# Using Duplicate2 (v. 0.4)
A Moray plugin by Steffen Hartleib (©2000)

Introduction

In 2000, Steffen Hartleib provided us with a smart little plugin that extended the possibilities of the standard duplicate function of Moray. Duplicate2 (version 0.4) is the only Moray plugin that is called from the Plugins Menu on the menu bar. So, after installing it, do not look for Duplicate2 on the object bar along with the other plugin thumbnails. The major difference with the Moray duplicate function is the possibility to duplicate an object to random positions while scaling the object randomly at the same time, within a given space or CSG object. In addition, you have the possibility to place the objects on a height_field if you want to. The plugin is clearly in a developing stage but, unfortunately, Steffen Hartleib has not followed up with upgrade versions.

When you are building your scene and you have reached the point where you want to do some random duplications of an object, select the object and open the Duplicate2 plugin. You will see the following window:
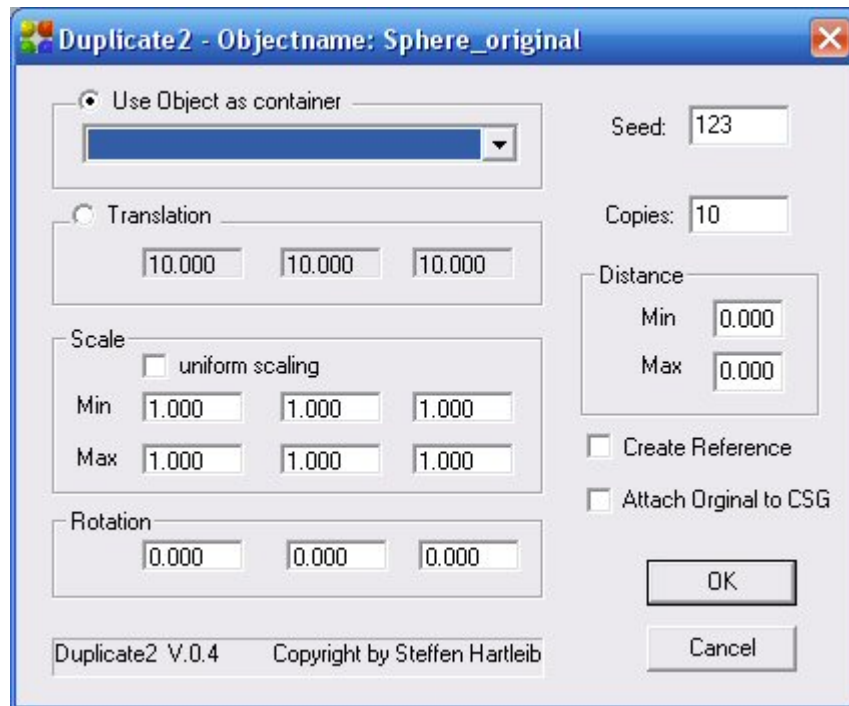
Important! Short description of the parameters and their use:
1. Use Object as container: Choose here the container in which you want to place the duplicate objects. Plane and Disk do not work! Height_field works as trace().
2. Translation: If no Container is chosen, fill in here the size of 3D-space in which you want your random objects placed. The space is positioned with the Original object as its center.
3. Scale: Random scaling along the three axes. If you choose Uniform Scaling, only in the Min boxes the values for the y- and z-scales are greyed out. This is a bug. Note: Strangely enough, the scaling applied to the original object will be applied *again* to the random copies, and *before* the scaling by the plugin!
4. Rotation: Random rotation around the three axes.
5. Seed: A random seed value.
6. Copies: Number of random copies. See also Distance.

7. Distance: There are two ways to make use of this box: (1) Minimum and maximum distance between the random objects. The plugin fills the container from lower left to upper right. If the number of copies is too low the whole space will not be filled. Either increase Copies or increase the Distance values. When distance is set to zero, the whole space will be used. This is similar to: (2) An interesting side effect is if you fill in here the limits of the Container. The random objects are then randomly spread within the whole space.
8. Create Reference: The random objects are references of the original one.
9. Attach Original to CSG: The original can be included into the created union of random objects.

