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AutoCAD® Architecture 2023 Fundamentals

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Lesson 3:
Floor Plans

AutoCAD Architecture comes with 3D content that you use to create your building model and to annotate your views. In ACA 2023, you may have difficulty locating and loading the various content, so this exercise is to help you set up ACA so you can move forward with your design.

The Content Browser lets you store, share, and exchange AutoCAD Architecture content, tools, and tool palettes. The Content Browser runs independently of the software, allowing you to exchange tools and tool palettes with other Autodesk applications.

The Content Browser is a library of tool catalogs containing tools, tool palettes, and tool packages. You can publish catalogs so that multiple users have access to standard tools for projects.

ACA comes with several tool catalogs. When you install ACA, you enable which catalogs you want installed with the software. By default, Imperial, Metric, and Global are enabled. The content is located in the path: C:\ProgramData\Autodesk\ACA 2023\enu\Tool Catalogs.

The floor plan is central to any architectural drawing. In the first exercise, we convert an AutoCAD 2D floor plan to 3D. In the remaining exercises, we work in 3D.

A floor plan is a scaled diagram of a room or building viewed from above. The floor plan may depict an entire building, one floor of a building, or a single room. It may also include measurements, furniture, appliances, or anything else necessary to the purpose of the plan.

Floor plans are useful to help design furniture layout, wiring systems, and much more. They're also a valuable tool for real estate agents and leasing companies in helping sell or rent out a space.

Exercise 3-1:

Going from a 2D to 3D Floor plan

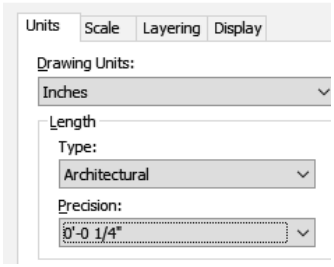
Drawing Name: New
Estimated Time: 45 minutes

This exercise reinforces the following skills:

- Create Walls
- Wall Properties
- Wall Styles
- Style Manager
- Insert an AutoCAD drawing
- Trim, Fillet, Extend Walls

1. Start a new drawing using QNEW or select the + tab.

2. Type **UNITS**.



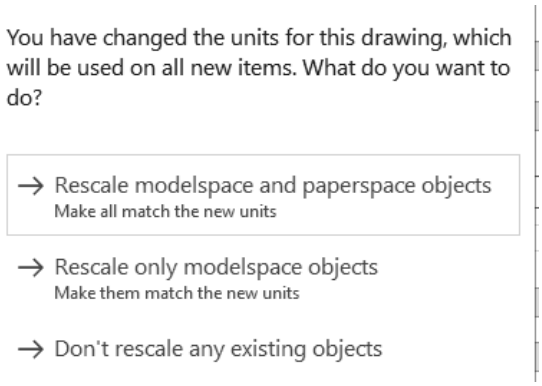
Set the Units to **Inches**.

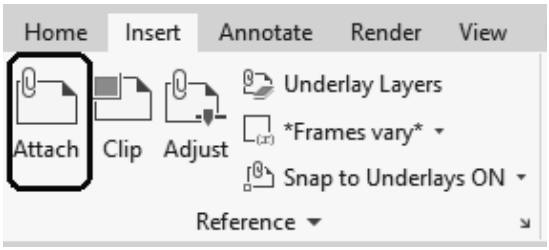
Set the Type to **Architectural**.

Set the Precision to **¼"**.

Click **OK**.

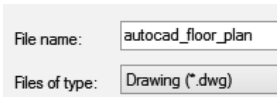
3. Select the first option: **Rescale modelspace and paperspace objects.**



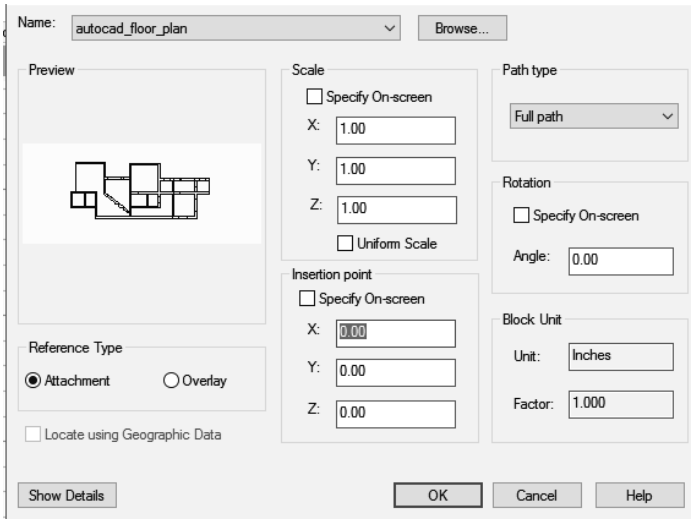
4. 

Activate the **Insert** tab on the ribbon.

Select **Attach**.

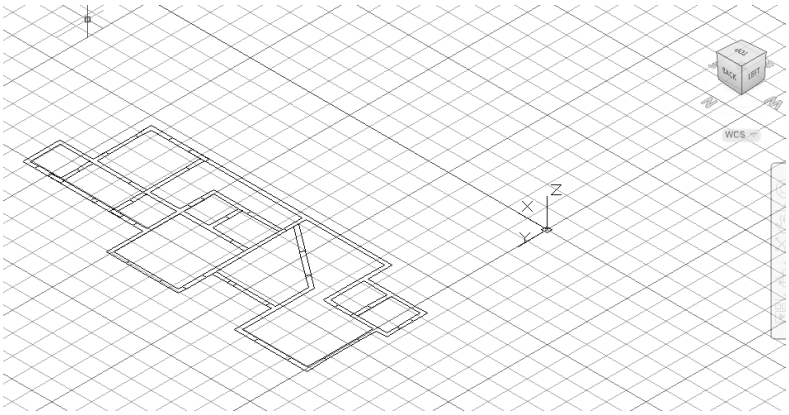
5. 

Locate the *autocad_floor_plan.dwg* file in the exercises.
Set your Files of type to Drawing (.dwg) to locate the file.*
Click **Open**.

6. 

Uncheck Insertion Point.
Uncheck Scale.
Uncheck Rotation.
This sets everything to the default values.

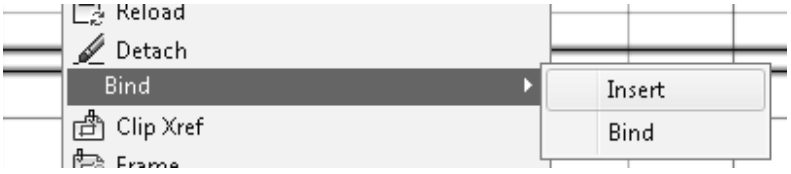
Click **OK**.

7. 

Use the ViewCube to switch to a 3D view.

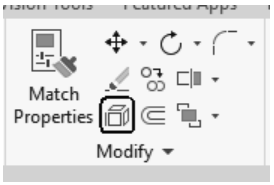
Note that the AutoCAD file is 2D only.

Return to a top view.

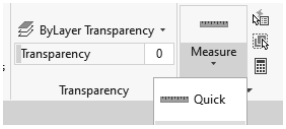
8. 

Select the attached xref.
Right click and select **Bind→Insert**.
This converts the xref to an inserted block.

9. Select the block reference and type **EXPLODE** to convert to lines.



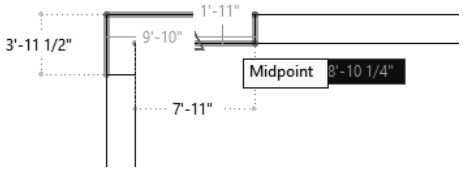
You can also use the Explode tool on the Modify panel of the Home ribbon on the ribbon.

10. 

Activate the **Home ribbon** on the ribbon.

Select the **Quick** measure tool from the Utilities panel.

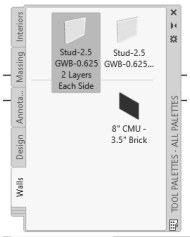
11. Hover the cursor over a wall.



Note that the walls are 1′-11″ thick.

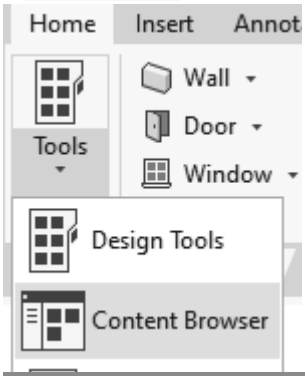
12. 

Launch the **Design Tools** palette from the Home ribbon on the ribbon.

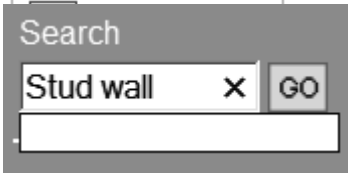
13. 

Activate the **Walls** palette.

This palette was created in an earlier exercise.

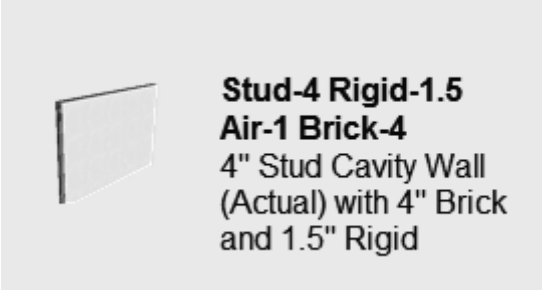
14. 

Launch the **Content Browser** from the Home ribbon.

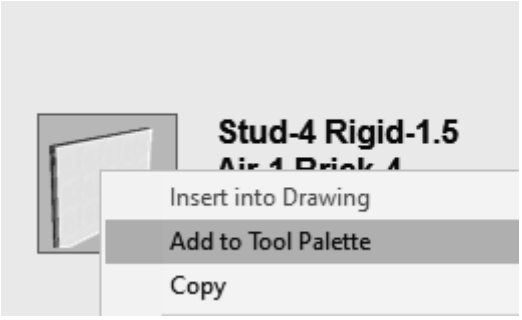
15. 

In the Search field, type **Stud wall**.

Click **Go**.

16. 

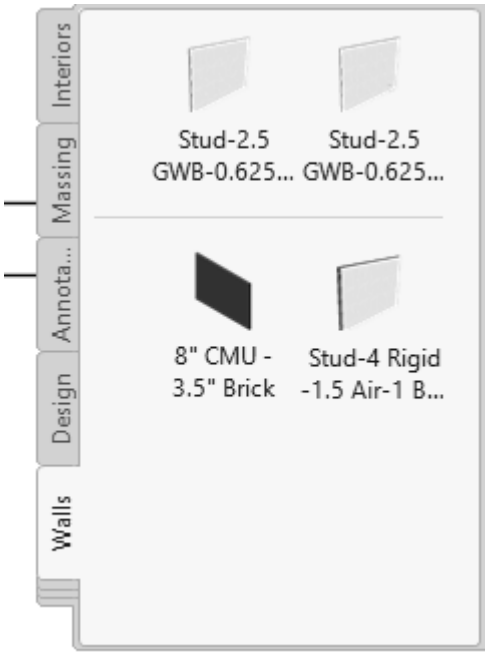
Click **Next** until you locate the **Stud-4 Rigid-1.5 Air-1 Brick-4** wall style.

17. 

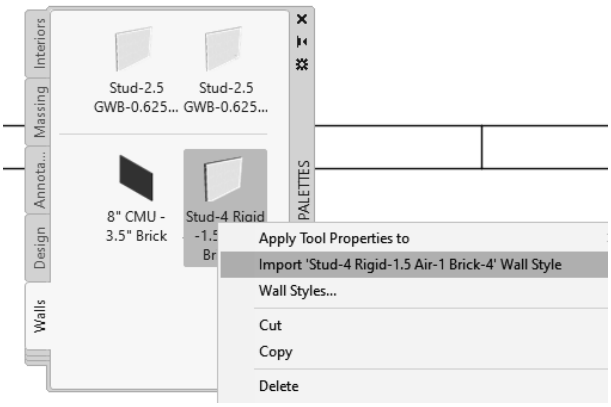
Right click on the desired wall style.

Select **Add to Tool Palette**.

18. Close the Content Browser.

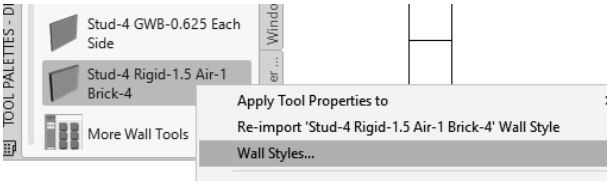
19. 

Place the wall style in the area used by exterior wall styles.

20. 

Right click on the **Stud-4 Rigid-1.5 Air-1 Brick-4** wall style and select **Import Stud-4 Rigid-1.5 Air-1 Brick-4 wall style.**

This makes the wall style available in the active drawing.

21. 

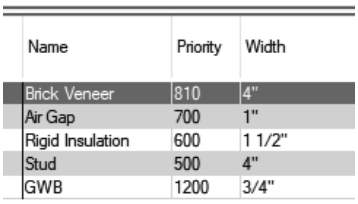
Right click on the **Stud-4 Rigid-1.5 Air-1 Brick-4** wall style and select **Wall Styles**.

This launches the Style Manager.

22. 

Note that the only wall styles available are Standard, the style you saved in the template, and the style you just imported.

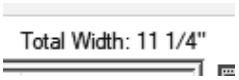
Highlight the **Stud-4 Rigid-1.5 Air-1 Brick-4** wall style.

23. 

Name	Priority	Width
Brick Veneer	810	4"
Air Gap	700	1"
Rigid Insulation	600	1 1/2"
Stud	500	4"
GWB	1200	3/4"

Activate the **Components** tab.

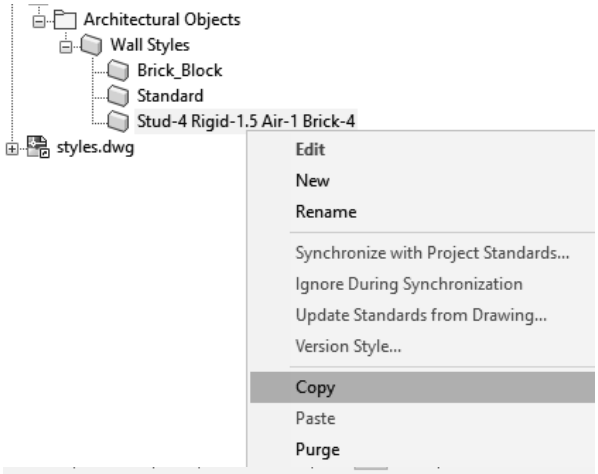
The components tab lists the materials used in the wall construction.



Note the components listed in the Style Manager for the wall style. The total wall thickness is 11-1/4″.

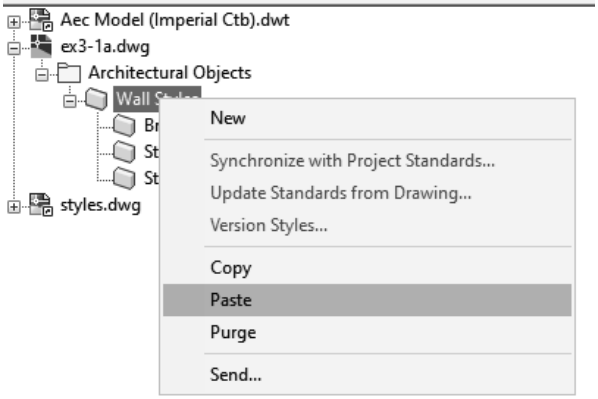
The total width value is located in the upper right of the dialog.

We need a wall style that is 1′–11″. We need to add material to the wall style.

24. 

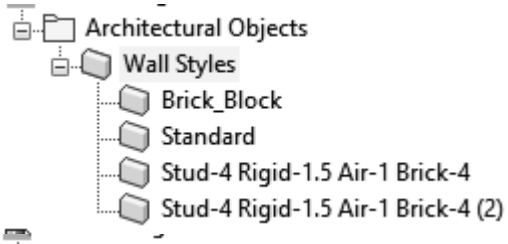
Highlight the **Stud-4 Rigid-1.5 Air-1 Brick-4** wall style.

Right click and select **Copy**.

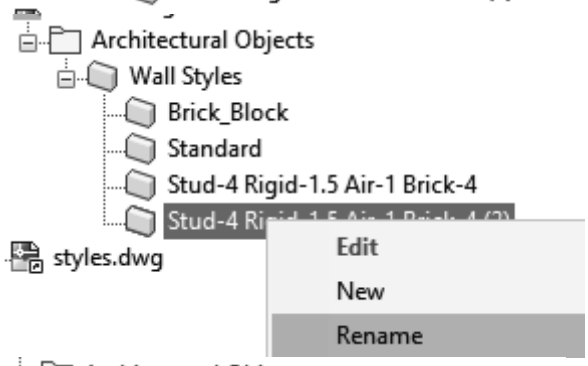
25. 

Click on **Wall Styles**.

Right click and select **Paste**.

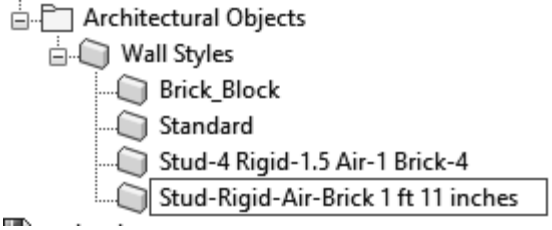


You now should see two of the same wall style.

26. 

Highlight the copy of the **Stud-4 Rigid-1.5 Air-1 Brick-4** wall style.

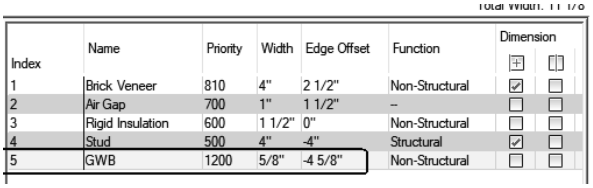
Right click and select **Rename**.

27. 

Rename the wall style:

Stud-Rigid-Air-Brick-1 ft 11 inches.

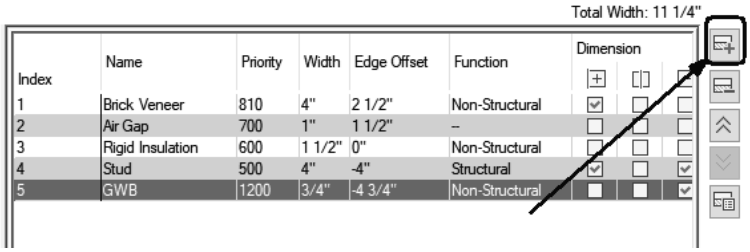
You cannot use special characters in your style names.

28. 

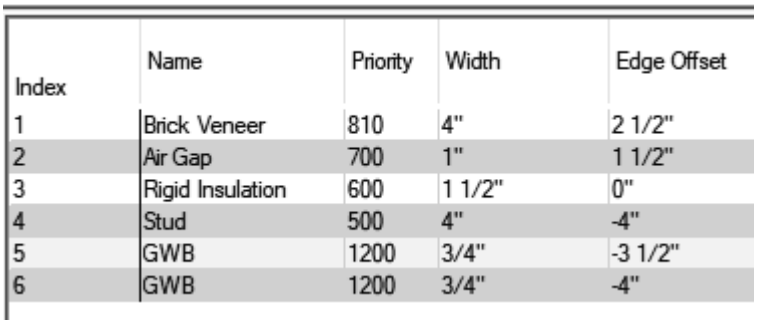
Index	Name	Priority	Width	Edge Offset	Function	Dimension
1	Brick Veneer	810	4"	2 1/2"	Non-Structural	
2	Air Gap	700	1"	1 1/2"	--	
3	Rigid Insulation	600	1 1/2"	0"	Non-Structural	
4	Stud	500	4"	-4"	Structural	
5	GWB	1200	5/8"	-4 5/8"	Non-Structural	

Highlight the row that lists the GWB material.

GWB stands for Gypsum Wallboard.

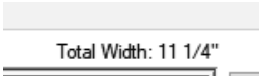
29. 

Select the **Add Component** tool.

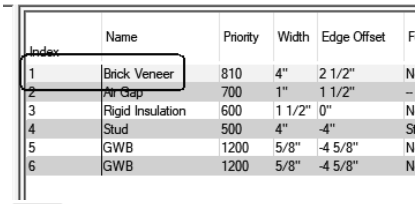
30. 

