TILING BACKGROUND IMAGES

Excerpt from:
Learning Web Design, 5e

by Jennifer Robbins
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Author's Note: *This article originally appeared in "Chapter 13, Colors and Backgrounds" in Learning Web Design, 5e. It was removed from the 6th edition due to space limitations, but I have made it available here to provide additional detail and practice. If you have read the "Colors and Backgrounds" chapter in the 6th edition, you will find that some text is repeated.*

We've seen how to add images to the content of the document using the **img** element, but most decorative images are added to pages and elements as backgrounds with CSS. After all, decorations such as tiling background patterns are firmly part of presentation, not structure. We've come a long way from the days when sites were giant graphics cut up and held together with tables (*shudder*).

In this section, we'll look at the collection of properties used to place and push around background images, starting with the basic **background-image** property.

IN THIS ARTICLE

ADDING A BACKGROUND IMAGE

The **background-image** property adds a background image to any element. Its primary job is to provide the location of the image file.

background-image

Values:	url(*location of image*) | none
Default:	none
Applies to:	all elements
Inherits:	no

The value of **background-image** is a sort of URL holder that contains the location of the image (see **Note**).

NOTE

The proper term for that "URL holder" is a functional notation. It is the same syntax used to list decimal and percentage RGB values.

■ **DESIGN TIP**

Tiling Background Images

When working with background images, keep these guidelines and tips in mind:

- Use a simple image that won't interfere with the legibility of the text over it.
- Always provide a background-color value that matches the primary color of the background image. If the background image fails to display, at least the overall design of the page will be similar. This is particularly important if the text color would be illegible against the browser's default white background.
- As usual for the web, keep the file size of background images as small as possible.

■ **AT A GLANCE**

The properties related to the background are:

```
background-color
background-image
background-repeat
background-position
background-attachment
background-clip
background-size
background
```

The URL is relative to wherever the CSS rule is at the time. If the rule is in an embedded style sheet (a **style** element in the HTML document), then the pathname in the URL should be relative to the location of the HTML file. If the CSS rule is in an external style sheet, then the pathname to the image should be relative to the location of the *.css* file.

As an alternative, providing site root relative URLs for images ensures that the background image can be found regardless of the location of the style rules. The root directory is indicated by a slash at the beginning of the URL. For example:

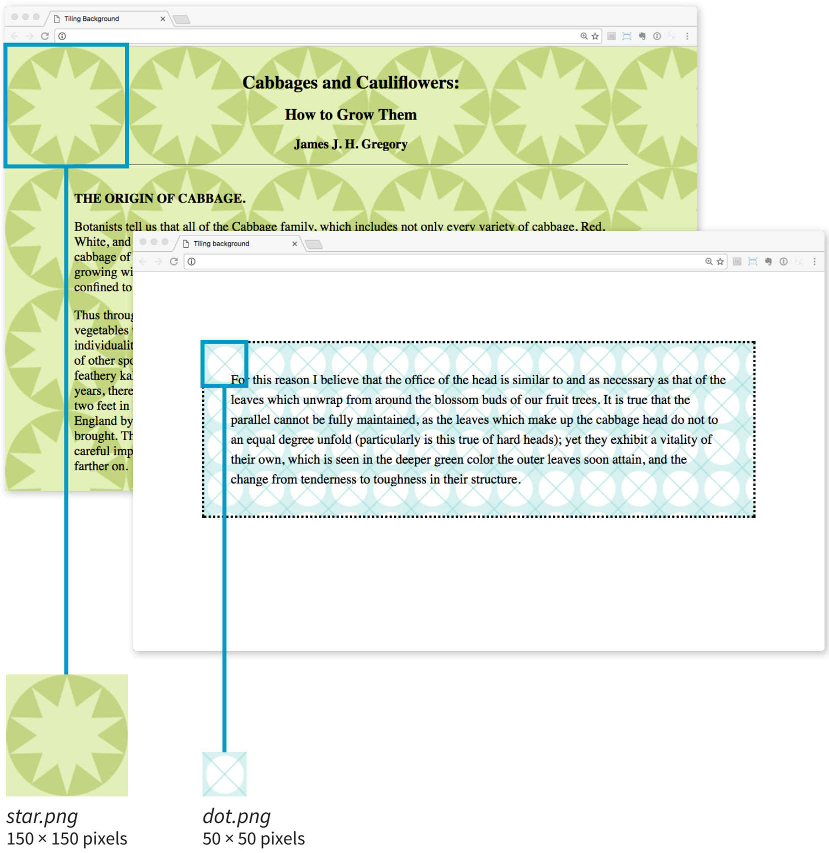
```
background-image: url(/images/background.jpg);
```

The downside, as for all site root relative URLs, is that you won't be able to test it locally (from your own computer) unless you have it set up as a server.

These examples and FIGURE A show background images applied behind a whole page (**body**) and a single **blockquote** element with padding and a border applied.

```
body {
  background-image: url(star.gif);
}

blockquote {
  background-image: url(dot.gif);
  padding: 2em;
  border: 4px dashed;
}
```



Cabbages and Cauliflowers:

How to Grow Them

James J. H. Gregory

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FIGURE A. Examples of tiling background images added with the **`background-image`** property.

Here you can see the default behavior of **`background-image`**. The image starts in the top-left corner and tiles horizontally and vertically until the entire element is filled (although you'll learn how to change that in a moment). Like background colors, tiling background images fill the area behind the content area, fill the extra padding space around the content, and extend to the outer edge of the border (if there is one). You can change the background painting area with the **`background-clip`** property.

If you provide both a **`background-color`** and a **`background-image`** to an element, the image is placed on top of the color. In fact, it is recommended that you *do* provide a backup color that is similar in hue, in the event that the image fails to download.

You can get your first experience adding a tiling background image in EXERCISE A.

EXERCISE A | ADDING A TILING BACKGROUND IMAGE

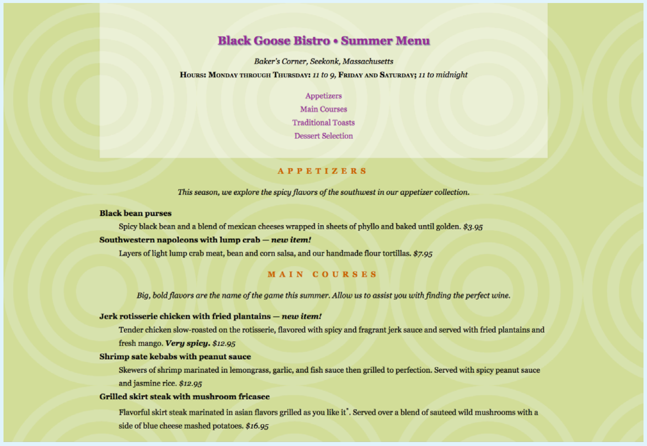
In this exercise, we're going to add a simple tiling background image to the menu. The files and images for this exercise are available with the exercise materials provided for *Learning Web Design, 6e* (*learningwebdesign/6e/materials*).

