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**Michael Rohde**

*Web development professional and writer*



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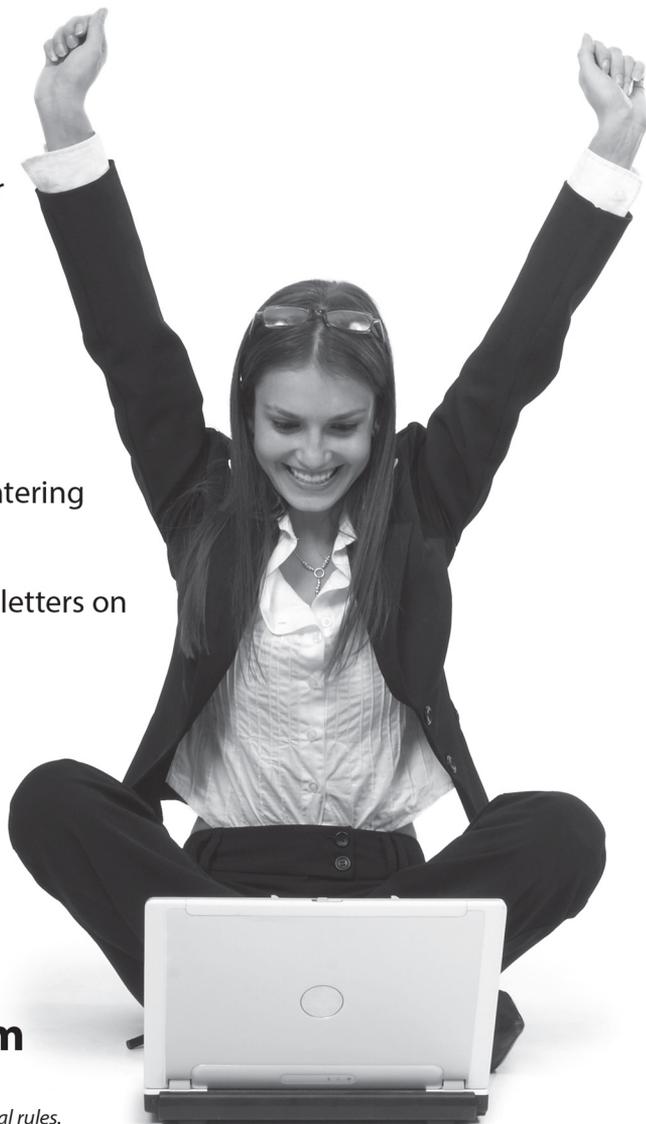
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# ***GameMaker: Studio***

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**by Michael Rohde**

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**GameMaker: Studio For Dummies®**

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# Introduction

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**M**y interest in GameMaker: Studio started in the summer of 2013. I was scrolling through Twitter when a buddy of mine mentioned using GameMaker to make a game. So, of course, I had to check it out. I was immediately hooked on the idea of creating games without needing to know how to code. I read through some of the tutorials and got a couple of basic games to work, and soon enough I found myself coding. From there, it was only a matter of time before I realized that I wanted to write a book on GameMaker: Studio.

I hope you're as excited as I am about creating video games. This book provides a ton of procedures on how to do everything from creating basic movements to creating some very special effects. I also provide overview concepts on how different parts of the game fit together. My hope is that you take the concepts you learn here and apply them to your own game. Who knows? Maybe one day we'll be playing each other's games on our favorite consoles and devices.

## About This Book

This book shows you how to make video games, quickly and easily. You make games geared toward PC and mobile devices with the possibility of expanding to consoles. You create different effects that you can apply to your own games. You find out all about Events and Actions and Sprites and Objects and Instances and Scripts and Rooms and Targets. . . . I could go on and on. There is an absolute ton of information packed into these pages.

If you enjoy reading through tutorials, written in a clear manner, full of details, you'll appreciate *GameMaker: Studio For Dummies*. Much of the material I present here is stuff I learned from the GameMaker tutorials. But it was slow and hard going and I made a ton of mistakes. That's where this book comes in to play: I'm sharing with you the secrets and details necessary to make the tutorials work, so that you can use them on your own games.

*GameMaker: Studio For Dummies* is modular — you don't have to read straight through the book from Chapter 1 to the end. You can skip around and read the sections you're most interested in. I include plenty of cross-references, so you won't feel lost. I explain concepts a couple times in a couple different ways. That way, you can apply lessons learned in different situations. That should provide a solid foundation from which you can use GameMaker: Studio.

