BASIC DRAW COMMANDS IN AUTOCAD DRAWINGS

1. LINE

A. **Freehand drawing** using Line.

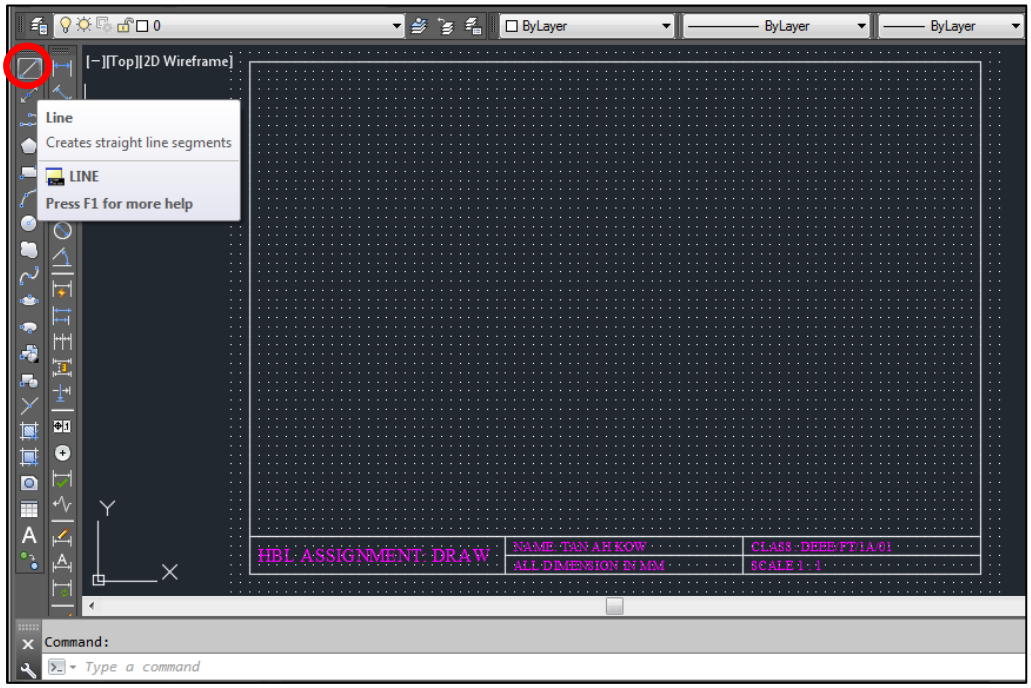

Fig 1.1- Type **keyboard shortcut "l"** or **click Line icon** as circled in red.

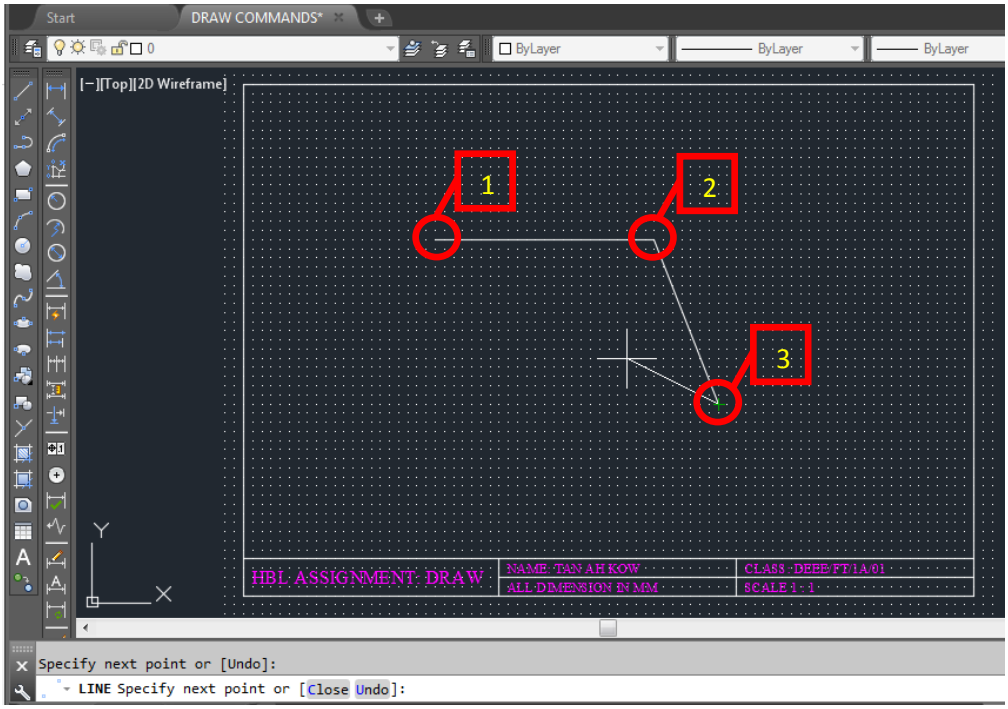

Fig 1.2- Freehand drawing of line: **click** at position **point 1**, drag the cursor and **click** at position **point 2**, then **click** at position **point 3**.

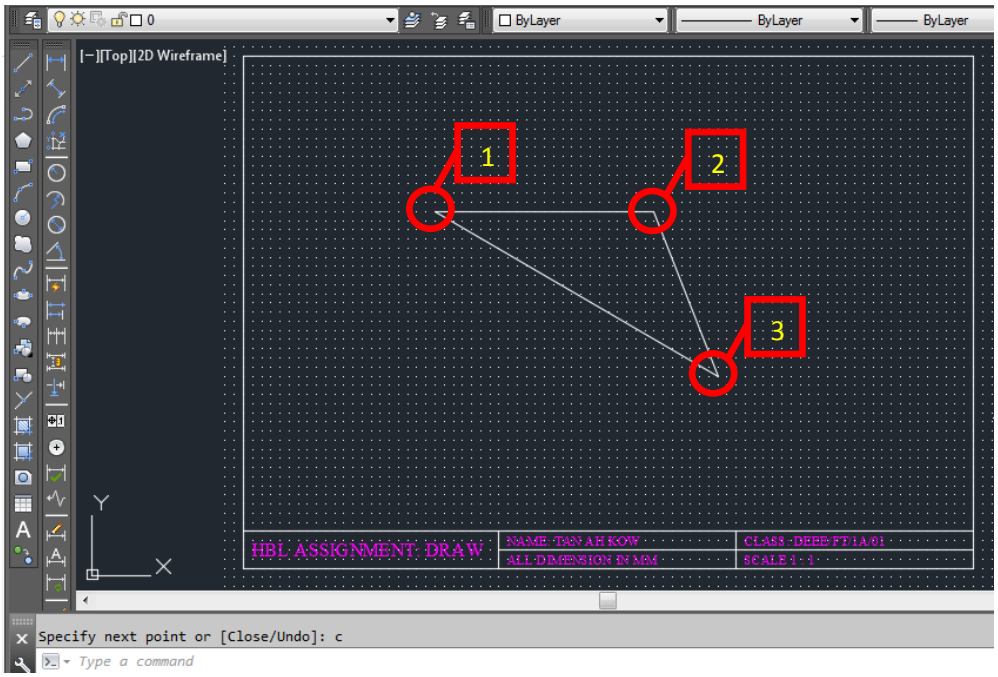

FIG 1.3- Last step, type "**c**" for close, i.e. **last point 3 is jointed** to the starting **point 1.**

B. DRAWING LINES WITH RECTANGULAR COORDINATES

Click **Line icon** or **type** "**l**" as in Fig 1.1. Then type **coordinates (100,100), next (200,200) and (300,200)** as shown in the command dialog in red box. The lines appears as shown in drawing.

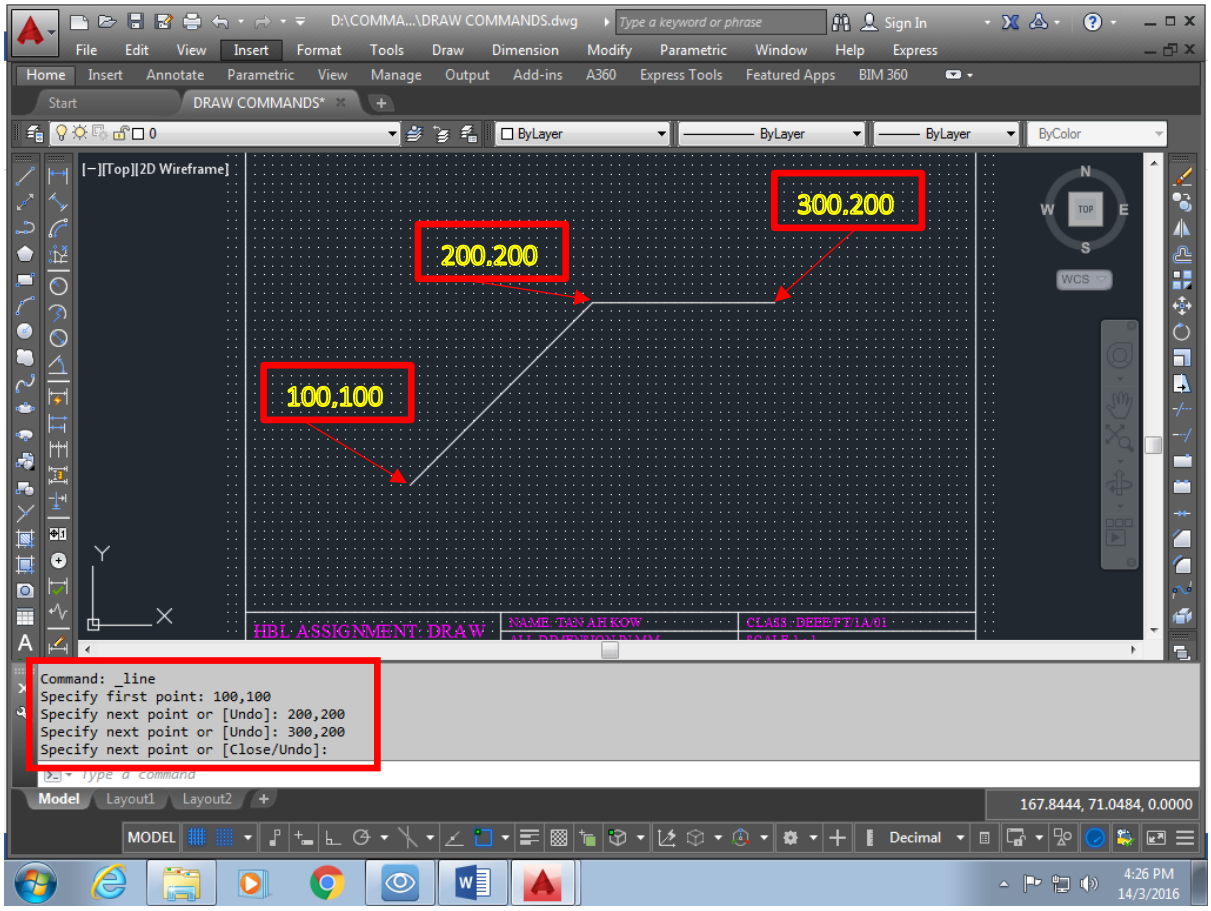

Fig 1.4- Drawing **Line** using **rectangular coordinates**.

C. DRAWING LINE BY SPECIFYING LENGTH & ANGLE

Type **100,100 as 1st coordinate.** Next type **@150<30** followed by **@70<0.**

@ = with respect to coordinate 100,100.

150 & 30 = Length of line

30 and 0 = angle subtended by the line

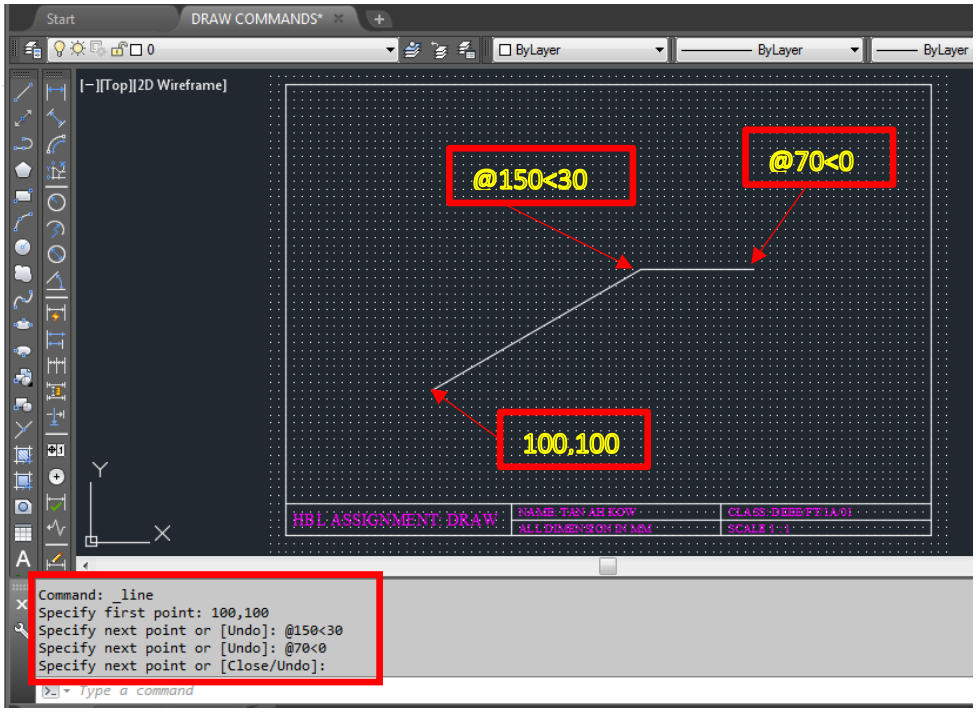

Fig 1.5- Drawing **lines** by specifying **length & angle**

2. CIRCLE

A. Drawing circle by specifying center and radius.

Click **circle icon** or type keyboard shortcut "**c**".

