



BROKEN HORIZONS

INDIVIDUAL CONTRIBUTION

Jessica Dong (s5803453)

MSc CAVE

ABOUT OUR PROJECT

Introduction

We aimed to recreate a real-world environment in Unreal Engine 5, exploring innovative and efficient workflows in technical art.

Approach

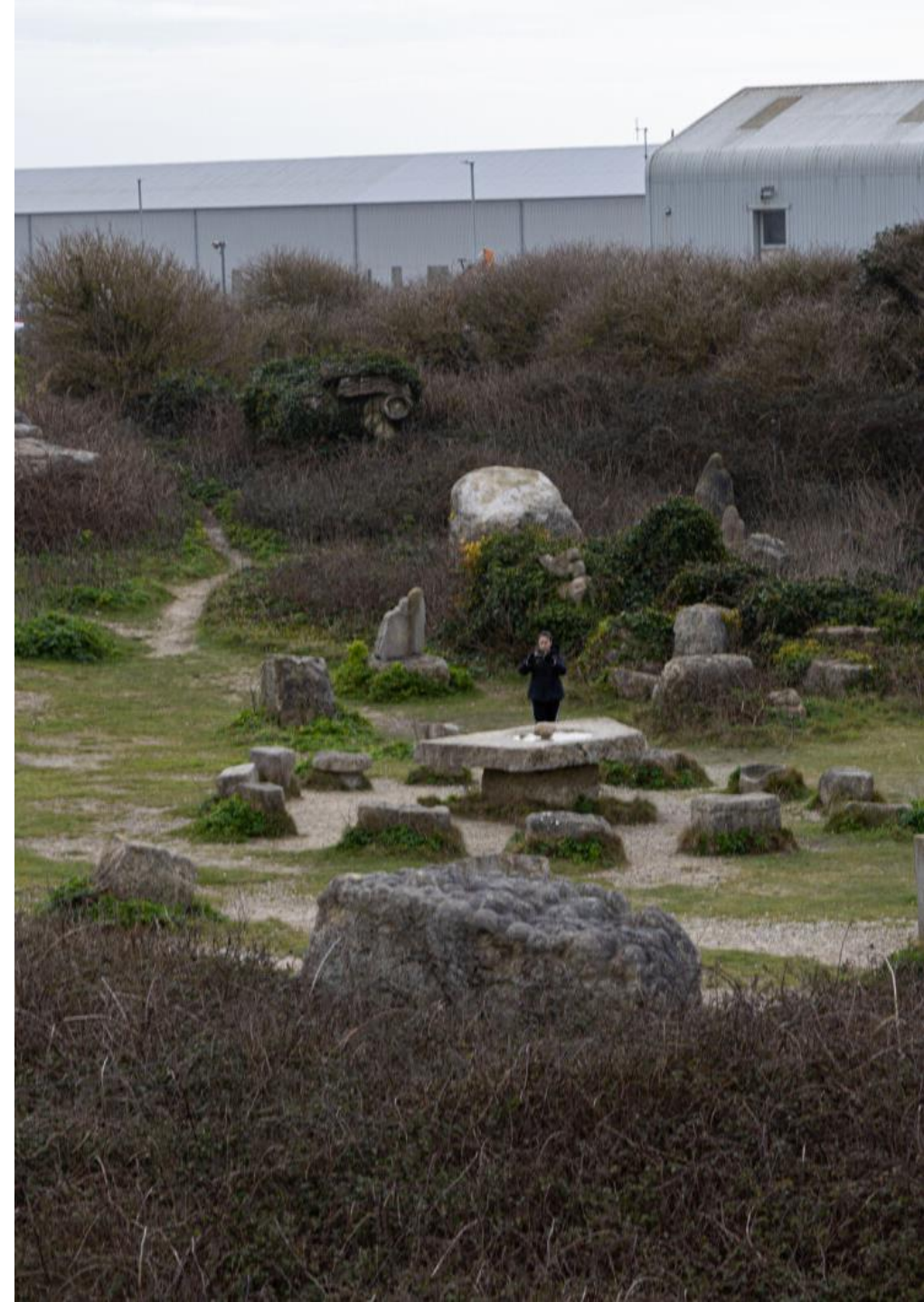
We visited Tout Quarry Sculpture Park to capture photographic references.

Using PCG workflows and various DCC tools, we reconstructed the environment in Unreal Engine..

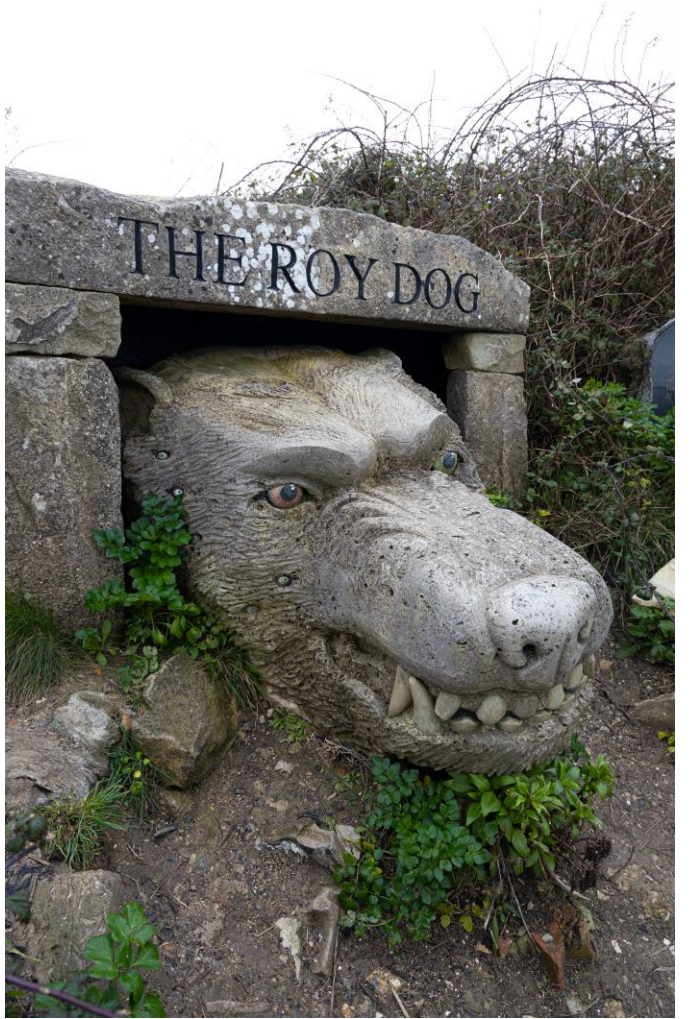
Outcome

Recreation of the “Circle of Stones” area with a high level of detail — a 1,500 square meter environment featuring ancient sculptures, stone structures, and natural foliage.

