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# What We Should Really Be Teaching in the AutoCAD® Classroom, Part I

J.C. Malitzke – Moraine Valley Community College

**ED305-1** This class will present the challenges instructors face with the 2D commands and features in AutoCAD. As AutoCAD grows in size, what have we, as instructors, done to redesign our lesson plans to meet the challenges of the ever-changing classroom? If you're an industrial trainer or teach high school- or college-level AutoCAD, then this class is for you. From both a technical and pedagogical point of view, we'll explore new tools available in recent releases, superseded 2D commands, and tried-and-true commands and features. You'll leave this session knowing what you really should be teaching in your AutoCAD classes.

## About the Speaker:

J.C. is the department chair of Computer Integrated Technologies and a faculty member at Moraine Valley Community College in the Chicago area. He manages and teaches for the Autodesk Authorized Premier Training Center in his area and has been instrumental in the college's consistent receipt of awards from Autodesk. He is an Authorized AutoCAD instructor, has been using and teaching Autodesk products for 21 years, and was a founding member of the Autodesk Training Center Executive Committee, which consults with Autodesk on training matters. He is the recipient of several educator awards and has presented at numerous conferences. This is his 14th year presenting at Autodesk University. He holds a Bachelor's degree in Education and a Master's degree in Industrial Technology from Illinois State University



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There are two simple rules I try to keep: these are simple and basic rules for educators when it comes to using AutoCAD. The number one rule for educators is to learn the new release as soon as you can. The second rule is to incorporate the newest features and commands that will make your students work faster and become more proficient. These simple rules keep the instructor current with the technology and keep you and your students on the leading edge of technology.

*Be learners and leaders!*

NOTE: this paper could be 100+ pages long! What one teacher teaches and another teacher teaches is always debatable. But the one common factor is that we should teach or guide the learner along with the most efficient tools that AutoCAD gives us. Over the years AutoCAD has grown in size. We as teachers must concentrate on the commands and features that will make our students the most proficient users in the time that we have them in our classrooms. This paper addresses *only a few of these* techniques. (There is no particular order to the methods listed below. Use your own teaching order to cover the topics. Have fun!)

## 1. The Interface look and feel of AutoCAD

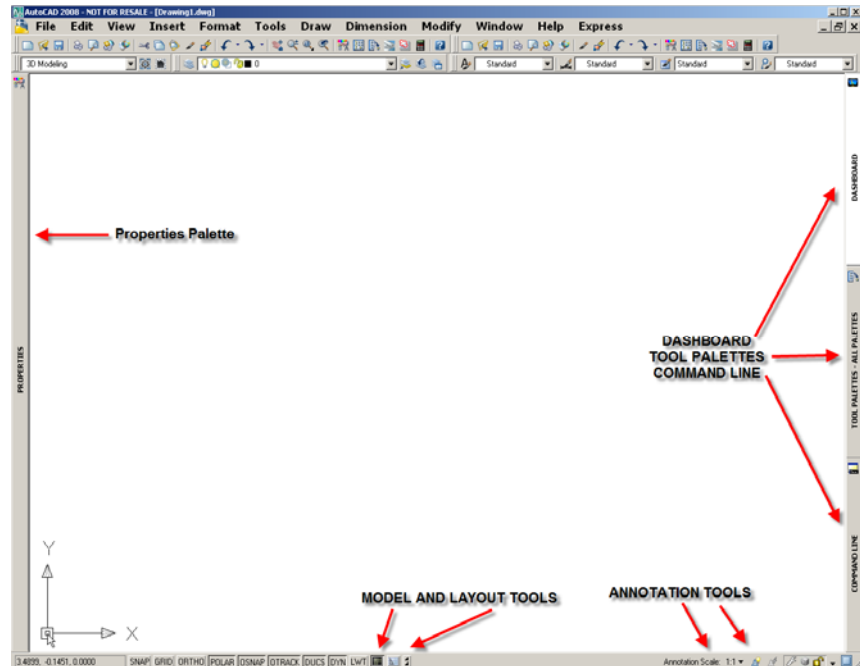
The new student or the experienced user always needs a short review of the interface. In AutoCAD 2008 changes to the interface impact us all. Demonstrate the layout of the screen, the palettes, toolbars, and the menu structure and especially take time with the new **Dynamic Input**.

When demonstrating the interface, we need to look at the big picture. An overview of most of the tools needed to succeed in completing a drawing should be discussed. However, not all need to be demonstrated.

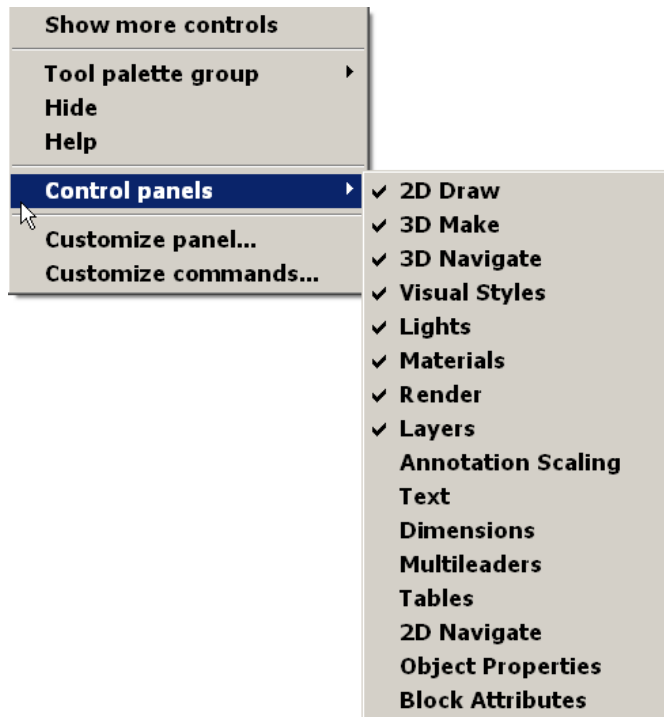
Example: When demonstrating the pull down menus, discuss in general terms using association. Ask these questions, "If I were going to save a drawing, what pull down menu would I use?". If I were going to draw a line, what pull down would I use?". If I were going to dimension some object, what pull down would I use?". Group your questions by association. You DO NOT need to show the students EVERY pull down menu pick!

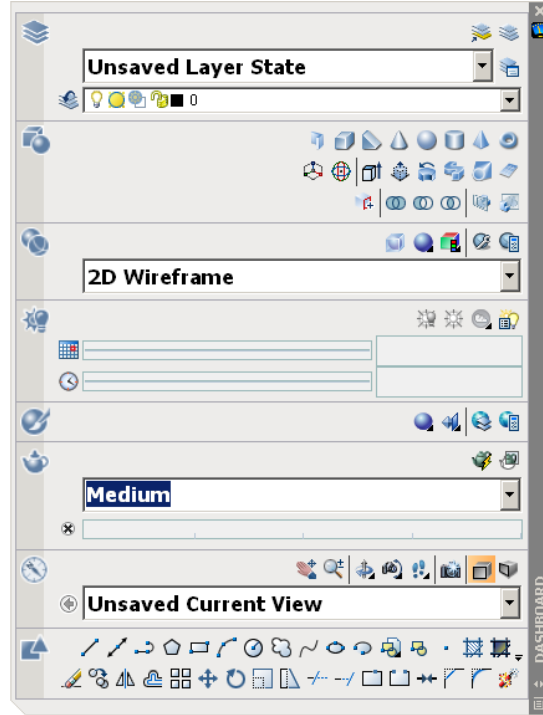
The same goes for all the toolbars. Only discuss the use of toolbars by group associations.

But for AutoCAD 2008 you should be teaching the DASHBOARD!



Right click on the Dashboard and add or subtract control panels. **USE THE DASHBOARD!**





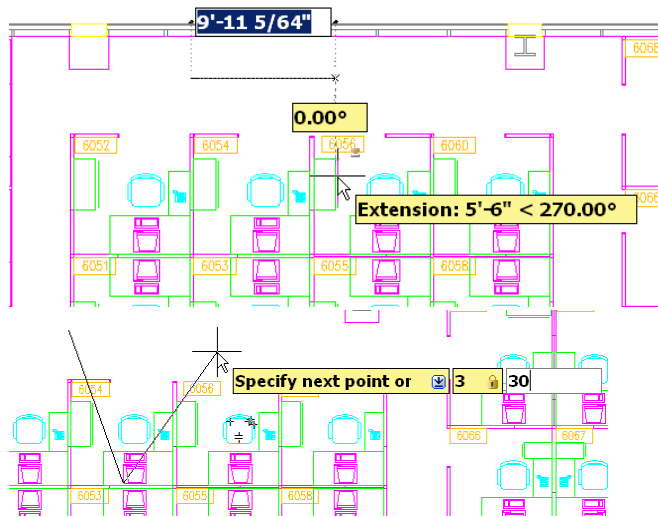
**Dynamic input** is the tool for heads-up design. It is the interface between AutoCAD and the user

Dynamic input offers the user "heads-up" design by allowing you to input command information on screen at the cursor location,

Many of the commands will be attached to the cursor. Some time is need for discussion and demonstration when using the new dynamic input interface. Some simple rules are: Do NOT turn off this feature! It really saves time when drawing!

Example: To draw a line 5 units in the X direction and 5 units in the Y direction you type 5,5 NOT @5,5. The new dynamic input interface defaults to relative movements! Likewise, type 3<30 instead of @3<30 for 3 units at an angle of 30 degrees. For absolute input. you do need to type #3,3 instead of 3,3.

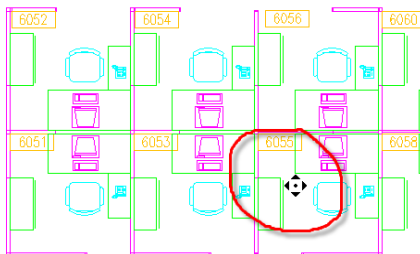
The [TAB] key can lock a distance or angle, try it!



## 2. What are you looking at?

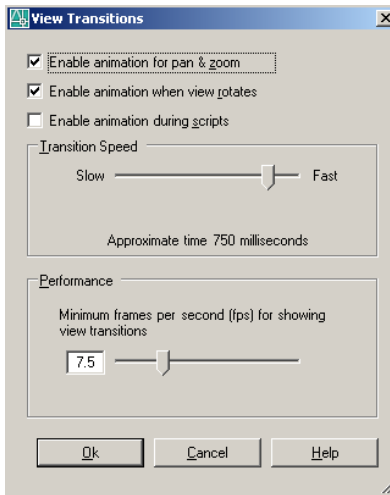
When you are introducing AutoCAD to new users or seasoned veterans you usually look at the interface. When the experienced user is updating his or her skills to the latest release you usually go over the interface first. The second topic you should look at is viewing your drawing. Ask yourself, "What are the tools we really need to teach"?

