



CAD Camp 2009

Revit Architecture

So you want to start a family?

Veronica Lamb

S2-2

Course Summary:

Learn the basics of creating families in Revit Architecture. This course is suited for individuals with little to no experience with families. Attendees will walk away with the ability to create parametric 2D and 3D components for use in their Revit projects.

Instructor:

Ms. Lamb is a Certified Revit Architecture 2009 Professional and a Technical Specialist for U.S. CAD with nearly 10 years experience in the Architectural industry. Prior to joining the Autodesk reseller channel, she was an AutoCAD Instructor at the Delaware Technical and Community College and has served as a CAD technician in a variety of architectural firms. Ms. Lamb has experience using AutoCAD on a variety of residential and commercial projects and more recently has utilized Revit Architecture to complete construction documents on both domestic and international resorts and residences. She regularly conducts seminars in the use of Autodesk technology in Architectural design and provides implementation services, customization, training, and support on Revit Architecture.

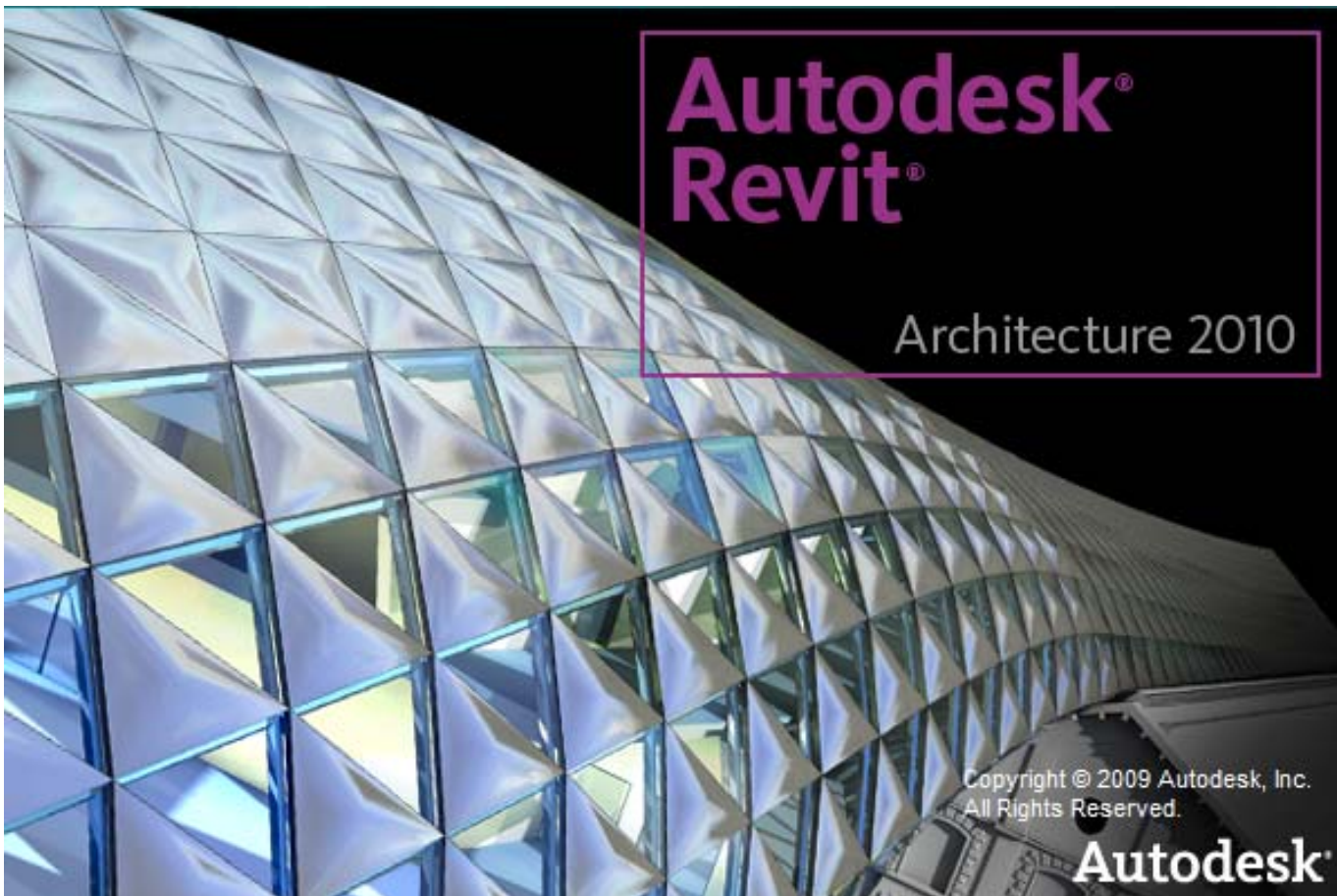


U.S. CAD

www.uscad.com | www.uscadbim.com

So you want to start a family?

