```
var c = document.getElementById("myCanvas");
var ctx = c.getContext("2d");
var img = document.getElementById("scream");
ctx.drawImage(img, 10, 10);
```

HTML Canvas Tutorial

To learn all about HTML `<canvas>`, Visit our complete HTML Canvas Tutorial.

HTML5 SVG

What is SVG?

- SVG stands for Scalable Vector Graphics
- SVG is used to define graphics for the Web
- SVG is a W3C recommendation

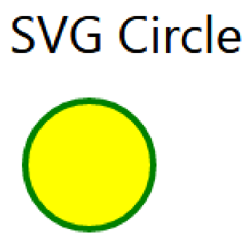
The HTML <svg> Element

The HTML `<svg>` element is a container for SVG graphics.

SVG has several methods for drawing paths, boxes, circles, text, and graphic images.

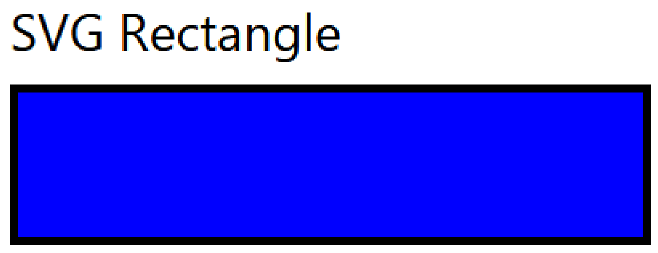
Browser Support

The numbers in the table specify the first browser version that fully supports the `<svg>` element.



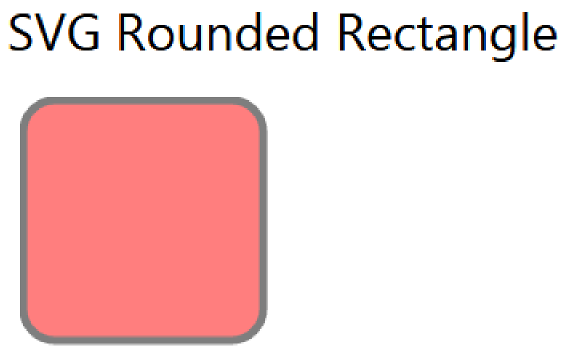
Example

```
<!DOCTYPE html>
<html>
<body>

<svg width="100" height="100">
  <circle cx="50" cy="50" r="40" stroke="green" stroke-width="4"
fill="yellow" />
</svg>

</body>
</html>
```



Example

```
<svg width="400" height="100">
  <rect width="400" height="100" style="fill:rgb(0,0,255);stroke-
width:10;stroke:rgb(0,0,0)" />
</svg>
```



Example

```
<svg width="400" height="180">
  <rect x="50" y="20" rx="20" ry="20" width="150" height="150"
  style="fill:red;stroke:black;stroke-width:5;opacity:0.5" />
</svg>
```

Example

```
<svg width="300" height="200">
  <polygon points="100,10 40,198 190,78 10,78 160,198"
  style="fill:lime;stroke:purple;stroke-width:5;fill-rule:evenodd;" />
</svg>
```

SVG Logo
SVG

Example

```
<svg height="130" width="500">
  <defs>
    <linearGradient id="grad1" x1="0%" y1="0%" x2="100%"
y2="0%">
      <stop offset="0%" style="stop-color:rgb(255,255,0);stop-
opacity:1" />
      <stop offset="100%" style="stop-color:rgb(255,0,0);stop-
opacity:1" />
    </linearGradient>
  </defs>
  <ellipse cx="100" cy="70" rx="85" ry="55" fill="url(#grad1)" />
  <text fill="#ffffff" font-size="45" font-family="Verdana" x="50"
y="86">SVG</text>
  Sorry, your browser does not support inline SVG.
</svg>
```

Differences Between SVG and Canvas

SVG is a language for describing 2D graphics in XML.

Canvas draws 2D graphics, on the fly (with a JavaScript).

SVG is XML based, which means that every element is available within the SVG DOM. You can attach JavaScript event handlers for an element.

In SVG, each drawn shape is remembered as an object. If attributes of an SVG object are changed, the browser can automatically re-render the shape.

Canvas is rendered pixel by pixel. In canvas, once the graphic is drawn, it is forgotten by the browser. If its position should be changed, the entire scene needs to be redrawn, including any objects that might have been covered by the graphic.

Comparison of Canvas and SVG

The table below shows some important differences between Canvas and SVG:

Canvas	SVG
• Resolution dependent • No support for event handlers • Poor text rendering capabilities • You can save the resulting image as .png or .jpg • Well suited for graphic-intensive games	• Resolution independent • Support for event handlers • Best suited for applications with large rendering areas (Google Maps) • Slow rendering if complex (anything that uses the DOM a lot will be slow) • Not suited for game applications

---

SVG Tutorial

To learn more about SVG, [read our SVG Tutorial](#).

