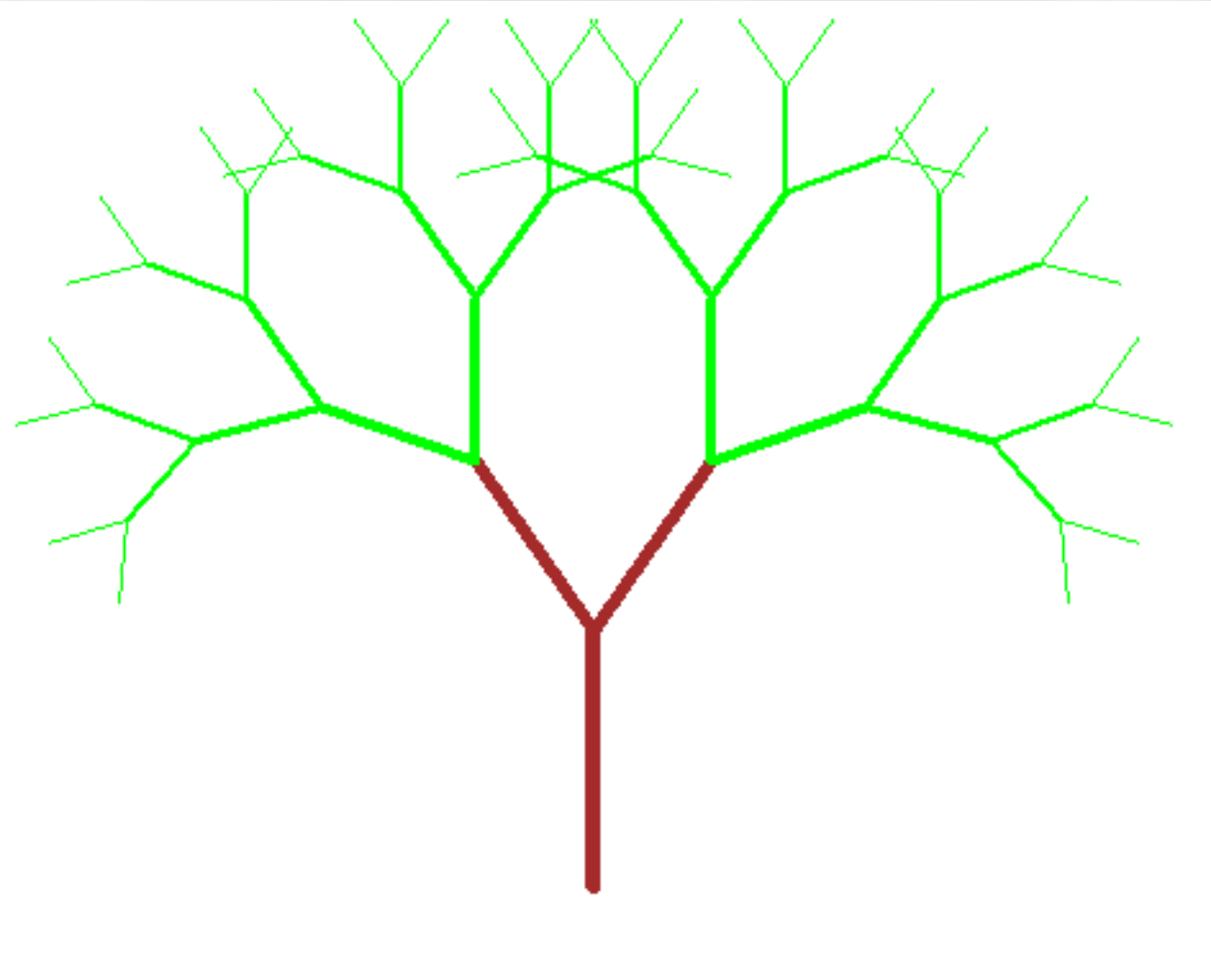
CIS 122

Random Text Generation

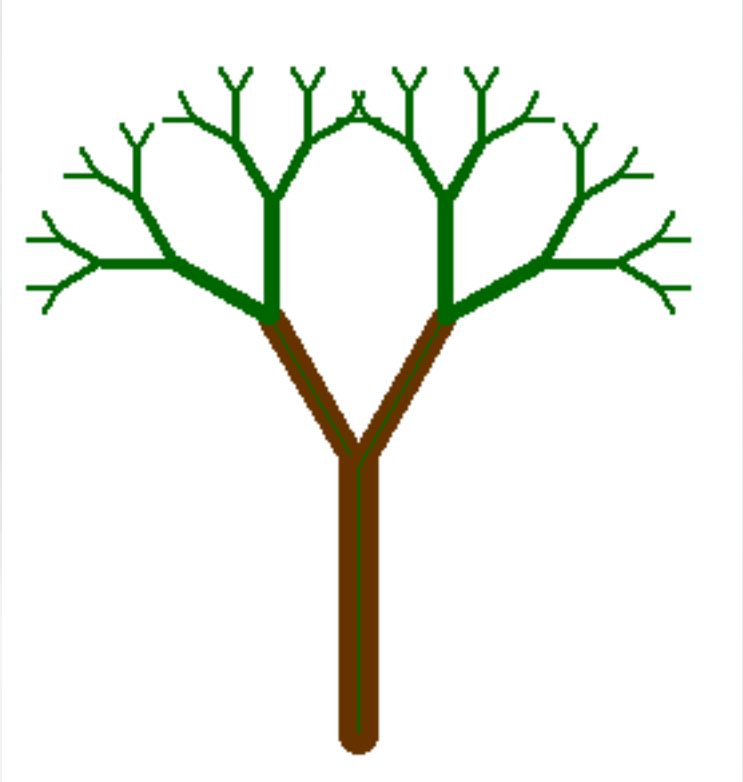
Assignment 4

- General trouble with this assignment
  - Only 8 submissions so far
- Class has been a little rushed
  - And I wasn't around over the weekend to help
- Homework 4 extension
  - Take a few extra days
  - Feel free to meet with me
- No new assignment this week
  - In-class project instead

