



EN1740 Computer Aided Visualization and Design

Spring 2012

3/8/2012

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Last Time:

- Finish Surface from Boundary Curve
- Free-form (Style features)

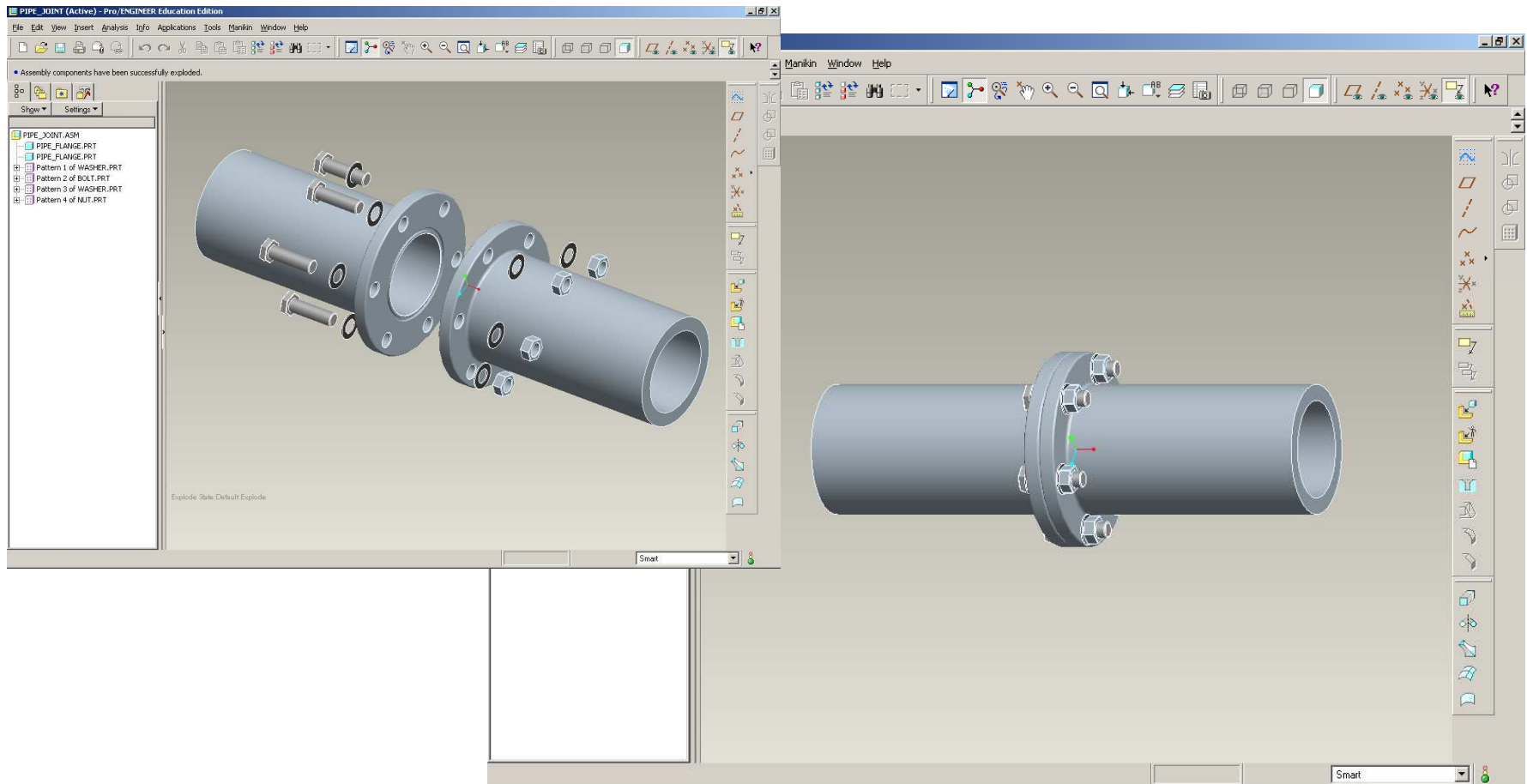
Tonight:

- Introduction to Assemblies
- Exploded Views
- Assembly drawings
 - X-sec
 - Exploded
 - Tables
 - BOM
 - Inclusions



Assemblies

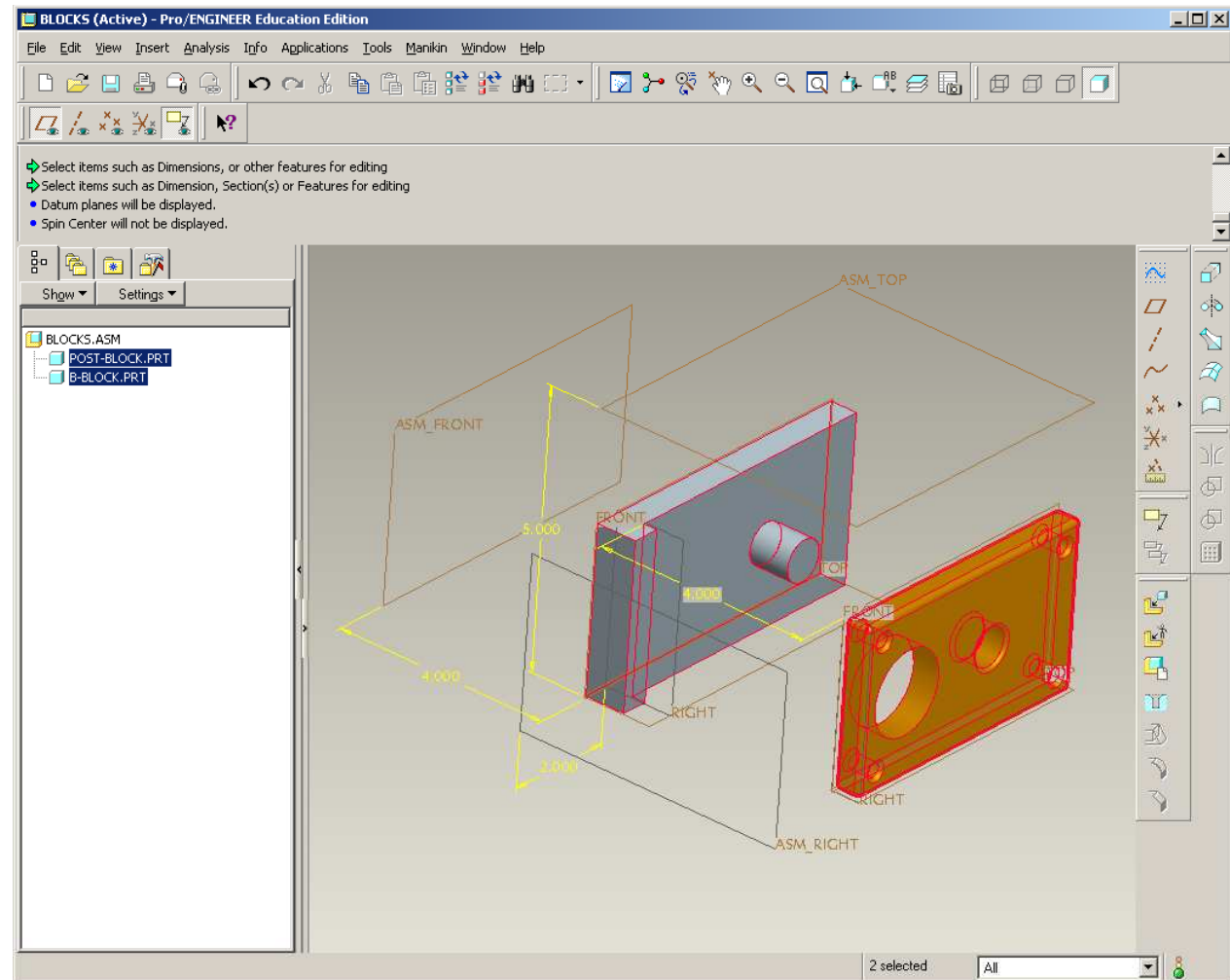
Assembly represent how components interact with each other





Assemblies

In assembly files components are constrained, either to other parts or to datums

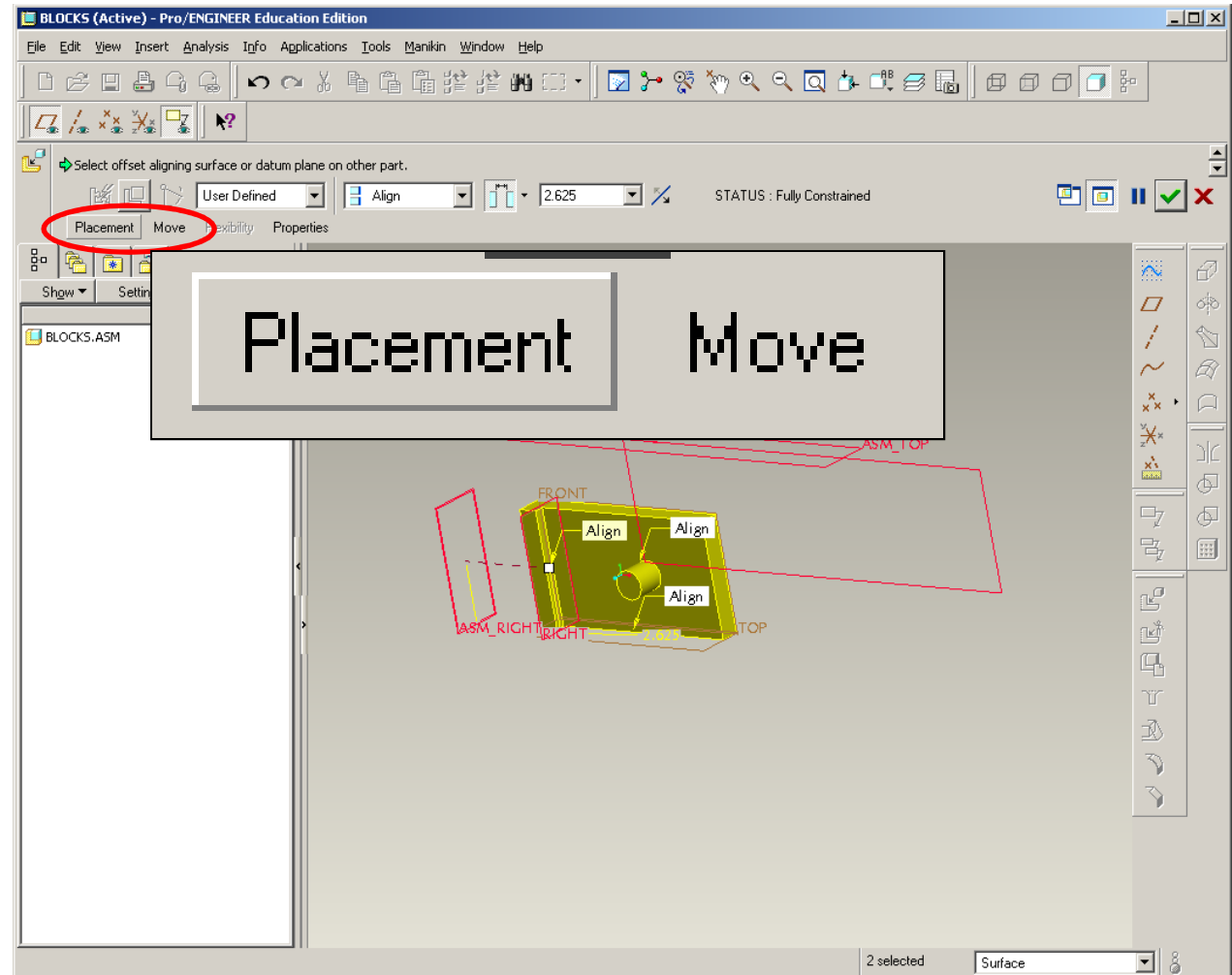




Assemblies

Assembly Dashboard

- There are wide variety of options available
- We really only need the Placement and Move tab for 95% of operations

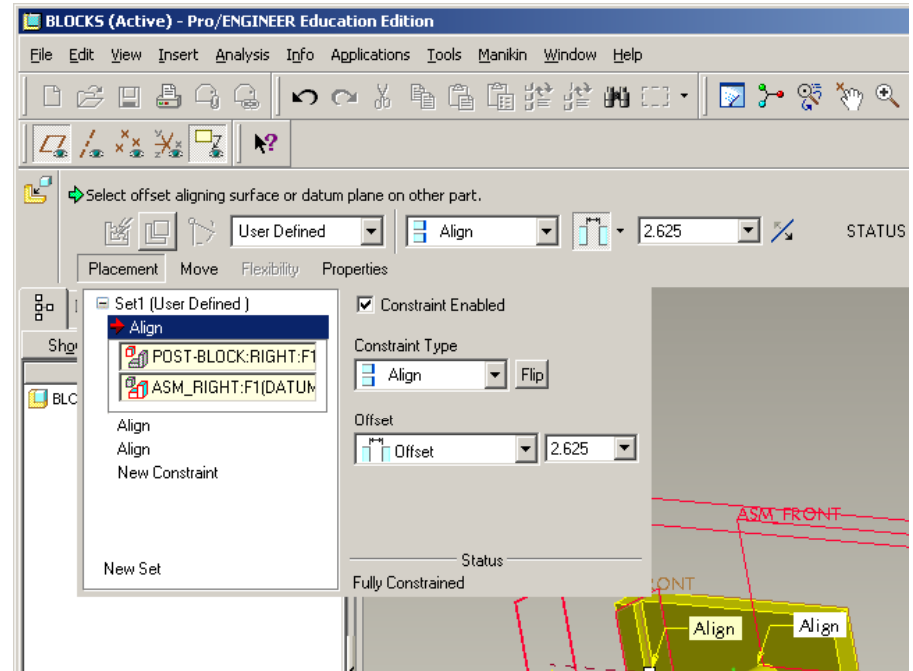




Assemblies

Assembly Dashboard – Placement Tab

- Constraints are applied in Placement
 - References are selected from Assembly and Component being placed
- Variety of Placements:
 - Align – Equal surface normals
 - Mate – Opposite surface normals
 - Insert
 - Tangent
- Constraints can be applied as Coincident, Offset or Oriented

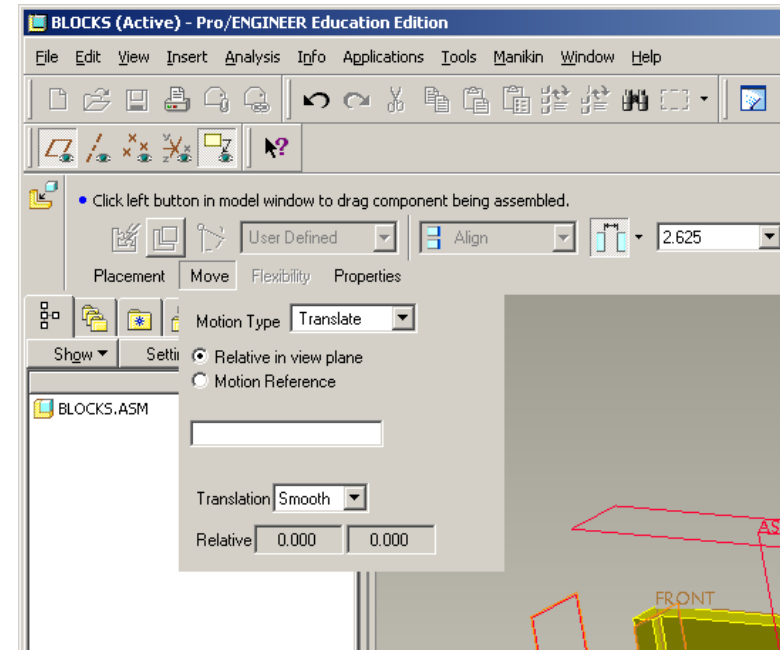




Assemblies

Assembly Dashboard – Move Tab

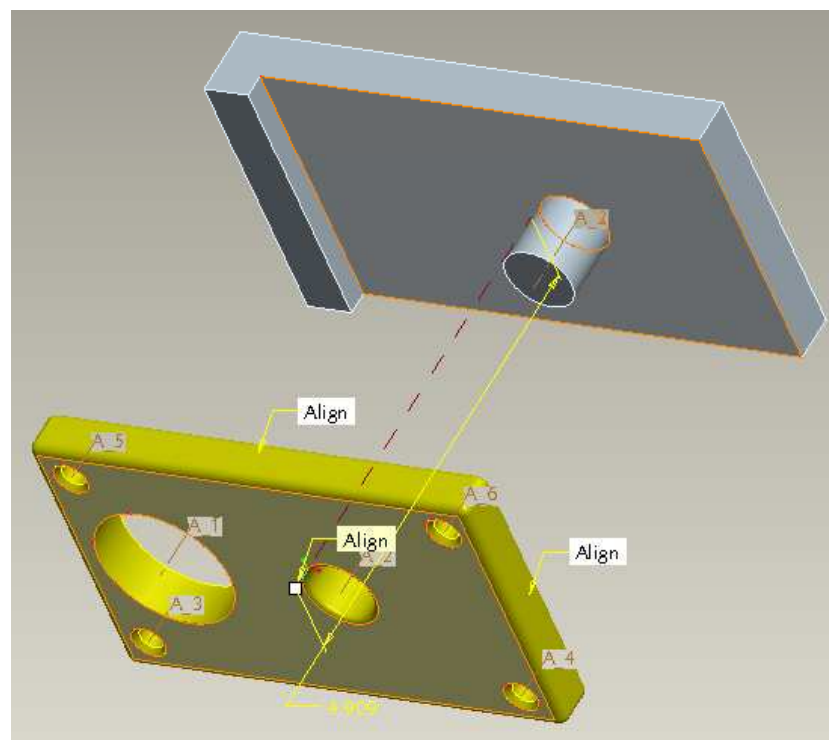
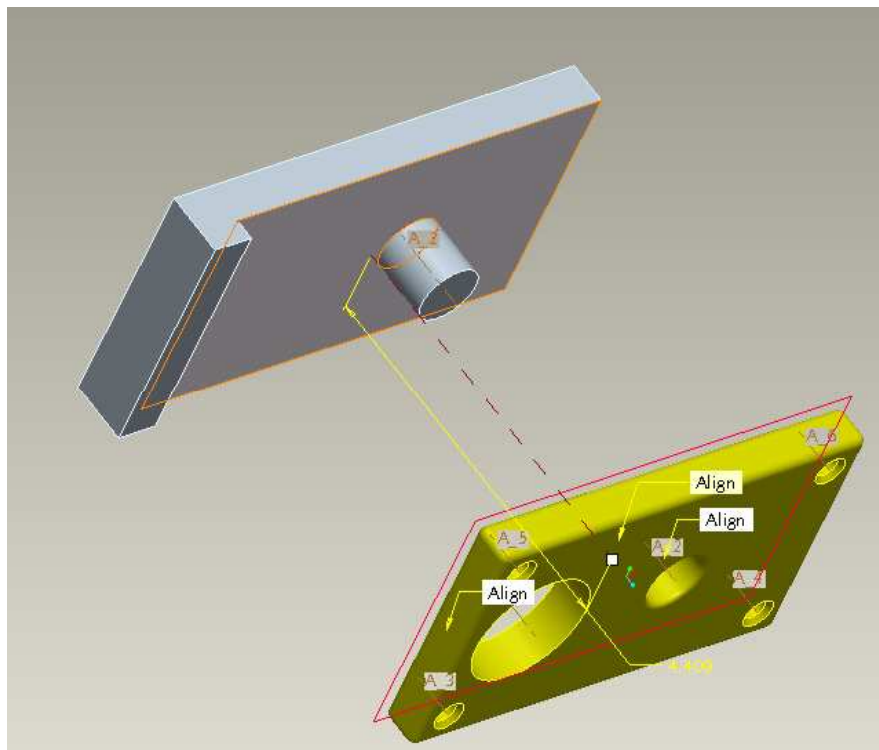
- Allows user to position component in space prior to applying constraints
 - Sometimes necessary when components are dropped in amongst many components
- DOES NOT TAKE THE PLACE OF CONSTRAINTS





