Japanese Garden

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ITGM 721 Environment for Games

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Professor Jacques Khouri

Contents

Inspirations

As a child in the 80's I was not only a huge fan of the Martial Arts, but I was really into plants as well.
When Karate Kid was released I became a huge fan of the Japanese Garden and Bonsai. Years later as an adult I wanted to create some beauty the likes of the Bonsai.
On this page is the final render from a self study of the tiny trees.

Finishing the tiny bonsai I was driven to create a whole environment in a similar style.

Research and Reference

I am fortunate to have lived close to an exquisite Japanese garden. At the Chicago Botanical Gardens just outside of Chicago Illinois the Japanese garden is on an island in the middle of a small lake. The garden actually starts before the bridge to the island, where there is a peaceful house of meditation and tranquility. I did two photo sessions and gathered my own research and references. The Botanical Gardens also has a Bonsai exhibit in one of its buildings. I took the time to gather pictures of almost every bonsai there. This link to my Flickr page has an album containing many photos from the garden. Here are a few picks of the 244 pictures in my Japanese Garden album. These pictures inspired art that was to come.

Research and Reference

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This image was digitally painted by Jeremy Vickery a former lighting artist at Pixar. Jeremy created a Gnomon class on practical CG lighting, and through watching it I learn good, fast, and efficient techniques for lighting. In this painting the atmosphere and color scheme were close to what I wanted to achieve. The blue and orange are complimentary, and the heat implied from the orange pulls the viewers eye to the house and lights as a main point of interest.

Thumbnails

Out of the many photographs taken a refined set of assets were planned and explored through quick sketches. While sketching I find that intricacies of items in our environment become more clear. This is a result of the close observation that is required for drawing an image.

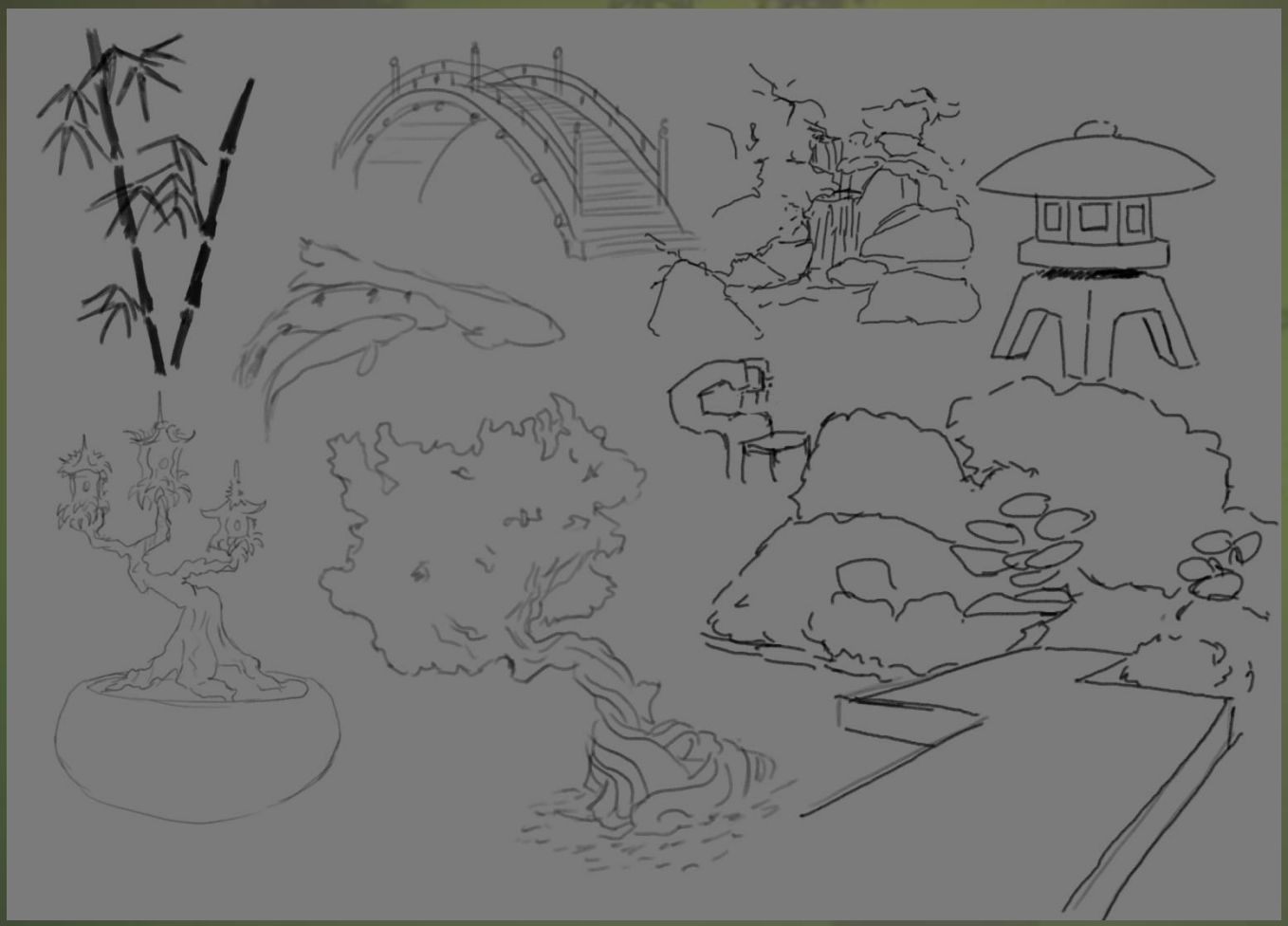
Here I was exploring lanterns, bonsai, vegetation, flowers and fish.

