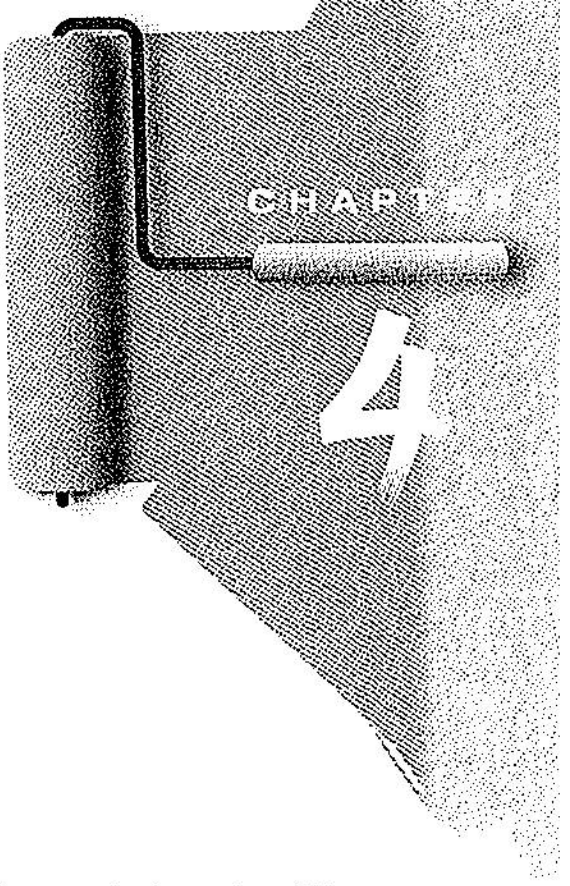


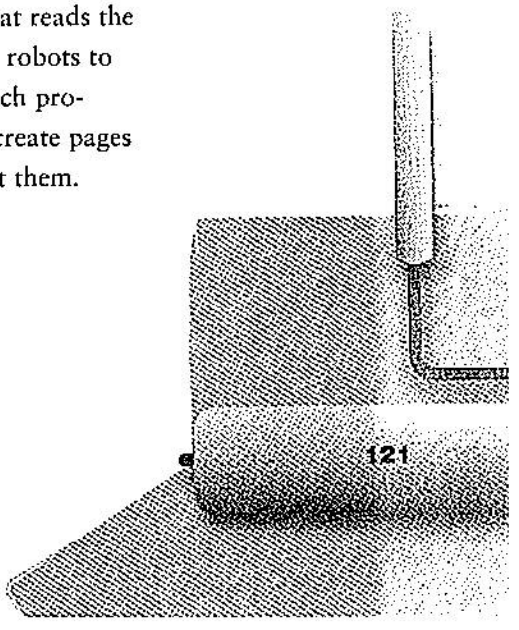
Visual Elements and Graphics

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

- Create and format lines and borders on Web pages
- Decide when to use graphics and what graphics are appropriate
- Apply the image element to add graphics to Web pages
- Configure images as backgrounds on Web pages
- Configure images as hyperlinks
- Find free and fee-based graphics sources
- Follow recommended Web design guidelines when using graphics on Web pages

A key component of a compelling Web site is the use of interesting and appropriate graphics. This chapter introduces you to working with visual elements on Web pages.

When you include images on your Web site, it is important to remember that not all Web users are able to view them. Some users may have vision problems and need assistive technology such as a screen reader application that reads the Web page to them. In addition, search engines send out spiders and robots to walk the Web and catalog pages for their indexes and databases; such programs do not access your images. As a Web developer, you should create pages that are enhanced by graphical elements but that are usable without them.



4.1 Configuring Lines and Borders

Web designers often use visual elements such as lines and borders to separate or define areas on Web pages. In this section you'll explore two coding techniques to configure a line on a Web page: the XHTML horizontal rule element and the CSS `border` and `padding` properties.

The Horizontal Rule Element

A horizontal rule or line visually separates areas of a page. The `<hr />` element configures a horizontal line across a Web page. Since the horizontal rule element does not contain any text, it is coded as a stand-alone tag, and not in a pair of opening and closing tags.

HANDS-ON PRACTICE 4.1

Open the Web page found at chapter4/starter1.html in the student files in a text editor. This file should be familiar to you; it is similar to the Web page you worked with in Chapter 3 (see Figure 3.11). Add an `<hr />` tag above the paragraph that contains the page footer (`id="footer"`).

Save your file as hr.html and test it in a browser. The lower portion of your Web page should look similar to the partial screenshot shown in Figure 4.1. Compare your work with the solution in the student files (Chapter4/hr.html).

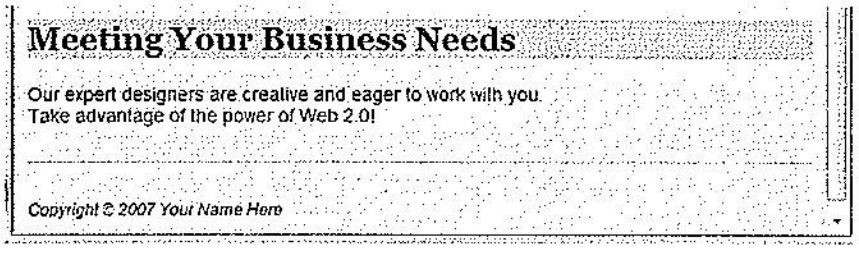


Figure 4.1
The `<hr />` element configures a horizontal line

Horizontal rules are centered within their container element (in this case the Web page body) by default. A number of attributes exist for the `<hr />` tag but they are deprecated or not officially supported by the W3C. Appendix A contains a list of these attributes and descriptions.

While a horizontal rule can be easily created using XHTML, a more modern technique is to use CSS to configure a border for a Web page element.

The `border` and `padding` Properties

As you may have noticed when you configured background colors for heading elements in Chapter 3, block-level XHTML elements form the shape of a rectangular box on a Web page. This is known as the CSS box model, which you will explore in detail in

Chapter 6. For now, let's focus on two CSS properties that can be configured for the "box"—the `border` and `padding` properties.

The `border` Property. The `border` property configures the border, or boundary, around an element. By default, the border has a width set to 0 and does not display. You can set the `border-width`, `border-color`, and `border-style`. And there's more—you can even configure individual settings for `border-top`, `border-right`, `border-bottom`, and `border-left`. You'll get some practice configuring properties for just the top border (`border-top`) in the next Hands-On Practice.

The `border-style` property also offers a variety of formatting options including `inset`, `outset`, `double`, `groove`, `ridge`, `solid`, `dashed`, and `dotted`. Be aware that these property values are not all uniformly applied by browsers. Figure 4.2 shows how Firefox 2 and Internet Explorer 7 render various `border-style` values.

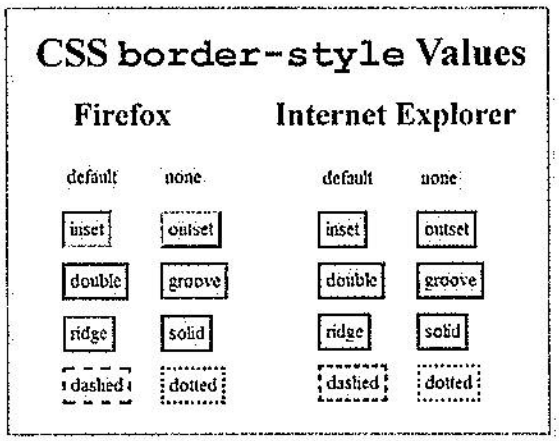


Figure 4.2
Not all `border-style` properties are rendered the same way by popular browsers

The CSS to configure the borders shown in Figure 4.2 uses a `border-color` of `#000033`, `border-width` of 3 pixels, and the value indicated for the `border-style` property. For example, the style rule to configure the dashed border follows:

```
.dashedborder { border-color: #000033;
                border-width: 3px;
                border-style: dashed;
}
```

A shorthand notation allows you to configure all the `border` properties in one style rule by listing the values of `border-width`, `border-style`, and `border-color`. An example follows:

```
.dashedborder { border: 3px #000033 dashed }
```

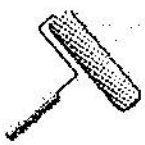
The `padding` Property. The `padding` property configures empty space between the content of the XHTML element (usually text) and the border. By default, the padding is set to 0. If you configure a background color for an element, the color is applied to both the padding and the content areas. You'll apply the `padding` property in the next Hands-On Practice. You may want to refer to Table 4.1, which presents a description of the CSS properties introduced in Chapter 4, as you work through the Hands-On Practice exercises.

