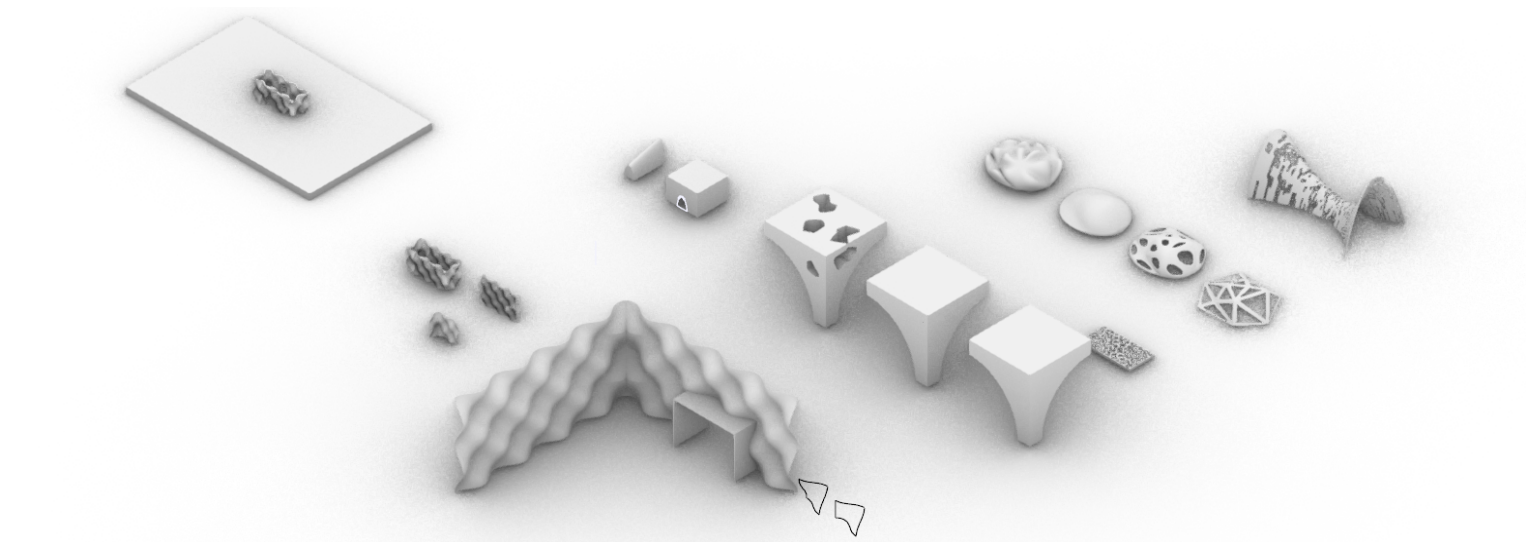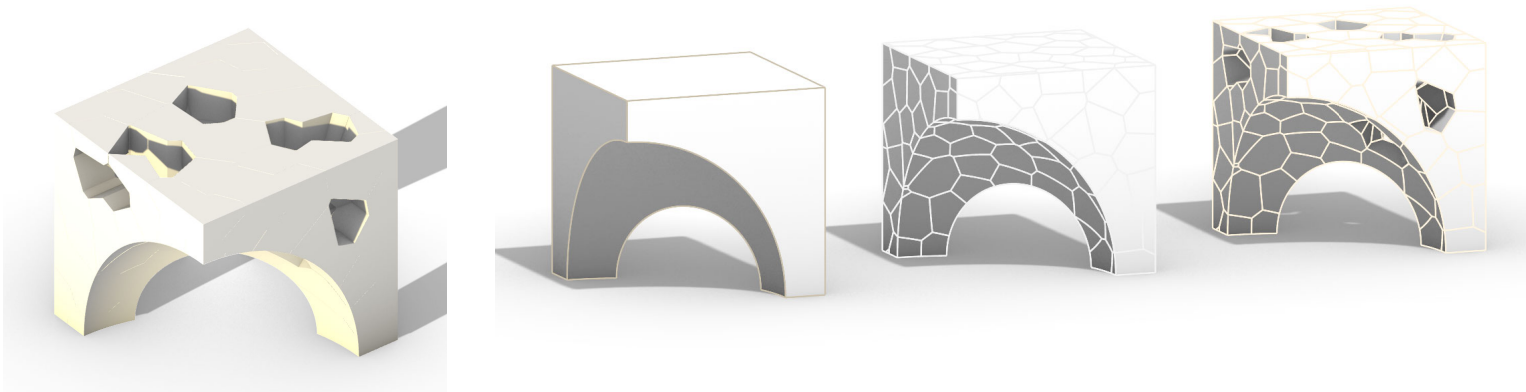# Project Development

Modeling with Rhino, Grasshopper, & Weaverbird

To begin developing a 3D model for my project, which is a modular play structure featuring organic forms, I found numerous tutorial videos showcasing grasshopper components and Rhino workflows that I thought would help me to better understand these tools to model my project. After watching and executing several of the tutorial videos, I started to modify the scripts.

