

Contents

Introduction.....	I
Download and Installation.....	VII
The Author.....	XI
Acknowledgements.....	XIII
Preamble.....	XV
CH01 Understanding the Interface.....	1
1.1 Understanding the Interface.....	3
1.2 The Blender Screen (GUI).....	4
1.3 Headers.....	5
1.4 How to Quit Blender.....	6
1.5 How to Start Over.....	6
1.6 3D View Editor.....	7
1.7 3D View Editor – Header.....	8
1.8 3D View Editor Tool Panel.....	9
1.9 Sidebar – Object Properties Panel.....	9
1.10 The Manipulation and Tool.....	10
1.11 Outliner Editor.....	10
1.12 The Properties Editor.....	11
1.13 Editor Types.....	12
1.14 The User Preferences Editor.....	12
1.15 Overlays in the 3D View Editor.....	14
1.16 Scene Manipulation.....	16
CH02 Editors and Workspaces.....	19
2.1 Editor Types.....	20
2.2 Resizing Editors.....	21
2.3 Splitting Editors.....	21
2.4 Cancel an Editor.....	22
2.5 Workspaces.....	22
2.6 Multiple Scenes.....	25

CH03 Navigate and Save.....	27
3.1 Files and Folders.....	28
3.2 Saving a File.....	29
3.3 Window File Explorer.....	30
3.4 Windows File Explorer Diagram.....	31
3.5 Blender File Browser.....	32
3.6 Navigation in the File Browser.....	33
3.7 File Browser Editor Features.....	34
3.8 Make a New Folder.....	34
3.9 Saving Your Work.....	35
3.10 The Concept of Files.....	36
3.11 The Append or Link Command.....	37
3.12 Importing Objects.....	38
3.13 Activating Import File Types.....	39
3.14 Packing Data.....	40
CH04 Objects in the 3D View Editor.....	41
4.1 Modeling Workflow Philosophy.....	42
4.2 Starting a New File.....	42
4.3 Modifying the Scene.....	43
4.4 Object Mode and Edit Mode.....	43
4.5 3D View Editor Cursor.....	44
4.6 Selecting/Deselecting Objects.....	45
4.7 Adding Objects.....	45
4.8 Object Primitives.....	46
4.9 Locating the Editor Cursor.....	47
4.10 Deleting Objects.....	47
4.11 Duplicating Objects.....	47
4.12 Object Mode Manipulation.....	48
4.13 The Last Operator Panel.....	49
4.14 Tool Panel – Widgets.....	49
4.15 Manipulation Units.....	51
4.16 Measuring – Ruler/Protractor.....	52
4.17 Precision Manipulation.....	53
4.18 Coloring Objects.....	56
4.19 Other Types of Objects.....	56
4.20 Naming Objects.....	58
4.21 The Header Buttons Menu.....	59
4.22 Meta Shapes.....	59
CH05 Editing Objects.....	61
5.1 The Mesh Object.....	62
5.2 Edit Mode Selection.....	62
5.3 Selecting Verts Edge Face.....	64
5.4 Manipulating.....	64

