Place the model in the scene, add the Diamond Render script to the model, under the MeshRenderer component.

Do not forget to check the Read\Write box in the model settings, this is mandatory for the script to be able to read the model, also make sure that the normals of the model are correct, not smoothed. Also, your model must have the correct cut and the correct topology so that the refraction is correct.
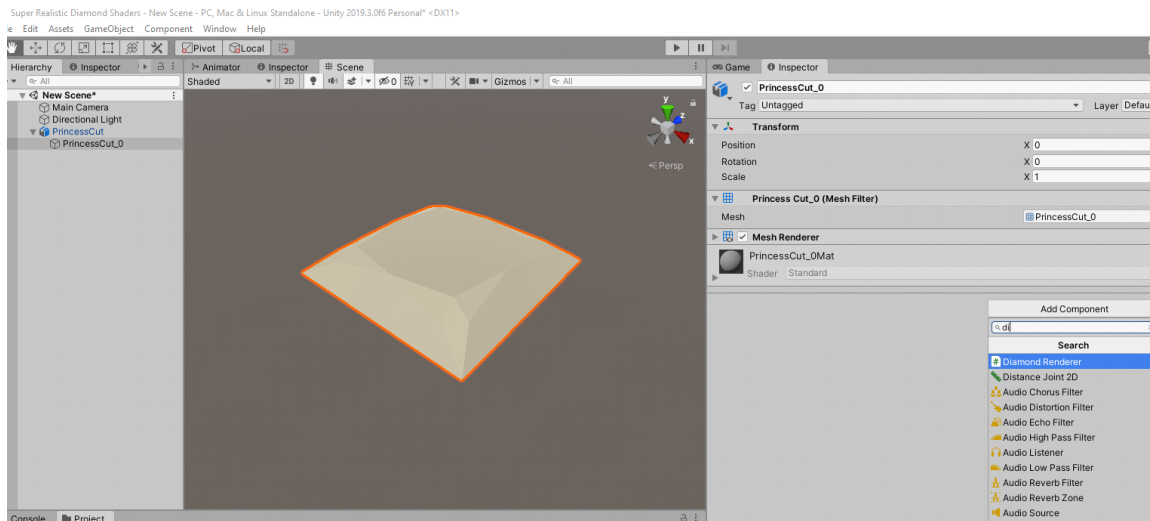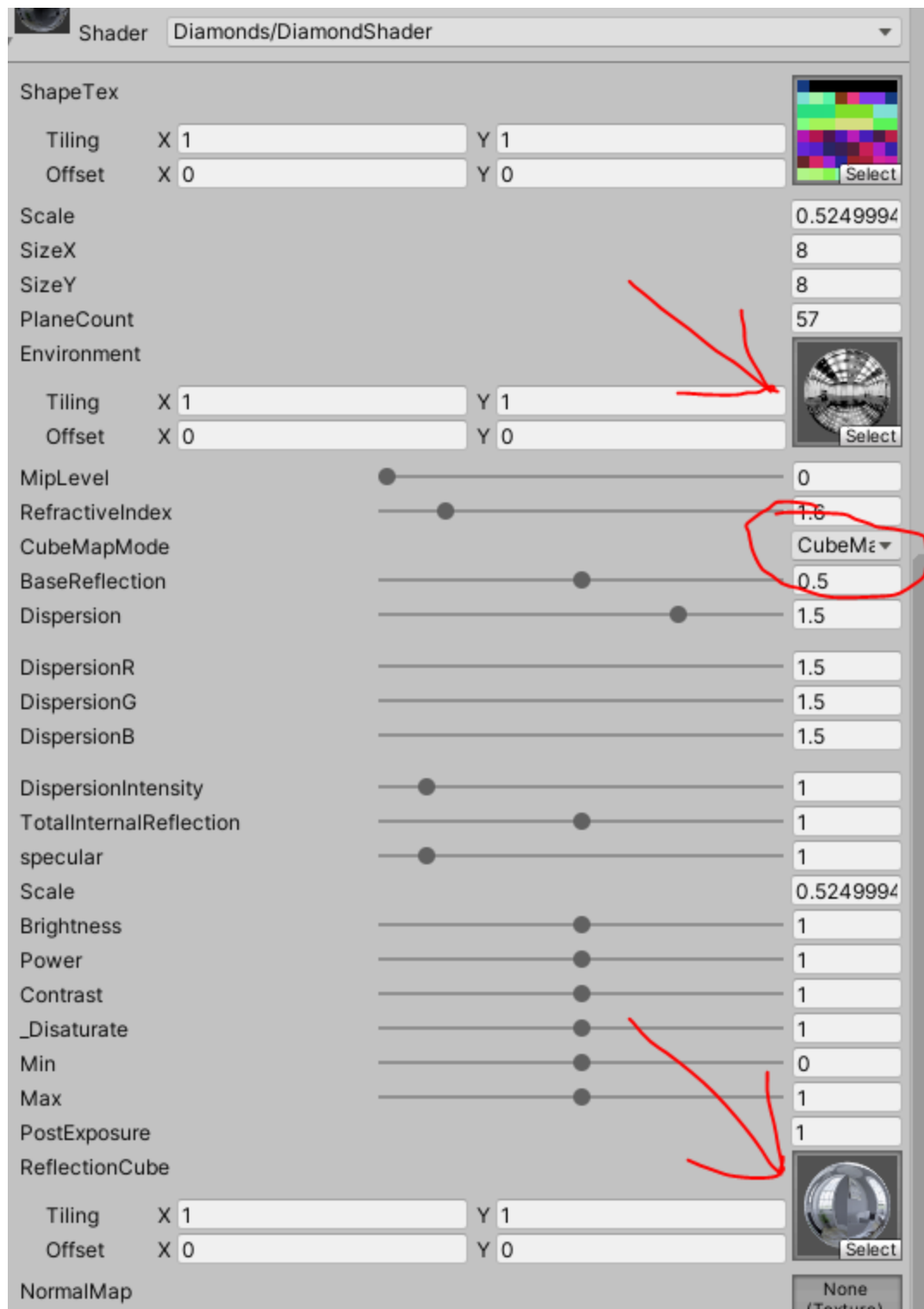

