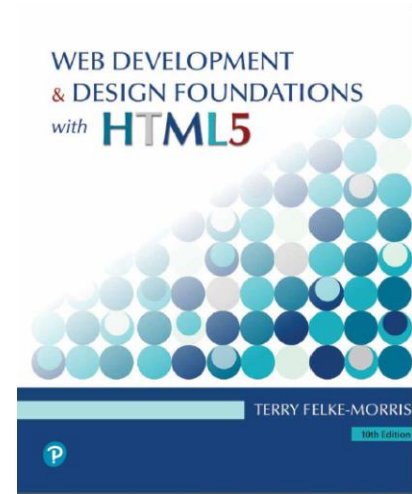# Web Development & Design Foundations with HTML5
10th Edition

CHAPTER 4
VISUAL ELEMENTS AND GRAPHICS

1

Learning Outcomes

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
- 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>

Figure 4.1

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

- ## 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

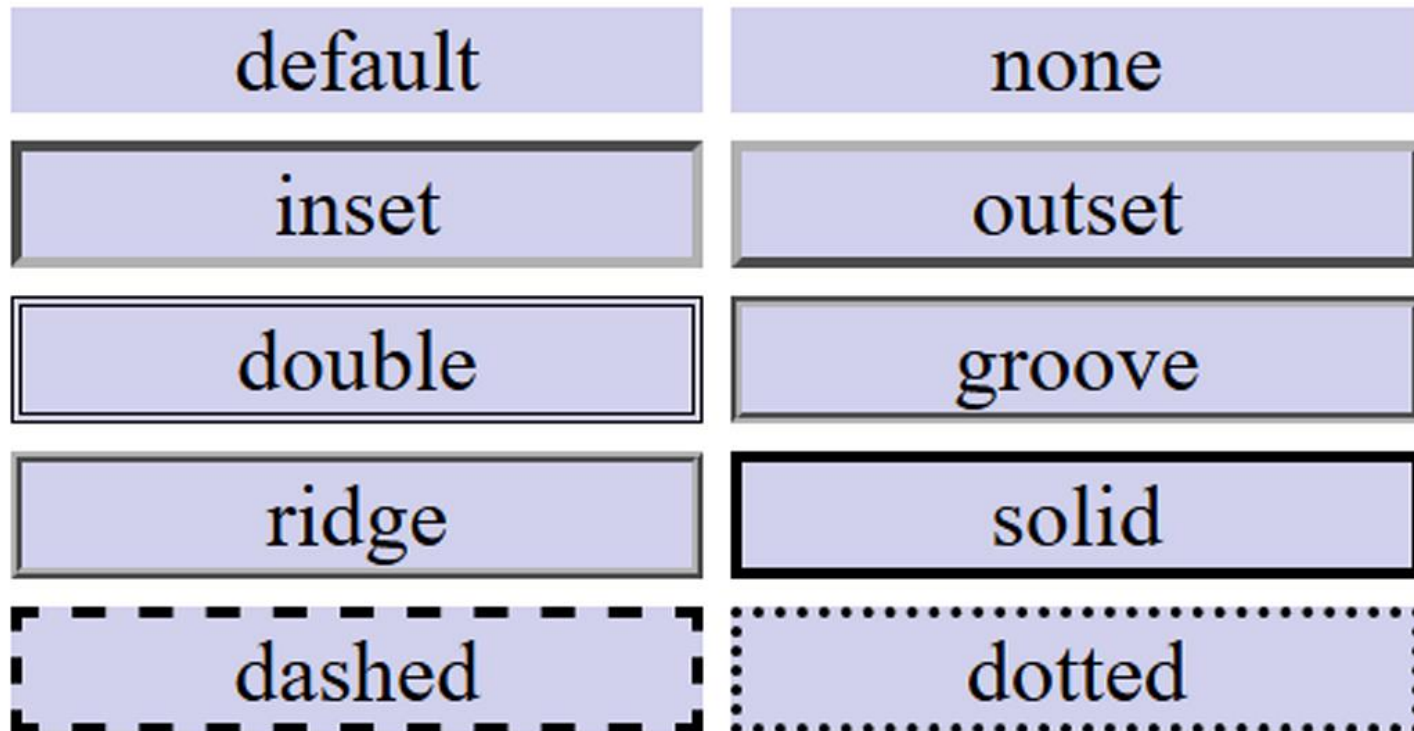|	
default	none
inset	outset
double	groove
ridge	solid
dashed	dotted

Figure 4.2

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;
}
```

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;
   }
```

