

Animated GIFs

2007 NOTES

This article was originally published in 2003 as Chapter 17 of [Learning Web Design](#), 2nd edition.

When you see a web graphic spinning, blinking, fading in and out, or otherwise putting on a little show, chances are it's an animated GIF. These days, they're *everywhere*—most notably in the advertising banners that crown nearly every page on the Web (however, Flash movies have become increasingly popular for web advertising). This chapter provides a basic introduction to how animated GIFs work and how to create them.

Animated GIFs have a lot going for them: they're easy to make, and because they are just ordinary GIF files, they will work on virtually any browser without the need for plug-ins. Adding simple animation to a web page is an effective way to attract attention (advertisers are no dummies).

However, be forewarned that it's easy to end up with too much of a good thing. Many users complain that animation is distracting and even downright annoying, especially when trying to read content on the page. So if you choose to use it, use it wisely (see the sidebar [Responsible Animation](#) on the following page).

How They Work

Basic animation is one of the features built into the GIF89a graphic file format. It allows one graphic file to contain a number of animation “frames,” which are separate images that, when viewed quickly together, give the illusion of motion or change over time ([Figure 1](#), following page). All of those images are stored within a single GIF file, along with settings that describe how they should be played in the browser window.

Within the GIF, you can control whether and how many times the sequence repeats, how long each frame stays visible (frame delay), the manner in which one frame replaces another (disposal method), whether the image is transparent, and whether it is interlaced. We'll discuss each of these settings later in this chapter.

In this chapter

How animated GIFs work

Creating an animated GIF

A cool shortcut (“tweening”)

GIF Animation Tools

To make an animated GIF, all you need is an animated GIF-making tool. These tools fall roughly into two categories.

Animation utilities are built into web graphics tools such as Adobe ImageReady and Adobe Macromedia Fireworks. If you already have one of these tools, you won't need additional software to make animations. The nice thing about built-in tools is that they allow you to create and save your animations all in one place. Another advantage is that they have advanced features that can do automatic frame generation.

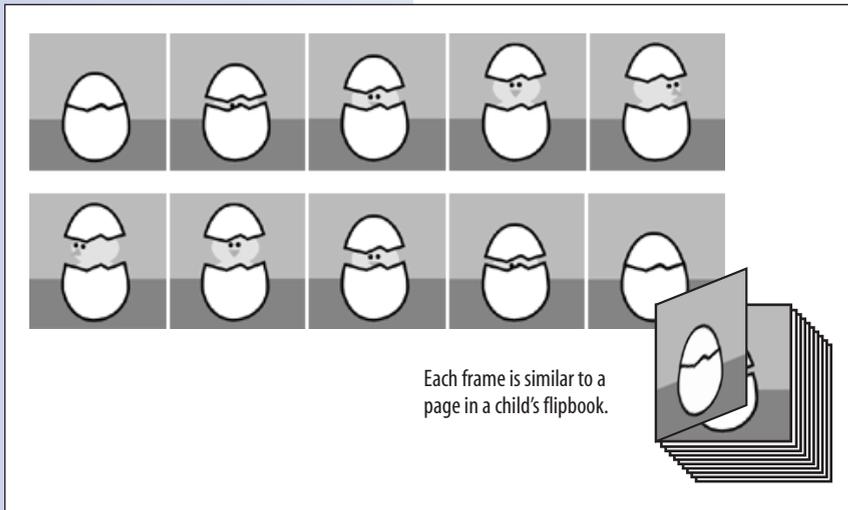


Figure 1. This animated GIF contains all of the images shown above. The images play back in sequence, creating a motion effect. When this GIF is viewed in a browser, the chick pops up, takes a look around, and then goes back in its shell.

Responsible Animation

If you don't want to annoy your audience, follow these recommendations for animation moderation:

- Avoid more than one animation on a page.
- Use the animation to communicate something in a clever way (not just gratuitous flashing lights).
- Avoid animation on text-heavy pages that require concentration to read.
- Consider whether the extra bandwidth to make a graphic “spin” is really adding value to your page.
- Decide if your animation really needs to loop continuously.
- Experiment with timing. Sometimes a long pause between loops can make an animation less distracting.

If you don't have the big guns, you can still make animations using stand-alone GIF-animation utilities. These take a pre-existing group of GIF files (one for each frame in the animation sequence) and turn them into a single animated GIF. They provide a simple interface for entering the animation settings (speed, looping, etc.). Some also provide excellent optimization options and even transition effects. The good news is that animation utilities are inexpensive (even free) and available for download (see the sidebar [Animated GIF Utilities](#), facing page).

Animation Settings

All GIF animation tools provide an interface for adding new frames to the animation and for viewing the frames in sequence. They also allow you to make standard animation settings that affect the behavior of the animation. These are the real heart of GIF animation. Some settings will be familiar and intuitive; some you will be encountering for the first time. The location of these settings may vary from tool to tool, but they'll be there.

