EN1740 Computer Aided Visualization and Design

Spring 2012

3/15/2012

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Last Time:

- Assembly drawings

    - X-sec

    - Exploded

    - Tables

        - BOM

        - Inclusions

- Simplified Reps

- Notes on Critical to Function Drawings
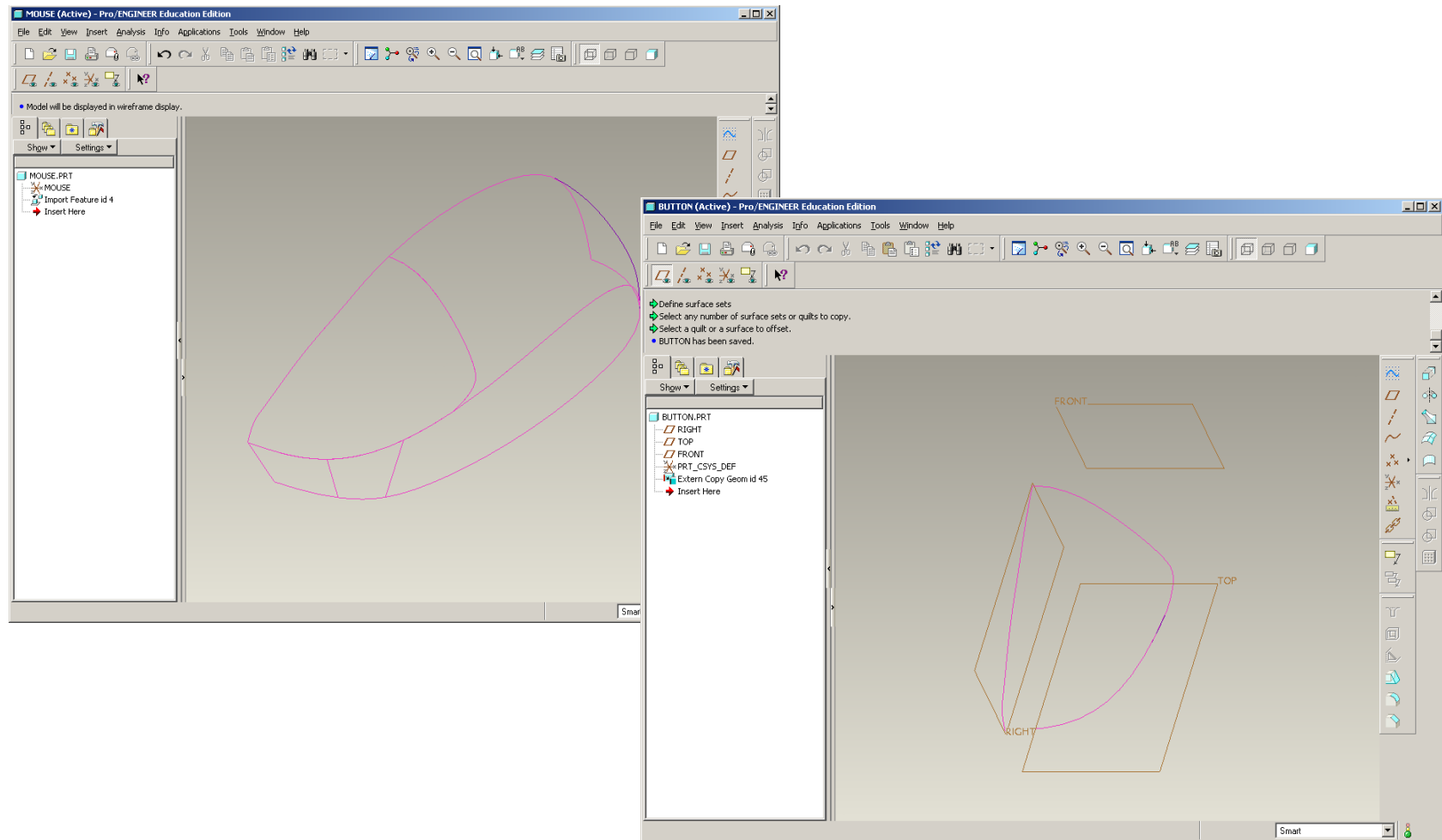
- Modeling text

- Color and Appearance Texture

Tonight:

- Shared data

    - Copied Geometry

    - Component Operations

- Family Tables

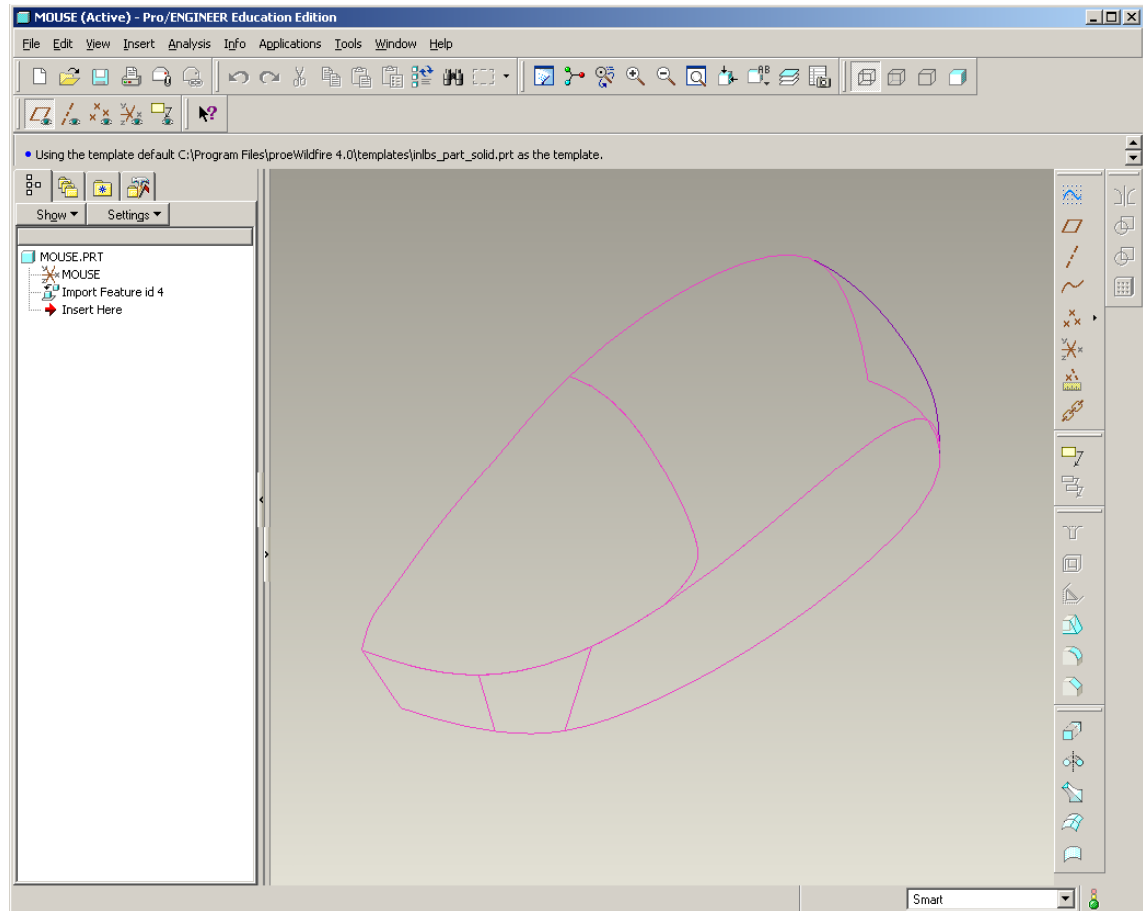# Shared Data - Copied Geometry

Component and assembly data can be shared among various files
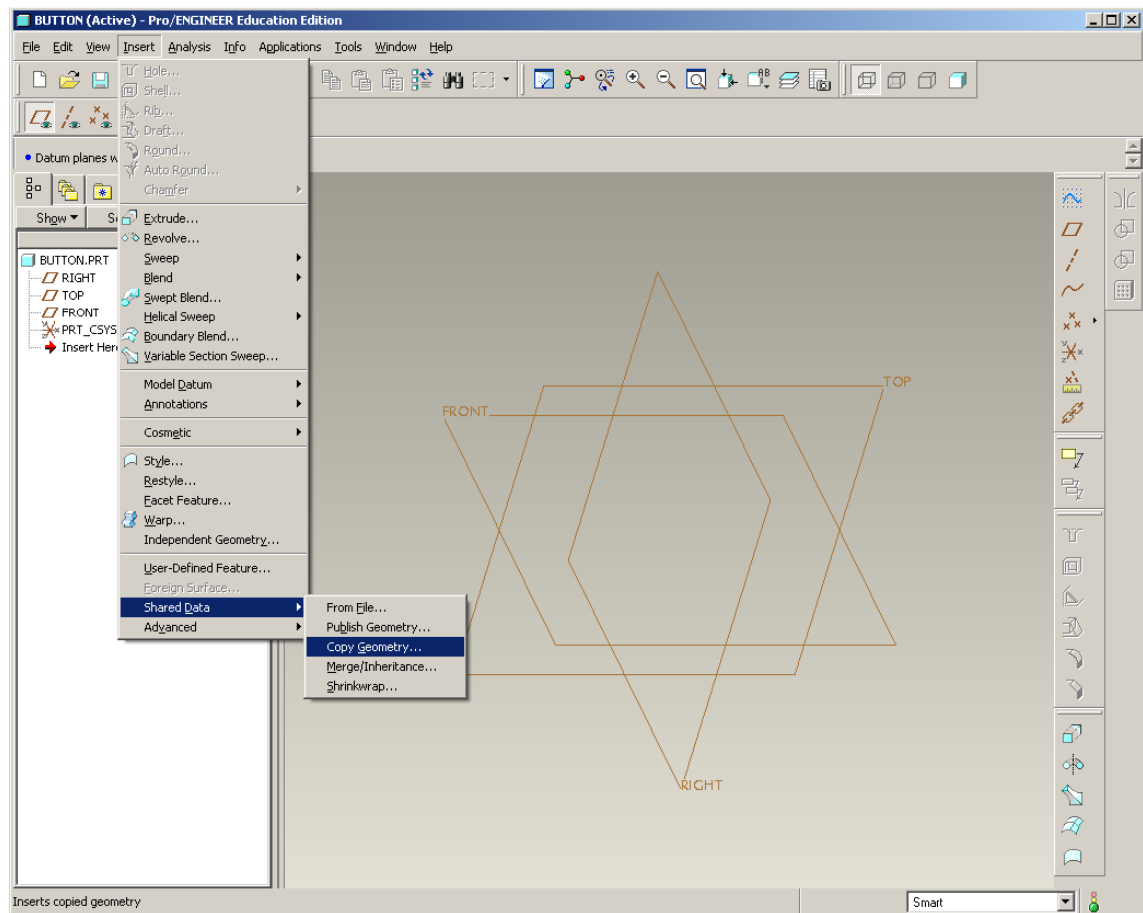
EXERCISE - Shared Data

- File > Open

- Select .stp file type

- Select mouse.stp
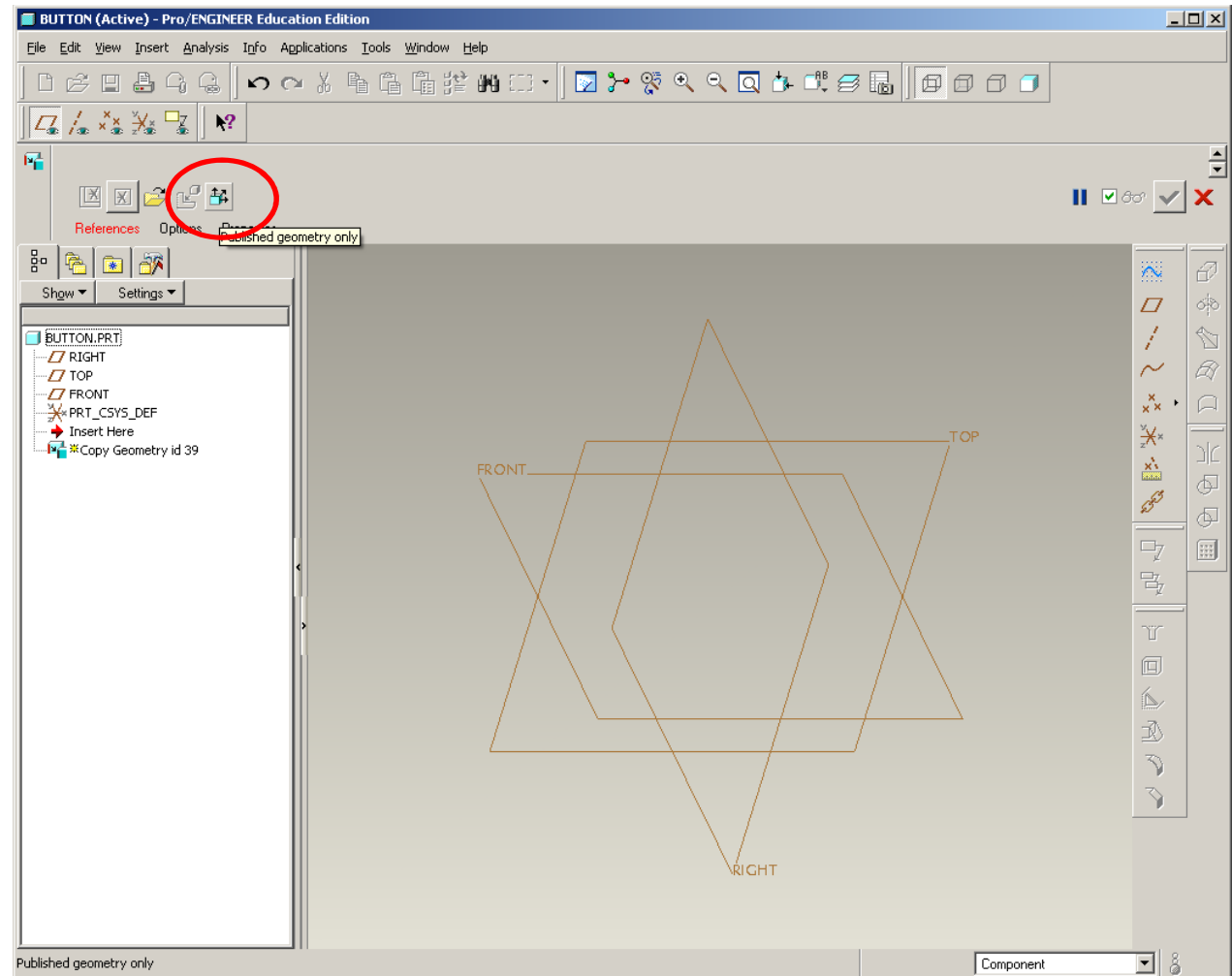
- File > New > Part > button

