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# JavaScript

Eighth Edition

TOM NEGRINO • DORI SMITH

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VISUAL QUICKSTART GUIDE

# JavaScript

EIGHTH EDITION

TOM NEGRINO • DORI SMITH

Peachpit Press

Visual QuickStart Guide
**JavaScript, Eighth Edition**
Tom Negrino and Dori Smith

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## Dedication

To the memory of Bill Horwitz and Dorothy Negrino, because they loved learning.

## Special Thanks to:

Big thanks to our editor Nancy Peterson; her expert touch, serenity, and compassion made this edition a pleasant one to create.

Thanks to Tracey Croom for her excellent production work and to Scout Festa for her skillful copyediting.

Our heartfelt thanks to Danielle Foster, the book's compositor, who laid out the book and pulled off the job with grace and aplomb, and to the indexer, Emily Glossbrenner, who should be thanked for doing a thankless job.

We're grateful to Peachpit's Nancy Ruenzel and Nancy Davis for their support.

We'd like to express our special thanks to all of the high school, college, and university instructors who chose to use the previous editions of this book as a textbook for their classes.

Between the time we signed the contract for this book and when we began working on it, Dori was offered her dream job at Stack Exchange (`http://www.stackexchange.com`). She could not have worked two jobs *and* still maintained a semblance of sanity without a great deal of help from others, for which she is truly grateful. In particular:

- Thanks to all the great folks at Stack: Joel Spolsky, Jeff Atwood, Robert Cartaino, Rebecca Chernoff, and Josh Heyer, among others—who gave their time and patience to help me stay employed while finishing this book.
- Thanks also to the amazingly patient women at Peachpit—I've worked with you for 14 years, and I'm still in awe of what you're able to create.
- And in particular, I must thank my co-author, Tom Negrino, who did much more than his share of the load on this edition, and who postponed his (and my) tenth wedding anniversary celebration until the book was complete.

# Contents at a Glance

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# Table of Contents

# Introduction

Welcome to JavaScript! Using this easy-to-learn programming language, you'll be able to add pizzazz to your Web pages and make them more useful for you and for your site's visitors. We've written this book as a painless introduction to JavaScript, so you don't have to be a geek or a nerd to write a script. Pocket protectors will not be necessary at any time. As a friend of ours says, "We're geeky, so you don't have to be!"

## We wrote this book for you

We figure that if you're interested in JavaScript, then you've already got some experience in creating HTML pages and Web sites, and you want to take the next step by adding some interactivity to your sites. We don't assume that you know anything about programming or scripting. We also don't assume that you are an HTML expert (though if you are, that's just fine). We do assume that you've got at least the basics of building Web pages down, and that you have some familiarity with common HTML, such as links, images, and forms.

We include some extra explanation of HTML in sidebars called "Just Enough HTML." You won't find these sidebars in every chapter, just the ones where we think you'll need a quick reference. Having this information handy means you won't need multiple books or Web pages open just to remember the syntax of a particular HTML attribute.

If you already know something about programming, you should be aware that we don't take the same approach to JavaScript as you might have seen in other books. We don't delve deeply into JavaScript's syntax and structure, and we don't pretend that this book is a comprehensive language reference (though you'll find some valuable reference material in Appendix A, the color section in the back of the book). There are several other books on the market that do that job admirably, and we list them at the end of this book, in Appendix D. The difference between those books and this one is that instead of getting bogged down in formalism, we concentrate on showing you how to get useful tasks done with JavaScript without a lot of extraneous information.

In previous editions, we added an introduction to Ajax, a technique that uses JavaScript and other common Web technologies to add extra interactivity to Web pages, and to improve the user experience of your Web sites. We covered the basics of Ajax and added some practical examples to allow you to Ajax-ify your sites without getting an advanced degree in Web programming. In this edition, we've added even more examples and techniques, using the jQuery *framework*—which you can think of as building blocks that allow you to easily add useful features to your sites.

## How to use this book

Throughout the book, we've used some devices that should make it easier for you to work both with the book and with JavaScript itself.

In the step-by-step instructions that make up most of the book, we've used a special type style to denote either HTML or JavaScript code, like this:

```
<div id="thisDiv">
→window.onload = initLinks;
```

You'll also notice that we show the HTML and the JavaScript in lowercase. We've done that because all of the scripts in this edition are compliant with the in-progress HTML5 standard from the W3C, the World Wide Web Consortium. Whenever you see a quote mark in a JavaScript, it is always a straight quote (like `'` or `"`), never curly quotes (aka “smart” quotes, like ’ or “). Curly quotes will prevent your JavaScript from working, so make sure that you avoid them when you write scripts.

In the illustrations accompanying the step-by-step instructions, we've highlighted the part of the scripts that we're discussing in **red**, so you can quickly find what we're talking about. We often also highlight parts of the screen shots of Web browser windows in **red**, to indicate the most important part of the picture.

Because book pages are narrower than computer screens, some of the lines of JavaScript code are too long to fit on the page. When this happens, we've broken the line of code up into one or more segments, inserted this gray arrow → to indicate that it's a continued line, and indented the rest of the line. Here's an example of how we show long lines in scripts.

```
dtString = "Hey, just what are you
→doing up so late?";
```

## You say browser, we say Kumbaya

Beginning with the Sixth edition of this book, we made a big change: we ended our support for browsers that are very old or that don't do a good job of supporting Web standards. We'd found that virtually all Web users have upgraded and are enjoying the benefits of modern browsers, ones that do a good-to-excellent job of supporting commonly accepted Web standards like HTML, CSS2, and the Document Object Model. That covers Internet Explorer 7 or later; Firefox 1.0 or later; all versions of Safari and Chrome; and Opera 7 or later.

We've tested our scripts in a wide variety of browsers, on several different operating systems, including Windows (both Vista and Windows 7; like Microsoft, we've dropped support for Windows XP), Mac OS X (10.4.11 and later), and Ubuntu Linux (we only tested scripts in Firefox, Ubuntu's default browser).

We used the 600-pound gorilla of the browser world, Microsoft Internet Explorer for Windows, to test virtually everything in the book (we used versions 7, 8, and 9). We also tested the scripts with Firefox 3 and 4, for Mac and Windows, and with Safari 5 for Mac and Windows. Working with the latter browser means that our scripts should also work in any browsers based on the WebKit engine (including Google Chrome), and on browsers (such as Konqueror for Linux) based on KHTML, the open-source rendering engine from which Safari got its start. WebKit is also the basis for browsers in mobile operating systems, such as Apple's iOS, Google's Android, Research in Motion's Blackberry 6 and later, and HP's WebOS. So far as mobile devices go, we mainly tested scripts on iPhones and iPads.

## Don't type that code!

Some JavaScript books print the scripts and expect you to type in the examples. We think that's way too retro for this day and age. It was tough enough for us to do all that typing, and there's no reason you should have to repeat that work. So we've prepared a companion Web site for this book, one that includes all of the scripts in the book, ready for you to just copy and paste into your own Web pages. The site also includes additional tips and scripts. If we discover any mistakes in the book that got through the editing process, we'll list the updates on the site, too. You can find our companion site at **`www.javascriptworld.com`**.

If for some reason you do plan to type in some script examples, you might find that the examples don't seem to work, because you don't have the supporting files that we used to create the examples. For example, in a task where an on-screen effect happens to an image, you'll need image files. No problem. We've put all of those files up on the book's Web site, nicely packaged for you to download. You'll find one downloadable file that contains all of the scripts, HTML files, CSS files, and any media files we used. If you have any questions, please check the FAQ (Frequently Asked Questions) page on the companion Web site. It's clearly marked.

If you've read the FAQ and your question isn't answered there, you can contact us via email at: **`js8@javascriptworld.com`**. We regret that because of the large volume of email that we get, we cannot, and will not, answer email about the book sent to our personal email addresses. We can only guarantee that messages sent to the **`js8@javascriptworld.com`** address will be answered.

## Time to get started

One of the best things about JavaScript is that it's easy to start with a simple script that makes cool things happen on your Web page, then add more complicated stuff as you need it. You don't have to learn a whole book's worth of information before you can start improving your Web pages. But by the time you're done with the book, you'll be adding advanced interactivity to your sites with Ajax and jQuery.

Of course, every journey begins with the first step, and if you've read this far, your journey into JavaScript has already begun. Thanks for joining us; please keep your hands and feet inside the moving vehicle. And please, no flash photography.

4

# Working with Images

One of the best (and most common) uses of JavaScript is to add visual interest to Web pages by animating graphics, and that's what this chapter is all about. Making an image on a Web page change when the user moves the mouse over the image, thereby making the page react to the user, is one of the most common—and effective—tricks you can learn in JavaScript. This *rollover*, as it is called, is easy to implement yet has many applications, as you'll see.

