

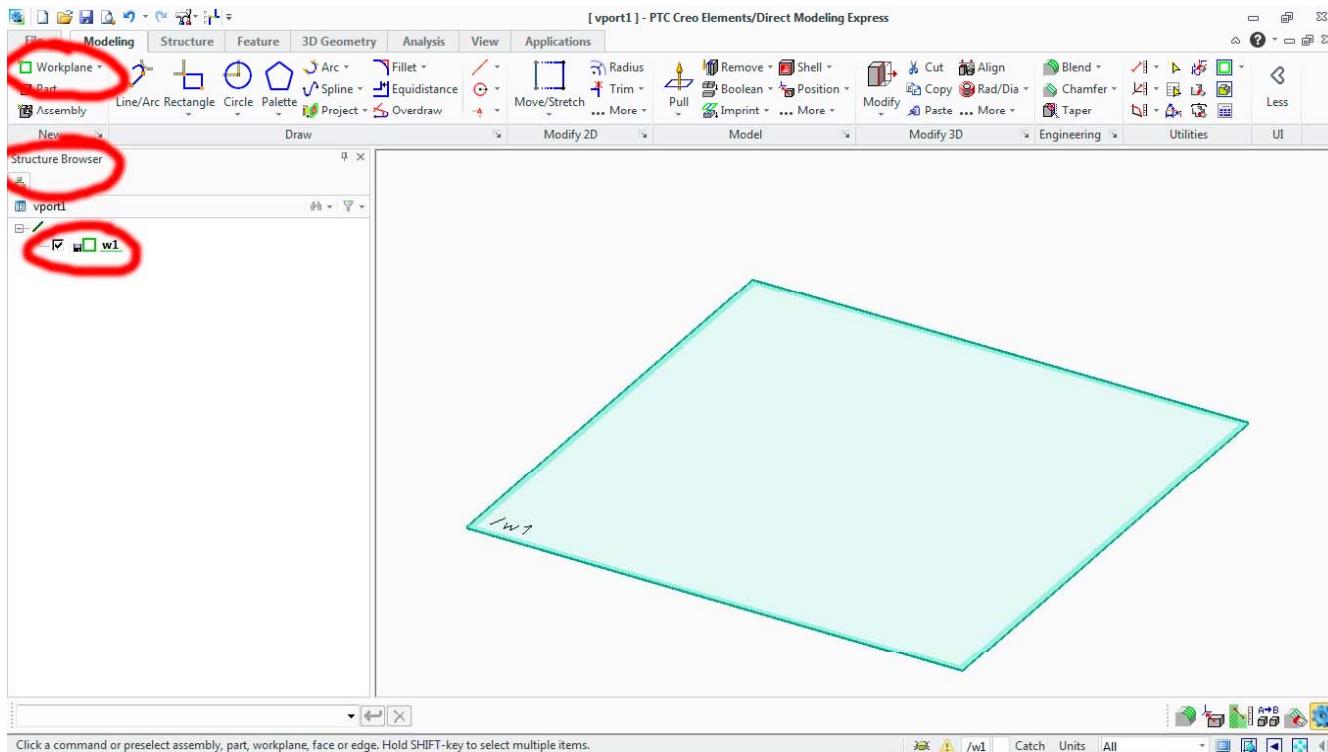


# CAD Basics Workshop

Creo Elements Direct  
Modelling Express 6.0

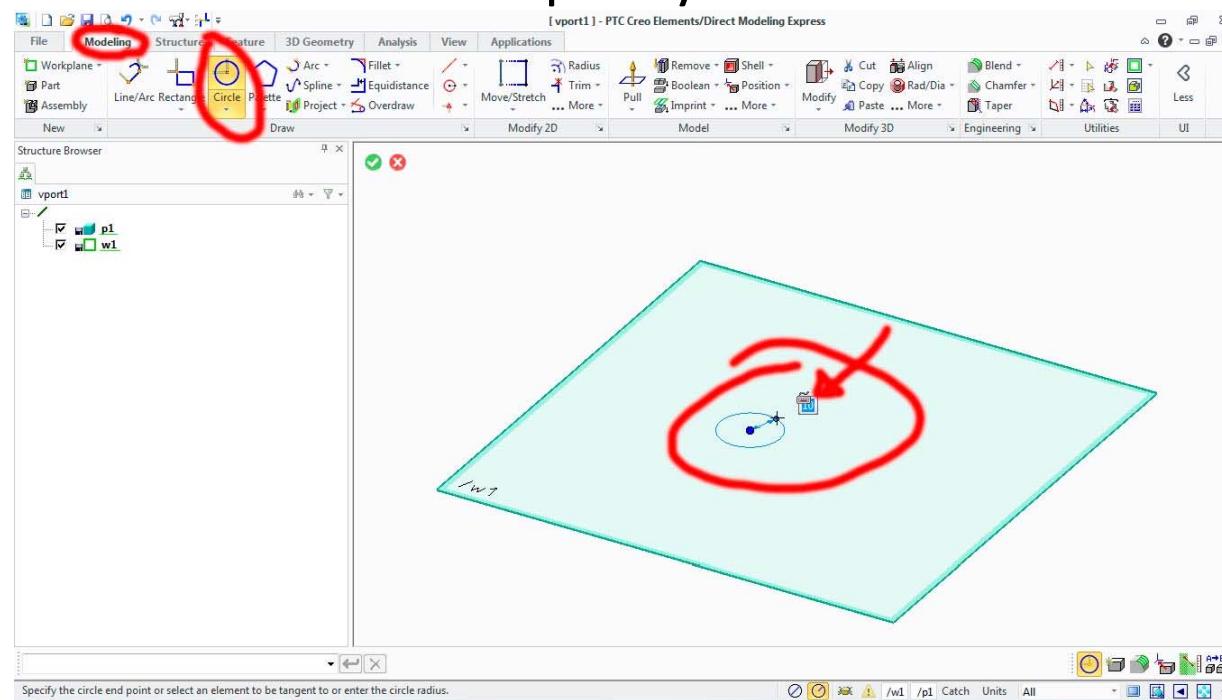
# Workplanes

- Workplanes are where everything gets done!
- To create a new workplane, click Workplane, New Workplane



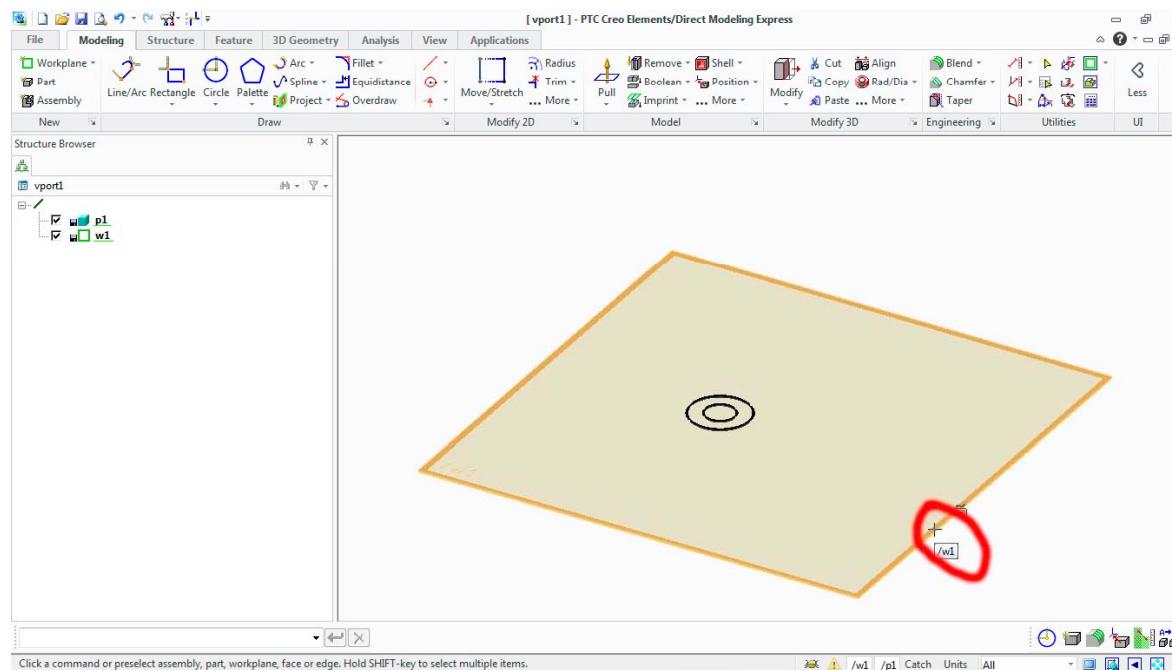
# Geometry Basics

- All shapes come from geometry
- All geometry must be ‘closed’
- We pull, turn and stamp geometry to make shapes
- Select the circle geometry, click and drag to form a circle
- Click in the numeric box to specify a radius



