Engineering Drawing with Autocad

Assistant Professor
SAHIB M. MAHDI

Lecture 5
Making Changes in Drawing

1 - Selecting Objects for Editing

The selection method is used to select individual objects. It can also be used to select particular objects from a group. Picking drawing elements becomes difficult sometimes as most of the tools require it. The selection methods make the process of selecting drawing elements easier.

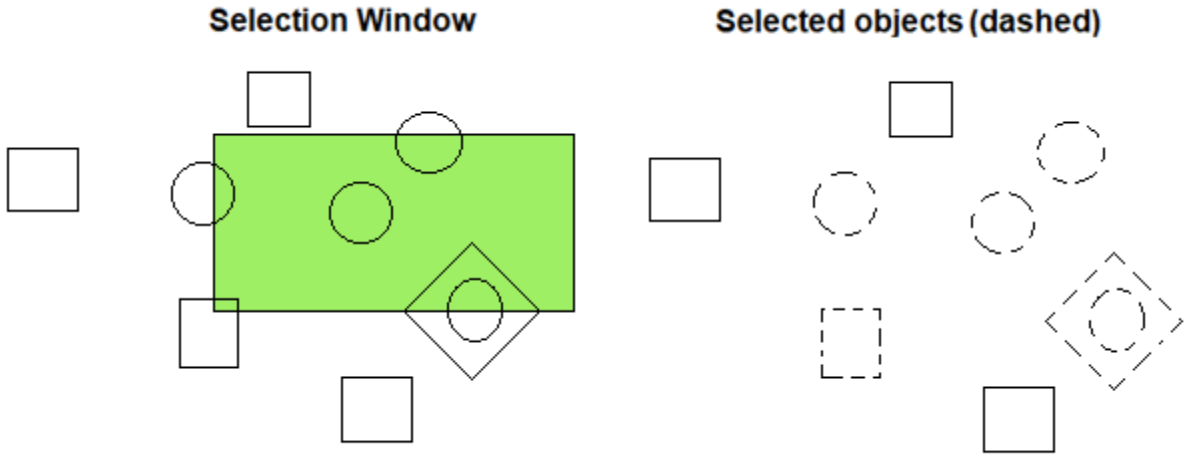
To Select Objects

1.Select individual objects by clicking them.
2.Drag from left to right to select all objects that are entirely enclosed in the selection rectangle or lasso (window selection).
3.Drag from right to left to select all objects that are crossed by
the selection rectangle or lasso (crossing selection)

1. Cross Window Selection

Let's understand by example.
The image for such an example is given below:

•For selection, click the 1st point on the right side and 2nd point on the left side (on the object).



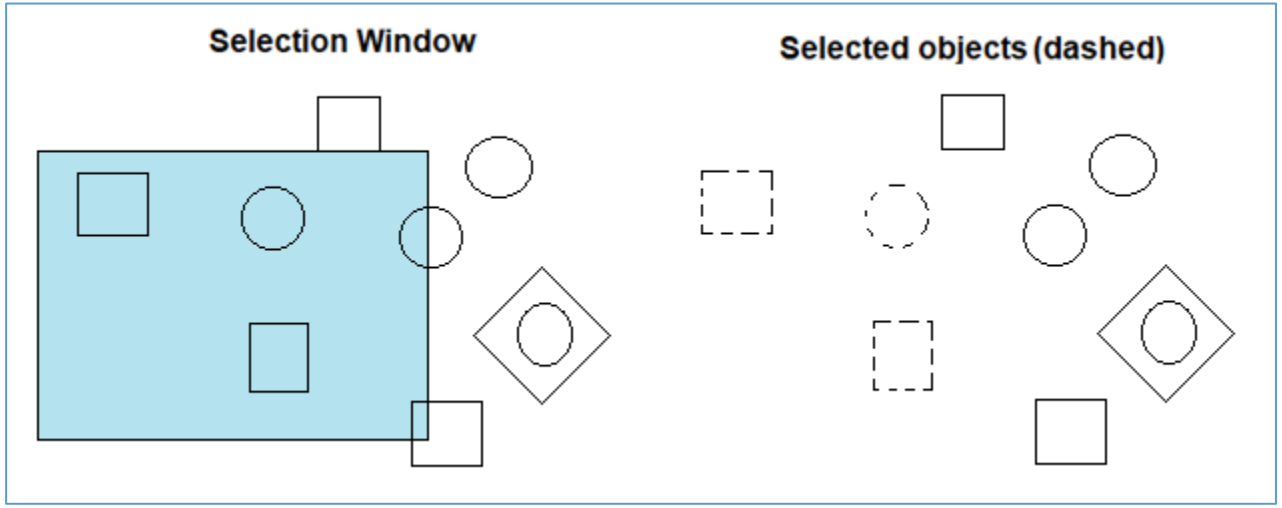
Here, to select the objects, only touch the objects by the selection window.

