Session01 Basic Table Family

Description:

Build a rectangular table Family. The Tabletop Height, Width, and Length are controlled by parameters. The Tabletop is 4" thick. The legs are 4" thick and offset from the edge of the table by 6."

File name

Basic Table.rfa

Type Names

Small, Large

Key Points

Template File

Generic Model

Parameters

"Width," "Length," "Height"

Types

"Small" = 2' – 6" x 4' x 3' – 6"

"Large" = 4' x 7' x 3' - 6"

STEP-BY-STEP PROCESSES

The Starting Point

Keynote

Before starting any new Family, take the time to think about its use:

Is it hosted by a wall, a floor, both, or none?

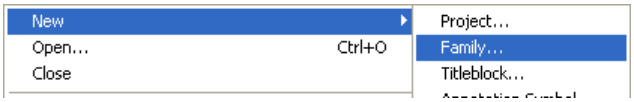
What parameters are needed?

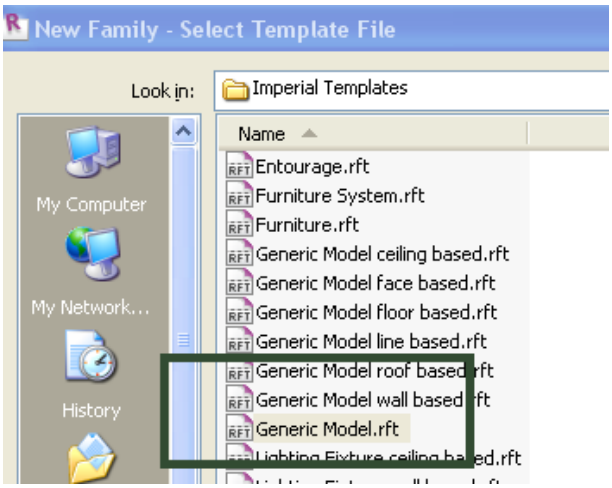
What category does this Family belong to?

These first few Families you build are straightforward. Once on your own, you need to understand the importance of using the correct template to start the Family.

Process

1. Start a new Family
   - ✓ *Template = Generic Model*





Process: Start a New Family

- Open Revit
- Select the File>New>Family... drop-down menu option
- A browse dialog box opens. By default you should be in the Imperial Templates location
- Select the appropriate template for the Family you are creating and select the Open button

A new family File opens within the Family Editor

Value

Using the Generic Model template allows you the most freedom when creating new families. This template is not attached to any host object: floor, roof, wall, and so on. Also, there are no predefined parameters as provided with door and window templates.

Building the Framework

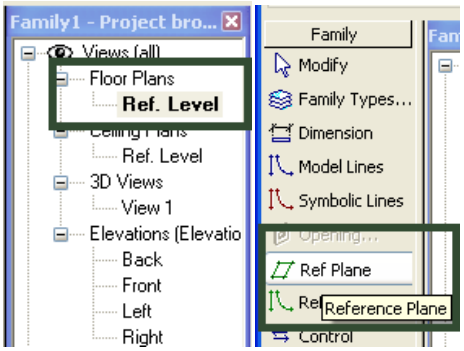
Keynote

In this section you layout the Tabletop and height. The first step of creating any Family is laying out the Reference Plane that drives the model geometry. Reference Planes are controlled parametrically using Labels and Parameters from the Family Types dialog box.

Process

The width and length of the table

2. View = Ref. Level

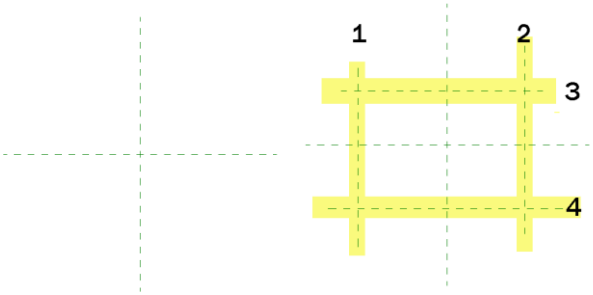


Process: Open a View

- From the Project Browser (on the left of the screen)
- Double-click the view name
- The view name is bold in the project browser when it is the active view.

