

# **Visualization Insider**

## **Interior Wall Modeling and Texture Tips from Visarty**

## Introduction

Hello. We are Visarty, a visualization firm Lviv, Ukraine. We were asked to write a tutorial for the Visualization Insider about some of the methods we use in our work. In this article, we will show one small area of how we work....specifically how we model interior scenes. The way we create interior scenes may be much different from the way other experienced users create their scenes, and there is no right or wrong way. But the method we will describe here is used by many firms and is quite efficient and allows us to create our scene geometry very quickly.

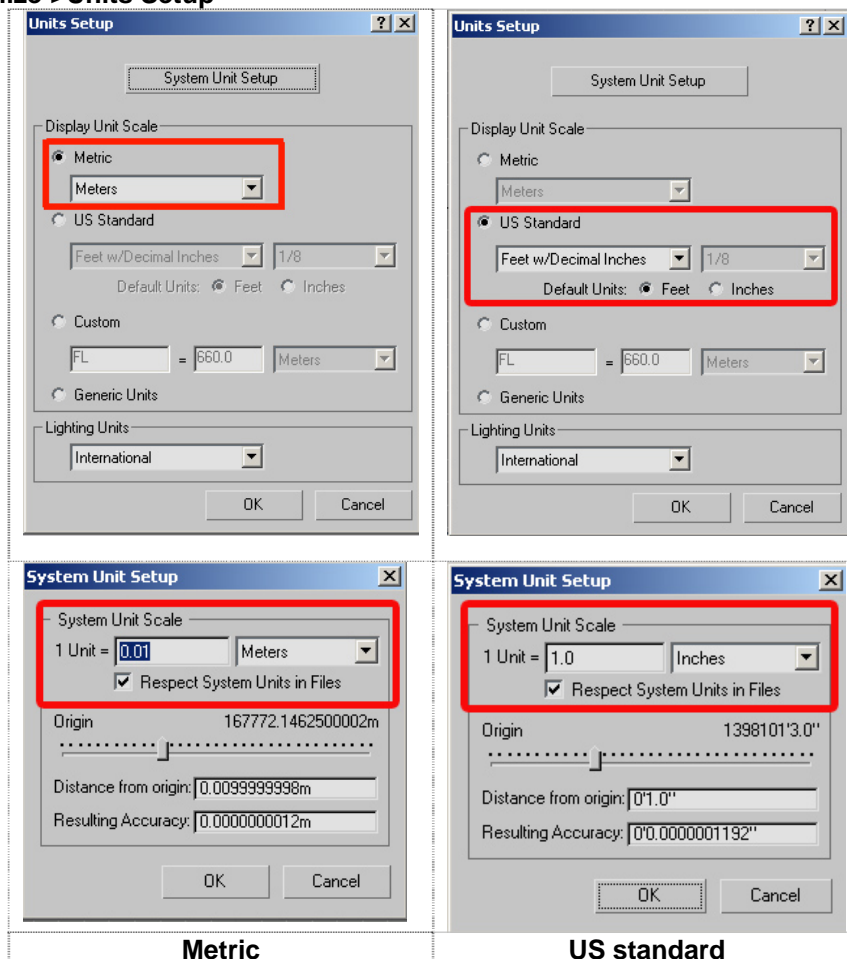
In most projects, interior scenes should be built separately from exterior scenes. This means that if you work on a project that requires interior and exterior views, you should consider the one project to be 2 smaller projects. The reasons for handling your projects this way are numerous; smaller and more manageable file sizes, easier viewing of scene objects, the ability to allow multiple people to work on the same project at the same time, just to name a few.

We will try to describe this method as clearly as possible but please forgive for any difficulty in understanding our English...it is not our primary language ☺.

## Units

An important thing from the start are units in the scene. So we will change them according to the system dimensions which we need. In our case it would be **US Standard**.

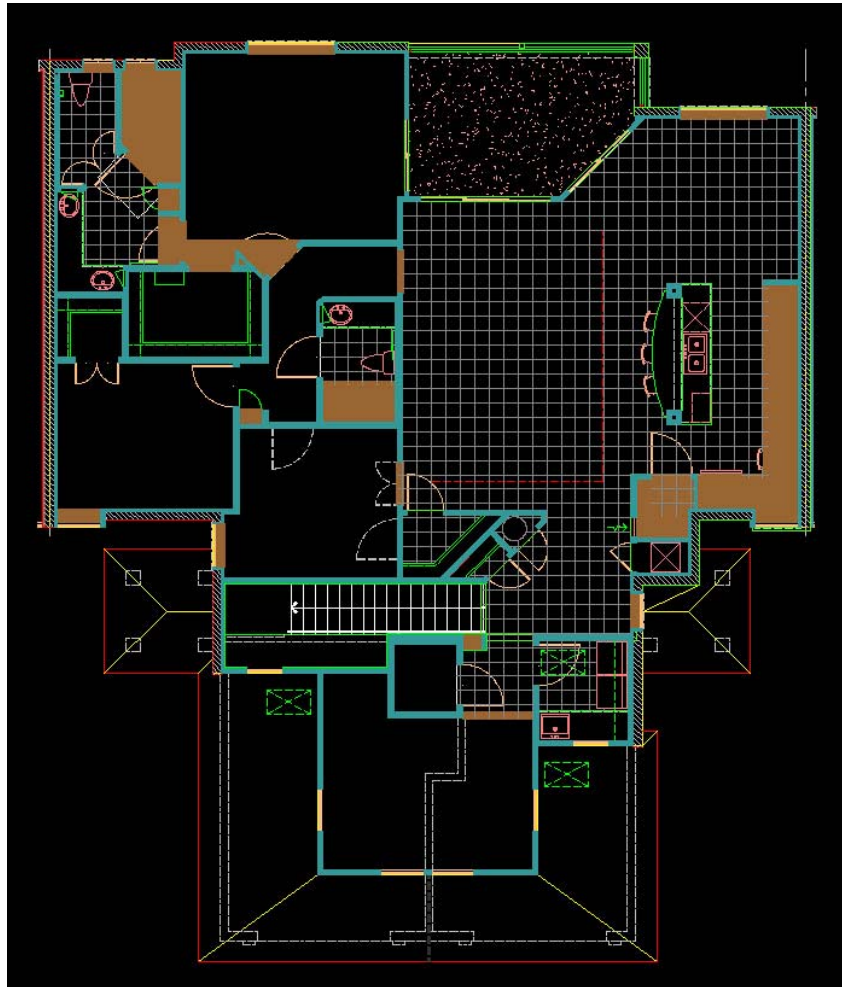
### Customize->Units Setup



## Importing drawings

Since virtually all architectural projects start with AutoCAD drawings, working properly with CAD linework is an important part of the visualization process. Though many visualization users choose to model in AutoCAD, we dislike this practice because we find importing linework into 3ds Max much easier and faster.

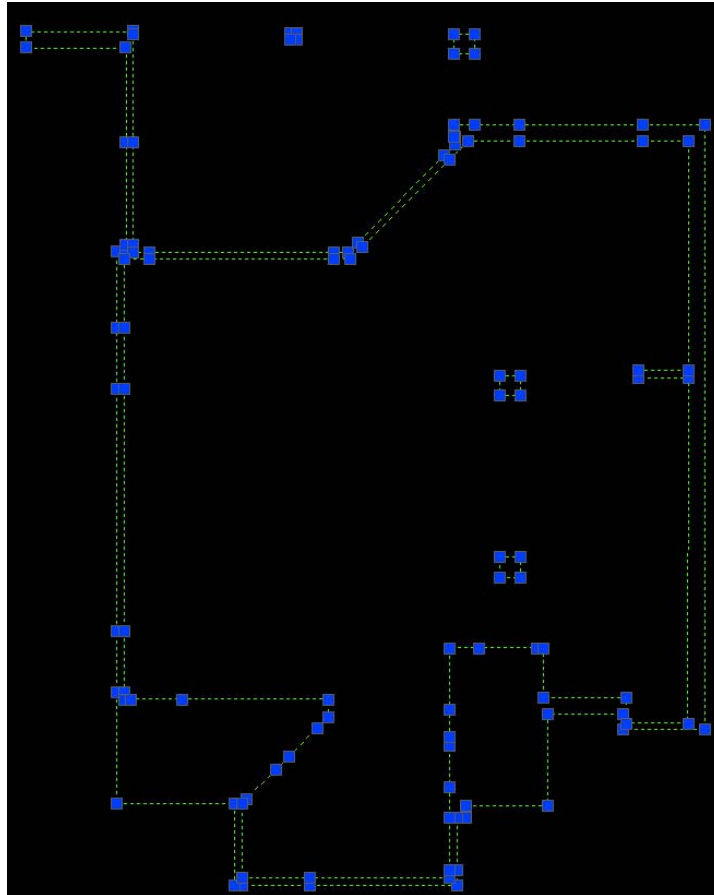
The image below shows a floor plan that we will use in this tutorial. We will be concentrating on creating the main living area, which includes the living room, kitchen, and dining room. But even when all doors are closed, from these rooms we still see the foyer and lanai, so we must model these areas too.



