

VSFX 721 - Procedural Animation

Project 3

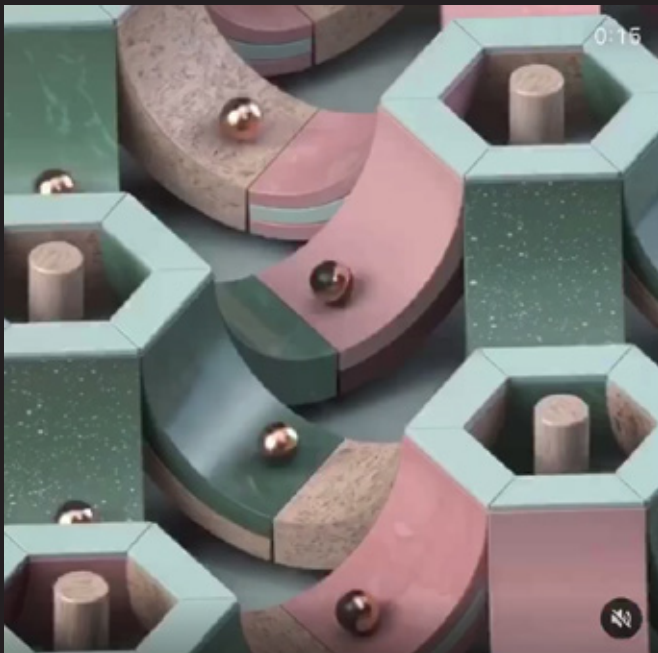
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Date: 05/30/2022

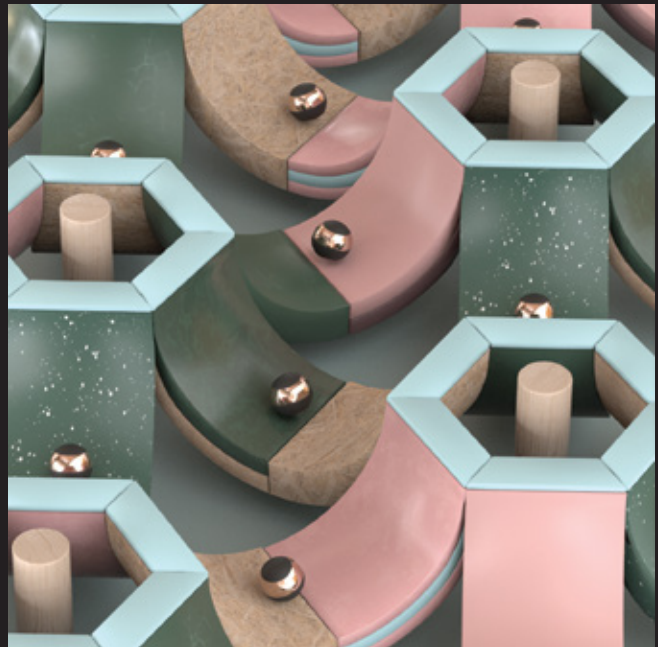
Houdini 19.0.498

This project is inspired by the 3d art made by Andreas Wannerstedt. It is part of the "Marble Madness" series posted in Instagram in 2017.

Reference



Render



Statics

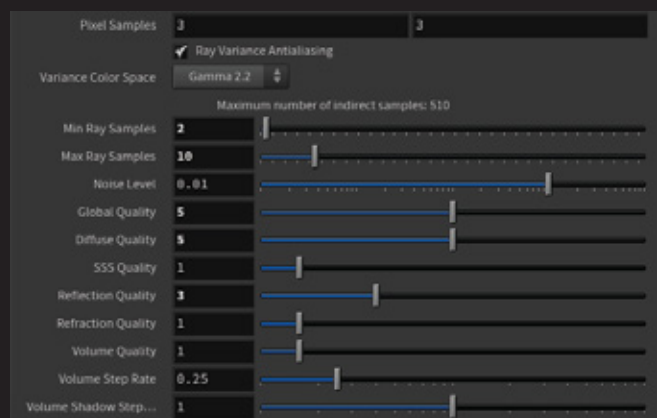
Average render time: 32 min / frame

Number of lights in scene: 1 Skydome with HDRI
1 Area Light

Complexity of geometry (approximate):