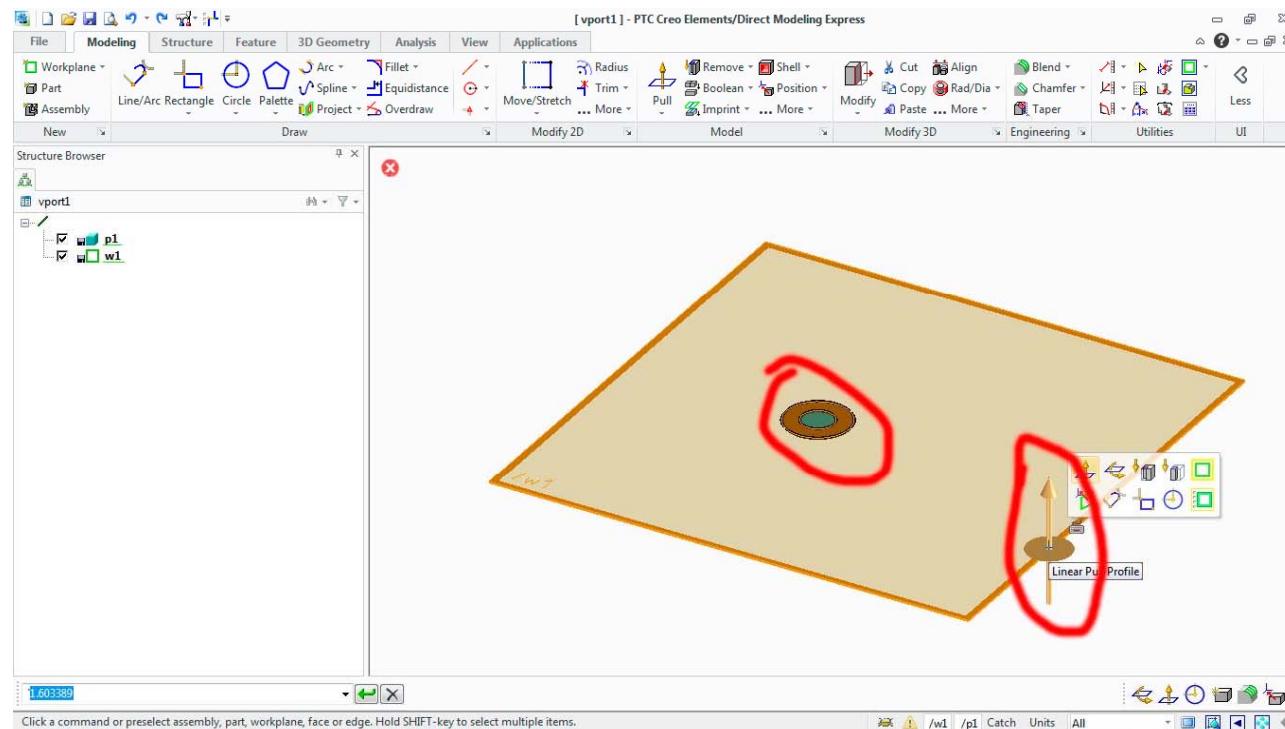
# To Start Making A Shape

- Add a smaller circle
- Click on the edge of the workplane to select it



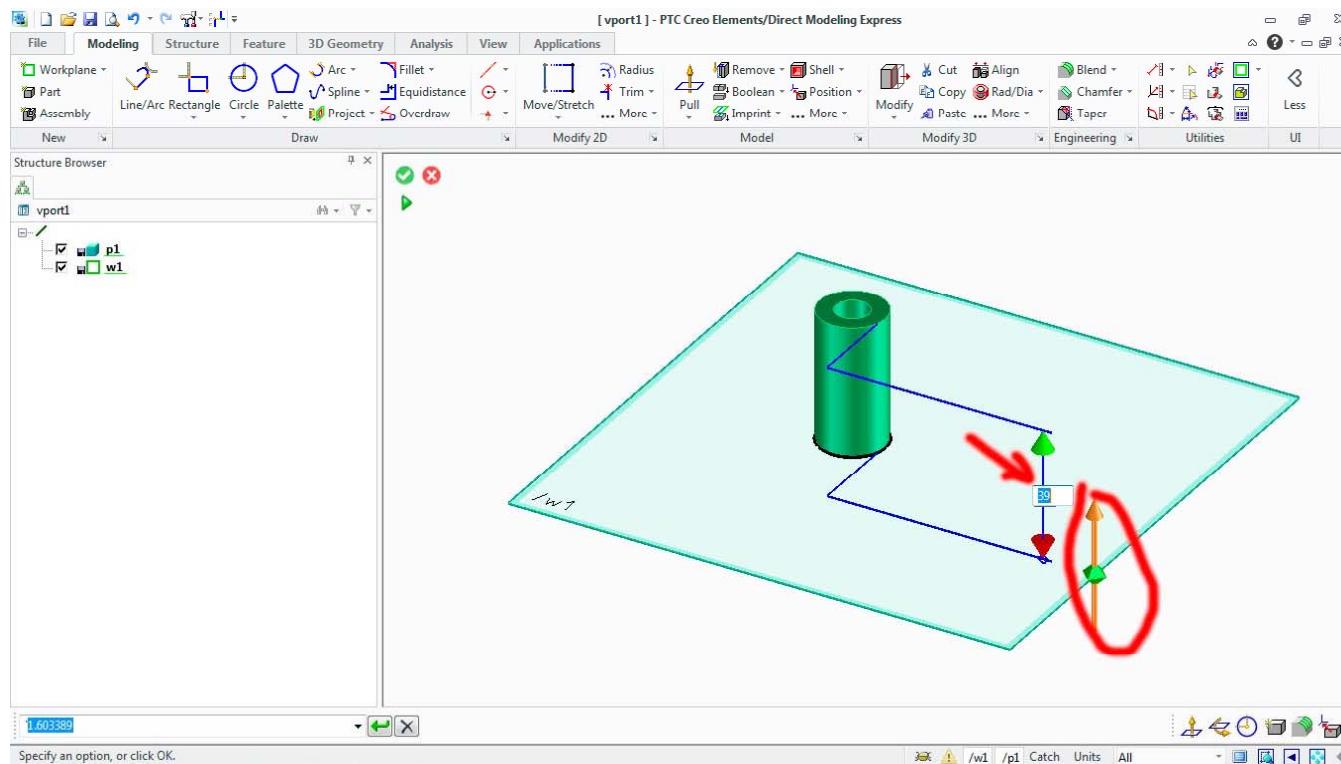
# Selecting Geometry

- Clicking on the edge of a workplane highlights in orange which geometry will be affected.
- Click any geometry you wish To select/de-select



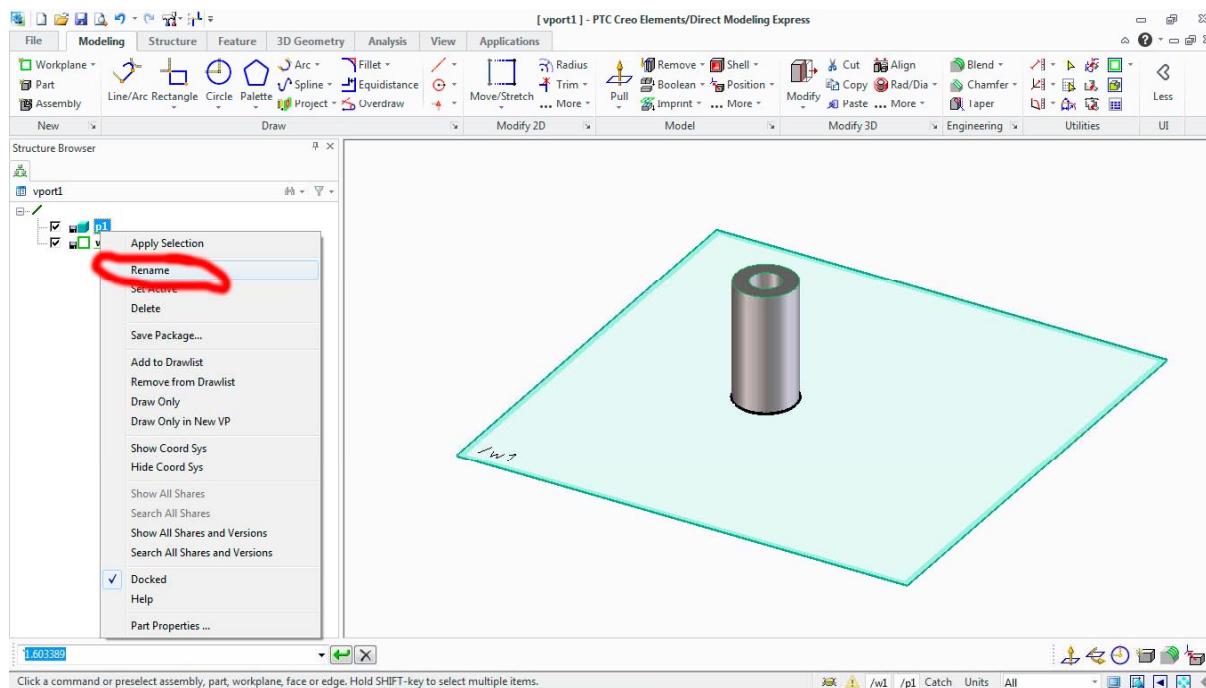
# The Pull

- Drag the arrow to pull the geometry into a shape.
- Press the tab key to move between the dimension boxes and type in a value if you need a precise value.



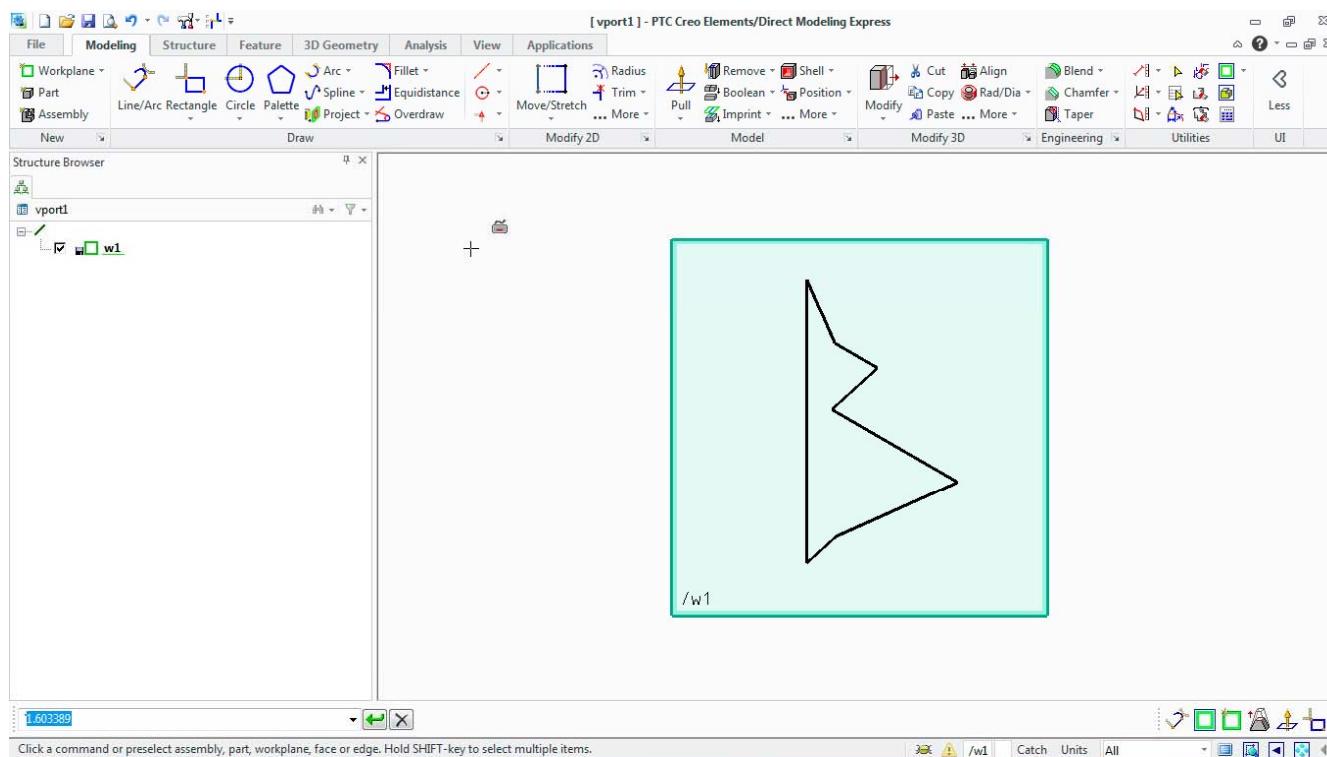
# Renaming Parts

- A large model gets confusing without names
- Right click on the part in the structure browser and select rename



