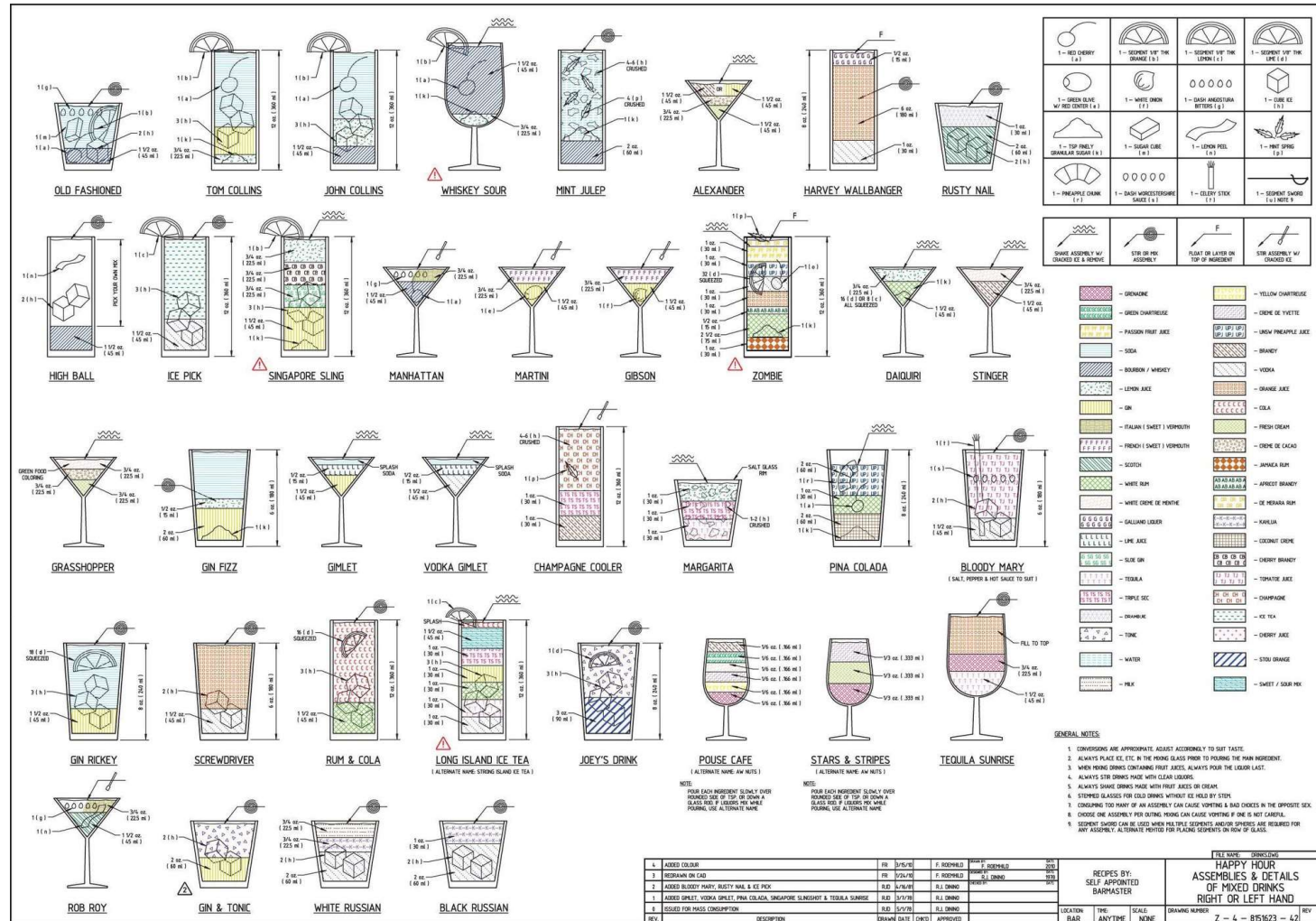


Working with Digital Technologies CAD



Working with AutoCAD



AUTODESK
AUTOCAD

Download Education Version of AutoCAD



AUTODESK
AUTOCAD

https://www.autodesk.com/education/edu-software/overview?_ga=2.119678017.834319708.1600961686-1615692111.1593105833&sorting=featured&page=1

MFA setup guides & the RemotePC Dashboard are the following:

RemotePC Dashboard - <https://remotepc.uwtsd.ac.uk/>

MFA Setup Guides - <https://www.uwtsd.ac.uk/mfa/>

Connection Guides - <https://www.uwtsd.ac.uk/virtuallearning/>

A booking system is in the process of being developed which will allow dedicated slots to be booked in advance.

At present a default of 180mins is allowed per student, so make sure you save your work regularly as you may need to log back in.



