Learn to:

- Create realistic animations with this free, open source software
- Build 3D objects with meshes, curves, and surfaces
- Take advantage of new features, including the incredibly powerful Cycles renderer
# Contents at a Glance

## Introduction ................................................................................................. 1

## Part I: Getting Started with Blender ............................................................. 7

- Chapter 1: Discovering Blender .................................................................... 9
- Chapter 2: Understanding How Blender Thinks .............................................. 27
- Chapter 3: Getting Your Hands Dirty Working in Blender .......................... 67
- Chapter 4: Working in Edit Mode and Object Mode ................................. 81

## Part II: Creating Detailed 3D Scenes.......................................................... 111

- Chapter 5: Creating Anything You Can Imagine with Meshes .................. 113
- Chapter 6: Using Blender’s Non-mesh Primitives ........................................ 157
- Chapter 7: Changing That Boring Gray Default Material .......................... 189
- Chapter 8: Giving Models Texture .............................................................. 221
- Chapter 9: Lighting and Environment ....................................................... 261

## Part III: Get Animated ................................................................................. 299

- Chapter 10: Animating Objects ................................................................... 301
- Chapter 11: Discovering the Tools Used in Rigging .................................... 335
- Chapter 12: Animating Object Deformations .............................................. 359
- Chapter 13: Letting Blender Do the Work for You ...................................... 377

## Part IV: Sharing Your Work with the World ................................................. 409

- Chapter 14: Exporting and Rendering Scenes ............................................ 411
- Chapter 15: Compositing and Editing ......................................................... 423

## Part V: The Part of Tens ............................................................................ 455

- Chapter 16: Ten Problems (and Solutions) for Newbies ......................... 457
- Chapter 17: Ten Tips for Working More Effectively in Blender .............. 467
- Chapter 18: Ten Excellent Community Resources .................................... 475

## Index ............................................................................................................. 481
# Table of Contents

**Introduction** ................................................................. 1
- About This Book ................................................................. 2
- Foolish Assumptions .............................................................. 2
- Icons Used in This Book ......................................................... 3
- Beyond the Book .................................................................. 4
- Where to Go from Here .......................................................... 5

**Part I: Getting Started with Blender** .............................. 7

**Chapter 1: Discovering Blender** ................................. 9
- Getting to Know Blender ........................................................... 10
  - Discovering Blender’s origins and the strength of the Blender community ........................................ 11
  - Making open movies and games ............................................. 12
- Getting to Know the Interface .................................................... 15
  - Working with an interface that stays out of your way ...................... 17
  - Resizing areas ....................................................................... 19
  - Maximizing an area ............................................................... 21
  - The menu that is a pie ............................................................. 22

**Chapter 2: Understanding How Blender Thinks** ............. 27
- Looking at Editor Types ........................................................... 27
  - General editors ..................................................................... 29
  - Animation editors ............................................................... 29
  - 2D editors .............................................................................. 30
  - Utility editors ........................................................................ 31
- Understanding the Properties editor ......................................... 31
- Customizing Blender to Fit You ................................................ 33
  - Using screen layout presets ...................................................... 34
  - Setting user preferences .......................................................... 36
  - Using custom event maps ........................................................ 47
- Navigating in Three Dimensions ............................................... 51
  - Orbiting, panning, and zooming the 3D View ................................ 51
  - Changing views ..................................................................... 52
  - Selecting objects .................................................................... 59
  - Taking advantage of the 3D cursor ............................................. 60
Extra Features in the 3D View .............................................................. 61
  Quad View ....................................................................................... 62
  Regions ............................................................................................ 62
  Don’t know how to do something? Hooray for fully integrated
  search! .............................................................................................. 65

Chapter 3: Getting Your Hands Dirty Working in Blender .......... 67
  Grabbing, Scaling, and Rotating ..................................................... 67
  Differentiating Between Coordinate Systems ............................... 68
  Transforming an Object by Using the 3D Manipulator ............... 71
    Switching manipulator modes ...................................................... 71
    Using the manipulator ................................................................. 72
  Saving Time by Using Hotkeys ..................................................... 75
    Transforming with hotkeys ......................................................... 75
    Hotkeys and coordinate systems .............................................. 76
    Numerical input ................................................................. 78
    The Properties region ............................................................... 79