Thumbnails

Here are sketches of waterfalls and statues, lily pads, vegetation, bridge and lanterns. I would have liked to incorporate a waterfall into the scene, but the short dev cycle of three weeks did not allow for extras.

Thumbnails

Bamboo is one of my favorite plants. When I was in a rainforest last year I was amazed at how high the bamboo can grow; it towered over me and created a green tint to the ambient color, very intriguing!

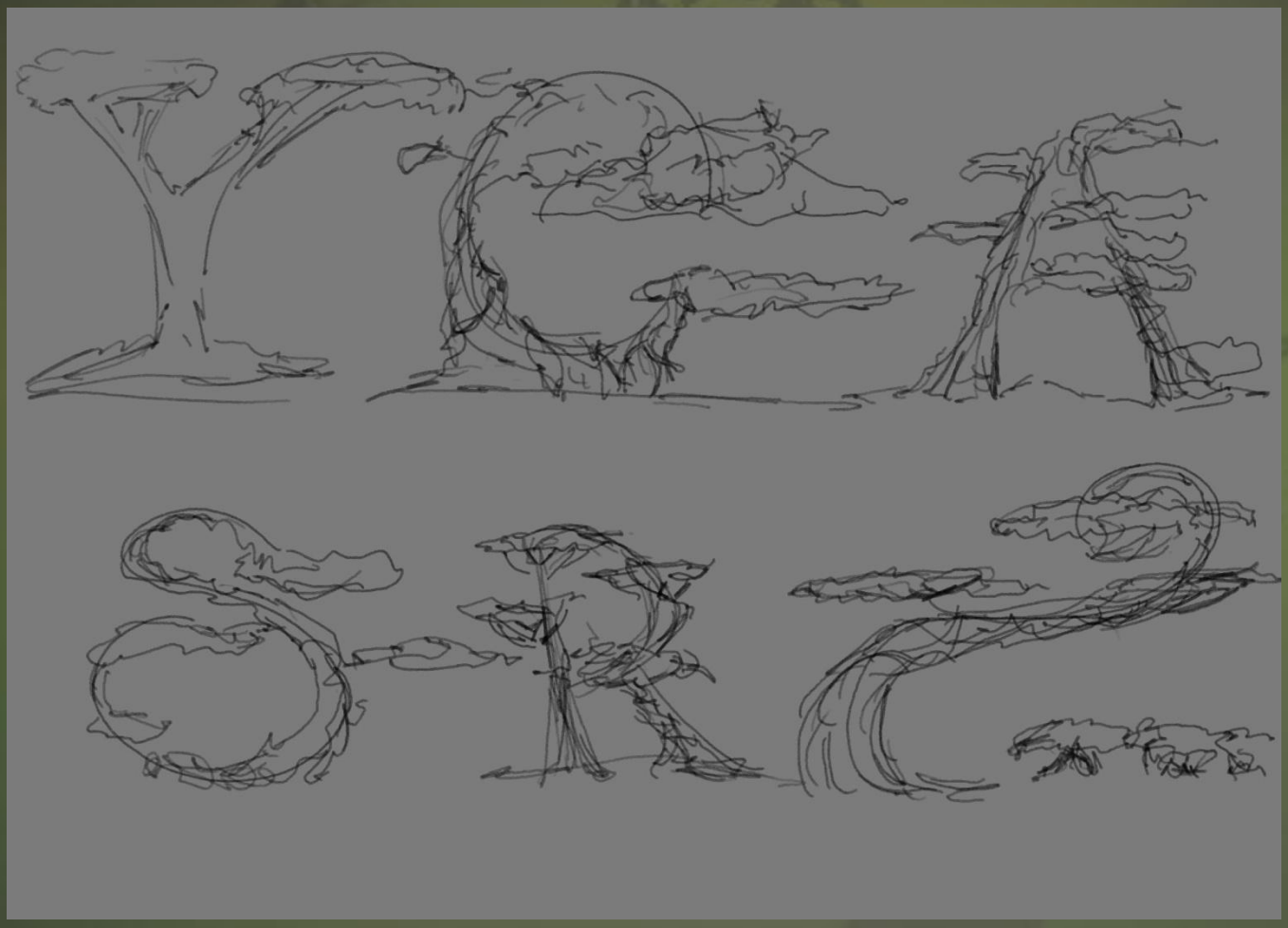


Thumbnails

Koi, pottery rocks, trees and more lily pads

Thumbnails

In this study I was exploring the possibility of writing with bonsai. I thought it would be interesting to communicate via vegetation.



