

Introduction to CSS

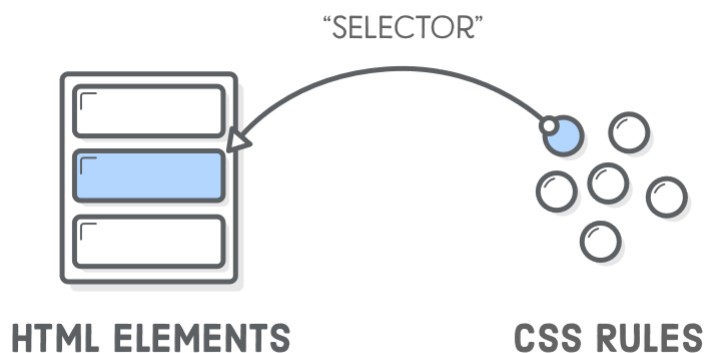
Section 1. HELLO, CSS

Section 2. CSS BOX MODEL

Section 3. CSS SELECTORS

Description:

Way back in the Links and Images chapter, we learned how to connect an HTML document to other files in our project. “CSS selectors” are similar, except instead of navigating between whole files, they let us map a single CSS rule to a specific HTML element. This makes it possible to *selectively* style individual elements while ignoring others.



Unless you want every section of your website to look exactly the same, this is a crucial bit of functionality for us. It’s how we say things like “I want this paragraph to be blue and that other paragraph to be yellow.” Until now, we’ve only been able to turn *all* our paragraphs blue (or yellow).

The only CSS selector we’ve seen so far is called the “type selector”, which targets all the matching elements on a page. In this chapter, we’ll explore more granular ways to style a web page with class selectors, descendant selectors, pseudo-classes, and ID selectors.

setup

We’ll only need one HTML file and a CSS stylesheet for our example this chapter. Create a new folder called `css-selectors` and new web page called `selectors.html` with the following markup:

```

<!DOCTYPE html>
<html lang='en'>
  <head>
    <meta charset='UTF-8' />
    <title>CSS Selectors</title>
    <link rel='stylesheet' href='styles.css' />
  </head>
  <body>
    <h1>CSS Selectors</h1>

    <p>CSS selectors let you <em>select</em> individual HTML elements in an HTML
      document. This is <strong>super</strong> useful.</p>

    <p>Classes are ridiculously important, since they allow you to select
      arbitrary boxes in your web pages.</p>

    <p>We'll also be talking about links in this example, so here's
      <a href='https://internetingishard.com'>Interneting Is Hard</a> for us to
      style.</p>

    <div>Button One</div>

  </body>
</html>

```

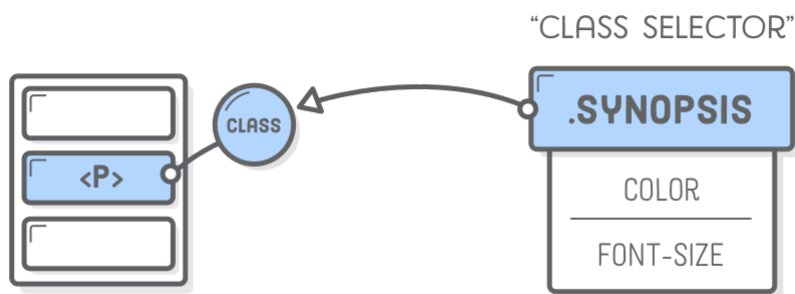
Go ahead and create that `styles.css` stylesheet in the same folder, too. This gives us everything we need to explore CSS selectors.

If you're just diving into this tutorial series, be sure to have a quick read through the Introduction to get set up with the Atom text editor.

class selectors

"Class selectors" let you apply CSS styles to a specific HTML element. They let you differentiate between HTML elements of the same type, like when we had two `<div>` elements in the previous chapter, but only wanted to style one of them. Class selectors require two things:

- A `class` attribute on the HTML element in question.
- A matching CSS class selector in your stylesheet.



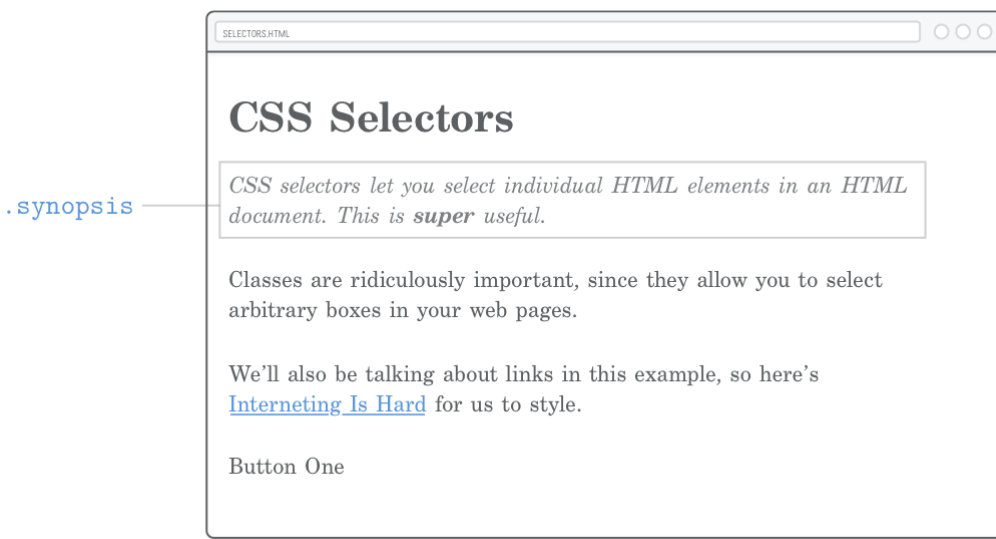
We can use a class selector to style the first paragraph of our example page differently than the rest of them. This could be, for instance, the synopsis of a newspaper article. First, let's add a `class` attribute to the desired paragraph:

```
<p class='synopsis'>CSS selectors let you <em>select</em> individual HTML  
elements in an HTML document. This is <strong>super</strong> useful.</p>
```