Install the material with the DiamondShader shader
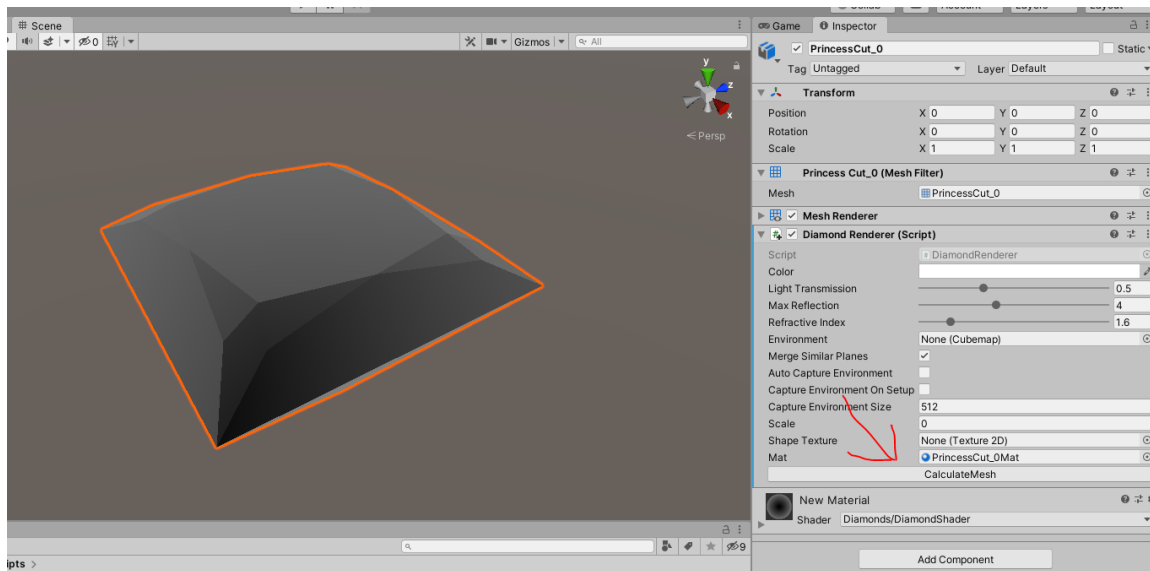
After that, click on the CalculateMesh button, the script will perform calculations and create data based on the model that the shader will process each frame, this approach will give good performance. If you change the model or change the geometry, press this button.
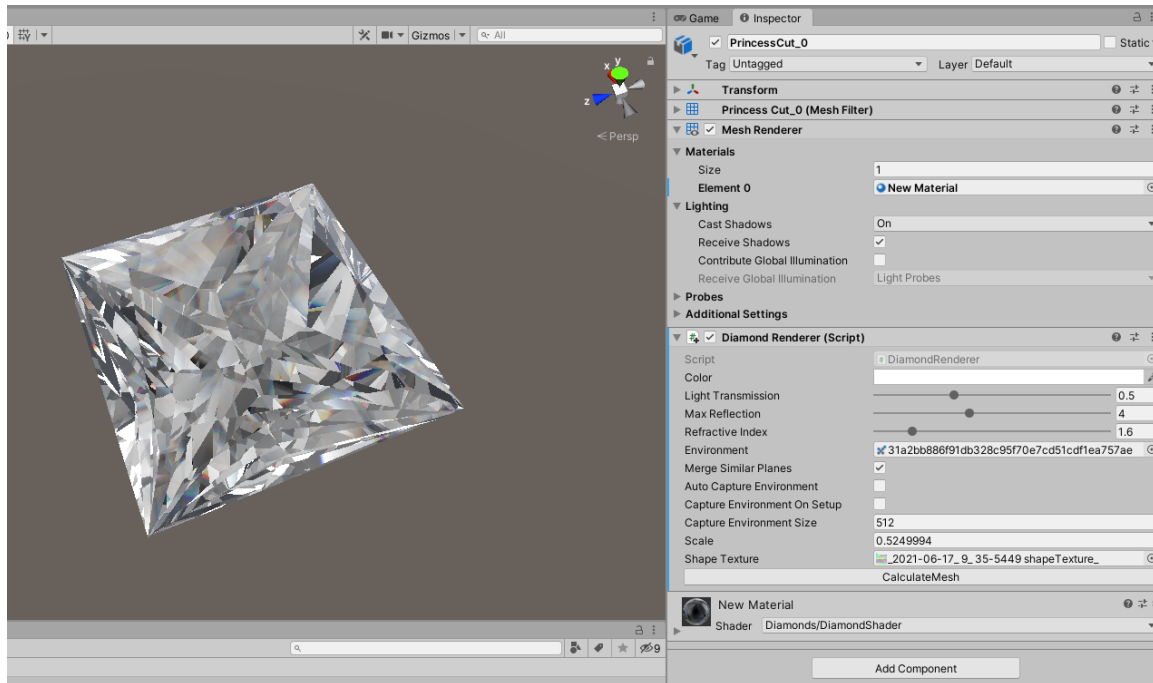
The next step is usually to select the desired cubmap or change the type to ReflectionProbe. There are only 2 cubemaps, 1 cubemap is needed for internal refractions and reflections, and the second for external reflection (regulated by the Specular value)

Shader	Diamonds/DiamondShader	▼

ShapeTex

Tiling	X 1	Y 1	
Offset	X 0	Y 0	Select

Scale	0.5249994
SizeX	8
SizeY	8
PlaneCount	57

Environment

Tiling	X 1	Y 1
Offset	X 0	Y 0	Select

MipLevel	●—————————————	0
RefractiveIndex	————————●———————	1.6
CubeMapMode		CubeMa ▼
BaseReflection	————————————●—————	0.5
Dispersion	————————————————●—	1.5
DispersionR	———————————————————	1.5
DispersionG	———————————————————	1.5
DispersionB	———————————————————	1.5
DispersionIntensity	———●——————————————	1
TotalInternalReflection	——————————●————————	1
specular	———●——————————————	1
Scale		0.5249994
Brightness	——————————●————————	1
Power	——————————●————————	1
Contrast	——————————●————————	1
_Disaturate	——————————●————————	1
Min	——————————●————————	0
Max	——————————●————————	1
PostExposure		1

ReflectionCube

Tiling	X 1	Y 1
Offset	X 0	Y 0	Select

NormalMap	None (Texture)

Let's analyze the script parameters.
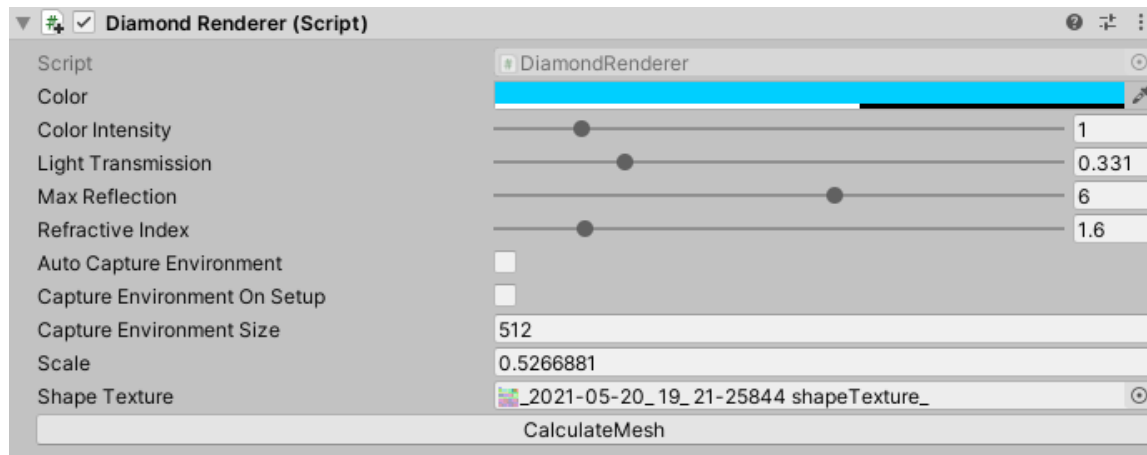
Color: Sets the color for the selected model, the alpha of this color is responsible for the saturation intensity.