Add a declaration to the **body** style rule that makes the image bullseye.png tile in the background of the page. Be sure to include the pathname relative to the style sheet (in this case, the current HTML document).

```
background-image: url(images/bullseye.png);
```

Easy, isn't it? When you save and view the page in the browser, it should look like Figure B.

I want to point out that bullseye.png is a slightly transparent PNG graphic, so it blends into any background color. Try temporarily changing the **`background-color`** for the **body** element by adding a second **`background-color`** declaration lower in the stack so it overrides the previous one. Play around with different colors and notice how the circles blend in. When you are done experimenting, delete the second declaration so the background is green again and you're ready to go for upcoming exercises.



Black Goose Bistro • Summer Menu

Baker's Corner, Seekonk, Massachusetts

Hours: Monday through Thursday: *11 to 9*, Friday and Saturday; *11 to midnight*

Appetizers
Main Courses
Traditional Toasts
Dessert Selection

APPETIZERS

This season, we explore the spicy flavors of the southwest in our appetizer collection.

Black bean purses
Spicy black bean and a blend of mexican cheeses wrapped in sheets of phyllo and baked until golden. *$3.95*
Southwestern napoleons with lump crab — *new item!*
Layers of light lump crab meat, bean and corn salsa, and our handmade flour tortillas. *$7.95*

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Jerk rotisserie chicken with fried plantains — *new item!*
Tender chicken slow-roasted on the rotisserie, flavored with spicy and fragrant jerk sauce and served with fried plantains and fresh mango. ***Very spicy.*** *$12.95*
Shrimp sate kebabs with peanut sauce
Skewers of shrimp marinated in lemongrass, garlic, and fish sauce then grilled to perfection. Served with spicy peanut sauce and jasmine rice. *$12.95*
Grilled skirt steak with mushroom fricasee
Flavorful skirt steak marinated in asian flavors grilled as you like it*. Served over a blend of sauteed wild mushrooms with a side of blue cheese mashed potatoes. *$16.95*

FIGURE B. The menu with a simple tiling background image.

BACKGROUND REPEATING

As we saw in FIGURES A and B, images tile left and right, up and down, when left to their own devices. You can change this behavior with the **`background-repeat`** property.

background-repeat

Values:	`repeat` | `no-repeat` | `repeat-x` | `repeat-y` | `space` | `round`
Default:	`repeat`
Applies to:	all elements
Inherits:	no

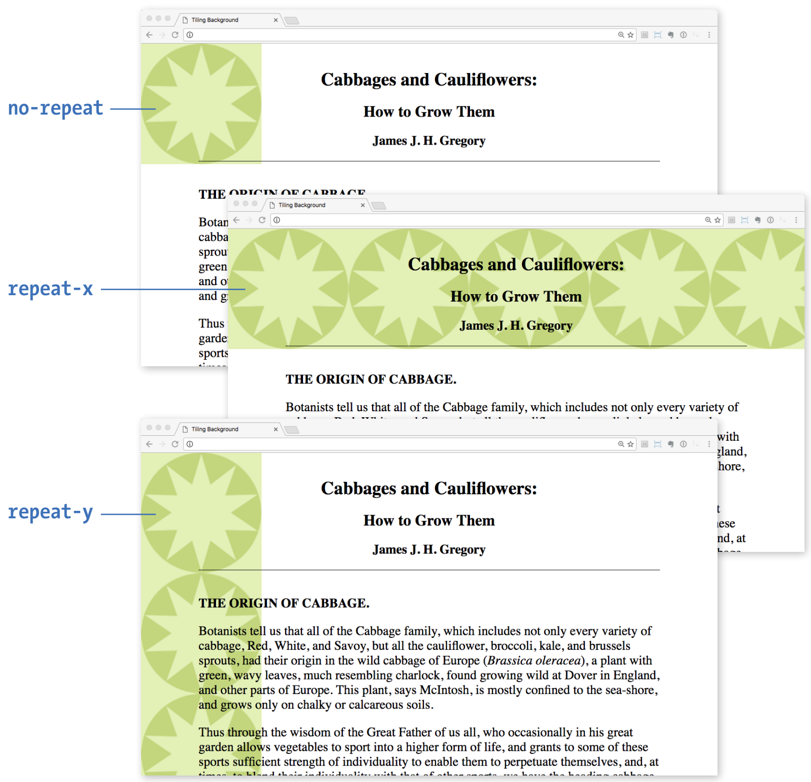
If you want a background image to appear just once, use the **`no-repeat`** keyword value:

```
body {
  background-image: url(star.gif);
  background-repeat: no-repeat;
}
```

You can also restrict the image to tiling only horizontally (**`repeat-x`**) or vertically (**`repeat-y`**), as shown in these examples.

```
body {
  background-image: url(star.gif);
  background-repeat: repeat-x;
}
body {
  background-image: url(star.gif);
  background-repeat: repeat-y;
}
```

FIGURE C shows examples of each of these keyword values. Notice that in all the examples, the tiling begins in the top-left corner of the element (or browser window when an image is applied to the **body** element). In the next section, I'll show you how to change that.



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Botanists tell us that all of the Cabbage family, which includes not only every variety of cabbage, Red, White, and Savoy, but all the cauliflower, broccoli, kale, and brussels sprouts, had their origin in the wild cabbage of Europe (*Brassica oleracea*), a plant with green, wavy leaves, much resembling charlock, found growing wild at Dover in England, and other parts of Europe. This plant, says McIntosh, is mostly confined to the sea-shore, and grows only on chalky or calcareous soils.

Thus through the wisdom of the Great Father of us all, who occasionally in his great garden allows vegetables to sport into a higher form of life, and grants to some of these sports sufficient strength of individuality to enable them to perpetuate themselves, and, at

FIGURE C. Turning off automatic tiling with no-repeat (top), applying horizontal-axis tiling with repeat-x (middle), and applying vertical-axis tiling with repeat-y (bottom).

The remaining keyword values, **space** and **round**, attempt to fill the available background painting area an even number of times.

When **background-repeat** is set to **space**, the browser calculates how many background images can fit across the width and height of the background area, then adds equal amounts of space between each image. The result is even rows and columns and no clipped images (FIGURE D, top).

The **`round`** keyword makes the browser squish the background image horizontally and vertically (not necessarily proportionally) to fit in the background area an even number of times (FIGURE D, bottom).

