

Making of Salmon Steak in UE 4 and Substance Suite

Professor Manuel Prada

GAME 722 – Real-Time Shader and Material

Savannah College of Art and Design (SCAD)

Thitaphon Palm Piraban

MA. Visual Effects

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Making of Salmon Steak in UE 4 and Substance Suite

Responsible for all visual aspects: model, material, texture, shade, lighting, and rendering

The organic material project "Salmon Steak" in the raw and cooked versions.
I use Maya, Substance Designer, Substance Painter, and Unreal Engine 4.27

This work is one of the assignments of GAME 722 - Real-Time Materials and Shaders
at Savannah College of Art and Design (SCAD)

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Introduction

Hi everyone! My Name is Thitaphon Palm Piraban, I'm a lookdev and lighting artist from Thailand. I've been working as a lookdev and lighting in animation and visual effects for 8 years before studying MA visual effects at SCAD. In this project, I create 2 versions (raw and cooked) materials from a substance designer, texture from a substance painter, and set up the scene in Unreal Engine.



Raw and cooked comparison

Inspiration and Reference

Food is one of my interests. So, I combined CGI and food in this project. To studying in subsurface scattering by researching from steak recipes and taking a photo by myself. And then I research mood and tone from the internet.



Lighting Mood



Ingredient references



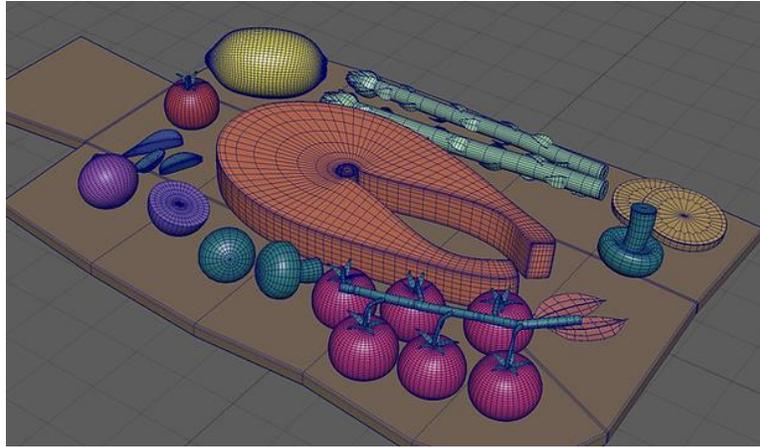
Lighting and material study
(I take photos by myself)

Work Process

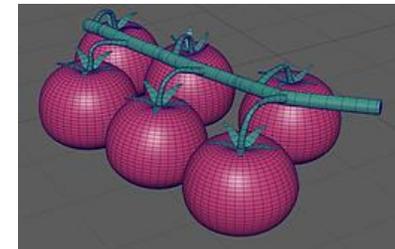
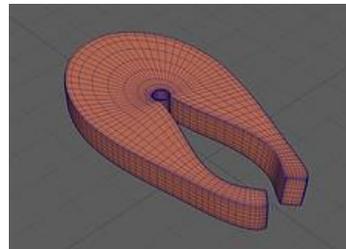
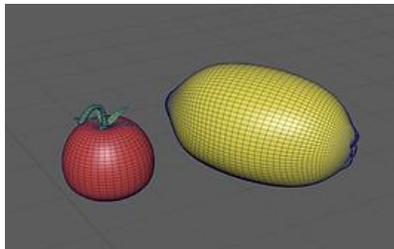
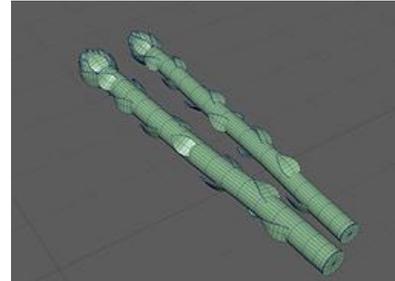
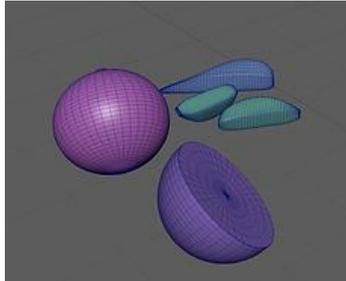
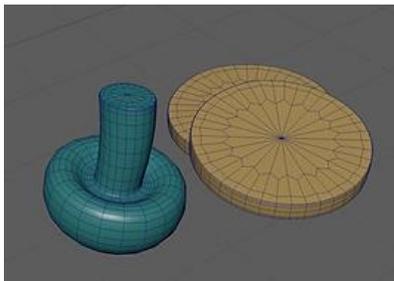
After I got a strong reference, I start to make a model in Maya, create base material (PBR) in Substance Designer, paint texture in Substance Painter, and set the scene in Unreal Engine 4.27

Step 01: Model

I make a model from Autodesk Maya by using the basic shapes: sphere, cylinder, oval, and cube. I start from low polygon create a bevel at the corner and add more division.



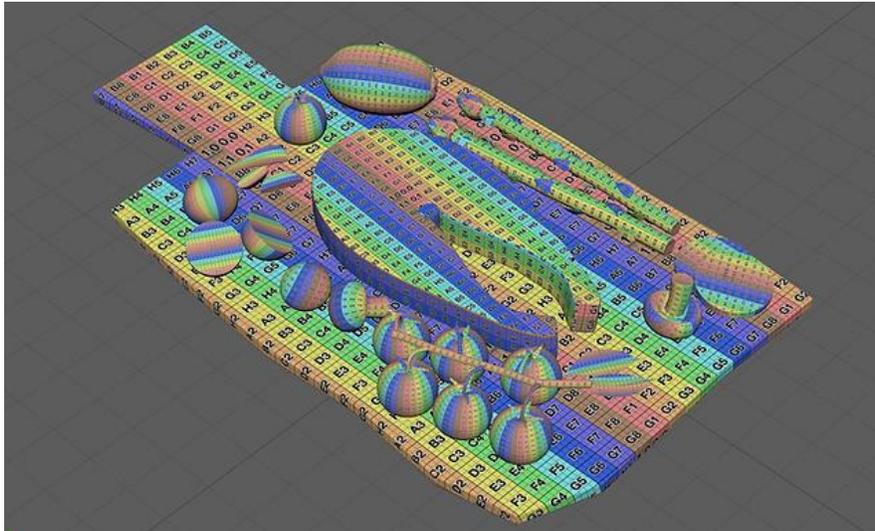
All models in Maya



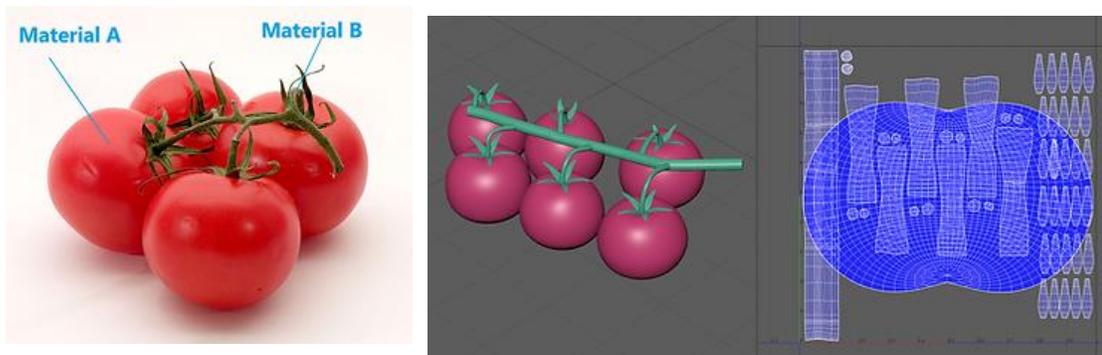
Isolated model

Step 02: UV Mapping

In this project, I need to make it close up as much as possible to test the texture resolution. Unreal Engine version 4.27 doesn't support multiple UV Mapping. I use the UV checker in 4K resolution. I change a repeat UV attribute in the place2dTexture node in Maya hypershade (1024x1024 to 4096x4096) to test how close I can make the most detail.



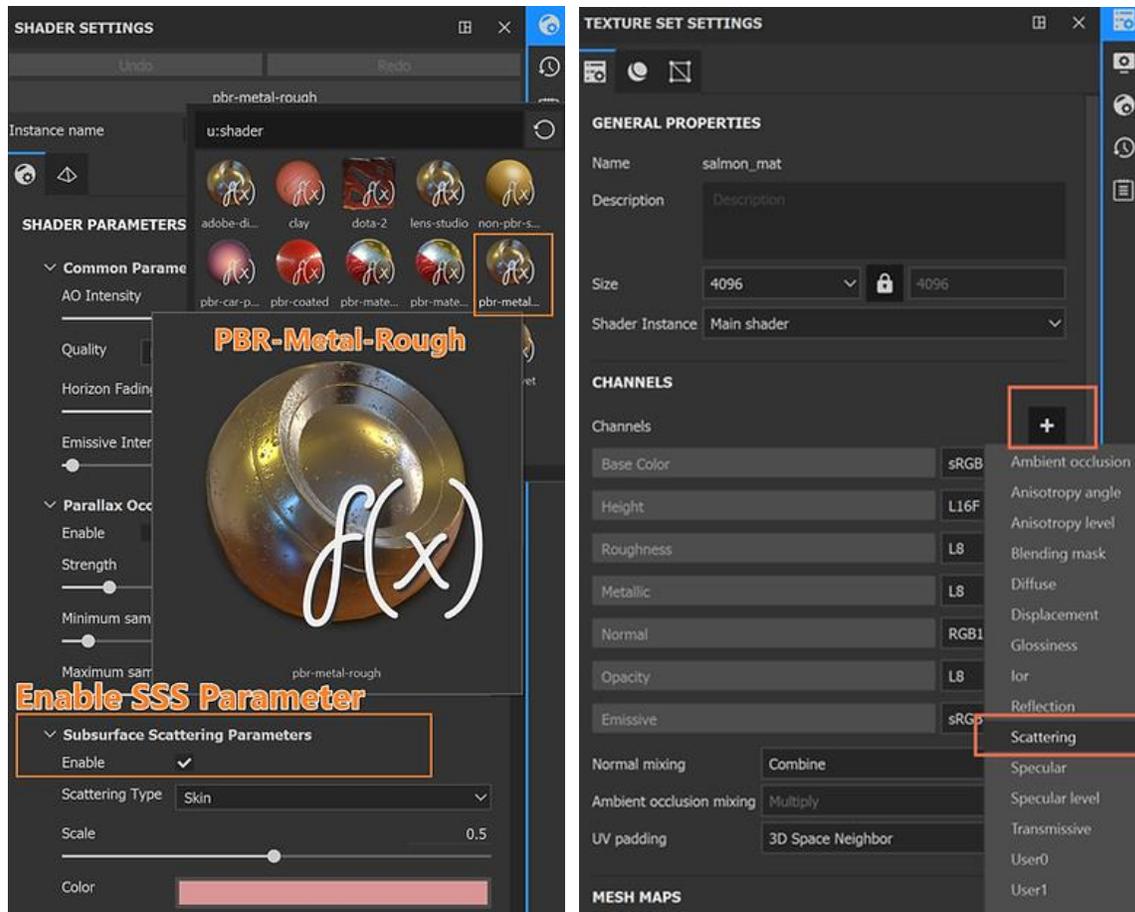
UV checker in all models



For the tomato model, I combined green and red parts to become one object but separate materials. When I separate material in Maya, UE will follow the material element same as Maya. So, this is a good way to make object has more details.

Texture Setting in Substance Painter

Substance Painter is very helpful software. For me, 3D paint texture creating is easier than 2D paint because I can see all around the object. In this chapter, I will explain the salmon texture creation process. however, you can see each material in the "[Material Breakdown](#)" chapter.



Starting with the right material type is a good thing! I change a setting in the default setting, let's follow it!

Shader Setting

1. Choose the PBR-Metal-Rough for the material type
2. Enable Subsurface Scattering and choose skin

Texture Setting

1. Click at the [+] button
2. Select Scattering

Salmon Texture Layering

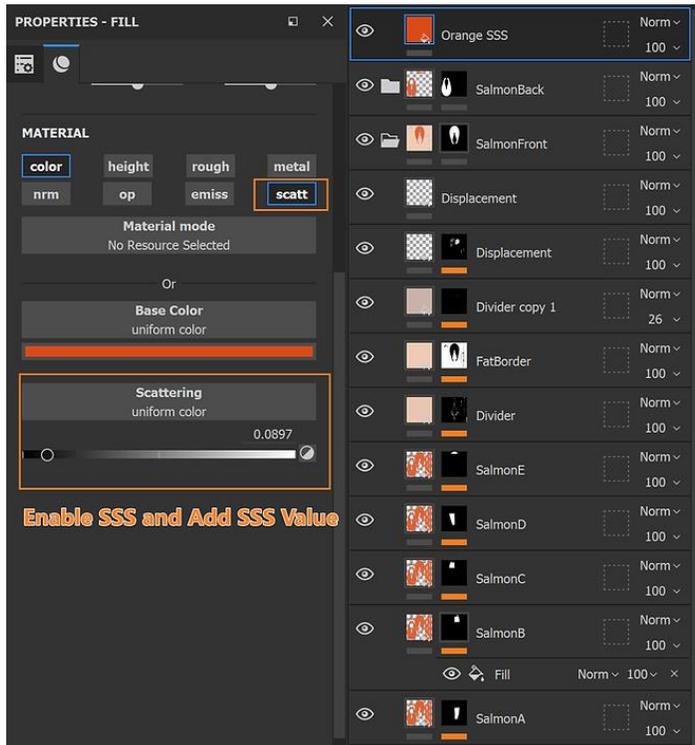
After I got the salmon base material in step03, I separate the top face into 5 zones and adjust each by each. You can see the salmon texture and mask in the first video. For the salmon skin, I create the base color, color detail, and add a normal map to it in the second video.



