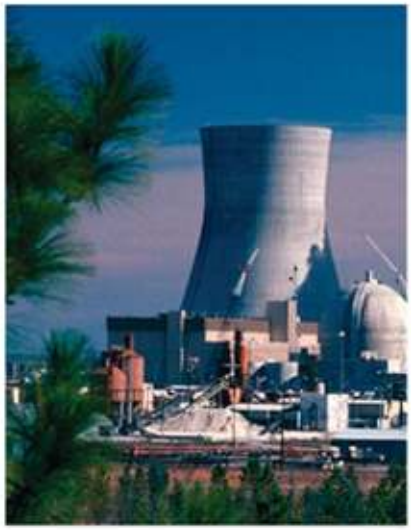
SmartSketch®

Lab Guide

Process, Power & Marine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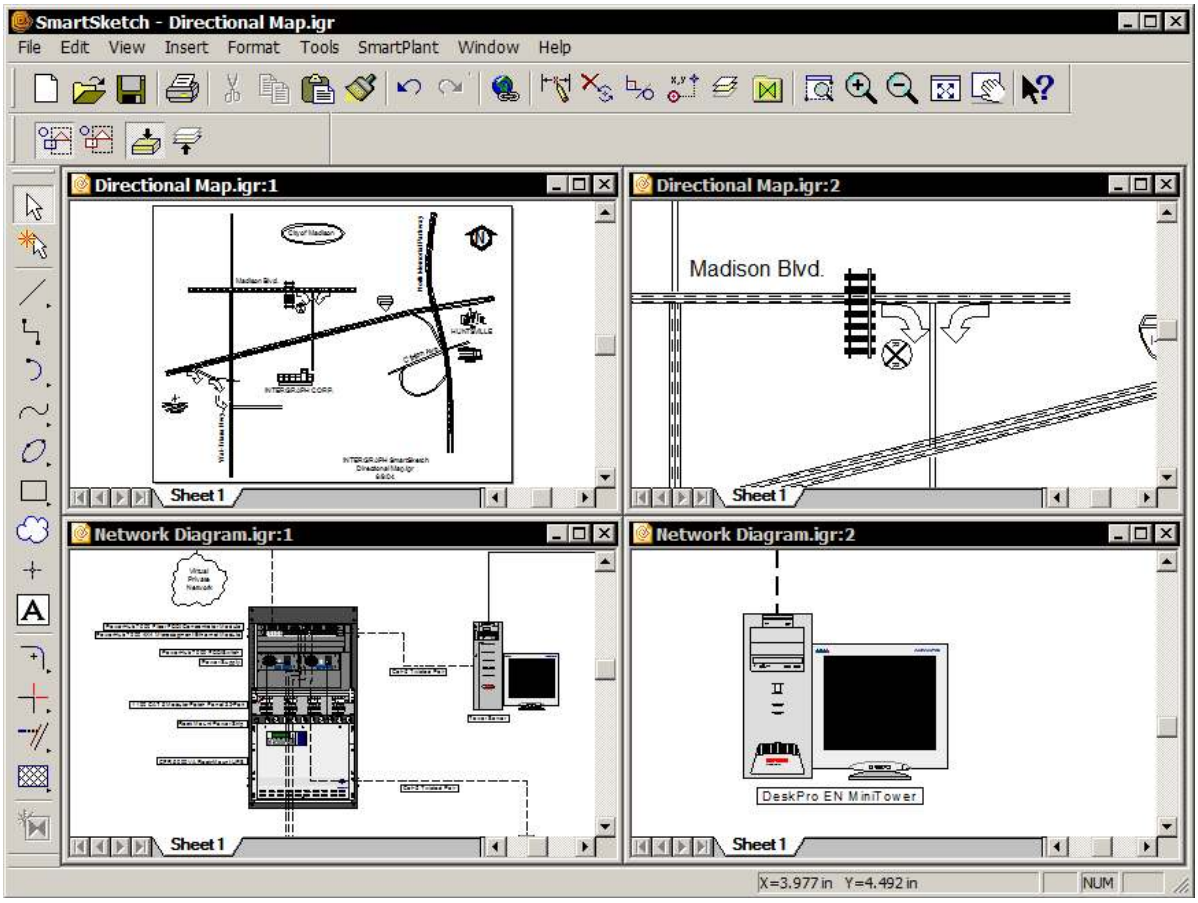
Preface

This document is a lab guide for the SmartSketch course.

Note: All labs in this guide are not expected to be done in class. They are to be used for practice when reviewing the course. The instructor will choose which labs will be used for class.

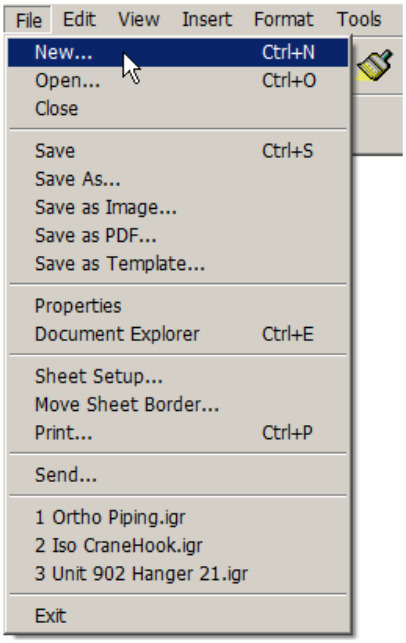
Lab 1 – Creating and Opening Documents

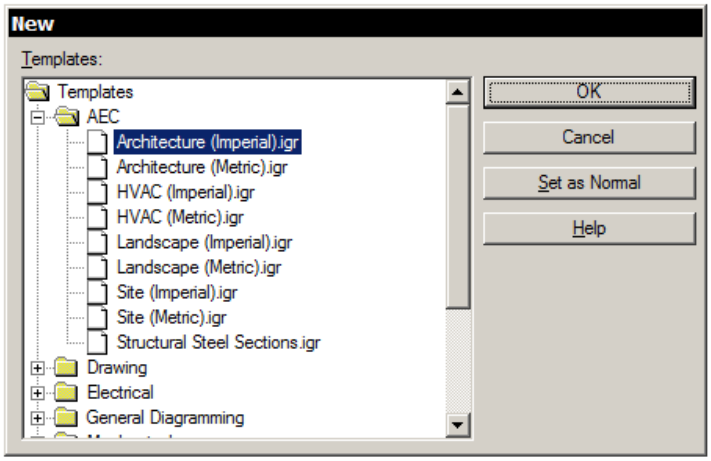
In this lab you will create new documents using different templates provided with SmartSketch, open existing documents, and change settings from the Options dialog box.



CREATE A NEW FILE USING AN ARCHITECTURE TEMPLATE

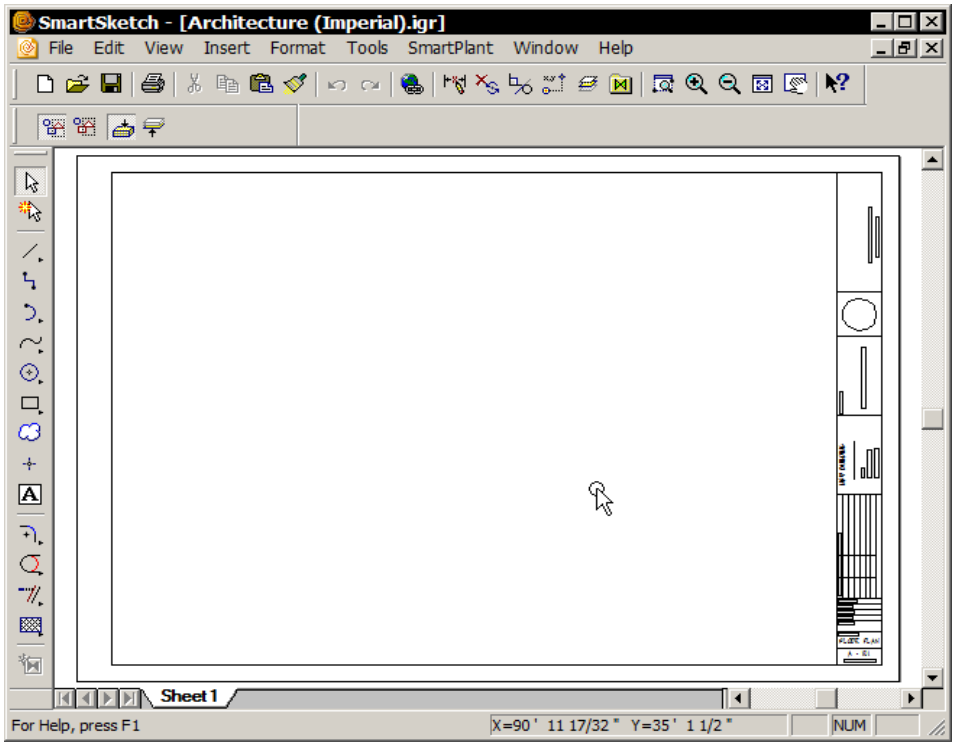
1. From the **File** menu, select **New**.





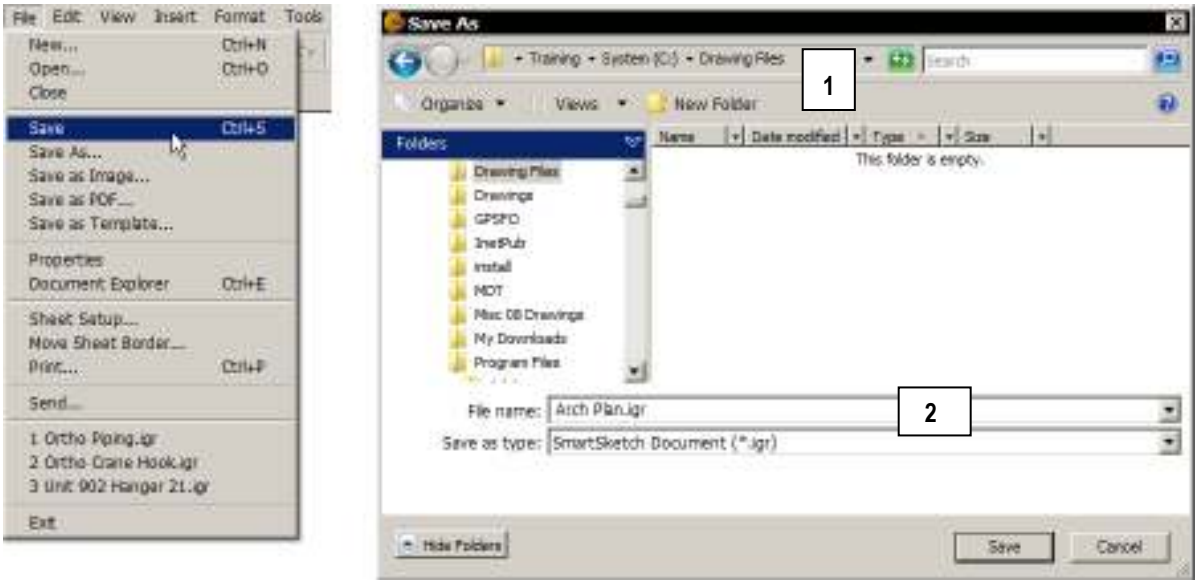
2. Select *Architecture (Imperial).igr* from the *AEC* template folder of the **New** dialog box.

3. Click the **OK** button. A new file will open.

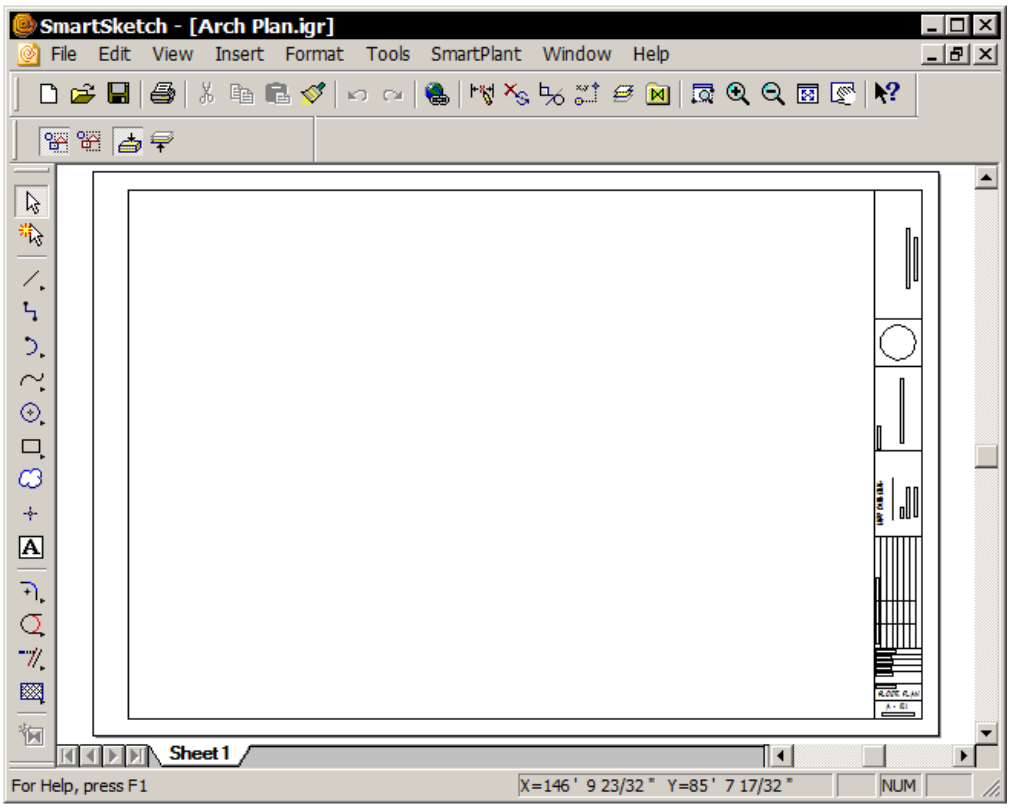


SAVE THE DRAWING

1. From the **File** menu, select **Save**.

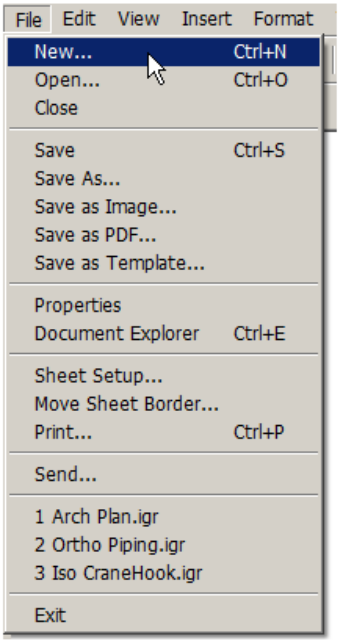


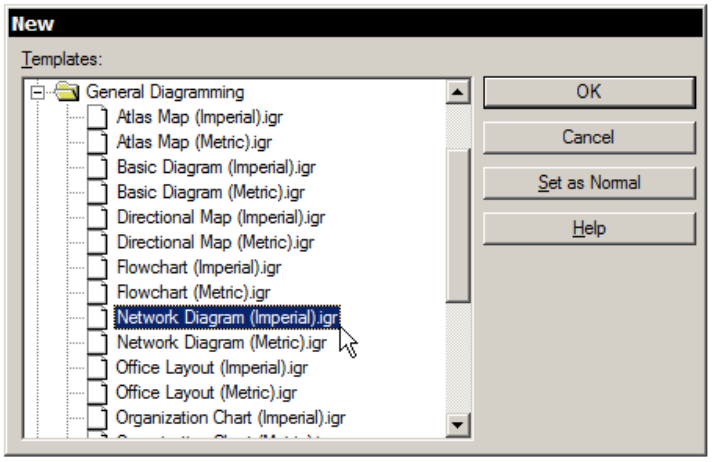
2. In the **Save in** list box, change to the *C:\Drawing Files* folder. (**1**)
3. Type ***Arch Plan*** in the **File name** field. (**2**)
4. Click the **Save** button. The drawing is saved as **Arch Plan.igr**.



CREATE A NEW FILE USING A NETWORK DIAGRAM TEMPLATE

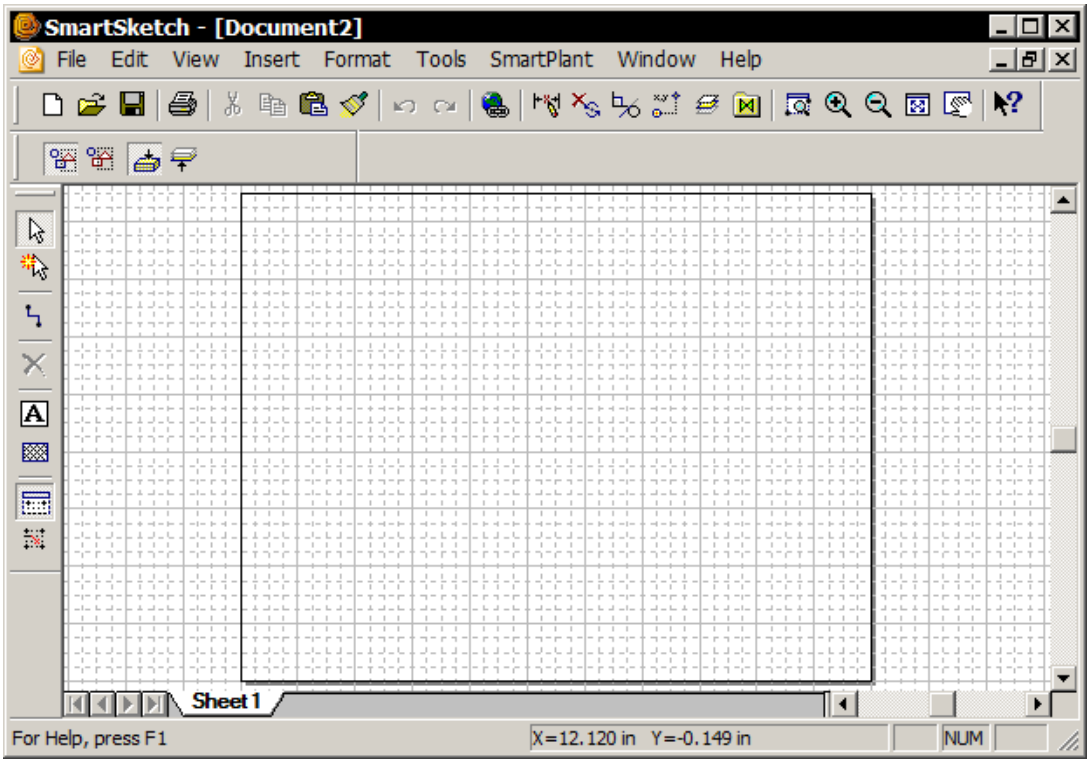
1. From the **File** menu, select **New**.





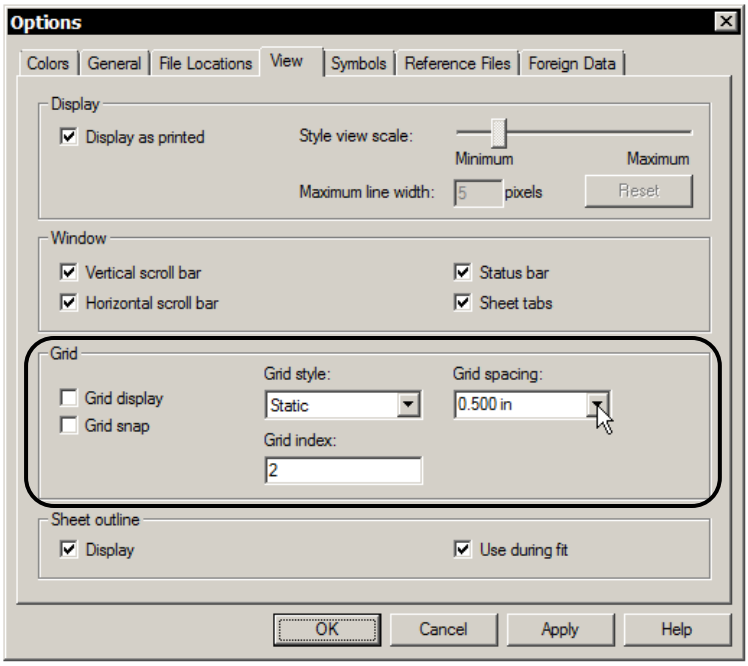
2. Select *Network Diagram (Imperial).igr* from the *General Diagramming* template folder of the **New** dialog box.

3. Click the **OK** button. A new file will open. Notice that the **Draw** toolbar has been replaced with the **Schematic** Toolbar.



CHANGE THE VIEW GRID SETTINGS

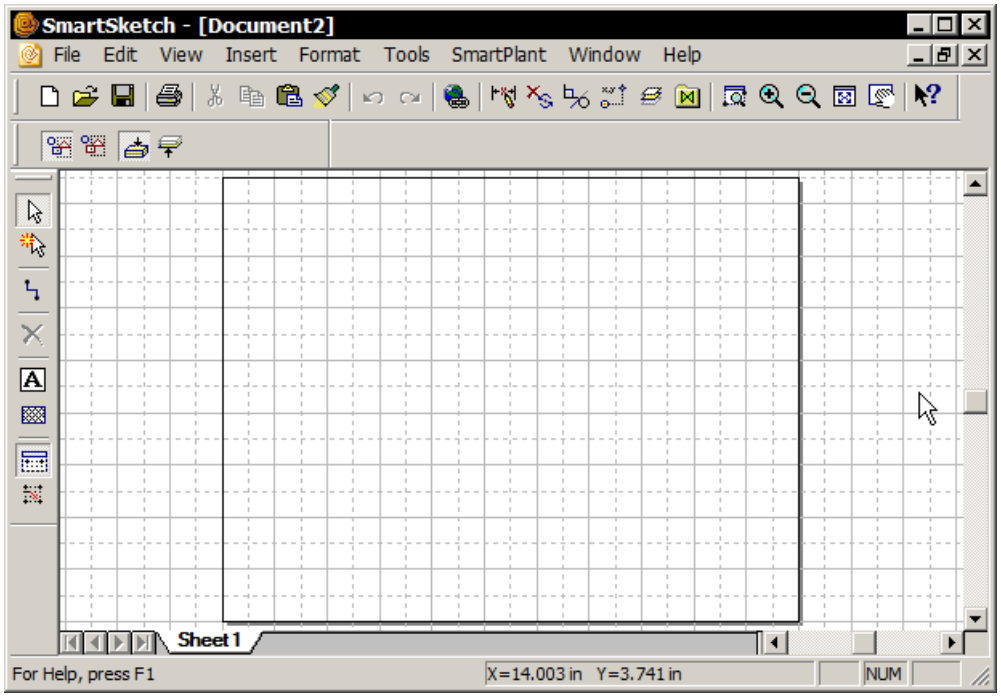
1. From the **Tools** menu, select **Options**.



2. On the **View** tab of the **Options** dialog box, set the following:

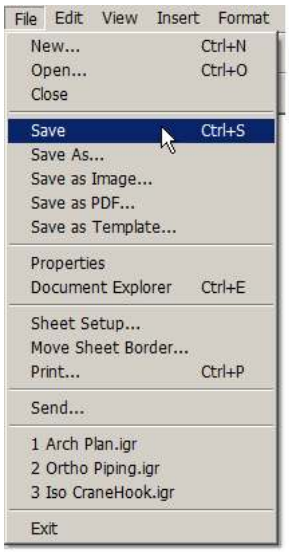
   Grid display: **ON** Grid snap: **ON** Grid style: **Static**
   Grid spacing: **.5 in** Grid index: **2**

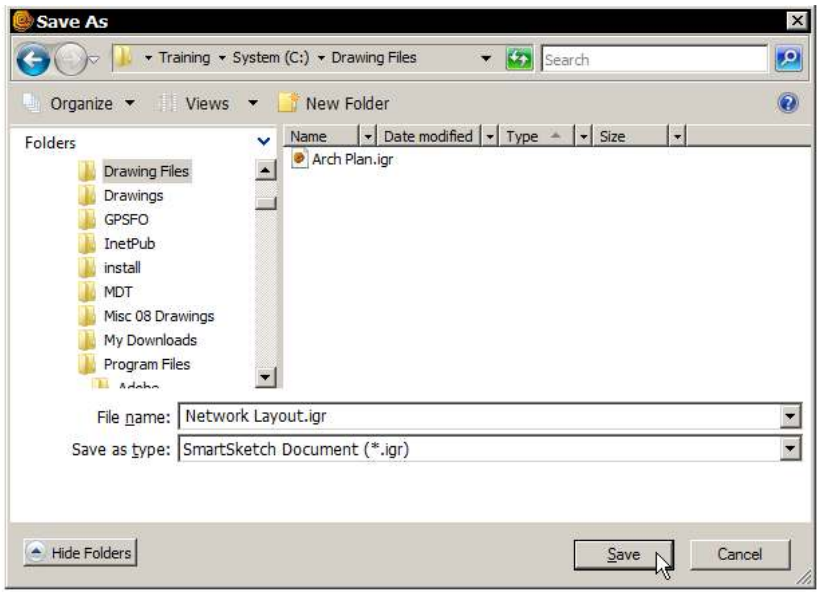
3. Click the **OK** button. The grid settings are changed.



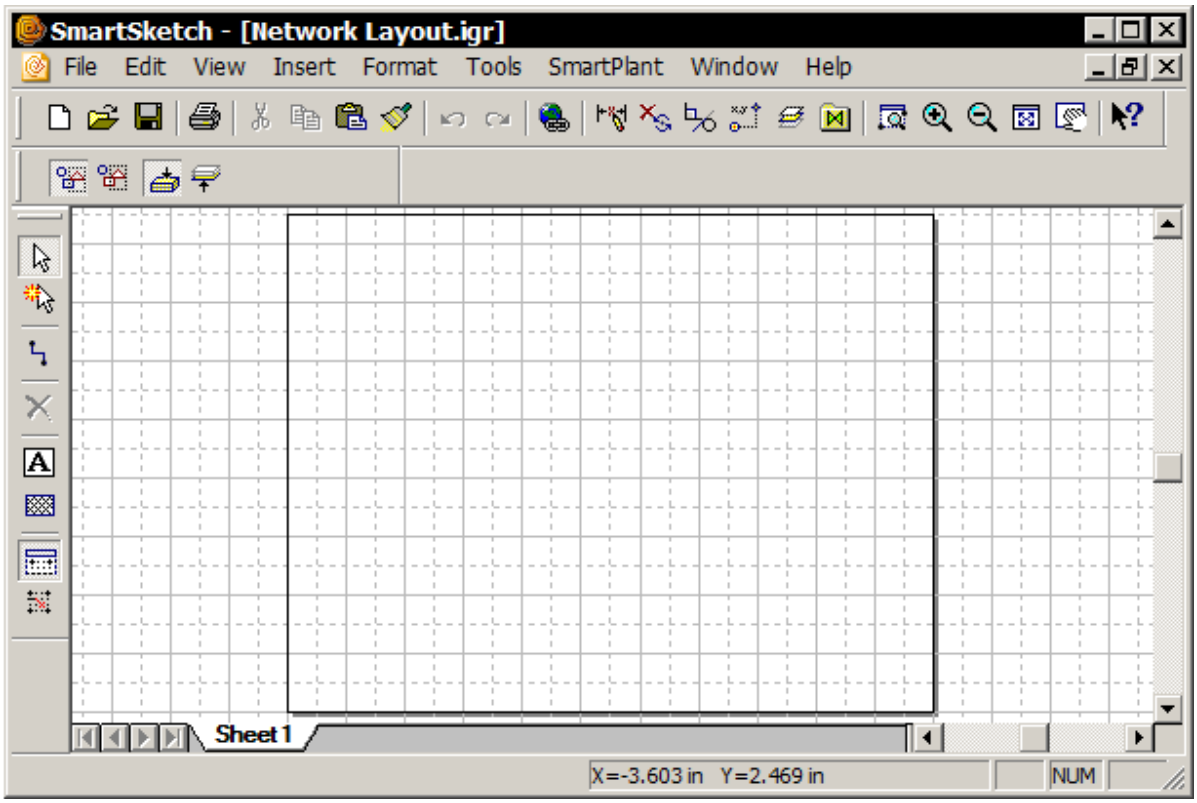
SAVE THE DRAWING

1. From the **File** menu, select **Save**.



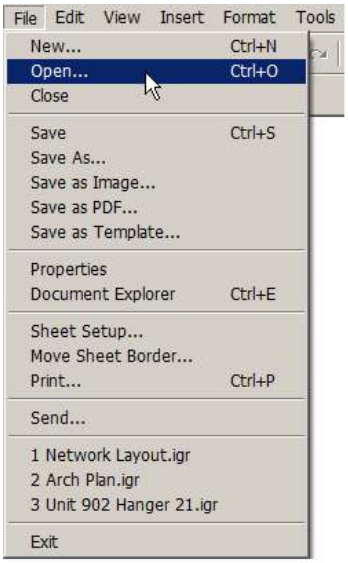


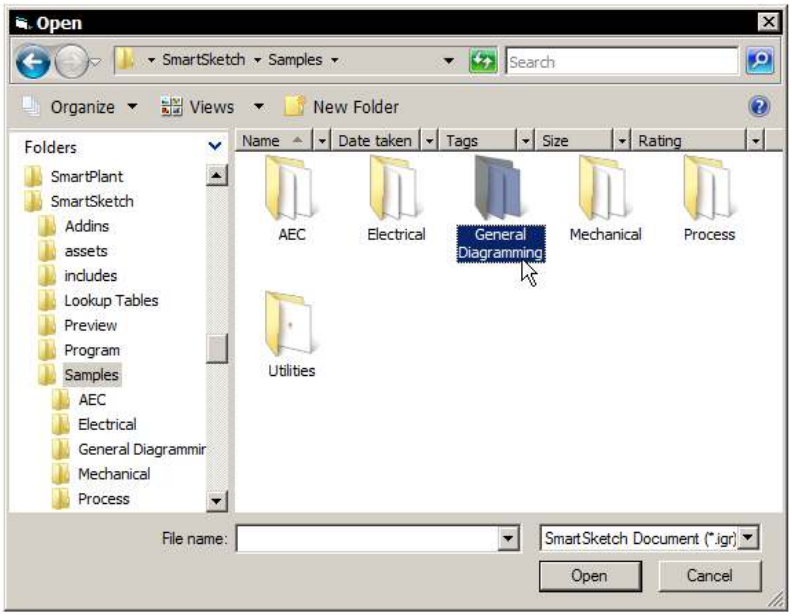
2. In the **Save in** list box, change to the *C:\Drawing Files* folder.
3. Type ***Network Layout*** in the **File name** field.
4. Click the **Save** button. The drawing is saved as **Network Layout.igr**.



OPEN A SMARTSKETCH SAMPLE FILE

1. From the **File** menu, select **Open**.

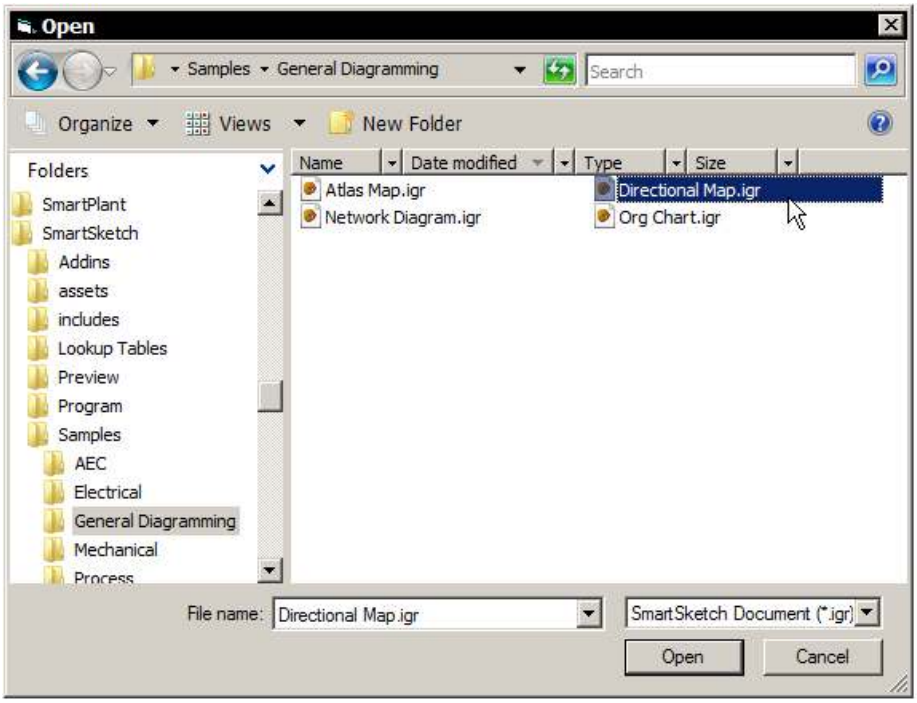




2. In the **Look in** list box, change to the following folder:

   C:\Program Files (x86)\SmartSketch\Samples\General Diagramming

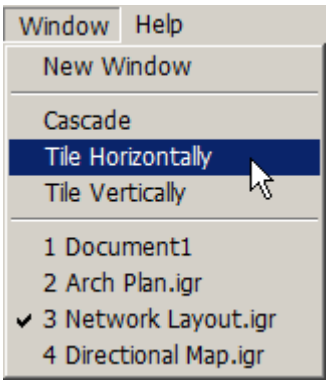
3. Select the sample file *Directional Map.igr* and click the **Open** button.

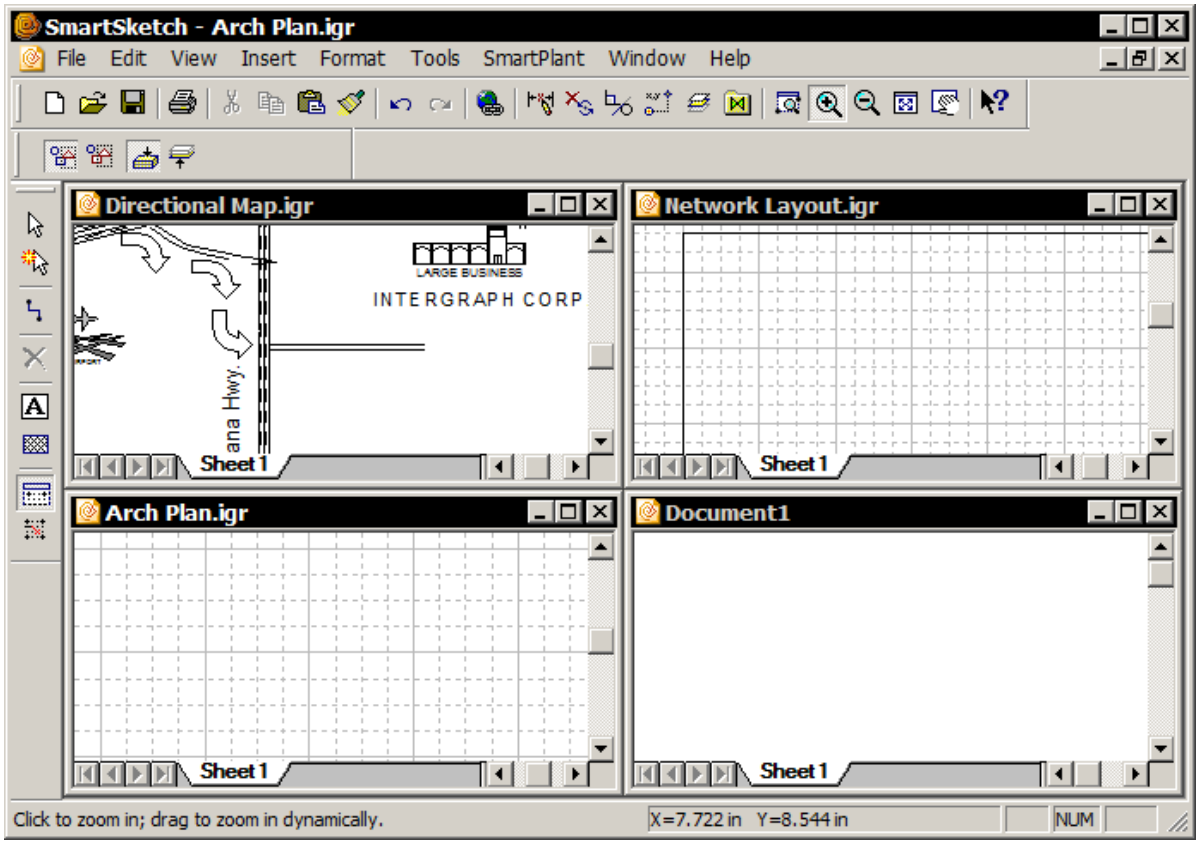


Note: ***If the Directional Map sample file does not exist on your computer, open a sample file of your choice.***

DISPLAY ALL OPEN SMARTSKETCH DOCUMENTS

1. From the **Window** menu, select **Tile Horizontally**.





Notice that each of the files is still open. You can make one of the open files active by clicking anywhere inside the window.

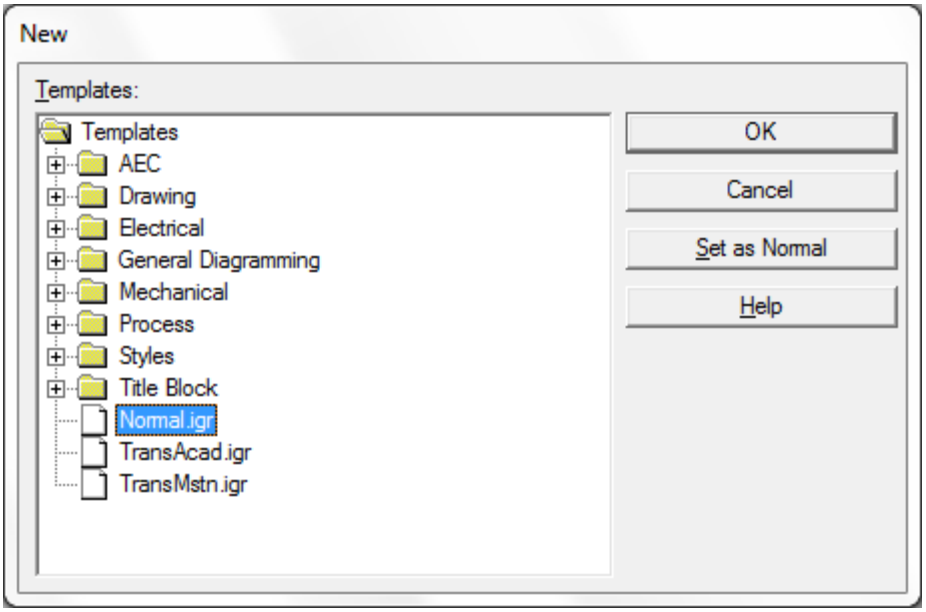
Time permitting, open other sample files and practice using the view control tools. When you finish, close all drawings without saving changes.

Lab 2 – Creating a Template File

In this lab you will create a new document, change sheet settings, create a new background sheet, define layers, and then save the document as a template.

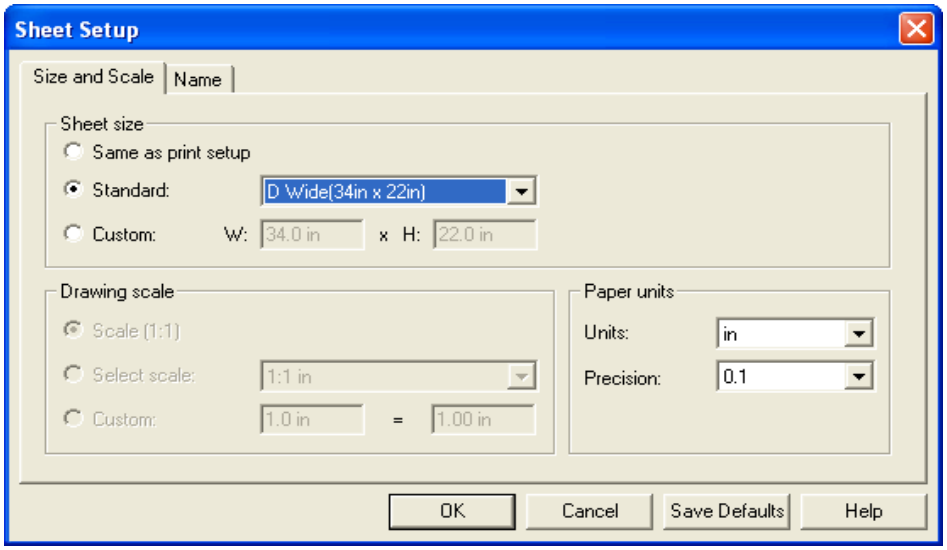
CREATE A NEW FILE USING THE NORMAL TEMPLATE

1. Start SmartSketch if it is not already running.
2. Create a new file using the *Normal* template.



SET UP THE DOCUMENT

1. Select **Background Sheets** from the **View** menu.
2. Insert a new sheet and rename it to *Class D Wide*.
3. Select **Sheet Setup** from the **File** menu.
4. Select the **Standard** option in the **Sheet size** area and set it to *D Wide(34in x 22in)*.
5. Click the **OK** button.



6. Select the *Fit* command from the *Main* toolbar.

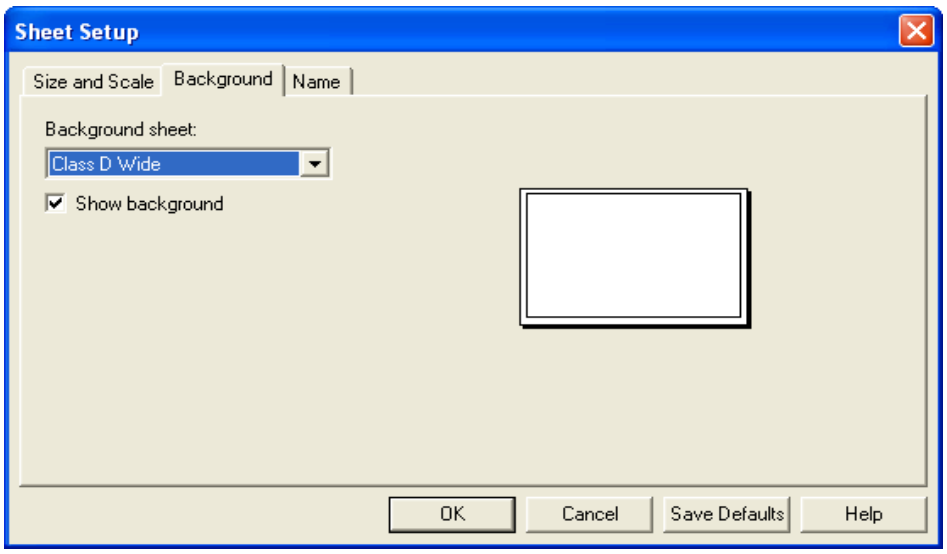
7. Using the *Line/Arc Continuous* command, draw a 32” by 20” border. Color, width and line type are left up to you.

8. Select **Working Sheets** from the **View** menu.

9. Select **Sheet Setup** from the **File** menu.

10. Click the **Background** tab.

11. Select the *Class D Wide* background sheet.



12. Make sure the **Show background** check box is selected.

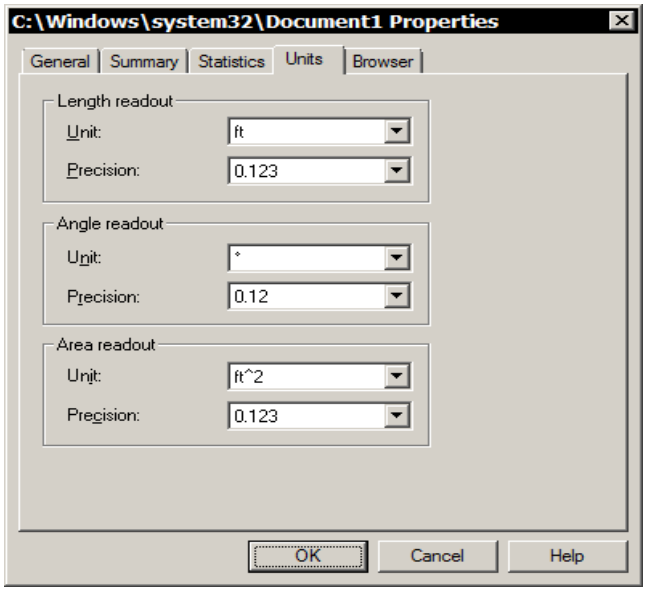
13. Click the **OK** button.

14. Select **Properties** from the **File** menu.

15. Select the **Units** tab.

16. Change the **Unit** setting under **Length readout** to *ft*.

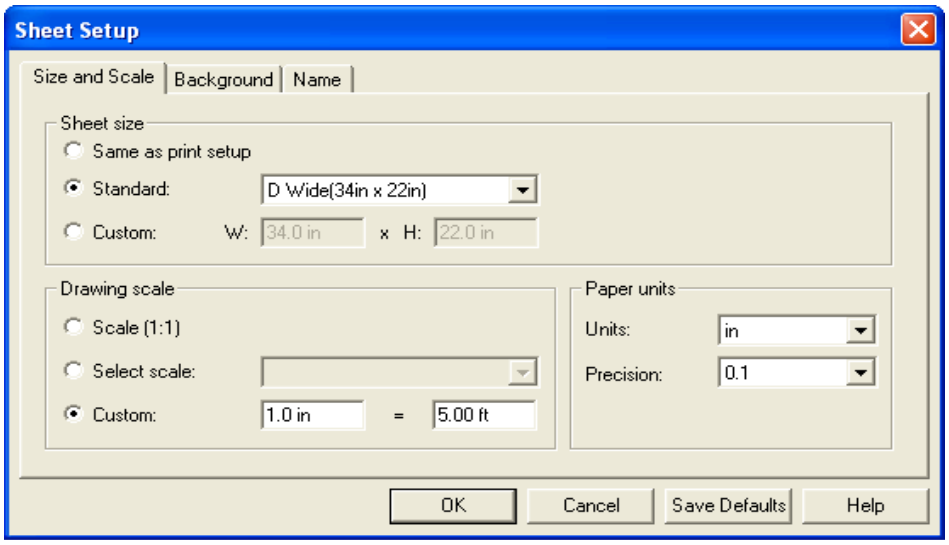
17. Change the **Unit** setting under **Area readout** to *ft^2*.



18. Click the **OK** button.

19. Select **Sheet Setup** from the **File** menu.

20. If not already selected, click the **Size and Scale** tab.



21. Make sure that the **Standard** option is selected in the **Sheet size** area and that it is set to D *Wide(34in x 22in).*

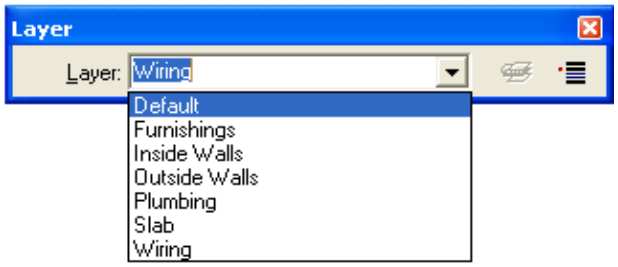
22. In the **Drawing scale** section set the **Custom** scale to *1in = 5ft*.

23. Click the **OK** button.

SET UP LAYERS AND LAYER GROUPS

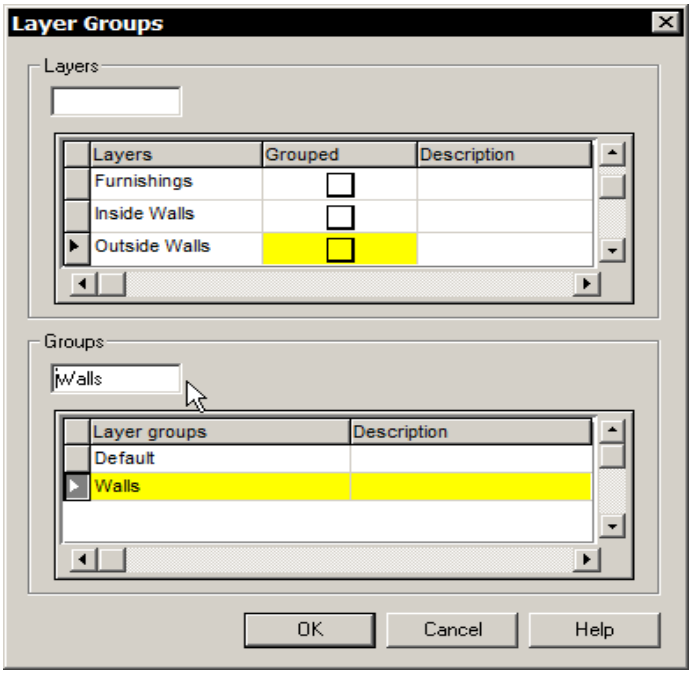
1. Activate the Layer ribbon bar by selecting **Layers** from the **Tools** menu.