## Foolish Assumptions

In writing this book, I made a few assumptions about you as the reader:

- ✔ You've probably been playing video games your entire life and now you want to make games. You want to make shooters, roguelike, and scrolling platform games.
- ✔ You want to play games on your iOS and Android devices.
- ✔ You may be envisioning getting your own Sony Developers License so that you can make games for the PS4 and Vita using GameMaker: Studio. Before you hit the big time, you need to start off slow, and that's why you most likely already downloaded the free version of GameMaker, if not the paid edition.
- ✔ You may or may not know the first thing about code, but if you do, you're one step ahead of the game. If you don't know how to code, you want to learn.
- ✔ You've already gone through some of the in-software tutorials. The first couple of tutorials were easy enough, but when you tried some of the more complex tutorials, well, that's when things got messy fast. At least, that's what happened to me. And that's why I wrote this book. Much of this book has you opening the in-software tutorial files, but I provide you the missing information, the step-by-step instructions that you want and deserve.

Basically, I'm envisioning you to be a go-getter who's ready to make and play some games.

## Icons Used in This Book

I use several icons throughout this book to help you understand GameMaker: Studio. The following is an explanation of each of the icons.



Whenever I provide information that'll help you do something easier, faster, or better, I mark it with the Tip icon.



I still want to write a *For Dummies* book in which I can write a warning as to when pirates are about to attack, but that hasn't happened yet. Instead, anything marked with the Warning icon has to do with your game crashing — as in, make sure to do or not to do something, so that your game doesn't crash.



Whenever I remind you of something that I've already covered elsewhere, or tell you about something you should commit to memory, I mark it with the Remember icon.



The Technical Stuff icon mainly refers to details on code. You can skip anything marked with this icon, but I hope you read this stuff because it can help you grow as a developer.

## Beyond This Book

In addition to the material in the print or e-book you're reading right now, this product also comes with some access-anywhere goodies on the web. Check out the free Cheat Sheet at [www.dummies.com/cheatsheet/gamemakerstudio](http://www.dummies.com/cheatsheet/gamemakerstudio) for helpful information, all provided in a concise, quick-access format. You can also find articles online that build on the material you find in this book. Go to [www.dummies.com/extras/gamemakerstudio](http://www.dummies.com/extras/gamemakerstudio) for these informative articles.

I could have written a 700-page book to cover everything that you can do with GameMaker: Studio. In fact, I've written several extra tutorials, which you can find at [www.gamemaker-tutorials.com](http://www.gamemaker-tutorials.com).

On the YoYo Games website (<http://www.yoyogames.com>), you can find developer resources, support, and forums where you can ask and answer questions. You can also find a showcase of games that people have made using GameMaker. There's a lot of cool stuff there — I recommend that you check it out if you haven't already.

## Where to Go from Here

Like all authors, I would love it if you read this book from cover to cover, writing notes in the margins, highlighting passages, and dog-earring pages for quick reference later. Alas, you probably just want to know how to add virtual keys for mobile devices (see Chapter 13), or how to make an explosion look really cool (see Chapters 8 and 9). In that case, you can jump to those chapters. But if you get lost, you can start from the beginning to get the core concepts of what it takes to make a GameMaker game.

You may be tempted to skip Chapter 1, thinking it's all fluff, but it's not. In Chapter 1, I provide a procedure on how to choose a Target for a game. That's very important information, especially if you want to play your game in a browser and not on Windows.

See how I did that? I included a reference in the Intro, to get you reading Chapter 1, and now you've taken the next step to create, publish, and play your video games.

## Part I

# Getting Started with GameMaker: Studio

getting started  
with

**GameMaker:  
Studio**



*For Dummies* can help you get started with lots of subjects. Visit [www.dummies.com](http://www.dummies.com) to learn more and do more with *For Dummies*.

## *In this part . . .*

- ✓ Get to know GameMaker: Studio.
- ✓ See how Sounds, Sprites, Objects, and Rooms work together.

