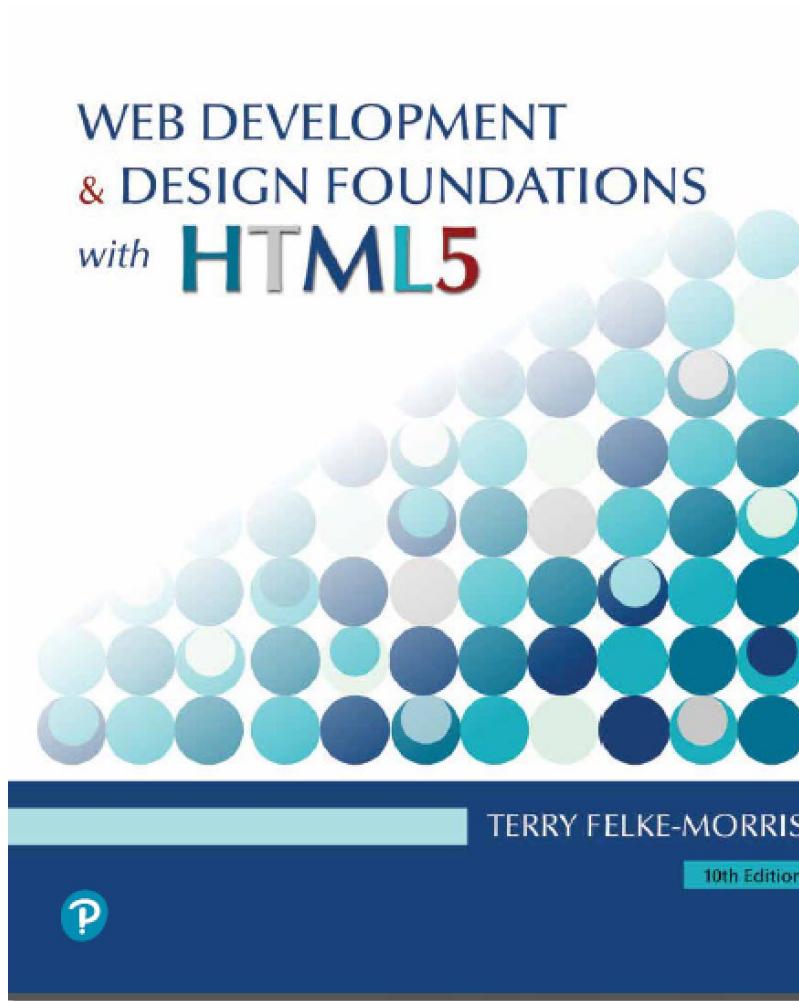


Web Development & Design Foundations with HTML5

Tenth Edition



Chapter 4

Visual Elements and
Graphics

Learning Outcomes (1 of 2)

In this chapter, you will learn how to ...

- Create and format lines and borders on web pages
- Apply the image element to add graphics to web pages
- Optimize an image for web page display
- Configure images as backgrounds on web pages
- Configure images as hyperlinks
- Configure visual effects with CSS3 including multiple background images, rounded corners, box shadow, text shadow, opacity, and gradients

Learning Outcomes (2 of 2)

- Configure RGBA and HSLA color with CSS3
- Use figure and figcaption elements
- Use the meter and progress elements
- Follow recommended web design guidelines for graphics on web pages

Horizontal Rule Element

Configures a horizontal line

<hr>

The image shows a screenshot of a website. At the top, there is a teal header bar with the text "Meeting Your Business Needs" in white. Below the header, there is a paragraph of text: "Our expert designers will listen to you as they create a website that helps to promote and grow your business." A thin horizontal line separates this text from the footer. At the bottom, there is a copyright notice: "Copyright © 2020 Your Name Here" followed by an email address: "yourfirstname@yourlastname.com".

Figure 4.1 The <hr> tag configures a horizontal line

CSS border Property

Configures a border on the top, right, bottom, and left sides of an element

Consists of

- border-width
- border-style
- border-color

```
h2 { border: 2px solid #ff0000 }
```

Heading with Border

CSS Borders: Block / Inline Elements

- Block display element
 - Default width of element content extends to browser margin (or specified width)
- Inline display element
 - Border closely outlines the element content

Heading with Border

This anchor tag has a border

```
h2 { border: 2px solid #ff0000; }
```

```
a { border: 2px solid #ff0000; }
```

Border Display Can Vary by Browser

default

none

inset

outset

double

groove

ridge

solid

dashed

dotted

Figure 4.2 Examples of the various border-style values rendered by Firefox

Configuring Specific Sides of a Border

Use CSS to configure a line on one or more sides of an element

- border-bottom
- border-left
- border-right
- border-top

Heading with Border

```
h2 { border-bottom: 2px solid #ff0000 }
```

CSS padding Property

Configures empty space between the content of the HTML element and the border

Set to 0px by default

```
h2 { border: 2px solid #ff0000; padding: 5px; }
```

Heading with Border

No padding property configured:

Heading with Border

Configure Padding on Specific Sides of an Element

Use CSS to configure padding on one or more sides of an element

- padding-bottom
- padding-left
- padding-right
- padding-top

Heading with Border

```
h2 { border: 2px solid #ff0000;  
background-color: #cccccc;  
padding-left: 5px;  
padding-bottom: 10px;  
padding-top: 10px; }
```

CSS padding Property Shorthand: two values

Two numeric values or percentages

- first value configures top and bottom padding
- the second value configures left and right padding

```
h2 { border: 2px solid #ff0000;  
     background-color: #cccccc;  
     padding: 20px 10px;  
 }
```

Heading with Border

CSS padding Property Shorthand: four values

Four numeric values or percentages

- Configure top, right, bottom, and left padding

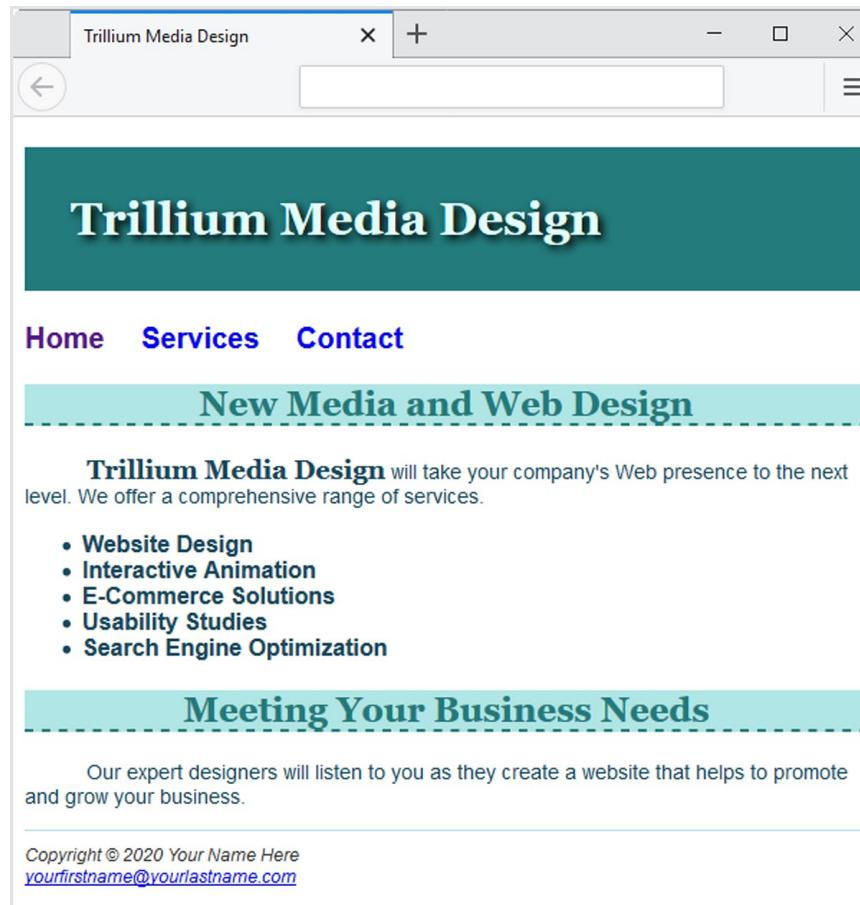
```
h2 { border: 2px solid #ff0000;
    width: 250px;
    background-color: #cccccc;
    padding: 30px 10px 5px 20px;
}
```

Heading with Border

Hands-On Practice

```
h2 { background-color: #B0E6E6;  
color: #237B7B;  
font-family: Georgia, "Times New Roman", serif;  
text-align: center;  
border-bottom: 2px dashed #237B7B; }
```

Figure 4.3 CSS border and padding properties add visual interest to the page.



