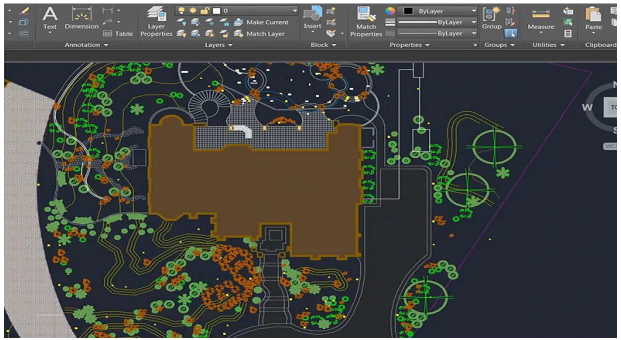
ARCH@UCSD

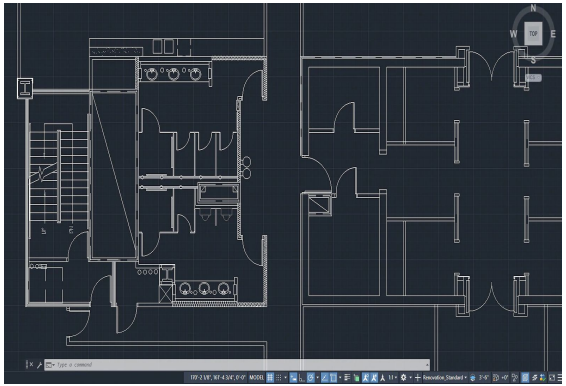
AutoCAD Basics:

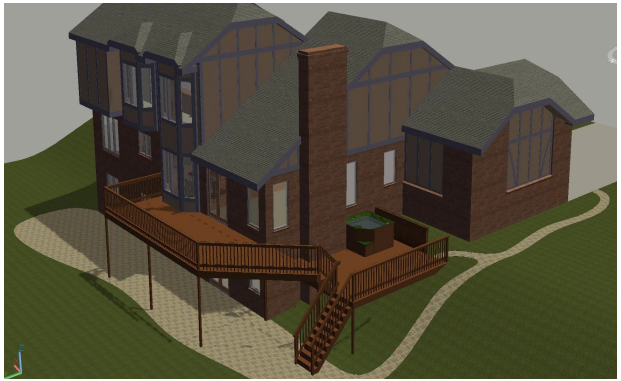
Drawing a Simple Floor Plan

Slides Created By: Doris Liu

How you can use AutoCAD

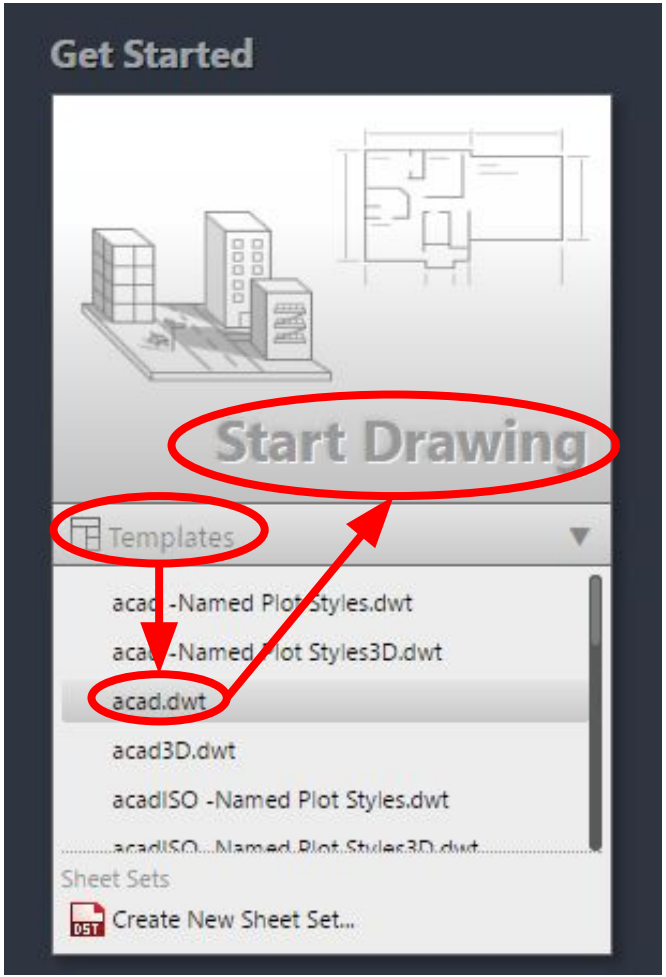






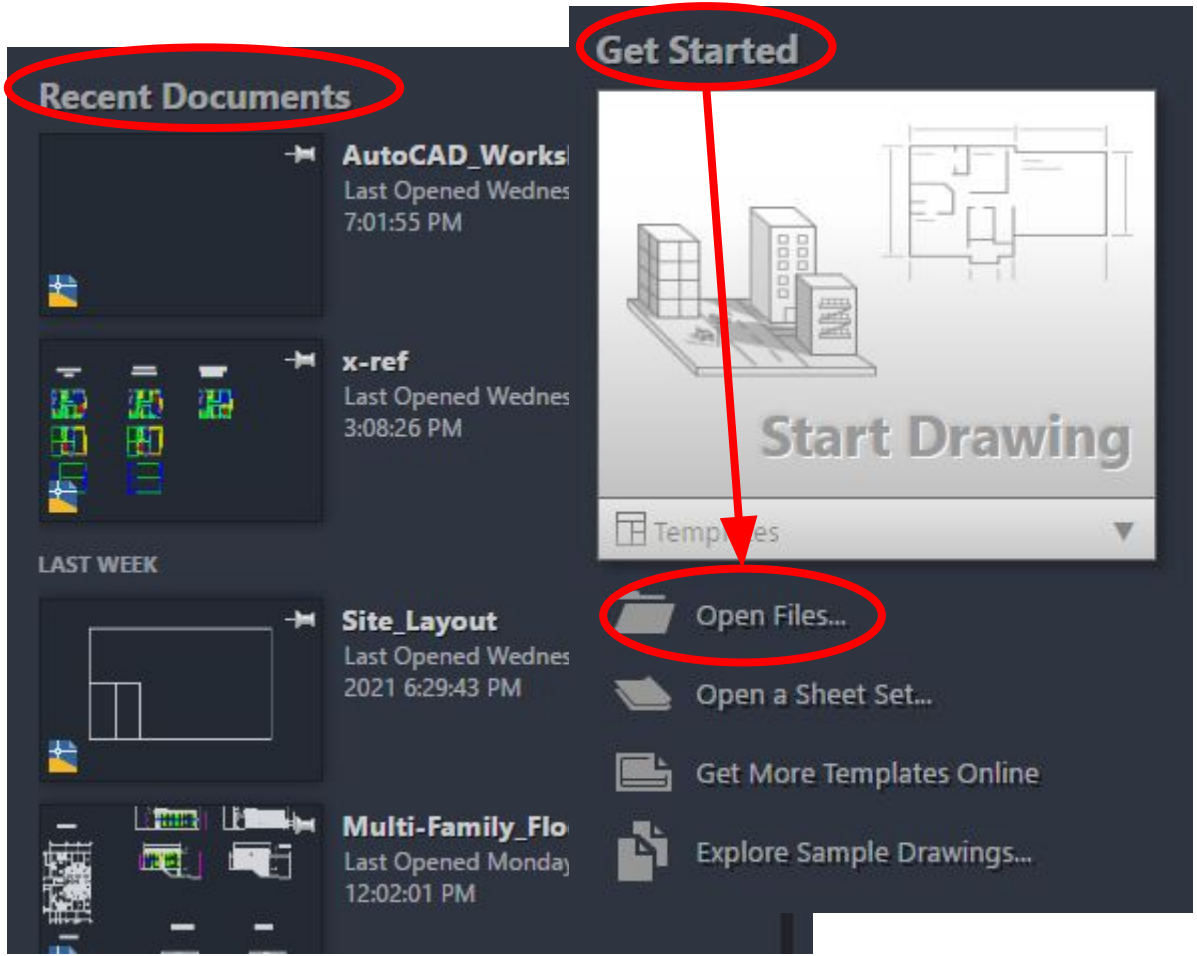
Creating a New Drawing

Under *"Get Started"* Check under *"Templates"* & make sure it is selected on *"acad.dwt"* then click *"Start Drawing"*



Opening an Existing Drawing

Under *"Get Started"* select *"Open Files"* or *"Recent Documents"* & find your AutoCAD file



Basic Functions

(These things would be quite good to know)

Remember to *SAVE YOUR PROJECT* often!

The *“Home”* tab will be used the most. *“Annotate”*, *“Insert”*, & *“View”* tabs will potentially be used too.

How to *Zoom In*:

Scroll *Mouse Wheel* Up

How to *Zoom Out*:

Scroll *Mouse Wheel* Down

How to *Pan*:

Hold down *Mouse Wheel*
& move mouse around

How to *Zoom* & *Pan*:

Use *Mouse Wheel* to zoom as usual and to pan while zooming, *Move Mouse* to different part of screen and then zoom.

Selecting Objects

Top right to bottom left
(selects all objects within bounds)

Top left to bottom right
(selects only objects entirely within bounds)

Shortcuts Using *"Function"* Keys

F1: Help

F2: Switch Between Command Line/Dynamic Input

F3: OSnap On/Off *(ex: midpoint, center, node, etc)*

F7: Grid On/Off

F8: Ortho On/off

F9: Snap On/Off

F10: Polar On/Off

F11: Object Snap Tracking On/Off

Note*: Try it out to familiarize yourself with these! *F3 & F8* are used a lot.

All commands can be *typed out* as well

How to *Exit* a command

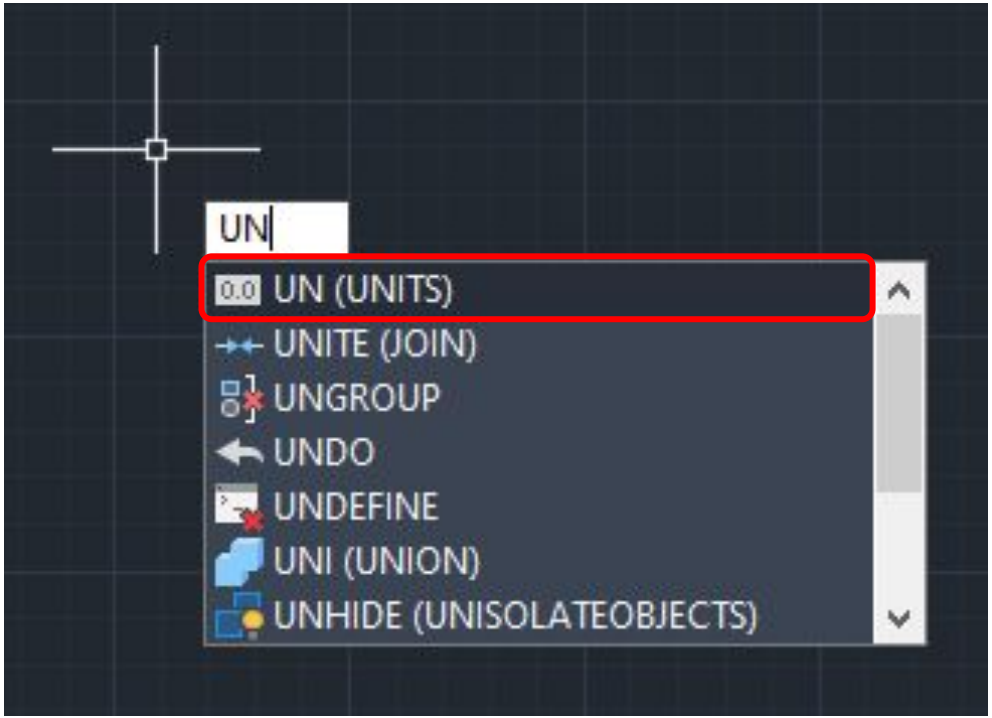
Press the *"ESC"* Key to
exit out of a command

Note*: Esc could be pressed once or more times as needed.

Setting Up the Drawing File

(Will only need to do this once if you plan to use the same settings in more than one drawing)

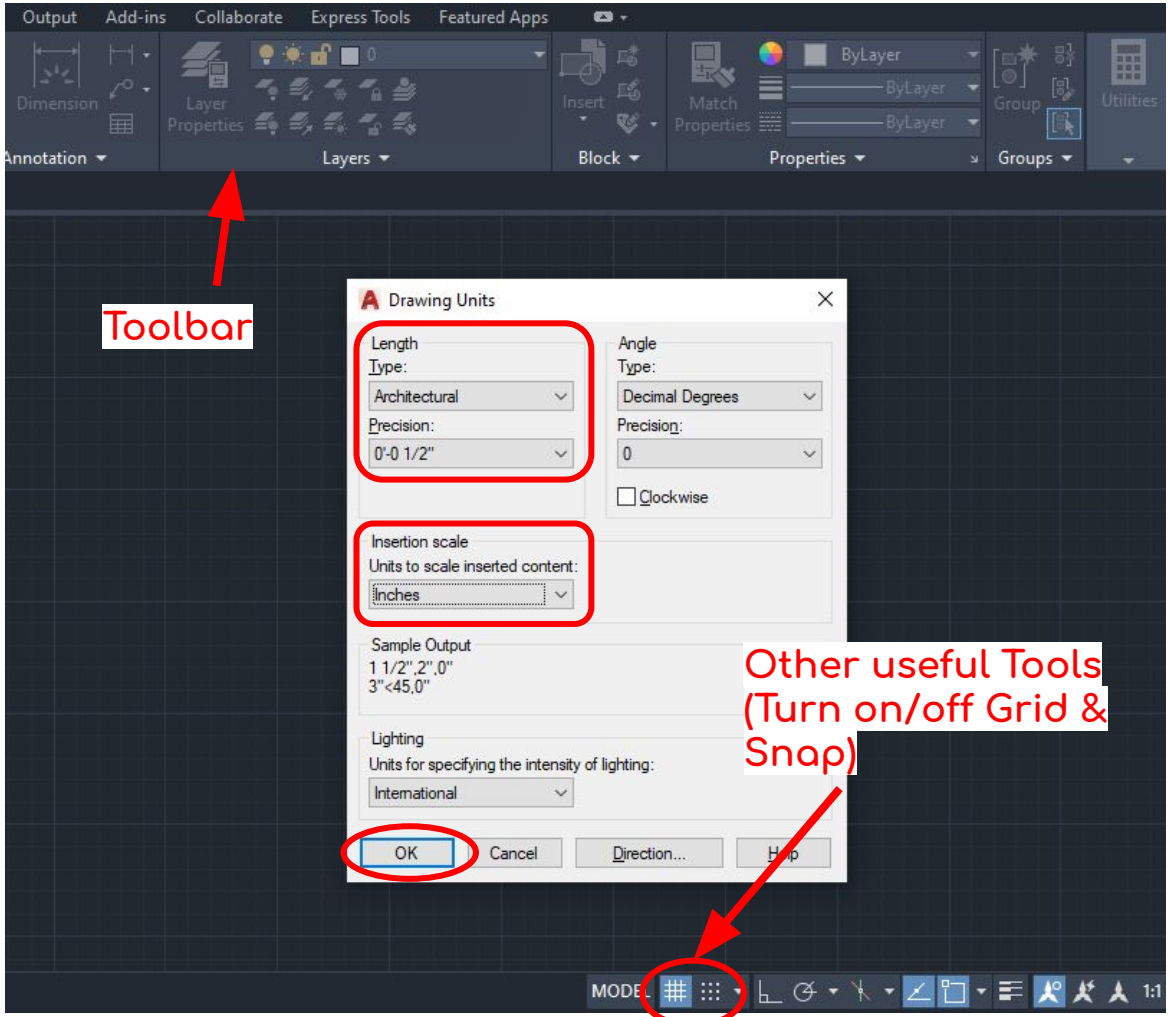
Type command *“un”* for units & press *“enter”*



Note*: You can also type the entire word as well

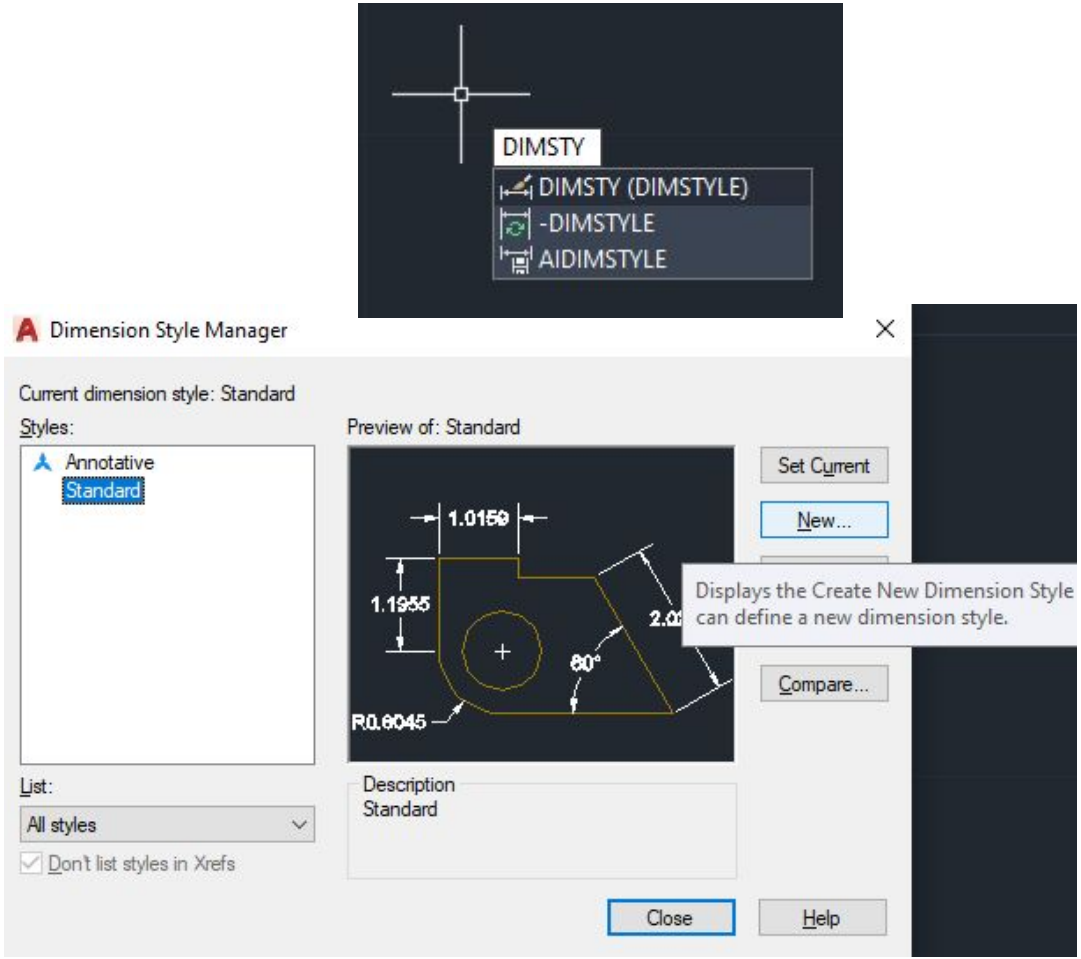
Change the Length *"Type"* & *"Precision"* as well as *"Insertion Scale"* then click *"OK"*

Note*: Check out the toolbar at the top & notice the useful tools at the bottom as well!

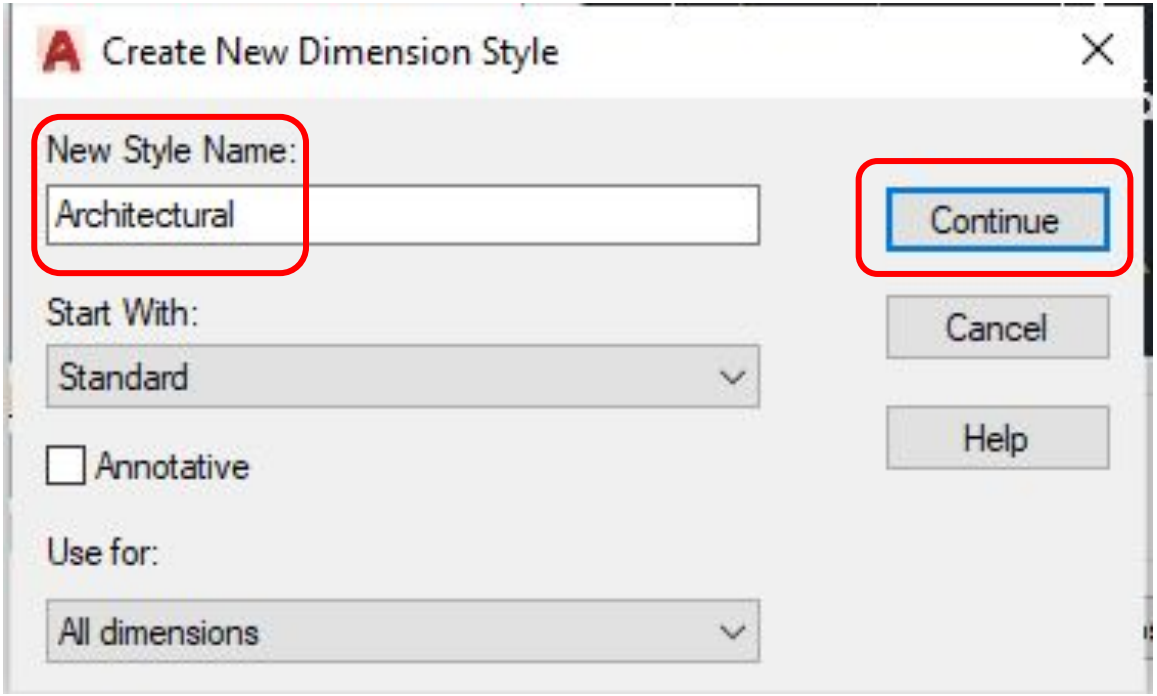


Type *“dimsty”* & in the window that pops up, select *“New...”*

Note*: The purpose of modifying this is to make sure it matches visually with the units we set.