2. Create the following six new layers *Slab*, *Outside Walls*, *Inside Walls*, *Wiring*, *Plumbing*, and *Furnishings*.

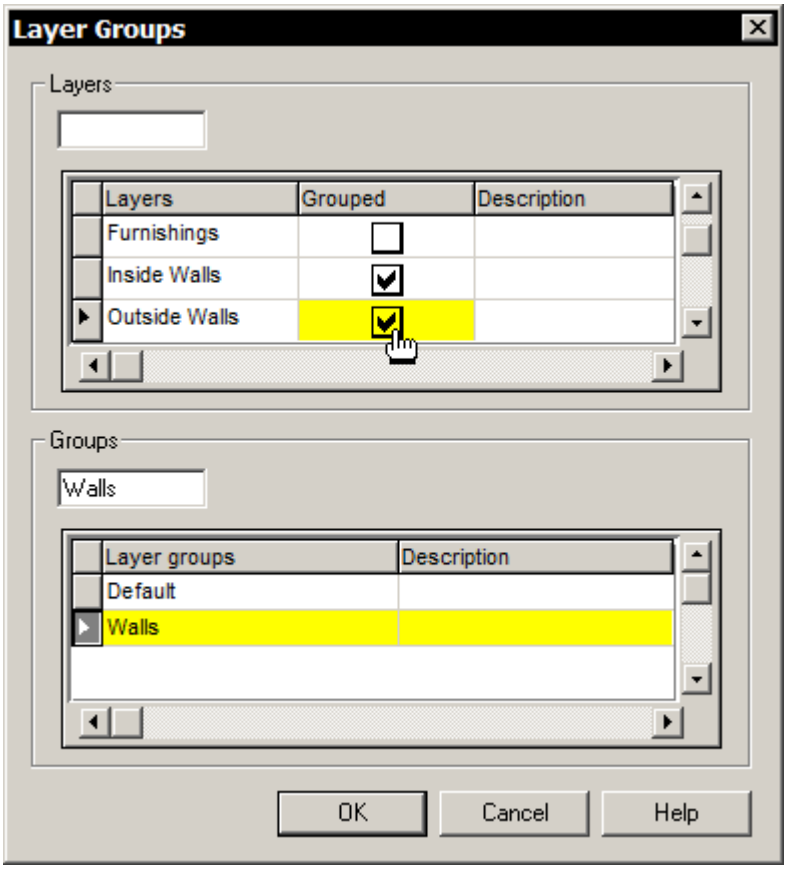


3. Select **Layer Groups** from the **Tools** menu.

4. Create a new layer group called *Walls*.



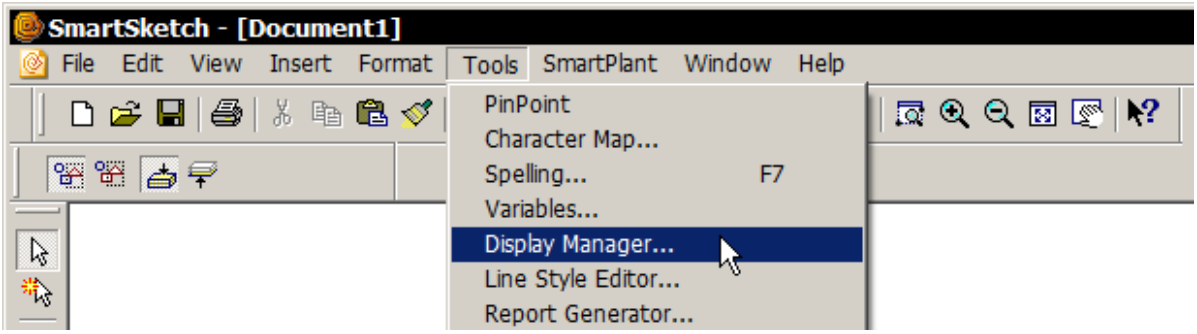
5. Select *Inside Walls* and *Outside Walls* to be members of the group *Walls*.



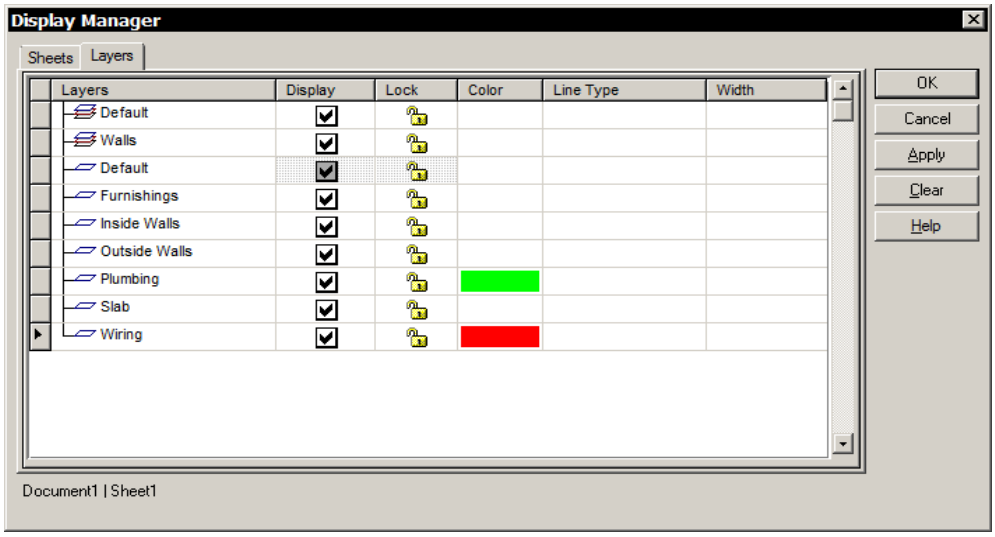
6. Click the **OK** button.

DISPLAY MANAGER

1. Select **Display Manager** from the **Tools** menu.



2. Choose the **Layers** tab. Set the *Plumbing* layer to display in *green* and the *Wiring* layer to display in *red*. Click the **OK** button.

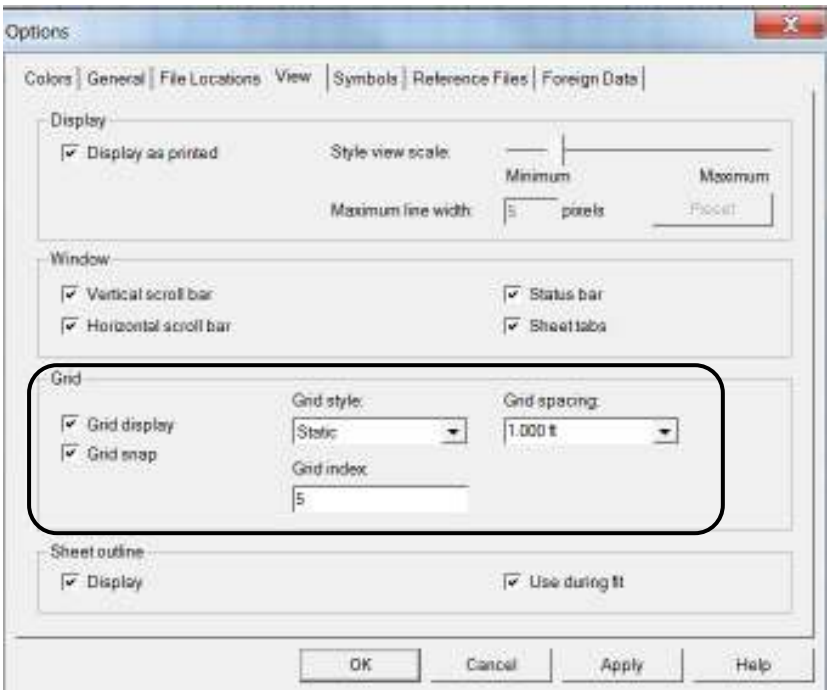


CHANGE THE VIEW GRID SETTINGS

3. From the **Tools** menu, select **Options**.

4. On the **View** tab of the **Options** dialog box, set the following:

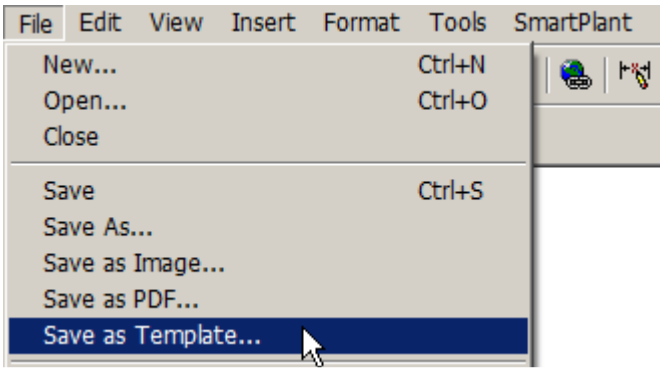
   Grid display: *ON* Grid snap: *ON* Grid style: *Static*
   Grid spacing: *1 ft* Grid index: *5*



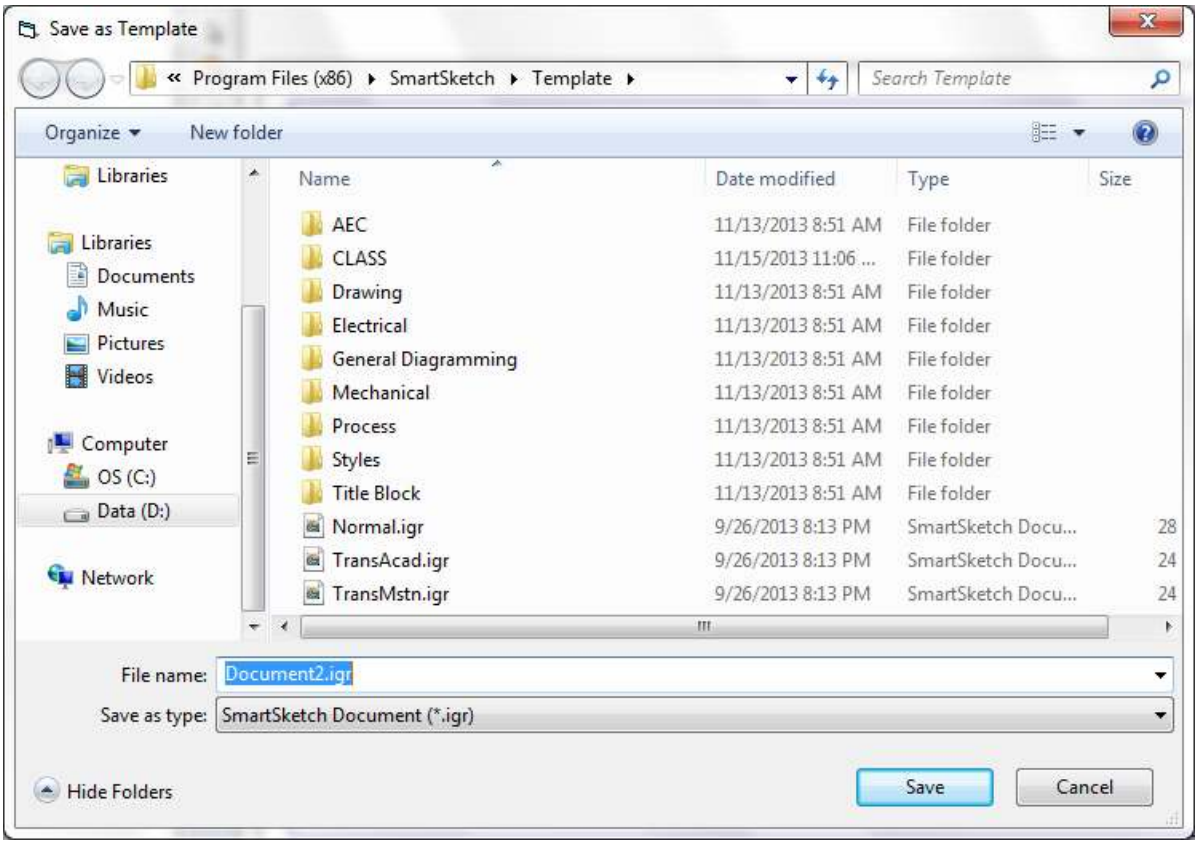
5. Click the **OK** button.

SAVE THE FILE

1. Select **Save as Template** from the **File** menu.



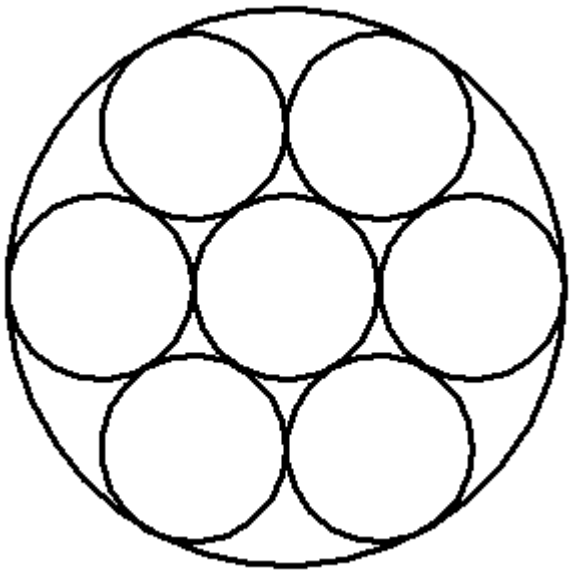
2. Create a new folder called *CLASS* in the *Template* folder.

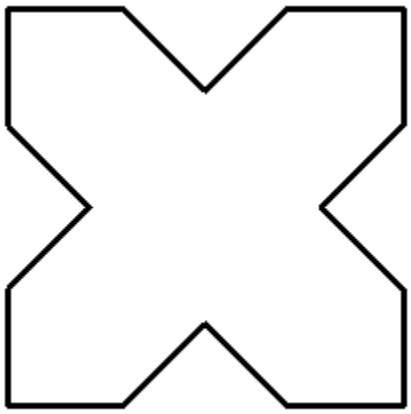


3. Open the *CLASS* folder and save the new template with the name *CLASSDWIDE*.
4. Exit SmartSketch.
5. Restart SmartSketch and select **New** from the **File** menu.
6. Select *CLASSDWIDE.igr* as your template and create a new file.

Lab 3 – Creating Basic Objects

In this lab you will practice using a few of the SmartSketch drawing commands, along with alignment and relationship indicators. Try to use the alignment and relationship indicators whenever possible throughout this lab.

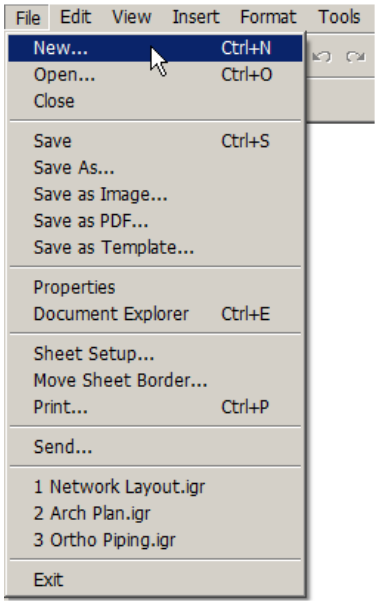


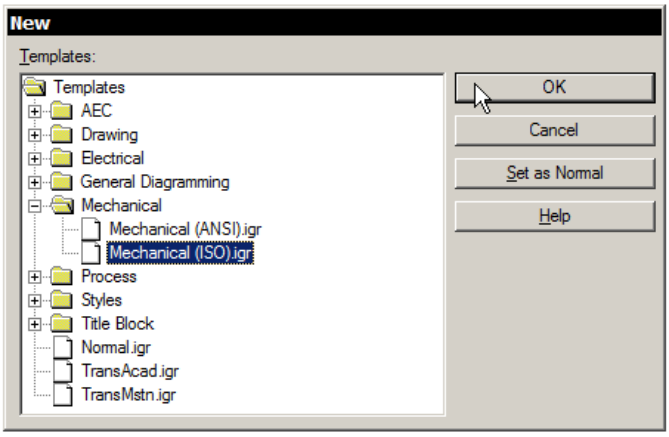


Lab 3 - Section A

CREATE A NEW FILE USING A MECHANICAL TEMPLATE

1. From the **File** menu, select **New**.

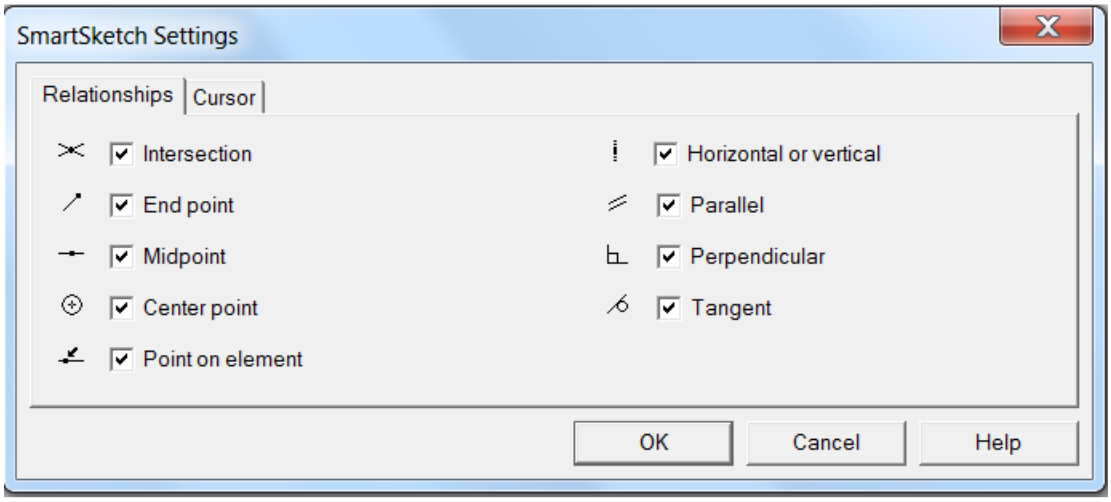




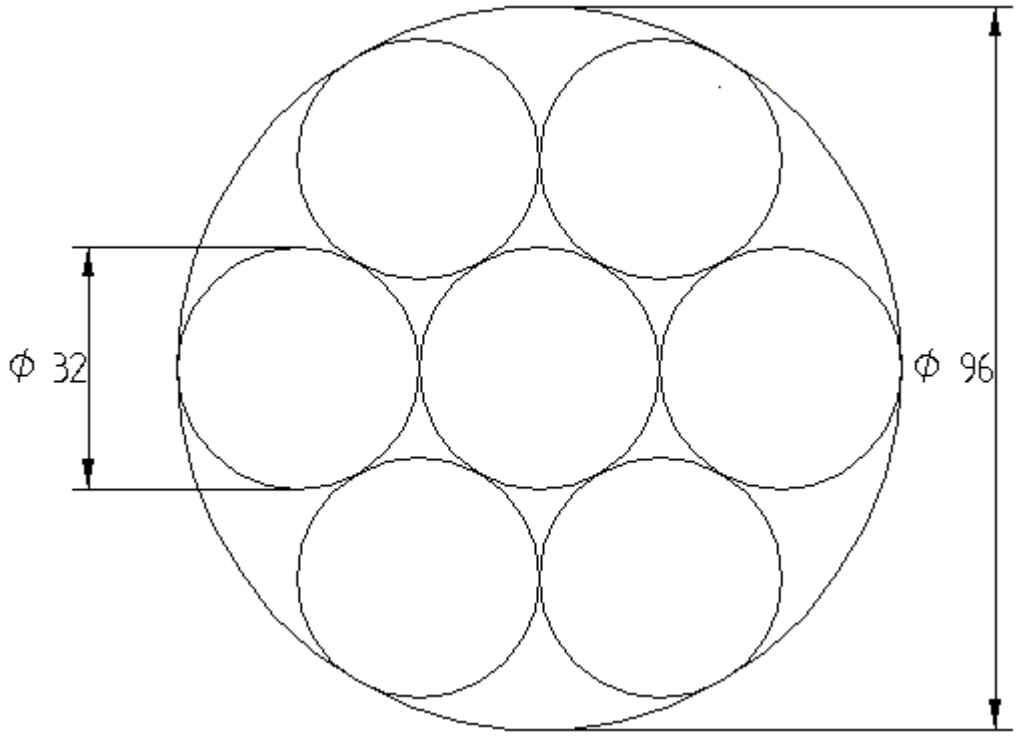
2. Select *Mechanical (ISO).igr* from the *Mechanical* template folder of the **New** dialog box.

3. Click the **OK** button. A new file will open.

4. From the **Tools** menu, select **SmartSketch Settings**. Toggle on all relationship indicators.



DRAW THE FOLLOWING DIAGRAM ON SHEET1



TO DRAW THE CIRCLES

Follow the step by step instructions provided on the next page.

OR

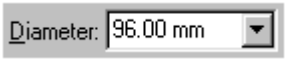
Draw the circles yourself and then skip ahead to the RENAME SHEET1 section on page 22.

Notes:

- ***Draw the circles only. Do not place dimensions.***
- ***Try to use the SmartSketch relationship and alignment indicators whenever possible.***
- ***Use the pictures in this lab as a guide; however, other relationship indicators may be displayed in SmartSketch in addition to or instead of the ones displayed in the pictures.***

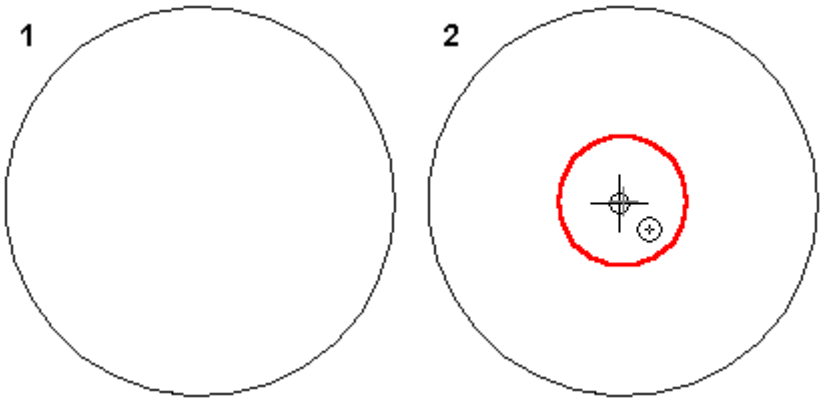
DRAW THE TANGENT CIRCLE DIAGRAM

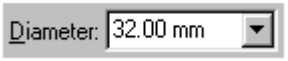
1. Select the **Circle by Center Point**  command.

2. Type **96** <Enter> in the **Diameter** field 

of the ribbon bar.

3. Place the circle in the center of the drawing sheet. (**1**)

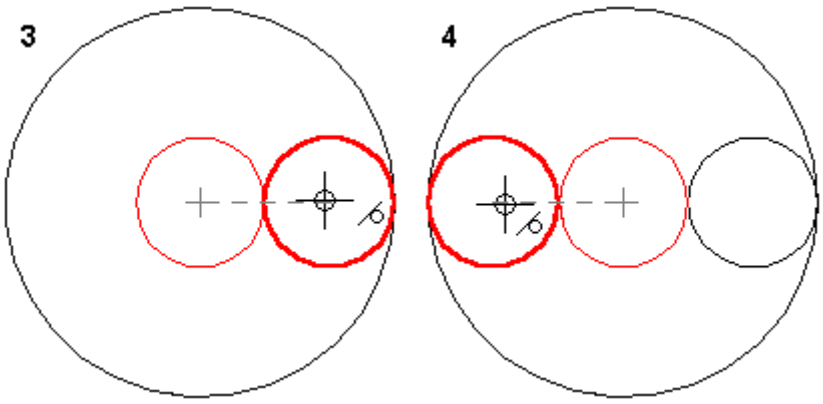


4. Type **32** <Enter> in the **Diameter** field 

of the ribbon bar.

5. Place the circle in the center of the first circle. (**2**)

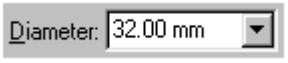
6. Place another circle aligned from the center and tangent to the center circle. (**3**)



7. Place the fourth circle aligned from the center and tangent to the center circle. (**4**)

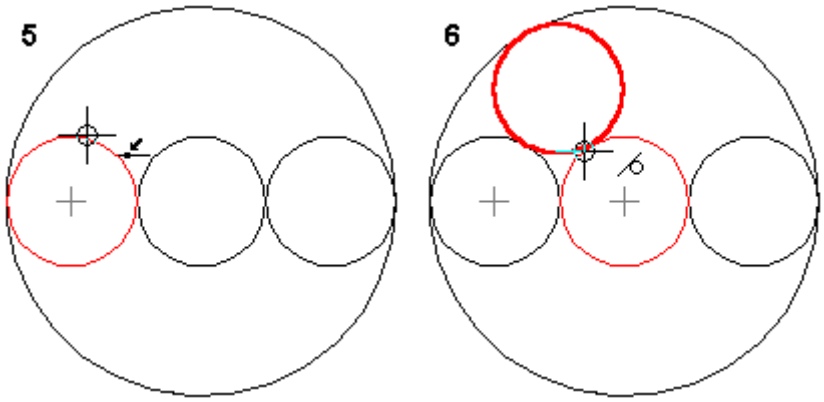
8. Hit the **Esc** key to terminate the **Circle by Center Point** command.

9. Select the **Tangent Circle**  command.

10. Type **32** <Enter> in the **Diameter** field 

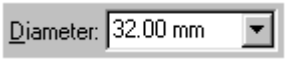
of the ribbon bar.

11. Click near the top of the last circle you placed when the point on element indicator displays. (**5**)



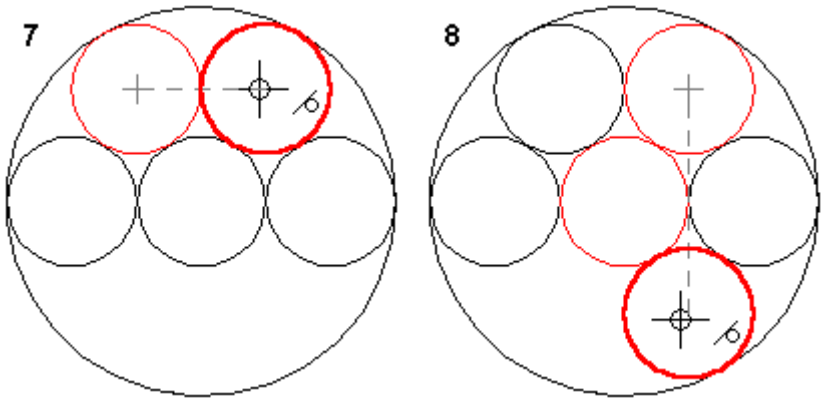
12. Click near the top of the center circle when the tangent indicator displays. (**6**)

13. Select the **Circle by Center Point**  command.

14. Type **32** <Enter> in the **Diameter** field 

of the ribbon bar.
Note: All remaining circles will be placed at a diameter of 32.

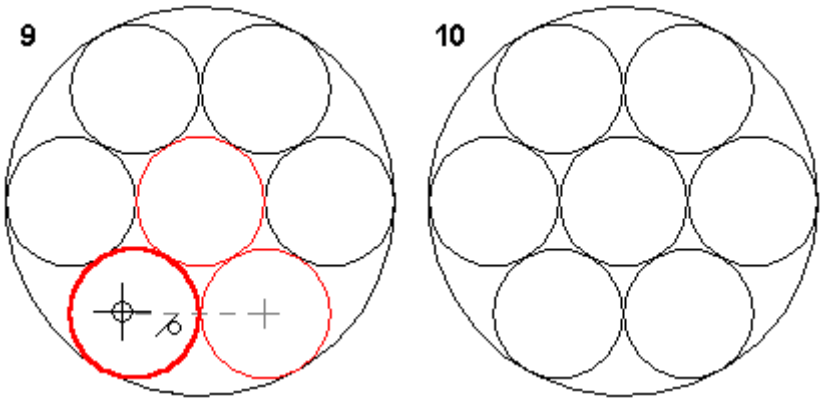
15. Place a circle aligned from the center and tangent to the last circle placed. (**7**)



16. Place another circle aligned from the center of the last circle placed and tangent to the center circle. (**8**)

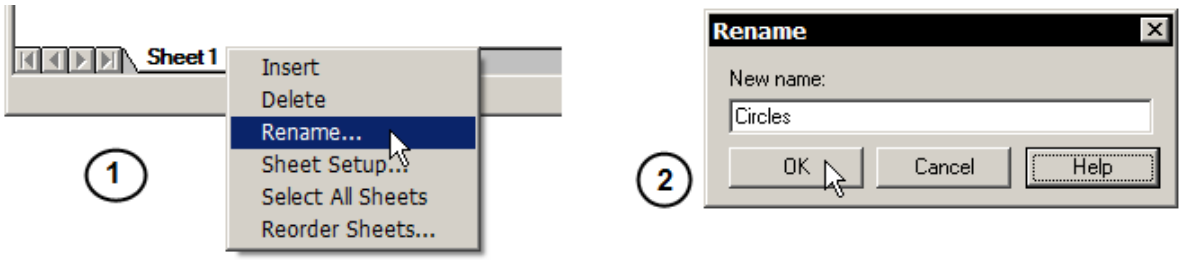
17. Place one more circle aligned from the center of the last circle placed and tangent to the center circle (**9**) to complete the group of tangent circles. (**10**)

18. Hit the **Esc** key to terminate the **Circle by Center Point** command.



RENAME SHEET1

1. Rename *Sheet1* to *Circles* by clicking the right mouse button on the *Sheet1* tab and then selecting **Rename** from the shortcut menu. (**1**)

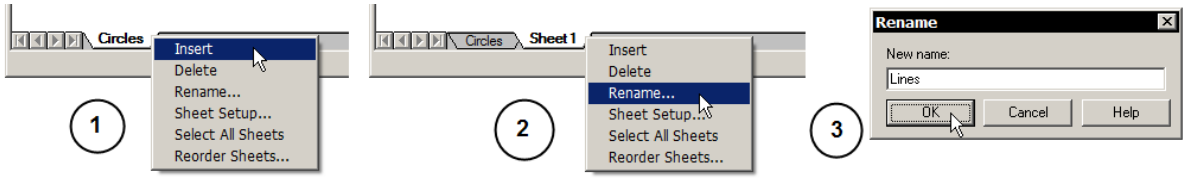


2. Type **Circles** (**2**) in the **Rename** dialog box and click the **OK** button.

ADD ANOTHER SHEET TO YOUR DOCUMENT

1. Click the right mouse button on the *Circles* sheet tab.

2. Select **Insert** from the shortcut menu. (**1**)



3. Rename *Sheet1* to *Lines* by clicking the right mouse button on the *Sheet1* tab and then selecting **Rename** from the shortcut menu. (**2**)

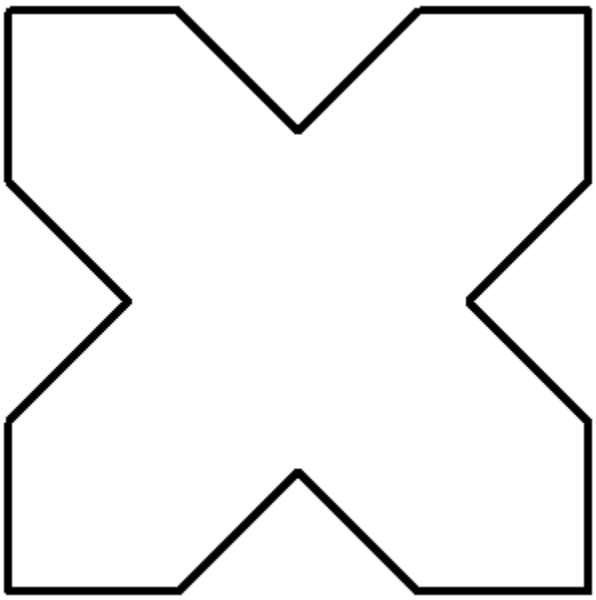
4. Type **Lines** (**3**) in the **Rename** dialog box and click the **OK** button.

SAVE THE DRAWING

Save the drawing in the *C:\Drawing Files* folder as *Basic Objects.igr*.

Lab 3 - Section B

DRAW THE FOLLOWING DIAGRAM ON THE LINES SHEET



All lines are 20 mm in length and at 0, 45, or 90-degree increments.

TO DRAW THE LINES

Follow the step by step instructions provided on the next page.

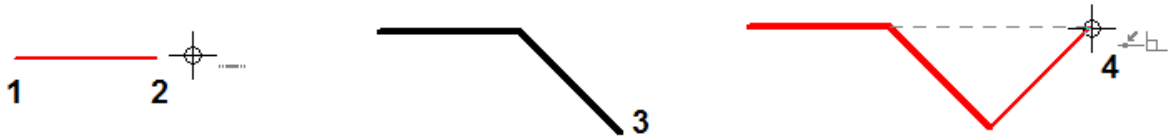
OR

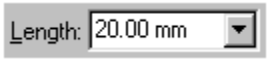
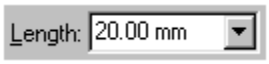
Draw the lines yourself and then skip ahead to step 28 on page 28.

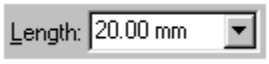
Note: Try to use the SmartSketch relationship and alignment indicators whenever possible.

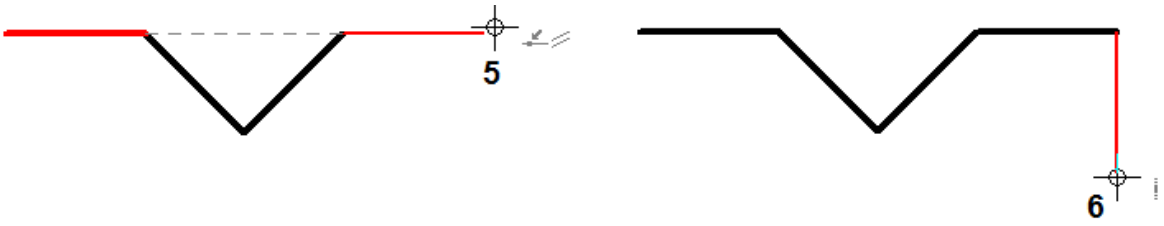
DRAW THE LINE DIAGRAM

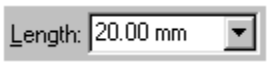
1. Select the **Line/Arc Continuous**  command.
2. Click near the top left of the drawing sheet to begin drawing the line. (**1**)

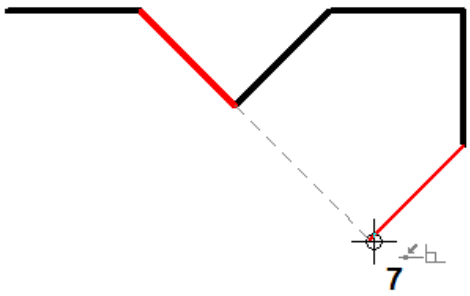


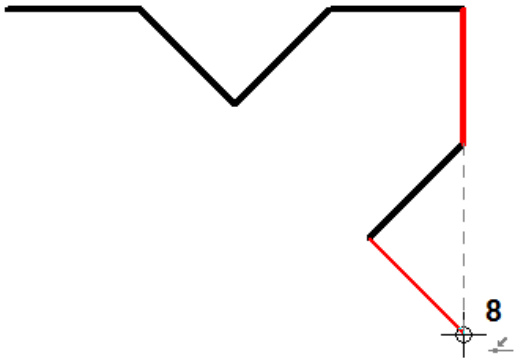
3. Type **20** <Enter> in the **Length** field  of the ribbon bar.
4. Move the cursor to the right and click when you see the horizontal indicator. (**2**)
5. Type **20** <Enter> in the **Length** field  of the ribbon bar.
6. Type **–45** <Enter> in the **Angle** field  of the ribbon bar.

   Note: The second line is placed. (3)
7. Move the cursor perpendicular from point **3** until it is aligned with the first line. With the perpendicular and alignment indicators displayed, click to draw the line. (**4**)
8. Type **20** <Enter> in the **Length** field  of the ribbon bar.
9. Move the cursor to the right and click when you see the parallel indicator. (**5**)



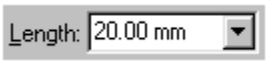
10. Type **20** <Enter> in the **Length** field  of the ribbon bar.
11. Move the cursor down and click when you see the vertical indicator. (**6**)
12. Move the cursor perpendicular from the last point **6** until it is aligned with the second line.
13. With the perpendicular and alignment indicators displayed, click to draw the line. (**7**)



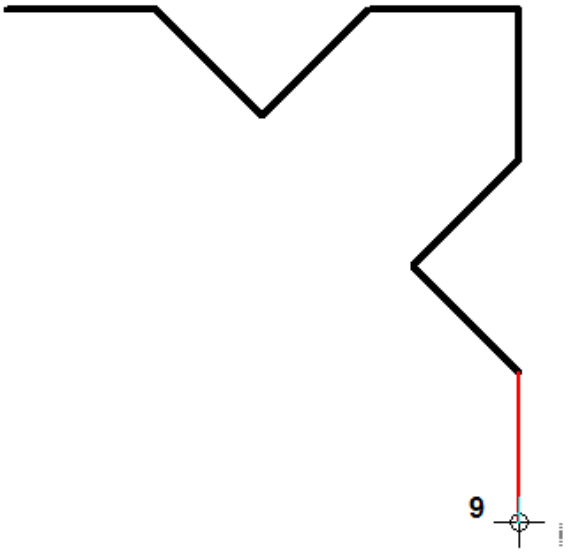


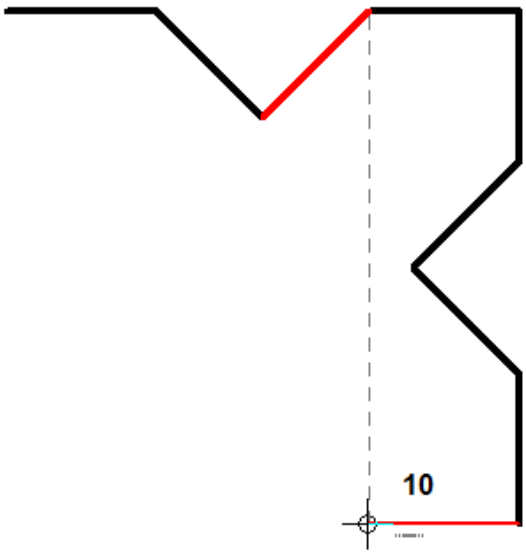
14. Move the cursor perpendicular from point **7** until it is aligned as displayed.

15. With the point on element and alignment indicators displayed, click to draw the line. (**8**)

16. Type **20** <Enter> in the **Length** field  of the ribbon bar.

17. Move the cursor down and click when you see the vertical indicator. (**9**)



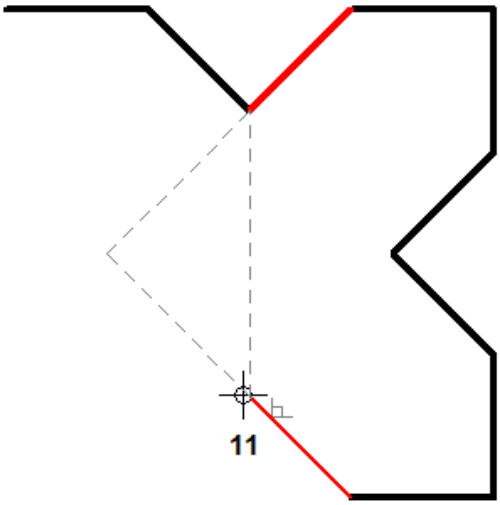


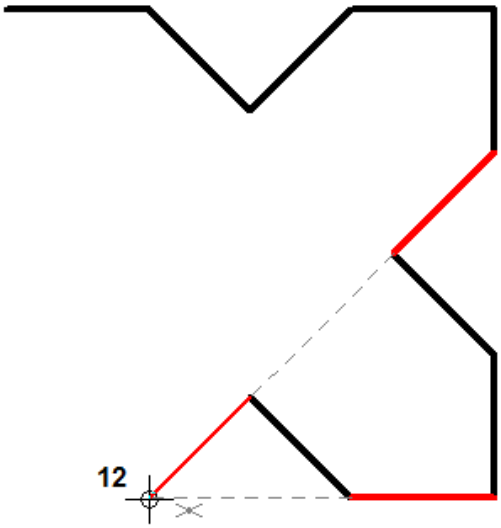
18. Move the cursor to the left until aligned with the top right line as displayed.

    Note: ***You may need to drag the cursor (prior to placing the line segment) across the top right horizontal line to activate the alignment indicator. Be careful not to click the mouse button while doing this or you will place the line. The alignment indicator is the dashed line displayed in example (10) above.***

19. With the horizontal and alignment indicators displayed, click to draw the line.

20. Move the cursor up and to the left. With the perpendicular and alignment indicators displayed, click to draw the line. (**11**)

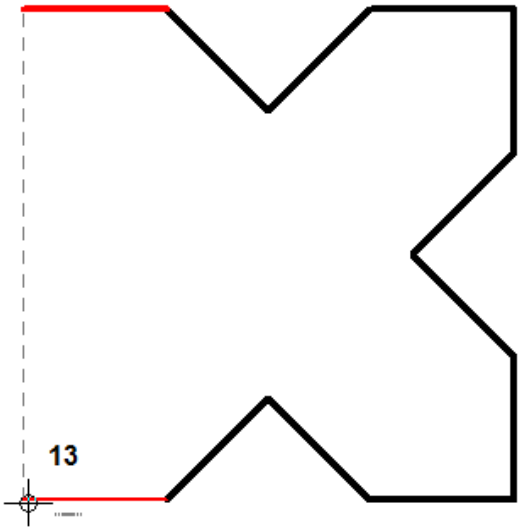


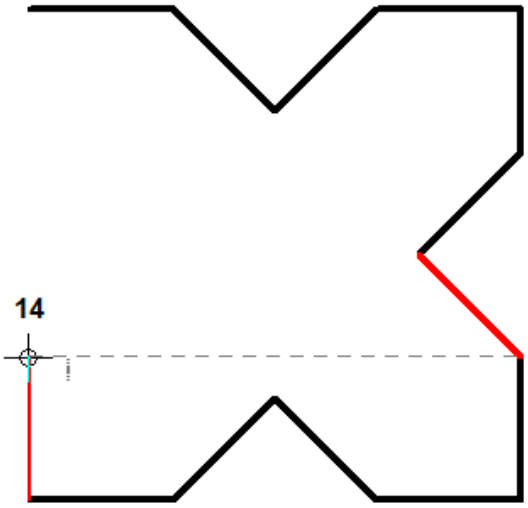


21. To place the next line segment, move the cursor perpendicular from point **11** until it is aligned as displayed.

22. With the perpendicular/intersection and alignment indicators displayed, click to draw the line. (**12**)

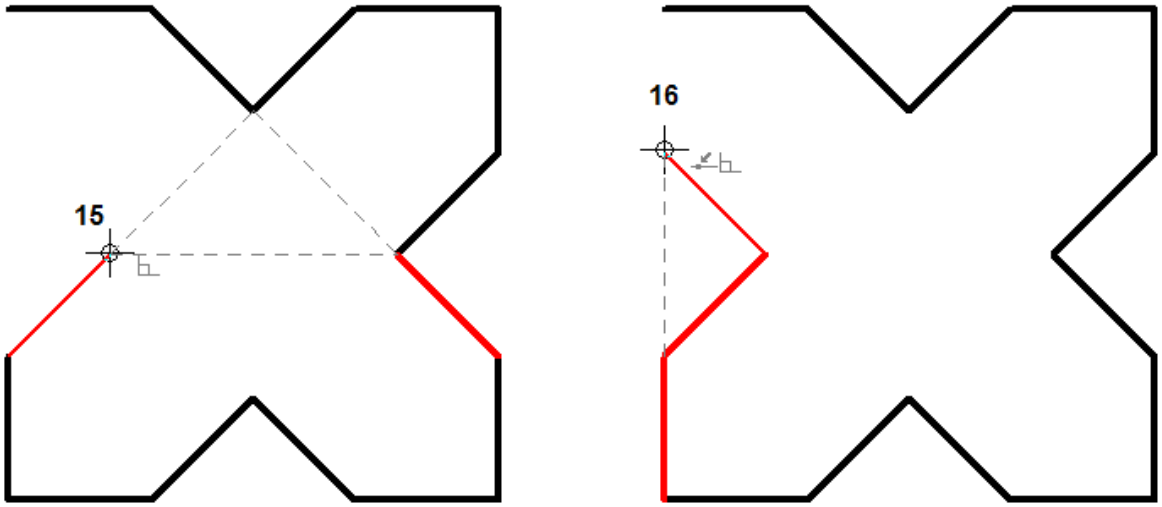
23. Move the cursor to the left and click when you see the horizontal indicator and the alignment line from the start point. (**13**) You can also key in the length of 20 mm in the length field, with an angle of 180 degrees.





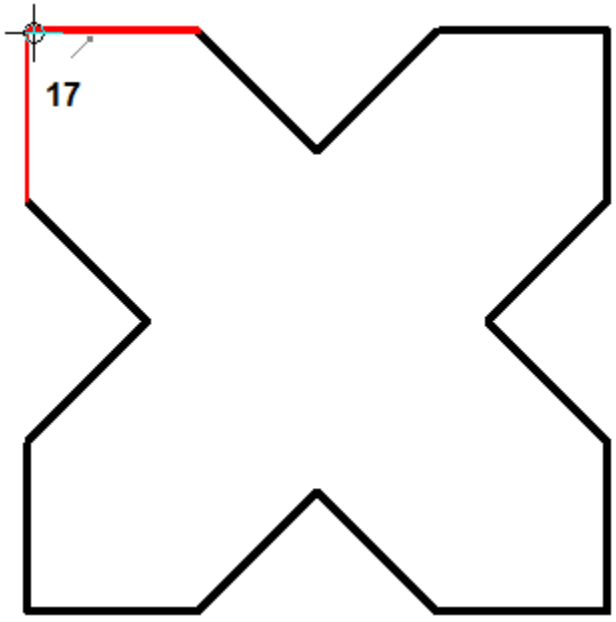
24. Move the cursor up until aligned with the line on the right as displayed. With the vertical and alignment indicators displayed, click to draw the line. (**14**)

25. Move the cursor perpendicular from point **14** until it is aligned as displayed. (**15**) With the perpendicular/intersection and alignment indicators displayed, click to draw the line.



26. Move the cursor perpendicular from point **15** until it is aligned as displayed. (**16**) With the perpendicular/intersection and alignment indicators displayed, click to draw the line.

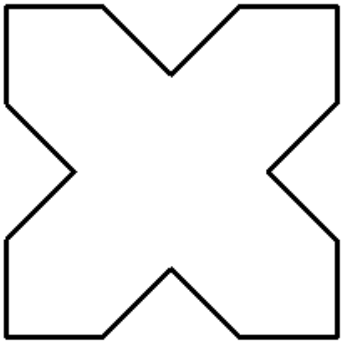
27. Move the cursor to the start point and click when the end point indicator displays. (**17**)

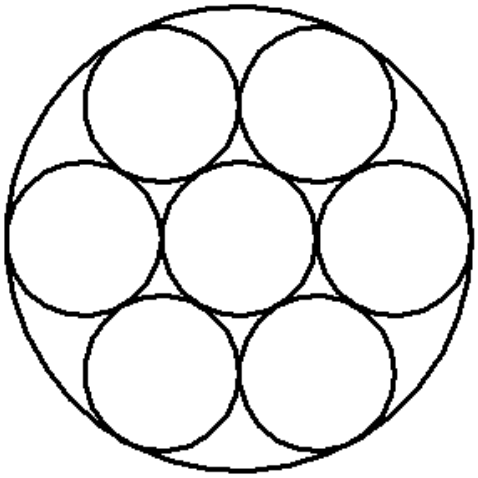


28. Hit the **Esc** key to terminate the **Line/Arc Continuous** command.

29. Hold down the **Ctrl** key and click the **Circles** sheet tab to display the diagrams on both sheets.

30. Select **Save**  from the **Main** toolbar to save the document changes.





Lab 4 – Placement Commands

Lab 4 - Section A

In this lab you will practice using commands from the Draw toolbar.

