Part I

Why Do People Play Games?

Chapter 1

You Are the One

Games are about creativity! Right? Games are about great gameplay ideas translated into great graphics and sound! Right? And because they're creative there is no place for science and experiments and all that measurement stuff that comes with them. Games should be purely about creativity! Right? Wrong! They can't be. Games are probably the most technological, most science-based entertainment medium there is. There are aspects of physics and rag dolls and collision detection and a whole lot of other stuff involved, not to mention math and programming. Games are where creativity and technology meet head on. That's what makes them so fascinating to study.

This book is an investigation into the nature of computer games. It's an invasion that gets below the pixelated surface and digitized sound the player sees and hears; that gives designers and producers and publishers tools to gain their own insights into how existing games work, to get some clues as to where games are going and, maybe, to give the investigator an edge in a hugely competitive world. There's bound to be a few maybes here; games are too big and complex and there are too many of them for there not to be a few maybes.

This book offers you some very practical tools to work with in analyzing games; they are also tools to think and invent with. It's all based on a module Clive ran in the School of Computing at Teesside University in the North East of England. The module was called "Games Futures" and was mostly taken by students in their final year of the BSc Computer Games Design degree. It was designed to make students think about computer games in a more fundamental way. By their very nature, computer games are designed to deceive. They are designed so that the player is deceived into believing that the flickering pixels and digitized sounds amount to something real: a planet in the far future, a steampunk city, a football game, a Formula One Grand Prix, and so on. Of course the player is more than willing to go along with this deception if he or she possibly can. Most of us want to be deceived by computer games. That is when the fun starts. Hence the term "willing suspension of disbelief" coined by the poet Coleridge (1817) way back in the beginning of the nineteenth century. He was talking about the power of poetry to conjure up images and imaginary worlds but his words apply just as well to computer games.

Game Invaders: The Theory and Understanding of Computer Games, First Edition. Clive Fencott, Mike Lockyer, Jo Clay, and Paul Massey.

Figure 1.1

But our very willingness to suspend our disbelief becomes a real problem when we try to understand why we submit so readily to the deceptions of computer games. They are so good at deceiving us it is difficult to be objective when we need to see through the illusion.

We need some help, but not the kind of help shown in Figure 1.1!

But let's think about *The Matrix* for a moment. At the climactic moment of the film, Neo—who already knows that the world people live in is a machine-made illusion—is brought back to life by Trinity. He gets back on his feet and looks down the corridor at the three sentinels walking away from him. They sense his presence and turn to face him with amazement. Neo now sees "through" the superficial world created by the machines and sees instead the code from which it is constructed. But he knows more than he apparently sees. As the sentinels fire their guns and the bullets race toward him he realizes he is no longer subject to the constraints on interaction imposed by the world he has lived in all his life. He can stop the bullets in midair, he can play with them, he can make up his own ways of interacting with the world he thought he knew. He has mastered this deadly game in a fundamental way and can change it as he chooses; he can construct cheats as he wishes, he can win as he wishes.

No doubt there are some who "know" computer games in such an intuitive and fundamental way. The vast majority of us don't. So what do the rest of us—about whom no one will ever say, "He is the one"—do? (Well, there are other social situations in which someone might say that you are the one, but they are not the subject of this book.) You have to do some work. That's why this book is as much about tools for you to work and create with as it is about us telling you how it is. In a very real sense "you are the one" because you're going to have to do it for yourself.

TOOLS TO THINK WITH

One way to understand the fundamentals of things is to use a theory that tries to show how something works in a simplified or abstract way. The *Concise Oxford English Dictionary* variously describes a theory as "abstract thought," "a plausible or scientifically acceptable general principle offered to explain phenomena," and "a belief policy or procedure proposed or followed as a basis for action." Theorizing is about trying to understand something by simplifying it, by abstracting away all the messy details and focusing in on a few remaining ones that we can better understand, but which still seem to capture the essence of that thing. This book uses a range of theories to try and do just that in order to better understand something of the fundamentals of computer games. Different theories can lead to different insights even into the same thing.

We use theories all the time in our everyday lives. For instance, we use theories to play computer games. Very few gamers ever read the manual. You learn a new game by playing it and in doing so you build up your own theory as to how the game works, what the underlying logic of the game is, and what you have to do to win. We are helped in this by training levels, by previous game playing experiences, and by recognizing the genre a new game belongs to. Training levels usually help out with the game's user interface and basic gameplay. They often also try to show us how to succeed. But to really know how to succeed there is nothing like real game playing experience and knowledge. This in turn leads to recognizing genres and all that comes with them; more discussion of this comes in Chapter 2.

