REVIEW MATERIAL IN

TECHNICAL DRAFTING NCII

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ARCHITECTURAL & STRUCTURAL TERMINOLOGIES

Attic – an upper room or space contained within the pitched roof space of a residential building.

Balcony – an accessible outdoor or with balustrade or glazed platform projecting from the external face of a building, often for recreational use.

Balusters - the vertical posts supporting the handrail or coping (on the side of a landing).

Beam – a horizontal structural member which transfers loading from above to its bearing points.

Bungalow – a one-storey detached dwelling house.

Cantilever Beam- is supported on one end and the other end and the other end projecting beyond the support or wall.

Carport – a covered space, canopy or shelter, open on at least one side, under which one or a number of vehicles may be parked.

Cement- a powdered mineral substance usually containing lime or gypsum, mixed with water to form a paste which will set to form hard, brittle materials used as a binder in concrete, mortars, plasters etc.

Circular Stair- a staircase with steps winding in a circle or a cylinder.

Column- a structural shaft of concrete masonry, metal or timber which transfers applied vertical loads through its length to its base.

Common Rafter – extended at right angles from the plate or girts to the ridge.

Concrete – a mixture of sand, aggregate, cement and water, often including admixtures, which sets to form a hard, versatile building material, mainly used for its structural properties.

Dormer Window – a projecting vertical window and surrounding construction located on a pitched roof, usually to afford light to an attic or upper storey space.

Elevator – is a type of vertical transport equipment that efficiently moves people or goods between floors (levels, decks) of a building, vessel or other structures.

Fascia - the vertical covering under the edge of an exposed landing which covers the gap between ceiling and floor.

Finial - a decorative ornament used to decorate the top (and possibly the bottom) of a newel post - often in the shape of a ball, spike, urn, bun, or figure.

Floor Joist –is term used for that part of the floor system that supports the floor boards.

Footing – a portion of the foundation of a structure which directly transmits the column load to the underlying soil of rock.

Foundation – a subterranean structure designed to transmit the structural loading of a building to the ground; all portions of the foundation of a structure below the footing.

Foundation Bed – refers to the soil or rock directly beneath the footing.

Foyer – an entranceway or transitional space from exterior to the interior of the building.

Garage – an enclosed space or shelter used for the parking or storage of a vehicle or vehicles

Girder – a horizontal structural piece which supports the end of the floor beams or joist or wall over opening.

Grade – the level at which the ground surface meets the foundation of a building.

Half Landing - a flat area of flooring where a stairway makes a turn between main floors.

Hallway – a corridor or passageway.

Handrail – it is a running parallel with the inclination of the stair; it holds the baluster.

Hip Jack – framed between hip rafters and girts.

Hip Rafter – laid diagonally from the corner of the plate or girts to the ridge.

Inner (closed) string - The side of a staircase set against a wall which locates the treads and risers.

Jack Rafter – any rafter which does not extend from the plate or girts to the ridge.

Jack Rafters- The frame between the hip rafters and the girts.

Lanai – a living room or lounge area which is entirely or in part open to the outdoors.

Landing - The flat area of flooring at the top and bottom of a staircase leading to rooms.

Lintel – a beam or girder above a window or door opening that supports the wall.

Mezzanine – an intermediate storey between two adjacent floors of a building, often a gallery, balcony or partial storey.

Newel post - The vertical post at the end or turn of a banister.

Octagonal Rafters – are placed on an octagonal shaped plate at the central apex or ridge pole.

Outer (open) string - The side of a staircase open to view which locates the treads and risers.

Ramp (mechanical) – a sloped surface that rises and twist simultaneously.

Porch – a structure attached to a building to shelter or to serve as semi-enclosed spaced, usually roofed and generally open sided.

Powder Room – a small first floor toilet room in a house.

Purlins – are structural members that support the roof sheathing which are placed on top of the rafters or top chord of a truss.

Return nosing - The moulding, (normally half round) fixed to the ends of the treads exposed in a hallway and which covers where the balusters fit into the treads. **Riser** - The vertical part of a step.

Riser wedges - The, usually wooden, wedges used vertically underneath a staircase in slots cut into the strings to secure the risers.

Soffit – the underside or lining beneath a beam, or lintel, or of any projection from the face of a building

Submerged Floor – the portion of the building between floor and ceiling which is wholly or partly below the grade and so located that the vertical distance from grade to the floor is equal to greater than the vertical distance from grade to ceiling.

Terrace – a raised external level or platform in a garden, park, protruding from a building etc.

Threshold – a piece of wood or stone placed beneath a door; a doorsill.

Tread - The horizontal part of a step.

Valley Jack – frame between the ridge and valley rafter.

Valley Rafter – place diagonally from the plate or girt at the intersection of gable extension with the main roof.

Wall Bearing –is a type of wall which supports any load other than its own weight.

Wall Footing – a strip of reinforced concrete wider than the wall which distributes the load to the soil.

Windy Stair – also known as winding or circular stair.

DRAWING COMMANDS:

AUTOCAD BASIC KEYS							
STANDARD		**DRAW**		**MODIFY**		**FORMAT**	
NEW	Ctrl+N	LINE	L	ERASE	E	PROPERTIES	MO
OPEN	Ctrl+O	RAY	RAY	COPY	CO	SELECT COLOR	COL
SAVE	Ctrl+S	PLINE	PL	MIRROR	MI	LAYER	LA
PLOT	Ctrl+P	3DPOLY	3P	OFFSET	O	LINETYPE	LT
PLOT PREVIEW	PRE	POLYGON	POL	ARRAY	AR	LINEWEIGHTS	LW
CUT	Ctrl+X	RECTANGLE	REC	MOVE	M	LT SCALE	LTS
COPY	Ctrl+C	ARC	A	ROTATE	RO	LIST	LI
PASTE	Ctrl+V	CIRCLE	C	SCALE	SC	DIMEN. STYLE	D
MATCH PROPE.	MA	SPLINE	SPL	STRECH	S	RENAME	REN
CLOSE	Ctrl+F4	ELLIPSE	EL	TRIM	TR	OPTION	OP
EXIT	Ctrl+Q	BLOCK	B	EXTENED	EX	**DIMENSION**	
		POINT	PO	BRAKE	BR	DIMALIGNED	DAL
		HATCH	H	CHAMFER	CHA	DIMLINEAR	DLI
		GRADIENT	GD	FILLET	F	DIMCONTINUE	DCO
		REGION	REG	EXPLODE	X	DIMANGULAR	DAN
		BOUNDARY	BO	OOPS	OO	DIMARC	DAR
		DONUT	DO			QUICK LEADER	LE

EXTRA				DRAFTING		PAPER SIZE
UNIT	UN	UCS	UCS	ORTHO	F8, Ctrl+L	A4=210*297
LIMITS	LIMITS	SINGLE TEXT	DT	OSNAP	F3, Ctrl+F	A3=297*420
(0,0; 1000,1000)		MULTILINE TEXT	MT	POLAR	F10, Ctrl+U	A2=420*594
ZOOM	Z	EDIT TEXT	ED	GRID	F7, Ctrl+G	A1=594*841
ALL	A	OBJECT SNAP	OB	OTRACK	F11	**20"x30" = 508*762**
PAN	P	DIMENTION	DIM	SNAP	F9	**REVIEWER**
CLEAN SCREEN	Ctrl+0	HORIZONTAL	HOR	TEXT WINDOW	F2	
COMMAMD WIN	Ctrl+9	VERTICAL	VER	HELP	F1	

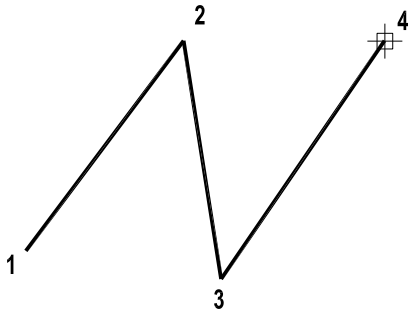
Construction Lines (Xline) – Lines that extend to infinity in one or both directions, known as rays and construction lines, respectively, can be used as references for creating other objects.

Multiline (Mline) - are composed of 1 to 16 parallel lines, called elements.

Draw Menu: **LINE or L**

You can simply draw lines by picking their position from the workspace. If you want to draw lines with precise direction and length you can use the Direct Distance Entry or the Relative Polar Coordinate.

By Picking



Command: ***LINE***
Specify first point: ***(pick 1)***

Specify next point or [Undo]: ***(pick 2)***

Specify next point or [Undo]: ***(pick 3)***

Specify next point or [Undo]: ***(pick 4)***

Specify next point or [Undo]: ***press Enter Key***

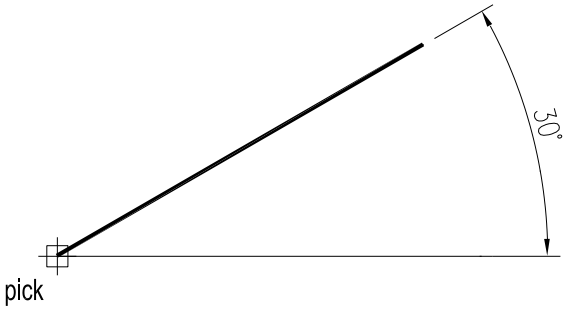
By Direct Distance Entry

Command: ***LINE***
Specify first point: *(pick)*

Specify next point or [Undo]: ***(activate ortho enter the distance) 100***

Specify next point or [Undo]: ***press Enter Key***

By Relative Polar Coordinate



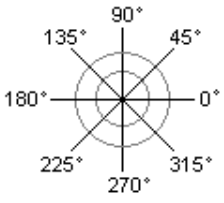
Command: ***LINE***
Specify first point: ***(pick)***

Specify next point or [Undo]: ***@100<30***

Specify next point or [Undo]: ***press Enter Key***

@100<30 where: @100 = *length of line*

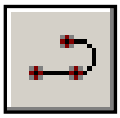
<30 = *degree of inclination*



Surveyor's Angle by Relative Polar Coordinate

@1000<N30D20'6"E where: @1000 = *length of line*

< N30D20'6"E = *degree of inclination*

Draw Menu: **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. Multi-segmented lines provide editing capabilities unavailable for single lines.

