AUTO CAD

MAKE YOUR DRAWING LIFE EASIER

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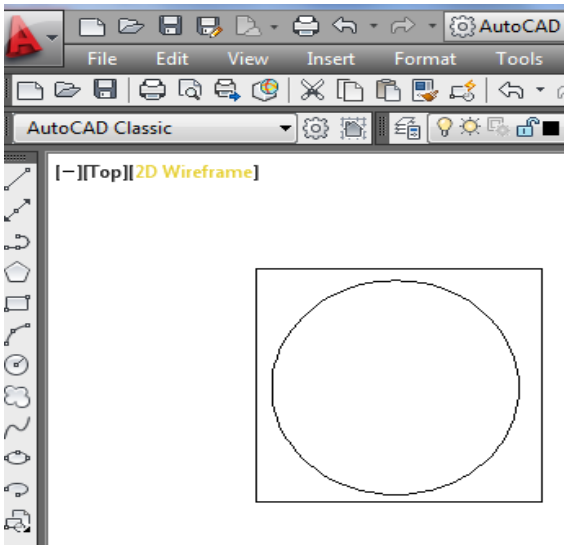
Introduction to Auto Cad
Auto Cad and AutoCAD versions

- Definition: AutoCAD is a computer aided design program used for 2-D and 3-D design and drafting.
- AutoCAD versions include; AutoCAD 2009, AutoCAD 2010, AutoCAD 2012, 2013,2014,2015,2016 just as Microsoft software.
- THE AUTO CAD ICON

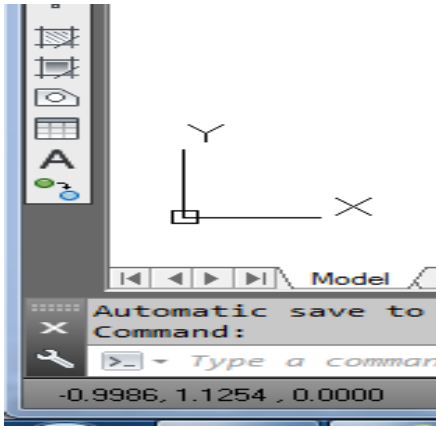
DRAFTING

- This is a systematic representation and dimensional specification of mechanical and architectural structures.
- Types of drafters include; mechanical drafters, electrical drafters etc.
- An example of a drafted object;

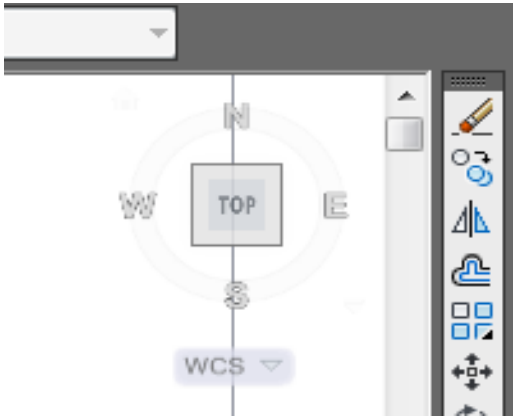


DRAWING COORDINATES AND LAY OUT TABS

- WCS- World Coordinate System ; this is a fixed system based on the Cartesian coordinate system as a basis for defining all objects and other coordinate systems used by the users.
- Normally in 2-D views, the WCS **X**-coordinate is horizontal and the **Y**-Coordinates is vertical. The WCS intersect at origin (0,0) as shown;



UCS: This is a movable ‘user coordinate system’ that can be altered



Absolute coordinates: using this method, you enter the points as they relate to the origin of the WCS. Just type in the exact points as (x,y).

Relative coordinates: this allows you to enter points in relation to the first point you have already entered. It is entered as @x,y.

Polar coordinates: this is used if you want to draw a line a certain distance at a particular angle. You would enter this as @D<A where D is the distance and A is the angle e.g. @10<90 will draw a line 10 units straight up from the first point.

Direct distance entry technique: Here, a second point is specified by first moving the cursor to indicate direction and then entering a distance.

DRAWING UNITS

- AutoCAD has many units in which to draw your objects.

