

Chapter 1

Getting Started with 3D Game Animation

In This Chapter

- ▶ Identifying 3D game elements
 - ▶ Knowing the tools used to create games
 - ▶ Discovering the process of creating games
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Before embarking on the journey of building game animations, you need to have a good idea of the task at hand. You also need to take some time to set up your system with the proper hardware and software needed to accomplish the task. This chapter gets you started on your journey by taking you through these preparatory tasks.

One of the first things to do is to look for all the various game elements that use 3D animations. 3D graphics and animations are used pervasively in games, and new uses are appearing all the time. As you play games, start looking for the places where 3D animations are used, and think about how you can use 3D animations in a similar way within your game.

After you have a good idea of all the various places within a game where 3D graphics are used, you need to familiarize yourself with the tools used to create these 3D graphics and the required hardware.

Finally, this chapter looks at the process of developing 3D games, so you'll have a good idea of what you're getting yourself into.

This Whole Place Is Full of 3D — Identifying 3D Game Elements

When 3D games first started to appear, they were easy to identify because the word, 3D, appeared in either the game title or its subtitle. Over time, 3D has affected every type of game, as if including a 3D aspect added some new element to the game. But I'm afraid that 3D Tetris has about the same game play as normal Tetris.

So, if 3D graphics don't add anything to the playability of a game, what is the benefit? The answer lies in making it visually appealing. Remember those Magic Eye stereogram posters that appeared everywhere several years ago. Why did people spend hours of time staring at those strange lines on the page? It was the 3D aspect that intrigued people and fed the frenzy.

In an increasingly competitive gaming market, a visually appealing game can make the difference between one that sells and one that doesn't, so 3D graphics have become an obvious choice for many game elements. If you begin to dissect many popular games, you find that 3D graphics are used all over the place. Figure 1-1 shows a sample 2D Tetris piece next to the same piece in 3D. Which would you rather see?



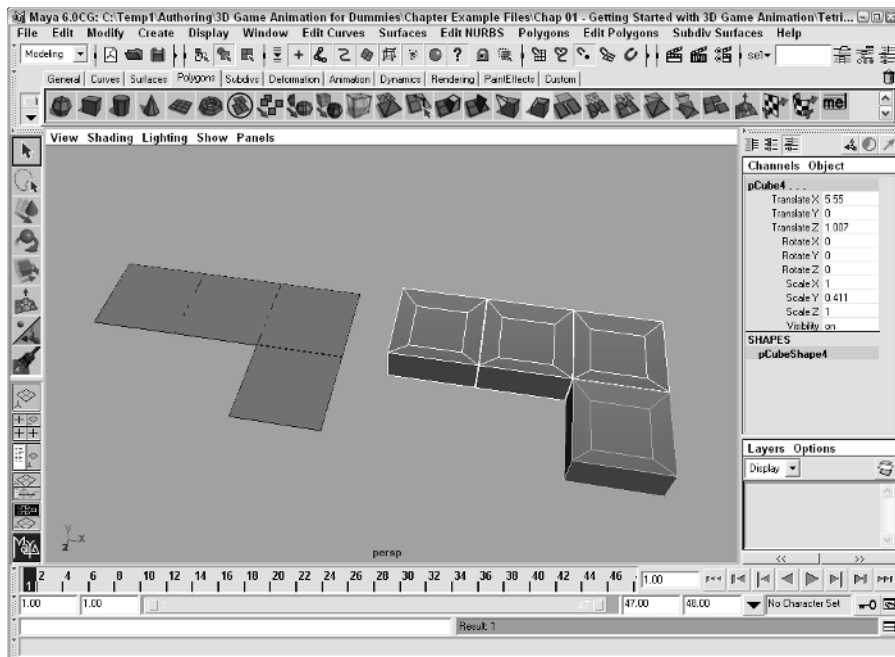
If your game idea is unique, look for additional ways to use 3D graphics to give your game added appeal.

User interfaces

One of the first places where you may notice 3D graphics in a game and probably the easiest 3D element to create is the user interface. This can range from something as simple as a menu with 3D text to a raised surface with some gradient variation to a complex fully-animated machine-like interface.

Creating and using a 3D user interface help accentuate the 3D action on the screen and do much to immerse the user within the game. A good example of this type of interface is found in the game *Descent*, where the interface surrounds the action like windows of the ship that you are controlling. This interface adds to the game play by helping you to think you're actually within a ship.

Figure 1-1:
3D graphics
can add a
lot to the
visual
appeal of
a game.



