EN1740 Computer Aided Visualization and Design

Spring 2012

2/28/2012

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Last time:

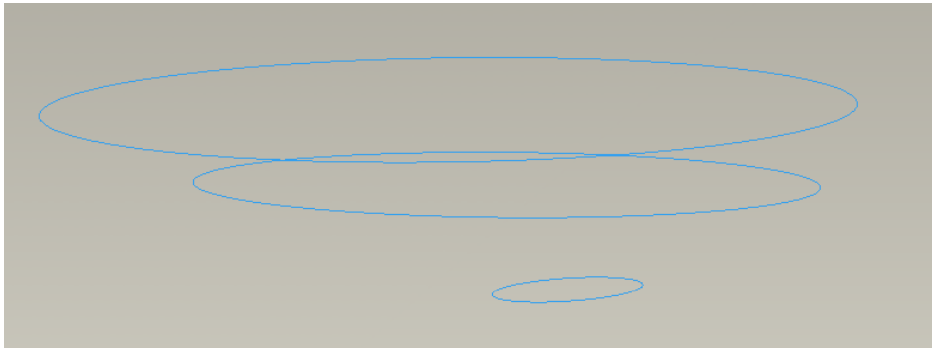
- How to get Pro/Engineer to stick to the standards
  - What can be automated
  - What we must format
- Advanced geometry creation
  - Sweeps
  - Helical sweeps
    - Threads
    - Springs

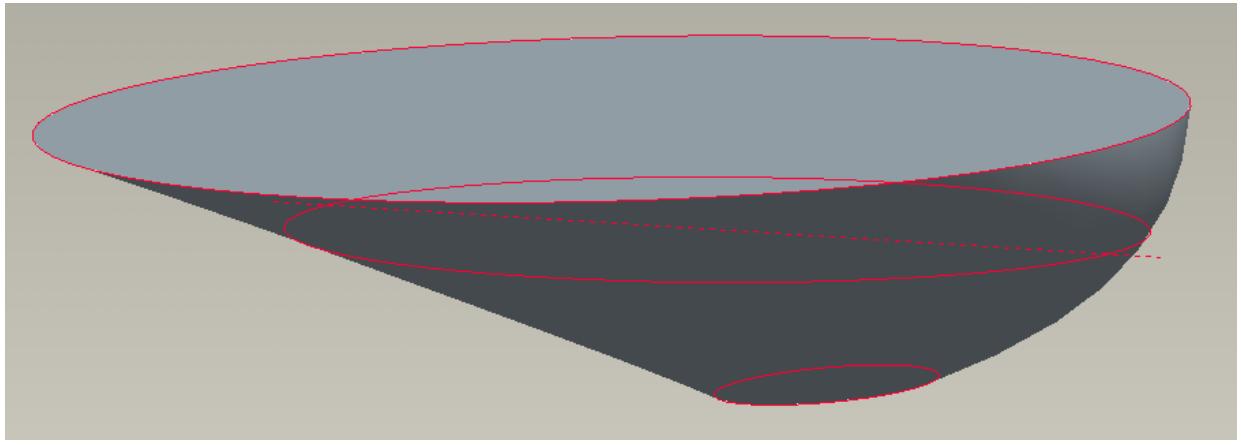
Tonight:

- Blends
- Shell
- Surfaces
  - Best practices/Appropriate Uses
  - Parametric
    - From standard features

Blends

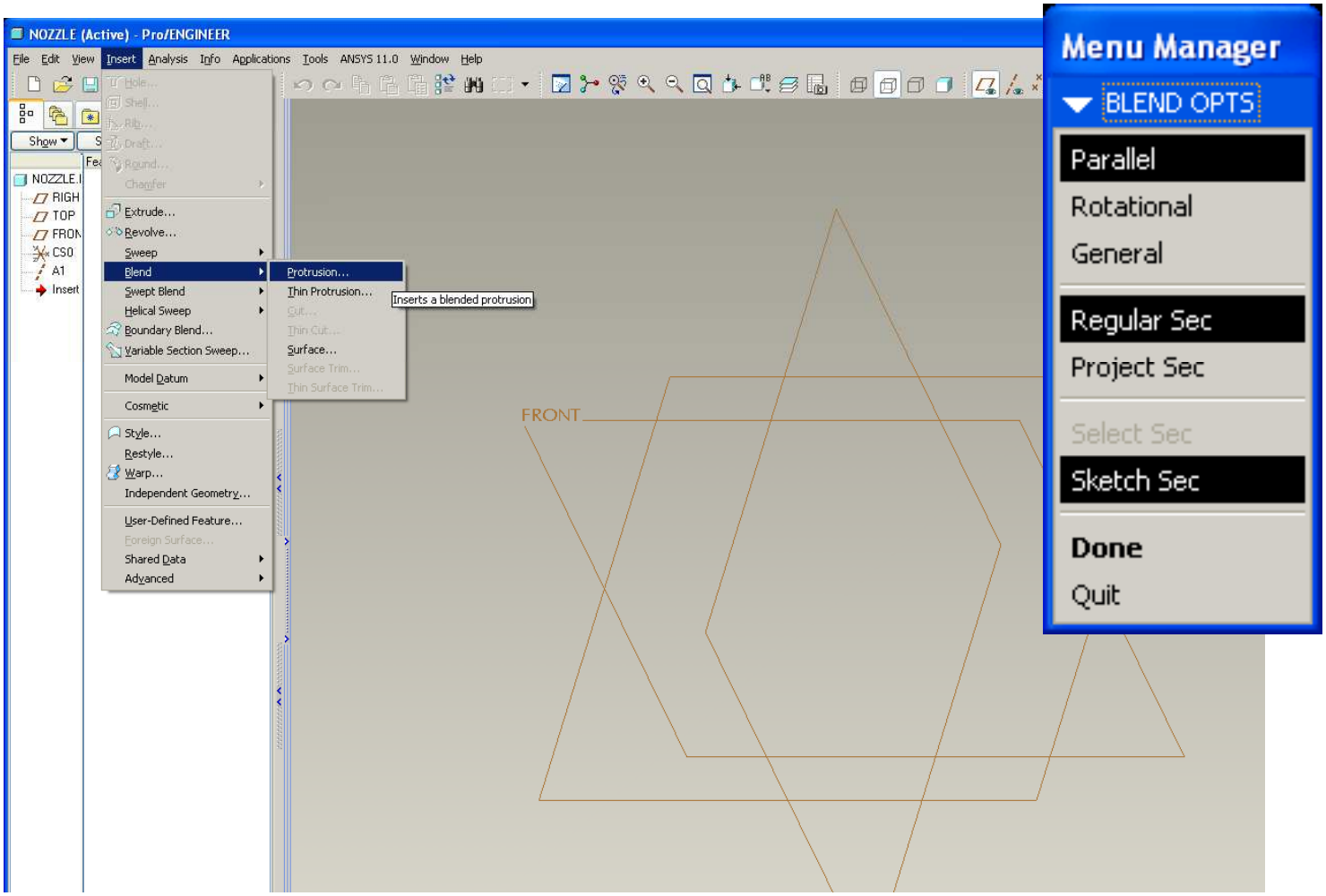
Connect various cross sections into one shape.



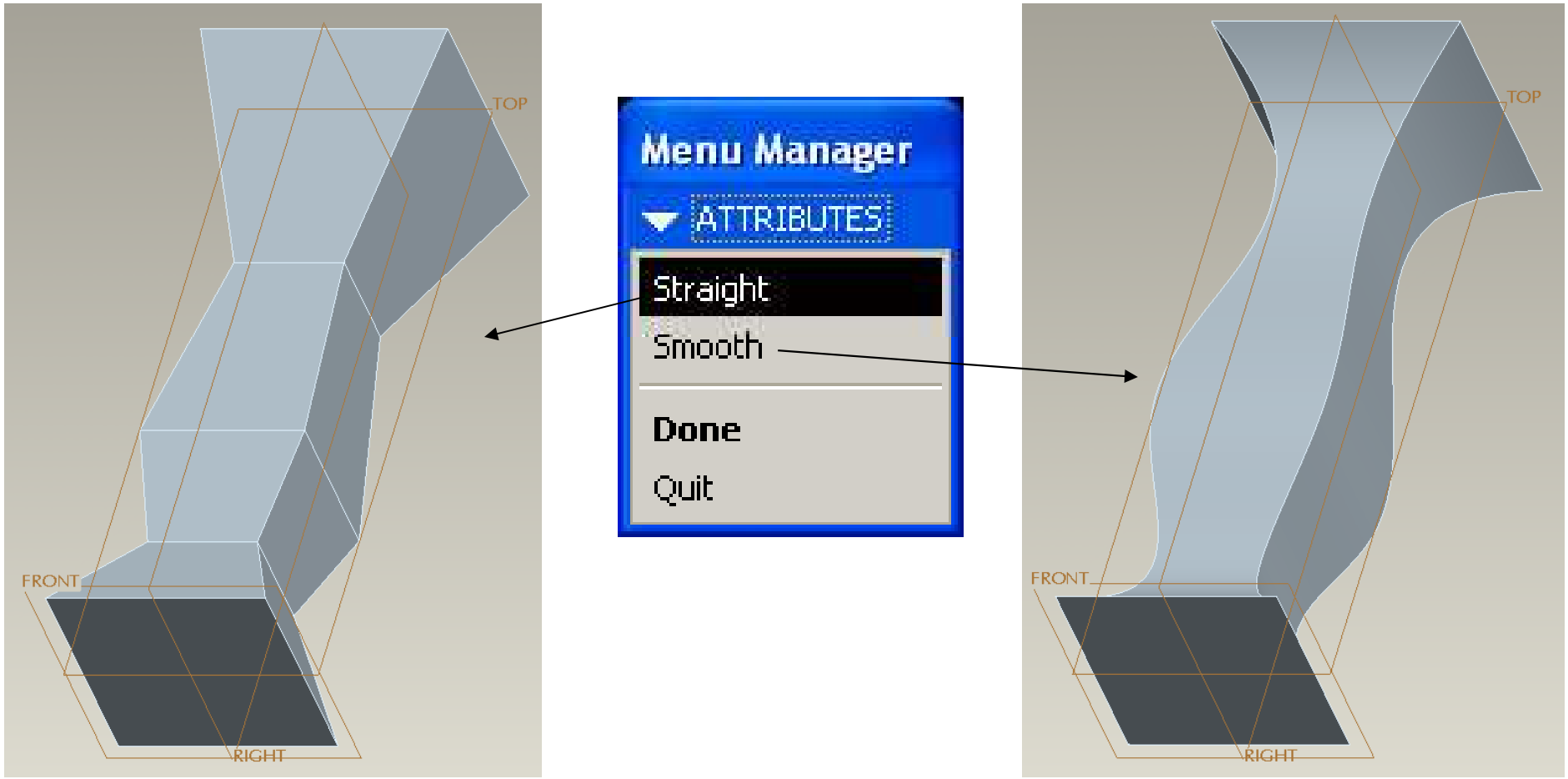


Blends

There's lots of options here too, but we only need to focus in a few key ones.

