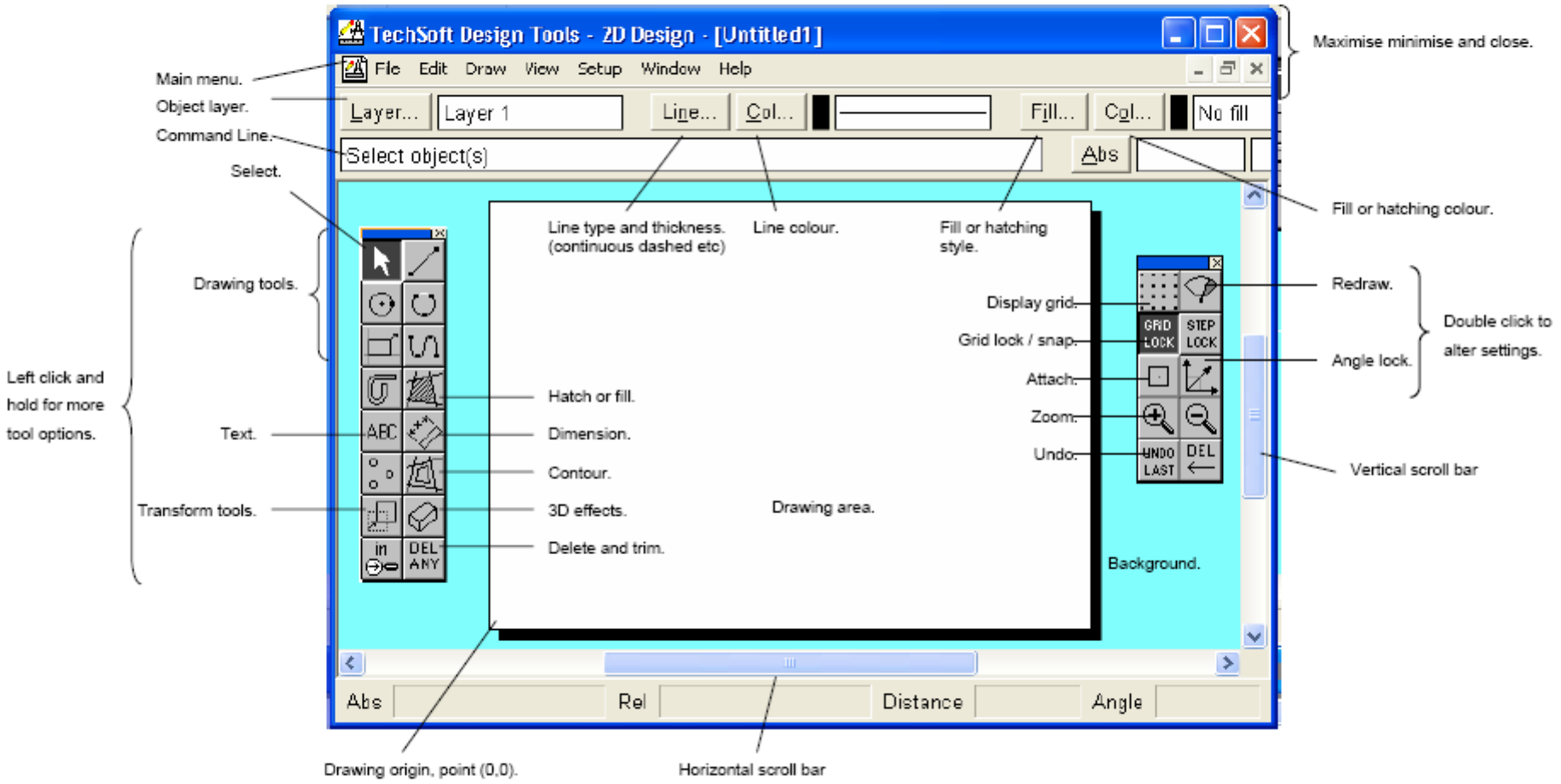
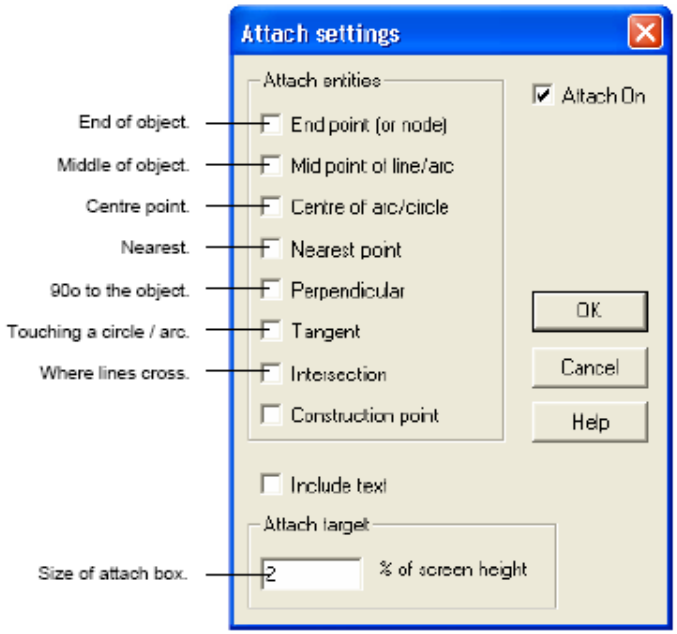
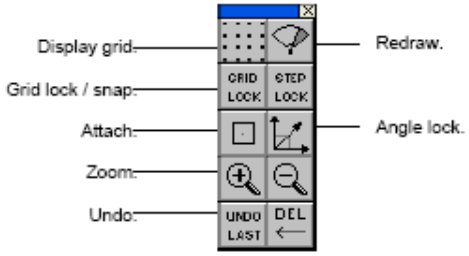
2D Design Tutorials

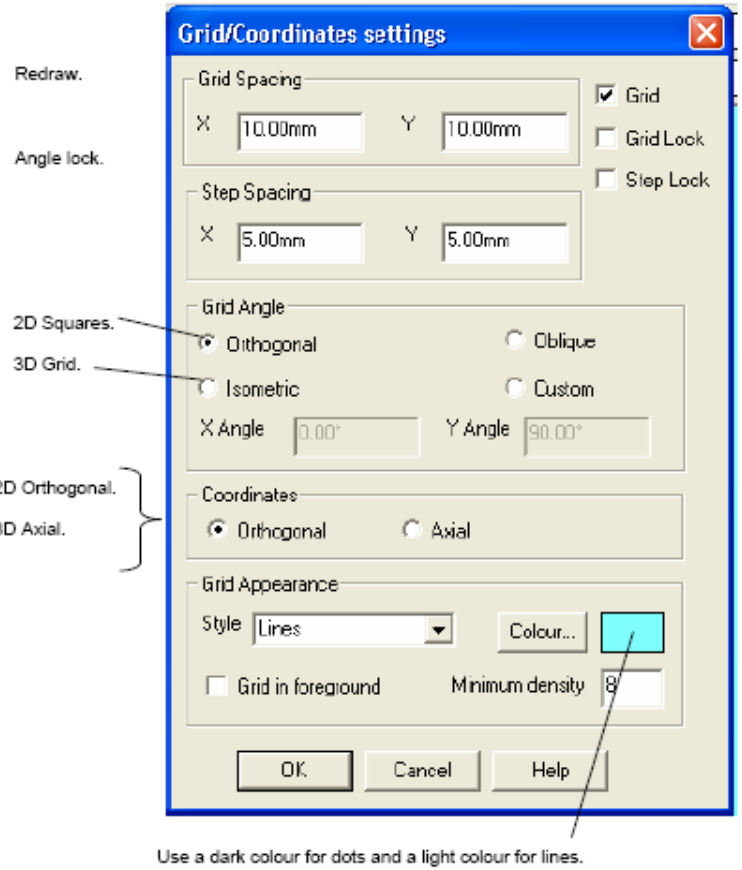
The Basics



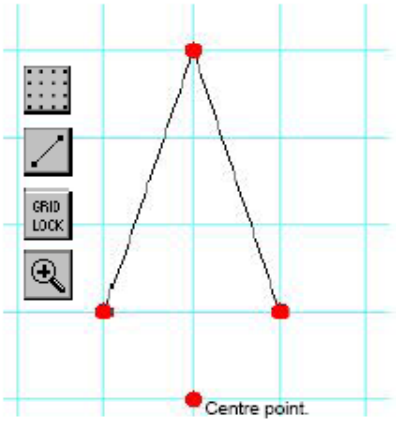
Grid Setup and Snap Tools



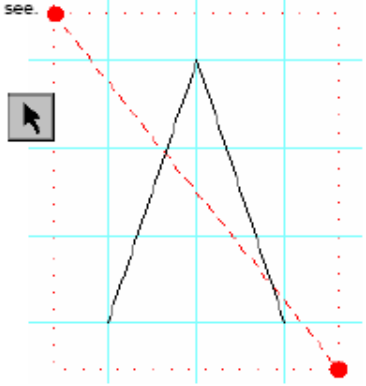




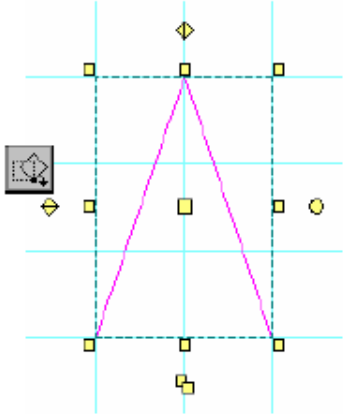
Drawing Exercise 1: Star



STEP 1: Using the line tool draw one spike of the star. Click on grid lock so that the lines attach to the dots or grid on your screen. Zoom in so your work is easy to see.



STEP 2: Select the spike by dragging a selection box across your work holding down your left-hand mouse button.



STEP 3: Use the rotate tool shown in figure 1 below. For a five pointed star the angle of rotation is 72 degrees* and another four points are needed. When you've clicked 'ok' click a point in the middle and below the spike this will become the centre of the star (Shown in step 1).

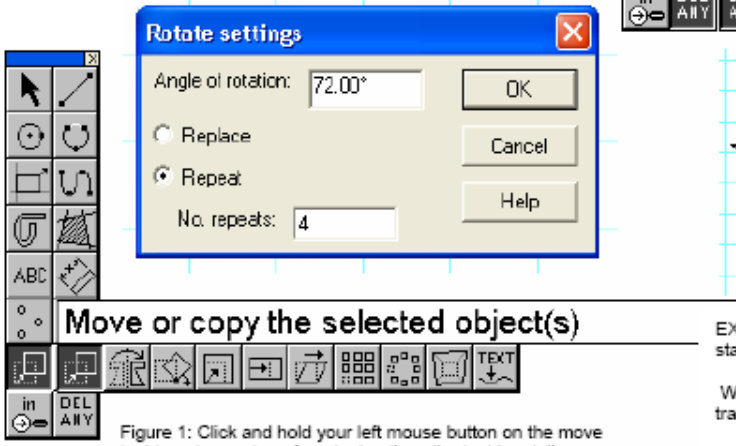
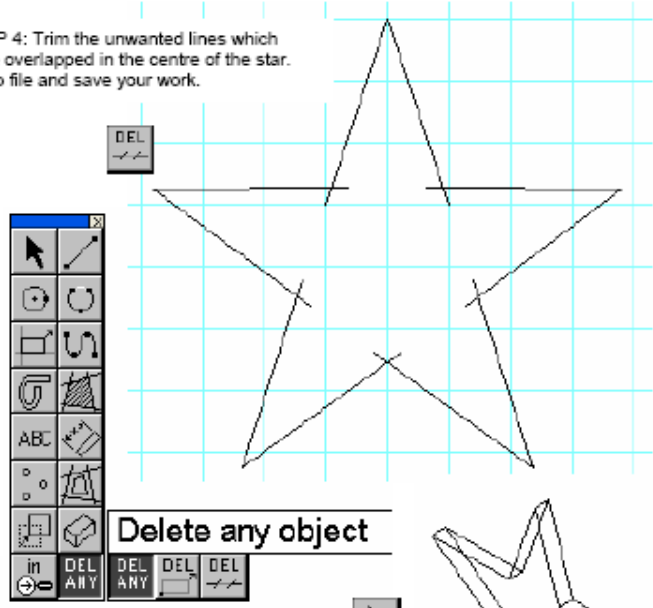
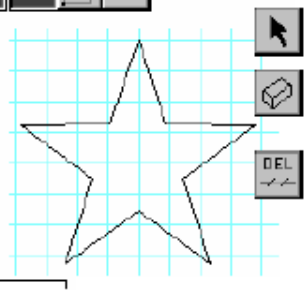


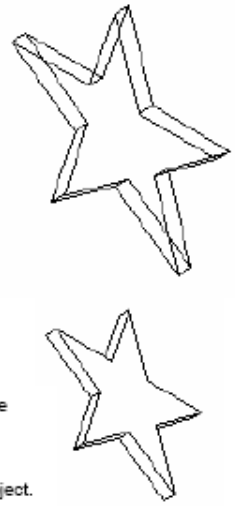
Figure 1: Click and hold your left mouse button on the move tool to get more transform tool options the text box tells you a bit of information about each tool. Select the rotate tool.

