FIT 3169 - A2 presentation: A Stylised Landscape

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Reflections

Research and conceptual development

When I saw the assignment the first week I was a bit lost and had no idea what scene I could do, what the other student made last year was really impressive.

What I was sure about is that I didn't wanted a fantastic landscape, I wanted something realist.

So I did some research to find a suitable environment. What I did is going on google image and look for different type of landscape until one of them gave me inspiration. After looking at different options, I decided to create a desert and oasis environment because it has interesting features and looks cool. I really liked having 2 environment in one and I felt that I could do a lot with the desert even if it could easily be a bit empty. It was one of the challenge to not have an empty desert with just 2 3 props on the side.

Research and conceptual development

So I spent time, looking about what kind of plants and animals are found in these environments, and what colors and shapes are common. So I could fit them well together and have a lot of them without it looking weird, since it will be a realistic scene if you can't see that it's a desert like you know it would have been bad.

Since I wanted it to look realistic, I mostly looked at real-life deserts and oasis from around the world. These pictures helped me figure out what my scene should look like. I took a lot of inspiration from unity/unreal asset store packages too.

For the colors I was looking for some green/blue for the oasis and really warm color for the desert red/orange.

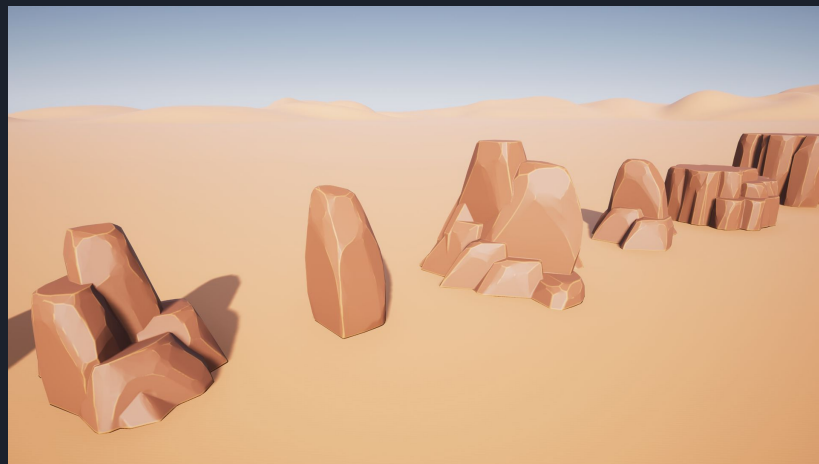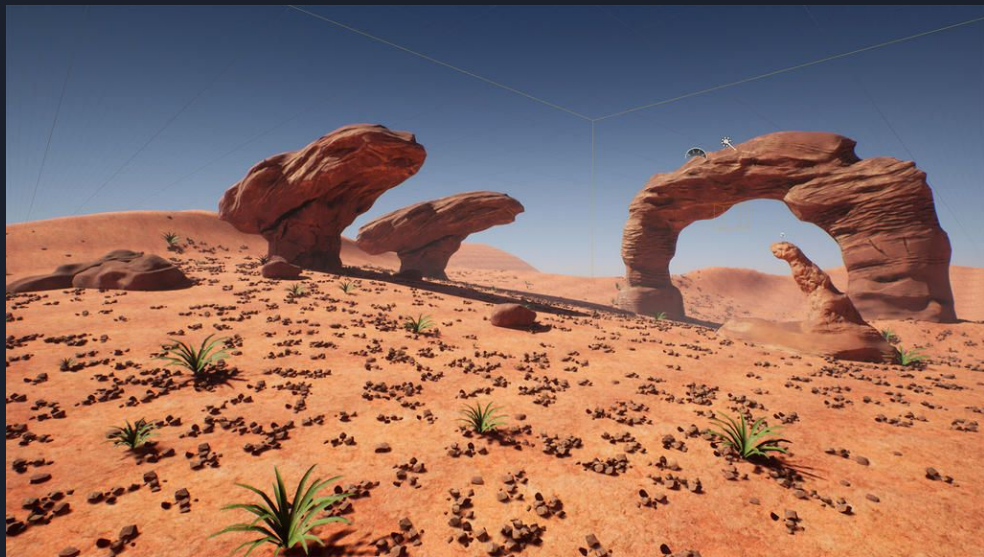# Research and conceptual development Desert

Stylized Desert Nature

This kind of image where my main inspiration for the desert environment. What I really liked are the rocks it was exactly how I wanted my rocks to be in my scene when I was looking at desert landscape.
Really like the shape and modularity, you can just make the base rocks and then create structures using the base rocks.

https://assetstore.unity.com/packages/3d/environments/fantasy/stylized-desert-nature-163040

Research and conceptual development Desert

Other desert inspiration mainly for the rocks

https://www.deviantart.com/suppart887/art/Stylized-Desert-Scene-794453828

Research and conceptual development
Desert

https://www.desertmuseum.org/programs/ifnm_cactusgallery.php

When we think of vegetations in a desert we think of something really arid with maybe one or two cactus there.
But finally after some research I found that when you had cactus somewhere, you could find forest of them.
It was perfect for my case cause I had to fill a desert environment.

Research and conceptual development Desert

Comparison between a real cactus forest and my scene

Cactus forest in my scene

Research and conceptual development Oasis

To find inspiration for the oasis it was a bit harder, because when looking around I couldn't find anything that fit what I wanted.
I could only find this which is exactly what I wanted, but it's from the unity asset store and the link is dead, the only thing I had for inspiration was this image and a video going around this scene.

https://www.reddit.com/r/unity_tutorials/comments/xkhzs5/hi_guys_i_released_a_stylized_water_asset_on/

Research and conceptual development
Oasis

Sobek oasis from Genshin Impact
https://genshin-impact.fandom.com/wiki/Sobek_Oasis

Here are other image that all look the same when you are looking for oasis landscape. But what I don't like is that it's still really arid and you have no grass on the ground.
This is why I really preferred the image from the previous slide. It's way more refreshing and less desertic.

Production Process - Greyboxing
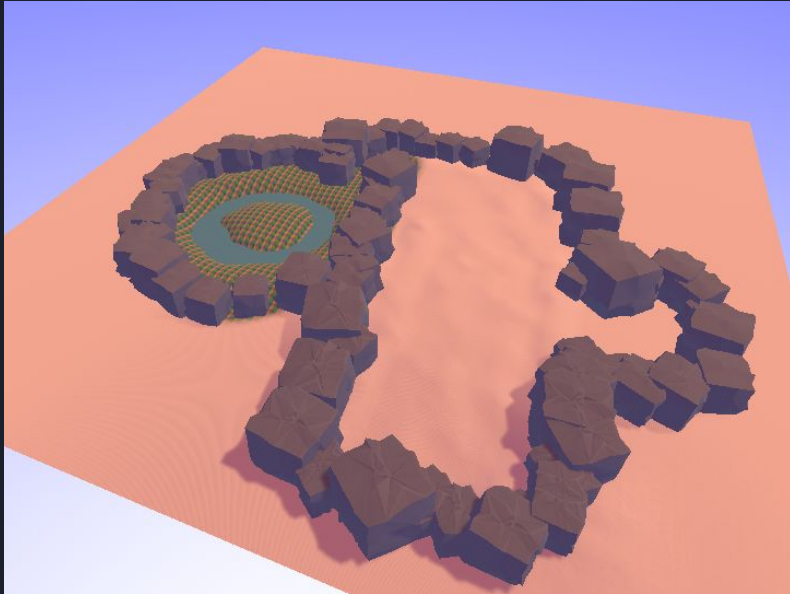
To be fair I only used greyboxing for the assignment for the layout of the level, and how big my scene should be compare at the character controller.

When trying to add grey boxes props it felt right and I was worried that my final props would be too much different that the grey boxed one and the feeling would be completely different.
So I chose to only used greyboxing for the level design of the terrain so I could move around and see if it's not too big or too small, but didn't add props during the greyboxing part. Even if I had some idea where would things go.

Production Process - Modelling

First of all I struggled to follow the 10 base model rule. I wanted to always add a little something here and there I was scared that having 2 different environment I would not be able to have enough model to fill them both. But finally with texturing variations and model deform I got exactly 10 base models.
What really help me are the rocks. As I said before I really wanted to have these modular rocks that I could re-use to create structure, thanks to them I was able to create complexe rocks combination to create new model from the base one.