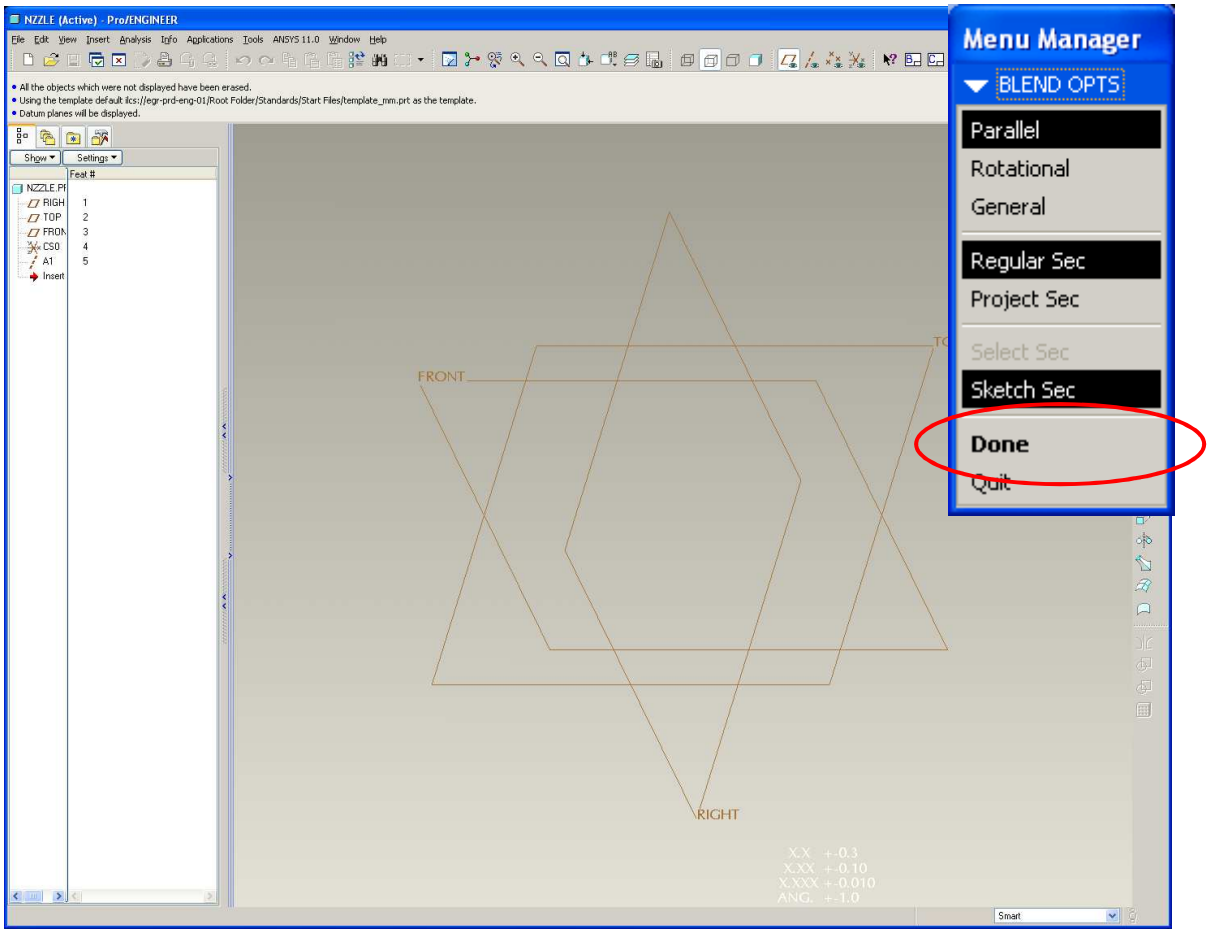


Blends


TOP
FRONT
RIGHT
Menu Manager
ATTRIBUTES
Straight
Smooth
Done
Quit
TOP
FRONT
RIGHT

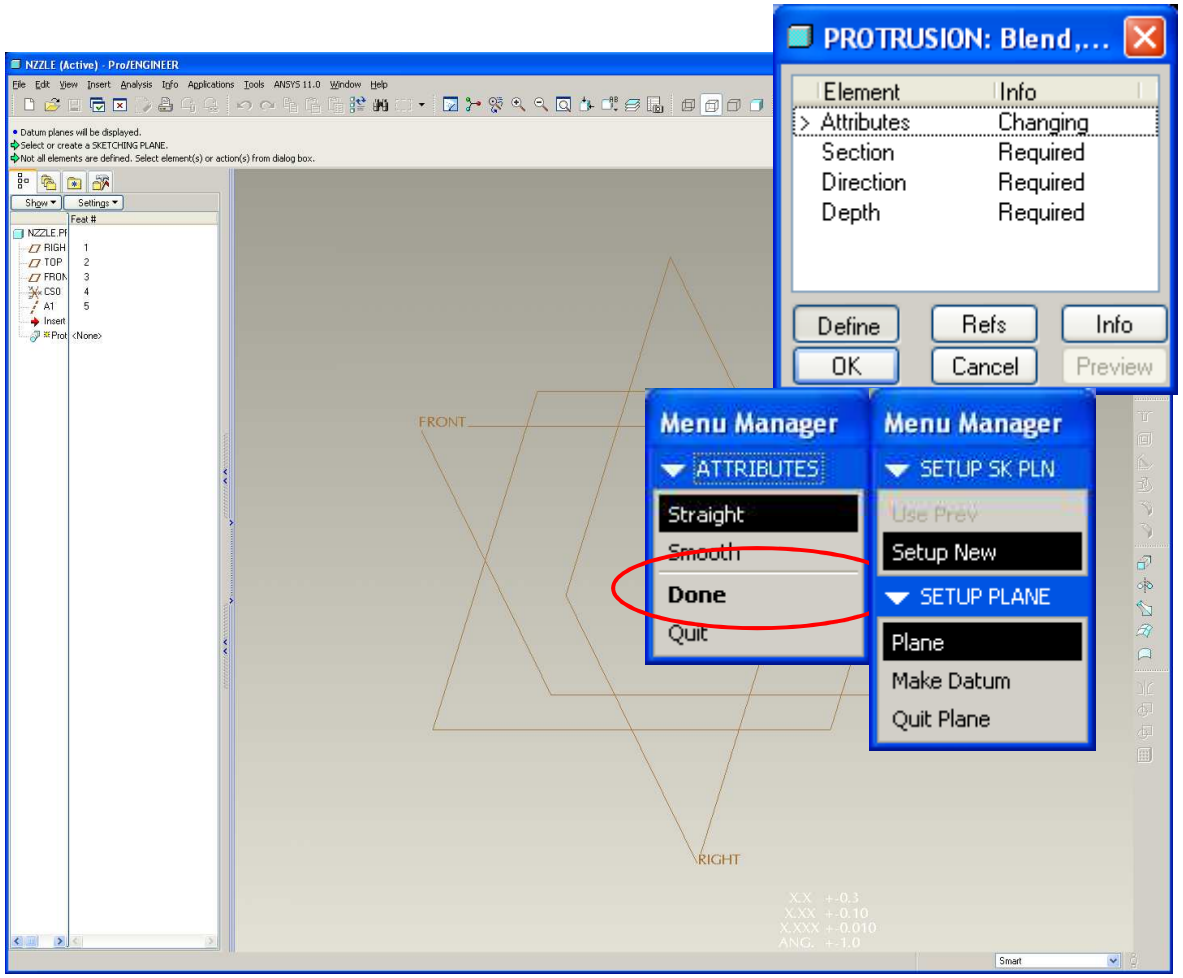
EXERCISE - Blends

- File > New > Part
- Name nozzle.prt
- Insert > Blend > Protrusion
- Click Done for Parallel, Regular Sec, Sketch Sec



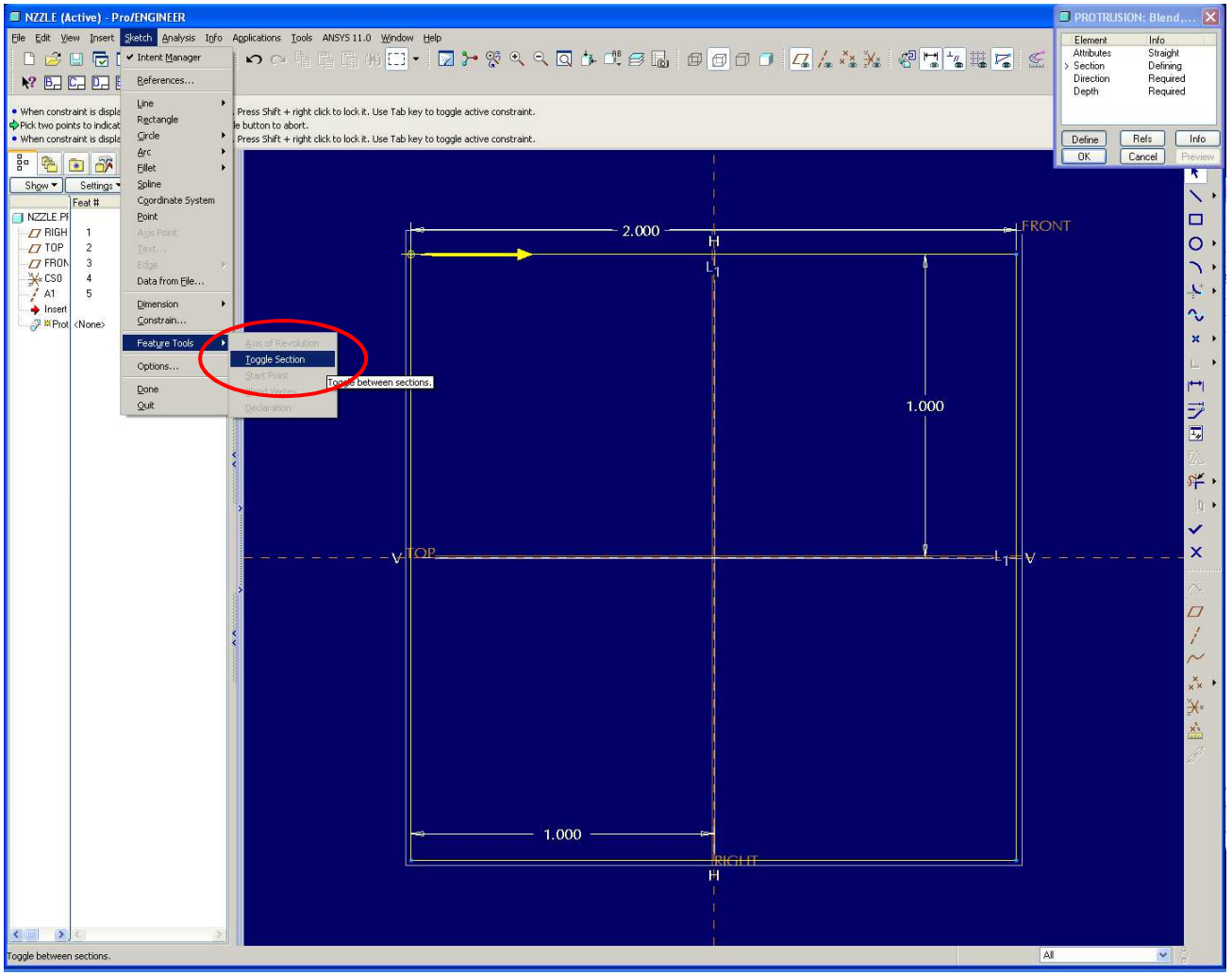
EXERCISE - Blends

- Click Done for Straight
- Setup to Sketch on the FRONT datum with TOP as the Top reference as we did for the Sweep and Helical Sweep