HTML Multimedia

Multimedia on the web is sound, music, videos, movies, and animations.

What is Multimedia?

Multimedia comes in many different formats. It can be almost anything you can hear or see.

Examples: Images, music, sound, videos, records, films, animations, and more.

Web pages often contain multimedia elements of different types and formats.

In this chapter you will learn about the different multimedia formats.

Browser Support

The first web browsers had support for text only, limited to a single font in a single color.

Later came browsers with support for colors and fonts, and images!

Audio, video, and animation have been handled differently by the major browsers. Different formats have been supported, and some formats require extra helper programs (plug-ins) to work.

Hopefully this will become history. HTML5 multimedia promises an easier future for multimedia.

Multimedia Formats

Multimedia elements (like audio or video) are stored in media files.

The most common way to discover the type of a file, is to look at the file extension.

Multimedia files have formats and different extensions like: .swf, .wav, .mp3, .mp4, .mpg, .wmv, and .avi.

Common Video Formats

MP4 is the new and upcoming format for internet video.

MP4 is recommended by YouTube.

MP4 is supported by Flash Players.

MP4 is supported by HTML5.

Format	File	Description
MPEG	.mpg .mpeg	MPEG. Developed by the Moving Pictures Expert Group. The first popular video format on the web. Used to be supported by all browsers, but it is not supported in HTML5 (See MP4).
AVI	.avi	AVI (Audio Video Interleave). Developed by Microsoft. Commonly used in video cameras and TV hardware. Plays well on Windows computers, but not in web browsers.
WMV	.wmv	WMV (Windows Media Video). Developed by Microsoft. Commonly used in video cameras and TV hardware. Plays well on Windows computers, but not in web browsers.
QuickTime	.mov	QuickTime. Developed by Apple. Commonly used in video cameras and TV hardware. Plays well on Apple computers, but not in web browsers. (See MP4)
RealVideo	.rm .ram	RealVideo. Developed by Real Media to allow video streaming with low bandwidths. It is still used for online video and Internet TV, but does not play in web browsers.
Flash	.swf .flv	Flash. Developed by Macromedia. Often requires an extra component (plug-in) to play in web browsers.
Ogg	.ogg	Theora Ogg. Developed by the Xiph.Org Foundation. Supported by HTML5.
WebM	.webm	WebM. Developed by the web giants, Mozilla, Opera, Adobe, and Google. Supported by HTML5.
MPEG-4 or MP4	.mp4	MP4. Developed by the Moving Pictures Expert Group. Based on QuickTime. Commonly used in newer video cameras and TV hardware. Supported by all HTML5 browsers. Recommended by YouTube.

Only MP4, WebM, and Ogg video are supported by the HTML5 standard.

Audio Formats

MP3 is the newest format for compressed recorded music. The term MP3 has become synonymous with digital music.

If your website is about recorded music, MP3 is the choice.

Format	File	Description
MIDI	.mid .midi	MIDI (Musical Instrument Digital Interface). Main format for all electronic music devices like synthesizers and PC sound cards. MIDI files do not contain sound, but digital notes that can be played by electronics. Plays well on all computers and music hardware, but not in web browsers.
RealAudio	.rm .ram	RealAudio. Developed by Real Media to allow streaming of audio with low bandwidths. Does not play in web browsers.
WMA	.wma	WMA (Windows Media Audio). Developed by Microsoft. Commonly used in music players. Plays well on Windows computers, but not in web browsers.
AAC	.aac	AAC (Advanced Audio Coding). Developed by Apple as the default format for iTunes. Plays well on Apple computers, but not in web browsers.
WAV	.wav	WAV. Developed by IBM and Microsoft. Plays well on Windows, Macintosh, and Linux operating systems. Supported by HTML5.
Ogg	.ogg	Ogg. Developed by the Xiph.Org Foundation. Supported by HTML5.
MP3	.mp3	MP3 files are actually the sound part of MPEG files. MP3 is the most popular format for music players. Combines good compression (small files) with high quality. Supported by all browsers.
MP4	.mp4	MP4 is a video format, but can also be used for audio. MP4 video is the upcoming video format on the internet. This leads to automatic support for MP4 audio by all browsers.

Only MP3, WAV, and Ogg audio are supported by the HTML5 standard.

HTML5 Video

Playing Videos in HTML

Before HTML5, a video could only be played in a browser with a plug-in (like flash).