Some combinations of the above will result in an error warning.

Placing copies on a height_field

You can use Duplicate2 to randomly place objects on a height_field. This function mimics the trace() function in POV_Ray. In order for the plugin to work, you need an *uncompressed* TGA file for the height_field. All other image files will generate an error message.
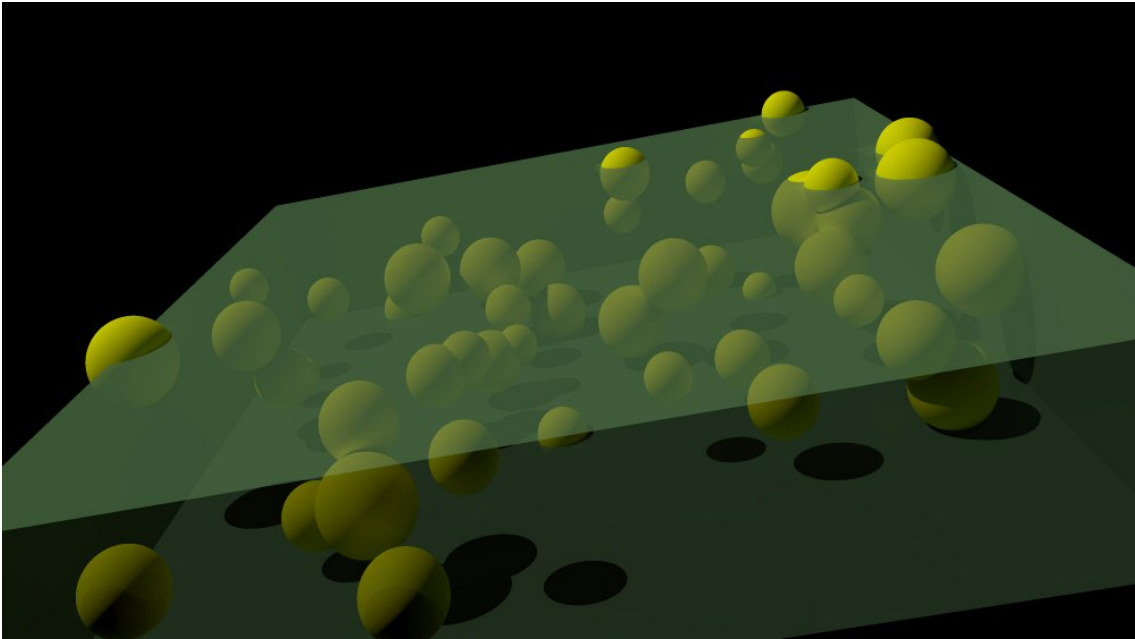
1. Choose the object to duplicate and open the plugin;
2. In the Duplicate2 window, choose the height_field as Container. Leave the Translation box alone;
3. Fill in the scale and rotation values where appropriate;
4. Change seed if appropriate;
5. Fill in the number of copies to be generated;
6. In the Distance box, fill in the minimum and maximum distance between the random copies (or the limits of the height_field);
7. Check 'Create Reference' and/or 'Attach Original to CSG' if appropriate;
8. Press OK.