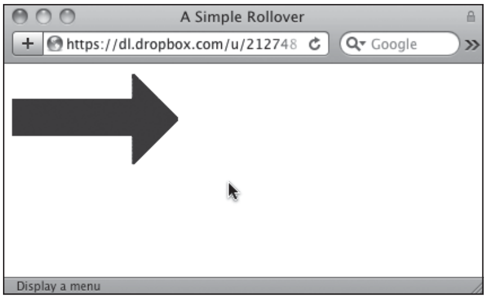
Rollovers are a great tool, but you can do much more than rollovers with JavaScript, such as automatically change images, create ad banners, build slideshows, and display random images on a page.

In this chapter, you'll learn how to make JavaScript do all of these image tricks. Let's get started.

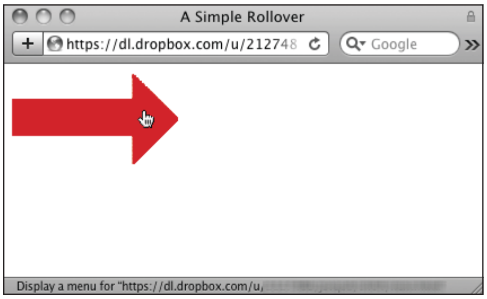
## In This Chapter

**TABLE 4.1** Just Enough HTML—Images

| Tag | Attribute | Meaning |
|---|---|---|
| `img` | | Contains the attributes that describe the image to be displayed by the browser |
| | `src` | Contains the URL of the image, relative to the URL of the Web page |
| | `width` | Contains the width (in pixels) at which the browser will display the image |
| | `height` | Contains the height (in pixels) at which the browser will display the image |
| | `alt` | Used for non-visual browsers in place of the image |
| | `id` | A unique identifier, which JavaScript will use to manipulate the image |



**A** The first image, before the user moves the mouse over it.


A Simple Rollover
https://dl.dropbox.com/u/212748
Google
Display a menu for "https://dl.dropbox.com/u/

**B** When the mouse is over the image, the script replaces the first image with the second image.

**Listing 4.1** Here's the simplest way to do a rollover, within a link tag.

```
<!DOCTYPE html>
<html>
<head>
     <title>A Simple Rollover</title>
     <link rel="stylesheet" href="script01.
     ➝ css">
</head>
<body>
     <a href="next.html" onmouseover=
     ➝ "document.images['arrow'].src=
     ➝ 'images/arrow_on.gif'" onmouseout=
     ➝ "document.images['arrow'].src=
     ➝ 'images/arrow_off.gif'"><img src=
     ➝ "images/arrow_off.gif" id="arrow"
     ➝ alt="arrow"></a>
</body>
</html>
```

## Creating Rollovers

The idea behind rollovers is simple. You have two images. The first, or *original,* image is loaded and displayed along with the rest of the Web page by the user. When the user moves the mouse over the first image, the browser quickly swaps out the first image for the second, or *replacement,* image, giving the illusion of movement or animation.

**Listing 4.1** gives you the bare-bones rollover; the whole thing is done within a standard image link. First a blue arrow is loaded **A**, and then it is overwritten by a red arrow when the user moves the mouse over the image **B**. The blue arrow is redrawn when the user moves the mouse away.

Some styles get applied to elements on the page, and we've broken those styles out into a separate CSS file, as seen in **Listing 4.2**.

### To create a rollover:

1. **`<a href="next.html"`**

   The link begins by specifying where the browser will go when the user clicks the image, in this case to the page **`next.html`**.

2. **`onmouseover="document.`**
   **`➝ images['arrow'].src=`**
   **`➝ 'images/arrow_on.gif'"`**

   When the user moves the mouse over the image (the **`src`** of the arrow **`id`**), the replacement image **`arrow_on.gif`**, which is inside the **`images`** directory, is written to the document window.

*continues on next page*

3. **`onmouseout="document.images`**
   **`➝['arrow'].src=`**
   **`➝'images/arrow_off.gif'">`**

   Then, when the mouse moves away, the image **`arrow_off.gif`** is swapped back in.

4. **`<img src="images/arrow_off.gif"`**
   **`➝id="arrow" alt="arrow">`**

   The image link defines the source of the original image for the page. We have included the **`alt`** attribute inside the image tag because **`alt`** attributes (which give non-graphical browsers a name or description of an image) are required if you want your HTML to be compliant with the W3C standards, and because using **`alt`** attributes helps make your page accessible to disabled users, such as visually impaired users who browse using screen readers.

**Listing 4.2** This CSS file is used to style elements throughout many of the examples in this chapter.

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

img {
    border-width: 0;
}

img#arrow, img#arrowImg {
    width: 147px;
    height: 82px;
}

#button1, #button2 {
    width: 113px;
    height: 33px;
}

.centered {
    text-align: center;
}

#adBanner {
    width: 400px;
    height: 75px;
}
```

## Disadvantages to This Kind of Rollover

This method of doing rollovers is very simple, but you should be aware that there are several problems and drawbacks with it.

- Because the second image is downloaded from the server at the time the user rolls over the first image, there can be a perceptible delay before the second image replaces the first one, especially for people browsing your site with a slower connection.
- Using this method causes an error message in ancient browsers, such as Netscape 2.0 or earlier, Internet Explorer 3.0 or earlier, or the America Online 2.7 browser. Since there are so few of these vintage browsers still in use, it's not much of a problem these days.

Instead of using this method, we suggest that you use the following way to create rollovers, in the "Creating More Effective Rollovers" section, which solves all these problems and more.

**Listing 4.3** The only JavaScript on this HTML page is the pointer to the external **.js** file.

```
<!DOCTYPE html>
<html>
<head>
     <title>A More Effective Rollover</title>
     <script src="script02.js"></script>
     <link rel="stylesheet" href=
     ➝"script01.css">
</head>
<body>
     <a href="next1.html"><img src=
     ➝"images/button1_off.gif" alt="button1"
     ➝id="button1"></a>&nbsp;&nbsp;
     <a href="next2.html"><img src=
     ➝"images/button2_off.gif" alt="button2"
     ➝id="button2"></a>
</body>
</html>
```

**Listing 4.4** This is a better way to do rollovers than in Listing 4.1, because it is much more flexible.

```
window.onload = rolloverInit;

function rolloverInit() {
     for (var i=0; i<document.images.length;
     ➝i++) {
        if (document.images[i].parentNode.
        ➝tagName == "A") {
           setupRollover(document.images[i]);
        }
     }
}

function setupRollover(thisImage) {
     thisImage.outImage = new Image();
     thisImage.outImage.src = thisImage.src;
     thisImage.onmouseout = function() {
        this.src = this.outImage.src;
     }

