

# PTC Creo CAD Workshop

September 26, 2015 – Glen Carbon, IL



## Part Families / Family Tables

*Rande Johnson, Mentor*  
*FRC4931/FTC8620*

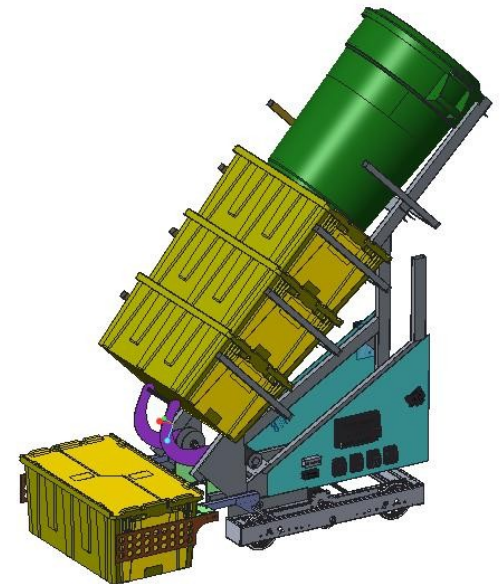
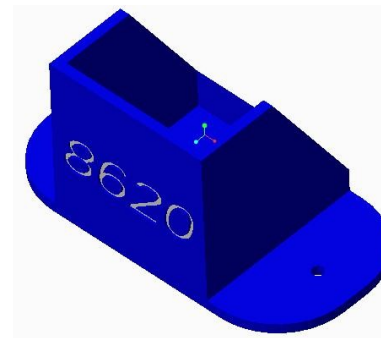
September 26, 2015



# CAD Team



- Mentors: Jason Schutte & Rande Johnson
- Students: FRC4931, Lexi, Jacob, & Kyle
- Students: FTC8620, Garrett

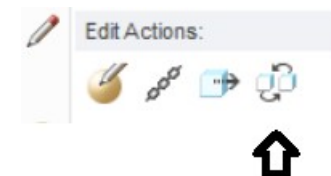
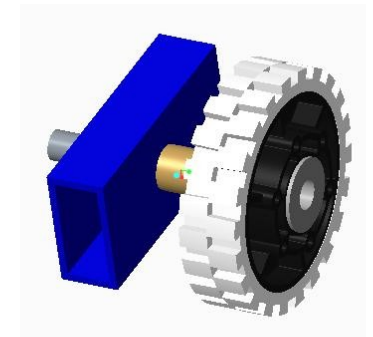


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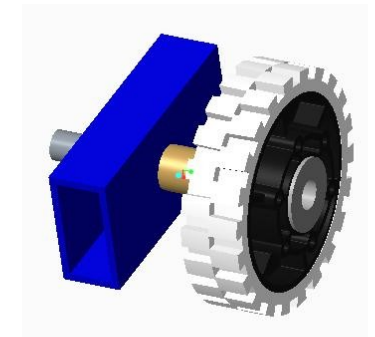
# Why Make a Family Table?

- Open the CAD Workshop Spacer Assembly
  - cadws\_spacer\_assembly.zip
    - cdws\_spacer\_assembly.asm
- Spacer causes the wheel to stick out
  - Let's replace it with a shorter one
    - Replace *cadws\_spacer1.prt* with *cadws\_spacer05.prt*
    - Right-click on *cadws\_spacer1.prt* and select Replace
    - Select Unrelated Component...
- You have to fix all the constraints!!



# Why Make a Family Table?

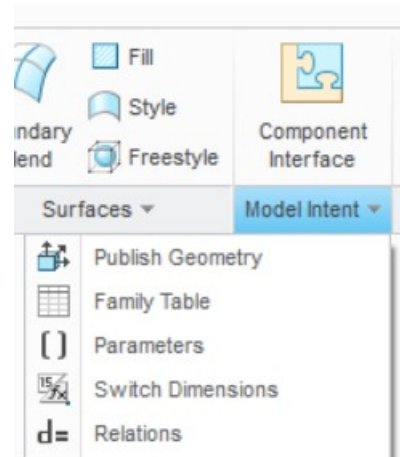
- Now open the CAD Workshop Family Assembly
  - cadws\_family\_assembly.zip
    - cadws\_family\_assembly.asm
- Spacer causes the wheel to stick out
  - Let's replace it with a shorter one
    - Replace *cadws\_thick\_spacer100.prt* with another...
    - Now Select Family Table & one of the 1/2" spacers
- Voila!! You are done!



