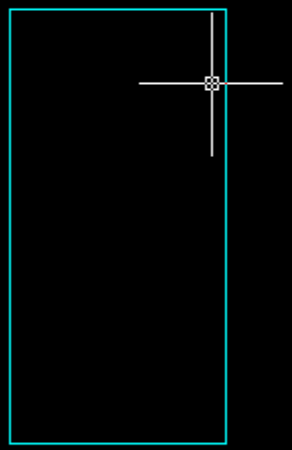
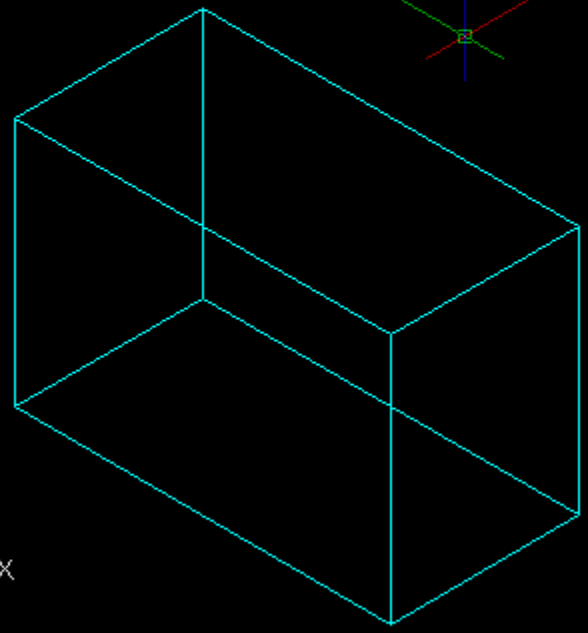
3D AUTOCAD

Thus far, we've looked at tools and operations in 2D with work completed on only the X- and Y-axes.

The axes symbol has been present on our screen but we haven't had much use for it.

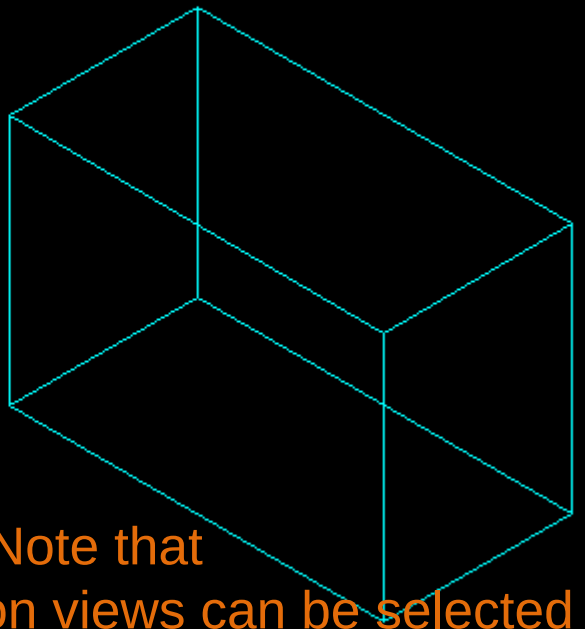


The view we've been working in is a **top** or **plan** view. From this view even a 3D drawing will appear 2D.



SWITCHING BETWEEN 2D & 3D

Switch between 2D and 3D views using the **View menu>3D Views> SW Isometric**, etc.



Select **Top** to return to a 2D viewing mode. Note that elevation views can be selected here as well: Left. Right, etc.

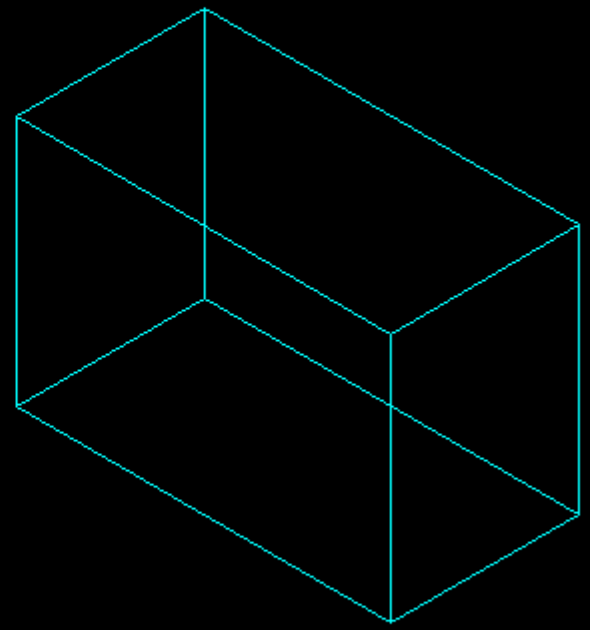
DRAWING IN 3D

While in a 3D view, draw a rectangle. To quickly turn that rectangle into a 3D object:

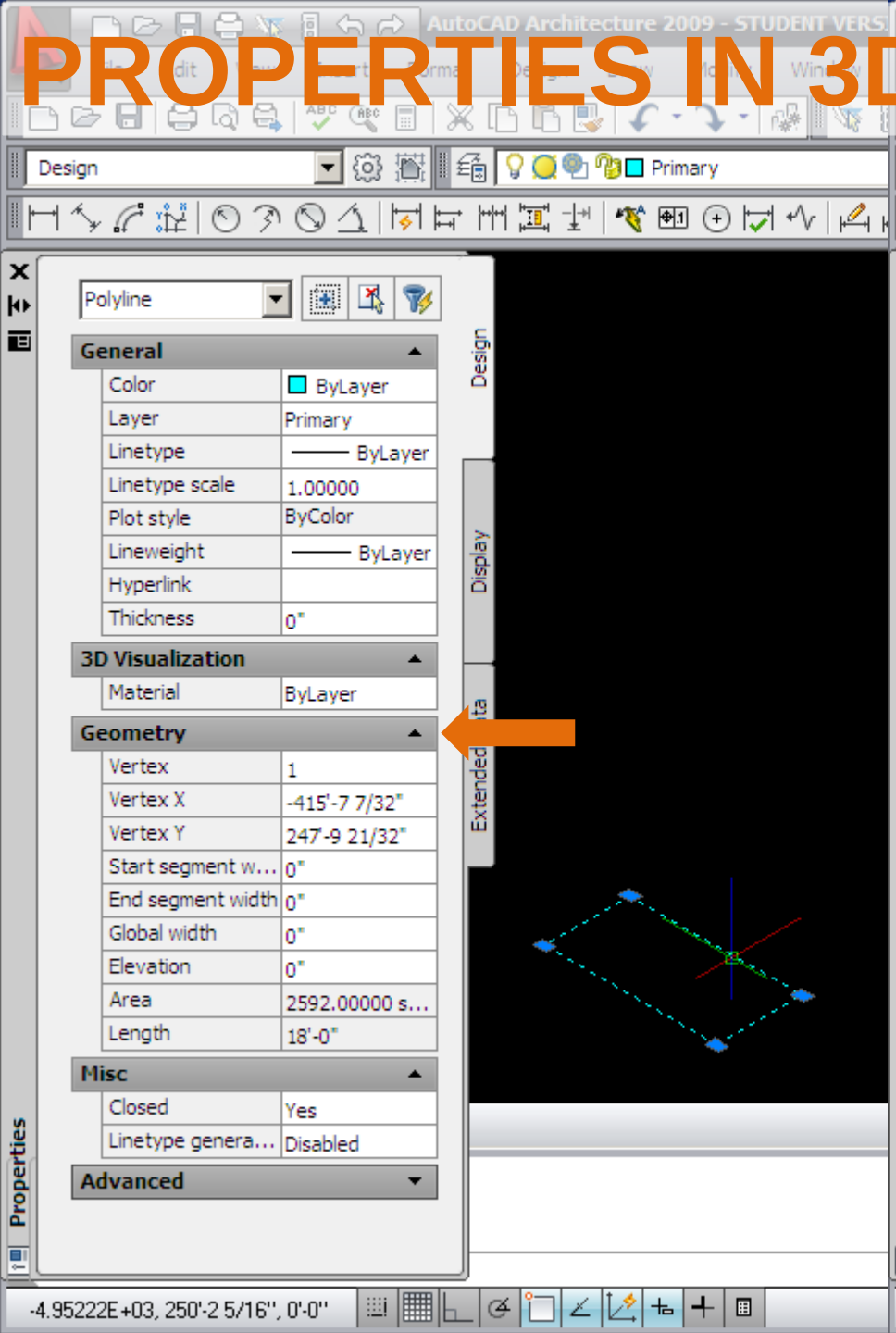
Type **extrude, spacebar.**

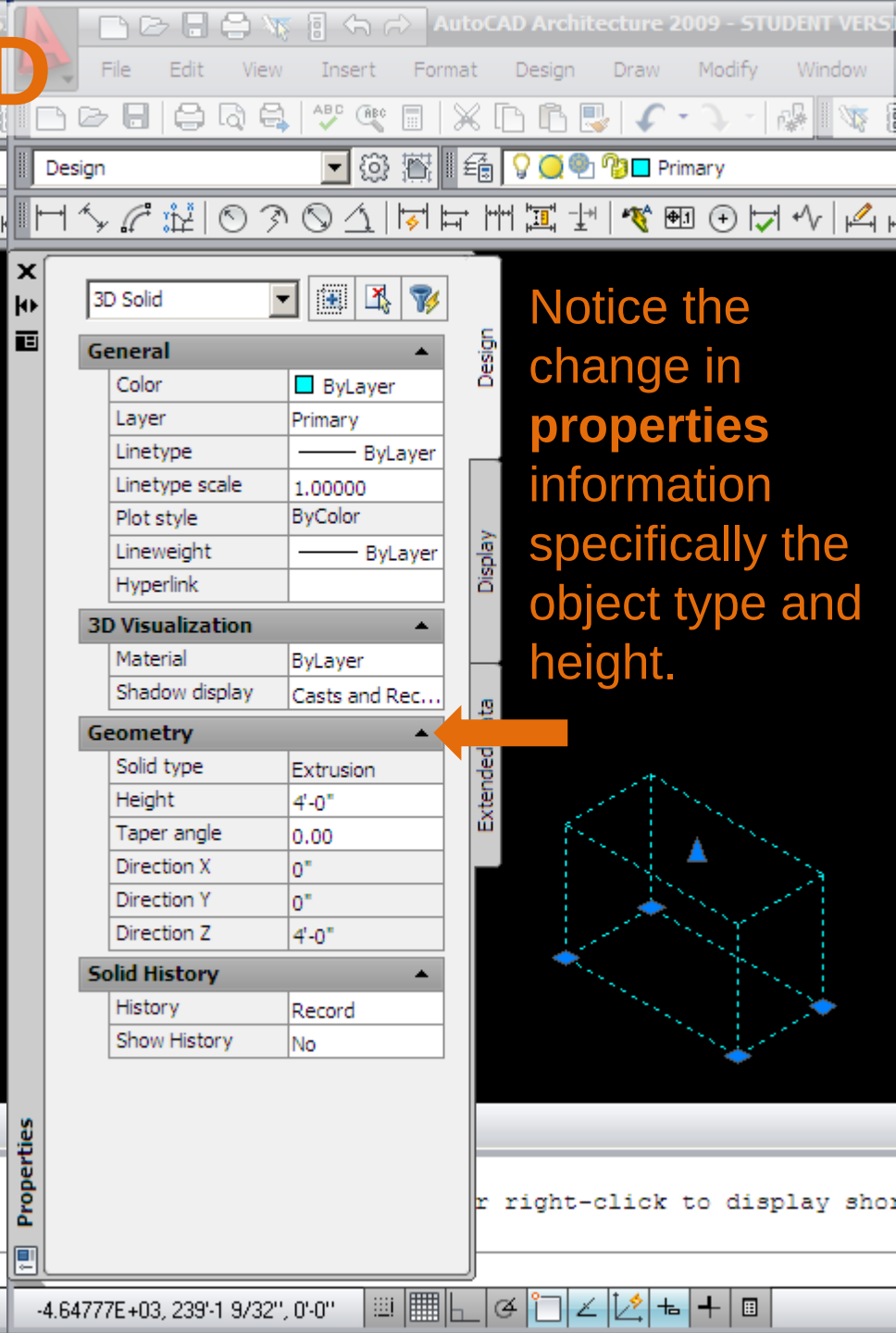
Select the rectangle to extrude.
Right-click to move onto the next prompt.

Notice that your cursor pulls the extrusion with it. Type a dimension into the command line to specify the distance.