Hands-On Practice

Figure 4.3

h2 { background-color: #B0E6E6;

   color: #237B7B;

   font-family: Georgia, "Times New Roman", serif;

   text-align: center;

   border-bottom: 2px dashed #237B7B; }
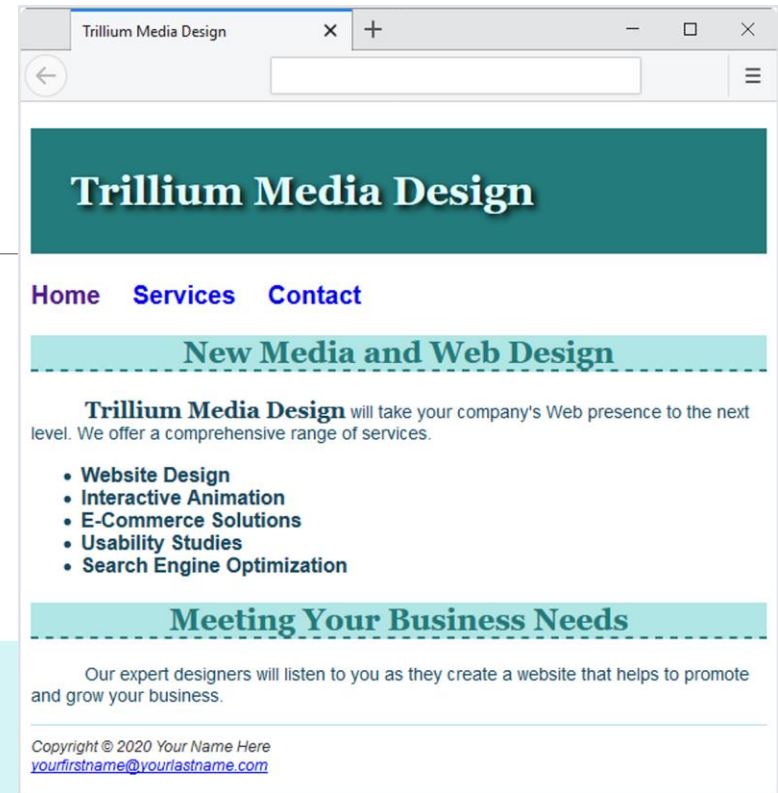
Checkpoint 4.1

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

Graphic types commonly used on web pages:

- GIF
- JPG
- PNG
- WebP

GIF

GIF saved with Transparency | GIF saved without Transparency

Figure 4.6

Background color configured to be transparent

Background color – no transparency

- 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

Figure 4.7

- Progressive JPEG – similar to interlaced display

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

`<img src="dog.jpg" alt="Dog at computer" height="100" width="100">`

- 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

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.

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

<img src="home.gif" height="19" width="85" alt="Home">

- Some browsers automatically add a border to image links.

- Configure CSS to eliminate the border
  img { border-style: none; }

Thumbnail Image

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

```
<a href="island.jpg"><img src="small.jpg" alt="tropical
island" width="200" height="100"></a>
```
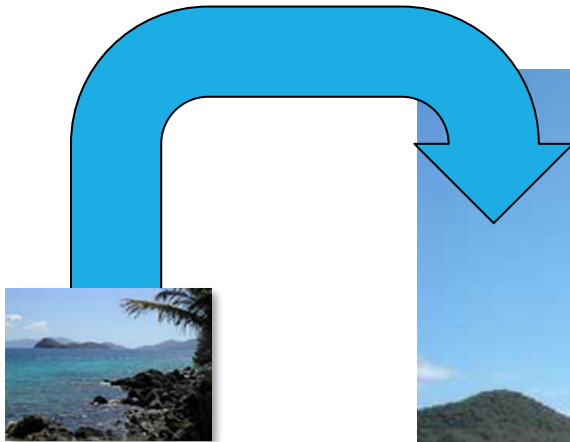
Figure 4.7

Figure 4.9

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
- dogbday.gif may be just about right