3. Draw Reference Planes

   ✓ *Four Reference Planes act as the outside edges of the Tabletop*



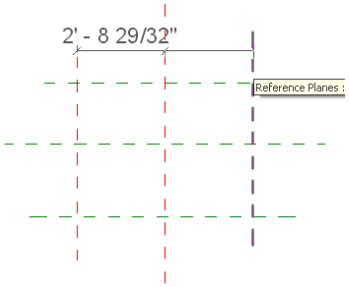
Process: Draw a Reference Plane

- Click Ref Plane in the Design Bar
- Select the end points of the Reference Plane

4. Dimension and Equalize

   ✓ *All in the same Dimension String*

   ✓ *Outside Reference Planes and Center Reference Plane*



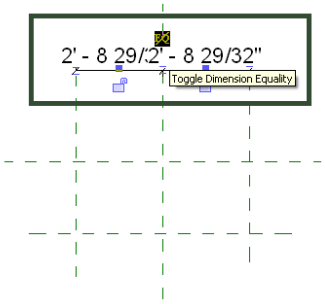
Process: Create a Dimension

- Select the Dimension tool in the Design Bar
- Zoom into the object you wish to dimension
- Select the first point or line to dimension from

  Use the Tab key to cycle between overlapping choices

- Select the second point or line to dimension

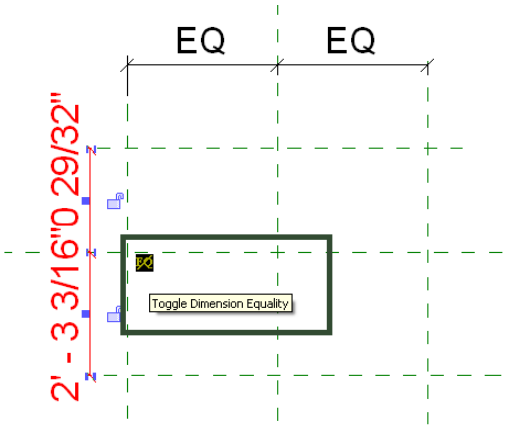
  The dimension tool stays active. Continue selecting lines or points to chain the



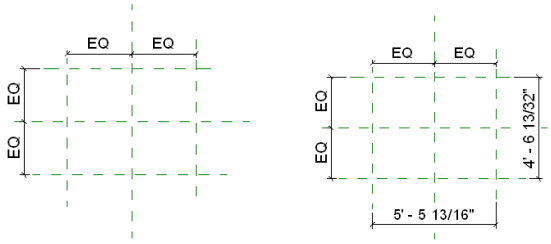
dimensions.

Chained dimensions behave differently from separate dimensions.

- Continue to select objects, points, or faces until finished
- Click away from objects and other dimensions to finish
- Press the Esc key to exit the dimension command
- Dimension and Label



5. Label the Dimensions
   - ✓ *Width*
   - ✓ *Length*

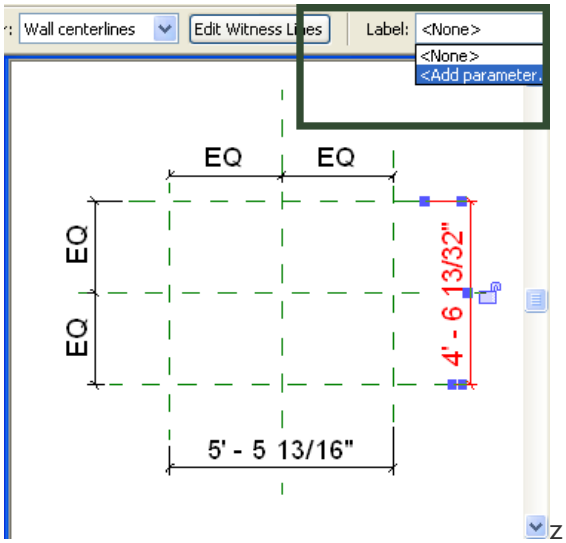


Process: Add a Parameter Label to a Dimension

- Select the dimension
- Notice the Label drop-down box in the Options Bar
- Select the appropriate parameter in the Label: drop-down box

The dimension selected is labeled with the parameter you selected in the previous step.

Note: It is also possible to create new parameters in this drop-down box; the discipline and type are predefined.