Before starting the CAD import, we review it and find the layers that we need to work with. Many times, drafters place linework on the wrong layer and this sometimes requires a lot of work to fix. Sometimes the CAD linework is good enough to work with and you can simply import this linework. Many times, however, drawings are so poorly constructed that it is far easier to create your own new linework by tracing the areas that you need to work with. The drawing in this project is an example of a fairly poorly constructed drawing, so we will create our own linework.

All we need to do is create a series of closed polylines that contain vertices at all window and door openings. First we create a new layer in AutoCAD, called **Walls**, and assign it a good color that will show up well in both AutoCAD and 3ds Max. Then, we simply use the pline command in AutoCAD to trace the inside perimeter of all the rooms we want to include in our scene, making

sure that we place a vertex at each side of openings in the walls. We also need to create a polyline that represents the other side of the walls that we trace, making sure to include vertices in all of the same locations. The image below shows what the plines should look like and all of the grips which represent locations where the vertices were created. An important thing to note is that all of the lines shown below are good, clean, closed polylines. This is important because if the polylines are not closed or if they are overlapping in some way, they will not extrude properly in 3ds Max. We will still automatically weld end points together, as a good practice, but good linework is very important to efficient and fast modeling.



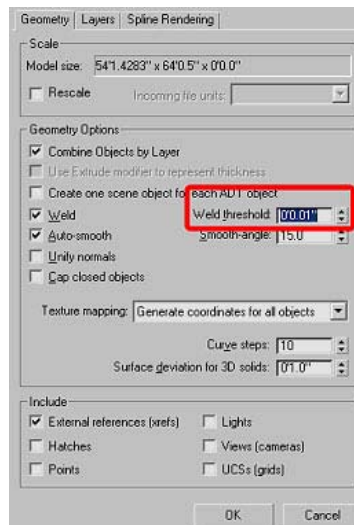
Once we create the polylines shown above, we should save the drawing with the name and the extension \_\_\_\_\_ **for Import.dwg**.

Now, we can start the import process. We usually import portions of the drawings rather than importing all the linework at once. For example, we import wall linework and work on the walls first. Later we may import cabinet linework and then work on the cabinets. We always start with the walls.

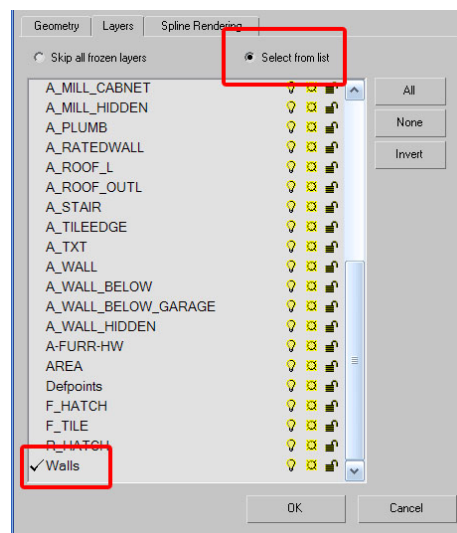
If you want to follow along, you can use the already created linework shown above by importing the file named **Unit B2 for import.dwg**. You can also open this AutoCAD file, delete this linework, and try creating it yourself for practice.

- From the menus, select **File > Import**.
- In the **File type**, choose AutoCAD Drawing (\*.dwg, \*.dxf)

- Enable the **Weld** option, and in the **Weld threshold** field of the **Geometry** tab type 0.01" (for the metric system 0.001m). This makes sure lines come into 3ds Max properly welded. Unwelded lines will not extrude properly.
- Enable **Combine Objects by Layer** (for Max 9 select **Layer** from the drop-down list)



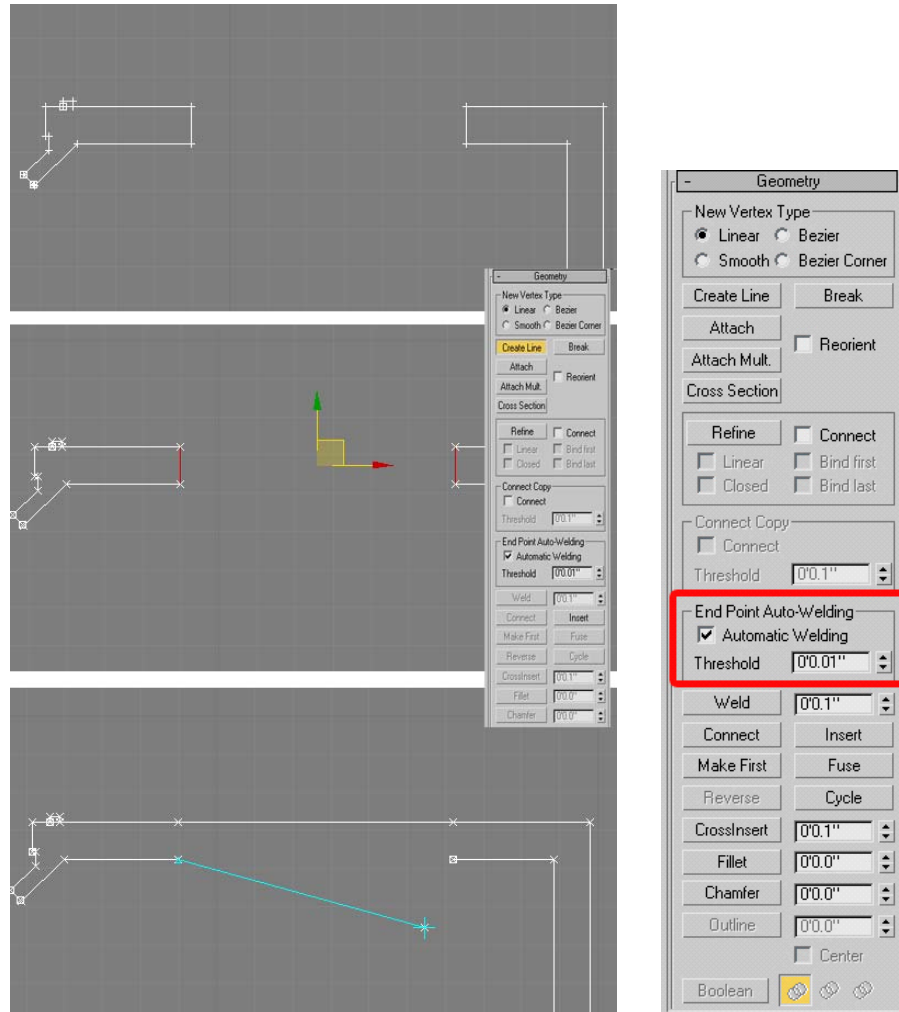
- In the **Layers** tab choose **Select from list**.
- Click the **None** button to deselect all layers and then click on the layer named **Walls**. A check mark should appear only next to this layer.
- Press **OK** to complete the import.



You should now have one object in Max called **Layer:Walls**.

At this point, we would like to mention that even though we had to create our own linework, we are often able to use the linework already created and the steps below show how we do this. If you do not wish to see this, continue on to page 8.

