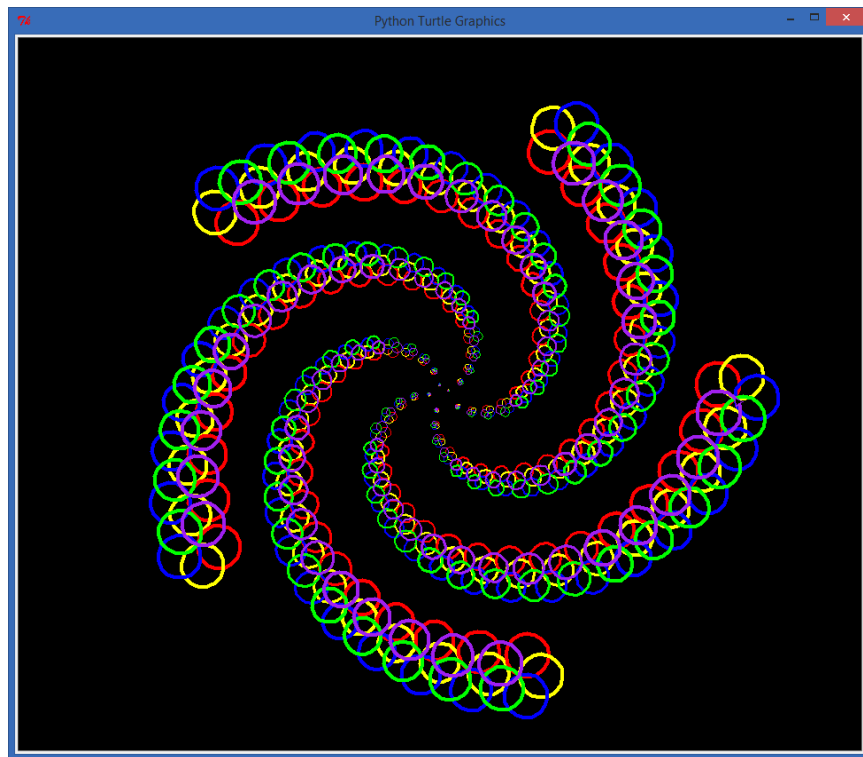# Section 4 Programming Challenge Problems

#1: Spiral Rosettes

Think about how you might modify the *ViralSpiral.py* program to replace the small spirals with rosettes like those in *Rosette6.py* and *RosetteGoneWild.py*. Hint: first replace the inner loop with an inner loop that will draw a rosette. Then, add the code to change the colors and sizes of the circles in each rosette. As an added touch, change the width of the pen slightly as your circles get bigger. When you finish, save the new program as *SpiralRosettes.py*. See the figure below for the drawing produced by one solution to this challenge.

A spiral of rosettes from one solution to Programming Challenge #1

#2: A Spiral of Family Spirals

Wouldn't it be cool to draw a spiral of spirals of our family's names? Take a look at the *SpiralFamily.py* program, and then refer back to the code for *ViralSpiral.py*.

Create an inner loop inside the `for` loop in *SpiralFamily.py* that draws the smaller spiral. Then, modify your outer loop to remember the position and heading of the turtle before drawing each small spiral and set it back before continuing to the next big spiral location. When you get it right, save the new program as *ViralFamilySpiral.py*.