Plus my rocks with a good retexturing could really well fit the oasis and desert environment.

Production Process - Modelling

As we can see for every of my models I have to same with deformation (mostly bend, lattice deform, or rotation for branches).
And I have the rocks structures on the left that are entirely made only using 1 2 3. I made them in maya because I felt it was way easier to move them and stick them together than with unity.

Production Process - Modelling
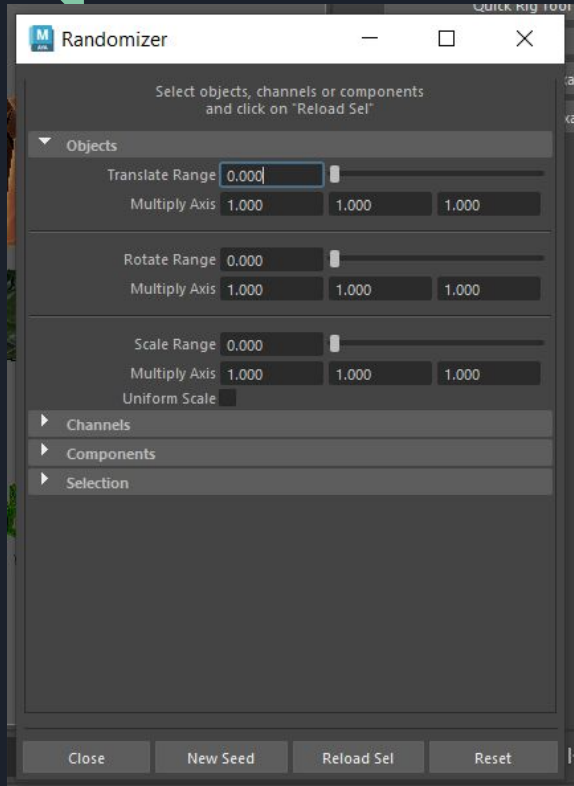
Since we are in a natural environment we don't want to see to much symmetrical models or human made objects. This is why I for nearly every of my models I used randomness when creating them.

This randomness come from the transform component that allow you to add a random value.

And I used another tool that come from the Maya bonus tool package made by Autodesk, Inc. themself. This is the randomizer, it allow you to randomize a transform component from the selected object. This is extremely useful to randomize rotation of leaf or scale. You can just play with it and generate new seed until you have something same fit you and then tweak everything a bit until you are happy with it.

Production Process - Modelling
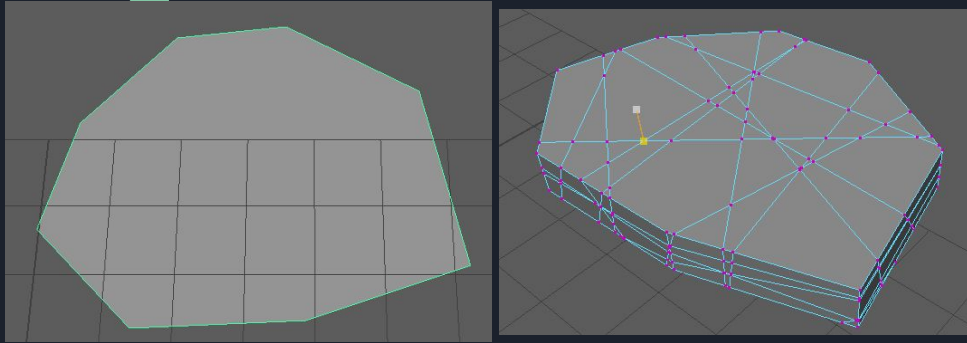
My rocks are the first props I did. Just after the class when we used maya terrain and the transform component with randomness.
I took a lot of inspiration from that class to make my rocks, like for example triangulating some faces to make it more rocky.
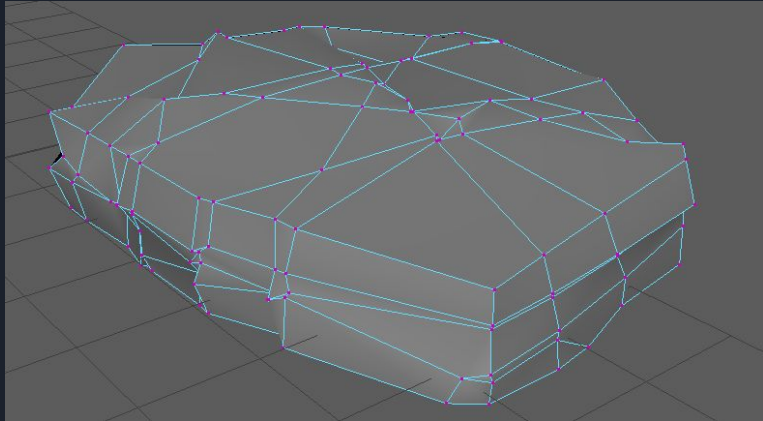
I just started by drawing shape with the polygon tool and after extruding it to the right size, I added dozen of randomly place multi cut. Then came the transformation part. And tweaked a bit the faces so it look like I wanted.

To make variations I just used the lattice deform tool.

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Production Process - Modelling

As I said the structure are just using the base rocks and moving/rotating/scaling on top of each other.
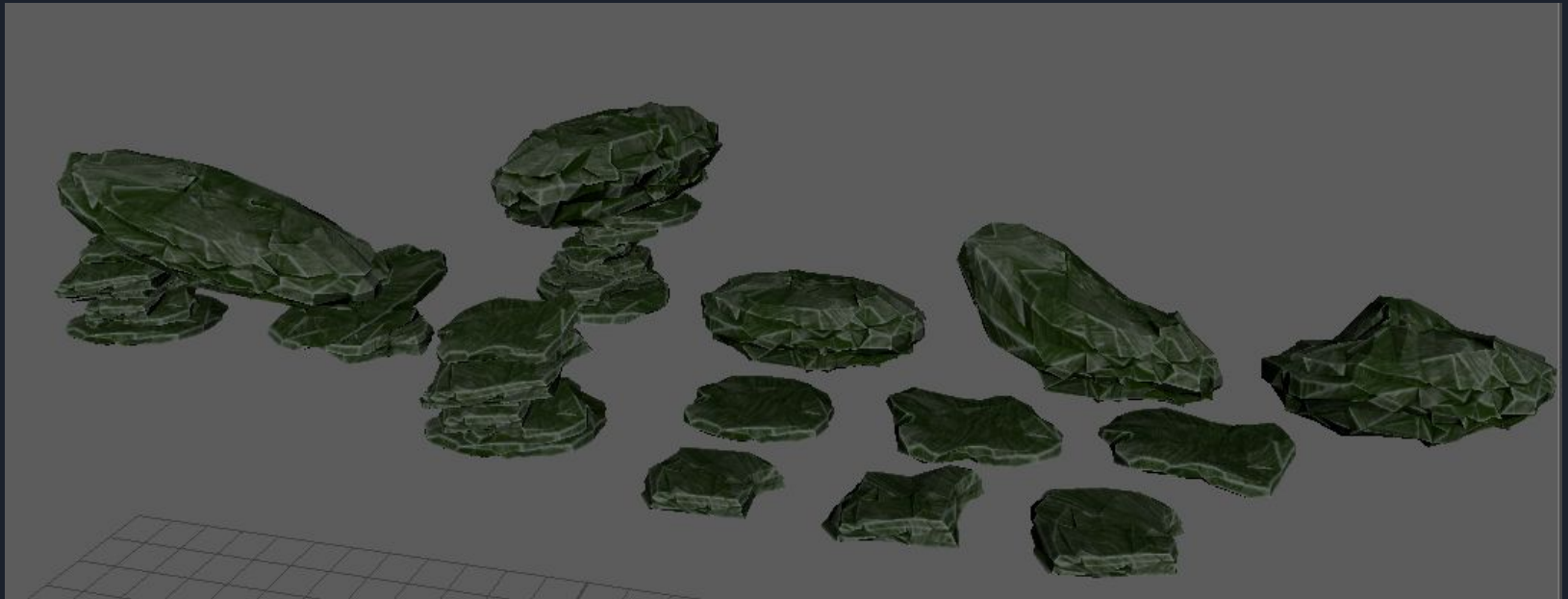
Production Process - Modelling