Salmon Texture



Salmon Skin Texture



This is all my salmon texture layer.
You can see the salmon layer and mask.

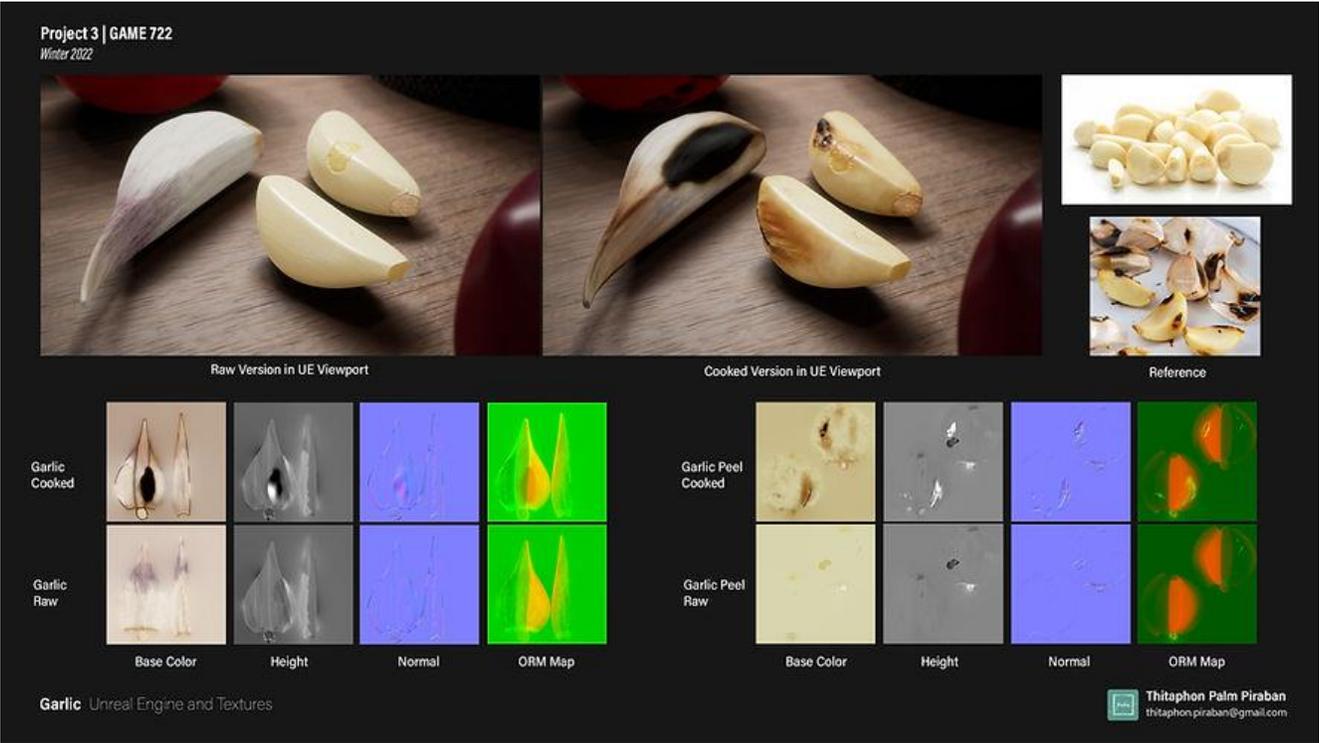
The Top Fill Layer is only one sss Layer.
I use just only one layer to control the sss

Example of Texture Painting

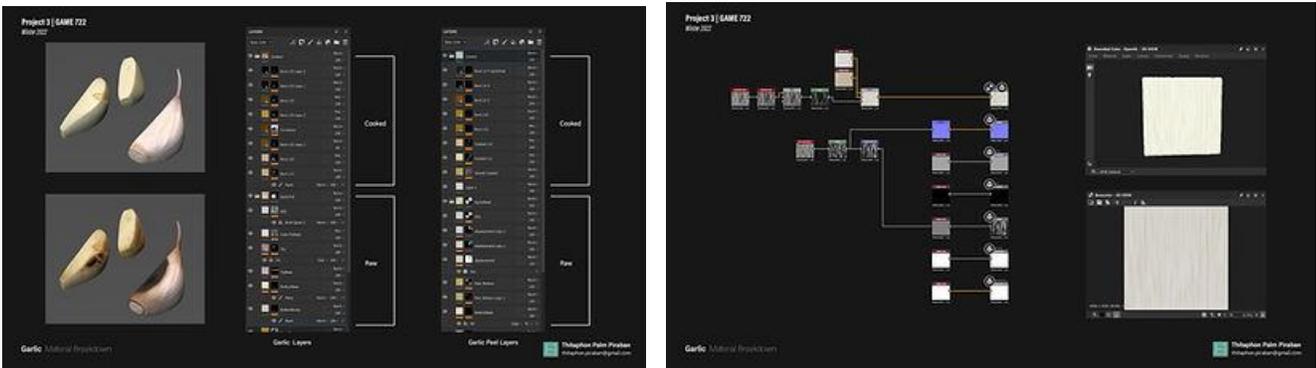
Material Breakdown

Garlic

I create a simple anisotropic noise and blend color same as reference in bolt unpeel and peel. After I got a base material, I assign it to Substance Painter and make a mask, change the color for the cooked version.



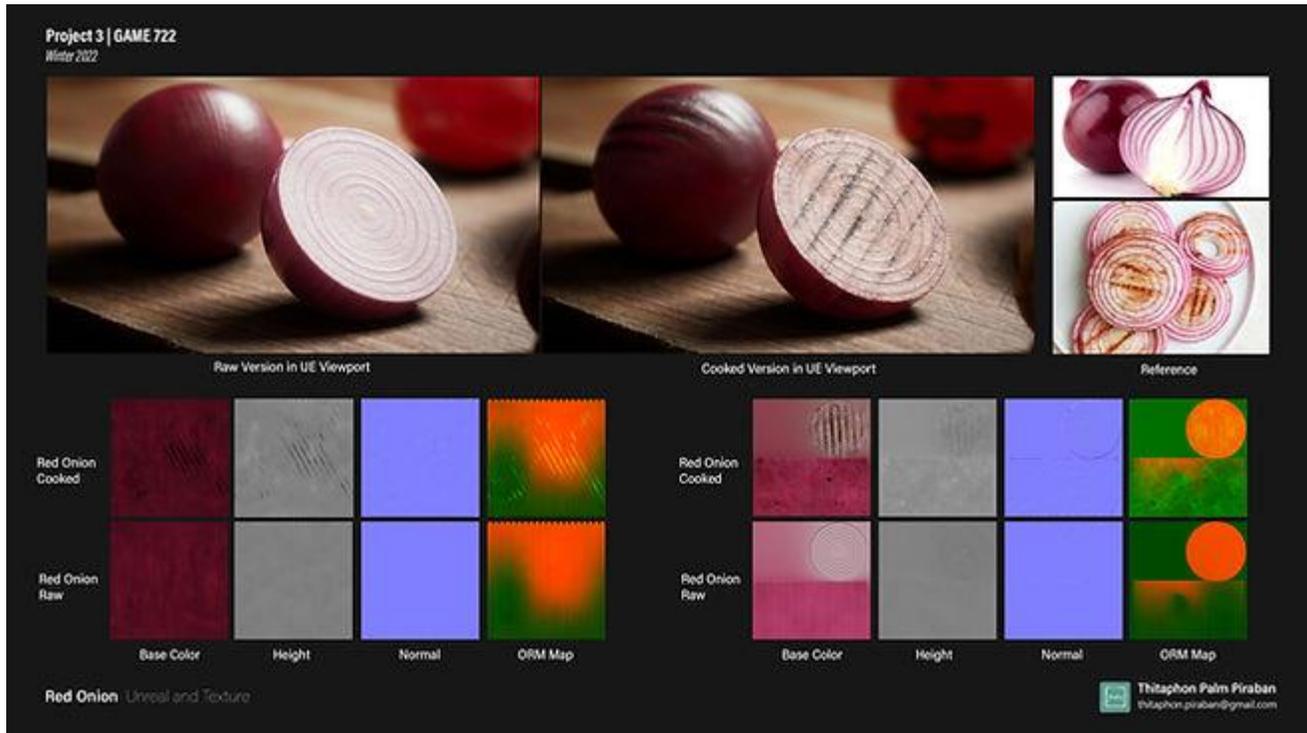
UE Render and Textures



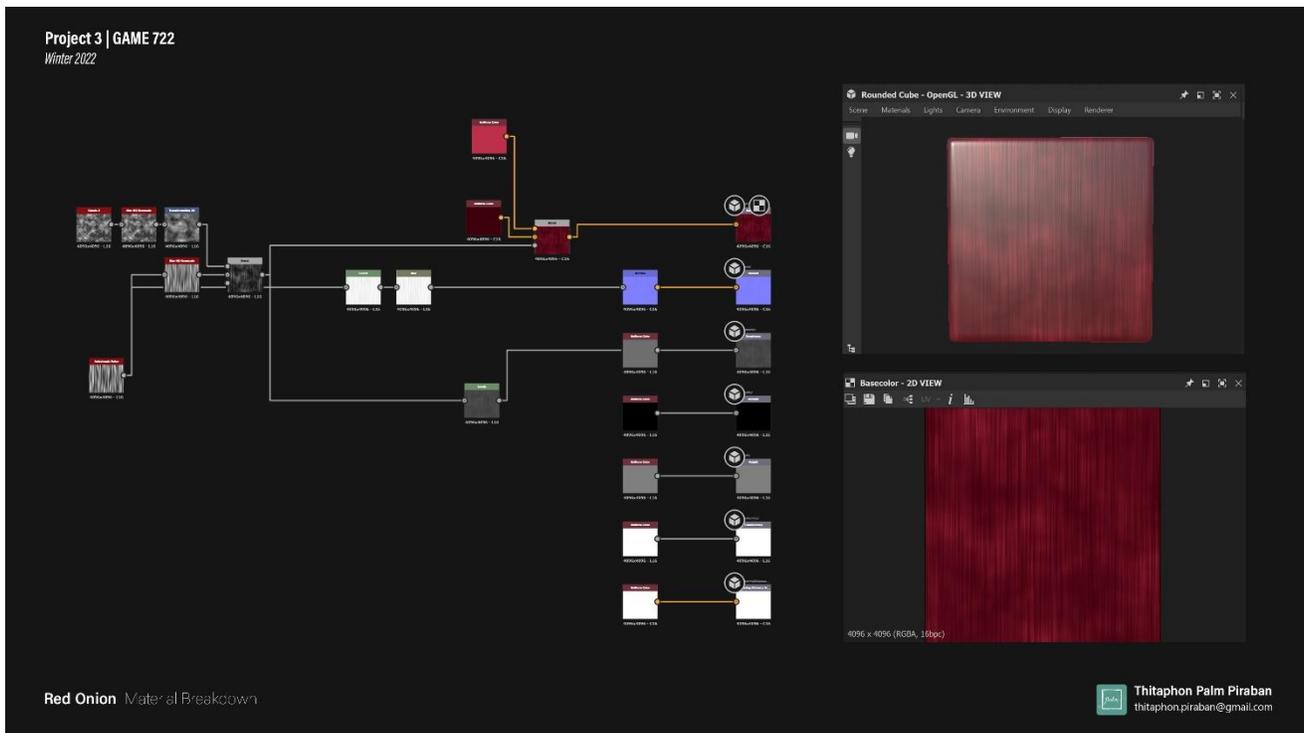
Texture creation in Substance Suite

Red Onion

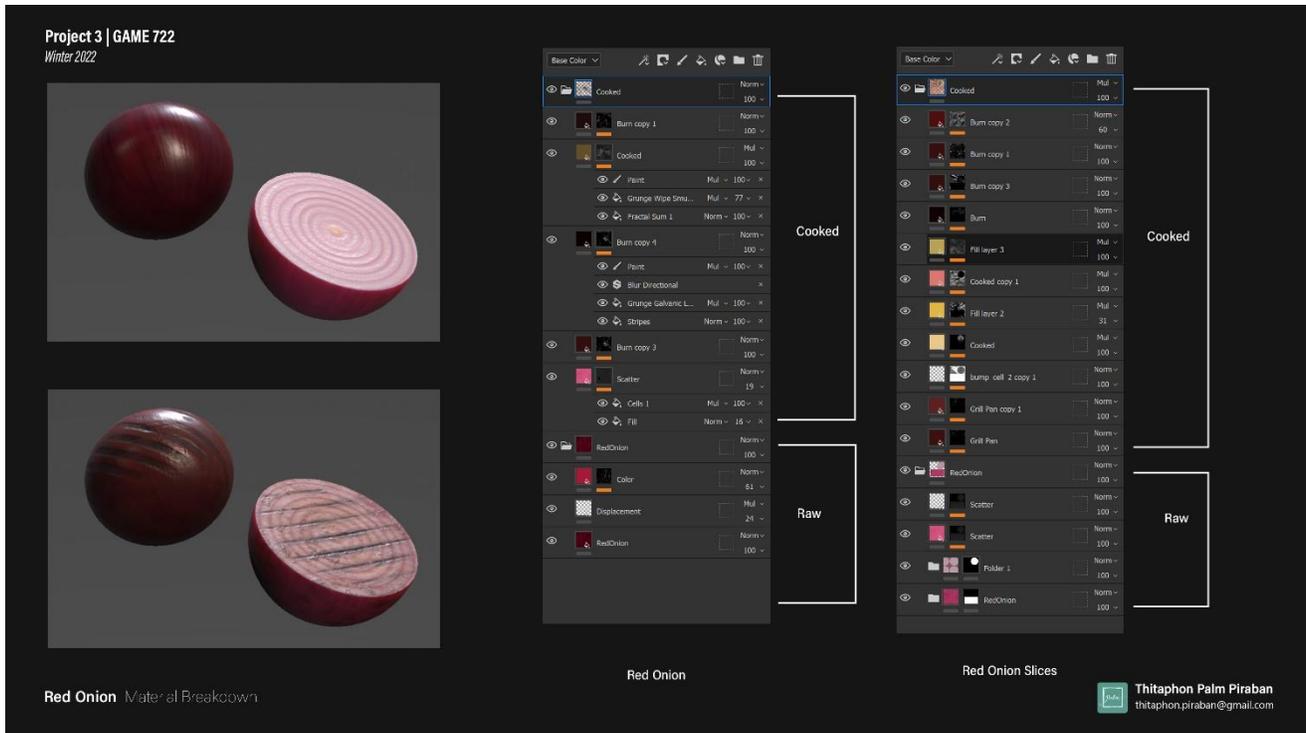
In the process of the full red onion, I make a directional noise first and change color with the blend node. For the slices of red onion, I create it from the "Splatter Circular" and change color with blend node.



