# Creating Graphics and Sound

Games require graphics and sound effects, but this book is more focused on programming than the details of media production. If you're not comfortable creating graphics and audio on your own, here's some step-by-step instructions for creating the media needed in the Mail Pilot game in Chapter 7.

Using GIMP Tools

GIMP has a number of tools common to high-end graphics editors. Figure D-1 shows the primary tools of GIMP. Different versions have slight differences in appearance, but the basic tools look the same.
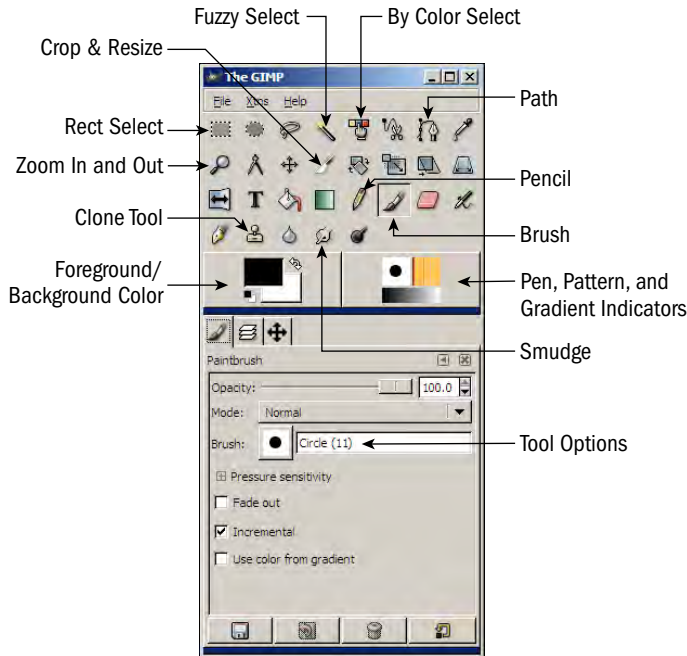
Figure D-1: The primary tools of GIMP.

- **Rect Select:** Select a rectangular region.

- **Fuzzy Select:** Select a contiguous region of the same color.

- **Zoom In and Out:** View details or overall view.

- **Crop & Resize:** Discard all of the image except a specific rectangle, or resize the entire image.

- **Clone Tool:** Duplicate specific pixels for touch-up.

- **Foreground/Background Color:** Double-click to select color.

- **By Color Select:** Pick selected/similar color throughout layer.

- **Path:** Select using Bezier paths (control point curves).

- **Pencil:** Draw hard lines (no anti-alias).

- **Brush:** Draw soft lines (with anti-alias).

- **Smudge:** Move pixels in the immediate vicinity.

- **Pen, Pattern, and Gradient Indicators:** Show the current status of these drawing and filling instruments. Double-click to open a dialog.

- **Tool Options:** The leftmost tab always shows options of currently selected tool. Other dialogs can be docked into this display for convenience.

Experimentation and the excellent online help at `http://docs.gimp.org` should help you figure out how to use GIMP well enough to get started. If you want to learn more, check out the excellent free online book *Grokking the Gimp* at `http://gimp-savvy.com/BOOK/index.html`.

Creating the Airplane Sprite

The primary figure in Chapter 7 is an airplane modified from an existing bitmap. The new image isolates a smaller part of the original image and adds transparency.

Here's how you use GIMP to create a plane sprite from the *1945* bitmap:

1. **Install GIMP if necessary.**

   Linux machines usually already have the GIMP installed, but you'll probably have to install it on your Windows or Mac machine. You may also have to install the GTK toolkit, which is also free and included on this book's Web site.

2. **Open the `1945.bmp` file from the `shooter` directory of the `SpriteLib` package.**

   Use File ➜ Open to open the file in GIMP.

3. **Use the Crop tool to select only the piece you need.**

   Use the zoom in/out tool to view a particular part of the image. Figure D-2 shows how to use the crop tool to select a smaller part of the image.

   ### Watch Your Step

   When cropping an image to use as a sprite, try to crop as closely to the actual image as you can. Having an image that's larger than necessary will cause you problems later when you're doing collision detection. Also, because everything but the main subject of the image is usually transparent, you don't want to take up a lot of file space for pixels you won't be displaying.

