UNIT 2– Draw Commands

==========

Objectives: At the end of this Unit, you will be able to familiarise with the following Draw Commands:

Line, Construction Line, Polyline, Polygon, Rectangle, Arc, Circle, Revcloud, Spline, Ellipse, Ellipse Arc, Make Block, Write Block, Insert Block, Point, Hatch, Multiline Text and Multiline.

==========

(1) The **LINE** command

- Toolbar 

// The tooltip will appear when you hold the mouse pointer over the Line button.
- Pull-down manual **Draw → Line**
- Command line **line** or **l**

- **Figure 2-1** shows the use of Line command.

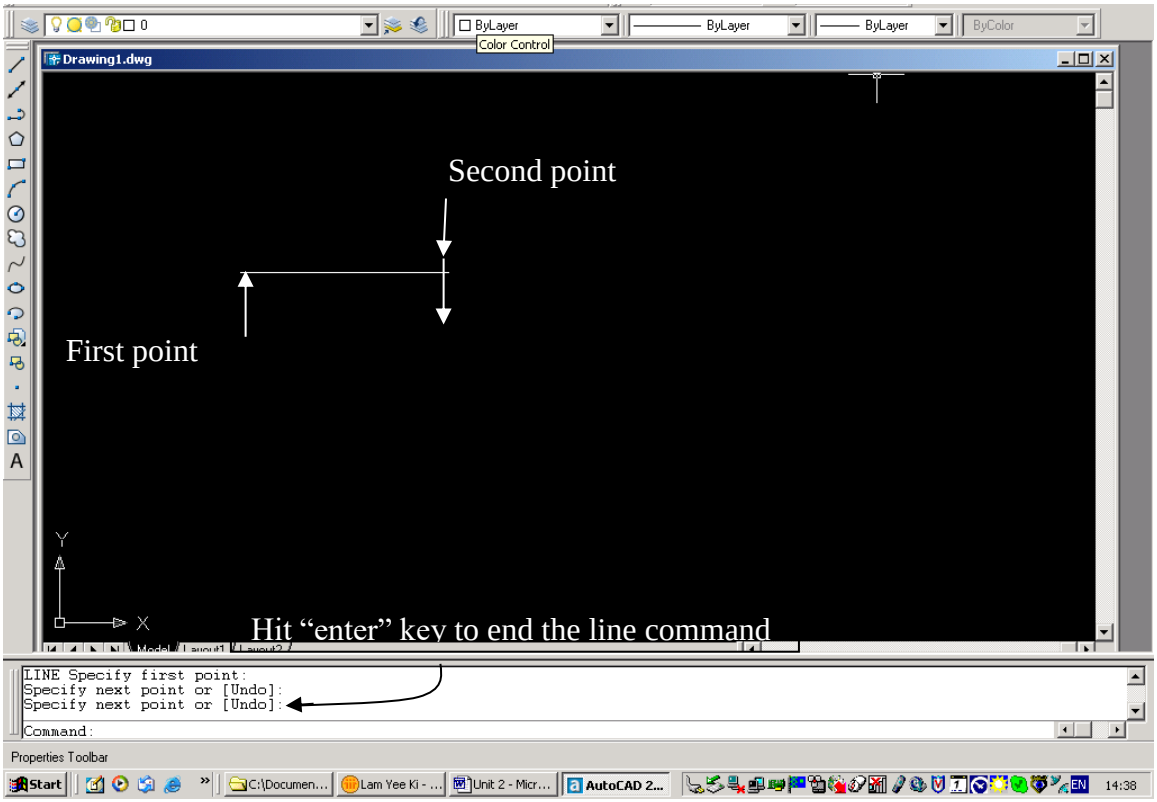

Figure 2-1: Use of Line command

(2) The **CONSTRUCTION LINE** command

- Toolbar 

- Pull-down manual Draw → Construction Line
- Command line **xline** or **xl**

- **Rays** and **Construction Lines** are lines that extend to infinity in one and both directions, respectively.

// Ray command: Draw → Ray

- Construction lines are used as references for creating other objects.
- For details, you can refer to Help command (F1).

(3) The **POLYLINE** command

- Toolbar 

- Pull-down manual Draw → Polyline
- Command line **pline** or **pl**

- A polyline is a connected sequence of line segments created as a **SINGLE** object. You can create straight line segments, arc segments, or a combination of the two.

Example 1: To draw a clock minute & hour hand using Polyline command

- **Draw → Circle** // radius = 50
- **Draw → Polyline** // start width = 5; end width = 0
- When you draw Polyline in this example, don't forget to turn-on **OSNAP** (F3). You can Object Snap at the centre of the circle, which is the Start Point of the Polyline as shown in **Figure 2-2**.

// to ensure the Start Points of the clock arms start at the centre of the circle.

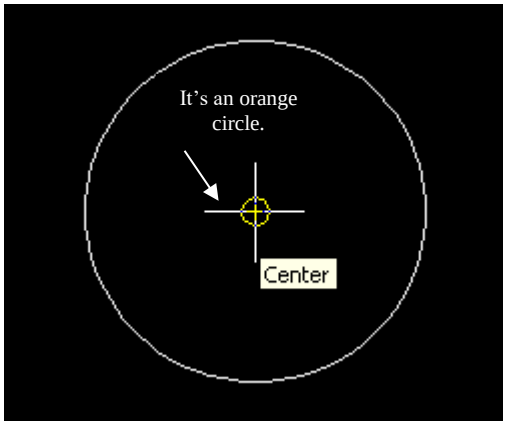

Figure 2-2: Use of OSNAP

- Specific next point or [Arc/Halfwidth/Length/Undo/Width]: **w**

  // specify Staring Width

- Specify starting width <0.0000>: **5**

  // specify Ending Width

- Specify ending width <5.0000>: **0**

- Specific next point or [Arc/Halfwidth/Length/Undo/Width]: **(pick any point for the long arm)**

  // turn-on ORTHO (F8) and bring cursor upwards to ensure it is vertical

- Right click the mouse to repeat the Polyline command.

