POINT CACHE WORKFLOW

N. Joseph Burnette

Student – Savannah College of Art and Design

Quote of Wisdom

If brute force doesn't work, you’re
not using enough
- unknown

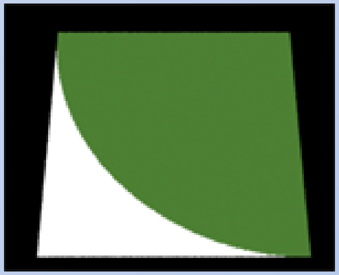
Tools

- ✓RenderMan
- ✓Text Editor
- ✓Python
- ✓Houdini

Assignment Objective

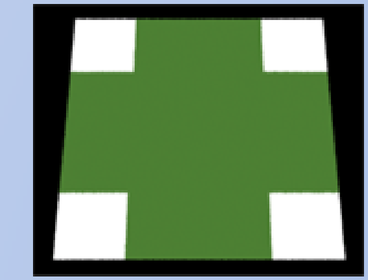
Draw on the ST Grid using certain rules. Like this:

```
if((s*s)+(t*t) < 1)
Surfcolor = color(0,1,0)
```



And this:

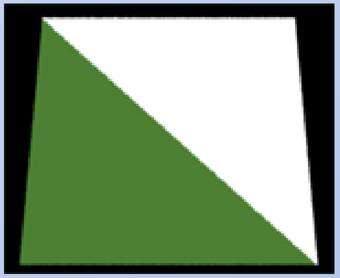
```
if(s >= 0.25 && s <= 0.75)
if(t >= 0.25 && t <= 0.75)
Surfcolor = color(0,1,0)
```



Assignment Objective

Oh.. .and this:

```
if(t + s > 1)
Surfcolor = color(0,1,0)
```



ok

New Assignment Objective

Draw a custom pattern on the ST Grid

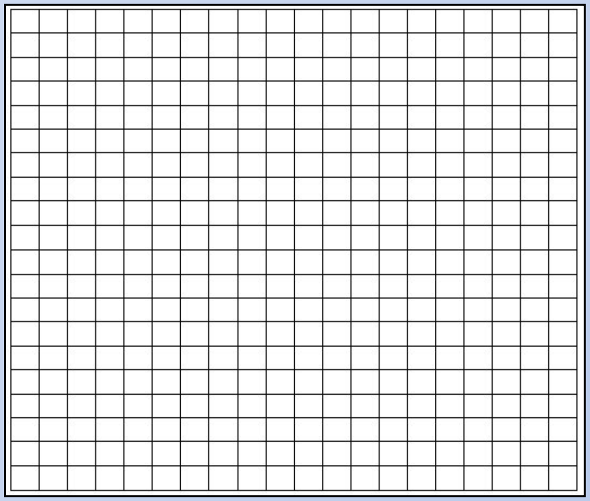
ok

New Assignment Objective

~~Draw a custom pattern on the ST Grid~~

Actually, why not try to Accurately represent ANY image on the ST Grid?
(Using the same simple rules)

How about dividing the ST Plane into a grid and coloring the individual squares?

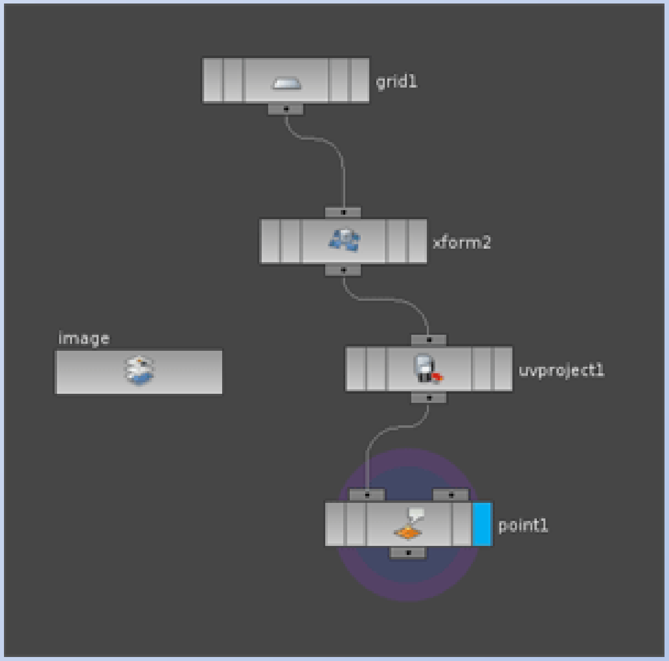


(I remember doing this when I was five…there’s no reason why it shouldn’t work now…)