Assemblies

DESIGN INTENT is as important in modeling Assemblies as in Components

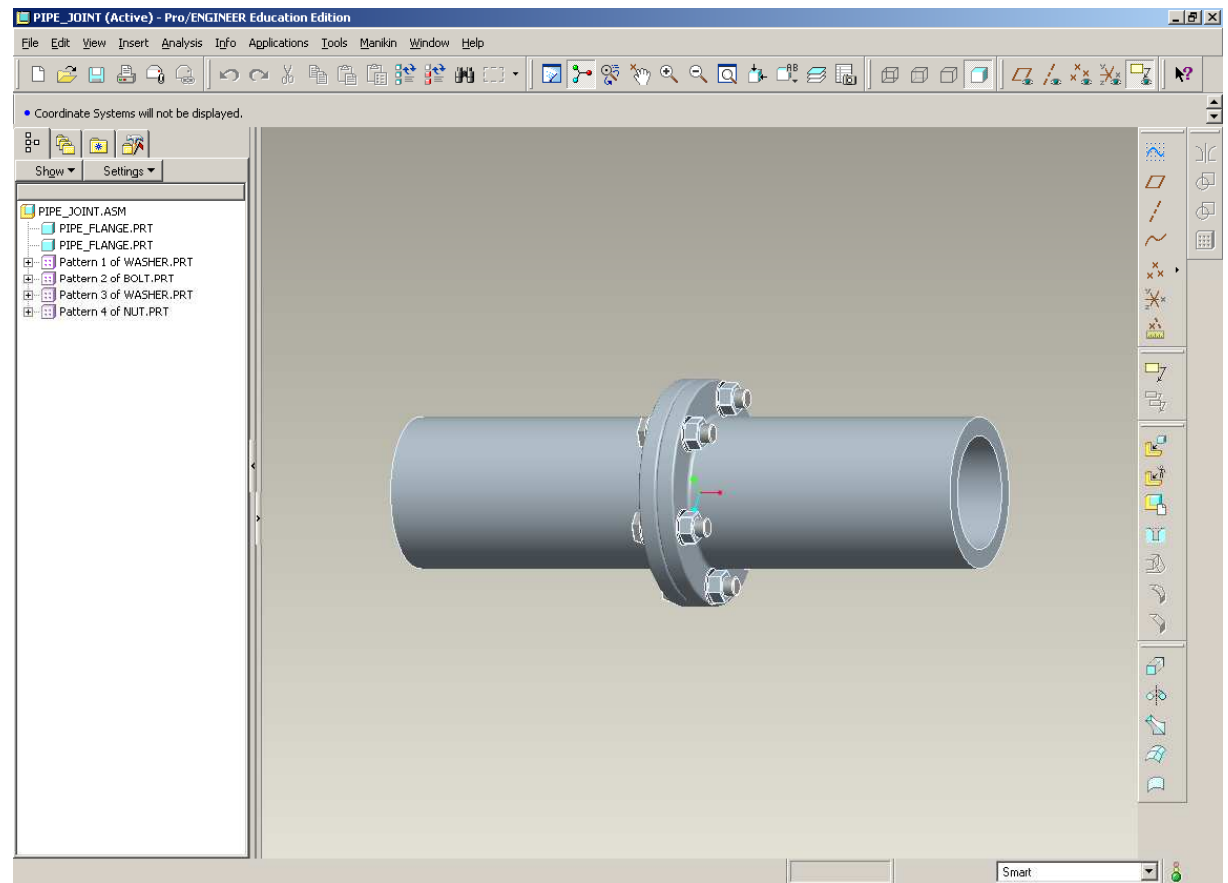




EXERCISE – Assemblies

Assemble the flanged pipe joint as shown below

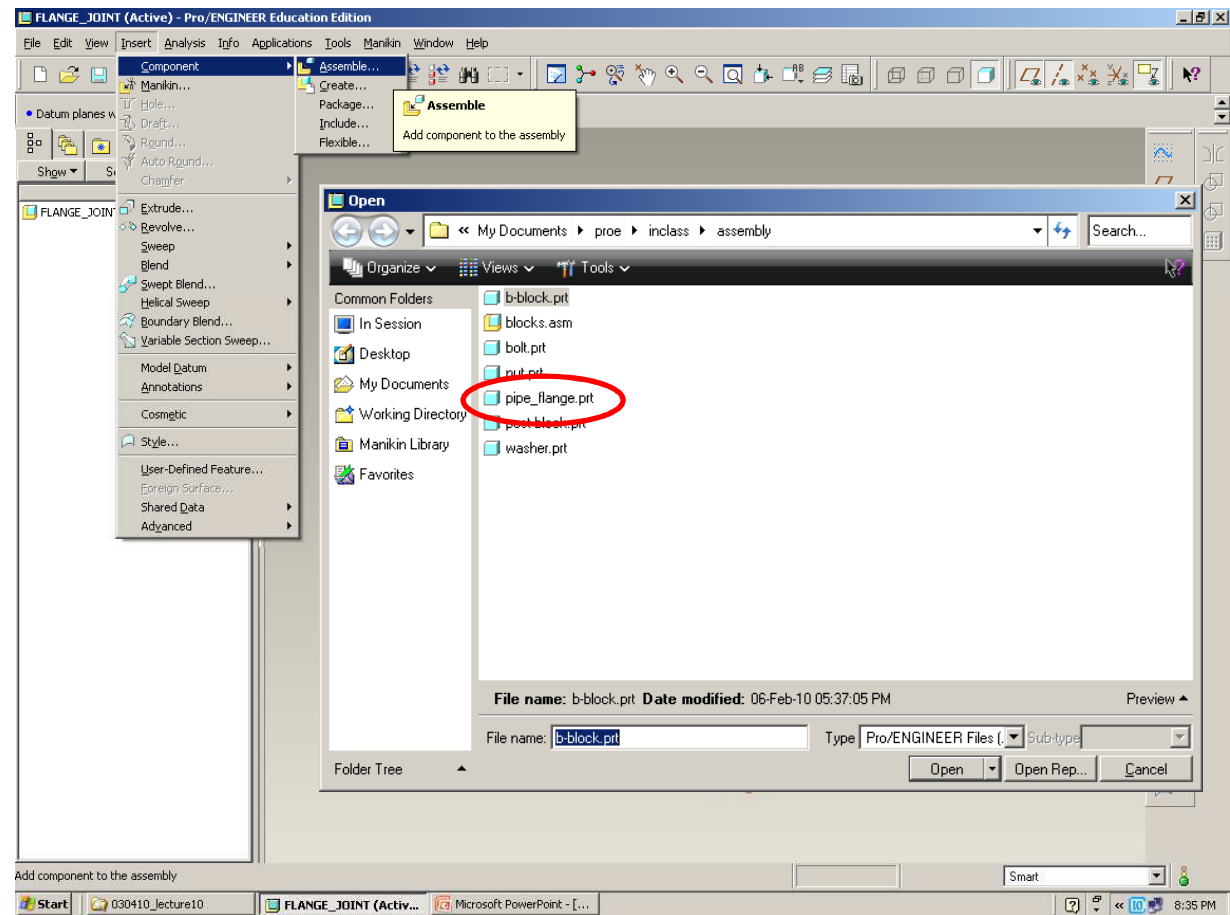
- Download flange_connection.zip from the supporting materials page
- Set Working Directory
- Extract file to working directory
- File > New > Assembly
 - pipe_joint.asm





EXERCISE – Assemblies

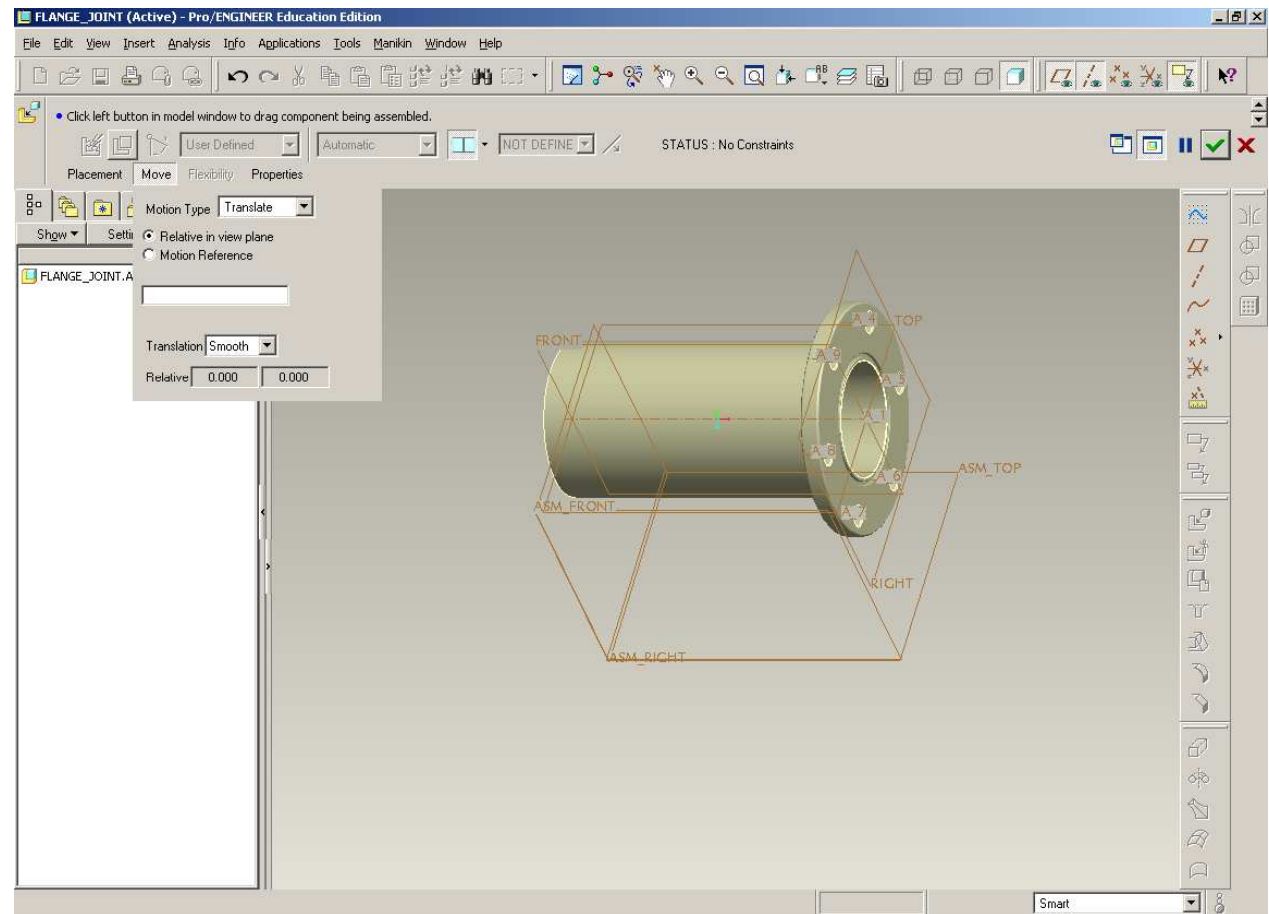
- Insert > Component > Assemble
- Select pipe_flange.prt





EXERCISE – Assemblies

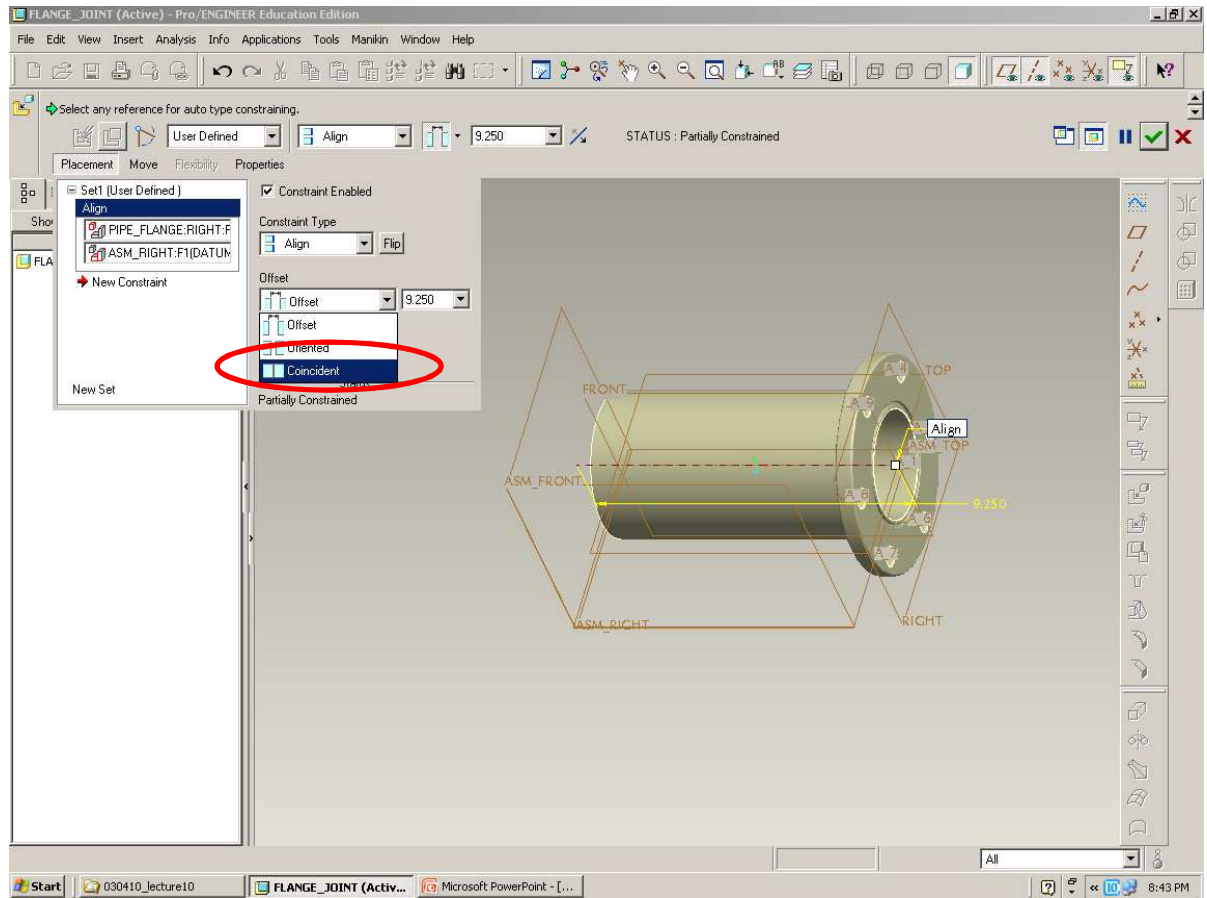
- Click on the Move tab
- LMB in graphics window
- Translate part
- LMB again to drop part
- You don't have to do this everytime you place a part, but its nice to know when you need it





EXERCISE – Assemblies

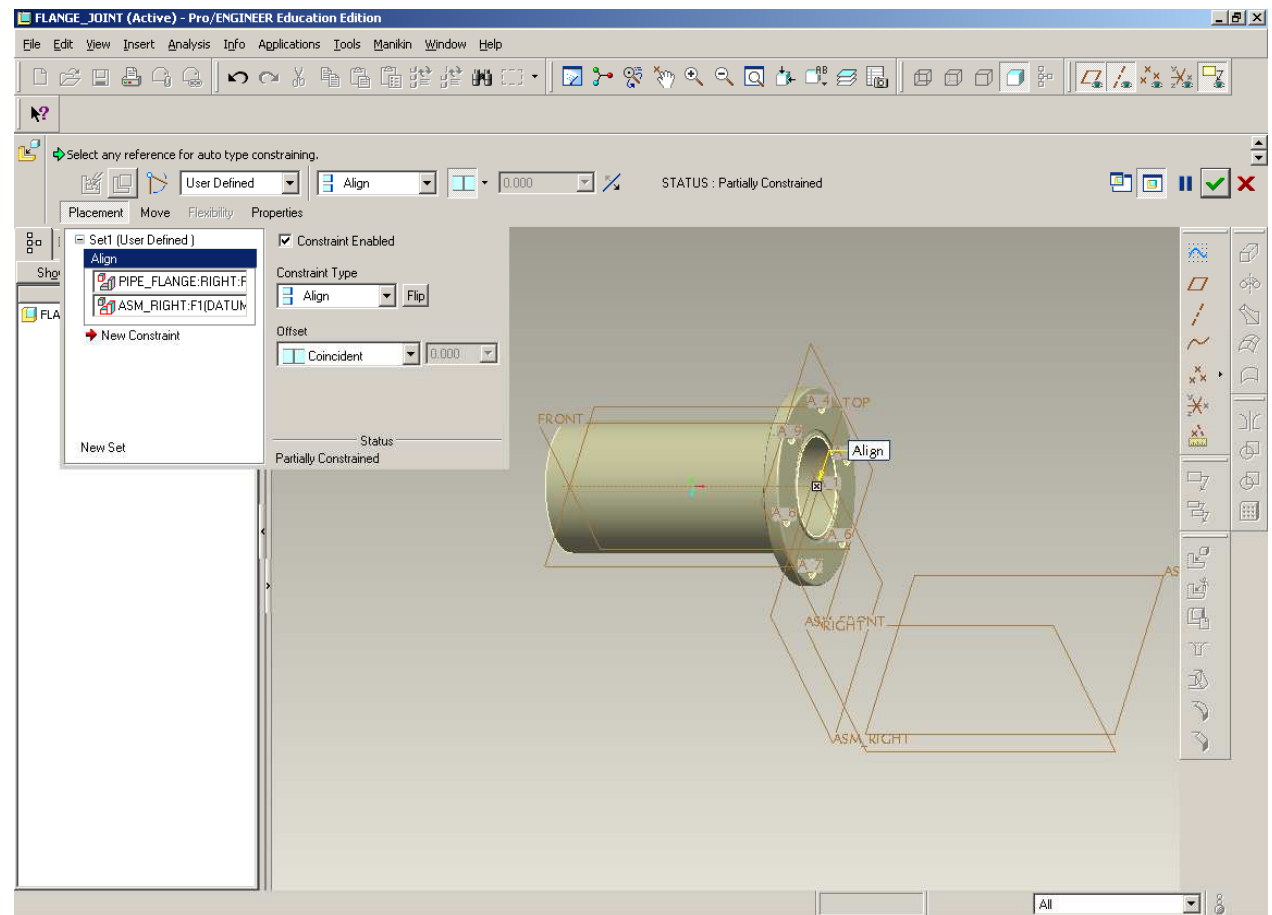
- Click on the Placement tab
- Select the RIGHT plane on the component
- Select ASM_RIGHT plane
- Select Coincident from the Offset drop-down