     thisImage.overImage = new Image();
     thisImage.overImage.src =
     ➝"images/" + thisImage.id + "_on.gif";
     thisImage.onmouseover = function() {
        this.src = this.overImage.src;
     }
}
```

## Creating More Effective Rollovers

To make the illusion of animation work, you need to make sure that the replacement image appears immediately, with no delay while it is fetched from the server. To do that, you use JavaScript to place the images into variables used by your script, which preloads all the images into the browser's cache (so that they are already on the user's hard disk when they are needed). Then, when the user moves the mouse over an image, the script swaps out one variable containing an image for a second variable containing the replacement image. **Listing 4.3** shows how it is done. The visible result is the same as in Ⓐ and Ⓑ from the previous exercise, but the apparent animation is smoother.

To keep your JavaScript more manageable, we'll extract the JavaScript code from the HTML page and put it in an external **.js** file, as in **Listing 4.4** (see Chapter 2 for more about **.js** files).

## To create a better rollover:

1. `<script src="script02.js"></script>`

   This tag is in Listing 4.3, the HTML page. It uses the **`src`** attribute to tell the browser where to find the external **`.js`** file, which is where the JavaScript resides.

2.
   ```
   <a href="next1.html"><img src=
   → "images/button1_off.gif"
   → alt="button1" id="button1">
   → </a>&nbsp;&nbsp;
   <a href="next2.html"><img
   → src="images/button2_off.gif"
   → alt="button2" id="button2"></a>
   ```

   Still in Listing 4.3, these are two typical link tags for the buttons, with image tags embedded in them. The **`href`** attribute describes the destination of the link when the user clicks it. In the **`img`** tag, the **`src`** attribute provides the path to the image before the user rolls over it. The link tags also define the image's **`alt`** text. Note that each of the two buttons also has an **`id`** attribute; as described in Chapter 1, the **`id`** must be unique for each object. The script uses the image's **`id`** to make the rollover work.

3. `window.onload = rolloverInit;`

   Moving to Listing 4.4, the **`window.onload`** event handler is triggered when the page has finished loading. The handler calls the **`rolloverInit()`** function.

   This handler is used here to make sure that the script doesn't execute before the page is done loading. That's because referring to items on the page before the page has finished loading can cause errors if some of the page's elements haven't yet been loaded.

4. **`function rolloverInit() {`**

   ```
      for (var i=0; i<document.
      →images.length; i++) {
   ```

   The **`rolloverInit()`** function scans each image on the page, looking to see if the tag around the image is an **`<a>`** tag, indicating that it is a link. The first of these two lines begins the function. The second begins a **`for…next`** loop that goes through all of the images. The loop begins by setting the counter variable **`i`** to 0. Then, each time the loop goes around, if the value of **`i`** is less than the number of images in the document, increment **`i`** by 1.

5.
   ```
   if (document.images[i].parentNode.
   →tagName == "A") {
   ```

   This is where we test to see if the tag surrounding the image is an anchor tag. We do it by looking at an object and seeing if the object's value is A (the anchor tag). Let's break that object apart a bit. The first part of the object, **`document.images[i]`**, is the current image. Its **`parentNode`** property is the container tag that surrounds it, and **`tagName`** then provides the name of that container tag. So in English, you can read the part of the line in the parentheses as "For this particular image, is the tag around it an 'A'?"

6. **`setupRollover(document.images[i]);`**

   If the result of the test in step 5 is true, then the **`setupRollover`** function is called and passed the current image.

*continues on next page*

7. **`function setupRollover(thisImage) {`**

   Take a minute to look at the whole function before we go through it line by line. Here's the overview: this function adds two new properties to the image object that's passed in. The new properties are **`outImage`** (the version of the image when you're not on it) and **`overImage`** (the version of the image when you are on it), both of which are image objects themselves. Because they're image objects, once they're created, we can add their **`src`** property. The **`src`** for **`outImage`** is the current (off) image **`src`**. The **`src`** value for **`overImage`** is calculated based on the **`id`** attribute of the original image.

   This line starts off the function with the image that was passed to it by the **`rolloverInit()`** function.

8. **`thisImage.outImage = new Image();`**

   This line takes the image object that was passed in and adds the new **`outImage`** property to it. Because you can add a property of any kind to an object, and because properties are just objects themselves, what's happening here is that we're adding an image object to an image. The parentheses for the new image object are optional, but it's good coding practice to include them; if needed, you can set properties of the new image object by passing certain parameters.

9. 
```
thisImage.outImage.src =
→thisImage.src;
```

   Now we set the source for the new **outImage** to be the same as the source of **thisImage**. The default image on the page is always the version you see when the cursor is off the image.

10. 
```
thisImage.onmouseout =
→function() {
   this.src = this.outImage.src;
}
```

   The first line here starts off what's called an *anonymous* function—that is, it's a function without a name. We could name it (say, **rollOut()**), but as it's only one line it's not so necessary.

   In this section, we're telling the browser to trigger what should happen when the user moves the mouse away from the image. Whenever that happens, we want to set the image source back to the initial source value, that is, the **outImage** version of the image.

11. 
```
thisImage.overImage = new Image();
thisImage.overImage.src =
→"images/" + thisImage.id +
→"_on.gif";
```

   In the first line, we create a new image object that will contain the **overImage** version of the image. The second line sets the source for **overImage**. It builds the name of the source file on the fly, concatenating **"images/"** with the **id** of the image (remember, in Listing 4.3, we saw that those **id**s were **button1** and **button2**) and adding **"_on.gif"**.

*continues on next page*

12. 
```
thisImage.onmouseover =
→function() {
  this.src = this.overImage.src;
}
```

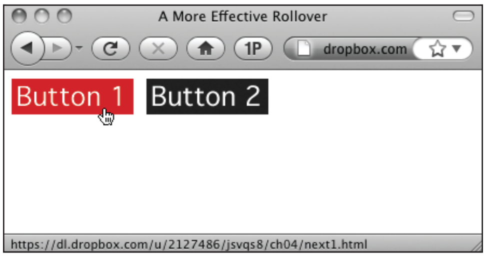
Here we have another anonymous function. This one tells the browser that when the user moves the cursor over the image, it should reset the current image's source to that of the **overImage** version, as seen in A and B.

**TIP When you prepare your graphics for rollovers, make sure that all your GIF or PNG images are *not* transparent. If they are, you will see the image you are trying to replace beneath the transparent image—and that's not what you want.**

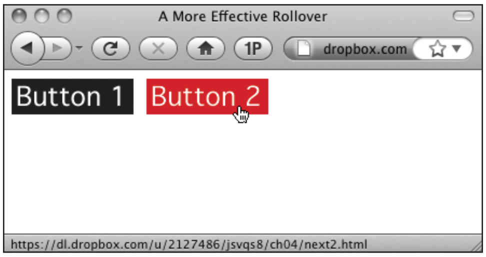
**TIP Both the original and the replacement images need to have identical dimensions. Otherwise, some browsers resize the images for you, and you probably won't like the distorted result.**

**TIP In the previous example, the rollover happened when you moved the cursor over the link; here, the rollover happens when you move the cursor over the image—that is, the `onmouseover` and `onmouseout` are now attached to the image, not the link. While these methods usually give the same effect, there's one big difference: some older browsers (Netscape 4 and earlier, IE 3 and earlier) don't support `onmouseover` and `onmouseout` on the `img` tag.**

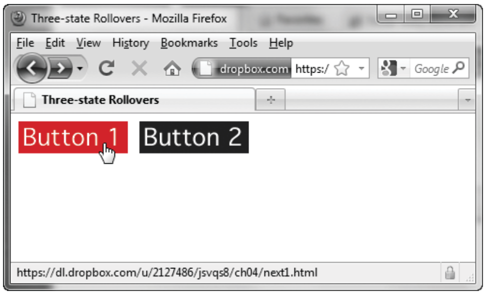
**TIP You might think that, because all of the tags on the HTML page are lowercase, `tagName` should be compared to a lowercase "a". That's not the way it works. `tagName` always returns an uppercase value.**


A More Effective Rollover
dropbox.com
Button 1
Button 2
https://dl.dropbox.com/u/2127486/jsvqs8/ch04/next1.html

A You can also put multiple rollovers on the same page.


A More Effective Rollover
dropbox.com
Button 1
Button 2
https://dl.dropbox.com/u/2127486/jsvqs8/ch04/next2.html

B Hovering over the second rollover.


Three-state Rollovers - Mozilla Firefox
File Edit View History Bookmarks Tools Help
dropbox.com https:/
Google
Three-state Rollovers
Button 1
Button 2
https://dl.dropbox.com/u/2127486/jsvqs8/ch04/next1.html

**A** When the button is clicked, you get a third image (hard to see in this grayscale image; check our companion Web site for the full effect).

**Listing 4.5** By putting your JavaScript in an external file, the HTML for a three-state rollover is virtually identical to a two-state rollover.

```
<!DOCTYPE html>
<html>
<head>
     <title>Three-state Rollovers</title>
     <script src="script03.js"></script>
     <link rel="stylesheet" href=
     → "script01.css">
</head>
<body>
     <a href="next1.html"><img src=
     → "images/button1_off.gif" alt="button1"
     → id="button1"></a>&nbsp;&nbsp;
     <a href="next2.html"><img src=
     → "images/button2_off.gif" alt="button2"
     → id="button2"></a>
</body>
</html>
```

## Building Three-State Rollovers

A three-state rollover is one where the rollover has three versions. Besides the original image and the version that appears when the user places the cursor over the image, there is a third version of the image when the button itself is clicked, as shown in **A**.

**Listing 4.5**, the HTML file, looks almost exactly the same as Listing 4.3 from the previous task. In fact, the only differences are the document's title and the name of the external JavaScript file that is being called. That's it. This is an example of why putting all your JavaScript into an external file is so powerful; you can add functionality to your pages without having to rework your HTML pages.

In **Listing 4.6**, the external JavaScript file, there are only a few changes from Listing 4.4. Rather than go through the whole script again, we'll just focus on the changes. Remember, the parts of the script that we're covering are shown in red in the code.

## To build a three-state rollover:

1. 
```
thisImage.clickImage =
➝ new Image();
thisImage.clickImage.src =
➝ "images/" + thisImage.id +
➝ "_click.gif";
```

   In the **`setupRollover()`** function, we now need to add a third image property for the click state. In the first line, we create a new image object that will contain the **`clickImage`** version of the image. The second line sets the source for **`clickImage`**. It builds the name of the source file on the fly, concatenating **`"images/"`** with the **`id`** of the image, and adding **`"_click.gif"`**.

2. 
```
thisImage.onclick = function() {
   this.src = this.clickImage.src;
}
```

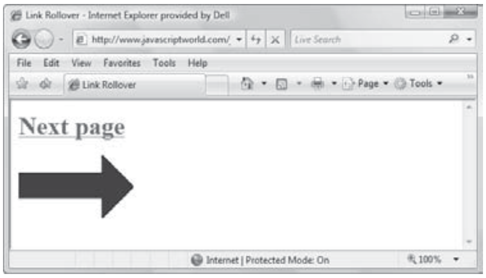
   This tells the browser what to do when the user clicks the mouse on the image: in this case, we want to set the image source to its **`clickImage`** version.

**Listing 4.6** This script powers the three-state rollover.

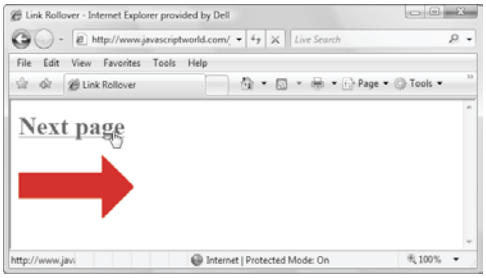
```
window.onload = rolloverInit;