By Picking

Command: ***PLINE***

Specify start point: ***(pick 1)***

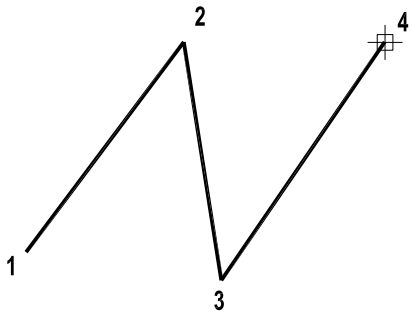
Current line-width is 0.0

Specify next point or [Arc/Halfwidth/Length/…]: ***(pick 2)***

Specify next point or [Arc/Close/Halfwidth/…]: ***(pick 3)***

Specify next point or [Arc/Close/Halfwidth/…]: ***(pick 4)***

Specify next point or [Arc/Close/Halfwidth/…]: ***press Enter Key***



By Direct Distance Entry and Polar Coordinate

Command: ***PLINE***

Specify start point: ***(pick 1)***

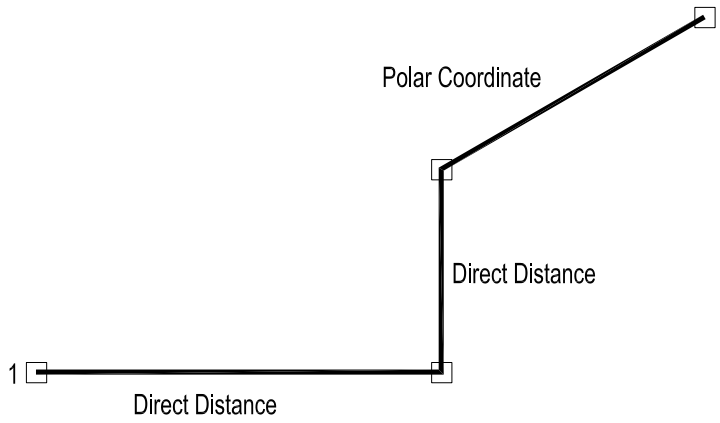
Current line-width is 0.0

Specify next point or […]: ***(ortho ON and drag the mouse for desired position) 400***

Specify next point or […]: ***200***

Specify next point or […]: ***@300<30***

Specify next point or […]: ***press Enter Key***



Creating Arc in Pline Command

Command: ***PLINE***

Specify start point: ***(pick 1)***

Current line-width is 0.0

Specify next point or […]: ***type A or Arc***

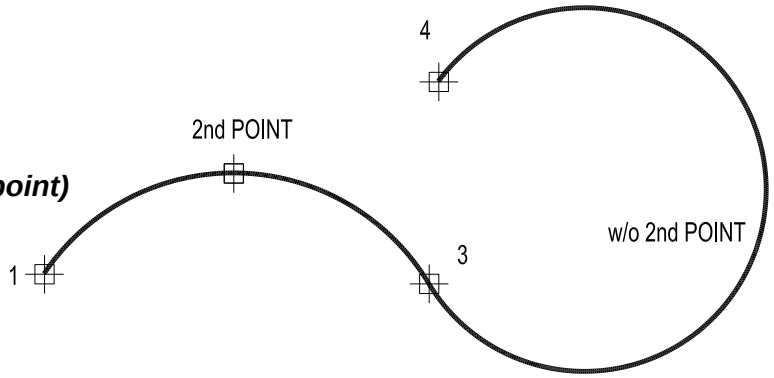
Specify endpoint of arc or […]: ***type S (as 2nd point)***

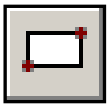
Specify second point on arc: ***(pick 2)***

Specify end point of arc: ***(pick 3)***

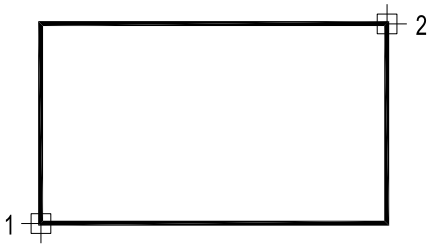
Specify endpoint of arc or […]: ***(pick 4)***

Specify endpoint of arc or […]: ***press Enter Key***



Draw Menu: **RECTANG or REC** 

The Rectangle command is used to draw a rectangle whose sides are vertical and horizontal. The position and size of the rectangle are defined by picking two diagonal corners or by specific dimension.

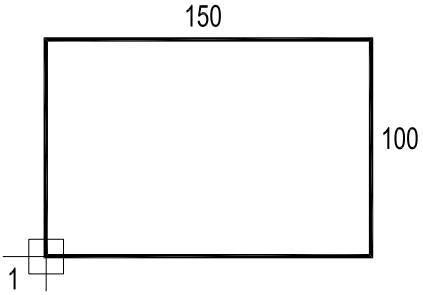


By Picking

Command: ***RECTANG***
Specify first corner point or […]: ***(pick 1)***
Specify other corner point or [Dimensions]: ***(pick 2)***

By Specifying Dimension

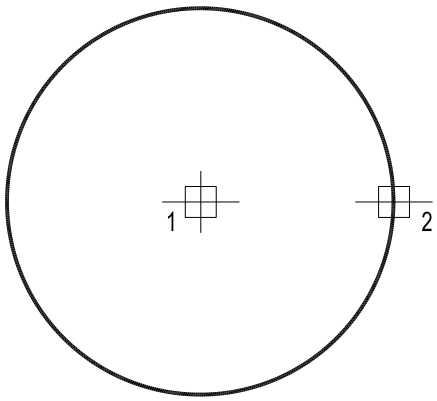
Command: ***RECTANG***
Specify first corner point or […]: ***(pick 1)***
Specify other corner point or [Dimensions]: ***@150,100***
Specify other corner point or [Dimensions]: ***press Enter Key***



Draw Menu: **CIRCLE or C**

The Circle command is used to draw circles. The best method is to pick the centre point and then to pick a second point that will serve as radius of the circle or enter the radius value.

Command: ***CIRCLE***
Specify center point for circle or [3P/2P/Ttr (tan tan radius)]: ***(pick 1)***
Specify radius of circle or [Diameter] <50.0195>: ***(pick 2 or enter the required radius say 100)***



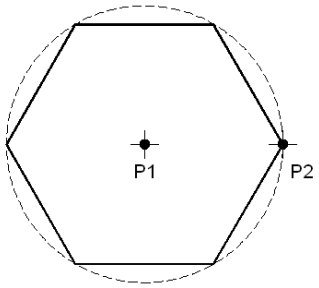
FORMULA for BUBBLE MARKS CIRCLE

Circle size in model space = desired text size / scale of the layout viewport

Say the desired circle size is 7mm with paper/layout scale of 1:50m.

Draw Menu: **POLYGON or POL**

This command creates a regular polygon from 3 sides to 1024 sides.



Command: ***POLYGON (press enter key)***
Enter number of sides <4>: ***enter say 6***
Specify center of polygon or [Edge]: ***(pick 1)***
Enter an option [Inscribed in circle/Circumscribed about circle] <I>:

(press enter key to accept the inscribed default or type C for circumscribed)

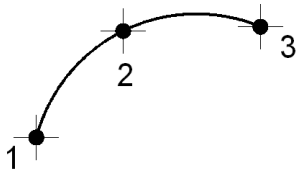
Specify radius of circle: ***(pick 2 or enter exact radius)***

Draw Menu: **ARC or A**

This command creates an arc by picking three points, although there many ways of defining an arc this method is the most useful in the drawing process.

Command: ***ARC or A (press enter key)***

Specify start point of arc or [Center]: ***(pick 1)***
Specify second point of arc or [Center/End]: ***(pick 2)***
Specify end point of arc: ***(pick 3)***



CONTROLLING DISPLAY:

The following commands are very useful in controlling the specific magnification, position, and orientation of the drawing.

To ZOOM in Realtime Mode

Command: ***ZOOM or Z (press enter key)***
Specify corner of window, enter a scale factor (nX or nXP), or […] <real time>: ***press ENTER key***

> ***Note:*** *To magnify press then hold down the LMC button of the mouse and move the cursor upward or downward.*

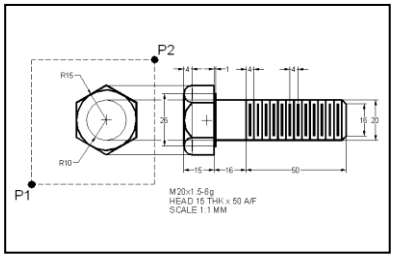
Press ESC or ENTER to exit, or right-click to display shortcut menu

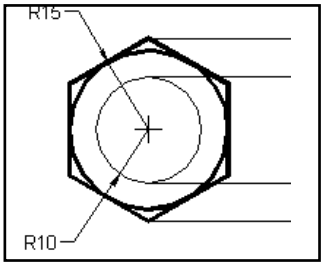
To ZOOM in Window Mode

Command: ***ZOOM or Z (press enter key)***
Specify corner of window, enter a scale factor (nX or nXP), or […] <real time>: ***W (press enter key)***

> *Note: To magnify pick two points on the desired area of the drawing.*

Press ESC or ENTER to exit, or right-click to display shortcut menu

Original View 

New View 

To ZOOM in Extents Mode

Command: ***ZOOM or Z (press enter key)***
Specify corner of window, enter a scale factor (nX or nXP), or […] <real time>: ***E (press enter key)***

Press ESC or ENTER to exit, or right-click to display shortcut menu

To PAN in Realtime Mode

Command: **PAN or P (press enter key)**
Note: Hold down the pick button of the mouse and move the drawing to desired area.

