

Table of Contents

Dedication	iii
Preface	xvii
Introduction to Solid Edge ST4	1-2
Solid Edge Environments <i>Enhanced</i>	1-6
System Requirements for Solid Edge ST4	1-8
Important Terms and Definitions	1-8
Getting Started With Solid Edge ST4	1-12
User Interface of Solid Edge	1-13
Radial Menu	1-17
Simulation Express	1-17
Using Intellisketch	1-17
Units for Dimensions	1-18
Automatic Saving Option	1-18
Color Scheme in Solid Edge	1-18
Self-Evaluation Test	1-20
Sketching in the Part Environment	2-2
Starting a New Document in the Part Environment	2-2
Starting a New Part file by Using the New Dialog Box	2-3
Transition between Part Environments	2-6
Starting a Sketch in the Part Environment	2-6
Sketching Tools	2-7
Drawing Lines	2-7
Drawing Tangent and Normal Arcs	2-9
Placing Sketched Points	2-10
Drawing Curves <i>Enhanced</i>	2-10
Drawing Circles	2-11
Drawing Ellipses	2-12
Drawing Arcs	2-13
Drawing Rectangles	2-14
Drawing Polygons	2-16
Converting Sketched Entities into Curves	2-17
Filleting Sketched Entities	2-17
Chamfering Sketched Entities	2-18
The Drawing Display Tools	2-18
Zooming into an Area	2-18
Zooming Dynamically	2-19
Fitting all Entities into the Current Display	2-19
Panning the Drawings	2-19
Restoring the Original Orientation of the Sketching Plane	2-20
Selecting Sketched Entities	2-20
Deleting Sketched Entities	2-20
Tutorial 1	2-21
Tutorial 2	2-25

Tutorial 3	2-29
Self-Evaluation Test	2-32
Review Questions	2-33
Exercise 1	2-34
Exercise 2	2-35
Exercise 3	2-35
Exercise 4	2-36

Chapter 3: Adding Relationships and Dimensions to Sketches

Geometric Relationships	3-2
Connect Relationship	3-2
Concentric Relationship	3-3
Horizontal/Vertical Relationship	3-3
Collinear Relationship	3-4
Parallel Relationship	3-4
Perpendicular Relationship	3-4
Lock Relationship	3-4
Rigid Set Relationship	3-5
Tangent Relationship	3-5
Equal Relationship	3-5
Symmetric Relationship	3-6
Setting the Symmetry Axis (Only in the Ordered)	3-6
Controlling the Display of Relationship Handles	3-7
Conflicts in Relationships	3-7
Deleting Relationships	3-7
Dimensioning the Sketched Entities	3-7
Adding Linear Dimensions	3-8
Adding Aligned Dimensions	3-11
Adding Angular Dimensions	3-12
Adding Diameter Dimensions	3-14
Adding Radial Dimensions	3-14
Adding Symmetric Diameter Dimensions	3-15
Adding Coordinate Dimensions	3-16
Adding Angular Coordinate Dimensions	3-16
Adding Automatic Dimensions (Only in the Ordered)	3-17
Understanding the Concept of Fully Constrained Sketches	3-18
Measuring Sketched Entities	3-18
Measuring Distances	3-18
Measuring the Total Length of a Closed Loop or an Open Sketch	3-19
Measuring an Area	3-19
Calculating the Area Properties	3-20
Tutorial 1	3-20
Tutorial 2	3-26
Tutorial 3	3-29
Self-Evaluation Test	3-33
Review Questions	3-34

Exercise 1	3-35
Exercise 2	3-35
Exercise 3	3-36

Chapter 4: Editing, Extruding, and Revolving the Sketches

Editing the Sketches	4-2
Trimming the Sketched Entities	4-2
Extending the Sketched Entities	4-2
Trimming/Extending Entities to a Corner	4-3
Creating Splits in the Sketched Entities	4-3
Creating Offset Copies	4-3
Creating Symmetric Offset Copies	4-4
Moving/Copying the Sketched Entities	4-6
Rotating the Sketched Entities	4-7
Mirroring the Sketched Entities	4-8
Scaling the Sketched Entities	4-9
Stretching the Sketched Entities	4-9
Editing the Sketched Entities by Dragging	4-10
Writing Text in the Sketching Environment	4-11
Inserting Images into Sketches	4-12
Converting Sketches into Base Features	4-14
Creating Base Features in Synchronous Part Environment	4-14
Creating an Extruded Feature	4-15
Creating Revolved Features <i>Enhanced</i>	4-16
Creating Ordered Features	4-17
Creating Extruded Features	4-17
Creating Revolved Features	4-18
Rotating the View of a Model in 3D Space	4-18
Restoring Standard Views	4-19
Setting the Display Modes	4-20
Shaded with Visible Edges	4-20
Shaded	4-20
Visible and Hidden Edges	4-20
Visible Edges	4-20
Wire Frame	4-20
Drop Shadow	4-20
Improving the Display Quality of a Model	4-21
Tutorial 1	4-21
Tutorial 2	4-25
Tutorial 3	4-27
Self-Evaluation Test	4-29
Review Questions	4-30
Exercise 1	4-31
Exercise 2	4-31
Exercise 3	4-32
Exercise 4	4-32