function rolloverInit() {
     for (var i=0; i<document.images.length;
     ➝ i++) {
        if (document.images[i].parentNode.
        ➝ tagName == "A") {
           setupRollover(document.images[i]);
        }
     }
}

function setupRollover(thisImage) {
     thisImage.outImage = new Image();
     thisImage.outImage.src = thisImage.src;
     thisImage.onmouseout = function() {
        this.src = this.outImage.src;
     }

     thisImage.clickImage = new Image();
     thisImage.clickImage.src = "images/" +
     ➝ thisImage.id + "_click.gif";
     thisImage.onclick = function() {
        this.src = this.clickImage.src;
     }

     thisImage.overImage = new Image();
     thisImage.overImage.src = "images/" +
     ➝ thisImage.id + "_on.gif";
     thisImage.onmouseover = function() {
        this.src = this.overImage.src;
     }
}
```

## Triggering Rollovers from a Link

In earlier examples, the user triggered the rollover by moving the mouse over an image. But you can also make a rollover occur when the user hovers over a text link, as in A and B. The HTML is an unexciting page with one link and one image, shown in **Listing 4.7.** We'll do the rollover by modifying the script used in previous examples, as in **Listing 4.8**.


Link Rollover - Internet Explorer provided by Dell
http://www.javascriptworld.com/
Live Search
File Edit View Favorites Tools Help
Link Rollover
Page Tools
Next page
Internet | Protected Mode: On
100%

A The text link is the triggering device for this rollover.


Link Rollover - Internet Explorer provided by Dell
http://www.javascriptworld.com/
Live Search
File Edit View Favorites Tools Help
Link Rollover
Page Tools
Next page
http://www.javi
Internet | Protected Mode: On
100%

B When the user points at the link, the graphic below changes.

**Listing 4.7** This script shows the HTML for a rollover from a text link.

```
<!DOCTYPE html>
<html>
<head>
     <title>Link Rollover</title>
     <script src="script04.js"></script>
     <link rel="stylesheet" href=
     → "script01.css">
</head>
<body>
     <h1><a href="next.html" id="arrow">
     → Next page</a></h1>
     <img src="images/arrow_off.gif"
     → id="arrowImg" alt="arrow">
</body>
</html>
```

## To trigger a rollover from a link:

1. `function rolloverInit() {`
   ```
      for (var i=0; i<document.links.
   →length; i++) {
   ```
   After beginning the **`rolloverInit()`** function, we start a loop, much like previous examples in this chapter. But there we were looking for images (**`document.images.length`**), and here we're looking for links (**`document.links.length`**). The loop begins by setting the counter variable **`i`** to zero. Every time around, if the value of **`i`** is less than the number of links in the document, increment **`i`** by 1.

2. `var linkObj = document.links[i];`

   We create the **`linkObj`** variable and set it to the current link.

3. `if (linkObj.id) {`
   ```
      var imgObj = document.
   →getElementById(linkObj.id +
   →"Img");
   ```
   If **`linkObj`** has an **`id`**, then we check to see if there's another element on the page that has an **`id`** that's the same plus **`Img`**. If so, put that element into the new variable **`imgObj`**.

4. `if (imgObj) {`
   ```
      setupRollover(linkObj,imgObj);
   ```
   If **`imgObj`** exists, then call the **`setupRollover()`** function, passing it the link object and the image object.

**Listing 4.8** Here is the JavaScript for a rollover from a text link.

```
window.onload = rolloverInit;

function rolloverInit() {
     for (var i=0; i<document.links.length;
     →i++) {
        var linkObj =  document.links[i];
        if (linkObj.id) {
           var imgObj = document.
           →getElementById(linkObj.id +
           →"Img");
           if (imgObj) {
              setupRollover(linkObj,imgObj);
           }
        }
     }
}

function setupRollover(thisLink,thisImage) {
     thisLink.imgToChange = thisImage;
     thisLink.onmouseout = function() {
        this.imgToChange.src =
        →this.outImage.src;
     }
     thisLink.onmouseover = function() {
        this.imgToChange.src =
        →this.overImage.src;
     }

     thisLink.outImage = new Image();
     thisLink.outImage.src = thisImage.src;

     thisLink.overImage = new Image();
     thisLink.overImage.src = "images/" +
     →thisLink.id + "_on.gif";
}
```

5. `function setupRollover`
   ```
   →(thisLink,thisImage) {
     thisLink.imgToChange =
     →thisImage;
   ```

   The **`setupRollover()`** function begins with the link and image parameters that were passed to it in step 4. Then we add a new property, **`imgToChange`**, to the link object. JavaScript needs some way of knowing what image is to be changed when the link is moused over, and this is where it's stored.

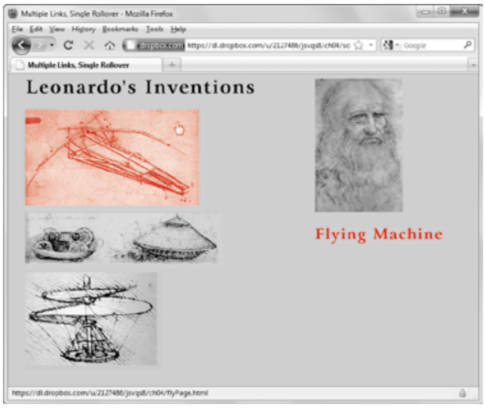
6. `thisLink.onmouseout = function() {`
   ```
     this.imgToChange.src =
     →this.outImage.src;
   }
   thisLink.onmouseover = function() {
     this.imgToChange.src =
     →this.overImage.src;
   }
   ```

   When the **`mouseover`** and **`mouseout`** are triggered, they're slightly different from the previous examples in this chapter: now, **`this.imgToChange.src`** is being reset instead of **`this.src`** itself.

**TIP This technique is useful when you want to provide the user with a preview of what they will see if they click the link at which they are pointing. For example, say you have a travel site describing trips to Scotland, Tahiti, and Cleveland. On the left of the page could be a column of text links for each destination, while on the right could be a preview area where an image appears. As the user points at the name of a destination, a picture of that place appears in the preview area. Clicking the link takes the user to a page detailing their fabulous vacation spot.**

## Making Multiple Links Change a Single Rollover

Up to now, you've seen how mousing over a single image (or actually, the link associated with that image) can trigger a rollover effect. But you can also have several different images that trigger a rollover. This can be very useful when you have several images that you want to annotate. Rolling over each of the images makes the description of that image appear. In this example, we've done just this with images of three of Leonardo da Vinci's inventions. As you roll over each image, the description of that image appears in a text box. The description itself is another image. Actually, it's three images, one for each of the three inventions. A shows **Listing 4.9** (HTML), **Listing 4.10** (CSS), and **Listing 4.11** (JavaScript) in action. As with most of the scripts in this book, it builds on previous examples, so we'll just explain the new concepts. There are just a few lines that are different between Listing 4.8 and Listing 4.11.



A This page has three interactive images, a flying machine, a tank, and a helicopter. When you roll over an image, its description appears under Leonardo's face.

**Listing 4.9** Note that the links and images on this page all have unique `id`s.

```
<!DOCTYPE html>
<html>
<head>
     <title>Multiple Links, Single Rollover
     ➝ </title>
     <script src="script05.js"></script>
     <link rel="stylesheet" href=
     ➝ "script02.css">
</head>
<body>
     <div id="captionDiv">
        <img src="images/DaVinci.jpg"
        ➝ width="144" height="219"
        ➝ alt="DaVinci">
        <img src="images/bg.gif"
        ➝ id="captionField" alt="Text Field">
     </div>
     <div id="inventionDiv">
        <img src="images/leoText.gif"
        ➝ id="heading" alt="Leonardo's
        ➝ Inventions">
        <a href="flyPage.html" class=
        ➝ "captionField" id="flyer"><img src=
        ➝ "images/flyer.gif" width="293"
        ➝ height="165" alt="Flying Machine"
        ➝ id="flyerImg"></a>
        <a href="tankPage.html" class=
        ➝ "captionField" id="tank"><img
        ➝ src="images/tank.gif" width="325"
        ➝ height="92" alt="Tank"
        ➝ id="tankImg"></a>
        <a href="heliPage.html" class=
        ➝ "captionField" id="helicopter"><img
        ➝ src="images/helicopter.gif"
        ➝ width="224" height="160"
        ➝ alt="Helicopter"
        ➝ id="helicopterImg"></a>
     </div>
</body>
</html>
```

**Listing 4.10** In this CSS file, we define the classes we reference in the HTML.

