CSS

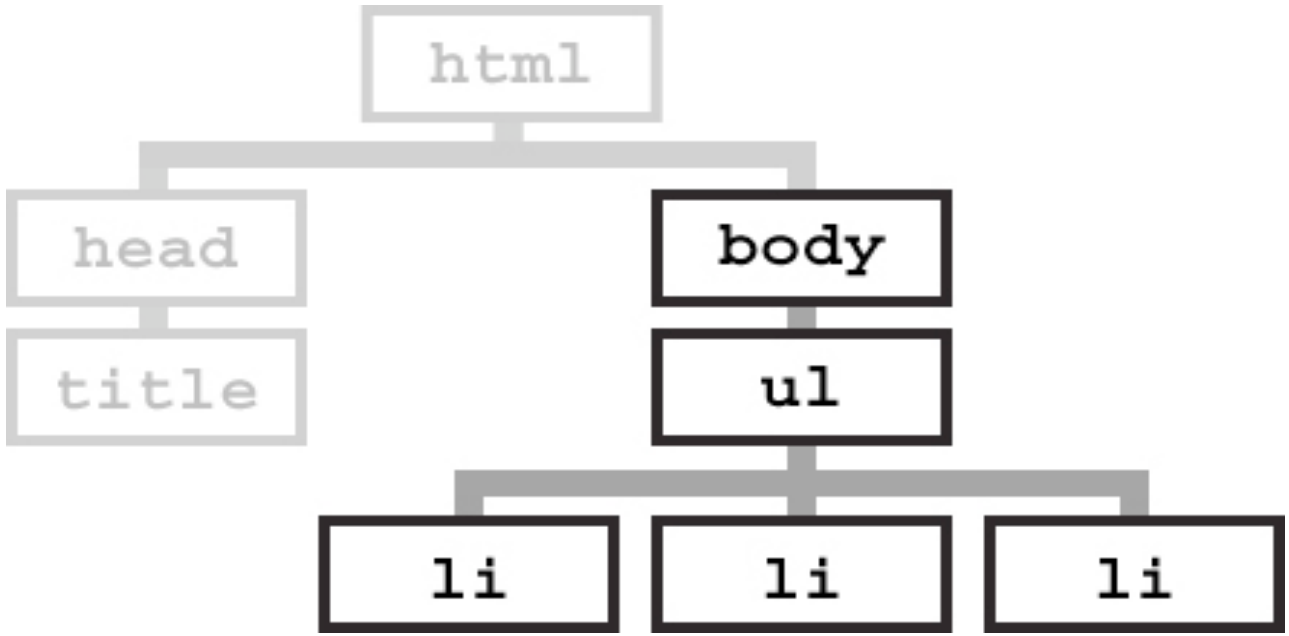
INHERITANCE

Let’s start with the document tree

Before we explore inheritance, we need to understand the **document tree**.

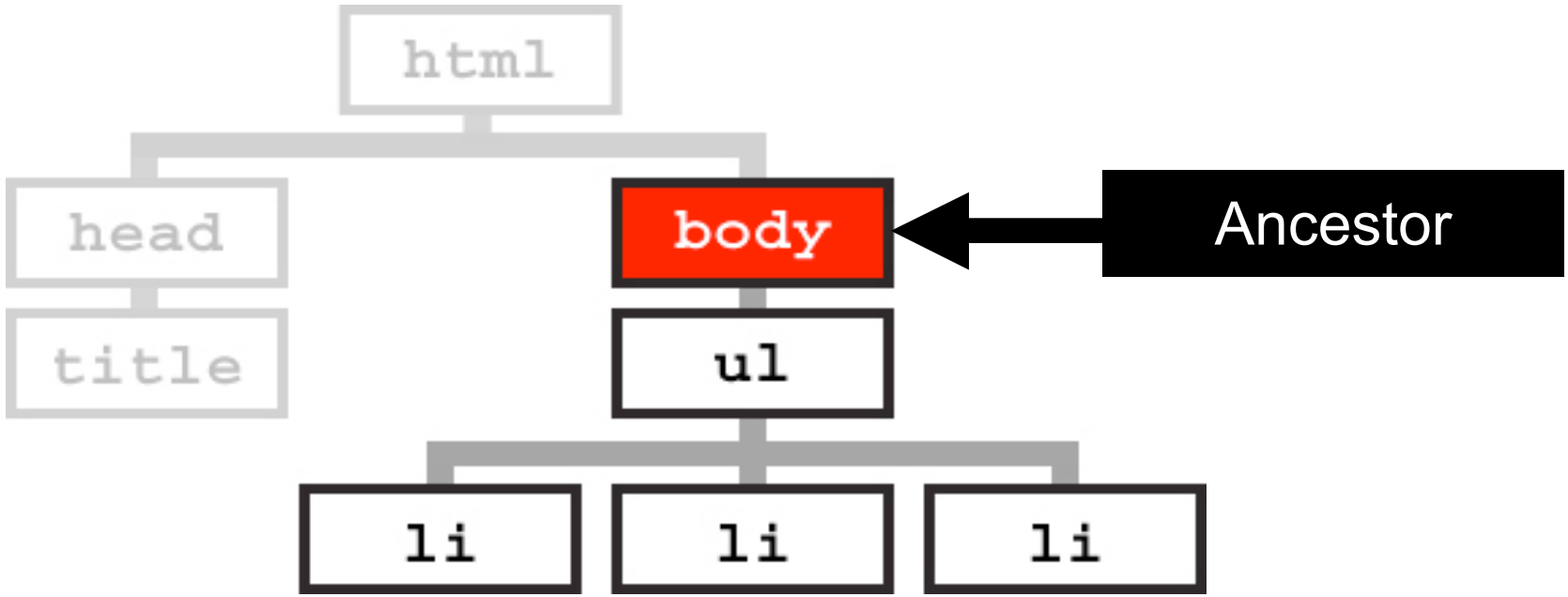
All HTML documents are **trees**.

