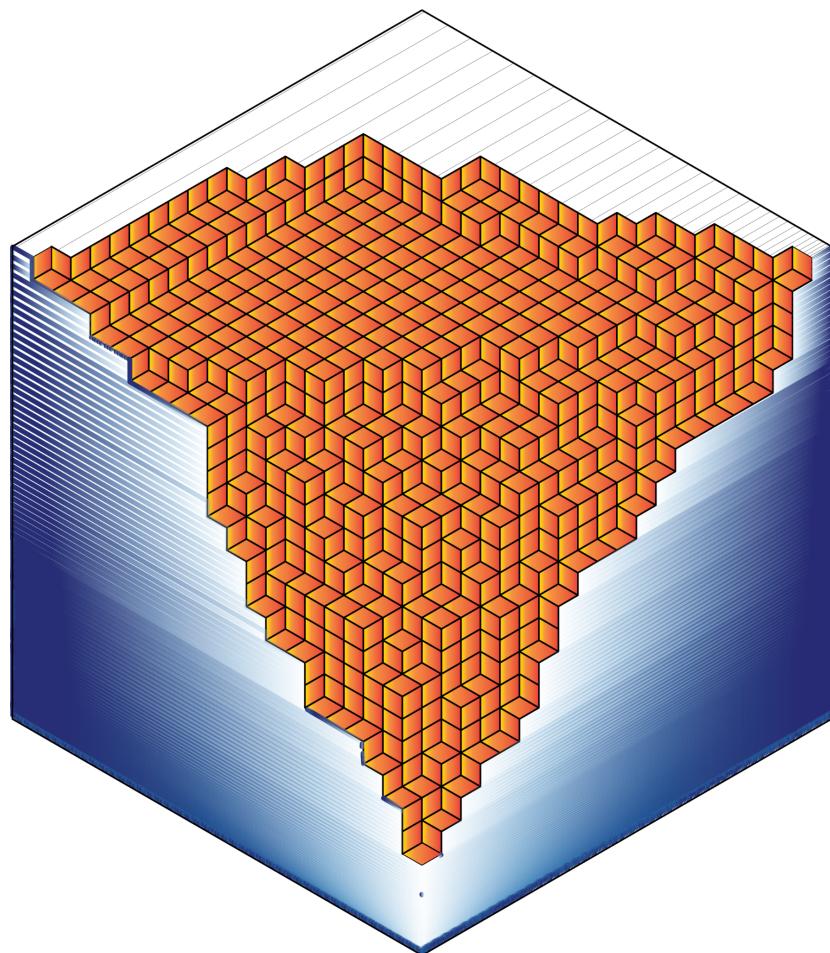


A Series of Generative Works: Isometric Projection and Depth Perception

Studies in Hexagonal Grids



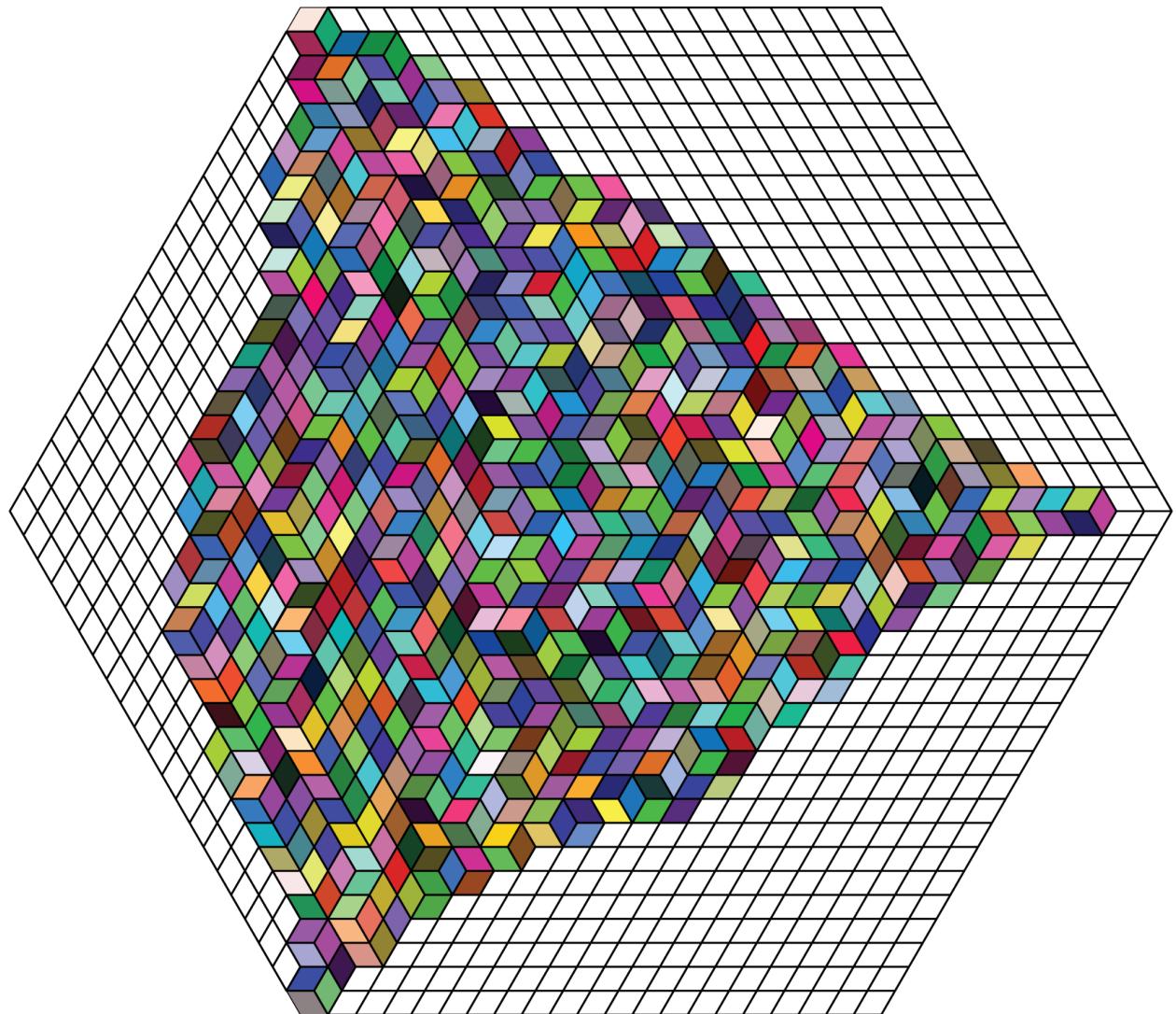
Jazer Sibley-Schwartz

Final Project for MAT236

Fall 2023

Illustrator Scripting

This avenue proved to be not as flexible as I had hoped. This is the result of running a script approximately 100 times, each run taking about 2.5 minutes:



The area on the left that has a less random portion was from turning blocks one at a time. I wrote a script that would group the three tiles I selected, rotate them by 180 degrees, color them randomly, and then ungroup them. I had hoped to encourage the main algorithm to move into this area.

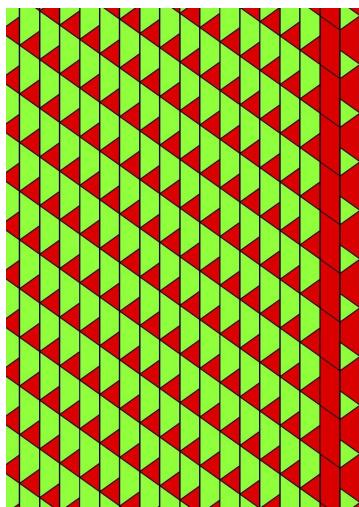
I ended up with a number of helper scripts. All of them, including the main algorithm are up on the class repo.

Although I spent many hours (days, weeks) on this approach, ultimately, I wasn't able to implement an algorithm with the flexibility and speed required for creating a diverse selection of artworks. I am still convinced there is a way to think about 2D tiles that can only travel on their 120 axis that would make this performant as a script in illustrator.