**Angle of rotation = Number of degrees in a full rotation / the number of points required. $72^{0} = 360^{0} / 5$*

STEP 4: Trim the unwanted lines which have overlapped in the centre of the star. Go to file and save your work.







EXTRA: Use the select tool to select the star you have drawn.

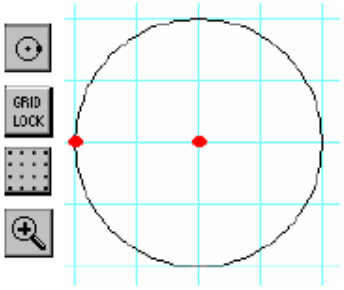
With the three dimensional object tool transform your star into a 5mm thick object.

Select the star again and go to the main menu, click on edit then explode.

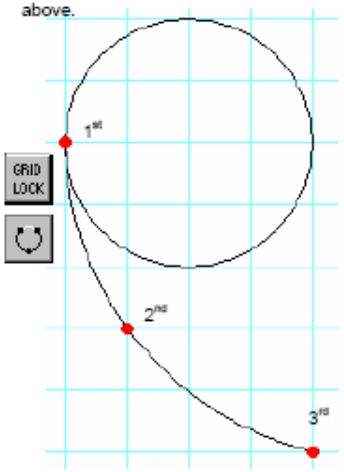
Now trim away lines that you wouldn't see if the star was a solid object!

Save your work.

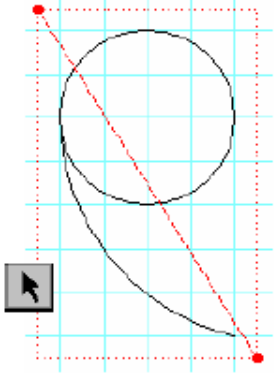
Drawing Exercise 2: Heart



STEP 1: Draw a circle with a radius of 20mm. Click on grid lock, zoom in and when drawing your circle click on either the dots or lines as shown by the two red dots above.



STEP 2: Draw an arc also using the grid lock and clicking on the points shown in the order labelled 1st, 2nd and 3rd.
You have now drawn half the hart as the heart shape is symmetrical it can be mirrored to get the other side.



STEP 3: Select the two parts using the select tool by dragging a selection box across your work. Using the mirror object tool repeat the object you've drawn along the mirror line shown.

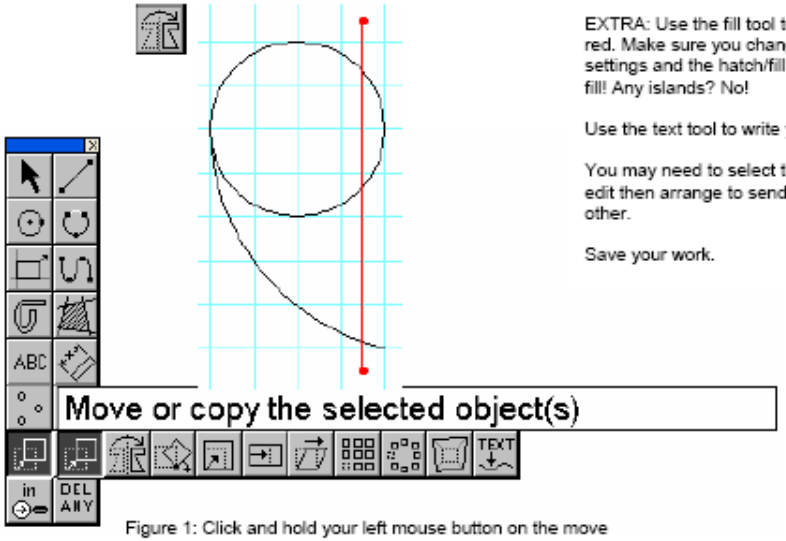
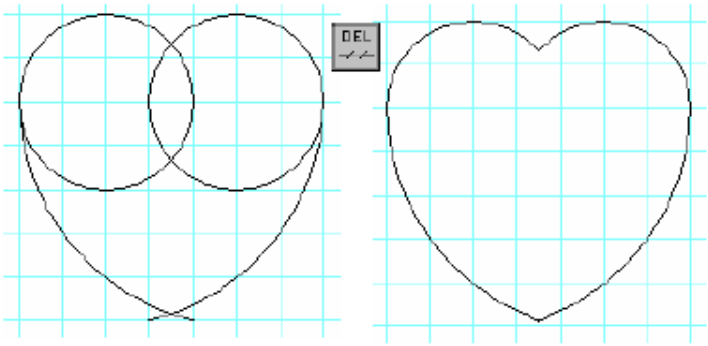


Figure 1: Click and hold your left mouse button on the move tool to get more transform tool options, the text box tells you a bit of information about each tool. Select the mirror object tool.



STEP 4: Trim the unwanted lines so that your heart looks better.

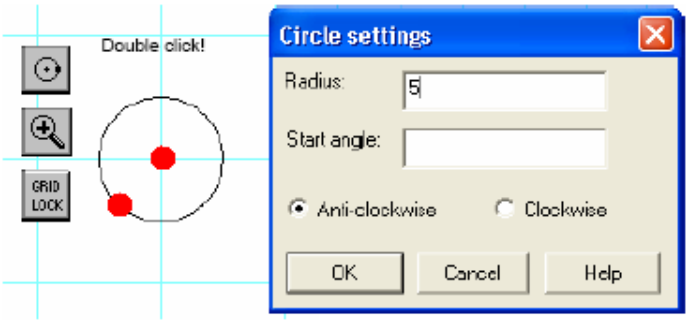
EXTRA: Use the fill tool to colour your heart red. Make sure you change the colour settings and the hatch/fill settings to solid fill! Any islands? No!

Use the text tool to write your name on top.

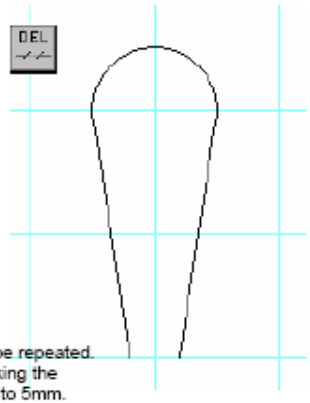
You may need to select the heart and go to edit then arrange to send one behind the other.

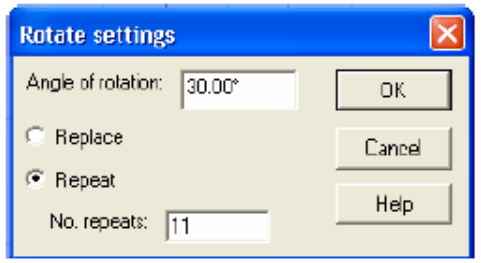
Save your work.

Drawing Exercise 3: Flower

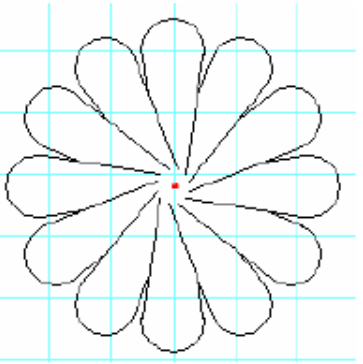


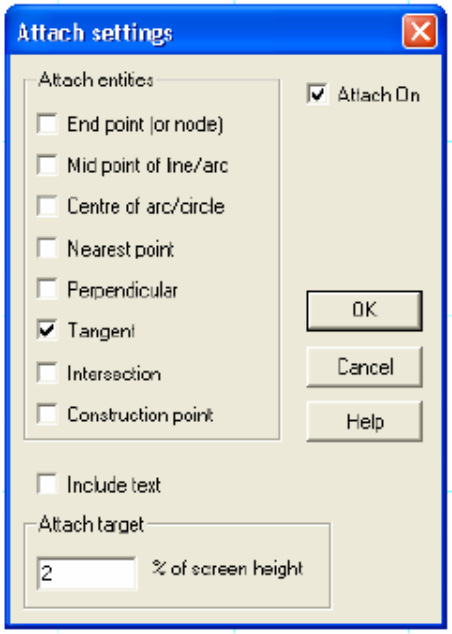
STEP 3: Trim the unwanted section of the circle before the petal is repeated this reduces work later.





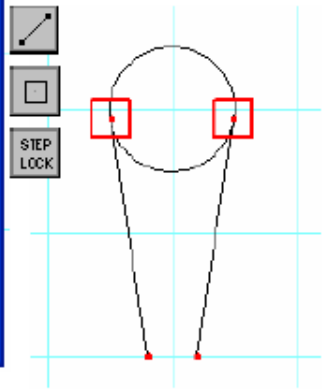
STEP 4: Use the rotate tool* to copy your petals. Make sure you use snap lock to select a point in the centre of what will be the flower head. The trim tool can be used to remove unwanted lines.

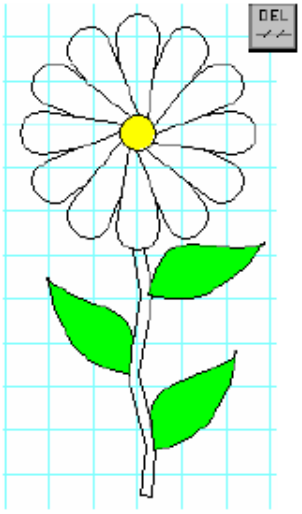




STEP 1: Draw a single petal to be repeated. Start with a circle by double clicking the circle tool and setting the radius to 5mm. Use the grid lock to position it on the grid and click again to confirm its size.

STEP 2: Draw the lines on either side of the petal using the attach tool to get lines touching the circle and using the step lock to help control the other end of the lines. Double click the attach icon to change the options as shown on the left.





EXTRA: Use the drawing tools to add a circle in the centre of your flower along with leaves and a stem.

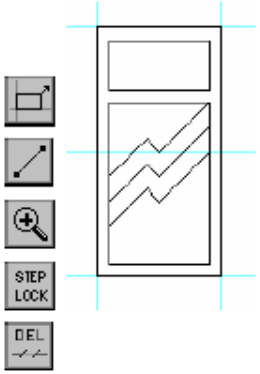
Use the fill tool to colour the leaves and the centre of the flower.

Use the move tool to move and repeat the flower head so that you have two flowers on the same stem.

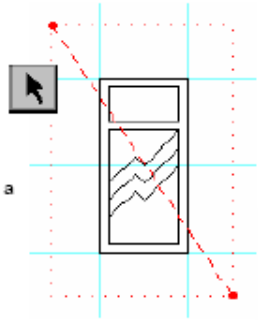
Save your work.