Process: Add a New Parameter

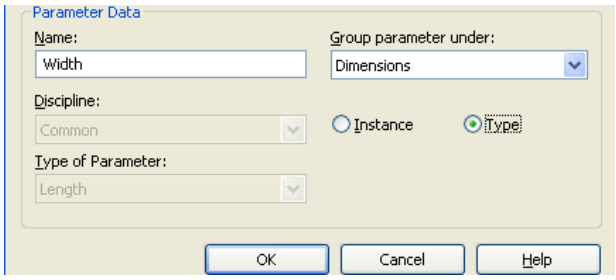
- Select the Family Types button on the Design Bar
- Select Add… in the parameters section

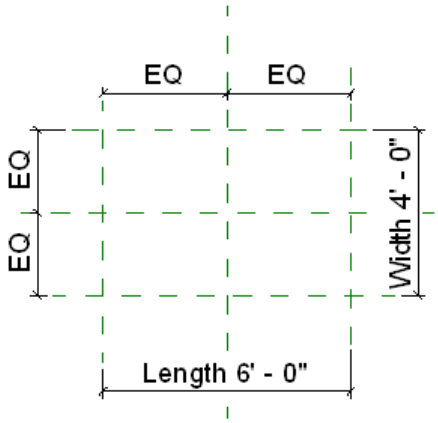
Attack complicated dialog boxes as if reading a book: top to bottom, and left to right.

- Name the Parameter
- Select a discipline, Type, and Group for the parameter

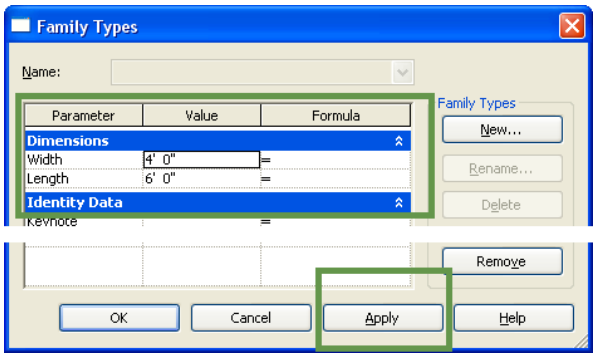
These options are important for displaying and scheduling, and some of them cannot be changed after the parameter is created – so choose carefully!

- Select whether this is an Instance or Type variable
- Select the OK button to create the parameter
- Assign a default value or formula to the parameter in the Family Types box if desired (not necessary)
- Select the OK button to exit the Family Types dialog box





6. "Flex" the model checking for:
   - ✓ *"Width" Parameter controls Reference Planes*
   - ✓ *"Length" Parameter controls Reference Planes*
   - ✓ *The center point does not move*



Process: Flex a Parameter

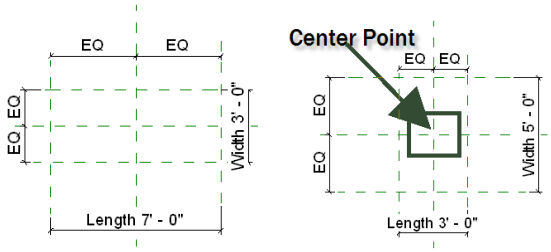
- Select Family Types... Family Types... in the Design Bar

  The Family Types Dialog box opens

- Find the parameter you wish to Flex
- Enter a new value
- Select the Apply button
- Note the change in the current view

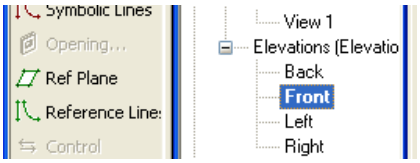
  To exit the Family Types dialog box,

- Select the Cancel or OK buttons

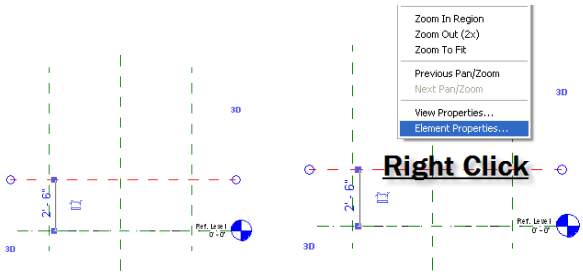


The Top and Bottom of the Table

7. View = Front

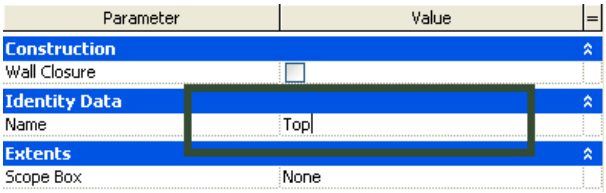


8. Draw Reference Plane
   - ✓ *Draw a Reference Plane above the Ref. Level*
9. Name the Reference Plane – it is a property of the Reference Plane
   - ✓ *Name = Top*