FUNCTION KEYS:

F1 = Help

F2 = AutoCAD Text Window *(History)*

F3 = Osnap On/Off *(locates a snap point of a valid object, see OSNAP setting)*

F7 = Grid On/Off

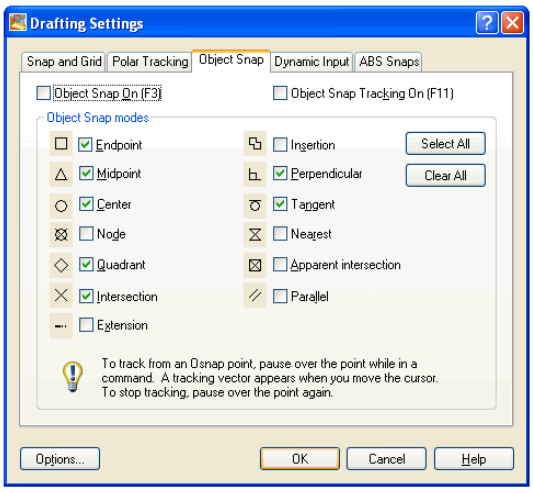
F8 = Ortho On/Off *(*limits pointing device input to horizontal or vertical*)*

F10 = Polar On/Off *(*displays temporary alignment paths defined by user-specified polar angles*)*

F12 = Dynamic Input On/Off *(*displays angle of inclination of drawing as temporary movement*)*

OSNAP SETTING:

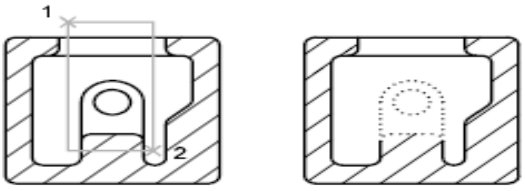
Command: ***OSNAP or OS (press enter key)***
Note: Activate the necessary object snap in order to track down a particular point of the object.



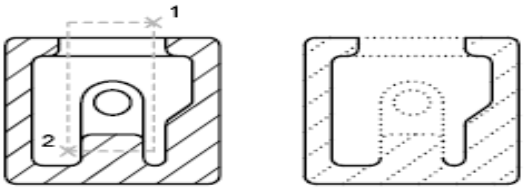
SELECTION METHODS:

WINDOW (Drag the cursor from left to right to select objects that are entirely enclosed by the rectangular area)

CROSSING (Drag the cursor from right to left to select objects that the rectangular window encloses or crosses)



objects selected using window selection box



objects selected using crossing selection box

MODIFYING COMMANDS:

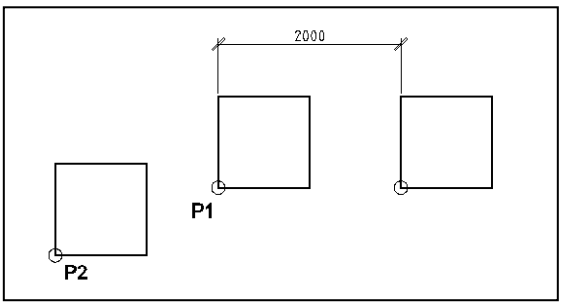
Draw Menu: COPY or CO

Command: ***COPY (press enter key)***
Select objects: ***pick the object/s (press enter key)***

Specify base point or [Displacement] <Displacement>: ***pick 1***

Specify second point or [Exit/Undo] <Exit>: ***pick 2 or specify value say 2000***

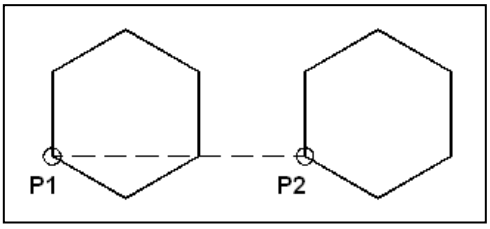
Specify second point or [Exit/Undo] <Exit>: ***(press enter key)***



Draw Menu: MOVE or M

Command: ***MOVE (press enter key)***
Select objects: ***pick the object/s***

Specify base point or [Displacement] <Displacement>: ***pick 1 and pick 2 or enter the movement value***



Draw Menu: OFFSET or O

Command: ***OFFSET (press enter key)***
Specify offset distance or [Through/Erase/Layer] <50.00>: ***(type the value or pick***

2 points that will serve as distance)

Select object to offset or [Exit/Undo] <Exit>: ***select object***

Specify point on side to offset or [Exit/Multiple/Undo] <Exit>: ***(select object if necessary or press Esc)***

Draw Menu: MIRROR or MI

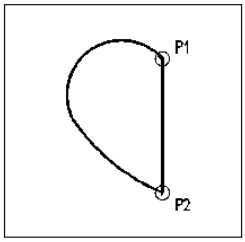
Command: ***MIRROR (press enter key)***
Select objects: Specify opposite corner: ***(pick the object)***

Select objects: ***press enter key***

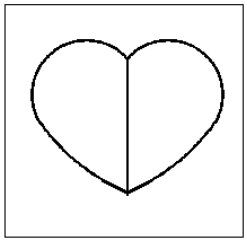
Specify first point of mirror line: ***pick 1***

Specify second point of mirror line: ***pick 2***

Erase source objects? [Yes/No] <N>: ***press enter key***



Original



Result

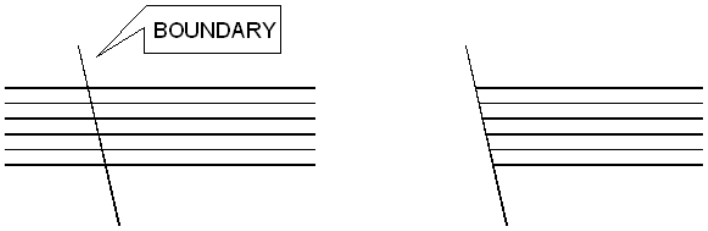
Draw Menu: TRIM or TR

Command line: ***TRIM (press enter key)***

Select objects or <select all>: ***(select the object that will serve as boundary)***

Select objects: ***(Select one or more objects to trim and press ENTER key)***

or press ENTER to select all objects (implied selection)



Original Result

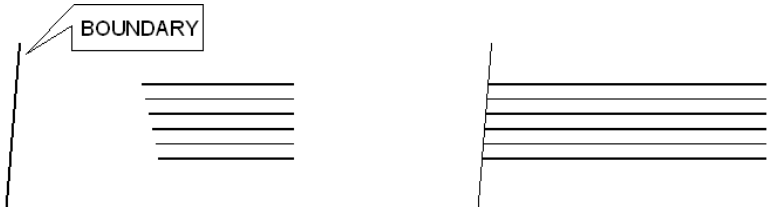
Draw Menu: EXTEND or EX

Command line: ***EXTEND (press enter key)***

Select objects or <select all>: ***(select the object that will serve as boundary)***

Select objects: ***(Select one or more objects to extend and press ENTER key)***

or press ENTER to select all objects (implied selection)



Original Result

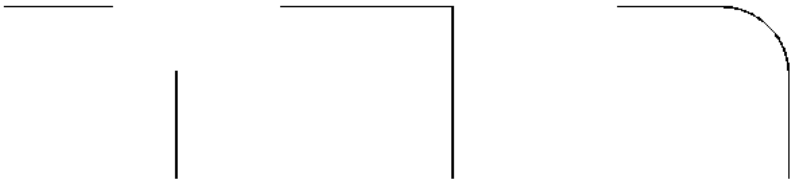
Draw Menu: FILLET or F

Command line: ***FILLET (press enter key)***

Select first object or [Undo/Polyline/Radius/Trim/Multiple]: ***type R in order to set the fillet radius***

Specify fillet radius <400>: ***(enter the value)***

Select first object or [Undo/Polyline/Radius/Trim/Multiple]: ***(pick the 2 lines)***



Original Result (If radius is 0) Result (If with radius value)

Draw Menu: CHAMFER or CHA

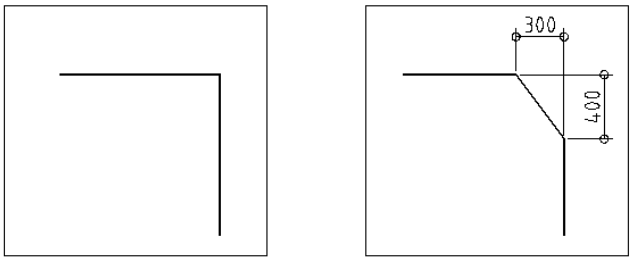
Command line: ***CHAMFER (press enter key)***

Select first object or [Undo/Polyline/Distance/…]: ***(type D to set the distance)***

