Fundamentals of Game Design

Ernest Adams

Andrew Rollings

Upper Saddle River, New Jersey 07458

Library of Congress Cataloging-in-Publication Data

Adams, Ernest.
Fundamentals of game design/Ernest Adams and Andrew Rollings.
p. cm.
ISBN 0-13-168747-6 (alk. paper)
1. Computer games—Design. 2. Computer games—Programming. 3. Video games—Design.
I. Rollings, Andrew, 1972- II. Title.
QA76.76.C672A322 2006
794.8'1536—dc22

2006023805

Vice President and Publisher: Natalie E. Anderson
Associate VP/Executive Acquisitions Editor, Print: Stephanie Wall
Executive Acquisitions Editor, Media: Richard Keaveny
Executive Acquisitions Editor: Chris Katsaropoulos
Product Development Manager: Eileen Bien Calabro
Editorial Supervisor: Brian Hoehl
Editorial Assistants: Rebecca Knauer, Kaitlin O'Shaughnessy
Executive Producer: Lisa Strite
Content Development Manager: Cathi Profitko
Senior Media Project Manager: Steve Gagliostro
Project Manager, Media: Alana Meyers
Director of Marketing: Margaret Waples
Senior Marketing Manager: Jason Sakos
Marketing Assistant: Ann Baranov
Senior Sales Associate: Joseph Pascale
Managing Editor: Lynda J. Castillo
Production Project Manager: Lynne Breitfeller
Manufacturing Buyer: Chip Poakeart
Production/Editorial Assistant: Sandra K. Bernales
Design Manager: Maria Lange
Art Director/Interior Design/Cover Design: Blair Brown
Cover Illustration/Photo: Northern Electrics
Composition: Integra
Project Management: BookMasters, Inc.
Cover Printer: RR Donnelley/Harrisonburg
Printer/Binder: RR Donnelley/Harrisonburg

Credits and acknowledgments borrowed from other sources and reproduced, with permission, in this textbook appear on appropriate page within text.

Pearson Education LTD.
Pearson Education Singapore, Pte. Ltd
Pearson Education, Canada, Ltd
Pearson Education–Japan
Pearson Education Australia PTY, Limited
Pearson Education North Asia Ltd
Pearson Educación de Mexico, S.A. de C.V.
Pearson Education Malaysia, Pte. Ltd

PEARSON
Prentice
Hall

10 9 8
ISBN 0-13-168747-6

Chapter 4

Game Worlds

Chapter Objectives

After reading this chapter and completing the exercises, you will be able to do the following:

- Know the various dimensions of a game world and understand how they affect the player's experience of the game.
- Define an appropriate physical model for your game world, including its dimensionality, scale, and what happens at the boundaries.
- Explain the relationship between game time and real time and decide how time will behave in your game.
- Create the culture and environment of a game world, set the level of detail that it will offer, and define a visual and auditory style for it.
- Know some of the techniques for influencing the player's emotions.
- Be aware of how the ethics of a game world can differ from the ethics of the real world and the implications that has for public acceptance of your game.
- Understand the multidimensional nature of *realism* as it applies to games and how it affects the player's expectations about the experience the game will give her.

Introduction

Games entertain through gameplay, but many also entertain by taking the player away to an imaginary place—a ***game world.*** (We also use the terms *world, setting,* and *game setting* interchangeably with *game world.*) In fact, the gameplay in most single-player video games appears to the player as interactions between himself and the game world. This chapter defines a game world and introduces the various dimensions that describe a game world: the physical, temporal, environmental, emotional, and ethical dimensions, as well as a quality called *realism.*

What Is a Game World?

A game world is an artificial universe, an imaginary place in which the events of the game occur. When the player enters the magic circle and pretends to be somewhere else, the game world is the place she pretends to be.

Not all games have a game world. A football game takes place in a real location, not an imaginary one. Playing football still requires pretending because the players assign an artificial importance to otherwise trivial actions, but the pretending doesn't create a game world. Many abstract games, such as tic-tac-toe, have a board but not a world—there is no imaginary element in playing the game. Chess has only a hint of a world; although the board and the moves are abstract, the names of the pieces suggest a medieval court with its king and queen, knights and bishops. *Stratego* has a slightly more elaborate world: The board is printed to look like a landscape, and the pieces are illustrated with little pictures, encouraging us to pretend that they are colonels and sergeants and scouts in an army. *Stratego* could be played entirely abstractly, using only numbers and a bare grid for a board, but the setting makes it more interesting.

KEY POINT

In defining your game world, it will be tempting to start drawing pictures right away, especially if you're artistically inclined anyway. That's good in the early stages of design; you will need concept art to pitch your game. But don't make the mistake of thinking that nice drawings are enough. Your game world must support and work with the core mechanics and gameplay of your game. To make the world serve the game well, you must design it carefully. Otherwise you may forget to address an important issue until late in the development process, when it's expensive to make changes.

The game world in a video game is traditionally presented by means of pictures and sound: art, animation, music, and audio effects. Not all game worlds have a visible or audible component, however. In a text adventure, the player creates the images and sounds of the world in his imagination when he reads the text on the screen. Designing such a world is a matter of using your literary skills to describe it in words.

Game worlds are much more than the sum of the pictures and sounds that portray them. A game world can have a culture, an aesthetic, a set of moral values, and other dimensions that we explain in this chapter. The game world also has a relationship to reality, whether it is highly abstract, with little connection to the world of everyday things, or highly representational, attempting to be as similar to the real world as possible.

The Purposes of a Game World

Games entertain by several means: gameplay, novelty, social interaction (if it is a multiplayer game), and so on. In a game such as chess, almost all the entertainment value is in the gameplay; few people think of it as a game about medieval warfare. In an adventure game such as *Escape from Monkey Island,* the world is essential to the fantasy. Without the world, *Escape from Monkey Island* would not exist, and if it had a different world, it would be a different game. One of the purposes of a game world is simply to entertain in its own right: to offer the player a place to explore and an environment to interact with.

As a general rule, the more that a player understands a game's core mechanics, the less the game world matters. Mastering the core mechanics requires a kind of abstract thought, and fantasy can be a distraction. Serious chess players don't think of the pieces as representing actual kings and queens and knights. When players become highly skilled at a game such as *Counter-Strike*, they no longer think about the fact that they're pretending to be soldiers or terrorists; they think only about hiding, moving, shooting, ambushing, obtaining ammunition, and so on. However, this kind of abstract play, ignoring a game's world, usually occurs only among experienced players. To someone who's playing a game for the first time, the world is vital to creating and sustaining her interest.

The other purpose of a game's world is to sell the game in the first place. It's not the game's mechanics that make a customer pick up a box in a store but the fantasy it offers: who she'll be, where she'll be, and what she'll be doing there if she plays that game.

The Dimensions of a Game World

A game's world is defined by many different properties. Some, such as the size of the world, are quantitative and can be given numerical values. Others, such as the world's mood, are qualitative and can only be described with words. Certain properties are related to one another, and we have characterized these related sets of properties as ***dimensions*** of the game world. To fully define your world and its setting, you need to consider each of these dimensions and answer certain questions about them.

The Physical Dimension

Video game worlds are almost always implemented as some sort of simulated physical space. The player moves his avatar in and around this space or manipulates other pieces or characters in it. The physical properties of this space determine a great deal about the gameplay.

Even text adventures include a physical dimension. The player moves from one abstract location, usually called a *room* even if it's described as outdoors, to another. Back when more people played text adventures, the boxes the games came in used to carry proud boasts about the number of rooms in the game. Gamers could take this as a very rough measure of the size of the world they could explore in the game and, therefore, the amount of gameplay that the game offered.

The physical dimension of a game is itself characterized by several different properties: spatial dimensionality, scale, and boundaries.

Spatial Dimensionality One of the first questions to ask yourself is how many spatial dimensions your physical space will have. It is essential to understand that the dimensionality of the game's physical space is not the same as how the game will *display* that space (the perspective) or how it will implement the space in the software. How to implement and display the space are separate but related questions. The former has to do with technical design, and the latter has to do with user interface design. Ultimately, all spaces must be displayed on the two-dimensional surface of the monitor screen.

