High Performance Computing Programming Excercises

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MRes - Computational Methods in Ecology and Evolution

Neutral Theory Simulations

Question 8 - Neutral Time Series

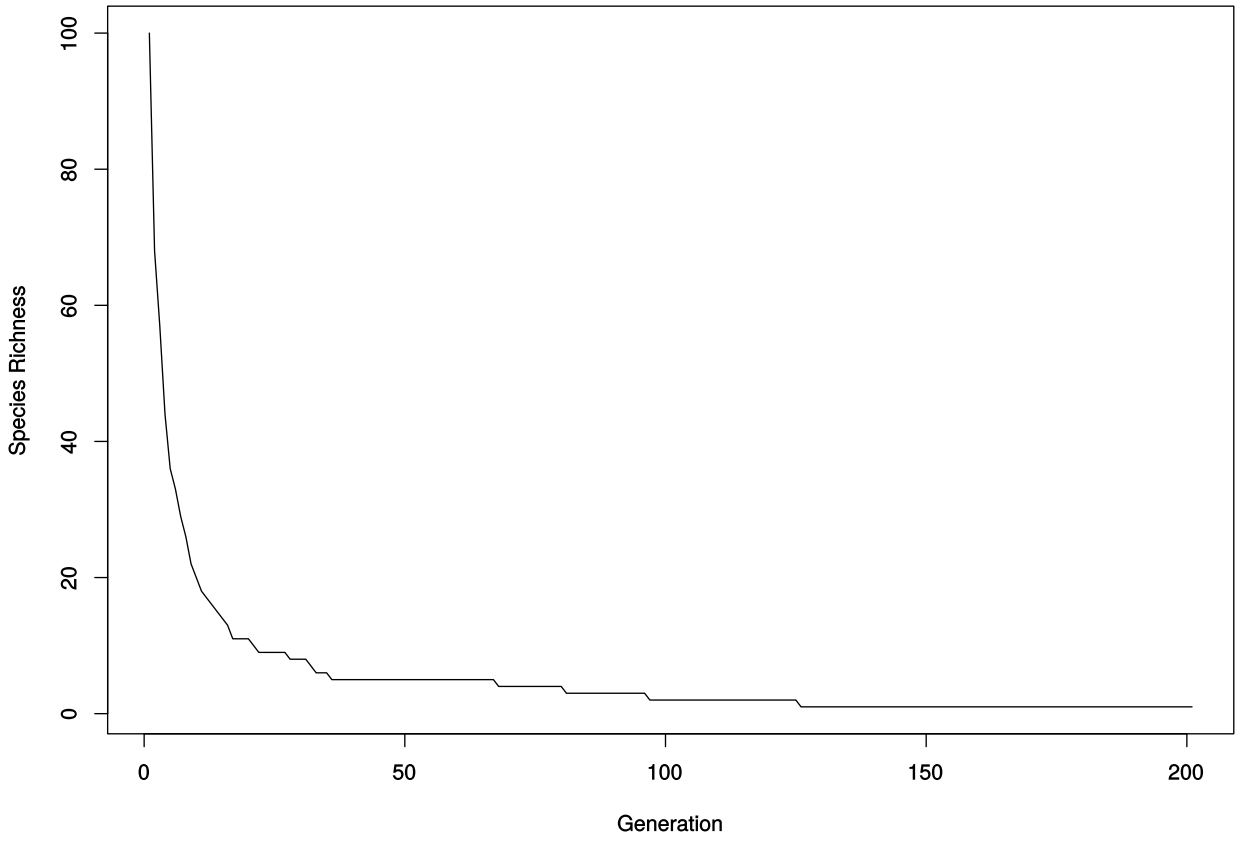

Figure 1: Species richness moving to one when under Netural Theory simulation with no speciation