The key to an effective interface is one that enhances and doesn't distract from game play. The adventure game *Myst* is a great example of an interface that doesn't interfere with the game play. It allows players to navigate between the different scenes using only the mouse cursor, which changes for the different commands. This simple solution doesn't require annoying buttons or a menu bar to get in the way of the gorgeous images. For more details on building effective 3D user interfaces, check out Chapter 4.

Backgrounds

3D backgrounds can provide a realistic sense of depth to the game. Backgrounds are typically rendered images that exist behind all the scene objects. Backgrounds differ from scenery and props in that they typically are not accessible to the game player.

Think of the background in the old *Battlezone* arcade game. The mountains in the distance were never accessible no matter how long you drove your tank toward them, yet they provided a reference that you could use to orient your rotations.

Creating background images typically involves texturing, which is covered in Chapters 6 and 7.

Scenery and props

Scenery and props are game elements with which the player can interact directly. They typically are specific objects placed in specific positions for a special purpose. However, sometimes the special purpose is only to adorn the game.

Scenery consists of objects that are used to populate the actual environment that the player is placed within such as the actual 3D environments in which the player can move around. Scenery is used as obstacles, shields, or goals and defines the boundaries of the environment, thereby limiting and channeling the range of motion for the player.

Doom is a good example of how scenery is used to create an environment. It includes an environment of 3D rooms, corridors, and halls through which the player can move. You could move through these rooms and see what was beyond, and they formed a nice barrier that kept you within a given area.

Props do more than just define the environment, but they are objects placed in the scene for a purpose tied to game play such as a weapon, a health unit, or a key for moving to other levels.

By using 3D graphics for scenery and props, you can use these objects to provide visual feedback to players that helps them as they play, such as a switch that gets indented or a door that slides open.

Scenery and props are actual 3D objects that populate the game environments. The process of modeling scenery and prop objects is covered in Chapter 5.

Characters

Perhaps the most visible aspects of a 3D game are the characters. These characters can be either the player itself or the game enemies. Using 3D graphics and the technical tools available in most 3D packages today, you can give your characters realistic lifelike motion that further embeds the player within the game.

The gaming world is replete with popular characters from the amorphous blobs like Pacman and his posse to the dangerous adventurer, Laura Croft.

The key to making memorable characters is to endow them with abilities, weaknesses, and personalities that make them unique from all other game characters. This also makes them likely to have sequels and even movie deals.

Working with 3D characters is also the most difficult aspect of 3D game animation creation and presents the most challenges. To address this difficult aspect of game animation, an entire part has been dedicated to characters. You can find details on designing, modeling, and animating characters in Part III.

Cut scenes

Although cut scenes aren't involved in game play, they serve an important purpose by providing a welcome break, a chance to add some narrative and explanations, and the ability to further engross the player in the game.

Although Pacman was one of the first video games to include cut scenes after so many levels as a reward for the successful player, most of the console games available today include cut scenes woven together to tell a story. The Nintendo console games featuring Mario are a great example of how cut scenes are used to tell an engrossing story to hold the game players as they progress through the game.

Cut scenes are typically static and aren't limited in the number of polygons required for real-time display. This gives you a chance to work with high-resolution 3D graphics that show the player what the characters and scenes could really be and should represent a visually appealing high point.

Cut scenes are also more flexible in their format. They could include cartoon segments, video, or any number of different techniques. Cut scenes are used for many different means, but remember that they should be a reward for the successful player and, like the interface, shouldn't interfere with the game play. More on creating cut scene animations is covered in Part IV.

Opening the Toolbox — the Tools Used to Create 3D Game Animations

Way back when video games first appeared, the graphics were less than appealing. Think of Pong with its single-pixel ball and four-pixel-wide paddles. The game programmers didn't use any external tools to create these graphics. They simply turned the pixels on.

Over time, these simple pixel representations were replaced with 2D images that can move about the screen (called sprites) like those found in the early video games such as Donkey Kong, Pacman, and Centipede. These sprites evolved from simple pixels to clever designs produced by an artistic department and delivered to the programmers who made the designs move about the scene. The art and design department used some type of 2D drawing package to create their designs.

With the introduction of 3D games, a whole new level of programming was introduced along with the tools used to create the 3D animations. These complex tools have come a long way from the simple 2D drawing packages.

Currently, several different software packages are used to create 3D game animations, and several other software packages work in conjunction with the 3D animation packages to create the finished results.



The software products mentioned in this section are professional-level tools and take some time to learn to use.

