

Introduction to CSS

Section 1. HELLO, CSS

Section 2. CSS BOX MODEL

Section 3. CSS SELECTORS

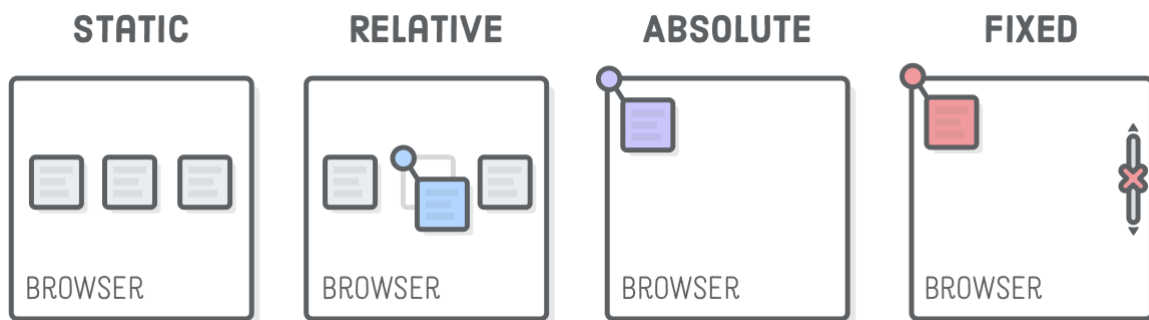
Section 4. FLOATS

Section 5. FLEXBOX

Section 6. ADVANCED POSITIONING

Description:

“Static positioning” refers to the normal flow of the page that we’ve been working with up ‘til this point. The CSS Box Model, floats, and flexbox layout schemes all operate in this “static” flow, but that’s not the only positioning scheme available in CSS.



The other three types of positioning are “relative”, “absolute”, and “fixed”. Each of them let you manually position elements using specific coordinates, opposed to the more semantic options in flexbox and floats. Instead of saying “Stick this box in the center of its container,” advanced

positioning lets you say things like “Put that box 20 pixels above and 50 pixels to the right of its parent’s origin.”

The vast majority of elements on a web page should be laid out according to the static flow of the page. These other positioning schemes come into play when you want to do more advanced things like tweak the position of a particular element or animate a UI component without messing up the surrounding elements.

This chapter is split into two parts. We'll start by examining relative, absolute, and fixed positioning in isolation, then we'll apply everything we learned to a fancy dropdown menu.

setup

Start by creating a new Atom project called `advanced-positioning` and a new file called `schemes.html` with the following markup:

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset='UTF-8' />
    <title>Positioning Is Easy!</title>
    <link href='styles.css' rel='stylesheet' />
  </head>
  <body>

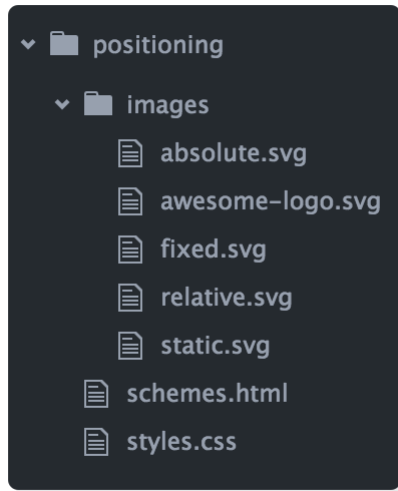
    <div class='container'>
      <div class='example relative'>
        <div class='item'><img src='images/static.svg' /></div>
        <div class='item item-relative'><img src='images/relative.svg' /></div>
        <div class='item'><img src='images/static.svg' /></div>
      </div>
    </div>

    <div class='container'>
      <div class='example absolute'>
        <div class='item'><img src='images/static.svg' /></div>
        <div class='item item-absolute'><img src='images/absolute.svg' /></div>
        <div class='item'><img src='images/static.svg' /></div>
      </div>
    </div>

    <div class='container'>
      <div class='example fixed'>
        <div class='item'><img src='images/static.svg' /></div>
        <div class='item item-fixed'><img src='images/fixed.svg' /></div>
        <div class='item'><img src='images/static.svg' /></div>
      </div>
    </div>

  </body>
</html>
```

We’ve got three examples to work with, all with the exact same HTML structure. Changing the positioning behavior inside each one will have dramatically different effects.



This page relies on some images to make our example a little bit clearer. Keep the parent `images` folder when unzipping the files into your project, as show above. Be sure to create `styles.css` and populate it with the necessary base styles, as well:

```
* {
  margin: 0;
  padding: 0;
  box-sizing: border-box;
}

body {
  height: 1200px;
}

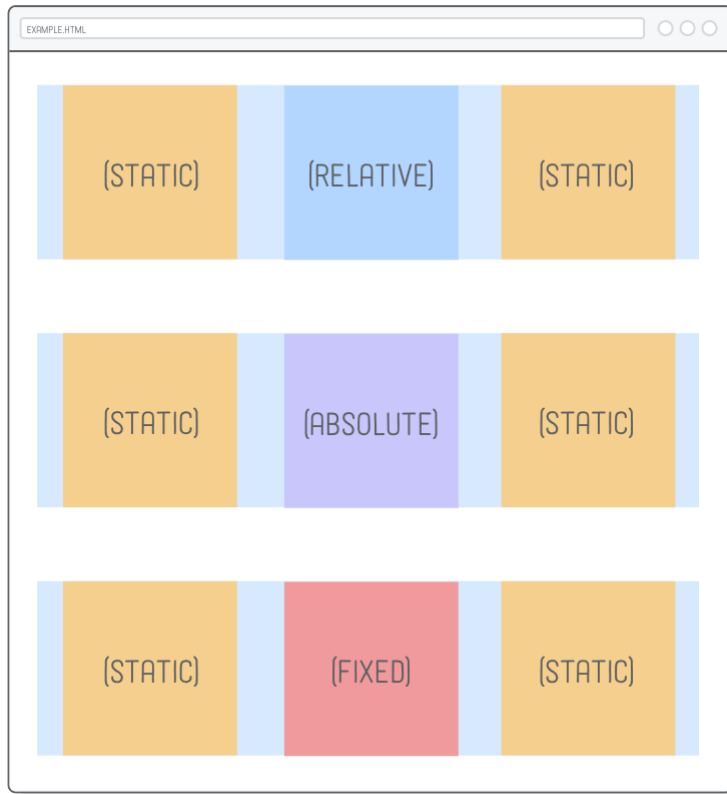
.container {
  display: flex;
  justify-content: center;
}

.example {
  display: flex;
  justify-content: space-around;

  width: 800px;
  margin: 50px 0;
  background-color: #D6E9FE;
}

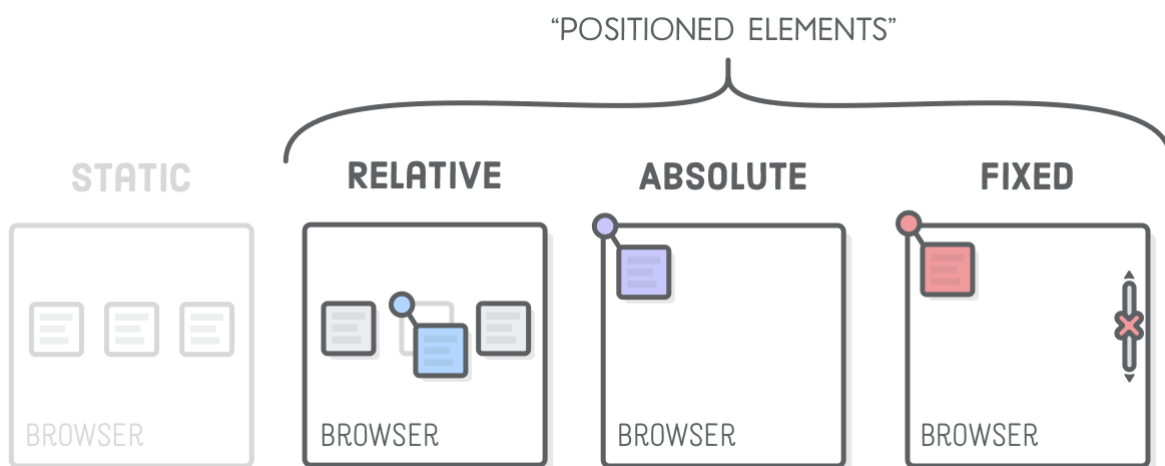
.item img {
  display: block;
}
```

Nothing new here, just some familiar flexbox techniques to create a grid of items. The only weird thing is the explicit `height` on the `<body>` element, which will let us scroll up and down the page to demonstration different positioning behaviors.



positioned elements

The CSS `position` property lets you alter the positioning scheme of a particular element. Its default value, as you might imagine, is `static`. When an element's `position` property *doesn't* have a value of `static`, it's called a "positioned element". Positioned elements are what this entire chapter is about.



It's possible to mix-and-match different positioning schemes. Again, most of your web page should be statically positioned, but it's common to find relatively and absolutely positioned elements inside of other elements that are part of the normal flow of the page.

relative positioning

"Relative positioning" moves elements around *relative* to where they would normally appear in the static flow of the page. This is useful for nudging boxes around when the default flow is just a little bit off.

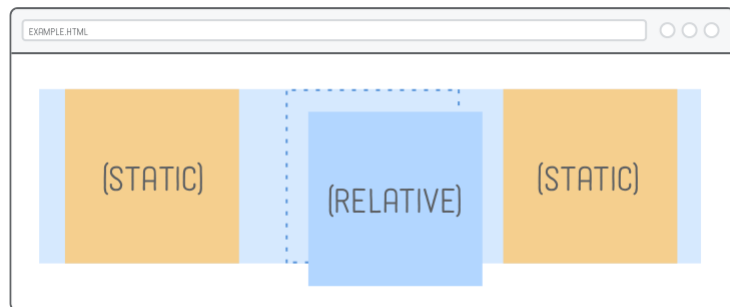


RELATIVE POSITIONING

Let's turn the `.item-relative` element in `schemes.html` into a relatively positioned element. Add the following rule to `styles.css`:

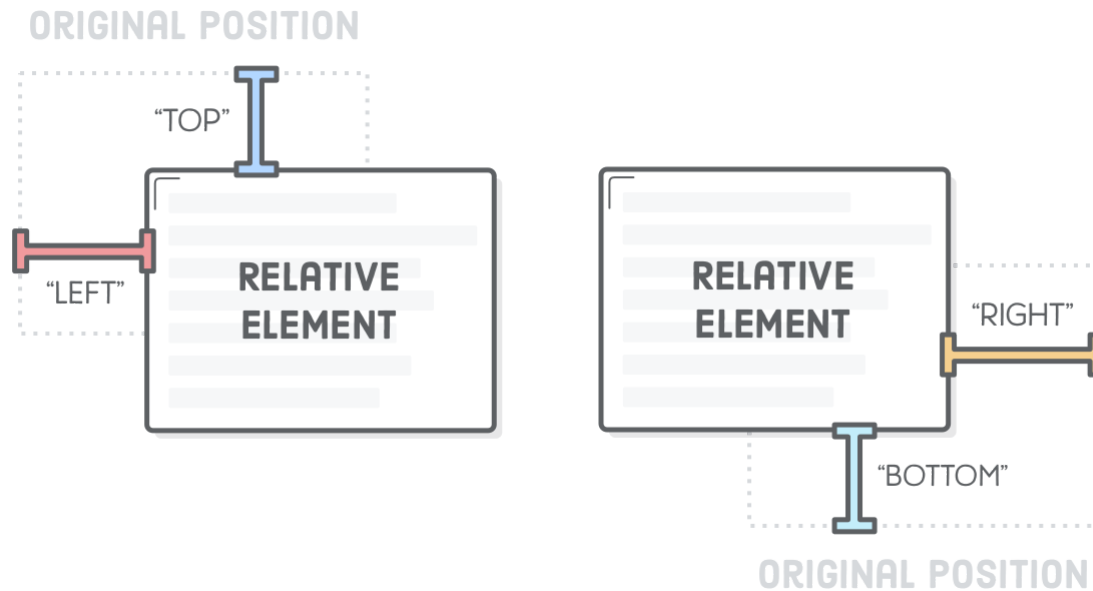
```
.item-relative {  
  position: relative;  
  top: 30px;  
  left: 30px;  
}
```

The `position: relative;` line makes it a positioned element, and the `top` and `left` properties let you define how far it's offset from its static position. This is sort of like setting an (x, y) coordinate for the element.



Relative positioning works similarly to margins, with one very important difference: neither the surrounding elements or parent element are affected by the `top` and `left` values. Everything else renders as if `.item-relative` was in its original position. Think of the offsets as being applied *after* the browser finishes laying out the page.

The `top` and `left` properties measure from the original box's top and left edges, respectively. We can offset relative to the other edges with the `bottom` and `right` properties.



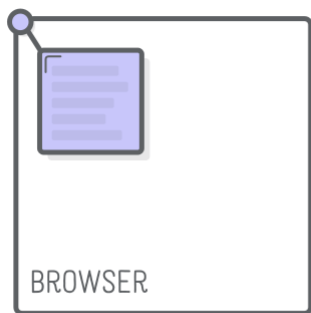
For example, the following will nudge the box in the opposite direction:

```
.item-relative {  
  position: relative;  
  bottom: 30px;  
  right: 30px;  
}
```

Note that these properties accept negative values, which means there's two ways to specify the same offset. We could just as easily used `top: -30px;` in place of the `bottom: 30px;` declaration above.

absolute positioning

"Absolute positioning" is just like relative positioning, but the offset is relative to the entire browser window instead of the original position of the element. Since there's no longer any relationship with the static flow of the page, consider this the most manual way to lay out an element.

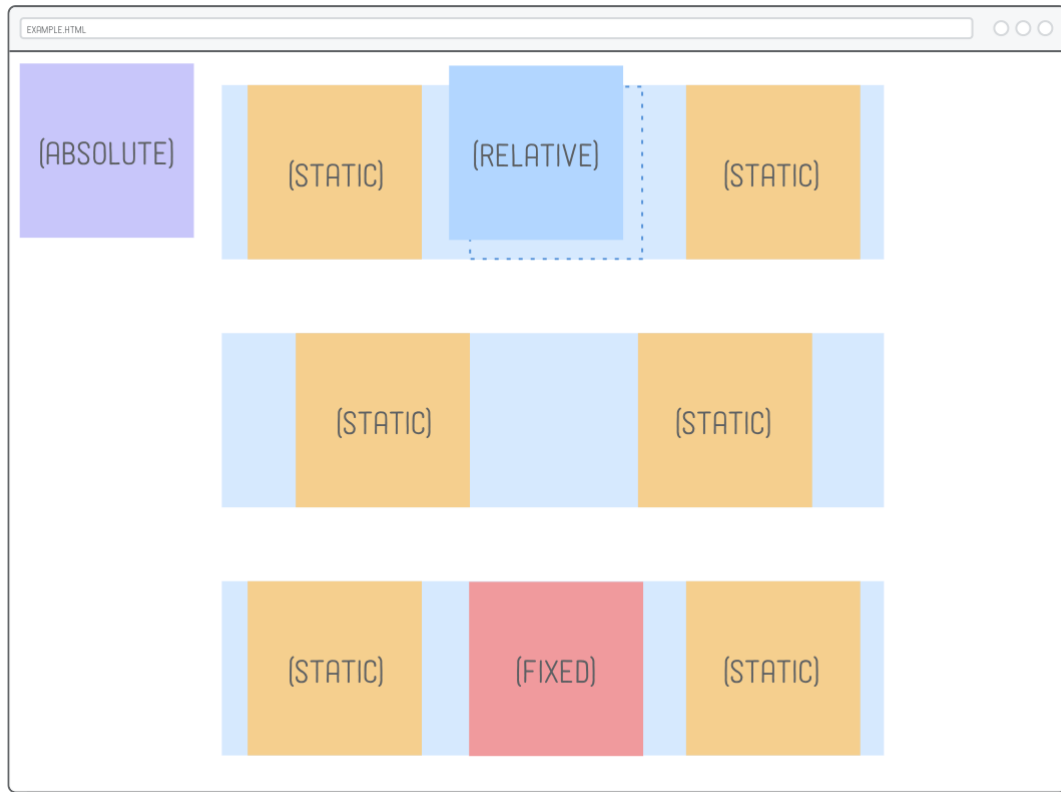


ABSOLUTE POSITIONING

Let's take a look by adding the following rule to our stylesheet:

```
.item-absolute {  
  position: absolute;  
  top: 10px;  
  left: 10px;  
}
```

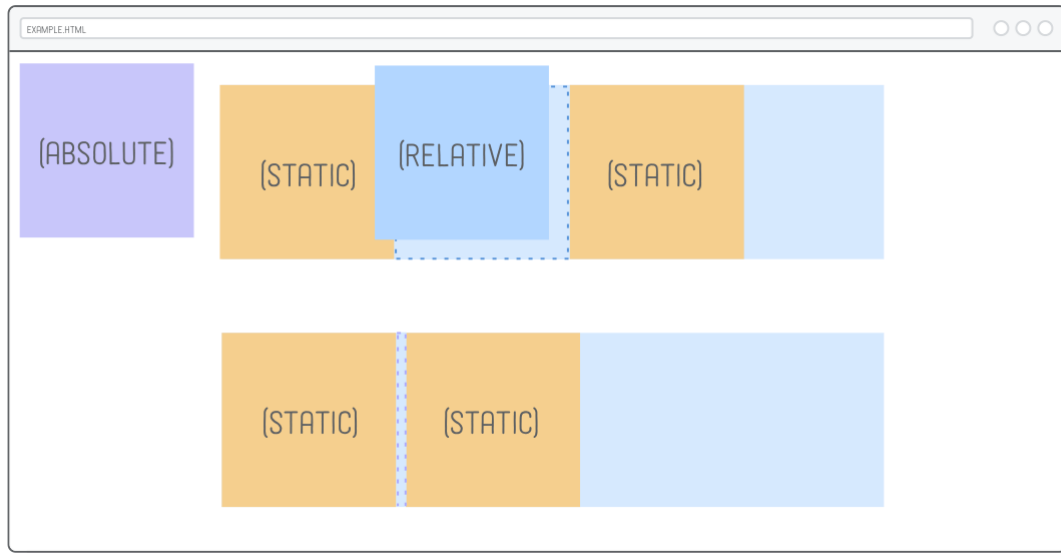
Our HTML structure is the exact same as the previous example, but this will stick the purple image in the top-left corner of the browser window. You can also try setting a `bottom` or `right` value to get a clearer idea of what's going on.



The other interesting effect of `absolute` is that it completely removes an element from the normal flow of the page. This is easier to see with left-aligned elements, so let's temporarily change the `justify-content` property in our `.example` rule:

```
.example {  
  display: flex;  
  justify-content: flex-start; /* Update this */  
  /* ... */  
}
```

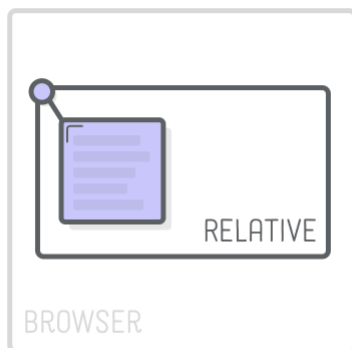
In our relative positioning example (the first row), there's still a space where the positioned element used to be, but with absolute positioning, that space has vanished. It's as if `.item-absolute` doesn't even exist to its parent and surrounding elements. Be sure to change the `justify-content` back to `space-around` before moving on.



This behavior isn't really all that useful most of the time because it would mean *everything* on your page needs to be absolutely positioned—otherwise we'd get unpredictable overlaps of static elements with absolute elements. So, why does `absolute` even exist?

(relatively) absolute positioning

Absolute positioning becomes much more practical when it's relative to some other element that *is* in the static flow of the page. Fortunately, there's a way to change the coordinate system of an absolutely positioned element.

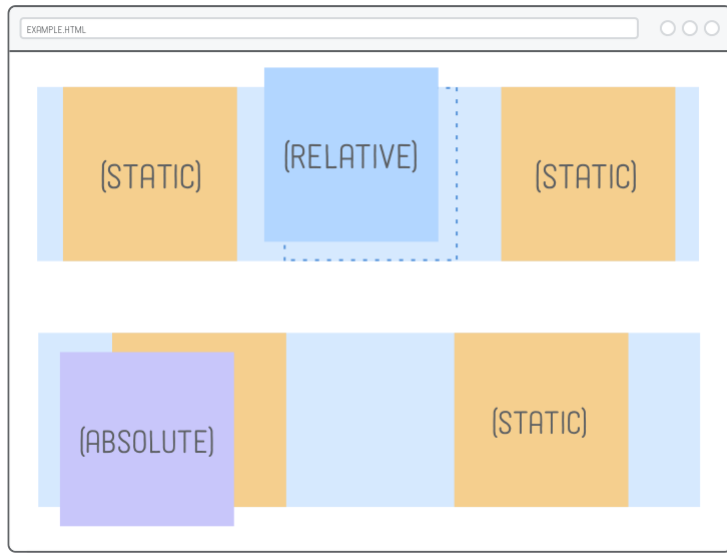


RELATIVELY ABSOLUTE POSITIONING

Coordinates for absolute elements are always relative to the closest container that is a positioned element. It only falls back to being relative to the browser when none of its ancestors are positioned. So, if we change `.item-absolute`'s parent element to be relatively positioned, it should appear in the top-left corner of *that* element instead of the browser window.

