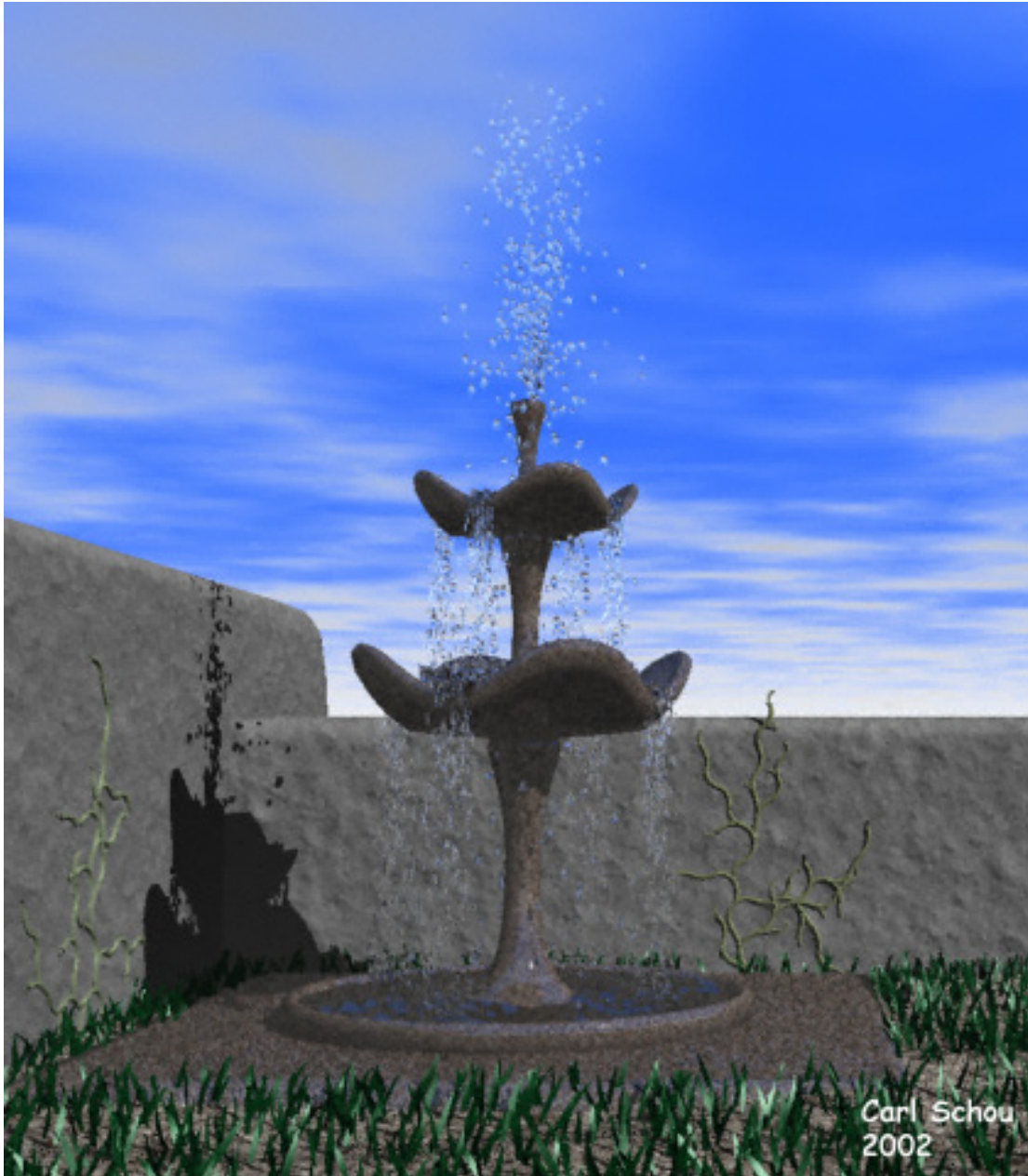


# The Fountains of Carrara

Carl E Schou

December 31, 2002



# The Fountain in the Garden

Ever wanted a fountain in your back yard but did not want to fool with the maintenance? Well, for this month's foray into the digital domain, we are going to build a three-tier fountain in Carrara Studio 2 so you won't have to dig up any flower beds.

## Overall Strategy

Before we start building our scene in Carrara, we are going to take a look at what Particle Emitters are and how they work. Then we will start up Carrara and build a simple three tier fountain for our project. We will create the water in each basin by using terrains. Next we will add particle emitters to simulate the moving water and tune them for the effect we want. Once we are satisfied with our model, we will set up the Sky and camera settings for our scene and add the assorted props needed to complete the picture.

## Particle Emitter Background

Particle Emitters are used to generate effects like explosions and fountains by generating small simple objects that follow the laws of physics over time. If you examine the individual frames of an animation, you can see how each particle follows its own trajectory. The user has control over parameters such as gravity, air resistance, particle spawning, duration, and bounce. Because particle emitters work over time, they need to be run from within an animation package, such as Carrara Studio 2.