Specify first chamfer distance: ***(type the value)***

Specify second chamfer distance: ***(type the value)***

Select the first object: ***(pick the two lines)***



Original Result

Draw Menu: SCALE or SC

Command line: ***SCALE (press enter key)***

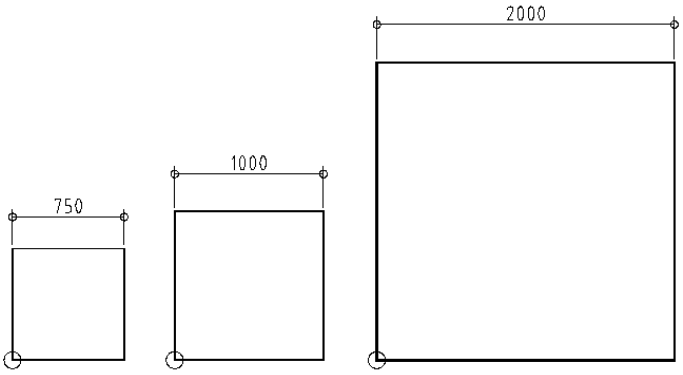
Select objects: ***pick the subject to scale up or down***

Select objects: ***(press enter key)***

Specify base point: ***pick the base point of the sut***

Specify scale factor or [Copy/Reference] <0.75>:

type the scale value



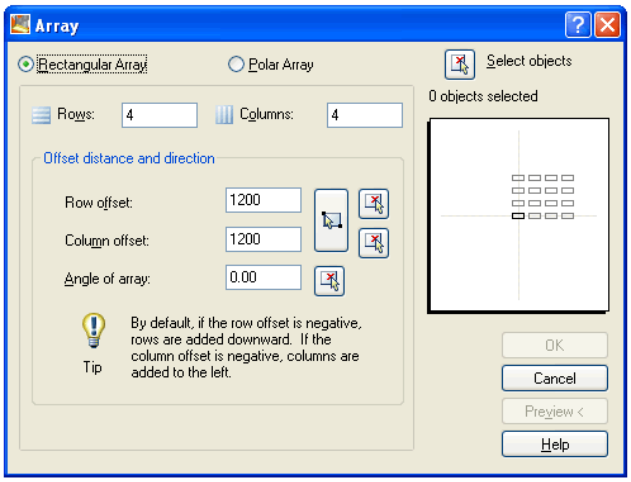
Result at 0.75 value Original Result at 2 value

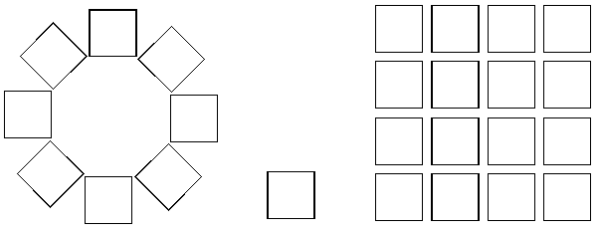
Draw Menu: ARRAY or AR

Command line: ***ARRAY (press enter key)***

In the dialog box, select rectangular or polar array, pick Select Objects icon,

complete the elements and pick OK





Polar Original Rectangular

Draw Menu: EXPLODE or X

Command line: ***EXPLODE (press enter key)***

Select the object to convert from single segment to multi-segmented.

Draw Menu: ROTATE or RO

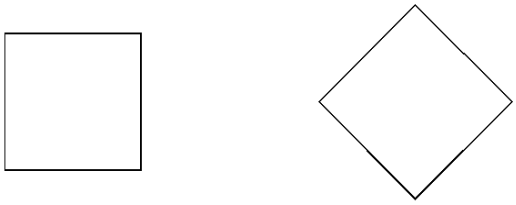
Command line: ***ROTATE (press enter key)***

Select objects: ***pick the object***

Select objects: ***(press enter key)***

Specify base point: ***pick the appropriate point***

Specify rotation angle or [Copy/Reference] <0.00>: ***type the rotation value***



Original Result

DRAWING NOTATIONS:

Draw Menu: MTEXT or MT

Command line: ***MTEXT (press enter key)***

***For settings see the AutoCAD Update 2016 at page 22

SPECIAL TEXT

%%p – plus/minus symbol (±)

%%d – degree symbol (°)

%%c – diameter symbol (ø)

Alt+164 – overscore of ñ (ñ)

1#4 – auto stacking (¼)

CREATING HATCH:

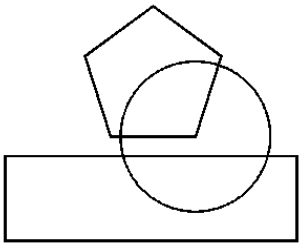
Draw Menu: HATCH or H

Command line: ***HATCH (press enter key)***

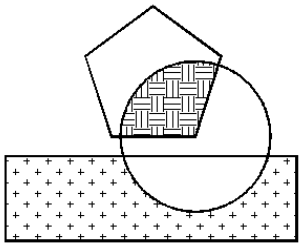
Pick internal point or [Select objects/remove Boundaries]: ***pick any boundary***

Look for hatch pattern or gradient color, change the scale, and select Ok.

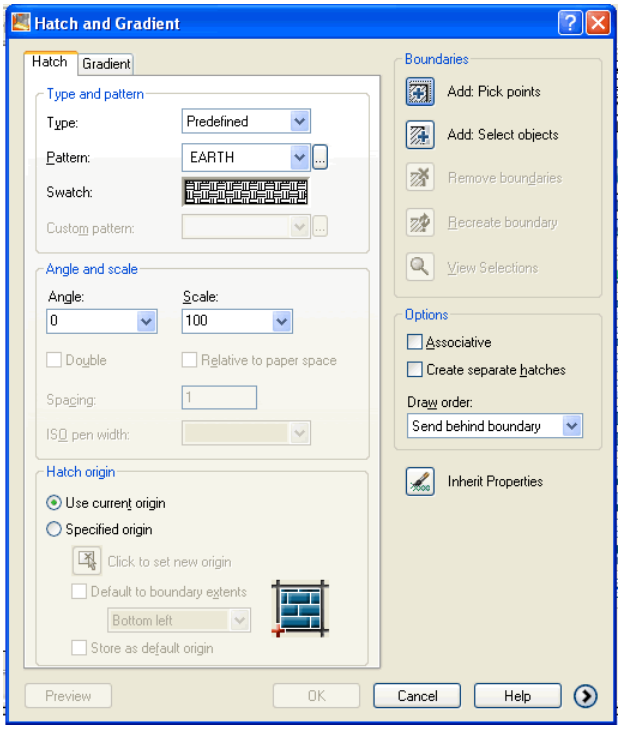
Pick internal point or [Select objects/remove Boundaries]: ***(press Esc or Enter key)***



Original



Result

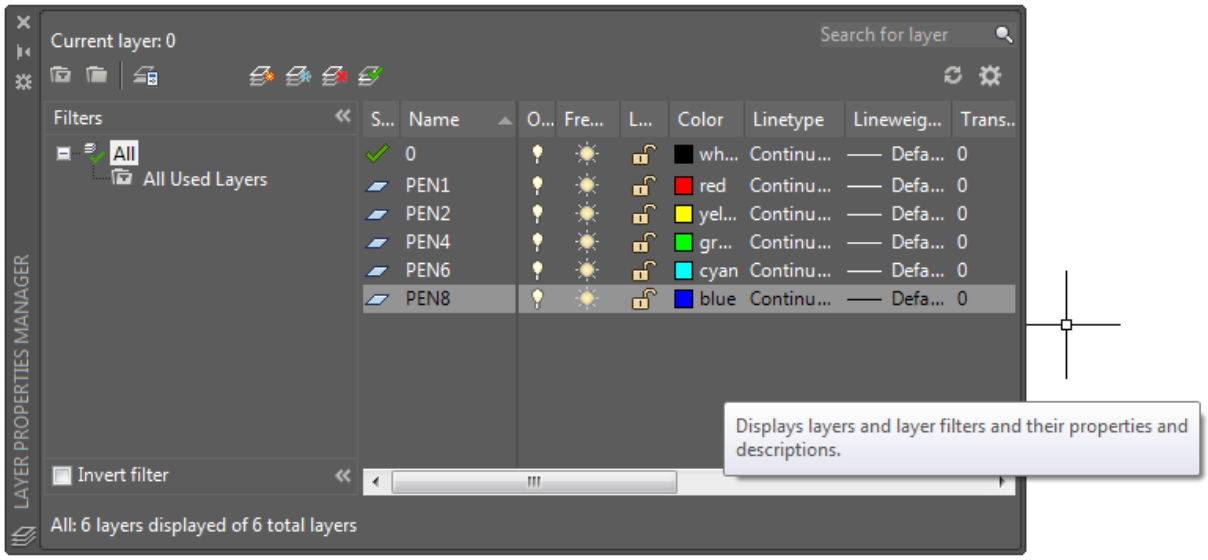


LAYERING & PEN ASSIGNMENT:

Draw Menu: LAYER or LA

Command line: ***LAYER (press enter key)***

*Pick **New Layer icon** and create pen assignment layers.*



CODE NAME	COLOR LINE	WEIGHT
1PEN	RED	0.1
2PEN	YELLOW	0.2
3PEN	GREEN	0.4
5PEN	CYAN	0.6
8PEN	BLUE	0.8

LINETYPE SCALE OF HIDDEN, PHANTOM, AND CENTER LINES:

Use 0.7 linetype scale for Hidden2, Phantom2, and Center2.