The cactus took me the most of time by far. I tried different things but most of the time it was to sharp and not really natural.
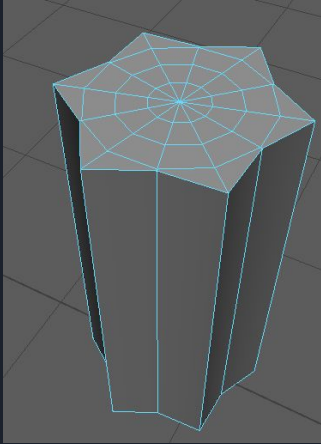
First things I tried for the base is taking a circle shape and moving toward the center the even vertices to make this star shape. But as you can see it's way to sharp.
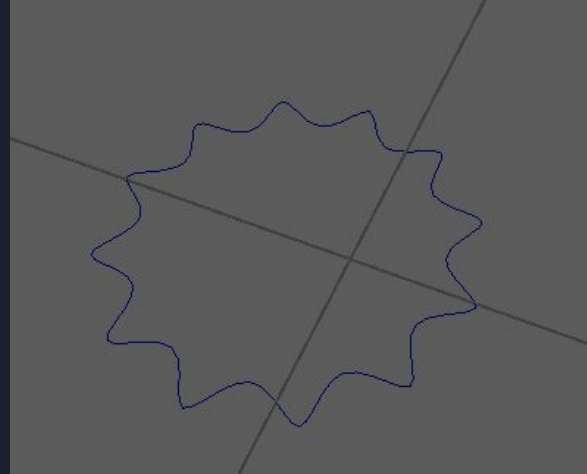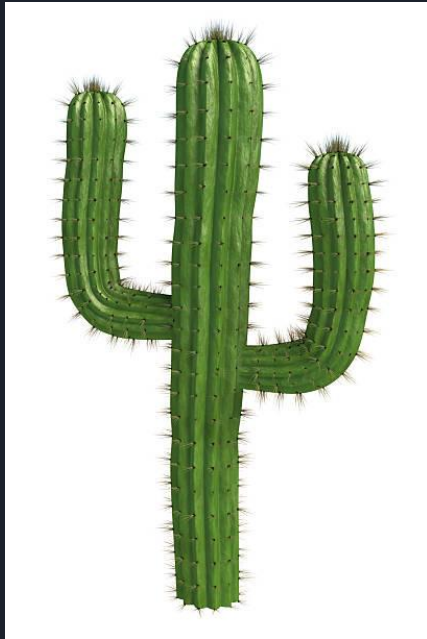

So Instead I went for the same approach but using a curve instead of just regular edges, so thanks to the curves the corner are smooth and looks way better

Production Process - Modelling
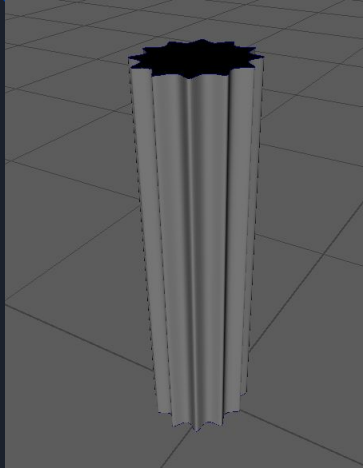
After extruding it wa already good, but I felt that only going up like this without any deformation was not natural at all again.

So I came up with a reference image and tried to follow the curve of the cactus base, by duplicating all my curves and just rescaling/rotating/translating a little bit so it fit the reference.

After that I just had to generate a surface (I used Surface->CreateLoft) to link all the curves.
The arms are just duplicate of the base with a bit of deform to have this L shape.
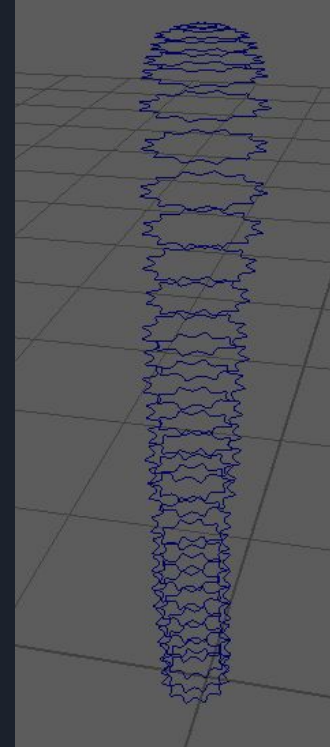
Production Process - Modelling
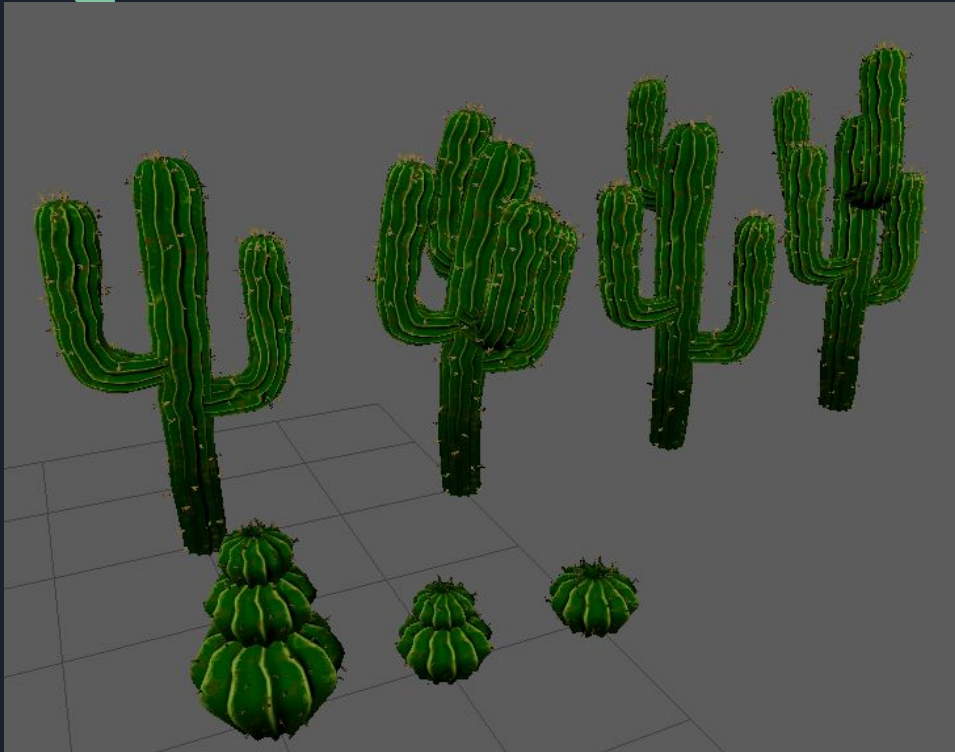
I added some deformation and branch variations to have different kind of cactus.

For the little cactus I just cut the head of the big one and scaled it so it's more round. Duplicate it 3 times and you are done, really simple.

Production Process - Modelling

```python
import maya.cmds as cmds
import math
import maya.api.OpenMaya as om
# create an array of selected vertices
myObj = cmds.ls(sl=True)
selVerts = cmds.polyEvaluate(myObj[0], v=True)

i = 0
for j in range(len(myObj)):
    for i in range(selVerts):
        if ((i % 64) == 0):
            # select and duplicate CactusSpike object
            cmds.select("CactusSpike")
            newCactusSpike = cmds.duplicate(n="newCactusSpike")[0]

            # create an array with the XYZ position of the selected vertex
            fVtxPos = cmds.xform(myObj[j] + ".vtx[" + str(i) + "]", q=True, ws=True, t=True)

            # get the normal vector at the selected vertex
            normal = cmds.polyNormalPerVertex(myObj[j] + ".vtx[" + str(i) + "]", q=True, xyz=True, fn=True)
            normalVector = om.MVector([normal[0], normal[1], normal[2]])

            # set the object's position and orientation
            cmds.move(fVtxPos[0]-normalVector[0]*0.005, fVtxPos[1]-normalVector[1]*0.005, fVtxPos[2]-normalVector[2]*0.005, newCa

            upVector = om.MVector([0,1,0])
            quat=om.MQuaternion()
            quat=upVector.rotateTo(normalVector)
            rot=quat.asEulerRotation()

            cmds.rotate(rot[0]*57.2958, rot[1]*57.2958, rot[2]*57.2958, newCactusSpike, a=True)

            cmds.scale(0.7,0.7,0.7, newCactusSpike, a=True)

            cmds.rename("duplicatedCactusSpike")
```

Last things to add about the cactus that took me so much time to do, are the spykes.
I didn't wanted to add the spykes one by one by hand for 2 reason. First it would take me so long to do this and translating/rotating them since there is hundreds of them.
Second if it was handmade it would not look natural. So I looked for tools that could place random amount of models on another model but couldn't find.