Table 4.1 New CSS properties introduced in this chapter

Property	Description	Values
`background-image`	Background image on an element	url (imagename.gif) or url (imagename.jpg)
`background-position`	Position of the background image	Two percentage values or numeric pixel values. The first value configures the horizontal position and the second configures the vertical position starting from the upper-left corner of the container's box. Text values can also be used: `left`, `top`, `center`, `bottom`, `right`.
`background-repeat`	Controls how the background image will repeat	Text values `repeat` (default), `repeat-y`, (vertical repeat), `repeat-x` (horizontal repeat) , `no-repeat` (no repeat)
`border`	Shorthand notation to configure the values for `border-width`, `border-style`, and `border-color` of an element	The values for `border-width`, `border-style`, and `border-color` separated by spaces; for example: `border: 1px solid #000000;`
`border-bottom`	Shorthand notation to configure the bottom border of an element	The values for `border-width`, `border-style`, and `border-color` separated by spaces; for example: `border-bottom: 1px solid #000000;`
`border-color`	The color of the border around an element	Any valid color
`border-left`	Shorthand notation to configure the left border of an element	The values for `border-width`, `border-style`, and `border-color` separated by spaces; for example: `border-left: 1px solid #000000;`
`border-right`	Shorthand notation to configure the right border of an element	The values for `border-width`, `border-style`, and `border-color` separated by spaces; for example: `border-right: 1px solid #000000;`
`border-style`	The type of border around an element	Text values `double`, `groove`, `inset`, `none` (the default), `outset`, `ridge`, `solid`, `dashed`, `dotted`, `hidden`
`border-top`	Shorthand notation to configure the top border of an element	The values for `border-width`, `border-style`, and `border-color` separated by spaces; for example: `border-top: 1px solid #000000;`
`border-width`	The width of a border around an element	A numeric pixel value (such as `1px`) or the text values `thin`, `medium`, `thick`

Table 4.1 New CSS properties introduced in this chapter (*continued*)

Property	Description	Values
`padding`	Shorthand notation to configure the amount of padding—the blank space between the element and its border	1. A single numeric value (px or em); configure padding on all sides of the element. 2. Two numeric values (px or em); the first value configures the top and bottom padding, the second value configures the left and right padding; for example: `padding: 20px 10px;` 3. Four numeric values (px or em) or percentages. The values configure the padding in the following order: `padding-top`, `padding-right`, `padding-bottom`, `padding-left`.
`padding-bottom`	Blank space between an element and its bottom border	A numeric value (px or em) or percentage
`padding-left`	Blank space between an element and its left border	A numeric value (px or em) or percentage
`padding-right`	Blank space between an element and its right border	A numeric value (px or em) or percentage
`padding-top`	Blank space between an element and its top border	A numeric value (px or em) or percentage



HANDS-ON PRACTICE 4.2

In this Hands-On Practice you will work with the `border` and `padding` properties. Launch a text editor and open the Web page found at chapter4/starter2.html in the student files. You will modify the CSS style rules for the `h1` selector, `h2` selector and `footer` id. When you are finished, your page should look similar to the one shown in Figure 4.3.

Modify the CSS style rules as follows:

- Modify the style rules for the `h1` selector. Remove the `line-height` style rule because you will configure the empty space using `padding`. Add a style rule to set the `padding` to 15 pixels. The code follows:

```
padding: 15px;
```

- Add a style rule to the `h2` selector to configure a 2 pixel, dashed, bottom border in the color #191970. The code follows:

```
border-bottom: 2px dashed #191970;
```

- Add style rules to the `footer` id to configure a thin, solid, top border in the color #aeaed4 along with 10 pixels of top padding. The code follows:

```
border-top: thin solid #aeaed4;
padding-top: 10px;
```

Save your file as border.html.

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

Test in multiple browsers. Expect your page to look slightly different in browsers such as Internet Explorer and Firefox. See Figure 4.3 for a screenshot of the page using Firefox. Figure 4.4 shows the page displayed in Opera. The student files contain a sample solution (Chapter4/border.html).

Figure 4.4
Opera renders the dashed border and bullet points differently than Firefox

FAQ

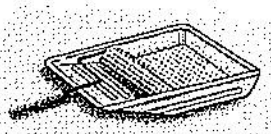
My page looks different in various browsers. What can I do?

Do not expect your Web pages to always look the same in every browser and every browser version. Web pages that look different in various browsers are a frustrating part of life in the world of Web developers. The good news is that browser manufacturers are finally beginning to be less inventive and more compliant with the W3C standards. Also, organizations such as The Web Standards Project at http://www.webstandards.org have lobbied for standards compliance in browsers. Look for more compliance in the future!

Notice how objects even as simple as bullet points and dashed borders appear different depending on the way the browsers display the page. To deal with this, remember the following:

- Design for the browser you think most of your visitors will use.
- Design the page so that it looks okay (degrades gracefully) in other browsers.

Perhaps the most exciting way to add visual interest to a Web page is to add graphics. The next section continues with a discussion of types of graphics used on Web pages.



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.

4.2 Types of Graphics

Graphics help to make Web pages compelling. Unfortunately, they can also make pages very slow to load. This section discusses types and features of graphic files used on the Web: GIF, JPEG, and PNG.

Browsers render, or display, Web page documents in order, line-by-line, starting at the top of the document. They also display standard images as the files are read in order from top to bottom. The top of a standard image begins to display after 50 percent of the image has been read by a browser. As you read about types of images, look for techniques you can use to make your pages load faster.

GIF Images

Graphic interchange format (GIF) is best used for flat line drawings containing solid tones and simple images such as clip art. The maximum number of colors in a GIF file is 256 (although most do not use more than the 216 colors in the Web Color Palette). GIF images have a .gif file extension.

Transparency. The format GIF89A used by GIF images supports image transparency. In a graphics application such as Adobe Photoshop or Adobe Fireworks one color (usually the background color) of the image can be set to be transparent. This helps the image to blend in with the Web page background or table background. Figure 4.5 shows two GIF images, one that does not use transparency and one with a background color configured to be transparent.

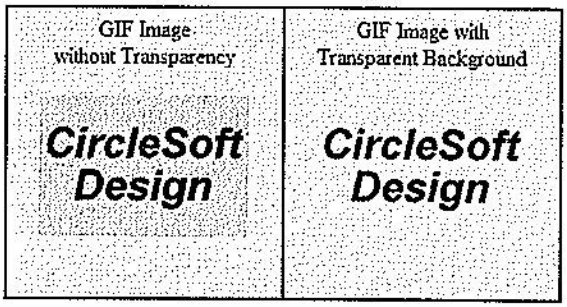


Figure 4.5
Comparison of nontransparent and transparent GIFs

When working with transparent GIFs you should also be aware of the **halo effect**—a fringe of color around parts of the transparent image. Transparent GIFs are usually optimized for display on a particular background color. Displaying them on a background other than the type they were designed for can produce the halo effect.