AUTODESK
AUTOCAD

the basics



Interface



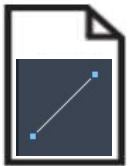
Ribbon



Command
Line



UNITS



Draw



Modify



Blocks



Images



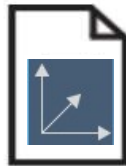
Layers



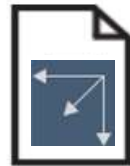
Properties



Linetype



WCS



UCS



Text



Dims



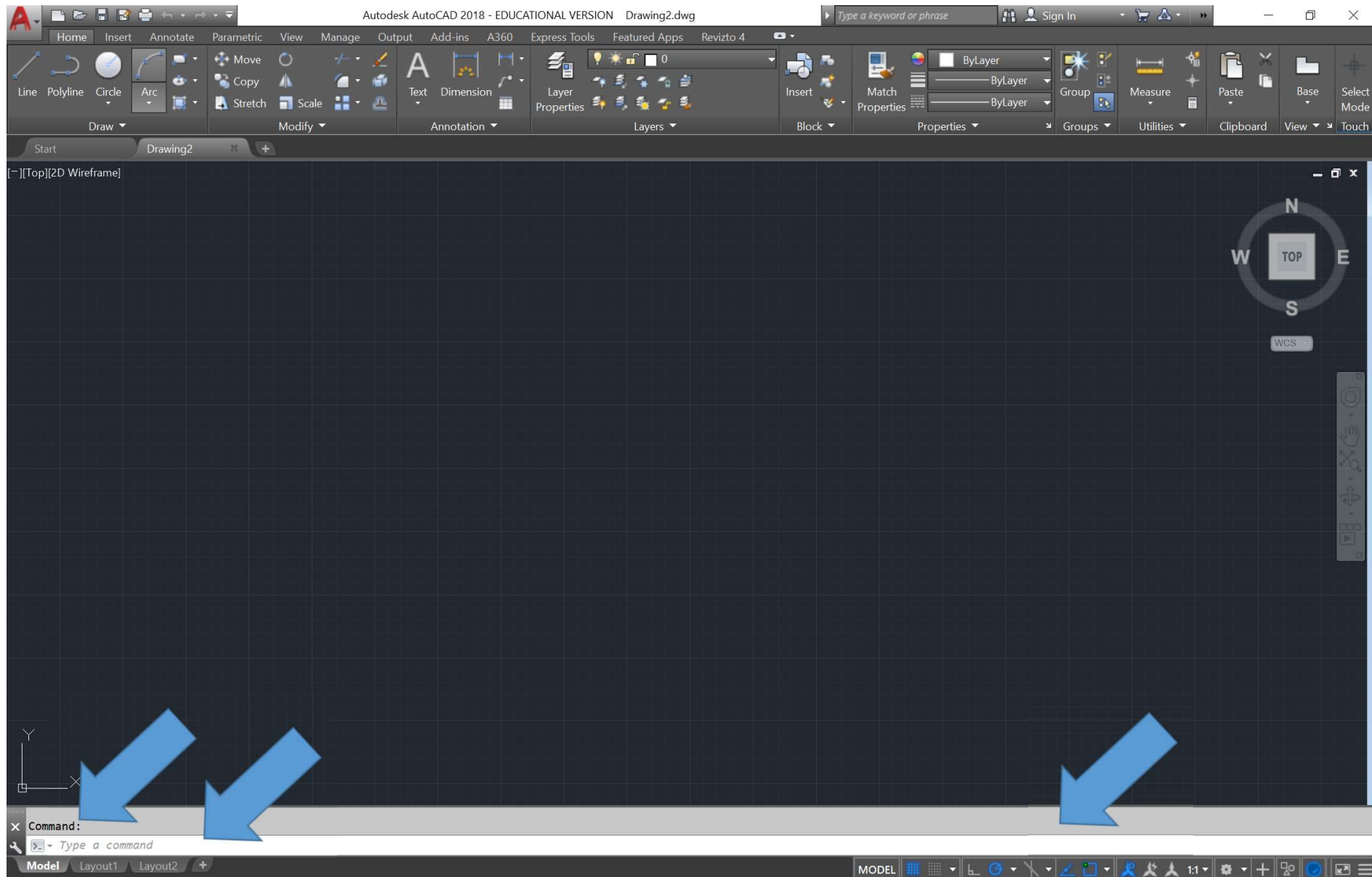
Titleblocks



Layouts

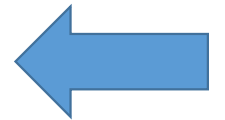
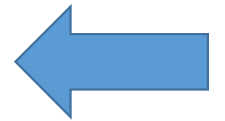
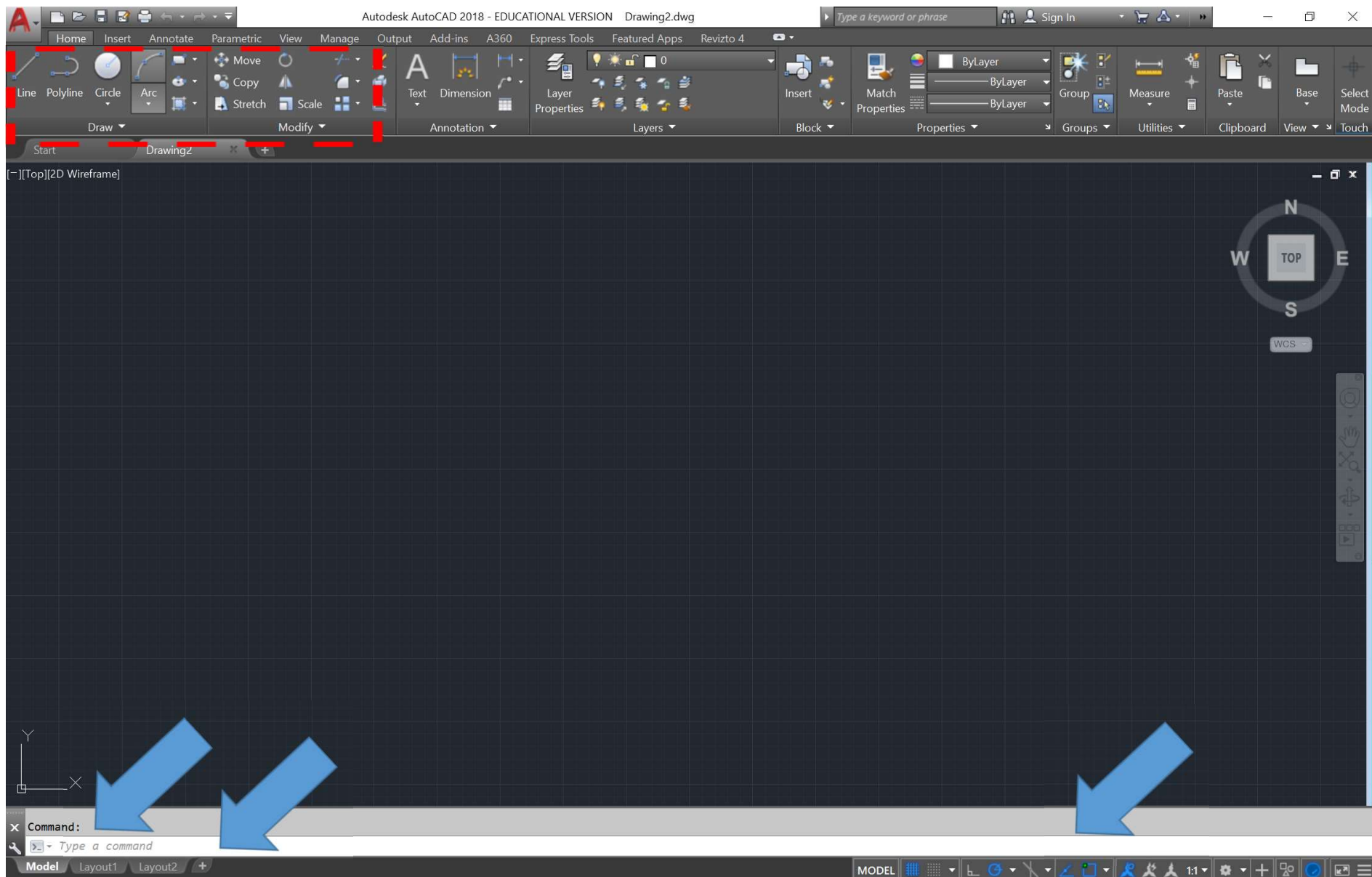


Plot



UNITS

BASIC
COMMANDS



UNITS

BASIC
COMMANDS

DRAW Menu

MODIFY Menu





Q **QSAVE** / Saves the current drawing.

A **ARC** / Creates an arc.

Z **ZOOM** / Increases or decreases the magnification of the view in the current viewport.

W **WBLOCK** / Writes objects or a block to a new drawing file.

S **STRETCH** / Stretches objects crossed by a selection window or polygon.

X **EXPLODE** / Breaks a compound object into its component objects.

E **ERASE** / Removes objects from a drawing.

D **DIMSTYLE** / Creates and modifies dimension styles.

C **CIRCLE** / Creates a circle.

R **REDRAW** / Refreshes the display in the current viewport.

F **FILLET** / Rounds and fillets the edges of objects.

V **VIEW** / Saves and restores named views, camera views, layout views, and preset views.

T **MTEXT** / Creates a multiline text object.

G **GROUP** / Creates and manages saved sets of objects called groups.

B **BLOCK** / Creates a block definition from selected objects.

N **NEW** / Create a new drawing

H **HATCH** / Fills an enclosed area or selected objects with a hatch pattern, solid fill, or gradient fill.

J **JOIN** / Joins similar objects to form a single, unbroken object.

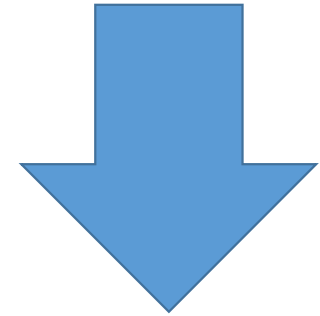
M **MOVE** / Moves objects a specified distance in a specified direction.

I **INSERT** / Inserts a block or drawing into the current drawing.

O **OFFSET** / Creates concentric circles, parallel lines, and parallel curves.

L **LINE** / Creates straight line segments.

P **PAN** / Adds a parameter with grips to a dynamic block definition.



<https://www.autodesk.com/shortcuts/autocad>

PL Polyline
CO Copy
REC Rectangle
MO/PR Modify Properties
Pallet
LA Layer Pallet

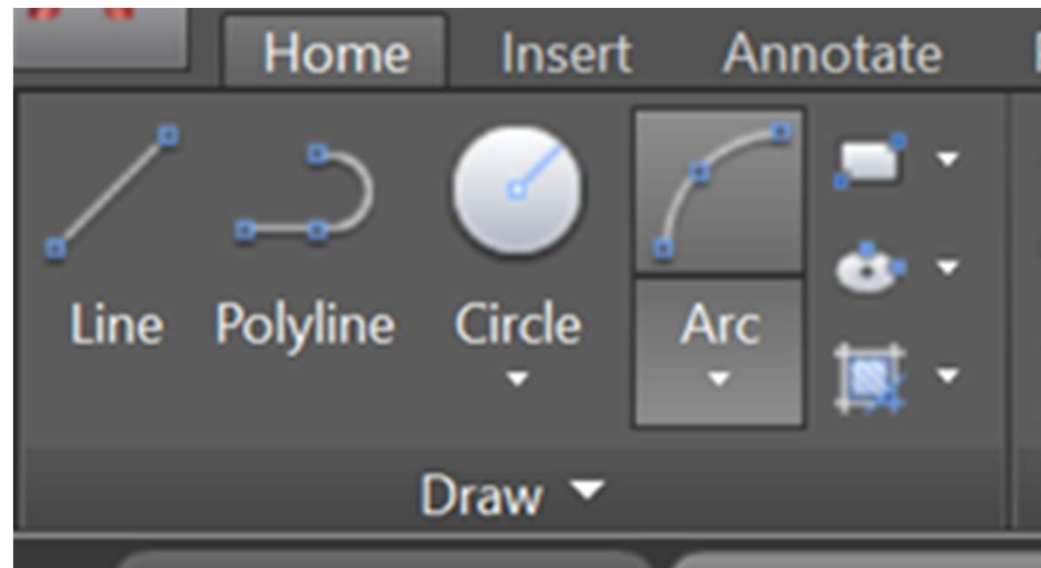
Warm Up

Explore the DRAW menu on the Ribbon:

Draw Line and shapes using the icons on the ribbon.

Look at the Command line.

Are there any prompts?