Question 12 - Neutral Time Series with Speciation

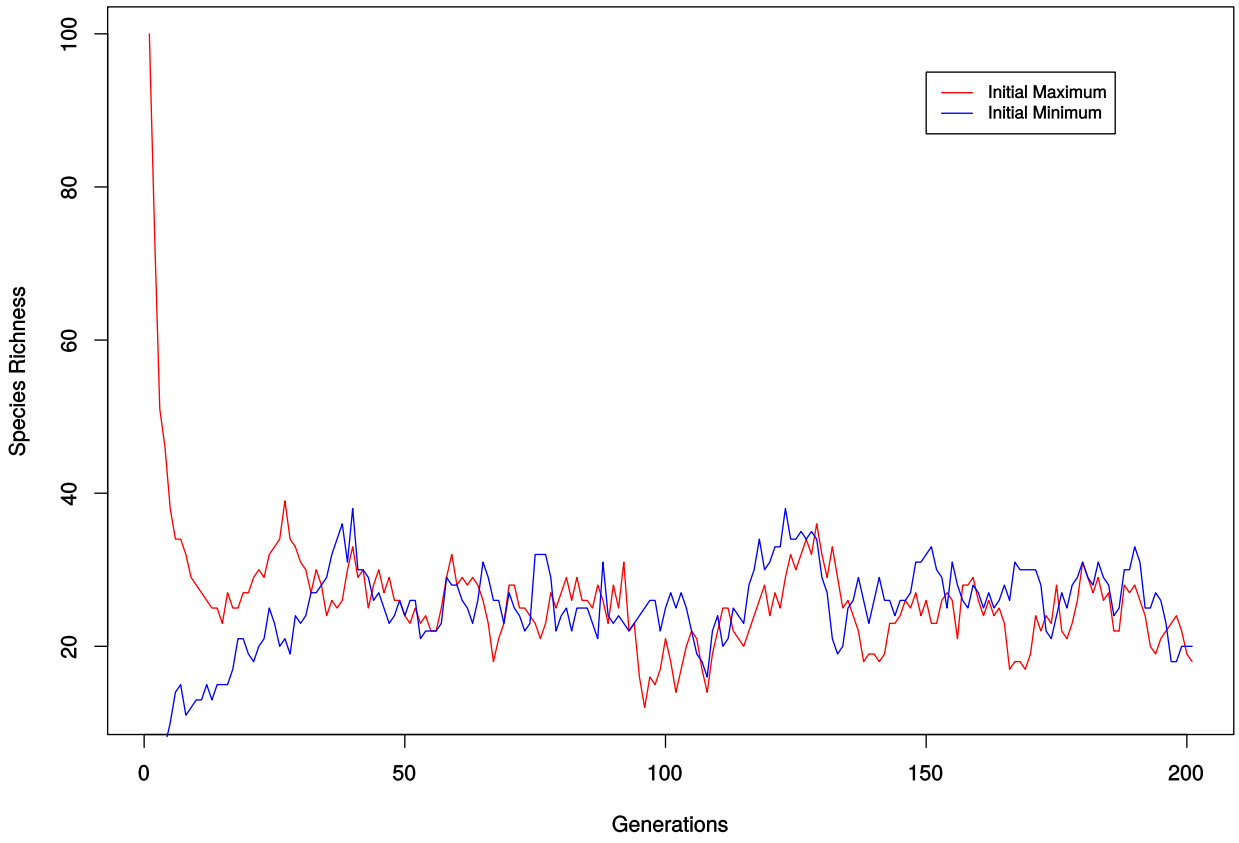

Figure 2: Spcecies richness under Neutral Theory simulation with 0.2 probability of speciation