The GIF used in Figure 4.6 was created to display on a light background. When it is shown on a dark background, the halo of light pixels is noticeable. This halo can only be fixed by modifying the image in a graphics application such as Adobe Photoshop or Adobe Fireworks and saving a version that is optimized for display on a dark background.

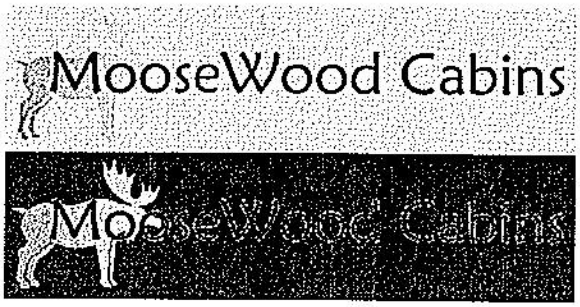


Figure 4.6
Notice the halo effect on the dark background

Animation. Animated GIF images also use the .gif file extension. They are contained in a GIF file that consists of several images or frames, each of which is slightly different. When the frames flash on the screen in order, the image appears animated—animated GIFs can be created in a graphics application such as Adobe Fireworks or Adobe

ImageReady. Shareware GIF animation applications such as the GIF Construction Set are also commonly used. There are advantages to using an animated GIF to add action to your Web page. This format is widely supported, does not require a browser plug-in, and is relatively easy to create.

When you decide to add an animated GIF to your Web page, try to use the image for special emphasis only. If you're like most people, at some time you have been annoyed by a flashing ad banner at the top of a Web page. Use animated gifs sparingly.

Compression. When a GIF file is saved, lossless compression is used. This means that nothing in the original image is lost and that the compressed image, when rendered by a browser, will contain the same pixels as the original.

Optimization. To avoid slow-loading Web pages, graphic files should be optimized for the Web. Image optimization is the process of creating an image with the lowest file size that still renders a good quality image—balancing image quality and file size. GIF images are typically optimized by reducing the number of colors in the image. The image shown in Figure 4.6 was created using 235 colors and is 12KB in size. A graphics application such as Adobe Photoshop can be used to optimize the image for the Web—reducing the number of colors, which decreases the file size. The image shown in Figure 4.7 uses only eight colors and has a file size less than 5KB. However, the image quality is unacceptable.

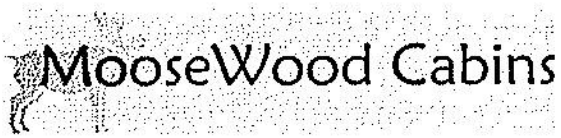


Figure 4.7
This GIF image is less than 5KB but is poor quality

Figure 4.8 shows the optimized image with acceptable quality using 128 colors and a file size of 9KB—the best balancing of quality and file size for this particular image.

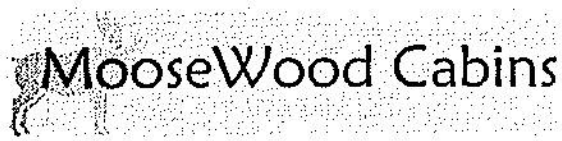


Figure 4.8
Optimization is a trade-off between file size and image quality

Interlacing. When a GIF graphic file is created it can be configured as interlaced. This changes the way that browsers render the image. Remember that browsers display standard (noninterlaced) images as the file is read from top to bottom and only begin to display the image after 50 percent of the file has been downloaded by a browser. An interlaced image progressively displays and seems to fade in as it downloads. The image first appears fuzzy but gradually becomes clearer and sharper. Interlaced images are repeatedly scanned from left to right. The first time about 13 percent of the image is displayed. The next pass renders about 25 percent. This process continues until the image is completely displayed. When you are using complex GIF images, consider interlacing to improve the perceived load time of your page.

FAQ

Why does my text image look jagged?

If your image looks jagged, your graphic designer did not use **antialiasing** (sometimes called smoothing). Antialiasing is the process of creating a slight blur to smooth the jagged (stair-step) edges found in digital images. In Figure 4.9, the top image was created using antialiasing and the bottom was not. Note the jagged edges in the bottom image. The only letters not affected are the "I" and "i" because the shapes of these letters are perfectly horizontal and vertical.

Figure 4.9
Notice the smoother look of the top line of text

JPEG Images

Joint Photographic Experts Group (JPEG) images are best used for photographic images. In contrast to a GIF image, a JPEG image can contain 16.7 million colors. However, JPEG images cannot be made transparent and they cannot be animated. JPEG images usually have a .jpg or .jpeg file extension.

Compression. Another difference between GIF and JPEG images is that when JPEG images are saved **lossy compression** is used. This means that some pixels in the original image are lost or removed from the compressed file. When a browser renders the compressed image, the display is similar but not exactly the same as the original image.

Optimization. There are trade-offs between the quality of the image and the amount of compression. An image with less compression will have higher quality and result in a larger file size. An image with more compression will have lower quality and result in a smaller file size. Most graphics applications allow you to preview the quality/compression trade-off and choose the image that best suits your needs.

Figure 4.10 shows a JPEG image (photograph taken by Karen Felke) that is stored in a 78KB file. The same image was saved at various quality levels: Figure 4.11 was saved with 80 percent quality and is 26KB; Figure 4.12 was saved with 20 percent quality and is 6KB, but its quality is unacceptable. View these images to gain a perspective on the quality/size trade-off. You should notice that the quality of the image degrades as the file size decreases. The square blockiness you see in the smallest file is called **pixelation**.

Another method to optimize JPEG images is to use a graphics application to reduce the dimensions of the images. Figure 4.13 shows a small version, or thumbnail, image of acceptable quality.

Figure 4.10
Initial JPEG image (78KB file size) photo courtesy of Karen Felke

Figure 4.11
JPEG saved at 80 percent quality (26KB file size)

Figure 4.12
JPEG saved at 20 percent quality (6KB file size)

Figure 4.13
This small image is only 6KB

Progressive JPEG. When a JPEG file is created it can be configured as progressive. A progressive JPEG is similar to an interlaced GIF in that the image progressively displays and seems to fade in as it downloads. Consider using this for complex images since the general shapes will initially appear and then sharpen as the file is progressively scanned and displayed by the browser.

PNG Images

PNG, pronounced "ping," stands for portable network graphic. Browsers have only recently begun to support this type of image. It combines the best of GIF and JPEG images and will be a replacement for the GIF in the future. PNG graphics can support millions of colors. They can support variable transparency levels and use lossless compression. PNG images also support interlacing. PNG is the native file format of some graphics applications, such as Adobe Fireworks.

4.3 Using Graphics

Now that you've been introduced to the types of graphic files displayed on Web pages, we'll discuss how to place graphics on your Web pages.

The Image Element

The `<img />`, pronounced image, element is used to place graphics on a Web page. These graphics can be photographs, banners, company logos, navigation buttons—you are limited only by your creativity and imagination.

The image tag is used alone, not in a pair of opening and closing tags. The image file should be either in the same folder as your Web site or in a subfolder of your site. For example, to place an image called logo.gif on your Web page, you would use the following XHTML code:

```
<img src="logo.gif" height="200" width="500" alt="CircleSoft Logo" />
```

The **`src`** attribute is used to specify the file name of the image. A number of optional attributes can be applied to images. It is a good idea to include the `height`, `width`, and `alt` attributes. The **`height`** attribute and **`width`** attribute can cause the Web page to load more efficiently and quickly. The **`alt`** attribute provides a text replacement, typically a text description, of the image. Table 4.2 lists attributes and their values. Commonly used attributes are shown in bold.