Color Intensity: This parameter increases the color saturation

Light Transmission: this slider is responsible for the transmission of light areas of the cubmap from the color, i.e. if, for example, the color of the stone is set = green and Light Transmission = more than 1, then where you have light areas of the cubmap there will be a more intense green color, less saturated, it will be more colorless, try with some bright color.

Max Reflection: A very important parameter, the performance and appearance of a diamond strongly depends on it, this is the number of passes that the shader performs, the more passes the more internal reflections and refractions, the higher the parameter, the slower the shader works, I do not advise setting high values for mobile phones, it is better to set 3-4 for small stones.

RefractiveIndex: this is the refractive index, usually in the real world it is equal to a diamond = 2.417, but I often put this value lower because it often looks better, I noticed many artists do this, but it's up to you, it all depends on your scene and your goals.

Auto Capture Environment: If enabled, the scene will be recorded in the cubmap and used in the material (it does not work for AR, it will be written about AR at the end of the documentation)

Capture Environment on Setup: cubemap will be recorded only when the CalculateMesh button is pressed

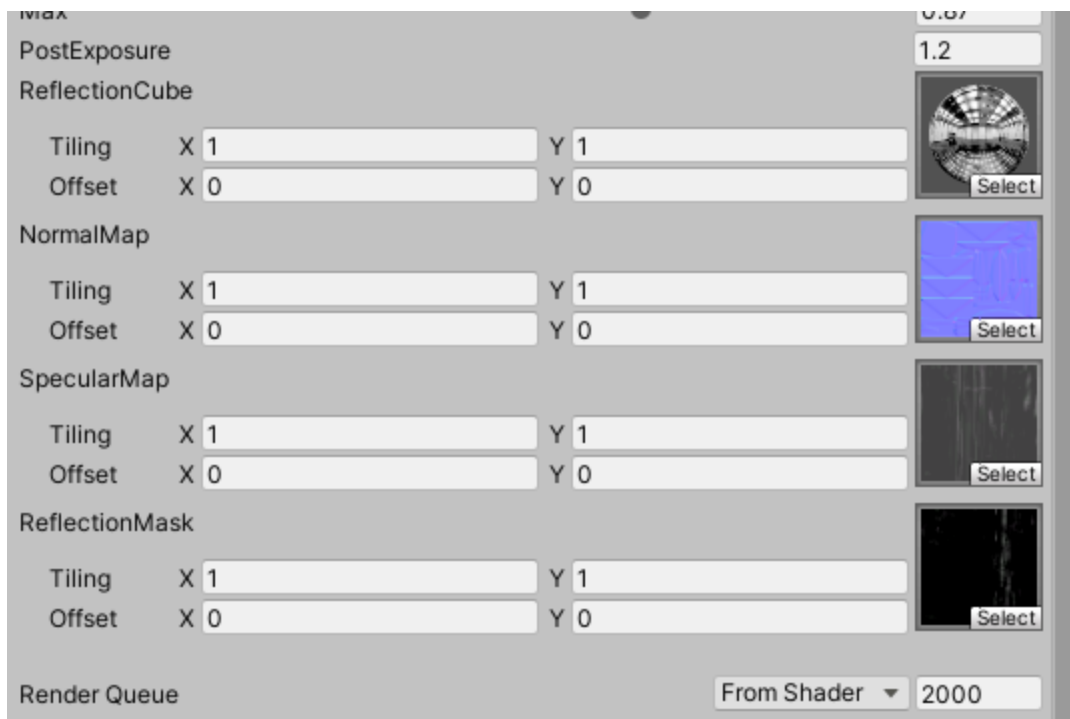Capture Environment Size: the size of the recorded cubmap

Scale: The value of this parameter is set automatically by the script, it determines the correct size of the model, if suddenly it did not work correctly, you can edit it manually, but this has not happened for me.
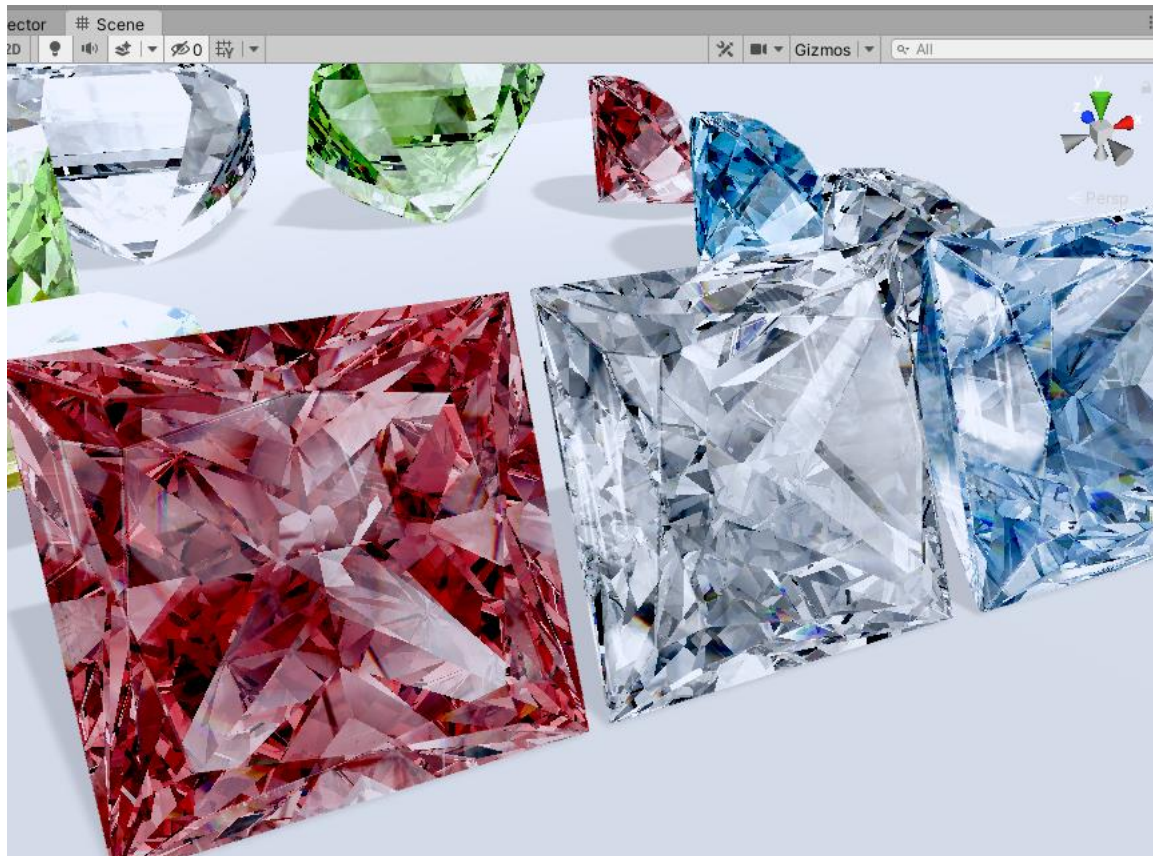
ShapeTexture: This is the data that the script has written to the texture, if it has written too many pixels, then perhaps your model has too many polygons.