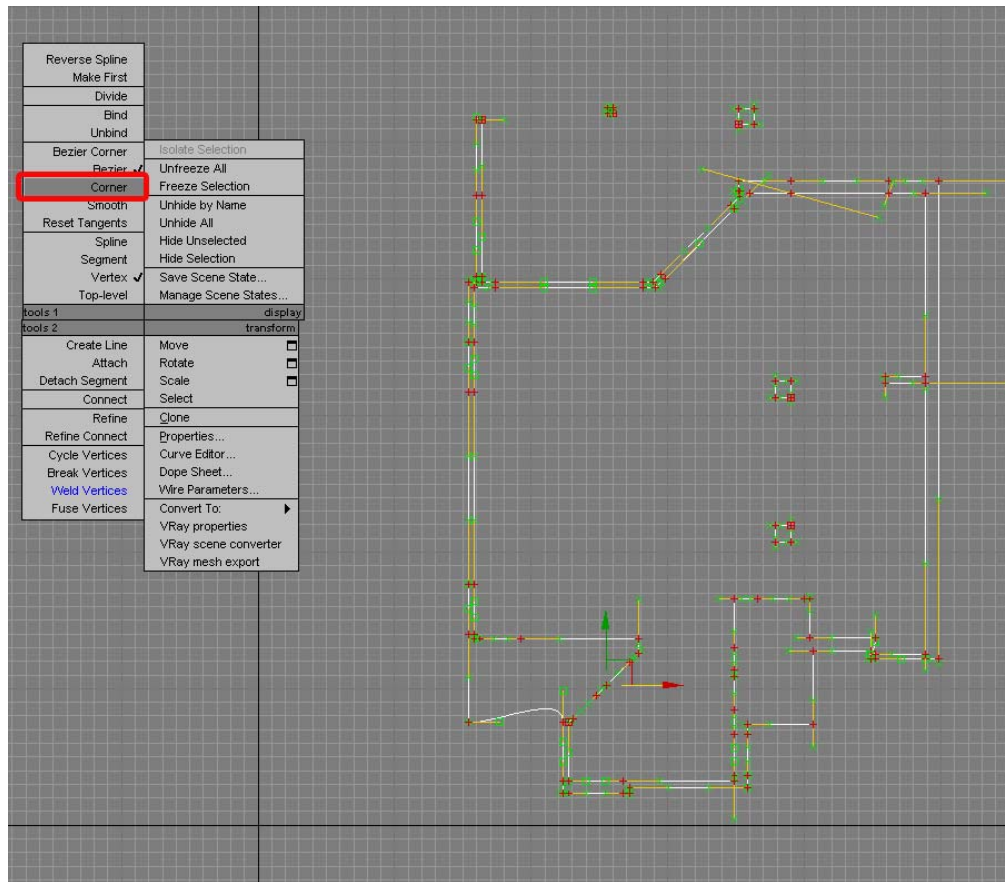
- All splines must still be unbroken because we will use **Extrude Modifier**. This means that we must remove the gaps like the openings for the doors and windows. To do this, we create the lines connecting these openings and delete perpendicular lines inside of the wall, **without removing vertices**. The next image shows this. We enter **Segment** subobject mode, delete the perpendicular segments, and then draw lines connecting the 2 ends of the opening.



To do this properly, we must use the **Snap Toggle**  with **Automatic Weld** with **Threshold** amount **0.01''**



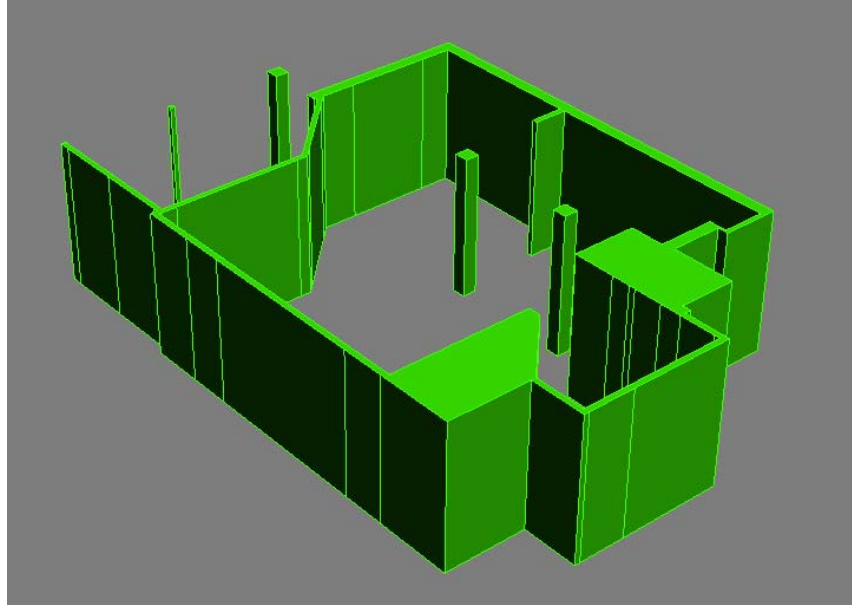
- Imported splines often have various vertices type. To keep the walls straight, we should make all of the vertices **Corner** vertices. To do this, go into Vertex subobject mode, press **Ctrl+A** to select all the vertices, right click the mouse and select **Corner**.



- Before using the **Extrude Modifier** we should first check the spline. Go to the **Utilities** rollout, press **More** and choose **Shape Check**.
- Select **Wall**. If the Spline is not correct, you will see red rectangles on the incorrect areas. If there are incorrect areas, you should fix these before continuing.

## Modeling

- Rename this spline, **Wall**.
- Go to **Modifier List** and choose **Extrude**. The walls in this interior project need to be 10 feet high so in the **Amount** field type **10'**.

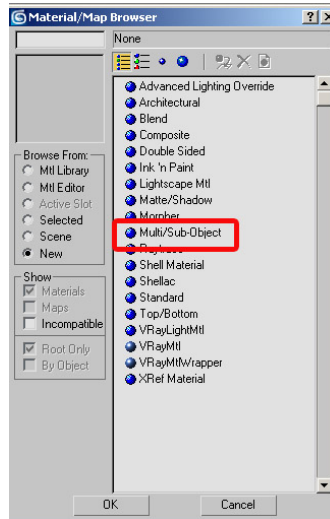


The next step would be modeling the floor and ceiling. We like to create the ceiling and floors as part of the walls, which means of course we need to use multi/subobject materials. We do this to prevent the possibility of light leaking from between these objects, which can have bad results. Of course, you may choose to make these separate objects and apply individual materials.

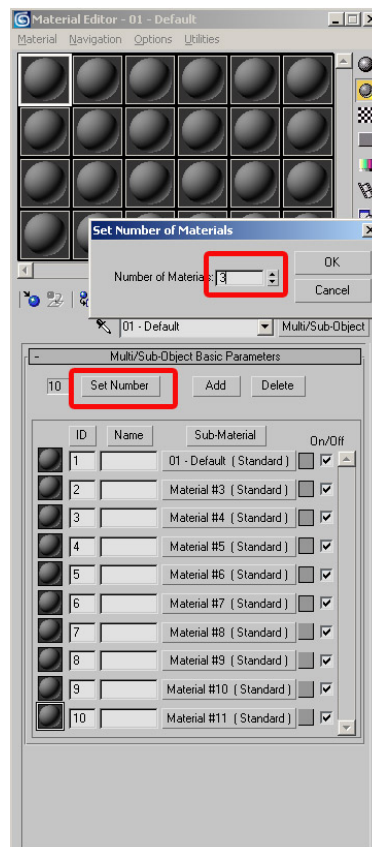
- With the object selected, right-click the mouse and choose **Convert to Editable Poly**.
- Enter **Polygon** subobject mode and press **Ctrl+A** to select all polygons.
- Scroll down to the **Polygon Properties** rollout and in the **Smoothing Groups** section click **Clear All**. This simply clears any smoothing groups which can cause an unwanted smoothing appearance to the model. Though not as much of a problem for linework that we create ourselves, it is a good practice to get into.



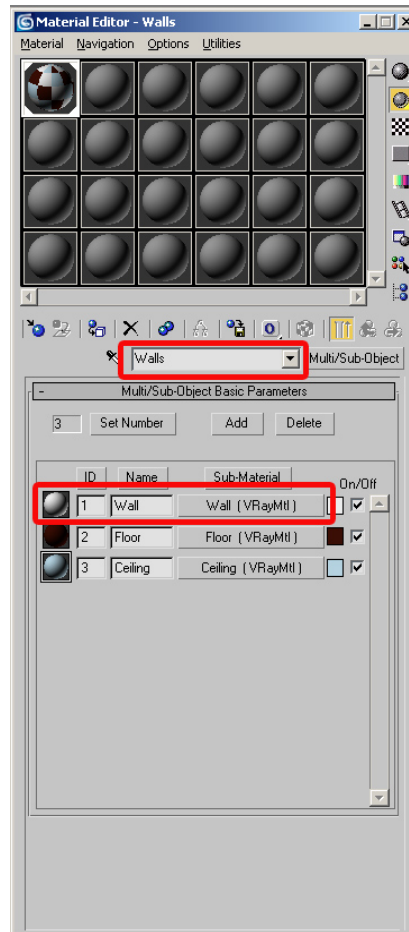
- With all polygons selected, type **1** in the **Set ID** field and press **Enter**. This makes all polygons have the same material ID to start with. We will change some polygons to have different IDs but we at least know they will all have the same to start with.
- In this article, we will be creating only walls, floors, and ceiling. Since we will be using an object with multiple material IDs, we need to apply a Multi-Subobject material to the object.