The Parametric House tutorials I followed explaining the 3D and 2D Voronoi components were helpful in that they intorduced one way to generate somewhat organic shapes on a surface to manipulate or cutout. The 3D component creates solid cells, while the 2D component creates curves which can be used to create a new surface to extrude.
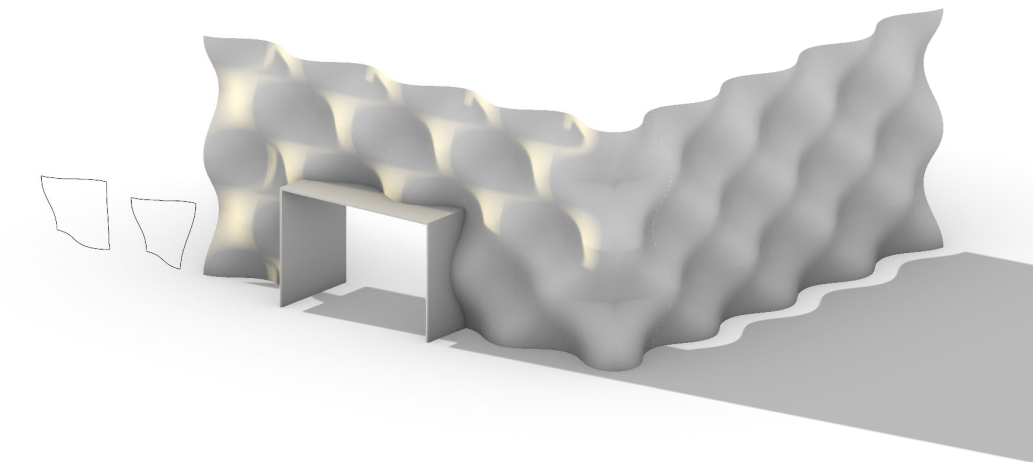
Useful components I learned from these tutorials include Voronoi 3D, Voronoi, Clean Tree, Cull Index, Evaluate Surface, and MD Slider. I also better understand the functions of the flatten, simplify, and graft options within various components as a result of this video.
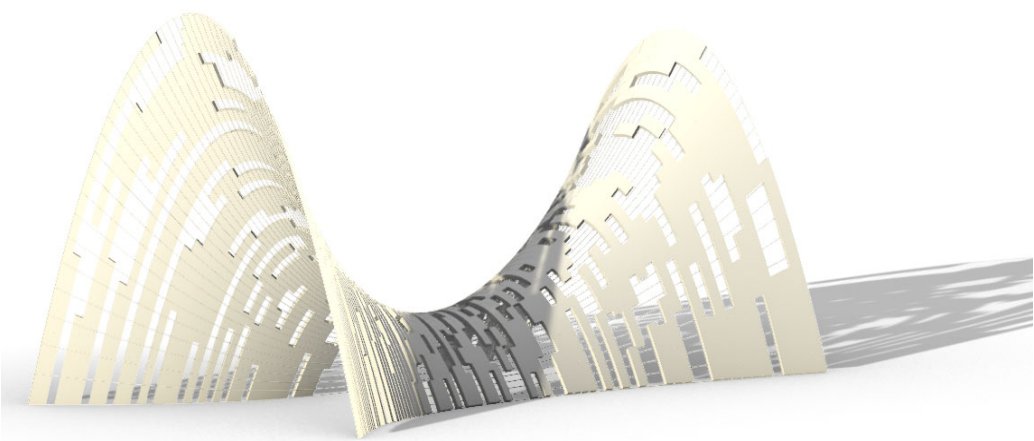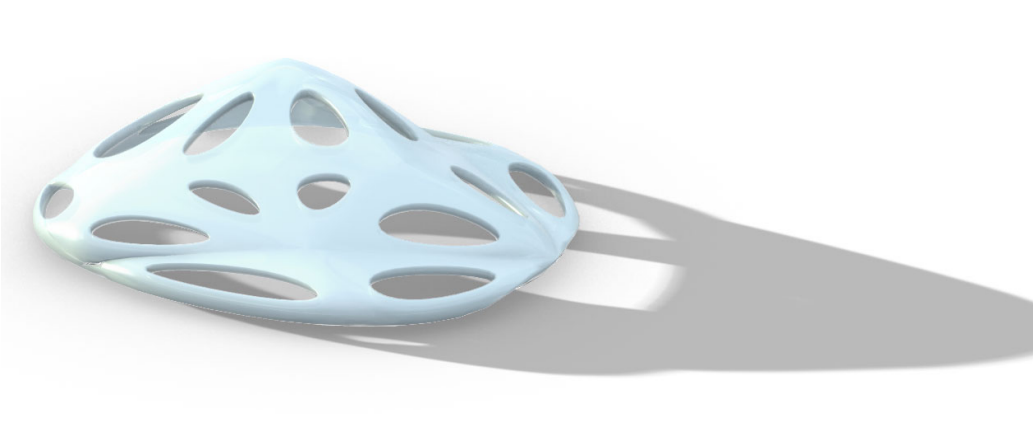