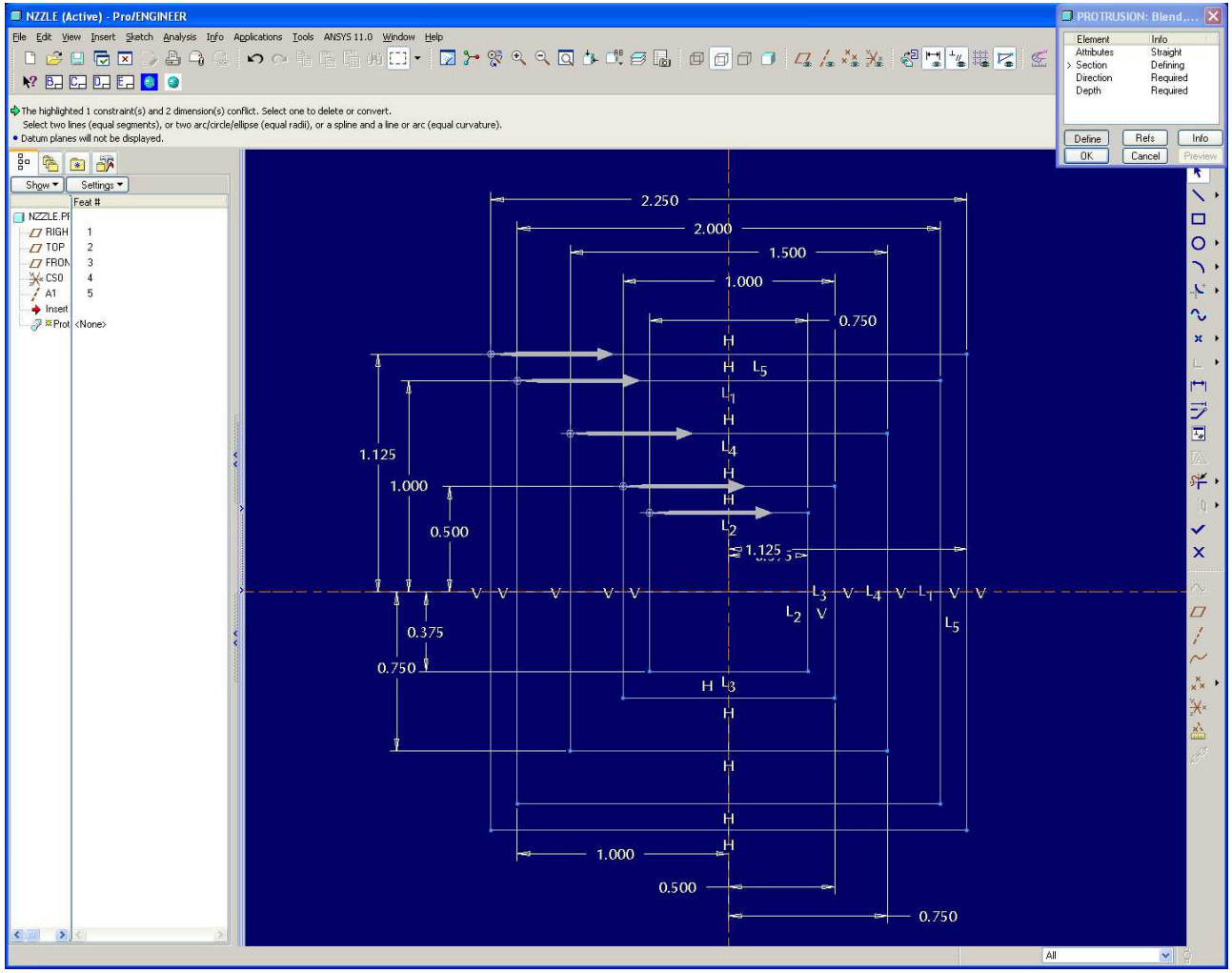
EXERCISE - Blends

- Sketch a 2 X 2 square centered on the sketch references
- Once the first section is complete toggle to the next section; Sketch > Feature Tools > Toggle Section



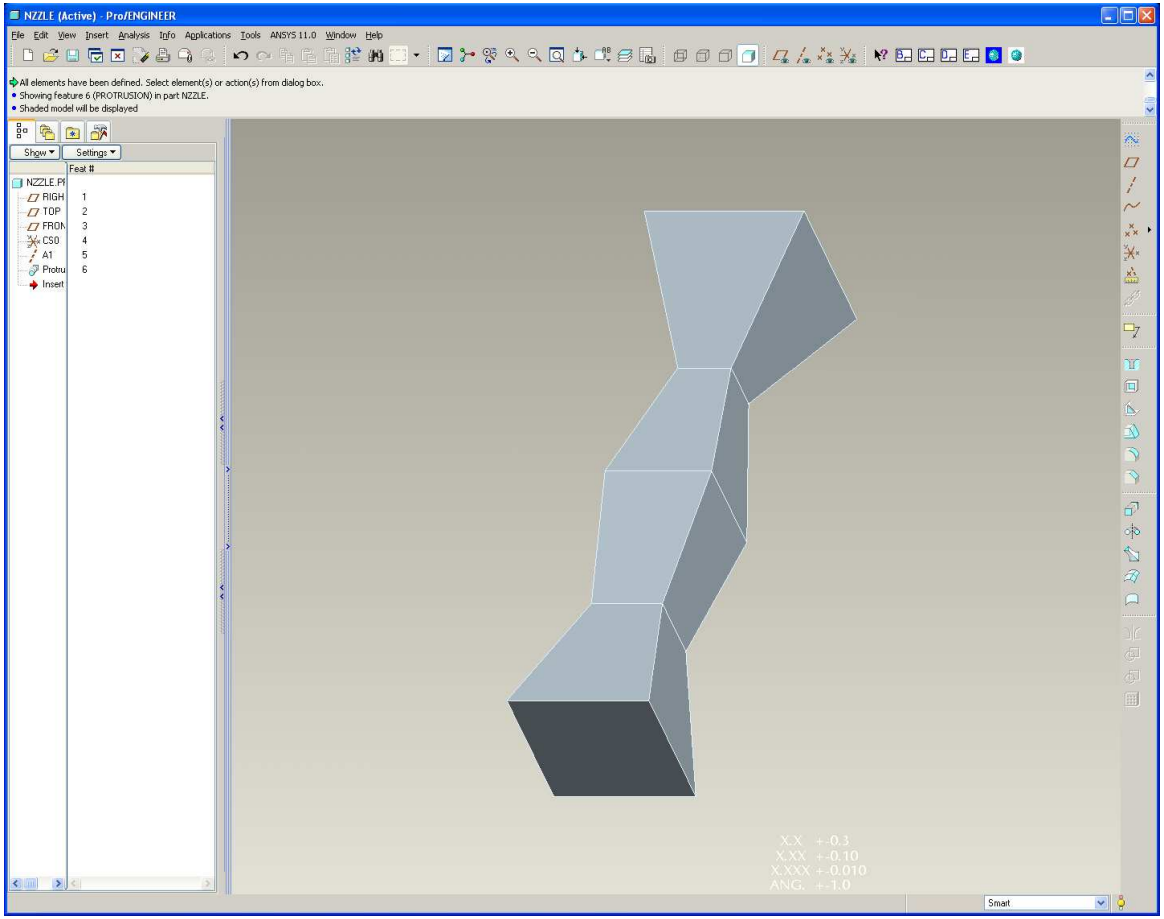
EXERCISE - Blends

- Continue sketching creating a section for a square, centered similarly of dimensions:
  - 1.00 X 1.00
  - 1.50 X 1.50
  - .75 X .75
  - 2.25 X 2.25
- Create them in that order
- Don't forget to Toggle section in between
- Click Done