Organizing Your Site
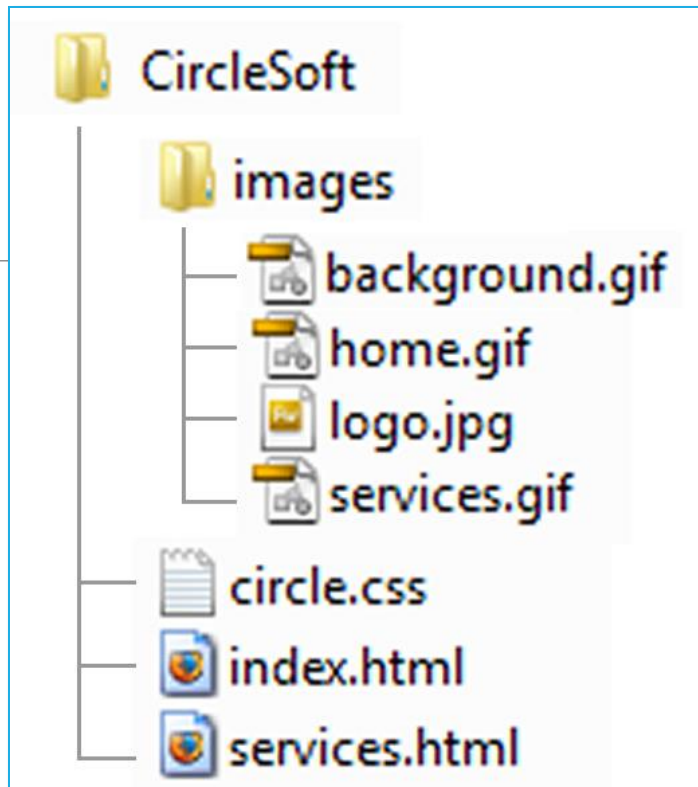
Figure 4.21

- Place images in their own folder

- Code the path to the file in the src atttribute

<img src="images/home.gif" alt="Home" height="100" width="200">

HTML5 Figure and Figcaption Elements

Figure 4.14

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>
```
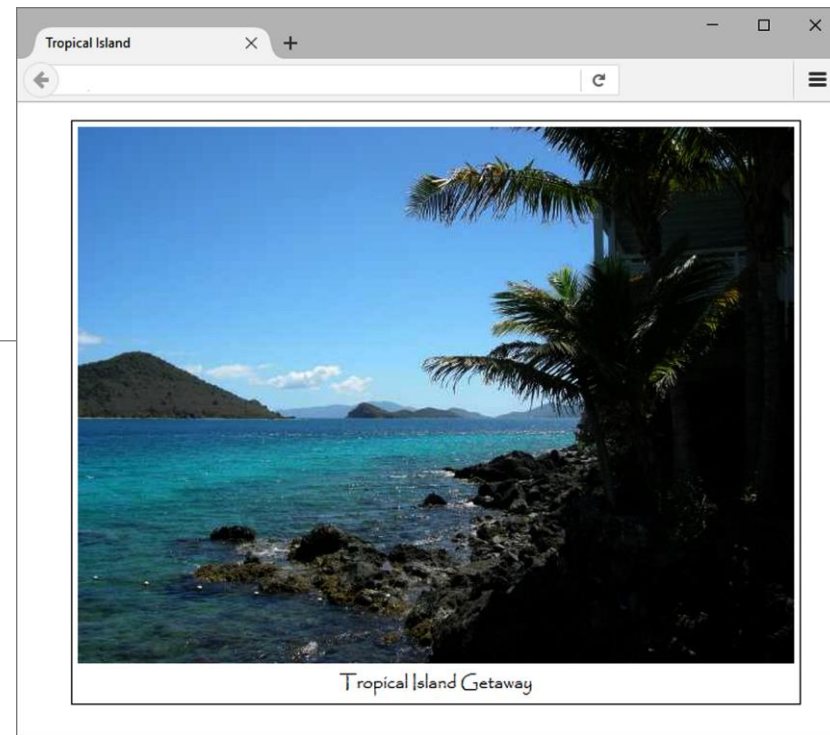
HTML5 Meter Element

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>    312 Opera<br>
<meter value="200" min="0" max="14417">200</meter>    200 other<br>
```
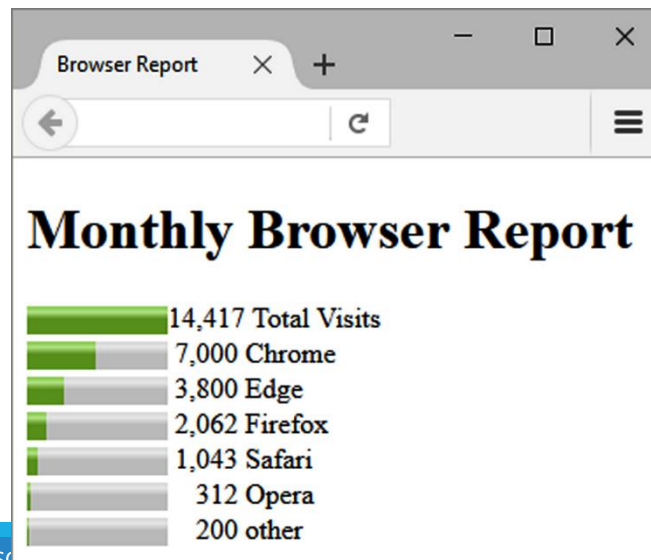
Figure 4.15