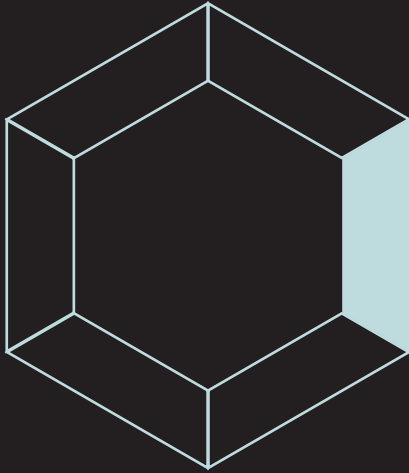
13.255 prims

13.464 points



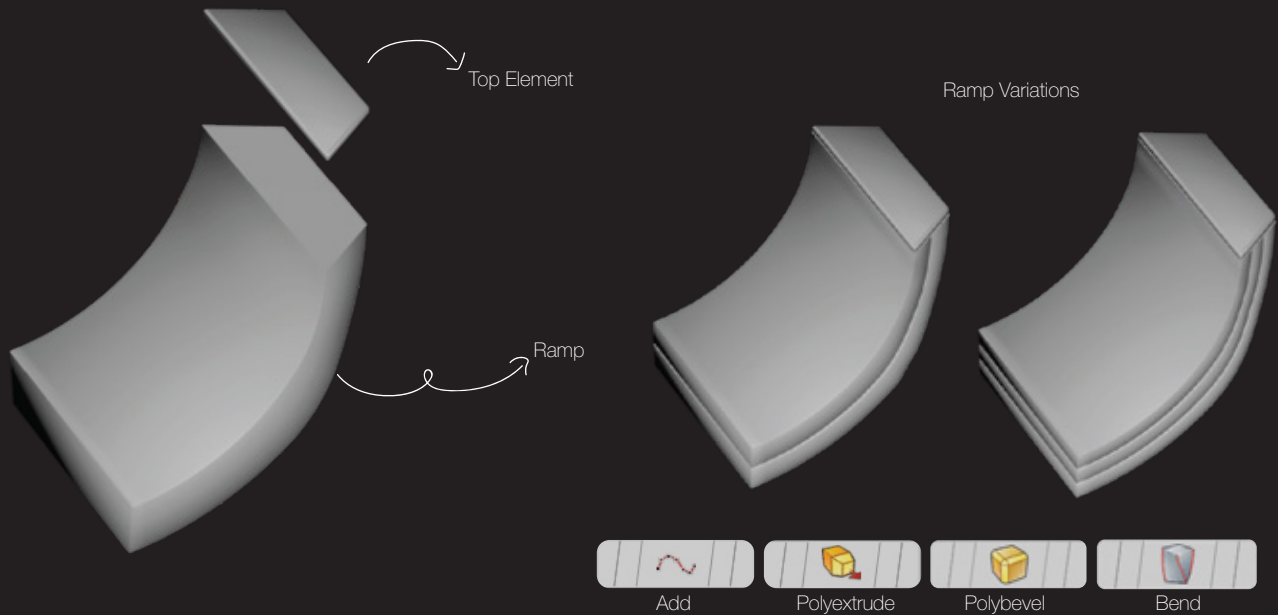
How I did it?

Modeling

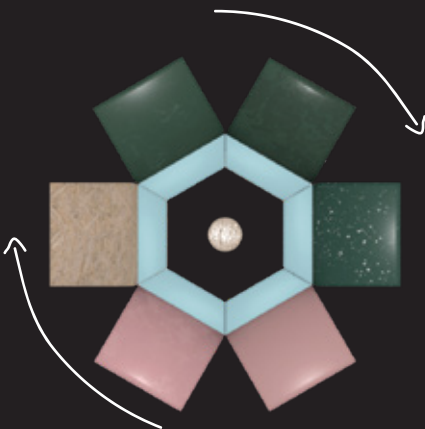


I started with the hexagon shape and divided it. Each of its sides although similar had details in the materials. So I had to create some of them individually and not use the copy node.

Each side is composed of the top cap and a box that deforms using the bend node.