Now, we can pluck out that `<p class='synopsis'>` element in our CSS with the following (add this to `styles.css`):

```
.synopsis {  
  color: #7E8184;      /* Light gray */  
  font-style: italic;  
}
```

This rule is *only* applied to elements with the corresponding `class` attribute. Notice the dot (`.`) prefixing the class name. This distinguishes class selectors from the type selectors that we've been working with before this chapter.



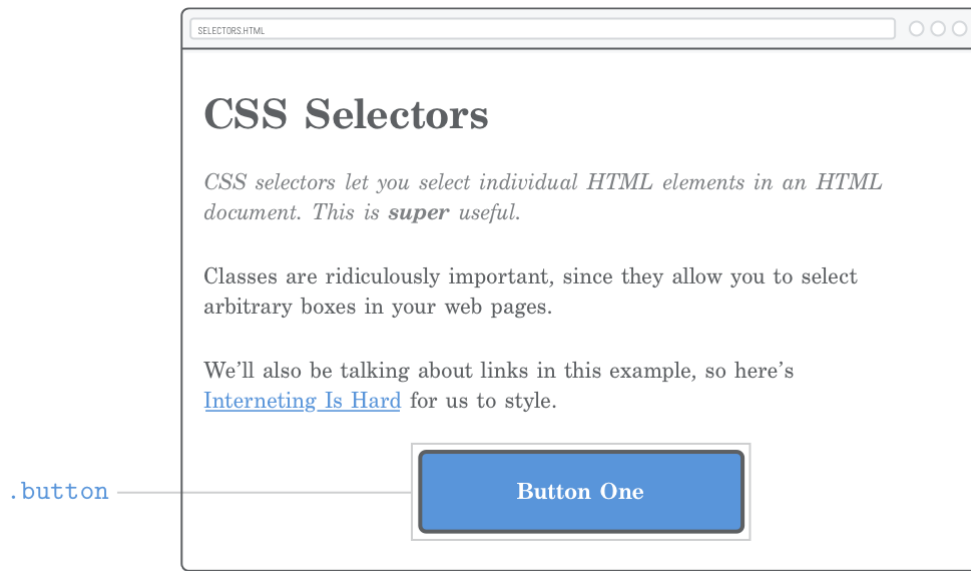
class naming conventions

The value of the HTML `class` attribute can be (almost) anything you want as long as it matches the selector in your CSS. The standard naming convention for classes is to use all lowercase and hyphens for spaces, just like file and folder names.

Adding a `class` attribute doesn't alter the semantic meaning of your HTML document at all—it's purely for hooking into your CSS stylesheet. However, it's still usually a good idea to avoid naming classes based on their appearance. If we chose to name our class `.italic`, we wouldn't be able to do much besides make it italic in our CSS without leading to a confusing situation. Using something semantic like `.synopsis` gives us more freedom for our CSS to customize how that synopsis is displayed.

more useful divs

The `class` attribute isn't limited to `<p>` elements—it can be defined on *any* HTML element. So, armed with CSS class selectors, our generic `<div>` and `` boxes from the previous chapter become much, much more useful. We can use them to style both individual elements as well as arbitrary sections of our web page.



Let's start with individual elements by recreating our button from the previous chapter. This time, we'll use a class instead of a `div` selector. Add the following to `styles.css` :

```
.button {  
  color: #FFF;  
  background-color: #5995DA;    /* Blue */  
  font-weight: bold;  
  padding: 20px;  
  text-align: center;  
  border: 2px solid #5D6063;    /* Dark gray */  
  border-radius: 5px;  
  
  width: 200px;  
  margin: 20px auto;  
}
```

Of course, we need a corresponding `class` attribute for this to work. Change the `<div>` in `selectors.html` to match the following:

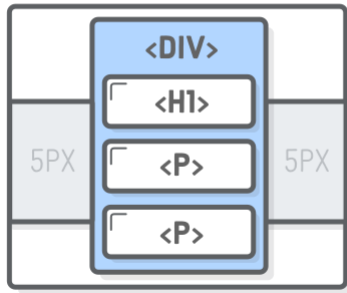
```
<div class='button'>Button One</div>
```

Unlike the previous chapter that styled *all* the `<div>` elements, this lets us use it for other things besides buttons.

container divs

Remember that `<div>` doesn't alter the semantic structure of a page. This makes it a great tool for defining the *presentational* structure of a web page. By wrapping other HTML elements in `<div>` tags, we can organize our site into larger layout-oriented chunks without messing up how search engines view our content.