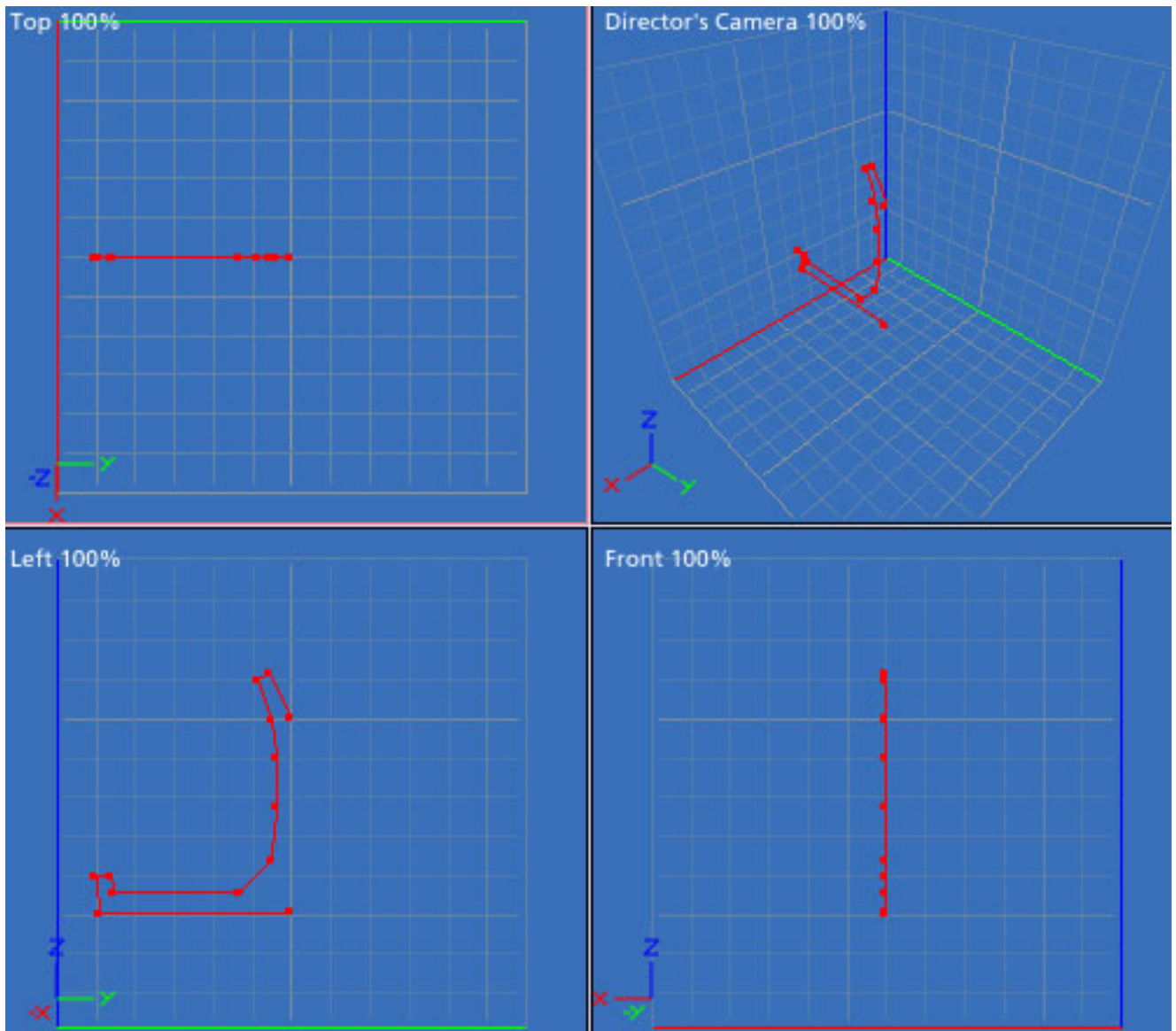
## Steps in Building the Fountain

To build the fountain, we are going to start by building a simple square base. Next, we are going to use the Vertex modeler's Draw tool to produce half the outline of the top level of the fountain. We will Lathe the outline to produce the actual 3D master object. This top level will be duplicated twice to produce the middle and bottom levels. The bottom level will be made its own master object so it is not affected by changes to the other two levels. The top level's bowl edge will be molded to give the water some clearly defined spill points. These changes will be automatically transferred to the middle level since the top level is the master object of the middle level. Finally the parts will be put into position in the Assemble room and grouped using the Sequencer tray.