These are the typical dimensionalities found in video games:

- **2D.** A few years ago, the vast majority of games had only two dimensions. This was especially noticeable in 2D side-scrolling games such as *Super Mario Bros.* (see Figure 4.1). Mario could run left and right and jump up and down, but he could not move toward the player (out of the screen) or away from him (into the screen). Two-dimensional worlds have one huge advantage when you're thinking about how to display them: The two dimensions of the world directly correspond to the two dimensions of the monitor screen, so you don't have to worry about conveying a sense of depth to the player. On the other hand, a number of games with 2D game worlds still use 3D hardware accelerators for display so that objects appear three-dimensional even

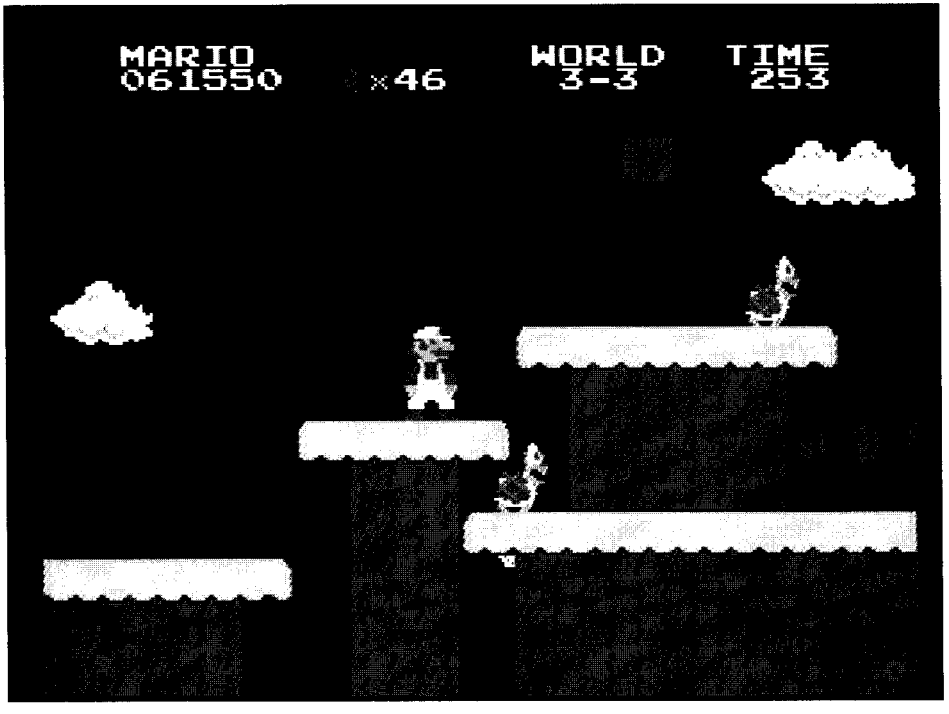

FIGURE 4.1 *Super Mario Bros.*, the classic 2D side-scrolling game.

though the gameplay does not make use of the third dimension. The more recent *SimCity* games are a good example. Two-dimensional worlds may seem rather old-fashioned nowadays, but there are still many uses for them, especially in smaller devices such as mobile phones.

- **2.5D,** typically pronounced "two-and-a-half D." This is found in game worlds that appear to be a three-dimensional space but in reality consist of a series of 2D layers, one above the other. *StarCraft*, a war game, shows plateaus and lowlands, as well as aircraft that pass over obstacles and ground units. Objects can be placed and moved horizontally within a layer with a fine degree of precision, but vertically an object must be in one plane or another; there is no in between. Flying objects can't move up and down in the air; they're simply in the air layer. See Figure 4.2.
- **3D.** Three true dimensions. Thanks to 3D hardware accelerators and modeling tools, 3D spaces are now easier to implement. They give the player a much greater sense of being inside a space (building, cave, spacecraft, or whatever) than 2D spaces ever could. With a 2D world, the player feels as if he is looking *at* it; with a 3D world, he feels as if he is *in* it. 3D worlds are great for avatar-based games with exploration

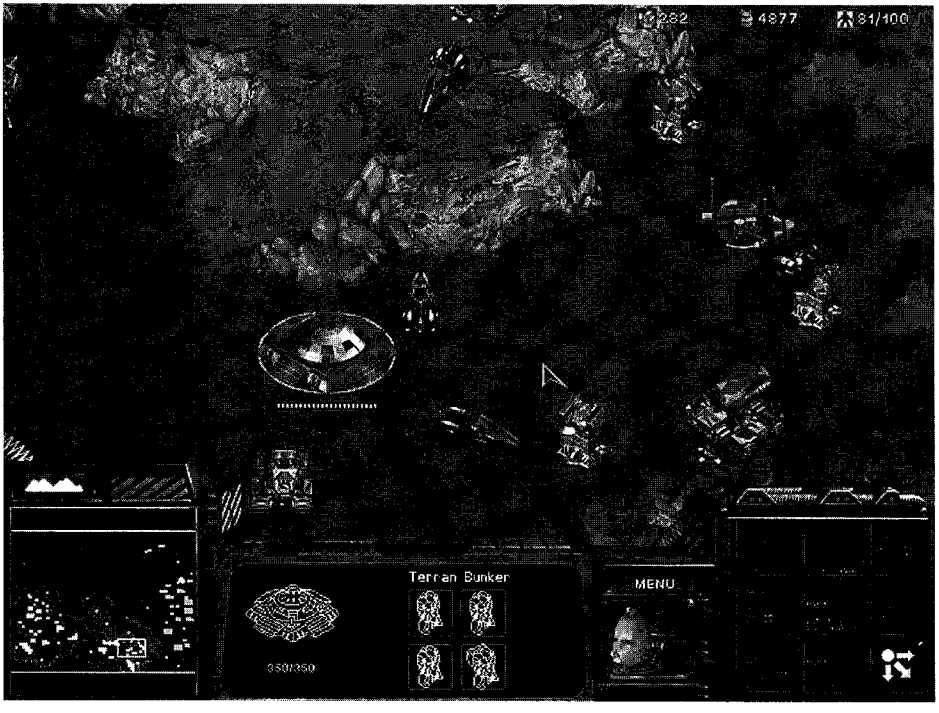

FIGURE 4.2 *StarCraft*, with plateaus and lowlands visible.

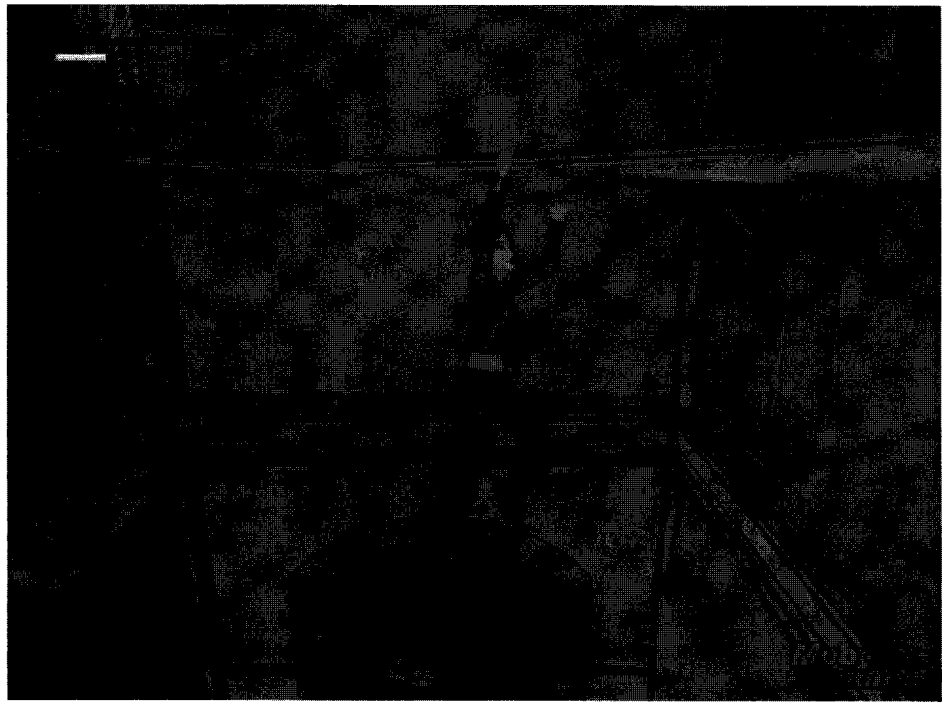

FIGURE 4.3 *Tomb Raider: The Angel of Darkness,* a fully 3D environment.

challenges, such as the *Tomb Raider* series (see Figure 4.3). Most large games for personal computers and consoles now use three dimensions, but many small casual games still need only two.

- **4D.** If you want to include a fourth dimension for some reason (not counting time), we suggest that you implement it as an alternate version of the 3D game world rather than an actual four-dimensional space. In other words, create two (or more) three-dimensional spaces that look similar but offer different experiences as the avatar moves among them. For example, the game *Legacy of Kain: Soul Reaver* contained two versions of the same 3D world, the spectral realm and the material realm, with different gameplay modes for each. The landscape was the same in both, but the material realm was lit by white light while the spectral realm was lit by blue light, and the architecture was distorted in the spiritual realm (see Figure 4.4). The actions available to the player were different in each realm. The realms looked similar but were functionally different places governed by different laws. In the movie version of *The Lord of the Rings,* the world that Frodo inhabits while he is wearing the Ring can be thought of as an alternate plane of reality as well, overlapping the real world but appearing and behaving differently.

FIGURE 4.4 *Legacy of Kain: Soul Reaver*'s material (left) and spiritual (right) realms. Notice how the walls are slightly twisted in the spiritual realm and the overlay indicator is different.

When first thinking about the dimensionality of your game space, don't immediately assume that you want it to be three-dimensional because 3D seems more real or makes the best use of your machine's hardware. As with everything else you design, the dimensionality of your physical space must serve the entertainment value of the game. Make sure all the dimensions will contribute meaningfully. Many games that work extremely well in two dimensions don't work well in three. *Lemmings* was a hit 2D game, but *Lemmings 3D* was nowhere near as successful because it was much more difficult to play. The addition of a third dimension detracted from the player's enjoyment rather than adding to it.

Scale By *scale,* we mean both the *absolute* size of the physical space represented, as measured in units meaningful in the game world (meters, miles, or light-years, for instance) and the *relative* sizes of objects in the game. If a game is purely abstract and doesn't correspond to anything in the real world, the sizes of objects in its game world don't really matter. You can adjust them to suit the game's needs any way you like. But if you are designing a game that represents (if only partially) the real world, you'll have to address the question of how big everything should be to both look real and play well. Some distortion is often necessary for the sake of gameplay, especially in war games; the trick is to distort without harming the player's suspension of disbelief too much.