```
.absolute {
  position: relative;
}
```

The `.absolute` div is laid out with the normal flow of the page, and we can manually move around our `.item-absolute` wherever we need to. This is great, because if we want to alter the normal flow of the container, say, for a mobile layout, any absolutely positioned elements will automatically move with it.



Notice how we didn't specify any offset coordinates for `.absolute`. We're using relative positioning for the sole purpose of letting our absolute element hook back into the normal flow of the page. This is how we safely combine absolute positioning with static positioning.

fixed positioning

"Fixed positioning" has a lot in common with absolute positioning: it's very manual, the element is removed from the normal flow of the page, and the coordinate system is relative to the entire browser window. The key difference is that fixed elements don't scroll with the rest of the page.



FIXED POSITIONING

Go ahead and update our third example to use fixed positioning:

```
.item-fixed {  
  position: fixed;  
  bottom: 0;  
  right: 0;  
}
```

This will place the red image in the bottom-right corner of the screen. Try scrolling the page, and you'll discover that it doesn't move with the rest of the elements on the page, while the absolutely positioned purple image does.

This lets you create navigation bars that always stay on the screen, as well as those annoying pop-up banners that never go away.

positioned elements for animation

This is a little out of scope, since this tutorial is about HTML and CSS, not JavaScript. However, animation is one of the primary use cases for relative and absolute positioning, so let's take a little peek into the future by animating one of our elements.

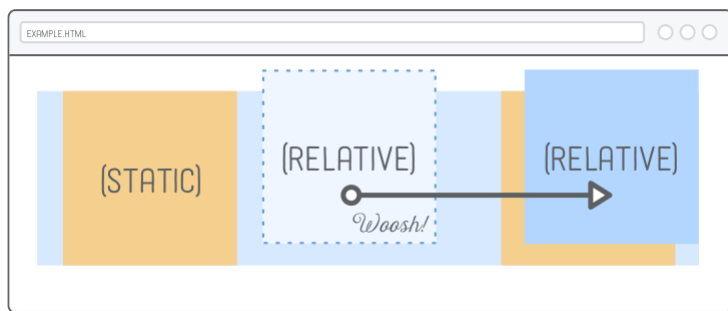
These advanced positioning schemes allow JavaScript to move elements around while avoiding any kind of interaction with surrounding elements. For instance, try copying-and-pasting the following into `schemes.html` after the third `.container` element. The `<script>` element should be the last thing inside of `<body>`.

```
<script>
  var left = 0;

  function frame() {
    var element = document.querySelector('.item-relative');
    left += 2;
    element.style.left = left + 'px';
    if (left >= 300) {
      clearInterval(id)
    }
  }

  var id = setInterval(frame, 10)
</script>
```

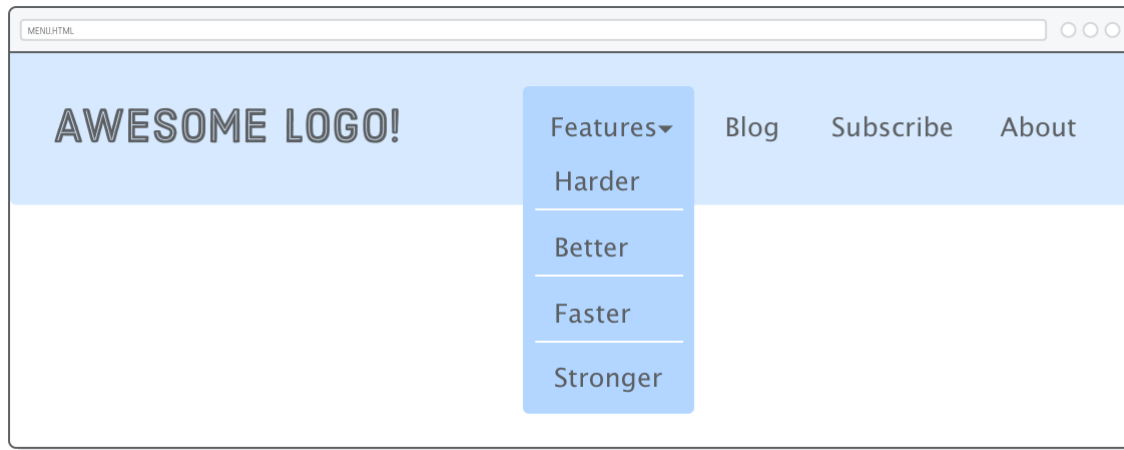
This JavaScript code creates a simple animation that continually updates the `left` property of the `.item-relative`. When you reload the page, you should see the blue image float to the right edge of its container.



This is a pretty rudimentary example, but you can hopefully see how it's applicable to fancy UI animations. If you were to try to achieve the same effect by manipulating the `margin` or `padding` properties, you would inadvertently move the statically positioned boxes and/or the containing `.example` element, too.

positioned elements for menus

So, those are all the techniques. Let's do something *advanced* with them! The rest of this chapter applies our newfound skills towards a fancy navigation menu with an interactive dropdown for one of its links. We'll be building this page entirely from scratch.



Fixed positioning will let us make the menu stick to the top of the page, and relative positioning will give us an anchor for the absolutely positioned dropdown. We'll also get a chance to talk about navigation menu best practices and see some practical applications of the pseudo-classes we talked about in *CSS Selectors*.

For starters, we need a new web page called `menu.html` that has a header and a simple top-level menu:

```
<!DOCTYPE html>
<html lang='en'>
  <head>
    <meta charset='UTF-8' />
    <title>Awesome!</title>
    <link href='menu.css' rel='stylesheet' />
  </head>
  <body>

    <div class='header'>
      <div class='logo'><img src='images/awesome-logo.svg' /></div>
      <ul class='menu'>
        <li class='dropdown'><span>Features ▼</span></li>
        <li><a href='#'>Blog</a></li>
        <li><a href='#'>Subscribe</a></li>
        <li><a href='#'>About</a></li>
      </ul>
    </div>