**Angle of rotation = Number of degrees in a full rotation / the number of points required. $30^0 = 360^0 / 12$*

Drawing Exercise 4: Flats

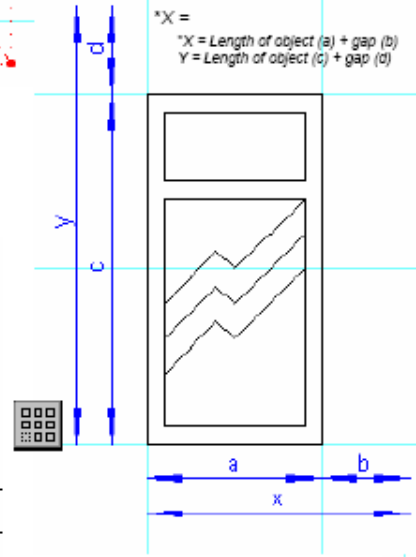


STEP 1: Draw a single window this may be a basic rectangle or could be complex with a frame and reflections on the glass. Use the rectangle and line tool along with the snap lock for accuracy.



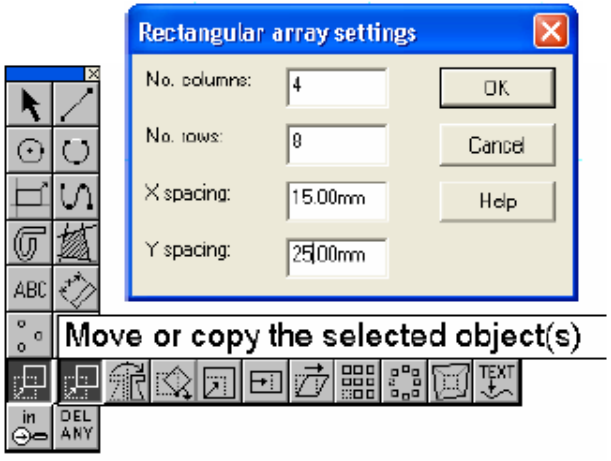
STEP 2: Select the window by dragging a selection box across your work holding down your left-hand mouse button.

STEP 3: Select the rectangular array tool. Columns are vertical and rows are horizontal. Enter the number of columns and rows of windows you want. You can work out the x and y spacing using trial and improvement techniques or the formula* below.

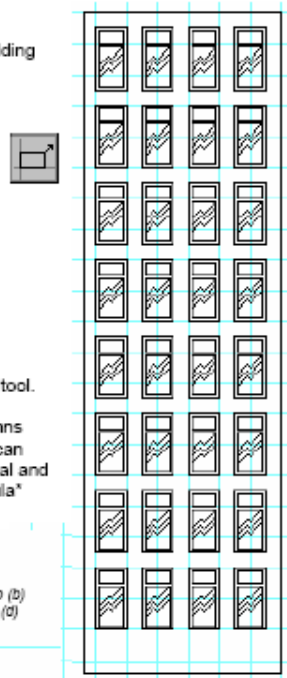


*X =

*X = Length of object (a) + gap (b)
Y = Length of object (c) + gap (d)



STEP 4: Draw the outline of the building using the rectangle tool.



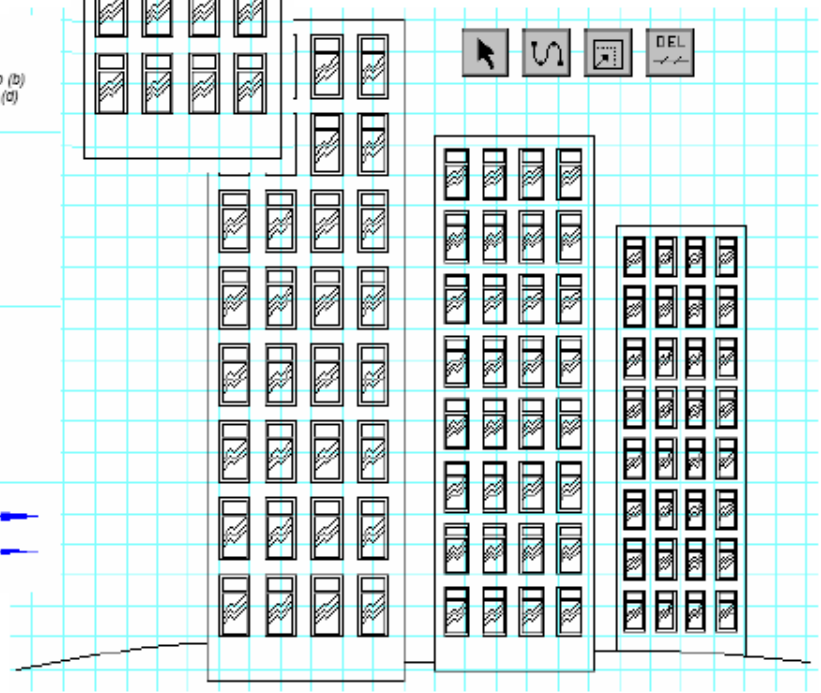
EXTRA: Use the select tool to select the flat you have drawn.

Copy the flat so that there are three in total.

Use the scale tool, setting both options to 0.9. Decrease the size of two of the flats so that they appear further away.

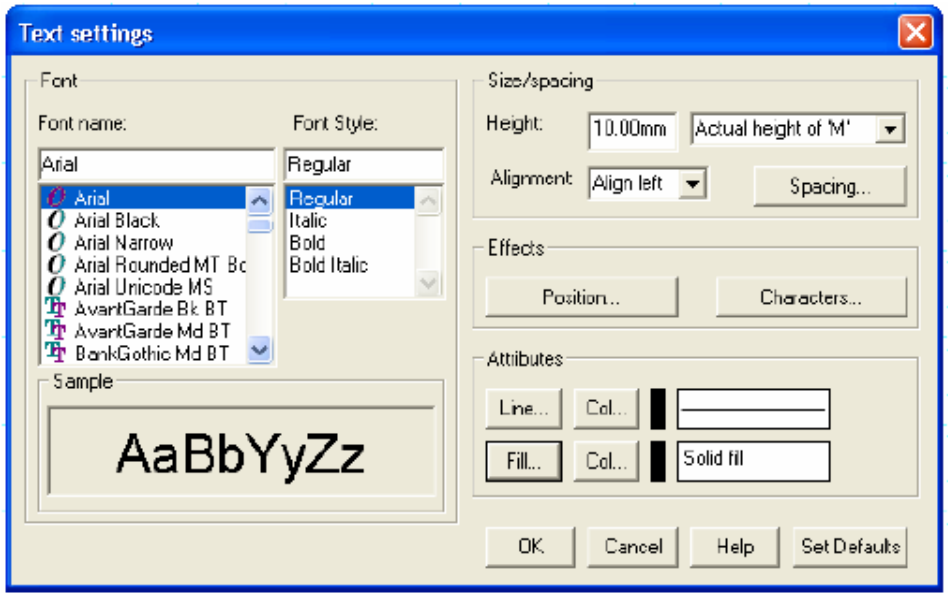
Use the curvy line tool to draw some ground.

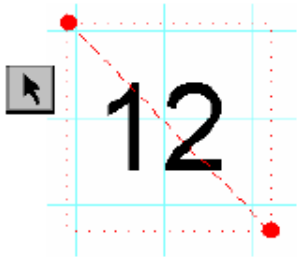
Now trim away lines that you wouldn't see.



Drawing Exercise 5: Clock

STEP 1: Create a number for the clock face. Use the text tool setting the text height and font by clicking on the settings button.

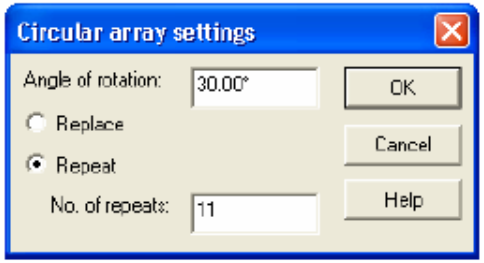


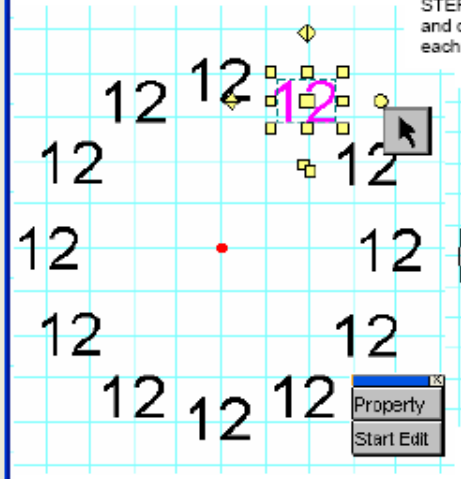


STEP 2: Select the text you have written.

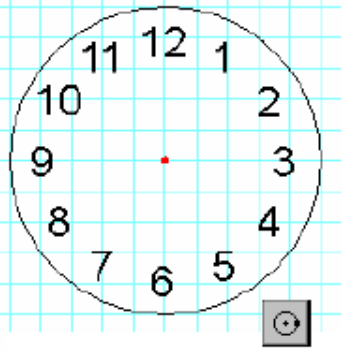
**Angle of rotation = Number of degrees in a full rotation / the number of points required. 30° = 360° / 12*

STEP 3: Use the circular array tool to repeat* the numbers around the clock face keeping them the right way up.





STEP 4: Select the text for each number and click on properties to alter the text for each number.



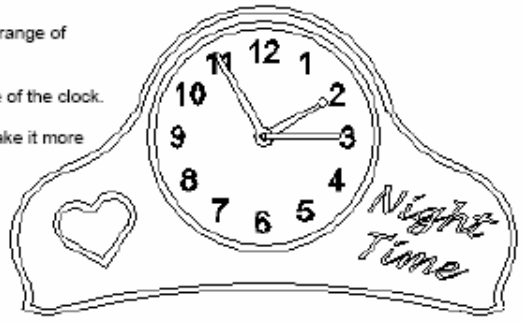
STEP 5: Use the circle tool to draw a circular face.

EXTRA: Add hands using a range of drawing tools.

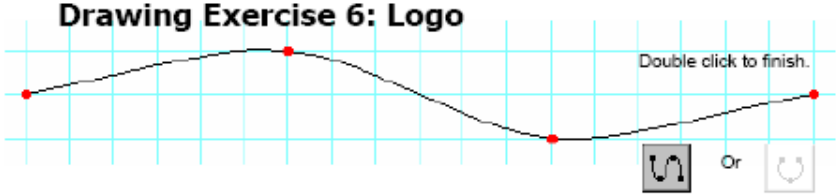
Develop the style and shape of the clock.

Add graphical imagery to make it more interesting.

Save your work.

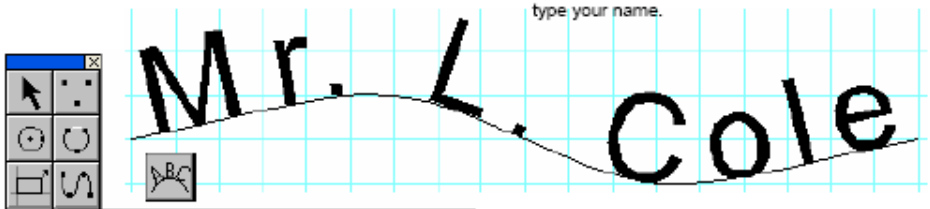


Drawing Exercise 6: Logo



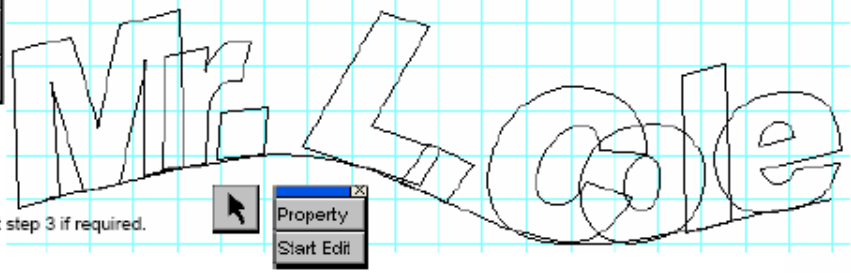
STEP 1: Using your name we will develop a logo. Start by drawing a shallow arc or gently curving line (above).

STEP 2: Click and hold on the text tool. Select the option for drawing text along a path. Click on the line you've drawn and type your name.