In a sports game, a driving game, a flight simulator, or any other kind of game in which the player will expect a high degree of verisimilitude, you have little choice but to scale things to their actual sizes. In old 2D sports games, it was not uncommon for the athletes to be depicted as 12 feet tall to make them more visible, but nowadays players wouldn't tolerate a game taking such liberties with reality. Serious simulations need an accurate representation of the physical world.

Similarly, you should scale most of the objects in first-person games accurately. Fortunately, almost all first-person games are set indoors or within limited areas, seldom larger than a few hundred feet in any dimension, so this doesn't create implementation problems. Because the player's perspective is that of a

person walking through the space, objects need to look right for their surrounding area. You might want to slightly exaggerate the size of critical objects such as keys, weapons, or ammunition to make them more visible, but most things, such as doors and furniture, should be scaled normally.

If you're designing a game with an aerial or isometric perspective, you might need to distort the scale of things somewhat. The real world is so much larger and more detailed than a game world that it's impossible to represent objects in their true scale in such a perspective. For example, in modern mechanized warfare, ground battles can easily take place over a 20-mile front, with weapons that can fire that far or farther. If you were to map an area this size onto a computer screen, an individual soldier or even a tank would be smaller than a single pixel, completely invisible. Although the display will normally be zoomed in on one small area of the whole map, the scale of objects will have to be somewhat exaggerated so that they're clearly identifiable on the screen.

Games frequently distort the relative heights of people and the buildings or hills in their environment. The buildings are often only a little taller than the people who walk past them. (See Figure 4.5 for an example.) To be able to see the roofs of all the buildings or the tops of all the hills, the camera must be positioned above the highest point in the world. But if the camera is too high, the people would hardly be visible at all. To solve this problem, the game simply does not

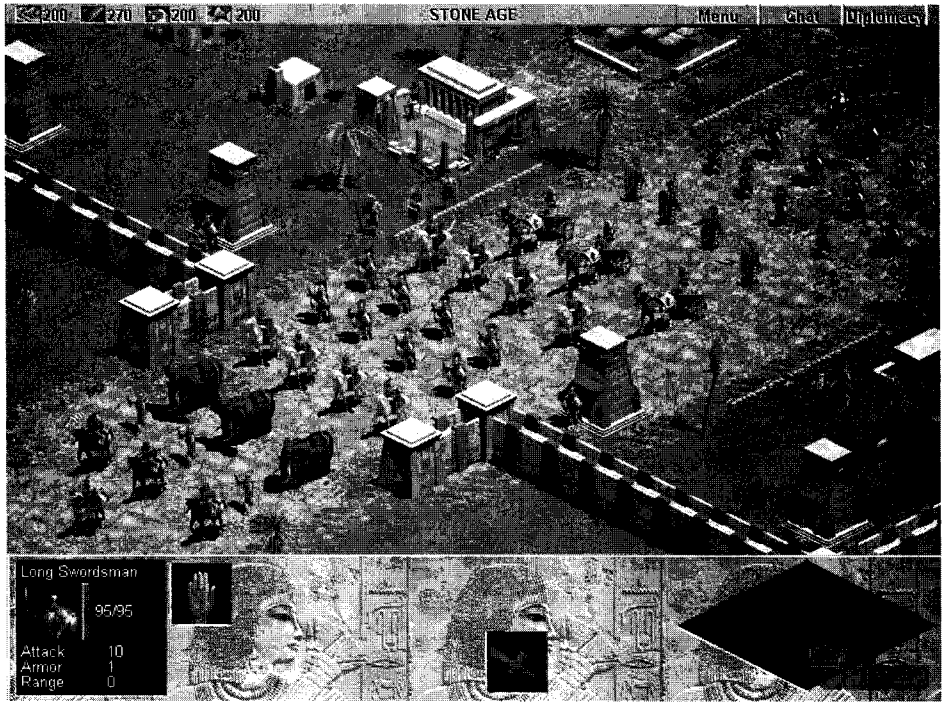

FIGURE 4.5 In *Age of Empires*, the buildings are only a little taller than the people.

include tall buildings or hills and exaggerates the height of the people. Because the vertical dimension is seldom critical to the gameplay in products such as war games and role-playing games, it doesn't matter if heights are not accurate, as long as they're not so inaccurate as to interfere with suspension of disbelief.

Designers often make another scale distortion between indoor and outdoor locations. When a character walks through a town, simply going from one place to another, the player will want the character to get there reasonably quickly. The scale of the town should be small enough that the character takes only a few minutes to get from one end to another unless the point of the game is to explore a richly detailed urban environment. When the character steps inside a building, however, and needs to negotiate doors and furniture, you should expand the scale to show these additional details. If you use the same animation for a character walking indoors and outdoors, this will give the impression that the character walks much faster outdoors than indoors. However, this seldom bothers players—they'd much rather have the game proceed quickly than have their avatar take hours to get anywhere, even if that would be more accurate.

This brings up one final distortion, which is also affected by the game's notion of time (see *The Temporal Dimension,* later in this chapter), and that is the relative speeds of moving objects. In the real world, a supersonic jet fighter can fly more than a hundred times faster than an infantry soldier can walk on the ground. If you're designing a game that includes both infantry soldiers and jet fighters, you're going to have a problem. If the scale of the battlefield is suitable for jets, it will take infantry weeks to walk across; if it's suitable for infantry, a jet could pass over it in the blink of an eye. One solution to this is to do what the real military does and implement transport vehicles for ground troops. Another is simply to accept a certain amount of distortion and create jets that fly only four or five times as fast as people walk (this trick was used in *StarCraft*). As long as the jet is the fastest thing in the game, it doesn't really matter how much faster it is; the strike-and-retreat tactic that jets are good at will still work. Setting these values is all part of balancing the game, as discussed in more detail in Chapter 9, "Gameplay."

Boundaries In board games, the edge of the board constitutes the edge of the game world. Because computers don't have infinite memories, the physical dimension of a computer game world must have an "edge" as well. However, computer games are usually more immersive than board games, and they often try to disguise or explain away the fact that the world is limited to maintain the player's immersion.

In some cases, the boundaries of a game world arise naturally, and we don't have to disguise or explain them. Sports games take place only in a stadium or an arena, and no one expects or wants them to include the larger world. In most driving games, the car is restricted to a track or a road, and this, too, is reasonable enough.

Setting a game underground or indoors helps to create natural boundaries for the game world. Everyone expects indoor regions to be of a limited size, with walls defining the edges. The problem occurs when games move outdoors, where

players expect large, open spaces without sharply defined edges. A common solution in this case is to set the game on an island surrounded by water or by some other kind of impassable terrain: mountains, swamps, or deserts. These establish both a credible and a visually distinctive "edge of the world."

In flight simulators, setting the boundaries of the world creates even more problems. Most flight simulators restrict the player to a particular area of the real world. Because there are no walls in the air, there's nothing to stop the plane from flying up to the edge of the game world, and the player can clearly see when he has arrived there that there's nothing beyond. In some games, the plane just stops there, hovering in midair, and won't go any farther. In *Battlefield 1942,* the game tells the player that he has left the scene of the action and forcibly returns him to the runway.

A common solution to the edge-of-the-world problem is to allow the flat world to "wrap" at the top, bottom, and sides. Although the world is implemented as a rectangular space in the software, objects that cross one edge appear at the opposite edge—they wrap around the world. If the object remains centered on the screen and the world appears to move beneath it, you can create the impression that the world is spherical. This was used to excellent effect in Bullfrog Productions' game *Magic Carpet.* Another Bullfrog game, *Populous: The Beginning,* actually displayed the world as a sphere on the screen, not just a wrapping rectangle (see Figure 4.6).

FIGURE 4.6 *Populous: The Beginning* was set on a genuinely spherical world.

The Temporal Dimension

The *temporal dimension* of a game world defines the way that time is treated in that world and the ways in which it differs from time in the real world.

In many turn-based and action games, the world doesn't include a concept of time passing: days and nights or seasons and years. Everything in the world idles or runs in a continuous loop until the player interacts with the game in some way. Occasionally, the player is put under pressure by being given a limited amount of real-world time to accomplish something, but this usually applies to only a single challenge and is not part of a larger notion of time in the game.

In some games, time is implemented as part of the game world but not part of the gameplay. The passage of time creates atmosphere and gives the game visual variety, but it doesn't change the game's challenges and actions. This usually feels rather artificial. If the player can do exactly the same things at night that she can during the daytime and no one ever seems to sleep, then there's little point in making the distinction. For time to really support the fantasy, time must affect the experience in ways besides the purely visual.

Baldur's Gate, a large role-playing game, is a good example of a game in which time is meaningful. At night, shops close and the characters in the game run an increased risk of being attacked by wandering monsters. It's also darker and hard to see. Taverns are open all day and all night, which is reasonable enough, but the customers don't ever seem to leave and the bartender never goes off shift. In this way, the game's use of time is a little inconsistent, but the discrepancy serves the gameplay well because you can always trade with the bartender and pick up gossip no matter what time it is. The characters do need rest if they've been on the march for a long while, and this makes them vulnerable while they're sleeping. In the underground portions of the game, day and night have less meaning, as you would expect.

Variable Time In games that do implement time as a significant element of the gameplay, time in the game world usually runs much faster than in reality. Time in games also jumps (as it does in books and movies), skipping periods when nothing interesting is happening. Most war games, for example, don't bother to implement nighttime or require that soldiers get any rest. In reality, soldier fatigue is a critical consideration in warfare, but because sleeping soldiers don't make exciting viewing and certainly aren't very interactive, most games just skip sleep periods. Allowing soldiers to fight continuously without a pause permits the player to play continuously without a pause also.