Try this: Roll the mouse wheel away from you. Roll the mouse wheel towards you. Hold the mouse wheel down to and pan your drawing. Double click quickly the mouse wheel to zoom extents. Now try holding down the [CTRL] key with your left hand while holding down the mouse wheel. You are in Joy Stick mode. Pan your drawing and see what happens. Stay close to your pick and you pan slowly, Move you cursor away from the center of the pick and your drawing pans faster!

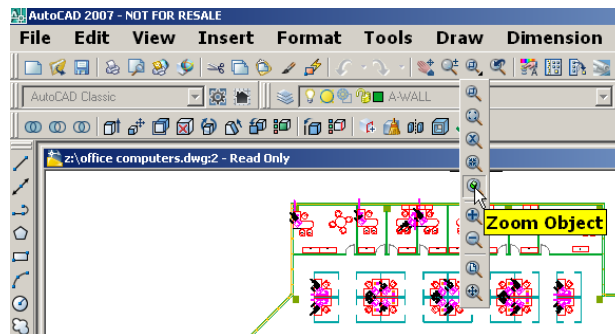


Intellimouse covers most of the entire zoom and pan commands. If you do not have a wheel mouse for scrolling, buy one!

Set your VTOPTION variable options for the new view transitions delay.



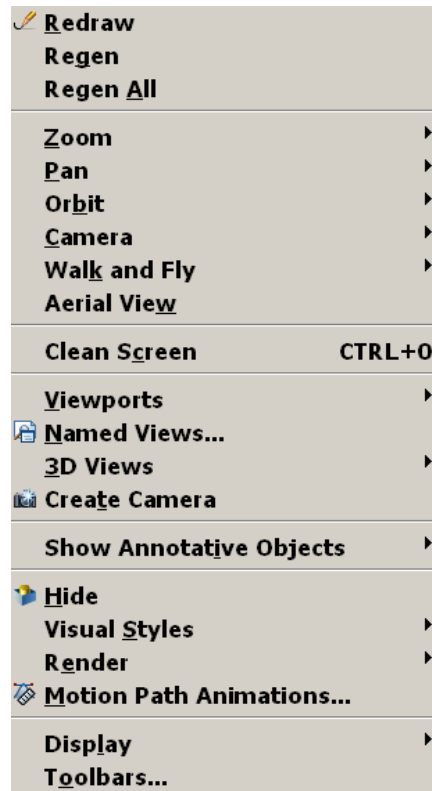
**Superseded Commands** AutoCAD 2007? Just look below. Do you really want to spend time teaching the Zoom flyouts and the Zoom Toolbar in AutoCAD 2008? Let's not waste our time here! The real-time zoom and pan tools are superseded by the mouse wheel!



The Zoom Toolbar.....No!. Use the mouse wheel!



The View menus have many tools you can use. NO! This is a waste of time to spend with your students. Just discuss the menu and move on! Using this menu takes time. Use the mouse wheel whenever possible.



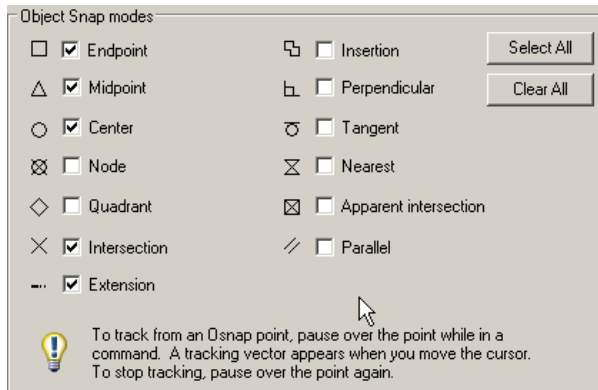
### 3. Running Osnaps, Osnap overrides, Tracking/TT, TK, and other methods for input.

When we first teach drawing lines and circles, we show the use of direct distance entry. This method is the simplest method to draw lines. Just pick a point, move your cursor and type in our distance. But what do we teach next. Many instructors teach the absolute, relative and polar coordinate systems. NO!

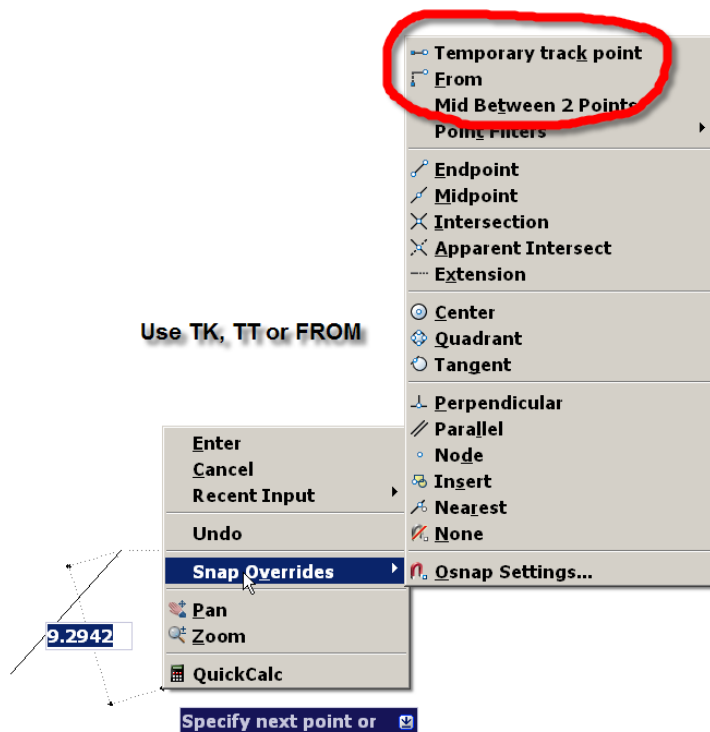
We should look at teaching the use of the basic Osnaps, then tracking! (3,3 @3,3 3,3 #3,3 @3<30 and 3,30) should be taught last. Teach the old way AND the new way with dynamic cursor turned on!



Set up the running Osnaps that most users always use.



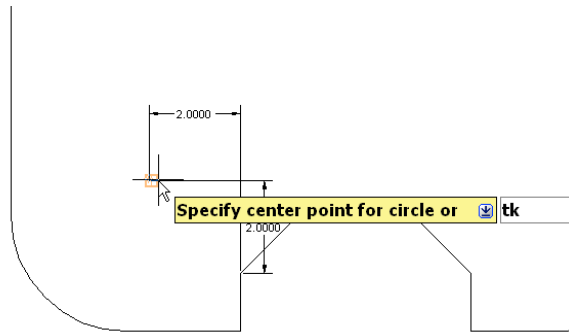
Use the FROM Osnap modifier. Use TK or Temporary track point to draw from an existing point in your drawing. **DO NOT** create construction geometry to find a specific point in space. (By right clicking, you get the Snap Overrides menu pick. You do not always need to [SHIFT] right click for your Osnaps!



**TK** is more versatile. When you need to position an object in relationship to other objects, type TK BEFORE you place your first point. In the example below, you start the circle command and type **TK**, select the intersection of the two lines and move your cursor vertically up. Type 2 and

press enter, then move your cursor to the left and type 2, press enter twice. Enter the value for the circle radius or diameter. You have created a circle from the intersection of the two lines 2 units up and two units to the left!

The use of the FROM OSNAP modifier can be used also to accomplish the same task. Give it a try.

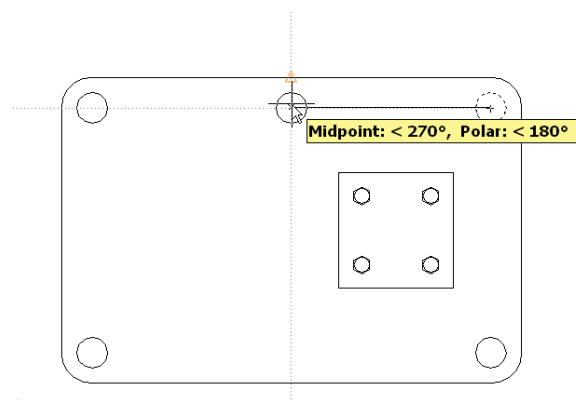


Track TK Example:

## Tracking

Teach Otrack and Polar tracking also. I always tell my students to keep these tracking tools on all the time.

The example below is using Otrack with running Osnaps on. It is then quite easy to copy circles to the midpoint locations as needed. Notice the two tracking lines for midpoint circle placement.



OTRACK Example:

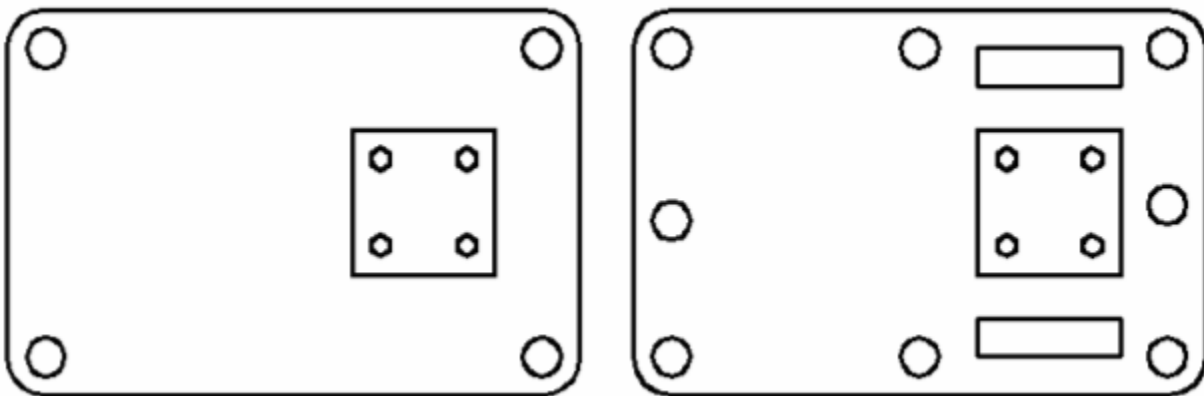
Tracking is a way for you to locate a point relative to another point in space. Tracking has been improved because of its graphical front end. *We can see exactly what is happening when we are using any of the varieties of tracking.* Tracking consists of the following:

- Tracking Paths –Extension and Alignment
- Tracking Points
- Temporary Tracking Point
- Object Tracking
- Polar Tracking
- Tracking Tool Tips
- TRACKPATH system variable
- Status bar changes

A system variable TRACKPATH is used to display the length of the tracking path. Think of the tracking path as a temporary construction vector showing direction. The default setting is 0. Set the TRACKPATH to 1 to reduce the length of the tracking path. Many beginners set the TRACKPATH to 1.