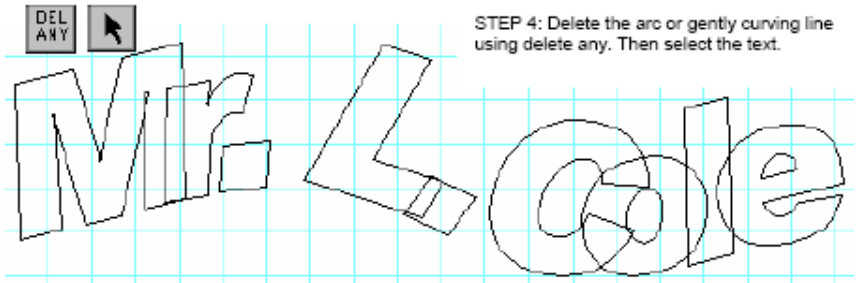


STEP 3: Select the text you have just typed. Click on properties. Edit it using the settings:

- Change the height until the lettering overlaps.
- Click on fill and select no fill.
- Change the font to a style of your choice.



Repeat step 3 if required.

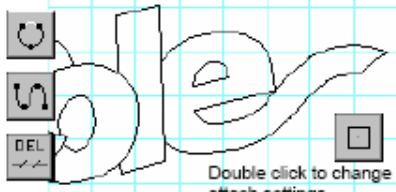


STEP 4: Delete the arc or gently curving line using delete any. Then select the text.

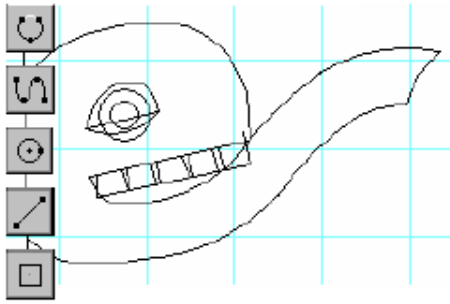
STEP 5: Go to edit at the top of the window. Scroll down to explode. Select the option 'explode fully to simple objects' and click ok.

STEP 6: Trim the unwanted lines where one letter has overlapped another.

STEP 7: Use a range of drawing tools and trim to remove and edit parts of your text. Use attach settings for good results.



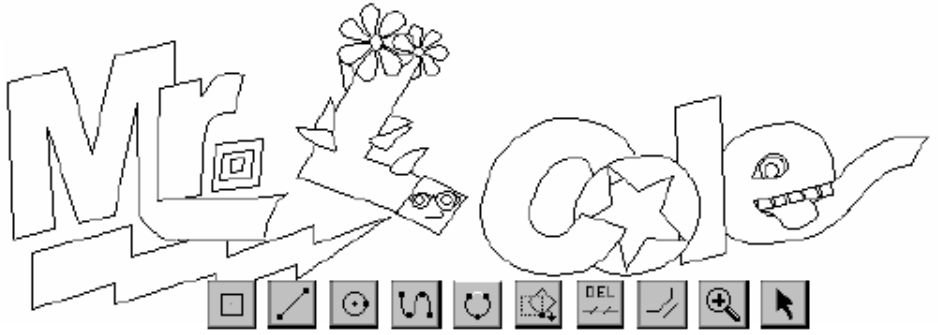
STEP 8: Use a range of drawing tools to change letters into creatures, buildings, plants and interesting shapes.



EXTRA: Use several tools and your creativity to customise your logo using a range of tools.

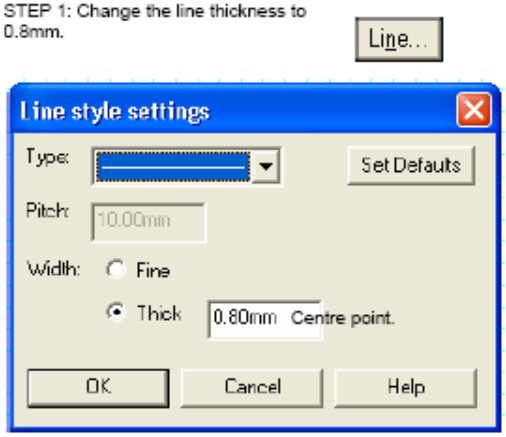
You may wish to add colour with the fill tool or import your design into other software to do this.

Save your work.

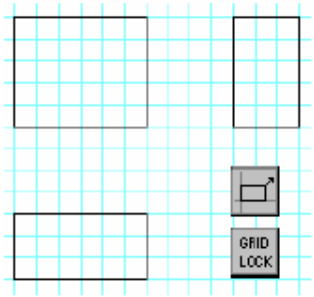


Drawing Exercise 7: Box

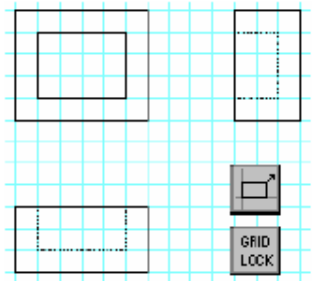
STEP 1: Change the line thickness to 0.8mm.



STEP 2: Draw three rectangles these will become the three outlines for the three views of the box. Use the grid lock to draw and position these accurately and easily.

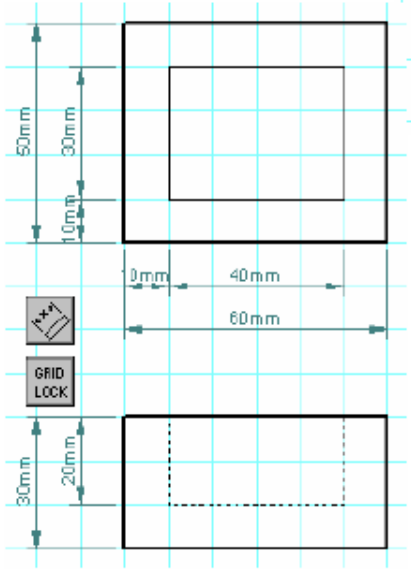


STEP 3: Change the line thickness to 0.25mm and draw the box in the top left view. Change the linetype to dashed the 'pitch' box will become active and change it to 2mm. Now draw the dashed boxes in the other two views.



STEP 4: Add some dimensions with the dimension tool. Double click on the tool first to set the text height units etc.

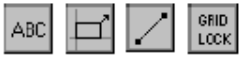
- Text/Text height: 2.5mm.
- Units/Manual/Lengths/Precision/1
- Units/Manual/Display/Display units
- Col…/Grey



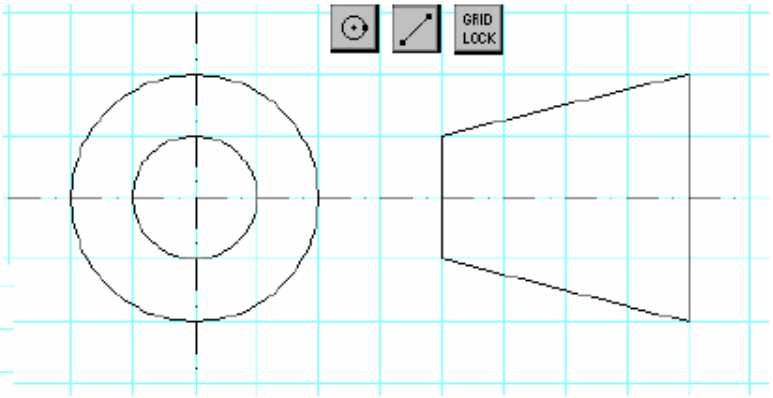
STEP 5: Give each view a title using the text tool. Double click on the text tool to preset the text height to 3mm.

- Top left: PLAN VIEW
- Top right: SIDE VIEW
- Bottom: FRONT VIEW

STEP 6: Use the rectangle tool to draw a boarder include text boxes to write information including: a title, orthographic drawing, do not scale, full size, all dimensions in mm material, your name, group, date etc.

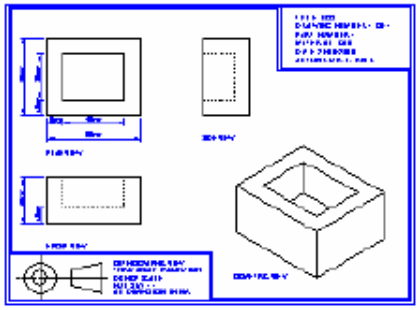


STEP 7: Add the orthographic drawing symbol (cork). Copy the symbol below using the line and circle tool remembering to change the linetype to centreline for the horizontal and vertical lines.

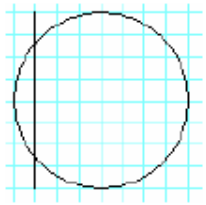


EXTRA: If you are able to draw an isometric shape add a three dimensional view to your drawing.

Save your work.

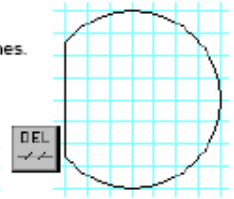


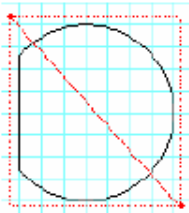
Drawing Exercise 8: Pocket Light



STEP 1: Using the circle and line tool draw the shape shown on the left.

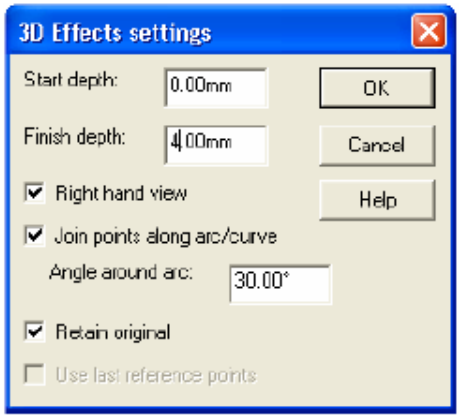
STEP 2: Trim unwanted lines. (right)

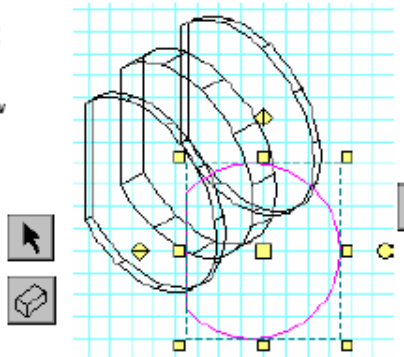




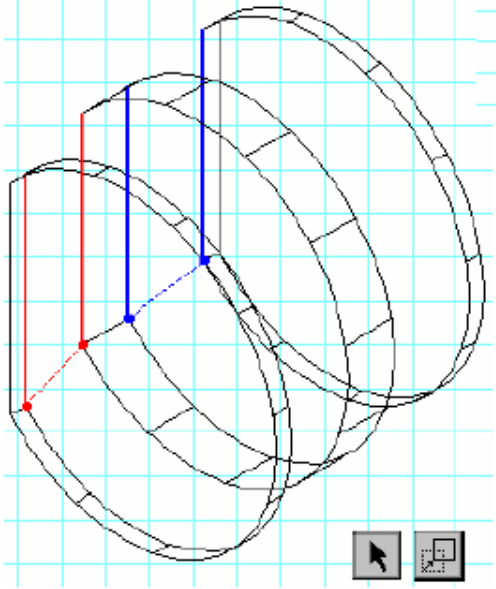
Step 3: Select the shape you have drawn. (left)

STEP 4: Use the 3D effects tool to transform your shape into 3D! Set the finish depth to 4mm and click 'Retain original'.





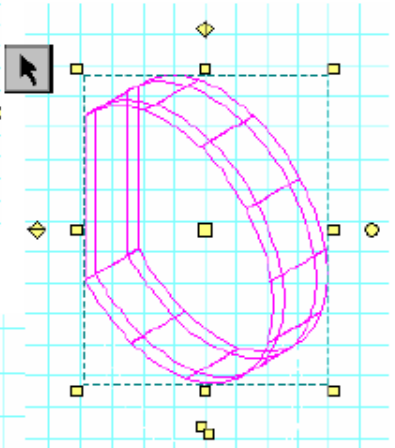
STEP 5: Repeat step 4 and possibly 3 until you have two shapes 4mm thick and one shape 12mm thick. Move objects by holding down the left-hand mouse button on the central node (yellow box) and dragging the objects around the screen.