# What Makes a Family Table?



- So let's see what makes these tables work
  - Right click on the spacer and select “Open Generic”
  - Select the generic part in the dialog that appears
  - Select “Family Table” from the “Model Intent” menu



# The Family Table



Family Table :CADWS\_SPACERS

File Edit Insert Tools

Look In: CADWS\_SPACERS

Ty...	Instance Name	Common Na...	DESCRIP...	THICKNE...	DEPTH
	CADWS_SPACERS	CAD Workshop Spacer Part Fam...		0.25	1.0
	CADWS_THICK_SPACER_100	CAD Workshop 1...	CAD Workh...	0.50	1.0
	CADWS_THICK_SPACER_050	CAD Workshop 1...	CAD Workh...	0.50	0.5
	CADWS_SPACER_050	CAD Workshop 1...	CAD Workh...	0.25	0.5
	CADWS_SPACER_100	CAD Workshop 1...	CAD Workh...	0.25	1.0

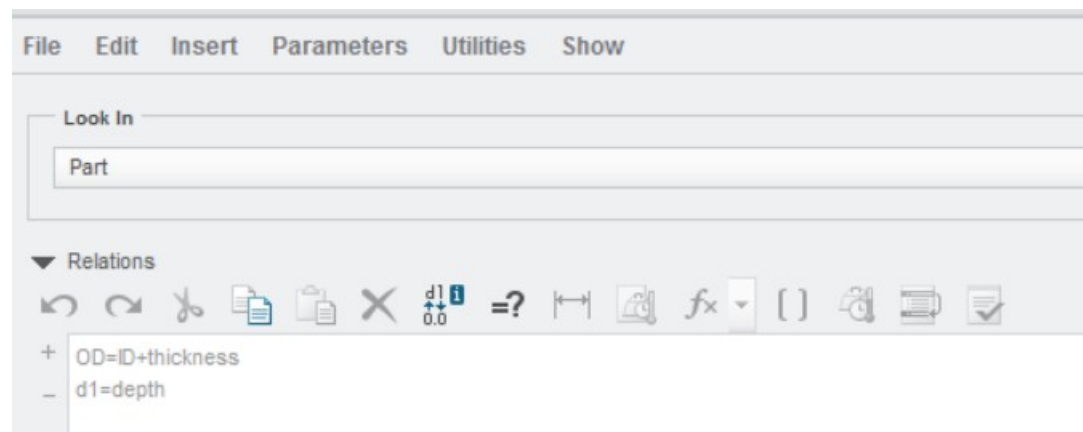
Different Parts



Parameters

# Relationships

- These can be used with dimensions and parameters to configure parts
  - Select “Relations” from same “Model Intent” menu
  - Here we set  $OD = ID + \text{thickness}$  automatically
  - We also set  $\text{depth} = \text{a parameter called depth}$





# Let's Try It!





- Create a new spacer, .75" in depth, 1" thick
- Don't use CAD functions!!
  - Select “Insert Instance” in the Family Table
    - You make have to select Edit first...
  - Make the new row look like this:

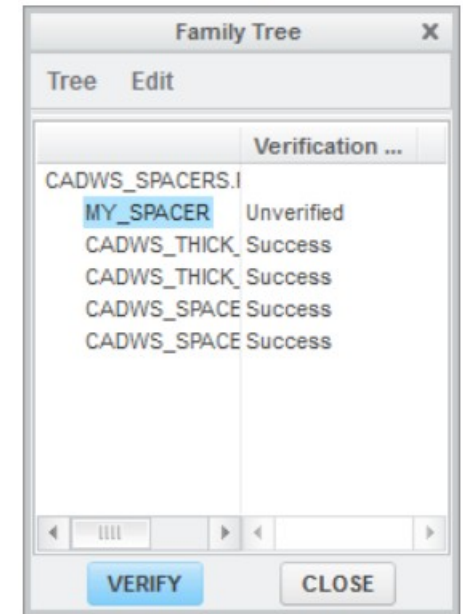


Look In: CADWS_SPACERS					
Ty...	Instance Name	Common Name	DESCRIPTION	THICKNE...	DEPTH
	CADWS_SPACERS	CAD Workshop Spacer Part Family		0.25	1.0
	MY_SPACER	CAD Workshop My Spacer	CAD Workshop My Spacer	1	.75
	CADWS_THICK_SPACER_100	CAD Workshop 1" Thick Spacer	CAD Workshop 1" Thick Spacer	0.50	1.0
	CADWS_THICK_SPACER_050	CAD Workshop 1/2" Thick Spacer	CAD Workshop 1/2" Thick Spacer	0.50	0.5
	CADWS_SPACER_050	CAD Workshop 1/2" Spacer	CAD Workshop 1/2" Spacer	0.25	0.5
	CADWS_SPACER_100	CAD Workshop 1" Spacer	CAD Workshop 1" Spacer	0.25	1.0



# Now Verify It

- Verify Icon makes Creo try it out 
- Choose Verify
- If all is ok, you'll see “Success”
- Close the Verify dialog
- Select Preview to look at it 
- Close when done



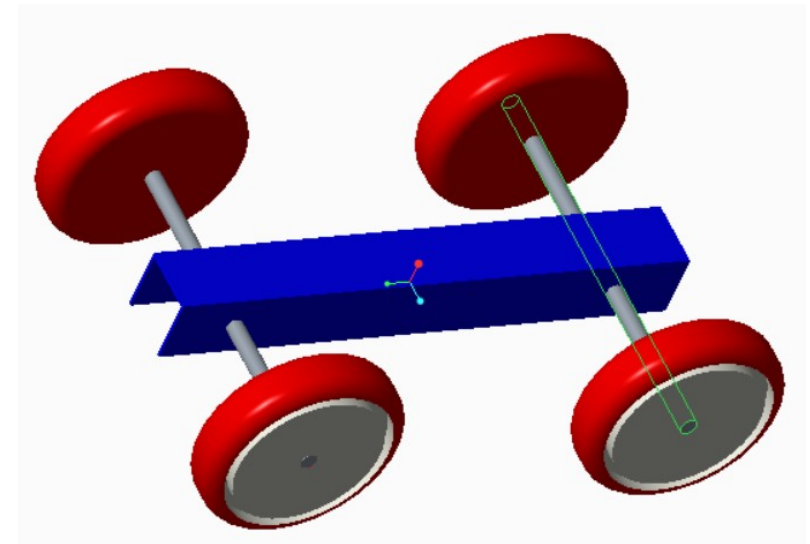


# Replace New Part

- After closing the Family Table try replacing the spacer with your new part
- Did it work?
  - If so, you should see a thick spacer that's 3/4" in depth (still too big for our wheel...)
  - Try creating a few more spacers to play
    - Vary the thickness and depth to see what happens
    - Don't forget to Verify before closing the family table