Document trees are made from **HTML elements**.

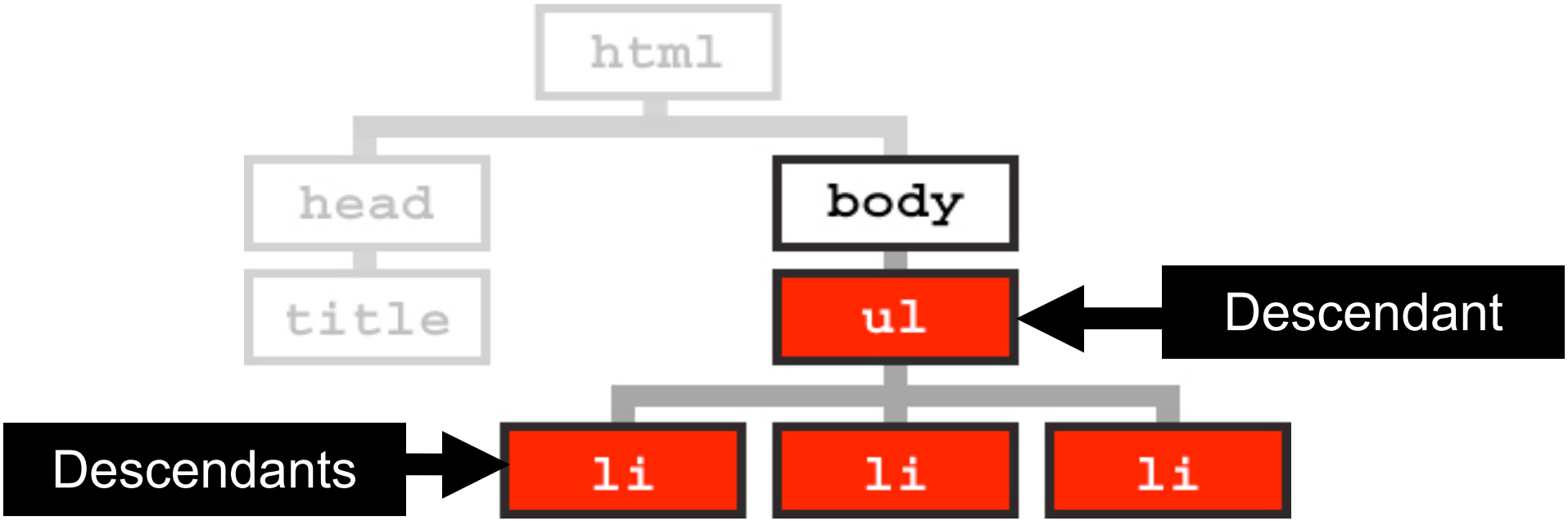


The document tree is just like your **family tree**.

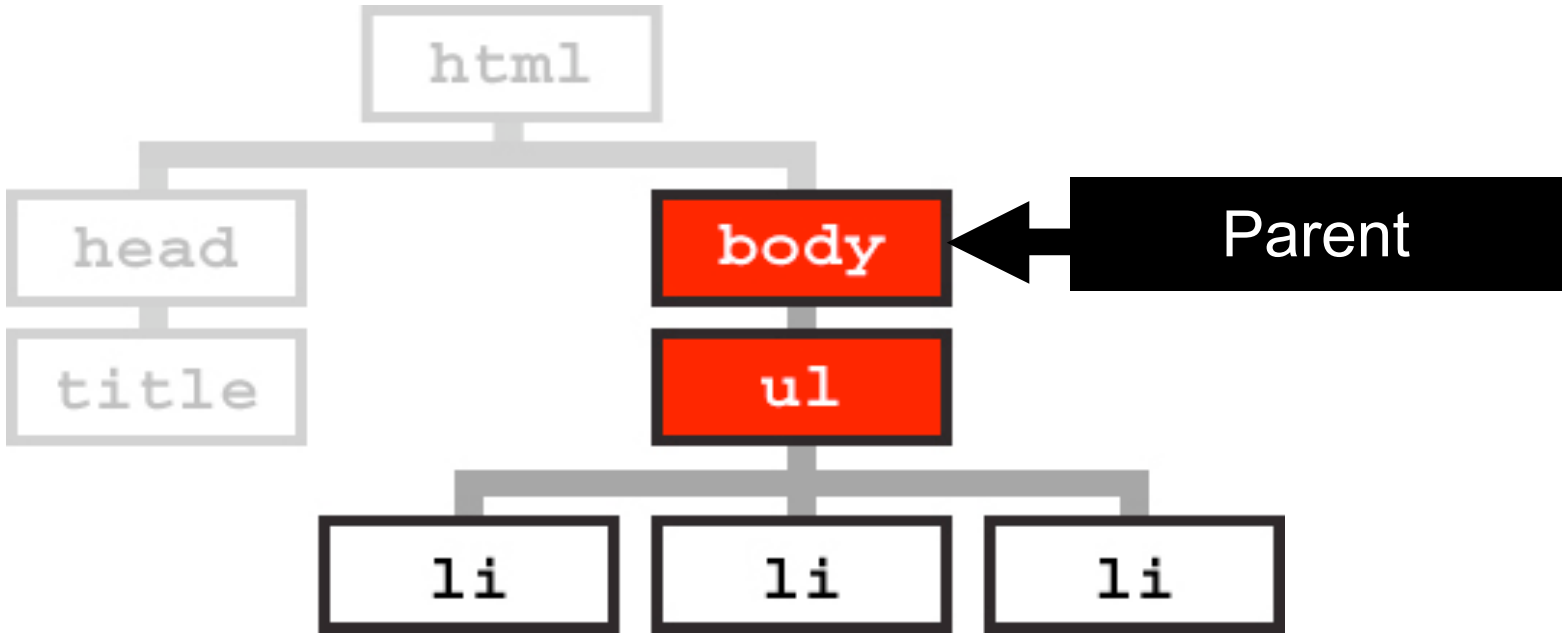
An **ancestor** refers to any element that is connected but further up the document tree.