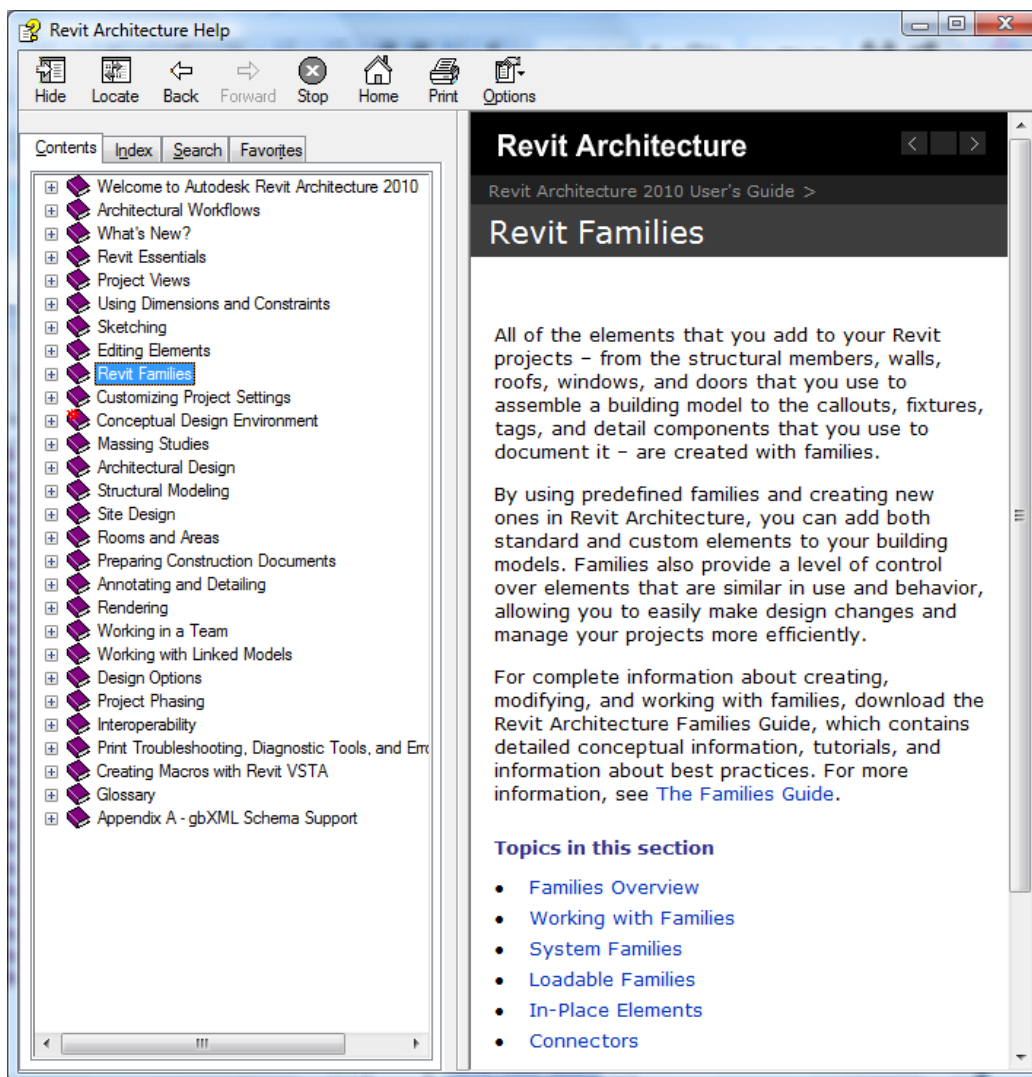
This handout includes a description of Revit families and instructions on creating basic families. The topic of families can be very complex, this class & handout is only meant to touch on the basics. The goal is to get a user familiar enough with the Family Editor to encourage them to start experimenting & practicing. There are many things to learn about this powerful tool, hopefully this starts the process for you.