WHAT PEOPLE SEE



WHAT ROBOTS SEE



For example, let's try to create a fixed-width layout using the auto-margin technique that we learned in the previous chapter. First, wrap our entire document in a generic `<div>` and give it a unique class:

```
<body>
  <div class='page'>  <!-- Add this -->
    <h1>CSS Selectors</h1>

    <p  class='synopsis'>CSS selectors let you <em>select</em> individual HTML
    elements in an HTML document. This is <strong>super</strong> useful.</p>

    <p>Classes are ridiculously important, since they allow you to select
    arbitrary boxes in your web pages.</p>

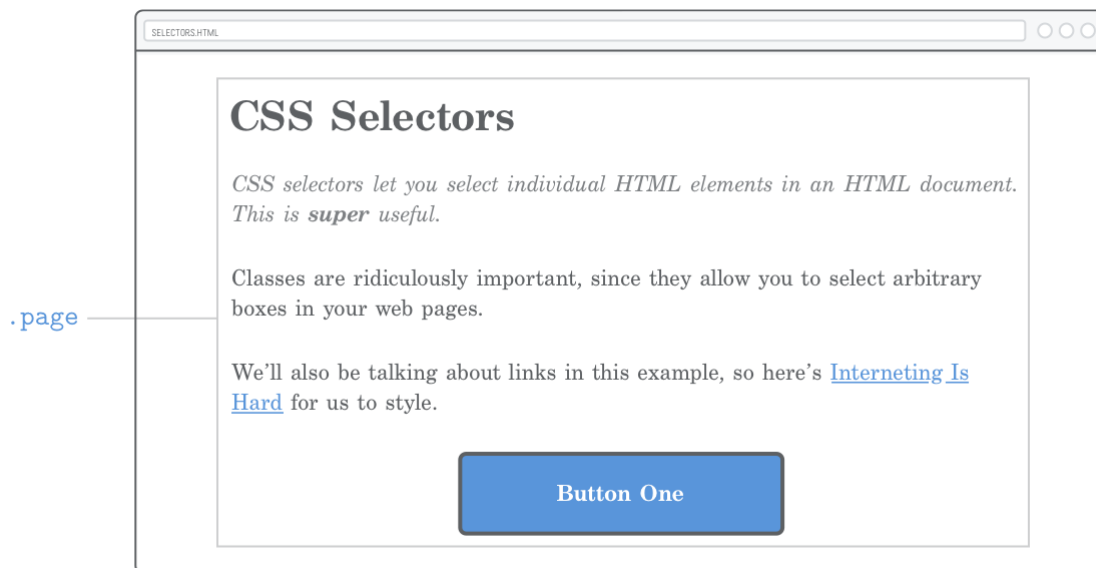
    <p>We'll also be talking about links in this example, so here's
    <a href='https://internetingishard.com'>Interneting Is Hard</a> for us to
    style.</p>

    <div class='button'>Button One</div>
  </div>  <!-- And this -->
</body>
```

Then, add the following to `styles.css` :

```
.page {
  width: 600px;
  margin: 0 auto;
}
```

No matter how you resize the browser window, our web page will always be 600 pixels wide and centered in the available space. Note that this was the exact same way we centered our button, but now we're doing it to multiple elements at the same time by nesting them in a generic container.



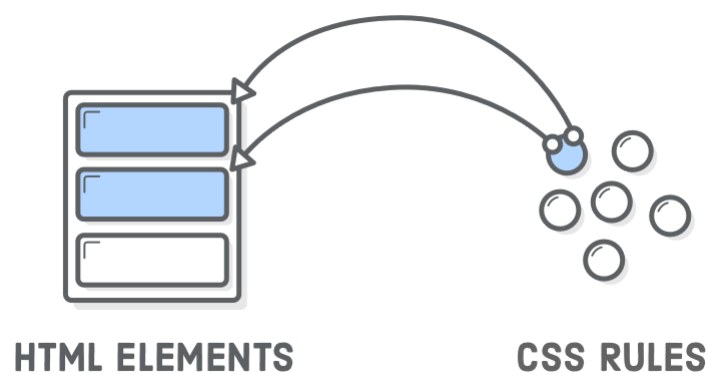
This is how layouts are defined in more complex web pages. For instance, if our page had a sidebar, we would nest all the sidebar elements in *another* `<div>` with a `.sidebar` class. We'll see this in action in the next chapter. For now, the key takeaway is that without class selectors to differentiate our `<div>` elements, none of this would be possible.

reusing class styles

The same class can be applied to multiple elements in a single HTML document. This means that we can now reuse arbitrary CSS declarations wherever we want. To create another button, all we have to do is add another HTML element with the same class:

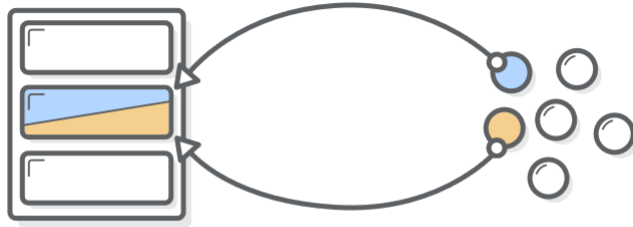
```
<div class='button'>Button One</div>
<div class='button'>Button Two</div>
```

This gives us a second button that looks just like the first one—without writing a single line of CSS! Organizing similar graphical elements into reusable CSS rules like this makes life much easier as a web developer. If we ever wanted to, say, change the button color, we would only have to do it in one place and all our buttons would automatically update.



modifying class styles

What if we want to alter our second button a little bit? Fortunately, we can apply multiple classes to the *same* HTML element, too. The styles from each class will be applied to the element, giving us the opportunity to both reuse styles from `.button` and override some of them with a new class.



HTML ELEMENTS

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Go ahead and add another class to our second button with the following markup. Notice how multiple classes live in the same `class` attribute, separated by spaces:

```
<div class='button call-to-action'>Button Two</div>
```

This element now has two separate classes, and we can use either of them to style it. This opens up some options. Styles shared by both buttons can live in the `.button` class (as they already do), and styles specific to the second button reside in the `.call-to-action` class (be sure to add this *after* the `.button` rule):

```
.call-to-action {
  font-style: italic;
  background-color: #EEB75A;    /* Yellow */
}
```

order matters

There's a couple of important things going on with our second button now:

- It's adding a *new* `font-style` declaration to the original `.button` rule.
- It's *overriding* an existing `background-color` style from `.button`.