- Repeat the above steps to create the short arm.

  // bring cursor to the left

- The final drawing is shown in **Figure 2-3**.

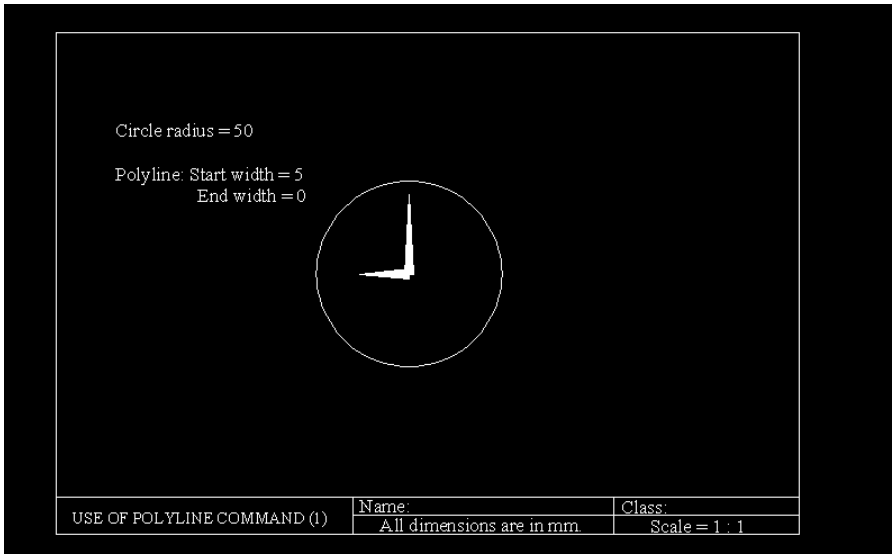

Figure 2-3: Example 1

Example 2: To draw a keychain base

- Draw → Polyline
- Start point // choose any point
- Specify next point or [Arc/Halfwidth/Length/Undo/Width]: **A**

  // choose Arc
- [Angle/CEnter/Direction/Halfwidth/Line/Radius/Second pt/Undo/Width]: **A**

  // choose Angle
- Specify included angle: **-180**
- Specify endpoint of arc: **80** // turn on ORTHO (F8)
  // set chord length of the arc
- [Angle/CEnter/Direction/Halfwidth/Line/Radius/Second pt/Undo/Width]: **L**

  // choose Line
  // bring cursor down with ORTHO on (F8)
- Specify next point or [Arc/Halfwidth/Length/Undo/Width]: **80**
- Specify next point or [Arc/Halfwidth/Length/Undo/Width]: **80**

  //bring cursor to the left
- Specify next point or [Arc/Halfwidth/Length/Undo/Width]: **c**

  // close
- You will get the drawing as shown in **Figure 2-4**, which is a single object.

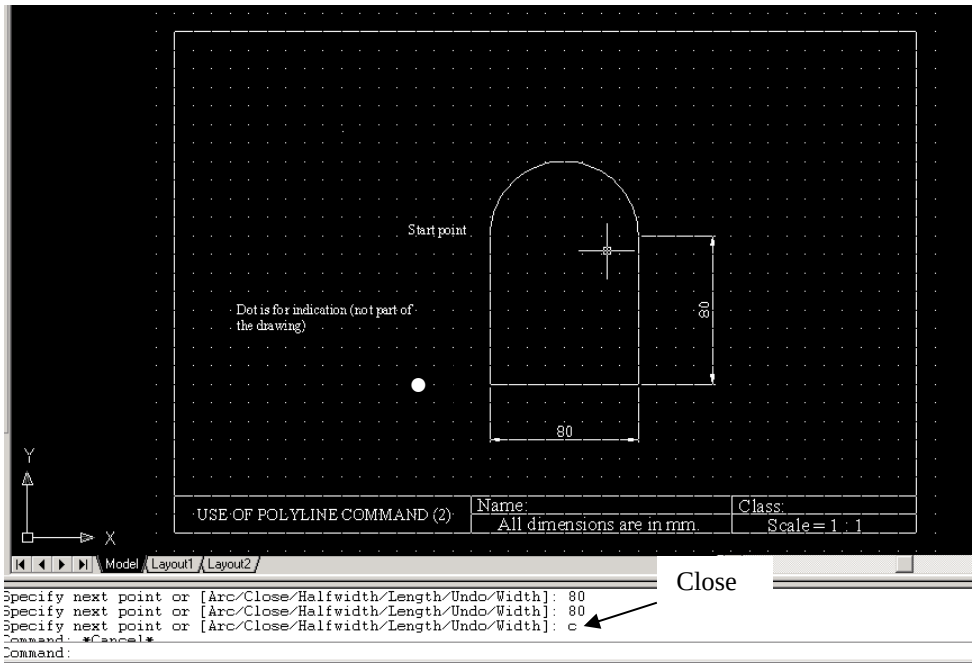

Figure 2-4: Example 2

(4) The **POLYGON** command

- Toolbar 

- Pull-down manual Draw → Polygon
- Command line **polygon** or **pol**

- Draw → Polygon
- Enter number of sides: **5**
- Specify centre of polygon or [Edge]: // pick any point
- You can choose either inscribed or circumscribed in this example, as shown in **Figure 2-5**.

Inscribed: Polygon is drawn inside the imaginary circle with intersection of polygon edges touching the circle
Circumscribed: Polygon is drawn outside the imaginary circle with circle touching the midpoint of polygon edges.