EXERCISE - Shared Data

• In button.prt

    • Insert > Shared Data

    > Copy Geometry
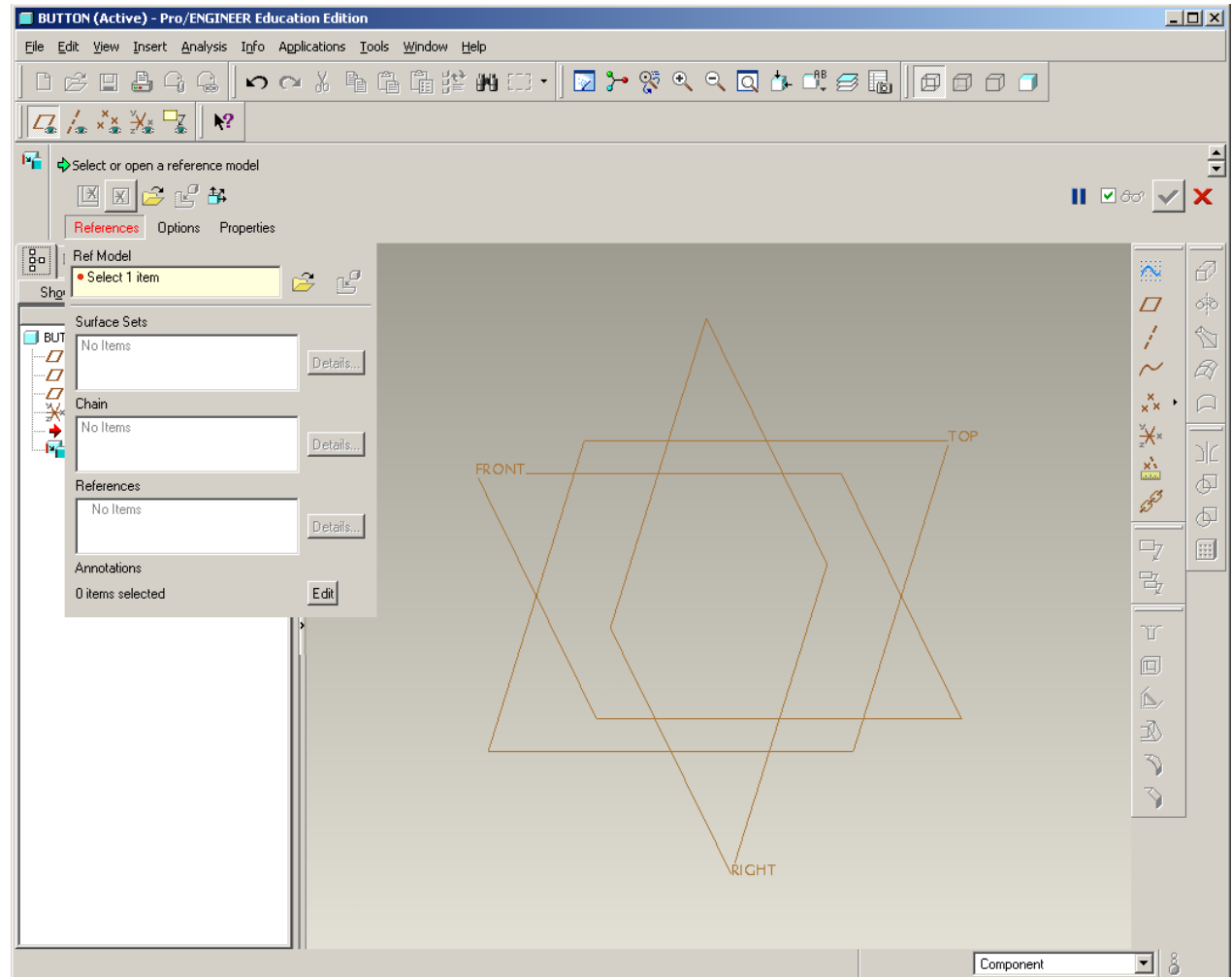
EXERCISE - Shared Data

• Uncheck Published
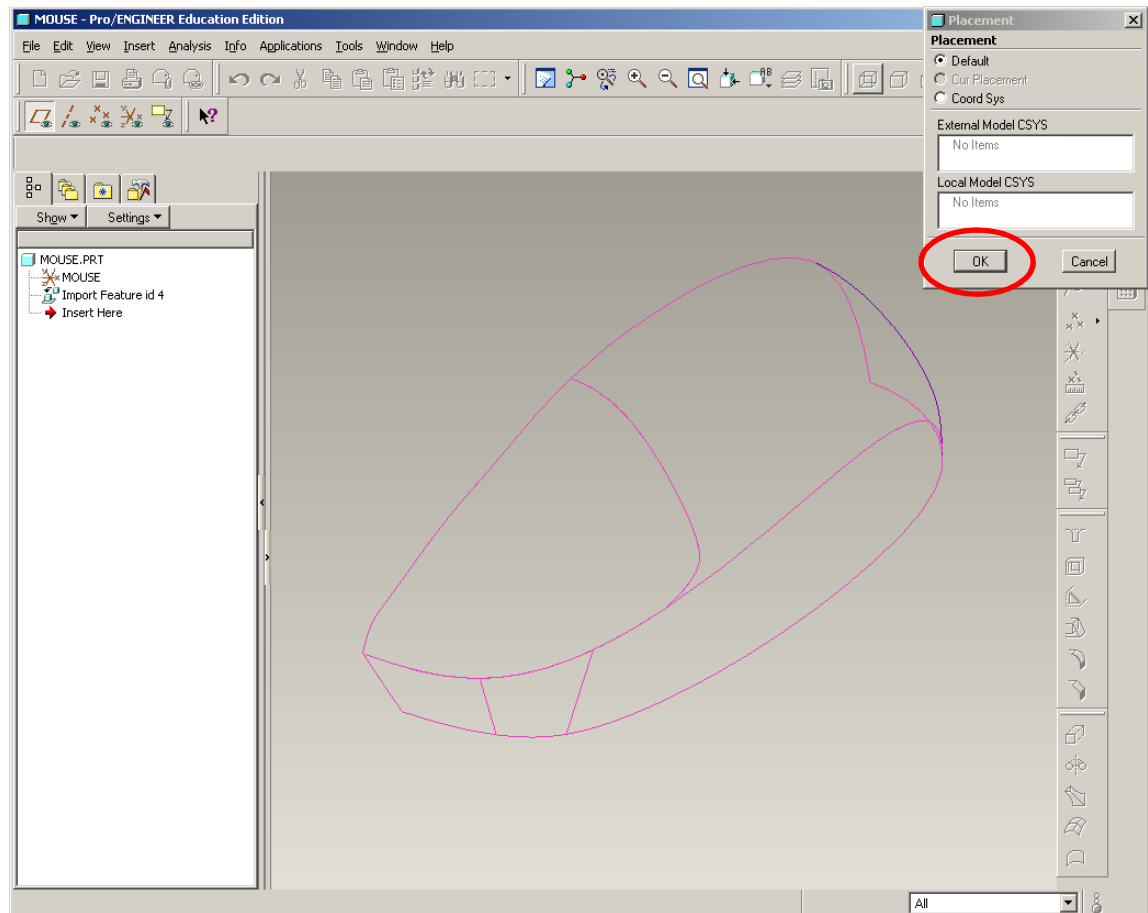
Geometry only

EXERCISE - Shared Data

• Select Reference

• From the taskbar, select

the Pro/E window with the
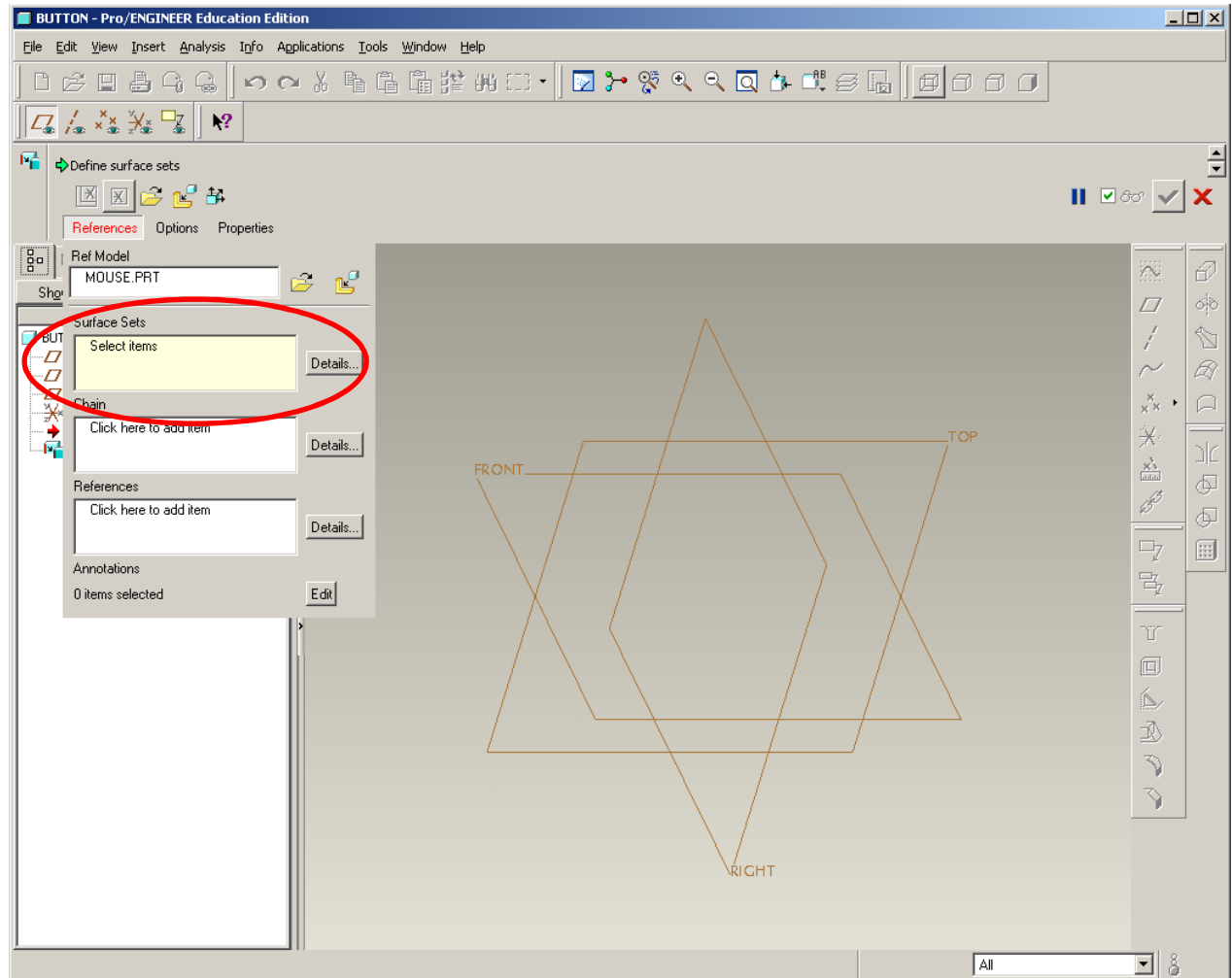
mouse surface…..