In the very early years of computer games there were no genres. Every game was a new mystery about which every player was required to build his or her own theory in order to play it successfully.

We can express a theory in words, perhaps highly informally, as a story or a fable, for instance. We might express a theory in mathematics when it becomes highly formal. But very often theories will have models associated with them. Models are a form of analogy used to help visualize something. We can use models to help visualize theories. The *Concise Oxford English Dictionary* variously describes a model as "a representation of structure," "a summary, epitome or abstract," and "something that accurately resembles something else."

We would often express a model as a diagram, or something made out of string and cardboard, or even as a cartoon, a game, or indeed anything that allows us to visualize the theory more clearly. Computer games are themselves models. SimCity is a model that illustrates some of the complexities of urban planning. SimCity uses a relatively simple theory of urban economics that is visualized in terms of a city model. These days SimCity is actually used by economists to play "what if" games to see how their economic theories work or don't. You can replace SimCity's economic model with a more complex one of your own and play and research at the same time.

Scientific models may be more pragmatic in that they are related to some aspect of reality by means of observational data, which in turn causes the theory upon which the model is constructed to be reformulated, and so on. But doesn't that sound like what I was just saying about how we learn to play games by experimenting with them, by building up our own theory of how they work?

Theories and models have been at the heart of much of human understanding and inquiry from very ancient times. Cultures often attempt to explain the world and human beings' place in it by means of complex mythologies or etiological fables (Carruthers, 1998). Such mythologies are essentially abstractions that allow complex and inexplicable phenomena to be understood in terms of a more accessible set of characters and stories set around them. Very often the underlying explanation of natural phenomena will map onto supernatural beings and phenomena which thus replace an unfathomable cause with a commonly held narrative. These are theories explained in terms of stories and pictures, which are models of explanation. Theories can work regardless of how true they are. Better, perhaps, to feel you understand rather than be terrified by knowing you don't.

With time, more rigorous forms of theorizing were invented. The ancient Mesopotamians developed sophisticated mathematics as a technique for modeling trade involving large numbers of items and customers (Davis and Hersh, 1983). Mathematics was thus being used to build a model of trade and stock control. The ancient Greeks, and following them the Arabic world, continued to develop theories and models—mathematical and otherwise—for a variety of phenomena ranging from cosmology to music and poetry. Meter and rhyming schemes for poetry, for example, are models which facilitate the construction of new poems within established forms.

We use theories to try and express how we think bits of the world work. Some theories are very specialized and difficult; quantum mechanics, for example, can be a synonym for "difficult." Other theories are less formidable.

As we already observed, theories may also be quite instrumental in the sense that their application as an analysis technique—and the results obtained therein—may be more important than the degree to which the model accurately reflects reality. Psychoanalysis is an obvious example because no one has yet established whether the theory of psychoanalysis corresponds to the way our minds are structured and function. Yet many people have been helped by psychoanalysis.

Semiotics, the study of signs and the way people construct meaning out of them (e.g., Chandler, 2002), is perhaps another case in point because it has never been ascertained whether or not signs as defined by semioticians actually represent structures or functions within the human brain—although there is some evidence to support this (e.g., Damasio, 1994). Nonetheless, semiotic analysis of communications artifacts—texts to semioticians—is a very valuable and general technique for gaining insights into the way in which humans communicate and make meaning using a whole range of media. Semiotics and, in particular, the semiotics of computer games is the subject of Part II of this book.

What kinds of theories and models might be useful to us in trying to investigate the fundamental nature of computer games? Many computer games already make use of some pretty heavy theory. The game engine for a driving game, for instance, will make use of various theories from physics in order to make the behavior of the vehicles appear as realistic as necessary. The math for friction, torque, suspension systems, acceleration, deceleration, and much more will all be embedded into the program code. We have already noted the role economic theory plays in SimCity and it is fairly obvious the roles ballistics and models of explosions play in the much-maligned *first-person shooter*. (In the rest of the book genres will be written in italics, as in *beat-'em-up*.)

Many of the very early games were in fact models of a particular theory: inertial physics for early space games, dynamics for the bouncing balls in Pong and Breakout, and basic artificial intelligence theories for nonplayable characters as diverse as the Ghosts in PacMan and the people that Ryo Hazuki meets in Shenmue. Such theories are at the heart of just about every game you could think of. Even Tetris has a simplistic notion of gravity coupled with a basic theory of the way right-angled objects fit together.