A 1.5-minute cinematic video to showcase the final result.







INSPIRATIONS

Death Stranding

Death Stranding is a well-known game famous for its realistic natural environment based on Iceland. We are inspired by this game and want to create our own version based on local historical place.

PROJECT PEGASUS

Project Pegasus is an in-house tech demo designed to use Houdini's procedural workflows to create an open world 3D environment that integrates with the latest technologies in Unreal Engine 5.

SideFX shows their workflow of creating a procedural environment with detailed documentation. However, it is challenge for us to complete similar project within two month, because SideFX takes more than half year with experts to develop those approaches.

Therefore, we will try to complete a selection of procedural functions and a simpler environment demo



MY ROLE AND RESPONSIBILITIES

Director (Environment & Pipeline)

- Pipeline and Workflow
- Environment Work
- Tool Development

PIPELINE AND WORKFLOW

Documents > General > Individual Progress		
	Name ▾	Modified ▾
	Jessica Dong	February 5
	Joshua Medina	February 10
	Kyle Galenzoga	February 10
	Osher	February 8
	Youyang Dong	February 10

Meeting Notes and Resources ▾

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Clipboard Notes and Resources ▾

+ Add section	+ Add page
Meetings	Meeting 1
Weekly Engagement	Meeting 2
tutorials resources	Meeting 3
	Meeting 4

Notes Week 1 / First Meeting / 10-02-2026

Jessica — Landscape / Environment Blockout

- **Current progress:** Building the project **Landscape** (the primary early mountainous terrain **blockout** during today's meeting).
- **In progress / research:** Continuing material research for the Landscape strategy, and shader approach).
- **Skill focus:** Needs more hands-on practice to speed up iteration.
- **Next steps (next week):** Start dressing the scene with **grass** (initially more populated environment with **plants and trees** by next week).

Osher — Procedural Foliage (Houdini → Unreal)

- **Current progress:** Developed a **procedural foliage system** in Houdini to "wrap" foliage over environment surfaces (e.g., foliage growth or required plugin to support the workflow).
- **Next steps (next week):** Explore **grass workflows**, begin experimenting with placement/control, and/or prototype **trees**. Final direction still flexible.

David — Wind Animation / Foliage Motion

- **Current progress:** Implemented a **wind effect** test using a plant asset to simulate foliage movement.
- **Next steps (next week):** Attempt **foliage interaction** (collision-stopping motion when elements overlap or come into contact, rather than just passing through).

Kyle — Task / Material / Shader / Material / Shader

I set up folder structure and notebook for the team to update their weekly progress. We meet weekly and have debrief meetings

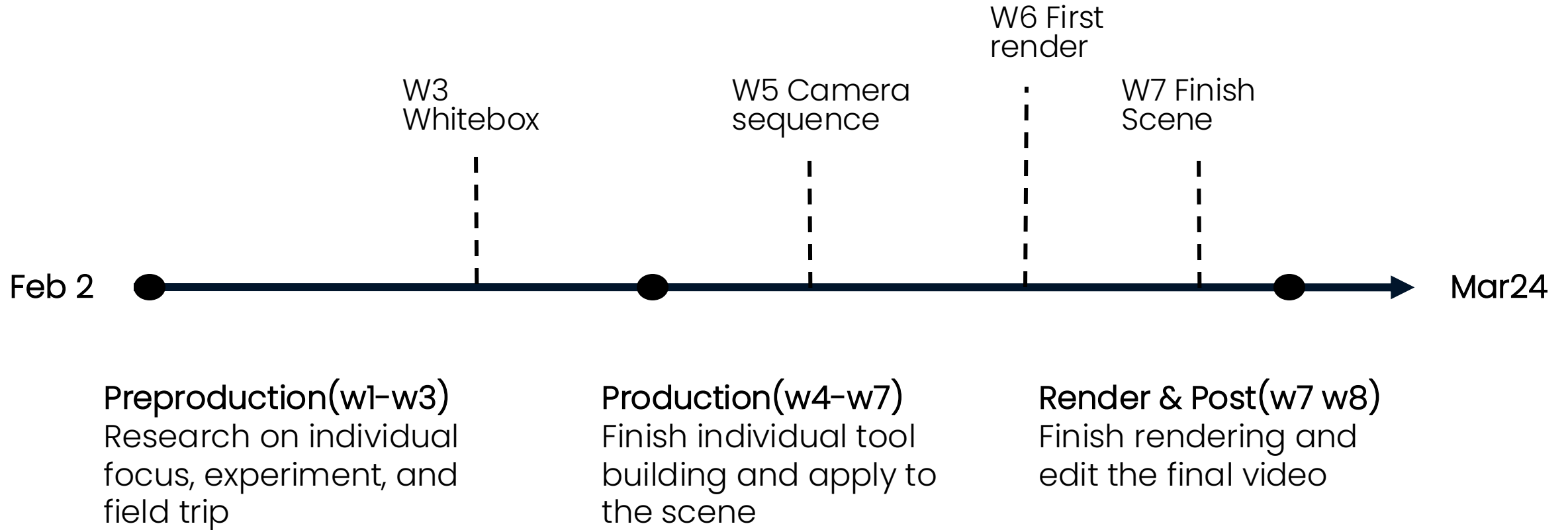
PIPELINE AND WORKFLOW

- Me and the producer design and set up engagement form so that every member document their weekly tasks and share together.
- We also set our weekly milestones in advance