Question 16 - Species Abundances after Neutral Theory Simulation

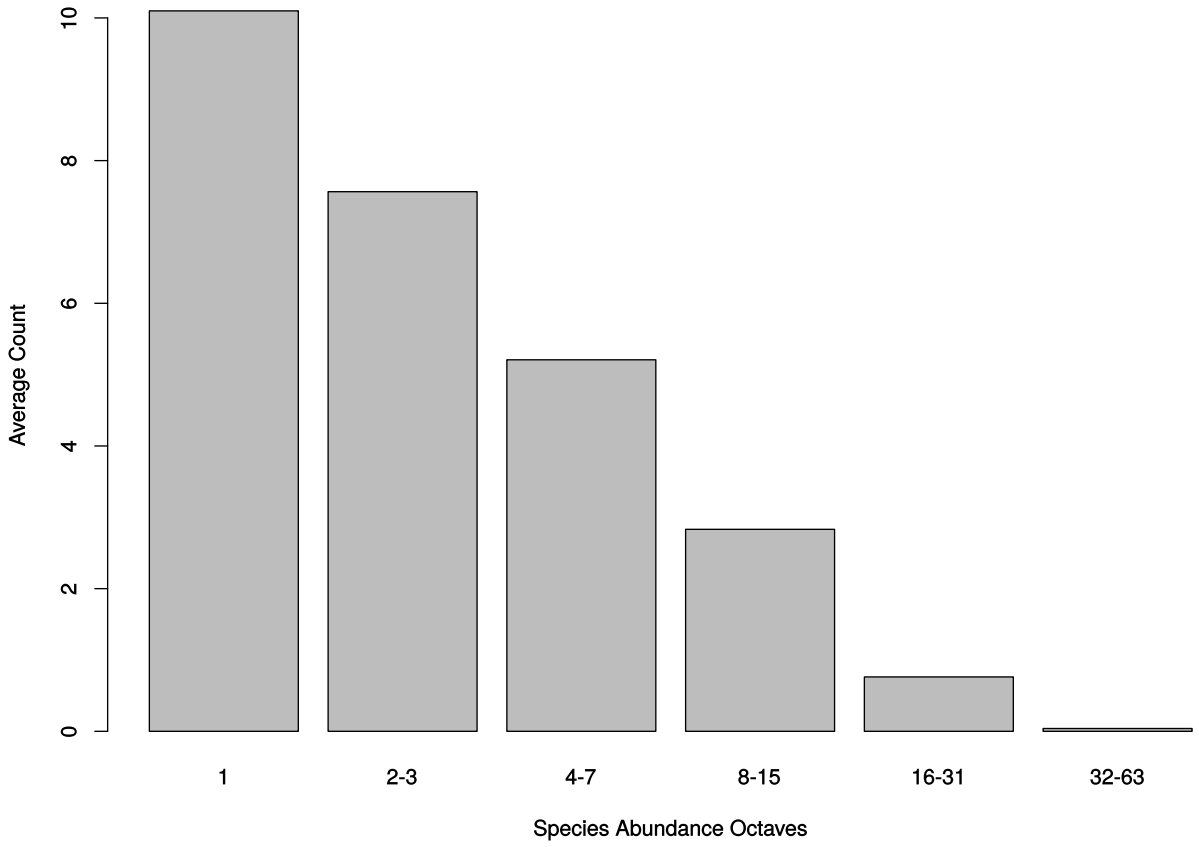

Figure 3: Distribution of Species Abundance after a Neutral Theory Simulation with speciation run for 2000 generation

Simulations Using HPC

Question 20 - Results from run on the Cluster

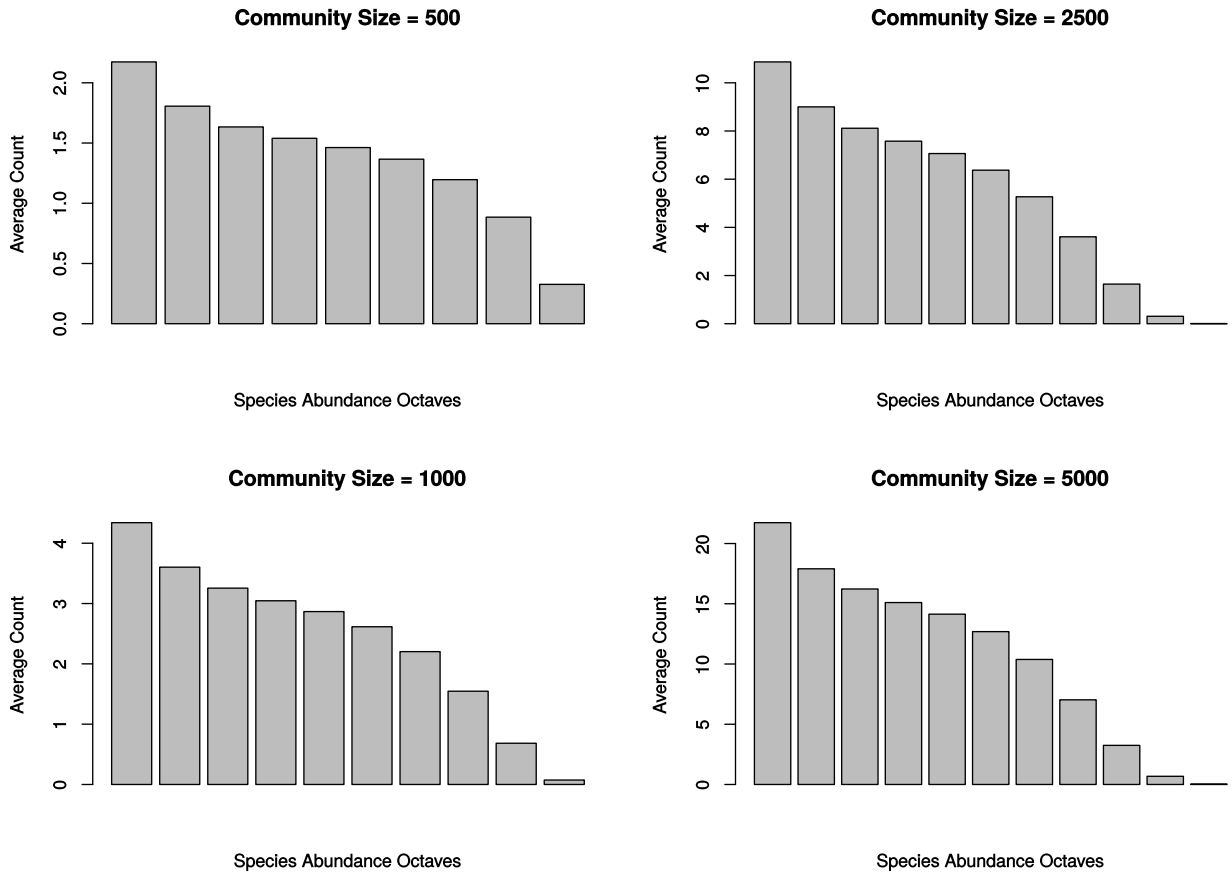

Figure 4: Distribution of mean Species Abundance's after Neutral Theory simulations with spciation run on four different community sizes