Chapter 5: Working With Additional Reference Geometries

Additional Sketching and Reference Planes	5-2
Local Reference Planes	5-2
Global Reference Planes	5-3
Creating Reference Planes (Synchronous)	5-3
Creating a Coincident Plane	5-3
Modifying Planes Using the Steering Wheel	5-4
Creating a Plane Normal to an Edge or a Sketched Curve	5-5
Creating a Plane Using Three Points	5-6
Creating a Tangent Plane	5-6
Creating a Parallel Plane	5-7
Creating an Angled Plane	5-8
Creating a Perpendicular Plane (Ordered)	5-9
Creating a Plane Using Coincident by Axis (Ordered)	5-10
Displaying the Reference Axes (Ordered)	5-10
Understanding Coordinate Systems	5-10
Creating a Coordinate System	5-11
Using the Other Options of the Extrude Tool	5-13
Creating Cutout Features	5-17
Creating Extruded Cutouts (Ordered)	5-17
Creating Revolved Cutouts (Ordered)	5-19
Creating Cutouts (Synchronous)	5-20
Using the Edges of Existing Features	5-21
Projecting Edges (Ordered)	5-23
Advanced Drawing Display Tools	5-23
Creating User-defined Named Views	5-23
Using Common Views	5-24
Tutorial 1	5-24
Tutorial 2	5-29
Tutorial 3	5-34
Self-Evaluation Test	5-38
Review Questions	5-39
Exercise 1	5-40
Exercise 2	5-41
Exercise 3	5-42

Chapter 6: Advanced Modeling Tools-I

Advanced Modeling Tools	6-2
Creating Holes (Ordered)	6-2
Creating Holes (Synchronous)	6-9
Creating Rounds (Ordered)	6-11
Creating the Constant Radius Round	6-11
Creating the Variable Radius Round	6-16
Creating Rounds (Synchronous)	6-17
Creating Variable Radius Round (Synchronous)	6-17

Creating Chamfers (Ordered)	6-17
Creating Rectangular and Circular Patterns (Ordered)	6-19
Creating Rectangular Patterns	6-20
Creating Circular Patterns	6-24
Creating a Pattern along a Curve	6-26
Creating Patterns (Synchronous)	6-29
Creating Rectangular Patterns	6-29
Creating Circular Patterns	6-32
Creating a Pattern along a Curve (Ordered)	6-32
Fill Pattern	6-33
Mirroring Features and Bodies (Ordered)	6-37
Mirroring Selected Features	6-37
Mirroring Bodies	6-38
Tutorial 1	6-38
Tutorial 2	6-43
Tutorial 3	6-47
Self-Evaluation Test	6-53
Review Questions	6-54
Exercise 1	6-55
Exercise 2	6-56
Exercise 3	6-56
Exercise 4	6-57

Chapter 7: Editing Features

Editing Models in the Synchronous Environment	7-2
Adding Dimensions to the Model	7-2
Dimensioning a Feature	7-2
Dimensioning Holes	7-2
Editing the Round Feature (Synchronous)	Enhanced 7-3
Adding Relations	7-4
Align Faces	7-4
Live Rules	7-6
Advanced Live Rules	7-7
Other Selection Handles	7-8
Reference Plane Handle	7-8
Selection Manager	Enhanced 7-8
Modifying Faces Using the Steering Wheel	7-9
Modifying the Model by Editing Dimensions	7-10
Creating Live Sections	7-11
Modifying the Model by Detaching and Attaching Faces	7-11
Modifying the Model by Isolating Features	7-12
Editing Features in the Ordered Environment	7-13
Suppressing Features	7-15
Unsuppressing the Suppressed Features	7-15
Deleting Features	7-16
Copying and Pasting Features	7-16