Since I am a programmer I made my own script that randomly place number of model (the spyke) into the some vertex of an other one. It took me some time but at the end I am really happy of the result.
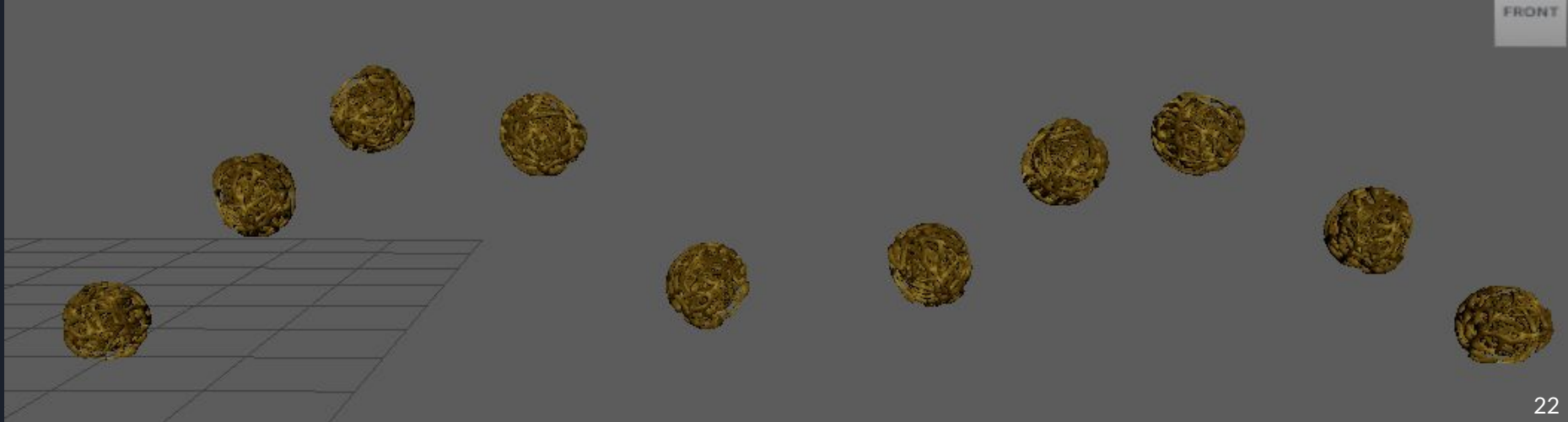
Production Process - Modelling

For my last models, the palm tree, the grass and the tumbleweed I reused pretty much all the technique from above. Some bend deform for the leaf and randomizer to rotate/scale them well and a curve form the trunc of the palm tree.
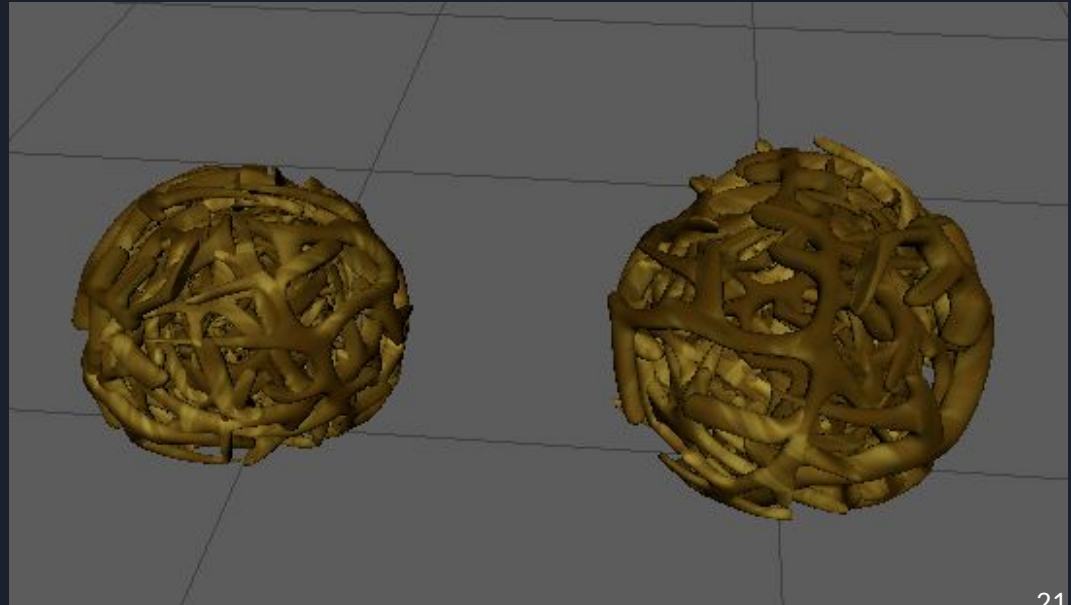
Production Process - Modelling

Last things I would add for the maya part is for the tumbleweed. I didn't feel having immobile tumbleweed in my scene it would not be realistic at all, so I did a little animation of the tumbleweed moving/rolling/bouncing and the ground.
Just for fun I tried adding a rigidbody in unity to the animated tumbleweed and after a lot of tweak, it end up to do something extremely interesting, you will see it in action in the scene it really looks like they are moving along the wind and since they have a rigidbody it's extremely random since it collide to everything in the scene.

Production Process - UV unwrapping

I won't spend too much time on the UV unwrapping because it's extremely similar as assignment 1 and there is nothing really different or any other techniques that i used for it.

The only difference I tried to do is to better utilize the space of my UV map because I know for assignment 1 and test 1 I used to shrink everything down and have a bad layout because it was easier to handle in substance painter.

Last thing, since a lot of props are using the same materials/texture I put did put them in the same UV map.

Production Process - UV unwrapping
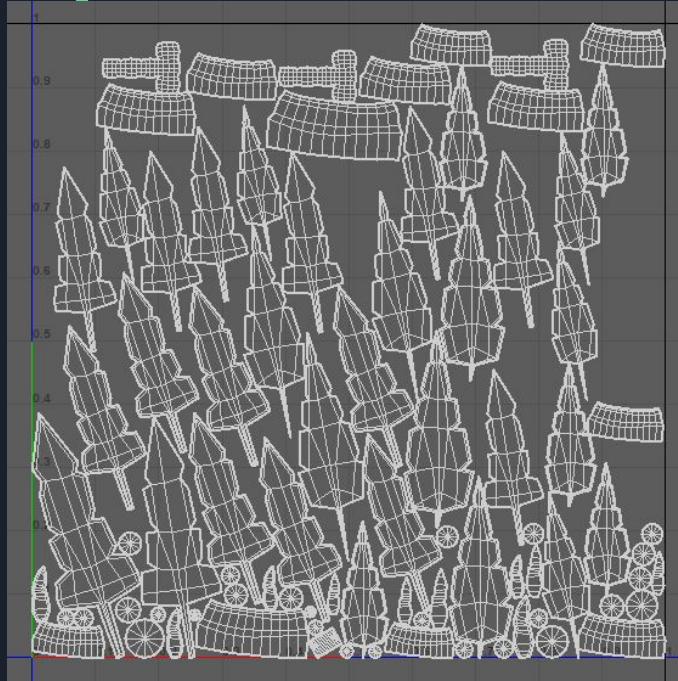
Palm tree UV
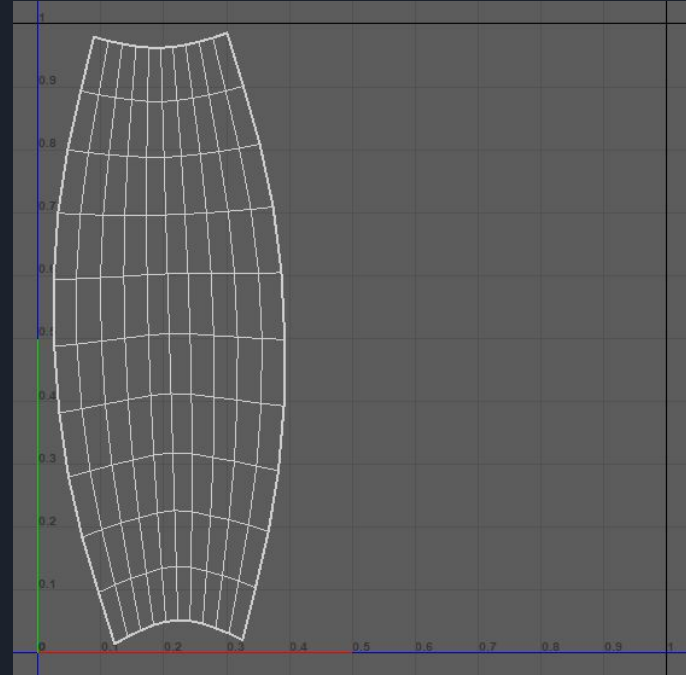
Grass UV