EXERCISE - Shared Data

- …Click on the outer surface

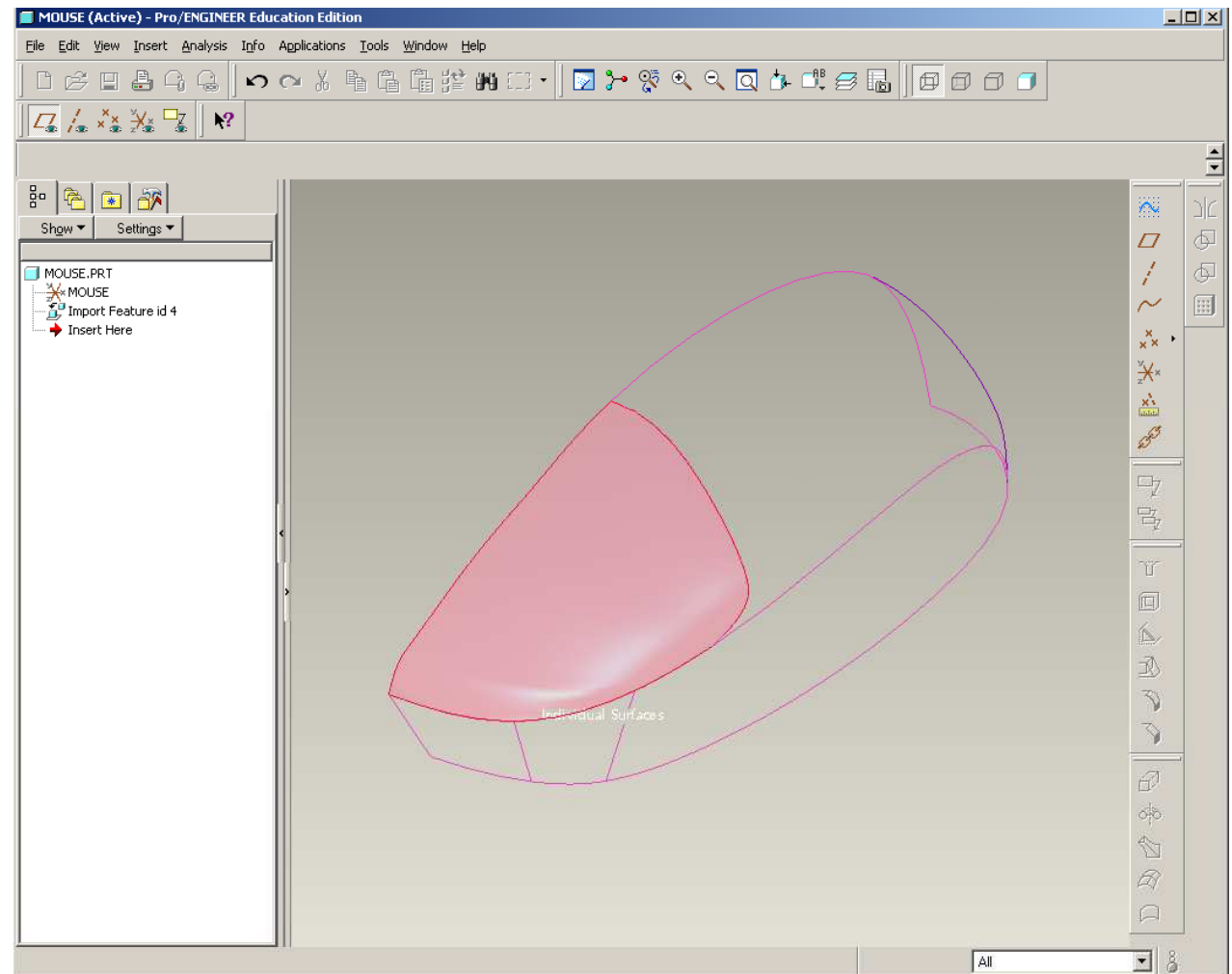- Click OK for Default CSYS

EXERCISE - Shared Data

• You'll be directed back to

button.prt

• Select Surface Sets
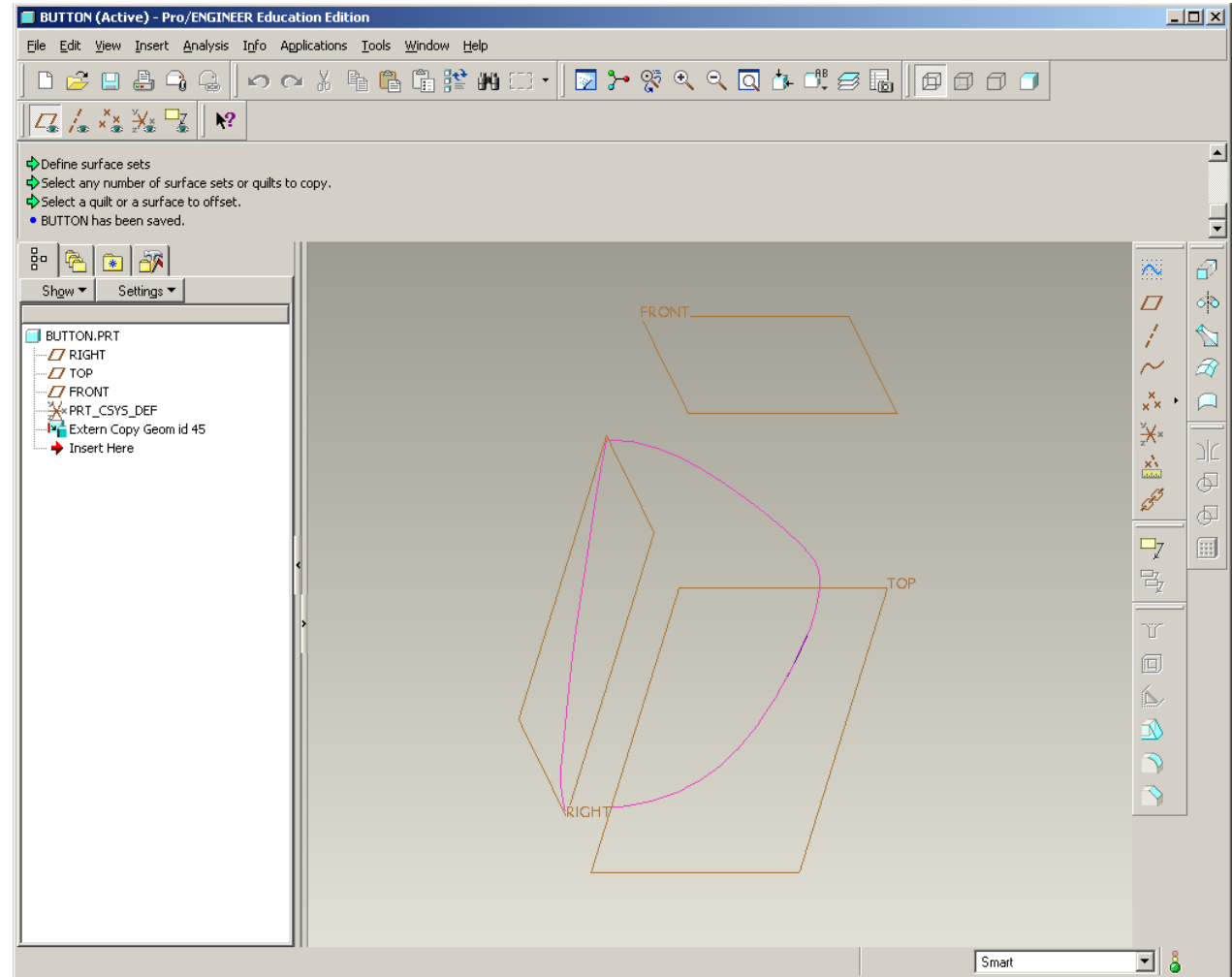
EXERCISE - Shared Data

- In mouse.prt, select the surface defining the button

- MMB when done

EXERCISE - Shared Data

• This file now is linked to previous file

• Try creating part files for the top and bottom of the body as well

Family Tables

- In many cases mechanical components have very similar constructions

- Family Tables can create multiple "instances" of components sharing common features

http://www.curiousinventor.com/images/guides/
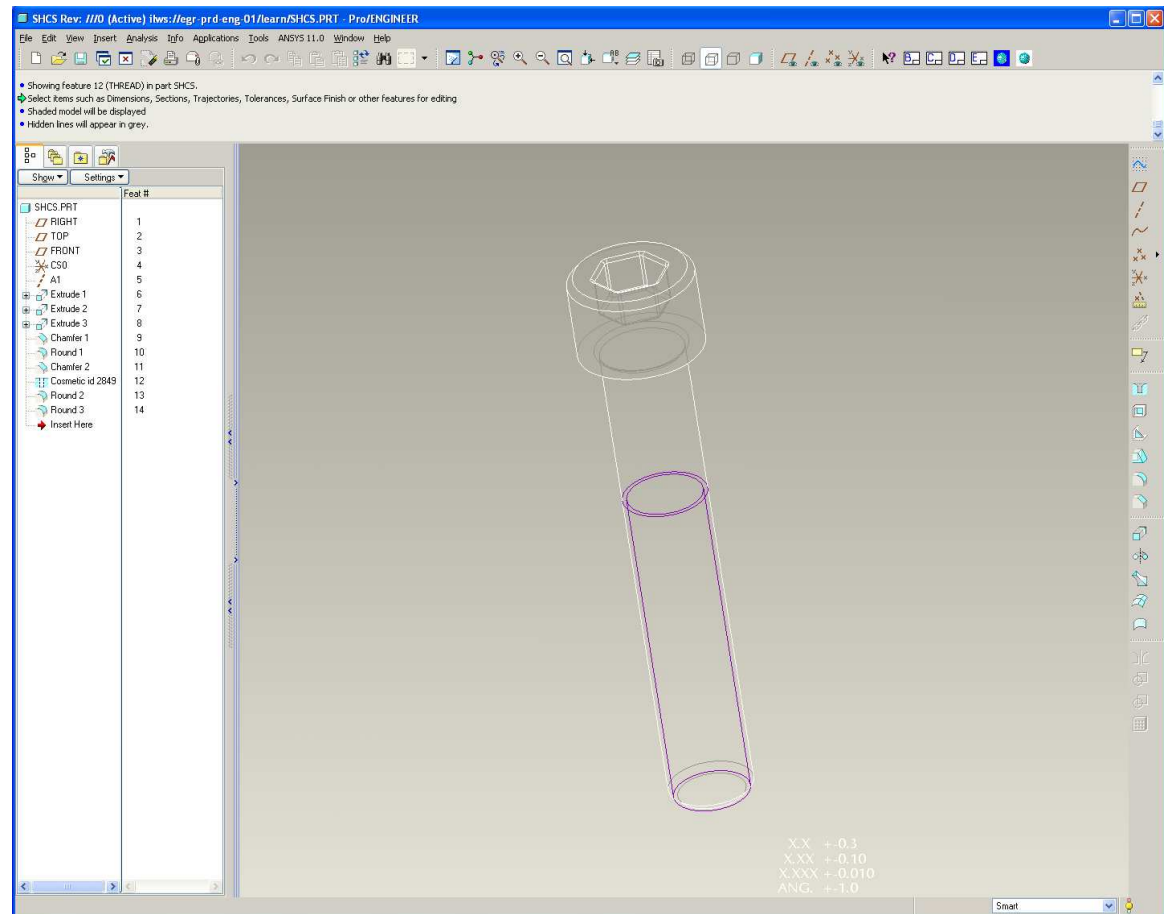metal_working/screws/machine_screws3.jpg

http://www.projectholds.com/images/SS38ST.jpg
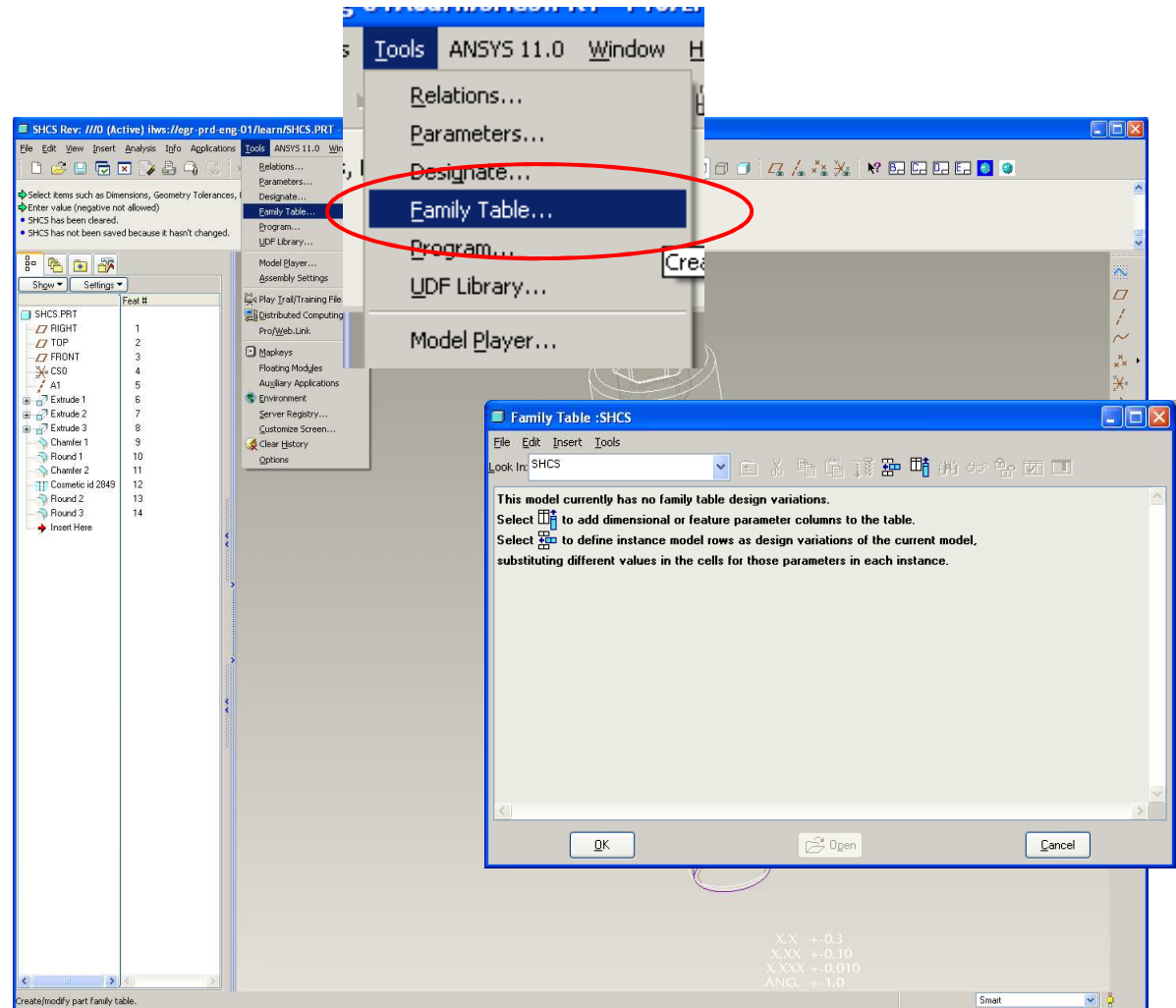
EXERCISE - Family Tables

• From the Supporting Materials page download stuff for tonight

• File > Open > shcs.prt

EXERCISE - Family Tables

- Tools > Family Table…

- This will launch the
Family Table definition
dialog

EXERCISE - Family Tables

• We will build a table in this dialog that defines the family of components

   • The columns of the table are comprised of the parameters that define the components

   • Each row will be a separate instance of the family, defining a specific set of parameter values
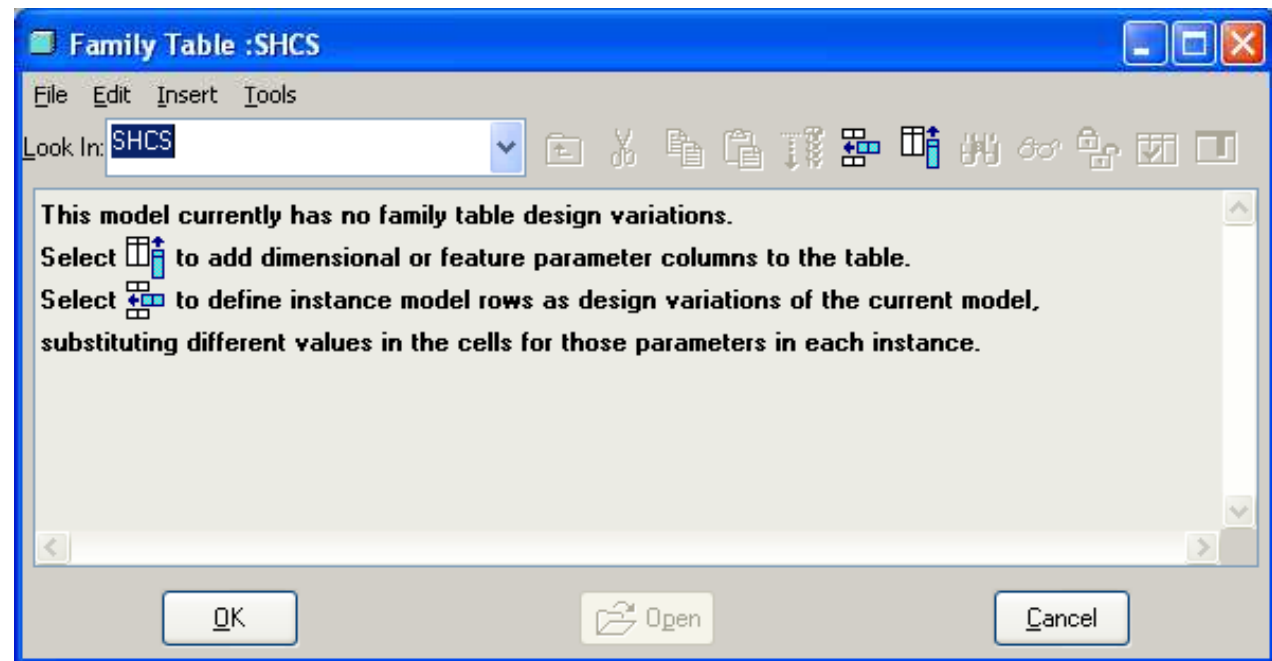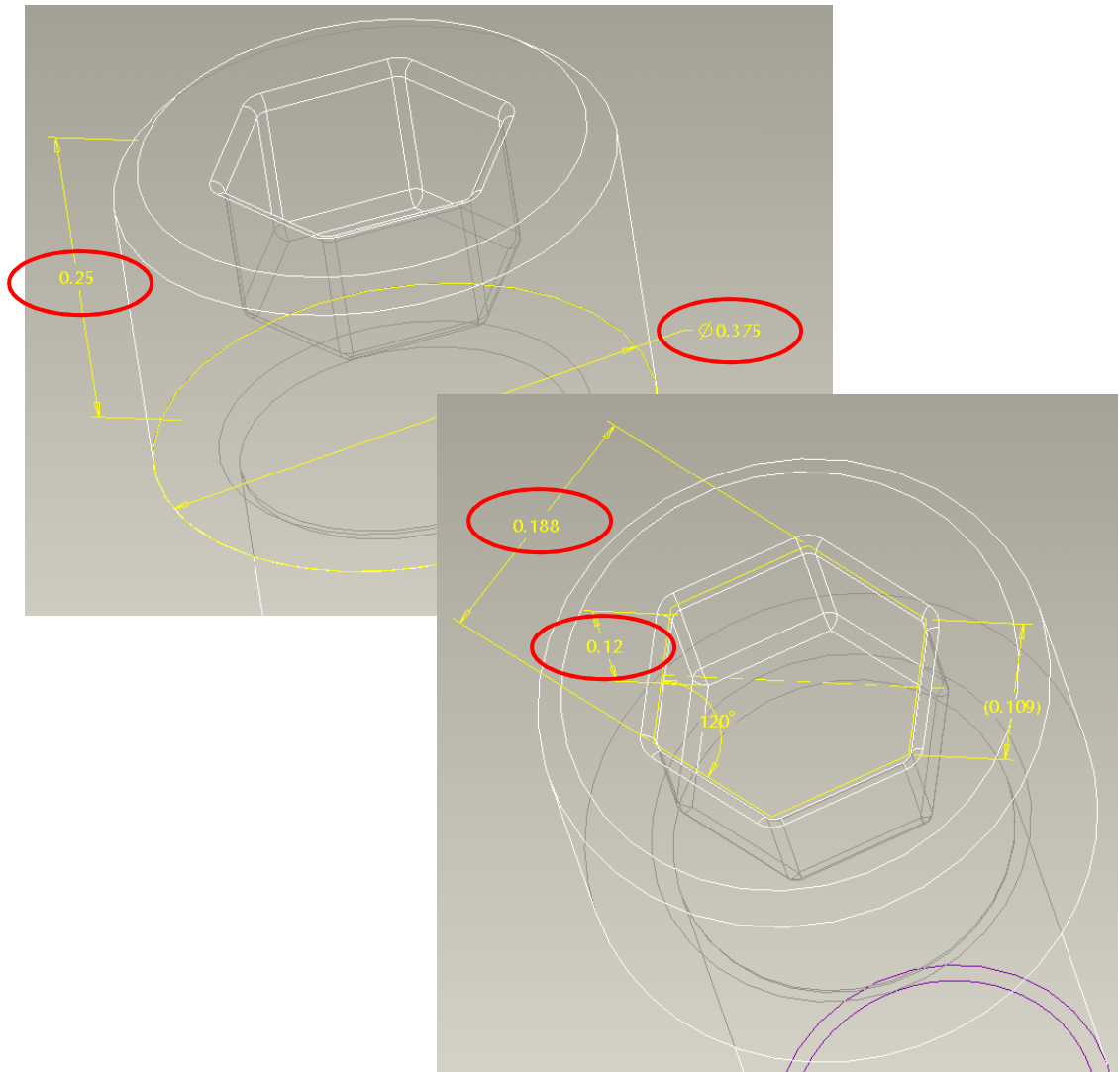
EXERCISE - Family Tables