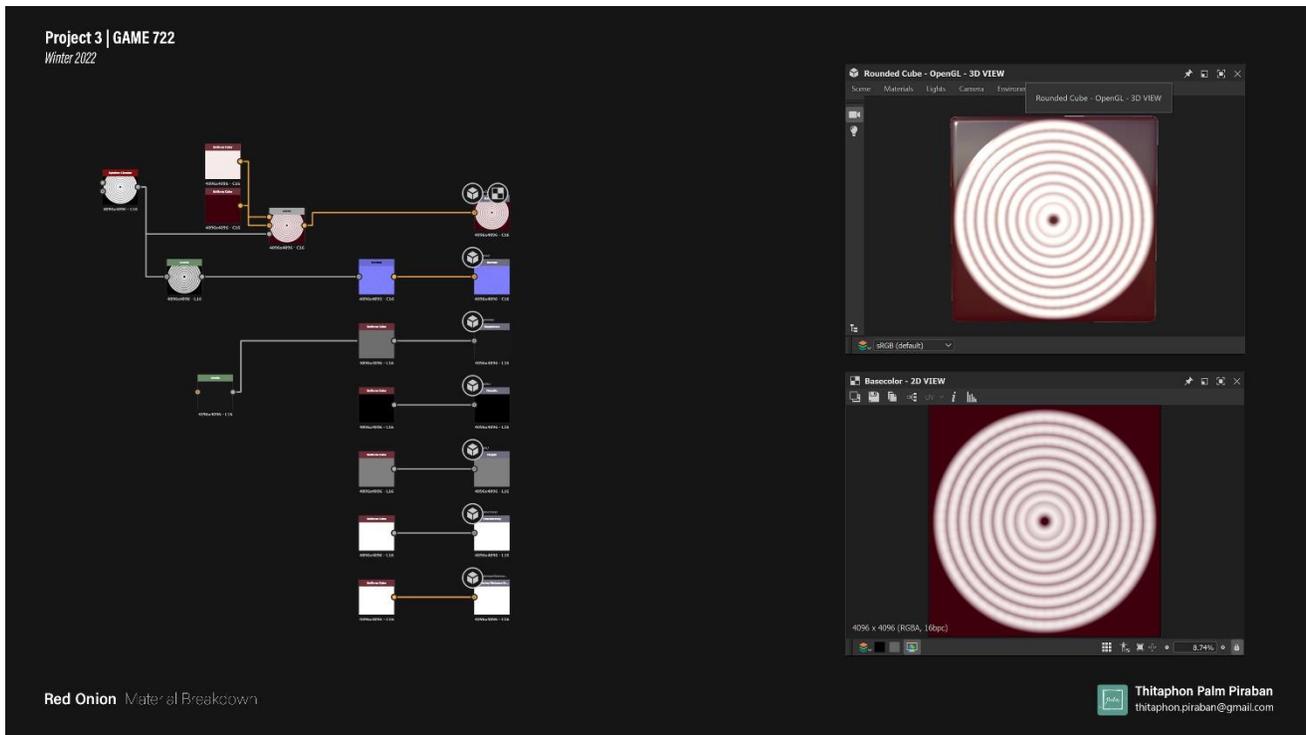
UE Render and Textures



Red Onion Peel Graph



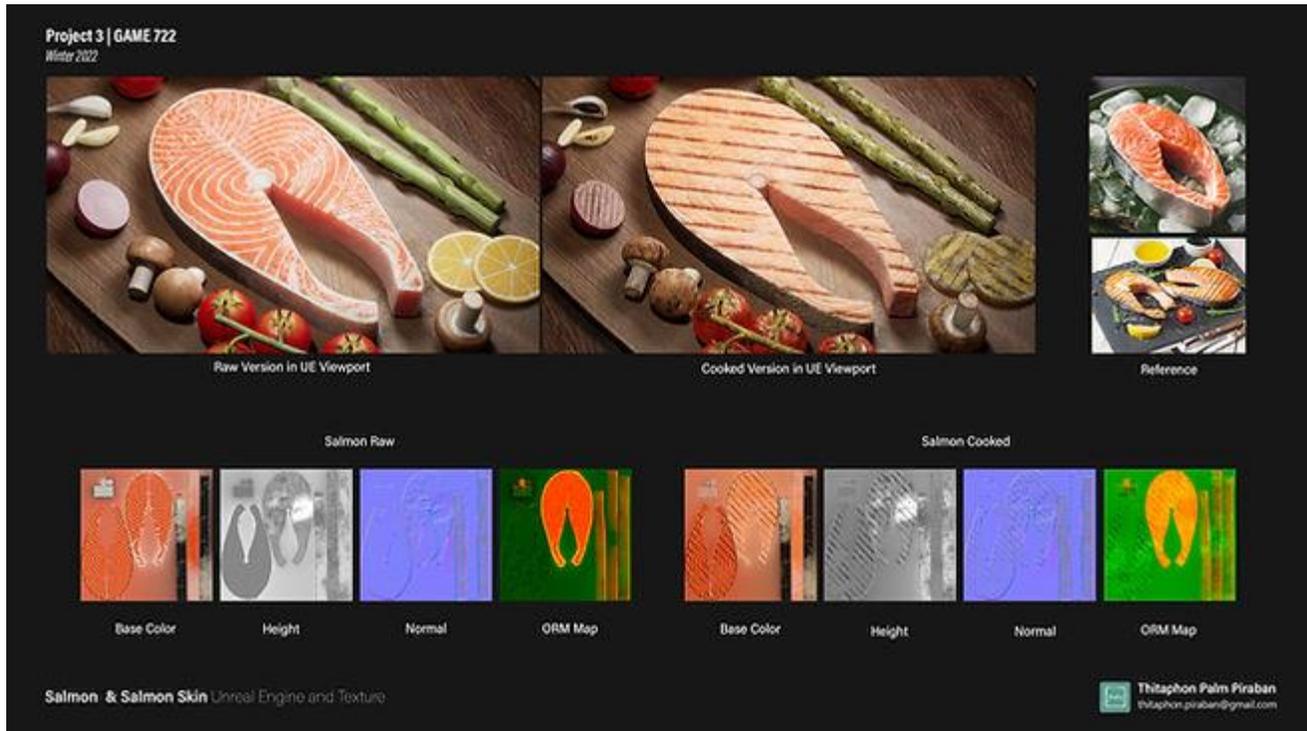
Comparison between raw and cooked version



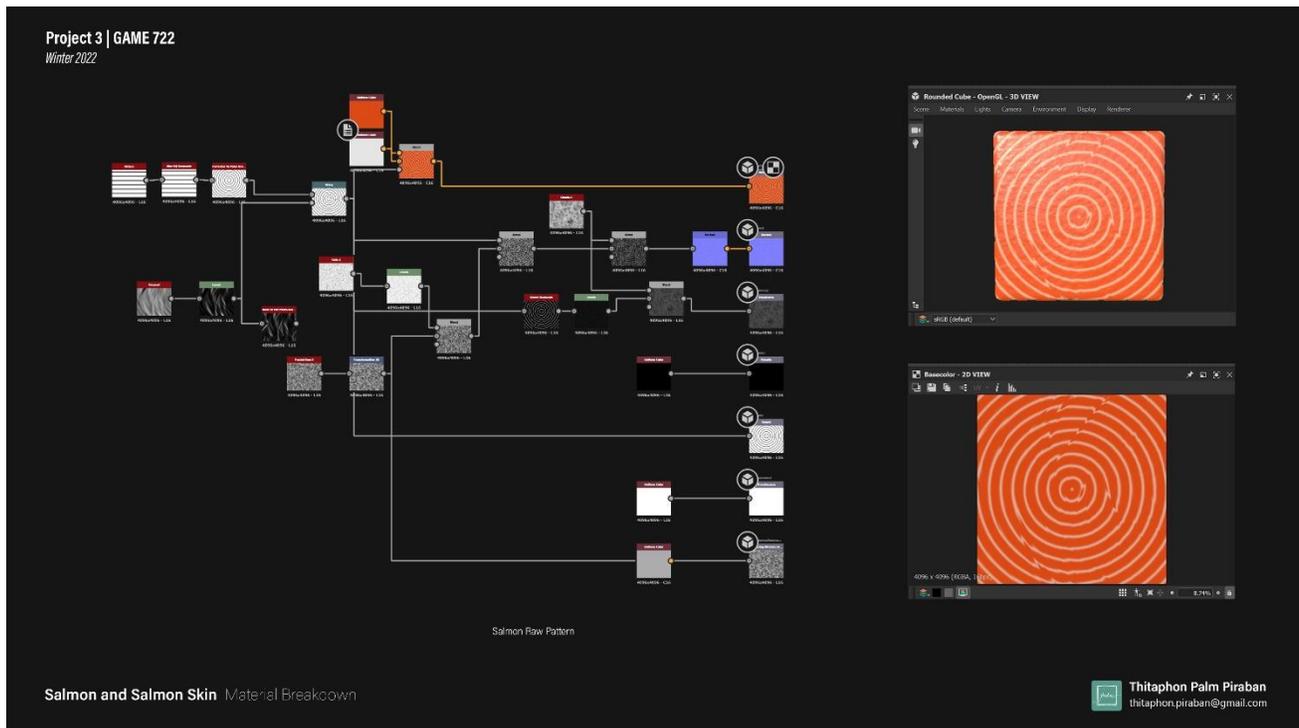
Red Onion Slices Graph

Salmon and Salmon Skin

I create a strip and use the Cartesian to Polar node to convert a straight line to the circle pattern. Before coloring it with blend node, I use wrap node and creased node to destroy the pattern. For the salmon skin, I create a wave node and use a tile generator node pattern.