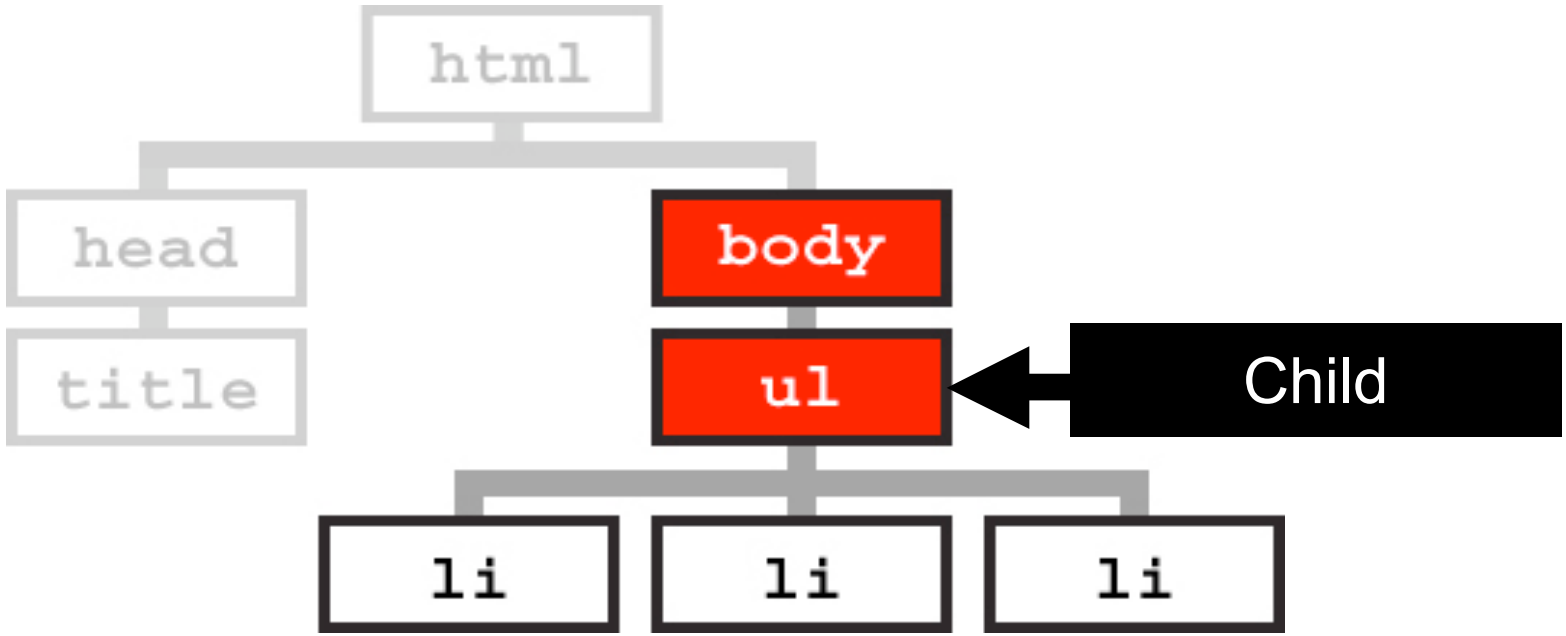
A **descendant** refers to any element that is connected but lower down the document tree.