Rolling Back a Model to a Feature	7-16
Converting Ordered Features to Synchronous	7-17
Assigning Color to a Part, Feature, or Face	7-17
Playing Back the Construction of Features	7-18
Checking the Physical Properties of a Model	7-18
Modifying the Display of Construction Entities	7-19
Tutorial 1	7-19
Tutorial 2	7-25
Tutorial 3	7-30
Tutorial 4	7-34
Self-Evaluation Test	7-38
Review Questions	7-38
Exercise 1	7-39
Exercise 2	7-40
Exercise 3	7-41

Chapter 8: Advanced Modeling Tools-II

Advanced Modeling Tools	8-2
Creating Threads	8-2
Adding Drafts to the Model	8-4
Adding Ribs to the Model	8-5
Adding Thin Wall Features (Ordered)	8-9
Adding Thin Wall to a Particular Region	8-11
Adding a Lip to the Model	8-13
Creating Web Networks	8-14
Creating Vents	8-16
Creating Mounting Bosses (Ordered)	8-19
Reordering Features	8-23
Tutorial 1	8-24
Tutorial 2	8-27
Tutorial 3	8-31
Tutorial 4	8-35
Self-Evaluation Test	8-38
Review Questions	8-39
Exercise 1	8-40
Exercise 2	8-41
Exercise 3	8-42

Chapter 9: Advanced Modeling Tools-III

Advanced Modeling Tools	9-2
Creating Swept Protrusions	9-2
Creating Swept Cutouts	9-8
Creating Lofted Protrusions	9-9
Creating Lofted Cutouts	9-14
Creating Helical Protrusions	9-14
Creating Helical Cutouts	9-19

Creating Normal Protrusions	9-19
Creating Normal Cutouts	9-20
Tutorial 1	9-20
Tutorial 2	9-28
Tutorial 3	9-36
Self-Evaluation Test	9-42
Review Questions	9-43
Exercise 1	9-44
Exercise 2	9-44
Exercise 3	9-46

Chapter 10: Assembly Modeling-I

The Assembly Environment	10-2
Working with the Assembly Environment	10-2
Types of Assembly Design Approaches	10-2
Creating the Bottom-Up Assembly	10-3
Assembling the First Component	10-3
Assembling the Second Component	10-4
Applying Assembly Relationships <i>Enhanced</i>	10-5
Creating the Top-Down Assembly	10-15
Creating a Component in the Top-Down Assembly	10-15
Creating the Pattern of Components in an Assembly	10-17
Creating a Reference Pattern	10-17
Mirroring a Component in an Assembly	10-18
Creating Material Removal Features in an Assembly	10-19
Assembly Features	10-19
Assembly-driven Part Features	10-19
Moving the Individual Components	10-21
Moving Multiple Components	10-21
Tutorial 1	10-22
Tutorial 2	10-37
Self-Evaluation Test	10-45
Review Questions	10-46
Exercise 1	10-47
Exercise 2	10-50

Chapter 11: Assembly Modeling-II

Creating Subassemblies	11-2
Editing the Assembly Relationships	11-3
Modifying the Values	11-3
Applying Additional Relationships	11-4
Modifying Assembly Relationships	11-5
Editing the Assembly Components	11-6
Modifying Synchronous Components in the Assembly Environment	11-6
Dispersing Subassemblies	11-6

Replacing Components	11-7
Simplifying Assemblies Using Visibility Options	11-8
Hiding and Displaying the Components	11-8
Changing Transparency Conditions	11-8
Interference Detection in Assemblies	11-8
Interference Options	11-9
Checking for the Interference	11-11
Creating Fastener System <i>Enhanced</i>	11-11
Creating the Exploded State of Assemblies	11-15
Automatic Explode	11-15
Unexploding Assemblies	11-17
Exploding Assemblies Manually	11-17
Changing the Distance between the Components	11-19
Repositioning the Parts	11-19
Removing the Parts	11-20
Drop	11-20
Modify	11-20
Draw	11-21
Tutorial 1	11-21
Tutorial 2	11-28
Tutorial 3	11-36
Self-Evaluation Test	11-39
Review Questions	11-39
Exercise 1	11-40

Chapter 12: Generating, Editing, and Dimensioning the Drawing Views

The Draft Environment	12-2
Types of Views Generated in Solid Edge	12-3
Generating Drawing Views	12-4
Generating the Base View	12-4
Generating the Principal View	12-8
Generating the Auxiliary View	12-10
Generating the Section View	12-12
Revolved Section Views	12-13
Generating the Broken-Out Section View	12-15
Generating the Detail View	12-17
Generating the Broken View	12-18
Working with Interactive Drafting	12-19
Manipulating Drawing Views	12-19
Aligning Drawing Views	12-19
Modifying the Scale of Drawing Views <i>Enhanced</i>	12-20
Cropping the Drawing Views	12-20
Moving the Drawing Views	12-21
Rotating the Drawing Views	12-21
Applying the Hatch Pattern	12-21