WC February 2nd

	Weekly Tasks	Notes	Place to share what we did
Jessica	Create a procedural Landscape in UE	Created landscape with Gaea, a professional landscape tool that can export heightmap, rivermap , snow map etc. Set Gaea plug-in to Unreal. Created landscape master material and paint material to layers. Problem to be solved: Texture size unmatching	GaeaLandscapeToUnreal.mp4
Osher	Look at the foliage tutorial and try to see what's achievable to do in our time frame.	Created the procedural foliage tool in houdini , set the houdini plugin in Unreal and then uploaded the had to Unreal. After uploading to Unreal, set an input for the tool (can be any object) and the foliage will apply on it (the asset will be covered in foliage). User can change size of leaves, amount of branches, layout on the object, can change leaves model. Seems quite feasible to do.	foliage_test_1.mov
Josh	Basic Lighting	I did some tutorial of basic Lighting and applied some techniques of Visual Effects on an environment	Exponential Height Fog.mp4 Sky Atmosphere Basic Overview.mp4
Youyang	Watch some blueprints and a simple HLSL tutorial, try to make the foliage sway in the wind.	Created a wind field effect for foliage by writing an HLSL noise shader (assisted by Gemini) and integrating it with Blueprints to drive vertex displacement.	week1_windgrass.mp4

PIPELINE AND WORKFLOW | TIMELINE

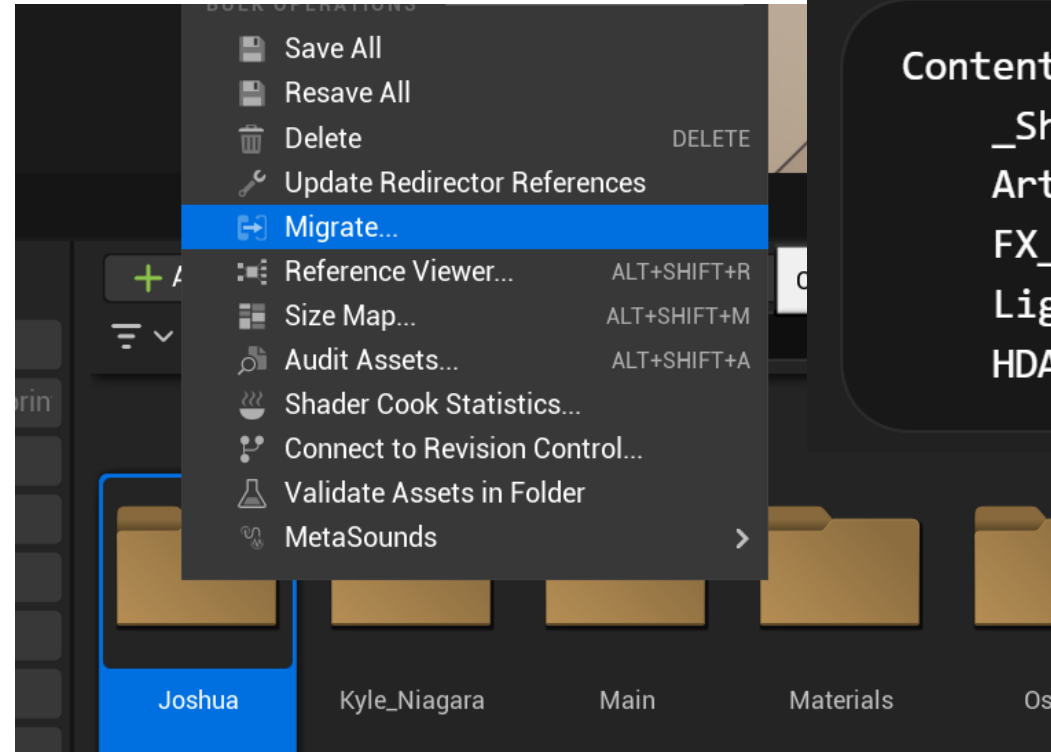


PIPELINE AND WORKFLOW | UNREAL

Working on the same project

Since the university doesn't provide any version control tool, we use **named folder** and **migration** to import individual works to the project

I check everyone's work by the end of the working day and integrate them together



Example:

```
Content/  
  _Shared/  
    Art_Xuwen/  
    FX_Jack/  
    Lighting_Lisa/  
    HDA_Mike/
```