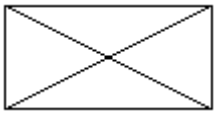
CREATE A VALVE

1. Create a new drawing using the *Normal* template.

2. Select the Layers command ( ) from the Main toolbar and create a new layer called *Valve*. After it is created, it becomes the active layer.

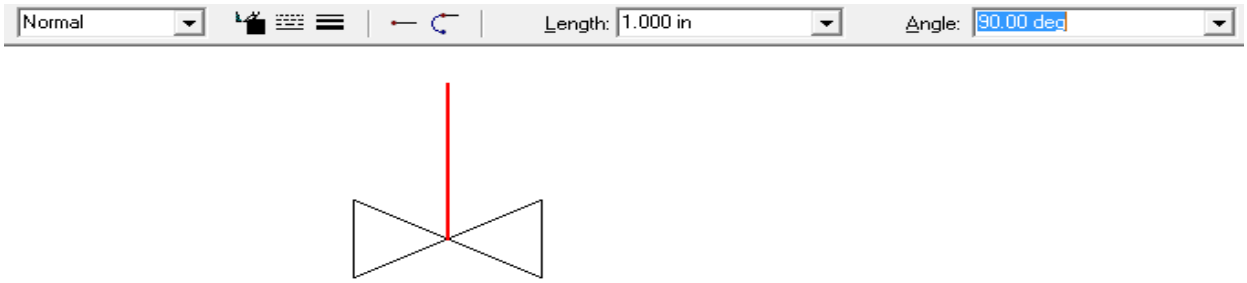
3. Place a rectangle ( ) with a width of 1 in, a height of 0.5 in, and an angle of 0 degrees.

4. Zoom in to the area of the rectangle and place diagonal lines between the corners, creating an "X" in the middle of the rectangle. Use end point relationship indicators/glyphs for accurate placement.

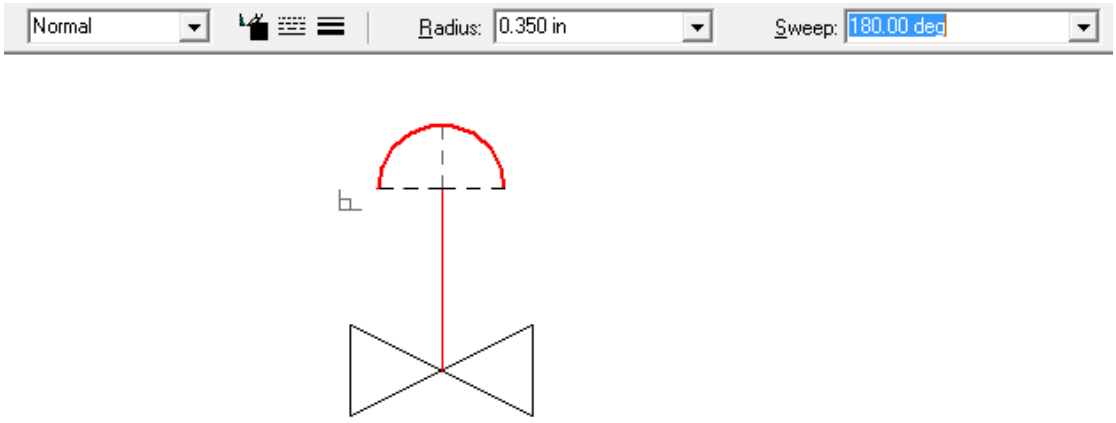


5. Use the "Trim" command ( ) located on the Draw toolbar and remove the top and bottom horizontal lines.

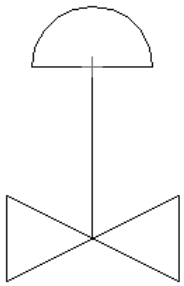
6. From the intersection of the “X” draw a vertical line 1 in long at 90 degrees.



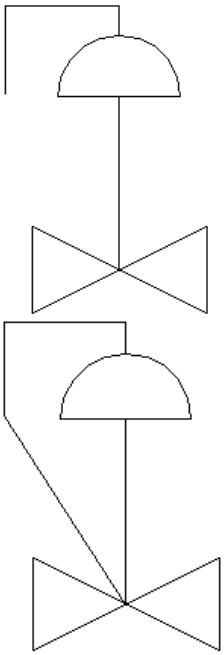
7. At the end of the vertical line place an “Arc by Center Point” ( ), with the center-point of the arc being the end of the line. The radius for the arc should be 0.35 in and the sweep angle should be 180 degrees. Follow the prompts in the status bar.



8. Connect the ends of the arc with a horizontal line.



9. From the center of the top of the arc, draw another vertical line 0.165 in long and at an angle of 90 degrees. Draw a second horizontal line measuring 0.65 in long at 180 degrees and a third vertical line measuring 0.5 in long at -90 degrees.



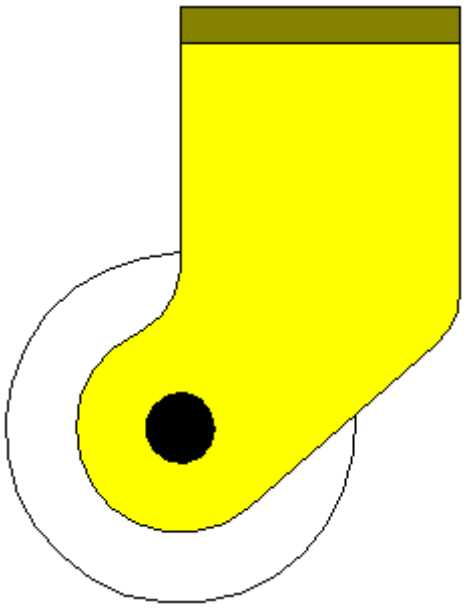
10. Finally connect the last vertically placed line with the center of the "X."

11. Hit the **Esc** key to terminate the **Line/Arc Continuous** command.

12. Save the drawing in the *C:\Drawing Files* folder as *Valve.igr.*

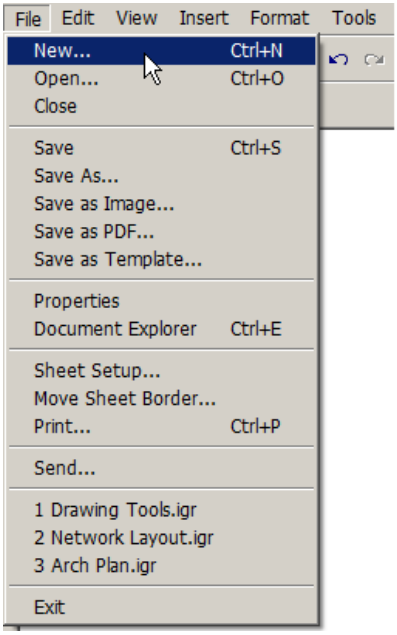
Lab 4 - Section B

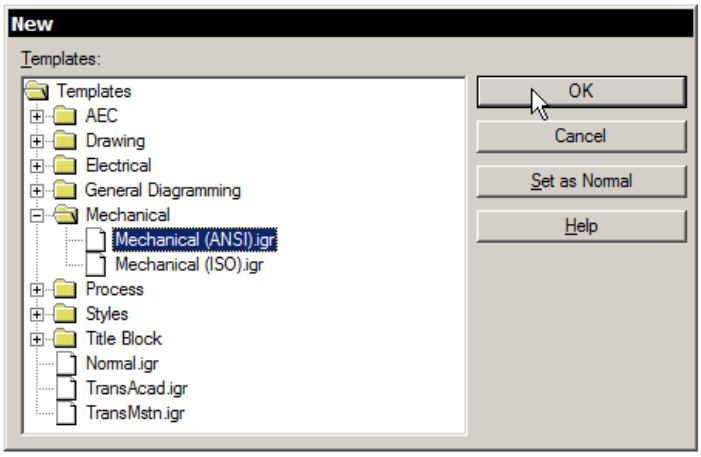
In this lab you will draw a caster using the **Line/Arc Continuous** and **Circle by Center Point** commands; make modifications using the **Trim** and **Fillet** commands; and add color using the **Fill** command. All of these commands are located on the **Draw** toolbar.



CREATE A NEW FILE USING A MECHANICAL TEMPLATE

1. From the **File** menu, select **New**.



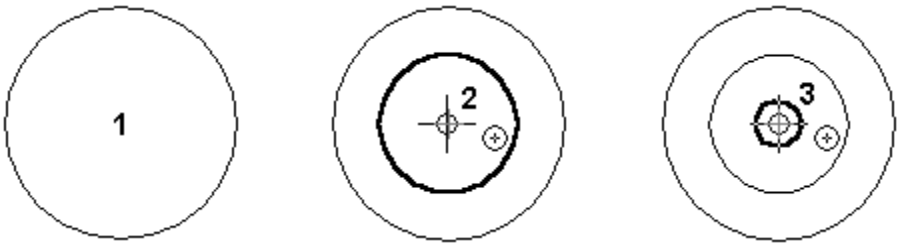


2. Select *Mechanical (ANSI).igr* from the *Mechanical* template folder of the **New** dialog box and click the **OK** button.

DRAW THE CASTER ASSEMBLY

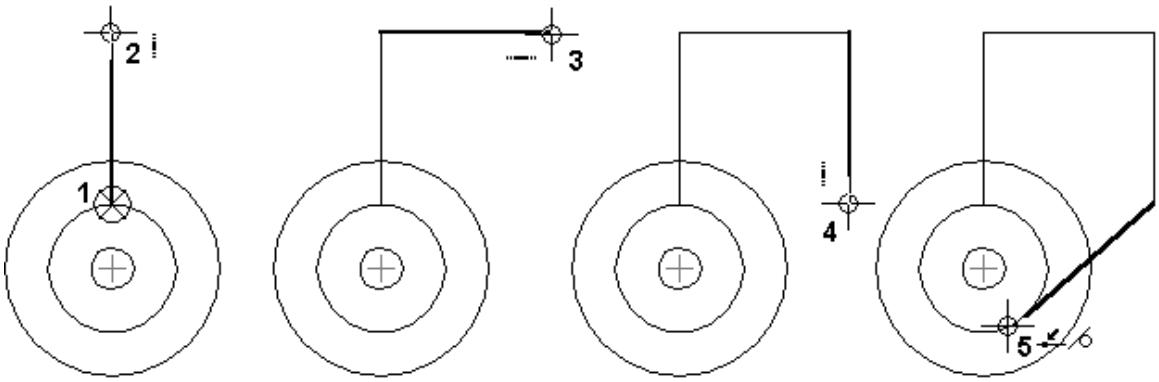
3. Select the **Circle by Center Point**  command.

4. Draw a circle with a **1.25** inch radius. Create a second circle with a **.75** inch radius centered about the first circle. Create a third circle with a **.25** inch radius centered about the first two circles.

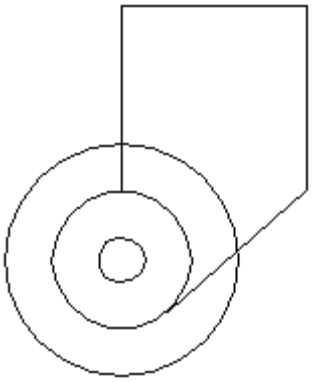


5. Select the **Line/Arc Continuous**  command.

6. Draw a line from the top of the second circle up 2 inches, to the right 2 inches, then down 2 inches. End with a line tangent to the second circle.



Your drawing should look like the following illustration.

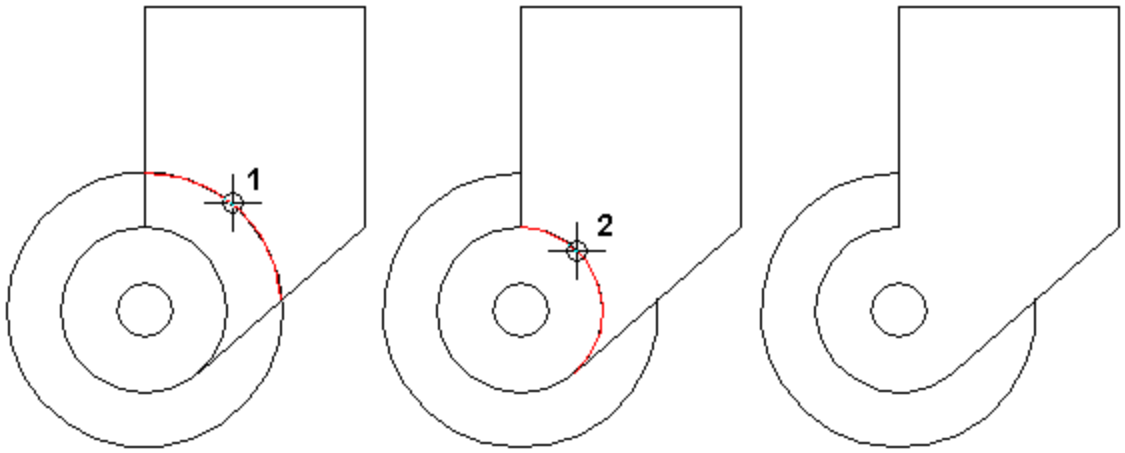


7. Save the drawing in the *C:\Drawing Files* folder as *Caster.igr*

MODIFY THE CASTER ASSEMBLY

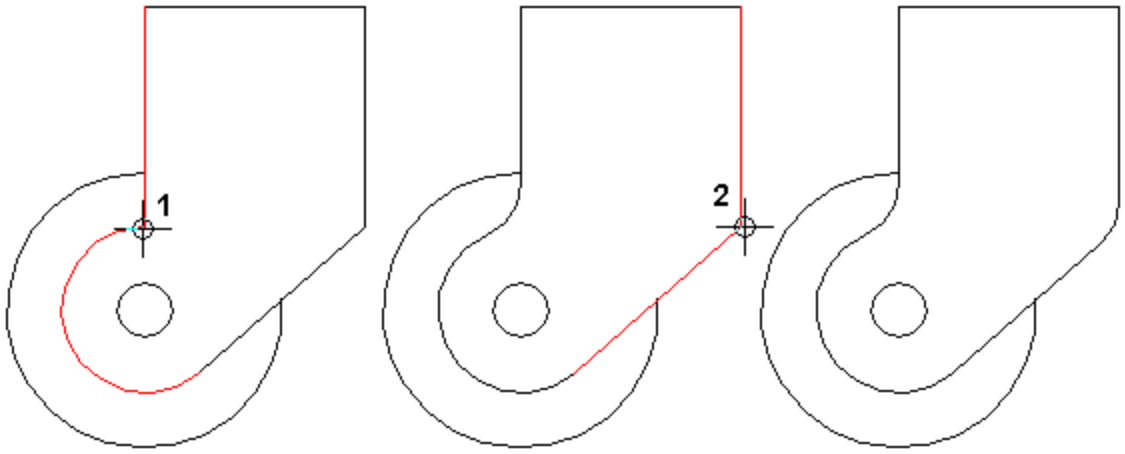
8. Select the **Trim**  command.

9. Trim the objects shown below.



10. Select the **Fillet**  command.

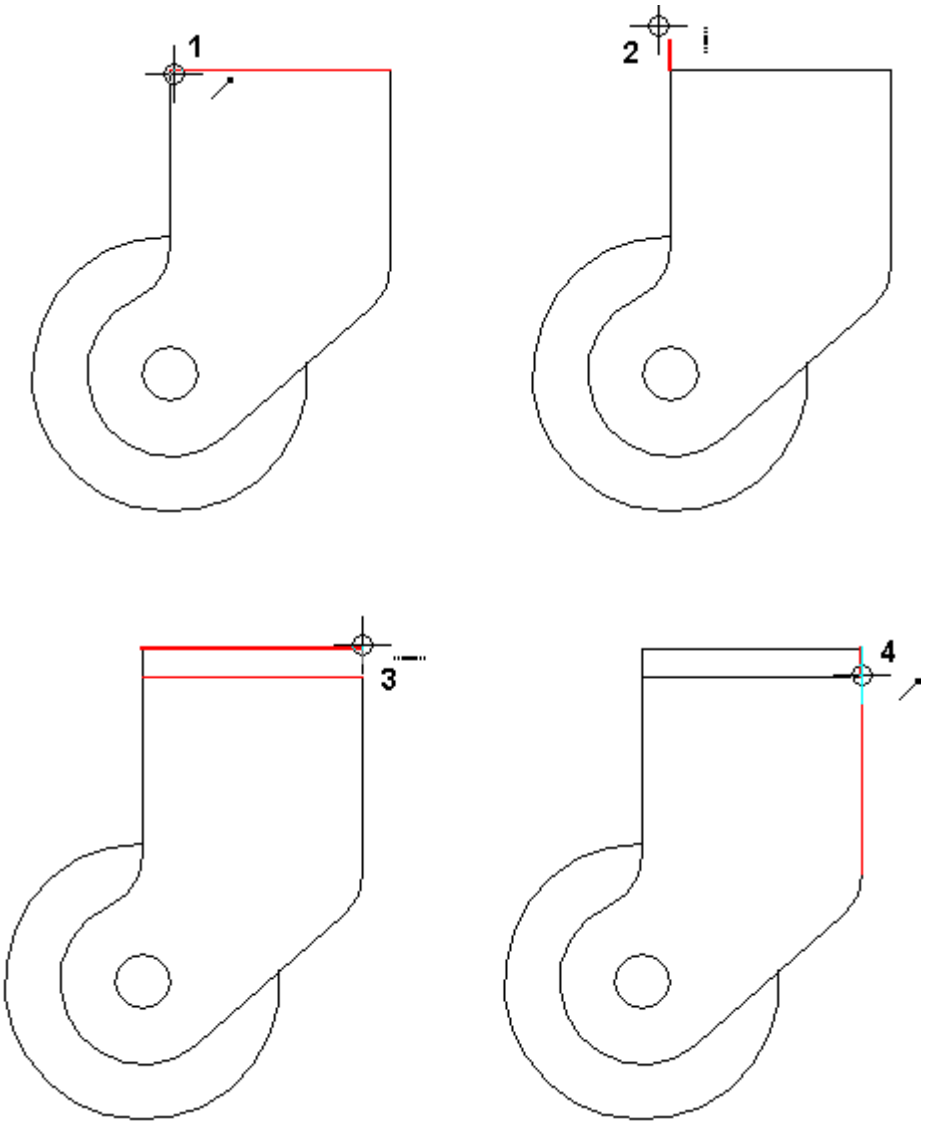
11. Fillet the line segments shown below at a radius of **.5** inches.



12. Select **Save**  from the **Main** toolbar to save the document changes.

13. Select the **Line/Arc Continuous**  command.

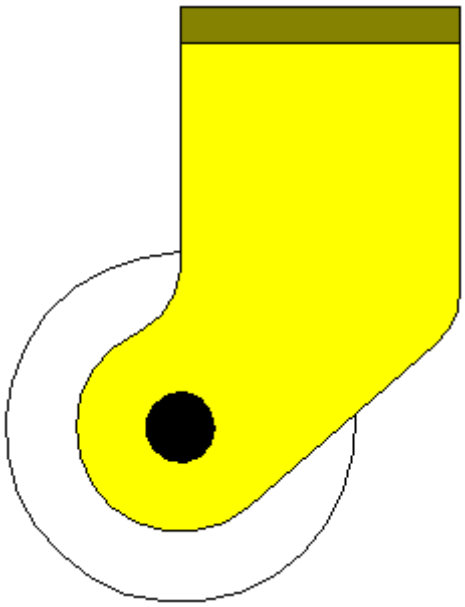
14. Draw a line from the top left corner of the caster up **.25** inches, to the right **2** inches, then down .**25** inches.



ADD COLOR TO THE CASTER

15. Select the **Fill**  command and change the **Style** in the ribbon bar to **Solid**.

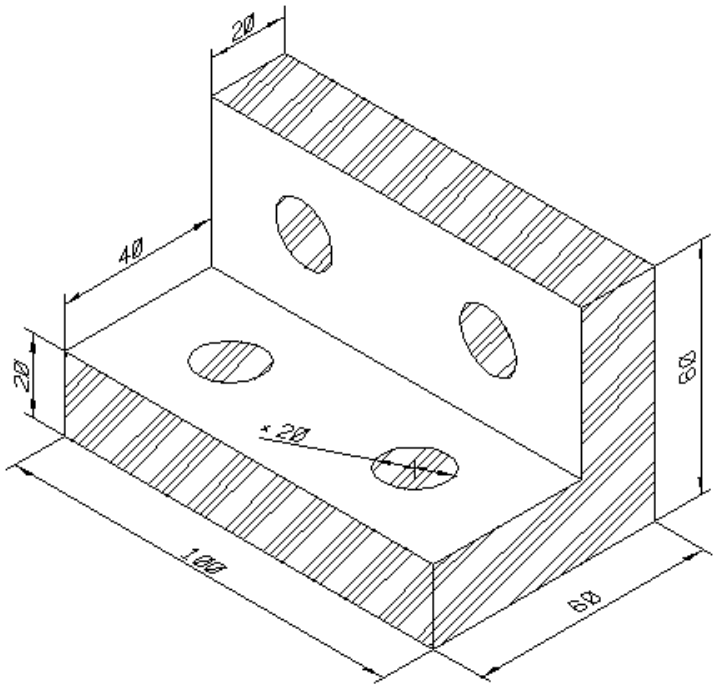
16. Using colors of your choice, fill in the different areas of the drawing as shown below.



17. Select **Save**  from the **Main** toolbar to save the document changes.

Lab 5 - Isometric Drawing Tools

In this lab you will use the *Isometric Drawing Tools* to draw the illustration shown below. To access the isometric drawing tools, you can place them on a toolbar or menu using the **Customize** command or they can be activated as an Add-In.

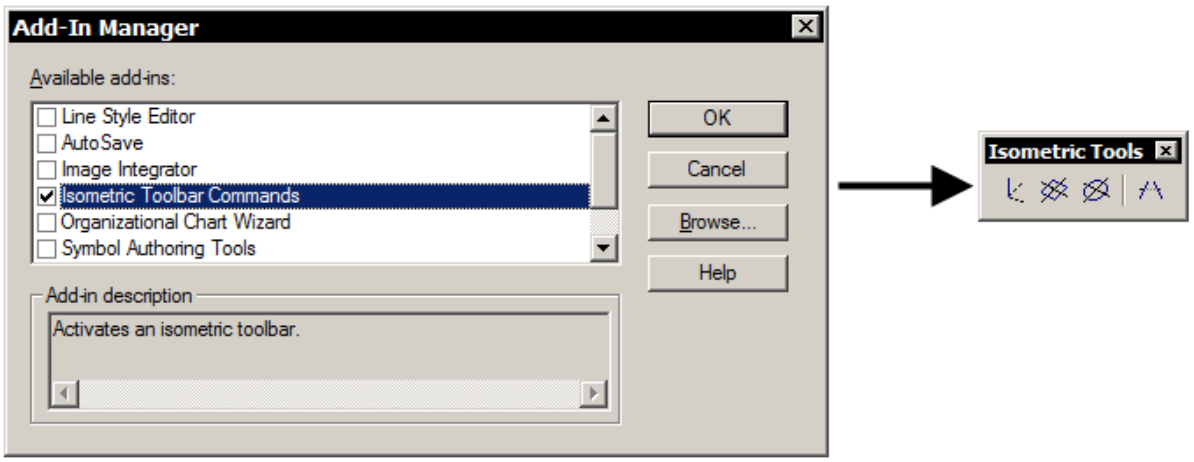


CREATE AN ISOMETRIC DRAWING

1. Create a new drawing using *Mechanical (ISO).igr* as the drawing template.

2. Select **Add-Ins** from the **Tools** menu.

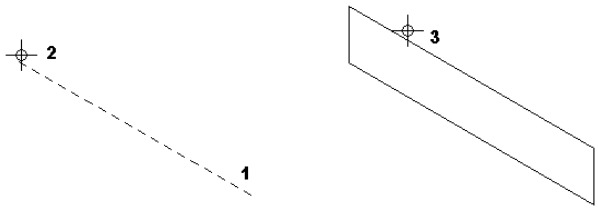
3. In the **Add-In Manager** dialog box, select the **Isometric Toolbar Commands** add-in and click the **OK** button.
   Note: This will display the *Isometric Tools* toolbar.



4. Select the **Isometric Rectangle**  command from the *Isometric Tools* toolbar.

5. Click the **Left Side**  button in the ribbon bar.

6. Draw a left side isometric rectangle as illustrated below:



   a. Click to start the left side isometric rectangle. (**1**)

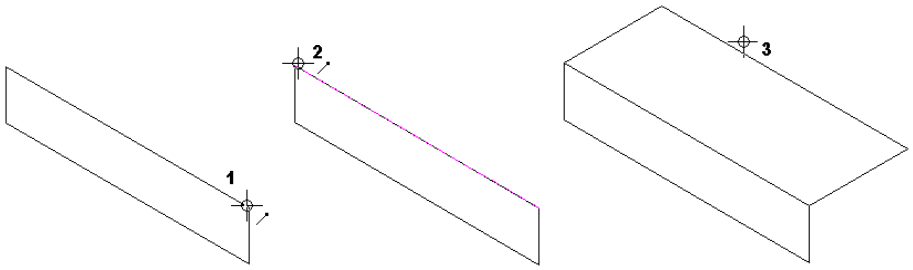
   b. Move the cursor to the left and type **100** <Enter> in the **Width** field of the ribbon bar. (**2**)

   c. In the **Height** field of the ribbon bar, type **20** <Enter>. (**3**)

   d. Click to place the isometric rectangle.

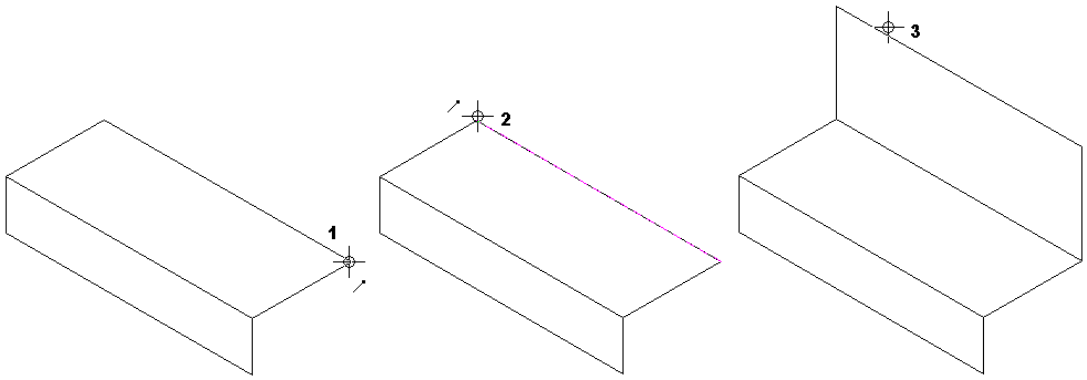
Note: You must press the <Enter> or <Tab> key after typing a value in the ribbon bar.

7. Click the **Top**  button in the ribbon bar.
8. Draw a top isometric rectangle as illustrated below:



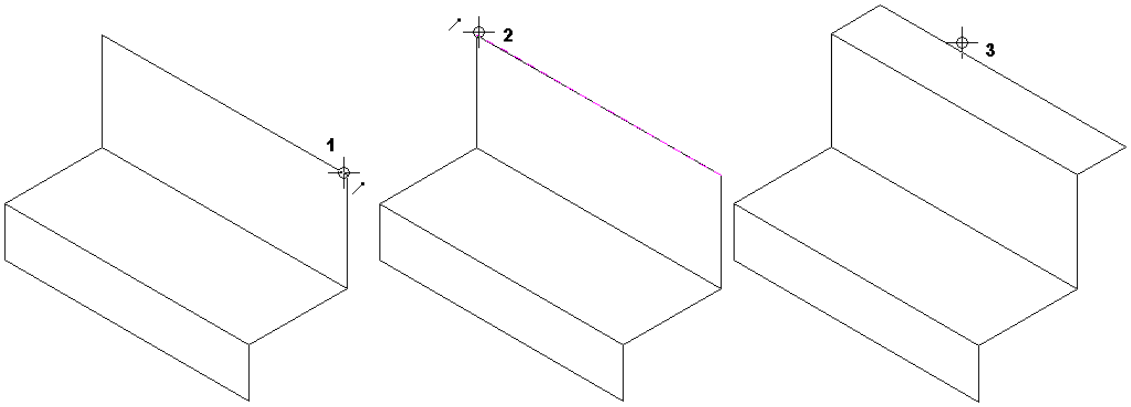
   a. Click to start the top isometric rectangle at point **1**.
   b. Set the width of the isometric rectangle by clicking at point **2**.
   c. Set the height by typing **40** <Enter> in the **Height** field of the ribbon bar. (**3**)
   d. Click to place the isometric rectangle.

9. Click the **Left Side**  button in the ribbon bar.
10. Draw a left side isometric rectangle as illustrated below:



   a. Click to start the left side isometric rectangle at point **1**.
   b. Set the width of the isometric rectangle by clicking at point **2**.
   c. Set the height by typing **40** <Enter> in the **Height** field of the ribbon bar.
   d. Click to place the isometric rectangle.

11. Click the **Top**  button in the ribbon bar.
12. Draw a top isometric rectangle as illustrated below:



a. Click to start the top isometric rectangle at point **1**.

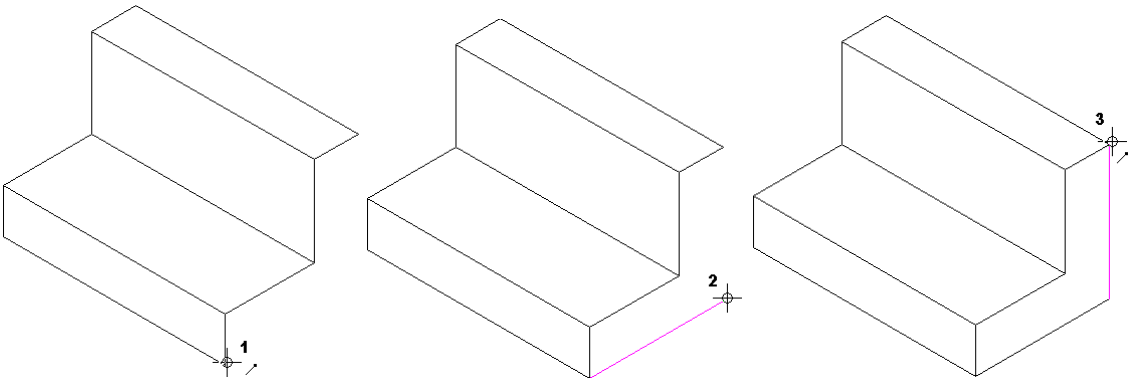
b. Set the width of the isometric rectangle by clicking at point **2**.

c. Set the height by typing **20** <Enter> in the **Height** field of the ribbon bar.

d. Click to place the isometric rectangle.

13. Select the **Isometric Line**  command.

14. Draw the isometric lines as illustrated below:



a. Click to start the isometric line at point 1.

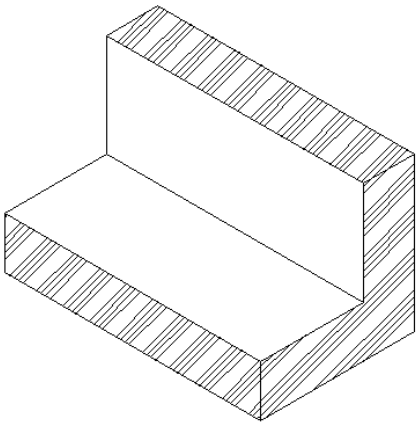
b. Move the cursor at a 30° angle and type 60 <Enter> in the Length field of the ribbon bar. Click the left mouse button to place the line.

c. Complete the next line by clicking at point 3.

15. Fill the edges as shown in the finished drawing below using the **Fill**  command. Save the drawing when finished.

    a. Set **Style** to Aluminum, Angle to 0°, and Spacing to 10 mm.

    b. Pattern Color and Solid Color are your choice.



16. Save the drawing in the *C:\Drawing Files* folder as *Isometric Drawing.igr*

Time permitting: add a few isometric circles to your drawing.

Lab 6 – Modification Commands

Lab 6 - Section A

In this lab you will practice using commands from the Draw and Change toolbars to create and modify objects in the document.

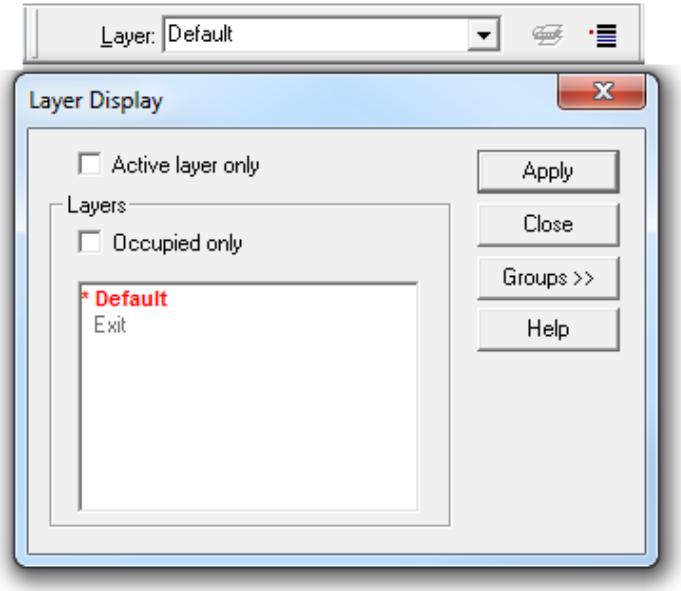
CREATE AN EXIT SIGN

1. Create a new file using the *Normal* template.

2. Select the **Layers** command ( ) from the Main toolbar and create a new layer called *Exit*.

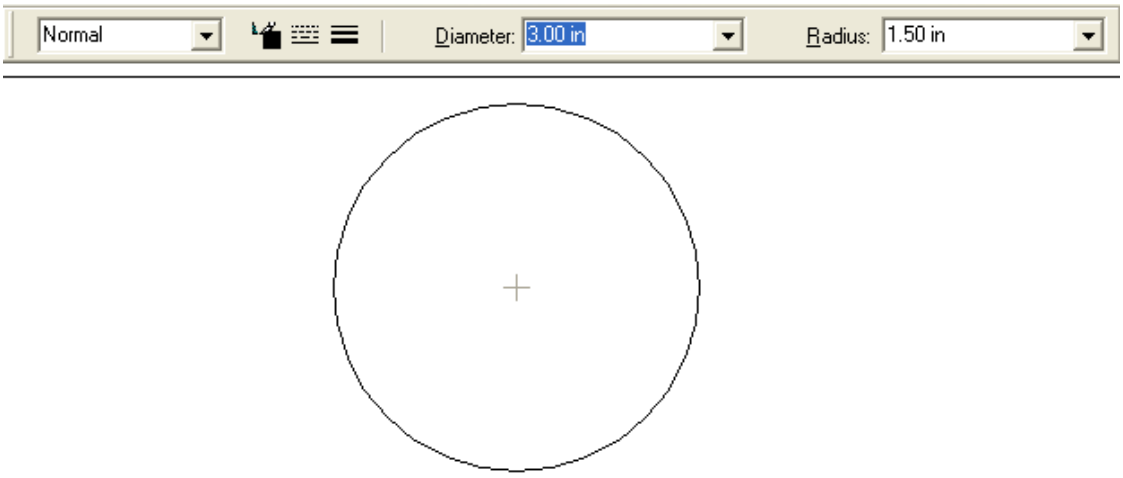
3. Select the Text Box command ( ) from the Draw toolbar. In the ribbon bar set the font to *Bookman Old Style*, font size to *0.5 in*, turn on **Bold**, click in the drawing window, and key in the word *EXIT*.

4. Select the **Layer Display** command ( ) from the Layer ribbon bar. Turn off the *Exit* layer by double-clicking another layer to make it the active layer and then deselecting the *Exit* layer. Click the Apply and Close buttons.

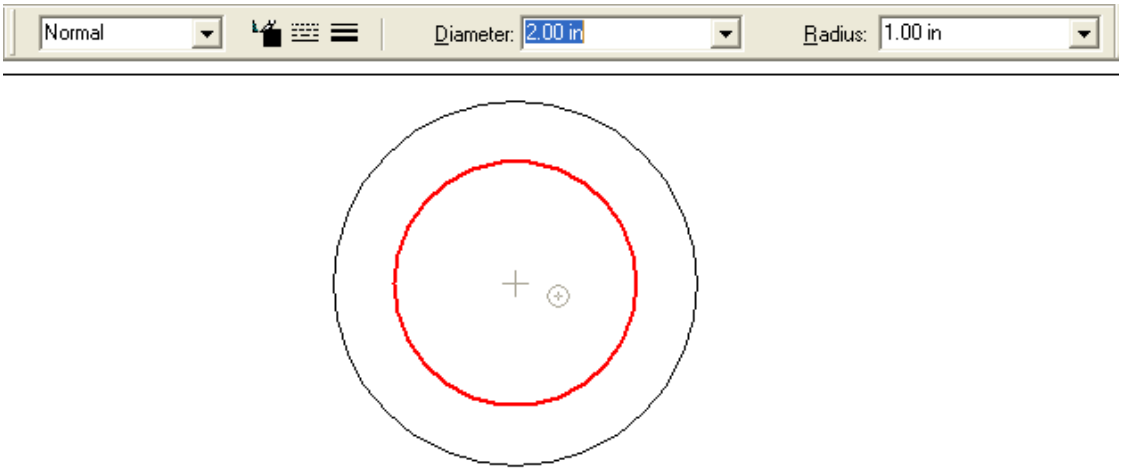


5. Next, create a new layer called *Sign*.

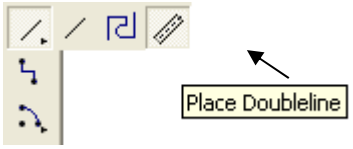
6. Start creating the sign by placing a circle with a *3 in* diameter using the **Circle by Center Point** command.



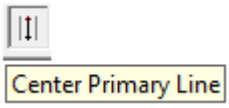
7. Continue by placing a second circle with a diameter of *2 in* concentric to the first circle. Use the center point relationship indicator for accuracy.



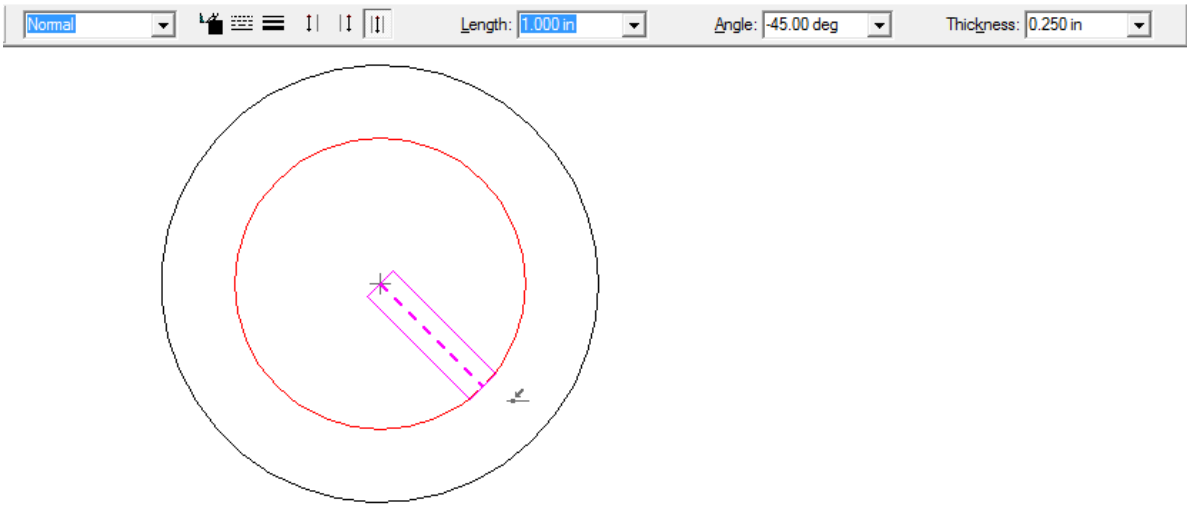
8. Select the **Place Doubeline** command from the *Draw* toolbar. This command can be accessed from the *Line* fly-out.



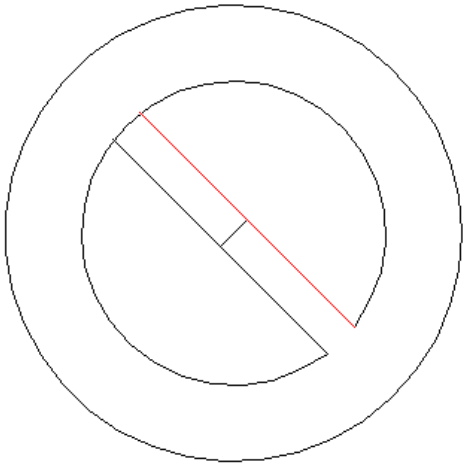
9. On the **Place Doubleline** ribbon bar, select the **Center Primary Line** option.



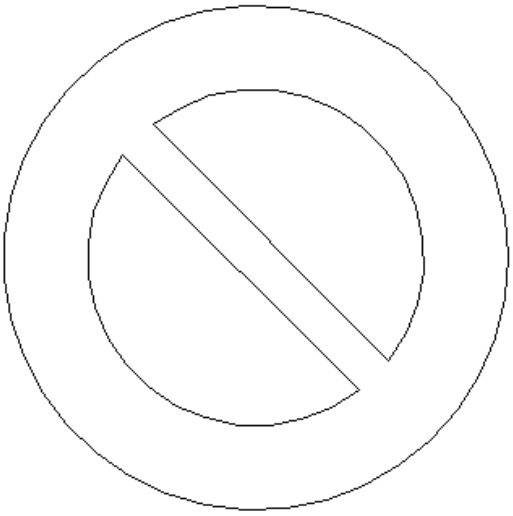
10. Draw a line with a thickness of *0.25 in* at a *-45* degree angle between the center of the circle and the edge of the inner circle.



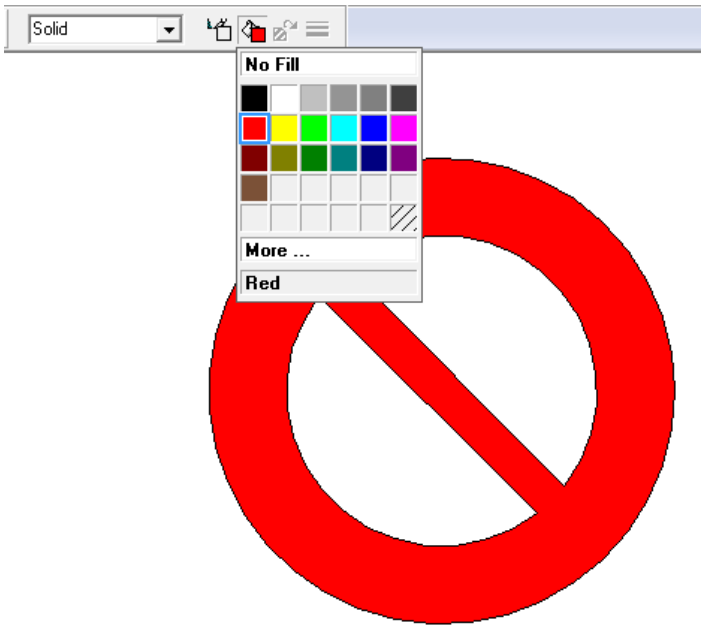
11. Once placed, the section of the circle the line intersects will disappear. Click the **Extend to Next** ( ) command to extend the existing diagonal lines to intersect the inner circle opposite the original intersection.



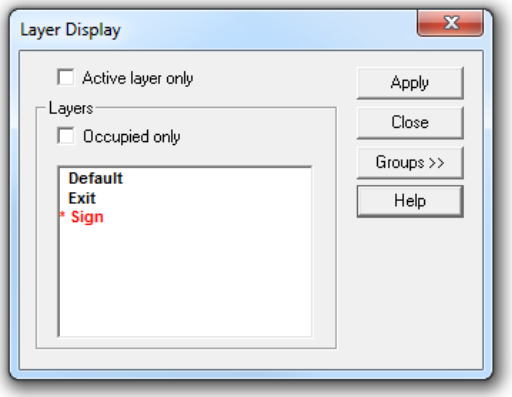
12. Use the **Trim** command ( ) to remove the two lines shown below.



13. Select the **Fill** command ( ) and fill the circle with a solid red fill style.



14. Once the sign is completed, turn on the *Exit* and *Sign* layers.



15. Select the text box and drag/drop it on the center of the sign. Click off the text box and notice that *EXIT* is placed behind the sign. This is because the text box was created first and has the lowest priority.

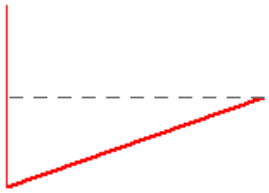
16. Select the text box and then select the **Bring to Front** command ( ) on the Change toolbar. Your final drawing should look like the image below.

17. Save the drawing in the *C:\Drawing Files* folder as *Exit Sign.igr.*

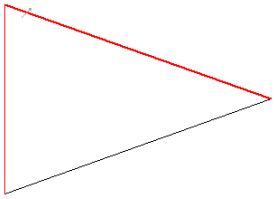
Lab 6 - Section B

CREATE A BALL VALVE WITH FLANGES

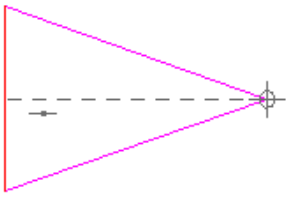
1. Create a new file using the *Normal* template.
2. Draw a *1 in* vertical line. Continue by drawing a *1.5 in* diagonal line from the end point of the vertical line. Use alignment indicators so that the end point of the diagonal line is aligned with the midpoint of the vertical line.



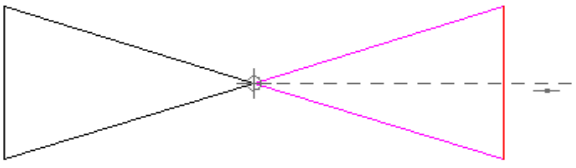
3. Connect the end point of the diagonal line to the first point of the vertical line using the end point relationship glyph.



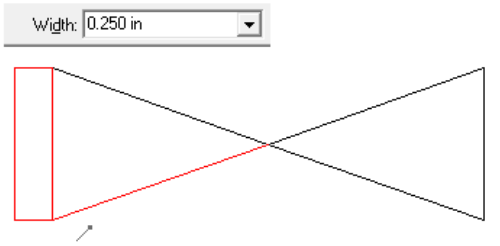
4. Select all three lines using the **Select Tool**. Activate the **Rotate** command ( ) on the **Change** toolbar and select the **Copy** button ( ) on the ribbon bar. Select the point where the two diagonal lines intersect as the *center of rotation* and the midpoint of the vertical line as the *point to rotate from*.

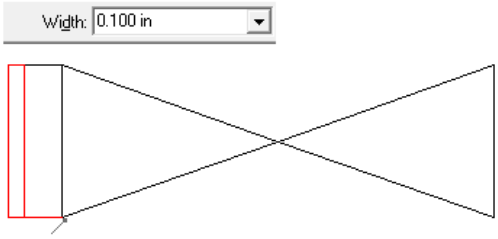


5. Move the cursor so that the *rotation angle* is *180.00 deg* and click to place a second triangle. Right mouse click to exit the **Rotate** command.