2. Box Selection

It is also called a blue selection because the selection area looks blue in color. We need to move our cursor from **left to right (L to R)**.The objects in this selection need to be fully covered by the selection window. Otherwise, the object will not be selected.

Let's understand by example.
The image for such an example is given below:

•For selection, click on the 1st point on the left side and 2nd point on the right side (on the object).



Here, to select the objects, enclose the objects within the selection window.

2 - Moving Objects

The **move** command in AutoCAD is used to move objects at a specified distance and direction.

To move the objects with precision, we can use object **snaps, grid snaps, coordinates,** etc.

There are four steps to move any object at a specific distance in a specified direction.

1.Select objects

We need to select the objects.

2.Specify the base point

Specify the starting point to move, which acts as a base point of an object.

3.Specify the point to place a moving object

Specify a point to put the object being moved. We can either specify it using a cursor or can enter the displacement value in the X, Y, and Z-direction. For example, **3, 4**. The object will be moved **3 Units in the X-direction** and **4 Units in the Y-direction** from its current position.

4.Displacement

It signifies the relative distance and direction of the object from its last position. It determines how far the object is placed from its original position.

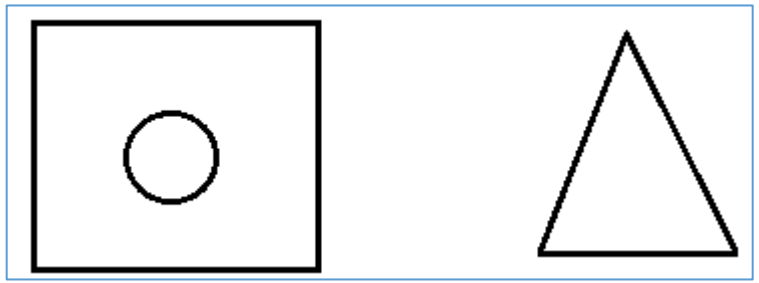
Let's understand with an examples.

Example 1: To move a circle.

In this example, we will move a circle from a rectangle and will place it inside a triangle.

The steps for such an example are listed below:

1.The figure is shown in the below image:



2. Select the move icon from the Ribbon panel, as shown in the below image



Or

Type **M** or **Move** on the command line or command prompt and press **Enter**.

3.Select the object to move, through a small square cursor. Here, we will select the circle.

4.Press **Enter**.

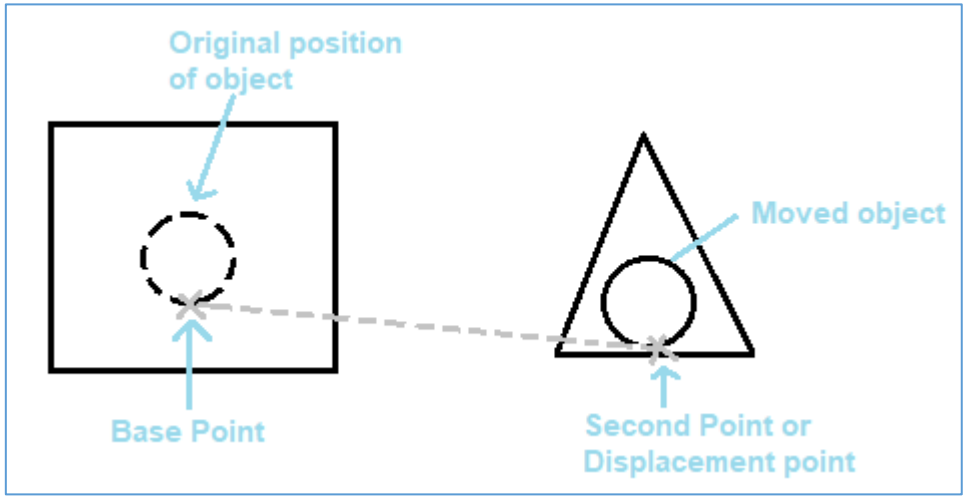
5.Specify the base point or displacement.