- 0 Displays full screen object snap tracking path
- 1 Displays object snap tracking path only between the alignment point and from point to cursor location
- 2 Does not display polar tracking path
- 3 Does not display polar or object snap tracking paths

The drawing below had a change order to punch in four new holes and to punch in the two new slots. Using object tracking, extension, center, endpoint and midpoint running Osnaps it should take only 30 seconds or less to create the changes. Give this a try!

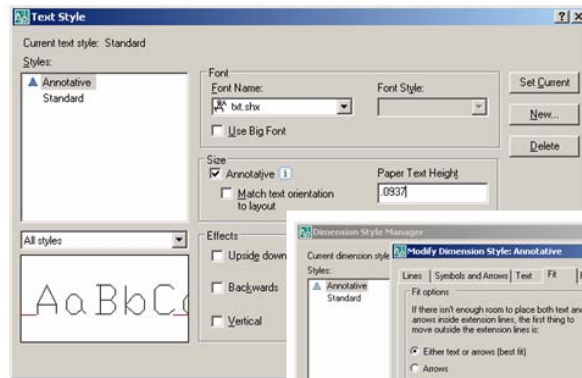


After you have taught running Osnaps, Osnap overrides, Tracking/TT, TK, and other methods for input, now, it is time to teach absolute, relative and polar movements!

#### **4. Annotation Scaling- Text styles, TEXT, MTEXT, Dimensioning, Dimensioning in paper space, Multileaders, Hatch and FIELDS.**

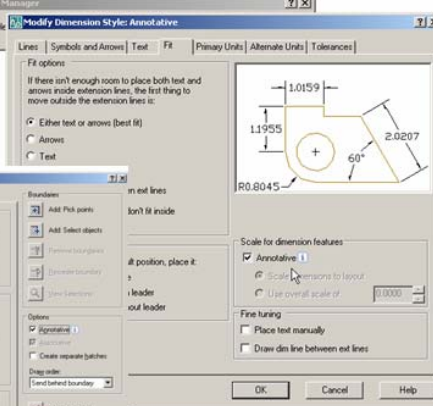
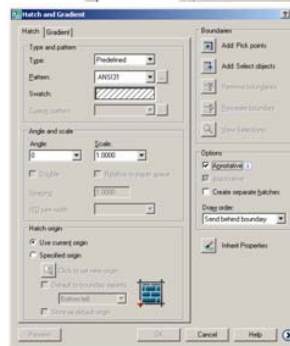
Discuss with your students what text is and how to create different styles of text. Do NOT use the standard styles in AutoCAD ever! The same goes for Dimension styles!

Use Annotative Scaling for all Text, dimensions, Hatch, Multi-leaders and Blocks!



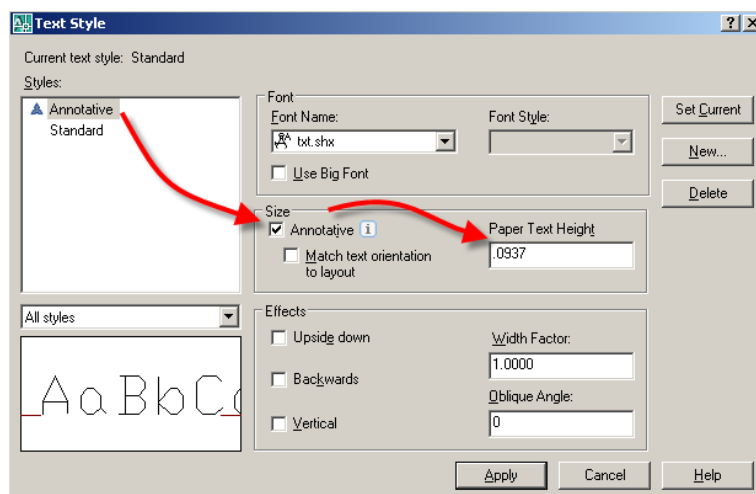
Annotative Text in  
AutoCAD 2008

Annotative Hatch  
in AutoCAD 2008



Annotative Dimension  
Style in AutoCAD  
2008

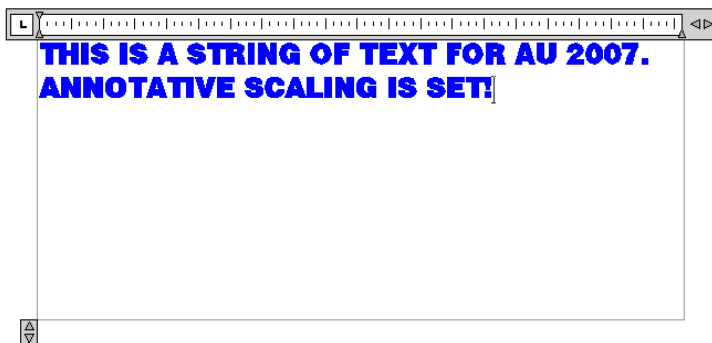
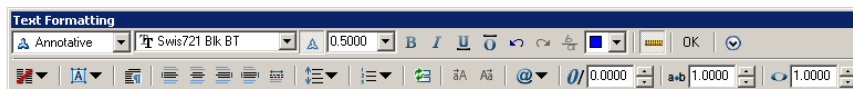
Always create you own text styles. **USE ANNOTATIVE SCALING!** Set the Paper Text Height to .125 or to .0937



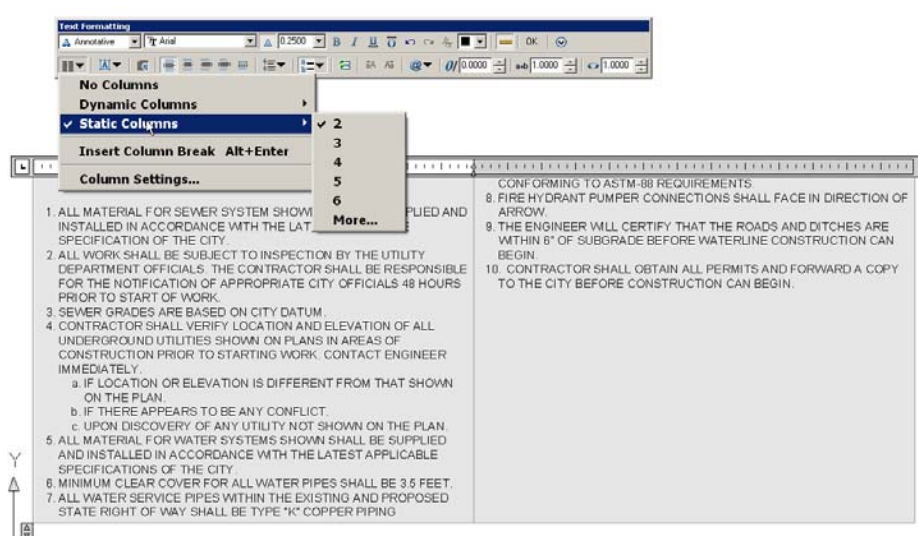
TEXT usage for one line at a time. Show your students how easy it is to create text and how to double click to edit Text. In the example below is a simple string of text created. If you double click on the string you get the new editing box.

**THIS IS AU TEXT.**

The MTEXT editor is frameless. The user has many new tools and the ability to pan and zoom in the drawing when the MTEXT editor is present. Time should be spent teaching as many of the features as possible of the MTEXT editor!

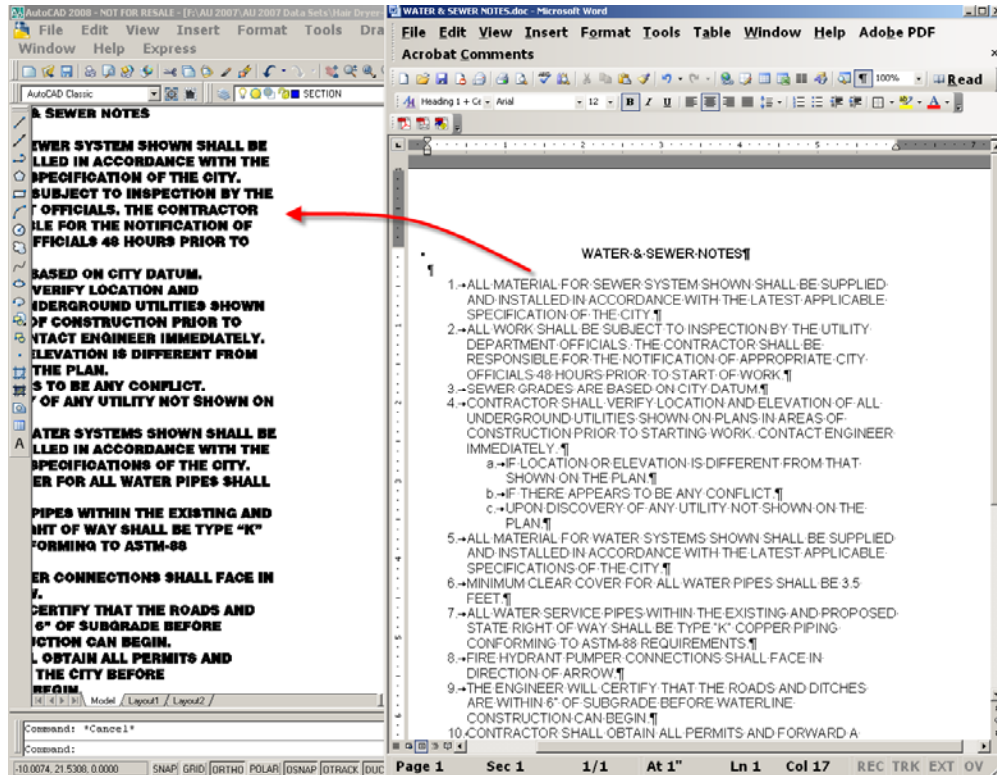


TEXT=DTEXT. MTEXT for paragraphs, text imports, cut and pastes and greater customization for the use of text. Bullets, numbers, indents, paragraphs, columns, and importing from Microsoft Word. Teach it ALL!



One GREAT feature is the ability to cut/copy and paste from a word document into AutoCAD. Just launch Microsoft Word and open a document. Cut/copy and paste you document to the

clipboard. Paste the contents into the MTEXT editor. Notice that all the bullets from Microsoft Word appear in AutoCAD.



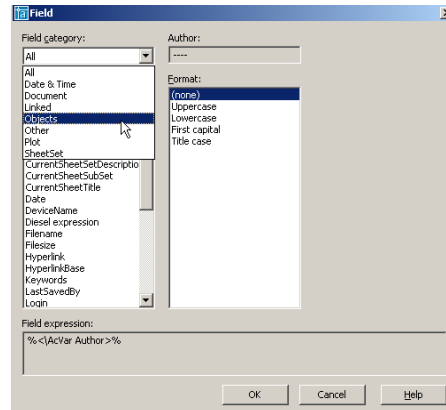
Set the MTJIGSTRING system variable. Set the preview to whatever you want! This changes the preview in MTEXT. CODY is my dog's name.