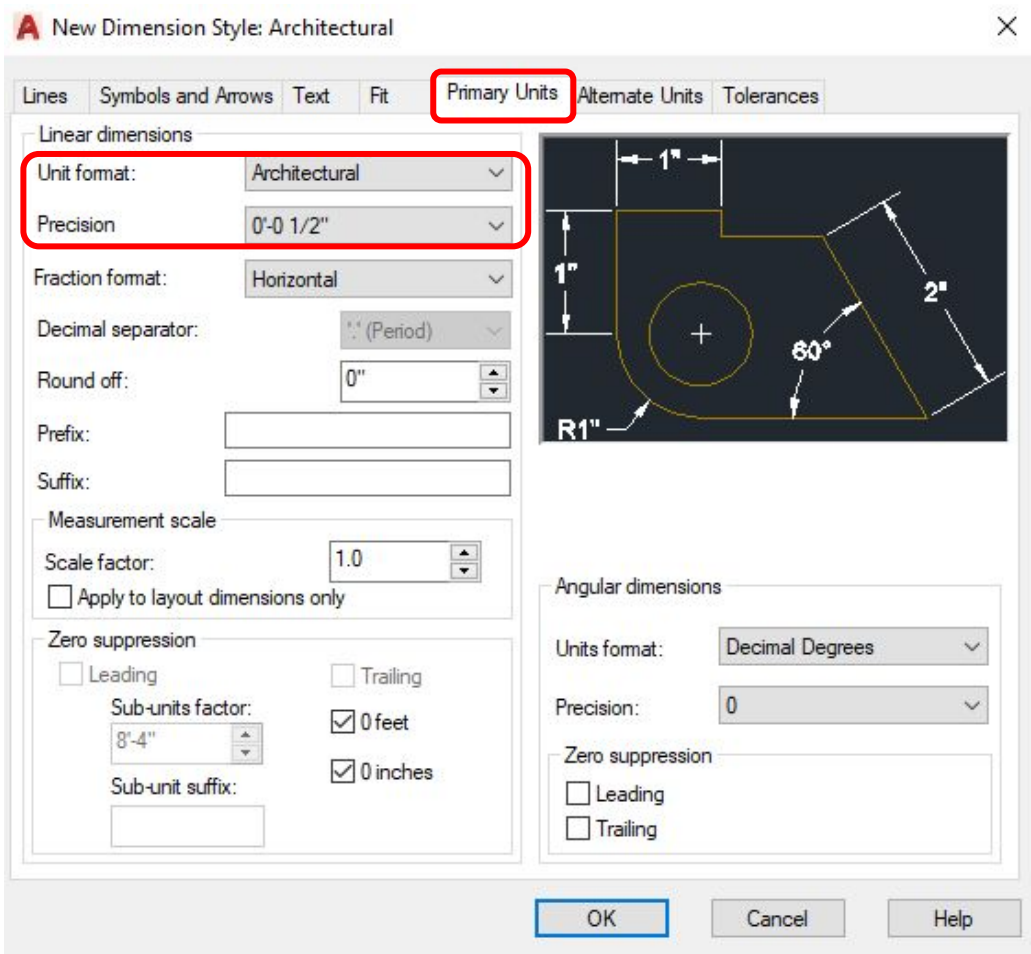


Rename new dimstyle & click *"Continue"*



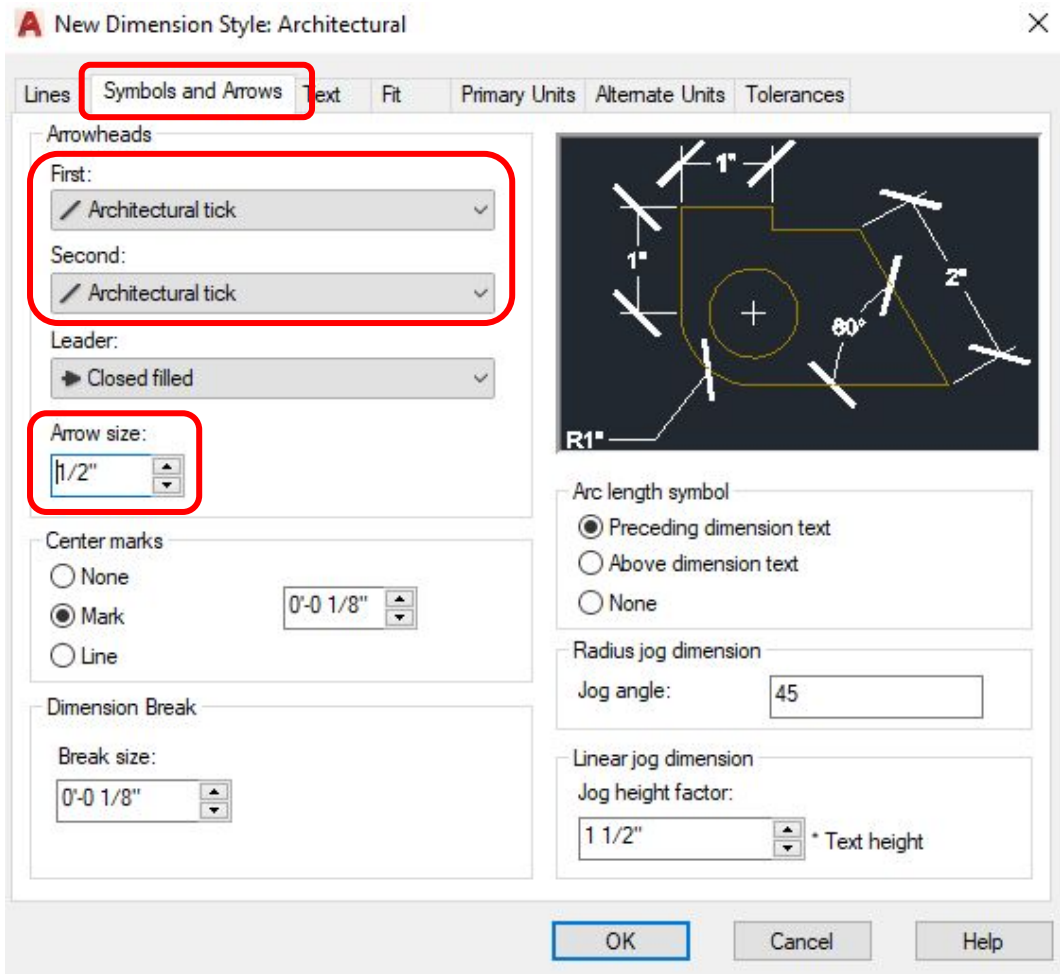
Note*: Rename to same name as the units. Leave the other settings as its default as shown above.

Change settings under *"Primary Units"* to match the image

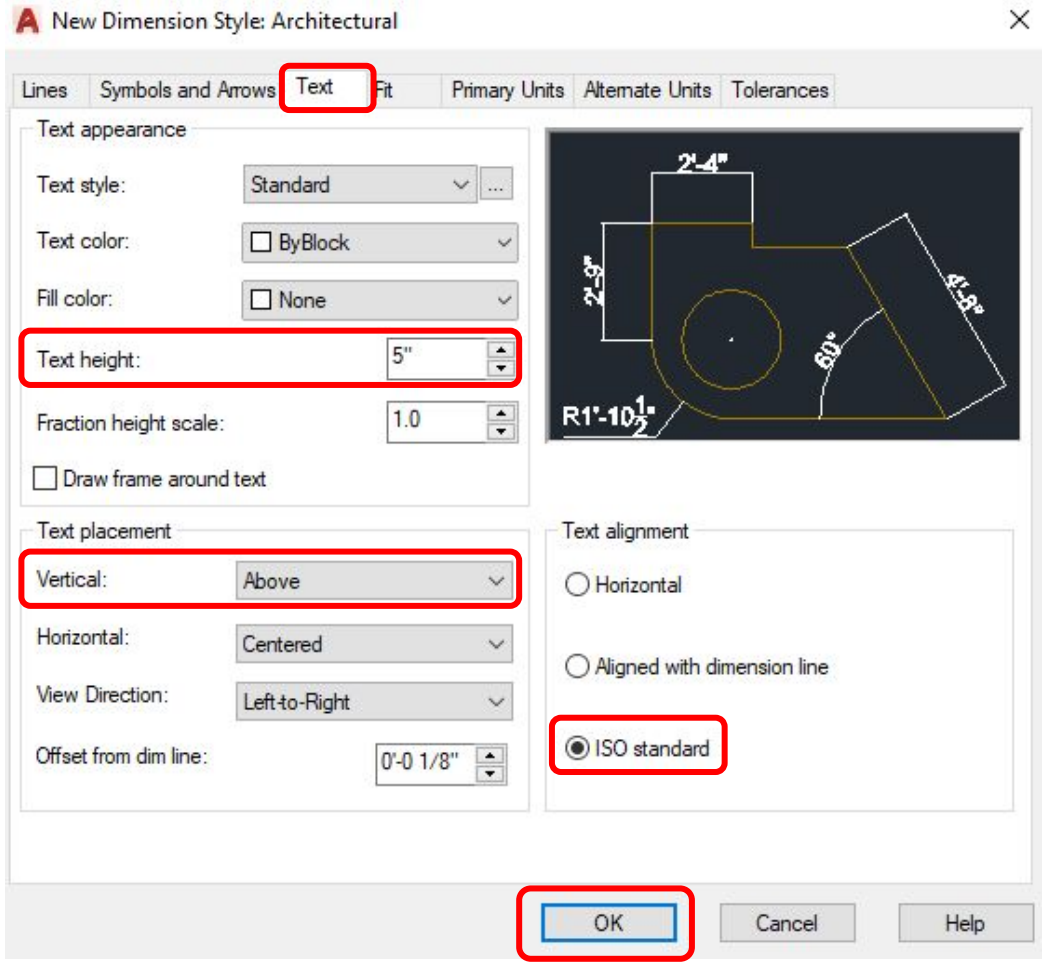


Change settings under *"Symbols and Arrows"* to match the image

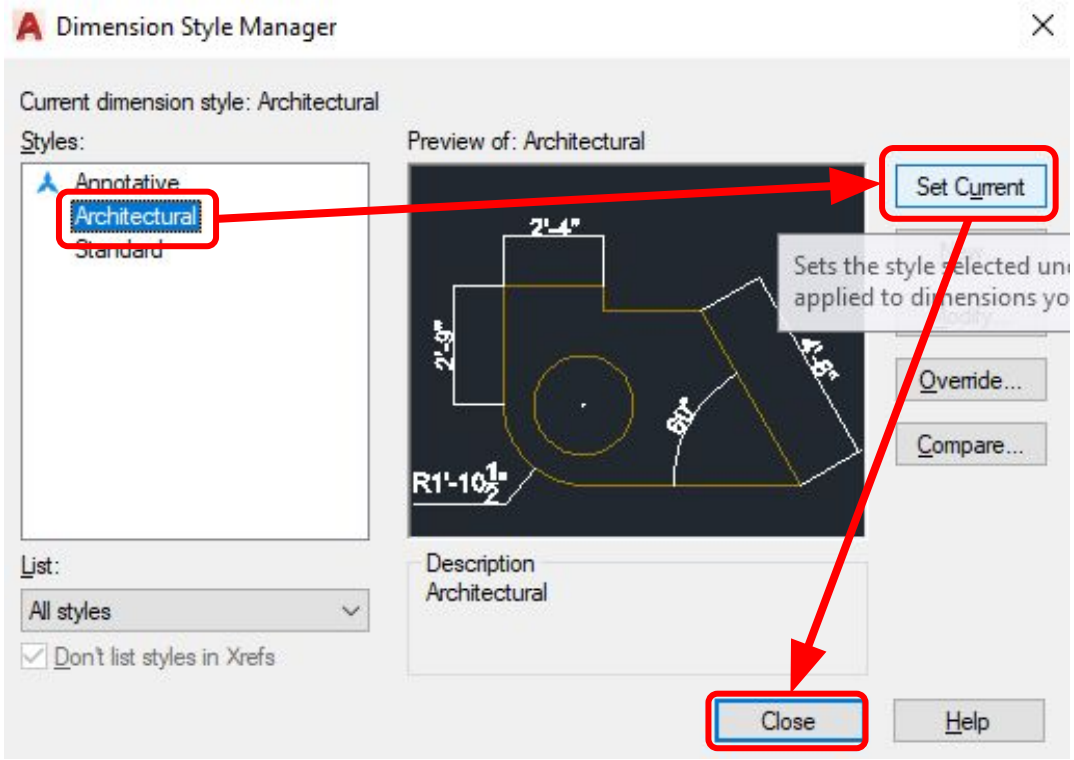
Note*: The arrow size could/should be modified as needed later on.



Change settings under *"Text"* to match the image then click *"OK"*

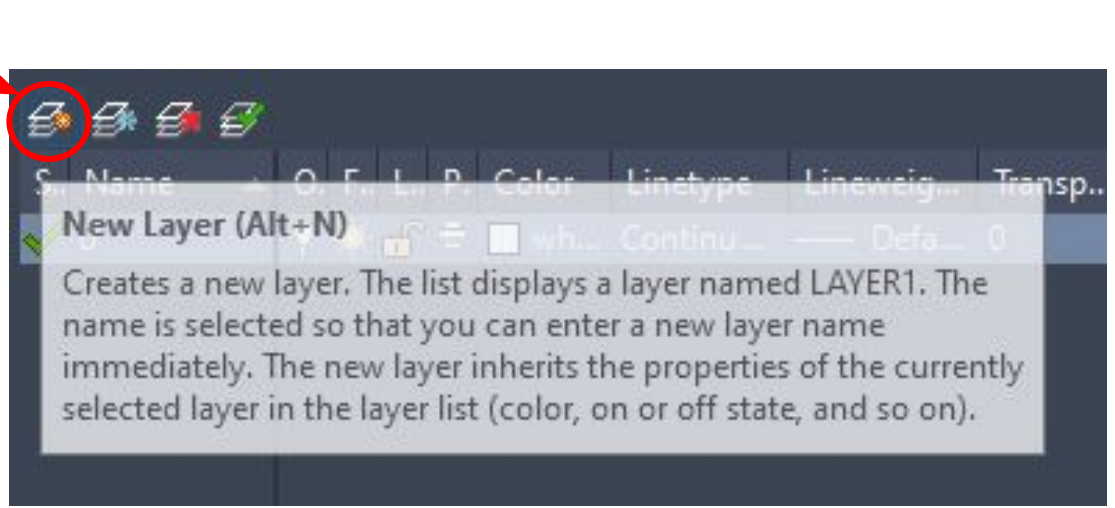


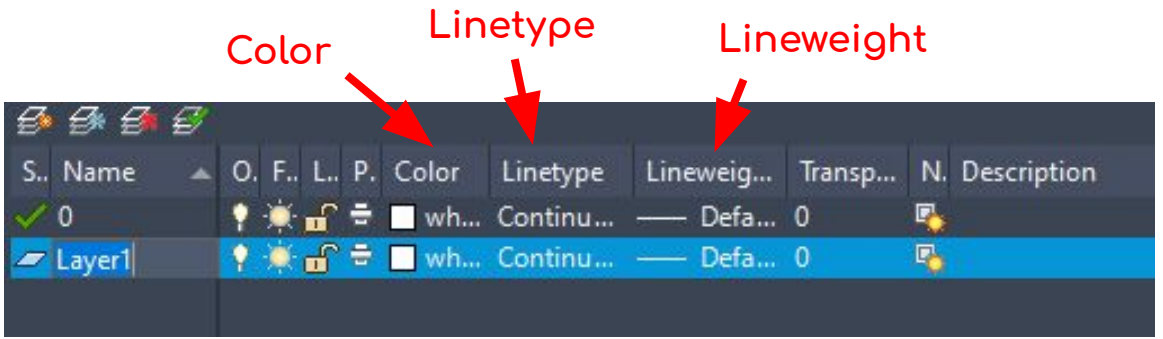
Select *"Architectural"* under styles & click *"Set Current"* on the right then "Close" the window



Note*: Set Current is important because this ensures that the dimension style is the one you selected

Type *"la"* for layer & *create new* layers: change *name*, *color*, *linetype*, & *lineweight* as preferred





Note*: There is a default "0" layer that can be used for images and things like that.. New layers could be created as needed.

Attaching an Image

Screenshot
this Floor Plan
(48’ x 25’)

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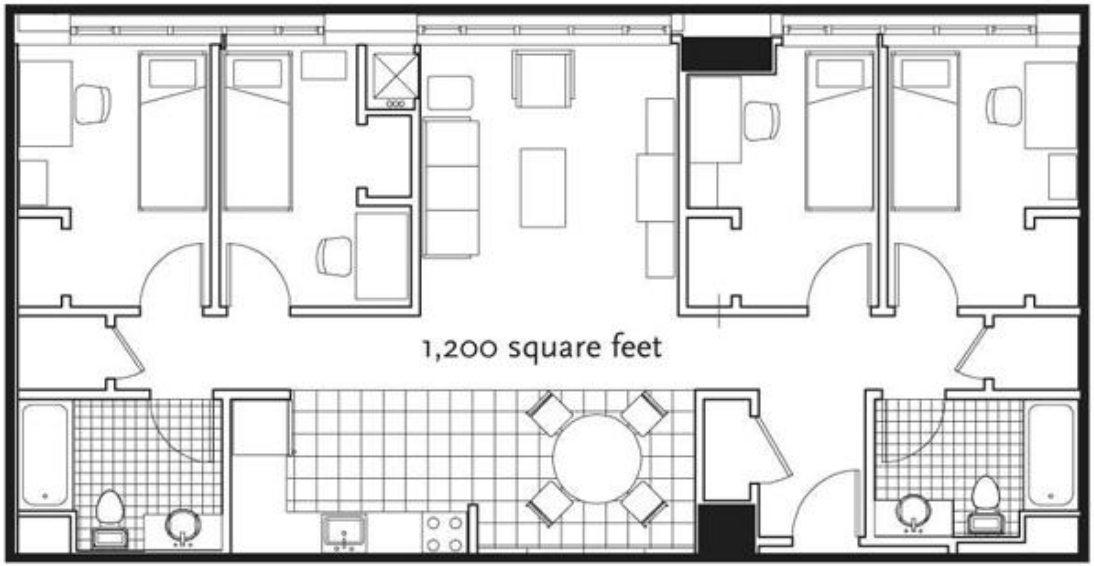
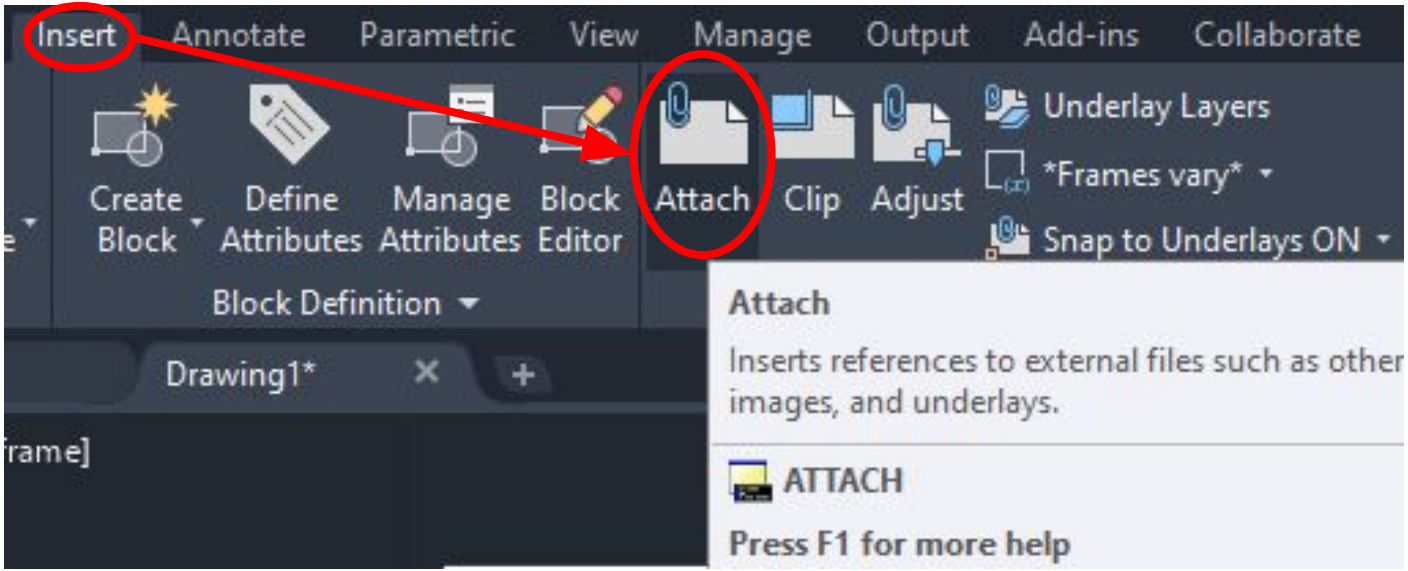
4 BEDROOM, 2 BATHROOM
4 PERSON APARTMENT



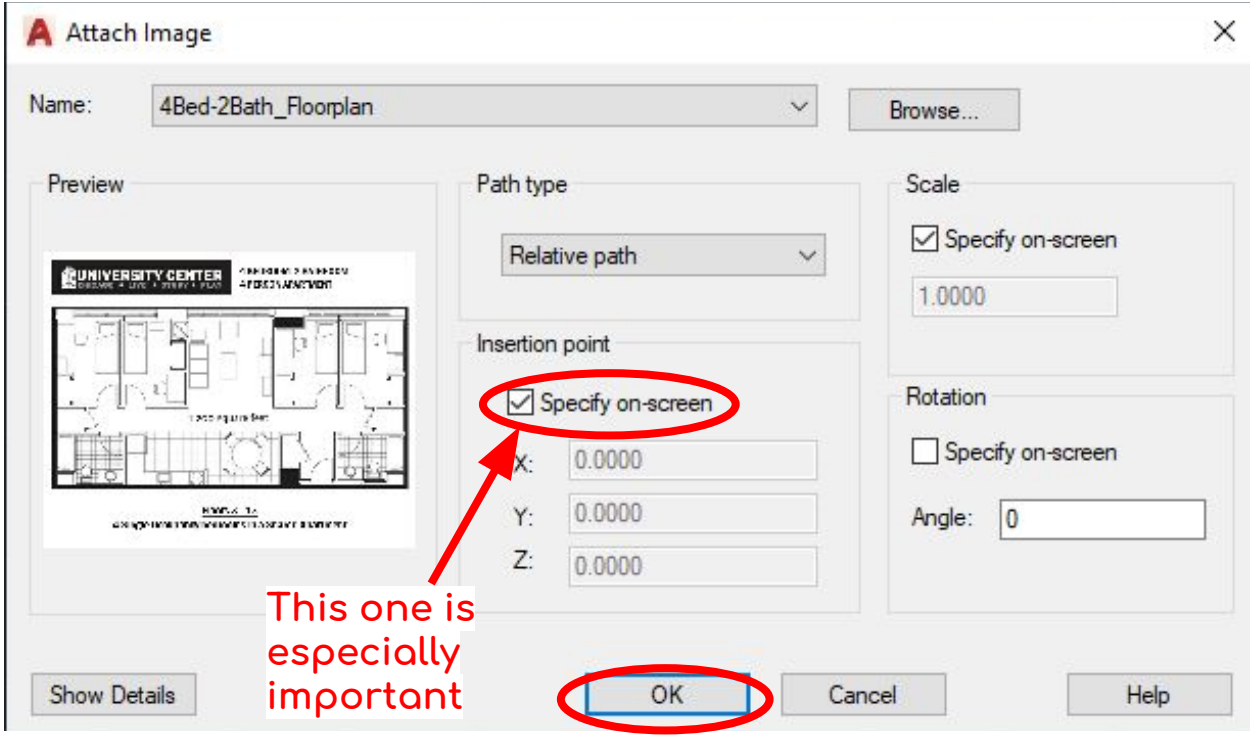
Floors 3 - 13
4 Single Occupancy bedrooms in a Shared Apartment

OG Image: https://students.colum.edu/residence-life/Images_folder/_housing/uc/4br-2ba-4p.jpg

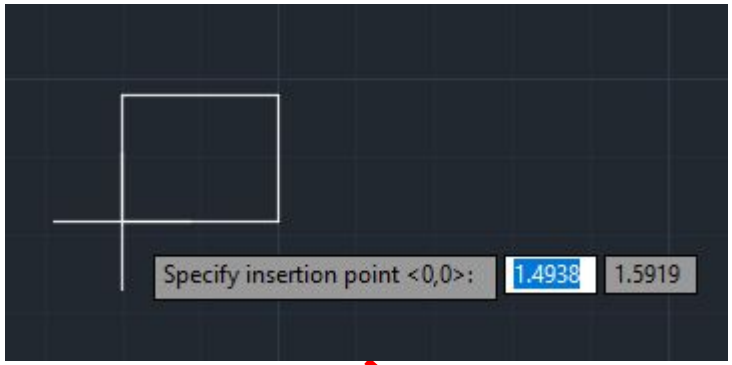
Go To *"Insert"* Tab & click *"Attach"* & find the image you want and either double-click or click *"Open"*