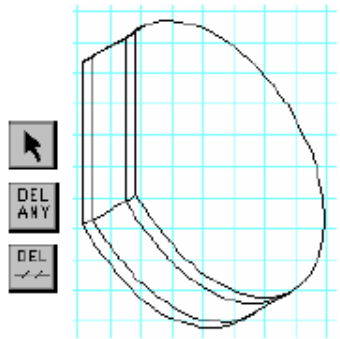


STEP 6: Use the move tool with the endpoint snap drawing tool to accurately position the three 3d shapes together. Look for points that should join up when complete shown in blue and red. Cont…

STEP 6: Cont… Select one side and move it then the other side and move it!

STEP 7: Select and explode the shape. Go to edit then explode select 'fully to simple objects' and click ok.





STEP 8: Trim lines that would be hidden by solid parts of the object.

EXTRA: Draw a light emitting diode (LED) bulb on using the ellipse tool.

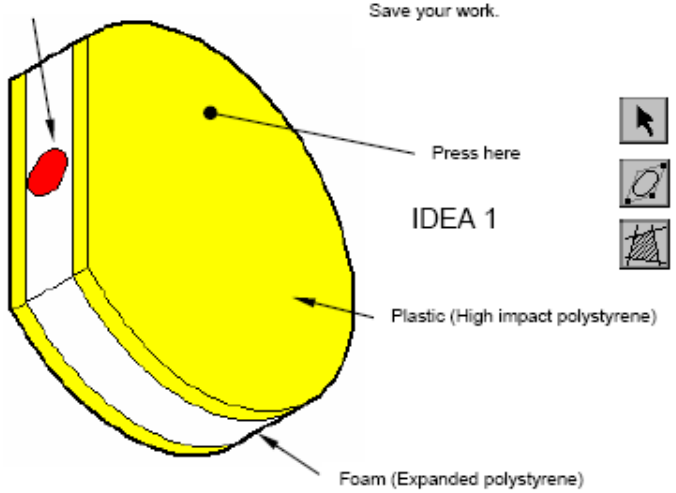
Add some colour using fill..

Change the outer linetype to thick and 0.8mm.

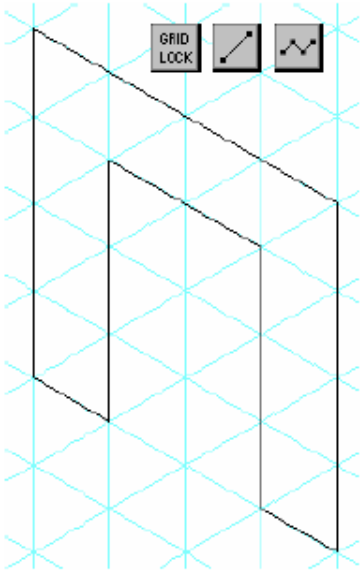
Possibly add a logo or graphical design to one side or notes to explain your idea.

Save your work.

Light emitting diode (LED)



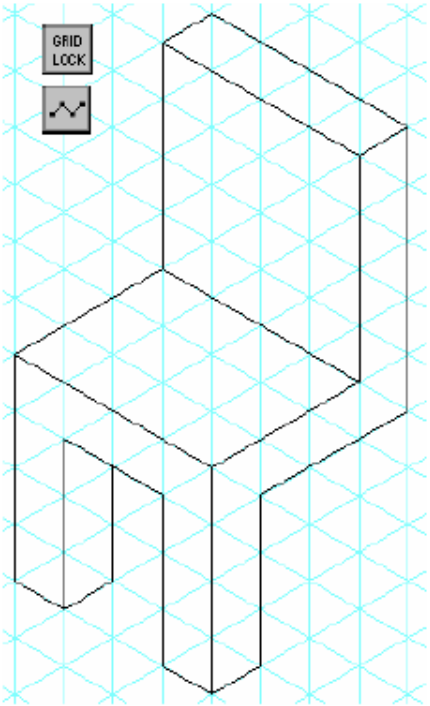
Drawing Exercise 9: Chair



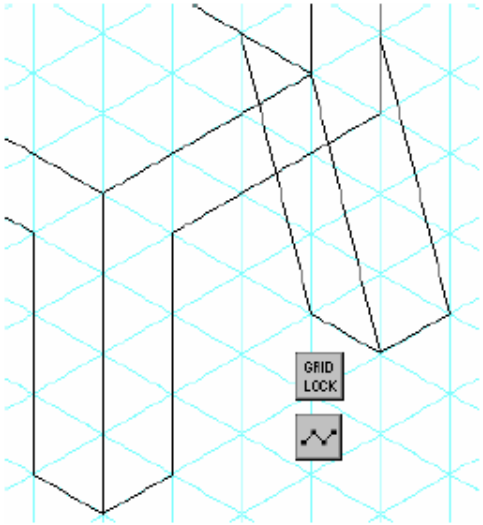
STEP 1: Double click on the grid lock tool so the grid options appear. Make the following changes to get an isometric grid.

- Grid angle: ISOMETRIC
- Coordinates: AXIAL

STEP 2: Click and hold on the line tool to get a continuous line tool (shown). Draw the front legs of the chair.



STEP 3: Draw the majority of the chair staying on the isometric grid lines as shown. Keep the grid lock tool on for accuracy and speed.



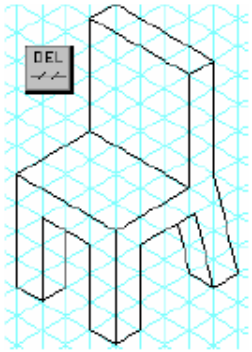
STEP 4: Draw the back leg using grid lock however make it look as though it is angled out from the back of the chair by moving off the grid lines.

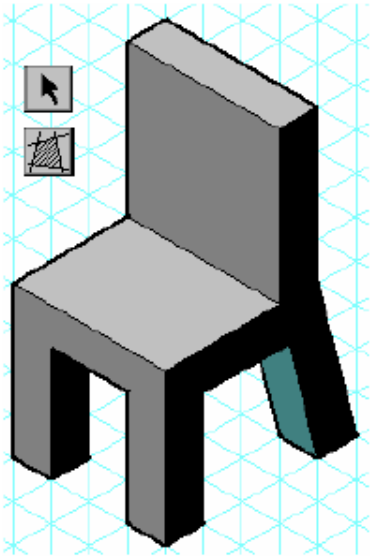
EXTRA: Select the outside lines of the chair together by selecting them with the shift key pressed down.

Change the line type of the outside line to thick and 0.8mm.

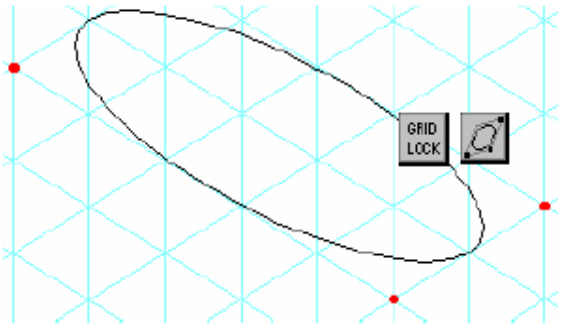
Fill the separate parts of the chair with colour so that it looks like it is being lit by a light source.

STEP 5: Trim unwanted lines.



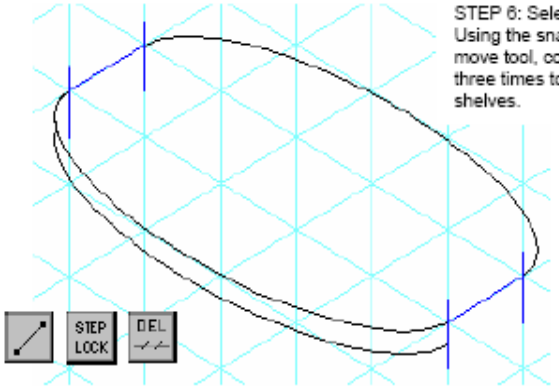


Drawing Exercise 10: Shelves

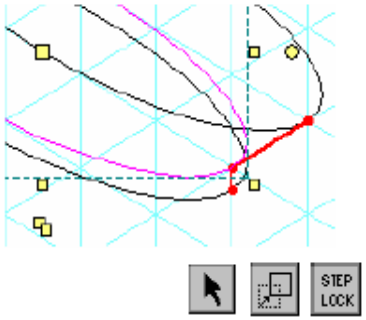


STEP 1: Double click on the grid lock tool so the grid options appear. Make the following changes to get an isometric grid.

- Grid angle: ISOMETRIC.
- Coordinates: AXIAL.
- Grid spacing: X=20, Y=20.
- Snap spacing: X=5, Y=5.

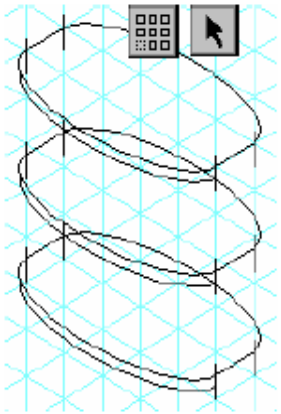


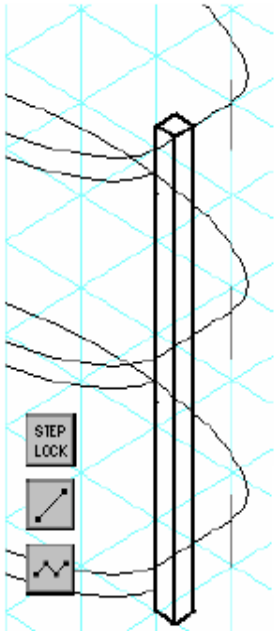
STEP 3: With step lock on draw the lines shown in blue then use the trim tool to remove unwanted parts of the ellipse.



STEP 2: Copy the ellipse using the move tool and step lock as shown above.

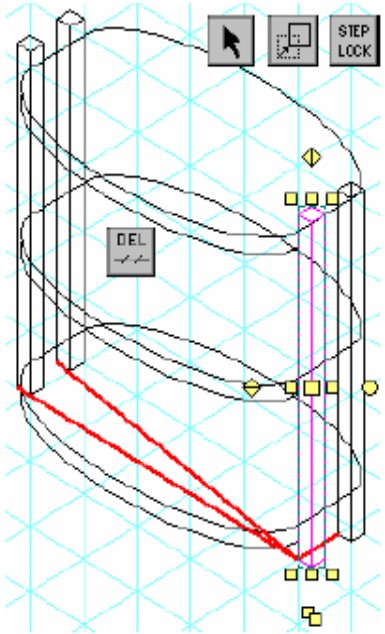
STEP 4: Select the shelf. Click and hold on the move tool to change to rectangular array. Create one column with 3 rows spaced at 45mm intervals.



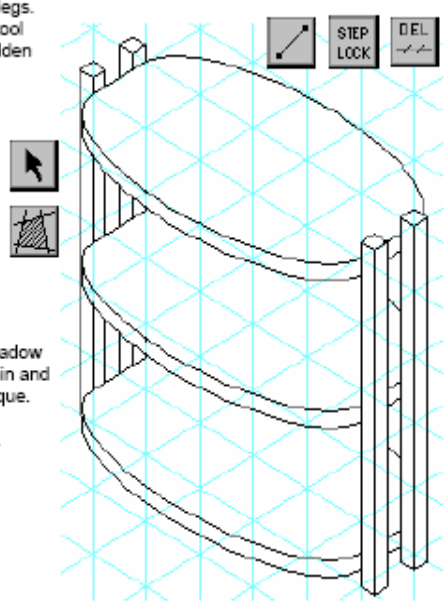


STEP 5: Draw one leg support for the shelves with the step lock on.

STEP 6: Select the front leg. Using the snap lock and move tool, copy the leg three times to complete the shelves.



