POLAR ARRAYS

Introduction
Although the Array modifier can create polar (circular) arrays, the process is not intuitive. There are two other methods to create circular arrays. Let’s start with the Spin tool to make an umbrella.

The Spin tool
Here’s a simple beach scene. Let’s make an umbrella, with eight spokes, to keep the sun off the cooler.

Create a tall eight sided cylinder to be the umbrella pole. Use Shift_D to copy, scale, and rotate it to create a simple rib and support strut.

Use Control_J to join the rib and strut into a single object. Whichever one you select last (the Active object) will preserve its name and properties through the process. The earlier selected object, or objects, will lose their names and independent properties.
Now we want to go into an orthographic top view using Keypad-7 (possibly with Keypad-5 to switch form perspective view; this depends on how your Blender preferences are set up). Select the central pole and then use Shift_S to snap Cursor to Selected. The 3D cursor will now be at the center of the umbrella pole; this is important because the Spin tool uses the 3D cursor as the center of rotation.

Select the rib and go into Edit mode. (Don’t use Keypad-Slash to enter isolation mode, however, as this resets the 3D cursor to the center of the isolated objects). You can always hide the other objects in the scene by clicking on their eye icons in the Outliner to gray them out.

Important - you must be in top orthographic view for the Spin tool to work properly. If you’re In a perspective view you’ll get a helical array of umbrella ribs: interesting, but not what we want here.

With everything selected, click on the Spin tool in Tools - Mesh Tools in the left fly-in. Unless you’ve used it before in the current session of Blender (in which case it will remember the previous settings) it will create nine copies in 90 degrees as below. If it creates something that looks more like a solid fan, select all, and use Remove Doubles. If it creates edges or irregular faces, you don’t have everything in the mesh selected (it’s possible to spin individual selections of sub object elements).
We’re almost there. Change the Angle value to 360 degrees and the Steps to 8. But ... now render the umbrella frame (I’ve changed the material to a light color to show this clearly).

The original rib shows the characteristic pattern of Z-fighting, where coincident planes confuse the rendering engine. This is because the Spin tool puts the last element of a 360 degree polar array over the top of the original mesh.

Crazy, but there is an easy fix. Simply select all in Edit mode and use Remove Doubles. Your umbrella frame will render properly.

Now you can drape a circular piece of cloth over it for the shade.

**Using instances for an editable polar array**

The Spin tool is good, but what happens when you want to edit the struts for your umbrella? They’re not instanced, so you’ll either have to edit them all in place or remove seven out of the eight, edit that last one, and then use the Spin tool once more. There’s a better way.

Let’s Control_Z back to a single strut.
Make sure that the origin point of the struts is in the center of the support pole when seen in top ortho view (Numpad 7). If it’s not, select the pole and use Shift_S to Snap Cursor to Selected. Then select the strut assembly and use Object - Transform - Origin to 3D Cursor. The struts’ origin will now be in the center of the support pole.

Still in top ortho view, use Alt_D to create an instanced duplicate of the struts. The new instance will have a white outline. Immediately after making the instance, hit R-Z-4-5-Enter. An instance of the strut will be offset by 45 degrees to the original - and as an instance, editing one will also edit the other.

Select both struts and repeat the process. Alt-D, then R-Z-9-0-Enter. Use ninety degrees this time as we are instancing two struts. Finally, select all four struts and use Alt-D, then R-Z-1-8-0-Enter.

Now we can edit any strut to change them all.

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