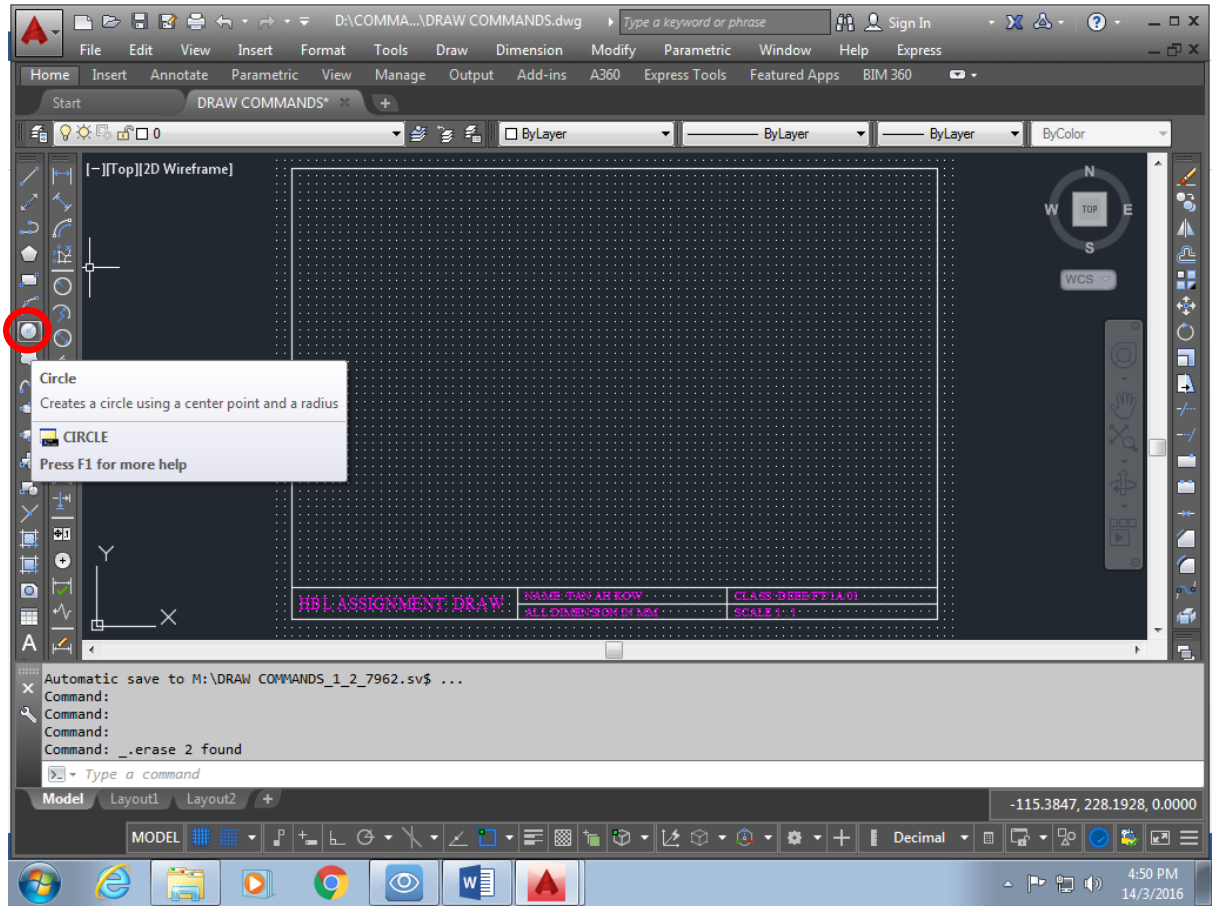

Fig 2.1- Type "**c**" or click on **circle icon**

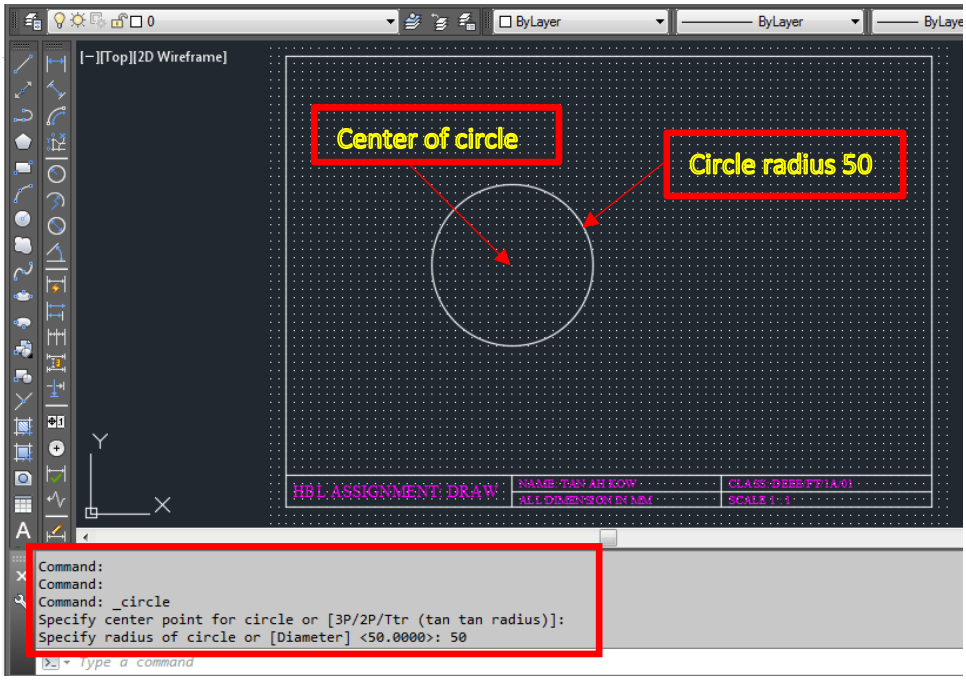

Fig 2.2- Specify **center of circle** as shown. Next, specify the **radius 50**.

B. Drawing circle by specifying center and diameter.

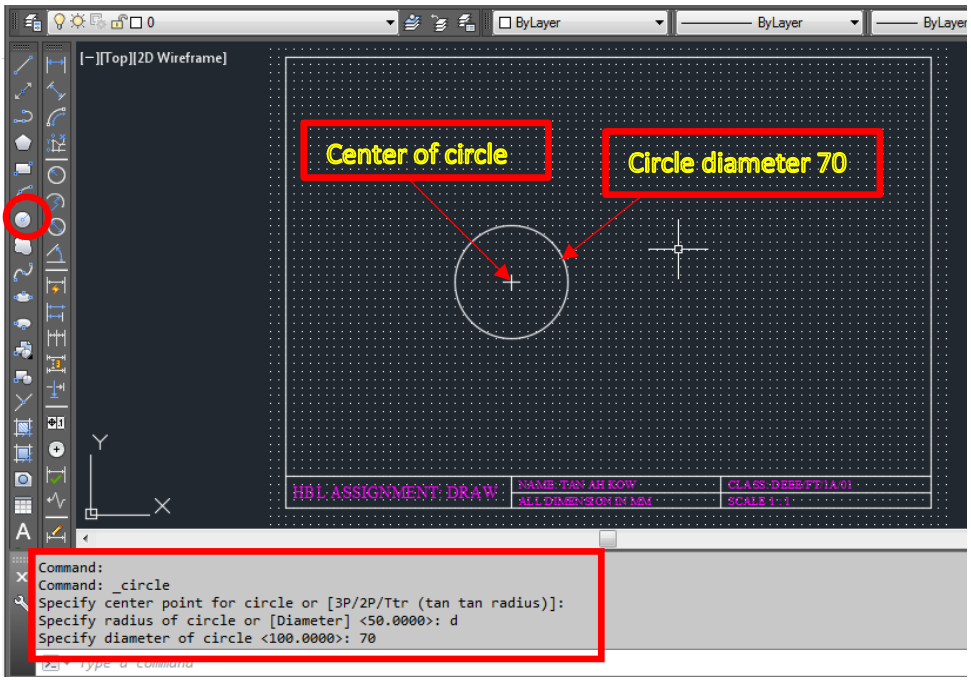

Fig 2.3- Type "**c**" or click **circle icon**. Click **centre** of icon in drawing space as shown. Type "**d**" for **diameter and enter**. Type "**70**" to indicate 70mm in **circle diameter**.

C. Drawing circle specifying Tangent, Tangent & Radius of circle

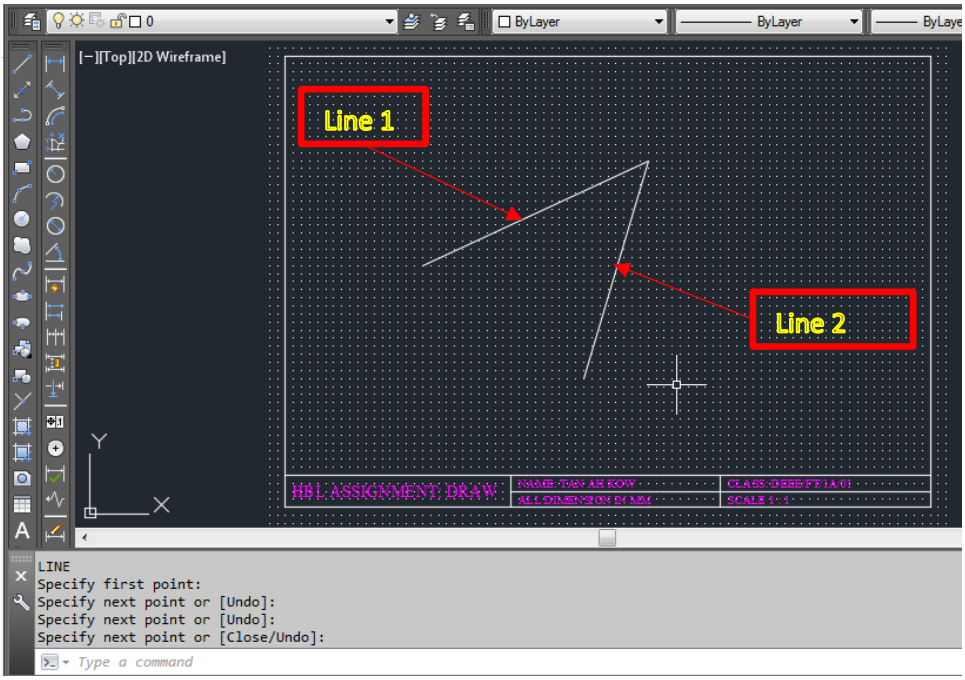

Fig 2.4- Draw **2 lines** as shown.

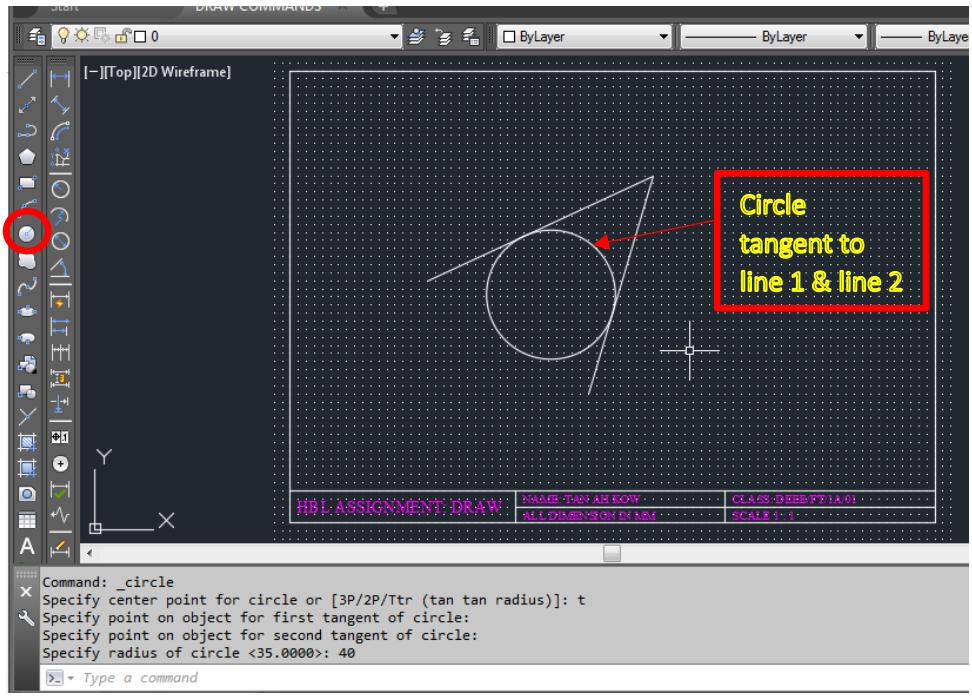

Fig 2.5- Type "**c**" or click **circle icon**. Type "**t**" to represent **Tan, Tan, Radius** & **enter.** Click **line 1 as 1st tangent**, next click **line 2 as 2nd tangent** and lastly **type 40** to represent radius 40mm and then **enter**.