Roughs

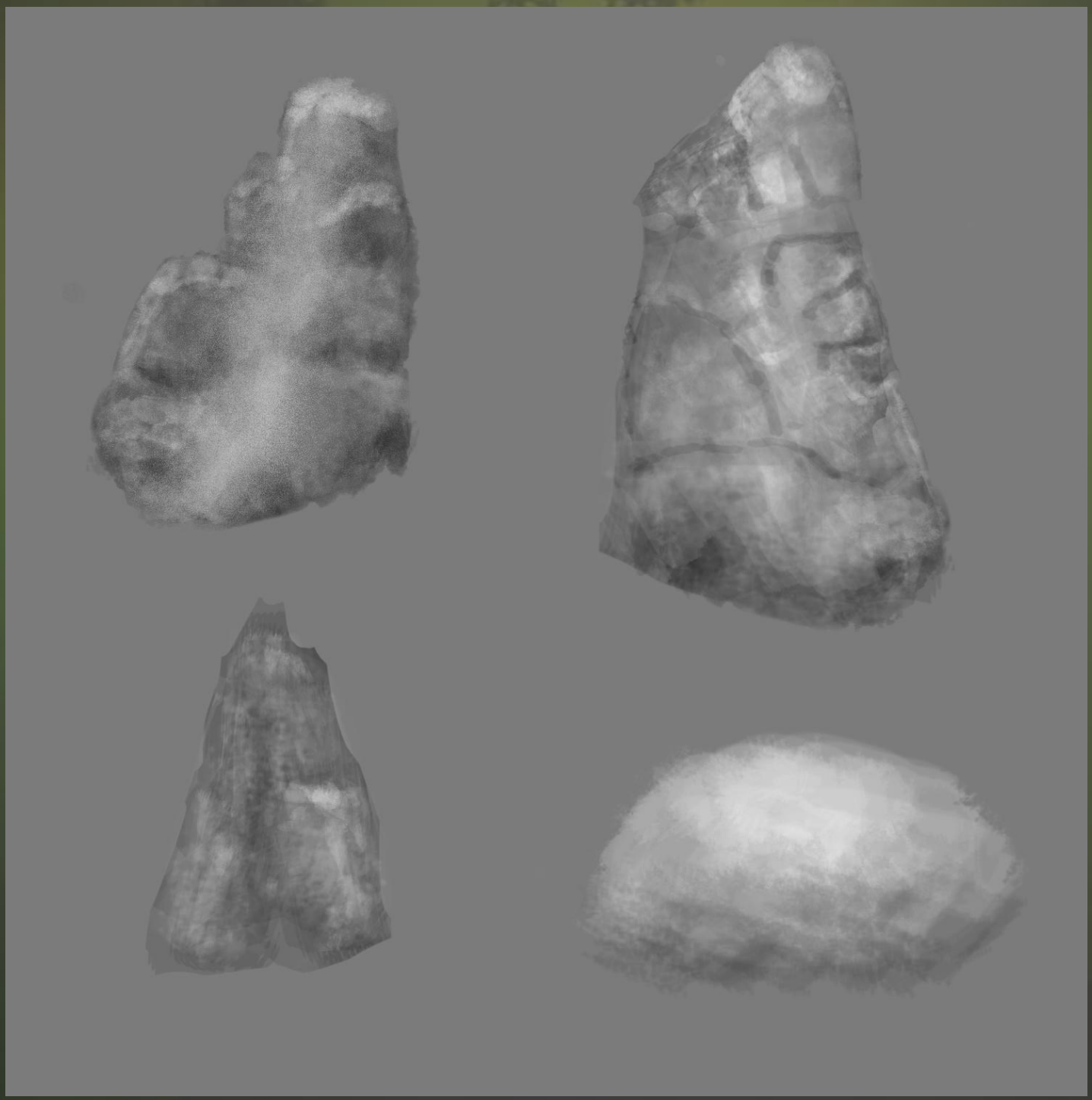
These lanterns have always intrigues me. They are like little houses for lights! And they light your way too. I created two similar lamps to these.

Roughs

I have always been a fan of simplicity. Sometimes life seems a little complex, but a simple little hut, and a good food supply might be all we need.

Roughs

A few different styled rocks were conceived for creation. At the botanic gardens there were some great mossy rocks that made a great source for texturing the final assets



Roughs

Here I was configuring terrain in 2D. I find that drawing things out helps me create better assets in the end. I took pictures of many of the trees around the garden, I thought the sparse ones looked interesting.

Roughs: Final Concept

Here I gave a visitors point of view, someone peaking in on the tranquil domicile.

Computer Roughs: Objects

Here are the lanterns I modeled and textured for this project along with the hut.

Computer Roughs: Rocks

Here are the rocks I created to be placed around the level. I tried to create the land rocks in a modular fashion so that they could be turned different ways to achieve variety.

These rocks were created using Zbrush and Substance Painter. The textures for the moss were created in Zbrush while the rock texture was taken from a photo and processed through Bitmap 2 Material (B2M). After all the normals, AO and curvature were baked out the two textures were brought into Substance Painter and combined using masks.