Table 4.2 Attributes of the <img /> tag

Attribute	Value
align	right, left (default), top, middle, bottom (Deprecated)
alt	Text phrase that describes the image
border	Image border size in pixels (Deprecated) 0 will prevent the border from being displayed.
height	Height of image in pixels
hspace	Amount of space that is blank to the left and right of the image in pixels (Deprecated)
id	Text name, alphanumeric, beginning with a letter, no spaces—the value must be unique and not used for other id values on the same XHTML document
longdesc	URL of a Web page that contains a text description of the image
name	Text name, alphanumeric, beginning with a letter, no spaces—this attribute names the image so that it can be easily accessed by client-side scripting languages such as JavaScript. This attribute is deprecated in XHTML but is used to provide backward compatibility with browsers that support HTML.
src	The URL or file name of the image
title	A text phrase containing advisory information about the image—typically more descriptive than the alt text
vspace	Amount of space that is blank above and below the image in pixels (Deprecated)
width	Width of image in pixels

Use height and width attributes to help the browser render your page more efficiently. If you omit the attributes, the browser must often adjust and shift the other page elements after your images load. This slows down the loading of your Web page. The browser reserves the correct amount of space for your image if you use the height and width attributes with values either equal to or approximately the size of the image.

FAQ

What if I don't know the height and width of an image?

Most graphics applications can display the height and width of an image. If you have a graphics application such as Adobe Photoshop or Adobe Fireworks handy, launch the application and open the image. These applications include options that will display the properties of the image, such as height and width.

If you don't have a graphics application available, you can determine the dimensions of an image using a browser. Display the image on a Web page. Right-click on the image to display the context-sensitive menu. Select properties and view the dimensions (height and width) of the image. (*Warning:* if the height and width are specified on the Web page, those values will be displayed even if the image's actual height and width are different.)

Accessibility and Images

Focus on Accessibility

WWW

Use the alt attribute to provide accessibility. Recall from Chapter 1 that Section 508 of the Rehabilitation Act requires the use of accessibility features for new information

technology (including Web sites) associated with the federal government. The `alt` attribute configures an alternative text description of the image. This `alt` text is used by the browser in two ways. The browser will show the `alt` text in the image area before the graphic is downloaded and displayed. Some browsers will also show the `alt` text as a tool tip whenever the Web page visitor places a mouse over the image area. Applications such as screen readers will read the text in the `alt` attribute out loud.

Standard browsers such as Internet Explorer and Safari are not the only type of application or user agent that can access your Web site. Major search engines run programs called spiders or robots; these programs index and categorize Web sites. They cannot process images, but some process the value of the `alt` attributes in image tags.

Focus on Accessibility

The **`longdesc`** attribute is used to provide accessibility when the `alt` text description is too short to convey the meaning of the image. The value of the `longdesc` attribute is the URL of a Web page that contains a detailed text description and explanation of the image. Most current browsers do not support this attribute but you can expect expanded support in the future.

Legacy Alert. The `align`, `vspace`, and `hspace` attributes help position the image on the page relative to text. Examples of formatting images and text using vertical alignment properties are shown in Figure 4.14.

Figure 4.15 provides examples of horizontal alignments, the **hspace attribute**, and the **vspace attribute.** The `hspace` and `vspace` attributes are used to add space around an image symmetrically.

Since you'll find many pages on the Web coded using the deprecated attributes of the image element (`align`, `hspace`, `vspace`, `border`), it's a good idea to become familiar with them. CSS techniques that replicate the functionality of these attributes will be discussed in Chapter 6.

Figure 4.14
Examples of vertical alignment

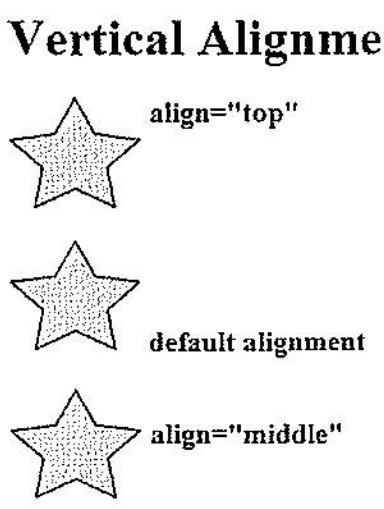
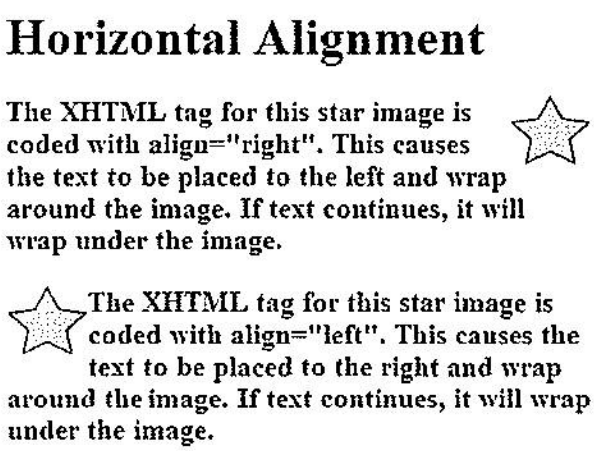


Figure 4.15
Examples of horizontal alignment



HANDS-ON PRACTICE 4.3

In this Hands-On Practice you will place a graphical logo banner on a Web page. Create a new folder called trilliumch4. The graphic used in this Hands-On Practice is located in the student files: Chapter4/starters folder. Save trilliumbanner.jpg file in your trilliumch4 folder. A starter version of the Trillium Media Design Home page is ready for you in the student files. Save the chapter4/starter3.html file to your trilliumch4 folder. Launch a browser to display the starter3.html Web page—notice a monochromatic green color scheme has been configured with CSS. When you are finished with this Hands-On Practice, your page will look similar to the one shown in Figure 4.16—with a logo banner.

Figure 4.16
The new Trillium Home page with a logo banner

Launch a text editor and open starter3.html in the Chapter4 folder.

Configure the image as follows:

Replace the text contained between the `<h1>` opening and closing tags. Code an `<img />` element to display trilliumbanner.jpg in this area. Remember to include the `src`, `alt`, `height`, and `width` attributes. Sample code follows:

```
<img src="trilliumbanner.jpg" alt="Trillium Media Design"
width="700" height="86" />
```

Modify the h2 selector as follows:

Let's review working with the CSS padding property. Add a style rule to configure 10 pixels of padding on the left side of the h2 element. The new style rule follows:

```
padding-left: 10px;
```

Save your page as index.html in the trilliumch4 folder. Launch a browser and test your page. It should look similar to the one shown in Figure 4.16. *Note*: if the image did not display on your Web page, verify that you have saved the trilliumbanner.jpg file in the trilliumch4 folder and that you have spelled the file name correctly in the <img /> element. The student files contain a sample solution in the Chapter4/4.3 folder. Isn't it interesting how just one image can add visual interest to a Web page?

Image Links

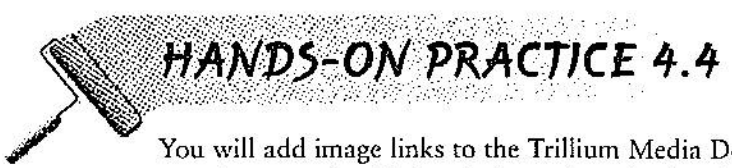
The XHTML to make an image function as a hyperlink is very easy. To create an image link all you need to do is surround your <img /> element with anchor tags. For example, to place a link around an image called home.gif, use the following XHTML code:

```
<a href="index.html"><img src="home.gif" height="19" width="85"
alt="Home" /></a>
```

When an image is used as a hyperlink, the default is to show a blue outline (border) around the image. If you would prefer not to display this outline, you could use the border="0" attribute in your image tag as follows:

```
<a href="index.html"><img src="home.gif" height="19"
width="85"alt="Home" border="0" /></a>
```

A more modern approach is to use CSS to configure the border on the img selector. The next Hands-On Practice will demonstrate this technique as you add image links to a Web page.