Checkpoint 4.1

1. Is it reasonable to try to code a web page that looks exactly the same on every browser and every platform? Explain your answer.
2. When a web page containing the style rules below is rendered in a browser, the border does not display.
Describe what is incorrect with the following code:

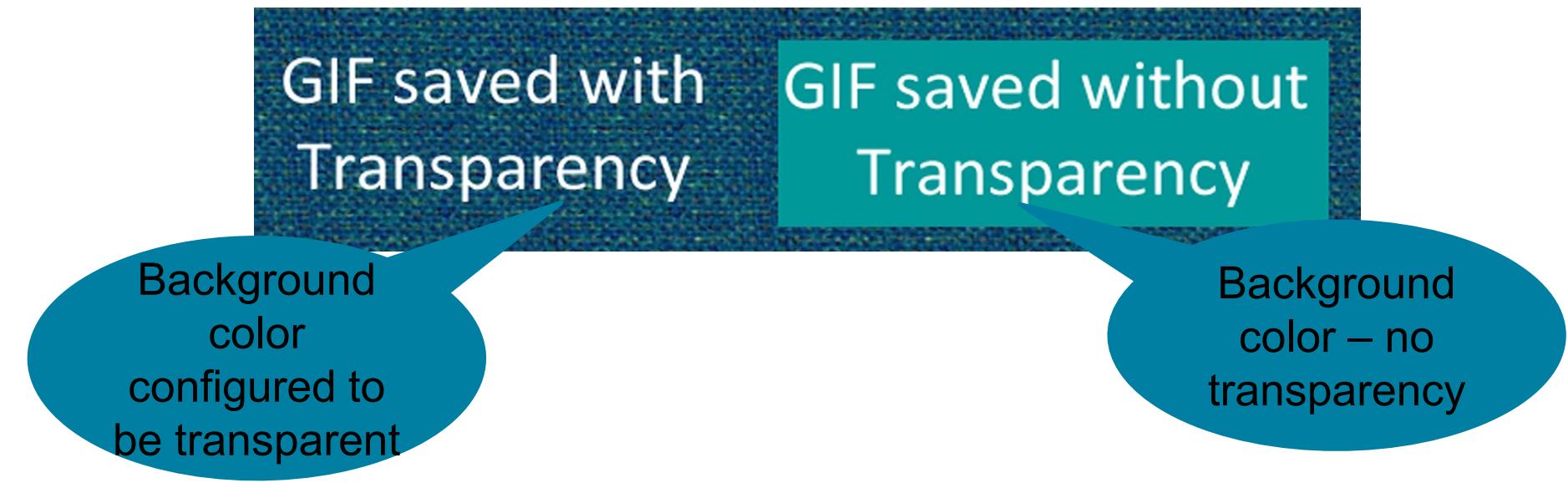
```
h2 { background-color: #ff0000  
      border-top: thin solid #000000  
    }
```
3. True or False? CSS can be used to configure visual elements such as rectangular shapes and lines on web pages.

Types of Graphics (1 of 2)

Graphic types commonly used on web pages:

- GIF
- JPG
- PNG
- WebP

Figure 4.6 Comparison of transparent and nontransparent GIFs



Types of Graphics (2 of 2)

- Graphics Interchange Format
- Best used for line art and logos
- Maximum of 256 colors
- One color can be configured as transparent
- Can be animated
- Uses lossless compression
- Can be interlaced

JPEG

- Joint Photographic Experts Group
- Best used for photographs
- Up to 16.7 million colors
- Use lossy compression
- Cannot be animated
- Cannot be made transparent
- Progressive JPEG – similar to interlaced display

Figure 4.7 A JPEG saved at 80% quality (55KB file size) displays well on a web page



PNG

- Portable Network Graphic
- Supports millions of colors
- Supports multiple levels of transparency
(but most browsers do not – so limit to one transparent color for Web display)
- Supports interlacing
- Uses lossless compression
- Combines the best of GIF & JPEG
- Well-supported by modern browsers

WebP

- <https://developers.google.com/speed/webp/>
- Supports millions of colors
- Supports transparency
- Uses both lossy and lossless compression
- Intended to provide improved compression for GIF and JPG images
- Browser support is growing

HTML Image Element

- Configures graphics on a web page

```

```

- src Attribute
 - File name of the graphic
- alt Attribute
 - Configures alternate text description
- height Attribute
 - Height of the graphic in pixels
- width Attribute
 - Width of the graphic in pixels



Figure 1.3 Who really updated that web page you are viewing?

Accessibility & Images

Required:

- Configure the alt attribute
 - Alternate text content to convey the meaning/intent of the image
 - NOT the file name of the image
 - Use alt="" for purely decorative images

Recommended:

- If your site navigation uses image links for the main navigation, provide simple text links at the bottom of the page.



Image Link

- To create an image hyperlink use an anchor element to contain an image element



Home

```
<a href="index.html"></a>
```

- Some browsers automatically add a border to image links.
- Configure CSS to eliminate the border
`img { border-style: none; }`

Thumbnail Image (1 of 2)

A small image configured to link to a larger version of that image.

```
<a href="island.jpg"></a>
```

Thumbnail Image (2 of 2)

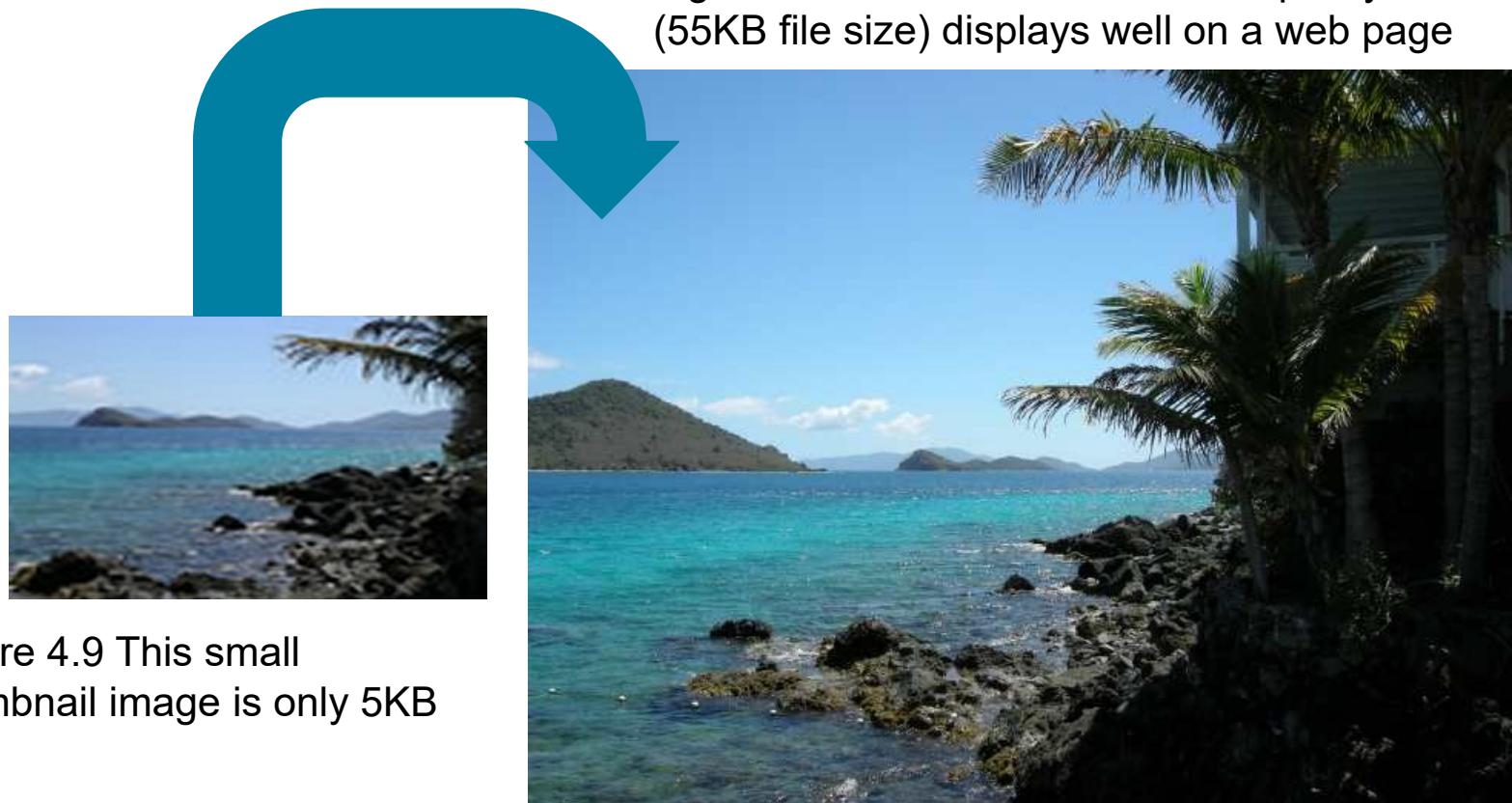


Image Optimization

The process of creating an image with the lowest file size that still renders a good quality image—**balancing image quality and file size.**

Photographs taken with digital cameras are not usually optimized for the Web

Optimize An Image for the Web

Image Optimization

- Reduce the file size of the image
- Reduce the dimensions of the image to the actual width and height of the image on the web page.

Image Editing Tools:

- GIMP <https://www.gimp.org/> (FREE!)
- Adobe Photoshop
- Pixlr
 - <https://pixlr.com/x/> (FREE!)