Families

Overview

Families, sometimes referred to as components, work in Revit similarly to the way blocks work in AutoCAD. They are built outside of a project, stored in a separate directory, and can be loaded into multiple projects. What makes families powerful is their parametric capabilities. We can create one family that will flex in size to accommodate the many needs. Examples of families are Doors, Windows, Furniture, Columns, Lighting & Plumbing Fixtures, etc... Most families are created as 3D objects, but there are many uses for 2D families as well, such as tags & symbols.



Families

Types of Families

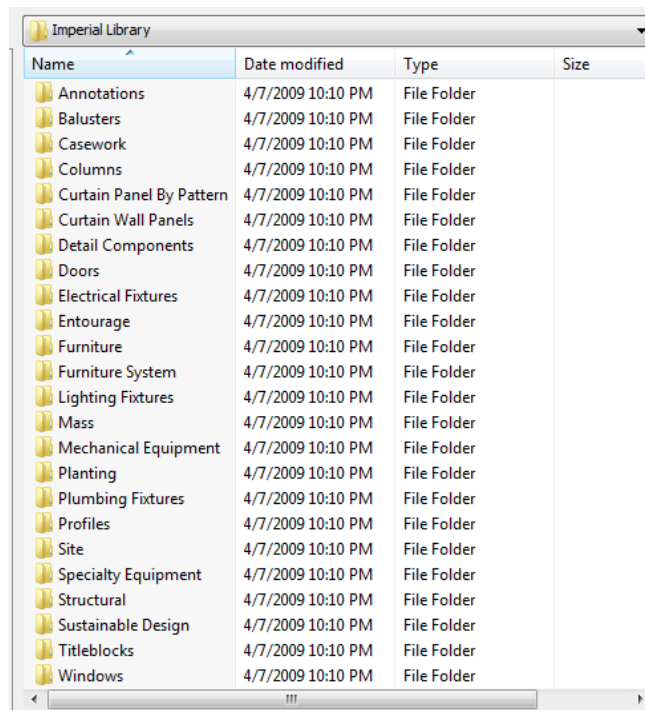
There are several types of families within Revit Architecture. Today we will be focusing on one in particular, standard families, but I have also included the others below with a short description.

Standard Families – these are our primary focus today. They are saved with the file extension of .rfa and loaded into projects. Rfa's can be either 3D or 2D families. Revit ships with a directory of pre-made families under the folders Imperial Library & Metric Library. For creating new families they've included a directory of templates again separated between Imperial and Metric.

Nested Families – Simply put these are families that have other families loaded into them. I will be covering these in my next class today, Extending the Family – Advanced Families & Components.

In-Place Families – An In-Place family is created within a project. This tool is only used when you have a need for a single instance of an object in a single project.

System Families – These are families defined inside Revit. They are not saved outside of projects, nor can they be loaded into other projects like standard families. Examples of these would be Walls, Roofs, Floors, Ceilings, Ramps, Stairs, etc...

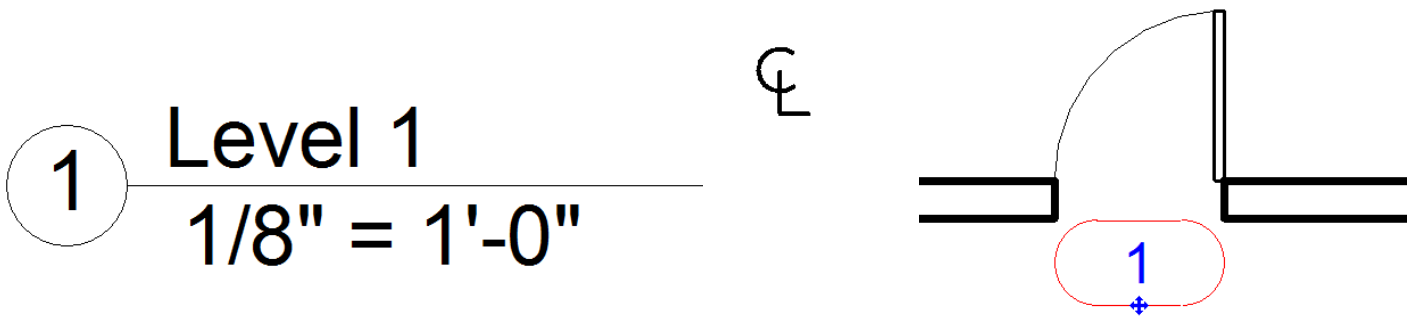


Families

2D or 3D

As stated previously, most families are 3D objects. They are constructed of solid parts and can have many parameters associated with them such as width, height, depth, material, etc... When loaded into a Revit project they will be visible in plan, section, & elevation views. These objects can also be scheduled & counted.