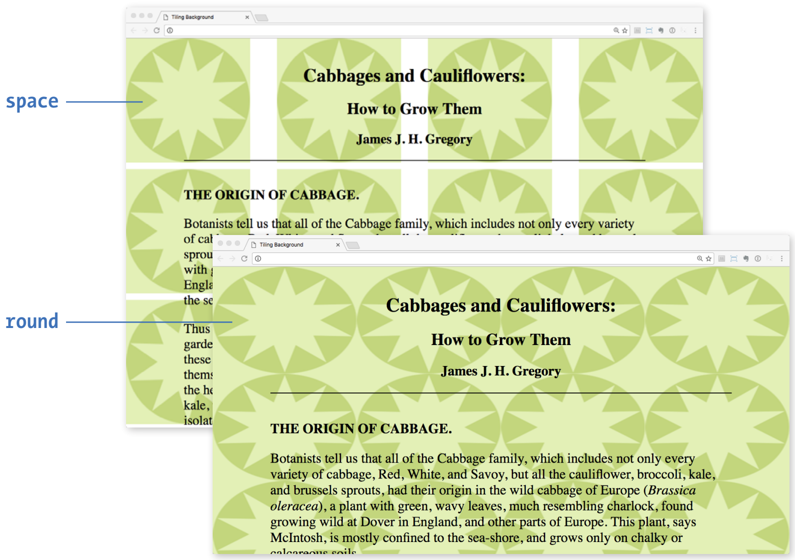

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FIGURE D. Examples of **`space`** and **`round`** keywords for **`background-repeat`**. The "space" example would be less clunky if the background color matched the image, but I've left it white to better demonstrate how the **`space`** value works.

Let's try out some background repeating patterns in EXERCISE B.

BACKGROUND POSITION

The **`background-position`** property specifies the position of the origin image in the background. You can think of the origin image as the first image that is placed in the background from which tiling images extend. Here is the property and its various values.

`background-position`

Values: *length measurement* | *percentage* | `left` | `center` | `right` | `top` | `bottom`

Default: 0% 0% (same as `left top`)

Applies to: all elements

Inherits: no

To position the origin image, provide horizontal and vertical values that describe where to place it. There are a variety of ways to do it.

EXERCISE B | CONTROLLING TILE DIRECTION

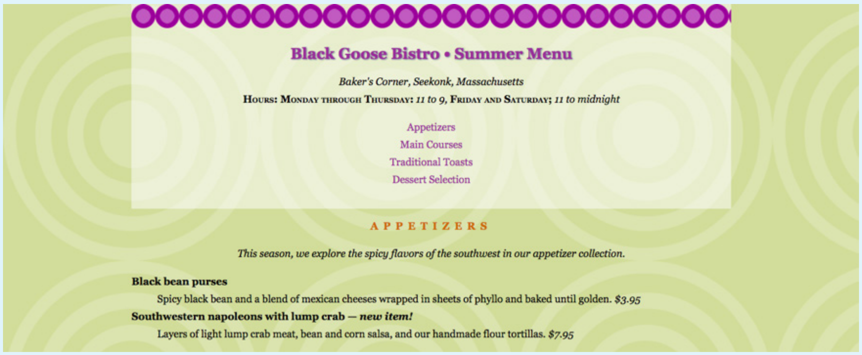
Now let's try some slightly more sophisticated tiling on the sample article page. This time we'll add a tiling background just along the top edge of the **header** element.

1. In the **header** rule, add the image *purpledot.png* and set it to repeat horizontally only.

```
header {
  margin-top: 0;
  padding: 3em 1em 2em 1em;
  text-align: center;
  background-color: rgba(255,255,255,.5);
  background-image: url(images/purpledot.png);
  background-repeat: repeat-x;
}
```

2. Save the file and look at it in the browser. It should look something like FIGURE E. I recommend resizing your browser window to wider and narrower sizes and paying attention to the position of the background pattern. See how it's always anchored on the left? You're going to learn how to adjust position next. Try changing the style rule to make the dot repeat vertically only, then make it not repeat at all (set it back to **repeat-x** and save when you're done).
3. Finally, try out the **space** and round repeat values on the **body** background image and see if you like the effect. Note that the tiles are evenly spaced within the body of the document, not just the viewport, so you may see some cut-off circles at the bottom edge of your browser. Delete the **background-repeat** declaration so it goes back to the default **repeat** for upcoming exercises.

```
body {
  …
  background-repeat: space;
}
```



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Black bean purses
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Southwestern napoleons with lump crab — *new item!*
Layers of light lump crab meat, bean and corn salsa, and our handmade flour tortillas. *$7.95*

FIGURE E. Adding a horizontal tiling image to the **header**.

Keyword positioning

The keyword values (**`left`**, **`right`**, **`top`**, **`bottom`**, and **`center`**) position the origin image relative to the outer edges of the element's padding. For example, **`left`** positions the image all the way to the left edge of the background area. The default origin position corresponds to "**`left top`**".

Keywords are typically used in pairs, as in these examples:

```
background-position: left bottom;
background-position: right center;
```

The keywords may appear in any order. If you provide only one keyword, the missing keyword is assumed to be **`center`**. Thus, **`background-position: right`** has the same effect as **`background-position: right center`**.

Length measurements

Specifying position using length measurements such as pixels or ems indicates an amount of offset from the top-left corner of the element to the top-left corner of the background origin image. When you are providing length values, the horizontal measurement always goes first. Specifying negative values is allowed and causes the image to hang outside the visible background area.

When you are providing length or percentage values, the horizontal measurement always goes first.

This example positions the top-left corner of the image 200 pixels from the left edge and 50 pixels down from the top edge of the element (or more specifically, the padding edge by default).

```
background-position: 200px 50px;
```

Percentages

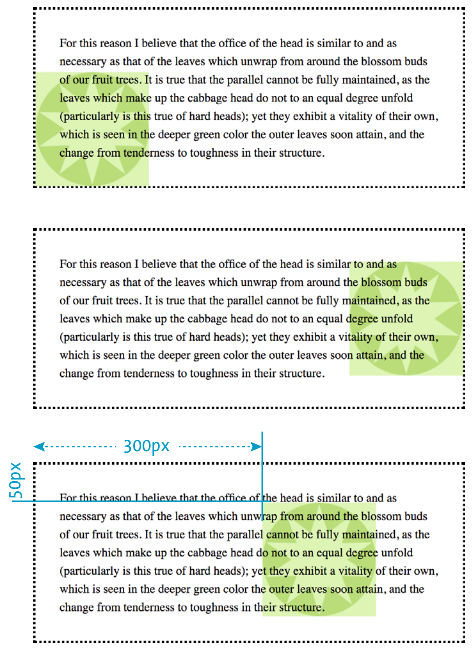
Percentage values are provided in horizontal/vertical pairs, with **`0% 0%`** corresponding to the top-left corner and **`100% 100%`** corresponding to the bottom-right corner. As with length values, the horizontal measurement always goes first.

It is important to note that the percentage value applies to both the canvas area *and* the image. A horizontal value of 25% positions the point 25% from the left edge of the image at a point that is 25% from the left edge of the background positioning area. A vertical value of 100% positions the bottom edge of the image at the bottom edge of the positioning area.

As with keywords, if you provide only one percentage, the other is assumed to be 50% (centered).

```
background-position: 25% 100%;
```

FIGURE F shows the results of each of the aforementioned **`background-position`** examples with the **`background-repeat`** set to **`no-repeat`** for clarity. It is possible to position the origin image and let it tile from there, in both directions or just horizontally or vertically. When the image tiles, the position of the initial image might not be obvious, but you can use **`background-position`** to make a tile pattern start at a point other than the left edge of the image. This might be used to keep a background pattern centered and symmetrical.