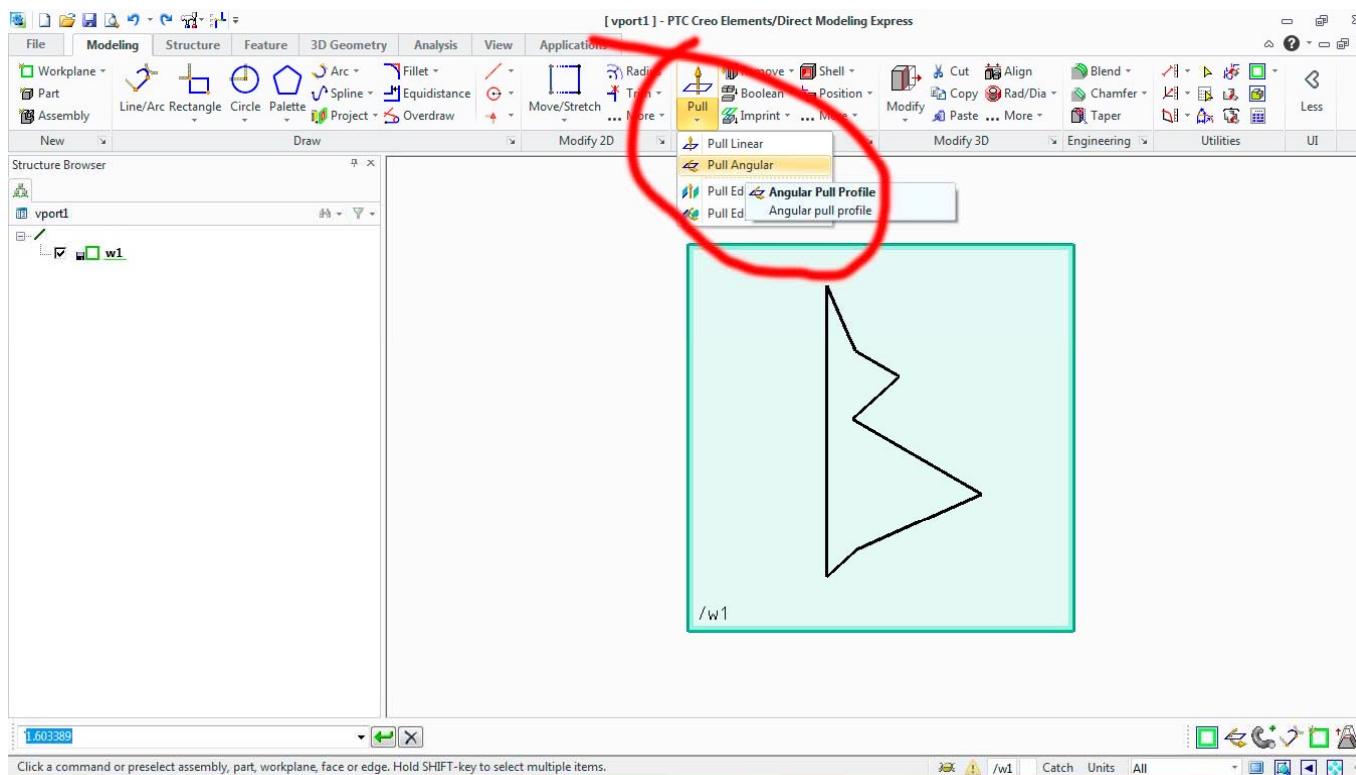
# Angular Pull

- Some parts need to be made by rotation
- Create an enclosed outline on a workplane.



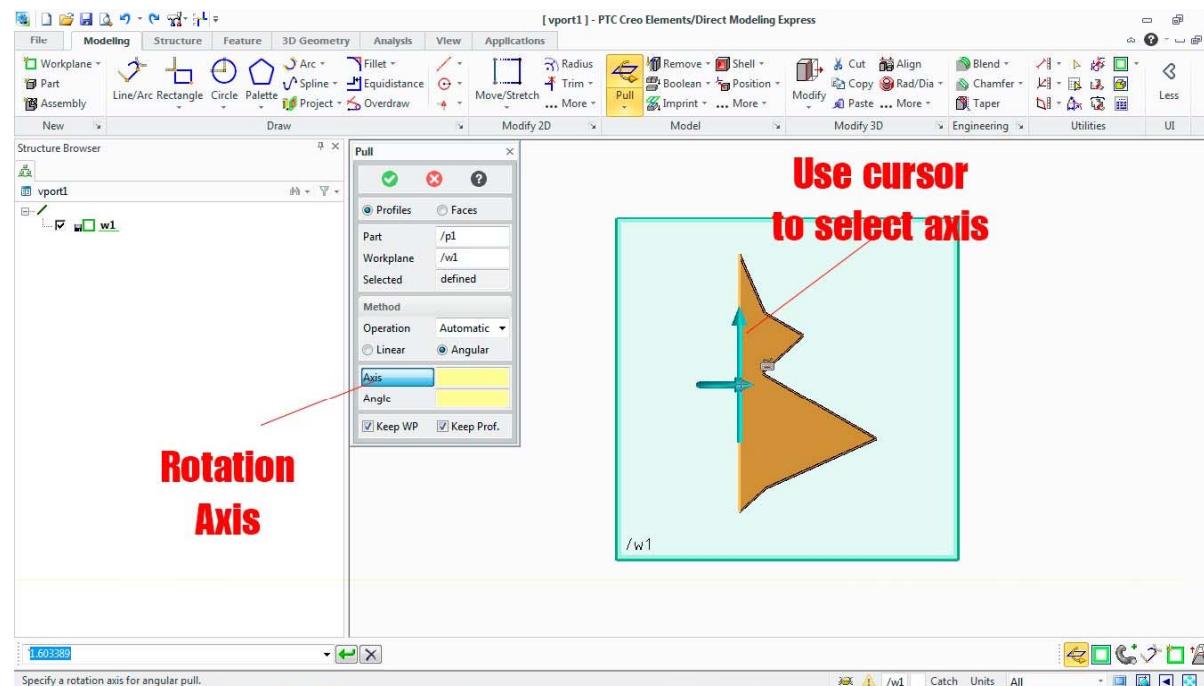
# Set up the angular pull

- Make sure the workplane is in bold in the Structure Browser
- Select angular pull from the pull menu



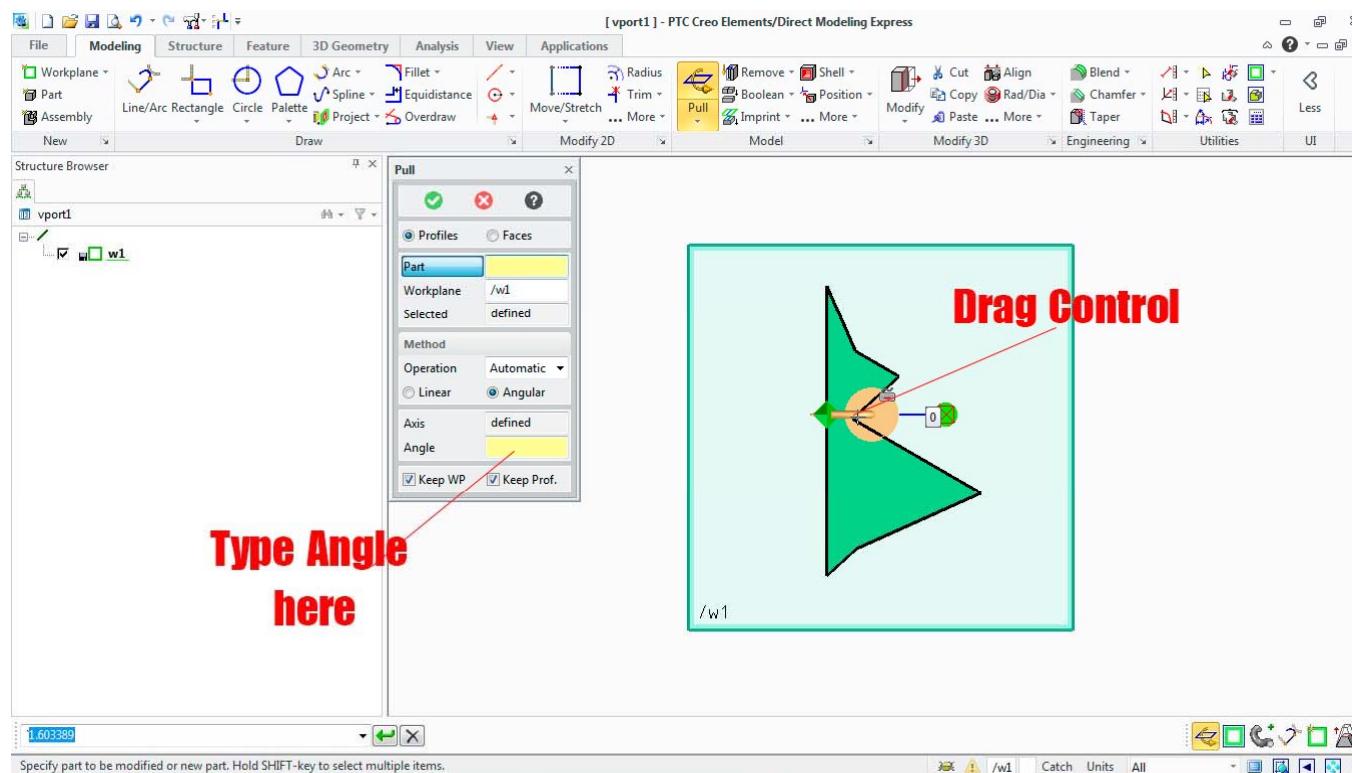
# Enter Angular Parameters

- The angular pull needs an axis to rotate about. This can be any geometry line.
- Click the axis button and select the line you wish to rotate about