Soon, we'll go through the GIF animation process step by step, but first, let's take a look at each setting and pick up some important terminology that we'll need to use our tools later.

Frame delay

Also called “interframe delay,” this setting adjusts the amount of time between frames. Frame delays are usually measured in 1/100ths of a second. Theoretically, a setting of 100 would create a one-second delay, but in reality,

this is a loose estimate and depends on the processor speed of the user's computer.

You can apply a uniform delay across all the frames or apply delay amounts to individual frames. Use custom frame delays to create pauses and other timing effects. You can set the frame delay to 0 (or "as fast as possible"), but I find that a setting of 10 (that's 10/100ths), or 0.1 second, usually results in smoother continuous-motion animations.

Transparency

Like their static cousins, animated GIFs can contain areas of transparency. You can set transparency for each frame within an animation. Previous frames will show through the transparent area of a later frame. If the background frame is made transparent, the browser background color will show through. You need to properly coordinate frame transparency with the disposal method.

Don't be surprised if the transparent areas you specified in your original GIFs are made opaque when you open the files in a GIF animation utility. You may need to reset the transparency in the animation package.

Transparent areas can be generated from black or white pixels, "first color" (the top-left pixel color), or a color chosen from the image with an eyedropper tool.

Looping

You can specify the number of times an animation repeats: "none," "forever," or a specific number. Early browsers do not consistently support a specific number of loops. Some will show the first frame, others the last. One workaround is to build the looping into the file by repeating the frame sequence a number of times. Of course, this increases the file size.

Color palette

Animated GIFs use a palette of up to 256 colors that are used in the image. Although each frame can have its own palette, it is recommended that you use a global palette for the whole animation for smoother display (especially on older browsers).

Interlacing

Like ordinary GIFs, animated GIFs can be interlaced, which causes them to display in a series of passes (starting blocky, finishing clear). It is recommended that you leave the interlacing option set to "no" or "off" because each frame is on the screen for a short amount of time.

Animated GIF Utilities

These tools are inexpensive, and useful for creating animated GIFs. Searching CNET's Download.com will turn up other options.

GIFmation

(Mac and Windows)

This commercial software from BoxTop Software comes highly recommended by web developers for its visual interface, efficient compression methods, and sophisticated palette handling. GIFmation costs \$49.95 (as of this writing). It is available at www.boxtopsoft.com.

GifBuilder 0.5

(Mac only)

GifBuilder, developed by Yves Pigué, is the old Mac standby for creating animated GIFs. It's freeware that is easy and intuitive to use. It is available for download at www.mac.org/graphics/gifbuilder/.

Corel Animation Shop 3

(Windows only)

This inexpensive GIF animation tool also comes bundled with Corel Paint Shop Pro (US\$29.95).

TIP

Starting Points

These settings are a good starting point for creating full-frame animations:

Color palette:

Global, adaptive palette

Interlacing:

Off

Dithering:

On for photos, off for drawings with few colors

Image size:

Minimum size

Background color:

Black or white

Looping:

None or forever

Transparency:

Off

Disposal method:

Do Not Dispose

TIP

Most GIF animation utilities offer “optimization,” which is a file-size-reducing process that takes advantage of the fact that previous frames will “show through” transparent areas of a latter frame. In order for the optimization process to work, the disposal method must be set to Do Not Dispose (or Leave As Is).

Disposal method

The disposal method gives instructions on what to do with the previous frame once a new frame is displayed (Figure 2). The options are:

Unspecified (Nothing). Use this option to replace one full-size, nontransparent frame with another.

Do Not Dispose (Leave As Is). With this option, any pixels not covered by the next frame continue to display. Use this method if you are using transparency within frames.

Restore to Background. The background color or background tile shows through the transparent pixels of the new frame (replacing the image areas of the previous frame).

Restore to Previous. This option restores to the state of the previous, undisposed frame. This method is not well supported and is best avoided.