The Workflow

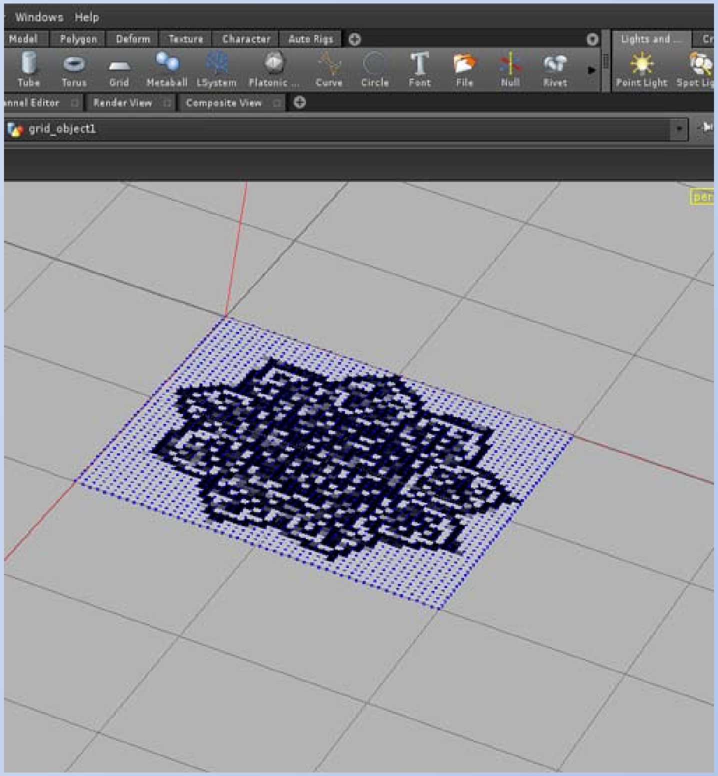
Celtic Pattern

The Workflow



Imported into a Houdini Network

The Workflow



= Celtic Pattern on Grid

The Workflow

Luckily, every possible Houdini point attribute can be extracted through the Houdini Object Model using python.

I’ll take point location (P) and point color (Cd)