For this reason I believe that the office of the head is similar to and as necessary as that of the leaves which unwrap from around the blossom buds of our fruit trees. It is true that the parallel cannot be fully maintained, as the leaves which make up the cabbage head do not to an equal degree unfold (particularly is this true of hard heads); yet they exhibit a vitality of their own, which is seen in the deeper green color the outer leaves soon attain, and the change from tenderness to toughness in their structure.

```
background-position: left bottom;
```

For this reason I believe that the office of the head is similar to and as necessary as that of the leaves which unwrap from around the blossom buds of our fruit trees. It is true that the parallel cannot be fully maintained, as the leaves which make up the cabbage head do not to an equal degree unfold (particularly is this true of hard heads); yet they exhibit a vitality of their own, which is seen in the deeper green color the outer leaves soon attain, and the change from tenderness to toughness in their structure.

```
background-position: right center;
or
background-position: right;
```

For this reason I believe that the office of the head is similar to and as necessary as that of the leaves which unwrap from around the blossom buds of our fruit trees. It is true that the parallel cannot be fully maintained, as the leaves which make up the cabbage head do not to an equal degree unfold (particularly is this true of hard heads); yet they exhibit a vitality of their own, which is seen in the deeper green color the outer leaves soon attain, and the change from tenderness to toughness in their structure.

```
background-position: 300px 50px;
```

FIGURE F. Positioning a non-repeating background image. If these background images were allowed to repeat, they would extend left and right and/or up and down from the initial positions.

Background Edge Offsets

The CSS3 specification also includes a four-part syntax for **background-position** that allows you to specify an offset (in length or percentage from a particular edge). This is the syntax:

`background-position:` *`edge-keyword offset edge-keyword offset`*`;`

In this example, an origin image is positioned 50 pixels from the right edge and 50 pixels from the bottom of the element's positioning area.

```
background-position: right
50px bottom 50px;
```

BACKGROUND POSITION ORIGIN

Notice in FIGURE F that when the origin image was placed in the corner of an element, it was placed inside the border (only repeated images extend under the border to its outer edge). This is the default position, but you can change it with the **background-origin** property.

background-origin

Values:	border-box | padding-box | content-box
Default:	padding-box
Applies to:	all elements
Inherits:	no

This property defines the boundaries of the background positioning area in the same way **background-clip** defined the background painting area. You can set the boundaries to the **border-box** (so the origin image is placed under the outer edge of the border, **padding-box** (outer edge of the padding, just inside the border), or **content-box** (the actual content area of the element). These terms will become more meaningful once you get more familiar with the box model in the next chapter. In the meantime, FIGURE G shows the results of each of the keyword options.

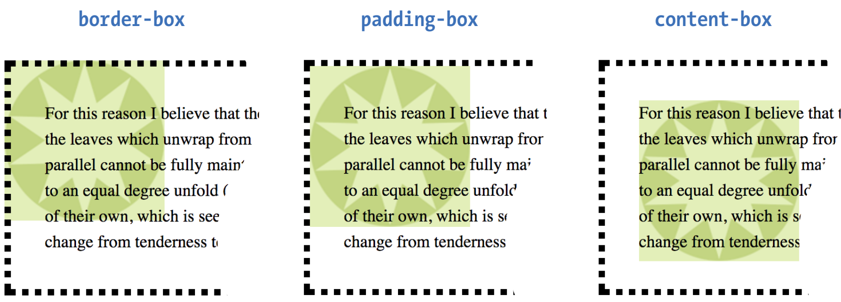


FIGURE G. Examples of **`background-origin`** keywords.

Before we move on to the remaining background properties, check out EXERCISE C to get a feel for background positioning.

BACKGROUND ATTACHMENT

In the previous exercise, I asked you to scroll the page and watch what happens to the background image. As expected, it scrolls along with the document and off the top of the browser window, which is its default behavior. However, you can use the **`background-attachment`** property to free the background from the content and allow it to stay fixed in one position while the rest of the content scrolls.

`background-attachment`

Values: `scroll` | `fixed` | `local`

Default: `scroll`

Applies to: all elements

Inherits: no

With the **`background-attachment`** property, you have the choice of whether the background image scrolls with the content or stays in a fixed position. When an image is **`fixed`**, it stays in the same position relative to the viewport of the browser (as opposed to being relative to the element it fills). You'll see what I mean in a minute (and you can try it yourself in EXERCISE D).

In the following example, a large, non-tiling image is placed in the background of the whole document (the **`body`** element). By default, when the document scrolls, the image scrolls too, moving up and off the page, as shown in FIGURE I. However, if you set the value of **`background-attachment`** to **`fixed`**, it stays where it is initially placed, and the text scrolls up over it.

EXERCISE C | POSITIONING BACKGROUND IMAGES

Let's have some fun with the position of the background image in the menu. First we're going to make some subtle adjustments to the background images that are already there, and then we'll swap them out for a whole different background and play around some more. We are still working with the summer-menu.html document, which should have repeating tile patterns in the **body** and **header** elements.

1. I'm thinking that because the main elements of the menu are centered, it would be nice if the background patterns stayed centered, too. Add this declaration to both the **body** and **header** rules, then save and look at it in the browser. You may not notice the difference until you resize the browser wide and narrow again. Now the pattern is anchored in the center and reveals more or less on both edges, not just the right edge as before.

   ```
   background-position:         center top;
   ```

2. For kicks, alter the **background-position** values so that the purple dots are along the bottom edge of the **header** (**center bottom**). (That doesn't look so good; I'm putting mine back to **top**.) Then try moving the *bullseye.png* down 200 pixels (**center 200px**). Notice that the pattern still fills the entire screen—we moved the origin image down, but the background is still set to tile in all directions. **Figure H** shows the result of these changes.

3. That looks good, but let's get rid of the background on the **body** for now. I want to show you a little trick. During the design process, I prefer to hide styles in comments instead of deleting them entirely. That way I don't need to remember them or type them in again; I only have to remove the comment indicators and they're back. When the design is done and it's time to publish, I strip unused styles out to keep the file size down. Here's how to hide declarations as CSS comments:

   ```
   body {
     …
     background-color: #d2dc9d;
     /*  background-image: url(images/bullseye.png);
     background-position: center 200px; */
   }
   ```

4. Now, add the *blackgoose.png* image (also a semi-transparent PNG) to the background of the page. Set it to not repeat, and center it at the top of the page:

   ```
   background-image:             png);
   url(images/blackgoose.
   background-repeat: no-repeat;
   background-position: center top;
   ```

   Take a look in the browser window and watch the background scroll up with the content when you scroll the page.

5. I want you to get a feel for the various position keywords and numeric values. Try each of these out and look at it in the browser. Be sure to scroll the page and watch what happens. Note that when you provide a percentage or keyword to the vertical position, it is based on the height of the entire document, not just the browser window. You can try your own variations as well.