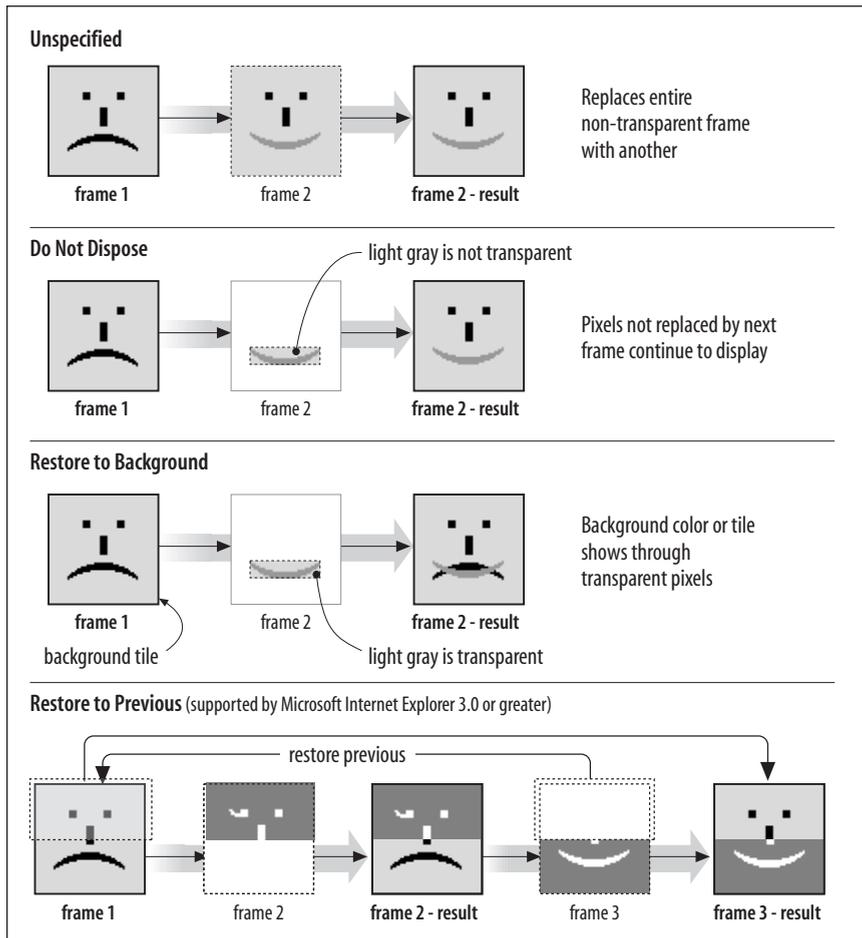


Figure 2. Animated GIF disposal methods.

Optimization

The better GIF animation tools allow you to optimize the GIF when exporting it. The optimization process saves only the pixels that change from frame to frame and throws out redundant pixels. The result is a big savings in file size with no change in the animation's appearance.

The choices are Bounding Box, in which the new animated area in the frame is saved in a rectangle, or Delete Redundant Pixels, in which only the unique pixels in each frame are saved and the rest is transparent (Figure 3).

Creating an Animated GIF, Step by Step

At last, it's time to roll up our sleeves and get started making an animated GIF. I will be using Adobe ImageReady (bundled with Photoshop) in this demonstration. Afterwards, we'll take a brief look at other tools.

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Adobe no longer offers ImageReady with Photoshop (as of CS3). The Animation palette shown in this article is now included in Photoshop CS3 (Window > Animation).

Step 1: Create the artwork

The first thing you need to do is create the artwork for the animation. I find it is useful to take advantage of layers to store the various states of the animation. I'm starting with the Photoshop file, *smile.psd*, which has a background color and the letters s-m-i-l-e stored on separate layers (Figure 4). The goal is to create a simple animation in which each letter appears one at a time and the word "smile" flashes at the end.

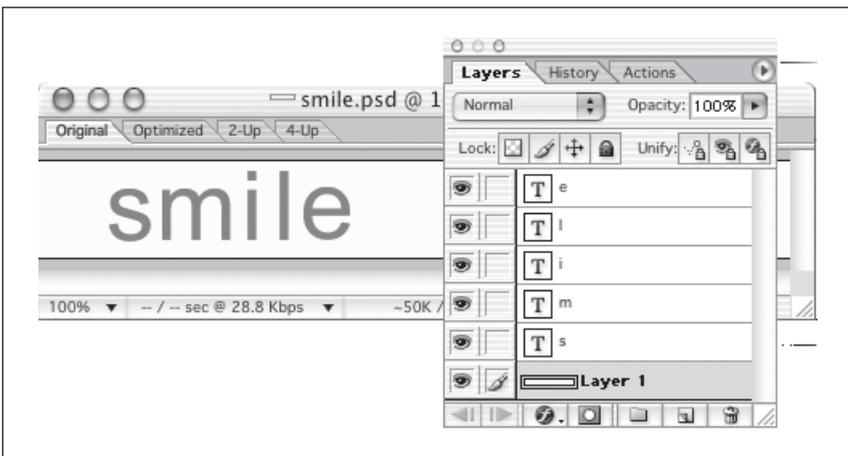


Figure 4. Each element in the animation is on its own layer.

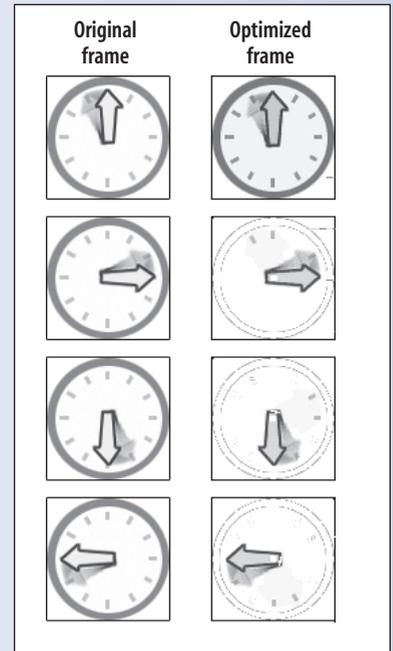


Figure 3. Optimized frames contain just the pixels that change from frame to frame. The result is a smaller file size than if you stored complete image information in every frame.