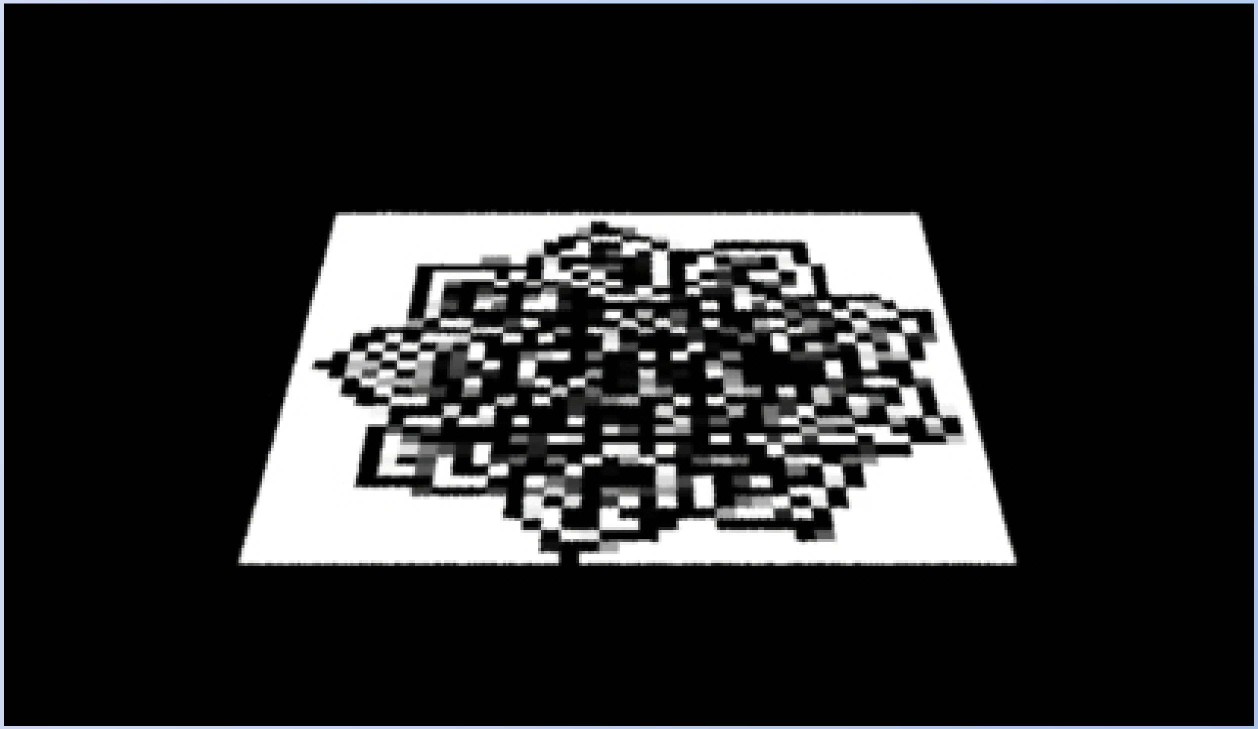
The Workflow

Python script extracts information and writes me a Shader…

```
f = open('C:\shadertest5.txt', 'w')
        ….
        ….
         for point in object.displayNode().geometry().points():
        ….
        ….
                f.write("if (s >= %.12f && t >= %.12f)\n" % (z,x))
                f.write( "    surfcolor = color(%.12f,%.12f,%.12f);\n" % (r,g,b))
                f.write( "\n")
        ….
        ….
f.close()
```

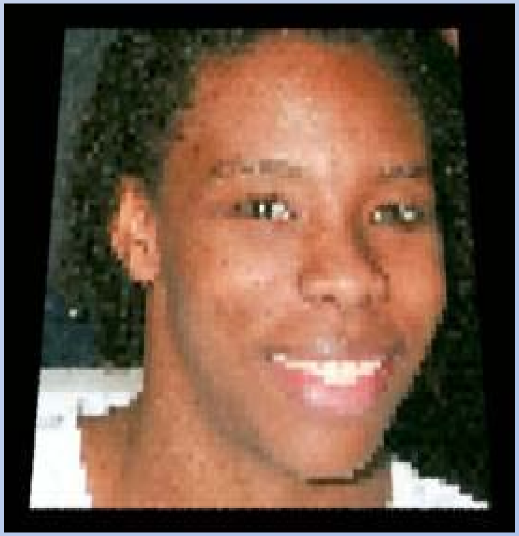
The Workflow

…which happens to be 14,709 lines of code but…whatever



Representing More Detail

=



Increasing detail is just a matter of increasing the grid resolution as well as your system RAM/Processor speed.

Representing More Detail

A few adjustments to my script and I can exclude colors to add transparency. This takes away at least 4000+ lines of code.

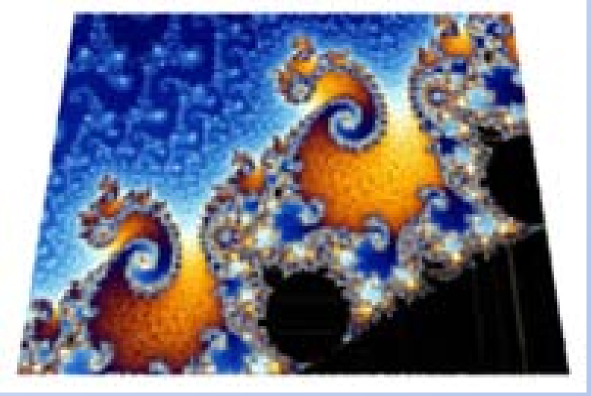
```
f.write("color surfcolor = 1;\n")
....
....
        if (r+b+g) != 3:
                f.write("if (s >= %.12f && t >= %.12f)\n" % (z,x))
                f.write( "      surfcolor = color(%.12f,%.12f,%.12f);\n" % (r,g,b))
                f.write( "\n")
```