```
body {
     background-color: #EC9;
}

img {
     border-width: 0;
}

#captionDiv {
     float: right;
     width: 210px;
     margin: auto 50px;
}

#captionField {
     margin: 20px auto;
     width: 208px;
     height: 27px;
}

#inventionDiv {
     width: 375px;
     margin-left: 20px;
}

#heading {
     margin-bottom: 20px;
     width: 375px;
     height: 26px;
}
```

## To make multiple links change a single rollover:

1. **`if (linkObj.className) {`**
   **`var imgObj = document.`**
   **`→getElementById`**
   **`→(linkObj.className);`**

   We can't use the **`id`** of the rolled-over images to calculate the **`id`** of the changed image—that's because an **`id`** has to be unique, and all of the rolled-over images have to come up with the same value for the changed image destination. Instead, we're using the **`class`** attribute (because you can have multiple page elements sharing the same **`class`**). In this line, we're looking for the **`className`** of the link object.

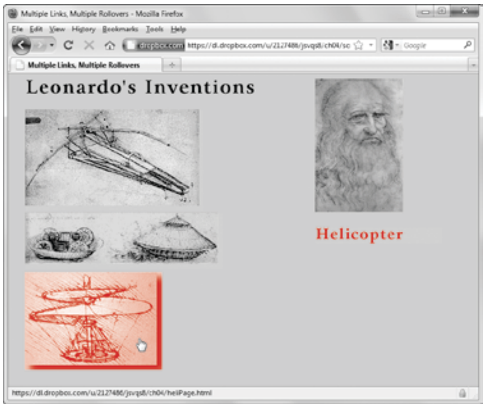
2. **`function setupRollover`**
   **`→(thisLink,textImage) {`**
   **`thisLink.imgToChange =`**
   **`→textImage;`**

   The **`setupRollover()`** function is passed the current link object (**`thisLink`**) and the image object, which we're calling **`textImage`**. Note that when we passed these objects (which can also be referred to as variables) in, we called them **`linkObj`** and **`imgObj`**, respectively.

   The rest of the script works the same way as the previous examples in this chapter.

**Listing 4.11** This script shows you how to use multiple links to trigger a single rollover.

```
window.onload = rolloverInit;

function rolloverInit() {
     for (var i=0; i<document.links.length;
     →i++) {
        var linkObj = document.links[i];
        if (linkObj.className) {
           var imgObj = document.
           →getElementById(linkObj.
           →className);
           if (imgObj) {
              setupRollover(linkObj,imgObj);
           }
        }
     }
}

function setupRollover(thisLink,textImage) {
     thisLink.imgToChange = textImage;
     thisLink.onmouseout = function() {
        this.imgToChange.src =
        →this.outImage.src;
     }
     thisLink.onmouseover = function() {
        this.imgToChange.src =
        →this.overImage.src;
     }

     thisLink.outImage = new Image();
     thisLink.outImage.src = textImage.src;

     thisLink.overImage = new Image();
     thisLink.overImage.src = "images/" +
     →thisLink.id + "Text.gif";
}
```



A When you roll over one of the images, a description appears and a drop shadow appears around the image itself.

## Working with Multiple Rollovers

What if you want the image that triggers the rollover to also be a rollover itself? A builds on the last example and shows how we've added this feature. When you roll over one of the invention images, it makes the description image appear, as before, but this time also swaps out the invention image for another image with a drop shadow. This gives the user visual feedback about what they're pointing at (as if the mouse pointer isn't enough!). **Listing 4.12** is the HTML page (no changes except for the title and the name of the external JavaScript file being called), and **Listing 4.13** shows the additions to the JavaScript from the previous example.

**Listing 4.12** This HTML is identical to Listing 4.9, except for the title and reference to the external script.

```
<!DOCTYPE html>
<html>
<head>
     <title>Multiple Links, Multiple Rollovers</title>
     <script src="script06.js"></script>
     <link rel="stylesheet" href="script02.css">
</head>
<body>
     <div id="captionDiv">
        <img src="images/DaVinci.jpg" width="144" height="219" alt="DaVinci">
        <img src="images/bg.gif" id="captionField" alt="Text Field">
     </div>
     <div id="inventionDiv">
        <img src="images/leoText.gif" id="heading" alt="Leonardo's Inventions">
        <a href="flyPage.html" class="captionField" id="flyer"><img src="images/flyer.gif"
        → width="293" height="165" alt="Flying Machine" id="flyerImg"></a>
        <a href="tankPage.html" class="captionField" id="tank"><img src="images/tank.gif"
        → width="325" height="92" alt="Tank" id="tankImg"></a>
        <a href="heliPage.html" class="captionField" id="helicopter"><img src="images/
        → helicopter.gif" width="224" height="160" alt="Helicopter" id="helicopterImg"></a>
     </div>
</body>
</html>
```

**Listing 4.13** This script handles the multiple rollovers.

```
window.onload = rolloverInit;

function rolloverInit() {
     for (var i=0; i<document.links.length; i++) {
        var linkObj = document.links[i];
        if (linkObj.className) {
           var imgObj = document.getElementById(linkObj.className);
           if (imgObj) {
              setupRollover(linkObj,imgObj);
           }
        }
     }
}

function setupRollover(thisLink,textImage) {
     thisLink.imgToChange = new Array;
     thisLink.outImage = new Array;
     thisLink.overImage = new Array;

     thisLink.imgToChange[0] = textImage;
     thisLink.onmouseout = rollOut;
     thisLink.onmouseover = rollOver;

     thisLink.outImage[0] = new Image();
     thisLink.outImage[0].src = textImage.src;

     thisLink.overImage[0] = new Image();
     thisLink.overImage[0].src = "images/" + thisLink.id + "Text.gif";

     var rolloverObj = document.getElementById(thisLink.id + "Img");
     if (rolloverObj) {
        thisLink.imgToChange[1] = rolloverObj;

        thisLink.outImage[1] = new Image();
        thisLink.outImage[1].src = rolloverObj.src;

        thisLink.overImage[1] = new Image();
        thisLink.overImage[1].src = "images/" + thisLink.id + "_on.gif";
     }
}

function rollOver() {
     for (var i=0;i<this.imgToChange.length; i++) {
        this.imgToChange[i].src = this.overImage[i].src;
     }
}

