Recursive Images and
Lab 9: Ethics

Following images are from: http://www.bfoit.org/itp/Recursion.html and
http://en.wikipedia.org/wiki/L-system

A recursive image

- Squiral: a square spiral
- Unique in that each recursive call actually makes the "problem" bigger than before
- Base case is the largest line size desired
- Or could start from the outside if the space taken up is figured out beforehand
  - Base case is then smallest line size
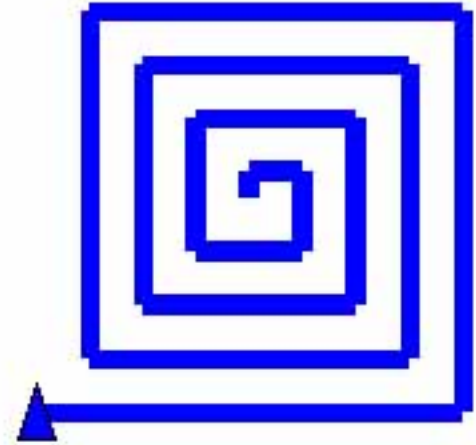
In the Finch

F = Move forward by some scaled amount

+ = Turn left by some set amount

X -> ∅ ← Base case: do nothing

X -> F+X

META squiral 1 side 1.0

(F):   SMOVE side 10 2000 20 20

(+):   MOVE side 11 1000 -5 5 ← Note: you will need to calibrate turn to achieve 90 degree rotation

(X):   META side 12 side 0.7

Another Koch Curve

General idea: draw a line, but the middle third is 3 sides of a square

- Base case: draw a straight line
- Recursive case: set up similar to String parser from class
  +, -: turn to the left/right by 90 degrees
- F: move forward (base case)
- X -> F
  X -> X+X-X-X+X
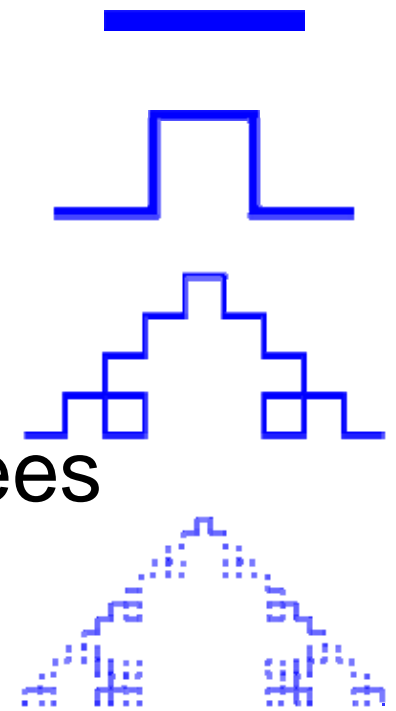
Modified for Project 5

Modified recursive program:

- X -> ∅
- X -> X+X-F-X+X

```
         META koch 1 side 1.0
(X):     META side 10 side 0.7
(+):     MOVE side 11 1000 -5 5
(X):     META side 12 side 0.7
(-):     MOVE side 13 1000 5 -5
(F):     MOVE side 14 2000 10 10
(-):     MOVE side 15 1000 5 -5
(X):     META side 16 side 0.7
(+):     MOVE side 17 1000 -5 5
(X):     META side 18 side 0.7
```

Another Option: Define Left/Right "Methods"

- X -> $\varnothing$
- X -> X+X-F-X+X

```
META koch 1 side 1.0
MOVE right 1 1000 5 -5
MOVE left 1 1000 -5 5
```

```
(X):      META side 10 side 0.7
(+):      META side 11 left 1.0
(X):      META side 12 side 0.7
(-):      META side 13 right 1.0
(F):      MOVE side 14 2000 10 10
(-):      META side 15 right 1.0
(X):      META side 16 side 0.7
(+):      META side 17 left 1.0
(X):      META side 18 side 0.7
```