Choosing Names for Image Files

Use all lowercase letters

Do not use punctuation symbols and spaces

Do not change the file extensions
(should be .gif, .jpg, .jpeg, or .png)

Keep your file names short but descriptive

- i1.gif is probably too short
- myimagewithmydogonmybirthday.gif is too long
- dogbdy.gif may be just about right

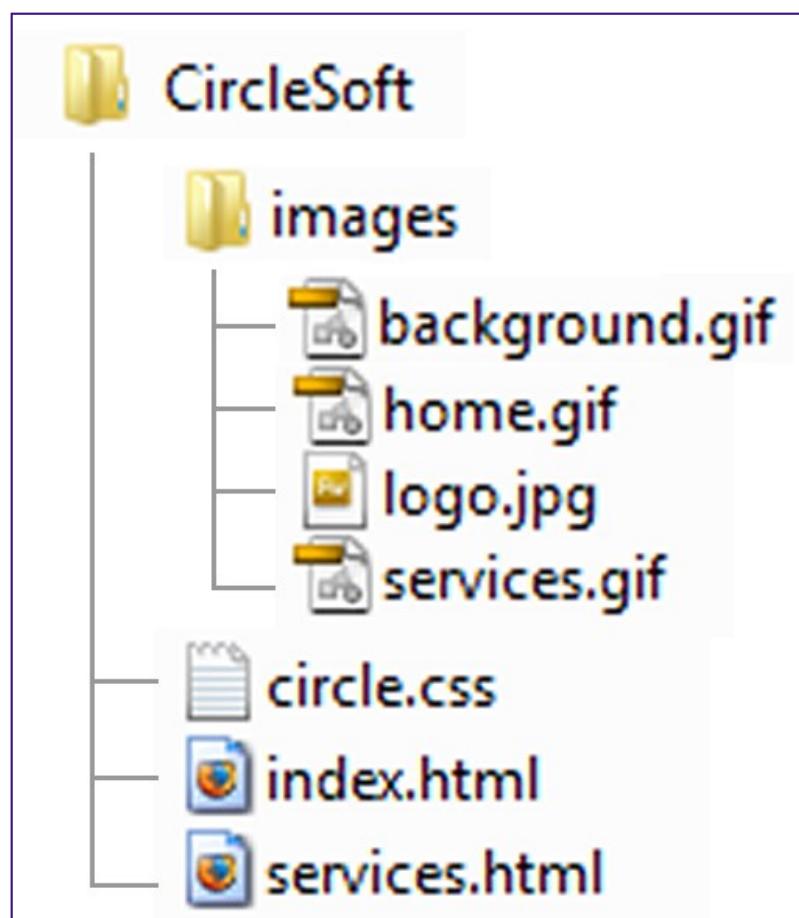
Organizing Your Site

- Place images in their own folder
- Code the path to the file in the src attribute

```

```

Figure 4.21 A folder named “images” contains the graphic files



HTML5 Figure and Figcaption Elements

Figure Element: contains a unit of content that is self-contained, such as an image, along with one optional figcaption element.

```
<figure>
```

```
  <img src= "myisland.jpg" width= "400" height= "400"  
       alt="Tropical Island Getaway">
```

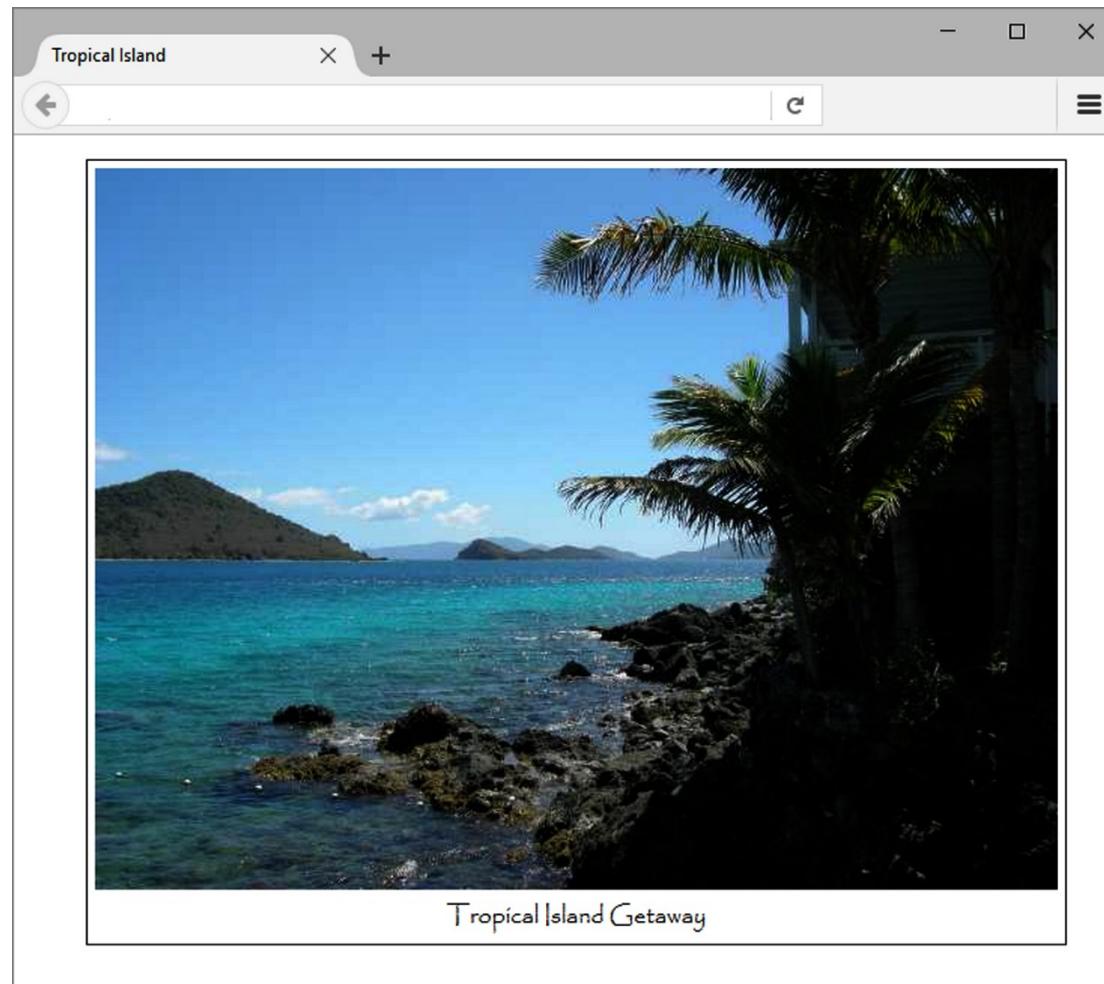
```
    <figcaption>
```

```
      Tropical Island Getaway
```

```
    </figcaption>
```

```
</figure>
```

Figure 4.14 The figure and figcaption elements were used in this web page

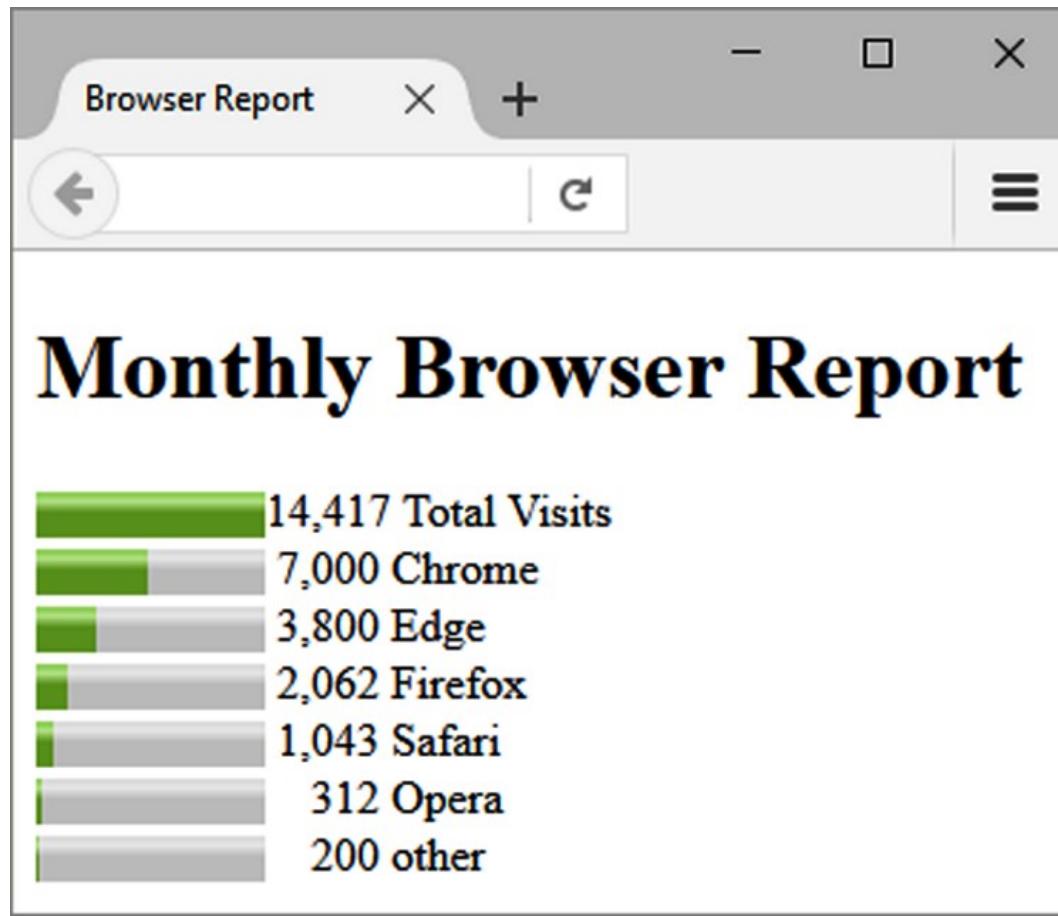


HTML5 Meter Element

Displays a visual gauge of a numeric value within a known range

```
<meter value="14417" min="0" max="14417">14417</meter>14,417 Total  
Visits<br>  
<meter value="7000" min="0" max="14417">7000</meter> 7,000  
Chrome<br>  
<meter value="3800" min="0" max="14417">3800</meter> 3,800 Edge<br>  
<meter value="2062" min="0" max="14417">2062</meter> 2,062 Firefox<br>  
<meter value="1043" min="0" max="14417">1043</meter> 1,043 Safari<br>  
<meter value="312" min="0" max="14417">312</meter> &nbsp;&nbsp; 312  
Opera<br>  
<meter value="200" min="0" max="14417">200</meter> &nbsp;&nbsp; 200  
other<br>
```

