**Assignment Overview**

This is yet another assignment that allows you to draw pretty figures. You must use recursion (a function calls itself) in this assignment.

Background

A curve that bends and curls at every level of magnification is a fractal curve. A fractal is a natural phenomenon or a mathematical set that exhibits a repeating pattern that displays at every scale. It is also known as expanding symmetry or evolving symmetry. A fractal curve never "flattens out'' and in some sense has infinite complexity. They are atheistically pleasing and have been used to model many natural phenomena. There are tons of such fractal images on the Web.
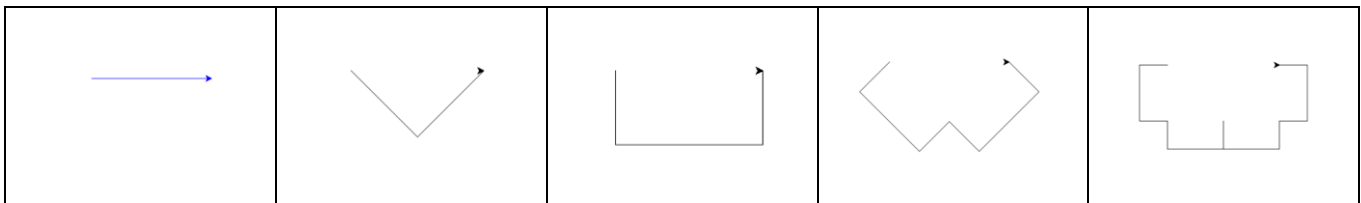
Assignment specification:

We are going to draw three different fractal curves: Dragon Curve, Levy C Curve, and Koch Snow Flake. The first 10 levels of a Dragon Curve are shown below:
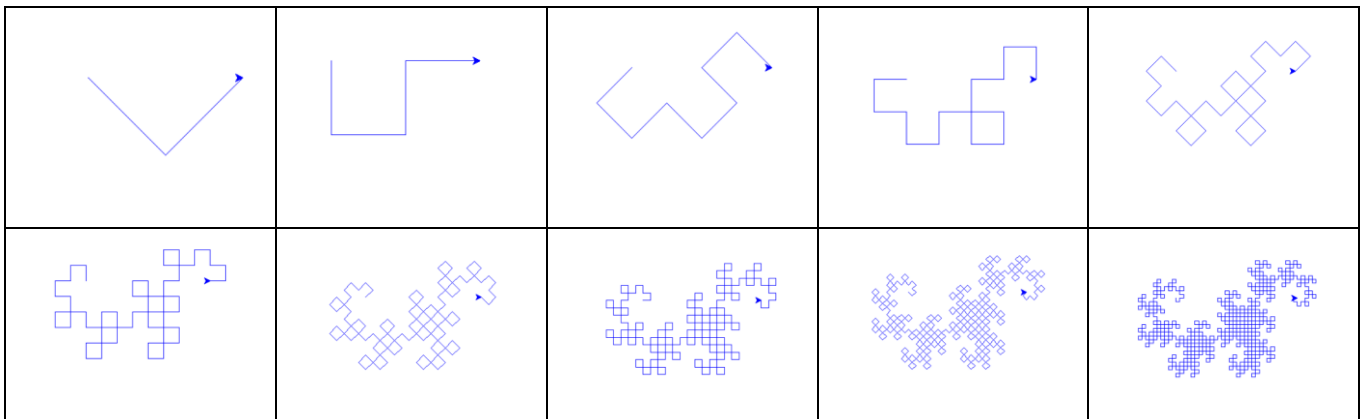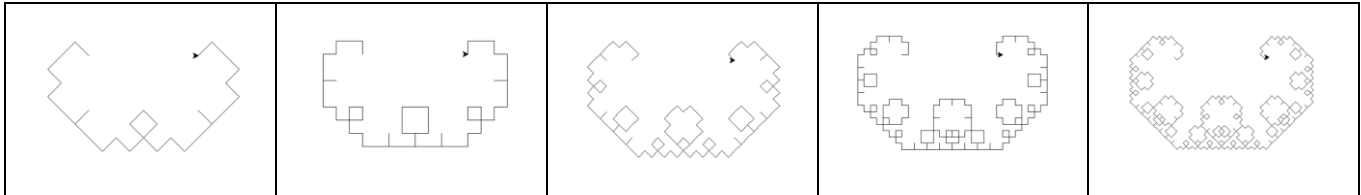

