

Breakdown | Growing - Procedural Plant growth

Houdini Version: 19.5.605

The project aims to utilize Houdini's KineFX to create procedural growth effects for plants, coupled with the height field function to generate procedural landscapes and distribute vegetation.

1. Rig

The rig consists of the following nodes in sequence:

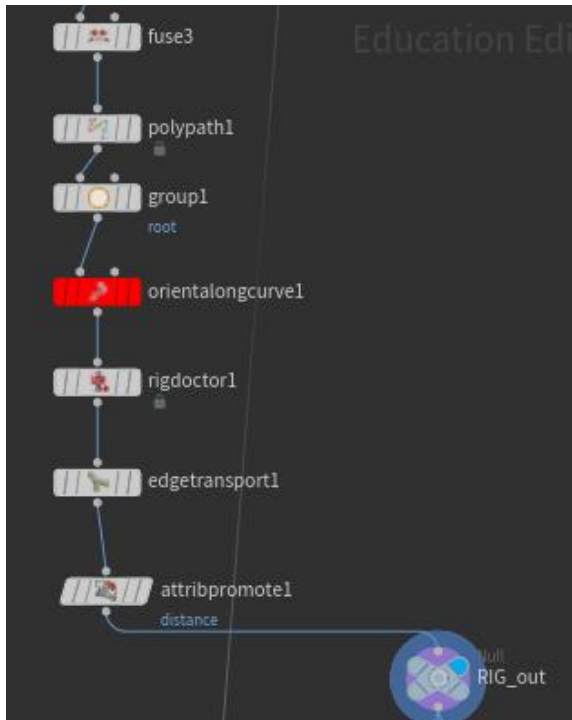
- normal1
- scatter1
- connectadjacentpieces1
- fuse1
- fuse2
- Attribute Wrangle (root_group)
- findshortestpath1
- fuse3
- polypath1

The VEX expression for the Attribute Wrangle node is:

```
1 int nearest = nearpoint(0,{0,0,0},1);  
2 if(@ptnum == nearest)@group_root=1;
```

The parameter panel for the 'findshortestpath1' node shows the following settings:

- Start Points: root
- End Points: !root
- Adjacency Array At...: neighbours
- Output Paths: From any start to each end
- Keep Original Geometry:
- Cost Attribute: cost



Orientation along Curve orientalongcurve1

Asset Name: orientalongcurve

Curve Group: [dropdown]

Frame:

Tangent Type: Next Edge

- Make Closed Curve Orientations Continuous
- Extrapolate End Tangents
- Transform Using Point Attributes

Target Up Vector: Y Axis

- Target Up Vector at Start (else Average)
- Use Target End Up Vector

Additional Rotations

Edge Transport edgetransport1

Asset Name: edgetransport

Method: Edge Network

Point Group: [dropdown]