PAPER SPACE SCALING:

MS or **Model Space** - where the drawings are set in real-time scale.

PS or **Paper Space** - where the drawings are set in appropriate scale.

MV or MVIEW - a command used for creating viewport in paper/layout space.

Command line: ***ZOOM or Z (press enter key)***

Specify corner of window, enter a scale factor […] <real time>: ***Scale or S***

Enter a scale factor (nX or nXP): ***1/20xp (or any desired scale with the tail XP)***

DIMENSIONING:

DDEDIT – used for modifying dimension text.

DDIM – used for modifying dimension style and size.

****Note: See AutoCAD 2016 Update at page 22.*

CREATING BLOCK:

BLOCK / B – used for creating pre-set symbol in the internal library of the current drawing file.

****Note: Be sure to have suitable layer and pen assignment to the target drawing before applying block command.*

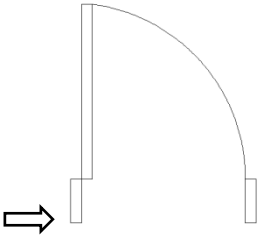
Command line: **B** (press enter key)

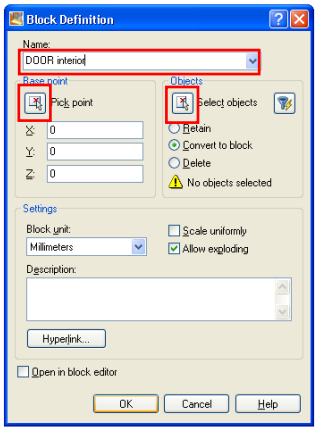
Specify the BLOCK name say **DOOR interior**

BLOCK Specify insertion base point: (pick the desired point)

Select objects: Specify opposite corner: (select the door drawing)

Pick OK to end the command





SHORT CUT COMMANDS:

DLI – Linear Dimension

DAL – Aligned Dimension

DCO – Continuous Dimension

DAN – Angular Dimension

DAR – Arc Dimension

DRA – Radius Dimension

ED - Edit Dimension Text

LE – Quick Leader

DR – Draw Order

OP – Options

FILEDIA – Select Template (Acadiso)

MA – Match Properties

FSHOT – 3D Flat Shot

BH – Hatch

BO – Boundary

CAM - Camera

DS – Drafting Setting

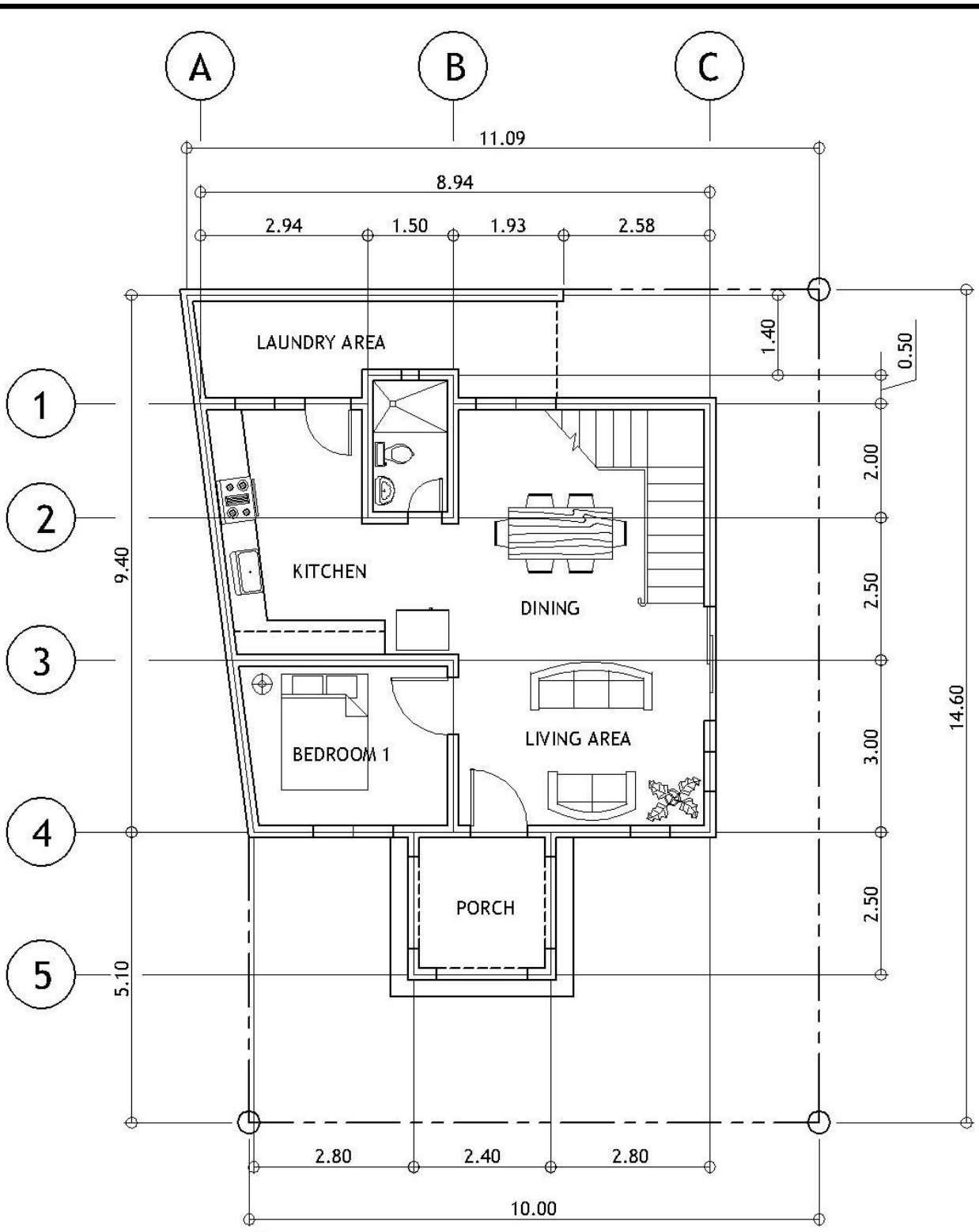
EATTEXT – Table or Schedule Format

DXF IN / DXF OUT – Stamp Problem / Not Saving

D / DDIM – Dimension Style Manager

3DCONFIG – Cursor Disappear

BEDIT – Block Edit

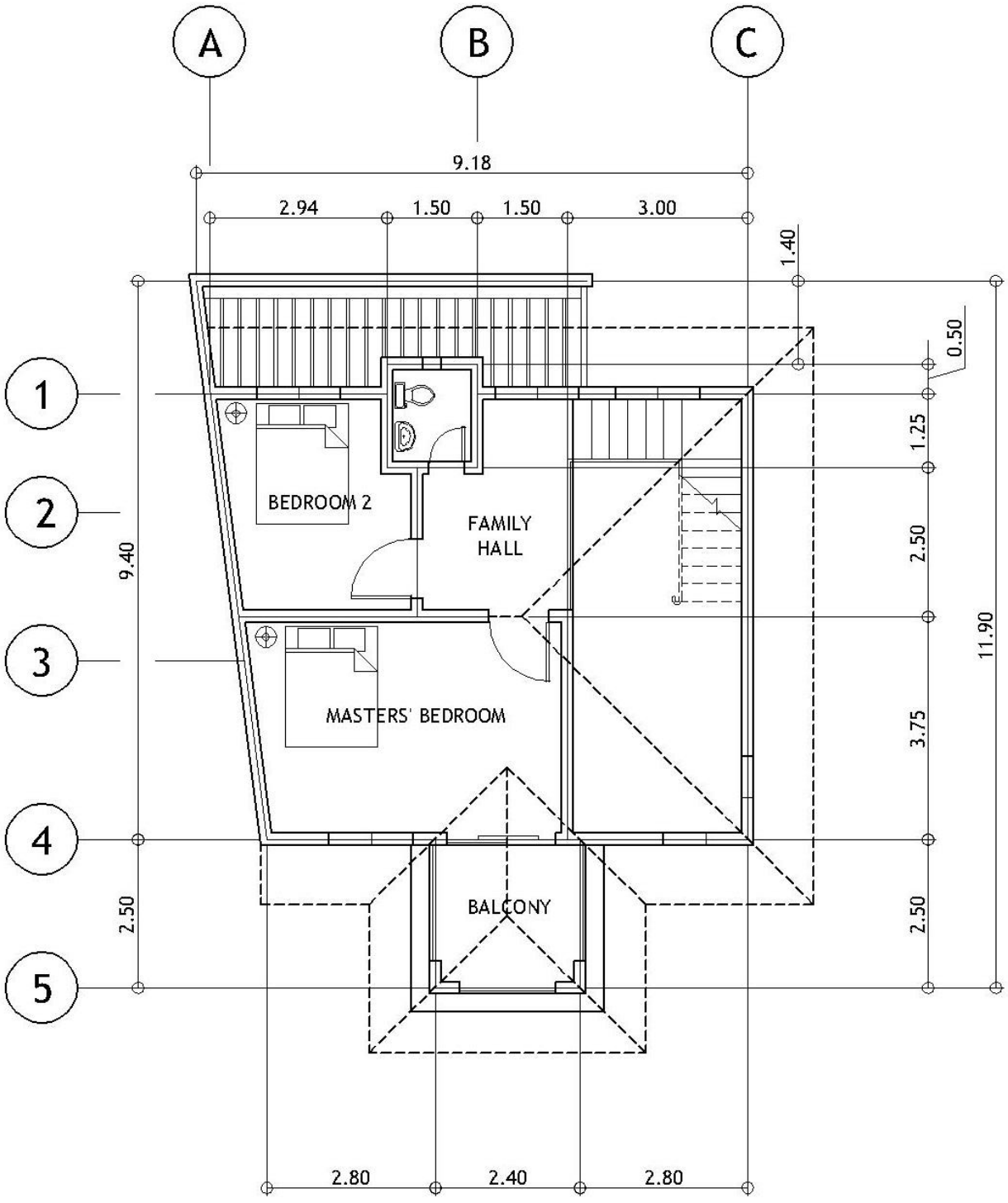


GROUND FLOOR PLAN

SCALE: 1:100 M

DESCRIPTION	LAYER NAME	LINETYPE	COLOR	LINEWEIGHT
DIM & OTHERS	DIM OT	CONTINUOUS	RED	0.1
FURNITURE	FURN	CONTINUOUS	RED	0.1
DOORS & WIN	D&W	CONTINUOUS	YELLOW	0.2
WALLS	WALL	CONTINUOUS	CYAN	0.6
HIDDEN	HD LINE	HIDDEN	GREEN	0.4

NOTE: LINE TYPE & LINE WEIGHT WITHOUT GIVEN LAYER IS DISCRETIONARY OF THE STUDENT/EXAMINEE.