Production Process - UV unwrapping
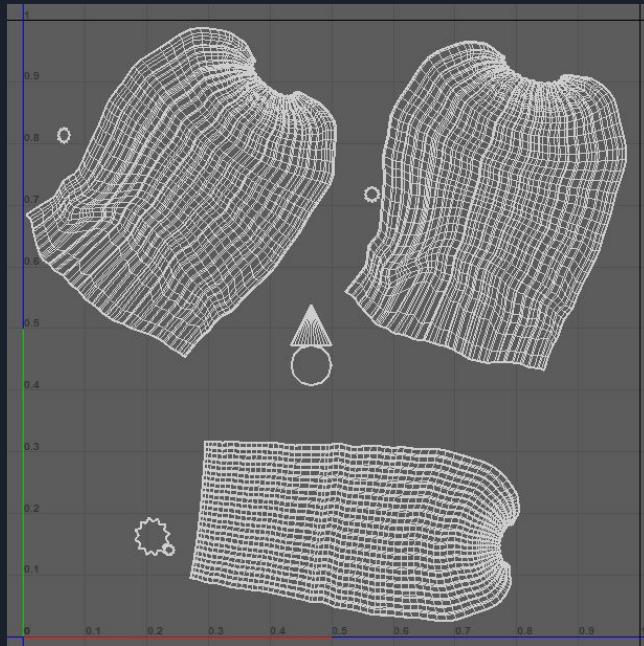
Cactus UV
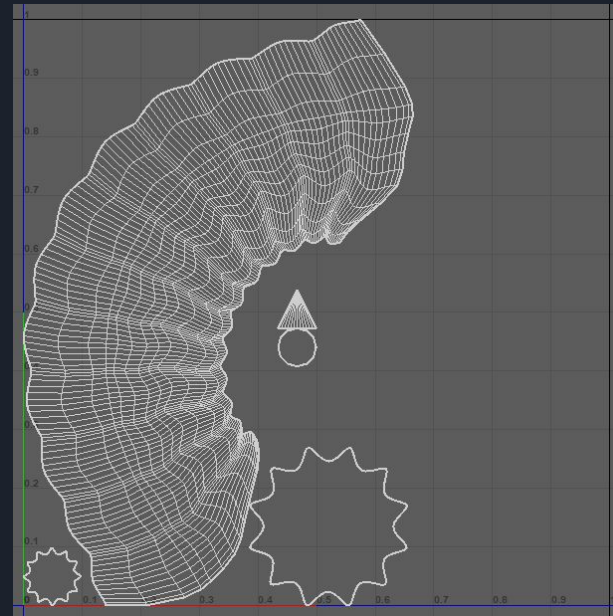
Small cactus UV

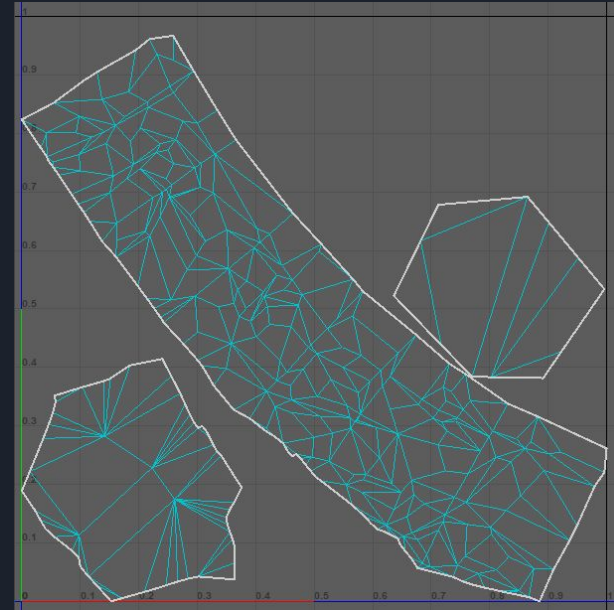# Production Process - UV unwrapping
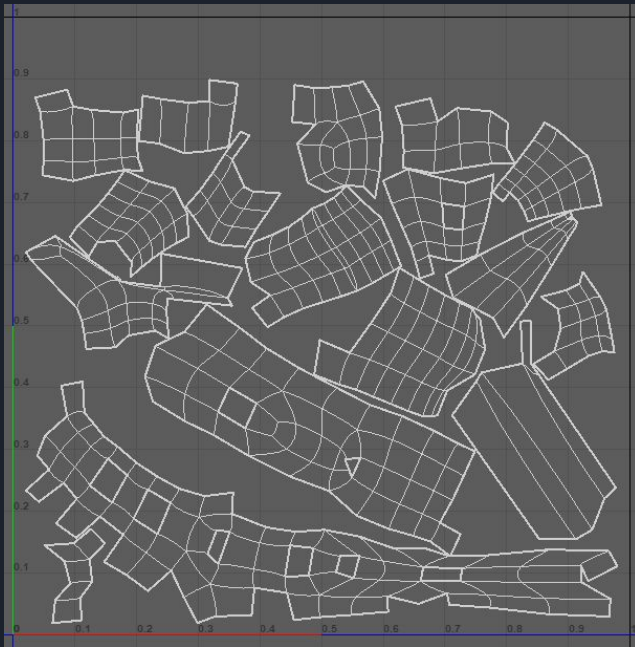
Tumbleweed UV
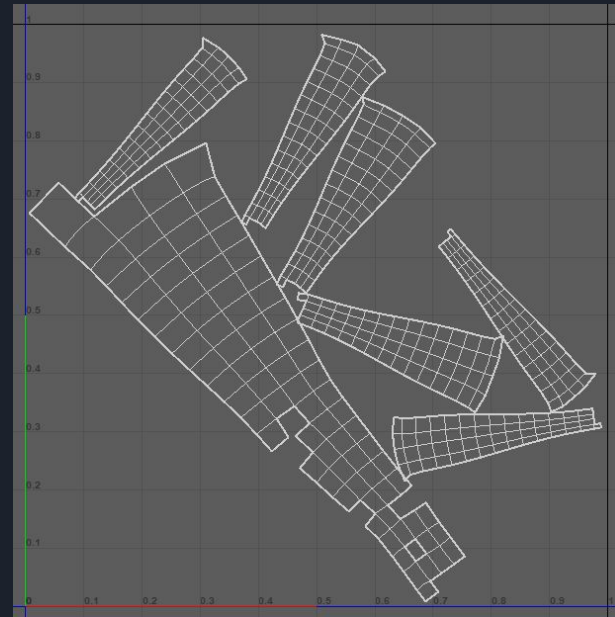
Dead tree UV

