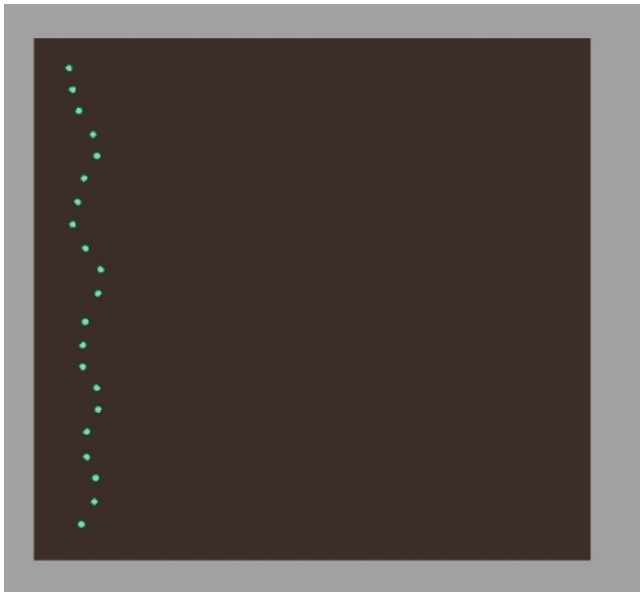
Per-Particle Expressions, Per-Particle Field Attributes, Noise and Rand

In this example, a per-particle field attribute is added to the particle shape and set using simple Creation Rules. The expressions that set the per-particle attributes also illustrate the difference between the rand and noise functions.

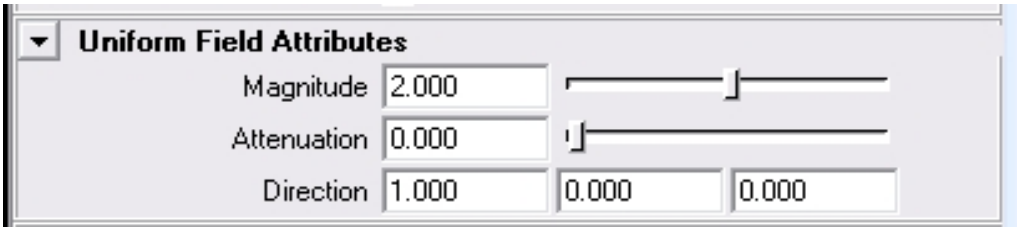
- Select the Dynamics Menu.
- Create a nurbs plane that is 100 units wide.
- Make the selected nurbs plane live.
- Now select the Particle Tool and using Sketch Particles with interval of 18, paint some particles on the plane as shown in Figure 1.

Figure 1.



- Set the Particle Render Type to Spheres with a radius of 0.5.
- Add the radiusPP per-particle attribute.
- With the particle object selected add a uniform field with these settings:

Figure 2.

