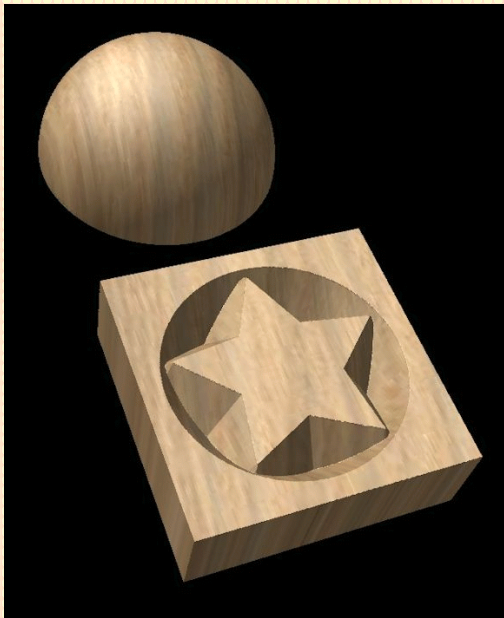


CREATING SHAPES ASPIRE v8.0

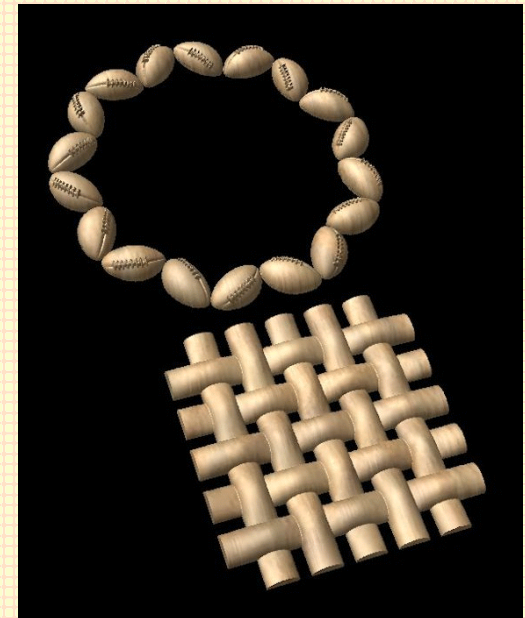
Create Shape



Two Rail Sweep



Extrude and Weave



Create Shapes

Some Basics

The reference manual for Aspire version 8.0 states **“The Create Shape tool allows the user to create Components based on one or more closed vectors”**. There are undocumented exceptions to the closed vector rule. Sometimes when used with other vectors that are closed vectors the software allows the creation of a 3d component. This is not something you would set up in the software to create a component, I am just mentioning it here so you are aware that the software will do things that were never intended to be used.

Any closed 2d vector or vectors you draw can be used to build a 3d component with the Create Shape tool.

If more than one vector is selected when creating the component then the software decides how the vectors will be treated.

If the vectors chosen are separate vectors and not overlapping or inside each other then Aspire will create a 3d item for each vector and all the items will be part of the component. The item with the largest footprint will be the tallest item based on the options chosen from the menu and the height of the other items will be based on their footprint and be proportionate to the height option chosen. The component can be divided later into separate components if needed with the Split Component tool.

If any of the vectors chosen are overlapping each other the software will create separate 3d items and combine them into one component. The items created with overlapping vectors can not be separated from the component later. The items created using vectors that are not overlapping can be separated later with the Split Components tool.

If the vectors chosen are not overlapping and have vectors inside vectors that do not overlap then the software makes a component based on where the vectors fall inside each other. Some vectors will create holes in the main component while others will create separate 3d items that are combined in the component. The separate 3d items can be separated from the main component later with the Split Component tool.

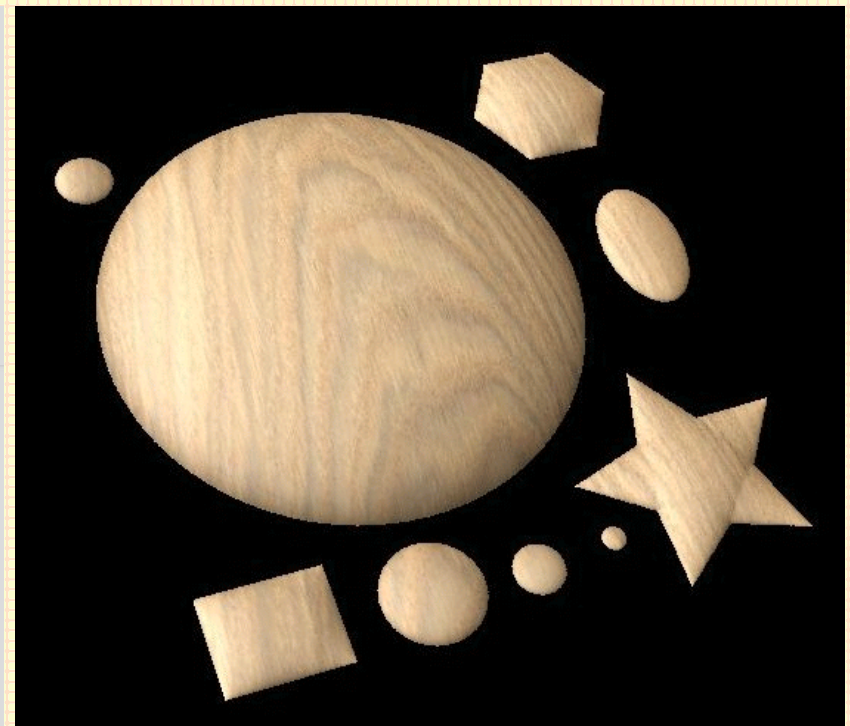
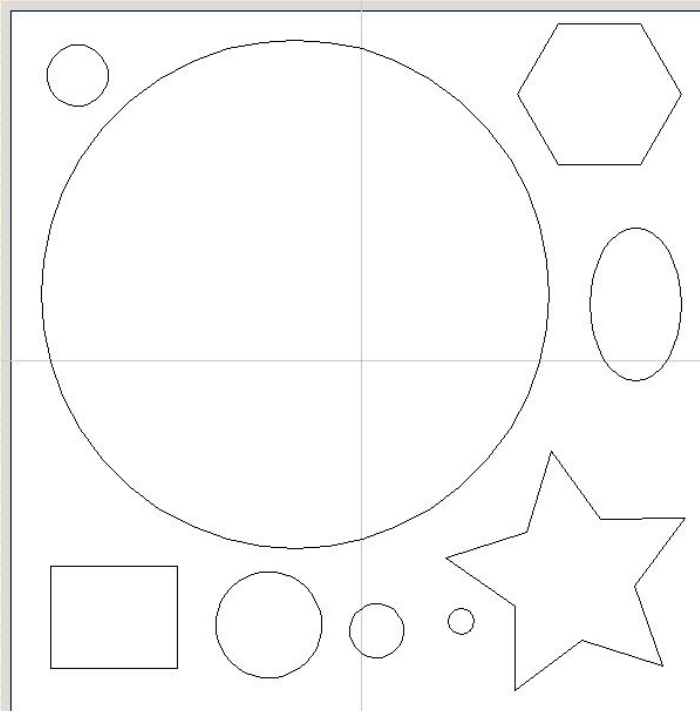
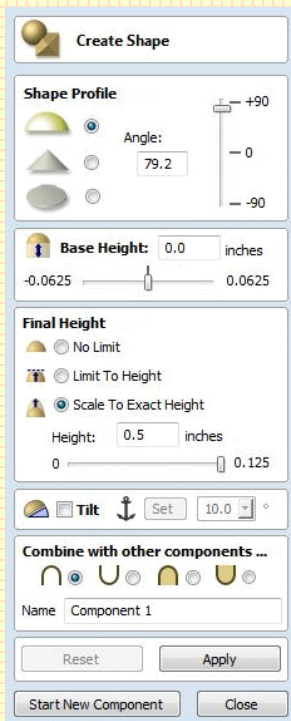
**You can download a trial version of Aspire v8.0 at
<http://www.vectric.com/downloads/trial-software.html>**

Create Shapes

Examples

All the following examples use the same options from the Create Shape menu so you can see how the choice and location of the vectors affect the components created. OPTIONS USED: 79.2 degree angle, 0.00 Base Height, Scale To Exact Height 0.5 inches, no Tilt, Combine set to Add(except where noted).

Separate Vectors - All vectors selected together

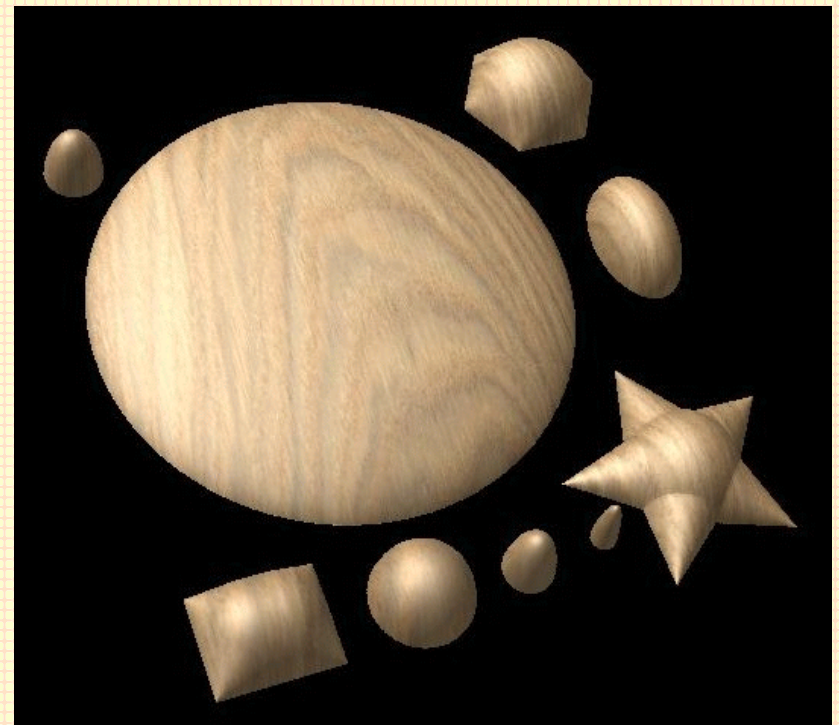
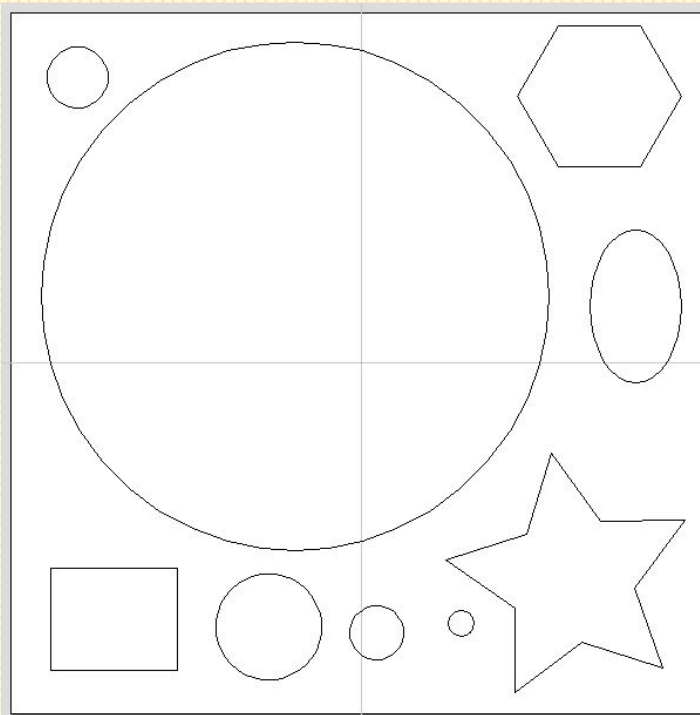
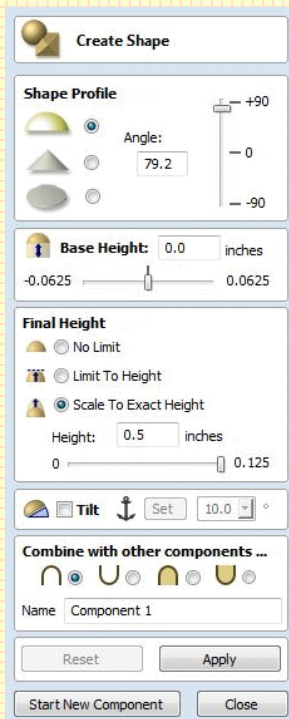


Create Shapes

Examples

All the following examples use the same options from the Create Shape menu so you can see how the choice and location of the vectors affect the components created. **OPTIONS USED:** 79.2 degree angle, 0.00 Base Height, Scale To Exact Height 0.5 inches, no Tilt, Combine set to Add(except where noted).

Separate Vectors - Each vector selected alone and components created separately

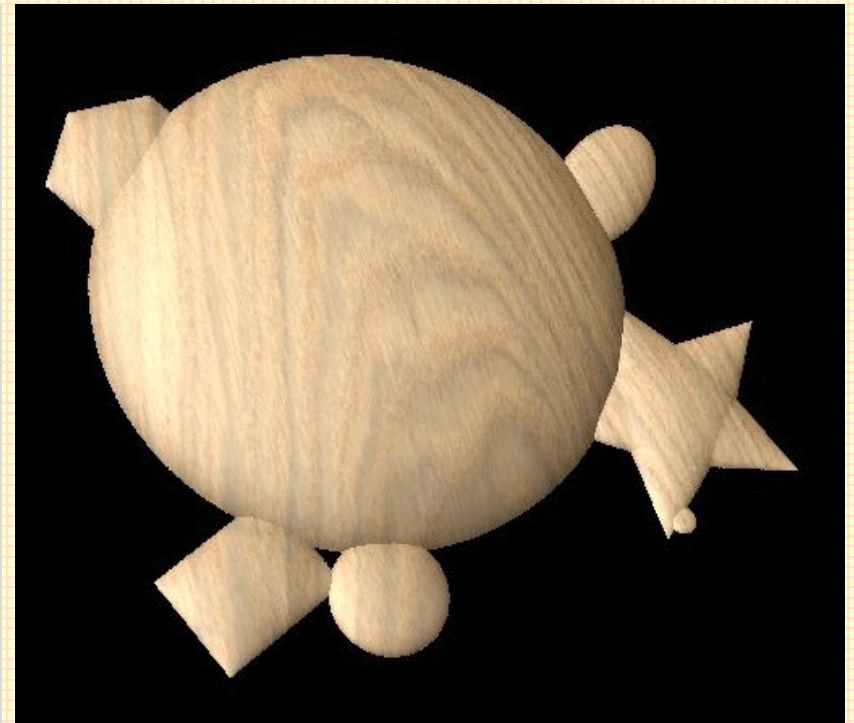
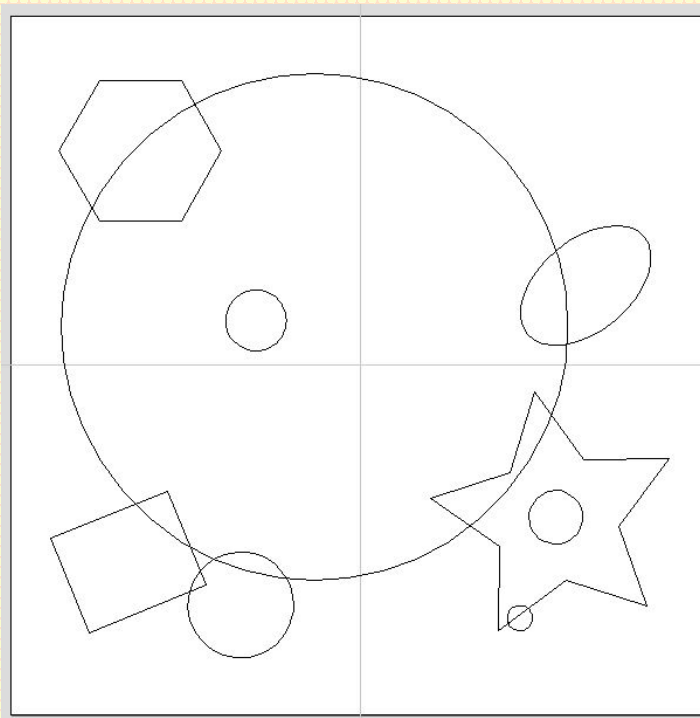
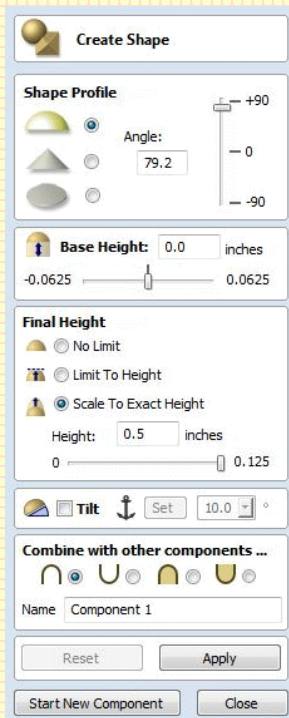


Create Shapes

Examples

All the following examples use the same options from the Create Shape menu so you can see how the choice and location of the vectors affect the components created. **OPTIONS USED:** 79.2 degree angle, 0.00 Base Height, Scale To Exact Height 0.5 inches, no Tilt, Combine set to Add(except where noted).