The Sims, a game about managing a household, handles this problem a different way. The simulated characters require rest and sleep for their health, so *The Sims* depicts day and night accurately. However, when all the characters go

to sleep, the game speeds up considerably, letting hours go by in a few seconds. As soon as anyone wakes up, time slows down again.

The Sims is a rather unusual game in that it's chiefly about time management. The player is under constant pressure to have his characters accomplish all their chores and get time for sleep, relaxation, and personal development as well. The game runs something like 48 times as fast as real life, so it takes about 20 minutes of real time to play through the 16 hours of game-world daytime. However, the characters don't move 48 times as fast. Their actions look pretty normal, about as they would in real time. As a result, it takes them 15 minutes according to the game's clock just to go out and pick up the newspaper. This contributes to the sense of time pressure. Because the characters do everything slowly (in game terms), they often don't get a chance to water their flowers, which consequently die.

Anomalous Time In *The Settlers III,* a complex economic simulation, a tree can grow from a sapling to full size in about the same length of time that it takes for an iron foundry to smelt four or five bars of iron. This is a good example of *anomalous time*: time that seems to move at different speeds in different parts of the game. Blue Byte, the developer of *The Settlers,* tuned the length of time it takes to do each of the many tasks in the game to make sure that the game as a whole would run smoothly. As a result, *The Settlers* is very well balanced at some cost to realism. However, it doesn't disrupt the fantasy because *The Settlers* doesn't actually give the player a clock in the game world. There's no way to compare game time to real time, so in effect, the game world has no obvious time scale (see Figure 4.7).

Another example of anomalous time appears in *Age of Empires,* in which tasks that should take less than a day in real time (gathering berries from a bush, for example) seem to take years in game time according to the game clock. *Age of Empires* does have a time scale, visible on the game clock, but not everything in the world makes sense on that time scale. The players simply have to accept these actions as symbolic rather than real. As designers, we have to make them work in the context of the game world without disrupting the fantasy. As long as the symbolic actions (gathering berries or growing trees) don't have to be coordinated with real-time actions (warfare) but remain essentially independent processes, it doesn't matter if they operate on an anomalous time scale.

Letting the Player Adjust Time In sports games and vehicle simulations, game time usually runs at the same speed as real time. An American football game is, by definition, an hour long, but because the clock stops all the time, the actual elapsed time of a football game is closer to three hours. All serious computerized football games simulate this accurately. Verisimilitude is a key requirement of most sports games; if a game does not accurately simulate the real sport, it might not be approved by the league, and its competitors

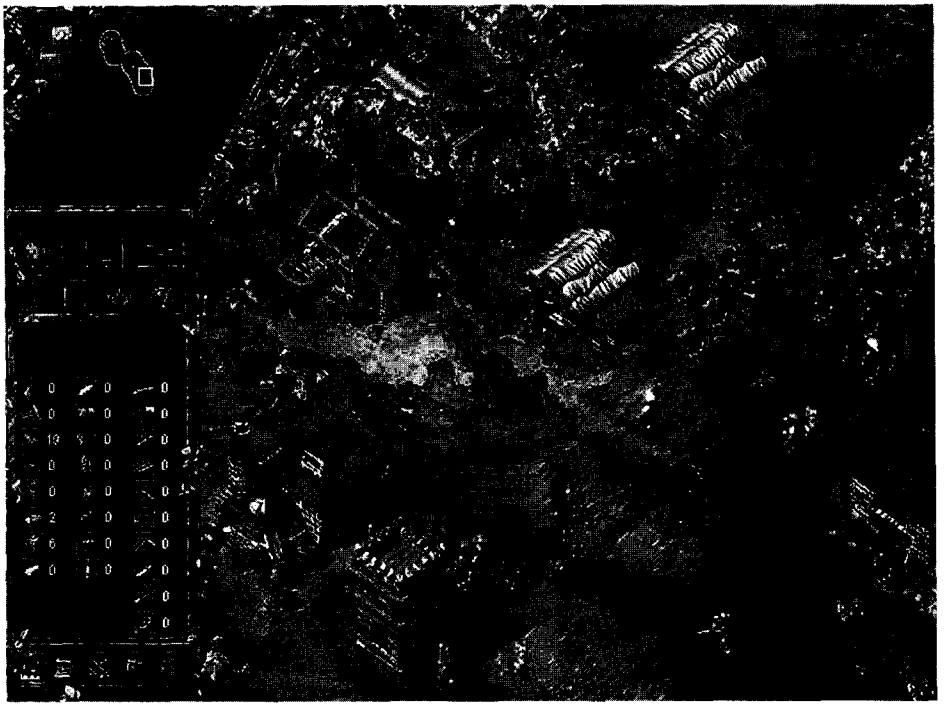

FIGURE 4.7 Activities in *The Settlers III* take anomalous lengths of time, but the game does not include a clock.

are bound to point out the flaw. However, most such games also allow the players to shorten the game by playing 5- or 10-minute quarters instead of 15-minute quarters because most people don't want to devote a full three hours to playing a simulated football game. This is also a useful feature in testing; it would take far too long to test the product if you had to play a full-length game every time.

Flight simulators also usually run in real time, but there are often long periods of flying straight and level during which nothing of interest is going on; the plane is simply traveling from one place to another. To shorten these periods, many games offer a way to speed up time in the game world by two, four, or eight times—in effect, making everything in the game world go faster than real time. When the plane approaches its destination, the player can return the game to normal speed and play in real time.

The Environmental Dimension

The environmental dimension describes the world's appearance and its atmosphere. We've seen that the physical dimension defines the properties of the game's space; the environmental dimension is about what's in that space. The environmental characteristics of the game world form the basis for creating

its art and audio. We'll look at two particular properties: the cultural context of the world and the physical surroundings.

Cultural Context When we speak of the *cultural context* of a game, we're talking about culture in the anthropological sense: the beliefs, attitudes, and values that the people in the game world hold, as well as their political and religious institutions, social organization, and so on—in short, the way those people live. These characteristics are reflected in the manufactured items that appear in the game: clothing, furniture, architecture, landscaping, and every other manmade object in the world. The culture influences not only what appears and what doesn't appear (a game set in a realistic ancient Egypt obviously shouldn't include firearms), but also how everything looks—including the user interface. *Cleopatra: Queen of the Nile* is an excellent example of a game's culture harmonizing with its user interface; see Figure 4.8. The appearance of objects is affected not only by their function in the world, but also by the aesthetic sensibilities of the people who constructed them; for example, a Maori shield will look entirely different from King Arthur's shield.

The cultural context also includes the game's backstory. The backstory of a game is the imaginary history, either large-scale (nations, wars, natural disasters)

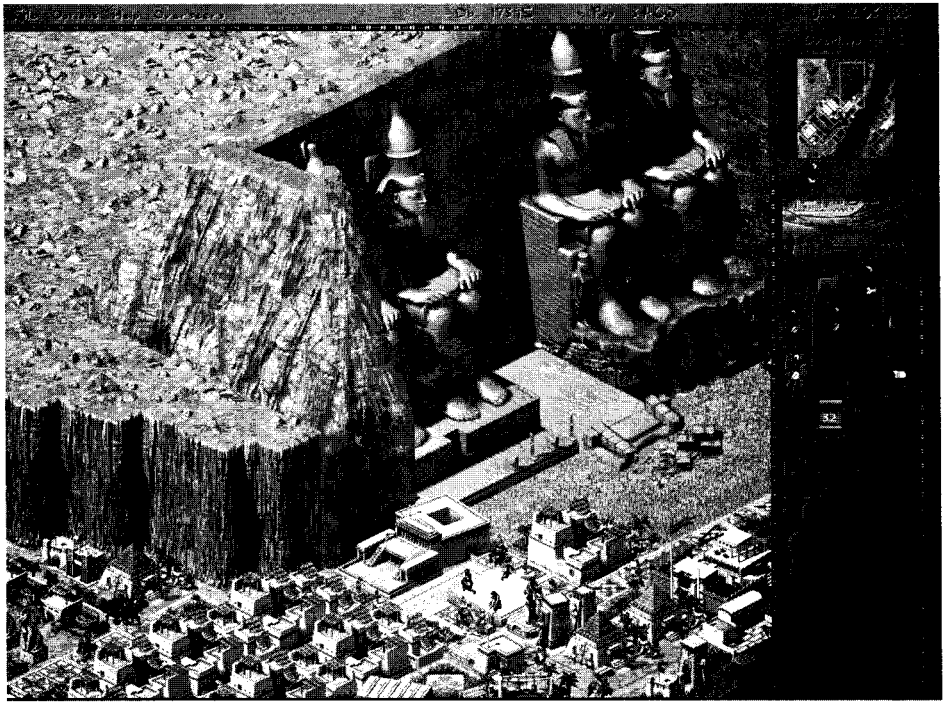

FIGURE 4.8 The cultural context of *Cleopatra: Queen of the Nile* influences everything on the screen, including the icons and text.

or small-scale (personal events and interactions), that preceded the time when the game takes place. This prior history helps to establish why the culture is the way it is. A warlike people should have a history of warfare; a mercantile people should have a history of trading. In designing the backstory, don't go into too much depth too early, however. As we warned in Chapter 3, "Game Concepts," the story must serve the game, not the other way around.

For most game worlds, it's not necessary to define the culture or cultures in great detail. A game set in your own culture can simply use the things that you see around you. The *SimCity* series, for example, is clearly set in present-day America (European cities are rarely so rectilinear), and it looks like it. But when your game begins to deviate from your own culture, you need to start thinking about how it deviates and what consequences that deviation has.