Chapter 4: Working in Edit Mode and Object Mode .......... 81
  Making Changes by Using Edit Mode .............................................. 81
    Distinguishing between Object mode and Edit mode ............... 82
    Selecting vertices, edges, and faces ......................................... 83
    Working with linked vertices .................................................... 86
    Still Blender’s No. 1 modeling tool: Extrude .............................. 88
  Adding to a Scene .......................................................................... 92
    Adding objects ........................................................................... 92
    Meet Suzanne, the Blender monkey .......................................... 94
    Joining and separating objects ................................................. 95
    Creating duplicates and links .................................................. 96
    Discovering parents, children, and groups .............................. 102
    Saving, opening, and appending .............................................. 107

Part II: Creating Detailed 3D Scenes ................................. 111

Chapter 5: Creating Anything You Can Imagine with Meshes .... 113
  Pushing Vertices ............................................................................ 113
  Working with Loops and Rings ...................................................... 116
    Understanding edge loops and face loops ............................. 116
    Selecting edge rings ................................................................ 118
    Creating new loops ................................................................. 119
    Cutting edges with the Knife ................................................... 119
# Table of Contents

Simplifying Your Life as a Modeler with Modifiers ............................................. 121
  - Doing half the work (and still looking good!) with the Mirror modifier ......................................................... 130
  - Smoothing things out with the Subdivision Surface modifier ............................................................................. 132
  - Using the power of Arrays ...................................................................................................................... 136

Sculpting in Virtual Space.................................................................................... 140
  - Sculpting with the Multiresolution modifier .................................. 140
  - Freeform sculpting with dynamic topology (Dyntopo) ....................................................... 142
  - Sculpting options ............................................................................... 148
  - Understanding the basics of retopology......................................... 155

Chapter 6: Using Blender’s Non-mesh Primitives ............................................. 157
  - Using Curves and Surfaces ......................................................................... 157
  - Understanding the different types of curves ........................................ 160
  - Working with curves............................................................................. 161
  - Understanding the strengths and limitations of Blender’s surfaces ............................................................................. 174
  - Using Metaball Objects ........................................................................... 174
    - Meta-wha? ...................................................................................... 174
    - What metaball objects are useful for .............................................. 178
  - Adding Text ............................................................................................ 179
    - Adding and editing text......................................................................... 179
    - Changing fonts.................................................................................... 183
    - Deforming text with a curve..................................................................... 186
    - Converting to curves and meshes ................................................... 187

Chapter 7: Changing That Boring Gray Default Material ............................ 189
  - Understanding Materials and Render Engines ........................................ 189
    - Quick n’ Dirty Coloring ........................................................................... 192
      - Setting diffuse colors........................................................................... 192
      - Assigning multiple materials to different parts of a mesh ......................................................................... 194
      - Using vertex colors............................................................................ 196
    - Setting Up Node Materials in Cycles ......................................................... 202
      - Adjusting your layout to work with node materials.......................... 203
      - Working with nodes ........................................................................... 204
      - Understanding shaders........................................................................ 204
    - Playing with Materials in Blender Internal ................................................. 209
      - Adjusting shader values....................................................................... 213
      - Reflection and transparency ............................................................. 216
      - Controlling how materials handle shadows...................................... 219
Chapter 8: Giving Models Texture ................................. 221
  Adding Textures .............................................................................................................. 221
  Working with textures in Blender Internal ................................................................. 222
  Including textures on a Cycles material ........................................................................ 223
  Using Procedural Textures .......................................................................................... 224
    Understanding Blender Internal’s procedural ......................................................... 225
    Discovering procedural ......................................................................................... 228
  Understanding Texture Mapping .............................................................................. 230
    Applying textures when using Blender Internal ..................................................... 230
    Mapping textures when using Cycles ...................................................................... 235
  Unwrapping a Mesh .................................................................................................... 241
    Marking seams on a mesh ..................................................................................... 242
    Adding a test grid ..................................................................................................... 244
    Generating and editing UV coordinates ................................................................... 245
  Painting Textures Directly on a Mesh ...................................................................... 247
    Preparing to paint ................................................................................................... 247
    Working in Texture Paint mode ............................................................................. 248
    Saving painted textures and exporting UV layouts .................................................. 250
  Baking Texture Maps from Your Mesh .................................................................... 251
    Discovering texture bake options in BI ................................................................. 253
    Discovering texture bake options in Cycles ......................................................... 253
    Baking textures ........................................................................................................ 254
  Using UV Textures ...................................................................................................... 257