function rollOut() {
     for (var i=0;i<this.imgToChange.length; i++) {
        this.imgToChange[i].src = this.outImage[i].src;
     }
}
```

## To work with multiple rollovers:

1. `thisLink.imgToChange = new Array;`
   `thisLink.outImage = new Array;`
   `thisLink.overImage = new Array;`

   These lines were added because the script has more images to work with (two for each rollover). In each line, we're creating a new property of **`thisLink`**, each of which is an array.

2. `thisLink.imgToChange[0] =`
   `→ textImage;`

   In the previous task, **`imgToChange`** was an image, but in this task, it's an array that will contain images. Here, **`textImage`** is stored in the first element of **`imgToChange`**.

3. `thisLink.outImage[0] =`
   `→ new Image();`
   `thisLink.outImage[0].src =`
   `→ textImage.src;`

   As previously, we need to store the out (off) version of the image, but this time it's stored in the first element of the **`outImage`** array.

4. `thisLink.overImage[0] =`
   `→ new Image();`
   `thisLink.overImage[0].src =`
   `→ "images/" + thisLink.id +`
   `→ "Text.gif";`

   Similarly, the over (on) version of the image is calculated and stored in the first element of **`overImage`**.

*continues on next page*

5. **`var rolloverObj =`**
   **`→ document.getElementById`**
   **`→ (thisLink.id + "Img");`**
   **`if (rolloverObj) {`**

   Now we need to figure out if this rollover will trigger multiple images, not just an individual image. If that's the case, there will be an element on the HTML page whose **`id`** is the same as this one, but with **`Img`** appended. That is, if we're working on **`flyer`**, we'll be checking to see if there's a **`flyerImg`** element on the page. If there is, it's saved in **`rolloverObj`**, and we should do the next three steps.

6. **`thisLink.imgToChange[1] =`**
   **`→ rolloverObj;`**

   In the same way that we set **`imgToChange[0]`** above, we now set **`imgToChange[1]`** (the second element in the array) to the new **`rolloverObj`**. When the **`onmouseout`** and **`onmouseover`** event handlers are triggered, both images swap to their alternate versions, as we'll see later.

7. **`thisLink.outImage[1] =`**
   **`→ new Image();`**
   **`thisLink.outImage[1].src =`**
   **`→ rolloverObj.src;`**

   This sets the second array element of **`outImage`** to the out (off) version of the image.

8. **`thisLink.overImage[1] =`**
   **`→ new Image();`**
   **`thisLink.overImage[1].src =`**
   **`→ "images/" + thisLink.id +`**
   **`→ "_on.gif";`**

   And here, the over (on) version of the image is calculated and stored in the second element of **`overImage`**.

If, for some reason, we wanted a third image to also change during this same rollover, we'd repeat steps 6–8 with the third image object.

9. 
```
for (var i=0; i<this.imgToChange.
→length; i++) {
  this.imgToChange[i].src =
  →this.overImage[i].src;
}
```

   Here inside the **`rollOver()`** function is where the images get swapped. Because one or more images can be changed, we need to start by asking how many images we have stored—that's the value of **`this.imgToChange.length`**. Here, the value is 2, because we want two images to change. We then loop through two times, setting the source of **`imgToChange[0]`** and then **`imgToChange[1]`** to their respective over values.

10. 
```
for (var i=0; i<this.imgToChange.
→length; i++) {
  this.imgToChange[i].src =
  →this.outImage[i].src;
}
```

   This code in the **`rollOut()`** function is virtually the same as that in the previous step; the only difference is that we're now resetting those images to their out source values.

**TIP It's important to remember that every image that ever gets rolled over must have a unique `id`.**

**TIP What if you want some of the links on your page to trigger multiple rollovers, but others to be individual rollovers? No problem—you don't even need to change a line of JavaScript. So long as the check in step 5 doesn't find the alternate `id` on the page, no second element is stored, and the `rollOver()` and `rollOut()` loops only animate the initial image.**

## Creating Cycling Banners

When you surf the Web, it's common to see advertising banners that periodically switch between images. Some of these are animated GIF files, which are GIF files that contain a number of frames that play in succession; others are Flash animations. If you want to have a page that cycles through a number of GIFs (either animated or not), you can use JavaScript to do the job, as in **Listing 4.15**. This example uses three GIFs and cycles repeatedly through them, as shown in A, B, and C. The simple HTML page is shown in **Listing 4.14**.

### To create cycling banners:

1. `var thisAd = 0;`

   Our script starts by creating **`thisAd`**, which is given its beginning value in this code.

2. 
```
function rotate() {
   var adImages = new Array
   →("images/reading1.gif",
   →"images/reading2.gif",
   →"images/reading3.gif");
```

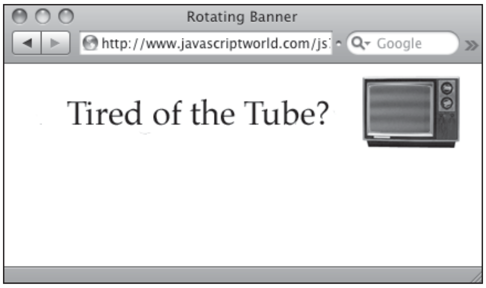
   We start off with a new function called **`rotate()`**. The next line creates a new array called **`adImages`**. In this case, the array contains the names of the three GIF files that make up the cycling banner.

3. `thisAd++;`

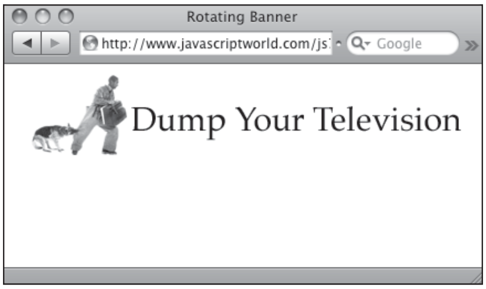
   Take the value of **`thisAd`**, and add one to it.

4. 
```
if (thisAd == adImages.length) {
   thisAd = 0;
```

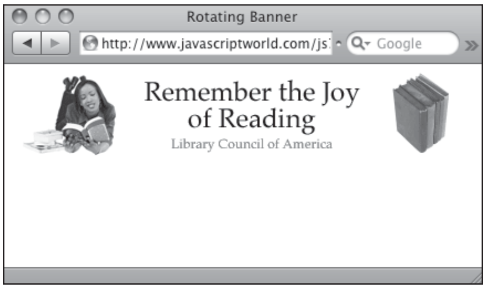
   This code checks to see if the value of **`thisAd`** is equal to the number of items in the **`adImages`** array; if it is, then set the value of **`thisAd`** back to zero.



A The first image, which starts the cycling banner...



B ...the second image...


Rotating Banner
http://www.javascriptworld.com/js
Google
Remember the Joy of Reading
Library Council of America

C ...the final image. Once the page loads and the banner begins cycling, the animation continues with no user intervention required.

**Listing 4.14** The HTML loads the first image in the cycling banner; the JavaScript handles the rest.

```
<!DOCTYPE html>
<html>
<head>
     <title>Rotating Banner</title>
     <script src="script07.js"></script>
     <link rel="stylesheet" href="script01.
css">
</head>
<body>
     <div class="centered">
        <img src="images/reading1.gif"
        ➝id="adBanner" alt="Ad Banner">
     </div>
</body>
</html>
```

**Listing 4.15** You can use JavaScript to cycle between images in a banner.

```
window.onload = rotate;

var thisAd = 0;

function rotate() {
     var adImages = new Array("images/
     ➝reading1.gif","images/reading2.
     ➝gif","images/reading3.gif");

     thisAd++;
     if (thisAd == adImages.length) {
        thisAd = 0;
     }
     document.getElementById("adBanner").
     ➝src = adImages[thisAd];

     setTimeout(rotate, 3 * 1000);
}
```

5. **`document.getElementById`**
   **`➝("adBanner").src =`**
   **`➝adImages[thisAd];`**

   The image on the Web that is being cycled has the **`id adBanner`**; you define the name as part of the **`img`** tag, as shown in Listing 4.14. This line of code says that the new sources for **`adBanner`** are in the array **`adImages`**, and the value of the variable **`thisAd`** defines which of the three GIFs the browser should use at this moment.

6. **`setTimeout(rotate, 3 * 1000);`**

   This line tells the script how often to change GIFs in the banner. The built-in JavaScript command **`setTimeout()`** lets you specify that an action should occur on a particular schedule, always measured in milliseconds. In this case, the function **`rotate()`** is called every 3,000 milliseconds, or every 3 seconds, so the GIFs will cycle in the banner every three seconds.

**TIP You might be wondering why you would want to use JavaScript for a cycling banner, rather than just create an animated GIF. One good reason is that it lets you use JPEGs or PNGs in the banner, which gives you higher-quality images. With these higher-quality images, you can use photographs in your banners.**

**TIP Unlike in some of the previous examples in this chapter, the images in this task are not pre-cached. Each downloads from the server the first time that it's displayed. This is because you might have any number of images in your ad array, and it's not polite to force users to download, for example, 100 images if they're only going to see 2 or 3 of them.**

## Adding Links to Cycling Banners

Banners are often used in advertising, and you'll want to know how to make a banner into a link that will take a visitor somewhere when the visitor clicks the banner. **Listing 4.16** shows the HTML page, which differs from the last example only in that it adds a link around the **`img`** tag. **Listing 4.17** shows a variation of the previous script. In this script, we'll add a new array. This new array contains destinations that users will be sent to when they click the banner. In this case, the "Eat at Joe's" banner takes you to negrino.com, "Drink more Java" goes to sun.com, and "Heartburn" goes to microsoft.com, as shown in A. No editorial comments implied, of course.

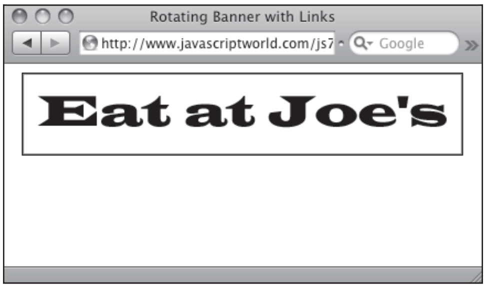
### To add links to cycling banners:

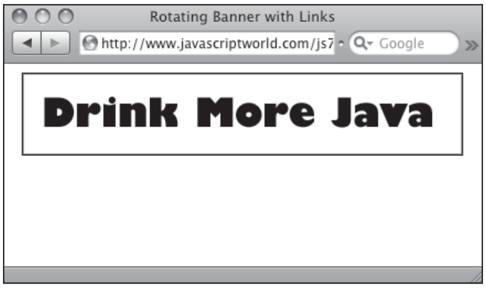
1. **`window.onload = initBannerLink;`**

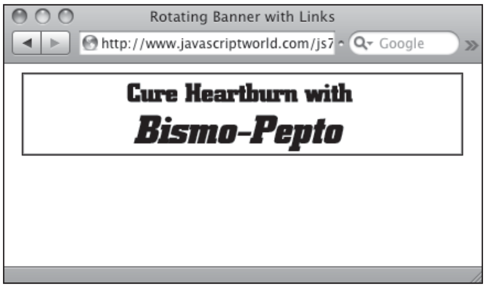
   When the window finishes loading, trigger the **`initBannerLink()`** function.

**Listing 4.16** The HTML needed for an ad banner.

```
<!DOCTYPE html>
<html>
<head>
     <title>Rotating Banner with Links
     → </title>
     <script src="script08.js"></script>
     <link rel="stylesheet"
     → href="script01.css">
</head>
<body>
     <div class="centered">
        <a href="linkPage.html"><img src=
        → "images/banner1.gif" id="adBanner"
        → alt="ad banner"></a>
     </div>
</body>
</html>
```


Rotating Banner with Links
http://www.javascriptworld.com/js7
Google
Eat at Joe's


Rotating Banner with Links
http://www.javascriptworld.com/js7
Google
Drink More Java


Rotating Banner with Links
http://www.javascriptworld.com/js7
Google
Cure Heartburn with
Bismo-Pepto

A Each of these three images is a link, and clicking each image takes you to one of three different Web sites.

**Listing 4.17** This script shows how you can turn cycling banners into real, clickable ad banners.