Regarding polygons, make sure that your model has a fairly low number of polygons, performance depends very much on this. Below is an example of my model, Plane Count in the material means the number of polygons that will be calculated in the shader, if you have too large a value, then reduce the number of polygons in your program where you make models, usually such a tool in Cinema4d as polygon reduction helps me, it is also in blender and possibly in other programs, if your topology is initially correct, this tool often creates a good cut with a significant reduction in polygons.
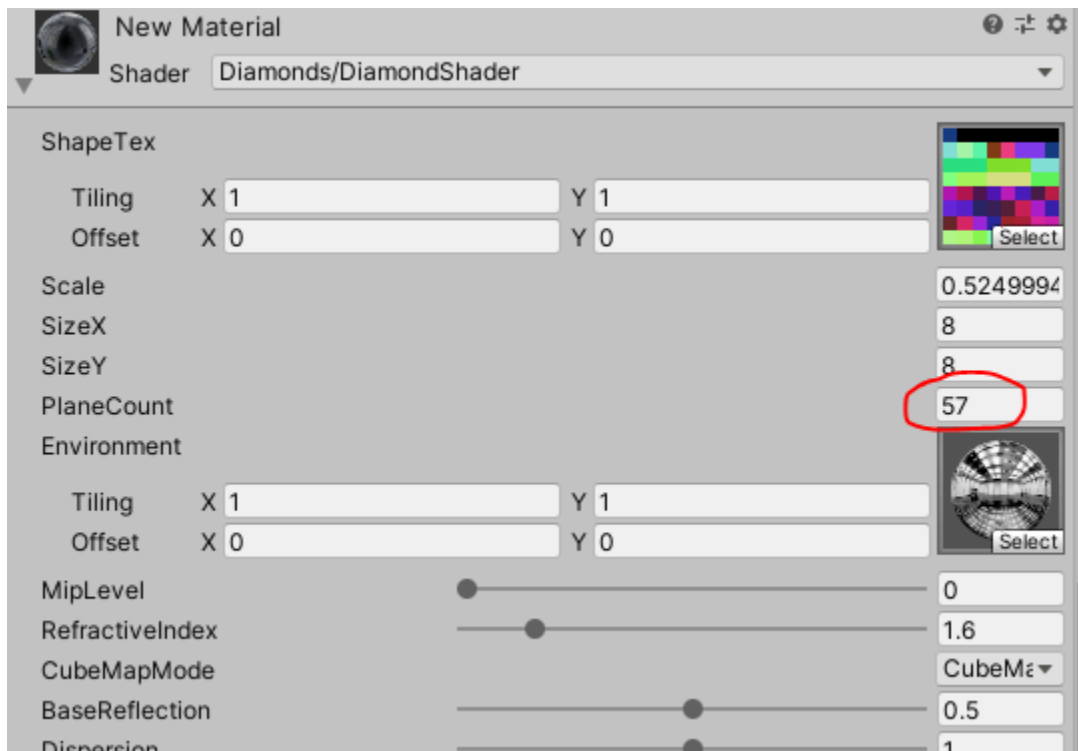
As for the chamfers on the edges of the stone, it is better not to do them, instead use baked normals and specularMap to create the illusion of chamfers, below I gave an example from the demo scene, it turned out a good result, despite the fact that I did not do it for a long time, give this task to a 3d artist who knows how to work with baking normals and texturing to make an excellent result, these 3 textures will also allow you to add stains on the stones and make them more realistic.

Max				0.67
PostExposure				1.2
ReflectionCube				
Tiling	X	1	Y	1
Offset	X	0	Y	0
NormalMap				
Tiling	X	1	Y	1
Offset	X	0	Y	0
SpecularMap				
Tiling	X	1	Y	1
Offset	X	0	Y	0
ReflectionMask				
Tiling	X	1	Y	1
Offset	X	0	Y	0
Render Queue			From Shader ▼	2000

Select
Select
Select
Select

Let's analyze all the parameters of the material:

ShapeTex				
Tiling	X	1	Y	1
Offset	X	0	Y	0

Select

SizeX — 8
SizeY — 8
PlaneCount — 57

Environment

Tiling	X	1	Y	1
Offset	X	0	Y	0

Select

MipLevel — 0
RefractiveIndex — 1.7
CubeMapMode — CubeMa ▼
BaseReflection — 0.4
Dispersion — 0.92

DispersionR — -0.326
DispersionG — -0.167
DispersionB — 0.068

DispersionIntensity — 1
TotalInternalReflection — 1
specular — 7.05

Brightness — 1.075
Power — 0.953
Contrast — 1
_Disaturate — 1
Min — 0
Max — 0.87
PostExposure — 1.2

ReflectionCube

Tiling	X	1	Y	1
Offset	X	0	Y	0

Select

NormalMap

Tiling	X	1	Y	1
Offset	X	0	Y	0

Select

SpecularMap

Tiling	X	1	Y	1
Offset	X	0	Y	0

Select

ReflectionMask

Tiling	X	1	Y	1
Offset	X	0	Y	0

Select

ShapeTex: As I already wrote , these are calculated polygons from the script, they are saved to the ShapeTextures folder with their unique number and date.

SizeXY: ShapeTex dimensions

PlaneCount: the number of polygons that will be processed, make sure that it is low enough

Environment: cubemap, which is used for refractions and reflections inside the stone

MipLevel: if MipMaps are enabled in the cube map, then you can choose the Mip Level to be used, the performance is almost not affected.

RefractiveIndex: this is the refractive index, usually in the real world it is equal to a diamond = 2.417, but I often put this value lower because it often looks better, I noticed many artists do this, but it's up to you, it all depends on your scene and your goals.