5.5	Creating Vertices.....	65
5.6	Adding and Deleting.....	67
5.7	Center Points.....	69
5.8	Joining and Separating.....	70
5.9	Creating Vertex Groups.....	73
5.10	Proportional Vertex Edit.....	75
5.11	Inset Faces.....	76
5.12	Parenting.....	78
CH06	Editing Tools	79
6.1	The Tool Panel.....	80
6.2	The Add Cube Tool.....	80
6.3	The Last Operator Panel.....	81
6.4	Extrusion.....	81
6.5	The Extrude Region Tool.....	82
6.6	Inset Faces.....	83
6.7	The Inset Faces Tool.....	83
6.8	The Bevel Tool.....	83
6.9	Edge and Loop Selection.....	84
6.10	The Loop Cut Tool	84
6.11	The Knife Tool.....	85
6.12	The Poly Build Tool.....	86
6.13	The Spin Tool.....	87
6.14	Creating a Spin Profile.....	88
6.15	Spin Duplication.....	90
6.16	The Screw Tool.....	91
6.17	The Smooth Tool.....	91
6.18	The Edge Slide Tool.....	92
6.19	The Shrink Fatten Tool.....	92
6.20	The Rip Region Tool.....	92
CH07	Modifiers	93
7.1	Modifiers in General.....	94
7.2	The Modifier Stack.....	96
7.3	The Modifier Group.....	97
7.4	The Simulate Group.....	97
7.5	Generate and Deform Modifiers.....	97
CH08	Editing with Generate Modifiers	99
8.1	Modifiers – Generate.....	100
8.2	Array Modifier.....	102
8.3	Boolean Modifier.....	104
8.4	Build Modifier.....	105
8.5	Decimate Modifier.....	106
8.6	Edge Split Modifier.....	107

8.7	Mask Modifier.....	108
8.8	Mirror Modifier.....	109
8.9	Multiresolution Modifier.....	111
8.10	Remesh Modifier.....	111
8.11	Screw Modifier.....	113
8.12	Skin Modifier.....	114
8.13	Solidify Modifier.....	115
8.14	Subdivision Surface Modifier.....	117
8.15	Triangulation Modifier.....	119
8.16	Wireframe Modifier.....	119

CH09 Editing with Deform Modifiers..... 121

9.1	Modifiers – Deform.....	122
9.2	Armature Modifier.....	122
9.3	Cast Modifier.....	122
9.4	Corrective Smooth Modifier.....	123
9.5	Curve Modifier.....	124
9.6	Displace Modifier.....	125
9.7	Hook Modifier.....	126
9.8	Laplacian Deform Modifier.....	128
9.9	Lattice Modifier.....	129
9.10	Mesh Deform Modifier.....	130
9.11	Shrinkwrap Modifier.....	131
9.12	Simple Deform Modifier.....	132
9.13	Smooth Modifier.....	133
9.14	Smooth Corrective Modifier.....	134
9.15	Smooth Laplacian Modifier.....	134
9.16	Surface Deform Modifier.....	135
9.17	Warp Modifier.....	137
9.18	Wave Modifier.....	139

CH10 Editing Using Curves..... 141

10.1	Curves, Circles and Paths.....	142
10.2	Bezier Curve.....	143
10.3	Bezier Circle.....	145
10.4	Nurbs Path.....	145
10.5	Nurbs Circle.....	145
10.6	Modeling from a Curve.....	146
10.7	Closed Loops.....	147
10.8	Using Nurbs Curves.....	148
10.9	Nurbs Circle.....	149
10.10	Nurbs Curve.....	151
10.11	Lofting.....	152

CH11	Editing Techniques and Examples.....	157
11.1	Creating a Landscape.....	158
11.2	Duplicverts.....	159
11.3	Modeling an Aircraft.....	161
11.4	Sculpting – Sculpt Mode.....	164
11.5	Sculpting Demonstration.....	166
11.6	Creating a Humanoid Figure.....	170
CH12	The Outliner and Collections.....	173
12.1	Collections in the Outliner Editor.....	174
12.2	View Options in the Outliner Editor.....	177
CH13	3D Text.....	179
13.1	Creating 3D Text in Blender.....	180
13.2	The Object Data Button “ A ”.....	181
13.3	Fonts.....	182
13.4	Creating Text on a Curve.....	185
13.5	Converting Text to a Mesh Object.....	186
13.6	Converting Text to a Curve.....	186
13.7	Entering External Font.....	187
CH14	Viewport Shading.....	189
14.1	Viewport Shading Options.....	190
14.2	Solid Viewport Shading – Sub Options.....	191
14.3	Rendered Viewport Shading.....	196
14.4	LookDev Viewport Shading.....	197
14.5	World Settings.....	198
CH15	Scene Lighting and Cameras.....	199
15.1	Scene Lighting.....	200
15.2	Lamps.....	200
15.3	Cameras.....	203
15.4	Camera Settings.....	204
15.5	Camera Switching.....	206
15.6	Camera Tracking.....	208
15.7	Basic Scene Lighting.....	209
15.8	Background Scene Lighting.....	211
15.9	Volumetric Lighting.....	213