Physical Surroundings The physical surroundings define what the game actually looks like. This is a part of game design in which it's most helpful to be an artist or to work closely with one. In the early stages of design, you don't need to make drawings of every single thing that can appear in the game world (although sooner or later someone is going to have to do just that). For the time being, it's important to create concept sketches: pencil or pen-and-ink drawings of key visual elements in the game. Depending on what your game is about, this can include buildings, vehicles, clothing, weaponry, furniture, decorations, works of art, jewelry, religious or magical items, logos or emblems, and on and on. See *Grim Fandango* (Figure 4.9) for a particularly distinctive example. Constructed artifacts in particular are influenced by the game's culture. A powerful and highly religious people are likely to have large symbols of their spirituality: stone temples or cathedrals. A warlike nomadic people will have animals or vehicles to carry their gear and weapons suitable for use on the move. (Note that these might be future nomads, driving robo-camels.)

Nor should you neglect the natural world. Games set in urban or indoor environments consisting entirely of manufactured objects feel sterile. Think about birds and animals, plants and trees, earth, rocks, hills, and even the sky. Consider the climate: Is it hot or cold, wet or dry? Is the land fertile or barren, flat or mountainous? These qualities, all parts of a real place, are opportunities to create a visually rich and distinctive environment.

If your world is chiefly indoors, of course, you don't have to think about nature much unless your character passes a window, but there are many other issues to think about instead. Where does the light come from? What are the walls, floors, and ceilings made of, and how are they decorated? Why is this building here? Do the rooms have a specific purpose, and if so, what? How can you tell the purpose of a room from its contents? Does the building have multiple stories? How does the player get from one floor to another?

Physical surroundings include sounds as well as sights: music; ambient environmental sounds; the particular noises made by people, animals, machinery,

FIGURE 4.9 *Grim Fandango* combines Aztec, Art Deco, and Mexican Day of the Dead themes.

and vehicles. Thinking about the sounds things make at the same time that you think about how they look helps create a coherent world. Suppose you're inventing a six-legged reptilian saddle animal with clawed feet rather than hooves. How does that creature sound as it moves? Its scales might rattle a bit. Its feet are not going to make the characteristic clop-clop sound of a shod horse. With six legs, it will probably have some rather odd gaits, and those should be reflected in the sound it makes.

The physical surroundings are primarily responsible for setting the tone and mood of the game as it is played, whether it's the lighthearted cheerfulness of *Mario* or the dimly lit suspense of the *Thief* series (see Figure 4.10). The sound, and especially the music, will contribute greatly to this. Think hard about the kind of music you want, and consider what genres will be appropriate. Stanley Kubrick listened to hundreds of records to select the music for *2001: A Space Odyssey,* and he astonished the world with his choice of "The Blue Danube" for the shuttle docking sequence. You have a similar opportunity in designing your game.

Detail Every designer must decide how much detail the game world needs—that is to say, how richly textured the world will be and how accurately modeled its characteristics will be. To some extent, your answer will be determined by the level of realism that you want, but technical limitations and time constraints

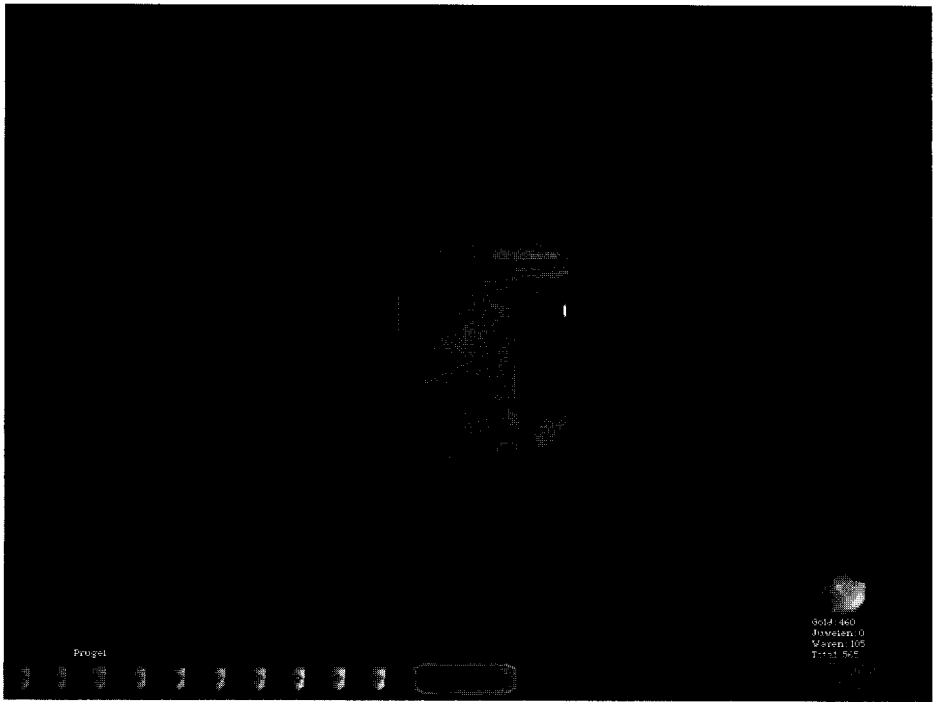

FIGURE 4.10 Hiding in the shadows in *Thief II: The Metal Age.*

will necessarily restrict your ambitions. No football game goes to the extent of modeling each fan in the stadium, and few flight simulators model all the physical characteristics of their aircraft. Detail helps to support the fantasy, but it always costs, in development time and in memory or disk space on the player's machine. In an adventure game, it should, in principle, be possible to pick up everything in the world; in practice, this just isn't practical. In consequence, the player knows that if an object *can* be picked up, it must be important for some reason; if it can't be picked up, it isn't important. Similarly, in god games, it's common for all the people to look alike; they're often male adults. Bullfrog Productions once designed a god game with both male and female adults, but there wasn't enough time for the artists to model children as well. People simply had to be born into the world full grown. Lionhead's *Black and White,* on the other hand, managed to include men, women, and children.

Here's a good rule of thumb for determining the level of detail your game will contain: Include as much detail as you can to help the game's immersiveness, *up to* the point at which it begins to harm the gameplay. If the player must struggle to look after everything you've given him, the game probably has too much detail. (This is one of the reasons war games tend to have hundreds rather than hundreds of thousands of units. The player in a war game can't delegate tasks to intelligent subordinates, so the numbers have to be kept down to a size that he can reasonably manage.) A spectacularly detailed game that's no fun to play won't sell many copies.

Defining a Style In describing how your world is going to look, you are defining a visual style for your game that will influence a great many other things as well: the character design, the user interface, perhaps the manual, and even the design of the box and the advertising. You actually have two tasks to take on here: defining the style of things *in* your world (that is, its intrinsic style), and also defining the style of the artwork that will *depict* your world. They aren't the same. For example, you can describe a world whose architectural style is inspired by Buddhist temples but draw it to look like a *film noir* movie. Or you could have medieval towns with half-timbered houses but depicted in a slightly fuzzy, Impressionistic style. You must choose both your content and the way in which you will present that content.

Both decisions will significantly influence the player's experience of the game, jointly creating a distinct atmosphere. In general, the style of depiction tends to superimpose its mood on the style of the object depicted. For example, a Greek temple might be architecturally elegant, but if its style of drawing suggests a Looney Tunes cartoon, players will expect something wacky and outrageous to take place there. The drawing style imposes its own atmosphere over the temple, no matter how majestic it is. For one example, take a look at *XIII* (see Figure 4.11). All the locations in *XIII* were rendered in a flat-shaded style reminiscent of the comic book that inspired the game.

FIGURE 4.11 *XIII* overlays the Anasazi cliff dwellings of the American Southwest, and many other places, with a comic book style.

Unless you're the lead artist for your game as well as its designer, you probably shouldn't—or won't be allowed to—do this alone. Your art team will have ideas of its own, and you should listen to those suggestions. The marketing department might insist on having a say as well. It's important, however, that you try to keep the style harmonious and consistent throughout your game. Too many games have been published in which different sections had wildly differing art styles because no one held and enforced a single overall vision.

Overused Settings All too often, games borrow settings from one another or from common settings found in the movies, books, or television. A huge number of games are set in science fiction and fantasy worlds, especially the quasi-medieval, sword-and-sorcery fantasy inspired by J. R. R. Tolkien and *Dungeons & Dragons*, popular with the young people who used to be the primary—indeed, almost the only—market for computer games. But a more diverse audience plays games nowadays, and they want new worlds to play in. You should look beyond these hoary old staples of gaming. As we mentioned in Chapter 3, *Interstate '76* was inspired by 1970s TV shows. It included cars, clothing, music, and language from that era, all highly distinctive and evocative of a particular culture. *Interstate '76* had great gameplay, but what really set it apart from its competitors was that it looked and sounded like nothing else on the market.

Especially if you are going to do science fiction or fantasy, try to make your game's setting distinctively different. At present, real spacecraft built by the United States or Russia look extremely functional, just as the first cars did in the 1880s, and the spacecraft in computer games tend to look that way also. But as cars became more common, they began exhibiting stylistic variation to appeal to different kinds of people, and now there is a whole school of aesthetics for automotive design. As spacecraft become more common, and especially as we start to see personal spacecraft, we should expect them to exhibit stylistic variation as well. This is an area in which you have tremendous freedom to innovate.