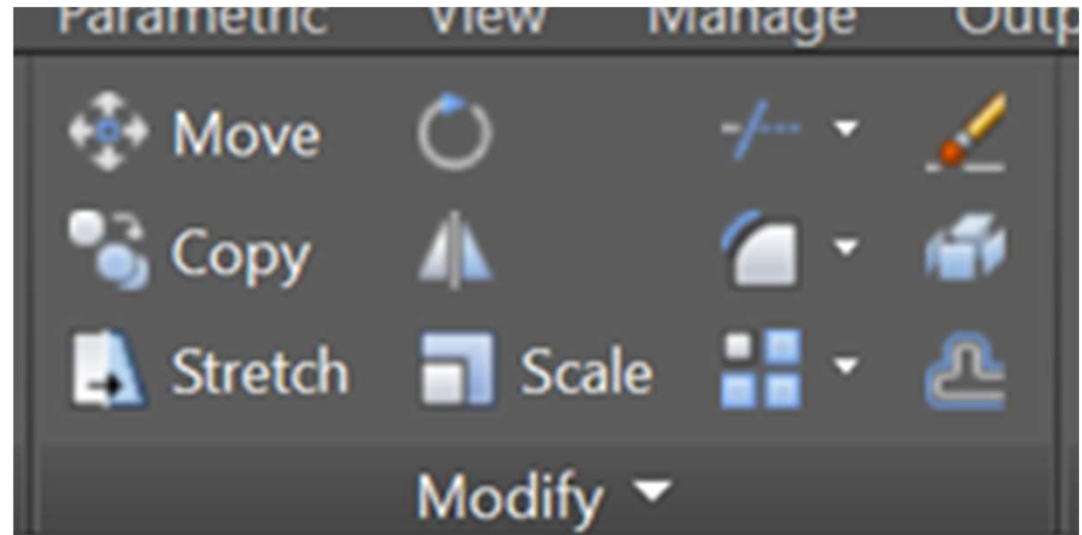
Warm Up

Explore the Modify menu on the Ribbon:

See what happens if you try and 'Modify' something that you have drawn.

Look at the Command line.

Are there any prompts?





AUTODESK
AUTOCAD

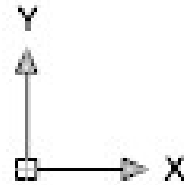
AutoCAD uses a Coordinates based system.

X and Y 2 Dimensional

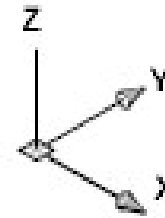
X Y Z 3 Dimensional

We can use the coordinates to accurately position buildings in space.

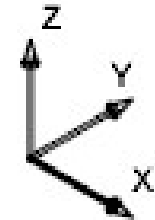
We can also use coordinates to draw



2D UCS Icon



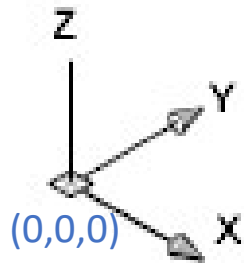
3D UCS icon



shaded UCS icon

AutoCAD uses a Coordinates Based system.

In the World Coordinate system WCS

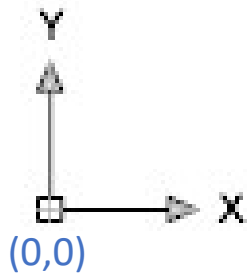


X axis is Horizontal on the screen

Y axis is Vertical on the screen

Z axis is the Elevation (Height)

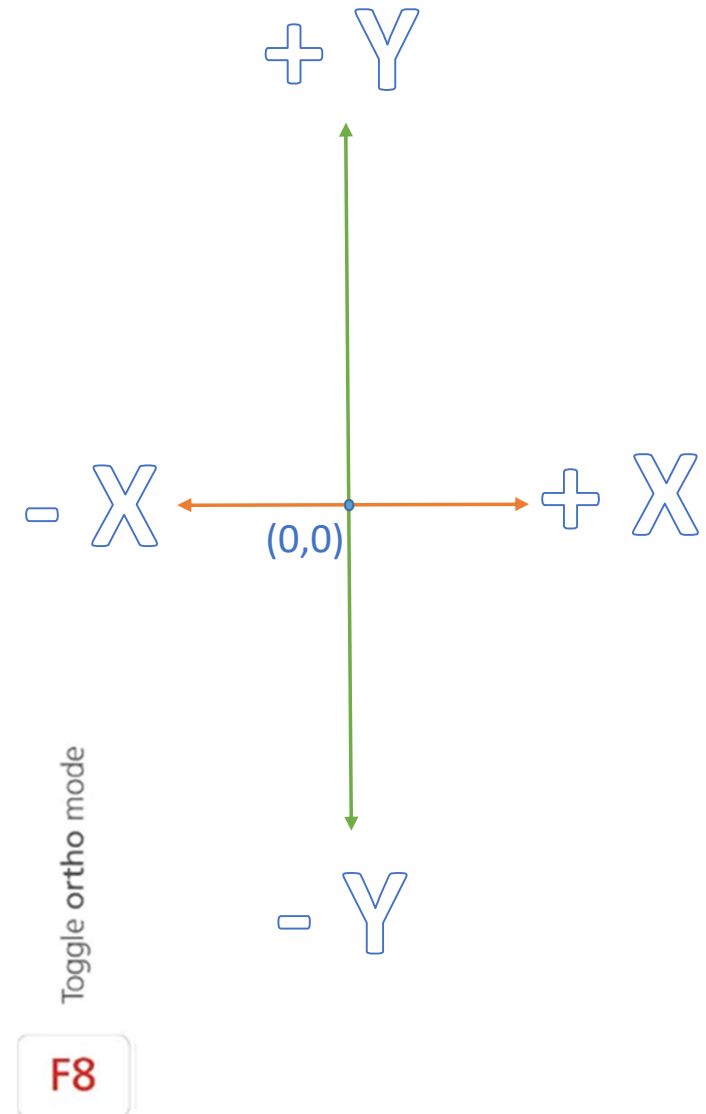
These values can be Positive + or Negative – depending on their relationship to the Origin Point. WCS origin = (0,0,0) = zero value in x y and z axis



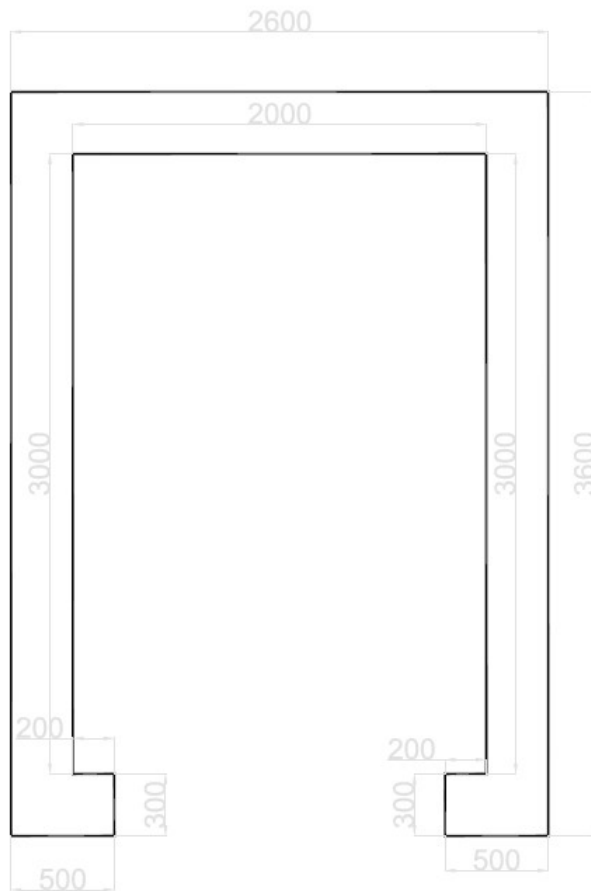
When drawing in 2D we do not need to consider the Z axis as we are drawing on a Flat plane where there is no Elevation (height) therefore the value of Z is 0

A 2D WCS icon is shown so we know that we are working in two dimensions using the x and y axis

Use can also use 'ORTHO' F8 to as a guide for Horizontal and Vertical distances in a directional manner.



Task 1



Starting from point 0,0 draw a Polyline to depict walls to the dimensions shown.