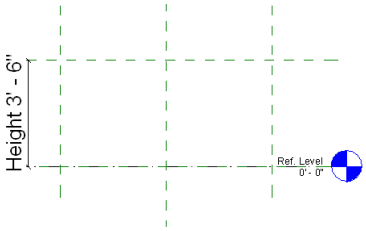


Process: Open an Element's Properties

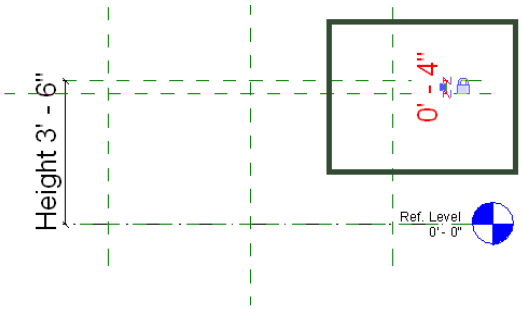
- Select the element
- Select the Properties button in the Options Bar



10. Dimension and Label the "Top" Reference Plane
    - ✓ *"Height"*
11. Flex the Model checking:
    - ✓ *"Height" Parameter works*

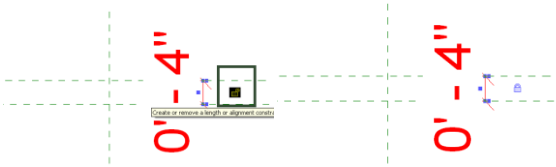


12. Draw Reference Plane
    - ✓ *A few inches below the "Top" Reference Plane*
13. Dimension and Constrain
    - ✓ *Constrain Reference Plane = 4" from the "Top" Reference Plane*

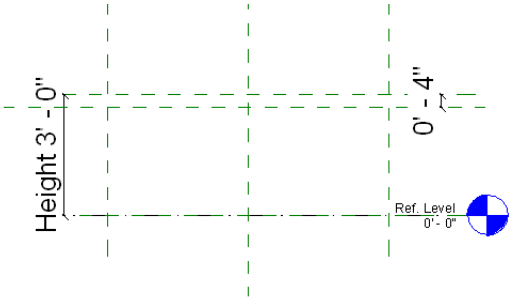


Process: Constrain a Dimension

- Select the Dimension
- Select the "Constrain" button



14. Name the Reference Plane
    - ✓ *Name = Bottom*
15. Flex the Model checking:
    - ✓ *"Height" Parameter controls "Top" Reference Planes*
    - ✓ *The "Bottom" Reference Plan maintains its relationship*



Value

You have finished laying out the framework for the family. Always draw the necessary Reference Planes then dimension and label them appropriately. Then, from the Family Types Dialog box, check that all the Parameters and the Reference Planes they control work properly. This is one step of the "Cha, Cha, Cha," all family creation goes though.

Starting the Tabletop

Keynote

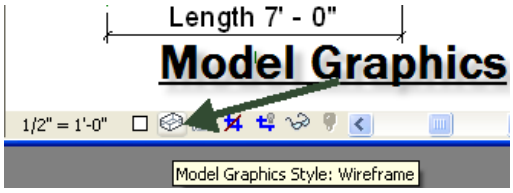
Now that you have laid out the Reference Planes that make up the table, you can move onto the physical geometry. If you have been using the mass tools in Revit, this process is incredibly easy. There are a few key points to note: attach sketch lines and control grips to the Reference Planes; these Reference Planes are controlled from parameters in the Family Types dialog box. Remember the one rule of Sketch mode, "Closed Loops."

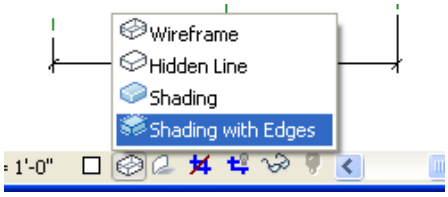
Process

16. View = Ref. Level

17. Change the view's settings = Shading with Edges

- ✓ *This allows you to see the solid mass once the sketch is finished.*

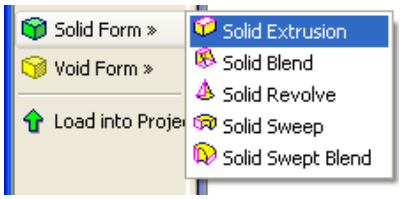




Process: Change a View's Shading

- On the view control bar (bottom left, next to the Project Browser)
- Select the "Model Graphics Style" button
- Select the desired shading view

18. Start the Solid Extrusion tool



This is the solid that comprises the Tabletop. All of the sketch lines of this solid must be attached to the appropriate Reference planes. If the sketch lines making up a solid are attached to a Reference plane that is parametrically changed, the solid also changes.