Overlapping Vectors - All vectors selected together

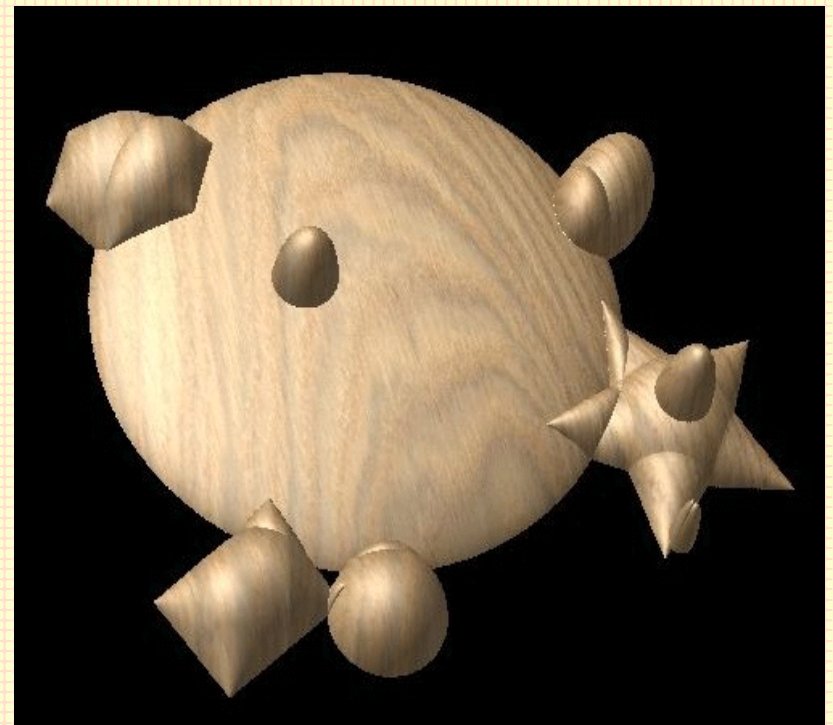
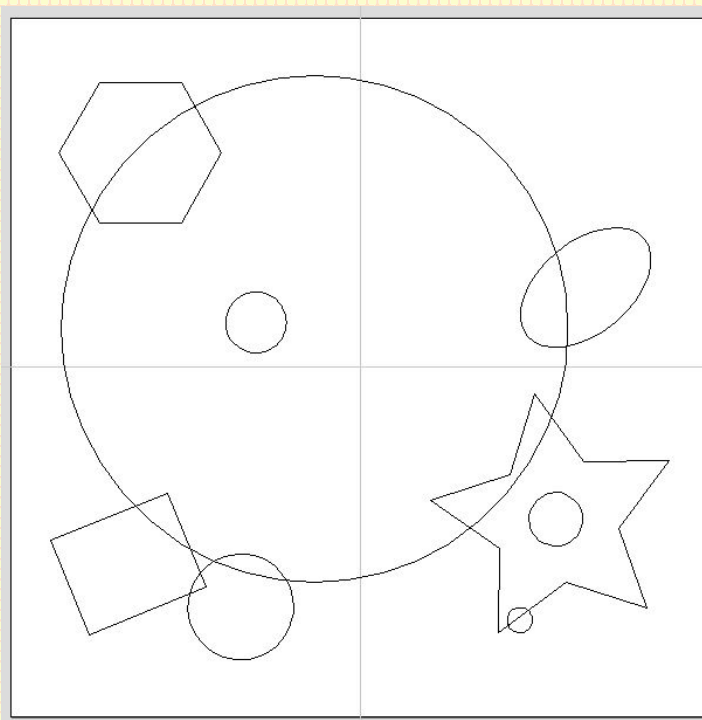
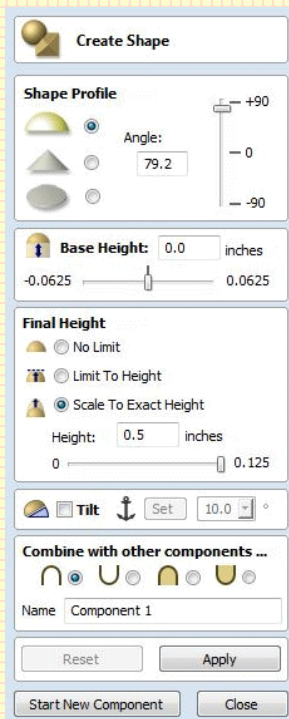


Create Shapes

Examples

All the following examples use the same options from the Create Shape menu so you can see how the choice and location of the vectors affect the components created. **OPTIONS USED:** 79.2 degree angle, 0.00 Base Height, Scale To Exact Height 0.5 inches, no Tilt, Combine set to Add(except where noted).

Overlapping Vectors - Each vector selected alone and components created separately, Combine option set to Add

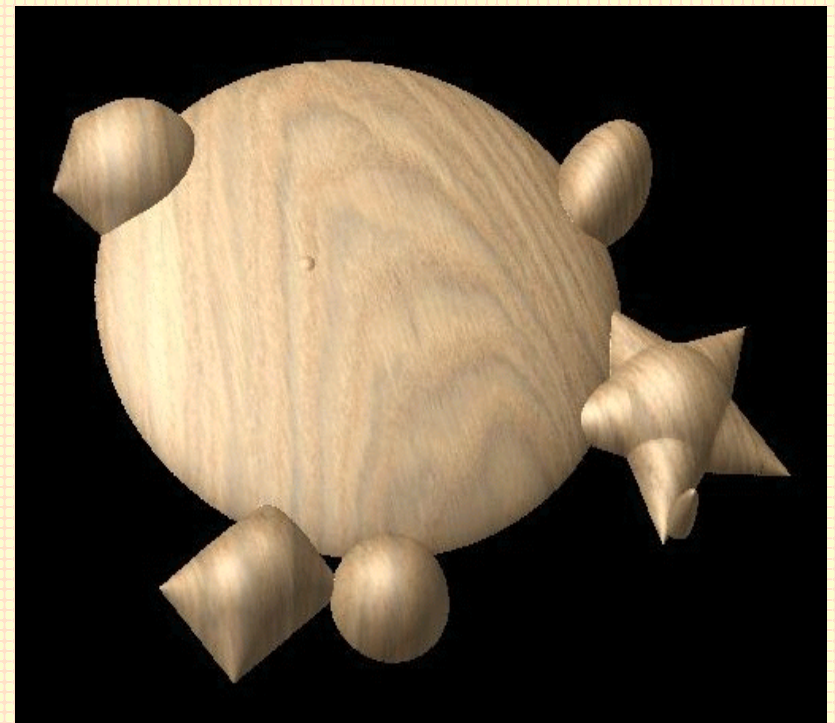
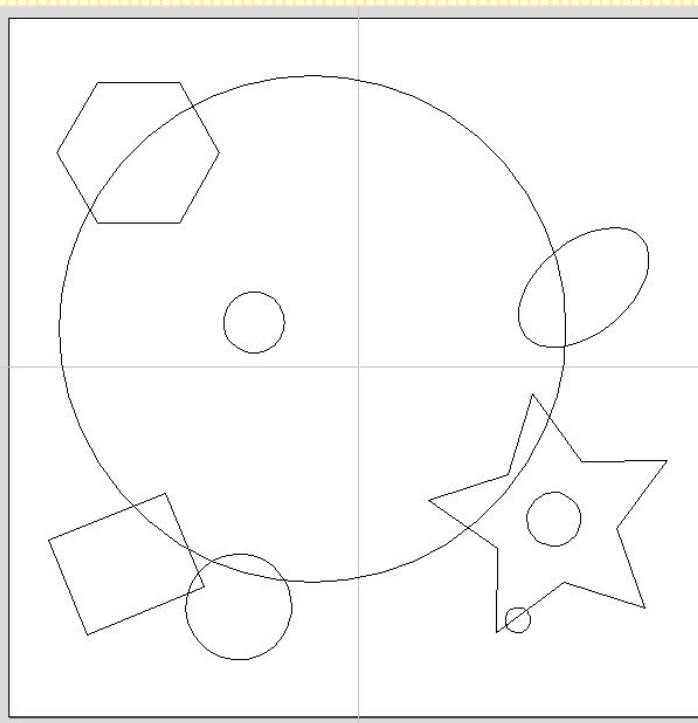
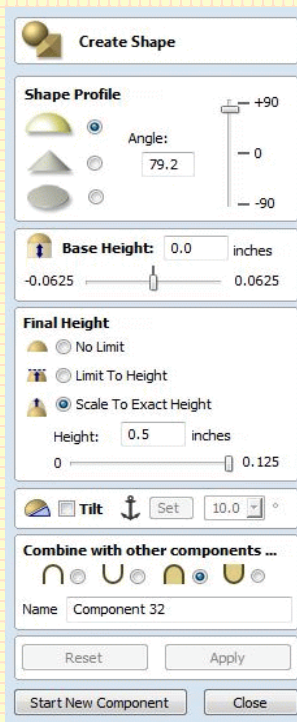


Create Shapes

Examples

All the following examples use the same options from the Create Shape menu so you can see how the choice and location of the vectors affect the components created. **OPTIONS USED:** 79.2 degree angle, 0.00 Base Height, Scale To Exact Height 0.5 inches, no Tilt, Combine set to Add(except where noted).

Overlapping Vectors - Each vector selected alone and components created separately, Combine option set to Merge

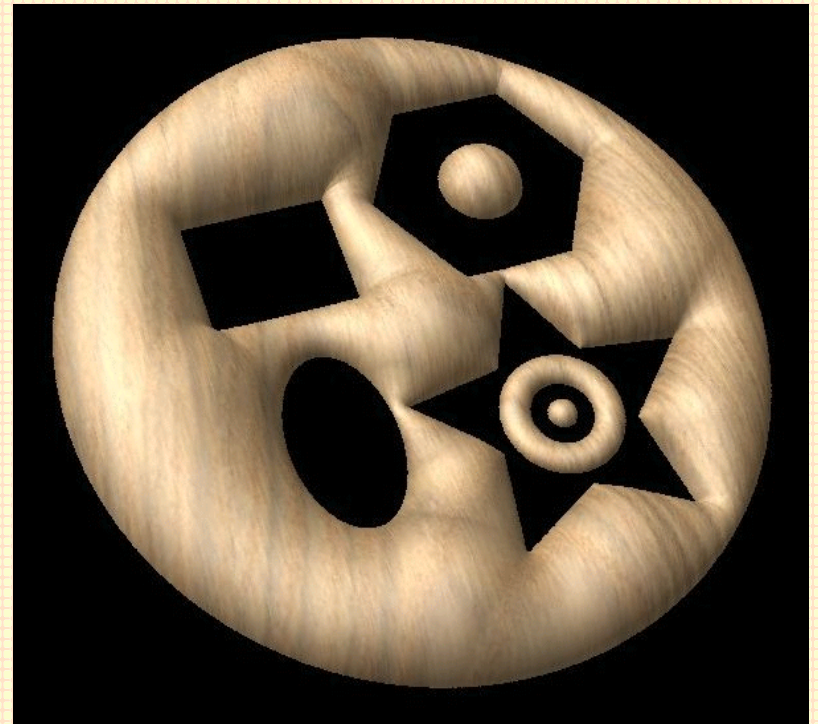
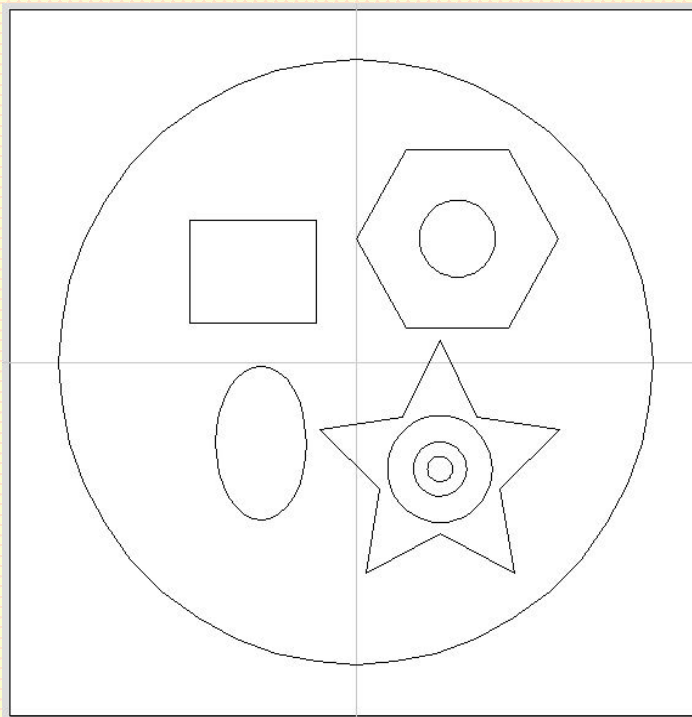
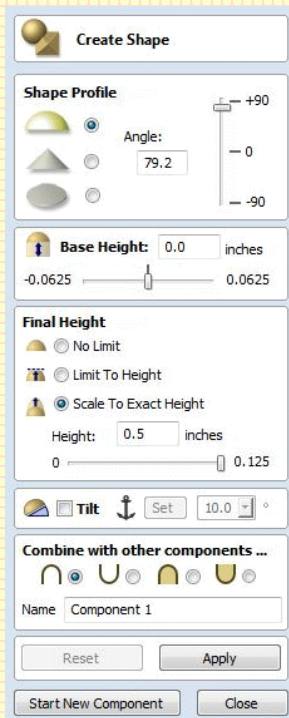


Create Shapes

Examples

All the following examples use the same options from the Create Shape menu so you can see how the choice and location of the vectors affect the components created. OPTIONS USED: 79.2 degree angle, 0.00 Base Height, Scale To Exact Height 0.5 inches, no Tilt, Combine set to Add(except where noted).