Index	Name	Priority	Width	Edge Offset
1	Brick Veneer	810	4"	2 1/2"
2	Air Gap	700	1"	1 1/2"
3	Rigid Insulation	600	1 1/2"	0"
4	Stud	500	4"	-4"
5	GWB	1200	3/4"	-3 1/2"
6	GWB	1200	3/4"	-4"

Another 3/4″ piece of GWB (gypsum board) is added.

31. 

Note that the thickness of the wall updated to **11 ¼”.**

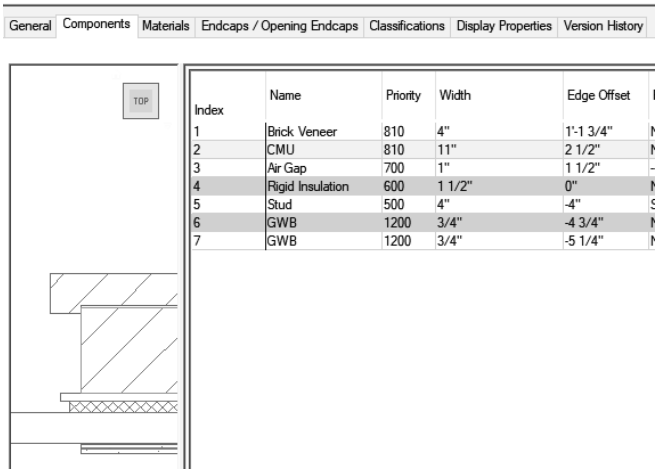
32. 

Index	Name	Priority	Width	Edge Offset	F
1	Brick Veneer	810	4"	2 1/2"	N
2	Air Gap	700	1"	1 1/2"	--
3	Rigid Insulation	600	1 1/2"	0"	N
4	Stud	500	4"	-4"	St
5	GWB	1200	5/8"	-4 5/8"	N
6	GWB	1200	5/8"	-4 5/8"	N

Highlight the Brick Veneer material in the top row.

33. 

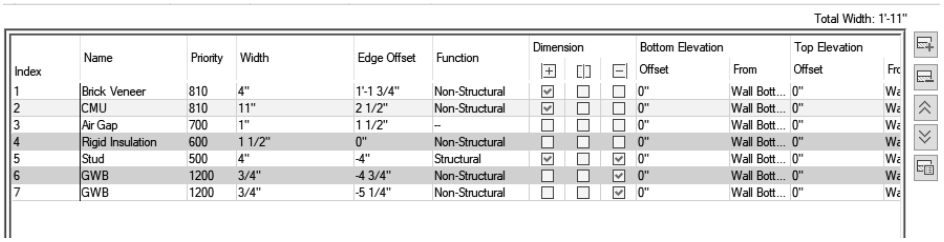
Select the **Add Component** tool.

34. 

Change the name of the second row material to **CMU**. Set the width to 11” thick.

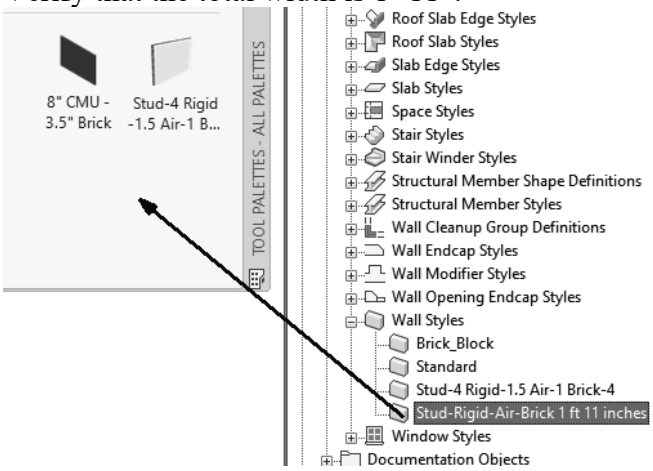
Use the Preview window to help you adjust the edge offset for all the components.

To change the values, just place the cursor in that cell and start typing.



Index	Name	Priority	Width	Edge Offset	Function	Dimension			Bottom Elevation		Top Elevation	
									Offset	From	Offset	Fro
1	Brick Veneer	810	4"	1'-1 3/4"	Non-Structural	☑	☐	☐	0"	Wall Bott...	0"	We
2	CMU	810	11"	2 1/2"	Non-Structural	☑	☐	☐	0"	Wall Bott...	0"	We
3	Air Gap	700	1"	1 1/2"	--	☐	☐	☐	0"	Wall Bott...	0"	We
4	Rigid Insulation	600	1 1/2"	0"	Non-Structural	☐	☐	☐	0"	Wall Bott...	0"	We
5	Stud	500	4"	-4"	Structural	☑	☐	☑	0"	Wall Bott...	0"	We
6	GWB	1200	3/4"	-4 3/4"	Non-Structural	☐	☐	☑	0"	Wall Bott...	0"	We
7	GWB	1200	3/4"	-5 1/4"	Non-Structural	☐	☐	☑	0"	Wall Bott...	0"	We

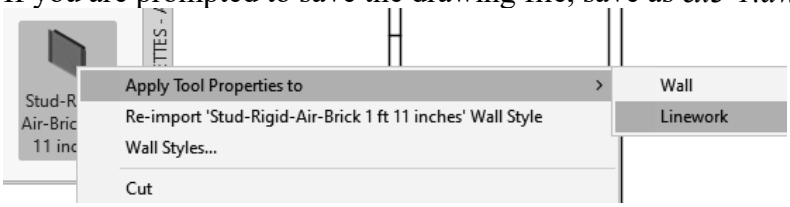
35. Verify that your layers are set as shown.
    Verify that the total width is 1' 11".

36. 

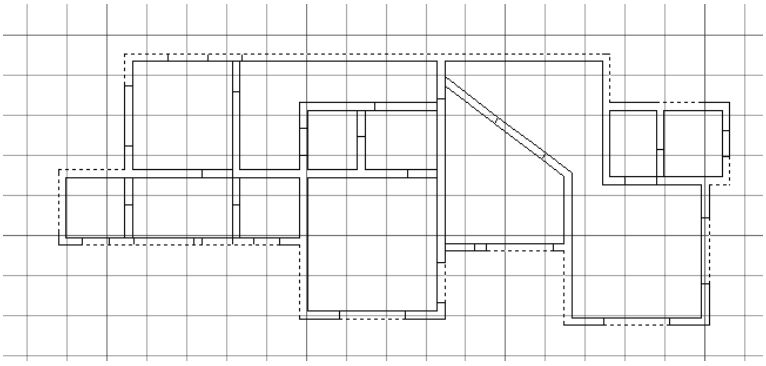
    Drag and drop the new wall style onto the Walls tool palette.

37. Click **OK** to close the Styles Manager dialog.

38. If you are prompted to save the drawing file, save as *ex3-1.dwg*.

39. 

    Right click on the **Stud-Rigid-Air-Brick-1 ft 11 inches** wall style and select **Apply Tool Properties to → Linework**.

40. 
    Select the outside segments of the walls.

    Do not select any of the interior walls.

    Click ENTER when you are done selecting lines.

41. You will be prompted if you want to erase any of the linework. Enter **NO**.

    The walls placed are misaligned. We will fix that in the next exercise.

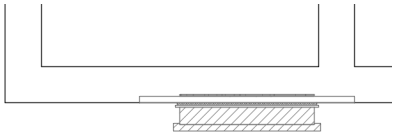
Exercise 3-2:

Adjusting Wall Position

Drawing Name: wall_postion.dwg
Estimated Time: 15 minutes

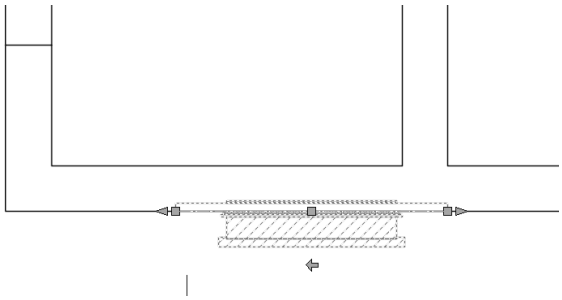
This exercise reinforces the following skills:

- Reposition Walls using Offset From
- Wall Properties

1. 

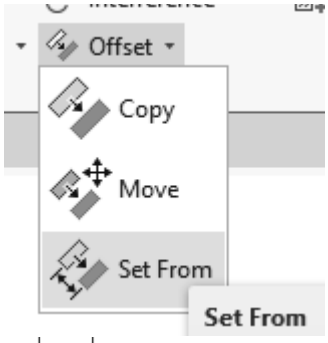
Zoom into one of the walls that was placed.

The wall is not aligned properly with the line.

2. 

Select the wall.

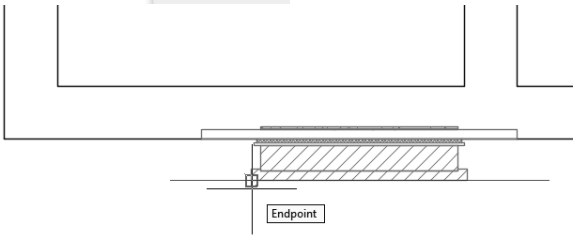
The blue arrow indicates the exterior side of the wall. If the blue arrow is inside the building, click on the blue arrow and it will flip the orientation of the wall.

3. 

When the wall is selected, the ribbon will change to a context sensitive ribbon for the selected element.

On the Walls ribbon/Modify panel:

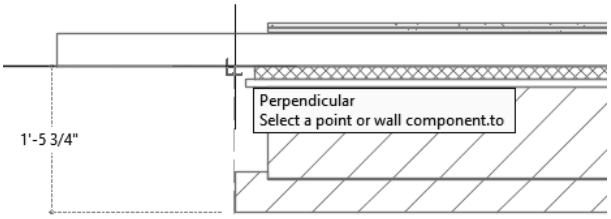
Click **Offset→Set From**.

4. 

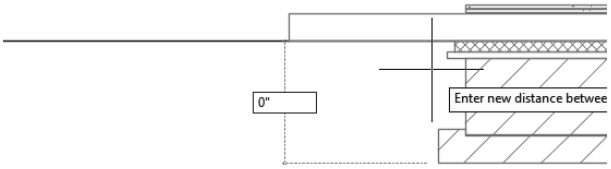
Move the cursor over the wall until the face of the component you want is highlighted with a red line, and click once.

Click the endpoint of the outside face of the wall.

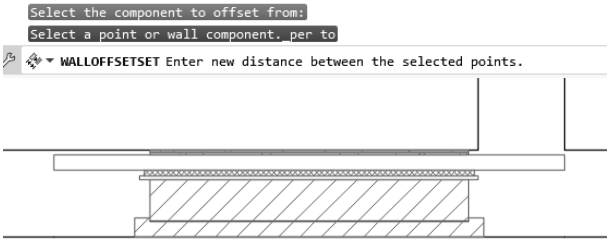
5. Click a point on the line perpendicular to the selected line.



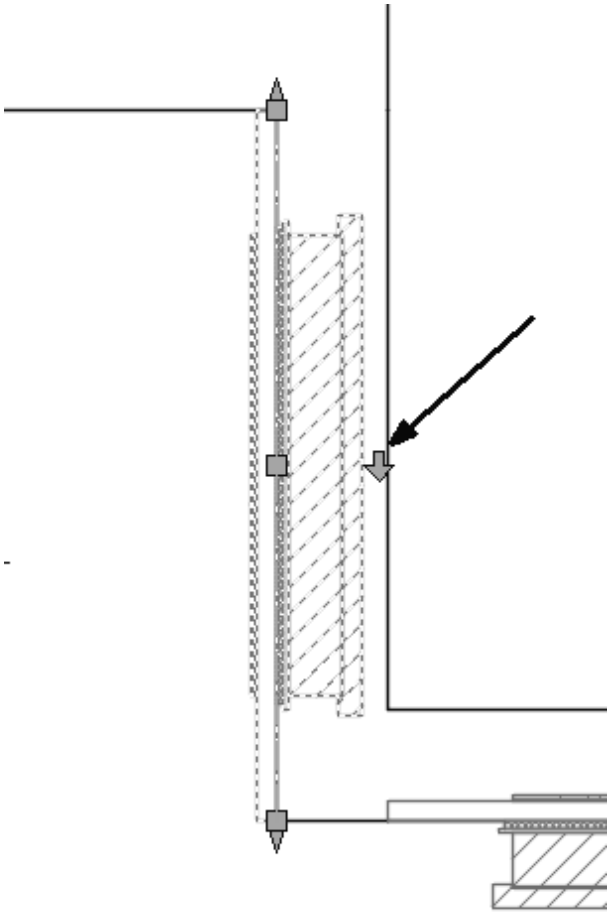
6. Enter **0”** when prompted for the distance between the selected points.



Click ESC to release the selection.



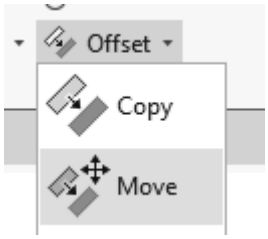
Note that it is the correct width.

7. 

Select another wall.

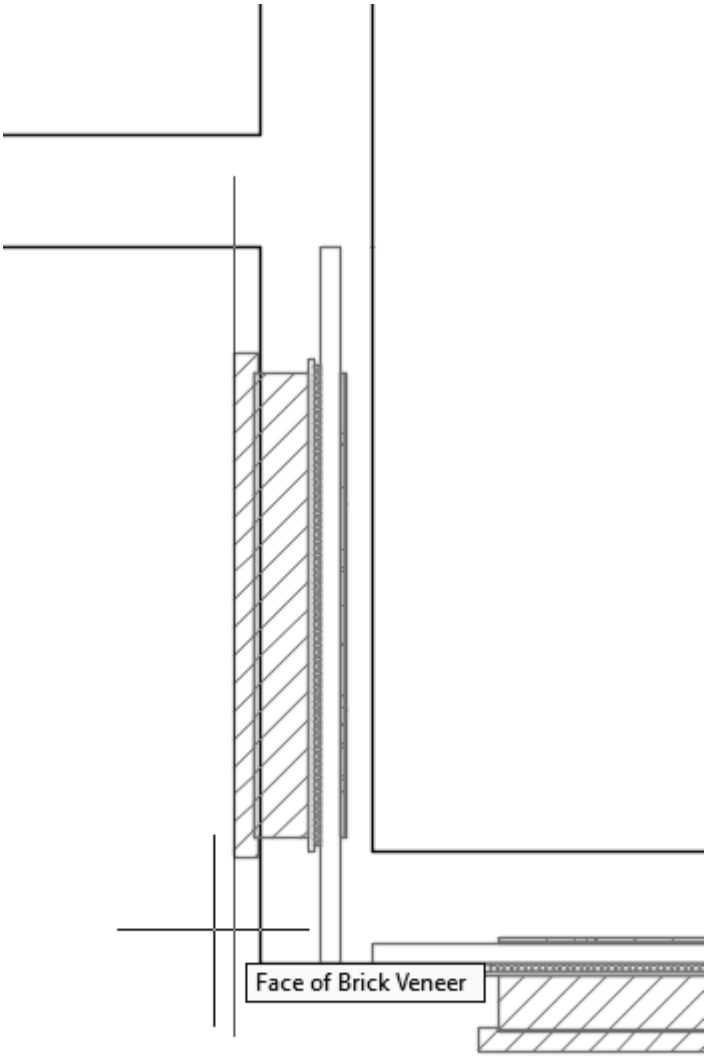
The blue arrow indicates the exterior side of the wall. If the blue arrow is inside the building, click on the blue arrow and it will flip the orientation of the wall.

Click on the blue arrow to flip the orientation of the wall.

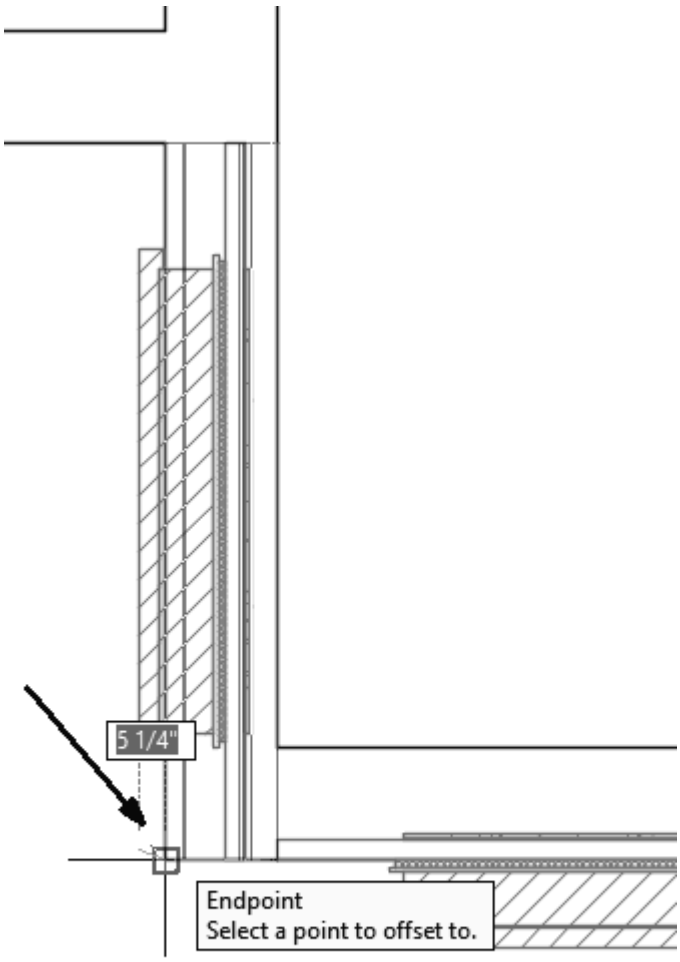
8. 

On the Walls ribbon/Modify panel:

Click **Offset→Move**.

9. 

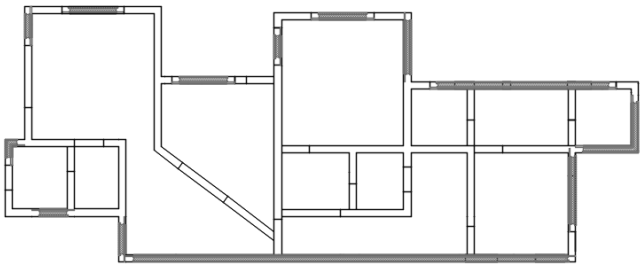
Click on the outside face of the brick veneer.

10. 

Select an endpoint or perpendicular point on the wall.

Click ESC to release the selection.

11. Go around the floor plan and move all the walls so that they overlay the floor plan correctly using the Offset tool.

12. 

The floor plan should look similar to this. Yours may look slightly different depending on which lines you selected when you placed the walls.

Save as *ex3-2.dwg*.

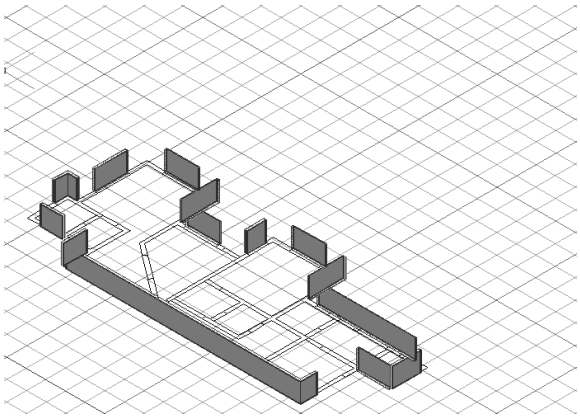
Exercise 3-3:

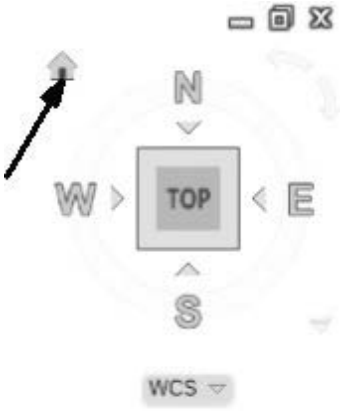
Joining Walls

Drawing Name: wall_fillet.dwg
Estimated Time: 15 minutes

This exercise reinforces the following skills:

- Connecting Walls using Fillet
- Wall Properties

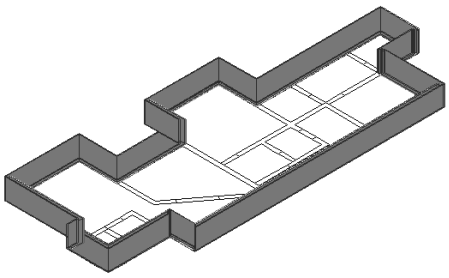
1. 