CH16 Nodes – Materials and Textures.....215

16.1	Material Nodes.....	216
16.2	Materials.....	217
16.3	Displaying Materials.....	218
16.4	Creating Materials.....	218
16.5	Multiple Material Slots.....	221
16.6	Material Nodes Extended.....	222
16.7	Basic Node Arrangement.....	226
16.8	The Shader Editor.....	227
16.9	Noodle Curving.....	229
16.10	Scene Arrangements.....	229
16.11	Mixing Material Example.....	229
16.12	Simple Node Arrangement.....	230
16.13	Texture Nodes.....	231
16.14	Unwrapping a Surface.....	231
16.15	Unwrapping with Seams.....	233
16.16	Applying a Texture.....	234
16.17	Mapping to a Surface.....	236
16.18	Texture Painting.....	236
16.19	Vertex Painting.....	240
16.20	The Principled BSDF Node.....	243
16.21	Quick Examples using the Principled BSDF Node.....	245
16.22	Transparency Using Nodes.....	246
16.23	Other Node Uses.....	247
16.24	Grouping Nodes.....	250
16.25	Compositing Nodes.....	252

CH17 Rendering.....255

17.1	Rendering.....	256
17.2	Properties Editor Render Buttons.....	256
17.3	Properties EditorOutput Buttons.....	257
17.4	The Dimensions Tab.....	257
17.5	The Output Tab.....	259
17.6	Rendering a JPEG Image.....	260
17.7	Rendering a Movie File.....	261
17.8	Video Playback.....	263
17.9	Video Codecs.....	264
17.10	Making a Movie.....	264

CH18 Animation.....265

18.1	The Animation Screen.....	266
18.2	Movement in the 3D View Editor.....	267
18.3	Planning the Animation.....	268
18.4	Keyframes Time and Interpolation.....	269
18.5	Animation Speed and Length.....	270

18.6	Inserting Keyframes.....	271
18.7	Playing the Animation.....	274
18.8	Automatic Keyframing.....	275
18.9	Controlling the Animation.....	275
18.10	The Graph Editor.....	277
18.11	Editing the Graph.....	280
18.12	Other Types of Curves.....	287
18.13	The Curve Properties Panel.....	290
18.14	Animating Rotation.....	291
18.15	Rotation Using F-Curves.....	292
18.16	Animating Other Features.....	294
18.17	Keying Sets.....	295
18.18	Animation Follow Path.....	297
18.19	Displacement Sound Animation.....	300
18.20	Sound Effect and Cast Modifier.....	304
CH19	Constraints.....	307
19.1	Introduction to Constraints.....	308
19.2	Track to Constraint.....	308
19.3	Constraint Stack.....	309
19.4	Transform Constraint List.....	310
19.5	The Transform Constraint.....	310
19.6	Tracking Constraint.....	311
19.7	Relationship Constraint.....	312
19.8	The Action Constraint.....	312
19.9	The Shrinkwrap Constraint.....	313
19.10	The Follow Path Constraint.....	315
CH20	Armature and Character Rigging.....	317
20.1	Single Bone Armature.....	318
20.2	Adding Armatures.....	318
20.3	Child Parent Relationship.....	321
20.4	Armature Display Types.....	322
20.5	Multi-bone Armatures.....	322
20.6	Multi-bone by Subdivision.....	324
20.7	Multi-bone by Extrusion.....	324
20.8	X-Axis Mirror Extrusion.....	326
20.9	Extruding Shoulder and Arms.....	327
20.10	Naming Bones.....	327
20.11	Deforming a Mesh.....	328
20.12	Assigning Vertices-Modifier.....	329
20.13	Assigning Vertices-Vertex Groups.....	331
20.14	Assigning Vertices-Weight Paint.....	332
20.15	Vertex Groups-Field of Influence.....	334
20.16	Inverse Kinematics Constraint.....	334
20.17	Spline IK Constraint.....	337