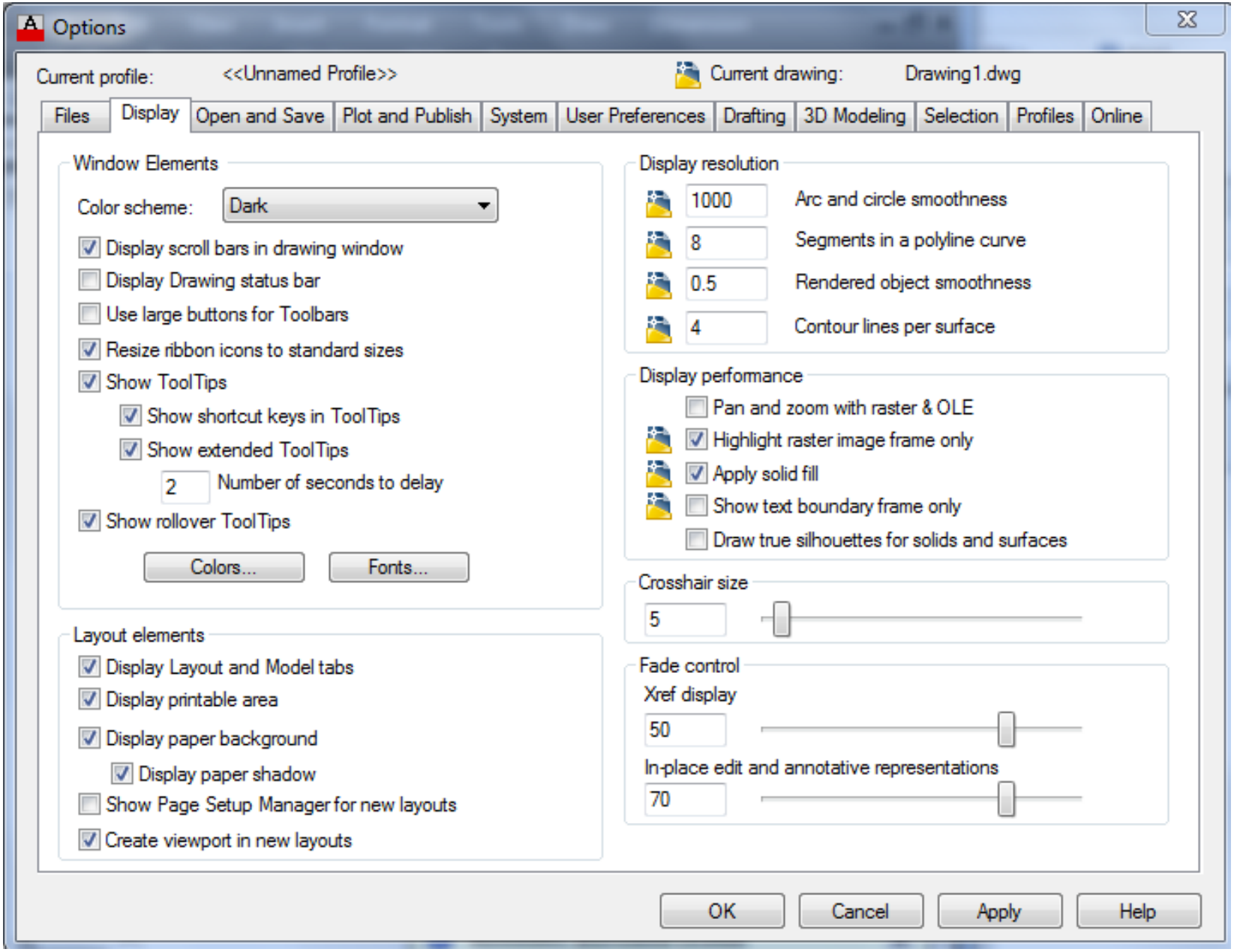
i) You can click on the Application red button on your left far-up corner and then choose drawing utilities then units. A drawing units dialogue box will display where you will make your preferred changes.

ii) From the menu bar, click format then units and make changes from the dialogue box.

iii) Also, you can type units in the command line window and press enter. The dialogue box will display automatically where you will make your changes.