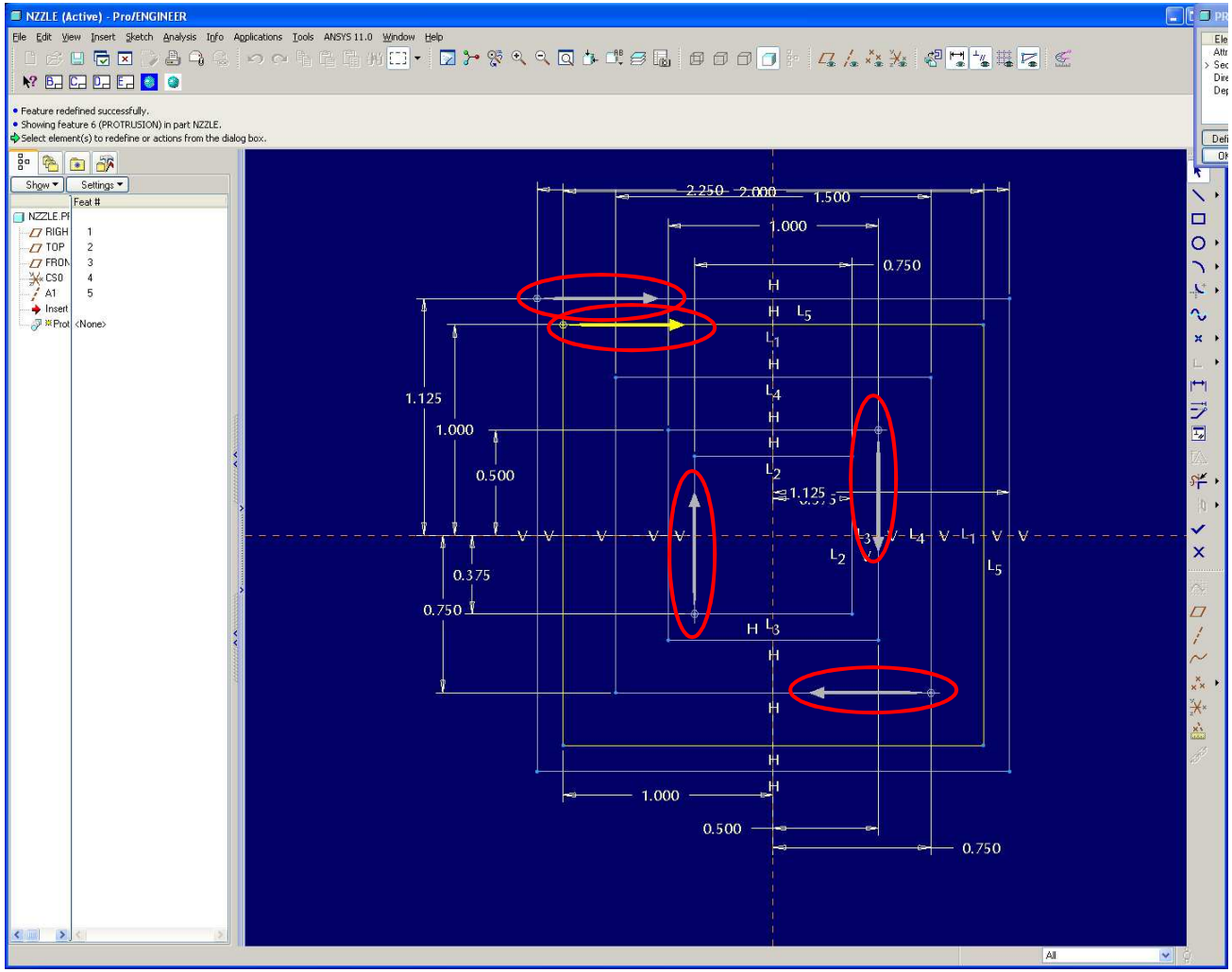
EXERCISE - Blends

- Separate each section by 2
- Click OK on the Protrusion dialog



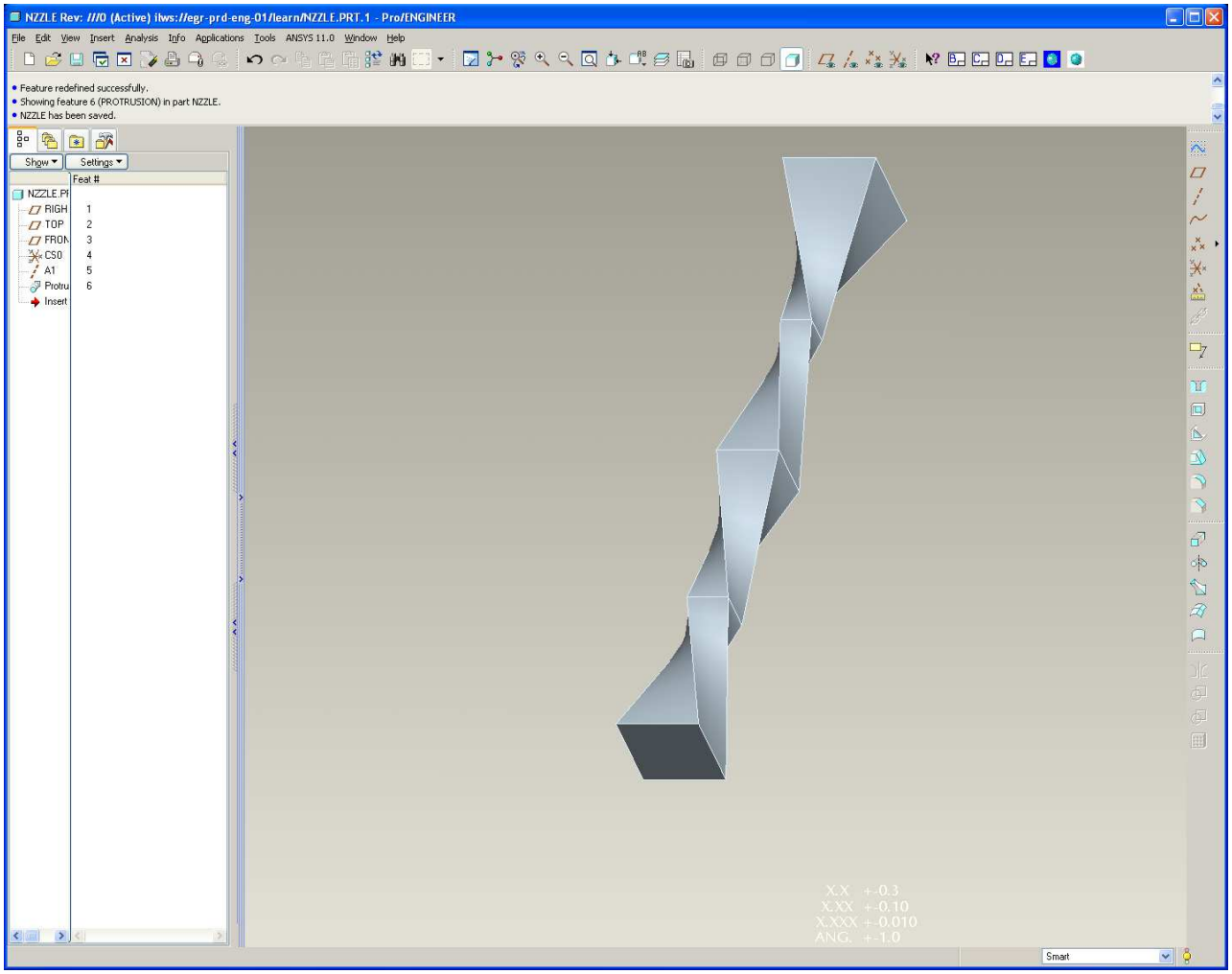
EXERCISE - Blends

- Edit Definition for the Blend feature and change the separation between sections to 4
- Re-arrange the Start Points on each section so that the Blend "cork-screws"
  - Select new vertex
  - RMB > Start Point
- Click Done



EXERCISE - Blends

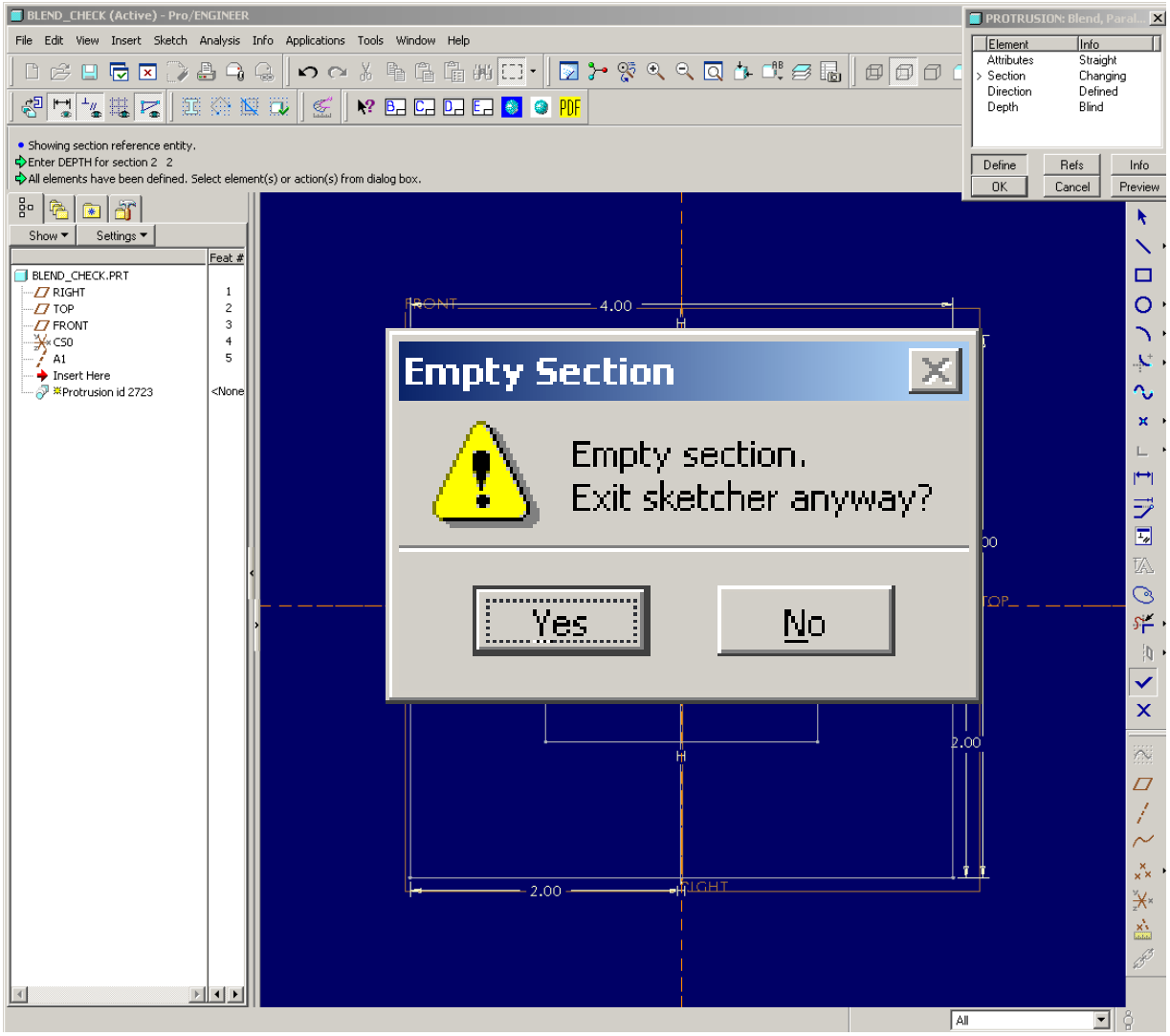
- View Result



Blend Troubleshooting

Some of you got this error message when trying to complete blend:

- Problem – Last section is empty
- Solution – Toggle back to last good section – green checkmark, done