Base Point

6.Specify the base point of an object.

7.Specify the second base point. It is the point where we want to move that object.

8.process is shown in the below image:



Or

Displacement

6. Type **D** on the command line.

7. Specify the displacement value in the form of (X, Y, Z). For example, **2, 3**. In this, the object will move 2 units in the X-axis and 3 units in the Y-axis from the original or current position.

3 - Copy Objects

Copy

The copy command is used to copy the objects. The concept is the same as Ctrl + C to copy and Ctrl + V to paste, which can also be used in AutoCAD.

The objects are copied in a specified direction and at a specified distance.

The Copy icon on the ribbon panel looks like the below image:



The steps to copy the objects are listed below:

1. Select the copy icon from the ribbon panel.

Or

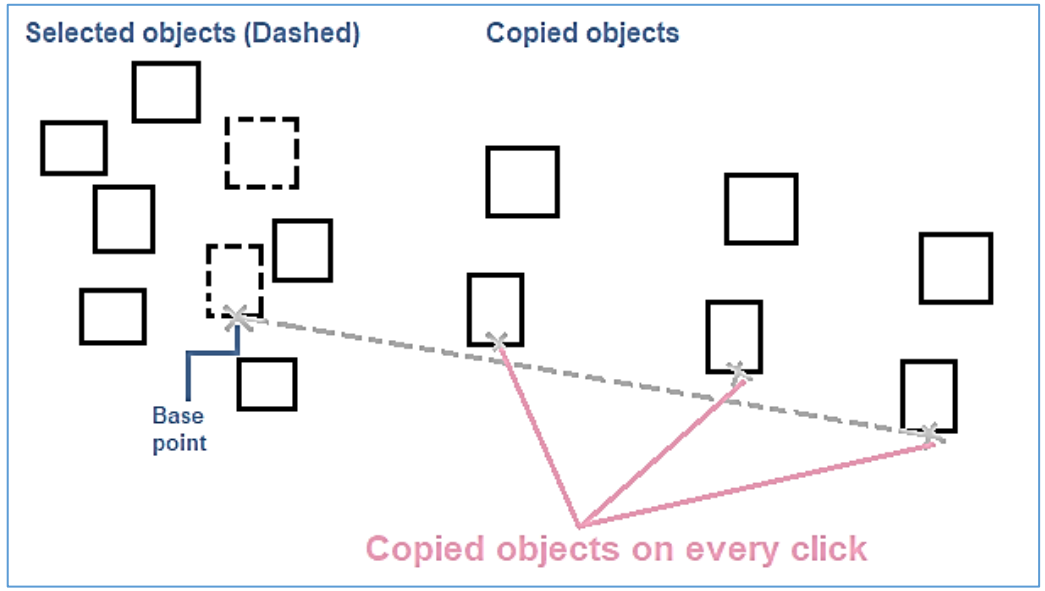
Type co or copy in the command line or command prompt and press Enter.

2. Select the objects. To select it, click on the boundary of objects through a small square cursor.
3. After the selection is completed, press Enter.
4. Specify the displacement or base point.

Base Point

5. Specify the base point of the objects.
6. Specify the second base point. It is the point where we want to move that object.

The process is shown in the below image:



7. To continue copying objects, repeat steps 5 and 6.
8. To Exit, press the **Esc** button.

Or

5. Specify the base point of the objects.
6. Type the displacement value, such as, 5. The distance 5 will be measured from the original object.
7. Press Enter.
8. To continue copying objects, repeat steps 6 and 7.