You will add image links to the Trillium Media Design Home page in this Hands-On Practice. You should already have the index.html and trilliumbanner.jpg files in your trilliumch4 folder. The graphics used in this Hands-On Practice are located in the student files: Chapter4/starters folder. Save the home.gif, services.gif, and contact.gif files to your trilliumch4 folder. View Figure 4.17 to see how your page should look after you are done with this Hands-On Practice.

Focus on Accessibility

Let's get started. Launch a text editor and open index.html. Notice that the anchor tags are already coded—you'll just need to convert the text links to image links! However, before you start changing the code, let's take a minute to discuss accessibility. Whenever

Figure 4.17
The new Trillium Home page navigation with image links

the main navigation consists of media, such as an image, some individuals may not be able to see the images (or may have images turned off in their browser). To provide navigation that is accessible to all, configure a set of plain text navigation links in the page footer area as follows:

1. Copy the `<div>` element containing the navigation area to the lower portion of the page and paste it above the page footer.
2. Modify the style rules in the nav class. Change the font size to `.75em`.
3. Now, focus on the top navigation area. Replace the text contained between each pair of anchor tags with an image element. Use home.gif for the link to index.html, services.gif for the link to services.html, and contact.gif for the link to contact.html. A sample follows:

   ```
   <a href="index.html"><img src="home.gif" alt="Home" width="120"
   height="40" /></a>
   ```

4. Create a new style rule that configures no border for the `img` selector. The code follows:

   ```
   img {border:0 }
   ```

Save your page as index.html. Launch a browser and test your page. It should look similar to the one shown in Figure 4.17. The student files contain a sample solution in the Chapter4/4.4 folder.

FAQ

What if my images don't show?

The following are common reasons for images not displaying on a Web page:

- Are your images really in the Web site folder? Use Windows Explorer to double-check.
- Did you code the XTHML and CSS correctly? Check for common mistakes such as typing `scr` instead of `src` and missing quotation marks.
- Do your images have the exact file names that you have used in the background or `src` attributes in your XHTML code? Attention to detail and consistency will be very helpful here.

Hints for naming 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

Background Images

Using the CSS `background-color` property to configure the background color of a Web page was introduced in Chapter 3. The W3C recommends that Web developers use the hexadecimal numeric value rather than the color name when setting a background color. For example, the following CSS code configures the background of a Web page to be a soft yellow:

```
body { background-color: #ffff99; }
```

In addition to a background color, you can also choose to use an image for the background of a Web page. Be careful not to choose an image that is too busy; it could interfere with your text and graphics. Use the CSS **`background-image`** property to configure a background image for a Web page. For example, the following CSS code configures the background of a Web page to be the image background1.gif located in the same folder as the Web page:

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

You can use a graphics application to create your own backgrounds or find a free background image on the Web.

Legacy Alert. If you work with Web pages created by others you may find that the XHTML attributes `bgcolor` and `background` have been used to configure the page instead of CSS properties. See Appendix A for more information on the `<body>` element and these attributes.

FAQ

Can I use both a `background-color` and a `background-image` attribute on the `body` selector?

Yes, you can! The background color (specified by the `background-color` property) will display first. Then the image specified as the Web page background will be loaded and tiled across the page. It's a good idea to choose a background color of a hue similar to the major color in your Web page background image. By coding both a background color and a background image you provide your visitor with a more pleasing visual experience. If the background image does not load for some reason, the page background will still have the expected contrast with your text color. If the background image is smaller than the Web browser window and the Web page is configured with CSS to not automatically tile (repeat), the page background color will display in areas not covered by the background image. The CSS for a page with both a background color and a background image is as follows:

```
body {  background-color: #cccccc;
        background-image: url(mybackground.gif);
}
```

You may think that a graphic created to be the background of a Web page would always be about the size of a browser window. This can be done; however, often the background image is actually much smaller than the typical browser window. The shape of a background image is usually either a long, thin rectangle or a small rectangular block. Unless otherwise specified in a style rule, Web browsers repeat, or tile, these images to cover the page background. The images have small file sizes so that they download as quickly as possible. Figure 4.18 shows a long, thin rectangular image that will repeat down the page. The Web page shown in Figure 4.19 uses a small rectangular image that is repeated or tiled on the page. In each of these cases, the small background image has the effect of a much larger image that fills the screen.

Figure 4.18
A long, thin background image tiles down the page

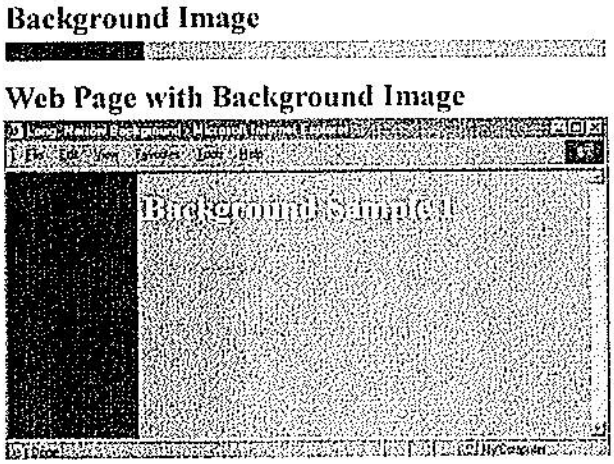
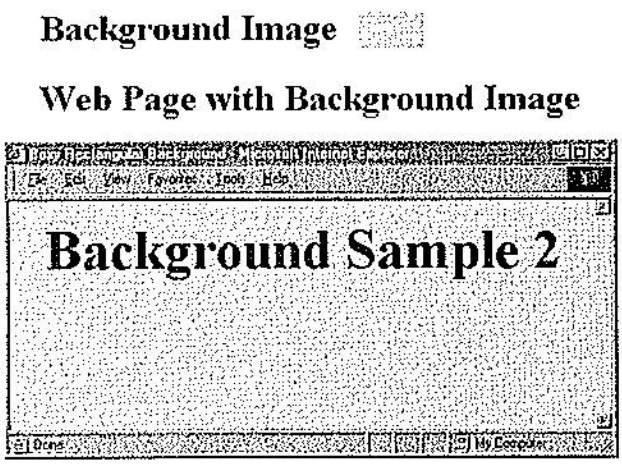


Figure 4.19
A small rectangular background is repeated to fill the Web page window



Configuring Background Images with CSS

The default behavior of a browser is to repeat, or tile, background images to cover the entire element's background. Figures 4.18 and 4.19 display examples of this type of tiling for a Web page background. This behavior also applies to other elements, such as backgrounds for headings, paragraphs, and so on. You can change this tiling behavior with the CSS **background-repeat property**. The `background-repeat` property has a number of values: `repeat` (default), `repeat-y` (vertical repeat of background image), `repeat-x` (horizontal repeat of background image), and `no-repeat` (background image does not repeat). Figure 4.20 provides examples of the actual background image and the result of applying various `background-repeat` property values.

You will explore configuring image backgrounds in the next Hands-On Practice.