To start type PL or select Polyline from the Ribbon.

type 0,0 and press enter

now use the coordinates system to enter the next point (s) of the polyline pressing enter after each until you Close the polyline

@500,0 (enter)
@0,300 (enter)
@-200,0 (enter)

and so on.

remember the @ symbol means you are moving in a direction.

the first distance value before the comma are along the 'x' axis

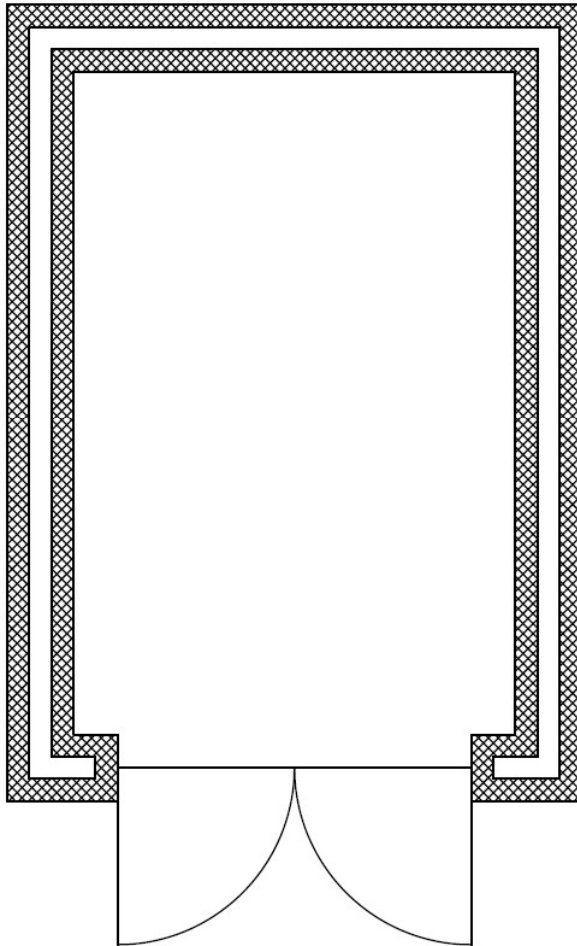
the second distance value after the comma are along the 'y' axis

adding a minus before an x distance will move a the line from right to left direction

adding a minus before a y distance will move the line down the Y axis.

TIP: AutoCAD also allows you to draw Directionally using the Ortho Mode and Curser.

Task 2



Find your way around the Draw and Modify options on the Ribbon.

Use 'Offset' command to offset the walls by 100mm (under Modify in the Ribbon or type 'o')

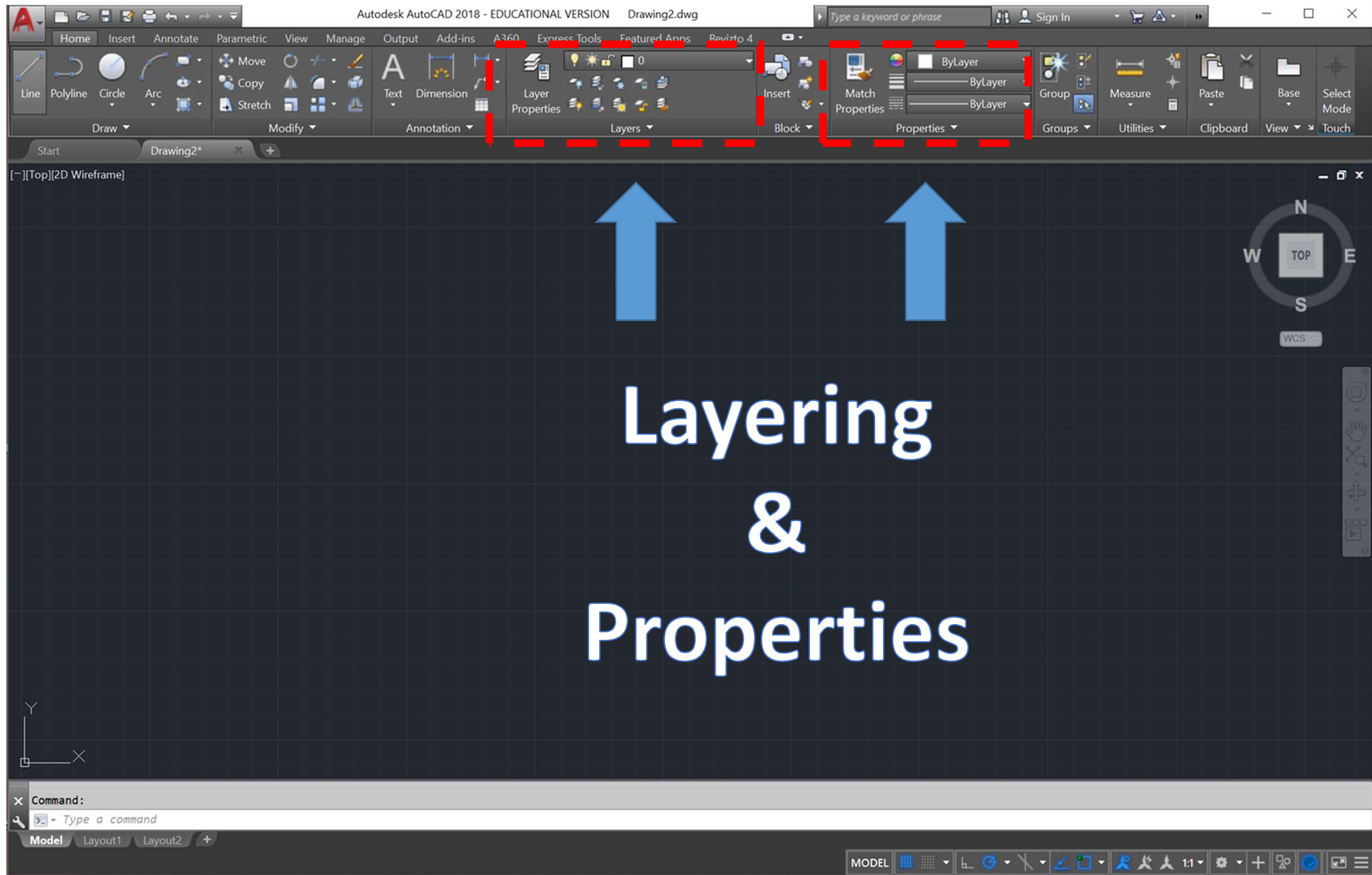
Use 'Hatch' command to hatch in the Blockwork change the scale in the hatch editor to 10

Draw a 'Line' from midpoint to midpoint of the doorway. (check your object snap settings)

Draw a 'Circle' from the midpoint of the door retuen to the midpoint of the doorway opening.

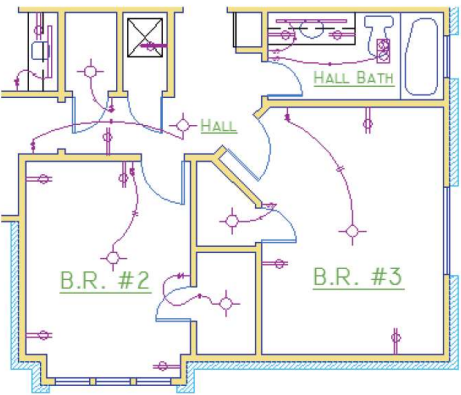
Use 'Trim' command to trim the circle to create a quarter circle (i.e single door)

Use 'Mirror command to mirror the door leaf and create a double door. You must indicate the line / point of the axis to mirror.

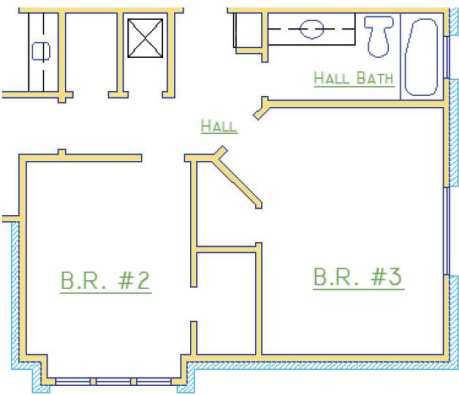


Layers

Organize your drawing by assigning objects to layers.
When a drawing becomes visually complex, you can hide objects that you currently do not need to see.

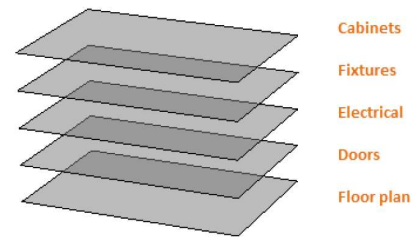


In the drawing below, the doors and electrical wiring were temporarily hidden by hiding their layers.



Layers (continued)

You gain this level of control by organizing the objects in your drawing on layers that are associated with a specific function or purpose. It might be helpful to think of layers as clear plastic sheets:



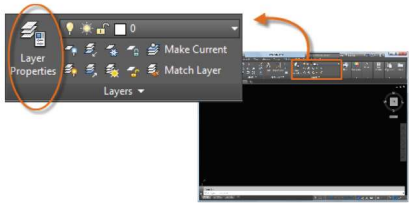
- With layers, you can:
- Associate objects by their function or location
 - Display or hide all objects related to a single operation
 - Enforce linetype, color, and other property standards for each layer

Important:

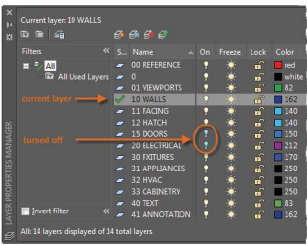
Resist the temptation to create everything on one layer. Layers are the most important organizing feature available in AutoCAD drawings.

Layer Controls

To see how a drawing is organized, use the **LAYER** command to open the Layer Properties Manager. You can either enter **LAYER** or **LA** in the Command window, or you can click the Layer Properties tool on the ribbon.