The HTML5 **`<video>`** element specifies a standard way to embed a video in a web page.

Browser Support

The numbers in the table specify the first browser version that fully supports the **`<video>`** element.

The HTML <video> Element

To show a video in HTML, use the `<video>` element:

Example

```
<video width="320" height="240" controls>
  <source src="movie.mp4" type="video/mp4">
  <source src="movie.ogg" type="video/ogg">
Your browser does not support the video tag.
</video>
```

How it Works

The `controls` attribute adds video controls, like play, pause, and volume.

It is a good idea to always include `width` and `height` attributes. If height and width are not set, the page might flicker while the video loads.

The `<source>` element allows you to specify alternative video files which the browser may choose from. The browser will use the first recognized format.

The text between the `<video>` and `</video>` tags will only be displayed in browsers that do not support the `<video>` element.

HTML <video> Autoplay

To start a video automatically use the `autoplay` attribute:

Example

```
<video width="320" height="240" autoplay>
  <source src="movie.mp4" type="video/mp4">
  <source src="movie.ogg" type="video/ogg">
Your browser does not support the video tag.
</video>
```

The autoplay attribute does not work in mobile devices like iPad and iPhone.

HTML Video - Browser Support

In HTML5, there are 3 supported video formats: MP4, WebM, and Ogg.

The browser support for the different formats is:

Browser	MP4	WebM	Ogg
Internet Explorer	YES	NO	NO
Chrome	YES	YES	YES
Firefox	YES	YES	YES
Safari	YES	NO	NO
Opera	YES (from Opera 25)	YES	YES

HTML Video - Media Types

File Format	Media Type
MP4	video/mp4
WebM	video/webm
Ogg	video/ogg

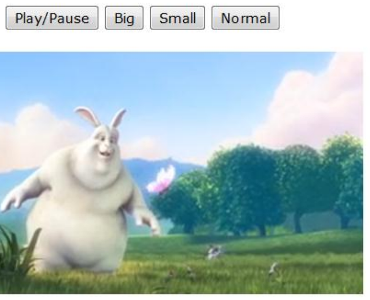
HTML Video - Methods, Properties, and Events

HTML5 defines DOM methods, properties, and events for the `<video>` element.

This allows you to load, play, and pause videos, as well as setting duration and volume.

There are also DOM events that can notify you when a video begins to play, is paused, etc.

Example: Using JavaScript



Video courtesy of Big Buck Bunny.

For a full DOM reference, go to our HTML5 Audio/Video DOM Reference.

HTML5 Video Tags

Tag	Description
<video>	Defines a video or movie
<source>	Defines multiple media resources for media elements, such as <video> and <audio>
<track>	Defines text tracks in media players

HTML5 Audio

Audio on the Web

Before HTML5, audio files could only be played in a browser with a plug-in (like flash).

The HTML5 `<audio>` element specifies a standard way to embed audio in a web page.

Browser Support

The numbers in the table specify the first browser version that fully supports the `<audio>` element.

The HTML <audio> Element

To play an audio file in HTML, use the `<audio>` element:

Example

```
<audio controls>
  <source src="horse.ogg" type="audio/ogg">
  <source src="horse.mp3" type="audio/mpeg">
Your browser does not support the audio element.
</audio>
```

HTML Audio - How It Works

The `controls` attribute adds audio controls, like play, pause, and volume.

The `<source>` element allows you to specify alternative audio files which the browser may choose from. The browser will use the first recognized format.

The text between the `<audio>` and `</audio>` tags will only be displayed in browsers that do not support the `<audio>` element.

HTML Audio - Browser Support

In HTML5, there are 3 supported audio formats: MP3, WAV, and OGG.

The browser support for the different formats is:

Browser	MP3	WAV	OGG
Edge/IE	YES	NO	NO
Chrome	YES	YES	YES
Firefox	YES	YES	YES
Safari	YES	YES	NO
Opera	YES	YES	YES

HTML Audio - Media Types

File Format	Media Type
MP3	audio/mpeg
OGG	audio/ogg
WAV	audio/wav

HTML Audio - Methods, Properties, and Events

HTML5 defines DOM methods, properties, and events for the `<audio>` element.

This allows you to load, play, and pause audios, as well as set duration and volume.

There are also DOM events that can notify you when an audio begins to play, is paused, etc.

For a full DOM reference, go to our HTML5 Audio/Video DOM Reference.

HTML5 Audio Tags

Tag	Description
<audio>	Defines sound content
<source>	Defines multiple media resources for media elements, such as <video> and <audio>

HTML Plug-ins

The purpose of a plug-in is to extend the functionality of a web browser.