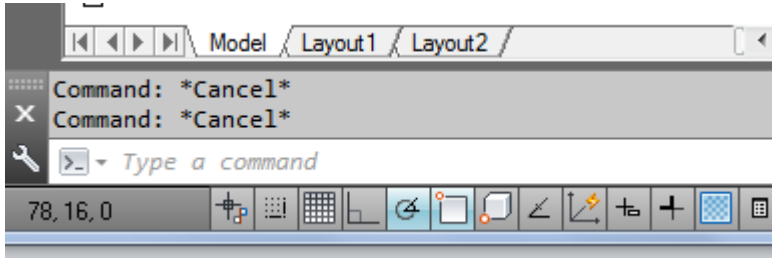
Changing the screen color:

- right click in an empty space and choose options.
- A dialogue box displays
- Click display in the menu of the dialogue box
- Click color and in the dropdown arrow, choose the color of your preference.
- Then click apply & close as shown below in the next slide.


Options
Current profile: <<Unnamed Profile>>
Current drawing: Drawing1.dwg
Files
Display
Open and Save
Plot and Publish
System
User Preferences
Drafting
3D Modeling
Selection
Profiles
Online
Window Elements
Color scheme: Dark
Display scroll bars in drawing window
Display Drawing status bar
Use large buttons for Toolbars
Resize ribbon icons to standard sizes
Show ToolTips
Show shortcut keys in ToolTips
Show extended ToolTips
2
Number of seconds to delay
Show rollover ToolTips
Colors...
Fonts...
Layout elements
Display Layout and Model tabs
Display printable area
Display paper background
Display paper shadow
Show Page Setup Manager for new layouts
Create viewport in new layouts
Display resolution
1000
Arc and circle smoothness
8
Segments in a polyline curve
0.5
Rendered object smoothness
4
Contour lines per surface
Display performance
Pan and zoom with raster & OLE
Highlight raster image frame only
Apply solid fill
Show text boundary frame only
Draw true silhouettes for solids and surfaces
Crosshair size
5
Fade control
Xref display
50
In-place edit and annotative representations
70
OK
Cancel
Apply
Help

The command line.

This is a window just slightly above the task bar that helps in giving out a set of instructions when a command is entered.



NOTE: Before drawing anything, make sure your command line is in ‘cancel’ ‘cancel’ as in the above picture. This is done by pressing the esc button on your key board so many times.

WORKSPACE AND THE AUTOCAD SCREEN

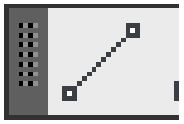
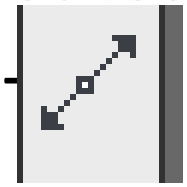
This is simply the working environment and it includes; Drafting & annotation, 3D Basics,3D modeling and AutoCAD classic.

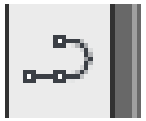
To switch workspace on, you go to the status bar and click workspace switching and select one of the above.

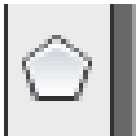
BASIC AUTOCAD TERMINOLOGIES.

- Application button. This is the one that displays commands for printing, saving, drawing utilities and other non-drawing tool.
- Quick Access Toolbar. This is for quick access to commands like New, Open, Save, Plot.
- Filename. Is the name of the current drawing you are working on.
- Ribbon. This has most of the commands/tools that you will use while you are working.
- Status bar. This allows to see and change different modes of drawing such as Ortho, Osnaps, Grid, Otrack etc. you can right click this area to toggle between icons and text for this area.
- Grips. These are small blue square ‘handles’ which appear on a selected object that allows for quick editing.
- Cross hairs. This is your cursor when it is in the drawing space.
- etc.

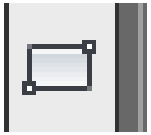
INTRODUCTION TO DRAWING AND MODIFYING.
THE DRAW TOOL BAR

- Line command. This creates single straight line segments.
- Choose draw, line or the line icon 
- Specify first point move the cursor to specify the next point or use coordinate system.
- Construction line. This creates a line of infinite length and its icon is this- 

Polyline. This creates a connected sequence of segments created as single planar objects. icon 

Polygon. This creates an equilateral polyline drawn by specifying the number of sides and sometimes inscribed and circumscribed options. Icon 

Rectangle. This creates a rectangular polyline.