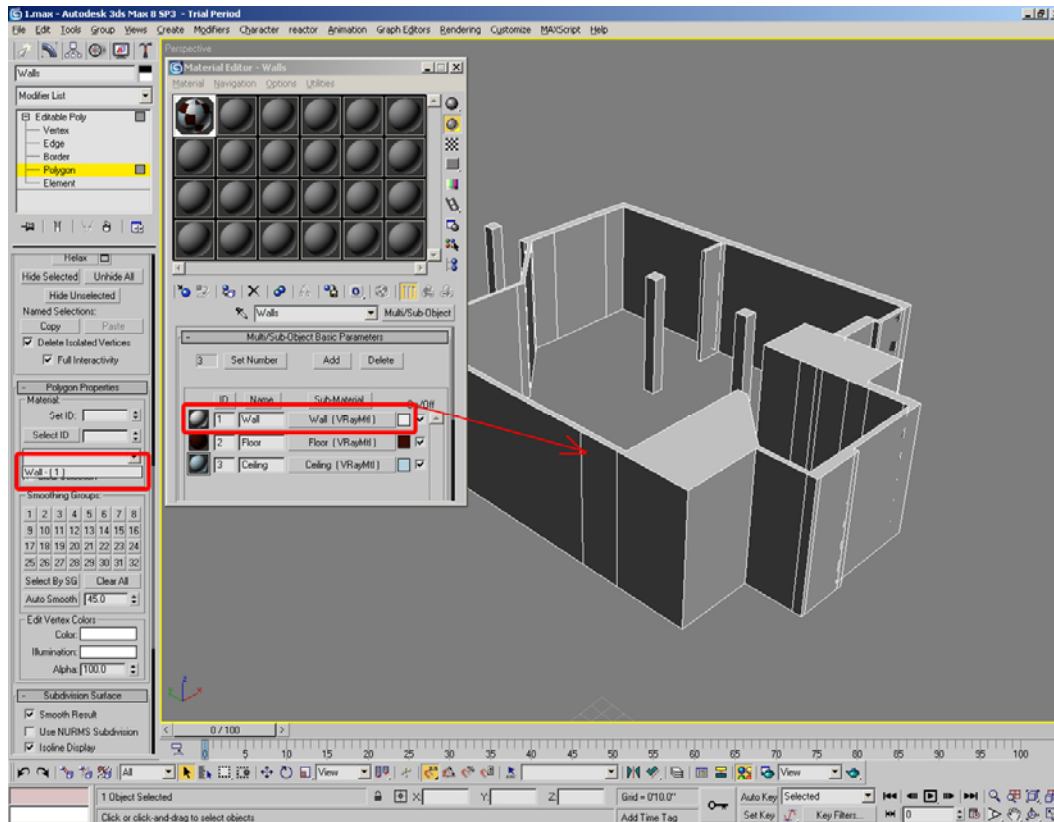
- Since we will be only creating 3 subobject types, select **Set Number** and enter **3** in the **Number of Materials** field.



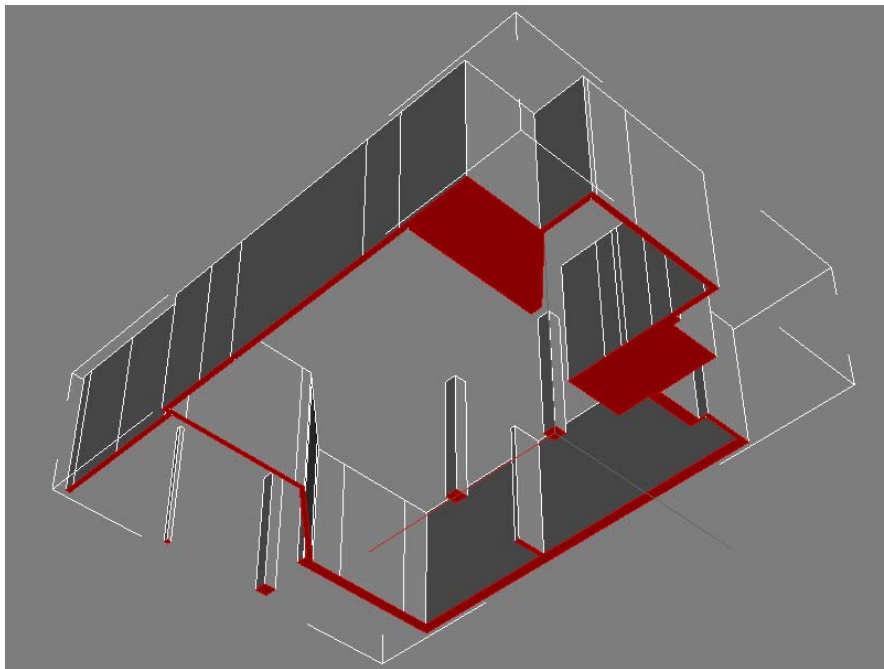
- We use the V-Ray render engine so in this article, we have to switch each subobject material from the **Standard** material type to the V-Ray material type. However, you can switch the type to whatever you need for your render engine.
- Name each material according to the ID of the future polygons and give each submaterial a unique color. This is shown on the image below.



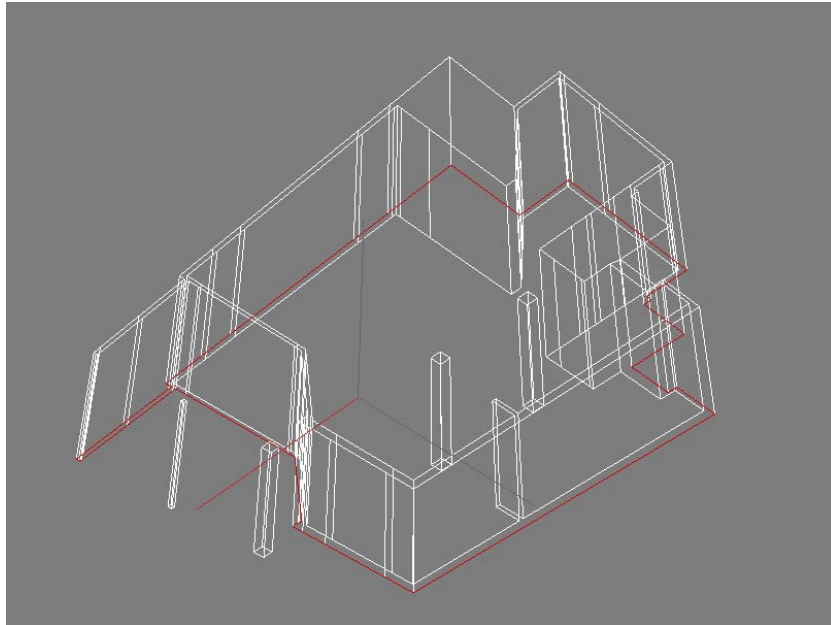
- With the wall object selected, click the **Assign Material to Selection**. Our object has only one ID at this moment so we only see one color on the object in the viewports. This is shown in the next image.



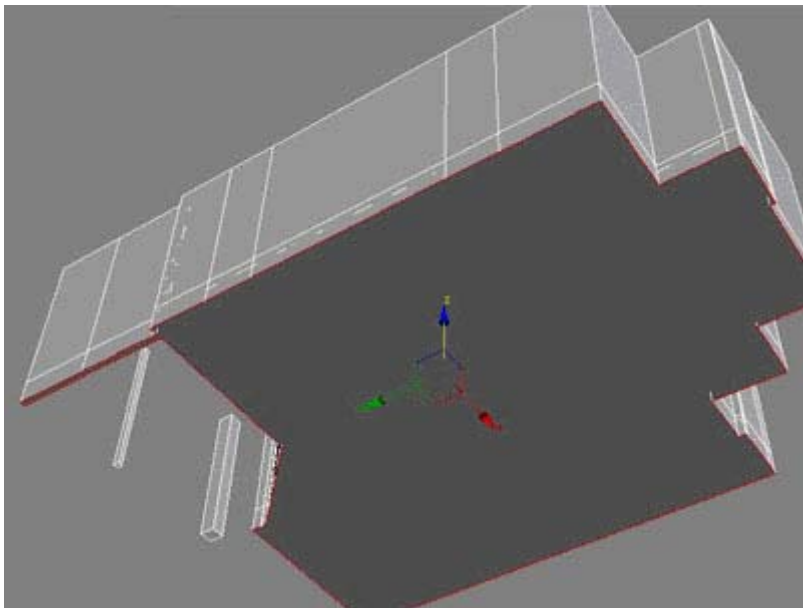
- Enter Polygon subobject mode, select all of the bottom polygons and delete them.