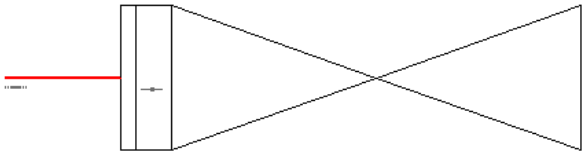


6. Draw two rectangles on the end of the left triangle (as shown below). The first one should be *0.25 in* wide by *1 in* tall and the second one should be *0.1 in* wide by *1 in* tall.

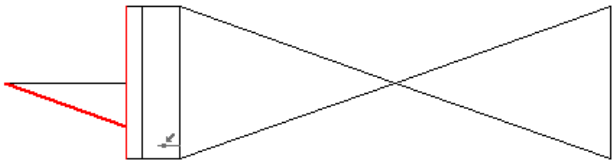




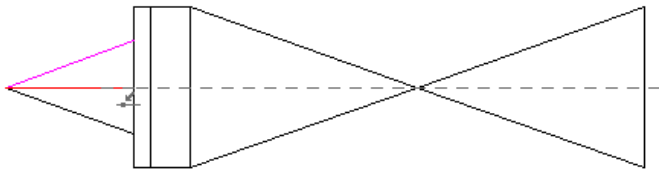
7. Draw a horizontal line *0.8 in* long from the midpoint of the farthest left vertical line.



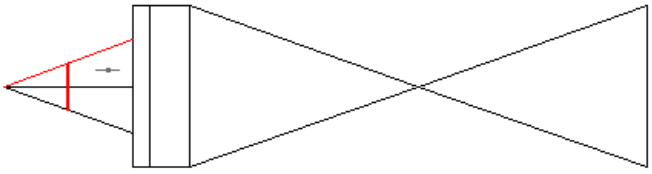
8. From the horizontal line draw a second line, 0.*85 in* long, and move the cursor until it touches the farthest left vertical line. Click to place the second line.



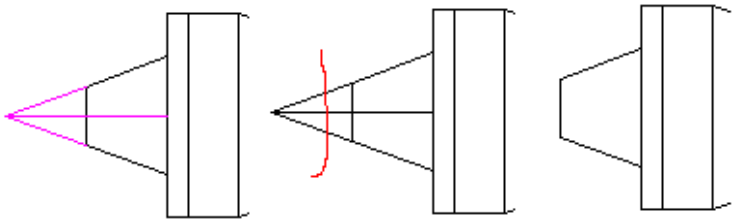
9. Select the *0.85 in* line that was just placed and click the *Mirror* command ( ). Ensure that the **Copy** button ( ) is selected. Using the horizontal line as the axis, click to place the mirrored diagonal line.



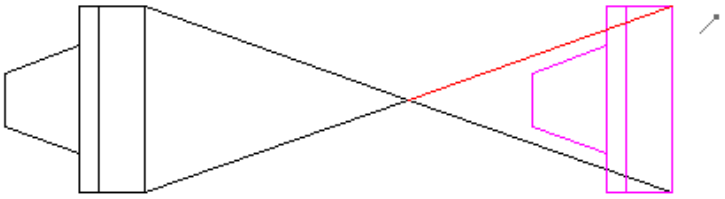
10. Select the **Line** command and draw a vertical line between the midpoints of the two diagonal lines (as shown below). Use the midpoint relationship glyph ( ) for accuracy.



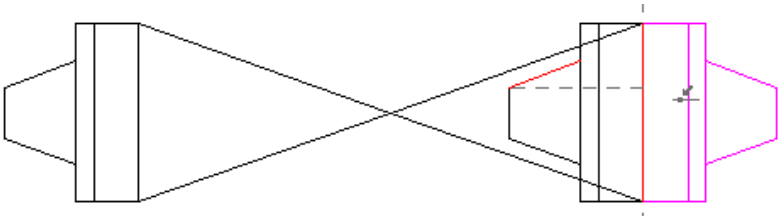
11. Select the **Trim** command ( ) on the **Draw** toolbar and remove the highlighted lines shown below. The final image should look similar to the third image below.



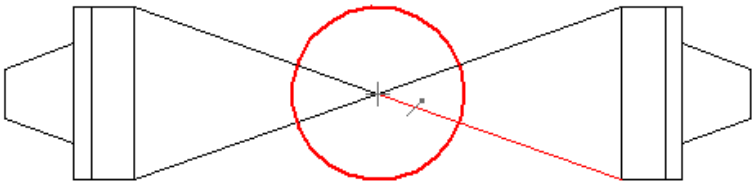
12. Select the trapezoid shape that was just created and the two rectangles, then execute the **Move** command ( ). Ensure that the **Copy** button ( ) is selected. Click the upper left hand corner of the left triangle as the *from point* and click the upper right corner of the right triangle as the *to point*. Right-mouse click when done.



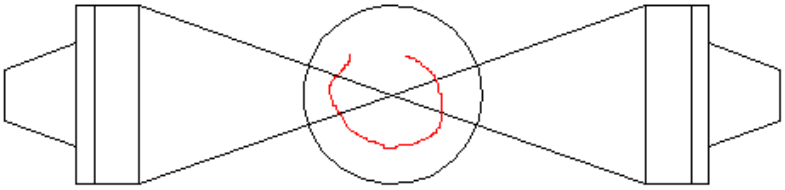
13. With the objects still selected, select the **Mirror** command. This time ensure that the **Copy** button ( ) is not selected. Select the vertical base of the right triangle as the mirror line and click to mirror the objects.



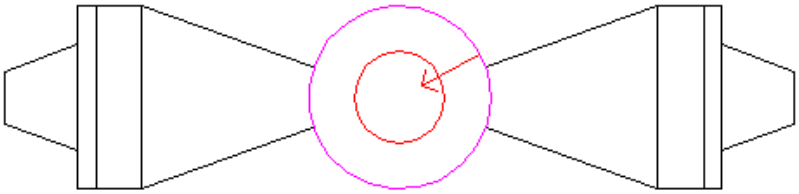
14. Place a *1 in* diameter circle where the two triangles meet.



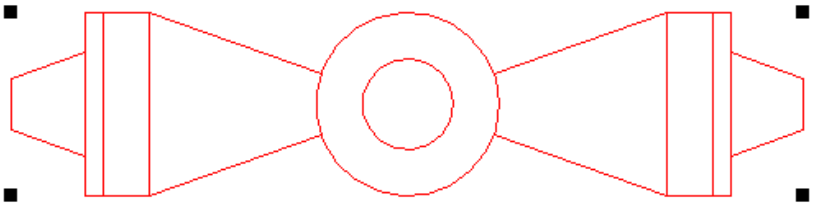
15. Use the **Trim** command ( ) to remove the sections of the triangles within the circle.



16. Use the **Offset** command ( ) to place a second circle within the original circle. Start by setting the step distance to *0.25 in*. Click the original circle and then click inside the circle to place the second circle. Right-mouse click when done.



17. Select the entire assembly and use the *Group* command ( ) to group the objects.



18. Save the drawing in the *C:\Drawing Files* folder as *Ball Valve.igr*.
19.

Lab 7 – Drawings Revision Workflow

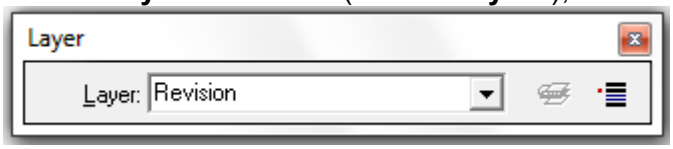
In this lab you will use some of the tools discussed in previous lessons to revise a Drawings file. During the lab, you will revise a detail that references part of a Drawing View in the file.

CONFIGURING ACCESS TO THE SCALED SKETCH COMMAND

1. Navigate to the Lab folder from the training class folder.
2. Open the file named Drawings-type file.sha.
3. Select **Tools>Customize** to create a new toolbar. Add the **Scaled Sketch** command to the toolbar. The **Scaled Sketch** command is available from the *Tools* category.

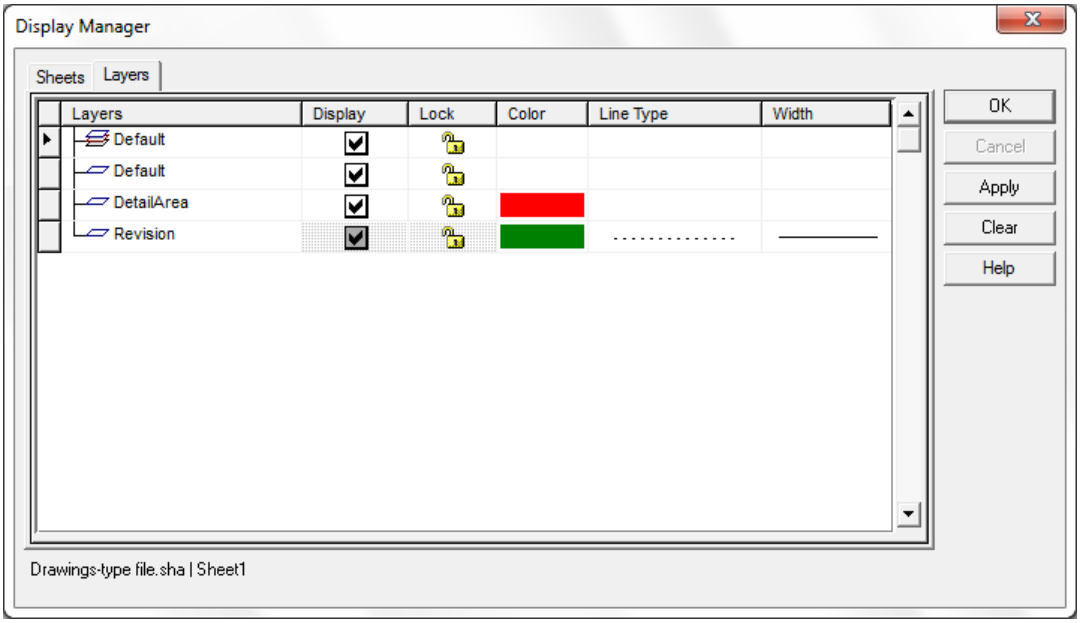
CREATE SEVERAL NEW LAYERS REQUIRED FOR THE FILE REVISION

1. On the **Layer** ribbon bar (**Tools>Layers**), create a new layer named *Revision*.



2. Select **Tools>Display Manager**. In the **Display Manager** dialog, make sure that *Sheet1* is selected and then click the **Layers** tab.

3. On the row associated with the *Revision* layer, set the color to *Dk Green*, the line type to *Dot*, and the width to *.13 mm*. The dialog box should look like the following when you are finished.



4. Use the same technique to create a new layer called *Annotation* and set its color to *Blue*.

5. Select the *Detail 4:1* SmartFrame on the right side of the sheet and select **Tools>Display Manager** or right-mouse click over an object in the SmartFrame and select *Display Manager* from the popup menu. Make sure that *Detail 4:1* is selected on the *Sheets* tab and then click the *Layers* tab to display the layers in the embedded SmartFrame.

6. Turn OFF the display of the *Piping*, *Structure*, and *Vessel* layers. You should notice that the display of several objects in the SmartFrame is turned off.

SCALED SKETCHING

1. Now, it's time to start revising the file by sketching against the Detail SmartFrame. Start by selecting the **Scaled Sketch** command from the toolbar you created earlier. The following ribbon bar is displayed:

2. Select the *Detail 4:1* SmartFrame. The scale (1:8) displays in the ribbon bar:

3. Select the first button on the **Scaled Sketch** ribbon bar to specify a color for *referenced* data. Any data not associated with the SmartFrame selected for scaled sketching displays in this color. It's a good visual indicator to let you

keep track of the SmartFrame you are sketching against. A bright color like Cyan or Green is usually a good choice.

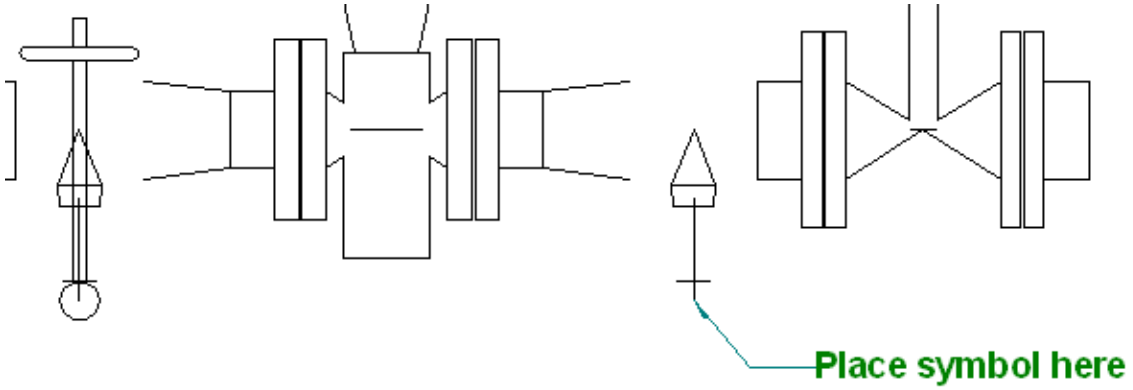
Note: If you need to move a label, select the label and click the lock to unlock it. Then drag the label to a new location.

4. Select the first button on the **Scale Sketch** ribbon bar to specify a color for *referenced* data. Any data not associated with the SmartFrame selected for scaled sketching displays in this color. It's a good visual indicator to let you keep track of the SmartFrame you are sketching against. A bright color like Cyan or Green is usually a good choice.

5. Select the **Start scaled sketching** button to start scaled sketching. At this point, you should see everything in the file except for the *Detail 4:1* SmartFrame change to the referenced color.

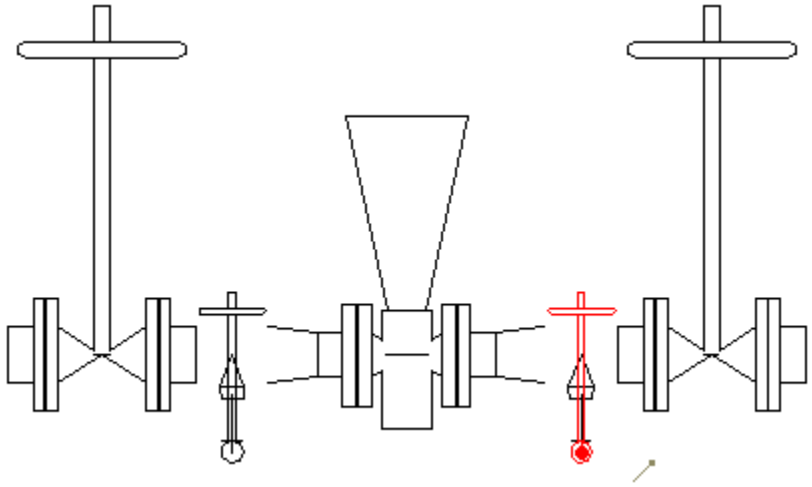
6. On the **Layer** ribbon bar, select the *Revision* layer to ensure it is the active layer.

7. First, you will place a symbol from the **Symbol Explorer** onto the sheet; the picture below shows exactly where to position the symbol.

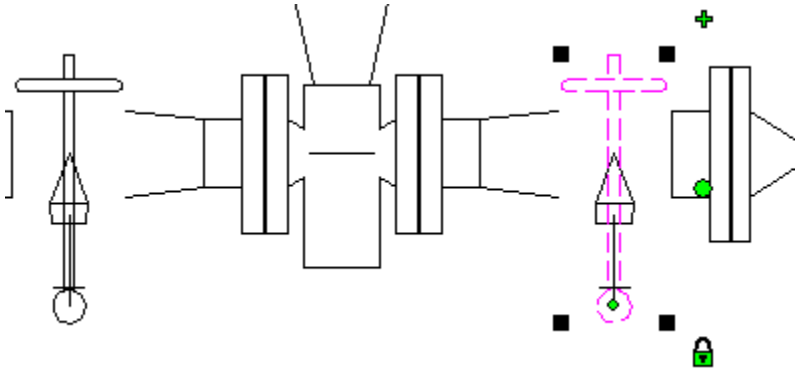


8. In the **Symbol Explorer**, browse to the *Lab 7* folder and single-click on the *Symbol.sym* file.

9. Now move the symbol to the end of the line shown in the picture below. You should see a bulls-eye target display, and an endpoint relationship glyph.



10. Click to place the symbol; then right-mouse click or press <*Esc*> to exit the command. The symbol is placed in the file, on the *Revision* layer.

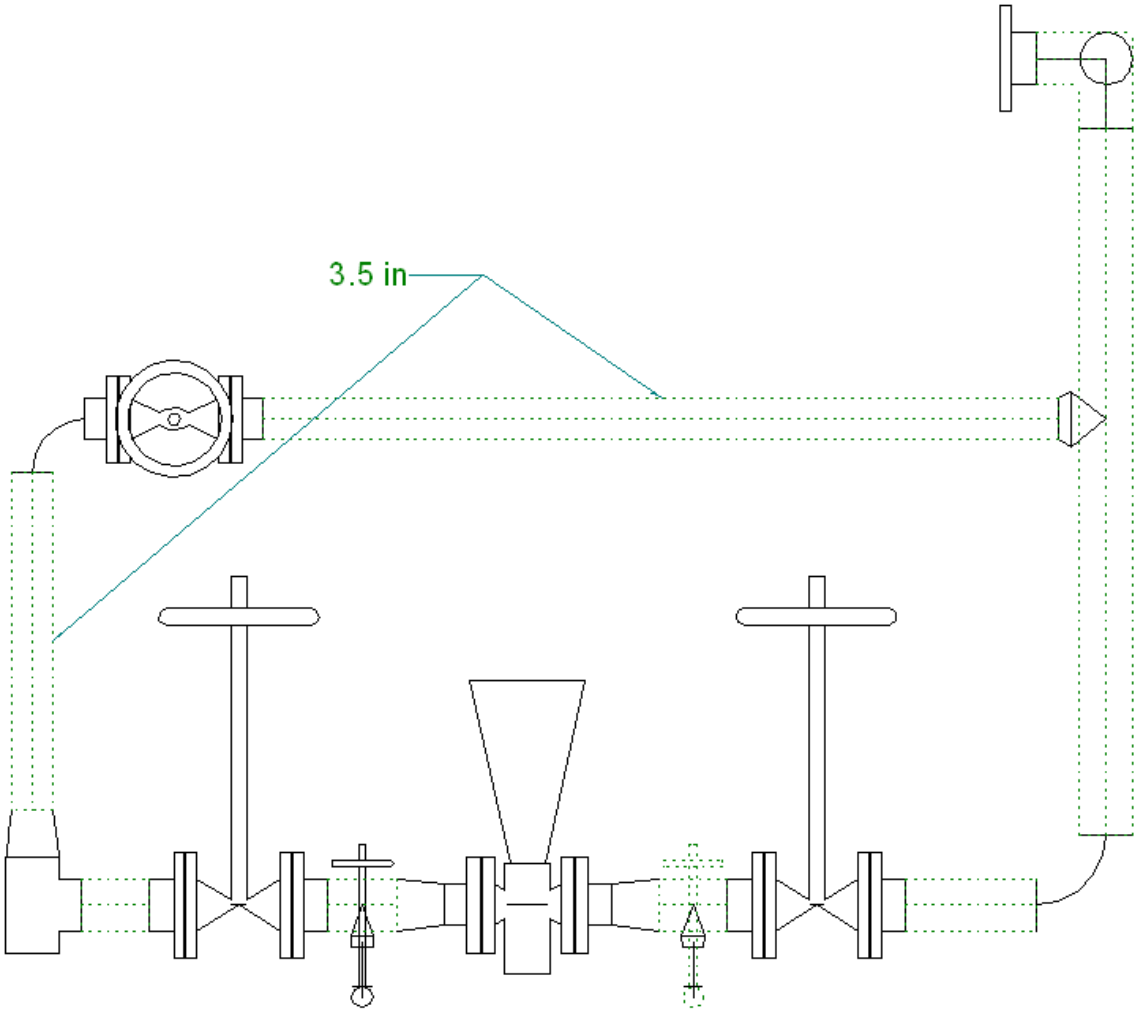


11. Now, draw some doublelines to represent the revision of the pipelines in the detail. Select the Place Doubleline command from the *Draw* toolbar.

Note: ***If you do not see the command button for Place Doubleline, it is accessible on the fly-out from the button for the Line command. Press and hold down this button to display the fly-out; then drag the cursor to the rightmost button for the Place Doubleline command.***

12. Before drawing the doublelines, make sure the *Center Primary Line* button is selected.

13. The doublelines you will draw in the file are *3.5 in* and *4.5 in* wide. Use the following picture as a guide for drawing the doublelines (there are only two 3.5 in runs; the remainder are 4.5 in):



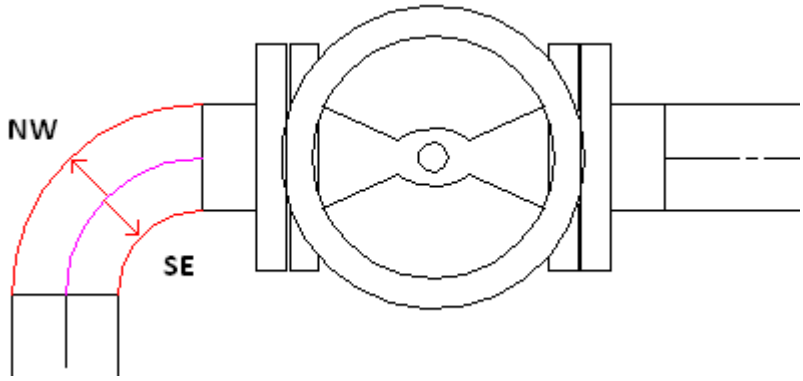
Note: ***Be sure to use SmartMouse feedback (relationship glyphs, alignment indicators, etc.) to get accurate placement of the doublelines.***

Note: ***In order to place centerlines between the doublelines, you will need to install the Support Utilities Pack, select the Toggle Enhancements command, and toggle on the Place Doubleline enhancement. This enhancement will add a Centerline checkbox to the Place Doubleline ribbon bar.***

14. Now, select the *Offset* command to draw the elbows. You will have to display the *Change* toolbar (if it is not already displayed) to access the command. The command displays the following ribbon bar when selected:

15. You will offset the arc objects that represent each elbow. The offsets will be half (*1.75 in* and *2.25 in*) the distance of the respective pipe sections. Simply key in *1.75 in* for the *Cumulative offset* value and select the arc at the mid-left

edge of the detail. Move away in a NW direction to offset the outer part of the elbow (*click to place*), SE to offset the inner part (*click to place*).



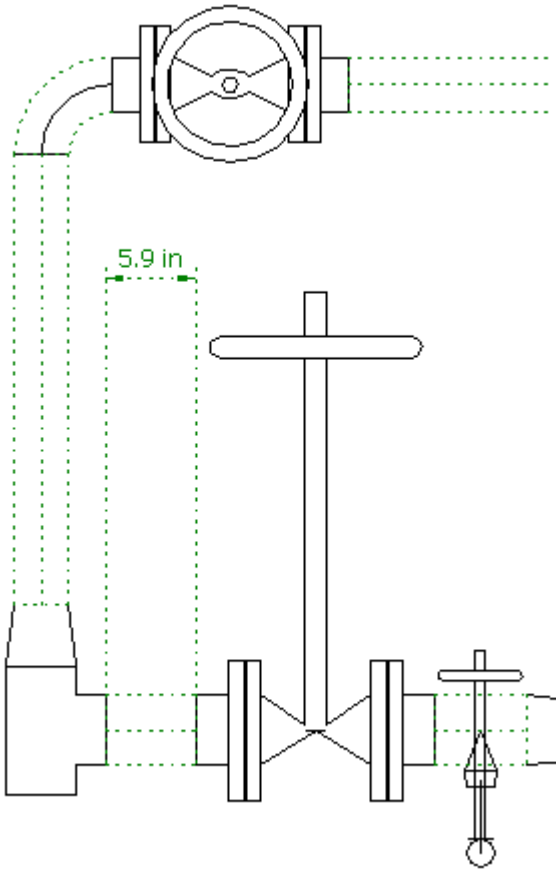
16. For the larger elbow, use the same technique; key in a *Cumulative offset* of *2.25 in*.

DIMENSION PLACEMENT

In the next few steps, you will add some dimensions for the run at the bottom of the detail. Two commands are used in this section: *SmartDimension* and *Distance Between* (from the *Dimension* toolbar).

1. Turn on the display of the **Dimension** toolbar if necessary; select **View→Toolbars** and check the **Dimension** toolbar from the list or select the **Dimension** icon on the **Main** toolbar. The following toolbar is displayed:

2. Select the **SmartDimension** command to dimension the doubleline segments you drew at the bottom of the detail. The first dimension should look something like the following picture:

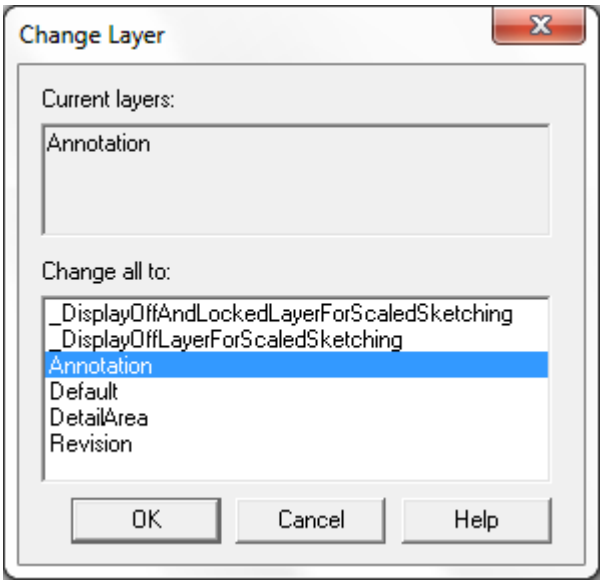


Note: ***Notice that the dimension is placed on the Revision layer; dimensions are to be placed on the Annotation layer.***

3. Select the dimension.

4. Select the **Change Layer** command on the **Layer** ribbon bar.

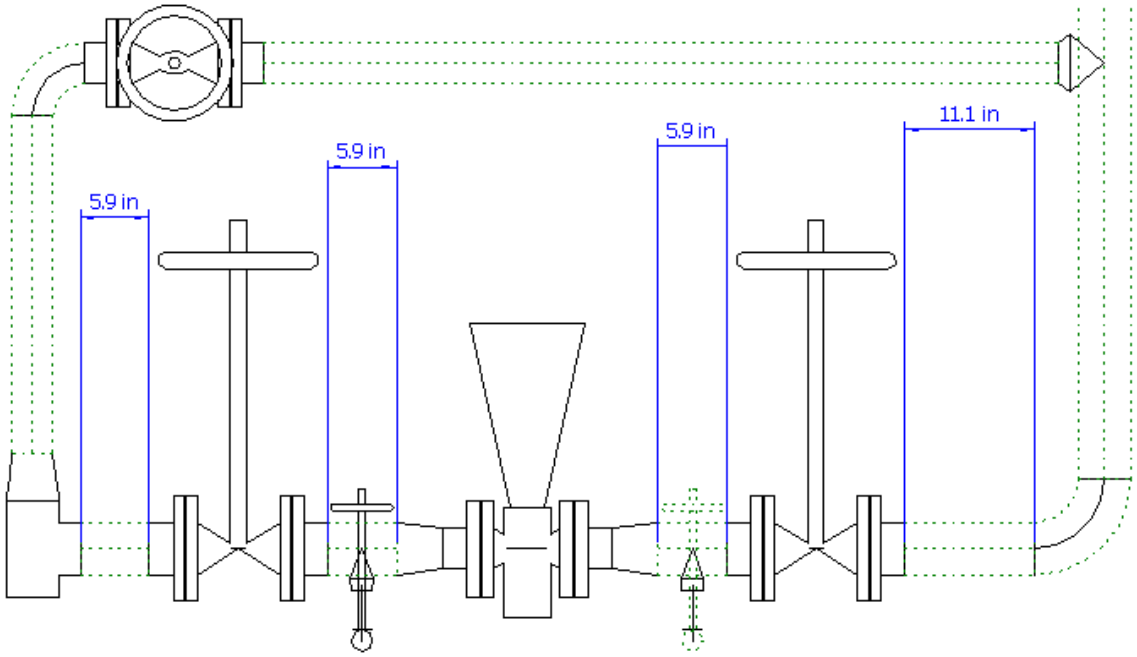
5. In the **Change all to** section of the **Change Layer** dialog, select *Annotation* (see below).



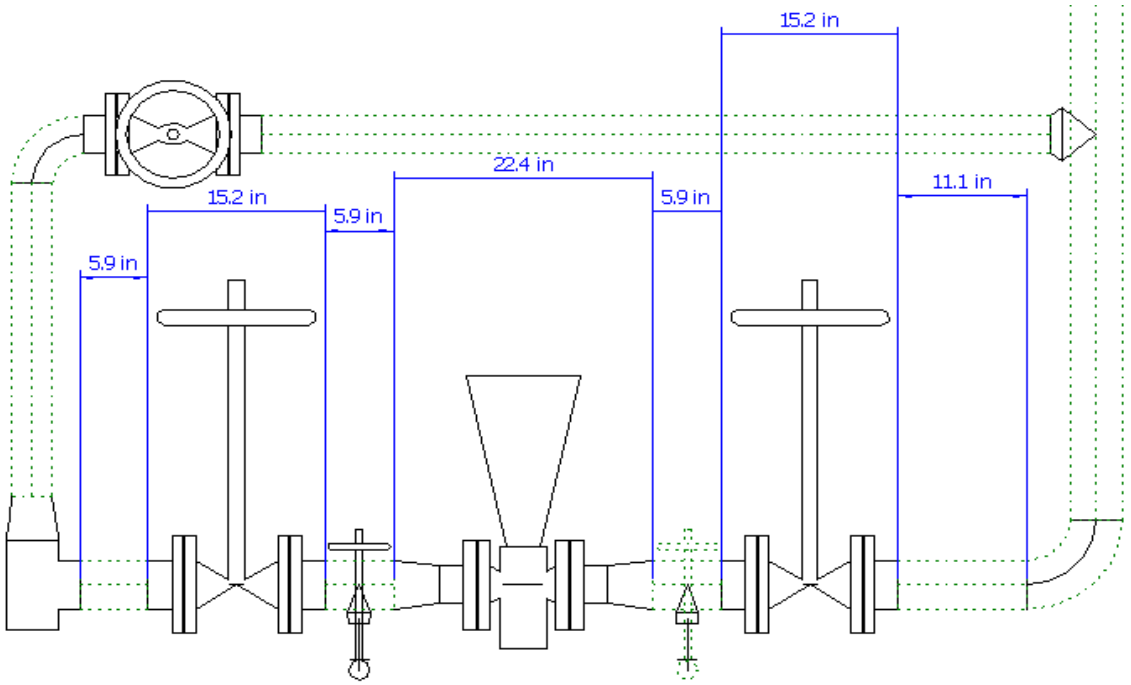
6. Select **OK** to move the selected dimension object to the *Annotation* layer.

7. On the **Layer** ribbon bar, select the *Annotation* layer to ensure it is the active layer.

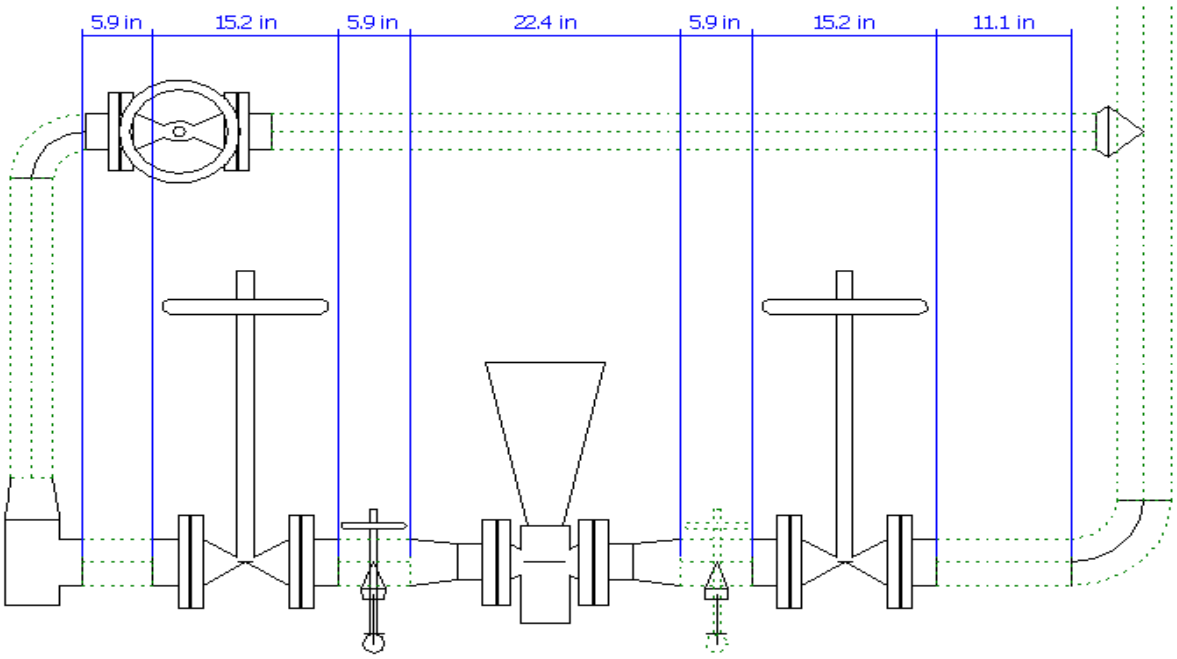
8. Select the **SmartDimension** command again and continue dimensioning the doubleline segments. Use the following picture as a guide:



9. Select the **Distance Between** command to dimension the distance between the pipe sections. Right-mouse click after placing each dimension. Use the following picture as a guide:

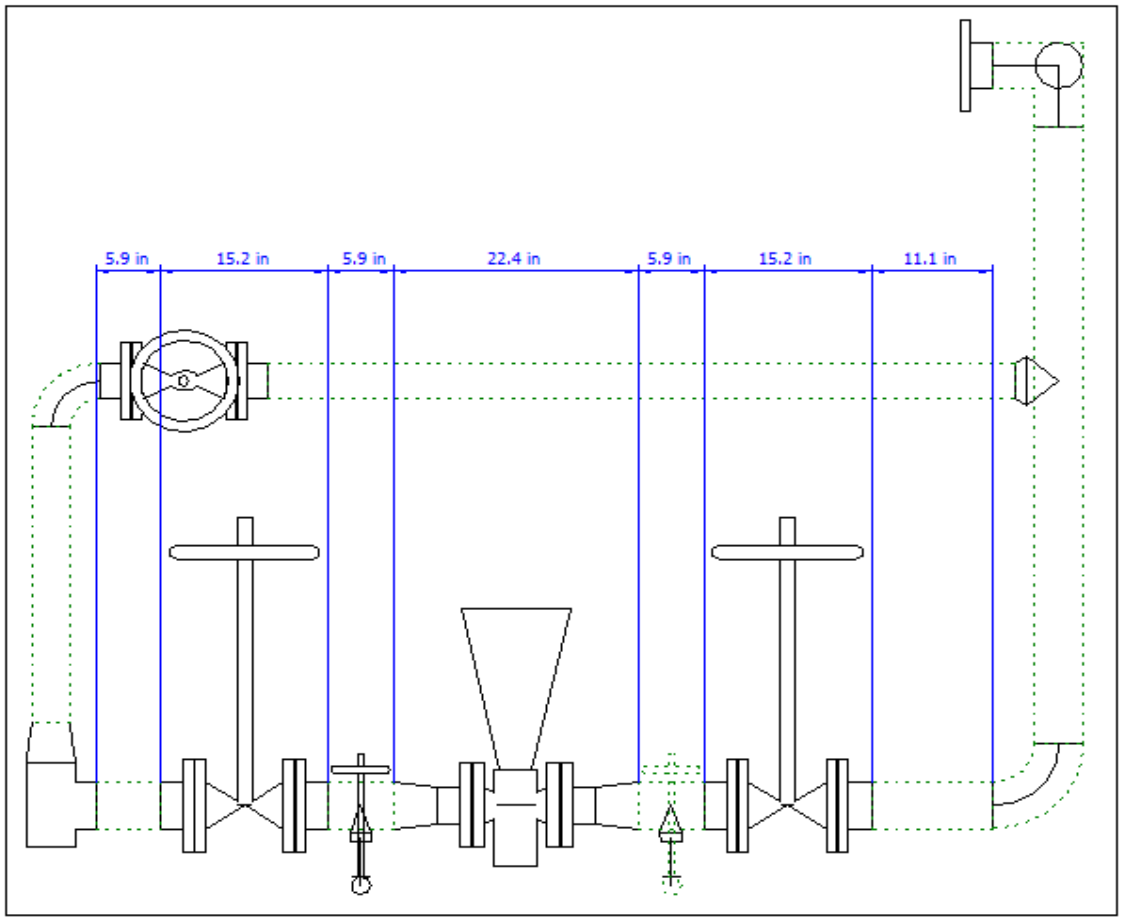


10. Because dimensions can be placed with different dimensioning commands, it is sometimes not easy to align them neatly. Select each dimension line, not the dimension text, and drag it to the proper location.



11. Select the **Finish** Finish button to exit out of Scaled Sketching.

The final revised version of the *Detail 4:1* SmartFrame should resemble the following picture:



Detail 4:1

Note: ***In order to align a select set of dimensions, you will need to install the Support Utilities Pack, select the Toggle Enhancements command, and toggle on the Align enhancement. This enhancement supports alignment for linear and coordinate dimensions and also alignment about a selected object. Often, you need to align about an object that is in a SmartFrame (not on the sheet for the container document). Holding the Shift key while clicking lets you locate an object in a SmartFrame without having to use QuickPick or change the locate mode.***

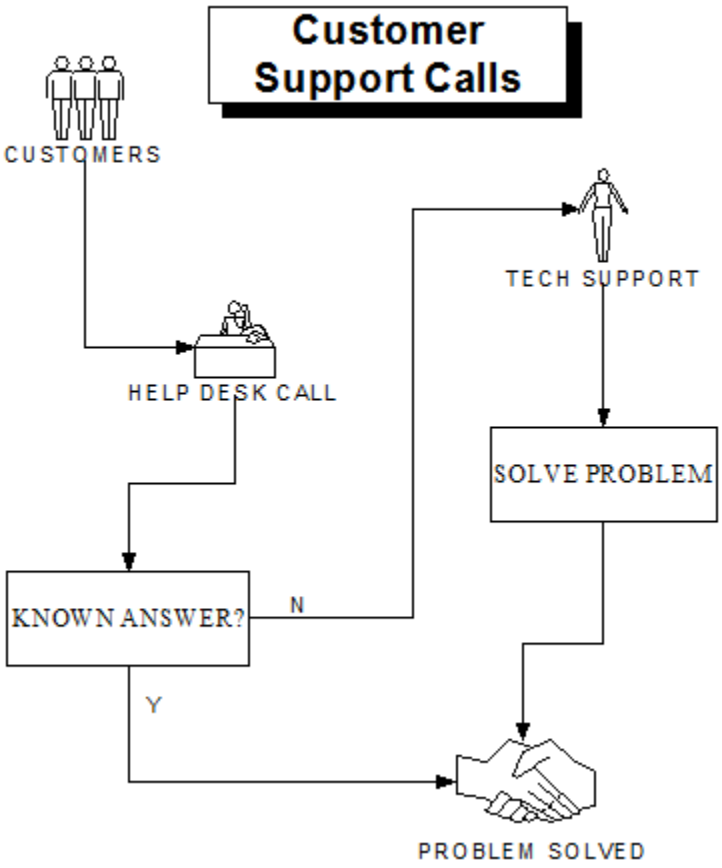
12. At some point, after Scaled Sketching, you may want to reposition a Drawing View and its related data. If you select/move the Drawing View SmartFrame, the data drawn during Scaled Sketching does not move along with the Drawing View (because it is not selected). However, if you hold down the <*Alt*> key when you select a Drawing View, items added during Scaled Sketching are also added to the select set. This allows you to reposition the Drawing View along with all of the revisions made during Scaled Sketching.

    Try selecting/moving the *Detail 4:1* Drawing View SmartFrame with and without the <Alt> key selection to see the difference.

    Note: Smart 3D has retired the use of explicitly locking SmartFrames since it was discovered that it caused a few problems with drawings update. Now in connected mode, drawing views are automatically locked and must be explicitly unlocked to move them. To explicitly unlock a drawing view, press the Alt key and select the view. This will select everything associated with the view and enable the move.

Lab 8 – Text and Annotations

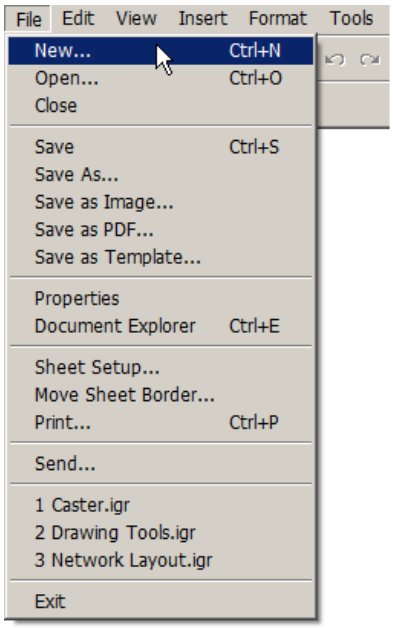
In this lab you will use the **Work Flow** symbols, **Connector** command, and the **Double-click Label** command to draw the work flow diagram shown below.

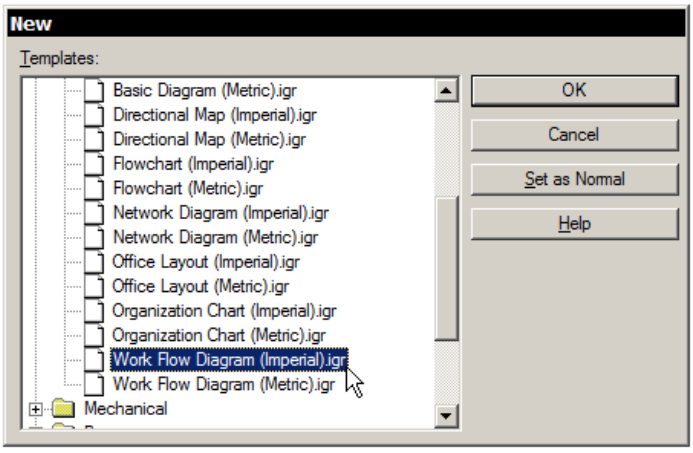


Lab 8 - Section A

CREATE A NEW FILE USING A WORK FLOW DIAGRAM TEMPLATE

1. From the **File** menu, select **New**.





13. Select *Work Flow Diagram (Imperial).igr* from the General Diagramming template folder of the **New** dialog box.

14. Click the **OK** button. A new file will open.

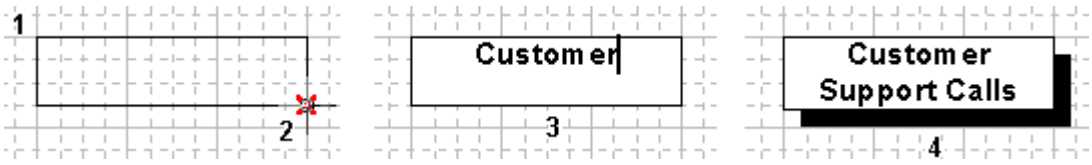
PLACE A TEXT BOX AT THE TOP CENTER OF THE DRAWING SHEET

15. Select the **Text Box**  command from the **Schematic** toolbar.

16. Set the following text settings in the ribbon bar:

- Font **Arial**
- Font Size **.25 in**
- Text Color **Black**
- Bold Option **On**
- Paragraph Alignment **Center**
- Border **Border with Shadow**

17. Using the grid lines as a guide, click and drag to define the size of the text box. The text box shown is 12 small grid blocks wide, 3 small grid blocks high.

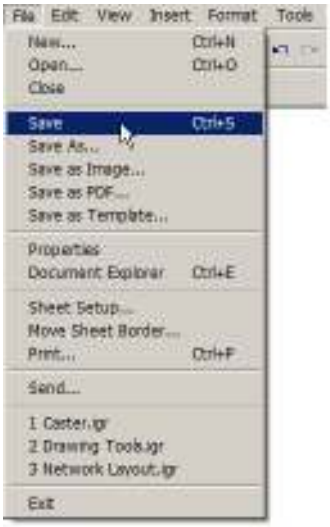


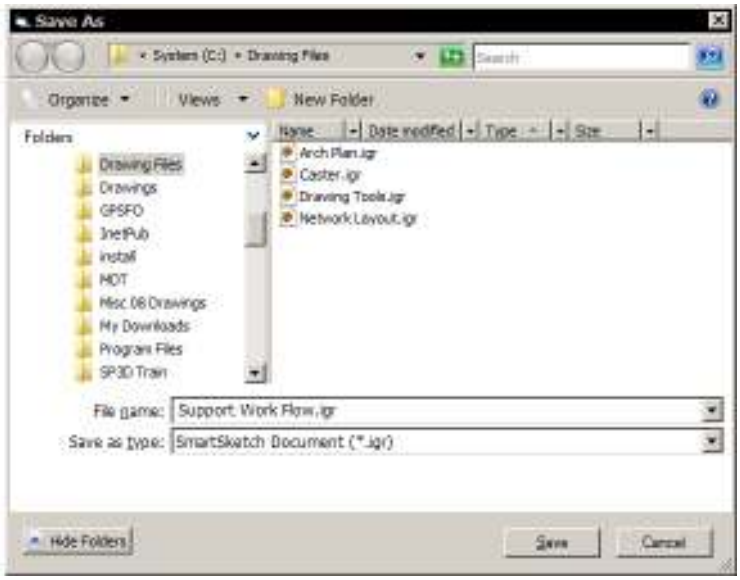
18. Type **Customer**; press the <**Enter**> key; then type **Support Calls**.

19. Click the right mouse button outside of the text box when finished typing.

SAVE THE DRAWING

20. From the **File** menu, select **Save**.





21. In the **Save in** list box, change to the **C:\Drawing Files** folder.

22. Type **Support Work Flow** in the **File name** field.

23. Click the **Save** button.

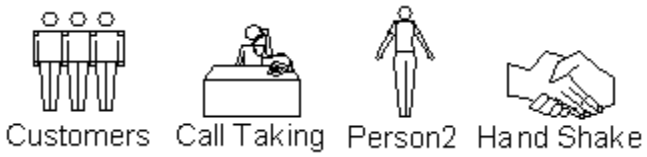
    If you prefer not to use the grid display and grid snap, they can be toggled on and off from the **Schematic** toolbar.