This is an example image:
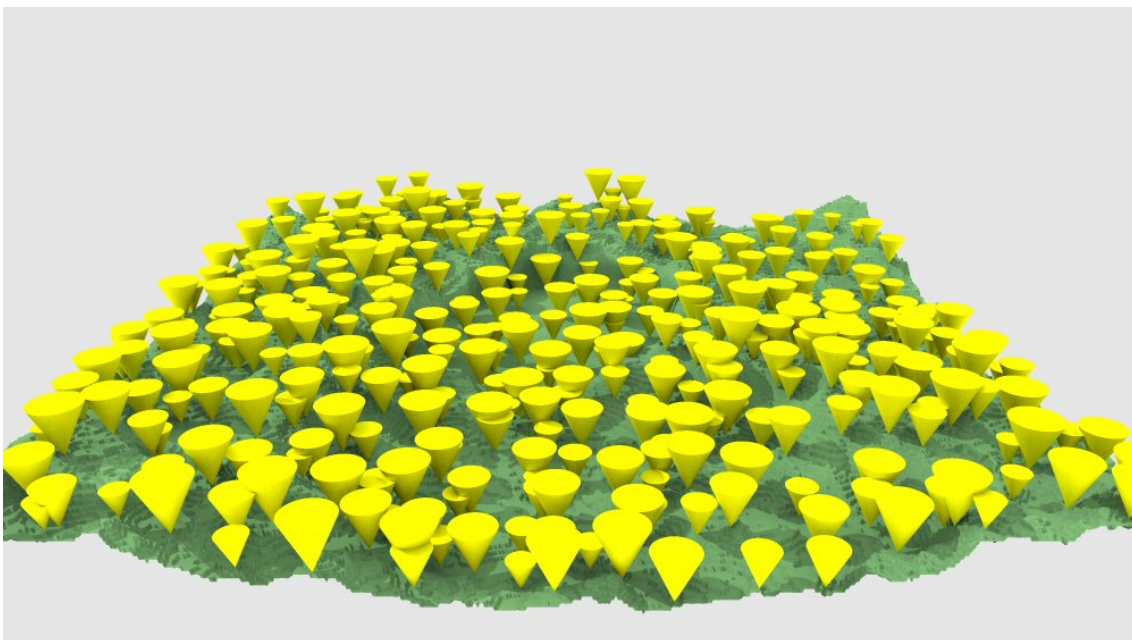
Placing copies *inside* a CSG object

With the same settings, you can also randomly place object inside a CSG. I have not tested all, but this is what you get with a box:

Placing copies *on* a plane or disk

Don't try a disk. It will not work and Moray will freeze.
If you want to place objects on a plane:
1. Choose the object to duplicate and open the plugin;
2. In the Duplicate2 window, leave the Container box alone;
3. Check the Translation box and set the z-value to 0;
4. Fill in the scale and rotation values where appropriate;
5. Change seed if appropriate;
6. Fill in the number of copies to be generated;
7. In the Distance box, fill in the minimum and maximum distance between the random copies;
8. Check 'Create Reference' and/or 'Attach Original to CSG' if needed;
9. Press OK.
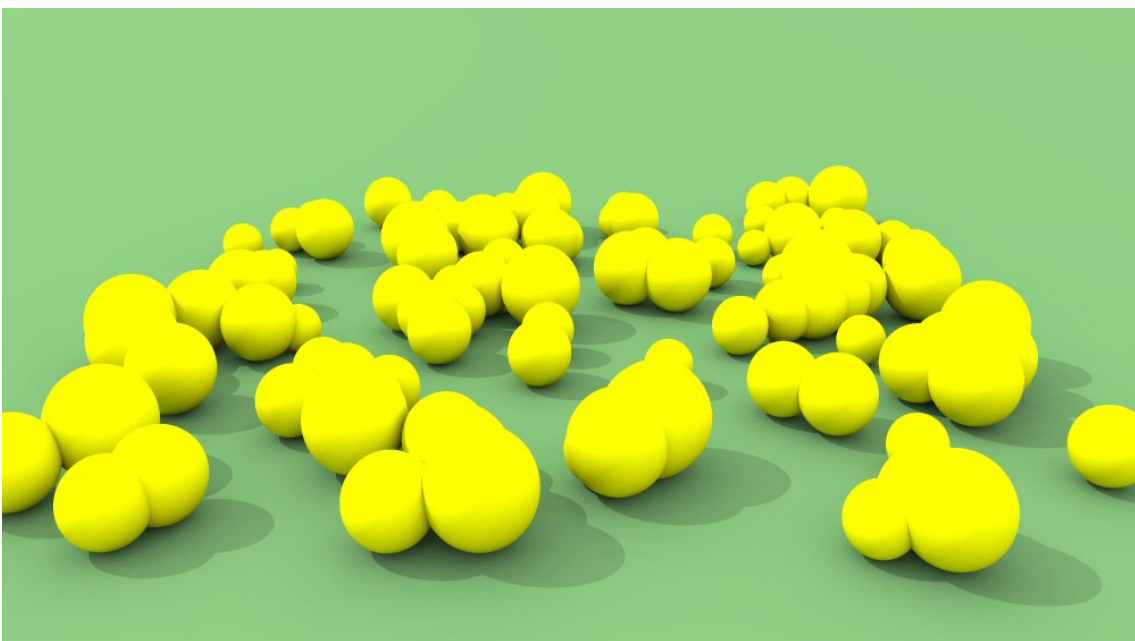
Placing copies inside a defined cubic space