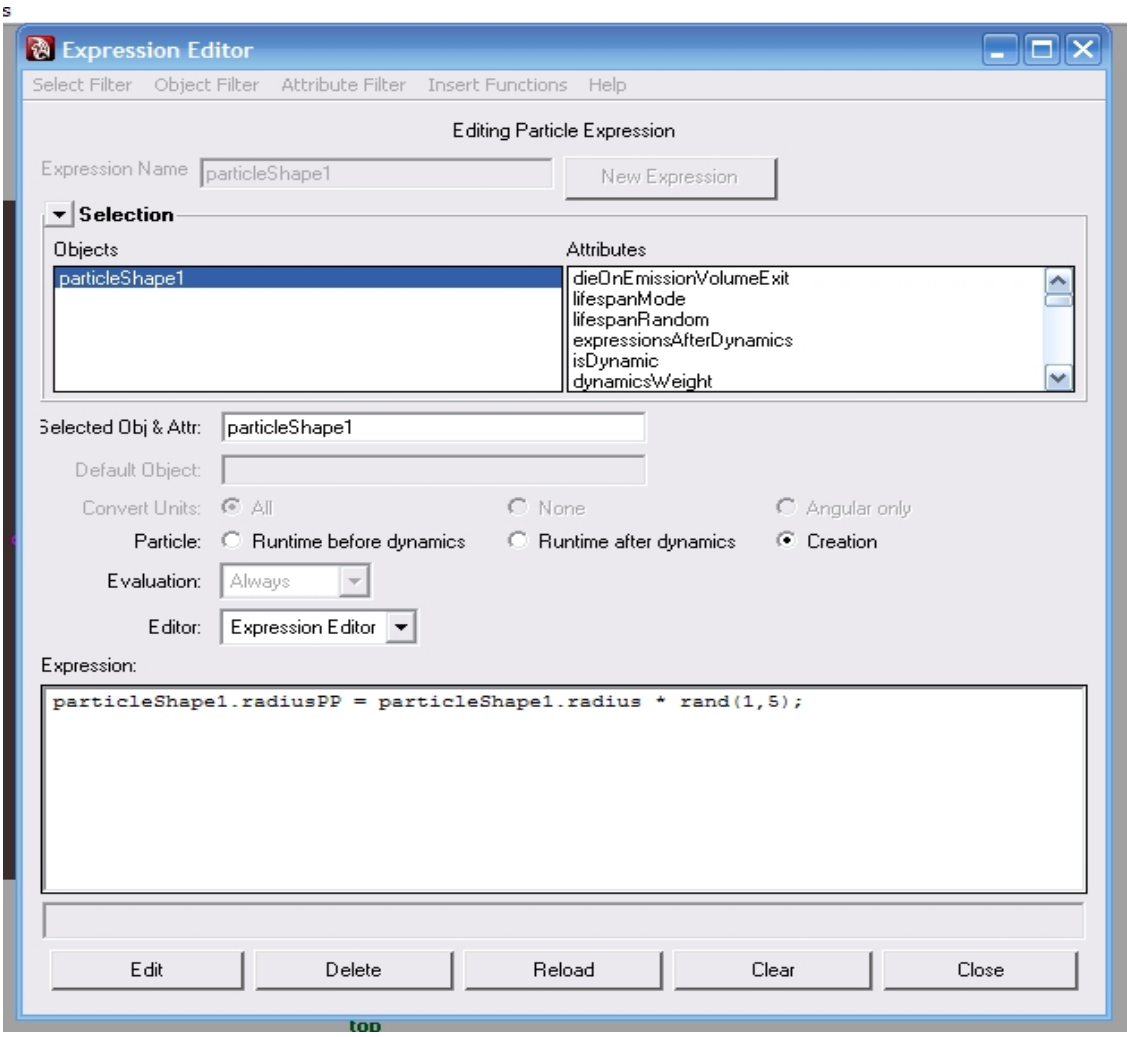


When the simulation plays, all the particles move across the plane at the same speed.

The objective is to vary the size of the particle spheres and then create a per-particle attribute for the uniform field magnitude that will cause the larger particle spheres to move faster across the plane.

From the particle shape attribute editor, right-click on the radiusPP entry and select Creation Expressions. This will open the Expression Editor. Enter the expression shown in Figure 3.

Figure 3.