Production Process - UV unwrapping
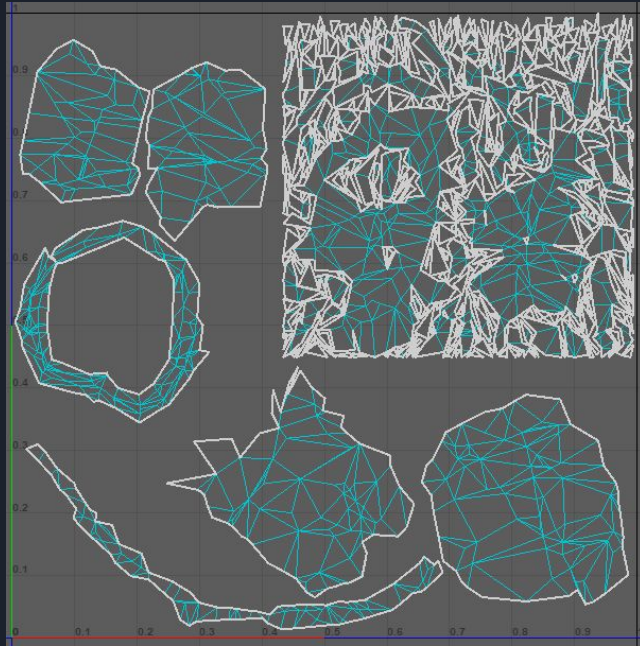
All my rocks UV

Cliff UV

Production Process - Texturing

For the texturing part there I focused on 2 main things.
First it's stylized so I wanted to stick with few color, and really smooth texturing. If you pay attention all my models are only one color and after only variations from this color. As we saw in lectures, working on monochromatic can be very pleasing to the eye due to its cohesive look.
Second it's about color again, each model is mainly only one color, but the whole scene won't be more than 2-3 colors equally spaced on the color wheel. The desert will be more red/orange with a little bit of green for the little vegetation there is, and the oasis will only be green and blue for the water. It help to keep the mood of the scene.

Production Process - Texturing

I will just start with the sand terrain texture, really simple, just a pattern seamless so we don't see the edges with some highlight and shadow and every of them with a little offset to add more texture to the flat plan.
For my grass I kept the one we did in class.
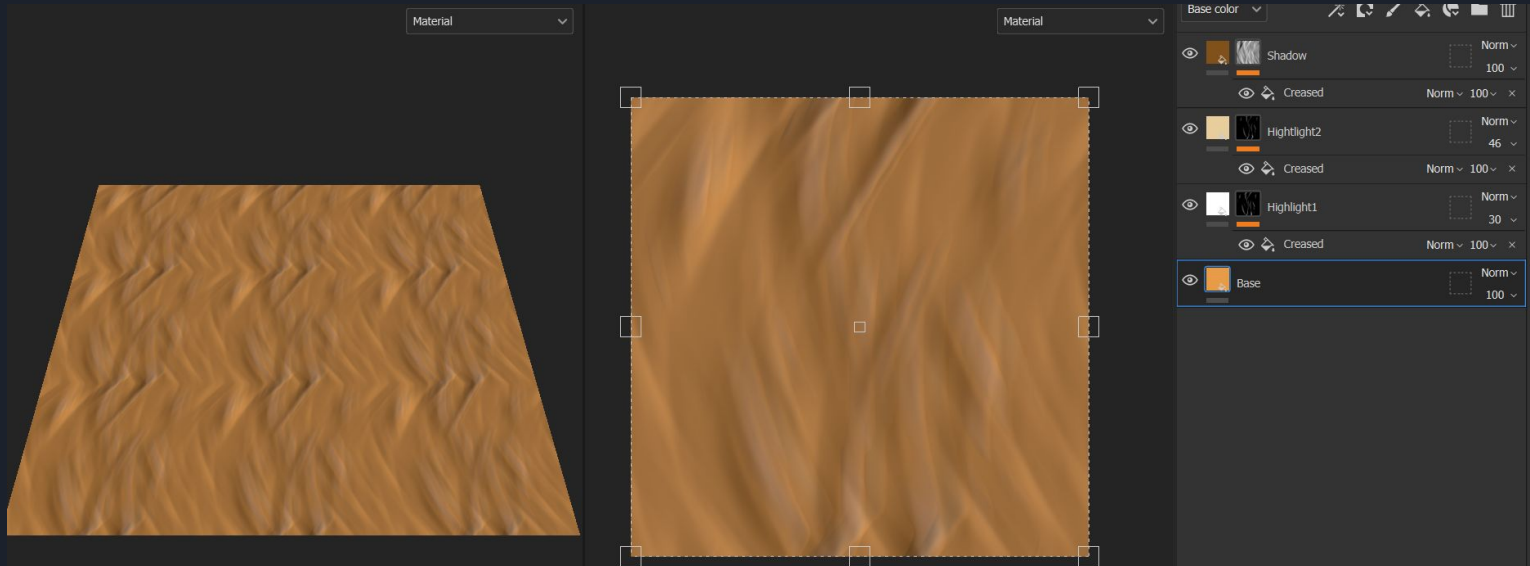
Production Process - Texturing

For all my models I used pretty much the same process. After baking the mesh map, I first use mask to separate all the different part of my model that would have different texture.

Since I wanted to keep it simple, my textures don't have more than 4-5 fill layers. They have 1 base color, 1-2 for the highlight and shadow, and then 1-2 to add more details to only one color.
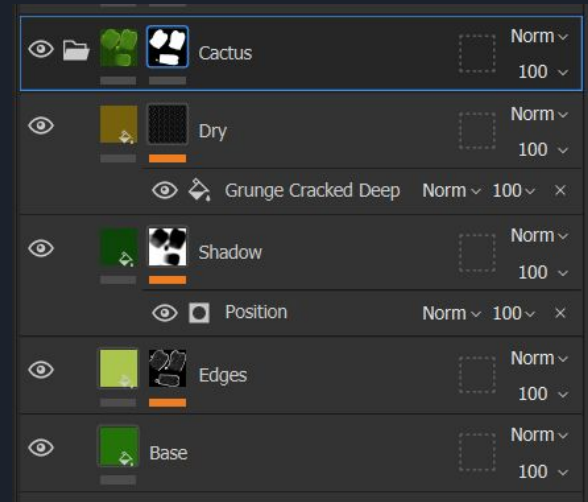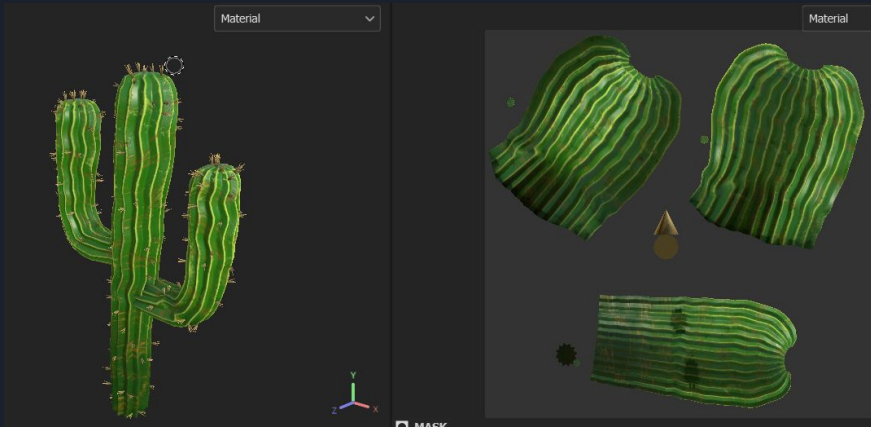

We can see it well on the cactus, only 4 colors, really simple but still fit the stylized style while keep the realistic part.
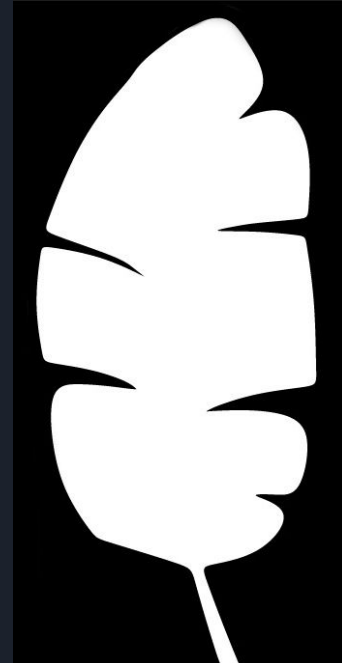
Production Process - Texturing

Something that I used a lot for nearly all my models, and that really help for the stylized part, is a curvature generator. It really help to delimit the edges of your model, by enhancing the surface details, and creating interesting effects based on the model's curvature.