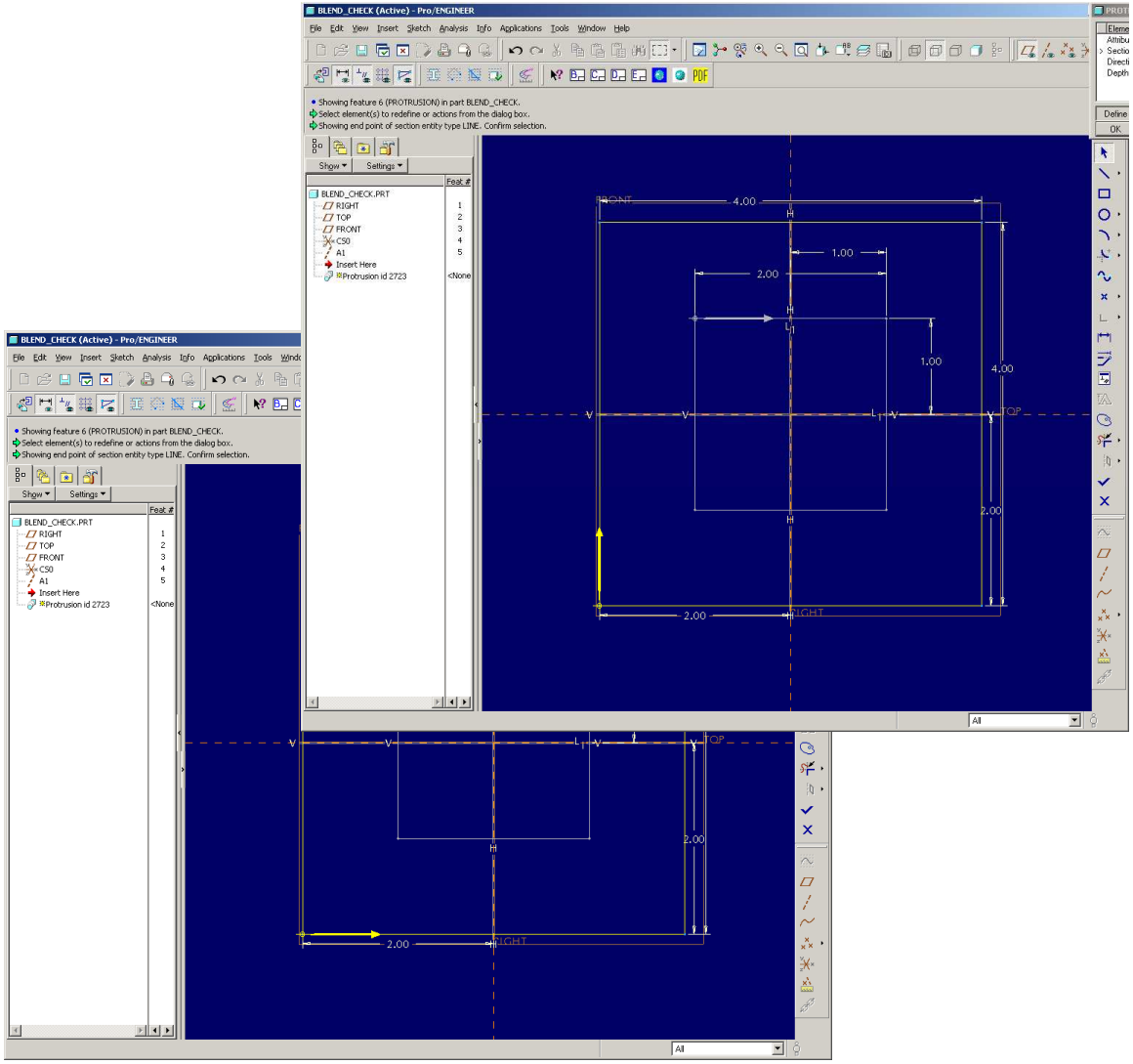


Blend Troubleshooting

Start Point arrow is going in the wrong direction:

Solution:

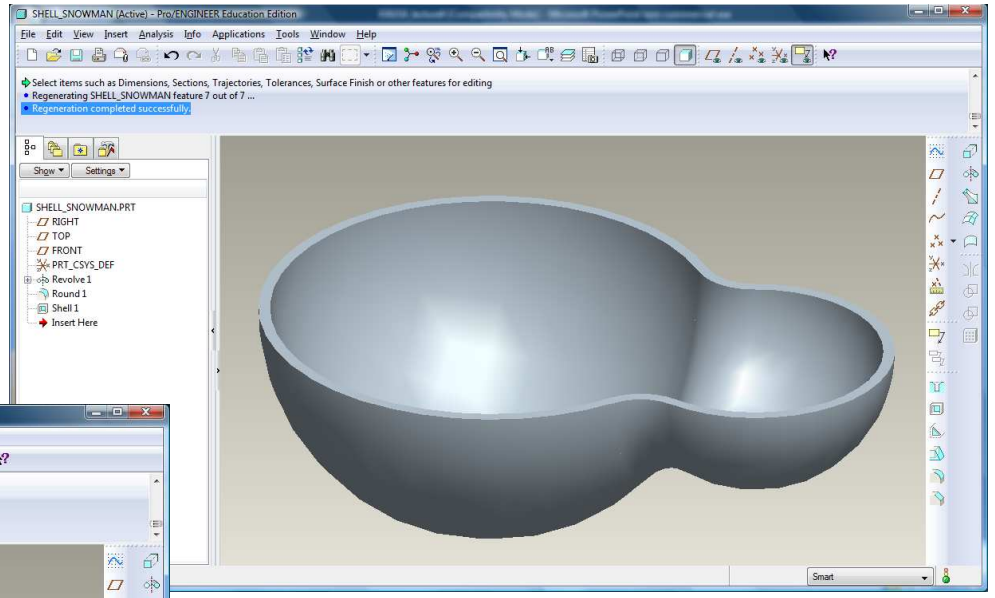
- LMB select same point again
- RMB hold
- Click Start Point

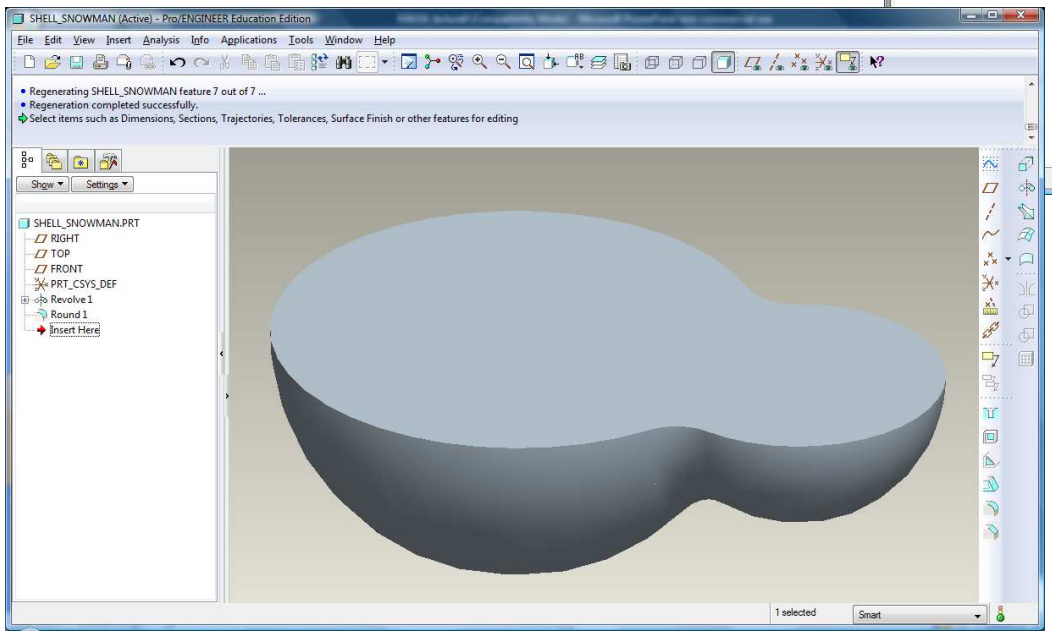


Shell

This is a quick way to create even wall thicknesses

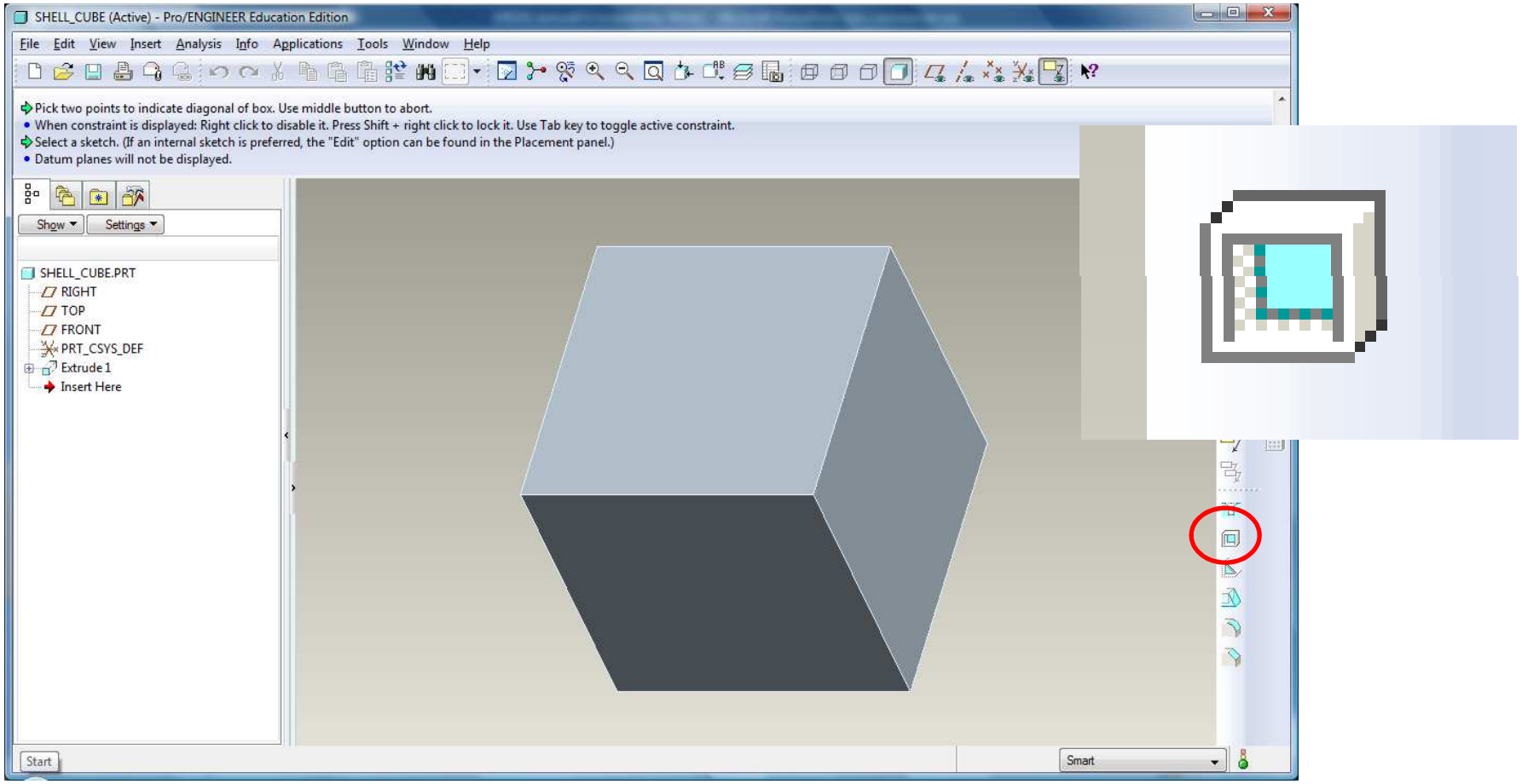
- Shell creates an even wall thickness
  - Eliminates a surface of a solid
  - Offsets the remaining surfaces to specified wall thickness