Circle will appear tangent to both line with radius 40mm.

D. Drawing circle tangent to 3 lines.

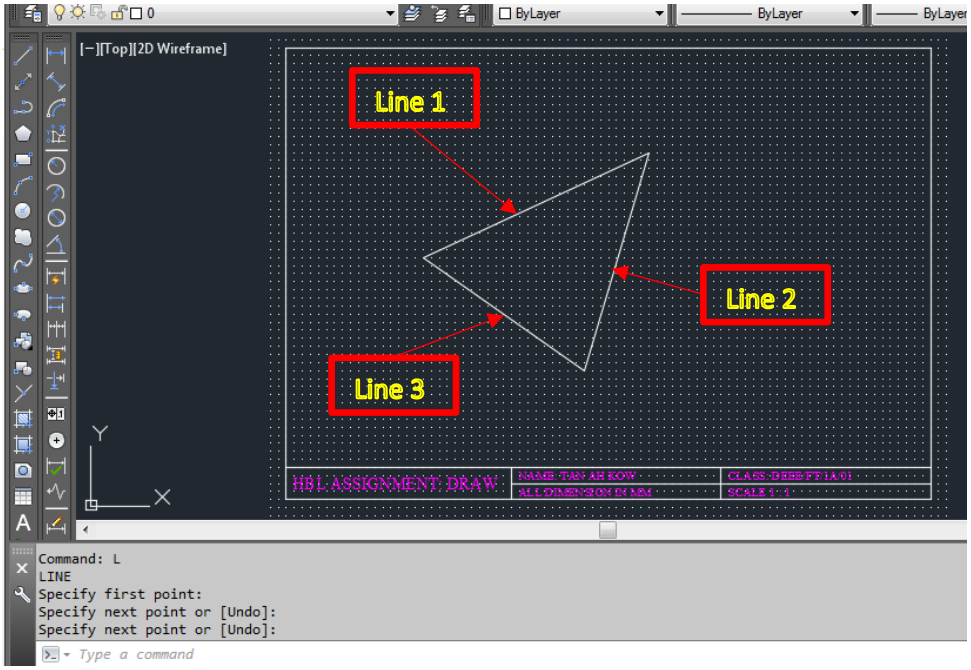

Fig 2. 6- Draw **a triangle using line command** as shown

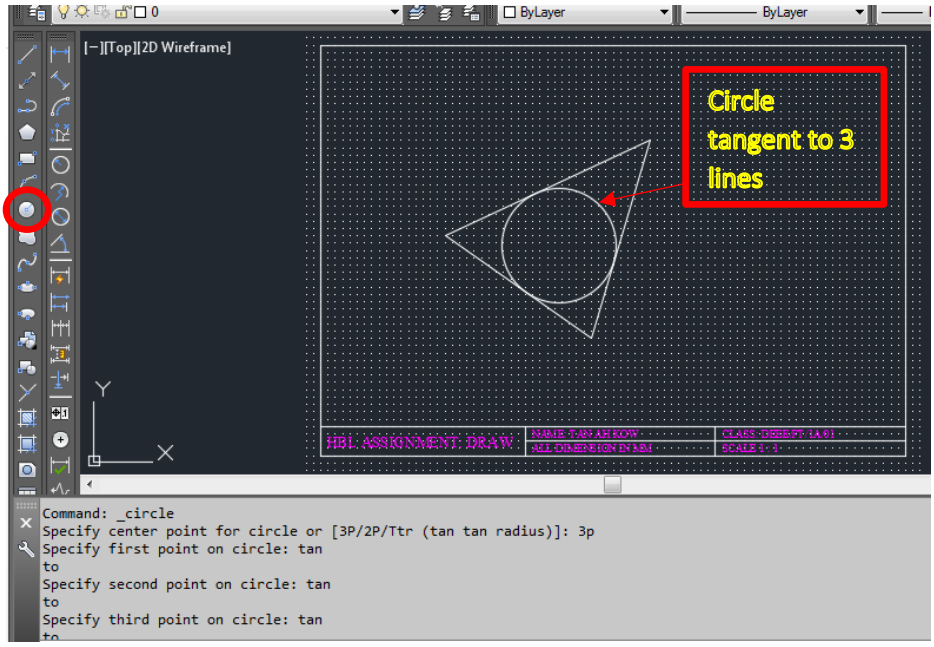

Fig 2.7- **type "c"** or click **circle icon**. Type **3P**.

When prompt for **1st point**, type **tan** (for tangent), **enter** & **Click** on **line 1**. When prompt for **2nd point**, type **tan, enter** & **Click** on **line 2**.

When prompt for **3rd point**, type **tan, enter** and click on **line 3**.

The **circle** will appear **tangent to all the 3 lines**.

3. DONUT

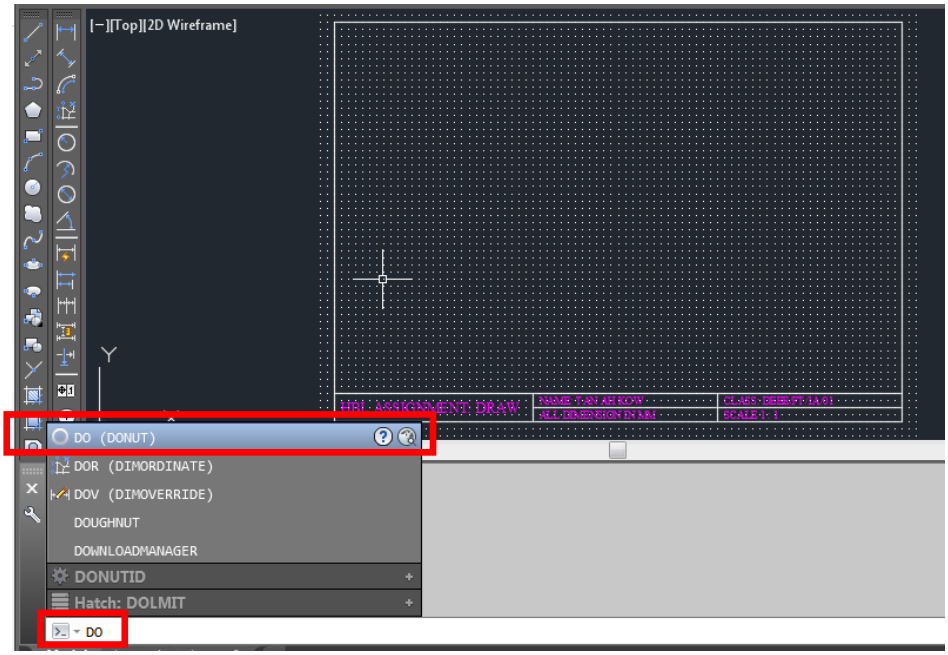

Fig 3.1- Type "**do"** and **enter.**

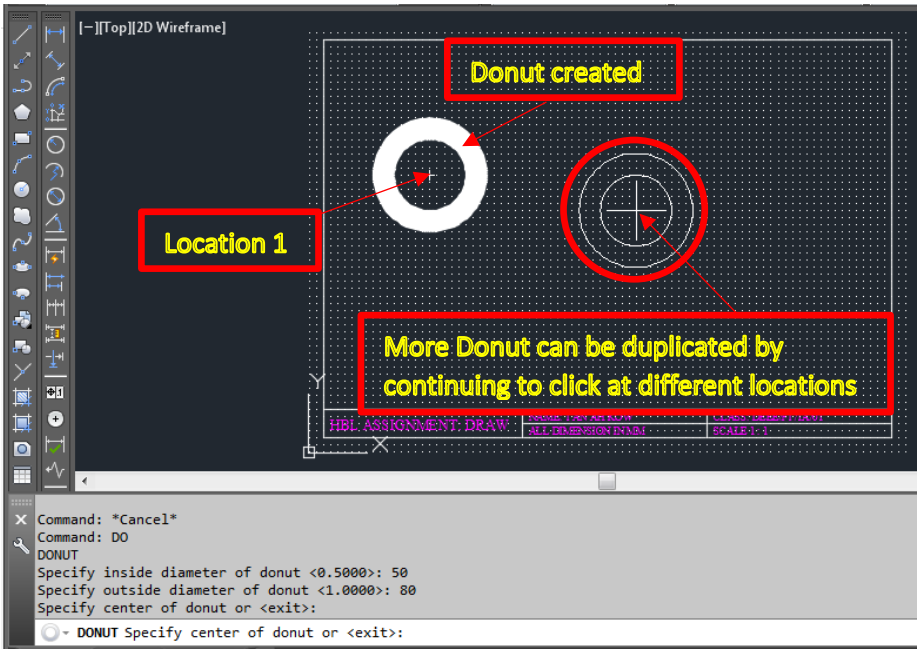

Fig 3.2- specify **inside diameter: 50**. Specify **outside diameter: 80**. Move donut and **click at the location 1 to place donut**. More donuts of the same diameters can be duplicated by continuing to place it in other locations.

4. RECTANGLE

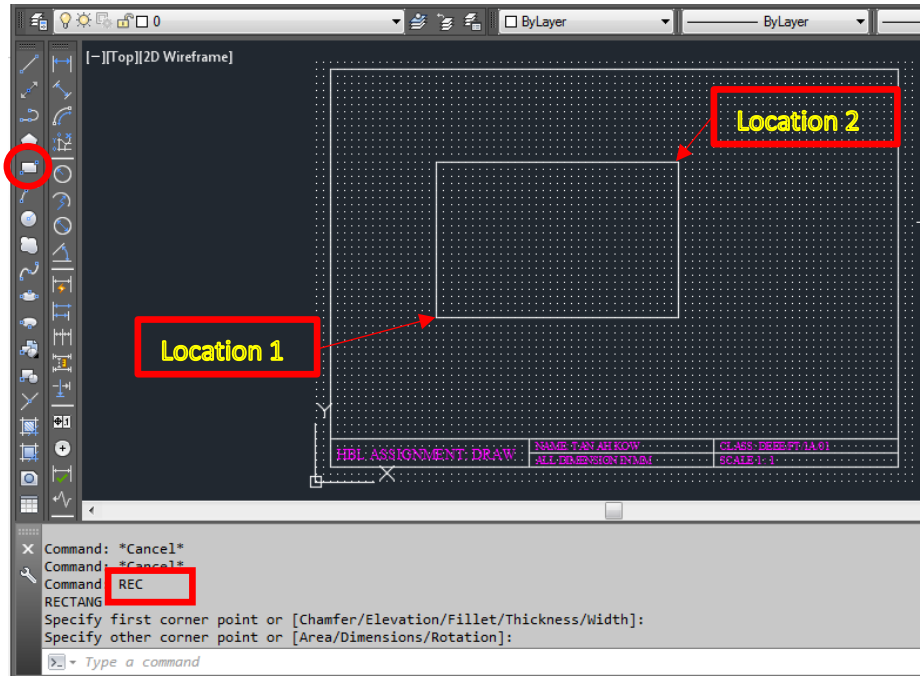

Fig 4.1- Type "**rec**" or click **Rectangle** icon circled in red. **Click at location 1**. Drag mouse to **click at location 2**. A freehand drawing of a rectangle is formed.