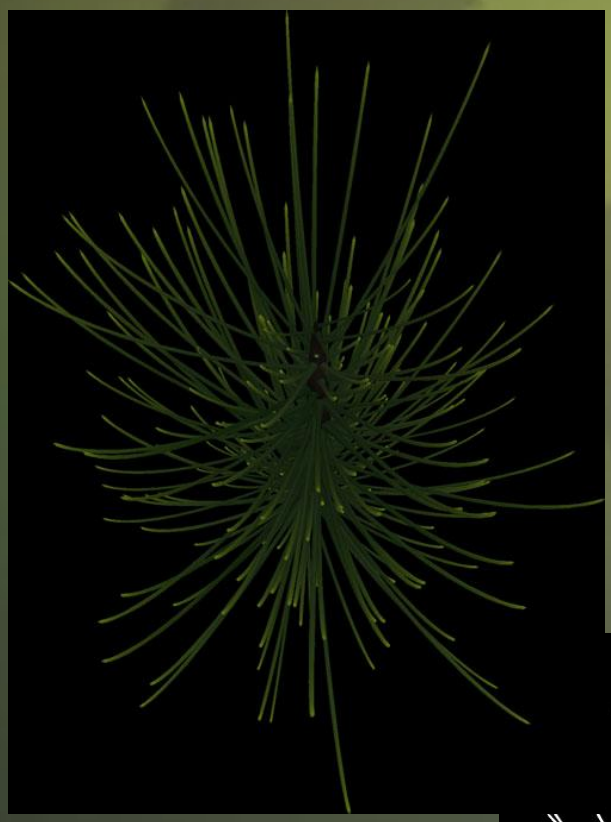
Computer Roughs: Trees

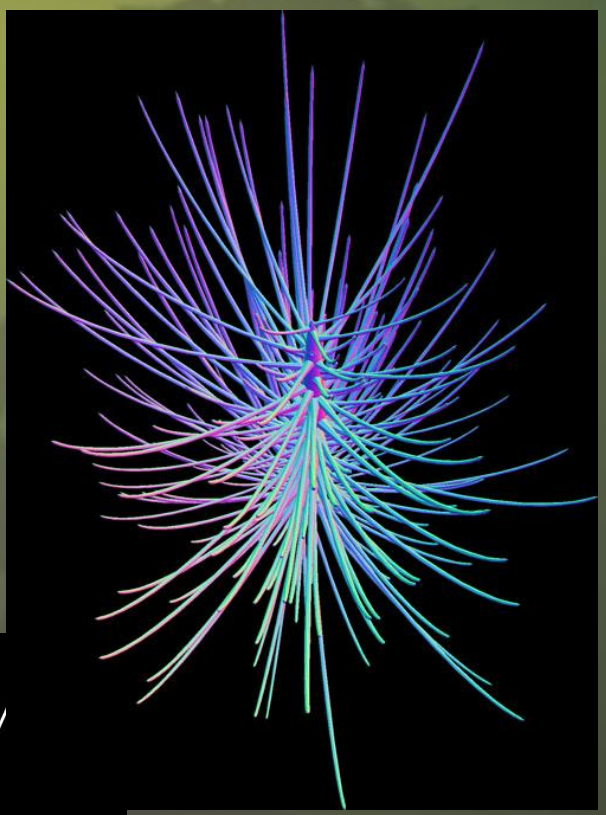
While I enjoy modeling trees, they do tend to eat up a lot of time in creating. For that reason I used speed tree to create the models and UV's. I created the bark and leave textures from photos I took and B2M. the pine tree needles on the other hand were created in Zbush with a workflow I figured out on my own. Shortly after I came up with the procedural workflow in Zbrush for plants, I saw other people doing the same kind of technique; I guess the collective conscience was sharing this nifty technique with other brains.

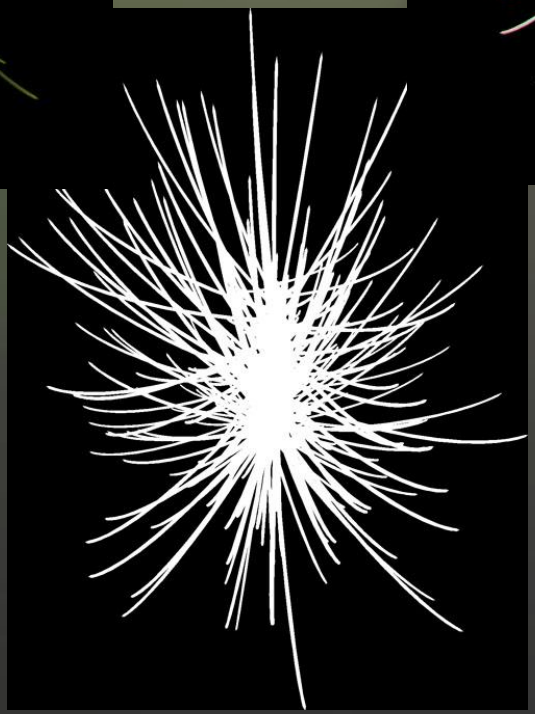
I chose trees that are usually found in Japanese gardens, but I wanted to have a little variety in the color scheme between the trees, so I added in the Japanese Maple on the right.

Computer Roughs: Foliage

This is an example of how the pine needle textures look coming from Zbrush. I use a combination of fiber mesh and material capture s to save out true geometrically accurate normal maps. The setup is rather fast and easy because of the procedural nature of fiber mesh. Basically all one has to do is create one fiber, then on that fiber create a bunch more; then adjust the camera to a desired angle and save the documents canvas as a PSD. Change the material to the Normal Map material, wash rinse and repeat.