• Select the "Add/Delete the Table Columns" button on the Family Table dialog box

• Another dialog will launch to select the dimensions we are concerned with
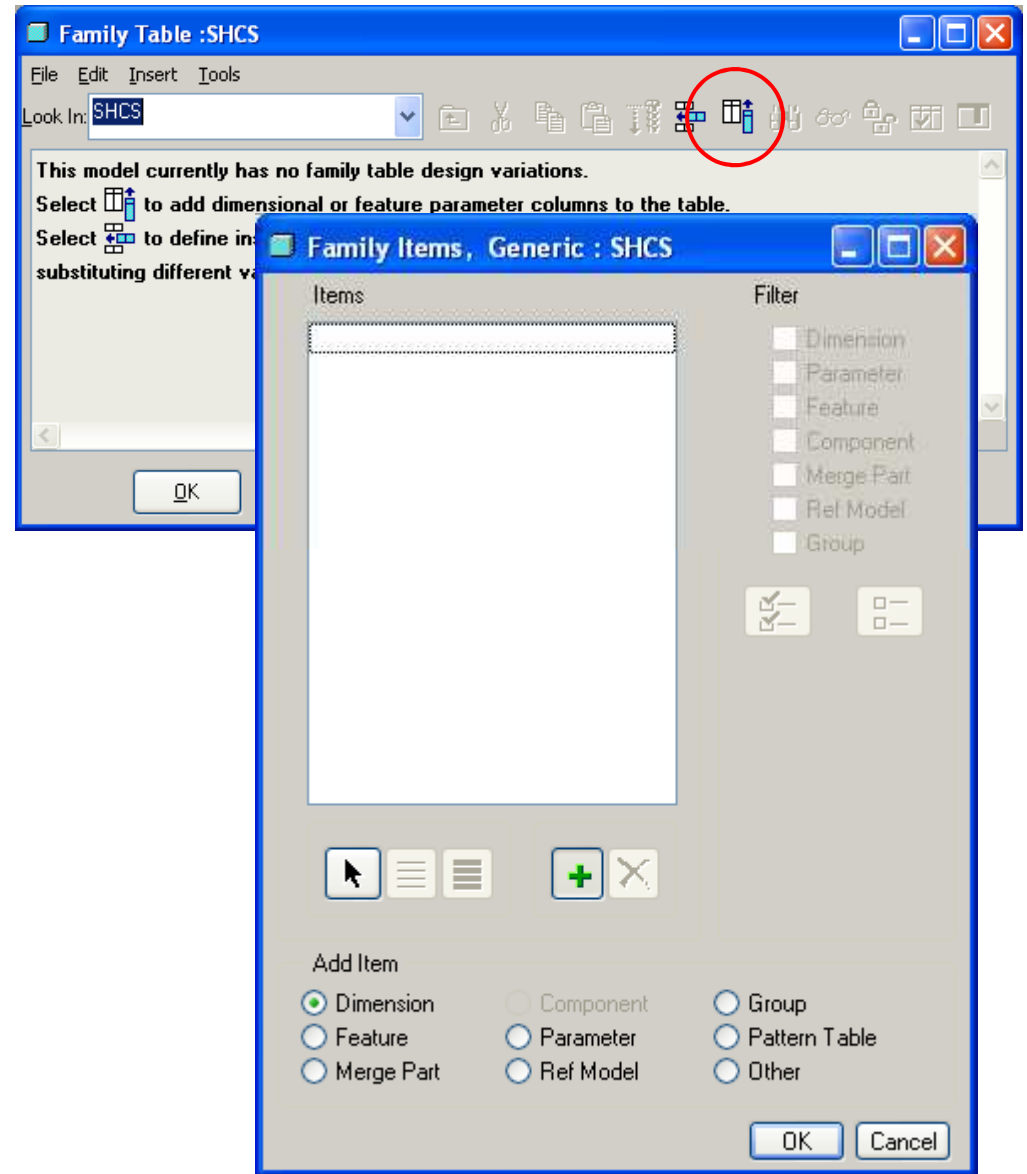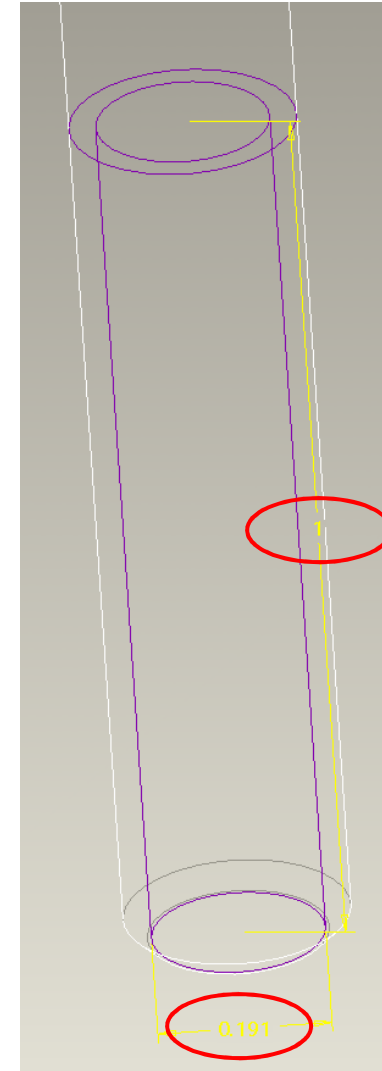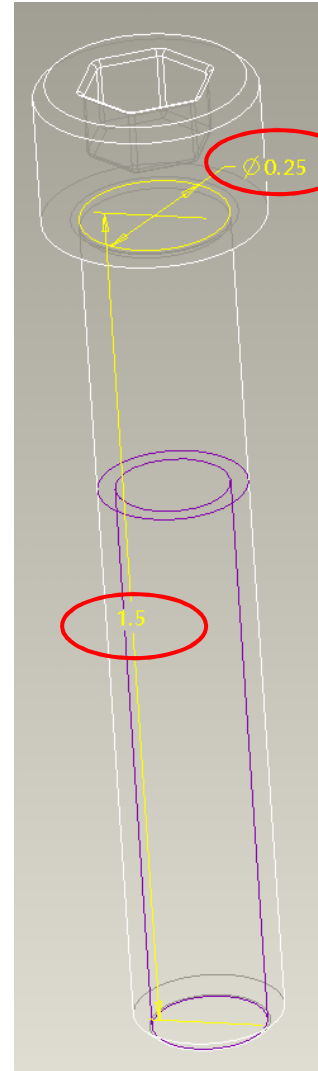
EXERCISE - Family Tables

• Select the following dimensions:

- • Head height (.250)
- • Head diameter (.375)
- • Hex width (.188)
- • Hex depth (.120)
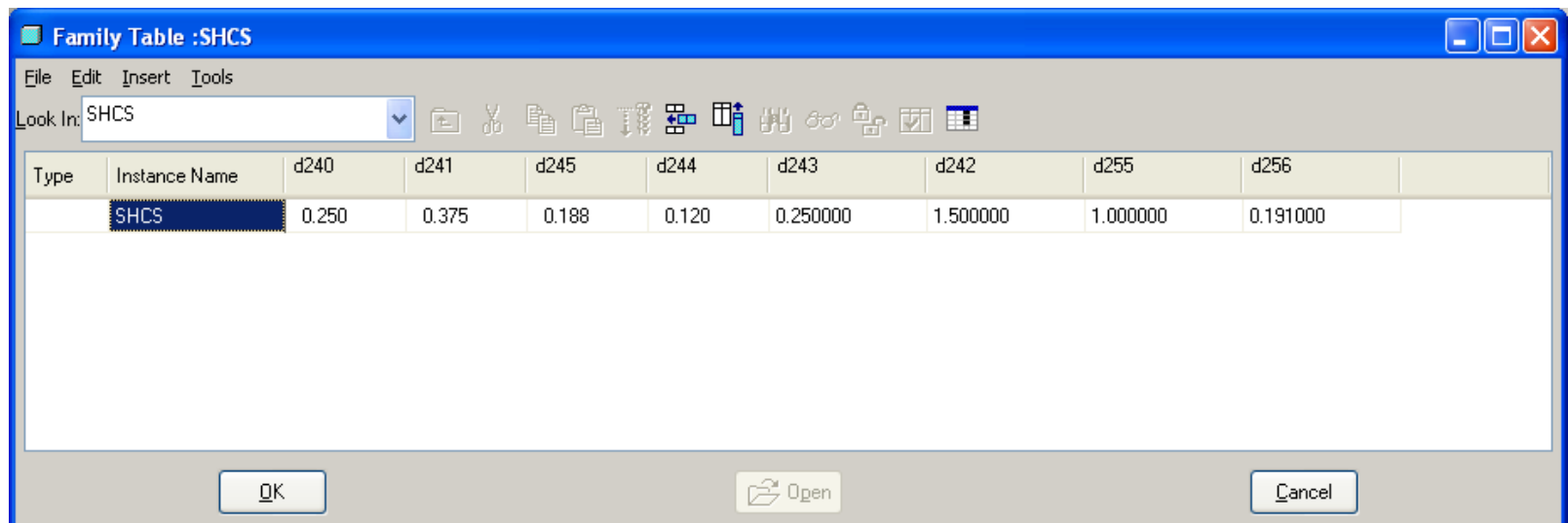
EXERCISE - Family Tables

• Select the following dimensions:

  • Thread major dia. (.250)

  • Shaft length (1.500)

  • Thread length (1.000)

  • Thread minor dia. (.191)

EXERCISE - Family Tables

• Click on OK on the selection dialog

• Take a look at the Family Table dialog to see the dimensions that available

EXERCISE - Family Tables

- Click on the "Insert a new instant at the selected row" button

- Note that a new row is created with blank values

- Name the new instance "P250-20_X_1P500"

  - Be careful that the name is accepted

  - The instance naming standard is very restrictive
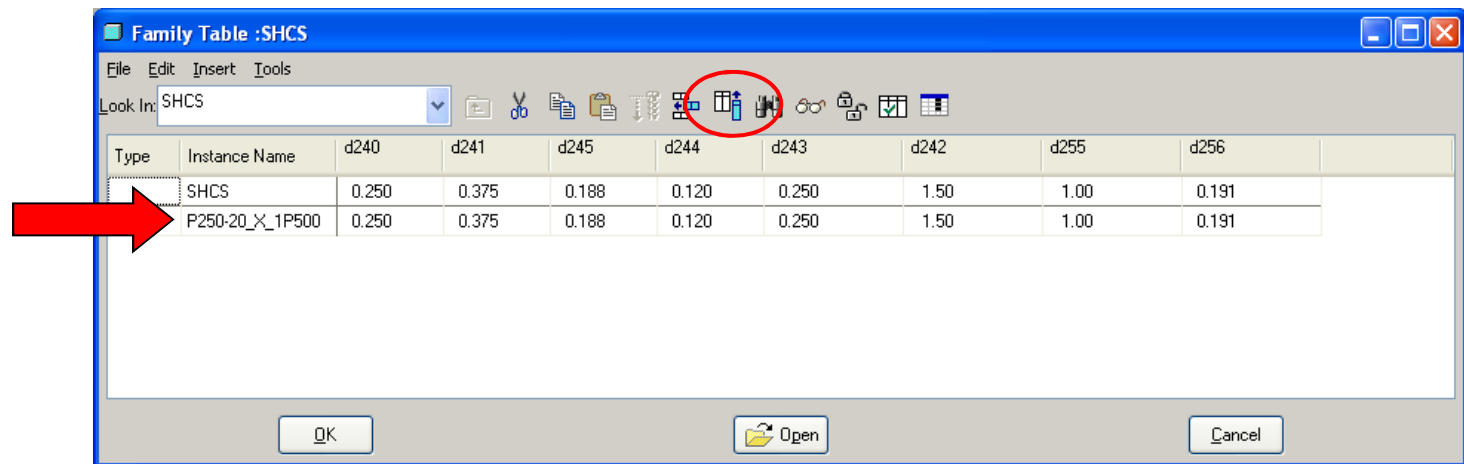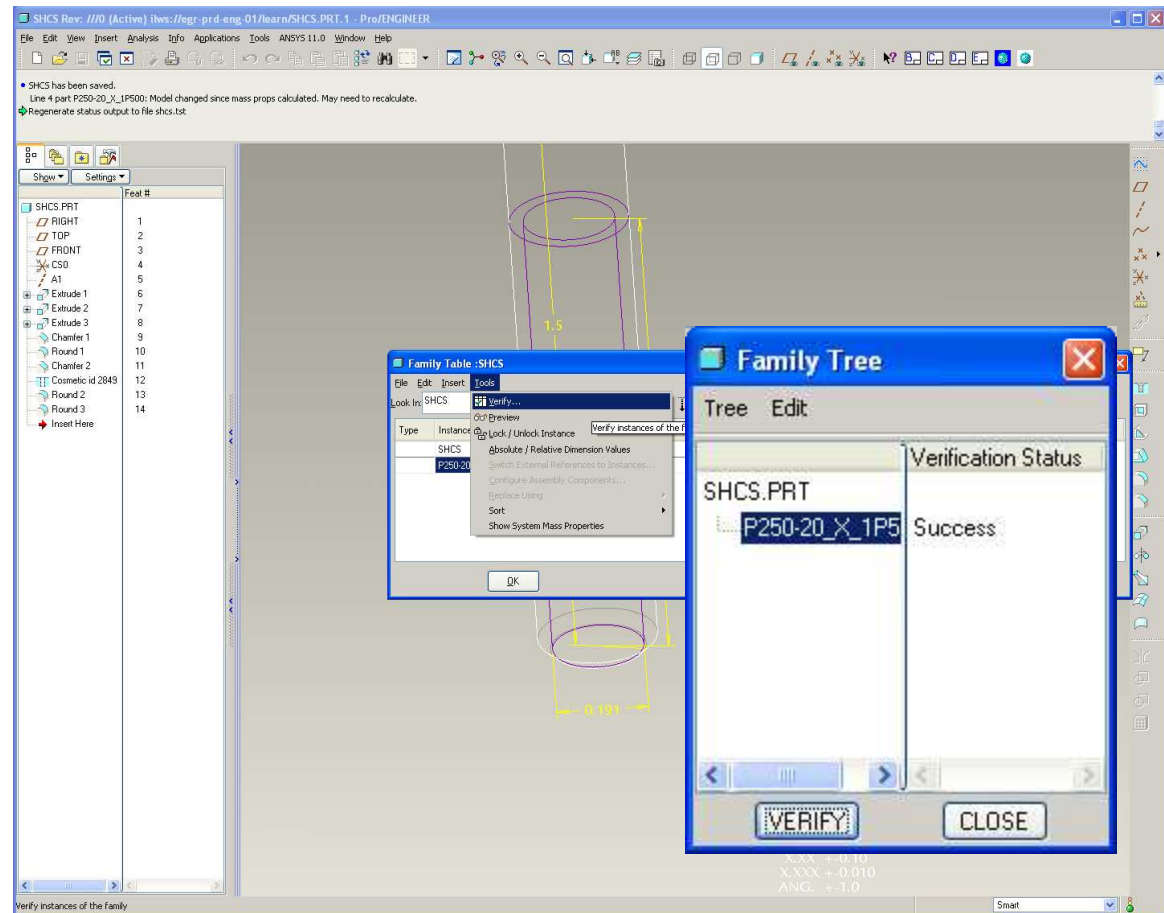
EXERCISE - Family Tables