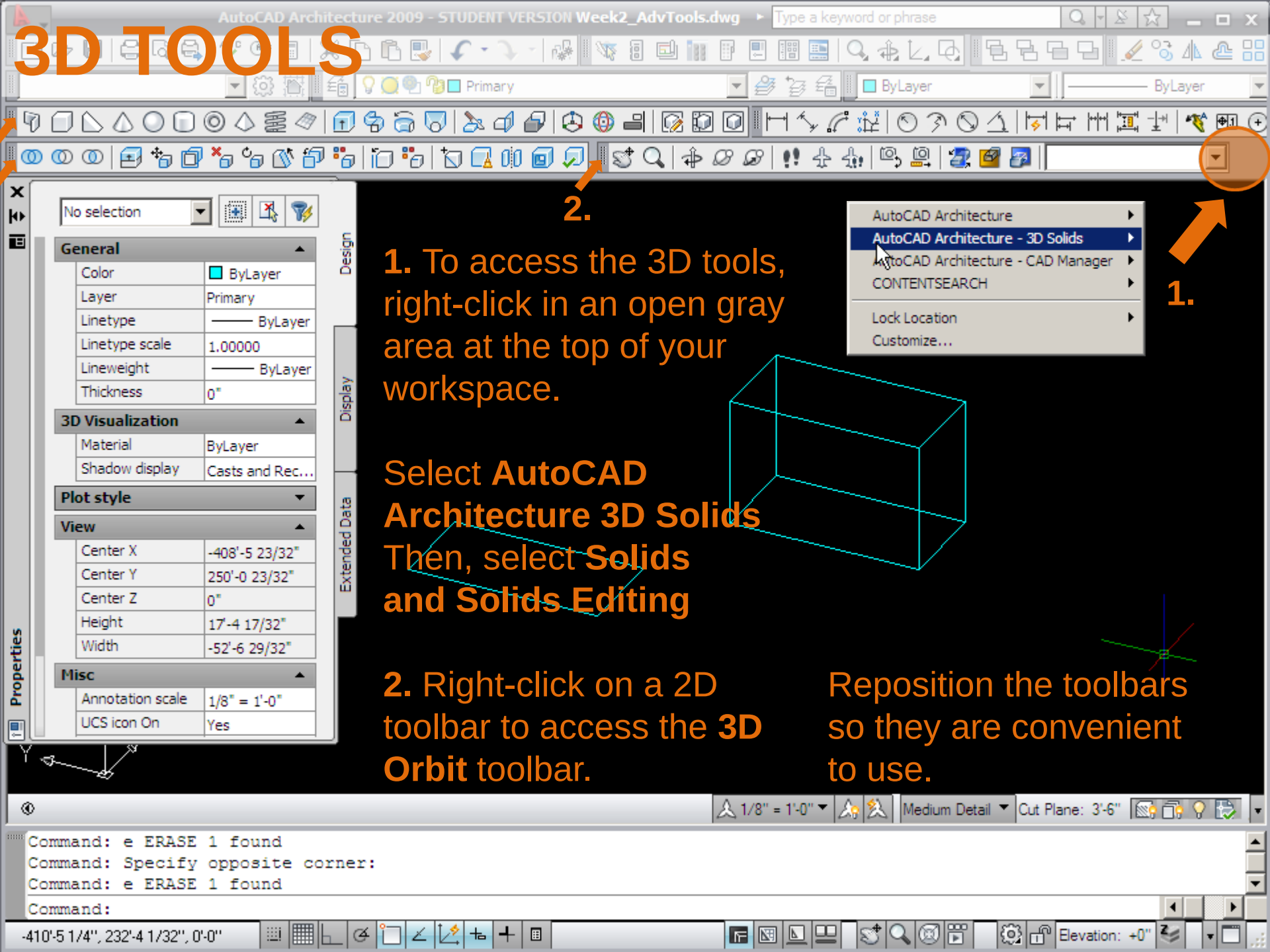
PROPERTIES IN 3D



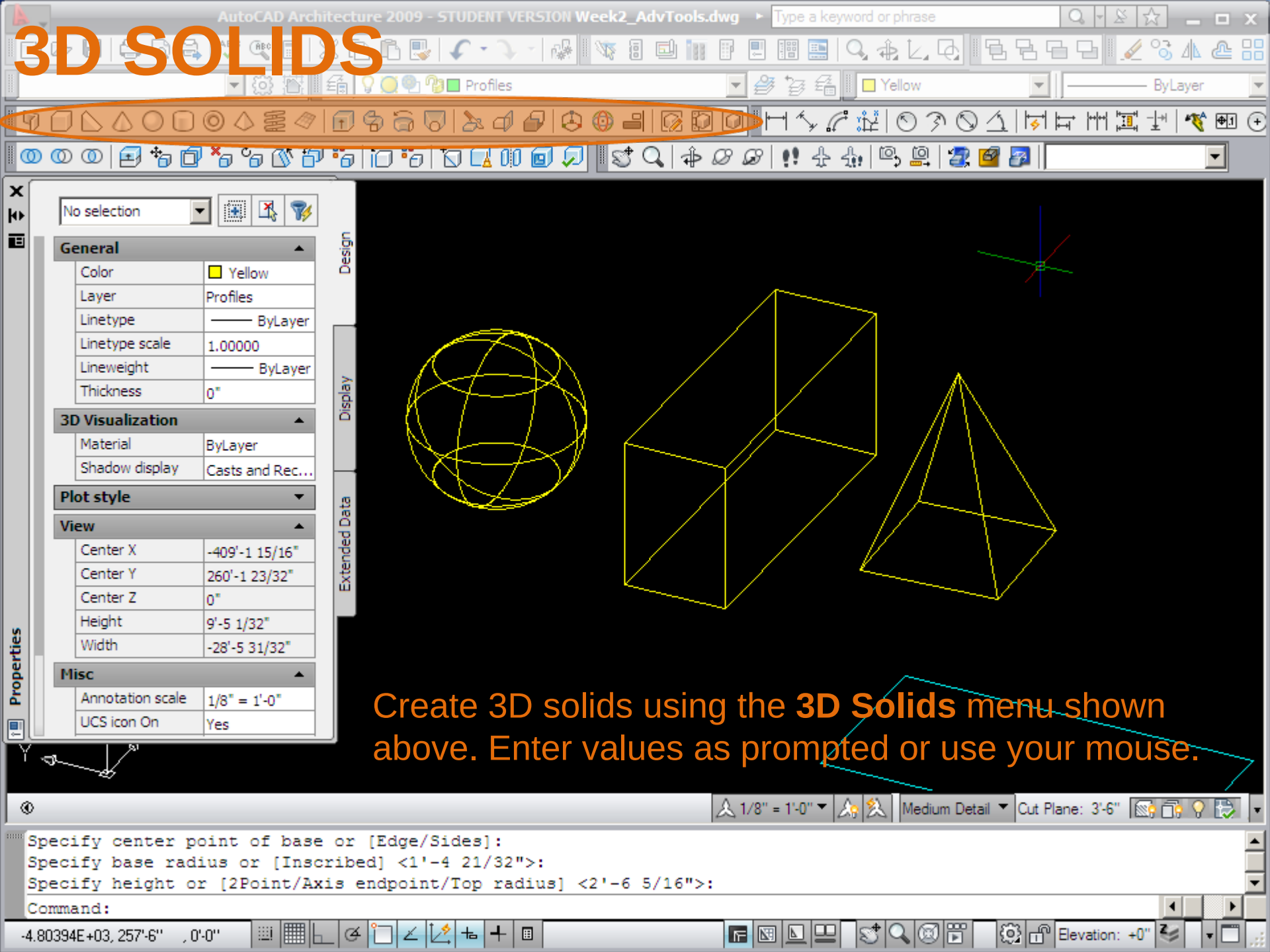


Notice the change in **properties** information specifically the object type and height.

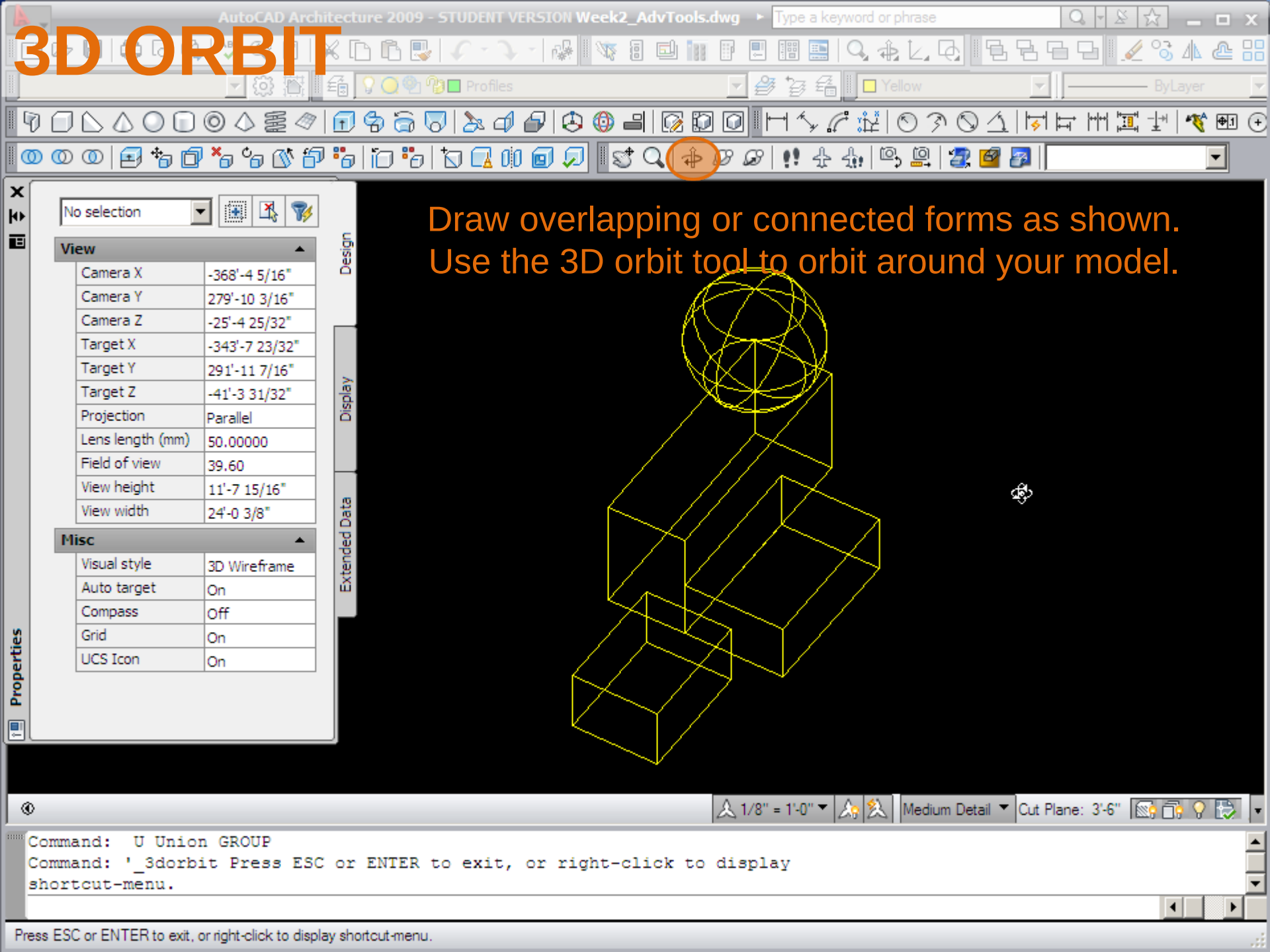
3D TOOLS


AutoCAD Architecture 2009 - STUDENT VERSION Week2_AdvTools.dwg
Type a keyword or phrase
Primary
ByLayer
ByLayer
No selection
General
Color ByLayer
Layer Primary
Linetype ByLayer
Linetype scale 1.00000
Lineweight ByLayer
Thickness 0"
3D Visualization
Material ByLayer
Shadow display Casts and Rec...
Plot style
View
Center X -408'-5 23/32"
Center Y 250'-0 23/32"
Center Z 0"
Height 17'-4 17/32"
Width -52'-6 29/32"
Misc
Annotation scale 1/8" = 1'-0"
UCS icon On Yes
Design
Display
Extended Data
Properties
2.
1. To access the 3D tools, right-click in an open gray area at the top of your workspace.
AutoCAD Architecture
AutoCAD Architecture - 3D Solids
AutoCAD Architecture - CAD Manager
CONTENTSEARCH
Lock Location
Customize...
1.
Select AutoCAD Architecture 3D Solids
Then, select Solids and Solids Editing
2. Right-click on a 2D toolbar to access the 3D Orbit toolbar.
Reposition the toolbars so they are convenient to use.
1/8" = 1'-0"
Medium Detail
Cut Plane: 3'-6"
Command: e ERASE 1 found
Command: Specify opposite corner:
Command: e ERASE 1 found
Command:
-410'-5 1/4", 232'-4 1/32", 0'-0"
Elevation: +0"

