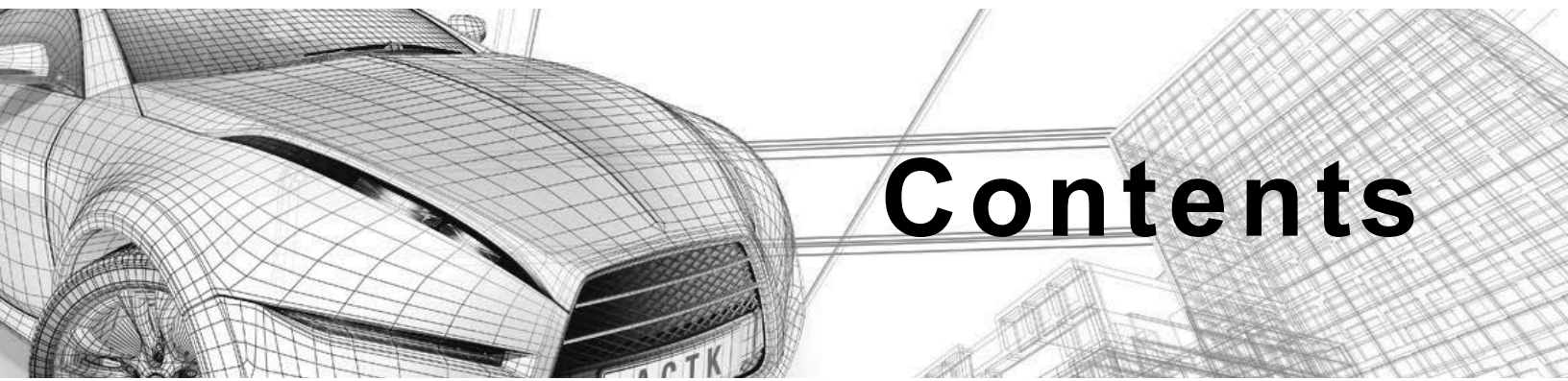




Autodesk®
3ds Max® 2016
Fundamentals

Visit the following websites to learn more about this book:





Contents

Preface	xi
Feedback	xii
In this Guide	xiii
Practice Files	xvii
Chapter 1: Introduction to Autodesk 3ds Max	1-1
1.1 Overview	1-2
1.2 Visualization Workflow	1-5
1.3 The Autodesk 3ds Max Interface	1-8
Welcome Screen	1-8
Interface	1-10
1.4 Preferences	1-29
1.5 Setting the Project Folder	1-32
1.6 Configure Paths	1-33
1.7 Display Drivers	1-36
1.8 Viewport Display and Labels	1-38
General Viewport	1-38
Point Of View	1-38
Visual Style	1-40
Practice 1a Organizing Folders and Working with the Interface	1-42
Practice 1b Autodesk 3ds Max Quickstart	1-53
Chapter Review Questions	1-60
Command Summary	1-61

Chapter 2: Autodesk 3ds Max Configuration	2-1
2.1 Viewport Navigation	2-2
Viewport Navigation Toolbar	2-2
Viewport Navigation Toolbar (Camera Viewport).....	2-4
Viewport Navigation using ViewCube	2-4
Viewport Navigation using SteeringWheel	2-5
2.2 Viewport Configuration	2-6
Practice 2a Viewport Configuration and Navigation	2-10
2.3 Object Selection Methods	2-15
Practice 2b Selection Methods	2-19
2.4 Units Setup	2-25
Practice 2c Working with Units Setup	2-27
2.5 Layer and Object Properties	2-28
Layers Toolbar	2-28
Layer Explorer.....	2-29
Layer Properties.....	2-31
Object Properties	2-32
Display Panel	2-33
Practice 2d Layer and Object Properties	2-34
Chapter Review Questions	2-39
Command Summary	2-41
Chapter 3: Assembling Project Files	3-1
3.1 Data Linking and Importing	3-2
Linking vs. Importing	3-2
Editing Linked Data.....	3-3
Importing	3-3
Merging Autodesk 3ds Max Scene Files.....	3-4
Practice 3a Ground Surfaces using Civil View	3-5
3.2 Linking Files	3-11
Linking DWG Files	3-11
Linking FBX and RVT Files	3-12
Manage Links Options	3-12
File Link Settings: DWG Files	3-14
File Link Settings: Revit Files (RVT or FBX)	3-20
Practice 3b Linking an AutoCAD DWG	3-22
Practice 3c Linking and Reloading Autodesk Revit File	3-28
3.3 References	3-34
External References (XRef)	3-34
Data Management and Asset Tracking	3-34