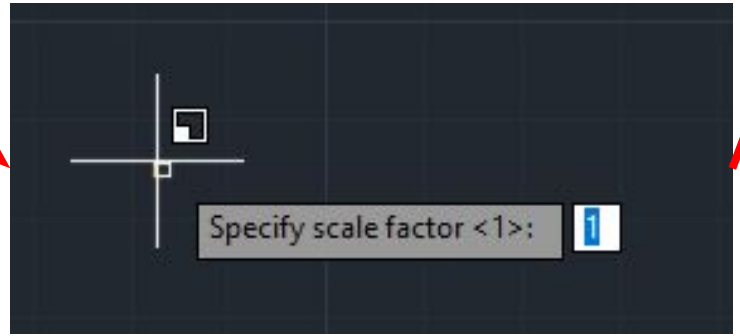


In the pop-up window here, make sure the settings are the *same*



Specify *Insertion* point & *Scale*

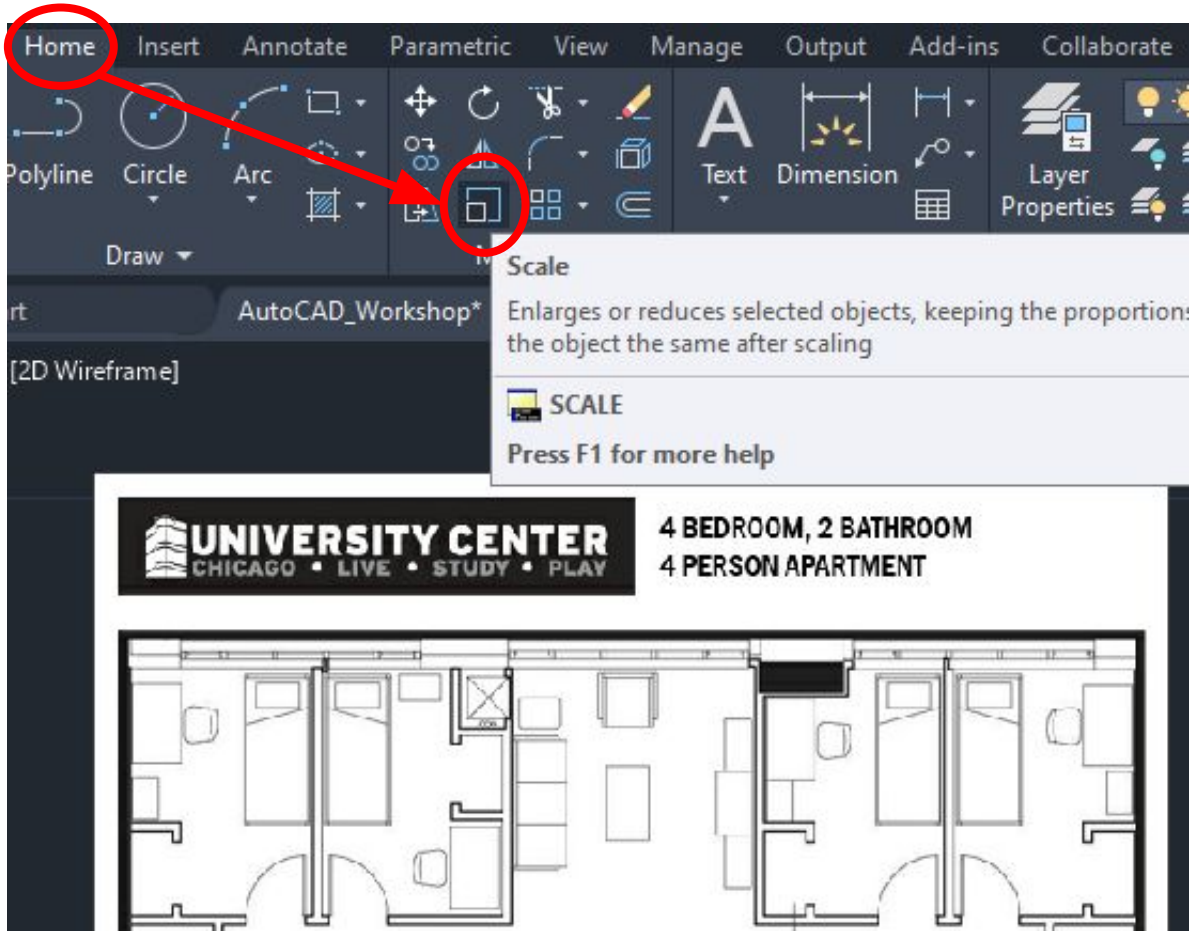




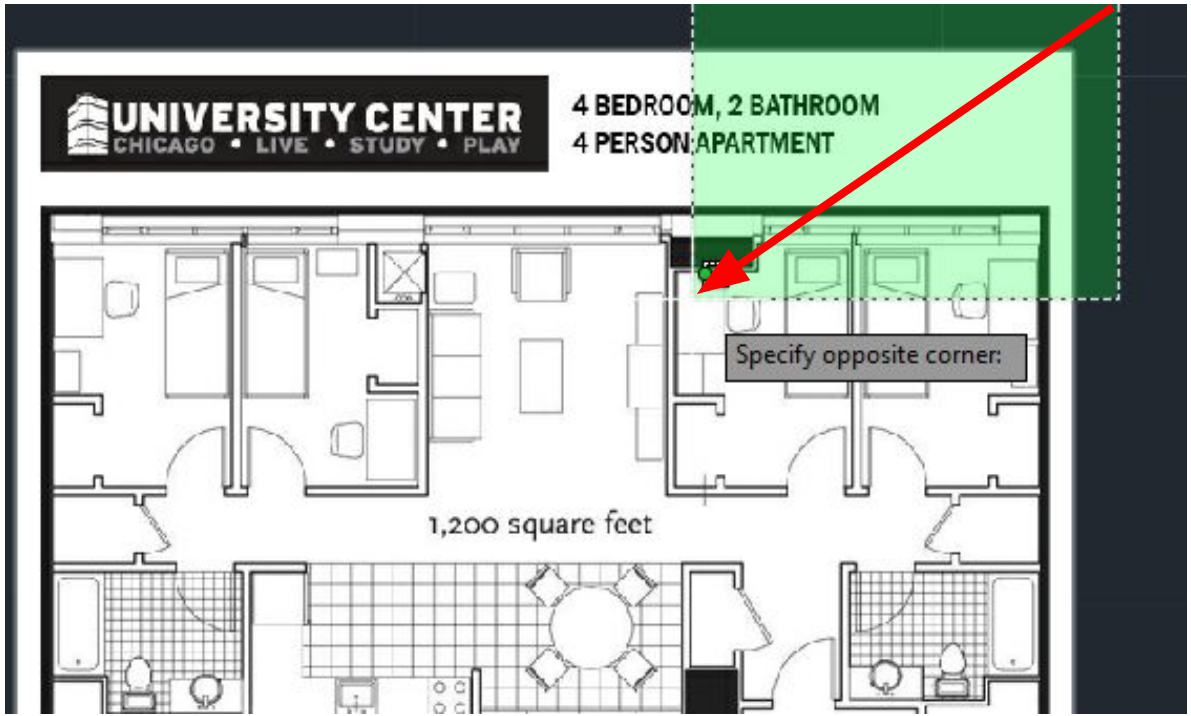
Scaling an Image

Under *"Home"* tab, click on the *"Scale"* icon

Note*: You have the option to scale when inserting the image as well.

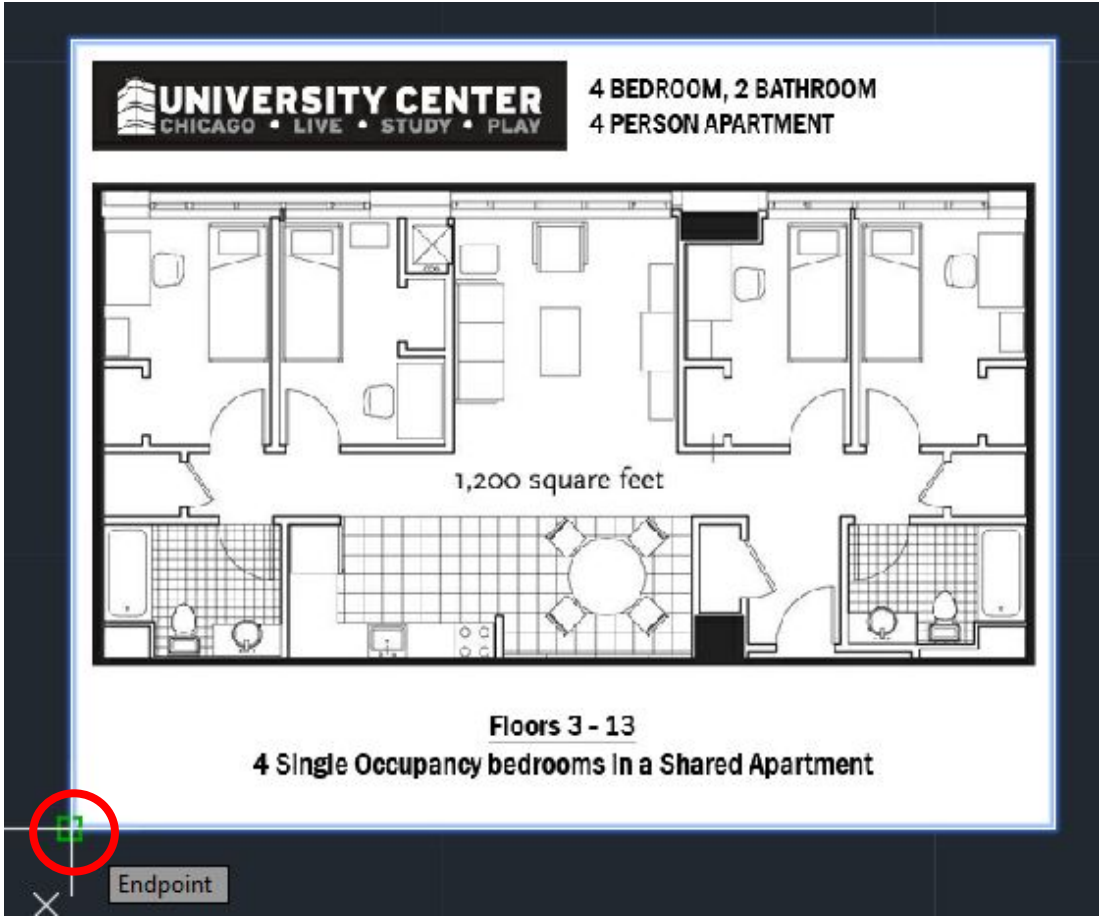


Cross-select from top right to bottom left of object you want to scale & press *"Enter"*



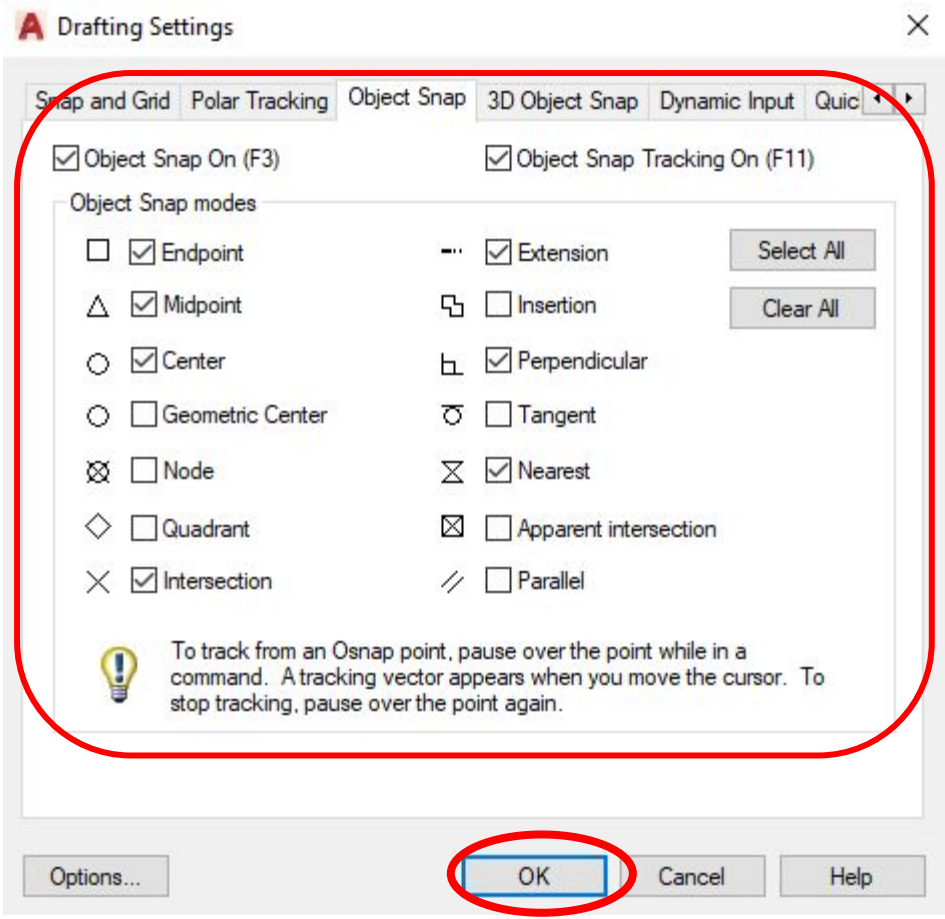
Specify the *Base Point* by clicking anywhere (in this case bottom left corner)

Note*: Make sure your o-snap (F3) is on & if needed type "o-snap" to check some boxes (see next slide)



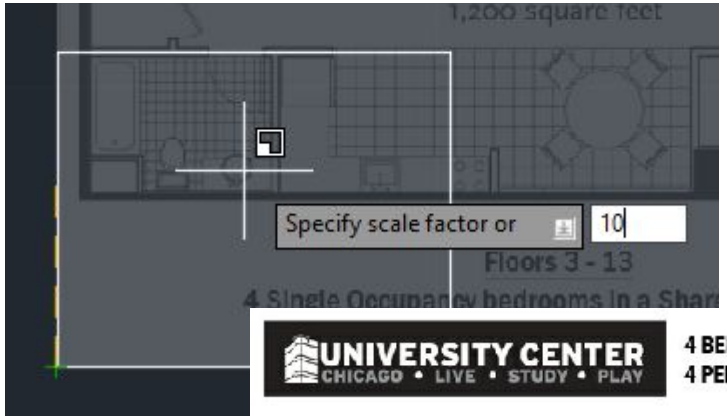
Optional Slide: Type *"osnap"* & check or uncheck any of the boxes then click *"OK"* to confirm

Note*: Does not need to be the same as this & can be changed at any time



Type in new scale value, in this case try *500* then press *"Enter"*

Note*: Make sure your o-snap (F3) is on & if needed type "o-snap" to check some boxes (see next slide)



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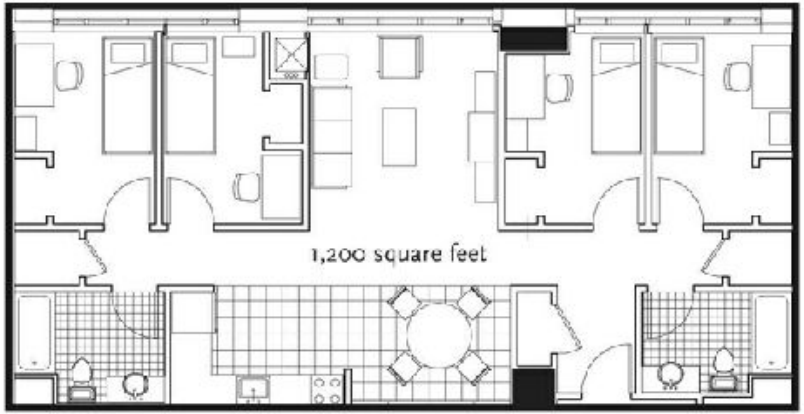
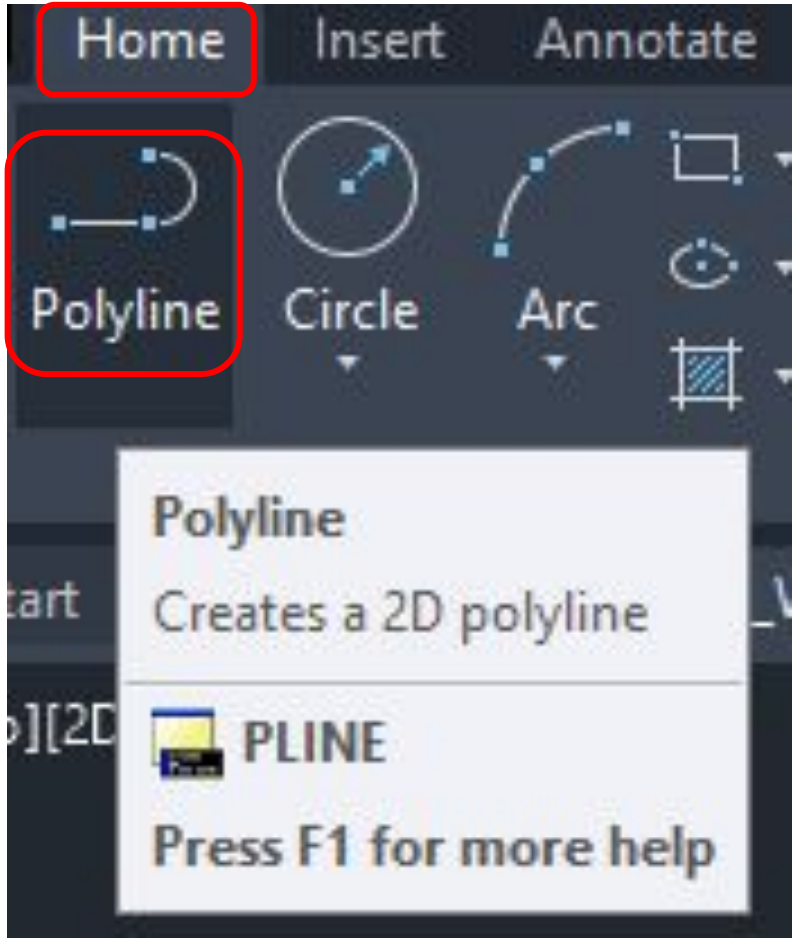
4 BEDROOM, 2 BATHROOM
4 PERSON APARTMENT



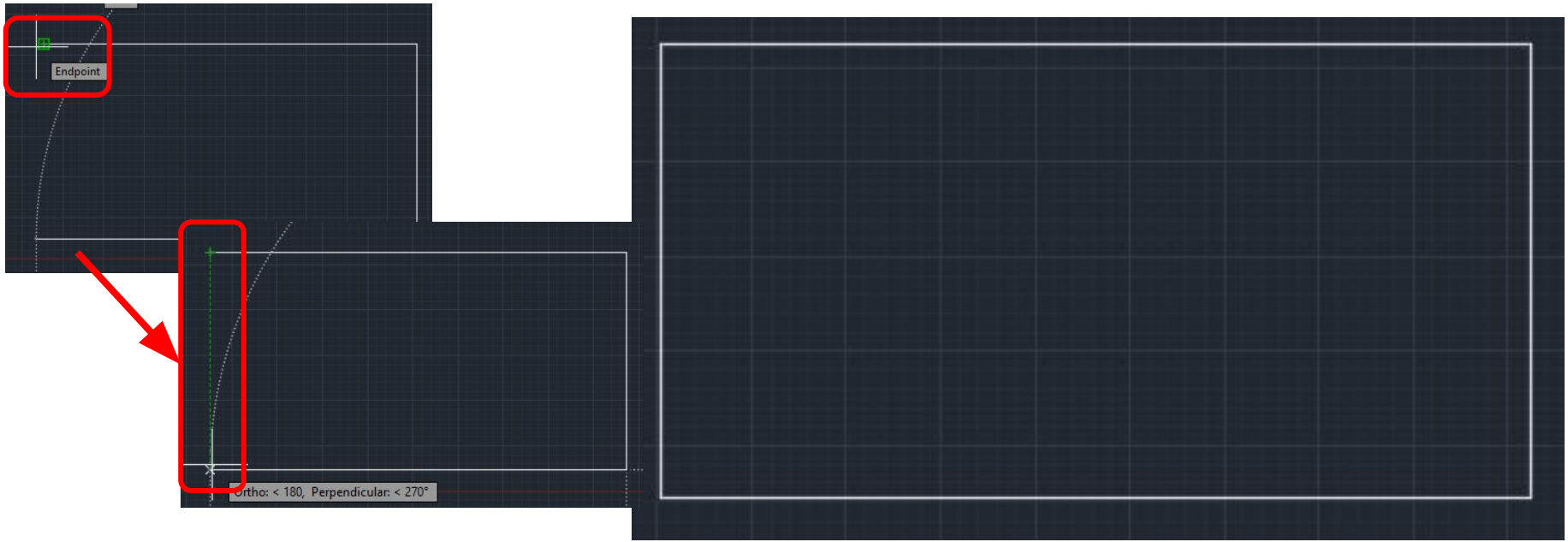
Floors 3 - 13
4 Single Occupancy bedrooms in a Shared Apartment

Drawing the Exterior Walls

Under
"Home" tab,
select
"Polyline"



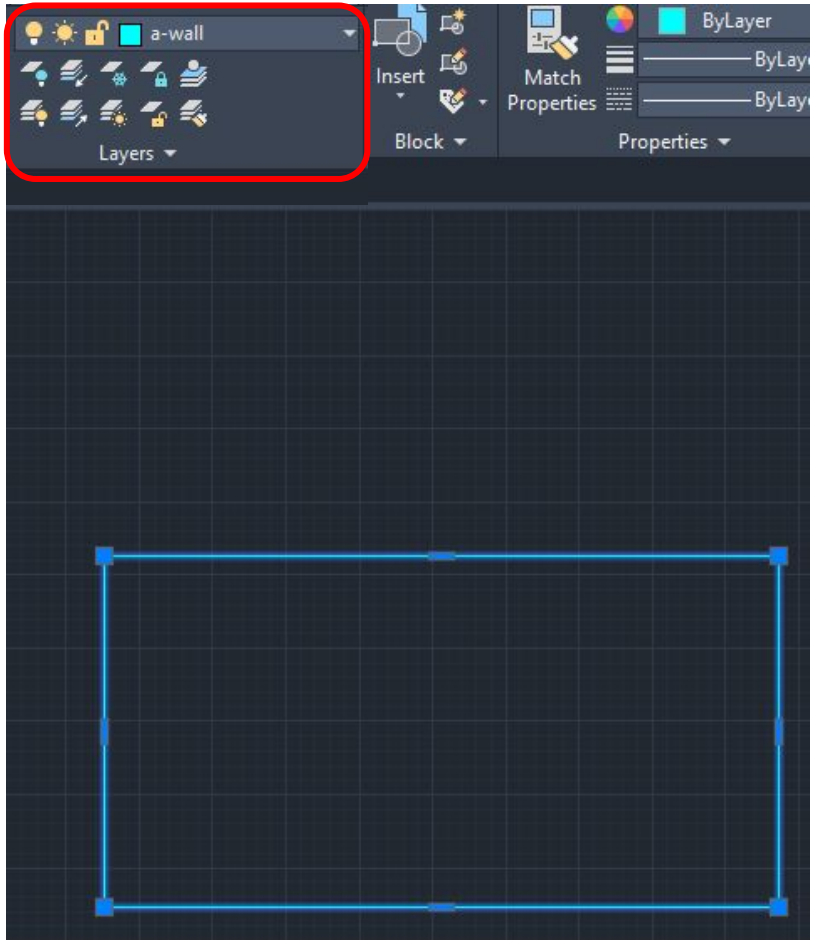
Use the *polyline* to draw the 4 sides of the exterior walls by *typing* in specified length each time & pressing *enter* respectively



Note*: Turn Object Snap Tracking (F11) on to get the dotted green line in the second image

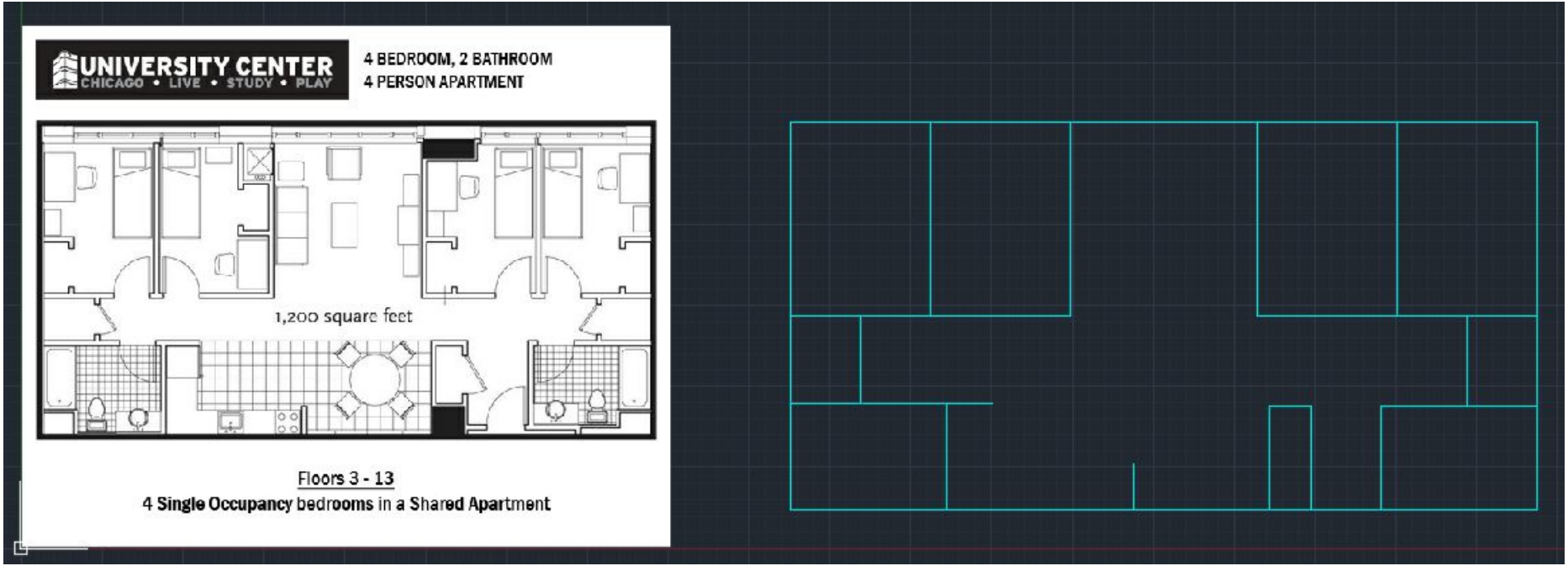
Optional Step: To switch a part of a drawing to a different layer, simply *Select* the *desired object(s)* & *Select* the *desired layer*

Note*: Do this step if you accidentally draw in the wrong layer.