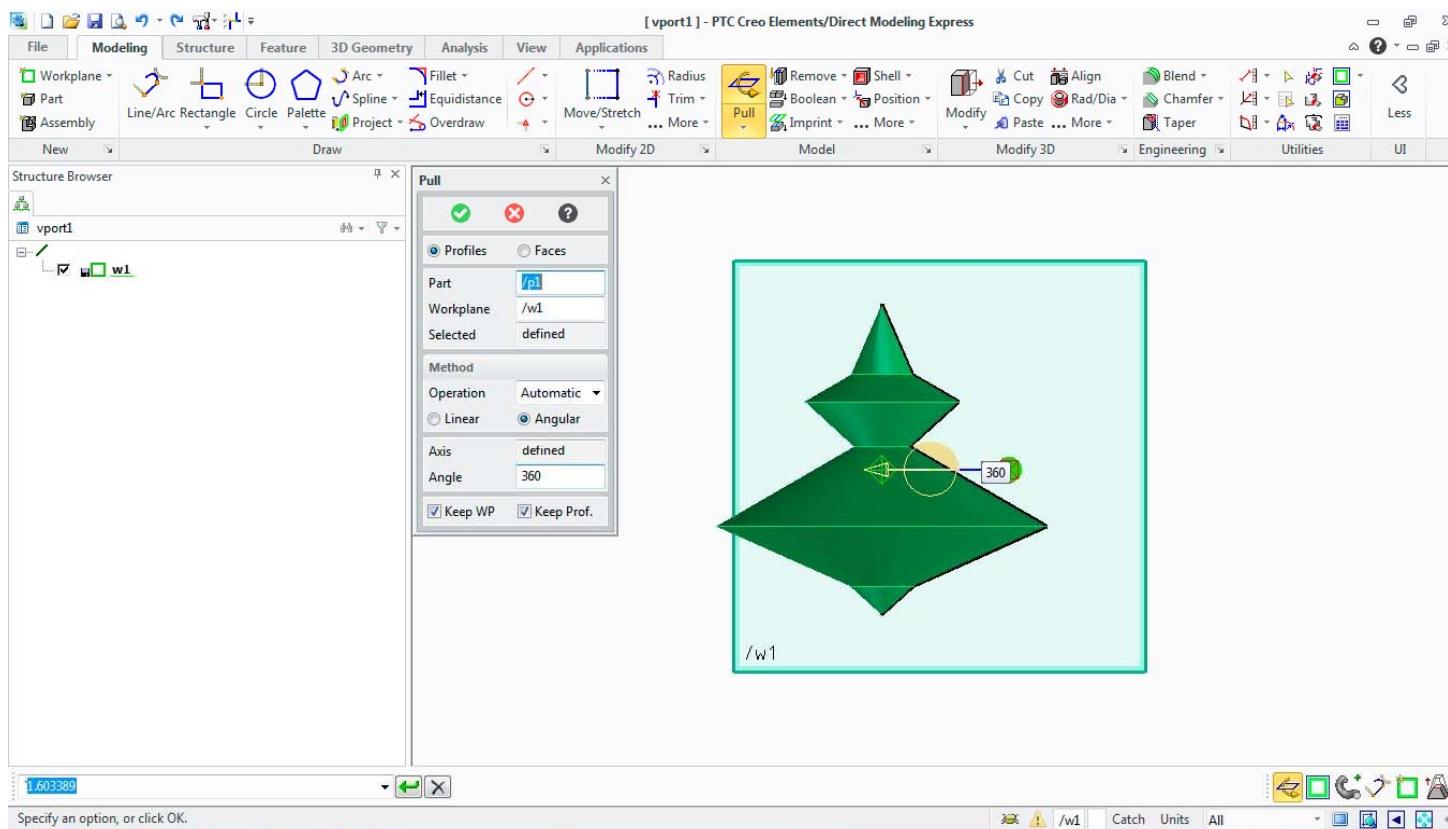
# Doing the Angular Pull

- To complete the angular pull, simply supply and angle of rotation by entering a value into the box, or, drag the control bar.



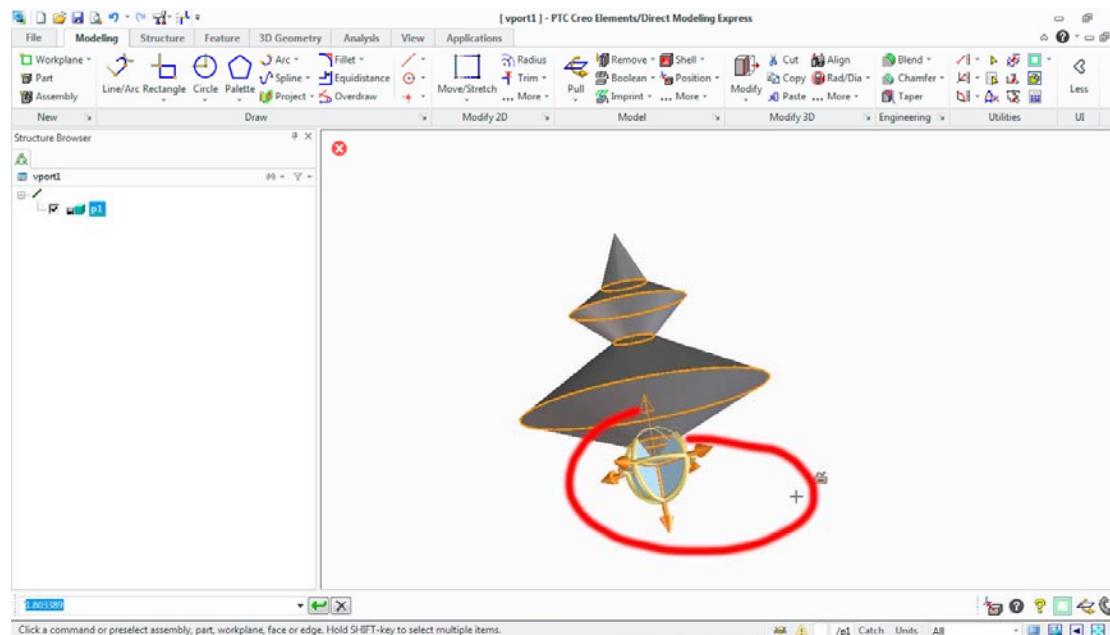
# Angular pull completed

- With a rotation angle of 360, a circular, solid object is formed



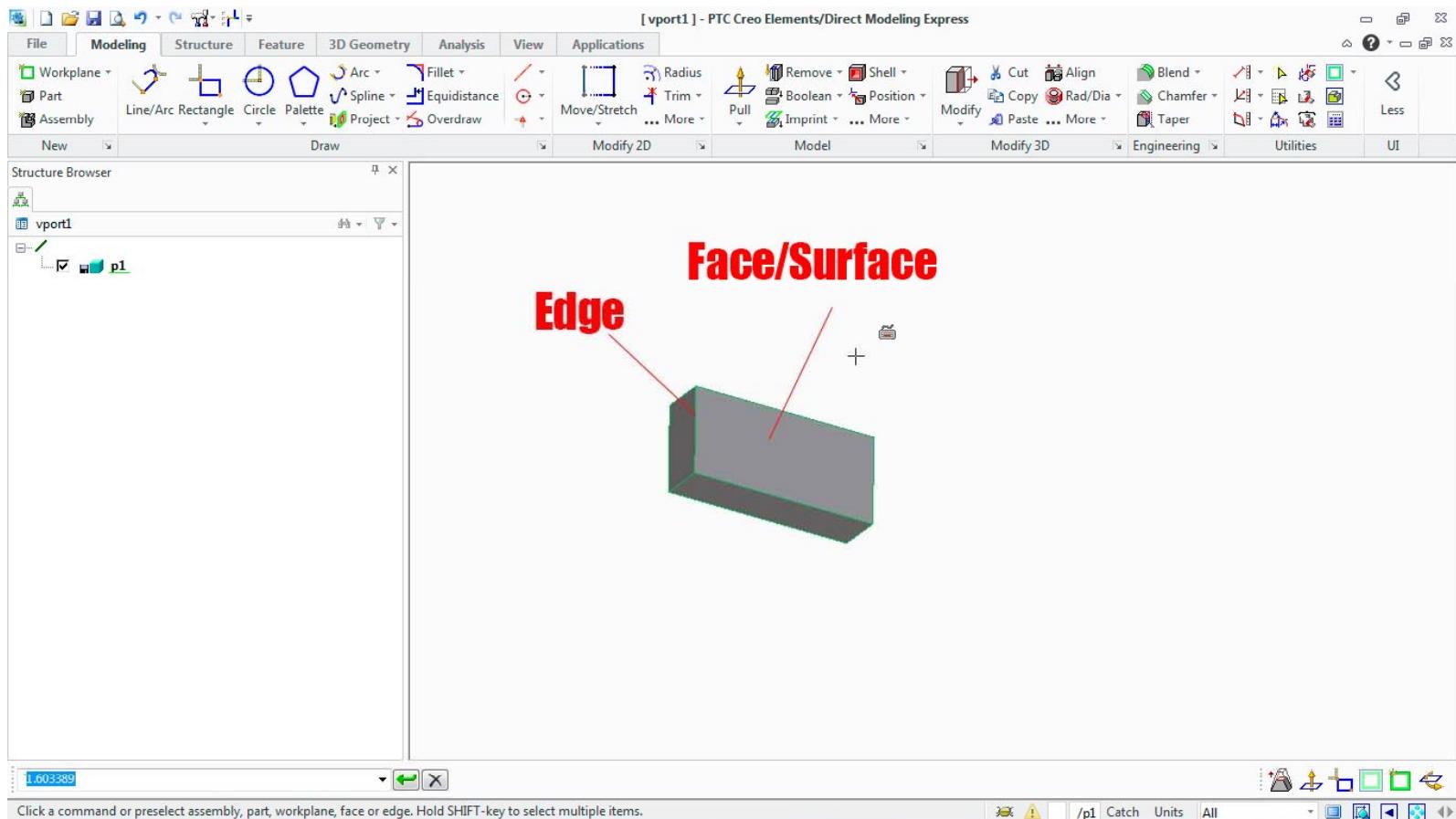
# Moving Parts

- Right click on part in the Structure Browser and select 'Apply Selection'
- Use the 3D widget to move parts.
- Drag the arrows to move parts in X/Y/Z
- Drag the curves to rotate