5. ARC

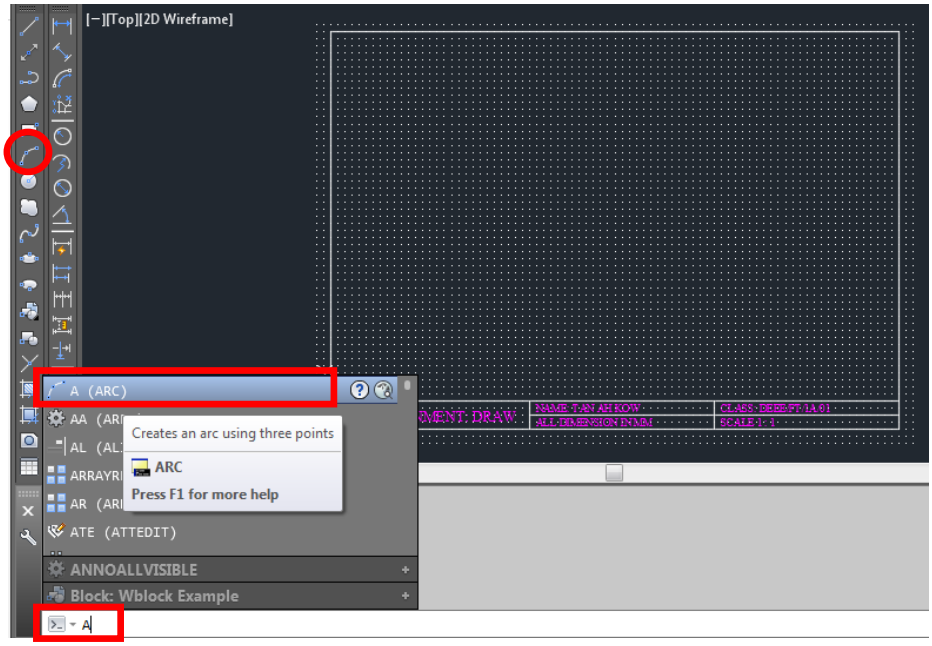

Fig 5.1- Type **"a"** or click **Arc icon** as circled in red.

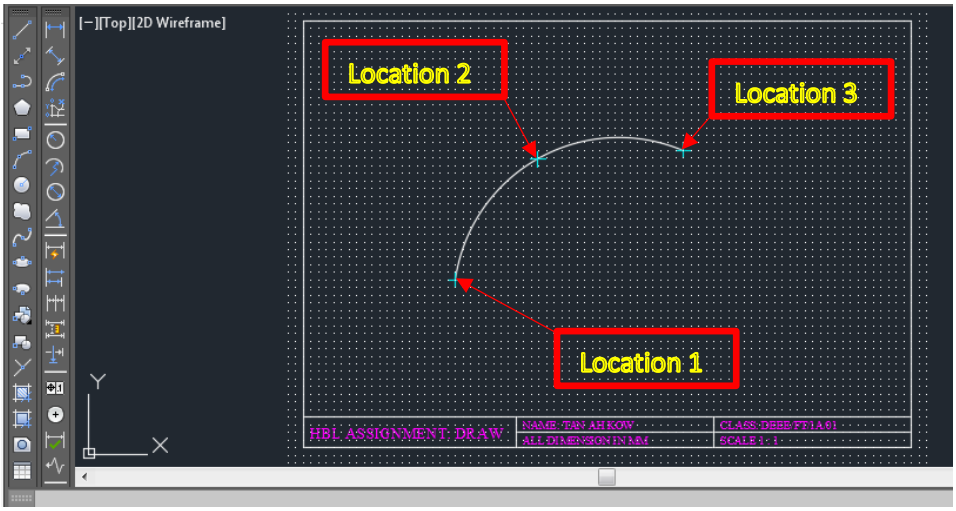

Fig 5.2- Click at 3 points namely **location 1, location 2** & **location 3.** A freehand drawing of an **arc** appears **passing through the 3 points.**

Another method to draw arc using Start, End & Radius.

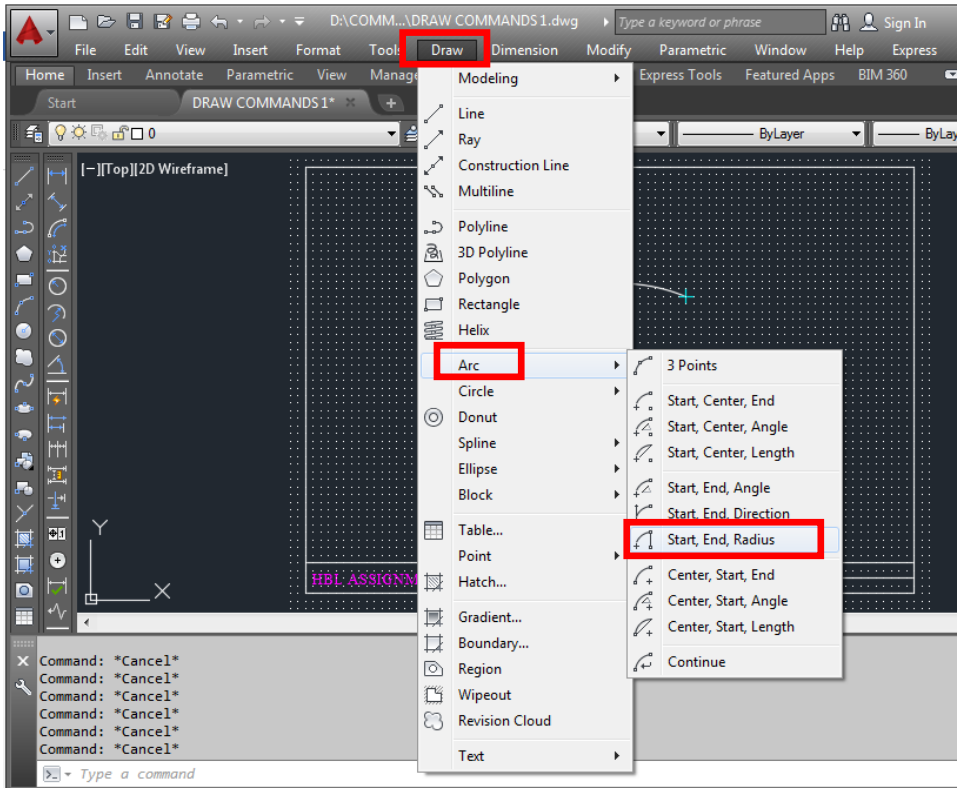

Fig 5.3- Click **draw, arc and "Start, End, Radius"** as shown

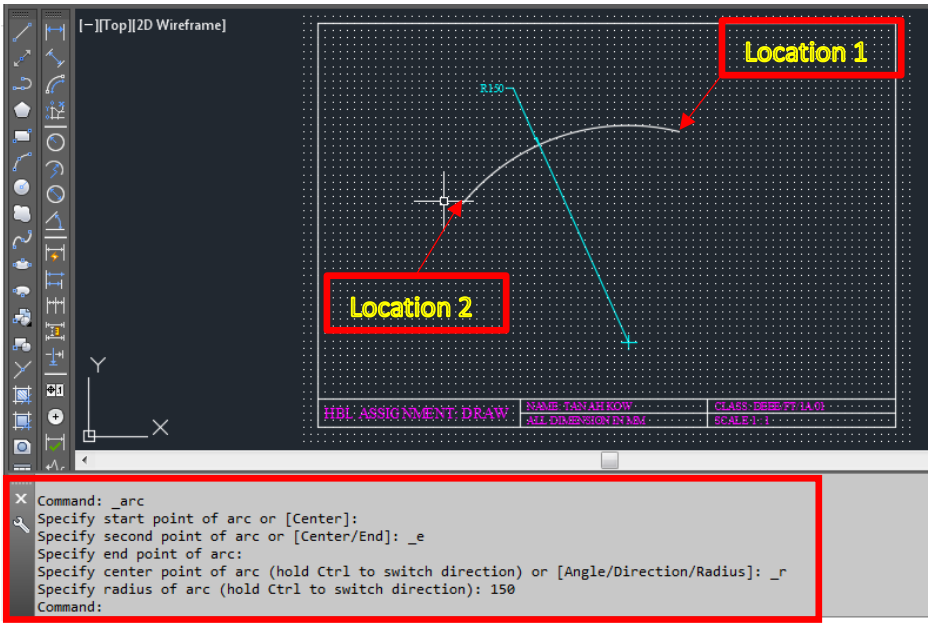

Fig 5.4: Click at **location1** (Start point) and then click at **location 2** (End point). Next specify **radius** of Arc by typing **150** and **enter**. An Arc of 150 radius appears. **Positive Arc direction** is always **anti-clockwise**.

6. POLYLINE

Polyline is basically consists of **one or many continuous lines but represents one entity or part.** Command "**line**" is different as each line represents one entity. So if there are 3 lines jointed together it means 3 entities.

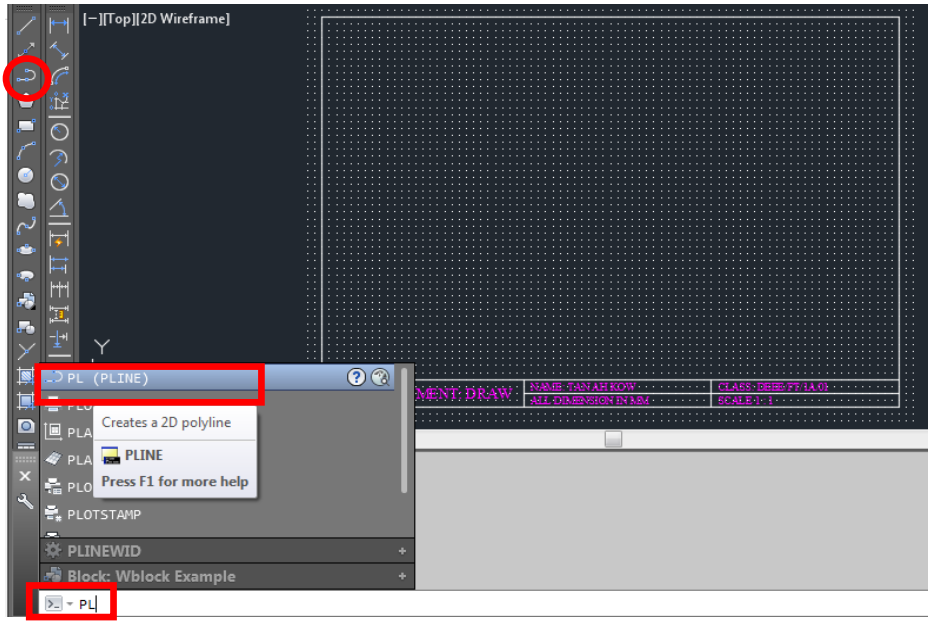

Fig 6.1- Type "**pl**" or click **Polyline icon** as circled in red.

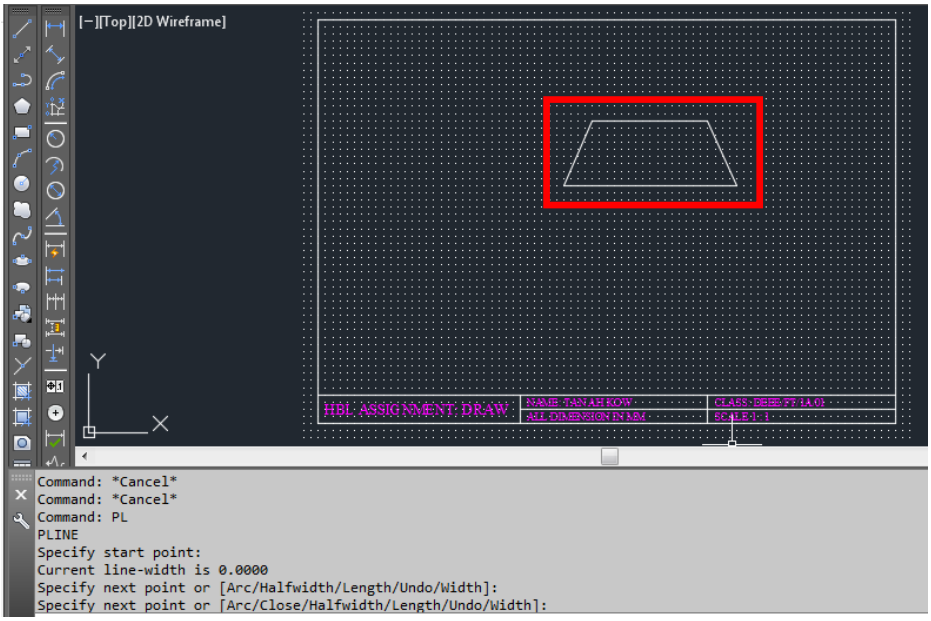

Fig 6.2- Next, **draw 4 lines continuously** that object looks like a trapezium.