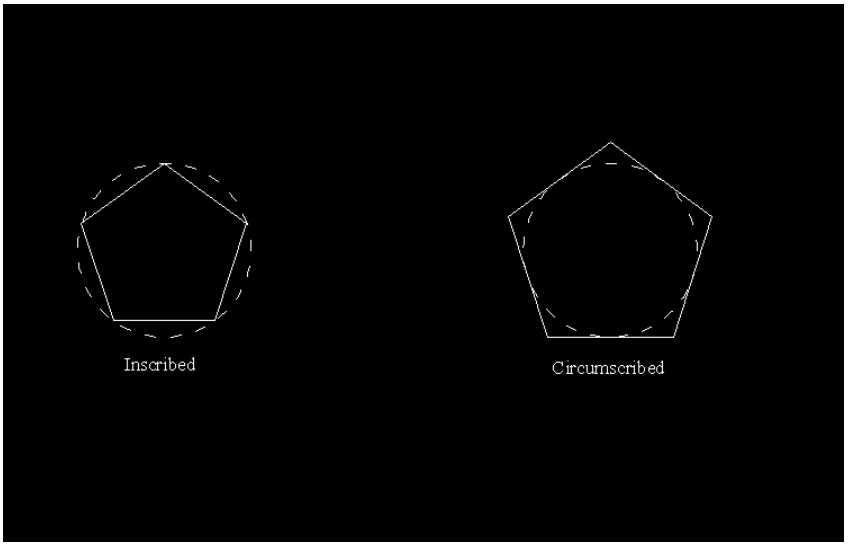

Figure 2-5: Inscribed/Circumscribed

(5) The **RECTANGLE** command

- Toolbar 

- Pull-down manual Draw → Rectangle
- Command line **rectangle** or **rec**

- Draw → Rectangle
- Specify first corner point or [Chamfer/Elevation/Fillet/Thickness/Width]:

  // pick any point as first corner
- Specify other corner point or [Dimensions]:

  // pick any point as other corner point
- You will get the drawing as shown on the left in **Figure 2-6**.
- Right click the mouse to repeat the Rectangle command.
- Specify first corner point or [Chamfer/Elevation/Fillet/Thickness/Width]:

  // pick any point as first corner
- Specify other corner point or [Dimensions]: **d**

  // set dimensions
- Specify length for rectangles <0.0000>: **200**
- Specify width for rectangles <0.0000>: **100**
- Specify other corner point or [Dimensions]:

  // left click the mouse to end the command
- You will get drawing as shown at the centre in **Figure 2-6**.
- Right click the mouse to repeat the Rectangle command.
- Specify first corner point or [Chamfer/Elevation/Fillet/Thickness/Width]: **w**

  // set width

- Specify line width for rectangles <0.0000>: **2**
- Specify first corner point or [Chamfer/Elevation/Fillet/Thickness/Width]: **f**

  // set fillet radius
- Specify fillet radius for rectangles <0.0000>: **5**
- Specify first corner point or [Chamfer/Elevation/Fillet/Thickness/Width]:

  // pick any point as first corner point
- Specify other corner point or [Dimensions]:

  // pick any point as other corner point
- You will get the drawing as shown on the right in **Figure 2-6**.

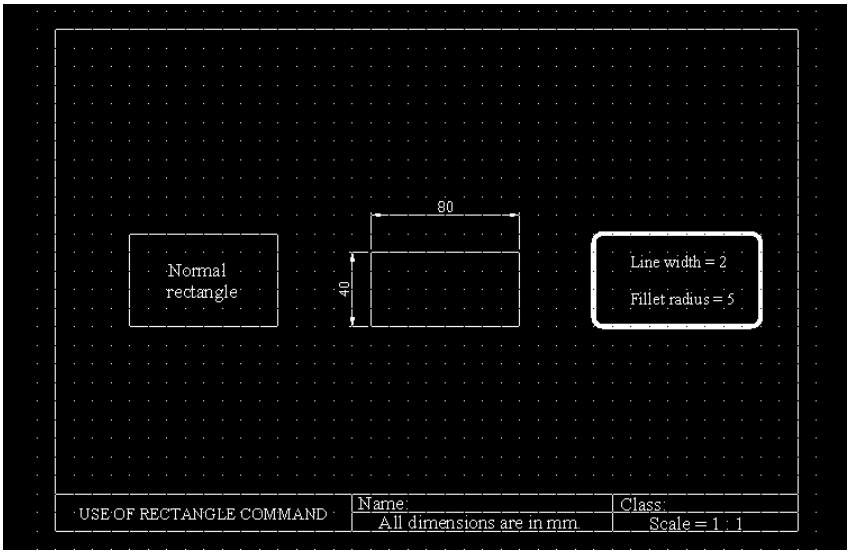

Figure 2-6: Use of rectangle command

(6) The **ARC** command

- Toolbar 

- Pull-down manual Draw → Arc
- Command line **arc** or **a**

- **Figure 2-7** shows the use of Arc command.

There are many ways to draw arc. Simple way is to draw a 3 points arc by entering the 3 points in the drawing space and an arc will pass through the 3 points.