- Click on the "Insert a new instant at the selected row" button

- Note that a new row is created with blank values

- Name the new instance "P250-20_X_1P500"

  - Be careful that the name is accepted

  - The instance naming standard is very restrictive

- Copy all the values from the previous row into the new row

EXERCISE - Family Tables

• In Family Table dialog,
Tools > Verify

• In Family Tree dialog,
Click VERIFY button

 • This step verifies that
 the model we've just
 created will regenerate
 correctly

• Verification Status should
appear as "Success"

EXERCISE - Family Tables

Why did we just create the same thing again?

Generic or Base Instance – Everything else is created from here, name indicates what the family is and indicates where it can be modified.

Family Table :SHCS

File   Edit   Insert   Tools

Look In: SHCS

Type	Instance Name	d240	d241	d245	d244	d243	d242	d255	d256
	SHCS	0.250	0.375	0.188	0.120	0.250	1.50	1.00	0.191
	P250-20_X_1P500	0.250	0.375	0.188	0.120	0.250	1.50	1.00	0.191

OK

Instance – The name given to this instance indicates exactly what the instance is.

NOTE: This isn't necessary, but is a good practice the adds to the clarity of the family

EXERCISE - Family Tables

These column headings are not particularly helpful…

• Already there are too many columns to keep track of

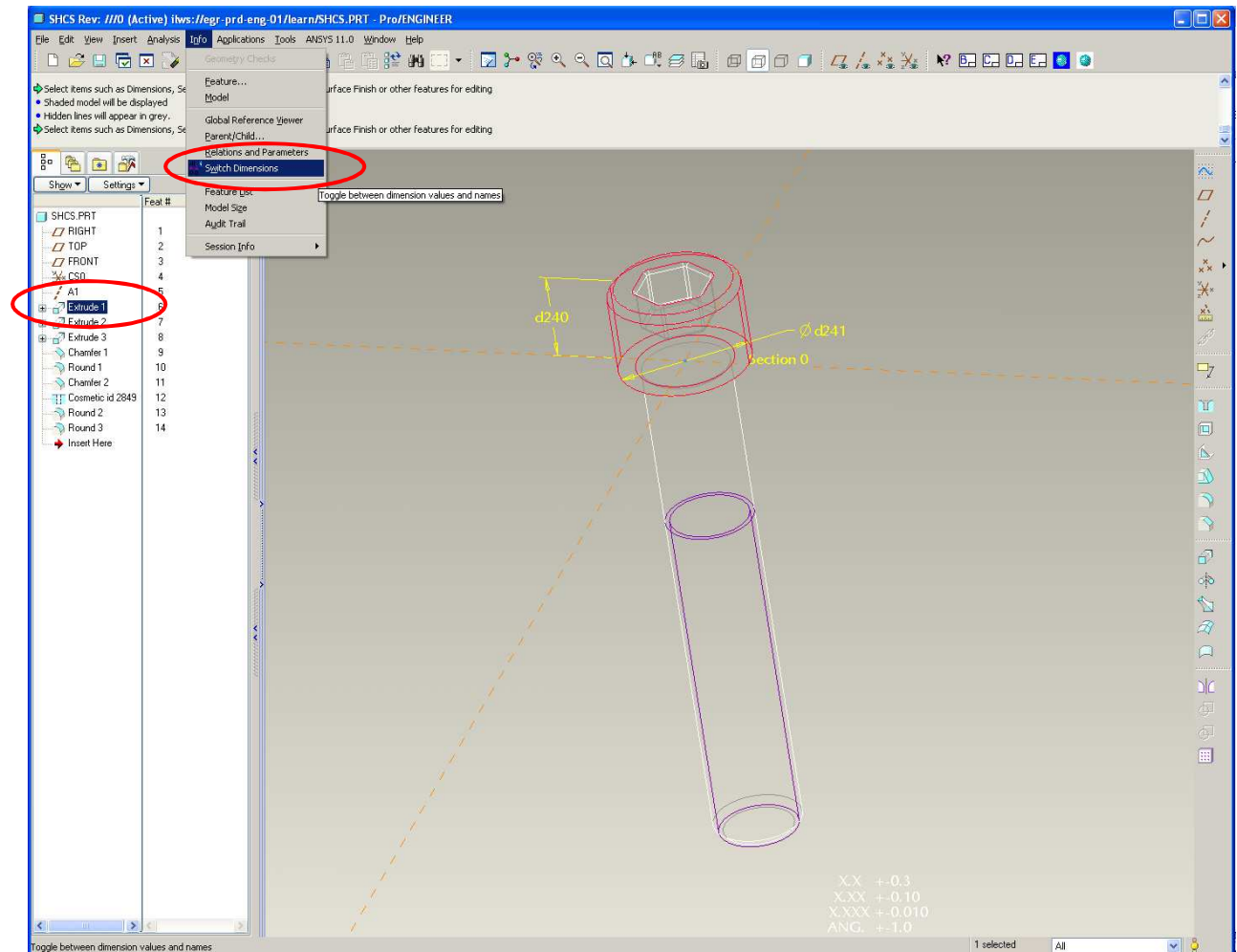• Let's add some clarity to make this more efficient going forward…..

EXERCISE - Family Tables

Change the name of the key feature dimensions

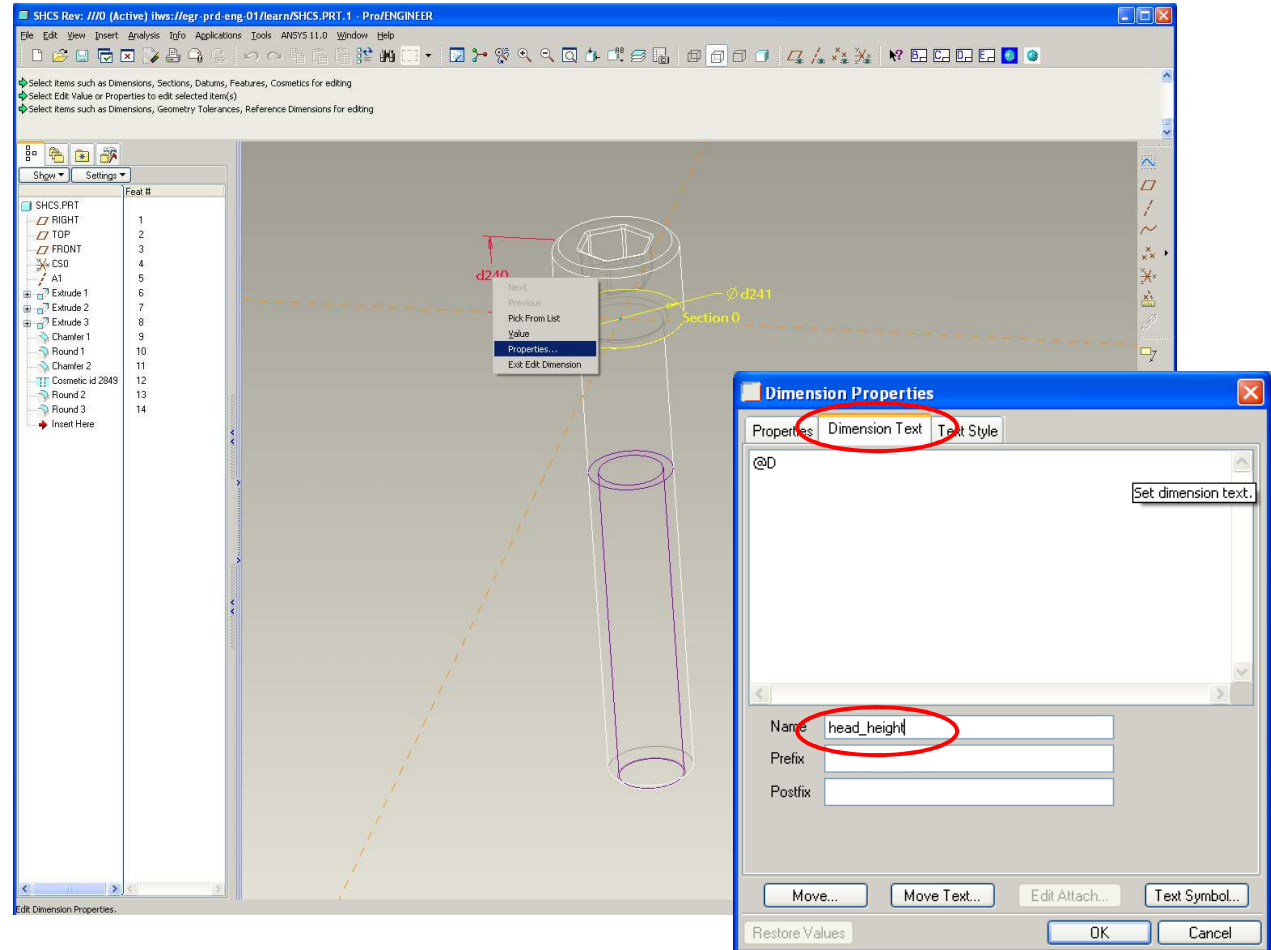• Edit the first solid feature (Extrude1)

• Info > Switch Dimensions

EXERCISE - Family Tables
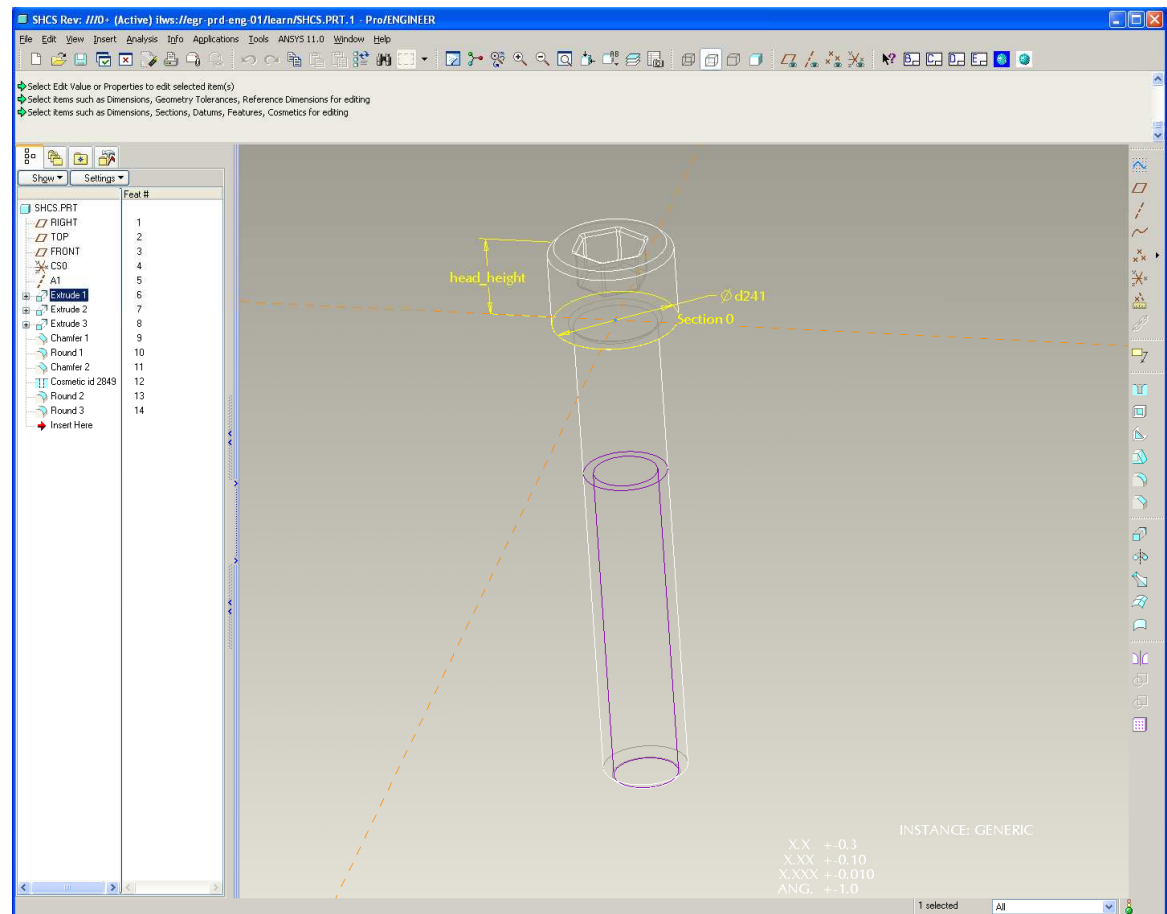
Change the name of the key feature dimensions

