CSS
INHERITANCE
Let’s start with the document tree
Before we explore inheritance, we need to understand the document tree.
All HTML documents are trees.
Document trees are made from **HTML elements.**
The document tree is just like your family tree.
An **ancestor** refers to any element that is connected but further up the document tree.
A descendant refers to any element that is connected but lower down the document tree.
A **parent** is an element that is connected & directly above an element in the document tree.
A **child** is an element that is connected & directly below an element in the document tree.
A **sibling** is an element that shares the same parent as another element.
Next, a bit about CSS rules
We also need to understand the **basics of CSS rules** before exploring inheritance.
CSS rules tell browsers how to render specific elements on an HTML page.
CSS rules are made up of five components.
The **selector** "selects" the elements on an HTML page that are affected by the rule.

```css
p {
  color: red;
}
```
The **declaration block** is a container that consists of anything between (and including) the brackets.

```javascript
p {
  color: red;
}
```
The **declaration** tells a browser how to render any element on a page that is selected.

```html
p {
  color: red;
}
```

Declaration
The **property** is the aspect of that element that you are choosing to style.

```css
p { color: red; }
```
The **value** is the exact style you wish to set for the property.

```html
p { color: red; }
```
Now... what is inheritance?
Inheritance is where specific CSS properties are passed down to descendant elements.
To see inheritance in action, we will use the **HTML code** below:

```html
<p>
    Lorem <em>ipsum</em> dolor sit amet consectetur etuer.
</p>
```
Note that the `<em>` element sits inside the `<p>` element.
We will also use this CSS code. Note that the `<em>` element has not been specified.

```css
p { color: red; }
```
In a browser, the `<p>` and `<em>` elements will both be colored red.
But why is the `<em>` element colored red when it has not been styled?
Because the `<em>` element has inherited the color property from the `<p>` element.
Why is inheritance helpful?
Inheritance is designed to make it easier for authors.
Otherwise we would need to specify properties for all descendant elements.

```css
p { color: red; }  
p em { color: red; }
```
CSS files would be much larger in size, harder to create and maintain as well as slower to download.
Are all CSS properties inherited?
No. All CSS properties are not inherited!
If every CSS property was inherited, it would make things much harder for authors.
Authors would have to **turn off** unwanted CSS properties for descendant elements.
For example, what would happen if the **border property was inherited** by default…
and we then **applied a border** to the `<p>` element?

```css
p { border: 1px solid red; }
```
The `<em>` inside the `<p>` would also have a **red border**.
Luckily, borders are not inherited, so the `<em>` would not have a red border.
Generally speaking, only properties that make our job easier are inherited!
So, which properties are inherited?
The following CSS properties **are inherited**...
azimuth, border-collapse, border-spacing, caption-side, color, cursor, direction, elevation, empty-cells, font-family, font-size, font-style, font-variant, font-weight, font, letter-spacing, line-height, list-style-image, list-style-position, list-style-type, list-style, orphans, pitch-range, pitch, quotes, richness, speak-header, speak-numeral, speak-punctuation, speak, speech-rate, stress, text-align, text-indent, text-transform, visibility, voice-family, volume, white-space, widows, word-spacing
To simply things, let’s take a look at some of the key groups of properties.
Text-related properties that are inherited:
azimuth, border-collapse, border-spacing, caption-side, color, cursor, direction, elevation, empty-cells, font-family, font-size, font-style, font-variant, font-weight, font, letter-spacing, line-height, list-style-image, list-style-position, list-style-type, list-style, orphans, pitch-range, pitch, quotes, richness, speak-header, speak-numeral, speak-punctuation, speak, speech-rate, stress, text-align, text-indent, text-transform, visibility, voice-family, volume, white-space, widows, word-spacing
List-related properties that are inherited:
azimuth, border-collapse, border-spacing, caption-side, color, cursor, direction, elevation, empty-cells, font-family, font-size, font-style, font-variant, font-weight, font, letter-spacing, line-height, list-style-image, list-style-position, list-style-type, list-style, orphans, pitch-range, pitch, quotes, richness, speak-header, speak-numeral, speak-punctuation, speak, speech-rate, stress, text-align, text-indent, text-transform, visibility, voice-family, volume, white-space, widows, word-spacing
And, importantly, the **color property** is inherited:
azimuth, border-collapse, border-spacing, caption-side, color, cursor, direction, elevation, empty-cells, font-family, font-size, font-style, font-variant, font-weight, font, letter-spacing, line-height, list-style-image, list-style-position, list-style-type, list-style, orphans, pitch-range, pitch, quotes, richness, speak-header, speak-numeral, speak-punctuation, speak, speech-rate, stress, text-align, text-indent, text-transform, visibility, voice-family, volume, white-space, widows, word-spacing
Is font-size inherited?
The simple answer is “yes”. However, font-size is inherited in a different way to many other properties.
Rather than the actual value being inherited, the calculated value is inherited.
Before explaining how font-size inheritance works, we need to look at why **font-size is not directly inherited.**
Let’s start with the **same sample** of HTML code we used earlier:

```html
<p>
    Lorem <em>ipsum</em> dolor sit amet consectetur.
</p>
```
As before the `<em>` sits inside the `<p>`.
Now, a font-size is applied to the `<p>` element only. The `<em>` has not been specified.

```
p { font-size: 80%; }
```
If the font-size value of 80% were to be inherited, the `<em>` would be sized to 80% of the `<p>` element...
and the rendered document would look like this:
However, **this is not the case!**
The `<em>` is the same size as the `<p>`.
So how does inheritance work for **font-size**?
Let’s look at **three examples** in action.
We will use the **same HTML code** as before:

```html
<p>
Lorem <em>ipsum</em> dolor sit amet consectetur etuer.
</p>
```
Which produces the same **document tree** as before.
Example 1: Pixels
The `<p>` element has been given a font-size of **14px**.
This pixel value (14px) overrides the browsers default font-size value (approx 16px). **This new value is inherited by descendants.**
So, the `<em>` element inherits the 14px value.