CubMapMode: Choose what to use, a cubmap or a ReflectionProbe from the scene (ReflectionProbe is especially important for AR, more on this below)

Base Reflection: This value determines how strongly the reflections will be visible in relation to the refracted light, always at the level of 0.3 - 0.6

Dispersion: This is the setting of the color dispersion, search the Internet for more information what it is, the level determines how far the light beams are separated from each other forming a different color.

DispersionRGB: These 3 values are needed in order to separate each color from each other with a different length.

Dispersion Intensity: this is the saturation or intensity of the dispersion effect

Total Internal Reflection: This value is in order to determine from which place it is possible to interrupt reflections, it is desirable to leave it at the initial level, but it may be useful to someone

Specular: This regulates the intensity of external reflections.

Brightness: The brightness of internal refractions/reflections.

Power: Raises the output result to a power, makes a more powerful and juicy result by the type of contrast, but it works a little differently.

Contrast: This is the contrast of the output result, the light areas are lighter, the dark ones are darker

Desaturate: Reduces saturation in light areas

Min: regulates the darkness in the stone

Max: Adjusts the brightness

PostExposure: Highlights the final result, makes it light or dark

ReflectionCube: This is a cubmap for external reflections

NormalMap: This is a normal map, it is necessary to give volume to external reflections, without a ReflectionCube, a normal map is useless

SpecularMap: This map is for changing the intensity of external reflections

ReflectionMask: adds reflections regardless of the "specular" value"

Flares

In addition to the shader for diamonds and the script, there is also a post-effect with flares in the asset, it works only in the standard render (perhaps in the future I will make support for URP\HDRP if someone needs it, write to me about it)
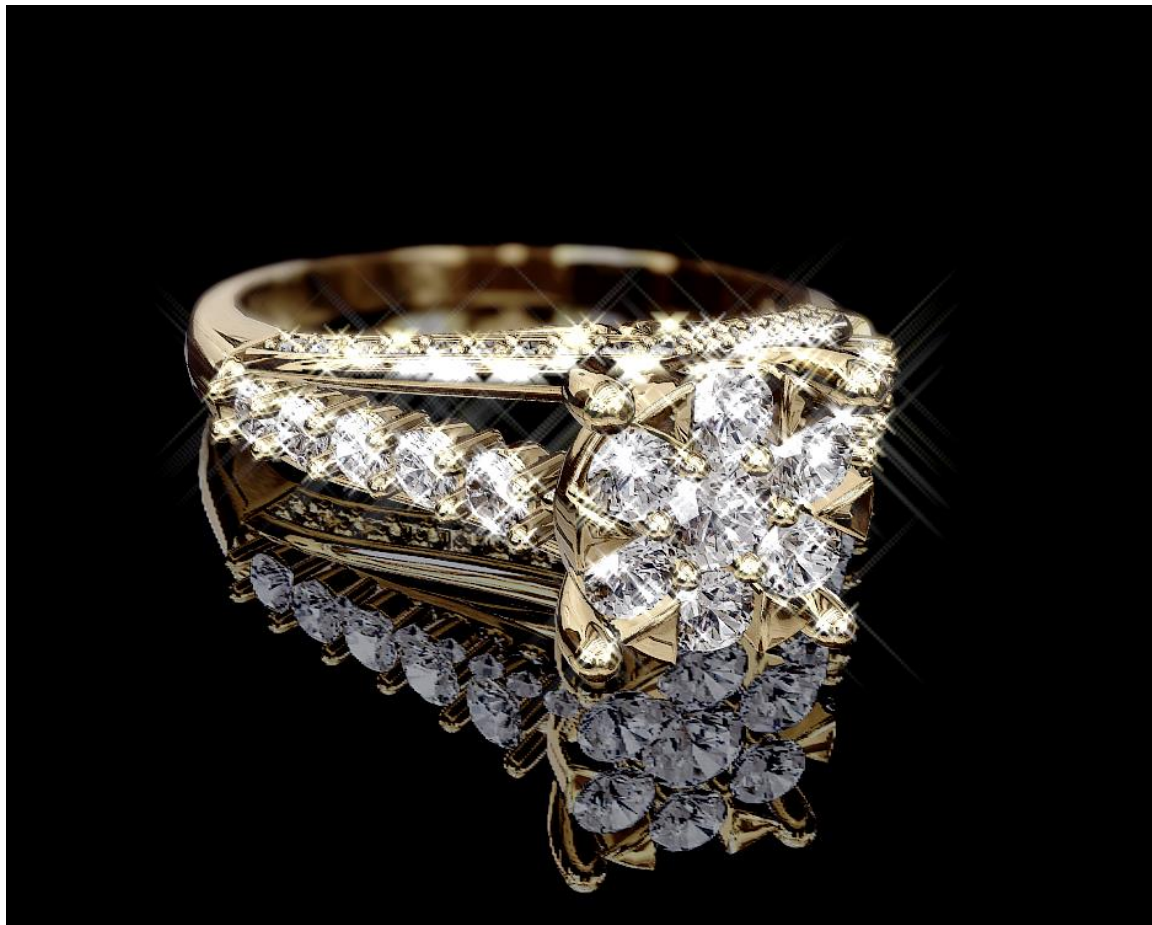
The first block is the basic values for image correction, so that it can be used without standard postprocessing, as well as 2 layers of glare at the bottom, for small points and large points on the screen, it calculates light points and creates glare in these places.