• RMB on head height

• Properties…

• Click Dimension Text tab

• Enter "head_height" in the Name box

• Click OK

EXERCISE - Family Tables

• Notice the name of the dimension

• Repeat this process for

- head_diameter

- hex_width

- hex_depth

- thread_major_dia

- shaft_length

- thread_length

- thread_minor_dia
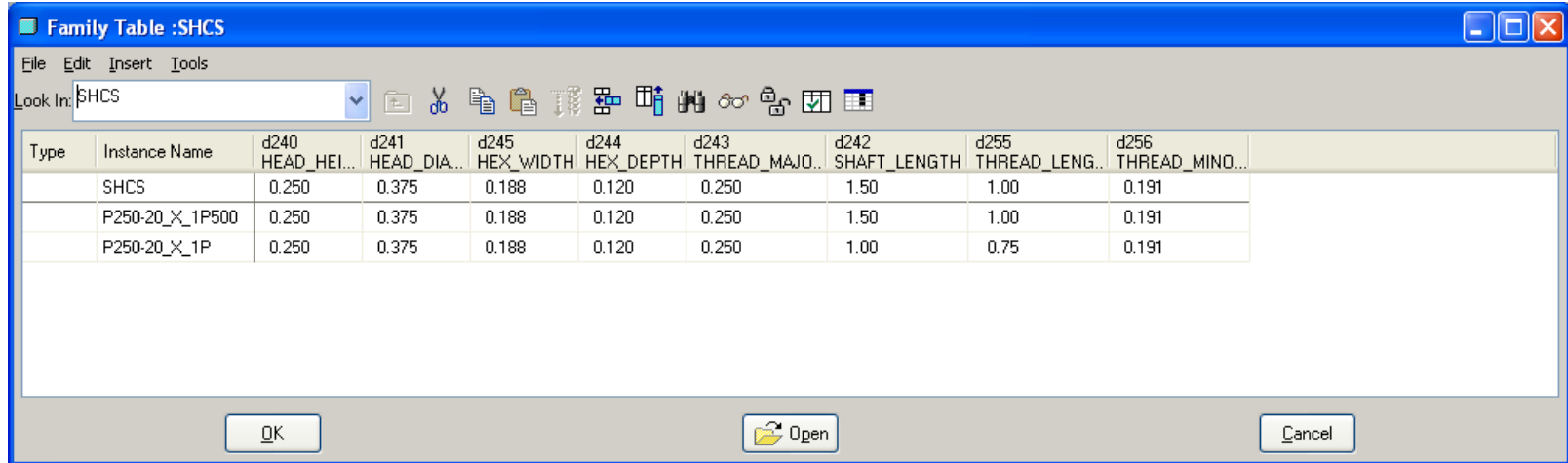
EXERCISE - Family Tables

• Go back and examine the Family Table column headers (much better)

EXERCISE - Family Tables

- Create a new instance that has a 1.000 shaft_length and .750 thread_length

- Verify the instance

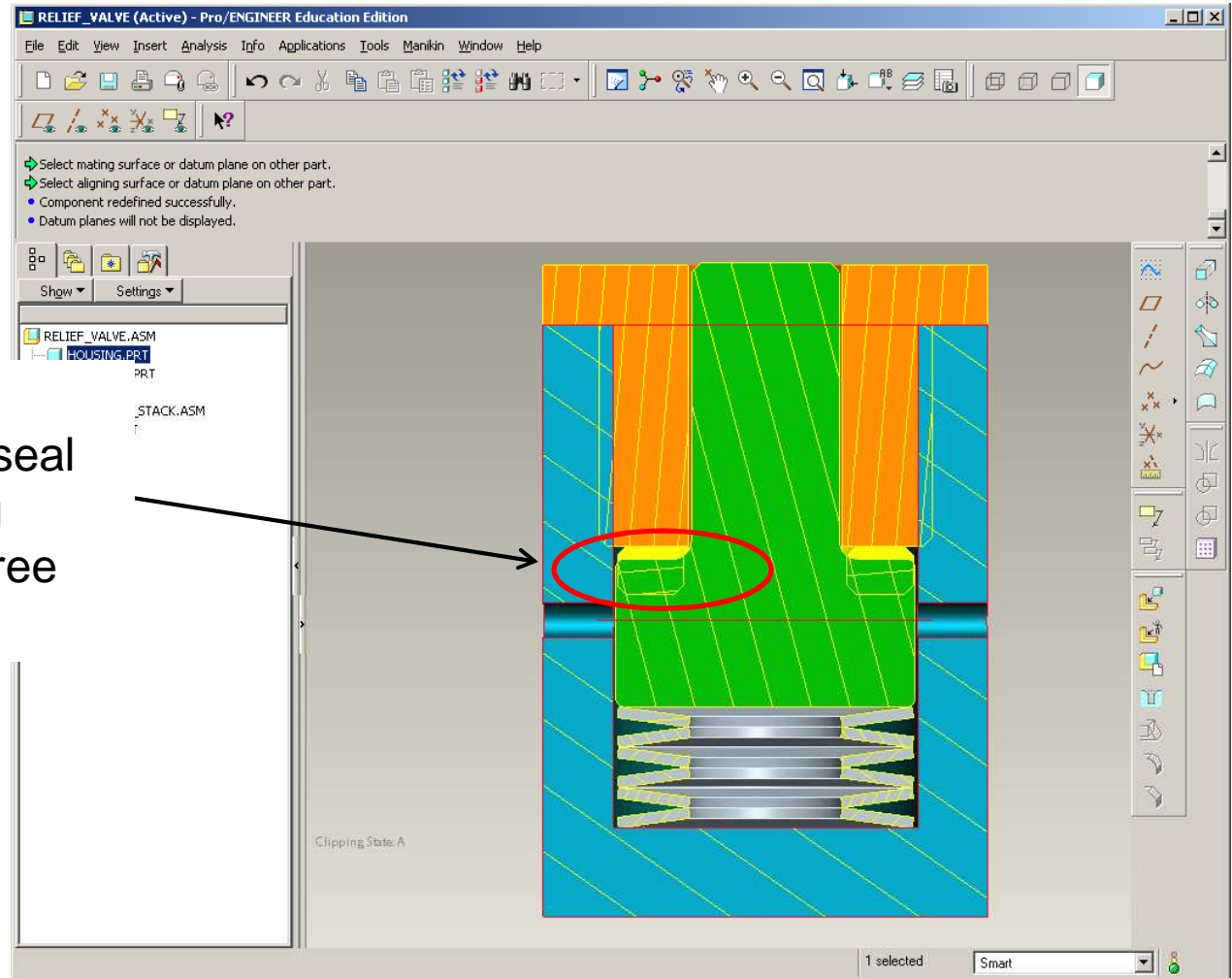- Save the model

- Open the new instance

EXERCISE - Family Tables

Create a Family Table to show a spring in free, installed and compressed lengths
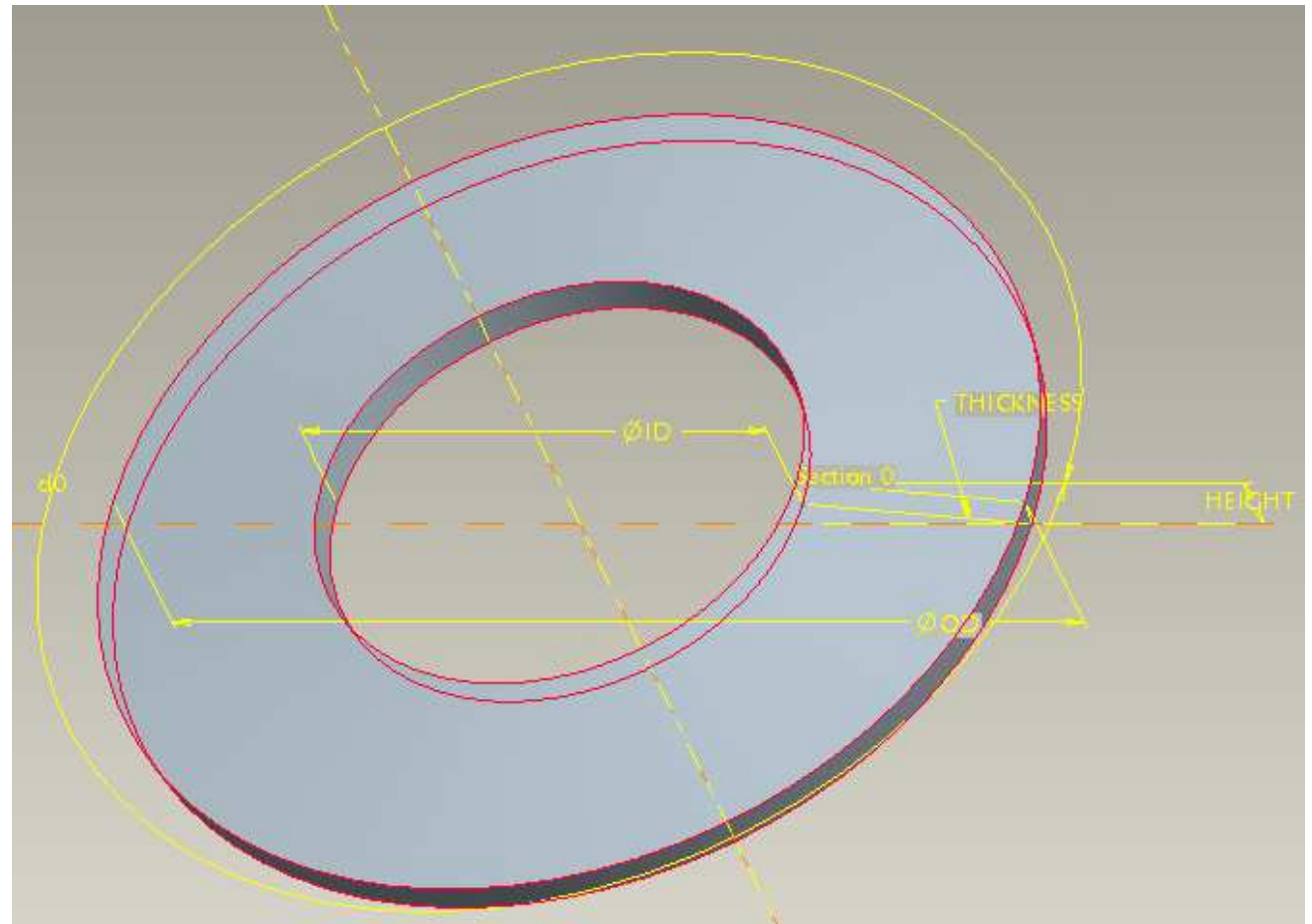
• Open relief_valve.asm

Notice: the piston interferes with the seal because the spring stack is shown at free length

EXERCISE - Family Tables
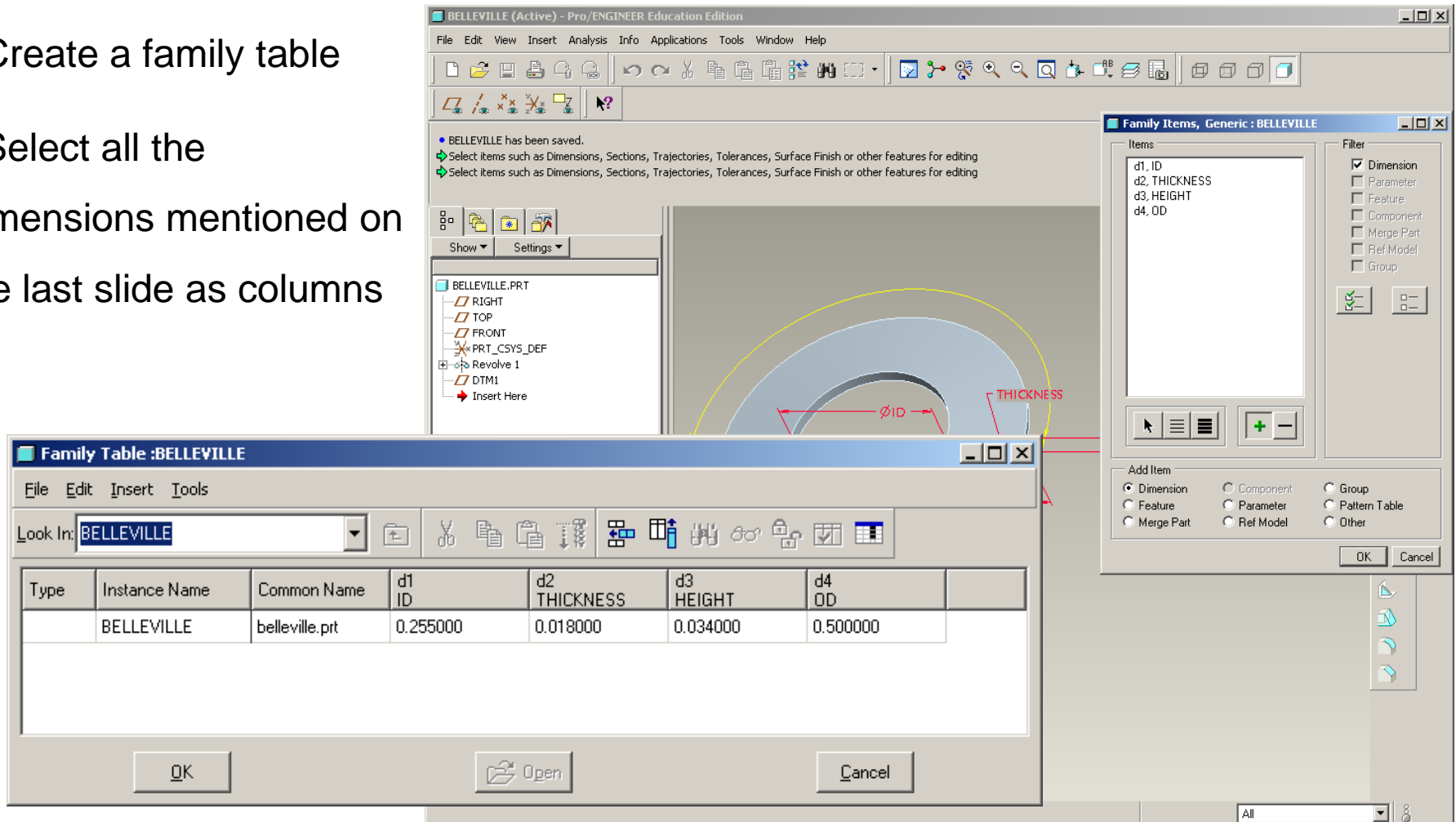
• Open belleville.prt