Drawing the Interior Walls

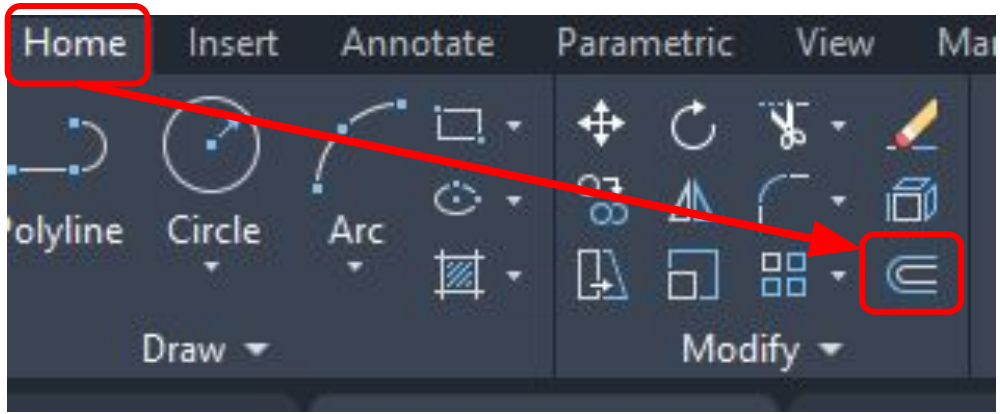
Use *Line* (“l”) under “Home” tab to draw the interior walls

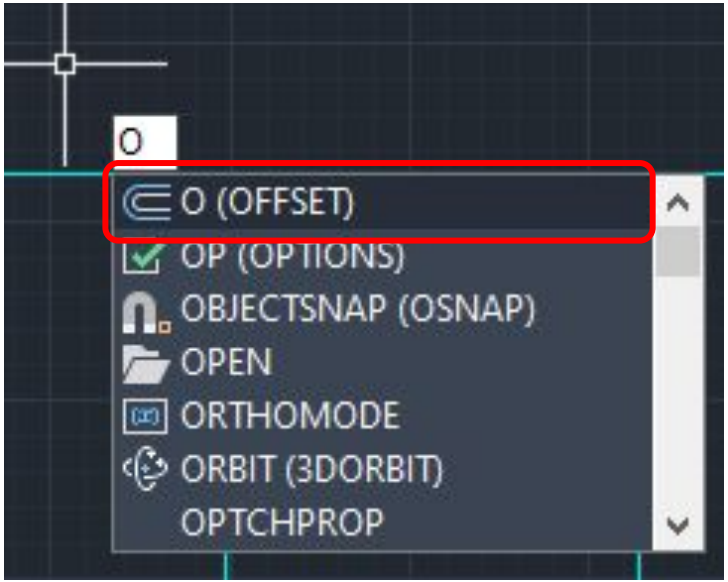


Note*: To repeat the line command, either press *“ESC”* or click on the *“Line”* command again. The drawing does not need to exactly match the image.

Offsetting Walls

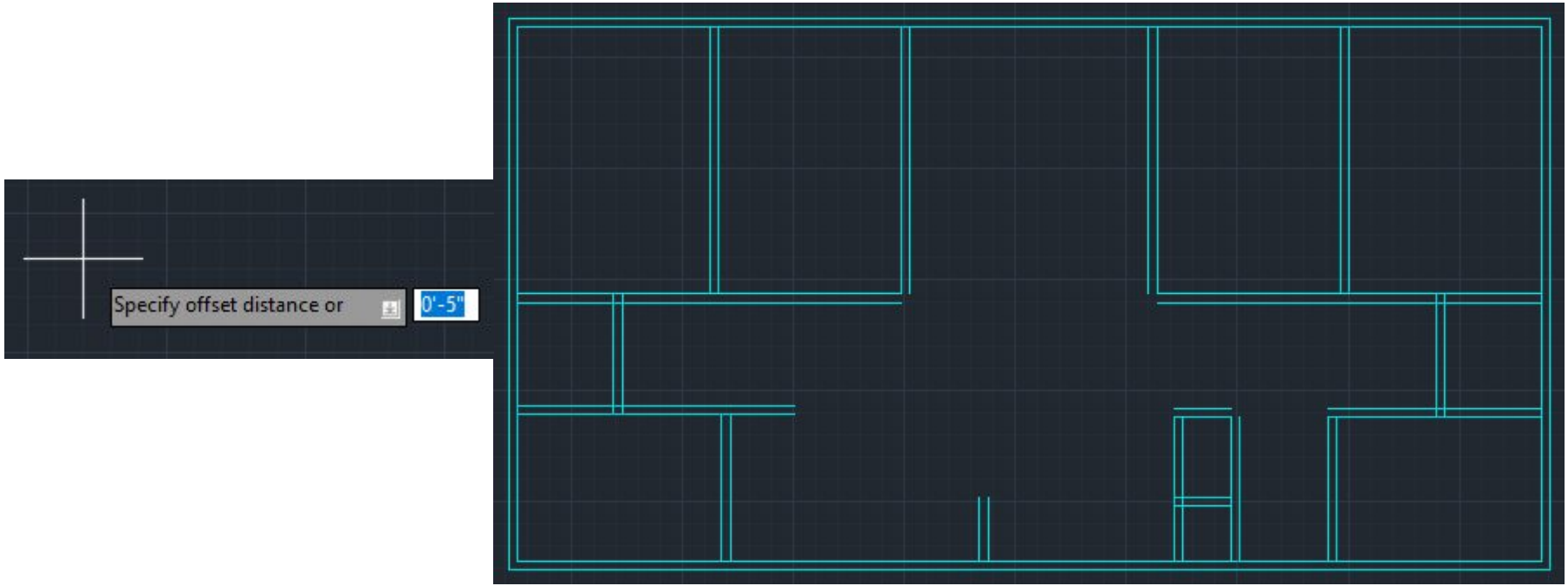
Draw the thickness of the walls using *"Offset"* by typing in *"o"*





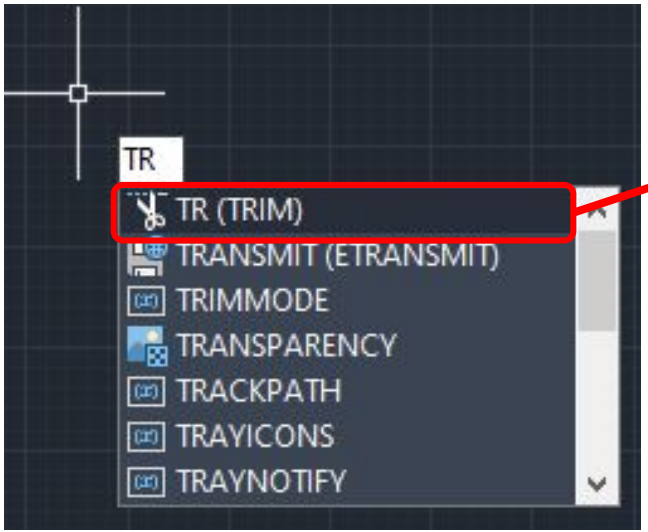
Note*: This step is necessary because this is to make space for things like electrical wires, insulation, & pipes.

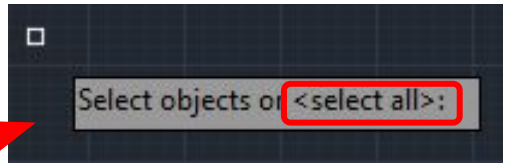
Type in desired *offset distance (5")* & offset all the lines to create wall thickness



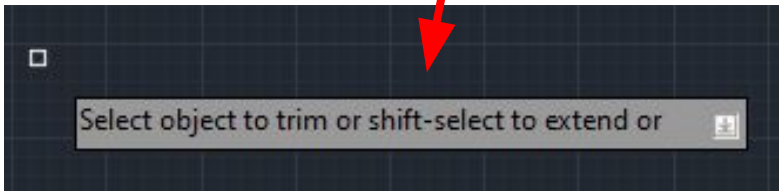
Trimming & Extending Walls

Type in *"tr"* for *trim*, press *"enter"* to select the *"<select all>"* option & trim all unnecessary line segments

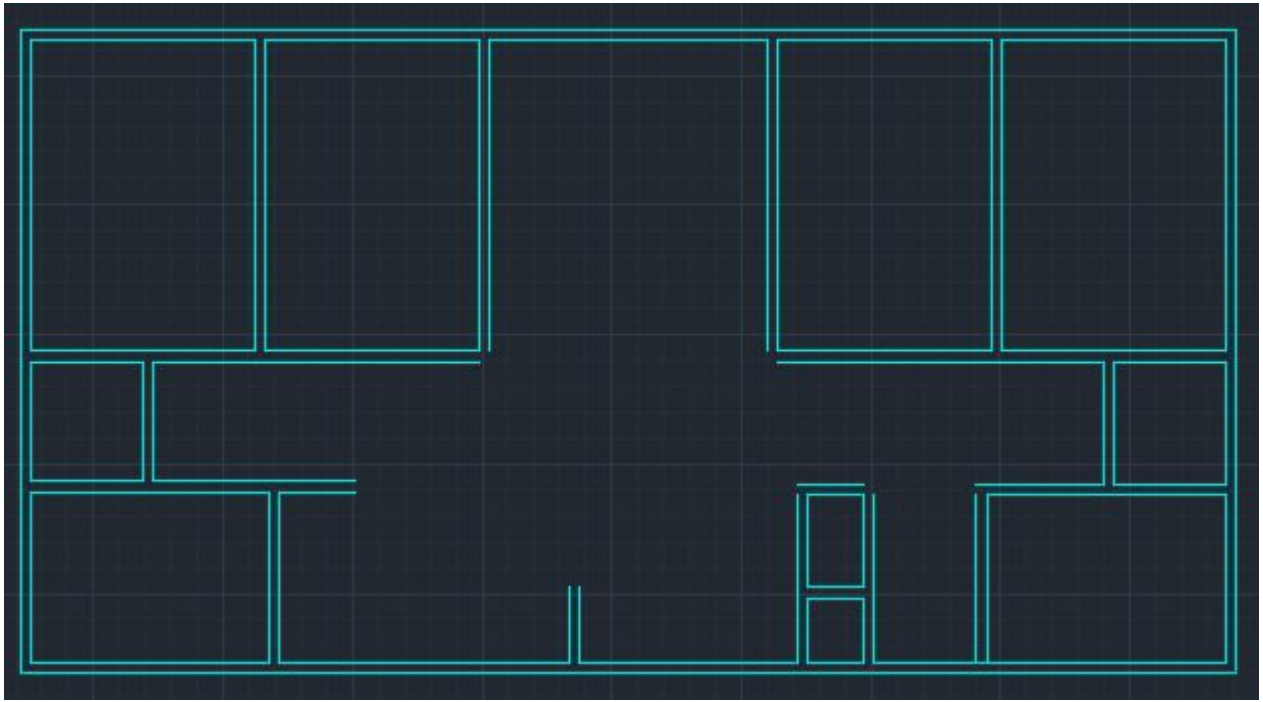




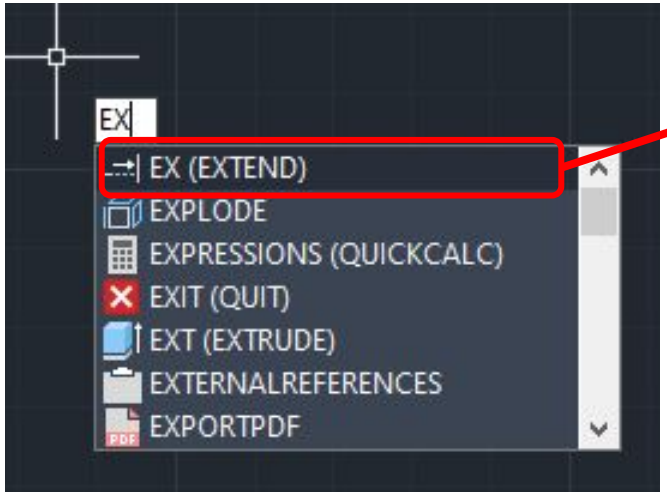
Press "Enter" for "<select all>"

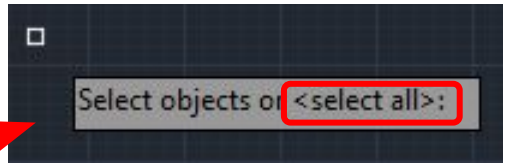


Result of walls trimmed

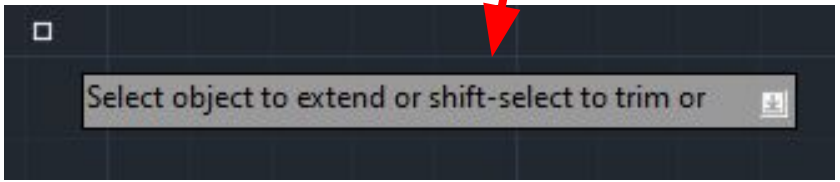


Stay in trim command & *"shift-select"* to *extend* lines OR exit out of command & type in *"ex"* for *extend* to connect up wall corners

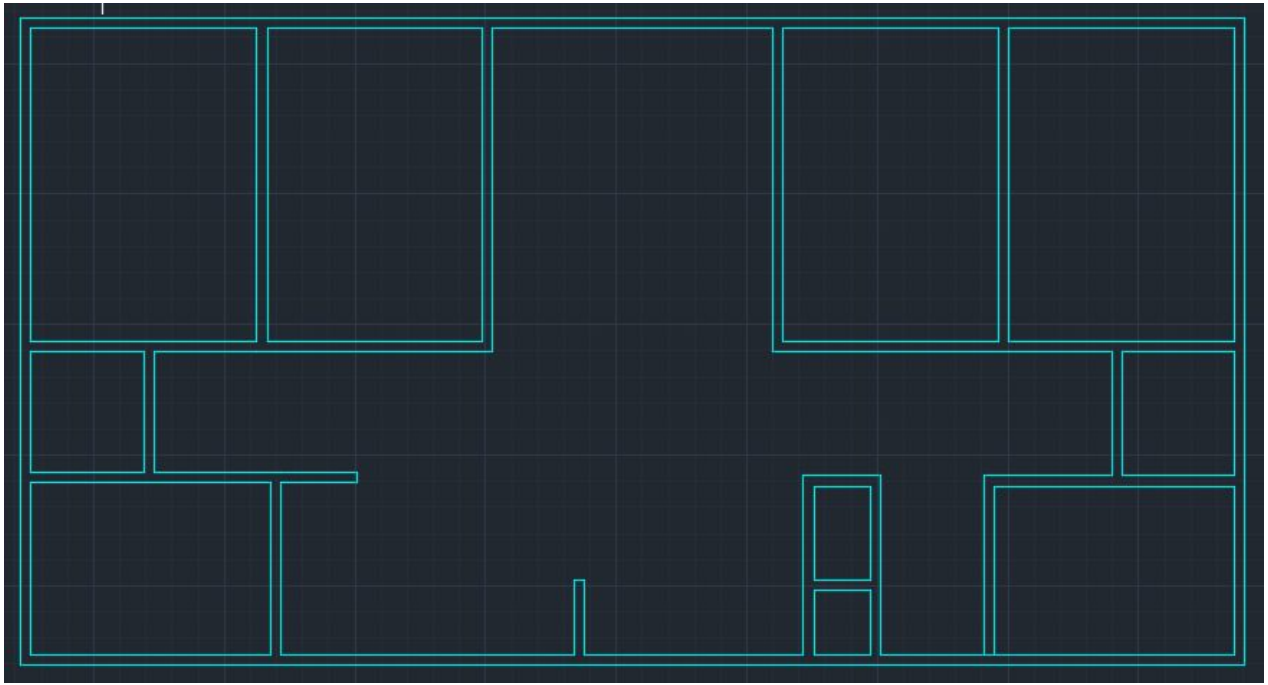




Press "Enter" for "<select all>"



Result of walls extended & connected

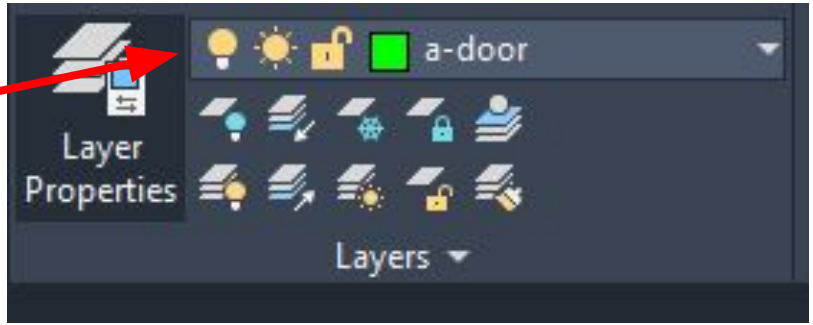


Note*: After extending all that could be extended, use the line command to connect some of the walls & manually extend the rest of the lines to meet at the corners.

Adding Doors

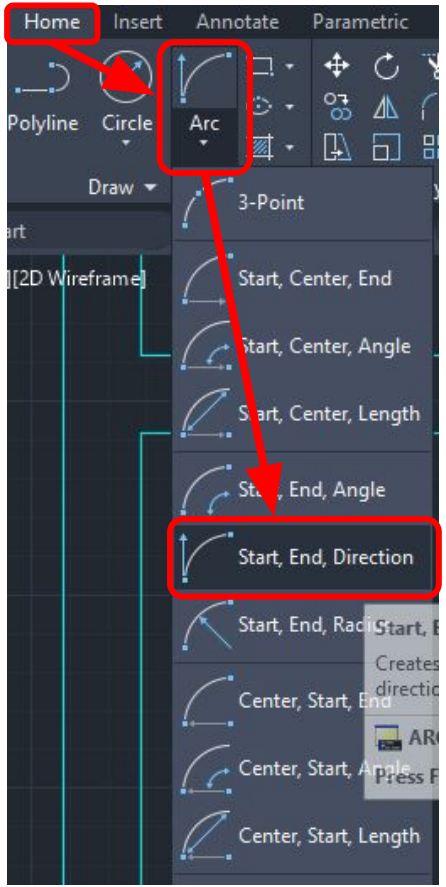
Create *new layer*, name it *"a-door"*

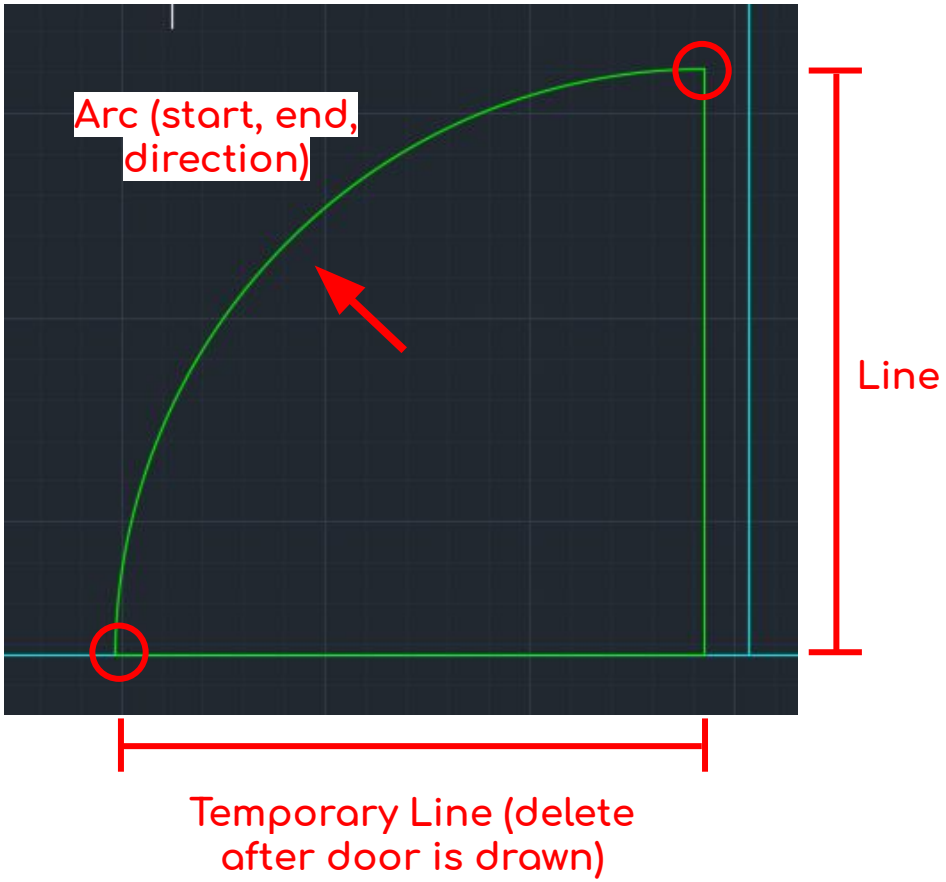
a-door as
current layer



Note*: Feel free to customize the other components of the layer (color, linetype & lineweight) & make sure the *current layer is set to Door*

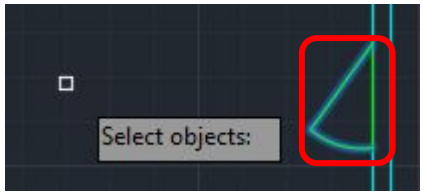
Draw *doors* using *"line"* & *"arc" (start, end, direction)*



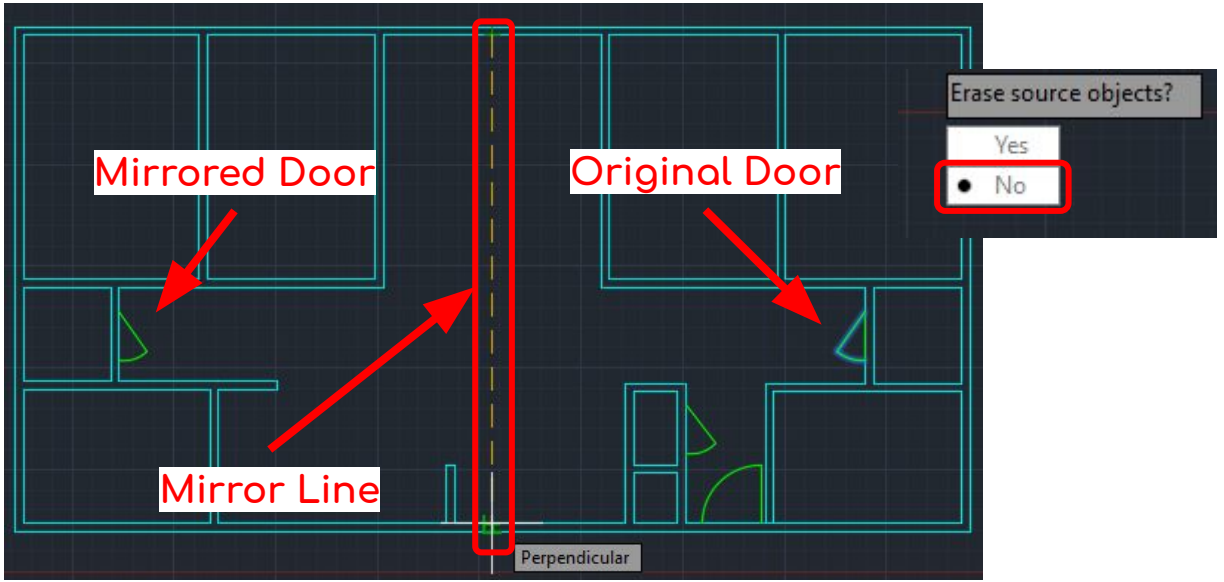


Note*: It is recommended to measure out two lines (as shown above in green) & then use the arc command.

Type *"mi"* to *mirror* certain doors to save time & effort

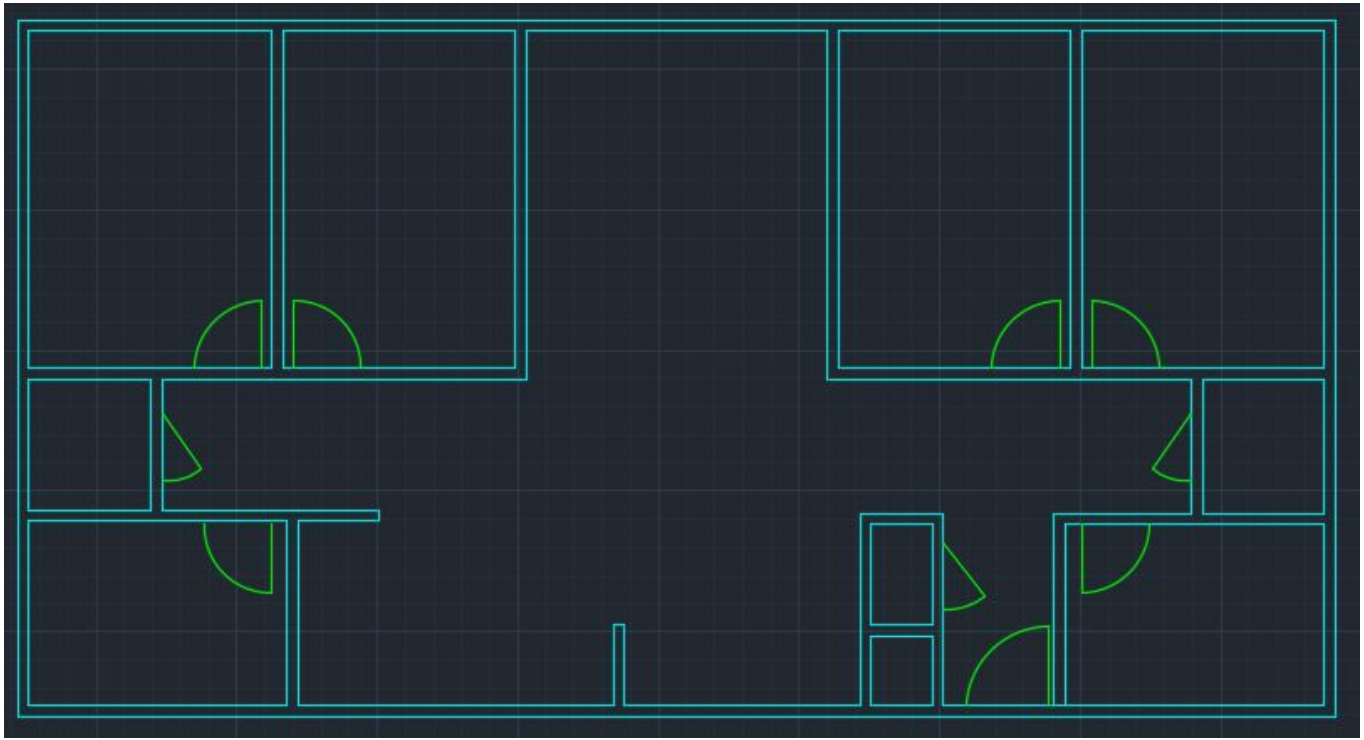


Press "Enter" after objects selected



Note*: In this case, applies to *bedroom, bathroom, & hallway closet doors*. Some doors may require turning *ortho (F8) on/off*.