Blur Amount: This is the shift of all the pixels of the rays, adjust it so that the ray looks without noise.
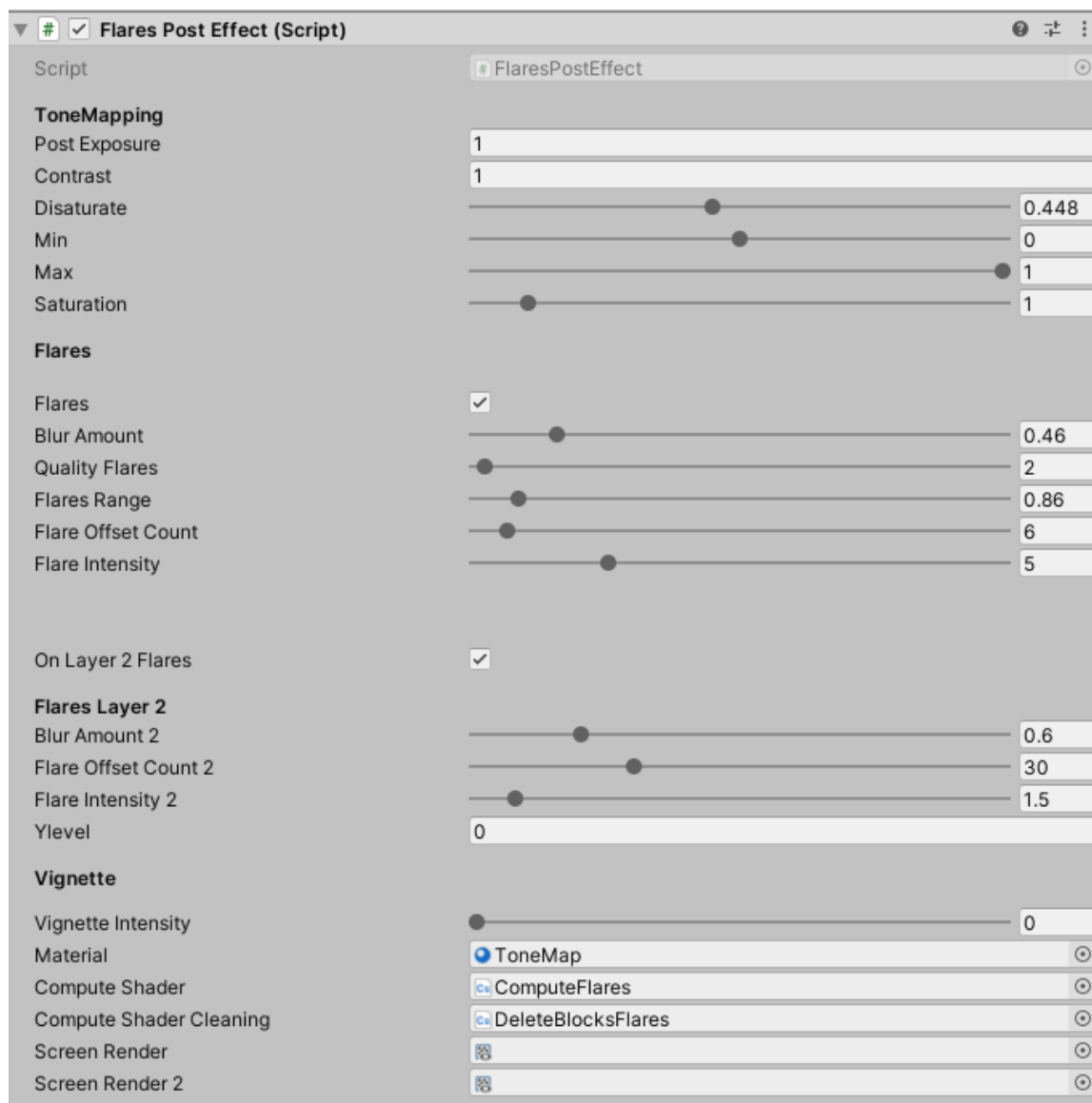
Quality Flares: the lower the value, the higher the quality and more pixels are used to create highlights, this will help change the size of the desired rays, this does not affect performance.

Flares Range: With this slider, you can adjust the threshold for creating glare

Flares Offset Count: Attention this slider greatly affects performance, the higher the value, the more passes occur and the smoother the beam turns out and it can be made longer.

Flare Intensity: This is the transparency of the rays

Level: This is the position in the world space, beyond which the rays do not appear, for example, so that the rays do not work from the white floor, the standard value is 0, from it and above, and the rays work

▼ # ✓ **Flares Post Effect (Script)**		❓ ⛭ ⋮
Script	# FlaresPostEffect	⊙
ToneMapping		
Post Exposure	1	
Contrast	1	
Disaturate		0.448
Min		0
Max		1
Saturation		1
Flares		
Flares	✓	
Blur Amount		0.46
Quality Flares		2
Flares Range		0.86
Flare Offset Count		6
Flare Intensity		5
On Layer 2 Flares	✓	
Flares Layer 2		
Blur Amount 2		0.6
Flare Offset Count 2		30
Flare Intensity 2		1.5
Ylevel	0	
Vignette		
Vignette Intensity		0
Material	◯ ToneMap	⊙
Compute Shader	cs ComputeFlares	⊙
Compute Shader Cleaning	cs DeleteBlocksFlares	⊙
Screen Render	▩	⊙
Screen Render 2	▩	⊙

Now I will describe what to do if the glare flashes too much when combined with standard post effects