Vectors Inside Vectors - All vectors selected together

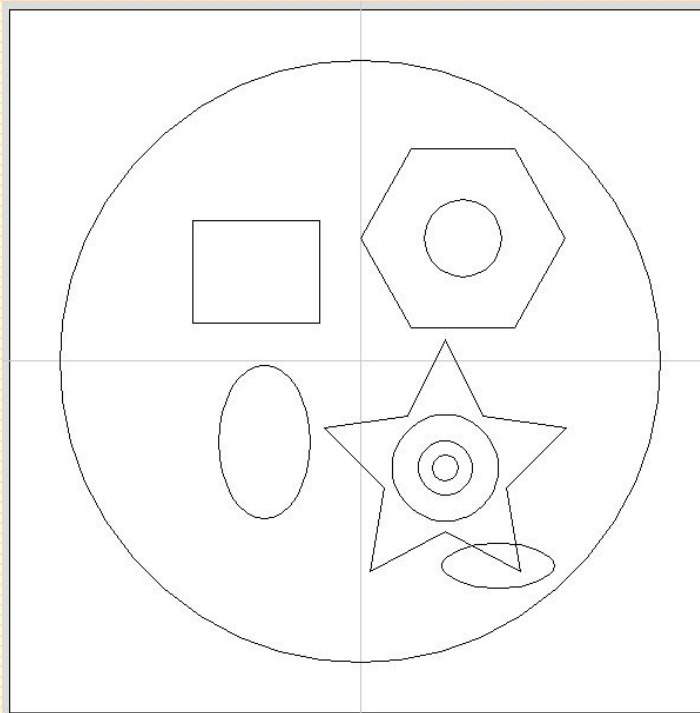
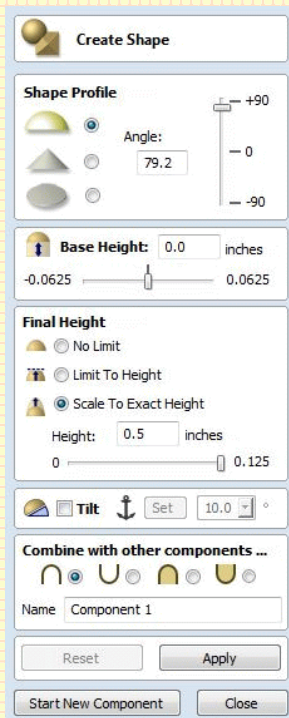


Create Shapes

Examples

All the following examples use the same options from the Create Shape menu so you can see how the choice and location of the vectors affect the components created. OPTIONS USED: 79.2 degree angle, 0.00 Base Height, Scale To Exact Height 0.5 inches, no Tilt, Combine set to Add(except where noted).

Vectors Inside Vectors with Overlapping Vector added inside Main Vector - All vectors selected together

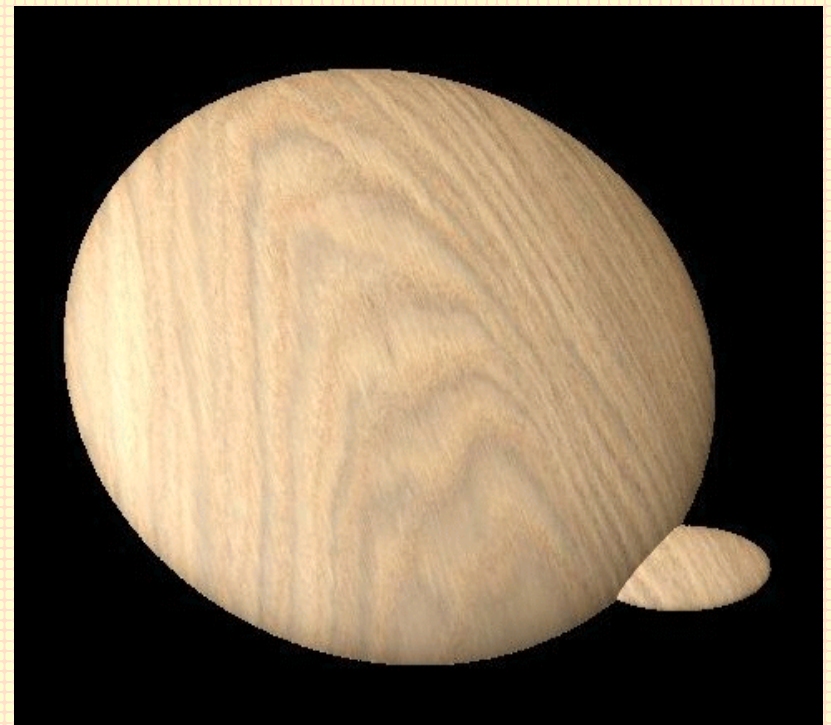
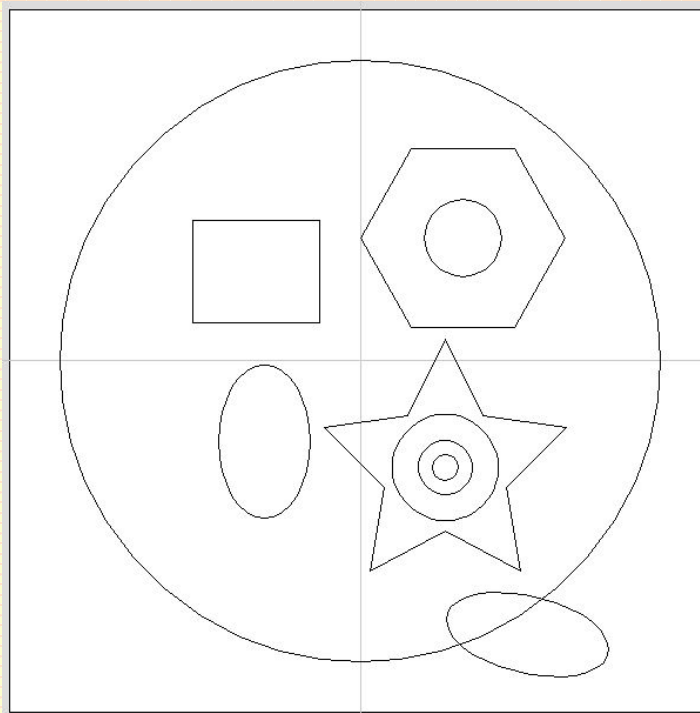
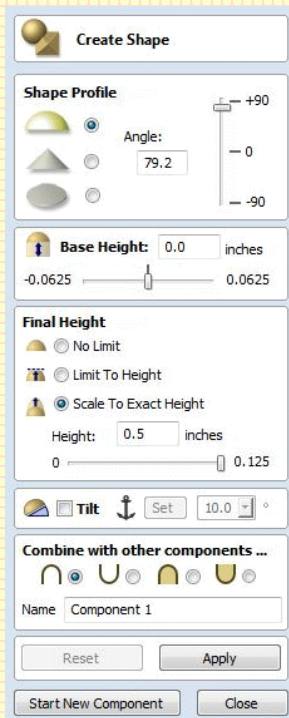


Create Shapes

Examples

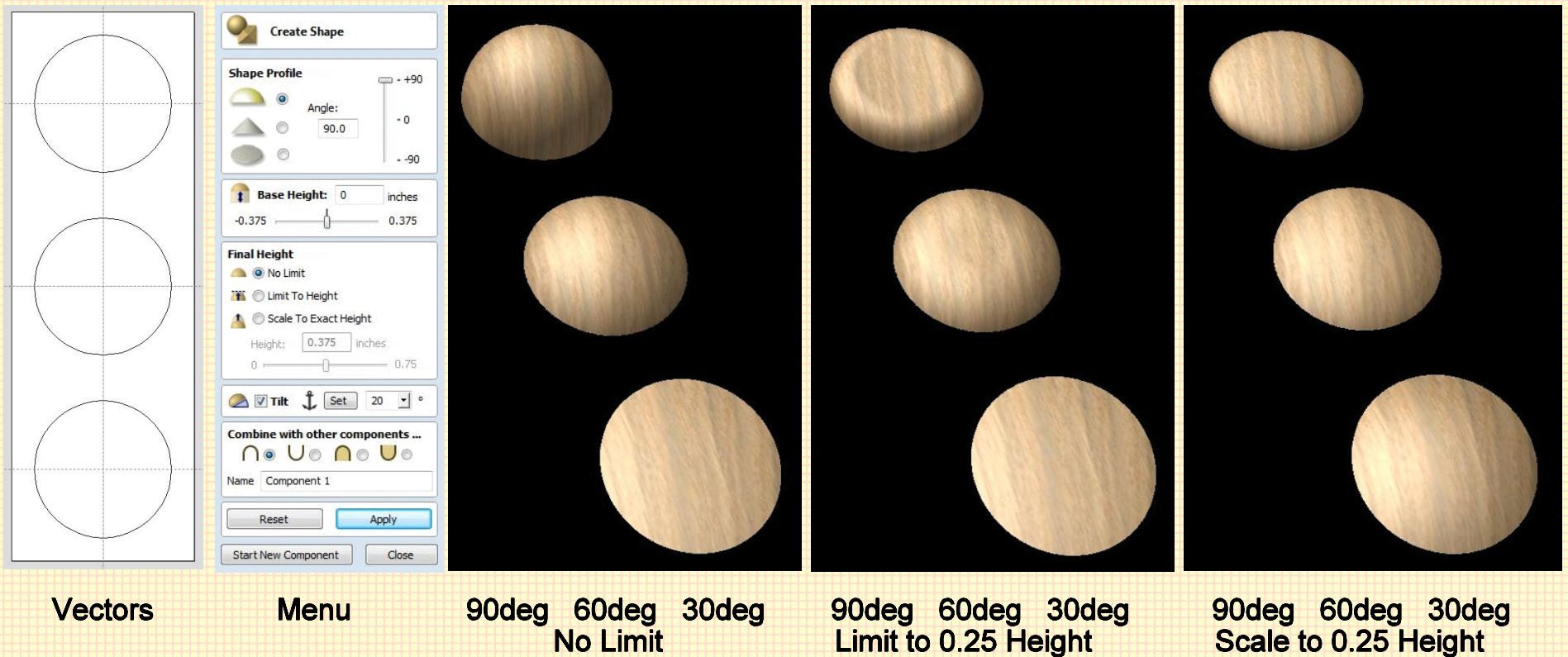
All the following examples use the same options from the Create Shape menu so you can see how the choice and location of the vectors affect the components created. **OPTIONS USED:** 79.2 degree angle, 0.00 Base Height, Scale To Exact Height 0.5 inches, no Tilt, Combine set to Add(except where noted).

Vectors Inside Vectors with Overlapping Vector added over Main Vector - All vectors selected together



Create Shapes

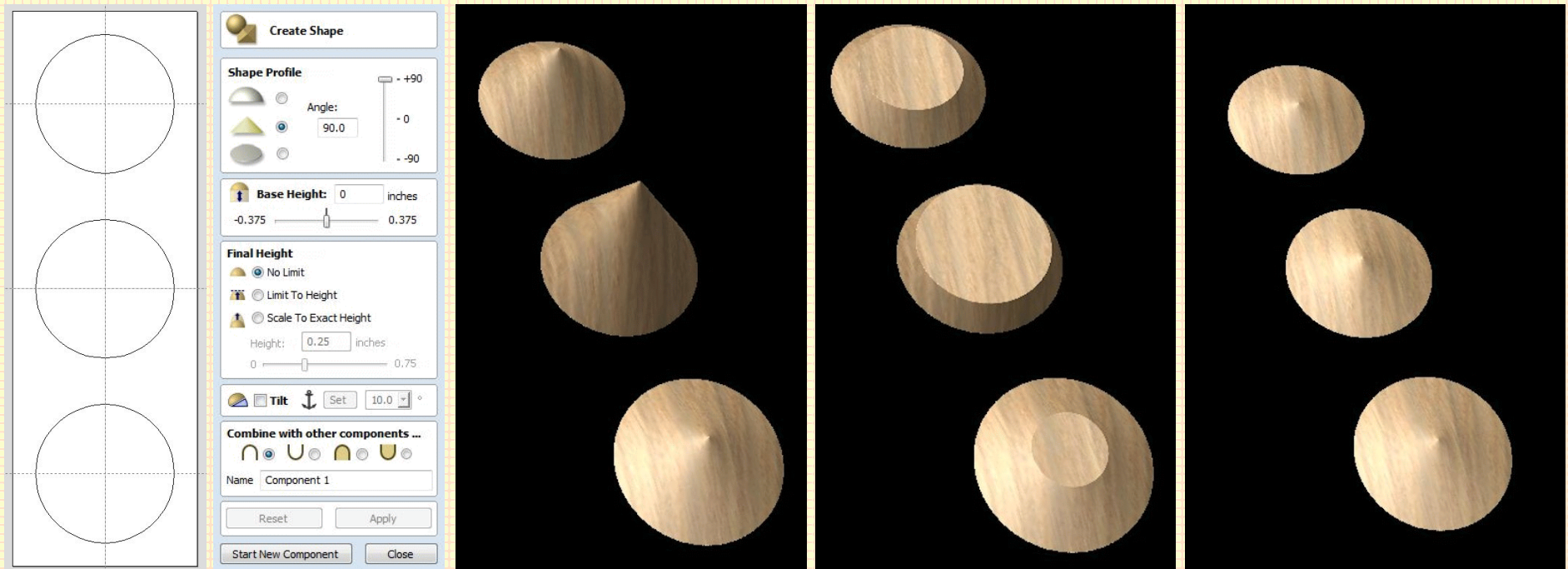
Curved Profiles



I am using a circle vector for demonstration purposes so it is easy to see how the choices in the menu affect the shape of an object created with the Create Shape tool. Negative angles, Base Height and Tilt will be addressed latter in this presentation.

Create Shapes

Angular Profiles



Vectors

Menu

90deg 60deg 30deg
No Limit

90deg 60deg 30deg
Limit to 0.25 Height

90deg 60deg 30deg
Scale to 0.25 Height

It is interesting to note that the 90 deg No Limit component is shorter than the 60deg No Limit component. In this case the software actually changes the 90deg angle to 45deg thereby making the component shorter. Also notice that the Scale To Height components are the same.

I am using a circle vector for demonstration purposes so it is easy to see how the choices in the menu affect the shape of an object created with the Create Shape tool. Negative angles, Base Height and Tilt will be addressed later in this presentation.

Create Shapes

Flat Profiles

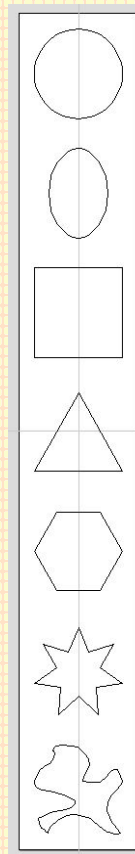
Any 2d shape you create can be used to build a 3d component with the Create Shape tool.

The most basic shape would be a flat profile much like a scroll saw cutout.

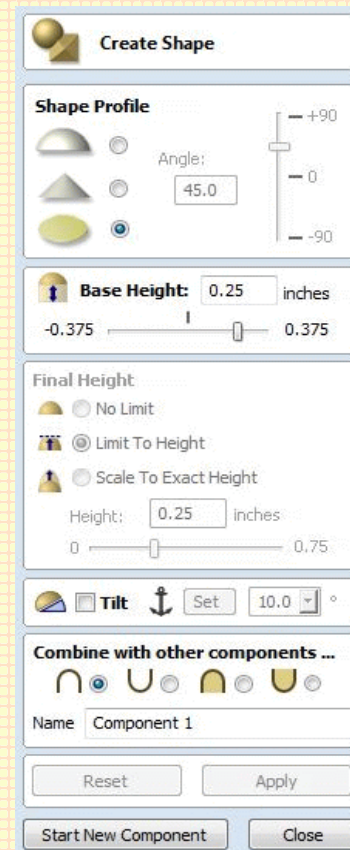
When creating a flat profile you only have 2 options, a base height and a tilt function (used to add a wedge under the component).

If the tilt option is not used and the component will not be used in conjunction with Curved or Angular profile components it would be better to cut the part with 2d toolpaths to save time.

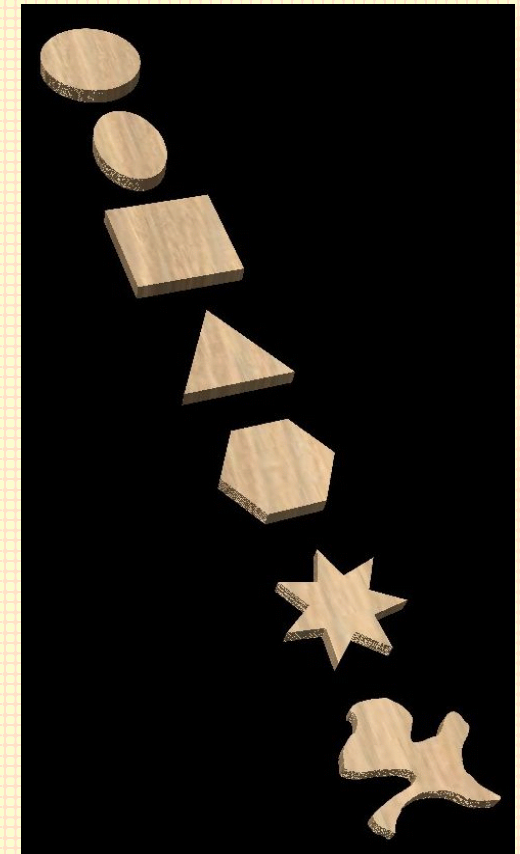
If several flat components are combined to create a model and the tilt option is not used on any of them then it is quicker to use 2d toolpaths to cut the model.