Challenge Question C - Species Richness by Generation

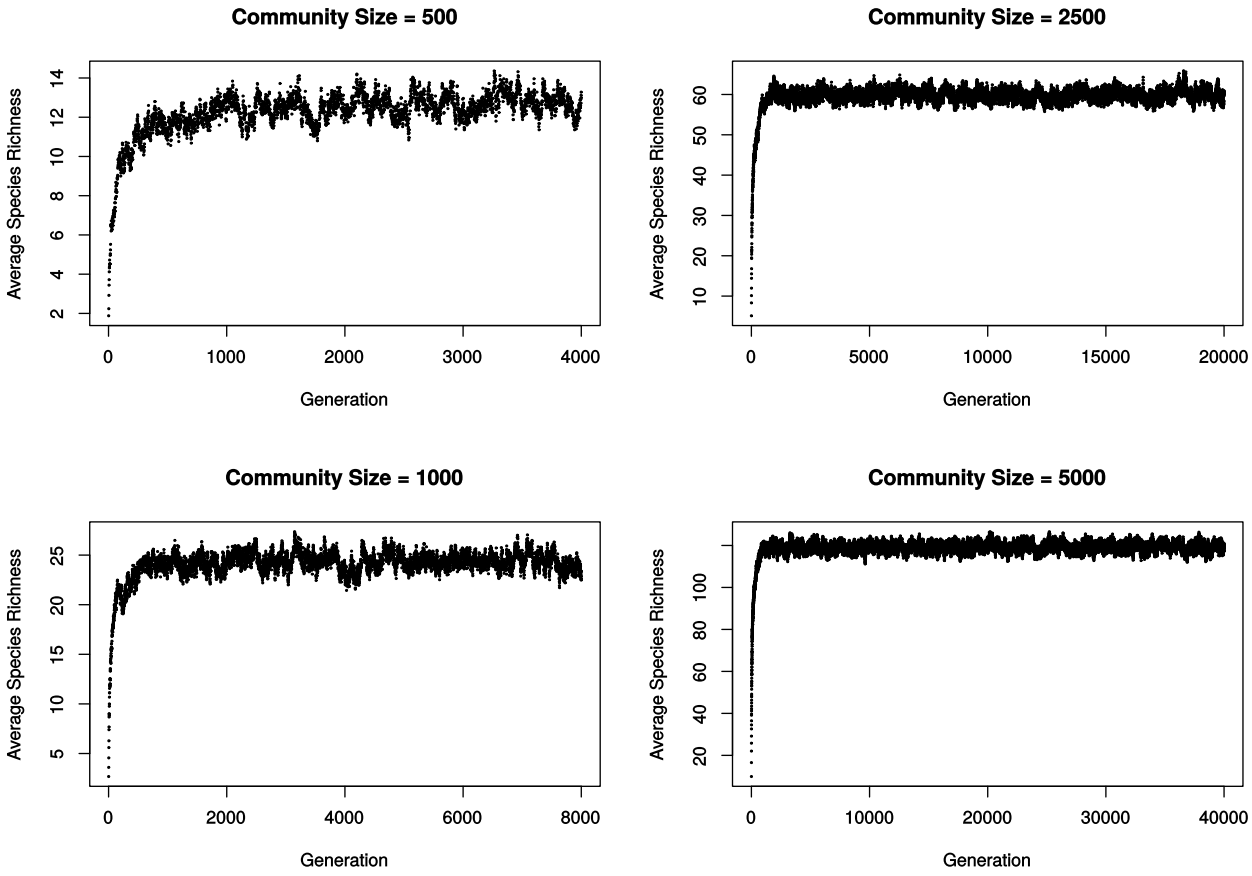

Figure 5: Average species richness for the burn in period of each community size

Fractals in Nature

Fractal Dimensions

The Chaos Game - Sierpinski Triangle

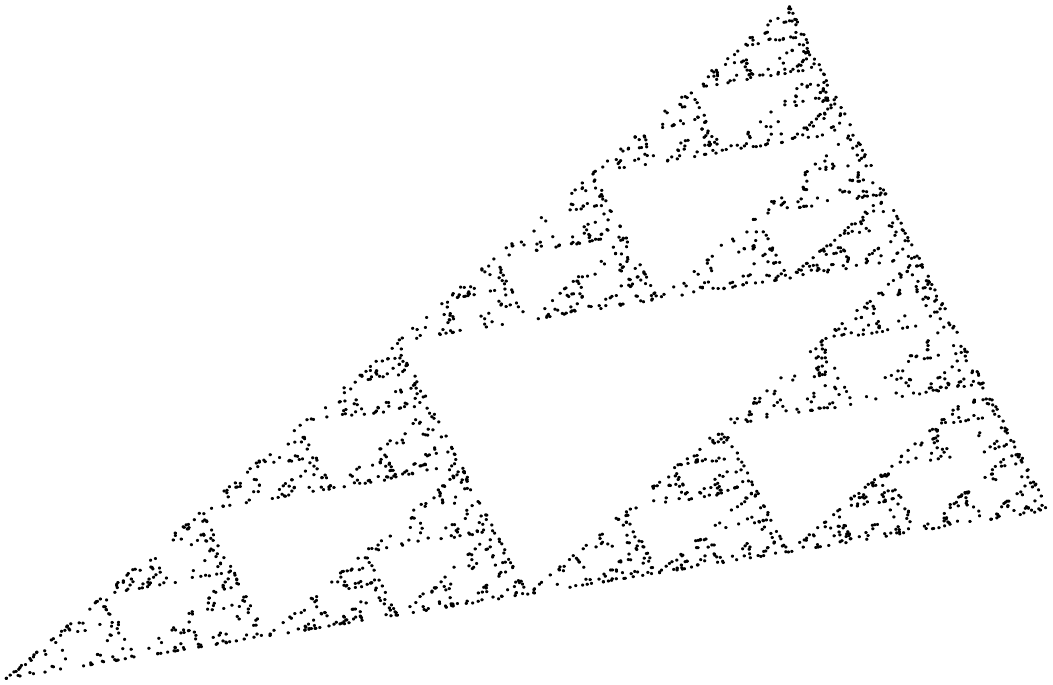