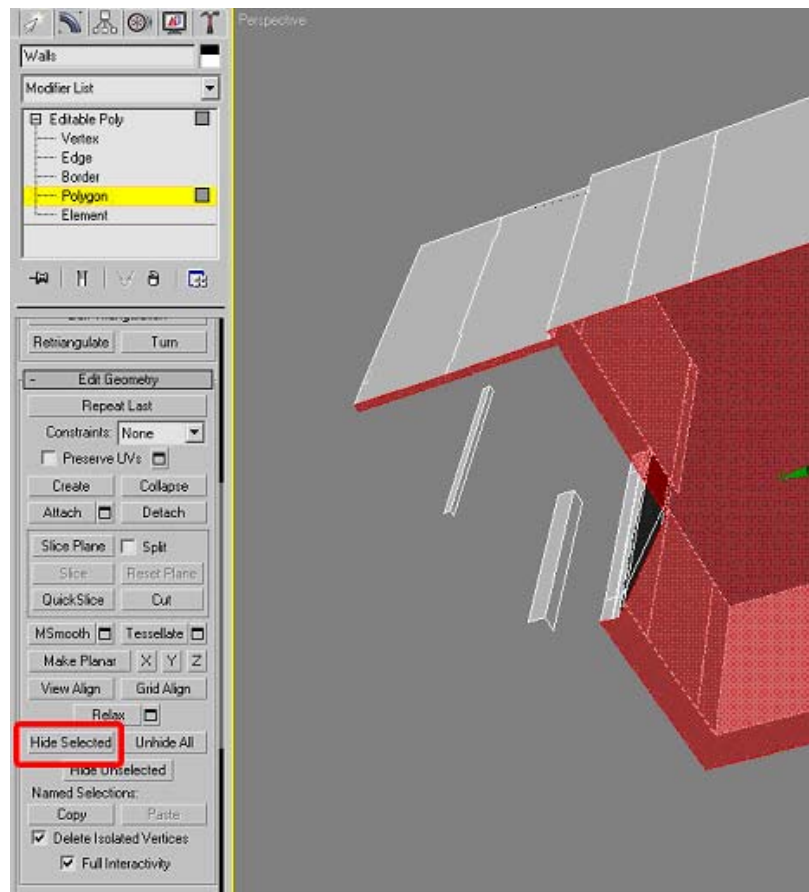
- Select outside **Border**.



- Press **Cap**. This provides our floor.

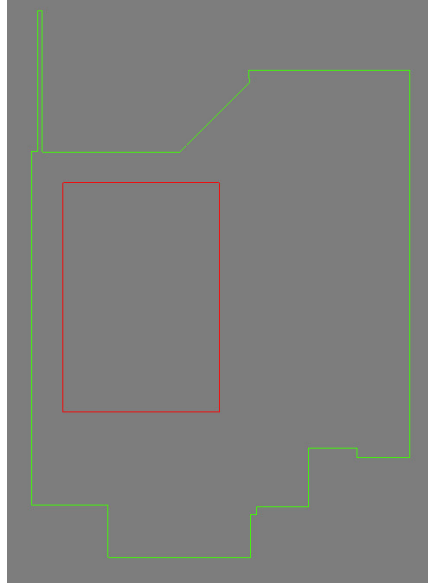


- Model the ceiling the same way as the floor.
- Set the ID of the ceiling to 3. For easier handling, you can hide the floor polygons by using the **Hide Selection** command in the **Edit Geometry** rollout.

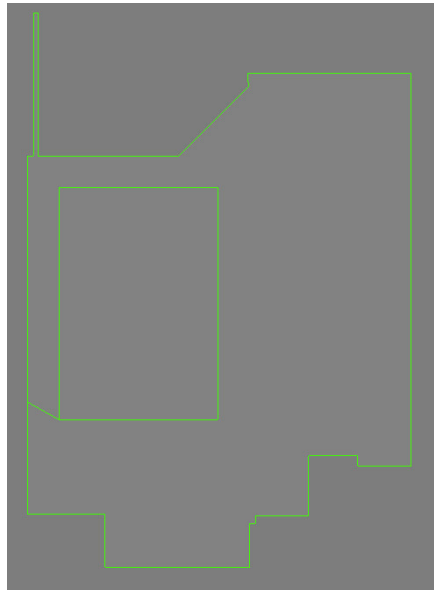


- Ceilings in modern interiors are usually straight, but the classic style may be raised. This project calls for a raised ceiling so to make the raised ceiling, we should first isolate the ceiling polygons. Let's try doing this by ID type.
- Type 3 in the **Select ID** field of the **Polygons Properties** rollout and hide all other polygons by clicking **Hide Unselected** in the **Edit Geometry** rollout. Now we can only see ceiling polygons. This makes it easier to model.

- To do the raised ceiling correctly, we should import the necessary linework from the drawing just like we did with the walls. In this project, the only real linework we need is a rectangle which outlines the area in which the ceiling is raised.
- Import the layer **A-FURR-HW**. A rectangle should appear as shown below.

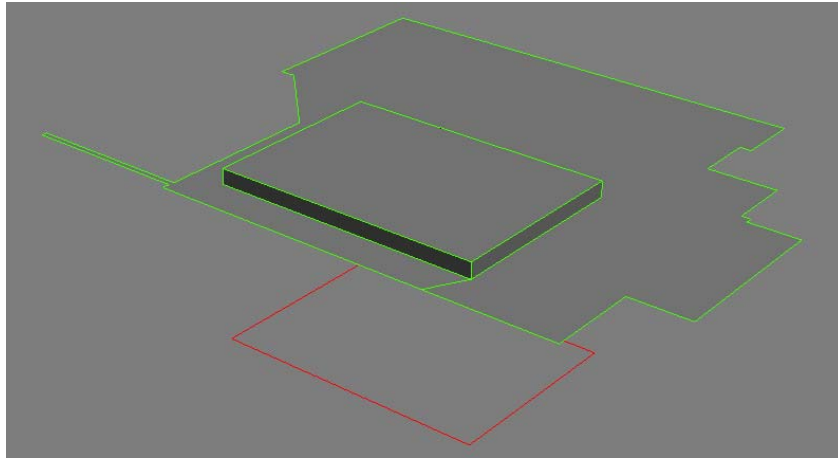


- Make the active viewport a **Top** view.
- Select the **Wall** object and go to **Edge** subobject mode.
- Enable **Endpoint** snaps.
- In the **Edit Geometry** rollout, click **Cut** and click on the 4 vertices of the imported rectangle. Right-click to end the command. The rectangle is now cut into the ceiling, as shown below.

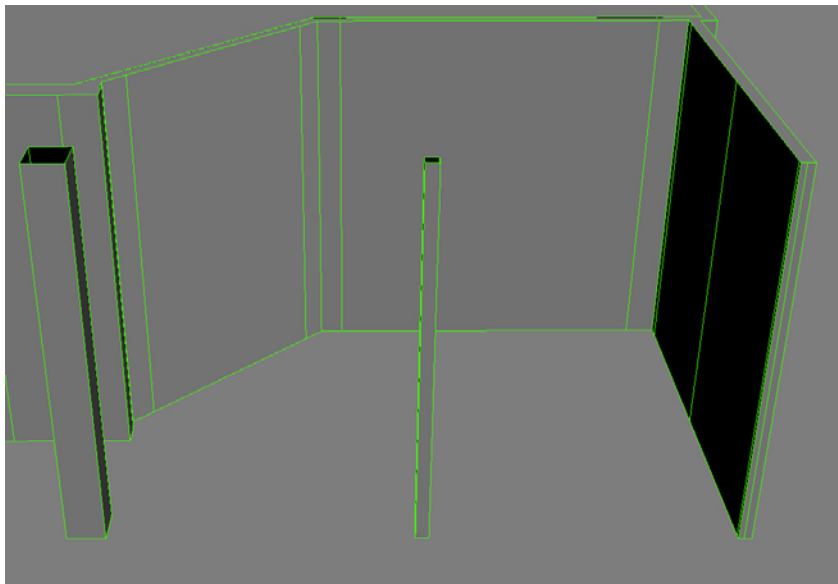




- Switch to Polygon mode, select the polygon you just created, and click the Extrude button.
- Click the icon to the right of the **Extrude** button, type -12" inside the dialog box that opens, and click OK to complete the extrude command. This will raise this part of the ceiling 12".

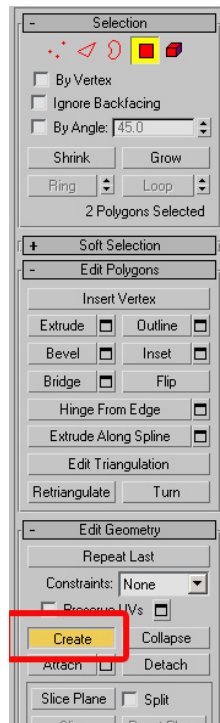


- Switch to Polygon mode and click **Unhide All** to unhide all the polygons that were hidden.
- Delete the imported rectangle.
- The next step of our modeling is the Lanai which would be seen from the great room.