The first five levels of a Koch Snow Flake are shown below:
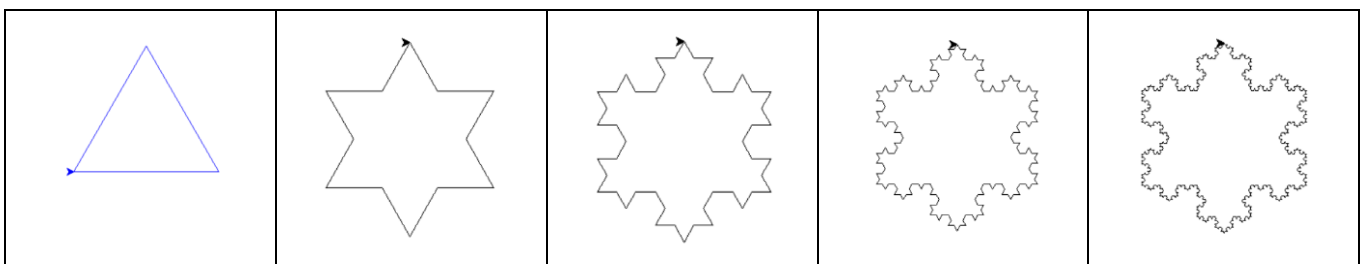
The first 10 levels of a Levy C Curve are shown below:

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These fractal curves have very simple rewriting rules. For Dragon Curve, starting from a base segment, replace each segment by 2 segments with a right angle and with a rotation of 45° alternatively to the right and to the left (https://en.wikipedia.org/wiki/Dragon_curve)
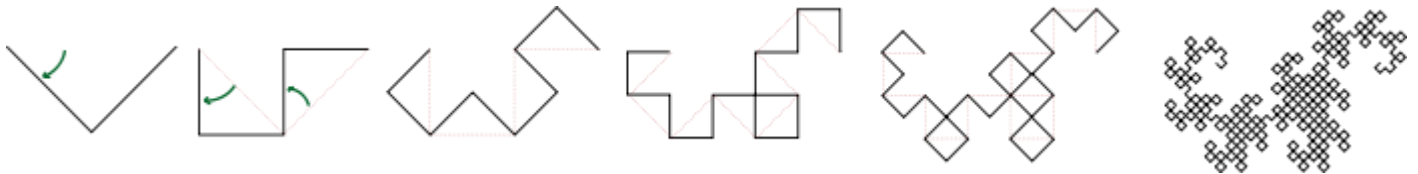
The Koch snowflake can be constructed by starting with an equilateral triangle, then recursively altering each line segment as follows (https://en.wikipedia.org/wiki/Koch_snowflake):

1. Divide the line segment into three segments of equal length.
2. Draw an equilateral triangle that has the middle segment from step 1 as its base and points outward.
3. Remove the line segment that is the base of the triangle from step 2.

The Levy C curve starts with a straight line. An isosceles triangle with angles of 45°, 90° and 45° is built using this line as its hypotenuse. The original line is then replaced by the other two sides of this triangle.

At the second stage, the two new lines each form the base for another right-angled isosceles triangle, and are replaced by the other two sides of their respective triangle. So, after two stages, the curve takes the appearance of three sides of a rectangle with the same length as the original line, but only half as wide.

At each subsequent stage, each straight line segment in the curve is replaced by the other two sides of a right-angled isosceles triangle built on it (https://en.wikipedia.org/wiki/L%C3%A9vy_C_curve).

Assignment Deliverables

The deliverable for this assignment is the following file:

      recursion.py – the source code for your Python program

Be sure to use the specified file name and submit it for grading via the **turnin** system before the project deadline.

Assignment Notes:

- Given the starting configuration and the number of recursion levels, you should draw the curve at a level, pause and wait for a mouse click, and after the mouse click, erase the canvas and draw the curve at the next level.

- Dragon Curve and Levy C Curve have the same parameters: number of levels, and X and Y coordinates of the initial curve (specified as two lists). Koch Snow Flake has number of levels and one more parameter which is the edge length (in pixels) of the initial equilateral triangle.