Modeling, rendering, and animation software

The main software tool that is used to create 3D game animations is a package that can model, render, and animate 3D scenes. Several different packages are available to do this for all the major operating systems. You can find a more in-depth list of these various software packages in Chapter 17.

Below is a short list of the most popular and capable 3D modeling, rendering, and animation packages:

- ✓ **Maya:** Used extensively to create both movies and games, Maya is especially good at modeling and animating organic-based objects.
- ✓ **3ds max:** Perhaps the most-popular modeling, rendering, and animation package for games, 3ds max includes a host of features for animating characters.
- ✓ **SoftImage XSI:** As part of the Avid line-up, SoftImage XSI includes an amazing collection of additional tools in its base package.
- ✓ **Lightwave:** Used in many television series, Lightwave consists of two separate interfaces for modeling and animating.

Follow these steps to download and install Maya, Personal Learning Edition:

1. **Open a Web browser and type the following address,** www.alias.com.

This is the home page for Alias, the company that creates Maya.

2. **On the home page, locate and click the product page for Maya. Then look for and click the link to download the Maya, Personal Learning Edition product.**

Be aware that Alias makes several other popular products, but you can find Maya in the Products page. Maya, PLE is available for both Windows and Mac. The entire file is around 150 MB.



If you don't have access to download the entire file, then you can also purchase a CD containing the software directly from Alias for a minimal cost. Information on purchasing a CD can also be found on the Alias Web site.

3. **Before you can download the software, you need to enter your e-mail address.**

Alias uses this address to e-mail you a software key that you need to run the software. You'll also have to fill out a form with your name, address and phone number.



In addition to the software, Alias also has several other resources available for download including shaders, models, and scenes.

4. **After the download is complete, locate and double-click the downloaded executable file.**

This begins the installation wizard. During the installation, you'll need to enter the software key number that was e-mailed to you (see Figure 1-2). If you check your e-mail right after initiating the download, you should be able to find the software key number.

Figure 1-2:
Maya,
Personal
Learning
Edition,
requires a
software
key in order
to be
installed.



5. After Maya, PLE is installed, you can run the software by locating and clicking its icon on the desktop or in the Alias folder.

When Maya, PLE is run, a title screen, shown in Figure 1-3, is shown while the program loads. A separate Output Window also loads. This window is used to display commands as text and can be closed if it gets in the way. Figure 1-4 shows the software when it is opened for the first time.

Figure 1-3: The Maya, Personal Learning Edition title screen appears while the software is loading.

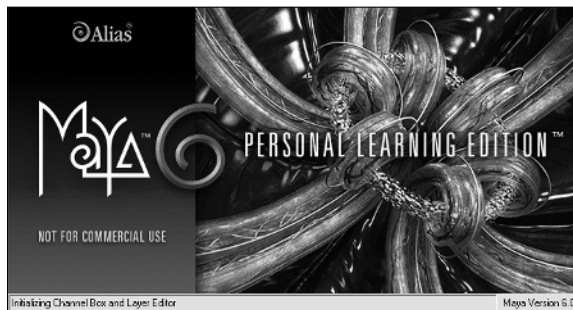
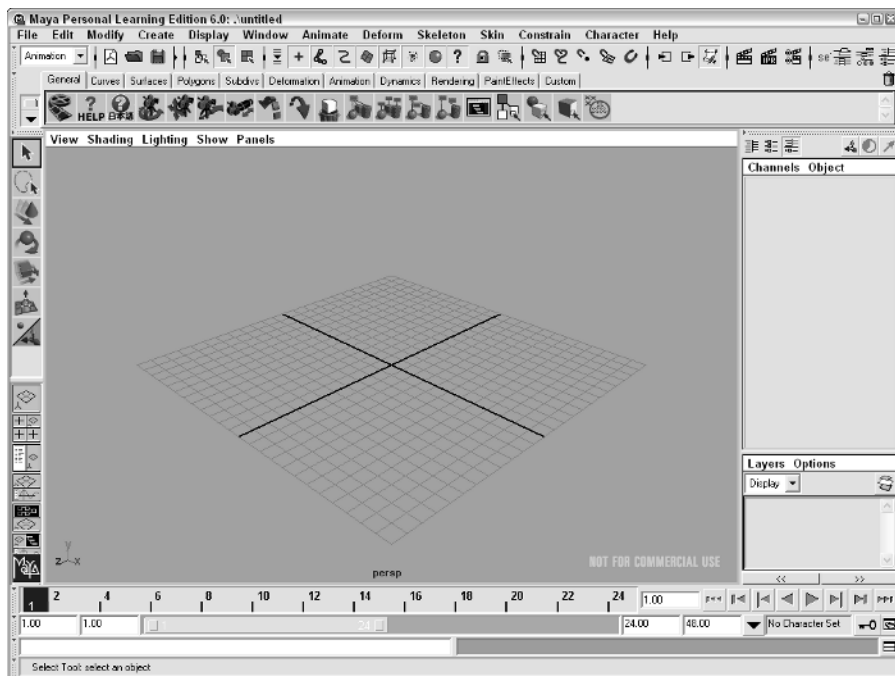


Figure 1-4: Maya, Personal Learning Edition is only available for non-commercial use.