Overriding occurs because of the order of `.call-to-action` and `.button` in our stylesheet. When there's two conflicting properties in a CSS file, the last one is always the one that gets applied. So, if you moved `.call-to-action` to the top of `styles.css`, `.button` would have the final word on the value of `background-color`, and it would remain blue.

This means that the order of the `class` attribute in our HTML element has no effect on override behavior. Multiple classes on a single element are applied "equally" (for lack of a better term), so the precedence is determined solely by the order of the rules in `styles.css`. In other words, the following elements are effectively equivalent:

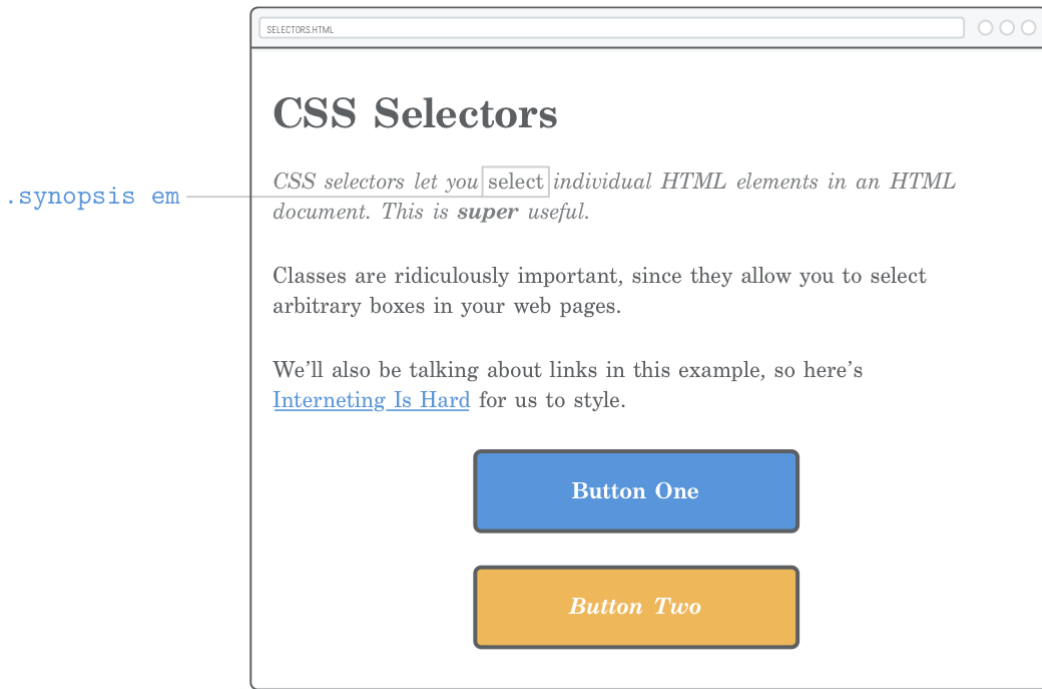
```
<!-- These result in the same rendered page -->
<div class='button call-to-action'>Button Two</div>
<div class='call-to-action button'>Button Two</div>
```

This does, however, get more complicated when CSS specificity is involved, which we'll discuss at the end of this chapter.

descendant selectors

You may have noticed that the `` in our first paragraph is no longer distinguishable from its surround text, since our `.synopsis` rule made everything italic.

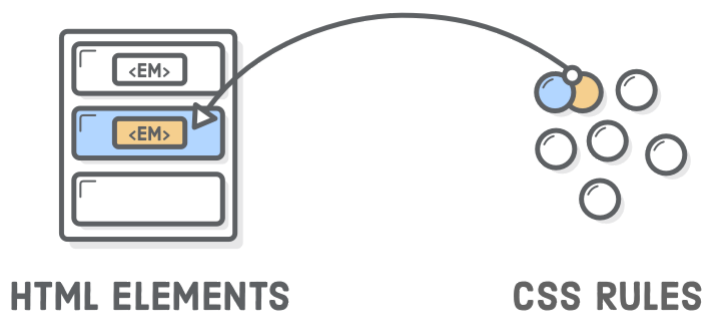
To alter that `` element, we could add another class directly to it, but that won't result in very maintainable code. We want to treat `.synopsis` as its own independent component that we can style entirely from CSS (i.e., without requiring alterations to our HTML just for the sake of styling something.)



This is what “descendant selectors” are for. They let you target only those elements that are *inside* of another element. For example, we can pull out that `` in the `.synopsis` paragraph with the following:

```
.synopsis em {  
  font-style: normal;  
}
```

Adding this rule to `styles.css` will make the `` display as upright (roman) characters, thus differentiating it from the italics we put on the entire `<p>` text. The rest of the `` elements on the page will be unaffected.