4. **Add transparency to the new image.**
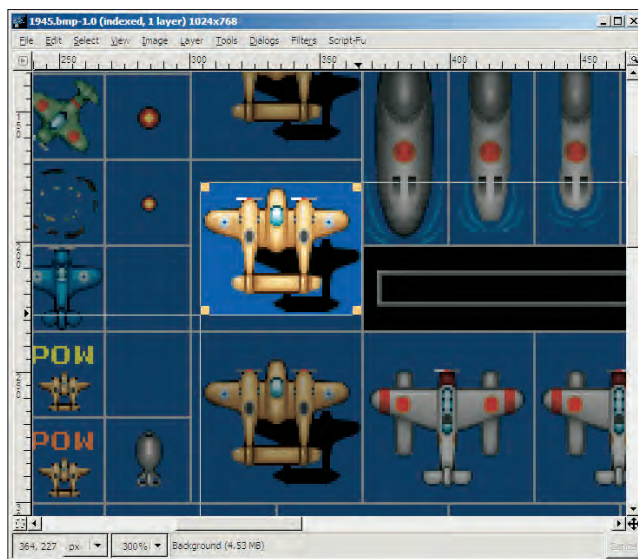
Figure D-2: Crop away everything but a rectangle containing the piece you need.

In the Image window, use the menu system to select Layer ➜ Transparency ➜ Add ➜ Alpha Channel. (*Alpha channel* is a fancy term for allowing transparency.)

Information Kiosk

An *alpha channel* is one way to manage transparency in computer graphics. Truthfully, I won't use the alpha channel here for long. I'm just telling GIMP that I want to allow transparency here, because the format of the image I loaded (BMP) doesn't normally handle transparency.

5. **Use the By Color Select tool to select the blue color of the original image's background.**

The original image has a blue background, but I'm going to eventually add a more interesting ocean background, so I need to change the blue to transparent so the plane won't appear to be flying in a blue box.

6. **Delete the original blue background.**

Use Ctrl+X to delete the blue area you just selected. Now the plane should show a checkerboard background indicating transparency, like Figure D-3.

7. **Save the image as `plane.gif`.**

Pygame can read plenty of image formats, but the GIF format has a terrific advantage: It can handle basic transparency automatically. Use the File ➜ Save As command to save the file. Name it **plane.gif**, and save it in the same directory as your game. Select the default option in all the dialogs that come up.

Figure D-3: The cropped plane image with its transparent background ready to be saved.

Building the Cloud Graphic

The Mail Pilot game requires a cloud graphic. You might be able to find a cloud image that suits your needs, but it won't be easy. Fortunately, modern graphics tools (such as GIMP) come with some great features for building something that will work. Here's what you do:

1. **Create an image of suitable size.**

   I started out at 300×200 and then cropped the image closer at the end of the process. Remember, smaller images are harder to hit and easier to avoid. Since the cloud is an enemy in this game, a smaller image size will lead to an easier game, and a larger image will make the game harder.

2. **Draw an outline.**

   Use the pencil or brush drawing tool to make a lumpy cloud outline.

3. Select the interior of the cloud.

The "Fuzzy Select" chooses contiguous regions. Use it to select the center of the cloud.

4. Choose the gradient tool.

A *gradient* is a smooth transition between colors. The gradient tool in GIMP looks like a green square fading to white.

5. Choose gray values for foreground and background color.

The two color squares on the GIMP's main window refer to foreground and background color. Double-click each to set the color. Set the foreground to a light gray, and the background to a darker gray. The darker you make your colors, the more menacing the clouds appear.

6. Select a shaped spherical gradient.

Double-click the gradient tool to get a series of options. There is a drop-down box with various shape options. Choose Shaped (spherical) from this list.

7. Apply the gradient to the selected area.

Drag anywhere inside the selection to create the gradient fill.

8. Add transparency to the image.

Choose Layer ➜ Transparency ➜ Add Alpha Channel to add transparency to your image.