But these are not the kinds of theory we need to use to investigate games. Understanding how the theory of gravity works in a game doesn't help you understand why the game does or doesn't work for its players. We need to understand the very nature of gameplay, the kinds of pleasures people experience in playing games, the reasons why people recognize a bunch of flickering pixels and digitized sounds as a realistic world in which we can get frightened or feel elated, and, most importantly, why we are so willing to devote so many hours of our lives to such artificial deceptions.

So there are theories we program into games. More importantly for us, are there also theories that can help us to probe into the nature of games, which will allow us to establish general principles of games? The answer is yes and no. There are such theories but computer games are developing so quickly that our fundamental understanding of them lags behind our ability to build them. Coming to understand computer games is very much a research topic. Much of what is in this book is based on current or recent research. Contemporary computer games are also very complex entities and no single, simple theory is going to describe them. Not even a whole bunch of theories is going to do that. Despite this we are going to try to do just that.

Let us say a few words about our approach to theory. All the theories in this book are holistic in the sense that they all apply to the whole game and not bits and pieces of it. We won't just study the game's internal economy or the interface; we'll study the game as whole. In the early chapters our theories won't be that deep but they will be useful. As the book develops the theories will get more complex, but because we're using holistic theories we can put them all together to form an integrated DIY analysis kit that looks at games from a variety of levels and from a variety of viewpoints; but they'll still all work together.

We can do several useful things with this DIY package. For one thing, we can go big game hunting! We can look at big games like Shenmue and SimCity and see how they tick. No game will be too big for us. We can also use the package to try and define games more clearly. At the beginning of the book the only definition I use for computer game is that they are things that people call games that are played on computers, consoles, handhelds, arcade machines, and so on. That's a really sloppy definition but it makes sure we don't exclude anything because we used the wrong definition. We'll return to this toward the end of the book. Another thing we can do is to use our package to think about game design and the creation of new gameplay ideas. There will also be a lot of tasks for you to do to practice your mastery of all this as the book progresses.

GETTING STARTED

Despite their having been around for some forty years or so, computer games are still an emerging art form. This means of course that what we are trying to understand keeps changing, keeps diversifying, keeps evolving before our eyes. Janet Murray discusses the implications of this in her excellent book on using interactive digital media, such as computer games and the World Wide Web, to create interactive stories (Murray, 1997). It is worth noting some of her observations on the emergence of new media in general. She identifies three stages in the emergence of a new medium.

1. **The Embryonic Medium**. People anticipate the new medium prior to the technology itself being available to support it.
2. **The Incunabula Medium**. The technology becomes available, in part at least, but people are still learning how to create specifically for it.
3. **The Fully Fledged Medium**. New forms arise that are specific to the medium and make best use of its capabilities.

Interactive digital media are mostly in the incunabula stage. We have the technology and have had it for some years now. We are still very much in the process of learning how to use it for what it is and creating specifically for it. It could well be argued that computer games are moving to being a fully fledged medium because of the fact that we have forms specific to the medium and some of these forms are quite mature. The *first-person shooter* could be considered a mature form. There are other genres which are still at the incunabula stage and others that have still to emerge, if indeed they ever do. Virtual storytelling—using computer games to tell stories—is currently the subject of much research and debate: it is most definitely incunabula but might never become fully fledged.

This highlights one of the problems. The fact that interactive media, such as computer games, are mostly still in their incunabula stage means we can't yet see exactly what we are trying to characterize and understand. Murray sees this as the passage from additive to expressive form, meaning that in the beginning of the incunabula stage we use the new medium as a simple extension of existing forms. As we become more familiar with its possibilities we find new forms that allow us to express ourselves in ways that previous media did not allow. To understand this is to understand why computer games are so interesting to study right now. Hopefully, it also leads the reader to understand why this book has an edge to it and why it sometimes seems to pose more questions than it answers.

Before we begin the book proper let's take a closer look at a theory and a model and the practical relationship between them. Let's look at something really straightforward: storyboards. We are going to look at the theory of storyboards because I imagine just about everyone who has anything to do with games design has come across, created, or worked with or from storyboards at some time or other. Storyboards are easy to understand—they give you the outline of a story—but require good drafting skills to make well. They are a way of communicating the main points in a story in a cheap and easy way. They can be easily changed and updated and don't require any expensive or time-consuming technology. They also have nothing to do with theories and models, right?

