Fractal Geometry: Koch Curve

In this project you have explored implementing a recursive curve-drawing algorithm that generates the famous Koch-Curve and by extension Koch-Polygons (aka Koch Snowflake for triangle). Additionally, we have discussed the ideas of fractal dimension, deriving what is known as the "similarity" dimension of this self-similar fractal object.

You are to put all of the stated ideas together into one user-friendly, well-documented and easy-to-understand python application that is fun to use and in part explains the underlying ideas. I cannot emphasize enough that what I am looking for from each one of you on this project is a thorough understanding of the basic concepts, along with a well-written and documented program, combined with a high level of individual creativity through things like the use of color, overlapping curves, uses of the setFill and setOutline properties of graphics object, etc. Your goals should include creating a program that is effectively a work of art and one that possesses unique features that make it stand out from every other project.

The basic, or minimum requirements for the program include:

- ❖ The basic inputs:
  - ➢ Theta - the Koch generating angle
  - ➢ Level - the desired level
  - ➢ Choice of curve or polygon
  - ➢ clear/redraw
- ❖ The basic outputs:
  - ➢ The image itself
  - ➢ The length of the curve as a function of level and theta (this length should be expressed in meaningful units, and should be based upon the actual length of the level 0 image on the screen)
  - ➢ The similarity dimension of the curve as a function of theta
- ❖ Correct submission of project
  - ➢ Create a folder called YourLastName_KochProject (for example, Karl's would be called Hajjar_KochProject)
  - ➢ Place a copy of every necessary file that your program uses in that folder. MAKE SURE everything necessary is there! I will run it from this folder and if it does not run, it does not run!
  - ➢ Compress that folder - should create an archive called "YourName_KochProject.zip"

- ➢ In an email to me with subject line “Koch Project”, attach the zip file above.

You should strive to make your user interface as beautiful and easy-to-use as possible. For level inputs above a relatively small value, the curve will be drawn at the individual pixel resolution, so it is not of any value to go beyond that level, whatever it may be, in terms of drawing the image. But you will still want to compute the lengths for the higher levels, so it may be a good idea to accept those higher levels, but only draw the curve at some predetermined max level, while still computing the length for the input (higher) level.
You should also strive to use color, and your program should be able to handle the case where the user inputs values that are not valid (i.e. if someone enters a negative level, your program should deal with that effectively, in a way that does not cause the program to crash). In other words, make your program unbreakable!

Finally, you should ask yourself “What makes my program unique?” What makes your program stand out from everyone else’s? I will definitely ask that question when I look it over.

And your program should be easy for me to use, with clear user instructions that are part of the program itself.

This program is due by this Friday May 4 at 3pm.