Vectors



Menu




Flat Profile
0.25 base height
no tilt

Create Shapes




Something to Consider When Creating Angular and Flat Profile Components.

3d machining takes a lot of time and is harder on tooling and the machine itself. If you can use standard v-bit tooling and 2d machining it will reduce the time the project is on your CNC thereby reducing cost of the item and wear and tare on bits and machine.

This is an example of an Angular Part with 60 degree sides and a limited height of 0.625 inches cut from a 0.75 inch thick board. The 2d part is on top cut with a straight bit and a 60 degree v-bit, the 3d part on the bottom is cut with a straight bit and a ball nose bit. 2d Toolpath Summary is on the left and 3d Toolpath Summary on the right.

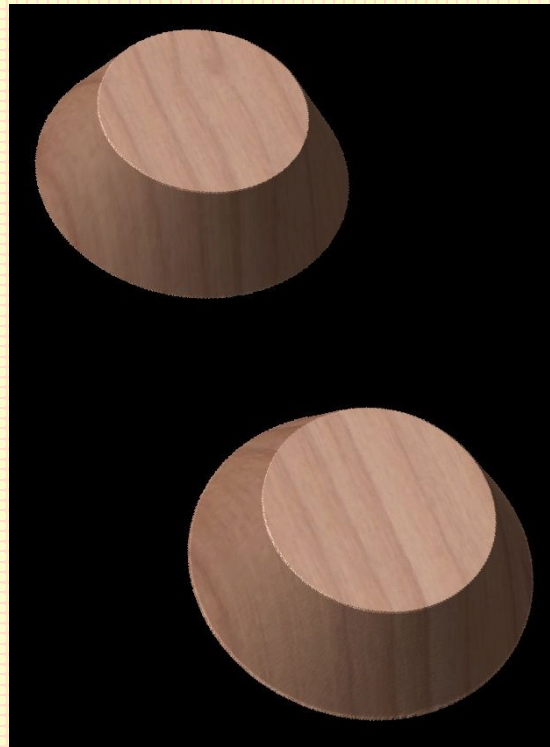
 **Toolpaths Summary**


Total machining time:	00:05:02
------------------------------	----------

 Thickness VCarve Part	00:01:54
 Shape VCarve Part	00:01:53
 Cutout 1 part	00:01:15




Time estimates based on

Rapid Rate	100.0	inches/min ▼
Scale Factor	1.0	



 **Toolpaths Summary**

Total machining time:	00:27:56
------------------------------	----------

 3D Roughing Model	00:17:26
 3D Finish Model	00:09:15
 Cutout 1 part	00:01:15

Time estimates based on

Rapid Rate	100.0	inches/min ▼
Scale Factor	1.0	

Create Shapes

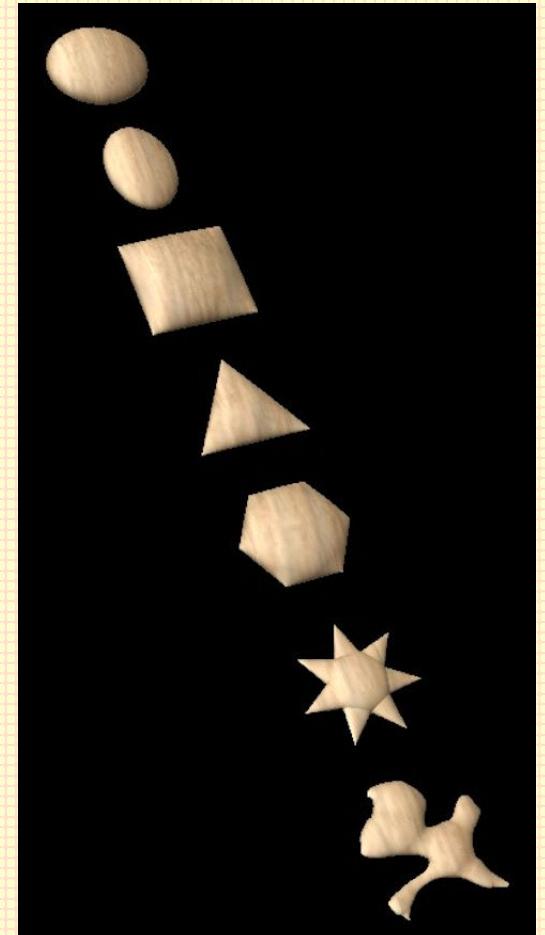
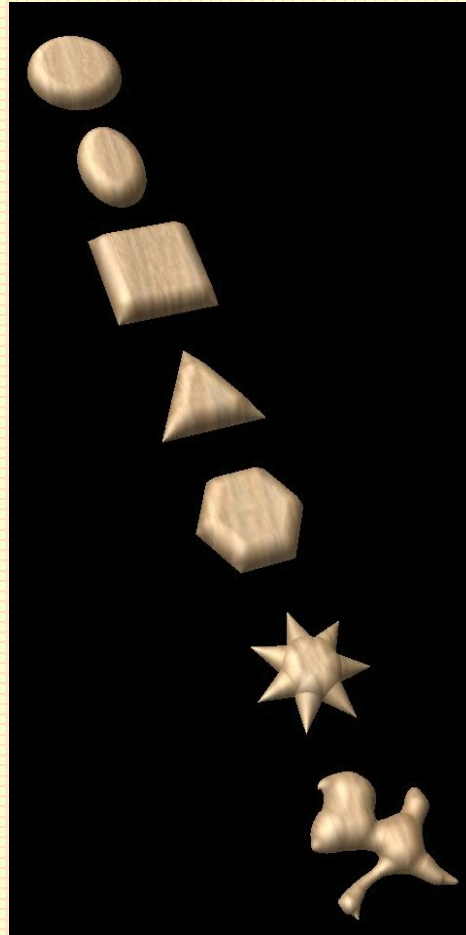
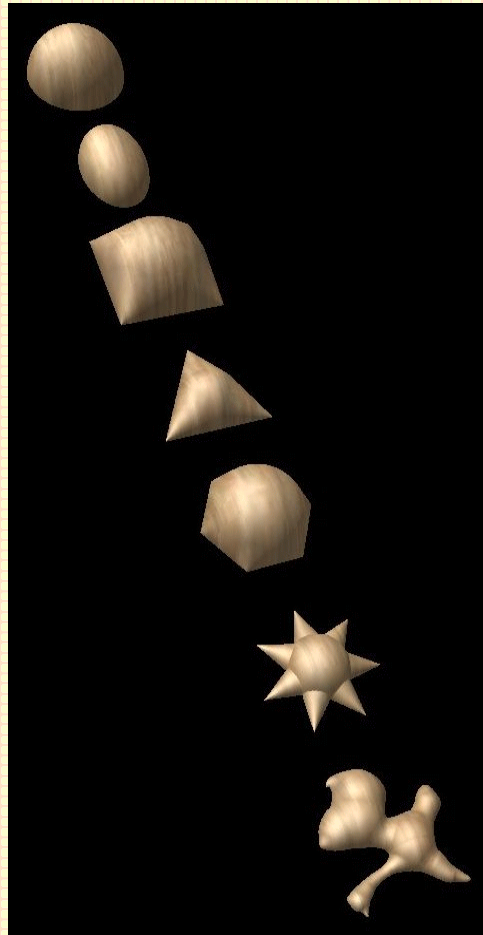
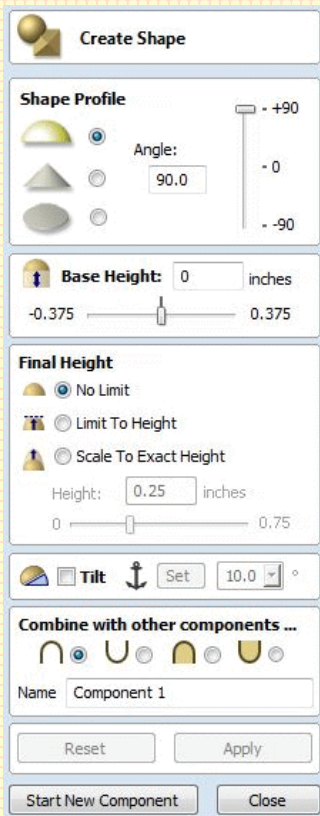
Various Shapes with Curved Profile

90 degree

No Limit

Limit to 0.25 inches

Scale to 0.25 inches



Create Shapes

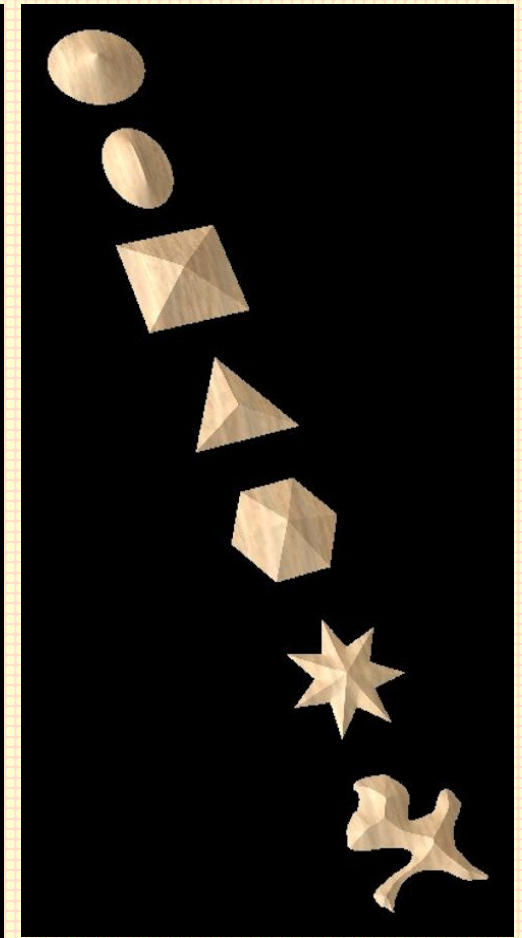
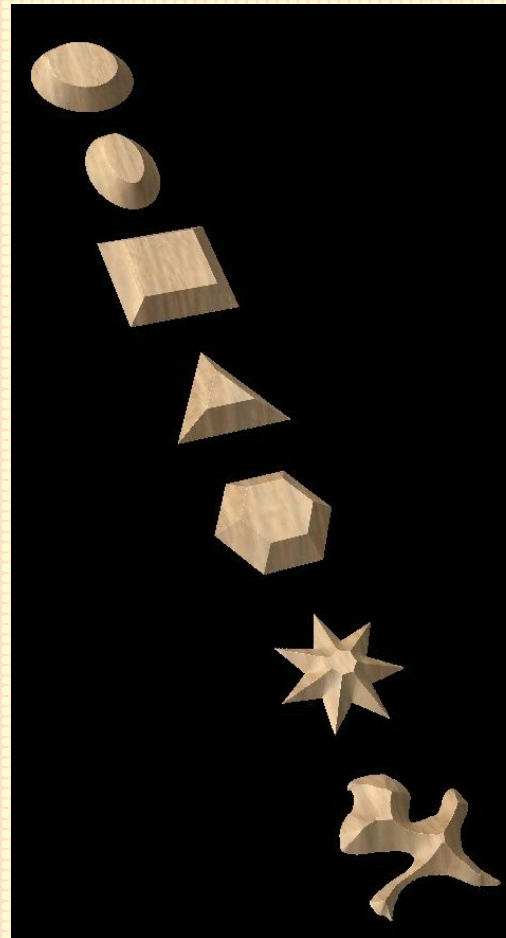
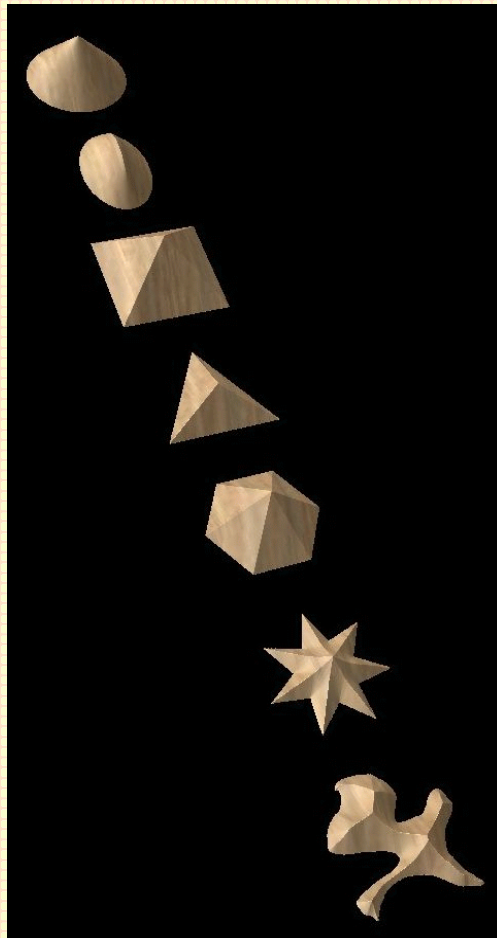
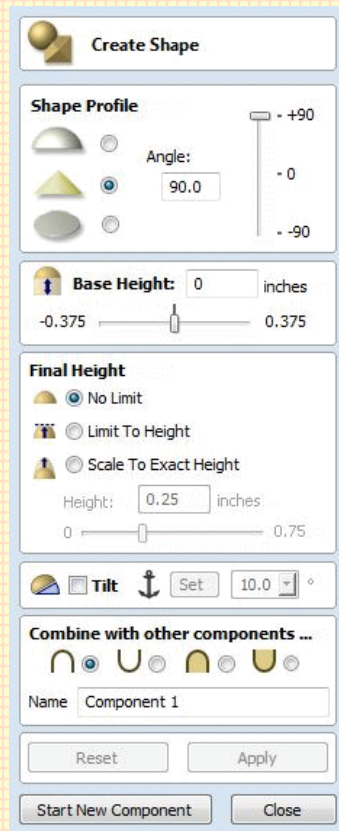
Various Shapes with Angular Profile