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
```
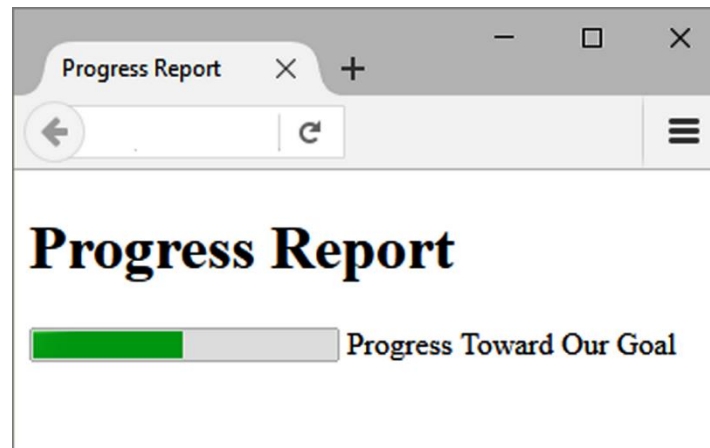

Figure 4.16

CSS background-image Property

Configures a background-image

By default, background images tile (repeat)

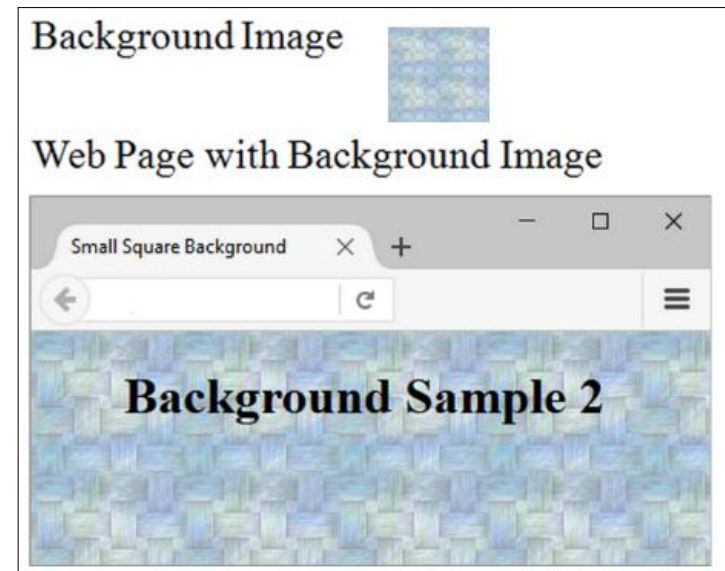**body { background-image: url(background1.gif); }**
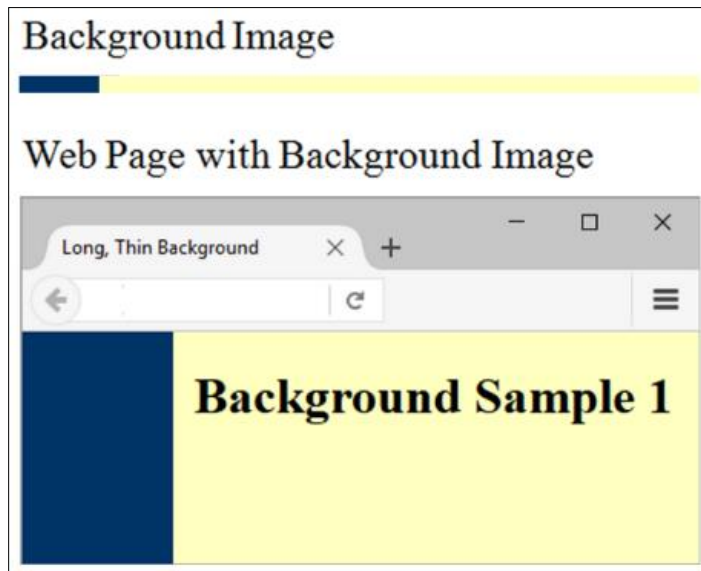
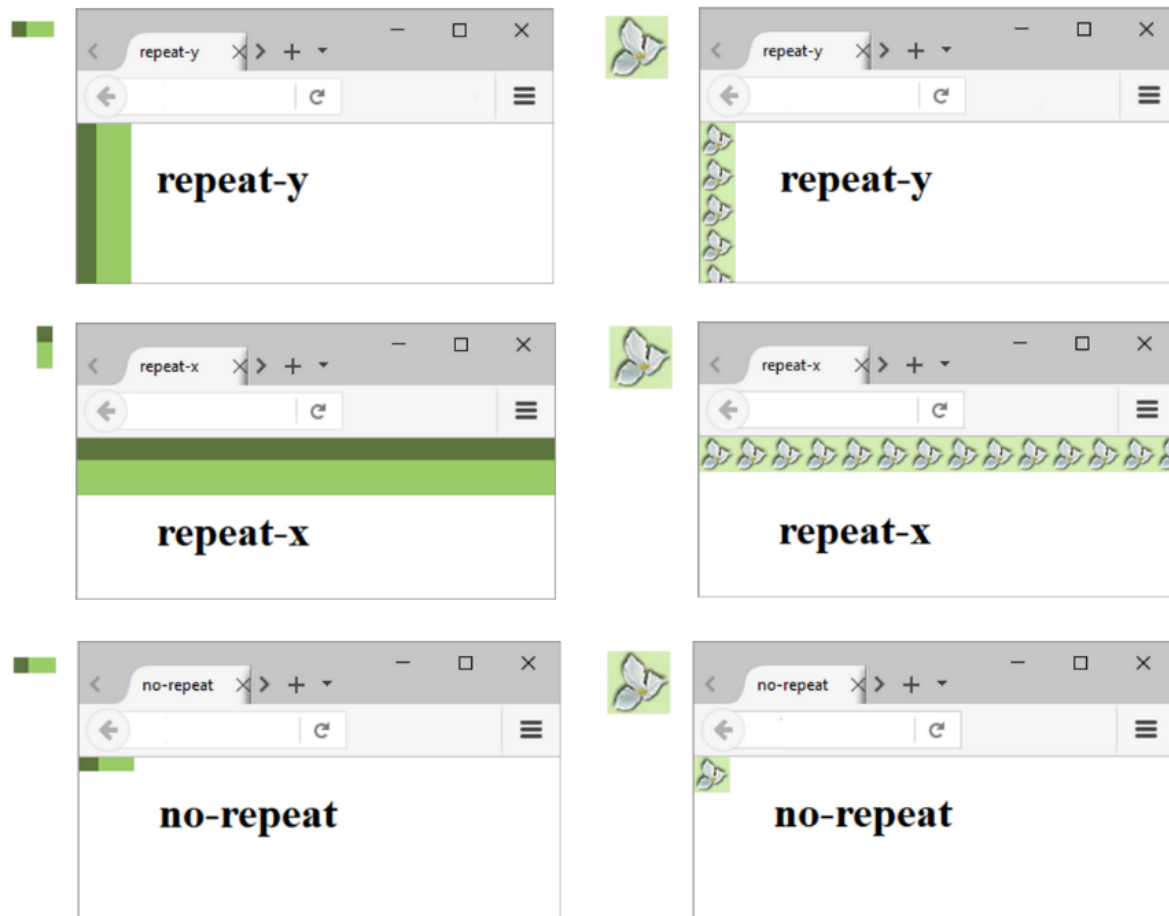Figure 4.17

Figure 4.18

CSS background-repeat Property

Figure 4.19

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;

}
```