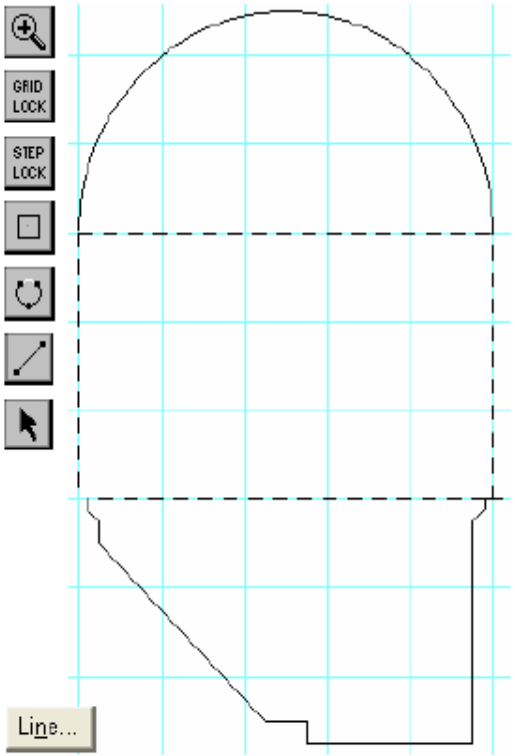
STEP 7: Draw lines on the bottom of the front edges of the shelves between the two front legs. Use the trim tool to remove hidden lines.



EXTRA: Add shadow and apply the thin and thick line technique.

Save your work.

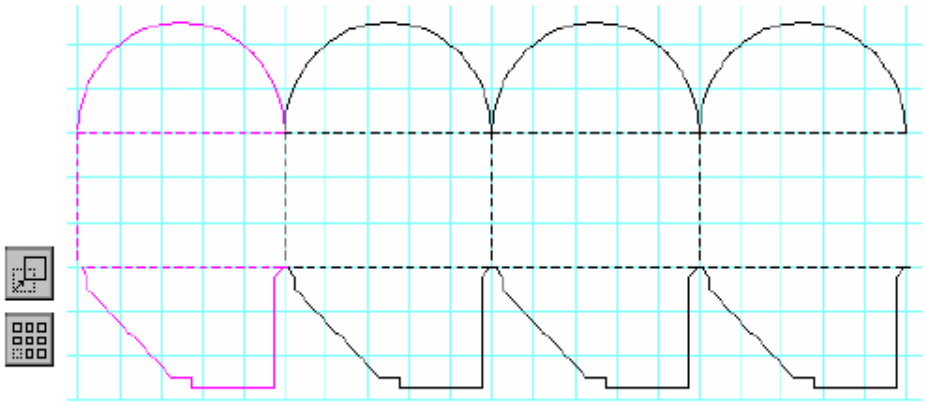
Drawing Exercise 11: Card Development



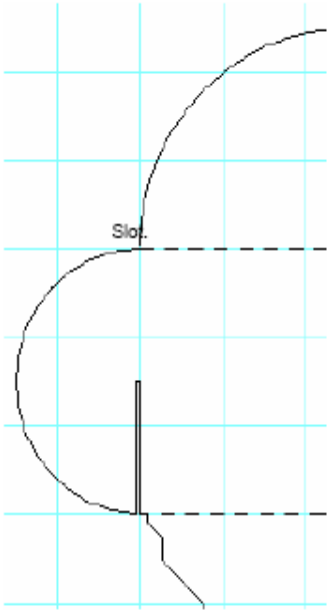
STEP 1: Use grid and step lock to help draw the shape shown above.

STEP 2: The dashed lines can be changed from continuous ones first by selecting them with the select tool then by going to the line options.

STEP 3: Select the whole shape using the select tool.

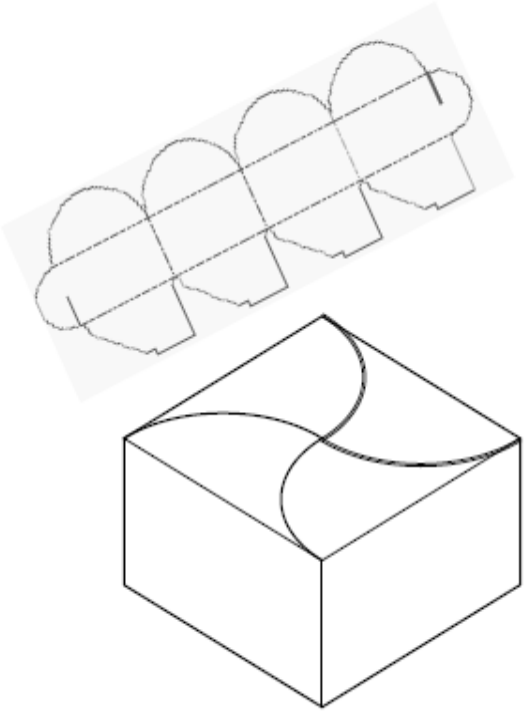


STEP 4: Either use the move/copy tool and repeat the shape another three times as shown or use the rectangular array tool setting it to 1 row, 4 columns and x spacing 50mm.



STEP 5: Draw this detail.
Use the line arc and lock aids. Draw the same shape on the opposite side with the slot coming down from the top.

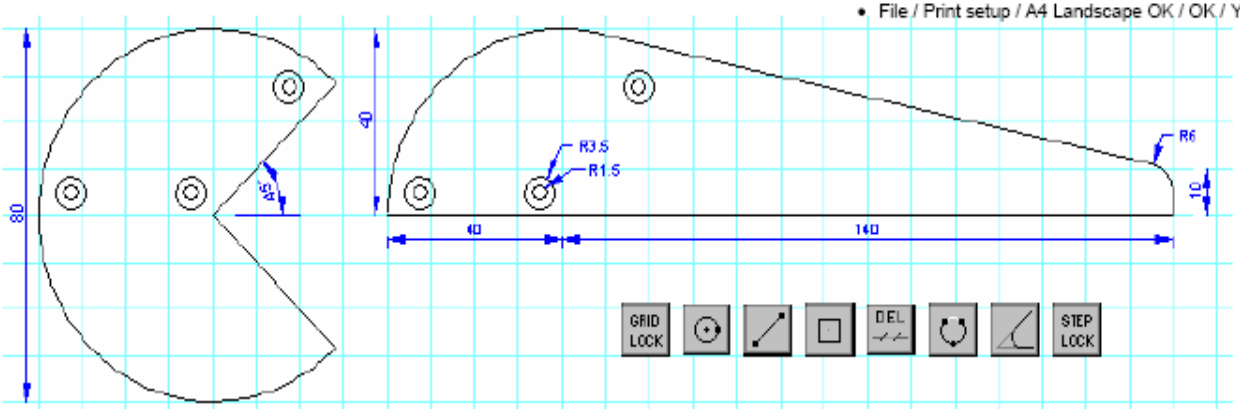
STEP 6: print off and cut out and make your design. Or use a plotter cutter to cut and score your work for you then fold it to make your box.



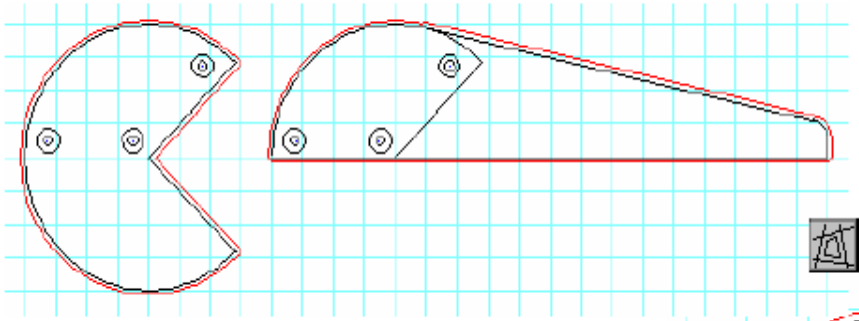
Drawing Exercise 12: Centre Finder

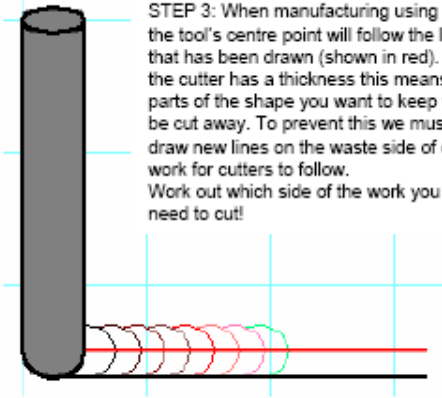
STEP 1: Change the print setup to A4 landscape:

- File / Print setup / A4 Landscape OK / OK / Yes



STEP 2: Draw the centre finder parts as shown below by the black lines. Use a range of tools as well as the grid lock, step lock and attach settings. The 6mm radius on the far right of the drawing can be made using the filleted arc command which is found by holding the arc command button down. The tangent attach setting is useful and so is the centre of arc or circle attach settings to get things positioned accurately. Attach settings can be changed by double clicking the attach tool.





STEP 3: When manufacturing using CAM the tool's centre point will follow the line that has been drawn (shown in red). As the cutter has a thickness this means parts of the shape you want to keep will be cut away. To prevent this we must draw new lines on the waste side of our work for cutters to follow.
Work out which side of the work you need to cut!

EXTRA: Add engraving details.

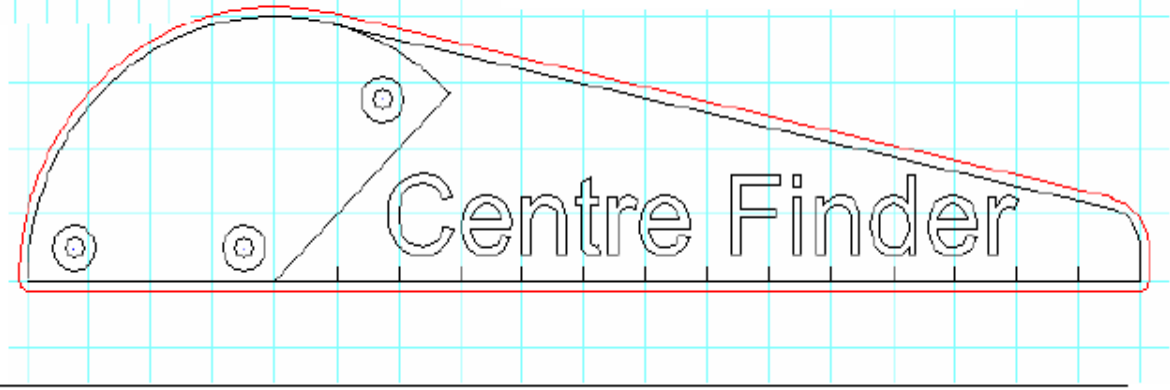
Save your work.

Use computer aided manufacturing to cut out your shapes.

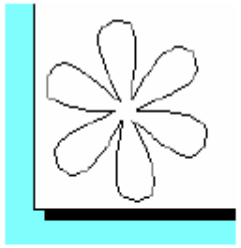
Attach the parts together with rivets.

See if it works!

STEP 4: Use the offset tool to draw the cutting paths. Set the offset distance to that of the radius of the tool you are going to use a 3mm diameter tool would be ideal (Radius 1.5mm). Make the paths / lines for the holes blue and the paths / lines for the outer shape red



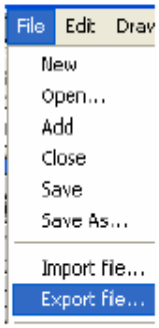
How to use 2D Design Drawings in Other Programmes



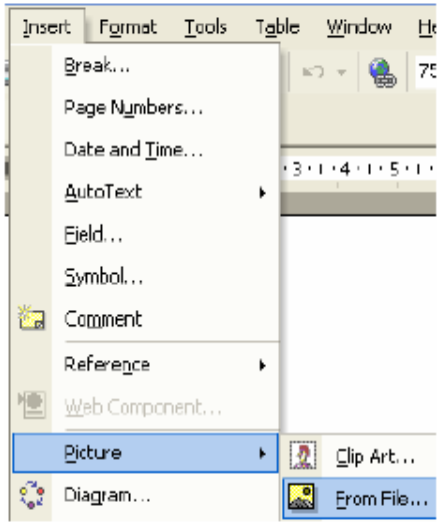
STEP 1: Draw your design and save it. Move it to the bottom left-hand corner of the drawing area / page.