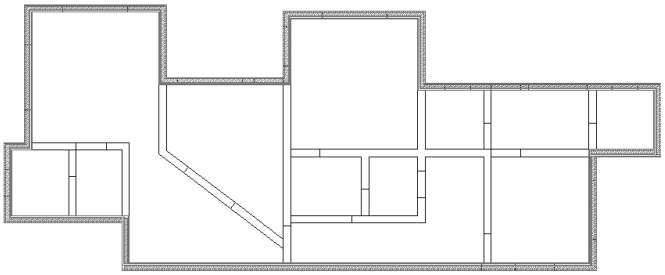
Switch to a 3D view.

You should see 3D walls where you selected lines.

2. 



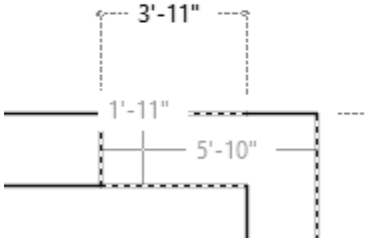
To join the walls together, use FILLET with an R value of 0.
Type FILLET, then select the two walls to be joined to form a corner.

3. 

In the plan view, the exterior walls should form a closed figure.

4. 

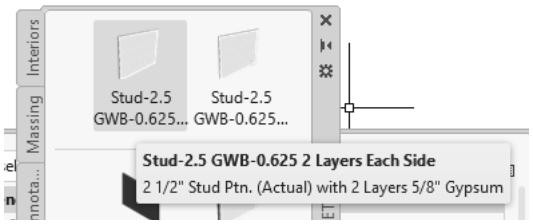
Click on the **Quick Measure** tool located on the Home ribbon/Utilities panel.

5. 

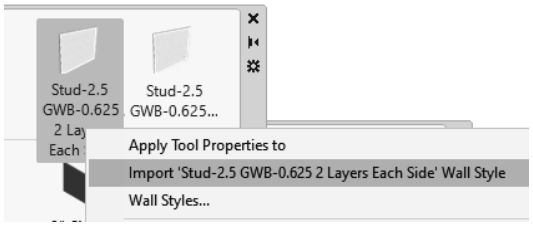
Measure the width of one of the interior walls.

It displays as 1’ -11”.

Click ESC to exit the Quick Measure tool.

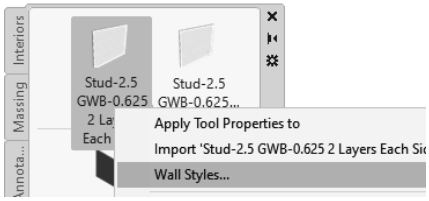
6. 

Locate the **Stud-2.5 GWB-0.625-2 Layers Each Side** Wall Style on the Walls tool palette.

7. 

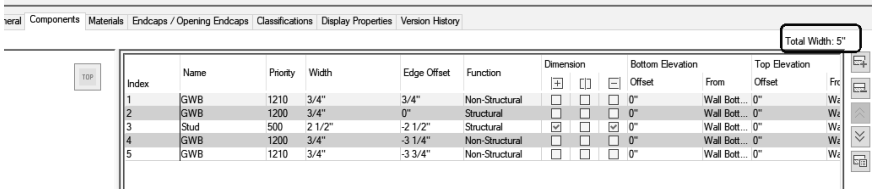
Highlight and right click.
Select **Import Stud-2.5 GWB-0.625-2 Layers Each Side.**

You need to add the wall style to the drawing before you will see it in the Styles Manager.

8. 

Right click and select Wall Styles.
This will launch the Styles Manager.

9. Highlight the **Stud-2.5 GWB-0.625-2 Layers Each Side** Wall Style in the Style Manager list.



Select the **Components** tab.

The total width for this wall style is 5”

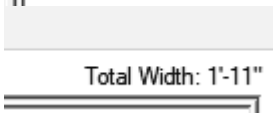
10. Change the Stud width to **1′ 8.5″**.

Index	Name	Priority	Width
1	GWB	1210	3/4"
2	GWB	1200	3/4"
3	Stud	500	1'-8 1/2"
4	GWB	1200	3/4"
5	GWB	1210	3/4"

11. Adjust the positions of the components so that the wall looks proper.

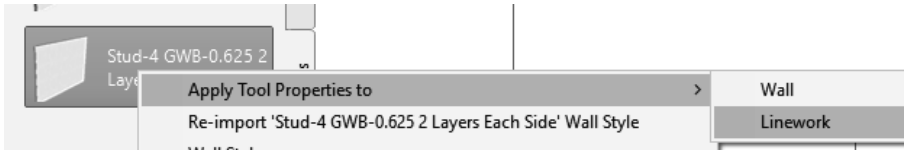
Index	Name	Priority	Width	Edge Offset	Fr
1	GWB	1210	3/4"	1'-9"	N
2	GWB	1200	3/4"	1'-8 1/2"	St
3	Stud	500	1'-8 1/2"	0"	St
4	GWB	1200	3/4"	-3/4"	N
5	GWB	1210	3/4"	-1 1/4"	N

12. Verify that the total width is 1’-11”.

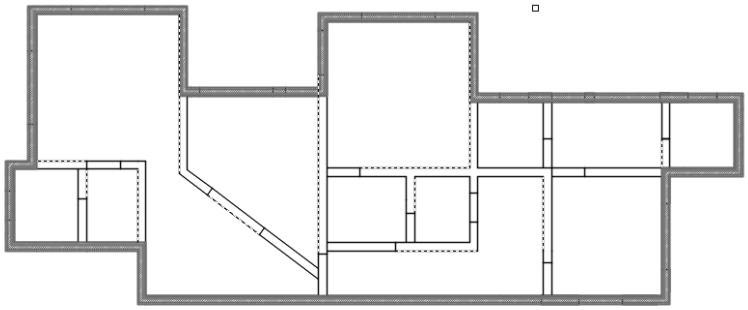


13. Click **OK** to close the Style Manager.

14. Select the **Stud-4 GWB-0.625-2 Layers Each Side** wall style.



Right click and select **Apply Tool Properties to → Linework**.

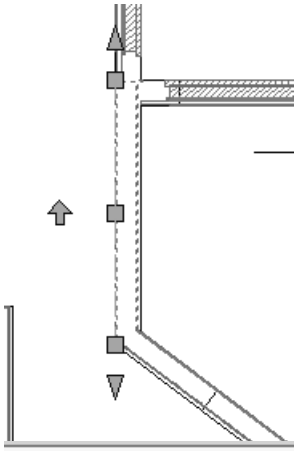
15. 

Select the inside segments of the walls.

Do not select any of the exterior walls.

Click ENTER when you are done selecting lines.

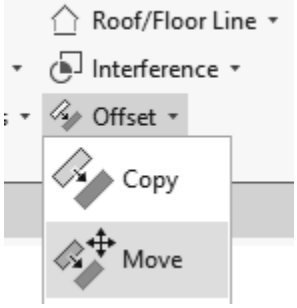
16. You will be prompted if you want to erase any of the line work. Enter **NO**.

17. 

Zoom into one of the walls that was placed. Note that it is the correct width.

The blue arrow indicates the exterior side of the wall. If the blue arrow is inside the building, click on the blue arrow and it will flip the orientation of the wall. Because these are interior walls with gypsum board on both sides, the orientation doesn't matter.

If necessary, move walls so they are aligned with the floor plan's walls.

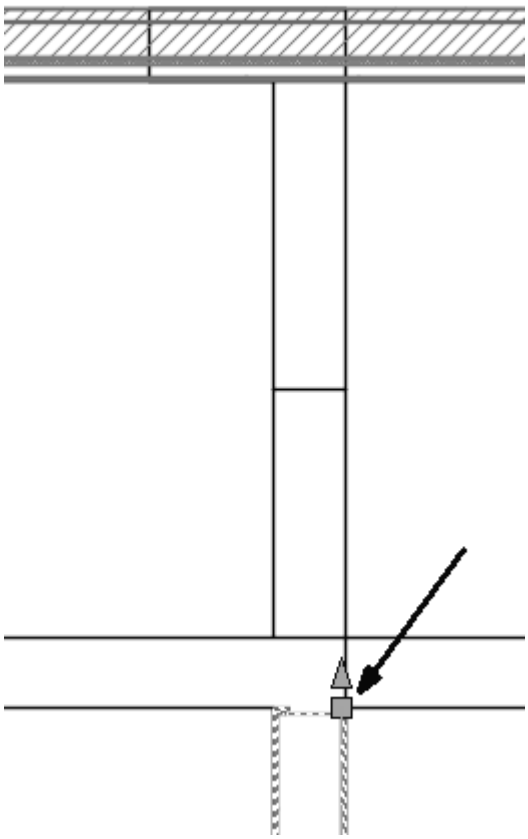
18. 

Use the OFFSET tool to move the interior walls to the correct position.

19. To extend a wall:

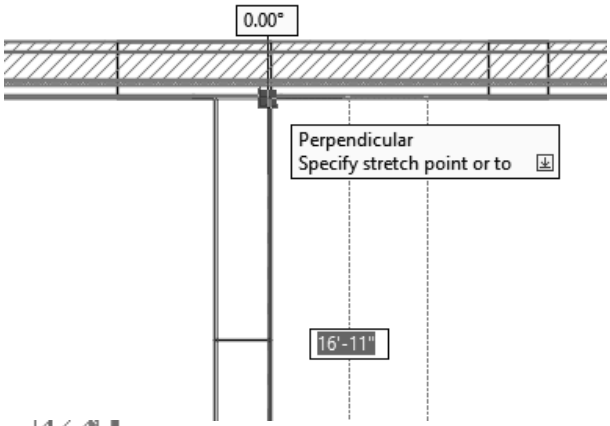
Click on the wall to select.

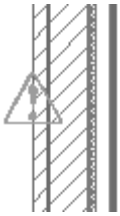
Select the end grip.



20. Select a perpendicular OSNAP to connect to an existing wall.

Hint: Turn ORTHO on to keep walls straight.



21. 

Some of your walls may display a warning symbol.

This means that you have walls overlapping each other.

Check to see if you have more than one wall or if you need to trim the walls.

22. Save as *ex3-3.dwg*.

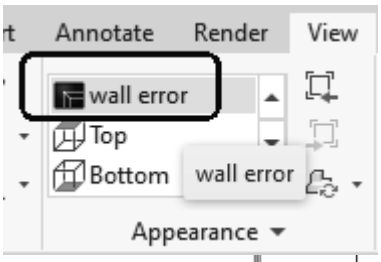
Exercise 3-4:

Wall Cleanup

Drawing Name: wall_cleanup.dwg
Estimated Time: 10 minutes

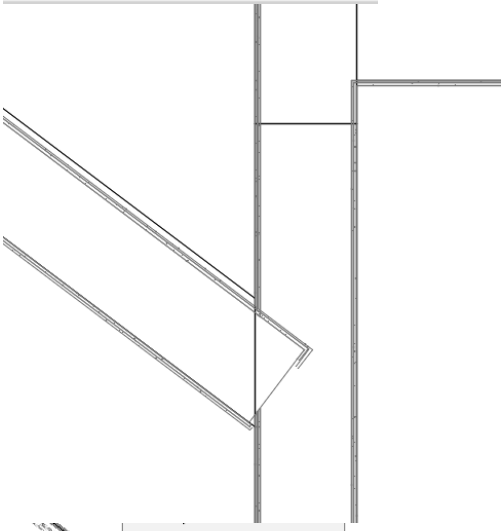
This exercise reinforces the following skills:

- Using Wall Cleanup
- Wall Properties

1. 

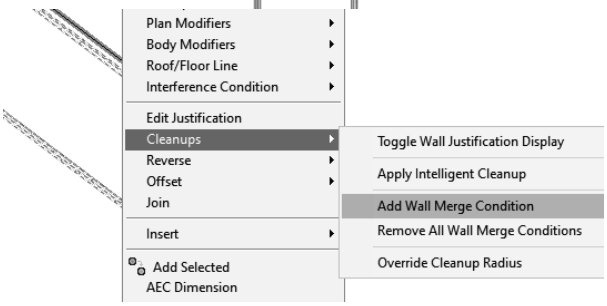
Activate the View ribbon.

Click on the **wall error** view.

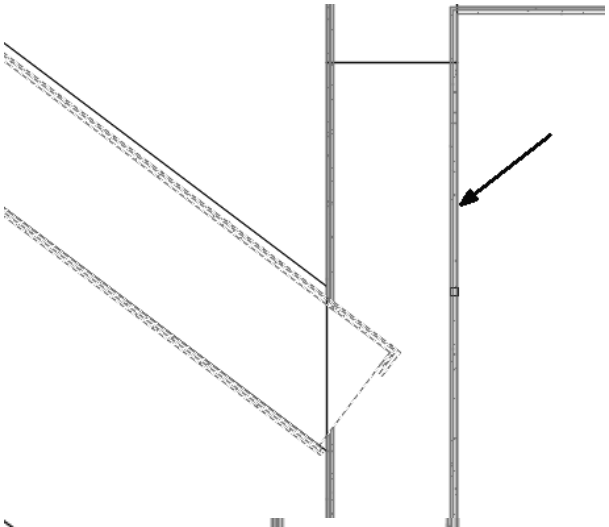
2. 

The view zooms into an area where the wall needs to be cleaned up.

Click to select the angled wall.

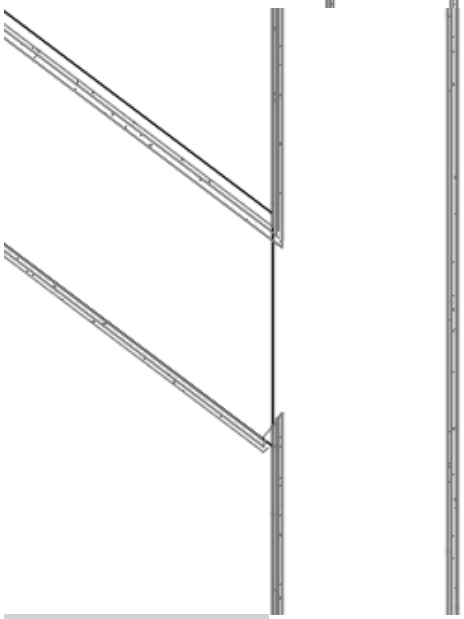
3. 

Right click and select **Cleanups→Add Wall Merge Condition**.

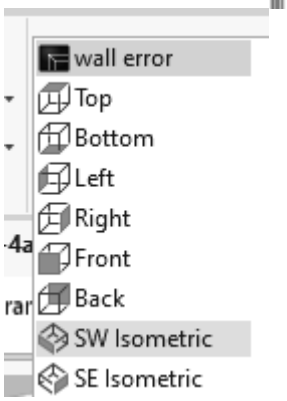
4. 

Select the vertical wall.

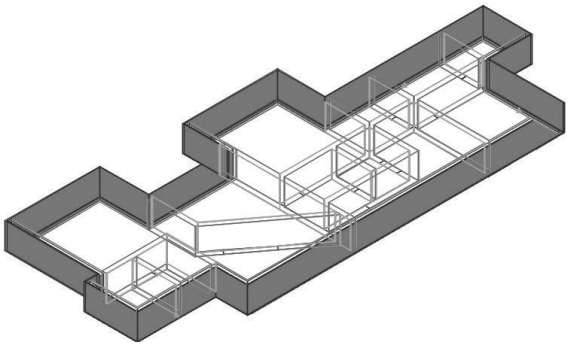
Click **ENTER**.

5. 

The walls are cleaned up.

6. 

Select a **SW Isometric** view.

7. 

The model is displayed as 3D.

Save as *ex3-4.dwg*.

Exercise 3-5:

Importing a PDF into ACA

Drawing Name: New, floorplan.pdf
Estimated Time: 10 minutes

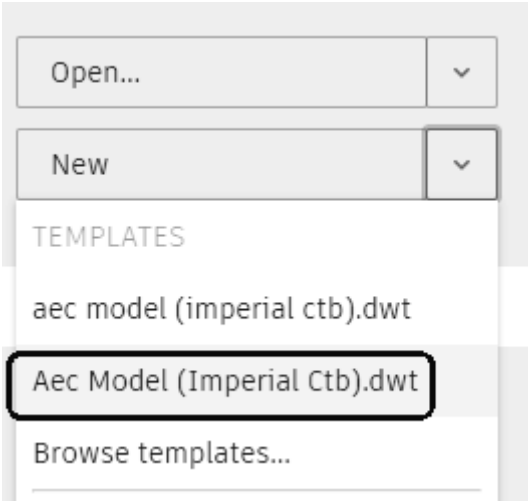
This exercise reinforces the following skills:

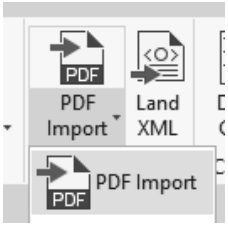
- Import PDF
- Create Walls
- Wall Properties
- Wall Styles
- Model and Workspace

1. Go to the Start tab.

   Select **New→Aec Model(Imperial Ctb).dwt**.

   This starts the new drawing using imperial units.



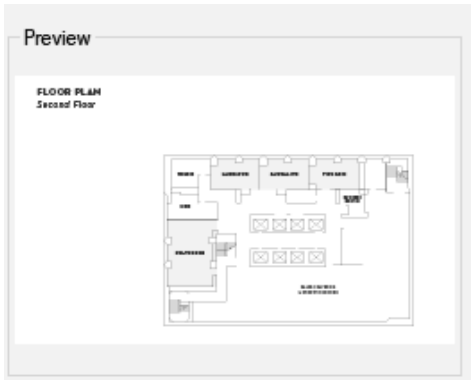
2. 

   Activate the **Insert** tab on the ribbon.

   Select the **Import PDF** tool (located in the middle of the tab on the ribbon).

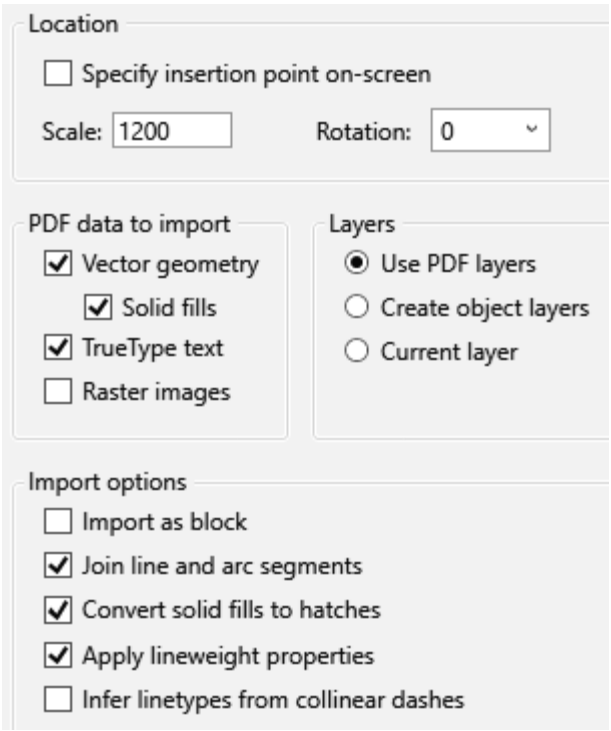
3. 

Select the *floorplan.pdf* file.

4. 

You will see a preview of the pdf file.

Click **Open**.



Uncheck specify insertion point on-screen.

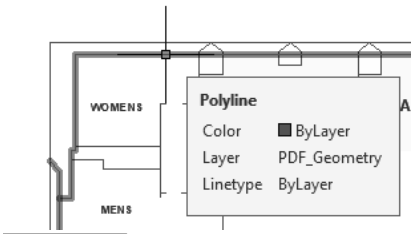
This will insert the pdf to the 0,0 coordinate.

Set the Scale to **1200**.

This will scale the pdf.

Set the rotation to 0.

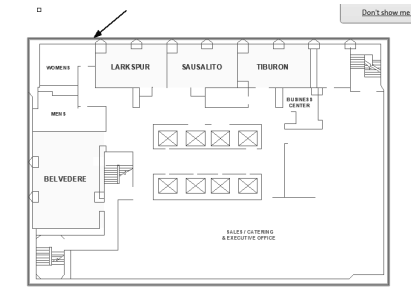
Enable Vector Geometry.
Enable Solid Fills.
Enable TrueType Text.
This will convert any text to AutoCAD text.
Enable Join line and arc segments.
Enable Convert solid fills to hatches.
Enable Apply lineweight properties.
Enable Use PDF layers.

5. Click **OK**.
6. 

Notice if you hover your mouse over any of the elements imported, they have been converted to ACA elements.