HTML Helpers (Plug-ins)

Helper applications (plug-ins) are computer programs that extend the standard functionality of a web browser.

Examples of well-known plug-ins are Java applets.

Plug-ins can be added to web pages with the **`<object>`** tag or the **`<embed>`** tag.

Plug-ins can be used for many purposes: display maps, scan for viruses, verify your bank id, etc.

To display video and audio: Use the **`<video>`** and **`<audio>`** tags.

The <object> Element

The **`<object>`** element is supported by all browsers.

The **`<object>`** element defines an embedded object within an HTML document.

It is used to embed plug-ins (like Java applets, PDF readers, Flash Players) in web pages.

Example
```
<object width="400" height="50" data="bookmark.swf"></object>
```

The `<object>` element can also be used to include HTML in HTML:

Example
```
<object width="100%" height="500px"
data="snippet.html"></object>
```

Or images if you like:

Example
```
<object data="audi.jpeg"></object>
```

The <embed> Element

The `<embed>` element is supported in all major browsers.

The `<embed>` element also defines an embedded object within an HTML document.

Web browsers have supported the <embed> element for a long time. However, it has not been a part of the HTML specification before HTML5.

Example
```
<embed width="400" height="50" src="bookmark.swf">
```

Note that the <embed> element does not have a closing tag. It can not contain alternative text.

The `<embed>` element can also be used to include HTML in HTML:

Example
```
<embed width="100%" height="500px" src="snippet.html">
```

Or images if you like:

Example
```
<embed src="audi.jpeg">
```

HTML YouTube Videos

The easiest way to play videos in HTML, is to use YouTube.

Struggling with Video Formats?

Earlier in this tutorial, you have seen that you might have to convert your videos to different formats to make them play in all browsers.

Converting videos to different formats can be difficult and time-consuming.

An easier solution is to let YouTube play the videos in your web page.

YouTube Video Id

YouTube will display an id (like tgbNymZ7vqY), when you save (or play) a video.

You can use this id, and refer to your video in the HTML code.

Playing a YouTube Video in HTML

To play your video on a web page, do the following:

- Upload the video to YouTube
- Take a note of the video id
- Define an <iframe> element in your web page
- Let the src attribute point to the video URL
- Use the width and height attributes to specify the dimension of the player
- Add any other parameters to the URL (see below)

Example - Using iFrame (recommended)
```
<iframe width="420" height="315"
src="https://www.youtube.com/embed/tgbNymZ7vqY">
</iframe>
```

YouTube Autoplay

You can have your video start playing automatically when a user visits that page by adding a simple parameter to your YouTube URL.

Note: Take careful consideration when deciding to autoplay your videos. Automatically starting a video can annoy your visitor and end up causing more harm than good.

Value 0 (default): The video will not play automatically when the player loads.

Value 1: The video will play automatically when the player loads.

YouTube - Autoplay
```
<iframe width="420" height="315"
src="https://www.youtube.com/embed/tgbNymZ7vqY?autoplay=1"
>
</iframe>
```

YouTube Playlist

A comma separated list of videos to play (in addition to the original URL).

YouTube Loop

Value 0 (default): The video will play only once.

Value 1: The video will loop (forever).

YouTube - Loop
```
<iframe width="420" height="315"
src="https://www.youtube.com/embed/tgbNymZ7vqY?playlist=tgb
NymZ7vqY&loop=1">
</iframe>
```

YouTube Controls

Value 0: Player controls does not display.

Value 1 (default): Player controls display.

YouTube - Controls
```
<iframe width="420" height="315"
src="https://www.youtube.com/embed/tgbNymZ7vqY?controls=0">
</iframe>
```

YouTube - Using <object> or <embed>

Note: YouTube `<object>` and `<embed>` were deprecated from January 2015. You should migrate your videos to use `<iframe>` instead.

Example - Using <object> (deprecated)
```
<object width="420" height="315"
data="https://www.youtube.com/embed/tgbNymZ7vqY">
</object>
```

Example - Using <embed> (deprecated)
```
<embed width="420" height="315"
src="https://www.youtube.com/embed/tgbNymZ7vqY">
```

HTML5 Geolocation

The HTML Geolocation API is used to locate a user's position.

Locate the User's Position

The HTML Geolocation API is used to get the geographical position of a user.

Since this can compromise privacy, the position is not available unless the user approves it.

Note: Geolocation is most accurate for devices with GPS, like smartphone.

Browser Support

The numbers in the table specify the first browser version that fully supports Geolocation.

Note: As of Chrome 50, the Geolocation API will only work on secure contexts such as HTTPS. If your site is hosted on an non-secure origin (such as HTTP) the requests to get the users location will no longer function.