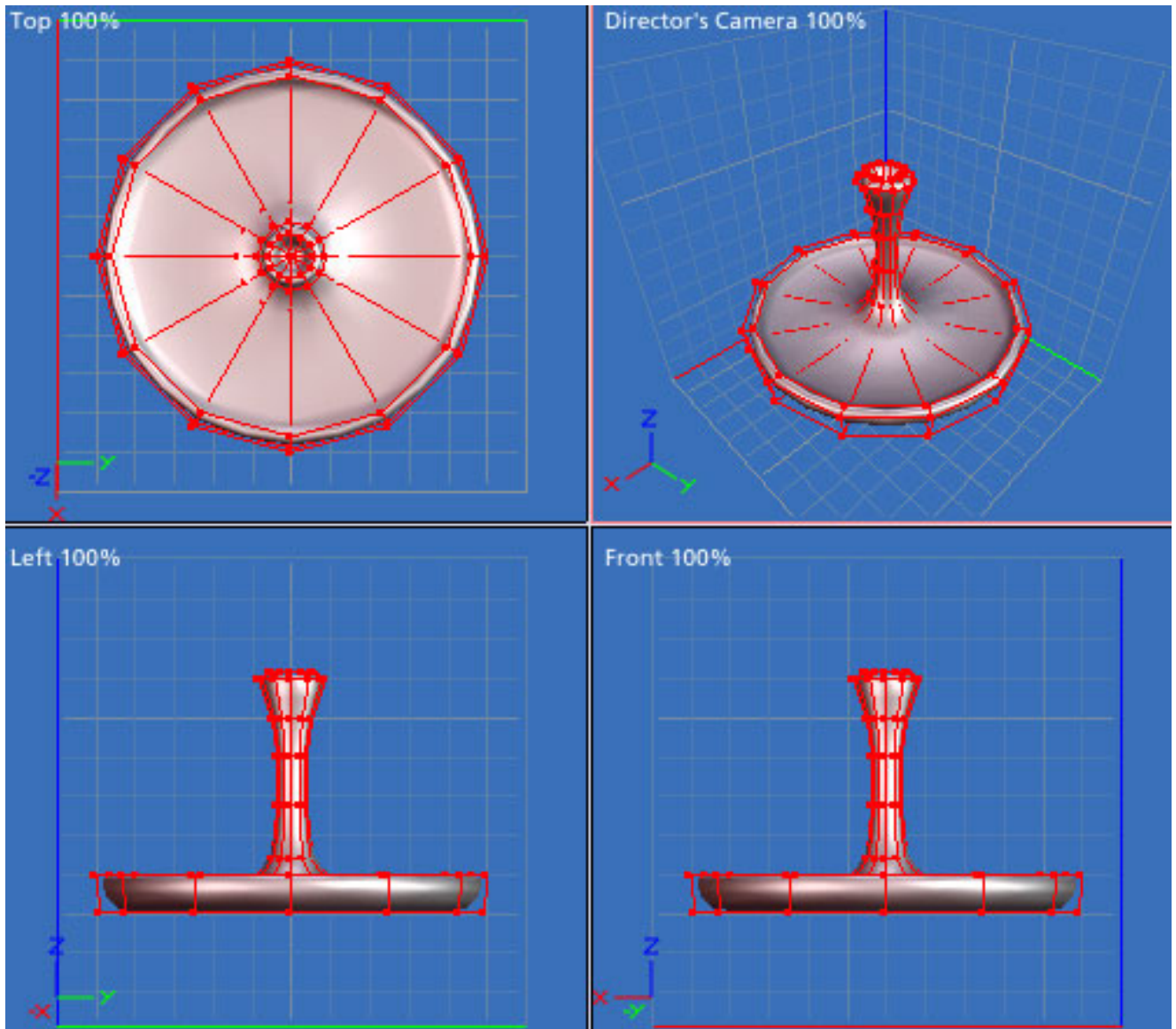
### Building the Fountain

In the Carrara Assembly room, drag the Vertex Object icon into the 3D View to insert a Vertex object. This will put you into the Vertex modeling room. Click on Insert>Block and set X and Y to 30 and Z to 1. To prevent any hard edges, the top surface of the base was beveled by extruding it 0.2 in the Z direction and reducing the size of the extrusion by 95% in the X and Y directions. Return to the Assembly room, open the Properties tray at the right side of the screen, and set the X and Y position to 0 and the Z position to 0.5. Change the object's name to "Base".

Drag another Vertex object into the 3D View and return to the modeling room. Select the Polyline tool and build the outline shown in the Left View Window below. Make sure the end points of the outline are resting on the Z axis so that  $Y = 0$ .