Figure 4.15 The meter element



HTML5 Progress Element

Displays a bar that depicts a numeric value within a specified range

```
<progress value="5000" max="10000">5000</progress>
```

Progress Towards Our Goal

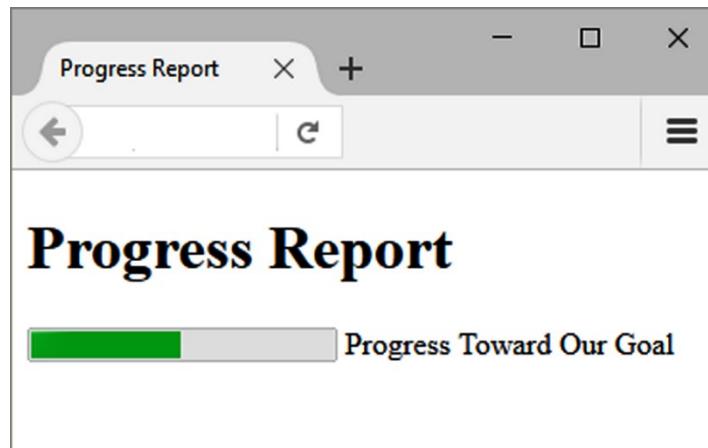


Figure 4.16 The progress element

CSS background-image Property

Configures a background-image

By default, background images tile (repeat)

```
body { background-image: url(background1.gif); }
```

Figure 4.17 A long, thin background image tiles down the page

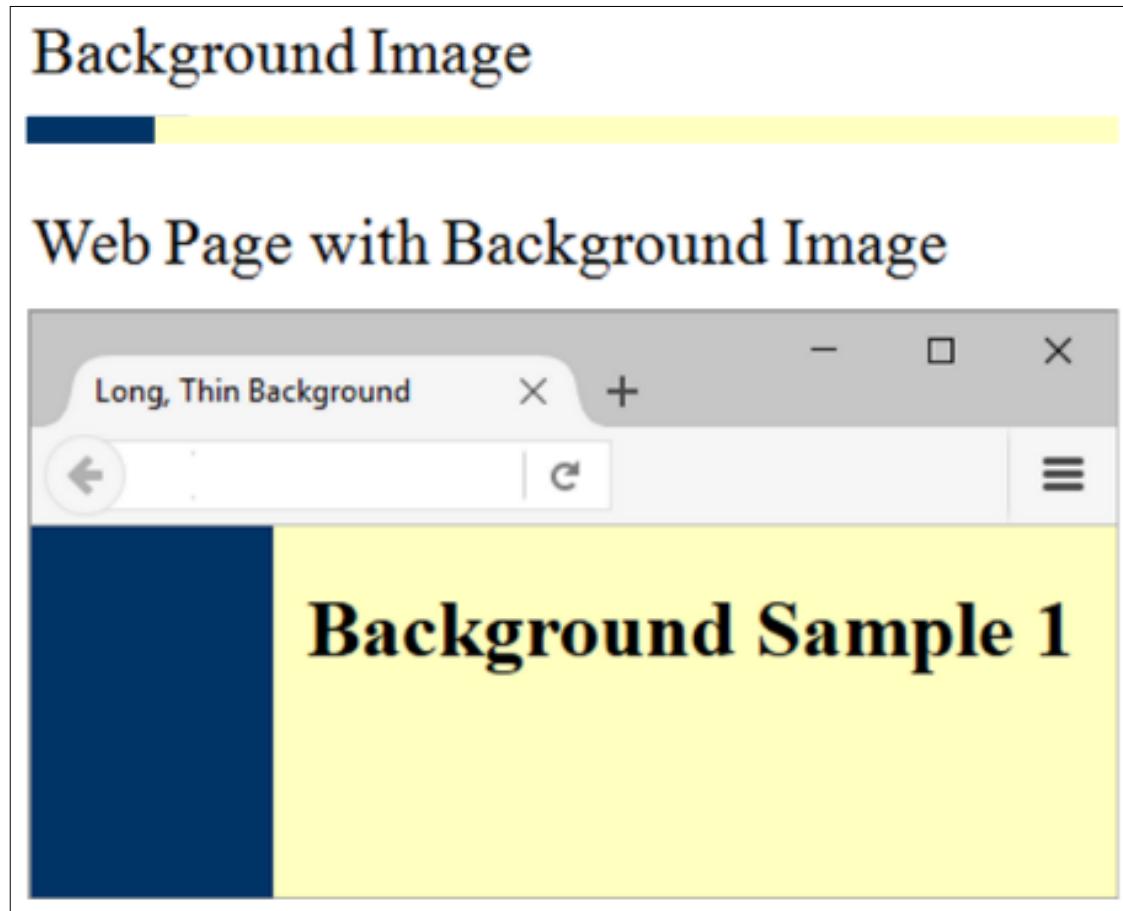
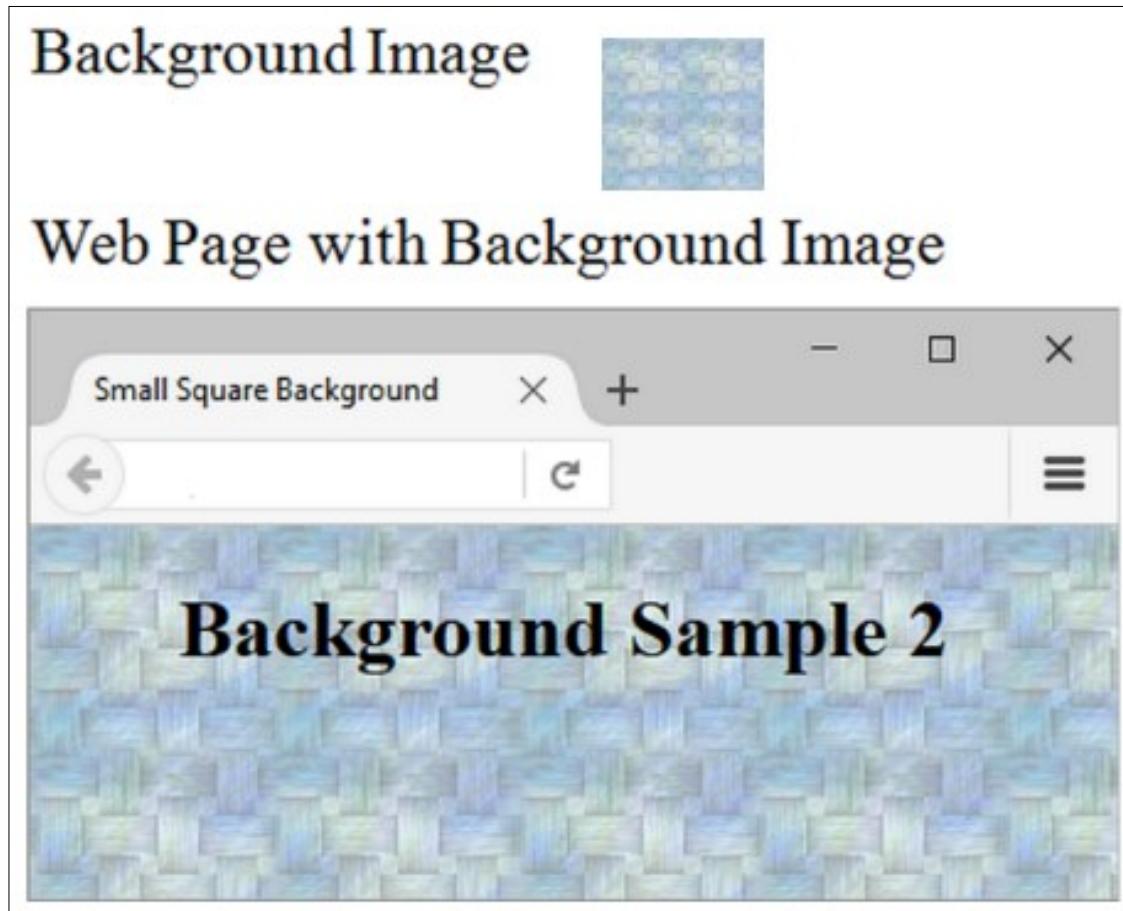


Figure 4.18 A small rectangular background is repeated to fill the web page window