• Rename the following dimensions as we did previously

- • ID

- • OD

- • THICKNESS

- • HEIGHT

EXERCISE - Family Tables

- Create a family table

- Select all the dimensions mentioned on the last slide as columns

EXERCISE - Family Tables

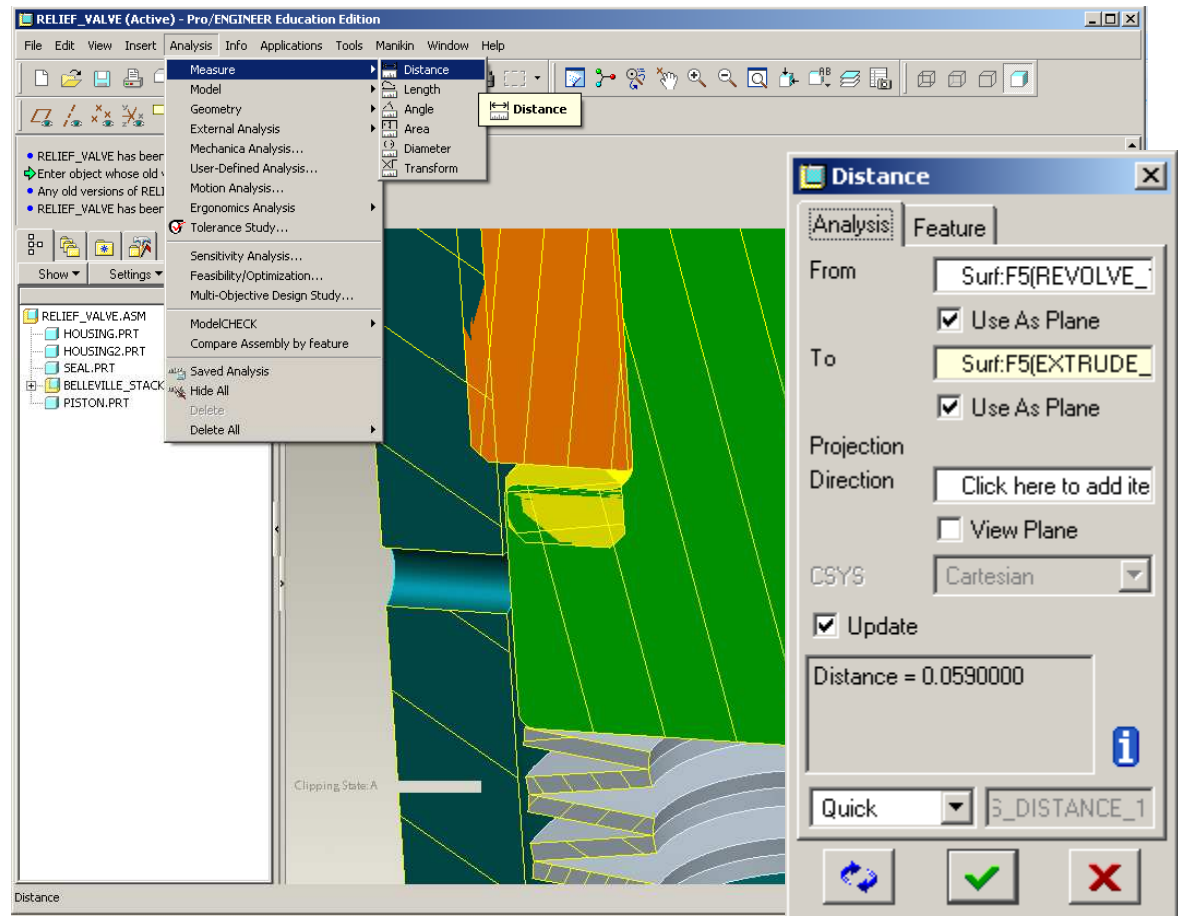• Go back to the relief_valve.asm

assembly

• Measure the interference

between the piston and the seal

    • Analysis > Measure >

    Distance
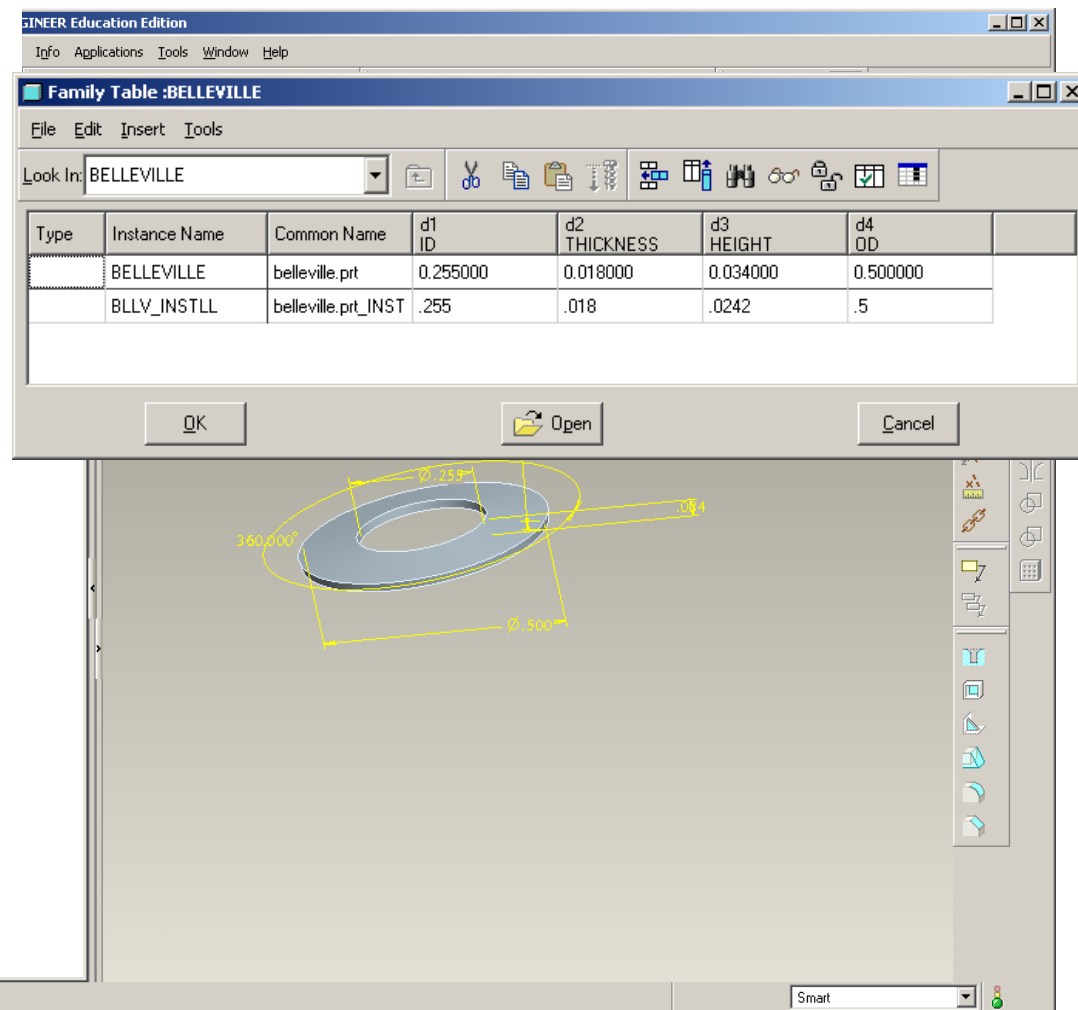
    • Select plane on piston

    • Select plane on seal

• Note the total interference is

.059in

EXERCISE - Family Tables

• From the measurement, we need to lower the height of the Bellevilles from .034 to .0242

    • Create a new instance "BLLV_INSTLL"

    • Copy all dimensions, except for the height

    • Change height to .0242

• Verify instance and save part

GINEER Education Edition
Info Applications Tools Window Help

Family Table :BELLEVILLE
File Edit Insert Tools

Look In: BELLEVILLE

Type	Instance Name	Common Name	d1 ID	d2 THICKNESS	d3 HEIGHT	d4 OD
	BELLEVILLE	belleville.prt	0.255000	0.018000	0.034000	0.500000
	BLLV_INSTLL	belleville.prt_INST	.255	.018	.0242	.5

OK   Open   Cancel

EXERCISE - Family Tables

• Return to the assembly

• Create a Family Table (Tools >

Family Table…)

• Begin by adding columns

BCB – Mar. 15, 2012   EN1740, S2012
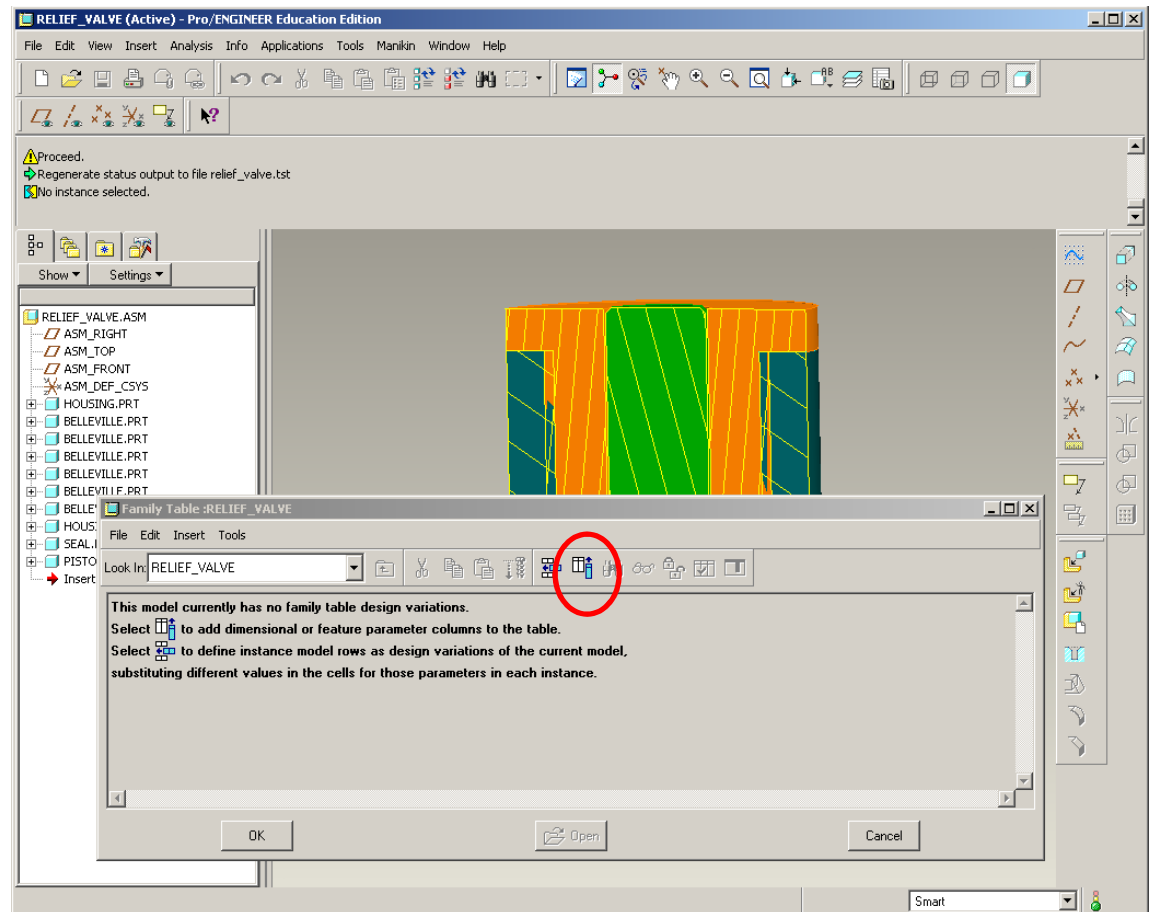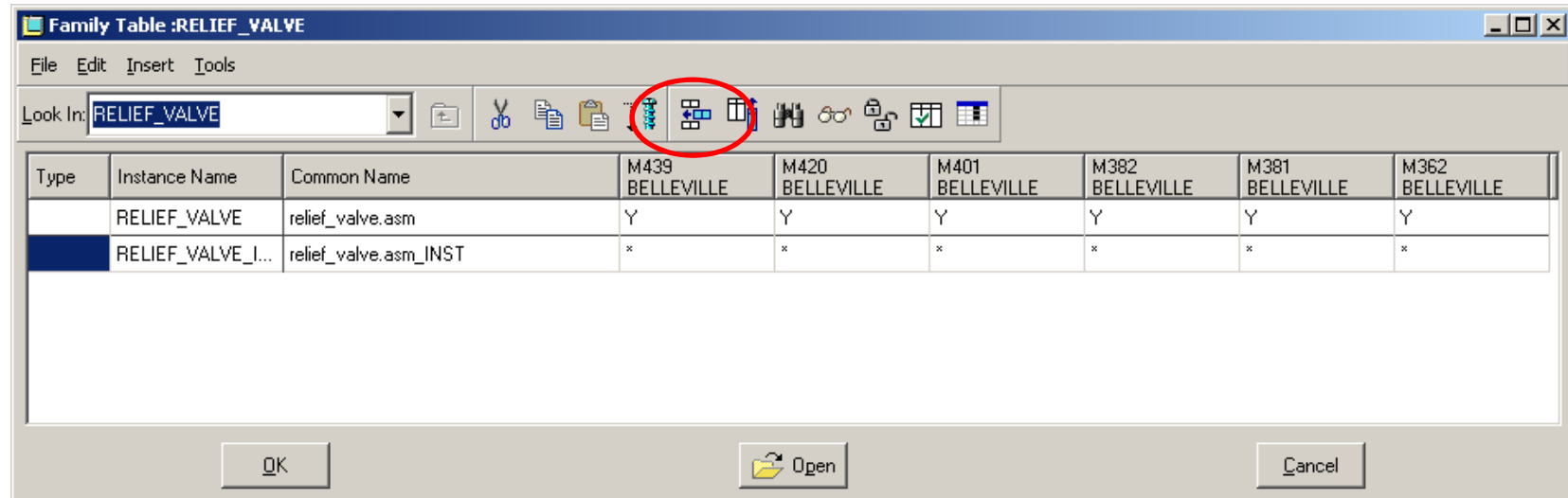
EXERCISE - Family Tables