Set the system variable TASKBAR to 1. You now have all your drawings listed at the bottom of your screen.

## Fields

The use of Fields in AutoCAD can really change the way we teach. We should spend time teaching many of the different permutations of this feature. Fields are place holders for text. Fields are important in the fact that they might change during the lifetime of a drawing. As the drawing changes, the field could automatically update. Field data can include drawing properties such as author or date, system variables, object properties and sheet set date. Custom fields can be created at the sheet level and the sheet set level. Fields can also be cells in Tables, block attributes, MTEXT and drawing title blocks.



**Fields in title blocks.** The SHEET TITLE is a field. Use Fields for *all* title block information. You should re-design all of your title blocks using fields! Notice the custom fields created for this title block. (Drawing By, Drawing title, Drawing Number, etc.)

X	X	XXX	XXX
ITEM	QTY	NAME	DESCRIPTION
STANDARD TOLERANCES UNLESS OTHERWISE SPECIFIED		<b>YOUR SCHOOL</b>	
.X = ±.1			
.XX = ±.01			
.XXX = ±.005			
ANGULAR = ±.5°			
MAT'L			
THIRD ANGLE PROJECTION			
COURSE			
DRAWN BY		SIZE B	FILE NAME FIELD-AREA-TB.dwg
INSTRUCTOR		SCALE	DATE
		DWG NO.	REV
		SHEET	

**Fields in tables.**



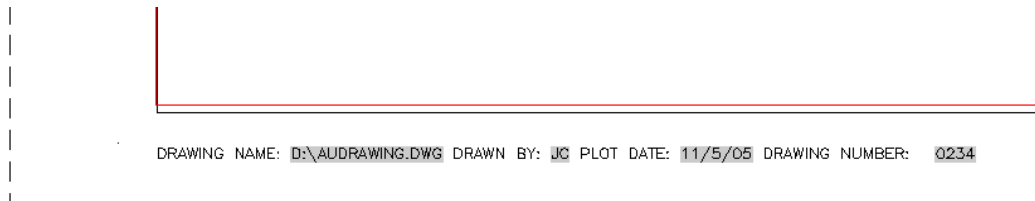
	A	B	C	D	E
1	OFFICE COMPUTERS				
2	Quantity	EMPLOYEE	MODEL	RAM	COST
3	1	Alexis Kamberos	HP XW 4300	2GB	
4	1	Janice Walters	Dell Optiplex 320	2GB	1750
5	1	Jennifer Lynn	Dell Precision 490	2GB	2500
6	1	Jerilyn Ann	Dell Optiplex 320	2GB	1750
7	1	Jim Smith	Dell Precision 690	2GB	3500
8	1	John Carter	Dell Precision 490	2GB	1500
9	1	Jose Solis	Dell Optiplex 740	2GB	2700
10	1	Julie Marie	Dell M90	2GB	2050
11	1	Maria Lopez	Dell Precision 490	2GB	2500
12	1	Suesan Waddle	Dell Precision 390	2GB	1500
13	1	Susan Marie	Dell Optiplex 745	2GB	3250

**Fields in MEXT strings.**



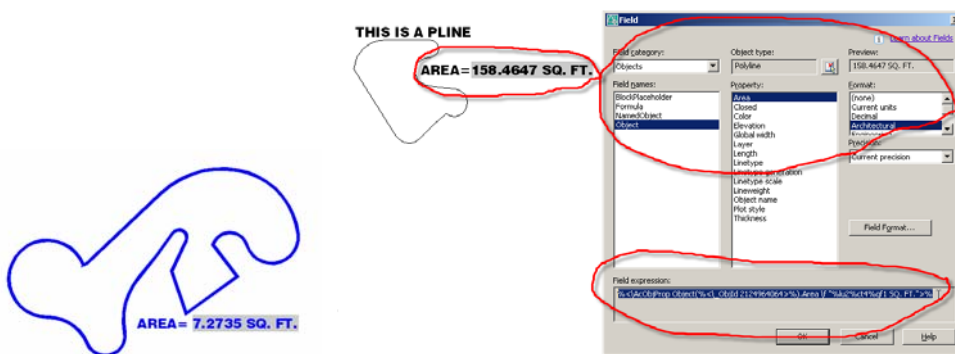
## Fields for Plot Stamps

Another simple use for fields that we can teach is the creation of a simple plot stamp. Use standard fields and a custom field for a plot stamp in the lower left corner of your sheet. The plot stamp WILL preview when you plot.



## Fields for area calculations

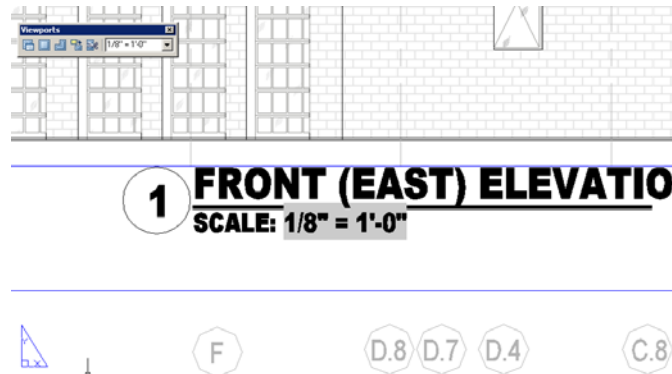
One simple trick I use for introducing fields is linking a field to an area of an object in model space. I then use another trick to copy and paste the field code to paper space.



## Fields for Layouts

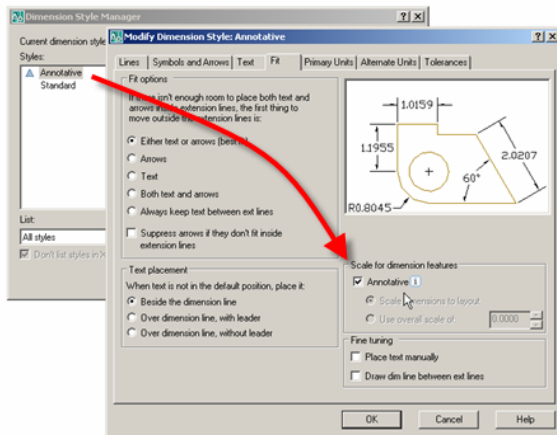


When we create a viewport and scale the viewport, we need to lock the scale. We can use the Display Viewport locked function or we can set a dynamic field attached to the viewport. If we rescale the view in the viewport the field updates!



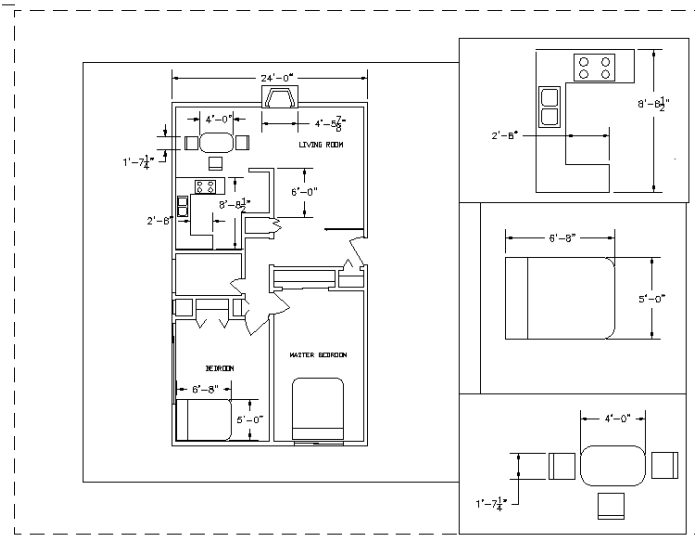
## Annotative Dimensioning

Annotative Dimension Style  
in AutoCAD 2008



Teach Annotative Dimensions after you have discussed and demonstrated the basic concepts of dimensioning and have done a few simple dimension problems at full scale 1:1.

In the example below, the floorplan is scaled at 1/8"=1'-0" while the three details are scaled at 1/4"=1'-0" using the same dimstyle!



### **Associative Dimensioning** (a great setting! Use it!)

True associative dimensioning was introduced in AutoCAD 2002. Dimaso is replaced by DIMASSOC. Forget about Defpoints. We now dimension to an object. The dimensions are now attached to the object and not to a definition point. This works in both model space and paper space. Use your grips to stretch a rectangle and watch your dimensions change. We could not do this in previous releases of AutoCAD.

### **Dimensioning in Paper Space.**

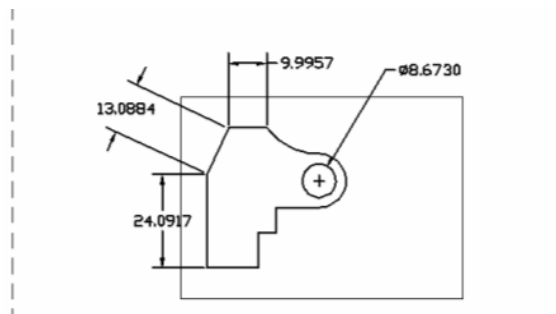
Transpatial References or Transpatial dimensioning. If you have been applying your dimensions in Model space you now can dimension in Paper Space. Give it a try!

DIMASSOC is a new system variable. The settings are:

- 2 enables associative dimensioning
- 1 creates non-associative dimensioning
- 0 creates exploded dimensions

Also, you can set this variable in OPTIONS.

Use the DIMREGEN command to force an update of all associative dimensions in the current drawing. Use the DIMREASSOCIATE command to associate a non-associative dimension to an object or object snap points on geometry. Use the DIMDISASSOCIATE command to remove any associations for a set of dimensions.