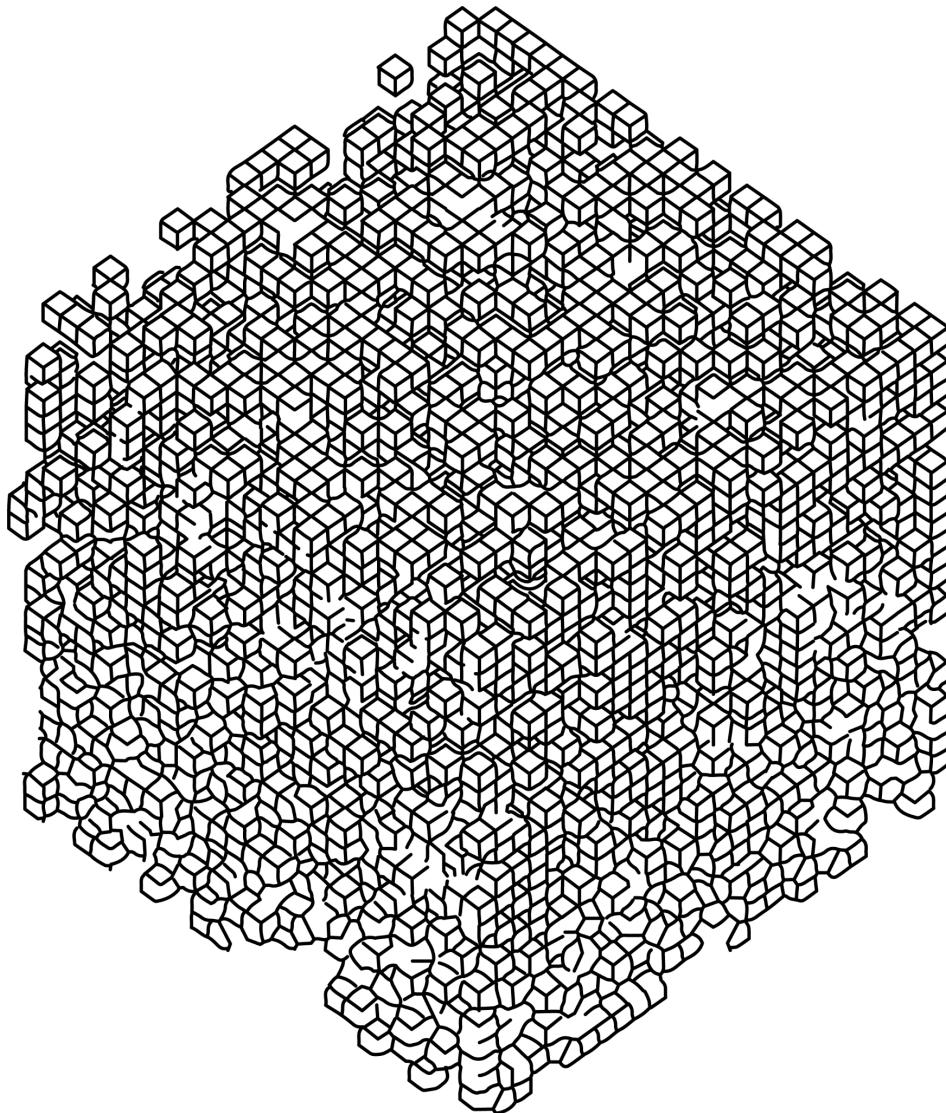
Processing

To the rescue.....