I used it for the 2 cactus, the 3 rocks, the cliff, the leafs of
the palm tree, nearly everywhere.
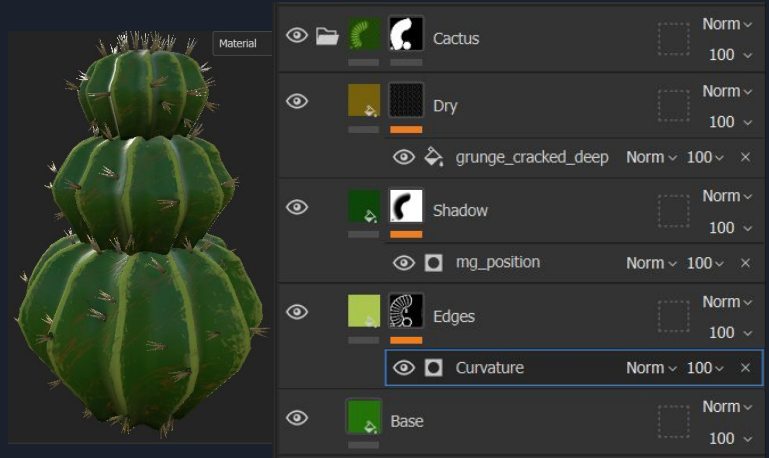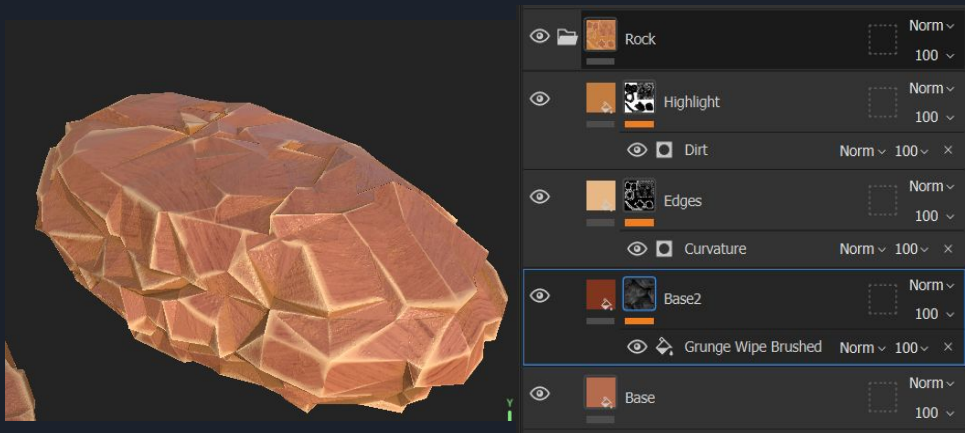
Production Process - Texturing

For my leafs I used an alpha layer, using the study ressources textures we were provided. It add transparency and allow you to shape your texture to the selectionned alpha.
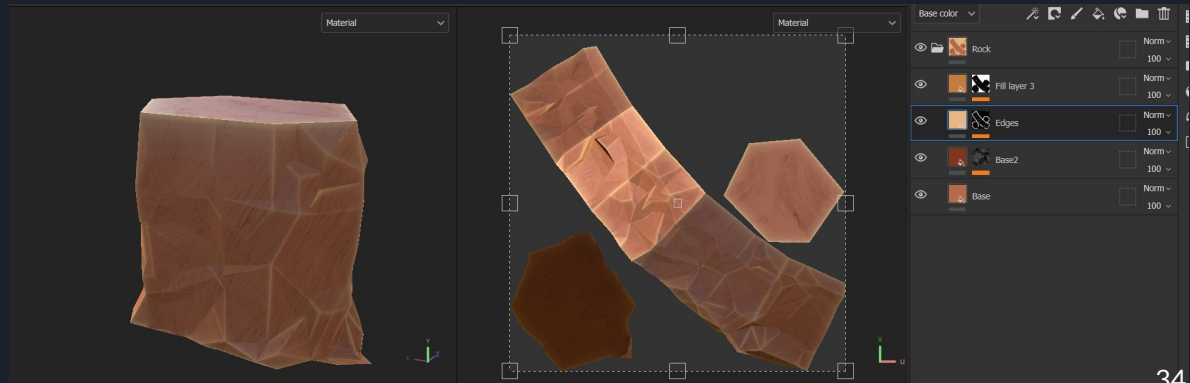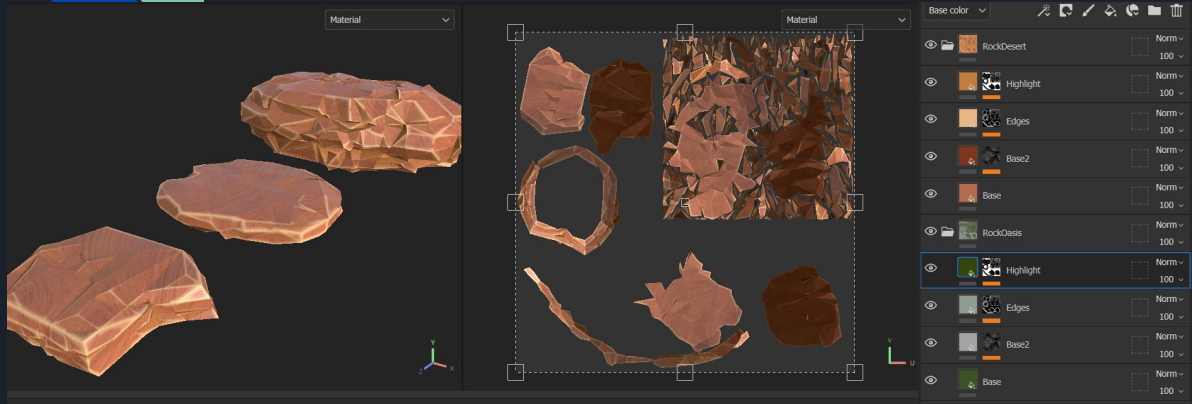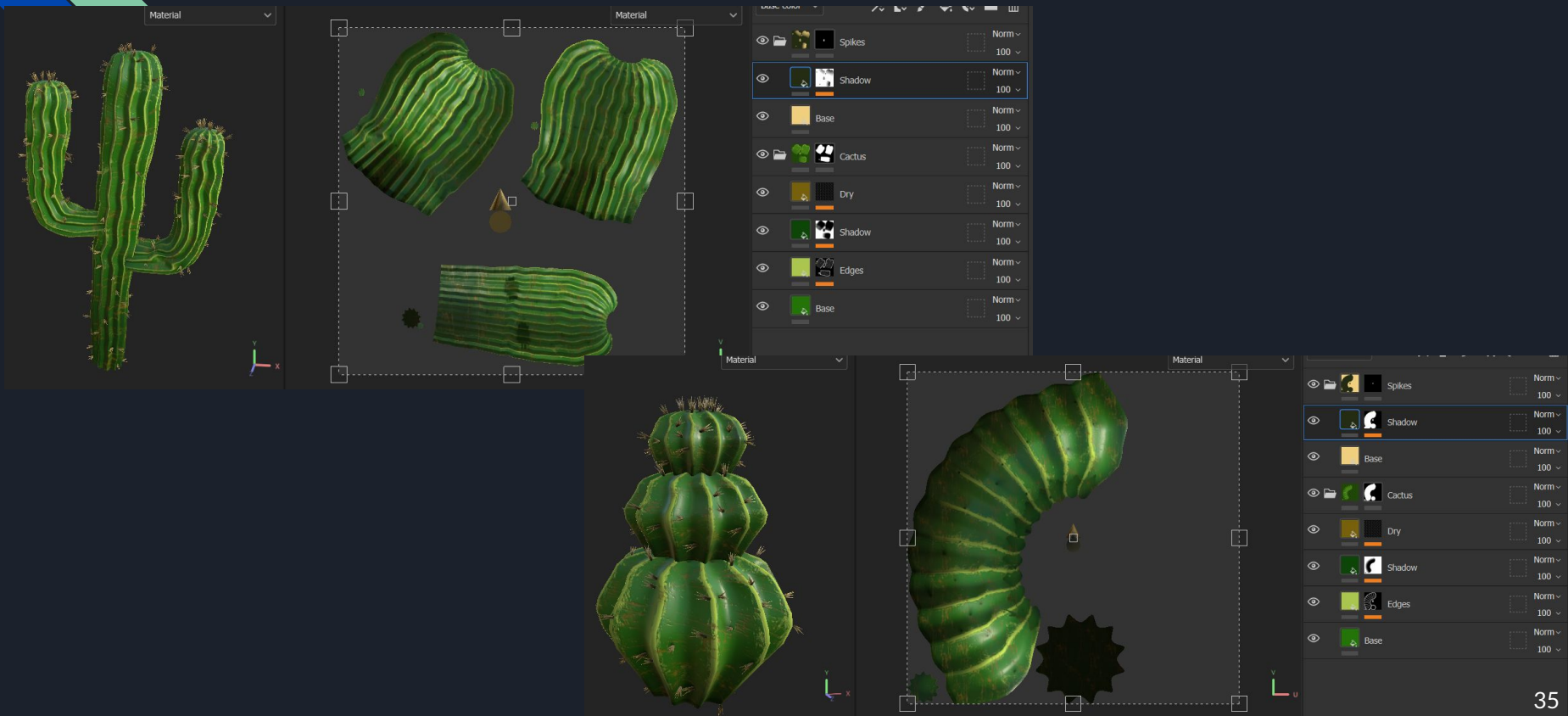
Production Process - Texturing

