Aladdin-4D Tutorial #11:

Creating arrays with Genie Tools

by Shamms Mortier

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Many years ago, for those of you who are too Amiga-young to remember, there was a 3D program, distributed by a company called MindWare, called PageRender-3D. Though somewhat primitive by today's standards, PageRender had a few tools that nobody else had. One of these, and my absolute favorite, was the ability to create what are called ''arrays''.

Arrays are groupings of a cloned object formed in a specific pattern, such as cubic, spherical, cylindrical, and other 3D possibilities. By various methods, some too complex to be inviting, you can create arrays in all of today's Amiga graphic programs. And now, with the superlative list of accessories for ADSPEC's Aladdin-4D software called ''Genie Tools: volume 2'' from Shead data processing, the intuitive magic of array creation is again easy and enjoyable with a tool called ''Point Instancing''.

Traditional Aladdin Instancing

We've already covered the general way that Aladdin addresses instancing an object in tutorial number nine in Amazing, so we won't bother to go through the whole process here. Suffice to redefine the instancing process as a way to tell the computer that a polygon or 3D object that has been selected can be cloned (repeated) any number of times along a defined path.

In A4D's normative instancing process, the selected poly or object never shows its duplicates on the editing screen, but only appears when rendered. This is meant to save space when the 3D file is saved, because all that is stored are the directions and not the polygons. This is fine when you want to animate a number of objects following a path at the same time, like similar marchers in a large parade. It does little good, however, when you want to wind a path through the objects with a flying camera, or have another reason for needing to see the duplicated objects on the edit screen. Normally, except for wireframe previewing, instanced objects do not appear until rendered. Shead's Genie Tools ride to the rescue.

Genie Tools

Let me back up for a second and say a bit about Shead's genie Tools in general. Ever since Greg Gorby, the author of Aladdin-4D, opened up his program to other programmer's in version 3.0, there have been a number of folks who have written their own tools. Usually these tools have addressed processes that A4D was missing, and in rare cases the new tools have lived up to the high standard Greg Gorby set in the root program. Genie Tools was an exemplary member of this process from the start. All of the added tools in volume one, and now in volume two as well, not only added some new operations, but Mr. Shead seems to have captured the very essence of what ADSPEC has done in Aladdin itself.

Shead's tools have exactly the same look and feel as the original A4D set, and are just as qualitatively useful and intuitive. All are accompanied by a wealth of on-line explanatory text, and even tutorials for the intuitively disadvantaged. Point-Instancing, one of a whole collection of new tools in volume two, is the tool being referenced in this tutorial. As we continue this series of A4D tutorials in future issues of Amazing, I'm sure selected Genie Tools will continue to be a frequent subject of attention.

Point-Instancing

Unlike their A4D standard counterpart (called simply ''instancing''), point-instanced objects appear on the edit screen for path allocation and whatever other editing you may want to apply to them (resizing, rotation, deletion of selected members, etc.). Once objects are point-instanced (meaning duplicated in specific arrays on the edit screen), it's a fairly simple task to thread a path in between them and fly the ''camera'' along it for the animated ride of a lifetime. Given the right recording equipment, these types of animations rival the hottest stuff seen on the networks. One of my present projects consists of flying a detailed spaceship into and through a cubic array of textured revolving spheres.

The Varieties of Point-Instancing

P-Instancing comes in three flavors in the Genie Tools volume two utility: Cubic, Spherical, and Cylindrical. Each does exactly what you would expect, arranging any number of selected polys or objects in the associated array. But there's a lot more possible than that, because each array type has other controls associated with it as well. Let's look at each of these three types.

Cubic Arrays

This would be better understood as a rectangular array, because you can vary the number of units along any combination of XYZ axis vectors. You could just as easily produce a planar arrangement as a 3D one by keeping all but one unit number at 1. A wall of bricks or a tiled floor could be shaped in this manner. Cubic arrays are the simplest to visualize and understand. Aside from setting the

number of the rectangular elements in the configuration, you can also set the distance the objects maintain from each other on each separate axis. The scale and rotation of objects can also be set with each separate axis addressed individually. Scaling and rotation can take place from either the Attach Point or the object's center.

Cylindrical Arrays

This gets a bit more complex. In addition to the expected parameters, objects can be set to rotate by user selected amounts around the Z axis, and there is a special ''Align Theta'' button that allows objects to have their faces aligned with the cylindrical shape.

Spherical Arrays

This is potentially the most complex of the three, though the on-line help files make operation a virtual snap. There are two ''align'' toggles here to activate the polys lining up their faces with the spherical arrangement.

Cautions

These operations are very computation intensive, and the more cloning that takes place (the higher number of duplicates chosen on each axis) the more time it takes to place them in 3D space. I tested these attributes on an Amiga 3000 Tower, and even at 68030 speed, some of the finalizing on the edit screen took over a half hour for larger arrays. On an Amiga 4000, this time is cut to about a third. I would hate to have to work with these tools on a stock 2000 unless I had all night to wait for the finished 3D arrays to be ready to render.