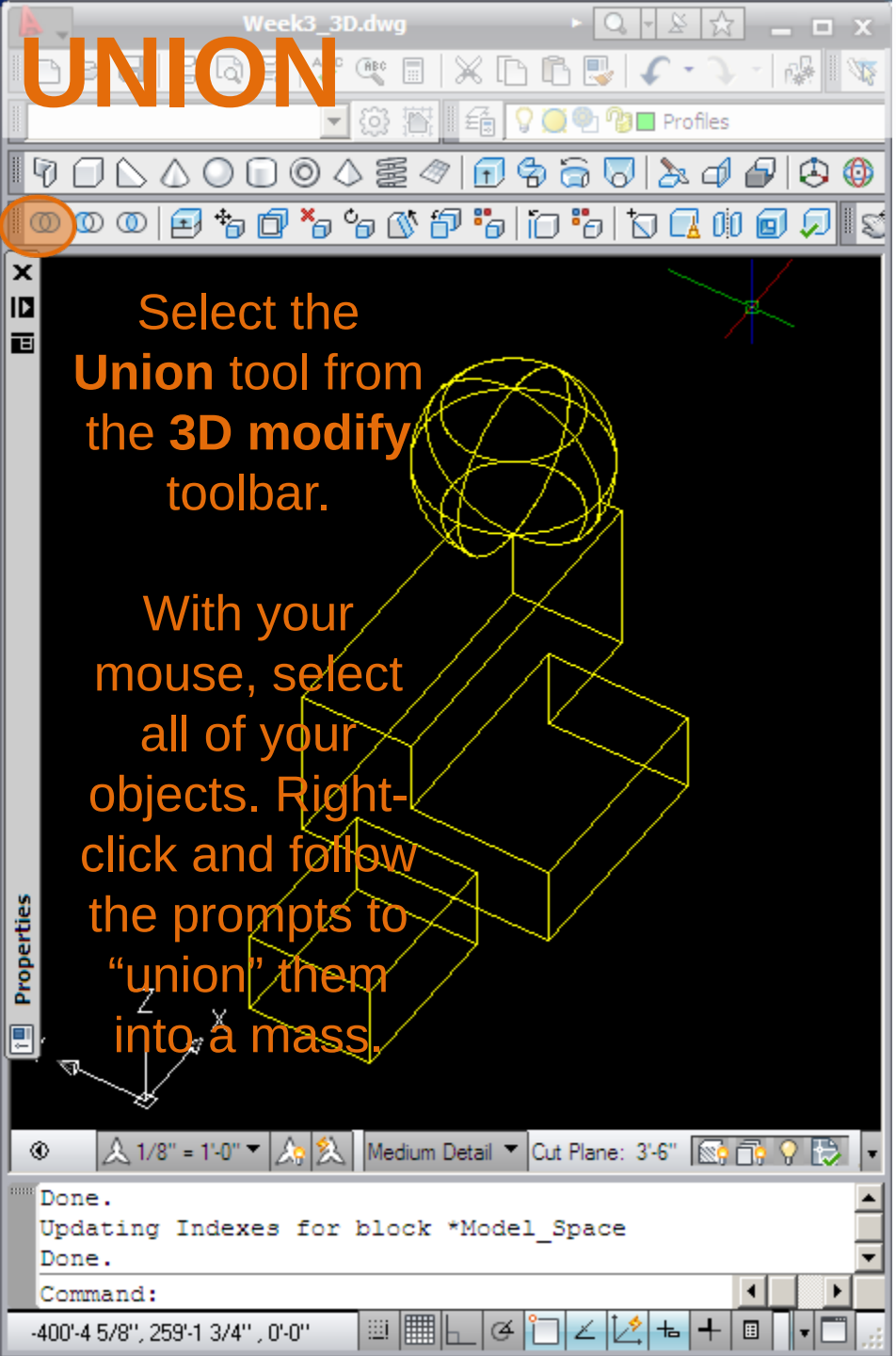
3D SOLIDS

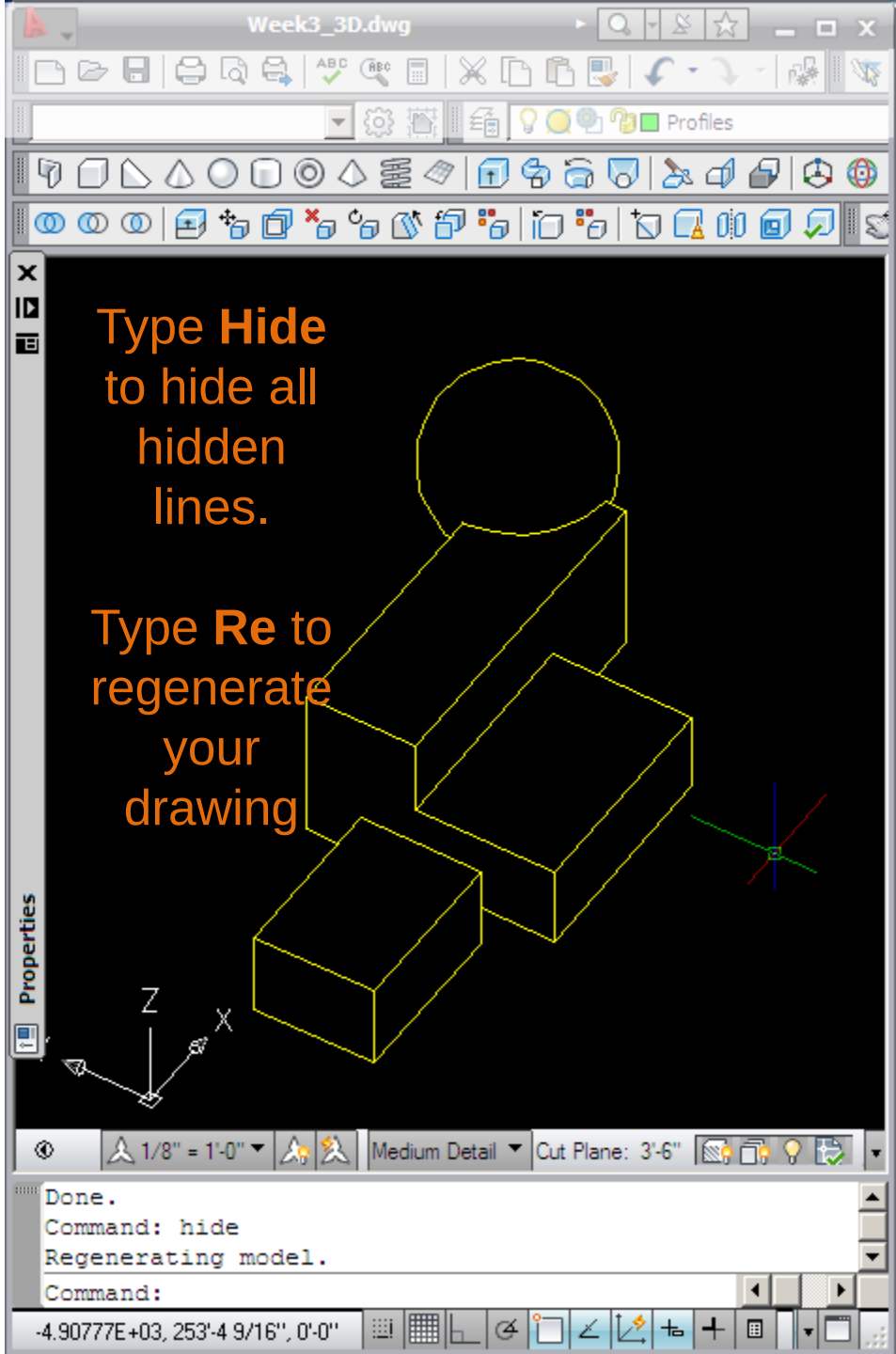

AutoCAD Architecture 2009 - STUDENT VERSION Week2_AdvTools.dwg
Type a keyword or phrase
Profiles
Yellow
ByLayer
No selection
General
Color Yellow
Layer Profiles
Linetype ByLayer
Linetype scale 1.00000
Lineweight ByLayer
Thickness 0"
3D Visualization
Material ByLayer
Shadow display Casts and Rec...
Plot style
View
Center X -409'-1 15/16"
Center Y 260'-1 23/32"
Center Z 0"
Height 9'-5 1/32"
Width -28'-5 31/32"
Misc
Annotation scale 1/8" = 1'-0"
UCS icon On Yes
Design
Display
Extended Data
Properties
Create 3D solids using the 3D Solids menu shown above. Enter values as prompted or use your mouse.
1/8" = 1'-0"
Medium Detail
Cut Plane: 3'-6"
Specify center point of base or [Edge/Sides]:
Specify base radius or [Inscribed] <1'-4 21/32">:
Specify height or [2Point/Axis endpoint/Top radius] <2'-6 5/16">:
Command:
-4.80394E+03, 257'-6" , 0'-0"
Elevation: +0"

3D ORBIT

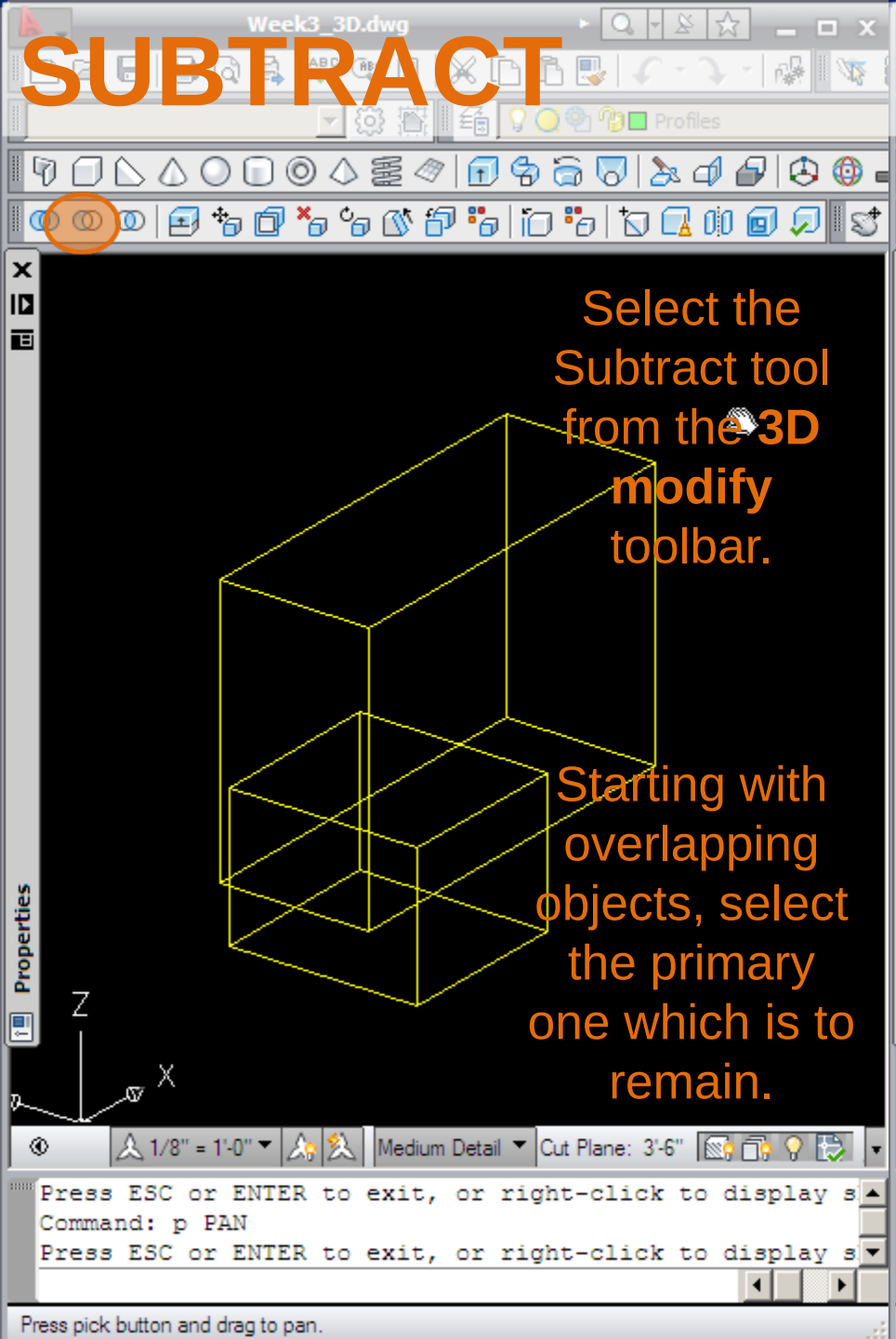

AutoCAD Architecture 2009 - STUDENT VERSION Week2_AdvTools.dwg
Type a keyword or phrase
Profiles
Yellow
ByLayer
No selection
View
Camera X -368'-4 5/16"
Camera Y 279'-10 3/16"
Camera Z -25'-4 25/32"
Target X -343'-7 23/32"
Target Y 291'-11 7/16"
Target Z -41'-3 31/32"
Projection Parallel
Lens length (mm) 50.00000
Field of view 39.60
View height 11'-7 15/16"
View width 24'-0 3/8"
Misc
Visual style 3D Wireframe
Auto target On
Compass Off
Grid On
UCS Icon On
Design
Display
Extended Data
Properties
Draw overlapping or connected forms as shown.
Use the 3D orbit tool to orbit around your model.
1/8" = 1'-0"
Medium Detail
Cut Plane: 3'-6"
Command: U Union GROUP
Command: '_3dorbit Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Press ESC or ENTER to exit, or right-click to display shortcut-menu.