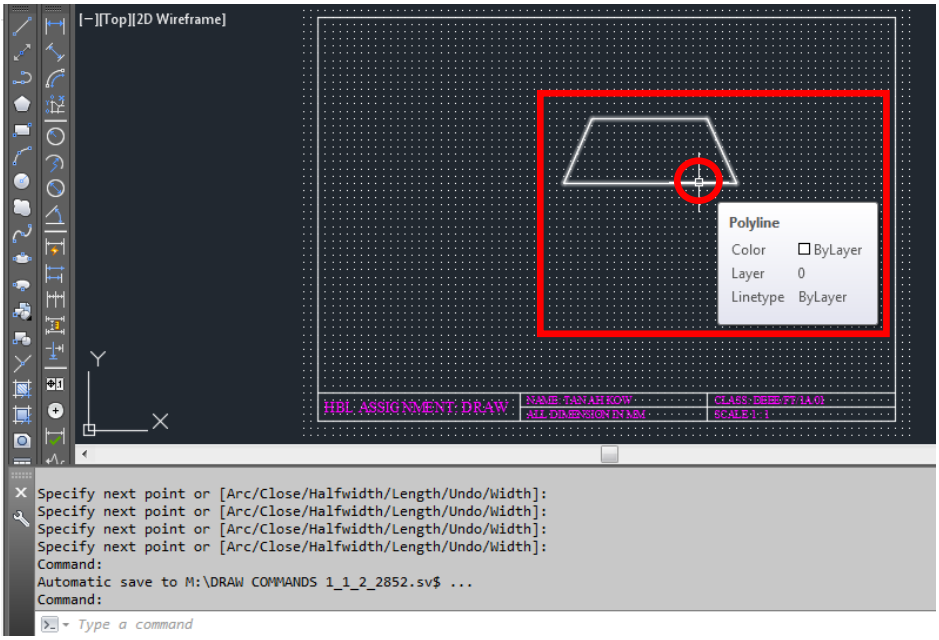

Fig 6.3- **Place cursor over the lines** (circled in red) and a box indicating **Polyline** is drawn. Notice that the 4 lines are highlighted as **one entity.**

7. POLYGON

Polygon is basically object with many sides but of the same length.

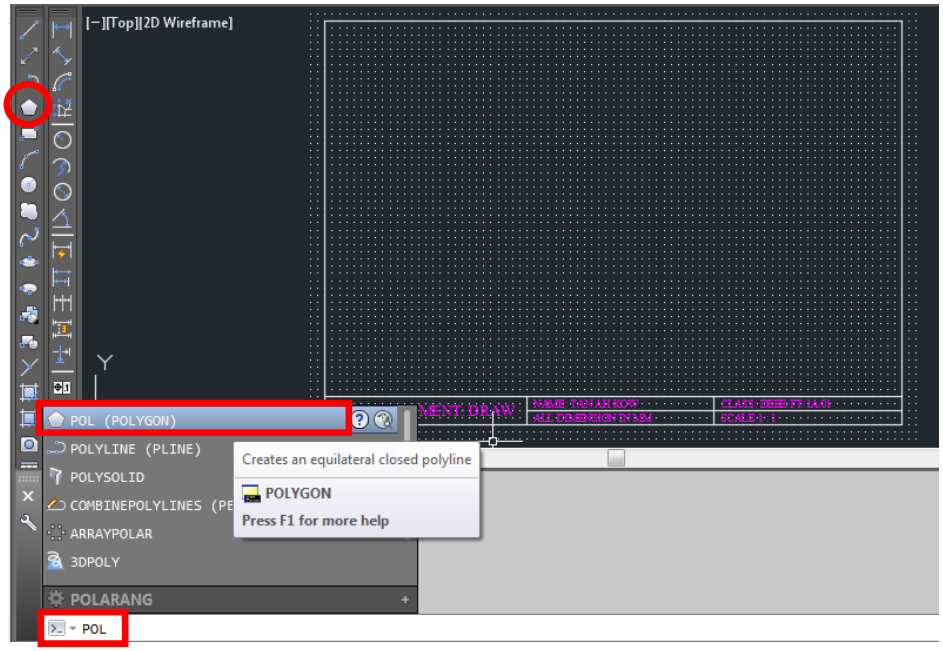

Fig 7.1- Type "**pol**" or click **Polygon icon** circled in red.

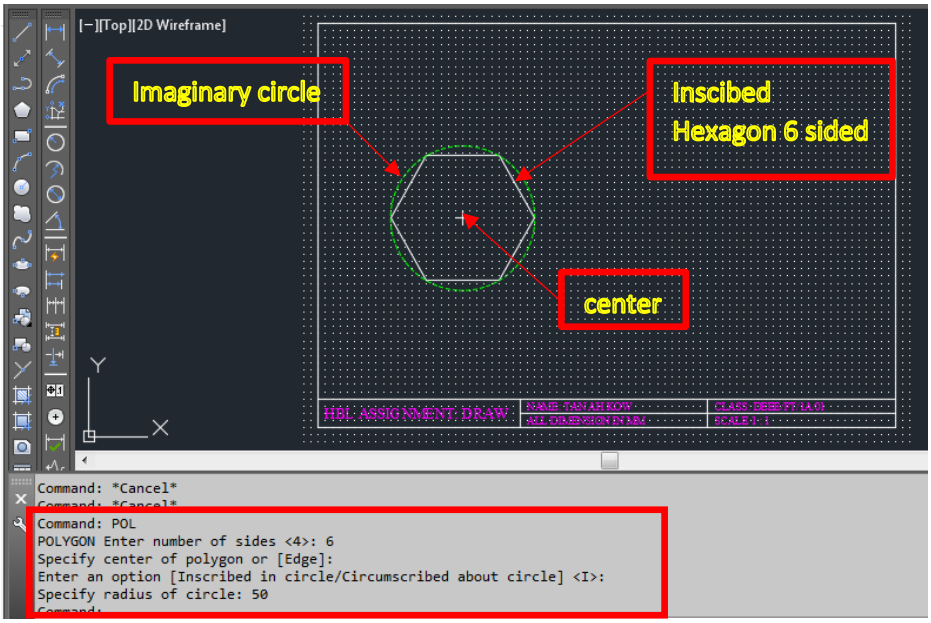

Fig 7.2- Enter number of sides in Polygon: **6.**

Specify center of polygon: **click anywhere in drawing space**.

Enter an Option: **i** (for Inscribed, i.e. hexagon is form inside an imaginary circle).

Specify radius of Imaginary circle: **50**

“Enter” in keyboard.

An **Inscribed hexagon** appears as shown in figure.

Similarly, drawing a polygon with **Circumscribed about circle means** a **polygon** is drawn **outside the imaginary circle**.

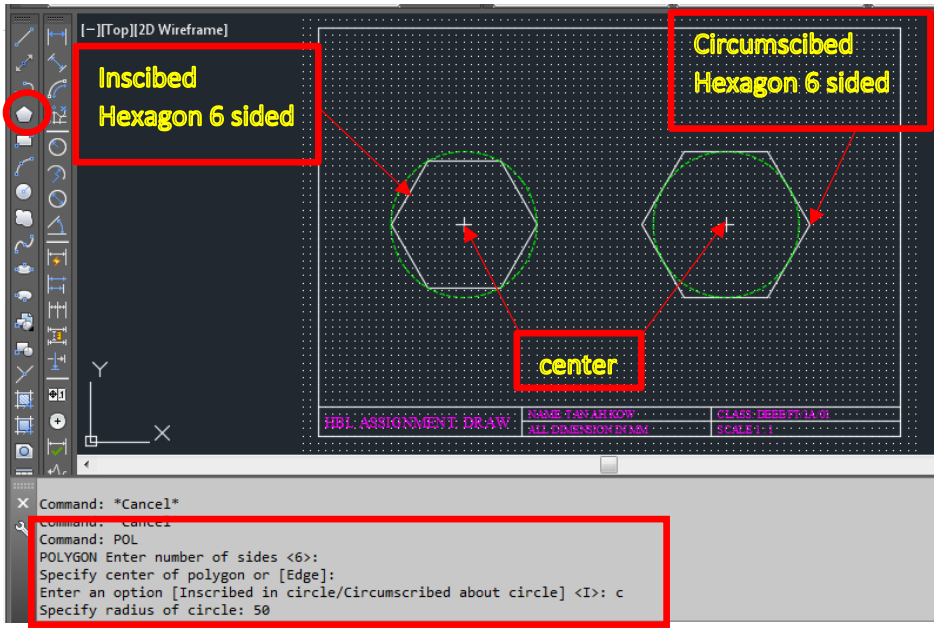

Fig 7.3- Type "**pol**" or click **Polygon icon**.

Enter number of sides: **6**

Specify center of polygon: **as shown in drawing for circumscribed hexagon**

Enter an option: **c** (represents circumscribed about circle)

Specify radius of circle: **50**

"Enter" in keyboard to complete command.

A circumscribed Hexagon appears as shown on the right.

8. ELLIPSE

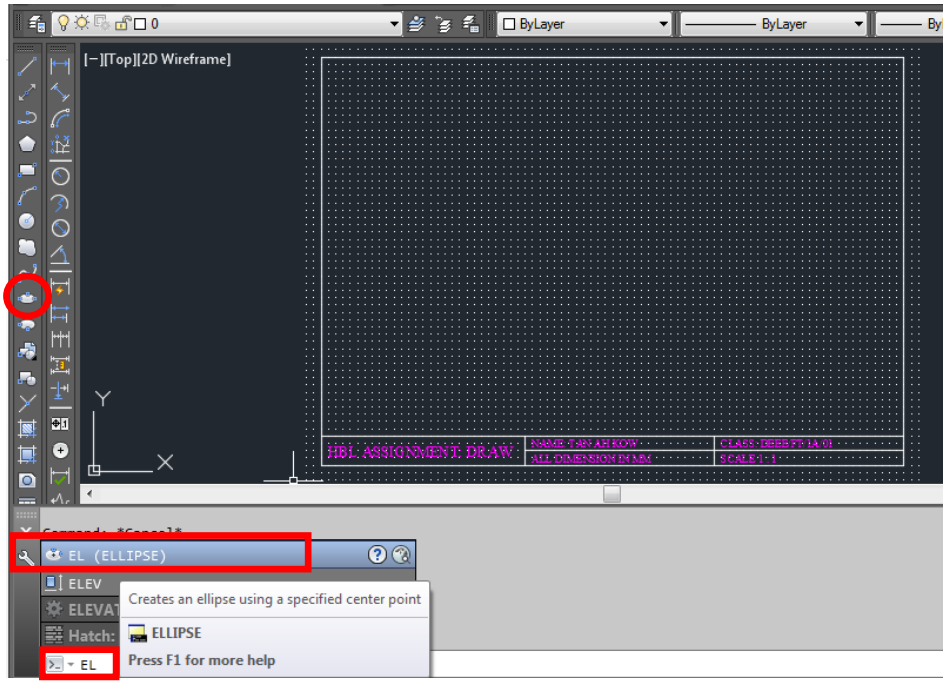

Fig 8.1- Type "**el**" or click **Ellipse icon** as circled in red.

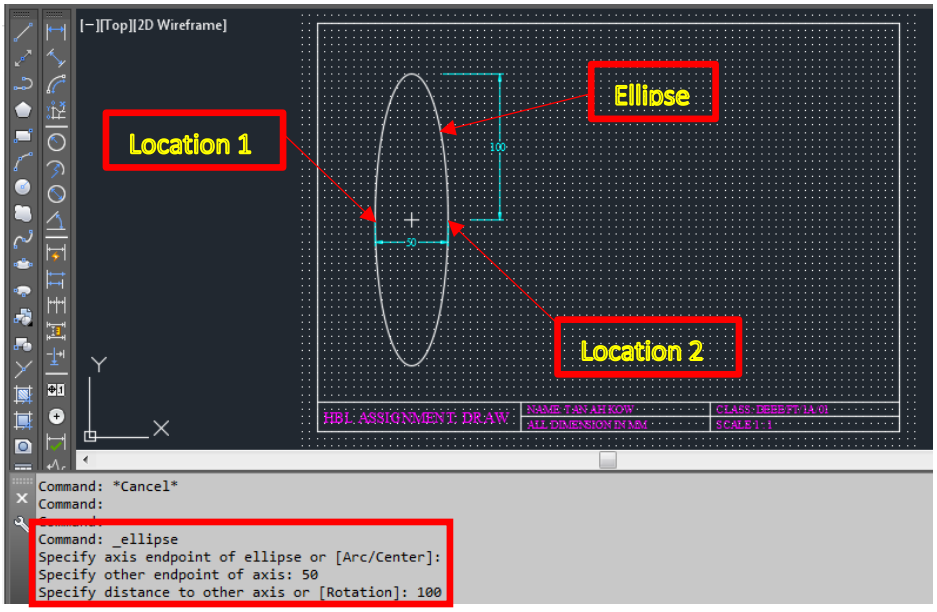

Fig 8.2- specify 1st axis endpoint: **location 1**.

Other endpoint of axis: **50** (Ensure cursor is pointing horizontal direction towards right, i.e. **location 2**)

Specify distance to other axis: **100**. An ellipse appears as shown.

Another method of drawing ellipse is by specifying the centre first.