Figure 6: Sierpinski Triangle drawn between the points: (0,0), (3,4) and (4,1)

Challenge Question E - Sierpinski Triangle

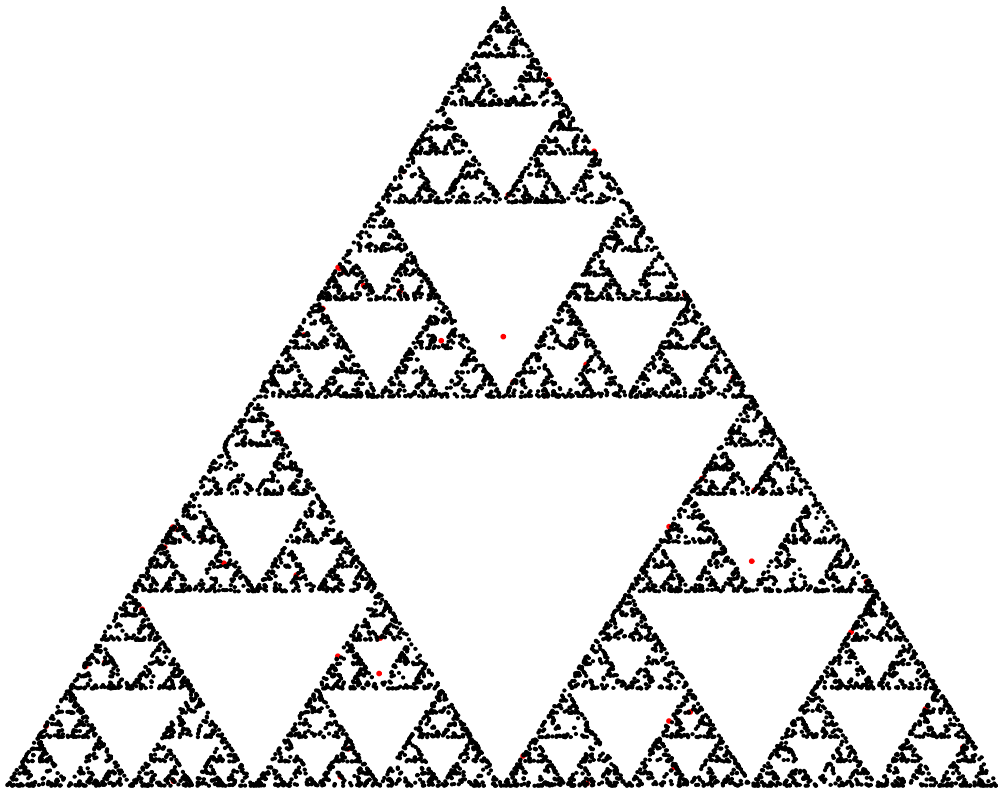

Figure 7: Sierpinski Triangle drawn between the points: (0,0), (4,0) and $(2,\sqrt{12})$ to make an equilateral triangle