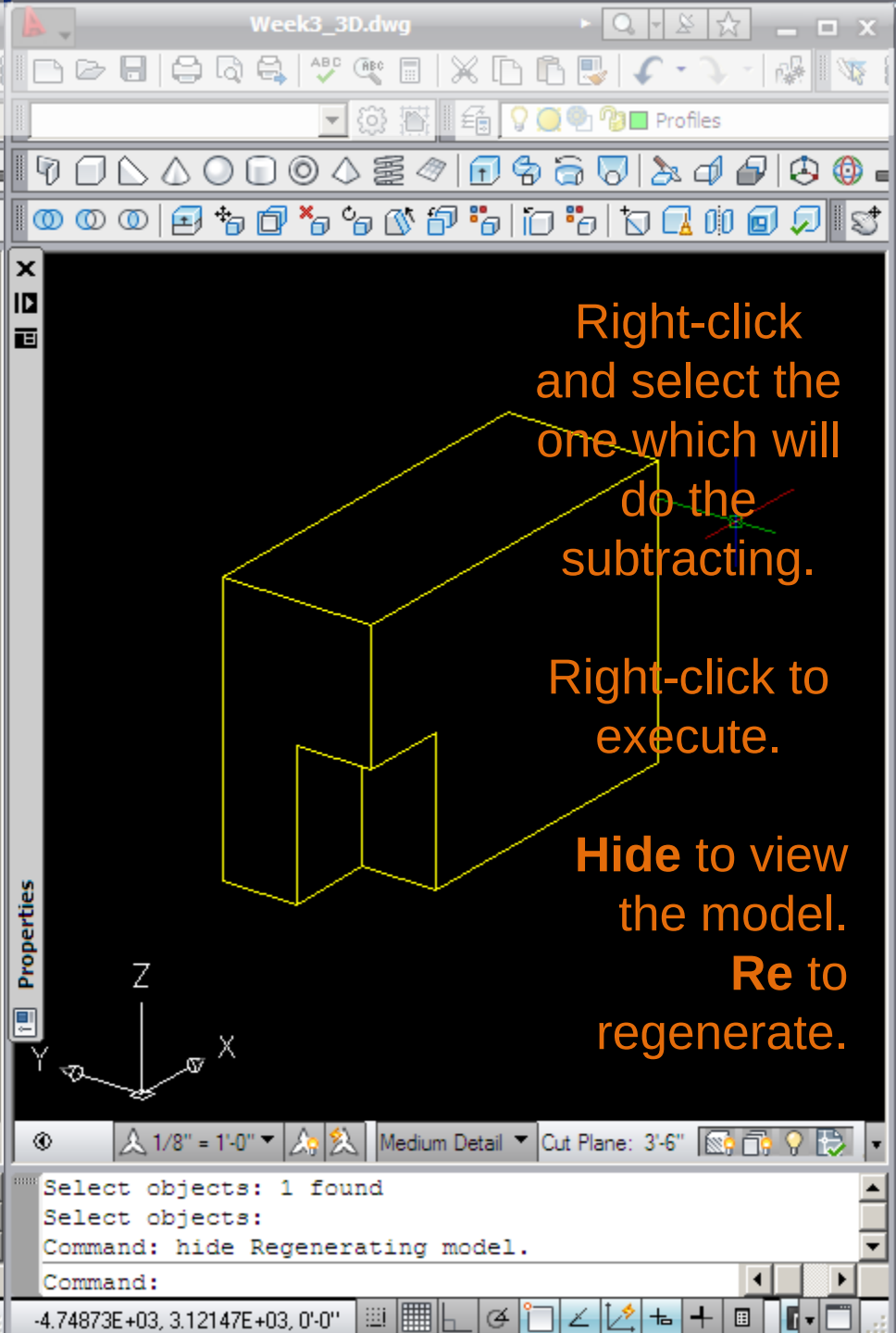
UNION


Week3_3D.dwg
Profiles
Select the **Union** tool from the **3D modify** toolbar.
With your mouse, select all of your objects. Right-click and follow the prompts to "union" them into a mass.
Properties
Z
X
1/8" = 1'-0"
Medium Detail
Cut Plane: 3'-6"
Done.
Updating Indexes for block *Model_Space
Done.
Command:
-400'-4 5/8", 259'-1 3/4", 0'-0"


Week3_3D.dwg
Profiles
Type **Hide** to hide all hidden lines.
Type **Re** to regenerate your drawing
Properties
Z
X
1/8" = 1'-0"
Medium Detail
Cut Plane: 3'-6"
Done.
Command: hide
Regenerating model.
Command:
-4.90777E+03, 253'-4 9/16", 0'-0"

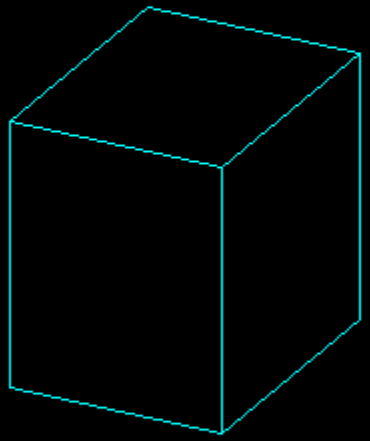
SUBTRACT


Week3_3D.dwg
Profiles
Select the Subtract tool from the **3D modify** toolbar.
Starting with overlapping objects, select the primary one which is to remain.
Properties
Z
X
1/8" = 1'-0"
Medium Detail
Cut Plane: 3'-6"
Press ESC or ENTER to exit, or right-click to display s
Command: p PAN
Press ESC or ENTER to exit, or right-click to display s
Press pick button and drag to pan.


Week3_3D.dwg
Profiles
Right-click and select the one which will do the subtracting.
Right-click to execute.
Hide to view the model.
Re to regenerate.
Properties
Z
Y
X
1/8" = 1'-0"
Medium Detail
Cut Plane: 3'-6"
Select objects: 1 found
Select objects:
Command: hide Regenerating model.
Command:
-4.74873E+03, 3.12147E+03, 0'-0"

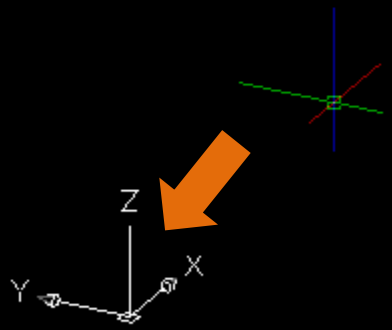
UCS

The UCS system (User Coordinate System) allows us to redefine where our drawing plane is.

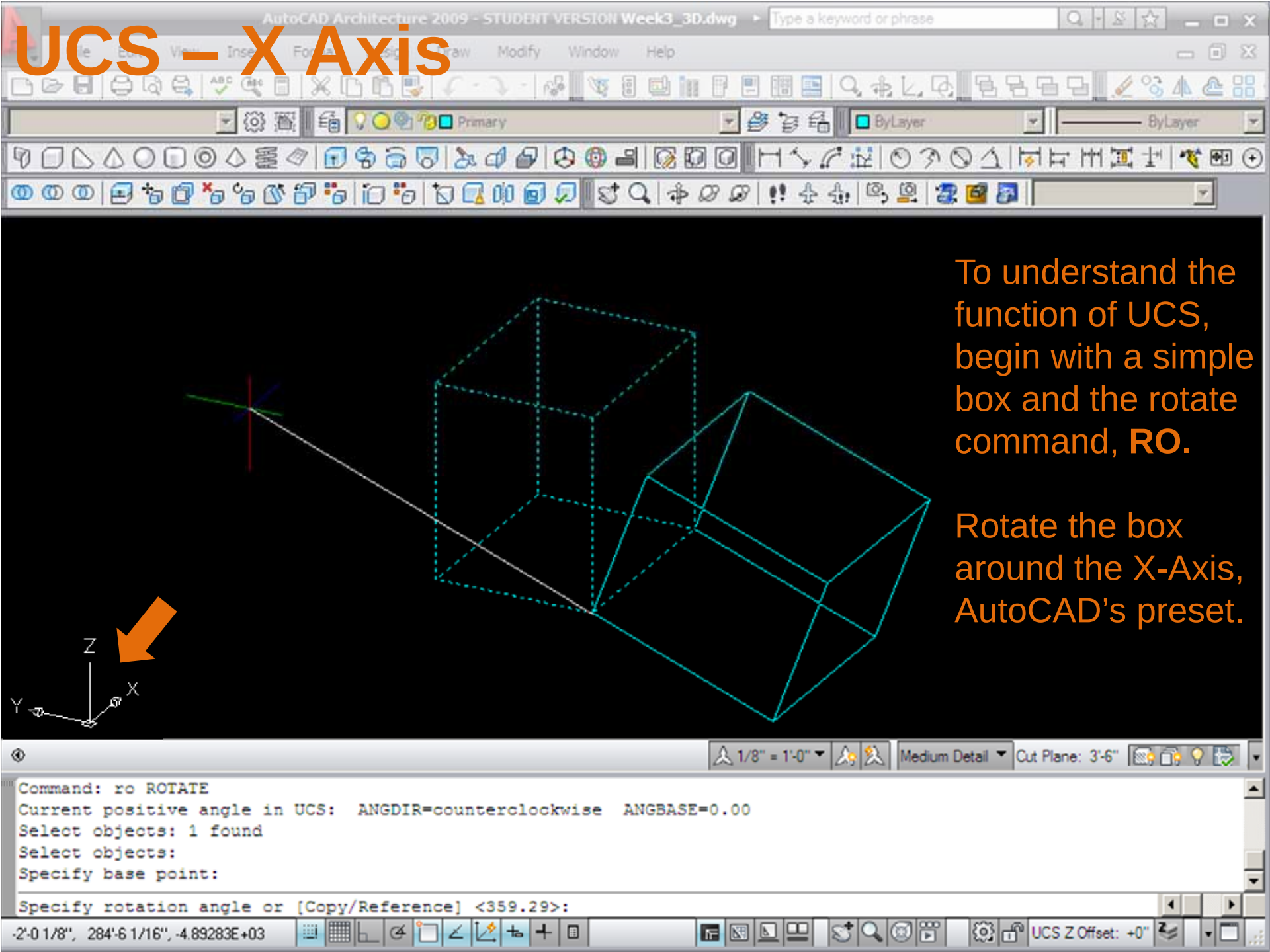


In 2D we drew in the WCS or World Coordinate System, one which presumes the ground plane is always in the same location, defined by X & Y axes.

It's often necessary to adjust this when working with the Z-axis in 3D.



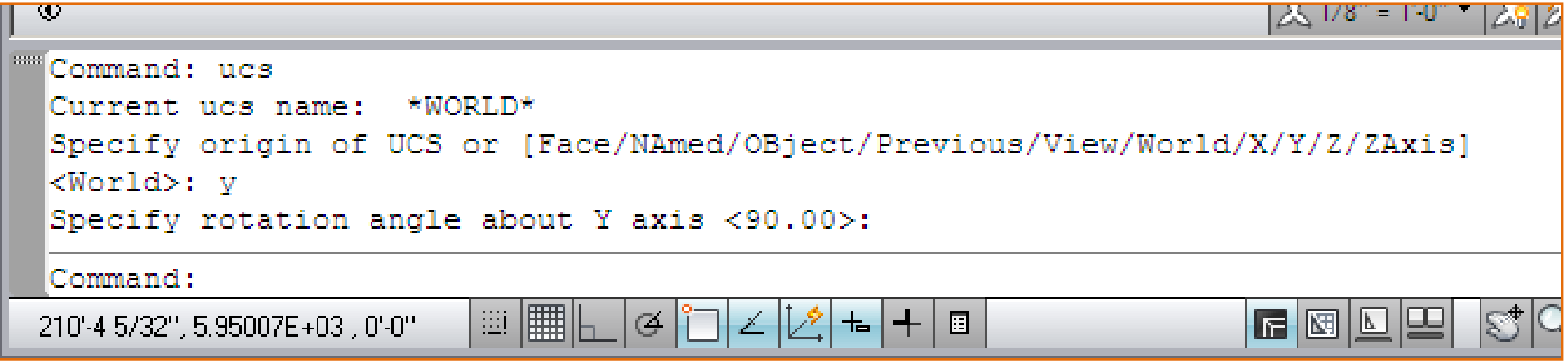
UCS – X Axis



To understand the function of UCS, begin with a simple box and the rotate command, **RO.**

Rotate the box around the X-Axis, AutoCAD's preset.

WCS



To change the UCS, activate the command:

UCS, Spacebar

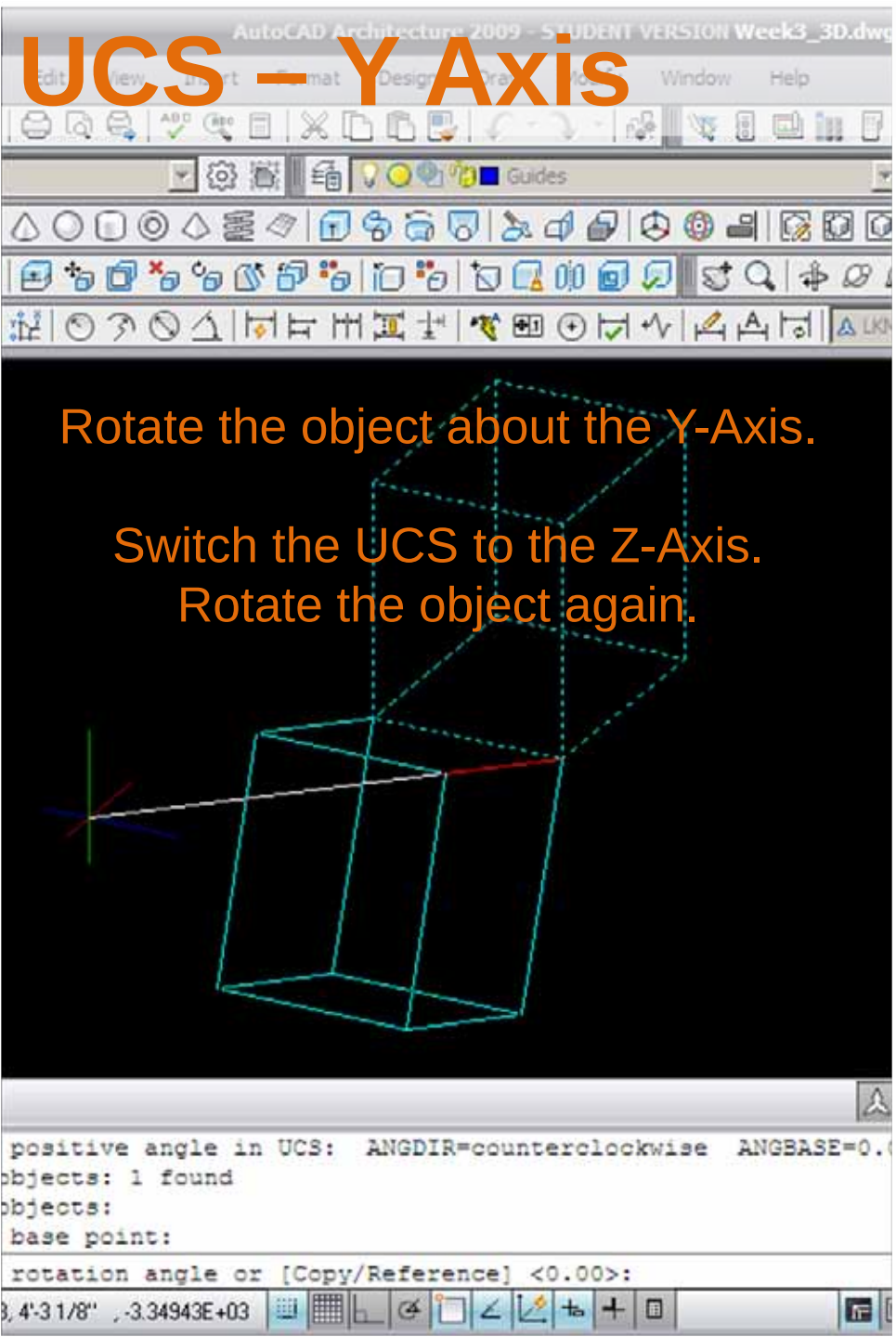
Y (for Y-axis, according to the prompts), **Spacebar**