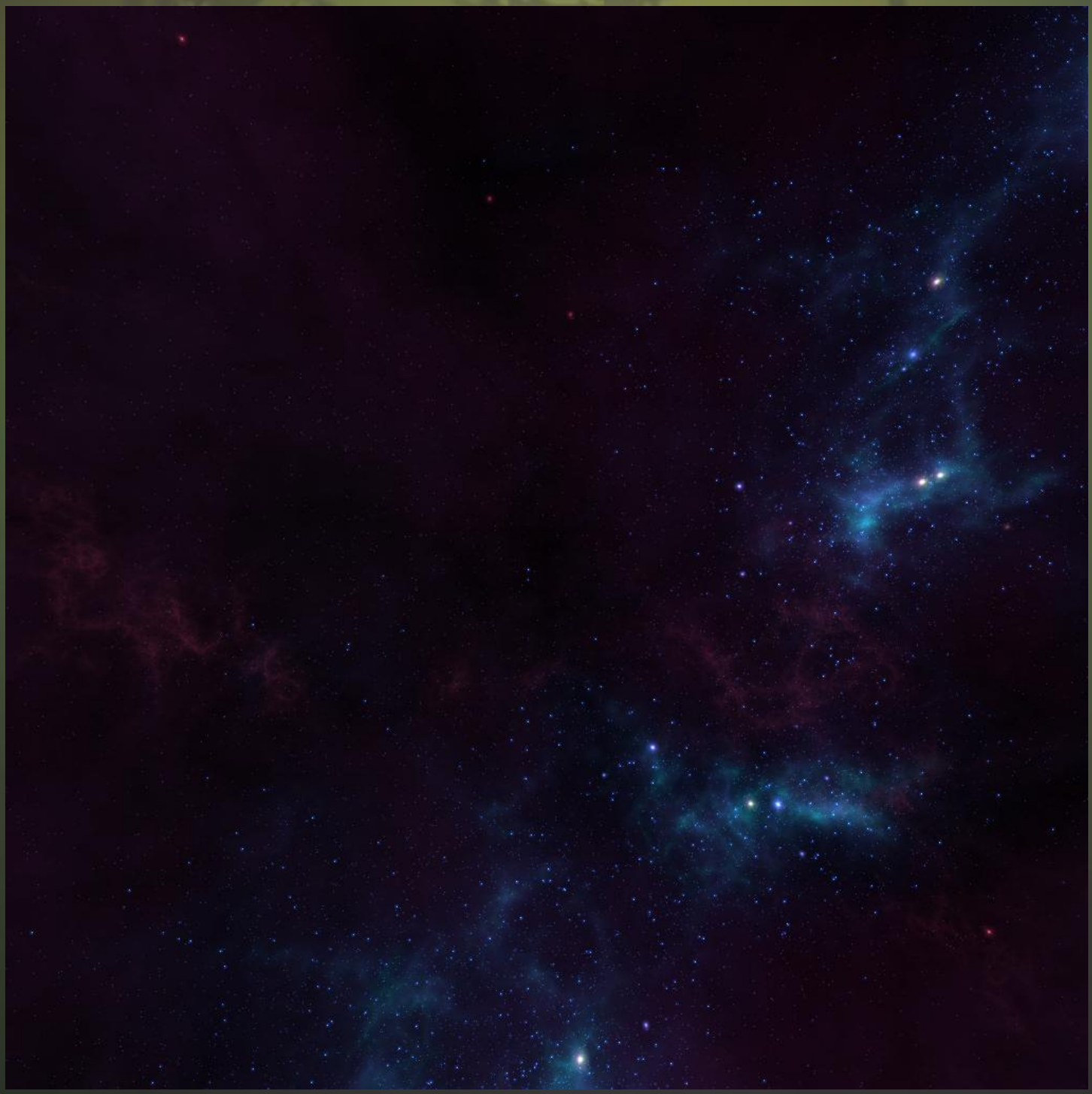






Computer Roughs: Sky

For the sky I used a free sky creation program called "Spacescape" . Spacescape allows the user to enter numerical values for different space phenomenon's and have them procedurally generated. Here is an example of one of the cube mapped sides. I chose to go with blues and purples to compliment the orange from the lamps and the hut.