CSS background-repeat Property

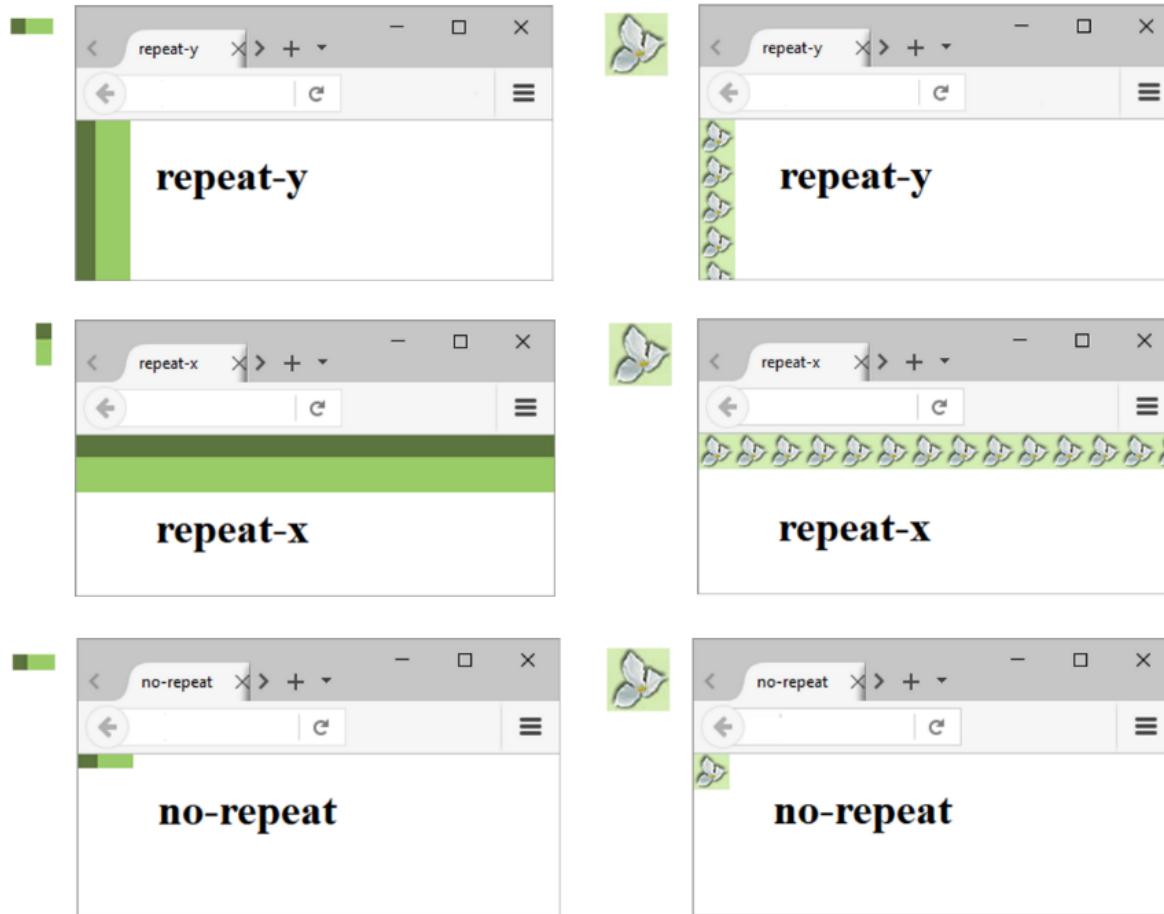


Figure 4.19 Examples of the CSS background-repeat property

Using background-repeat

flower.gif:



 New Media and Web Design

```
h2 { background-color: #d5edb3;  
    color: #5c743d;  
    font-family: Georgia, "Times New Roman", serif;  
    padding-left: 30px;  
    background-image: url(flower.gif);  
    background-repeat: no-repeat;  
}
```

CSS background-position Property

The default placement of a background image is top left.

The background-position property can change this placement.

New Media and Web Design



```
h2 { background-image: url(flower.gif);  
     background-position: right;  
     background-repeat: no-repeat; }
```

CSS background-clip Property

- confines the display of the background image

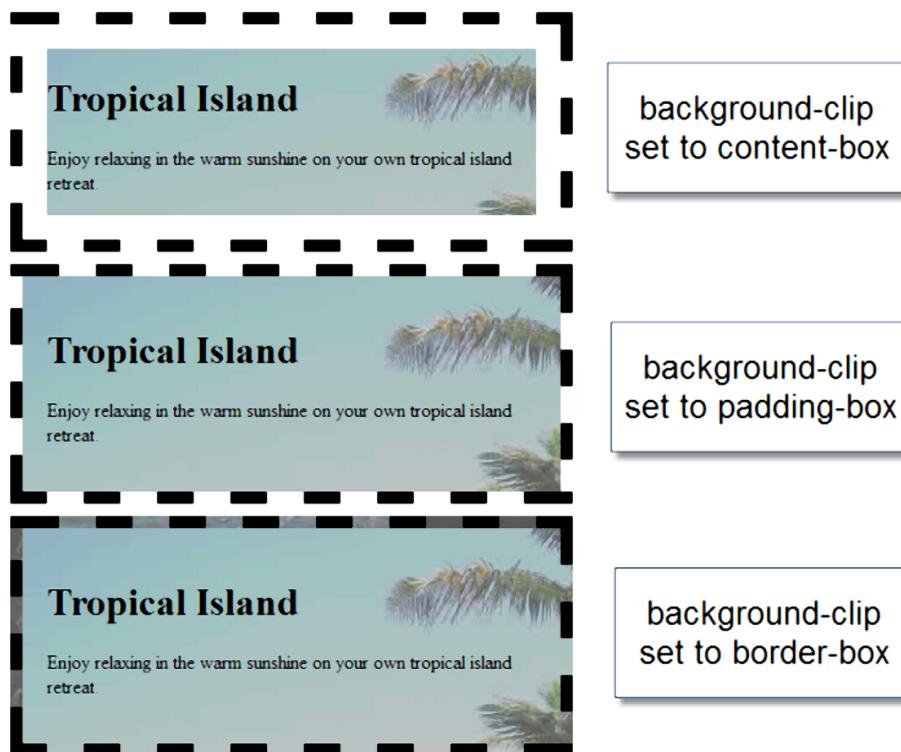


Figure 4.23 The CSS background-clip property

CSS background-origin Property

- positions the background image relative to the content, padding or border



Figure 4.24 The CSS background-origin property

CSS background-size Property

can be used to resize or scale the background image

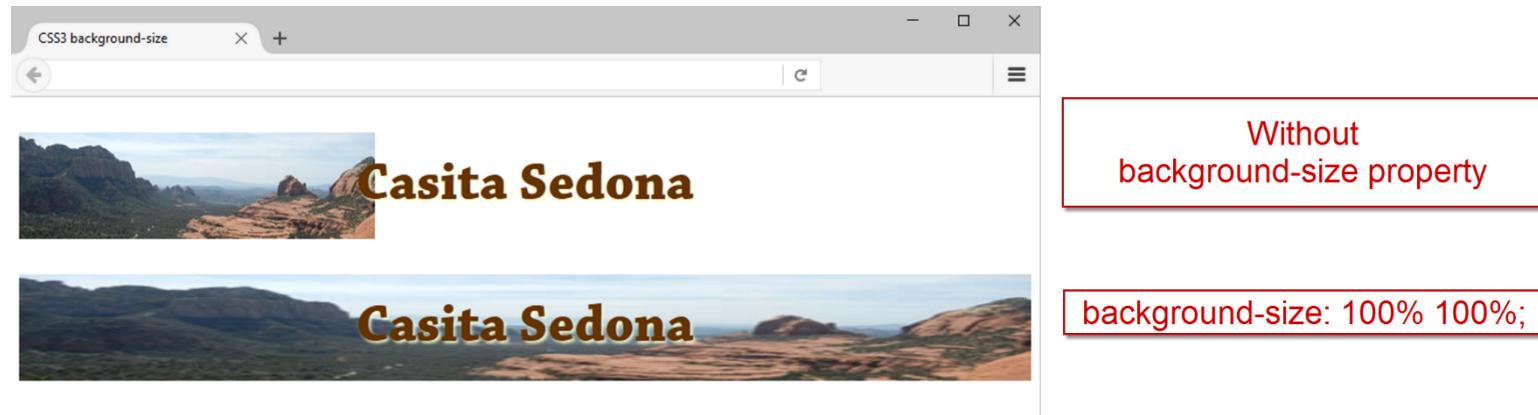


Figure 4.25 Configuring a background image.