Iterations & Experiments

Voronoi 3D Baked Results (modified from: https://parametrichouse.com/parametric/voronoi3d/)
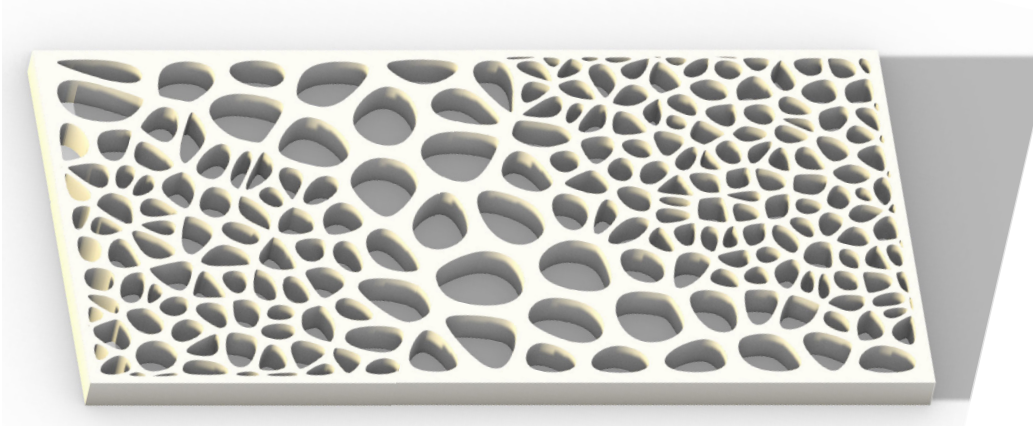
Voronoi 2D Baked Results (modified from: https://parametrichouse.com/parametric/attractor-voronoi-cells/)

The Boiler Suit Model was the only tutorial that I watched that did not include a grasshopper script, but instead was created entirely in Rhino. This video explained a simple workflow for creating a freeform tile that is repeated to create a skin. This tutorial is based on an actual building facade.

Boiler Suit Rhino Model (modified from: https://parametrichouse.com/parametric/boiler-suit/)

This tutorial described how to create catenary curves in grasshopper, scale them, loft them together, then create a structure and panel system for the lofted surface. While the actual panelization technique was more useful for my studio project, the Catenary component and the way in which the video explained how to scale and loft the curves was useful.


Catenary Panelization Baked Results (modified from: https://www.youtube.com/watch?v=qpuSBm7PGqU)