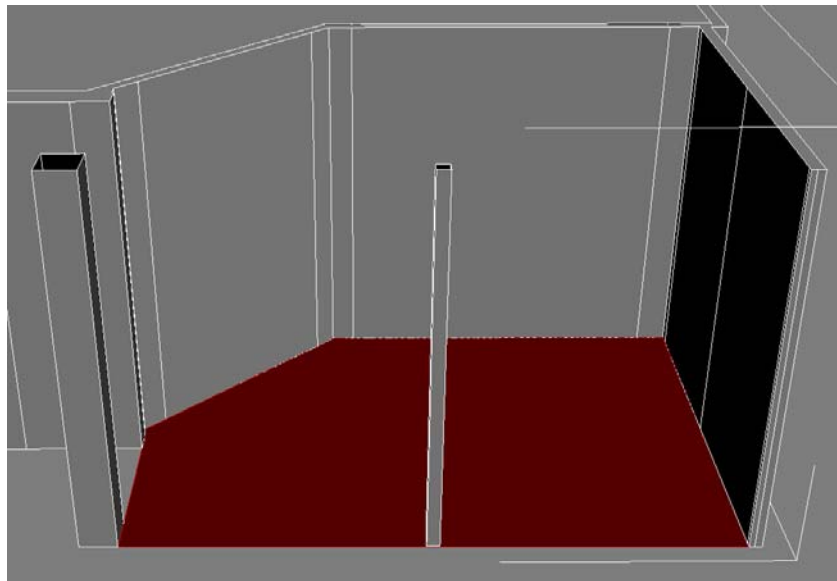


- To create the lanai, we will create a new polygon from scratch.

- Go to **Polygon** subobject mode and press **Create** in the **Edit Geometry** rollout.



- Draw a horizontal polygon connecting outside columns with the other walls. To do this, hold down Shift, use snaps to click the correct points in space, and after creating the last vertex, click on this same vertex again. This will create the polygon as shown in the image below.

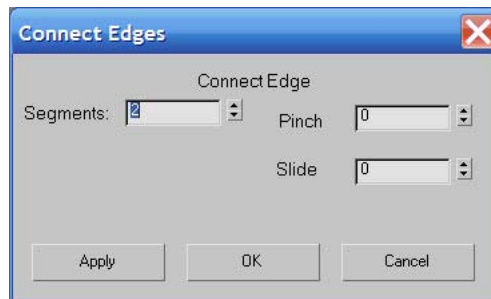


- Go to **Vertex** subobject mode and press **Ctrl + A** to select all of the vertices of the object.
- Weld vertices using a **Weld Threshold** of **0.01"**. This ensures no light can leak between these separate subobjects and it's another good practice to get into.

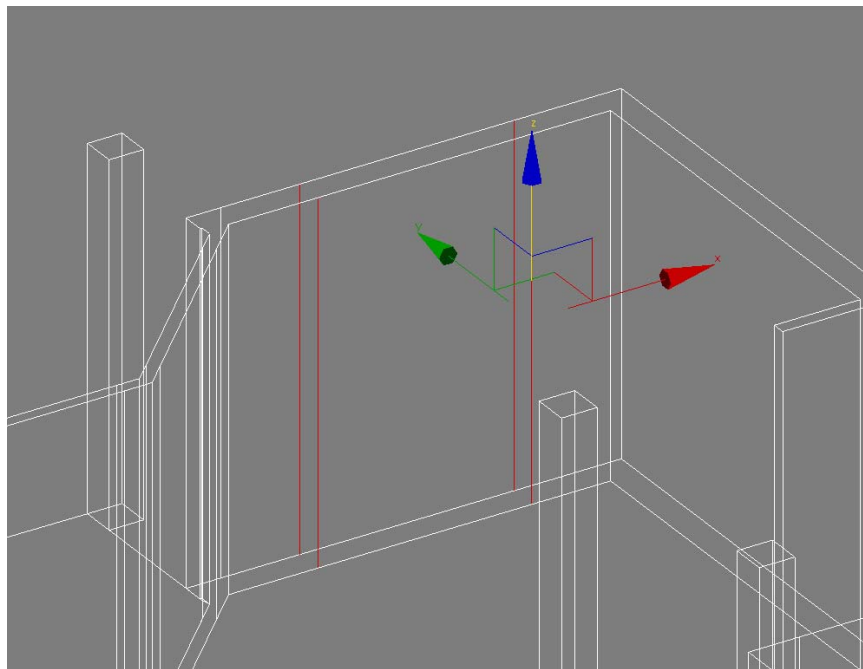
- Set to the floor polygon in Lanai to **ID4** and add an additional sub-material. Call it **Floor Lanai**.
- Create a polygon for the ceiling of the lanai in the same way as you created the floor. You could also just clone the lanai floor and move the clone up 10 feet.
- Set the ID of the lanai ceiling to **ID3**, like the rest of the ceilings.

The next step will be creating window and door openings. To do this we will use the box modeling approach which will keep us in the **Edit Poly** modifier.

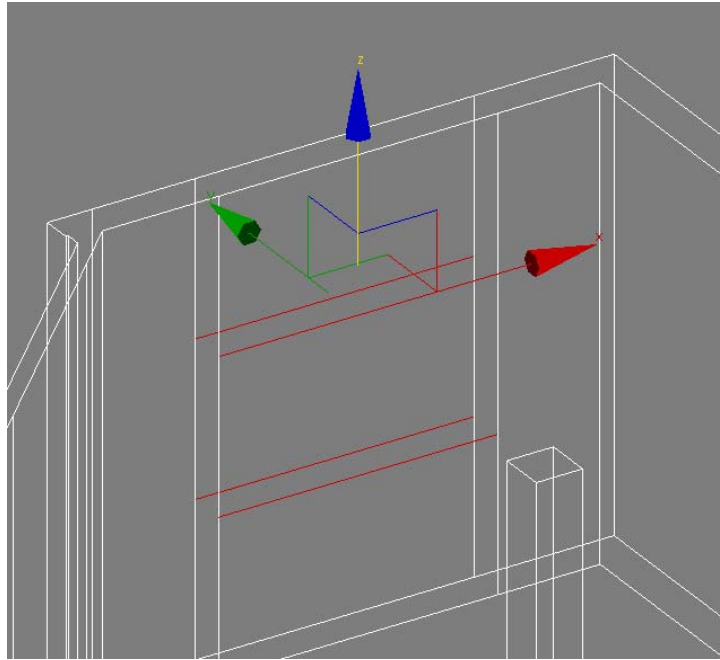
- First, hide all ceiling polygons for better viewing.
- Go to **Edge** subobject mode.
- Click the icon to the right of the **Connect** button shown below. A dialog box will open.
- Type **2** in the **Segments** field, as shown below.



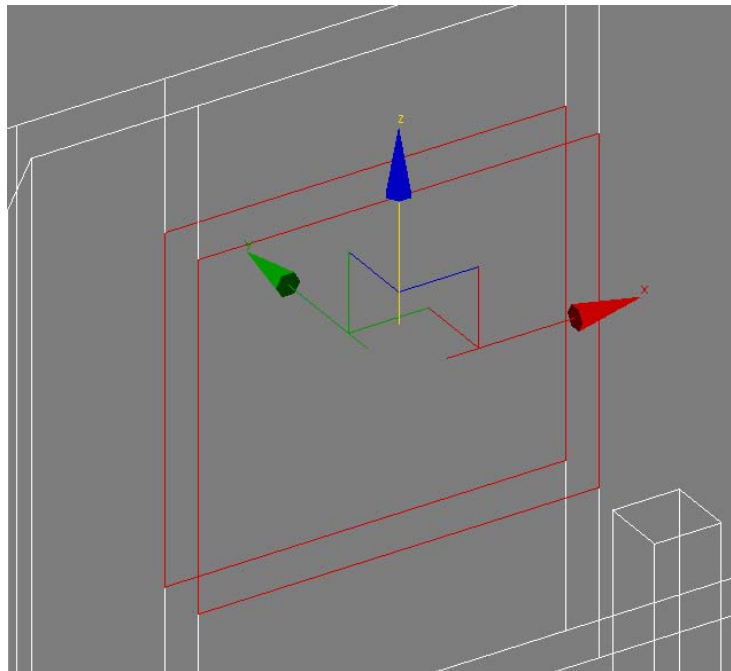
- Click OK to close the dialog box.
- Select any two vertical lines that represent a window opening and then select vertical lines on the other side of the wall.