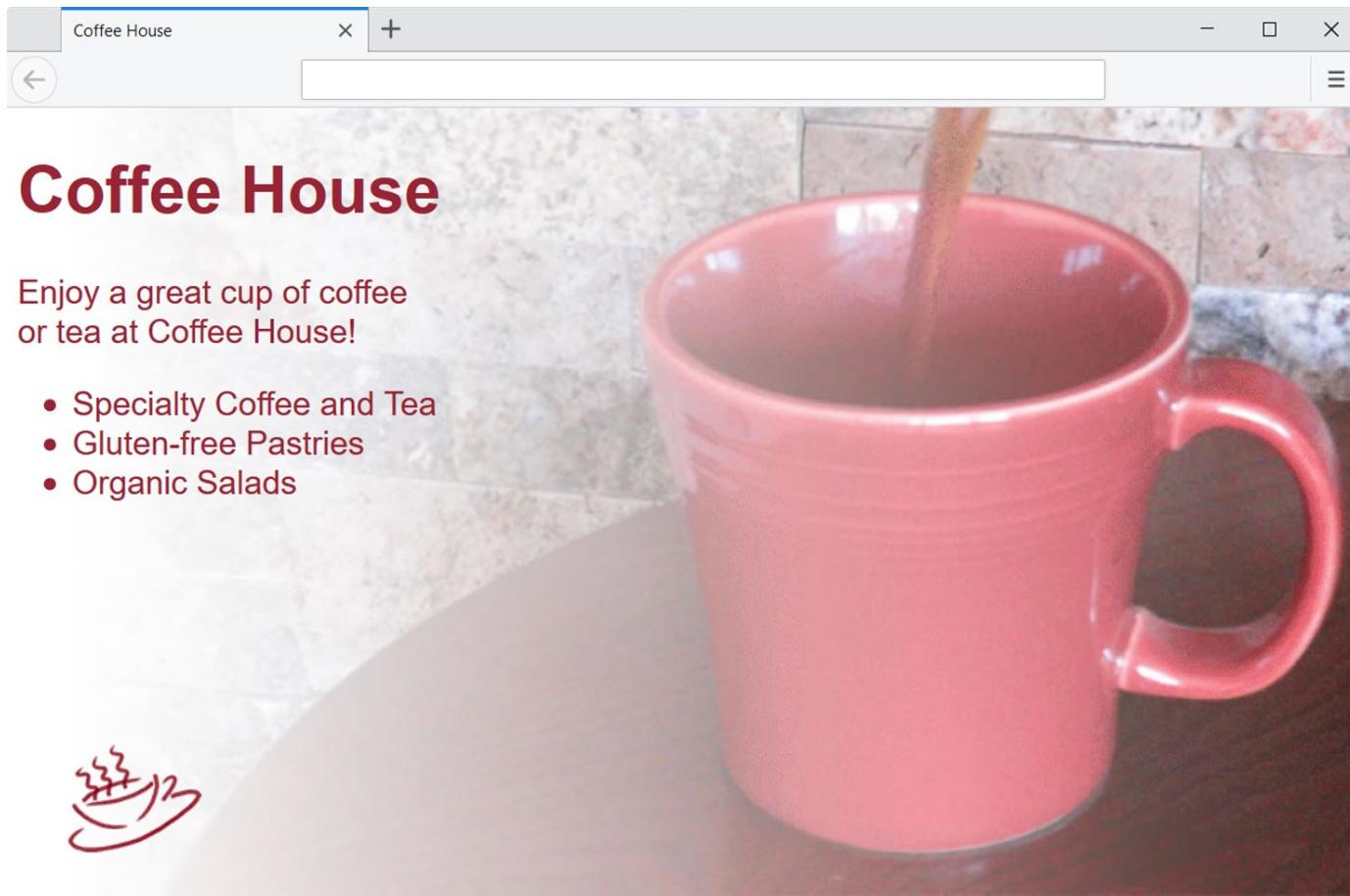
CSS Multiple Background Images

Use the background property to configure multiple background images.

Example:

```
body { background: url(coffee.gif) no-repeat left  
bottom,  
url(coffeepour.jpg) no-repeat  
fixed;  
background-size: auto, cover; }
```

Figure 4.27 The browser displays multiple background images.



Checkpoint 4.2

1. Describe the CSS to configure a graphic named circle.jpg to display once in the background of all <h1> elements. Code sample CSS to demonstrate this.
2. Describe the CSS that configures a file named bg.gif to repeat vertically down the background of a web page. Code sample CSS to demonstrate this.
3. Explain how the browser will render the web page if you use CSS to configure both a background image and a background color.

More About Images

Image Map

Favorites Icon

CSS Sprites

Sources for Graphics

Guidelines for Using Images

Accessibility & Visual Elements

Image Map (1 of 2)

map element

- Defines the map

area element

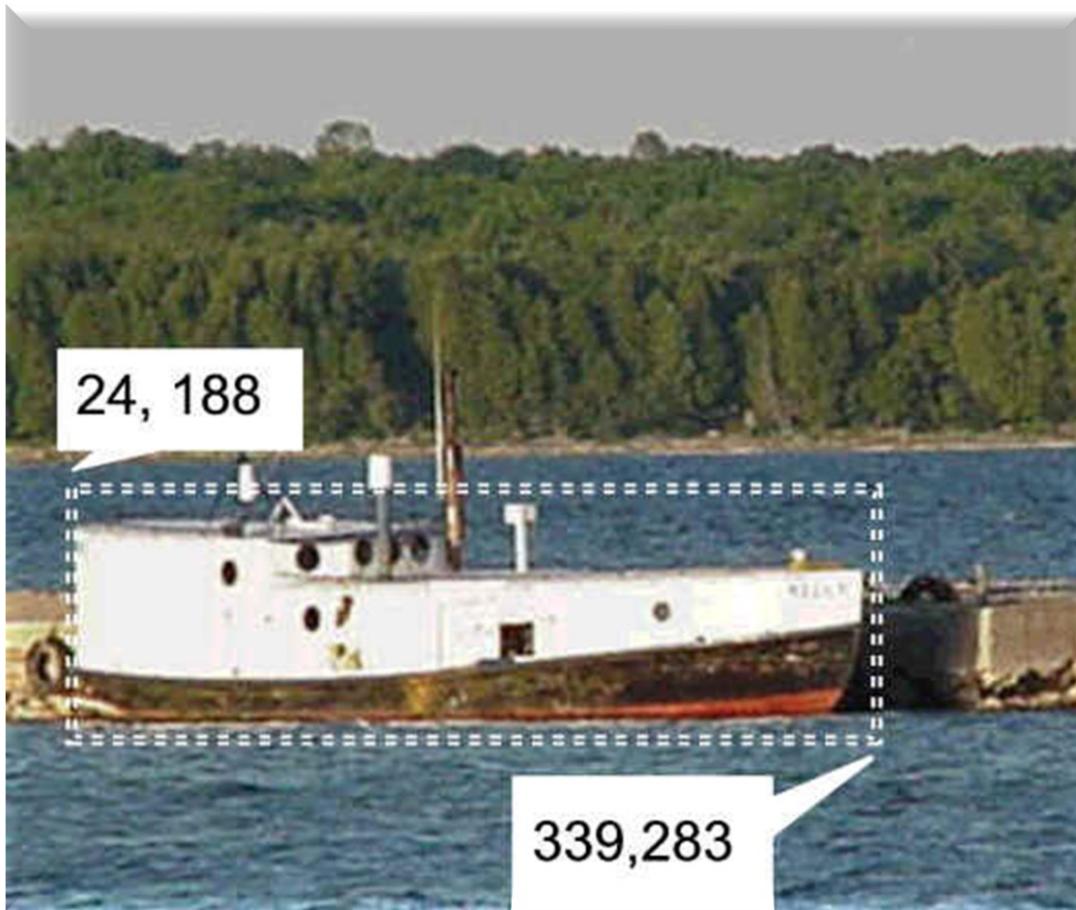
- Defines a specific area on a map
- Can be set to a rectangle, circle, or polygon
 - href Attribute
 - shape Attribute
 - coords Attribute

Image Map (2 of 2)

```
<map name="boat" id="boat">  
  <area href="http://www.fishingdoorcounty.com"  
        shape="rect"  
        coords="24, 188, 339, 283" alt="Door County  
Fishing">  
</map>  
  

```

Figure 4.29 Sample image map



Favorites Icon - favicon

- A square image associated with a web page
- Usually named: favicon.ico
- May display in the browser address bar, tab, or favorites/bookmarks list
- Configure with a link tag:



```
<link rel="icon" href="favicon.ico" type="image/x-icon">
```

Figure 4.30 The favorites icon displays in the browser tab and address bar



CSS Sprites

Sprite –

- an image file that contains multiple small graphics that are configured as background images for various web page elements

Modern technique to optimize use of multiple icon or small images

Saves overhead by reducing the number of http requests made by the browser.

You'll use CSS Sprites in Chapter 7!

Sources for Graphics (1 of 2)

- Create them yourself using a graphics application:
 - GIMP
 - Adobe Photoshop
 - Adobe Fireworks
- Download graphics from a free site
- Purchase/download professional-quality graphics
- Purchase a graphics collection on a CD

Sources for Graphics (2 of 2)

- Take digital photographs
- Scan your photographs
- Scan your drawings
- Hire a graphic designer to create graphics

Guidelines for Using Images

Reuse images

Consider image file size with image quality

Consider image load time

Use appropriate resolution

Specify dimensions

Be aware of brightness and contrast

Images and Accessibility

Don't rely on color alone.

- Some visitors may have color perception deficiencies.
Use high contrast between background and text color.

Provide a text equivalent for non-text elements.

- Use the alt attribute on your image elements

If your site navigation uses image links, provide simple text links at the bottom of the page.

Checkpoint 4.3 (1 of 2)

Search for a site that uses image links to provide navigation. List the URL of the page.

What colors are used on the image links?

If the image links contain text, is there good contrast between the background color and letters on the image links?

Would the page be accessible to a visitor who is sight-challenged?

Checkpoint 4.3 (2 of 2)

How have accessibility issues been addressed?

Is the alt attribute used to describe the image link?

Is there a row of text links in the footer section of the page?

Answer the questions above and discuss your findings.