- ✓ *For clarity consider this mass "Tabletop"*
- ✓ *Notice that the Design Bar Changes too*

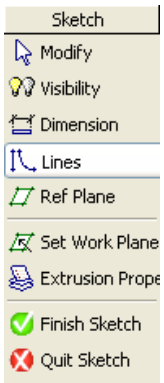
Process: Create an Extrusion Solid

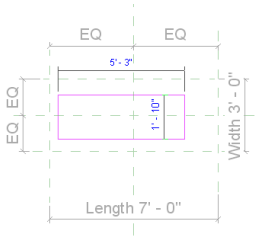
- Select Solid Form>Solid Extrusion in the Design Bar

  This takes you into Sketch mode.

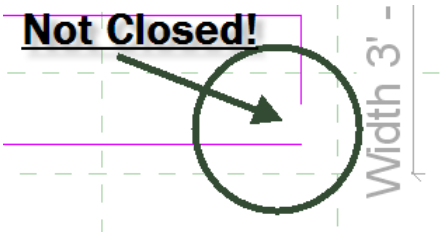
- Sketch the extrusion outline in the appropriate view using the Lines tool in the design bar
- Select the Extrusion Properties button in the Design Bar
- Edit any properties as necessary
- Select the Finish Sketch button in the Design Bar to finish the extrusion

  You now have a solid extrusion



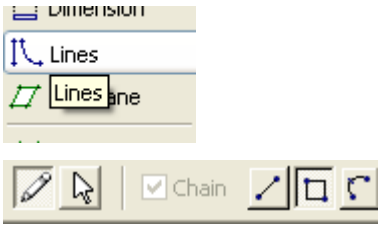


19. Draw Sketch Lines
    - ✓ *Draw a rectangle*
    - ✓ *Sketch lines must form closed loops*

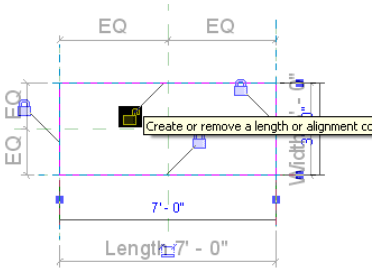


Process: Use the Rectangle Drafting Option

- Using a drafting tool such as Lines, Walls, or Reference Lines,
- Select the Rectangle button in the Options Bar
- Select the starting corner of the rectangle
- Move the cursor to draw the rectangle
- Select the opposite corner



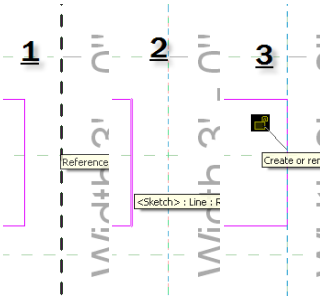
20. Align and lock the Sketch lines
    - ✓ *All four Sketch Lines that represent the sides of the table need to be aligned and locked (constrained) by the Reference Planes you drew above*
    - ✓ *Hint: when drawing the Sketch lines, use the Reference Planes as snap points*



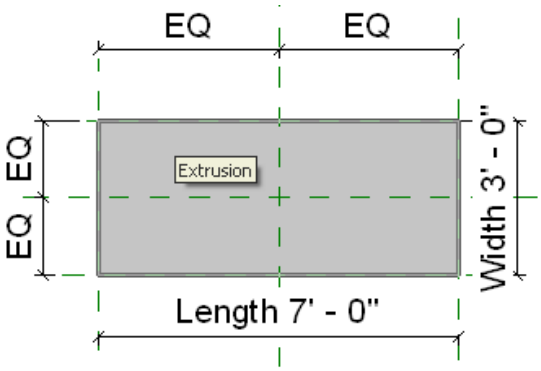
Process: Use the Align Tool

- Select the Align tool button in the toolbar
- Select a face or point as a Reference
- Select the face or point on an object that moves in alignment with the Reference

Remember when using this tool that the object that moves is the second one you select.



21. Finish the Sketch



Process: finish a sketch

- Select the Finish Sketch button in the Design Bar
- The sketch lines must form closed loops

22. Flex the Model checking:

✓ *That the solid object moves with the Reference Planes*

Value

You have just created the footprint of the table. This footprint, since it is attached to the Reference Planes, is controlled though the Family Types Dialog Box. Well, actually, the Family Types Dialog Box controls the Parameters. The Parameters are controlling labeled dimensions and those Dimensions are controlling the Reference Planes so that when those Planes move, so does the attached geometry. Get all that?

Finishing the Tabletop

Keynote

You have the footprint of the table completed. You also want to control the height of the table based off the "Top" Reference Plane. You want the thickness of the Tabletop to always be 4." That is why we created the "Bottom" Reference Plane. In the front view of this family you align and lock the top and bottom of the mass we just created to the "Top" and "Bottom" Reference Planes.