# Introducing GameMaker: Studio

## *In This Chapter*

- ▶ Coding without coding using Actions
- ▶ Coding by coding with GameMaker Language
- ▶ Getting your game into players' hands
- ▶ Identifying the major features of GameMaker: Studio
- ▶ Looking at the main steps of creating a game

**G**ameMaker: Studio software, from YoYo Games, is a game development tool that enables you to make video games. At the Game Developers Conference (GDC), I had an opportunity to meet with key players from YoYo Games. I saw firsthand the level of excitement this team from Dundee, Scotland has. It's as if each of them embodied the spirit of a magical dragon, circling high overhead a misty mountaintop, ready to breathe down green flames of magical energy to level up all game developers with enhanced game-making attributes.

All game developers can benefit from GameMaker: Studio. Whether you're a professional developer looking to enter the videogame community, or a university student interested in breaking into the videogame field, or a 10-year-old with no coding experience at all, GameMaker: Studio has the tools you need to make your vision a reality.

## *Dragging and Dropping Your Way to Making a Game*

You can make games with GameMaker: Studio without knowing code! That's because GameMaker uses the drag-and-drop Actions (see Chapter 4). You use Actions to tell GameMaker how, what, when, and where you want something to happen during your game. When you create an Action, GameMaker creates the code for you in the background. For example, say you create an Action

so that when the player presses the spacebar, she shoots bullets from her plane. When you make that Action, GameMaker creates the code that causes the plane to shoot a bullet when the player presses the spacebar. In that way, using the drag-and-drop Actions enables the non-developer to develop code.

The drag-and-drop Actions are also good for developers who *do* know how to code but want a quick and efficient way to write large blocks of code. For example, a developer could sit down and write out the code by hand, which can be timely and can lead to typos and errors. Or, she can use the drag-and-drop Actions to create those same blocks of code, which can take seconds instead of hours.

## Looking to the future

When I met with members of the YoYo team during GDC, I walked away with the feeling that this is a team with a dream. While I spoke to them, in the background, they had a PS4 setup running games made with GameMaker. They were telling me that it's only a matter of time before everyone with a PS4 will be able to purchase and download those games. These are exciting times when a person with a Sony developers license can make her own games, whether it be from the office or the kitchen table, and then play it on a major console.

YoYo Games sees a day when any self-starter, of any age, can make a game with GameMaker: Studio, play it on his Nintendo 3DS, show it to his friends, and then possibly put it up for sale on the eShop. This is the direction we, as a gaming community, are headed: Independent developers have a spotlight shining on them, and it's time to show the world what you can do.

As you start to think about your own possibilities for making games, keep these words of inspiration fresh in your mind:

- ✔ Start with the free version of GameMaker: Studio, and then keep growing and adding on as you make your way to becoming a professional.

- ✔ Hard work is what it's all about — you'll get out of it what you put into it.
- ✔ Include your own special touch in each of your games to make them unique and special.
- ✔ You can work your way up in the game development industry. Start out as a tester and then climb the ladder to becoming a developer.
- ✔ You don't have to join a big company anymore to make a living making games. You just need the passion and desire to make the best game you can. The exploding indie scene opens game development up to everyone.

YoYo Games is looking forward to seeing the games you make so it can feature them on [www.yoyogames.com](http://www.yoyogames.com). The YoYo Games website has a Showcase of games, along with YoYo Labs, where you can find open-source games. It also has a lively community in the forums and Help pages. Who knows? One day you might even see your game available for sale on your favorite console or handheld device!

## Understanding the GameMaker Language

The drag-and-drop Actions provide a quick and easy way to create code. But you should start your game-making adventure with an open mind for learning how to code because, ultimately, it will benefit you and your games. Plus, by learning code, you gain a better appreciation for how the Actions work.

I'm not a developer, but I'm familiar enough with code that I can tweak existing code. Having this level of familiarity with how code works give you some background knowledge on what you're doing when you drag and drop an Action.



If you're a professional developer, and you want to write specific code for your own specific means, then GameMaker: Studio features a code-editing tool that most professional game developers should appreciate. Part IV of this book dives into the GameMaker language — it's filled with example code, including working with physics and controls for mobile devices. Chapter 14 includes sample code for saving game configurations such as muting the sound or customizing the game keys.

## Publishing Games to Different Platforms

As of this writing, you can install GameMaker: Studio on a PC or on a Mac with a Windows emulator, but that doesn't mean you're stuck making only games for Windows. Oh no, my friends, that's far from the truth. When you're ready to invest in the Professional or Master Collection version of GameMaker: Studio, you open yourself up to a world of platforms on which you can publish your game.