CSS Rounded Corners

border-radius property

- Configures the horizontal radius and vertical radius of the corner
- Numeric value(s) with unit (pixel or em) or percentage

Example

```
h1 { border-radius: 15px;  
}
```

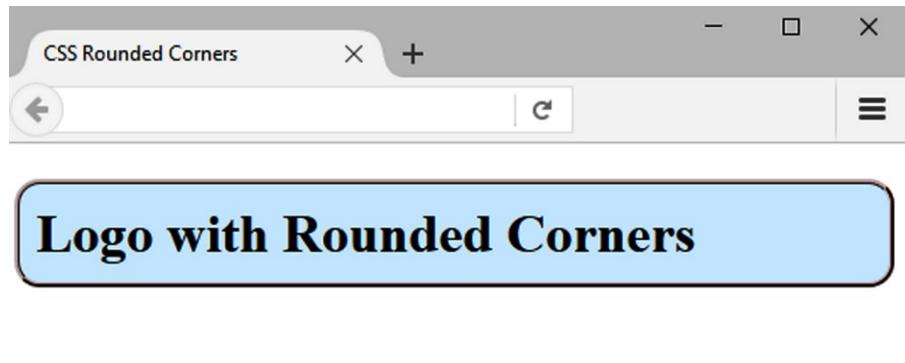


Figure 4.32 Rounded corners were configured with CSS

Examples of Rounded Corners

One value for border-radius configures all four corners

Example:

border-radius: 15px;

Logo with Rounded Corners

Four values for border-radius configure each corner separately

Ordered by top left, top right, bottom right, bottom left

Example:

border-radius: 15px 30px 100px 5px;

Logo with Rounded Corners

CSS box-shadow Property

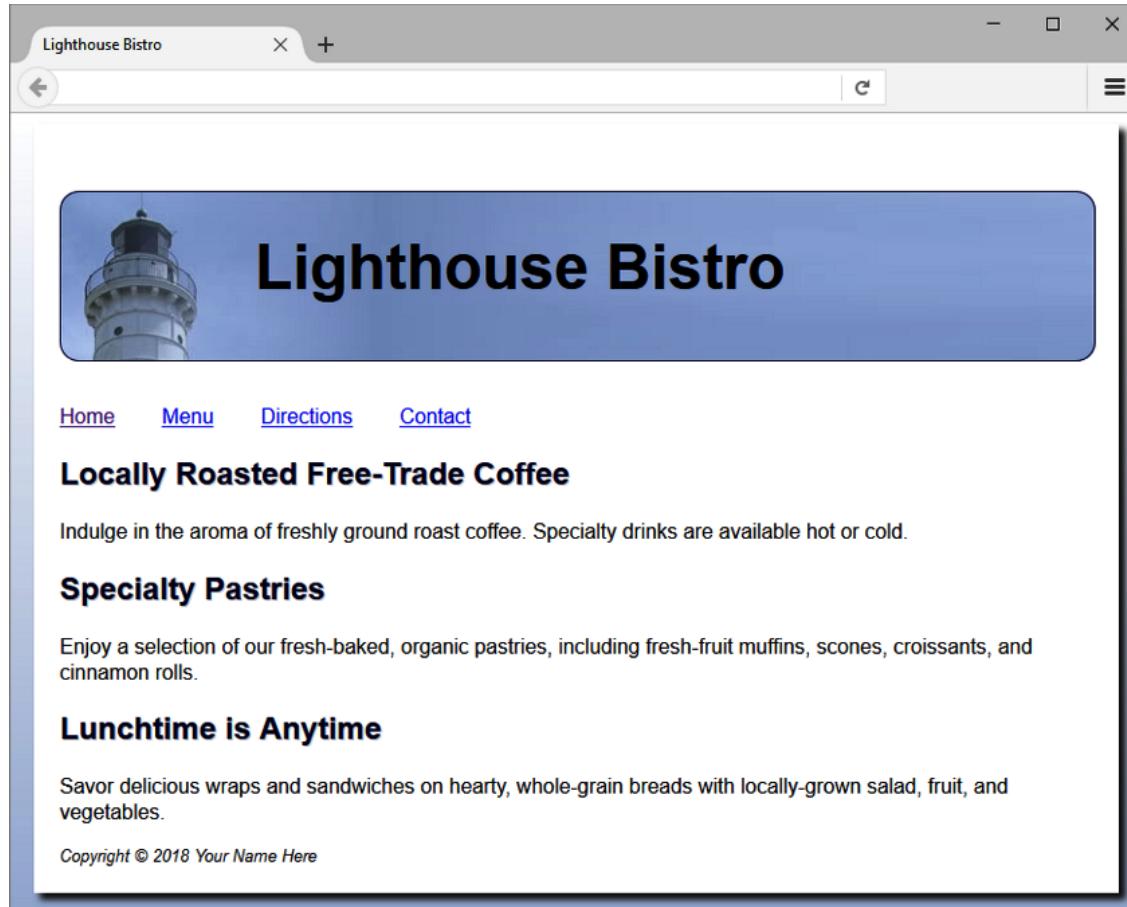
Configure the horizontal offset, vertical offset, blur radius, and valid color value

Example:

```
#wrapper { box-shadow: 5px 5px 5px #828282; }
```

Optional keyword: inset

Figure 4.35 The centered neutral background along with shadow properties add dimension



CSS opacity Property

Configure the transparency of the element

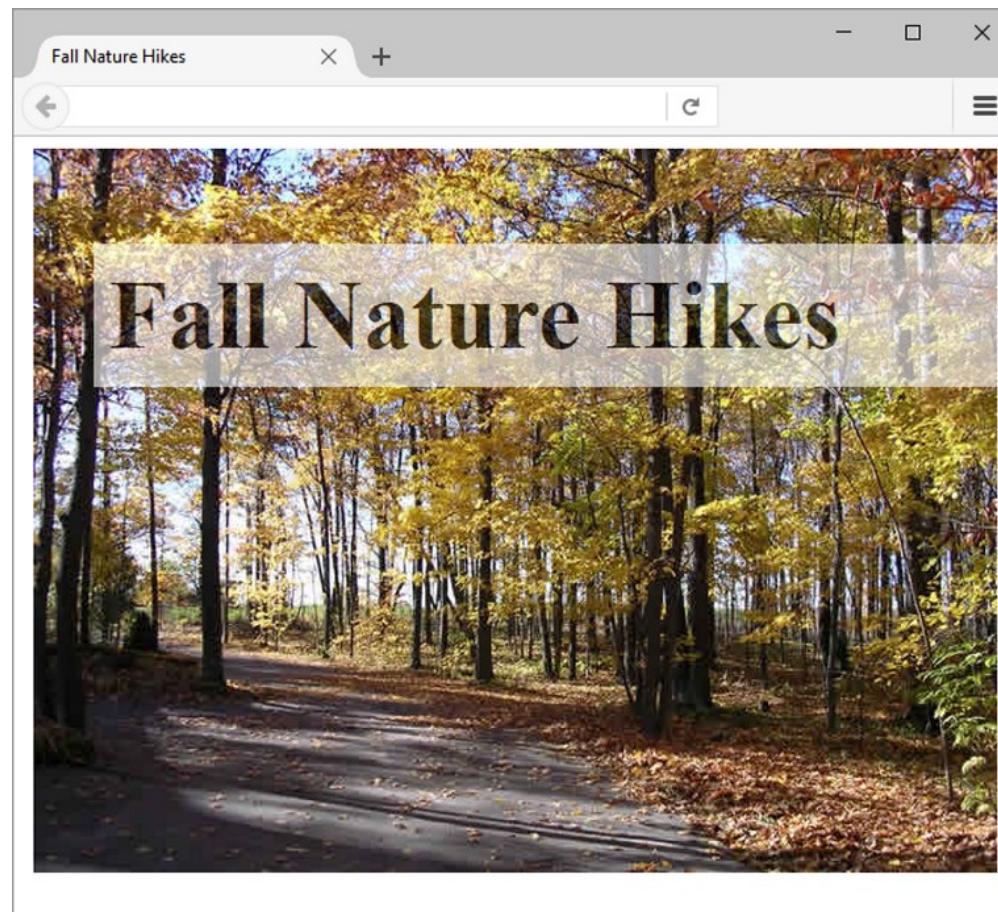
Opacity range:

- 0 Completely Transparent
- 1 Completely Opaque
 - horizontal offset, vertical offset, blur radius, and valid color value

Example:

```
h1{ background-color: #FFFFFF;  
    opacity: 0.6; }
```

Figure 4.37 The background of the h1 area is transparent



Rgba Color (1 of 2)

Four values are required:

red color, green color, blue color, and
alpha(transparency)

- The values for red, green, and blue must be decimal values from 0 to 255.
- The alpha value must be a number between 0 (transparent) and 1 (opaque).