Here's what the Layer Properties Manager displays for this drawing.



As indicated, layer 10 WALLS is the *current layer*. All new objects are automatically placed on that layer. In the list of layers, the green check next to layer 10 WALLS indicates that it is the current layer.

In the column labeled On, notice that the light bulb icons for two layers are dark. This indicates that these layers were turned off to hide the doors and electrical wiring in the floor plan.

Notice that each layer name starts with a two-digit number. This convention makes it easy to control the order of the layers because their order does not depend on the alphabet.

Layer Settings

The following are the most commonly used layer settings in the Layer Properties Manager. Click the icon to turn the setting on and off.

COMMONLY USER LAYER SETTINGS

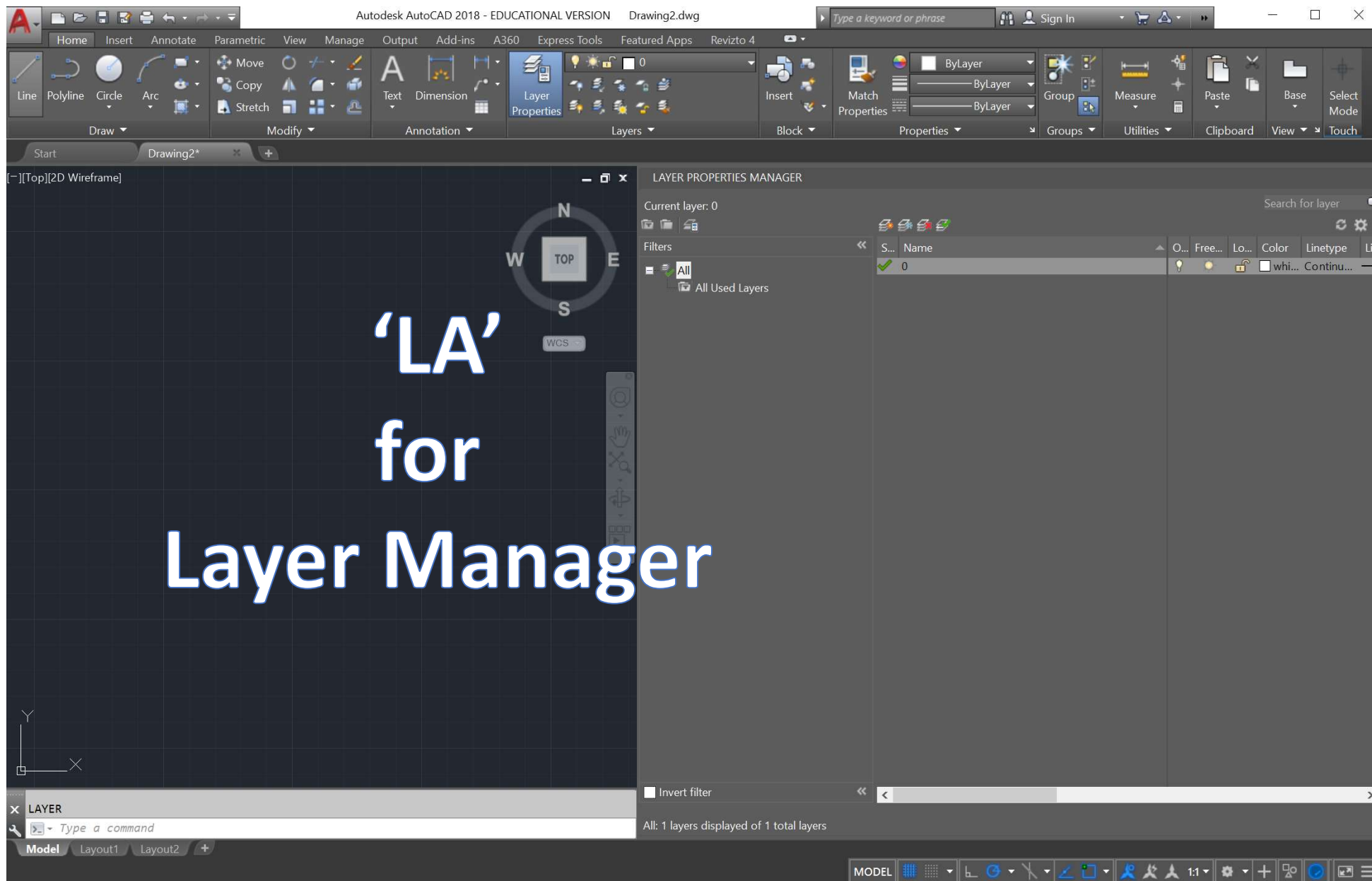
Turn Off Layers: This will help reduce the visual complexity of your drawing while you work.

Freeze Layers: Freeze layers that you do not need to access for a while. Freezing layers is similar to turning them off, but improves performance in very large drawings.

Lock Layers: Locking layers prevents accidental changes to the objects on those layers. Also, the objects on locked layers appear faded, which helps reduce the visual complexity of your drawing.

Set Default Properties: You can set the default properties for each layer, including color, linetype, line weight, and transparency. New objects that you create will use these properties unless you override them. Overriding layer properties is explained later in this topic.



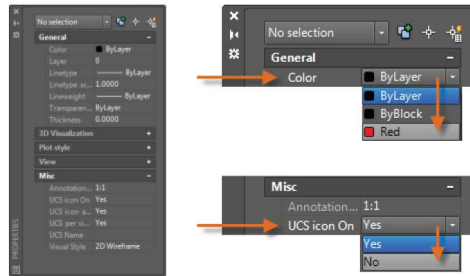


The Properties Palette

The Properties palette is an essential tool. You can open it with the **PROPERTIES** command (enter **PR** in the Command window), you can press **Ctrl + 1**, or you can click the tiny arrow in the Properties panel on the Home tab—whichever you prefer.

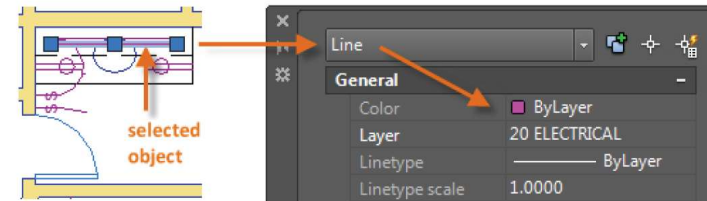


The Properties palette displays a list of all the important property settings. You can click any of the available fields to change the current settings. In the following example, if no objects are selected, the current color will be changed from ByLayer to Red and the UCS icon will be turned off.



Verify and Change Object Properties

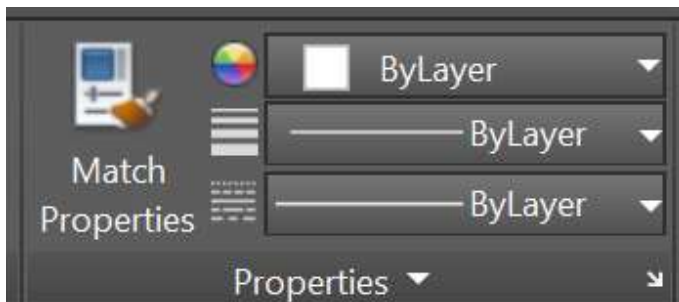
You can use the Properties palette to verify and change property settings for selected objects. If you click an object in your drawing to select it, here is what you might see in the Properties palette.