Copyright © Terry Felke-Morris http://terrymorris.net

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
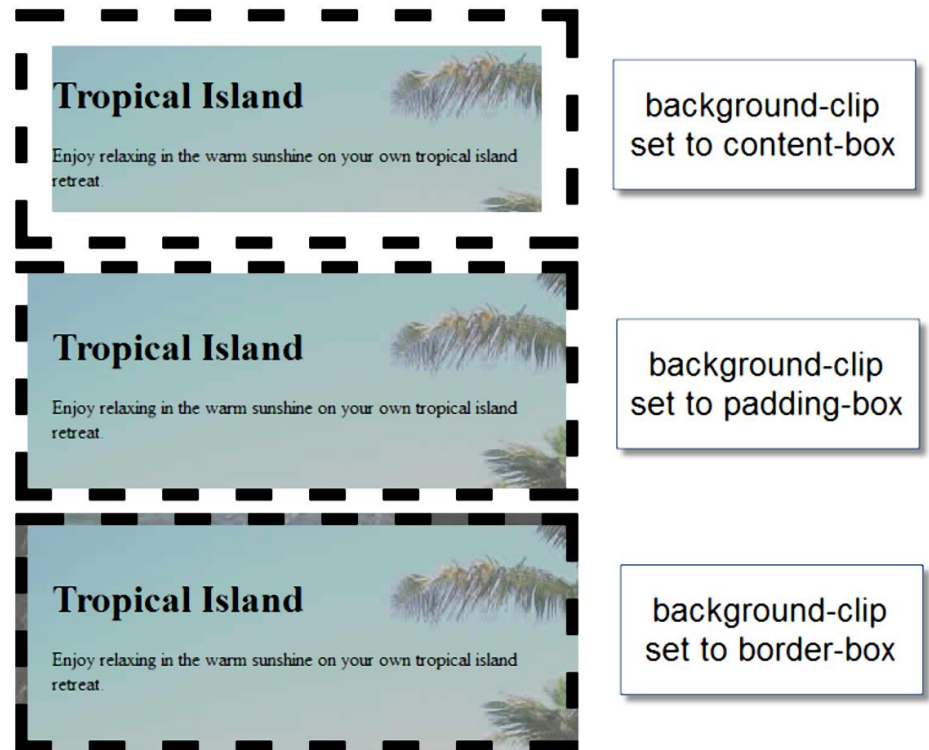
Figure 4.23

CSS background-origin property

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

Figure 4.24

CSS background-size Property

can be used to resize or scale the background image
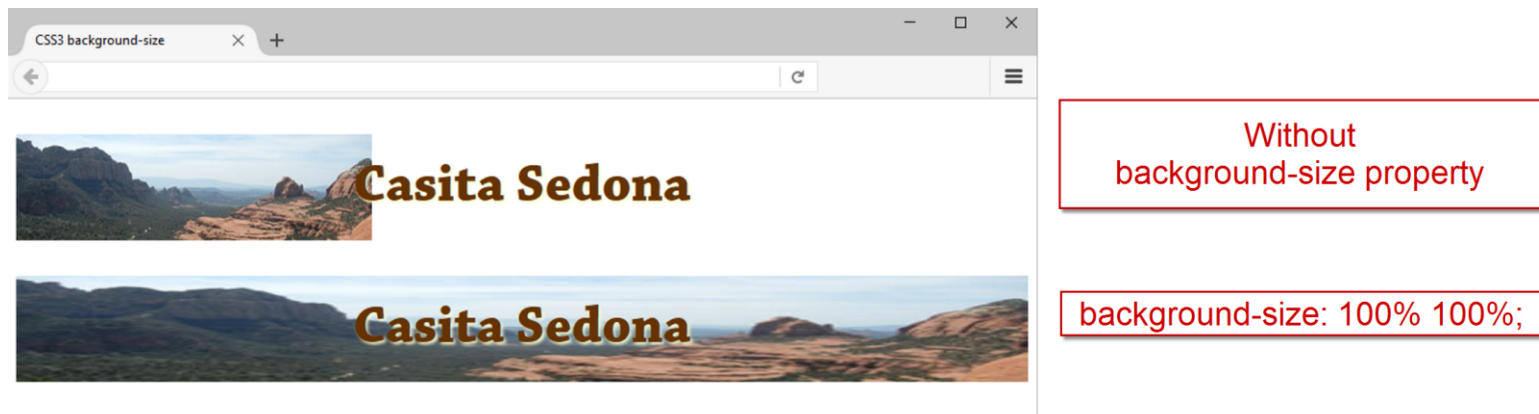
Figure 4.25