(everything is fine without them), this happens because of the Post-Process Layer component and its anti-aliasing, in order to fix at least part of the strong twitching, you need to go to this folder below and open the Uber. shader file
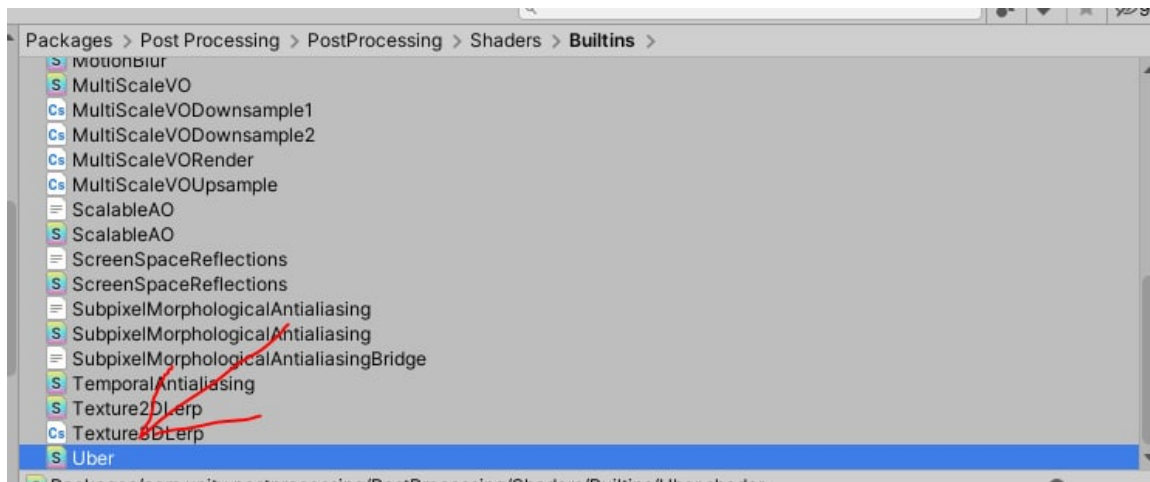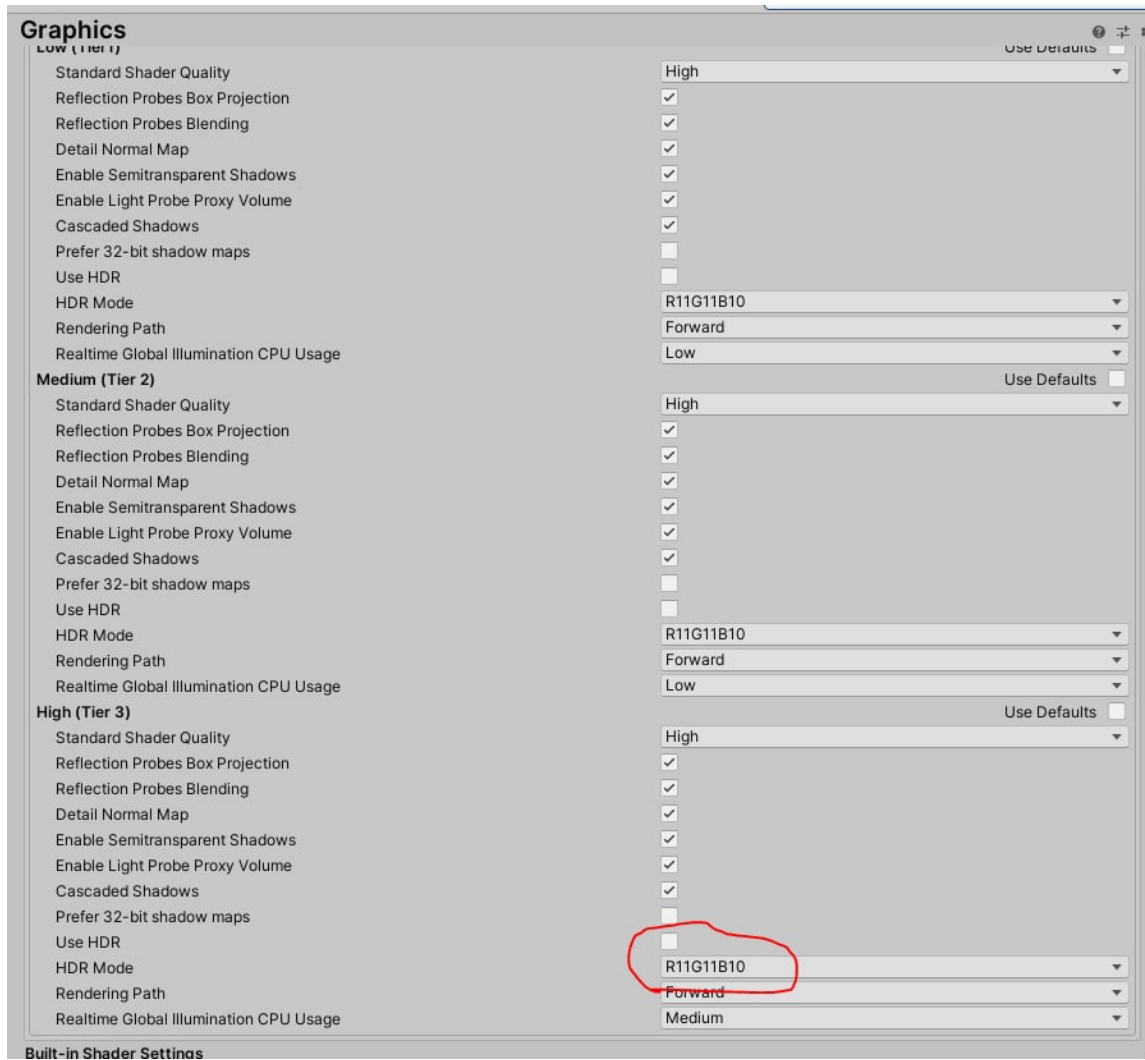

You need to find the line that is green, you will have it white and active, comment out as in the screenshot and add an entry instead:

output.rgb = output.rgb;

This will disable the built-in dithering and the noise that creates the Post-Process Layer will decrease
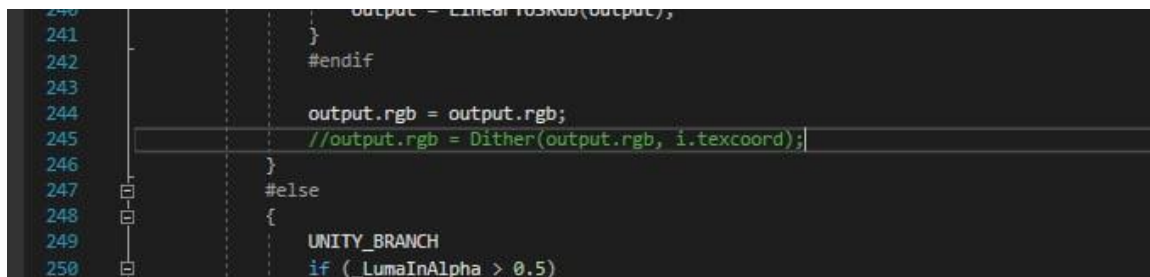
In my project, I used the following graphics settings:

Stage design

To create realistic stones in the scenes, I had to sort through 600 HDRI and more suitable ones, there are only less than a dozen left, so write on the Internet, for example, "**beautiful interior**" and download 300 pieces at once and check all of them to find the right one for your scene. The shader does everything possible to create realistic stones, it makes the correct rendering of diamonds as life, everything else depends on the shape of the scene.По поводу антиалияснига, советую использовать TemporalAntialiasing чтобы грани внутри бриллиантов были более четкие, если подкрутить значение Sharpness.

При использовании Color Grading используйте лучше режим custom, чтобы светлые участки не затемнялись.

Mirror Reflection

For some scenes the "MirrorReflection" script will be useful

It is needed to create reflections on the floor, with the help of the shader you can change the transparency of the reflections and adjust the size in the script, the size will greatly affect the performance, I also created a second shader for diamonds that has pass restrictions, the value "Diamond Shader".
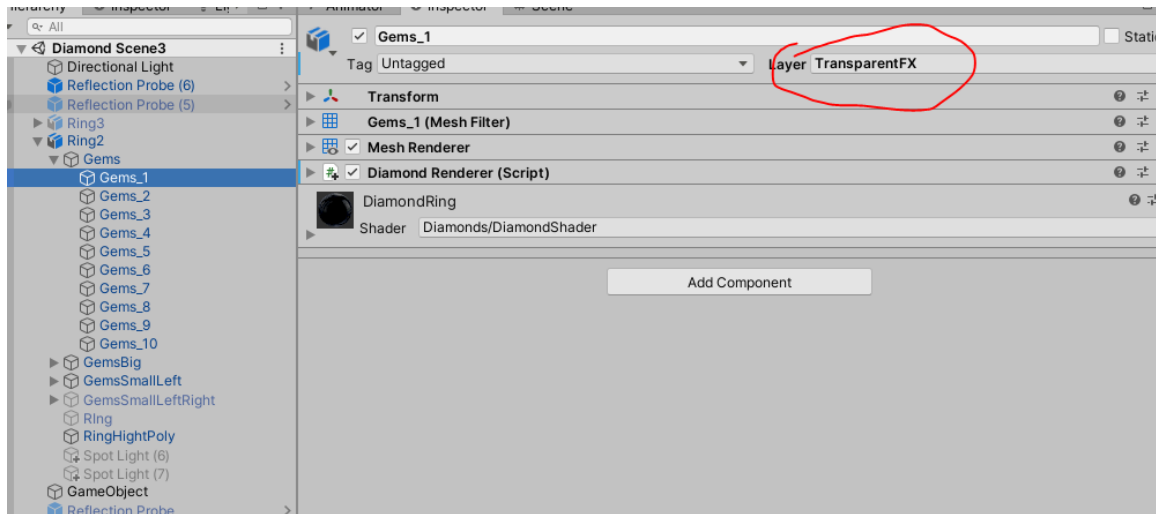
It is necessary so that not stones from the scene are rendered in reflections, but stones with a replaced shader, with a faster one, for this there is a division into layers in the script,

