Introduction

So you're ready to progress beyond the basics. Having already tackled drawing polygons and meshes, blending textures, manipulating vertex buffers, and tinkering with vertex shaders, what's next for an aspiring game programmer like you to learn? Well, you've come to the right place if you're ready to move on beyond the basics.

Welcome to *Advanced Animation with DirectX®* ! This book is your guide to getting past the basics of DirectX graphics and into the bigger world of advanced animation! Take the information you already know and learn how to expand it into a vast array of various eyepopping graphical effects.

Keep your highschool textbooks at school, however, because this book won't bore you with pages of theories and algorithms. Instead, you'll see realworld examples of some of the hottest animation techniques used today. Jampacked with easy to understand concepts, fully commented code, and cool demos, this book makes learning the advanced stuff simple and fun!

What This Book Is About

As you can tell from the table of contents (you did check it out, didn't you?), this book has been developed with intermediate to advanced programmers in mind. There are no beginner sections (well, almost no beginner sections)it's all hardcore theory and programming from the get go!

This means there is no room wasted on teaching basic concepts, such as initializing Direct3D or using Windows message pumps, so you need to know a little something about Direct3D in general before you go on. Whoa! Don't put the book down just yet. I'm talking about the extreme basics, such as initializing Direct3D, using materials and textures, and handling vertex buffers. If you know all that, then you are definitely ready to move on to the advanced stuff, and this book is the place to start!

Why You Should Read This Book

That is the milliondollar questionWhy read this book? Let's face it, gaming technologies are evolving faster than most of us can keep up with. Today is one thing, and tomorrow introduces techniques that'll blow your socks off. Within these pages, you'll find information on advanced animation techniques that you can use in your own projects, and then your game will be the one that blows people's socks off!

What type of advanced animation techniques am I discussing? Well, my friend, read on to see what this book has to offer.

What's in This Book?

In this book you'll find 14 chapters full of advanced animation goodies. Each chapter concentrates on a single animation technique; aside from the first few informational chapters, the book is completely modular, meaning you can skip the chapters that don't interest you and get right to the topics that do.

Of course, I know you're really interested in every chapter in this book, so why don't you take a moment and see what you're about to get yourself into. The following list summarizes each chapter.

- **Chapter 1: Preparing for the Book.** Prepare yourself, because this book gets right to the point of using DirectX to create awesome animations in your programs! This chapter will help you install DirectX and set up your compiler to use it, and then get you programming right off the bat by using a

library of objects and functions created to hasten your development. This chapter is a mustread before you journey into the rest of the book.

- **Chapter 2: Timing in Animation and Movement.** Timing is an important aspect of animation, and this chapter provides a primer of what to expect throughout the rest of the book. See how to make your meshes animate and move over time.
- **Chapter 3: Using the .X File Format.** Getting your mesh data into your project is quite an endeavor. The information in this chapter will give you a firm grasp of using Microsoft's proprietary 3D graphics storage format, .X, in your game projects. Learn how to store and retrieve 3D mesh information, as well as how to use .X to contain custom data related to your game project.
- **Chapter 4: Working with Skeletal Animation.** Probably the most technically advanced realtime animation technique used today is skeletal animation. This chapter tackles the subject by showing you how to get started using this popular technique to manipulate meshes based on an underlying set of bones.
- **Chapter 5: Using KeyFramed Skeletal Animation.** One of the most popular animation techniques is using keyframed animation sets (created with popular 3D modeling packages such as discreet's 3D Studio Max or Caligari's trueSpace) in your projects. This chapter will show you how o take the key–framed skeletal animation informaion (stored in .X files) and use it to animate your meshes onscreen.
- **Chapter 6: Blending Skeletal Animations.** Tired of your key–framed animations being so static? I'm talking about animations that never change! How about mixing things up by blending multiple animation sets to create new and unique animations in your game?
- **Chapter 7: Implementing Rag Doll Animation.** Here it is; I know you've been waiting for it. See how to create your very own rag doll animation sequences, with limbs flailing and bodies flyingit's all in this chapter. Leave your physics books at home, kids; this book gives it to you in a straightforward and easytounderstand manner.
- **Chapter 8: Working with Morphing Animation.** Skeletal animation be damnedmorphing animation still has a rightful place in the world of advanced animation! See how you can use a simple animation technique to get those meshes morphing in your own projects.
- **Chapter 9: Using KeyFramed Morphing Animation.** Even morphing animation needs to be sequenced, right? See how to define and create your own series of keyframed animation objects and apply them to your morphing animation techniques! You'll even get to extend the usefulness of .X by creating your own morphing keyframe templates!
- **Chapter 10: Blending Morphing Animations.** Once again, blending rears its eversohelpful head, this time for combining various blending animations together to create new and unique animations during run time!
- **Chapter 11: Morphing Facial Animation.** They walk, they jump, and yesthey even talk! Your game's characters really come to life when you use the facial animation techniques shown in this chapter. If you don't know what facial animation can do for you, check out a game such as Electronic Art's *Medal of Honor: Frontline* or Interplay's *Baldur's Gate: Dark Alliance.*
- **Chapter 12: Using Particles in Animation.** What game nowadays doesn't have flashy, smoking, zinging blobs of graphical pixels that we call particles? Yours, you say? Well, no worriesthis chapter will show you how to effectively add particle animation into your game and get those flashy blobs of particles flying around in no time.
- **Chapter 13: Simulating Cloth and Soft Body Mesh Animation.** Close your eyes and imagine your game's hero wearing a silky cape that reaches the ground and flutters with every small gust of wind. Using cloth simulation, you can give your hero a cape, clothes, and much more than you ever imagined. Top it off with the use of soft body meshes that deform to the slightest touch, and you have yourself some fine advanced animation techniques!
- **Chapter 14: Using Animated Textures.** I'm saving the best for last. This chapter will show you how to animate the textures you use to paint your 3D world. Animated fire, flowing water, and so much more is possible using animated textures, and this chapter will show you how!

Introduction

Whew! There are some major topics in here, all for your eyes only! As I wrote this book, I couldn't help but wonder what type of applications you'll apply these techniques to. I can envision some incredible games using the various techniques, and I can tell that you're just the person for the job. After you read this book (if you're like me, that means reading it at least six times), I believe you'll find some useful ways to apply your newfound knowledge to your game projects.

I know you're anxious to get going, so let me once again say welcome, and thank you for buying my book. I hope it helps you learn some of the concepts and techniques currently used in 3D animation. Have fun, and enjoy!