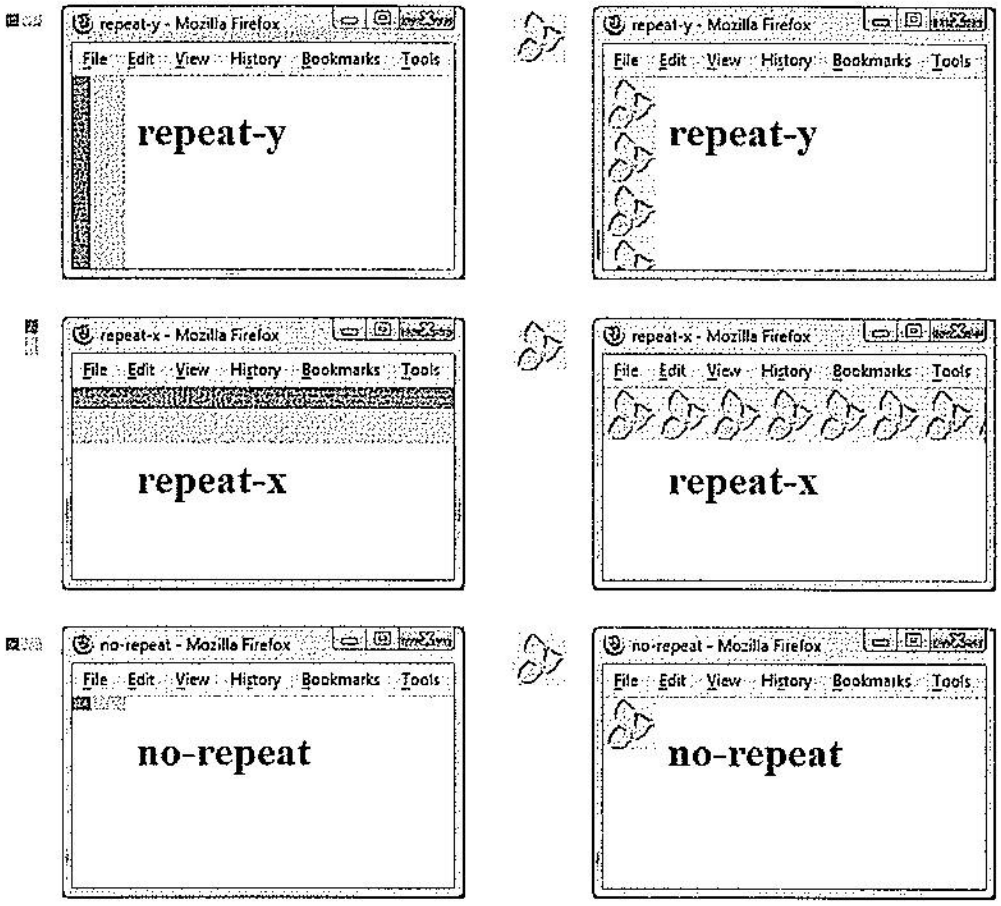


Figure 4.20
Examples of the CSS `background-repeat` property

HANDS-ON PRACTICE 4.5

You will update the index.html file from the previous Hands-On Practice (shown in Figure 4.17). In this Hands-On Practice you will configure the `h2` selector with a background image that does not repeat. Obtain the trilliumbullet.gif image from the student

files in the Chapter4/starters folder. Save the images in your trilliumch4 folder. When you are completed with this exercise, your page should look similar to the one shown in Figure 4.21.

Figure 4.21
The background image in the <h2> areas is configured with `background-repeat: no-repeat`

Launch Notepad and open index.html.

Modify the style rule for the `h2` selector and configure the `background-image` and `background-repeat` properties. Set the background image to be trilliumbullet.gif. Set the background to not repeat. The `h2` selector style rules follow:

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

Save your page as index.html. Launch a browser and test your page. It should look similar to the one shown in Figure 4.21. The student files contain a sample solution in the Chapter4/4.5 folder.

FAQ

What if my images are in their own folder?

It's a good idea to organize your Web site by placing all your images in a folder separate from your Web pages. Notice that the CircleSoft Web site shown in Figure 4.22 has a folder called images, which contains a number of GIF files. To refer to these files in XHTML or CSS code, you also need to refer to the images folder. The following are some examples:

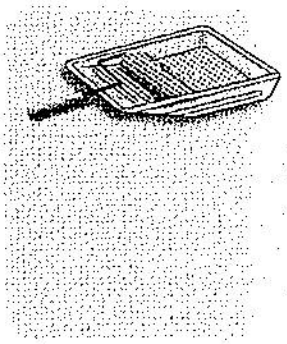
- The CSS code to configure the background.gif file from the images folder as the page background is as follows:

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

- XHTML to display the logo1.gif file from the images folder is as follows:

```
<img src="images/logo1.gif" alt="CircleSoft" width="588"
height="120" />
```

Figure 4.22
A folder named "images" contains the graphic files



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. True or False? When coding image links, you must configure the image tag with `border="0"` to avoid the default blue border.

4.4 XHTML Images and More

This section introduces additional XHTML coding techniques associated with using images on Web pages. Topics discussed include image maps, thumbnail images, and image slicing.

Image Maps

An **image map** is an image that can be used as one or more hyperlinks. An image map will have at least one clickable area and usually multiple clickable areas that link to another Web page or Web site. The clickable areas are sometimes called **hotspots**. You have probably used image maps many times but never realized it. One common use of image maps is to create real clickable maps that Web site visitors can manipulate to

choose a location. Figure 4.23 shows the home page of Recreation.gov with a map of the United States. Visitors use the map to select the state they are interested in. You can also visit the textbook's Web site at http://webdevfoundations.net to try out an image map.

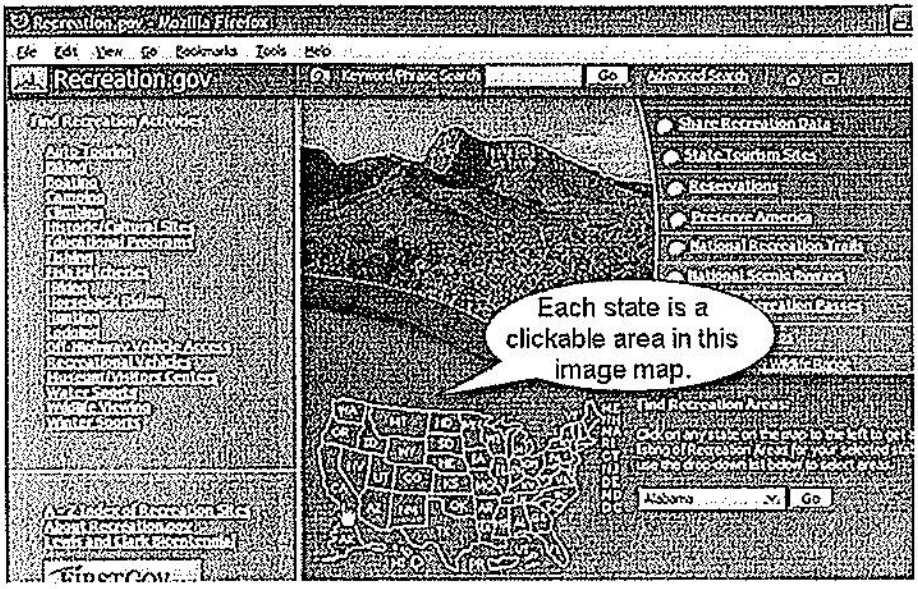


Figure 4.23
An image map is used to select a location on this Web site

Most Web authoring software, such as Adobe Dreamweaver, have wizards or other tools to help you create image maps quickly and easily. If you don't have access to a Web authoring tool to create an image map, the most difficult part is determining the pixel coordinates of the hyperlink area. The coordinates are in pairs of numbers that signify the number of pixels from the top and the number of pixels from the left edge of the image. If you are working with a graphic artist, he or she may be able to supply you with the coordinates. Another option is to open the image in a graphics application such as Adobe Fireworks, Adobe Photoshop, or even MS Paint to obtain approximate coordinates. You can modify these coordinate values as you work with the XHTML on your Web page. Image maps can be used to create clickable areas in three shapes: rectangles, circles, and polygons.

An image map uses two new elements: `<map>` and `<area />`. The `<map>` tag is a container tag and is used to begin and end the image map. The `name` attribute is used to correspond the `<map>` tag with its associated image. The image tag uses the **`usemap` attribute** to indicate which `<map>` to use. For example, `<img src="fishingboat.jpg" usemap="#boat" />` will be associated with the image map described by `<map name="boat" id="boat">`. The `id` attribute is part of XHTML. The `name` attribute is required for backward compatibility with older browsers that were written to process HTML.

The `<area />` tag is used to define the coordinates or edges of the map area and uses `shape`, `coords`, `alt`, and `href` attributes. Table 4.3 describes the type of coordinates (`coords`) needed for each shape value.