 **Grid Display**  **Grid Snap**

Lab 8 - Section B

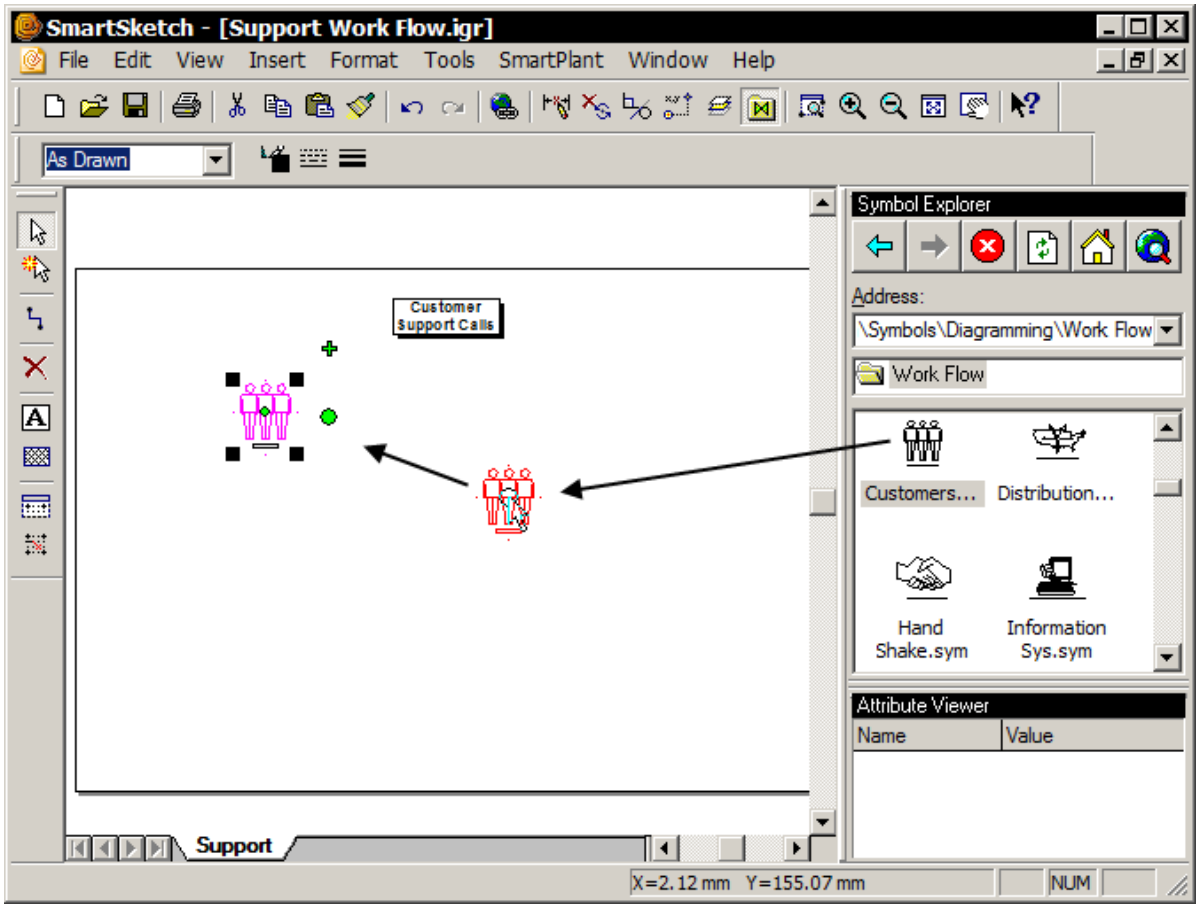
ADD WORK FLOW SYMBOLS TO YOUR DOCUMENT

Using the illustration on the first page of this lab as a guide, place the following symbols on the drawing sheet. Do not worry about exact symbol placement. You can reposition the symbols at any time during the design process without losing existing connections.



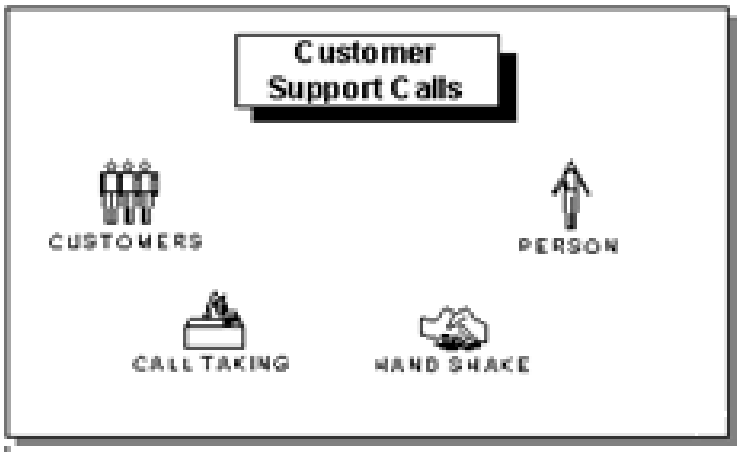
1. If the Symbol Explorer is not displayed, click the **Symbol Explorer** button from the **Main** toolbar.
   Note: The Symbol Explorer should display the symbols associated with the Work Flow Diagram template.

2. Drag the symbol **Customers.sym** from the **Symbol Explorer** and drop it in the upper left corner of the drawing sheet.



3. Continue dragging the other symbols into the document. If needed, use the **Select Tool**  to reposition the symbols at any time.

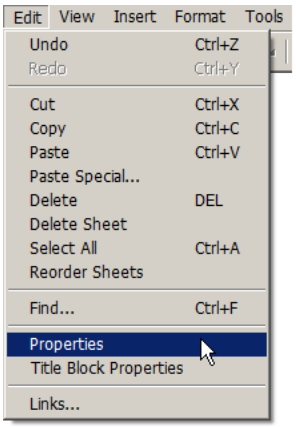
CHANGE THE TEXT SIZE OF THE WORK FLOW SYMBOLS

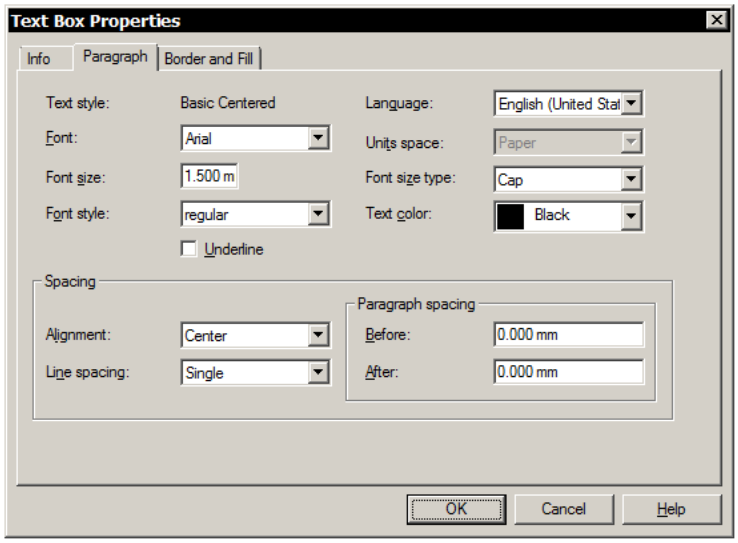


4. Choose the **Select Tool**  from the **Schematic** toolbar.

5. While pressing the <**Ctrl**> key on the keyboard, select each of the small text labels that are under the symbols. Make sure all labels are selected before going to the next step.

6. From the **Edit** menu, select **Properties**.



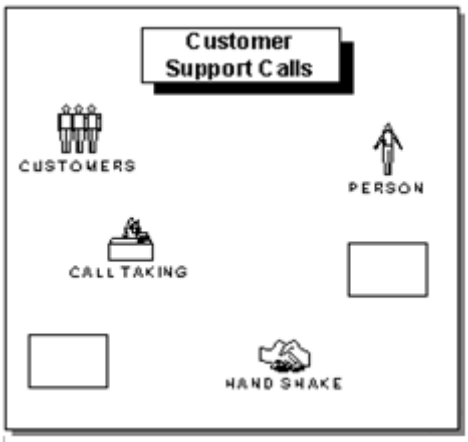


7. On the **Paragraph** tab of the **Text Box Properties** dialog box, set the following:

   Font – **Arial** Font size – **.15 in** Font style – **regular**

8. Click the **OK** button to apply the changes.

PLACE TWO AUTO-SIZE BOX SYMBOLS



9. In the **Symbol Explorer**, click the left mouse button on the ***Auto-Size Box*** symbol to activate the symbol.

10. Click two other points in the document to place two copies of the ***Auto-Size Box*** symbol and then click the right mouse button to end the command.

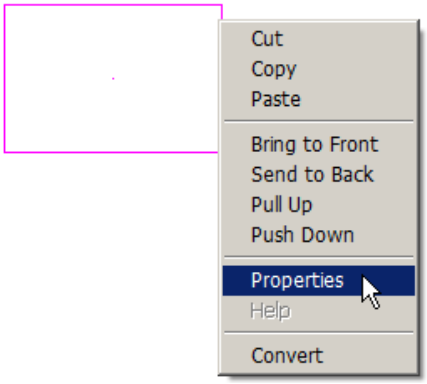
11. Select **Save**  from the **Main** toolbar to save the document changes.

CHANGE THE TEXT SIZE OF THE AUTO-SIZE BOX SYMBOLS

1. Choose the **Select Tool**  from the **Schematic** toolbar.

2. While pressing the <**Ctrl**> key on the keyboard, select both of the *Auto-Size Box* symbols previously placed in the drawing.

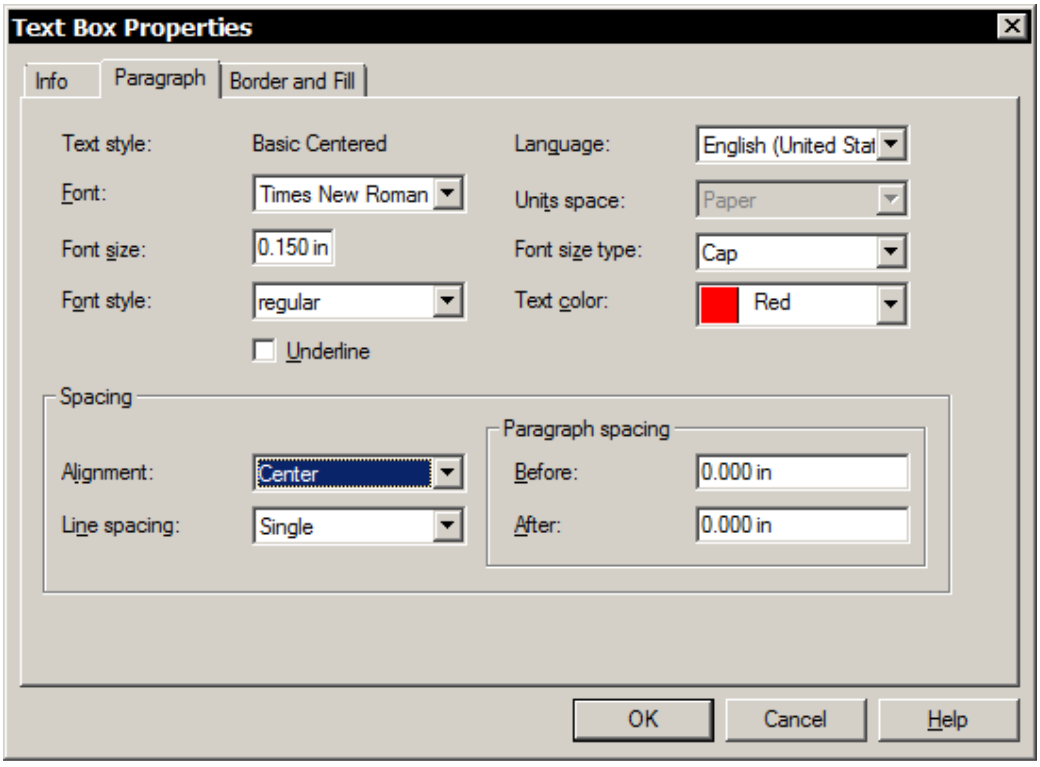
3. Position the cursor near one of the highlighted symbols, click the right mouse button to activate the short cut menu and select **Properties**.



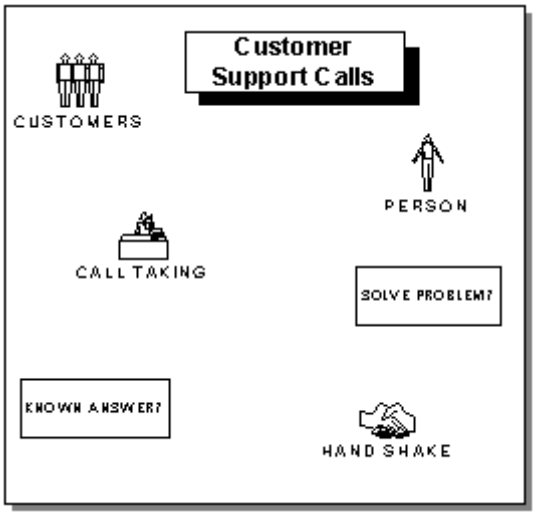
4. In the **Select Properties to Edit** dialog box, choose *Edit Text Properties* and click the OK button.

5. On the **Paragraph** tab of the **Text Box Properties** dialog box, set the following:

   Font – **Times New Roman** Font size – **.15 in** Font style – **regular**



ADD TEXT TO THE AUTO-SIZE BOX SYMBOLS



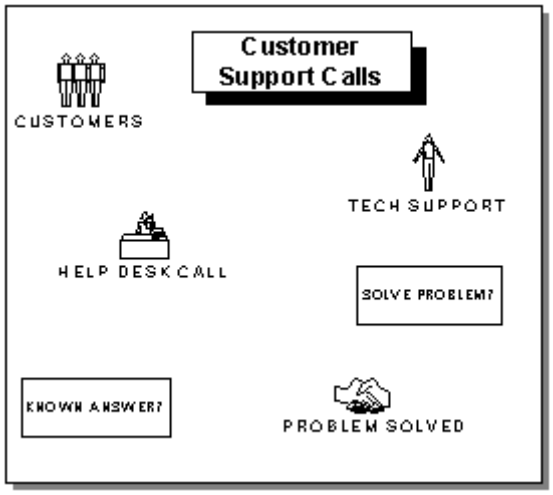
1. With the **Select Tool** active, double-click one of the *Auto-Size Box* symbols.
2. Type the text shown above for one of the symbols. Click the right mouse button when complete.
3. Label the other *Auto-Size Box* symbol with the text shown in the illustration at the top of the page.

Lab 8 - Section C

EDIT THE WORK FLOW SYMBOL LABELS

1. With the **Select Tool** active, double-click the label of the *Call Taking* symbol and change the text to read: HELP DESK CALL. Click the right mouse button when you are finished.

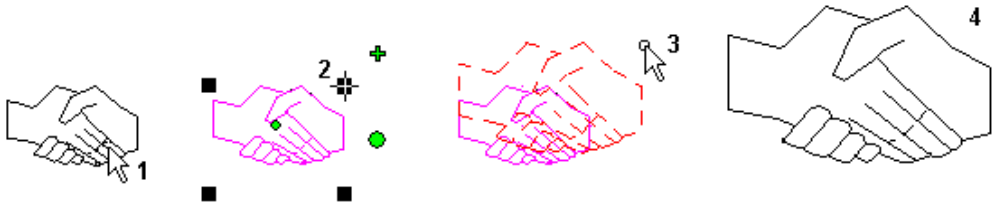
2. Edit the remaining work flow symbols to display the text shown in the illustration below.



RESIZE THE HAND SHAKE SYMBOL

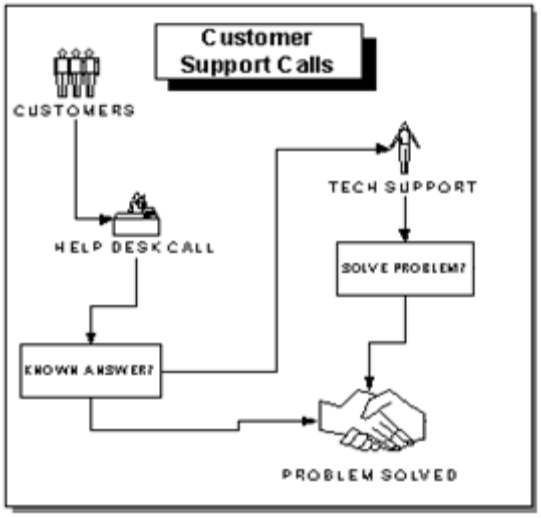
1. With the **Select Tool** active, select the symbol labeled: **PROBLEM SOLVED**.

2. Drag one of the scale handles that appear as a black box on each corner of the symbol to enlarge it. Scale to the desired size.



3. Click in the drawing window away from other objects to deselect the symbol.

4. Select **Save**  from the **Main** toolbar to save the document changes.

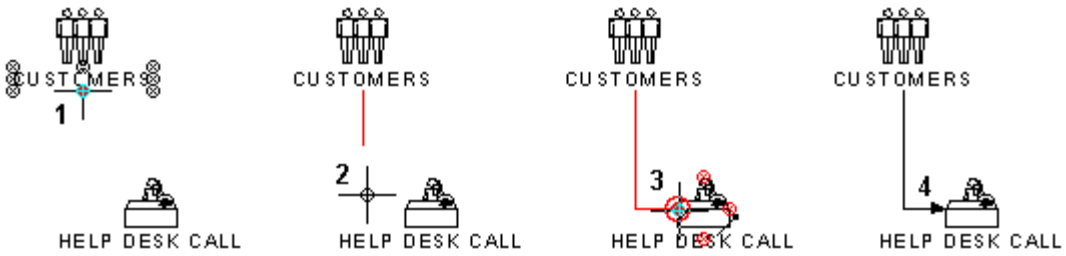


5. Select the **Connector** command from the **Schematic** toolbar.

6. Set the **Place Connector** ribbon bar settings as follows:

Start Terminator – **None** End Terminator – **Solid Arrow2** Clearance - **.5 in**

7. Move the cursor over the **CUSTOMERS** label and click to start the connector at the bottom middle keypoint. (**1**)

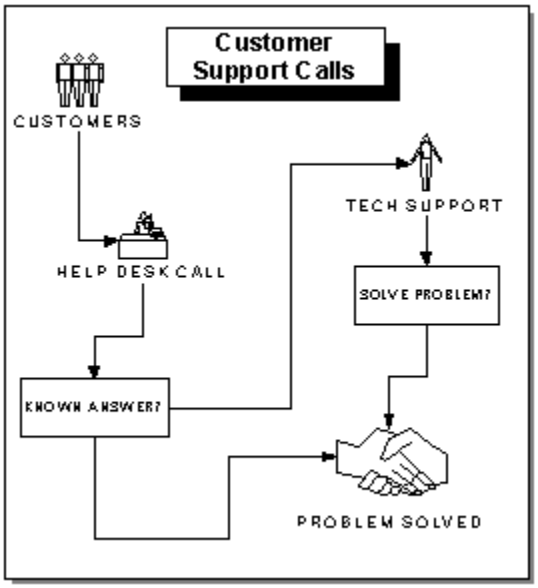


8. Move the cursor down (**2**) and to the right passing the cursor over the **HELP DESK** symbol. (**3**)

9. Click the connect point on the left side of the desk. (**4**)

10. Add the remaining connectors as shown in the illustration at the top of the page.

REPOSITION / MODIFY CONNECTORS AND SYMBOLS - IF NEEDED



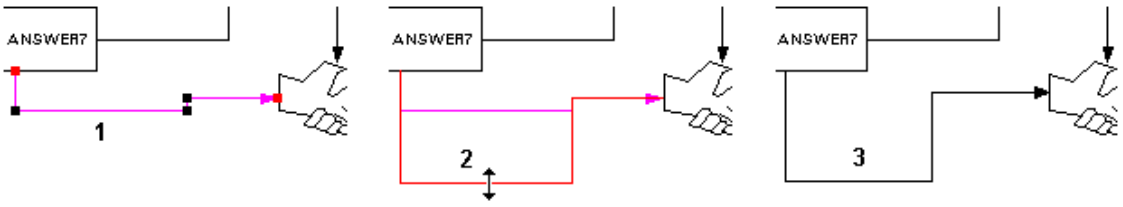
1. Choose the **Select Tool**  from the **Schematic** toolbar.

2. Drag a symbol to the desired location.
   Note: When the symbol is moved, all connections are maintained.

3. To modify a connector, select the connector.

4. Place the cursor over the connector handle (solid black dot or box) and drag to a new location.

5. To move a connector segment, select the segment to be modified.

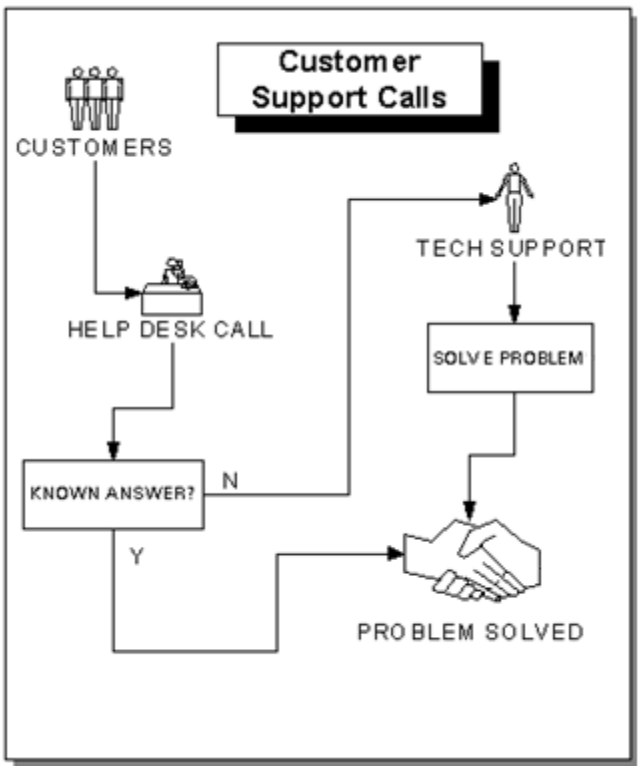


6. Place the cursor over the connector segment and drag to the desired location.

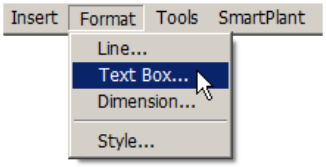
7. Select **Save**  from the **Main** toolbar to save the document changes.

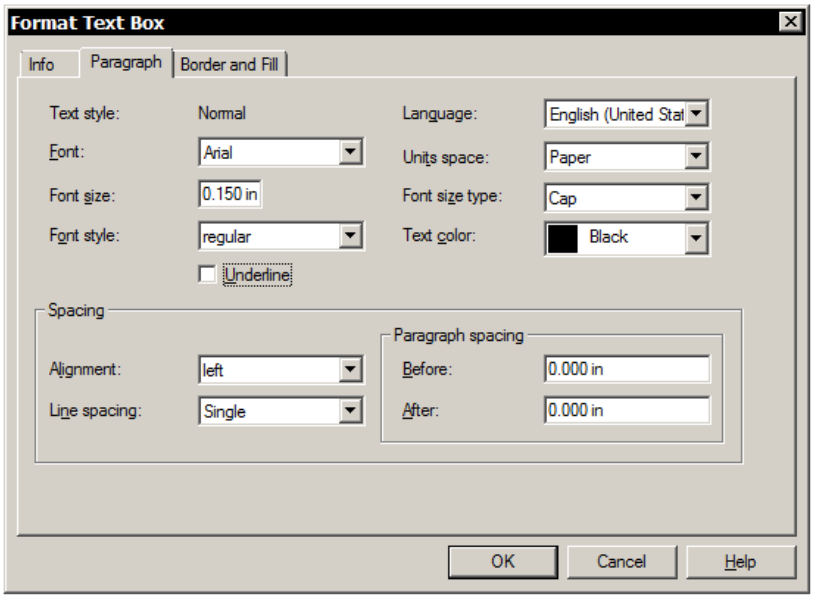
Lab 8 - Section D

ADD Y / N LABELS TO CONNECTORS



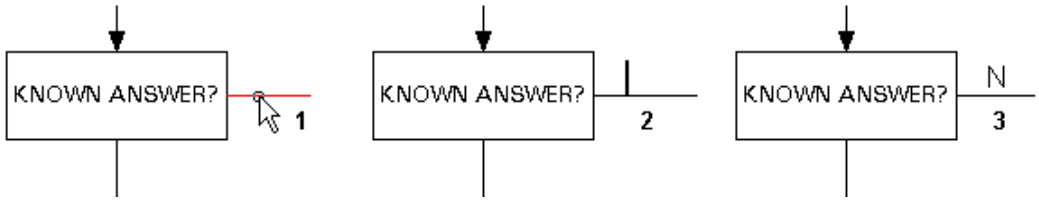
1. From the **Format** menu, select **Text Box**.
2. On the **Paragraph** tab of the **Format Text Box** dialog box, set the following:





Font – **Arial** Font size – **.15 in** Font style - **regular**

3. With the **Select Tool** active, double-click the left mouse button at a point on the connector to activate a “double-click” label.

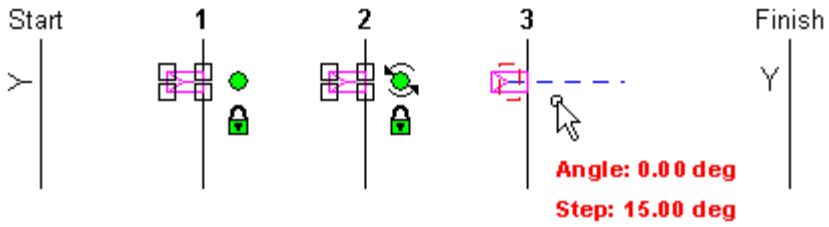


4. At the blinking cursor, type the desired text.

5. Click the right mouse button to complete the command. Repeat to label the other connectors.

ROTATE LABELS – IF NEEDED

1. With the **Select Tool** active, select the label.



2. Place the cursor over the rotate handle (large green circle).

3. Click and drag the rotate handle to adjust the label angle to **0°**.

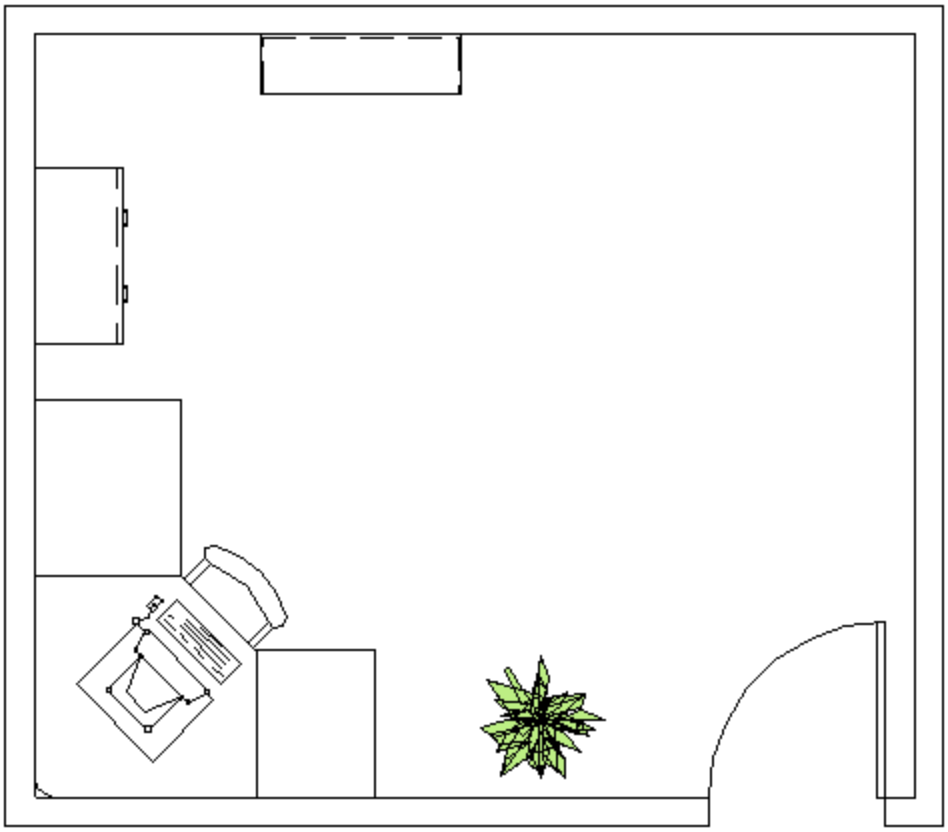
4. Click away from the label to deselect it.

Note: ***If you need to move a label, select the label and click the lock to unlock it. Then drag the label to a new location.***

5. Select **Save**  from the **Main** toolbar to save the document changes.

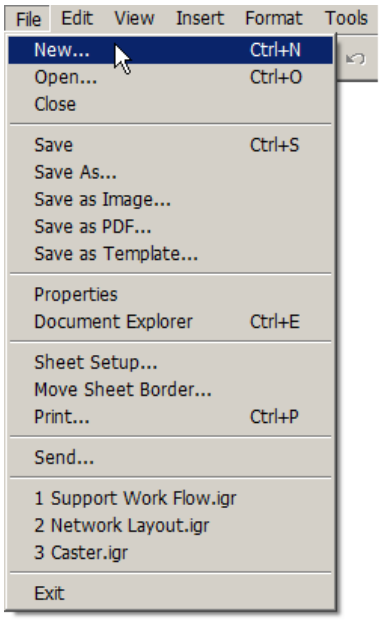
Lab 9 – Working with Symbols

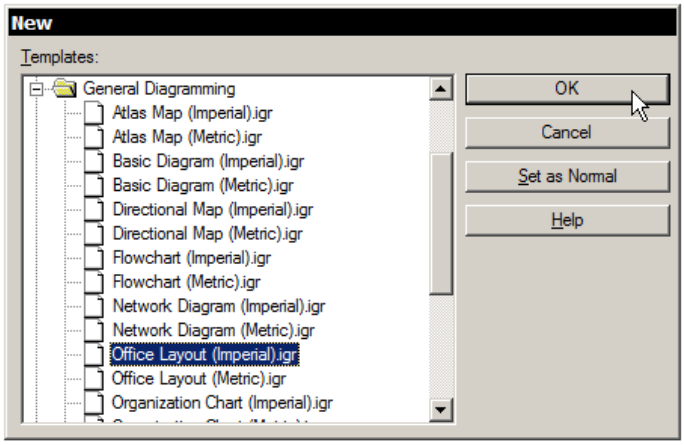
In this lab you will set up **Grid Options**, create **Layers**, draw walls using the **Place Doubleline** command, and then diagram using the **Office Layout** symbols.



CREATE A NEW FILE USING AN OFFICE LAYOUT TEMPLATE

1. From the **File** menu, select **New**.



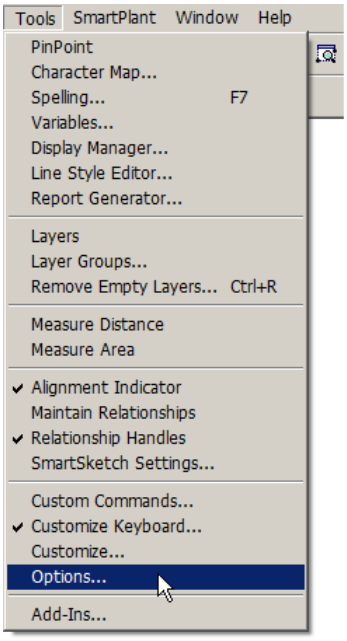


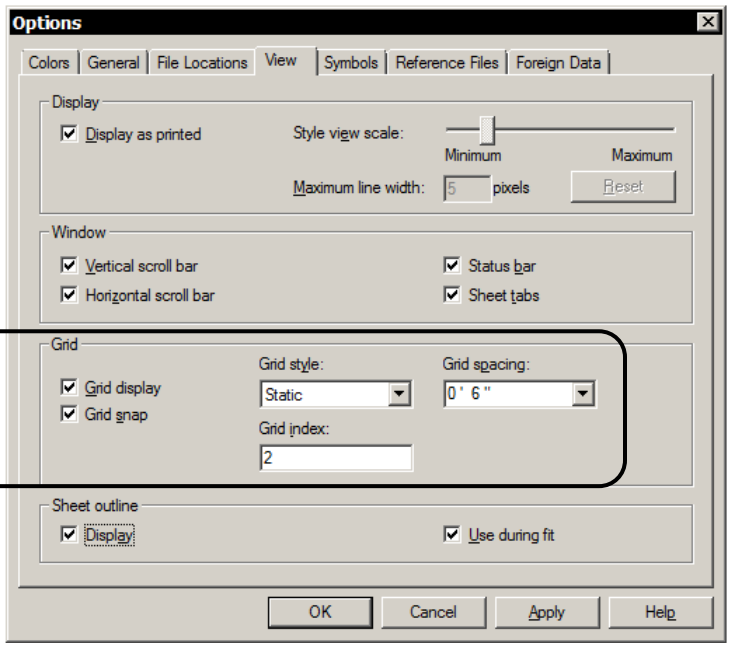
2. Select *Office Layout (Imperial).igr* from the General Diagramming template folder of the **New** dialog box.

3. Click the **OK** button. A new file will open.

SET UP VIEW GRID SETTINGS

1. From the **Tools** menu, select **Options.**





2. On the **View** tab of the **Options** dialog box, set the following:

- Grid display **ON**
- Grid snap **ON**
- Grid style **Static**
- Grid spacing **0’ 6”**
- Grid index **2**

3. Click the **OK** button.

CREATE THE WALLS LAYER

1. Select the **Layers**  command from the **Main** toolbar.

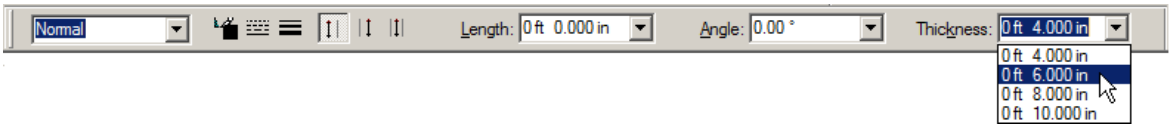
2. Create a Layer named **Walls.** Walls is now the active layer.

3. Select the **Layers**  command again to dismiss the **Layer** ribbon bar.

DRAW THE WALLS USING THE PLACE DOUBLELINE COMMAND

1. Select the **Place Doubleline**  command from the **Draw** toolbar.

2. Click the **Left Primary Line**  button and select **0’ 6”** from the **Thickness** dropdown list on the ribbon bar.

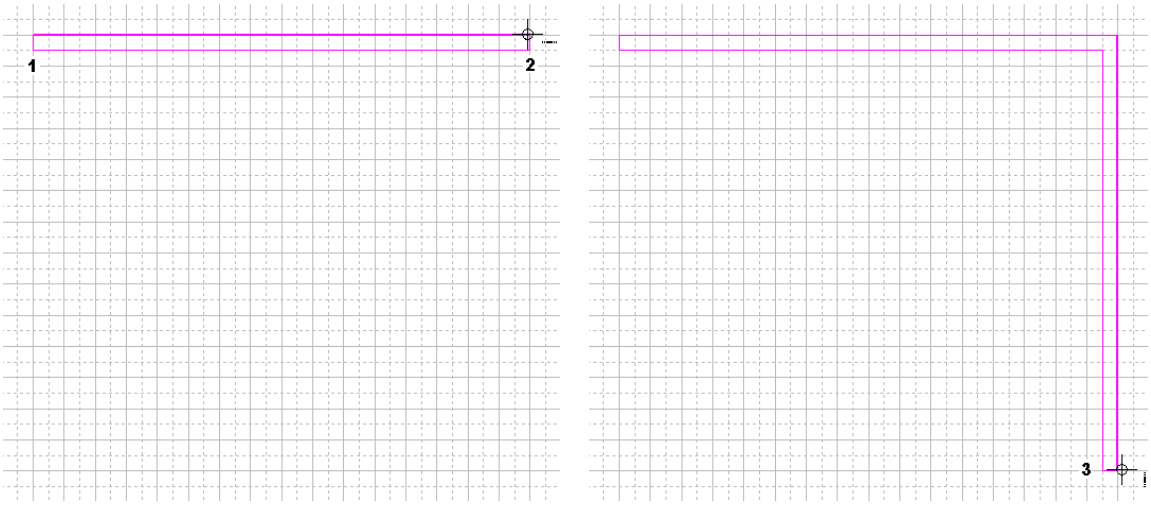


3. Using the grid snap as a guide, draw the walls for the office as shown below:

   a. Click to start the doubleline.

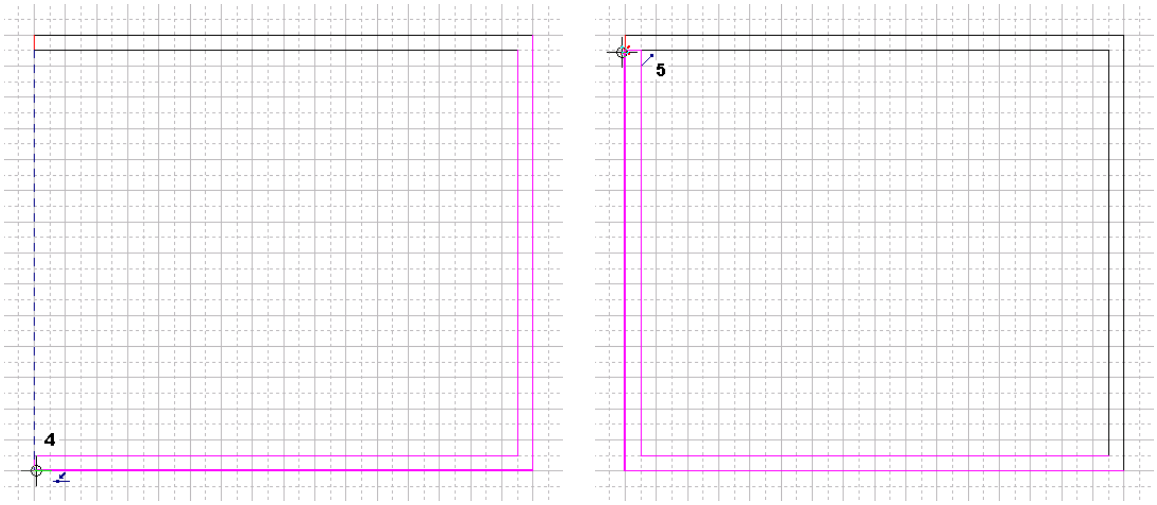
   b. Move the cursor to the right and draw a **16’** horizontal doubleline.

c. Move the cursor down and draw a **14'** vertical doubleline.

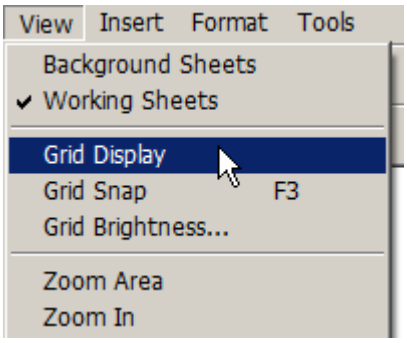


d. Move the cursor to the left and draw a **16'** horizontal doubleline.

e. Click the "**lower line**" of the start point to complete the walls.

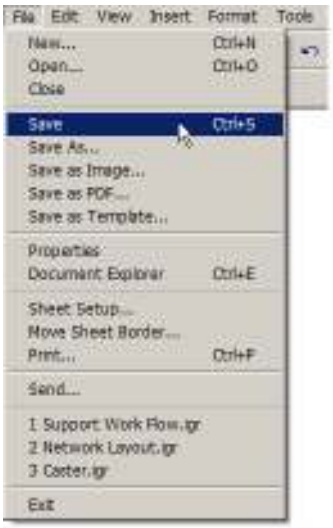


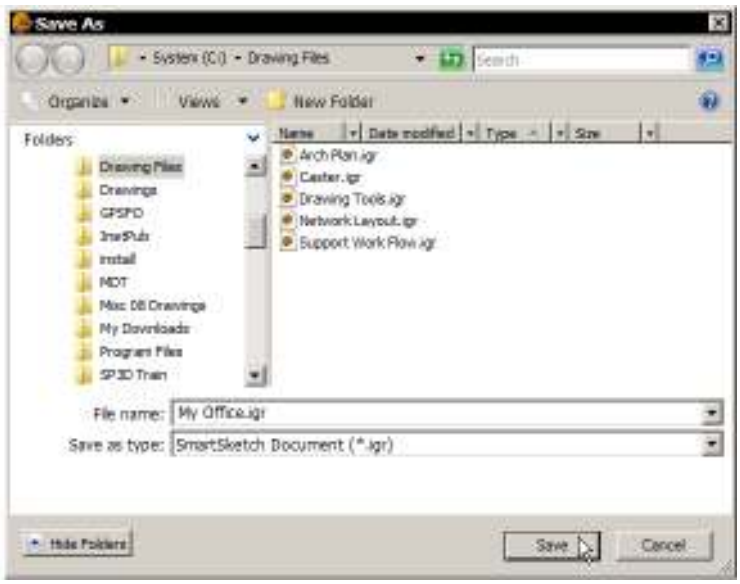
4. Turn off **Grid Display** and **Grid Snap** from the **View** menu.



SAVE THE DRAWING

1. From the **File** menu, select **Save**.





2. In the **Save in** list box, change to the **C:\Drawing Files** folder.
3. Type **My Office** in the **File name** field.
4. Click the **Save** button.

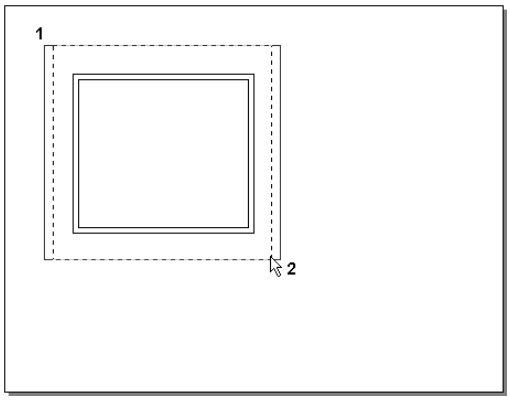
CREATE THE FURNITURE LAYER

1. Select the **Layers**  command from the **Main** toolbar.

2. Create a layer named **Furniture**. Furniture is now the active layer.
3. Select the **Layers**  command again to dismiss the **Layer** ribbon bar.

ZOOM IN ON THE OFFICE WALLS

1. Select the Zoom Area  command from the Main toolbar.



2. Draw a rectangular window around the office walls.

PLACE FURNITURE SYMBOLS IN THE OFFICE

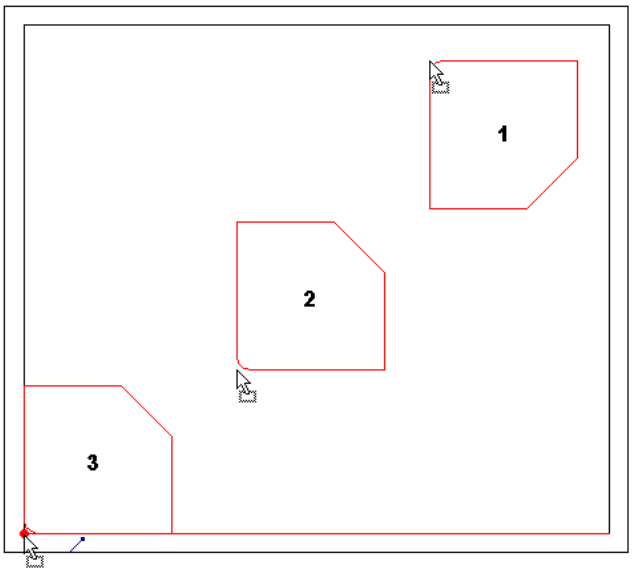
1. Place the ***Desk (Corner)*** symbol in the lower left corner of the office.

   a. Drag the ***Desk (Corner)*** symbol from the **Symbol Explorer** into the drawing.

   Note: Do not release the mouse button until the symbol is in its final location.

   b. Click the **left arrow** key on the keyboard to rotate the desk.

   c. Position the desk in the lower left corner of the office.



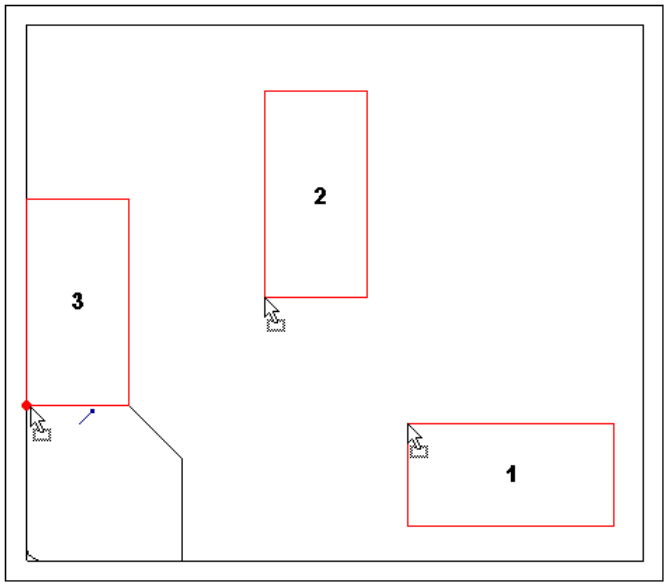
2. Place the ***Desk*** symbol above the corner desk.

   a. Drag the ***Desk*** symbol from the **Symbol Explorer** into the drawing.

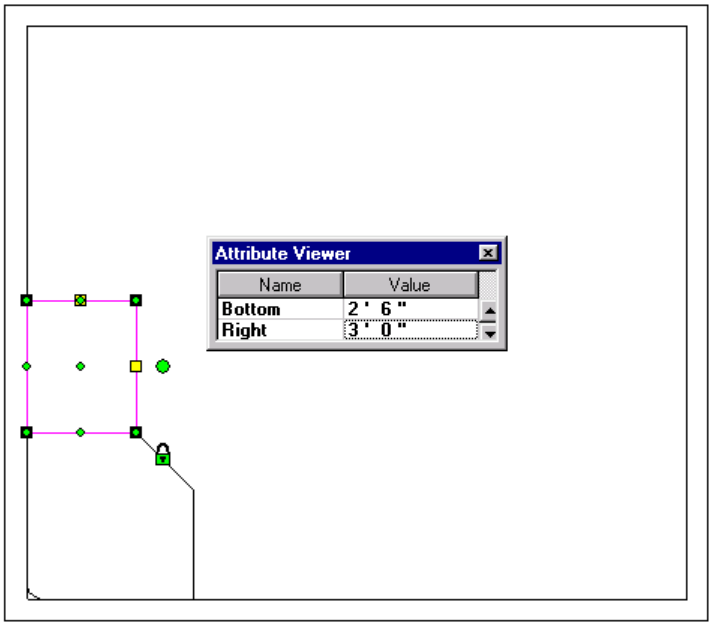
   Note: Do not release the mouse button until the symbol is in its final location.

   b. Click the **left arrow** key on the keyboard to rotate the desk.

   c. Position the desk above the corner desk.



3. With the desk still selected, type **3'** in the **Right** value field of the **Attribute Viewer**.



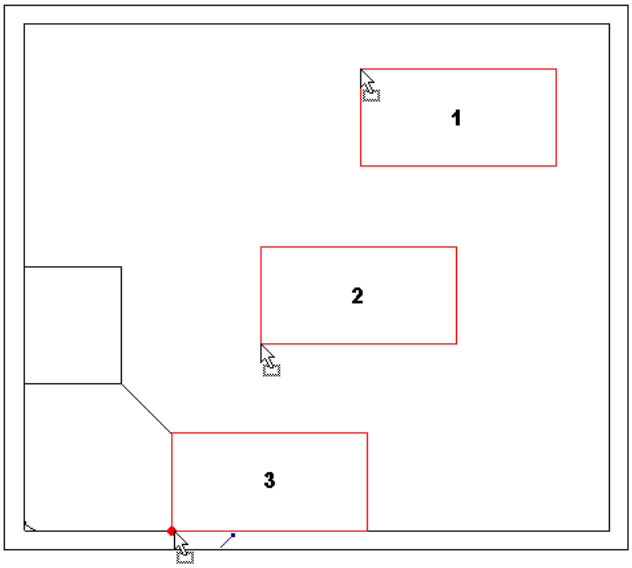
4. Place another ***Desk*** symbol on the right side of the corner desk.

   a. Drag the ***Desk*** symbol from the **Symbol Explorer** into the drawing.

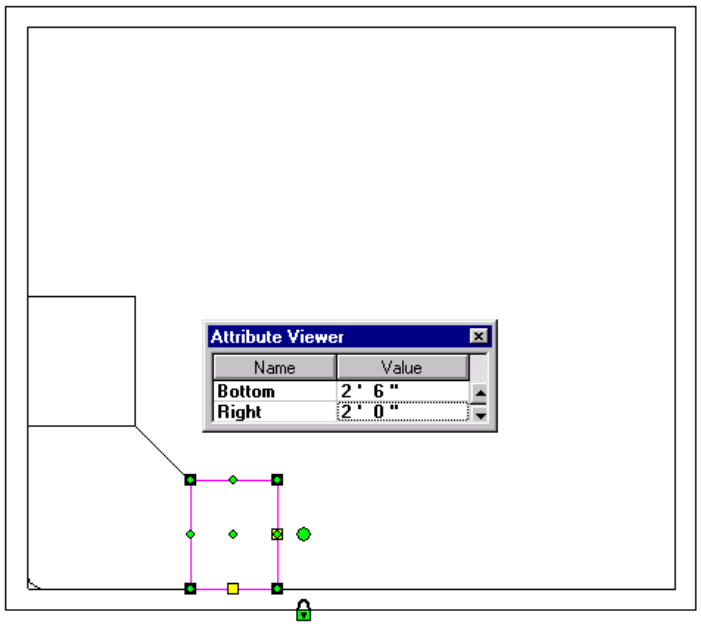
   Note: Do not release the mouse button until the symbol is in its final location.

   b. Click the **down arrow** key on the keyboard to change the drag point to the lower left corner of the desk.