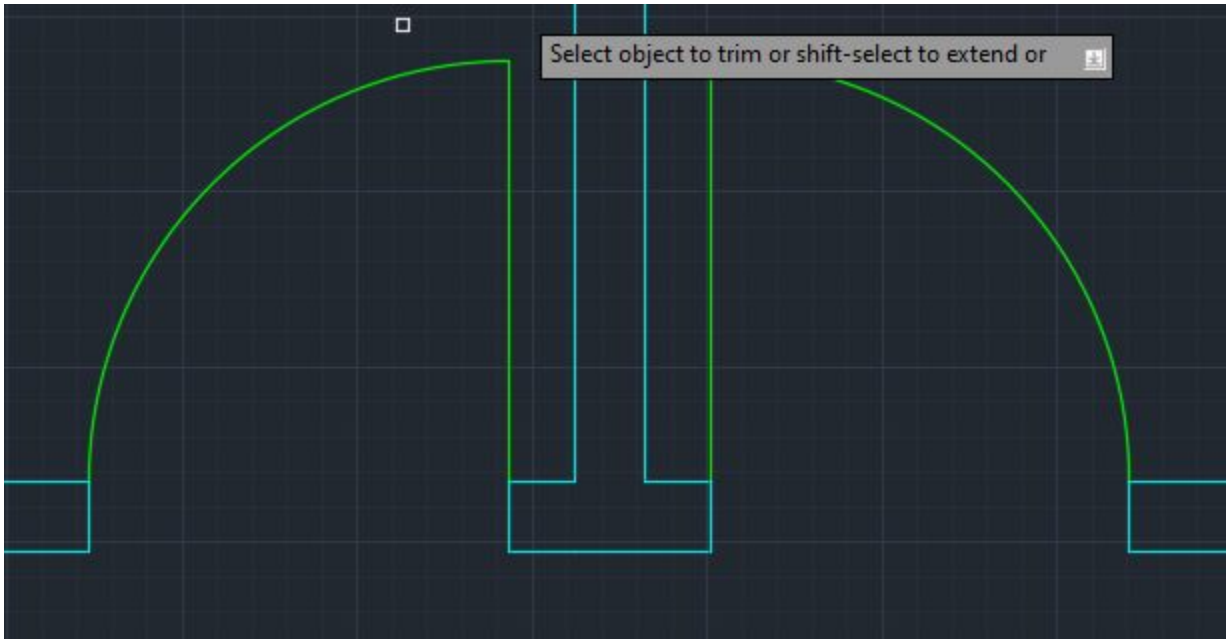
Result of all doors drawn



Note*: Made the *front door (exterior) 36" or 3'* & *all interior doors 30" or 2'6"*. Turn *ortho (F8)* on/off as needed.

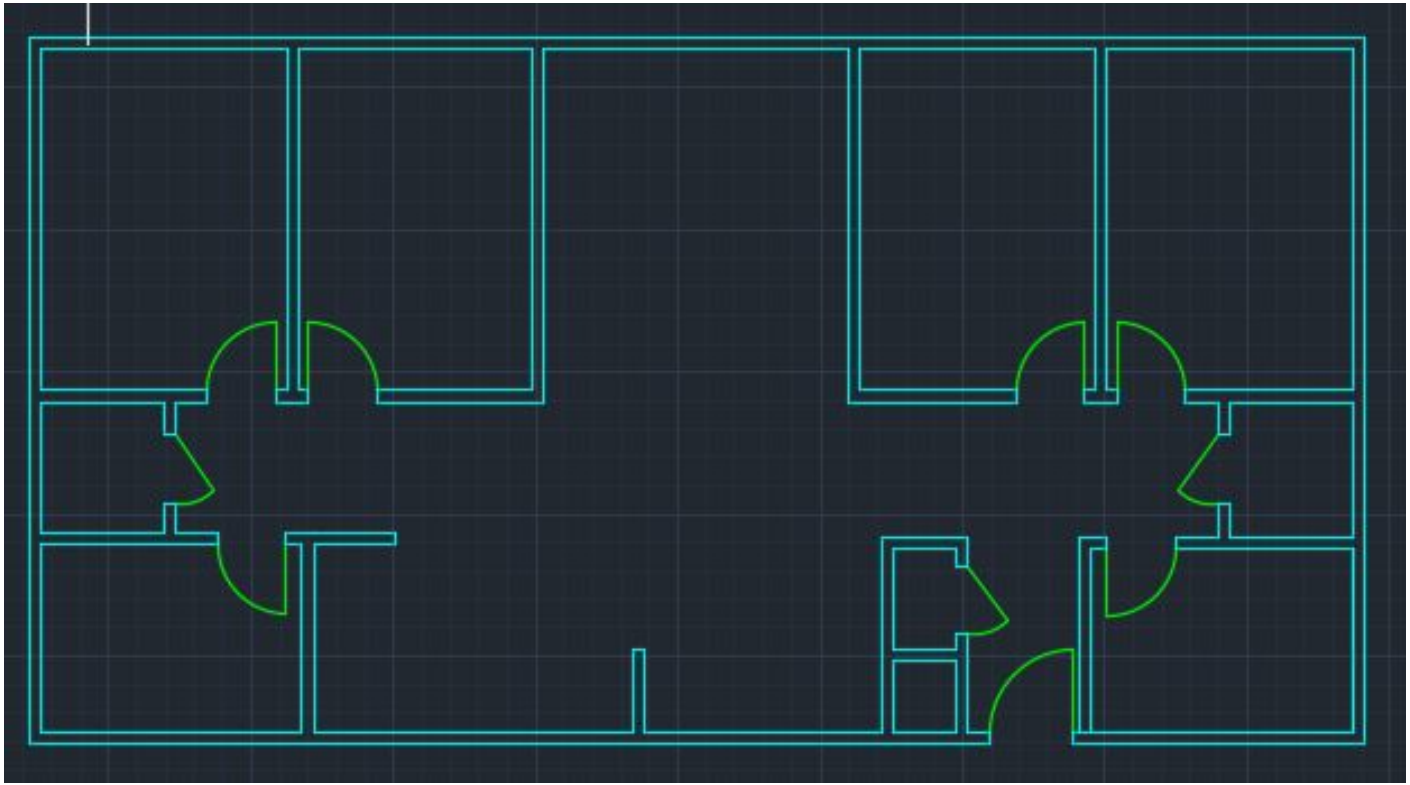
Cut out Walls for Doors

Draw *lines* marking the ends of the doorways then *trim* the excess lines



Note*: Do this step in the *"a-wall"* layer

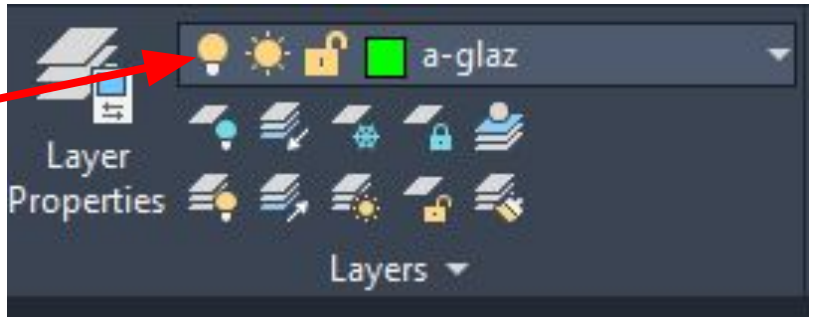
Result of all doorways created



Adding Windows

Create *2 new layers*, name them *"a-glaz"* & *"a-glaz-sill"*

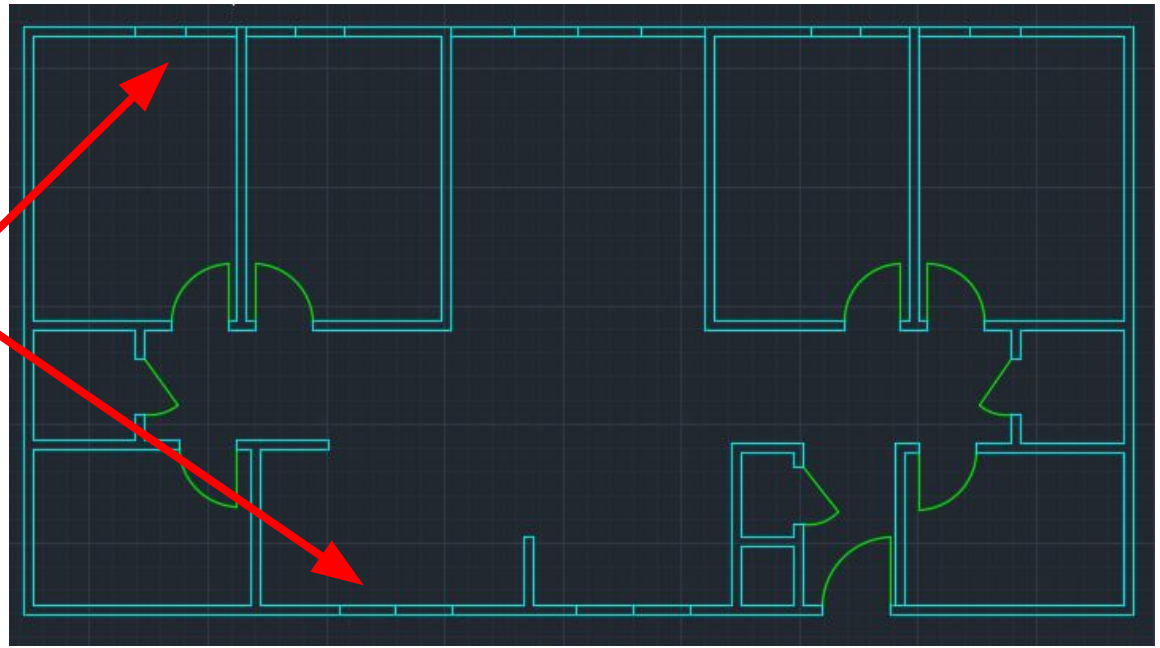
a-glaz as current layer



Note*: https://ppc.ucsc.edu/consultants/images/12part8layering.pdf (refer to pages 1-4) to understand why these layers were named the way they are.

Draw *lines* to mark where the walls end & the windows start

Lines marking window placement



Some of the lines are temporary & will be removed in future steps.

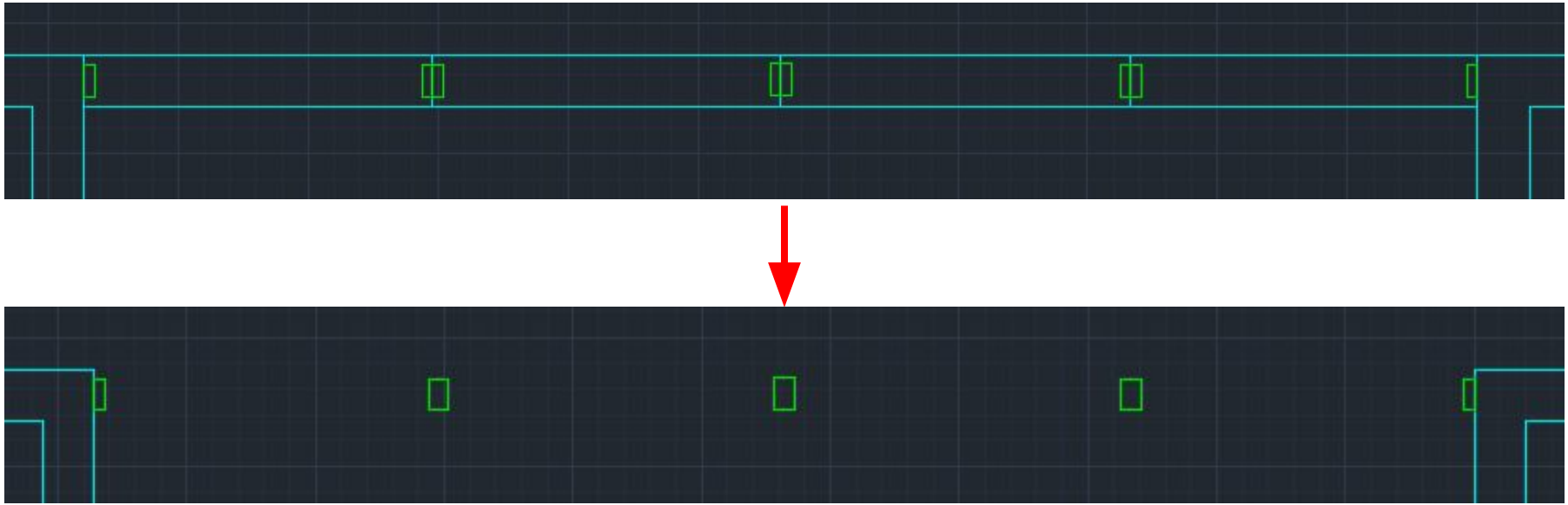
Note*: Go to layer *"a-wall"* for this step. Windows do not need to match the image. Make sure *ortho (F8)* is on.

Set to layer *"a-glaz"* & use the *"polyline"* for window frames to create rectangle

Note*: Make *length* of rectangle *3" long* & the *width 1" wide*. Utilize *copy/paste* once one rectangle is created

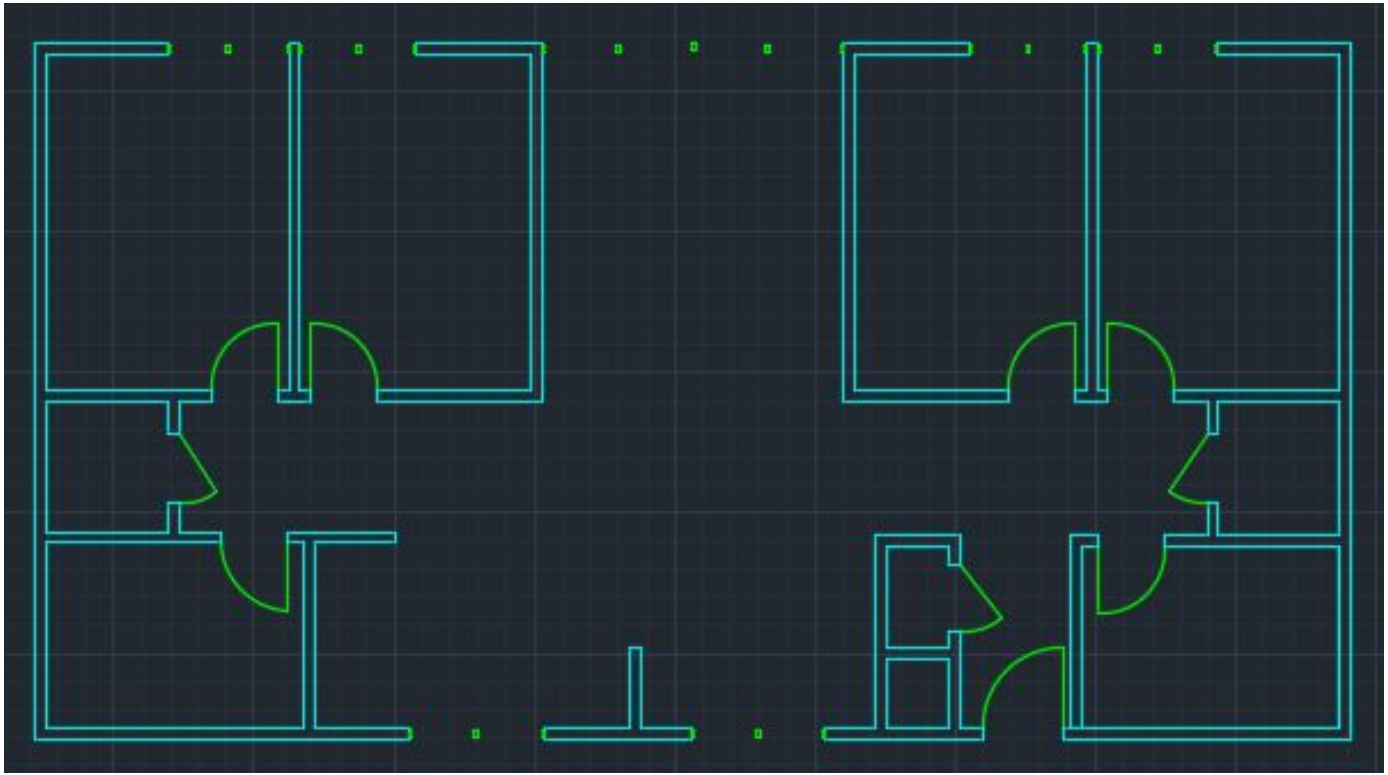
Use *“move” (m)* command to move the newly created frames to the desired location

For frames not connected to walls, *trim* excess lines



Note*: Make sure to also *delete* any excess lines.

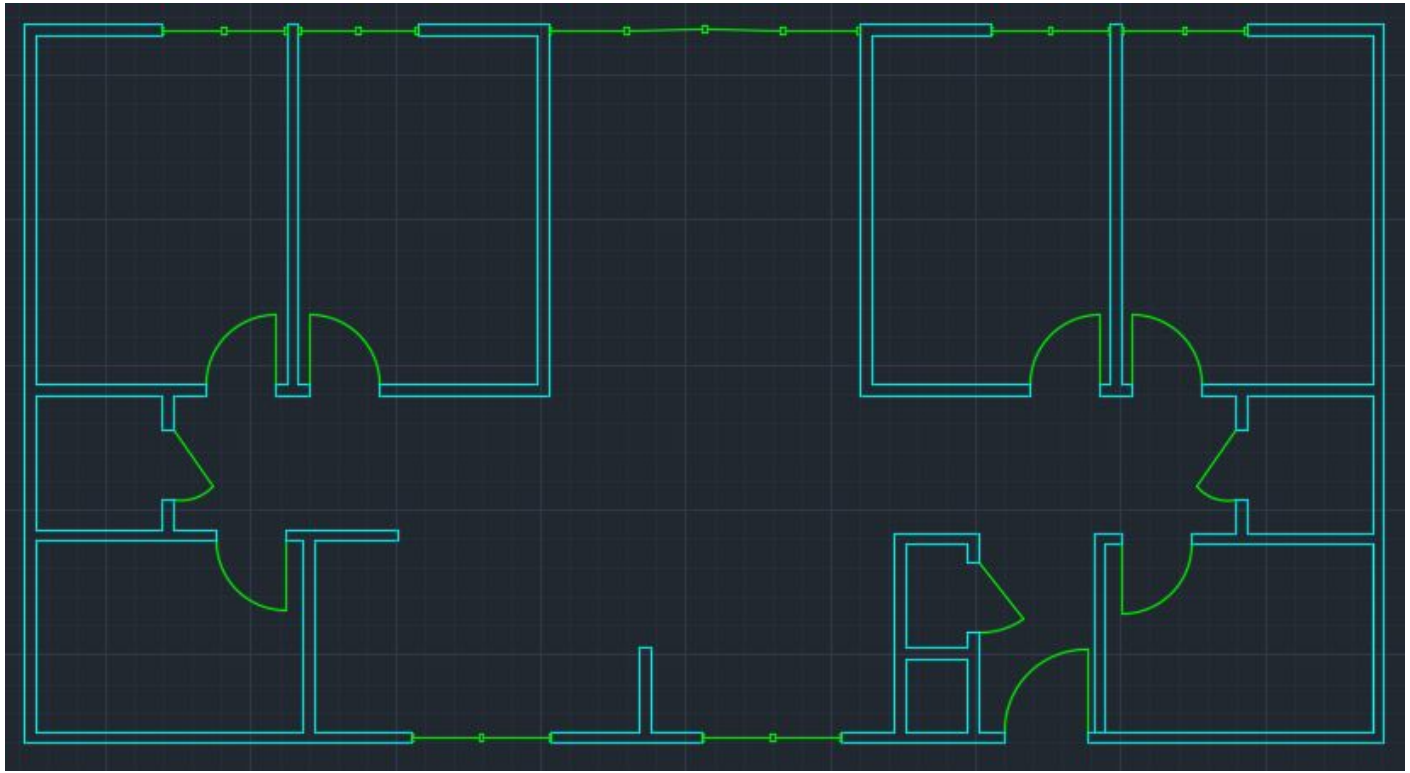
Result of window frames completed



Stay at layer *"a-glaz"* & use the *"line"* for the windows' glass

Note*: Make sure *o-snap (F3)* is *on* and *midpoint* is checked. Connect *lines* at *midpoints* of each frame.

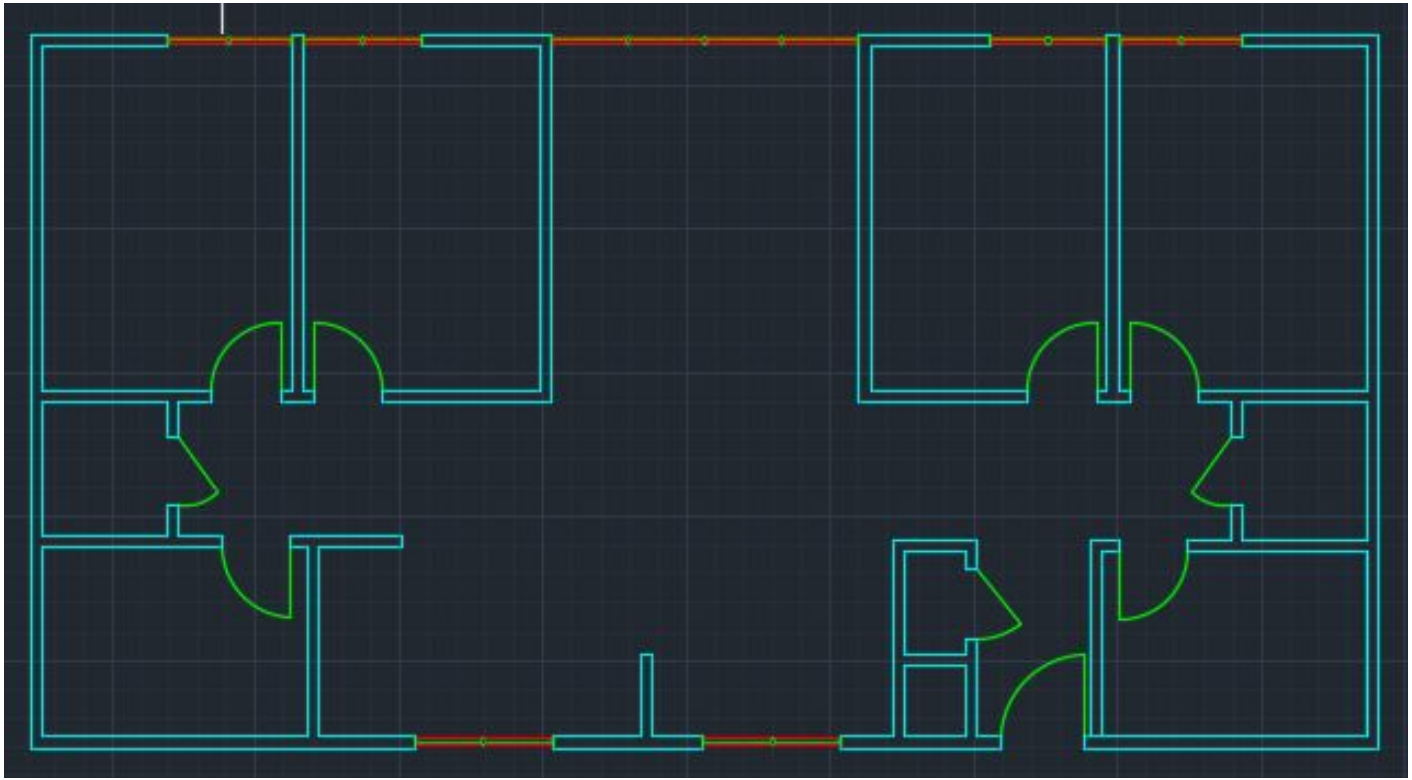
Result of windows' glass placed



Go to layer *“a-glaz-sill”* & use the *“line”* for the window sills

Note*: Make sure *o-snap (F3)* is *on* and *endpoint* is checked. Connect *lines* at *endpoint* of each frame.

