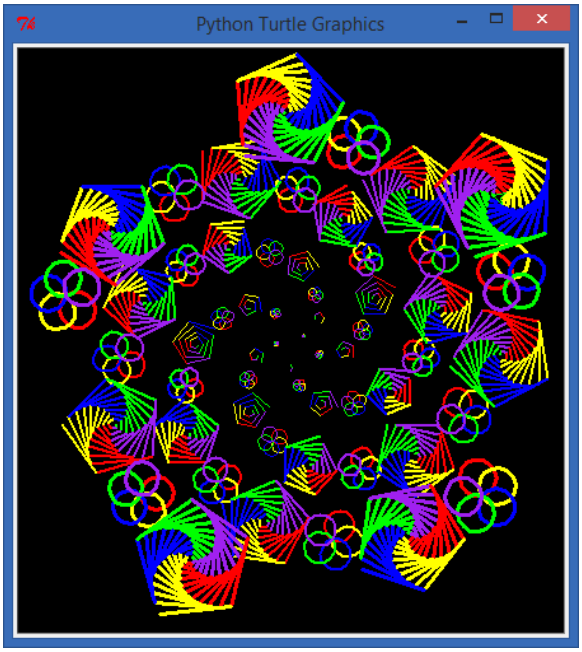
Section 5 Programming Challenge Problems

#1: Colorful Rosettes and Spirals

For a more visual challenge, look at the colorful spiral and rosette image in the figure below. You should be able to modify *RosettesAndPolygons.py* from Section 5 to make it more colorful and, if you like, to replace the polygons with small spirals to match the illustration below.



A spiral of rosettes and smaller spirals, courtesy of an `if` *statement*

#2: User-Defined Keys

For a more text-based challenge, create an advanced version of our *EncoderDecoder.py* program by allowing the user to input their own key value, from 1 to 25, to determine how many letters to shift the message by. Then, in *EncoderDecoder.py*, instead of shifting by 13 every time, shift by the user's key value.

To decode a message sent with a different key (let's use 5 as a key value, so *A* becomes *F*, *B* becomes *G*, and so on), the person receiving the message needs to know

the key. They retrieve the message by encoding again with the reverse key (26 minus the key value, 26 - 5 = 21) so that *F* wraps around to *A*, *G* becomes *B*, and so on.

If you'd like to make this program easier to use, start by asking the user whether they'd like to encode or decode (`e` or `d`), and then ask them for a key value that you store as `key` (the number of letters to shift by). If the user chooses encode, add the key value to each letter, but if they choose decode, add `26 - key` to each letter. Send this program to a friend, and message away!

For sample answers to these programming challenges, go to http://www.TeachYourKidsToCode.com