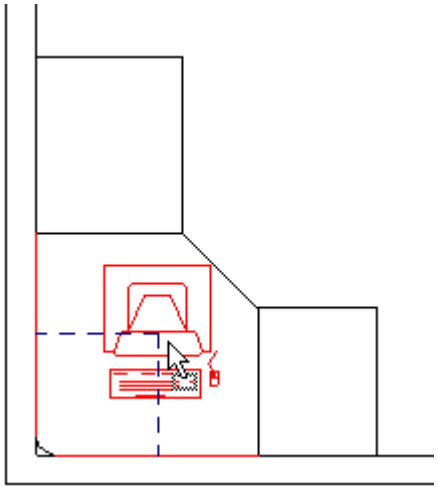
   c. Position the desk on the right side of the corner desk.



5. With the desk still selected, type **2'** in **Right** value field of the **Attribute Viewer**.



6. Open the **Misc** folder in the **Symbol Explorer**. Place the ***PC*** symbol centered on the corner desk using the alignment indicators displayed below. To locate the midpoint of the left and bottom sides of the desk, lock the **Walls** layer using the **Display Manager** command.

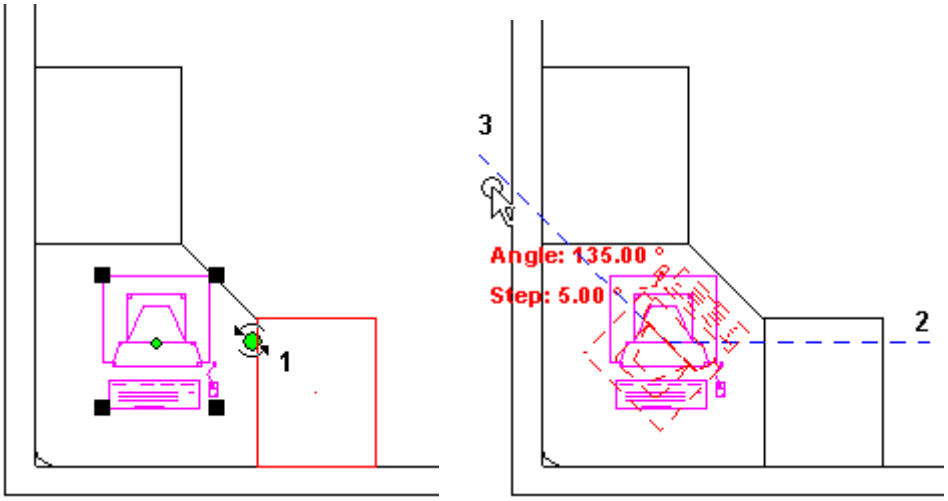


7. Rotate the ***PC*** symbol 135° using the symbol rotate handle.

   a. Place the cursor over the rotate handle (large green circle).

   b. Click and drag to rotate the ***PC*** symbol.

   c. Adjust the symbol's angle to **135°**.



8. Place the ***Cabinet (Lateral)*** symbol against the left wall of the office.

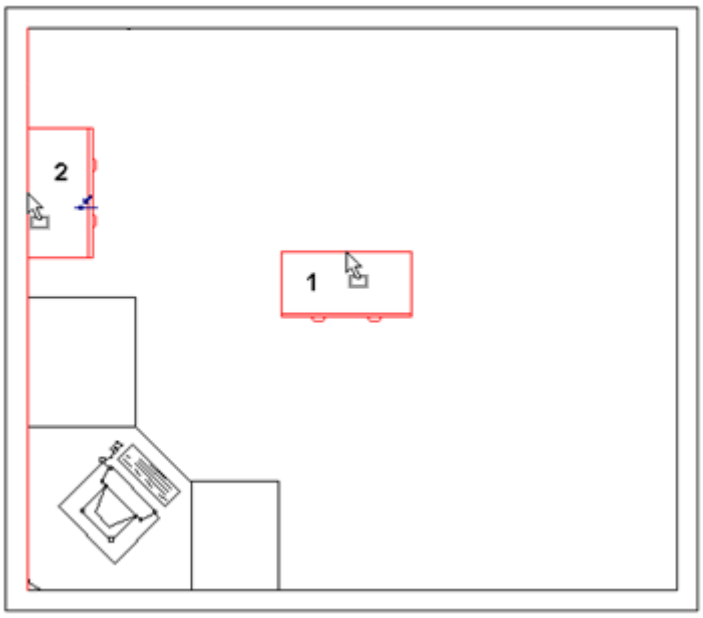
   a. Unlock the **Walls** layer using the **Display Manager** command.

   b. Drag the ***Cabinet (Lateral)*** symbol from the **Symbol Explorer** into the drawing.

   Note: Do not release the mouse button until the symbol is in its final location.

   c. Click the **left arrow** key on the keyboard to rotate the lateral cabinet.

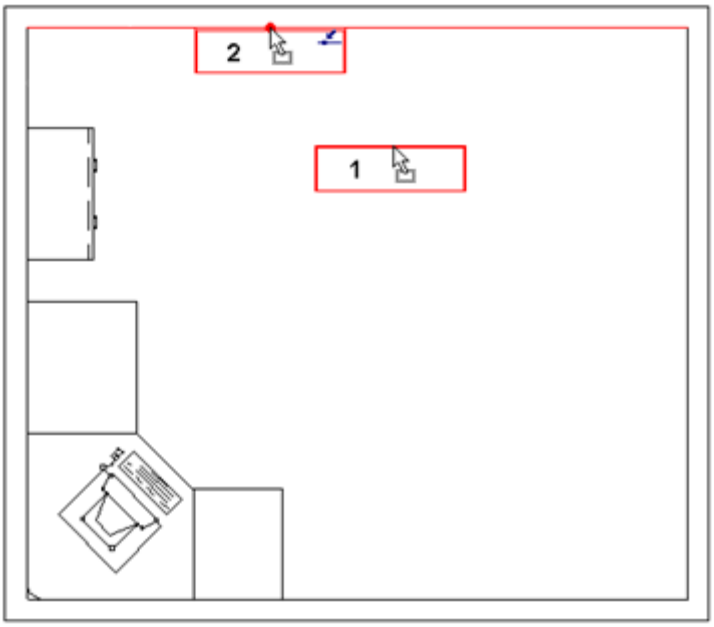
   d. Position the lateral cabinet on the left wall.



9. Place the ***Bookcase*** symbol against the top wall of the office.

   a. Drag the ***Bookcase*** symbol from the **Symbol Explorer** into the drawing.

b. Release the mouse button when the bookcase is on the top wall of the office.

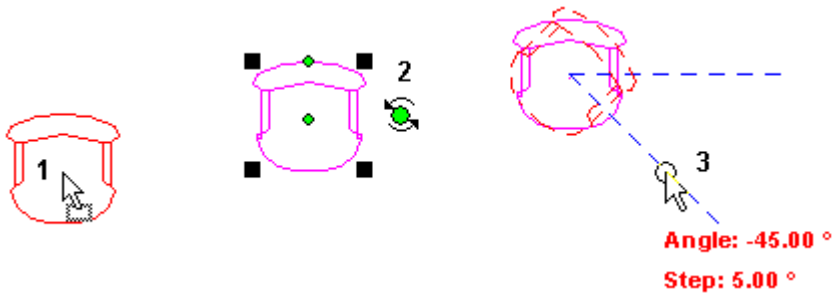


10. Place the ***Chair (Standard2)*** symbol in front of the corner desk.

a. Drag and drop the ***Chair (Standard2)*** symbol from the **Symbol Explorer** into the drawing.

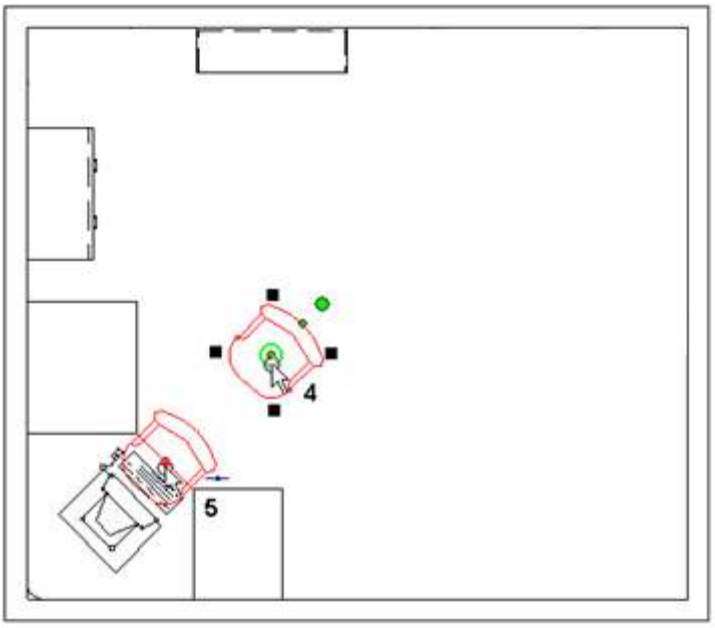
b. Place the cursor over the rotate handle (large green circle).

c. Click and drag the rotate handle to adjust the chair angle to **-45°.**

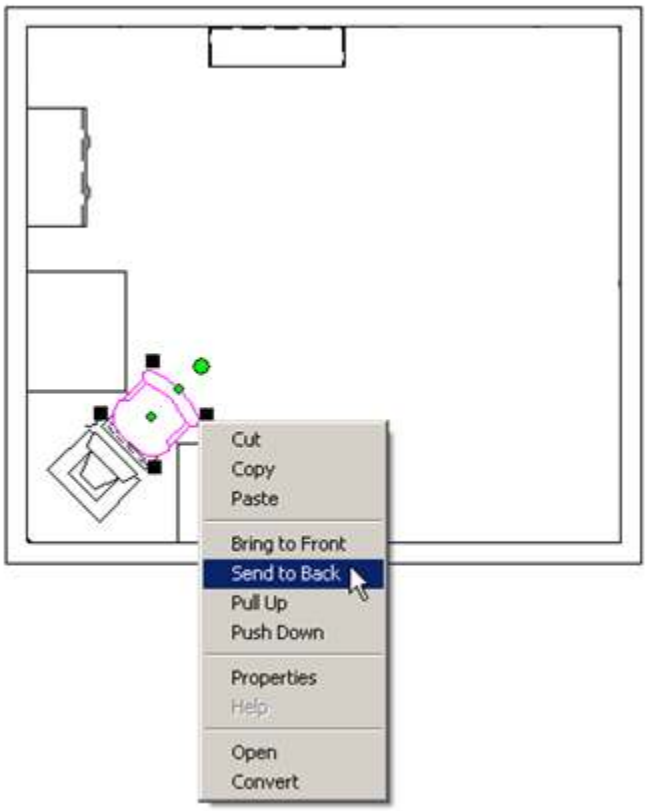


d. Place the cursor over the green drag handle in the center of the chair.

e. Drag the chair and position it at the midpoint of the front part of the desk.



f. With the **Select Tool** active, click the right mouse button on the chair and choose **Send to Back** from the shortcut menu.

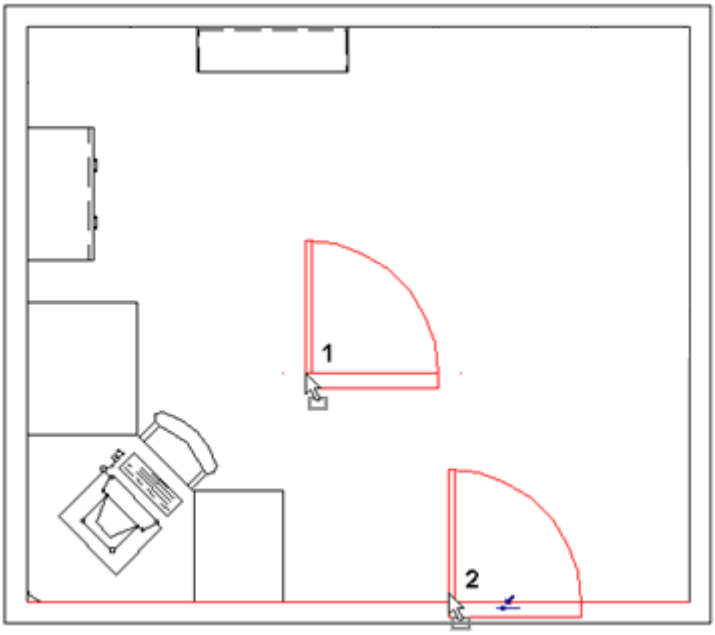


11. Add a door to your office.

    a. Drag the ***Door Left (parametric)*** symbol from the **Symbol Explorer** into the drawing.

    b. Drop the door on the inside wall at the bottom of the office.

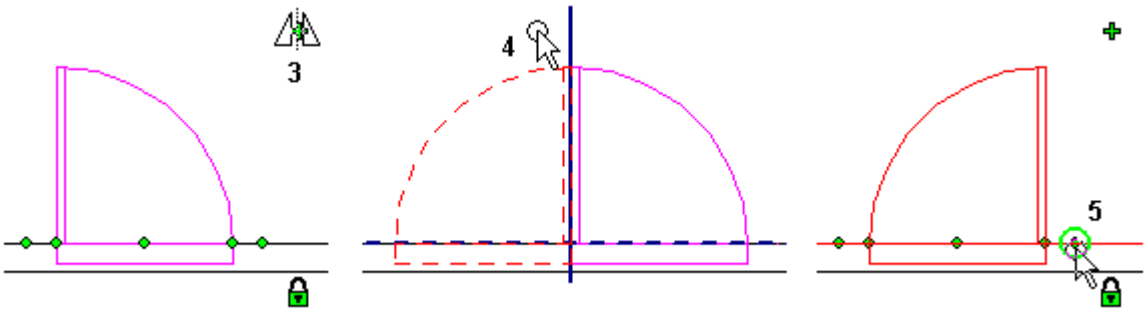
Note: Leave the door symbol selected through the following steps.



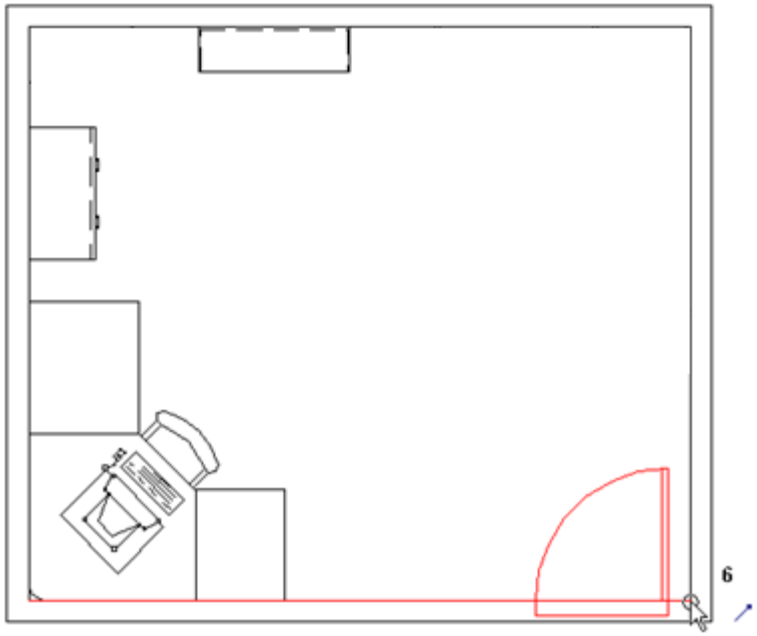
    c. Place the cursor over the **mirror** handle (green plus sign) to display triangles.

    d. Click and drag the cursor to the left. Release the cursor on the left side of the mirror line.

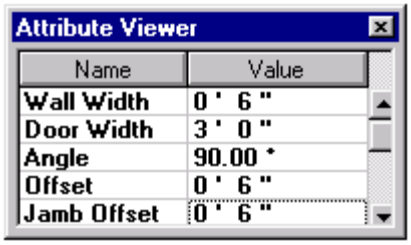
    e. Place the cursor over the right outside drag point (green circle).



f. Drag the cursor to the right and place the drag point on the inside corner of the office.



g. Set the following door parameters in the **Attribute Viewer**:

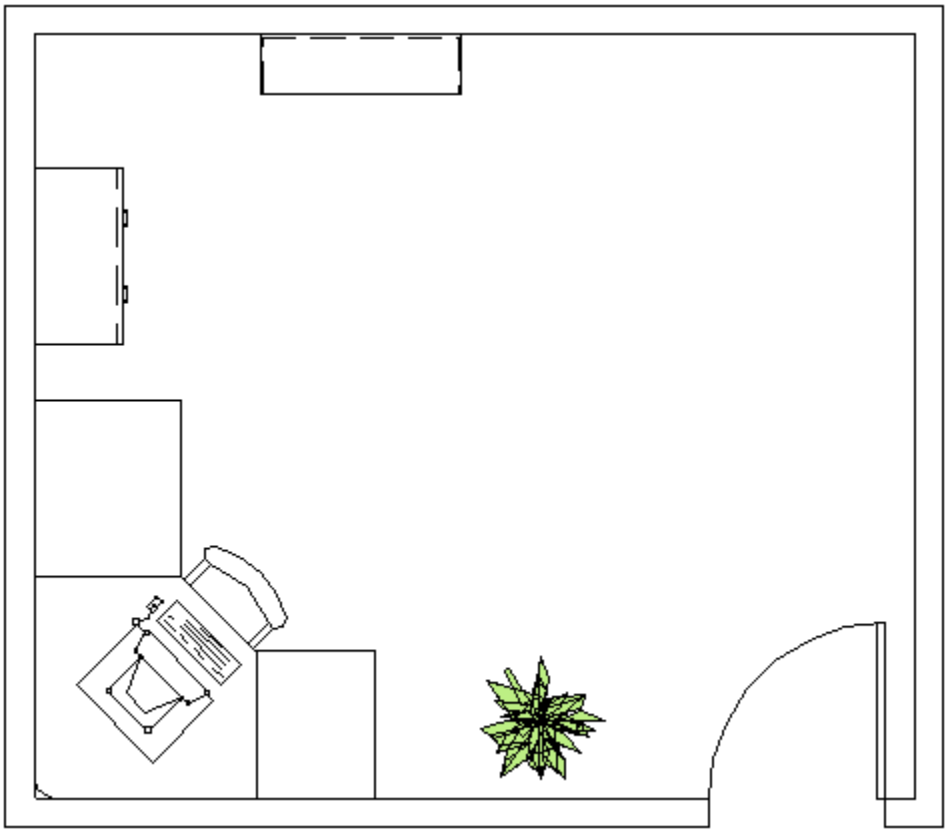


- **Wall Width** - thickness of the doubleline wall
- **Door Width** - width of door
- **Angle** - angle of door

Note: ***There is also a Door Right (parametric) symbol. If used here, it would have eliminated the mirror step of the door placement.***

12. Place the **Plant** symbol (located in the **Miscellaneous** folder) to the left of the door.

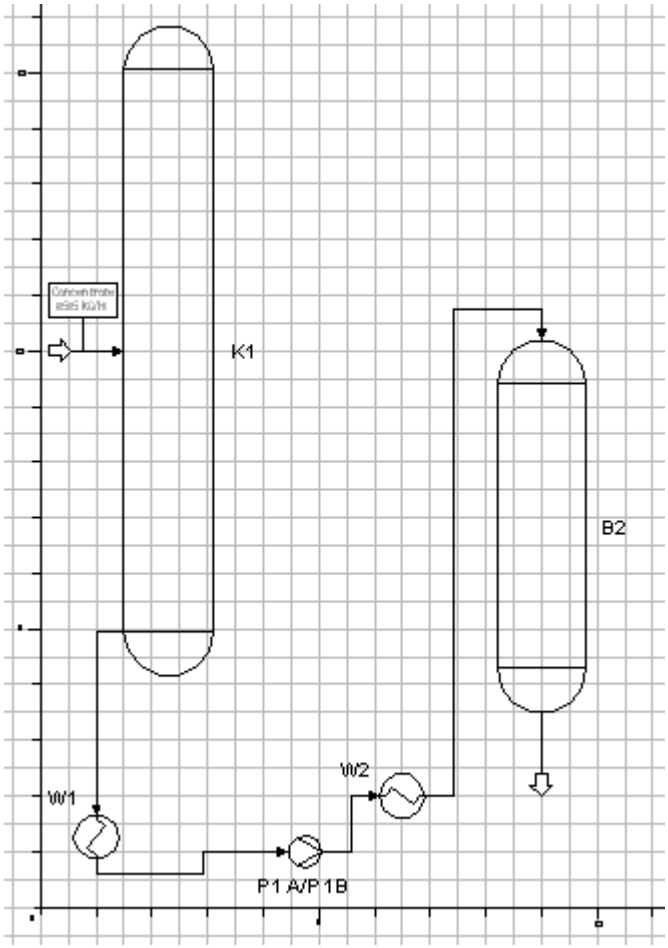
13. Select **Save**  from the **Main** toolbar to save the document changes.



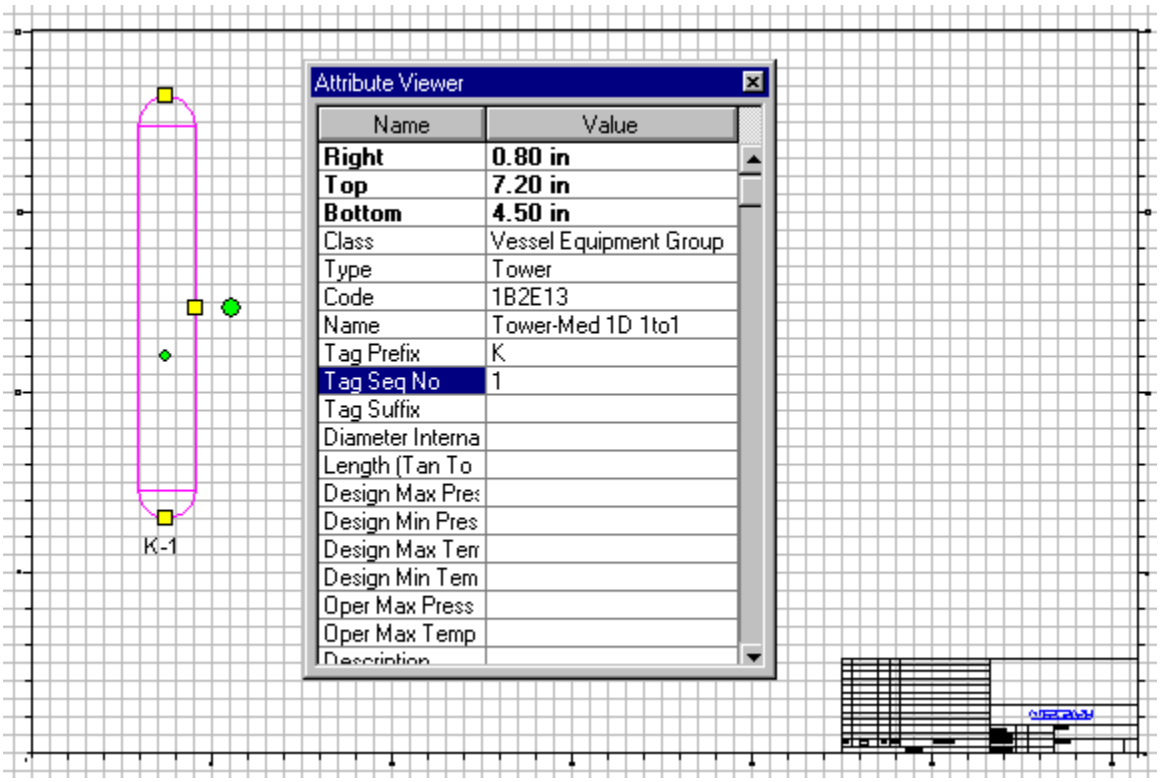
Time permitting: add an Equipment layer and additional office furnishings of your choice.

Lab 10 – Working with Connectors

In this lab you will create a new *Process Flow Diagram* (PFD) document, drag and drop symbols, change view settings, modify symbol attributes, place connectors, and annotate the drawing.



PARAMETRIC SYMBOLS



The first step in creating a *Process Flow Diagram* is to create a new document based on a process template.

1. From the **File** menu, select **New**. Expand the *Process* folder and select the *Process Flow (Intergraph).igr* template. Click the **OK** button to create the document.

   Note: The Symbol Explorer displays directories and subdirectories of delivered process symbols.

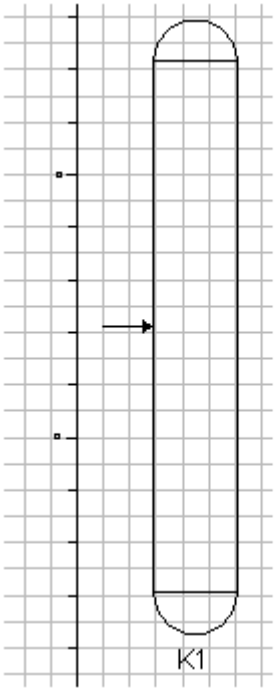
2. In the **Symbol Explorer**, expand the *Vessels* symbol folder and then click on the *Towers* folder.

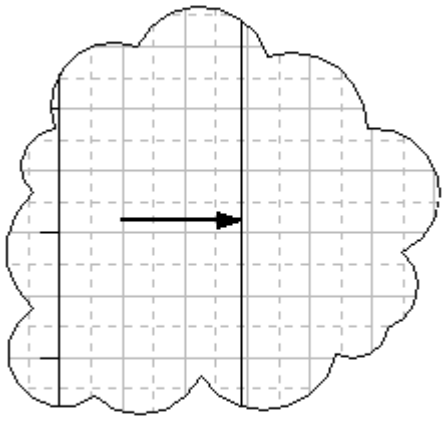
3. Click and drag the ***1to1Parametric Tower*** symbol into the drawing and place it on the sheet about three large grid spaces from the left inside border.

   Note: The Tower symbol is a parametric symbol, a symbol that contains geometry constrained together using relationships, with driving dimensions that are defined as adjustable parameters.

4. In the **Attribute Viewer**, change the **Top** value field of the *Tower* symbol to **7.20**. Click the <Enter> key to accept the change. Set the **Tag Prefix** value field to **K** and the **Tag Seq No** value field to **1**.

PLACE INPUT CONNECTOR





1. On the **Main** toolbar, select the **Zoom Area** command. Click near the upper left corner of the drawing sheet. Move the cursor to the lower right corner of the *Tower* symbol and release the mouse button. Click the right mouse button to terminate the command.

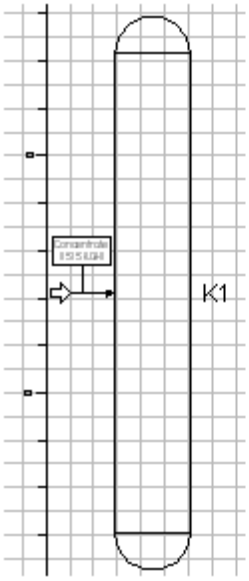
2. On the **Schematic** toolbar, select the **Connector** command.

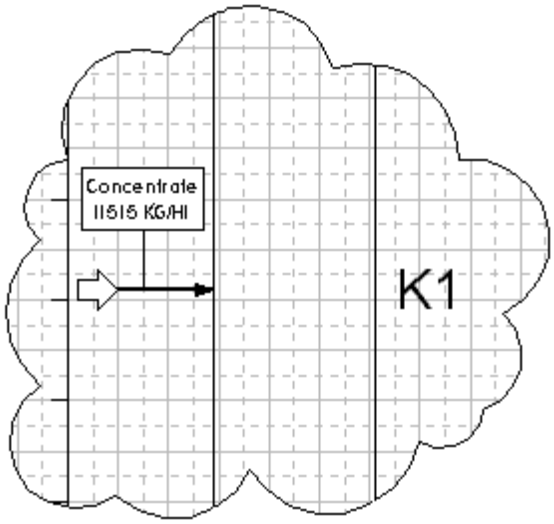
3. On the **Place Connector** ribbon bar, select *Primary Line* from the **Style** dropdown list. Click the **Line Start Terminator** button and select the largest solid arrow. Make sure that the **Line End Terminator** button does not have a terminator selected.

4. Move the cursor over the *Tower* symbol and connect the first point of the connector to the left side center connection point of the *Tower*.

5. Move the cursor horizontally to the left two large grid squares. Click to place the connector and then click the right mouse button to reset the command.

TEXT AND ANNOTATIONS





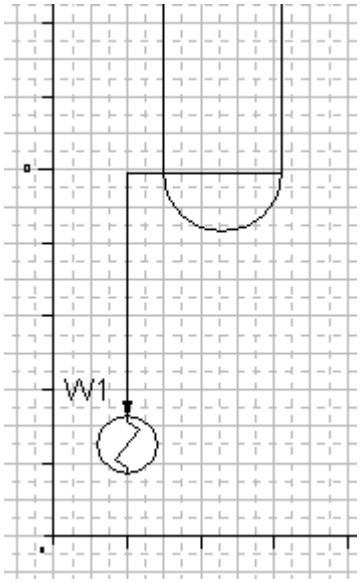
1. On the **Symbol Explorer**, click the **Explore Elsewhere** button.
2. Select the *...\Symbols\Process\Block* folder and click the **OK** button.
3. Place an ***Auto-Size Box*** symbol centered between the left border and the *Tower* symbol and about two large grid spaces above the horizontal connector.
4. On the **Schematic** toolbar, click the **Select Tool**.
5. Double-click the *Auto-Size Box* symbol and type the following:

   Concentrate <Enter> **(1515 KG/H)**. Click away from the symbol when done.
6. On the **Schematic** toolbar, click the **Connector** command.
7. On the ribbon bar, select *Normal* from the **Style** dropdown list and then select *None* for the line start and end terminators.
8. Move the mouse cursor over the *Auto-Size Box* symbol and connect the first point of the connector to the bottom center connect point. Connect the second point to the horizontal connector. This connector should be vertical.
9. On the **Symbol Explorer**, click the **Home** button.
10. Select the *…\PFD (Intergraph)\Annotation\Arrows* folder. Drag the ***Arrow Input Output*** symbol and place it on the left end of the horizontal connector.
11. On the **Schematic** toolbar, click the **Select Tool**.

12. Click the label **K1**. Unlock the label position by clicking the *lock* icon.

13. Place the cursor over the label, hold down the left mouse button and move the label to the right side of the tower and center it. When the mouse button is released, the label automatically returns to the locked state.

ADDING A HEAT EXCHANGER



1. On the **Main** toolbar, click the **Pan**  command.

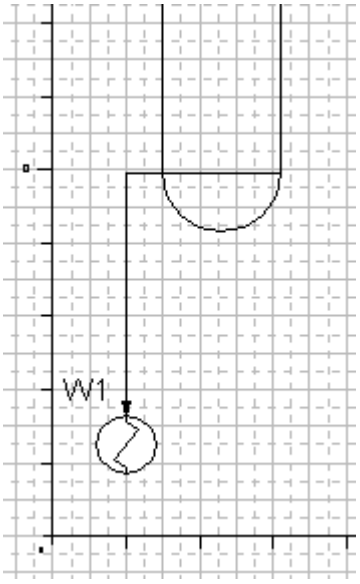
2. Click and hold the mouse cursor in the center of the drawing sheet. While holding down the mouse button, move the cursor up until the bottom of the *Tower* and the bottom border is in view. Click the right mouse button to end this command.

3. On the **Symbol Explorer**, click the *Heat Exchangers* folder.

4. Drag the ***Generic 1-Shell&Tube*** symbol and place it two large grid squares up and one large grid space to the right of the inside border.

5. On the **Schematic** toolbar, click the **Select Tool**  and then select the *Heat Exchanger*.

6. In the **Attribute Viewer**, change the **Tag Prefix** value field to **W**. Change the **Tag Seq No** value field to **1**. Remember to press the <Enter> key to accept the change.



7. With the symbol still selected, move the cursor over the rotate handle . Click and move the cursor up and to the left until the angle reads **90.00°.**

8. On the **Schematic** toolbar, click the **Connector** command.

9. On the ribbon bar, select *Primary Line* from the **Style** dropdown list. Then set the **Line End Terminator** to the largest solid arrow.

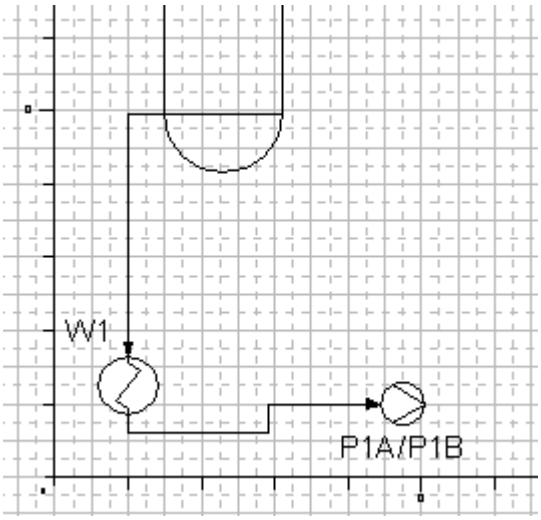
10. Move the cursor over the *Tower* and connect the first point to the bottom left side connect point. Connect the second point to the top of the *Heat Exchanger*.

11. On the **Schematic** toolbar, click the **Select Tool** and then select the *Heat Exchanger* label **W1**.

12. Unlock the **W1** label and move it to the top left side of the *Heat Exchanger*.

13. Rotate the **W1** label so that the text is horizontal to the drawing sheet. (Angle = **0°**)

PUMP PLACEMENT



1. On the **Symbol Explorer**, select the *Pumps* folder and scroll down to view the **Pump** symbol.

2. Place the ***Pump*** symbol about six large grid blocks from the right side of the *Heat Exchanger* and two large grid blocks up from the bottom borderline.

3. In the **Attribute Viewer**, change the **Tag Prefix** value field to **P**. Change the **Tag Seq No** value field to **1A**. Then set the **Tag Suffix** value field to **/PIB**.

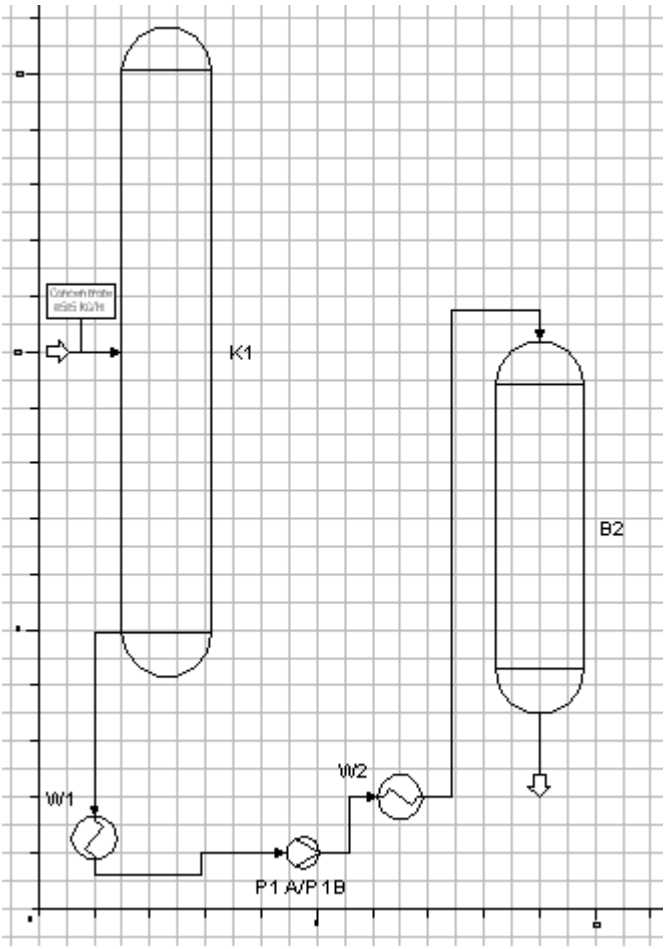
4. On the **Schematic** toolbar, click the **Connector**  command.

5. On the ribbon bar, select *Primary Line* from the **Style** dropdown list. Then set the **Line End Terminator**  to the largest solid arrow.

6. Connect the bottom of the symbol labeled **W1** to the left side of the symbol labeled **P-1A/P1B**.

7. On the **Main** toolbar, click the **Fit**  command.

PLACING ADDITIONAL COMPONENTS



1. On the **Symbol Explorer**, expand the *Vessels* folder and select the *Towers* folder.

2. Drag the ***1to1Parametric Tower*** symbol and place it approximately 6 grid spaces to the right of the pump symbol and 6 grid spaces up from the bottom border.

3. In the **Attribute Viewer**, change the **Top** value field to **2.20**. Change the **Tag Prefix** value field to **B**. Then change the **Tag Seq No** value field to **2**.

4. On the **Main** toolbar, click the **Zoom Area**  command and zoom in enough to see the pump **P1A/P1B** and the tower **B2**.

5. On the **Symbol Explorer**, select the *Heat Exchangers* folder and scroll down to the ***Generic 1-Shell & Tube*** symbol.

6. Place the *Heat Exchanger* about two large grid spaces up and 3 large grid spaces to the right of the pump symbol **P1A/P1B**.

7. In the **Attribute Viewer**, change the **Tag Prefix** value field to **W** and the **Tag Seq No** value field to **2**.

8. Move the **W2** label to the top left side of the *Heat Exchanger* symbol.

9. On the **Schematic** toolbar, click the **Connector**  command.

10. On the **Ribbon** bar, select *Primary Line* from the **Style** dropdown list. Then set the **Line End Terminator**  to the largest solid arrow.

11. Connect the right side of the symbol labeled **P1A/P1B** to the left side of the symbol labeled **W2**.

12. Connect the right side of the symbol labeled **W2** to the top of the symbol labeled **B2**.

13. On the **Schematic** toolbar, click the **Select Tool**  .

14. Select the label **B2** and move it to the right side of the tower symbol and center it.

15. On the **Schematic** toolbar, click the **Connector**  command.

16. On the **Ribbon** bar, select *Primary Line* from the **Style** dropdown list. Then remove the start and end line terminators.

17. Move the cursor over the symbol labeled **B2** and connect the first point to the bottom middle of the symbol labeled **B2**. Place a vertical connector line three large grid spaces below the symbol labeled **B2**.

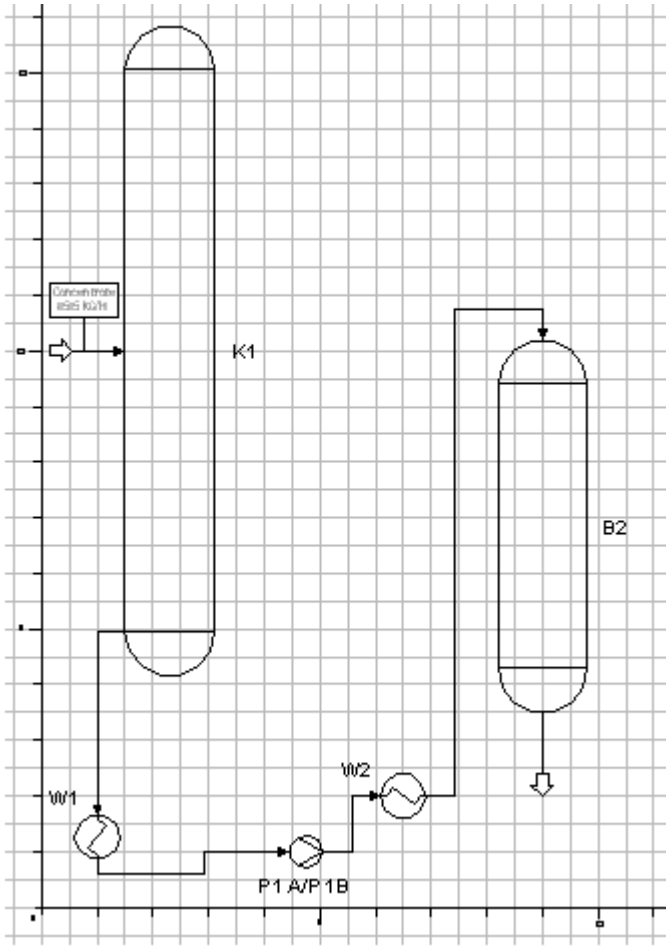
18. In the **Symbol Explorer**, select the …*PFD (Intergraph)\Annotation\Arrows* folder.

19. Drag the ***Arrow Input Output*** symbol and place it on the bottom end of the vertical connector.

20. On the **Main** toolbar, click the **Fit**  command to view the entire drawing.

21. On the **Main** toolbar, click the **Zoom Area**  command and zoom in enough to view the process flow diagram created in this lab.

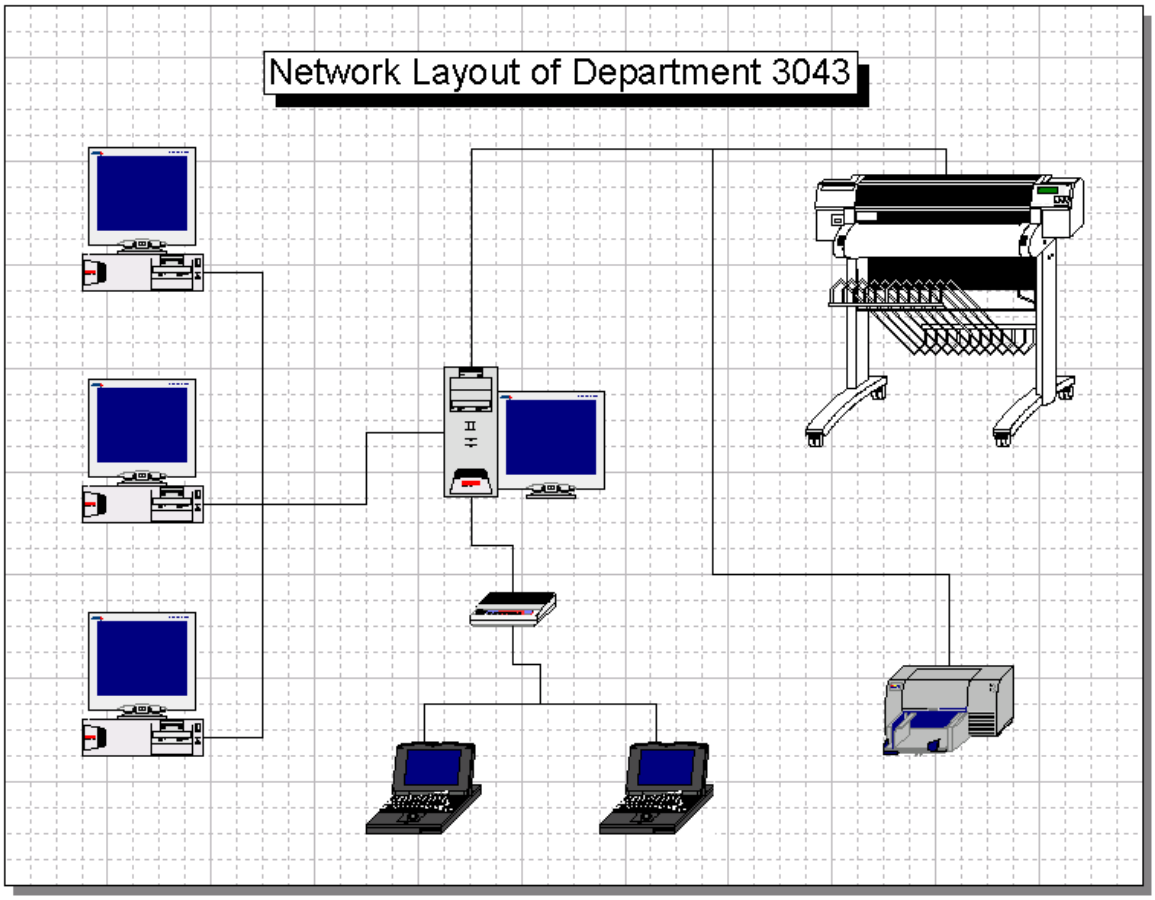
22. Save the drawing in the C:\Drawing Files folder as Process Flow Diagram.igr.



Time permitting: Place other process flow symbols in your diagram.

Lab 11 – Adding Attributes

This lab can be completed after the *Attributes* lesson. In this lab you will add attributes to components of a symbol, create an equipment diagram, assign attributes to the symbols, and then generate an inventory report on the symbols.