Chapter 9: Lighting and Environment ................................. 261
  Lighting a Scene .......................................................................................................... 261
    Understanding a basic three-point lighting setup .................................................. 262
    Knowing when to use which type of lamp .............................................................. 264
  Lighting for Speedy Renders .................................................................................... 280
    Working with three-point lighting in Blender ....................................................... 282
    Creating a fake Area light with buffered Spots ..................................................... 283
    Dealing with outdoor lighting .................................................................................. 285
  Setting Up the World ................................................................................................. 286
    Changing the sky to something other than dull gray ............................................. 287
    Modifying the World in Cycles ............................................................................. 289
    Creating sky textures in BI .................................................................................... 291
    Understanding ambient occlusion ......................................................................... 292
    Adding mist in BI ..................................................................................................... 296
# Part III: Get Animated

> Table of Contents

**Chapter 10: Animating Objects**

- Working with Animation Curves
- Customizing your screen layout for animation
- Working in the Graph Editor
- Inserting keys
- Working with keying sets
- Editing motion curves
- Using F-curve modifiers
- Using Constraints Effectively
  - The all-powerful Empty!
  - Adjusting the influence of a constraint
  - Using vertex groups in constraints
  - Copying the movement of another object
  - Putting limits on an object
  - Tracking the motion of another object

**Chapter 11: Discovering the Tools Used in Rigging**

- Creating Shape Keys
  - Creating new shapes
  - Mixing shapes
  - Knowing where shape keys are helpful
- Adding Hooks
  - Creating new hooks
  - Knowing where hooks are helpful
- Using Armatures: Skeletons in the Mesh
  - Editing armatures
  - Putting skin on your skeleton

**Chapter 12: Animating Object Deformations**

- Working with the Dope Sheet
- Animating with Armatures
  - Principles of animation worth remembering
  - Making sense of quaternions (or, “Why are there four rotation curves?!”)
  - Copying mirrored poses
  - Seeing the big picture with ghosting
  - Visualizing motion with paths
- Doing Nonlinear Animation
  - Mixing actions to create complex animation
  - Taking advantage of looped animation
Chapter 13: Letting Blender Do the Work for You ................. 377
  Using Particles in Blender .......................................................... 378
  Knowing what particle systems are good for ......................... 379
  Using force fields and collisions ............................................. 383
  Using particles for hair and fur ............................................... 385
  Giving Objects Some Jiggle and Bounce .............................. 389
  Dropping Objects in a Scene with Rigid Body Dynamics .......... 392
  Simulating Cloth ....................................................................... 393
  Splashing Fluids in Your Scene ............................................... 396
  Smoking without Hurting Your Lungs: Smoke
    Simulation in Blender .............................................................. 400
    Rendering smoke using Blender Internal ............................... 403
    Rendering smoke using Cycles ............................................. 405

Part IV: Sharing Your Work with the World ............... 409

Chapter 14: Exporting and Rendering Scenes ............... 411
  Exporting to External Formats .................................................... 411
  Rendering a Scene ..................................................................... 414
    Creating a still image .............................................................. 414
    Creating a sequence of still images for editing
      or compositing ..................................................................... 420

Chapter 15: Compositing and Editing ......................... 423
  Comparing Editing to Compositing .......................................... 423
  Working with the Video Sequence Editor ............................... 424
    Adding and editing strips ...................................................... 427
    Adding effects ....................................................................... 431
  Rendering from the Video Sequence Editor ........................... 433
  Working with the Node-Based Compositor ............................... 433
    Understanding the benefits of rendering
      in passes and layers ......................................................... 434
    Working with nodes ............................................................. 439
    Discovering the nodes available to you ............................... 445
  Rendering from the Node Compositor .................................. 452

Part V: The Part of Tens ............................................... 455

Chapter 16: Ten Problems (and Solutions) for Newbies .... 457
  Blender’s Interface Is Weird or Glitchy .................................. 457
  A Notorious Black Stripe Appears on Models ....................... 458
  Objects Go Missing ............................................................... 459
Table of Contents

Edge Loop Select Doesn't Work ................................................................. 460
A Background Image Disappears ............................................................... 461
Zooming Has Its Limits ............................................................................... 461
Lost Simulation Data ................................................................................... 462
Objects Don’t Appear When Rendering .................................................... 463
No GPU Rendering for Cycles ..................................................................... 463
Funky Deformations in Animation Rigs .................................................... 464