PIPELINE AND WORKFLOW | UNREAL

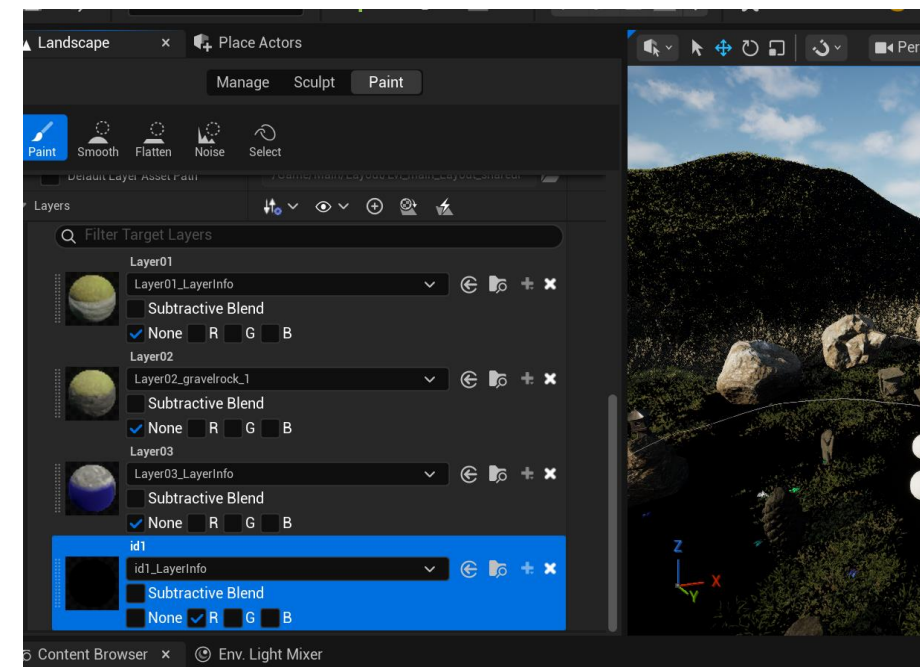
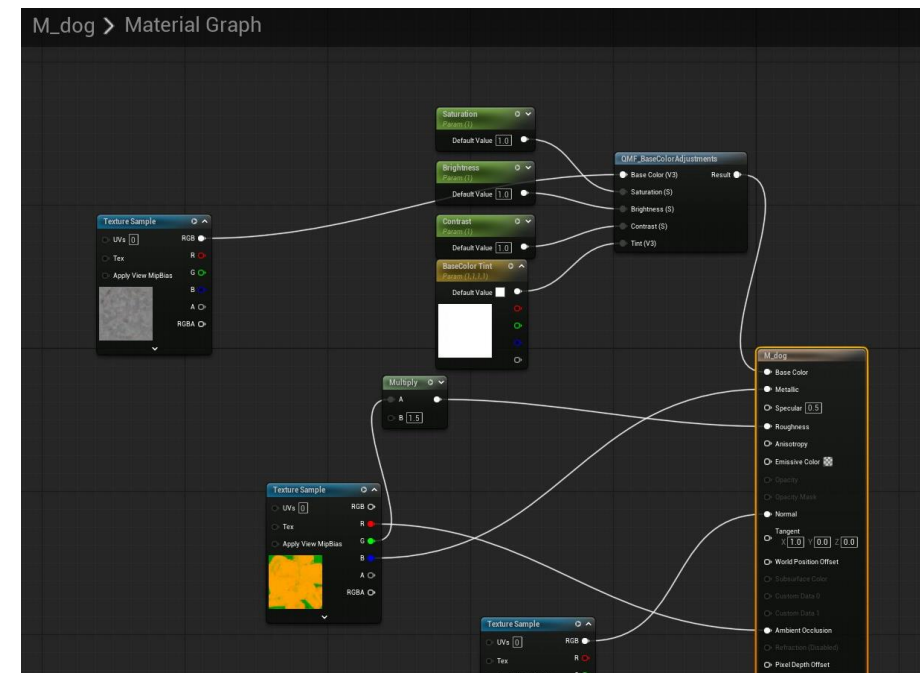
Custom Problem Solving

When team members submitted their tools or assets, they were not always directly usable in Unreal Engine.

I investigated these issues and developed solutions to ensure proper integration into the pipeline.

Examples:

- Adjusted texture color and parameters to better fit the scene
- Added ID masks to support HDA tools developed by other team members



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ENVIRONMENT WORK | LANDSCAPE CREATION

APPROACH	EFFICIENCY	PROS	CONS
Gaea	Unsure, learning curve	Open world size, has texture and details	Still need sculpting if doing real world reference
Unreal sculpting tool	Slow	Easy use	Not natural, time consuming
Houdini	Unsure, learning curve	More possibilities	Lots of to learn
DTM Data Heightmap	Fast	Accurate and fast	Less artistic, still need modify

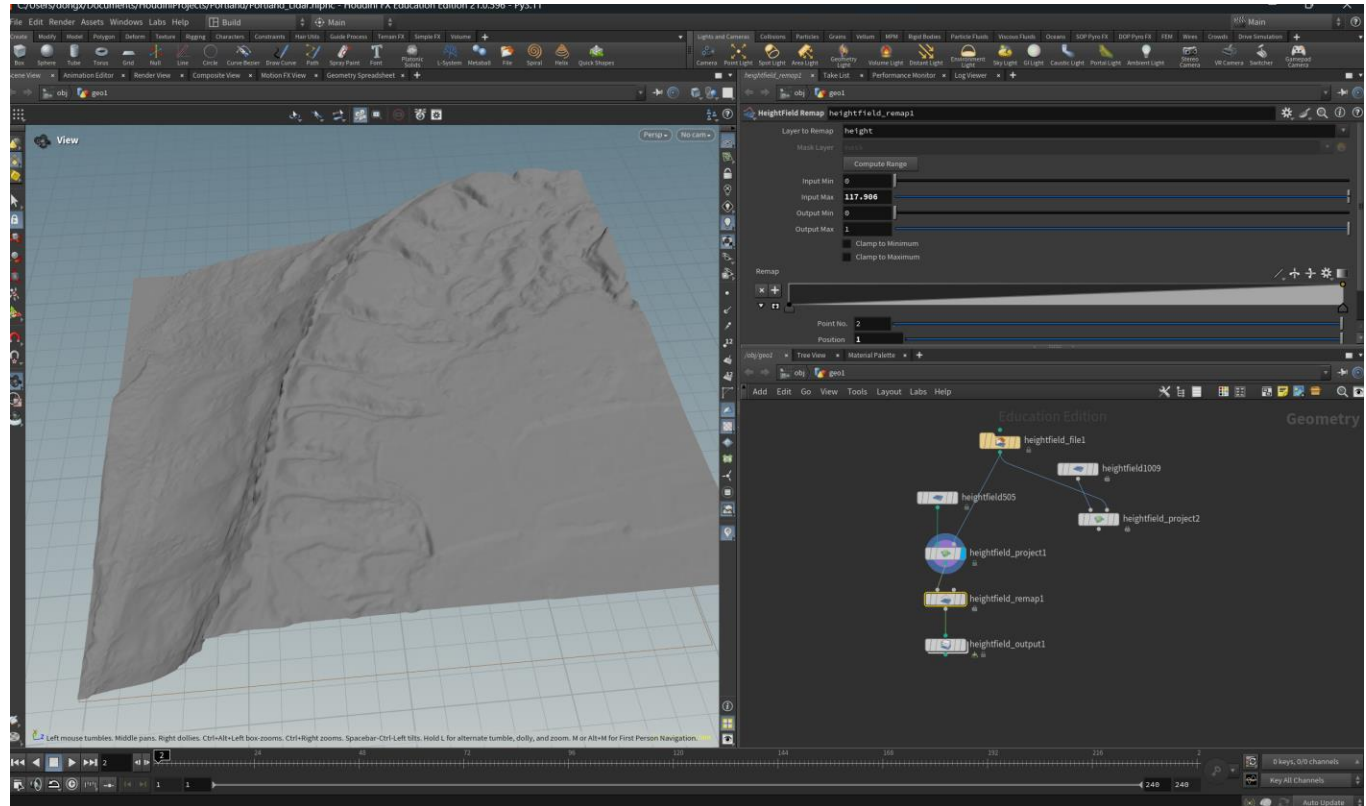
There are multiple methods for creating landscapes.