Storyboards work because they enable us to visualize a very complex entity such as an entire feature film before anyone has even decided to make it, before it even exists. Yet from a good storyboard we can get a pretty good idea of what the film might be like to watch. Storyboards are an abstraction, a summary; a representation of structure, characters, events, moods, camera angles, lighting and, no doubt, much more; all this in a few little hand-drawn pictures. Yet feature films are photographed at 24 frames a second, rely heavily on sound and music and are highly dynamic; they change over time. Sound and music *only* work because they change over time. Visually, films are also highly dynamic: the characters move; the camera moves; the focus changes; cars, trains, clouds all move; the lighting changes; the film jumps from one scene to another; and so on. Yet storyboards still work. Why?

Storyboards provide a useful model of what a feature film is all about. Underlying this model is a theory concerning the nature of feature films. What might this theory be and what is the real relationship between a storyboard and the actual film it models?

In Figure 1.2 you can see an excerpt from the storyboard for "Timmy's Lessons in Nature" by Mark Simon. Without knowing the story you'll quickly see that you should read the storyboard in rows: top row first, left to right; second row next, left to right; and so on. You'll also quickly get the basic story. Timmy, the main character, is swinging through the trees of a great forest using a large snake as a rope. The snake isn't too happy about this and bites Timmy's head who then can't see where he's going. All this is being watched with great interest by a wily predator. Eventually the snake can no longer support the both the weight of Timmy and itself and crashes to the ground and is pounced on by the predator; Timmy escapes and his adventure continues.

We "read" this storyboard almost as if we are actually watching the finished cartoon. And yet all we have is a series of outline pencil drawings. The storyboard is a model of the cartoon and could of course be used to refine it and as a design

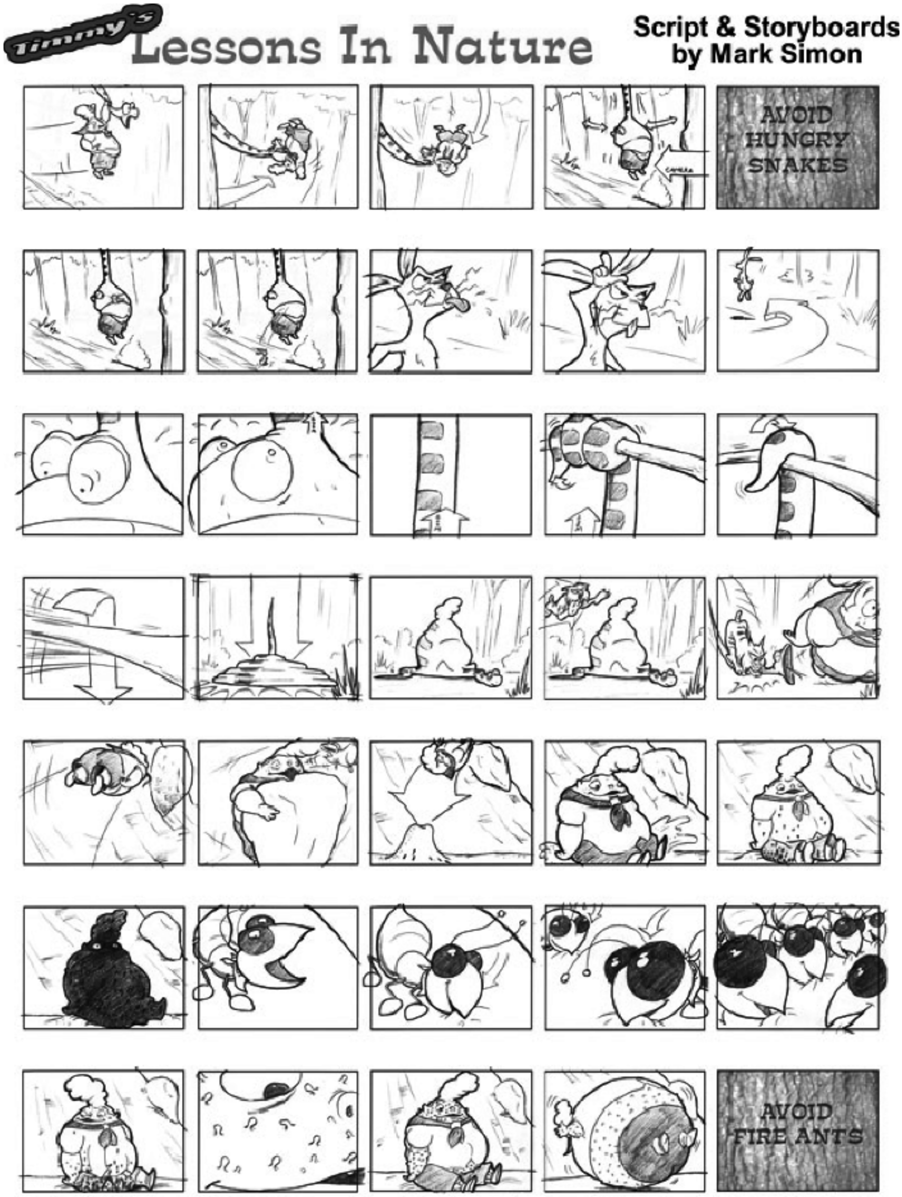

Figure 1.2 (Courtesy of Mark Simon, Animatics and Storyboards Inc., http://www.storyboards-east.com/about.htm.)

