Tutorial 5: Drawing Floor Plan and Elevations

Introduction

In this tutorial you will learn how to draw front and back external elevations of an original house and a plan showing the space layout for every floor. The drawings of the elevations and floor plan are given in Fig. 5.1 and Fig 5.2 respectively.

Fig 5.1 Front and back elevations
Dimensions: Use the dimensions for preparing the drawings (i.e. the Plans and Elevations).

Window Dimensions:
W1: (750 x 1500 mm)
W2: (1000 x 1500 mm)
W3: (2250 x 2250 mm)

Door Width: 750 mm
Outer Wall Thickness: 250 mm
Inner wall thickness: 50 mm

**Starting the Drawing**

To start the drawing, first you should decide the limits and units that you have to use. For developing the plans, refer to the dimensions indicated in Figure 5.2 and for Elevations, Figure 5.1. The final drawing should look like that shown in Figure 5.3. I.e., draw the elevations side by side and the floor plans just below the elevations on the same page.
Fig. 5.3 The final view of the drawing plan (your drawing should also include the dimensions)

**Setting Limits and Units**

It is normal when using AutoCAD to draw objects full size, so it’s usually necessary to reset the drawing limits to (about) the size of the object being drawn (or in the case of a building the building’s site). You can use the following logic to arrange your limits;

Let’s consider the example (Figure 5.3)

**For X Limits**

Left margin (2000mm)+Width of the house (5750 mm)+ margin between the 2 plans (2500)+
Width of the House (5750 mm) + right margin (2000 mm)= **18000 mm**
For Y limits:
Margin from the top (2000 mm) + The total height of the house (7500 mm) + Margin between the elevation and the floor plan (2000 mm) + length of the floor plan (10500 mm) + bottom margin (2000 mm) = 24000 mm

You can arrange your limits as (18000, 24000)

Type:

Limits

0, 0

18000, 24000

(this sets the drawing size to 18x24 metres)

Next you need to arrange the units. Select Format - Units, AutoCAD will display the “Drawing Units” dialog box. Make sure Decimal is selected in the Length section and Decimal Degrees in the Angles section, then in Unit’s Precision, click on the down arrow beside “0.0000” and select "0.00", and finally select “OK”.

At this point the screen is still displaying the old 420 X 297 size and we need to magnify the screen to the new size. This is done by typing:

Command: ZOOM

Specify corner of window, enter a scale factor (nX or nXP), or
[All/Center/Dynamic/Extents/Previous/Scale/Window/Object] <real time>: A

Regenerating model.

Alternatively you can select zoom all icon from the zoom toolbar.

Rulers, grids and snapping

Click on Tools Menu

Click on Drafting Settings

In the SNAP section enter 250 in the X spacing box
(The Y spacing changes automatically to 250 by highlighting the Y box)

Check the ON box

Click on OK, arrange the grids to 250 as well.
Following are detailed steps to develop the Ground Floor Plan

Note that you will prepare the first floor plan using the same principles.

- Draw a rectangle 5750x8500 starting at point (2000,2000)
- Click on Modify then Offset or click on type O in the command line. Input offset distance: 250 and press return
- Click on the rectangle and then inside the box, this will offset the rectangle, now the outer wall of the house is drawn.

- Draw a rectangle 625x1500 starting point at (2000, 10500)
- Click on Modify then Offset or click on type O in the command line. Input offset distance: 50 and press return
- Click on the rectangle and then inside the box, this will offset the rectangle, now you have the layout for WC.
• Draw a line starting from (2250, 6500) to (7500, 6500) and click on type O in the command line, Input offset distance: 250 and press return and click below the line. Now you have the following drawing.
Click on Trim and select these two lines (which is just drawn) and then click on the small vertical line between these two horizontal lines (only right hand side of the rec). (Bear in mind that if you can not select the vertical line it is because the Snap button is on)
Now, you will draw a line starting from (3750,2250) to (3750,10250) in order to separate sitting room and kitchen from hall and utility room. Then offset this line with 50 mm (inner wall thickness) distance to the right hand side.

- Draw a new line starting from (2250,7000) to (3800,7000), then offset with 50mm distance to the bottom side of the line in order to create the separation wall between utility room and hall.
- Draw a line from (2625,2000) to (2625,10500) and offset this line by 750 mm to the right.
- Now you have the following drawing in your computer screen. You have to use trim command to get rid of the unnecessary lines in this drawing, the first lines to be trimmed are shown on the figure.
- Click on Trim and select the upper rectangle, press enter, then select the third and forth vertical line from the left, so you have the following drawing. On this drawing you will also see the second lines to be trimmed with the dashed sign.
Click on Trim, Select the upper rectangle and the first long vertical line within the house layout, then select the two horizontal lines as shown with the dashed sign in the previous drawing. Now you have the following figure. You will also see the next portions to be trimmed on this figure.