Thinking in 3D made this a much easier problem to solve. Utilizing orthographic projection via the `ortho()` method and drawing cubes in 3D space was fairly straightforward. I ended up actually only drawing the front and top quads of cubes and columns in the hopes of using pdf output to make vector paths directly. Unfortunately, the `ortho()` seemed to break the pdf:

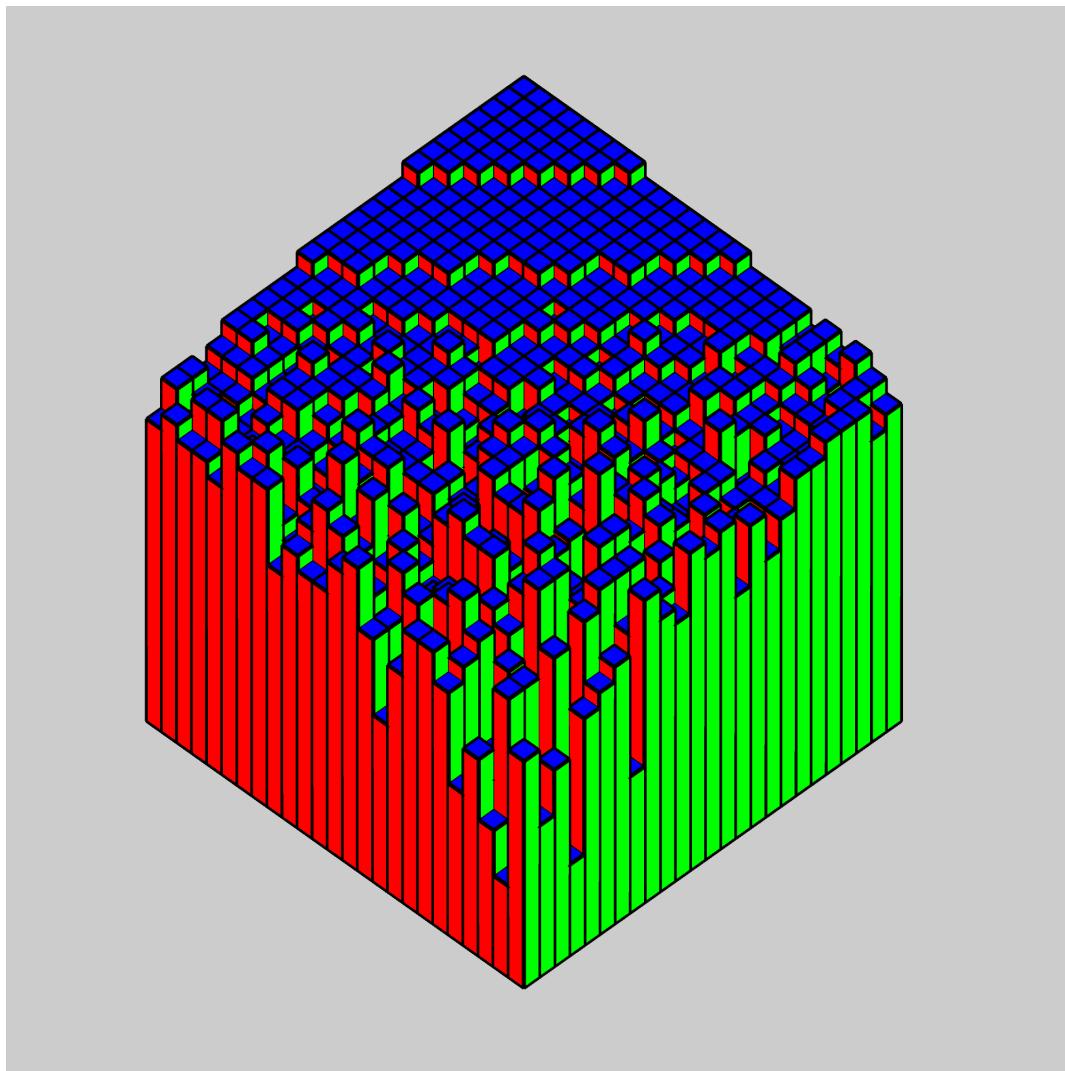


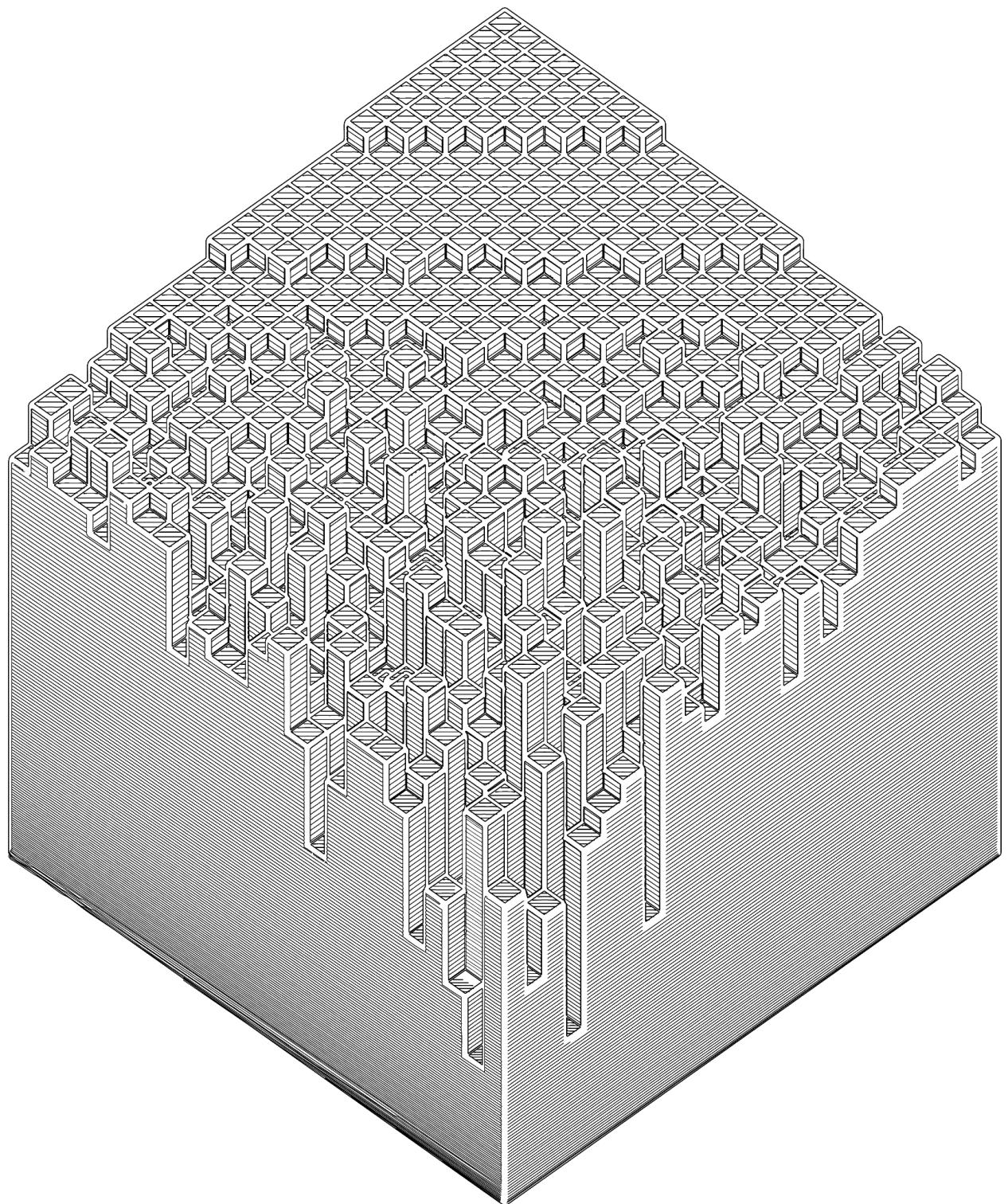
Using path tracing in Illustrator on an image from processing didn't capture the sharp edges I wanted.

