

# Web Development Basics

## Why is web development important?

Web based applications, those accessed via HTTP/HTTPS, provide a certain level of versatility to your applications that you would not have when developing OS specific applications. If your application is web based, then it will be accessible from any device that has a web browser. In comparison, applications developed for iOS or Android would need separate implementations for use on different operating systems. Because of the versatility that web based applications provide, web development is an important skill for web developers to possess.

## HyperText Markup Language (HTML)

HTML is a markup language which defines the structure of the webpage content. HTML elements surround content, indicating how the content should appear or act.

### General Structure

Below is an example of the general structure of an HTML document.

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

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

</body>
</html>
```

### Doctype Declaration

Each HTML file starts with a doctype declaration which is used to inform the browser that it should expect an HTML file.

### <html> Tag

The <html> element is known as the root element of an HTML document. Each additional element is contained within the <html> element.

## <head> Tag

The <head> tag is a container which contains sub elements that specify the document's metadata, which will not be displayed. The <head> element is found between the <html> tag and the <body> tag. The <title> element, as shown above, is required for every HTML document. Other elements that can be included within the <head> element include: <style>, <base>, <link>, <meta>, <script>, and <noscript>.

## <body> Tag

The <body> tag is the container tag which contains all HTML elements that will be displayed on the webpage. In this example, the <body> element contains a <h1> element and a <p> element.

## What is an HTML element?

An HTML refers to the opening tag, the content, and the closing tag. Below is an example of a paragraph element.

```
<p class="standardParagraph"> Hello World! </p>
```

## Opening Tag

The opening tag **<p>** consists of the element name (in this case “p” for paragraph), which is enclosed in angle brackets. This marks the start of the element, indicating that paragraph formatting should begin.

## Content

In this case, the content of the element only consists of the text “Hello World!” However, an element's content can also include other elements.

## Closing Tag

The closing tag is the same as the opening tag, besides the fact that it includes a forward slash before the element name. The closing tag indicates the end of the element, and must be included to ensure that the HTML is valid.

## Attributes

Any HTML element can have additional attributes, which are specified as name=“value” pairs in the element's opening tag. In this example the paragraph has a class attribute which has a value of “standardParagraph.”

## Nested Elements

Elements can be nested within other elements. For example, a paragraph element could be nested within a section element. This is where it becomes important that elements are closed properly. It should be ensured that inner elements are closed before the outer elements. As

shown in the example below, the closing tag of the paragraph element (`</p>`) precedes the closing tag of the section element (`</div>`).

```
<div>
  <p>This is some text in a div element.</p>
</div>
```

## Common Elements

### Section (`<div>`)

The `<div>` tag defines a section or a division of an HTML document. It is used as a container element that encloses other HTML elements.

```
<div>
  <h2>This is a heading in a div element</h2>
  <p>This is some text in a div element.</p>
</div>
```

### Paragraph (`<p>`)

The `<p>` tag defines a paragraph element. Browsers automatically add a blank line before and after every paragraph element.

```
<p>This is some text in a paragraph.</p>
```

### Heading (`<h1>` - `<h6>`)

The tags `<h1>` to `<h6>` are used to define HTML headings, with the content in `<h1>` styled with the largest font size and the content in `<h6>` styled with the smallest font size.

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

### Image (`<img>`)

The `<img>` tag is used to embed an image into a webpage. The image tag requires two attributes: `src` and `alt`. The source attribute is used to specify the source of the image. The `alt`

attribute indicates text that should be displayed if the image cannot be rendered for some reason.

```

```

List (<ol>, <ul>, and <li>)

The <ul> tag defines an unordered bulleted list, whereas the <ol> tag defines an ordered list (displayed with numbers or letters specifying the order). The <li> tag is used to define a list item within one of these lists.