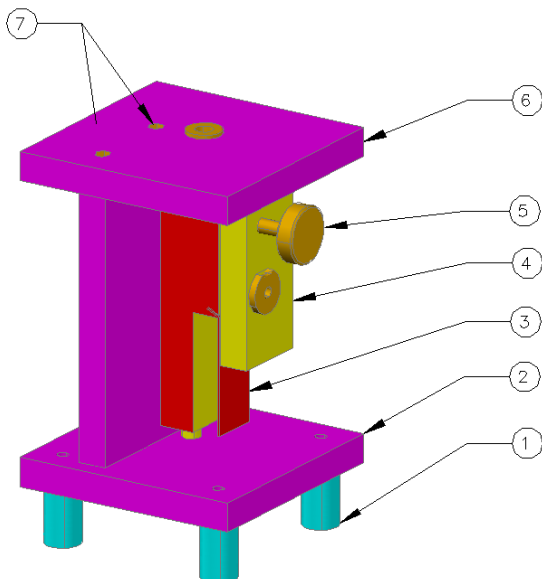
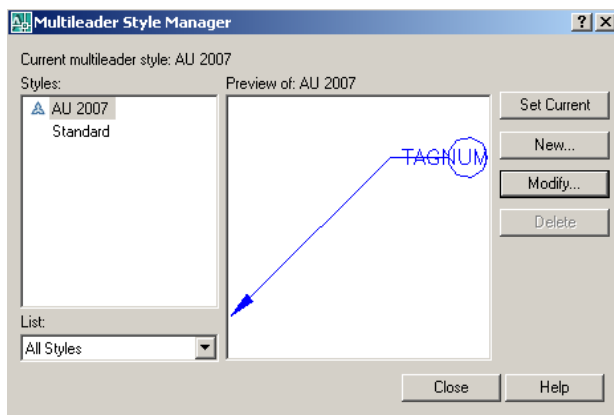
## MultiLeaders

This is a new feature to AutoCAD 2008. We need to teach this when we teach dimensioning.

Use the MultiLeader Panel in the Dashboard.

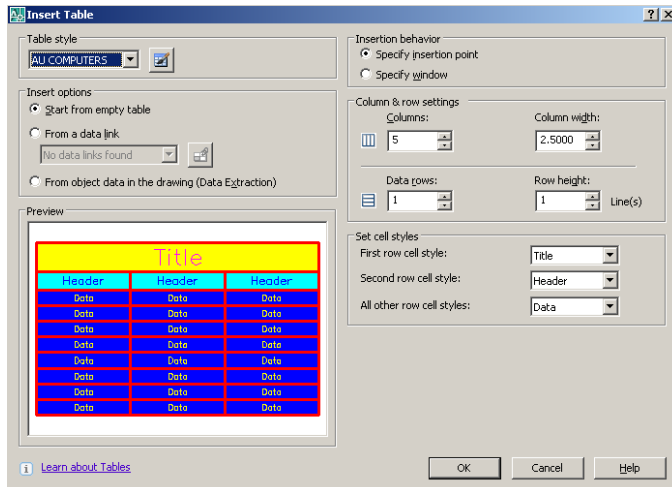


Create an new Multileader style. Make it annotative!



## 5. Tables

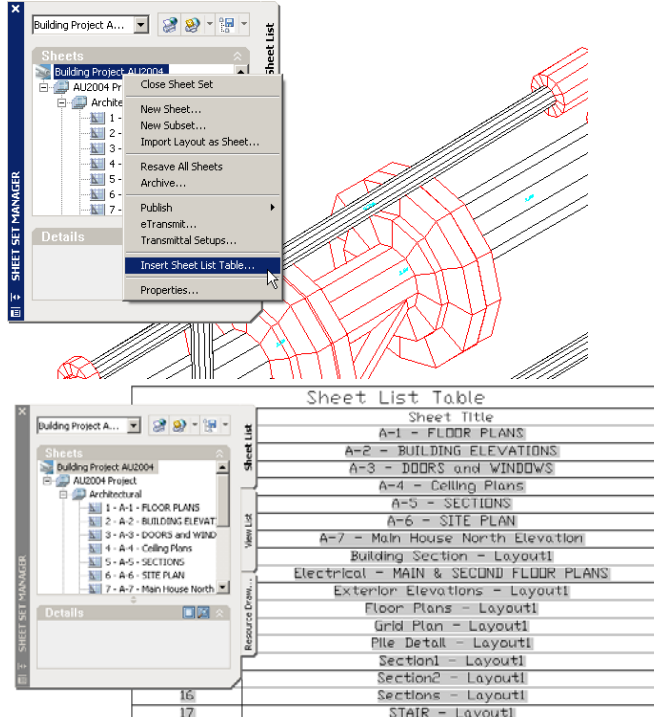
A Table can be a standard part of a drawing. You do not have to draw every line to create a table. Tables use text, blocks or fields for each cell. Use the Tablestyle command to create the look and feel of tables! Use the TABLE command to start your table.



TEXT OR FIELDS HERE OR IN EACH CELL				

You can create custom tables. Create unique rows and columns as shown. Each row and column can be modified.

Table lists from Sheet Sets any be created on the fly!



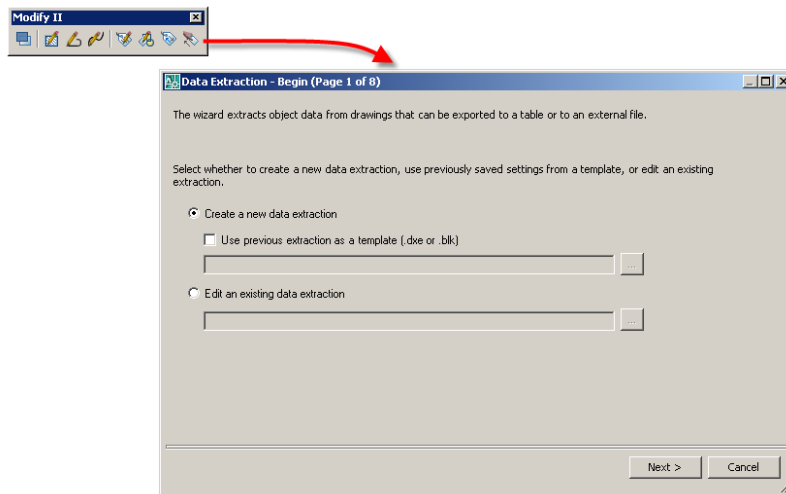
Cut and Past from Excel to create a table. In AutoCAD, use Edit>Paste Special>AutoCAD Entities!

Text Formatting

STANDARD | txt.shx | 3/16" | B I U | OK

EMPLOYEE	MODEL	RAM	COST
Nate Smith	Dell XPS	1024MB	\$5,995
	Dell XPS	2024MB	\$5,995
Lynn James	Dell XPS	1024MB	\$5,995
Robert Jones	Dell XPS	1024MB	\$2,999
Sam Jones	Dell XPS	1024MB	\$5,995
Martha Bouchard	MPC 525	256MB	\$4,995
J.C. Smith	MPC 525	256MB	\$4,995
Car Toon	MPC 525	1024MB	\$5,995
Bobby Hull	Dell XPS	1024MB	\$5,995
Robert K. Syt	Dell XPS	1024MB	\$2,999
Sally Kim	Dell XPS	1024MB	\$2,999
Ismail Gordon	Dell XPS	1024MB	\$2,999

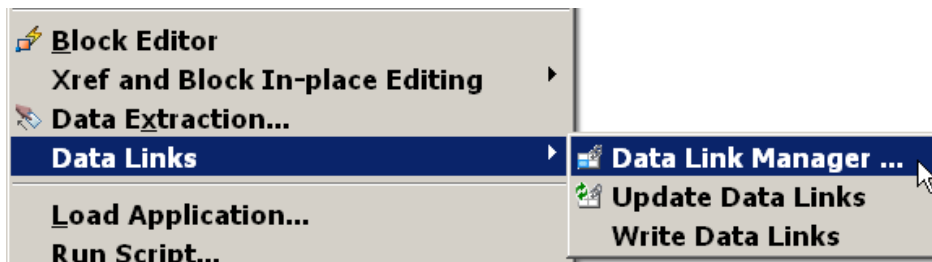
AutoCAD 2008 gives you the ability to extract data directly to a table or a data link. Delete some of the blocks with attributes in your drawing and the table will update showing the changes.



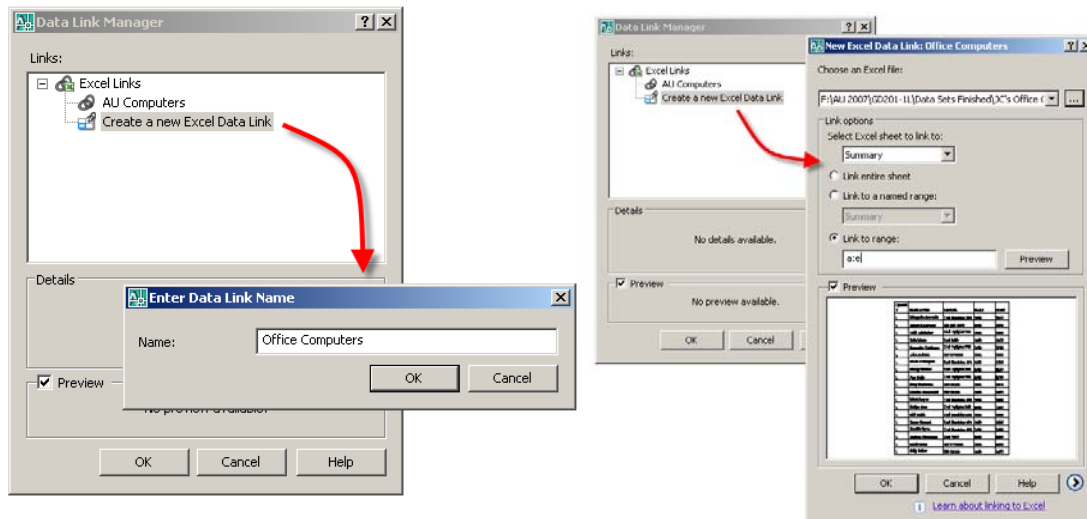
EMPLOYEE	MODEL	RAM	COST
Nate Smith	Dell XPS	1024MB	\$5,995
	Dell XPS	2024MB	\$5,995
Lynn James	Dell XPS	1024MB	\$5,995
Robert Jones	Dell XPS	1024MB	\$2,999
Sam Jones	Dell XPS	1024MB	\$5,995
Martha Bouchard	MPC 525	256MB	\$4,995
J.C. Smith	MPC 525	256MB	\$4,995
Car Toon	MPC 525	1024MB	\$5,995
Bobby Hull	Dell XPS	1024MB	\$5,995
Robert k. Syt	Dell XPS	1024MB	\$2,999
Sally Klm	Dell XPS	1024MB	\$2,999
Ismail Gordon	Dell XPS	1024MB	\$2,999

## Joining In AutoCAD and External Tables

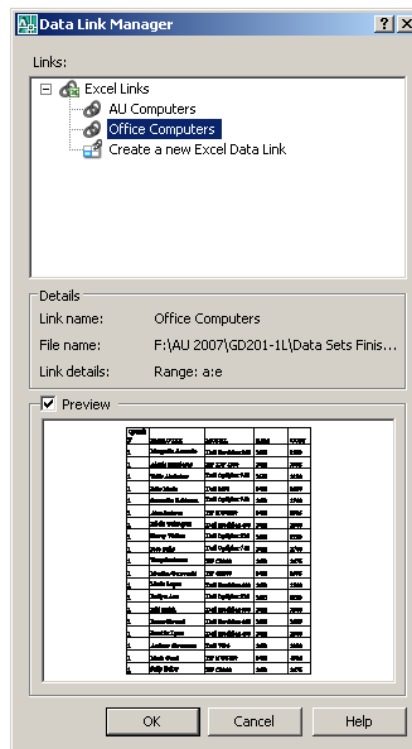
You can now join AutoCAD and Microsoft Excel spreadsheets. To do this, you use a data link to link AutoCAD to the external file. Go to Tool>Data Links and select the Data Link Manager as shown below.