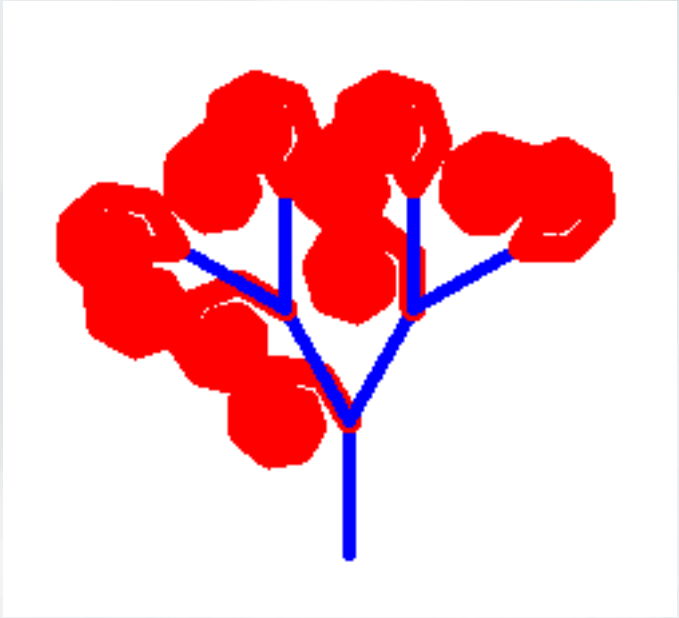
Fractal Art



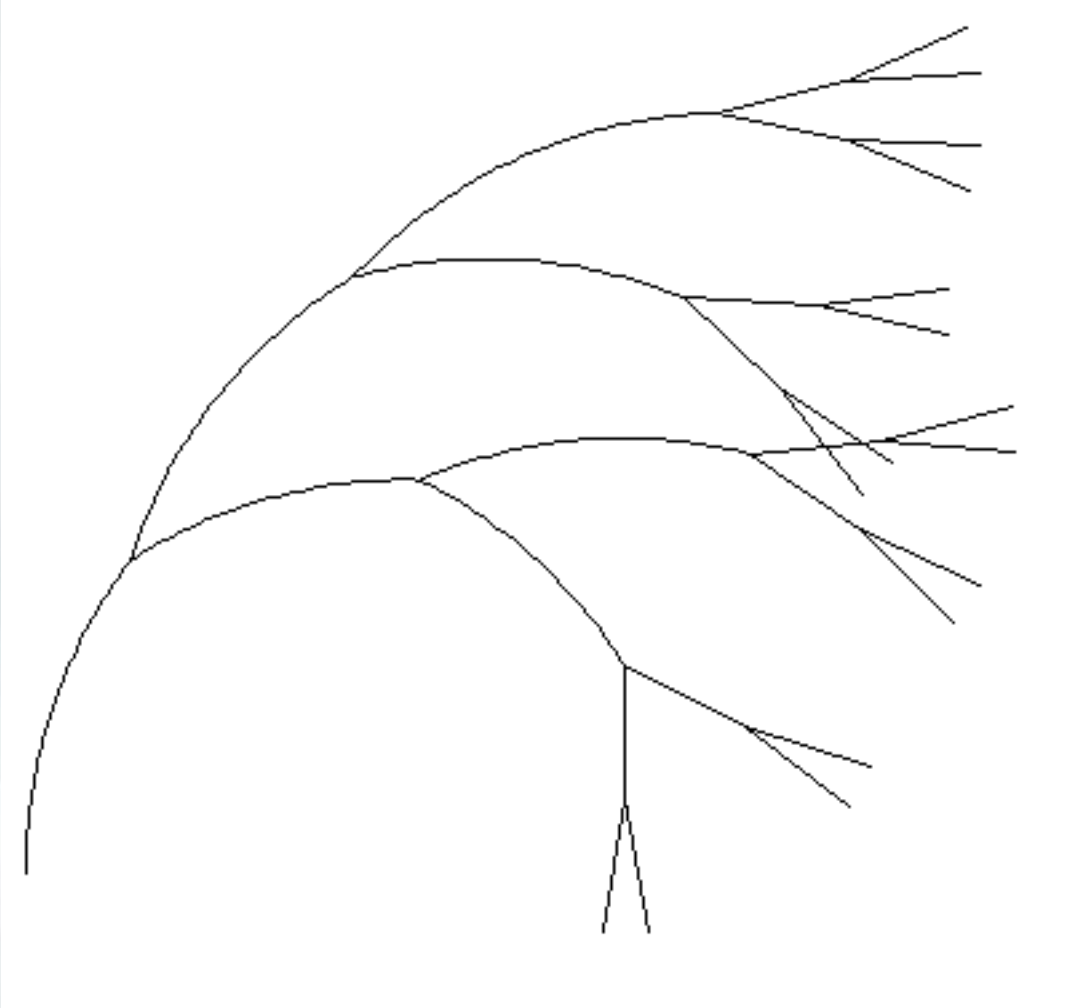
Fractal Art



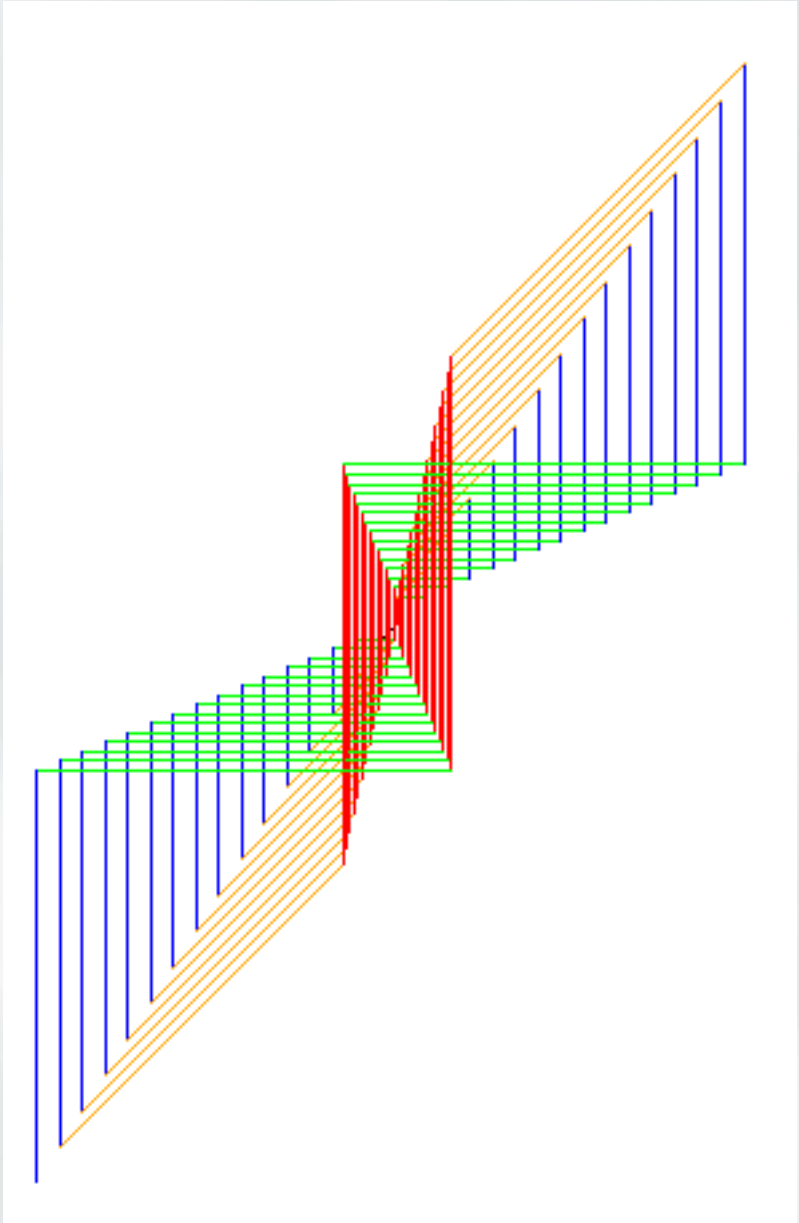
Fractal Art



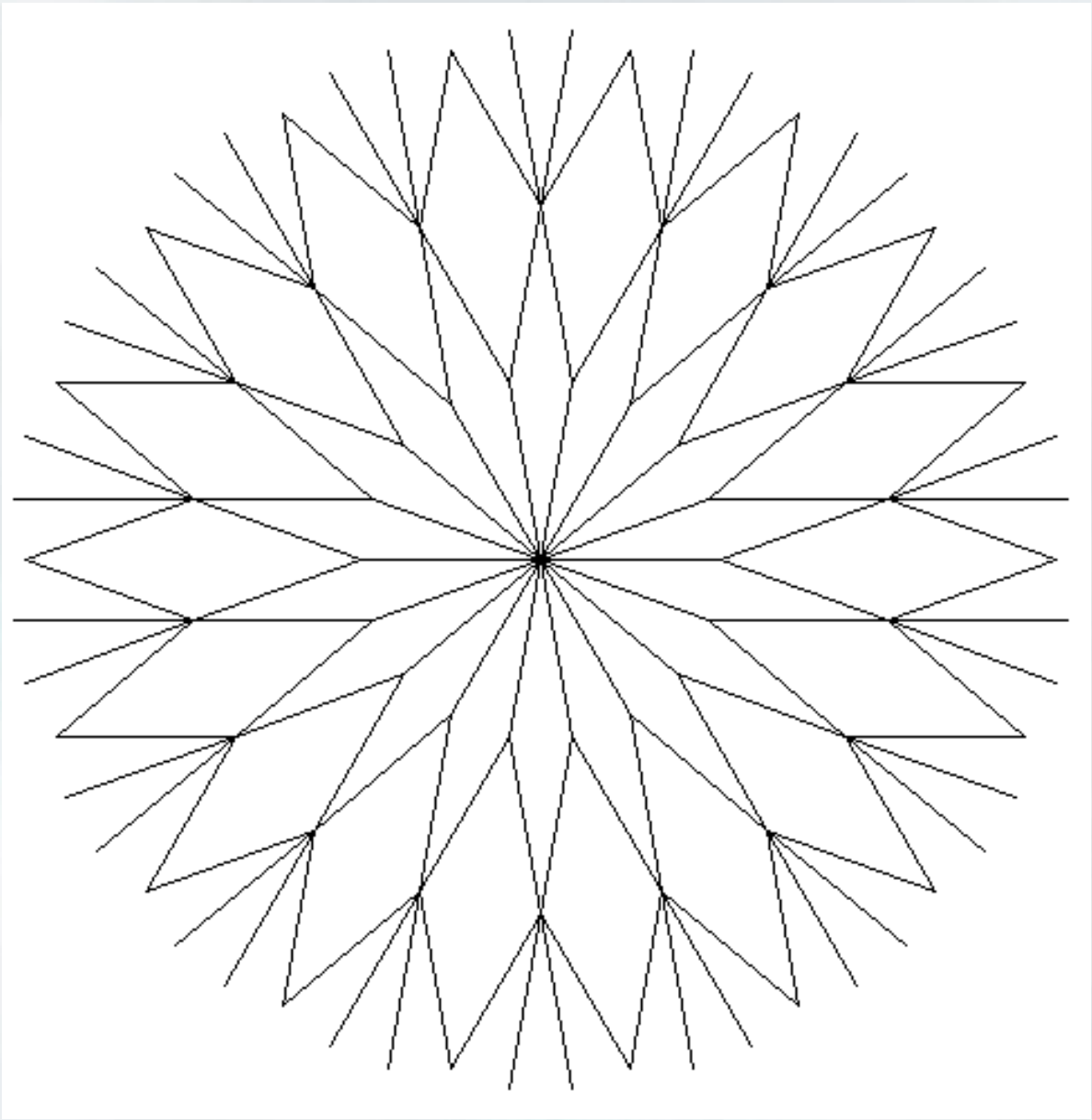
Fractal Art



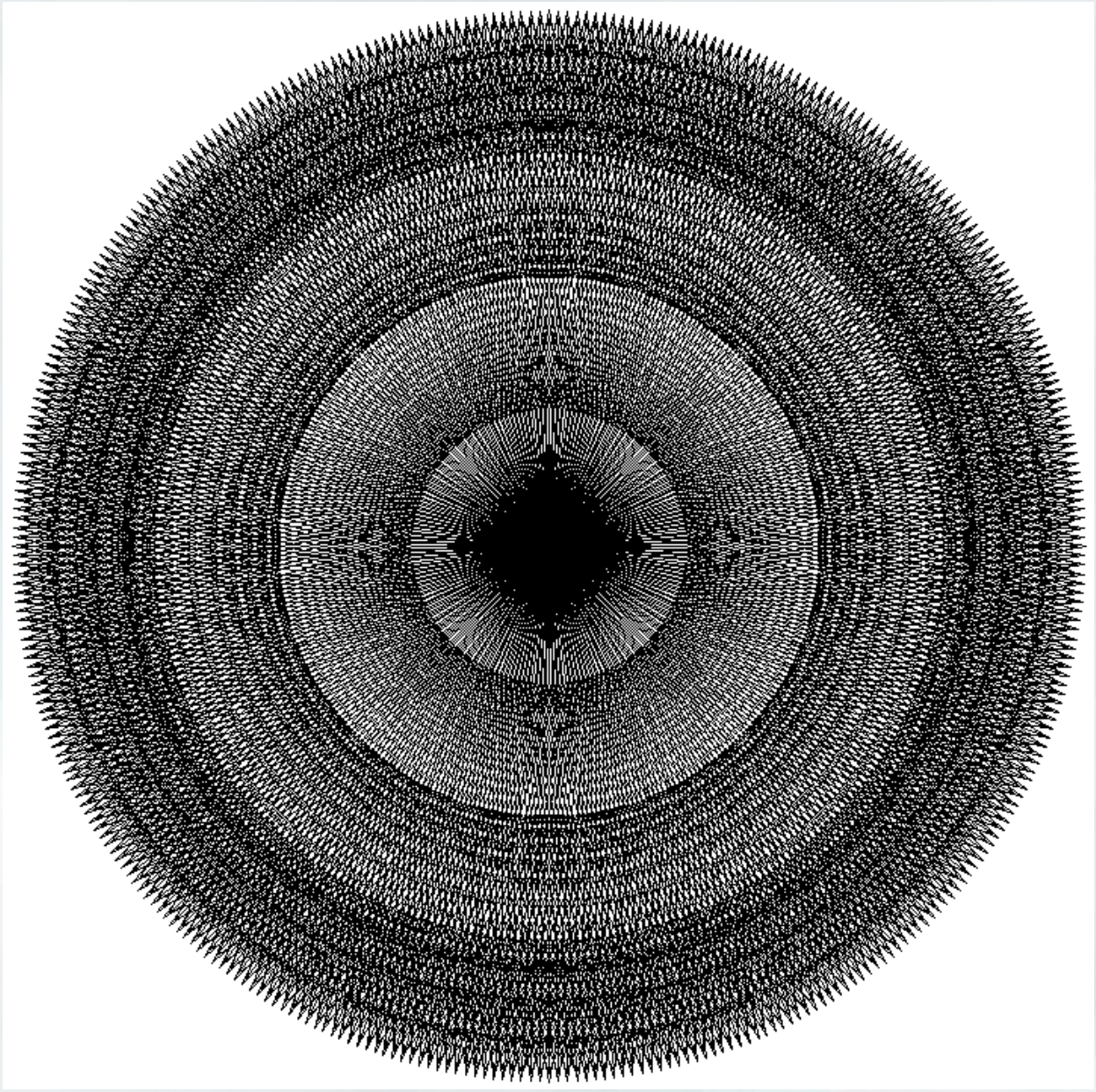
Fractal Art



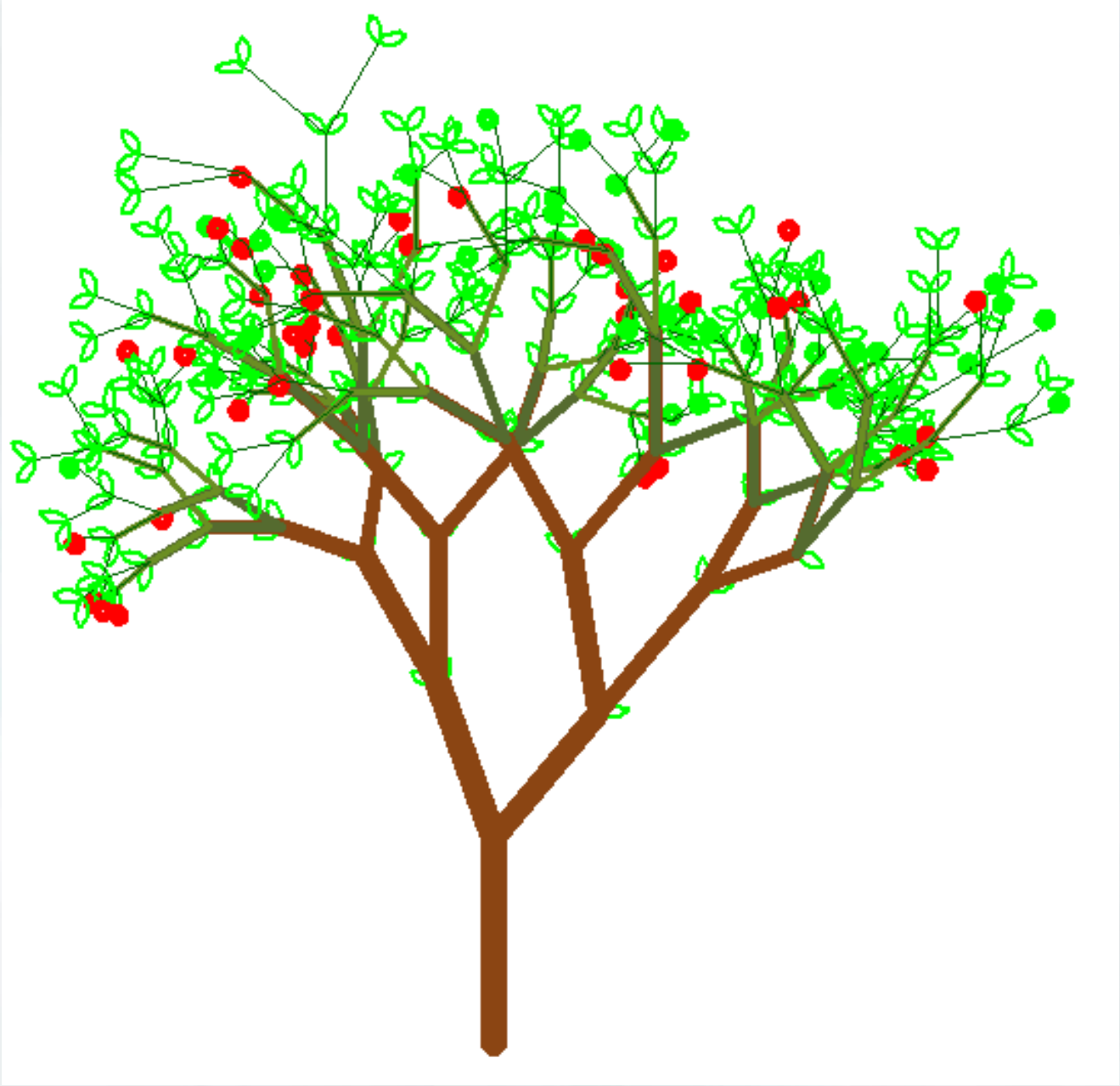
Fractal Art



Fractal Art



Fractal Art



Random Paper Generator

- http://pdos.csail.mit.edu/scigen/

- Generates random academic computer science papers
  - Randomly generated graphs
  - Randomly generated tables
  - Randomly generated citations

- 2005 paper accepted to conference

This week's project