Considering the project timeline and requirements, I evaluated different approaches and chose to use real-world DTM data.

ENVIRONMENT WORK | LANDSCAPE CREATION

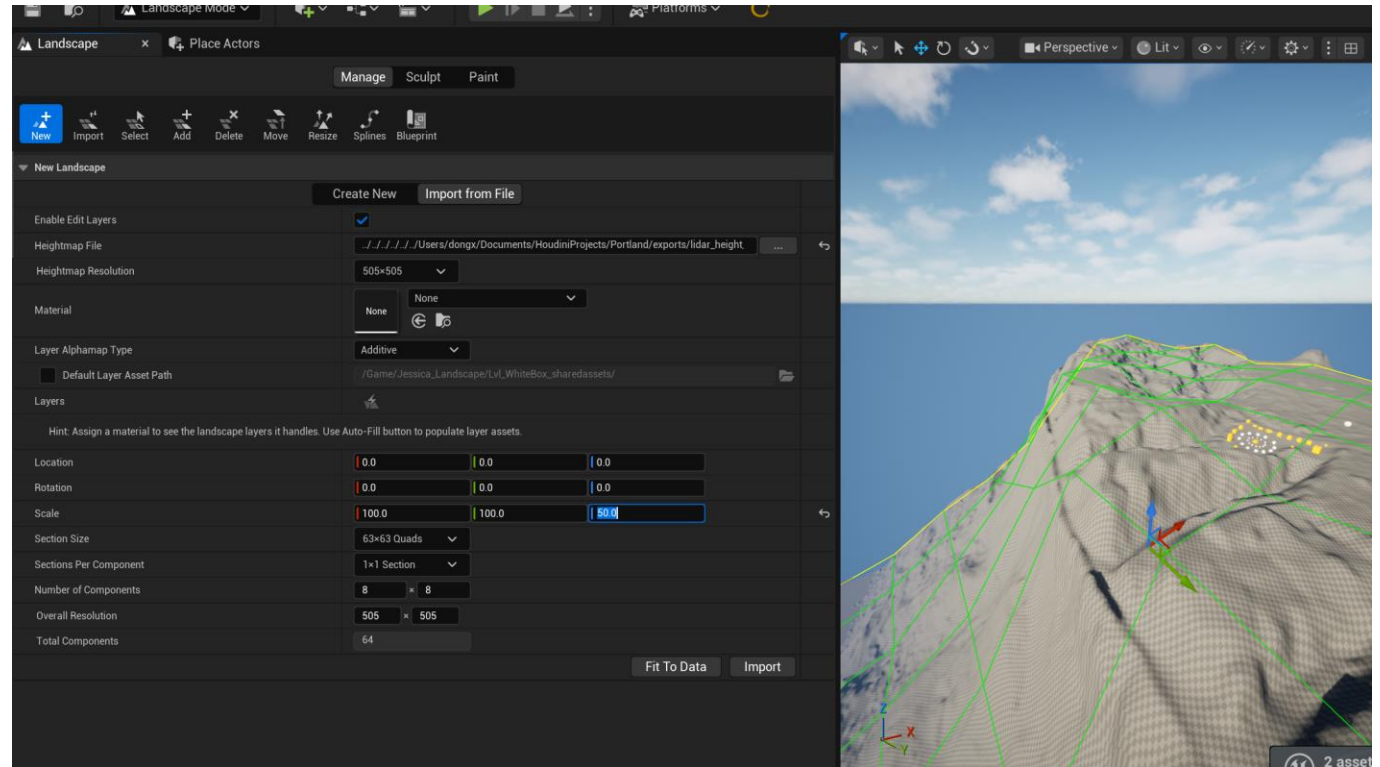
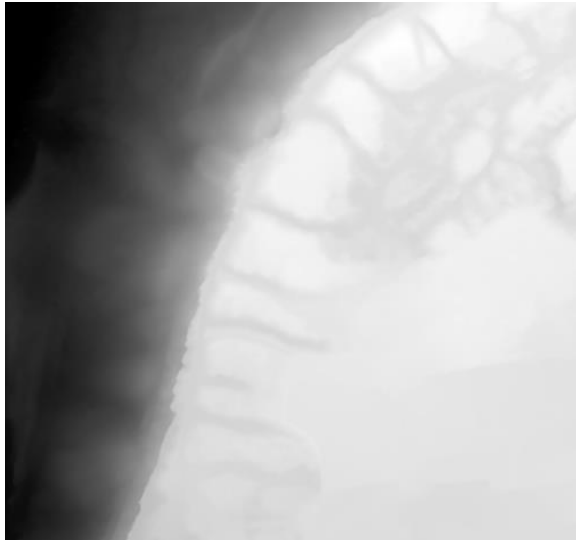
"The LIDAR Composite DTM (Digital Terrain Model) is a raster elevation model covering ~99% of England at 1m spatial resolution."

I download the DTM data map and process in Houdini to generate height map that can later be used in Unreal to create landscape



<https://environment.data.gov.uk/survey>

ENVIRONMENT WORK | LANDSCAPE CREATION



From Houdini I export a heightmap grayscale image and use it to create the landscape in UE.

