Move Vertices in CPQ 3D Scenes

In this course, you will learn the theory of Move Vertices by watching a real-world example of how to use this feature to solve a design requirement. Then see how the feature can be changed during run time with Snap rules.

Objectives

- Move Vertices Theory & Example: Window

- Move Vertices Manipulations with Snap

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Move Vertices Theory & Example: Window

Use the Move Vertices feature to stretch or twist part of a mesh, while leaving the rest alone.
Before we begin, remember other techniques are available. If you want to resize a mesh along all 3 dimensions, you can simply change the scale property of the mesh.

Or, if you want to change only certain dimensions, you can use the transform geometry feature.
However, for many real-world objects, these two techniques don't work. Since they both scale the mesh evenly across all vertices, parts of the object may be distorted.
For example, consider this mesh of a window frame assembly we imported into the scene.
If we use transform geometry to resize a window assembly, note the distortion of both the casing around the edges and the wood between the panes of glass.

These should stay the same width, even though we want the entire window wider.
To solve the problem, we define the points, or vertices, of the mesh that will move together with the move vertices feature.
To use this feature, first select the mesh you'd like to transform.
In the properties column on the right, open the features expander, and add a new Move Vertices feature.
As with all features, you can change the name of the feature to make future Snap programming easier.
As you edit the move vertices feature, notice that all the vertices of the featured mesh are highlighted in the scene.
Select the vertices you want include by shift-dragging a marquee around them. They light up.
You can shift-drag to add more points, and alt-shift-drag to remove them.
Use the usual mouse gestures to view your mesh from other angles, to ensure you have all the correct vertices selected.
Click the Done button to complete your selection.

You can add or remove vertices again by clicking the "Edit Vertices" button in the feature.
 Now that a portion of the mesh has been defined, test it in two different ways. First, entering field values into the feature's translation, rotation, and scale properties will show you how the mesh reacts to the adjustments.
Second, clicking the gizmo buttons at the bottom of the feature is a more intuitive way to do the same thing.
One mesh can have multiple move vertices features. We created one for the right side of the window, we can do the same thing for the left side.

Create the feature…

select the vertices…

and test the operation.

When multiple features are applied to a mesh, they are shown in a stack in the features expander. The features are applied in order, from top to bottom.

Here, the two features we added do not impact each other, so the order does not matter. In other meshes, with other features applied, you may need to change the order. Simply select any feature and drag it up or down in the stack.

Move Vertices Manipulations with Snap

Like any other feature, Move Vertices can be adjusted during run-time with Snap rules.

Usually, the fields of data controlling this feature would come from a configurator, or some other source. For demonstration purposes, we will use fields within this stand-alone scene.

To start, we have a window mesh in the scene. Two move vertices features define the left and right sides of the window.

To control those features, create a number field called "window width in inches."

We use a select list for the 4 widths of window we sell.

Create a new scene rule, called "update Window"

We want to set the feature on the Window mesh called "Right Side". We want to move it (translate it) along the X axis.

We want to move it as far as the user asked… minus the standard 24 inch width the window has by default, and divided by two, since we're moving the right half of the window.

When we run the scene, we see the Move Vertices is now moving the right half of the window.

Return to the rule, and add a second set feature block. Since it's almost identical to the first, we can select the first and control-drag it to duplicate.

Use the math block to move the left side in the opposite, negative direction.

When we run the scene again, we see both sides of the window moving, and the casing around the edges and the wood between the panes of glass have a constant width.

Recap

As a recap, You reviewed the theory of how move vertices can stretch or twist part of a mesh, while leaving the rest alone. You saw how the feature can be applied multiple times to the same mesh.

You also learned how to automate the feature using Snap

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