Lesson 8: Design Tables

Goals of This Lesson

- Upon successful completion of this lesson, your students will be able to create a design table that generates the following configurations of Tutor1:

![Design Table for Tutor1](image)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design Table for Tutor1</td>
<td>box_width @Sketch1</td>
<td>box_height @Sketch1</td>
<td>knob_dia@Sketch1</td>
<td>hole_dia@Sketch2</td>
<td>fillet_radius @Outside corners</td>
<td>Depth@Kn</td>
</tr>
<tr>
<td>2</td>
<td>blk1</td>
<td>120</td>
<td>120</td>
<td>70</td>
<td>50</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>blk2</td>
<td>120</td>
<td>50</td>
<td>50</td>
<td>40</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>blk3</td>
<td>90</td>
<td>150</td>
<td>50</td>
<td>10</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>blk4</td>
<td>120</td>
<td>120</td>
<td>30</td>
<td>10</td>
<td>25</td>
<td>90</td>
</tr>
</tbody>
</table>

Before Beginning This Lesson

- Design Tables requires Microsoft Excel application. Ensure that Microsoft Excel is loaded on your classroom/lab systems. It is strongly recommended that you use either Microsoft Office 2000, or Microsoft Excel 97 Service Release 2 (SR2) or later.

Resources for This Lesson

This lesson plan corresponds to the Design Tables module in the SolidWorks Online Tutorials. For more information about the Online Tutorials, See “Online Tutorials” on page v.
Active Learning Exercises — Creating a Design Table

Create the design table for Tutor1. Follow the instructions in the Design Tables module in the SolidWorks Online Tutorials.

5 Minute Assessment

1. What is a configuration? ____________________________________________
   ___________________________________________________________________
   ___________________________________________________________________

2. What is a design table? _____________________________________________
   ___________________________________________________________________
   ___________________________________________________________________

3. What additional Microsoft software application is required to create design tables in SolidWorks? __________________________________________
   ___________________________________________________________________
   ___________________________________________________________________

4. What are three key elements of a design table? _________________________
   ___________________________________________________________________
   ___________________________________________________________________
   ___________________________________________________________________

<table>
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<tr>
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<td>30</td>
<td>10</td>
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</tr>
</tbody>
</table>
5 True of False. **Link Values** equates a dimension value to a shared variable name.

6 Describe the advantage of using geometric relations versus linear dimensions to position the **Knob** feature on the **Box** feature.

7 What is the advantage of creating a design table?

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**Exercises and Projects — Creating a Design Table for Tutor2**

**Task 1**

Create a design table for **Tutor2** that corresponds to the four configurations of **Tutor3**. Rename the features and the dimensions. Save the part as **Tutor4**.

**Task 2**

Create three configurations of the **CD storagebox** to contain 50, 100 and 200 CDs. The maximum width dimension is 120cm.
Task 3

Convert the overall dimensions of the 50 CD storage box from centimeters to inches. The design for the CD storage box was created overseas. The CD storage box will be manufactured in the US.

**Given:**

- Conversion: 2.54 cm = 1 inch
- Box_width = 54.0 cm
- Box_height = 16.4 cm
- Box_depth = 17.2 cm

**Answer:**

- Overall dimensions = \( \text{box}_\text{width} \times \text{box}_\text{height} \times \text{box}_\text{depth} \)
- Box_width = ____________________________
- Box_height = ____________________________
- Box_depth = ____________________________

Use SolidWorks to confirm the conversion values.

**Task 4**

What CD storage box configurations are feasible for use in your classroom?
Exercises and Projects — Creating Part Configurations Using Design Tables

Create a cup. In the **Extrude Feature** dialog box, use a **5° Draft Angle**. Create four configurations using a design table. Experiment with different dimensions.

Note: Units are in Inches

In Class Discussion

Bring in some examples of products that lend themselves to design tables. You can bring in the actual objects or illustrations from magazines or catalogs.
More to Explore — Configurations, Assemblies, and Design Tables

When each component in an assembly has multiple configurations, it makes sense that the assembly should have multiple configurations as well. There are two ways to accomplish this:

- Manually change the configuration being used by each component in the assembly.
- Create an assembly design table that specifies which configuration of each component is to be used for each version of the assembly.

**Note:** If you followed the directions in the online tutorial, they saved Tutor1 as Tutor3 when they created the design table. Likewise in Task 1 of the exercises, Tutor2 would have been saved as Tutor4. To explore assembly design tables, you will need an assembly that is made up of Tutor3 and Tutor4. This assembly is located in the Lessons\Lesson08 folder in SolidWorks Teacher Tools.

Changing the Configuration of a Component in an Assembly

To manually change the displayed configuration of a component in an assembly:

1. Open the assembly Tutor Assembly which is located in the Lesson08 folder.
2. Right-click the component, either in the FeatureManager design tree or in the graphics area, and select Properties.
3. In the Component Properties dialog, select the desired configuration from the list in the Referenced configuration area. Click OK.
4. Repeat this procedure for each component in the assembly.
Assembly Design Tables

While manually changing the configuration of each component in an assembly works, it is neither efficient nor very flexible. Switching from one version of an assembly to another would be tedious. A better approach would be to create an assembly design table.

The procedure for creating an assembly design table is very similar to the procedure for creating a design table in an individual part. The most significant difference is the choice of different keywords for the column headers. The keyword we will explore here is $CONFIGURATION@component<instance>.

Procedure

1. Click **Insert, Design Table**.
   
   The **Design Table** PropertyManager appears.

2. For **Source**, click **Blank** and then click **OK**.

3. The **Add Rows and Columns** dialog box appears.
   
   If the assembly already contained configurations that were created manually they would be listed here. You could select them and they would automatically be added to the design table.

4. Click **Cancel**.

5. In cell B2, enter the keyword $Configuration@ followed by the name of the component and its instance number. In this example, the component is **Tutor3** and the instance is <1>.

6. In cell C2, enter the keyword $Configuration@ **Tutor4</1>.
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7 Add the configuration names in column A.

8 Fill in the cells of columns B and C with the appropriate configurations for the two components.

9 Finish inserting the design table.
   Click in the graphics area. The system reads the design table and generates the configurations.
   Click **OK** to close the message dialog.

10 Switch to the ConfigurationManager.
    Each of the configurations specified in the design table should be listed.

    **Note:** The configuration names are listed in the ConfigurationManager alphabetically, **not** in the order in which they appeared in the design table.

11 Test the configurations.
    Double-click on each configuration to verify that they display correctly.
Lesson Summary

- Design Tables simplify making families of parts.
- Design Tables automatically change the dimensions and features of an existing part to create multiple configurations. The configurations control the size and shape of a part.
- Design Tables require Microsoft Excel application.
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