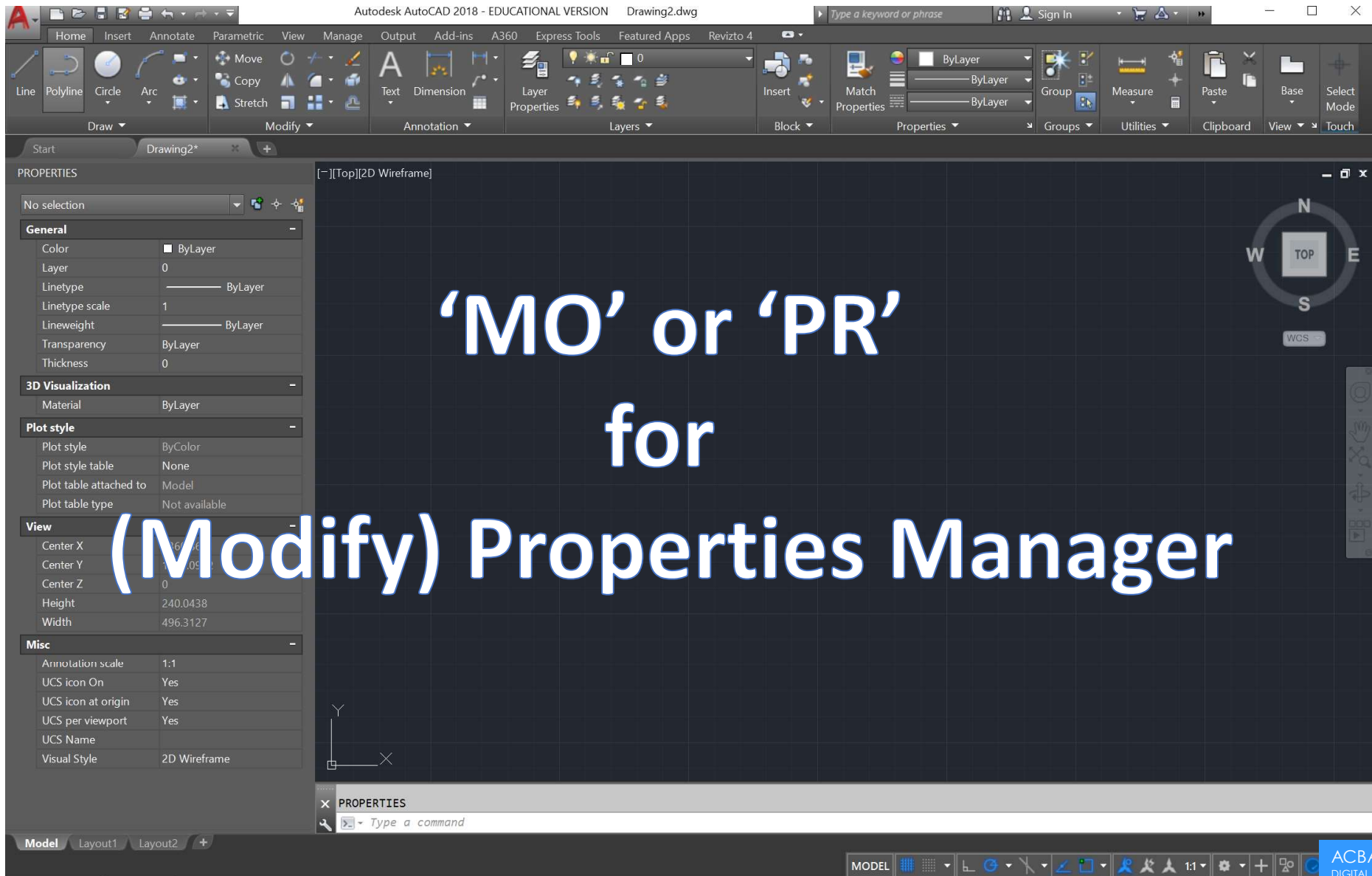


Notice that the current properties for the selected object are displayed in the palette. You can change any of these properties by clicking and changing the setting.

A property that is set to "ByLayer" inherits its setting from the layer. In the previous example, the objects that were created on the 20 ELECTRICAL layer are purple because that is the default color of the objects on that layer.

If you select several objects, only their common properties are listed in the Properties palette. If you change one of these properties, all the selected objects will change in one operation. Selecting objects is covered in more detail in the Modifying topic.



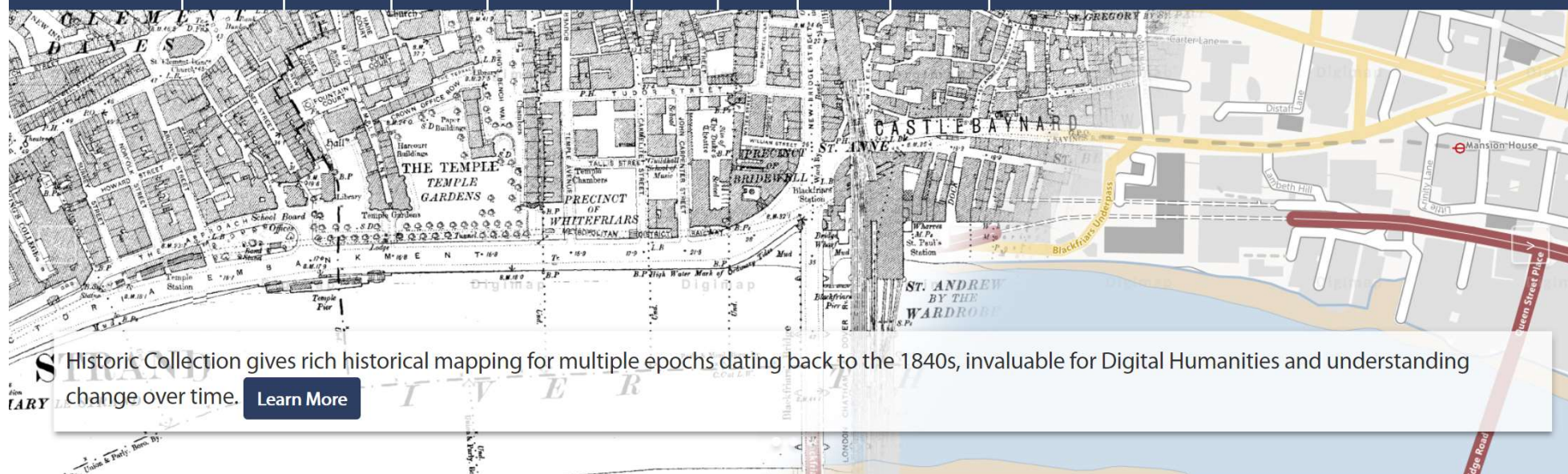




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Historic Collection gives rich historical mapping for multiple epochs dating back to the 1840s, invaluable for Digital Humanities and understanding change over time. [Learn More](#)

What is Digimap?

Digimap is an online map and data delivery service, available by subscription to UK Higher and Further Education establishments. Operated by EDINA at the University of Edinburgh, Digimap offers a number of data collections, including Ordnance Survey, historical, geological, LiDAR and marine maps and spatial data.

What are we offering?

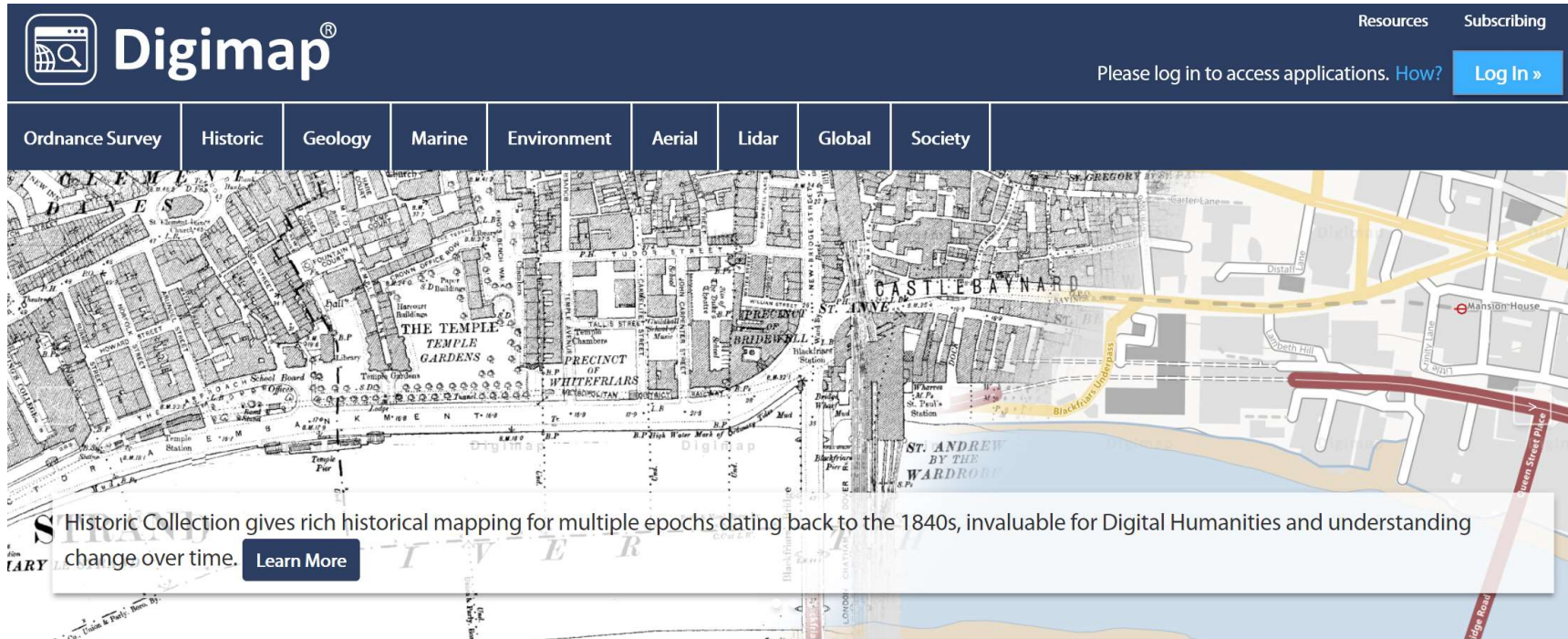
Digimap offers access to a range of datasets for the purposes of education and research. Create or interrogate a map online by selecting an appropriate base map, adding annotations and customising the content, use measurement and query tools to learn more about any study area. Download the raw spatial data in a wide range of formats for use in local GIS, CAD or image processing software.