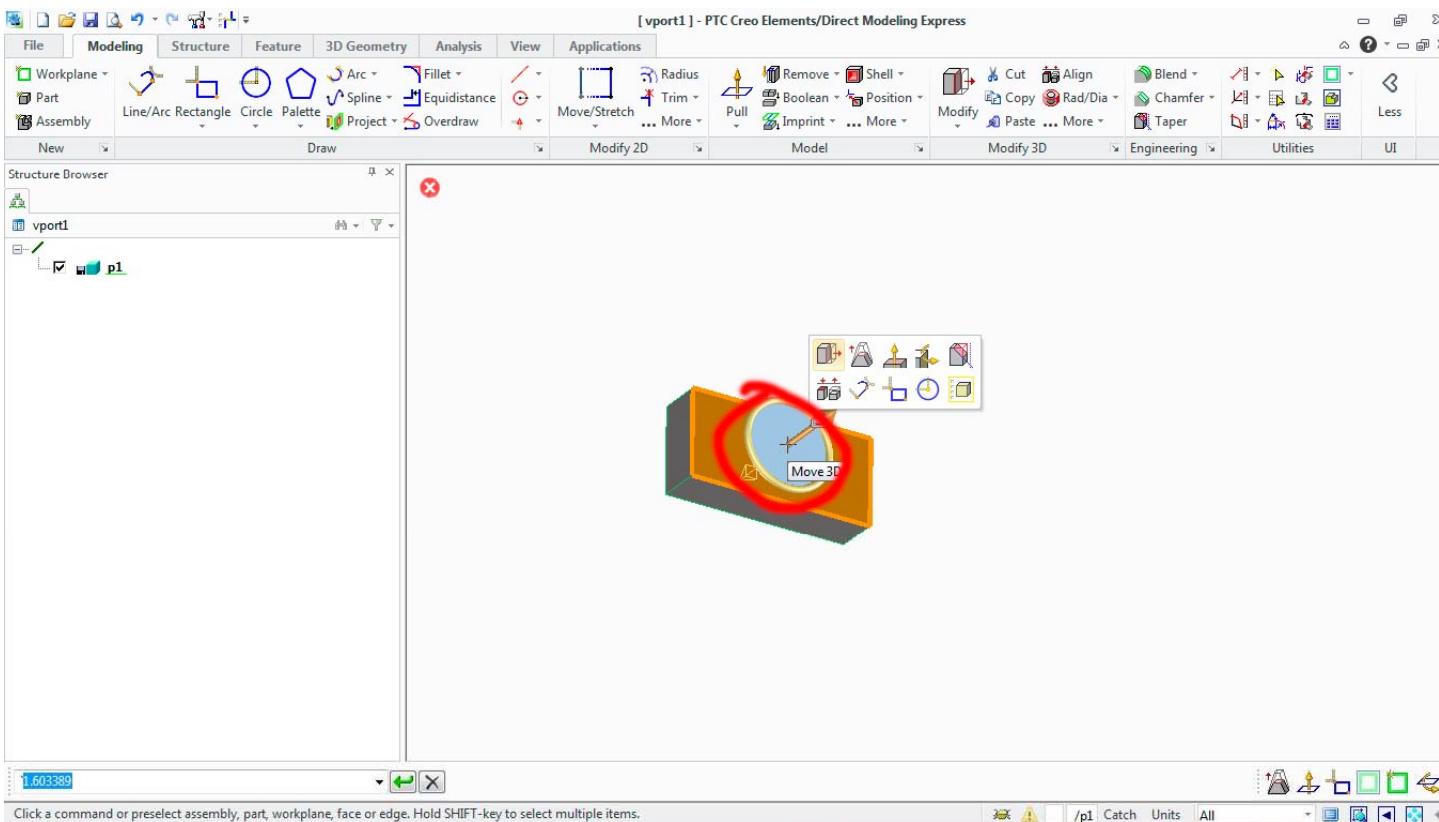
# Surfaces and Edges

- Parts are made of surfaces and edges



# Changing Objects Faces

- Once an object is created, you can change its size by ‘pulling faces’!
- Click on the surface of any shape and drag the surface to a new position.

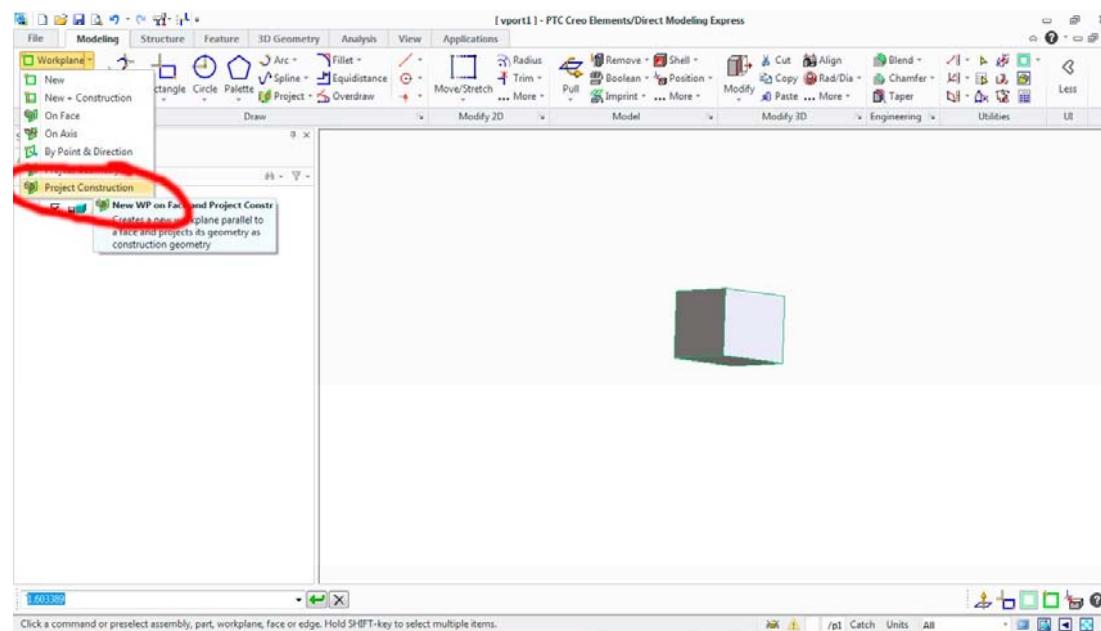


# Using Construction

- Construction lines are references to allow you to measure and align geometry.
- Construction never features in the creation of objects.
- Very useful when aligning holes etc.

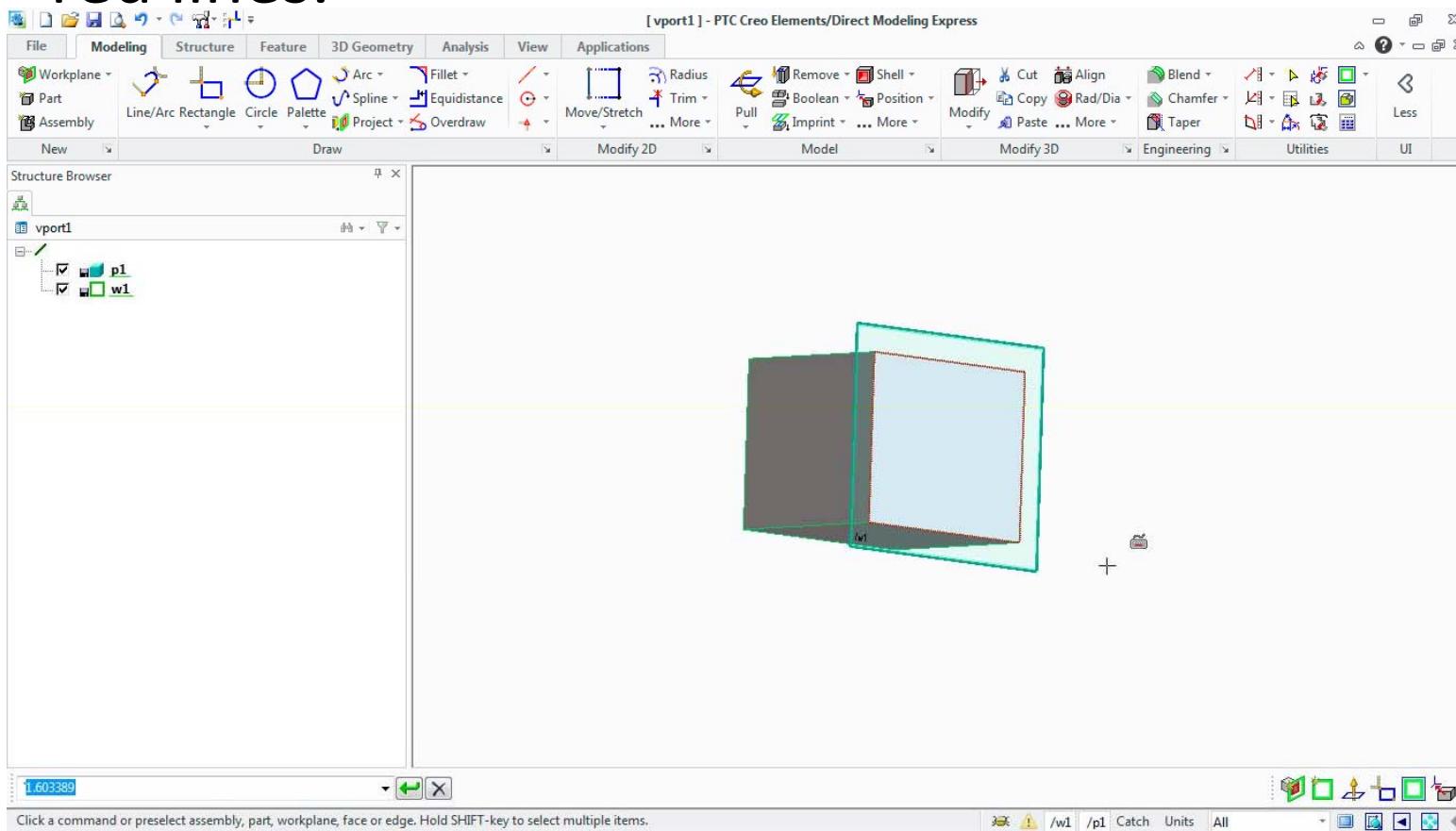
# Creating Construction

- The best way is to use projection. This takes the surface of an object and ‘throws’ its construction onto a workplane.
- Create a cube.
- Workplane->Project Construction
- Click on the cube face.