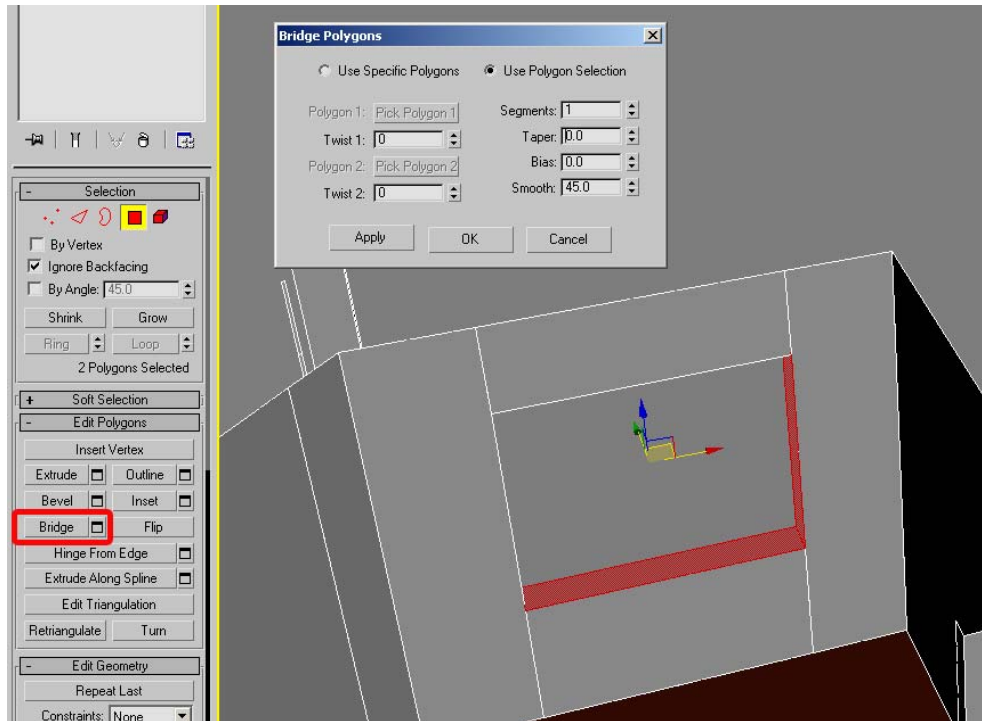
- Click the **Connect** button. Two horizontal lines should appear between the vertical lines. The horizontal lines basically divide the one rectangular area into three small and even rectangular areas.



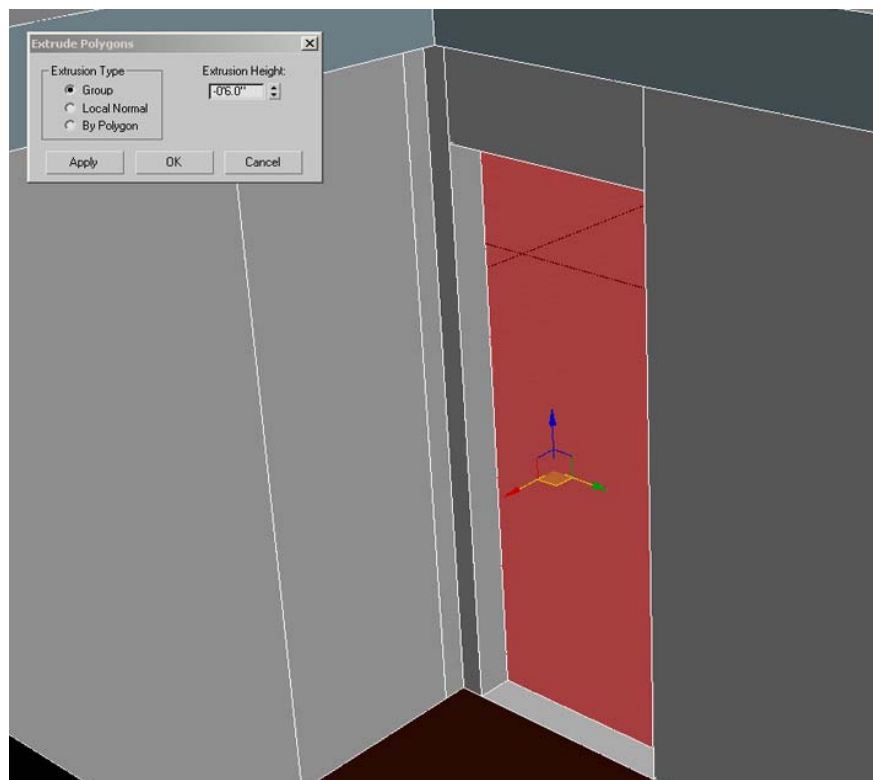
- Select only the upper edges and move them to the correct height for the top of the window/door and do the same for the bottom edges.
- Go to **Polygon** subobject mode and select the polygons within the area of the window/door opening on both sides of the wall, as shown below.



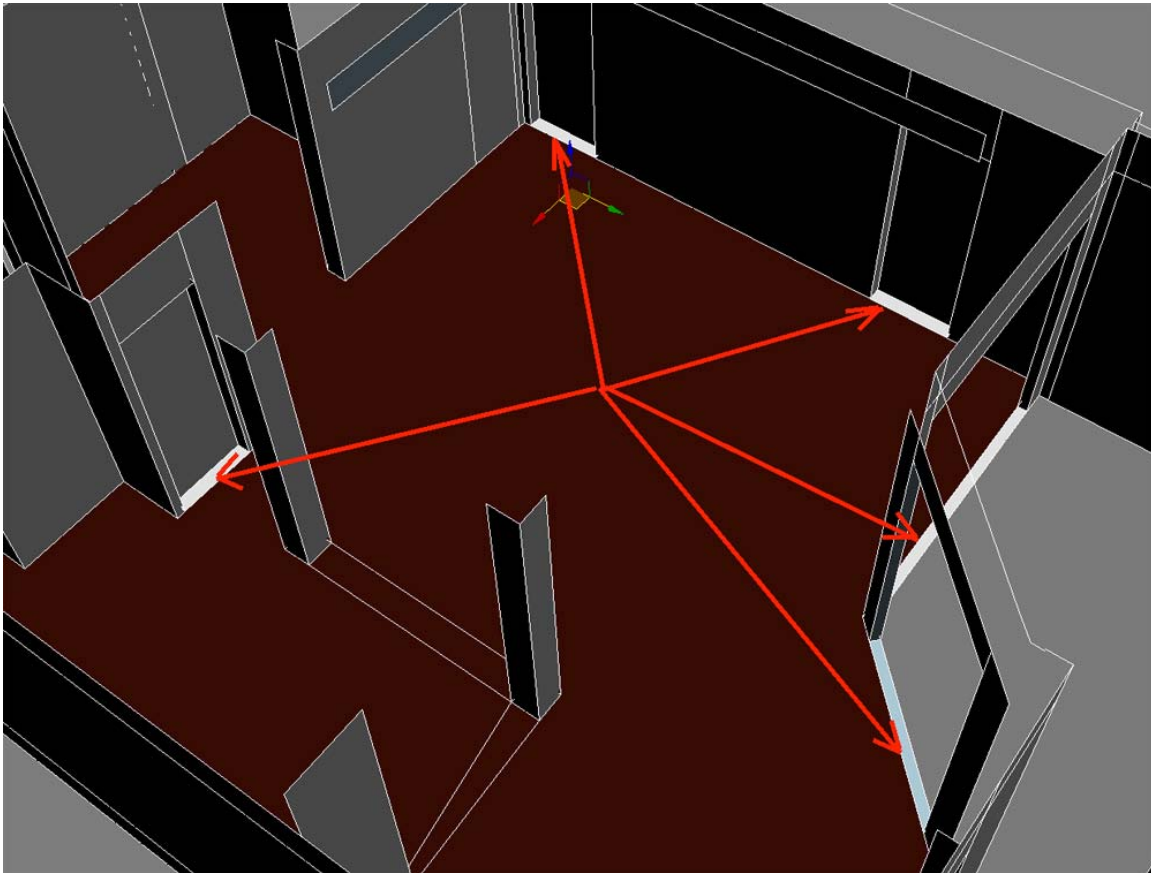
- Click on the **Bridge** button in the **Edit Polygons** rollout. An opening is created. We then create the rest of the window and door openings in the same way.



- For the doors which will not be open we don't use **Bridge** but rather the **Extrude** command with about **-6"** amount.



- After using **Bridge**, new side polygons in the window/door openings have automatically created new IDs, as shown in the image below. Therefore, we need to deal with these new IDs.



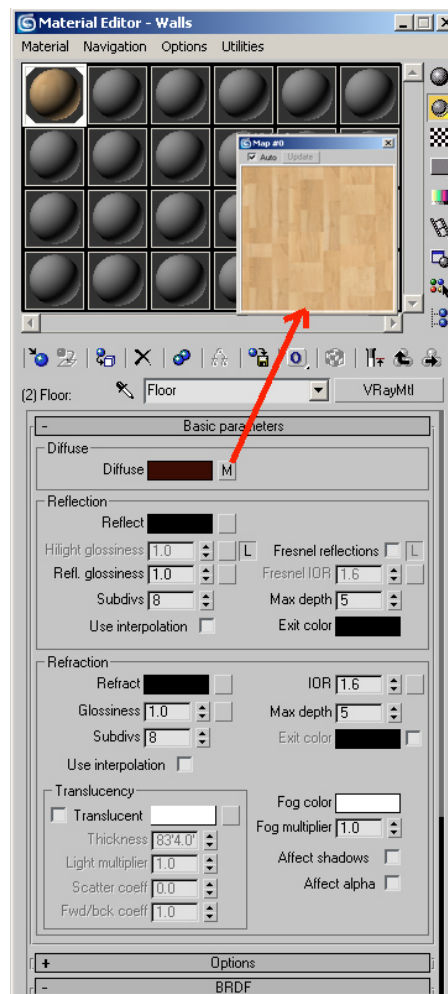
- **Unhide All** polygons. Walls geometry is done.