UE Render and Textures



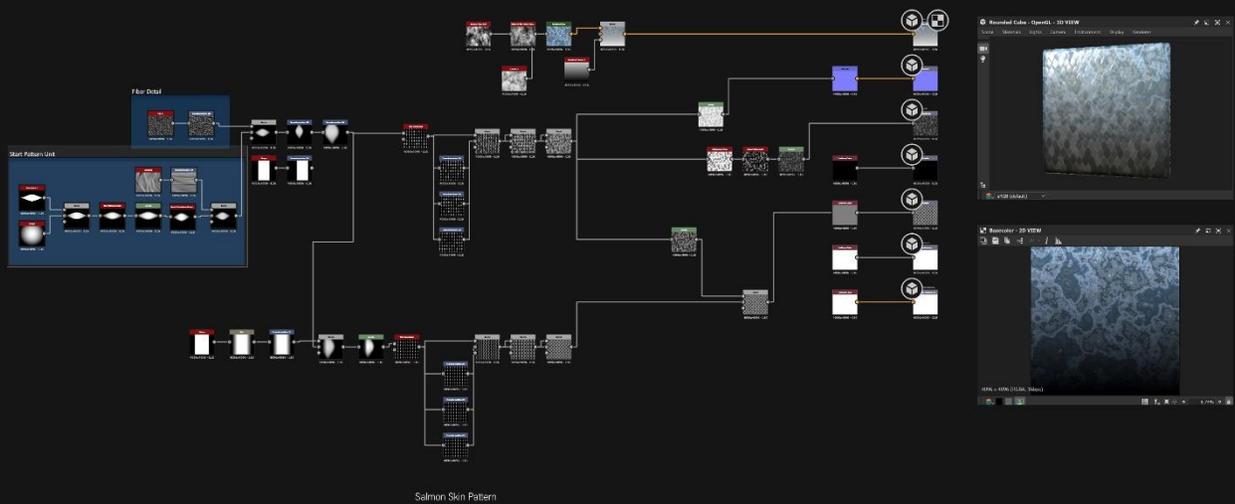


Pattern Masking

Fat Layer Masking

Grilled Pattern Masking

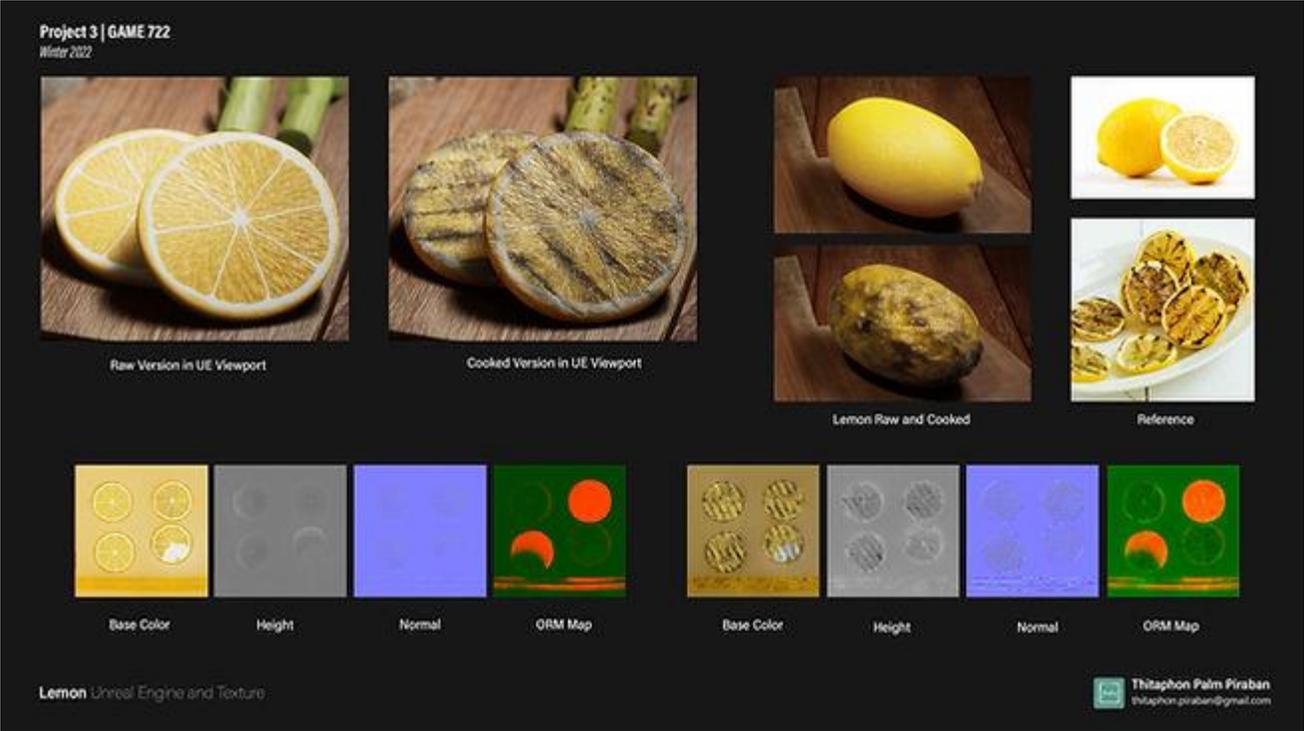
Salmon masking



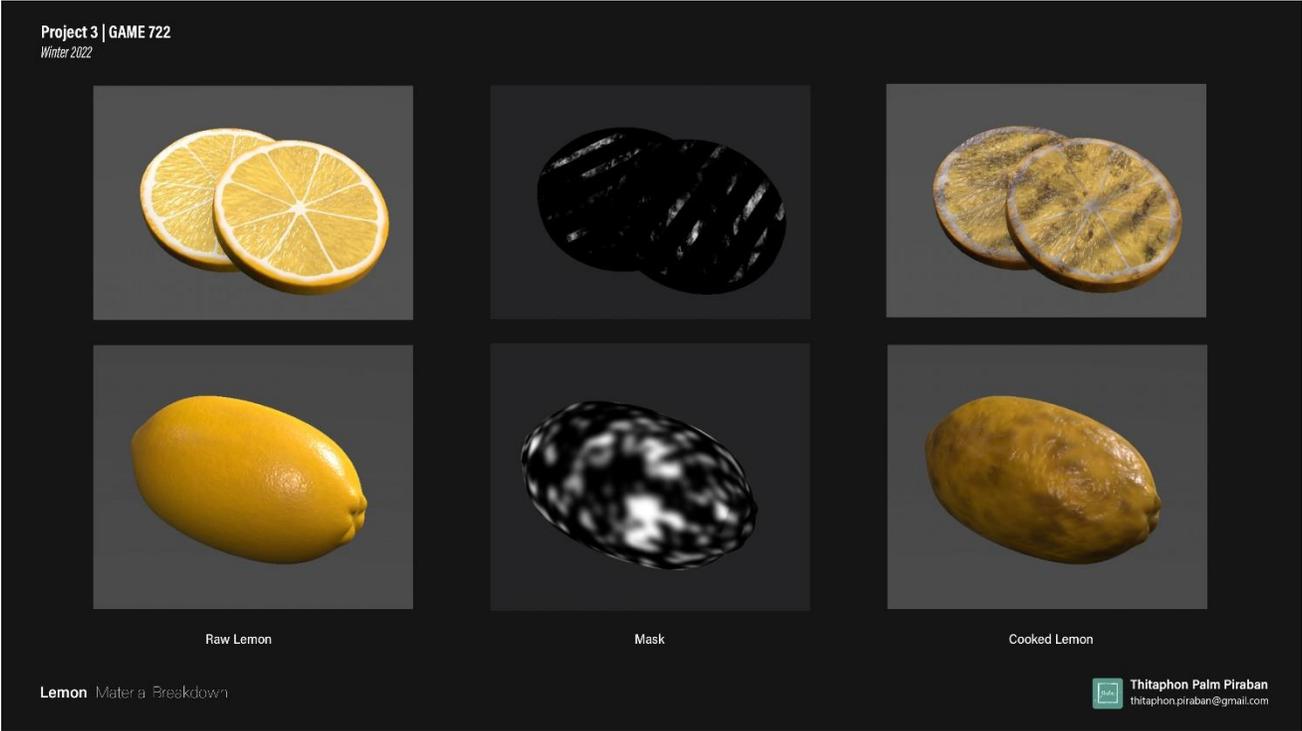
Salmon Skin Graph

Lemon and Lemon Slice

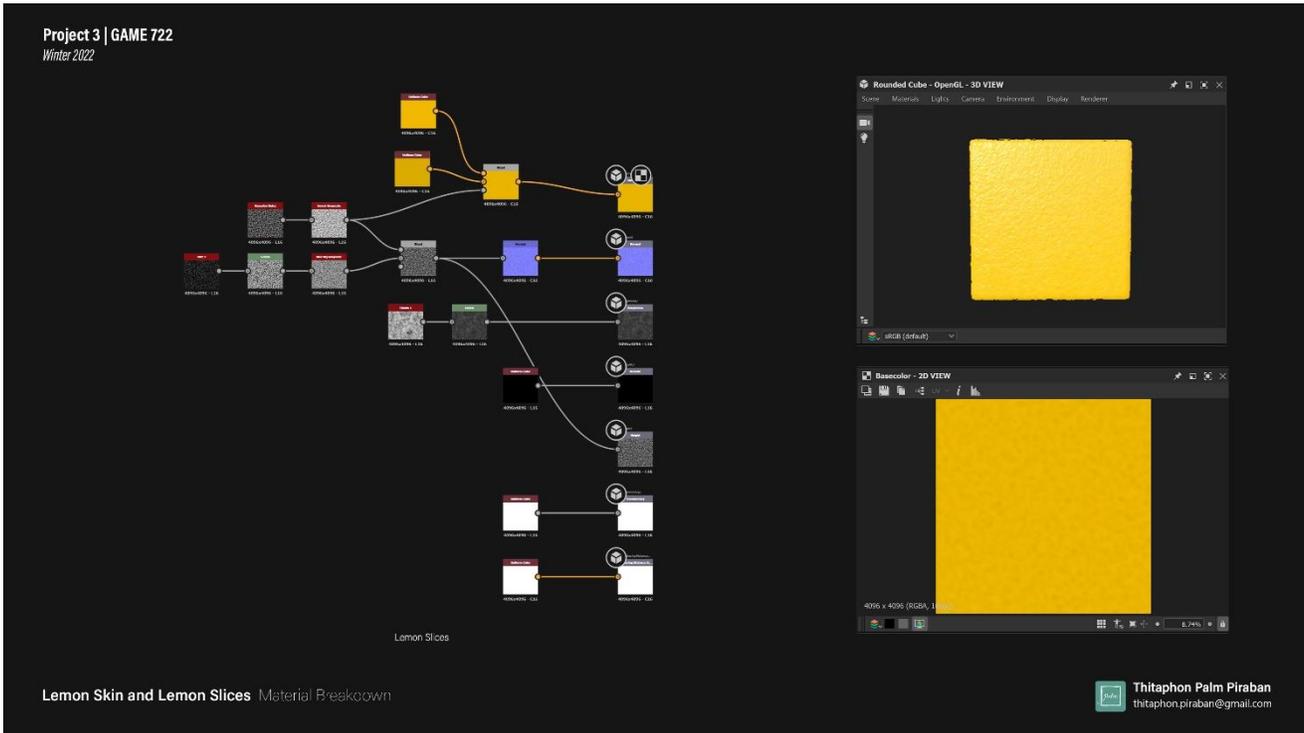
Lemon skin has a lot of noise patterns, I use a dirt procedural for the base noise and add more contrast before blending with the gaussian node. To make a different visual, I connect different links to base color, normal, and roughness.