WORK ALONG

The layered Photoshop file used in this demo (*smile.psd*) is available in the *chap17* materials folder. The step-by-step nature of this section will make it easy to work along.

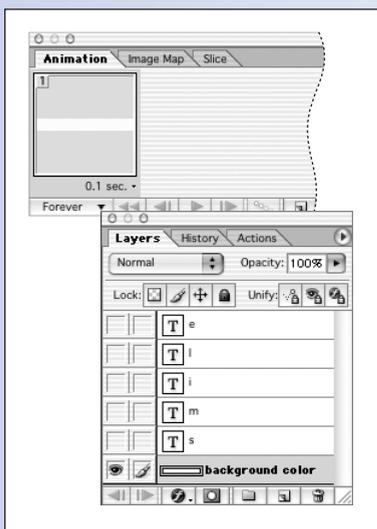


Figure 5. With the first frame selected, I turn on the layers I want to be visible at the beginning of the animation.

Pay attention to which frame is selected, then make the image look the way you want it to look for that frame.

Step 2: Set the first frame

You add and view animation frames in ImageReady (and Photoshop CS3) using the Animation palette (select Window → Show Animation if it isn't visible). The palette shows a thumbnail view of the graphic that corresponds to the first frame of the animation. While this frame is selected (selected frames are highlighted with a shaded box around the thumbnail), organize the layers of your image (turning on and off layers as needed) until the image looks the way you want at the start of the animation. Turn layers on and off by clicking the Eye icon next to them.

I want the animation to start with just the blank background color, so I've turned off all the layers except the background fill layer. I can see the state of the animation in the thumbnail view (Figure 5).

Step 3: Add more frames

Now I'm ready to add another frame. Add a new frame by selecting New Frame from the Animation options (the triangle in the upper-right corner) or by clicking the New Frame button on the bottom bar; it looks like a page with a turned corner.

While the new frame is selected, it's time to arrange the layers so they look the way I want in the second frame of the animation. In my second frame, I want to reveal the letter "s," so I turn that layer on with the frame selected (Figure 6).

Continue adding frames and adjusting layers until you have completed the animation. Remember to pay attention to which frame is selected, then make the image look the way you want it to look for that frame. Use the Trash icon to delete frames if you make a mistake.

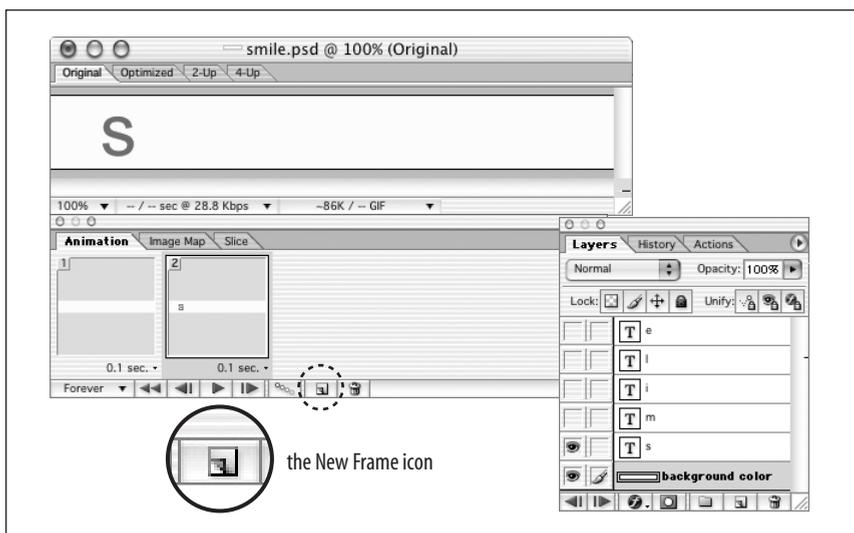


Figure 6. With the second frame selected, I turn on the layers I want to be visible for that frame. I can see the state of the animation (and edit the image if needed) in the Original image window.

Step 4: Check your progress

My final animation has eight frames: one for each letter, a blank frame, then a frame showing the whole word again.

The Animation palette has controls like those of a VCR at the bottom for viewing the animation in progress (Figure 7). When I click the Play button, the animation plays really fast and keeps repeating. I can also move through the animation one frame at a time using the “previous frame” and “next frame” buttons.