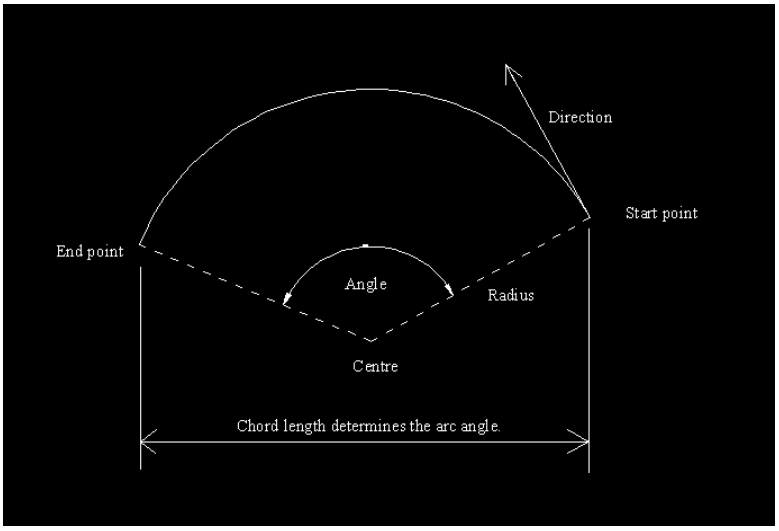

Figure 2-7: Use of Arc command

(7) The **CIRCLE** command

- Toolbar 

- Pull-down manual Draw → Circle
- Command line **circle** or **c**

- **Figure 2-8** shows the use of Circle command.
- Use Line command to draw an equilateral triangle.
- **Draw → Circle → Tan, Tan, Tan**

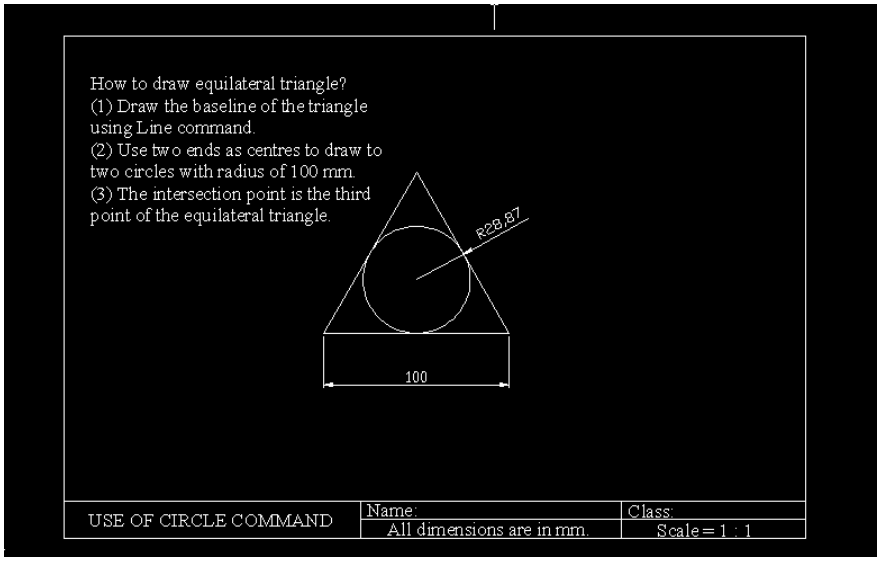

Figure 2-8: Use of Circle command

- What is the radius of the circle?

(8) The **REVCLOUD** command

- Toolbar 

- Pull-down manual Draw → Revision Cloud
- Command line **revcloud**

- This command is used to creates a polyline of sequential arcs to form a cloud-shaped object.
- **Figure 2-9** shows the use of Revision Cloud command.

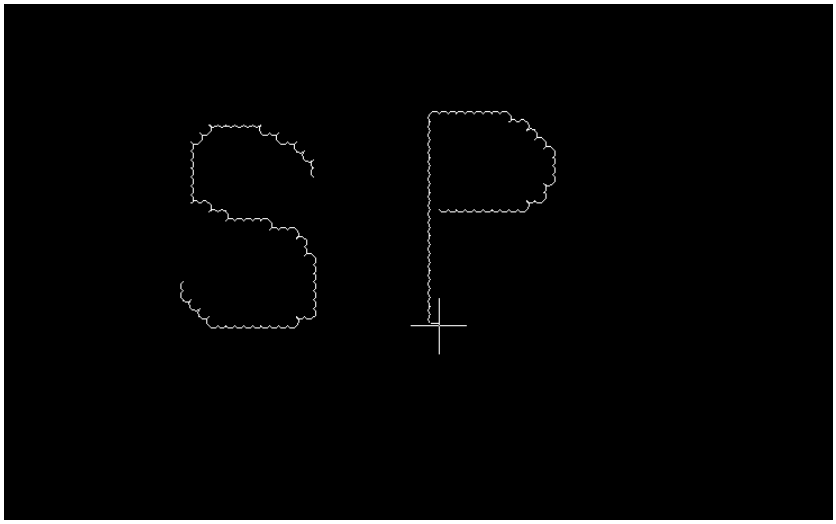

Figure 2-9: Use of Revision Cloud command

This command is not often used but good for creative drawing purposes.

(9) The **SPLINE** command

- Toolbar 

- Pull-down manual Draw → Spline
- Command line **spline** or **spl**

- This command is useful for creating irregularly shaped curved. It is used to construct very smooth curves through fixed points.
- **Figure 2-10** shows the use of Spline command.