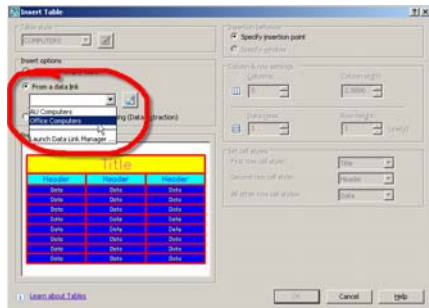
This creates the link between AutoCAD and Microsoft Excel.



The result is the data link to an existing Microsoft Excel spreadsheet. As shown below.



Now you need to use the TABLE command and link the data link into the drawing.

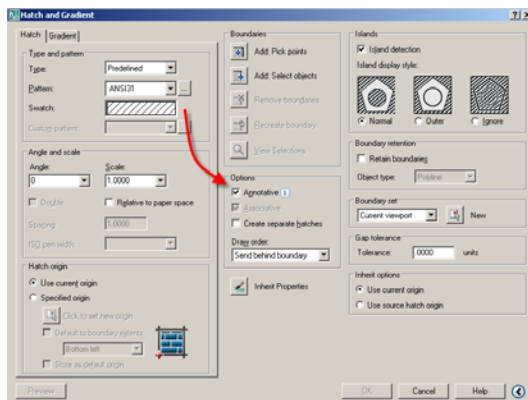


Your result is.....

Quantity	EMPLOYEE	MODEL	RAM	COST
1	Margaretto Hernandez	Dell Precision 380	2GB	1800
1	Alexis Kamberow	HP XV 4200	2GB	3949
1	Talia Akhbarov	Dell Optiplex 745	2GB	3250
1	Juho Morio	Dell M90	2GB	2050
1	Someshwari Robinson	Dell Optiplex 740	2GB	2700
1	Alan Jackson	HP 194300	2GB	3695
1	Eddie Velazquez	Dell Precision 400	2GB	2500
1	Stacey Webster	Dell Optiplex 320	2GB	1750
1	John Carter	Dell Precision 490	2GB	1900
1	Hadija Jiroud	Dell Precision 490	2GB	2300
1	Natasha Jackson	HP NWS440	2GB	4900
1	Jim Smith	Dell Precision 690	2GB	3000
1	Madison Parker	Dell M90	2GB	2050
1	Johnnie Williams	Dell Optiplex 320	2GB	1750
1	Susan Morio	Dell Optiplex 745	2GB	3250
1	Patricia Jones	Dell Precision 690	2GB	3000
1	Tommy Bell	Dell Optiplex 745	2GB	3250
1	Suzanne Widdie	Dell Precision 360	2GB	1800
1	Joan Smith	Dell Optiplex 740	2GB	2700
1	Taty Serfatovich	HP C8590	2GB	2675
1	Monica Gorzowski	HP C8590	2GB	2675
1	Hanna Lopez	Dell Precision 490	2GB	2300
1	Jennifer Ann	Dell Optiplex 320	2GB	1750
1	Bob Smith	Dell Precision 690	2GB	3000
1	James Stewart	Dell Precision 690	2GB	3000
1	Jennifer Lynn	Dell Precision 490	2GB	2300
1	Andrew Stevenson	Dell M90	2GB	2050
1	Mark Court	HP NWS440	2GB	4900
1	Sally Baker	HP C8590	2GB	2675

## 6. Hatching in AutoCAD 2008 Annotative

Teach hatching like we always have, but you need to show the new Annotative feature. Change the viewport scale and your hatch scales appropriately!

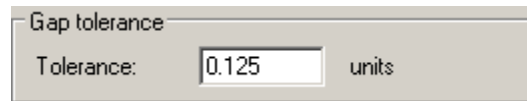




Teach..

- Boundary hatching with closed geometry and open geometry. Explain HPGAPTOL.

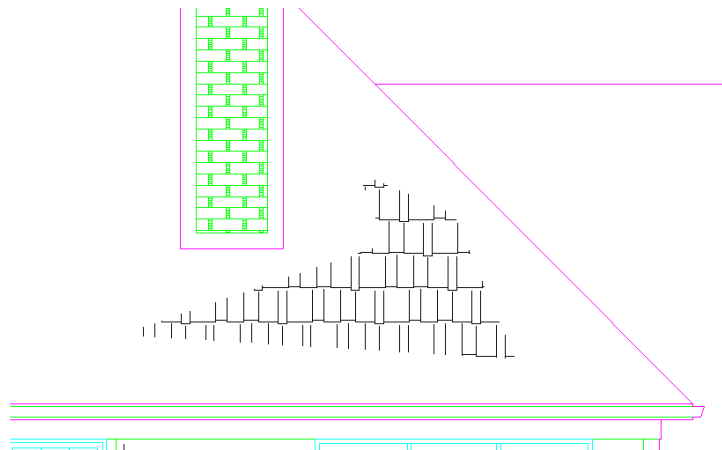
Select the Advanced tab and set the Gap Tolerance to the size of the opening or just slightly larger! Your hatch works!



- AutoCAD has the ability to pre-assign the draworder of hatch objects to create hatches that are above or below the boundary geometry.
- The Hatch Origin can also be set so hatches do not bleed together.
- Separate hatches can be used instead of having one large pattern across a drawing.
- You can also trim your hatch. Just use the trim command and press return before you select the hatch pattern.

### The -HATCH command

Many times we do not need to hatch the total area of a drawing. Using the old drafting term “conventional practice” we only need to hatch just part of the area needed. Type -HATCH, select W for draw boundary, follow the prompts and pick your points.

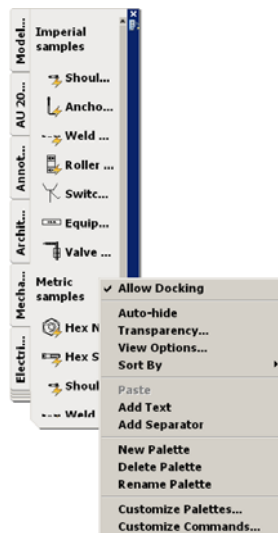


## 7. Tool Palettes and the new AutoCAD 2008 Dashboard

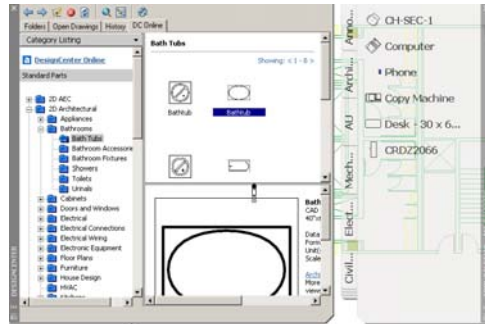
Organization at its best! Keep your blocks, images, tables, custom hatches, your favorite commands on Tool Palettes. Tool Palettes in AutoCAD 2008 has been enhanced again.

- You can drag and drop objects onto inactive palettes.
- You can create custom tool palette images.
- Customize the CUI by dragging commands from the command list in the Customize User Interface dialog box to a new palette.
- You can copy and paste individual commands or entire toolbars from the Custom User Interface on to a palette!
- You can also customize the Dashboard Panels by dragging commands or entire toolbars to create new Dashboard Panels.

Remember you can add AutoCAD commands, drag and drop content from DesignCenter or the Web onto a Tool Palette such as hatch patterns, Xrefs, blocks, images and hatch gradients. In AutoCAD 2007, you could add text and separator bars for tool palette grouping. When you drag and drop content from a drawing onto a Tool Palette, you create a *tool by example*. The properties of the content that is dragged and dropped onto the Tool Palette is maintained! You also have the ability to set individual properties to each Tool Palette object. Just right click and set the properties. A good example is a block that may have a different scale factor! Tool Palettes can be transparent as well as docked. In AutoCAD, you can create Tool Palette groups. These groups help in the organization of design content. Right click in the Tool Palette. Set Auto-hide, transparency or View Options. You can delete or rename a Tool Palette. You can create new Tool Palettes!



Use DC Online for importing content via the Autodesk Web site. Also, Google to sites the have AutoCAD i-drop technology for block insertion directly onto your drawing or directly on to your Tool Palettes.

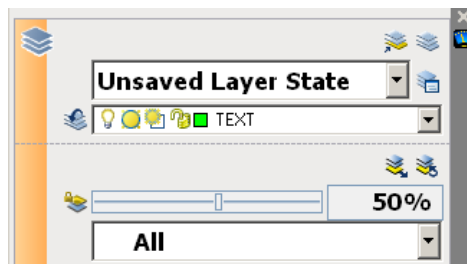


## 8. Layers

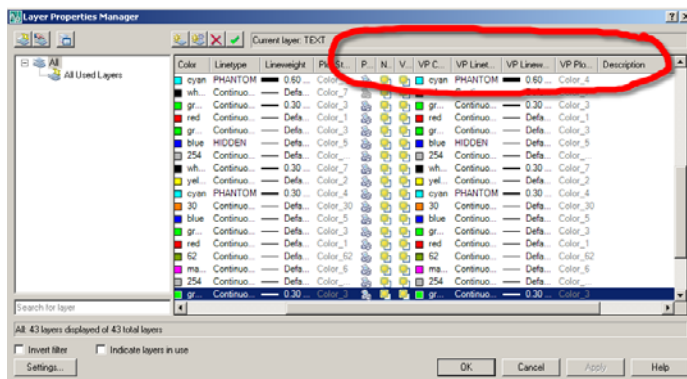
Layers, Layers, Layers.....Teach what we always have been teaching! Set the big picture of why we use layers and how companies use layering standards to control the management of the drawing.

The layer dialog has been enhanced in AutoCAD 2008. Remember that all layer tools that were part of Express Tools have been integrated into AutoCAD 2007.