Using HTML Geolocation

The `getCurrentPosition()` method is used to return the user's position.

The example below returns the latitude and longitude of the user's position:

Example
```
<script>
var x = document.getElementById("demo");
function getLocation() {
  if (navigator.geolocation) {
    navigator.geolocation.getCurrentPosition(showPosition);
  } else {
    x.innerHTML = "Geolocation is not supported by this browser.";
  }
}

function showPosition(position) {
  x.innerHTML = "Latitude: " + position.coords.latitude +
  "<br>Longitude: " + position.coords.longitude;
}
</script>
```

Example explained:

- Check if Geolocation is supported
- If supported, run the getCurrentPosition() method. If not, display a message to the user
- If the getCurrentPosition() method is successful, it returns a coordinates object to the function specified in the parameter (showPosition)
- The showPosition() function outputs the Latitude and Longitude

The example above is a very basic Geolocation script, with no error handling.

Handling Errors and Rejections

The second parameter of the `getCurrentPosition()` method is used to handle errors. It specifies a function to run if it fails to get the user's location:

Example

```
function showError(error) {
  switch(error.code) {
    case error.PERMISSION_DENIED:
      x.innerHTML = "User denied the request for Geolocation."
      break;
    case error.POSITION_UNAVAILABLE:
      x.innerHTML = "Location information is unavailable."
      break;
    case error.TIMEOUT:
      x.innerHTML = "The request to get user location timed out."
      break;
    case error.UNKNOWN_ERROR:
      x.innerHTML = "An unknown error occurred."
      break;
  }
}
```

Displaying the Result in a Map

To display the result in a map, you need access to a map service, like Google Maps.

In the example below, the returned latitude and longitude is used to show the location in a Google Map (using a static image):

Example

```
function showPosition(position) {
  var latlon = position.coords.latitude + "," +
position.coords.longitude;

  var img_url =
"https://maps.googleapis.com/maps/api/staticmap?center=
  "+latlon+"&zoom=14&size=400x300&sensor=false&key=YOUR_KEY
";

  document.getElementById("mapholder").innerHTML = "<img
src='"+img_url+"'>";
}
```

Location-specific Information

This page has demonstrated how to show a user's position on a map.

Geolocation is also very useful for location-specific information, like:

- Up-to-date local information
- Showing Points-of-interest near the user
- Turn-by-turn navigation (GPS)

The getCurrentPosition() Method - Return Data

The `getCurrentPosition()` method returns an object on success. The latitude, longitude and accuracy properties are always returned. The other properties are returned if available:

Property	Returns
coords.latitude	The latitude as a decimal number (always returned)
coords.longitude	The longitude as a decimal number (always returned)
coords.accuracy	The accuracy of position (always returned)
coords.altitude	The altitude in meters above the mean sea level (returned if available)
coords.altitudeAccuracy	The altitude accuracy of position (returned if available)
coords.heading	The heading as degrees clockwise from North (returned if available)
coords.speed	The speed in meters per second (returned if available)
timestamp	The date/time of the response (returned if available)

Geolocation Object - Other interesting Methods

The Geolocation object also has other interesting methods:

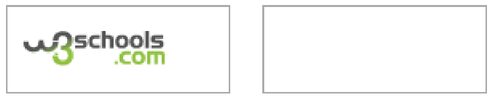
- `watchPosition()` - Returns the current position of the user and continues to return updated position as the user moves (like the GPS in a car).
- `clearWatch()` - Stops the `watchPosition()` method.

The example below shows the `watchPosition()` method. You need an accurate GPS device to test this (like smartphone):

Example

```
<script>
var x = document.getElementById("demo");
function getLocation() {
  if (navigator.geolocation) {
    navigator.geolocation.watchPosition(showPosition);
  } else {
    x.innerHTML = "Geolocation is not supported by this browser.";
  }
}
function showPosition(position) {
  x.innerHTML = "Latitude: " + position.coords.latitude +
  "<br>Longitude: " + position.coords.longitude;
}
</script>
```

HTML5 Drag and Drop



Drag the W3Schools image into the rectangle.

Drag and Drop

Drag and drop is a very common feature. It is when you "grab" an object and drag it to a different location.

In HTML5, drag and drop is part of the standard: Any element can be draggable.

Browser Support

The numbers in the table specify the first browser version that fully supports Drag and Drop.