ENVIRONMENT WORK | WHITEBOX

Create whitebox based on
google earth 3d scan

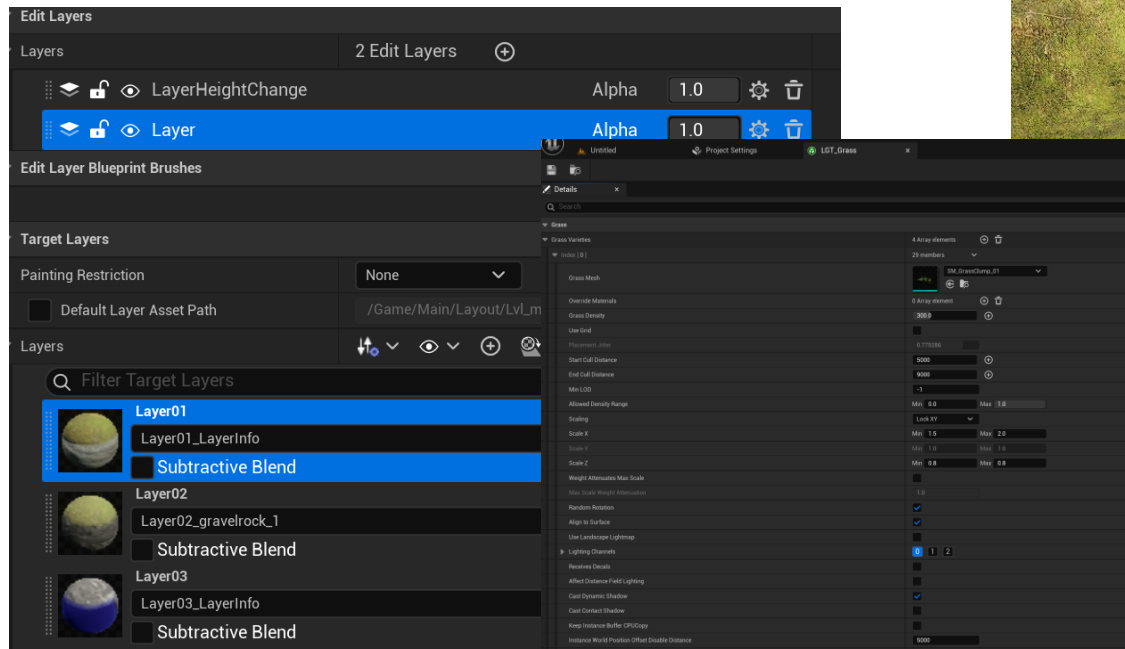
Except for the reference
pictures we took ourselves,
google earth has a
interactive map that have
measurement

I measured the distance
between the stones and
create the whitebox layout
in Unreal



ENVIRONMENT WORK | LANDSCAPE TEXTURE

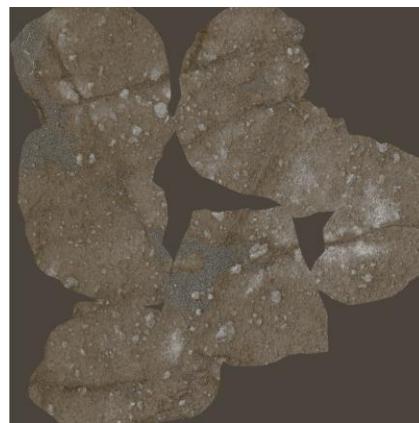
I use Landscape auto material and custom layers to quickly texture ground and grass





ENVIRONMENT WORK | ROCK MATERIAL

To make the sculptures blend naturally with the environment, I made seamless texture and blend two diffuse textures together using lerp function



ENVIRONMENT WORK | ADD DETAILS

I add other 3d assets such as sculptures created or found by other members to the scene. I use foliage mode to create more shrubs in the background. I add small things like water plane.



MY ROLE AND RESPONSIBILITIES

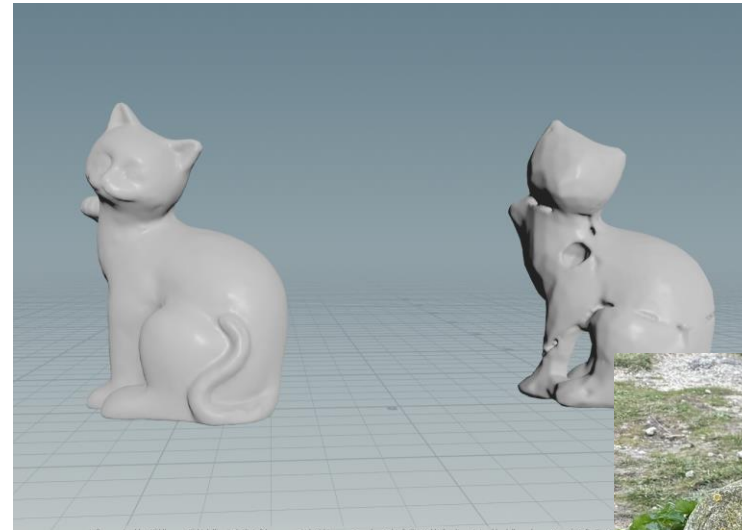
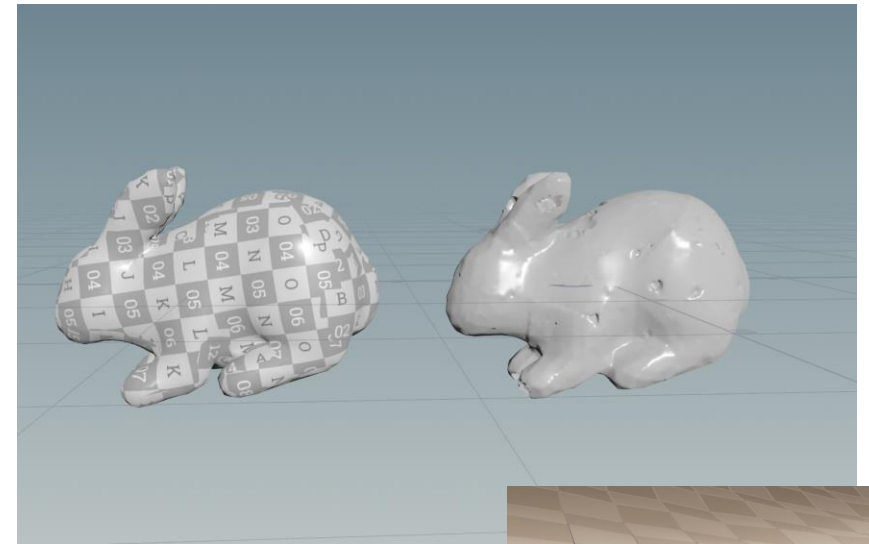
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TOOL DEVELOPMENT | HDA

Ruinify Tool

Based on our reference there are many corrupted stone sculptures. Therefore, I built Houdini Digital Asset that can transform model into a corrupted version.