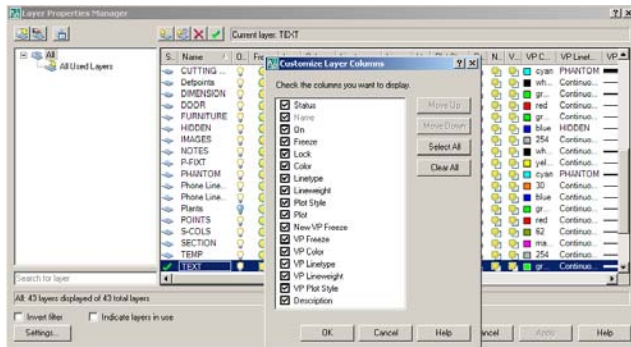
The Layers Panel is in the new dashboard. Use the dashboard!



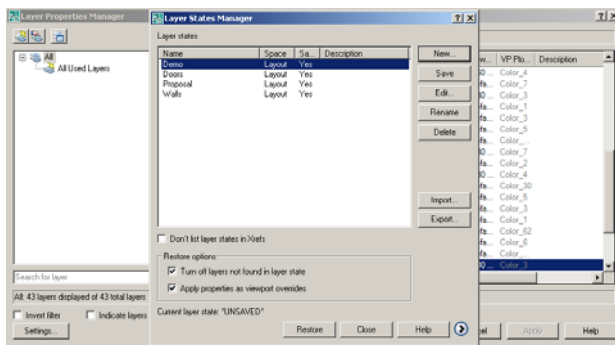
We have new columns in the Layers Property Manager.



You can customize the layers columns in the Layers Property Manager.

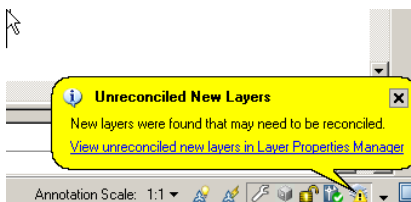


Explain the Layer States Manager. Create different display configurations of your geometry.

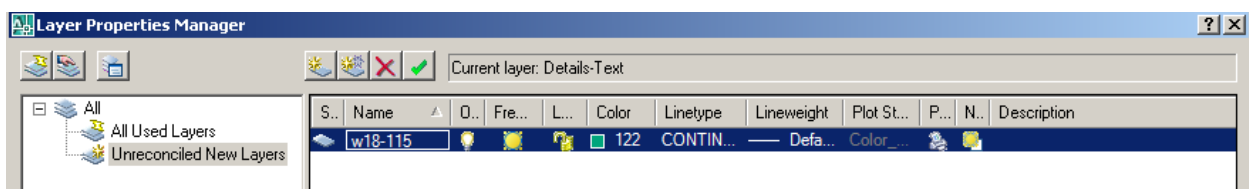


You will run into Reconciling Layers! This new features enables you to determine if layers are to be added to a drawing, or during the drawing process or inserting of other geometry/layers into a drawing if the layers are to be reconciled!

If new layers are added to the drawing a the Unreconciled New Layers icon is displayed and the alert pops up to tell you that unreconciled layers are present on save.

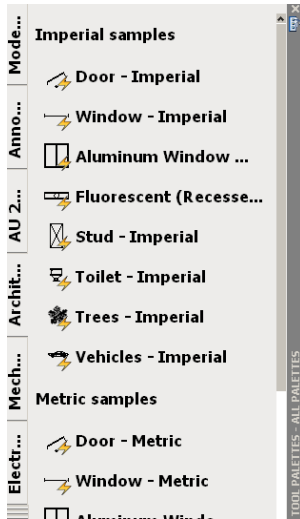


The layers property manager will display the unreconciled layer. This give us a display of layers that are new to this drawing.



## 9. Blocks, Dynamic Blocks, External References

**Always teach Tool Palette customization when teaching blocks!** Place all your blocks on your custom tool palettes. Use the tool palettes to place blocks into your drawing!



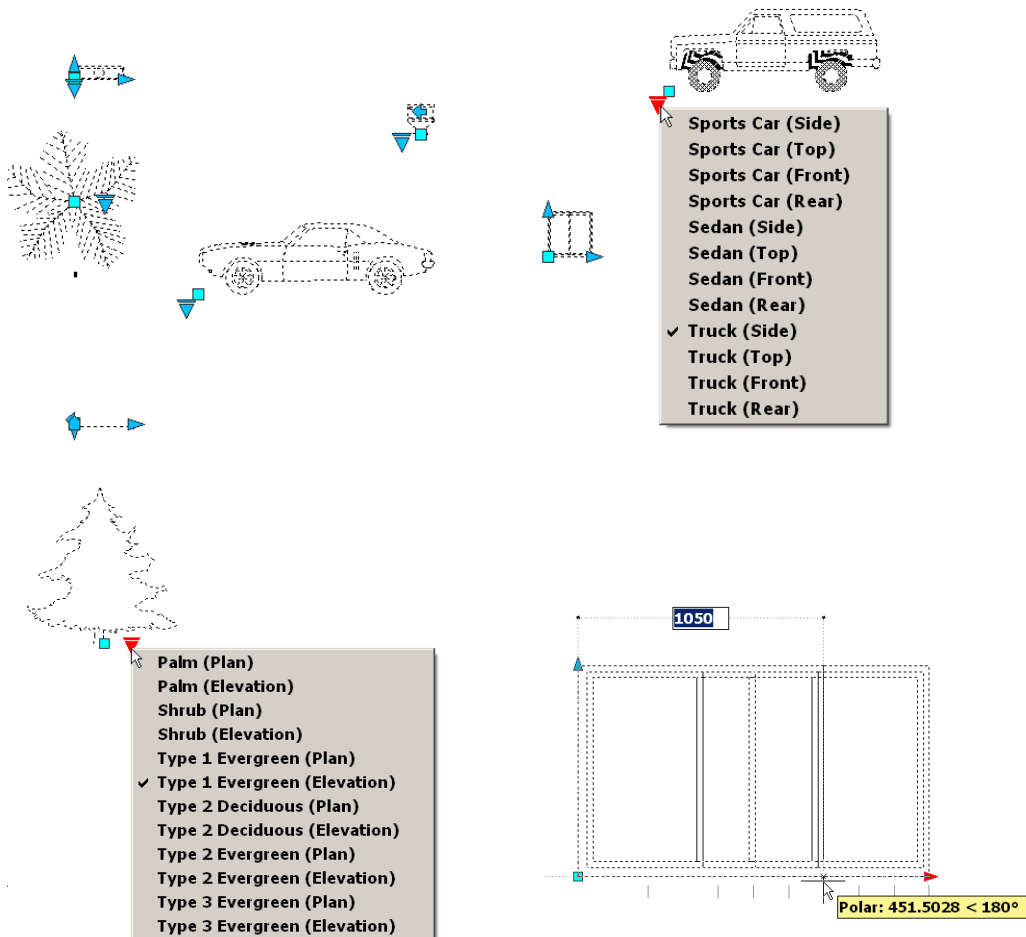
The Blocks like you always have!

Dynamic blocks are blocks that can change their appearance when you grip-edit them or when you change their custom properties. Regular blocks are made dynamic by using the BEDIT command and by adding parameters and actions to the block definition in the new BEDIT Command-Block Editor.

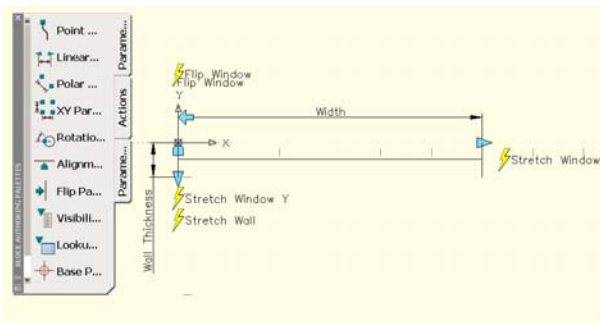
The advantages for using Dynamic blocks are the streamlining of your existing Block Libraries into singular blocks with varying parameters and actions and for nested block solutions. You can increase your productivity by using the new automatic alignment feature, the ability to cycle the insertion point and use in place editing techniques.

There is a sample folder of dynamic blocks included in the installation of AutoCAD 2008.

Have your students review the different permutations of dynamic blocks.

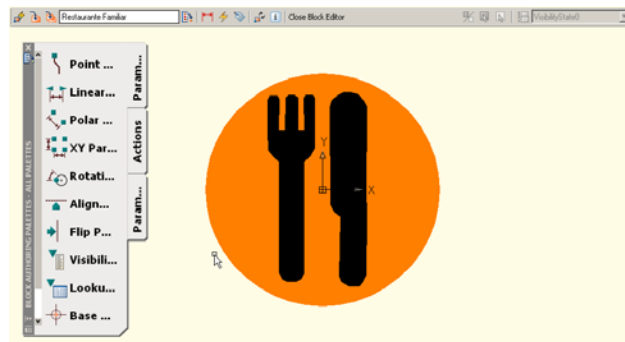


Once you have understood the various concepts of dynamic blocks, use the new BEDIT command to edit blocks or create or edit dynamic blocks.



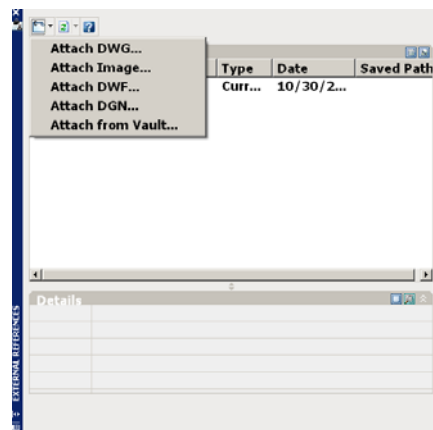
Use the Block Editor as the preferred method for editing blocks and especially dynamic blocks.

DO NOT EXPLODE YOUR BLOCKS! Unless your really need too!!!!!!



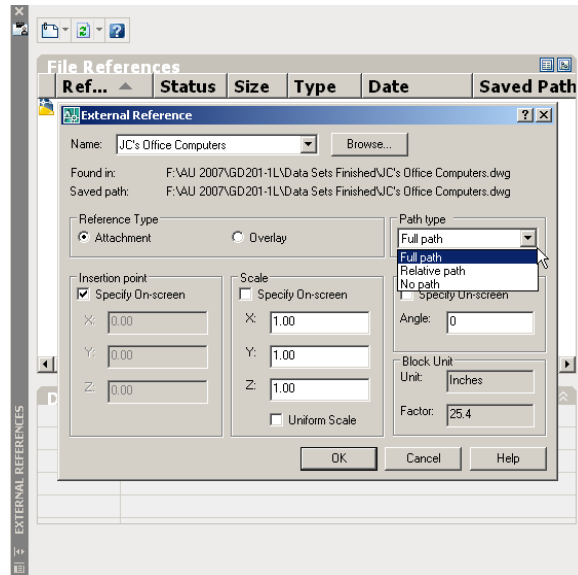
## External Reference Improvements

External Reference usage enables you to see all your externally referenced files in one palette. You can now see attached DWG and DGN files, images and DWF underlay files.