HTML Drag and Drop Example

The example below is a simple drag and drop example:

Example

```
<!DOCTYPE HTML>
<html>
<head>
<script>
function allowDrop(ev) {
  ev.preventDefault();
}

function drag(ev) {
  ev.dataTransfer.setData("text", ev.target.id);
}

function drop(ev) {
  ev.preventDefault();
  var data = ev.dataTransfer.getData("text");
  ev.target.appendChild(document.getElementById(data));
}
</script>
</head>
<body>

<div id="div1" ondrop="drop(event)"
ondragover="allowDrop(event)"></div>

<img id="drag1" src="img_logo.gif" draggable="true"
ondragstart="drag(event)" width="336" height="69">

</body>
</html>
```

It might seem complicated, but lets go through all the different parts of a drag and drop event.

Make an Element Draggable

First of all: To make an element draggable, set the `draggable` attribute to true:

```
<img draggable="true">
```

What to Drag - ondragstart and setData()

Then, specify what should happen when the element is dragged.

In the example above, the `ondragstart` attribute calls a function, drag(event), that specifies what data to be dragged.

The `dataTransfer.setData()` method sets the data type and the value of the dragged data:

```
function drag(ev) {
  ev.dataTransfer.setData("text", ev.target.id);
}
```

In this case, the data type is "text" and the value is the id of the draggable element ("drag1").

Where to Drop - ondragover

The `ondragover` event specifies where the dragged data can be dropped.

By default, data/elements cannot be dropped in other elements. To allow a drop, we must prevent the default handling of the element.

This is done by calling the `event.preventDefault()` method for the ondragover event:

```
event.preventDefault()
```

Do the Drop - ondrop

When the dragged data is dropped, a drop event occurs.

In the example above, the ondrop attribute calls a function, drop(event):

```
function drop(ev) {
  ev.preventDefault();
  var data = ev.dataTransfer.getData("text");
  ev.target.appendChild(document.getElementById(data));
}
```

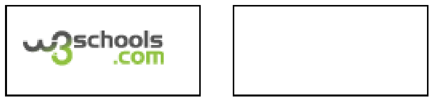
Code explained:

- Call preventDefault() to prevent the browser default handling of the data (default is open as link on drop)
- Get the dragged data with the dataTransfer.getData() method. This method will return any data that was set to the same type in the setData() method
- The dragged data is the id of the dragged element ("drag1")
- Append the dragged element into the drop element

More Examples

Drag image back and forth

How to drag (and drop) an image back and forth between two <div> elements:



HTML5 Web Storage

HTML web storage; better than cookies.

What is HTML Web Storage?

With web storage, web applications can store data locally within the user's browser.

Before HTML5, application data had to be stored in cookies, included in every server request. Web storage is more secure, and large amounts of data can be stored locally, without affecting website performance.

Unlike cookies, the storage limit is far larger (at least 5MB) and information is never transferred to the server.

Web storage is per origin (per domain and protocol). All pages, from one origin, can store and access the same data.

Browser Support

The numbers in the table specify the first browser version that fully supports Web Storage.

HTML Web Storage Objects

HTML web storage provides two objects for storing data on the client:

- `window.localStorage` - stores data with no expiration date
- `window.sessionStorage` - stores data for one session (data is lost when the browser tab is closed)

Before using web storage, check browser support for localStorage and sessionStorage:

```
if (typeof(Storage) !== "undefined") {
  // Code for localStorage/sessionStorage.
} else {
  // Sorry! No Web Storage support..
}
```

The localStorage Object

The localStorage object stores the data with no expiration date. The data will not be deleted when the browser is closed, and will be available the next day, week, or year.

Example

```
// Store
localStorage.setItem("lastname", "Smith");

// Retrieve
document.getElementById("result").innerHTML =
localStorage.getItem("lastname");
```

Example explained:

- Create a localStorage name/value pair with name="lastname" and value="Smith"
- Retrieve the value of "lastname" and insert it into the element with id="result"

The example above could also be written like this:

```
// Store
localStorage.lastname = "Smith";
// Retrieve
document.getElementById("result").innerHTML =
localStorage.lastname;
```

The syntax for removing the "lastname" localStorage item is as follows:

```
localStorage.removeItem("lastname");
```

Note: Name/value pairs are always stored as strings. Remember to convert them to another format when needed!

The following example counts the number of times a user has clicked a button. In this code the value string is converted to a number to be able to increase the counter:

Example

```
if (localStorage.clickcount) {
  localStorage.clickcount = Number(localStorage.clickcount) + 1;
} else {
  localStorage.clickcount = 1;
}
document.getElementById("result").innerHTML = "You have clicked
the button " +
localStorage.clickcount + " time(s).";
```

The sessionStorage Object

The `sessionStorage` object is equal to the localStorage object, **except** that it stores the data for only one session. The data is deleted when the user closes the specific browser tab.