Process

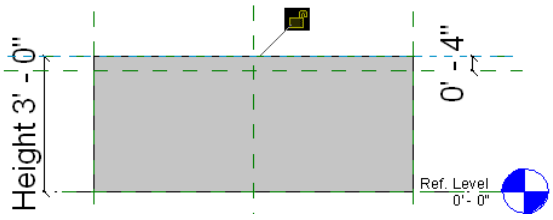
Aligning the Solid Geometry and Reference Planes

23. View = Front

24. Change the view's settings = Shading with Edges

25. Align and Lock

✓ *Top of the "Tabletop" Mass to the Top Reference Plane*

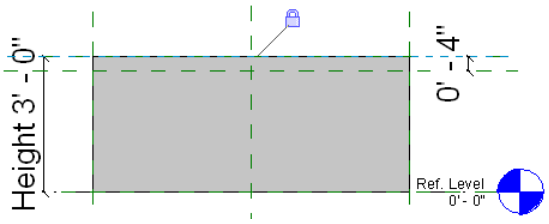


Process: align and lock mass grips

- Select the Align tool button in the toolbar
- Select a face or point to use as a

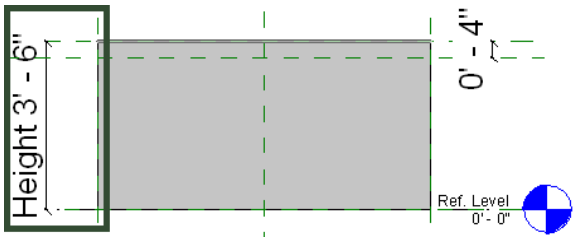
Reference

- Select the edge of the mass you want to move
- Select the "Constrain" Button >

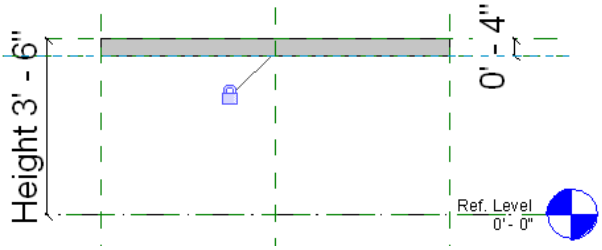


Remember that the mass is not constrained until the constrain button is "locked"

26. Flex the Model checking:
    - ✓ *"Height" Parameter controls "Top" Reference Planes*
    - ✓ *Mass objects moves with the Reference Planes*



27. Align and lock
    - ✓ *The bottom of the "Tabletop" mass to the "Bottom" Reference Plane*
28. Flex the Model checking:
    - ✓ *That the solid object moves with the Reference Planes*



Value

The "Tabletop" Mass is completely controlled by the Reference Plane. Now, if you need to change the Width, "Length," or "Height" of the Tabletop, go to the Family Types dialog box and change it there. Essentially, the Tabletop is now fully parametric.

Building Table legs

Keynote

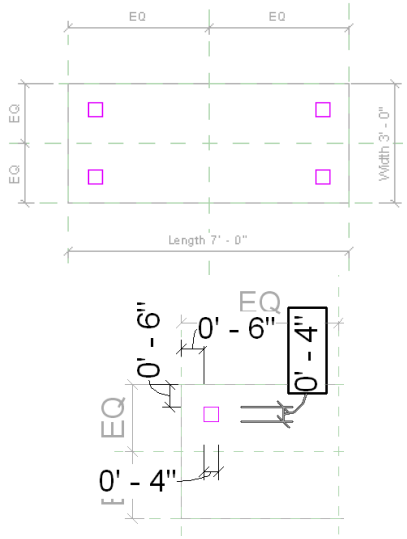
You want to be able to control the width, length, or height of the Tabletop. What is needed to control the legs? In this case, nothing! The heights of the legs are always going to be determined from the height of the table. What about the thickness of the legs? They are always going to be 4" x 4." The locations of the legs are always 6" from the corners of the table. If you build the leg masses and dimension and constrain them correctly, as the width, length, or height changes, so does the location and height of the legs.