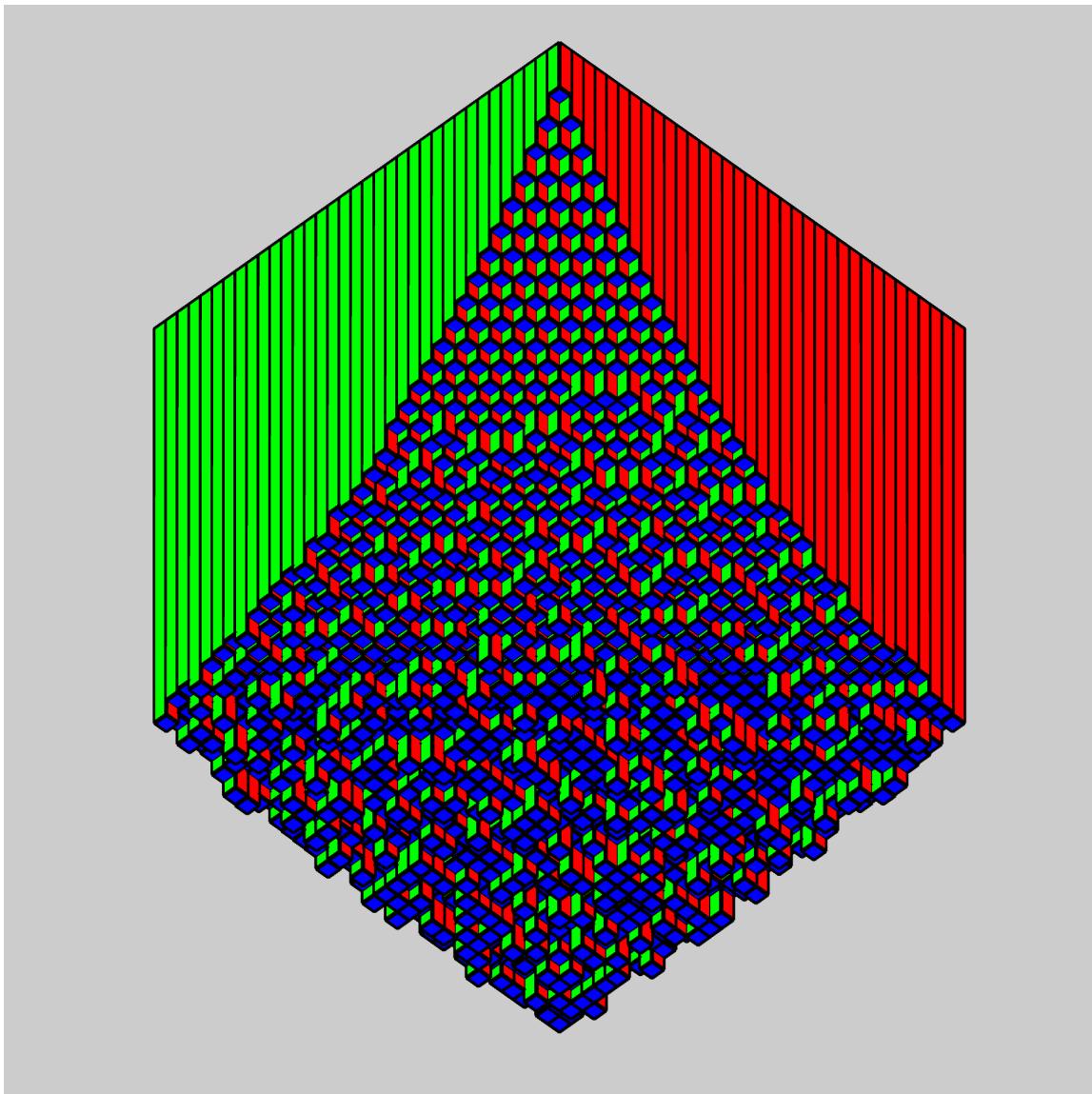


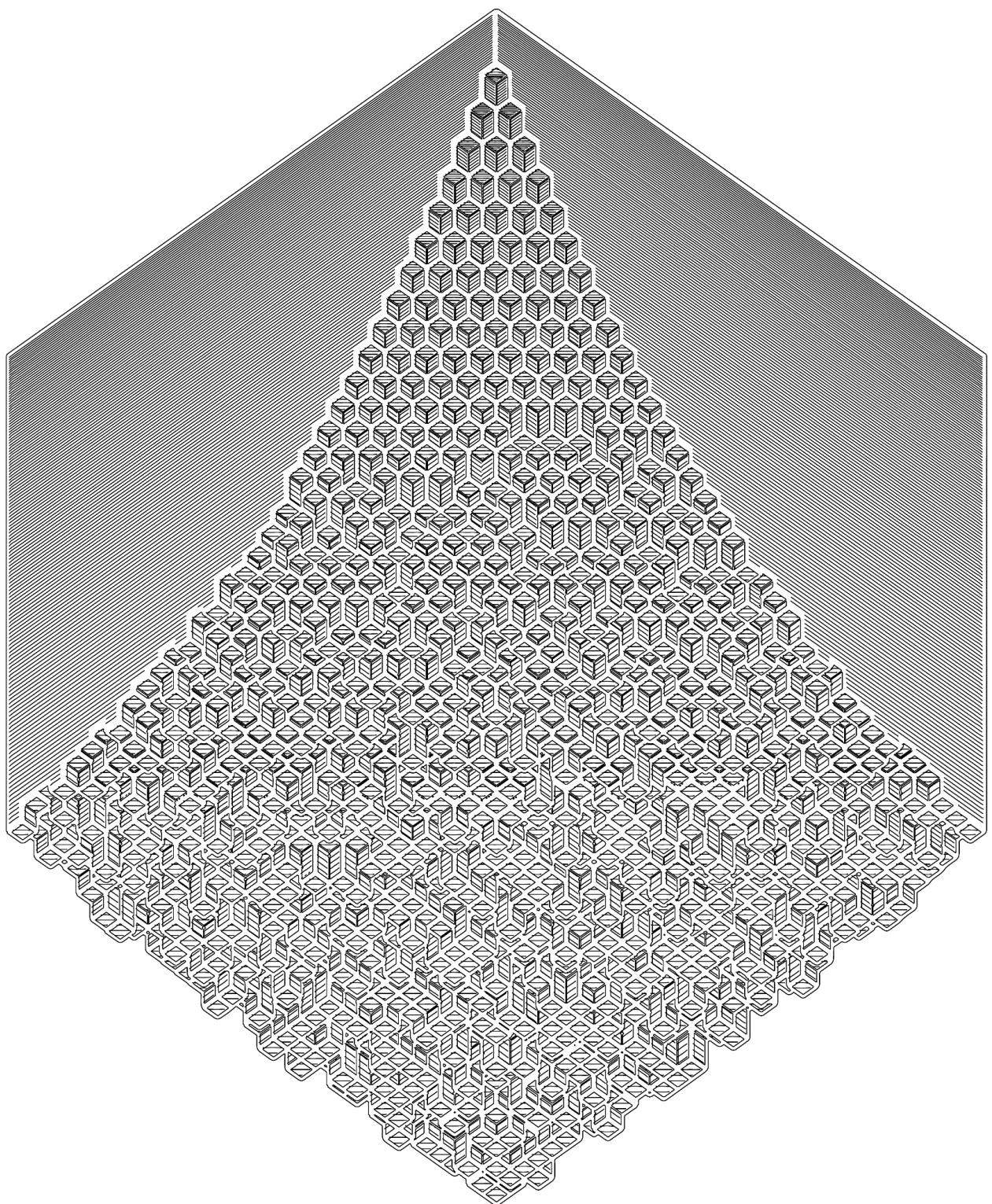
Vectorizer.ai proved to work fairly well. It also had the added feature of grouping by color. That meant I could make clipping masks for each face direction. This wasn't as straightforward as I would have liked because the clipping mask doesn't truncate paths. So I would have to rasterize the masked lines and then Image trace them. In this case for whatever reason, Illustrator worked better than vectorizer.ai. Upon reading this last sentence to myself, I realize I should have just made gradient lines in Processing when drawing the columns....

ok, did that. I will have to think up something if I want to retain the ability to do different colors for the different faces though.