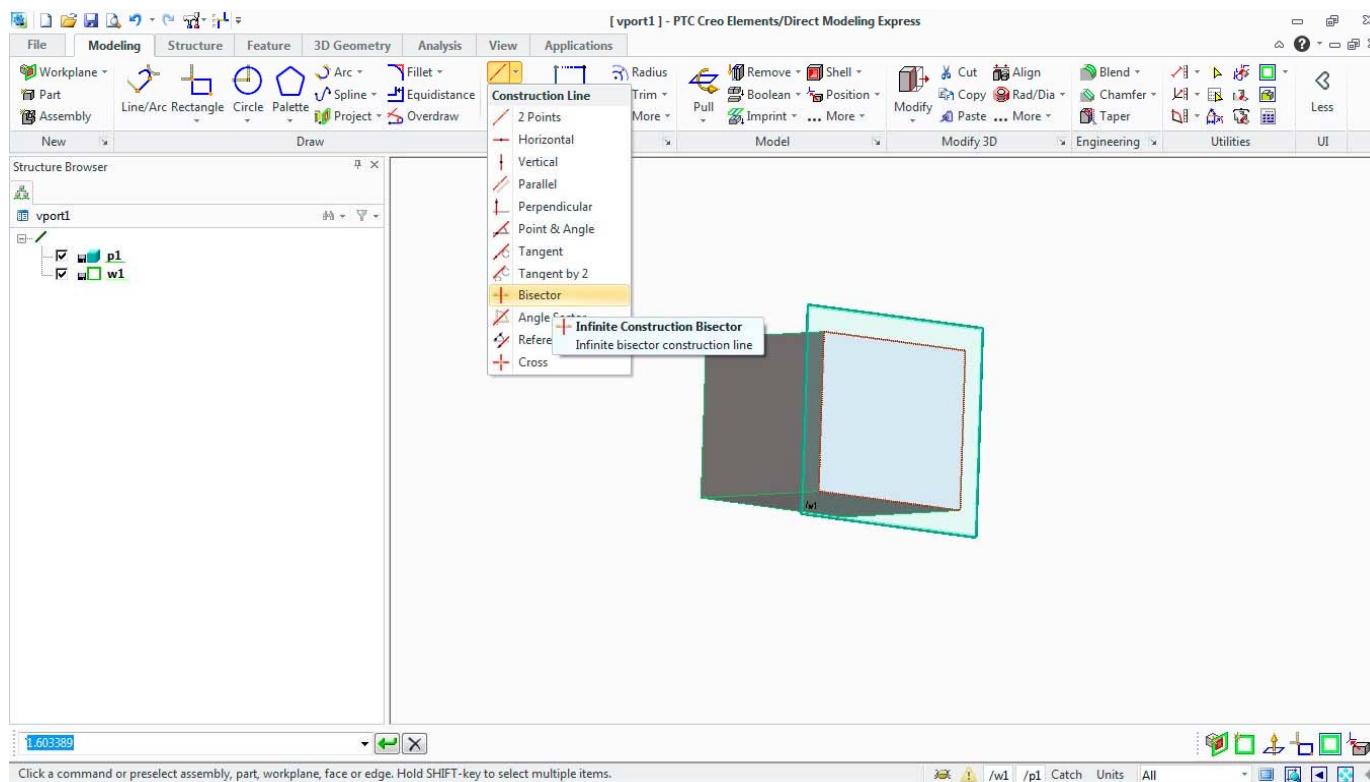
# Construction lines

- After projection, the surface of the selected shape is projected onto the workplane in dotted red lines.



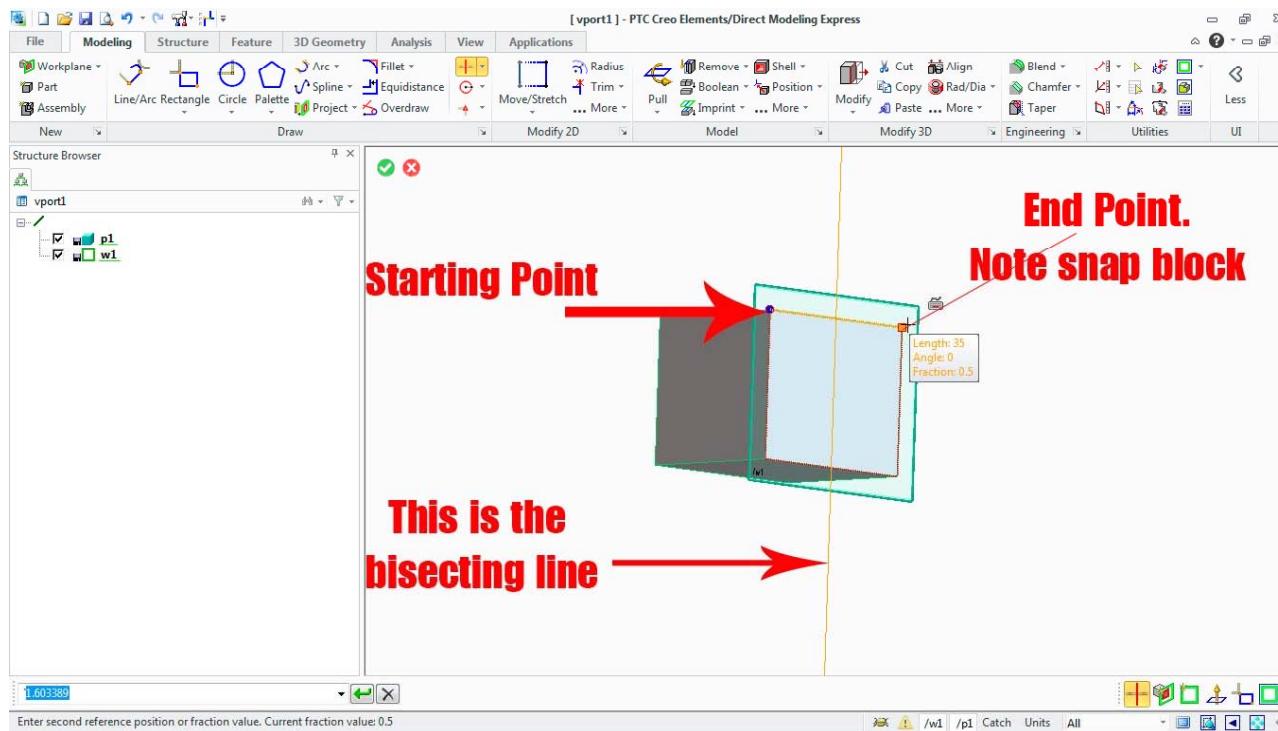
# Using construction

- With construction in place, it is simple to find the centre of a surface.
- We use the bisector to find the centre between two points.



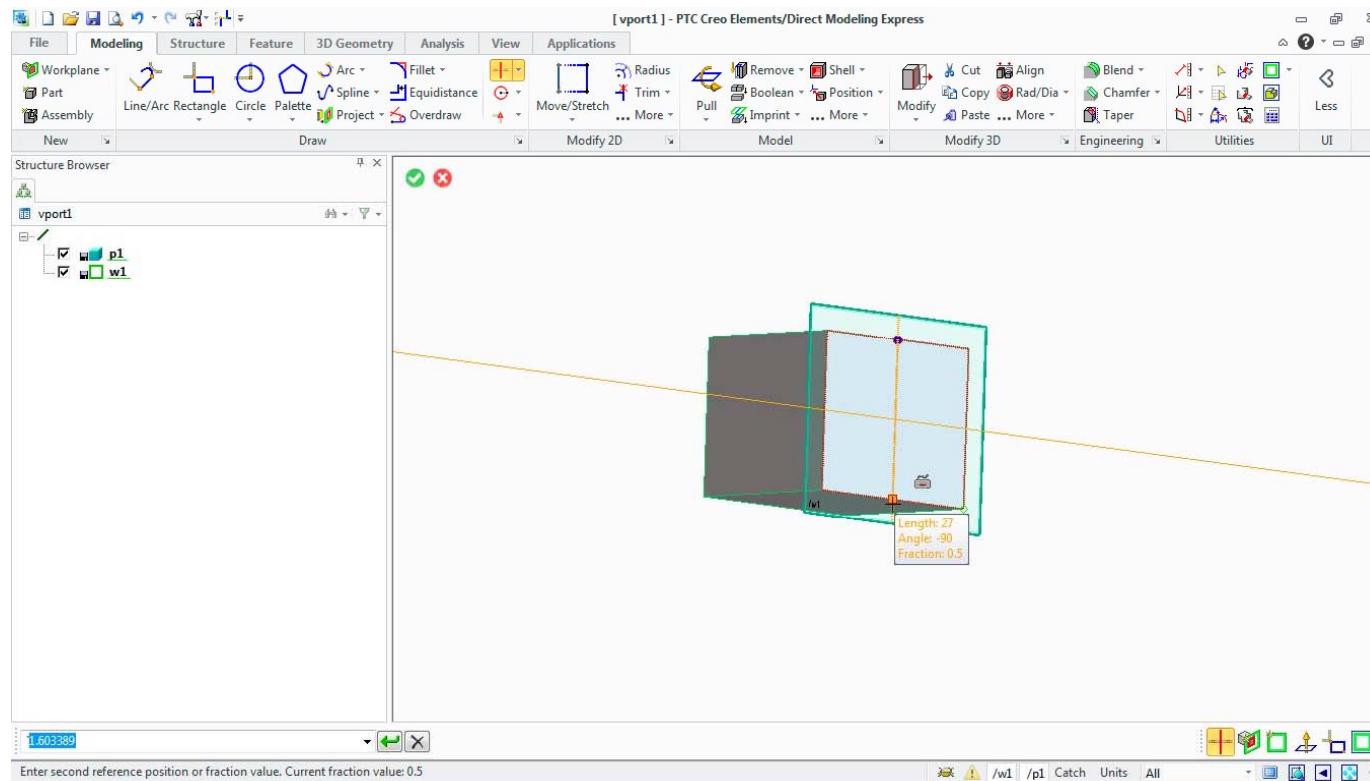
# Bisecting Two Points

- Use the bisector and click on the starting point.
- Move the mouse to the end of the edge you wish to bisect
- The tool will leave a construction line half way between the two points