Figure 1-1 shows the drop-down list showing the different platforms to which you can target your game.

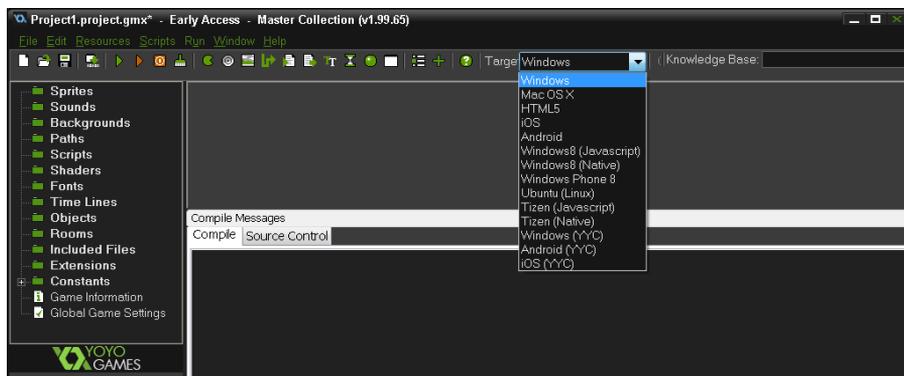


Figure 1-1: You have lots of options for where to publish your game.



If you don't see your favorite platform on this list, it's probably just a matter of time before it appears.

If you're wondering why you don't see PS4 or Vita in Figure 1-1, that's because you need to be a licensed Sony developer for that option to appear.

To publish a game to a specific platform, follow these steps:

**1. From the icon menu, click the Target drop-down list (refer to Figure 1-1).**

The Target options appear.

**2. Choose the platform you want to play your game on (for example, HTML5, if you want to be able to play it in a browser, such as Chrome or Firefox).**

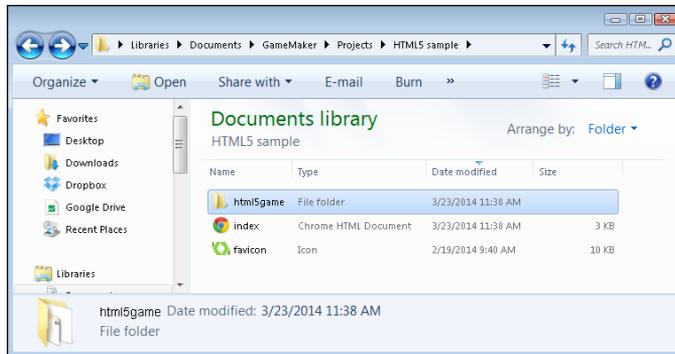
The chosen platform appears in the Target field.

**3. Choose File → Create Application.**

A navigation window opens, allowing you to choose where to save the files. GameMaker names the file for you.

**4. Navigate to where you want to save the files, and then click Save.**

GameMaker saves the appropriate files for the platform you chose, as shown in Figure 1-2.



**Figure 1-2:** The saved game folder structure and files for HTML5 games.

Now you can take these saved games files and folders and use them to upload to a website, which is great for HTML5 games. I use FTP software such as FileZilla (<https://filezilla-project.org>) to do that.



You can update the favicon file to your own icon. The favicon icon appears in the tabs of most web browsers.

## Highlighting the Key Features of GameMaker: Studio

GameMaker: Studio is so feature-rich, with such a multitude of tools, that I could write ten books on the subject! This book is excellent for those who want to learn what an Object is, and how Objects relate to Instances, and how you can assign Events and Actions to Objects to make them do things, like create a flower blossoming into a beautiful display of color, and then have the player blow it all up. You know, fun stuff like that. Objects and Actions are covered in detail in Chapters 3 and 4, respectively.

The interface for GameMaker: Studio is based on a series of windows. When you first open the software, you see a New Project window, from which you can do several things, such as open a tutorial, a demo, or a saved project, or start an entirely new project. When you start working on a project, the main window appears with a Resource tree, main menu, icon menu, and compile window. (I go into detail on each of these in Chapter 2.)

Another critical feature of GameMaker: Studio is the robust coding window, complete with color coding to highlight text. I discuss this in detail in Chapter 11. YoYo Games is planning an upgrade to this code window so that it supports tabs. This feature is not available as of this writing, but it should be out by the time you're reading this book.