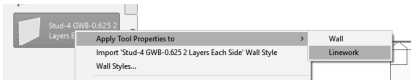
7. 

Highlight the **Stud-4 Rigid** wall style on the tool palette. Right click and select **Apply Tool Properties to Linework.**

8. 

Select the outside polyline on the floorplan.
Click ENTER to complete the selection.

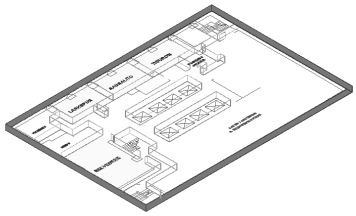
When prompted to erase existing lines, select **No**.

9. 

Highlight the **Stud 4- GWB** wall style.
Right click and select **Apply Tool Properties to Linework.**

Select the lines used for the interior walls.
Click ENTER to complete the selection.

When prompted to erase existing lines, select **No**.

10. 

Use the OFFSET and FILLET tools to clean up the floor plan.

11. Save as *ex3-5.dwg*.

You can compare your model with mine and see how you did.

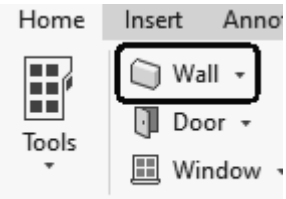
Exercise 3-6:

Creating Walls

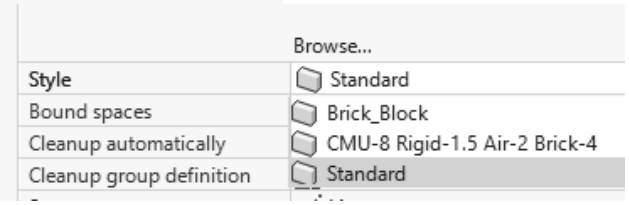
Drawing Name: wall_space
Estimated Time: 10 minutes

This exercise reinforces the following skills:

- Create Walls
- Wall Properties
- Wall Styles
- Model and Workspace
- Content Browser

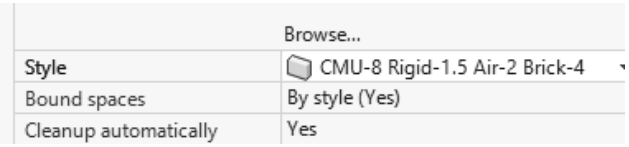
1. 

Select the **Wall** tool from the Home ribbon on the ribbon.

2. 

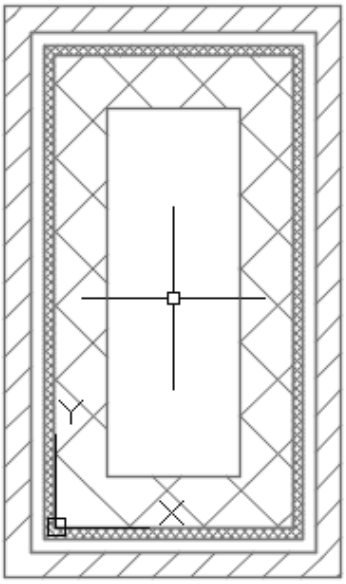
In the Properties dialog, check under the Style drop-down list.

These are the styles currently available for use loaded in the drawing.

3. 

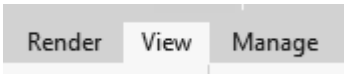
Select the **CMU-8 Rigid-1.5 Air 2 Brick-4** wall style.

4. Toggle **ORTHO** ON.



Start the wall at 0,0. Create a rectangle 72 inches [1830 mm] tall and 36 inches [914 mm] wide.

You can use Close to close the rectangle.

5. 

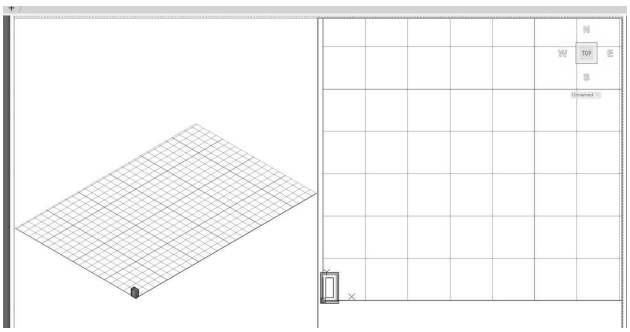
Go to the **View** ribbon.

6. 

Toggle on the Layout tabs.

7. 

Select the **Work** tab visible in the lower left corner of the screen.

8. 

The work tab opens up a layout with two viewports. One viewport is 3D and the other viewport is a top view.

You see that the walls you placed are really 3-dimensional.

9. Save your drawing as e*x3-6.dwg.*

- If you draw a wall and the materials composing the wall are on the wrong side, you can reverse the direction of the wall. Simply select the wall, right click and select the Reverse option from the menu.
- To add a wall style to a drawing, you can import it or simply create the wall using the Design Tools.
- Many architects use external drawing references to organize their projects. That way, teams of architects can concentrate just on their portions of a building. External references also use fewer system resources.
- You can convert lines, arcs, circles, or polylines to walls. If you have created a floor plan in AutoCAD and want to convert it to 3D, open the floor plan drawing inside of AutoCAD Architecture. Use the Convert to Walls tool to transform your floor plan into walls.
- To create a freestanding door, click the ENTER key when prompted to pick a wall. You can then use the grips on the door entity to move and place the door wherever you like.
- To move a door along a wall, use Door→Reposition→Along Wall. Use the OSNAP From option to locate a door a specific distance from an adjoining wall.

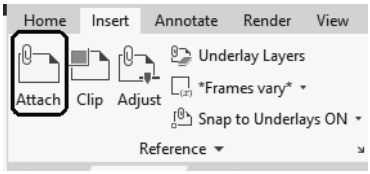
Exercise 3-7:

Inserting an Image

Drawing Name: insert_image.dwg
Estimated Time: 10 minutes

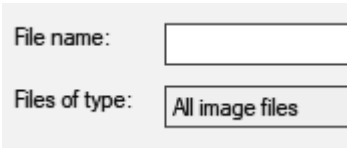
This exercise reinforces the following skills:

- Insert Image
- Properties
- Lock Layer

1. 

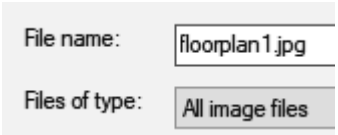
Select the **Insert** tab on the ribbon.

Select the **Attach** tool.

2. 

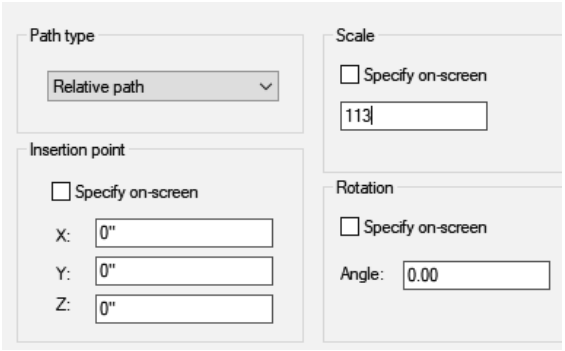
Browse to the folder where the exercises are downloaded.

Change the Files of type to **All image files**.

3. 

Select the *floorplan1* file.

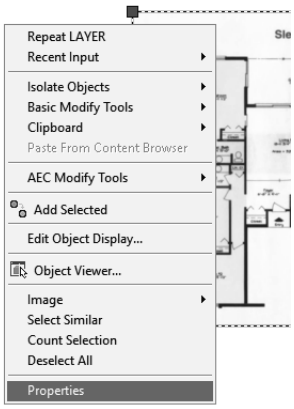
Click **Open**.

4. 

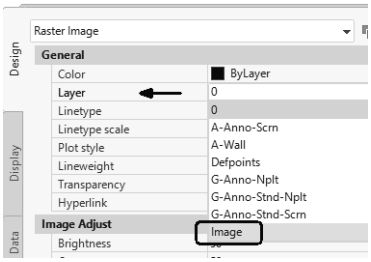
Uncheck the insertion point to insert the image at **0, 0, 0**.

Set the Scale to **113.00**.
Set the Angle to **0.0**.

Click **OK**.

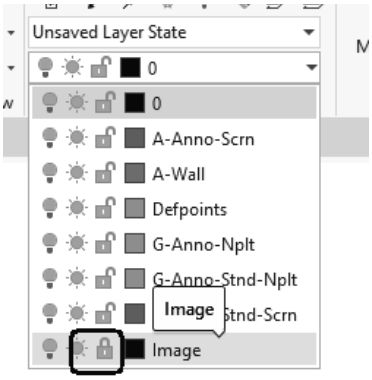
5. 

Select the image.
Right click and select **Properties**.

6. 

Assign the image to the image layer.

Click ESC to release the selection.

7. 

Lock the image layer.

8. Save as *ex3-7.dwg*.

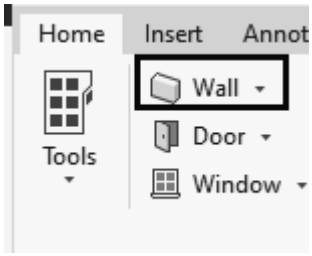
Exercise 3-8:

Creating a Floorplan from an Image

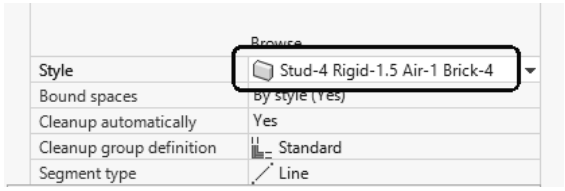
Drawing Name: image_floorplan.dwg
Estimated Time: 60 minutes

This exercise reinforces the following skills:

- Wall
- Wall Properties
- Wall Style
- Offset
- Quick Measure

1. 

Select the **Wall** tool from the Home ribbon.

2. 

Select the **Stud-4 Rigid-1.5 Air-1 Brick-4** wall style from the Style drop-down list on the Properties palette.

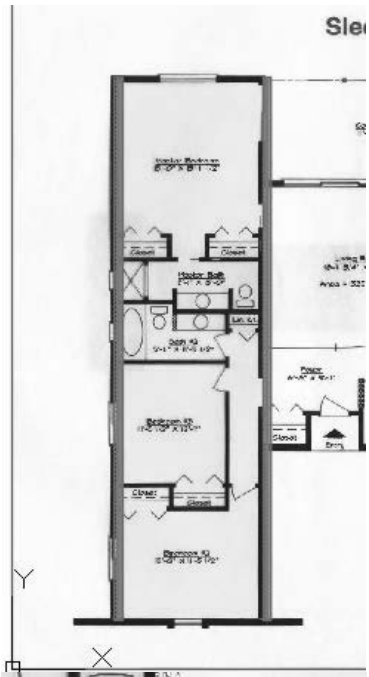
This wall style was pre-loaded in the drawing.

3. 

Turn **ORTHO** on.

Draw a wall on the far left side of the floor plan, tracing over the wall shown in the image file.

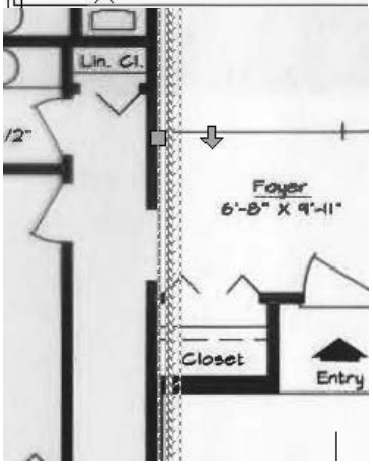
Orient the wall so the exterior side of the wall is on the outside of the building.

4. 

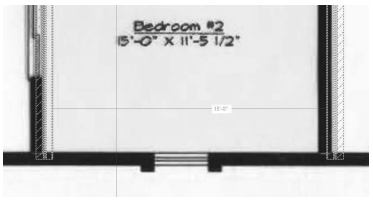
Offset the wall 15′ 11-1/8″ to the right.

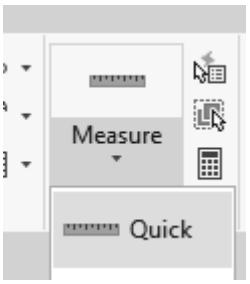
Type **OFFSET**.
Type **15′ 11-1/8″** for the offset distance.
Select the wall.
Click to the right of the wall to indicate the side to place the new wall.

The additional offset takes into account the wall thickness of 11-1/8".

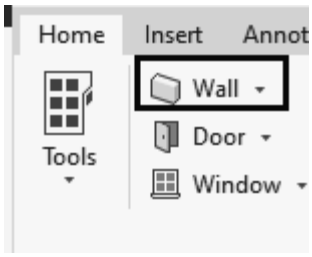
5. 

Flip the wall orientation so the wall exterior is on the outside of the building.

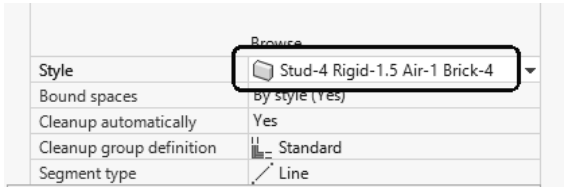
6. 



Use the Quick Measure tool to check the offset distance to ensure the two walls are 15′ apart from inside finish face to inside finish face.

7. 

Select the **Wall** tool from the Home ribbon.

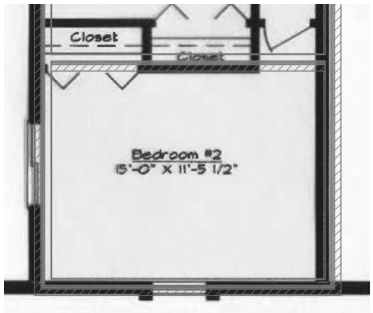
8. 

Select the **Stud-4 Rigid-1.5 Air-1 Brick-4** wall style from the Style drop-down list on the Properties palette.

9. 

Draw a wall at the bottom of the Bedroom #2 area, connecting the two vertical walls.

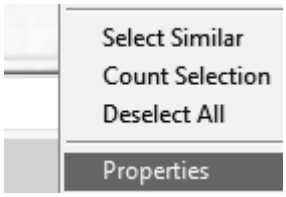
Hint: If you draw the wall from right to left, then it will be oriented with the exterior wall on the outside.

10. 

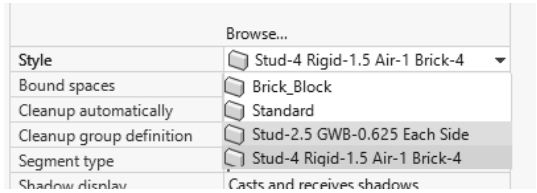
Offset the bottom horizontal wall 12’ 4.625″ above.

Type **OFFSET**.
Type **12’-4.625″** for the offset distance.
Select the wall.
Click above the wall to indicate the side to place the new wall.

The additional offset takes into account the wall thickness of 11-1/8".

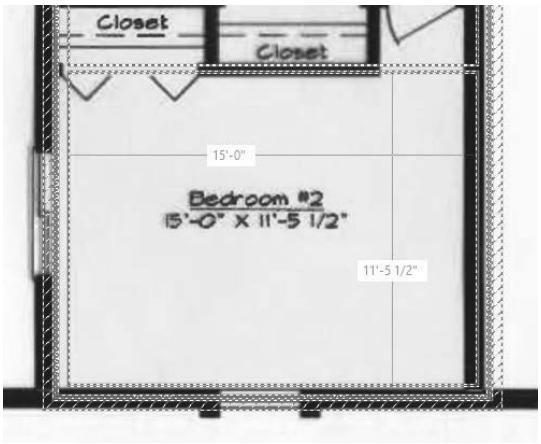
11. 

Select the upper horizontal wall that was just placed. Right click and select **Properties**.

12. 

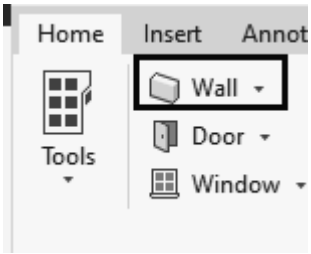
Change the wall style to **Stud-4 GWB-0.625 Each Side.**

Click **ESC** to release the selection.

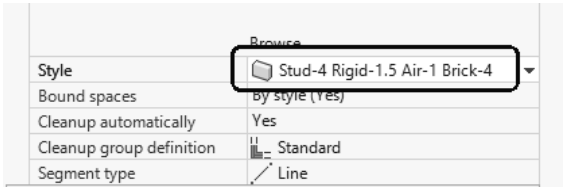
13. 

Use the Quick Measure tool to verify the room size for Bedroom #2.

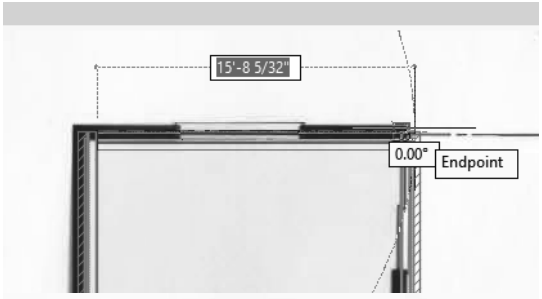
Use the MOVE tool to adjust the placement of the upper wall so the distance finish face to finish face is 11’ 5 ½”.

14. 

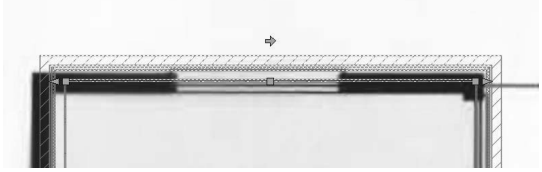
Select the **Wall** tool from the Home ribbon.

15. 

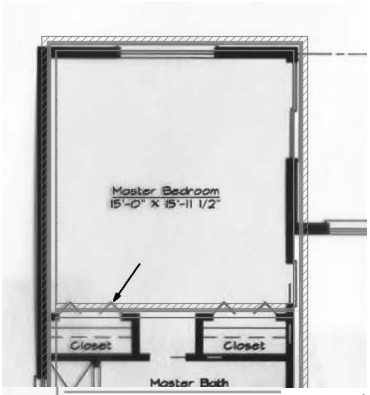
Select the **Stud-4 Rigid-1.5 Air-1 Brick-4** wall style from the Style drop-down list on the Properties palette.

16. 

Draw a wall from left to right at the top of the vertical walls.

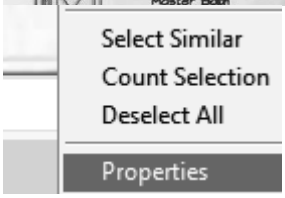
17. 

Verify that the orientation for the exterior side of the wall is outside the building.

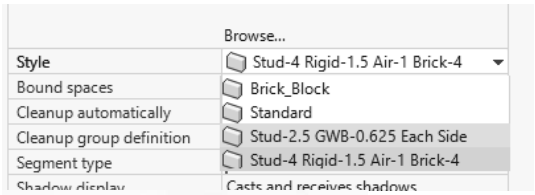
18. 

Offset the top horizontal wall 16′ 10.625″.

Type **OFFSET**.
Type **16'-10.625″** for the offset distance.
Select the wall.
Click below the wall to indicate the side to place the new wall.

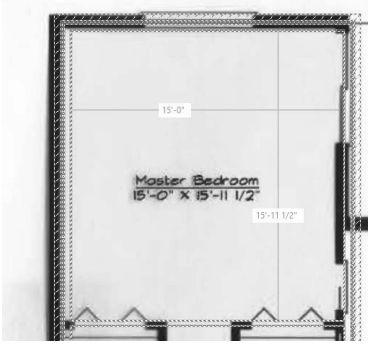
19. 

Select the horizontal wall that was just placed.
Right click and select **Properties**.

20. 

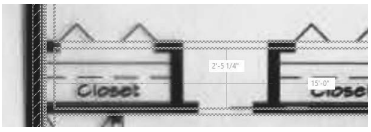
Change the wall style to **Stud-2.5 GWB-0.625 Each Side.**

Click **ESC** to release the selection.

21. 

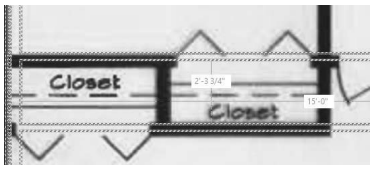
Use the Quick Measure tool to verify the Master Bedroom dimensions.

MOVE the top horizontal wall as needed to get the correct dimensions.

22. 