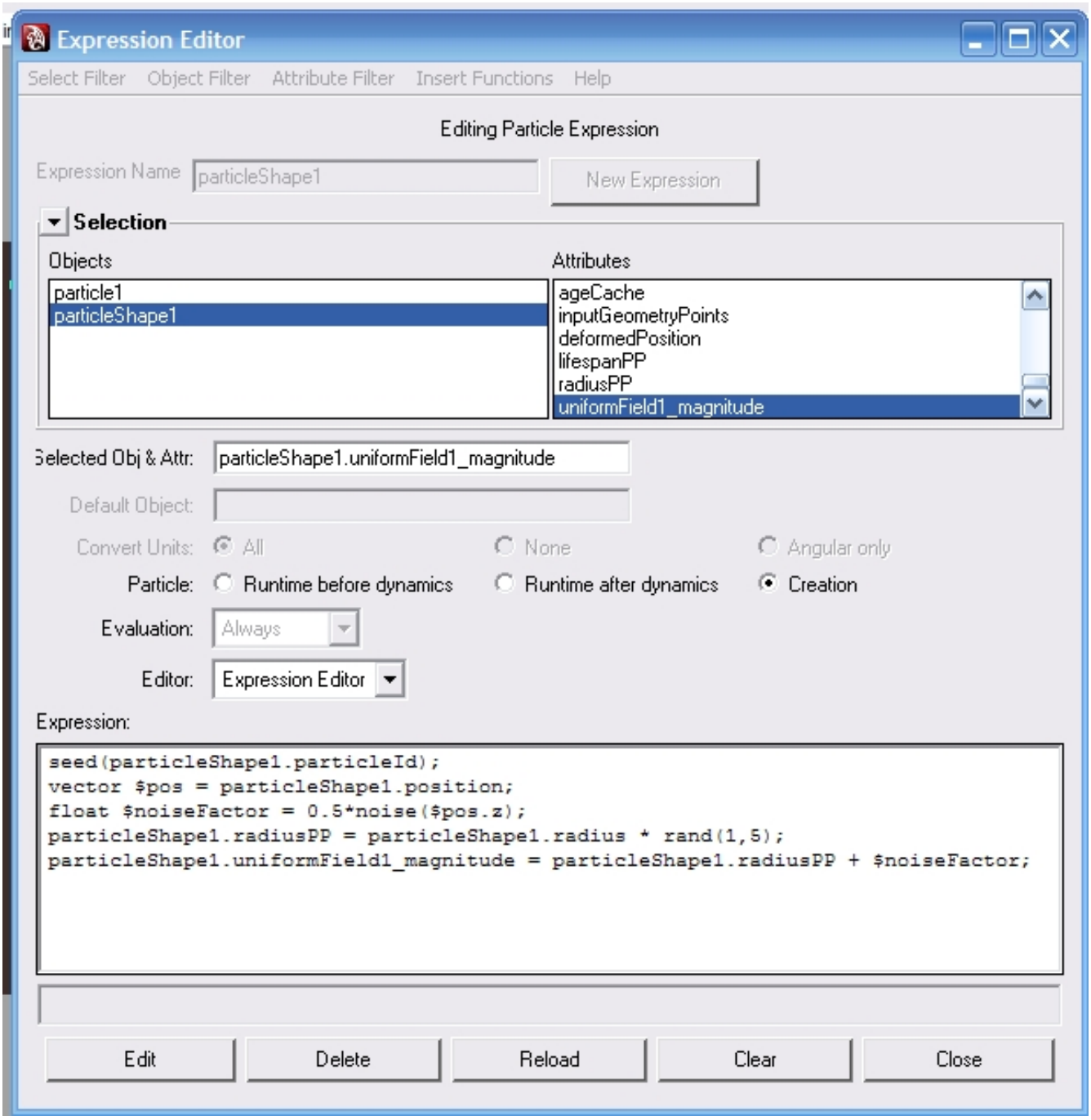
There is a problem. Each time the animation plays, the particle radiusPP changes. In order to have the rand function return the same values each time the scene is played, the seed function must be called first. Insert this expression before the assignment of radiusPP:

```
seed(particleShape1.particleId);
```

Now the sphere radius' do not change each time the animation is re-played.