Descendant selectors aren't limited to class selectors—you can combine any other group of selectors this way. For instance, if we wanted to select only `` elements inside of headings, we might use something like this:

```
h1 em {  
  /* Some other styles */  
}
```


Again, the goal of this chapter is to let you apply styles to exactly the element you want. Descendant selectors are a great tool towards this end. You may also want to check out the related “child selector” over at MDN (https://developer.mozilla.org/en-US/docs/Web/CSS/Child_selectors) if you’ve still got room in your toolbox.

don't overdo it

You can nest descendant selectors as deep as you want, but don't get carried away. Life gets confusing and terrible when you start writing rules that look like this:

```
/* Try to avoid this */
.article h2 .subheading em {
  /* Special styles */
}
```

This isn't the least bit reusable because it matches *only* the following HTML structure:

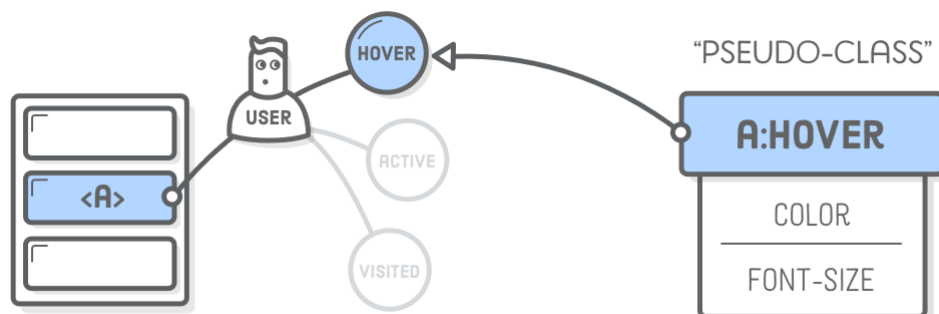
```
<div class='article'>
  <h2>
    <span class='.subheading'>This is <em>really</em> special text</span>
  </h2>
</div>
```

If you ever wanted to apply these styles to an `<h2>` heading that's not wrapped in `<div class='article'>` tags, you're kind of screwed. Same deal if you want to apply them to an `<h3>` heading anywhere on the page. This kind of CSS also leads to a specificity nightmare.

pseudo-classes for links

So far, all the CSS selectors we've seen map directly to a piece of HTML markup that we wrote. However, there's more going on in a rendered web page than just our HTML content. There's “stateful” information about what the user is doing (opposed to the content we've authored).

The classic example is a link. As a web developer, you create an `<a href>` element. After the browser renders it, the user can interact with that link. They can hover over it, click it, and visit the URL.



CSS “pseudo-classes” provide a mechanism for hooking into this kind of temporary user information. At any given time, an `<a href>` element can be in a number of different states, and you can use pseudo-classes to style each one of them individually. Think of them as class selectors that you don't have to write on your own because they're built into the browser.

basic link styles

Pseudo-classes begin with a colon followed by the name of the desired class. The most common link pseudo-classes are as follows:

- `:link` – A link the user has never visited.
- `:visited` – A link the user has visited before.
- `:hover` – A link with the user's mouse over it.
- `:active` – A link that's being pressed down by a mouse (or finger).

Let's take a look at all of these by adding the following rules to our CSS stylesheet (also note our use of keyword colors instead of our usual hex codes):

```
a:link {
  color: blue;
  text-decoration: none;
}
a:visited {
  color: purple;
}
a:hover {
  color: aqua;
  text-decoration: underline;
}
a:active {
  color: red;
}
```

If you've never been to the DCT Academy (<https://www.dctacademy.com/>) home page, you should see a blue link. Otherwise, you'll see a purple link. When you hover over the link, it will turn aqua, and when you push down on it, it'll turn red.

visited hover state

The above snippet is just fine for most websites, but take a closer look at the `a:visited` behavior by changing the `href` attribute to a URL that you've been to before. Our `a:hover` style is applied to both visited and unvisited links. We can refine our links even more by stringing pseudo-classes together. Add this below the previous snippet:

```
a:visited:hover {
  color: orange;
}
```

This creates a dedicated hover style for visited links. Hovering over an unvisited link changes it to aqua, while hovering over a visited link will turn it orange. Fantastic! Except for the fact that this breaks our `a:active` style due to some complicated CSS internals that you'll never want to read about. When you click down, our link won't turn red anymore.

visited active state

We can fix that with `a:visited:active`. Add the following to the end of our stylesheet. Note that, as with our `.call-to-action` class, the order in which these are defined in `styles.css` matters:

```
a:visited:active {  
  color: red;  
}
```

These last two sections let you style visited links entirely separately from unvisited ones. It's a nice option to have, but again, you're welcome to stop at basic link styles if that's all you need.

pseudo-classes for buttons

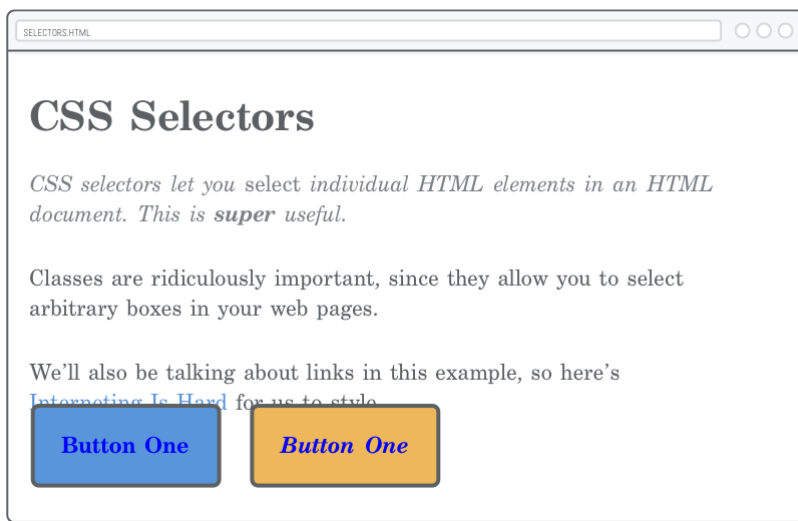
Pseudo-classes aren't just for styling text links—they can be applied to any kind of selector (not just type selectors). Instead of styling `a:link` and friends, we'll be modifying our `.button` class with pseudo-classes in this section. This will let us create buttons that actually go somewhere.

link elements, not div elements

First, we need change our buttons to be `<a href>` elements instead of generic `<div>` elements, as shown below:

```
<a class='button' href='nowhere.html'>Button One</a>  
<a class='button call-to-action' href='nowhere.html'>Button Two</a>
```

If you reload this in your browser, you'll see that we lost some of our styles even though we're using the same classes. This is because `<a>` is an inline element by default and also has a default `color` value.