_Reflect Layers: this is the first layer that the camera renders

_Reflect Diamond Layers: this is the layer for the diamond where the shader will be replaced in the materials
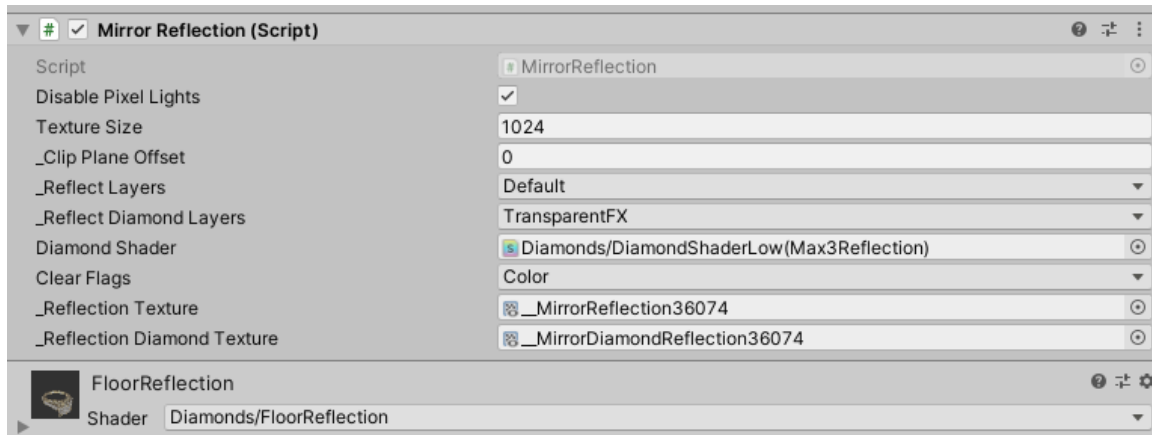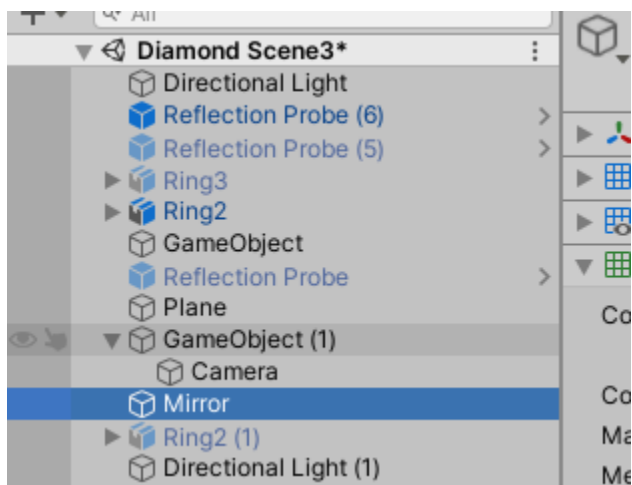
AR

In order for the image from the camera to be transmitted to the stones and to make refractions taking into account the environment, you need to use the " AR Environment Probe Manager" https://docs.unity3d.com/Packages/com.unity.xr.arfoundation@2.2/manual/environment-probe-manager.html

You will need to make a prefab with ReflectionProbe and with this component and create it on the stage, and in the materials of the stones put it in the mode of using ReflectionProbe.

Mobile applications and optimization

Before creating applications for mobile devices, delete the script "ImportPostProcces. cs" inche it will constantly change the color space to Linear, this was only necessary to demonstrate the scenes, since they were created on Linear, use all the above described parameters that affect performance so that everything works quickly on mobile devices,

The most basic ones are:

Max Reflection in the script;

the number of polygons in the diamond model;

Flares Offset Count in the script for flares;

The Mirror Reflection script and its render size.

I also want to note that it is the size of the diamonds on the screen that has a big impact on performance, and not the number of diamonds, since calculations take place pixel by pixel, the fewer pixels a diamond occupies, the less calculations need to be performed, keep this in mind when creating

scenes.

Also, for even greater optimization, you can switch to URP and use such a feature as the render size, the smaller this parameter is, the higher the FPS will be, but the lower the quality of the render will be.
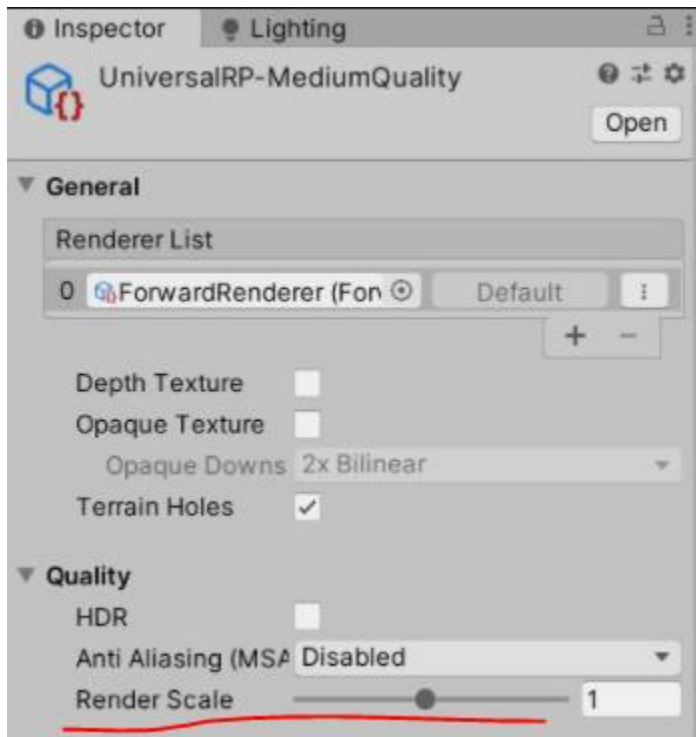
Write me an email if you need help, any help related to this asset,

industrialforest@mail.ua

Version: 1.1