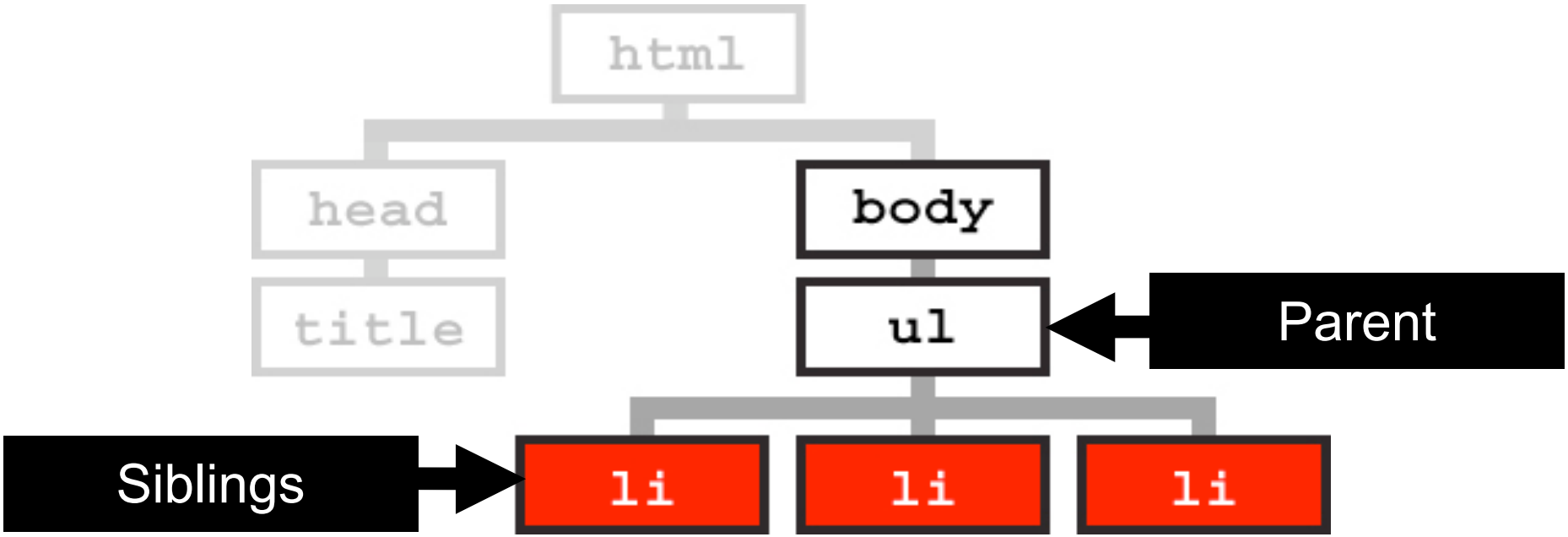
A **parent** is an element that is connected & directly above an element in the document tree.



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.

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

Selector

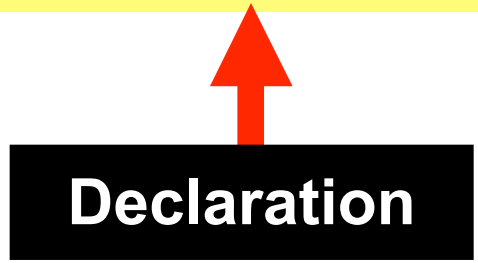
The **declaration block** is a container that consists of anything between (and including) the brackets.

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

Declaration block

The **declaration** tells a browser how to render any element on a page that is selected.

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



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

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

Property

The **value** is the exact style you wish to set for the property.

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

Value

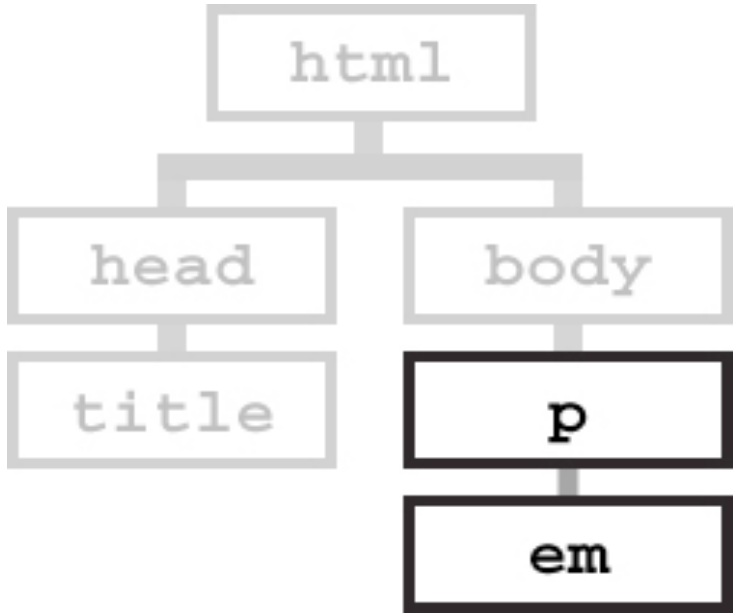
Now...
what is
inheritance?

Inheritance is where specific CSS properties are **passed down** to descendant elements.

To see inheritance in action, we will use the **HTML code** below:

```
<p>
    Lorem <em>ipsum</em> dolor
    sit amet consect etuer.
</p>
```

Note that the `<em>` element **sits inside** the `<p> element`.



We will also use this CSS code. Note that the element has **not been specified**.

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

In a browser, the <p> and elements will **both be colored red**.

But why is the `<em>` element **colored red** when it has not been styled?