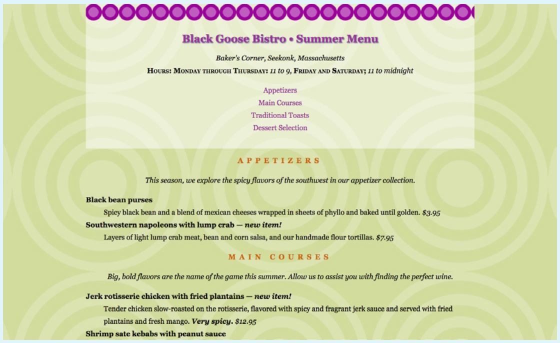
   ```
   background-position: right top;

   background-position: right bottom;

   background-position: left 50%;

   background-position: center 100px;
   ```

6. Leave the image positioned at **center 100px** so you are ready to go for the next exercise. Your page should look like the one shown on the right in **Figure H**.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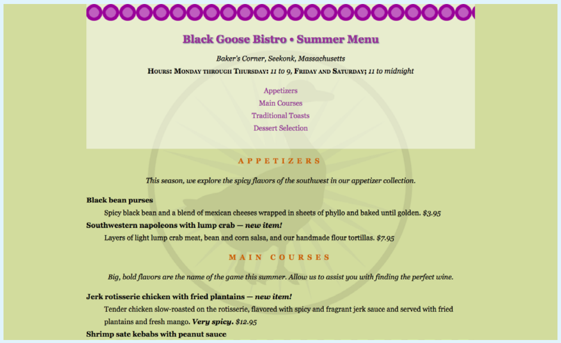
Southwestern napoleons with lump crab — *new item!*
Layers of light lump crab meat, bean and corn salsa, and our handmade flour tortillas. *$7.95*

MAIN COURSES

Big, bold flavors are the name of the game this summer. Allow us to assist you with finding the perfect wine.

Jerk rotisserie chicken with fried plantains — *new item!*
Tender chicken slow-roasted on the rotisserie, flavored with spicy and fragrant jerk sauce and served with fried plantains and fresh mango. ***Very spicy.*** *$12.95*
Shrimp sate kebabs with peanut sauce

Centered background pattern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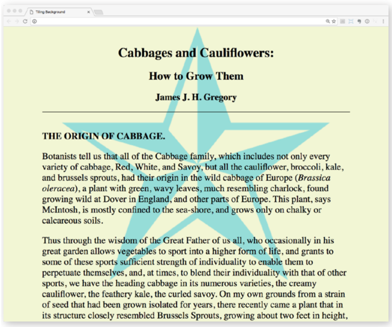
Positioned non-repeating image

FIGURE H. The results of positioning the origin image in the tiling background patterns (left) and positioning a single background logo (right).

```
body {
  background-image: url(images/bigstar.gif);
  background-repeat: no-repeat;
  background-position: center 300px;
  background-attachment: fixed;
}
```

The `local` value, which was added in CSS3, is useful when an element has its own scrolling mechanism. Instead of scrolling with the viewport's scroller, `local` makes the background image fixed to the content of the scrolling element. This keyword is not supported in IE8 and earlier and may also be problematic on mobile browsers.

FIGURE 1. Preventing the background image from scrolling with the **`background-attachment`** property.



Cabbages and Cauliflowers:

How to Grow Them

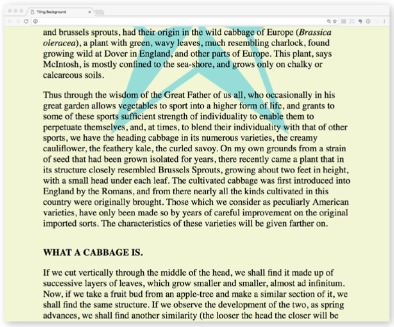
James J. H. Gregory

THE ORIGIN OF CABBAGE.

Botanists tell us that all of the Cabbage family, which includes not only every variety of cabbage, Red, White, and Savoy, but all the cauliflower, broccoli, kale, and brussels sprouts, had their origin in the wild cabbage of Europe (*Brassica oleracea*), a plant with green, wavy leaves, much resembling charlock, found growing wild at Dover in England, and other parts of Europe. This plant, says McIntosh, is mostly confined to the sea-shore, and grows only on chalky or calcareous soils.

Thus through the wisdom of the Great Father of us all, who occasionally in his great garden allows vegetables to sport into a higher form of life, and grants to some of these sports sufficient strength of individuality to enable them to perpetuate themselves, and, at times, to blend their individuality with that of other sports, we have the heading cabbage in its numerous varieties, the creamy cauliflower, the feathery kale, the curled savoy. On my own grounds from a strain of seed that had been grown isolated for years, there recently came a plant that in its structure closely resembled Brussels Sprouts, growing about two feet in height,

A large non-repeating background image in the **body** of the document.



and brussels sprouts, had their origin in the wild cabbage of Europe (*Brassica oleracea*), a plant with green, wavy leaves, much resembling charlock, found growing wild at Dover in England, and other parts of Europe. This plant, says McIntosh, is mostly confined to the sea-shore, and grows only on chalky or calcareous soils.

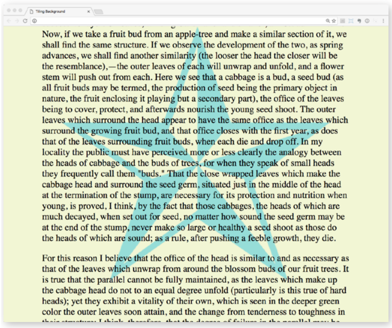
Thus through the wisdom of the Great Father of us all, who occasionally in his great garden allows vegetables to sport into a higher form of life, and grants to some of these sports sufficient strength of individuality to enable them to perpetuate themselves, and, at times, to blend their individuality with that of other sports, we have the heading cabbage in its numerous varieties, the creamy cauliflower, the feathery kale, the curled savoy. On my own grounds from a strain of seed that had been grown isolated for years, there recently came a plant that in its structure closely resembled Brussels Sprouts, growing about two feet in height, with a small head under each leaf. The cultivated cabbage was first introduced into England by the Romans, and from there nearly all the kinds cultivated in this country were originally brought. Those which we consider as peculiarly American varieties, have only been made so by years of careful improvement on the original imported sorts. The characteristics of these varieties will be given farther on.

WHAT A CABBAGE IS.

If we cut vertically through the middle of the head, we shall find it made up of successive layers of leaves, which grow smaller and smaller, almost ad infinitum. Now, if we take a fruit bud from an apple-tree and make a similar section of it, we shall find the same structure. If we observe the development of the two, as spring advances, we shall find another similarity (the looser the head the closer will be

`background-attachment: scroll;`

By default, the background image is attached to the **body** element and scrolls off the page when the page content scrolls.



Now, if we take a fruit bud from an apple-tree and make a similar section of it, we shall find the same structure. If we observe the development of the two, as spring advances, we shall find another similarity (the looser the head the closer will be the resemblance),—the outer leaves of each will unwrap and unfold, and a flower stem will push out from each. Here we see that a cabbage is a bud, a seed bud (as all fruit buds may be termed, the production of seed being the primary object in nature, the fruit enclosing it playing but a secondary part), the office of the leaves being to cover, protect, and afterwards nourish the young seed shoot. The outer leaves which surround the head appear to have the same office as the leaves which surround the growing fruit bud, and that office closes with the first year, as does that of the leaves surrounding fruit buds, when each die and drop off. In my locality the public must have perceived more or less clearly the analogy between the heads of cabbage and the buds of trees, for when they speak of small heads they frequently call them "buds." That the close wrapped leaves which make the cabbage head and surround the seed germ, situated just in the middle of the head at the termination of the stump, are necessary for its protection and nutrition when young, is proved, I think, by the fact that those cabbages, the heads of which are much decayed, when set out for seed, no matter how sound the seed germ may be at the end of the stump, never make so large or healthy a seed shoot as those do the heads of which are sound; as a rule, after pushing a feeble growth, they die.

