In-class Exercise 1 – Phyllotactic Pattern Demo

DATE DUE Completion: Class 4 (NO RESUBMITS)
DATE ASSIGNED: Class 2

CHECKLIST:
- hipnc
- jpg beauty
- mp4

Goals:

This assignment will focus on the student becoming familiar with Houdini and mastering the use of the copy methods (copy, copy to points, for-each), hscript (or vex) expressions and-. This will also be an exercise in following proper naming conventions for submission of exercises and projects. A render still and optional animation will acquaint the student with rendering in Houdini.

Requirements:

Using the phyllotactic pattern formula discussed in class, create a visualization of the importance of the angle to the pattern.
- Be able to adjust:
  - the angle
  - size of individual "florets"
  - total number of "florets"
  - the constant to spread the florets or "spacing" between them
- These adjustments should be accessible at the **top-level** node
- A rendered still (jpg) and animation (mp4)

These are the *minimum* requirements.

Considerations:

There is no resubmission for this Exercise. Do your best – this is the first formal assignment I will see from you. This is an exercise to get you prepared for Project 1.

Additional NOTES summarizing what was covered in class:

If you are having trouble remembering the formulas from class or did not have a chance to write them down, here is the summary:

See also the class notes for more tips or the Math for VSFX page on Phyllotaxis
- http://deborahrfowler.com/MathForVSFX/Phyllotaxis.html

Given Vogel's formula for the spiral phyllotactic schematic, where

$$r = c \ sqrt(\ n\ ) \quad \text{and} \quad \theta = n * 137.508$$

Since for any given floret, we know r (distance from center to floret) and the angle, we can solve for x and y (which is what we need to plug into the position node – specifically the translate x and y parameter fields.)

The position of x,y for any given **"floret"** is **x = r cos θ** and **y = r sin θ**

Doing the substitution in the x coordinate we get:

x =   r   cos   Θ

⇓   ⇓

x = (c * sqrt(n)) cos (n * 137.508)

But we also know that the value of n is the copy number which we can access using $CY we get:
x = c * sqrt($CY) * cos ($CY * angle)

Where c is a value that controls how "spread out" the florets are.

If you find it easier, you may start off with the values of c and angle (137.508) just with numbers. Then, add the parameter interface as you go along.

ie.   2 * sqrt($CY) * cos($CY * 137.508) is the expression which you would input into the x parameter of the translate value of your copy node.
and eventually ch("../myParmName") * sqrt($CY) * cos($CY * ch("../angleName")) when you have the proper interface set up. Parameters are assumed to be in the top-level node.

Do the analogous steps for y substituting sin for cos.

Reminder: turn translate cumulative off if using copy with stamp (deprecated – encourage you to use for-each)

Submission guidelines:

S25_V721_E1_LastnameFirstname_Title/

This directory should *contain* the following:
- **S25_V721_E1_LastnameFirstname_Title.hipnc**
- **S25_V721_E1_LastnameFirstname_Title.jpg (or png NO tifs!)**, still image
  Note you always **render to exr**, you can use mplay, photoshop, irfanview etc. to convert to other file formats
- **S25_V721_E1_LastnameFirstname_Title.mp4** [not optional – required] a rendered animation, a compressed *h264 mp4* movie (any file > 1GB will not be accepted)

On windows Handbrake is available for compressing files and uses H264x codec.

Important note: Adherence to these naming and format conventions is required. The naming conventions above will be used for exercises and projects (not for "Dailies"). No spaces please! If you do not have your work properly labeled your professionalism grade **as well as** your exercise grade will be affected.

Grading:

Proper use of proceduralism and learning Houdini's node-based approach is the emphasis. Be creative, have fun!

What am I looking for?
- have you created a tool that can easily produce the pattern?
- does it have top level parameters, specifically the four listed in the requirements?
- do you have default values that allow the user to revert to the pattern easily? do things disappear?
- are you practicing good Houdini hipnc habits?

Pushing your exercise further:
- have you created an animation?
- creativity and aesthetics count toward moving your grade to an A

This is a warm-up exercise to prepare you for your project. Grading will be /10 and the rubric is listed above. Meeting the minimum requirements 8/10, handing it in properly as well 8.5/10, being creative (some ideas to experiment with: orientation of the objects, different objects, switching ideas, adding interesting color use, animation all count) would be 9-10.