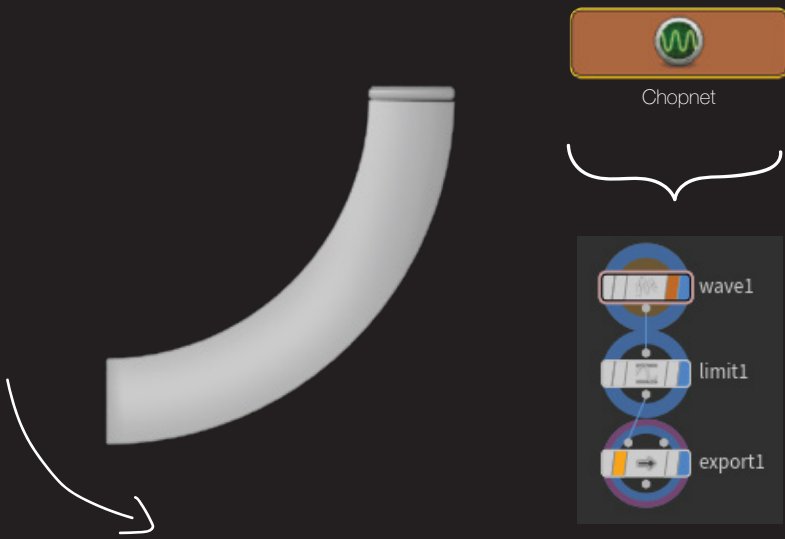
Animation



The first animation consists in rotate in the Y axis the whole hexagon 60 degrees each 12 frames, and then stop moving for other 12 frames.

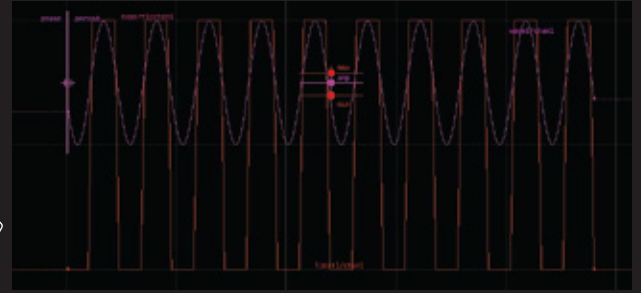
Rotation Y

```
{
  degree = 60;
  static = 12;
  rotate = 12;
  period = static + rotate;
  temp = $F - int($F/period) * period;
  if (temp < static)
    temp = 0;
  else temp = (temp-static)*period/(period-static);
  return temp * degree/period + degree * int($F/period);
}
```



The first animation consists in rotate each ramp in the Z axis:

- 10 frames static
- 2 frames rotating
- 10 frames static
- 2 frames returning to starting position



I used the chops example made by professor Deborah Fowler
<http://www.deborahfowler.com/HoudiniResources/HoudiniTipsAndTricksModel.html>

Simulation



Initial State	Bullet Data	Physical
Position	0	0 0 0
Rotation	0	0 0 0
Velocity	0	-20 0 0
Angular Velocity	3	3 3 3
<input type="checkbox"/> Inherit Velocity from Point Velocity		

Initial State	Bullet Data	Physical
<input checked="" type="checkbox"/> Compute Center of Mass		
<input checked="" type="checkbox"/> Inherit Pivot from Point Position		
Pivot	0	0 0 0
<input checked="" type="checkbox"/> Compute Mass		
Density	100	
Mass		
Rotational Stiffness	10	
Bounce	0	
Friction	0.24	

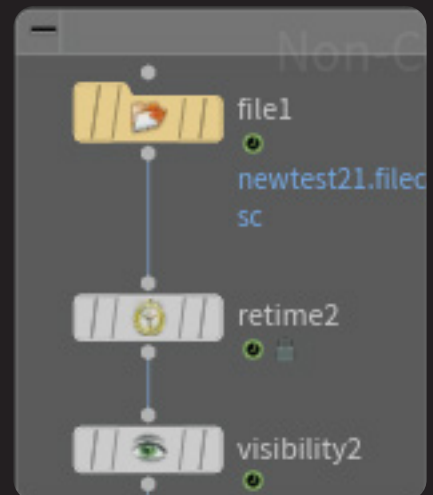
For the simulation I used RBD.

I played with different parameters such as angular velocity, velocity, density and friction to get the result I wanted it. My goal was to make the sphere looks like it is rolling.

I simulated the sphere rolling forward and backwards, that means two simulations.

At the end of the first simulation I placed the sphere of the second simulation in the exact position the first one had finished. To make it look as only one movement.

I cached both simulations and repeated it using the retime node and visibility node to place it in the frames I needed it and hide it in the rest of the frames.



Challenges

The first challenge I had to face was the rotation in the Z axis, After trying with diferent Sin and Cos expressions I wasnt getting the result I need it because the element wasnt returning to the starting position. It kept rotating in the same direction.

So with the help of professor Deborah Fowler I decided to use a Chop Network to recreate the Sin curve I needed it.

The Second challenge was in the simulations. Make it match was a task that took time and playing with all the parameters.

SOURCE

MARBLE MADNESS

3D Art

Artist: Andreas Wannerstedt

Year : 2017

Posted in Instagram

@Wannerstedt