- Write a text generator
- Using same general methods as SCIgen
  - A little less coherent
  - But still cool
- We have many of the tools we need already
  - We'll pick up more as the week progresses

Markov Text Generation

- How do we generate random text?
  - Start by generating a single sentence
- Find a word that could start a sentence
  - Put it at the beginning
- Find words which could come after that word
  - Pick one to continue the sentence
- Repeat until you've formed a sentence
  - Now do it again!

Markov Text Generation

- How do we know which words come after other words?
  - Need a reference corpus

fuzzy wuzzy was a bear.
fuzzy wuzzy had no hair.
fuzzy wuzzy wasn't very fuzzy was he.

Markov Text Generation

- For each word in corpus, see what words come afterwards

fuzzy wuzzy was a bear.
fuzzy wuzzy had no hair.
fuzzy wuzzy wasn't very fuzzy was he.

Markov Text Generation

- For each word in corpus, see what words come afterwards

fuzzy wuzzy was a bear.
fuzzy wuzzy had no hair.
fuzzy wuzzy wasn't very fuzzy was he.

Markov Text Generation

- For each word in corpus, see what words come afterwards

fuzzy wuzzy was a bear.
fuzzy wuzzy had no hair.
fuzzy wuzzy wasn't very fuzzy was he.

fuzzy → [wuzzy, wuzzy, wuzzy, was]

Markov Text Generation