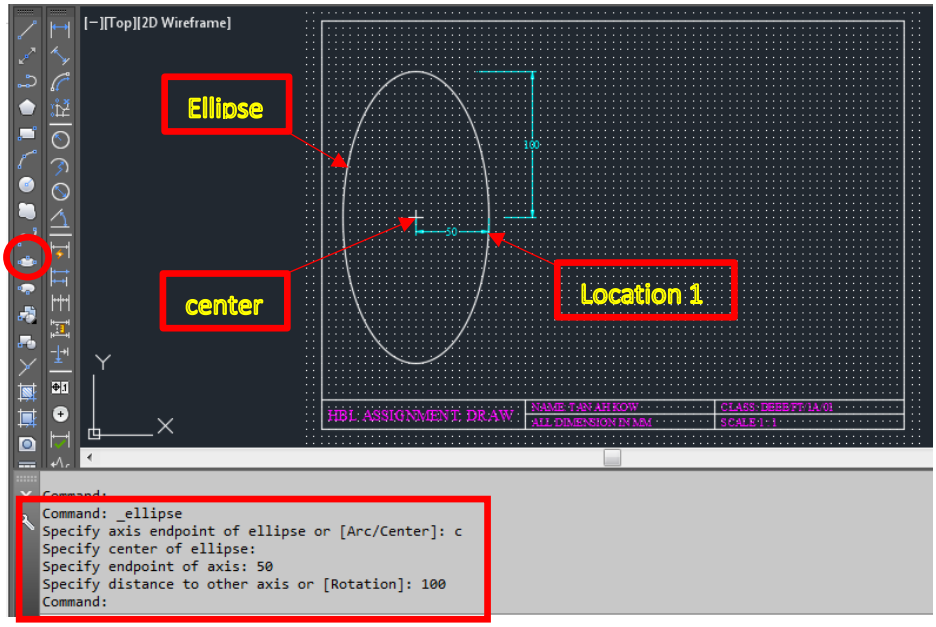

Fig 8.3- Type "**el**" or click **Ellipse icon** as circled in red.

Specify axis endpoint of ellipse: **c** (to specify centre of ellipse)

Specify center of ellipse: **click as shown in drawing**

Specify endpoint of axis: **50** (Ensure cursor is pointing horizontal direction towards right, i.e. **location 1**)

Specify distance to other axis: **100**

"**Enter**" in keyboard to complete command.

An **ellipse is created** using the method **centre**.

9. HATCH / 2D SOLID

When drawing objects with lines, it looks like a piece of wireframe object, i.e. hollow inside the object.

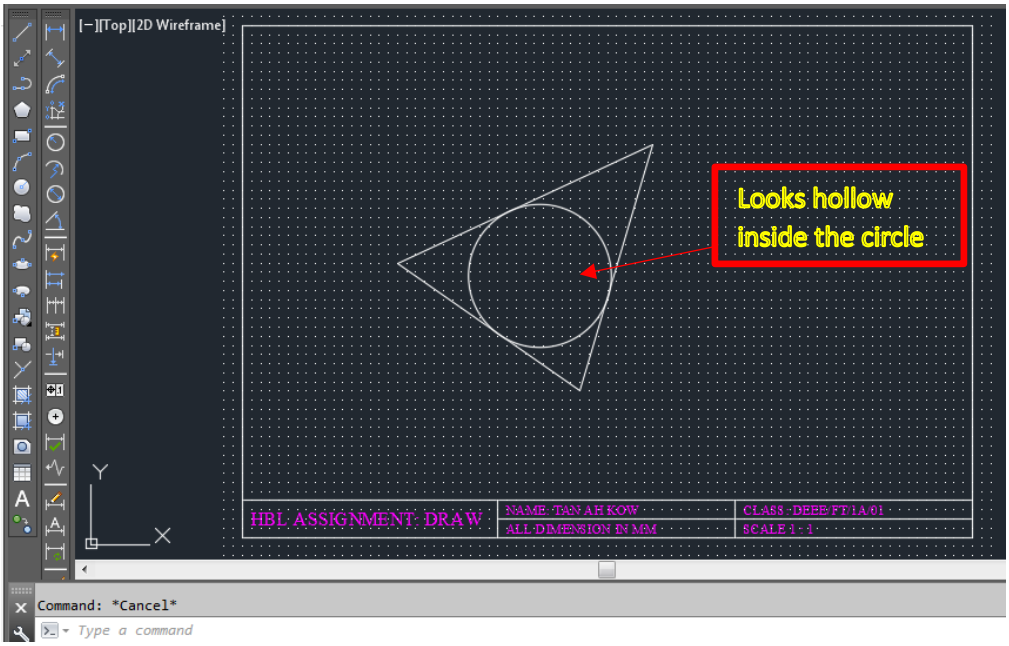

Fig 9.1- a wireframe object drawn using line

To solidify the inside of circle and make it looks like a **sheet of circular object**, command "**Hatch**" is used.

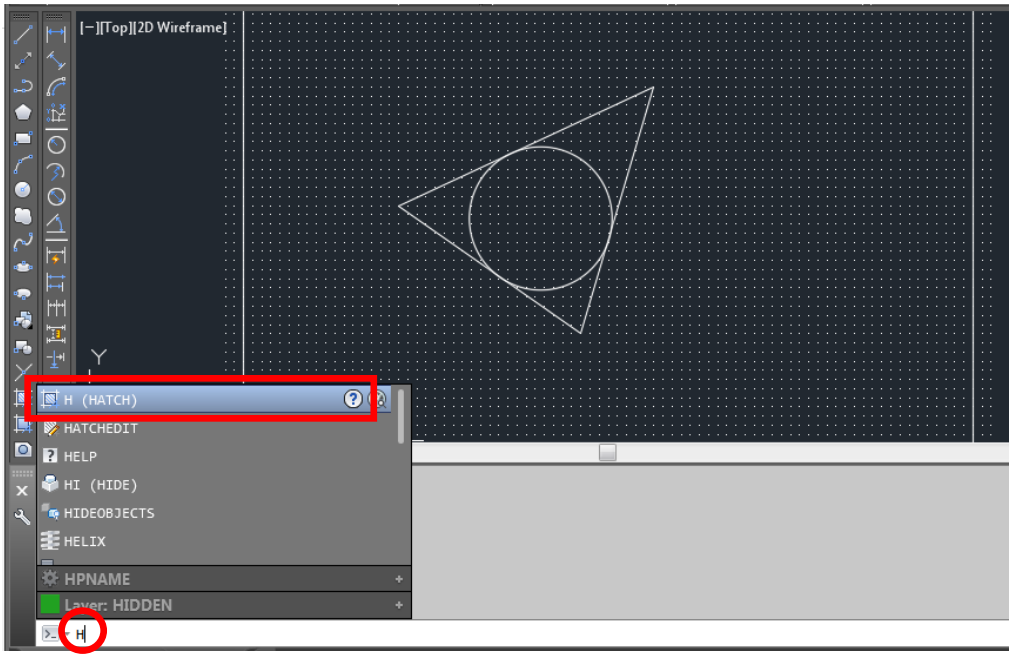

Fig 9.2- Type "**h**" for hatch.

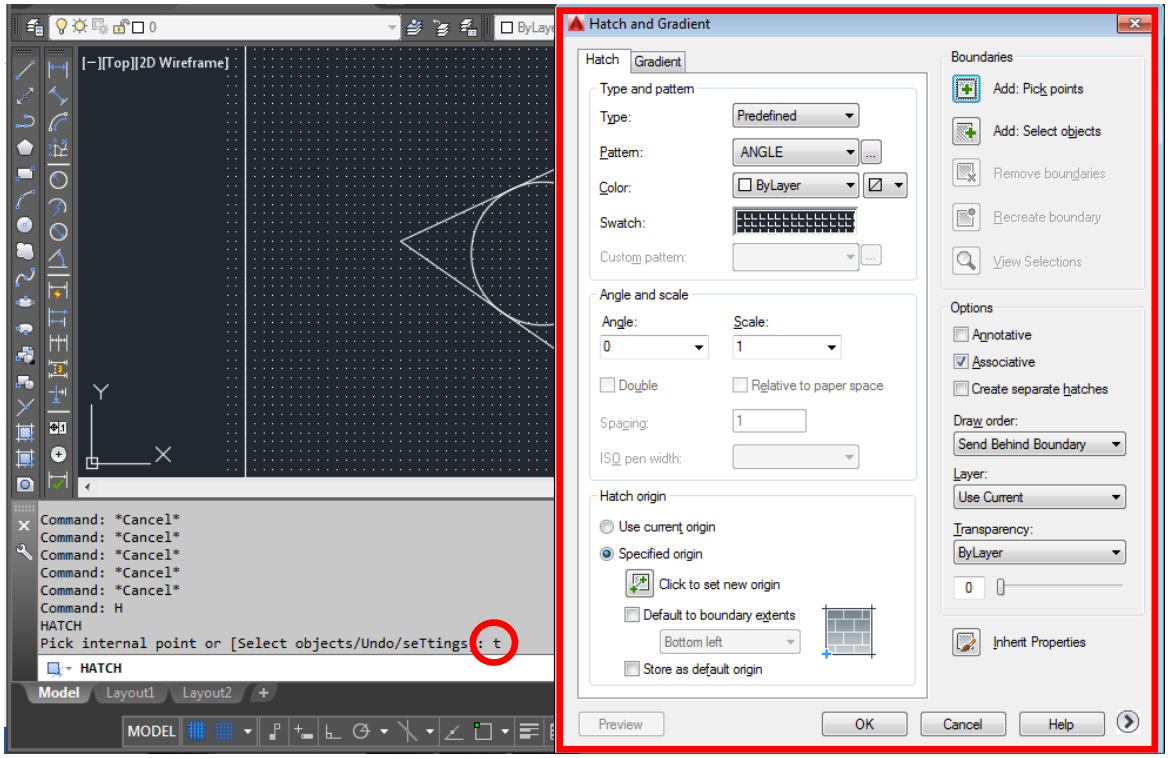

Fig 9.3- Type "**t**" for setting, **enter** and **Hatch & Gradient dialog box** appears.

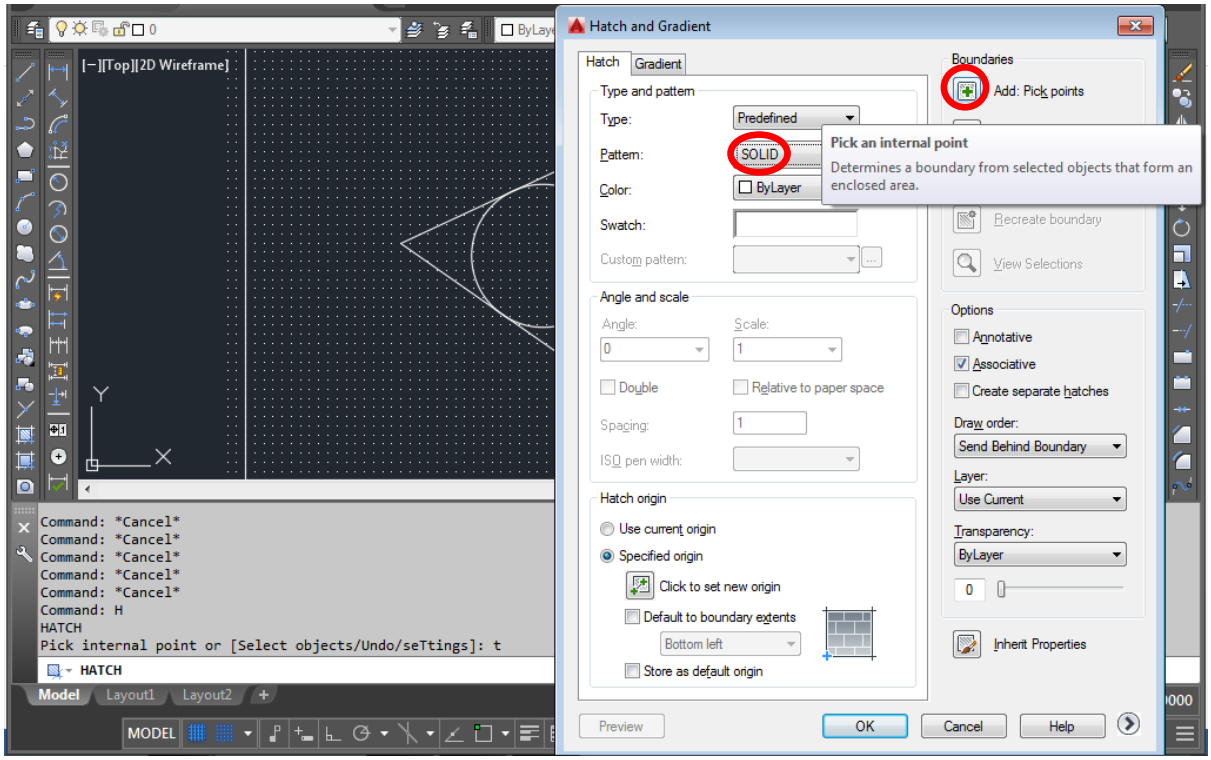

Fig 9.4- Change pattern to "**SOLID**" & pick an internal point by clicking on the button = **Add: Pick points** under Boundaries as circled in red.