Spacebar again to accept a 90 degree rotation angle

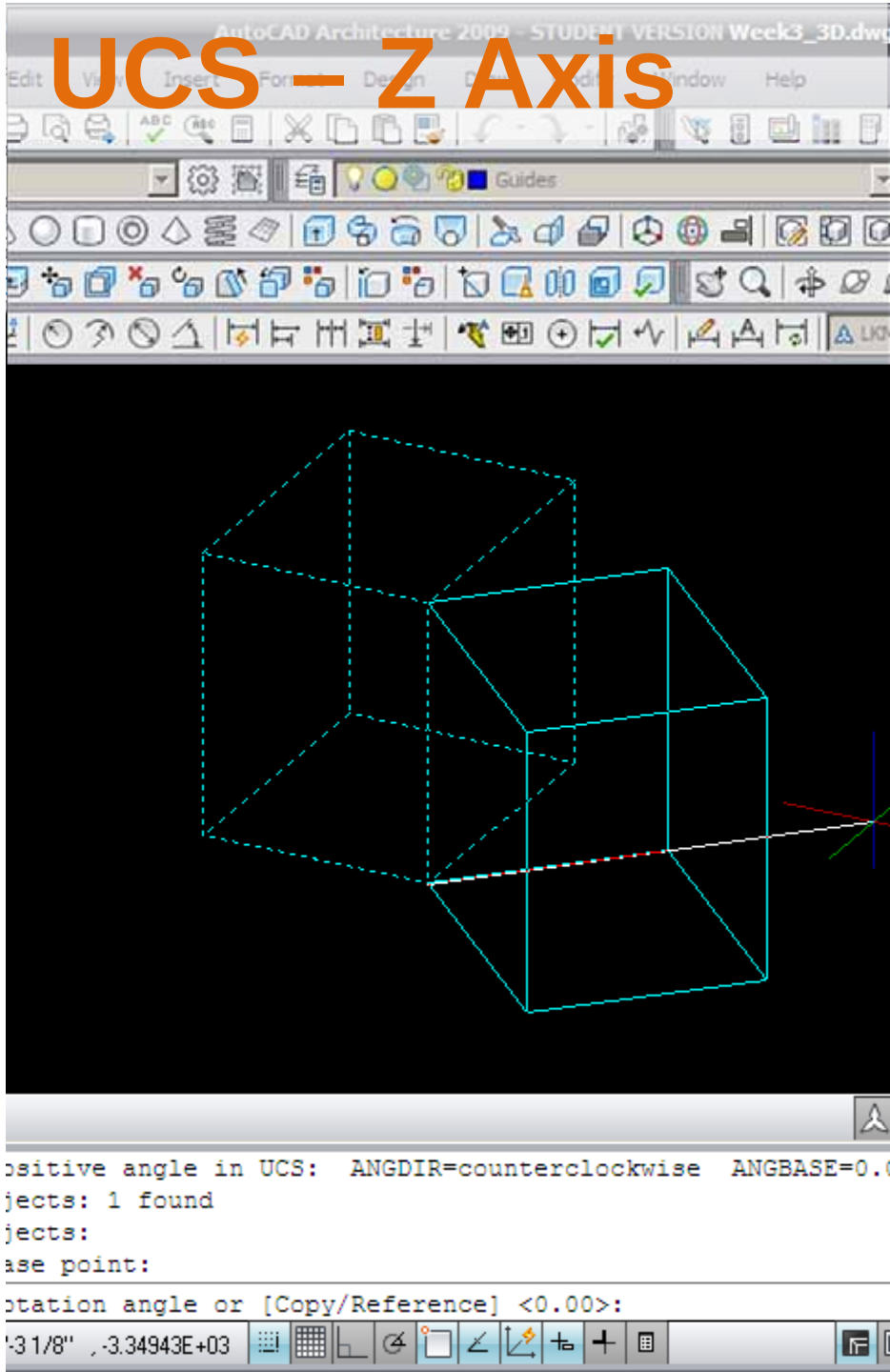
UCS – Y Axis

Rotate the object about the Y-Axis.

Switch the UCS to the Z-Axis.
Rotate the object again.

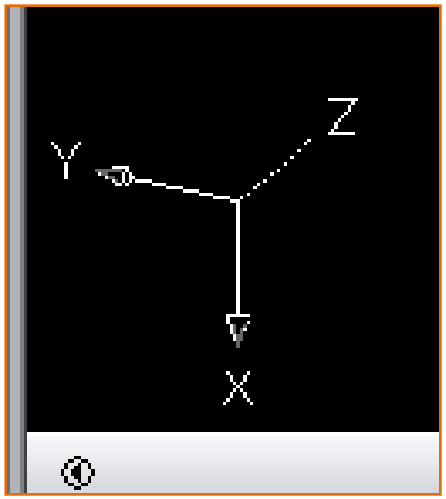


UCS – Z Axis



RESET WCS

When switching between UCS settings, the coordinate system may need to be reset to the present World Coordinate System or WCS



To return to WCS, type **UCS, Spacebar, W**.

```
Command: *Cancel*
Command: ucs
Current ucs name:  *NO NAME*
Specify origin of UCS or [Face/NAmed/OBject/Previous/View/World/X/Y/Z/ZAxis]
<World>: w

Command:
-4.96831E+03, 278'-7 1/8", 0'-0"
```

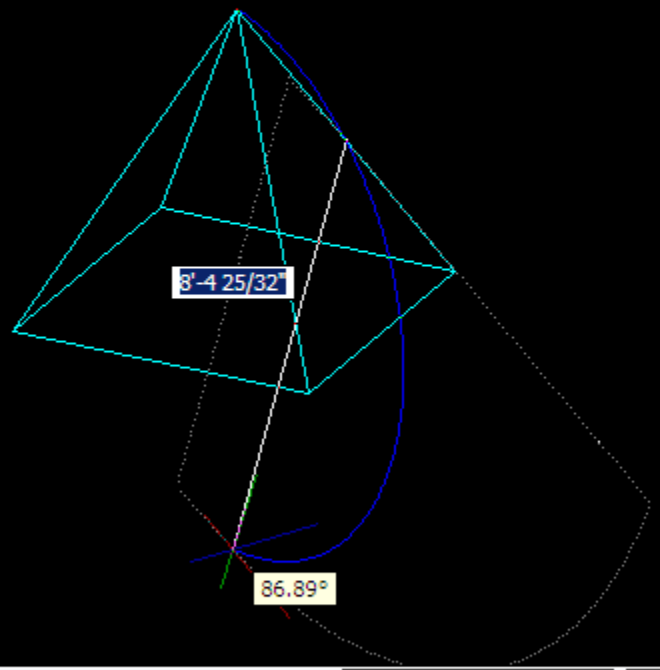
UCS – Face

To set a non-orthogonal face as the drawing plane, type **UCS, Spacebar.**

F for Face.

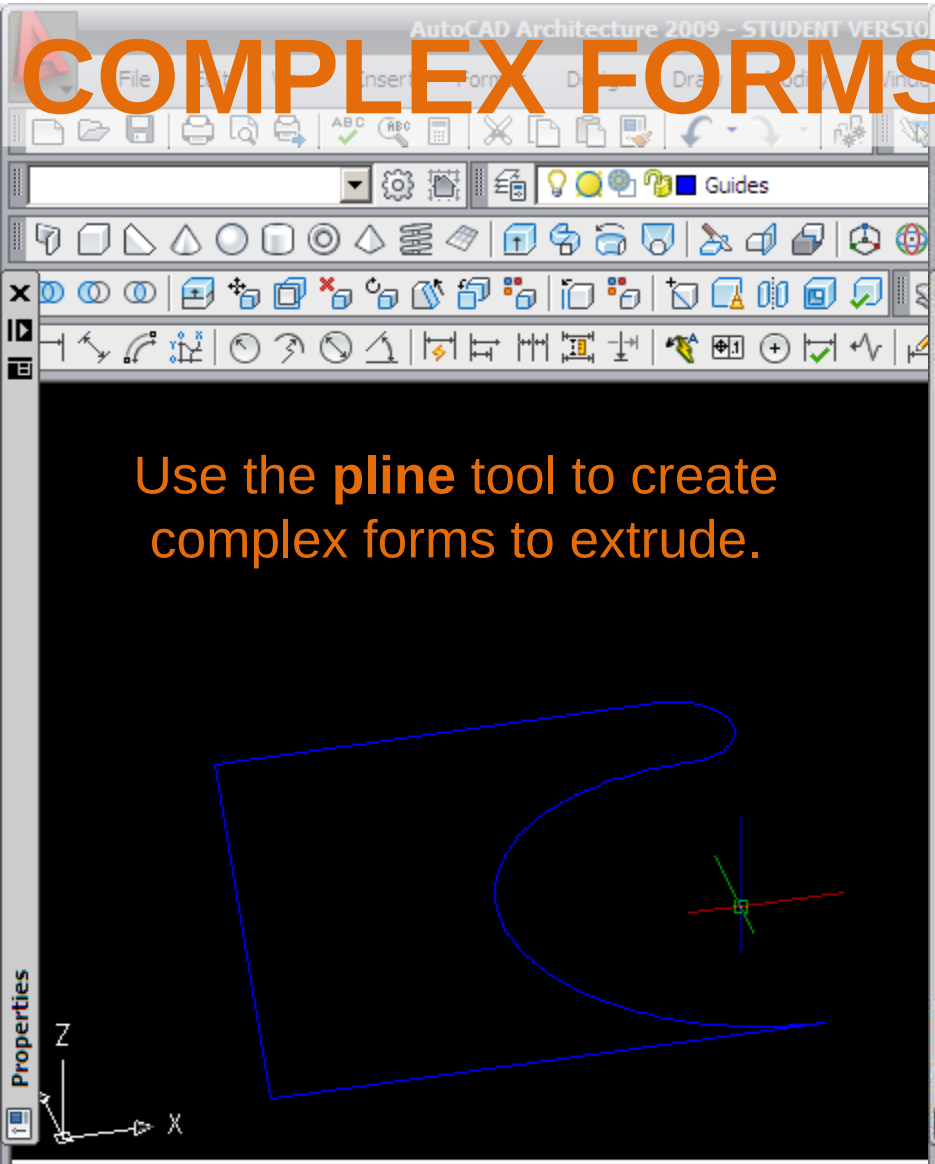
Then, use the tools to draw upon that face.

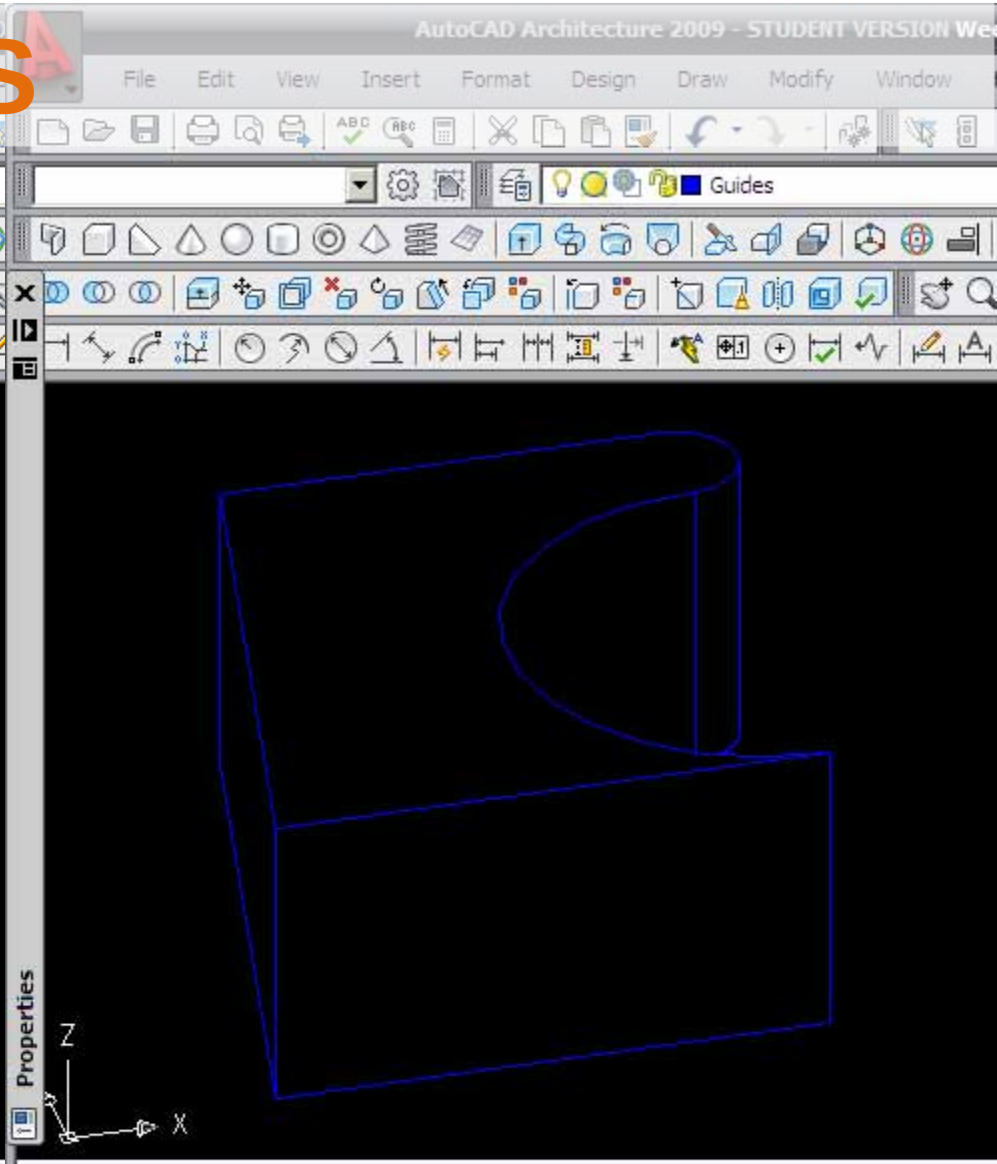
Return to WCS upon completion. **(WCS, Spacebar)**