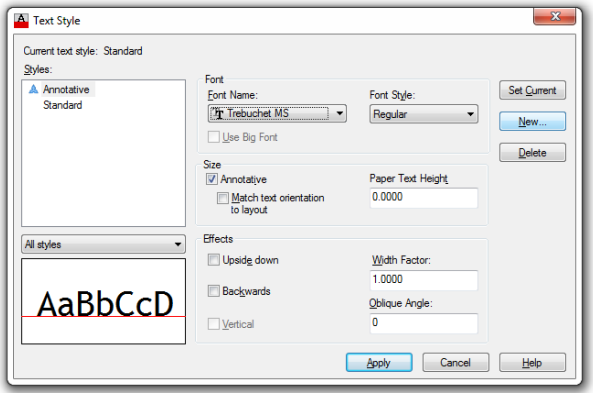
SECOND FLOOR PLAN

SCALE: 1:100 M

DESCRIPTION	LAYER NAME	LINETYPE	COLOR	LINEWEIGHT
DIM & OTHERS	DIM OT	CONTINUOUS	RED	0.1
FURNITURE	FURN	CONTINUOUS	RED	0.1
DOORS & WIN	D&W	CONTINUOUS	YELLOW	0.2
WALLS	WALL	CONTINUOUS	CYAN	0.6
HIDDEN	HD LINE	HIDDEN	GREEN	0.4

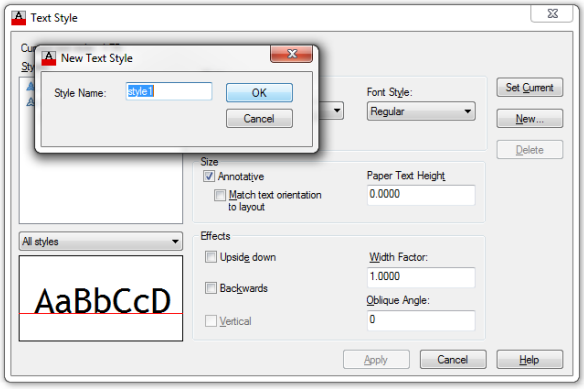
NOTE: LINE TYPE & LINE WEIGHT WITHOUT GIVEN LAYER IS DISCRETIONARY OF THE STUDENT/EXAMINEE.

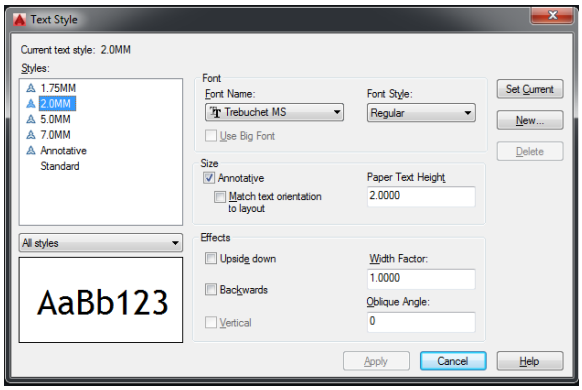
1. Open NEW file using the template "Acadiso" or "Acadiso.dwt". In the command line type **ST (text style)** → in dialog box set to **ANNOTATIVE** style →change the Font Name into GRAPHITE LIGHT or TREBUCHET MS →click NEW



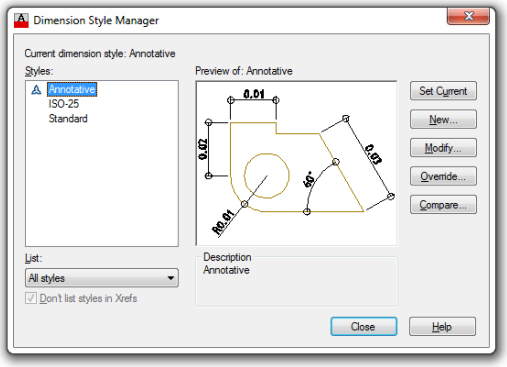
Note: If the SELECT TEMPLATE dialog box is not showing, type FILEDIA command and set to 1.

2. In the NEW TEXT STYLE dialog box type 1.75MM then change the PAPER TEXT HEIGHT into 1.75 then press enter key. Repeat the process by clicking NEW to set-up any different height of text common for drafting building plans. *Select 2.0MM style as your default font size.*

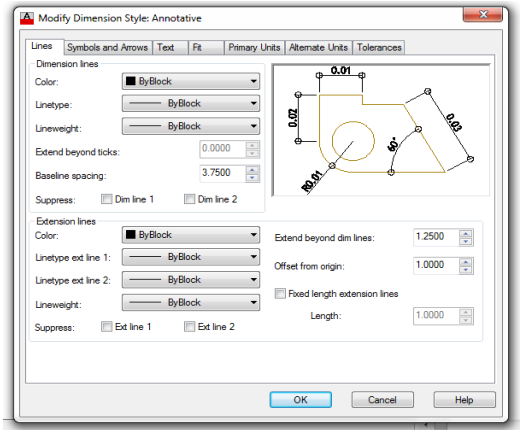




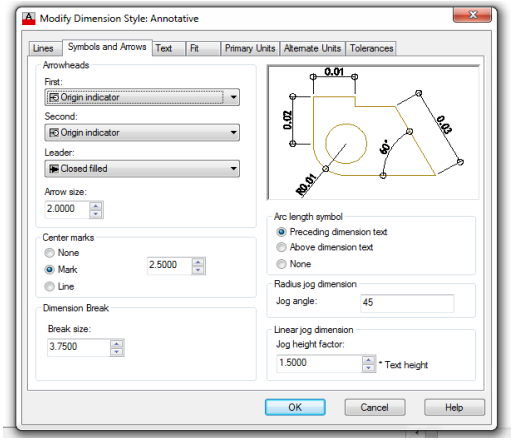
3. In the command line type D (Modify Dimension Style) → in dialog box set to ANNOTATIVE and click MODIFY.



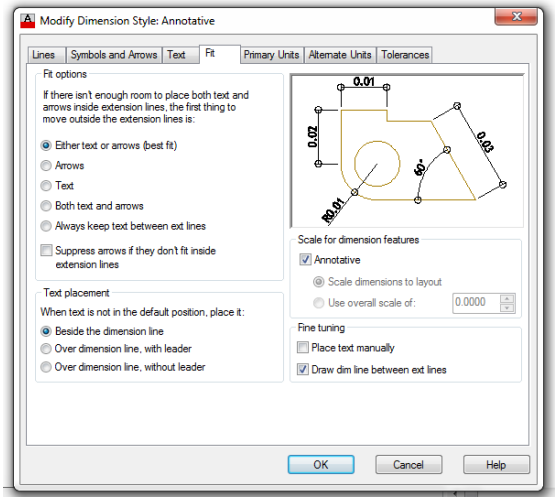
4. Click LINES TAB and set-up the following:
   BASELINE SPACING into 3.75
   EXTEND BEYOND DIM LINES into 1.25
   OFFSET FROM ORIGIN into 1.00