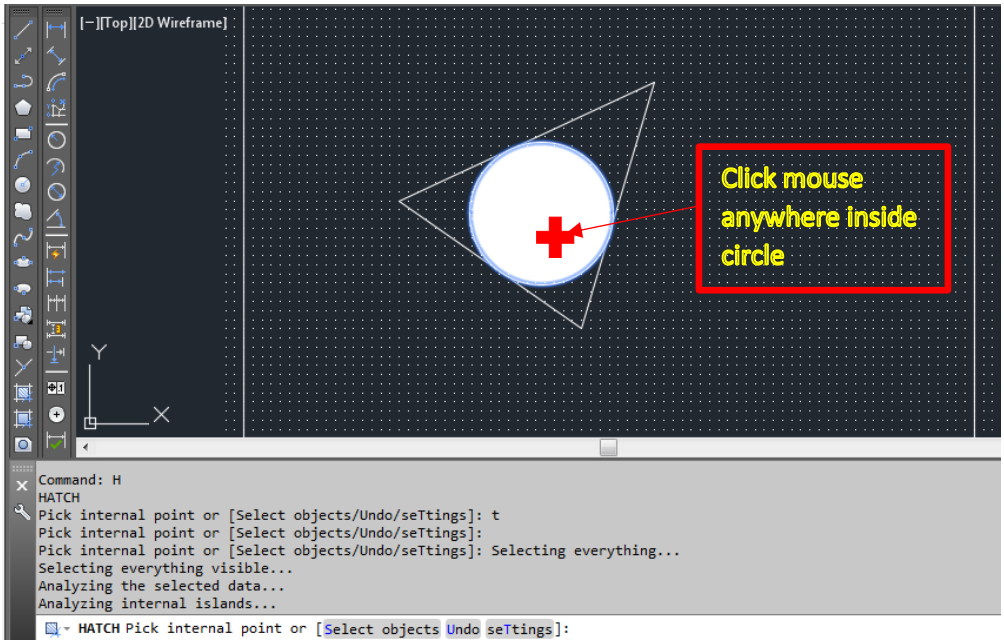

Fig 9.5- Next, **click the mouse** anywhere inside the circle.

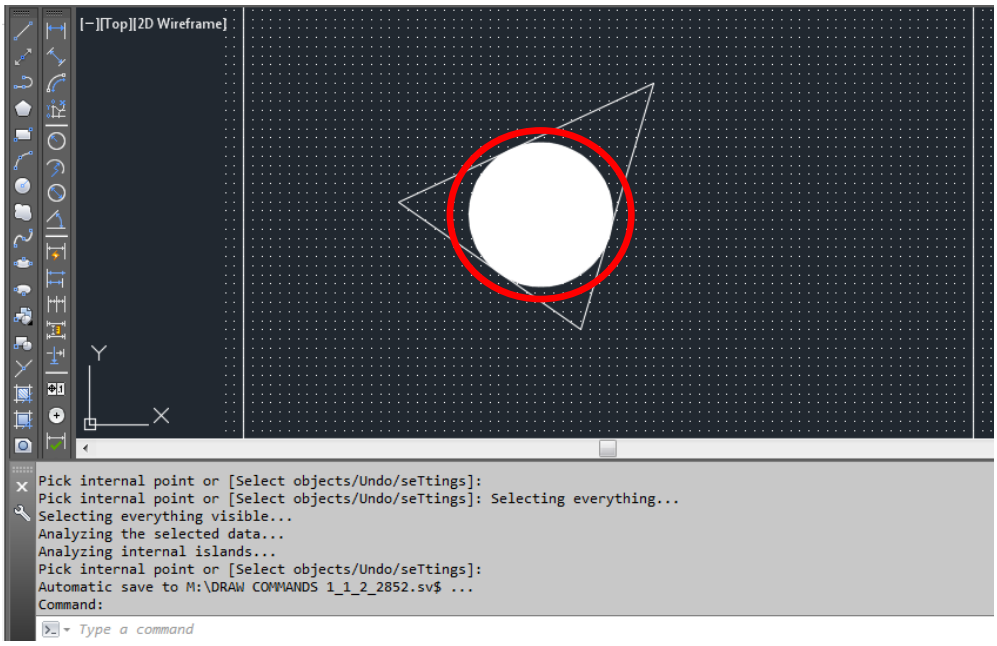

Fig 9.6- A permanent display of **2D-Solid circle** is displayed as circled in red.

10. WRITE BLOCK / INSERT

A. BLOCK

When object is drawn using many commands, the object is created with many entities or parts. **Write Block** is to **combine the many parts of an object into one single entity.** E.g. the object in Fig 10.1 is created with 3 lines, 1 circle and 1 solid which has a total of 5 entities or parts.

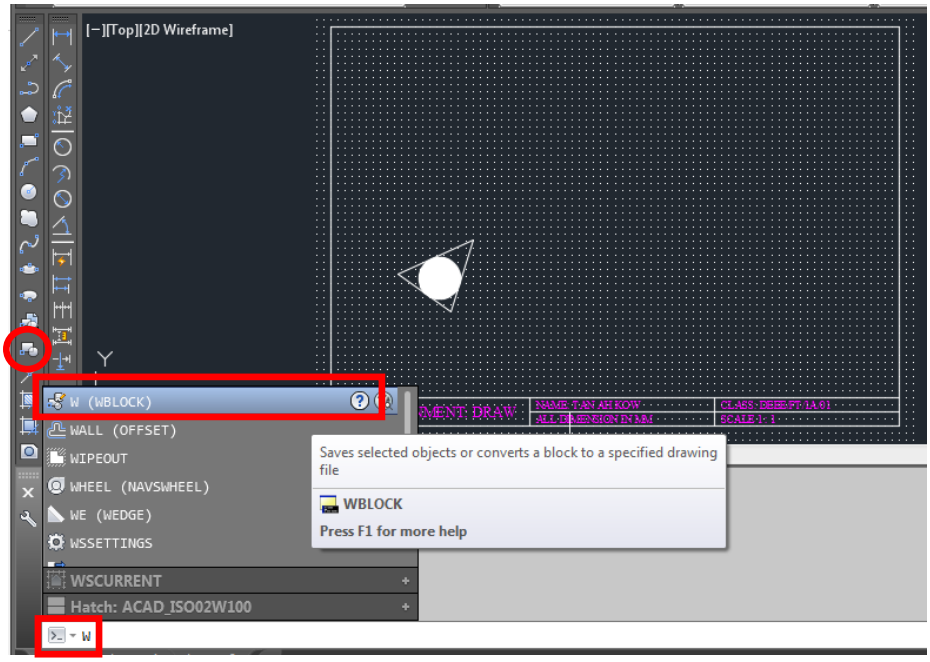

Fig 10.1- Type "**w**" and **enter** or click **block icon** as circled in red.

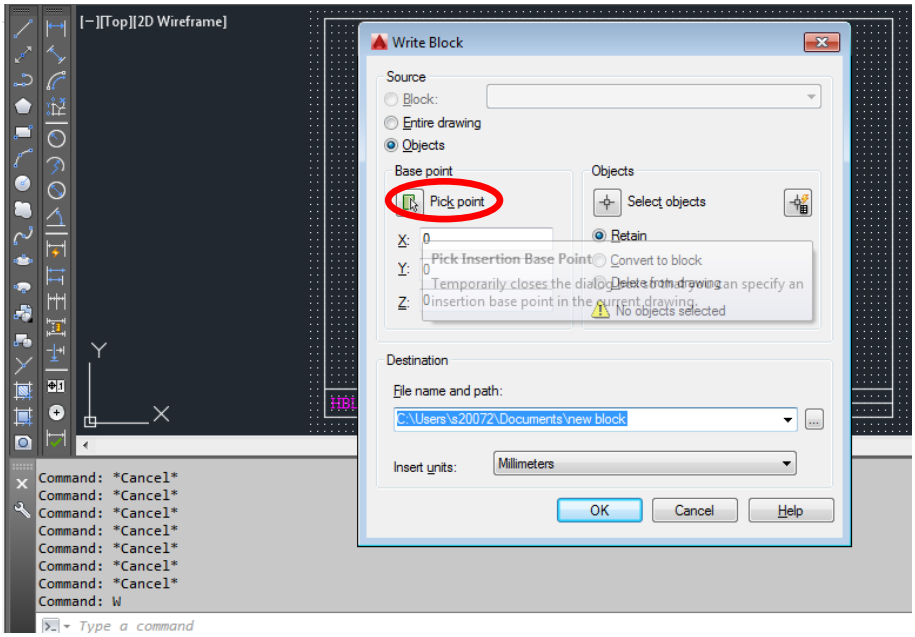

Fig 10.2- Click the button "**Pick point**".

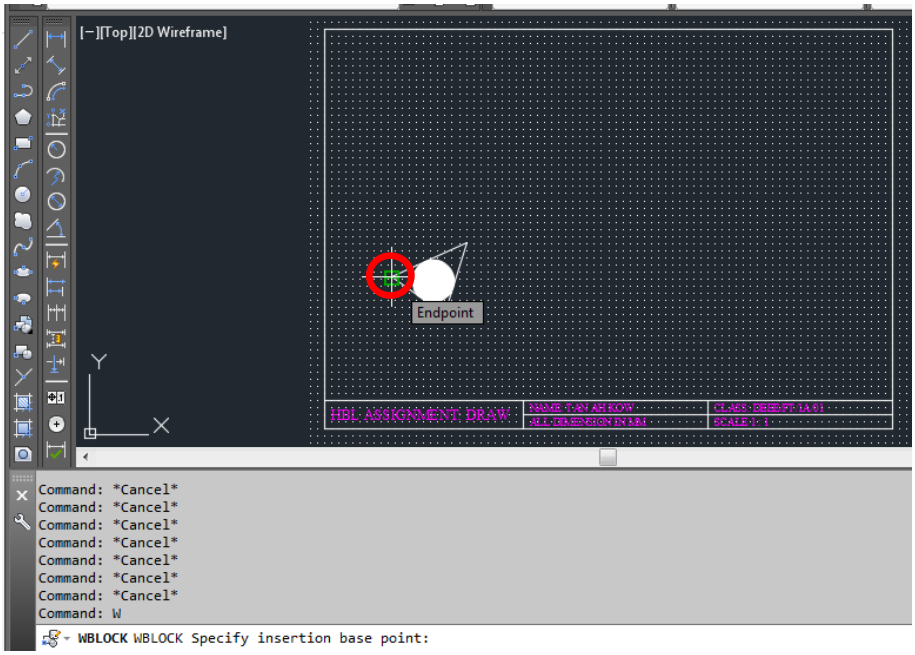

Fig 10.3- Click a **reference point (e.g. apex of triangle circled in red)** for insertion of whole object in any drawing later.