The Delauney mesh tutorial introduced me to the Delauney Mesh component and how different Weaverbird components such as Picture Frame, Mesh Thicken, and Catmull-Clark SubD can be used to subdivide, smooth, and perforate the mesh in different ways to produce organic and unique forms.
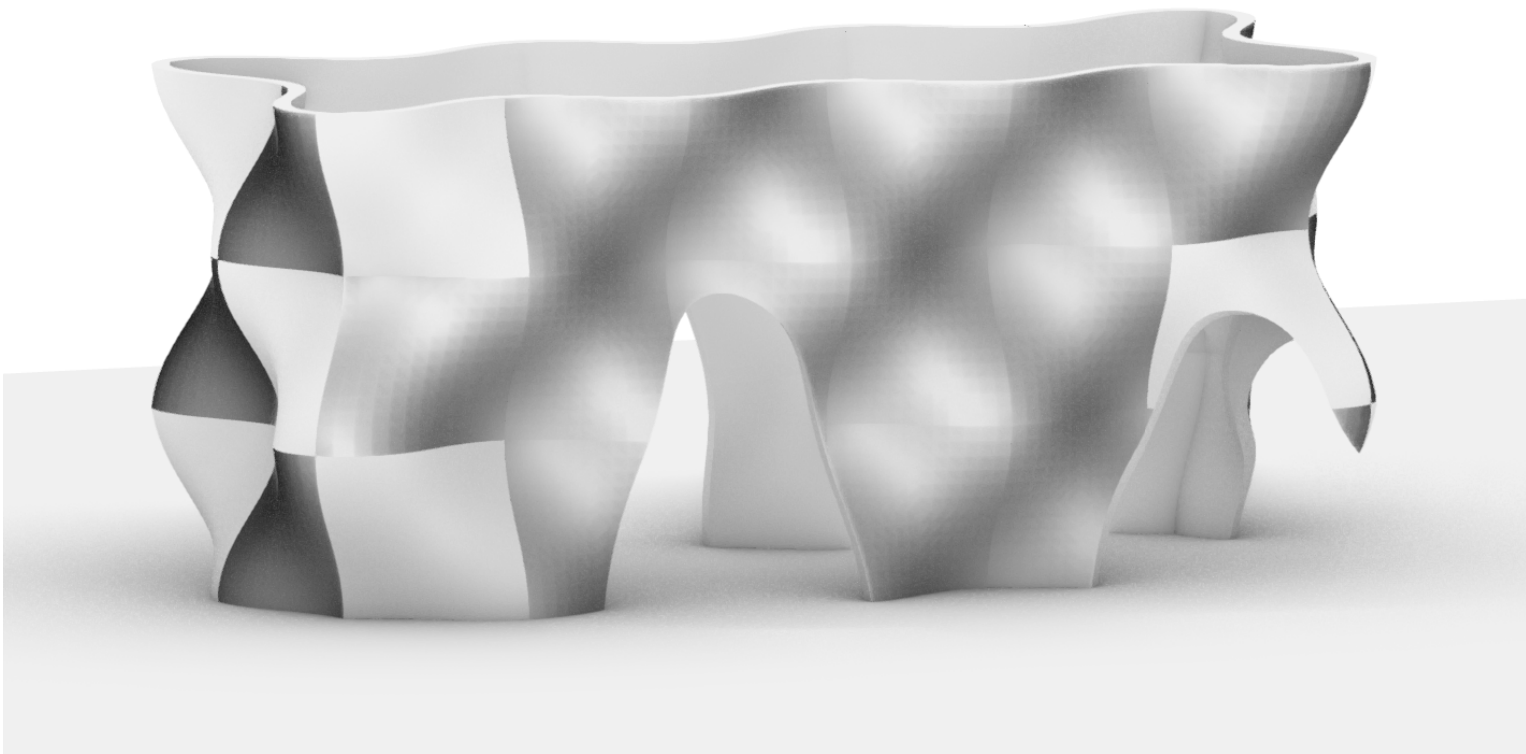

Delauney Mesh w/ Weaverbird Components Baked Results (modified from: https://parametrichouse.com/parametric/delaunay-mesh-2/)