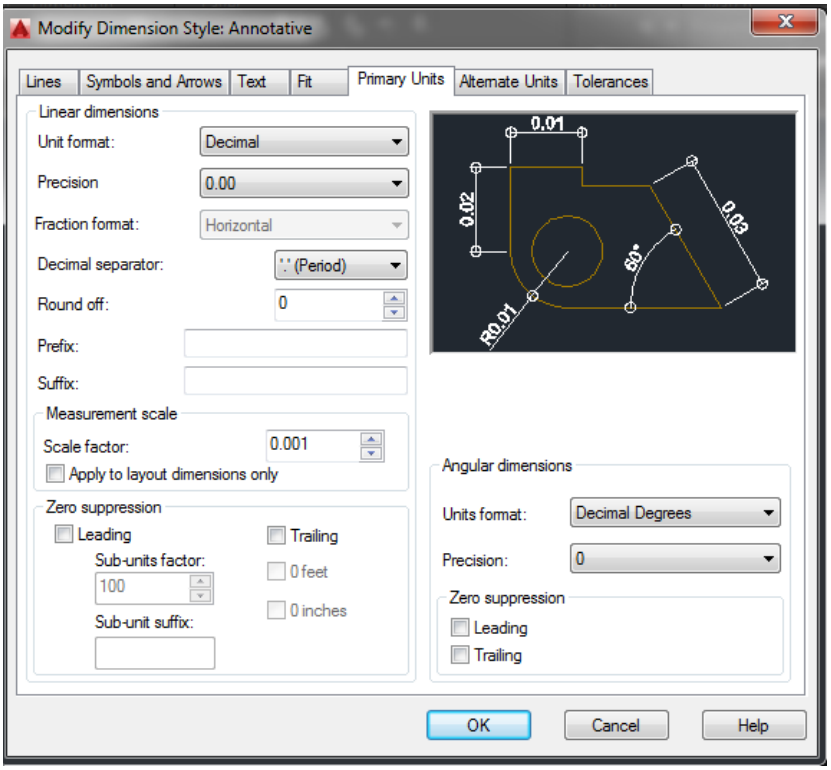
5. Click SYMBOLS & ARROWS TAB and set-up the following:
   ARROWHEADS 1ST & 2ND into ORIGIN INDICATOR
   LEADER into CLOSED FILLED
   ARROW SIZE into 2.0
   CENTER MARKS into 2.5



6. Click FIT TAB and check if the default set-up is also in ANNOTATIVE.

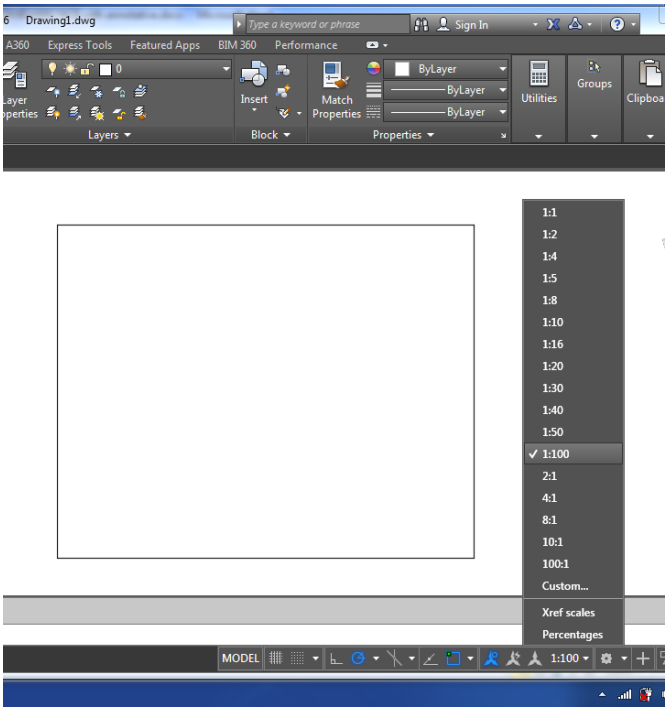


7. Click PRIMARY UNITS TAB and check if the default set-up is also in ANNOTATIVE.
   UNIT FORMAT into DECIMAL
   PRECISION into 0.00
   DECIMAL SEPARATOR into "." PERIOD
   SCALE FACTOR into 0.001
   ZERO SUPPRESSION deactivate TRAILING & LEADING

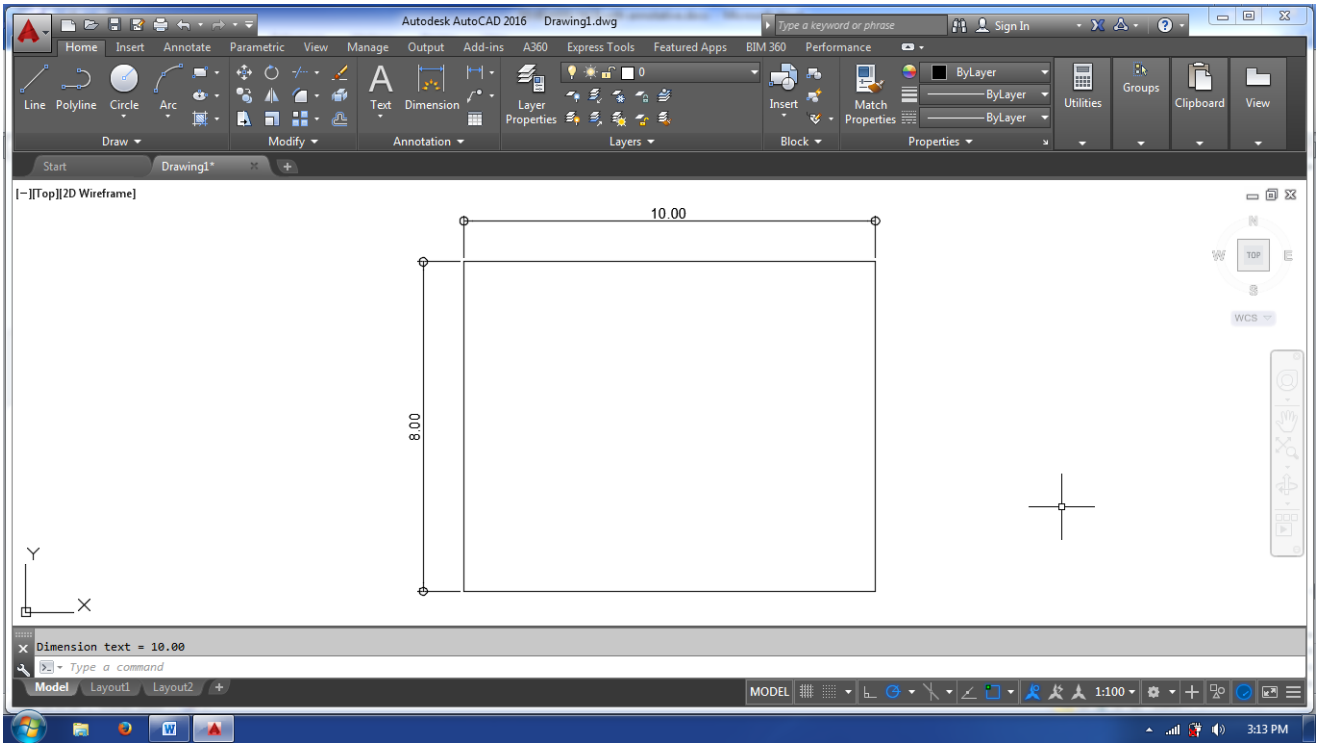


8. Click OK and CLOSE

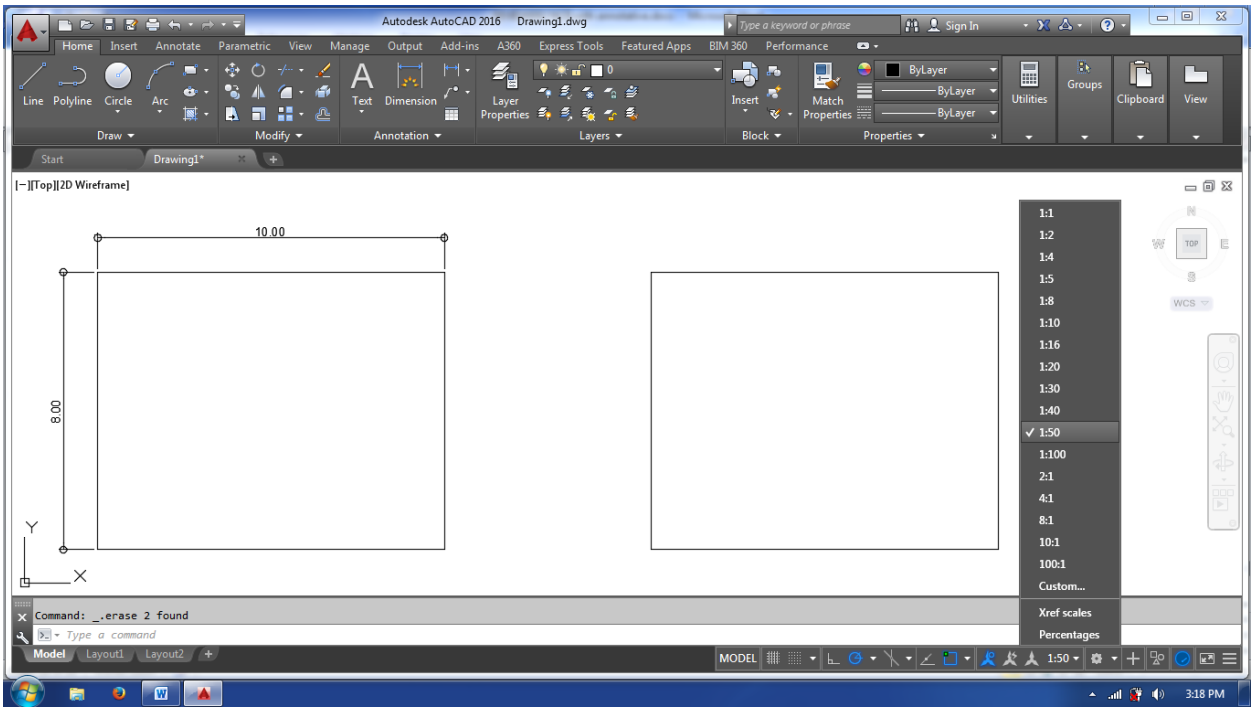
9. To check the effectiveness of ANNOTATIVE DIMENSIONING, create a rectangle with the size of 8000mm x 10000mm. Set the ANNOTATION SCALE of the current view into 1:100 before applying dimension.