```
<ul>
  <li>List Item 1</li>
  <li>List Item 2</li>
  <li>List Item 3</li>
</ul>

<ol>
  <li>List Item 1</li>
  <li>List Item 2</li>
  <li>List Item 3</li>
</ol>
```

## Cascading Style Sheets (CSS)

CSS is used to describe how HTML should be displayed. One CSS file can be used to control the formatting of multiple HTML pages.

### CSS Syntax

Each CSS rule consists of a selector and a declaration. The declaration consists of property and value pairs. In the example below, “p” is the selector and the content within the curly brackets is the declaration. Here, two properties are defined: color and text-align. This means that every paragraph element will have a center aligned red font.

```
p {
  color: red;
  text-align: center;
}
```

## CSS Selectors

There are multiple ways to specify which HTML elements should be styled based on a given rule. Here we will focus on simple selectors which select elements based on their name, id, or class.

### Element Selector

The element selector will apply style to elements based on the element name. In the example below all paragraph elements will be center aligned with a red font color.

```
p {  
  color: red;  
  text-align: center;  
}
```

### id Selector

As mentioned before, HTML elements can have attributes. One attribute that can be specified is an element id. The id attribute is unique for each page. Thus, this selector is used to select a unique element. The id selector is specified by a hash (#) character followed by the id name. In the example below the first paragraph is affected by the css below, but the second paragraph is not.

```
<p id="para1">Hello World!</p>  
<p>This paragraph is not affected by the style.</p>
```

```
#para1 {  
  text-align: center;  
  color: red;  
}
```

### class Selector

Another attribute that an element can be assigned is the “class” attribute. The class selector is specified by the period (.) character followed by the class name. The class attribute can be assigned to multiple elements per a page. Thus, this selector can be used to style multiple elements.

```
<h1 class="center">Red and center-aligned heading</h1>  
<p class="center">Red and center-aligned paragraph.</p>
```

```
.center {  
  text-align: center;  
}
```

```
color: red;
}
```

The class selector can also be used in combination with the element selector. When a selector containing an element name is followed by a class selector (elementName.className), the style will only apply to elements with the given element name and class. In the example below, only paragraph elements with the class “center” will be affected by the style.

```
p.center {
  text-align: center;
  color: red;
}
```

HTML elements can also be a part of multiple classes. In the example below, the header element will not be affected by the style because the “p.center” selector only applies style to paragraph elements with the “center” class. The first paragraph will only be affected by the “p.center” style rule, and the second paragraph will be affected by both the “p.center” and “p.large” rules.

```
<h1 class="center">This heading will not be affected</h1>
<p class="center">This paragraph will be red and center-aligned.</p>
<p class="center large">This paragraph will be red, center-aligned, and in
a large font-size.</p>
```

```
p.center {
  text-align: center;
  color: red;
}

p.large {
  font-size: 300%;
}
```

## Project

Create a basic webpage about you or something that you are interested in!

Requirements:

- Must contain multiple pages
- Must contain some method of navigation between pages
- Must contain HTML elements that are styled using CSS

Helpful resource: <https://www.w3schools.com/>

## Sources & Additional Resources

### [Web based applications](#)

HTML on w3schools: <https://www.w3schools.com/html/default.asp>

Basic HTML definition as a markup language: <https://en.wikipedia.org/wiki/HTML>

Markup Language and HTML:

[https://developer.mozilla.org/en-US/docs/Learn/Getting\\_started\\_with\\_the\\_web/HTML\\_basics](https://developer.mozilla.org/en-US/docs/Learn/Getting_started_with_the_web/HTML_basics)

Markup Language:

[https://en.wikipedia.org/wiki/Markup\\_language#:~:text=In%20computer%20text%20processing%2C%20a.markup%20language%20does%20not%20appear.](https://en.wikipedia.org/wiki/Markup_language#:~:text=In%20computer%20text%20processing%2C%20a.markup%20language%20does%20not%20appear.)

HTML Tags: [https://www.w3schools.com/tags/tag\\_head.asp](https://www.w3schools.com/tags/tag_head.asp)

HTML attributes: [https://www.w3schools.com/tags/ref\\_attributes.asp](https://www.w3schools.com/tags/ref_attributes.asp)