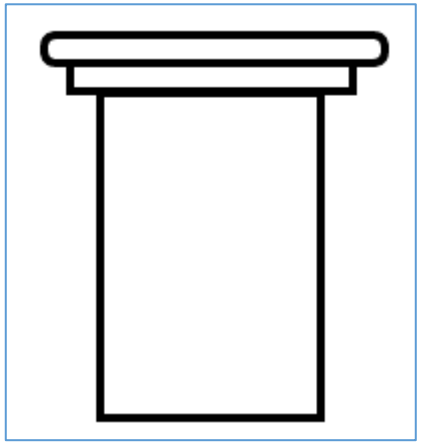
4 - Rotating Objects

The rotate command is used to rotate the object by an absolute angle. It turns objects through the specified point.
The specified point is the base point, and the rotation is performed from that point.
The rotation of objects can be performed by randomly dragging the cursor and also by the specified angle. Let's discuss the concept in detail.

Rotation by Dragging

The dragging of the cursor will rotate the object in the corresponding direction of the cursor.
Let's understand with an example.

The object is shown in the below image:



We will rotate the object by dragging the cursor.
The steps for such an example are given below:

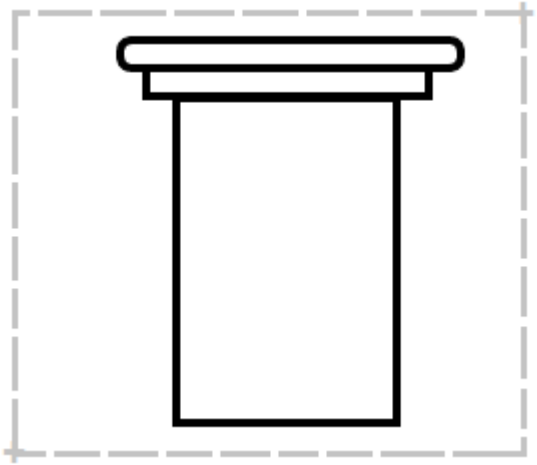
1. Select the **rotate icon** from the ribbon panel, as shown in the below image:



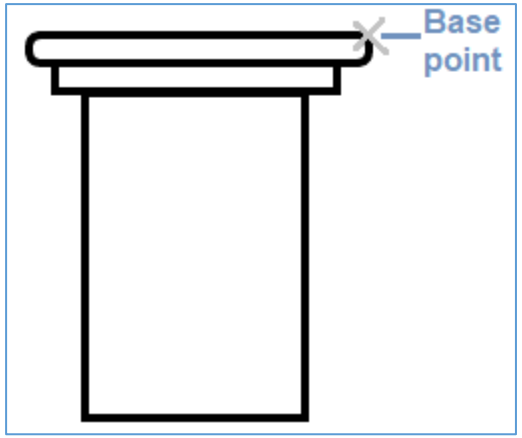
Or

Type **ro** or **rotate** in the command line or command prompt and press **Enter**.

2. Select the object. Here, we will rotate the full object, so the whole object will be selected, as shown in the below image:

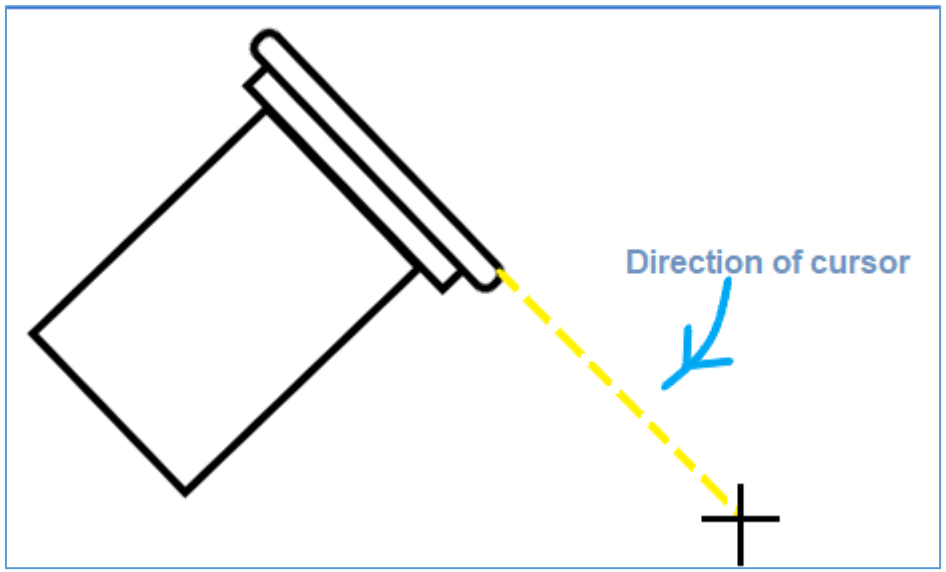


3. Press **Enter**.
4. Specify the base point on the figure. Here, the specified base point is shown in the below image:



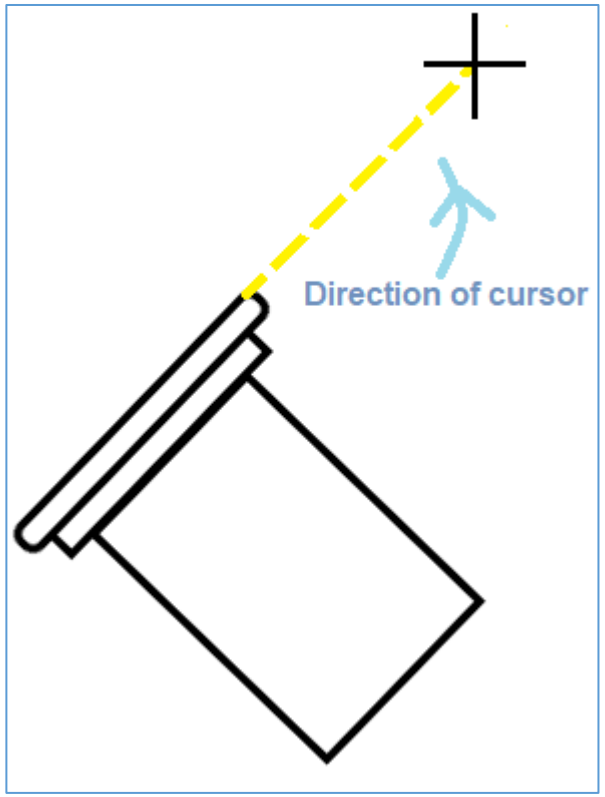
We can specify any base point on the figure.

5. Drag the cursor **clockwise** to rotate the object, as shown in the below image:



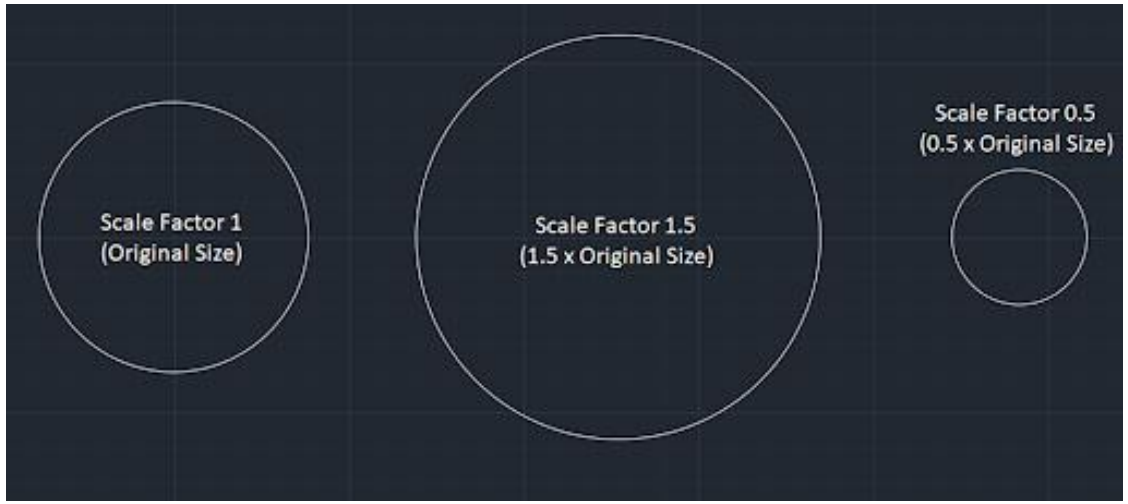
We can drag the cursor at the point according to the requirements.

6. Drag the cursor **counter-clockwise** (or **anti-clockwise**) to rotate the object, as shown in the below image:



5 - Scaling Objects

The scale tells us what some length on the scale drawing represents in actual length. For example, a scale of “1 inch to 5 miles” means that 1 inch on the drawing represents 5 actual miles.



