SOLIDWORKS[®] 2023 Basic Tools

Getting Started with Parts, Assemblies and Drawings





Better Textbooks. Lower Prices. www.SDCpublications.com

Visit the following websites to learn more about this book:





Googlebooks



Table of Contents

Introduction:	SOLIDWORKS 2023 User Interface	XXI
	The 3 reference planes	XXII
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	The toolbars	XXII
2000000 22000 0 0 0 0 0 0 0 0 0 0 0 0 0	The system feedback symbols	XXIV
- And	The status bar	XXIV
	2D sketch examples	XXV
	3D feature examples	XXVI
7		

Setting the System Parameters

Chapter 1:	System Options	1-1
•	Setting up the system options	1-1
	The general options	1-2
	The drawings options	1-3
	The display style options	1-3
System Options - General Company Compa	The area hatch/fill options	1-4
Chard denotes new Chard denotes new Chard denotes parts	The performance options	1-4
mi Kangki Carimanian Carana Kata on bangki Angaya ukan yana tang ti Kata on bangki Angaya ukan yana tang ti mara Sana Uka di mana ata mana dan di Kangki Kata Sana di Kata dan Kata Sana Kata Sana di Kata dan	The colors options	1-5
the school and any school and the school and t	The sketch options	1-5
ny Memory y VE BENDON Contrant Lagenterne Regressment Program SERENSE. Winning marke ESO/DARDER products before tog anternetisning someting providing providing time to ES Saldelinate Cognitions	The relations / snaps options	1-6
	The display options	1-6
OK Genet Rep	The selection options	1-7
	The performance options	1-7
	The assemblies options	1-8
	The external references options	1-8
	The default templates options	1-9
	The file locations options	1-9
	The feature manager options	1-10
	The spin box increments options	1-10
	The view options	1-11
	The backups / recover options	1-11
	The touch options	1-12
	The hole wizards / toolbox options	1-12
	The file explorer options	1-13
	The search options	1-13
	The collaboration options	1-14
	The messages/errors/warnings options	1-14

	The import options	1-15
	The export options	1-15
	Questions for review	1-16
Chapter 2:	Document Templates	2-1
-	Setting up the Document Properties	2-1
	The drafting standard options	2-2
	The annotations options	2-2
	The balloon options	2-3
	The datum options	2-3
	The geometric tolerance options	2-4
	The note options	2-4
	The revision clouds options	2-5
	The surface finish options	2-5
	The weld symbol options	2-6
Decement Reporter - Darling Stantard	The dimensions options	2-6
eeG w Annue Copy Event Laadhan Kena Fin. Sann Annue Fin.	The angle options	2-7
Set	The angular running options	2-7
	The arc length options	2-8
	The chamfer options	2-8
	The diameter options	2-9
C. Crock Nor	The hole callout options	2-9
	The linear options	2-10
	The ordinate options	2-10
	The radius options	2-11
	The virtual sharps options	2-11
	The table options	2-12
	The bend options	2-12
	The bill of materials options	2-13
	The general options	2-13
	The title block table options	2-14
	The DimXpert options	2-14
	The size dimension options	2-15
	The location dimension options	2-15
	The chain dimension options	2-16
	The geometric tolerance options	2-16
	The chamfer controls options	2-17
	The display options	2-17
	The detailing options	2-18
	The grid / snap options	2-18
	The units options	2-19
	The model display options	2-19
	The material properties options	2-20

Jens Bank Jonan Januari Constantino Consta

The image quality options	2-20
The sheet metal options	2-21
The weldments options	2-22
The plane display options	2-22
The configurations options	2-23
Saving the settings in a part template	2-23
Questions for review	2-24

Basic Modeling Topics

Chapter 3:	Basic Solid Modeling – Extrude Options	3-1
-	Tools needed	3-2
	Starting a new part	3-4
	Changing the scene	3-5
	Starting a new sketch	3-6
	Using the Click + Hold + Drag Technique	3-9
	Adding geometric relations	3-10
	Adding a collinear relation	3-11
	Geometric relations examples	3-12
	Adding the horizontal dimensions	3-13
	Adding the vertical dimensions	3-14
	The status of a sketch	3-14
	Hiding the sketch relation symbols	3-15
\sim	Extruding the base	3-16
	Sketching on a planar face	3-17
	Using the Trim Entities command	3-19
	Extruding a boss	3-20
	Extrude summary	3-24
	Adding the model fillets	3-25
	Questions for review	3-27
	Using the search commands	3-28
	Exercise: Extrude Boss & Hole Wizard	3-32
	Exercise: Extrude Boss & Extrude Cut	3-35
Chapter 4:	Basic Solid Modeling – Extrude and Revolution	ve 4-1