Practice 3d XRef and Merge Objects.....	3-36
Chapter Review Questions.....	3-41
Command Summary	3-42
Chapter 4: Basic Modeling Techniques.....	4-1
4.1 Model with Primitives	4-2
Practice 4a Modeling with Primitives	4-4
4.2 Modifiers and Transforms	4-8
Modifiers.....	4-8
Transform Tools	4-9
Practice 4b Modeling with Modifiers and Transforms	4-13
4.3 Sub-Object Mode.....	4-24
Working in Sub-Object Mode	4-24
Geometric Edits through Sub-objects	4-25
Geometric Sub-Objects.....	4-26
Smoothing	4-26
Practice 4c Modeling with Edit Poly in Sub-Object Mode	4-28
4.4 Reference Coordinate Systems and Transform Centers	4-33
Reference Coordinate Systems	4-33
Transform Centers	4-35
4.5 Cloning and Grouping	4-36
Cloning.....	4-36
Grouping	4-37
Practice 4d Modeling with Coordinate Systems	4-38
Practice 4e Cloning and Grouping	4-40
4.6 Polygon Modeling Tools in the Ribbon.....	4-44
Practice 4f Poly Modeling Using the Ribbon	4-45
4.7 Statistics in Viewport.....	4-60
Chapter Review Questions.....	4-62
Command Summary	4-64
Chapter 5: Modeling From 2D Objects	5-1
5.1 3D Modeling from 2D Objects	5-2
Practice 5a Drawing Lines.....	5-4
5.2 The Lathe Modifier	5-10
Practice 5b Creating a Candlestick	5-11
5.3 2D Booleans	5-13
Practice 5c 2D Booleans.....	5-14

5.4 The Extrude Modifier	5-18
5.5 Boolean Operations	5-22
Practice 5d Extrude Walls and Create Wall Openings.....	5-25
5.6 Using Snaps for Precision	5-33
Practice 5e Creating a Door with Snaps	5-37
5.7 The Sweep Modifier	5-42
Sweep Parameters.....	5-43
Practice 5f Sweeping the Wall Baseboard	5-45
Chapter Review Questions.....	5-50
Command Summary	5-51
Chapter 6: Materials	6-1
6.1 Understanding Maps and Materials.....	6-2
Introduction to Materials.....	6-2
Material Components	6-3
6.2 Managing Materials.....	6-6
Slate Material Editor Interface.....	6-6
Practice 6a Introduction to Materials	6-15
6.3 Standard Materials	6-23
Architectural Materials.....	6-23
Multi/Sub- Object Materials	6-24
Additional Standard Materials	6-25
6.4 Material Shaders	6-26
Shader (Specific) Basic Parameters	6-28
6.5 Assigning Maps to Materials.....	6-30
Practice 6b Working with Standard Materials and Maps.....	6-32
Practice 6c Working with Multi/Sub-Object Materials.....	6-42
6.6 Opacity, Bump, and Reflection Mapping	6-51
Opacity Mapping	6-51
Bump Mapping	6-52
Reflection Mapping	6-52
Practice 6d Opacity and Bump Mapping.....	6-53
6.7 mental ray Materials.....	6-62
Arch & Design Materials.....	6-63
Autodesk Materials.....	6-64
Car Paint Material	6-65
Matte/Shadow/Reflection Material	6-65
mental ray Material.....	6-65
Subsurface Scattering (SSS) Materials.....	6-65

Practice 6e Working with mental ray Materials	6-66
6.8 The Material Explorer.....	6-74
Chapter Review Questions.....	6-76
Command Summary	6-78
Chapter 7: Mapping Coordinates and Scale	7-1
7.1 Mapping Coordinates	7-2
Mapping Controls in Slate Material Editor.....	7-3
MapScaler Modifier	7-4
UVW Map Modifier	7-5
Practice 7a Applying Mapping Coordinates	7-6
Practice 7b Mapping a Large Scale Image.....	7-9
7.2 Mapping Scale	7-13
Explicit Map Scaling	7-13
Continuous Map Scaling	7-14
Practice 7c Assigning Map Scales	7-16
7.3 Spline Mapping.....	7-22
Practice 7d Spline Mapping.....	7-23
Chapter Review Questions.....	7-29
Chapter 8: Introduction to Lighting	8-1
8.1 Local vs. Global Illumination	8-2
Default Illumination.....	8-2
Local Illumination	8-2
Global Illumination.....	8-3
Types of Lights.....	8-5
8.2 Standard Lighting	8-6
Common Parameters	8-6
8.3 Types of Standard Lights	8-9
Omni Lights	8-9
Spotlights	8-10
Directional Lights.....	8-11
Fill Lights	8-12
Skylight and mr Sky	8-13
mental ray (mr) Area Omni Light and mental ray (mr) Area Spotlight.....	8-13
Practice 8a Standard Lighting for an Interior Scene.....	8-14