Subscription Information

Digimap is available to members of subscribing higher and further education institutions in the UK. Individual registration is required, but the service is free at the point of use. More information about subscription fees can be found on our [website](#).

Exercise:
Download an OSMAP of IQ
Campus / your home in
Digimap

Working with OS Maps



The screenshot shows the Digimap website interface. At the top, there is a dark blue header with the Digimap logo on the left and links for 'Resources' and 'Subscribing' on the right. Below the header is a navigation bar with tabs for 'Ordnance Survey', 'Historic', 'Geology', 'Marine', 'Environment', 'Aerial', 'Lidar', 'Global', and 'Society'. The main content area displays a historical map of Edinburgh, showing streets, buildings, and landmarks like 'THE TEMPLE GARDENS' and 'CASTLE BAYNARD'. A white text box with a blue border is overlaid on the map, containing the text: 'Historic Collection gives rich historical mapping for multiple epochs dating back to the 1840s, invaluable for Digital Humanities and understanding change over time. Learn More'. The text box has a blue 'Learn More' button.

OS Maps are drawn in Metres

Scale in AutoCAD by 1000 to convert into millimetres

Use 'SCALE' command

Using basepoint 0,0

What is Digimap?

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What are we offering?

Digimap offers access to a range of datasets for the purposes of education and research. Create or interrogate a map online by selecting an appropriate base map, adding annotations and customising the content, use measurement and query tools to learn more about any study area. Download the raw spatial data in a wide range of formats for use in local GIS, CAD or image processing software.

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<https://digimap.edina.ac.uk/>



AUTODESK
AUTOCAD

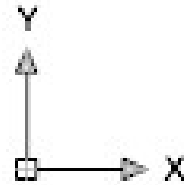
AutoCAD uses a Coordinates based system.

X and Y 2 Dimensional

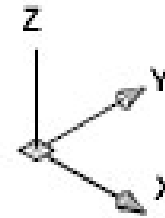
X Y Z 3 Dimensional

We can use the coordinates to accurately position buildings in space.

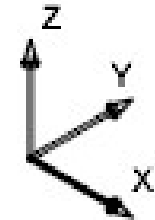
We can also use coordinates to draw



2D UCS Icon



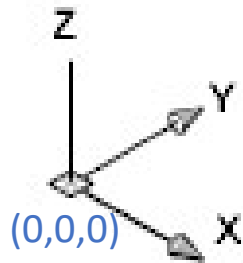
3D UCS icon



shaded UCS icon

AutoCAD uses a Coordinates Based system.

In the World Coordinate system WCS

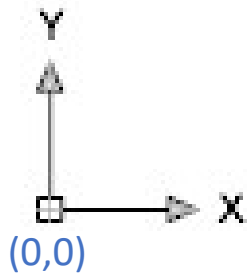


X axis is Horizontal on the screen

Y axis is Vertical on the screen

Z axis is the Elevation (Height)

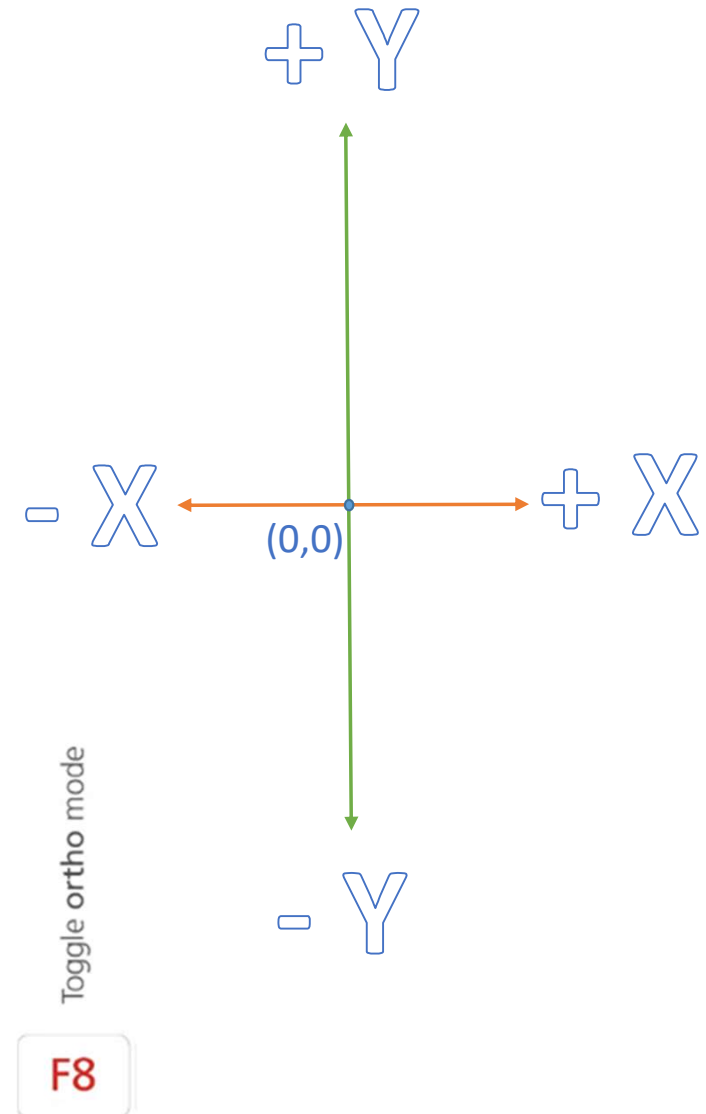
These values can be Positive + or Negative – depending on their relationship to the Origin Point. WCS origin = (0,0,0) = zero value in x y and z axis



When drawing in 2D we do not need to consider the Z axis as we are drawing on a Flat plane where there is no Elevation (height) therefore the value of Z is 0

A 2D WCS icon is shown so we know that we are working in two dimensions using the x and y axis

Use can also use 'ORTHO' F8 to as a guide for Horizontal and Vertical distances in a directional manner.



Exercise 1

Creating Layers

Walls - Cyan

Doors - Magenta

Text - White

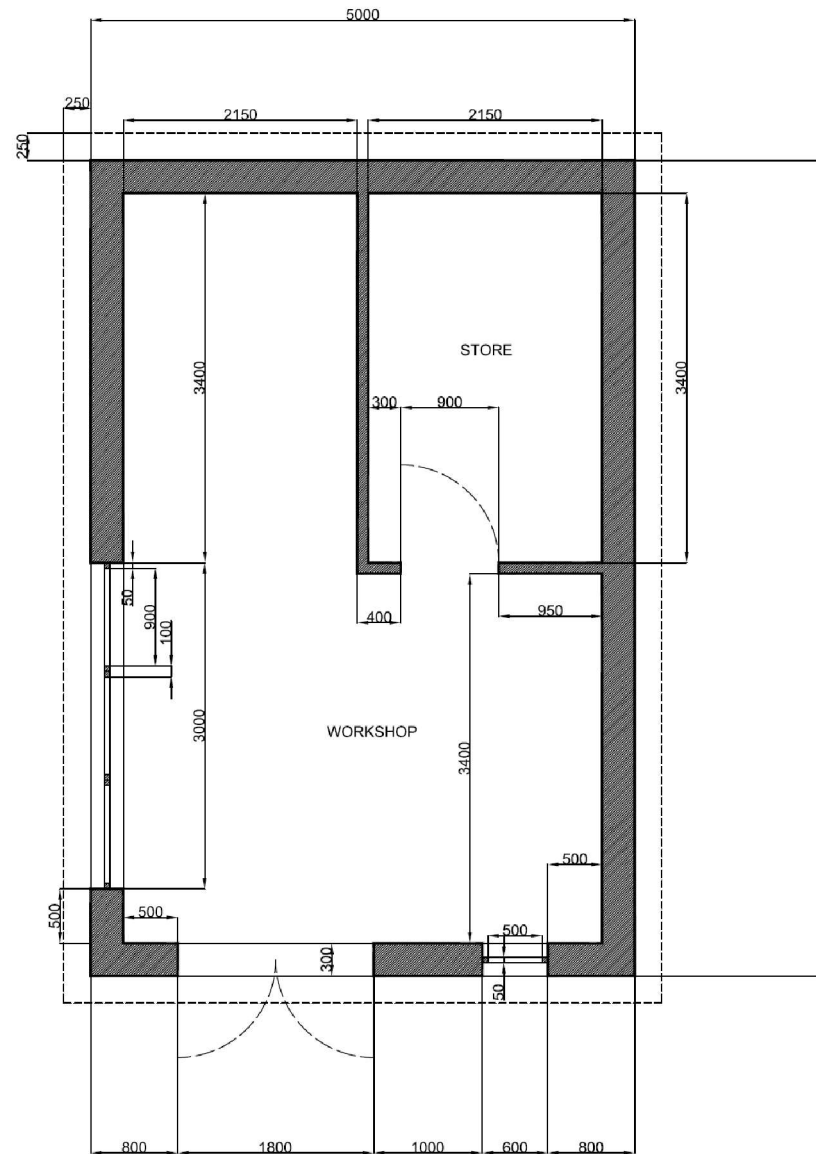
Hatching - Red

Draw it the building plan opposite, drawing the walls as a Polyline

Modify the thickness of the walls to show the cut plane.