2D families are primarily used for annotation, like tags or as symbols.



I also recommend creating 2D families for components that do not need to be seen in elevations or sections. For instance, if you have a consultant working the interior elevations then there may be no need for you to place 3D casework in the kitchens or baths. You could simply use linework to represent the objects in plan view, leaving the interior elevation view a blank canvas for the consultant.

While creating a family, you have two choices for linework. Symbolic lines are more like detail lines in the sense that they are not viewable in 3D views. Symbolic lines will only show in the view types that you create them in. For instance, draw symbolic lines in a floor plan view & they will only be visible in plan views. If you draw symbolic lines in an elevation view, then they would be visible in all elevations (front & back). Model lines are visible in 3D views as well as plans, elevations & sections. These lines are work plane based, meaning that they can have a defined height above a level line or can be drawn on the vertical face of an object. Model lines are 3D objects even though they don't have a defined depth.

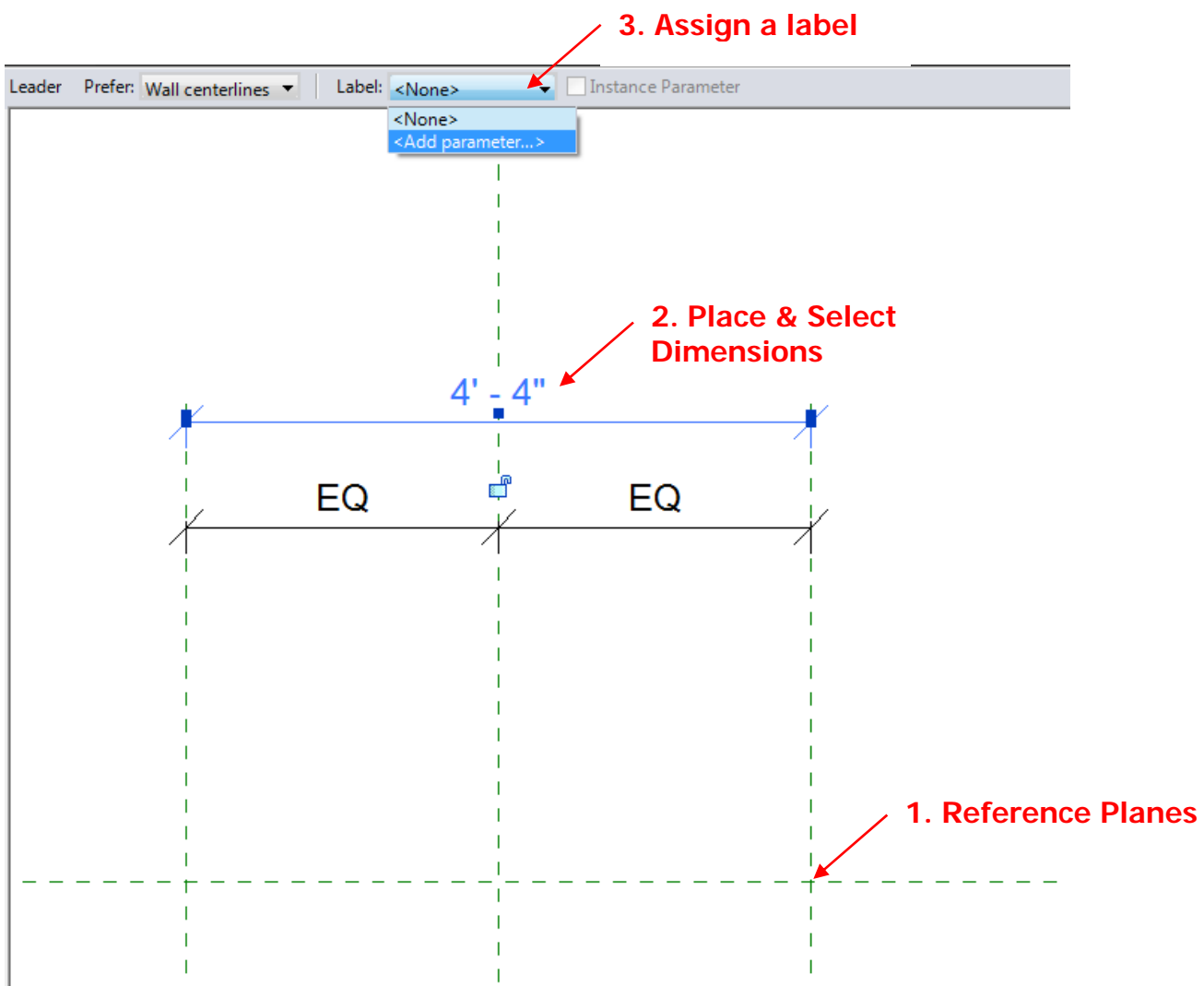
Linework like model objects can be dimensioned, aligned & locked, turned on & off, and have parameters applied to them. You will learn about these things in a few minutes.