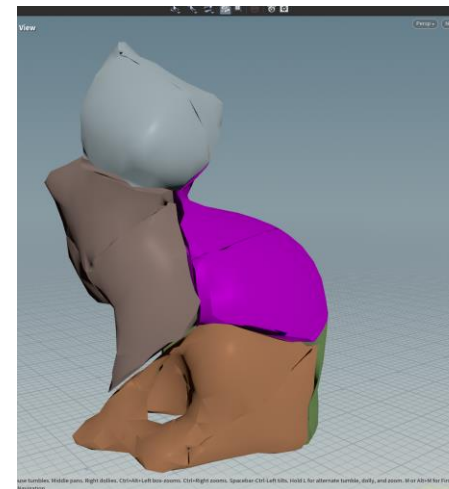
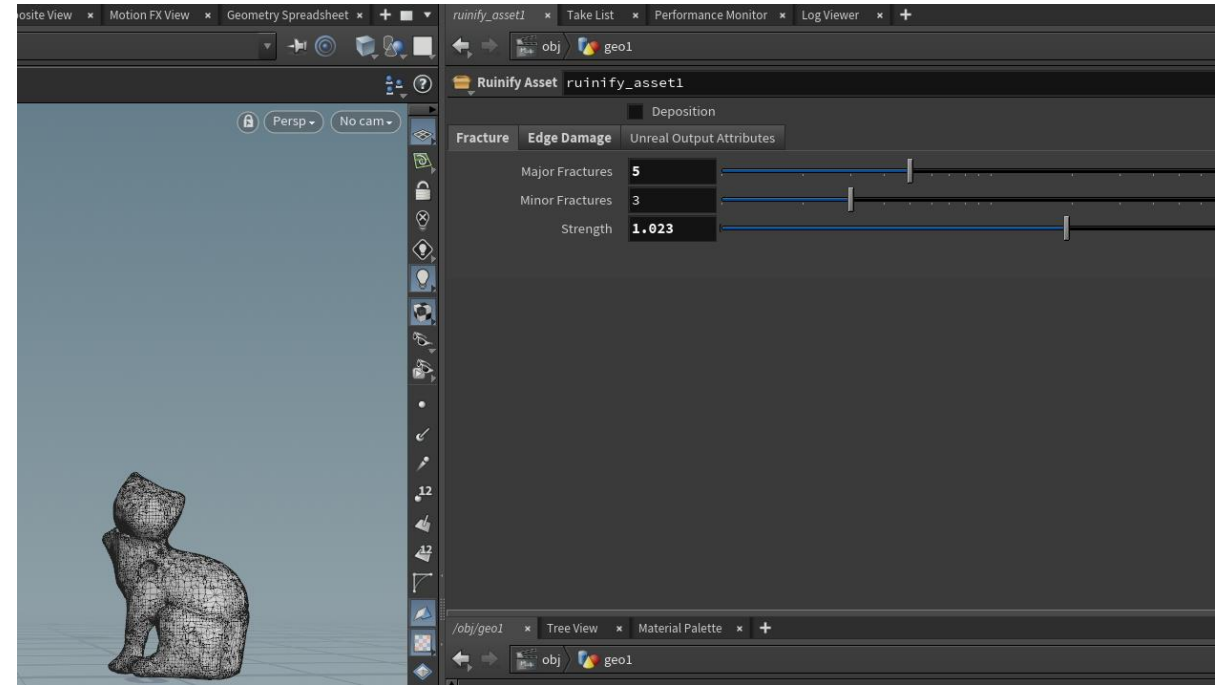
TOOL DEVELOPMENT | HDA

Tool Function

The tool has parameters to control fractures and corrupted level.

The method is that the had take model as input and transfer to VDB, use noes like Voronoi, copy to points, VDB combine etc. To process the model and finally transform it back to polygons.