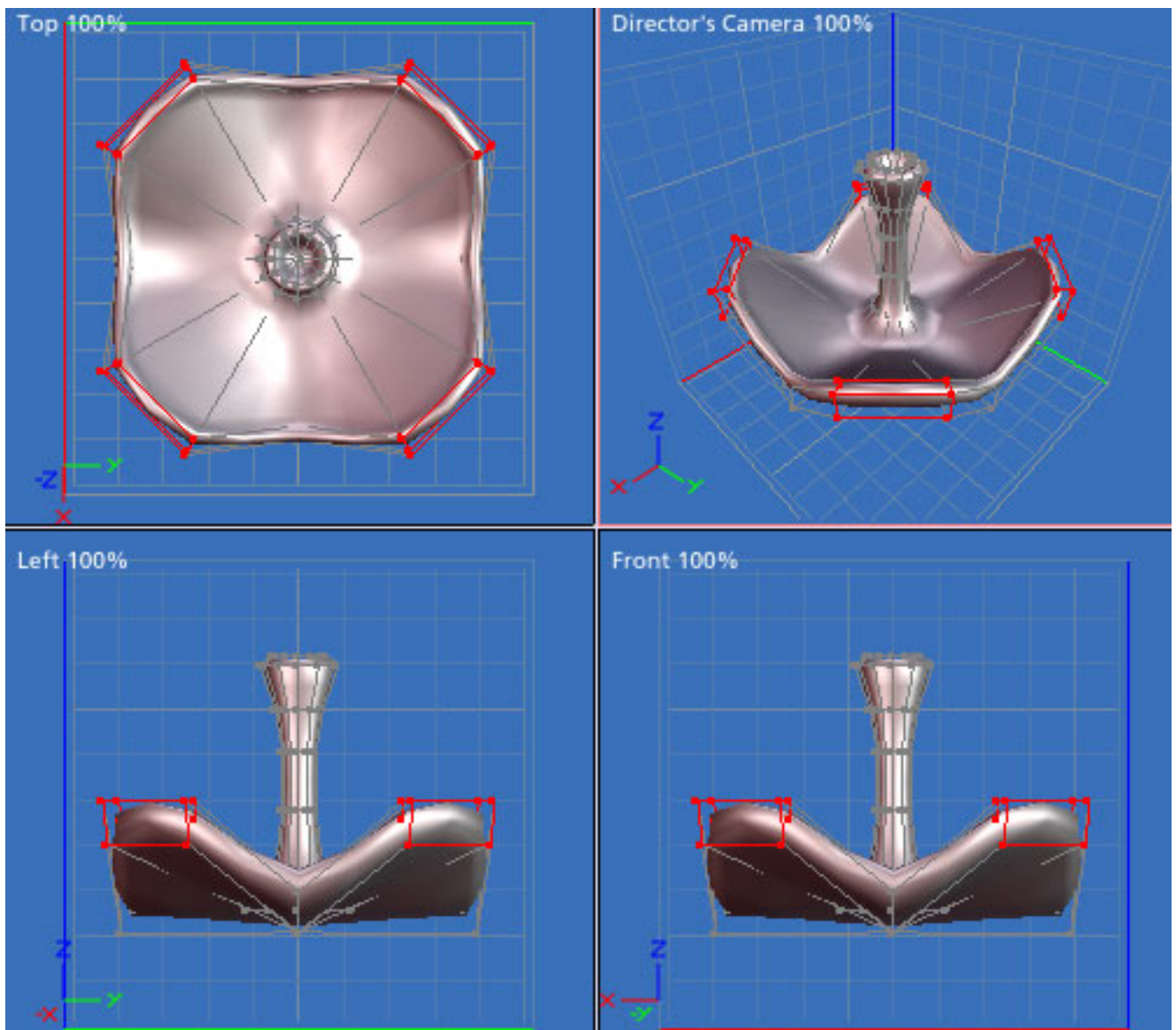
Next we Lathe the outline to produce the 3D object. Make sure all of the points are selected and press Construct>Lathe and press Enter. Select everything and turn on Subdivision Surfaces in the Properties tray at the right side of the screen. Your view should look similar to the image below. Return to the Assembly room and use the Properties tray to change the name of this part to TopLevel. Set the X and Y position to 0 and the Z position to 24.



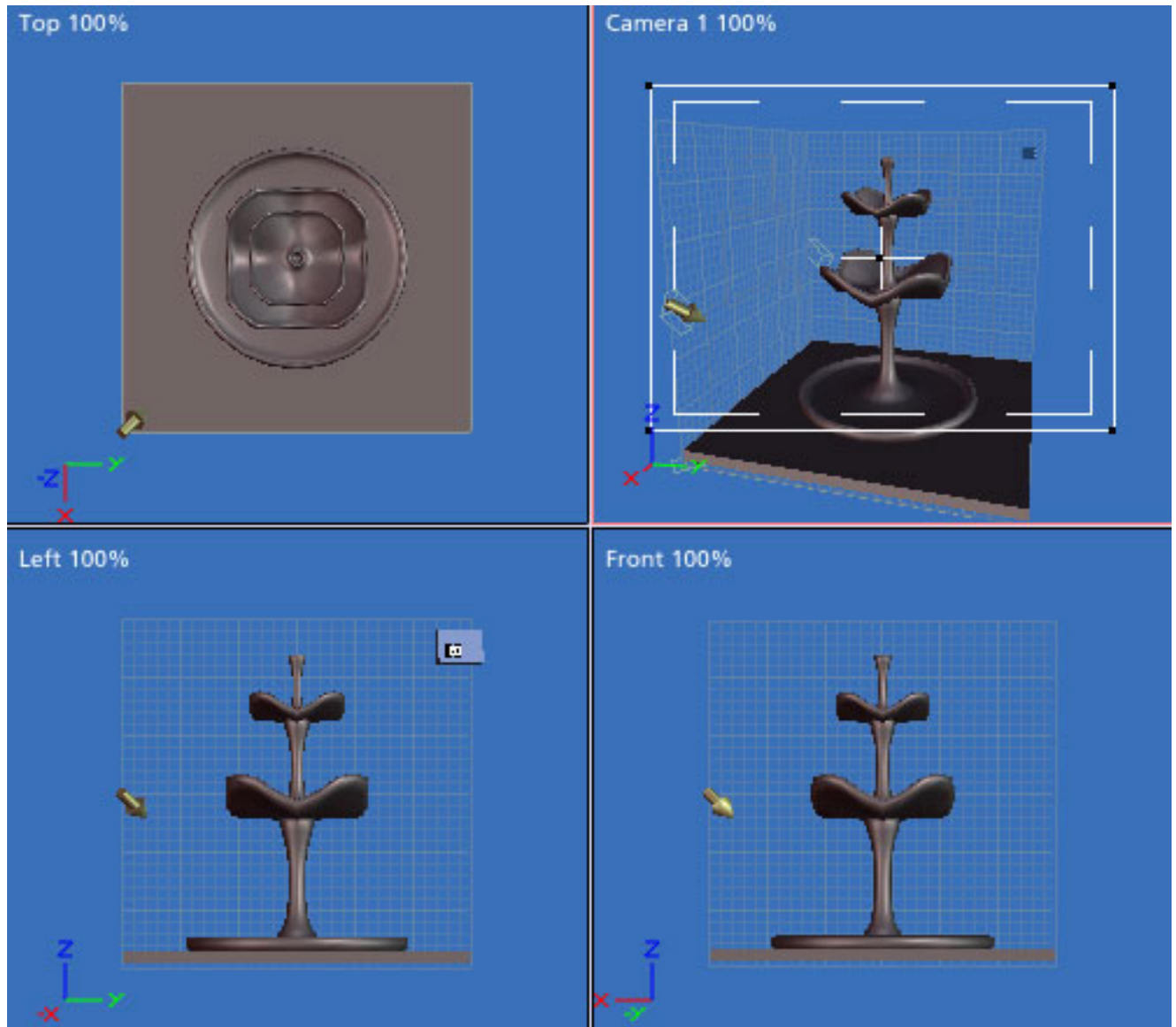
Duplicate the top level by selecting it and pressing CTRL+D. Using the Properties tray at the right side of the screen, increase the Overall Size of the new part to 150% and change the name to MiddleLevel. Set the X and Y position to 0 and the Z position to 17. Press CTRL+D again to create the BottomLevel and set the Overall Size to 200%. Set the X and Y position to 0 and the Z position to 7. The simplest way to make the BottomLevel a new master object is to double click on it to edit it. In the window that opens, click the button that says "Create a new master". Return to the Assembly room.