Result of window sills placed



Adding Furniture

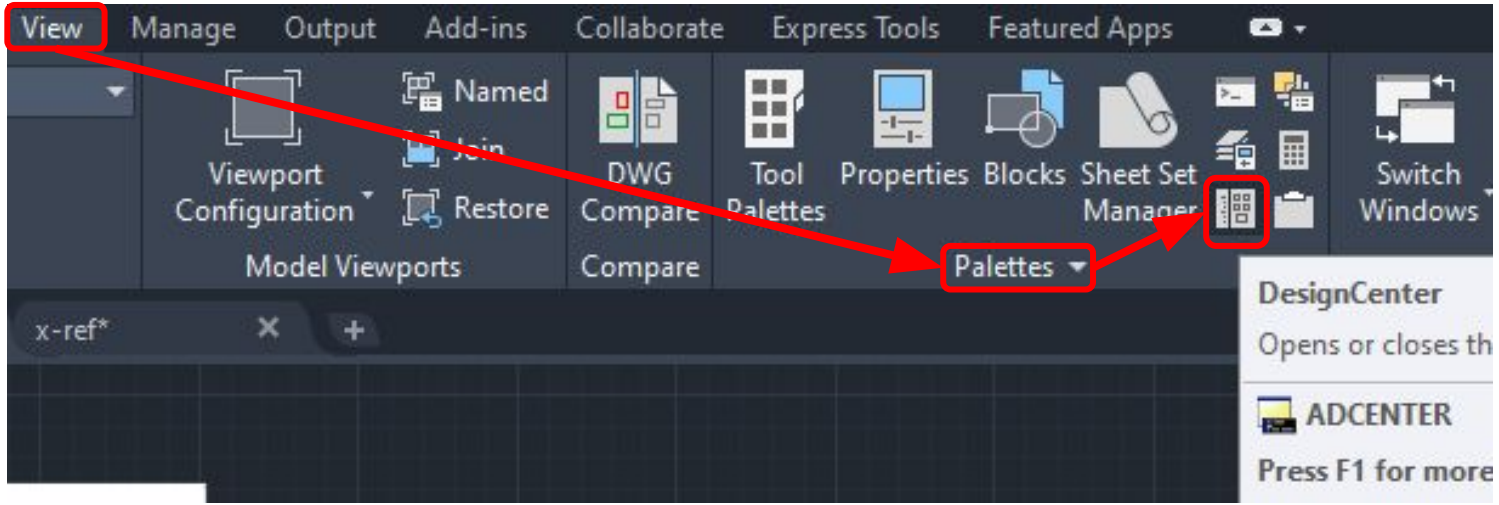
(This includes: tables, beds, tv, sofas, etc.)

Create a *new layer*, name it *"a-furn"*

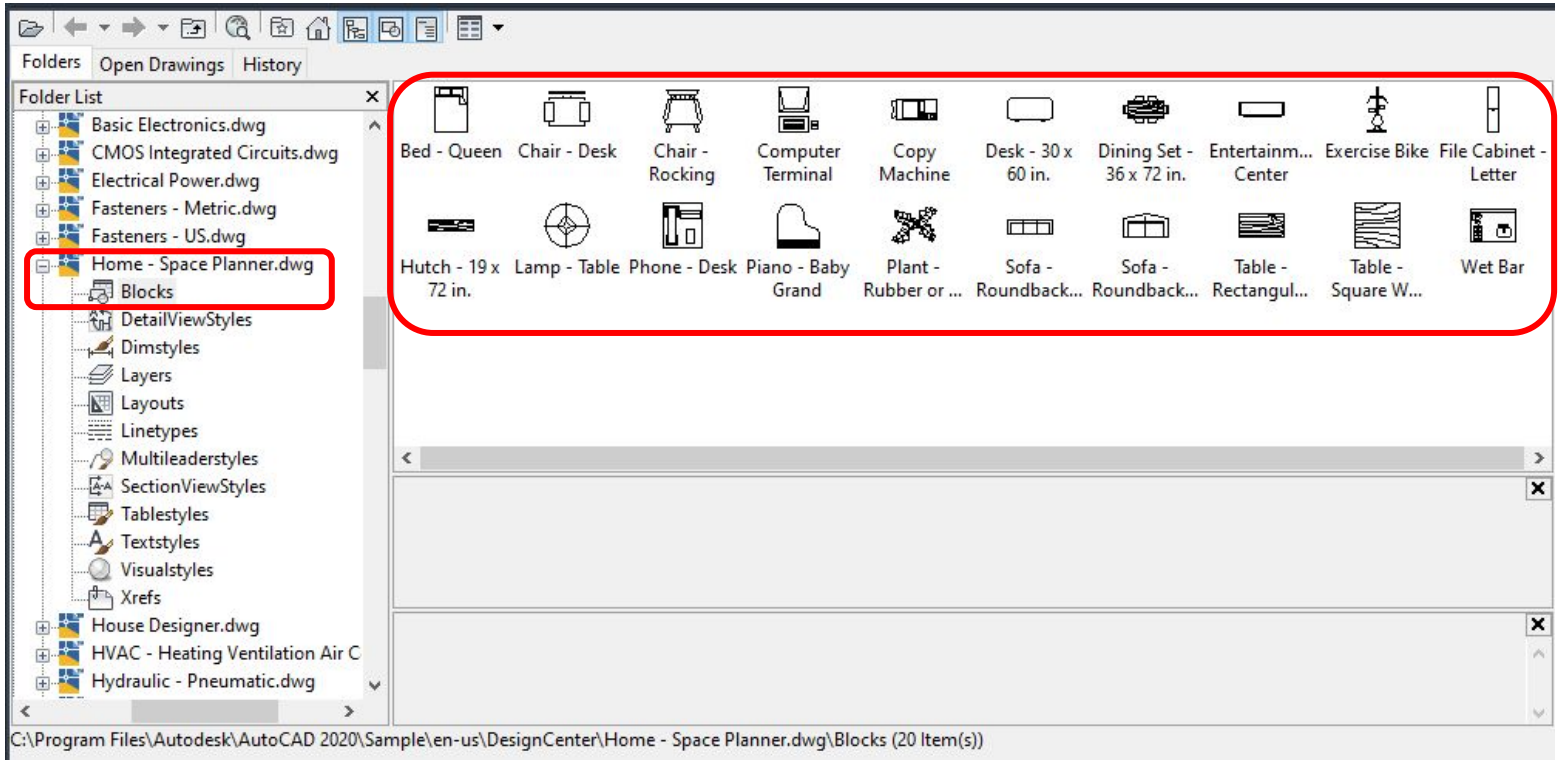
a-furn as current layer

Note*: https://ppc.ucsc.edu/consultants/images/12part8layering.pdf (refer to pages 1-4) to understand why the layer was named the way it is.

Go to the *"View"* tab & under *Palette*, select *"DesignCenter"*

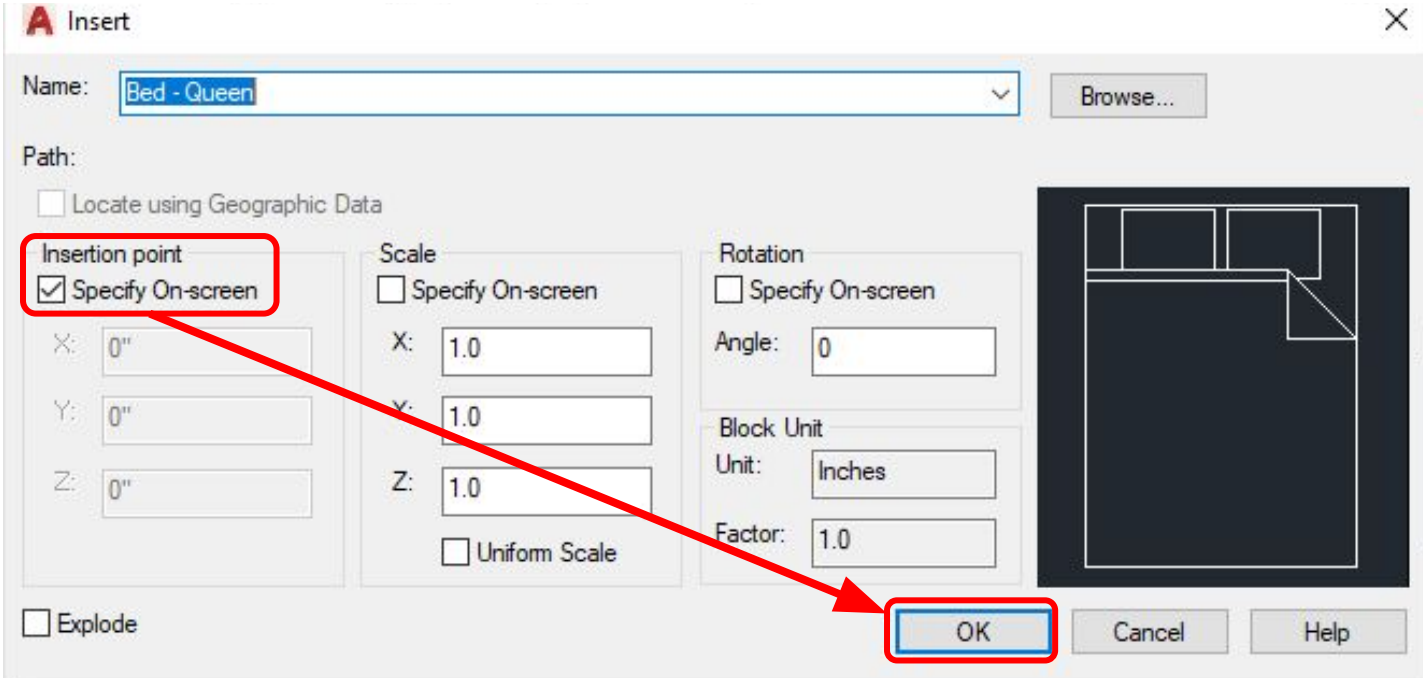


Selecting *"DesignCenter"* will give you this:



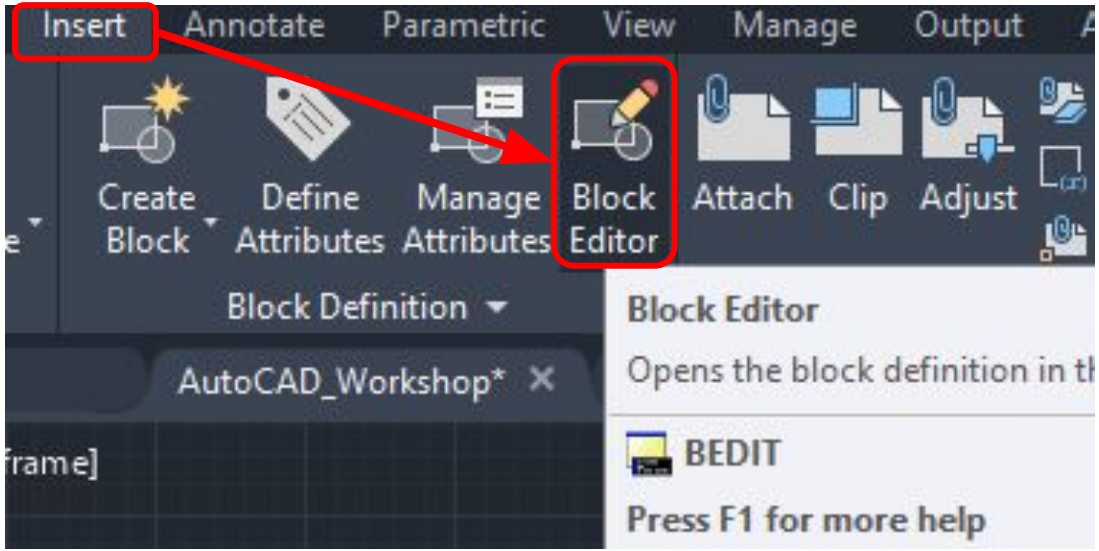
Note*: *Navigate* to this view. Both *"Home-Space Planner.dwg"* & *"House Designer.dwg"* are good options for furniture.

Double-click on *"Bed-Queen"* & this will pop up

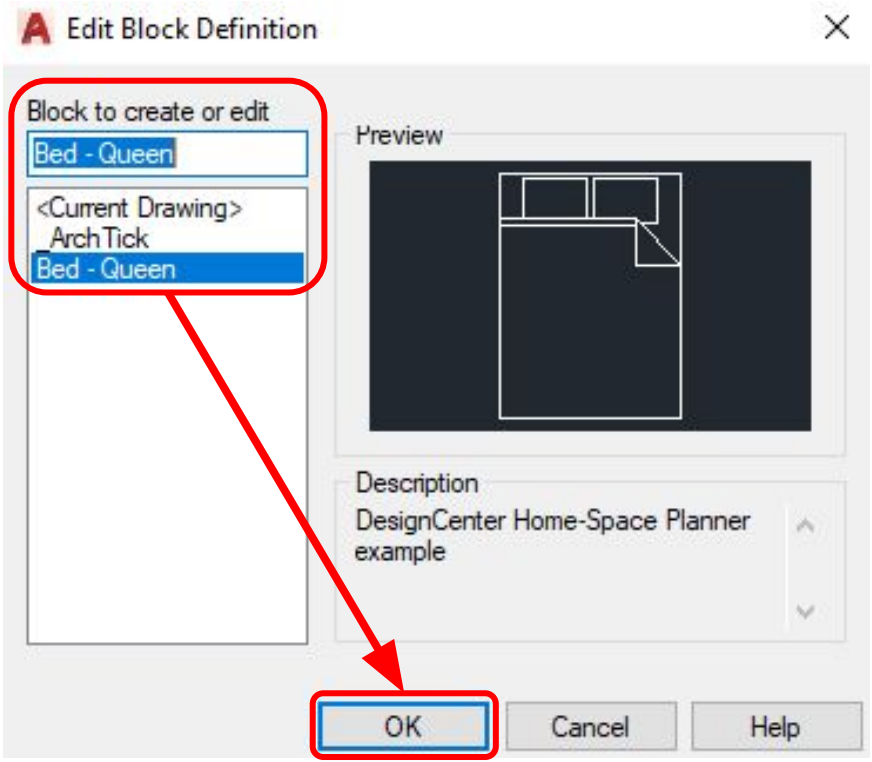


Note*: Make sure *"insertion point - specify on-screen"* is checked.

Temporarily place Bed-Queen in the drawing then Go to *"Insert"* tab & select *block editor*

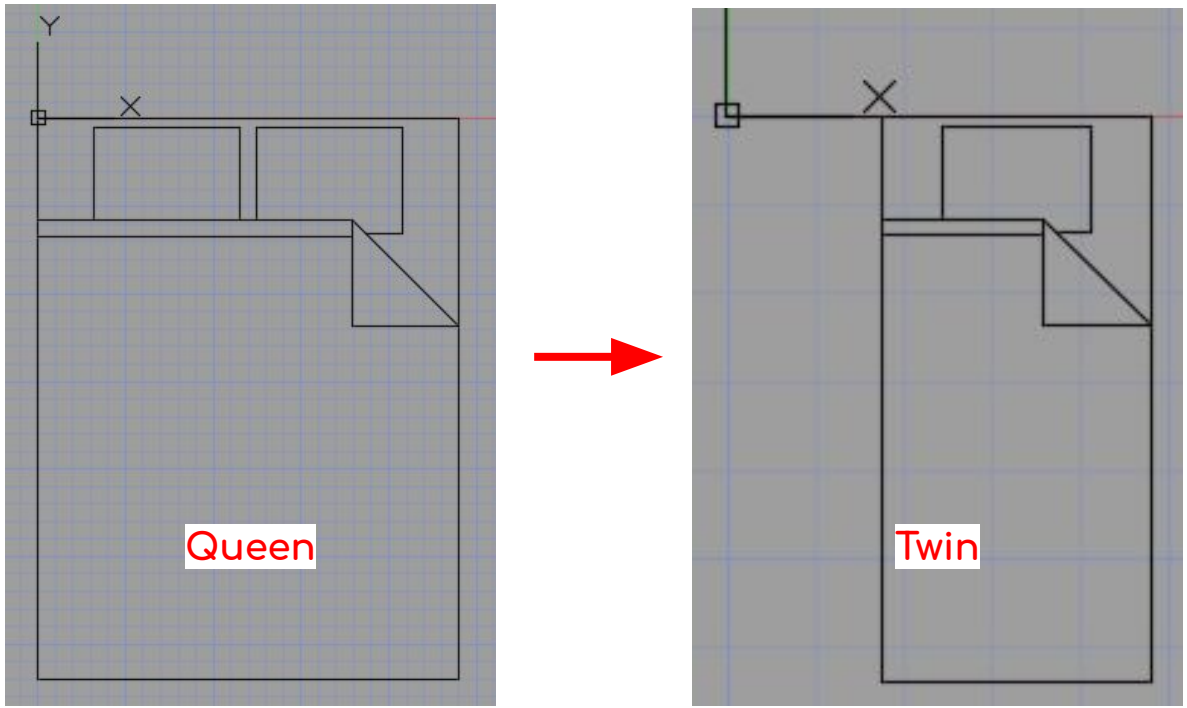


Selecting
block-editor
pops up this:



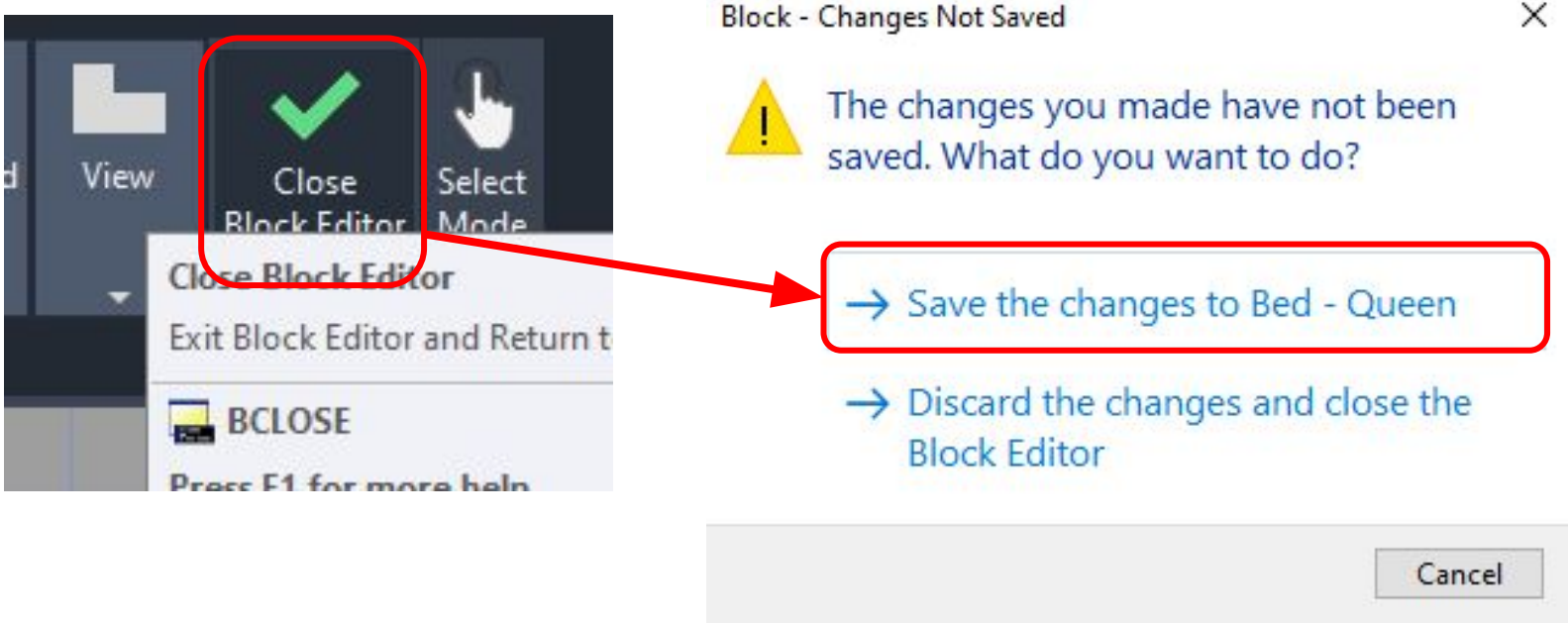
Note*: Select *Bed-Queen* to edit and click *"OK"*

Edit Bed-Queen Block to desired dimensions

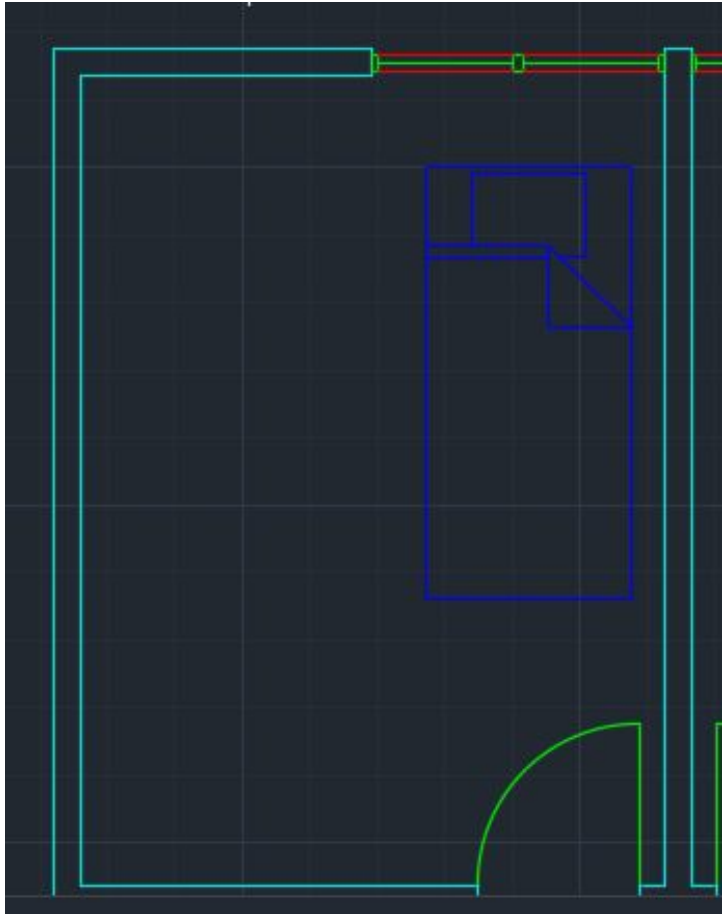


Note*: Standard UCSD *twin* size bed is *38" wide by 83" long* (headboard to foot board)