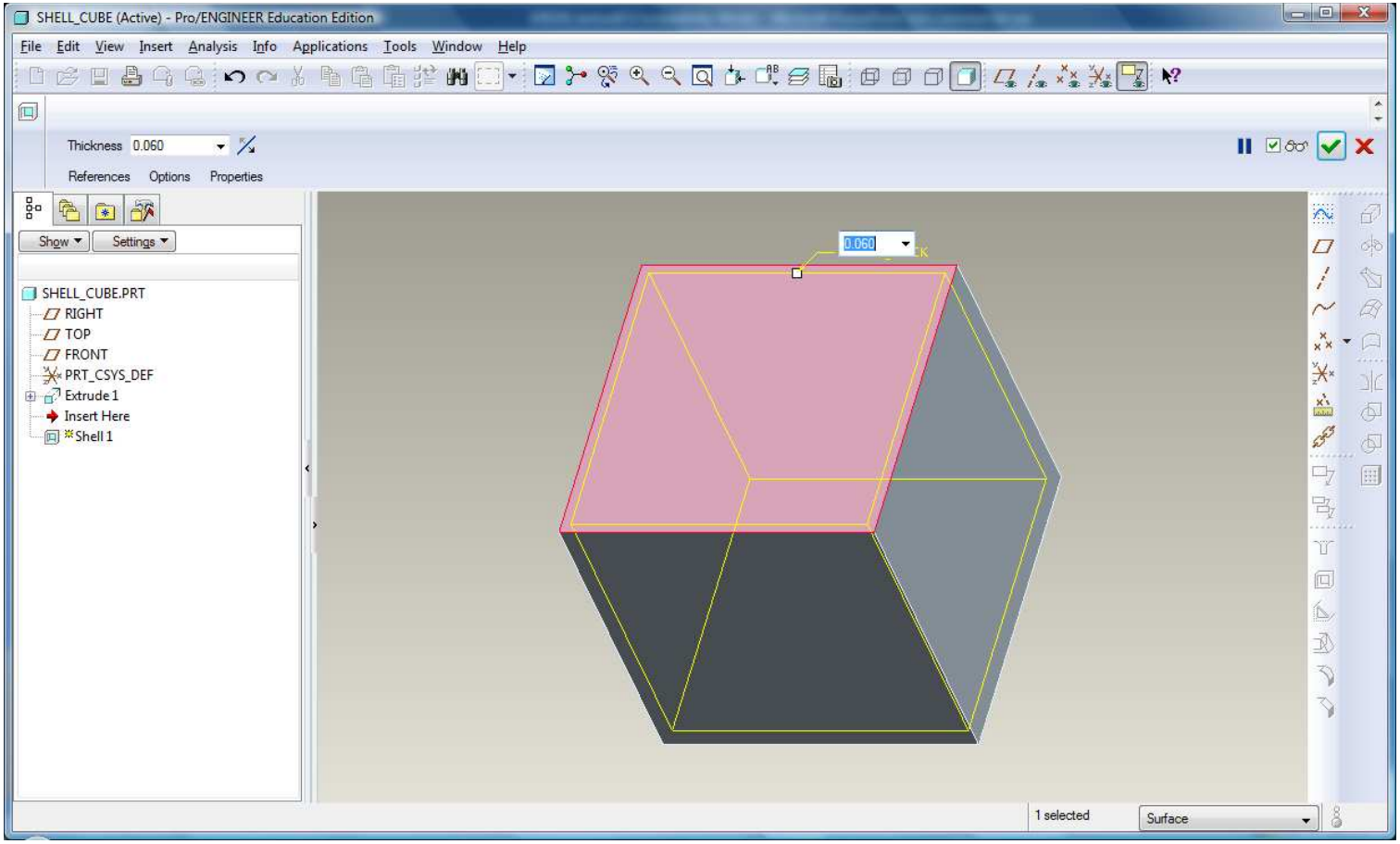
EXERCISE - Shell

- Create a 2 X 2 X 2in cube
- Activate Shell tool



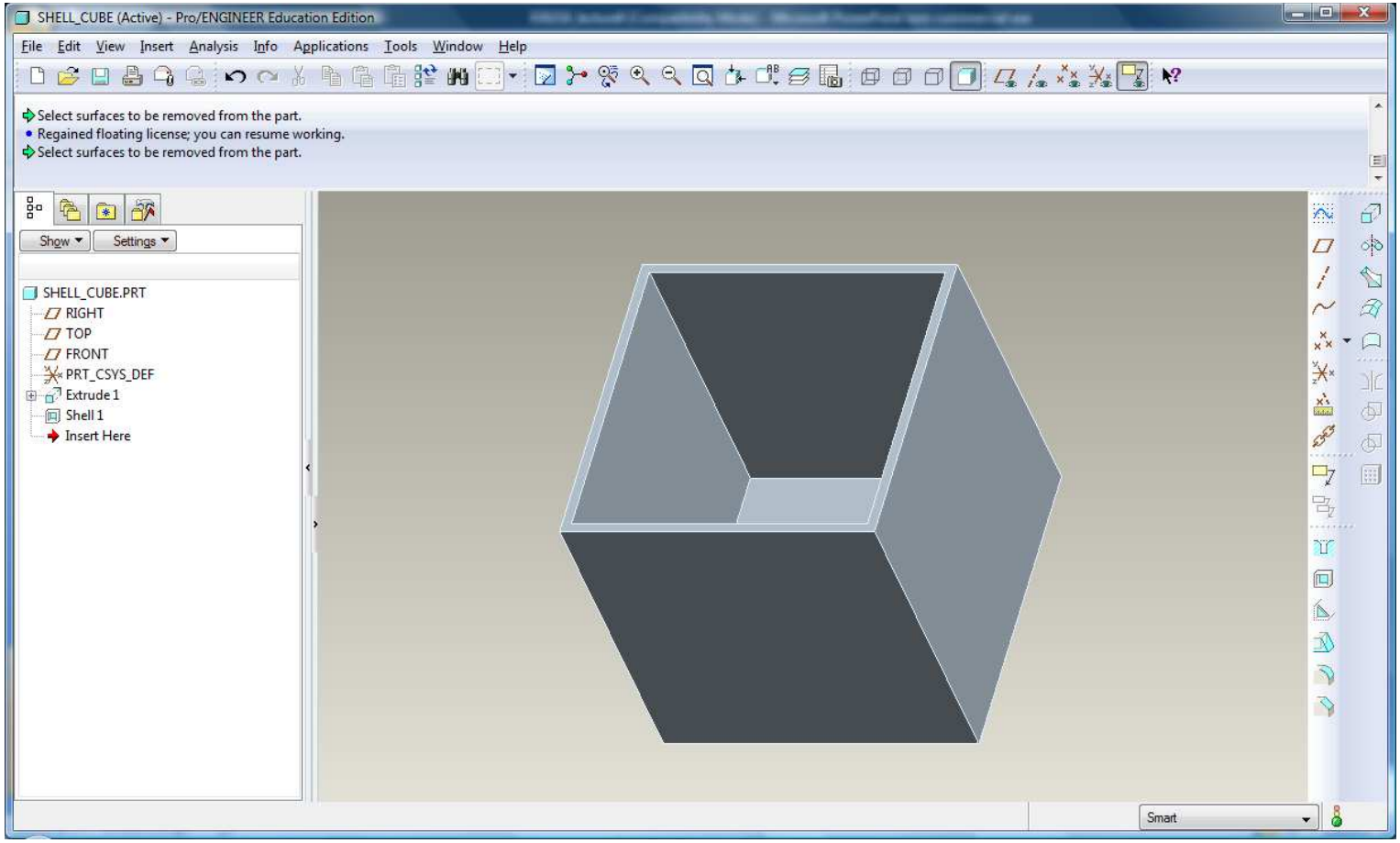
EXERCISE - Shells

- Select the top surface
- Change the wall thickness to .060in.