Families

Parametric Sizes

Parameters can be applied to families to allow adjustments after the family is loaded into a project. For example, a Single Panel Flush door can be loaded into a project and different sizes created from that one family. The phrase “parametric” refers to a family’s ability to adjust on the fly. The key to creating a parametric family is using reference planes.

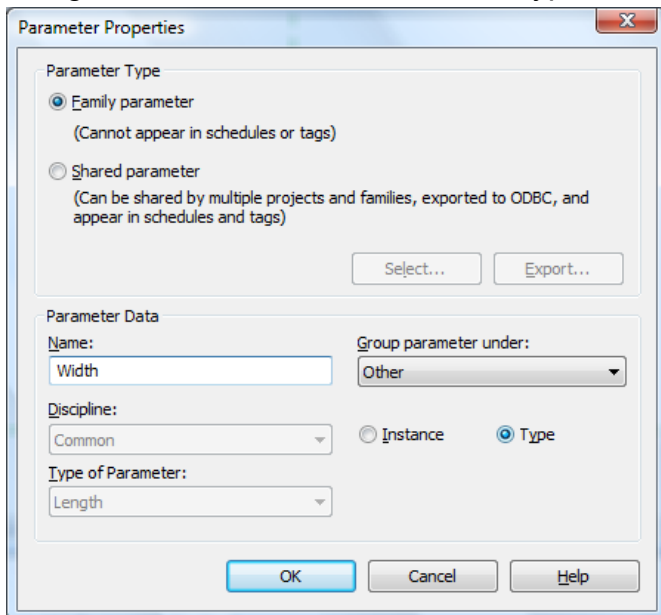
First step is to create reference planes, then dimension between them. Once you’ve placed a dimension, a label (or parameter) can be assigned to it.



Families

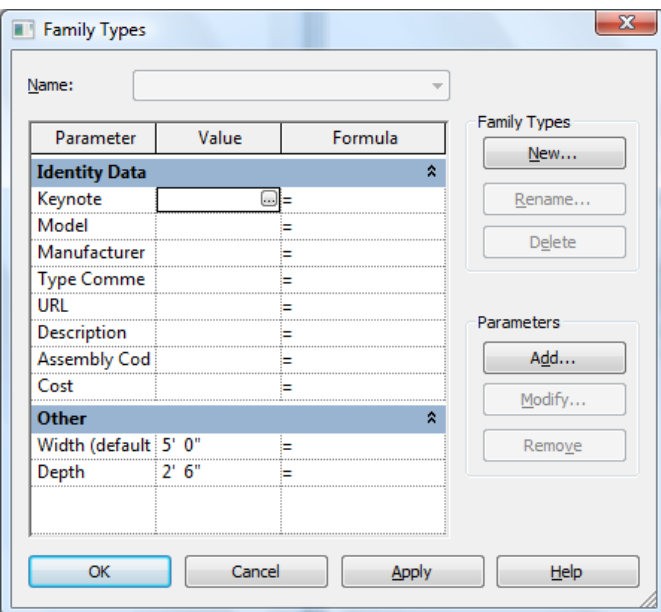
Type vs Instance Parameters

When assigning a parameter you are brought to a dialogue box. Here you can define what type of parameter you are creating (Choose Family 99% of the time, Shared Parameters will be covered in the advanced class later today), specify a name for the new parameter, group parameters under categories, and choose Instance or Type.



Type parameters are used more often. For example, if you create a new size of that Single Flush Door – 36” x 84”, then you want every one of those doors to be 3 feet wide and 7 feet high, you don’t want them to vary from one to the next.