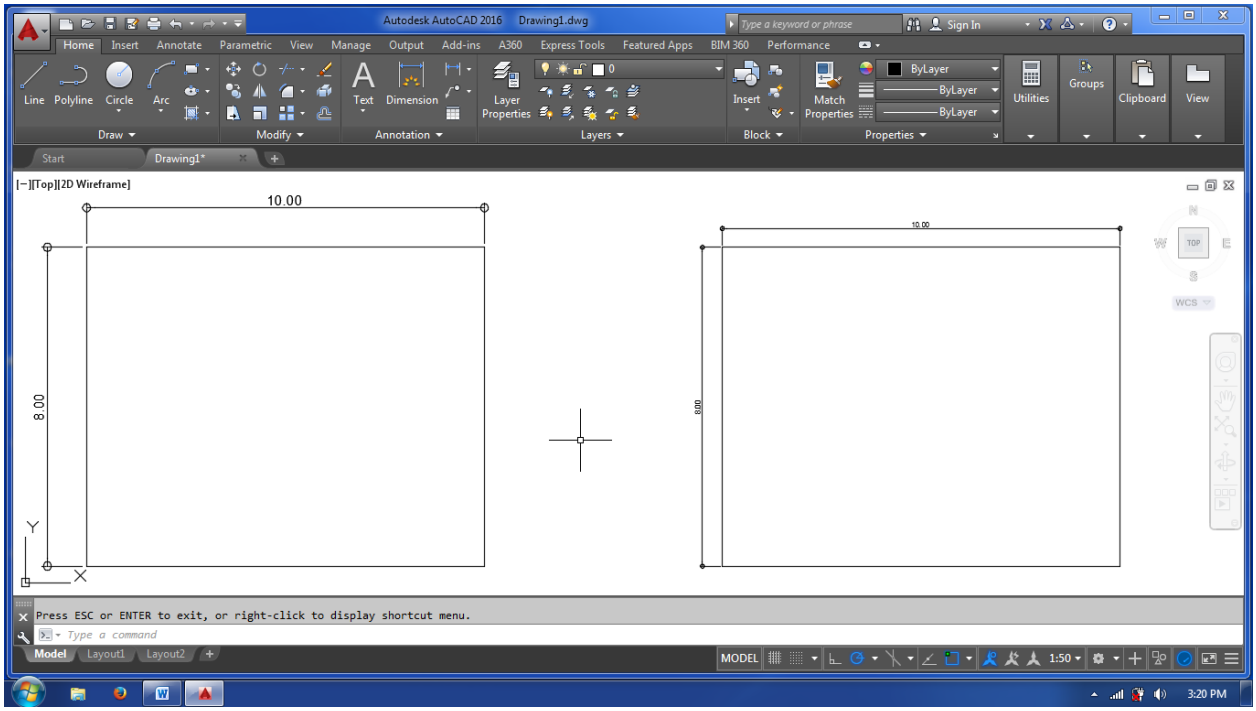
10. Apply DIMLINEAR (DLI) command with the dimension line distance of 1000.



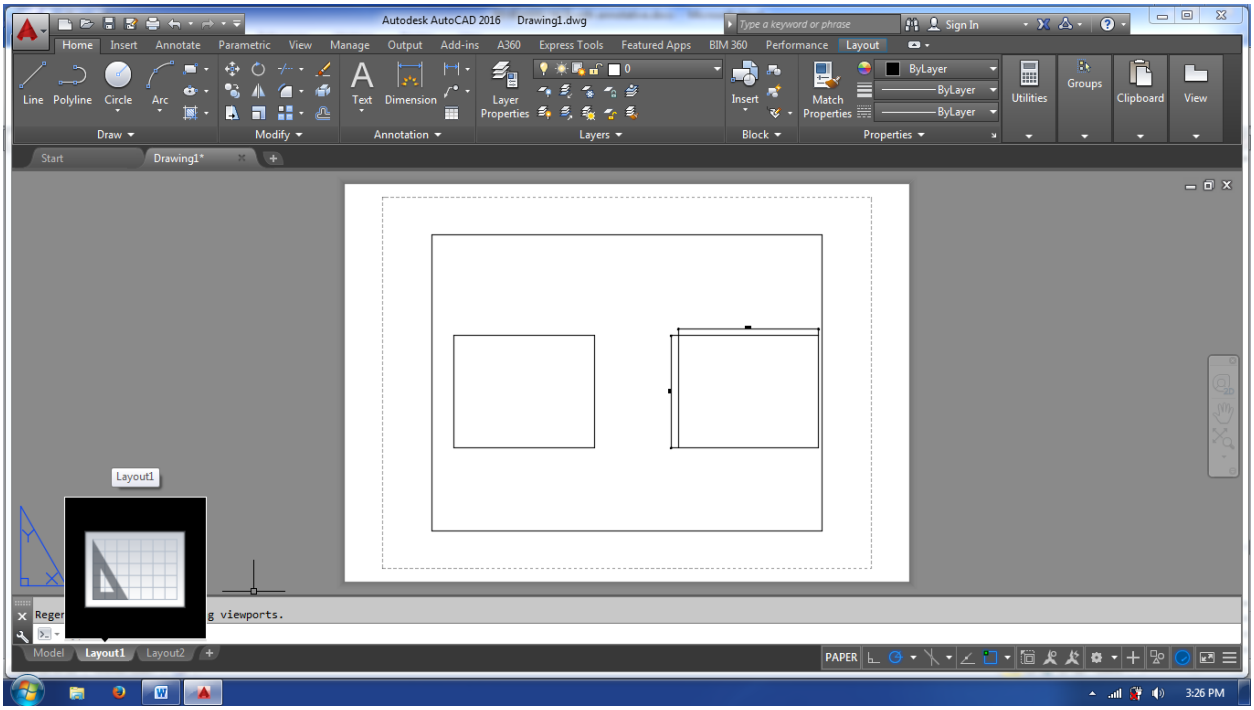
11. Copy the RECTANGLE and Set the ANNOTATION SCALE of the current view into 1:50 before applying dimension.



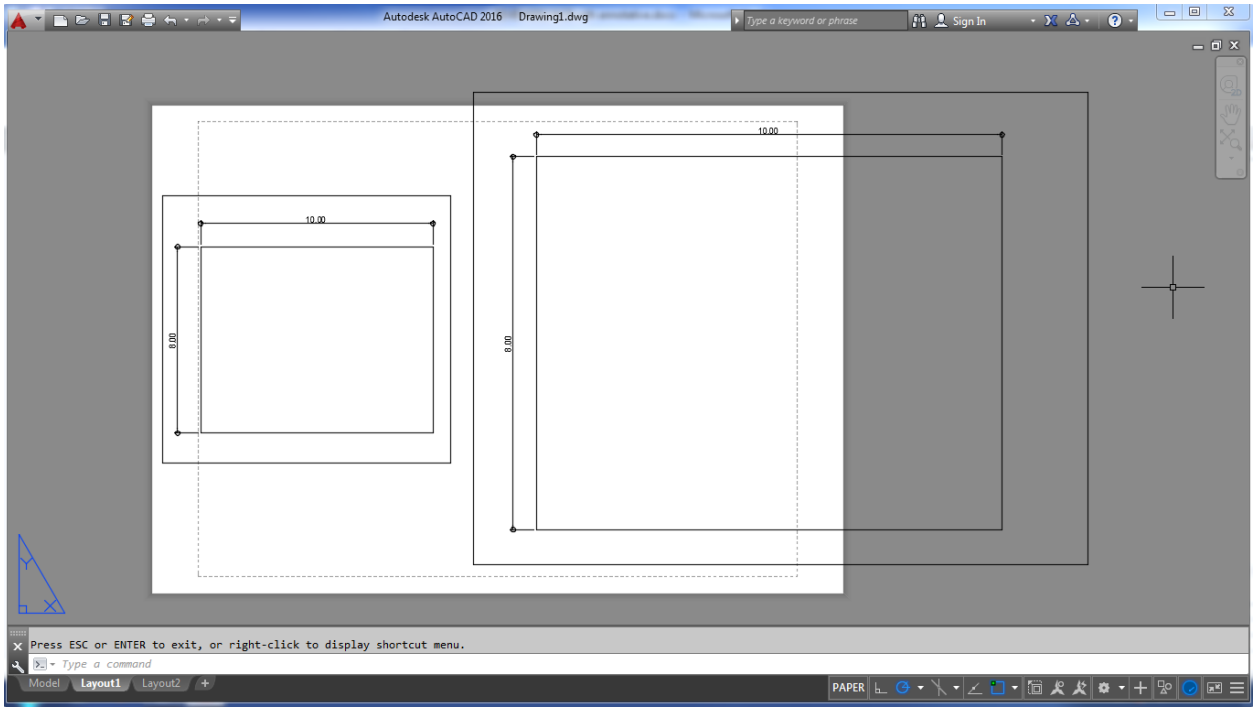
12. Apply DIMLINEAR (DLI) command with the dimension line distance of 500. After applying the command, you will notice that the size of your recent dimension text and arrows are reduced.



13. Select LAYOUT TAB.



14. Erase the current view and apply MVIEW (MV) command twice. Set the first view into 1:100 scale and the other view into 1:50 scale. You will notice that the dimension text and offset distance of dimension line are the same though the scale used are different in each layout view.



15. Enjoy working with ANNOTATIVE dimensioning!!!