Draw 6 no 200 x 2000mm rack shelving units in the workshop

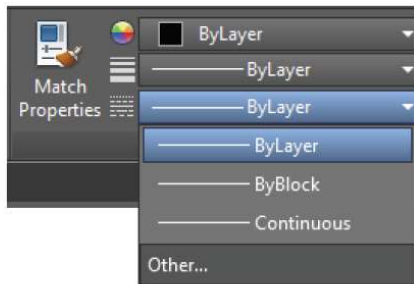
Create a new layer called Furniture and relocate to the layer.



Linetypes

Dashed and other non-continuous linetypes are assigned from the Properties panel. You must first load a linetype before you can assign it.

In the Linetype drop-down list, click Other.

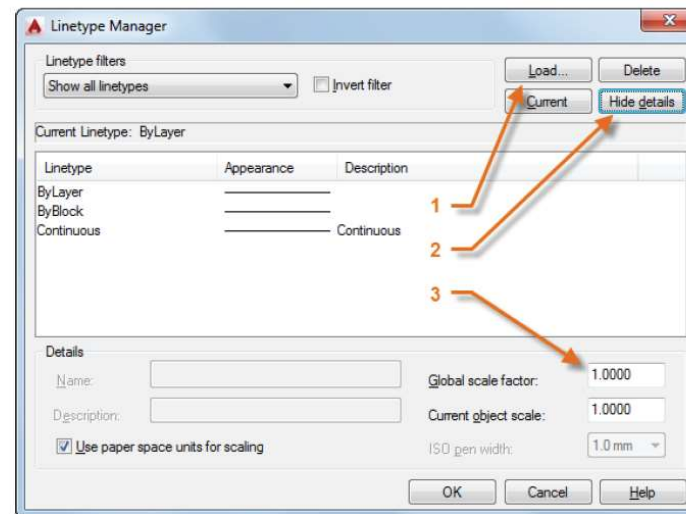


This action displays the Linetype Manager dialog box.

Perform the following steps in order:

1. Click Load. Choose one or more linetypes that you want to use. Notice that dashed (non-continuous) linetypes come in several preset sizes.
2. Click Show/Hide details to display additional settings.
3. Specify a different "global scale factor" for all linetypes—the larger the value, the longer the dashes and spaces. Click OK.

4. Once you've loaded the linetypes that you plan to use, you can select any object and specify a linetype from the Properties panel or the Properties palette. Alternatively, you can specify a default linetype for any layer in the Layer Properties Manager.



Exercise 2

Using Orthographic Projection

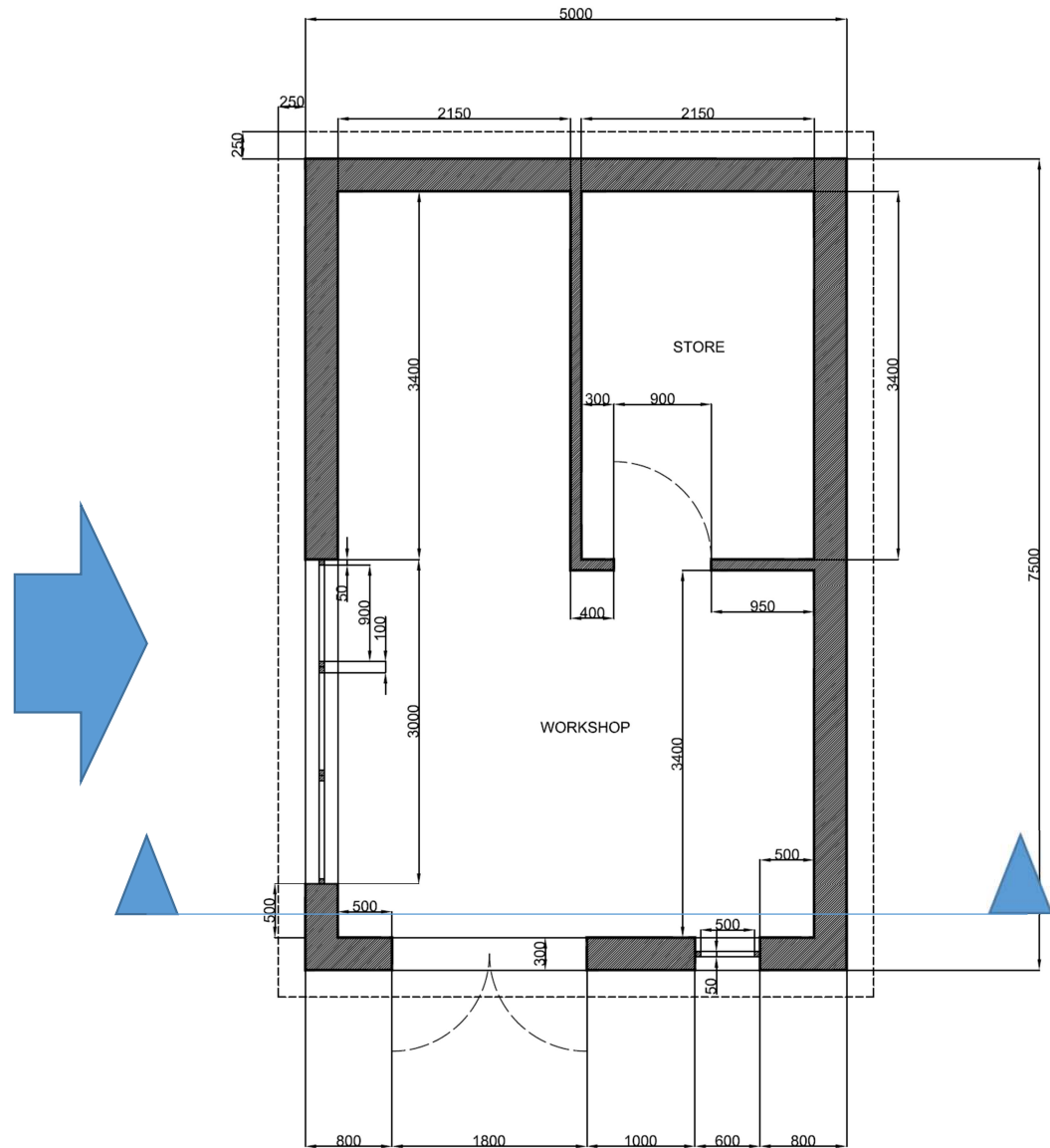
Prepare an Elevation and Section of the proposed building.

You will need to create a 'UCS'

Assume the following:

- High to Apex of roof is 5m
- Floor to ceiling height is 2.5m
- Floor slab is 300mm,
- Roof is 300mm thick
- Cill heights are 900mm

Create appropriate layers



User Coordinate System UCS can assist you to orientate your drawing for orthographic projection.

Type UCS

'N' for Create New

Click on a suitable origin

Click a positive point on the X axis

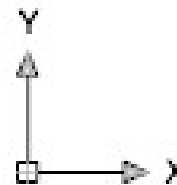
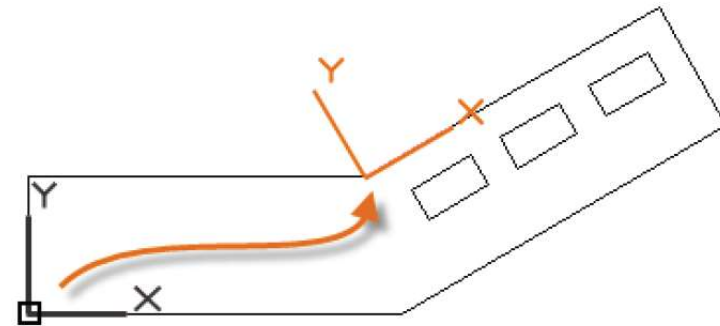
Click a positive point on the Y axis

Select '0' for Z axis (if prompted)

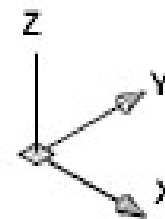
TYPE 'Plan' for reorientation your view to the new UCS

The User Coordinate System

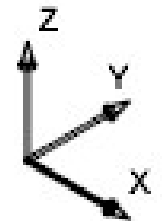
The user coordinate system (UCS) icon indicates the direction of the positive X and Y axis for any coordinates that you enter, and it also defines the horizontal and vertical directions in a drawing. In some 2D drawings, it can be convenient to click, drag, and rotate the UCS to change the origin point, and the horizontal and vertical directions.



2D UCS icon



3D UCS icon



shaded UCS icon