We need to change it to a block element and remove some of the default link styling.

button styles

Let's start with `:link` and `:visited` variants. We're using a similar pattern as in the previous section, but since these are buttons, we want to keep both the unvisited and visited color the same. Change the existing `.button` rules to match the following:

```
.button:link,                /* Change this */
.button:visited {           /* Change this */
  display: block;           /* Add this */
  text-decoration: none;    /* Add this */

  color: #FFF;              /* The rest is the same */
  background-color: #5995DA;
  font-weight: bold;
  padding: 20px;
  text-align: center;
  border: 2px solid #5D6063;
  border-radius: 5px;

  width: 200px;
  margin: 20px auto;
}
```

Notice the new `:link` and `:visited` pseudo-classes in the selector. Without it, our `color` would not override the browser's default `a:link` style. CSS specificity explains why this is the case in greater detail. Next, let's do the hover states:

```
.button:hover,
.button:visited:hover {
  color: #FFF;
  background-color: #76AEED; /* Light blue */
}
```

Both our buttons will be a lighter blue on hover. Finally, let's make it a little darker when the user presses the mouse down with the `:active` pseudo-class:

```
.button:active,
.button:visited:active {
  color: #FFF;
  background-color: #5995DA; /* Blue */
}
```

The great part about this is that all the styles we just defined are entirely reusable. Stick a `.button` class on *any* HTML element, and you'll turn it into an interactive button.

the other button

Now, what about that second button? It's supposed to have a yellow background, but we broke it with the code from the previous section. Our `.button:link` selector was more "specific" than our current `.call-to-action` rule, so it took precedence. Again, we'll explore this further at the end of the chapter.

For now, let's fix it by applying some pseudo-classes to our `.call-to-action` rule. Replace the existing rule with the following (make sure this appears *after* the new `.button` styles from the previous section):

```
.call-to-action:link,  
.call-to-action:visited {  
  font-style: italic;  
  background-color: #EEB75A;    /* Yellow */  
}  
  
.call-to-action:hover,  
.call-to-action:visited:hover {  
  background-color: #F5CF8E;    /* Light yellow */  
}  
  
.call-to-action:active,  
.call-to-action:visited:active {  
  background-color: #EEB75A;    /* Yellow */  
}
```

Since we only added the `.call-to-action` class to our second button, that's the only one that'll turn yellow. Of course, we still need the `.button` class on both `<a>` elements because it defines shared styles like the padding, border radius, and font weight.

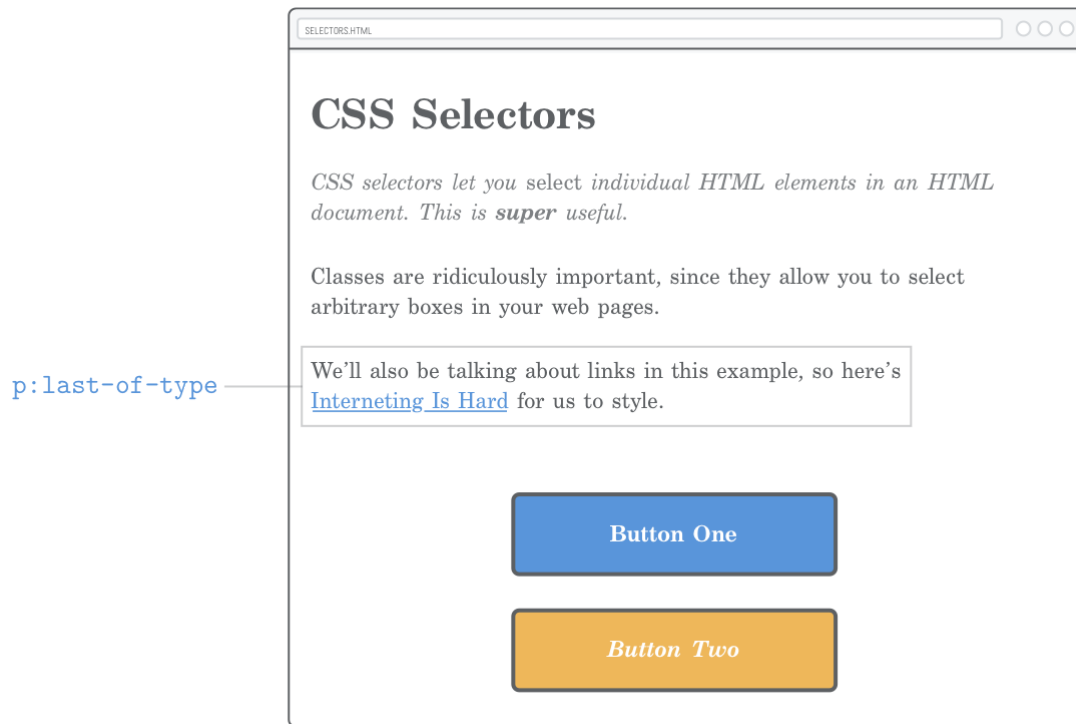
pseudo-classes for structure

Link states are just one aspect of pseudo-classes. There's also a bunch of other pseudo-classes that provide extra information about an element's surroundings. For example, the `:last-of-type` pseudo-class selects the final element of a particular type in its parent element. This gives us an alternative to class selectors for selecting specific elements.