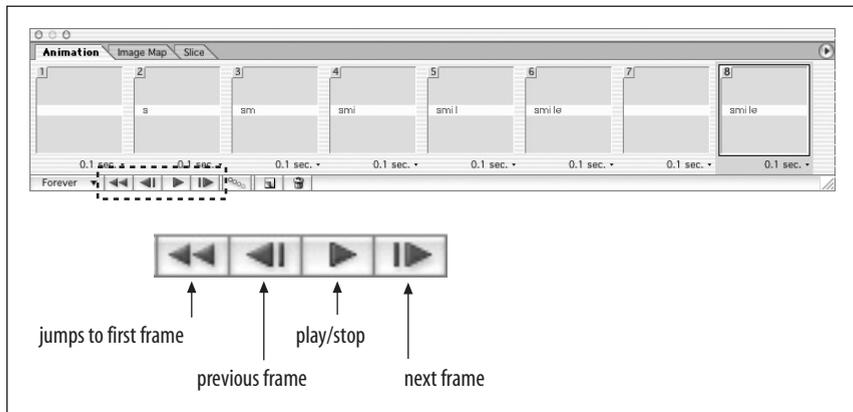


Figure 7. The preview controls of the Animation palette.

Step 5: Adjust the animation settings

I like the frame sequence, but now I need to adjust the behavior of the animation with the various animation settings (Figure 8, following page).

Looping. I usually begin by deciding whether I’d like my animation to repeat. In this case, I’d like it to play through once and stop, so I choose Once from the looping pop-up menu in the bottom corner of the Animation palette ❶.

Frame delay. Next comes the fun part: setting the timing of each frame. Do this using the pop-up delay menu that appears under each frame ❷.

It is usually necessary to play the animation a few times and continue tweaking the settings until you get the timing you want. For this animation, I ended up with the settings listed in Table 1.

Disposal method. By default, the disposal method is set to Automatic in ImageReady, which allows the tool to choose for the best method for each frame. If I had wanted to set the disposal for a frame, I’d context-click (right-click on Windows, Ctrl-click on Mac) ❸.

Timing Tips

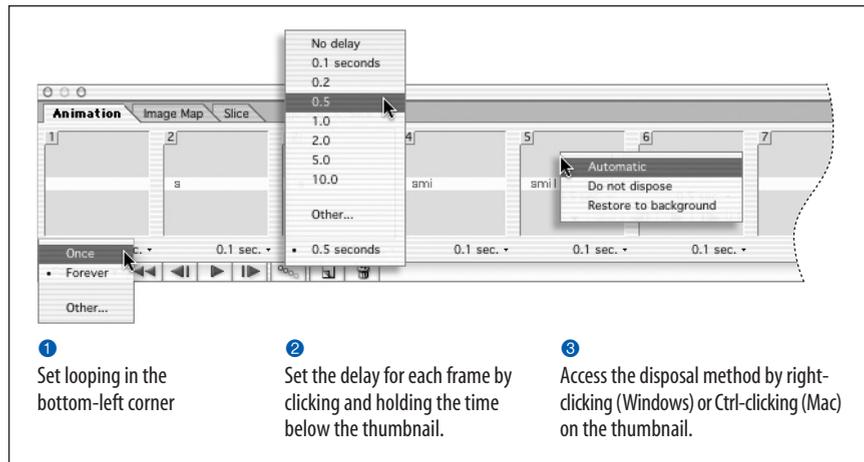
Here are a few tips for setting the frame delays in your animation. Always test your animation on friends and coworkers to make sure it is user-friendly.

- In general, make the animation a little slower than your initial instinct. It takes people a moment to digest new images, especially if they are in motion.
- Don’t set frame delays less than .1 second, even if you want the animation to play as fast as possible. Having a small delay will help the browser play the animation more smoothly.
- If your animation contains text, make sure that you allow enough time for people to read the message. A rule of thumb is that the text should be on the screen long enough to be read aloud.
- Put a slight delay on the first frame of the animation to give users a chance to notice it and pay attention, particularly if there is a sequential text message.

Table 1. Animation frame delays

Delays for the sample animation	
Frame 1	1.0 second
Frame 2	.2
Frame 3	.2
Frame 4	.2
Frame 5	.2
Frame 6	.5
Frame 7	.5
Frame 8	.1

(Note: the final frame delay is not used because the animation is set to play only once.)



- 1 Set looping in the bottom-left corner
- 2 Set the delay for each frame by clicking and holding the time below the thumbnail.
- 3 Access the disposal method by right-clicking (Windows) or Ctrl-clicking (Mac) on the thumbnail.

Figure 8. Adjusting the animation settings.

Color palette. In ImageReady, the color palette selection is made using the Optimization panel for the GIF (Figure 9). As with any GIF, your file will be smaller as a result of limiting the number of colors in the image. This simple image will be fine with only eight colors.

Optimization. Finally, for extra file size savings, I'm going to optimize the animation using the pop-up options menu (Figure 10). I'm leaving both Bounding Box and Redundant Pixel Removal options checked, so the file will be as small as possible. Bounding Box optimization crops each frame to the area that has changed from the preceding frame. Redundant Pixel Removal saves only the pixels that change in each frame, making the rest transparent.

IMPORTANT

For the Redundant Pixel Removal optimization to work, Transparency must be selected in the Optimize palette and the disposal method must be set to Automatic (the default).