90 degree

No Limit

Limit to 0.25 inches

Scale to 0.25 inches



Create Shapes

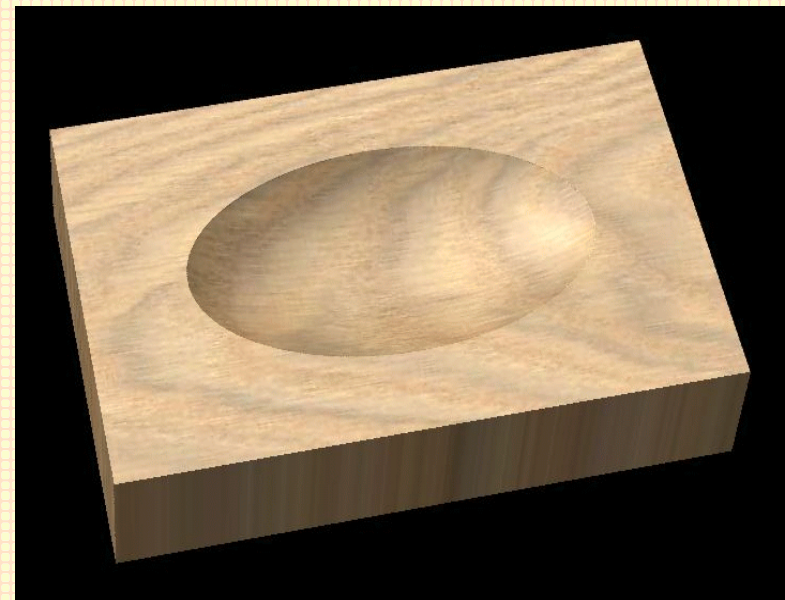
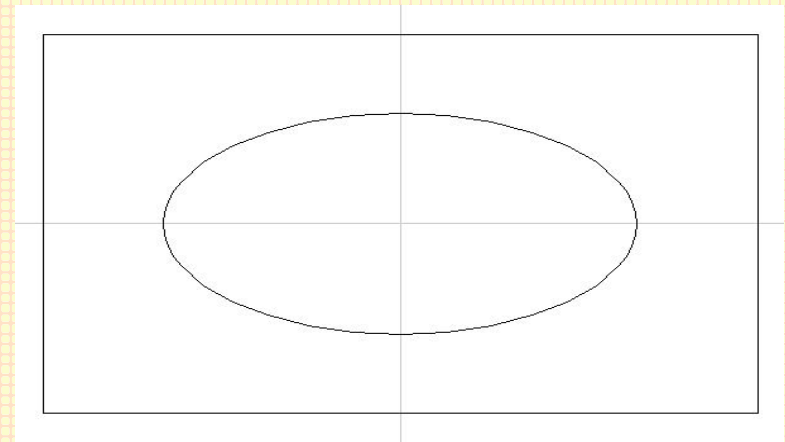
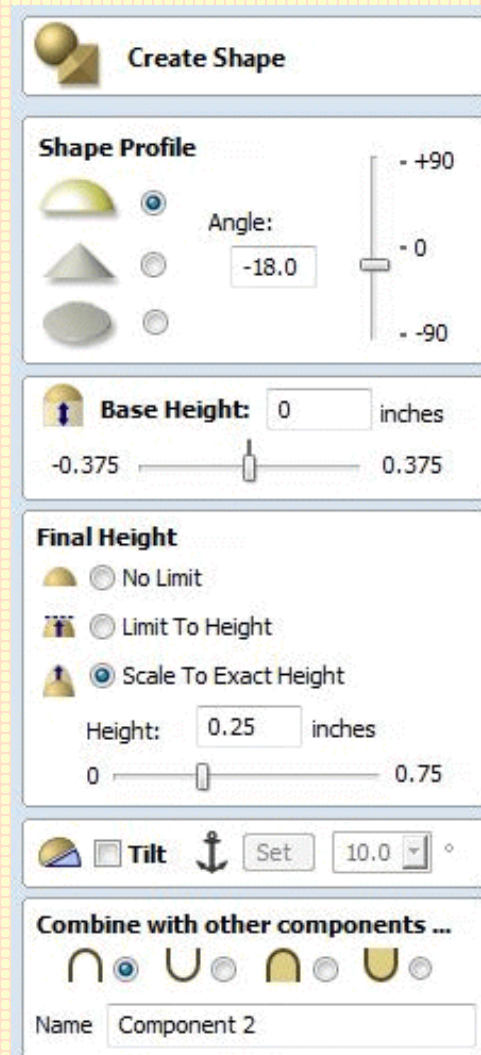
Negative Angles for Dish Shapes

To make dish shapes in your project you use a negative angle when you create the component.

Use the limit or scale to height options to limit how deeply into the part the dish shape goes.

You can use curved or angular shape profiles with the negative angles.

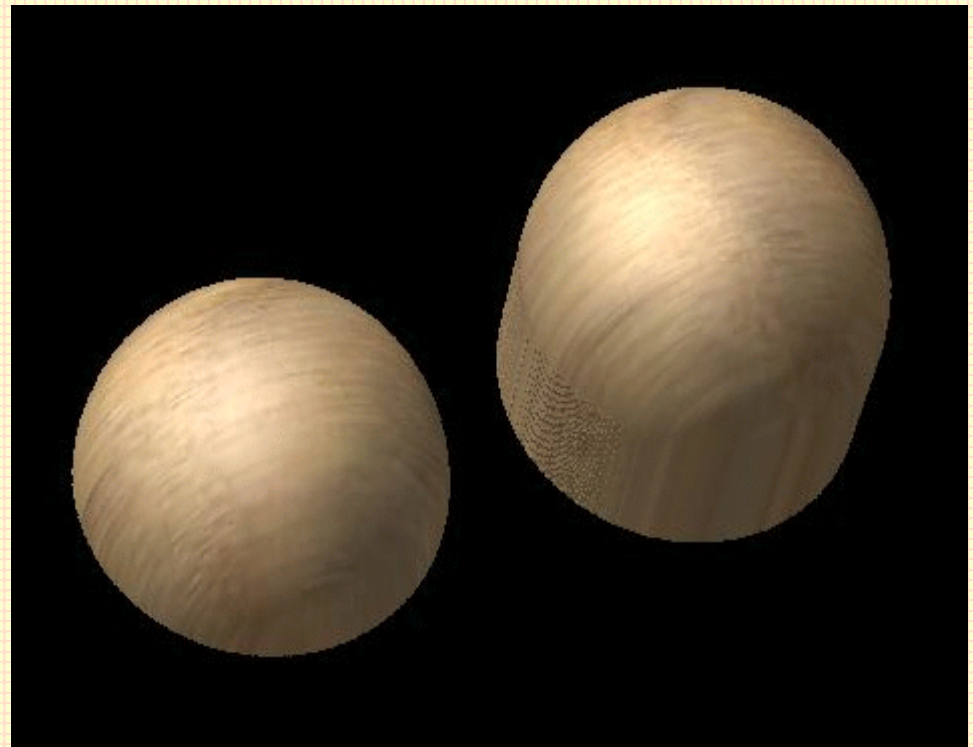
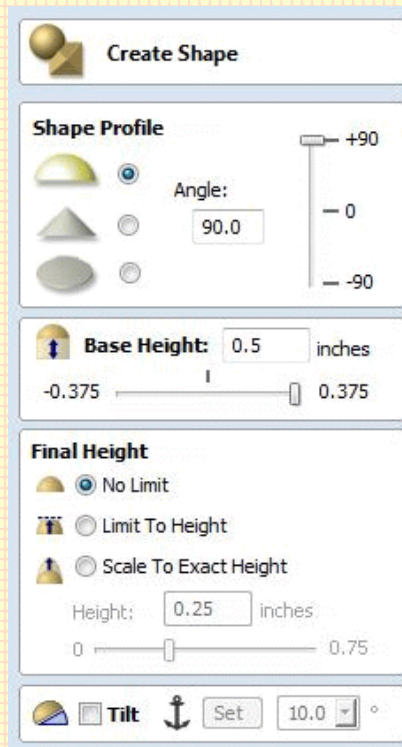
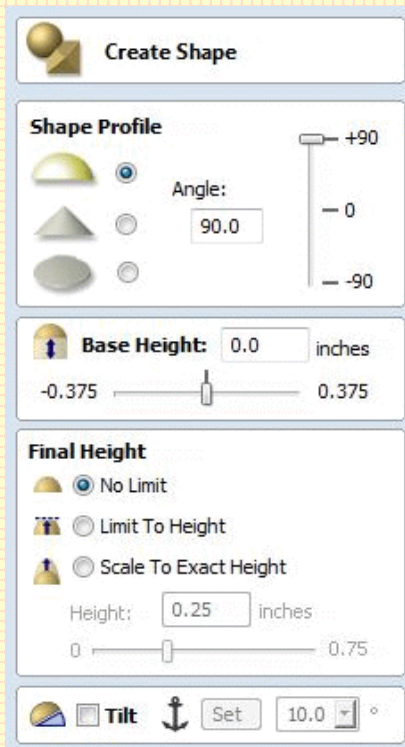
You can add straight sides leading into the dish by using a negative Base Height or you can just use the negative base height with the flat profile to create a flat bottom hole with straight sides.



Create Shapes

Base Height Option

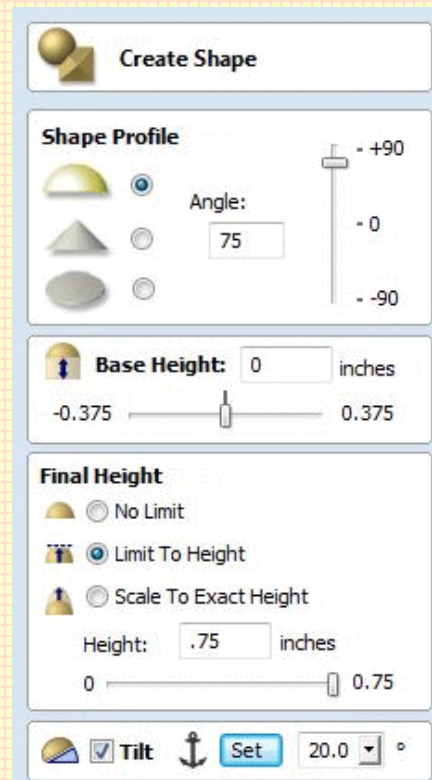
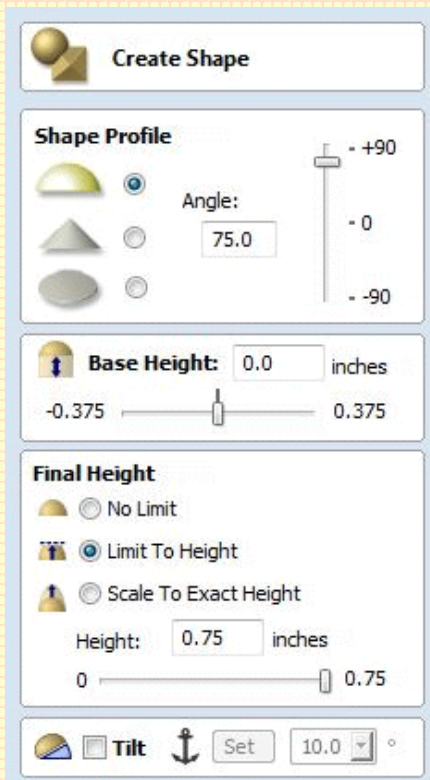
The Base Height option allows you to create flat profile components or to add material under other components that use curved or angular profiles. This can be used to make the component merge with other components properly or add a straight base to a shape.



Create Shapes

The Tilt Option

The tilt option allows you to tilt the component to help make adjustment when arranging components in the project. You set an anchor in the 2d view design to a point where you want the tilt to start then pick the direction for the tilt. The tilt angle can be set from 0 degrees to 20 degrees. This option is also available in the component properties menu.



Two Rail Sweep

Some Basics

The Two Rail Sweep is one more tool to make 3d components. There is more design layout needed but this method gives you much more control when creating components.

The Two Rail Sweep requires a set of 2 rails that can be open or closed vectors and one or more cross sections that must be open vectors.

Basically you select the rails you want to use to create the component and pick the option to use the vectors to create the component. Then you can select the cross section you want to sweep between the rails. If your design has more than one cross section you select each cross section and then click on the drive rails at the location you want the section to start. There are several options that can be used with the Two Rail Sweep tool that modify the shapes in different ways.

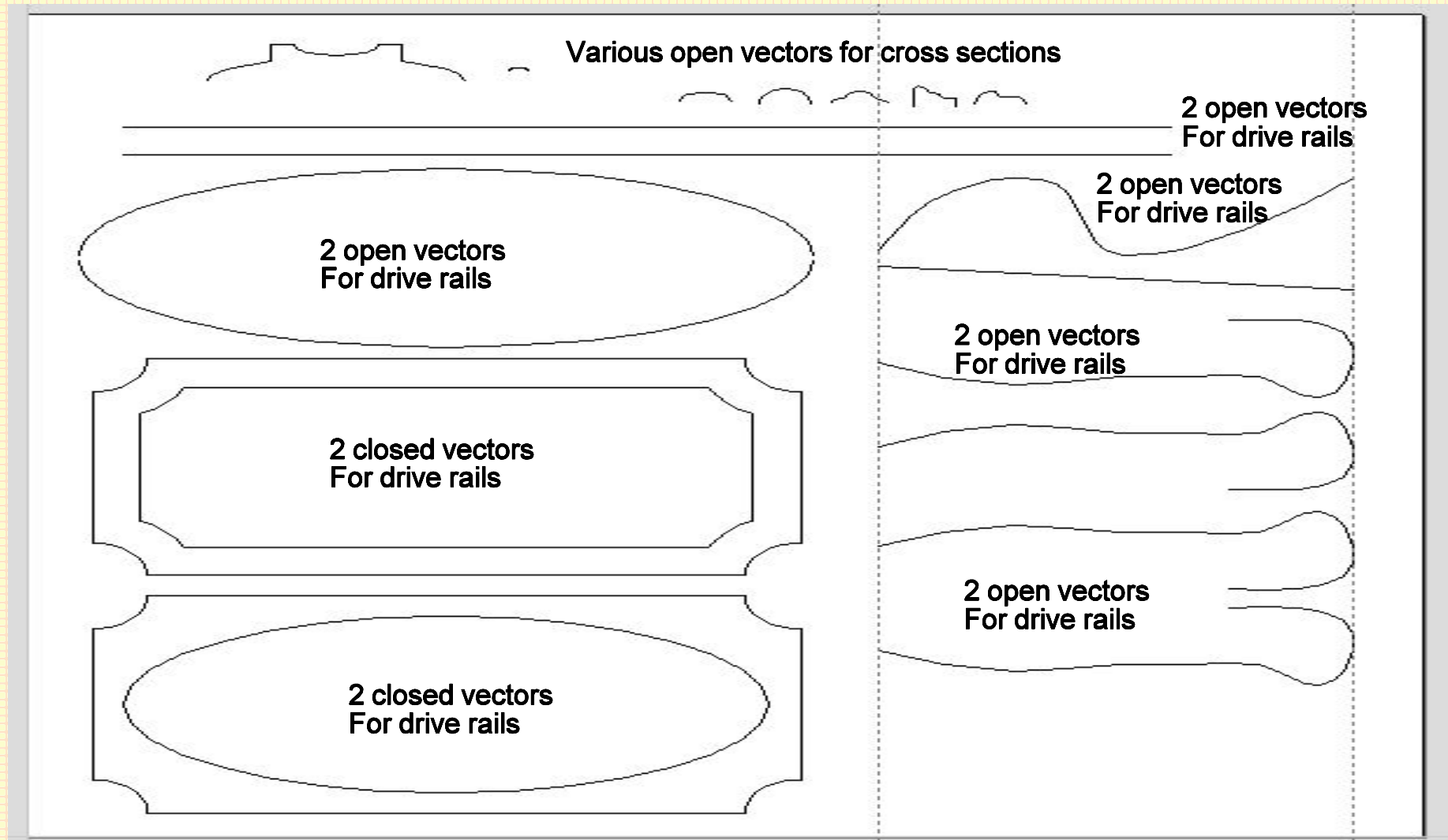
If you have several sets of rails that will use the same options you can select them all and the software will create sweeps based on the options you choose from the menu. This is undocumented but it will work.

The best way to see how the rails, cross sections and options change the shape of the component is to play with the Two Rail Sweep tool.

**Remember you can download a trial version of Aspire v8.0 at
<http://www.vectric.com/downloads/trial-software.html>**

Two Rail Sweep

Drawing Vectors



Two Rail Sweep

Using Open Vectors for Rails

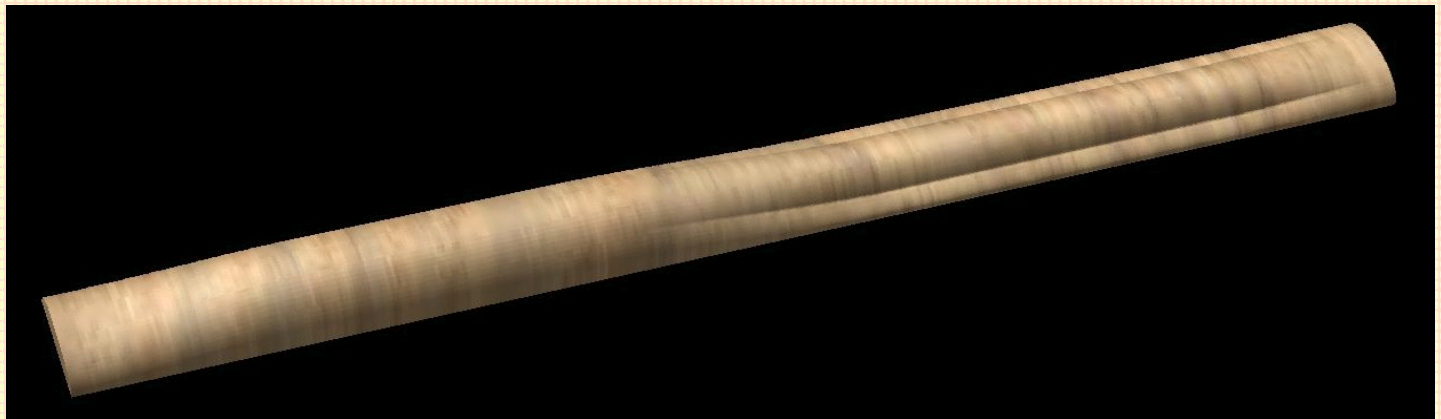
First you need to get all of your vectors drawn for the rails and cross sections.