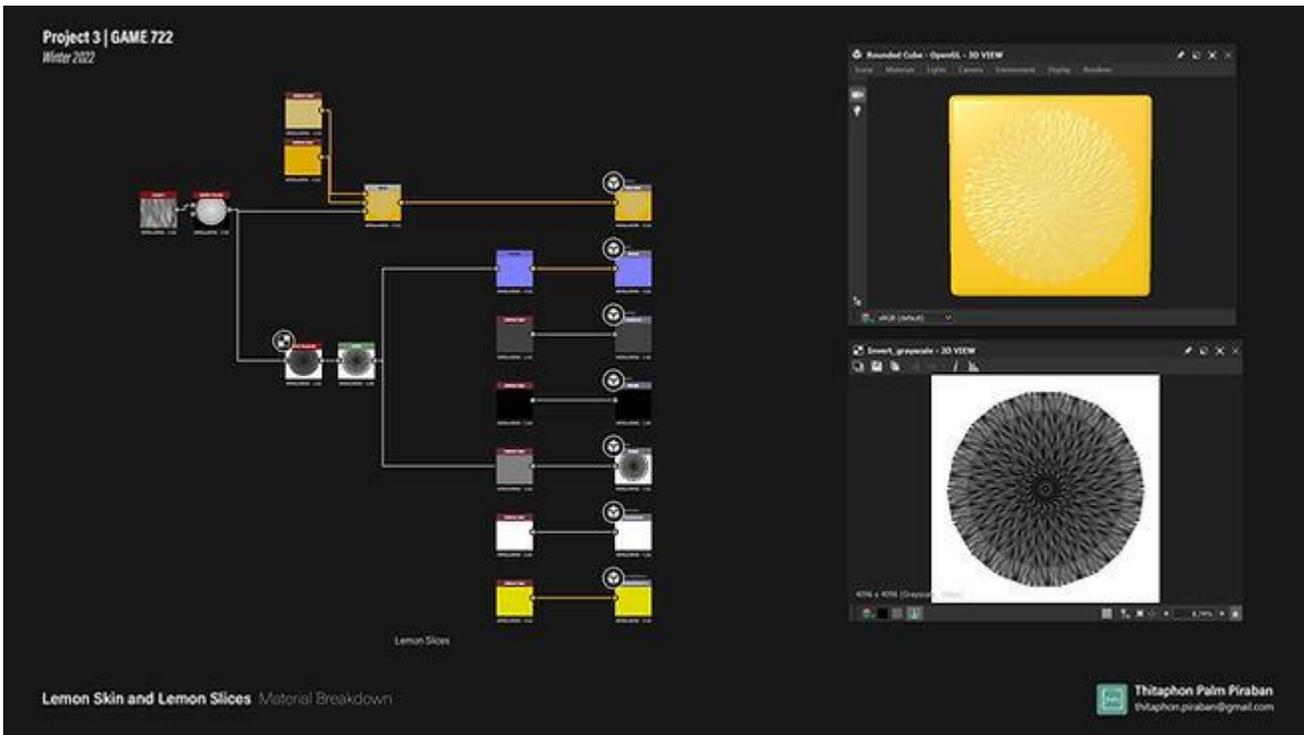
UE Render and Textures



lemon and lemon slice masking



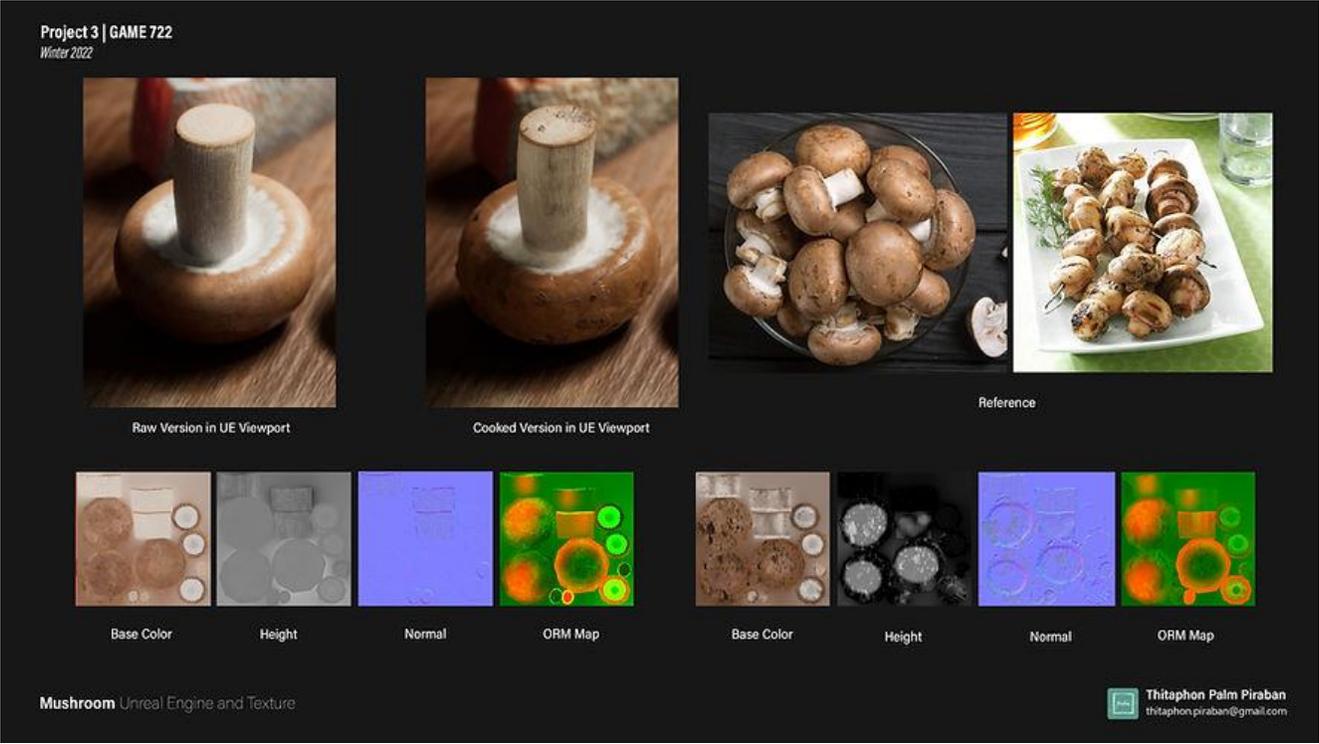
Lemon Graph



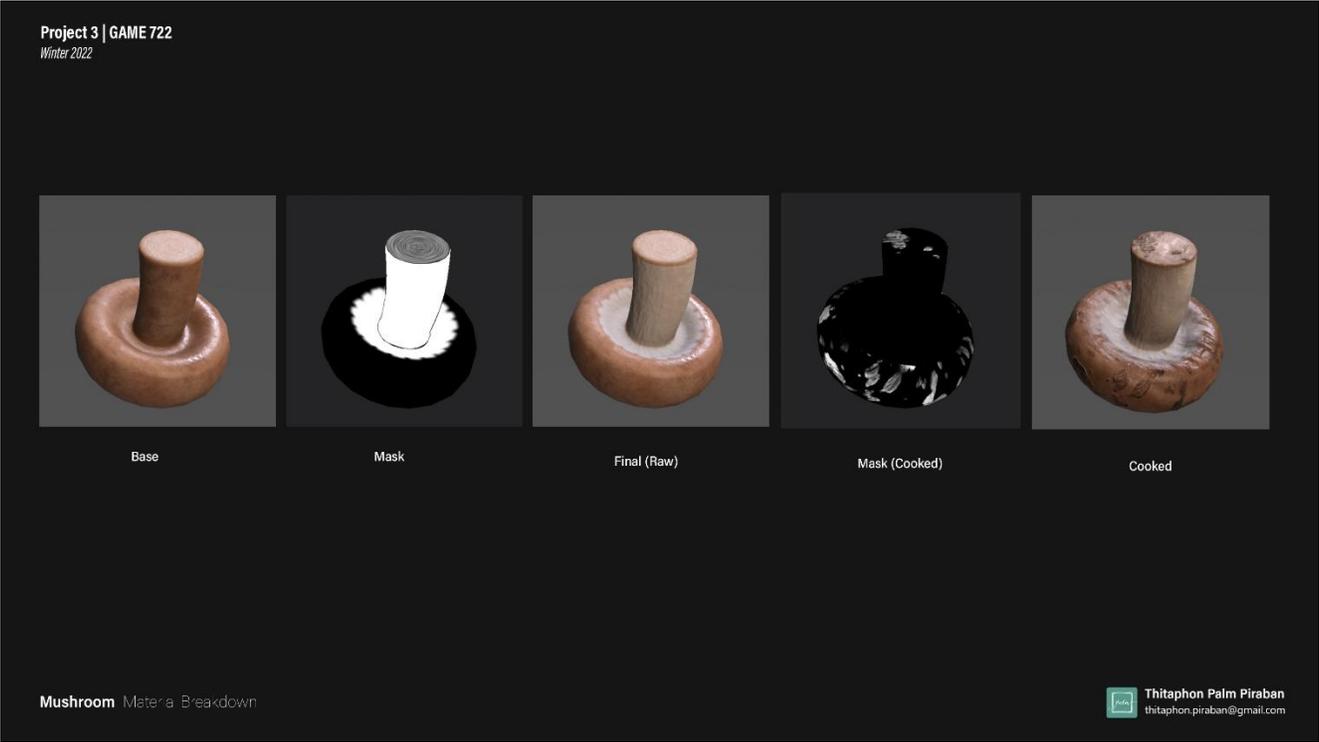
Lemon Slice Graph

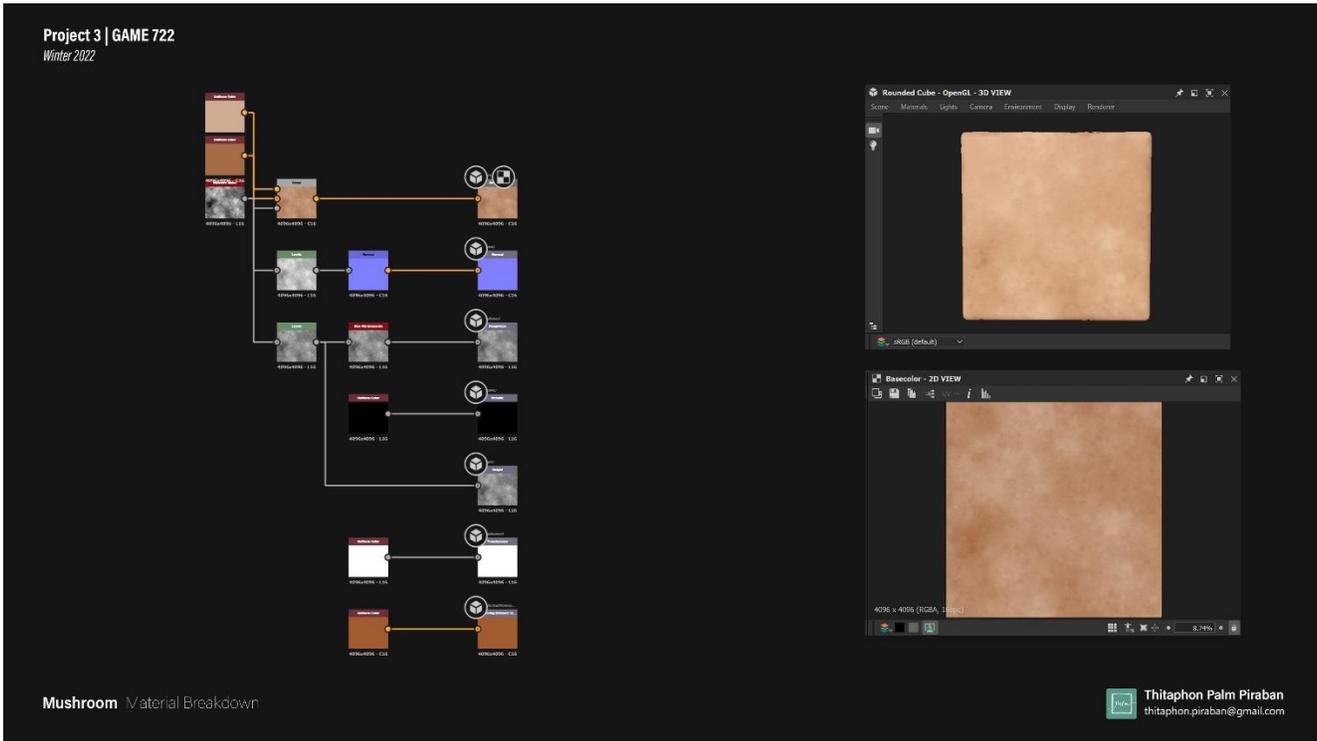
Mushroom

The mushroom texture is analogous color and has low contrast. I start with light brown for the base color, add a white color on the root part. Next, I make a burning part by using a mask and dimming it.



UE Render and Textures

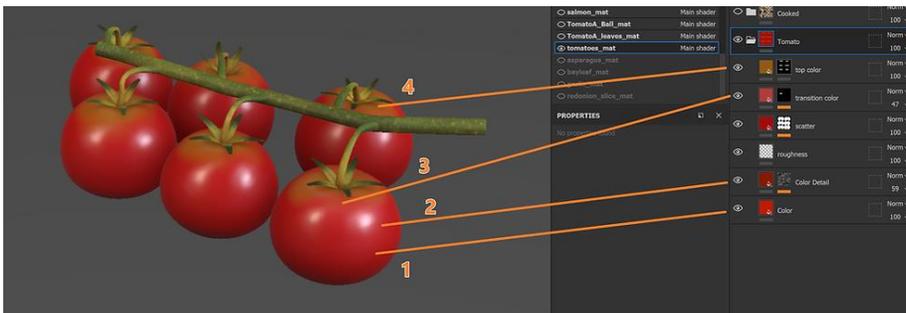




Texture creation in Substance Suit

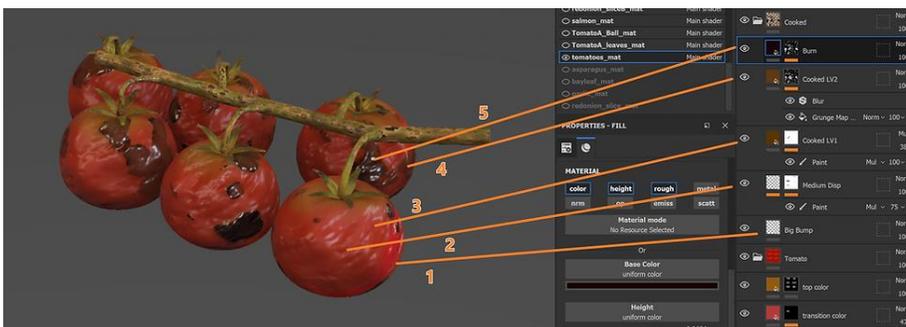
Tomato

I make tomato texture in Substance Painter directly. I use the fill layer and add another layer to control roughness. You can see my breakdown in the following images.