Instance parameters are helpful when information needs to vary from one object to the next. For example each door gets its own unique number that would be an instance parameter. Other than numbering, I typically only use instance parameters if I know that an object needs to be stretched to fit in each location.



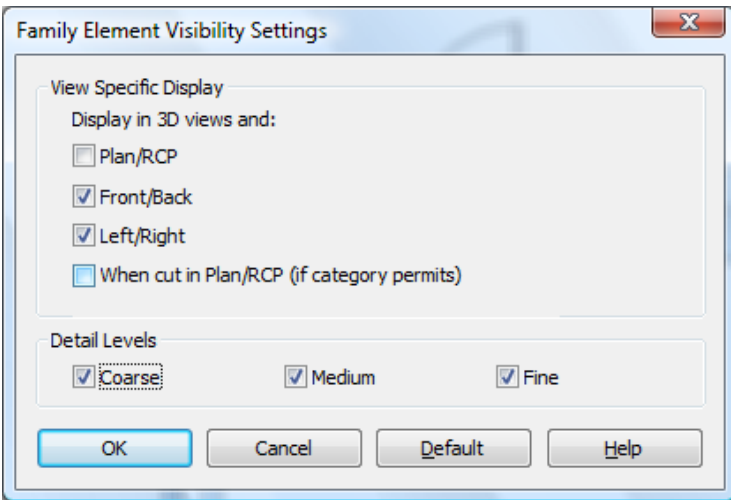
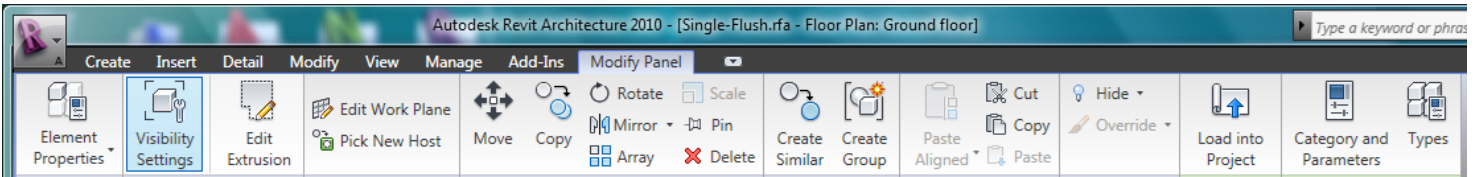
Once parameters are created you will be able to view the Family Types dialogue box. There’s a button on right side design bar. Some parameters are defined by default depending on the Family Template that you start with.

We can see the new Width & Depth parameters are down in the “Other” category. We could specify another category grouping by selecting the parameter then clicking on Modify. Notice that Width has “(default)” written beside it, this tells us that it is an instance parameter. When placing this object the width will be 5’-0” by default, the user can then modify it after it’s placed.

Families

Visibility

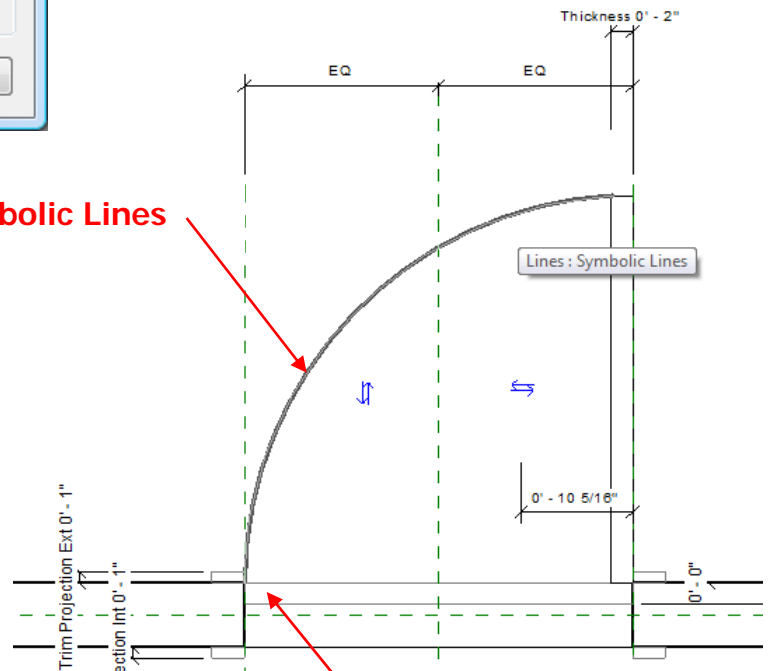
Both objects and lines can be managed visibly in families. If you were to open a standard door family in Revit you would notice that the door is modeled in a closed position, but when viewed in project's floor plan it shows as if it was open. This is achieved through the use of Visibility Settings.