9. Remove the background.

Use the "Fuzzy Select" tool to remove the background and border. You should now have a cloud on a transparent background.

10. Crop the image as close as you can.

Make the image around the cloud as small as you can so you don't have a lot of empty space there to disturb the illusion.

11. Save the cloud as a GIF image.

Save it as a GIF with transparency, in the same directory as your game.

Step Into the Real World

I gave instructions here using the GIMP, because it's my favorite graphics editor, it's free, and I can give you a copy. If you want to use some other tool, of course you should feel free to do so. Any high-end graphics program will have the same general tools that I describe in the GIMP, although they will have different names. You also don't have to use the techniques I describe here. It's your game. Make clouds. If you know a better way, go for it. If not, start with the method I describe and make your own improvements on down the road.

Building a Scrolling Background Graphic

Chapter 7 includes a scrolling background that gives the illusion of water. Recall from the chapter that this type of graphic requires the same image at the top and bottom of a large image, and that no seams should be apparent on the large graphic.

Information Kiosk

The water graphic I'm showing you now is based on a simple and effective tutorial for making a random water texture — which I found on the GIMP Talk forum (www.gimptalk.com). Of course, you can use my image if you want, or you can use another editor. Most high-end graphics tools have the same capabilities but might name things differently.

Here's one easy way to build the ocean graphic using the GIMP:

1. Create a new image.

This image should be 640 pixels wide by 1440 pixels tall (three times as tall as the intended game.)

2. Use the Lava script built into GIMP.

GIMP has a scripting language called "Script-Fu" (I love these guys). A special script called "Lava" comes with most versions of the GIMP. From the menu system, use Script-Fu ➜ Render ➜ Lava to find it.

3. Change the gradient.

A dialog appears. Click Gradient to pick a new color scheme. Find a gradient with blues and greens on it. (Hint: If you want to see how various gradients will work, experiment with a smaller image before working on this large surface.)

**4. Run the script by clicking OK.**

It will take a few moments, but eventually you'll see the image.

5. Copy the top and set its size to 640 by 480 pixels.

Use the rectangular selection tool to select the top section of the picture. Make sure your selection is 640×480 pixels.

6. Paste the copy to the bottom of the image.

Paste the section you just copied — carefully — onto the bottom of the image. When this step is complete, the bottom and top of the image will look exactly the same, but there will be an obvious seam two-thirds of the way down the image (as shown in Figure D-4).
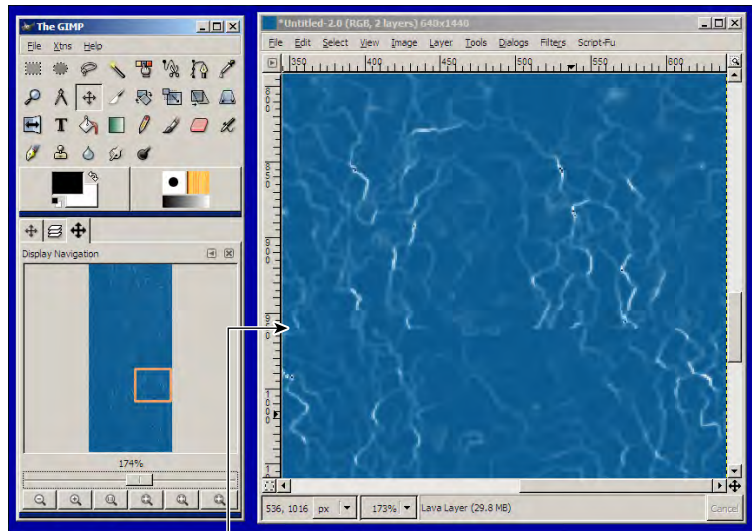
The seam

Figure D-4: After you copy the top, there is a seam.

Watch Your Step

To complete pasting in GIMP, you have to click once *outside* the selected area. This click "nails down" your selection into its final place.

7. **Blur the seam.**

You don't want the user to see the seam. To make it less obvious, zoom in and use the Smudge tool (shown in Figure D-4) to make the seam less noticeable.