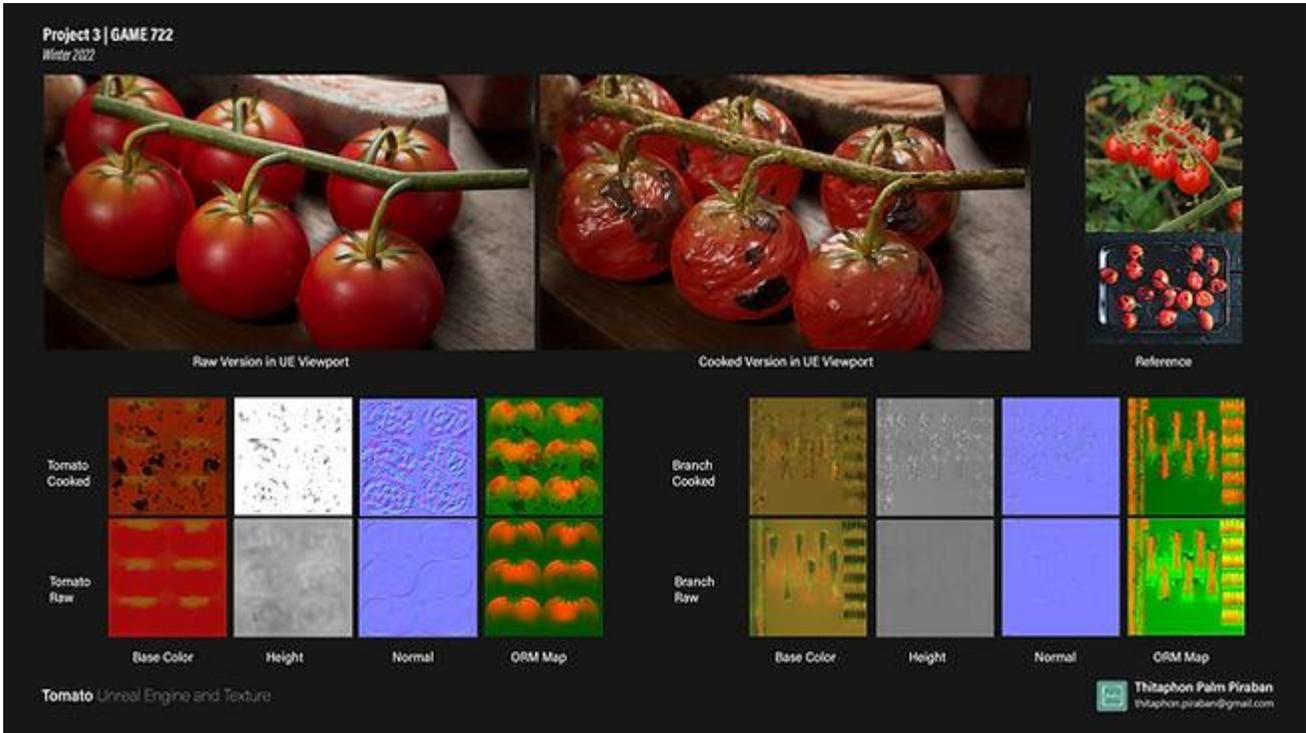
Raw version

1. Red color
2. Dark red color
3. Transition color
4. Top color

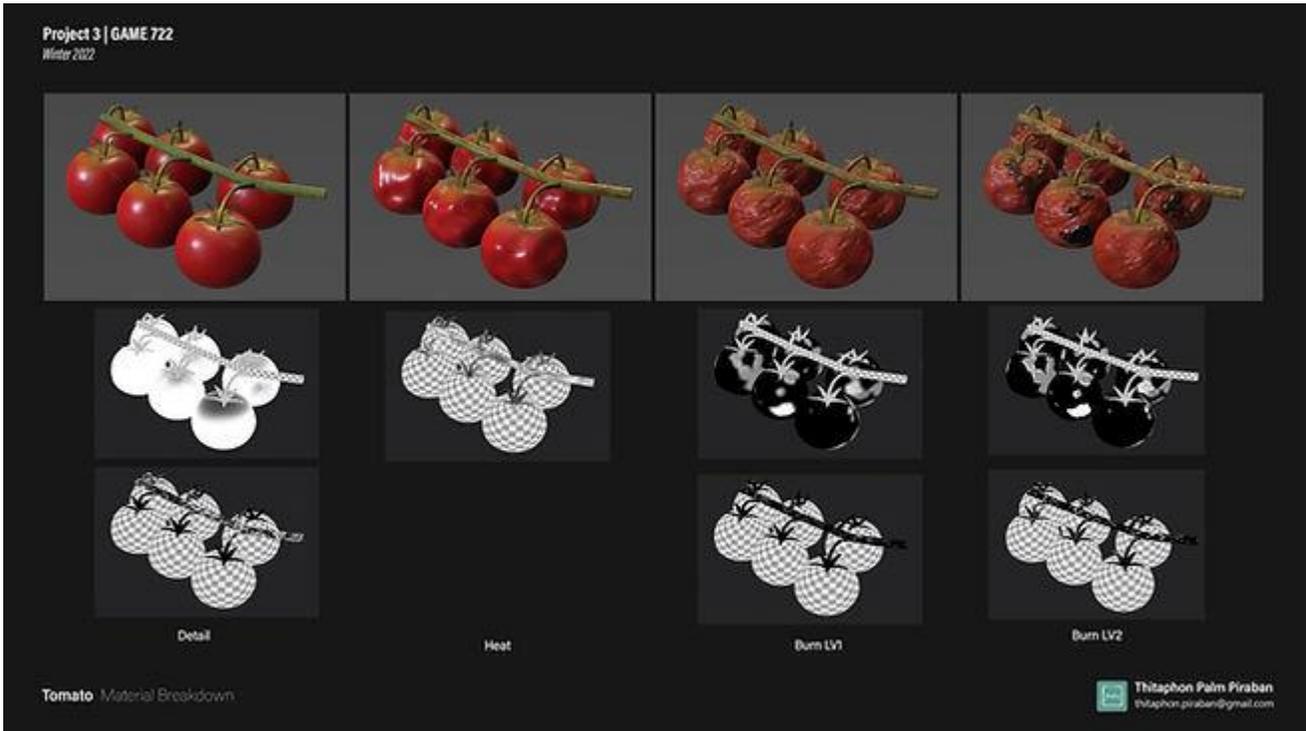


Cooked version

1. Big Bump (Break overall shape)
2. Medium Bump (add detail)
3. Cook LV 1(Heat)
4. Cook LV 2 (Brown)
5. Burn (Dark brown to black)



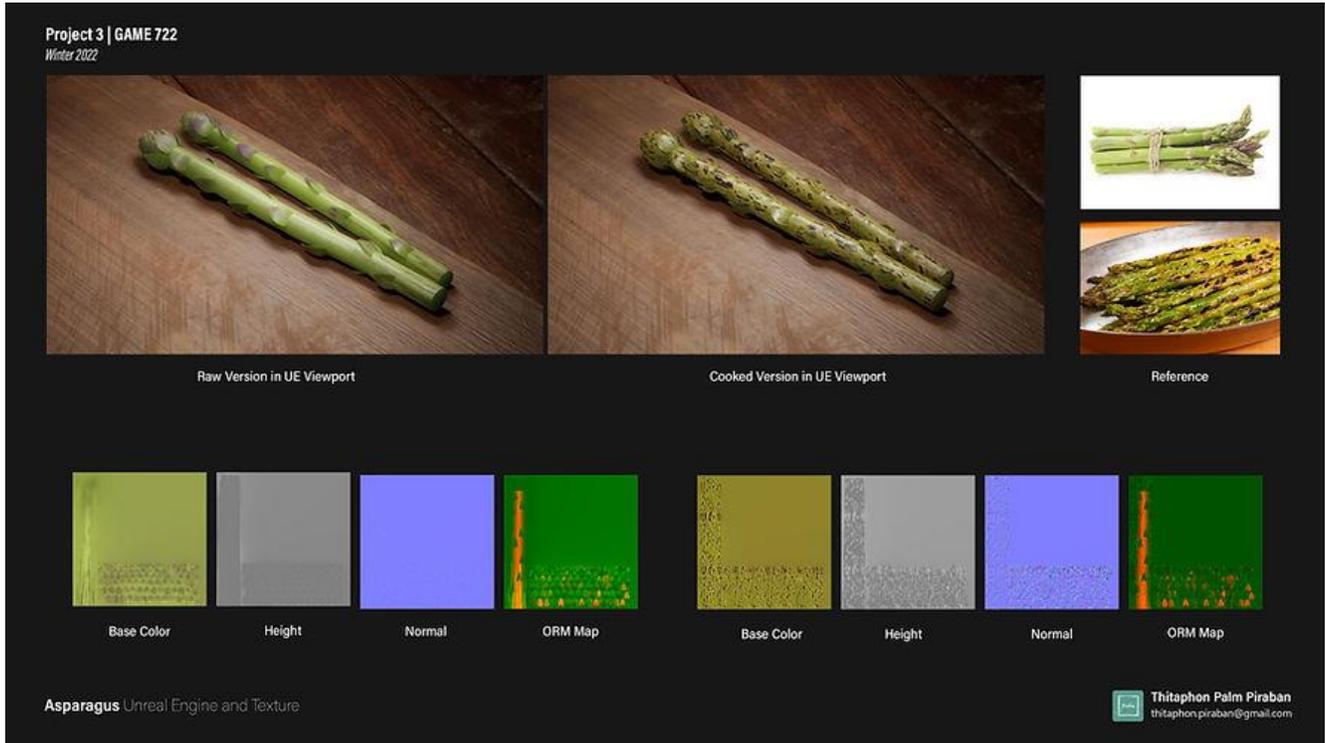
UE Render and Textures



Lemon and lemon slice masking

Asparagus

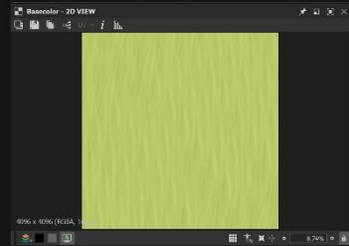
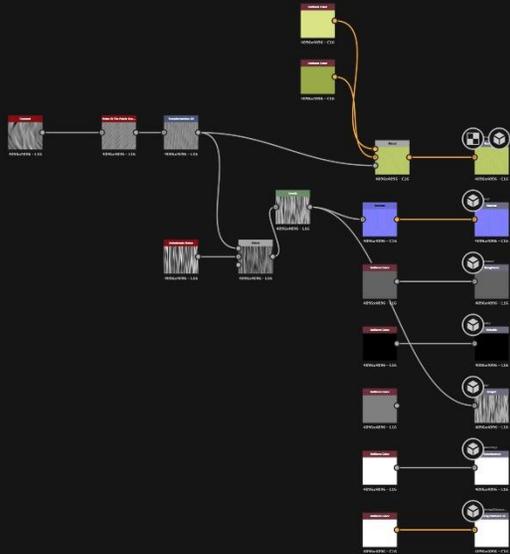
In nutrition fact, asparagus is high in dietary fiber. so, it contains a lot of vertical lines in the texture. I use the anisotropic noise and blend it with the creased node.



UE Render and Textures



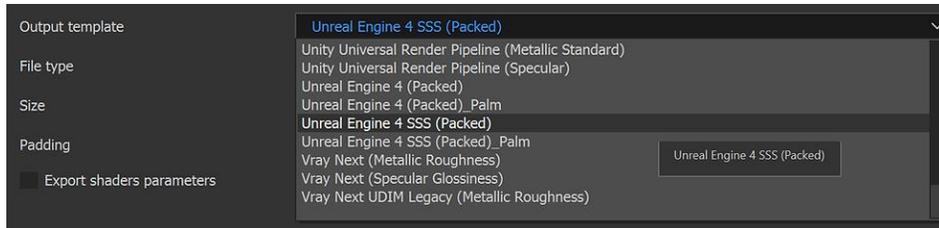
Asparagus masking



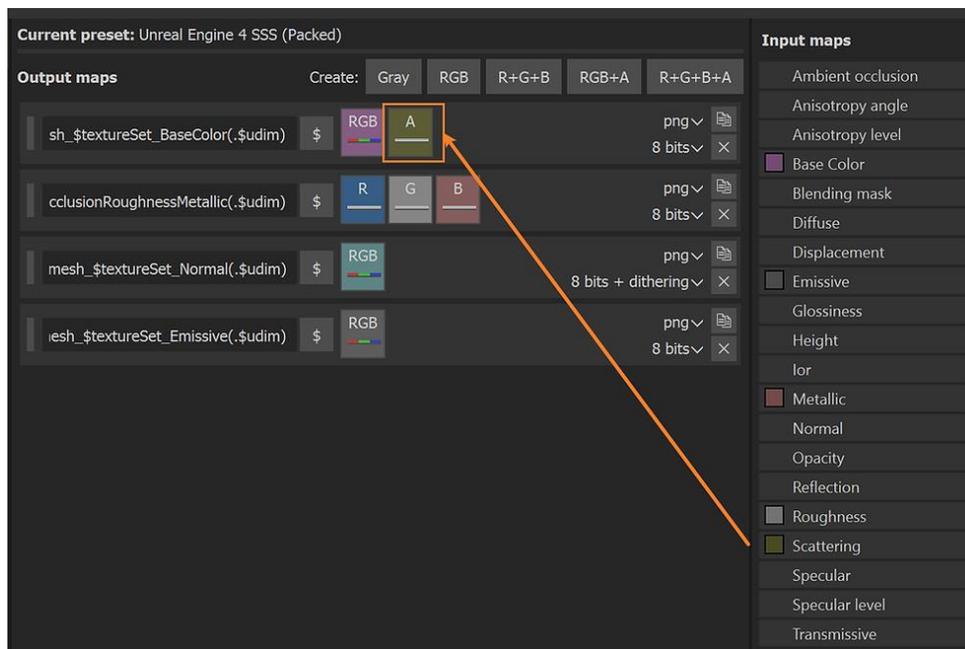
Texture creation in Substance Suit

Texture Exporting (Substance Painter)

Subsurface needs an alpha channel for calculating subsurface intensity in unreal engine material. You can see the material connection in the next chapter. The following images show the output template that I use in this project.



Output preset "Unreal Engine 4 SSS (Pakced)"



This image shows the texture preset detail. Scattering is attached with BaseColor Channel as Alpha

Step 04: Shader (Unreal Engine)

In this part, I will explain more about shader and material connection in Unreal Engine.

Because subsurface scattering is a complex effect that is related to material and light, I use both subsurface scattering systems: sss and sss profile.



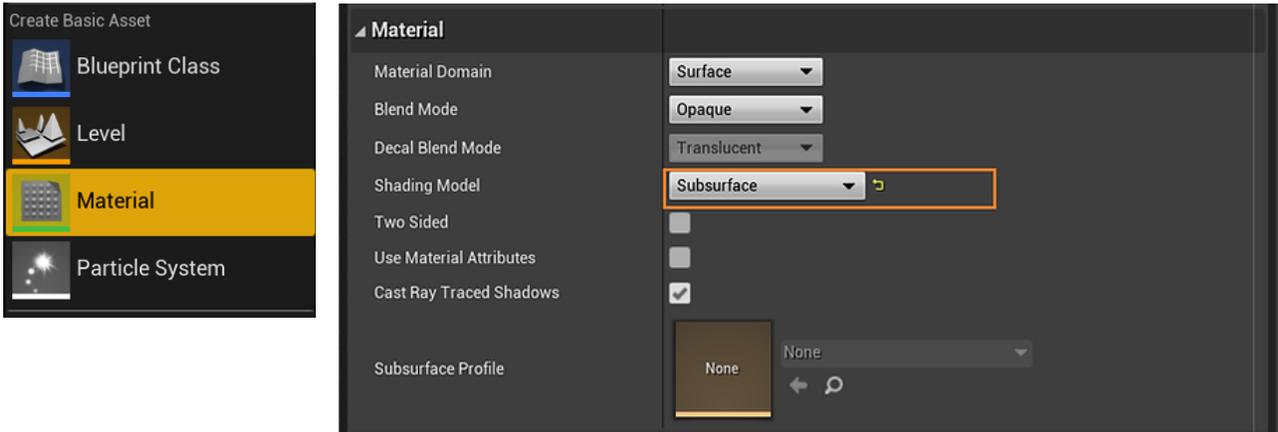
Raw material



Cooked material

Subsurface Scattering

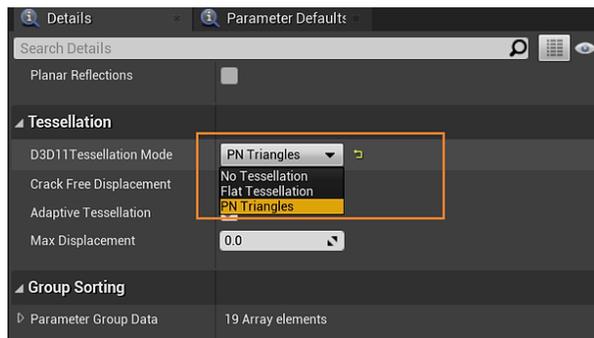
Let's create the Material and change the shading model to "**Subsurface**". Please click [here](#) to see the Subsurface Scattering document.