For this reason I believe that the office of the head is similar to and as necessary as that of the leaves which unwrap from around the blossom buds of our fruit trees. It is true that the parallel cannot be fully maintained, as the leaves which make up the cabbage head do not to an equal degree unfold (particularly is this true of hard heads); yet they exhibit a vitality of their own, which is seen in the deeper green color the outer leaves soon attain, and the change from tenderness to toughness in

`background-attachment: fixed;`

When **`background-attachment`** is set to **`fixed`**, the image stays in its position relative to the browser viewing area and does not scroll with the content.

EXERCISE D | FIXED POSITION

When we last left the bistro menu, we had applied a large, non-repeating logo image to the background of the page. We'll leave it just like that, but we'll use the **`background-attachment`** property to keep it in the same place even when the page scrolls.

```
body {
  …
  background-attachment: fixed;
}
```

Save the document, open it in the browser, and now try scrolling. The background image stays put in the viewing area of the browser. Cool, huh?

For extra credit, see what happens when you fix the attachment of the dot pattern in the **`header`**. (Hint: it stays in the same place, but only within the **`header`** itself. When the **`header`** slides out of view, so does its background.)

BACKGROUND SIZE

OK, we have just one more background image property to cover before we wrap it all up with the **background** shorthand property. So far, the background images we've seen are displayed at the actual size of the image itself. You can change the size of the image using the **background-size** property.

background-size

Values:	*length* | *percentage* | auto | cover | contain
Default:	auto
Applies to:	all elements
Inherits:	no

The most straightforward to specify background size is to provide the dimensions in length units such as pixels or ems. As usual, when two values are provided, the first one is used as the horizontal measurement. If you provide just one value, it is used as the horizontal measurement and the vertical value is set to **auto**. This example resizes the *target.png* background image, which has an intrinsic size of 300 pixels by 300 pixels (FIGURE J).

```
header {
  background-image: url(images/target.png);
  background-size: 600px 150px; }
```

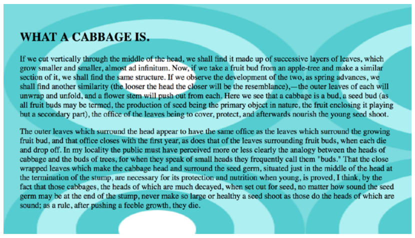
Percentage values are calculated based on the background positioning area, which by default runs to the inside edge of the border. So a horizontal value of 50% does not make the image half its width; rather, it sizes it to 50% of the width of the positioning area (FIGURE J). Again, the horizontal value goes first. It is OK to mix percentage and length values, as shown in this example:

```
header {
  background-image: url(images/target.png);
  background-size: 50% 10em; }
```

WARNING

When sizing a bitmapped image such as a GIF or PNG larger, you run the risk that it will end up blurry and pixelated. Use background sizing with care.

target.png
300 × 300 pixels

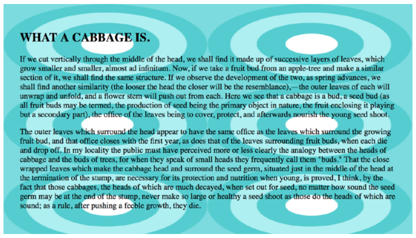


WHAT A CABBAGE IS.

If we cut vertically through the middle of the head, we shall find it made up of successive layers of leaves, which grow smaller and smaller, almost ad infinitum. Now, if we take a fruit bud from an apple-tree and make a similar section of it, we shall find the same structure. If we observe the development of the two, as spring advances, we shall find another similarity (the looser the head the closer will be the resemblance),—the outer leaves of each will unwrap and unfold, and a flower stem will push out from each. Here we see that a cabbage is a bud, a seed bud (as all fruit buds may be termed, the production of seed being the primary object in nature, the fruit enclosing it playing but a secondary part), the office of the leaves being to cover, protect, and afterwards nourish the young seed shoot.

The outer leaves which surround the head appear to have the same office as the leaves which surround the growing fruit bud, and that office closes with the first year, as does that of the leaves surrounding fruit buds, when each die and drop off. In my locality the public must have perceived more or less clearly the analogy between the heads of cabbage and the buds of trees, for when they speak of small heads they frequently call them "buds." That the close wrapped leaves which make the cabbage head and surround the seed germ, situated just in the middle of the head at the termination of the stump, are necessary for its protection and nutrition when young, is proved, I think, by the fact that those cabbages, the heads of which are much decayed, when set out for seed, no matter how sound the seed germ may be at the end of the stump, never make so large or healthy a seed shoot as those do the heads of which are sound; as a rule, after pushing a feeble growth, they die.

`background-size: 600px 300px;`



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`background-size: 50% 10em;`

FIGURE J. Resizing a background image with specific length units and percentages.

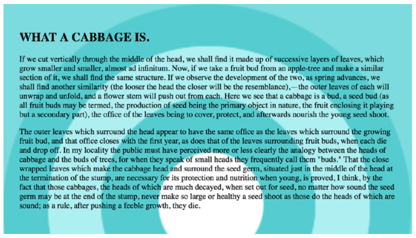
The **auto** keyword resizes the image in whatever direction is necessary to maintain its proportions. Bitmapped images such as GIF, JPEG, and PNG have intrinsic proportions, so they will always stay proportional when one sizing value is set to **auto**. Some images, such as SVG and CSS gradients, don't have intrinsic proportions. In that case, **auto** sets the width or height to 100% of the width or height of the background positioning area.

The **cover** and **contain** keywords are interesting additions in CSS3. When you set the background size to **cover**, the browser resizes a background image large enough to reach all the sides of the background positioning area. There will be only one image because it fills the whole element, and it is likely that portions of the image will fall outside of the positioning area if the proportions of the image and the positioning area do not match (FIGURE K).

By contrast, **contain** sizes the image just large enough to fill either the width or the height of the positioning area (depending on the proportions of the image). The whole image will be visible and "contained" within the background area (FIGURE K). If there is leftover space, the background image repeats unless **background-repeat** is set to **no-repeat**.

```
div#A {
  background-image: url(target.png);
  background-size: cover; }

div#B {
  background-image: url(target.png);
  background-size: contain; }
```



WHAT A CABBAGE IS.

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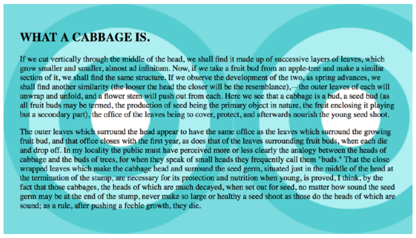
`background-size: cover;`

The entire background area of the element is covered, and the image maintains its proportions even if it is clipped.