CSS Multiple Background Images

Use the background property
 to configure
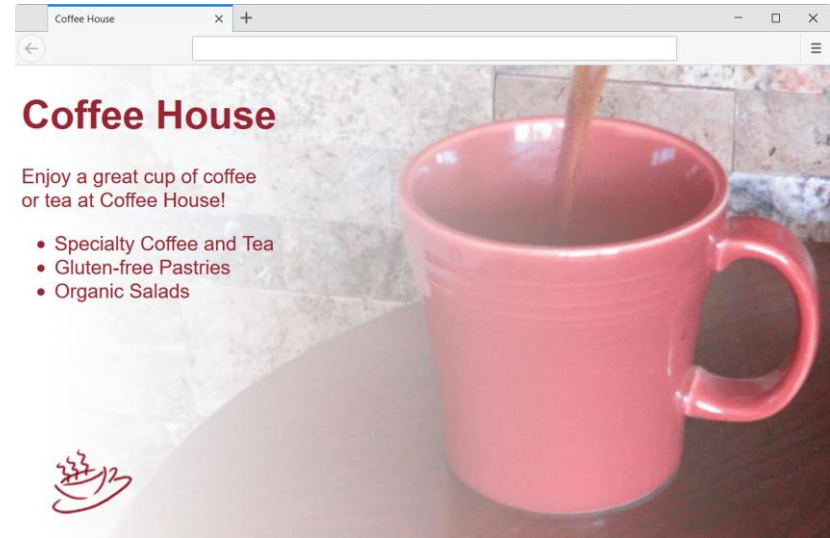 multiple background images.

Figure 4.27

Example:

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

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.

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.
   h1{background-image: url (circle.jpg);
   background-repeat: no repeat;}

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.
   body{background-image: url (bg.gif);
   background-repeat: repeat-y;}

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

map element
◦ Defines the map

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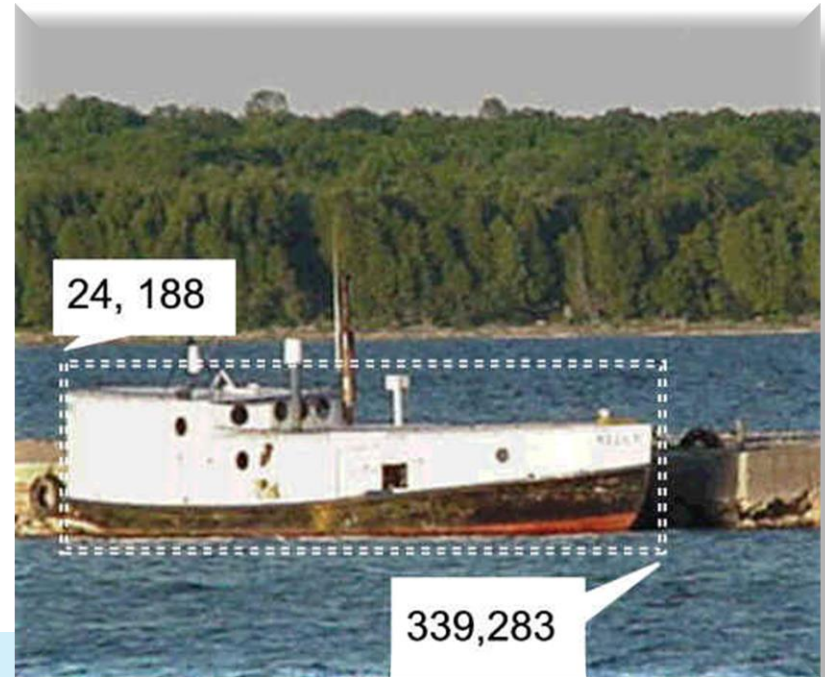 ◦ href Attibute
  ◦ shape Attribute
  ◦ coords Attribute

24, 188

339,283

Figure 4.29

```
<map name="boat" id="boat">
 <area href="http://www.fishingdoorcounty.com"
       shape="rect"
       coords="24, 188, 339, 283" alt="Door County Fishing">
</map>
<img src="fishingboat.jpg" usemap="#boat" alt="Door County"
     width="416" height="350">
```