8.4 Shadow Types	8-26
Common Shadow Parameters	8-28
Shadow Map Parameters.....	8-29
Ray Traced Shadows.....	8-30
Advanced Ray-Traced Shadows.....	8-31
mental ray Shadow Maps.....	8-32
Practice 8b Working with Shadow Parameters	8-33
Chapter Review Questions	8-36
Command Summary	8-38
Chapter 9: Lighting and Rendering	9-1
9.1 Photometric Light Objects	9-2
Photometric Light Types	9-2
Templates Rollout	9-3
General Parameters Rollout.....	9-3
Distribution (Photometric Web) Rollout	9-4
Shape/Area Shadows Parameters	9-6
Intensity/Color/Attenuation Rollout.....	9-8
Practice 9a Working with Photometric Lights	9-10
Practice 9b Materials that Create Lighting	9-18
9.2 Exposure Control	9-21
Exposure Control Methods.....	9-21
Logarithmic Exposure Control Parameters	9-23
mr Photographic Exposure Control Parameters	9-24
Practice 9c Working with Exposure Control	9-26
9.3 Daytime Lighting	9-31
Sunlight Parameters.....	9-32
Skylight Parameters	9-33
Sun and Skylight Options.....	9-34
Image Based Lighting	9-35
Exterior Daylight with mental ray.....	9-36
Practice 9d Image Based Lighting	9-37
Practice 9e Lighting for an Exterior Scene with mental ray Daylight	9-41
Practice 9f Viewport Lighting and Shadows	9-45
Chapter Review Questions	9-48
Command Summary	9-50

Chapter 10: mental ray Rendering	10-1
10.1 Fundamentals of mental ray	10-2
mental ray Rendering	10-3
10.2 mental ray Interior Rendering	10-4
Photon Mapping	10-5
Final Gather	10-9
Exposure Control	10-12
Sampling Quality	10-14
mental ray Quality	10-15
Ambient Occlusion (AO)	10-16
Practice 10a Improving mental ray Speed, Quality, and using Material Overrides	10-19
Practice 10b Adding a Sky Portal for Interior Lighting from Daylight	10-29
10.3 mental ray Proxies	10-34
Practice 10c mental ray Proxies	10-35
Chapter Review Questions	10-39
Command Summary	10-40
Chapter 11: Rendering and Cameras.....	11-1
11.1 Rendering Options	11-2
Common Options	11-3
Common Tab	11-4
Renderer Tab	11-6
Raytracer Tab (Scanline Renderer)	11-10
Practice 11a Working with Rendering Options	11-12
11.2 Single vs. Double-Sided Rendering	11-17
Surface Faces and Rendering Modes.....	11-17
Surface Normals	11-18
Steps to Resolve Face-Normal Issues.....	11-19
Enabling Double-Sided Mode	11-20
Practice 11b Double-Sided Rendering Mode.....	11-22
11.3 State Sets	11-25
11.4 Cameras	11-28
Target and Free Camera Parameters	11-28
Physical Camera	11-32
11.5 Background Images	11-33
Aspect Ratio.....	11-35
Safe Frames.....	11-36

Practice 11c Cameras and Background Images	11-39
11.6 The Print Size Wizard.....	11-48
Practice 11d Using the Print Size Wizard.....	11-49
Chapter Review Questions.....	11-51
Command Summary	11-53
Chapter 12: Animation	12-1
12.1 Animation and Time Controls	12-2
Time Configuration.....	12-5
Progressive Display and Adaptive Degradation.....	12-7
12.2 Walkthrough Animation.....	12-11
Practice 12a Creating a Turntable Animation.....	12-13
Practice 12b Keyframing a Camera Animation.....	12-21
Practice 12c Creating a Walkthrough Animation	12-27
12.3 Animation Output.....	12-32
Practice 12d Creating Animation Output.....	12-34
Chapter Review Questions.....	12-40
Command Summary	12-42
Appendix A: Optional Topics	A-1
A.1 Getting Help with Autodesk 3ds Max	A-2
A.2 Compact Material Editor.....	A-4
Compact Material Editor.....	A-4
A.3 Architectural Materials	A-8
Architectural Material Parameters.....	A-8
Configuring Architectural Materials for mental ray	A-9
A.4 Object Substitution	A-13
Practice A1 Substituting the Parking Lot Light Poles	A-14
A.5 Lighting Analysis	A-17
Practice A2 Conduct a Lighting Analysis	A-23
A.6 Creating Hierarchies	A-28
Practice A3 Create Hierarchies	A-29
Practice A4 Create an Assembly Animation.....	A-31
A.7 Customizing the User Interface	A-33
Practice A5 Customizing the User Interface.....	A-35
Command Summary	A-37

Appendix B: Optional Practices	B-1
Practice B1 Create Additional Extrusions	B-2
Practice B2 Making a Chair Base by Lofting Objects	B-5
Practice B3 Using the mental ray Multi/Sub-Map Shader.....	B-11
Practice B4 Shadow Study Animation	B-20
Practice B5 Assigning the Renderable Spline Modifier.....	B-23
Practice B6 Using Script for Converting Materials	B-26
Appendix C: Autodesk 3ds Max 2015 Certification Exam Objectives	C-1
Index	Index-1