Process

Sketching out the Legs

29. View = Ref. Level

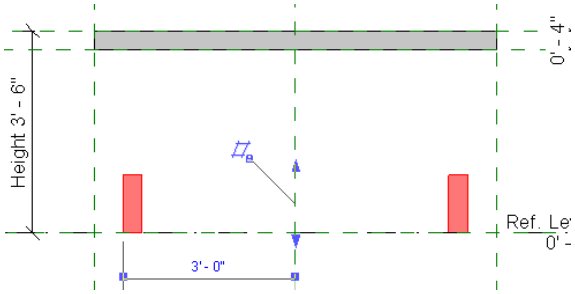
30. Start the Solid Extrusion tool
    - ✓ *Draw all four legs in the same mass for ease of use*
    - ✓ *Draw four rectangles*
31. Dimension and lock each rectangle
    - ✓ *Leg thicknesses are 4" x 4"*
    - ✓ *Legs are 6" from edges*



32. Finish the Sketch

Constraining the Leg height

33. View = Front
34. Align and Lock
    - ✓ *Top of legs to the "Bottom" Reference Plane*
35. Flex the Model checking:
    - ✓ *"Width," "Length," and "Height" Parameters*
    - ✓ *All Parameters move Reference Planes*
    - ✓ *All masses move with Reference Planes*



Value

When you flex the model, all the geometry should change using Parameters in the Families Type Dialog. This means that we can now create Type information based off Parameters. In projects, we do not want to have to choose the width, length, and height of the table. We want to select a "Small" or "Large" table. This is done using the type selector.

Checking the Family

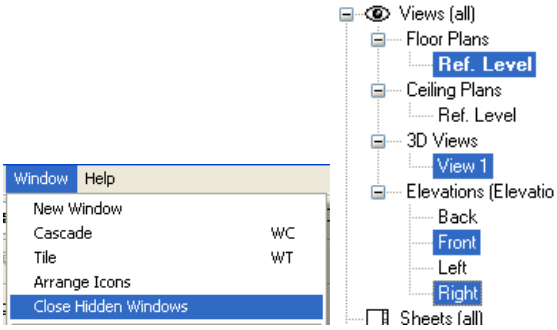
Keynote

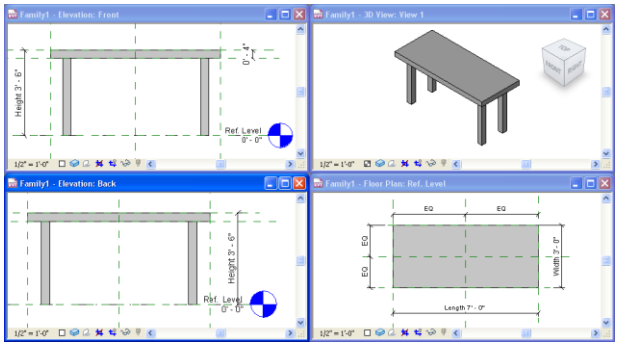
Before you move on to types, you want to check that all parameters, Reference Planes, and masses work.

This should be done prior to creating types and prior to loading the family into a test project. It is a quick visual check that should become second nature when creating families. When you open a view in Revit, that view remains open until you close it. If you open a second view of the project, that first view is still open, it has just been pushed behind the first view. That is, if you open four views, one after another, all four are open; you can not see them all until you "Tile" your windows.

Process

36. Close Hidden windows (from the pull-down menus)
    - ✓ *Windows>Close Hidden Windows*
37. Open the following Views
    - ✓ *Ref. Level*
    - ✓ *Front*
    - ✓ *Right*
    - ✓ *3D*
38. Tile Windows (from the pull-down menus)
    - ✓ *Windows>Tile*
    - ✓ *Shortcut Key = WT*
39. Flex the Model checking:
    - ✓ *"Width," "Length," and "Height" Parameters*
    - ✓ *All Parameters move Reference Planes*
    - ✓ *All masses move with Reference Planes*





Value

This might seem repetitive; however, sometimes the only place to catch errors is with all four views open. You want to be absolutely sure that the Parameters work. If the Parameters work then you may start creating Types. This is your goal: to create a multiple types that can be selected in your project.

Creating Types

Keynote

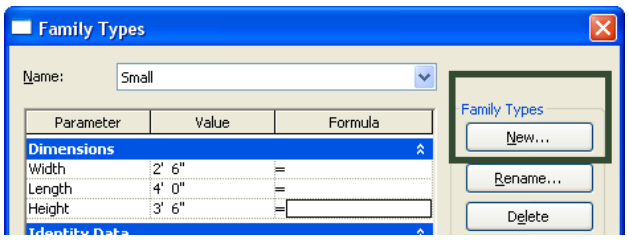
Types are just a container. You are creating two types in this family, "Small" and "Large." These two type names are just that, names. You have to give the names meaning by setting their parameters to specific, meaningful values.