20.18	Forward.....	338
20.19	Character Rigging.....	339
20.20	Creating the Armature.....	343
20.21	Adding More Bones.....	345
20.22	Creating Arm Bones.....	346
20.23	Creating Leg Bones.....	347
20.24	Bones Naming	347
20.25	Assigning The Mesh.....	349
20.26	Vertex Groups.....	350
20.27	Posing the Character Model.....	351
20.28	Pre-Assembled Armatures.....	354
CH21	Shape Keys and Action Editors.....	355
21.1	Shape Key Editor.....	356
21.2	Add a Key Slider.....	357
21.3	Set Limits of Movement.....	358
21.4	Inserting Keyframes.....	358
21.5	Inserting Multiple Keyframes.....	359
21.6	The Animation.....	360
21.7	Additional Keyframes.....	360
21.8	Action Editor.....	361
21.9	Shapes Keys and Action Editor in Practice.....	362
CH22	Particle Systems.....	365
22.1	The Default Particle System.....	366
22.2	The Emissions Tab.....	368
22.3	The Source Tab.....	368
22.4	The Cache Tab.....	368
22.5	The Velocity Tab.....	370
22.6	Particle Display.....	371
22.7	Particle Emission Options.....	372
22.8	Order of Emission.....	373
22.9	Normals.....	375
22.10	Particle Modifiers.....	378
22.11	Particles Array.....	379
22.12	The Viewport Display Tab.....	381
22.13	Particle Interaction.....	382
22.14	Wind Force Effect.....	383
22.15	Boids Particles.....	384
22.16	Hair Particles.....	388
22.17	Particles for Arrays.....	393
22.18	More Arrays.....	394
22.19	The Assignment Panel.....	397
22.20	Particle Exercises.....	398
22.21	Multiple Particle Systems.....	404
22.22	Keyed Particles.....	406

CH23 Physics and Simulation.....	409
23.1 Modifiers and Physics.....	410
23.2 Force Field.....	410
23.3 Collision Physics.....	411
23.4 Cloth Physics.....	411
23.5 Soft Body Physics.....	413
23.6 Fluid Simulation.....	414
23.7 Fluid Simulation Examples.....	420
23.8 Fluid Particles.....	431
CH24 Dynamic Paint.....	435
24.1 Dynamic Paint.....	436
CH25 Installing Add-Ons.....	441
25.1 Blender FishSim Add-On.....	442
25.2 Finding the FishSim File.....	442
25.3 Installing the Add-On.....	443
CH26 Grease Pencil – 2D Animation.....	445
26.1 Annotation.....	446
26.2 Grease Pencil Object.....	448
26.3 2D Animation.....	457
CH27 Video Sequence Editor.....	461
27.1 Making a Movie.....	462
27.2 Storyboard.....	462
27.3 The Video File.....	462
27.4 The Sound File.....	463
27.5 Preparation.....	463
27.6 Video Editing Workspace.....	464
27.7 File Browser Editor.....	465
27.8 Video Sequence Editor.....	466
27.9 Rendering the Movie.....	470
27.10 Summary.....	471
CH28 Drivers.....	473
28.1 Blender Drivers Introduction.....	474
28.2 Understanding Drivers.....	476
28.3 Randomize Object Properties.....	478
28.4 Using Random.Pyblend.....	481

CH29 Cycles Render.....	485
29.1 Cycles Render.....	486
29.2 How to Start Cycles.....	486
29.3 Create an Object Light Source.....	490
29.4 Cycles in Practice.....	492
29.5 Texture in Cycles.....	499
CH30 Internet Resources.....	503
Appendix A.....	507
Index	511