For instance, we could use `:last-of-type` to add some space after the last paragraph of our example page:

```
p:last-of-type {  
  margin-bottom: 50px;  
}
```

This avoids selecting the first two `<p>` elements *without* requiring a new `class` attribute on the last paragraph:



We could even use a `:first-of-type` pseudo-class in place of our `.synopsis` class. Replacing the existing `.synopsis` rule with the following snippet should result in the exact same page.

```
p:first-of-type {
  color: #7E8184;
  font-style: italic;
}
```

There's pros and cons to using this method over plain old classes. For instance, this *only* works if our synopsis is a `<p>` element. If we ever wanted to create a multi-paragraph synopsis by wrapping a bunch of `<p>` elements in a `<div class='synopsis'>`, we'd have to rewrite our CSS accordingly. On the other hand, the pseudo-class method lets us style specific elements without having to alter the HTML at all. This gives us a very clean separation of content from presentation.

caveats

Ok, so actually the pseudo-class method is a little more complicated. They're still a useful tool—as long as you know their ins-and-outs. The `:first-of-type` and `:last-of-type` selectors only operate inside their parent element. That is to say, `p:first-of-type` selects the first `<p>` in *every* container element.

We have a single generic `<div>` wrapping our content (`.page`), so this isn't a problem for us. However, consider what happens when we add this to the bottom of our `.page` element:

```
<div class='sidebar'>
  <p>If this page had a sidebar...</p>
  <p>We'd have some problems with pseudo-classes.</p>
</div>
```

We won't be able to make a real sidebar until the next chapter, but this does highlight the complications of pseudo-classes for structure. The first `<p>` element here will also match `p:first-of-type` because the pseudo-class's scope is limited to the parent element.

If you wanted to avoid the sidebar paragraphs and select only the first `<p>` in our `<div class='page'>`, you would need to limit its scope using a child selector, like so:

```
.page > p:first-of-type {
  color: #7E8184;
  font-style: italic;
}
```

All of this is yet another example of how there are many ways to do the same thing in the wonderful world of HTML and CSS. Different developers adhere to different schools of thought. Some like the semantic nature of pseudo-classes, while others go to the far extreme with explicit `class` attributes on *every* HTML element.

id selectors

“ID selectors” are a more stringent alternative to class selectors. They work pretty much the same way, except you can only have *one* element with the same ID per page, which means you can’t reuse styles at all. Instead of a `class` attribute, they require an `id` attribute on whatever HTML element you’re trying to select. Try adding one to our second button:

```
<a id='button-2' class='button' href='nowhere.html'>Button Two</a>
```

The corresponding CSS selector must begin with a hash sign (`#`) opposed to a dot. Adding the following to `styles.css` will change the text color of our yellow button:

```
#button-2 {
  color: #5D6063; /* Dark gray */
}
```

The problem is, if we wanted to share this style with another button, we’d have to give it another unique `id` attribute. Pretty soon, our CSS would start to look pretty gnarly:

```
/* (This is painful to maintain) */
#button-2,
#button-3,
#checkout-button,
#menu-bar-call-to-action {
  color: #5D6063;
}
```

For this reason, ID selectors are generally frowned upon. Use class selectors instead.

url fragments

`id` attributes need to be unique because they serve as the target for “URL fragments”, which we sort of glossed over in our discussion of URLs. Fragments are how you point the user to a specific part of a web page. They look like an ID selector stuck on the end of a URL.

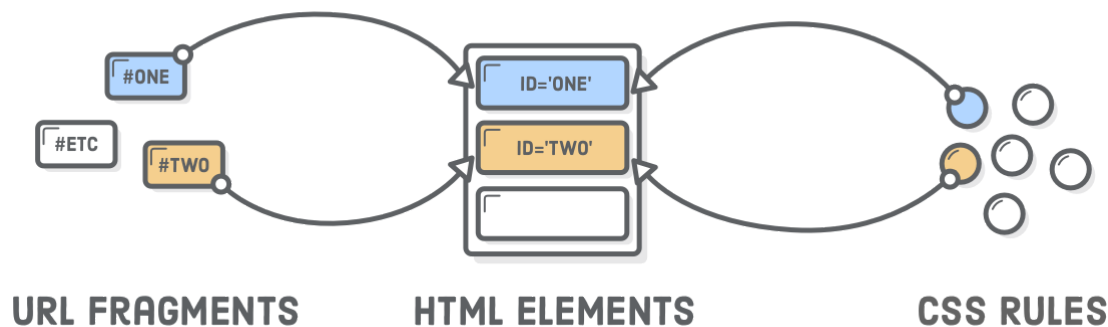


For example, if we wanted to point the user to our second button, we could use the following. Note that we can omit the URL entirely if we're linking to a different section on the same page:

```
<!-- From the same page -->
<a href='#button-2'>Go to Button Two</a>

<!-- From a different page -->
<a href='selectors.html#button-2'>Go to Button Two</a>
```