Favorites Icon - favicon

- A square image associated with a web page
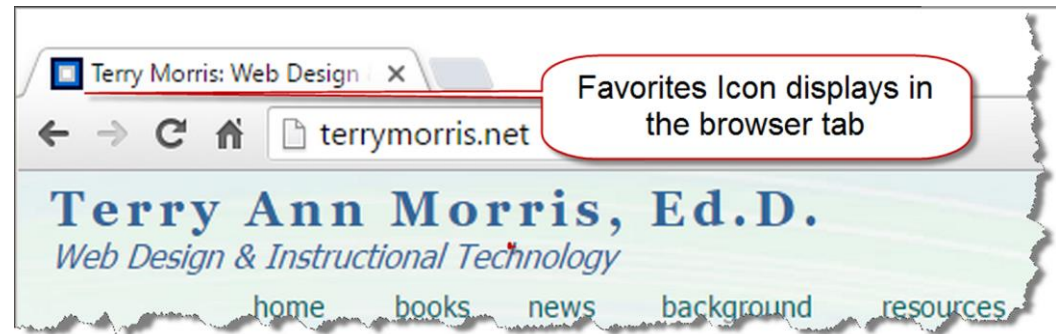
Figure 4.30

- 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">
```

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

- 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

- 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

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? 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

Copyright © Terry Felke-Morris http://terrymorris.net
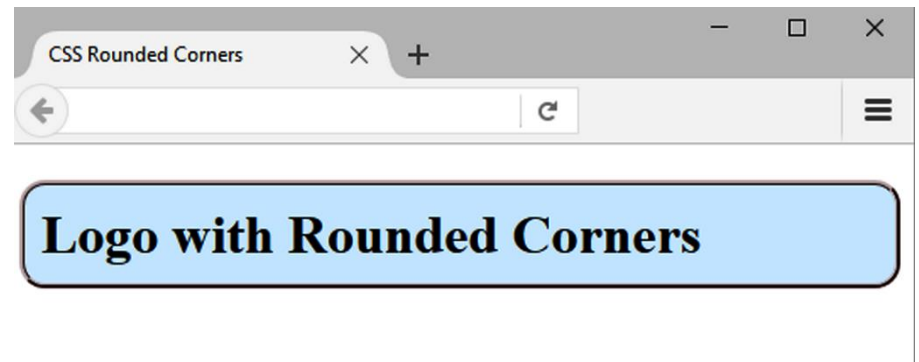
Examples of Rounded Corners

One value for border-radius configures all four corners
Example:

border-radius: 15px;

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;

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
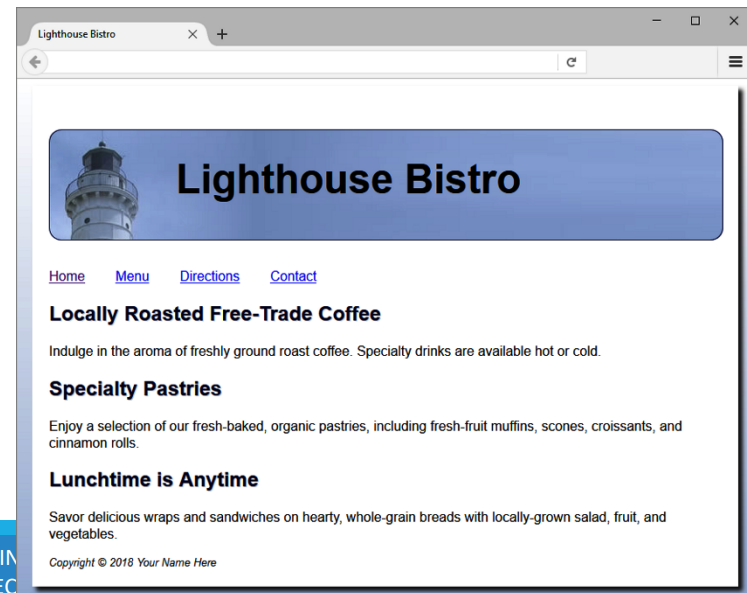
Figure 4.35

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