## Creating a Game, Step by Step

The steps I take to create a game are the same approach I use for most any creative project. First, you have to plan. Then you have to plan some more.

Here's a quick list of action items I take before creating a game:

- 1. Create an outline of the game, complete with objectives, characters, and game type.**

- 2. Think about how each level of the game will play.**

Too often, developers create an awesome first and second level, only to run out of ideas for consecutive levels.

- 3. Gather your assets, including images for Sprites, text, and any other resources you need for your game, such as music and sound effects.**

- 4. As you create your game based on your outline, start testing each new aspect.**

- 5. Test the game some more.**

- 6. Finally, test your game.**

Seriously. You can't test enough.



# Discovering GameMaker: Studio Features and Tools

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## *In This Chapter*

- ▶ Getting acquainted with the interface
  - ▶ Adding Sounds to your game
  - ▶ Making things pretty with Sprites
  - ▶ Bringing your game to life with Objects
  - ▶ Putting your Objects in Rooms
- 

In this chapter, I provide a broad overview of some of the most used features and tools of GameMaker. That includes the interface, Sounds, Sprites, Objects, Actions, and Events. I go into much more detail on Actions and Events in the following chapters, but here I show you how to get started with creating and loading Sprites, adding music as a resource, and creating an Object that you can place in a Room. Buckle up, folks — this ride is about to start!

## *Navigating the GameMaker Interface*

The basic work area within GameMaker consists of several sections. These sections are laid out in an organized manner to form the interface from which you work. You see a main menu along the top and an icon menu directly below that; these two menus provide separate ways of, say, creating a Sprite, loading a Sound, creating an Object, and so on. The icon menu is where you can find the Target drop-down list, which is where you tell GameMaker which platform you want to publish to, such as HTML5, Android, iOS, and so on (see Figure 2-1).

Along the left pane, you can find the Resource tree, which contains a quick list of resources, including Sprites, Sounds, Backgrounds, Objects, Rooms, and more. The bottom pane consists of a Compile window, which blasts into

life when you run the game (meaning, when you run the game, you can watch GameMaker compile the game through a series of lines of text).



I tend to keep the Compile window closed while I'm working just to save screen space; however, if you have a large screen, you may find it useful when debugging and setting up extra Target modules, such as Android.

If you're working from a tutorial, in the right pane you see the tutorial window. Figure 2-1 highlights the various parts of the interface.

When you create a new Object, or a Sprite, or a Room, or what have you, a new floating window appears. This floating window could contain several tabs of configurations, or it could have radio buttons, text fields, drop-down icons, drag-and-drop icons, and more. It's within these floating windows where you do the majority of your work.

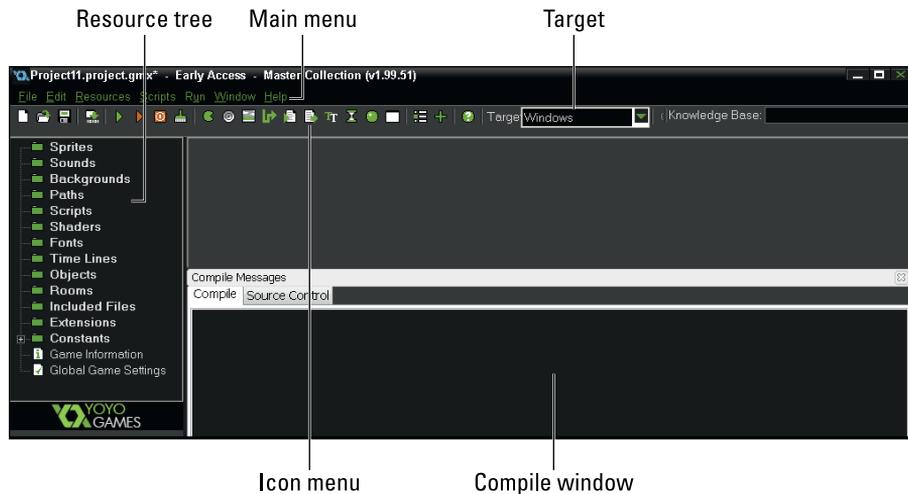


Figure 2-1: The GameMaker interface.

## Pump Up the Volume: Adding Sounds to Your Game

Sounds make up a large part of games these days. Everything from moody background music that builds as the player anticipates a challenging boss battle, to explosions, bullets firing, a character jumping (sproing!), and more.