Table 4.3 Shape coordinates

Shape	Coordinates	Meaning
`rect`	"x1,y1, x2,y2"	The coordinates at point (x1,y1) represent the upper-left corner of the rectangle. The coordinates at point (x2,y2) represent the lower-right corner of the rectangle.
`circle`	"x,y,r"	The coordinates at point (x,y) indicate the center of the circle. The value of r is the radius of the circle in pixels.
`polygon`	"x1,y1, x2,y2, x3,y3", etc.	The values of each (x,y) pair represent the coordinates of a corner point of the polygon.

This text focuses on rectangular image maps. For a rectangular image map, the value of the `shape` attribute is `rect` and the coordinates indicate the pixel positions as follows: upper-left corner distance from top of image, upper-left corner distance from left side of image, lower-right corner distance from top of image, and lower-right corner distance from left edge of image.

Figure 4.24 shows an image with a fishing boat. The dotted rectangle around the fishing boat indicates the location of the hotspot. The coordinates shown (24, 188) indicate that the top-left corner is 24 pixels from the left edge of the image and 188 pixels from the top of the image. The pair of coordinates in the lower-right corner (339, 283) indicates that this corner is 339 pixels from the left image edge and 283 pixels from the image top. The XHTML code to create this image map follows:

```
<map name="boat" id="boat">
<area href="http://www.doorcountyvacations.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" />
```

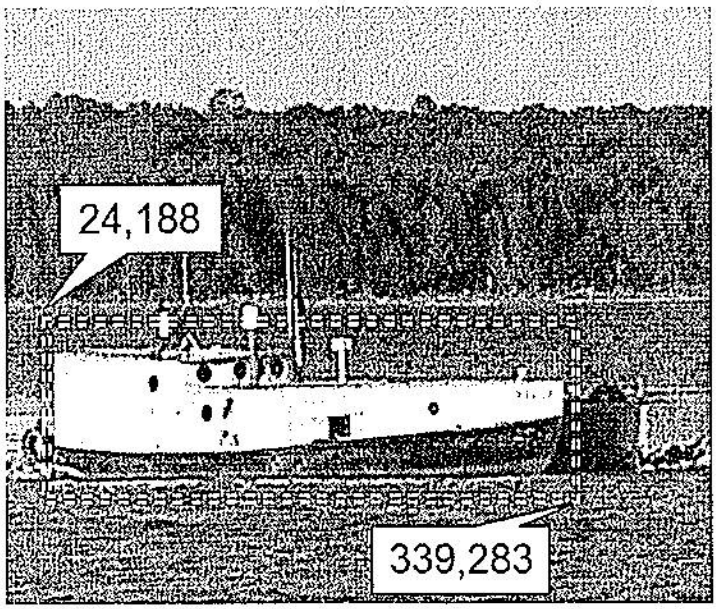


Figure 4.24
Sample image map

This example is for a client-side image map. No special Web server processing is needed for this image map to work. Another, more complex type of image map is a server-side image map. This type requires a program on the Web server to coordinate the linking. Server-side maps are no longer commonly used because they require resources on the Web server. It is more efficient to distribute processing to be on the Web browser client whenever possible. This way, the resources of the Web server can be reserved for the tasks that only it can perform.

Most Web developers do not hand-code image maps. As mentioned previously, the easiest way to create a client-side image map is to use a Web authoring tool. Some shareware programs, such as CoffeeCup Image Mapper (http://www.coffeecup.com) and HTML Map Designer Pro (http://www.imagecure.com/) also provide this feature.

Thumbnail Images

A **thumbnail image** is a smaller version of an image you would like to include on a Web site. It is usually placed within anchor tags that link to the larger, more detailed version of the image. Large images can significantly increase the load time of a Web page. If you are creating a page with multiple detailed images, consider displaying thumbnail images instead. This way, visitors who are interested in the images and willing to wait can use the thumbnail image to link to the larger image. Most graphics applications can create thumbnail images.

Advanced Techniques: Image Slicing

Graphic artists and designers can create complex Web page images. Sometimes parts of these images are better optimized as GIFs than as JPEGs. Some parts of these images may be better optimized as JPEGs than as GIFs. By **image slicing** the single, complex images into multiple, smaller images, you can optimize all portions for the most efficient display. There may be times when you plan special mouse rollover effects for parts of a large, complex image. In this case, parts of the image need to be individually accessible to scripting languages and the image needs to be sliced. When an image is sliced, it is broken into multiple graphic files. These multiple graphic files are formatted using an XHTML table. Most graphics applications, such as Macromedia Fireworks and Adobe Photoshop, have features for image slicing that automatically create the XHTML for you. Visit the textbook Web site at http://webdevfoundations.net/4e/chapter4.html for more information on image slicing.

4.5 Sources and Guidelines for Graphics

How do you obtain graphics for your pages? What are recommended ways to use graphics? This section will help you answer these questions and discuss sources of graphics as well as guidelines for using images on Web pages.

Sources of Graphics

There are many ways to obtain graphics: you can create them using a graphics application, download them from a free site, purchase and download them from a graphics site,

purchase a graphics collection on a CD, take digital photographs, scan photographs, scan drawings, or hire a graphic designer to create graphics for you. Popular graphic applications include Adobe Photoshop, Adobe Fireworks, and Jasc Paint Shop Pro. These applications usually include tutorials and sample images to help you get started. Visit the textbook Web site at http://webdevfoundations.net/4e/chapter4.html, for tutorials on using Adobe Fireworks and Adobe Photoshop to create a logo banner image.

Focus on Ethics

However, one thing that you should definitely not do is right-click and download graphics that others have created without first obtaining their permission. Materials on a Web site are copyrighted (even if a copyright symbol or notice does not appear) and are not free to use unless the owner of the site permits it.

There are many Web sites that offer free graphics, although some graphics are free for nonprofit use only. Choose a search engine and search for "free graphics"—you'll get more results than you have time to view. The following are a few sites that you may find helpful when looking for images:

- Microsoft Clip Art: http://office.microsoft.com/clipart/default.aspx
- FamFamFam: http://www.famfamfam.com
- Free Stock Photos: http://free-stock-photos.com
- Free Images: http://www.freeimages.co.uk

Some sites offer graphics and photographs for a fee. A selection is listed here. Search for "stock photos" to find others.

- The Stock Solution: http://www.tssphoto.com
- SuperStock: http://www.superstock.com
- Getty Images: http://creative.gettyimages.com

It is also possible to create a banner or button image online. There are a number of sites that offer this feature—some include advertising with your free image, some offer paid memberships, others are simply free. Search for "create free online banner" to find sites offering this service.

- Animation Online: http://www.animationonline.com
- 3D Textmaker: http://www.3dtextmaker.com
- Cooltext.com: http://www.cooltext.com
- Ad Designer.com: http://www.addesigner.com

Guidelines for Using Images

Images can help your Web page by creating an engaging, interesting user experience. Images can hurt your Web pages by slowing down their performance to a crawl and discouraging visitors.

Consider Image Load Time. Be careful when using images on Web pages—it takes time for them to load. A suggested maximum file size for both the Web page and all the media files used by it is 60KB. If your banner graphic is 25KB, that does not leave much room for other images or even for your Web page XHTML. Use images when they are necessary to convey a message or complement a Web site's look and feel. Table 4.4 lists the download time for file sizes of 30KB, 60KB, and 90KB at various connection speeds.