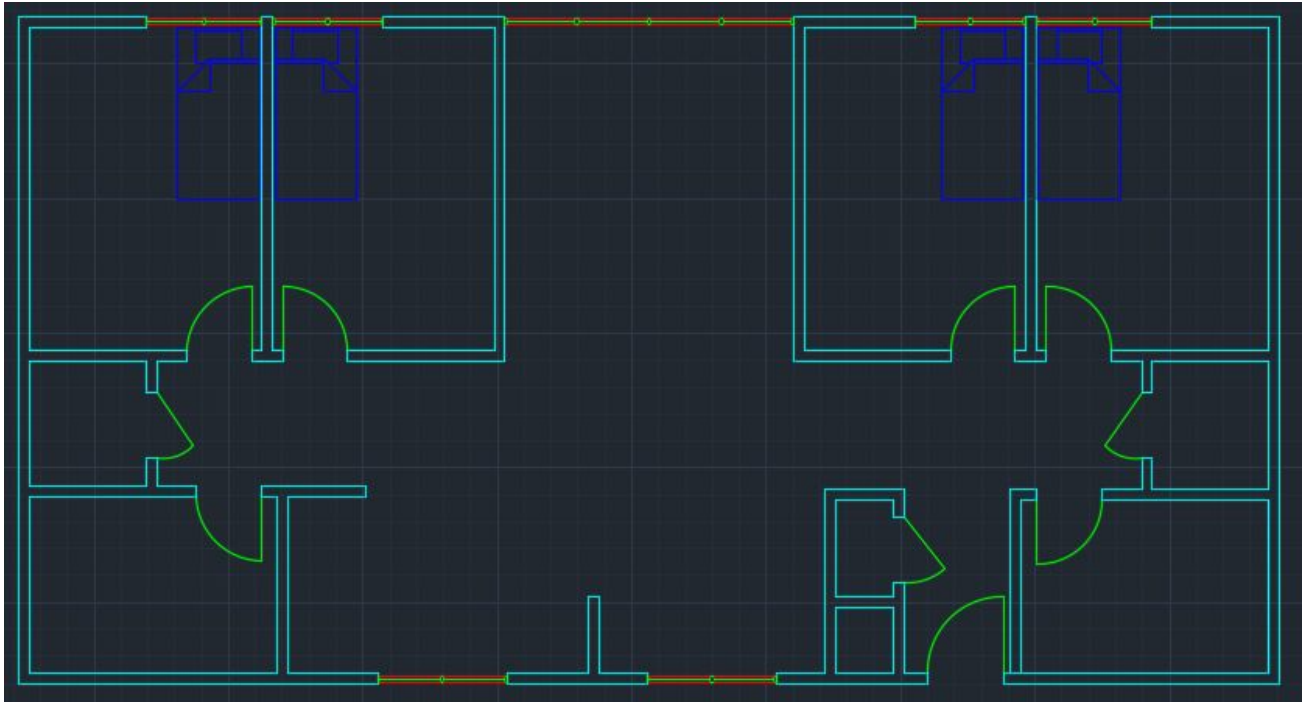
Close Block-Editor & *Save* Changes



Result of
Edited Block

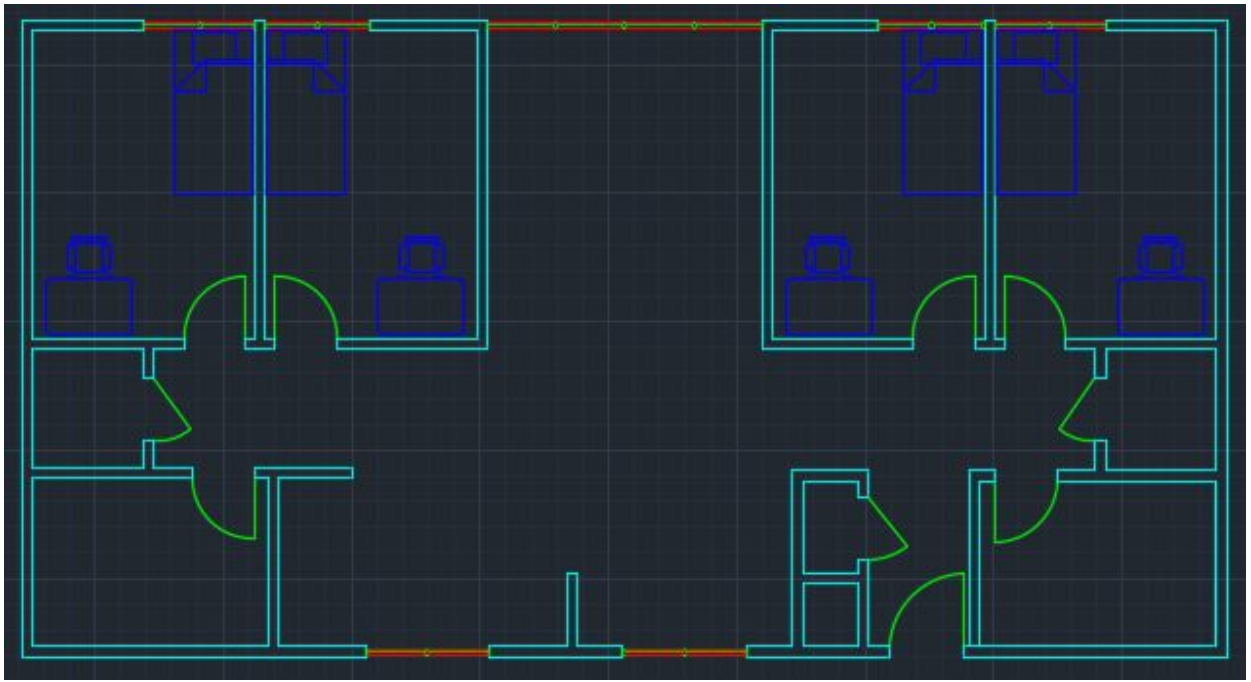


Move bed to desired location (See Result)



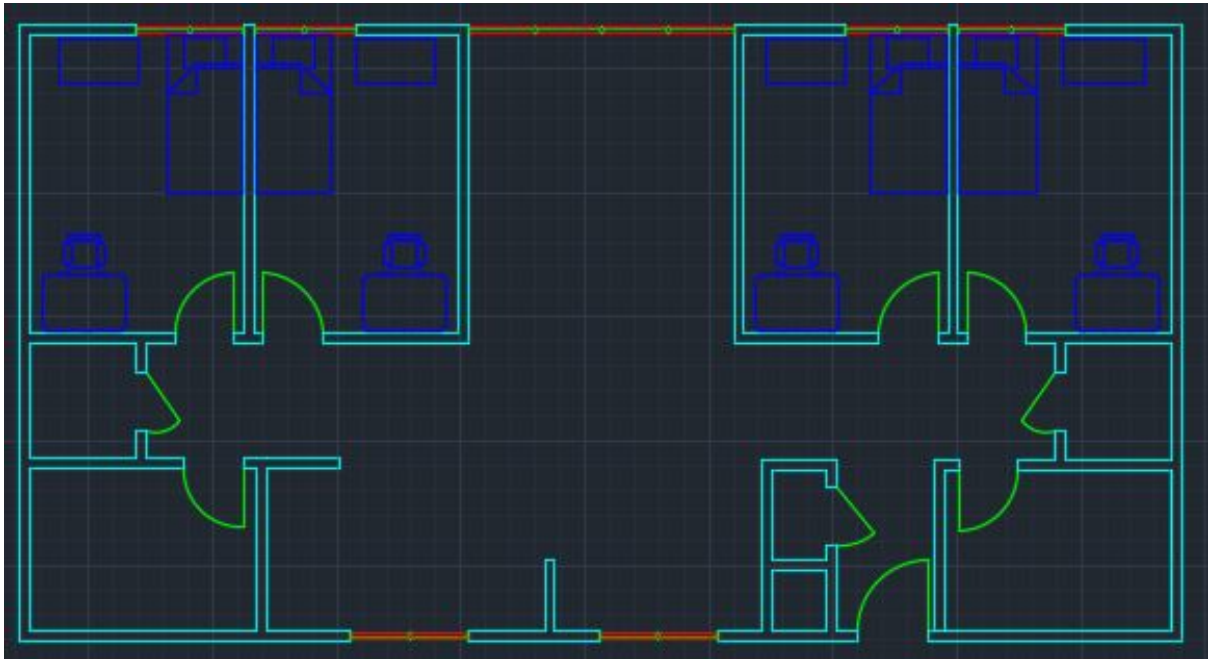
Note*: Utilize *Copy/Paste* to duplicate the bed & *move/mirror* all beds to desired locations.

Go to *DesignCenter* & bring in *Desk - 30 x 60in* & *Chair - Desk* (see result)



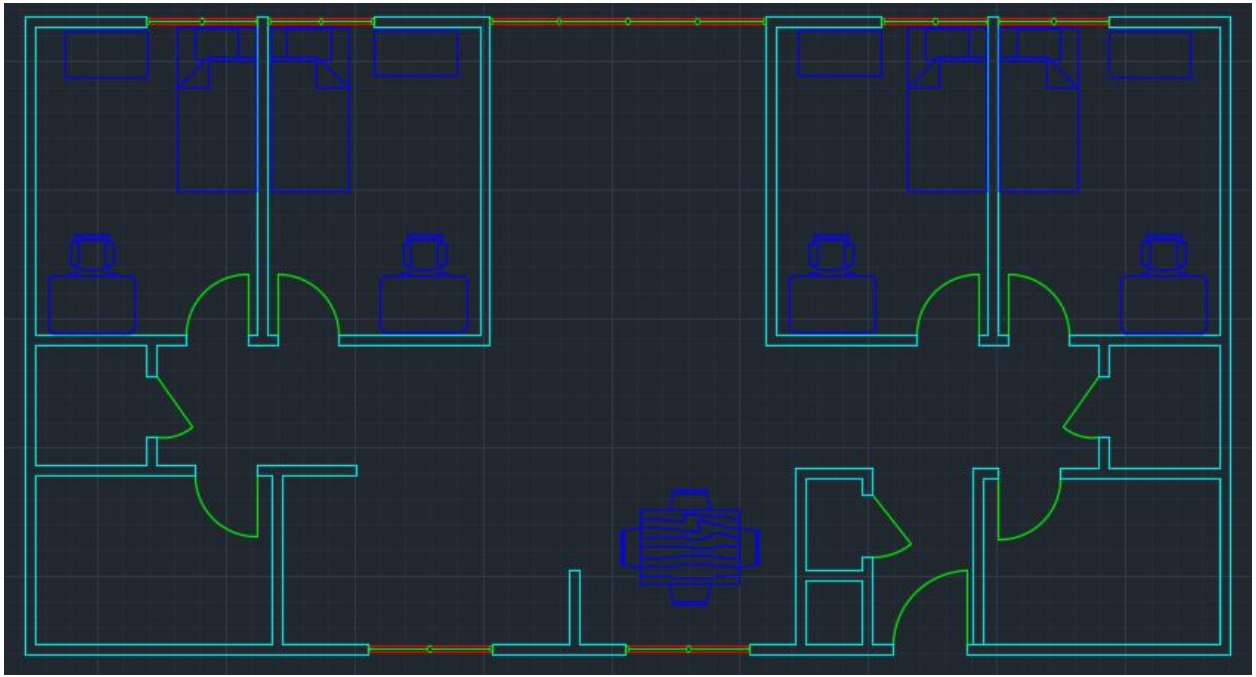
Note*: *Edit Desk* to *28" deep* by *42" wide*. Utilize *Copy/Paste* & *move/mirror/rotate* for these pieces of furniture.

For wardrobe next to bed, simply use *polyline* to draw a *rectangle* (see result)



Note*: Draw *rectangle 22" deep* by *40" wide*. Utilize *Copy/Paste* & *move/mirror* as needed.

Go back to design center & bring in *"dining set - 36 x 72in"* & edit it if desired (see result)



Note*: *Table for 4* could be *48" by 36"*. Can use *rotate/move* to place edited table as desired.

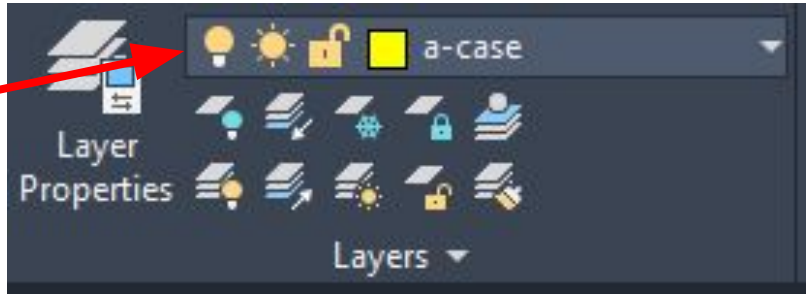
For the living room furniture, *try it yourself!* If DesignCenter doesn't have what you are looking for, create it yourself. *(example shown near end of PDF)*

Adding Casework & Appliances

(This includes: countertops & vanities; refrigerator, stove, washer, dryer, etc.)

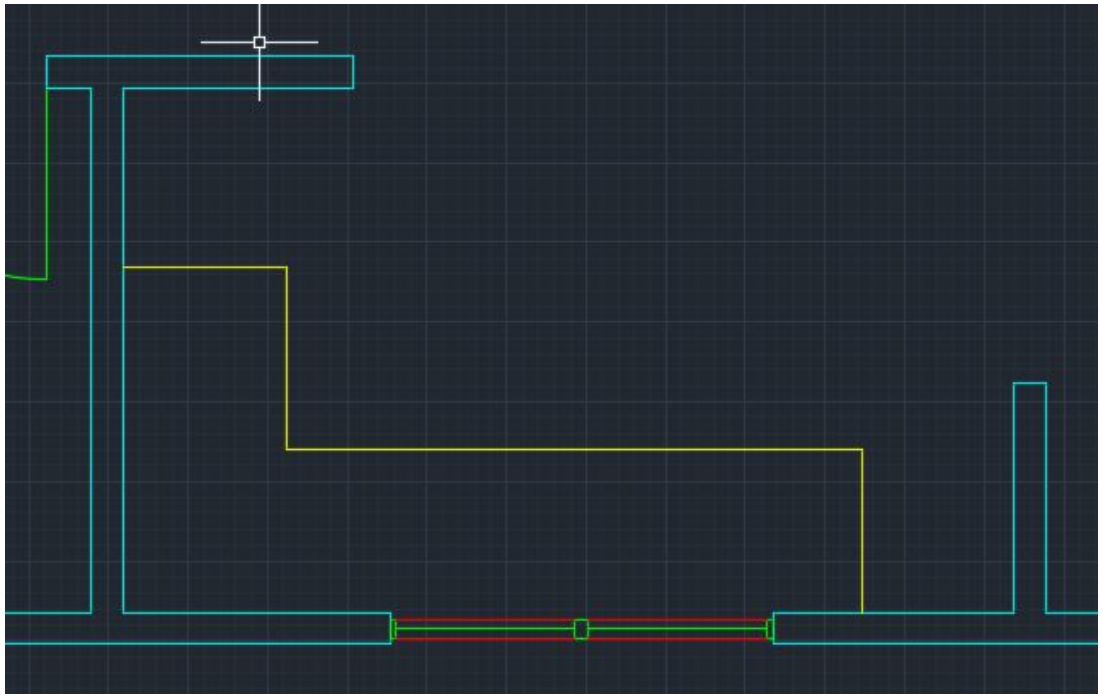
Create *2 new layers*, name them *"a-appl"* & *"a-case"*

a-case as current layer



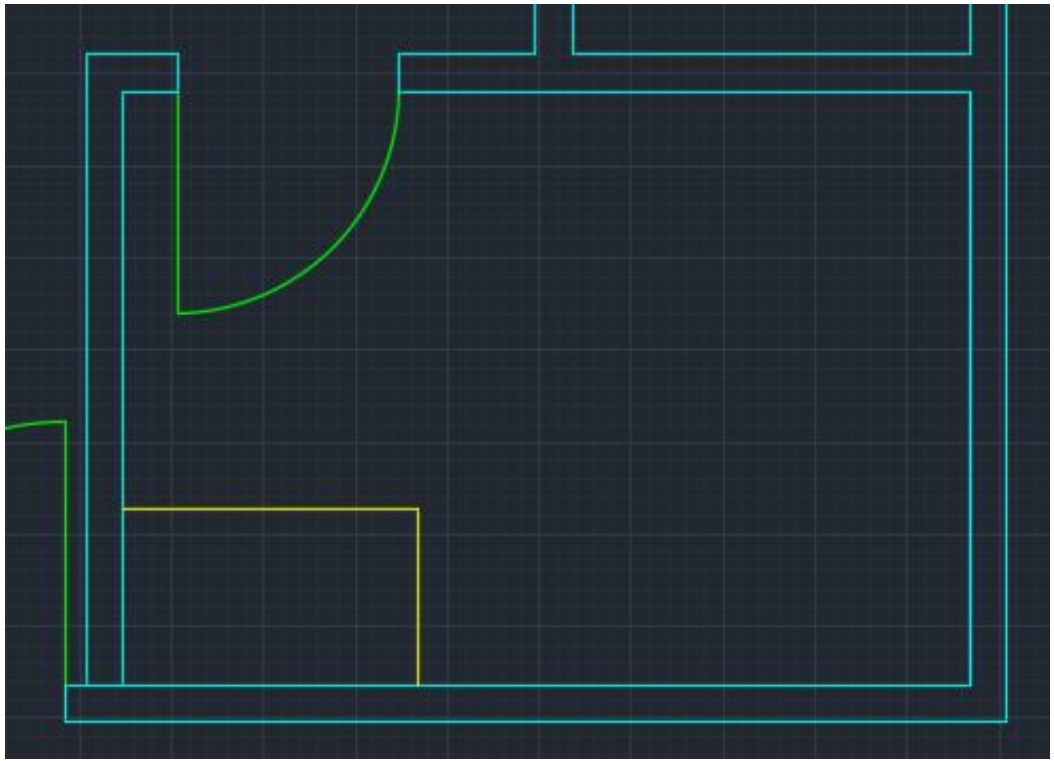
Note*: The layer *"a-appl"* is not a standard layer & *"a-case"* is the shortened version of *"a-flor-case"*

Use *polyline* or *line* to roughly draw the *countertops* (casework) for the kitchen.



Note*: Make the *depth* of the countertops *25.5"* (minimum). Use layer *"a-case"*. Casework can be adjusted later.

Use *polyline* or *line* to roughly draw the *vanity* (casework) for the bathrooms.

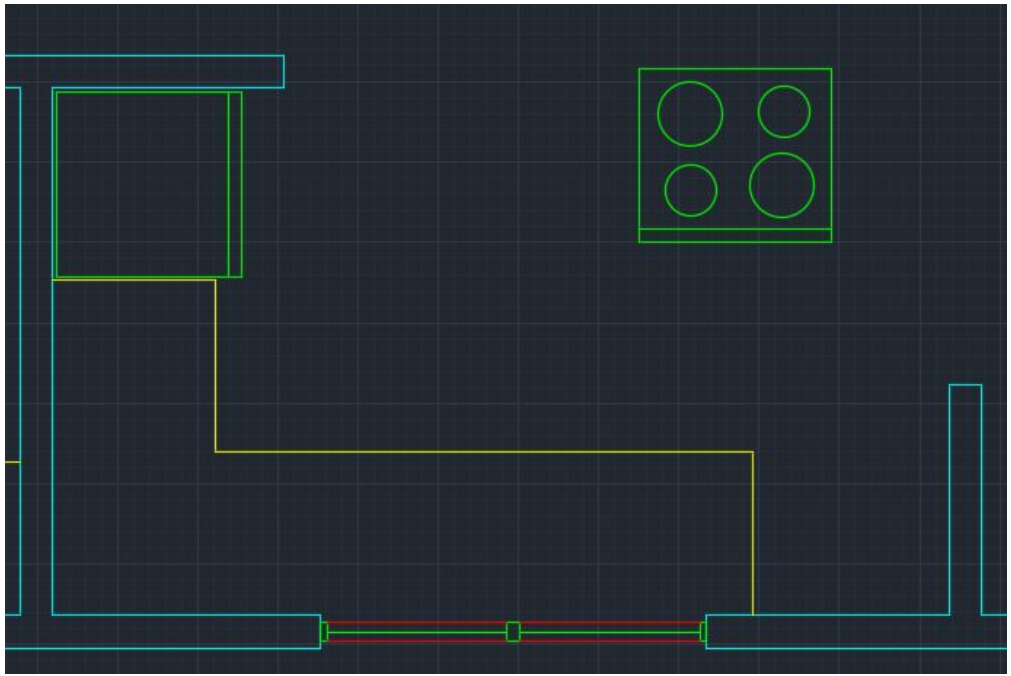


Note*: The *bathroom vanity* is *24" deep* by *40" wide* (it can be different). Can be drawn in empty space then *moved* to desired location afterwards.

Set to layer *"a-appl"* & use *line* or *polyline* to draw the *refrigerator*

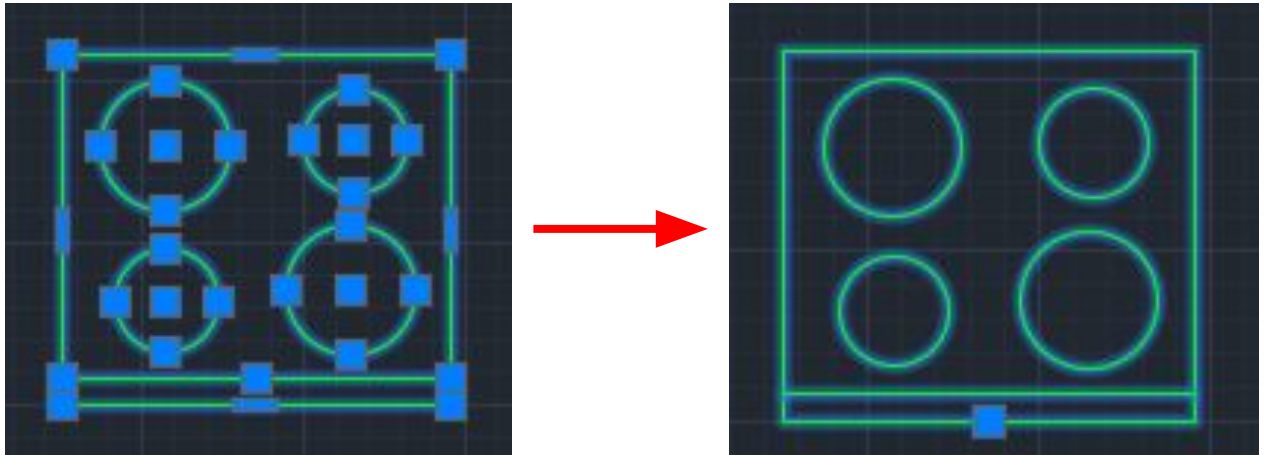
Note*: Standard *fridge* (freezer on top) is *28.75" deep* by *28.75" wide*. Draw fridge in empty space first, adjust casework if needed then *move* fridge to desired location. Fridge door detail can be added if desired.

Stay at *"a-appl"* & use *line/polyline* & *circles* to draw the *stove*



Note*: Standard *stoves* are *25" to 27" deep* by *30" wide*. Customize your stove however you want. For *circles*, you can use *"center, radius"*.