STEP 2: Go to File and select 'Export file…'.

STEP 3: To use your design with Microsoft software save your design as a Windows metafile (WMF). To use it with Pro desktop save it as a Drawing transfer file (DXF). Take the arc command off when you save the file.

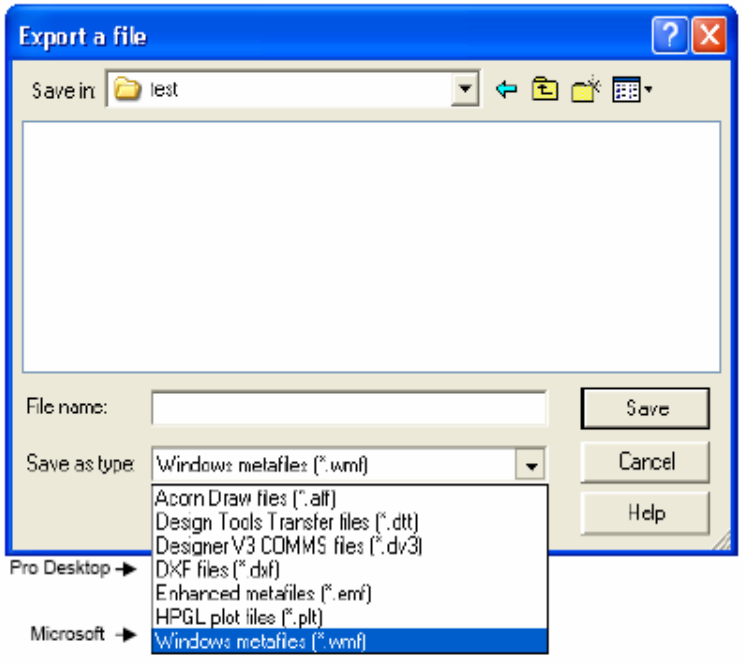


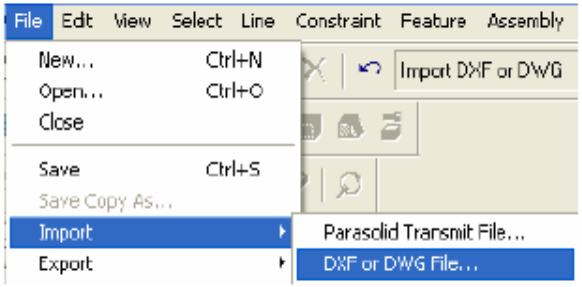
STEP 4: Microsoft Word: Open your document and to add your design go to Insert then Picture and select the from file option. You can now browse to find the file and insert it.



STEP 5: Pro Desktop: Go to File / New / Design / Ok. Make sure you put your design on the most appropriate workplane if need be create a new sketch.

STEP 6: Pro Desktop: Go to File / Import / DXF or DWG File. Browse to find your DXF file. Click next then finish. Note your drawing must be drawn correctly for it to be used effectively in pro-desktop!

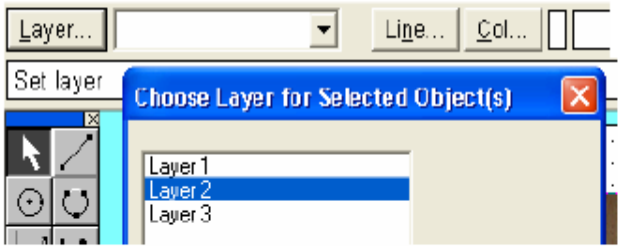




Tracing images using 2D Design

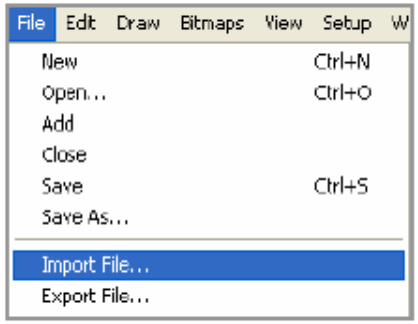
- INTRO: Most computer aided manufacturing tools will not recognise lines on drawn sketches or internet images. If you wanted to use one of these types of image it will need to be drawn again in Techsoft 2D Design.

- Step 1: Find or scan an image you want to trace. Save or copy the image.
- Step 2: Open 2D design V2. Paste the image or go to File Import File; find the image and click Open.
- Step 3: With the image selected (Yellow boxes appear) change the layer to 'Layer 2'.



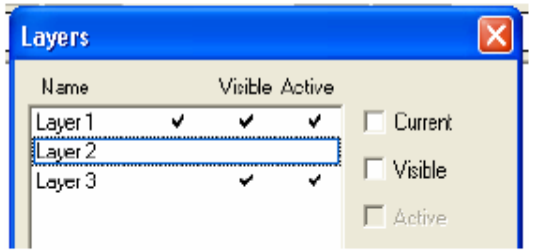
- Step 4: Make sure the layer goes back to 'Layer 1' when the picture is no longer selected. This means you're working on layer 1.

- Step 5: Use the continuous straight and curved line tools to trace the image. As your image wasn't drawn using the grid make sure both grid lock and step lock are off. To improve the quality of your work use the attach tool when you are connecting one line to another on the endpoint and zoom in to make it easier to follow details.



- Step 6: If the image you are tracing is too dark change the line colour so that it stands out better.

- Step 7: Click on layers when nothing is selected. De-select the tick by Visible on Layer 2.



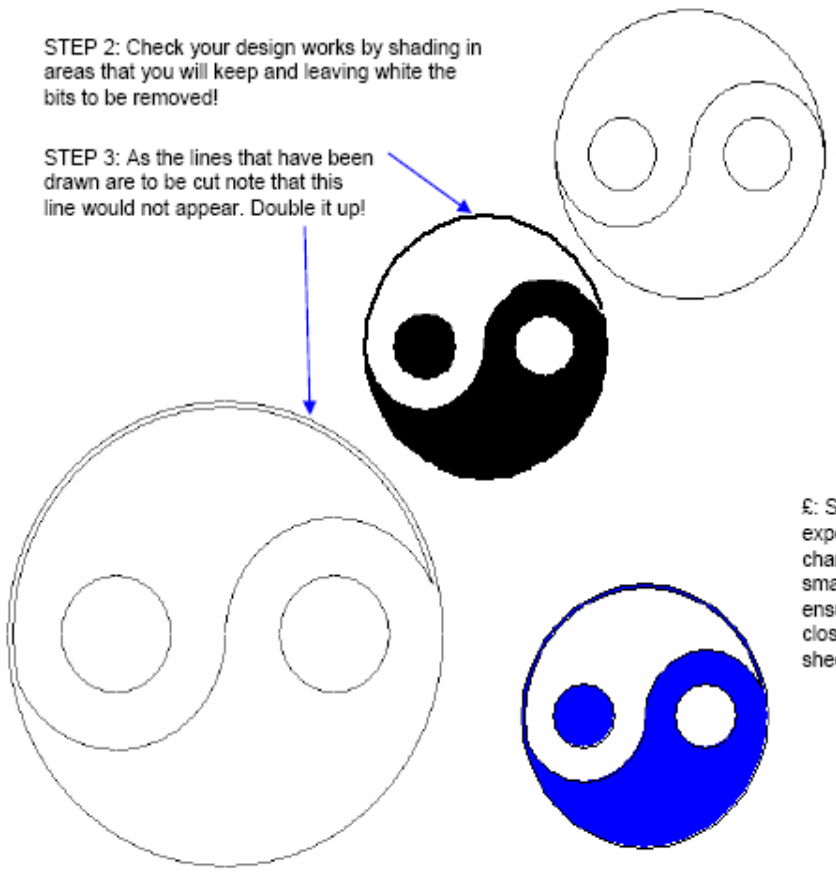
Using 2D Design to make vinyl stickers

- INTRO: Vinyl stickers are very versatile; they can be used on cars, furniture, products and used as masks to screen print onto fabric or paper. Vinyl is a type of plastic. In order to create an image with it, it must be cut so that parts can be removed. If you make a cut on a piece of paper it can only be seen if a part is removed to reveal whatever is behind it. This may involve doubling up some lines.

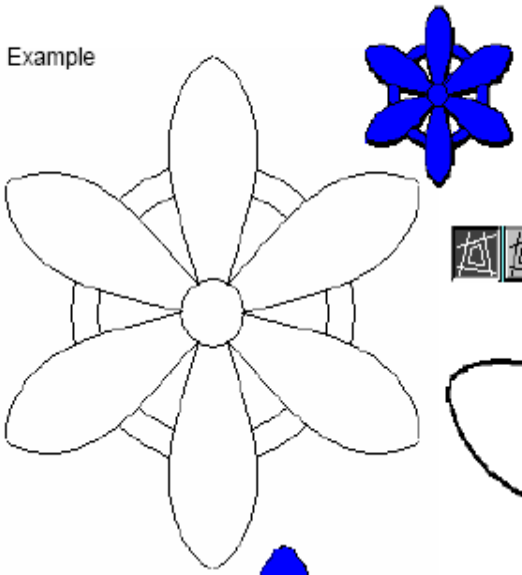
STEP 1: Create your design using 2D Design and print off.

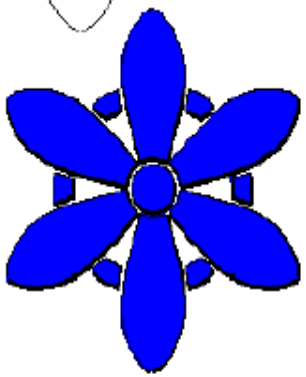
STEP 2: Check your design works by shading in areas that you will keep and leaving white the bits to be removed!

STEP 3: As the lines that have been drawn are to be cut note that this line would not appear. Double it up!

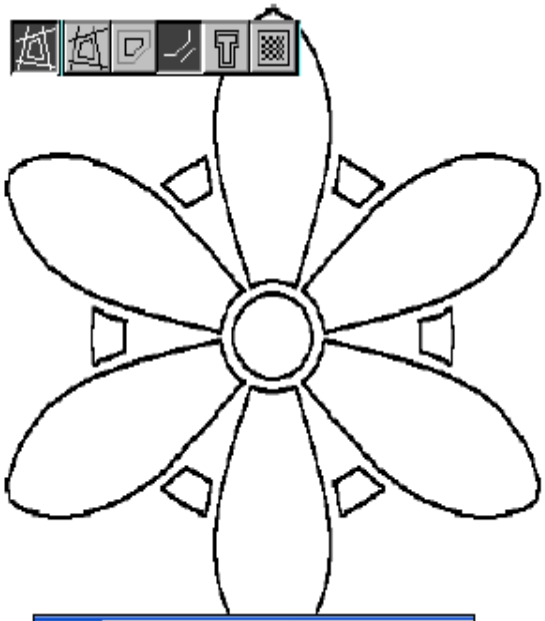


Example

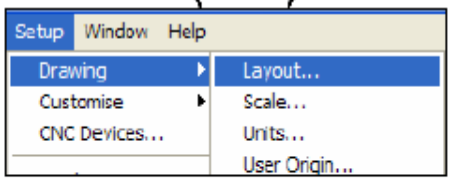


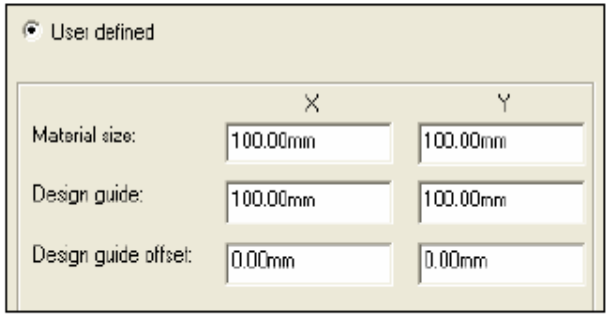


NOTE: When two dark areas are side by side those lines / cuts will not show. Double them up! The contour tool shown below may be useful to do this.