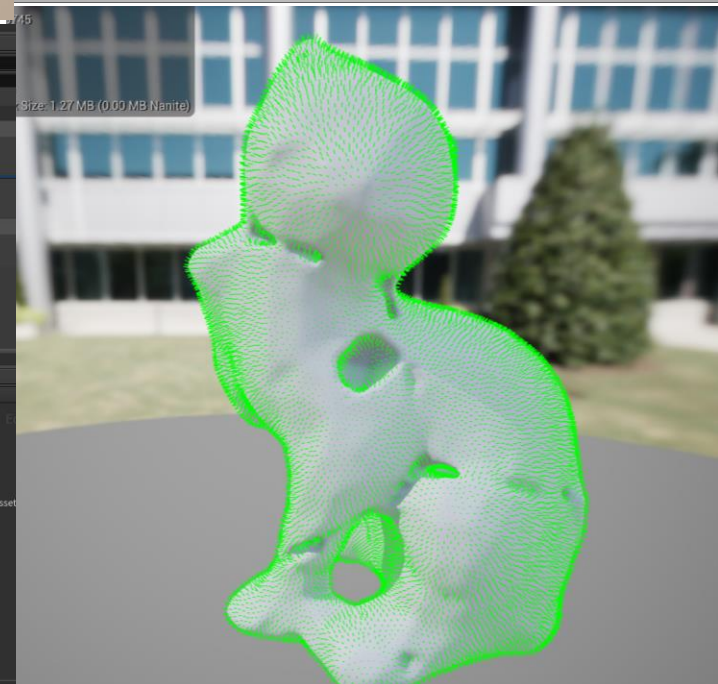
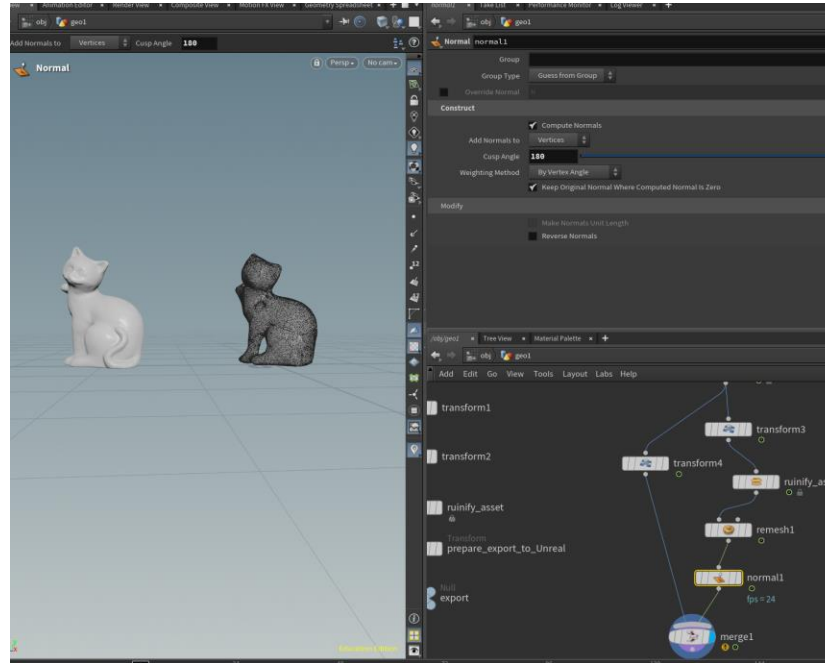
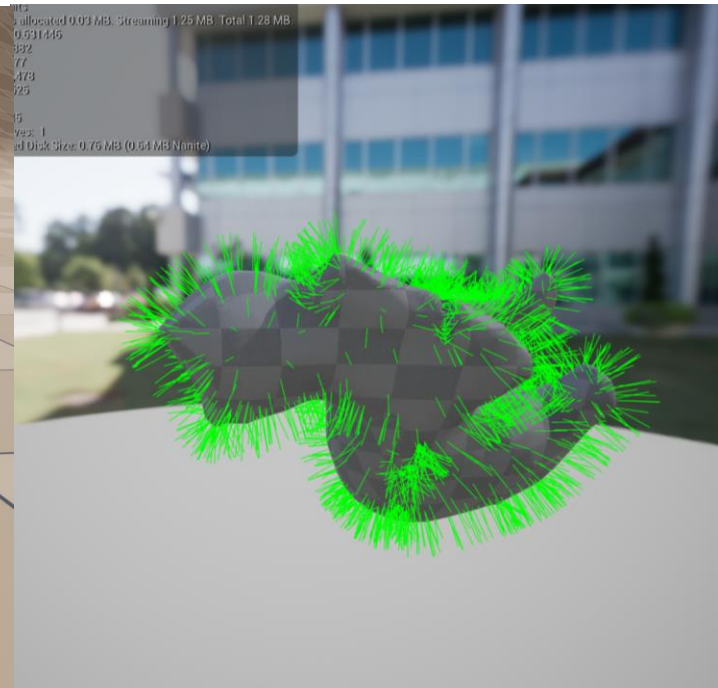
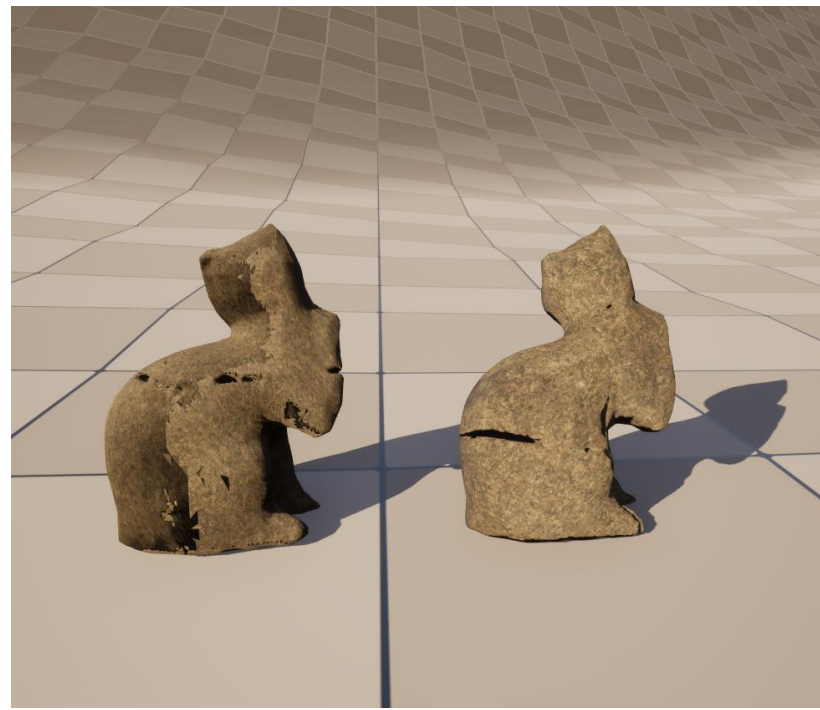
The HDA works with Houdini Engine in Unreal to allow realtime editing



TOOL DEVELOPMENT | HDA

Smooth shading in UE

Most model has sharp edge shadow due to disconnected normals, I use normal SOP and make Cusp Angle 180 in Houdini to smooth shading, which will recalculate the shared faces vertex normal





THANK YOU

References

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Project Pagasus. SideFX. <https://www.sidefx.com/pegasus/>