

ULTIMATE GAME PROGRAMMING *with* DIRECTX®

- Teaches aspiring game programmers the fundamentals of DirectX game development.
- Provides DirectX users with a complete reference for game development, including the creation of a First Person Shooter game.
- Includes a companion CD-ROM with all source code, projects, demo applications, Microsoft® DirectX® SDK, and the final version of *Stranded*.





Contents

Introduction	xiii
1 DirectX Introduction	1
Overview of This Book	2
Game Plan	4
DirectX Background	10
Setting Up a Window Manually	14
Demo Applications	28
Summary	53
2 The Game <i>Stranded</i>	55
Introduction to the Game Plan	56
Game Planning	57
Engine Planning	61
Game Project Overview	63
Game Project Part 1: Starting the Project	66
Summary	85
3 Direct3D Lighting and Objects	87
Introduction to Direct3D Lighting	89
Creating Objects with Direct3D Functions	97
Creating Lights in Direct3D	102
Game Project Part 2: Adding Support for Hardware Lighting	108
Summary	112
4 Textures	115
Introduction to Textures in Direct3D	118
Creating and Applying Textures	119

Sprites	138
Bump Maps	143
Saving Textures	147
Off-screen Rendering	150
Game Project Part 3: Adding Texture Support	156
Summary	167
5 Direct3D Text and GUI	169
Displaying Text to the Screen	171
Calculating the Frames-Per-Second	177
Creating and Displaying a GUI	178
Game Project Part 4: Adding Text and GUI Support	202
Summary	222
6 Special Effects	223
Multisampling	224
Fog	228
Detail Mapping	232
Particle Systems	236
Game Project Part 5: Adding Special Effects	248
Summary	255
7 Basic Scripting Systems	257
Introduction to Scripting	258
Property Scripting Systems	259
Command Scripting Systems	276
Token Streams	292
Additional Types of Scripting Systems	299
Game Project Part 6: Adding Scripting Support	300
Summary	301

8	Game Math Review	303
	Introduction to Game Math	304
	Vector Math and Review	305
	Matrix Math	309
	Quaternion Math	315
	Ray Math	317
	Plane Math	318
	Triangles and Polygons	325
	Physics	326
	Game Project Part 7: Creating the Math Library	326
	Summary	356
9	Collision Detection	359
	Collision Introduction	360
	Bounding Boxes	361
	Bounding Spheres	364
	Plane Collisions	367
	Demo Applications	368
	Game Project Part 8: Adding Collision Detection	387
	Summary	396
10	Input Detection and Response	397
	Using DirectInput	398
	DirectInput Demo Application	401
	Game Project Part 9: Adding an Input System	415
	Summary	431
11	Sound	433
	Introduction to Sound	434
	Using DirectSound and DirectMusic	436
	Sound Demo Application	442

	Game Project Part 10: Adding Sound	452
	Summary	460
12	Model Loading	463
	Introduction to Model Loading	464
	Working with .X Files	465
	Working with .OBJ Files	476
	Working with .UMF Files	492
	Game Project Part 11: Loading Models	506
	Summary	532
13	Model Animation	533
	Introduction to Animation	534
	Animation Paths	534
	Bone Animation	563
	X Model Animation	571
	Game Project Part 12: Adding Support for Animations	592
	Summary	594
14	Scene Management	597
	Introduction to Scene Management	597
	Scene-Management Techniques	598
	Summary	604
15	Finishing the Game Engine	607
	Logging System	608
	3D Camera System	612
	Frustum Culling	619
	Game Project Part 13: Finishing the Engine	629
	Summary	634

16	Making the Game: <i>Stranded</i>	637
	Overview of This Chapter	638
	Organizing the Game Source	639
	Loading and Displaying the Final Level	651
	Camera Movements and Collision Detection	659
	Game Elements	667
	Agent Characters	678
	Wrap Up	688
	Summary	689
17	Conclusions	691
	Final Thoughts	691
	The Next Step	692
Appendix A	Recommended Books and Web Sites	693
	Recommended Books	693
	Recommended Web Sites	696
Appendix B	C++ Primer	699
	Basics of C++	699
	Dynamic Memory and File Input/Output	708
	Structures and Classes	711
	Summary	714
Appendix C	About the CD-ROM	715
	System Requirements	715
	Folders	715
	Software	716
	Index	717