The same goes for fantasy. Forget the same old elves, dwarves, wizards, and dragons (Figure 4.12). Look to other cultures for your heroes and villains. Right now about the only non-Western culture portrayed with any frequency in games is Japanese (feudal, present-day, and future) because the Japanese make a lot of games and their style has found some acceptance in the West as well. But there are many more sources of inspiration around the world, most untapped. Around AD 1200, while the rulers of Europe were still holed up in cramped, drafty castles, Islamic culture reached a pinnacle of grace and elegance, building magnificent palaces filled with the riches of the Orient and majestic mosques of inlaid stone. Yet this proud and beautiful civilization seldom appears in computer games because Western game designers haven't bothered to learn about it or don't even know it existed. Set your fantasy in Valhalla, in Russia under Peter the Great, in the arctic tundra, at Angkor Wat, at Easter Island, or at Machu Picchu.

FIGURE 4.12 Yet another quasi-medieval setting: *Armies of Exigo.*

Sources of Inspiration Art and architecture, history and anthropology, literature and religion, clothing fashions, and product design are all great sources of cultural material. Artistic and architectural movements, in particular, offer tremendous riches: Art Nouveau, Art Deco, Palladian, Brutalism. If you haven't heard of one of these, go look it up now. Browse the Web or the art, architecture, and design sections of the bookstore or the public library for pictures of interesting objects, buildings, and clothing. Carry a digital camera around and take pictures of things that attract your eye, then post the pictures around your workspace to inspire yourself and your coworkers. Collect graphic scrap from anywhere that you find it. Try old copies of *National Geographic*. Visit museums of art, design, and natural history if you can get to them; one of the greatest resources of all is travel if you can afford it. A good game designer is always on the lookout for new ideas, even when he's ostensibly on vacation.

It's tempting to borrow from our closest visual neighbor, the movies, because the moviemakers have already done the visual design work for us. *Blade Runner* introduced the decaying urban future; *Alien* gave us disgustingly biological aliens rather than little green men. The problem with these looks is

that they've already been borrowed many, many times. You can use them as a quick-and-dirty backdrop if you don't want to put much effort into developing your world, and players will instantly recognize the world and know what the game is about. But to stand out from the crowd, consider other genres. *Film noir,* the Marx Brothers, John Wayne westerns, war movies from the World War II era, costume dramas of all periods—from the silliness of *One Million Years B.C.* to the Regency elegance of *Pride and Prejudice,* they're all grist for the mill.

Television goes through its own distinct phases, and because it's even more fashion-driven than the movies, it is ripe for parody. The comedies of the 1950s and 1960s and the nighttime soaps of the 1970s and 1980s all had characteristic looks that seem laughable today but that are immediately familiar to most adult Americans. This is not without risk; if you make explicit references to American popular culture, non-Americans and children might not get the reference. If your gameplay is good enough, though, it shouldn't matter.

The Emotional Dimension

The emotional dimension of a game world defines not only the emotions of the people in the world but, more important, the emotions that you, as a designer, hope to arouse in the player. Multiplayer games evoke the widest variety of emotions, because the players are socializing with real people and making friends (and, alas, enemies) as they play. Single-player games have to influence players' emotions with storytelling and gameplay. Action and strategy games are usually limited to a narrow emotional dimension, but other games that rely more heavily on story and characters can offer rich emotional content that deeply affects the player.

The idea of manipulating the player's emotions might seem a little strange. For much of their history, games have been seen only as light entertainment, a means to while away a few hours in a fantasy world. But just because that's all they have been doesn't mean that's all they *can* be. In terms of the richness of their emotional content, games are now just about where the movies were when they moved from the nickelodeon to the screen. Greater emotional variety will enable us to reach new players who value it.

Influencing the Player's Feelings Games are intrinsically good at evoking feelings related to the player's efforts to achieve something. They can create "the thrill of victory and the agony of defeat," as the old *ABC's Wide World of Sports* introduction used to say. Use the elements of risk and reward—a price for failure and a prize for success—to further heighten these emotions. Games can also produce frustration as a by-product of their challenges, but this isn't a good thing; some players tolerate frustration poorly and will stop playing if it gets too high. To reduce frustration, build games with player-settable

difficulty levels and make sure the easy level is genuinely easy. Excitement and anticipation, too, play large roles in many games. If you can devise a close contest or a series of stimulating challenges, you will generate these kinds of emotions.

Construction and management simulations, whose challenges are usually financial, arouse the player's feelings of ambition, greed, and desire for power or control. They also offer the emotional rewards of creative play. Give the player a way to amass a fortune, then let him spend it to build things of his own design. The *SimCity* and various Tycoon games (*RollerCoaster Tycoon, Railroad Tycoon,* and so on), do this well. Artificial life games and god games such as *Black and White* or *The Sims* let the player control the lives of autonomous people and creatures for better or worse, satisfying a desire to be omnipotent over a world of beings subject to the player's will. (This may not be a very admirable fantasy, but it's one that a lot of people enjoy having fulfilled.)

To create suspense, surprise, and fear, use the time-honored techniques of horror films: darkness, sudden noises, disgusting imagery, and things that jump out at the player unexpectedly. Don't overdo it, however. A gore-fest becomes tedious after a while, and Alfred Hitchcock demonstrated that the shock is all the greater when it occurs infrequently. For suspense to work well, the player needs to feel vulnerable and unprepared. Don't arm him too heavily; the world's a lot less scary when you're carrying a rocket launcher around. ***Survival horror*** is a popular subgenre of action game, as seen in the *Silent Hill* and *Resident Evil* series, that uses these approaches.

Another class of emotions is produced by interactions between characters and the player's identification with one of them. Love, grief, shame, jealousy, and outrage are all emotions that can result from such interactions. (See Figure 4.13 for a famous example.) To evoke them, you'll have to use storytelling techniques, creating characters that the player cares about and believes in and credible relationships between them. Once you get the player to identify with someone, threaten that character or place obstacles in his path in a way that holds the player's interest. This is the essence of dramatic tension, whether we're watching Greek tragedy or reading *Harry Potter*. Something important must be at stake. The problem need not necessarily be physical danger; it can also be a social, emotional, or economic risk. The young women in Jane Austen's novels were not in imminent peril of death or starvation, but it was essential to their family's social standing and financial future for them to make good marriages. The conflict between their personal desires and their family obligations provides the tension in the novels.

A good many games set the danger at hyperbolic levels with extreme claims such as "The fate of the universe rests in your hands!" This kind of hyperbole appeals to young people, who often feel powerless and have fantasies about being powerful. To adults, it just sounds a bit silly. At the end of *Casablanca*, Rick said, "The problems of three little people don't amount to a

FIGURE 4.13 The death of Aeris, from *Final Fantasy VII*.

hill of beans in this crazy world," but he was wrong. The whole movie, a movie still popular over a half century after its first release, is about the problems of those three little people. For the duration of the film, these problems hold us entranced. It isn't necessary that the fate of the world be at stake; it is the fates of Rick, Ilsa, and Victor that tug at our hearts.

COMMANDMENT: Avoid Implausible Extremes

Don't make your game about the fate of the world if you are serious about producing emotional resonance with your audience; the fate of the world is too big to grasp. Make your game about the fate of people instead.

The Limitations of Fun Most people think that the purpose of playing games is to have fun, but *fun* is a rather limiting term. It tends to suggest excitement and pleasure, either a physical pleasure such as riding a roller coaster, a social pleasure such as joking around with friends, or an intellectual pleasure such as playing cards or a board game. The problem with striving for fun is that it tends to limit the emotional range of games. Suspense, excitement, exhilaration,

surprise, and various forms of pleasure fall within the definition of fun, but not pity, jealousy, anger, sorrow, guilt, outrage, or despair.

You might think that nobody in their right mind would want to explore these emotions, but other forms of entertainment—books, movies, television—do it all the time. And, in fact, that's the key: Those media don't provide only fun; they provide entertainment. People can be entertained in all sorts of ways. Movies with sad endings aren't fun in the conventional sense, but they're still entertaining. Although we say that we make games, what we in fact make is interactive entertainment. The potential of our medium to explore emotions and the human condition is much greater than the term *fun game* allows for.

All that said, however, bear in mind that most publishers and players want fun. Too many inexperienced designers are actually more interested in showing how clever they are than in making sure the player has a good time; they place their own creative agenda before the player's enjoyment. As a designer, you must master the ability to create fun—light enjoyment—before you move on to more complex emotional issues. Addressing unpleasant or painful emotions successfully is a greater aesthetic challenge and is commercially risky besides.

You Can't Paint Emotion by Numbers The idea that games should include more emotional content and should inspire more emotions in players has been gaining ground in the game industry for several years. Unfortunately, this has produced a tendency to look for quick and easy ways to do it, mostly by relying on clichés. The young man whose family is killed and who is obsessed by his desire for revenge or the beautiful princess who needs to be rescued both belong more to fairy tales than to modern fiction. That may be all right if your game aspires to nothing more, but it won't do if you're trying to create an experience with any subtlety. Beware of books or articles that offer simple formulas for emotional manipulation: "If you want to make the player feel X, just do Y to the protagonist." An imaginative and novel approach to influencing the players' feelings requires the talents of a skilled storyteller. Paint-by-numbers emotional content has all the sensitivity and nuance of paint-by-numbers art.