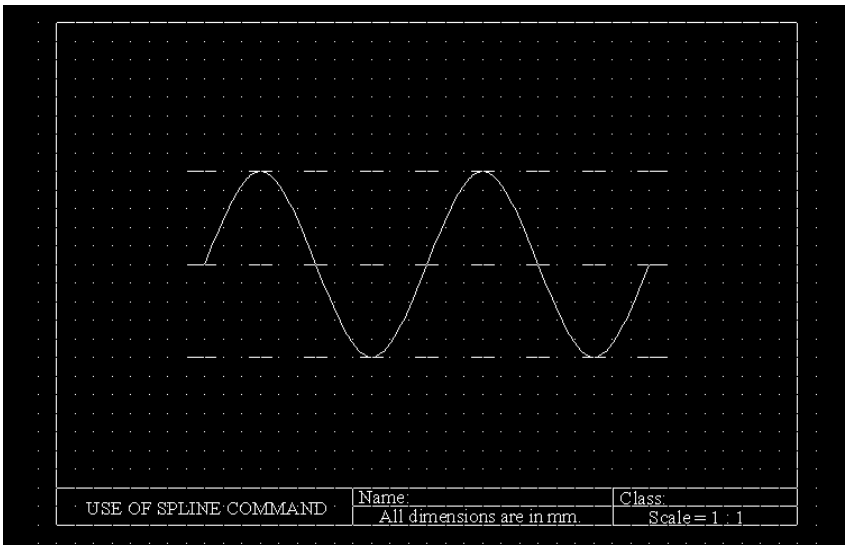

Figure 2-10: Use of Spline command

(10) The **ELLIPSE** command

- Toolbar 

- Pull-down manual Draw → Ellipse
- Command line **ellipse** or **el**

- **Figures 2-11 and 2-12** show the use of Ellipse command.
- Specify axis endpoint of ellipse or [Arc/Centre]: pick any point
- Specify other endpoint of axis: **100**
- Specify distance to other axis or [Rotation]: **40**

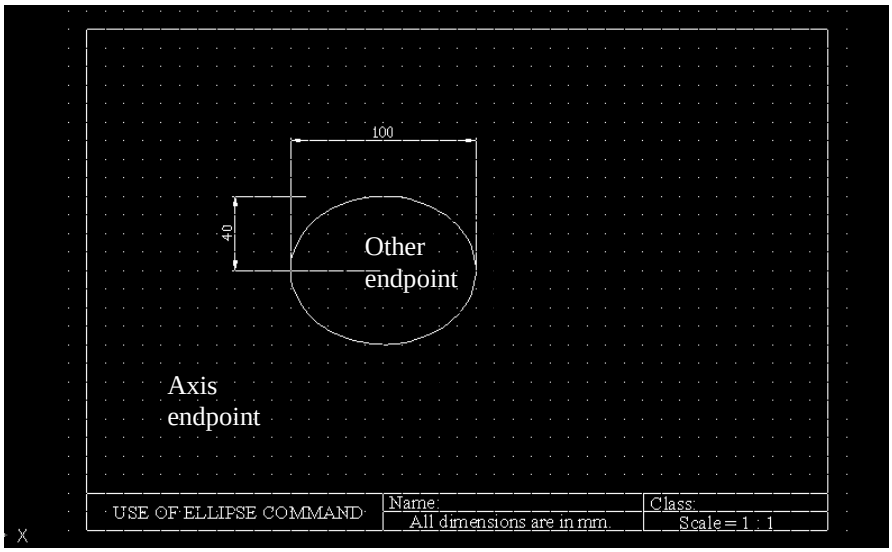

Figure 2-11: Use of Ellipse command

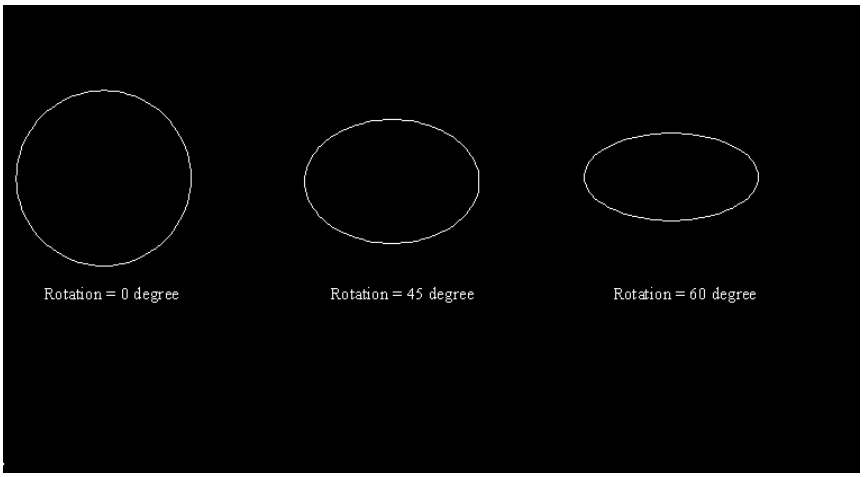

Figure 2-12: Ellipse command with different rotation angles

(11) The **ELLIPSE ARC** command

- Toolbar 

- Pull-down manual Draw → Ellipse → Arc
- Command line Not Appropriate

- **Figure 2-13** shows the use of Ellipse Arc command.
- Specify axis endpoint of elliptical arc or [Centre]: (Pick any pint)
- Specify other endpoint of axis: **100**
- Specify distance to other axis or [Rotation]: **40**
- Specify start angle or [Parameter]: (Pick the first point)
- Specify end angle or [Parameter/Included angle]: **250**

- How to use the angular dimension?
- Select arc, circle, line or <specify vertex>: hit enter key
- Specify first angle endpoint:
- Specify second angle endpoint:

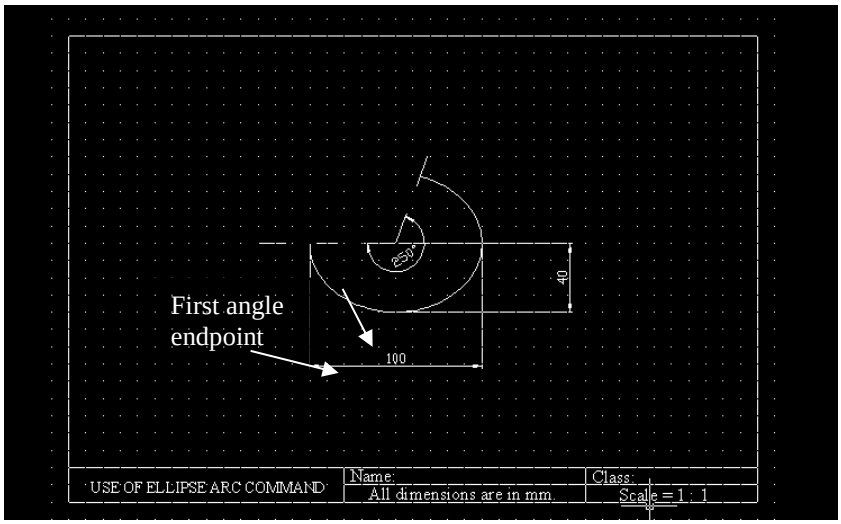

Figure 2-13: Use of Ellipse Arc command

(12) The **MAKE BLOCK** command

- Toolbar 

- Pull-down manual Draw → Block → Make
- Command line wb

- Block is a collection of simple entities, such as lines, arc, etc. that forms a complex entity that normally represents an object in the real world, e.g. a door, window or even a symbol.
- This is useful for creating symbols which can be inserted into the (same) drawing.

- **Figure 2-14** shows the use of Make Block command which is similar to Write Block.

❶ Create the block. (It is a resistor in this example)

❷ Issue Make Block command.

❸ Type name of the Block.

❹ Choose base point.

❺ Select object and then click “Ok”.

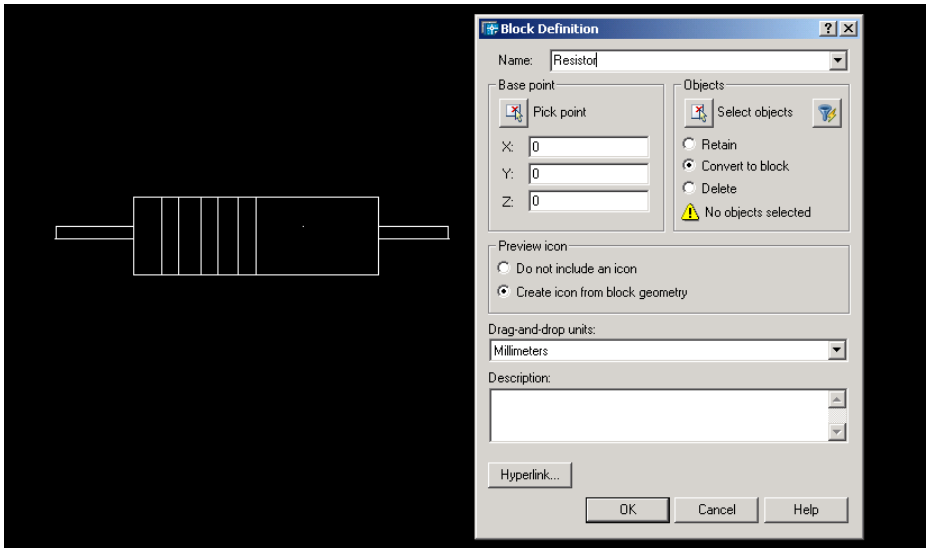

Figure 2-14: Use of Make Block command

(13) The **WRITE BLOCK** command

- Command line: wblock

- Creating a template of symbols. The intention is to create a template drawing which contains the standard symbols that can be inserted as into **ANY** working drawing.

- **Figure 2-15** shows the dialog box of the write block command.

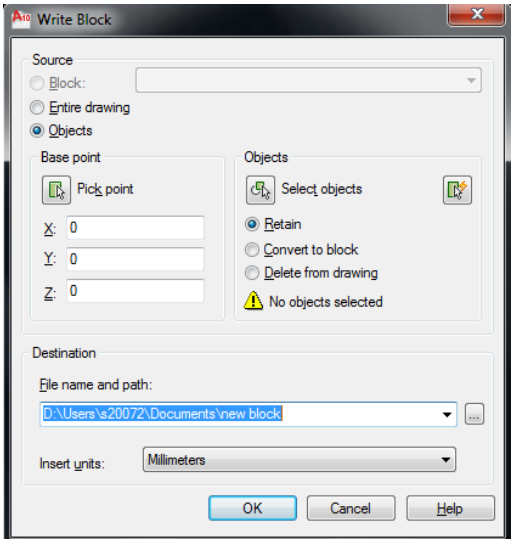

Figure 2-15: Dialog box of the write block command

(14) The **INSERT BLOCK** command

- Toolbar 

- Pull-down manual Insert → Block
- Command line Not Appropriate

- **Figure 2-16** shows the use of Insert Block command.
- You can browse the block that you want to insert.