Paint and texturing software

In addition to creating and animating objects that appear in the scene, 3D animators also paint and texture objects for added realism while keeping down the polygon count. These textures are typically painted in an image-editing package such as Photoshop, which provides tools for including transparency, texture, and surface treatments.

Compositing software

Another important piece of the animation puzzle is compositing several separate rendered pieces together into a single image. Compositing software is typically used to accomplish this. This software is also used to edit animations and in some cases add special effects to the rendered animation sequence.

Hardware requirements

In addition to the software, you need a pretty powerful computer to run this software. These are the minimum requirements for running the 3D packages mentioned above:

- ✓ A Pentium II, AMD Athlon, or Macintosh G4 processor
- ✓ Microsoft Windows XP, Windows 2000, or Mac OS 10.2.4
- ✓ 512 MB RAM
- ✓ CD-ROM drive
- ✓ A video graphics card that supports OpenGL and/or Direct3D
- ✓ A three-button mouse or a mouse with a scroll wheel
- ✓ 450 MB of hard drive space

Although the above hardware configuration makes animation possible, it also represents the minimum requirement, which means you'll be waiting often and dealing with memory issues. If available, you'll want to secure the following recommended system configuration:

- ✓ A dual-processor Pentium IV, AMD Athlon, or Macintosh G4 processor
- ✓ Microsoft Windows XP with the latest Service Pack, or Mac OS X Panther
- ✓ 1 GB RAM

- ✓ A video graphics card with 256 MB that supports OpenGL and Direct3D
- ✓ A mouse with a scroll wheel
- ✓ A pressure-sensitive graphics tablet

Creating 3D Games — Slightly More Complicated Than a Connect-the-Dots Puzzle

Creating a 3D game involves many different aspects, but at the most basic level, you can think of two separate pipelines — programming and artwork. The programming aspect involves defining how the objects move, and the artwork aspect creates the look and feel of the objects involved.

This book focuses on the artwork aspect of 3D game creation, but it doesn't really touch on the programming aspect.



A good companion book to this one that covers the game programming aspect is *Windows Game Programming For Dummies*, 2nd Edition, by André LaMothe.

For the artwork aspect of game development, a simplified approach includes the following four steps. However, at no point along the way is the artwork considered final and complete: You may need to make adjustments during each phase.

Game design

The process for the artwork aspect of game creation begins with a design. In most game companies, this task is accomplished by a single person known as a Game Designer, but it typically involves the input from many members of the game development team. The design is the high-level plan for the game and deals with the playability of the game. This design has a direct impact on both the artwork and the programming aspects.

Having a solid design up front is critical to the success of the game. If the design has flaws, these will be discovered later in the game development, causing artwork and programming to be redone. Chapter 2 covers most of the design documents that you need to create during this critical phase.

Art design

After the game design is completed and approved, the art team can start with the art design. This task defines how the game will look and should adhere closely to the game design blueprint. During this phase, the programmers can work in parallel using simple representations that can be swapped out later with the actual art pieces. The Art Design phase is where most of a 3D Game Animator's time is spent.

Chapter 2 also covers the art design elements that you'll be working on.

Integration

As the artwork is completed, it is delivered to the programmers who combine it with their program code. This integration phase may require some rework of the various art pieces.

While the programmers are integrating the artwork with the game code, game animators are free to work on the cut scenes along with any rework that is necessary.

Testing

After the artwork and the code are combined into a cohesive game, the process of testing is essential to reveal any potential problems. Although a separate team of testers is typically used to complete this phase, the art department needs to take a close look at the final results to see how their colors and shading are affected by the real-time lighting.

Learning the Big Picture

The big picture is that this book is teaching you how to create 3D animations. These animations and the skills you learn can be applied toward a game, but they can also be used to create artistic images and movies. The goal is to teach you 3D animation skills, but exactly how you use them is up to you.