Attribute: distance

Direction: Forward

Root Choice: Group

Root Group: root

Operation: Total

- Integrate a Constant Value
- Scale by Edge Length

Edge Split Method: Copy

Attribute Promote attribpromote1

Asset Name: attribpromote

Original Name: distance

Original Class: Point

New Class: Detail

Piece Attribute: none

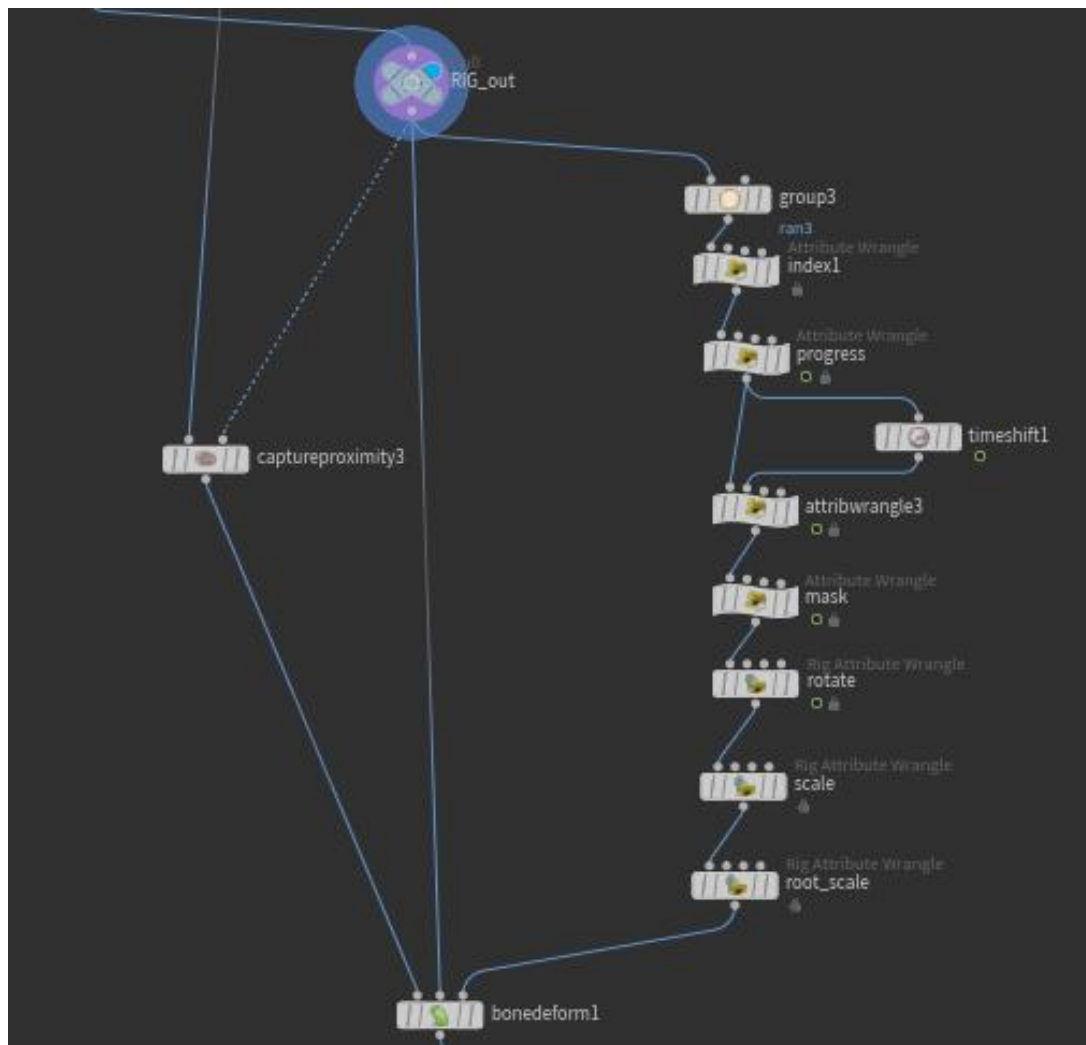
Promotion Method: Maximum

- Change New Name

New Name: maxDist

Delete Original

2.Growth Animation



```
VEXpression
1 f@progress=chf("progress");
```

```
VEXpression
1 float width=chf("width");
2
3 @mask=fit(@distance,0,detail(0,"maxDist"),width,1);
4 @mask=fit(@mask,@progress,@progress*width,0,1);
```

```
VEXpression
1 prerotate(4@localtransform,radians(chramp("mainAngle",(f@mask))),{1,0,0});
```

```
VEXpression
1 prescale(4@localtransform,(1-@scale));
```



The image shows a screenshot of a Houdini node's code editor. The interface has a dark theme. At the top, there are tabs for 'Code', 'Bindings', and 'Rig'. Below the tabs, there are three dropdown menus: 'Group' set to 'root', 'Group Type' set to 'Guess from Group', and 'Run Over' set to 'Points'. Below these is a 'VEXpression' section with a scrollable text area containing two lines of VEX code:

```
1 float startScale=fit(@Frame,0,60,0,1);  
2 scale(4@localtransform,startScale);
```

This node combination can be assembled onto any plant model to achieve growth effects, providing diversity through parameter adjustments.

Tutorial Reference:

<https://www.sidefx.com/houdini-hive/houdini-hive-paris-2023/#massive>

Flower Garden by Carl Krause