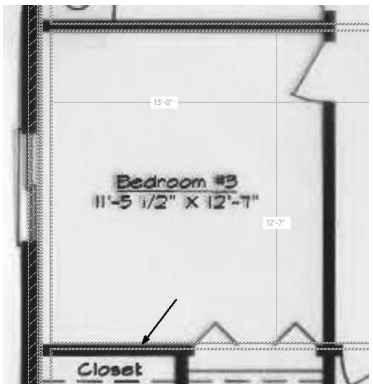
Use an offset of 2′ 9″ to create the closet space for the master bedroom.

Quick Measure will display a finish face to finish face dimension of 2’ 5.25”

23. 

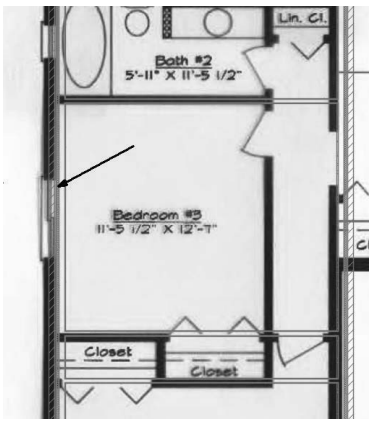
Use an offset of 2′ 7.5″ to create the closet space between the bedroom #3 and bedroom #2.

Quick Measure will display a finish face to finish face dimension of 2’ 3.75”

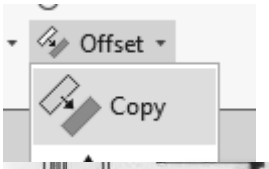
24. 

Offset the upper closet wall at the bottom of Bedroom #3 12'-10.75".

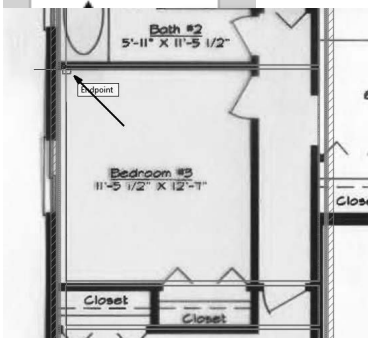
Quick Measure should show a vertical distance of 12'- 7".

25. 

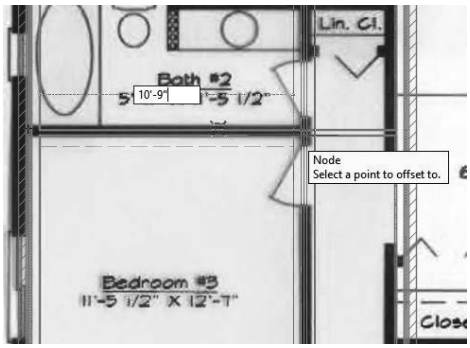
Select the left vertical wall for Bedroom #3.

26. 

Select **Offset→Copy** from the Walls ribbon.

27. 

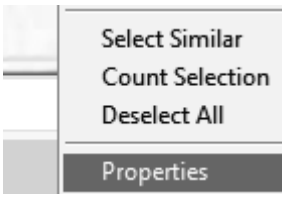
Select the upper left corner of the room.

28. 

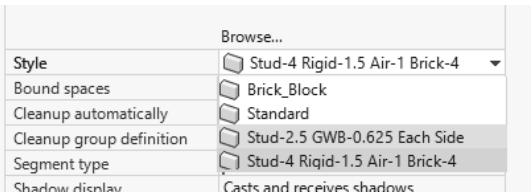
Move the mouse slightly to the right. Type **10'-9"** as the offset distance.

Click ENTER.

Click ESC to release the selection and exit the command.

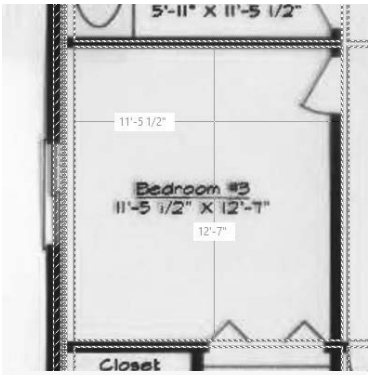
29. 

Select the wall that was just placed.
Right click and select **Properties**.

30. 

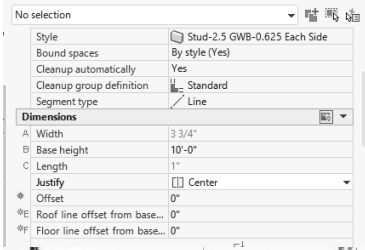
Change the wall style to **Stud-2.5 GWB-0.625 Each Side.**

Click **ESC** to release the selection.

31. 

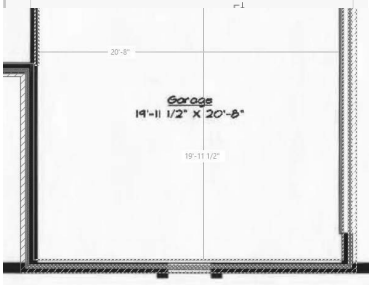
Use Quick Measure to check the dimensions for Bedroom #3.

Move the interior wall as necessary.

32. 

Trace the remaining walls of the floor plan.

Set Justify to **Center** in the Properties palette to line the walls up to the image lines.

33. 

As you work, use the Quick Measure tool to verify the wall placement.

34. Save as *ex3-8.dwg*.

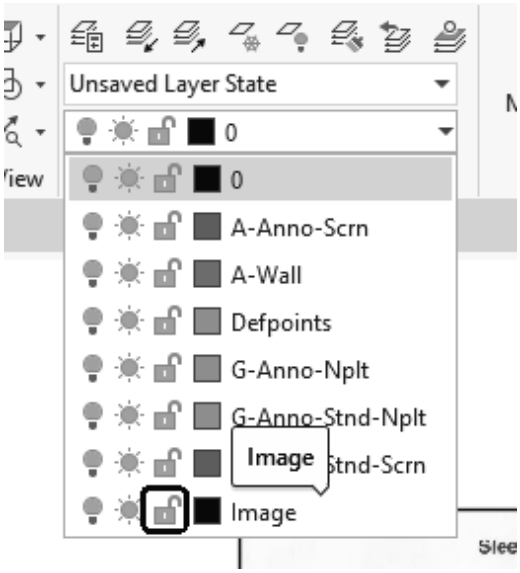
Exercise 3-9:

Controlling Image Visibility

Drawing Name: image_properties.dwg
Estimated Time: 5 minutes

This exercise reinforces the following skills:

- Images
- Layers
- IMAGEFRAME

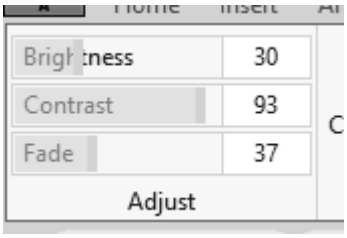
1. 

Unlock the image layer.

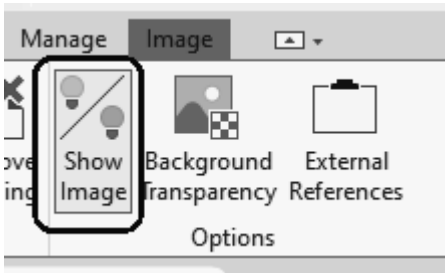
2. 

Select the image.

3. On the Image ribbon:
On the Adjust panel.
You can adjust how much of the image you see so it doesn't interfere with your work.

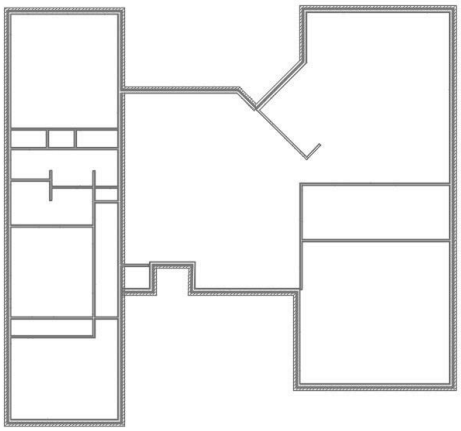


Alternatively, you can freeze the image layer or change the transparency of the layer.



You can also toggle the Show Image tool to turn the visibility of the image on or off.

To turn off the image border, type **IMAGEFRAME** and set the value to **0**.

4. 

You should have a completed floor plan.

Save as *ex3-9.dwg*.

Exercise 3-10:

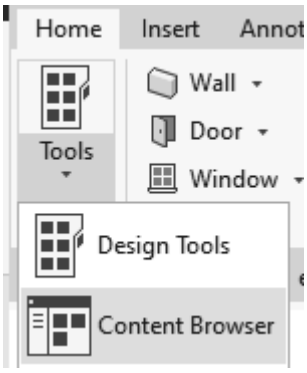
Importing a Palette from the Content Browser

Drawing Name: import_palette.dwg
Estimated Time: 5 minutes

This exercise reinforces the following skills:

- Content Browser
- Tool Palettes

While AutoCAD will allow you to export and import tool palettes, ACA only allows you to add tool palettes using the Content Browser. You can create your own tool palettes. In order to transfer tool palettes from one workstation to another, you need to create a custom catalog in the Content Browser, create a catalog and then add the desired tools to the catalog. You can store the custom catalog on a server or on a shared drive.

1. 

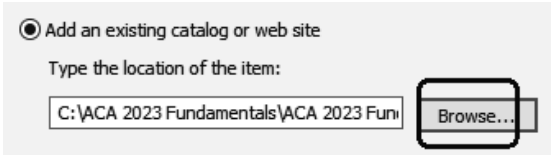
   Switch to the Home ribbon.

   Go **Tools→Content Browser**.

2. 

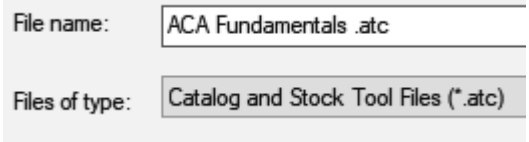
   In the lower left of the dialog window:

   Click **Create or Add Catalog**.

3. 

   Enable **Add an existing catalog or website**.

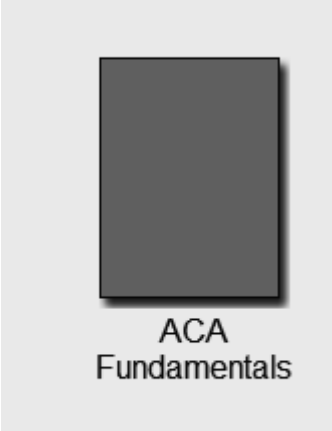
   Click **Browse**.

4. 

   Browse to the downloaded files and locate the *ACA Fundamentals.atc* file.

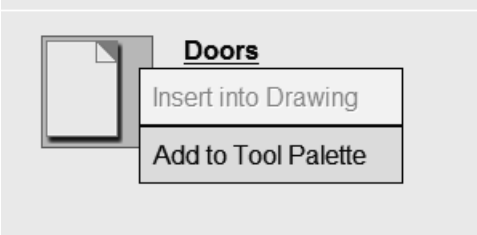
   Click **Open**.

   Click **OK**.

5. 

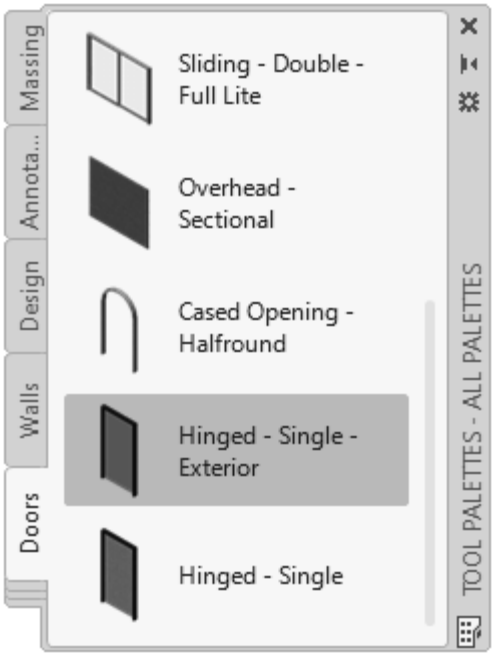
The catalog will be added to your Content Browser.

Click on the catalog.

6. 

You see a Doors Category.

Right click and select **Add to Tool Palette**.

7. 

The tool palettes open with the new imported Doors palette.

Exercise 3-11:

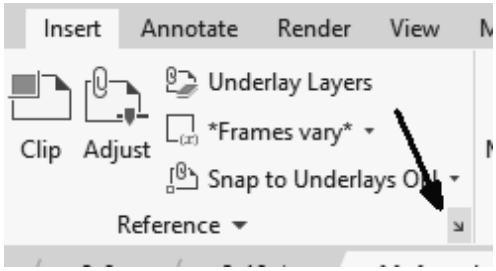
Adding Doors

Drawing Name: add_doors.dwg
Estimated Time: 45 minutes

This exercise reinforces the following skills:

- External References
- Adding Doors
- Door Properties

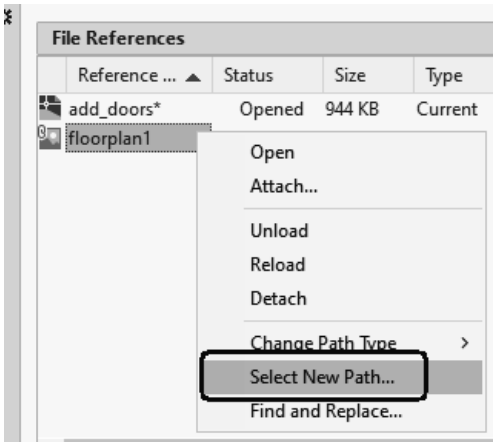
1. Open *add_doors.dwg.*

2. 

Activate the Insert ribbon.

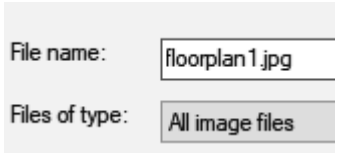
Open the External References Manager.

You can also type XREF.

3. 

Highlight the *floorplan1* image file.

Right click and click **Select New Path**.

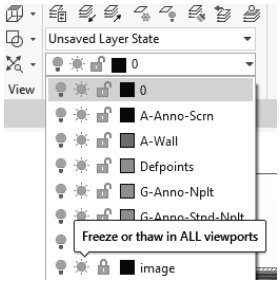
4. 

Browse to where you downloaded the file.
Select the file.
Click **Open**.

Because the drawing is referencing an external file, you need to point it to the correct path.

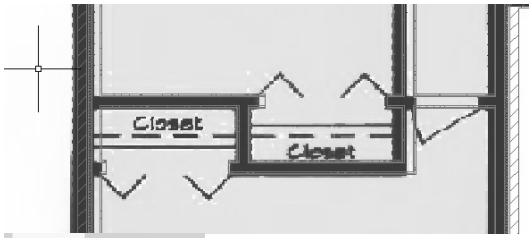
Close the XREF Manager.

5. Type **PLAN** to switch to a plan view.
Click **ENTER**.

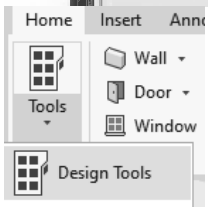
6. 

Switch to the Home ribbon.

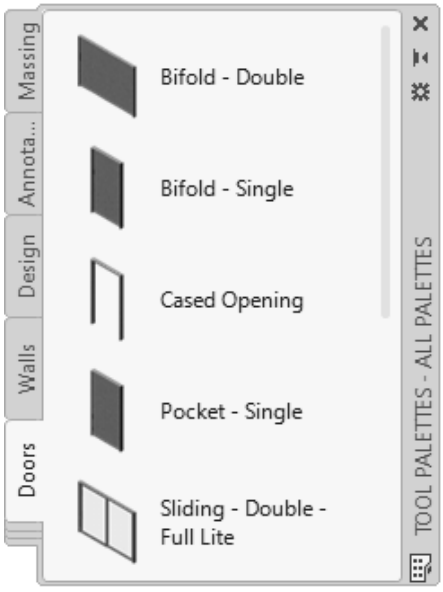
Thaw the image layer so you can see where doors are located.

7. 

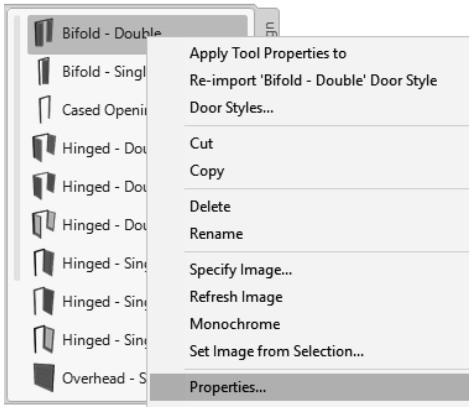
Zoom into the Closets between the two bedrooms.

8. 

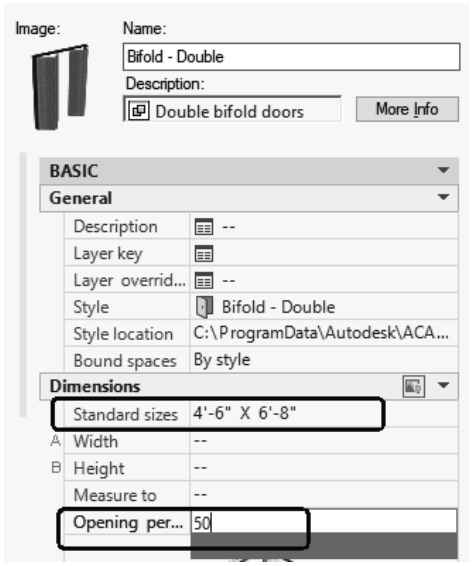
Click **Tools→Design Tools**.

9. 

Select the **Doors** tab on the palette.

10. 

Highlight the **Bifold - Double** door.
Right click and select **Properties**.

11. 

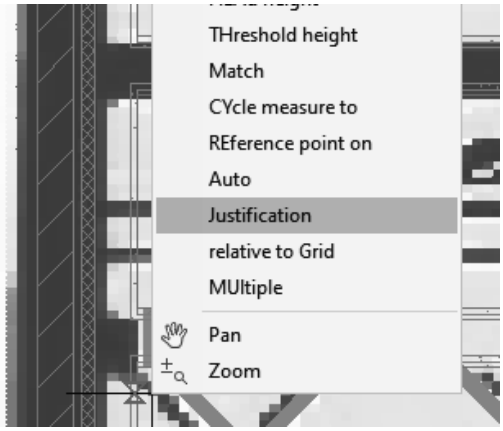
Click the **Bifold - Double** door tool.
Expand the **Dimensions** section.
Set the size to
4′-6″ x 6′-8″.

Set the Opening percent to **50**.

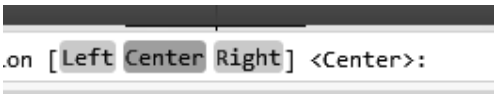
Click **OK**.

If you left click in the Standard sizes field, a down arrow will appear…select the down arrow and you will get a list of standard sizes. Then, select the size you want.

A 25% opening will show a door swing at a 45-degree angle.
The value of the Opening percentage determines the angle of the arc swing.
A 50% value indicates the door will appear half-open at a 90-degree angle.

12. 

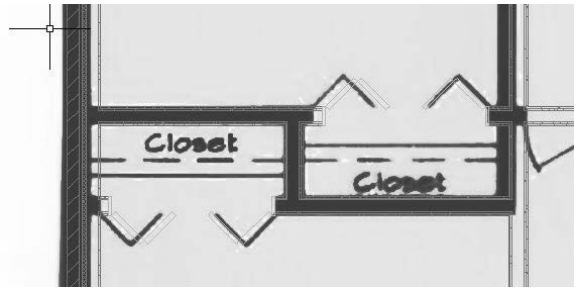
Right click and select **Justification**.

13. 

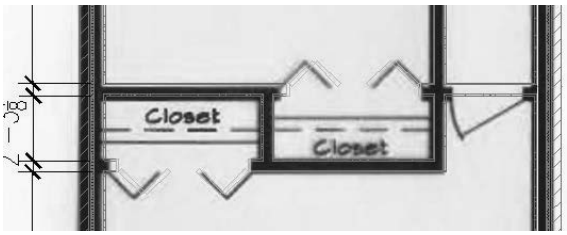
Select **Center**.