The Ethical Dimension

The ethical dimension of a game world defines what right and wrong mean within the context of that world. At first glance, this might seem kind of silly—it's only a game, so there's no need to talk about ethics. But most games that have a setting, a fantasy component, also have an ethical system that defines how the player is supposed to behave. As designers, we are the gods of the game's world, and we establish its morality. When we tell a player that he must perform certain actions to win the game, we are defining those actions as good or desirable. Likewise, when we say that the player must avoid certain actions, we are defining them as bad or undesirable. The players who come into the world must adopt our standards or they will lose the game.

In some respects, the morality of a game world is part of its culture and history, which we earlier classed with the environmental dimension, but we've broken it out for separate discussion because it poses special design problems. The ethics of most game worlds deviate somewhat from those of the real world—sometimes they're entirely reversed. Games allow, even require, you to do things that you can't do in the real world. The range of actions that the game world permits is typically narrower than in the real world (you can fly your F-15 fighter jet all you want, but you can't get out of the plane), but often the permitted actions are quite extreme: killing people, stealing things, and so on.

Moral Decision-Making On the whole, most games have simple ethics: clobber the bad guys, protect the good guys. It's not subtle but it's perfectly functional; that's how you play checkers. Not many games explore the ethical dimension in any depth. A few include explicit moral choices, but unfortunately, these tend to be namby-pamby, consistently rewarding good behavior and punishing bad behavior. Such preachy material turns off even children, not to mention adults. But you can build a richer, more involving game by giving the player tough moral choices to make. Ethical ambiguity and difficult decisions are at the heart of many great stories and, indeed, much of life. Should you send a platoon of soldiers to certain death to save a battalion of others? How would you feel if you were in the platoon?

FYI *The Peculiar Morality of* America's Army

America's Army, a team-based multiplayer first-person shooter (FPS) game distributed free by the U.S. Army, is intended to serve as an education and recruiting tool, teaching players how real soldiers are supposed to fight (Figure 4.14). It differs from most FPS games in two significant ways. First, it requires that the player act in conformance with the actual disciplinary requirements of the Army, so it detects and punishes dishonorable behavior. The Army is anxious to make the point that soldiering comes with serious moral responsibilities. Second, and rather strangely, all sides in a firefight see themselves as U.S. soldiers, and they see the enemy as rather generic terrorists. The Army did not want to give any player the chance to shoot at American soldiers, even though they are obviously shooting at one another. So a player sees himself and his teammates as U.S. soldiers carrying M-16 rifles, but his opponents see him and his teammates as terrorists carrying AK-47s. In other words, everyone perceives himself as a

▸▸ CONTINUED ON NEXT PAGE

FIGURE 4.14 Our guys get the drop on somebody who also thinks he's one of our guys.

good guy and his opponents as a bad guy, and the game's graphics literally present two different versions of reality to each team. By avoiding a politically unacceptable design (letting players shoot at American soldiers in a game made by the U.S. Army), they created a moral equivalence: The question of who is in the right is purely a matter of perspective.

America's Army's trick of displaying different versions of the game world to different players may be unique among video games. We would be interested to see some other uses for it.

In many role-playing games, you can choose to play as an evil character who steals and kills indiscriminately, but other characters will refuse to cooperate with you and might even attack you on sight. It's easier to get money by robbing others than by working for it, but you may pay a price for that behavior in other ways. Rather than impose a rule that says, "Immoral behavior is forbidden," the game implements a rule that says, "You are free to make your own moral choices, but be prepared to live with the consequences." The player can play however he sees fit,

but there are advantages and disadvantages either way. This is a more adult approach to the issue than simply punishing bad behavior.

All that said, we strongly discourage creating games that reward or even allow the player to do truly hateful things. One of the most repugnant games ever created was a cartridge for the Atari 2600 console called *Custer's Revenge*, in which the player's avatar, a cowboy, was supposed to try to rape a Native American woman who was tied to a pole. (The cartridge was independently published and was not supported or endorsed by Atari.) This kind of thing is beyond bad taste; it's pathological. Games that expect a player to participate in sexual assault, torture, or child abuse serve only to gratify their designers' sick fantasies while tarnishing the reputation of game industry as a whole. Although no one would condemn all cinema on the basis of one offensive movie, interactive entertainment is still a young enough medium that we all get tarred with the same brush . Like it or not, one game can affect the entire industry. The best way to avoid censorship is to exercise some judgment in the first place.

You must be sure to explain the ethical dimension of your game clearly in the manual, in introductory material, or in mission briefings. For example, some games that have hostage-rescue scenarios make the death of a hostage a loss condition: If a hostage dies, the player loses. This means that the player has to be extra careful not to kill any hostages, even at the risk of his own avatar's life. In other games, the only loss condition is the avatar's death. In this case, many players will shoot with complete abandon, killing hostages and their captors indiscriminately. In real life, of course, the truth is somewhere in between. Police officers who accidentally shoot a hostage are seldom prosecuted unless they've been grossly negligent, but it doesn't do their careers any good. You can emulate this by penalizing the player somehow. To be fair to the player, however, you need to make this clear at the outset.

The ethical dimensions of multiplayer games, whether online or local, are an enormous and separate problem. We discuss this at length in Chapter 21, "Online Games," which is available on the Companion Website.

A Word about Game Violence It's not part of our mission in this book to debate, much less offer an answer for, the problem of whether violent video games cause violent behavior in children or adults. This is a psychological question that will be resolved only after prolonged and careful study. Unfortunately, a good many people on both sides of the issue seem to have made up their minds already, and arguments continue to rage in the halls of Congress and elsewhere, supported for the most part by very few facts.

For you, as a designer, however, we do have a few suggestions. The essence of many games is conflict, and conflict is often represented as violence in varying degrees of realism. Chess is a war game in which pieces are killed—removed from the board—but nobody objects to the violence of chess; it's entirely abstract. American football is a violent contact sport in which real people get injured all the time, but there are no serious efforts to ban football, either.

The only way to remove violence from gameplay would be to prohibit most of the games in the world because most contain violence in some more-or-less abstract form. The issue is not violence, per se, but how violence is portrayed and the circumstances under which violence is acceptable.

Games get into political trouble when they have a close visual similarity to the real world but an ethical dimension that is strongly divergent from the real world. The game *Kingpin* encouraged the player to beat prostitutes to death with a crowbar, with bloodily realistic graphics. Not surprisingly, it earned a lot of criticism. On the other hand, *Space Invaders* involved shooting hundreds of aliens, but it was so visually abstract that nobody minded. In other words, the more a game resembles reality visually, the more its ethical dimension should resemble reality as well, or it's likely to make people upset. If you want to make a game in which the player is encouraged to shoot anything that moves, you're most likely to stay out of trouble if those targets are nonhuman and just quietly disappear rather than break apart into bloody chunks. Tie your ethical realism to your visual realism.

Computer games are about bringing fantasies to life, enabling people to do things in make-believe that they couldn't possibly do in the real world. But make-believe is a dangerous game when played by people for whom the line between fantasy and reality is not clear. Young children (those under about age eight) don't know much about the real world; they don't know what is possible and what isn't, what is fantasy and what is reality. An important part of raising children is teaching them this difference. But until they've learned it, it's best to make sure that any violence in young children's games is suitably proportionate to their age. The problem with showing violence to children is not the violence, per se, but the notion that there's no price to pay for it. For a detailed and insightful discussion of how children come to terms with violence, read *Killing Monsters: Why Children Need Fantasy, Super Heroes, and Make-Believe Violence* by Gerard Jones (Jones, 2002)

Ultimately, the violence in a game should serve the gameplay. If it doesn't, then it's gratuitous and you should consider doing without it. A few designers, mostly young and male, seem to think that deliberately including gratuitous violence in their games is a gesture of rebellion against the antiviolence crusaders. We encourage these gentlemen to grow up and to remember who the game is for. Our customers don't buy games to see rebellious gestures; they buy them to be entertained.

Realism

In Chapter 2, "Design Components and Processes," we introduced the concept of *realism* in the context of a discussion about core mechanics. All games, no matter how realistic, require some abstraction and simplification of the real

world. Even the multimillion-dollar flight simulators used for training commercial pilots are incapable of turning the cockpit completely upside down. This event is so rare (we hope) in passenger aircraft that it's not worth the extra money it would take to simulate it.

The degree of realism of any aspect of a game will be found on a continuum of possibilities from highly representational at one end to highly abstract at the other. Players and game reviewers often talk about realism as a quality of an entire game, but in fact, the level of realism differs in individual components of the game. Many games have highly realistic graphics but unrealistic physics. A good many first-person shooters accurately model the performance characteristics of a variety of weapons—their rate of fire, size of ammunition clips, accuracy, and so on—but allow the player to carry about ten of them at once with no reduction in speed or mobility. Therefore, realism is not a single dimension of a game world, but a multivariate quality that applies to all parts of the game and everything in it. (If you're mathematically inclined, think of realism as a vector over every aspect of the game, with values ranging from 0, entirely abstract, to 1, entirely realistic. However, no value will ever equal 1 because nothing about a game is ever entirely realistic—if it were, it would be life, not a game.)

The representational/abstract dichotomy is mostly useful as a starting point when thinking about what kind of a game you want to create. On the one hand, if you're designing a cartoony action game such as *Banjo-Kazooie,* you know that it's going to be mostly abstract. As you design elements of the game, you'll need to ask yourself how much realism you want to include. Can your avatar be hurt when he falls long distances? Is there a limit to how much he can carry at once? Do Newtonian physics apply to him, or can he change directions in midair?