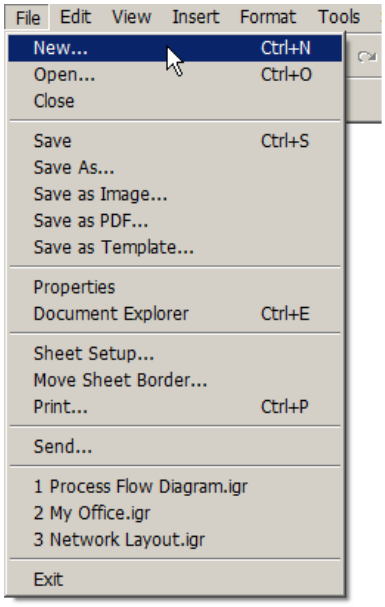


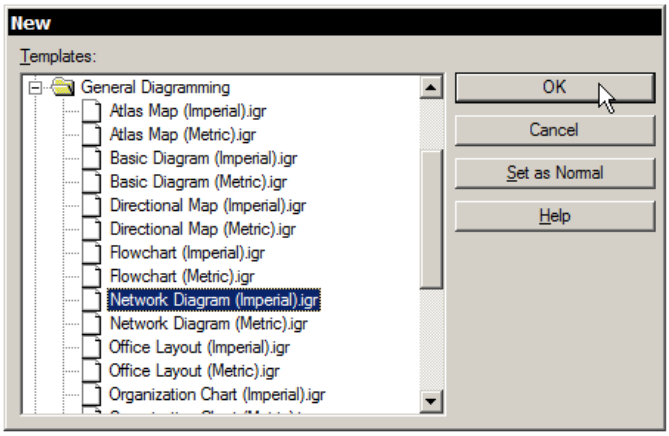
NETWORK EQUIPMENT INVENTORY							
Manufacturer	**Model**	**Serial Number**	**Type**	**Description**	**Location**	**Building**	**Floor**
Acer America Corporation	Acerview 78ie		Monitor	Acerview 78ie 17" Color Monitor			
Acer America Corporation	Acerview 78ie		Monitor	Acerview 78ie 17" Color Monitor			
Acer America Corporation	Acerview 78ie		Monitor	Acerview 78ie 17" Color Monitor			
Acer America Corporation	Acerview 78ie	IW2BHA	Monitor	Acerview 78ie 17" Color Monitor	407	20	1
Altima - Generic Equipment	56K Modem	mod1602	Modem	56K Modem	407	20	1
Compaq	Laptop	1261988	Laptop	Laptop	Home		
Compaq	Laptop	3041986	Laptop	Laptop	Home		
Compaq Computer Corporati	DeskPro EN Desktop		Desktop	DeskPro EN Desktop			
Compaq Computer Corporati	DeskPro EN Des	4121944	Desktop	DeskPro EN Desktop	407	20	1
Compaq Computer Corporati	DeskPro EN Des	5301945	Desktop	DeskPro EN Desktop	407	20	1
Compaq Computer Corporati	DeskPro EN Mini	IW2BH2	MiniTower	DeskPro EN MiniTower	407	20	1
HP	DesignJet	12131958	Printer	DesignJet Printer	407	20	1
HP	Deskjet 8xxC	5251964	Printer	Deskjet 8xxC Printer	407	20	1

Lab 11 - Section A

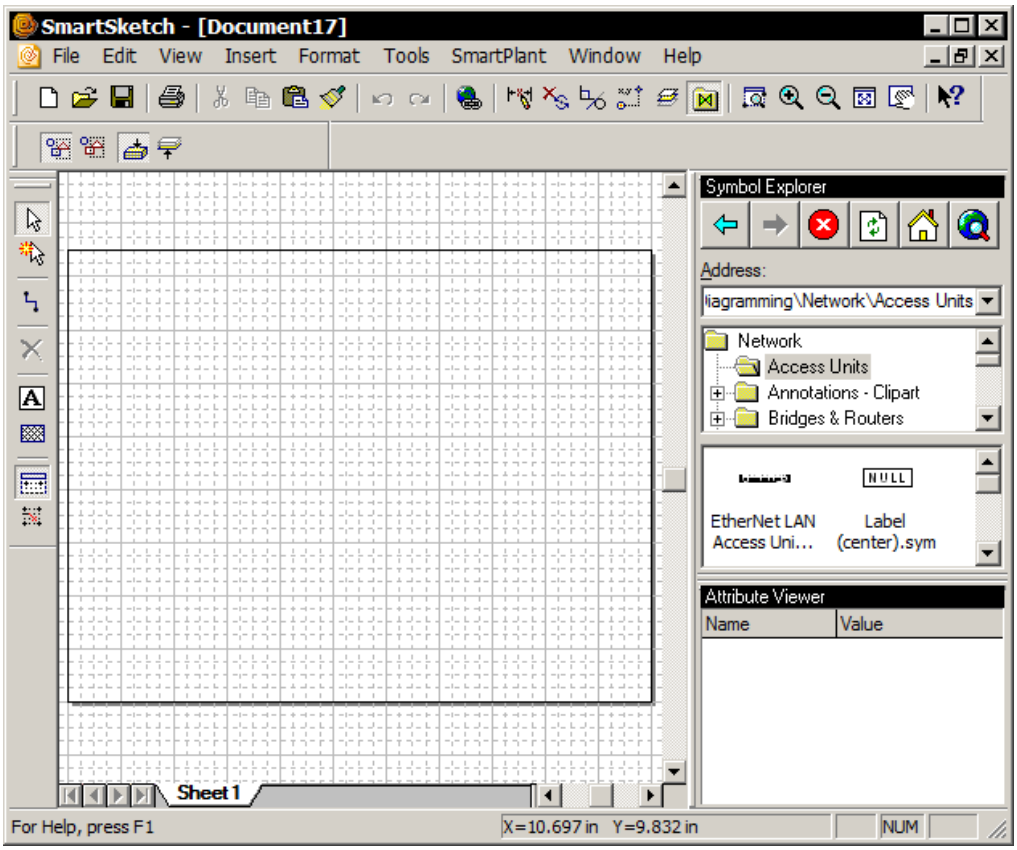
CREATE A NEW FILE USING A NETWORK DIAGRAM TEMPLATE

1. From the **File** menu, select **New**.



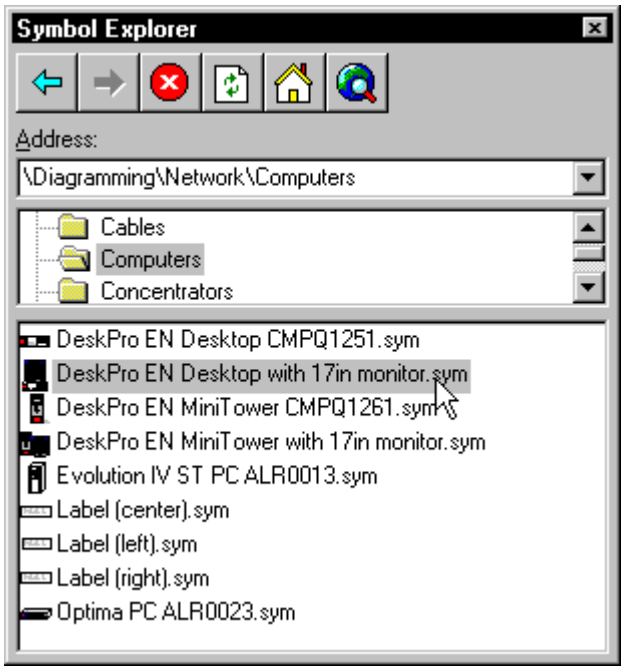


2. Select *Network Diagram (Imperial).igr* from the *General Diagramming* template folder of the **New** dialog box and then click the **OK** button. The new file opens.



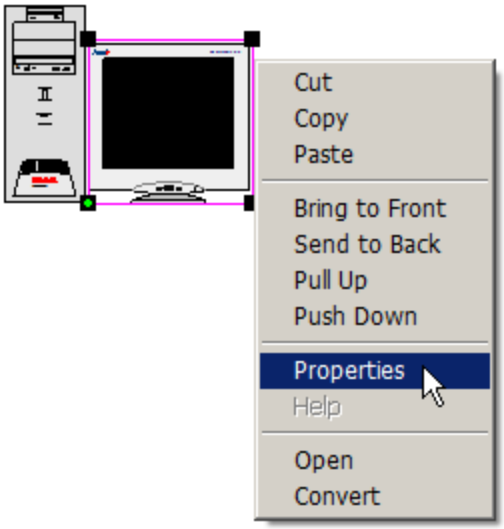
ADD ATTRIBUTES TO COMPONENTS OF A SYMBOL

1. Open the symbol file ***DeskPro EN Desktop with 17in monitor.sym***, located in the **Computers** folder, by double-clicking the symbol.



2. Select **Save As** from the **File** menu, and save the symbol, keeping the same name, to the **C:\Drawing Files** folder. You will work with a new copy of the symbol.

3. With the **Select Tool** active, click the right mouse button on the computer base and select **Properties** from the short-cut menu.



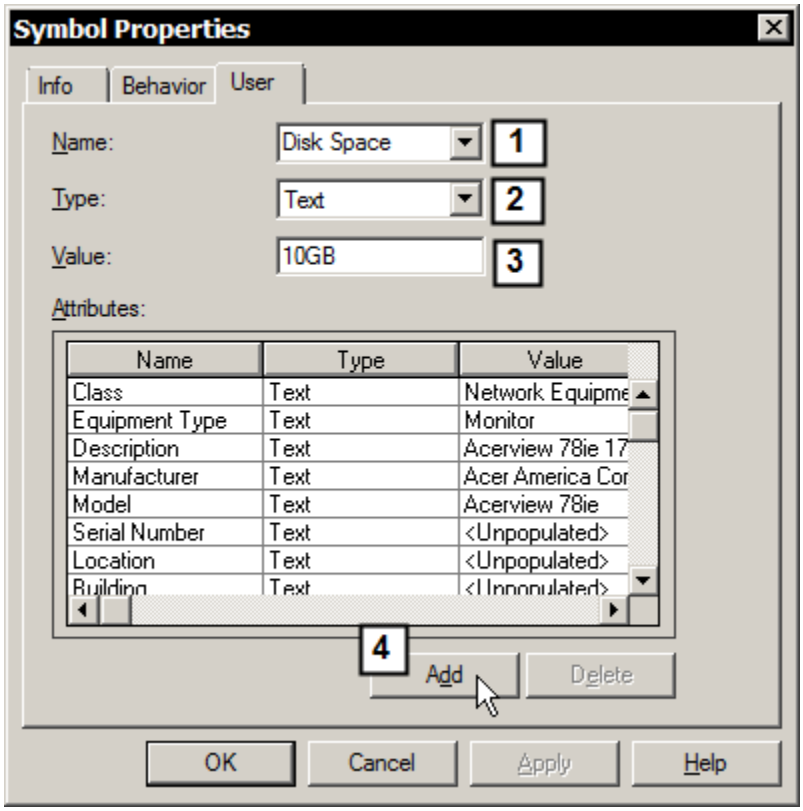
4. On the **User** tab of the **Symbol Properties** dialog box, complete the following:

   a. Type *Disk Space* in the **Name** field (**1**)

   b. Select *Text* as the **Type** (**2**)

   c. Type *10 GB* in the **Value** field (**3**)

   d. Click the **Add** button. (**4**)



5. Repeat the above process to add another attribute named *Memory*, Type =*Text*, and Value = *64 MB*.

6. Click the **Add** button (**4**) and then click the **OK** button (**5**).

7. Save and close the symbol file.

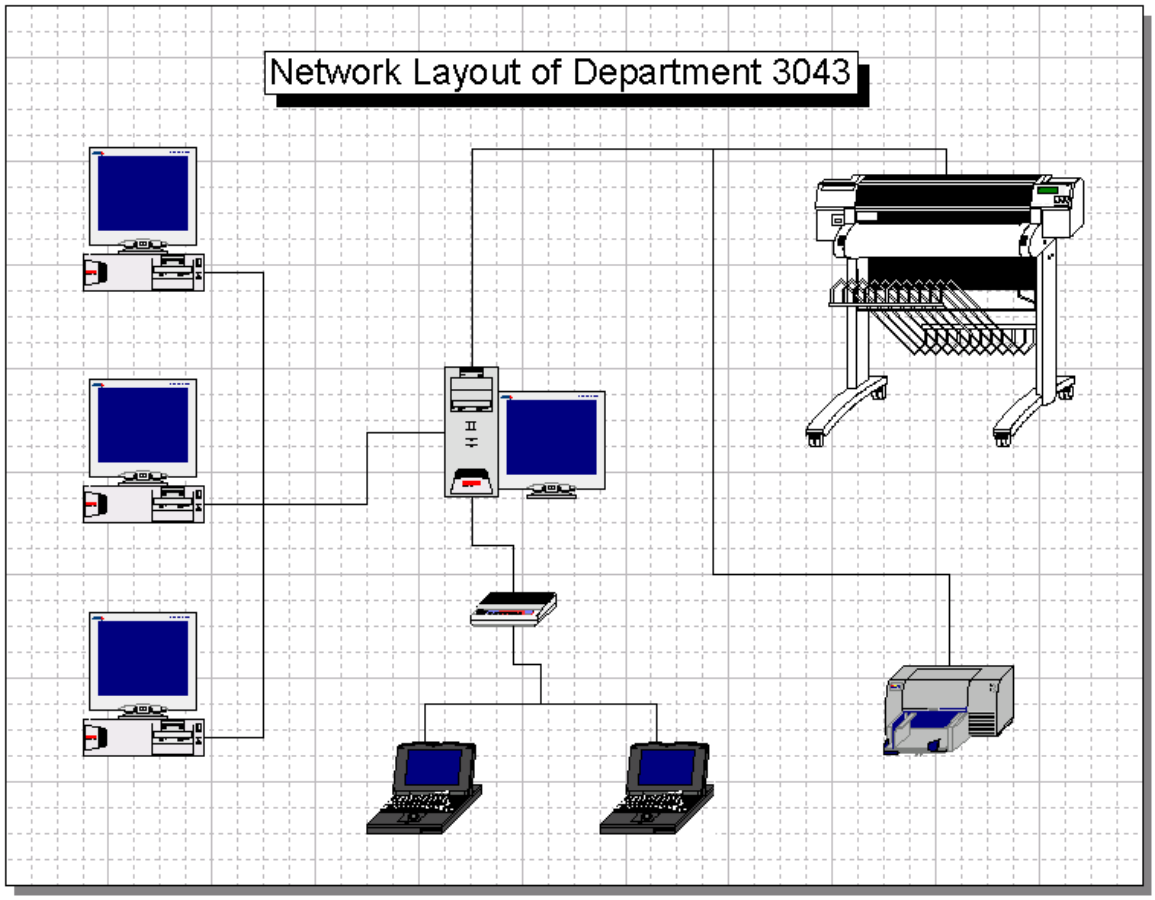
Notes:

- You can delete existing attributes in the **Symbol Properties** dialog box by selecting the desired attribute and clicking the **Delete** button.
- The content of the **Value** field is the default value when the symbol is placed.
- Attributes are assigned to the symbol file by selecting **Properties** from the **File** menu while the symbol file is open.

Lab 11 - Section B

LAYOUT EQUIPMENT DIAGRAM

In the new Network Diagram drawing, create a diagram similar to the one shown below. Text is optional.



The following symbols were used:

Three new computer symbols: (computer with new attributes)

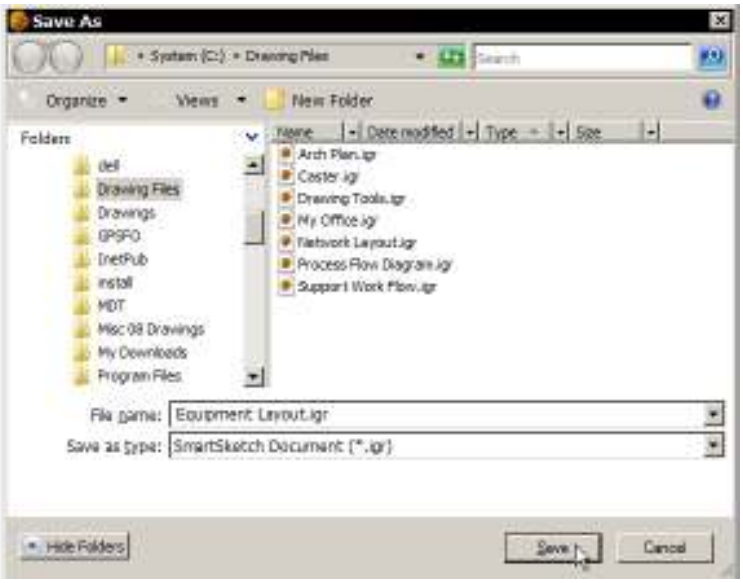
- C:\Drawing Files\DeskPro EN Desktop with 17in monitor.sym

Existing symbols associated with the Network Diagram template. Click the **Home** button in the **Symbol Explorer** to display the *Network Diagram* folders.

- ..\Computers\DeskPro EN MiniTower with 17in monitor.sym
- ..\Modems\56K Modem GENR1243.sym
- ..\Workstations & PCs\Laptop GENR0963.sym
- ..\Printers\Designjet Printer genr3013.sym
- ..\Printers\Deskjet 8xxC Printer genr3063.sym

SAVE THE DRAWING

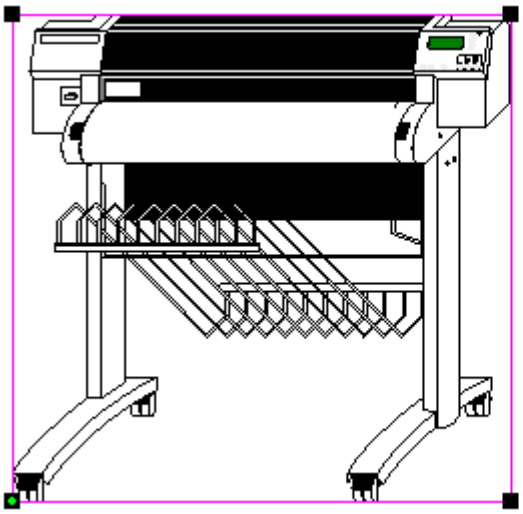
1. From the **File** menu, select **Save**.



2. In the **Save In** list box, change to the *C:\Drawing Files* folder.
3. Type ***Equipment Layout*** in the **File name** field.
4. Click the **Save** button. The drawing is saved as **Equipment Layout.igr**.

CHANGE THE ATTRIBUTE VALUE OF EQUIPMENT

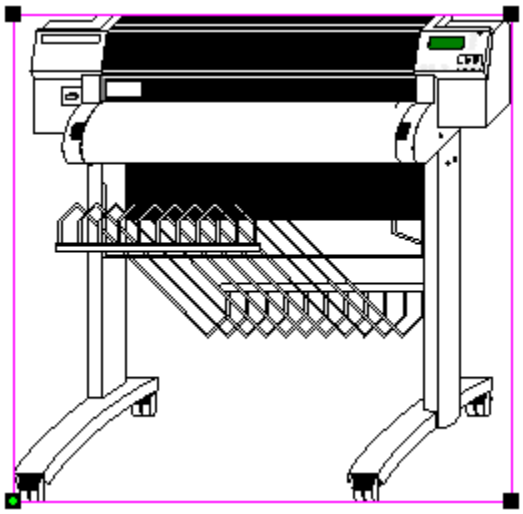
1. With the **Select Tool**  active, select the large plotter. The plotter's attributes display in the **Attribute Viewer**.



Attribute Viewer

Name	Value
Class	Network Equipment
Equipment Type	Printer
Description	DesignJet Printer
Manufacturer	Altima - Generic Equi
Model	DesignJet
Serial Number	
Location	
Building	
Floor	
Contact Name	
Contact Phone	
Contact Fax	
More Symbols	www.altimatech.com
Item Value	0

2. Type a value of your choice for each of the attributes in the **Attribute Viewer**.



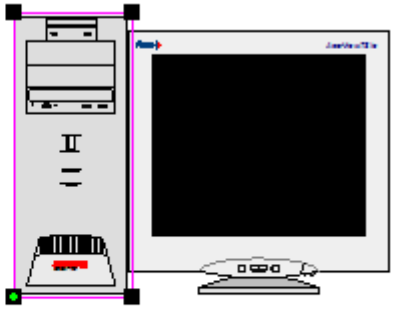
Attribute Viewer

Name	Value
Class	Network Equipment
Equipment Type	Printer
Description	DesignJet Printer
Manufacturer	Altima - Generic Equipm
Model	DesignJet
Serial Number	5678901234
Location	116
Building	30
Floor	1
Contact Name	Suzie Hoffman
Contact Phone	x 1972
Contact Fax	x 1323
More Symbols	www.altimatech.com/sr
Item Value	0

3. Select one of the computer bases and change attribute values of your choice.

Attribute Viewer

Name	Value
Class	Network Equipment
Equipment Type	MiniTower
Description	DeskPro EN MiniTower
Manufacturer	Compaq Computer Corp
Model	DeskPro EN MiniTower
Serial Number	6789012345
Location	114
Building	30
Floor	1
Contact Name	Suzie Hoffman
Contact Phone	x 1972
Contact Fax	x 1323
More Symbols	www.altimatech.com/sr
Item Value	0



4. Continue updating the attribute value of a few more symbols.

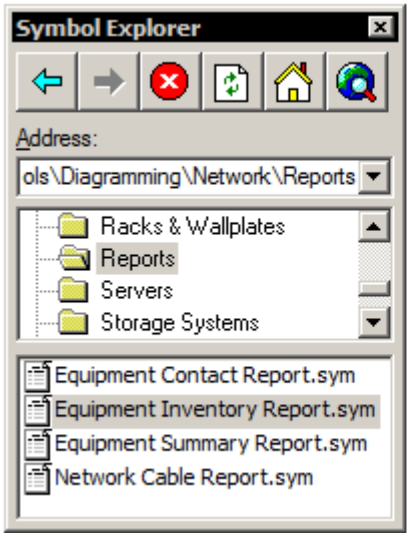
5. Select **Save**  from the **Main** toolbar to save the document changes

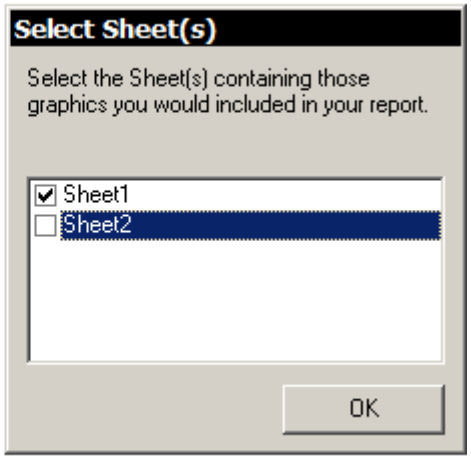
Lab 11 - Section C

RUN A DELIVERED REPORT

1. Create a new sheet in the *Equipment Layout* document by selecting **New Sheet** from the **Insert** menu.

2. Drag the report symbol ***Equipment Inventory Report.sym*** from the *..\Network\Reports* folder in the **Symbol Explorer** and drop it on **Sheet2**.





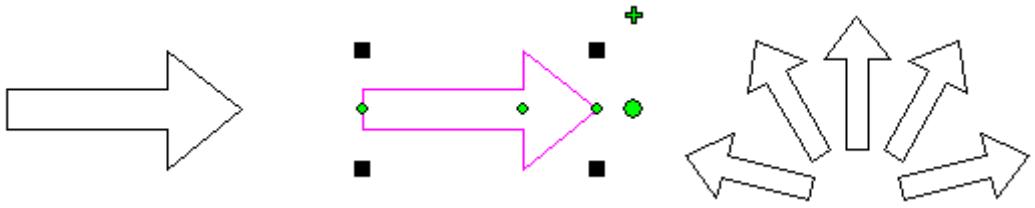
When prompted, deselect *Sheet2* in the **Select Sheet(s)** dialog box.

The Equipment Report is generated. When you want to update the report, delete the existing report in the document and then drag the report symbol back into the document.

NETWORK EQUIPMENT INVENTORY							
Manufacturer	**Model**	**Serial Number**	**Type**	**Description**	**Location**	**Building**	**Floor**
Acer America Corporation	Acerview 78ie		Monitor	Acerview 78ie 17" Color Monitor			
Acer America Corporation	Acerview 78ie		Monitor	Acerview 78ie 17" Color Monitor			
Acer America Corporation	Acerview 78ie		Monitor	Acerview 78ie 17" Color Monitor			
Acer America Corporation	Acerview 78ie	IW2BHA	Monitor	Acerview 78ie 17" Color Monitor	407	20	1
Altima - Generic Equipment	56K Modem	mod1602	Modem	56K Modem	407	20	1
Compaq	Laptop	1261988	Laptop	Laptop	Home		
Compaq	Laptop	3041986	Laptop	Laptop	Home		
Compaq Computer Corporati	DeskPro EN Desktop		Desktop	DeskPro EN Desktop			
Compaq Computer Corporati	DeskPro EN Des	4121944	Desktop	DeskPro EN Desktop	407	20	1
Compaq Computer Corporati	DeskPro EN Des	5301945	Desktop	DeskPro EN Desktop	407	20	1
Compaq Computer Corporati	DeskPro EN Mini	IW2BH2	MiniTower	DeskPro EN MiniTower	407	20	1
HP	DesignJet	12131958	Printer	DesignJet Printer	407	20	1
HP	Deskjet 8xxC	5251964	Printer	Deskjet 8xxC Printer	407	20	1

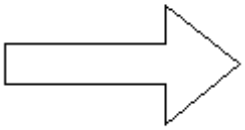
Lab 12A - Symbol Authoring

This lab can be completed after the *Basic Symbol Creation* lesson. In this lab you will draw and create an arrow symbol, add a favorite bar to the **Symbol Explorer,** create drag points, and change the symbol's default behavior using tools from the **Symbol Authoring Tools** toolbar.



Lab 12A - Section A

CREATE A NEW ARROW SYMBOL

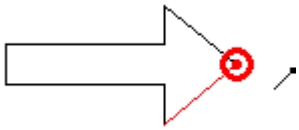


1. Using the **Line/Arc Continuous**  command, draw an arrow similar to the one above.

2. With the **Select Tool**  active, select the newly created arrow.

3. Select the **Create Symbol**  command from the **Draw** toolbar.

4. Click to define the origin point of the arrow symbol.

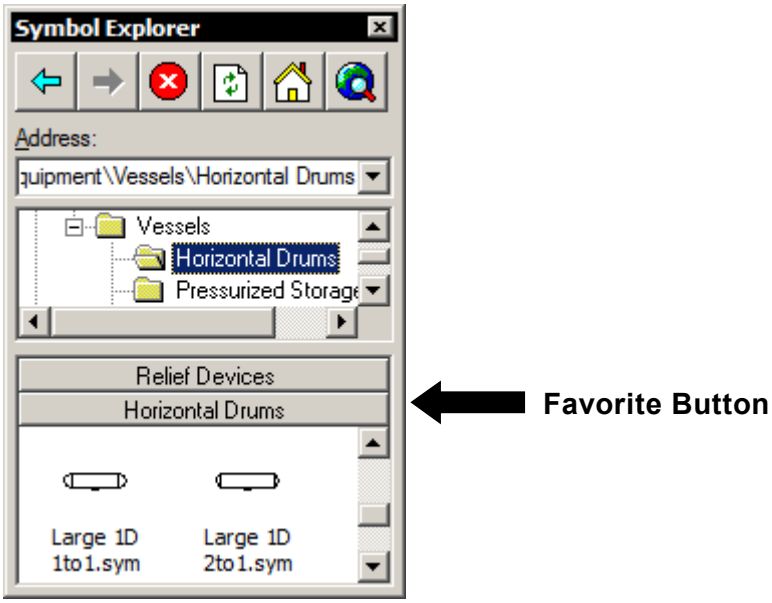


   The **Save As Symbol** dialog box appears.

5. Save the symbol as ***arrow.sym*** in the *C:\Drawing Files* folder.

Lab 12A - Section B

ADD A SHORTCUT BAR (FAVORITE BUTTON) TO THE SYMBOL EXPLORER



1. Click the **Explore Elsewhere** button in the **Symbol Explorer** and browse to the *C:\Drawing Files* folder to make it active.

2. In the **Symbol Explorer** window, right mouse click in the **Content View** and then click the **Add To Favorites** command from the **Shortcut** menu.

3. A *Drawing Files* bar appears at the top of the pane. You can click this bar to display the contents of the *C:\Drawing Files* folder when you have changed to a different folder.

4. Drag the arrow symbol into your drawing and try the following while dragging

- Click the **left** and **right** arrow keys on the keyboard.

  Arrow rotates in 90° steps.

- Click the **up** and **down** arrow keys on the keyboard.

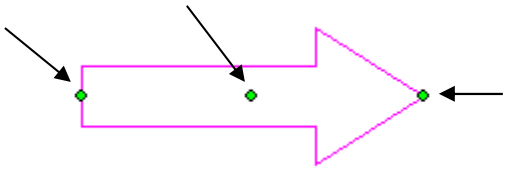
  There is no change; a new symbol only has one drag point; the origin.

- Drop the arrow on an object placed at an angle, such as a 45° line.

  The arrow does not align to the object.

Lab 12A - Section C

CREATE THREE DRAG POINTS ON THE ARROW SYMBOL

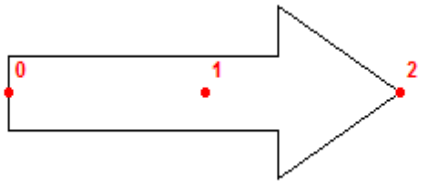


The **SmartPoint Properties** button on the **Symbol Authoring Tools** toolbar allows you to place additional drag points on a symbol. The **Symbol Authoring Tools** are not available until they have been added with the **Add-In Manager**. The **Add-In Manager** can be displayed by selecting **Add-Ins** from the **Tools** menu.

1. Open the symbol ***arrow.sym*** by double-clicking the symbol in the **Symbol Explorer**.

2. On the **Symbol Authoring Tools** toolbar, click the **SmartPoint Properties**  command. Existing drag points will display in the document if they exist.

3. Toggle on the **Drag point** option and click the **Insert** button. Click the left side (point **0**) of the arrow to place the first drag point.



4. In the **SmartPoint Properties** dialog box, click the **OK** button.

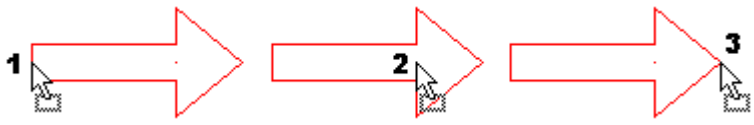
   The **SmartPoint Properties** dialog box allows you to define the order in which the drag points attach to the mouse cursor when dragging the symbol. Drag point 0 is the default when dragging a symbol into the drawing.

5. Repeat steps 2 and 3 above on points **1** and **2** of the arrow symbol.

6. Save the symbol as ***arrow2.sym*** and close the symbol file.

7. Click the **Drawing Files** shortcut bar in the **Symbol Explorer**.

8. Drag a few *arrow2* symbols into the drawing while clicking the **up** and **down** arrow keys on the keyboard. The symbol now cycles through three drag points.



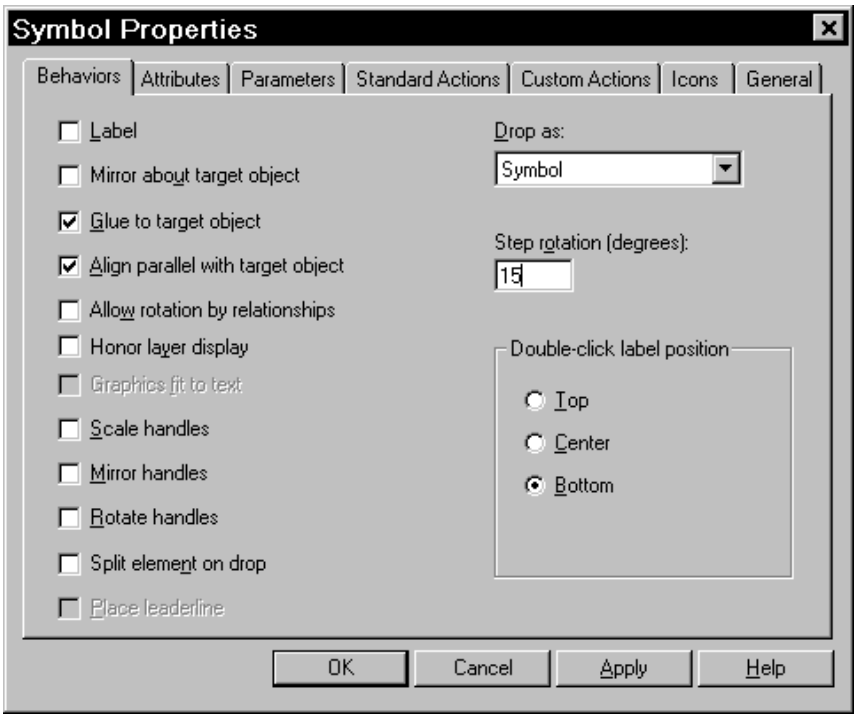
Lab 12A - Section D

CHANGE THE DEFAULT BEHAVIOR OF A SYMBOL

1. Open the symbol ***arrow2.sym*** by double-clicking the symbol in the **Symbol Explorer**.

2. Select Symbol Properties  from the Symbol Authoring Tools toolbar.

   The **Symbol Properties** dialog box displays.



3. On the **Behaviors** tab of the **Symbol Properties** dialog box, type **15** in the **Step rotation** field.

   The arrow will rotate in steps of 15°, instead of 90°, when the left and right arrow keys on the keyboard are pressed while dragging.

4. On the **Behaviors** tab of the **Symbol Properties** dialog box, turn on **Glue to target object**.

   This specifies that the arrow locks to and moves with the object to which it is attached.

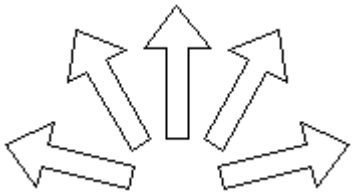
5. On the **Behaviors** tab of the **Symbol Properties** dialog box, turn on **Align parallel with target object**.

   This ensures that the arrow aligns parallel to the object to which it is being attached.

6. In the **Symbol Properties** dialog box, click the **OK** button.

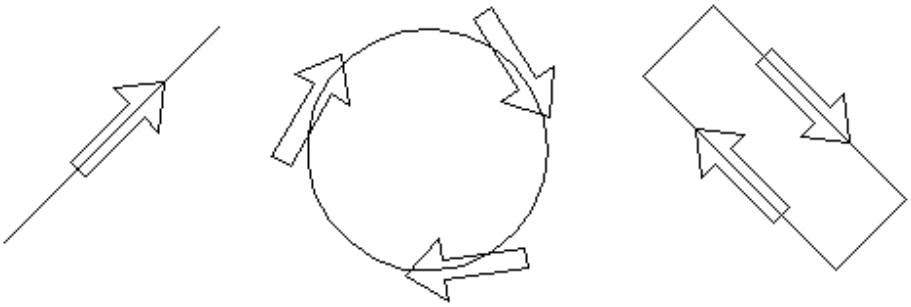
7. Save the symbol as ***arrow3.sym*** and close the symbol file.
8. Click the **Drawing Files** shortcut bar in the **Symbol Explorer**.
9. Drag the *arrow3* symbol into your drawing and try the following while placing:

   Click the **left** and **right** arrow keys on the keyboard.



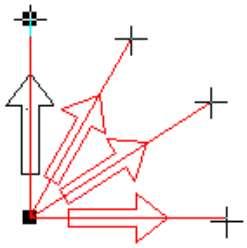
   Arrow now rotates in 15° steps.

   Drop the arrow on different objects.



   The arrow now aligns parallel to the objects.

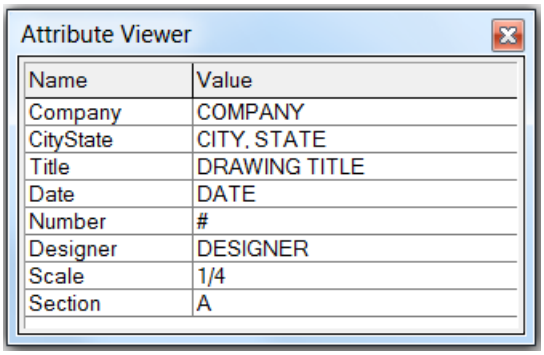
   Drag the line or object that the arrow was dropped on.



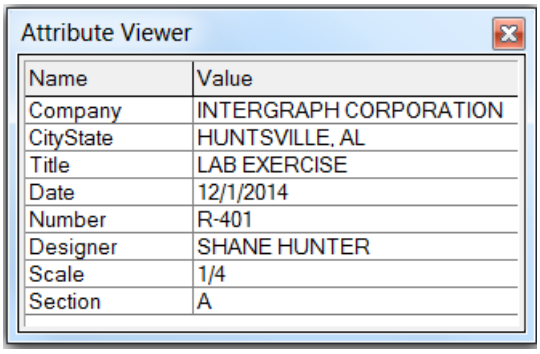
   The arrow now moves with the object.

Lab 12B - Title Block

This lab can be completed after the *Basic Symbol Creation* lesson. In this lab you will create a title block with user definable properties that can be defined in the **Attribute Viewer**.



COMPANY CITY, STATE		
DRAWING TITLE		
DRAWN BY: DESIGNER		SECT A
DATE	SCALE: 1/4	#



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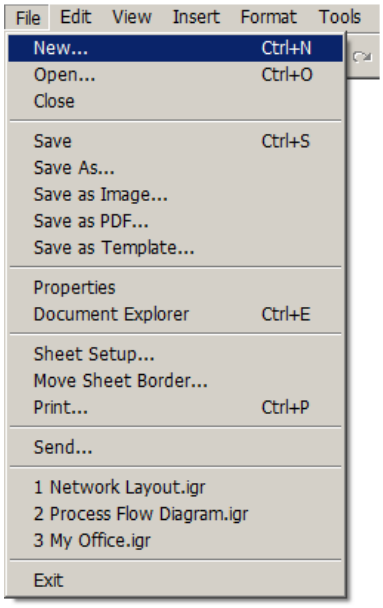
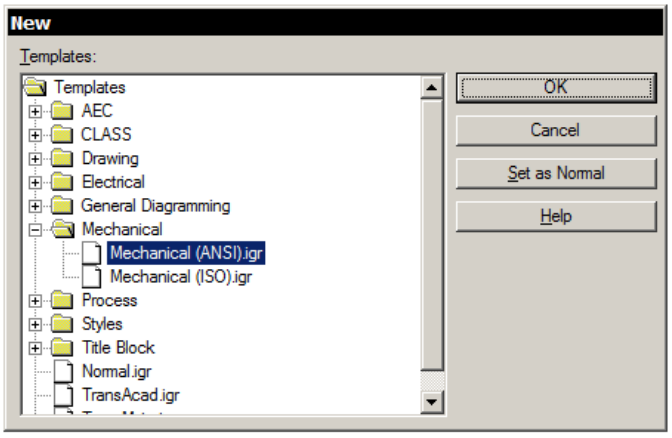
LAB EXERCISE		
DRAWN BY: SHANE HUNTER		SECT A
12/1/2014	SCALE: 1/4	R-401

Lab 12B - Section A

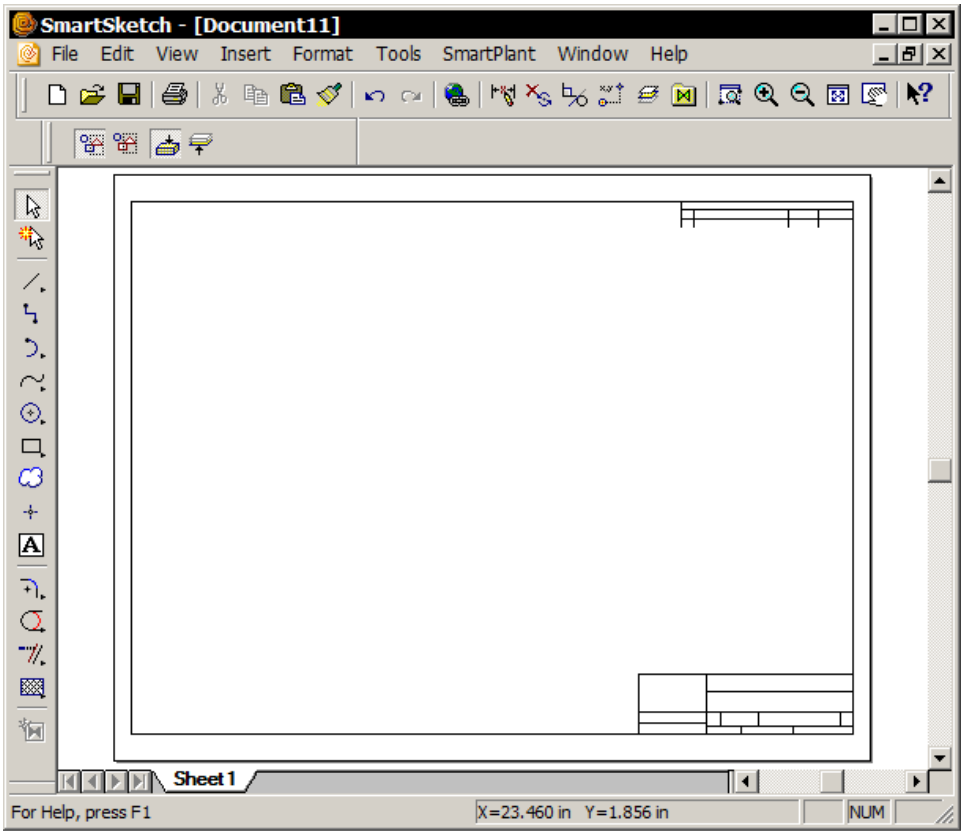
CREATE A NEW FILE USING A MECHANICAL TEMPLATE

1. From the **File** menu, select **New**.





2. Select *Mechanical (ANSI).igr* from the *Mechanical* template folder of the **New** dialog box.
3. Click the **OK** button. A new file will open.

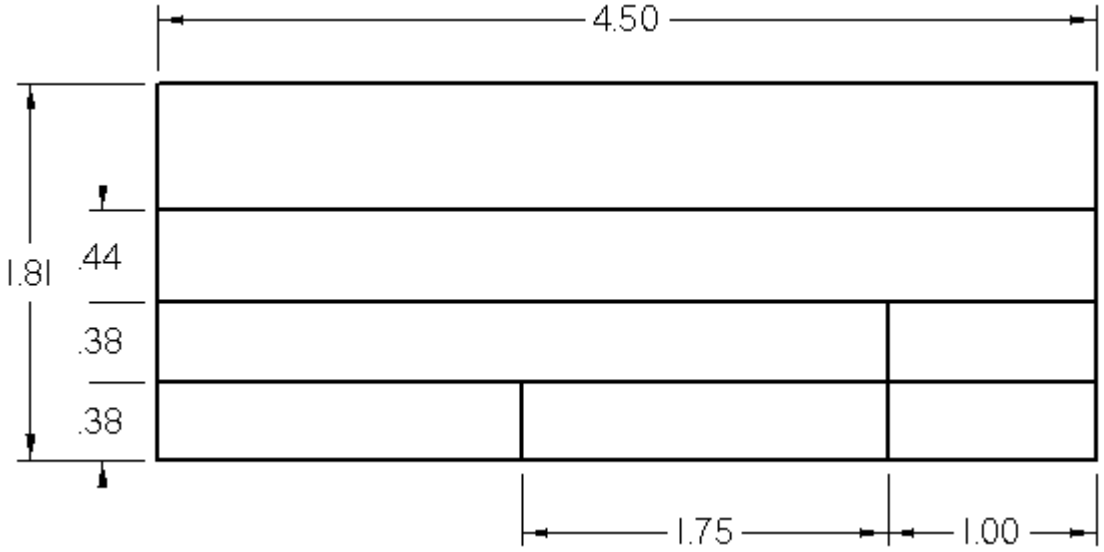


Lab 12B - Section B

CREATE A TITLE BLOCK SYMBOL

1. Select the **Line/Arc Continuous**  command from the **Draw** toolbar.
2. Draw the following title block in the center of your drawing sheet.

   Note: Do not dimension the title block.



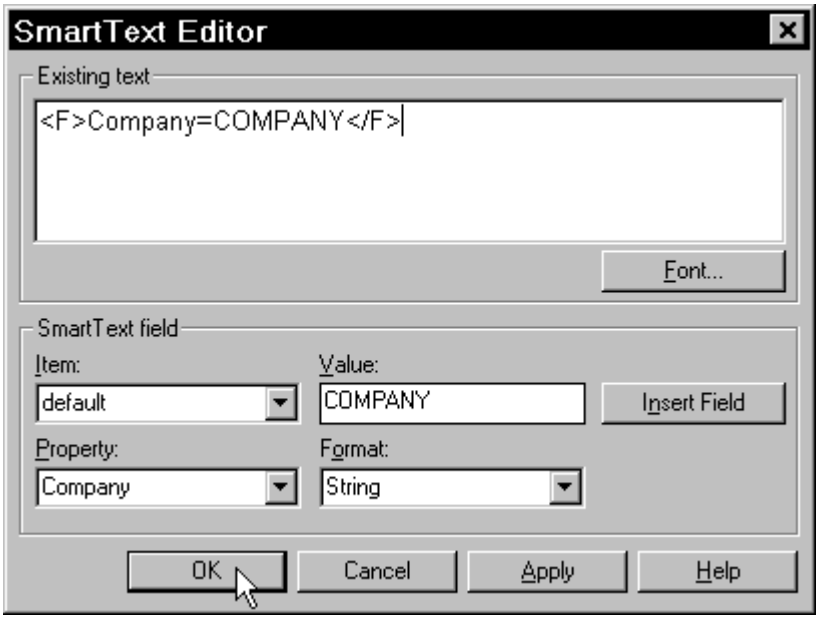
3. Using the **Select Tool**  , select the title block components.
4. Click the **Create Symbol**  command on the **Draw** toolbar.
5. Click the lower right corner of the title block to define the origin point.
   The **Save As Symbol** dialog box appears.
6. Save the symbol as ***TitleBlock.sym*** in the *C:\Drawing Files* folder.

ADD SMARTLABELS TO THE TITLE BLOCK

1. Open the symbol ***TitleBlock.sym***.

   Note: The symbol can be opened by double-clicking the symbol in the Symbol Explorer or by selecting Open from the File menu.

2. Select the **Edit SmartText**  command from the **Symbol Authoring Tools** toolbar.



Note: If you do not have the Symbol Authoring Tools toolbar, go to **Add-in Manager** (**Tools -> Add-ins**) and select **Symbol Authoring Tools**.

3. In the **SmartText Editor** dialog box, complete the following:

   a. Type the attribute name *Company* in the **Property** box.

   b. Type the default value of the attribute, *COMPANY*, in the **Value** box.

   c. Select *String* from the **Format** dropdown list.

   d. Click the *Insert Field* button.

   e. The text that appears in the label will display in the editor.

   f. Click the **OK** button.

      The new SmartLabel appears in the drawing.

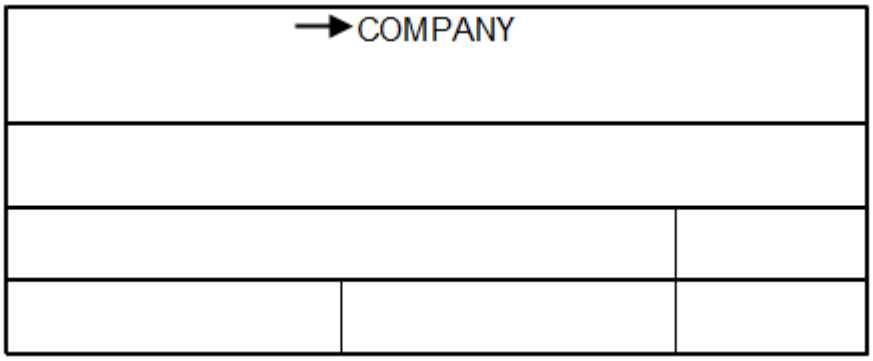
   Notes:

   - The order in which the SmartLabels are created is the order that they appear in the Attribute Viewer.
   - Deselect existing SmartLabels before trying to create a new SmartLabel.

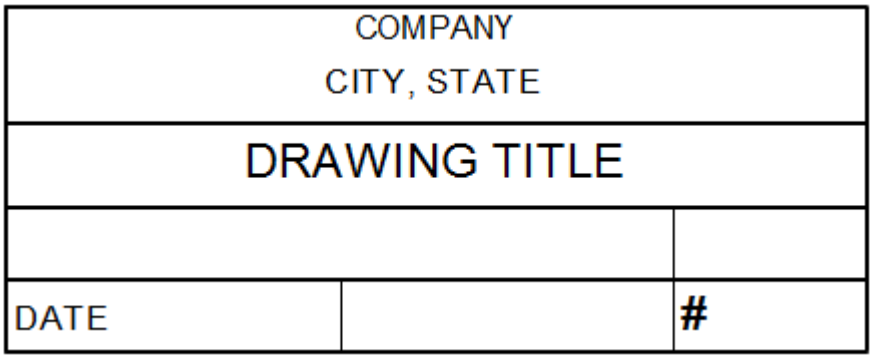
4. Using the **Select Tool** select the new SmartLabel.

5. In the ribbon bar, change the **Font Size** to *.120 in*.

6. Move the *COMPANY* SmartLabel to the desired location in the title block.



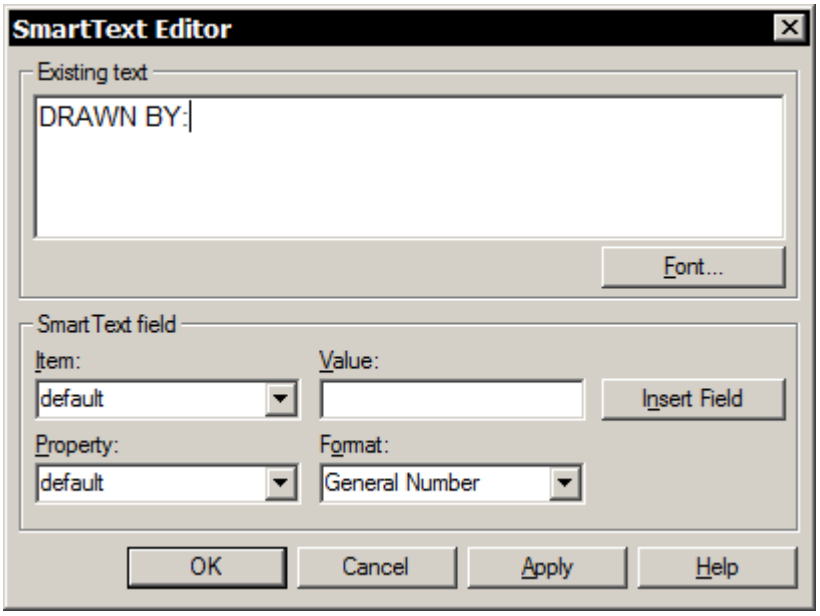
7. Repeat steps **2** through **6** to create the labels as shown below.