Material Attribute, Change shading Model to "Subsurface"

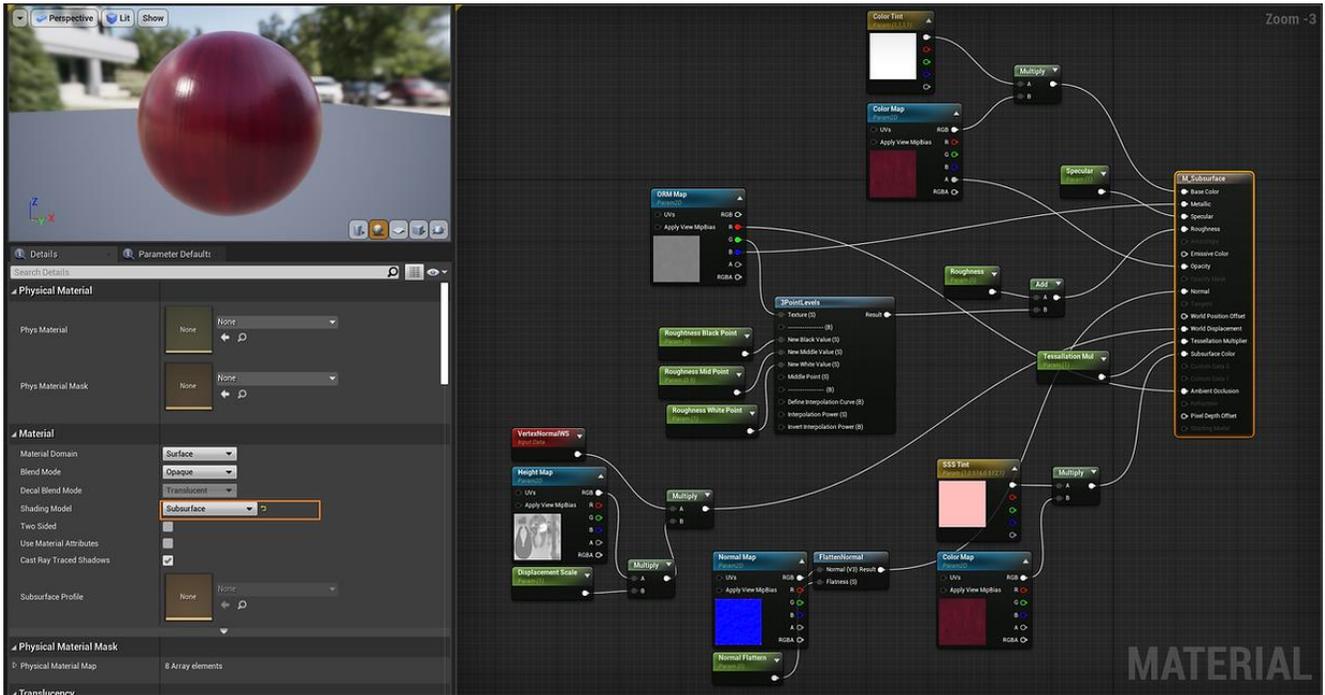
This is an explanation of the material connection.

1. Connect the input of the base color with a 3 vector color before multiplying with Base Color Map.
2. Connect ORM (Ambient Occlusion, Roughness, Metalness) separately
 - R channel, connect with ambient occlusion input
 - G channel, connect with roughness input
 - B channel, connect with metalness input
3. Before connecting the roughness map, I create **3 PointLevel** for adjusting the image.
4. Create a VectorNormalWS and multiply with Height Map before connecting to the World Displacement.
5. Connect Normal Map with FlattenNormal Map and then connect with material node
6. Create vector 3 color node and multiply SSS



Enable Tessellation Mode in Material

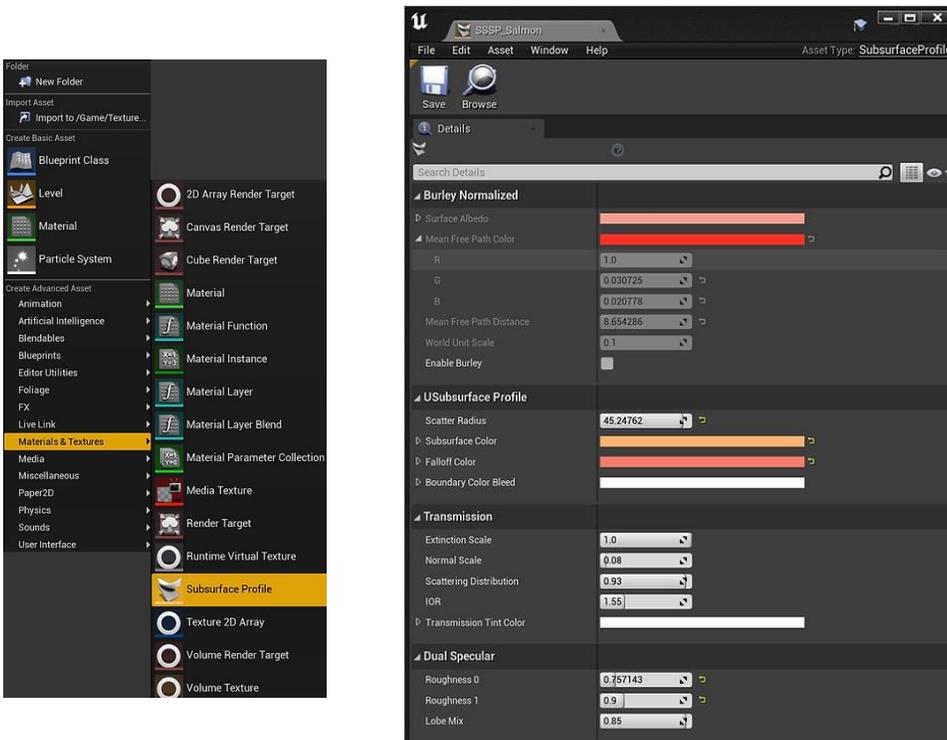
Scroll down to the Tessellation Part. Enable Tessellation Mode to Flat or PN.
for more information about [tessellation](#) please click here.



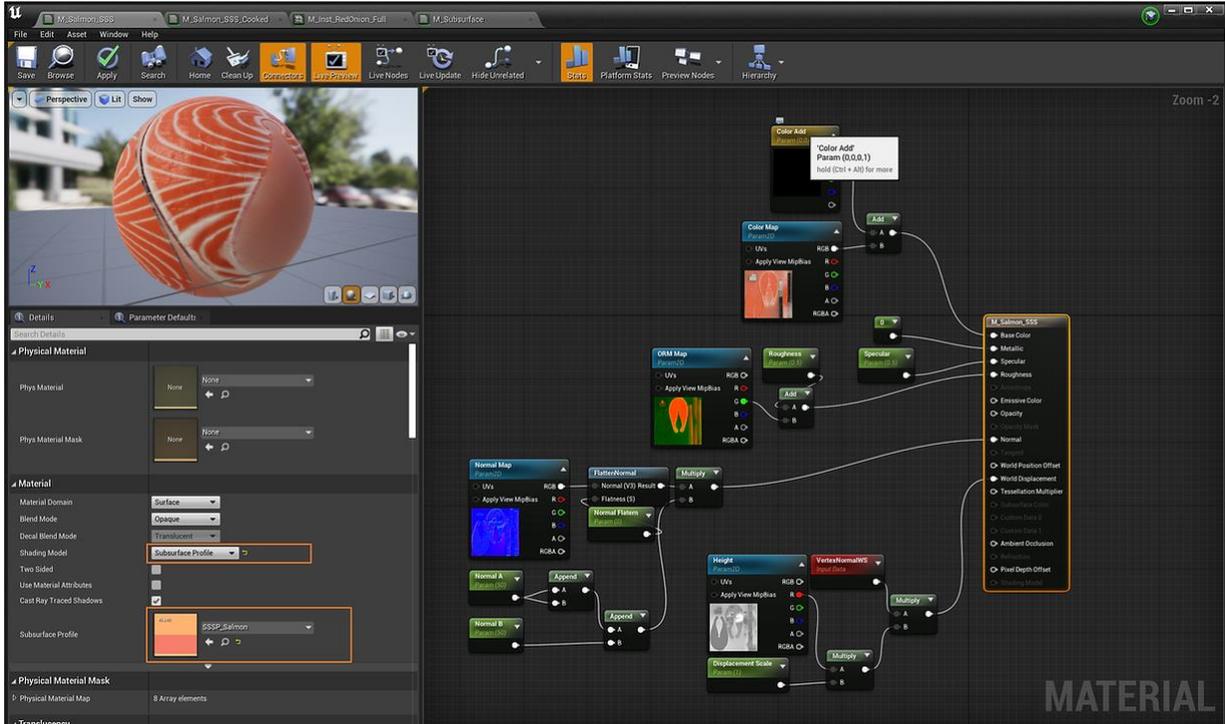
Example of Subsurface Scattering Material Connection

Subsurface Scattering Profile

For the subsurface profile, I create that node from right-click > Material & Textures > Subsurface Profile. And then adjust the SSS profile attribute: scatter radius, subsurface color, and falloff color. Click [here](#) to see more information about sss profile.

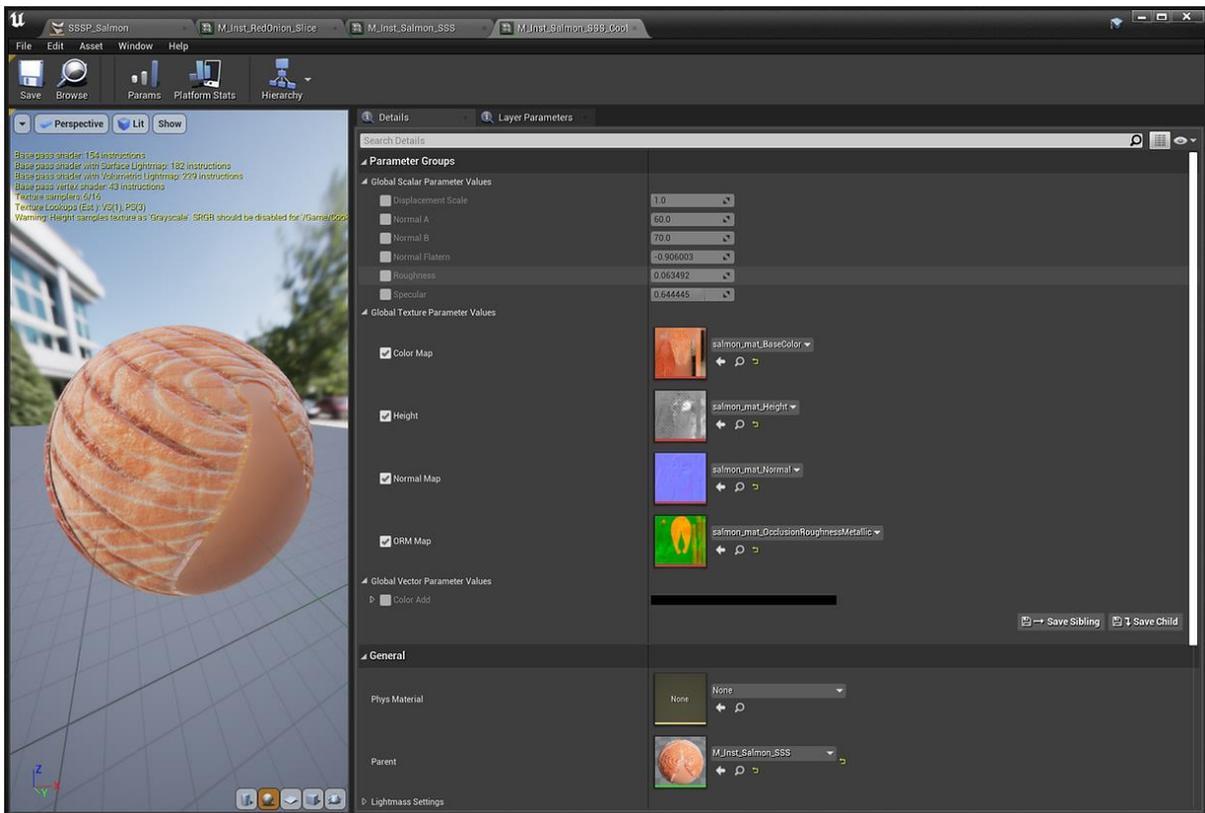


SSS Profile Attribute



Example of Subsurface Scattering Profile Material Connection

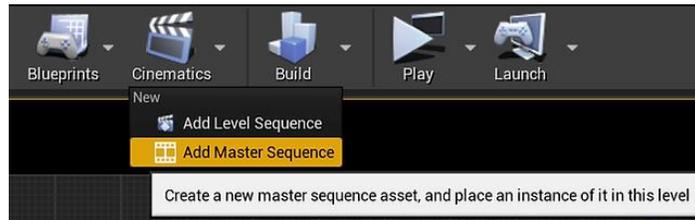
I create a material instance from Salmon SSS material because it is easy to replace it. You can see the example of material instance and cooked texture version in the following image.



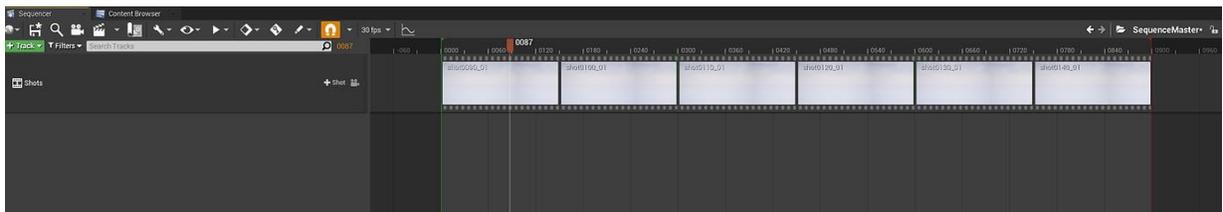
Material Instance

Step 05: Sequencer

In this part, I use the master sequence instead of the level sequence. The master sequence is easy for editing, I create 6 shots and move the camera each by each. Click [here](#) to see more detail about the master sequence.