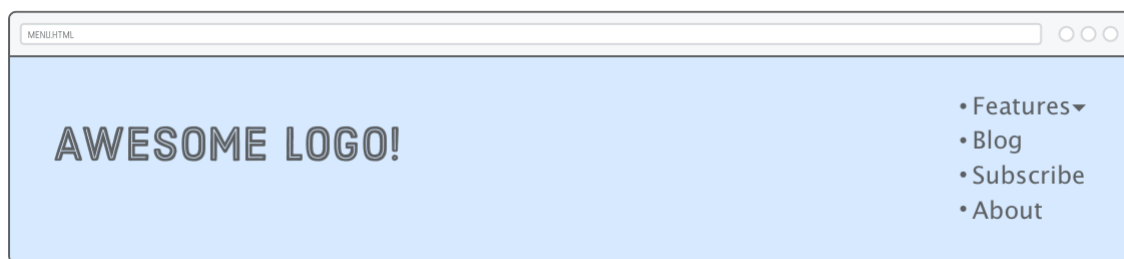
  </body>
</html>
```

Navigation menus should almost always be marked up as a `` list instead of a bunch of `<div>` elements. These semantics make your site's navigation much more accessible to search engines. Also notice how we're preparing for our dropdown menu by adding a `class` attribute to the first `` in the list. That `` will allow us to differentiate the label from the submenu it reveals.

Next, we need a new stylesheet called `menu.css` that makes our `.header` look a little bit more like a header, among other things:

```
* {  
  margin: 0;  
  padding: 0;  
  box-sizing: border-box;  
}  
  
body {  
  height: 1200px;  
  font-size: 18px;  
  font-family: sans-serif;  
  color: #5D6063;  
}  
  
a:link,  
a:visited {  
  color: #5D6063;  
  text-decoration: none;  
}  
a:hover {  
  text-decoration: underline;  
}  
  
.header {  
  position: fixed;  
  display: flex;  
  justify-content: space-between;  
  
  width: 100%;  
  padding: 50px;  
  background: #D6E9FE;  
}
```

This should all be familiar, but note the `fixed` position of the `.header`, which keeps our navigation menu on top of any content that would go into the page.



inline menu items

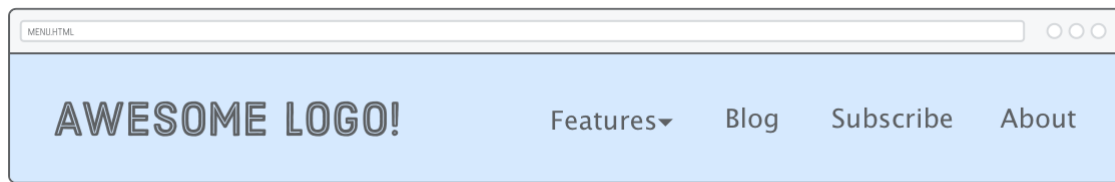
Despite being marked up as unordered lists, the navigation menus for most websites don't actually look like a list. We can fix this by making the list items inline boxes instead of block boxes via the `display` property. Add the following to `menu.css`:

```
.menu {
  margin-top: 15px;
}

.menu > li {
  display: inline;
  margin-right: 50px;
}

.menu > li:last-of-type {
  margin-right: 0;
}
```

We have to use child selectors (https://developer.mozilla.org/en-US/docs/Web/CSS/Child_selectors) here instead of descendant selectors because we only want to select `` elements that are directly inside the `.menu`. This will become important once we add our submenu, which has its own `` elements that we don't want to style with this rule. This snippet also adds margins to all the list items, but removes it from the final `` using the `:last-of-type` pseudo-class. This is a pretty common technique for creating margins *between* items.



submenus

Our submenu is going to look just like the top-level menu, except the whole thing will be nested inside a list item. Change the `.menu` element to match the following, ensuring that the entire `.features-menu` list is wrapped in the first `` of the `.menu` element.

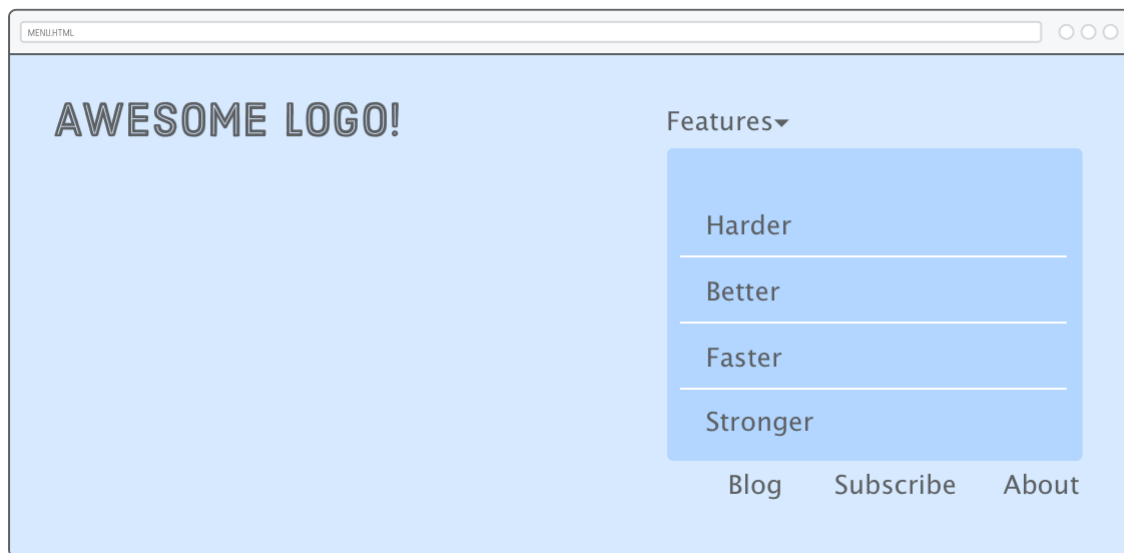
```
<ul class='menu'>
  <li class='dropdown'><span>Features &#9662;</span>
    <ul class='features-menu'>                <!-- Start of submenu -->
      <li><a href='#'>Harder</a></li>
      <li><a href='#'>Better</a></li>
      <li><a href='#'>Faster</a></li>
      <li><a href='#'>Stronger</a></li>
    </ul>                                     <!-- End of submenu -->
  </li>
  <li><a href='#'>Blog</a></li>                <!-- These are the same -->
  <li><a href='#'>Subscribe</a></li>
  <li><a href='#'>About</a></li>
</ul>
```

This provides a lot of crucial information for search engines. It allows Google to see that all these new items are associated with the **Features** label and that they form an isolated section of our website. You should always mark up complex navigation menus with this kind of structure.

As for the CSS, we'll deal with the interactive dropdown part later. Right now, let's just get our submenu looking the way we want it to. Add some simple styles so we can see the box we're trying to position:

```
.features-menu {  
  display: flex;  
  flex-direction: column;  
  background: #B2D6FF;  
  border-radius: 5px;  
  padding-top: 60px;  
}  
  
.features-menu li {  
  list-style: none;  
  border-bottom: 1px solid #FFF;  
  
  padding: 0 40px 10px 20px;  
  margin: 10px;  
}  
  
.features-menu li:last-of-type {  
  border-bottom: none;  
}
```

The submenu itself is styled correctly, but it's showing up in the wrong place and severely messing up the rest of our top-level menu items. This should be expected because it's still statically positioned, which means it still interacts with its parent and surrounding elements.



To create our desired layout, we need to call on our new CSS positioning skills.

(relatively) absolute submenus

We want our other top-level menu items to display just like they did before we added the submenu, as if the submenu wasn't even there. Wait a second...that's the exact behavior of absolutely positioned elements. Let's give it a shot. Add a few lines to the `.features-menu` rule:

```
.features-menu {  
  display: flex;  
  flex-direction: column;  
  background: #B2D6FF;  
  border-radius: 5px;  
  padding-top: 60px;  
  
  position: absolute;      /* Add these */  
  top: -25px;  
  left: -30px;  
}
```

Great! The submenu is no longer part of the static flow of the page, so our top-level menu items are back to normal. However, the submenu should appear underneath the **Features** label—not in the corner of the browser window. What a coincidence...we just learned how to do that!

The submenu resides in `<li class='dropdown'>`. Turning that into a positioned element should change the coordinate system used by our absolutely positioned `.features-menu`:

```
.dropdown {  
  position: relative;  
}
```

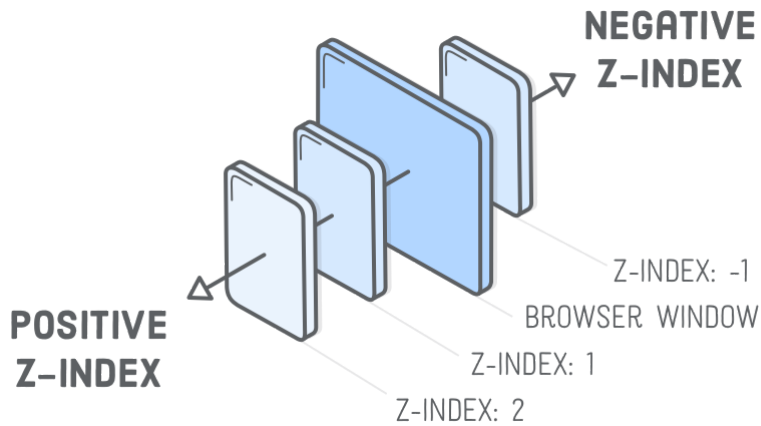
Ok, next problem. Our submenu is in the right spot, but now it's covering up the **Features** label.



z-index

We've never had to deal with "depth" issues before. Until now, all our HTML elements rendered above or below one another in an intuitive way. But, since we're doing advanced stuff, relying on the browser to determine which elements appear on top of other ones isn't going to cut it.

The `z-index` property lets you control the depth of elements on the page. If you think of your screen as 3D space, negative `z-index` values go farther into the page, and positive ones come out of the page.

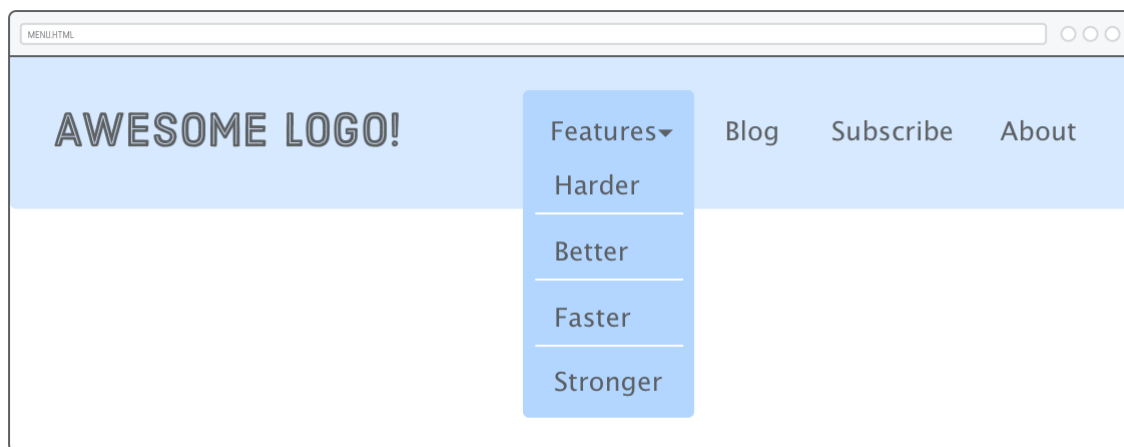


In other words, the `.features-menu` element needs to have a lower `z-index` than the **Features** label. The default `z-index` value is `0`, so let's make both of them higher than that. We conveniently wrapped the **Features** label in a ``, allowing us to style it via a child selector, like so:

```
.dropdown > span {
  z-index: 2;
  position: relative; /* This is important! */
  cursor: pointer;
}

.features-menu {
  /* ... */
  z-index: 1;
}
```

The **Features** label should now appear on top of the submenu. Take note of that `position: relative;` line. It's *required* because only positioned elements pay attention to their `z-index` property. This is easy to forget, so make a mental note for the next time you're having depth issues and your CSS rules don't seem to have any effect.



We threw in an example of the `cursor` property to make it look like a link when the user hovers over the label. You can read more about it at Mozilla Developer Network (<https://developer.mozilla.org/en-US/docs/Web/CSS/cursor>).

pseudo-classes for dropdown menus

Alright! Submenu done! Our final task is to hide it until the user hovers over it. Remember that `:hover` pseudo-class from the *CSS Selectors* chapter? We can use that to turn our submenu into an interactive dropdown.

First, we need to change our existing `.features-menu` rule to only show the submenu when the user hovers over it by adding a `:hover` descendant selector. Update the `.features-menu` selector to match the following:

```
.dropdown:hover .features-menu {    /* This used to be `.features-menu` */
  display: flex;                    /* Leave everything else alone */
  flex-direction: column;
  background: #B2D6FF;
  /* ... */
}
```

Then, we need to initially hide the submenu using the `display` property. Add a new rule to `menu.css`:

```
.features-menu {                                /* Add this as a new rule */
  display: none;
}
```

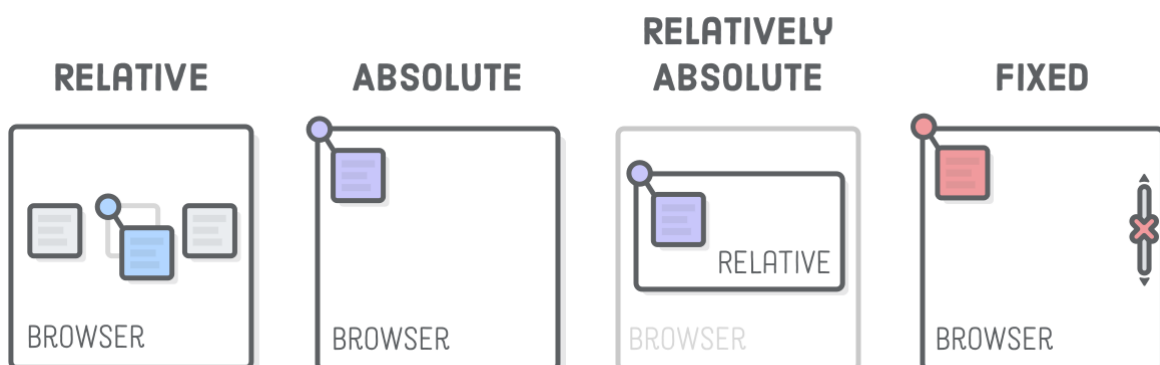
Setting `display` to `none` makes an element completely disappear. By overriding that value with `flex` in the `:hover` rule, we're effectively telling the browser to show the `.features-menu` again. This clever combination of descendant selectors and pseudo-classes enables us to conditionally hide or show an element.

summary

In this chapter, we took a look at four new CSS layout schemes:

- Relative
- Absolute
- Relatively absolute
- Fixed

Relative positioning was for tweaking the position of an element without affecting its surrounding boxes. Absolute positioning took elements out of the static flow of the page and placed them relative to the browser window, while relatively absolute positioning allowed us to hook back into the static flow of the page. Finally, fixed positioning let us make elements that didn't scroll with the rest of the page.



We used these new positioning techniques to create a rather sophisticated navigation menu. If it felt complicated, that's cause it was. But don't worry, you shouldn't feel pressure to *memorize* the HTML and CSS behind our menu. Your goal should be to have the ability to reference this example three months from now and understand what all

those `position: relative;` and `position: absolute;` declarations are doing.

This menu was also a pretty good example of how starting with the HTML markup makes life a lot easier. First, we created the semantic structure we wanted. *Then*, we wrote some fancy CSS to position the boxes right where we wanted them. Whenever you're looking at a complicated mockup and not sure where to start, this is good way to approach the problem.

There's still one big issue with our menu: it's not built for mobile devices. Smartphones and tablets don't have a way to hover, and our layout doesn't display well when the browser is narrower than 960 pixels. The former requires a little bit of JavaScript magic (or some *really* advanced CSS), so we'll leave that for another tutorial. But, we will be able to tackle the latter problem with some responsive design in the next chapter.

Section 7. RESPONSIVE DESIGN

Section 8. RESPONSIVE IMAGES

Section 9. HTML FORMS

Section 10. WEB TYPOGRAPHY