Question 22 - Spiral

Question 23 - Spiral2

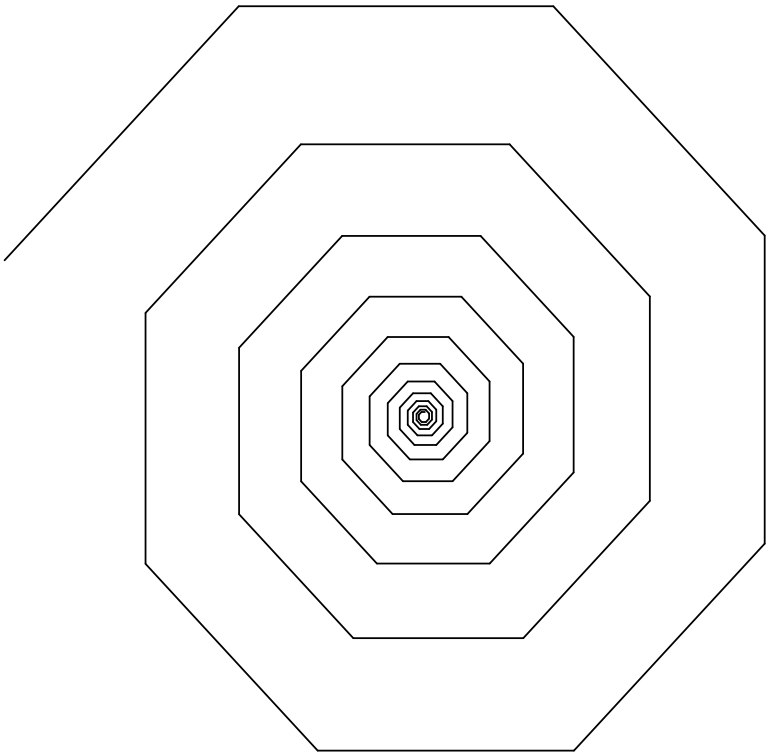

Figure 8: Spiral drawnby adding lines at $\pi/4$ radians and 0.95 length until lines went below a threshold length