Methods for SCALING a drawing in AutoCAD in the MODELING section

1. Select the object(s) you wish to scale.
2. Type SCALE in the command bar and hit Enter.
3. Select a base point for your object.
4. Type the SCALE factor and hit enter. If the number is between 0 and 1, it means you'll be scaling down.

Task : Rescale a drawing, using the same unit

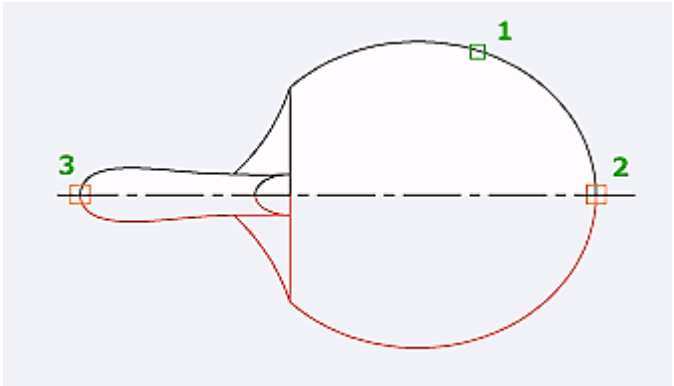
Start the scaling command with SC (or SCALE). Make a selection for the objects that need to be included in the scaling operation. Click in the drawing for the first point of the scaling base (base point). Type R to activate Reference scaling.

6 - Mirroring Objects

The **mirror** command in AutoCAD is used to create a copy (mirror copy) of the selected object. We can also delete the source object after mirroring the object.

The objects that represent the same as the half of their object can be mirrored across a center line to create the other half of the object.

It is shown in the below image:

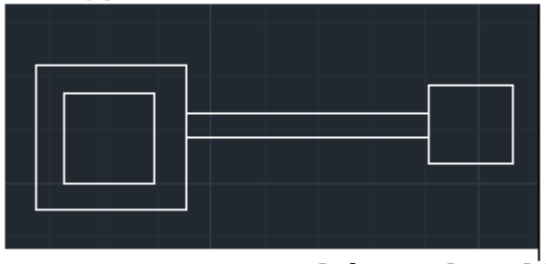


Let's understand with two examples.

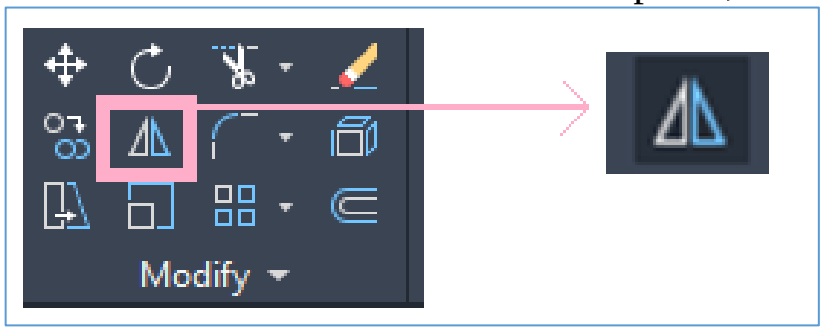
Example 1:

The steps are listed below:

1. The upper half is created, as shown in the below image:



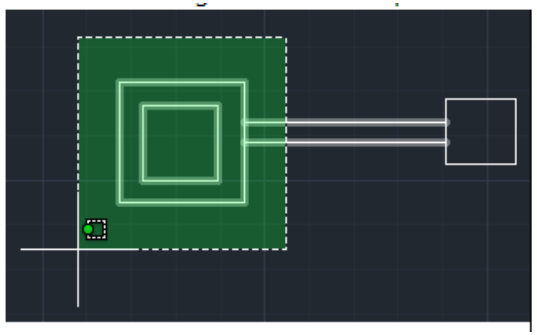
2. Select the mirror command from the ribbon panel, as shown below:



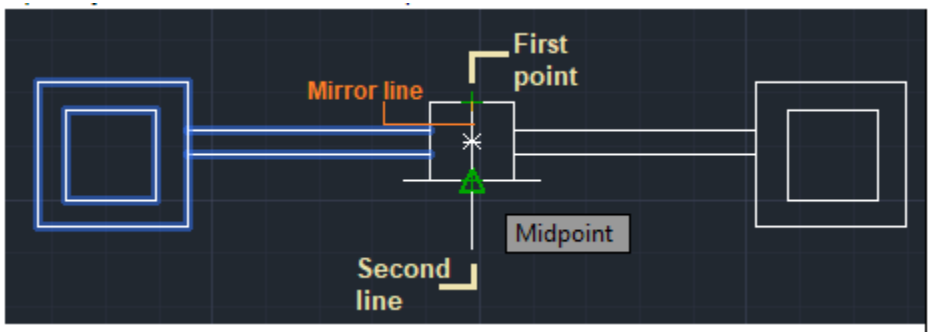
Or

Type **mi** or **mirror** on the command line or command prompt and press **Enter**.

3. Select the half figure with the help of box selection, as shown in the below image:

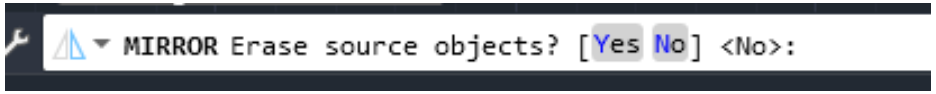


4. Press **Enter**.
5. Specify the first and second point of the mirror line, as shown in the below image:

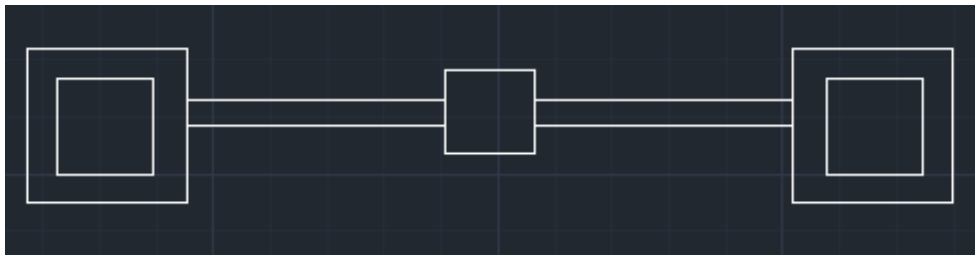


Erase the source object

6. After the figure is formed, the command line will look like the below image:



7. Click on No.
8. The created figure is shown in the below image:



7 - Editing with Grips

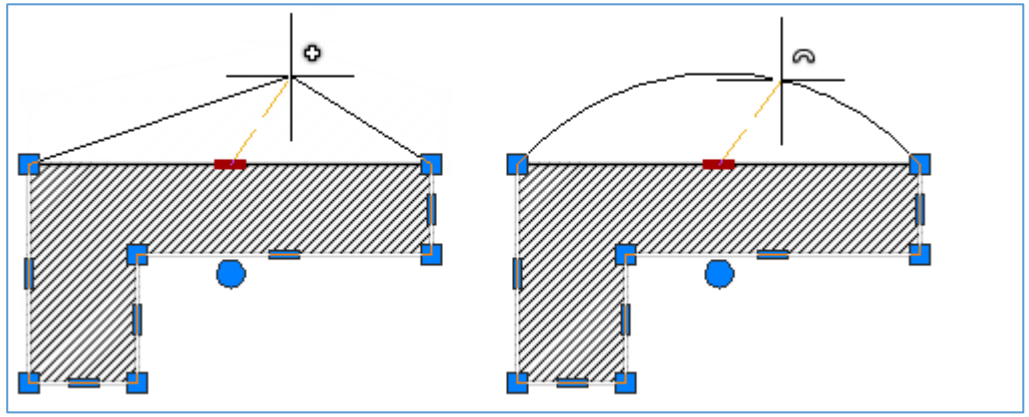
To Edit Objects Using Grips

1. Select and move grips to stretch the object. ...
2. Press Enter or Spacebar to cycle to the move, rotate, scale, or mirror grip modes, or right-click the selected grip to view a shortcut menu with all available grip modes and other options.
3. Move the pointing device and click.

Turning Grips On

Right-click in the drawing area and select Options.

In the Options dialog box, Selection tab, make sure that Show Grips is selected



The following objects have multi-functional grips that offer object-specific and, in some cases, grip-specific options:

•**2D objects:** Lines, polylines, arcs, elliptical arcs, splines, and hatch objects.