Now we are going to mold the edge of the bowls for the top and middle levels. Double click the TopLevel object to edit it in the Modeling room. Select the points at the outside of the rim at the 12, 3, 6, and 9 o'clock positions in the Top view. You should have a total of 16 points selected. Resize these points to 80% in the X and Y directions to make the top view more square.

Next select the other points along the rim as shown in the Top view below. Move these points up 2 units in the Z direction. Return to the Assembly room and you'll see the same changes have been automatically made to the MiddleLevel object.



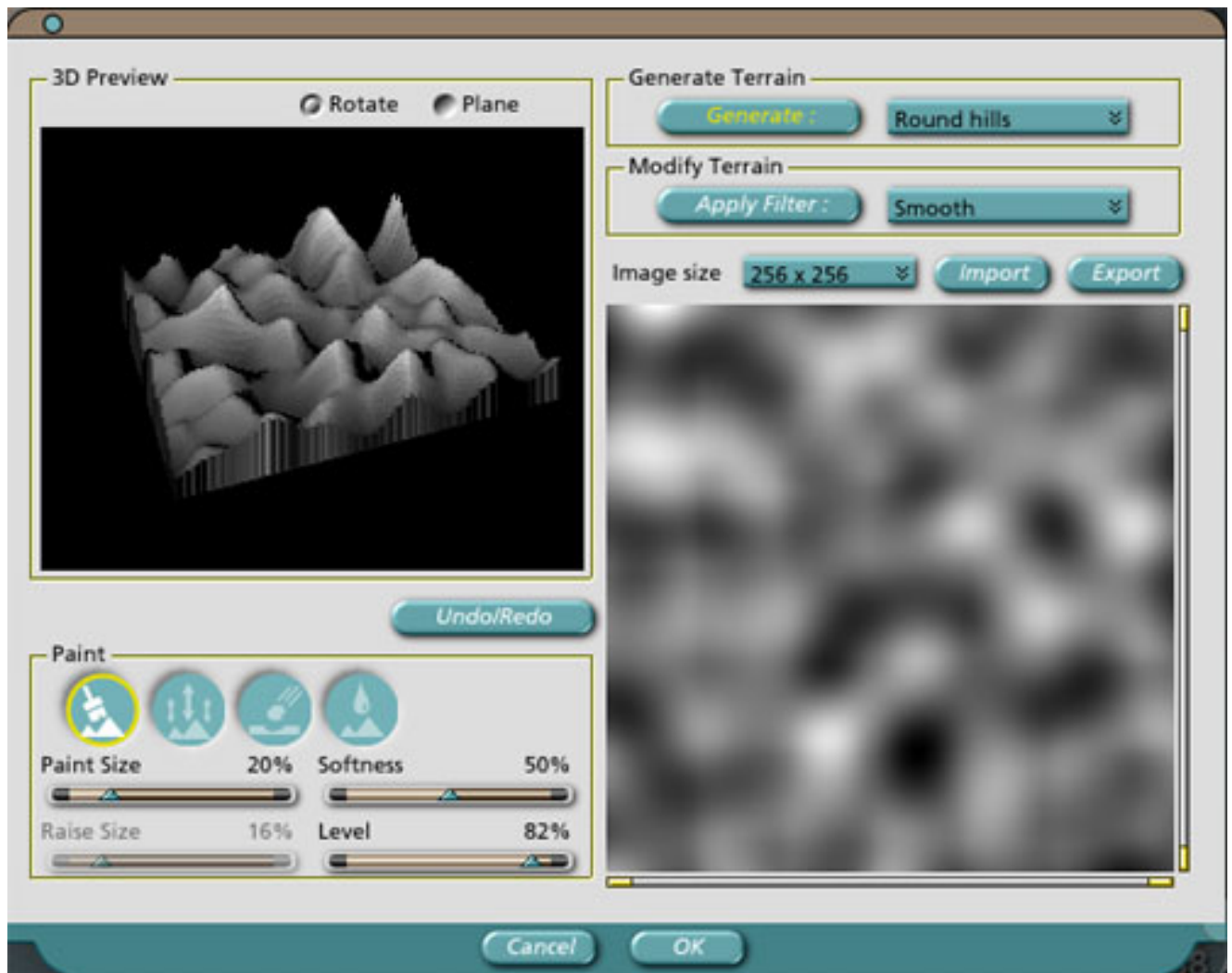
When you're through, the fountain should look something like the image below. Just apply some granite shaders for texturing, and you'll be ready to add the water.