Basic Solid Modeling – Extrude and Revolve 4-1		
Link Components	4-2	
Tools needed	4-2	
Sketching the first profile	4-3	
Extruding the first solid	4-3	
Creating the bore holes	4-4	

(0)>>>>	
$\mathcal{A}((O))$	

Chapter 5:

Cutting the bore holes	
	4-5
Mirroring the bore holes	4-6
Extruding a Through All cut	4-8
Adding fillets	4-8
Creating the sub-components	4-10
Revolving the base feature	4-10
Adding chamfers	4-11
Extruding the base	4-15
Sketching the Recess Profiles	4-15
Extruding a blind cut	4-16
Mirroring the cut	4-16
Adding holes	4-17
Adding more fillets	4-18
Questions for review	4-20
Exercise: Extrude Boss & Extrude Cut	4-21
Revolve Parts	5-1
Ball Joint Arm	5-1
Tools needed	5-2
Tools needed Creating the base profile	5-2 5-3
Creating the base profile	5-3
Creating the base profile Revolving the base feature	5-3 5-4
Creating the base profile Revolving the base feature Sketching the opened-end profile Revolving the opened-end feature	5-3 5-4 5-4
Creating the base profile Revolving the base feature Sketching the opened-end profile	5-3 5-4 5-4 5-5
Creating the base profile Revolving the base feature Sketching the opened-end profile Revolving the opened-end feature Mirroring the revolved feature	5-3 5-4 5-4 5-5 5-6
Creating the base profile Revolving the base feature Sketching the opened-end profile Revolving the opened-end feature Mirroring the revolved feature Adding fillets	5-3 5-4 5-4 5-5 5-6 5-6
Creating the base profile Revolving the base feature Sketching the opened-end profile Revolving the opened-end feature Mirroring the revolved feature Adding fillets Questions for review	5-3 5-4 5-4 5-5 5-6 5-6 5-8
Creating the base profile Revolving the base feature Sketching the opened-end profile Revolving the opened-end feature Mirroring the revolved feature Adding fillets Questions for review Exercise: Flat Head Screwdriver	5-3 5-4 5-4 5-5 5-6 5-6 5-8 5-9





Derived Sketches	5-12
Center Ball Joint	5-12
Tools needed	5-13
Creating the base profile	5-14
Revolving the base feature	5-14
Creating a new work plane	5-15
Creating a derived sketch	5-15
Positioning the derived sketch	5-16
Adding fillets	5-17
Questions for review	5-18
Exercise: Revolved Parts - Wheel	5-19
Exercise: Plastic bottle	5-21

Chapter 6:	Rib & Shell Features	6-1
_	Plastic Tray	6-1
	Tools needed	6-2
	Sketching the base profile	6-3
	Extruding the base feature	6-3
	Adding the side cutouts	6-4
	Removing more material	6-5
	Creating the rib profiles	6-6
	Adding fillets	6-7
	Shelling the lower portion	6-8
	Questions for review	6-9
	Shell & Mirror Features - Styrofoam Box	6-10
	Tools needed	6-11
	Starting a new part	6-12
	Extruding the base	6-12
	Adding fillets	6-13
	Creating an offset sketch	6-14
	Creating a recess	6-14
	Creating the rim	6-16
	Creating the fold feature	6-17
	Mirroring the solid body	6-18
	Creating the lock feature	6-19
	Creating the lock cavity	6-20
	Shelling the part	6-22
	Questions for review	6-25
Chapter 7:	Patterns	7-1
	Linear Patterns – Test Tray	7-1
	Tools needed	7-2
	Sketching the base profile	7-3
000	Extruding the base feature	7-3
	Sketching the seed feature	7-4
10000	Extruding a seed feature	7-4
-	Creating a linear pattern	7-5
	Shelling the base feature	7-6
	Adding fillets	7-7
	Questions for review	7-8
	Circular Patterns – Spur Gear	7-9
	Tools needed	7-10
	Sketching the body profile	7-11
	Using the dynamic mirror	7-11