Chapter 17: Ten Tips for Working More Effectively in Blender ............... 467
Use Tooltips and Integrated Search .......................................................... 467
Look at Models from Different Views ........................................................ 468
Lock a Camera to an Animated Character ................................................ 468
Don’t Forget about Add-ons ....................................................................... 469
Name Everything ......................................................................................... 469
Use Scene Layers Effectively ..................................................................... 470
Do Low-Resolution Test Renders ............................................................. 470
Mind Your Mouse ........................................................................................ 472
Use Grease Pencil to Plan ........................................................................... 472
Have Fun, but Take Breaks ......................................................................... 473

Chapter 18: Ten Excellent Community Resources ................................. 475
Blender.org ................................................................................................... 475
BlenderArtists.org ....................................................................................... 476
BlenderNation .............................................................................................. 476
BlenderBasics.com ...................................................................................... 476
blender.stackexchange.com ....................................................................... 477
BlenderCookie.com ..................................................................................... 477
Blendswap .................................................................................................... 477
Blenderart Magazine ................................................................................... 478
builder.blender.org .................................................................................... 478
Blender IRC Channels on freenode.net ..................................................... 478

Index .............................................................................................................. 481
Welcome to Blender For Dummies, 3rd Edition, your introduction to one of the most well-known free programs for creating 3D computer graphics. With Blender, you can create characters, props, environments, and nearly anything else your imagination can generate. And it’s not just about creating objects. You can set them in motion, too. Tell a story in an animation, entertain people in a video game, or add a special effect to some video footage. It’s all possible. They still haven’t quite designed a way for Blender to give you a foot massage if you’ve had a bad day, but in all seriousness, it’s difficult to imagine a task in computer animation that you can’t do with Blender. And just think: the developers of Blender have included all these features in a package you can download for free and run on nearly any computer. Crazy!

Blender sits at a very unique position in the world of 3D computer graphics. In the past, to get into 3D modeling and animation, you had only a few options, and most of them were too expensive, too limiting, or — ahem — too illegal for people just trying to see what this whole 3D thing was all about. Blender circumvents all those issues because it’s free. And not just zero-cost free, but freedom Free. Blender is open source. A world full of developers and users regularly contribute code and documentation, adding enhancements and improvements at a mind-boggling pace.

Of course, 3D computer graphics is a complex topic, and all software of this type is dense with buttons, options, settings, and unique ways of working. Perhaps more than any other program like it, Blender carries a pretty heavy reputation for being difficult to understand. Blender isn’t typically viewed as software for beginners. But, if I’ve done my job right, this book will help simplify things. Blender For Dummies, 3rd Edition is not just a book on using Blender. Sure, I explain why things in Blender work in their peculiar Blenderish ways, but I also make a point to explain core principles of 3D computer graphics as they are relevant. There’s no use in being able to find a button if you’re not really sure what it does or how it works. My hope is that with this combined knowledge, you can actually take advantage of Blender’s unique traits to create your own high-quality 3D art as quickly and efficiently as possible. Perhaps you can even become as addicted to it as I am!
About This Book

Blender is an extremely complex program used for the even more complex task of producing high-quality 3D models and animations. As such, I can’t cover every single feature and button in Blender. For a more comprehensive manual, refer to the excellent online documentation available through Blender’s website at http://www.blender.org/manual.

Because I want to bring you up to speed on working in 3D space with Blender so that you can start bringing your ideas to life as soon as possible, I focus on introducing you to the fundamental “Blender way” of working. Not only do I show you how something is done in Blender, but I also often take the time to explain why things are done a certain way. This approach should hopefully put you on the fast track to making awesome work and also allow you to figure out new parts of Blender on your own when you come across them.

Throughout the book, I refer to the Blender community. Blender’s user community is probably one of its most valuable assets, and I would be remiss to neglect bringing it up. Not only do many members of the community create great work, but they also write new code for Blender, write and edit documentation, and help each other improve. And understand that when I make reference to the Blender community, I include you in that community as well. As of right now, you are a Blenderhead — a fellow Blender user and therefore a member of the Blender community.

Blender is a truly cross-platform program, running on Linux, Windows, and Mac OS X. Fortunately, not much in Blender differs from one platform to another. However, for the few things that are different, I’ll be sure to point them out for you.

Foolish Assumptions

I’ve written this book for two sorts of beginners: people who are completely new to the world of 3D, and people who know a thing or two about 3D, but are completely new to Blender.