Select an object and click on the Visibility button on the options toolbar. Here you can specify which types of views and at what levels of detail the selected object will show in.

So, for the standard door family the modeled door is set to only show in elevations / sections. In floor plan view there are symbolic lines sketched to represent the open door & its swing.

Symbolic Lines



Modeled Door to only show in elevation

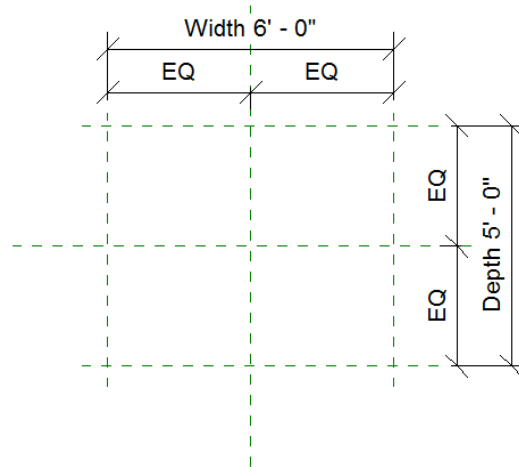
Families

How to:

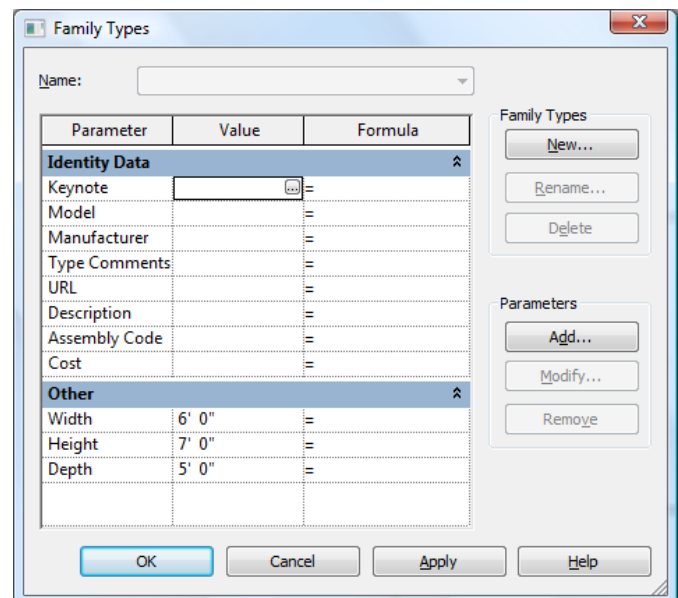
Create a parametric cube... start simple.

Manage your groups well:

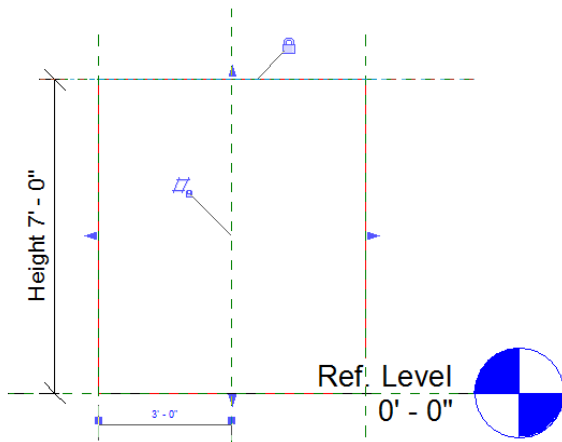
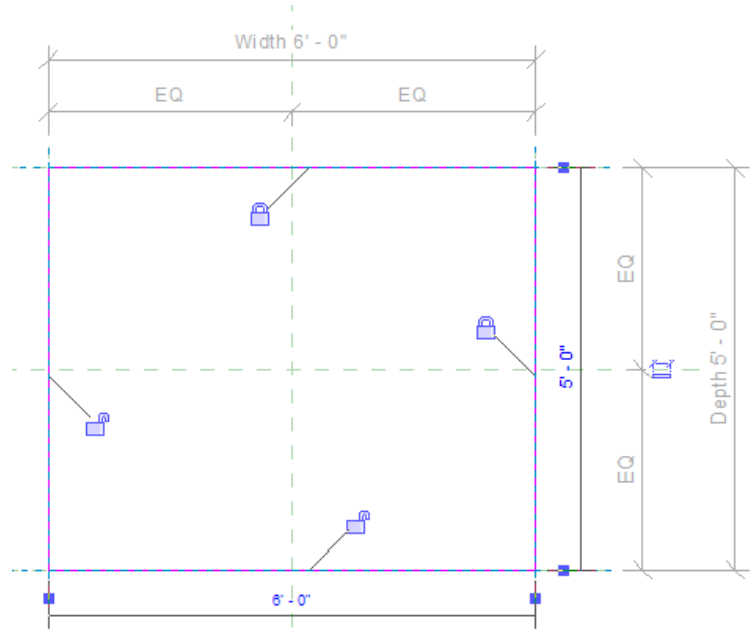
1. Open Revit
2. File menu – New – Family
3. Choose the Generic Model.rte from the Imperial Templates
4. Tile your windows so that you can see all 4 views that opened; Plan, Front, Side, & 3D.
5. In your plan view, you will see 2 reference planes defining the center point of your new object.
6. Draw more ref planes, one to each the right & left side, then one above & below
7. Place a dimension string between the left, center, & right ref planes and equalize.
8. Place another dimension from the left to the right ref planes
9. Select that dimension & add a label from the options bar
10. Name the new parameter “Width” and leave it as a type parameter
11. Repeat step 7-9 for the horizontal ref planes; above, center, & below.
12. Name this new parameter Depth