EXERCISE – Assemblies

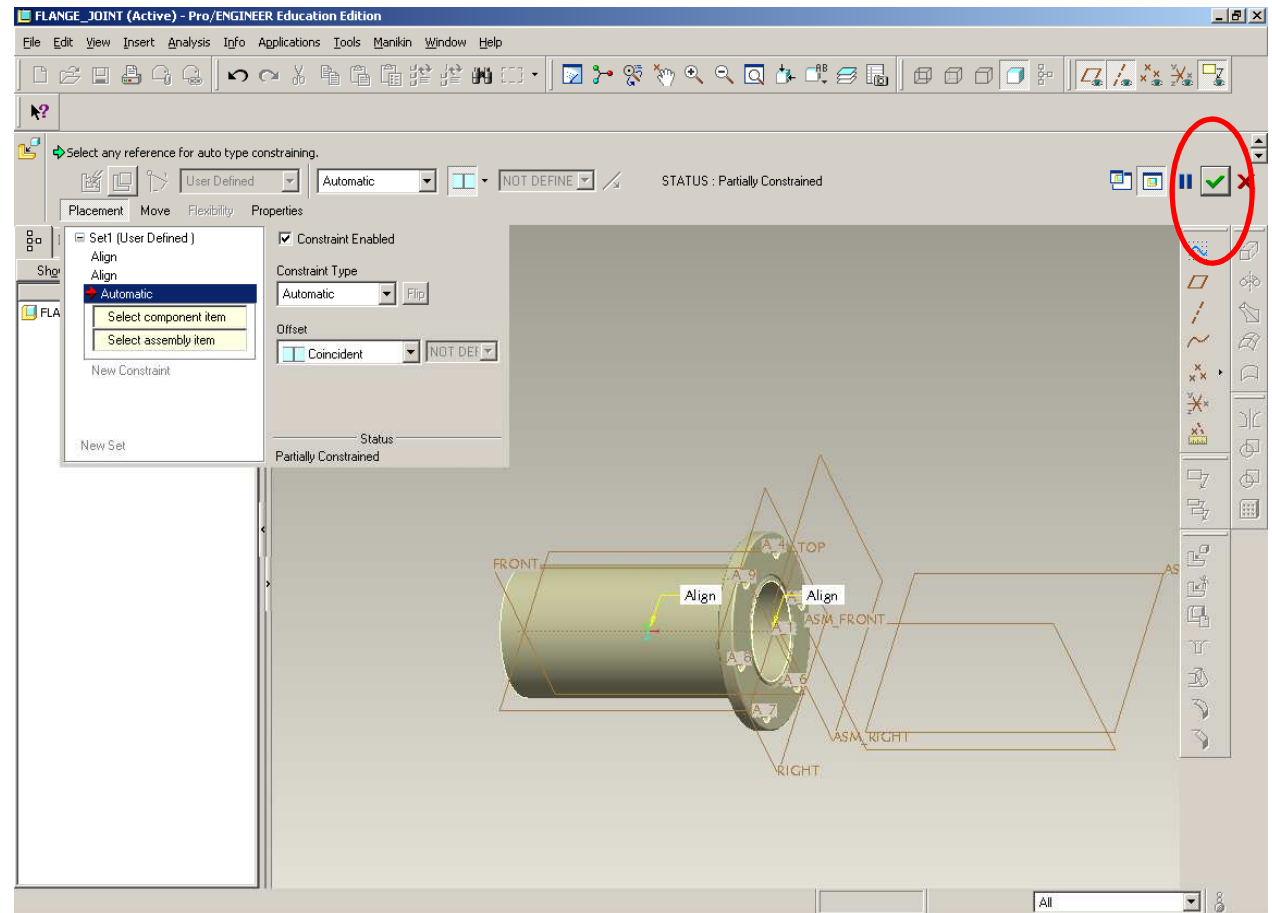
- Select the FRONT plane on the component
- Select ASM_FRONT plane
- Select Coincident from the Offset drop-down





EXERCISE – Assemblies

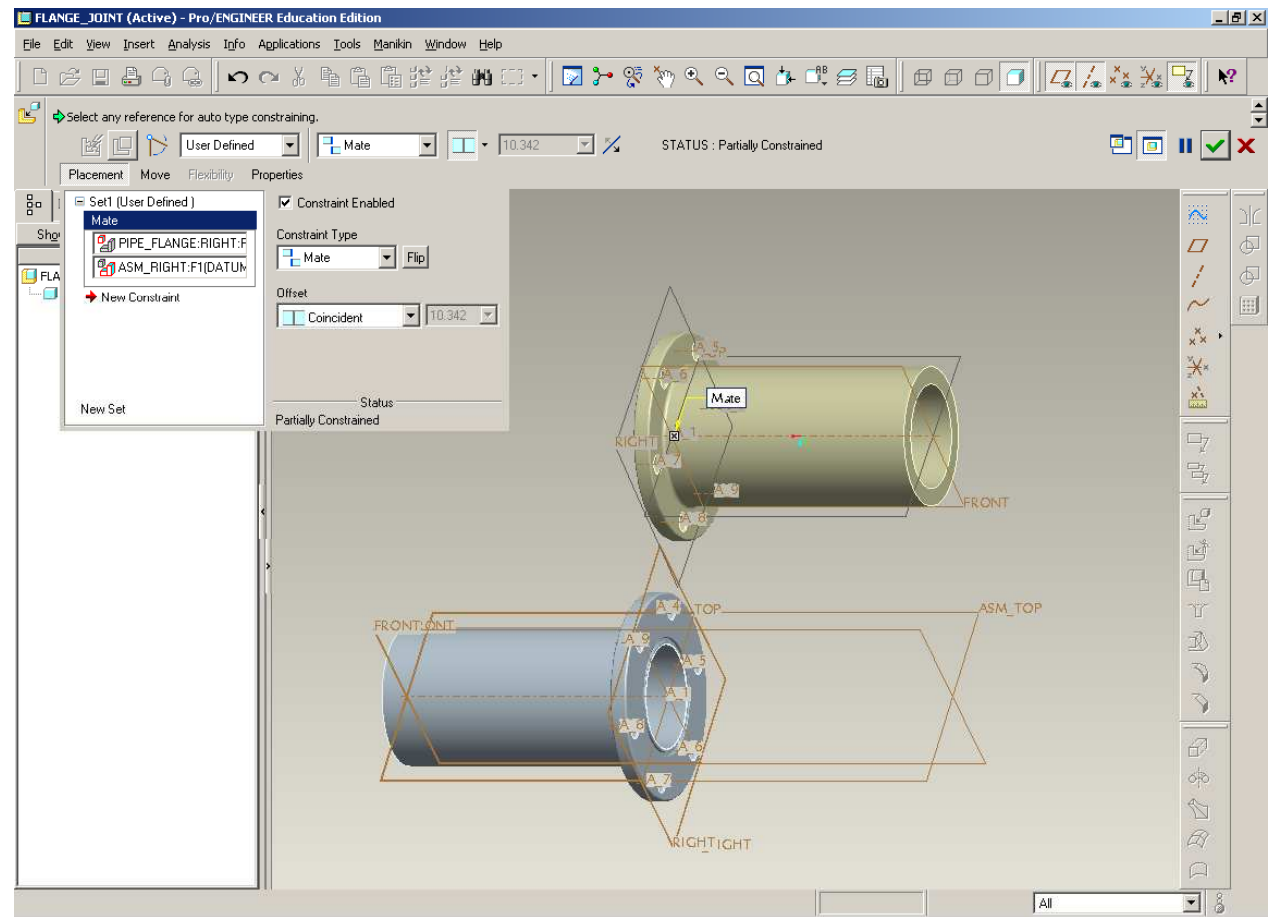
- Select the TOP plane on the component
- Select ASM_TOP plane
- Select Coincident from the Offset drop-down
- Click the Done check





EXERCISE – Assemblies

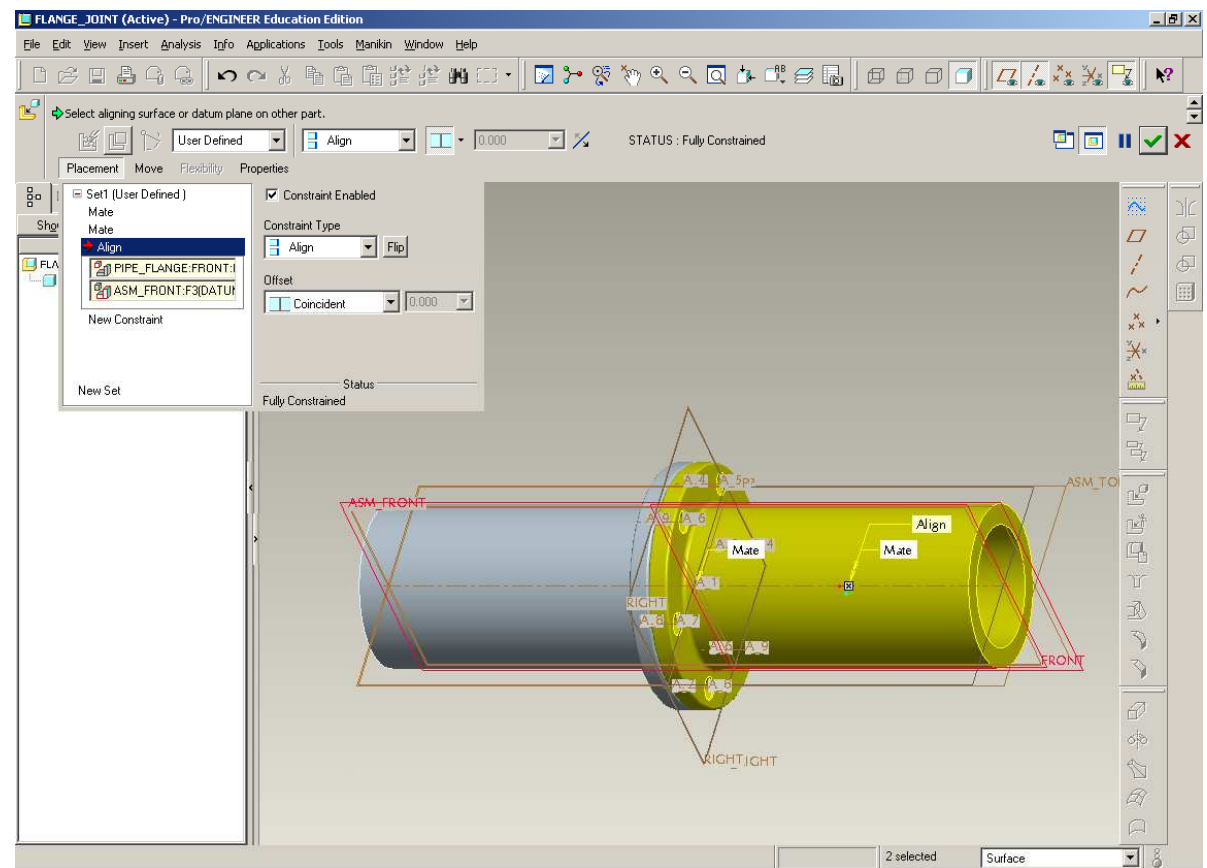
- Insert > Component > Assemble
- Select pipe_flange.prt again
- Select the RIGHT plane on the component
- Select ASM_RIGHT plane
- From Constraint drop down box select Mate





EXERCISE – Assemblies

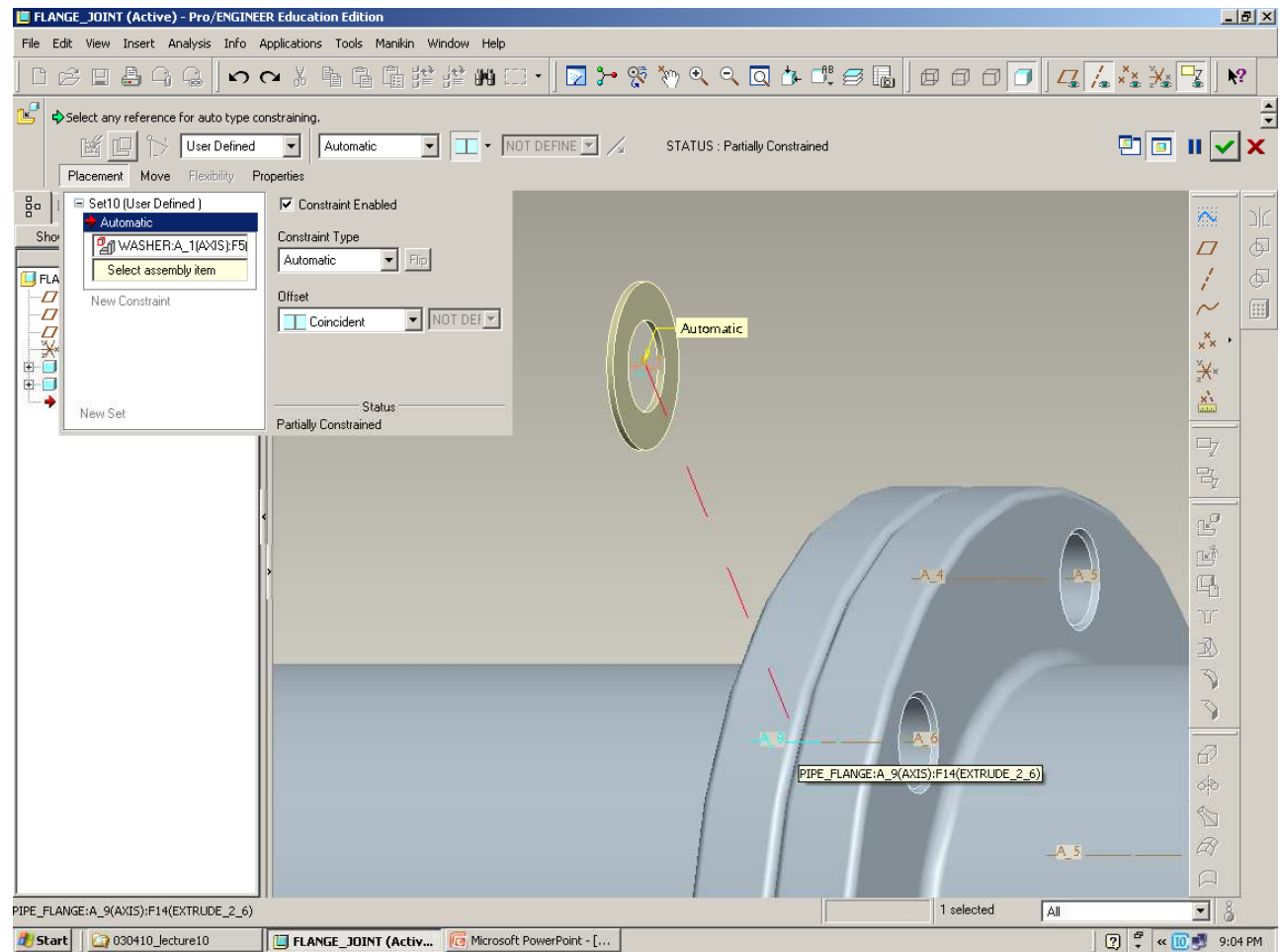
- Define additional constraints between FRONT and ASM FRONT as well as TOP and ASM TOP
- Click Done





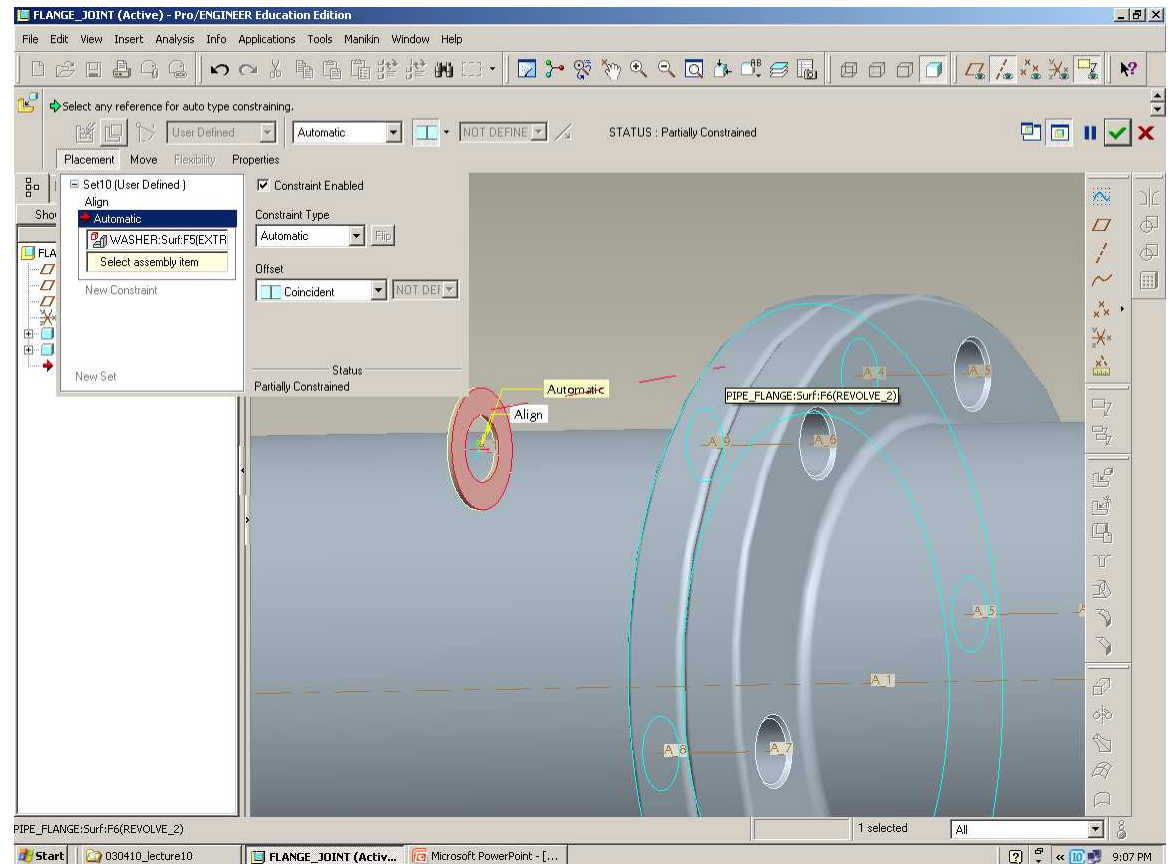
EXERCISE – Assemblies

- Insert > Component > Assemble
- Open washer.prt
- Select the axis (A2) on the part
- Select an axis of one of the through holes