Because of the various types of beginners this book addresses, I tend to err on the side of explaining too much rather than too little. If you’re someone who is already familiar with another 3D computer graphics program, such as 3DS Max, Maya, Lightwave, or even an earlier version of Blender, you can probably skip a number of these explanations. Likewise, if you’re a complete newbie, you may notice that I occasionally compare a feature in Blender to one in another package. However, that comparison is mostly for the benefit
of these other users. I write so that you can understand a concept without having to know any of these other programs.

I do, however, make the assumption that you have at least a basic understanding of your computer. I assume that you know how to use a mouse, and I *highly* recommend that you use a mouse with at least two buttons and a scroll wheel. You *can* use Blender with a one- or two-button mouse, and I provide workarounds for the unfortunate souls in that grim state (*cough* Mac users *cough*), but it’s certainly not ideal.

An exception is if you’re using Blender with a drawing tablet like the ones produced by Wacom. Depending on the model, these devices have quite a variety on the number and type of buttons. For that reason, I focus primarily on using Blender with a mouse, although I will occasionally point out where having a tablet is helpful. Because Blender makes use of all your mouse buttons, I stipulate whether you need to left-click, right-click, or middle-click. And in case you didn’t already know, pressing down on your mouse’s scroll wheel typically accesses the middle mouse button. I also make use of this cool little arrow (→) for indicating a sequence of steps. It could be a series of hotkeys to press or menu items to select or places to look in the Blender interface, but the consistent thing is that all these items are used for steps that you need to do sequentially.

I also assume that you’re working with Blender’s default settings and theme. You can customize the settings for yourself, but if you do, Blender may not behave exactly like I describe. Bearing in mind this point about Blender’s themes, you may notice that the screenshots of Blender’s interface are lighter in this book than you see on-screen because I created a custom Blender theme that would show up better in print. If I used Blender’s default theme colors, all the figures in the book would appear overly dark. I include this custom theme at [www.blenderbasics.com](http://www.blenderbasics.com) if you who want your copy of Blender to match what’s shown on these pages.

**Icons Used in This Book**

As you flip through this book, icons periodically appear next to some paragraphs. These icons notify you of unique or valuable information on the topic at hand. Sometimes that information is a tip, sometimes it’s more detail about how something works, and sometimes it’s a warning to help you avoid losing data. The following are descriptions of each icon in this book.

This icon calls out suggestions that help you work more effectively and save time.
This icon marks something that I think you should try to keep in mind while working in Blender. Sometimes it’s a random tidbit of information, but more often than not, it’s something that you’ll run into repeatedly and is therefore worth remembering.

Working in 3D can involve some pretty heavy technical information. You can usually work just fine without ever having to know these things, but if you do take the time to understand it, I bet you dollars to donuts that you’ll be able to use Blender more effectively.

This icon doesn’t show up often, but when it does, I definitely recommend that you pay attention. You won’t blow up your computer if you overlook it, but you could lose work.

Blender is a fast-moving target. Quite a bit has changed since the previous edition of this book. These icons point out things that are new or different in Blender so that you can get to be at least as effective (and hopefully more effective) with the current version as you were with past versions.

**Beyond the Book**

*Blender For Dummies*, 3rd Edition, includes the following goodies online for easy download:

- **Cheat Sheet**: You can find the Cheat Sheet for this book here:
  
  www.dummies.com/cheatsheet/blender

- **Extras**: I provide a few extra articles here:
  
  www.dummies.com/extras/blender

I keep and maintain a website at [www.blenderbasics.com](http://www.blenderbasics.com) with additional resources. I have a whole bunch of tutorials, both in written and in video format, specifically for readers of this book. Also, Blender’s a big, fast-moving program. I do my best on that site to chronical changes in Blender that affect the content of this book (and perhaps share a new tip or two as well).

Occasionally, John Wiley and Sons has updates to its books. If there is an update to this book, it will be posted at [http://dummies.com/go/blenderupdates](http://dummies.com/go/blenderupdates).
Where to Go from Here

Wondering where to start? The easy answer here would be to say “Just dive on in!” but that’s probably a bit too vague. This book is primarily intended as a reference, so if you already know what you’re looking for, flip over to the table of contents or index and start soaking in the Blendery goodness.