Because the 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**.

```
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.

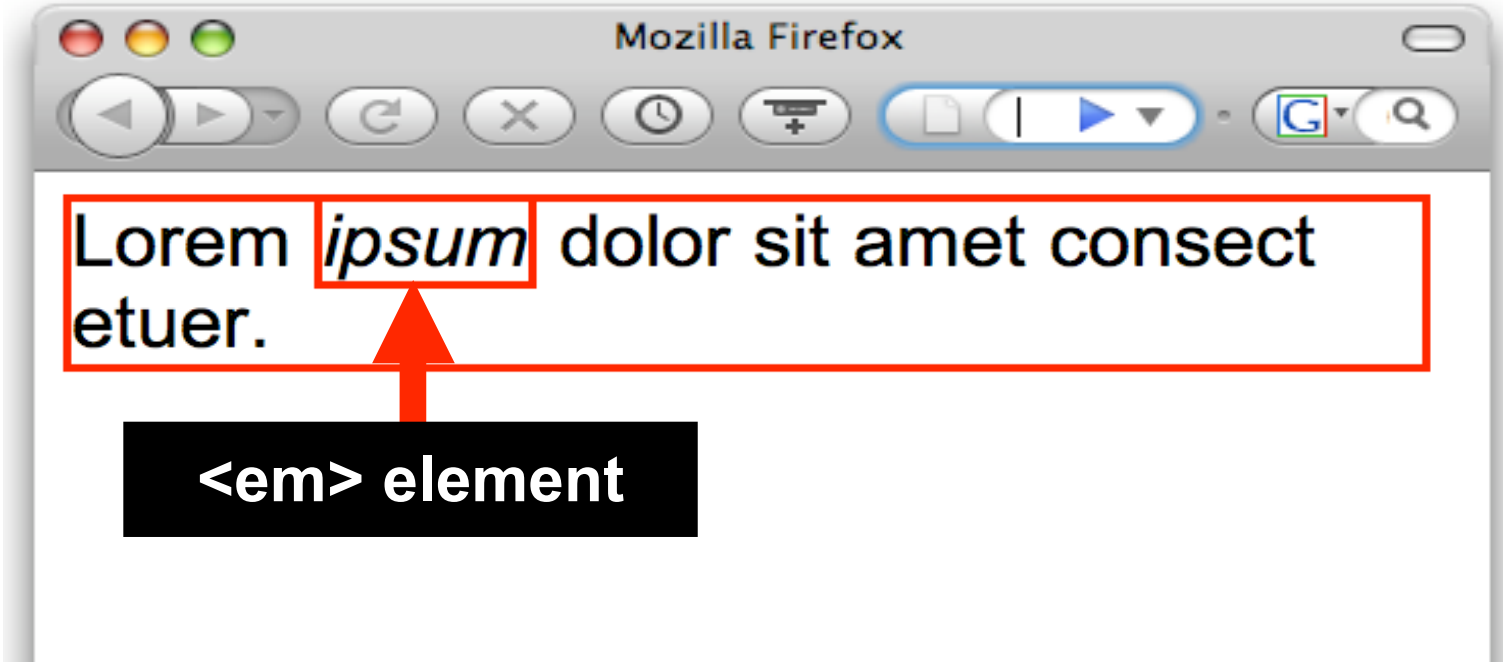
Authors would have to **turn off** unwanted CSS properties for descendant elements.

For example, what would happen if the **border property was inherited** by default…

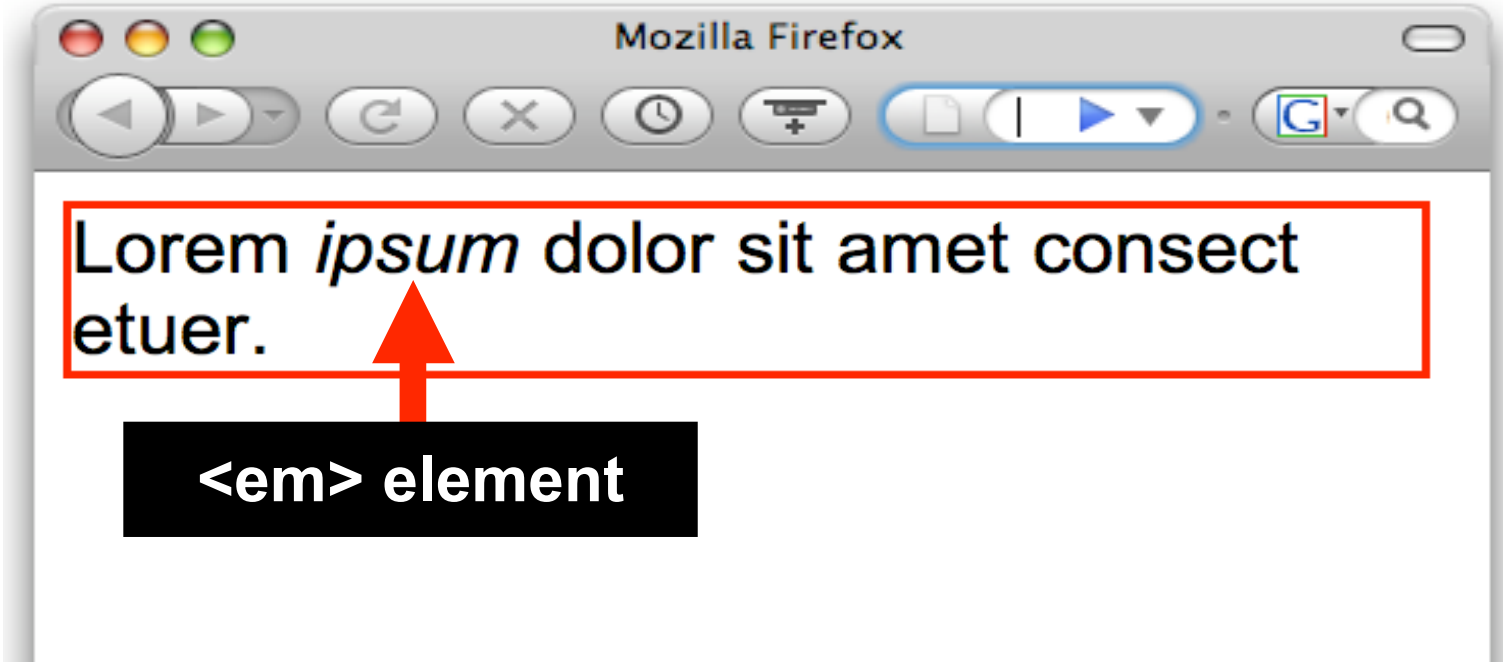
and we then **applied a border** to the <p> element?

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

The 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

Yikes! That is a **lot of properties**.

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.

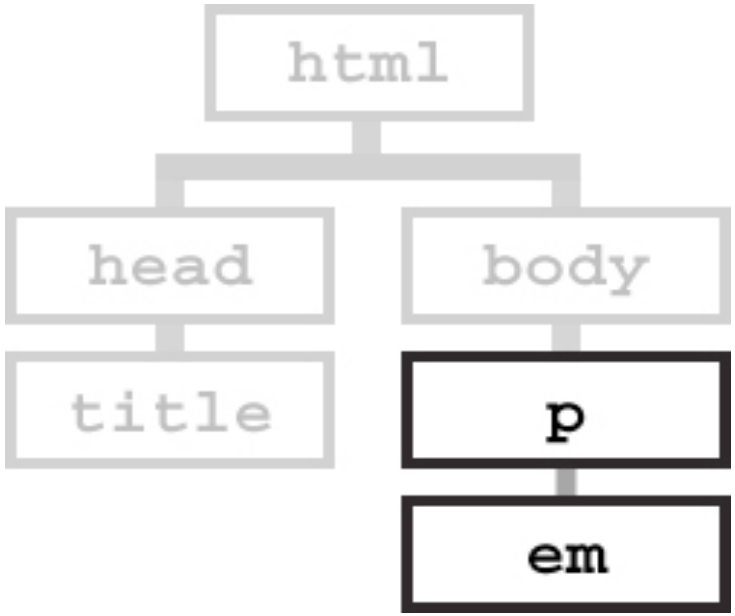
Rather than the actual value being inherited, the **calculated value** is inherited.

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:

```
<p>
    Lorem <em>ipsum</em> dolor
    sit amet consect etuer.
</p>
```

As before the
sits inside the <p>.

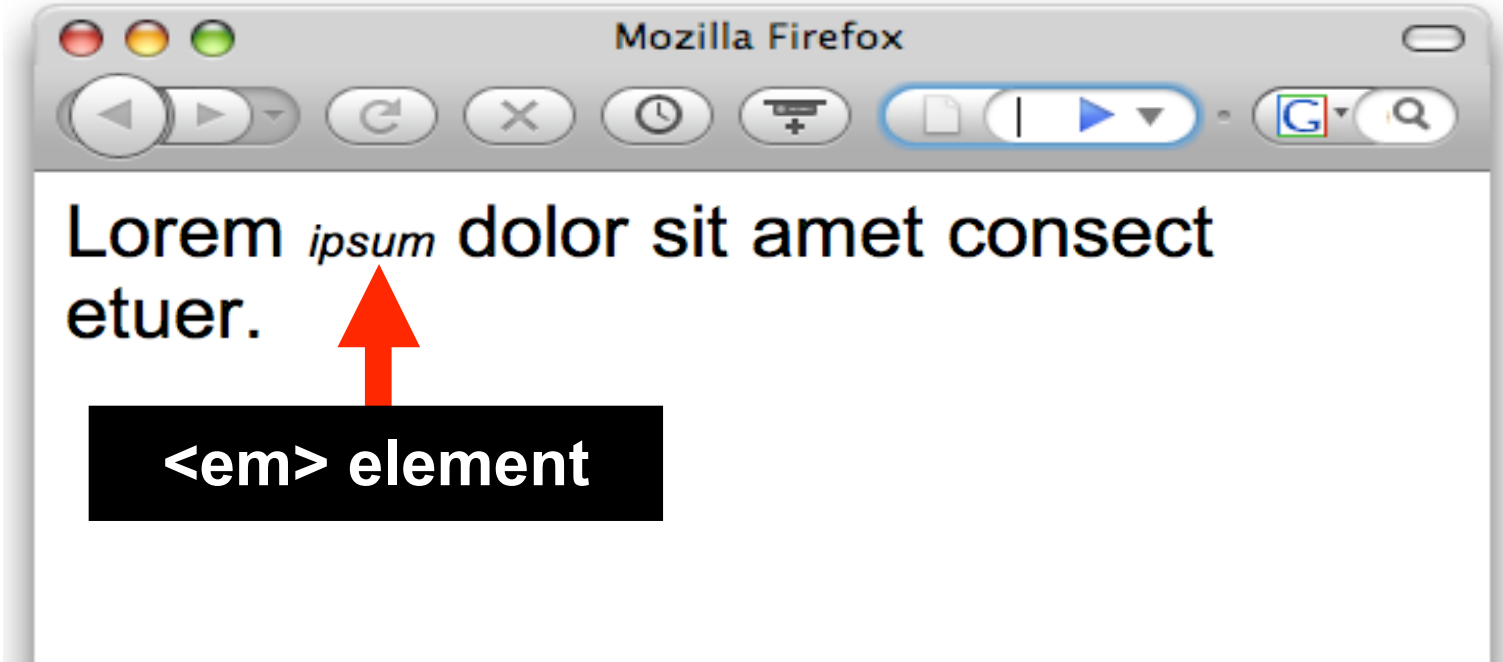


Now, a font-size is applied to the **<p> element only**. The has not been specified.

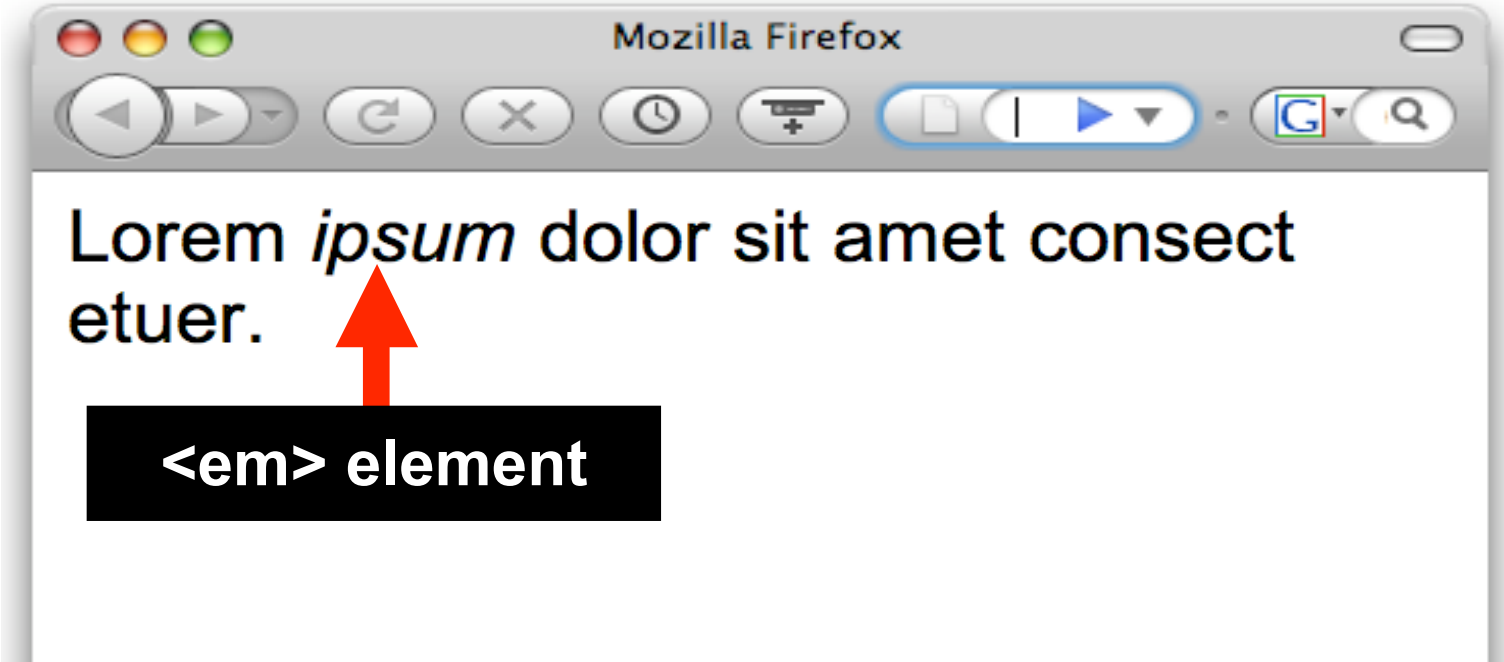
```