٢

	Revolving the base body	7-13
	Sketching the thread profile	7-14
	Converting the entities	7-15
	Trimming the sketch entities	7-16
	Adding dimensions	7-16
	Cutting the first tooth	7-17
	Circular patterning the tooth	7-17
	Adding the keyway	7-19
	Extruding a cut	7-20
	Questions for review	7-22
	Circular Patterns – Circular Base Mount	7-23
	Tools needed	7-24
	Creating the base sketch	7-25
	Revolving the base feature	7-25
	Creating the first-side tab sketch	7-26
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Extruding the side-tab	7-26
	Adding a counterbore hole	7-27
	Circular patterning the bore hole	7-28
	Creating a new plane	7-28
	Creating the pockets sketch	7-29
	Adding fillets	7-30
	Questions for review	7-32
	<b>Curve Driven Pattern and Hole Wizard</b>	7-35
	Tools needed	7-36
	Opening the existing file	7-37
	Extruding the base	7-38
0	Creating the sketch for the first hole	7-38
	Constructing the curve-sketch	7-39
	Creating the first curve driven pattern	7-40
	Adding the hole wizard	7-41
	Creating the second curve driven pattern	7-42
Chapter 8:	Part Configurations	8-1
	Machined Block	8-1
	Tools needed	8-2
0	Sketching the base profile	8-3
••	Extruding the base feature	8-3
	Creating the pocket profiles	8-4
	Adding a counterbore	8-5
	Patterning the counterbore	8-6
	Creating the mirror-plane	8-6







XII



Mirroring the counterbores	8-7
Creating the blind holes	8-8
Creating a cutaway section	8-9
Sketching a profile for the cut	8-10
Creating the section cut	8-11
Switching between the configurations	8-12
Splitting the FeatureManager pane	8-13
Creating a new configuration	8-13
Questions for Review	8-16
Exercise 1: Using Vary-Sketch	8-17
Exercise 2: Using Vary-Sketch	8-20







Excluse 2. Osing vary-breten	0-20
Modeling Threads	9-1
Threaded Insert	9-1
Tools needed	9-2
Sketching the base profile	9-3
Revolving the base feature	9-4
Creating the right-hand threads	9-4
Using the Mirror bodies option	9-7
Adding chamfers	9-8
Questions for review	9-9
Exercise: Modeling threads - Internal	9-10
Exercise: Internal threads	9-14
Exercise: External threads	9-22
Exercise: Automatic vs manual threads	9-28

# **Bottom-Up Assembly Topics**

### Chapter 10:



Bottom Up Assembly	10-1
Ball Joint Assembly	10-1
Tools needed	10-2
Starting a new assembly template	10-3
Inserting the components	10-4
Mating the components	10-6
Moving the component	10-7
Inserting another instance	10-7
Constraining the components	10-8
Questions for review	10-11



Bottom Up Assembly – Links Assembly	10-12
Tools needed	10-13





Starting a new assembly template	10-14
Placing the first component	10-15
Adding other components	10-16
Changing colors	10-17
Inserting the single link into the assembly	10-18
Using the selection filters	10-18
Adding mates	10-19
Adding a width mate	10-20
Making copies of the component	10-21
Inserting other components into the assembly	10-23
Rotating the pin head	10-23
Constraining the alignment pin	10-24
Constraining the pinhead	10-25
Using the align & anti-align options	10-27
Questions for review	10-29
Exercise: Gate Assembly	10-30
Using Advanced Mates	11-1
Rack and Pinion	11-1
Open an assembly document	11-2
Adding standard mates	11-3
Suppressing a mate	11-4
Adding a mechanical mate	11-4
Testing the mates	11-5
Creating a linear motion	11-5
Limit & Cam Mates	11-8
Opening a part file	11-8
Adding mates	11-9
Adding a width and a cam mate	11-10
Adding a parallel mate	11-12
Adding a limit mate	11-13
Exercise: Cam Followers	11-16
Questions for review	11-20
Using Gear Mates	11-21
Using Limit Mates	11-25
Exercise: Bottom up assembly	11-27



Chapter 11:





Exercise: Bottom up assembly	11-27
Level 1 Final Exam: Assembly Motions	11-33

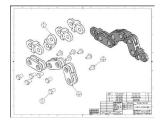
Chapter 12:	Kinematics Assembly Assembly Motions Tools Needed	<b>12-1</b> 12-2 12-2
Ê	Opening an assembly document	12-3
	Constraining the link_center	12-4
	Adding a concentric mate	12-4
	Adding a width mate	12-4
	Mating the long pin	12-5
	Adding a concentric mate	12-5 12-5
۲	Adding a coincident mate	12-3
	Mating the last 2 pins	12-0
	Testing the kinematics motions Removing the collisions	12-0
	Saving the assembly	12-8
	Exercise: Oscillating Mechanism	12-8
	SOLIDWORKS Animator – The Basics	12-15
	Opening an existing assembly document	12-15
	Adding a rotary motor	12-16
	Viewing the rotary motions	12-17
	Using the animation wizard	12-17
	Animating the explode of an assembly	12-19
	Animating the collapse of the assembly	12-20
	Changing the view orientation of the assembly	12-24
	Creating the flashing effects	12-25
	Looping the animation	12-28
	Saving the animation as AVI	12-29
	Viewing the AVI with Windows Media Player	12-30
Chapter 13:	PhotoView360 Basics	13-1
-	Activating PhotoView 360	13-1
	Setting the appearance	13-2
	Setting the scene	13-3
	Setting the image quality options	13-4
	Rendering the image	13-5
	Exercise: HeliDrone Assembly	13-7
	Rendering the screen with Ambient Occlusion	13-11
	Opening an assembly document	13-11
	Changing the scene	13-12
	Retrieving a named view	13-13
TE	Applying appearances to the components	13-14

B

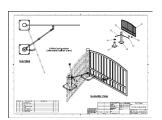
# **Drawing Topics**

Chapter 14:	Drawing Preparations	14-1
-	Customizing the Document Template	14-1
	Tools needed	14-2
lecter (and ) cant trapped () () () () () () () () () () () () ()	Setting up new drawing	14-3
entralistika proved entralistika proved entralist	Switching to the sheet format layer	14-5
and a second sec	Switching to the sheet layer	14-6
Lef value description in la later antique description in la later antique description in late	Setting up the drawing options	14-7
A Carloy Garder, Carl		14-8
In the second		14-16
	Questions for review	14-17
Arrow Control and Arrow C	Setting up the document template options Saving the document template	14- 14-

Chapter	15:
---------	-----



	,
Assembly Drawings	15-1
Links Assembly	15-2
Tools needed	15-2
Creating a new drawing	15-3
Editing the sheet format	15-6
Setting up the anchor point to attach the B.O.M.	15-6
Switching back to the sheet layer	15-7
Opening an existing assembly document	15-8
Switching to the exploded view state	15-10
Changing the line style	15-11
Using the view palette	15-12
Switching to shaded view	15-13
Adding the bill of material (B.O.M.) to the drawing	15-13
Selecting the B.O.M. options	15-14
Creating the custom Properties	15-15
Modifying the B.O.M.	15-17
Reversing the table headers	15-19
Adding balloon callouts	15-20
Changing the balloon style	15-21
Questions for review	15-22
Exercises: Assembly Drawings	15-23
Alternate Position Views	15-26
Table pooled	15 27



Alternate Position Views	15-26
Tools needed	15-27
Creating a new drawing	15-28
Creating the isometric drawing view	15-29
Changing the drawing view scale	15-30
Creating an alternate position drawing view	15-31

Adding the top drawing view	15-32
Adding text / annotations	15-34
Creating an exploded isometric view	15-35
Adding auto-balloons to the exploded view	15-36
Adding the bill of materials	15-37
Questions for review	15-38

16-1

16-1

16-2

16-3

16-4

16-6

16-6

16-7

16-9

16-10

16-11 16-12

16-12

16-13

16-14

16-15

16-16

16-16

16-17

16-18

16-19

16-20

#### Chapter 16: Drawing Views Machined Block

Tools needed

Creating a new drawing

Editing the sheet format

Using the view palette

Creating a detail view

Modifying the existing text

Adding an isometric view

Moving the drawing views

Using the detail view options

Creating a broken-out-section

Creating a projected view

Creating an auxiliary view

Creating a section view

Adding a cutaway view

Changing configurations

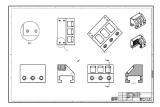
Adding the title of the drawing

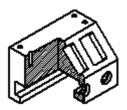
Breaking the alignments between the views

Showing the hidden lines in a drawing view

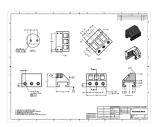
Adding crosshatch to the sectioned surfaces