14. Place the Bifold - Double doors at the two closets.

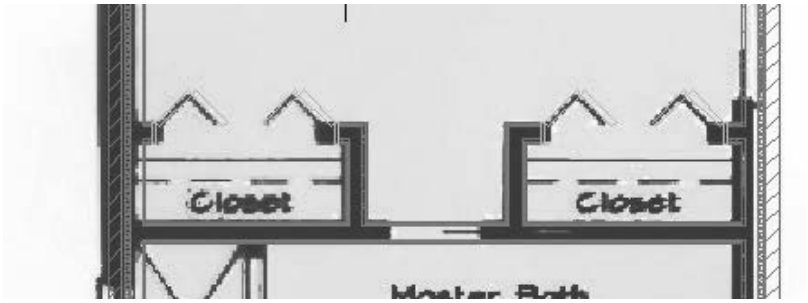
The orientation of the door swing is determined by the wall side selected.



In both cases, you want to select the outside face of the wall.
Center the closet door on each wall.

15. 

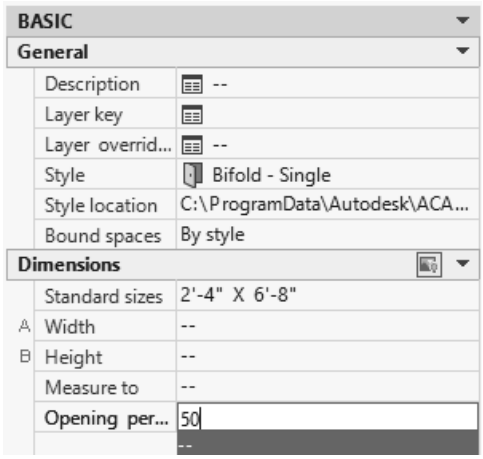
Place the **Bifold - Double** door at each of the closets located in Bedroom #2 and Bedroom #3.

16. 

Place the **Bifold - Double** door at the closets in the Master Bedroom.

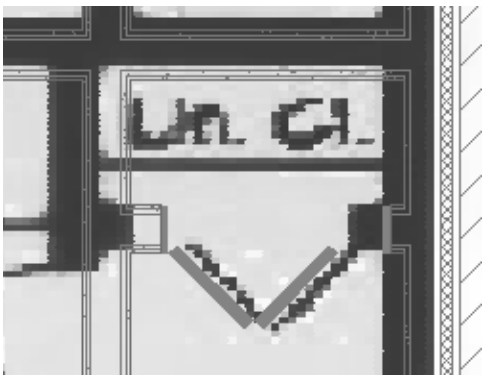
17. 

Click the **Bifold - Single** door on the Doors tab of the Design Tools palette.

18. 

In the Properties palette:

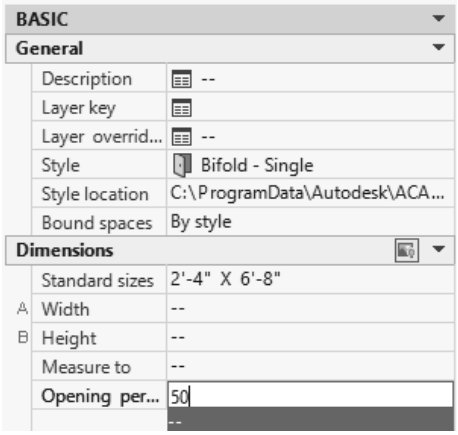
Set the door to use the Standard Size **2′ 4″ x 6′ 8″**.
Set the Opening percent to **50**.

19. 

Place the door in the Linen Closet near Bath #2.

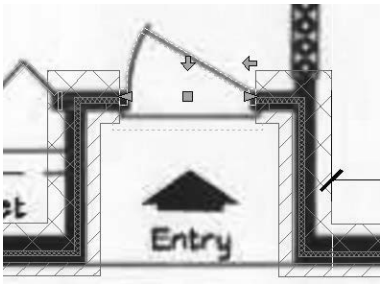
20. 

Select the **Hinged - Single - Exterior** door on the Doors tab of the Design Tools palette.

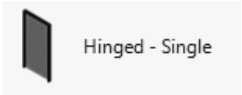
21. 

In the Properties palette, set the door to use the size **3′ 0″ x 6′ 8″**.

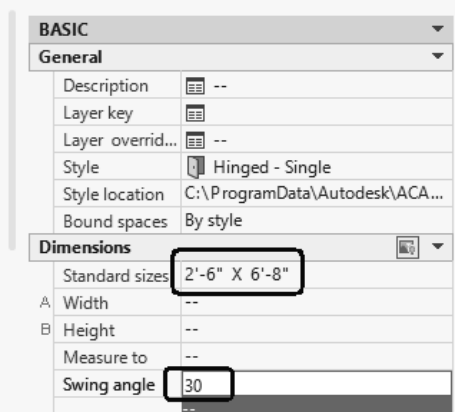
Set the Swing angle to **30**.

22. 

Select the side of the wall that will be used for the door swing and place the entry door.

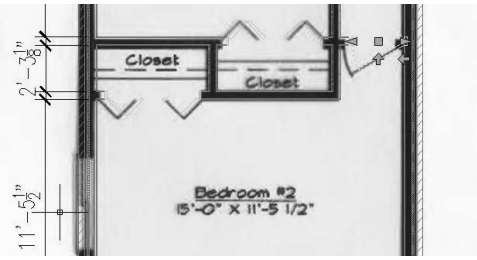
23. 

Select the **Hinged - Single** door on the Doors tab of the Design Tools palette.

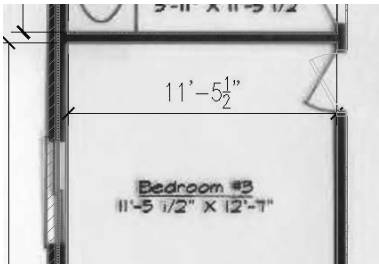
24. 

In the Properties palette, set the door to use the size **2′ 6″ x 6′ 8″**.

Set the Swing angle to **30**.

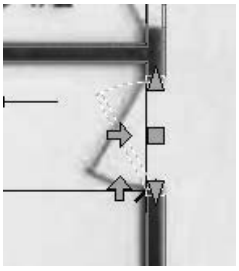
25. 

Place the door in Bedroom #2.

26. 

Place the door in Bedroom #3.

The swing is on the correct side but not the correct direction.

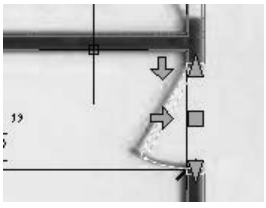
27. 

Select the door so it highlights.

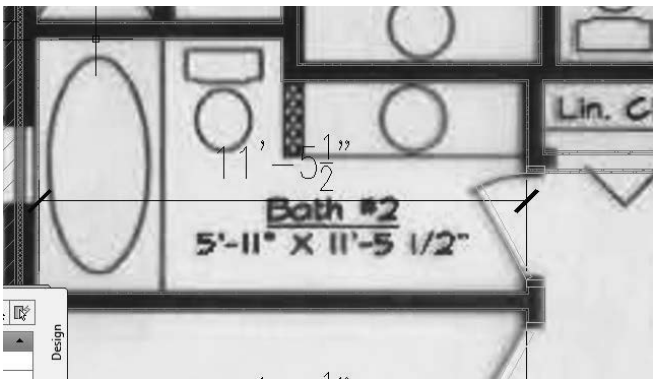
The horizontal arrow flips the orientation of the door to the other side of the wall.

The vertical arrow flips the orientation of the door swing.

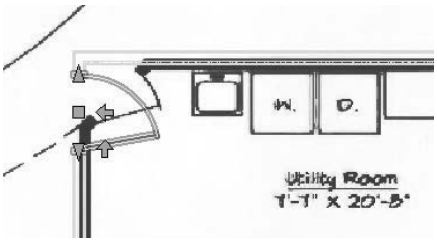
Left click on the vertical arrow.



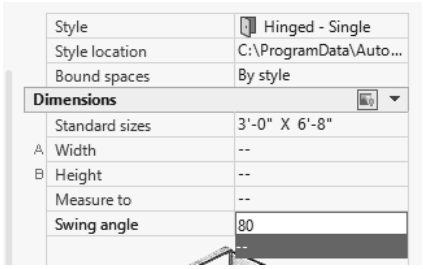
The door updates to match the floor plan image.

28. 

Place a **Hinged - Single** door in Bath #2.

29. 

Place a **Hinged - Single** door in the Utility Room.

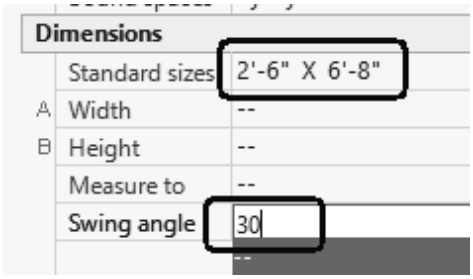
30. 

Change the size to **3'-0" x 6'-8"**.

Set the swing angle to **80**.

31. 

Locate the **Hinged - Single - Exterior** door on the Doors tab of the Design Tools palette.

32. 

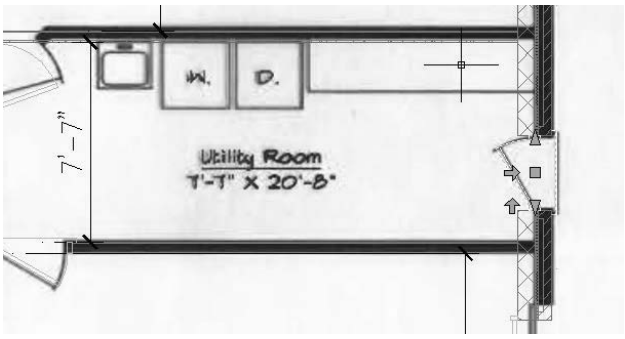
Highlight and right click to select **Properties.**

In the Properties palette,
set the door to use the Standard Size
2′ 6″ x 6′ 8″.

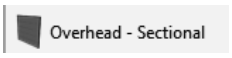
Set the Swing angle to **30**.

33. 

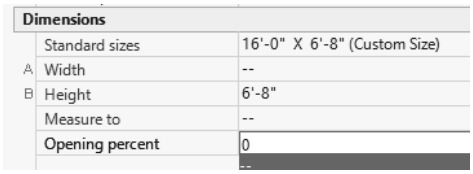
Place the door between the Utility Room and the Garage.

34. 

Place the door on the east wall of the Utility Room.

35. 

Locate the **Overhead - Sectional** door on the Doors tab of the Design Tools palette.

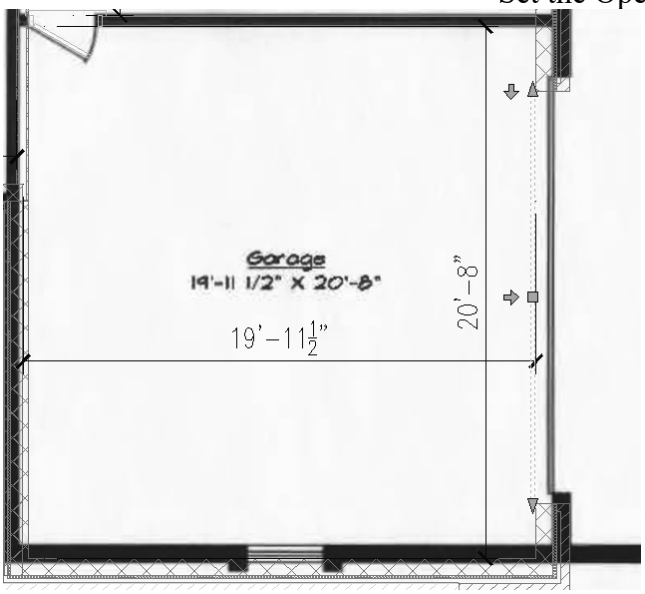
36. 

Highlight and right click to select **Properties.**

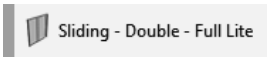
In the Properties palette,
set the door to use the Size
16′ 0″ x 6′ 8″.

To set the size, select the Custom Size option in the drop-down list.
Type in the desired width and height. The size will adjust.

Set the Opening percent to **0**.

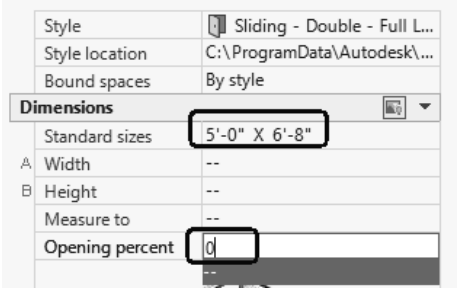
37. 

Place the garage door.

38. 

Select the **Sliding - Double - Full Lite** door on the Doors tab of the Design Tools palette.

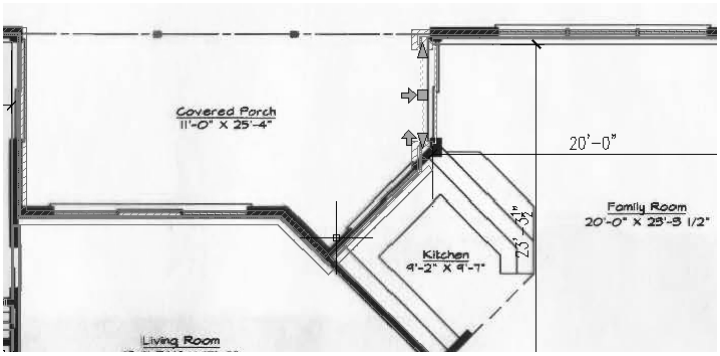
39.



In the Properties palette, set the door to use the Standard Size **5′ 0″ x 6′ 8″**.

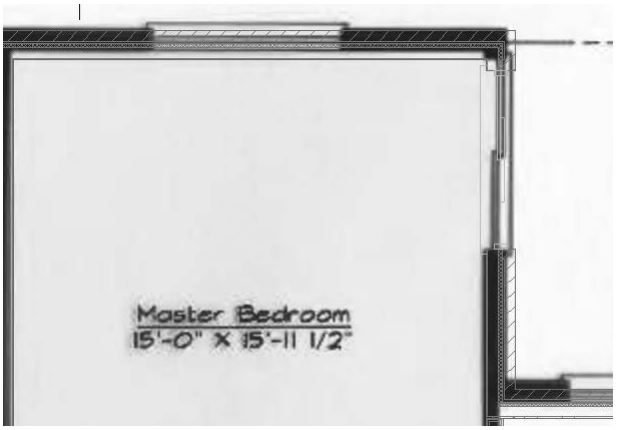
Set the Opening percent to **0**.

40.



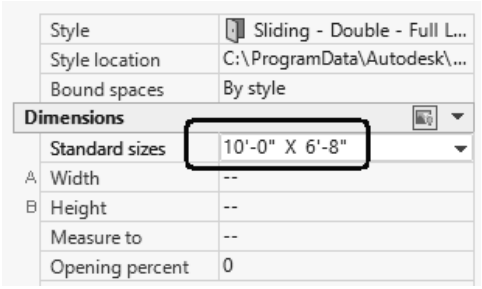
Place the door in the family room.

41.

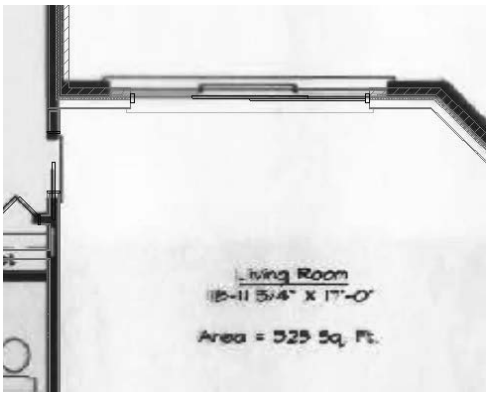


Place a second **Sliding - Double - Full Lite** door on the east wall of the Master Bedroom.

42.



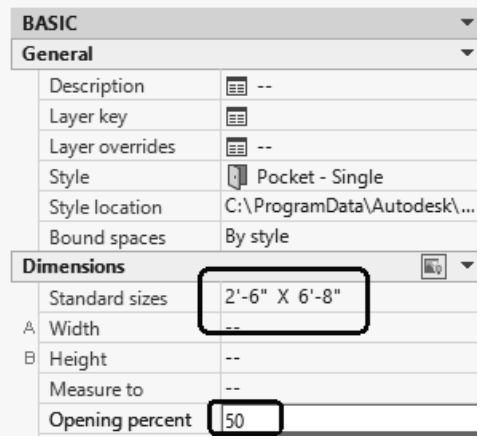
Set the door to use the size **10′ 0″ x 6′ 8″**.
Set the Opening Percent to **0**.

43. 

Center the door on the north wall of the Living Room.

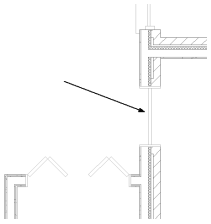
44. 

Select the **Pocket - Single** door on the Doors tab of the Design Tools palette.

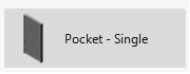
45. 

In the Properties palette
set the door to use the size:
2′ 6″ x 6′ 8″.

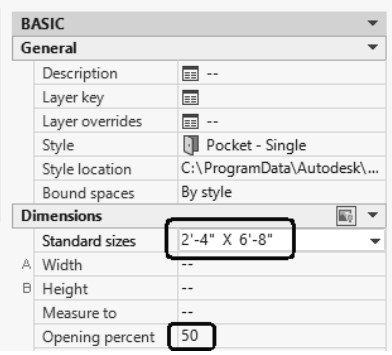
Set the Opening percent to **50**.

46. 

Place the door in the lower right corner of the Master Bedroom.

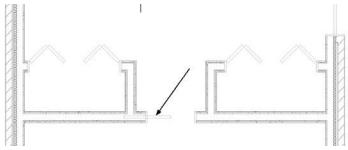
47. 

Select the **Pocket - Single** door on the Doors tab of the Design Tools palette.

48. 

In the Properties palette,
set the door to use the Standard Size **2′ 4″ x 6′ 8″**.

Set the Opening percent to **50**.

49. 

Center the pocket door on the lower horizontal wall between the Master Bedroom closets.

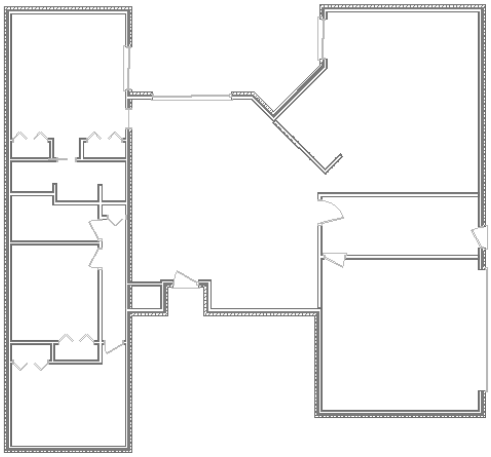
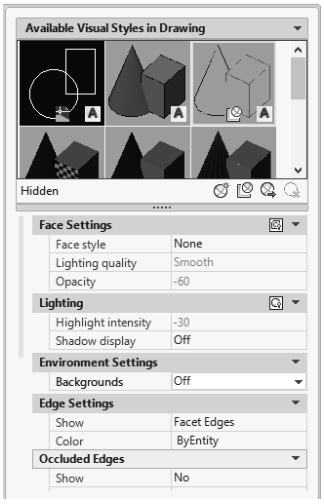
50. 

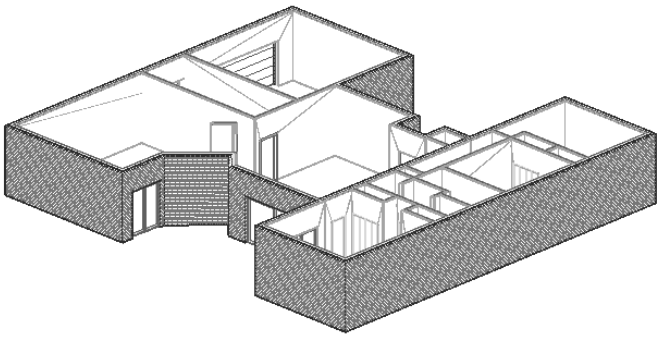
Image layer is frozen.

This is the floor plan so far.

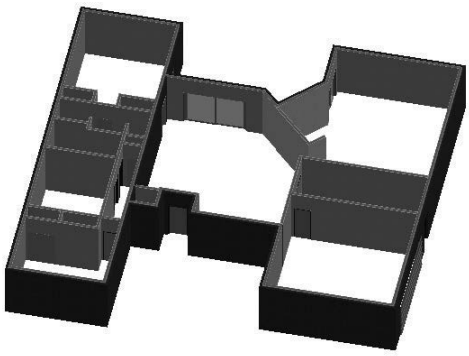
51. Save as *ex3-11.dwg*.