Process

Open the Type Selector

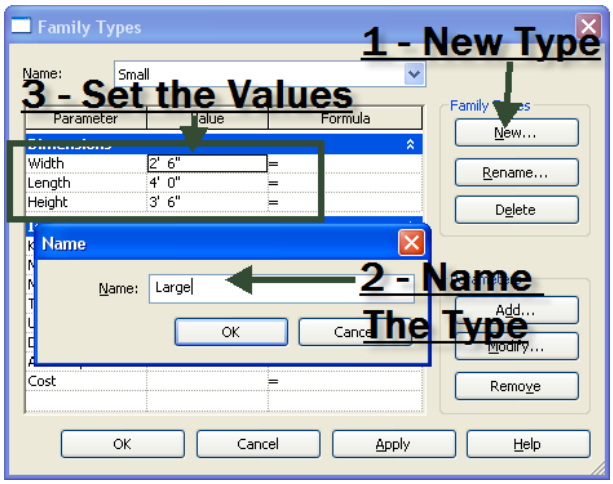
40. Create New Types

- ✓ *Type Name = Small*
- ✓ *"Width" = 2' 6"*
- ✓ *"Length" = 4'*
- ✓ *"Height" = 3' 6"*



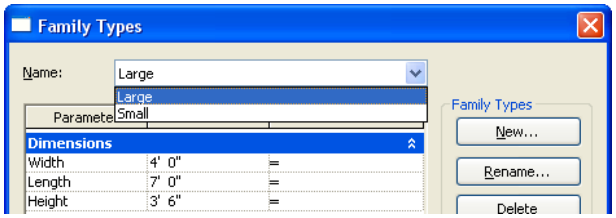
Process: Create a New Family Type

- Select the Family Types button in the Design Bar
- The Family Types dialog box opens.
- Select the New... button in the Family Types area in the upper right of the dialog box
- Name the Family Type something descriptive
- Select the OK button
- A new Family Type has just been created. It keeps the last values that were in the tables while it's showing in the Name drop-down list at the top of the Family Types dialog box.
- Select the OK button to exit the Family Types dialog box when you have finished creating types



41. Create New Type

- ✓ *Type Name = Large*
- ✓ *"Width" = 4"*
- ✓ *"Length" = 7'*
- ✓ *"Height" = 3' 6"*



42. Save the Family

✓ *Family Name = Basic Table*

Process: Save a Family in the Family Editor

Select the Save button in the Standard toolbar

Value

In a project where you are placing a small or a large table; you don't want to constantly define the lengths and heights of the tables. When you place a single flush door, you care about the width and height. Door types are named with their dimensions. Keep in mind though that the name has nothing to do with the actual parameter. If you change a 36" door's Type Name to 30", all you have done is change the container's name, not the parameters that make up the geometry. The flip side is also true. If you change the Width Parameter in the 36" door type to 30" you have changed the geometry. When you place the door, you are placing a 36" door but the door is really only 30" wide.

Testing the family

Keynote

You have a complete family and it works perfectly. Or at least it does in the Family Editor. Sometimes you find that a Family works in the Family Editor but not in an actual project. Always test your family in a Blank "Test" Project just to be sure that your Family is truly working.

Process

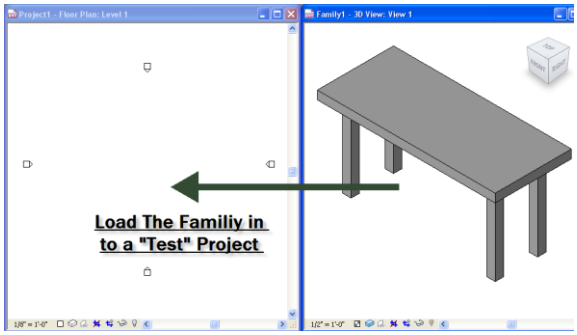
43. Start a New Project

44. Load the Family into the Project

Process: Load a Family into an Open Project from the Family Editor

Select the Load into Projects Load into Projects button at the bottom of the Design Bar

A window for the project into which you loaded the family appears automatically.



45. Place the component into your Model

Process: Place a Component in Revit

- From the Project Brower
- Start the Component command
- Select the Family and Type from the Type Selector

46. Change the Component type
    - ✓ *Basic Table: Small*
    - ✓ *Basic Table: Large*

Value

You have completed your first Family and tested it at every level including: Reference Planes, Parameters, Masses, and Types within in a Project. If you skip any step along the way you may have to start from scratch to find where the problem is. Take your time, as each step should be well thought out, executed, and tested. Although this is a simple Family, if you follow the step-by-step process laid out in this document, you are able to create almost any Family.

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