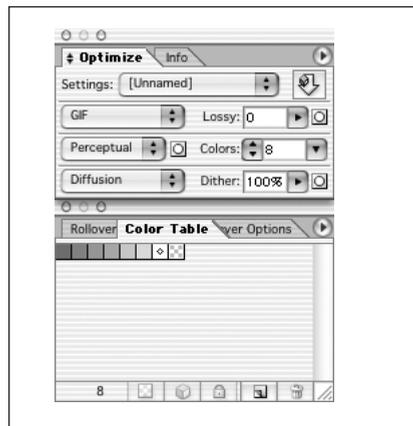


Figure 9. Choose the color palette in the Optimize panel.

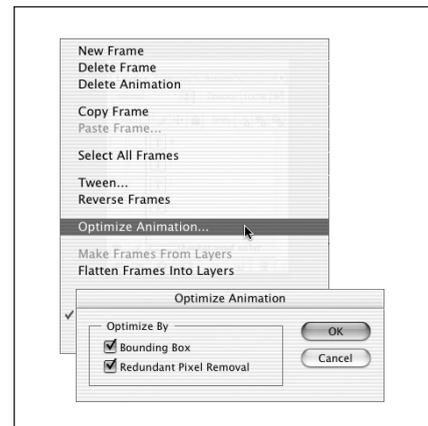


Figure 10. Select Optimize Animation from the Options pop-up menu (the triangle button). Leave both options checked for the smallest possible file.

Step 6: Export the GIF

Once I've made all the settings and the animation is playing the way I want, I can export the GIF by choosing File → Save Optimized, as I would for any graphic in ImageReady. (In Photoshop CS3, select Save for Web & Devices.)

You can see the resulting GIF by opening *smile1.gif* (included in the *chap17* materials folder) in a browser.

Using animated GIF utilities

If you do not have ImageReady, you can use one of the many inexpensive or freely available standalone animation utilities. Most of these tools (such as GIFmation shown in [Figure 11](#)) have some sort of Frames palette where you arrange the frames and enter their settings and a preview window where you can play the animation.

The major difference is that you need to create all your frames as individual GIF images first. You then load the GIF files into the tool by importing or dragging and dropping them into the Frames palette. When you have made all of the frame settings, save or export the file.

Creating Animated GIFs in Fireworks

You can also use Adobe Fireworks to create animated GIFs. Like ImageReady, there is a Frames palette where you can control the order and settings of all the frames in the animation. However, Fireworks uses a symbol-based (rather than layer-based) model for creating animation. Animation symbols are like characters in a movie that you can move around.

If you are a Fireworks user, consult the documentation to learn how to create animations.

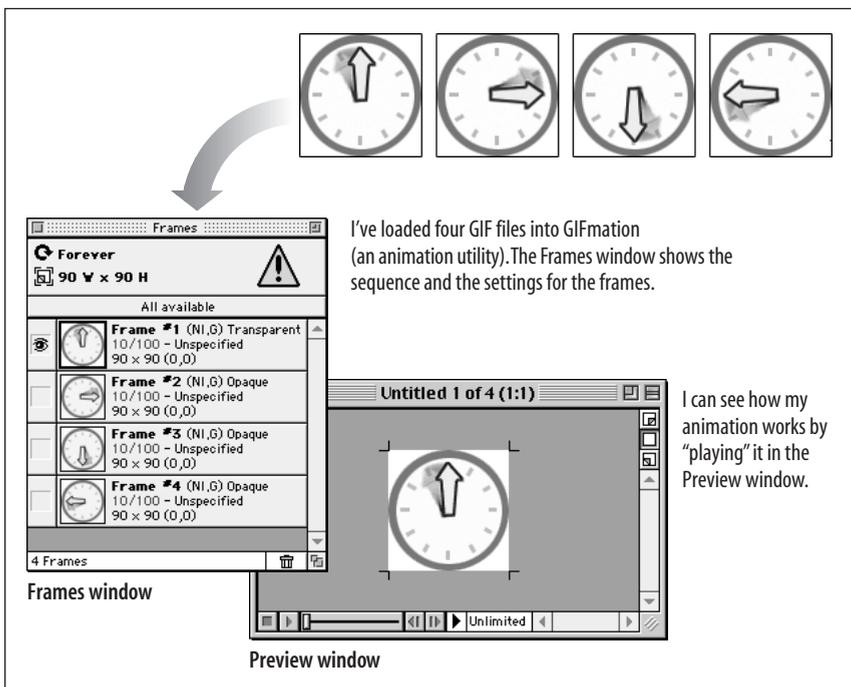


Figure 11. GIFmation, one of the standalone animation utilities.

DESIGN TIP

Standard Ad Sizes

Since animation is so often used for animated ad banners, this seems like a good time to talk about standard ad dimensions.

In the Web's early days, every online publication had its own page layout and size for advertising elements. Unfortunately, this meant that advertisers needed to create dozens of differently sized versions of the same ad to put in each paid space. It didn't take long for them to say "enough is enough" and demand that online advertising dimensions be standardized.