There are a lot more tools and options in the Edit Poly feature, and many of them can be used to create far more intricate models. For example we can use the tools to build window and door frames as part of the same object or create these elements as separate objects using the same Edit Poly tools.



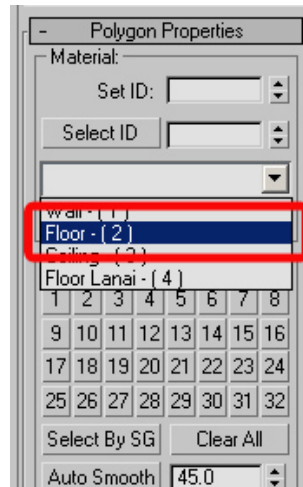
Now we will deal with a problem some new users face using multi/subobject materials. The biggest difficulty for new users using multi/subobject materials is how to apply different mapping to different sub materials. To do this, you must use material and mapping channels. We will try to describe the mapping process using an example of the model we've created. Let's start from the floor.

- Since the ceiling material has no texture, we will hide it. Go to **Polygon** subobject mode, select the ceiling polygons and press **Hide Selected** in the **Edit Geometry** rollout.
- Add the **UVW Map** modifier to the object.
- Open the **Material Editor**.
- Go to sub-material called **Floor**.
- Load the bitmap called **Floor.jpg** in the **Diffuse** channel of this sub-material.



- Go into the **Bitmap** channel by clicking the icon to the right of the diffuse color swatch.
- Click the **Show Map Viewport** icon. Notice that the bitmap might not show on the floor. If it does not show it is probably because the normals for the floor polygon must be flipped.
- Enter **Polygon** subobject mode, select the floor polygon and click on the **Flip** button in the **Edit Polygons** rollout. The bitmap should now be visible in the viewport.

- In case you did not know, you can easily select subobject polygons using the material ID drop down list shown below.

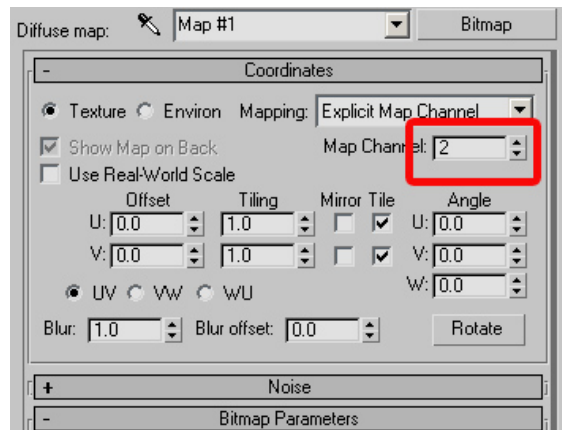


- In the **UVW Map** modifier, set amount of tiling to **U=7** and **V=3**. You could of course specify an actual size for the **Length** and **Width** parameters.
- Go to 4th **Sub-Material** called **Lanai Floor**.
- Apply the **Lanaifloor.jpg** bitmap to the diffuse channel of the submaterial.
- Make the bitmap visible in the viewport as was done before. Notice you may have to flip the polygon of the lanai as before.

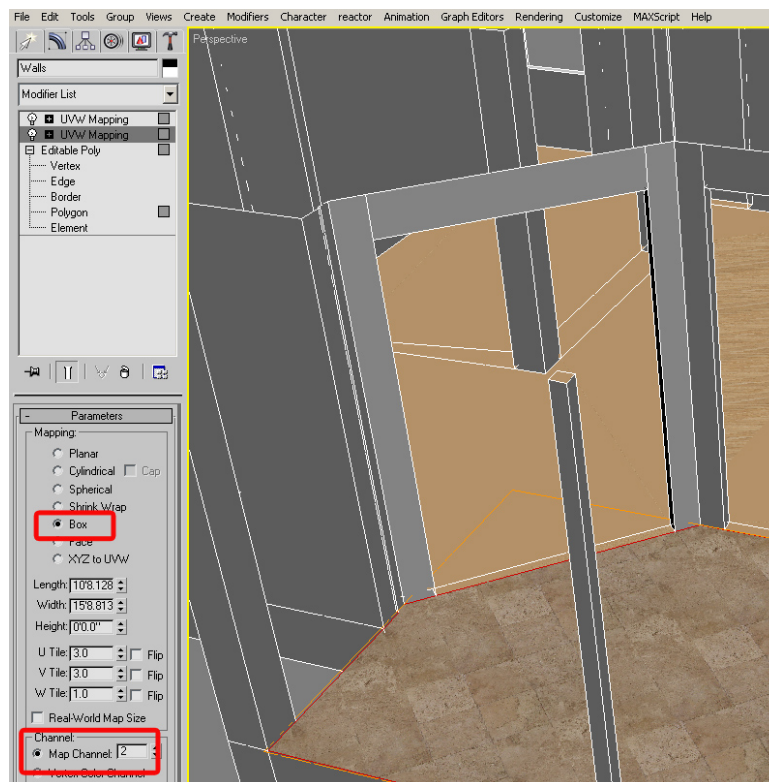
If we use only one texture, one UVW map is enough. But this object will have several sub materials applied to it. Therefore, we must apply map channels and have a separate UVW Map for each channel. All materials and objects automatically have a map channel value of 1 applied. We will leave this channel for the main floor and apply a map channel value of 2 to the lanai floor.



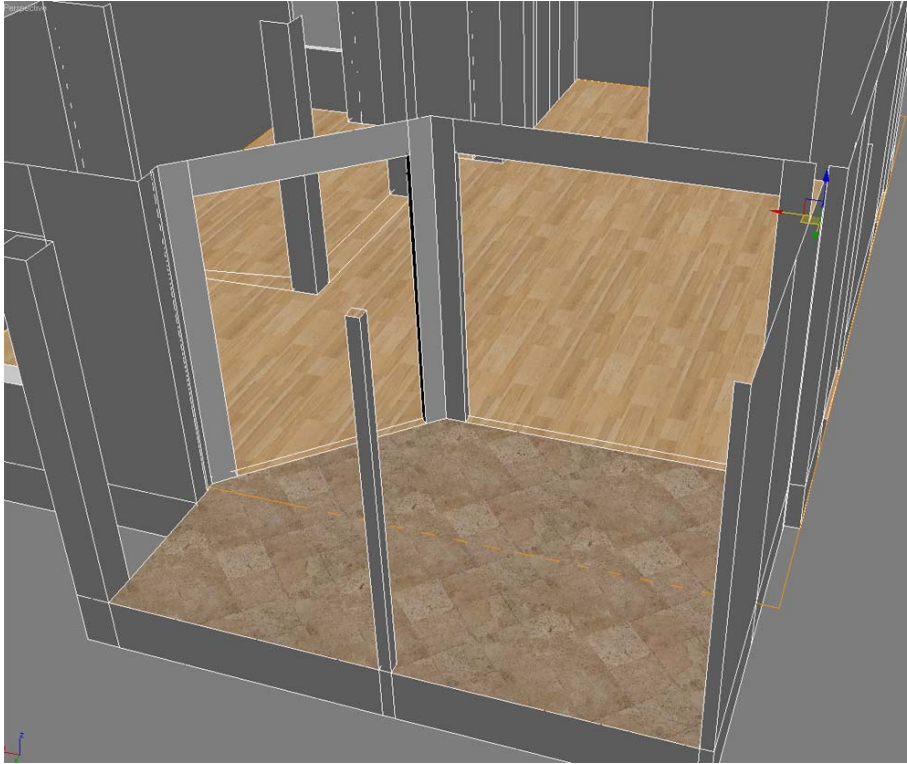
- First, set **Map Channel 2** to this texture in the **Coordinates** rollout of the **Diffuse** map channel. Notice the bitmap disappears in the viewport because we don't have a **UVW Map** for this channel yet.



- Add a 2<sup>nd</sup> **UVW Map** to the object.
- Change the **Map Channel** value of this modifier to **2**. Now whatever changes you make to the mapping in this modifier will only affect the submaterials that have map channel 2 applied, which is the lanai floor.



- Set amount of tiling to **U=3** and **V=3**. Now both the main floor and lanai floor should have separate mapping applied.



- **Unhide All** polygons and deselect polygons which were selected. If you use a map for the **Bump** channel, it should have the same ID as the **Diffuse** texture.

You may apply as many textures as you want using channels but all of them should have their own **UVW Map** coordinates.

So our model is ready. Thank you for viewing these tips and tricks.