## Adding the Water

Now we are going to build the water that fills each bowl. We could just use a simple disk with a water texture applied and size it to fit the different levels, but real water isn't flat, especially in a running fountain. We are going to build the water using a terrain. We will export the terrain's grayscale height map and adjust it a bit in Photoshop, then import it back into Carrara to produce the water disk. If you don't have Photoshop or another image editor, you can do this step in Carrara, and we will cover that as well.

In the Assembly room, drag a Terrain object into the 3D view, then go into the modeling room. Click the Edit button and generate a Rounded Hills terrain from the presets as shown below.

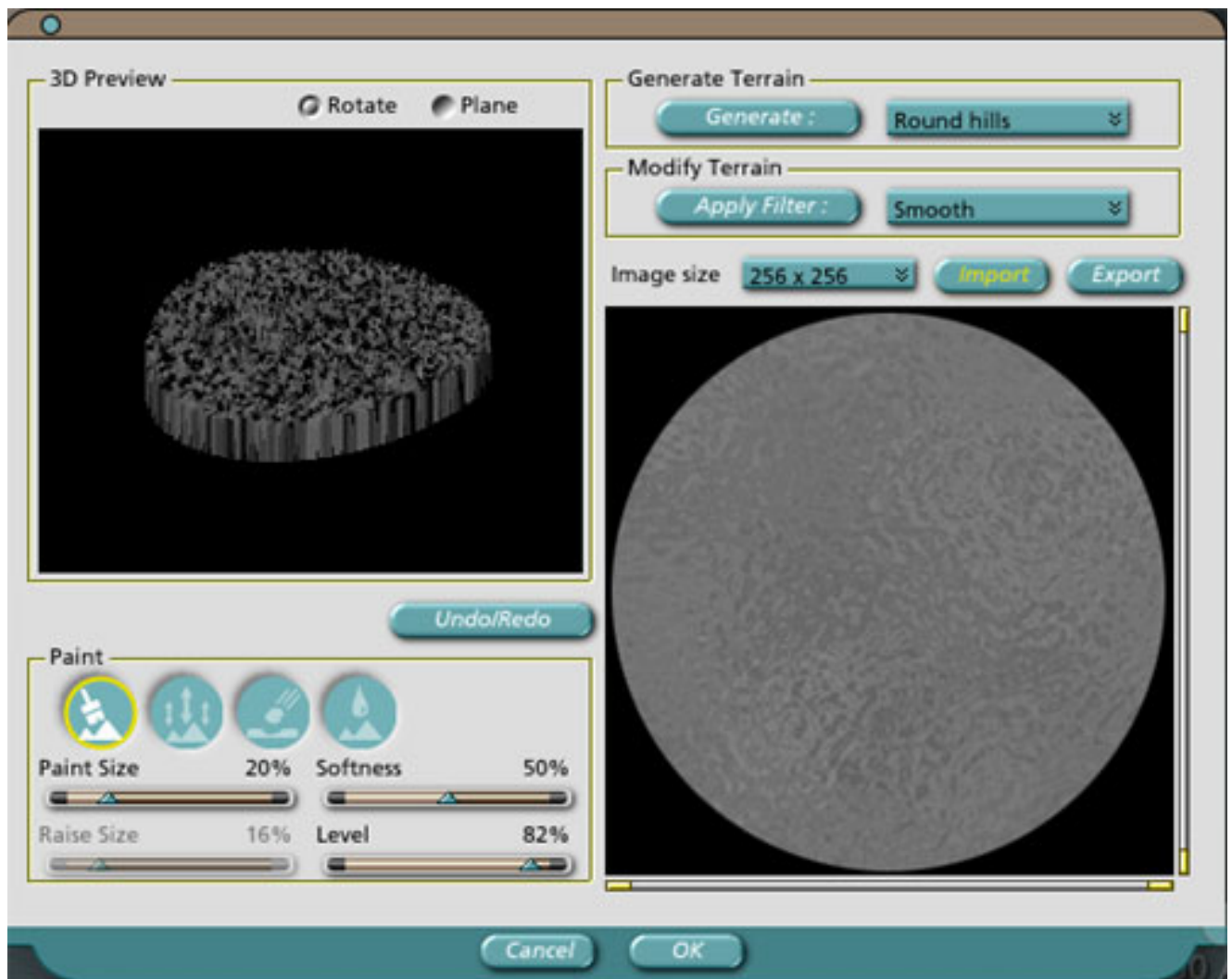




Export the image from the terrain editor and import it into Photoshop. Decrease the contrast. Apply the Ocean Ripple filter to get a water effect. Select a circle in the middle of the image, invert the selection, and fill the selection with black. Export the image from Photoshop. Back in Carrara, import the new image into the Terrain Editor and generate the terrain. You should see something like the image below.