When not using a container, it is possible to place the objects within a predefined space.
1. Choose the object to duplicate and open the plugin;
2. In the Duplicate2 window, check the Translation box and fill in the size of the 3D-space;
3. Fill in the scale and rotation values where appropriate;
4. Change seed if appropriate;
5. Fill in the number of copies to be generated;
6. In the Distance box, fill in the minimum and maximum distance between the random copies;
7. Check 'Create Reference' and/or 'Attach Original to CSG' if needed;
8. Press OK.
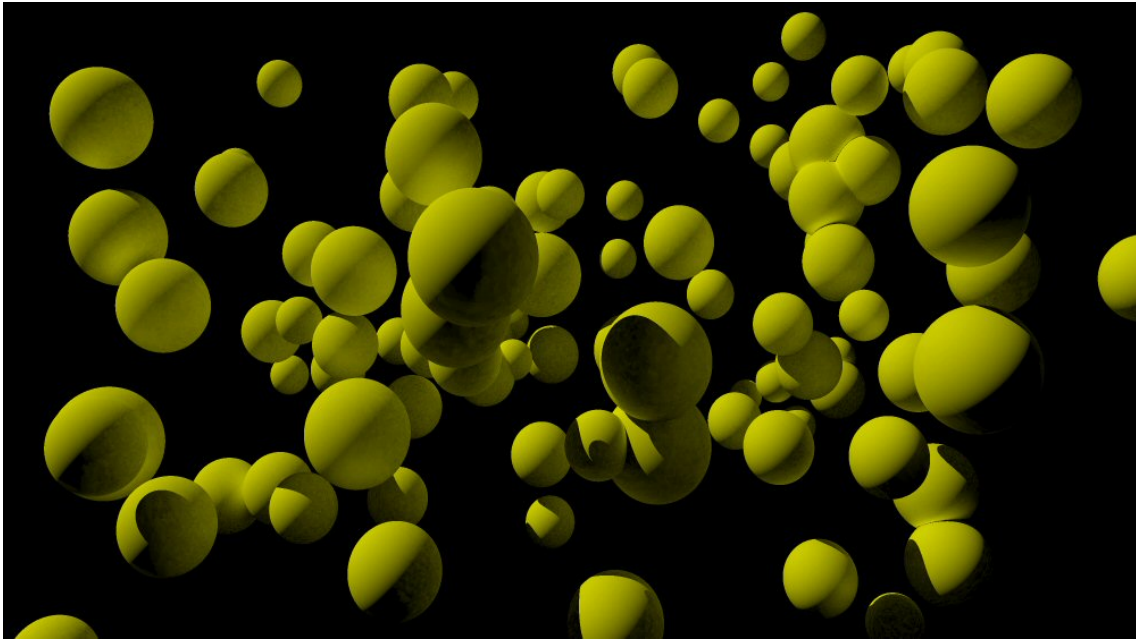
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