Rgba Color (2 of 2)

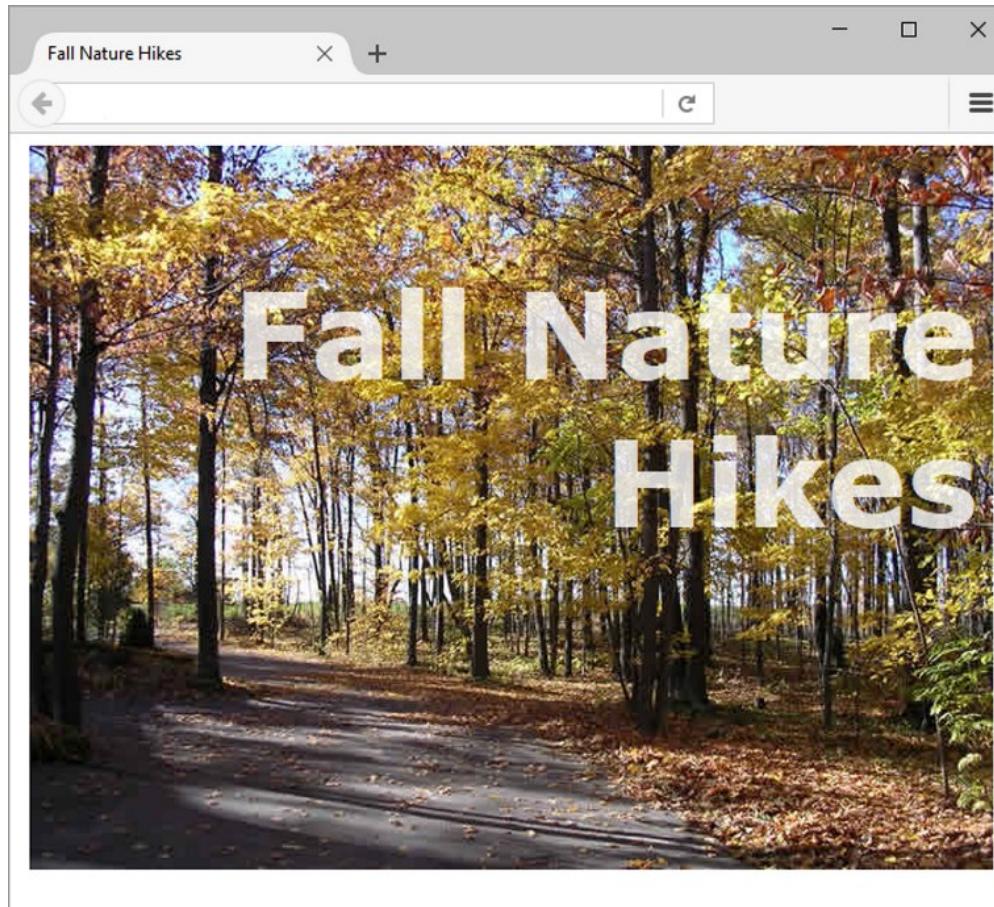
Example:

```
h1 { color: #ffffff;  
     color: rgba(255, 255, 255, 0.7);  
     font-size: 5em; padding-right: 10px;  
     text-align: right;  
     font-family: Verdana, Helvetica, sans-serif;  
}
```

Figure 4.38 Hexadecimal and RGB decimal color values

#FFFFFF rgb(255, 255, 255)	#FFFFCC rgb(255, 255, 204)	#FFFF99 rgb(255, 255, 153)	#FFFF66 rgb(255, 255, 102)
#FFFF33 rgb(255, 255, 51)	#FFFF00 rgb(255, 255, 0)	#FFCCFF rgb(255, 204, 255)	#FFCCCC rgb(255, 204, 204)
#FFCC99 rgb(255, 204, 153)	#FFCC66 rgb(255, 204, 102)	#FFCC33 rgb(255, 204, 51)	#FFCC00 rgb(255, 204, 0)
#FF99FF rgb(255, 153, 255)	#FF99CC rgb(255, 153, 204)	#FF9999 rgb(255, 153, 153)	#FF9966 rgb(255, 153, 102)

Figure 4.39 CSS RGBA color configures the transparent text



HSLA Color

hue, saturation, light, alpha

Hue is a value between 0 and 360

Saturation: percent

Lightness: percent

Optional alpha: from 0 to 1

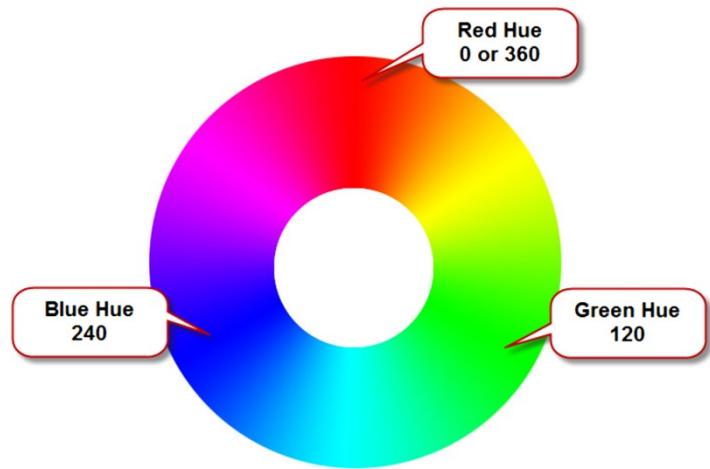


Figure 4.40 A color wheel

Figure 4.41 HSLA color examples

Red

```
hsla(360, 100%, 50%, 1.0);
```

Green

```
hsla(120, 100%, 50%, 1.0);
```

Blue

```
hsla(240, 100%, 50%, 1.0);
```

Black

```
hsla(0, 0%, 0%, 1.0);
```

Gray

```
hsla(0, 0%, 50%, 1.0);
```

White

```
hsla(0, 0%, 100%, 1.0);
```

CSS Gradients

Gradient: a smooth blending of shades from one color to another

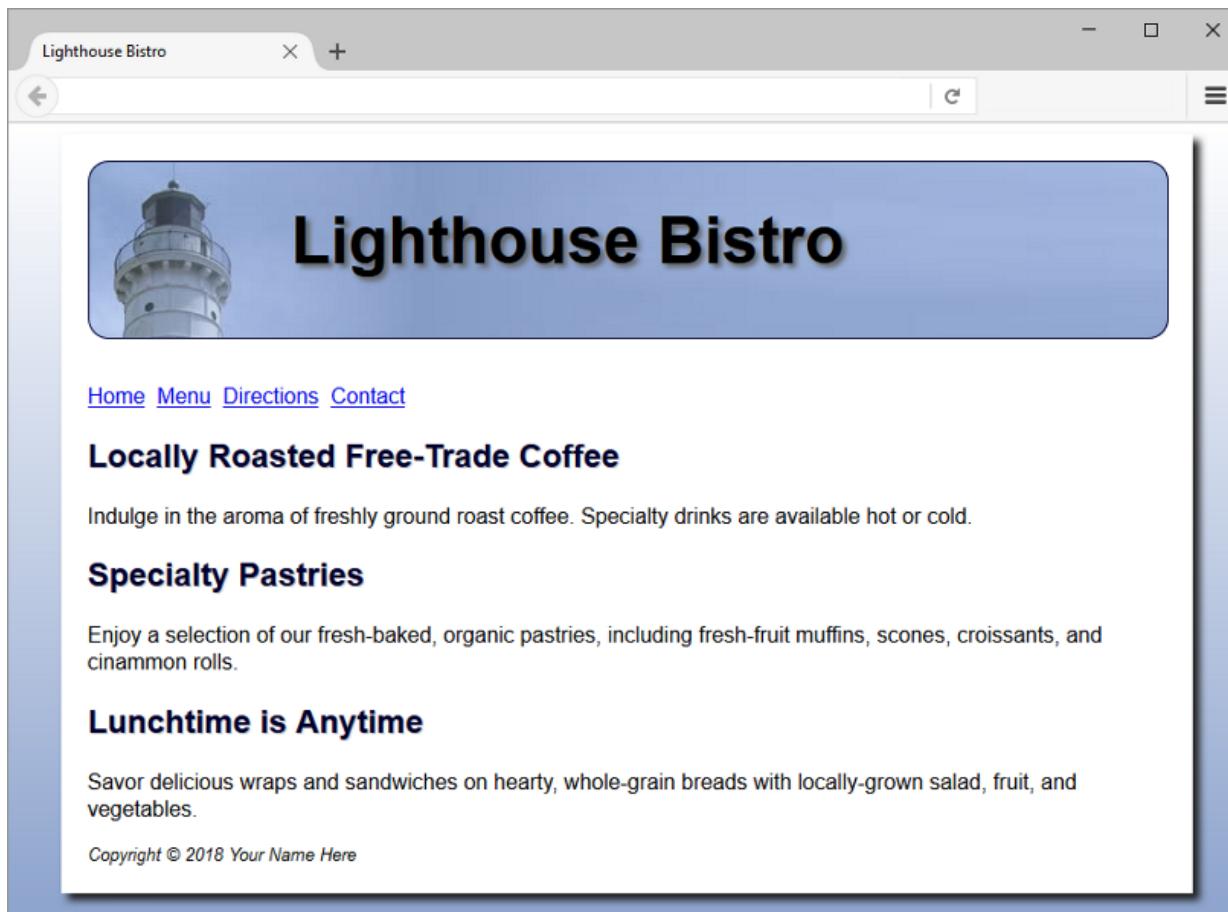
Use the background-image property

- linear-gradient()
- radial-gradient()

Example:

```
body {  
    background-color: #8FA5CE;  
    background-image: linear-gradient(#FFFFFF,  
#8FA5CE); }
```

Figure 4.44 The gradient in the background was configured with CSS without an image file



Summary

- This chapter introduced the use of visual elements and graphics on web pages.
- As you continue to create web pages, look back at the guidelines and accessibility issues related to graphics.
- The number one reason for visitors to leave web pages is too long of a download time. When using images, be careful to minimize this issue.
- Provide alternatives to images (such as text links) and use the alt attribute on your pages.