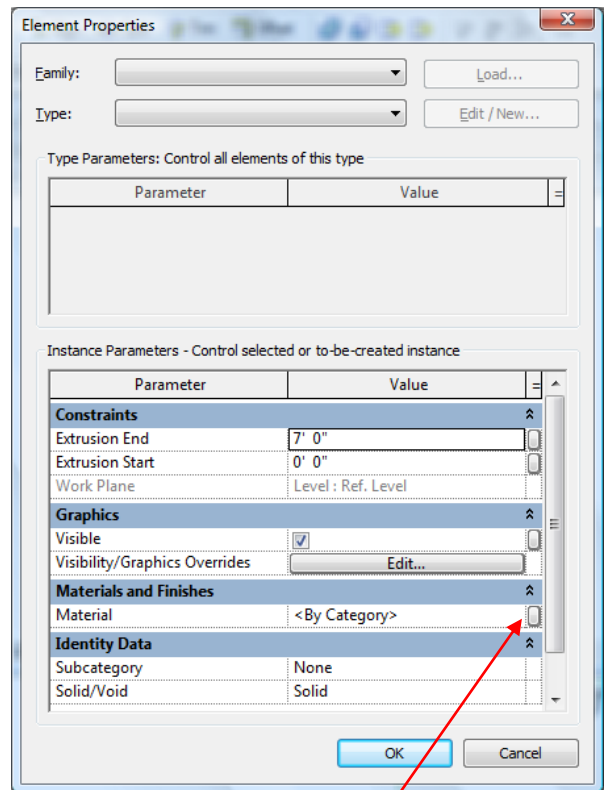
13. Now it's time to make sure things are working properly, Flex the model.
14. Click on the Family Types button on your design bar to the left.
15. Change the dimensions for both the Width & Depth parameters & press Apply
16. You should see the reference planes move accordingly. If not, go back & redo the above steps.
17. Now that you've got these working, let's create a parameter for Height
18. Switch to the Front elevation view
19. Create a horizontal ref plane above the level line
20. Place a dimension between the the level line & the new ref plane
21. Label this dimension with a new parameter called “Height”



22. Flex the model to make sure it works
23. Once you verify all three parameters are adjusting the ref planes correctly you can create the model
24. Switch back to the plan view
25. From the design bar, choose Solid Form – Solid Extrusion
26. Sketch a rectangle along the Width & Depth ref planes
27. Be sure to lock these sketch lines to the ref planes and Finish the sketch
28. Flex the model again to verify that your extrusion moves with the ref planes
29. Go to the front elevation view
30. Select the extrusion and drag it up to your Height reference plane
31. Lock the extrusion to the ref plane
32. Flex your model again
33. Congrats! You've made a parametric family!



Continue practicing making different shapes, adding more parameters, and experimenting with visibilities. Select a model object and click on the properties button to access additional parameters like material. Click on the gray box to the right hand side to assign a material parameter.



Click gray box for material parameter