After drawing the stove, *select* it & go to *"insert"* tab & select *"create block"*

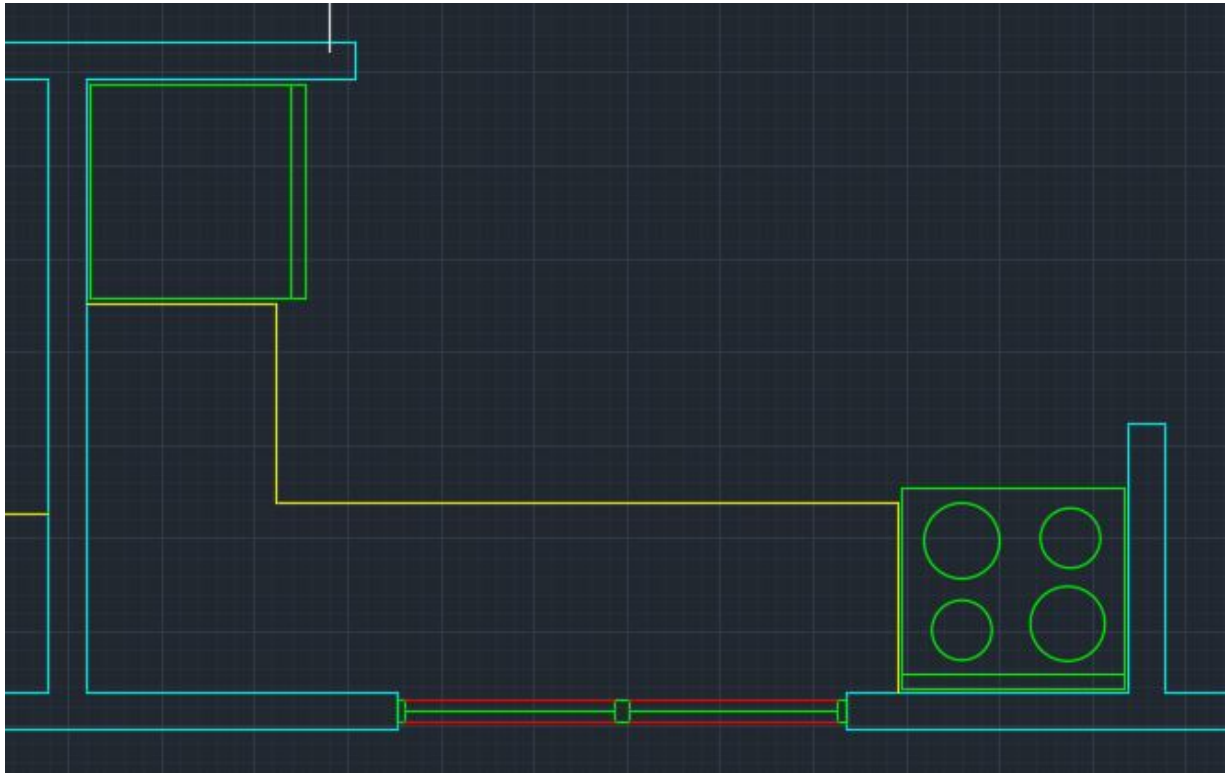


Lines & circles
(several objects)

Block
(one object)

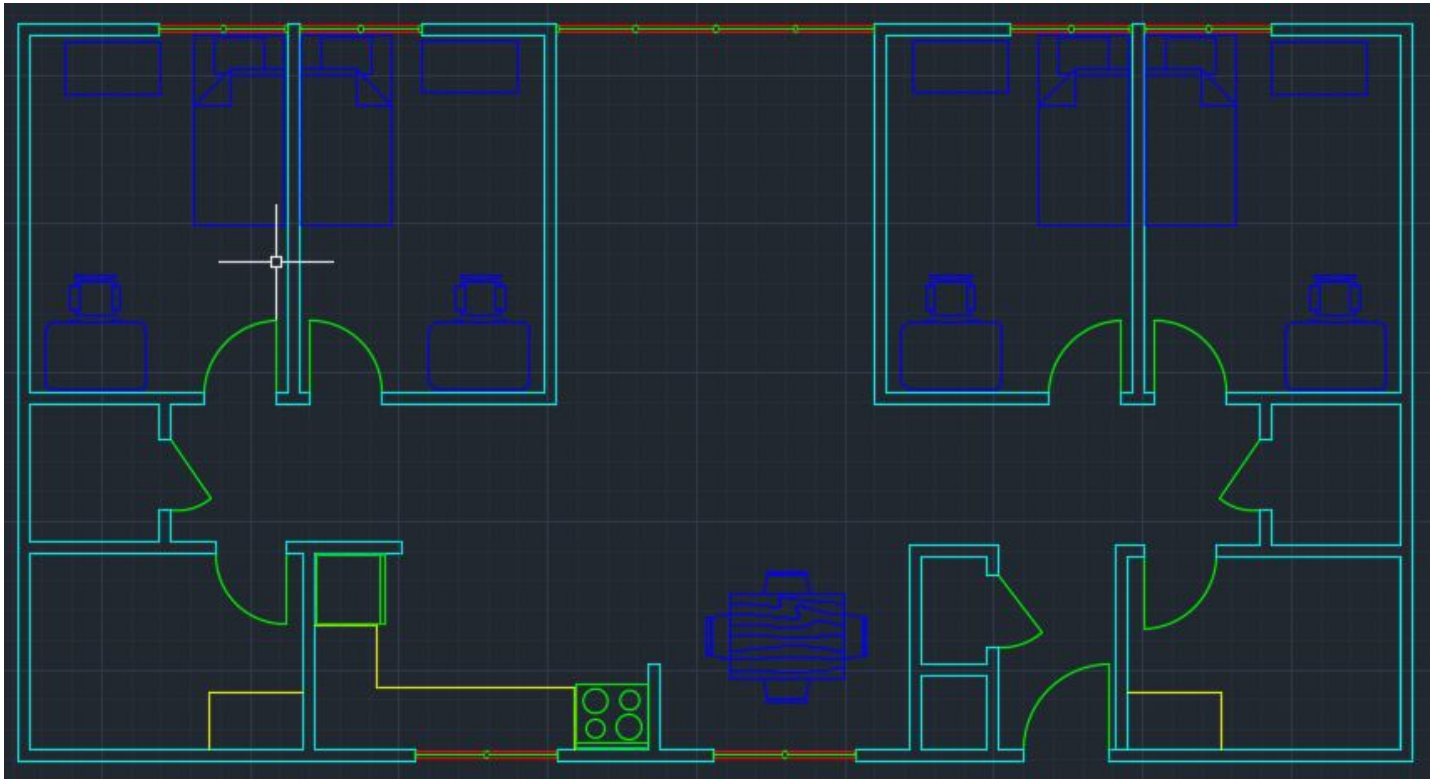
Note*: This step isn't really necessary but it makes it easier to move the stove around. Make sure to check *"specify insertion point on-screen"* & just choose your own insertion point for the stove.

Stove in place: Result



Note*: Casework can be adjusted if needed to make room for the stove.

Casework and *Appliances* in place

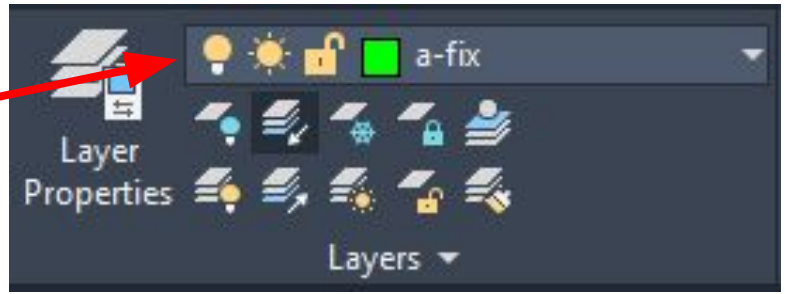


Adding Fixtures

(This includes: sinks, toilets, bathtubs, showers etc.)

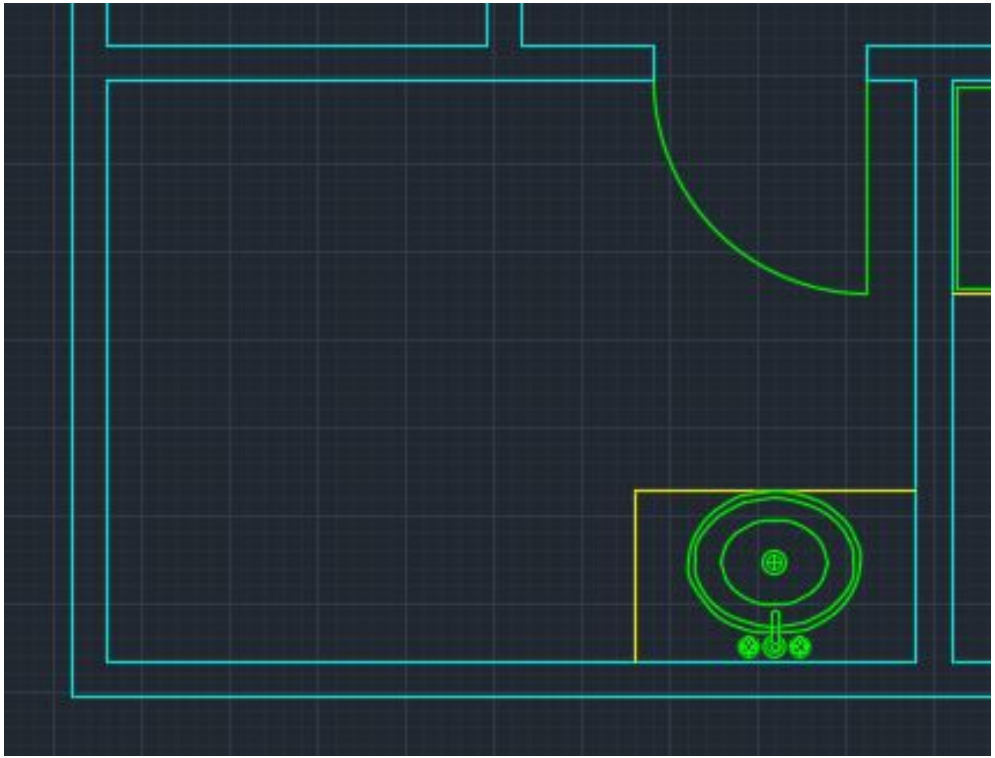
Create a *new layer*, name it *"a-fix"*

a-fix as
current layer



Note*: This layer is not a standard layer.

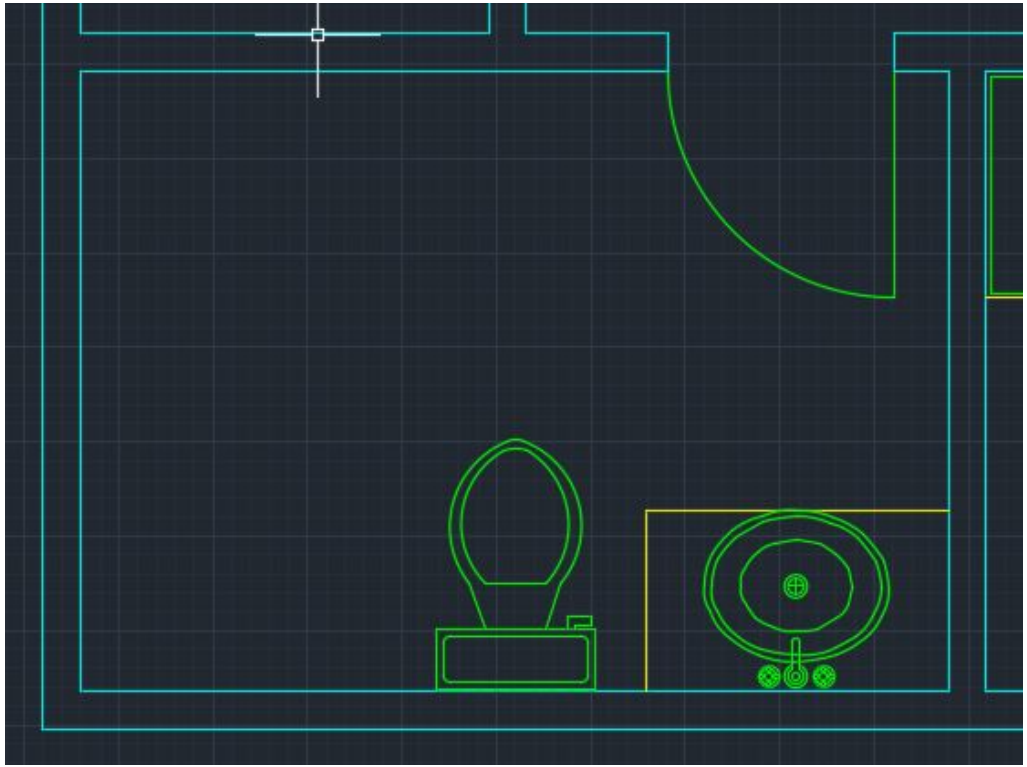
Go to
DesignCenter
& bring in
sink - oval top
& *faucet - bathroom top*
for sinks



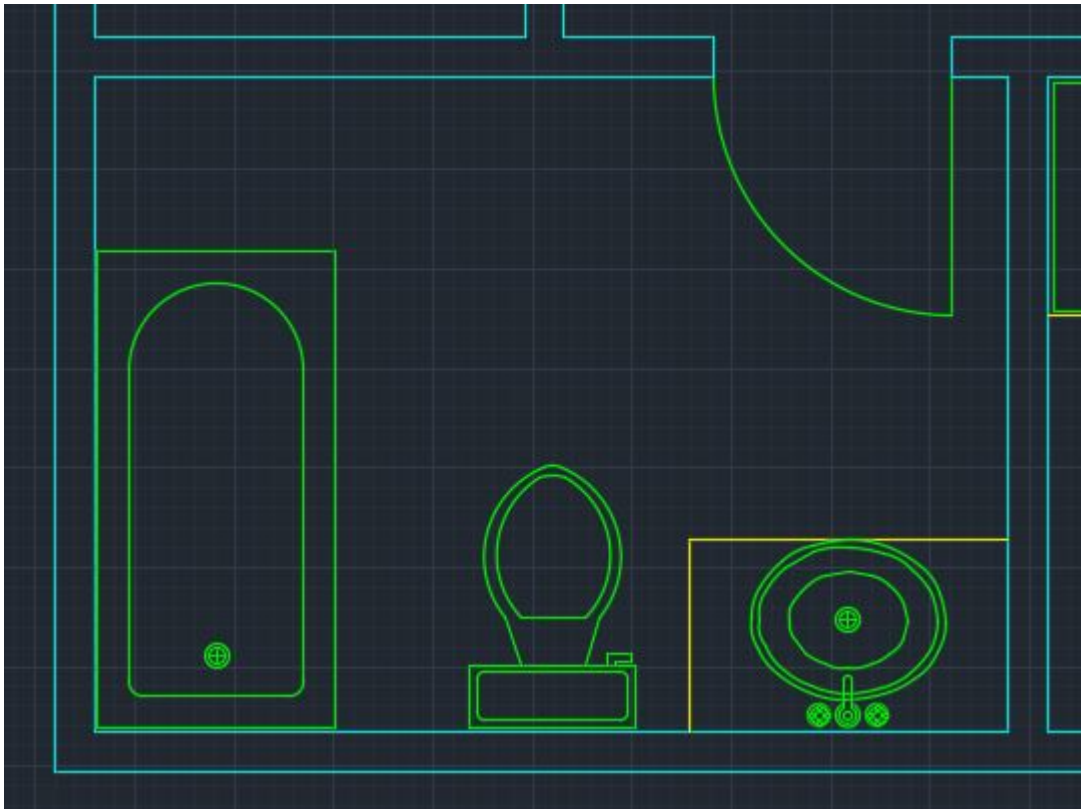
Note*: Edit sink if desired; otherwise, leave as default &. *Rotate/move/mirror* as needed.

Go to
DesignCenter
& bring in
toilet - top

Note*: *Rotate/move* toilet as needed.



Go to
DesignCenter
& bring in
toilet - top &
Bath tub 26 x 60in

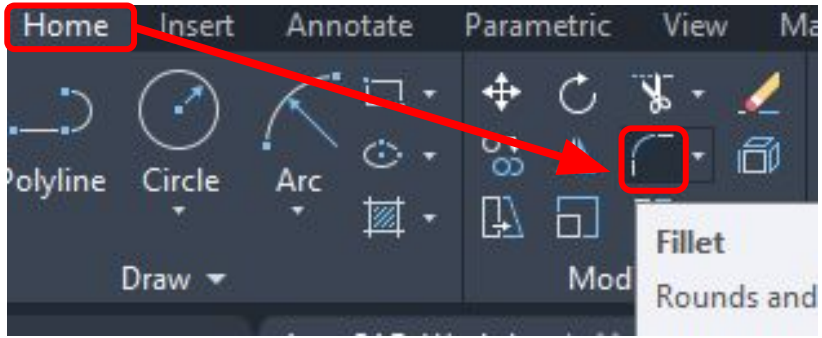


Note*: Standard *bathtubs* are usually *30" wide* by *60" long* (this refers to outer edges so edit the tub). Utilize *dimensions, line, circle (center, radius), trim* & *fillet* to edit tub. *Rotate/move* tub as needed.

The *fillet* command: *Where* it is located & *how* to use it

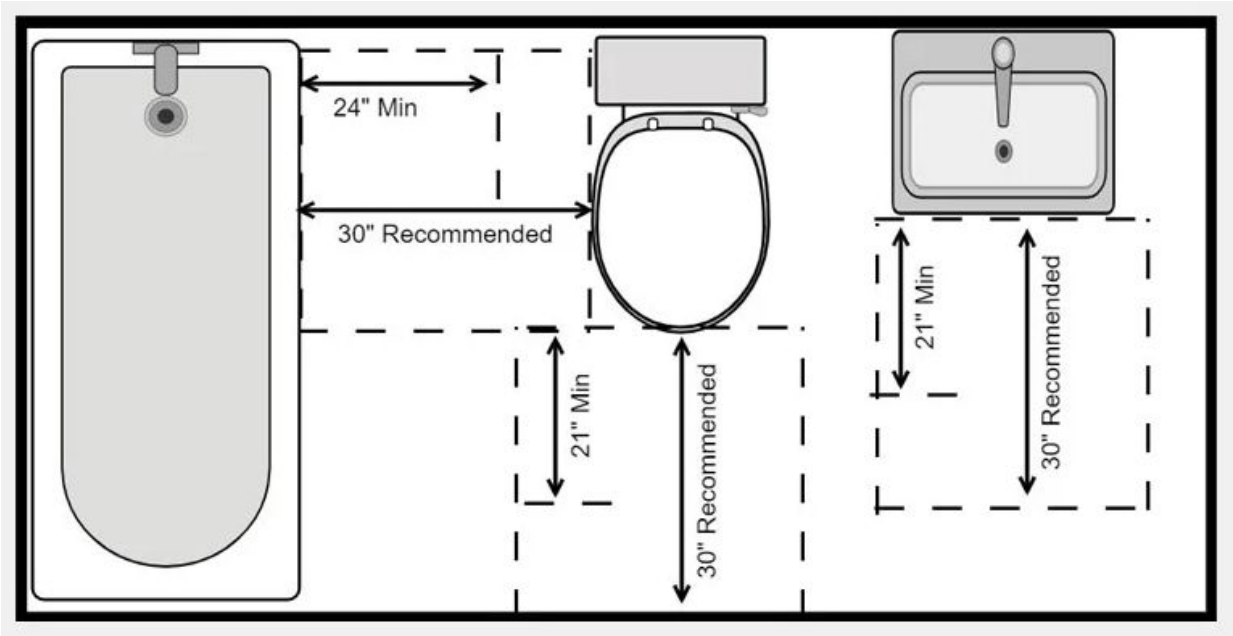
AutoCAD Fillet

1. Select the **Fillet** command from the ribbon panel, as shown below: Or. Type F on the command line or command prompt and press Enter.
2. Select the first object.
3. Type R or Radius.
4. Press Enter.
5. Specify the radius of the **Fillet** and press Enter.
6. Select the second object.



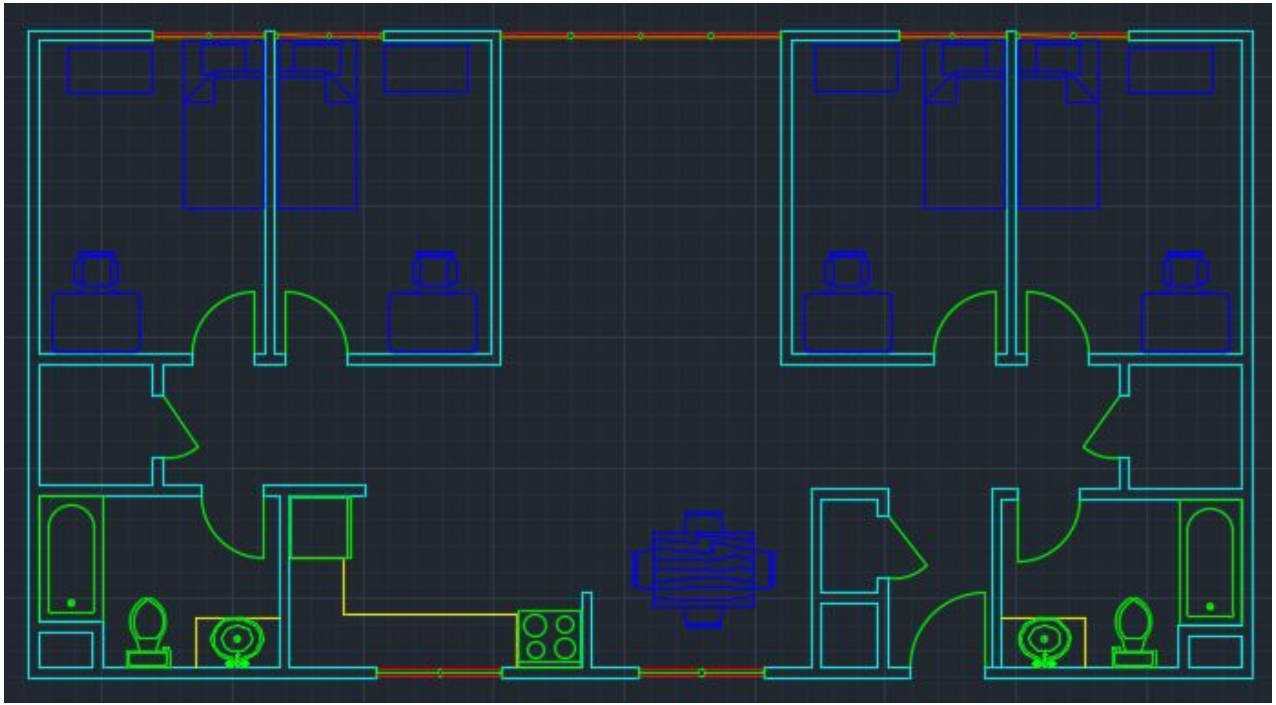
Note*: This slide is purely to show you how to use the fillet command (skip if you already know how to use it)

This is a reference image showing *standard bathroom clearance dimensions*.



OG Link*:
https://www.crddesignbuild.com/hs-fs/hubfs/Blog/Residential%20Bathroom%20Codes%20and%20Design%20Tips/Clear-Floor-Space.jpg?width=800&name=Clear-Floor-Space.jpg

Result - Bathroom fixtures placed



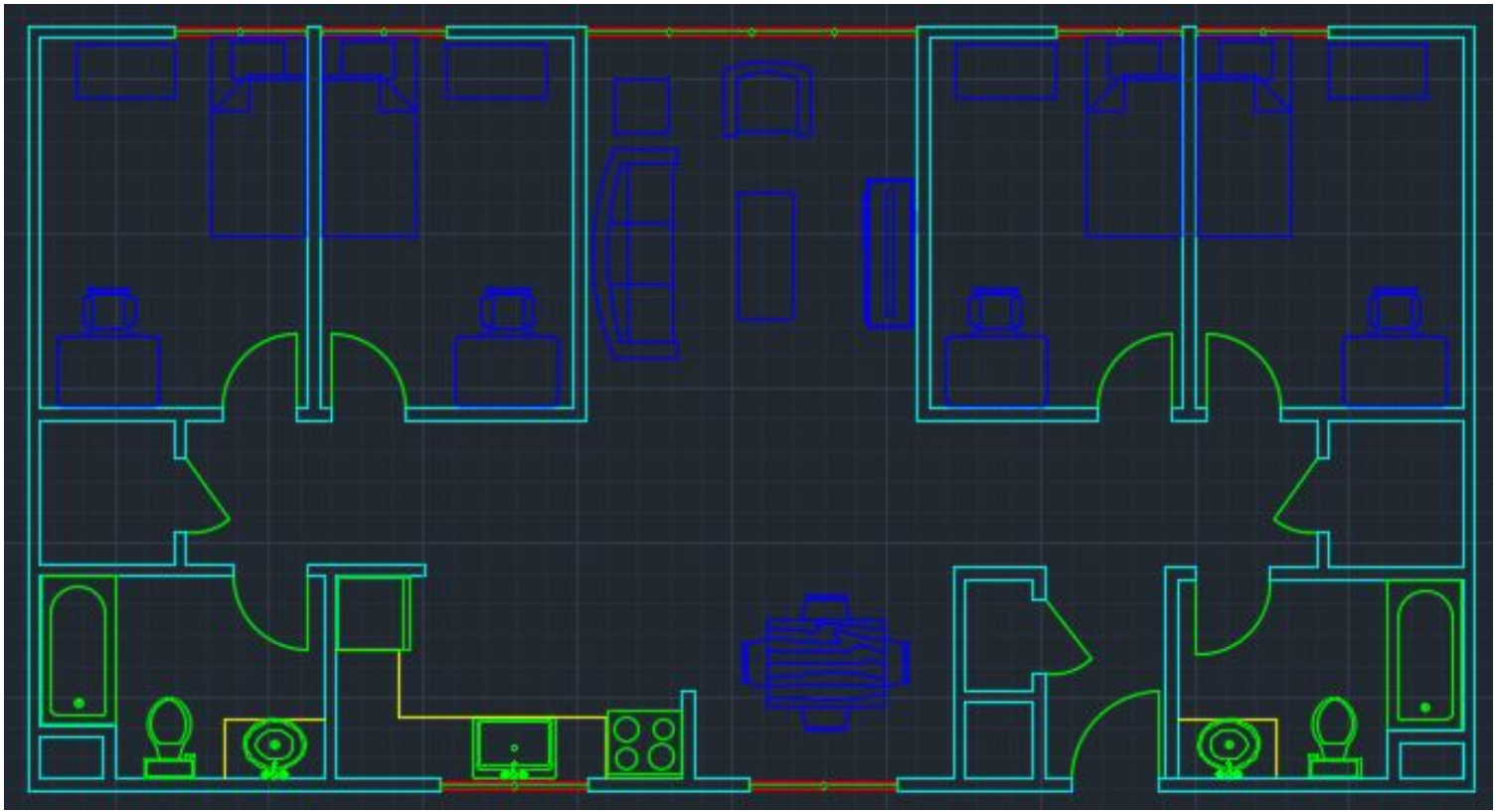
Note*: After considering previous slides, *adjustments* were made to fixtures to better satisfy standards. Extra *walls* were drawn as well. Make sure that everything is in the *correct layer*.

For the kitchen sink fixture, *try it yourself!* If DesignCenter doesn't have what you are looking for, create it yourself. *(example shown 2 slides from this one)*

Completed Interior Example

(This shows the furniture in the living room & the kitchen sink fixture)

Complete - Interior



Extra Functions

(These are more relevant to 3D AutoCAD)

More *"Function"* Shortcuts (More Advanced)

F4: 3D-OSnap On/Off *(Specific Snaps like endpoint, midpoint, center, etc.)*

F5: Isoplane Top/Left/Right *(3-D)*

F6: Dynamic UCS On/Off *(X-Y Axis)*

More Resources

Helpful links

- https://ppc.ucsc.edu/consultants/images/12part8layering.pdf
  - See *pages 1-4* for standard *architectural layers*
- Go to **YouTube** & **Google** to learn more about AutoCAD!
- forums.autodesk.com/ & knowledge.autodesk.com/ are good sources too