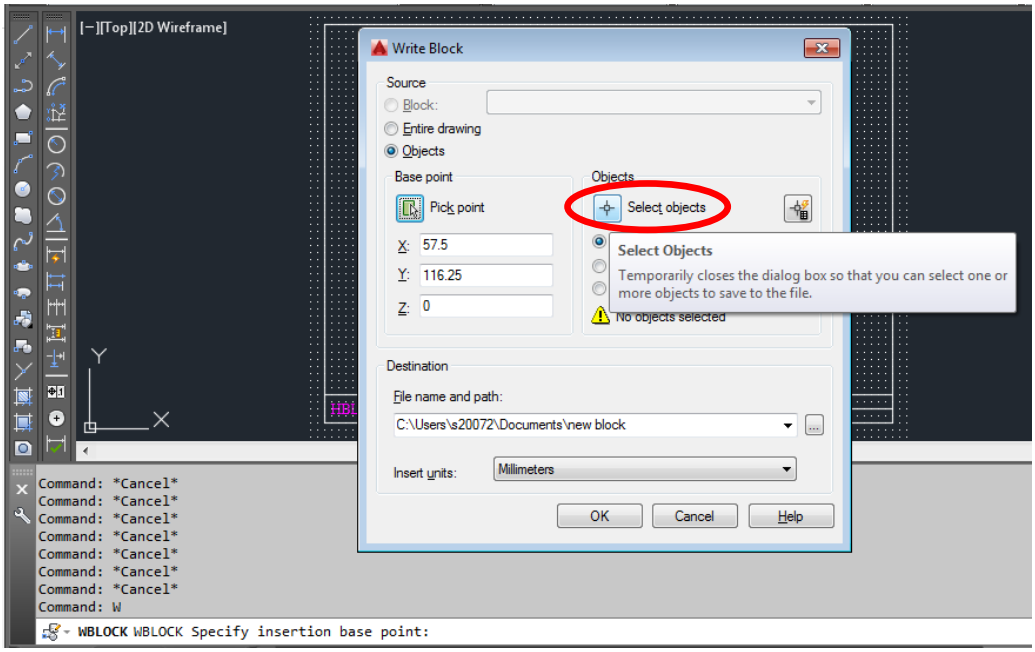

Fig 10.4- Next, Click "**Select object**" that needed to be write block

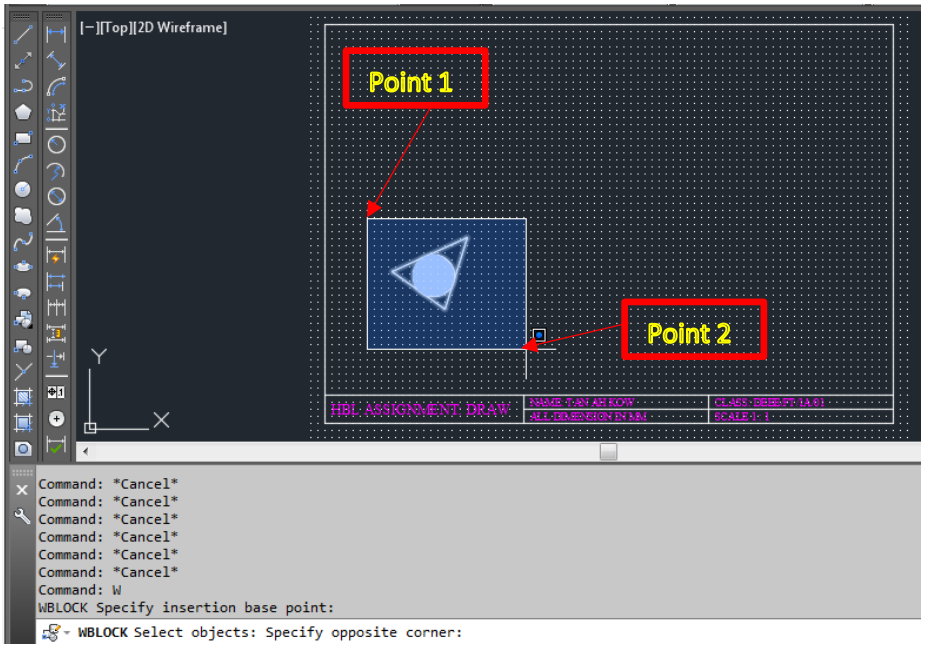

Fig 10.5- window the whole object by clicking at **point 1** and drag the cursor & click at **point 2**. Next, press **enter** in keyboard.

(Note: Ensure the **blue window covers whole object**).

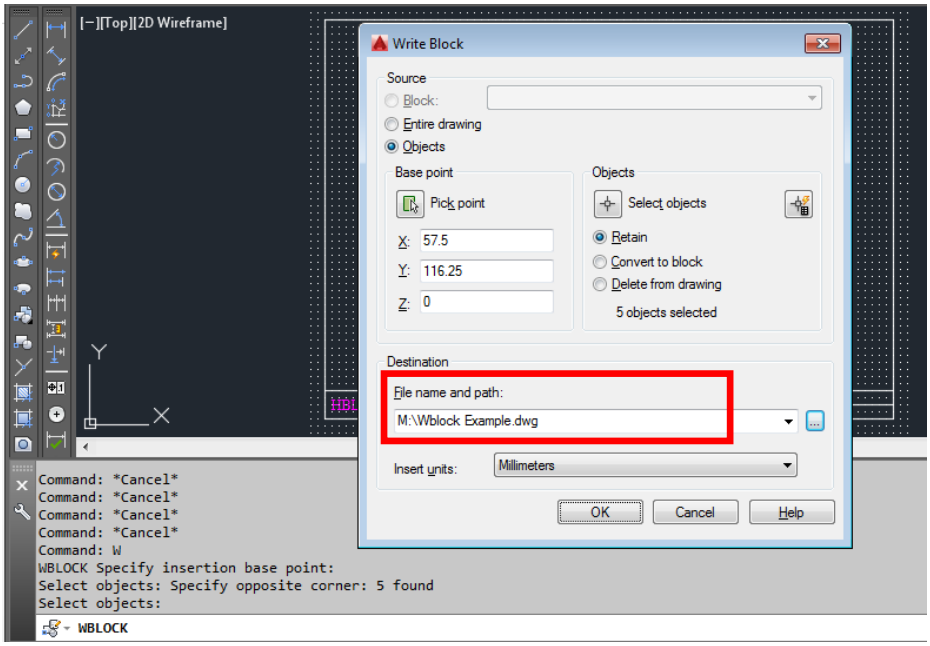

Fig 10.6- The Write block dialog box again appears. **Type in File name & Path** where you want the Object to be saved in.

(E.g. M:\\Wblock Example where object is saved in M drive with name “Wblock Example”).

B. INSERT

Use command Insert shortcut “I” to insert the Wblock object.

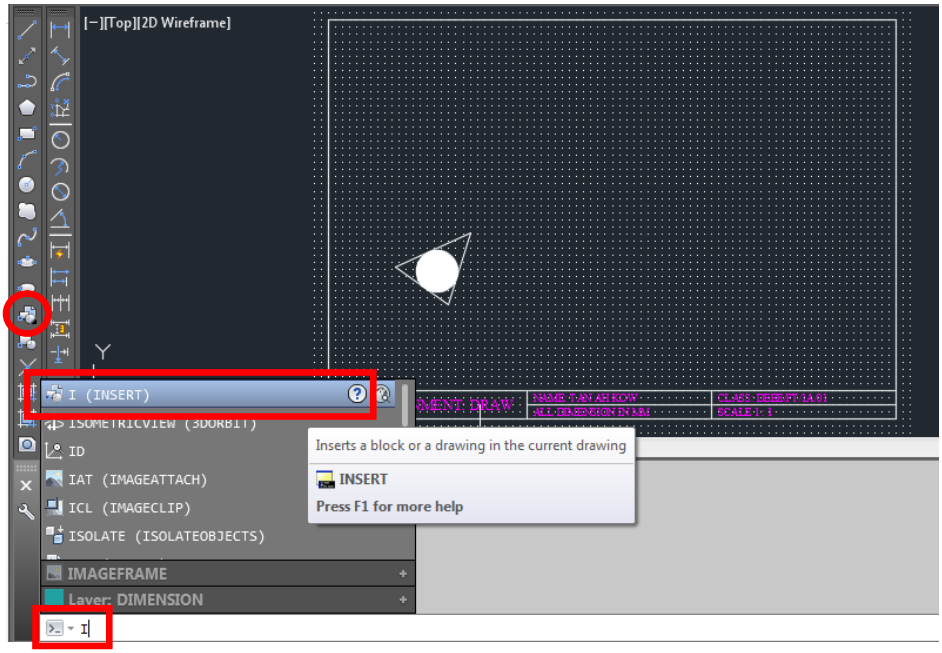

Fig 10.7- Type “**i**” and **enter** or click insert icon circled in red

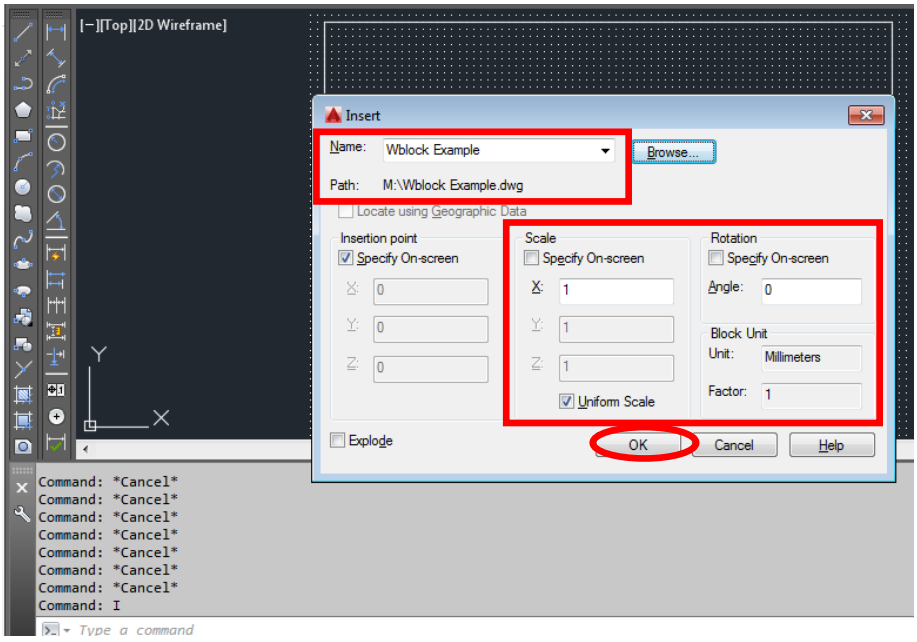

Fig 10.8- **Browse** it in **M Drive** that you have saved in and select the file name “**Wblock Example**”. Change **Scale** or **Rotation** if required. Then click **OK**.

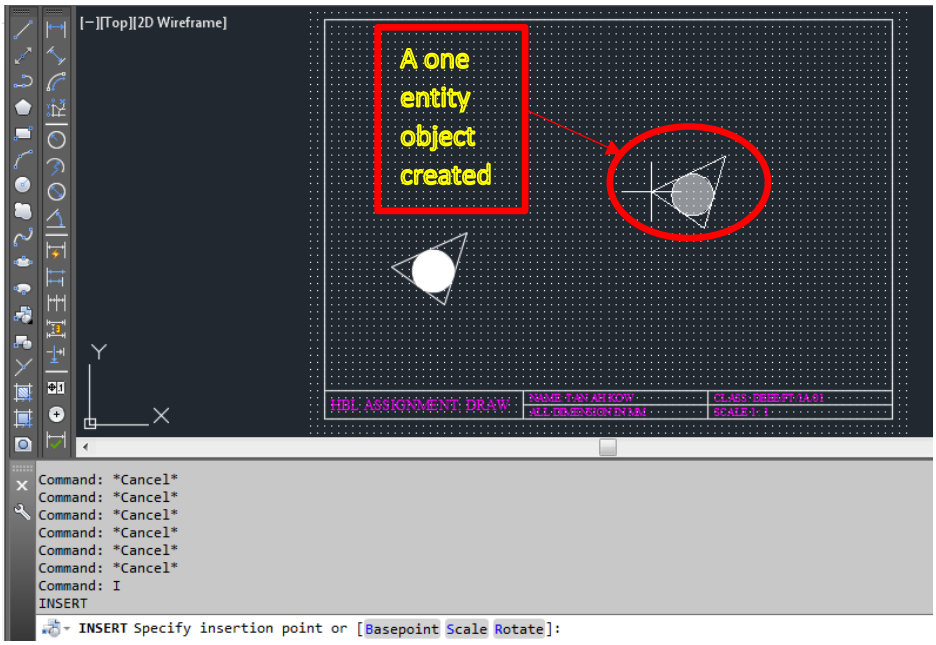

Fig 10.9- A one entity object duplicate is ready to be inserted anywhere inside the drawing.

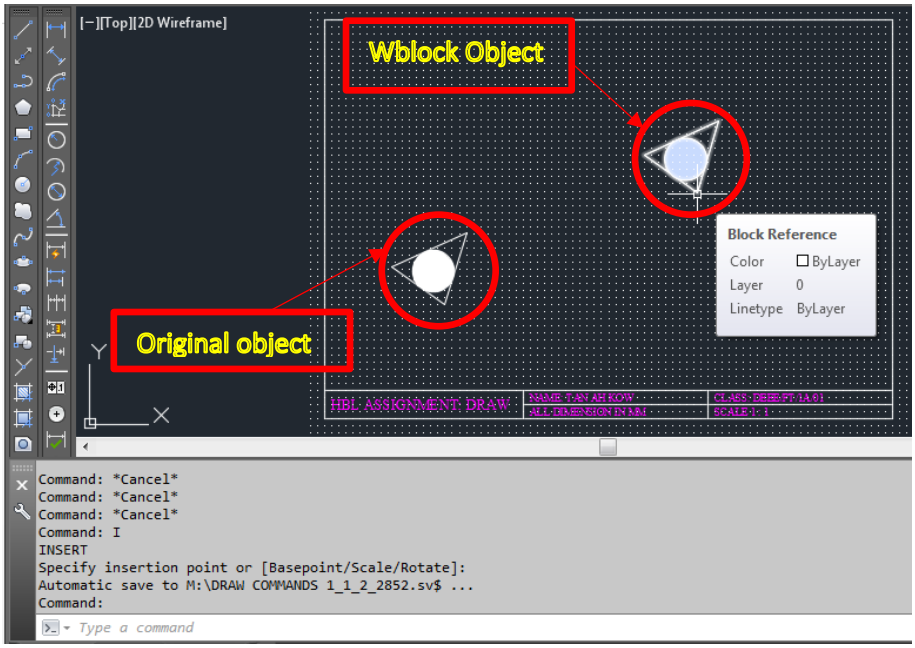

Fig10.10- The difference between original object and the WBlock object is that the **Wblock Object is one whole entity**. It can be seen the **whole object is highlighted** when the cursor is placed over the Wblock object. **Original object consists** of 3 lines, 1 circle & 1 solid totalling **5 entities** or parts.