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`background-size: contain;`

The image is sized proportionally so it fits entirely in the element. There may be room left over for tiling (as shown).

FIGURE K. Examples of the **cover** and **contain** background size keywords.

THE SHORTHAND BACKGROUND PROPERTY

You can use the handy **background** property to specify *all* of your background styles in one declaration.

background

Values:	*background-color background-image background-repeat background-attachment background-position background-clip background-origin background-size*
Default:	see individual properties
Applies to:	all elements
Inherits:	no

As with the shorthand **font** property, the value of the **background** property is a list of values that would be provided for the individual background properties previously listed. For example, this one background rule:

```
body { background: white url(arlo.png) no-repeat right top
fixed; }
```

replaces this rule with five separate declarations:

```
body {
  background-color: white;
  background-image: url(arlo.png);
  background-repeat: no-repeat;
  background-position: right top;
  background-attachment: fixed;
}
```

All of the property values for **background** are optional and may appear in any order. The only restriction is that when you are providing the coordinates for the **background-position** property, the horizontal value must appear first, immediately followed by the vertical value.

As with any shorthand property, be aware that if any value is omitted, it will be reset to its default value. See the "Watch Out for Overrides" sidebar.

In EXERCISE E you can convert your long-winded background properties to a single declaration with **background**.

Watch Out for Overrides

The **background** property is efficient, but use it carefully. We've addressed this before, but it bears repeating. Because **background** is a shorthand property, when you omit a value, that property will be reset to its default. Be careful that you do not accidentally override style rules earlier in the style sheet with a later shorthand rule that reverts your settings to their defaults.

In this example, the background image dots.gif will not be applied to **h3** elements because by omitting the value for **background-image**, you essentially set that value to **none**.

```
h1, h2, h3 { background:
red url(dots.gif) repeat-x; }
h3 { background: green; }
```

To override particular properties, use the specific background property you intend to change. For example, if the intent in the preceding example were to change just the background color of **h3** elements, the **background-color** property would be the correct choice.

EXERCISE E | CONVERT TO SHORTHAND PROPERTY

This one is easy. Replace all of the background-related declarations in the **body** of the bistro menu with a single **background** property declaration.

```
body {
  font-family: Georgia, serif;
  font-size: 100%;
  line-height: 175%;
  margin: 0 15%;
  background: #d2dc9d url(images/
blackgoose.png) no-repeat center 100px
fixed;
}
```

Do the same for the **header** element, and you're done.

MULTIPLE BACKGROUNDS

CSS3 introduced the ability to apply multiple background images to a single element. To apply multiple values for **background-image**, put them in a list separated by commas. Additional background-related property values also go in comma-separated lists; the first value listed applies to the first image, the second value to the second, and so on.

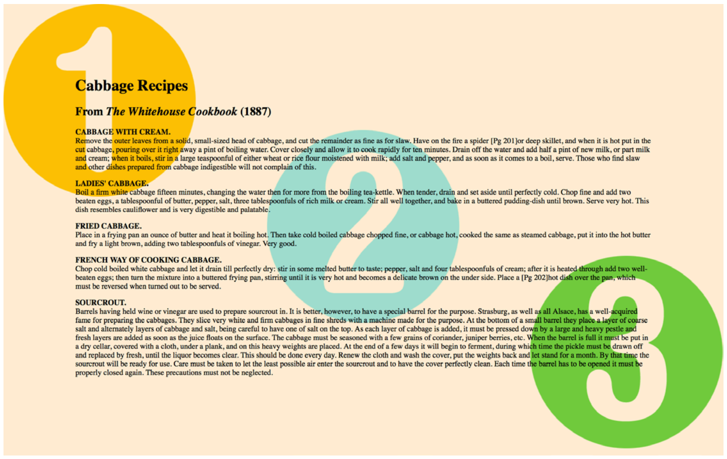
Although CSS declarations usually work on a "last one wins" rule, for multiple background images, whichever is listed last goes on the bottom and each image prior in the list layers on top of it. You can think of them like Photoshop layers in that they get stacked in the order in which they appear in the list. Put another way, the image defined by the first value will go in front, and others line up behind it, in the order in which they are listed.

```
body {
  background-image: url(image1.png), url(image2.png), url(image3.png);
  background-position: left top, center center, right bottom;
  background-repeat: no-repeat, no-repeat, no-repeat;
  …
}
```

Alternatively, you can take advantage of the **background** shorthand property to make the rule simpler. Now the **background** property has three value series, separated by commas:

```
body {
  background:
    url(image1.png) left top no-repeat,
    url(image2.png) center center no-repeat,
    url(image3.png) right bottom no-repeat;
  …
}
```

FIGURE L shows the result. The big, orange 1 is positioned in the top-left corner, the 2 is centered vertically and horizontally, and the 3 is in the bottom-right corner. All three background images share the background positioning area of one **body** element. Try this technique out for yourself in EXERCISE F.


Cabbage Recipes

From *The Whitehouse Cookbook* (1887)

CABBAGE WITH CREAM.
Remove the outer leaves from a solid, small-sized head of cabbage, and cut the remainder as fine as for slaw. Have on the fire a spider [Pg 201]or deep skillet, and when it is hot put in the cut cabbage, pouring over it right away a pint of boiling water. Cover closely and allow it to cook rapidly for ten minutes. Drain off the water and add half a pint of new milk, or part milk and cream; when it boils, stir in a large teaspoonful of either wheat or rice flour moistened with milk; add salt and pepper, and as soon as it comes to a boil, serve. Those who find slaw and other dishes prepared from cabbage indigestible will not complain of this.

LADIES' CABBAGE.
Boil a firm white cabbage fifteen minutes, changing the water then for more from the boiling tea-kettle. When tender, drain and set aside until perfectly cold. Chop fine and add two beaten eggs, a tablespoonful of butter, pepper, salt, three tablespoonfuls of rich milk or cream. Stir all well together, and bake in a buttered pudding-dish until brown. Serve very hot. This dish resembles cauliflower and is very digestible and palatable.

FRIED CABBAGE.
Place in a frying pan an ounce of butter and heat it boiling hot. Then take cold boiled cabbage chopped fine, or cabbage hot, cooked the same as steamed cabbage, put it into the hot butter and fry a light brown, adding two tablespoonfuls of vinegar. Very good.

FRENCH WAY OF COOKING CABBAGE.
Chop cold boiled white cabbage and let it drain till perfectly dry: stir in some melted butter to taste; pepper, salt and four tablespoonfuls of cream; after it is heated through add two well-beaten eggs; then turn the mixture into a buttered frying pan, stirring until it is very hot and becomes a delicate brown on the under side. Place a [Pg 202]hot dish over the pan, which must be reversed when turned out to be served.