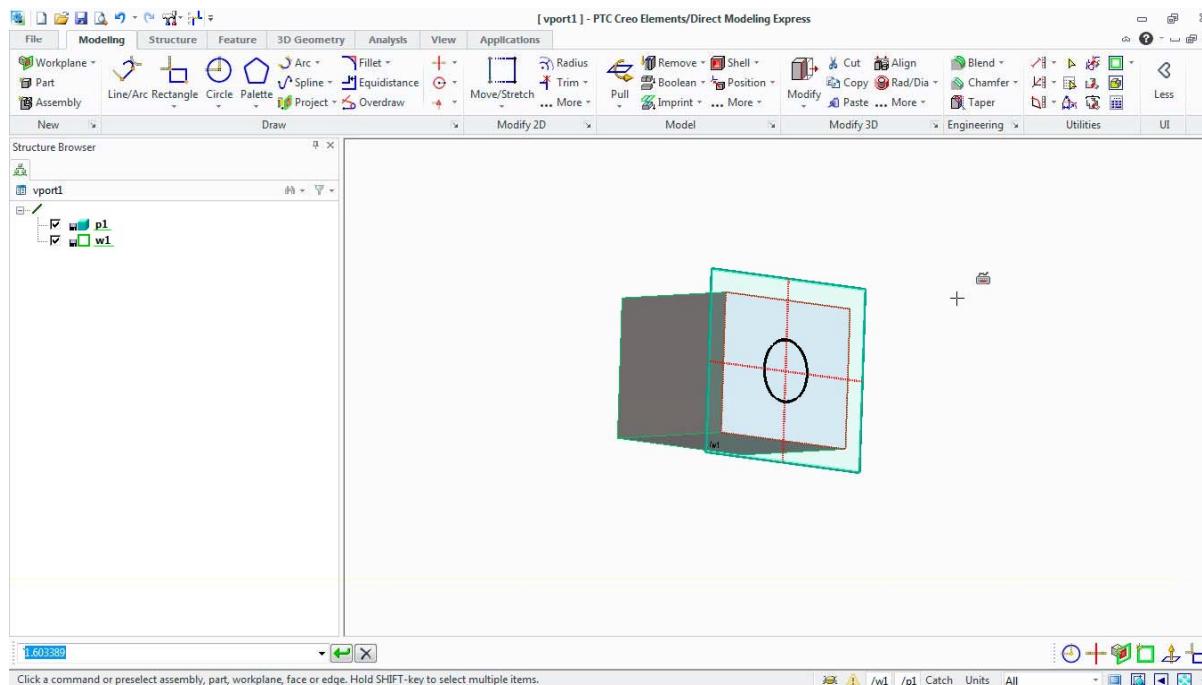
# Finding the Centre

- Repeat the bisector to find the centre of a piece.



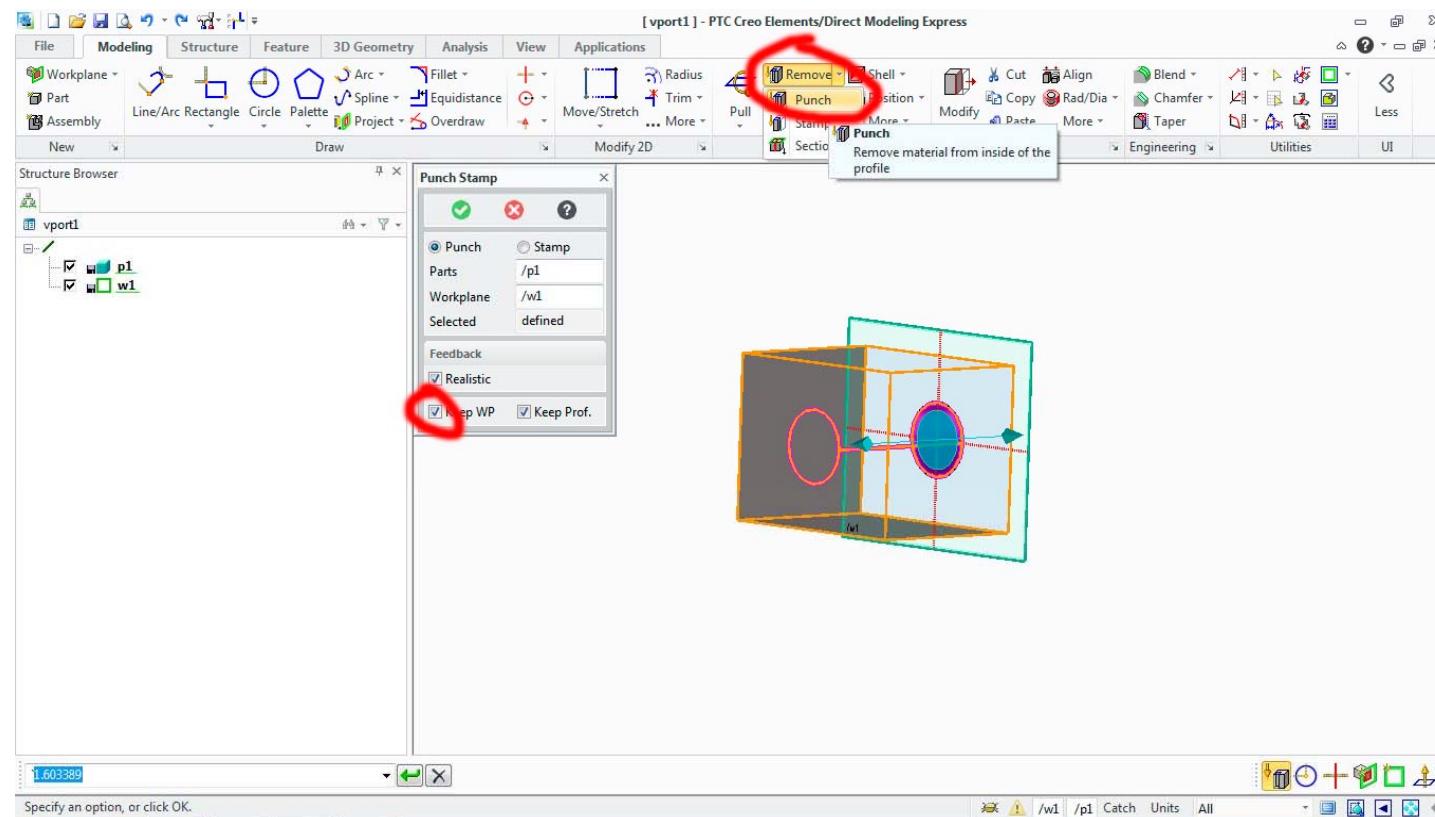
# Preparing to punch a hole

- With the centre of the piece defined using construction lines. Use geometry to create a circle in the centre of the piece. The circle tool will snap to the cross formed by the construction lines.



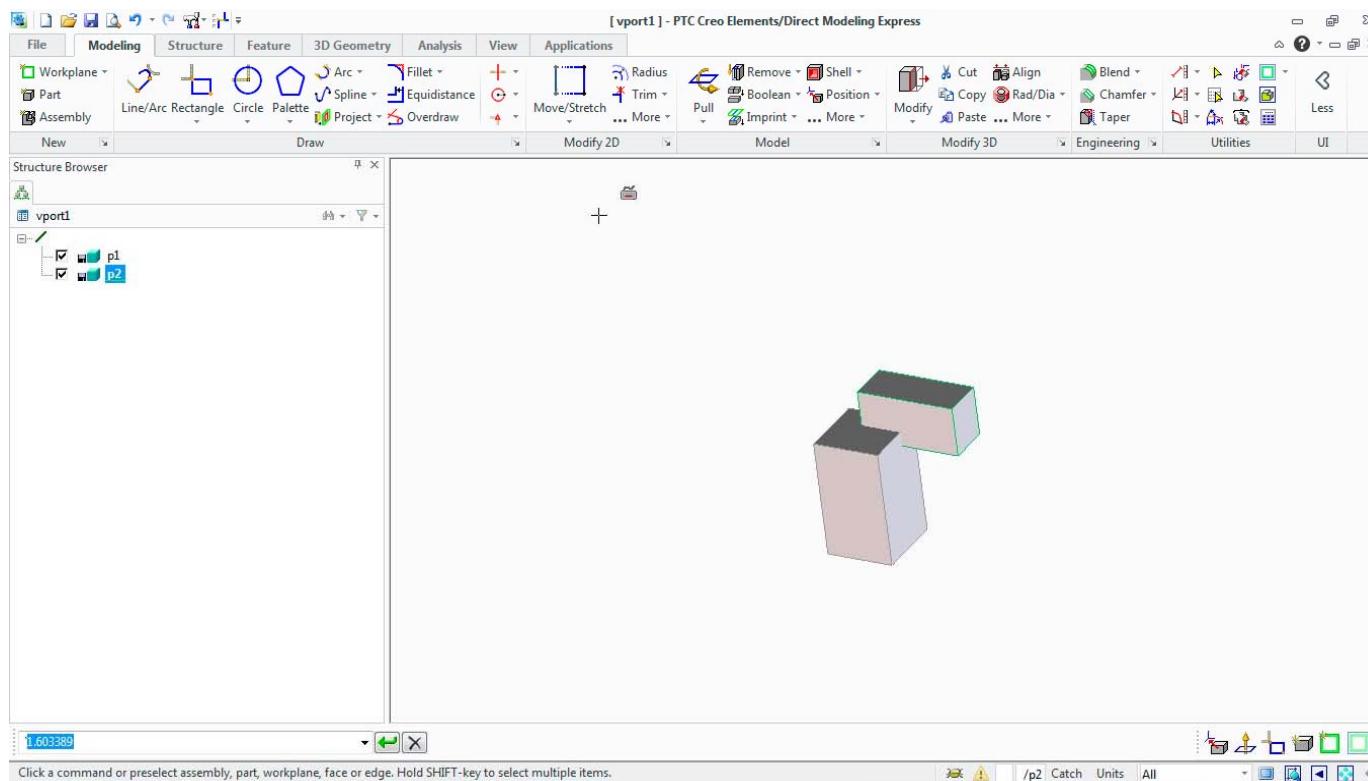
# The Punch

- With the punch workplane in place, select remove->punch.
- Tick 'Remove wp' if you wish the workplane to be removed after the punch operation



# Using Multiple Objects

- With multiple objects it is possible to subtract or add them together.
- Create two rectangles and use the 3D widget to position one over the other.