EXERCISE – Assemblies

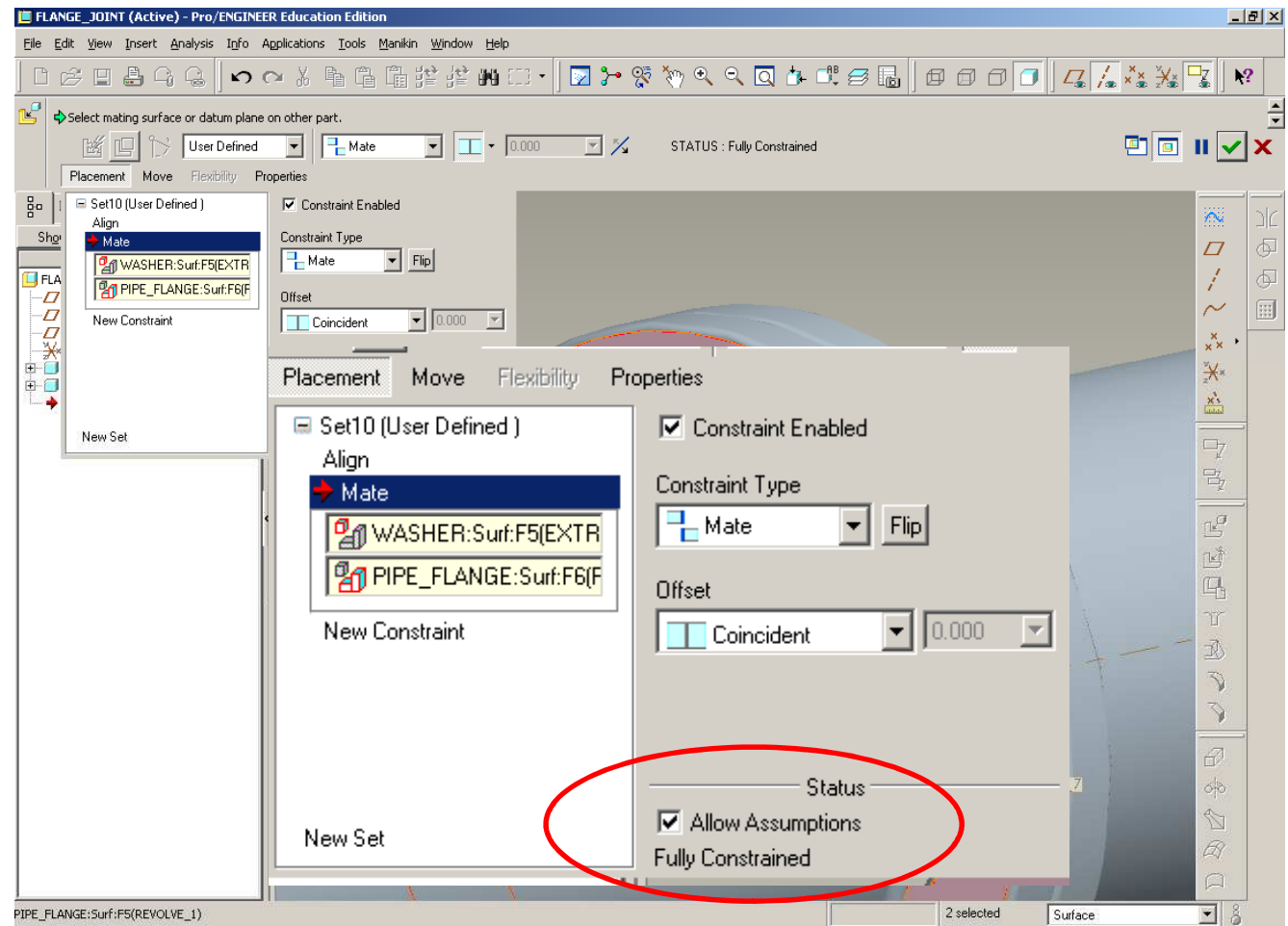
- Move the component (if necessary) to find it again
- Select the face of the washer
- Select the face of the flange
(Design Intent!!)
- Select Mate from drop-down
- Select Coincident from drop-down
- Click Done





EXERCISE – Assemblies

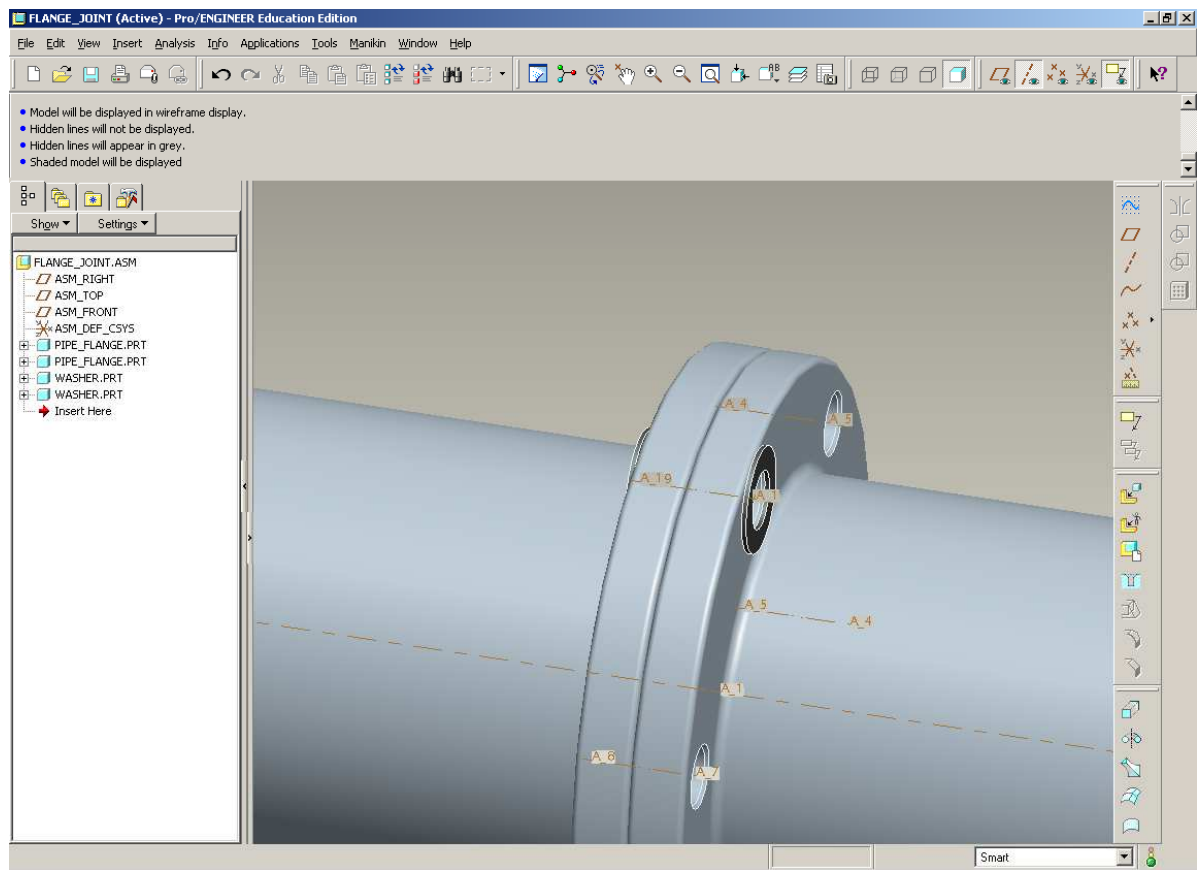
- Note after these two constraints are applied Pro/E has enough to Fully Constrain the parts





EXERCISE – Assemblies

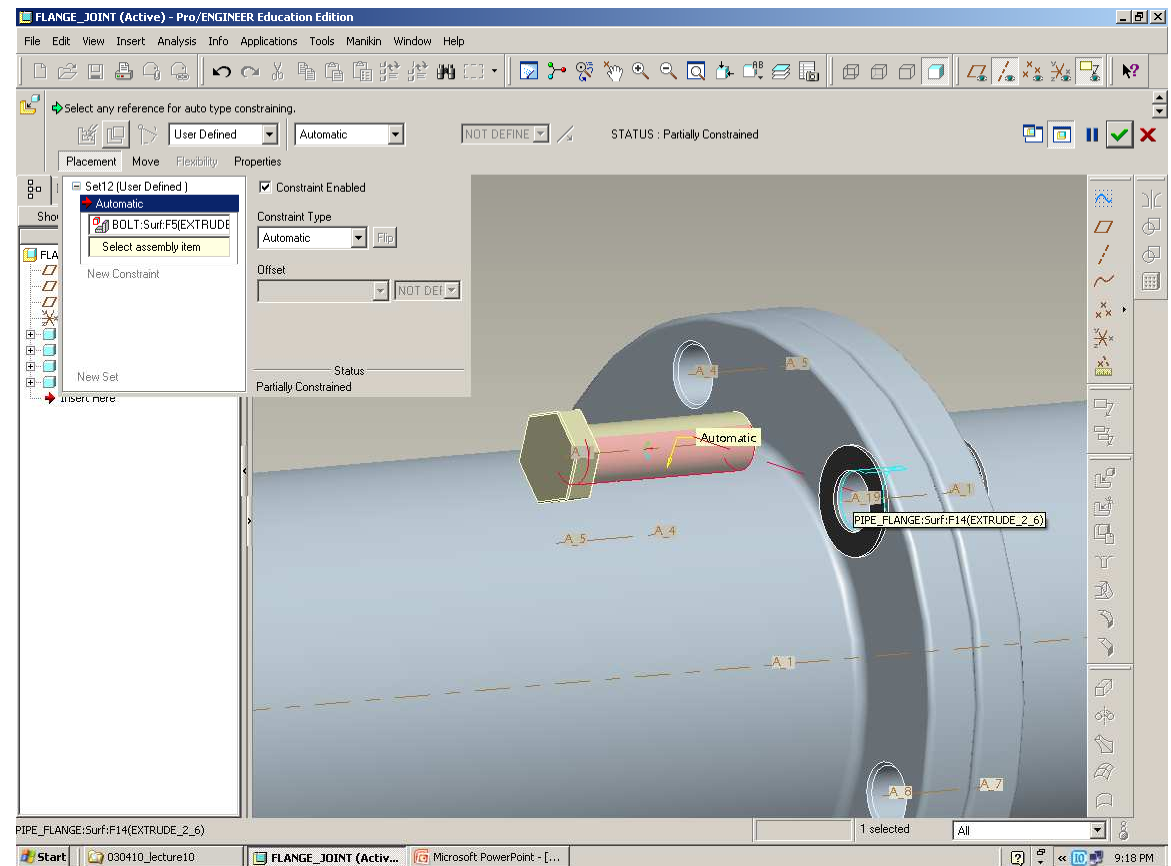
- Assemble a second washer in the same way on the other side of the flange





EXERCISE – Assemblies

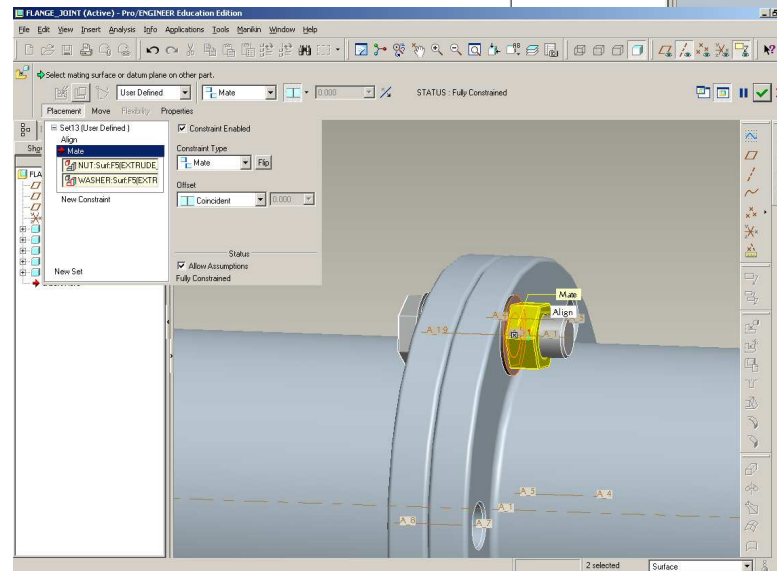
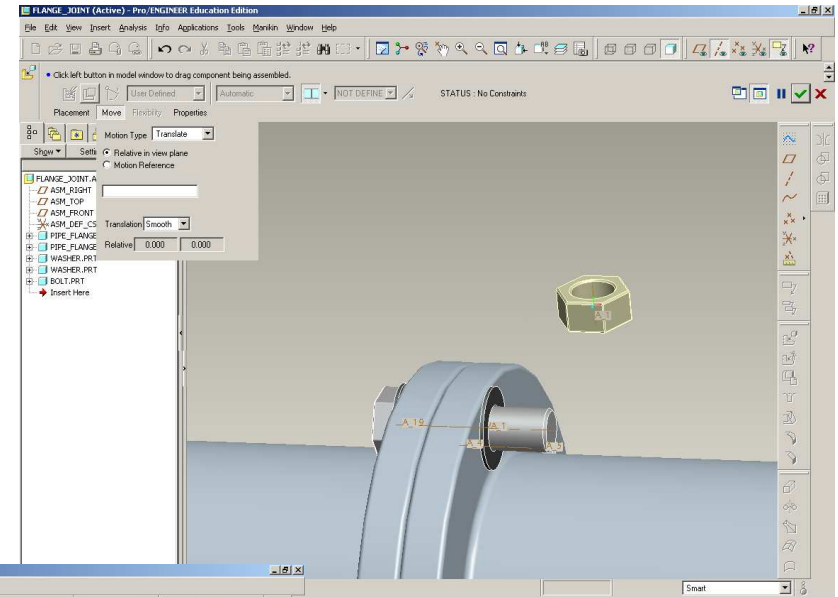
- Insert > Component > Assemble
- Assemble bolt.prt
- Select the outside cylinder surface of the bolt
- Select the surface of the through hole
- NOTE: this will create an Insert constraint
- Mate the head of the bolt to the washer
- Click Done





EXERCISE – Assemblies

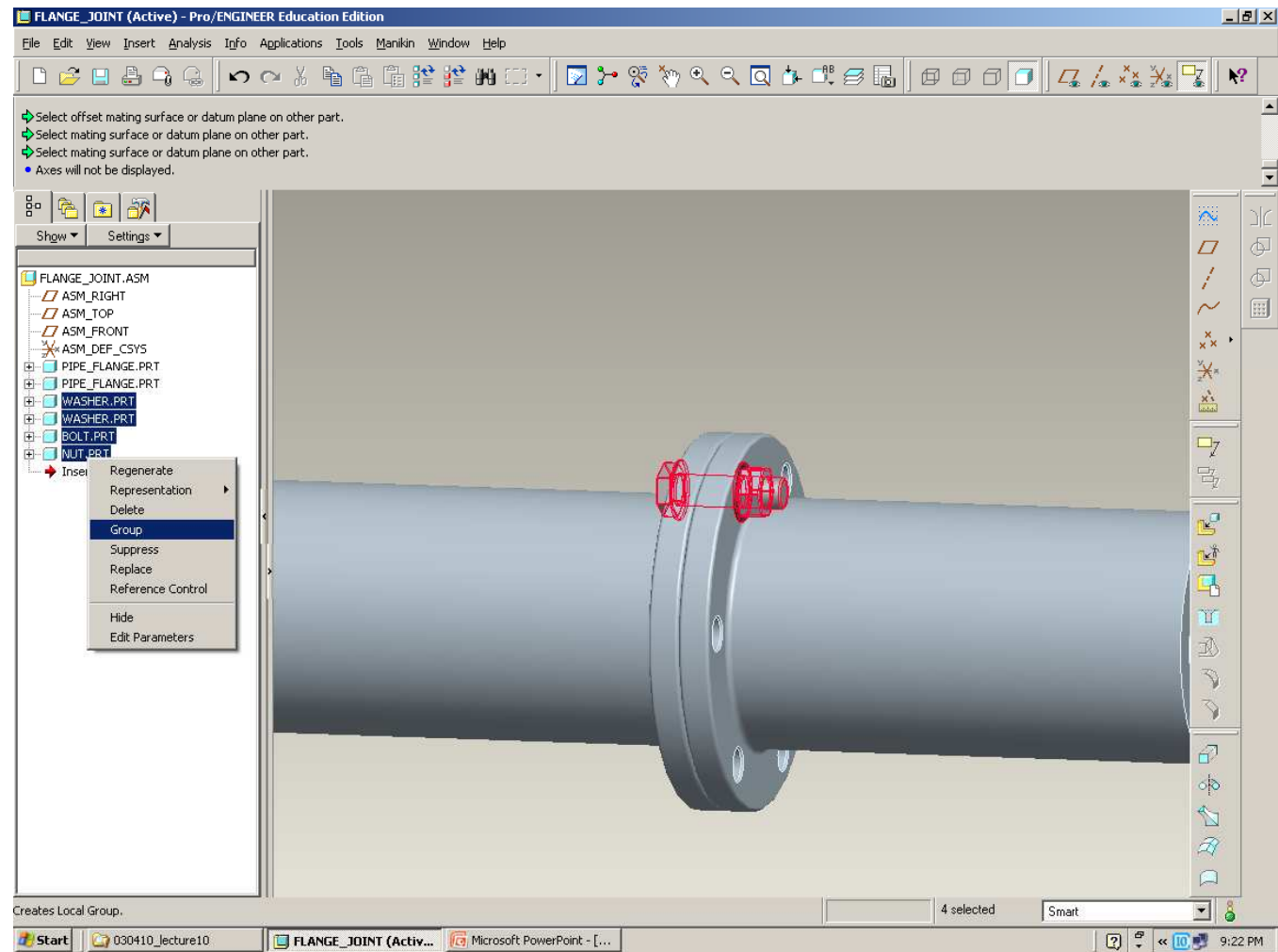
- Insert > Component > Assemble
- Assemble nut.prt
- Use an appropriate set of constraints to put nut on the bolt
- Click Done