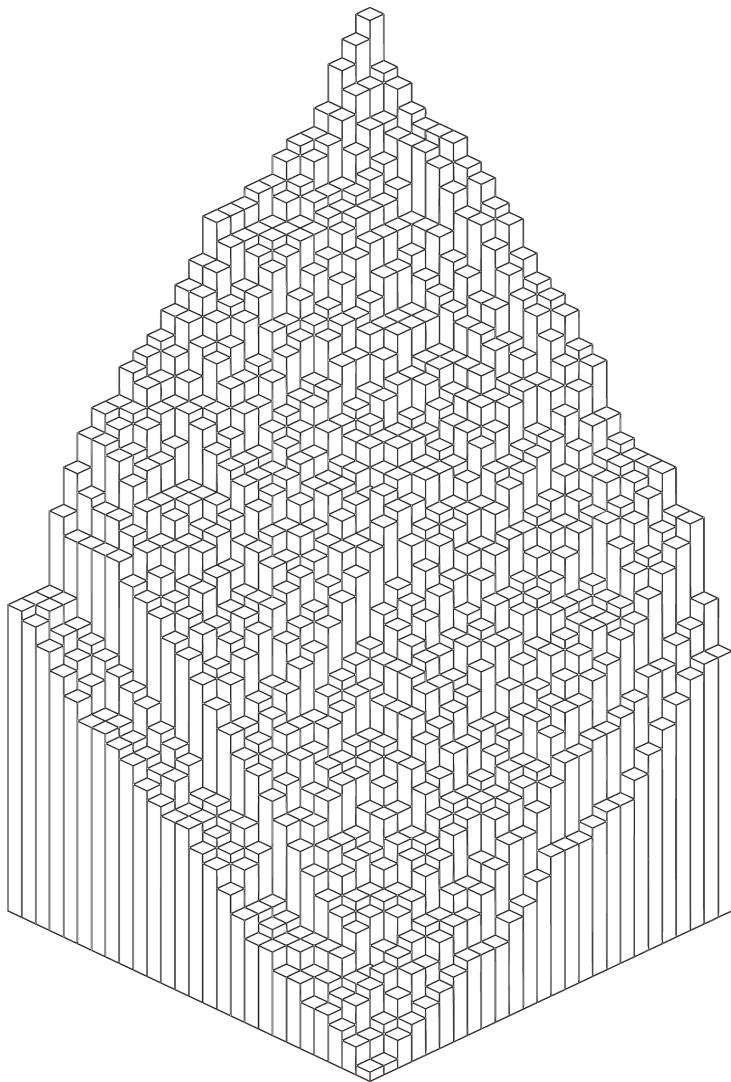








I also was able to create continuous surfaces using processing:



The image is drawn in two halves from the bottom/inside to the top/outside. Each column must be as high or higher than the column in the row below and the tile drawn just before it.

Plotting

Plotting itself went fairly smoothly. It was interesting how different the plotted piece was from the screen version. The pens add a lot of character depending on how much they bled into the paper. Each of the individual paths in these pieces start and end at the same point, so those spots tend to be a bit thicker than the rest of the line.

The colors from the Sharpie set worked well together. When choosing colors for outlines and gradient lines it was important that the gradient lines were lighter than the outline color as the paths overlapped slightly. Going between pen sizes was a bit tricky. Between the two sizes of Sharpies required a small shim and a rubber band. Going between Sharpies and the triangular bodied Staedtler pens didn't always go well.

Time-lapse videos of plots:

<https://youtube.com/shorts/VsZE3IpPriE>

<https://youtu.be/AZGeLrmxwOE>

Things I thought I might explore but didn't

I didn't use Illustrator's built-in path effects/manipulations. I did a couple tests at the very beginning of my process and I felt the modified path shape distracted from the 3D-ness. I will probably try again with some of the more developed pieces, potentially just creating my own with additional vertex calls between the column vertices.

I didn't warp the grid to explore where the 3D effect breaks down.

Truchet?

Not sure if I will get to this. I am hopeful though.