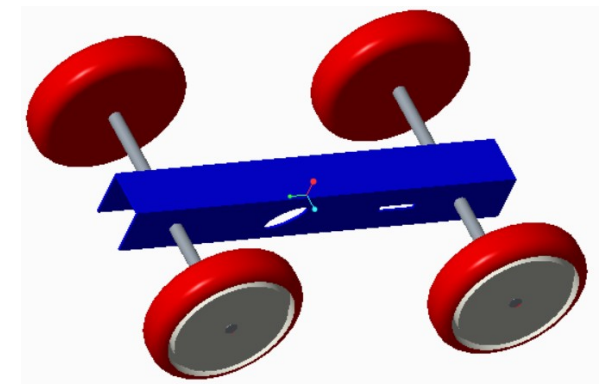
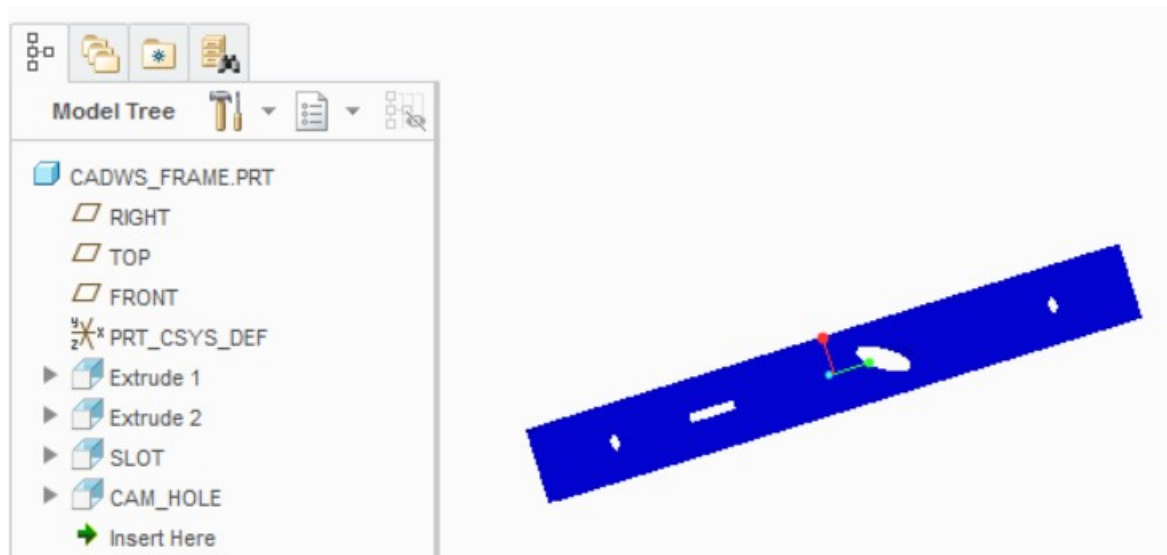
# Create a Family Table

- Lets create one from scratch
- Open the CAD Workshop Part Family Robot
  - cadws\_part\_family\_robot.zip
    - cadws\_part\_family\_robot.asm
- Let's make
  - Different lengths
  - Different features



# Starting a Family Table

- To add/remove features
  - Open the frame and add some holes or slots
  - Give them each names
    - Right click on Extrude and select “Rename”



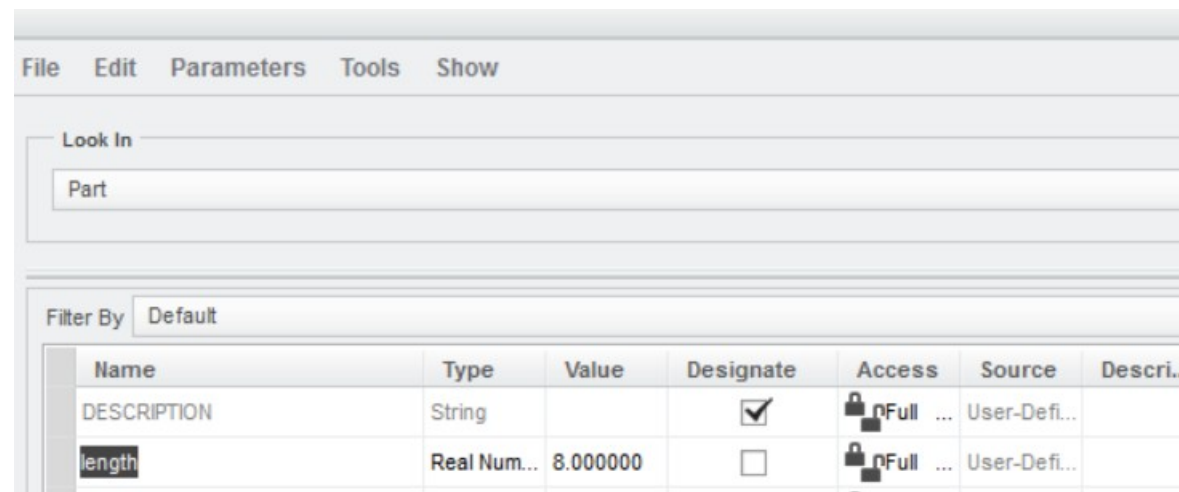


# Name Dimensions

- Show dimensions, then right-click the frame length dimension and hold it
  - Select properties from the pop-up menu
  - Change “d0” in the dialog to “len” and press Ok
- Select “Switch Dimensions” to see the new name for the length of the part