p { font-size: 80%; }
```

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 is the same size as the <p>.



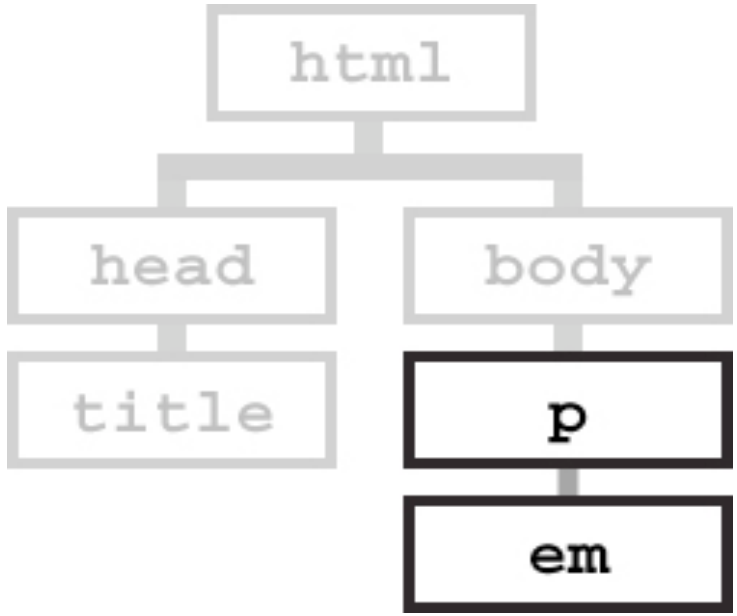
So how does inheritance work for **font-size**?

Let’s look at **three examples** in action.

We will use the **same HTML code** as before:

```
<p>
    Lorem <em>ipsum</em> dolor
    sit amet consect etuer.
</p>
```

Which produces the same **document tree** as before.



Example 1: Pixels

The <p> element has been given a font-size of **14px**.

Note: pixels are not recommended for sizing fonts due to accessibility issues associated with older browsers such as IE5 and IE6.

```
p { font-size: 14px; }
```

This pixel value (14px) overrides the browsers default font-size value (approx 16px). **This new value is inherited by descendants.**

So, the element inherits the **14px value**.

element	value	calcuated value
default font size	approx 16px	
<body>	unspecified	approx 16px
<p>	14px	14px
	unspecified	inherited value = 14px

Example 2: Percentage

The <p> element has been given a font-size of **85%**.

```
p { font-size: 85%; }
```

The browsers default font-size (16px) and the percentage value (85%) are used to create a calculated value (16px x 85% = 13.6px). **This calculated value is inherited by descendants.**

So, the element inherits the **13.6px calculated value**.

element	value	calcuated value
default font size	approx 16px	
<body>	unspecified	approx 16px
<p>	85%	16px x 85% = 13.6px
	unspecified	inherited value = 13.6px

Example 3: EMs

The <p> element has been given a font-size of **.85em**.

Note: Avoid using EMs for font-size values under 1em as IE5 renders these values in pixels instead of EMs (.8em is rendered as 8px).

```
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 element inherits the **13.6px calculated value**.

element	value	calcuated value
default font size	approx 16px	
<body>	unspecified	approx 16px
<p>	.85em	16px x .85em = 13.6px
	unspecified	inherited value = 13.6px

Those examples were too simple. What about more complex examples using **different elements**?

Example 4:

All elements have been specified using **percentage values**.

```
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

element	value	calculated font-size
default font size	approx 16px	
<body>	85%	16px x 85% = 13.6px
<h1>	200%	inherited value 13.6px x 200% = 27.2px
<h2>	150%	inherited value 13.6px x 150% = 20.4px
<p>	unspecified	inherited value = 13.6px
	unspecified	inherited value = 13.6px

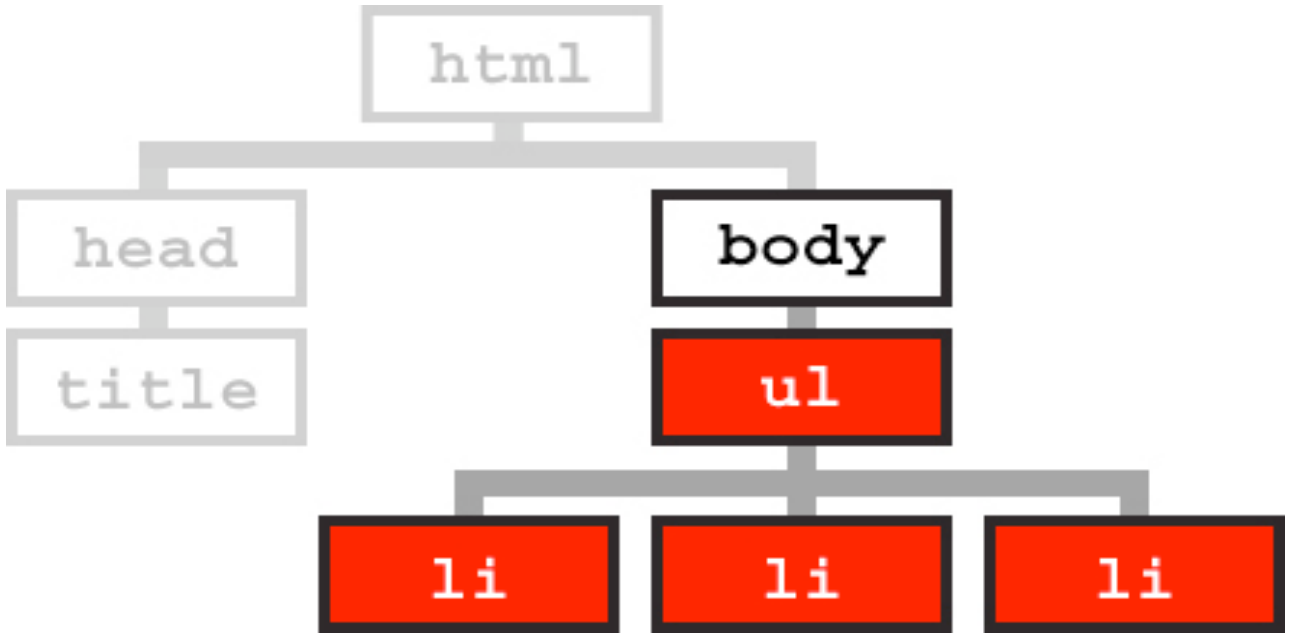
Using inheritance for efficiency

Authors can use inheritance to write **efficient CSS**.

For example, you can set the color, font-size and font-family on the **body element**.

```
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%; }
```

Now, go forth and
inherit the world!

We’re done!