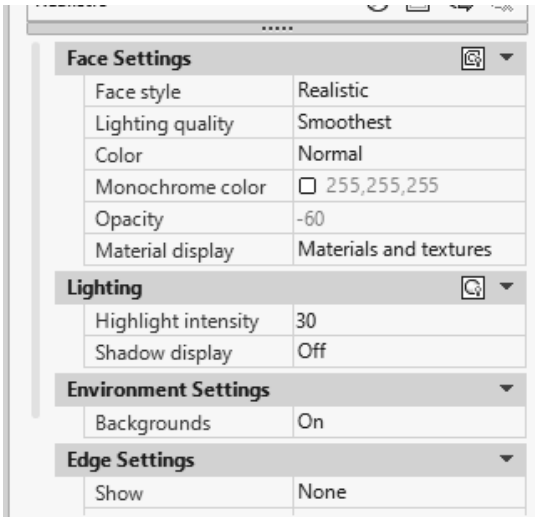
Switch to an isometric view and you will see that your model is 3D.





Look at the model using different visual styles. Which style do you like best? The model shown uses a Hidden visual style with a white background.





This is a Realistic style.

Openings

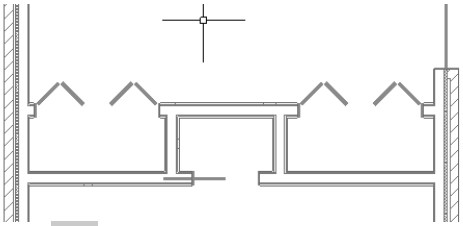
Openings can be any size and elevation. They can be applied to a wall or be freestanding. The Add Opening Properties allow the user to either select a pre-defined shape for the opening or use a custom shape.

Exercise 3-12:
Adding an Opening

Drawing Name: opening.dwg
Estimated Time: 15 minutes

This exercise reinforces the following skills:

- Adding Openings
- Opening Properties
- Copying Tools
- Set Image from Selection



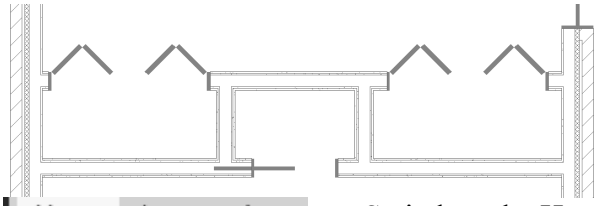
An opening will be added to the upper wall between the Master Bedroom closets.

1. Open *opening.dwg.*

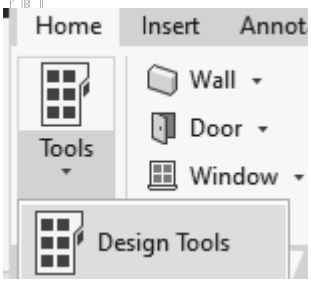
2. 

Go to the View ribbon.

Activate the **MASTER BEDROOM OPENING** view.



The view updates to the location where the opening will be placed.

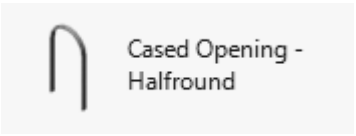
3. 

Switch to the Home ribbon.

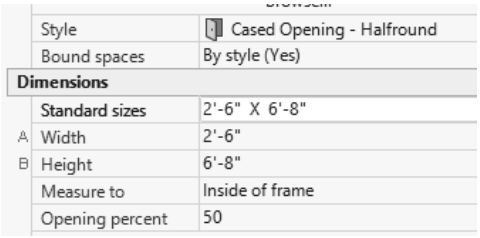
Click **Tools→Design Tools**.

4. 

Right click on the Tool Palettes bar.
Enable **All Palettes**.

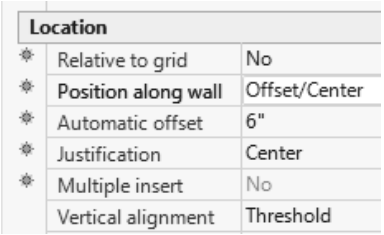
5. 

Select the **Cased Opening – Halfround** tool on the Doors palette.

6. 

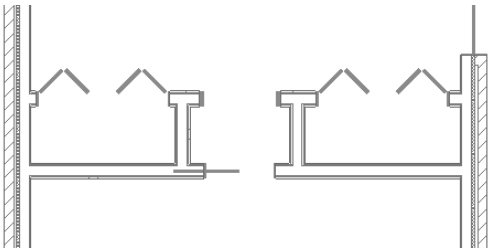
	Style	Cased Opening - Halfround
	Bound spaces	By style (Yes)
Dimensions		
	Standard sizes	2'-6" X 6'-8"
A	Width	2'-6"
B	Height	6'-8"
	Measure to	Inside of frame
	Opening percent	50

In the Properties palette,
set the door to use the size
2′ 6″ x 6′ 8″.

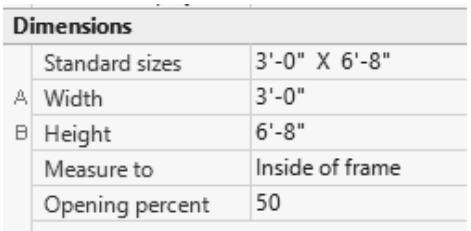
7. 

Location		
	Relative to grid	No
	Position along wall	Offset/Center
	Automatic offset	6"
	Justification	Center
	Multiple insert	No
	Vertical alignment	Threshold

Expand the Location section in the Properties palette.
Set the Position along wall to **Offset/Center**.
Set the Automatic offset to **6″ [300.00]**.

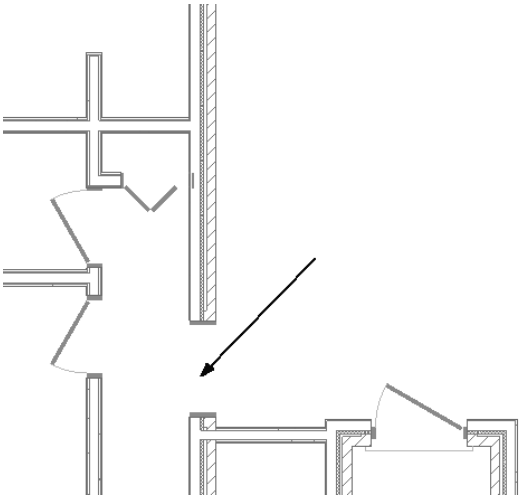
8. 

Place the arched opening in the wall between the closets in the Master Bedroom. Center it on the wall.

9. 

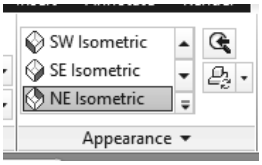
Dimensions		
	Standard sizes	3'-0" X 6'-8"
A	Width	3'-0"
B	Height	6'-8"
	Measure to	Inside of frame
	Opening percent	50

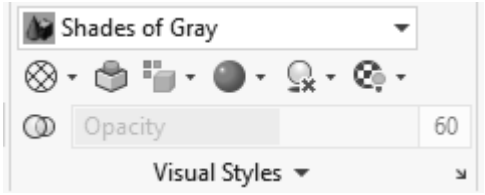
In the Properties palette,
set the door to use the size
3′ 0″ x 6′ 8″.

10. 

Place the Arched Opening on the left side of the Foyer above the Entry.

11. Use the View tools on the View tab on the ribbon **View → NE Isometric** and **3D orbit** to view the arched opening.

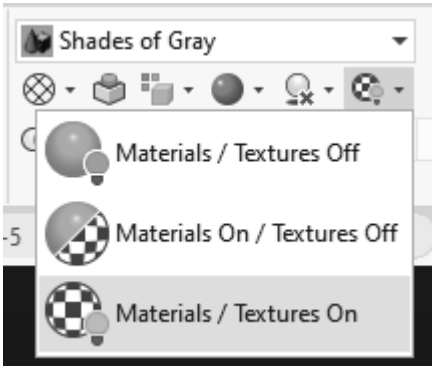


12. 

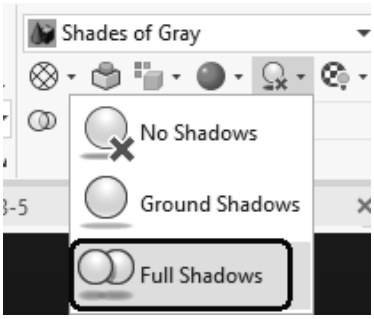
On the View tab on the ribbon,

Switch to a **Shades of Gray** display.

If your walls are reversed, you can change the orientation in the plan/top view.

13. 

Set the **Materials/Textures On**.

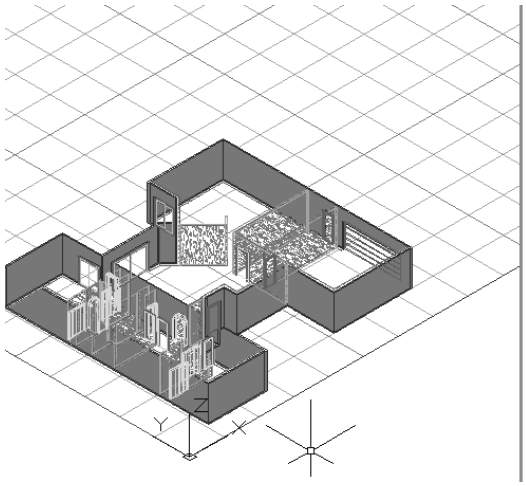
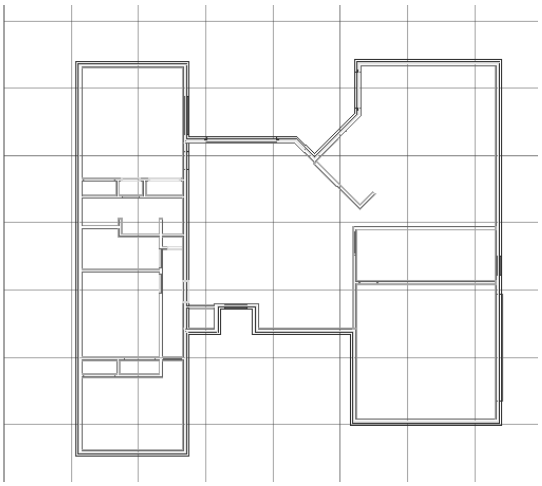
14. 

Set to **Full Shadows**.

Note how the display changes.

When materials, textures, and shadows are enabled, more memory resources are used.

15. Select the Work tab to view your model. 

16.  

17. Save the file as *ex3-12.dwg.*

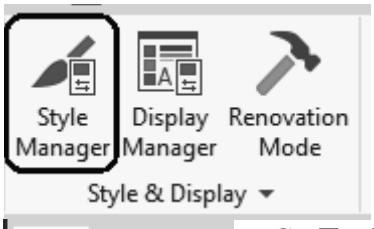
Exercise 3-13:

Create A Tool Palette using the Styles Manager

Drawing Name: windows_adc.dwg
Estimated Time: 30 minutes

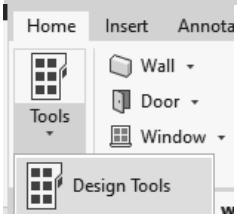
This exercise reinforces the following skills:

- Styles Manager
- Tool Palettes
- New Palette

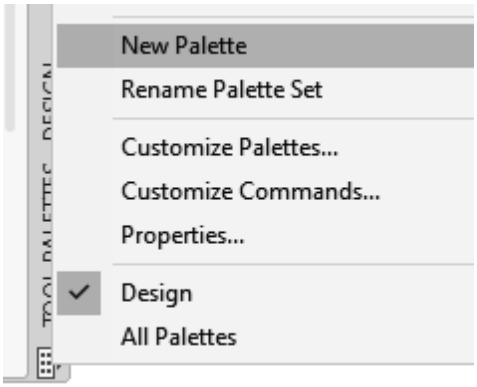
1. 

Activate the **Manage** ribbon.

Click **Style Manager**.

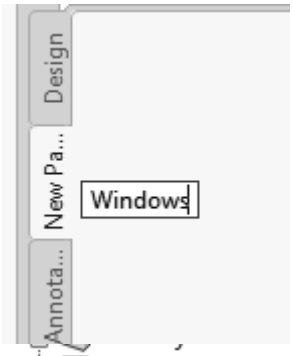
2. 

Go **Tools→Design Tools**.

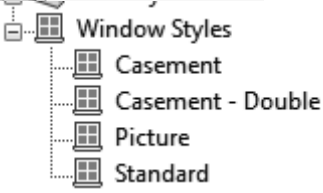
3. 

Right click on the tool palettes title bar.

Click **New Palette**.

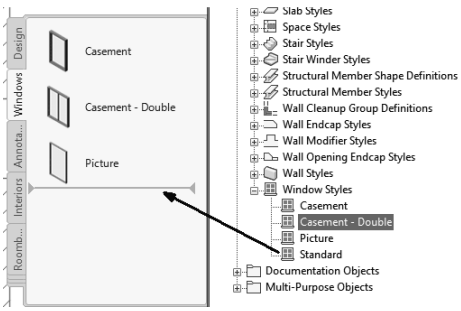
4. 

Name the New Palette **Windows**.

5. 

In the Styles Manager:

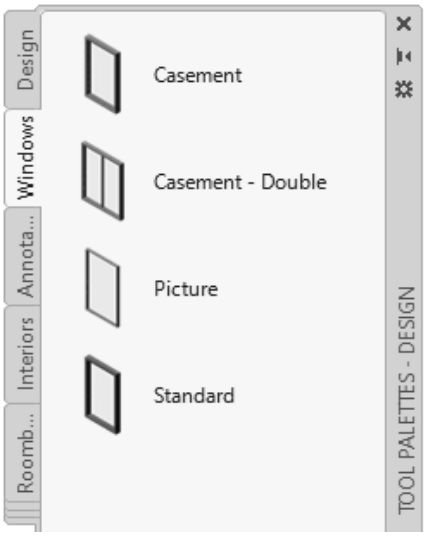
Locate the **Window Styles** in the Windows_ADC.dwg.

6. 

Drag and drop all the window styles from the Styles Manager onto the Windows tool palette.

Close the Styles Manager.

You now have a Windows tool palette.



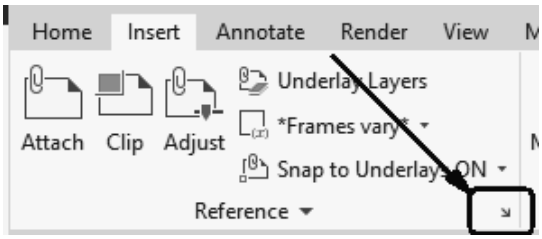
Exercise 3-14:

Add Windows

Drawing Name: windows.dwg
Estimated Time: 30 minutes

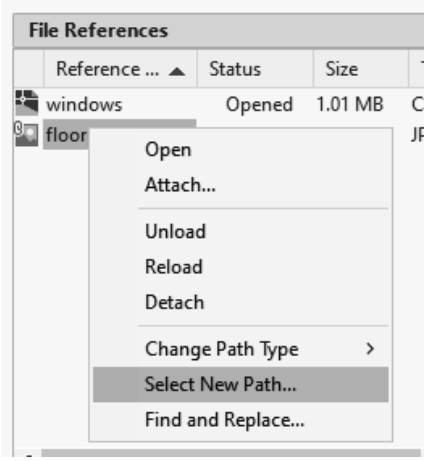
This exercise reinforces the following skills:

- Add Windows

1. 

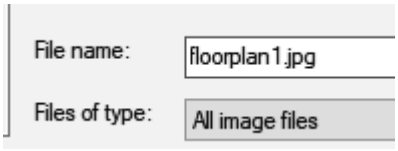
Switch to the **Insert** ribbon.

Launch the **XREF Manager.**

2. 

Right click on the image file.

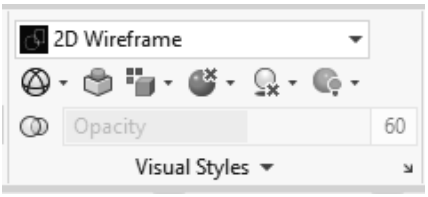
Click **Select New Path**.

3. 

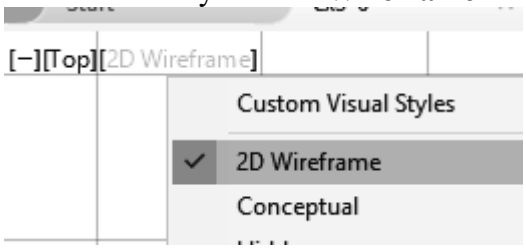
Locate the image file.

Click **Open**.

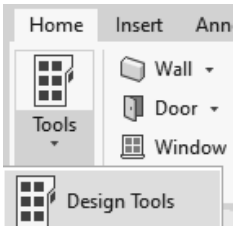
4. Close the **XREF Manager**

5. 

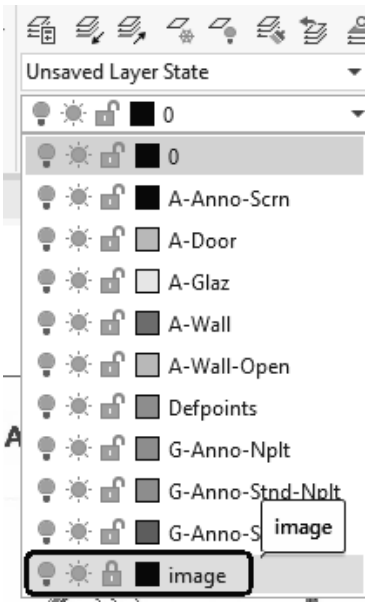
Set the View style to **2D Wireframe**.



Remember you can change the view settings in the upper left corner of the display window.

6. 

Activate the **Design Tools** from the Home ribbon on the ribbon, if they are not launched.

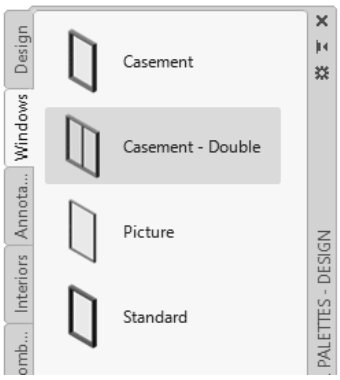
7. 

Switch to the Home ribbon.

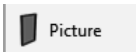
Thaw the image layer, so you can see the location of the windows.

8. 

Switch to a PLAN view. Type **PLAN, ENTER**.

9. 

Select the **Windows** tab of the Tool palette.

10. 

Select the **Picture** window.

11.

Dimensions	
Standard sizes	6'-0" X 5'-0"
A Width	6'-0"
B Height	5'-0"
Measure to	Outside of frame
Opening percent	0

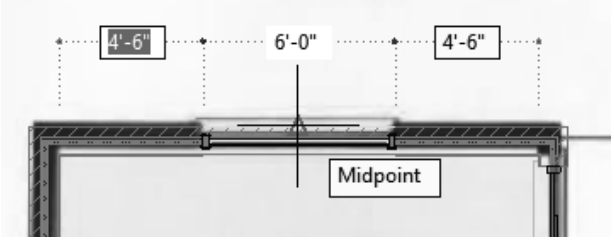
Expand the Dimensions section.
Set the size to **6′-0″ x 5′-0″**.

12.

Location	
Relative to grid	No
Position along wall	Offset/Center
Automatic offset	6"
Justification	Center
Multiple insert	No
Vertical alignment	Head
Head height	6'-8"
Sill height	1'-8"
Rotation	0.00

Expand the Location section.
Set the Position to **Offset/Center**.
Set the Automatic Offset to **6″**.

13.



Select the midpoint of the north Master Bedroom wall.

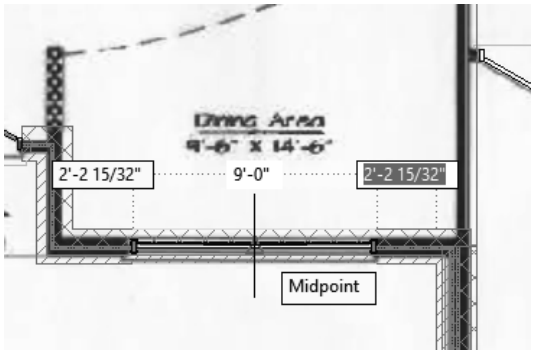
14.