Rgba Color

Figure 4.38

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).

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;
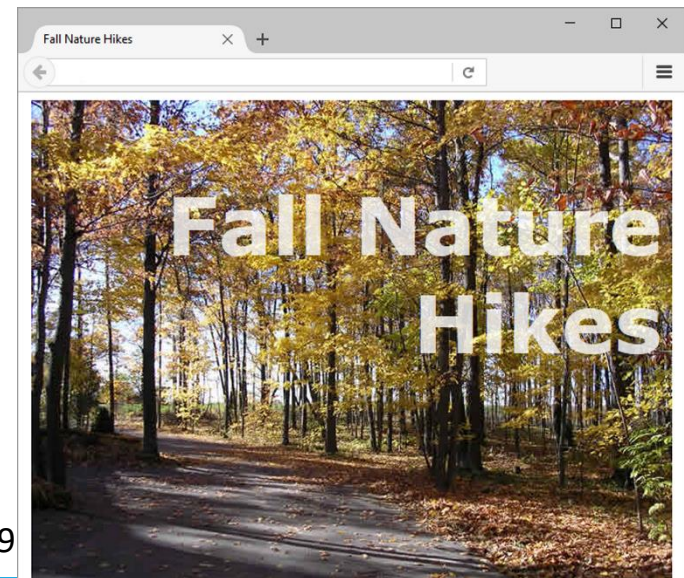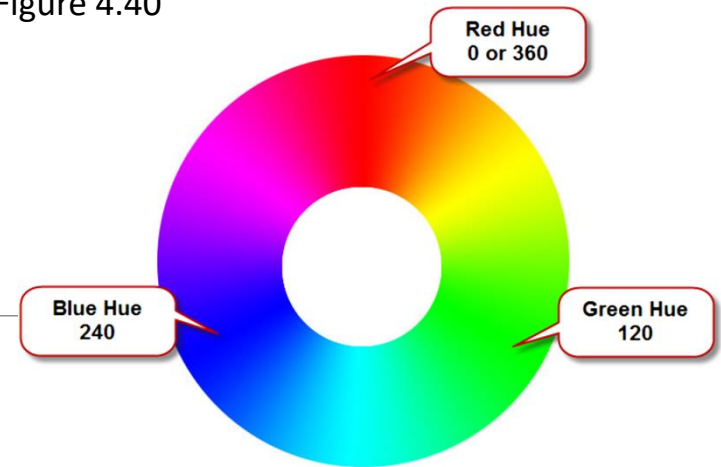}

Figure 4.39

HSLA Color
hue, saturation, light, alpha

Figure 4.40

Hue is a value between 0 and 360

Saturation: shade of gray: percent

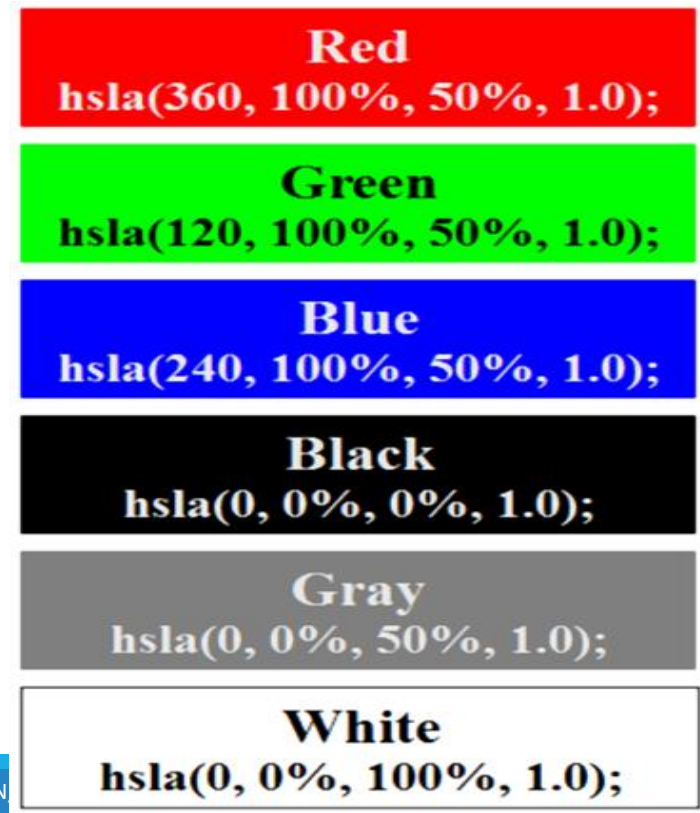Lightness: dark to wight: percent

Optional alpha: from 0 to 1

Figure 4.41

CSS Gradients

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

Use the background-image property

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

Figure 4.44

Example:

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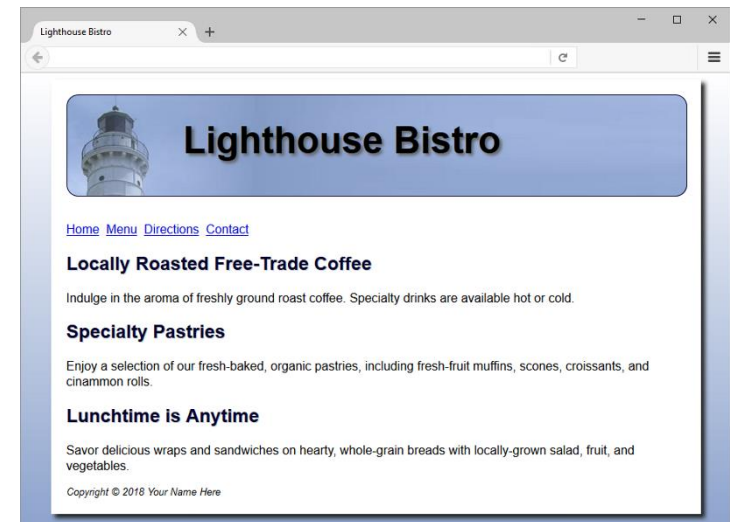   background-image: linear-gradient(#FFFFFF, #8FA5CE); }

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.