Computer Roughs: Terrain

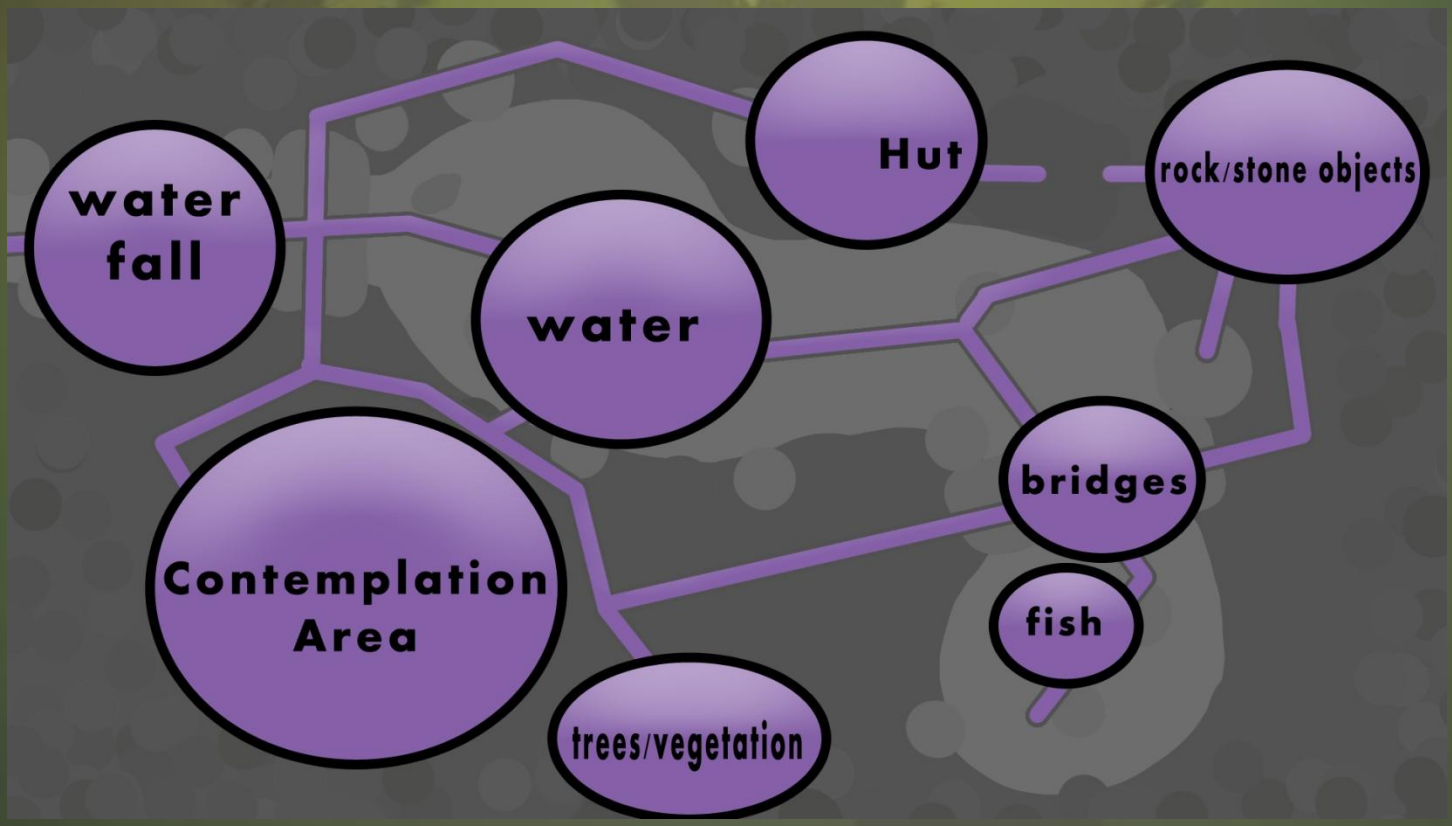
This is the terrain with textures applied. The terrain was created with a combination of Zbrush and Substance Painter. The moss was created using a combination of sculpture and fiber mesh. The rock was from photos and was processed in B2M.