Modifying the crosshatch properties





### Chapter 17:



Geometric tolerances & flag notes	16-22
Modifying & hole symbols	16-23
ANSI symbol descriptions	16-24
Detailing	17-1
Machined Block	17-2
Tools needed	17-2
Opening a drawing document	17-3
Inserting dimensions from the model	17-3
Re-arranging the new dimensions	17-4
Inserting dimensions to the section view	17-4
Adding dimensions to the auxiliary view	17-6
Adding the center marks	17-6

Adding the datum feature symbols	17-7
Datum reference & geometric tolerance examples	17-8
Adding the hole specifications using the hole-callout	17-9
Adding geometric tolerances	17-9
Align the geometric tolerance	17-11
Attaching the geometric tolerance to the driving dimension	17-12
Adding tolerances / precision to dimensions	17-13
Adding symmetric tolerance to a dimension	17-14
Adding surface finish callouts	17-14
Adding non-parametric callouts	17-16
Inserting notes	17-16
Changing the document's font	17-17
Questions for review	17-19
Exercise: Detailing I	17-20
Exercise: Detailing II	17-21
Fastener Callouts	17-22
Thread Nomenclature	17-23
Attaching note or symbol to a dimension	17-24

Chapter 18:	Sheet Metal Drawings	18-1
-	Post Cap	18-1
	Tools needed	18-2
	Starting a new drawing	18-3
	Creating the 3 standard views	18-4
	Rearranging the drawing views	18-5
	Creating the flat pattern drawing view	18-5
	Creating a detail view	18-6
	Adding the ordinate dimensions	18-6
	Adding the model dimensions	18-7
	Creating the isometric flat pattern view	18-9
	Showing / hiding the bend lines	18-10
	eDrawing & 3D Drawing View	18-11
	SOLIDWORKS 2023 – 3D Drawing View	18-20
	Reorienting views	18-23
Chapter 19:	Configurations	19-1
•	Part I: Part, Assembly & Drawing	19-1
	Tools needed	19-2
S N	Opening an assembly document	19-3
	Using configurations in the part mode	19-3
	Changing the pitch	19-4
	Creating an assembly configuration	19-5

#### XVIII





### Chapter 20:



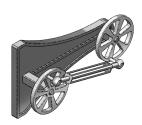


Changing the mate conditions	19-5
Adding new mates	19-6
Changing configuration	19-6
Using configurations in a drawing	19-7
Changing the configuration of a drawing view	19-8
Part II: Part, Assembly & Drawing	19-9
Tools needed	19-10
Part Configurations	19-11
Opening a part document	19-11
Creating a new configuration	19-11
Changing the number of the spokes	19-12
Viewing the configurations	19-13
Assembly configurations	19-14
Starting a new assembly	19-14
Inserting the Sub-Assembly	19-15
Mating the sub-assembly	19-16
Viewing the assembly configurations	19-18
Drawing Configurations	19-19
Creating an assembly drawing	19-19
Creating the standard drawing views	19-20
Auto start the projected view	19-21
Creating the aligned section view	19-21
Creating the isometric view	19-22
Displaying the exploded view	19-23
Changing configurations	19-24
Adding annotations	19-24
Design Tables	20-1
Tools needed	20-2
Copying the document	20-3
Creating a new design table	20-4
Transferring the dimensions to the design table	20-5
Using Excel's addition formula	20-5
Controlling the suppression-states of the holes	20-7
Viewing the configurations generated by the design table	20-8
Assembly – Design Tables	20-9
Copying the eggbeater assembly	20-9

Copying the eggbeater assembly20-9Creating a new assembly design table20-10Defining the column headers20-11Inserting the control parameters20-12Adding the configuration names20-13

0	Assigning the control values Viewing the new configurations Exercise: Part design tables	20-13 20-14 20-15
	Level 2 Final Exam	20-19
	Table of U.S. Measures Table of Metric Measures	20-21 20-22

### **CSWA** Preparation Materials (Certified SOLIDWORKS Associate)



Preparation materials for the CSWA examination	21-1
Drafting competencies	21-3
Basic Part Modeling	21-6
Bottom Up Assembly 1	21-30
Bottom Up Assembly 2	21-42



### Glossary Index SOLIDWORKS 2023 Quick-Guides:

Quick Reference Guide to SOLIDWORKS 2023 Command Icons and Toolbars.