Modifying the Properties of Drawing Views	12-21
Adding Annotations to the Drawing Views	12-23
Adding Callouts to Drawing View	12-26
Adding Surface Texture Symbols to a Drawing View	12-28
Specifying Edge Conditions	12-28
Adding a Feature Control Frame to Drawing Views	12-29
Adding Datum Target to Drawing View	12-30
Adding a Datum Frame to Drawing View	12-31
Adding New Drawing Sheets	12-31
Editing the Default Sheet Format	12-31
Evolving a 3D Model from a 2D Drawing	12-32
Generating the Exploded Views of Assemblies	12-32
Creating Associative Balloons and Parts List	12-34
Parts List Properties Dialog Box	12-35
Setting the Text Properties	12-39
Tutorial 1	12-41
Tutorial 2	12-46
Tutorial 3	12-51
Tutorial 4	12-57
Self-Evaluation Test	12-61
Review Questions	12-61
Exercise 1	12-63
Exercise 2	12-64

Chapter 13: Surface Modeling

Surface Modeling	13-2
Creating Surfaces in Solid Edge	13-2
Creating an Extruded Surface	13-2
Creating a Revolved Surface	13-3
Creating a Swept Surface	13-4
Creating Surfaces Using the BlueSurf Tool	13-6
Creating Surfaces Using the Bounded Tool	13-12
Stitching Multiple Surfaces to Create a Single Surface	13-14
Creating Offset Surfaces	13-14
Copying a Surface	13-15
Creating a BlueDot (Ordered)	13-16
Creating a Curve at the Intersection of Two Surfaces	13-17
Trimming the Surfaces	13-18
Extending the Surfaces	13-18
Replacing the Faces of a Part with a Surface	13-20
Splitting Faces	13-21
Creating Curves in 3D by Selecting Keypoints	13-21
Creating Curves by Table	13-22
Projecting the Curves on Surfaces	13-23
Creating a Curve at the Projection of Two Curves	13-25
Drawing a Curve on a Surface	13-25

Deriving Curves	13-26
Splitting a Curve	13-26
Splitting a Body	13-27
Adding Thickness to a Surface	13-28
Creating Rounds Using Blending	13-29
Adding a Draft	13-34
Using the Parting Split Tool	13-36
Using the Parting Surface Tool	13-37
Using the Offset Edge Tool	13-38
Tutorial 1	13-39
Tutorial 2	13-44
Self-Evaluation Test	13-51
Review Questions	13-52
Exercise 1	13-52
Exercise 2	13-53
Exercise 3	13-54

Chapter 14: Sheet Metal Design

The Sheet Metal Module	14-2
Setting the Sheet Metal Part Properties	Enhanced 14-4
Creating the Base of the Sheet Metal Parts	14-7
Adding Flanges to a Sheet Metal Part	14-8
Adding Flanges in Synchronous Sheet Metal	14-13
Creating Contour Flanges	14-13
Adding Contour Flanges in Synchronous Sheet Metal	14-17
Creating Lofted Flanges	14-18
Adding the Jog to the Sheet	14-19
Bending the Sheet Metal Part	14-20
Unbending the Sheet Metal Part	14-21
Rebending the Sheet Metal Part	14-21
Filleting or Chamfering Corners of a Sheet Metal Part	14-22
Closing the 2 Bend Corners of a Sheet Metal Part	Enhanced 14-22
Creating Dimples in a Sheet Metal Part	14-25
Creating Louvers in a Sheet Metal Part	14-27
Creating Drawn Cutouts in a Sheet Metal Part	14-30
Creating Beads in a Sheet Metal Part	14-31
Adding Gussets to a Sheet Metal Part	14-33
Adding Hems	14-36
Converting a Solid Part into a Sheet Metal Part	14-40
Ripping the Corners of a Solid Part	14-42
Creating the Flat Pattern of a Sheet Metal Part	14-42
Creating Flat Patterns in the Flat Pattern Environment	14-42
Saving a Sheet Metal Part in the Flat Pattern Format	14-43
Tutorial 1	14-44
Tutorial 2	14-52
Self-Evaluation Test	14-57

Review Questions	14-57
Exercise 1	14-58
Exercise 2	14-59

Chapter 15: Student Projects

Project 1	15-2
Project 2	15-16
Exercise 1	15-43

Index	I-1
--------------	------------