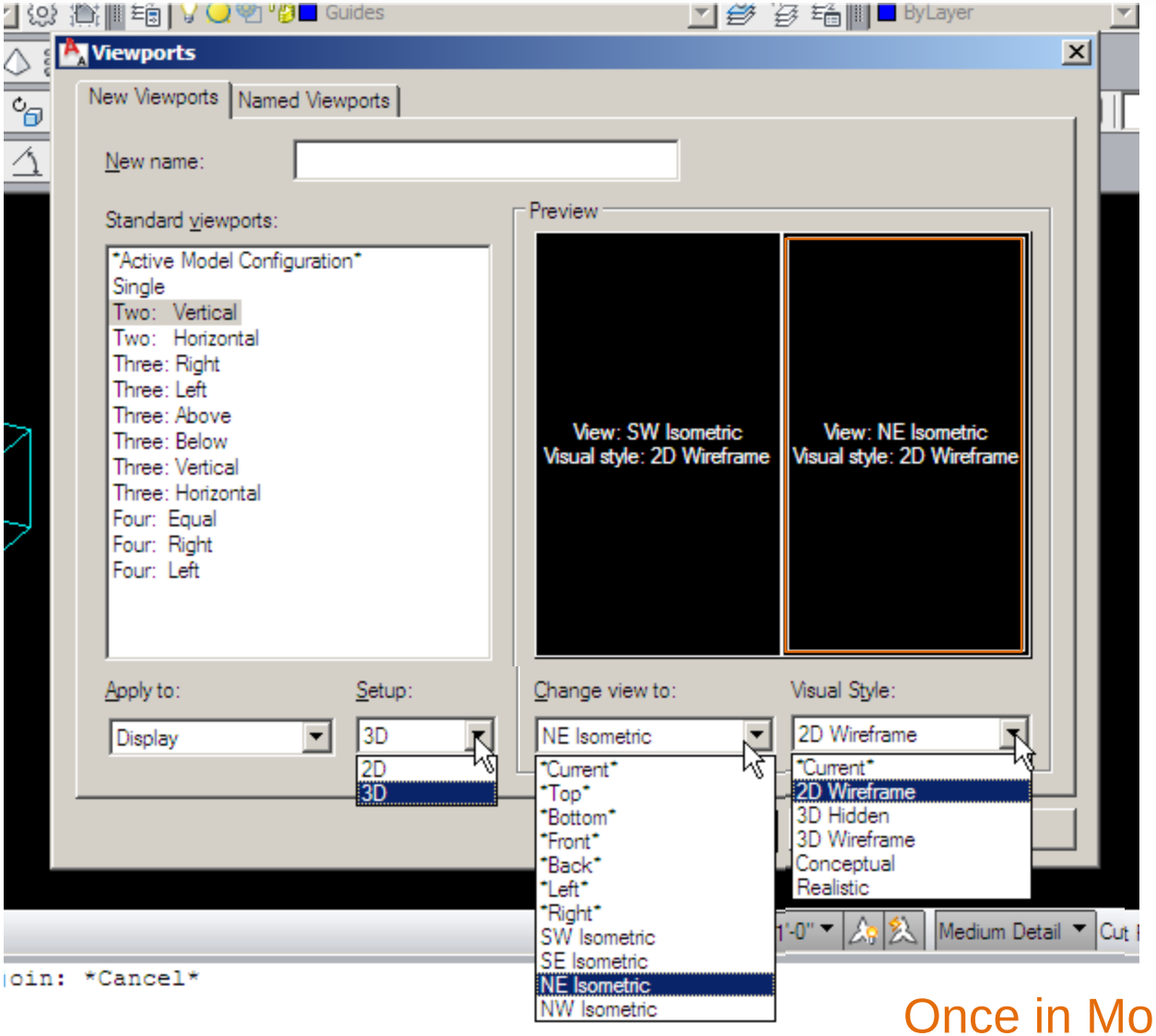
COMPLEX FORMS

Use the **pline** tool to create complex forms to extrude.





VIEWPORTS IN MODEL SPACE



Viewports can be useful in Model Space by providing multiple views of your model while it's being worked on.

Access the Viewports window:
VPORTS, Spacebar.

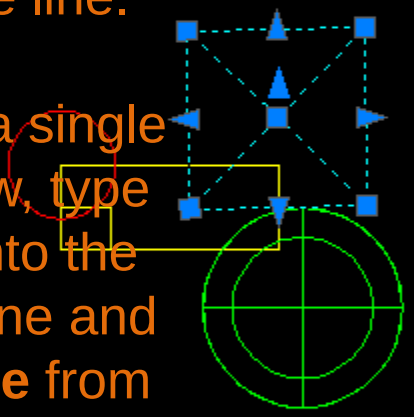
Select the viewport in the screen to the right and then select its attributes.

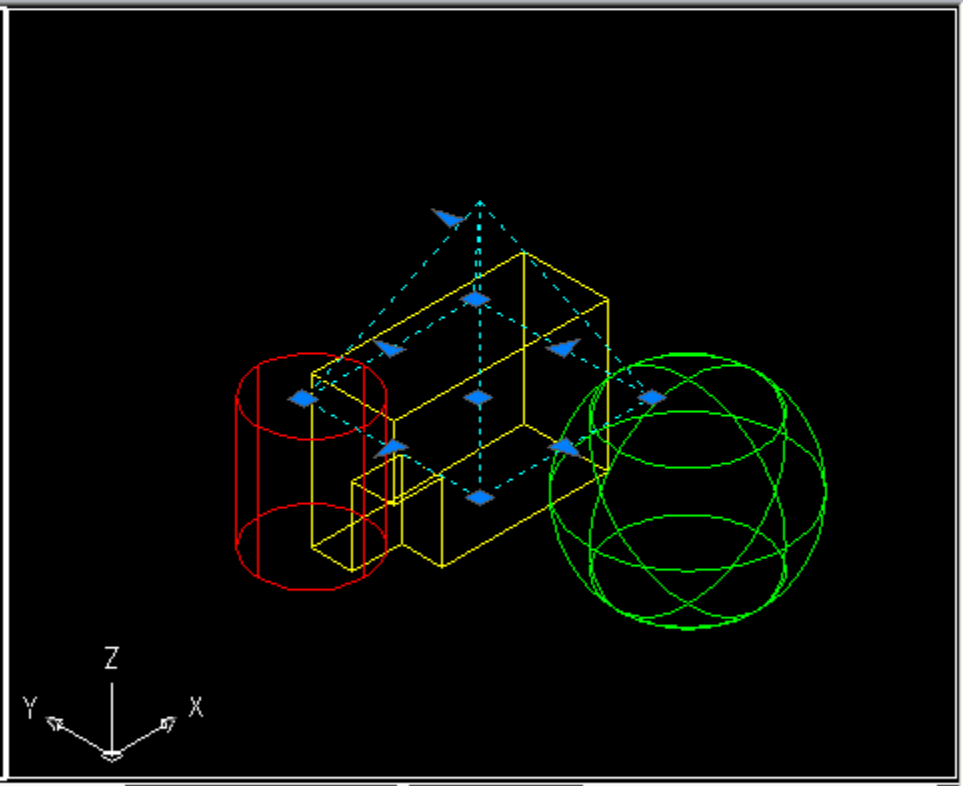
Once in Model Space you'll also be able to make changes to the view direction and visual style.

VIEWPORTS IN MODEL SPACE

The active viewport will be highlighted with a white line.

To return to a single work window, type **VPORTS** into the Command line and select **Single** from the menu.