Click on Edit>ConvertToOtherModeler and select Vertex modeler. In the Side view, select the bottom few edges and delete them. You should be left with a thick round disk.

If you don't have Photoshop or another image editor, you can do this step in Carrara by Boolean intersecting a cylinder with the terrain, then cutting the size in the Z direction down to about 20%.



Return to the Assembly room. rename the object to BottomWater, and set the X and Y position to 0 and the Z position to 1.9. Open the Browser tray at the left side of the screen, select Shaders, and drag the Water shader onto the BottomWater object. Duplicate this object twice, rename the duplicates to MiddleWater and TopWater, place them in their respective bowls and adjust their size to fit.

## Turning on the Fountain

We could stop the modeling process here but, without moving water, all we would have for our efforts would be a three story birdbath. We will produce the top level spray of water with a master particle emitter. Another master particle emitter and three duplicates will produce the water spilling from the TopLevel object to the MiddleLevel. The same arrangement will be used to produce the water spilling from the MiddleLevel to the BottomLevel.

## Building the Top Level Spray

From the Assembly room, drag a Particle Emitter object into the 3D view and go into the modeling room. Start with a Fountain preset and adjust the system settings as shown in the image below.

System

Preset Custom

Particles

Maximum 2000 132 Kb

Frequency 200.00 ± 50.00

Lifetime 10.00 ± 0.00

Velocity 3.75 ± 1.50

Size 0.05 ± 0.02

Random

Seed -556882451 Generate

Shape

Sphere

Colors

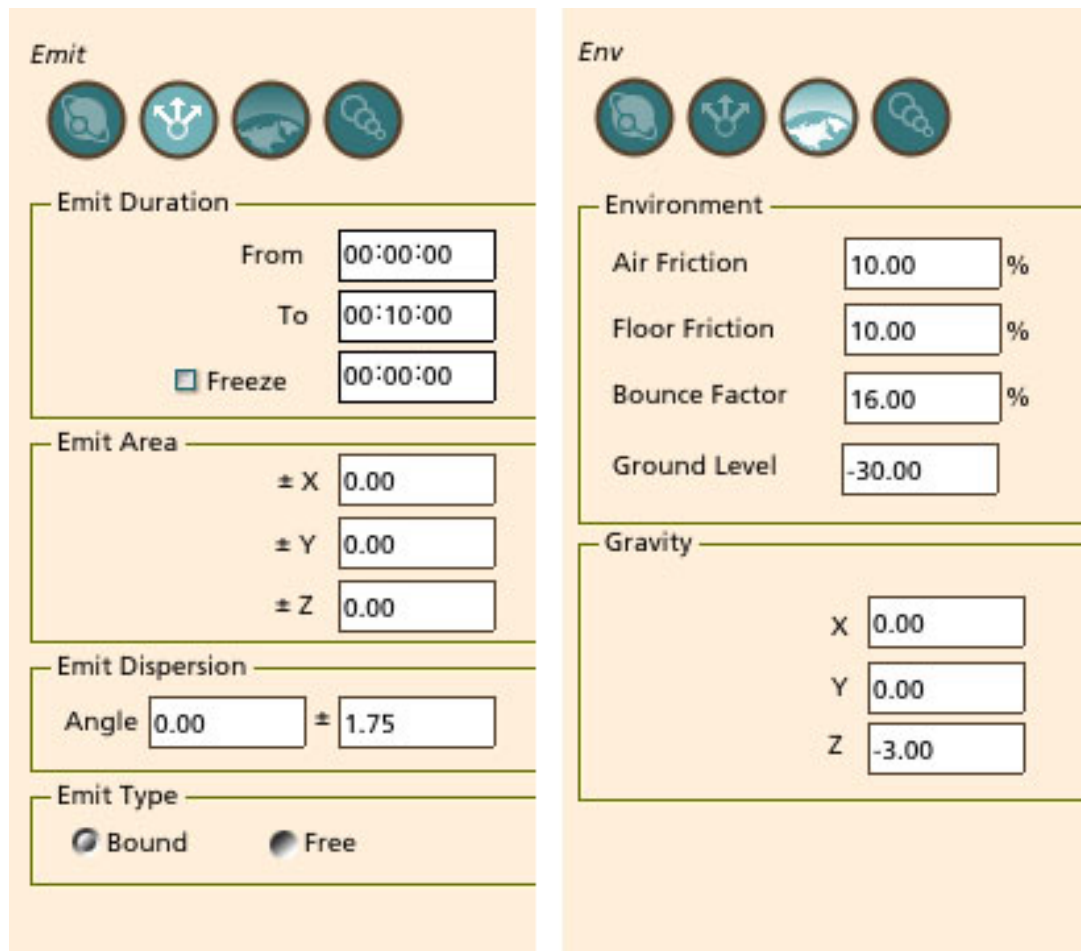
Birth Death

Preview

Run Reset

Duration 10.00 Front

For the Emit and Environment settings, use the values shown below.



In the Assembly room, rename this object as TopLevelFountain, set the Z size and the Overall size to 200% and set the Z position to 13.0. This should place the emitter in the little opening at the top of the TopLevel object, though you will probably have tweak the settings to account for your individual model. Apply a water shader to this object.