Computer Roughs: Grass

Grass was very important to the scene as it suggests a healthy living environment. The grass was placed around the hut and in the water. The bamboo was handmade in Modo and textured using photos I took of similar plants found in Puerto Rico. The grass was photo sourced from the Botanical Gardens photo shoot.

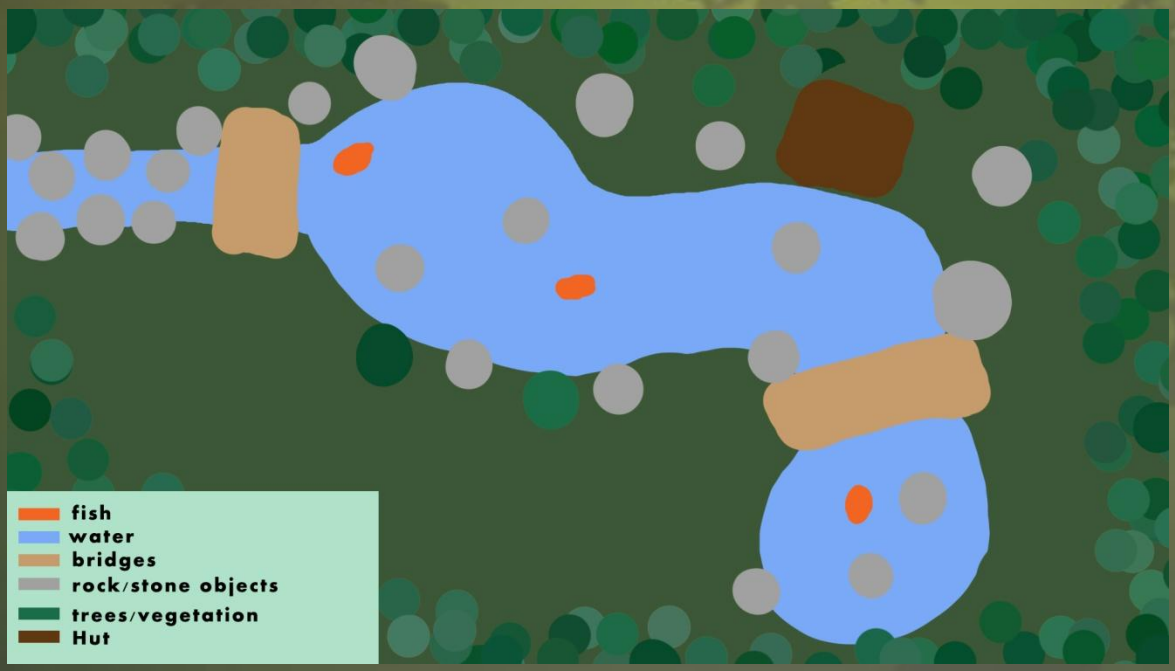
Analysis: Bubble Diagram

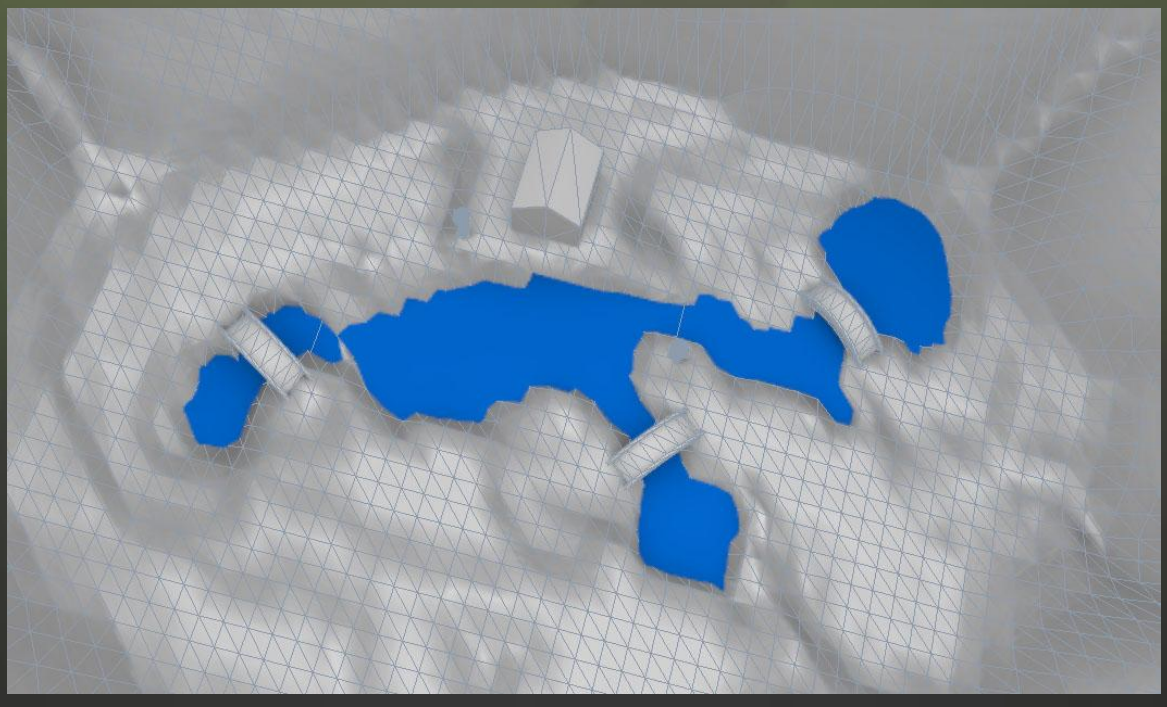
We learned in the course unit reading that creating a simple bubble diagram is a good way to flesh out the direction the environment is to take. Here is the diagram that introduces the major areas that were wanted for the completion of the assignment. While an effort was made to complete all the areas the project goals and the project timeline were not in sync, and the waterfall and the fish had to be cut.



Analysis: Design Plans

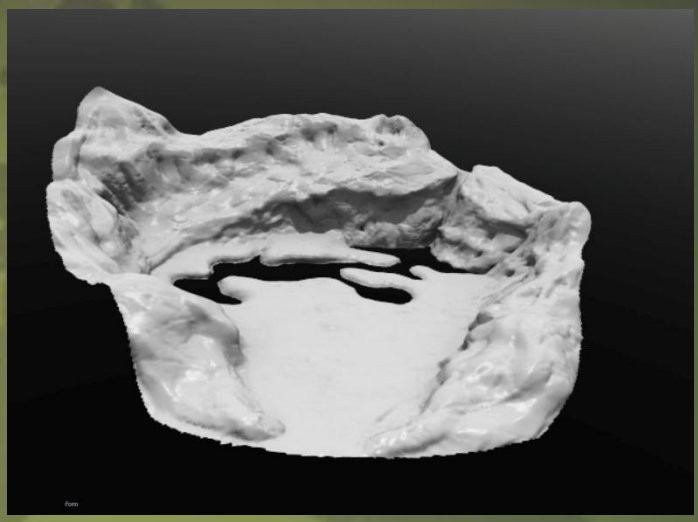
The second step in environment creation was to create design plans that served as a top down look at the layout of the environment. Below is a loose representation of where the layout was headed. In the end deviation occurred because of the fact that 2D plans do not always translate to 3D in an aesthetically pleasing way. In the bottom picture, during the block out stage, modifications were made based on perspective camera research within the game engine.

