Assignment 8

1. String Modification
   Write a piece of code that will perform the replacement: $f \mapsto string$ n times, where $n$ is an arbitrary integer.

2. Self-Similar 2D Curves
   (a) Graph the Koch curve for $n = 4$.
   (b) Graph the Square Dragon for $n = 4$.
   (c) Generate two interesting, self-similar 2D curves without looking up a formula somewhere.
   (d) Graph the curve given by $f \mapsto flfrf$ with an angle of $\pi/3$.
   (e) What makes this last example different? Does it make sense?
   (f) Modify your method to handle an example with two, different angles.
   (g) Generate an example using the above code.

3. More Self-Similar, 2D Objects
   (a) First tree
      i. Using the tree growth code provided, graph a tree with angle $\pi/2$, and scale=1/2 growing for 4 generations.
      ii. How tall is the tree at the end of every generation?
      iii. If the tree grows forever, what height will it approach?
      iv. If the tree grows forever, what width will it approach?
   (b) Second Tree
      i. Using the tree growth code provided, graph a tree with angle $\pi/6$, and scale=1/3 growing for 4 generations.
      ii. How tall is the tree at the end of every generation?
      iii. If the tree grows forever, what height will it approach?
      iv. Can you find the width of this tree?
   (c) Choose one of the following two modifications.
      i. Change the tree growth and drawing code to use only one line for every “stick.” Currently the trunk consists of a segment of length 1 plus a segment of length 1/2 et cetera.
      ii. Change the tree growth and drawing code to use curved branches instead of straight. You can use any shape you desire.