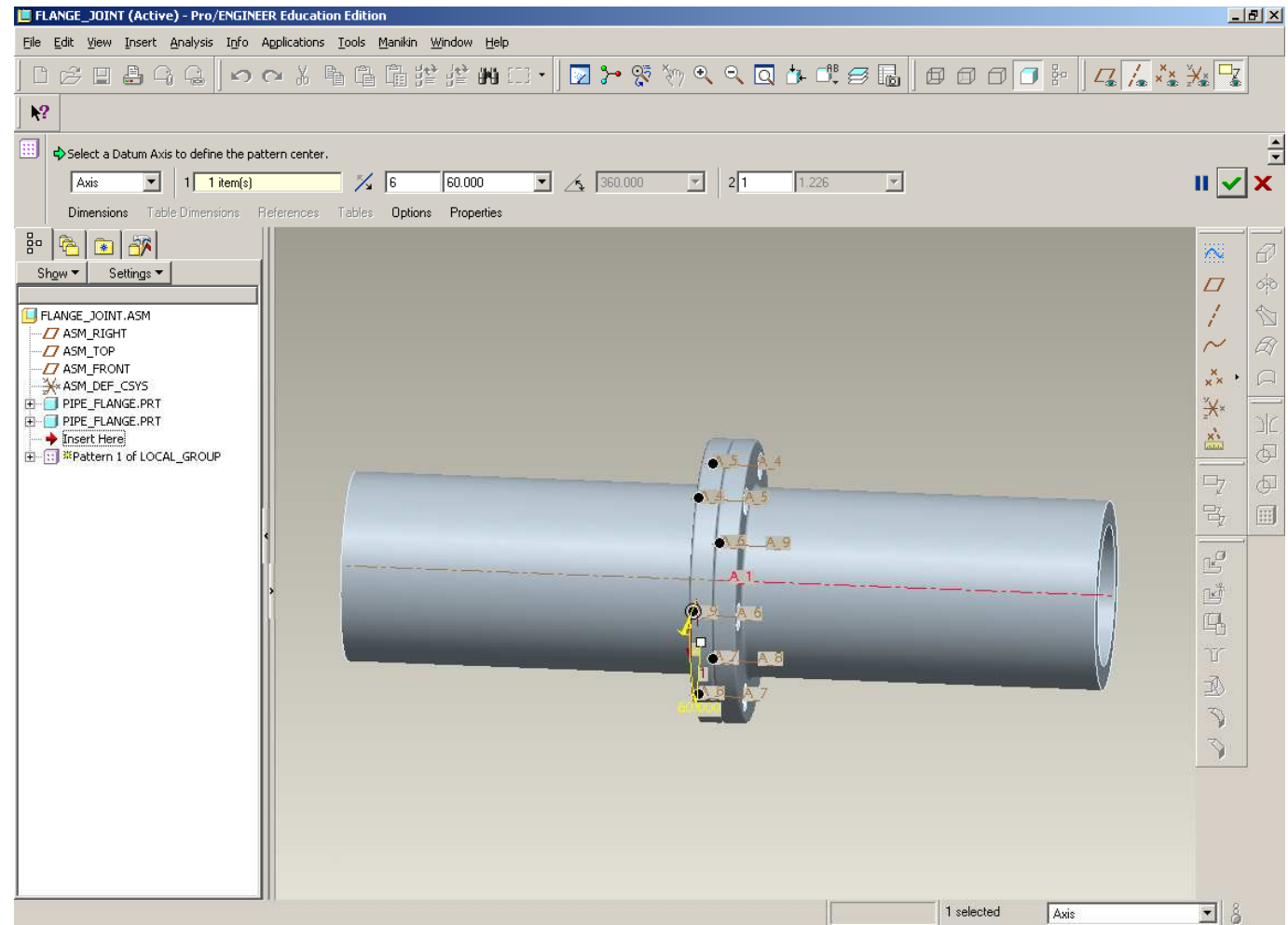
EXERCISE – Assemblies

- In the Model Tree, select the two washers, bolt and nut
- RMB, Group



EXERCISE – Assemblies

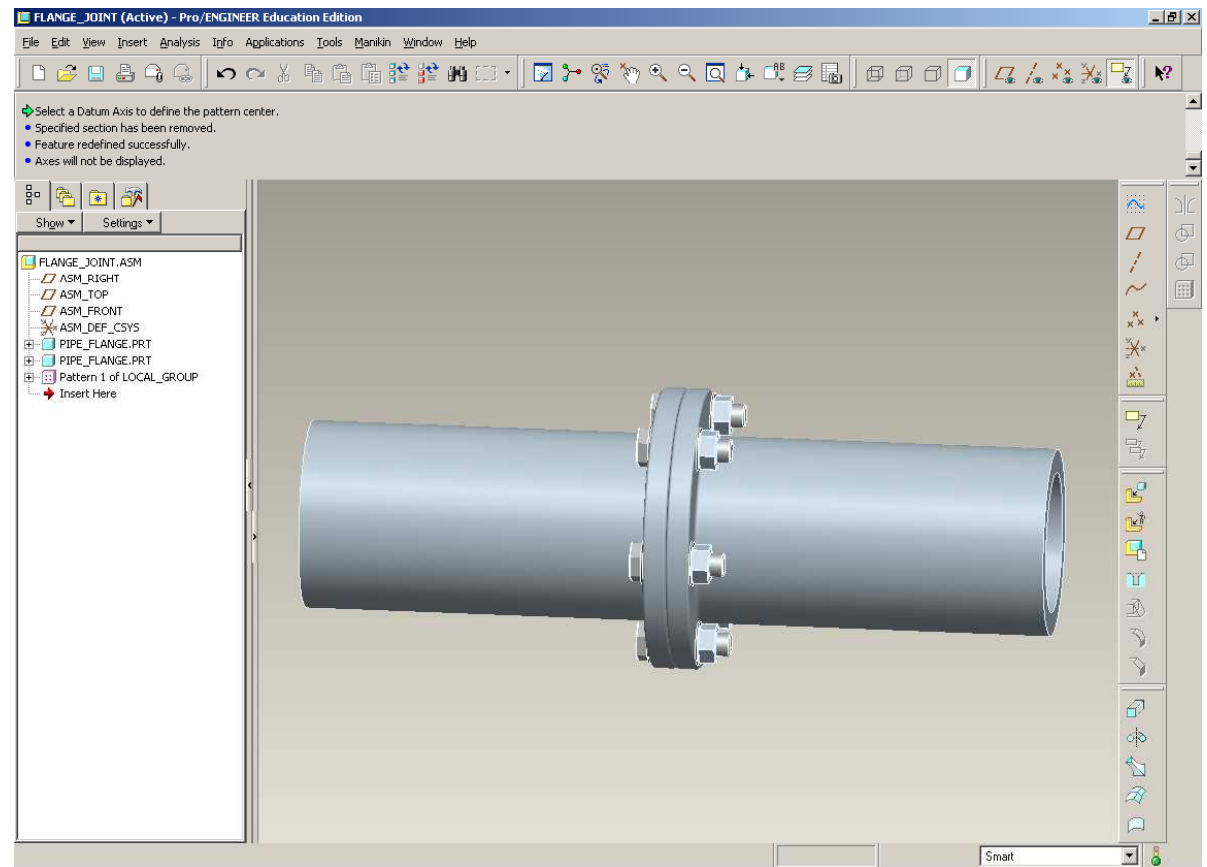
- RMB on the Group
 - Pattern
- Select Axis Pattern
- Select 6 entities
- Select 60deg separation
- Click Done





EXERCISE – Assemblies

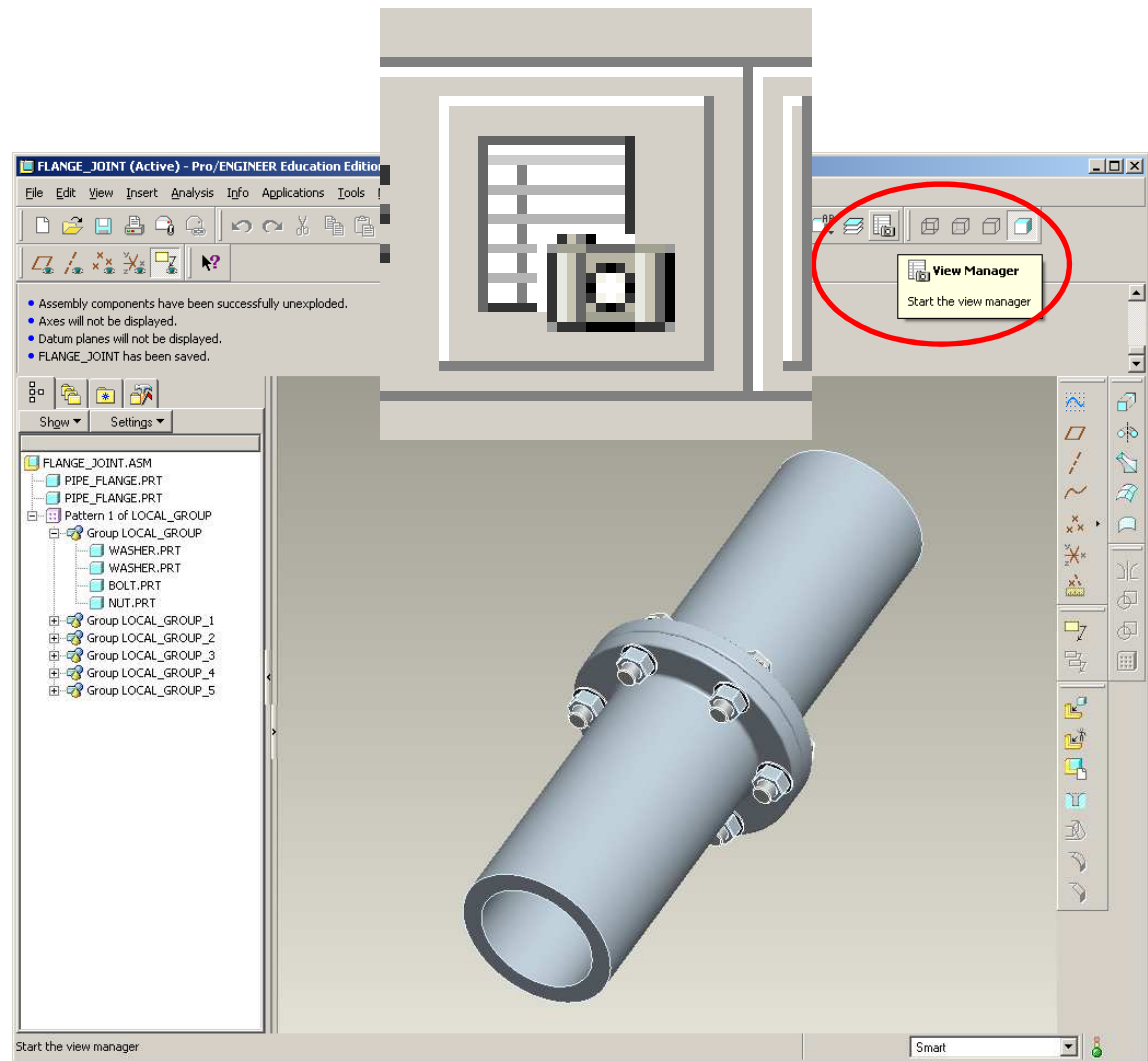
- NOTE: If we had assembled washers, nut and bolt to first feature in part model, we could have used a Reference Pattern
- Try this.
 - Delete Pattern
 - Redefine component placement
 - RMB > Pattern





EXERCISE – Exploded View

- Create a general view that effectively displays components
- Once you're happy with the orientation, open View Manager

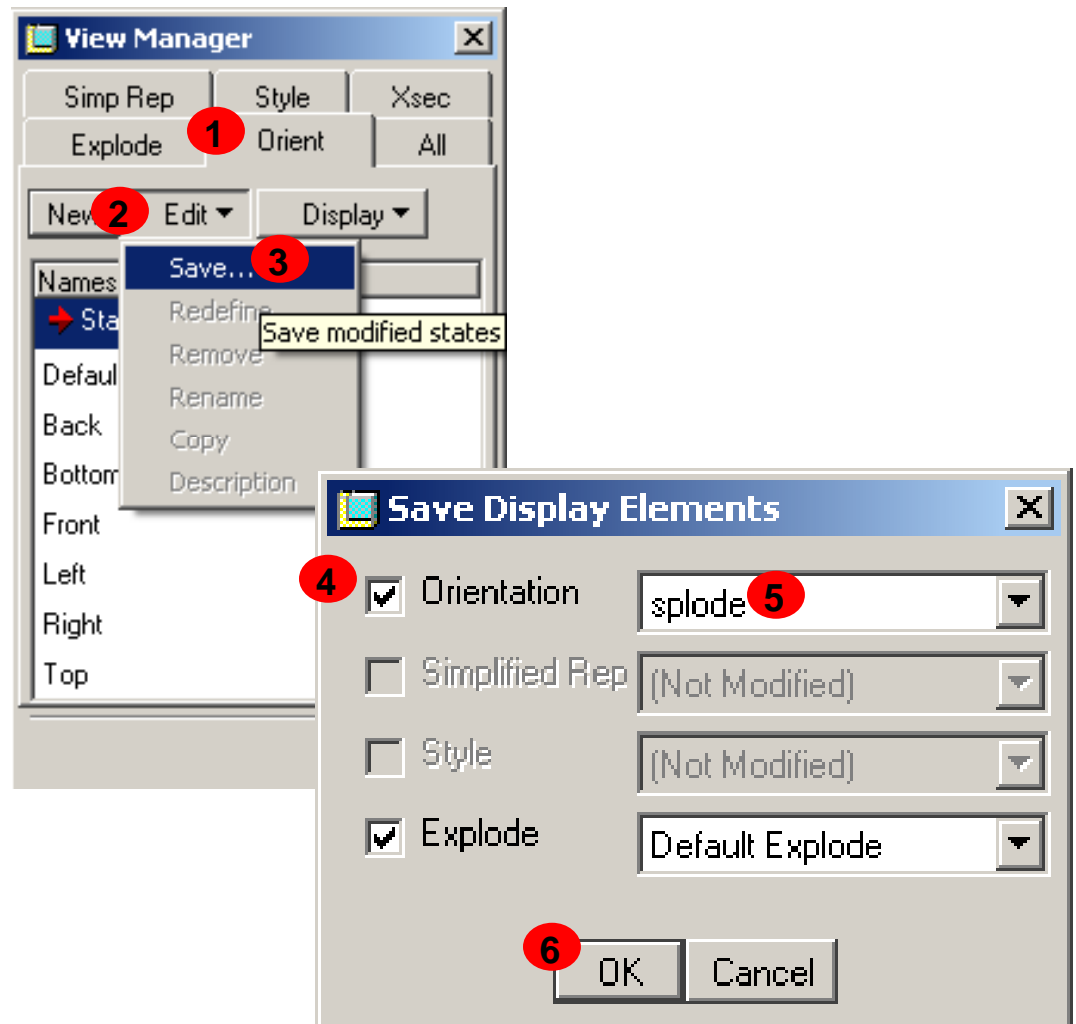




EXERCISE – Exploded View

• To Save the Orientation...

- 1 Select the Orient tab
- 2 Select Edit
- 3 Click Save...
- 4 Check to save orientation
- 5 Name the orientation
- 6 Click OK
- 7 Toggle between another orientation and this one to make sure it's saved

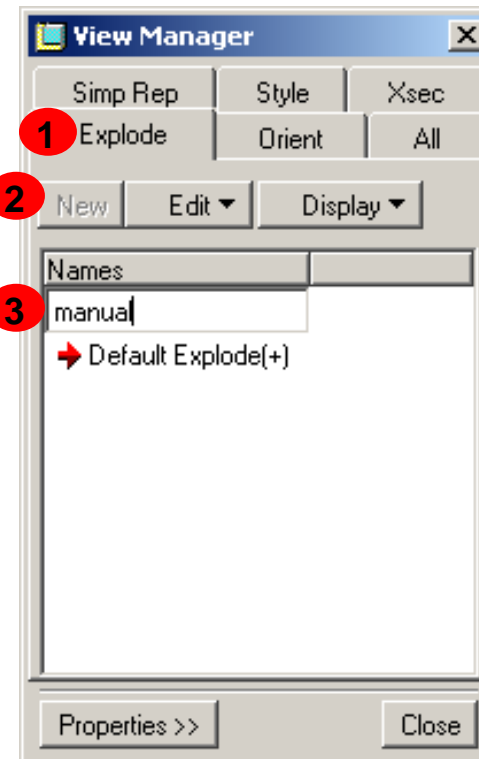




EXERCISE – Exploded View

- Create an Explode Display

- 1 Select the Explode tab
- 2 Select New
- 3 Click Return

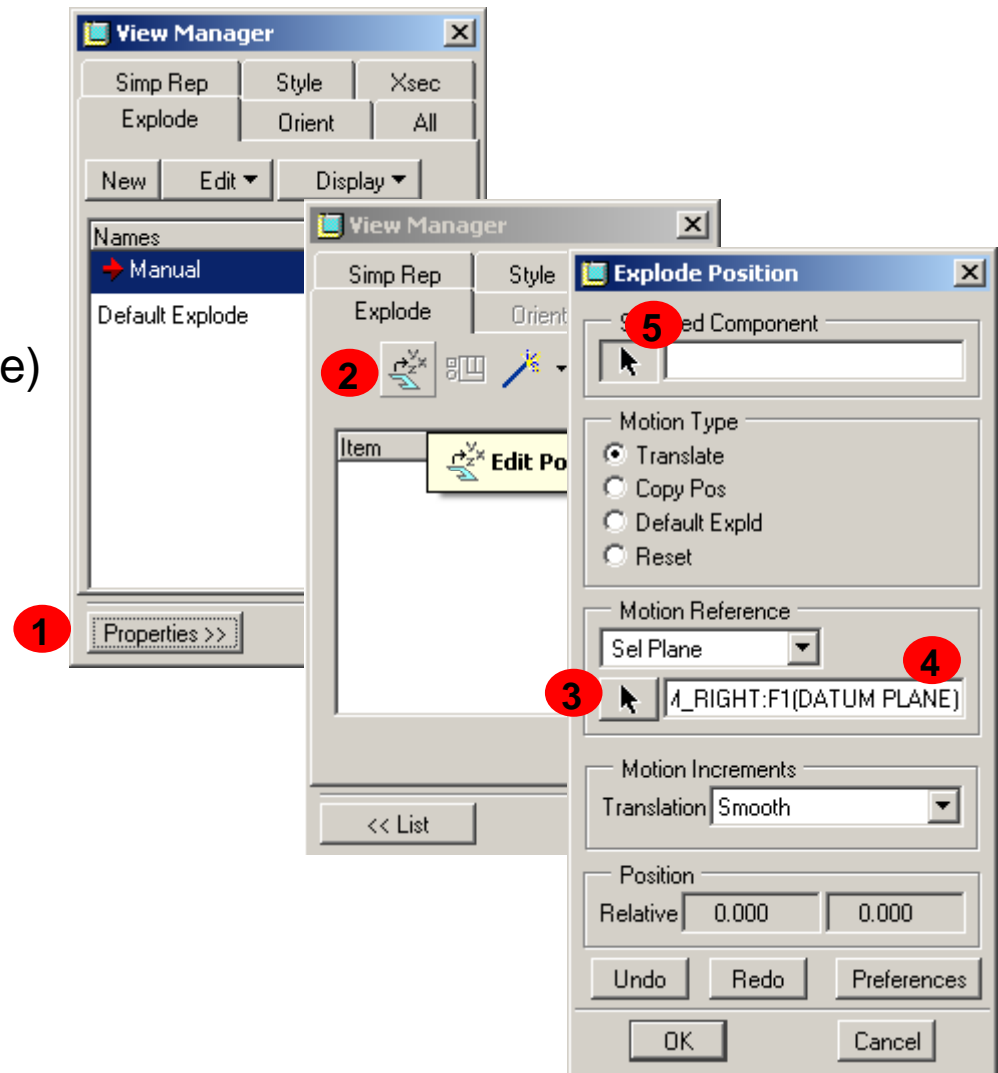




EXERCISE – Exploded View

- Create an Explode Display (cont.)