8. **Save the image in the same directory as your game file.**

Step Into the Real World

This particular pattern can be made seamless with the Smudge tool, but some patterns (especially sharper ones) require other techniques. The Clone Brush can be handy in these situations. Look it up in GIMP's online help if you need it.

Creating Basic Audio Files

It's also easy to create sound effects using free tools. I created most of the sound effects for the games in this book using Audacity. Here's how I made the "yay" and thunderclap sound effects for Mail Pilot:

1. **Open Audacity or whatever audio recording tool you prefer.**

Make sure you have a microphone plugged in and turned on.

Watch Your Step

You might need to adjust your computer's audio settings, especially if you don't use the microphone much. Double-click the Volume icon, which normally appears in the lower-right icon tray in Windows XP, to open the Volume Control window. Be sure your microphone is not set to Mute.

2. **Click the Record button (the red circle) in the Audacity window and record your sound effect.**

Simply speak or make your sound effect into the microphone. A waveform will appear as you create the sound. Click the Stop button (two blue parallel lines) when you're finished.

3. **Test the sound (by clicking the Play button).**

Make sure it sounds right. It may be easier to start over than to edit a sound that has a lot of problems.

Watch Your Step

Make sure you don't have too much blank space at the beginning or end of a sound effect; this can throw off your timing, and the sound effect should happen exactly when you want it to. You can select a portion of your recording in Audacity and trim off everything but the selected portion.

4. **Modify the sound as needed.**

Use the various effect tools to change your sounds. Experiment! Try adding an echo or reverse effect. Use the Undo command (Ctrl+Z) if you make a mistake.

5. Normalize the sound.

The default volume of a recorded sound is not predictable. Highlight your sound and use the Normalize option (choose Effect ➜ Normalize) to force the sound to a predictable maximum level. You can make fine adjustments in your game, but if you normalize all sound effects in your audio editor, they'll be at approximately the right level.

6. Export in Ogg Vorbis format.

Pygame works best with the Ogg Vorbis format, which is built into Audacity. The default settings should be fine for your use.

Building Looping Sound Effects

The engine sound is a little different from the other effects in Mail Pilot because it is meant to repeat and is in stereo. There are many ways to make this type of sound, but here's how I did it in Audacity:

1. Record a humming noise.

I started by recording my own humming into the microphone. Figure D-5 shows the wave form of the basic sound effect.

2. Trim off the beginning and end of the sound file.

Most of the sound is relatively uniform, but (as with most natural sounds) the volume starts soft, builds up to a stable volume, and trails off at the end. Since I'm going to repeat this sound indefinitely, I'll trim off the beginning and the end so the whole effect looks like Figure D-6. To trim a part of the sound, simply select the part you want to remove and press the Cut icon (it looks like scissors).
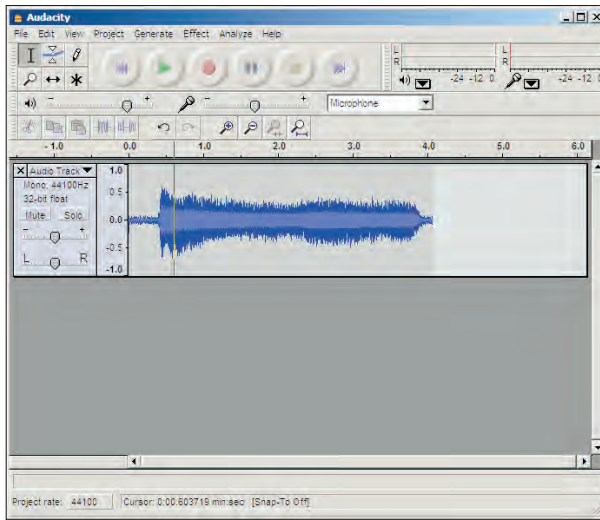
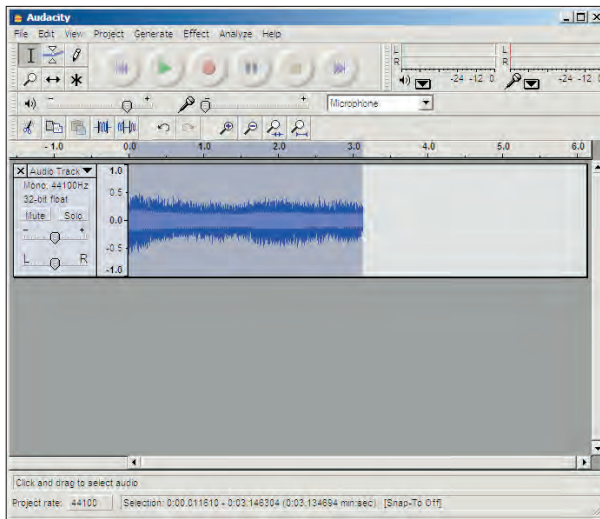**Figure D-5:** The engine sound right after recording.