Project Development

Modeling with Rhino, Grasshopper, & Weaverbird

After going through the tutorials, I attempted to create an iteration of the overall form of the play structure by combining concepts and components from the tutorials. For this initial iteration, I first emulated the Boiler Suit model in grasshopper rather than in Rhino in an attempt to make the process more parametric. Next, I used the catenary component to create a series of lofts to cut into the main model of the freeform panels, creating interesting holes in the form that begin to resemble my earlier sketches and take inspiration from Antoni Gaudí's experiments with catenary curves and oragnic shapes. Next, I plan to continue to implement components used in the tutorials, such as the Voronoi tools, to bring the model closer to my sketches. Additionally, I plan to model a structural idea for the play structure and implement elements of play such as slides, mobile steps (see earlier drawings), swings, and more.
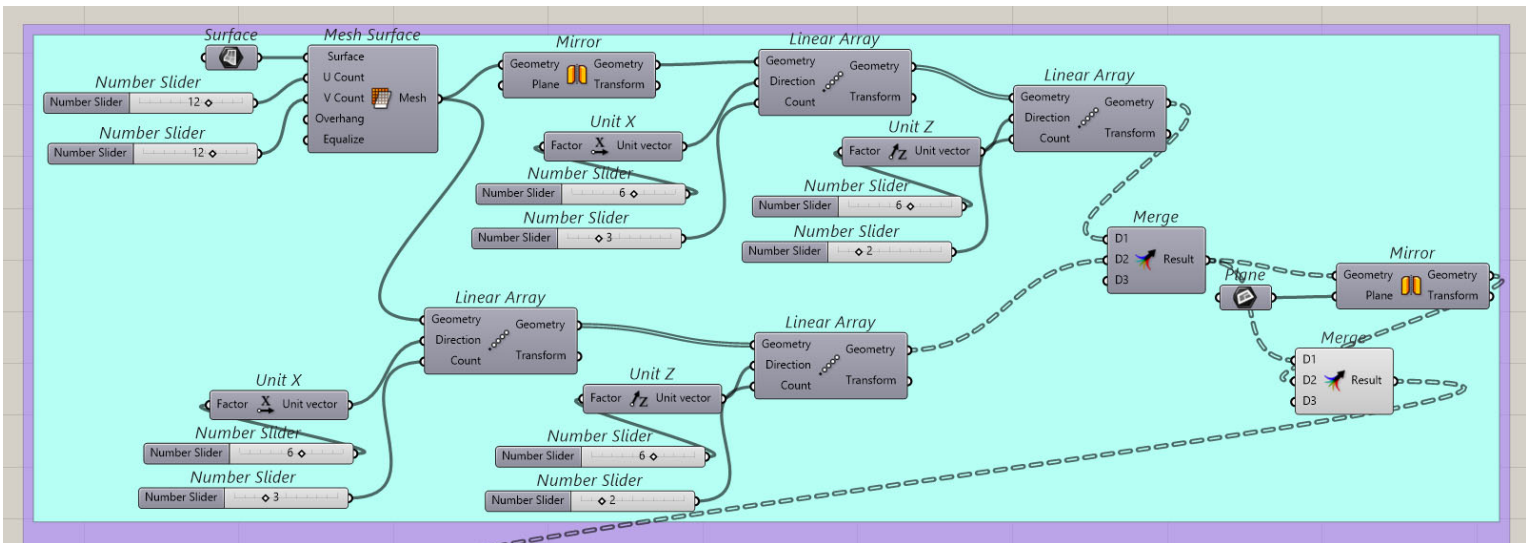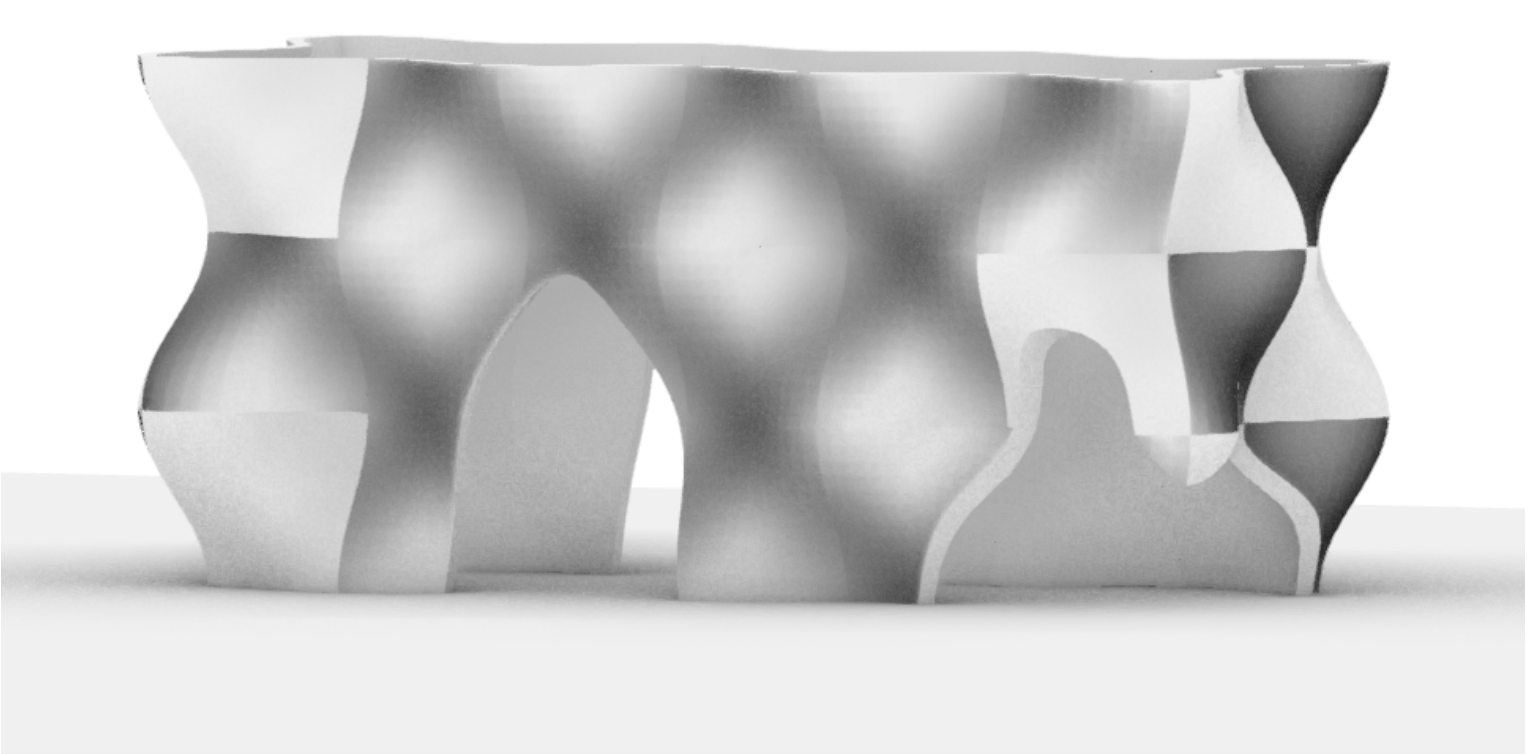