Question 24 - Tree

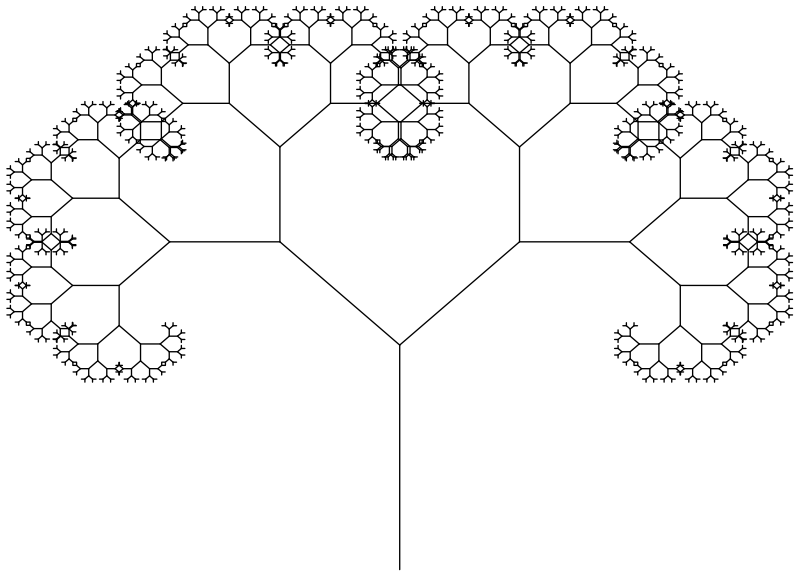

Figure 9: Words Words Words

Quesiton 26 - Fern2

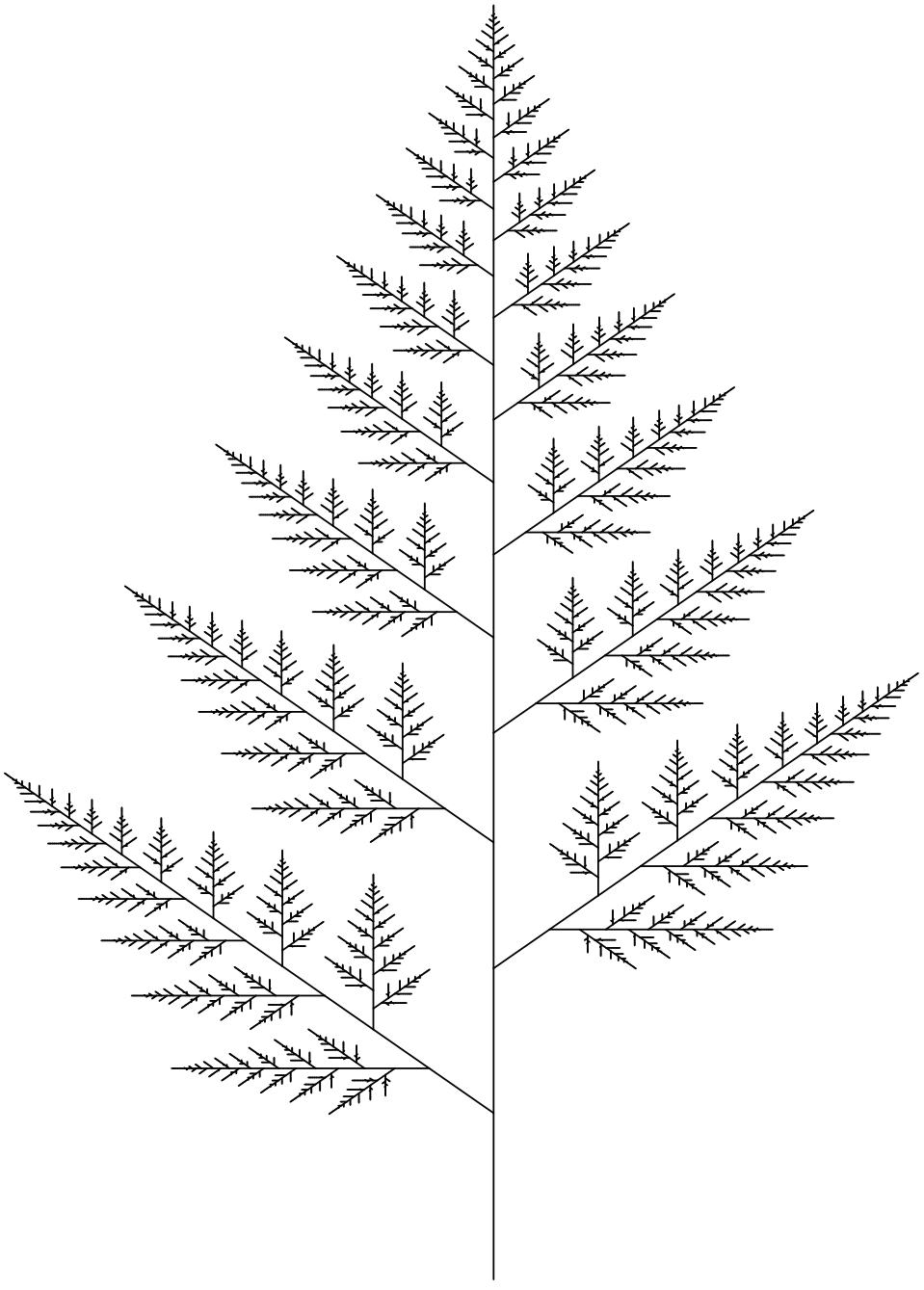

Figure 10: Words Words Words