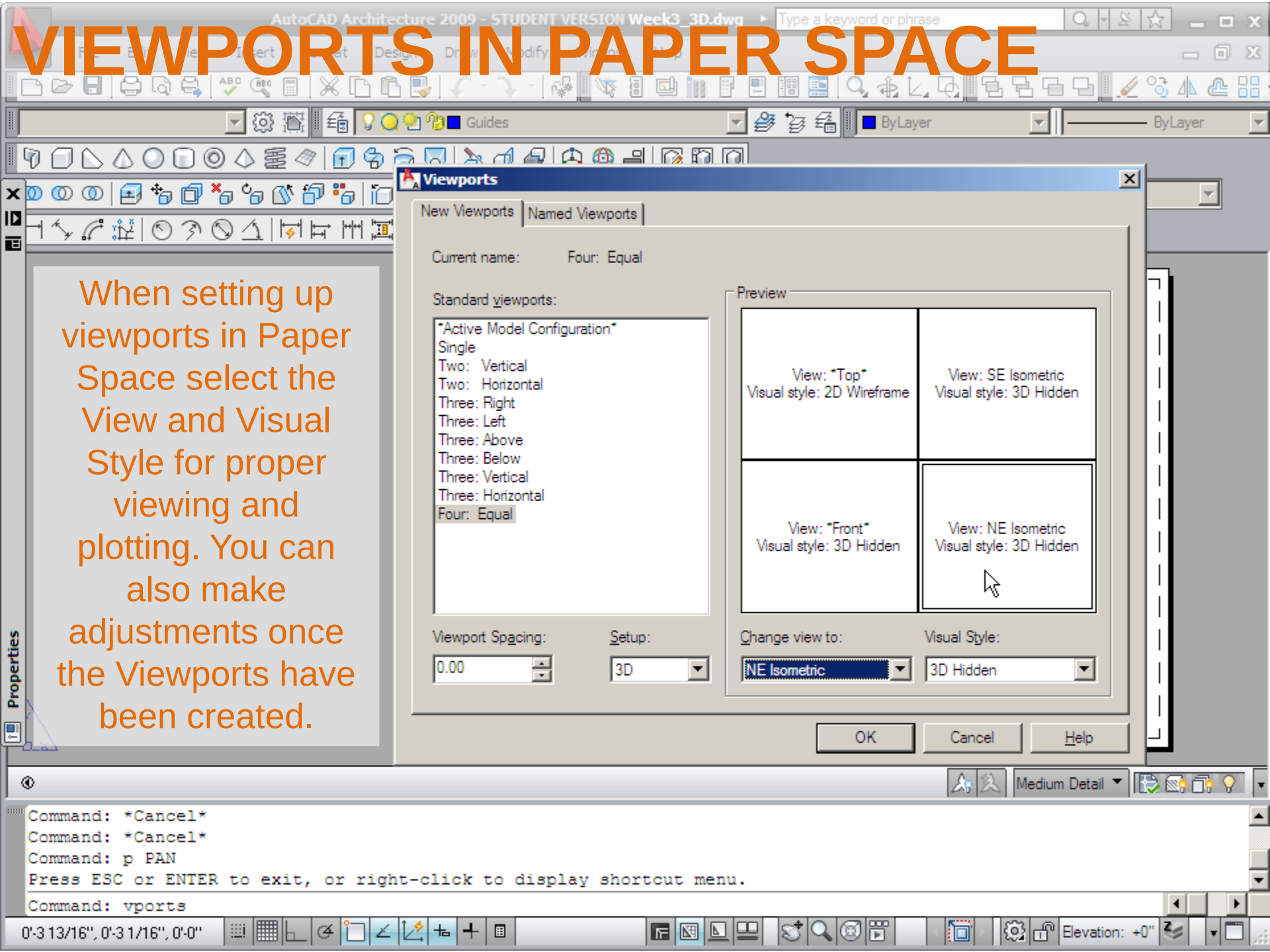




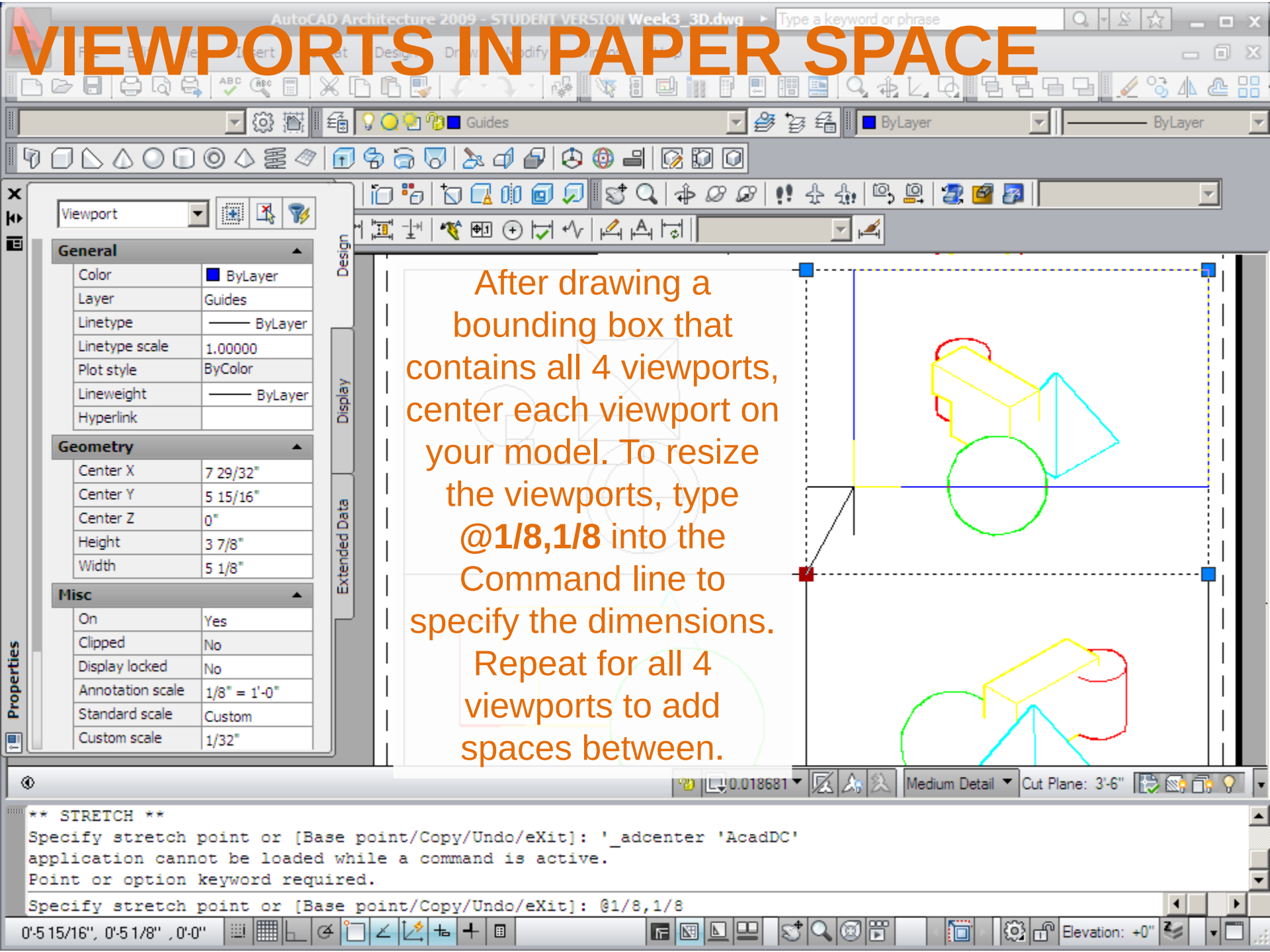
```
Command:
Command: _-view Enter an option
[?/Delete/Orthographic/Restore/Save/sEttings/Window]: _swiso Regenerating model.
Command:
Command:
```

VIEWPORTS IN PAPER SPACE

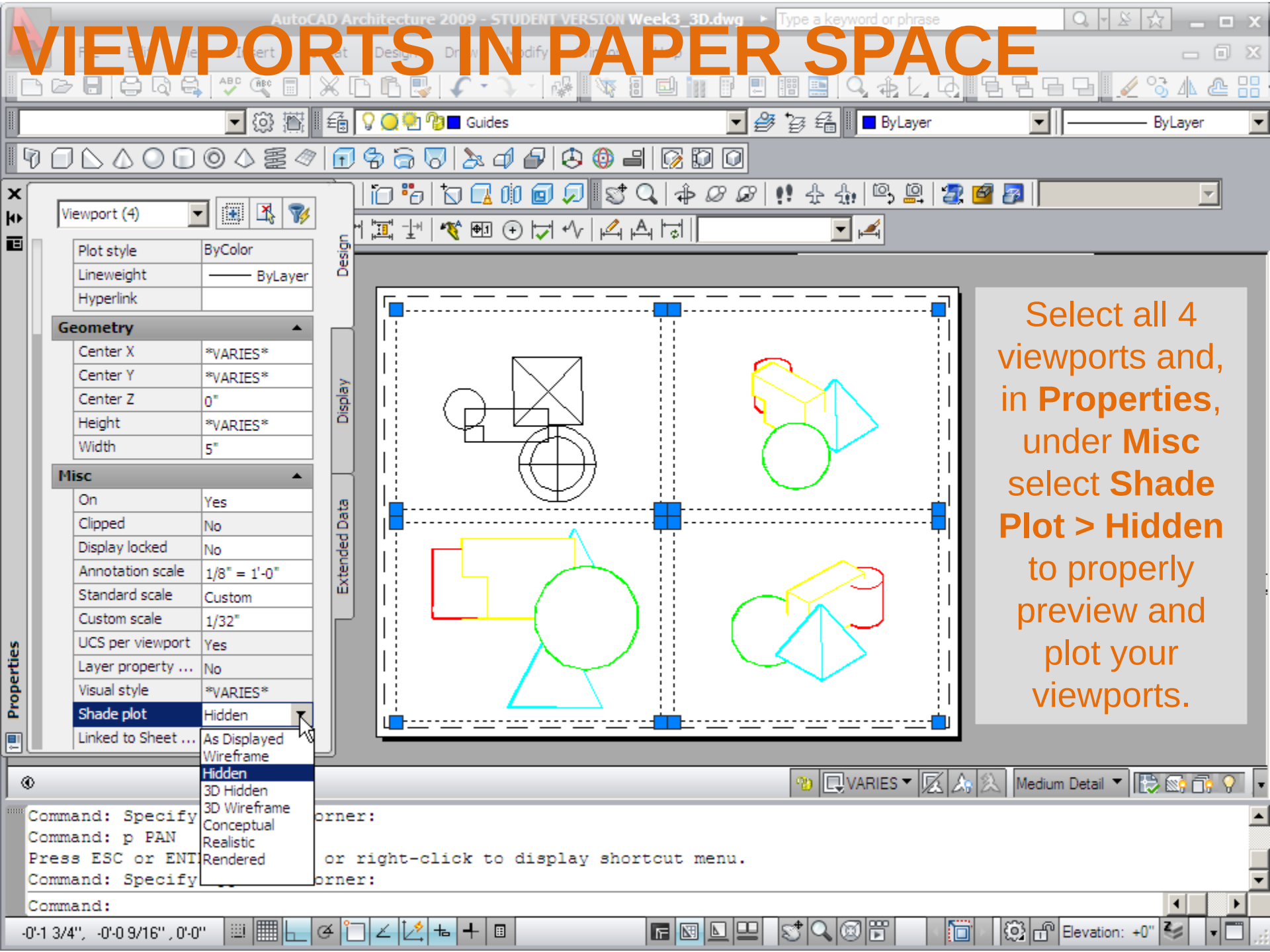
When setting up viewports in Paper Space select the View and Visual Style for proper viewing and plotting. You can also make adjustments once the Viewports have been created.



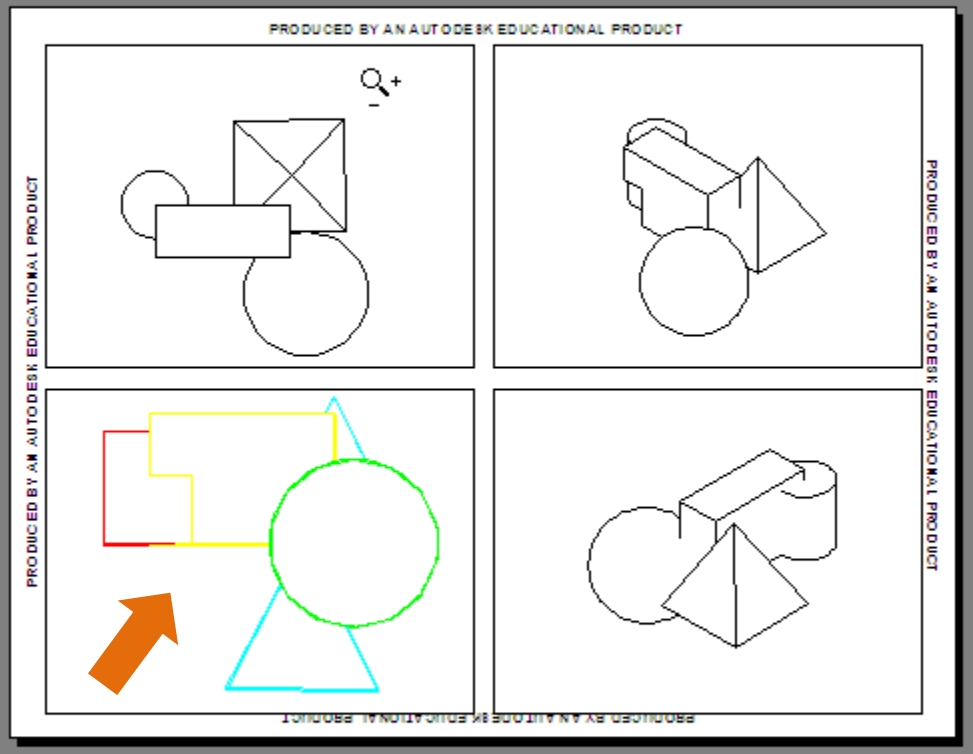
VIEWPORTS IN PAPER SPACE



VIEWPORTS IN PAPER SPACE

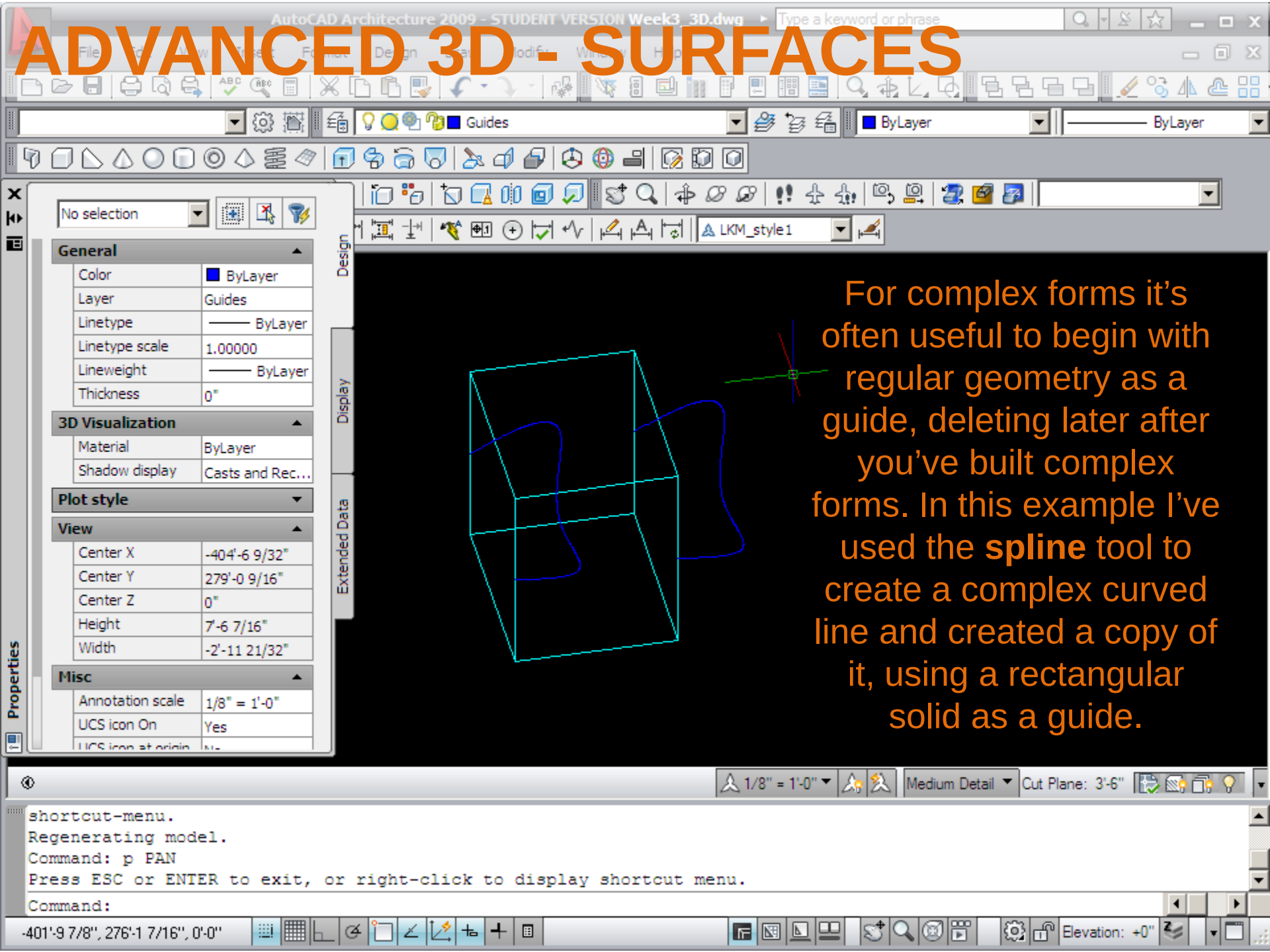


VIEWPORTS IN PAPER SPACE

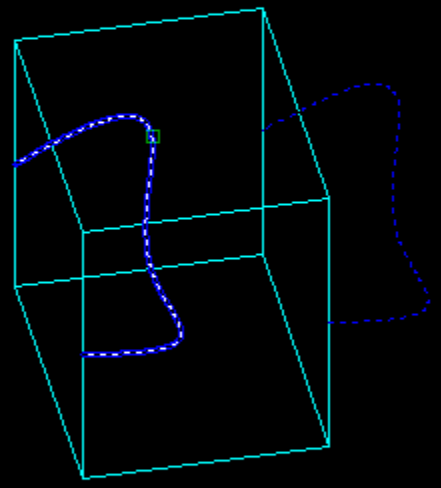


If the previous step *is not done* your preview will look like the lower left viewport whose Shade Plot is set at “As Displayed”. Return to Paper Space and select **Shade Plot > Hidden** from the Properties window.