Let’s draw Window 3 on the ground floor plan by using polyline, Click on Polyline and select first point as; 4500,2000, second point as; 5125,1500, third point as 6125,1500 and the last point as 6750,2000. Then connect the end points of the window with the inner wall as shown. (Snap must be on!)
You should now make the trims to complete the Window 3 as shown.

- Now let's start drawing the stairs on the floor plan. Draw 800x2800 rectangle starting from (2250, 4200) and then explode the rectangle and offset the short side with a distance of 400 mm throughout the rectangle. You should have the following figure;
Let’s see how we draw an example door by using the line and arc command. First draw a line by using the end points of the inner walls. Then Click on the rotate command from the tool bar, and select the line represented as door. Then press enter;

Specify Base Point: Left end point of the door
Rotation Angle: 45
Press Enter

Then using the arc command first specify the start point as the opposite side of the wall; Go to Draw from the menu, select Arc- then select Start- End- Angle. Click on the right hand side of the door space as start point, select the end of the door as end point and write 45° as the angle value. You have the following figure now.
• Please complete the other doors by using the arc and line command as used in the example. Also, “Break” command can be used to divide the walls into two pieces in order to locate doors into appropriate places.

• Now locate your windows by using logical assumptions by considering their location and their given dimensions on the drawing.

• Now you should write the names of the rooms and the main dimensions on your drawing.

• Write “Text” into Command line and then specify the start point of text by clicking on the place that you want to locate your text. Specify height as 200 and press enter, then you can set your rotation angle as “0” and press enter. Now, type in the text and end the command. In the meantime you can use Tool Bar/ Draw/ Text/Multi Line or Single Line Text to insert text into drawing.

• Now you can show your dimensions on the screen.

  1. Click on Dimension, Dimension Style, Modify
  2. Click on Symbols and Arrows
  3. In Arrowheads window, change Arrow size to 200
  4. Click on Text
  5. In Text Appearance window, change Text height to 200
  6. Press OK then close
  7. Click on the DIMENSION menu on the top of the screen
  8. Then click on LINEAR from the menu. The command line will then display:

    Specify first extension line origin or <select object>:

  9. Using the mouse select the starting point and then pick the end point of any part of the drawing that you would like to show its dimension.
10. Again a box will appear at the end of the line. 
   Click on the point. The command line will display: 
   Specify dimension line location or 
   [Mtext/Text/Angle/Horizontal/Vertical/Rotated]: 
   • Pick a point outside the rectangle and next to the horizontal line. Command line will display the dimension of the part you selected.

**Following are detailed steps to develop the South Elevation:**

*Note that you will prepare the North Elevation using the same principles.*

- Let’s draw South Elevation on top of Ground Floor Plan and leave 2000 mm spacing between these two figures.
- Draw a rectangle 5750x7000 starting at (2000, 14000).
• Command: ZOOM

Specify corner of window, enter a scale factor (nX or nXP), or [All/Center/Dynamic/Extents/Previous/Scale/Window/Object] <real time>: W

Select the upper rectangle by specifying first and opposite corner and zoom into the South Elevation.

• Click on explode from the toolbar, and select the rectangle drawn.

• Now you will draw the roof of the house. Draw a line with start point [2000,19250] and end point as mid point of the top line of the rectangle. Draw a second line with start point as the mid point of top line of rectangle and end point [7750,19250]
• Click on trim from the toolbar and select the lines shown with the dashed lines as in the figure and press enter. Select the other side of the triangle to get rid of it. Repeat this for the other side. At the end delete the top of the rectangle.

• Now you have the following house shape (South Elevation)

• Locate the windows and the door by using the rectangle command.

W1: [2750, 17500], [3500, 19000]
W2: [5125, 17500], [6125, 19000]
W3: [4500, 14000], [6750,17250]
Door: [2750, 14000], [3500, 16250]

- Click on Draw, Arc, Start End Radius and select the door right top corner, and then left top corner with radius [375].
- Draw line with start point [4500, 15000], end point [6750, 15000]

Now you have the following figure:

![House Plan with Door and Window](image)

Now complete the door and window details by making assumptions for the dimensions. Add the chimney at the end.

**Exercise:**

Draw the floor layout and the north elevation by yourself.