The following example counts the number of times a user has clicked a button, in the current session:

Example

```
if (sessionStorage.clickcount) {
  sessionStorage.clickcount = Number(sessionStorage.clickcount) + 1;
} else {
  sessionStorage.clickcount = 1;
}
document.getElementById("result").innerHTML = "You have clicked
the button " +
sessionStorage.clickcount + " time(s) in this session.";
```

HTML5 Web Workers

A web worker is a JavaScript running in the background, without affecting the performance of the page.

What is a Web Worker?

When executing scripts in an HTML page, the page becomes unresponsive until the script is finished.

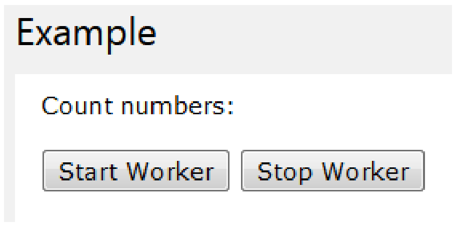
A web worker is a JavaScript that runs in the background, independently of other scripts, without affecting the performance of the page. You can continue to do whatever you want: clicking, selecting things, etc., while the web worker runs in the background.

Browser Support

The numbers in the table specify the first browser version that fully support Web Workers.

HTML Web Workers Example

The example below creates a simple web worker that count numbers in the background:


Example

Count numbers:

Check Web Worker Support

Before creating a web worker, check whether the user's browser supports it:

```
if (typeof(Worker) !== "undefined") {
  // Yes! Web worker support!
  // Some code.....
} else {
  // Sorry! No Web Worker support..
}
```

Create a Web Worker File

Now, let's create our web worker in an external JavaScript.

Here, we create a script that counts. The script is stored in the "demo_workers.js" file:

```
var i = 0;

function timedCount() {
  i = i + 1;
  postMessage(i);
  setTimeout("timedCount()",500);
}

timedCount();
```

The important part of the code above is the `postMessage()` method - which is used to post a message back to the HTML page.

Note: Normally web workers are not used for such simple scripts, but for more CPU intensive tasks.

Create a Web Worker Object

Now that we have the web worker file, we need to call it from an HTML page.

The following lines checks if the worker already exists, if not - it creates a new web worker object and runs the code in "demo_workers.js":

```
if (typeof(w) == "undefined") {
  w = new Worker("demo_workers.js");
}
```

Then we can send and receive messages from the web worker.

Add an "onmessage" event listener to the web worker.

```
w.onmessage = function(event){
  document.getElementById("result").innerHTML = event.data;
};
```

When the web worker posts a message, the code within the event listener is executed. The data from the web worker is stored in event.data.

Terminate a Web Worker

When a web worker object is created, it will continue to listen for messages (even after the external script is finished) until it is terminated.

To terminate a web worker, and free browser/computer resources, use the `terminate()` method:

```
w.terminate();
```

Reuse the Web Worker

If you set the worker variable to undefined, after it has been terminated, you can reuse the code:

```
w = undefined;
```

Full Web Worker Example Code

We have already seen the Worker code in the .js file. Below is the code for the HTML page:

Example

```
<!DOCTYPE html>
<html>
<body>

<p>Count numbers: <output id="result"></output></p>
<button onclick="startWorker()">Start Worker</button>
<button onclick="stopWorker()">Stop Worker</button>

<script>
```

```
var w;

function startWorker() {
  if (typeof(Worker) !== "undefined") {
    if (typeof(w) == "undefined") {
      w = new Worker("demo_workers.js");
    }
    w.onmessage = function(event) {
      document.getElementById("result").innerHTML = event.data;
    };
  } else {
    document.getElementById("result").innerHTML = "Sorry! No Web
Worker support.";
  }
}

function stopWorker() {
  w.terminate();
  w = undefined;
}
</script>

</body>
</html>
```

Web Workers and the DOM

Since web workers are in external files, they do not have access to the following JavaScript objects:

- The window object
- The document object
- The parent object

HTML5 Server-Sent Events

Server-Sent Events allow a web page to get updates from a server.

Server-Sent Events - One Way Messaging

A server-sent event is when a web page automatically gets updates from a server.

This was also possible before, but the web page would have to ask if any updates were available. With server-sent events, the updates come automatically.

Examples: Facebook/Twitter updates, stock price updates, news feeds, sport results, etc.

Browser Support

The numbers in the table specify the first browser version that fully support server-sent events.