Select the rails then select the cross section and place them on the rails. Make changes as needed

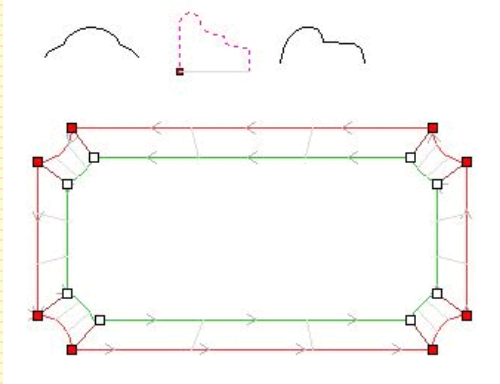


Select the options you want to use to create the component and click the apply button. You now have a 3d component to use.



Two Rail Sweep

Using Closed Vectors for Rails



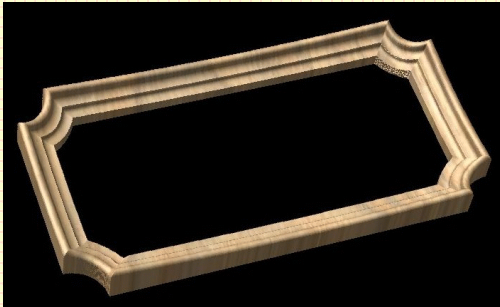
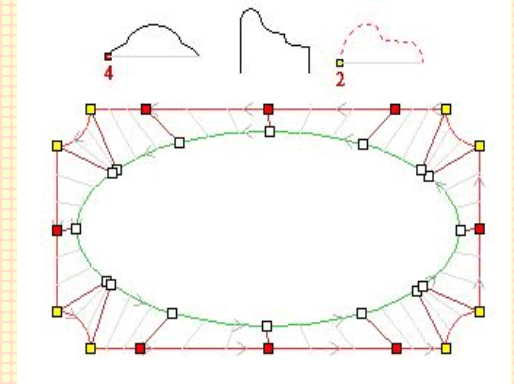
You can use closed vectors for the rails however the cross sections still need to be open vectors. The set of rail vectors do not have to contain the same number of nodes or have to be the same shape.

After selecting the rails the cross sections to be used are selected and placed on the rails at the desired locations. You can rearrange the nodes of the cross sections to force the sweeps to start and end at the best locations.

When the apply button is clicked the 3d component is created between the two rails.

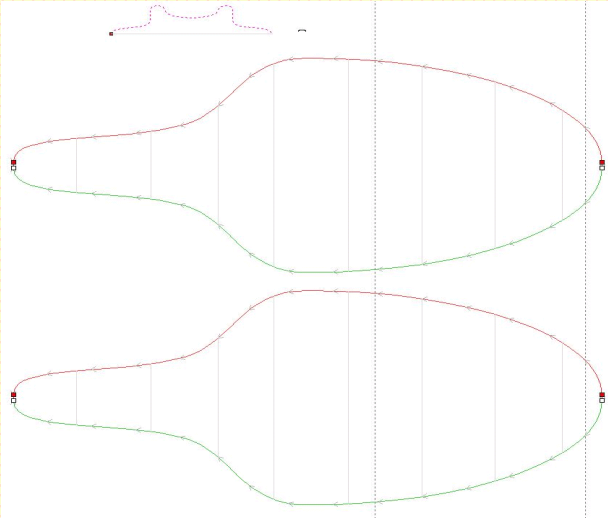
If the option to fill the center of the inner vector is not checked you will have a 3d component with a hole created by the inner vector.

If the option is picked to fill the inner vector the software creates a solid bottom inside the inner vector.



Two Rail Sweep

Scale Cross Sections with Width Option

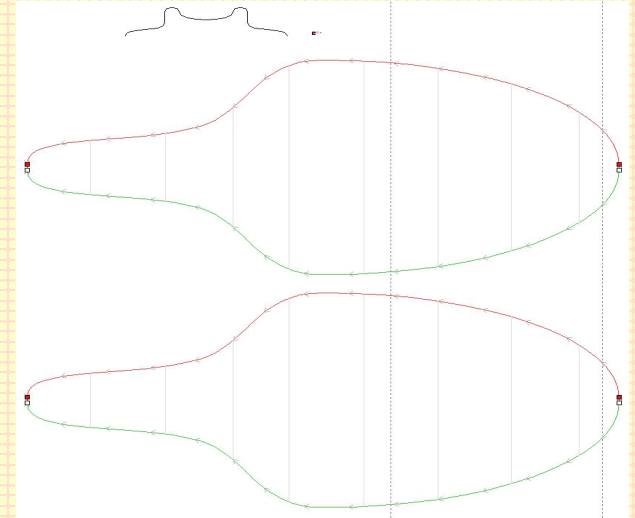


The Scale Cross Section With Width option allows you to use cross sections of varying widths and heights to get a smoother flow through the sweep or to get more definition from a small short cross section.

The example to the left uses a wide tall cross section. The top component was created without the Scale option causing the narrow portion and the end of the sweep to be distorted. The lower component was created using the Scale option giving a more pleasing look and better representation of the cross section.



The example to the right uses a narrow short cross section. Without the Scale option the component is almost flat only being visible on the very ends. By using the Scale option the shape of the cross section is now seen giving the component much better detail.



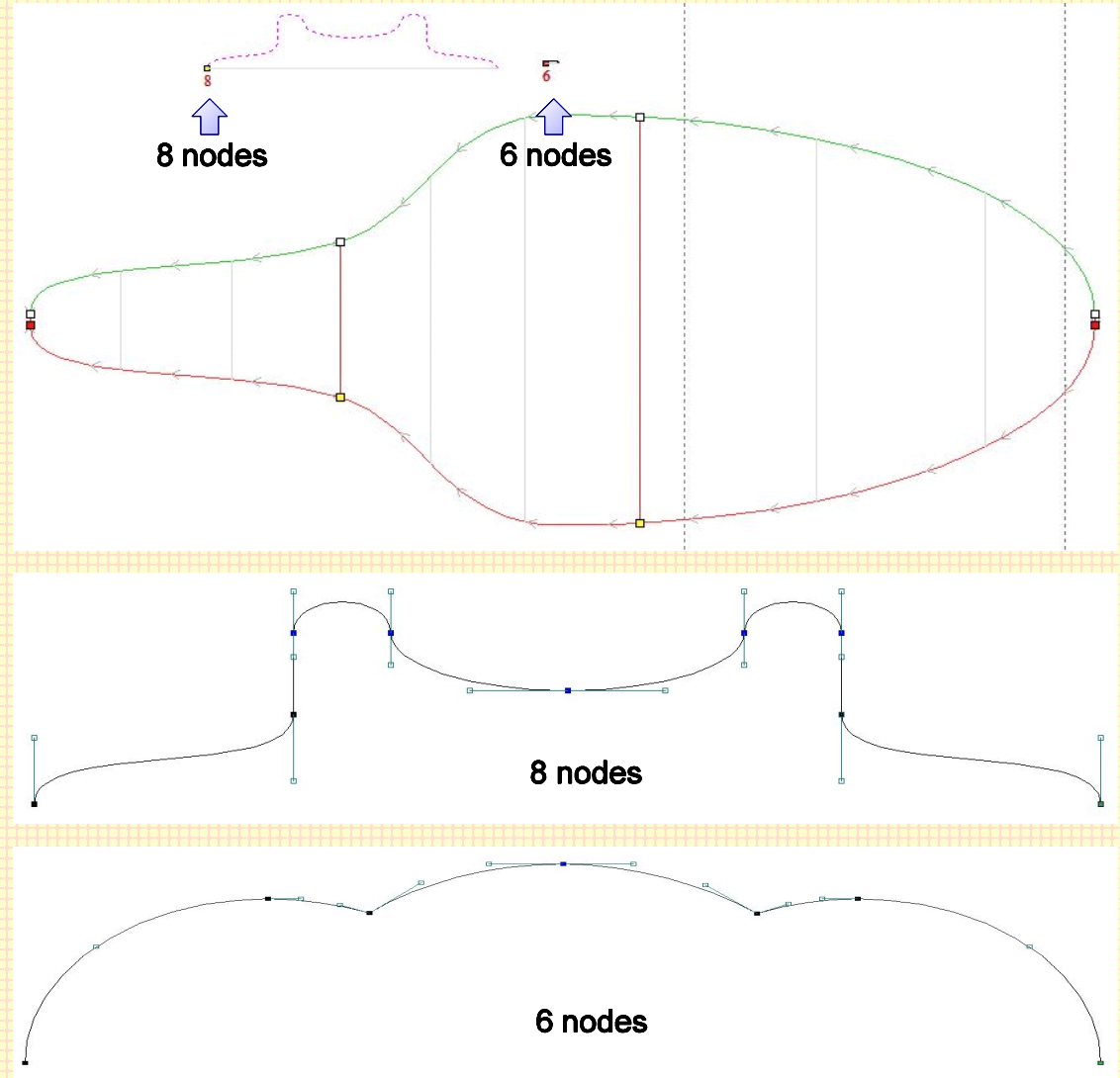
Two Rail Sweep

Sweep Between Spans Option

The Sweep Between Spans option helps smooth the flow between two cross sections. The cross sections used must have the same number of nodes because the sweep will flow from a node on the first cross section to the same node on the next cross section.

When the option to Sweep Between Spans is checked in the menu the software will check each cross section selected to make sure they contain the right number of nodes to match the other cross section. If the number of nodes is different the number of nodes contained in each section will be shown at the start of the cross section. If you continue without editing the cross sections the component will still be created but the Sweep Between Spans option will be ignored.

One solution to this problem is shown on the next page.



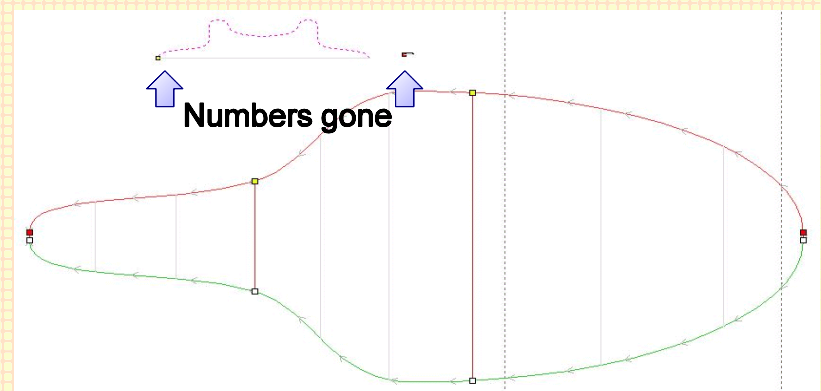
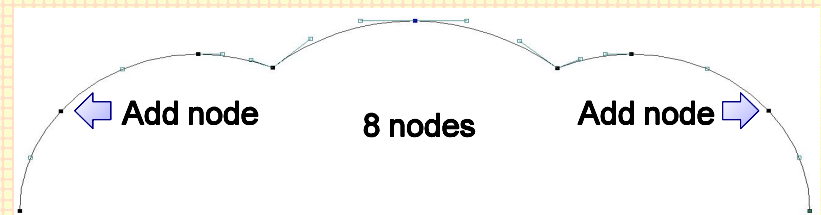
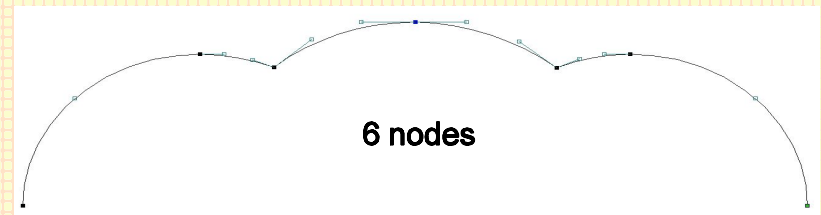
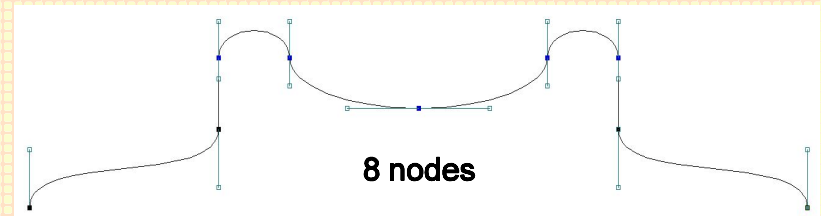
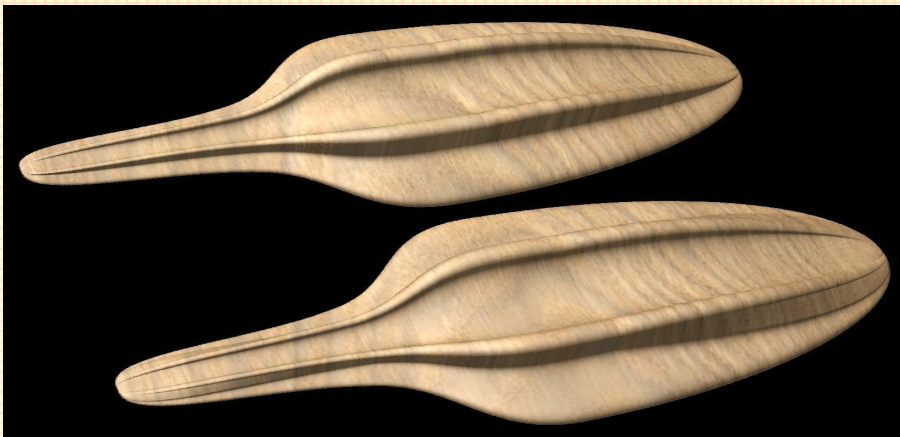
Two Rail Sweep

Sweep Between Spans Option

One solution to the problem of the cross sections not having the same number of nodes is to edit the cross sections so they have the same number of nodes. Here 2 nodes were added on the section that had 6 nodes to match the number of nodes contained in the other section for a total of 8 nodes.

When the cross sections have the same number of nodes and the Sweep Between Spans option is checked the numbers by the section will disappear signifying that the option will be used.

In the below example the top component does not use the option and the bottom component shows the effect of using the Sweep Between Spans option.