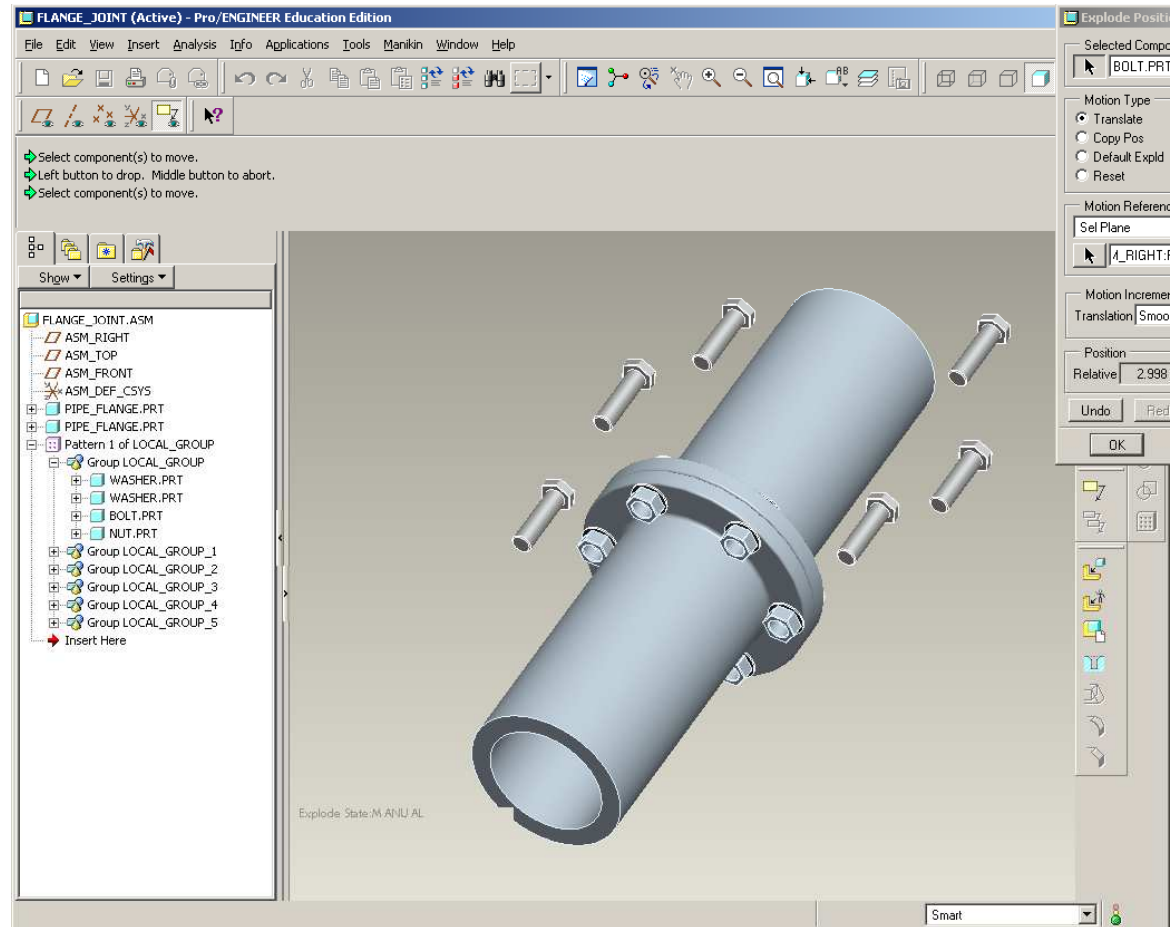
- 1 Select the Properties tab
- 2 Select Edit Position
- 3 Select a Motion Reference (Sel Plane)
- 4 Select the ASM RIGHT plane
- 5 Select a component to move





EXERCISE – Exploded View

- Move all 6 bolts off the flange parts



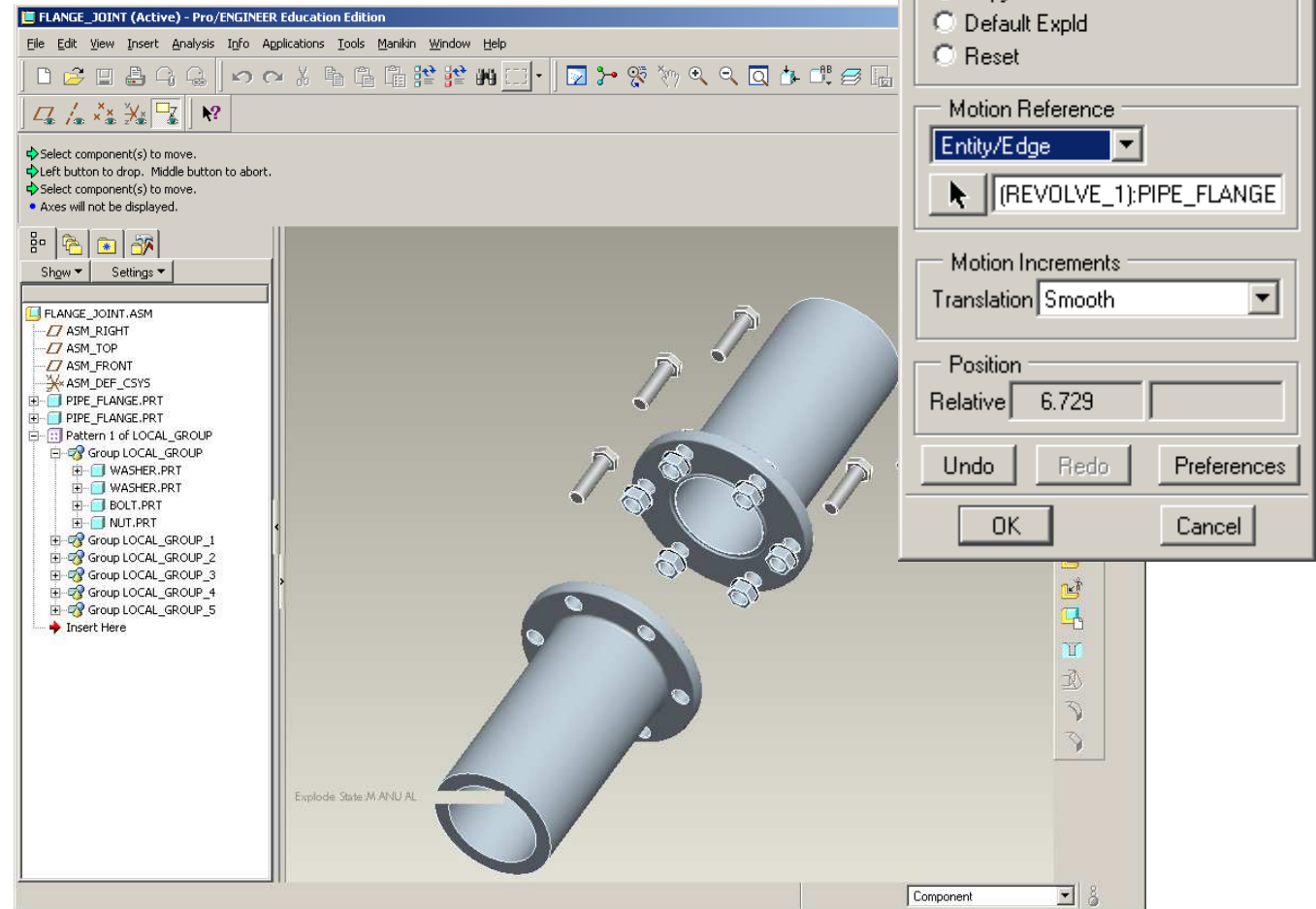


EXERCISE – Exploded View

- Select the center axis as a Motion Reference

Reference and slide the bottom

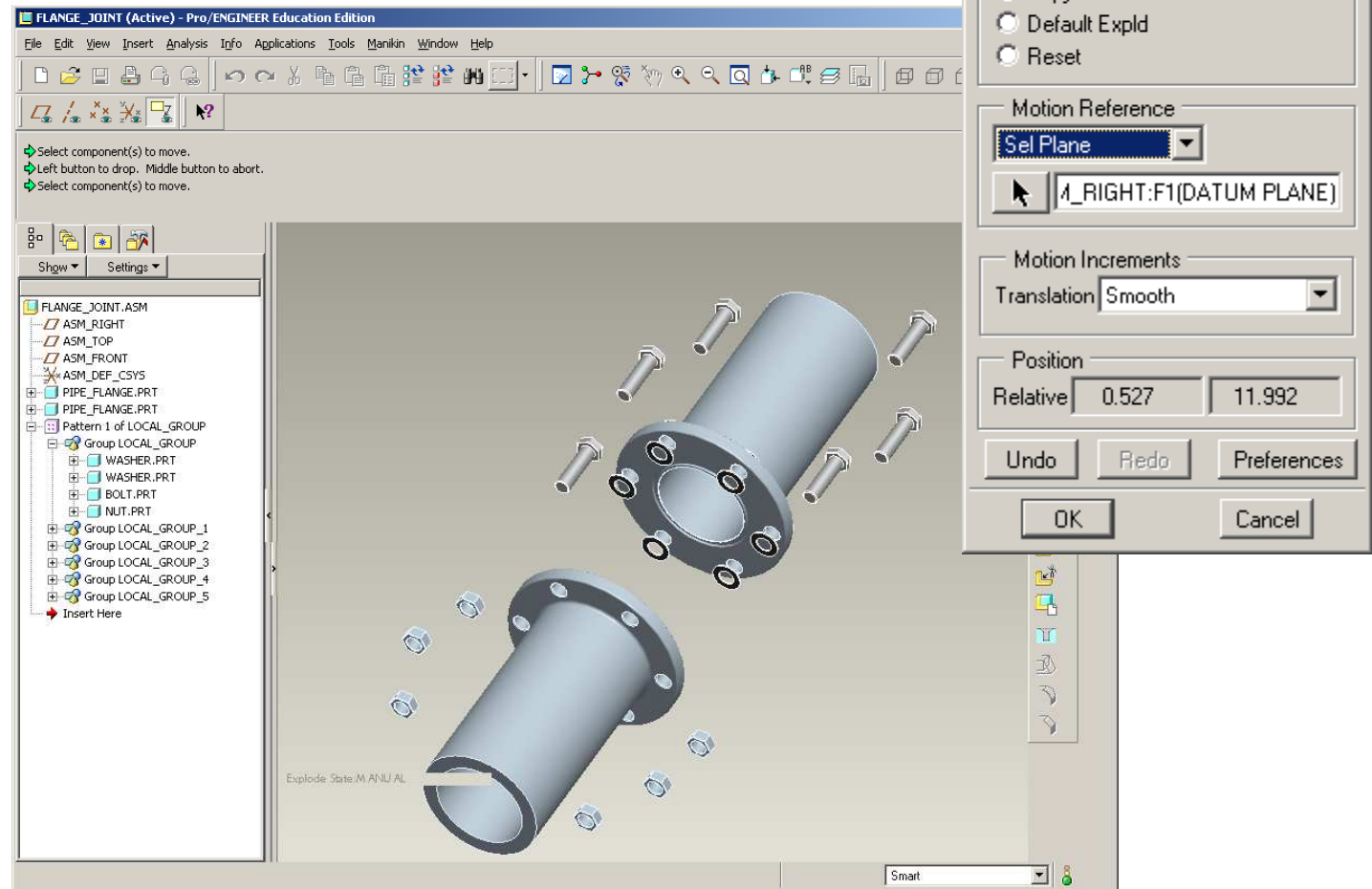
flange back





EXERCISE – Exploded View

- Select the ASM_RIGHT datum plane again and move the 6 nuts off the pipe flange

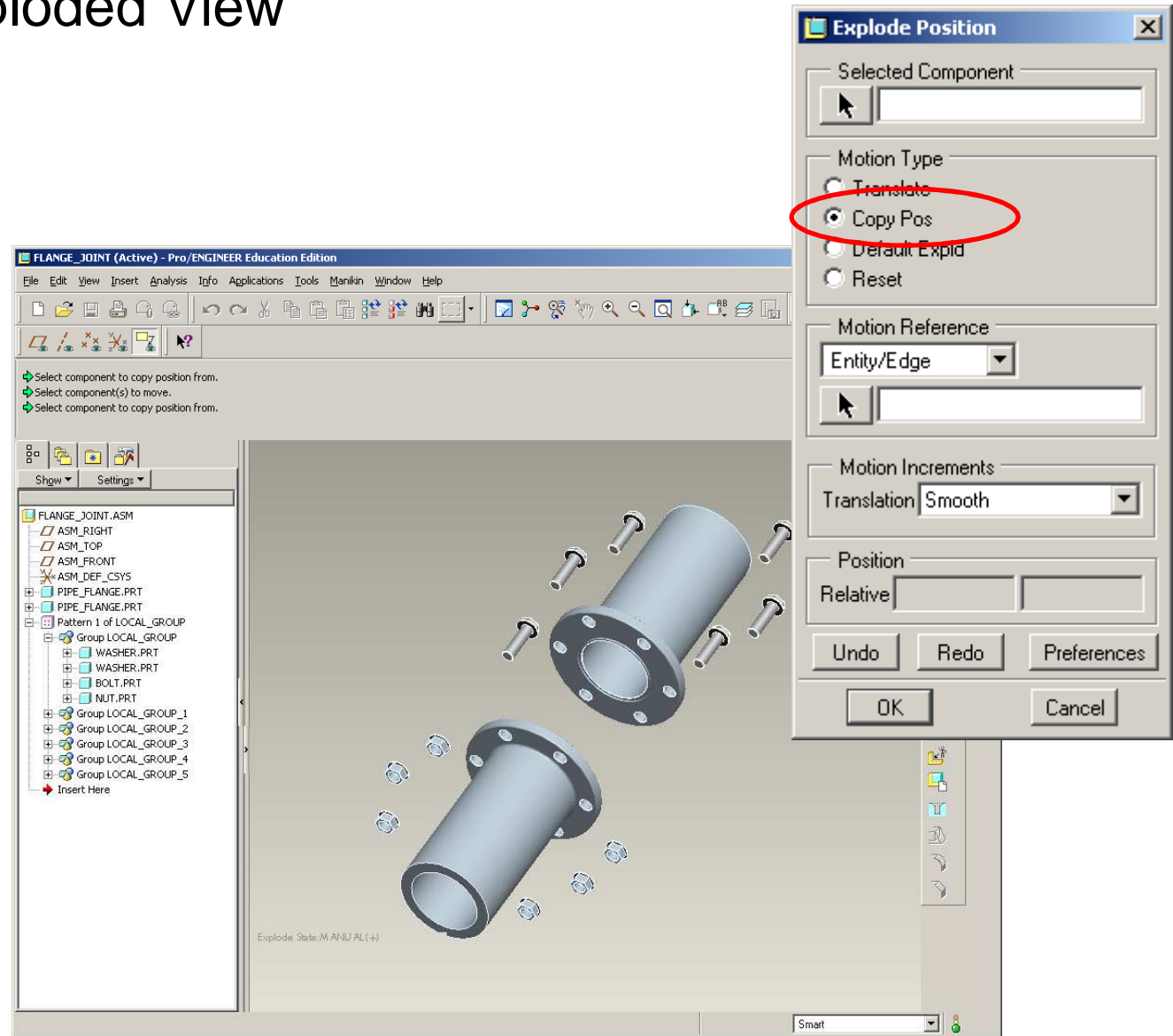




EXERCISE – Exploded View

- Move washers back on to corresponding parts

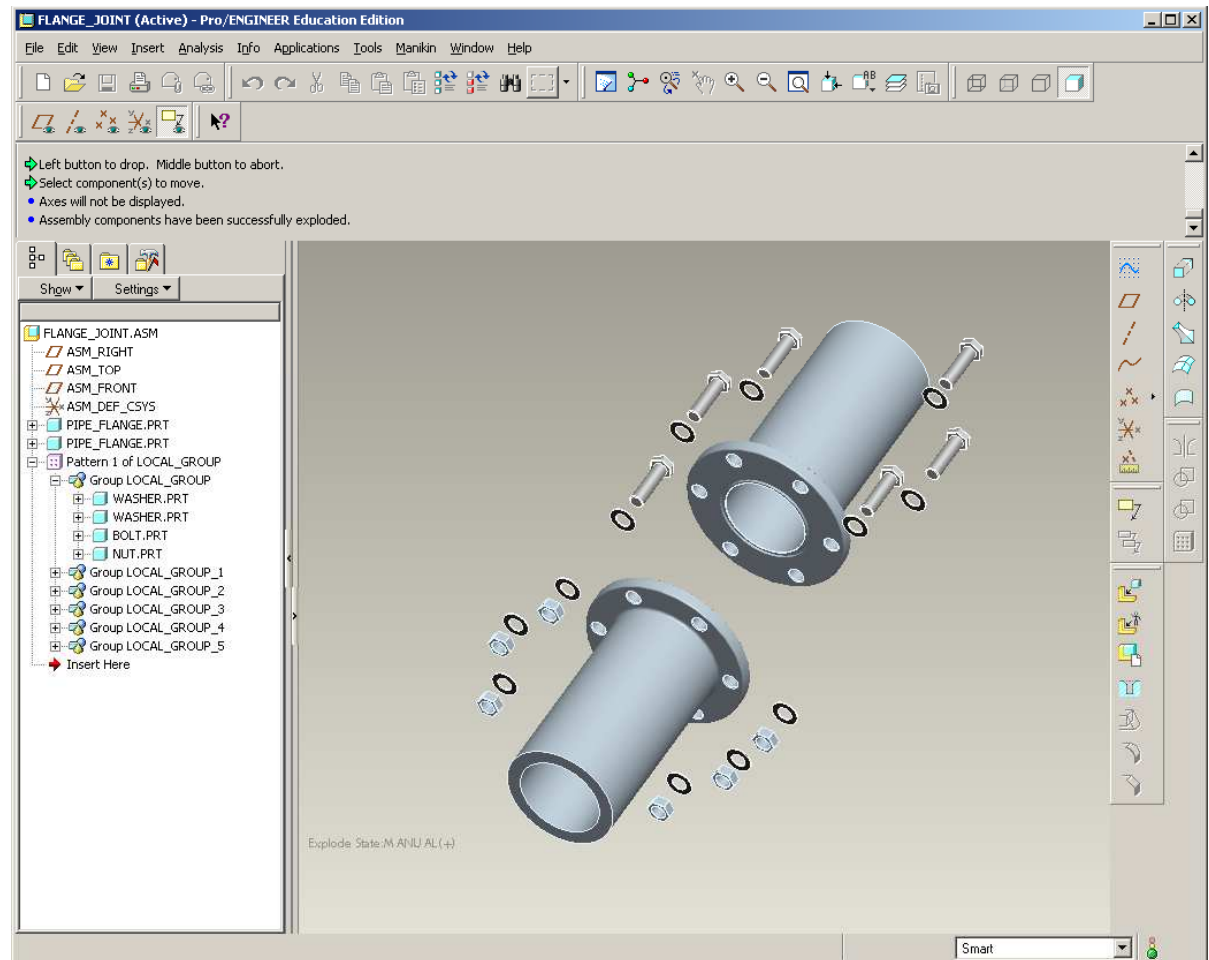
- Select Copy Pos
- Select either nut or bolt
- Select corresponding washer