To add a Sound resource to GameMaker, follow these steps:

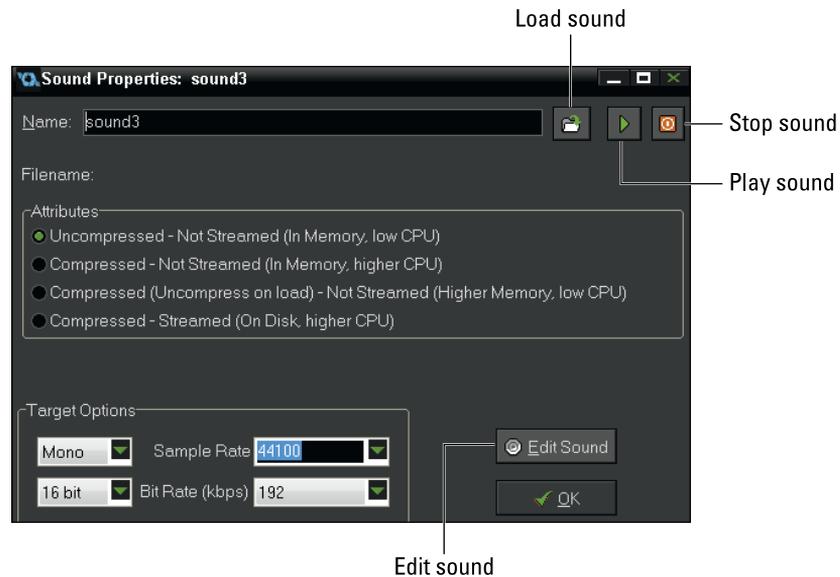
1. **Choose the icon that looks like an old-fashioned stereo speaker (see Figure 2-2).**

The Sound Properties window opens.



**Figure 2-2:** Click this icon to create a new Sound.

2. **To load a sound, click the Load Sound button (see Figure 2-3).**



**Figure 2-3:** The Sound Properties window.

3. **Navigate to a sound file that you previously saved on your PC.**
4. **To play and stop the Sound, click the Play and Stop buttons (refer to Figure 2-3).**

You hear the Sound when you click Play and it continues to play until you click the Stop button.

5. You can edit the Sound by clicking the Edit Sound button (refer to Figure 2-3).

You need to configure an external sound editor to work with GameMaker in order to edit a Sound. Read on for instructions on how to do this.

6. Click OK to save and close the Sound Properties window.

You can configure external editors to work within GameMaker. This includes sound editors, image editors, and code editors. To configure an external editor to work in GameMaker, follow these steps:

1. From the main menu, choose File⇨Preferences.

The Preferences window appears.

2. Click the Editors tab (shown in Figure 2-4).

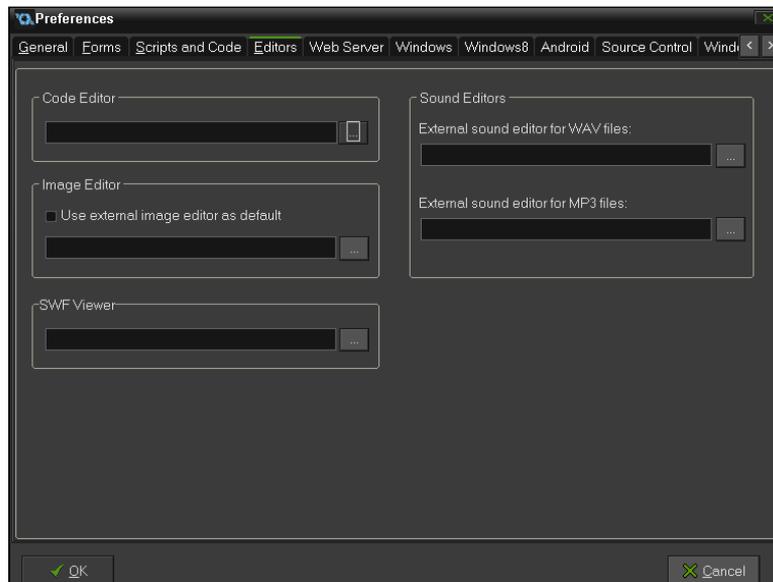


Figure 2-4: The Editors tab of the Preferences dialog box.

3. Click the Open (...) button for the type of editor that you want to configure to work with GameMaker.

Your options are Code Editor, Image Editor, SWF Viewer, and Sound Editors (for WAV files or MP3 files).