```
window.onload = initBannerLink;

var thisAd = 0;

function initBannerLink() {
     if (document.getElementById("adBanner").
     → parentNode.tagName == "A") {
        document.getElementById("adBanner").
        → parentNode.onclick = newLocation;
     }

     rotate();
}

function newLocation() {
     var adURL = new Array("negrino.com",
     → "sun.com","microsoft.com");
     document.location.href = "http://www." +
     → adURL[thisAd];
     return false;
}

function rotate() {
     var adImages = new Array("images/
     → banner1.gif","images/banner2.gif",
     → "images/banner3.gif");

     thisAd++;
     if (thisAd == adImages.length) {
        thisAd = 0;
     }
     document.getElementById("adBanner").
     → src = adImages[thisAd];

     setTimeout(rotate, 3 * 1000);
}
```

**TIP** The **adURL** array needs to have the same number of array items as the **adImages** array for this script to work correctly.

2.
   ```
   if (document.getElementById
   → ("adBanner").parentNode.
   → tagName == "A") {
     document.getElementById
     → ("adBanner").parentNode.
     → onclick = newLocation;
   }

   rotate();
   ```

   This code, inside the **initBannerLink()** function, first checks to see if the **adBanner** object is surrounded by a link tag. If so, when the link is clicked, the **newLocation()** function will be called. Finally, the **rotate()** function is called.

3.
   ```
   function newLocation() {
     var adURL = new Array("negrino.
     → com","sun.com","microsoft.com");
   ```

   In the new function **newLocation()**, the **adURL** variable gets assigned the three constituents of a new array. Just the domain names need to go in here, because we'll complete the URLs next.

4.
   ```
   document.location.href =
   → "http://www." + adURL[thisAd];
   return false;
   ```

   Still inside **newLocation()**, we set the **document.location.href** object (in other words, the current document window) to the value of the text string **http://www.** (notice the period), plus the value of one item from **adURL.** Since **adURL** is an array, you need to specify a member of the array. That's stored in **thisAd**, and the resulting string can be any of the three links, depending on when the user clicks. Last, it returns false, which tells the browser that it should *not* also load in the **href**. Otherwise, the browser would do both. We've handled everything within JavaScript, so the **href** doesn't need to be loaded.

## Building Wraparound Slideshows

Slideshows on Web sites present the user with an image and let the user control the progression (either forward or backward) of the images. JavaScript gives the user the interactive control needed. **Listing 4.18** shows the HTML needed, and the JavaScript in **Listing 4.19** has what you need to add slideshows to your pages.

This script builds a slideshow that wraps around—that is, if you go past the end of the list you go back to the beginning and vice versa. **A** shows the new slideshow.

**Listing 4.18** This HTML page creates a slideshow.

```
<!DOCTYPE html>
<html>
<head>
     <title>Image Slideshow</title>
     <script src="script09.js"></script>
     <link rel="stylesheet"
     → href="script01.css">
</head>
<body>
     <div class="centered">
        <h1>Welcome, Robot Overlords!</h1>
        <img src="images/robot1.jpg"
        → id="myPicture" width="200"
        → height="400" alt="Slideshow">
        <h2><a href="previous.html"
        → id="prevLink">&lt;&lt; Previous
        → </a>&nbsp;&nbsp;<a href="next.
        → html" id="nextLink">Next &gt;&gt;
        → </a></h2>
     </div>
</body>
</html>
```

**Listing 4.19** This script builds a slideshow that the user can click through using links to control movement forward and back.

```
window.onload = initLinks;

var myPix = new Array("images/robot1.jpg","images/robot2.jpg","images/robot3.jpg");
var thisPic = 0;

function initLinks() {
     document.getElementById("prevLink").onclick = processPrevious;
     document.getElementById("nextLink").onclick = processNext;
}

function processPrevious() {
     if (thisPic == 0) {
        thisPic = myPix.length;
     }
     thisPic--;
     document.getElementById("myPicture").src = myPix[thisPic];
     return false;
}

