CMSC427 Fractal exercises
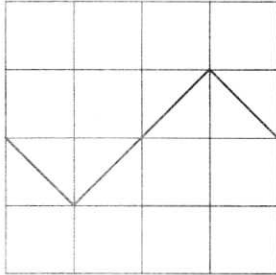
1. Given the fractal curve below, give (a) an Turtle graphics generator for it and (b) the fractal dimension.

a) $\delta = 45°$ initiator F

$F \rightarrow -F++FF--F+$

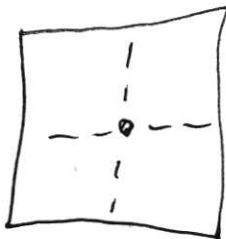(last $+$ to realign is optional)
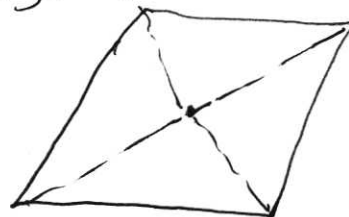
b)

$$D = \frac{\log N}{\log \frac{1}{S}}$$

$N = 4$

$$S = \frac{1}{4}\sqrt{2} = \frac{1}{2\sqrt{2}}$$

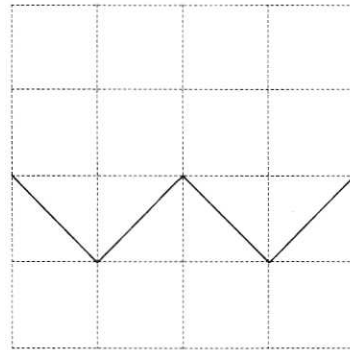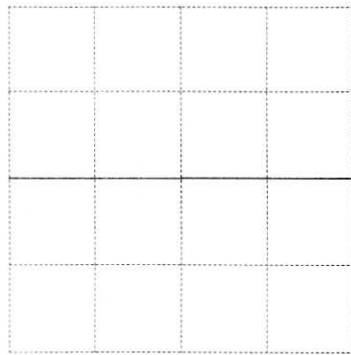$$= \frac{\log 4}{\log \frac{1}{\frac{1}{2\sqrt{2}}}} = \frac{\log 4}{\log 2\sqrt{2}} = 1.3\overline{3}$$

2. If you're creating a midpoint displacement surface in 3D, how could you do it in a quadrilateral array (eg, a grid like above) if you want to produce triangles eventually?

Compute the midpoint displacement in the center of a cell then at the end triangulate in each cell

3. **L-System** Given this diagram of recursive step of a possible L-system curve, with the initiator on the left and the next step on the right, answer the questions below.

a) Give an L-system with grammar for drawing the shape defined by the curve.

b) Give the fractal dimension of the curve.

a) $\delta = 45°$ F initator

$$F \rightarrow -F++F--F++F-$$

b) Same as problem 1.'