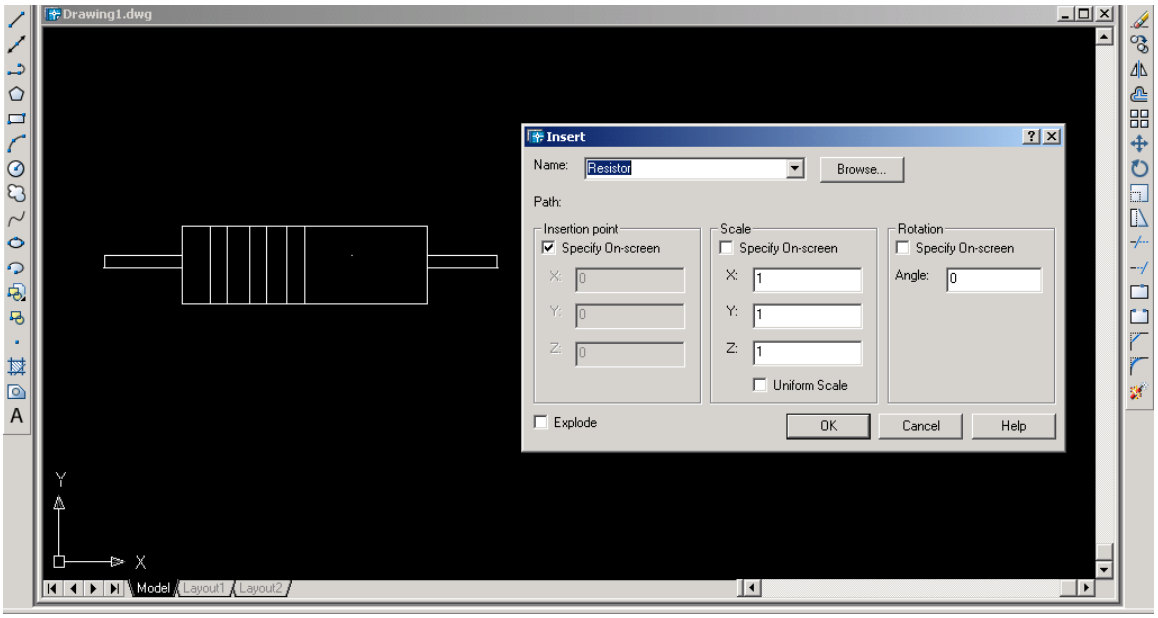

Figure 2-16: Use of Insert Block command

(15) The **POINT** command

- Toolbar 

- Pull-down manual Draw → Point
- Command line **point** or **po**

- **Figures 2-17 and 2-18** show how to set point style.

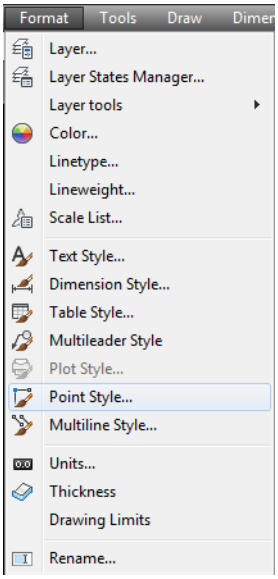

Figure 2-17: Set point style

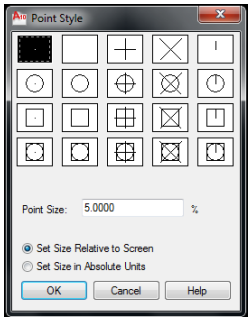

Figure 2-18: Set point style (Cont'd)

(16) The **HATCH** command

- Toolbar 

- Pull-down manual Draw → Hatch
- Command line **hatch** or **h**
- Select a pattern, e.g. **ANGLE**
- Under Boundaries, Add: **Pick points**
- Select **internal point of object for the pattern to appear** on the resistor drawing.
- Click OK

- **Figure 2-19** shows the use of Hatch command.

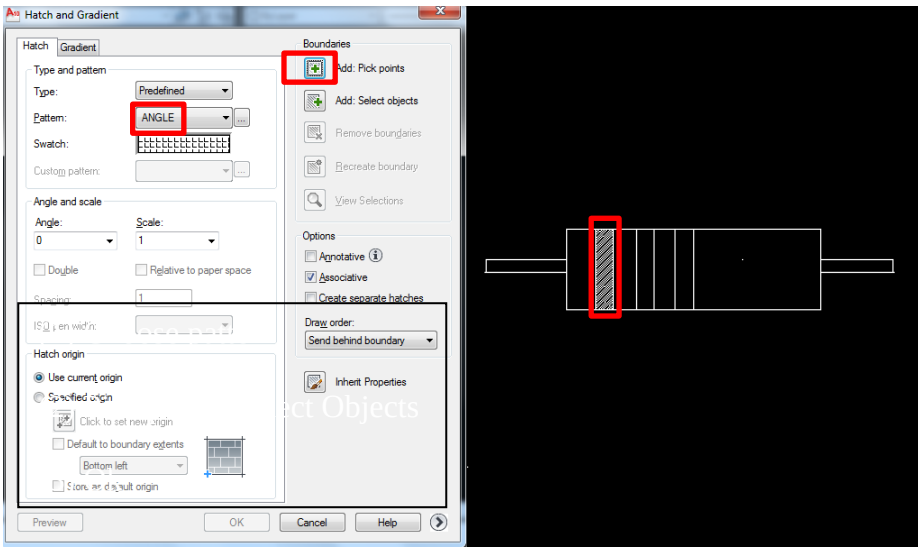

Figure 2-19: Use of Hatch command

(17) The **REGION** command

- Toolbar 

- Pull-down manual Draw → Region
- Command line **region** or **reg**

- This command is not covered in this module. You can refer to reference books for more information.

(18) The **MULTILINE TEXT** command

- Toolbar 

- Pull-down manual Draw → Text
- Command line **mtext** or **mt** or **t**

- This command is used to create or modify multiline text objects and imports or pastes text from other files.
- **Figure 2-20** shows the use of Multiline Text command.