function processNext() {
     thisPic++;
     if (thisPic == myPix.length) {
        thisPic = 0;
     }
     document.getElementById("myPicture").src = myPix[thisPic];
     return false;
}
```

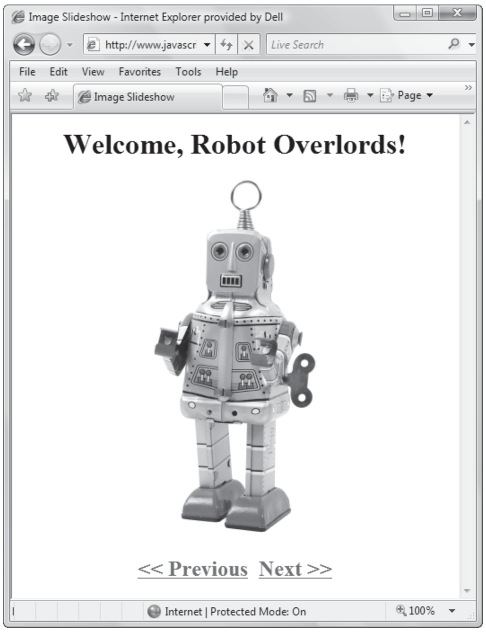


Image Slideshow - Internet Explorer provided by Dell
http://www.javascr
Live Search
File Edit View Favorites Tools Help
Image Slideshow
Page
Welcome, Robot Overlords!
<< Previous Next >>
Internet | Protected Mode: On
100%

## To build a wraparound slideshow:

1. `window.onload = initLinks;`

   When the window finishes loading, trigger the **`initLinks()`** function.

2.
   ```
   function initLinks() {
      document.getElementById
      →("prevLink").onclick =
      →processPrevious;
      document.getElementById
      →("nextLink").onclick =
      →processNext;
   }
   ```

   This function sets up the **`onclick`** event handlers for the Previous and Next links.

*continues on next page*

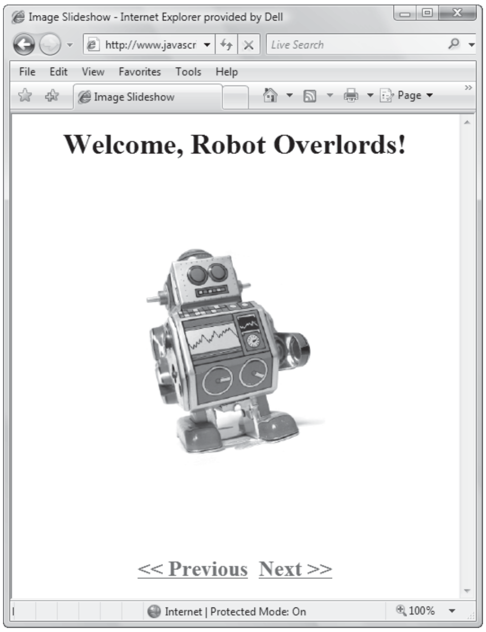


Image Slideshow - Internet Explorer provided by Dell
http://www.javascr
Live Search
File Edit View Favorites Tools Help
Image Slideshow
Page
Welcome, Robot Overlords!
<< Previous Next >>
Internet | Protected Mode: On
100%

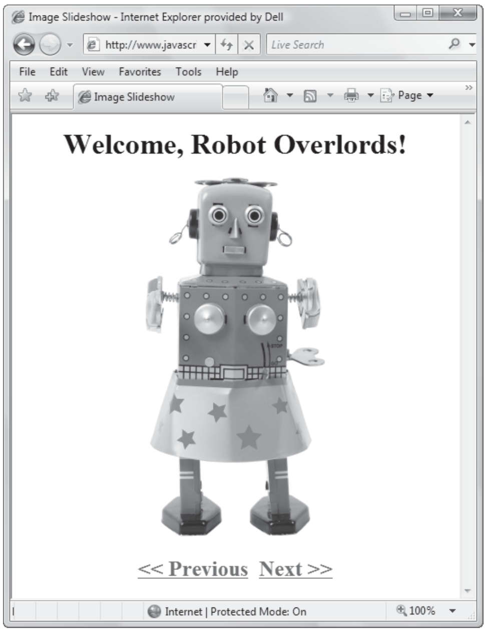


Image Slideshow - Internet Explorer provided by Dell
http://www.javascr
Live Search
File Edit View Favorites Tools Help
Image Slideshow
Page
Welcome, Robot Overlords!
<< Previous Next >>
Internet | Protected Mode: On
100%

A Clicking the Previous or Next link calls the **`processPrevious()`** or **`processNext()`** function, respectively.

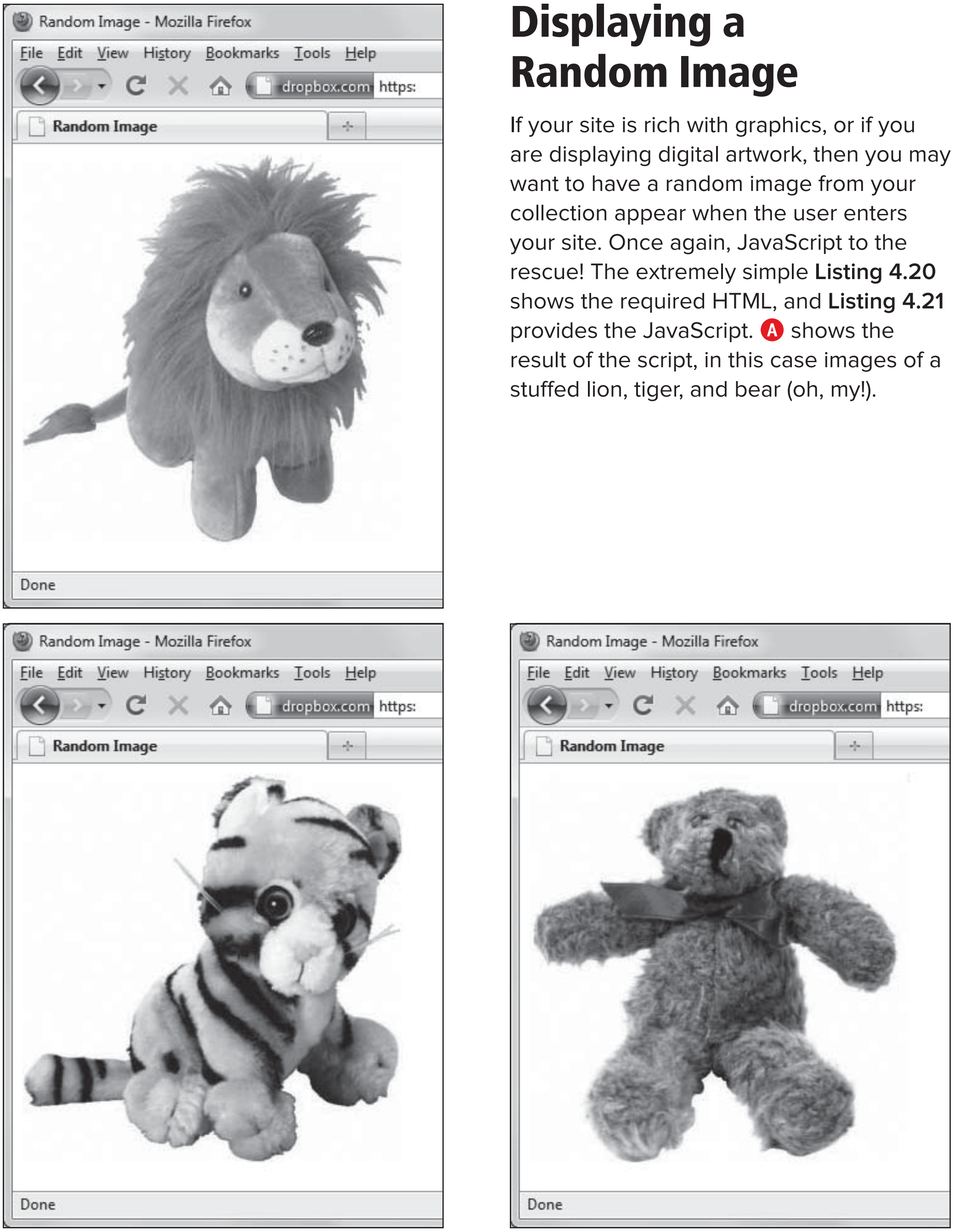
3.
   ```
   function processPrevious() {
     if (thisPic == 0) {
       thisPic = myPix.length;
   ```
   This function makes the slideshow run in the Previous direction. This first part checks to see if **`thisPic`** is equal to 0. If it is, the function gets the number of pictures in the **`myPix`** array.

4.
   ```
   thisPic--;
   document.getElementById
   →("myPicture").src =
   →myPix[thisPic];
   ```
   The first line reduces the value of **`thisPic`** by 1. The next line sets the **`src`** of **`myPicture`** to the element of the **`myPix`** array represented by the current value of **`thisPic`**.

5.
   ```
   thisPic++;
   if (thisPic == myPix.length) {
     thisPic = 0;
   }
   document.getElementById
   →("myPicture").src =
   →myPix[thisPic];
   ```
   This code, inside the **`processNext()`** function, makes the slideshow run in the Next direction and is much like the **`processPrevious()`** function. The first thing it does is increment the value of **`thisPic`** by 1. Then it checks to see if the value of **`thisPic`** is the same as the number of items in the **`myPix`** array. If so, it sets **`thisPic`** back to 0. The next line sets the **`src`** of **`myPicture`**.

## Displaying a Random Image

If your site is rich with graphics, or if you are displaying digital artwork, then you may want to have a random image from your collection appear when the user enters your site. Once again, JavaScript to the rescue! The extremely simple **Listing 4.20** shows the required HTML, and **Listing 4.21** provides the JavaScript. A shows the result of the script, in this case images of a stuffed lion, tiger, and bear (oh, my!).


Random Image - Mozilla Firefox
File Edit View History Bookmarks Tools Help
dropbox.com https:
Random Image
Done

A Depending on the value of the random number generated by the script, the user is presented with the lion, the tiger, or the bear.

## To display a random image:

1.
   ```
   var myPix = new Array
   ➝("images/lion.jpg", "images/
   ➝tiger.jpg", "images/bear.jpg");
   ```

   Inside the function **`choosePic()`**, as is now familiar, build an array of three images, and stuff it into the variable **`myPix`**.

2.
   ```
   randomNum = Math.floor
   ➝((Math.random() * myPix.length));
   ```

   The variable called **`randomNum`** gets the value of a math expression that's best read from the inside outwards. **`Math.random`** generates a random number between 0 and 1, which is then multiplied by **`myPix.length`**, which is the number of items in the array (in this case, it's 3). **`Math.floor`** rounds the result down to an integer, which means that the number must be between 0 and 2.

3.
   ```
   document.getElementById
   ➝("myPicture").src =
   ➝myPix[randomNum];
   ```

   This says that the source of the image **`myPicture`** is set based on the array **`myPix`**, and the value at this moment is dependent on the value of **`randomNum`**.

**Listing 4.20** This simple HTML creates the page for a random image.

```
<!DOCTYPE html>
<html>
<head>
     <title>Random Image</title>
     <script src="script10.js"></script>
     <link rel="stylesheet"
     ➝href="script01.css">
</head>
<body>
     <img src="images/spacer.gif" width="305"
     ➝height="312" id="myPicture"
     ➝alt="some image">
</body>
</html>
```

**Listing 4.21** You can display random images on your page with this script, which uses JavaScript's **`Math.random`** method to generate a random number.

```
window.onload = choosePic;

function choosePic() {
     var myPix = new Array("images/lion.jpg",
     ➝"images/tiger.jpg","images/bear.jpg");
     var randomNum = Math.floor
     ➝((Math.random() * myPix.length));
     document.getElementById("myPicture").
     ➝src = myPix[randomNum];
}
```

## Cycling Images with a Random Start

If you have a number of images that you want to display, you may not want to display them beginning with the same image each time the page is loaded. **Listing 4.22** has the HTML, and **Listing 4.23** combines the code used earlier for the cycling ad banners with the random image code.

**Listing 4.22** There's a spacer GIF in the HTML file, which is a placeholder until the ad banner appears.

```
<!DOCTYPE html>
<html>
<head>
     <title>Rotating Random Banner</title>
     <script src="script11.js"></script>
     <link rel="stylesheet"
     → href="script01.css">
</head>
<body>
     <div class="centered">
        <img src="images/spacer.gif"
        → id="adBanner" alt="Ad Banner">
     </div>
</body>
</html>
```

**Listing 4.23** This script allows you to start your cycling image show with a random image.

```
window.onload = choosePic;

var adImages = new Array("images/reading1.gif","images/reading2.gif","images/reading3.gif");
var thisAd = 0;

function choosePic() {
     thisAd = Math.floor((Math.random() * adImages.length));
     document.getElementById("adBanner").src = adImages[thisAd];

     rotate();
}

function rotate() {
     thisAd++;
     if (thisAd == adImages.length) {
        thisAd = 0;
     }
     document.getElementById("adBanner").src = adImages[thisAd];

     setTimeout(rotate, 3 * 1000);
}
```

## To start images cycling from a random start:

1. **`var adImages = new Array("images/`**
   **`➝ reading1.gif","images/reading2.`**
   **`➝ gif","images/reading3.gif");`**

   As in previous examples, set up the array and the variable that contains the number of items in the array.

2. **`function choosePic() {`**

   This function is similar to the **`choosePic()`** function in Listing 4.21. See that explanation for the details of how it works.

3. **`function rotate() {`**

   This function is similar to the **`rotate()`** function in Listing 4.15. See that explanation for the details of how it works.

# Index