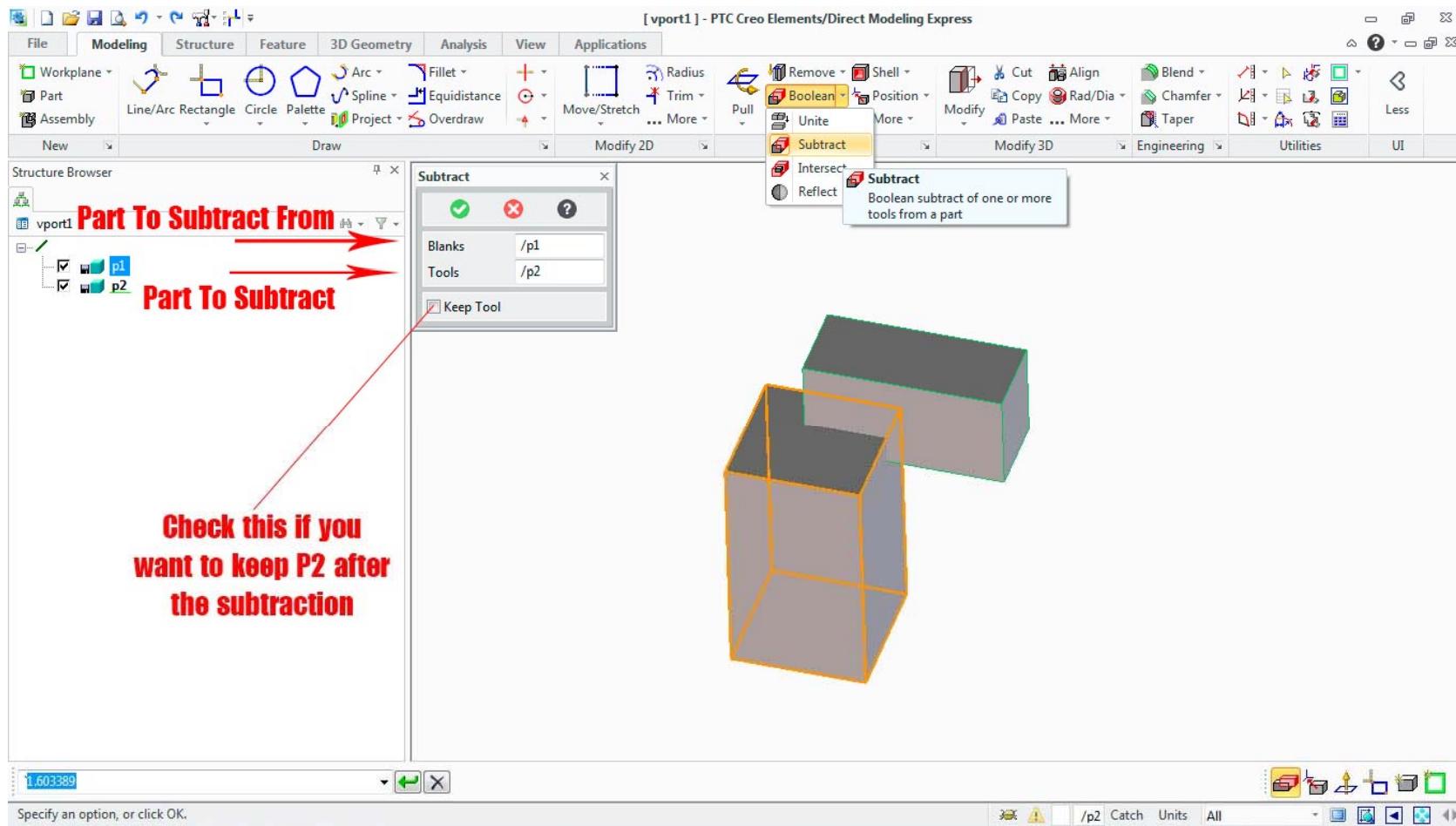


# Preparing the subtract

- Use the Structure Browser to select the larger block to be active (select active)
- Click boolean->subtract. A control box allows you to select the ‘tool’ that we will use.
- Click the tool button and select the smaller rectangle. The tool is the shape we will use to subtract from the active object.

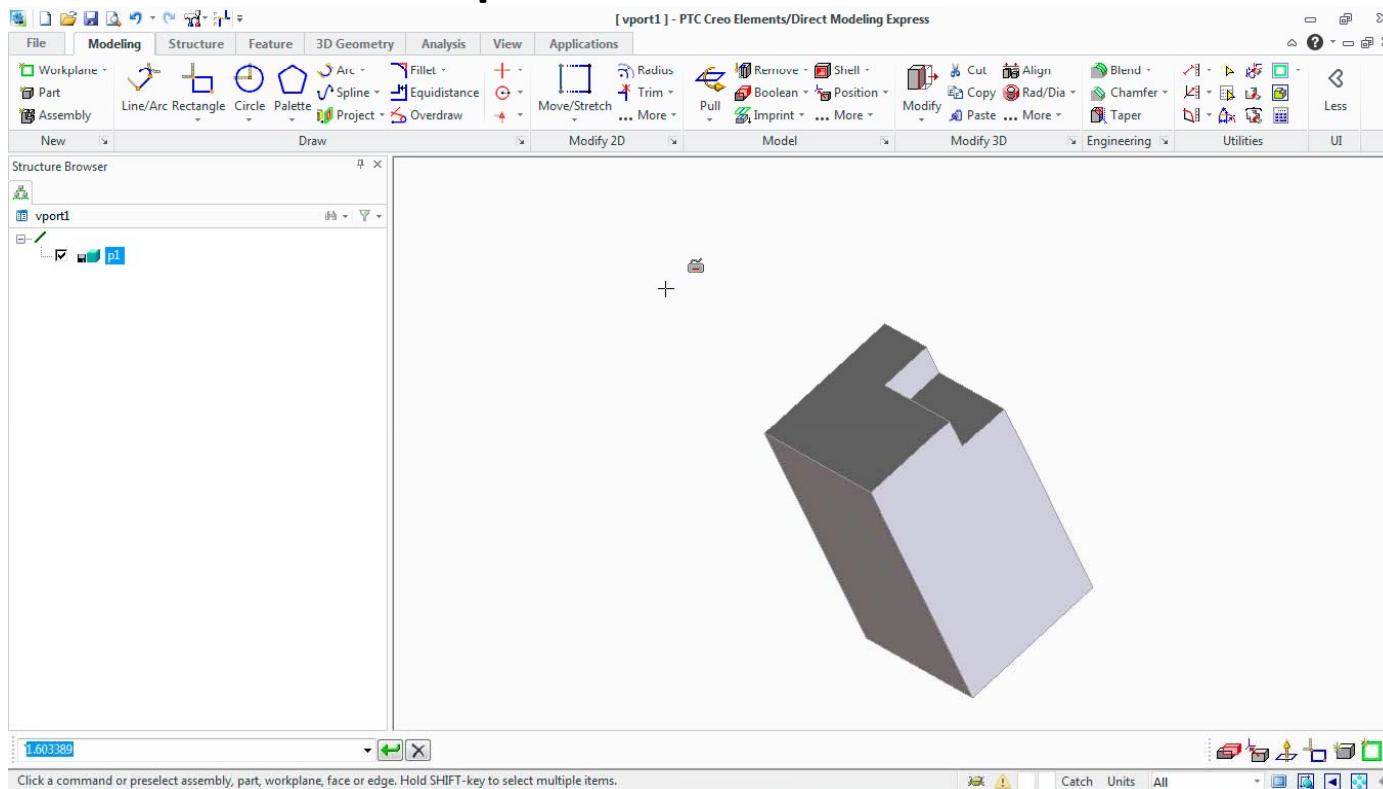
# Preparing the Subtract

Keep tool checked means that the tool will not be deleted after the subtraction



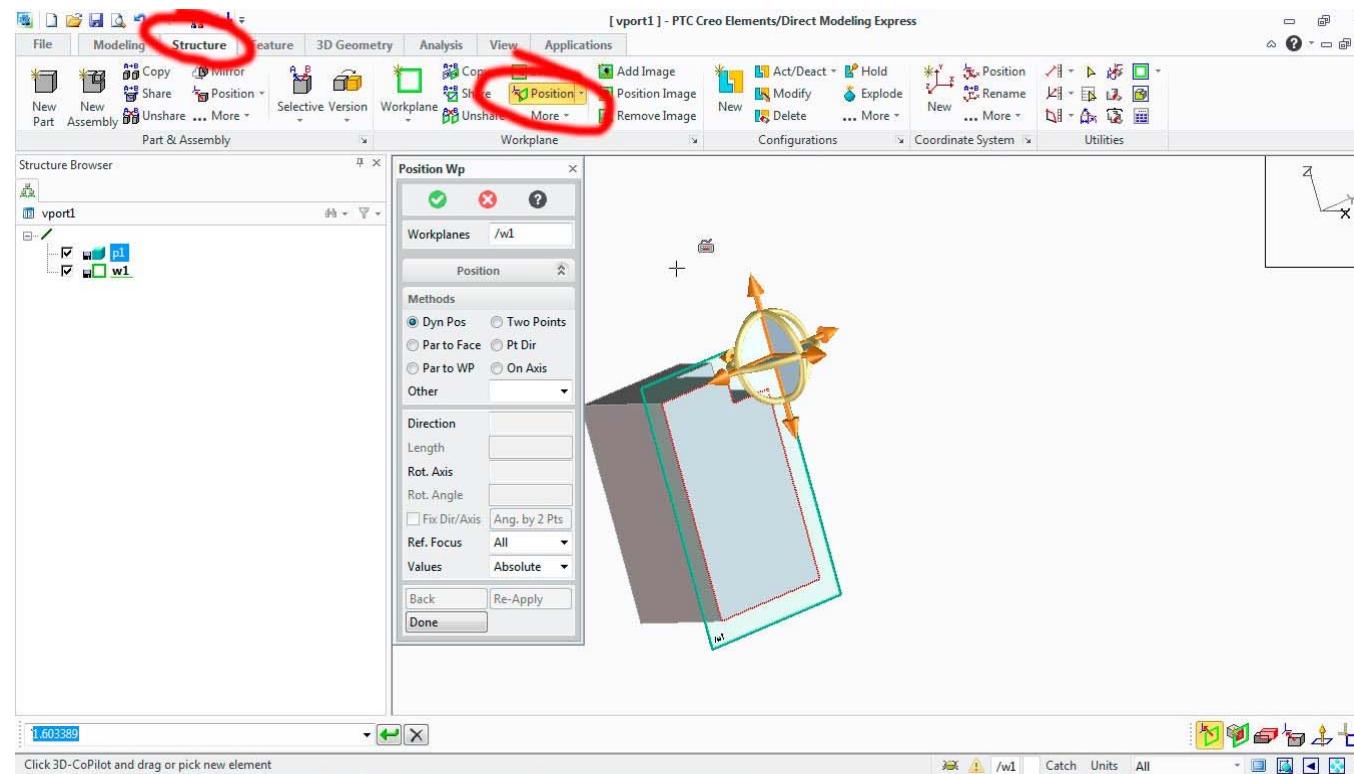
# After Subtraction

- After the subtraction, with ‘keep tool’ unchecked the part should look like this:



# Moving Workplanes

- To move workplanes around, Structure->Position and click on the workplane to move.
- Use the 3D widget to position the workplane.



# Measuring

- It's possible to measure the distance, length, angle and radius/diameter of anything. Use the measuring system to check the dimension you need.