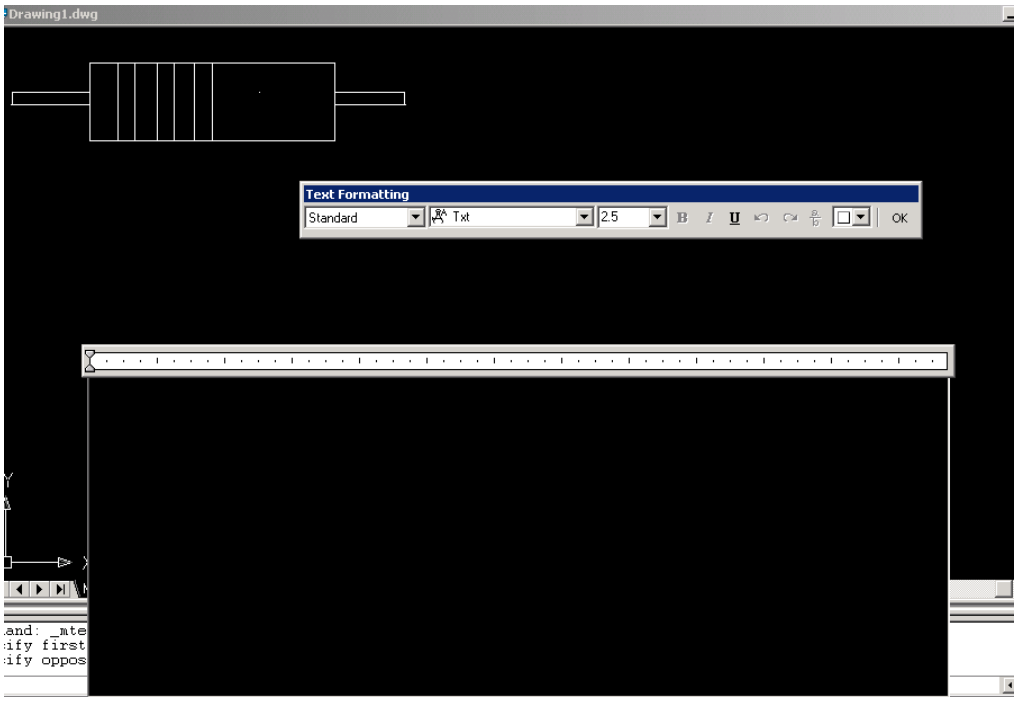

Figure 2-20: Use of Multiline Text command

- **Figure 2-21** shows the use of DTEXT command which you can specify the rotation angle and other properties of the text.
- DTEXT command is used to edit text in single line.
- MULTILINE TEXT command is used to edit text in multiple lines.

Figure 2-21: Use of DTEXT command

(19) Draw **MULTILINE** (not multiline text)

- Format → Multiline Style…
  // to set multiline style
- The multiline styles can be set in the dialogue box as shown in **Figure 2-22**, including the Multiline Properties and Element Properties.

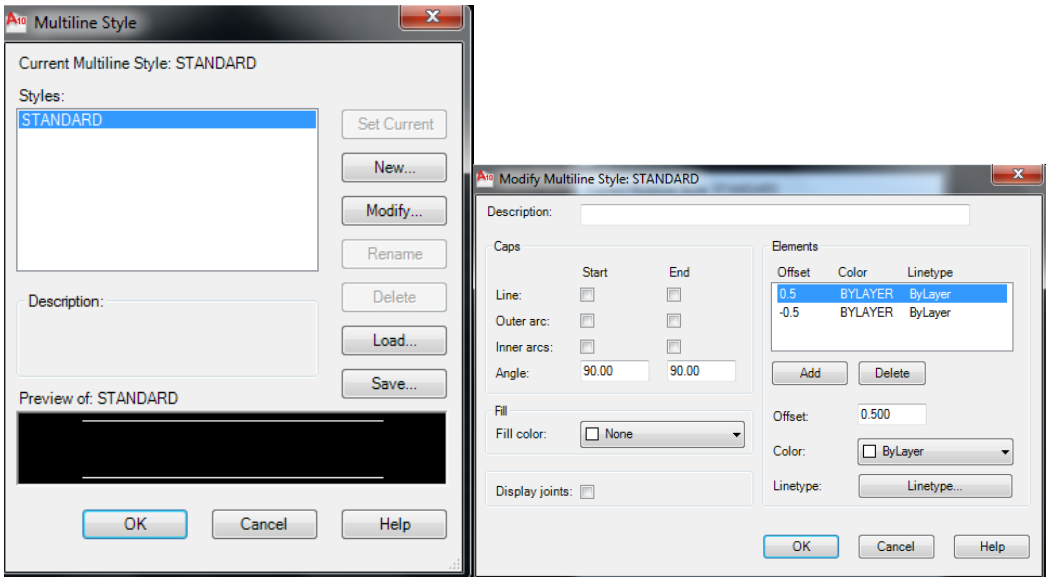

Figure 2-22: Dialogue box of Multiline Styles

- An example illustrating the use of Draw Multiline is shown in **Figure 2-23**.
- Draw → Multiline.

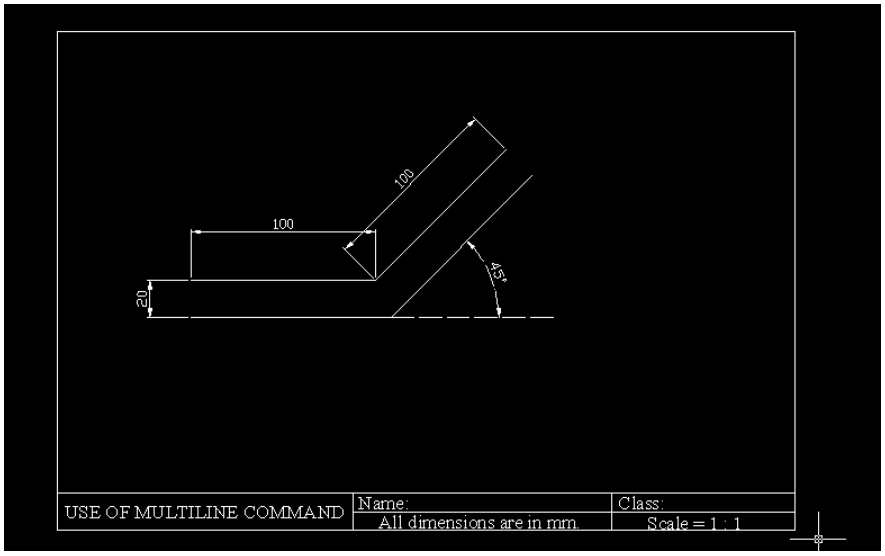

Figure 2-23: Use of Multiline

----- END OF UNIT 2 -----