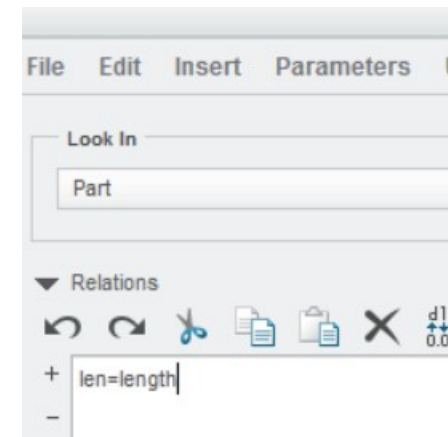
# Create Parameters

- Select “Parameters” from “Model Intent” menu
  - Hit the “+” sign to add one
    - Change the Name to “length”
    - Change the Value to 8
    - Hit ok




# Create Relations

- Select Relations
  - Type “len=length” in the dialog box & hit ok
  - This creates a relationship between the parameter “length” and the dimension “len”
    - Sets them equal
    - *NOTE: you can use dimensions directly as parameters, but this is for training purposes...*



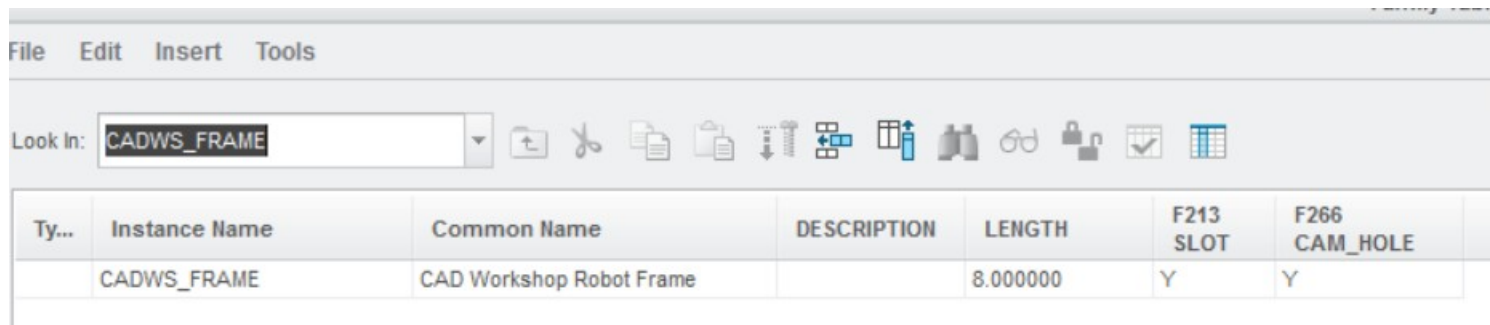


# Create the Table


- Now we're ready
  - Select “Family Table” from the “Model Intent” menu
  - Select Add/Delete Columns icon 
  - Select “Parameter” button
    - Select & insert Description & Length in the dialog
    - Hit Ok
  - Select “Feature” button
    - Choose “Select” in pop-up menu
    - Then select your two features in the model tree
    - Hit ok

# Default Table

- Your table should look something like this



Ty...	Instance Name	Common Name	DESCRIPTION	LENGTH	F213 SLOT	F266 CAM_HOLE
	CADWS_FRAME	CAD Workshop Robot Frame		8.000000	Y	Y

- Now let's create some parts in our family
  - Select the “Insert Instance” icon 