Dimensions	
Standard sizes	9'-0" X 4'-0" (Custom Size)
A Width	9'-0"
B Height	4'-0"
Measure to	Outside of frame
Opening percent	0

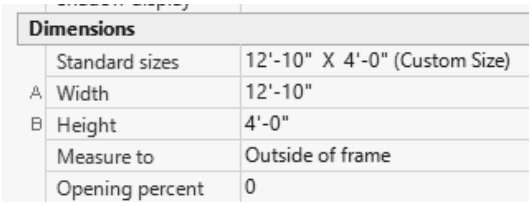
On the Properties palette, expand the Dimensions section.

Change the Width to **9′-0″**.
Change the Height to **4′-0″**.

15.



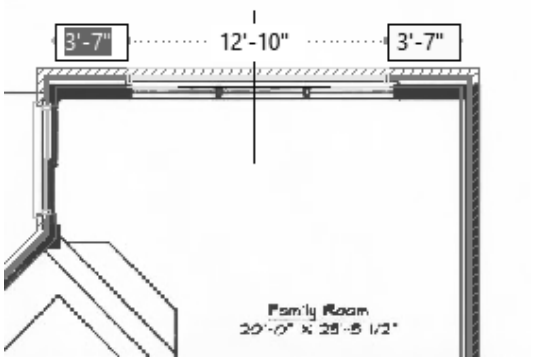
Place the window at the midpoint of the south wall in the Dining Area.

16. 

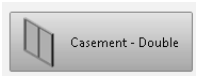
Dimensions		
	Standard sizes	12'-10" X 4'-0" (Custom Size)
A	Width	12'-10"
B	Height	4'-0"
	Measure to	Outside of frame
	Opening percent	0

On the Properties palette, expand the Dimensions section.

Change the Width to **12′-10″**.
Change the Height to **4′-0″**.

17. 

Place the window at the midpoint of the north wall for the Family Room.

18. 

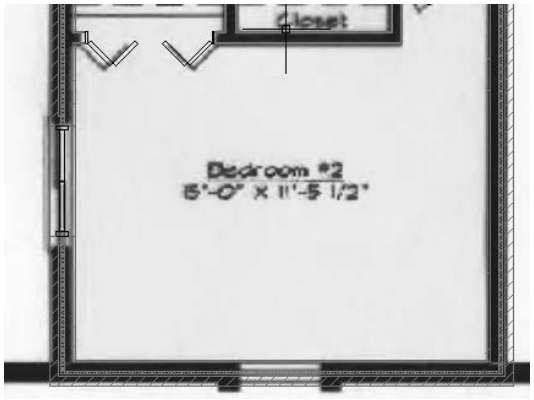
Select the **Casement - Double** window on the Windows palette.

19.

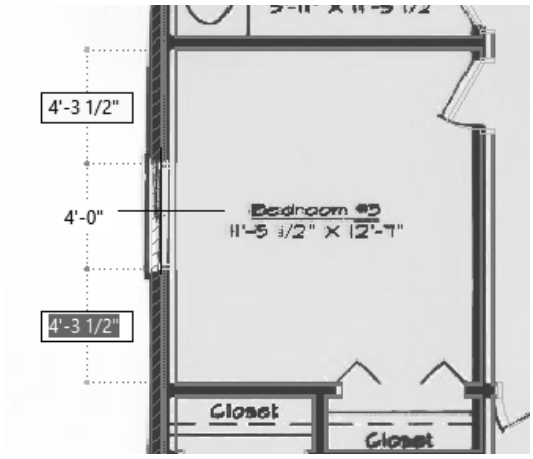
Dimensions		
	Standard sizes	4'-0" X 4'-0"
A	Width	4'-0"
B	Height	4'-0"
	Measure to	Outside of frame
	Swing angle	0

On the Properties palette, expand the Dimensions section.

Set the Standard size to **4′-0″ x 4′-0″**.

20. 

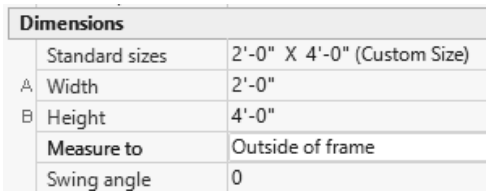
Place the window in the west wall of Bedroom #2.

21. 

Place the window in the west wall of Bedroom #3.

22. 

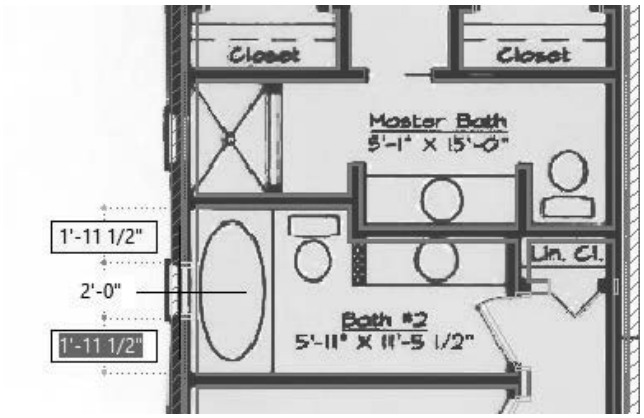
Select the **Casement** window.

23. 

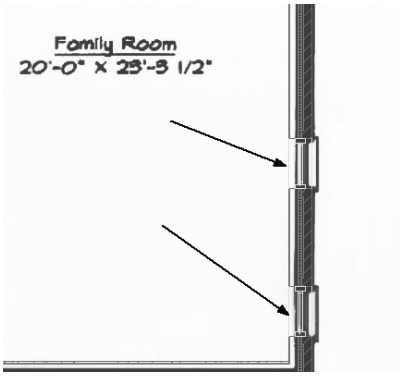
Dimensions	
Standard sizes	2'-0" X 4'-0" (Custom Size)
A Width	2'-0"
B Height	4'-0"
Measure to	Outside of frame
Swing angle	0

On the Properties palette, expand the Dimensions section.

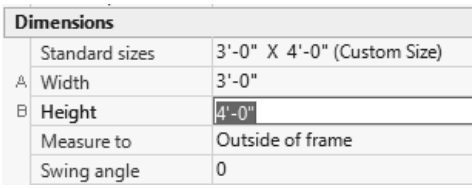
Change the Width to **2′-0″** .
Change the Height to **4′-0″**.

24. 

Place two windows on the west wall of the bathrooms.

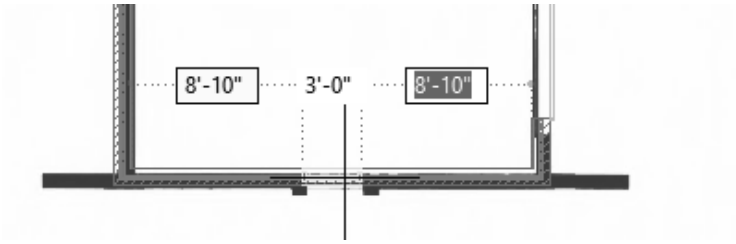
25. 

Place two windows on the east wall of the Family Room.

26. 

On the Properties palette, expand the Dimensions section.

Change the Width to **3′-0″** .
Change the Height to **4′-0″**.

27. 

Place the window in the south wall of the Garage.

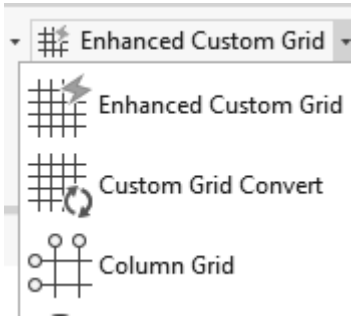
28. Save as *ex3-14.dwg.*

Grids

Grids are used in floor plans to help architects and designers locate AEC elements, such as columns, walls, windows, and doors. The grid is one of the oldest architectural design tools – dating back to the Greeks. It is a useful tool for controlling the position of building elements. Grids may fill the entire design work area or just a small area.

In laying out wood framed buildings, a 16” or 24” grid is useful because that system relies on a stud spacing of 16” or 24”.

In large projects, the layout design of different building sub-systems and services are usually assigned to different teams. By setting up an initial set of rules on how the grid is to be laid out, designers can proceed independently and use the grid to ensure that the elements will interact properly.



ACA comes with several grid tools.

The Enhanced Custom Grid allows you to place an entire grid using a dialog box to designate the bay spacing.

The Custom Grid Convert tool allows you to convert lines and arcs to grid lines. After the grid lines are placed, you have to manually edit the labels for each bubble.

The Column Grid tool allows you to place a rectangular grid with equal spacing between the grid lines.

Use the Enhanced Custom Grid tool if you want to use different spacing between grid lines or if you want to place radial grid lines.

Exercise 3-15:
Place a Grid

Drawing Name: grid.dwg
Estimated Time: 5 minutes

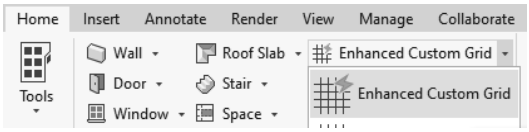
This exercise reinforces the following skills:

- Place a grid

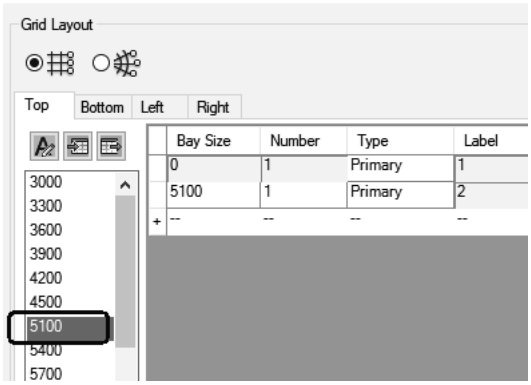
1. 

Open *grid.dwg.*

Activate the Model tab.
Switch to a Top View.

2. 

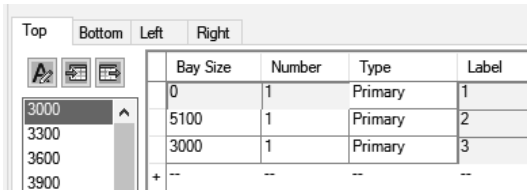
Click on **Enhanced Custom Grid** on the Home ribbon.

3. 

Click **5100**.

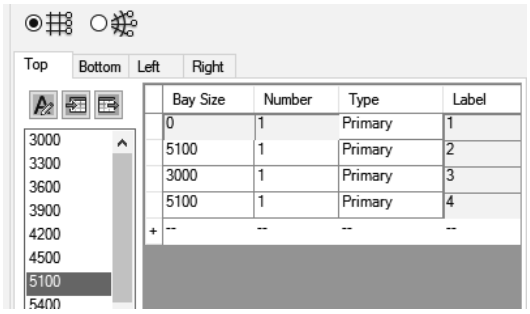
The first two grids are defined.

There is a preview window which shows the grids spaced 5100 mm apart.

4. 

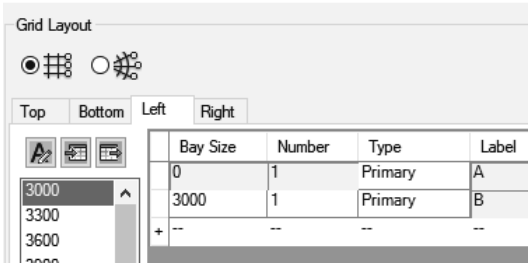
Click 3000.

A third grid is placed.

5. 

Click **5100**.

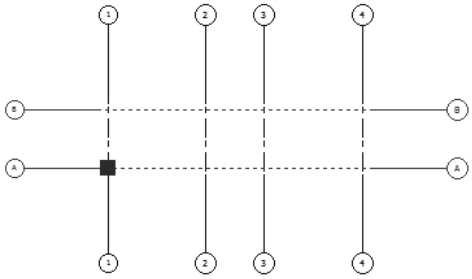
A fourth grid is placed.

6. 

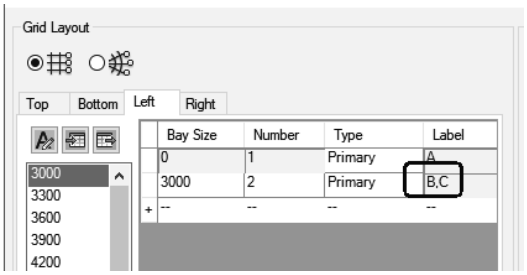
Switch to the Left tab.

Click **3000**.

The first two grids are defined.



There is a preview window which shows the grids spaced 3000 mm apart horizontally.

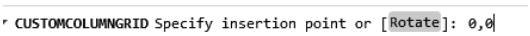
7. 

Click **3000.**

A third grid is placed.

Notice that because the spacing is set the same, it is listed with the previous grid.

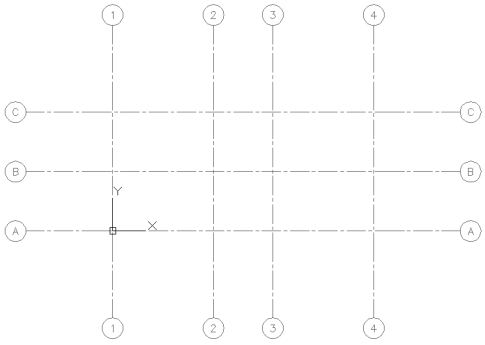
Click **OK** to close the dialog.

8. 

Type **0,0** for the insertion point.

9.

Click **ENTER** to accept the default rotation of 0 degrees.

10. 

Click ENTER to exit the command.

Double click the wheel of the mouse to Zoom Extents.

The grid is placed.

Save as *ex3-15.dwg*.

Exercise 3-16:

Convert to Grid

Drawing Name: convert_grid.dwg
Estimated Time: 5 minutes

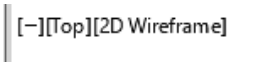
This exercise reinforces the following skills:

- Convert an arc to a grid

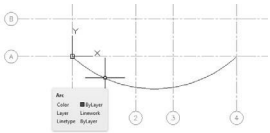
1. 

Open *convert_grid.dwg.*

Activate the Model tab.

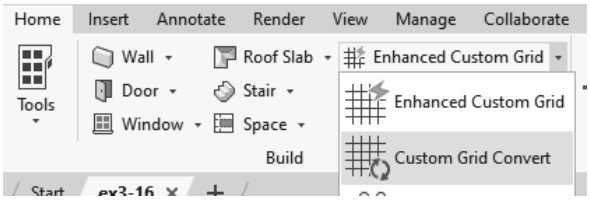


Switch to a Top View.

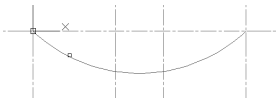


We are going to convert the arc to a grid line.

The Enhanced Custom Grid tool also allows you to place and create radial grids.

2. 

Click **Custom Grid Convert** on the Home ribbon.

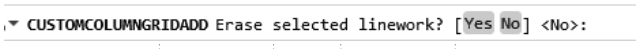
3. 

Click on the arc to select.

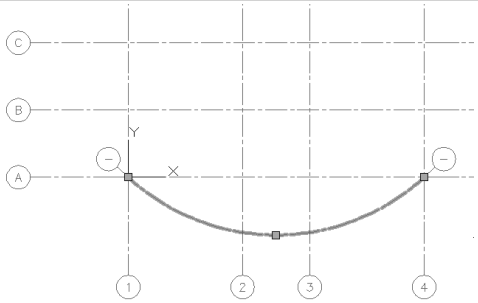
Click **ENTER** to complete the selection.

4.

Click **ENTER** to accept the default value for the label extensions.

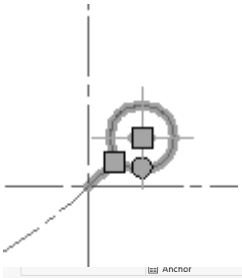
5. 

Click **Yes** to erase the existing linework.

6. 

The grid is placed but notice that the labels have not been defined.

Click **ESC** to release the selection.

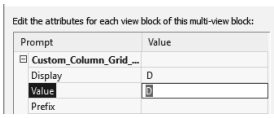
7. 

Select one of the grid bubbles.

Right click and select **Properties**.

8. 

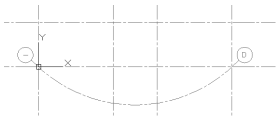
In the Properties palette, select **Attributes**.

9. 

Change the Value to **D**.
Change the Display to **D**.

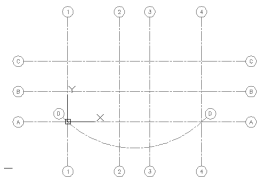
Click **OK**.

Click **ESC** to release the selection.

10. 

Note that one label updated, but not the other.

Repeat to update the other bubble to also display **D**.

11. 

Save as *ex3-16.dwg*.

Exercise 3-17:

Place a Curtain Wall

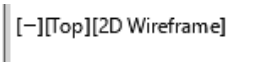
Drawing Name: curtain_wall.dwg
Estimated Time: 5 minutes

This exercise reinforces the following skills:

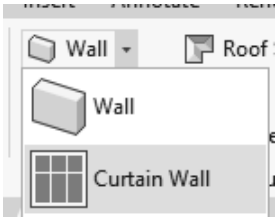
- Place a curtain wall

1. 
Open *curtain_wall.dwg*.

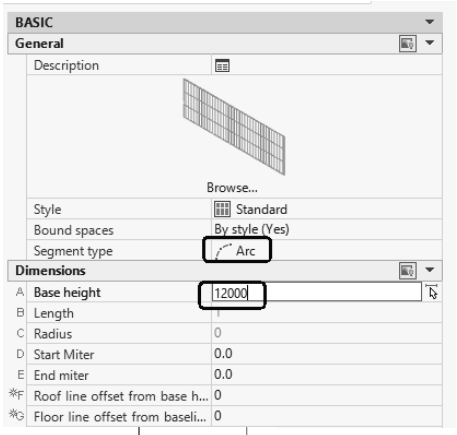
Activate the Model tab.



Switch to a Top View.

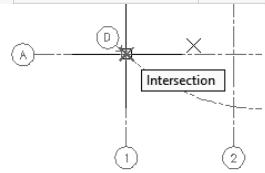
2. 

Select the **Curtain Wall** tool on the Home ribbon.

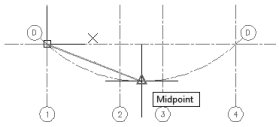
3. 

Set the Segment type to **Arc**.

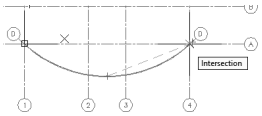
Set the Base height to **12000**.

4. 

Select the intersection of A1 as the start point.

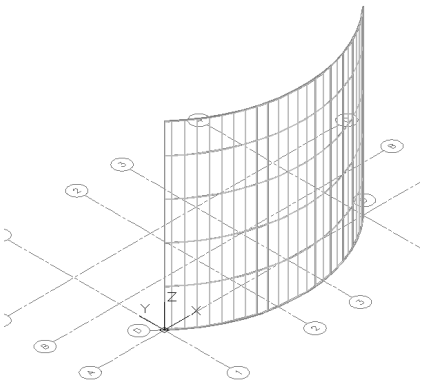
5. 

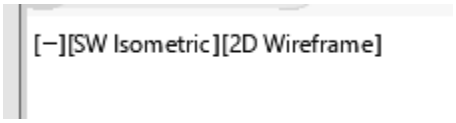
Select the Midpoint/Arc Lower Quadrant between Grids 2 and 3 as the midpoint.

6. 

Select the intersection of A4 as the end point.

Click **ENTER** to complete the wall.

7. 



Switch to a SW Isometric view to see the curtain wall.

Save as *ex3-17.dwg*.

Notes:

QUIZ 3

True or False

1. When you insert a PDF into a drawing, it cannot be converted to AutoCAD elements, like lines or text.
2. When you insert an image, it cannot be converted to AutoCAD elements, like lines or text.
3. The direction you place walls – clockwise or counter-clockwise – determines which side of the wall is oriented as exterior.
4. Curtain walls can only be linear, not arcs, in AutoCAD Architecture.
5. Grids can only be lines, not arcs, in AutoCAD Architecture.
6. To re-orient a door, use the Rotate command.
7. You can set cut planes for individual objects (such as windows), an object style (such as walls) or as the system default.

Multiple Choice

8. To change the hatch display of wall components in a wall style:

    A. Modify the wall style
    B. Change the visual style
    C. Change the display style
    D. Switch to a plan\top view

9. This tool on the status bar:

    A. Sets the elevation of the active level
    B. Controls the default cut plane of the view and the display range
    C. Sets the distance between levels
    D. Sets the elevation of the active plane

10. To assign a material to a door:

    A. Modify the door component by editing the door style
    B. Drag and drop the material from the Material Browser onto a door
    C. Use the Display Manager
    D. Define a new Visual Style

ANSWERS:

1) F; 2) T; 3) T; 4) F; 5) F; 6) F; 7) T; 8) A; 9) B; 10) A