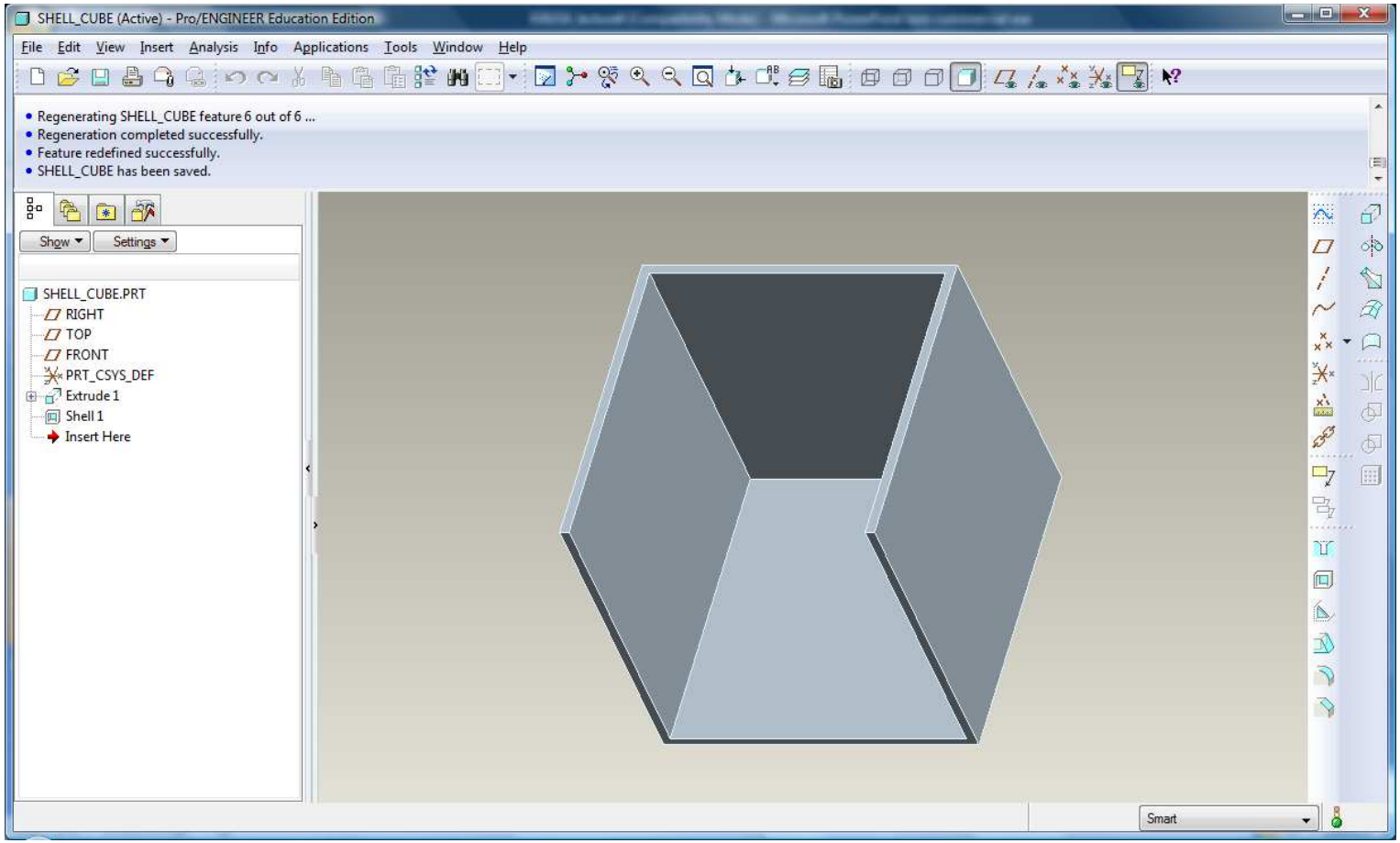
EXERCISE - Shells

- Click Done.



EXERCISE - Shells

- Redefine the feature and select the top and front surfaces to eliminate.



Surfaces

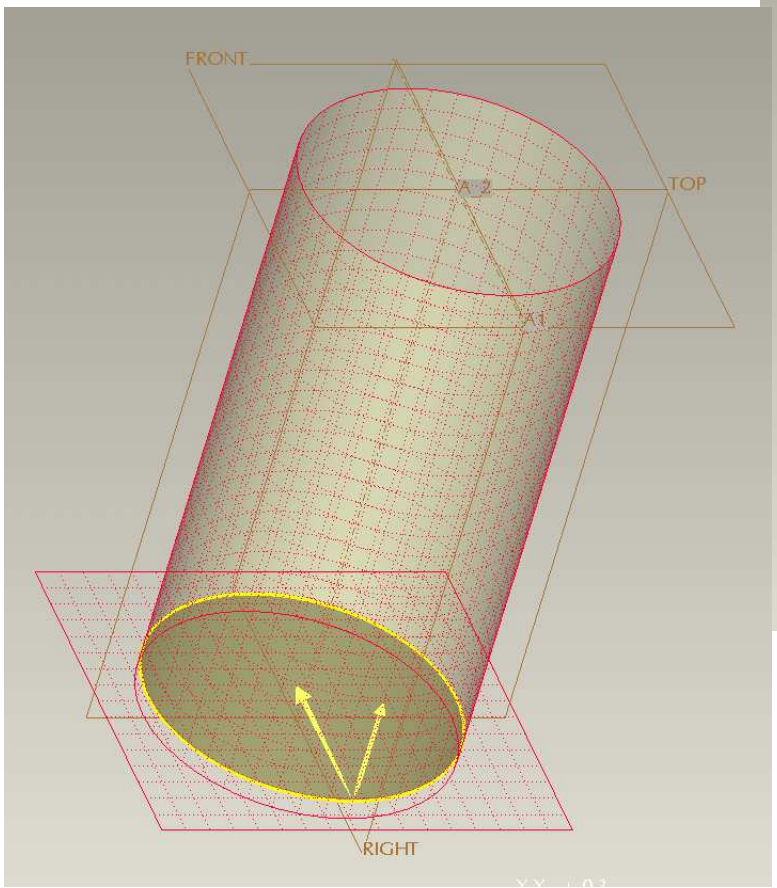
Surface features create geometry describing only an area; they do not define a volume.

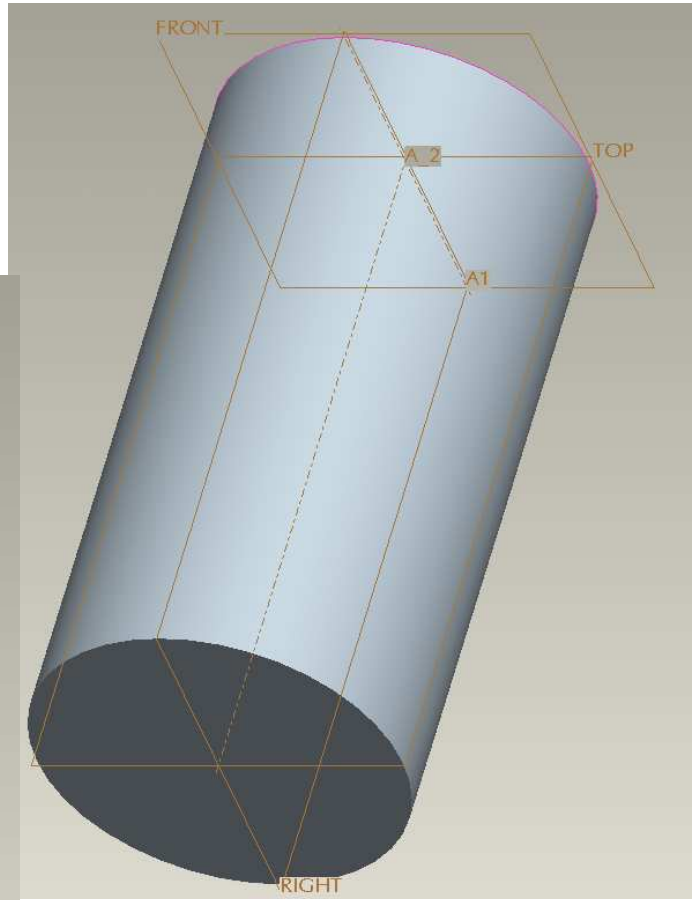
Typical uses for surfaces:

- Components requiring even wall thickness (in the likely event Shell won't work)
- As an Import from Industrial Design
- Repair a CAD geometry imported from another system
- Non-parametric geometry
- Shapes that just can't be done any other way

Surfaces

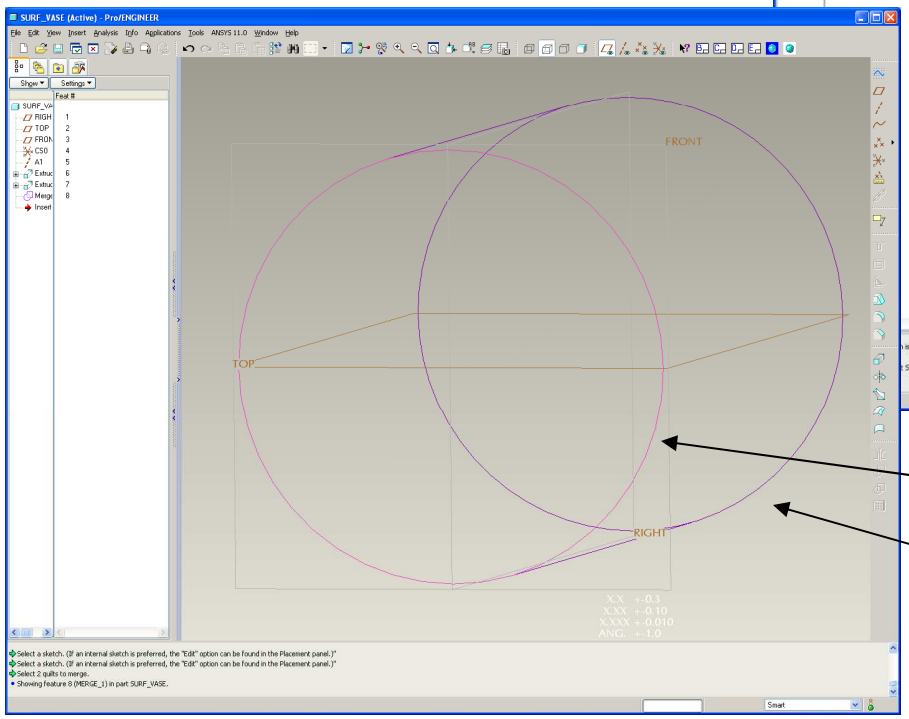
- Individual Surfaces are joined to form “Quilts”
- Quilts are closed and “Solidified” to form 3D geometry

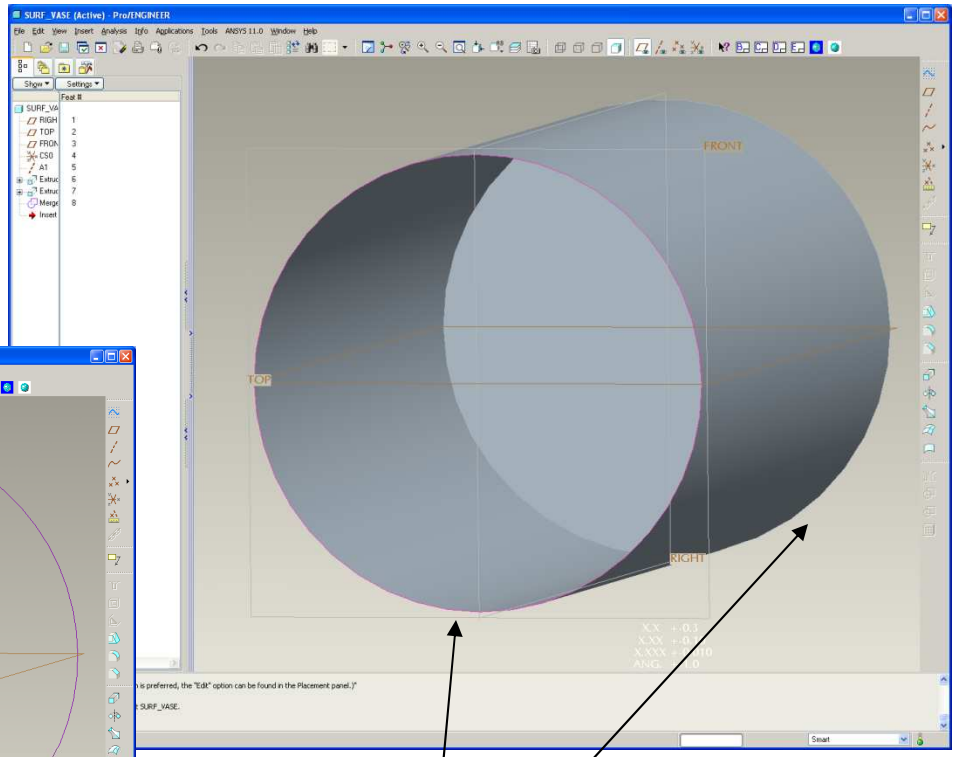




Working with Surfaces

- Edge color specifies a surface:
- Pink edge signifies an open section
- Purple edge signifies a closed section