If you’re just starting out, I suggest that you merely turn a couple of pages, start at Chapter 1, and enjoy the ride. And even if you’re the sort of person who knows exactly what you’re looking for, take the time to read through other sections of the book. You can find a bunch of valuable little bits of information that may help you work more effectively.

Regardless of how you read this book, though, my one hope is that you find it to be a valuable resource that allows you to flex your creative muscles and, more importantly, have fun doing it.
Part I

Getting Started with Blender
In this part . . .

- Getting comfortable with Blender.
- Customizing the interface.
- Working in 3D.
- Managing .blend files.
- Visit www.dummies.com for great Dummies content online.
In the world of 3D modeling and animation software, programs have traditionally been expensive — like, thousands-of-dollars-and-maybe-an-arm expensive. That's changed a bit in the last few years, with software companies moving to more subscription-based ways of selling their programs. The entry cost is lower, but paying each month can still add up pretty quickly. There are some valid reasons for the high prices. Software companies spend millions of dollars and countless hours developing these programs. And the large production companies that buy this kind of software for their staff make enough money to afford the high cost, or they hire programmers and write their own in-house software.

But what about us, you and I: the little guys? We are the ambitious dreamers with big ideas, high motivation . . . and tight budgets. How can we bring our ideas to life and our stories to screen, even if only on our own computer monitors? Granted, we could shell out the cash (and hopefully keep our arms) for the expensive programs that the pros use. But even then, animation is a highly collaborative art and it's difficult to produce anything in a reasonable amount of time without some help.

We need quality software and a strong community to work, grow, and evolve with. Fortunately, Blender can provide us with both of these things. This chapter is an introduction to Blender, its background, its interface, and its community.
Getting to Know Blender

Blender is a free and open source 3D modeling and animation suite. Yikes! What a mouthful, huh? Put simply, Blender is a computer graphics program that allows you to produce high quality still images and animations using three-dimensional geometry. It used to be that you’d only see the results of this work in animated feature films or high-budget television shows. These days, it’s way more pervasive. Computer-generated 3D graphics are everywhere. Almost every major film and television show involves some kind of 3D computer graphics and animation. (Even sporting events! Pay close attention to the animations that show the scores or players’ names.) And it’s not just film and TV; 3D graphics play a major role in video games, industrial design, scientific visualization, and architecture (to name just a few industries). In the right hands, Blender is capable of producing this kind of work. With a little patience and dedication, your hands can be the right hands.

One of the things that makes Blender different and special compared to other comparable 3D software is that it is freely available without cost and that it’s Free and Open Source software.

Being free of cost, as well as free (as in freedom) and open source, means that not only can you go to the Blender website (www.blender.org) and download the entire program right now without paying anything, but you can also freely download the source, or the code that makes up the program. For most programs, the source code is a heavily guarded and highly protected secret that only certain people (mostly programmers hired by the company that distributes the program) can see and modify. But Blender is open source, so anybody can see the program’s source code and make changes to it. The benefit is that rather than having the program’s guts behind lock and key, Blender can be improved by programmers all over the world!

Because of these strengths, Blender is an ideal program for small animation companies, freelance 3D artists, independent filmmakers, students beginning to learn about 3D computer graphics, and dedicated computer graphics hobbyists.

Blender, like many other 3D computer graphics applications, has had a reputation for being difficult for new users to understand. At the same time, however, Blender is also known for allowing experienced users to bring their ideas to life quickly. Fortunately, with the help of this book and the regular improvements introduced in each new release of Blender, that gap is becoming much easier to bridge.
Discovering Blender’s origins and the strength of the Blender community

The Blender you know and love today wasn’t always free and open source. Blender is actually quite unique in that it’s one of the few (and first!) software applications that was “liberated” from proprietary control with the help of its user community.

Originally, Blender was written as an internal production tool for an award-winning Dutch animation company called NeoGeo, founded by Blender’s original (and still lead) developer, Ton Roosendaal. In the late 1990s, NeoGeo started making copies of Blender available for download from its website. Slowly but surely, interest grew in this less-than-2MB program. In 1998, Ton spun off a new company, Not a Number (NaN), to market and sell Blender as a software product. NaN still distributed a free version of Blender, but also offered an advanced version with more features for a small fee. There was strength in this strategy and by the end of 2000, Blender users numbered well over 250,000 worldwide.

Unfortunately, even though Blender was gaining in popularity, NaN was not making enough money to satisfy its investors, especially in the so-called “dot bomb” era that happened around that time. In 2002, NaN shut its doors and stopped working on Blender. Ironically, this point is where the story starts to get exciting.