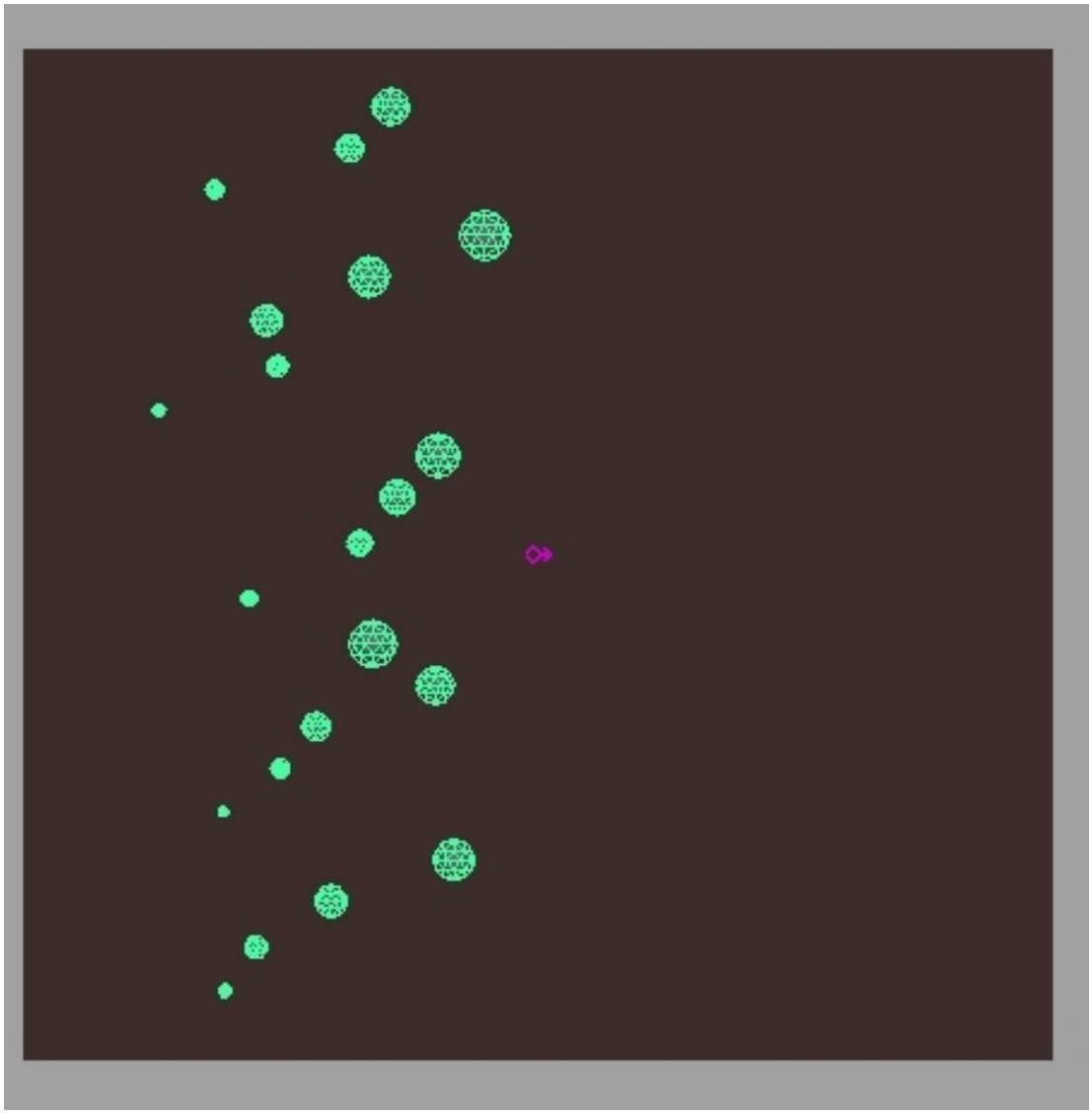
Add the per-particle attribute, uniformField1_magnitude and enter these expressions:

Figure 4.



To create interesting variation in the particle movement a noise factor is added to radiusPP for the assignment to uniformField1_magnitude. The noise is based on the z position which means the noise values of particles close in z will be similar to each other.

Figure 5.



Question: What is the difference in behavior between the rand and noise function ?

Question: Which field is affected by the particle's mass ?

Assignment: Either using the same field or another connected field, setup a different per-particle field attribute and demonstrate its behavior. Also provide at least one example of a visual effect where the per-particle field attribute improves the realism and/or appearance of the effect.