EXERCISE – Exploded View

- Select center axis again and move washers so they are off all other components



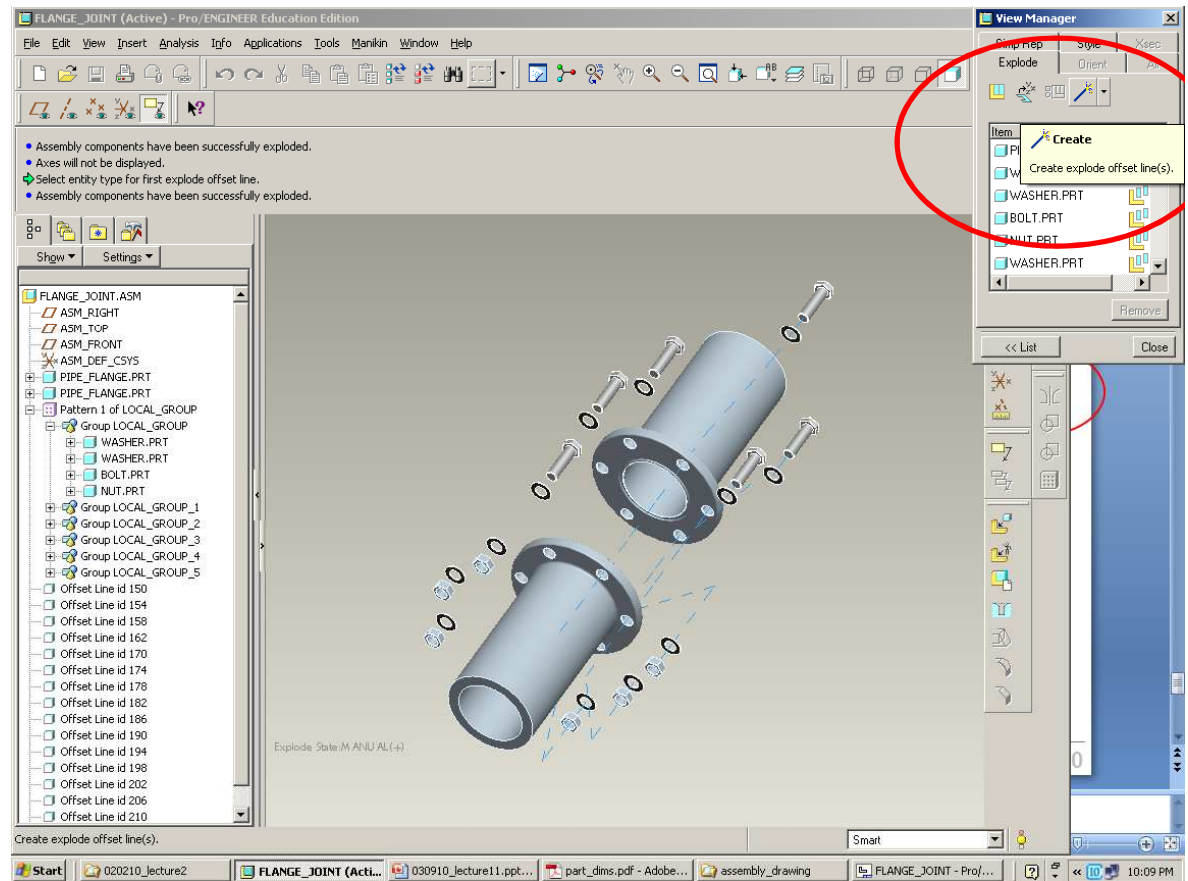


EXERCISE – Exploded View

- Create Offset Lines

connecting

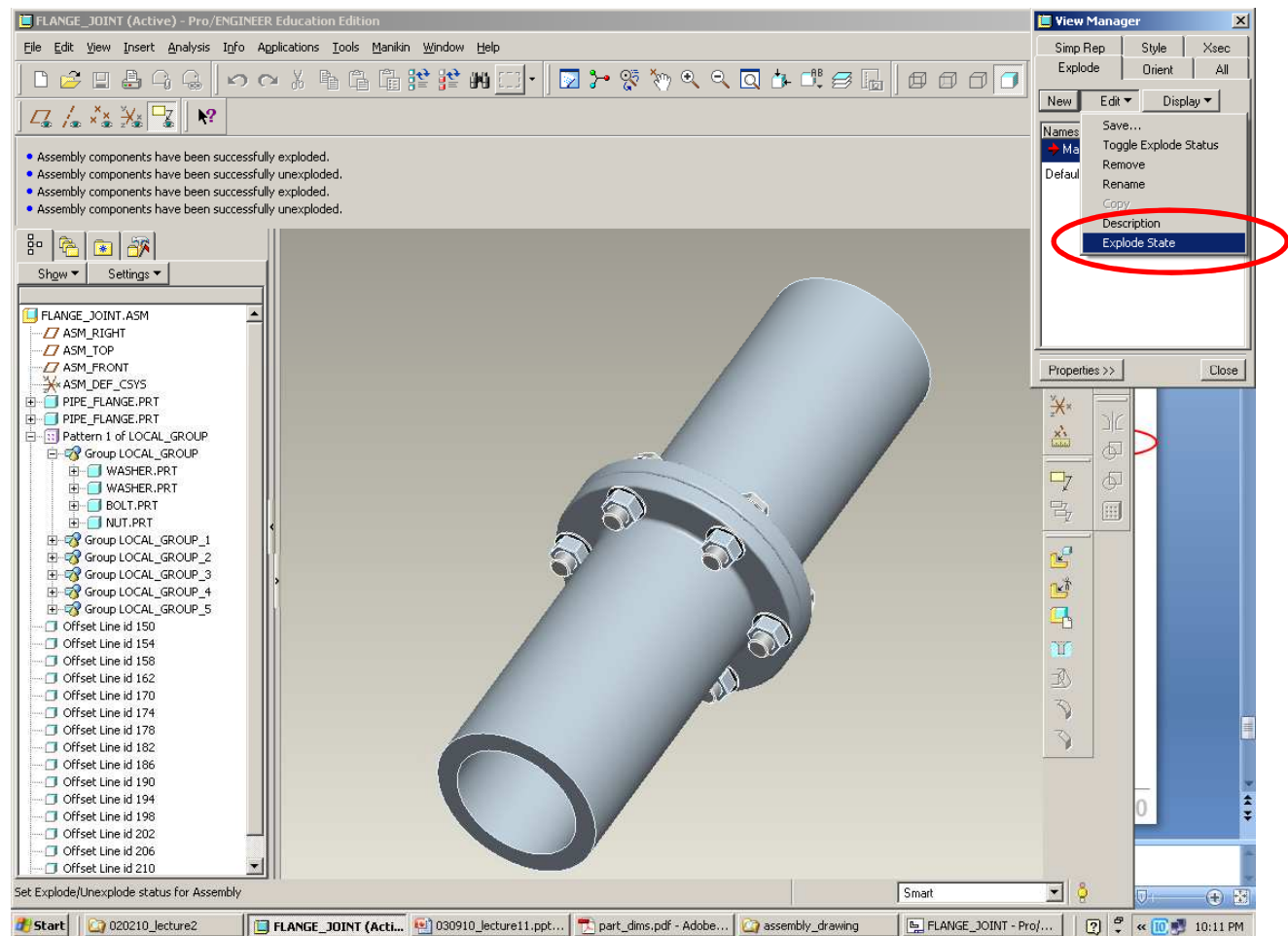
- Click Create
- Select Axis of one part
- Select Axis of another part
- Connect
 - Nut to Washer
 - Washer to Flange
 - Flange to Flange
 - Flange to Washer
 - Washer to Bolt





EXERCISE – Exploded View

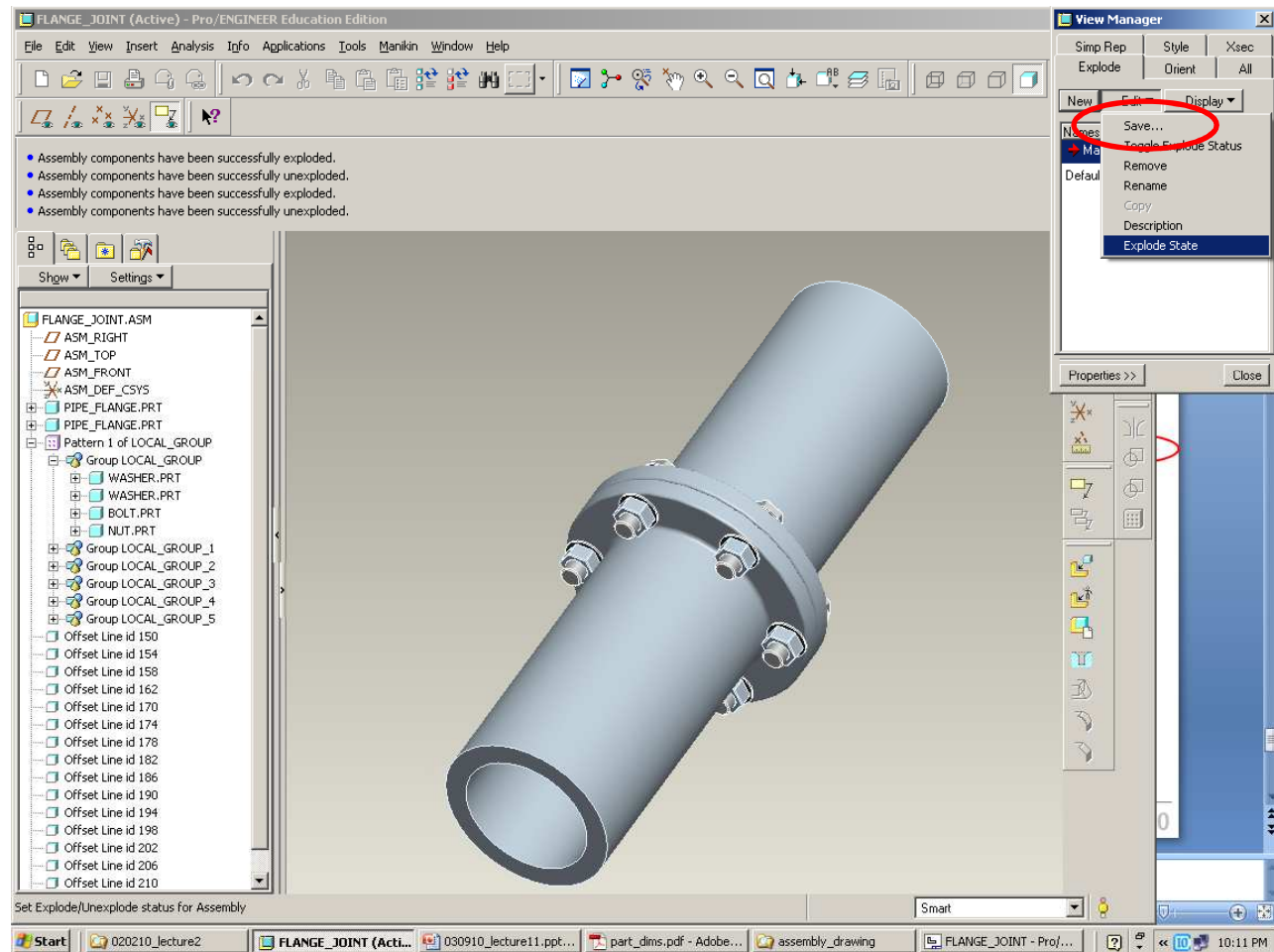
- Return and toggle off exploded display





EXERCISE – Exploded View

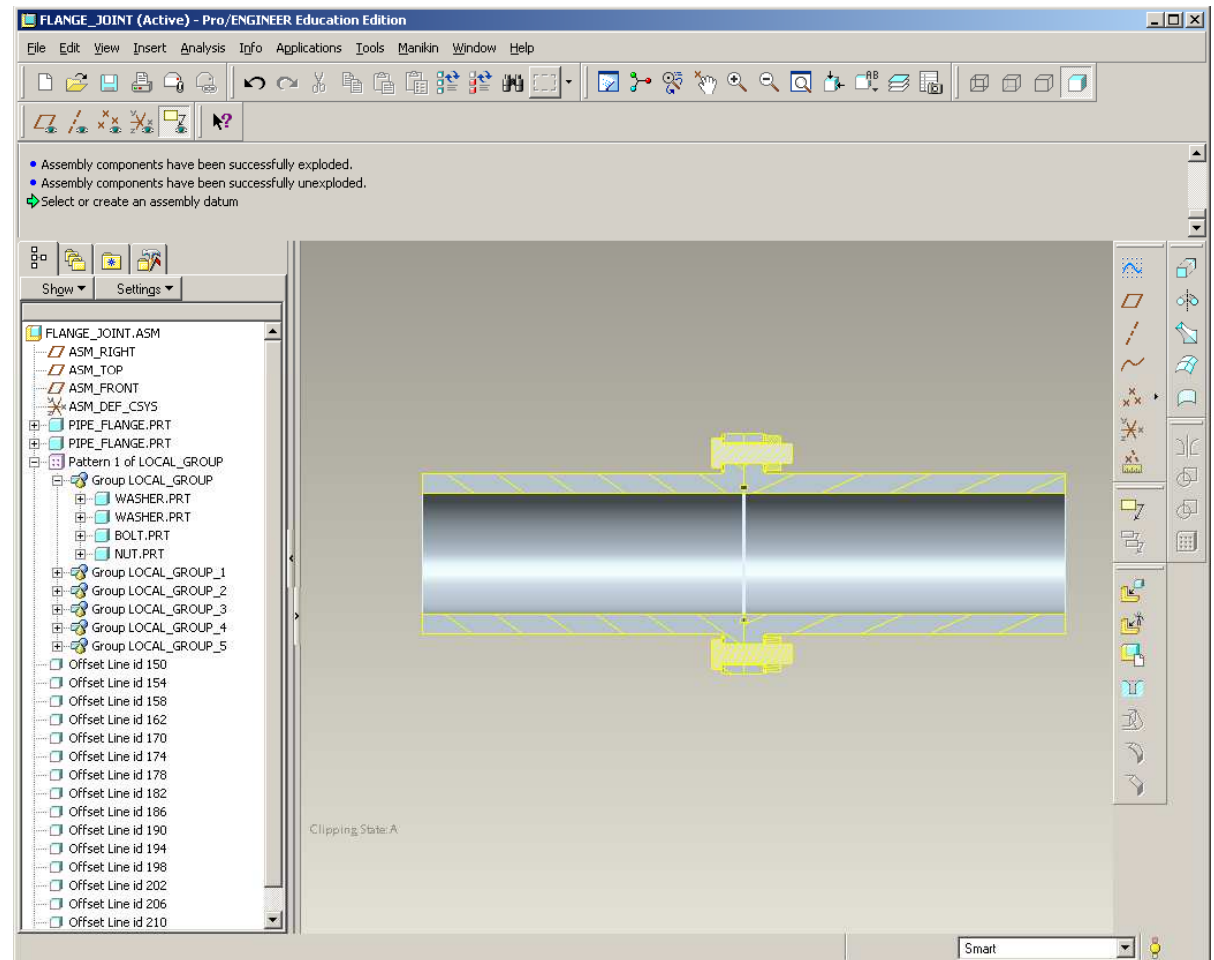
- SAVE, SAVE, SAVE
 - Exploded View details must be saved from View Manager
- Return and toggle off exploded display





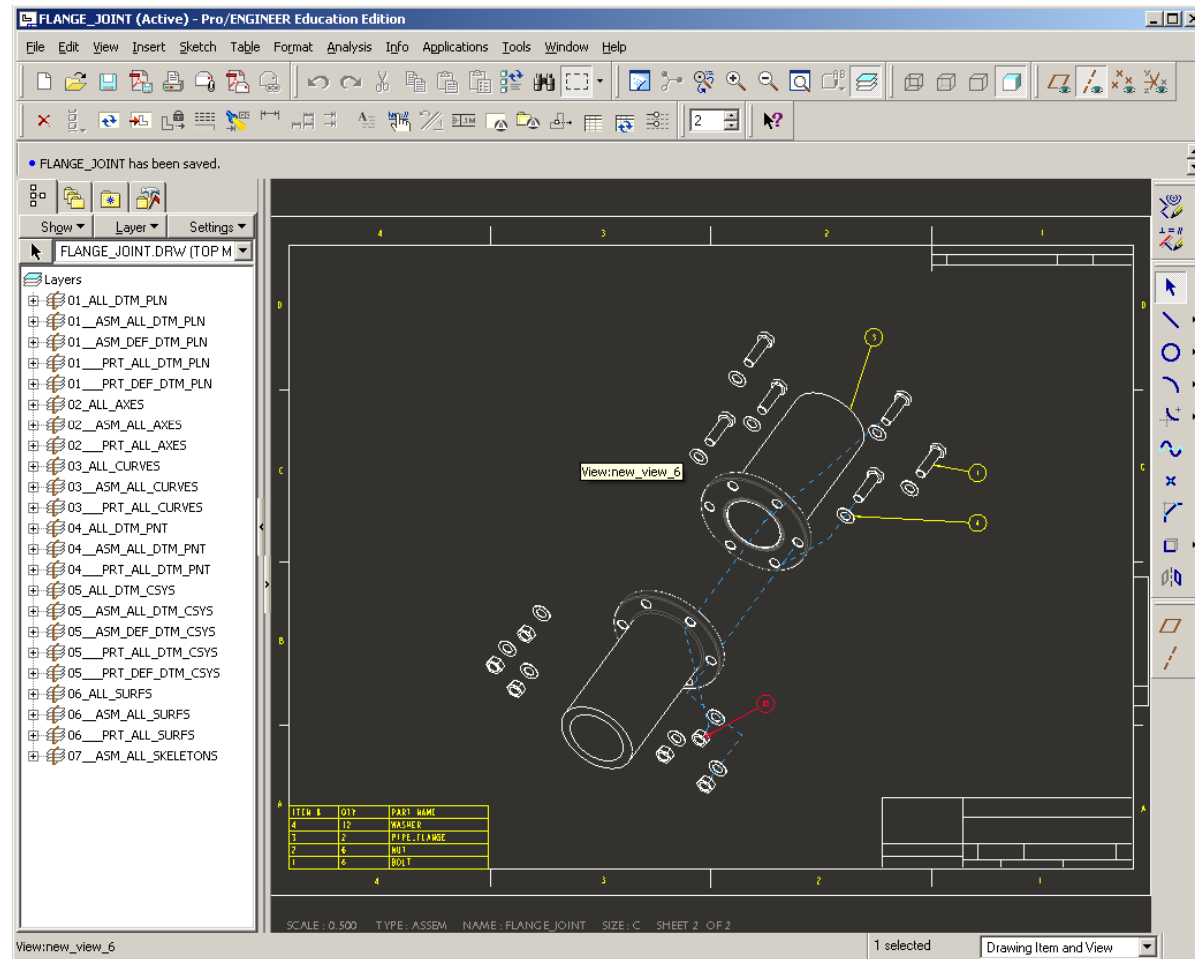
EXERCISE – Exploded View

- While we're at it....create a cross section (A-A) through ASM_FRONT datum just as we did for components





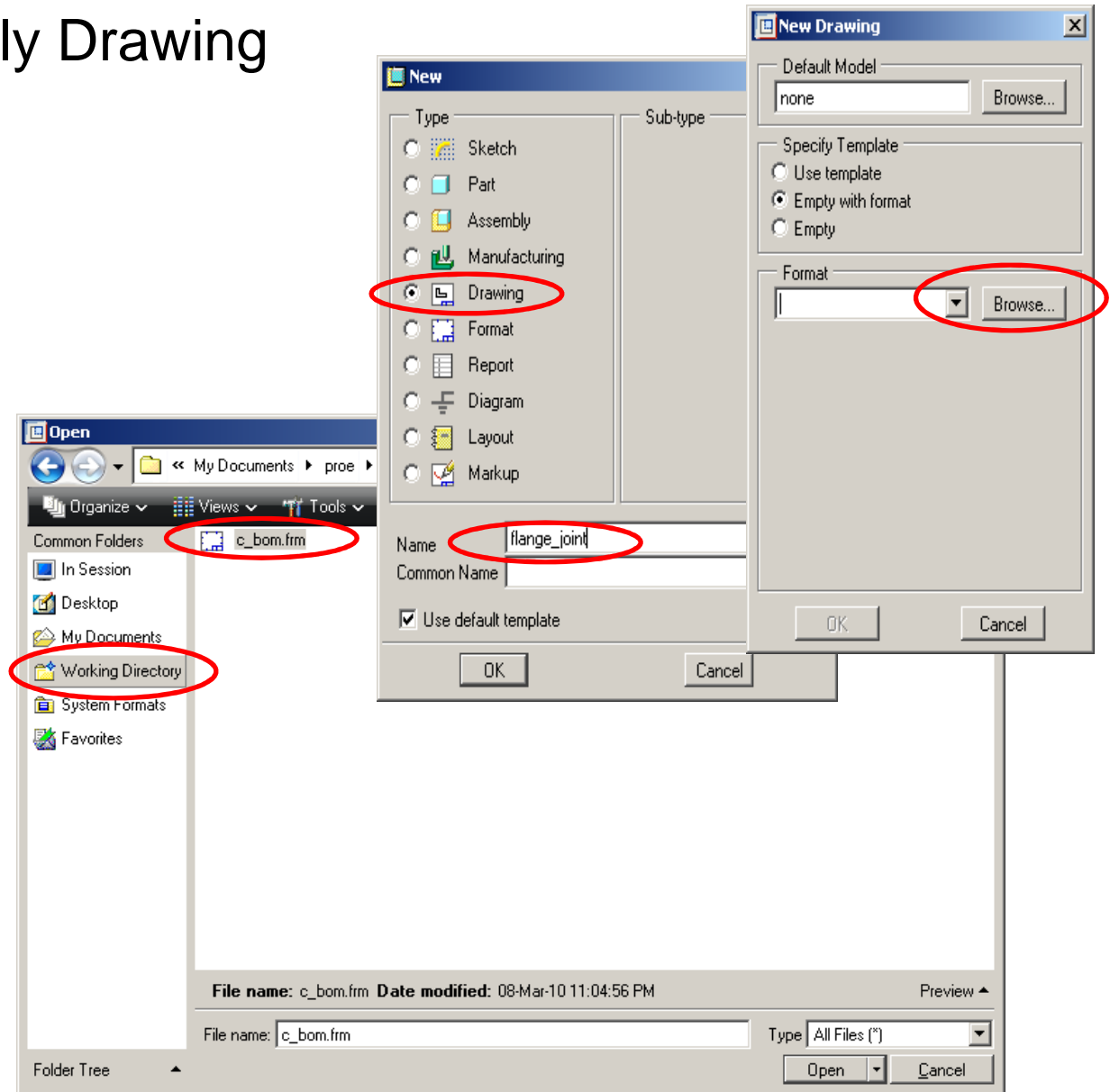
Assembly Drawing





EXERCISE - Assembly Drawing

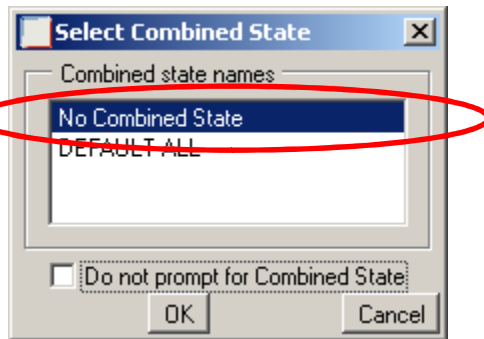
- Create an assembly drawing or the pipe flange assembly
 - Begins in same way as for components
 - Be sure to use same name as Assembly
- For Format, use c_bom.frm that came with the files for tonight's lecture (should be in working directory)