ADVANCED 3D - SURFACES



ADVANCED 3D - SURFACES

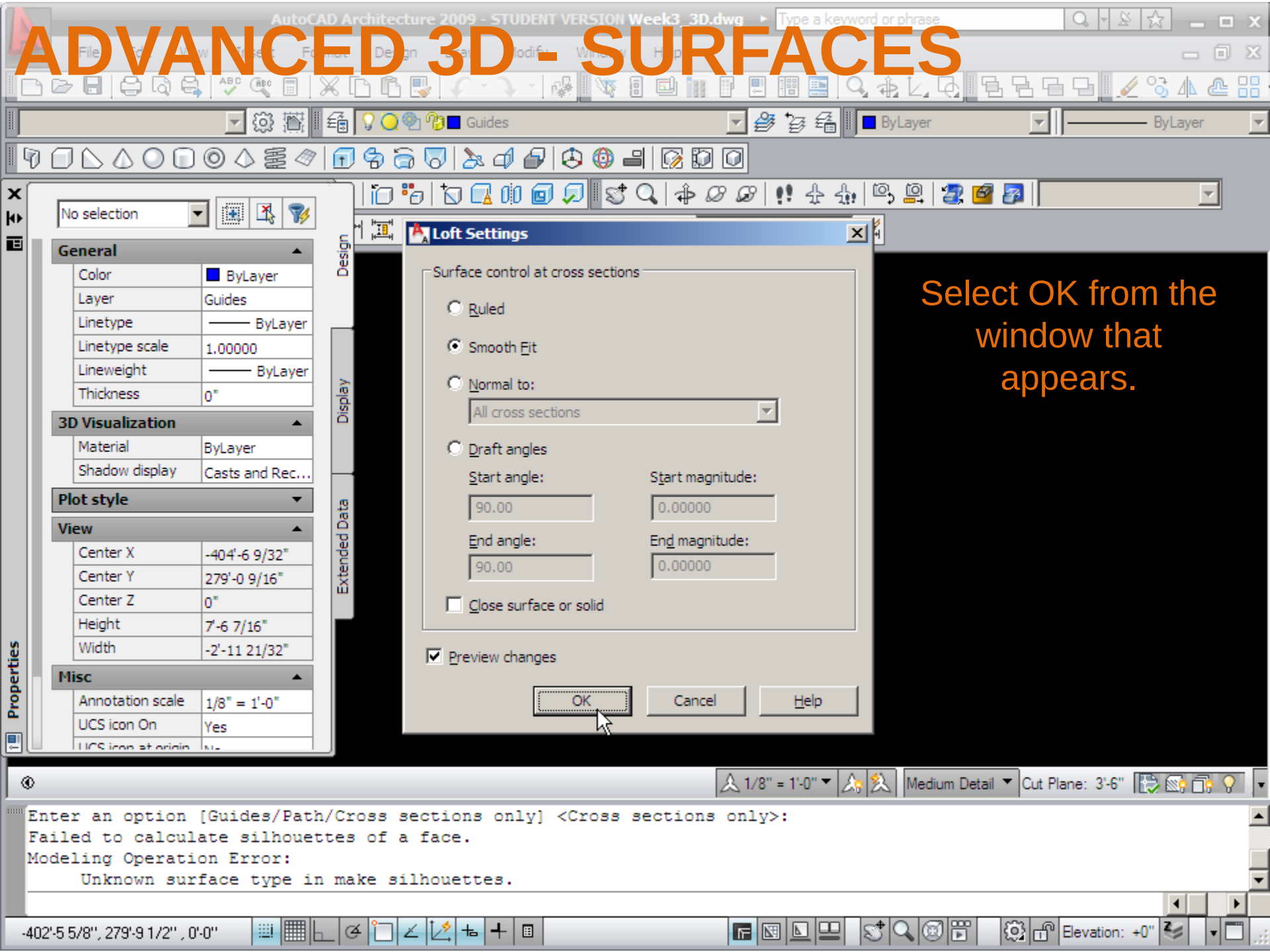


To create a surface from those splines, use the **loft** command. Select the cross sections in the order you wish to create the surface.

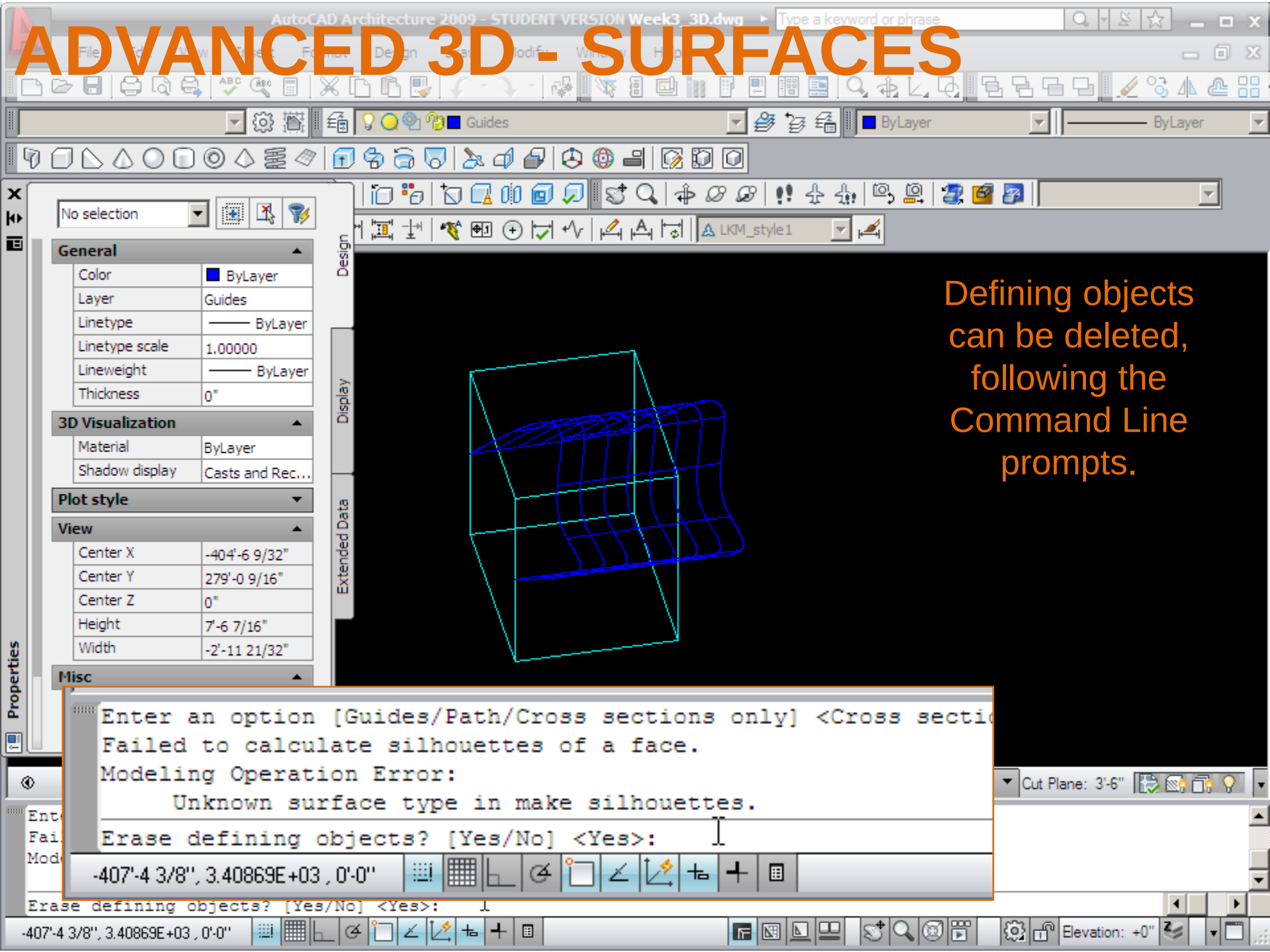
Right-click when your selections are complete.

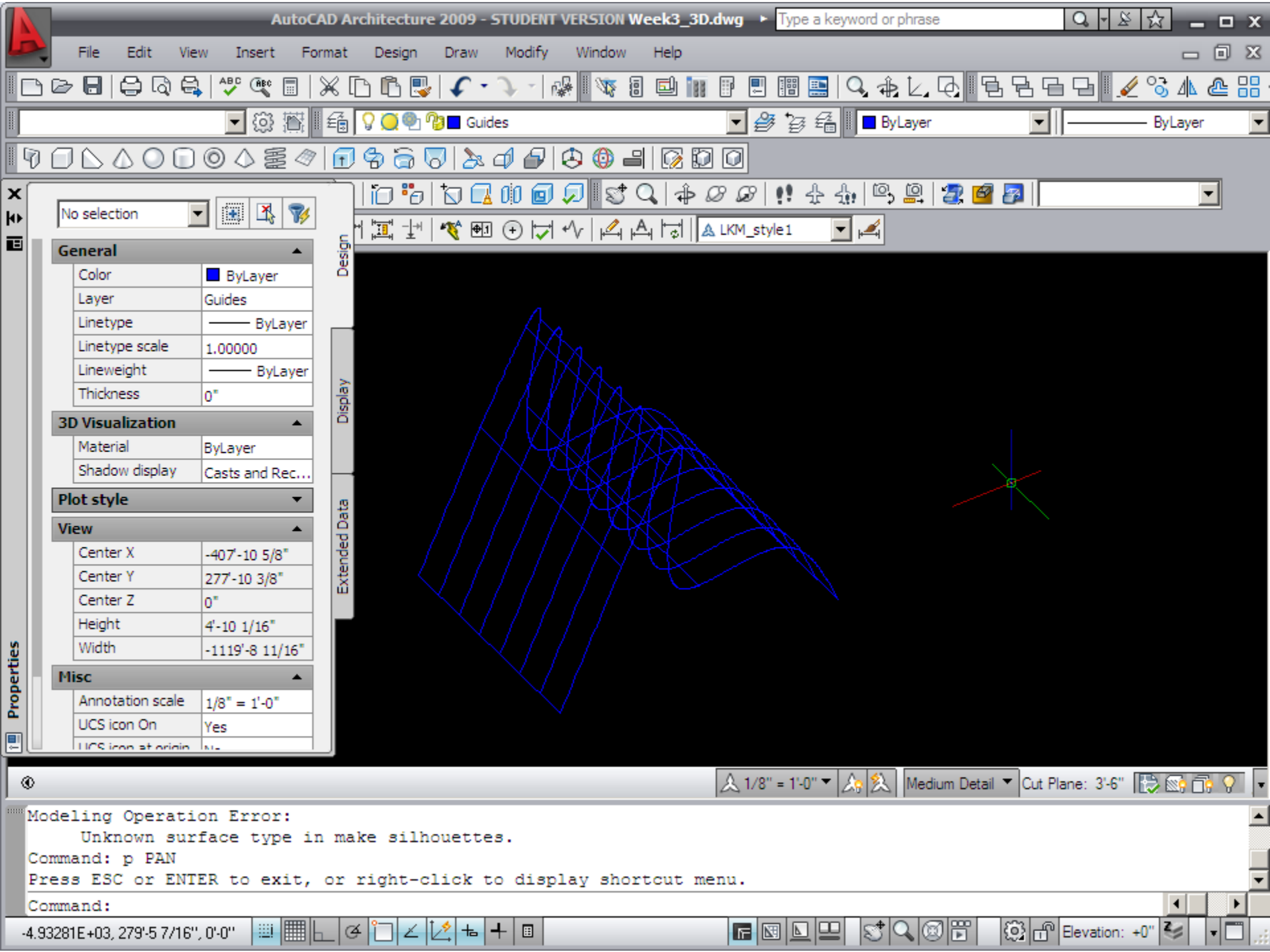
```
Command: p PAN
Press ESC or ENTER to exit, or right-click to display shortcut menu.
Command: loft
Select cross sections in lofting order: 1 found
Select cross sections in lofting order:
```

ADVANCED 3D - SURFACES



ADVANCED 3D - SURFACES




AutoCAD Architecture 2009 - STUDENT VERSION Week3_3D.dwg
Type a keyword or phrase
File Edit View Insert Format Design Draw Modify Window Help
Guides
ByLayer
ByLayer
No selection
General
Color ByLayer
Layer Guides
Linetype ByLayer
Linetype scale 1.00000
Lineweight ByLayer
Thickness 0"
3D Visualization
Material ByLayer
Shadow display Casts and Rec...
Plot style
View
Center X -407'-10 5/8"
Center Y 277'-10 3/8"
Center Z 0"
Height 4'-10 1/16"
Width -1119'-8 11/16"
Misc
Annotation scale 1/8" = 1'-0"
UCS icon On Yes
Design
Display
Extended Data
Properties
LKM_style1
1/8" = 1'-0"
Medium Detail
Cut Plane: 3'-6"
Modeling Operation Error:
Unknown surface type in make silhouettes.
Command: p PAN
Press ESC or ENTER to exit, or right-click to display shortcut menu.
Command:
-4.93281E+03, 279'-5 7/16", 0'-0"
Elevation: +0"

ADVANCED 3D – SOLID