Two Rail Sweep

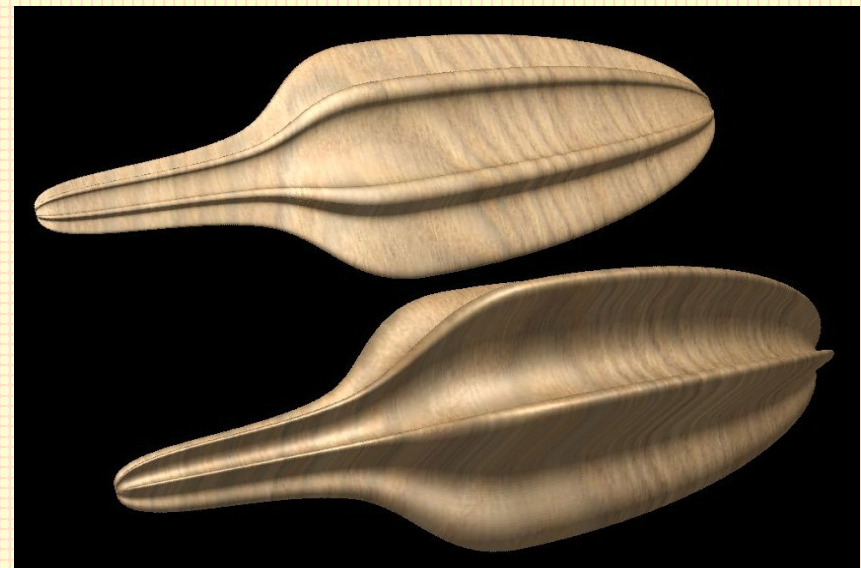
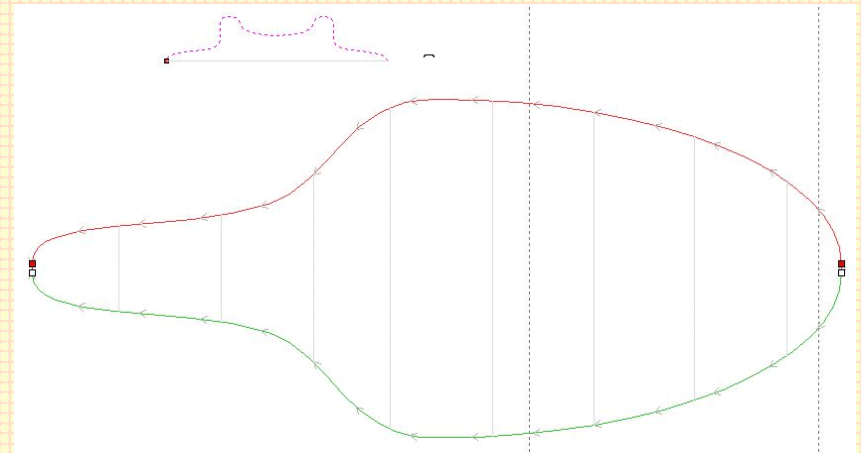
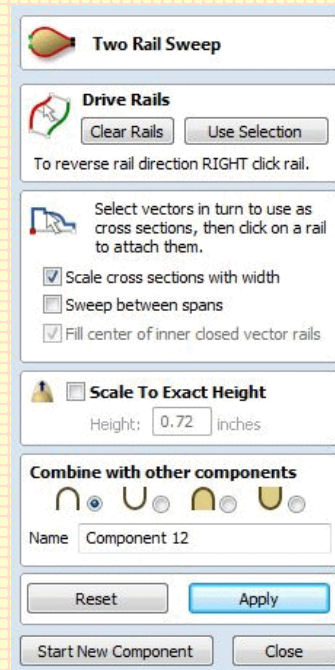
Scale to Exact Height Option

The Scale to Exact Height option allows you to adjust the total height of the component to fit design needs.

In this example the cross section used is 0.10 inches high and the Scale Cross Section With Width makes the component 0.15 inches high without the Scale to Exact Height option used as shown in the top component.

The lower component shows the results of creating a component with the option selected and a height of 0.72 inches entered so that the component will fill a 0.75 inch thick board and leave material to machine the part.

The height of the component is change proportionally. It can also be used to reduce the height of a component.



Extrude and Weave

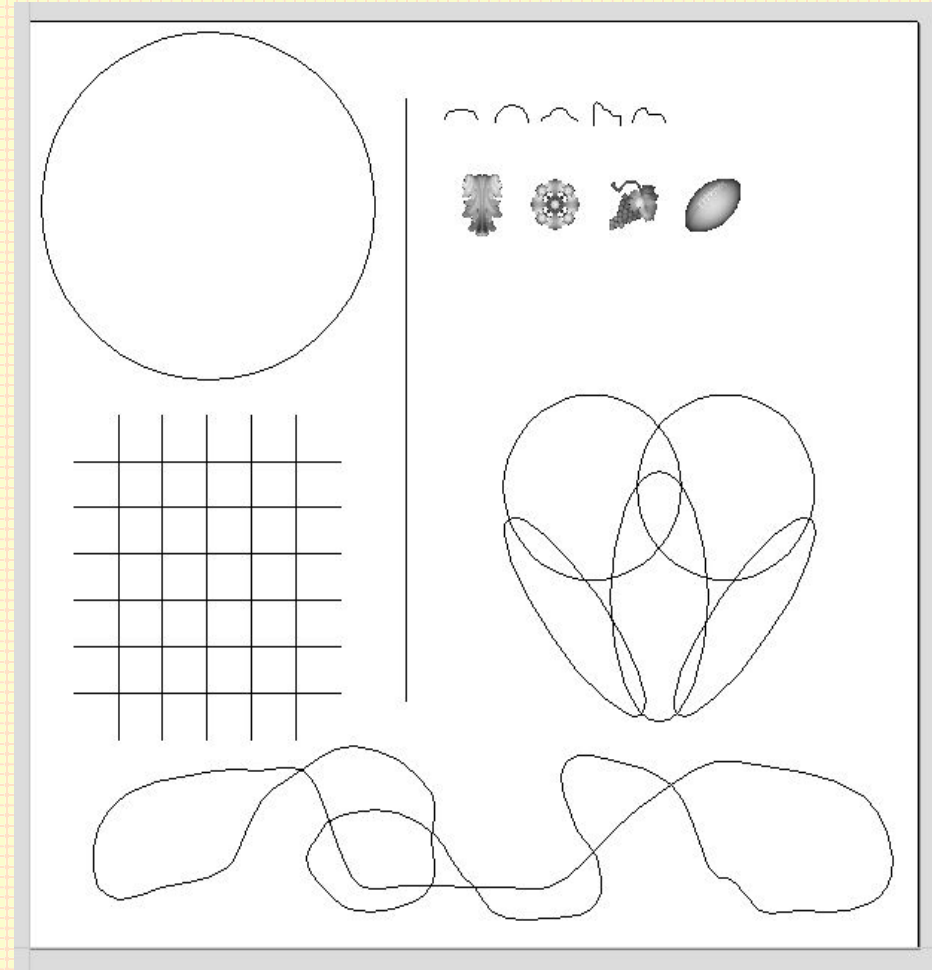
Basics and Drawing Vectors

You can extrude vector cross sections or components on both open and closed vector rails.

Any cross sections used have to be open vectors to work properly.

Any 3d model or component can also be extruded along a vector.

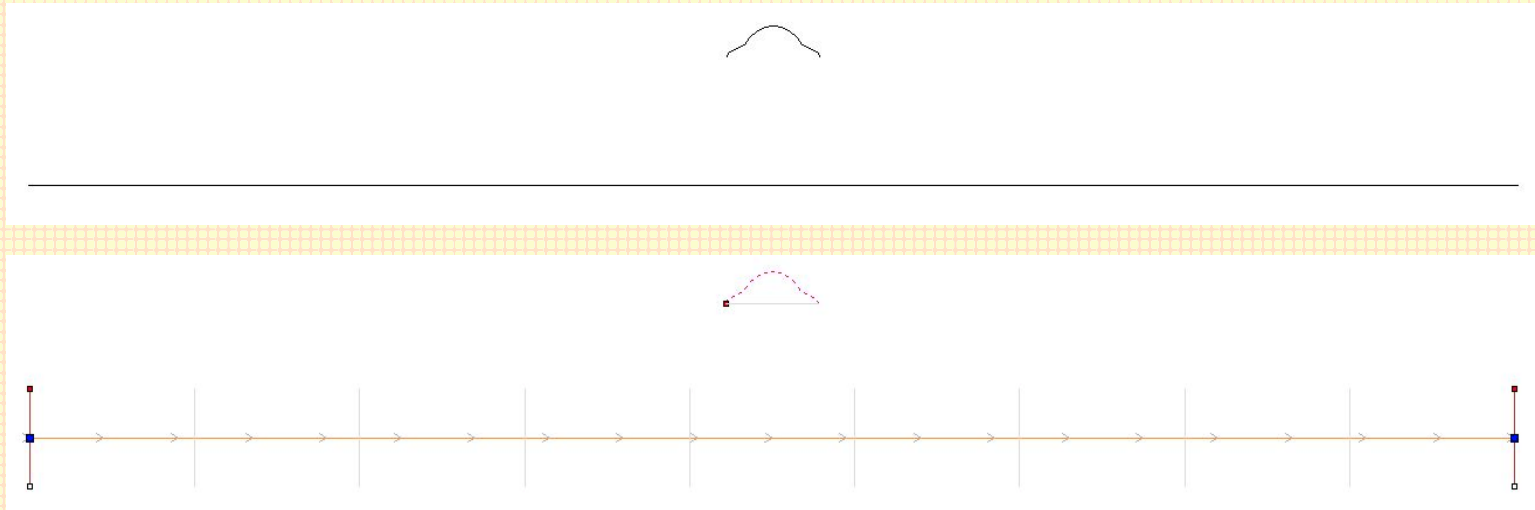
The vectors for rails can cross over other vectors and can be woven over and under other vectors using the weave option.



**Remember you can download a trial version of Aspire v8.0 at
<http://www.vetric.com/downloads/trial-software.html>**

Extrude and Weave

Simple Vector Extrusions

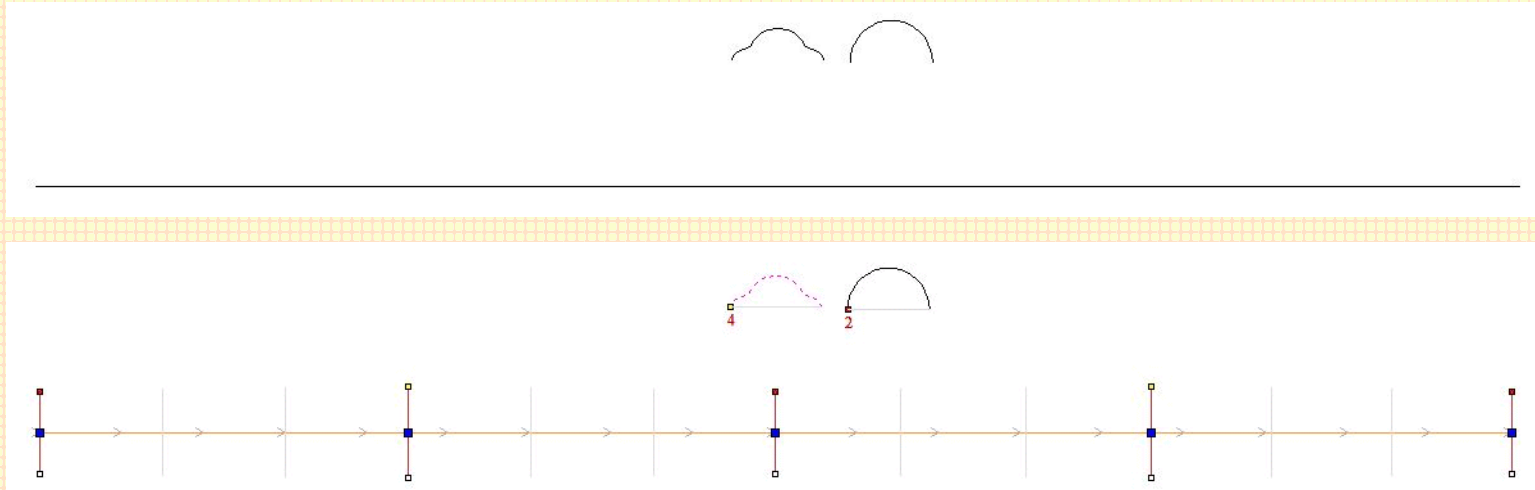


A simple straight line for the vector rail and a single vector cross section.



Extrude and Weave

Simple Vector Extrusions



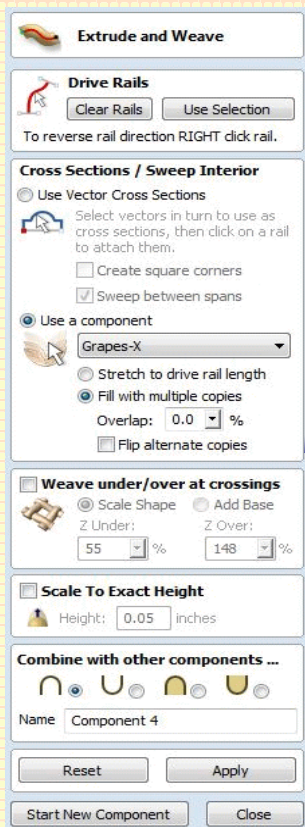
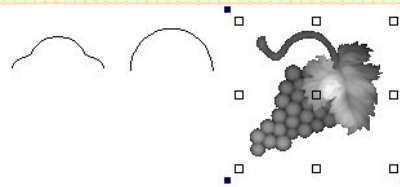
A simple straight vector for the rail and 2 cross sections used.

You can use any number of cross sections you need to create a component.



Extrude and Weave

Simple Vector Extrusions Using Components

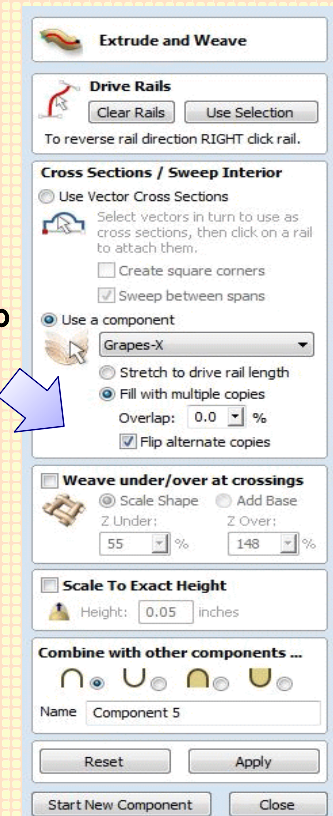


Select components in the drop down menu

Fill with multiple copies option



Option to flip every other copy

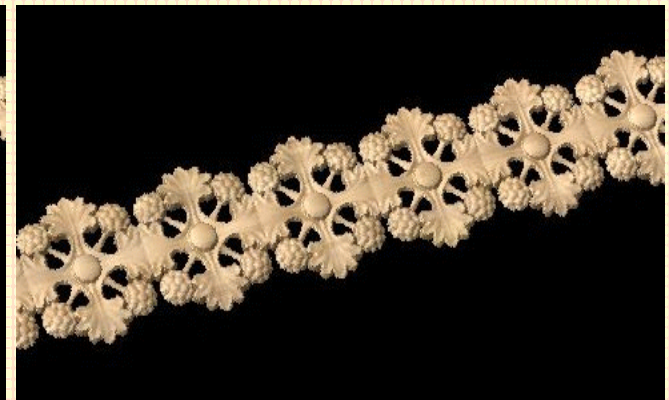
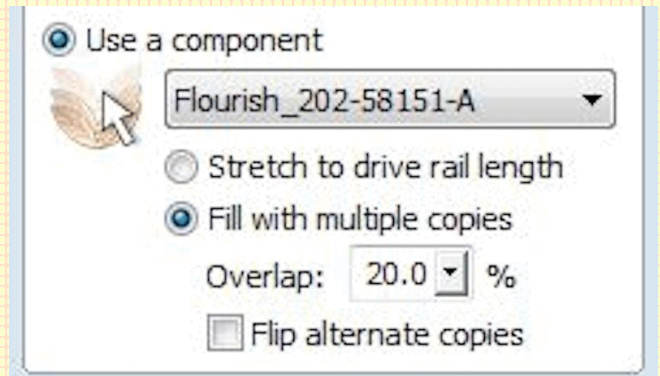
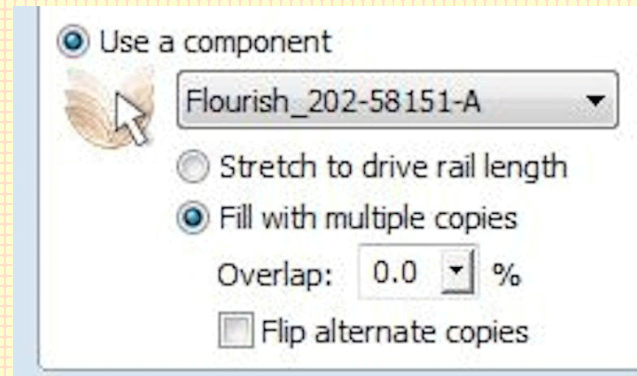
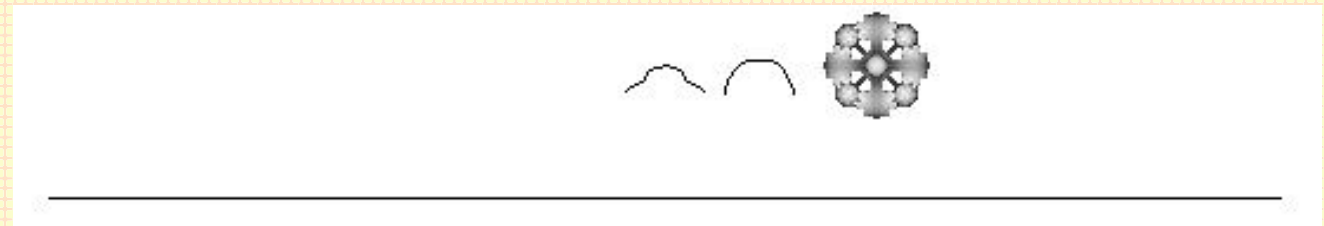


Extrude and Weave

Simple Vector Extrusions Using Components

Using the Overlap option when extruding components can help tie the design together.