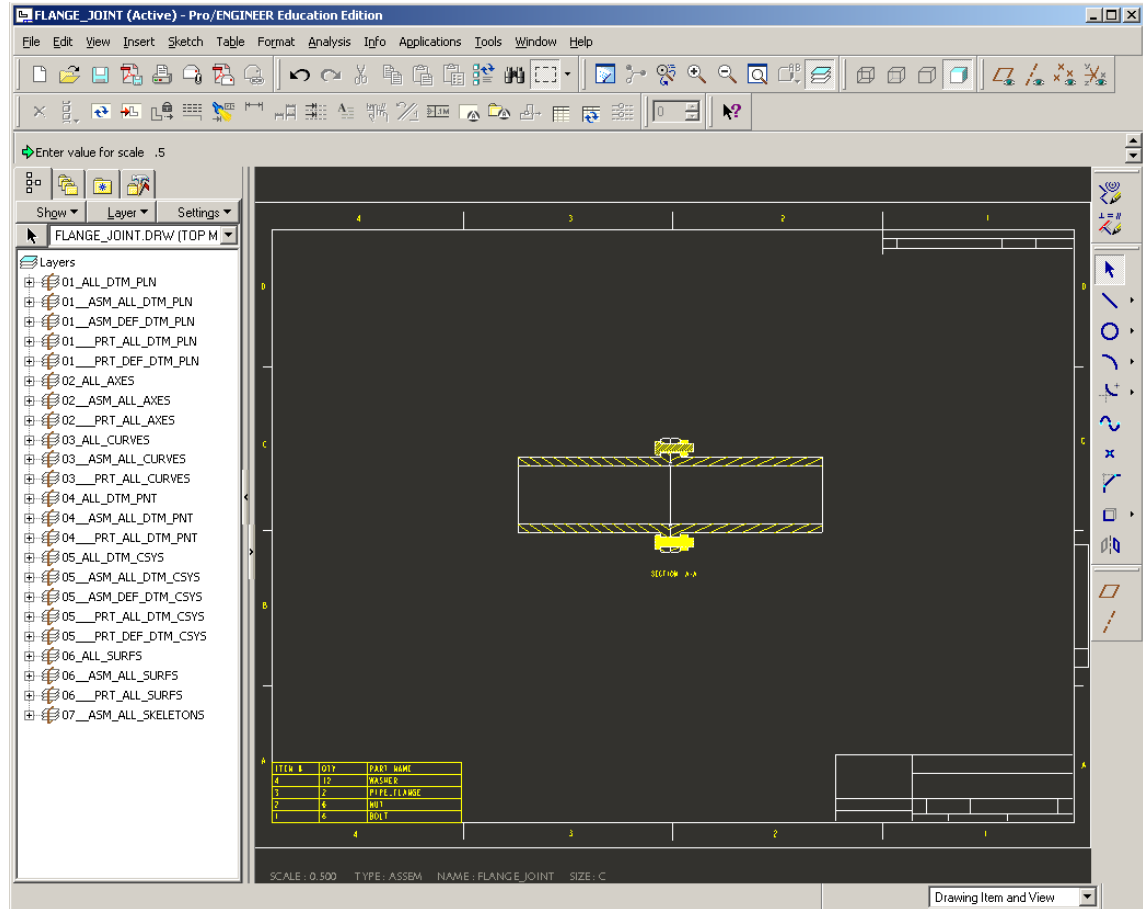


EXERCISE - Assembly Drawing

- When prompted select No Combined State



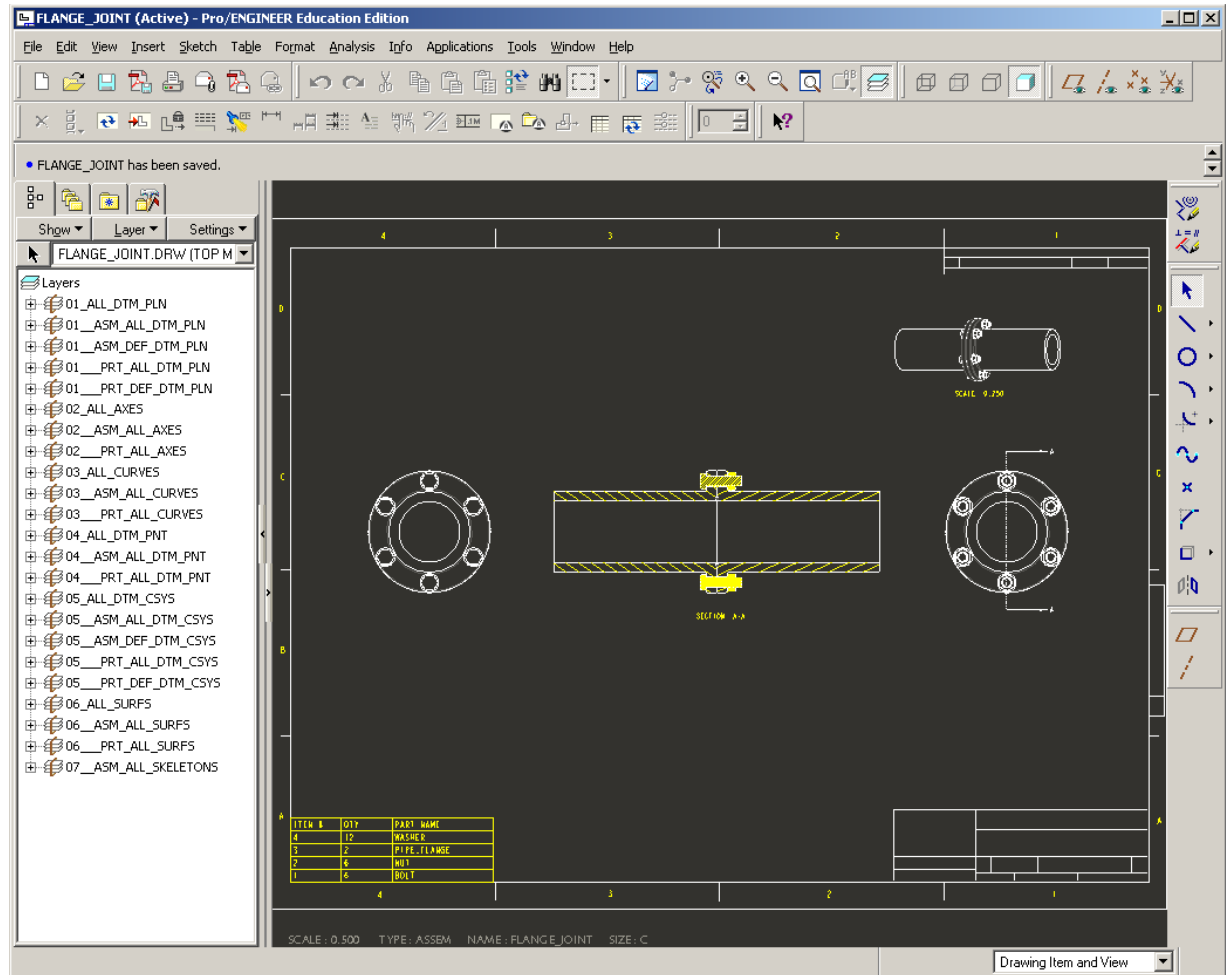
- Use FRONT orientation
- Set View Display to No Hidden, Tan-Dimmed
- Turn on Section A-A
- Change default scale to .5





EXERCISE - Assembly Drawing

- Add two projection views
- Add section arrow to one of them
- Add a general view to aid in visualization in upper right



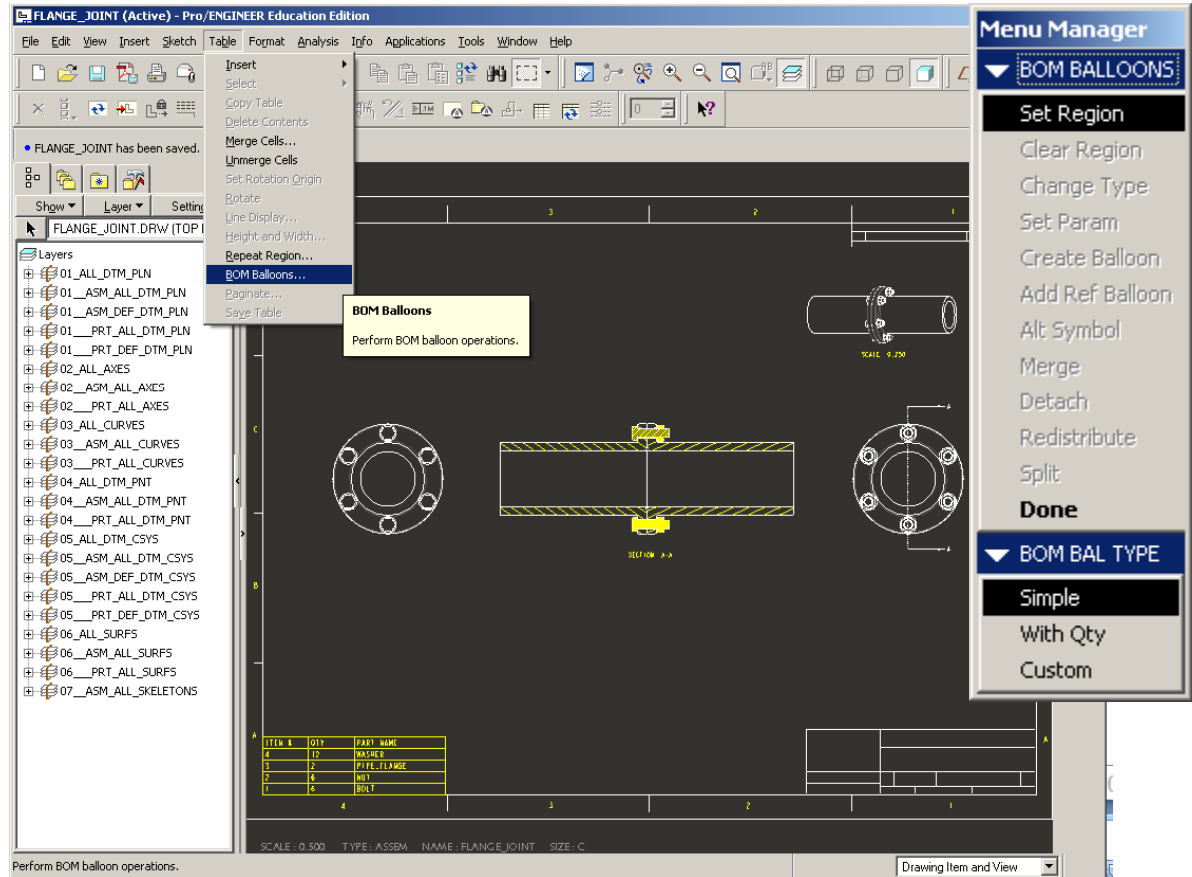


EXERCISE - Assembly Drawing

- Add Bill of Materials

balloons

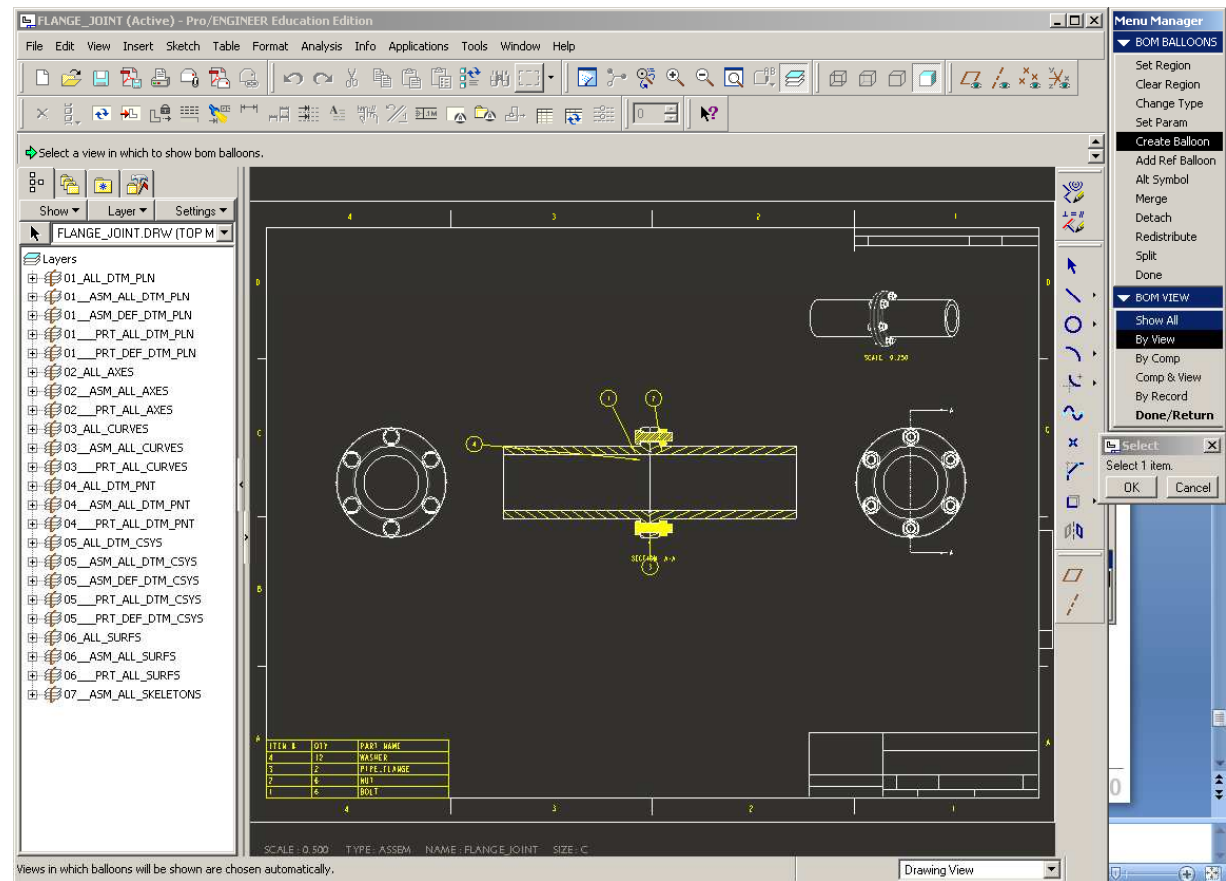
- Table > BOM Balloons
- Click on BOM table in lower left





EXERCISE - Assembly Drawing

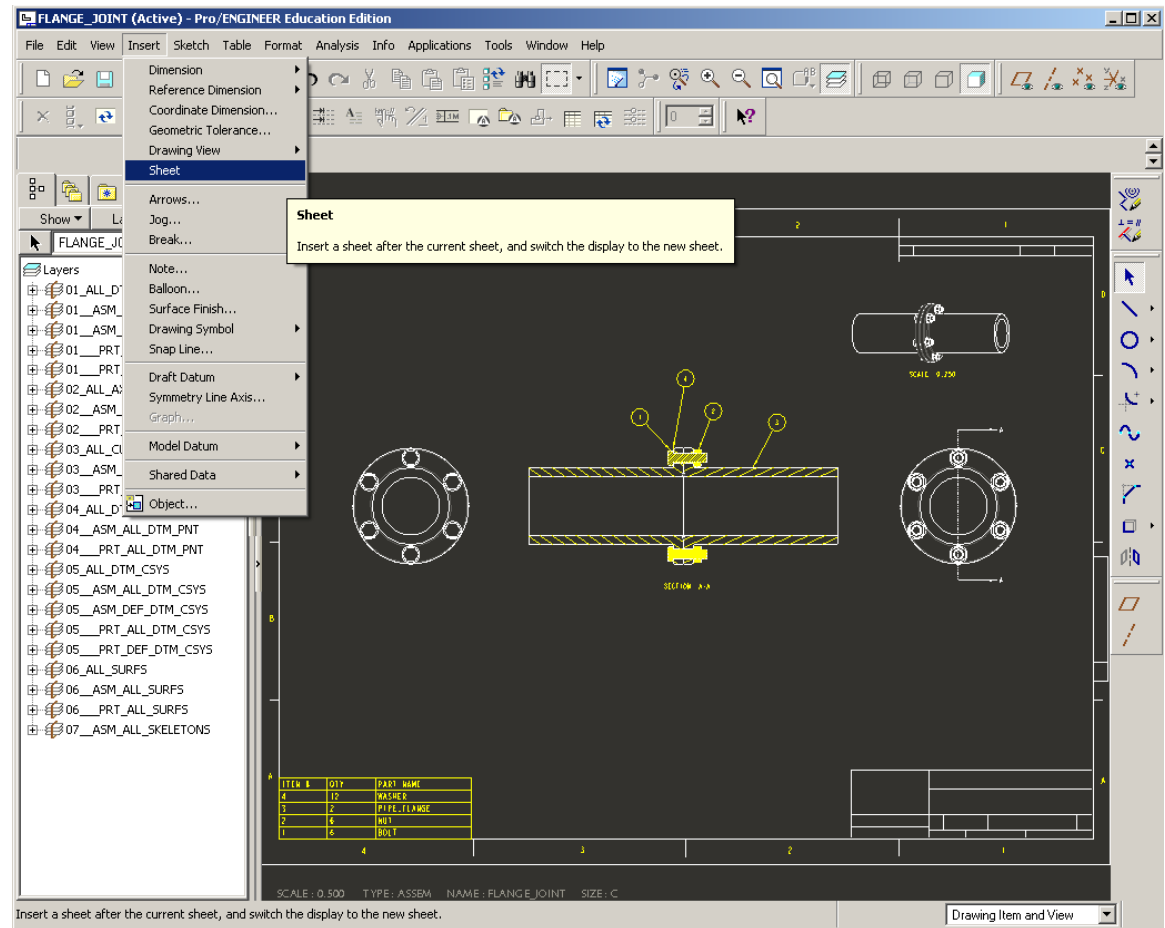
- Add Bill of Materials balloons (cont.)
 - Create Balloons
 - Show All
- Arrange balloons so they make sense
 - Edit Attachment
 - Re-arrange





EXERCISE - Assembly Drawing

- Create a second sheet for the exploded view
- Insert > Sheet





EXERCISE - Assembly Drawing

- Set View Display and show BOM balloons