The following are the most popular standard ad sizes as of this writing. For an updated list, see the Interactive Advertising Bureau site (www.iab.net/standards/adunits.asp).

Rectangles and Pop-Ups

Medium Rectangle	300 x 250
Square Pop-Up	250 x 250
Vertical Rectangle	240 x 400
Large Rectangle	336 x 280
Rectangle	180 x 150

Skyscrapers

Wide Skyscraper	160 x 600
Skyscraper	120 x 600

Banners and Buttons

Full Banner	468 x 60
Half Banner	234 x 60
Micro Bar	88 x 31
Button 1	120 x 90
Button 2	120 x 60
Vertical Banner	120 x 240
Square Button	125 x 125

A Cool Shortcut (Tweening)

ImageReady, Photoshop CS3, and Fireworks have a great time-saving function called **tweening**, which generates frames automatically. If you want an image to move from one side of the graphic to another, or you want a graphic to fade in from light to dark, you just need to provide the beginning frame and the end frame, and the tool generates all the frames in between, thus "tweening" (Figure 12).

Let's go through the tweening process in ImageReady, starting with the same layered Photoshop file, *smile.psd*. This time, I'm going to use the Tween function to make the whole word "smile" move across the banner from left to right.

Step 1: Set up the first and last frames

Start by opening the file in ImageReady and view the Animation palette. If there are already frames there from the previous exercise, delete them (select Delete Animation from the Options pop-up menu).

With the first frame selected, I turned on all the layers and positioned the word in the far left corner (you can see its position in the first frame thumbnail in Figure 13). Then I add a new frame and, while it is selected, I alter the Original image to look the way I want in the final frame. For the last frame, have moved the whole word to the far right of the banner.

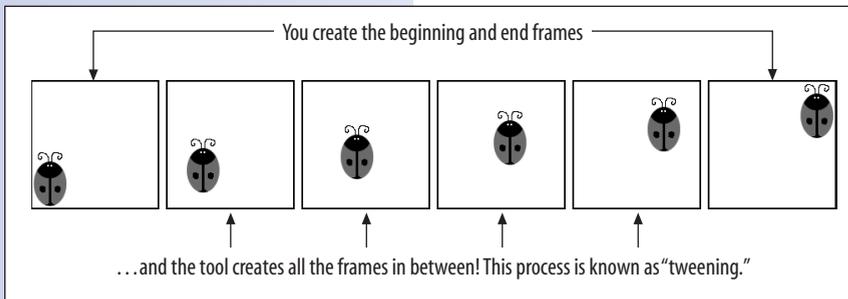


Figure 12. Tweening in action.

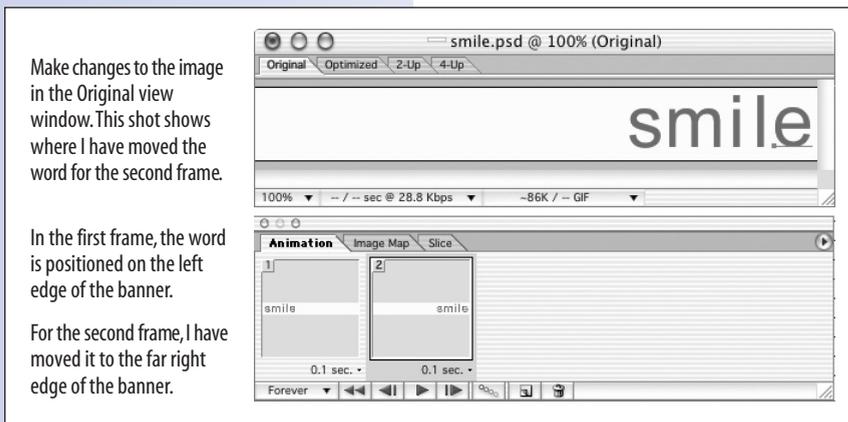


Figure 13. Setting up first and last frames.

Step 2: Set the tweening

Now I can use the Tween function to generate the frames between the start and end frames.

Select Tween from the Options menu on the Animation palette (Figure 14). In the dialog box, I check Position because that is the aspect of the object that changes in the animation. The other settings allow you to change the opacity between two frames (for instance, to fade an object in or out) or change effects, such as blurring. I also set the number of frames I want the transition to take. Remember, the more frames, the larger the file, so it's best to start with a small number and go up if you need to. When I click OK, the frames are automatically inserted, as shown below.