**Figure D-6:** Now I've trimmed off the beginning and end.

Information Kiosk

You don't need much audio. A second or two should be plenty. This is supposed to be a repetitive background sound, so don't make it too long, or your game file will be larger than necessary.

3. Duplicate the track.

Select the track and choose Edit ➜ Duplicate from the menu bar. You'll now have two identical tracks, as illustrated in Figure D-7.
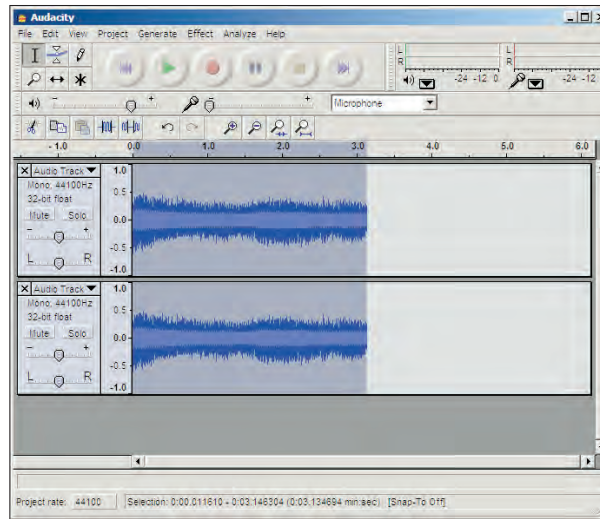
Figure D-7: The beginning of a stereo effect.

4. Reverse the second track.

I want the sounds to be subtly different in the left and right ear. There are lots of ways to do this, but I'm going to reverse one of the tracks. Select a track, and choose Effects ➜ Reverse.

5. Assign each track to one ear.

The slider in each track's information panel allows you to adjust whether it is heard in the left or right ear. Adjust your sound to resemble Figure D-8, so one track is heard in the left ear and the other in the right.

6. Test in loop mode.

Hold the Shift key down as you press the Play button (the one with a single triangle) to hear how your recording will sound when it loops.

7. Normalize the sound effect.

Select both tracks and use the Normalize effect to set a default starting volume for the engine sound.

8. Save the file in the Ogg Vorbis format.

When you save your file to the Ogg Vorbis format, the two tracks will be combined into one file.
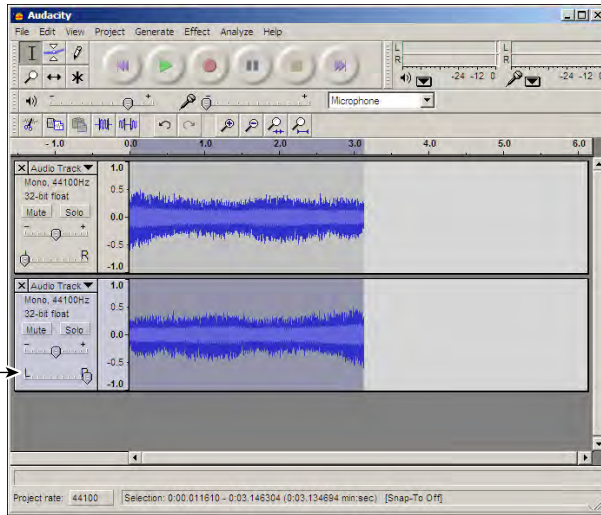
Use this slider to control which speaker you'll hear the audio on.

Figure D-8: The first track is played in the left ear and the second in the right