Receive Server-Sent Event Notifications

The EventSource object is used to receive server-sent event notifications:

Example

```
var source = new EventSource("demo_sse.php");
source.onmessage = function(event) {
  document.getElementById("result").innerHTML += event.data +
"<br>";
};
```

Example explained:

- Create a new EventSource object, and specify the URL of the page sending the updates (in this example "demo_sse.php")
- Each time an update is received, the onmessage event occurs
- When an onmessage event occurs, put the received data into the element with id="result"

Check Server-Sent Events Support

In the tryit example above there were some extra lines of code to check browser support for server-sent events:

```
if(typeof(EventSource) !== "undefined") {
  // Yes! Server-sent events support!
  // Some code.....
} else {
  // Sorry! No server-sent events support..
}
```

Server-Side Code Example

For the example above to work, you need a server capable of sending data updates (like PHP or ASP).

The server-side event stream syntax is simple. Set the "Content-Type" header to "text/event-stream". Now you can start sending event streams.

Code in PHP (demo_sse.php):

```
<?php
header('Content-Type: text/event-stream');
header('Cache-Control: no-cache');
```

```
$time = date('r');
echo "data: The server time is: {$time}\n\n";
flush();
?>
```

Code in ASP (VB) (demo_sse.asp):

```
<%
Response.ContentType = "text/event-stream"
Response.Expires = -1
Response.Write("data: The server time is: " & now())
Response.Flush()
%>
```

Code explained:

- Set the "Content-Type" header to "text/event-stream"
- Specify that the page should not cache
- Output the data to send (**Always** start with "data: ")
- Flush the output data back to the web page

The EventSource Object

In the examples above we used the onmessage event to get messages. But other events are also available:

Events	Description
onopen	When a connection to the server is opened
onmessage	When a message is received
onerror	When an error occurs

HTML Accessibility

HTML Accessibility

Write HTML with accessibility in mind. Provide the user a good way to navigate and interact with your site. Make your HTML code as **semantic** as possible, so that the code is easy to understand for visitors and screen readers.

Semantic HTML

Semantic HTML means using correct HTML elements for their correct purpose as much as possible. Semantic elements are elements with a meaning; if you need a button, use the `<button>` element (and not a `<div>`).

Semantic

```
<button>Click Me</button>
```

Non-semantic

```
<div>Click Me</div>
```

Semantic HTML gives context to screen readers, which read the contents of a web page out loud.

With the button example in mind:

- buttons have more suitable styling by default
- a screen reader identifies it as a button
- focusable
- clickable

A button is also accessible for people relying on keyboard-only navigation; it can be clickable with both mouse and keys, and it can be tabbed between (using the tab key on the keyboard).

Examples of **non-semantic** elements: `<div>` and `<span>` - Tells nothing about its content.

Examples of **semantic** elements: `<form>`, `<table>`, and `<article>` - Clearly defines its content.

Headings Are Important

Headings are defined with the `<h1>` to `<h6>` tags:

Example

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

Search engines use the headings to index the structure and content of your web pages.

Users skim your pages by its headings. It is important to use headings to show the document structure and the relationships between different sections.

`<h1>` headings should be used for main headings, followed by `<h2>` headings, then the less important `<h3>`, and so on.

Note: Use HTML headings for headings only. Don't use headings to make text **BIG** or **bold**.

Alternative Text

The `alt` attribute provides an alternate text for an image, if the user for some reason cannot view it (because of slow connection, an error in the src attribute, or if the user uses a screen reader).

The value of the `alt` attribute should describe the image:

Example

```
<img src="img_chania.jpg" alt="Flowers in Chania">
```

If a browser cannot find an image, it will display the value of the `alt` attribute:

Example

```
<img src="wrongname.gif" alt="Flowers in Chania">
```

Declare the Language

Declaring a language is important for screen readers and search engines, and is declared with the `lang` attribute. Use the following to show a web page in English:

```
<!DOCTYPE html>
<html lang="en">
<body>

...

</body>
</html>
```

Use Clear Language

Use clear language that is easy to understand, and try to avoid characters that cannot be read clearly by a screen reader. For example:

- Keep sentences as short as possible.
- Avoid dashes. Instead of writing 1-3, write 1 to 3
- Avoid abbreviations. Instead of writing Feb, write February
- Avoid slang words

Write Good Links

A link should explain clearly what information the reader will get by clicking on that link.

Examples of good and bad links:

Good

Find out more about the HTML language

Read more about how to eat healthy

Buy tickets to Mars here

Bad

Click here

Read more..

Buy tickets to Mars here

Link Titles

The `title` attribute specifies extra information about an element. The information is most often shown as a tooltip text when the mouse moves over the element.

Example

```
<a href="https://www.w3schools.com/html/" title="Go to W3Schools HTML section">Visit our HTML Tutorial</a>
```

``````````````````````````````````````````````````````````````````````````````````````````````````
``````````````````````````````````````````````````````````````````````````````````````````````````