Icon 

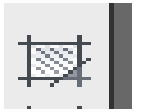
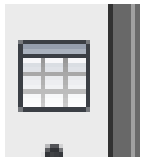
Arc. This creates an arc using **only three** points.

Icon 

Circle. This creates a circle using a center point and radius. 

Spline. This creates a smooth curve that passes through or near specified points. icon 

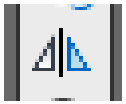
Ellipse. This creates an ellipse or an ellipse arc. Icon 

- Make block. This creates a block definition from selected objects.
- Hatch. This fills an enclosed area or selected objects with a hatch pattern or fill. Icon- 
- Gradient. This fills an enclosed area or a selected object with a gradient fill which creates a smooth transition between one or two colors. 
- Table. It creates an empty table object that contains data in rows and columns. 

Multiline text. This creates paragraphs of text as a single multiline text object. (Mtext) 

- Single line text. This one also creates paragraphs of text. It is done by typing the word text in the command line and specifying the start point, height of the text and the rotation angle.

THE MODIFY TOOL BAR

- Erase. This removes or deletes unwanted objects from a drawing. 
- Copy. This helps in copying a single or multiple copies of an object. 
- Mirror. It creates a mirrored copy of a selected object. 
- Offset. It creates concentric circles, parallel lines and parallel curves. 
- Rectangular array. This distributes object copies into any combination of rows and columns. 
- Move. It moves an object in a specified distance in a specified direction.
- Rotate. Rotates an object around a base point.

Scale. This enlarges or reduces selected objects, keeping the proportions of the object the same after scaling.

- Stretch. This stretches objects crossed by a selection window or polygon.
- Trim. It trims objects to meet the edges of other objects
- Extend. It extends objects to meet edges of other objects.
- Break at a point. It breaks an object at only a single point.
- Break. It breaks the selected object between two points.
- Join. This joins similar objects to form a single, unbroken object.

Chamfer. This bevels the edges of an object. Example of a chamfered object  

- Fillet. This rounds and fillets edges of objects e.g.  
- Blend curves. This creates a tangent or smooth spline between the end points of two open curves. 
- Explode. This breaks a compound object into its component objects. Icon 

USING DRAWING AIDS

- Osnap. This is the object snap mode that specifies a snap point at an exact location on an object. It is toggled on and off with F3 key
- Ortho mode. This controls lines from being drawn at various angles to straight lines. Shortcut F8
- Polar Tracking. This helps in drawing lines at specified angles. E.g. 45^0, 30^0, 15^0 . Its shortcut is F10
- Dynamic input. This is a user's keystroke that appears in the drawing area near the cursor once drawing. Its shortcut is F12.
- Grid. This option creates a pattern of lines that extends over an area on the screen that helps to align and visualize distance between objects. Shortcut is F7

CONTROLING OBJECT VISIBILTY

- Zoom. This increases or decrease the apparent size of objects in the current viewport. There are many options of zooming; including zoom window, zoom real time, zoom previous, zoom extent or even you can zoom in and out using the scroll button on your mouse.
- Undo. This reverses the last action. Its shortcut is ctrl+z.
- Redo. This reverses the effects of a single undo or u command.
- Pan. This shifts the location of a view.
- Layers. We shall look at this in detail.

FUNCTION KEYS AND ACCELERATOR KEYS

- F1- help
- F2- it toggles the text window
- F3- toggles the Osnap
- F7- toggles the Grid mode.
- F8-toggles the Orthomode
- F9- toggles the snapmode
- F10- toggles polar tracking
- F11- toggles object snap tracking
- F12- toggles Dynamic Input
- Ctrl+0- toggles clean screen.
- Ctrl+8- toggles the quick calculator palette
- Ctrl+A- selects all objects in the drawing area.
- Ctrl+J & ctrl+M- repeats the last command.
- Ctrl+N- creates a new drawing.
- Ctrl+O- opens an existing drawing

- .
- Ctrl+X- cuts objects to clipboard
- Ctrl+Y- cancels the preceding Undo action
- Ctrl+Z- reverses last action(Undo)
- Ctrl+V- pastes data from clipboard
- Ctrl+S- saves current drawing
- Ctrl+P- prints the current drawing