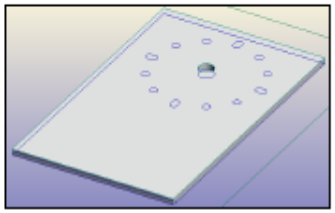
£: Save materials as vinyl is expensive. When plotting stickers, change the material size to be as small as possible. This will help to ensure that your design is plotted close to the edge when using large sheets or vinyl rolls.

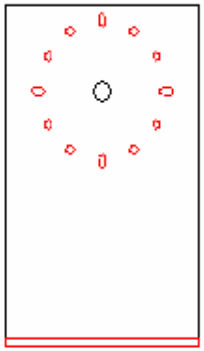




Using 2D Design to create 3D objects in Pro Desktop

Use information from page 20 on layers and 19 on exporting and importing DXF files from 2D design to Pro desktop.

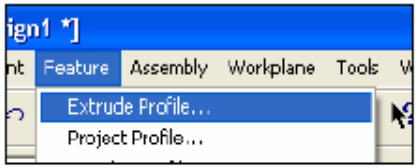




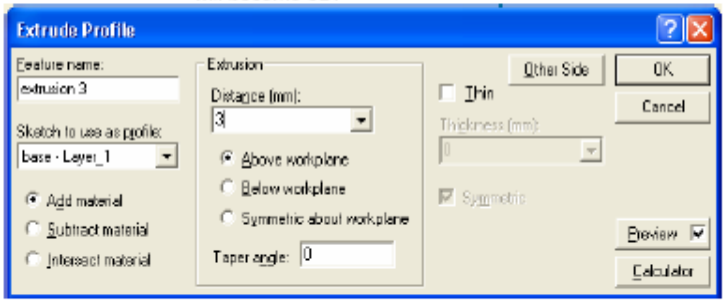
Step 1: Create your design with Techsoft 2D Design. Lines must join accurately without gaps or overlaps. You also need to avoid drawing over or on top of existing lines. Objects that are going to be different thicknesses three dimensionally need to be on different layers (See page 20). Two layers have been used and red and black have been used to show them. Black = layer one. Red = Layer two.

Step 2: Save your design first then export a 'DXF' (Drawing transfer file) of your design (See page 19).

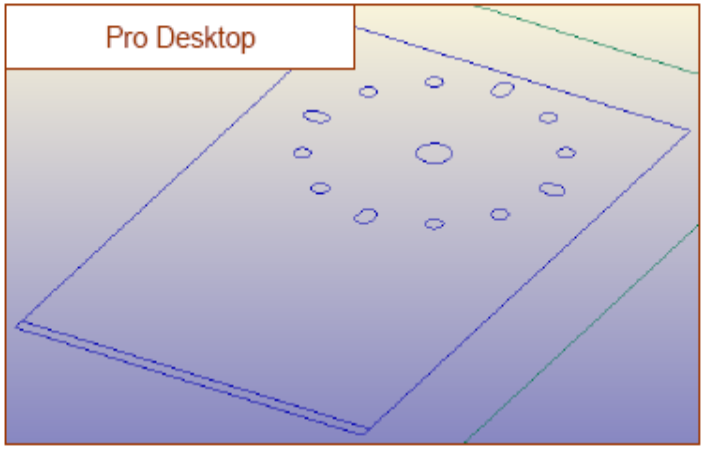
Techsoft 2D Design



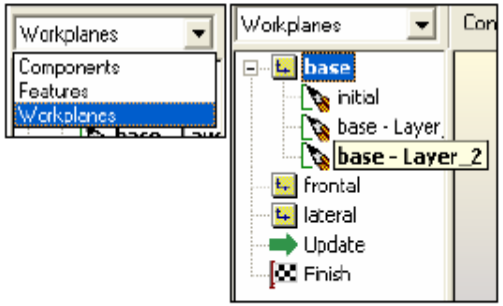
Step 4: Go to Feature/ Extrude Profile. Set the distance to 3mm and click OK. Note that the only object on Layer 1 of the Techsoft 2D Design drawing will become 3D.



Pro Desktop



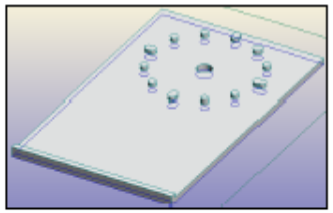
Step 3: Open Pro desktop go to File/ New/ Design and import your 'DXF' file. File import/ DXF or DWG File/ Browse/ Open/ Next/ Finish. Your drawing should appear in 3D on the base workplane. Layer 1 will be active and ready to make the 3D image without doing anything else!



Step 5: Select Layer 2. Change the features to Workplanes by clicking on the arrow to the right of where it says Features. Click the + symbol left of where it says Base and double click on 'base – Layer_2' so that it goes bold. This indicates that it is active.

Step 6: Repeat step 4. This time layer 2 is being extruded (made 3D). Make sure it sticks out further by setting the measurement to 5mm.

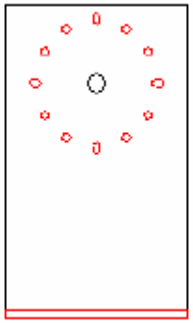
Extension: Other parts can be added to this model or the model can be rendered by creating a new album file and going to Image new image and selecting the design file in use.



Exporting files from 2D Design to import and model in Pro Desktop

Please use in conjunction with folder 'Using 2D Design with Pro-desktop' in the accompanying CD-Rom.

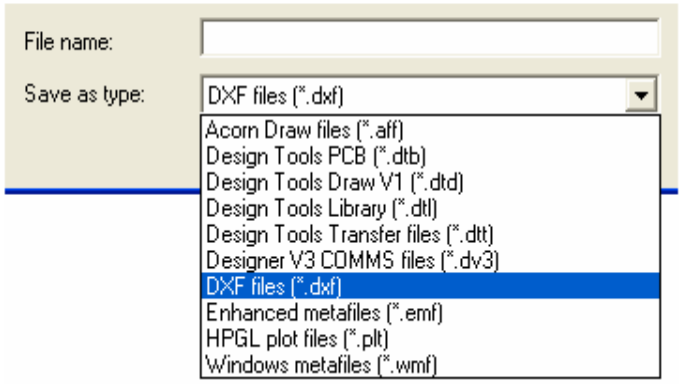
Techsoft 2D Design



Step 1: Create your design with Techsoft 2D Design.

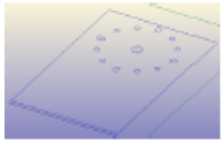
Step 2: Save your design first.

Step 3: Export it as a DXF file. Go to File / Export file. Change 'Save as type' to DXF.

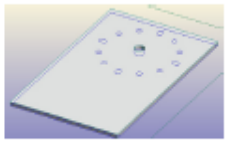


Pro Desktop: Design

Step 4: Open Pro-desktop. Go to File/ New/ Design and import your 'DXF' file. File import / DXF or DWG File / Browse / Open / Next / Finish.



Step 5: Go to Feature/ Extrude Profile. Set the distance to 3mm and click OK.

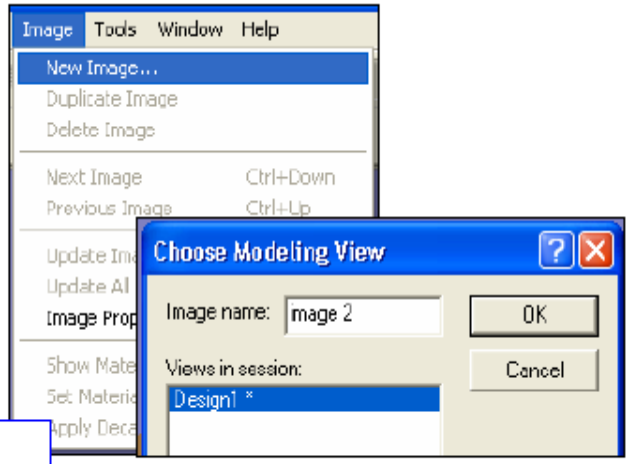


Step 6: Go to File. Save your work.

Step 7: Go to File / New / Album.

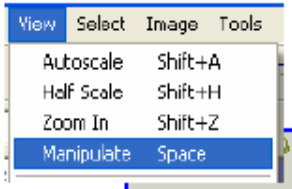
Step 8: Go to Image / New Image.

Step 9: Select your clock design. Click OK.

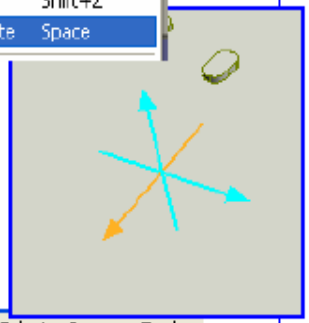


Pro Desktop: Album

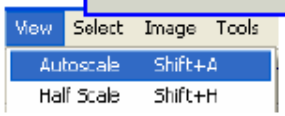
Pro Desktop: Album



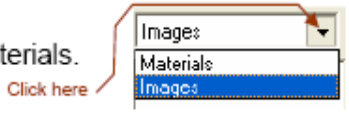
Step 10: Change the view. Go to View / Manipulate.



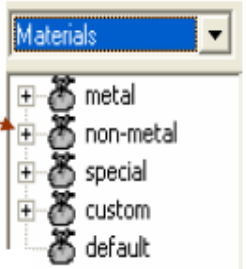
Step 11: Spin the object. Click and hold on an axis with your mouse. Drag the object around then release the mouse button.



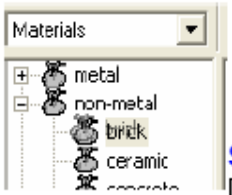
Step 12: View the whole clock. Click View / Autoscale.

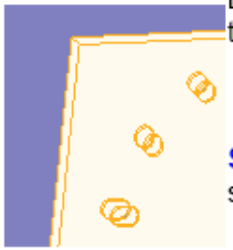


Step 13: Change Images to Materials.



Step 14: Find the material you want.



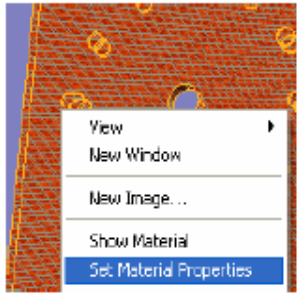


Step 15: Select the material. Drag it over the edge of your clock then release the mouse button.

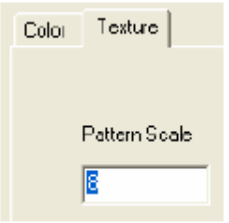
Step 16: Click the traffic light to show the material on your clock.

Pro Desktop: Album

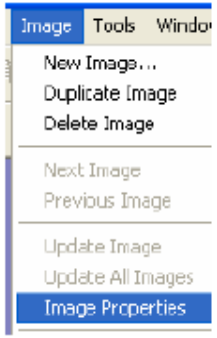
Step 17: Save your work. Go to File / Save.



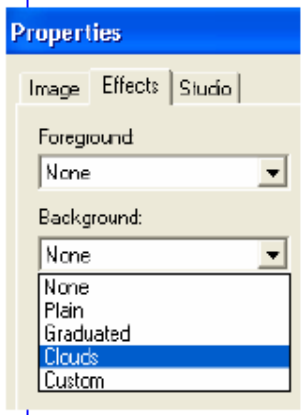
Step 18: Change the material properties. Move your mouse over the clock so it highlights. Right click / Set Material Properties.



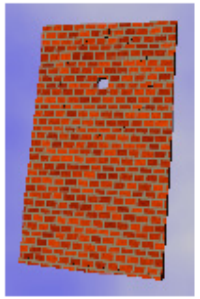
Step 19: Change the colour and scale of the material (texture) then click OK.



Step 20: Change the background, camera and lighting. Go to Image / Image Properties.



Step 21: Change the background in Effects and the camera and lighting in Studio.



Step 22: View the whole clock. Repeat step 12.

Step 23: Save your work. File / Save. Export an image file. File / Export / JPEG / Save.