Representing More Detail

Some rather complex fractals

Representing More Detail

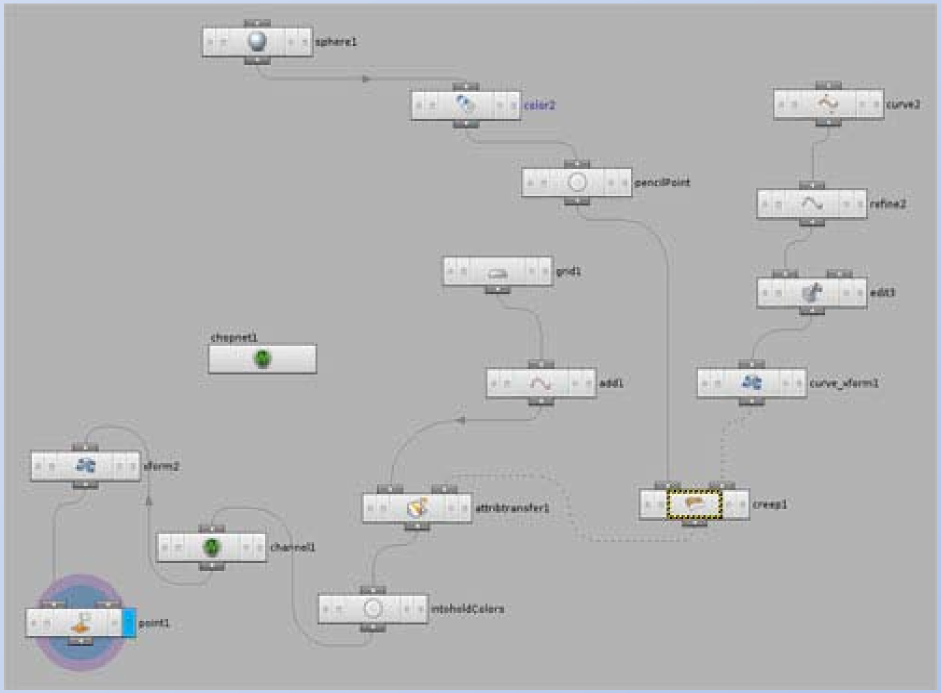
Some rather complex fractals



Representing More Detail

Some rather complex fractals

Driving Animation



A Curve in Houdini drives a moving point which simultaneously transfers it’s color attribute to a corresponding path on the grid.

Driving Animation

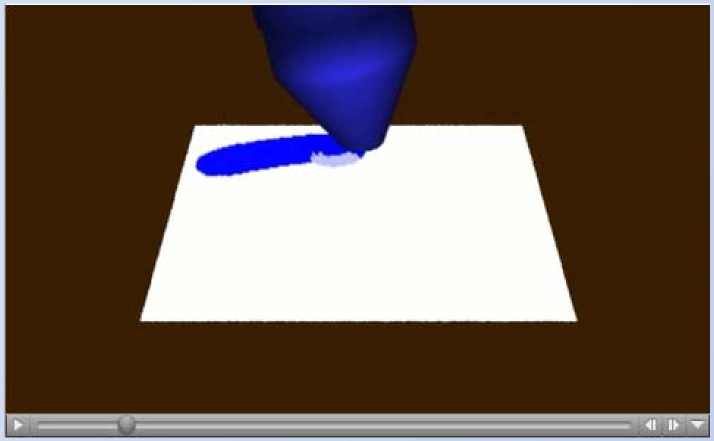
```
....
....
f.write("Format 427 240 1\n")
f.write("ShadingRate 1\n")
f.write("\n")

while currentFrame <= frames:
                    f.write("FrameBegin %.0f\n" % (currentFrame))
                    f.write('Display "SignatureAnimation%.0f.tiff" "tiff" "rgb"
"compression" ["lzw"]\n' % (CurrentFrame))
....
....
```

