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CS 148 Final Writeup: “The Guardian”

Image Motivation:

At first glance, I expect that viewers would see the fairies flying around and the dragons sleeping. However, as they look at the scene more, they might start to ask some questions. Why is this church abandoned? What are the intentions of the swordsman lurking in the shadows?

Work Done:

With the exception of the HDRI [2], the plant textures [3,5], the dirt textures [4], and the plant models [5], I constructed everything myself. All of the modeling and texturing was done in Blender.

Project Requirements:

Main Geometry from scratch:

I made all the main geometry from scratch. I sculpted each of the dragons’ heads, torsos, arms, and legs before remeshing them in a modeling workflow. I sculpted the swordsman, but I didn’t remesh it since it would be blurred anyways. I sculpted the cape using Blender’s cloth brushes and I directly modeled the sword. I sculpted the dirt to ensure that it was not flush with the ground.

I modeled the church using a reference image of the “Church of Mood” [1], and I used the fSpy addon [6] to keep all of my geometry aligned when I was using this reference. I modeled one pillar segment and used the array modifier to construct the rest of the hallway.

The only geometry I didn’t make from scratch were the trees, ivys, and grass. I imported the grass model from quixel [5], and I used Blender’s built-in “IvyGen” and “Sapling Tree Gen” plugins for the other models.

UV mapping from scratch:

I created UV maps for every part of the church and the dragons. Unwrapping the dragons was difficult since the base meshes did not follow natural curves (even with the automatic quadri-flow remeshing), so I modeled more natural meshes with vertex snapping and the shrinkwrap modifier.

Texturing from scratch:

I made the textures for all parts of the scene with the exception of the dirt, grass, and leaves. I hand-painted the baby dragon's eyes using Blender's Texture Paint system.

Create a custom/procedural material:

Most of my textures were procedural and used multiple non-shader nodes.

The trickiest procedural texture to make was the hexagonal tiling on the floor. I used the symmetry of regular hexagons to find a rectangular section that could be tiled infinitely. I then would determine which hexagon a certain point on the rectangle corresponds to using the formula for the distance from a point to a line segment. This procedural texture allows me to change the width of the margins between each hexagon, and it allows me to color certain hexagons differently from others.

I created a procedural texture for the scales on the dragons. I again used the technique of finding a rectangular section that could be repeated infinitely, and I used overlapping parabolas to represent each scale.

I also created a simple water surface texture, which was just a scaled noise texture pushed into a bump map. This gave me realistic results, since it seemed like the rain was causing ripples in the puddles.

Another interesting material was the texture of the fairies. I had to use the "Is Camera Ray" input in the light path node to make sure that the fairies don't become completely white and overexposed. I also used the random input of the object info node so that the fairies are varied in color.

Blender/Cycles feature:

My camera had a depth of field effect, where the f-stop was 0.5 and the focus object was the baby dragon's face. I used motion blur and particle emissions to simulate the rainfall. I had a volumetric mist in a cube around the entire scene to add to the rainy effect. I also used the new Geometry Nodes feature in Blender 3.0.0 to place the grass in the scene.

Technical Contributions:

The main technical contributions come from my use of nodes and other procedural effects in this scene, as laid out in the custom/procedural material section above.

References:

[1] I modeled the worn down church based on an abandoned church in Italy called the “Church of Mood” [<https://urbex.net.pl/church-of-mood/>].

[2] I used a cloudy HDRI from polyhaven [https://polyhaven.com/a/kloetzle_blei].

[3] I used the ivy textures from 3dtotal’s Ivy Generator tutorial [<https://3dtotal.com/tutorials/t/ivy-generator-how-to-create-with-blender-filippo-veniero-generator>].

[4] I used Poliigon’s free Ground Dirt Forest 14 texture [<https://www.poliigon.com/texture/ground-dirt-forest-014>].

[5] I used the quixel Ribbon Grass models and textures [<https://quixel.com/megascans/home?category=3D%20plant&category=grass&category=lawn&assetId=tbdpec3r>]

[6] I used the fSpy app for initial camera calibration [<https://fspy.io>]

[7] I took inspiration from a shutterstock image of a dragon sleeping [<https://www.shutterstock.com/image-illustration/3d-rendering-red-fantasy-dragon-isolated-1042531006>]