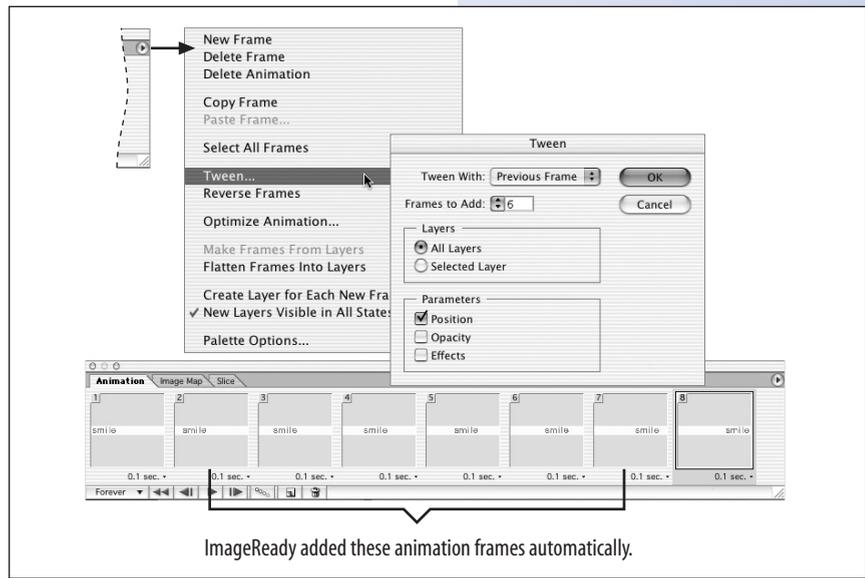


Figure 14. Specifying the “tween”



Figure 15. The final animated GIF.

Step 3: Save and export

At this point, I make the standard animated GIF settings such as frame delay and looping. When I am done, I select Save Optimized from the File menu. I also save the layered Photoshop file in case I want to edit it later. When the graphic is viewed in a browser, the word “smile” moves smoothly from left to right (Figure 15). A copy of this graphic (*smile-tween.gif*) is available in the *chap17* materials folder, so you can view it in a browser for yourself.

TRY IT

Exercise 1: Fading in Text

Try tweening for yourself using the same *smile.psd* file. Use tweening to change the opacity of the object and make the word “smile” fade in gradually.

STEP 1: Start by opening the file and clearing out any existing animation frames.

STEP 2: Position the word “smile” in the middle of the banner. With the first animation frame selected, turn off all the layers except the background fill.

STEP 3: In the final frame of the animation, we want the word “smile” to be fully visible. Add a new frame and turn on all the layers so that the word “smile” is visible in the Original window. You should see a thumbnail of it in the Animation palette as well.

STEP 4: Now you can use the Tween function (located in the Options pop-up menu) to create a number of frames in between your start and end frames. Be sure to click Opacity. Add six new frames for the transition. You should see the frames added to the palette as soon as you click OK. Play the animation and see if you need to adjust the frame delays.

STEP 5: Now you can use Save Optimized to save the animated GIF.

EXTRA CHALLENGE: Can you make a version of this graphic in which the word “smile” fades in as it is moving from left to right across the banner?

Things to Remember About Animated GIFs

Animated GIFs are quite popular on the Web today, particularly in banner advertising. With the proper tool, they are simple to create and are added to the web page just like any other graphic. Here are the major points about animated GIFs we covered in this chapter:

WHERE TO LEARN MORE

GIF Animation

You might want to check out the list of GIF animation resource links gathered by WebReference.com available at www.webreference.com/authoring/graphics/animation.html. They have an amazing article about animated GIF optimization, which you can find at www.webreference.com/dev/gifanim/.

Some of the articles have a few years on them, but GIF animation hasn't changed much since the late 90s, so they are still good resources.

- The ability to contain many frames of animation is a standard characteristic of the GIF file format.
- It's extremely easy to overdo animation on a web page. Consider carefully whether animation is adding or detracting from the success of your web page.
- In order to create an animated GIF, you need an animation utility. There are inexpensive (and even free) programs that do nothing but create GIF animations. In addition, animation tools are built into popular web graphics tools such as ImageReady Photoshop CS3, and Fireworks.
- When you create an animated GIF, you need to set the frame delay, disposal method, transparency, looping, color palette, and interlacing.
- Advanced animation tools may create frames for you automatically in a process called "tweening."

TRY IT

Exercise 2: Practice

Looking for some extra practice at animated GIFs? Here's the homework assignment I typically give in my web design classes.

The Challenge

Choose a product (your favorite new CD, cereal, deodorant, software package, whatever) and create an animated banner ad for it. The animation should feature the product (with an image, if possible) and text (a slogan or other ad copy) in a meaningful and attention-getting way.

Specifications

The banner ad should measure 468 x 60 pixels. It must have at least 8 frames and should be optimized for web delivery.

If you want a realistic challenge, see if you can keep the file size of your banner under 6 or 7 KB, which is the K-limit for most ads on the Web.

Test Yourself

Here are a few quick questions to test your knowledge of animated GIFs. The answers appear in the [Appendix](#).

1. What makes an animated GIF different from a static one?
2. Name three ways to reduce the file size of an animated GIF.
3. Which disposal method should you use if your image contains transparency?
4. What does "Redundant Pixel Removal" optimization do?
5. Where does the word "tween" come from?