- For each word in corpus, see what words come afterwards

fuzzy → [wuzzy, wuzzy, wuzzy, was]
wuzzy → [was, had, wasn't]
was → [a, he]
a → [bear]
bear → [.]
had → [no]
no → [hair]
hair → [.]
wasn't → [very]
very → [fuzzy]
he → [.]

Markov Text Generation

- Given a word, we can look up which words come next
  - And pick one of them randomly
- How do we know where to start/stop?
- Treat the '.' character as a special kind of word
  - Any word following a '.' can start a sentence
  - Reaching a period ends a sentence

Markov Text Generation

- This is a large problem
  - Where do we start?
- Break it down into pieces
  - What components do we need?
  - What do we need to be able to do?

One possible problem breakdown

- Read in corpus text from file as string
- Break string into list of words
- Process word list to separate out periods
- Produce markov dictionary from processed word list
- Produce single sentence from markov dictionary
- Generate text by producing as many sentences as desired

Back to Lists

- We saw lists briefly last week
  - Lets take a closer look

- Lists are sequences of values
  - [1, 2, 3]
  - ["apple", "banana", "carrot"]
  - [True, 'B', 3]

Back to Lists

- Lists are mutable
  - We can change them

```
>>> L = [ 1, 2, 3 ]
>>> L[ 0 ] = 99
>>> L
[ 99, 2, 3]
```

- What happens if we try this with a string?

Back to Lists

- Modifying a list is not the same as performing reassignment
- The variable still points to the same object
  - But that object has changed!

```
>>> L1 = [ 1, 2, 3 ]
>>> L2 = L1
>>> L2[ 0 ] = 99
>>> L1
[ 99, 2, 3 ]
```

Method to the Madness

- Objects have built-in functions just for themselves
  - Methods
  - Dot notation
- We saw a few in assignment 4
  - 'a'.isupper()
  - 'a'.isdigit()
- There are many more built-in string methods
  - "This string contains multiple words".split()
  - "   This string has too much whitespace   ".strip()