

# 24

*The wheel that squeaks the loudest ... gets the grease.*  
—John Billings (Henry Wheeler Shaw)

*We'll use a signal I have tried and found far-reaching  
and easy to yell. Waa-hoo!*  
—Zane Grey

*There is a natural hootchy-kootchy motion to a  
goldfish.*  
—Walt Disney

*Between the motion and the act falls the shadow.*  
—Thomas Stearns Eliot

## Multimedia: Applets and Applications

### Objectives

In this Chapter you'll learn:

- How to get, display and scale images.
- How to create animations from sequences of images.
- How to create image maps.
- How to get, play, loop and stop sounds using an `AudioClip`.
- How to play video using interface `Player`.

## Self-Review Exercises

- 24.1** Fill in the blanks in each of the following statements:
- a) Graphics method \_\_\_\_\_ displays an image on an applet.  
ANS: `drawImage`.
  - b) Java provides two mechanisms for playing sounds in an applet—the Applet's `play` method and the `play` method of the \_\_\_\_\_ interface.  
ANS: `AudioClip`.
  - c) A(n) \_\_\_\_\_ is an image that has hot areas that the user can click to accomplish a task such as loading a web page.  
ANS: image map.
  - d) Method \_\_\_\_\_ of class `ImageIcon` displays the `ImageIcon`'s image.  
ANS: `paintIcon`.
  - e) Java supports several image formats, including \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.  
ANS: Graphics Interchange Format (GIF), Joint Photographic Experts Group (JPEG), Portable Network Graphics (PNG).
  - f) The `JNLP` \_\_\_\_\_ class's static `lookup` method obtains a reference to the `FileOpenService`.  
ANS: `ServiceManager`.
- 24.2** Determine whether each of the following statements is *true* or *false*. If *false*, explain why.
- a) A sound is marked for garbage collection after it plays via the `play` method of class `Applet`.  
ANS: True.
  - b) Class `ImageIcon` provides constructors that allow an `ImageIcon` object to be initialized only with an image from the local computer.  
ANS: False. `ImageIcon` can load images from the Internet as well.
  - c) Method `play` of class `AudioClip` continuously loops an audio clip.  
ANS: False. Method `play` of class `AudioClip` plays an audio clip once. Method `loop` of class `AudioClip` continuously loops an audio clip.
  - d) The Java Image I/O API is used for adding 3D graphics to a Java application.  
ANS: False. The Java 3D API is used for creating and modifying 3D graphics. The Java Image I/O API is used for reading from and outputting images to files.
  - e) Applet method `getDocumentBase` returns, as an object of class `URL`, the location on the Internet of the HTML file that invoked the applet.  
ANS: True.
  - f) `FileOpenService` methods `openFileDialog` and `openMultiFileDialog` return a `FileContents` object and an array of `FileContents` objects, respectively.  
ANS: True.

## Exercises

**NOTE:** Solutions to the programming exercises are located in the **ch24solutions** folder. Each exercise has its own folder named **ex24\_##** where **##** is a two-digit number representing the exercise number. For example, exercise 24.10's solution is located in the folder **ex24\_10**.

- 24.3** Describe how to make an animation "browser friendly."
- ANS: Begin the animation with the `start` method of class `Timer` and suspend/terminate the animation in the `stop` method of class `Timer`. The animation should stop when the user switches web pages. If the user returns to the web page with the animation, the animation should be restarted.

**24.4** Describe the Java methods for playing and manipulating audio clips.

**ANS:** Class `Applet` method `play` and the `AudioClip` interface method `play` both load the sound and play it once. `AudioClip` method `loop` continuously loops the audio clip in the background. `AudioClip` method `stop` terminates an audio clip that is currently playing.

**24.5** Explain how image maps are used. List several examples of their use.

**ANS:** Image maps are used to create interactive web pages that: a) load different web pages based on user choice, b) show descriptive messages for images within the image maps, c) define regions for an image, when the mouse enters the image region, display the image, d) when the mouse clicks an image region, link the user to the URL associated with the image.