SOURCROUT.
Barrels having held wine or vinegar are used to prepare sourcrout in. It is better, however, to have a special barrel for the purpose. Strasburg, as well as all Alsace, has a well-acquired fame for preparing the cabbages. They slice very white and firm cabbages in fine shreds with a machine made for the purpose. At the bottom of a small barrel they place a layer of coarse salt and alternately layers of cabbage and salt, being careful to have one of salt on the top. As each layer of cabbage is added, it must be pressed down by a large and heavy pestle and fresh layers are added as soon as the juice floats on the surface. The cabbage must be seasoned with a few grains of coriander, juniper berries, etc. When the barrel is full it must be put in a dry cellar, covered with a cloth, under a plank, and on this heavy weights are placed. At the end of a few days it will begin to ferment, during which time the pickle must be drawn off and replaced by fresh, until the liquor becomes clear. This should be done every day. Renew the cloth and wash the cover, put the weights back and let stand for a month. By that time the sourcrout will be ready for use. Care must be taken to let the least possible air enter the sourcrout and to have the cover perfectly clean. Each time the barrel has to be opened it must be properly closed again. These precautions must not be neglected.

FIGURE L. Three separate background images added to the body element.

EXERCISE F | MULTIPLE BACKGROUND IMAGES

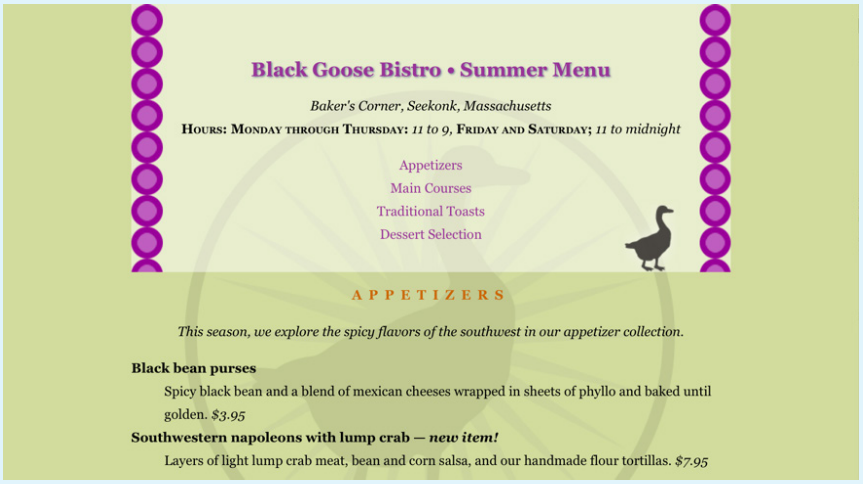
In this exercise, we'll give multiple background images a try (be sure you aren't using an old version of Internet Explorer, or this won't work).

I'd like the dot pattern in the **header** to run along the left and right sides. I also have a little goose silhouette (gooseshadow.png) that might look cute walking along the bottom of the header. I've separated out the background color declaration so it doesn't get overridden by the shorthand.

You can see in the example that we are placing three images in a single header: dots on the left side, dots on the right, and a goose at the bottom.

```
header {
  …
  background:
    url(images/purpledot.png) left top repeat-y,
     url(images/purpledot.png) right top repeat-y,
     url(images/gooseshadow.png) 90% bottom no-repeat;
  background-color: rgba(255,255,255,.5);
}
```

FIGURE M shows the final result. Meh, I liked it better before, but you get the idea.



Black Goose Bistro • Summer Menu

Baker's Corner, Seekonk, Massachusetts

HOURS: MONDAY THROUGH THURSDAY: *11 to 9*, FRIDAY AND SATURDAY; *11 to midnight*

Appetizers
Main Courses
Traditional Toasts
Dessert Selection

APPETIZERS

This season, we explore the spicy flavors of the southwest in our appetizer collection.

Black bean purses
Spicy black bean and a blend of mexican cheeses wrapped in sheets of phyllo and baked until golden. *$3.95*

Southwestern napoleons with lump crab — *new item!*
Layers of light lump crab meat, bean and corn salsa, and our handmade flour tortillas. *$7.95*

FIGURE M. The bistro menu header with two rows of dots and a small goose graphic in the **header** element.

BLEND MODES

background-blend-mode

Values:	`normal` | `darken` | `multiply` | `color-burn` | `screen` | `color-dodge` | `overlay` | `soft-light` | `hard-light` | `difference` | `exclusion` | `hue` | `saturation` | `color` | `luminosity`
Default:	`normal`
Applies to:	all elements
Inherits:	no

The **`background-blend-mode`** specifies how the background image should blend in with the background color and other background images applied to the element. It works similar to layer interaction features found in image editing software such as Photoshop and the effects use the same terminology. FIGURE N shows how a black and white photo blends with the blue background color using the multiply, hard-light, overlay, and difference values.

For demos and more information about the **`background-blend-mode`** property by Robin Rendle, see *css-tricks.com/almanac/properties/b/background-blend-mode/*.

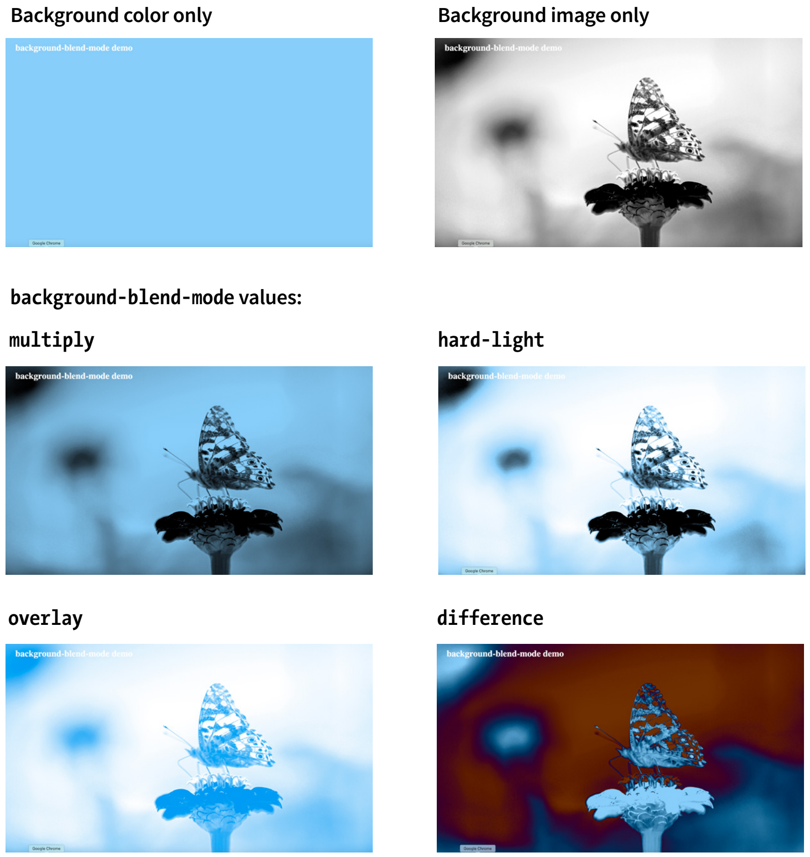


FIGURE N. Examples of various background-blend-mode values