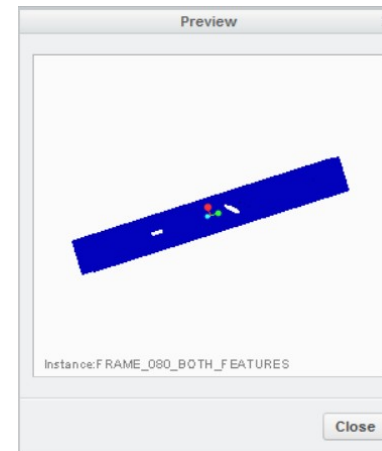
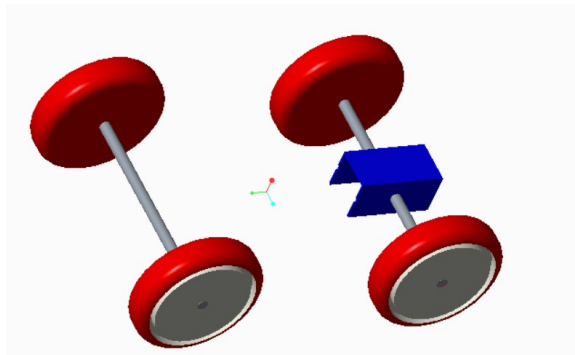
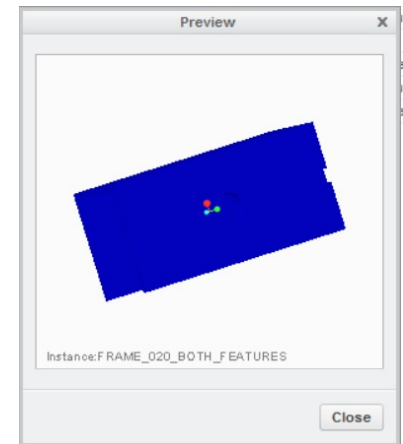
# Create Instances

- Create a bunch
  - Short, long, with & without features
  - Make sure to choose something really short too...

File Edit Insert Tools						
Look In: CADWS_FRAME						
Ty...	Instance Name	Common Name	DESCRIPTION	LENGTH	F213 SLOT	F266 CAM_HOLE
	CADWS_FRAME	CAD Workshop Robot Frame		8.000000	Y	Y
	FRAME_080_BOTH_FEATURES	8" Frame, both features	8" Frame, both features	8	Y	Y
	FRAME_080_WITH_SLOT	8" Frame with slot	8" Frame with slot	8	Y	N
	FRAME_060_NO_FEATURES	6" Frame, no features	6" frame, no features	6	N	N
	FRAME_020_BOTH_FEATURES	2" Frame, both features	2" Frame, both features	2	Y	Y
	FRAME_080_NO_FEATURES	8" Frame, no features	8" Frame, no features	8	N	N

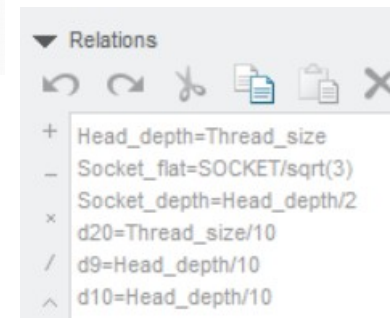
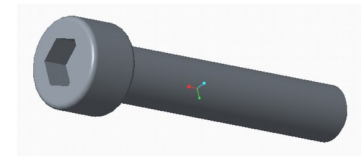
# Verify Your Changes

- Select the Verify icon like before
  - Make sure all are successful
  - View the various instances
    - Some may not be quite what you expect...
- When you are done, hit Ok



# Other Examples

- Round & Hex Shaft Bearings
  - Some with a flange, some without
- Various fasteners
  - Different head styles (each a family)
    - Lots of Relations to make the part look right
    - Better than typing all the dimensions in if all you need is the approximate look & feel



# Summary



- Create part families for similar parts
  - Parts that just differ in size or a feature or two
  - Makes replacing parts much easier
  - Also makes creating similar parts very easy
  - Ordering & part usage are more consistent