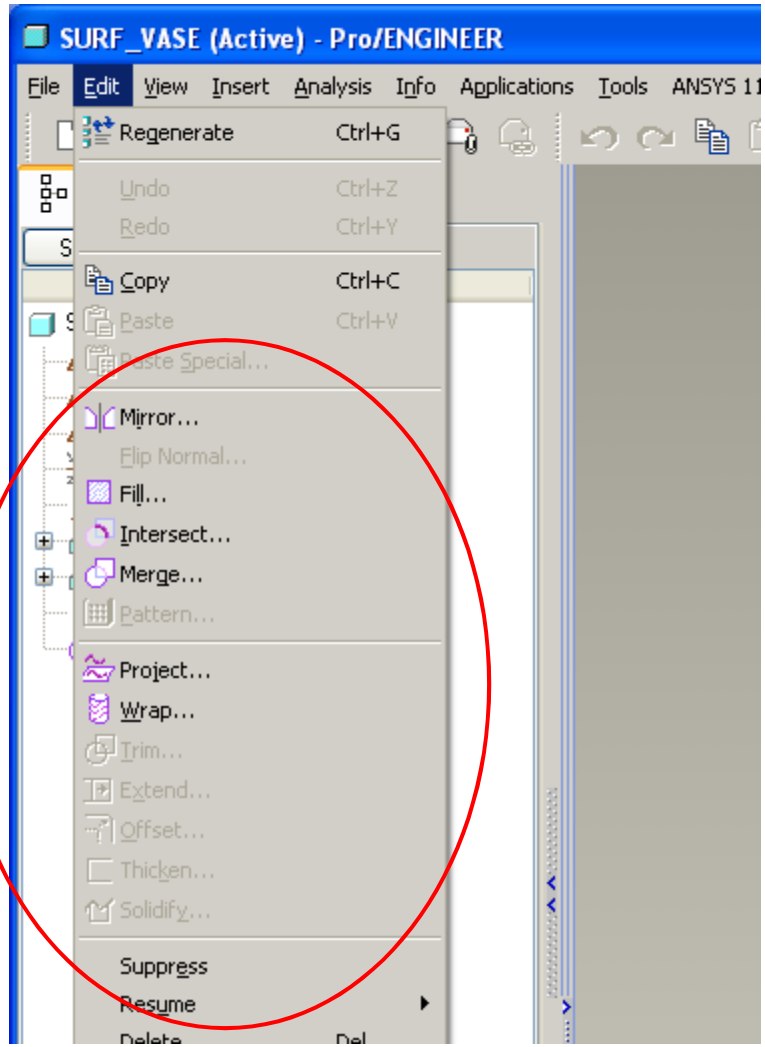


Open Edge

Close Edge

Working with Surfaces

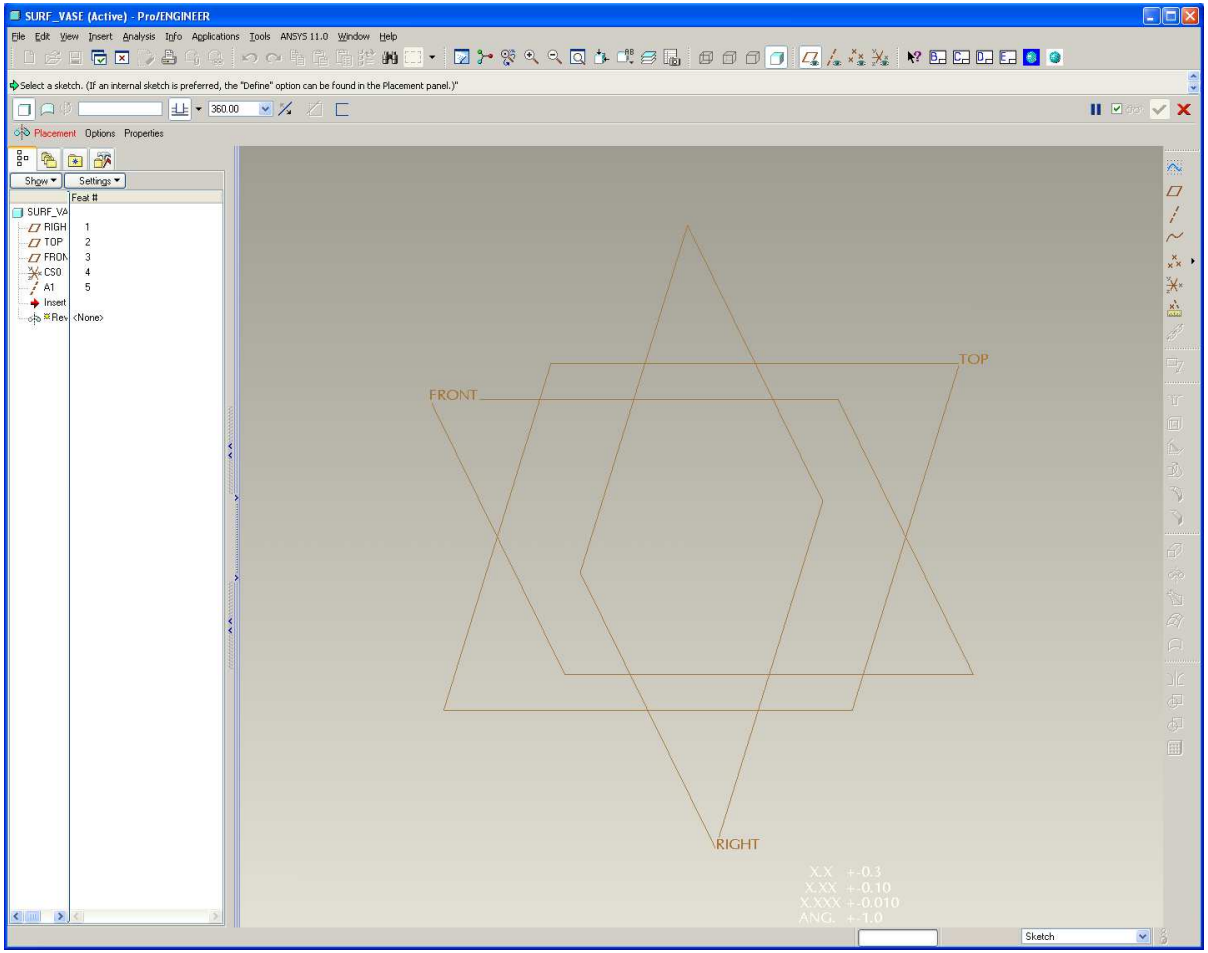
- There are a number of tools for working with Surfaces and Quilts
- These are only available if the necessary Surfaces references have been selected in the Model Tree or Graphics Window



EXERCISE – Vase from Surfaces

To highlight difference between Solid and Surface features, we'll re-create the vase from Assignment 2.

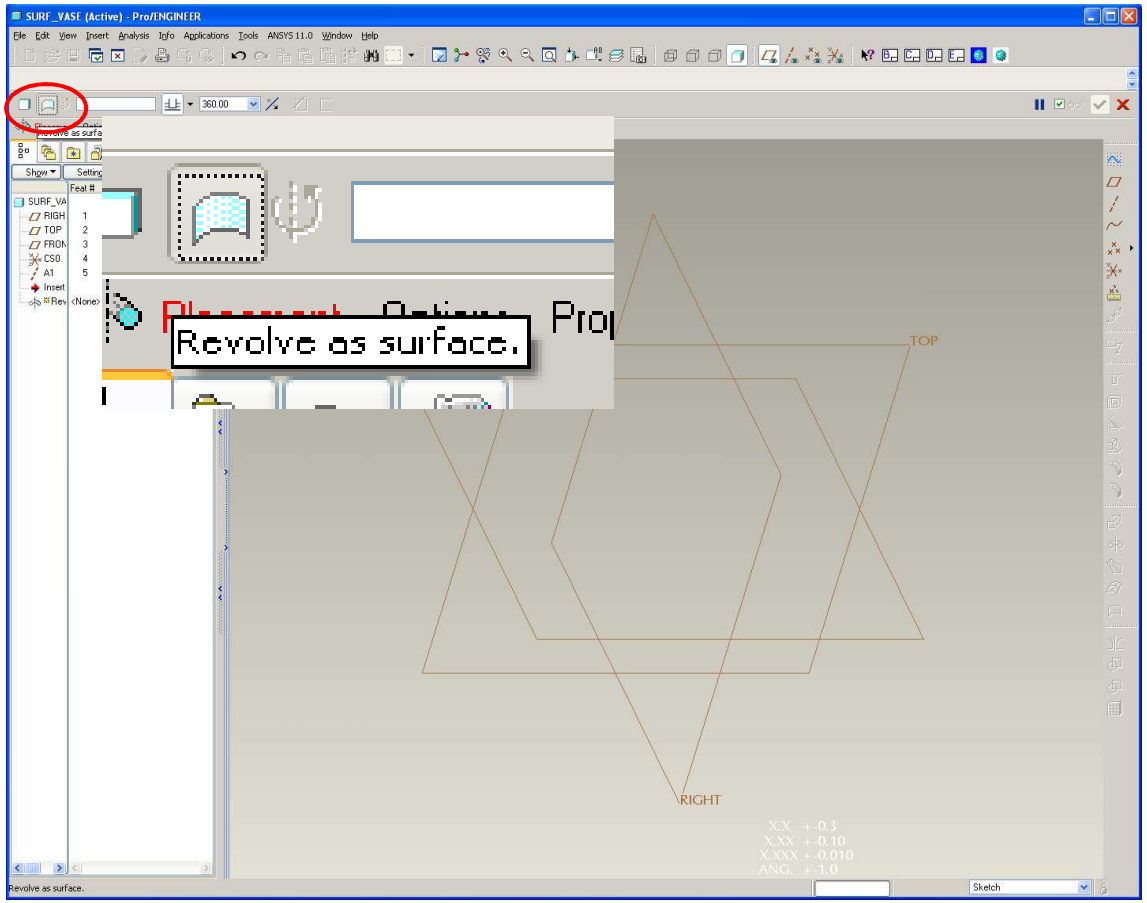
- File > New > Part
- Filename 'surf_vase.prt'
- Begin a Revolve feature



EXERCISE – Vase from Surfaces

- Before defining a sketch, toggle the Revolve as a Surface button

- Define a sketch using FRONT datum as a sketch plane and TOP datum as Top reference



EXERCISE – Vase from Surfaces

- Sketch the profile of the vase without a top or bottom