guide to produce it. But what is the underlying theory? What form of abstraction is involved here?

The theory espoused by the storyboard is very much to do with assumptions that can be made about the way people watch and make sense of films. "Timmy's Lessons in Nature" is a comic animation, meaning that it belongs to the cartoon genre of films, and thus has certain conventions to do with theme, story, lighting, and so on. One of the many, well known conventions of the genre is that not only are strange, unusual things likely to happen but that reversals of fortune occur very frequently for all the characters involved. The storyboard conveys this very well but it also relies on the idea that, knowing the rules of film and of the cartoon genre in particular, we can actually take a single, hand drawn image and produce the whole clip in our minds.

Each picture in the storyboard stands in for a complete film clip and we use our imaginations and knowledge of the language of film to make it real in our minds. The storyboard thus emphasizes the sequence of dramatic events that happen to the three characters in question. In other words, the way dramatic tension is controlled through the editing together of film clips is taken as the most important detail to be abstracted. If the storyboard is well constructed we can imagine a highly complex sequence of filmic/cartoon events with a great degree of precision.

Not all storyboards work in exactly this way, of course. There are other features of films we can abstract out of films: action sequences or long tracking or panning shots, for example. Storyboards will often also be annotated to bring in additional information to do with dialogue, lighting, musical score and sound effects, and so on. There are a lot of details relevant to a film which cannot easily be represented in static images.

Notice in the example above how many times an arrow is added to the image representing each clip. Cartoons and film in general are about action. In rows one and two, the arrows represent direction of a character. In row three, the arrows represent the "camera" panning upwards to the branch the snake is trying to hold on to. By using the nonfilmic device of an arrow to indicate directions of movement, the idea of one image for each clip/sequence of film can be preserved. We don't have to be told that the arrow won't appear in the finished cartoon. We know how to read the storyboard and "view" it in our minds eye as a cartoon sequence.

To summarize, we can observe that even something as apparently simple as the humble storyboard is based on the twin notions of theory and model. The modeling aspect of storyboarding allows us to visualize a complex entity such as a cartoon or feature film in terms of a few salient features. Underlying the model is the theory that from simple static images, people can imagine complex sequences of film because they are familiar with the language of film, the way films are photographed and lit, the way they are edited, and so on.

Interestingly, one of the reasons why this particular storyboard works so well is that it is easily recognizable as belonging to the cartoon genre, which in turn means that we are able to employ more specific knowledge of this particular type of content in our imaginings. In the next chapter we will make a study of genre theory and models based on it as our first attempt to find out more about the fundamental nature of computer games.

SUMMARY

Storyboards are also used in the design of computer games but with less success due to fact that games introduce interaction which, in turn, means that the diverging consequences of interaction must be conveyed somehow. This means some form of branching storyboard or complex annotations which show where in the storyboard to jump to if a certain intervention is made. This can work to a certain extent for *point-and-click* games such as the Monkey Island series, but for *first-person shooters* and most other game genres, storyboarding just isn't up to the job. This is because there is no predefined story to branch; the player intervenes whenever they want. But that is interesting in itself. The fact that storyboards as theory and model are not really appropriate for designing and are certainly not appropriate for analyzing games already tells us that there must be major differences between films and games. This reinforces the notion that we would seem to need particular theories and therefore particular models in order to understand the fundamentals of computer games.

Before we get on with the book proper let me just summarize a few of the points made in this introduction and add one or two more:

- This is a book that attempts to understand the fundamental nature of computer games;
- It uses a variety of models and theories to achieve this;
- It is concerned with the look, feel, and gameplay of games, not with how to program them;
- We won't just look at new games. Many of the games will be quite old;
- The theories are going to get more complex as the book progresses;
- This means you, the reader, will have to put in some effort;
- We'll go on to use our theories and the insights they enable to define games more rigorously and to think about game design as well.

Time to get going . . .