One neat animation trick is to set the expected array, and then with ''Deform Mode'' on (the way Aladdin 4D generates key frame animations), snap every object in the array to the center so that they all overlap each other. Once the animation is rendered, what you witness is the array growing magically out of a single object. Shead's Genie Tools volume one and two deserves more tutorials, all of which I hope to provide you with in Amazing time. For now,.. Enjoy! And, oh yes, see you in ROMulan space.

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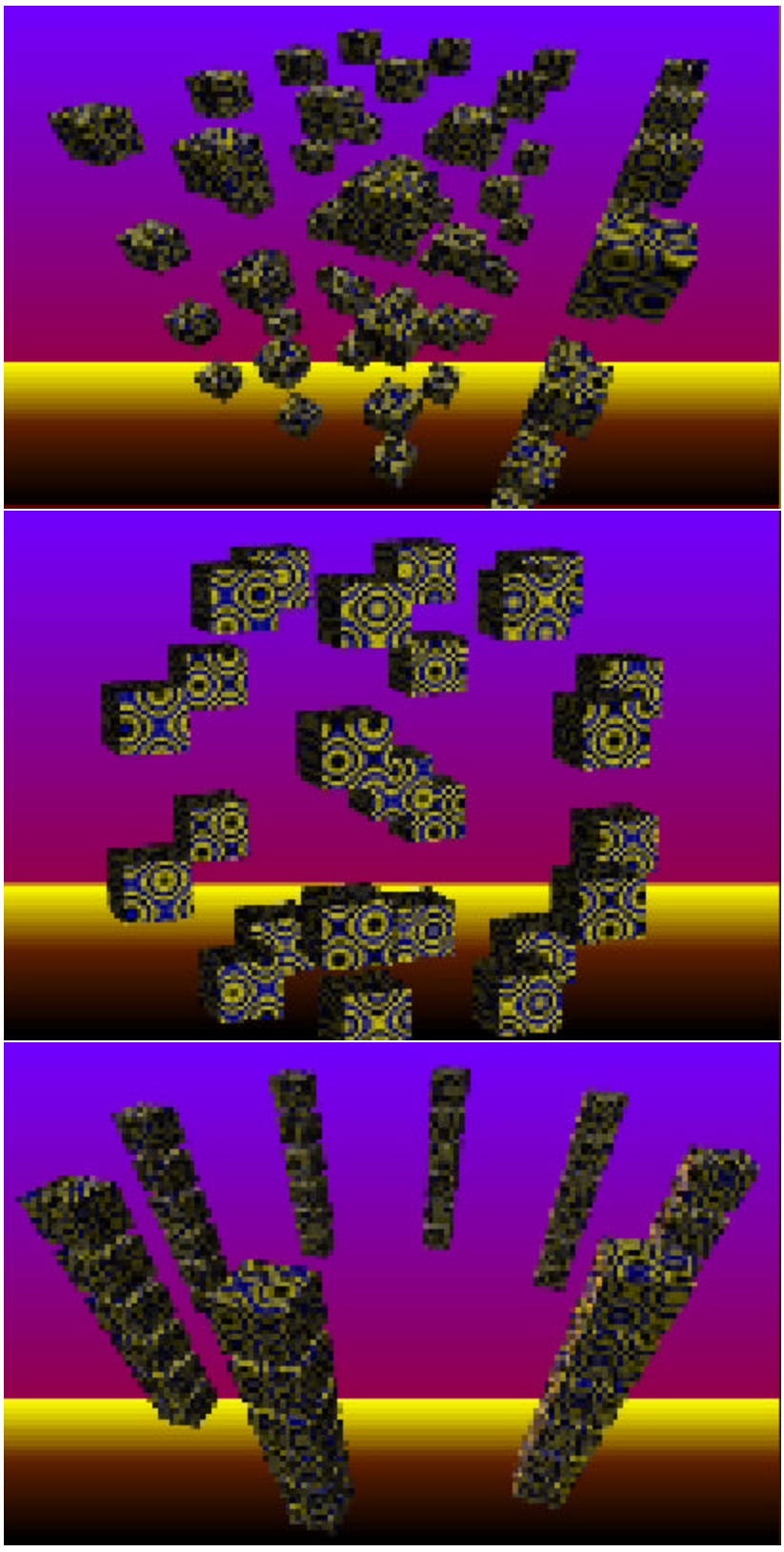

Figure 1 (Top): A cubic array is one of the most beautiful. Its ordered symmetry appeals to our sense of balance, and its a snap to produce with genie Tools volume two. Figure 2 (Middle): Spherical arrays can be as dense as you'd like. Here, we've taken the same textured cubic shapes and arranged a small number in a targeted spherical array. Figure 3 (bottom): Cylindrical arrays anyone? What a great way to produce a cityscape with textured buildings, just by varying the P-Instancing in A4D with Genie Tools volume 2.