Table 4.4 Download times

File Size	Connection Speed				
	28.8KB	33.6KB	56KB	ISDN (128KB)	T-1 (1.544MB)
30KB	8 seconds	7 seconds	4 seconds	1 second	Less than 1 second
60KB	17 seconds	14 seconds	8 seconds	3 seconds	Less than 1 second
90KB	25 seconds	21 seconds	13 seconds	5 seconds	Less than 1 second

Reuse Images. Once an image from your site is requested for a Web page, it is stored in the cache on your visitor's hard drive. Subsequent requests for the image will use the file from the hard drive instead of another download. This results in faster page loads for all pages that also use the image. It is recommended that you reuse common graphics such as logos and navigation buttons on multiple pages instead of creating different versions of these common graphics.

Consider the Size/Quality Issue. When using a graphics application to create an image, you can choose among varying levels of image quality. There is a correspondence between the quality of the image and the size of the image file—the higher the quality, the larger the file size. Choose the smallest file that gives you appropriate quality. You may need to experiment until you get the right match. Also be aware of the file size when using graphics created by others—the image may look great but if it is 300KB, you really shouldn't use it on a Web page.

Use Appropriate Resolution. Web browsers display images at relatively low resolution—72ppi (pixels per inch) or 96ppi. Many digital cameras and scanners can create images with much higher resolution. Of course, higher resolution means larger file size. Even though the browser does not display the depth of resolution, more bandwidth is still used for the large file size. Be careful when taking digital photographs or scanning. Use a resolution setting appropriate for Web pages. A one-inch image saved at 150ppi will appear close to two inches wide on a 72ppi monitor.

Specify Dimensions. Always use accurate `height` and `width` attributes on image tags. This will allow the browser to allocate the appropriate space on the Web page for the image and load the page faster. Do not try to resize the appearance of an image by modifying the settings of the `height` and `width` attributes. While this will work, your page will load slower and your image quality may suffer. Instead, use a graphics application to create a smaller or larger version of the graphic when needed.

Be Aware of Brightness and Contrast. Gamma refers to the brightness and contrast of the monitor display. Monitors used with Macintosh and Windows operating systems use a different default gamma setting (Macintosh 1.8, Windows 2.2). Images that have good contrast on a computer running Windows may look slightly washed out on a Macintosh. Images created on a Macintosh may look darker with less contrast when displayed on a computer with a Windows operating system. Be aware that even monitors on the same operating system may have slightly different gamma values than the default for the platform. A Web developer cannot control gamma, but should be aware that images will look different on various platforms because of this issue.

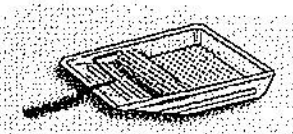
Web Accessibility

Focus on Accessibility

Even though images help to create a compelling, interesting Web site, remember that not all your visitors will be able to view your images. The Web Accessibility Initiative has a number of guidelines for Web developers in the use of color and images.

- 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 every nontext element. Use the `alt` attribute on your image tags.
- If your site navigation uses image links, provide simple text links at the bottom of the page.

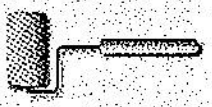
Vinton Cerf, the coinventor of TCP/IP and the former Chairman of the Internet Society, said, "The Internet is for everyone." Follow Web accessibility guidelines to ensure that this is true.



CHECKPOINT 4.3

1. 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 these questions and discuss your findings.
2. When configuring an image map, describe the relationship between the image, map, and area tags.
3. True or False? Save your images using the smallest file size possible.

CHAPTER SUMMARY



This chapter introduced the use of visual elements and graphics on Web pages. As you continue to create Web pages, refer to the guidelines and accessibility issues related to graphics. The number one reason visitors leave Web pages is long download times. When using images, be careful to minimize download time. Also, provide alternatives to images (such as text links) and use the `alt` attribute on your pages.

Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

`<area />`
`<hr />`
`<img />`
`<map>`
`alt` attribute
animated GIFs
antialiasing
`background-image` property
`background-repeat` property
`border` property
`border-color` property
`border-style` property
`border-width` property
gamma
GIF
halo effect
`height` attribute
hotspots
`hspace` attribute
image link
image map
image optimization
image slicing
interlaced image
JPEG
`longdesc` attribute
lossless compression
lossy compression
`padding` property
pixelation
PNG
progressive JPEG
resolution
`src` attribute
thumbnail image
transparency
`usemap` attribute
`vspace` attribute
`width` attribute

Review Questions

Multiple Choice

1. Why should you include `height` and `width` attributes on an `<img />` tag?

a. They are required attributes and must always be included.
b. They help the browser render the page faster because it reserves the appropriate space for the image.
c. They help the browser display the image in its own window.
d. none of the above

2. If you use CSS to configure both the background image and the background color, the browser will do which of the following?

a. display the background color instead of the background image.
b. display no background for the page because it is confused.
c. display the background color while the background image loads and while the background image is displayed.
d. none of the above

3. Which of the following creates an image link to the index.html page when the home.gif graphic is clicked?
   a. `<a href="index.html" src="home.gif"></a>`
   b. `<a href="index.html"><img src="home.gif" /></a>`
   c. `<img src="home.gif" href="index.html">`
   d. none of the above

4. What XHTML element is used to place an image on a Web page?
   a. `<a href>`
   b. `<img />`
   c. `<image>`
   d. `<graphic>`

5. Which attribute specifies text that is available to browsers and other user agents that do not support graphics?
   a. `alt`
   b. `text`
   c. `src`
   d. none of the above

6. Which of the following configures the size, color, and display style of an element's border?
   a. `border-edge` property
   b. `padding` property
   c. `border` property
   d. none of the above

7. Which of the following graphic types is best suited to photographs?
   a. GIF
   b. photo
   c. PNG
   d. none of the above

8. Which of the following graphic types can be made transparent and is most commonly used on the Web?
   a. GIF
   b. JPG
   c. PNG
   d. photo

9. Which of the following configures empty space between the content of the XHTML element (usually text) and the border?
   a. `vspace` property
   b. `padding` property
   c. `margin` property
   d. none of the above

10. Which of the following configures a graphic to repeat vertically down the side of a Web page?
    a. `hspace="10"`
    b. `background-repeat:repeat;`
    c. `valign="left"`
    d. `background-repeat: repeat-y;`

Fill in the Blank

11. A background image will automatically be repeated, or _____, by a Web browser.

12. If your Web page uses graphic links, include _____ at the bottom of the page to increase accessibility.

13. A _____ image is a smaller version of a larger image that usually links to the larger image.

14. One method to obtain graphics for your Web site is to _____.

15. A(n) _____ is an image that can be used as one or more hyperlinks.

Apply Your Knowledge

1. **Predict the Result.** Draw and write a brief description of the Web page that will be created with the following XHTML code:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
```

```
<title>Predict the Result</title>
</head>
<body>
  <div>
    <img src="logo.gif" alt="CircleSoft Design"
    height="150" width="600" />     <br />
    <p>Home <a href="about.html">About</a>
      <a href="services.html">Services</a>
    </p>
  </div>
  <p><img src="people.jpg" alt="Professionals at CircleSoft
Design" height="300" width="300" align="right" /> Our professional
staff takes pride in its working relationship with our clients by
offering personalized services which listen to their needs,
develop their target areas, and incorporate these items into a
well presented Web Site that works.</p>
  <p> </p>
  <p> </p>
  <div>
  <p>Contact
    <a href="mailto:web@circlesoft.com">web@circlesoft.com</a><br />
    Copyright &copy; 2008 CircleSoft Design</p>
  </div>
</body>
</html>
```

2. **Fill in the Missing Code.** This Web page contains an image link and should be configured so that the background and text colors have good contrast. The image used on this Web page should link to a page called services.html. Some XHTML attribute values, indicated by "_" are missing. Some CSS style rules indicated by "_" are incomplete.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<title>CircleSoft Design</title>
<style type="text/css">
.body { "_": "_";
        color: "_";
}
</style>
</head>
<body>
<div>
  <a href="_"><img src="logo.gif" alt="_" height="100" width="600" />
  <br />Enter CircleSoft Design</a>
</div>
</body>
</html>
```