Play Structure Iteration Grasshopper Script (Part 1)
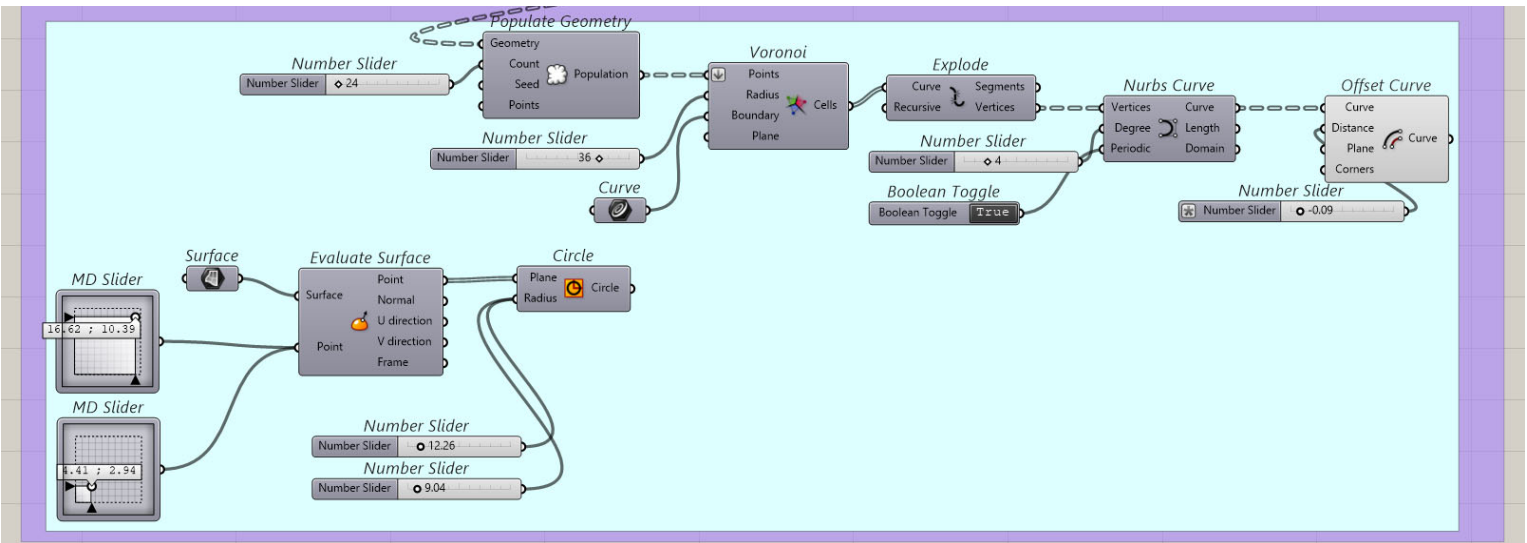
Play Structure Iteration Grasshopper Script (Part 2)

Play Structure Iteration Baked Results

Play Structure Iteration Baked Results