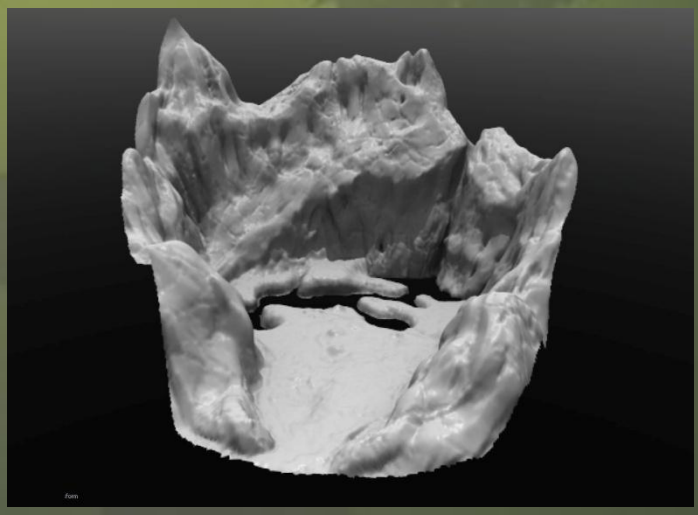


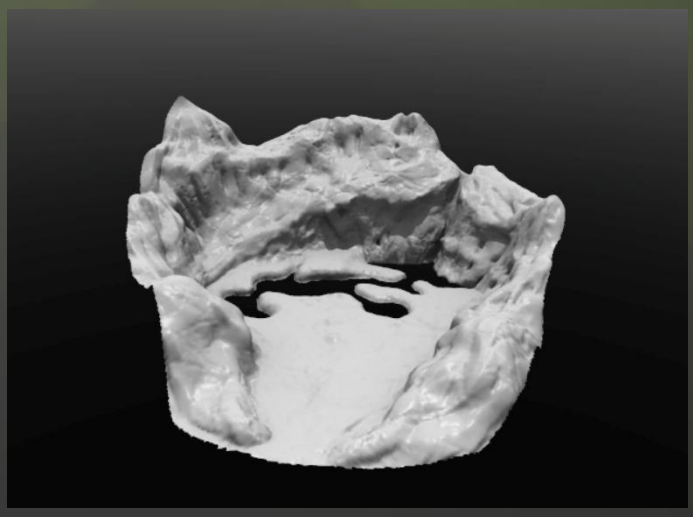


Analysis: Terrain

This is a look at the sculpted terrain; I started sculpting the major forms in Zbrush. Then using rock alphas and crack alphas I sculpted the high poly form. Consideration was given to how high would the rocks need to be to encapsulate the map, without going too high. Here you can see the terrain scaled 3 different ways. I wanted the area to feel private and removed, so I chose not to go with lower mountains (top). The taller mountains did isolate the area well, but I wanted the immediate mountains to look approachable, like one could walk up them if so inclined. I went with a peak that was in between tall and shorter mountains because I felt it would achieve the balance I was looking for (bottom).





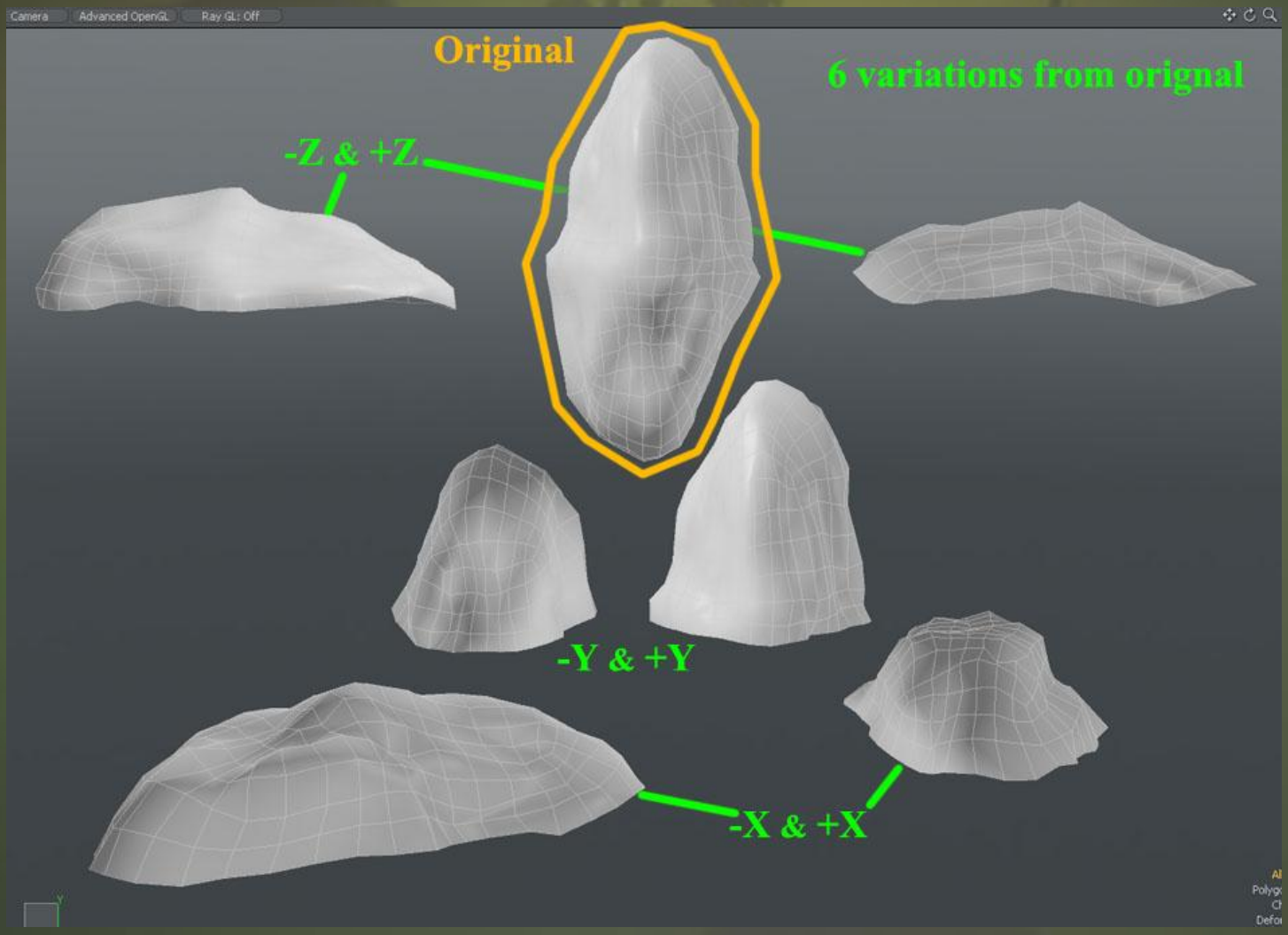


Analysis: Foliage Optimization

I really wanted to have a plethora of bamboo like I experienced in the rainforest, but within game environments foliage can really slow down the scene if it uses alpha. In order to try to optimize I created the bamboo leaves to be all geometry to avoid overdraw.

Analysis: Modularity and Optimization

The rocks were a very important addition for introducing ambiance, and direction of player. The rocks while modular were also optimized to be lower poly. In the diagram below 6 variations are present based on their XYZ axis.



Final

Here is a look at the final scene in Unreal Engine 4, after all of the pieces were placed and arranged.

Final II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Final III