Even though NaN went under, Blender had developed quite a strong community by this time, and this community was eager to find a way to keep their beloved little program from becoming lost and abandoned. In July of 2002, Ton provided a way. Having established a non-profit organization called the Blender Foundation, he arranged a deal with the original NaN investors to run the “Free Blender” campaign. The terms of the deal were that, for a price of €100,000 (at the time, about $100,000), the investors would agree to release Blender’s source code to the Blender Foundation for the purpose of making Blender open source. Initial estimations were that it would take as long as six months to one year to raise the necessary funds. Amazingly, the community was able to raise that money in a mere seven weeks.

Because of the Blender community’s passion and willingness to put its money where its metaphorical mouth was, Blender was released under the GNU General Public License on October 13, 2002. With the source in the community’s hands, Blender had an avalanche of development and new features added to it in a very short time, including somewhat common features like Undo (a functionality that was conspicuously missing and highly desired since the initial releases of Blender by NeoGeo).
Eight years later, the Blender community is larger and stronger than ever. Blender itself is a powerful modern piece of software, competitive in terms of quality with similar software costing thousands of dollars. Not too shabby. Figure 1-1 shows screenshots of Blender from its early days to the Blender of today.

**Making open movies and games**

One of the cool things about the programmers who write Blender is that many of them also use the program regularly. They’re writing code not just because they’re told to do it, but because they want to improve Blender for their own purposes. Part of the programmers’ motivation has to do with Blender’s open-source nature, but quite a bit also has to do with the fact Blender was originally an in-house production tool, built for artists, based on their direct input, and often written by the artists themselves.

Seeking to get even more of this direct artist feedback to developers, the Blender Foundation launched “Project Orange” in 2005. The project’s purpose was to create an animated short movie using open source tools,
Chapter 1: Discovering Blender

primarily Blender. A team of six members of the community were assembled in Amsterdam, in the Netherlands, to produce the movie. Roughly seven months later, *Elephants Dream* premiered and was released to the public as the first open movie. This means that not only was it created using open-source tools, but all the production files — 3D models, scenes, character rigs, and so on — were also released under a permissive and open Creative Commons Attribution license. These files are valuable tools for discovering how an animated film is put together, and anyone can reuse them in their own personal or commercial work. Furthermore, if you don’t like *Elephants Dream*, you’re free to change it to your liking! How many movies give you that luxury? You can see the film and all of the production files for yourself at the project’s website, www.elephantsdream.org.

Due to the success of the Orange project, Ton established the Blender Institute in 2007 for the expressed purpose of having a permanent space to create open movie and game projects, as well as provide the service of training people in Blender. Since then, the Blender Institute has churned out open projects (each code-named with a type of fruit) every couple of years. Like with *Elephants Dream*, both the final product and the production files for each project are released under a permissive Creative Commons license. Table 1-1 summarizes each of the Blender Institute’s open projects.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fruit</th>
<th>Title</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>Orange</td>
<td><em>Elephants Dream</em> (<a href="http://www.elephantsdream.org">www.elephantsdream.org</a>)</td>
<td>Animated Short Film (improved animation, basic hair, node-based compositing)</td>
</tr>
<tr>
<td>2008</td>
<td>Peach</td>
<td><em>Big Buck Bunny</em> (<a href="http://www.bigbuckbunny.org">www.bigbuckbunny.org</a>)</td>
<td>Animated Short Film (enhanced particles, large scene optimization, improved rendering, more animation and rigging tools)</td>
</tr>
<tr>
<td>2008</td>
<td>Apricot</td>
<td><em>Yo Frankie!</em> (<a href="http://www.yofrankie.org">www.yofrankie.org</a>)</td>
<td>Video Game (asset creation pipeline, real-time viewport, updates to the Blender Game Engine)</td>
</tr>
</tbody>
</table>

(continued)
Figure 1-2 shows rendered images from each of the open projects.

With the completion of each of these projects, the functionality and stability of Blender significantly increased. Much of the content of this book wouldn’t even exist without these projects. For example, Chapter 13 starts with using Blender’s particle system to achieve exciting effects along with hair and fur. Half of the content in Chapter 15 is focused on the node compositor, a way of combining and enhancing still images and animations. In fact, nearly all of Part III is devoted to features that were enhanced or directly added for one of these open projects.