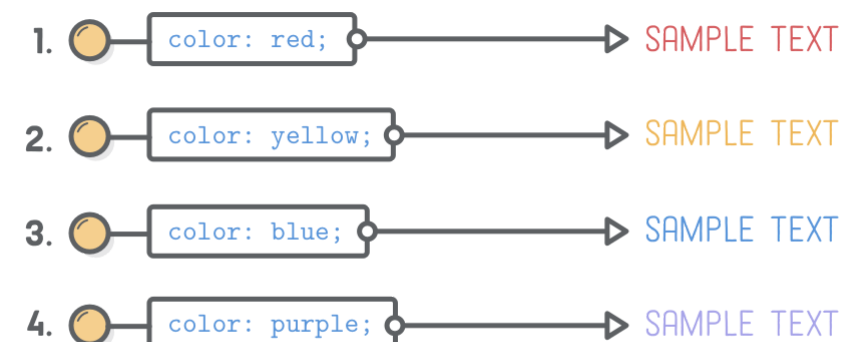
If you add the first option to our `selectors.html` page and click it, you'll see the URL in the browser change. To actually see it jump down to the second button, you'll need to add some more dummy content to the page or make the window height very short, as the browser will limit scrolling to the visible page.



This overlapping functionality is more reason to avoid ID selectors. They create a dependency between your website's URLs and your CSS styles. Imagine using a bunch of `id` attributes on your headings as both URL fragments and ID selectors. If you forgot to update your stylesheet every time you edited the URL of a section, you would actually break your website.

css specificity

Earlier in this chapter, we talked about how order matters when it comes to CSS rules in an external stylesheet. All else being equal, rules are applied from top-to-bottom. This allowed us to override rules in a predictable manner.



CSS RULES

HTML ELEMENT

Unfortunately, not all CSS selectors are created equal. "CSS specificity" is the weight given to different categories of selectors. This means that certain selectors will *always* override other ones, regardless of where they appear in the stylesheet.

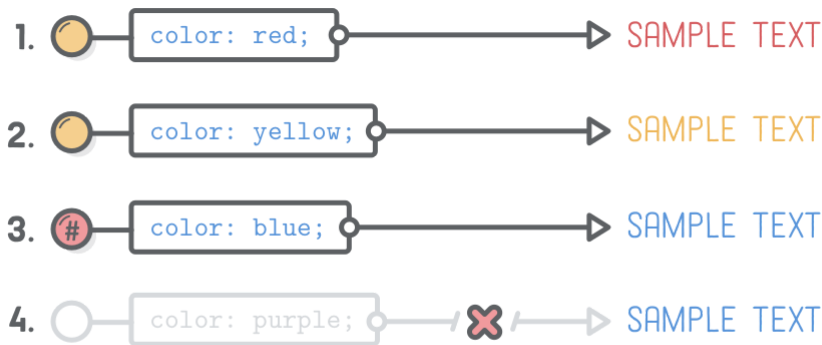
Let's start by seeing where this *doesn't* break. If you add the following after our existing `.call-to-action` rules, it will override the previous `background-color`. If you stick it at the top of the file, it'll get overridden later on, so our button won't turn red. This is expected behavior.

```
.call-to-action:link,
.call-to-action:visited {
  background-color: #D55C5F;    /* Red */
}
```

Now, watch what happens when we try to do the same thing with an ID selector. First, be sure to delete the previous snippet, then try adding this *before* our existing `.call-to-action` rules:

```
#button-2 {
  background-color: #D55C5F;    /* Red */
}
```

ID selectors have higher specificity than class selectors, so this *will* turn our second button red even though we try to set the `background-color` with `.call-to-action:link` later in our stylesheet. The whole "order matters" concept only works when all your rules have the same specificity.



CSS RULES

HTML ELEMENT

The specificity of selectors we've seen in this chapter are show below, from greatest to least:

- `#button-2`
- `.button:link`
- `a:link` and `.synopsis em` (they're equal)
- `.button`
- `a`

This can get very confusing. It's such a big problem that an entire methodology called "BEM" has evolved. BEM attempts to make CSS rules more reusable by making *everything* a class selector. This completely eliminates the potential for specificity issues.

BEM is outside the scope of this tutorial. The takeaway here is that CSS rules are not necessarily applied in sequential order, but you should try to make the browser do so by writing CSS that uses the same specificity.

summary

In this chapter, we got some hands-on experience with class selectors, descendant selectors, pseudo-classes, link styling, and ID selectors. The goal of all this was to be able to target a specific HTML element from your CSS. Class selectors are by far the most versatile and come with the

least amount of drawbacks. As a result, they'll become part of your daily life as a web developer.

Like it or not, things got a lot more complicated this chapter. We're now able to make our CSS interact with an HTML document in half a dozen different ways. Furthermore, over the next few chapters, we'll begin to see a dependency between our HTML's structure and the layout of a web page. With all this interplay between CSS and HTML, it can be hard to know where to start building a new web page.

The separation of content from presentation helps guide this process. You need content before you can present it, so your first step is usually to mark up your raw content with HTML tags. Once that's prepared, you're ready to add `class` attributes to your elements and style them one-by-one. When you discover a need for some extra structure to create a desired layout (e.g., turn a group of elements into a sidebar), that's when you start wrapping your content in container `<div>`'s.

This chapter covered almost all the CSS selectors that power real websites. We've got the tools we need to dive much deeper into complex CSS layouts. In the next installment of HTML and CSS Is Hard, we'll learn how to create columns and sidebars using CSS floats.

Section 4. FLOATS

Section 5. FLEXBOX

Section 6. ADVANCED POSITIONING

Section 7. RESPONSIVE DESIGN

Section 8. RESPONSIVE IMAGES

Section 9. HTML FORMS

Section 10. WEB TYPOGRAPHY