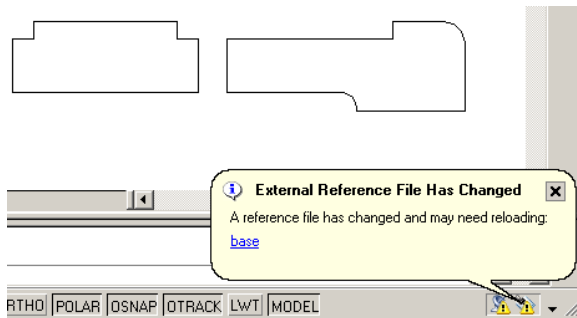


Enhancements to external references include the Xref Notification Icon in the Communication Center area, an external Xref Manager, the XOPEN command and modifications to the REFEDIT command. AutoCAD loads Xrefs in a first ready, first in, sequence.

You can now attach an Xref with a relative path. (This is a preferred method used by many especially when they move drawings around their offices or send drawings with Xrefs to others). When you attach an Xref using a relative path, the Xref's location becomes relative to the host drawing. You must save your host drawing first to its location, then Xref in a drawing using the relative path option.



An Xref notification icon is displayed in the communications area when an Xref is attached to a drawing. The Xref notification icon provides the user with a visual clue about the status of Xrefs. If an Xref gets modified and saved by another person, an alert balloon will appear.



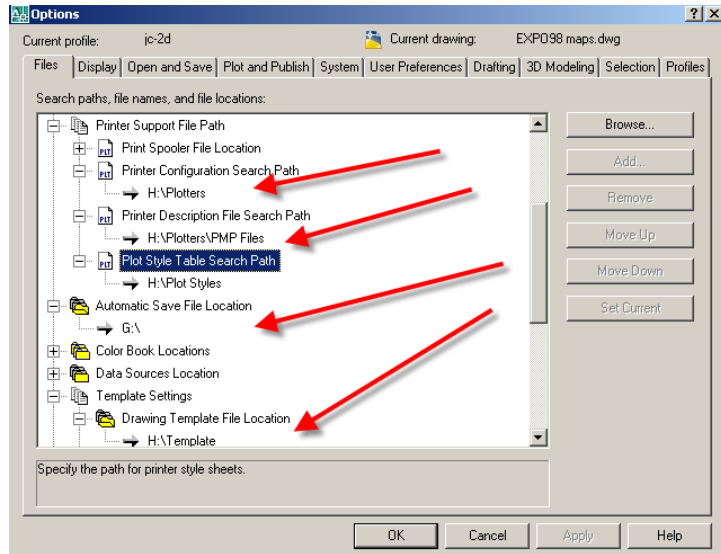
The XOPEN command gives you the ability to open an Xref that is currently in your drawing. A separate window opens for you to work with the Xref for modifications or changes. Once you save this drawing the notification balloon should appear to all users that have checked out the Xref. (Note: You can use the XOPEN command for Xref editing and the BEDIT command for block editing).

## 10. Options and Workspaces

### Setting your OPTIONS and saving your profile

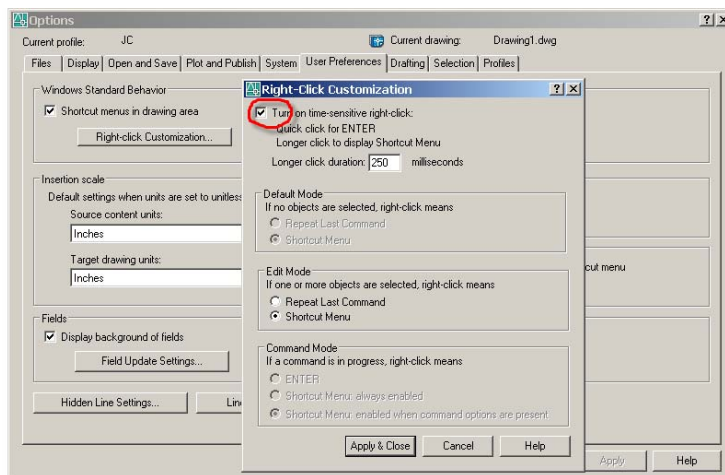
Profiles store drawing or system environment settings. Settings that relate to the drawing have the blue drawing symbol next to the setting in the OPTIONS dialog box. You can create profiles for different users or projects and share profiles by importing and exporting profile files. Important OPTION settings are: Plotter locations, Plot styles locations, PMP file locations, Autosave path locations. Set these locally or on a *network drive*.





## Right Click Enter Customization

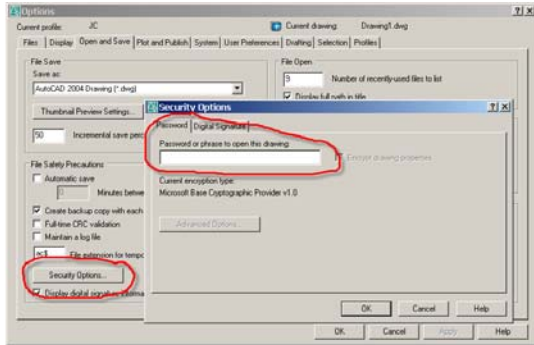
You can turn on time sensitive Right Click option in the options dialog box. A quick right click brings back ENTER. A delayed right click (pause) opens the shortcut pop-up menu. Set time in milliseconds.



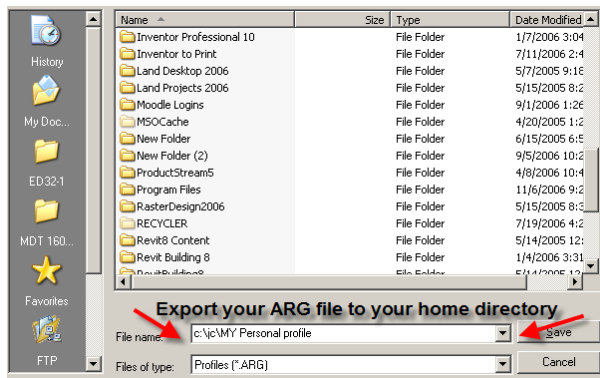
## Security

Setting the Security option for a password or digital signature can be to your advantage or disadvantage. If you wanted your students to turn in a drawing that had a password attached to the drawing file, this would lock the file so only the people that know the password can open it. Another example is for the teacher to assign a password to a drawing for exam purposes. When the exam is given, the teacher tells the students the password to open the drawing file.

However, passwords do have drawbacks. What happens if you forget the password? YOU ARE OUT OF LUCK! No backdoors here!

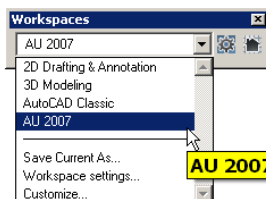


Continue to select ALL the OPTIONS dialog box tabs and make the settings changes that are important to you and your students. **Export** these settings as your profile to your student's home directory. Your students can then recall their profile as needed.



## Workspaces

Workspaces are your menus, toolbars, palettes that are organized so that you can work in your custom drawing environment. It's how your AutoCAD screen drawing layout environment looks! Workspaces are not the same as profiles. Think of Workspaces as what you want on and what you want off in regards to the appearance of your AutoCAD screen. Set up your AutoCAD with the toolbars you need, the palettes you need, etc and save your workspace. Use the Workspaces toolbar to save your workspace.



## 11. Linetype Scales

You have four scales to teach!

- a. LTSCALE-the global overall rounding factor for all linetypes.
- b. CELTSCALE-sets the current entity/object linetype scaling factor. Sets the linetype scaling for new objects X the LTSCALE factor. Note: the linetype scale factor in the Properties Palette is really CELTSCALE for that one object.
- c. PSLTSCALE- 0 setting is equal to no special linetype scaling. Linetypes are based on the drawing units of model space or paper space. 1.- Viewport scaling controls linetype scaling. Usually we set PSLTSCALE to 0 to see our linetypes in Model Space.
- d. MSLTSCALE- **NEW TO AutoCAD 2008.** 0 Linetypes displayed on the Model Tab are not scaled. By annotation scaling. 1 the Linetypes are scaled to the Model tabs annotation scale.

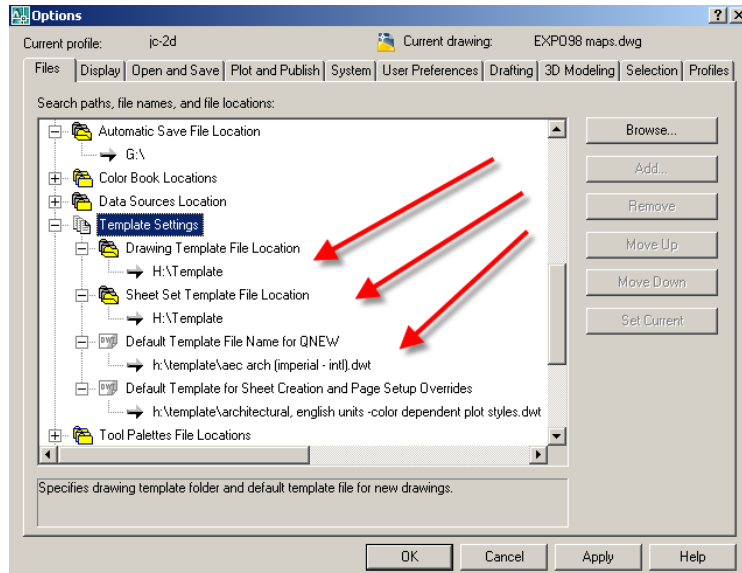
## 12. Templates

Templates are your key to good drawing management. You as the teacher/CAD Manager must create a standard template file for your students to use. (DO NOT have your students create their own templates). YOU create template files and have your students use YOUR standards! ADD Everything in your templates Layers, colors , linetypes, text styles, dim styles, multileader styles, title blocks and borders, layouts page setups, blocks, plot stamps fields, etc!

(Note: template file creation by your students is done in advanced classes or CAD management classes. Your students can modify your template file, but only with permission from you).

Template files in AutoCAD 2008 store all the tools for drawing creation. Show your students the location of your templates and how to use them. Set OPTIONS for template file location.

The second group of options to set is for your templates. This is very important so your students can create a new drawing with YOUR classroom standard template drawing. The QNEW setting is for creating a new drawing from the default template settings for QNEW. Just type QNEW at the command prompt and the default template launches.



### 13. What about GRIPS?

I usually explain grips when I teach dimensioning. However, anyplace you think you can weave in the concept and usage of grips, do it!

### 14. Customization, Advanced attributes, Advanced Dimension styles, 3D in AutoCAD, Plotting.....That's for other classes!

Hope you had a great time!