Second python script writes a rib file for entire animation

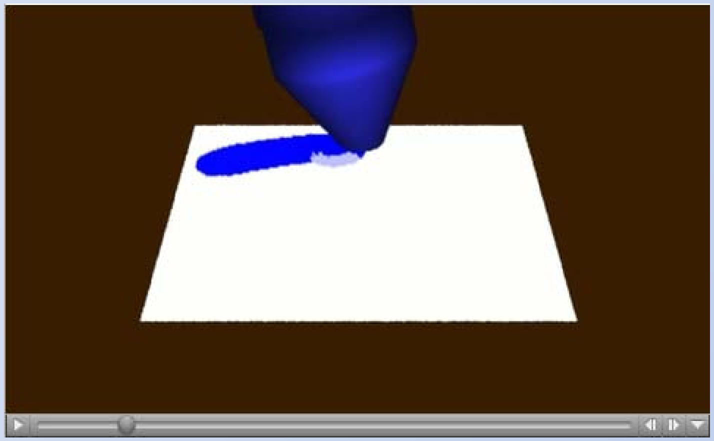
Driving Animation

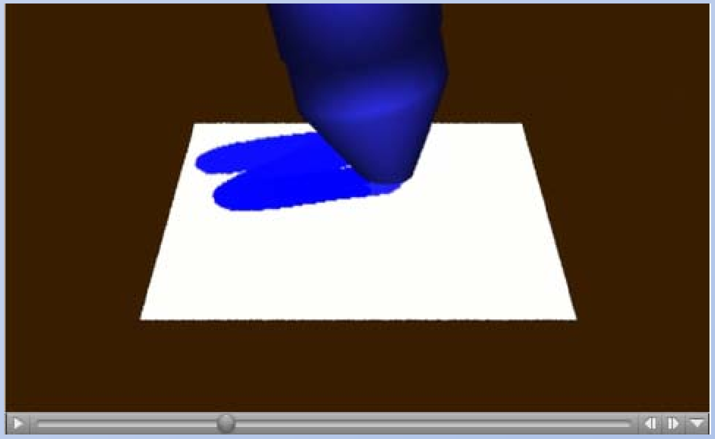
Rib results



Driving Animation

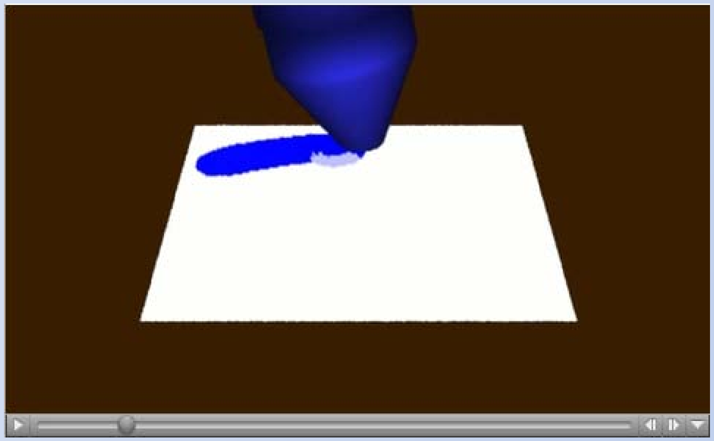
Rib results

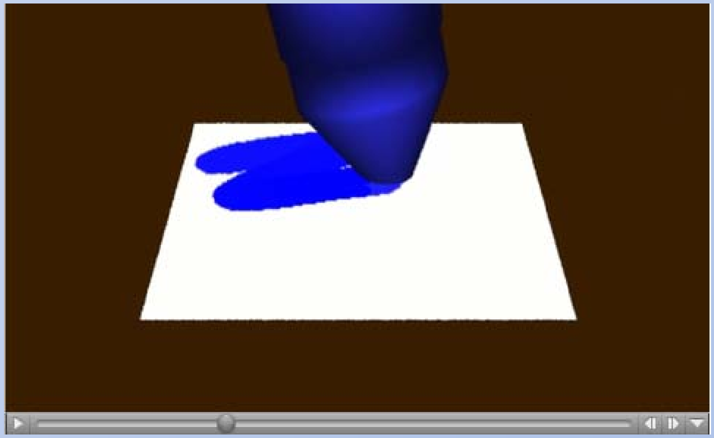


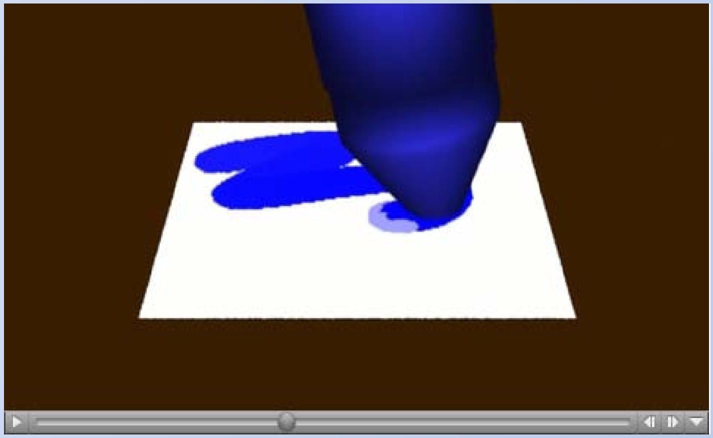


Driving Animation

Rib results

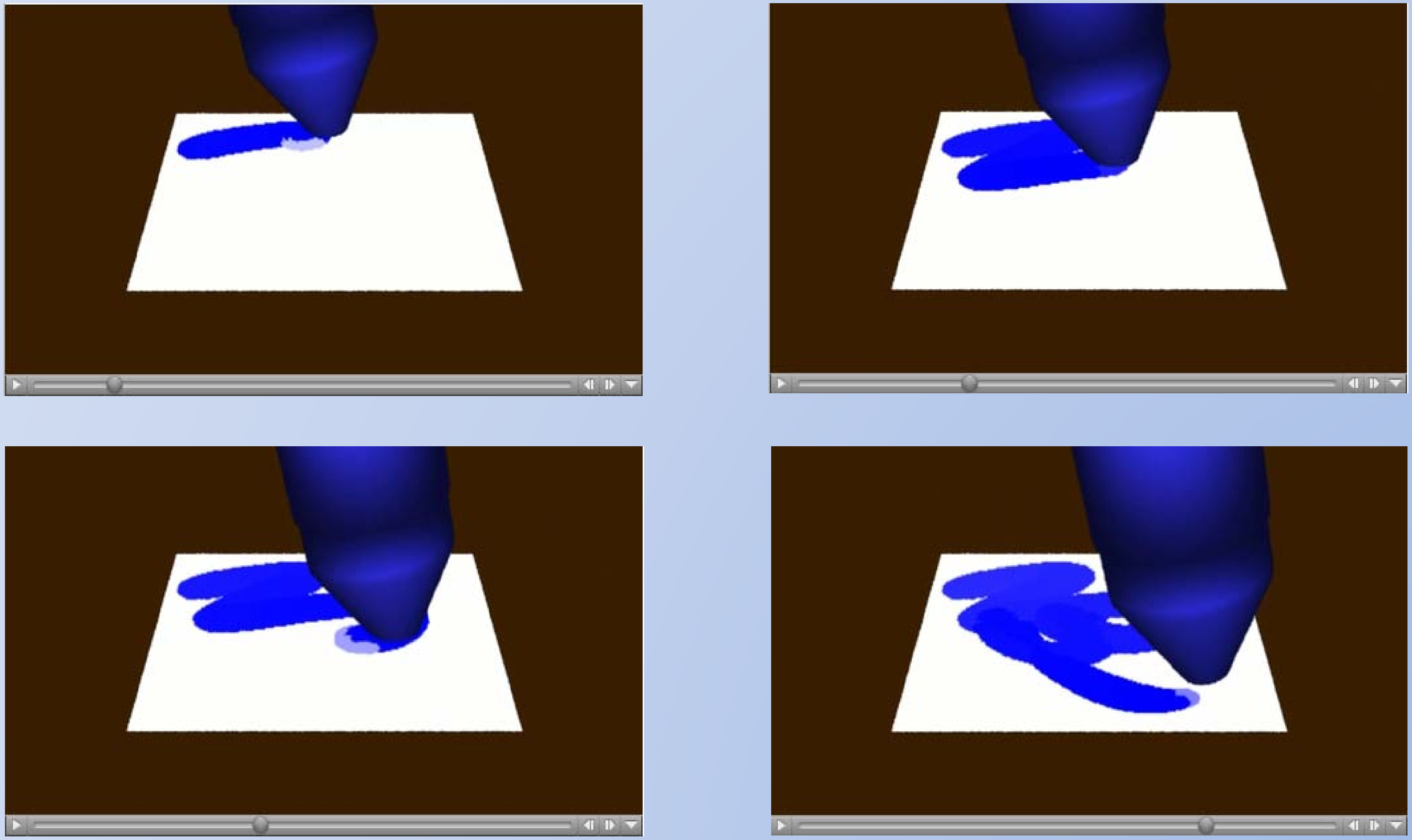






Driving Animation

Rib results



Animation Assets

✓Rib archive of crayon – driven by animated point location.

✓Unique Shader automatically written for each frame. Each Shader is approx. 18,267 lines of code.

✓3392-line rib file defines entire animation.

✓Craziness

Advantages

✓Any amount of points can be used along with their attributes to drive an image or animation.

✓Entire Scene, Animation and Shader is written procedurally by the Python Script.

Disadvantages

✓Painstakingly ridiculous method for applying a texture to a Shader.

✓One shader per frame of animation. Why anyone would do this is beyond me.

✓An 18,267 line shader is not the most efficient

✓Need to extract point coordinates externally

✓Outrageously brute force

Advantages = 2

Advantages = 2

Disadvantages = 5

Advantages = 2
Disadvantages = 5

…I still think it’s a cool trick

More Info

www.renderman.dreamerzstudio.net

St coloration & Pattern Animation

E-mail - jburne22@student.scad.edu