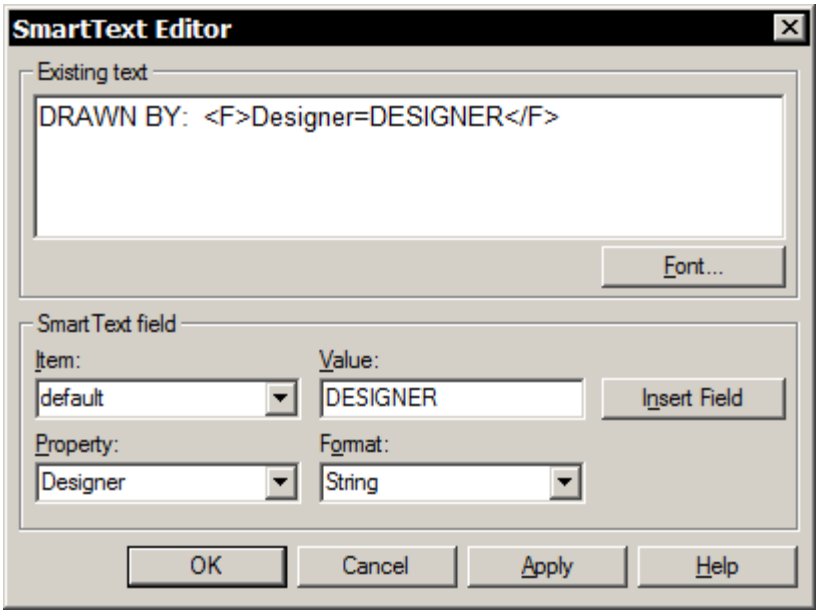
Property	Value	Format	Font Size
CityState	CITY, STATE	String	.120 in
Title	DRAWING TITLE	String	.140 in
Date	DATE	String	.120 in
Number	#	String	.140 in

DISPLAY SIMPLE TEXT WITH A SMARTLABEL

1. Select the **SmartText Editor**  command from the **Symbol Authoring Tools** toolbar.



2. In the **SmartText Editor** dialog box type the text that you want displayed with the SmartLabel. In this case, type *DRAWN BY:*



3. Complete the SmartLabel as you did in the previous steps.

   a. Type the attribute name *Designer* in the **Property** box.

   b. Type the default value of the attribute, *DESIGNER*, in the **Value** box.

   c. Select *String* from the **Format** dropdown list.

d. Select the **Font** button and change the font size to 10 pt.

e. Click the **Insert Field** button.

f. The text that appears in the label will display in the editor.

g. Click the **OK** button.

h. Remember to move the label to the desired location.

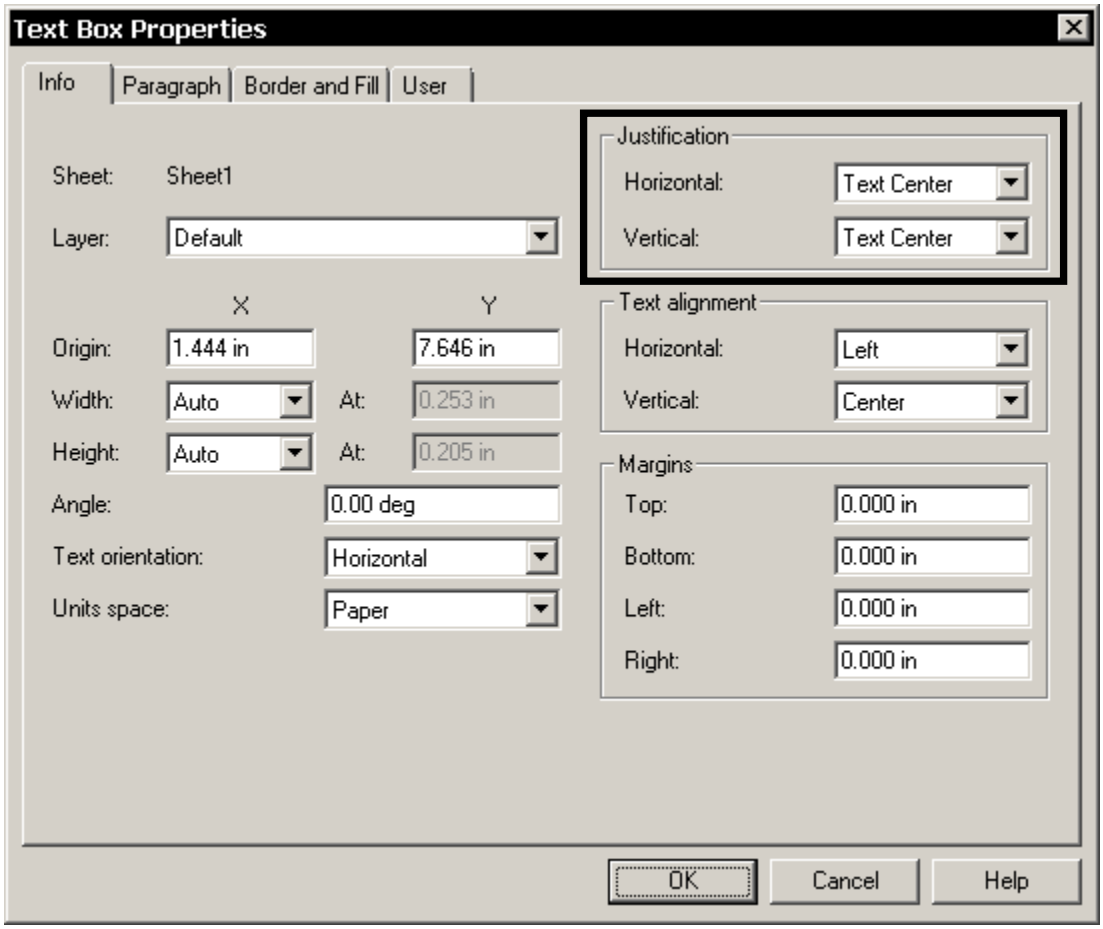
i. Add two additional fields listed below.

Simple Text	Property	Value	Format	Font Size
SCALE:	Scale	1/4	String	10 pt
SECT	Section	A	String	10 pt

CHANGE TEXT JUSTIFICATION OF THE SMARTLABELS

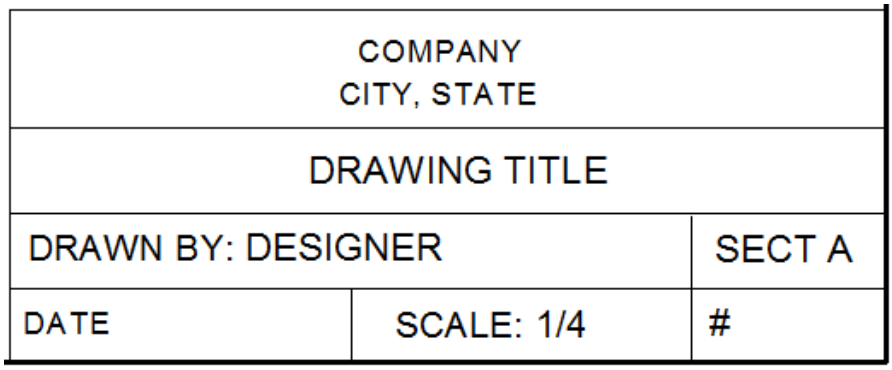
1. Select only the *Company*, *CityState*, and *Title* SmartLabels.

2. With the SmartLabels selected, choose **Properties** from the **Edit** menu.



3. On the **Info** tab of the **Text Box Properties** dialog box, change both **Horizontal** and **Vertical** justification to *Text Center*. Click the **OK** button.

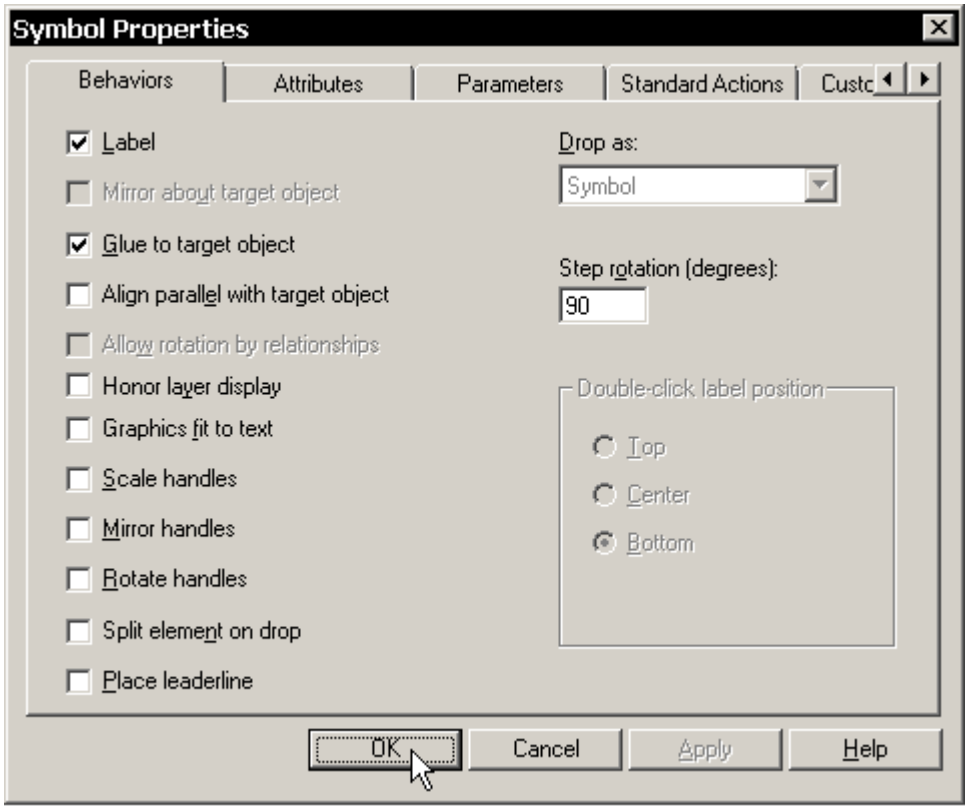
4. Move the *Company*, *CityState*, and *Title* SmartLabels to the center of their appropriate title block area.



Lab 12B - Section C

CHANGE THE SYMBOL TO A LABEL

1. Select the **Symbol Properties**  command from the **Symbol Authoring Tools** toolbar.



2. On the **Behaviors** tab of the **Symbol Properties** dialog box, select the **Label** check box and the **Glue to Target Object** check box. Click the **OK** button.

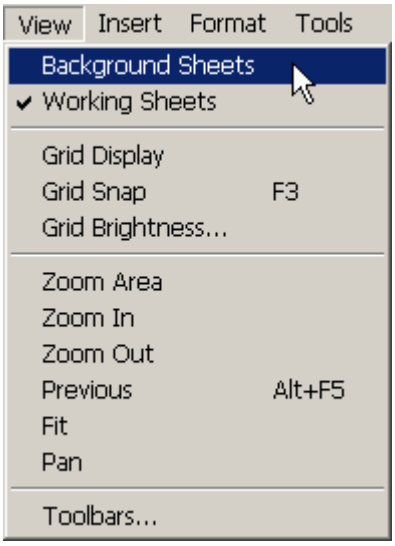
3. Select **Save**  from the **Main** toolbar to save the symbol changes. Close the symbol file.

Lab 12B - Section D

PLACE THE TITLE BLOCK

In this section of the lab you will add your title block to a background sheet.

1. Create a new file using the *Mechanical (ANSI).igr* template file from the *Mechanical* template folder of the **File New** dialog box.



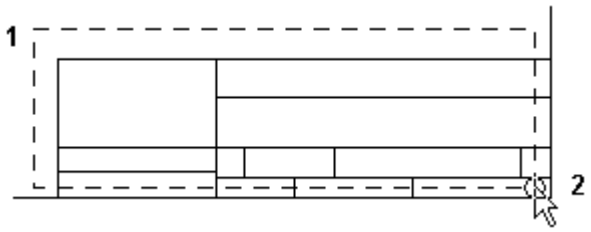
2. Select **Background Sheets** from the **View** menu.

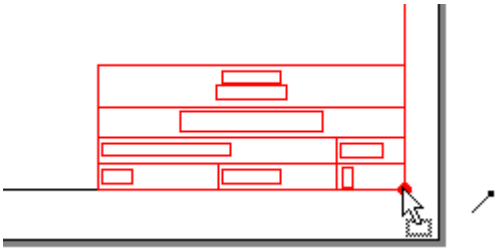
3. Select the **C-Sheet** tab to make it the active sheet.

4. Choose the **Select Tool**  from the **Draw** toolbar.

5. Select the **Overlapping**  button from the **Ribbon** bar.

6. Select and delete the existing title block. Leave only the border.



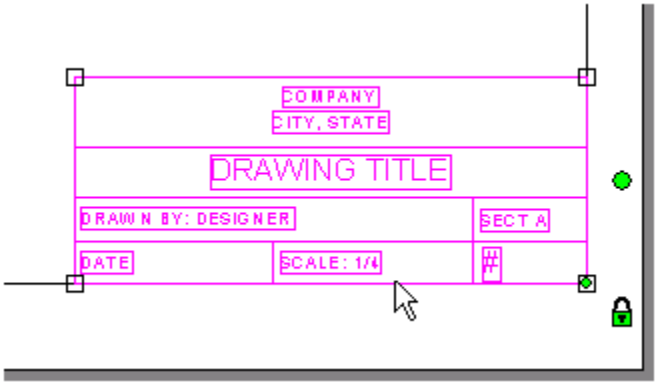


7. Place the *TitleBlock* symbol on the lower right corner of the border.

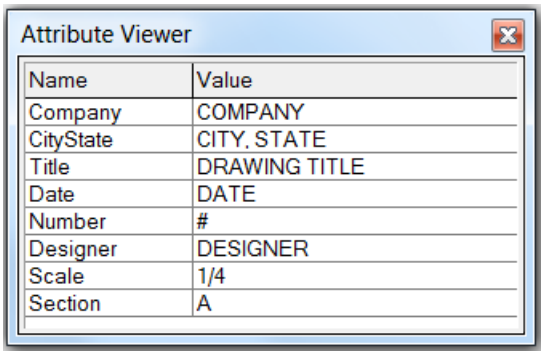
Note: ***You could place this title block symbol on each of the selectable background sheets. We will only place it on the C-size sheet in this lab.***

UPDATING THE TITLE BLOCK

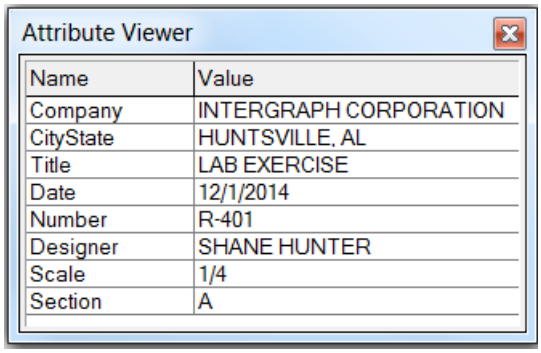
1. Using the **Select Tool**  , click anywhere on the title block.



The title block SmartLabels appear in the **Attribute Viewer**.



2. With the *TitleBlock* symbol selected, type the requested information in the **Attribute Viewer**.



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12/1/2014	SCALE: 1/4	R-401

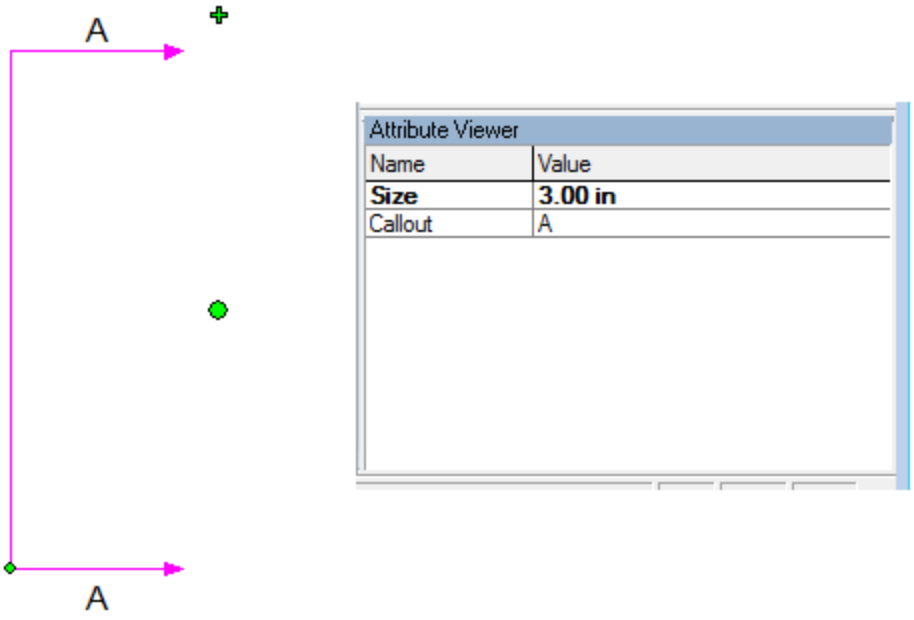
3. When finished updating the title block, select **Working Sheets** from the **View** menu.

Notes:

- When the title block needs to be updated, go to the background sheets, select the title block, make changes in the Attribute Viewer, then go back to the working sheets.
- If this is a title block that you want to use in several files, complete the procedures for this lab, and then select File > Save as Template.

Lab 12C – Creating a Parametric Symbol

In this lab you will create a section cut symbol, similar to the one below. This symbol will be parametric, meaning that the dimensions associated with the lines will drive the graphics via a parameter in the *Attribute Viewer*. In the second exercise you will create a SmartLabel for the symbol.



Lab 12C - Section A

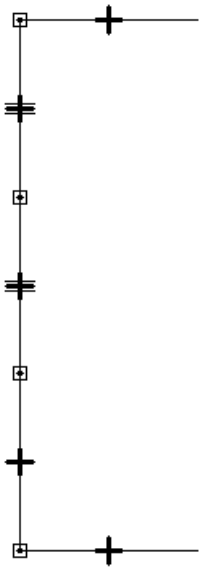
SKETCHING THE GRAPHICS

1. From the **File** menu, click **New** and create a drawing from *Normal.igr*.

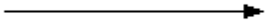
2. From the **Tools** menu, make sure that **Maintain Relationships** and **Relationship Handles** are turned on.

3. From the **Draw** toolbar, click the **Line** command  . Click on the sheet and place three endpoint connected vertical lines, each 1 inch long.

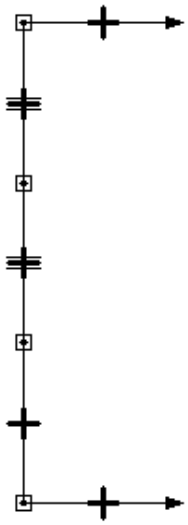
4. Place two horizontal lines, each 1 inch long, endpoint connected to the top and bottom vertical lines. Your drawing should look like this:



5. From the **Draw** toolbar, click the **Connector** command. On the **Place Connector** ribbon bar select *None* for the *Line Start Terminator* and one of the *Solid Arrow2* selections for the *Line End Terminator*. Place a horizontal connector on the sheet away from the previously placed lines.

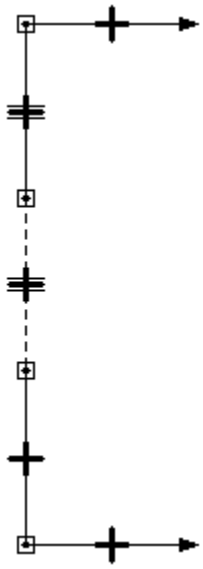


6. From the **Main** toolbar, click the **Format Painter** command. Select the connector when prompted for *the object to copy format from* and then select the two horizontal lines when prompted for *the object to copy the format to*. Delete the connector. Your drawing should look like this:



7. From the **Draw** toolbar, click the **Select Tool** command. Select the middle vertical line and change *Line Color* to *Blank* on the ribbon bar.

Your drawing should look like this. Note the dashed line representing the blank color.

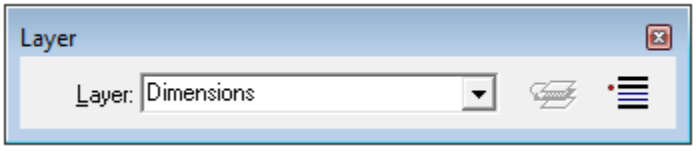


Lab 12C - Section B

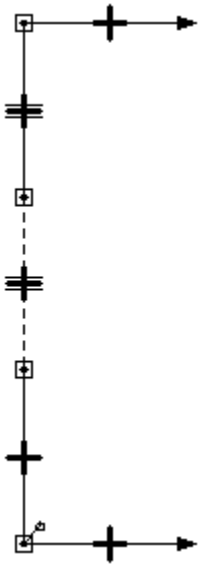
ADDING DIMENSIONS

In this portion of the exercise, we will add construction lines and dimensions to the symbol so that we can control how the geometry reacts to changes in size.

1. From the Tools menu, click the **Layers** command. On the **Layer** ribbon bar, key in a new Layer named *Dimensions* and press the **Enter** key. The new layer is now the active layer.

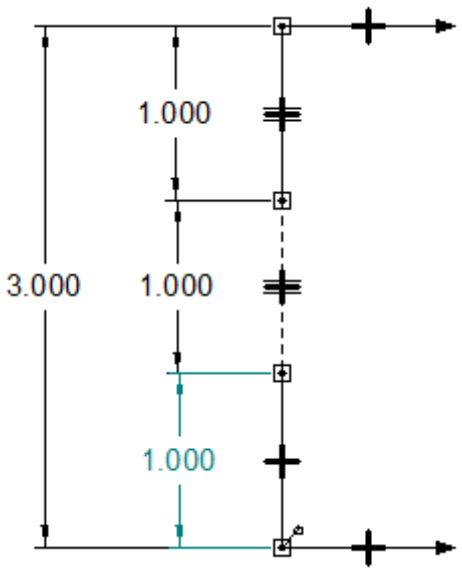


2. From the **Main** toolbar, select the **Relationships** command to bring up the **Relationship** toolbar. From the **Relationship** toolbar, click the **Lock** command. Place your cursor over the intersection of the vertical and horizontal lines at the bottom of the drawing and click when you see the endpoint indicator. This will lock the bottom of the section cut so that it will remain fixed during modifications. Dismiss the **Relationship** toolbar.



3. From the **Main** toolbar, select the **Dimension** command. On the **Dimension** toolbar, click the **Distance Between** command. Place a dimension to display the distance between the two horizontal lines.

4. On the **Dimension** toolbar, click the **SmartDimension** command. Dimension all three vertical lines. Dismiss the **Dimension** toolbar. Your drawing should look like this:

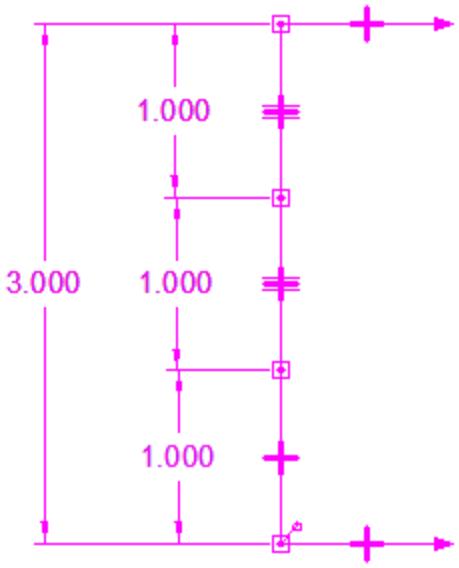


Lab 12C - Section C

CREATING THE SYMBOL

In this section, we will create the symbol from the graphics and hook-up a parameter to one of the dimensions.

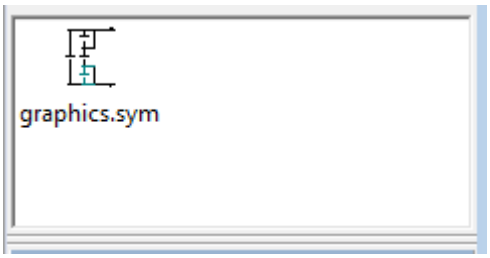
1. Click the **Select Tool**  and select the graphics for the symbol.



2. Click the **Create Symbol**  command on the **Draw** toolbar. Move your cursor to the intersection of the vertical and horizontal lines at the bottom of the drawing (same location as the lock relationship) and click to place the symbol origin.

3. In the **Save as Symbol** dialog box, browse to the *Training* folder and name the symbol *graphics.sym*.

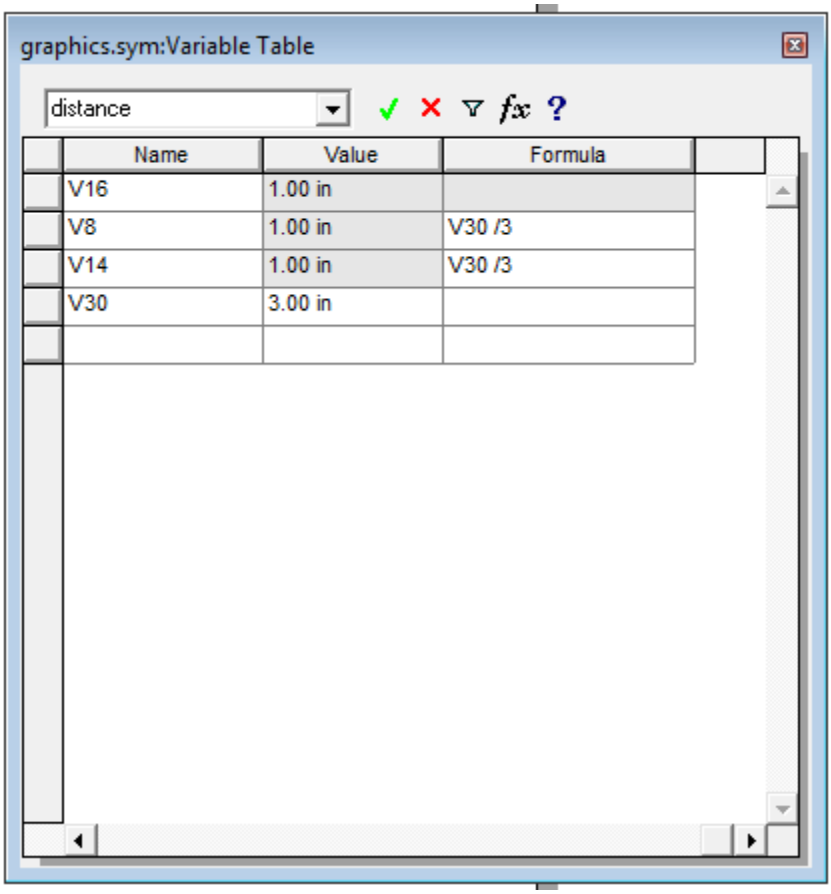
4. In the **Symbol Explorer**, browse to the *Training* folder. You should now see the *graphics.sym* file displayed in the **Content View** of the **Symbol Explorer.**



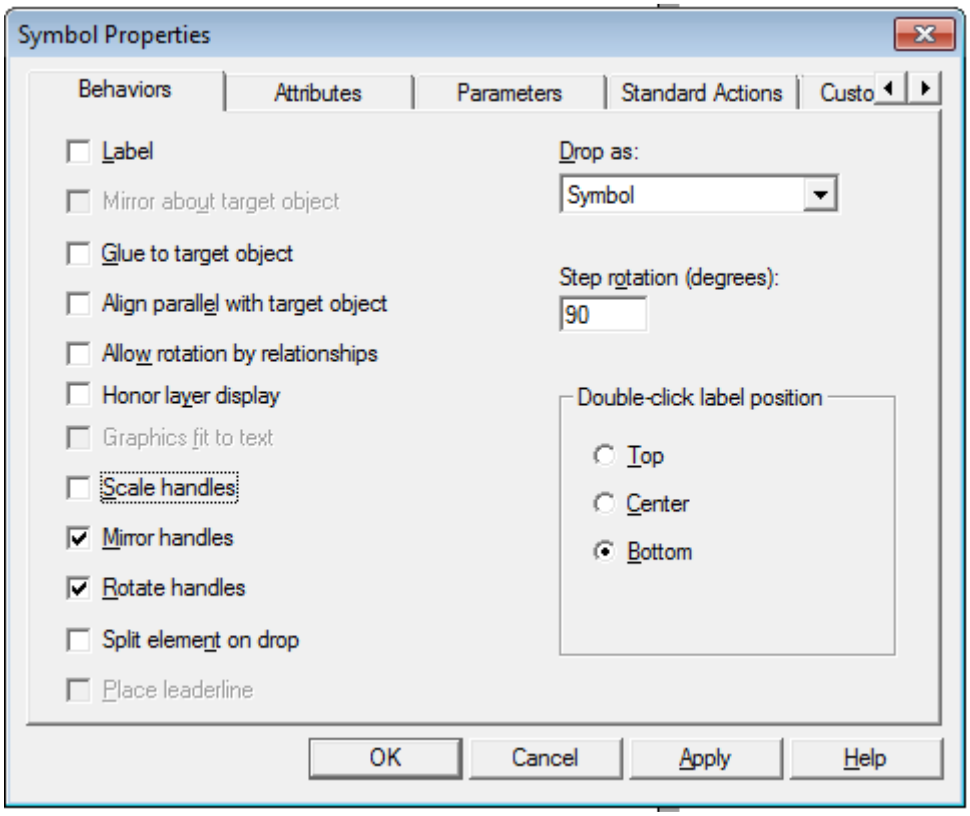
5. From the **Symbol Explorer**, double-click on *graphics.sym* to open the new symbol. The **Symbol Authoring Tools** toolbar should be displayed.

Note: ***If this toolbar is not activated, go to Tools > Add-Ins and make sure there is a check next to Symbol Authoring Tools. If the add-in is selected and this still does not bring up the Symbol Authoring Tools toolbar, then go to View > Toolbars and make sure Symbol Authoring Tools is selected.***

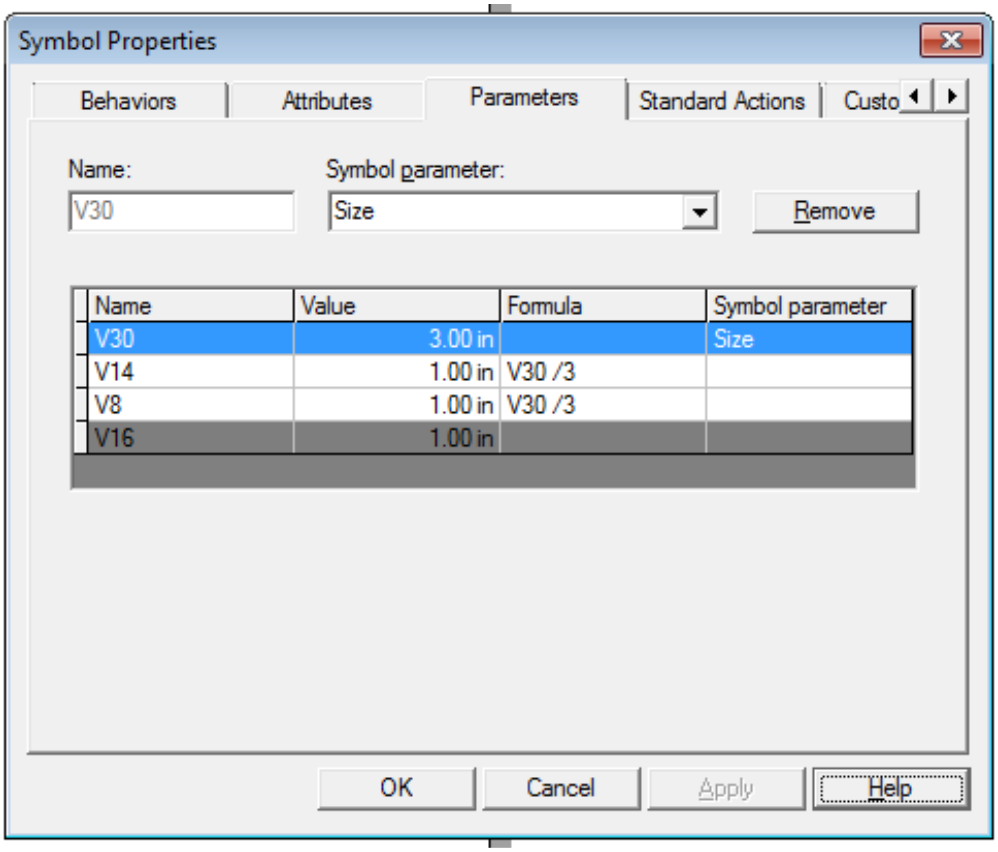
6. From the **Tools** menu, click **Variables**. In the **Variable Table**, add a formula for each driving dimension associated with the vertical lines. Each vertical line should always equal 1/3 of the larger dimension value. Note that the variable names listed in the variable table may be different from the names displayed below. Close the **Variable Table** when done.



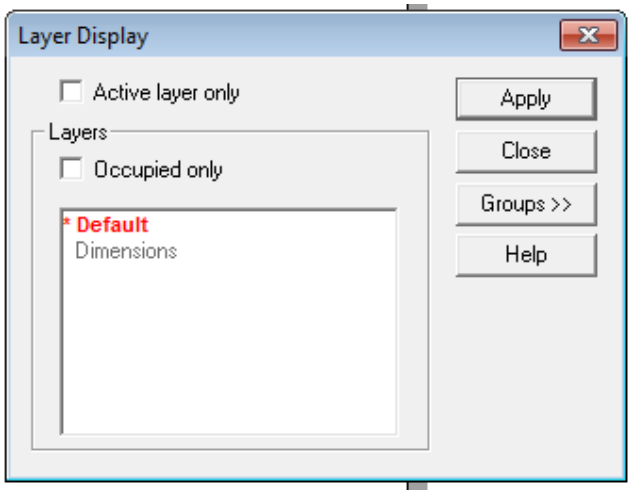
7. From the **Symbol Authoring Tools** toolbar, click **Symbol Properties**.  .
   On the **Behaviors** tab, turn off *Scale handles*



8. Click on the **Parameters** tab. From the table of dimensions, select the dimension with the largest value. Click on the **Symbol parameter** field and enter *Size*. Click the **Apply** button and then click the **Close** button.

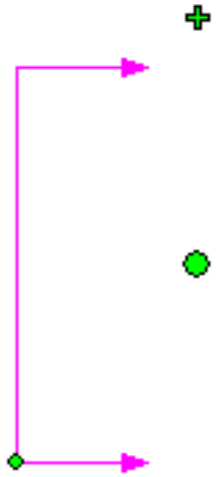


9. On the **Layer** ribbon bar, click on the *Layer Display* command.  (Note: If this ribbon bar is no longer displayed, select **Layers** from the **Tools** menu.) On the **Layer Display** dialog box, double-click on the *Default* layer to make it the active layer, and click once on the *Dimensions* layer to turn it off. Click the **Apply** button and then close the dialog box.



10. From the **File** menu, click on **Save** to save the symbol and then click on **Close** to close the symbol file

11. From the **Symbol Explorer**, click on *graphics.sym*. Move your cursor over the drawing sheet and click to place the symbol.



12. Click on the bold value in the **Attribute Viewer** and change it. Notice that the symbol changes to reflect the new value.

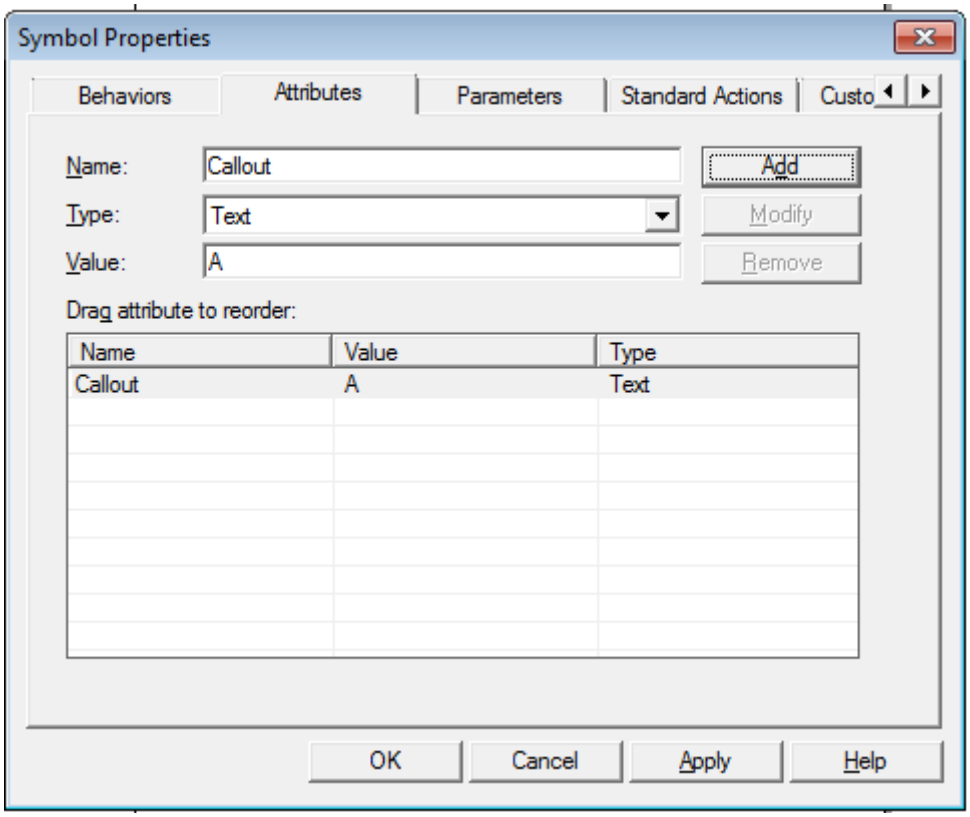
Lab 12C - Section D

ADDING A SMARTLABEL TO THE SYMBOL

In this part of the exercise, we will create a SmartLabel for the section cut that will display attribute information when the symbol is placed in a document.

1. From the **Symbol Explorer**, double-click on *graphics.sym*. From the **Symbol Authoring Tools** toolbar, click on the **Symbol Properties** command.  .

2. From the **Symbol Properties** dialog box, click on the **Attributes** tab. Add the following attribute (be sure to enter the values exactly as shown below):



Click **OK** on the **Symbol Properties** dialog box.

3. From the **File** menu, click on **Save** and then click on **Close**.

4. From the **Draw** toolbar, click on the **Text Box** command  . Move your cursor over the drawing sheet and click once to place a text box. Key in the word *Label* in the text box.

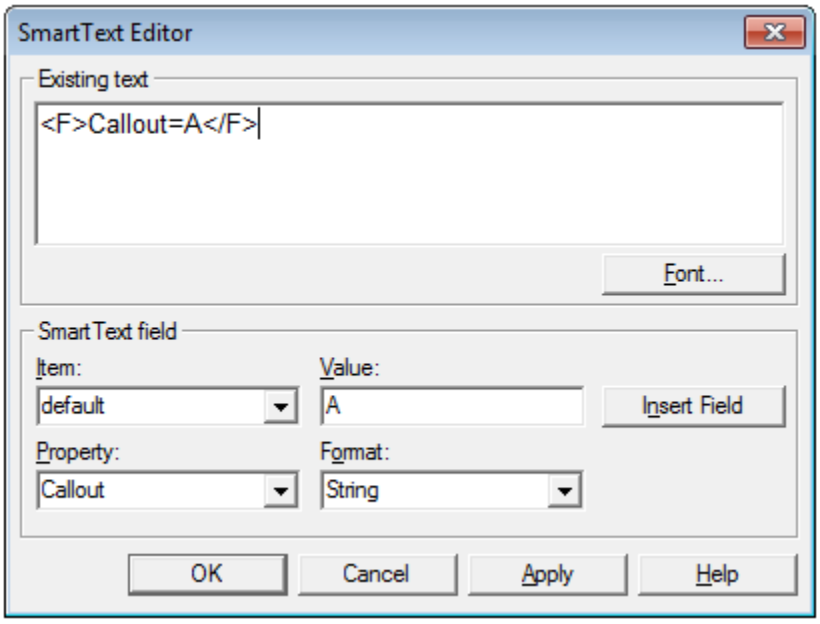
5. Using the **Select Tool**  , click on the new text box to select it. From the **Draw** toolbar, click on the **Create Symbol** command.  Click on the text box to place the origin. In the **Save as Symbol** dialog box, name the symbol *label.sym* and save it in the *Training* folder.

6. From the **Symbol Explorer**, double-click on *label.sym*. Using the **Select Tool**, select the *Label* text box and press the **Delete** key to delete it. (Note: You may have to Fit the drawing to see the text box.)

7. From the **Symbol Authoring Tools** toolbar, click on **Edit SmartText**  . In the **SmartText Editor** dialog box, enter the following values and then click on the **Insert Field** button.

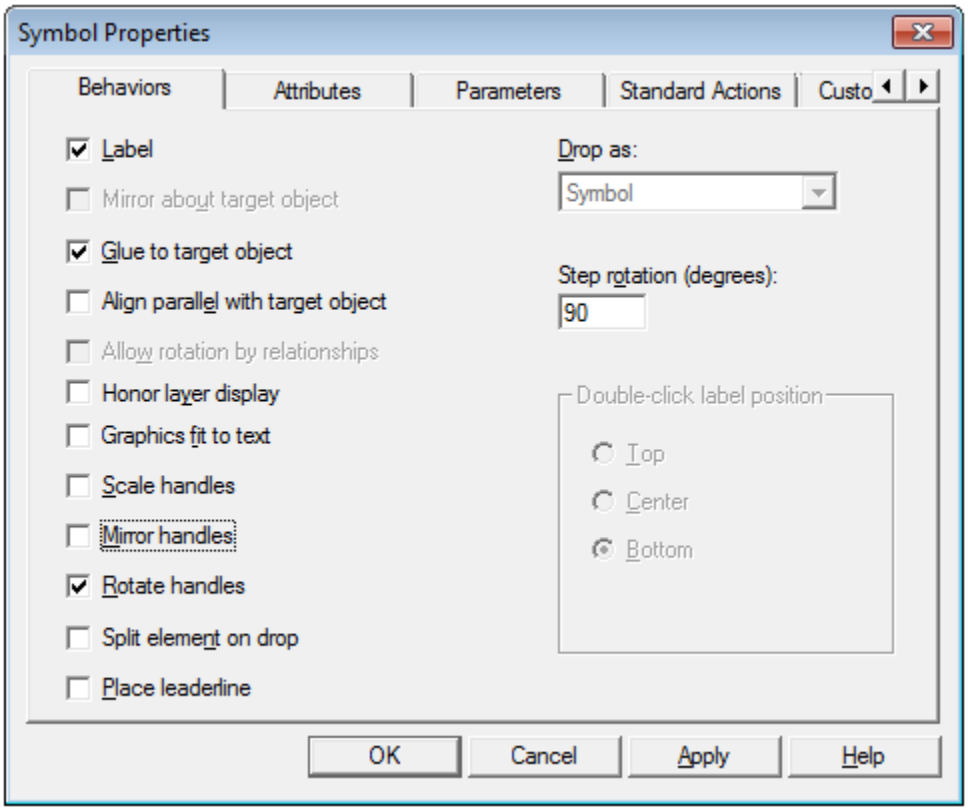
   Property: Callout
   Value: A
   Format: String

   Note: These values are similar to the attribute values you just added to the section cut symbol.



Click **OK** on the **SmartText Editor** dialog box to dismiss it

8. From the **Symbol Authoring Tools** toolbar, click on the **Symbol Properties** command.  On the **Behaviors** tab, turn on *Label*, *Glue to target object*, and *Rotate handles*. Turn off *Scale handles* and *Mirror handles*.



Click the **OK** button to dismiss the dialog box.

9. From the **Symbol Authoring Tools** toolbar, click on **Symbol Origin**  . Place your cursor just below the text and click to place the origin.

10. From the **File** menu, click on **Save** to save the symbol and then click on **Close** to close the symbol file.

Lab 12C - Section E

CREATE WRAPPER SYMBOL

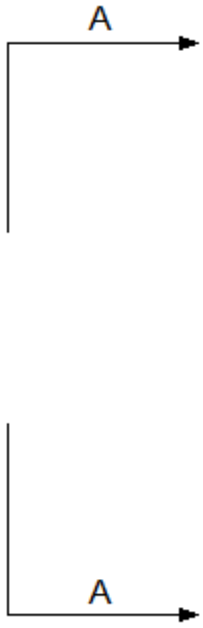
In this segment of the lab you will create the wrapper symbol that will contain the section cut graphics and the label**.**

1. From the **Draw** toolbar, click on the **Line** command  . Place a line anywhere in the document.

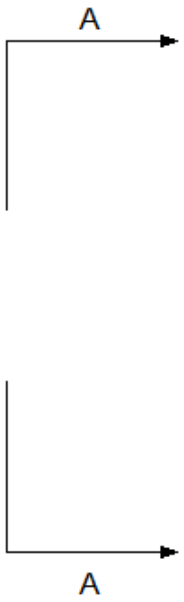
2. Select the line. From the **Draw** toolbar, click on the **Create Symbol** command  . Click anywhere on the line to place the origin. In the **Save as Symbol** dialog box, browse to the *Training* folder and name the symbol *SectionCut.sym*. You should now see *SectionCut.sym* in the **Symbol Explorer**.

3. From the **Symbol Explorer**, double-click on *SectionCut.sym* to open the symbol file. Click on the **Fit** command. Select the line and delete it.

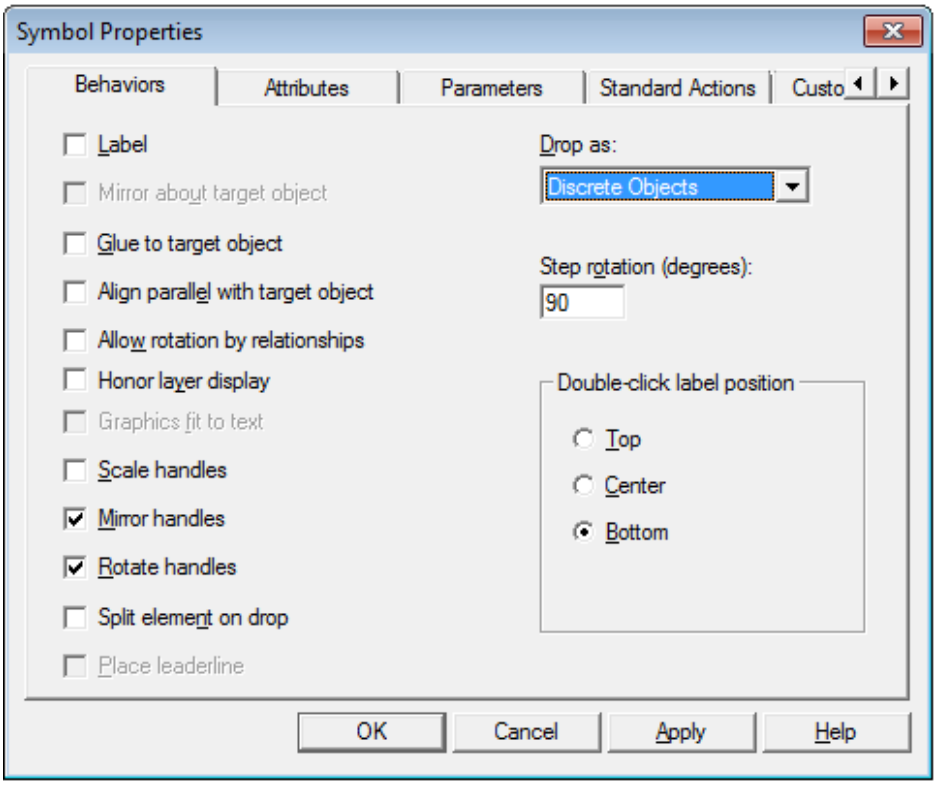
4. From the **Symbol Explorer,** click on *graphics.sym*. Move your cursor over the drawing sheet and click to place it. Select *label.sym* and place it on the drawing sheet on the two horizontal lines by touching the lines. Your symbol should look like this:



5. Select the label on the bottom horizontal line, click on the **Lock** handle next to the label, and move the label just below the line.



6. From the **Symbol Authoring Tools** toolbar, click on the **Symbol Properties** command.  On the **Behaviors** tab, turn on *Mirror handles* and *Rotate handles*. Turn off *Scale handles*. From the **Drop as** dropdown list, select *Discrete Objects*. Click the **OK** button.



7. From the **Symbol Authoring Tools** toolbar, click on **Symbol Origin**.  Place your cursor over the intersection of the vertical and horizontal lines at the bottom of the symbol and click to place the origin.

8. From the **File** menu, click on **Save** to save the symbol and then click on **Close**.