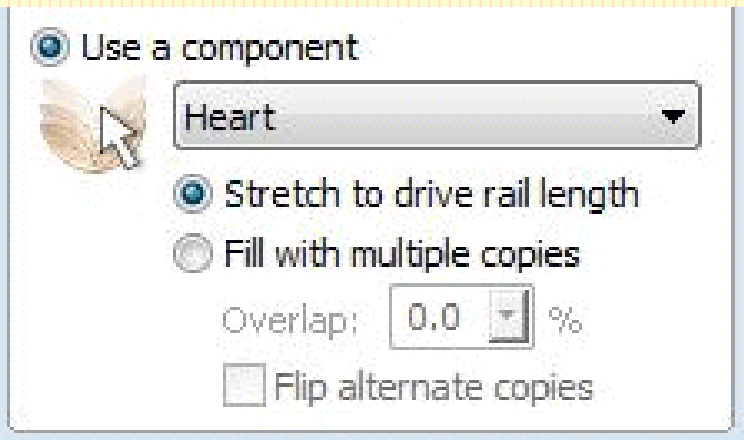
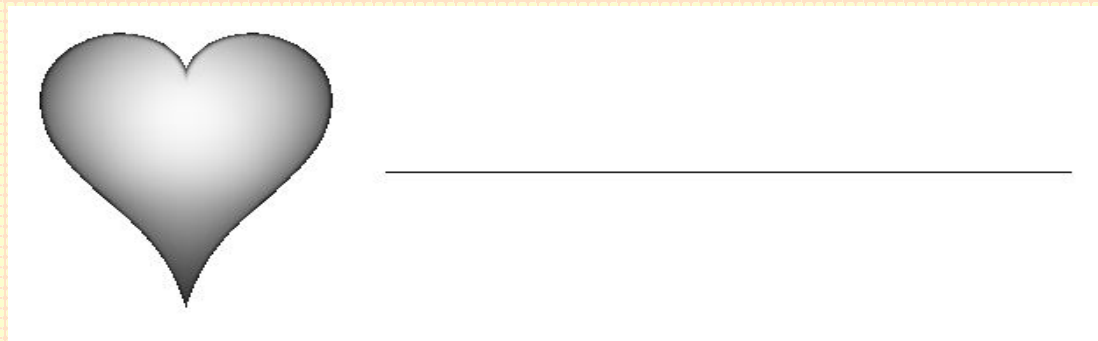
Use the drop down slide bar to adjust the percentage or enter the desired percentage directly into the box.



Extrude and Weave

Simple Vector Extrusions Using Components

One more option you have when extruding components is Stretch to Drive Rail Length.



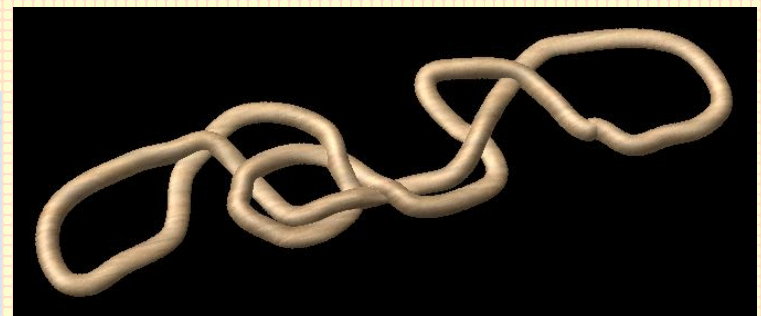
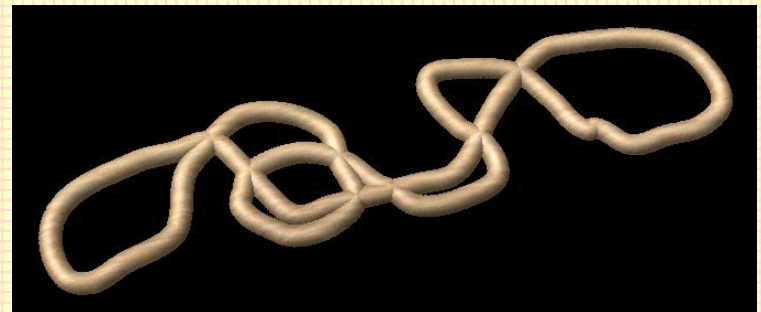
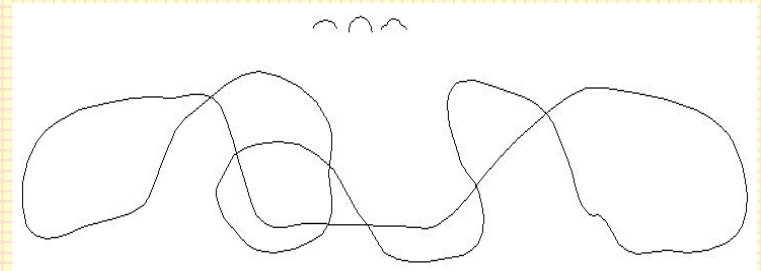
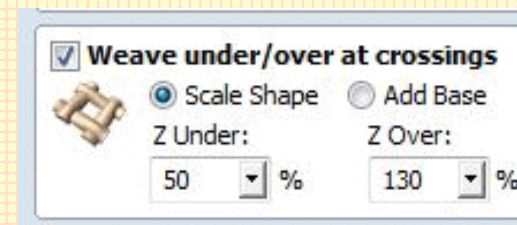
Extrude and Weave

Weave Under/Over At Crossings

The design below incorporates 8 spirals that climb from the low center hub cross over themselves and end just below the rim of the piece. There was no Extrude and Weave tool when it was made.

The spiral was built from many complex vectors drawn to build several parts pieced together added on top of a ramp made with many Two Rail Sweeps, to make it rise from bottom to top, merged together and sculpted to smooth the joints between parts. About 28 pieces and many hours to build one spiral, a good day or more of work. Once you have one you can copy, past and rotate as needed.

Now you can draw a set of basic vectors, use the Extrude and Weave tool, and have that same spiral built in less than a half hour.



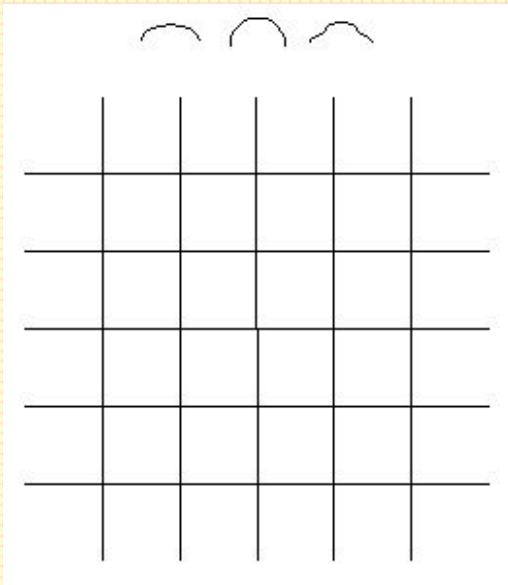
Extrude and Weave

Weave Under/Over At Crossings

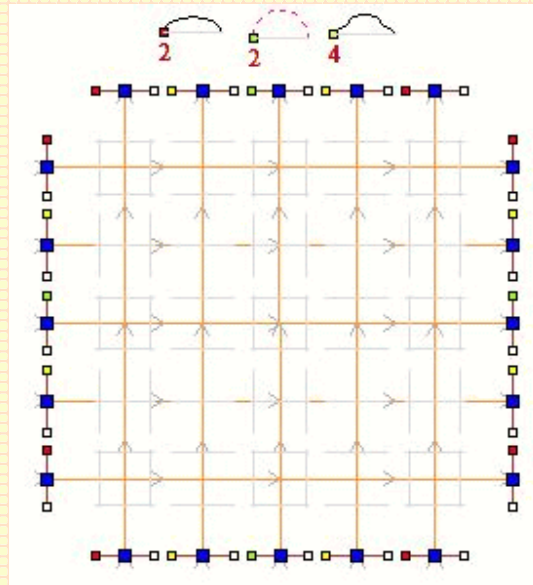
You can do a basket weave type component easily using the Weave Under/Over At Crossings option.

It is possible to use several cross section in the design, just select one and click on the rails where you wish the cross section to be extruded.

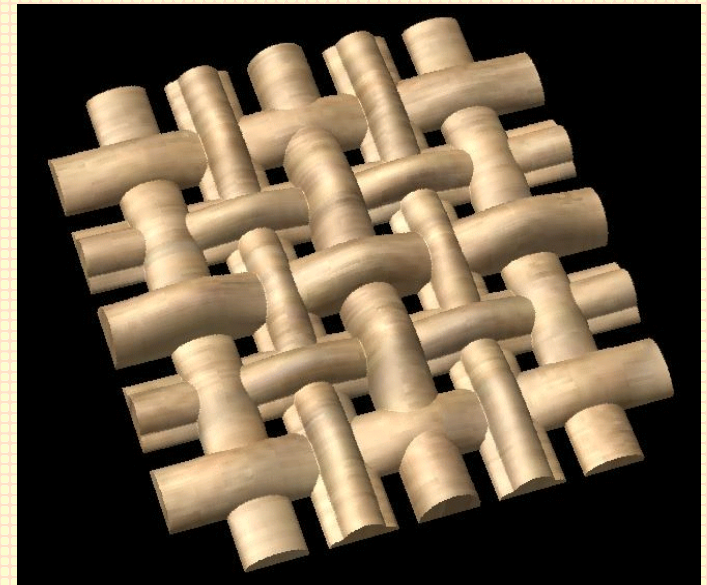
Vectors



Selections

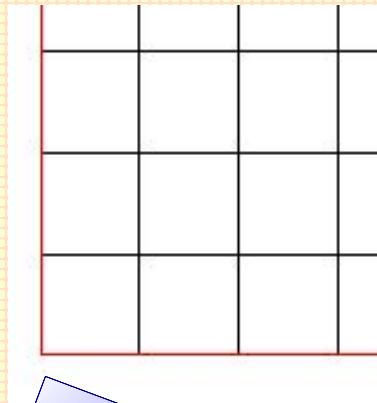


Component



Extrude and Weave

Weave Under/Over At Crossings

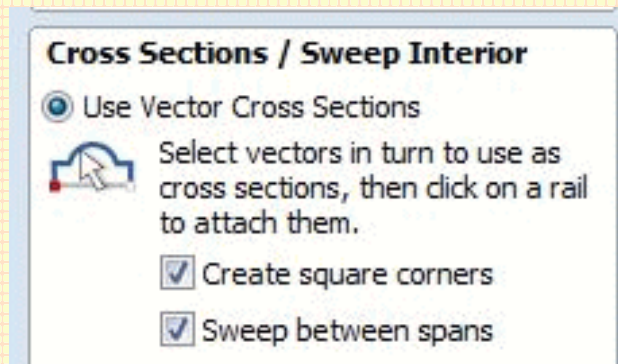
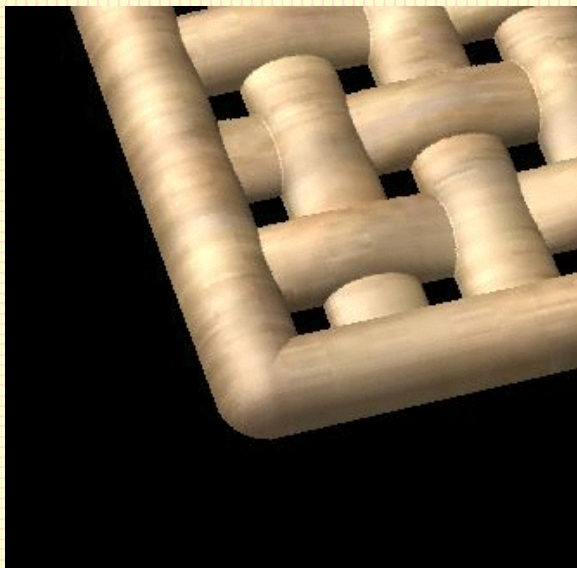


When extruding around a corner (example of the vector to the left) the extrusion may have a rounded corner depending on the cross section used (example on the lower left).

If you want the corners to be square check the Create Square Corners box and hit the apply button. The extrusion will be squared off like a miter joint (example on the lower right).

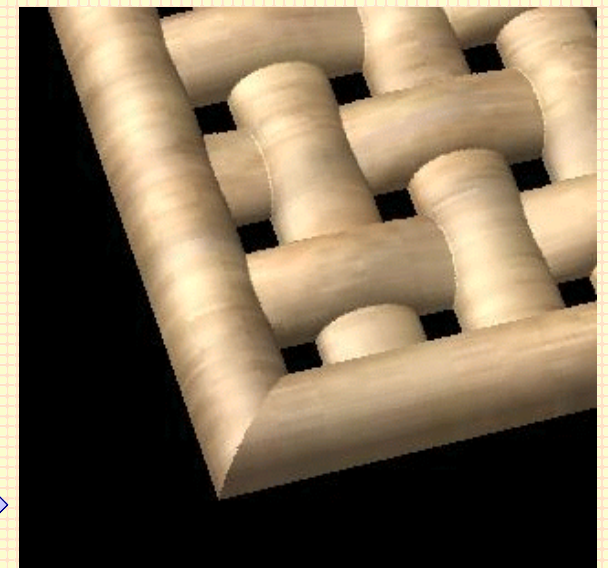


Extruding around a corner
Red vector



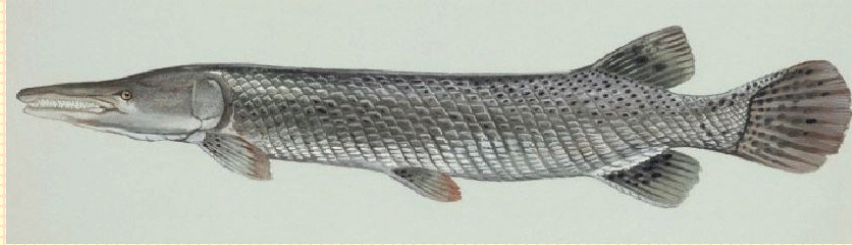
Original extrusion
Rounded corner

New extrusion
Square corner



Create Component From Selected Bitmap

One More Creative Tool



There is one more tool at your disposal, the Create Component From Selected Bitmap, and when used correctly can be very powerful.

This tool will require you to use other tools to achieve the desired component but is well worth the extra effort.

1. First import your bitmap and use the Trace Bitmap tool to fit vectors to the bitmap.
2. Use the Create Shape tool to create a component with the desired shape.
3. Select the bitmap and use the Create Component From Selected Bitmap tool to create a texture file.

Using the shape you created and the texture file together you have a good representation of the bitmap in a 3d model.

You may have to or want to tweak the components to achieve the final results.



CREATING SHAPES ASPIRE v8.0

This is just a brief explanation of the shape creation tools contained in Aspire v8.0 software. Aspire is a complete package helping you draw vectors, create shapes, refine your components, combine everything together for the best layout, then allows you to calculate toolpaths to cut the project and view the results in the software before cutting the project on your CNC machine. You can send pictures to customers for their approval so changes can be made before wasting materials and time carving the project.

If you are interested in creating your own 3d components and models there are other programs that you can use to build them, most are CAD-based and harder to understand unless you have used CAD-based programs in the past. Very few of these other programs allow you to complete a project from beginning to end.

Try it out for yourself download a trial version of Aspire v8.0 at <http://www.vectric.com/downloads/trial-software.html>