

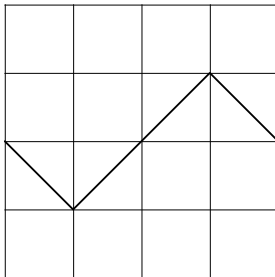
CMSC427 Fractal exercises

Aside from the full questions below, the

- a) In general you should be able to describe fractals as characterized by recursive structures, and self-similarity – and that fractal is short for fractional dimension.
- b) Iterated function systems. You should be able to describe the operation of an IFS, and how the set of affine transformations represent a collection of self-similarities for the shape.
- b) Midpoint displacement. For this, you can apply it to in two 2D to a line, or 3D to a rectangular or triangular grid. In all case you have to define a perpendicular bisector line, randomly select a point along it, and generate recursive case – and to account for multi-resolution
- c) Mandelbrot sets. Here you should know the basics as the set of complex numbers for which an iterated sequence doesn't diverge, and the function that defines the sequence.

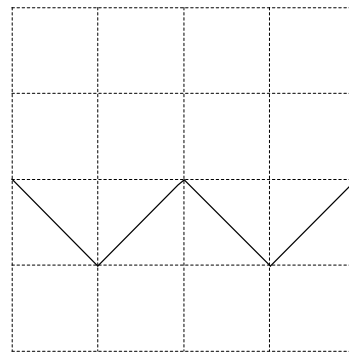
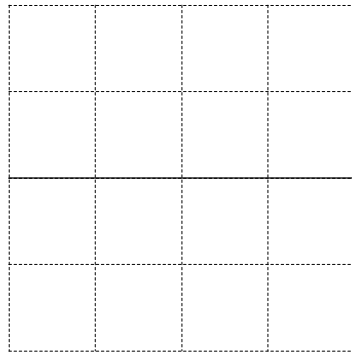
Full questions:

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



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?

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.



- Give an L-system with grammar for drawing the shape defined by the curve.
- Give the fractal dimension of the curve.