At the top, you can see the cinematics (film slate icon). click at that button and select "Add Master Sequence"



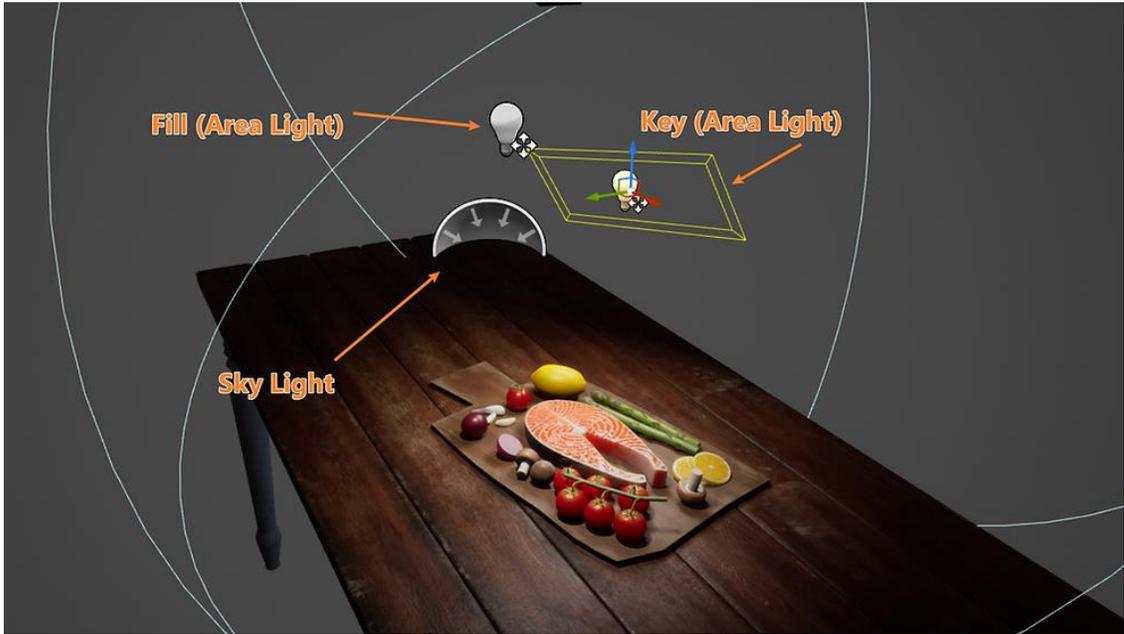
6 shots in master sequence



Many shots in master sequence

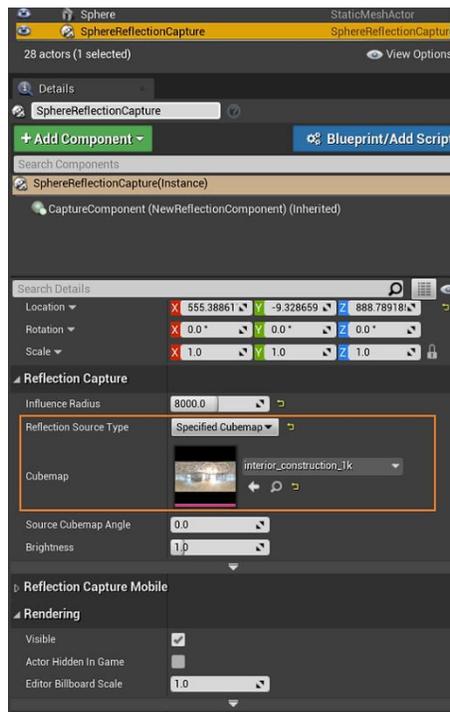
Step 06: Lighting

I got a reference from fine dining food photography. Almost my reference is soft lighting in low-key lighting. so, I use 1 sky light and 2 medium size area lights.



Lighting Diagram

After that, I add reflection capture and change the Reflection Source Type from Capture Scene to Specified Cubemap



Sphere Reflection Capture Attribute

Step 07: Rendering

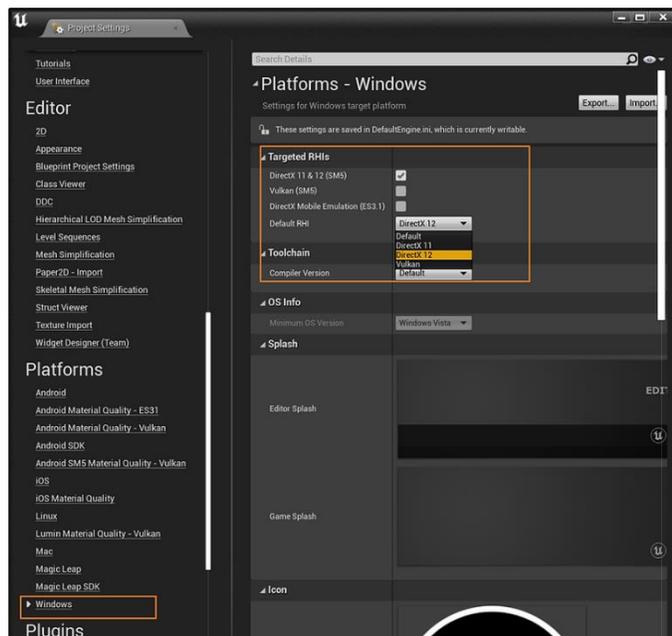
In this project, I use raytracing because I need to study more about real-time rendering. The following slide image shows the comparison between ray tracing and no ray tracing render from Unreal Engine.



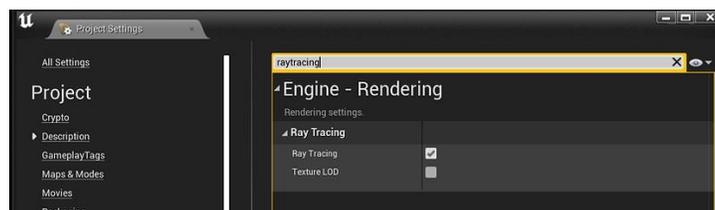
No Ray Tracing and Ray Tracing comparison image

Ray Tracing

First, select Direct X 12 and enable Ray Tracing in Project Setting. please click [here](#) to see more information about ray tracing



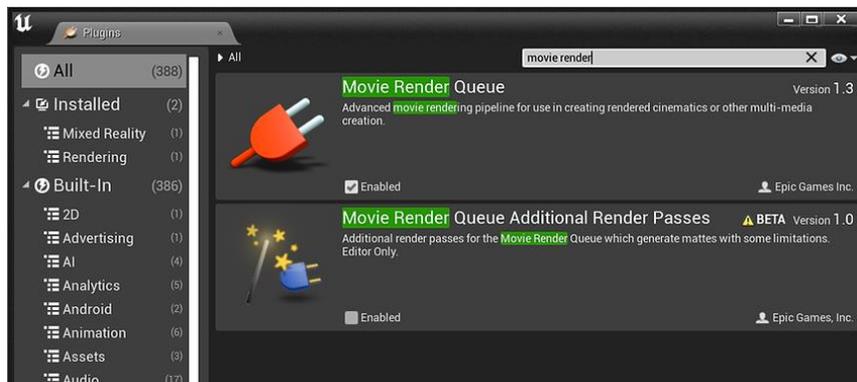
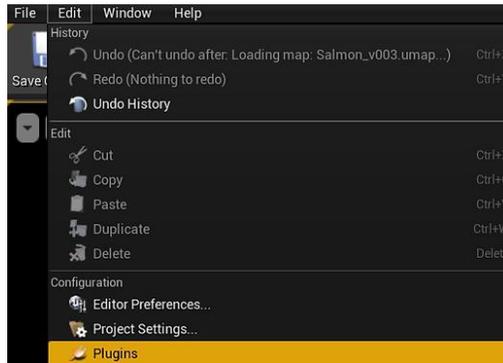
Direct X 12 in Project Setting



Ray Tracing in Project Setting

Movie Render Que

For the best quality, I enable the Movie Render Que to capture the sequence in the Edit > Plugins. Movie Render Queue is a tool for controlling the quality, format, etc. Please click [here](#) to see more information about Movie Render Que.

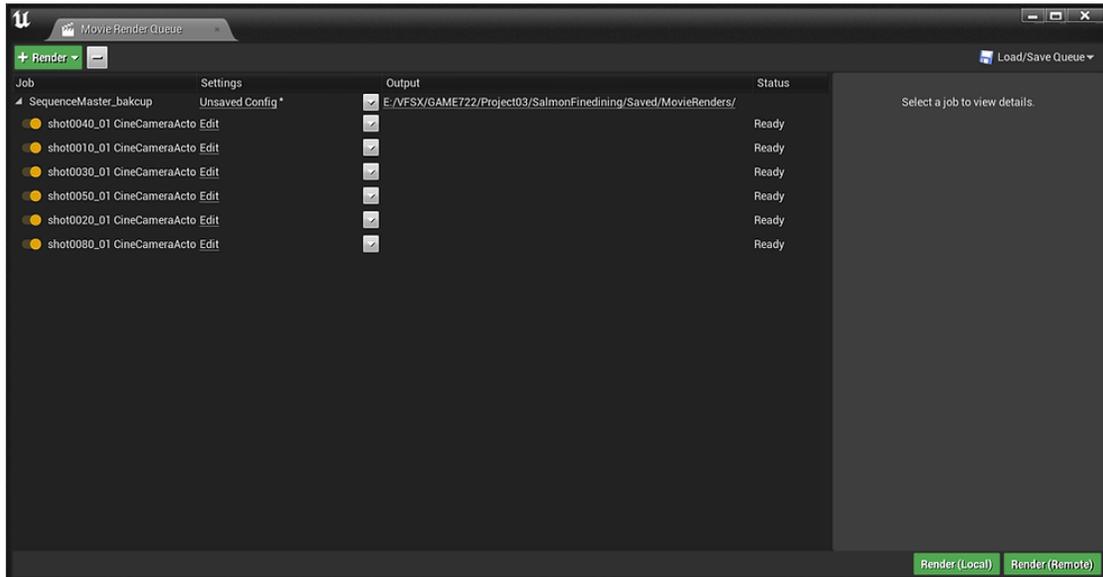


Window > Plugins

Click on the film slate icon in the sequencer to set up the movie before render.



Master Sequence in this project



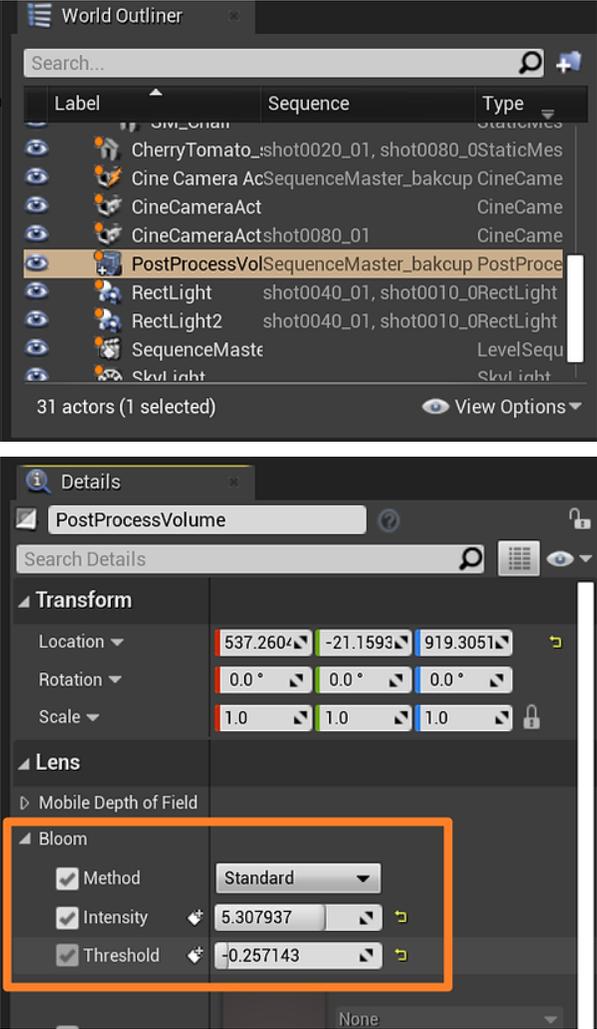
Movie Render Que Job Setting

The 'Render Preview' window displays a still image of sliced onions and a red apple on a wooden surface. Below the image, the text 'Render Preview (Low Quality)' is centered. To the left, under the heading 'Overall', are the following details: 'Current Sequence: SequenceMaster_backup', 'Total Frames: 47 of 1,214 (4%)', 'Elapsed Time: [00:00:11]', 'Est. Time Remaining: [00:04:48]', and 'Pipeline State: Producing Frames'. To the right, under the heading 'Current Camera Cut', are the following details: 'Cut Name: shot0040_01 (CineCameraActor9) (1 of 6)', 'Frame: 48 of 150 (32%)', 'Sub Sample: 0 of 1', and 'Cut State: Rendering'.

Render Preview

Post Processing

In the post-processing node, I enable the bloom attribute. this effect enhances the image, makes a soft light and glow. It is like a glow node in Nuke, but it processes in real-time. Please click [here](#) to see more information about the post-processing node.



Post Processing Node and Attribute in Post Process

Conclusion

Real-Time Shading and material in Unreal Engine are really new for me. It's out of my comfort zone. I created a bunch of works with traditional rendering in both CPU and GPU-based rendering. however, real-time stuff is a new trend recently. In my opinion, it would be a great opportunity if I know this process. I can expand my existing skills and study in-depth. When I was working on the shader, I was very impressed with the pace. When I enable the ray tracing, the shadow is softer, and the sample quality is much better than before. I will study more in lighting and material in Unreal Engine and will use it in my MA Project.

In addition, I have edited the transition and juicy look for the sliced lemon from the professor and professional artist's advice. I think Unreal Engine can solve problems and go back and forth very easily. so, this is the before and after image.



Before and after in raw version



Before and after in cooked version

Finally, thank you, Professor Manuel Prada, Ariyawat Meechoui, Gen Li for helping and giving me a useful suggestion. I hope this article will help you guys who have a passion for building visual imagery, lighting, and rendering can find a solution. if you need more information, please contact me at thitaphon.piraban@gmail.com