Challenge Question F

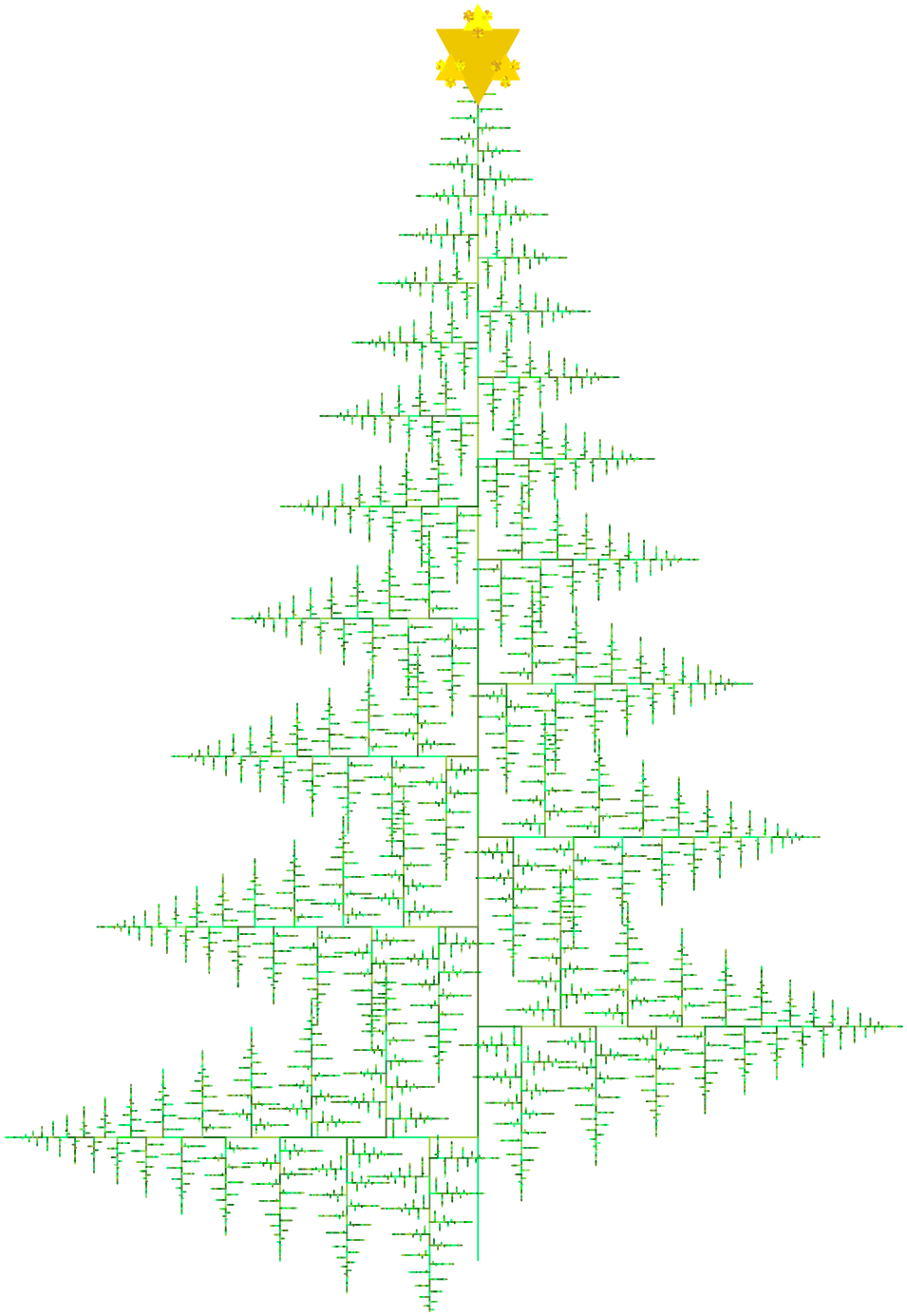

Figure 11: Words Words Words

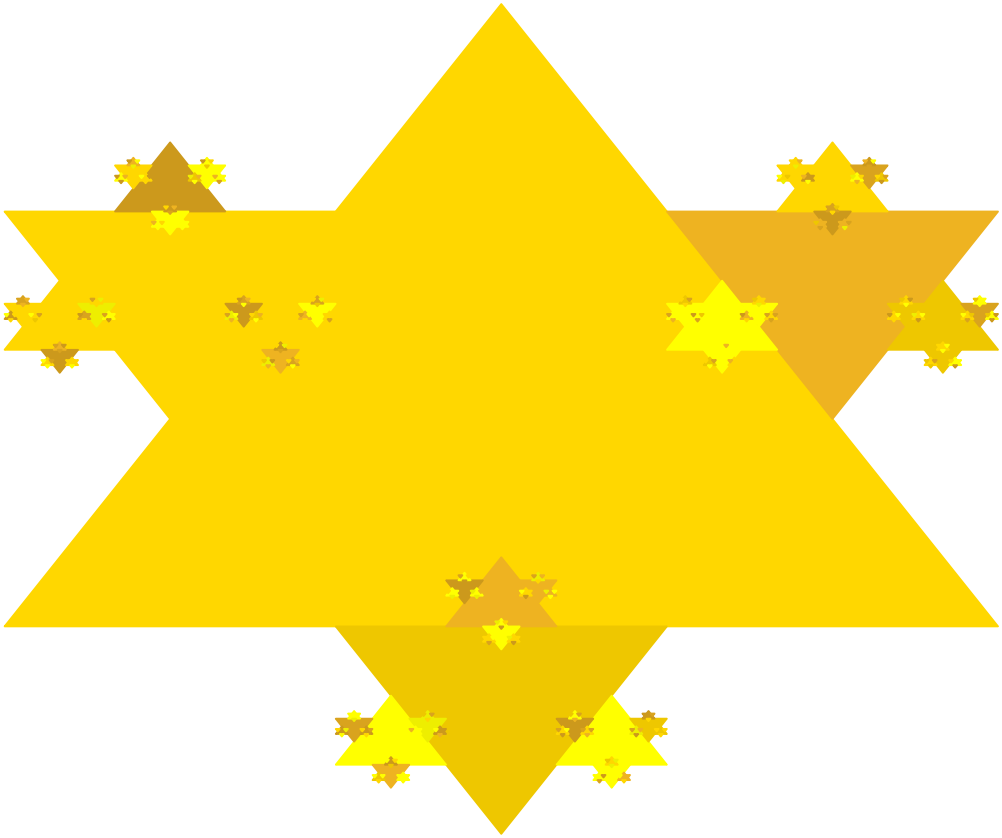

Figure 12: Words Words Words