## Spill from the Top to the Middle Level

With the TopLevelFountain still selected, press CTRL+D to duplicate it, then rename the duplicate as TopLevelSpill\_1 and edit it as a new master. Under System, change size to 0.25 + or - 0.05. Under Emit, change the Emit Areas to 1.50 for X and 4.00 for Y. Change the Emit Dispersion angle to 75 degrees. Under Environment, change the Ground Level to -7.00.

Back in the Assembly room, apply a water shader, set the X and Y size to 10%. Set the Z size and the Overall size to 100%. Set the position to X = 4.00, Y = 0.00, and Z = 19.3. It should be sitting in one of the four spill points from the top level, but again the position

may need tweaking. Duplicate it three times, naming the duplicates as TopLevelSpill\_2, \_3, and \_4. Position TopLevelSpill\_2 at X = 0.00, Y = 4.00, and Z = 19.3, tweak it to fit your model, and set the Yaw to 90 degrees. Similarly, set TopLevelSpill\_3 to X = 0.00, Y = -4.00, Z = 19.3, and Yaw = 90. Finally set MiddleLevelSpill\_4 to X = -4.00, Y = 0.00, Z = 19.3, and Yaw = 0.

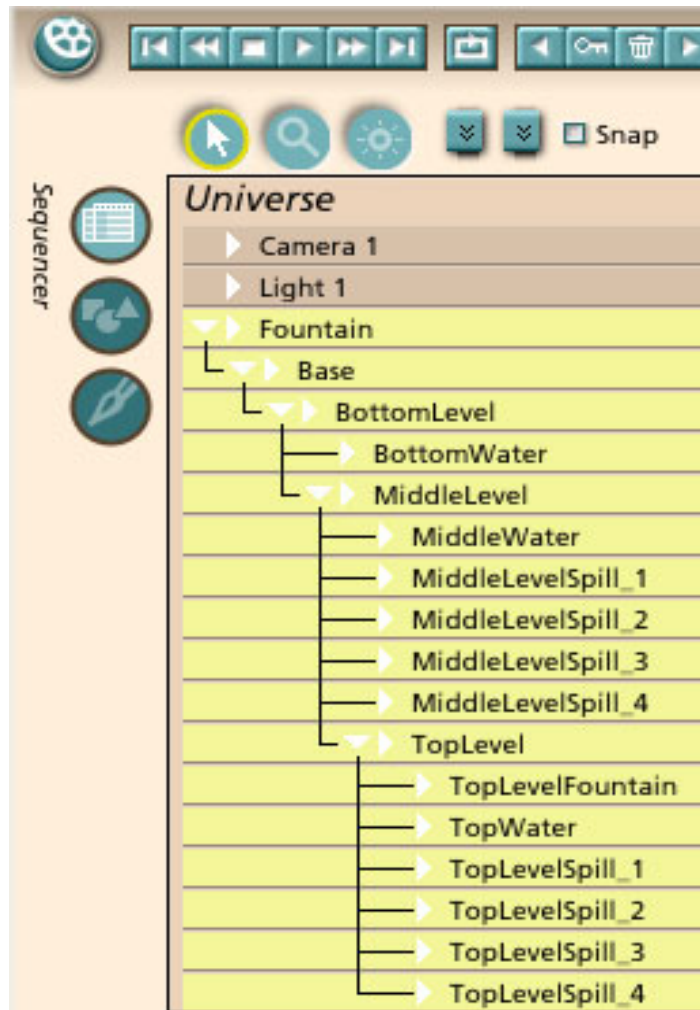
## Spill from the Middle to the Bottom Level

Select TopLevelSpill\_1, press CTRL+D to duplicate it, then rename the duplicate as MiddleLevelSpill\_1 and edit it as a new master. Under Emit, change the Emit Areas to 3.00 for X and 8.00 for Y. Under Environment, change to Ground Level to -12.00.

Back in the Assembly room, set the position to X = 6.00, y = 0.00, and Z = 9.2. Once you have MiddleLevelSpill\_1 in position, duplicate it three times, naming the duplicates as MiddleLevelSpill\_2, \_3, and \_4. Position MiddleLevelSpill\_2 at X = 0.00, Y = 6.00, and Z = 9.2, and set the Yaw to 90 degrees. Similarly, set MiddleLevelSpill\_3 to X = 0.00, Y = -6.00, Z = 9.2, and Yaw = 90. Finally set MiddleLevelSpill\_4 to X = -6.00, Y = 0.00, Z = 9.2, and Yaw = 0.

## Setting up the Hierarchy

To keep our model organized and to hold it together when we move it around in a scene, we are going to group it in the Hierarchy section of the Sequencer Tray. To do this, simply click and drag each child part onto its associated parent part. For example, the BottomLevel is the child of the base, but it is also the parent of the MiddleLevel. The hierarchy used for the Fountain is shown below.



## The Rest of the Picture

The sky in the image at the top of this tutorial was adjusted using Carrara's Atmosphere editor. Two intersecting walls were added to the scene by using blocks that were beveled the same way as the base. The vines on the walls were generated in PlantStudio from Kurtz-Fernhout Software. The grass was generated with a program called Grass from Bantam3D. Links for both of these free programs are given below.

## Wrapping Up

Well, that's it for this time. I hope everyone has a safe and happy holiday.

## Related Links

[Eovia, home of Carrara](#)

[PlantStudio from Kurtz-Fernhout Software](#)

[Grass from Bantam3D](#)

[RETURN TO TUTORIALS]

Copyright © 2002, Carl E Schou, All Rights Reserved