<table>
<thead>
<tr>
<th>element</th>
<th>value</th>
<th>calculated value</th>
</tr>
</thead>
<tbody>
<tr>
<td>default font size</td>
<td>approx 16px</td>
<td></td>
</tr>
<tr>
<td><code>&lt;body&gt;</code></td>
<td>unspecified</td>
<td>approx 16px</td>
</tr>
<tr>
<td><code>&lt;p&gt;</code></td>
<td>14px</td>
<td>14px</td>
</tr>
<tr>
<td><code>&lt;em&gt;</code></td>
<td>unspecified</td>
<td>inherited value = 14px</td>
</tr>
</tbody>
</table>
Example 2: Percentage
The `<p>` element has been given a font-size of **85%**.

```css
p { font-size: 85%; }
```
The browsers default font-size (16px) and the percentage value (85%) are used to create a calculated value (16px \times 85\% = 13.6px). This calculated value is inherited by descendants.
So, the `<em>` element inherits the 13.6px calculated value.

<table>
<thead>
<tr>
<th>element</th>
<th>value</th>
<th>calculated value</th>
</tr>
</thead>
<tbody>
<tr>
<td>default font size</td>
<td>approx 16px</td>
<td></td>
</tr>
<tr>
<td><code>&lt;body&gt;</code></td>
<td>unspecified</td>
<td>approx 16px</td>
</tr>
<tr>
<td><code>&lt;p&gt;</code></td>
<td>85%</td>
<td>16px x 85% = 13.6px</td>
</tr>
<tr>
<td><code>&lt;em&gt;</code></td>
<td>unspecified</td>
<td>inherited value = 13.6px</td>
</tr>
</tbody>
</table>
Example 3:
EMs
The `<p>` element has been given a font-size of `.85em`.

```css
p { font-size: .85em; }
```
The browsers default font-size (16px) and the EM value (.85em) are used to create a calculated value (16px x .85em = 13.6px). This calculated value is inherited by descendants.
So, the <em> element inherits the 13.6px calculated value.

<table>
<thead>
<tr>
<th>element</th>
<th>value</th>
<th>calculated value</th>
</tr>
</thead>
<tbody>
<tr>
<td>default font size</td>
<td>approx 16px</td>
<td></td>
</tr>
<tr>
<td>&lt;body&gt;</td>
<td>unspecified</td>
<td>approx 16px</td>
</tr>
<tr>
<td>&lt;p&gt;</td>
<td>.85em</td>
<td>16px x .85em = 13.6px</td>
</tr>
<tr>
<td>&lt;em&gt;</td>
<td>unspecified</td>
<td>inherited value = 13.6px</td>
</tr>
</tbody>
</table>
Those examples were too simple. What about more complex examples using different elements?
Example 4:
All elements have been specified using **percentage values**.

```css
body { font-size: 85%; }

h1 { font-size: 200%; }

h2 { font-size: 150%; }
```
The browsers default font-size (16px) and the body percentage value (85%) are used to create a calculated value (16px x 85% = 13.6px). This calculated value is inherited by descendants unless new values are specified.
The **font-size inheritance** in action

<table>
<thead>
<tr>
<th>element</th>
<th>value</th>
<th>calculated font-size</th>
</tr>
</thead>
<tbody>
<tr>
<td>default font size</td>
<td>approx 16px</td>
<td></td>
</tr>
<tr>
<td>&lt;body&gt;</td>
<td>85%</td>
<td>16px x 85% = 13.6px</td>
</tr>
<tr>
<td>&lt;h1&gt;</td>
<td>200%</td>
<td>inherited value 13.6px x 200% = 27.2px</td>
</tr>
<tr>
<td>&lt;h2&gt;</td>
<td>150%</td>
<td>inherited value 13.6px x 150% = 20.4px</td>
</tr>
<tr>
<td>&lt;p&gt;</td>
<td>unspecified</td>
<td>inherited value = 13.6px</td>
</tr>
<tr>
<td>&lt;em&gt;</td>
<td>unspecified</td>
<td>inherited value = 13.6px</td>
</tr>
</tbody>
</table>
Using inheritance for efficiency
Authors can use inheritance to write efficient CSS.
For example, you can set the color, font-size and font-family on the **body element**.

```css
body {
  color: #222;
  font-family: arial, helvetica, sans-serif;
  font-size: 90%;
}
```
These properties will be **inherited** by all descendant elements.
You can then **override** the properties as needed, specifying new color values...
body {
  color: #222;
  font-family: arial, helvetica, sans-serif;
  font-size: 90%;
}

h1, h2, h3 { color: green; }

h4, h5, h6 { color: black; }
new **font-family** values...
body {
    color: #222;
    font-family: arial, helvetica, sans-serif;
    font-size: 90%;
}

h1, h2, h3 { color: green; }

h4, h5, h6 { color: black; }

h1, h2, h3, h4, h5, h6 {
    font-family: georgia, times, serif;
}

and new **font-size values** as needed.
h1, h2, h3 { color: green; }
h4, h5, h6 { color: black; }

h1, h2, h3, h4, h5, h6 {
  font-family: georgia, times, serif;
}

h1 { font-size: 200%; }
h2 { font-size: 150%; }
h3 { font-size: 125%; }
#footer { font-size: 90%; }