• This time in the selection dialog box, check the Component radio button

• Select each Belleville washer

    • When prompted select Single

• Continue until all 6 Bellevilles are selected
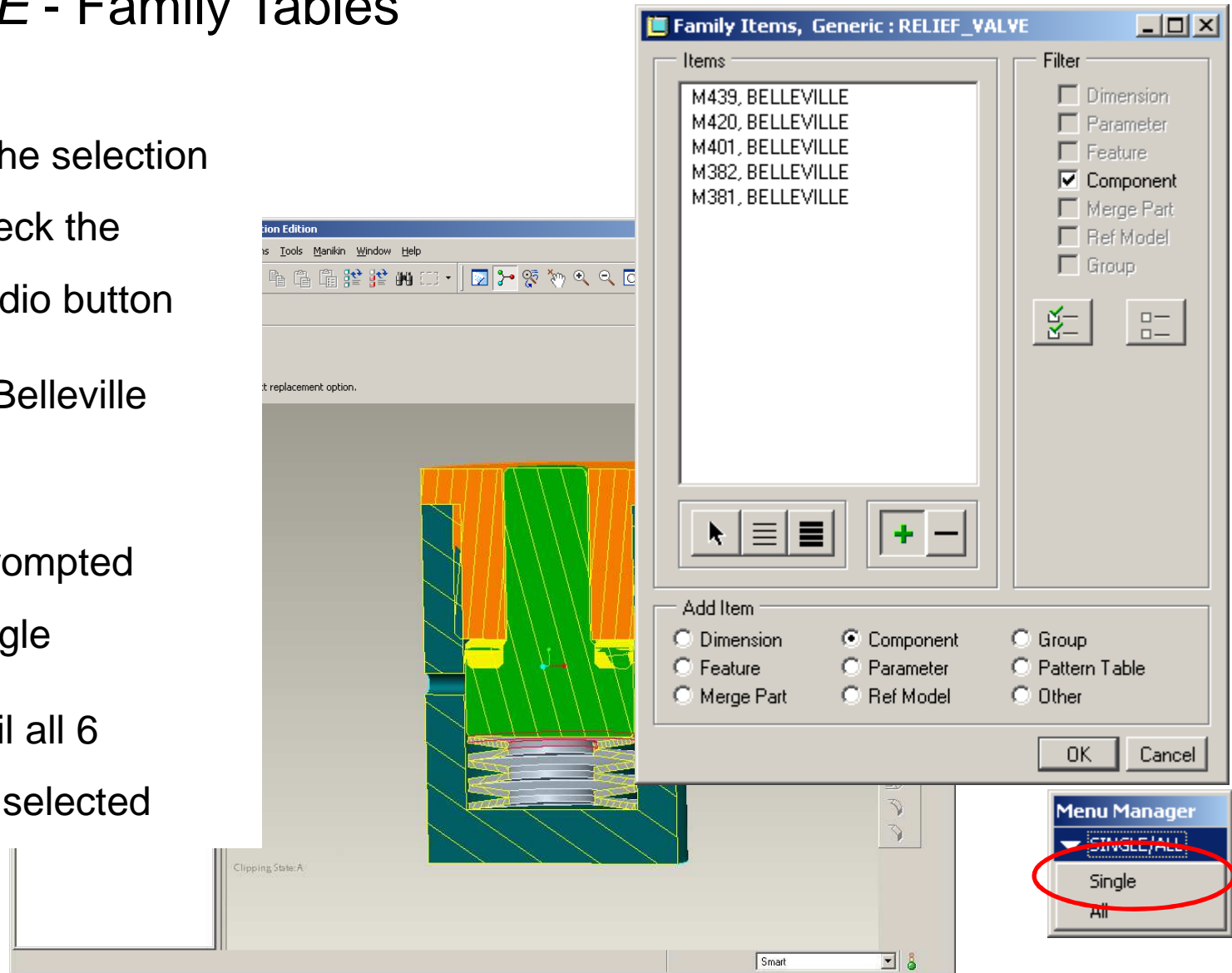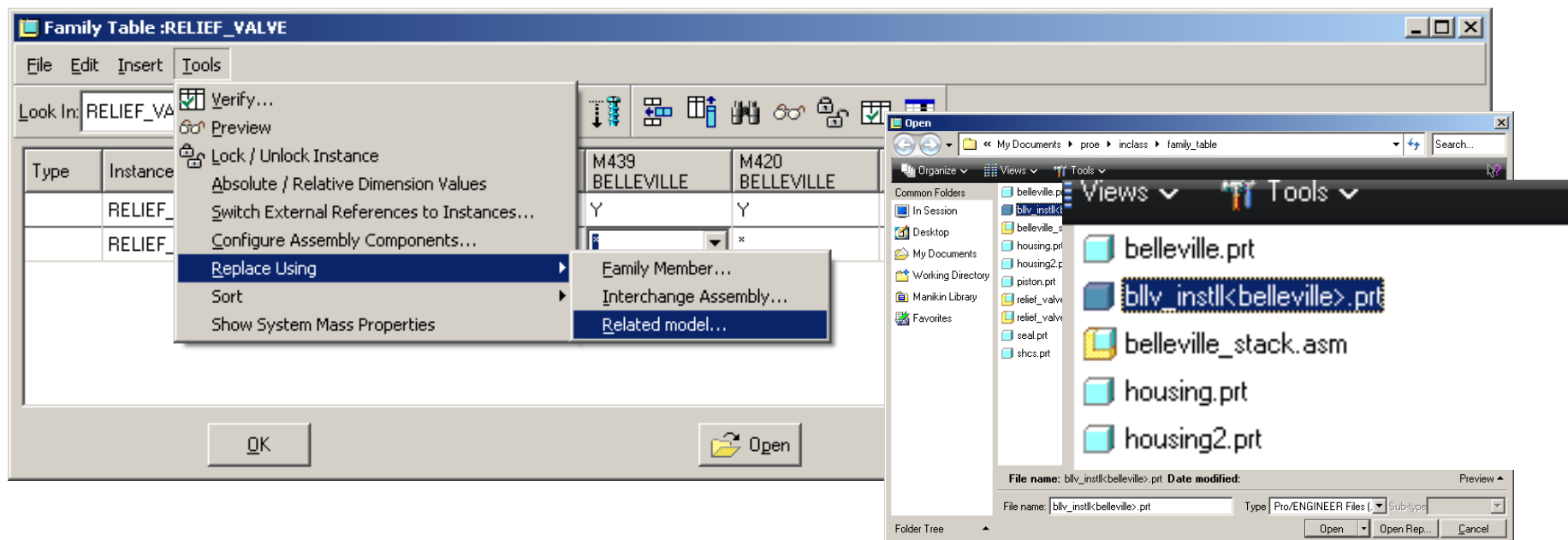
EXERCISE - Family Tables
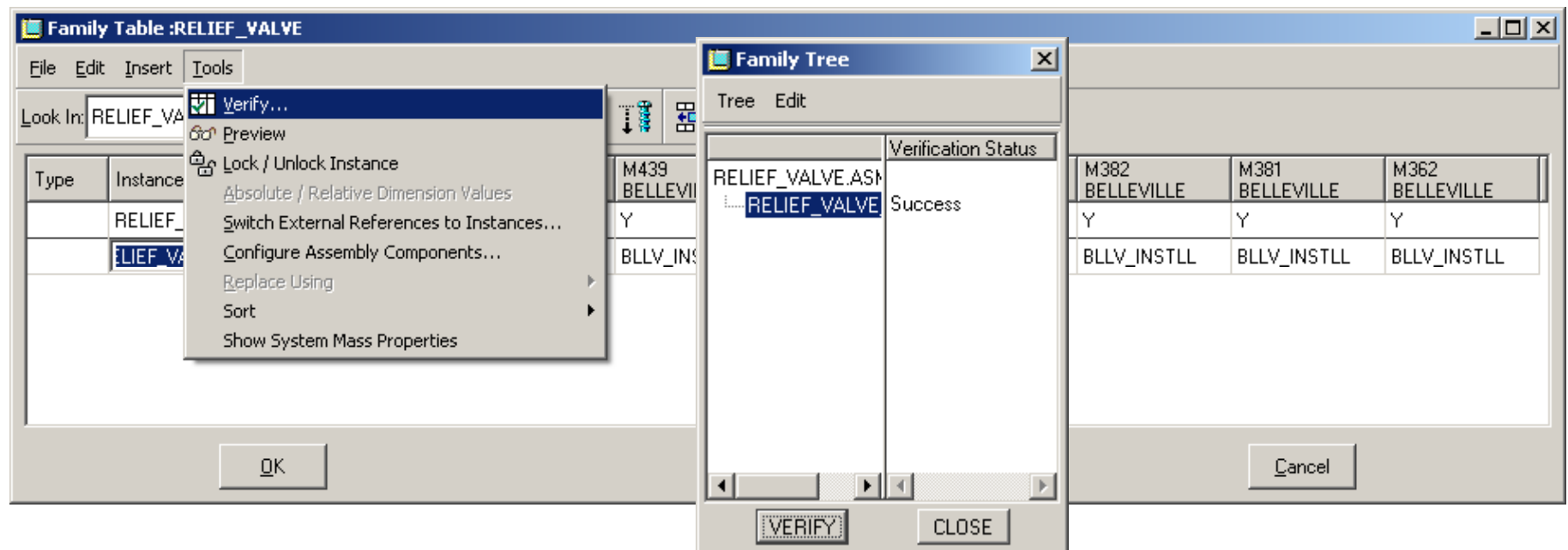
- Create a new instance with the add row button

EXERCISE - Family Tables

- Select cell for the first Belleville instance

- Tools > Replace Using > Related model…

- Select the Belleville instance with the reduced height

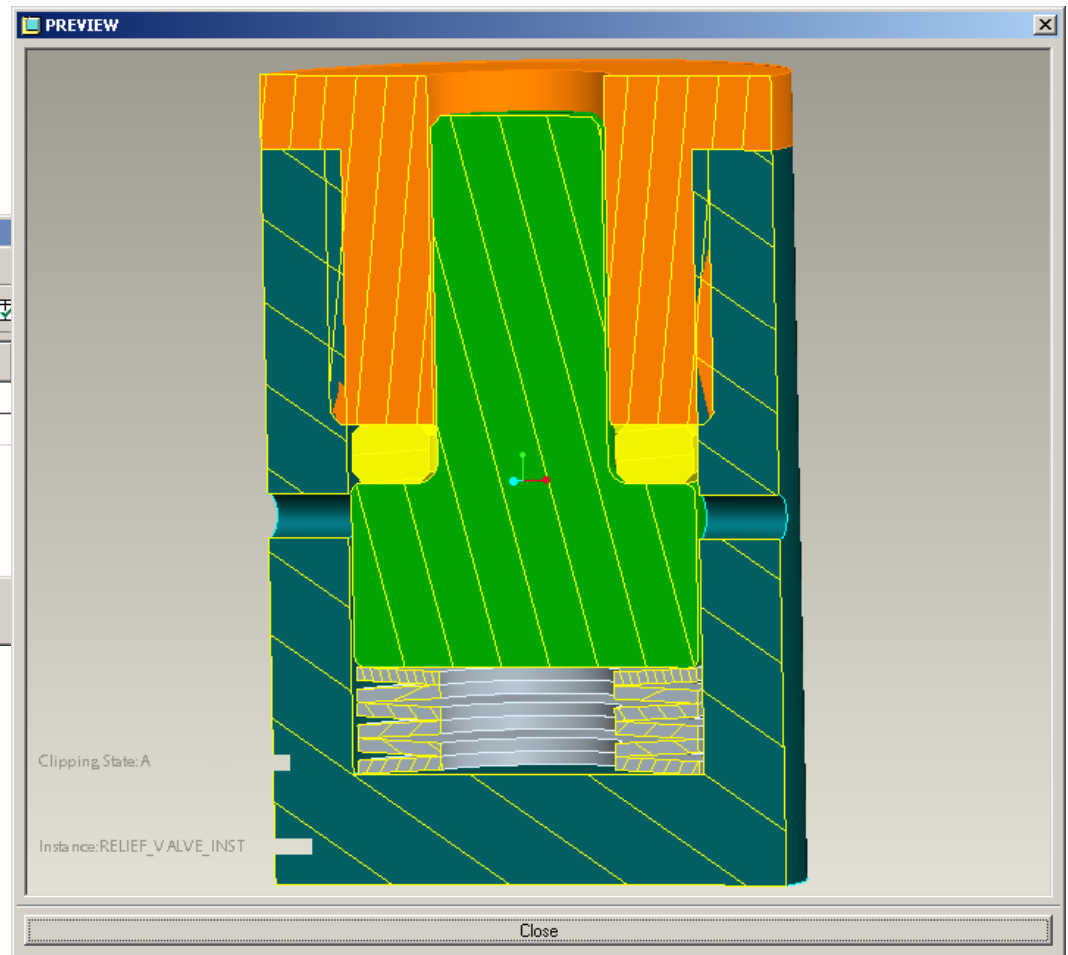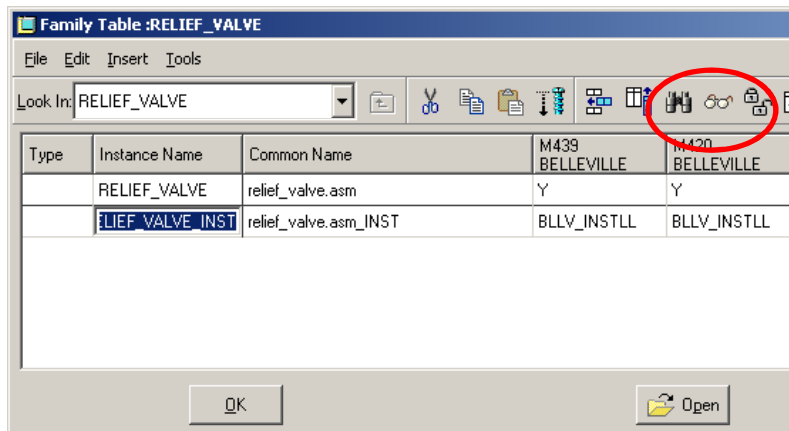- Repeat these steps for all 6 Bellevilles

EXERCISE - Family Tables

• Once all the Bellevilles are swapped out, Verify the model
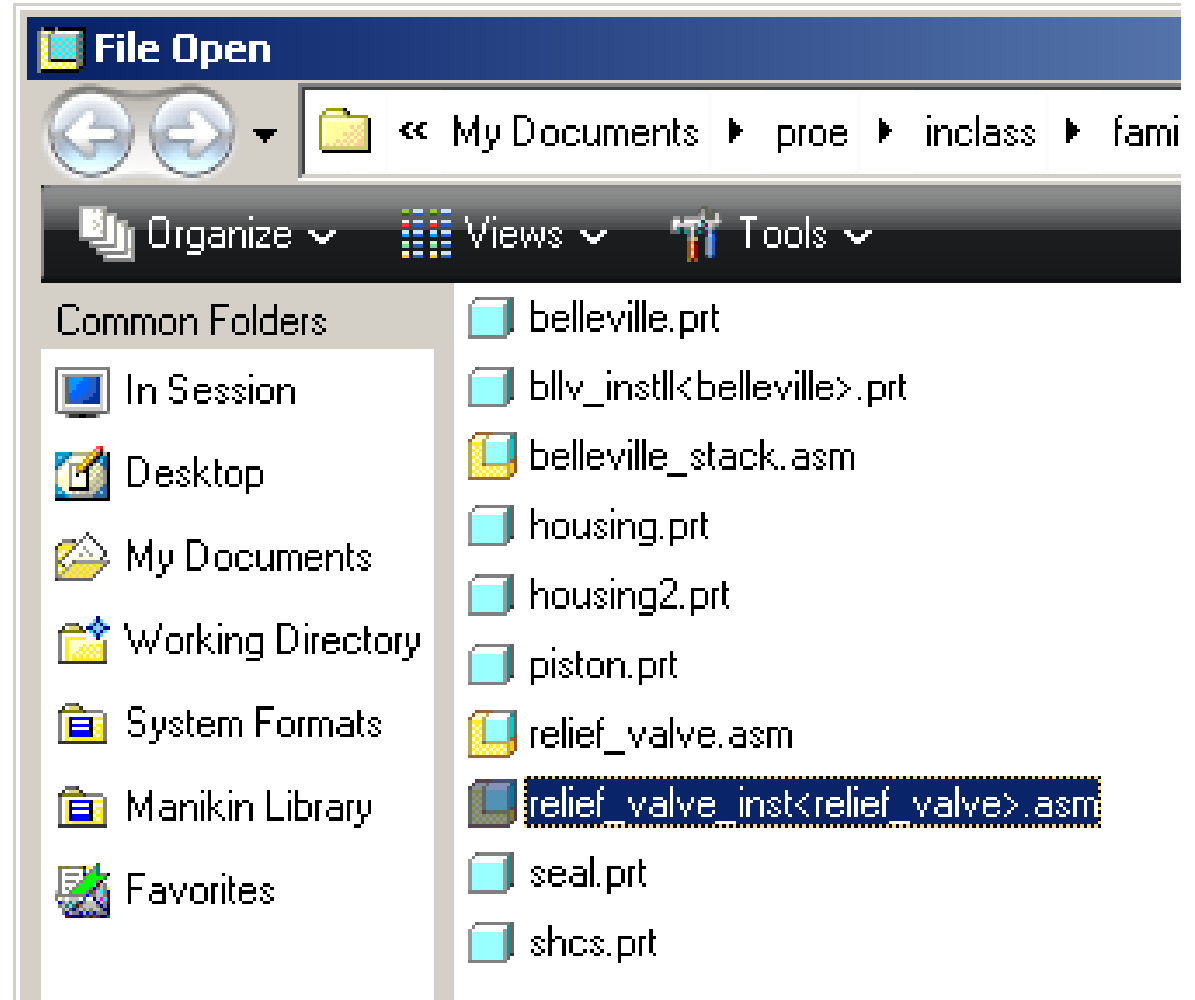
EXERCISE - Family Tables

- After verifying the model, select Preview and make sure the interference is gone

EXERCISE - Family Tables

- Save the generic and then open the instance

EXERCISE - Family Tables

- Done