Exercise 1 – Phyllotactic Pattern Demo

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

Goals:

This assignment will focus on the student becoming familiar with Houdini and mastering the use of the copy node, hscript expressions and user defined parameters. For copy stamping see later assignments. 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.

0) Be able to adjust the angle
1) Be able to adjust size of individual "florets"
2) Be able to adjust total number of "florets"
3) Be able to adjust the constant to spread the florets or "space" them on the disc
4) These adjustments should be accessible at the **top level** node

These are the **minimum** requirements.

Considerations:

You have worked on this exercise in class and will be allowing another student to try your result. Please use this as an opportunity for feedback for improvement. This is an exercise also in receiving and giving constructive criticism. It is also an exercise in going through the submission process of handing in exercises and projects. (Previous examples exist on my website under Student Examples.)

There is no resubmission for this Exercise. Do your best – this is the first assignment I will see from you.

Submissions guidelines (READ THIS):

The project will be submitted to your dropbox in a **folder (also called a directory)** named:

W18_V721_E1_LastnameFirstname_Phyllo/

This directory should *contain* the following:

- **W18_V721_E1_LastnameFirstname_Phyllo.hipnc**
- **W18_V721_E1_LastnameFirstname_Phyllo.pdf**, a brief description of information you would like to communicate. This document is to provide a user's guide noting any extra features you have added. In future, the pdf document will provide a breakdown with your target audience being your Houdini peers.
- **W18_V721_E1_LastnameFirstname_Phyllo.jpg (or exr, png NO tifs!)**, still image
  Note you always **render to exr**, you can use mplay to convert to other file formats
- **W18_V721_E1_LastnameFirstname_Phyllo.mov** [optional but *highly* encouraged] a rendered animation, a compressed *mov or mp4* movie (any file > 1GB will not be accepted)

Important note: Adherence to these naming and format conventions constitutes 5% of your exercise grade. The naming conventions above will be used for all exercises and projects. 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. A grading rubric is posted on the class website with very specific criteria, in general the grading of this exercise is

structured as follows. Meeting the minimum specifications, 80%. To move your grade above 80% go beyond the specifications, demonstrate exploration and understanding. Extensions/Enhancements to consider would be to add a vertical component, variety of "florets", interesting render, and so on. Keep in mind an easy to use, simple interface properly executed is better than one that is too complicated. Be creative, have fun!

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:

**TIP:** use copy parameter and paste relative reference

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

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

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 $x = r \cos \theta$ and $y = r \sin \theta$

Doing the substitution in the x coordinate we get:

$$x = \quad r \quad \cos \quad \Theta$$
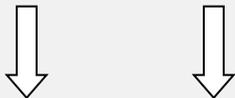
$$x = (c \ * \ sqrt(\ n \ )) \cos (\ n * 137.508 \ )$$

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

See the class notes for more tips