A navigation window opens from which you can navigate to and select the editor you want on your PC.

4. Click OK to save and close the Preferences window.

## Making Things Sparkle with Sprites

A Sprite is an image, or a series of sub-images, that you assign to Objects. You can use Sprites to represent Objects in the game, such as the player (a ship or a character), explosions, walls, score displays, or anything you want in your game.

When a Sprite consists of a series of images, those images are known as *sub-images*, and they play continuously, as if they were mini-movies. That can give the appearance of a plane's propellers rotating, an animated explosion, and so forth. Each sub-image within a Sprite is named consecutively (image 0, image 1, image 2, and so on), as shown in Figure 2-5.

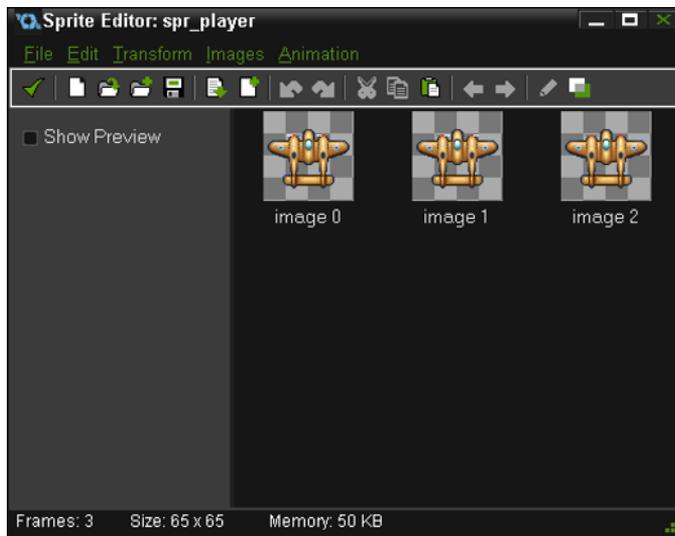


Figure 2-5: The Sprite Editor showing sub-images.



Just as in programming, which starts counting at 0, the sub-image numbering starts at 0 as well.



If you don't want the Sprite to play continuously, you can tell GameMaker to display a specific sub-image of your choice. You can even tell GameMaker to choose a sub-image at random (see Chapter 11).

The remainder of this section covers

- ✓ **Loading and creating Sprites:** You can do this a few ways, including using the main menu, the icon menu, or the Resource tree.
- ✓ **Editing Sprites:** You can do everything from adding the final detail to an already loaded Sprite to creating a new Sprite from scratch.

- ✓ **Configuring Sprites:** Sprites have their own properties, which you can set to affect their behavior during a game.

## Loading and creating Sprites

To load a Sprite that already exists, follow these steps:

1. Click the icon that looks like Pac-Man from the icon menu (see Figure 2-6).



Figure 2-6: Click this icon to create a new Sprite.

The Sprite Properties window appears (see Figure 2-7).

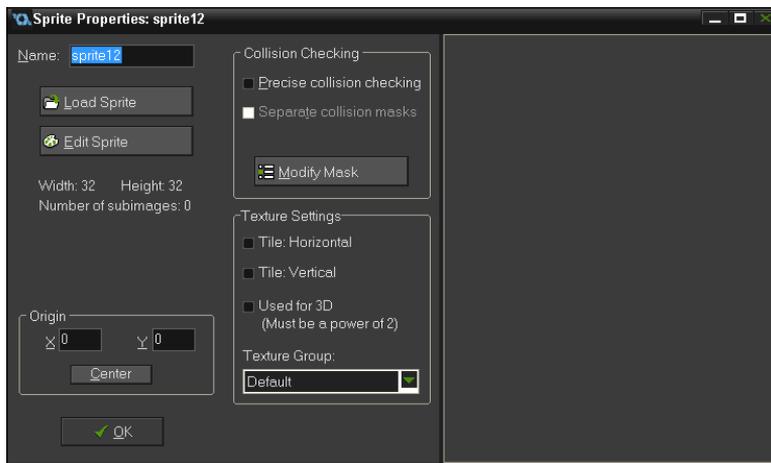


Figure 2-7: The Sprite Properties window.

2. Click the **Load Sprite** button (refer to Figure 2-7).

A navigation menu opens from which you can find an image on your computer.