On the other hand, if you're designing a game that people will expect to be representational—a vehicle or sports simulation, for example—then you have to think about it from the other direction. What aspects of the real world are you going to remove? Most modern fighter aircraft have literally hundreds of controls; that's why only a special group of people can be fighter pilots. To make a fighter simulation accessible to the general public, you'll have to simplify a lot of those controls. Similarly, a fighter jet's engine is so powerful that certain maneuvers can knock the pilot unconscious or even rip the plane apart. Are you going to simulate these limitations accurately, or make the game a little more abstract by not requiring the player to think about them?

As we have said, every design decision you make must serve the entertainment value of the game. In addition, every design decision must serve your goals for the game's overall degree of realism. Some genres demand more realism than others. It's up to you to establish how much realism you want and in what areas. During the design process, you must continually monitor your decisions to see if they are meeting your goals.

Summary

At this point, you should know when and where your game takes place. You will have answered a huge number of questions about what your world looks like, what it sounds like, who lives there, and how they behave. If you've done it thoroughly, your game world will be one in which a player can immerse himself, a consistent fantasy that he can believe in and enjoy being part of. The next step is to figure out what's going to happen there.

Test Your Skills

MULTIPLE CHOICE QUESTIONS

1. A game world is
   A. an essential element of every game.
   B. the mental state of a player playing a game.
   C. the fictional setting of a game, if it has one.
   D. a "presentation layer" that is unrelated to the game's rules or gameplay.

2. In defining the physical dimension of a game world, it is important to consider its
   A. length, width, depth, and duration.
   B. dimensionality, scale, and boundaries.
   C. aesthetic and musical styles.
   D. relationship to the player's own surroundings.

3. Having an unexplained boundary in a representational game world
   A. is a good way to create a sense of surrealism.
   B. appears to the player as a violation of the laws of physics.
   C. is unavoidable due to the limitations of 3D hardware.
   D. may harm the player's immersion in the world.

4. In game worlds that are simulations of some kind, time usually moves at a rate
   A. faster than that of the real world.
   B. slower than that of the real world.
   C. the same as that of the real world.
   D. that can always be adjusted by the player.

5. What is anomalous time?
   A. Time whose rate can be adjusted by the player.
   B. Time in which different things appear to change at inconsistent rates.
   C. Time that flows backward.
   D. Time whose rate is different from real-world time.
6. In a fictional game world, the cultural characteristics of the imaginary inhabitants
   A. define everything about the game world.
   B. are abstractions that won't affect the final product.
   C. have a direct bearing on the rate of time in the game world.
   D. influence the appearance and function of all the manmade objects in the game world.
7. Which of the following is *not* a reason for limiting the amount of detail in a game?
   A. Development costs and time.
   B. Player ability to manage the game.
   C. Limitations of the target hardware.
   D. The size of the publisher's marketing budget.
8. Defining the aesthetic style of a game includes deciding the style of the content of the game world itself and which other decision?
   A. The programming language that the developers should use.
   B. The dimensionality of the physical dimension.
   C. The size of the audio budget.
   D. The style of the art with which you present the world.
9. Which is a disadvantage of borrowing a commonly used fictional setting?
   A. The players will be unfamiliar with the world and uncertain of its rules.
   B. It is more difficult to design a consistent, harmonious look for the world.
   C. It may be difficult to differentiate your game from similar ones on the market.
   D. Testing and balancing the game are harder to do.
10. Which are reasonable sources to study for inspiration in designing a fictional world?
    A. Botany, zoology, and geography.
    B. Myths, fables, and stories.
    C. History, biography, and architecture.
    D. All of the above.

11. Traditional gameplay mechanics are good at producing which group of emotions?
    A. Jealousy, hatred, and fear.
    B. Envy, love, and bitterness.
    C. Triumph, dejection, and frustration.
    D. All of the above.

12. Which kinds of games are likely to evoke the greatest variety of emotions?
    A. Card games.
    B. Handheld games.
    C. Multiplayer games.
    D. Role-playing games.

13. Why are video games more ethically problematic than noninteractive forms of entertainment?
    A. Video games can require the player to act unethically if he wants to get to the end of the game.
    B. The characters in video games are more well rounded than in other media.
    C. Video games are necessarily more violent than other forms of entertainment.
    D. All of the above.

14. When is it important to make the ethical system of a game world clear to the player?
    A. Only when the players are likely to be children.
    B. Whenever it is possible for the player's avatar to die in the game.
    C. When the game contains religious themes.
    D. When the game's ethical system deviates significantly from that of the real world.

EXERCISES

1. Imagine that you could use any content you liked in a game without regard for copyright. Choose one of the following game genres and then select a famous painter, photographer, or filmmaker, and a famous composer or musician, whose work you would like to use to create the appropriate emotional tone for your game. Create a short

presentation (PowerPoint or similar) that shows how the images and music work together for your purpose. The genres are action (survival horror subgenre), real-time strategy (modern warfare), or children's nonviolent adventure game.

2. Write an essay discussing two contrasting systems of morality in games you have played or in two games assigned by your instructor. What actions does each game reward, and what actions does it punish? Address the relationship between right behavior in the two game worlds and right behavior in the real world.

DESIGN QUESTIONS

Questions to Ask Yourself about the Physical Dimension

1. Does my game require a physical dimension? What is it used for? Is it an essential part of gameplay or merely cosmetic?
2. Leaving aside issues of implementation or display, how many imaginary spatial dimensions does my game require? If there are three or more, can objects move continuously through the third and higher dimensions, or are these dimensions partitioned into discrete "layers" or zones?
3. How big is my game world, in light-years or inches? Is accuracy of scale critical, as in a football game, or not, as in a cartoon-like action game?
4. Will my game need more than one scale, for indoor versus outdoor areas, for example? How many will it actually require?
5. How am I going to handle the relative sizes of objects and people? What about their relative speeds of movement?
6. How is my world bounded? Am I going to make an effort to disguise the "edge of the world," and if so, with what? What happens if the player tries to go beyond it?

Questions to Ask Yourself about the Temporal Dimension

1. Is time a meaningful element of my game? Does the passage of time change anything in the game world even if the player does nothing, or does the world simply sit still and wait for the player to do something?
2. If time does change the world, what effects does it have? Does food decay, and do light bulbs burn out?

3. How does time affect the player's avatar? Does he get hungry or tired?
4. What is the actual purpose of including time in my game? Is it only a part of the atmosphere, or is it an essential part of the gameplay?
5. Is there a time scale for my game? Do I need to have measurable quantities of time, such as hours, days, and years, or can I just let time go by without bothering to measure it? Does the player need a clock to keep track of time?
6. Are there periods of time that I'm going to skip or do without? Is this going to be visible to the player, or will it happen seamlessly?
7. Do I need to implement day and night? If I do, what will make night different from day? Will it merely look different, or will it have other effects as well? What about seasons?
8. Will any of the time in my game need to be anomalous? If so, why? Will that bother the player? Do I need to explain it away, and if so, how?
9. Should the player be allowed to adjust time in any way? Why, how, and when?

Questions to Ask Yourself about the Environmental Dimension

1. Is my game world set in a particular historical period or geographic location? When and where? Is it an alternate reality, and if so, what makes it different from ours?
2. Are there any people in my game world? What are they like? Do they have a complex, highly organized society or a simple, tribal one? How do they govern themselves? How is this social structure reflected in their physical surroundings? Are there different classes of people, guilds, or specialized occupations?
3. What do my people value? Trade, martial prowess, imperialism, peace? What kinds of lives do they lead in pursuit of these ends? Are they hunters, nomadic, agrarian, industrialized, even postindustrial? How does this affect their buildings and clothing?
4. Are my people superstitious or religious? Do they have institutions or religious practices that will be visible in the game? Are there religious buildings? Do the people carry charms or display spiritual emblems?
5. What are my people's aesthetics like? Are they flamboyant or reserved, chaotic or orderly, bright or subtle? What colors do they like? Do they prefer straight lines or curves?

6. If there aren't any people in the game, what are there instead, and what do they look like and how do they behave?
7. Does my game take place indoors or outdoors, or both? If indoors, what are the furnishings and interior decor like? If outdoors, what is the geography and architecture like?
8. What are the style and mood of my game? How am I going to create them with art, sound, and music?
9. How much detail can I afford in my game? Will it be rich and varied or sparse and uncluttered? How does this affect the way the game is played?

Questions to Ask Yourself about the Emotional Dimension

1. Does my game have a significant emotional dimension? What emotions will my game world include?
2. How does emotion serve the entertainment value of my game? Is it a key element of the plot? Does it motivate characters in the game or the player himself?
3. What emotions will I try to inspire in the player? How will I do this? What will be at stake?

Questions to Ask Yourself about the Ethical Dimension

1. What constitutes right and wrong in my game? What player actions do I reward and what do I punish?
2. How will I explain the ethical dimensions of the world to the player? What tells him how to behave and what is expected of him?
3. If my game world includes conflict or competition, is it represented as violence or as something else (racing to a finish, winning an economic competition, outmaneuvering the other side)?
4. What range of choices am I offering my player? Are there both violent and nonviolent ways to accomplish something? Is the player rewarded in any way for minimizing casualties, or is he punished for ignoring them?
5. In many games, the end—winning the game—justifies any means that the game allows. Do I want to define the victory conditions in such a way that not all means are acceptable?
6. Are any other ethical questions present in my game world? Can my player lie, cheat, steal, break promises, or double-cross anyone? Can she

abuse, torture, or enslave anyone? Are there positive or negative consequences for these actions?

7. Does my world contain any ethical ambiguities or moral dilemmas? How does making one choice over another affect the player, the plot, and the gameplay?
8. How realistic is my portrayal of violence? Does the realism appropriately serve the entertainment value of the game?