To add variations to my texture I didn't change anything from the base texturing I did. I just copy pasted the folder with the texture and just changed the color of all my fill layer. Keeping in mind where there would be in the scene, and which color should I use.
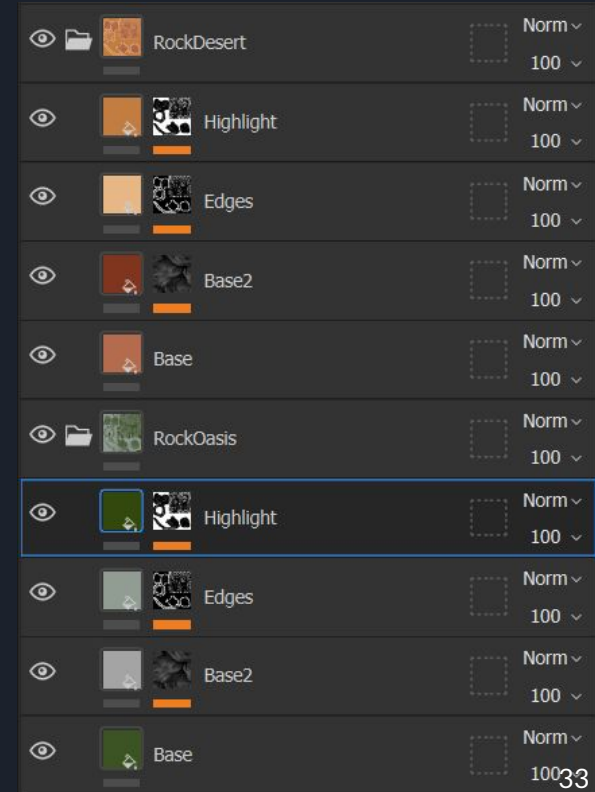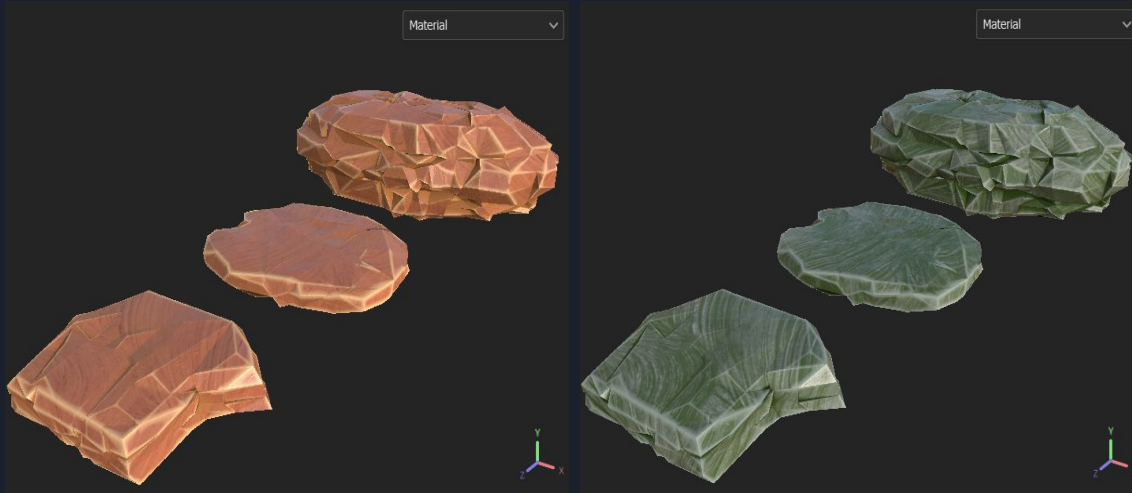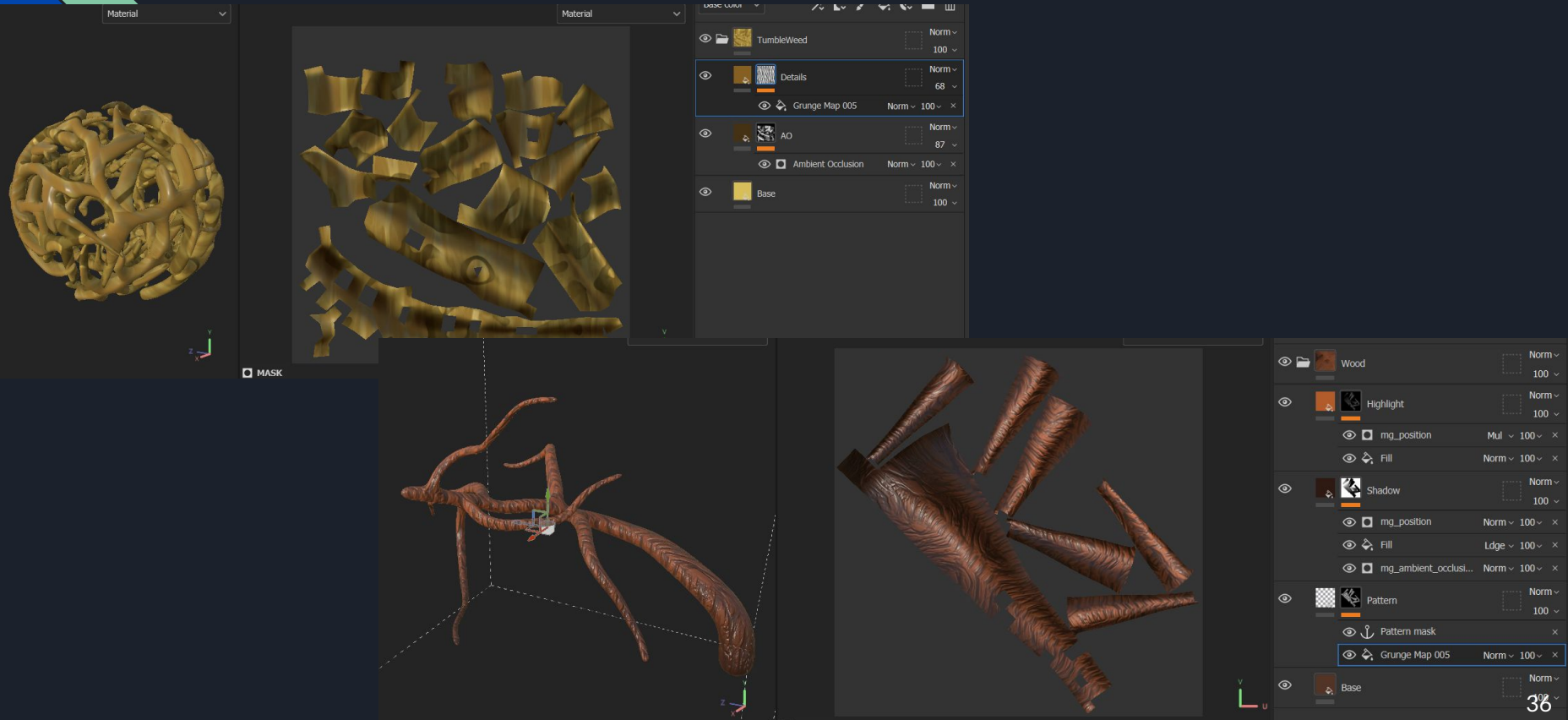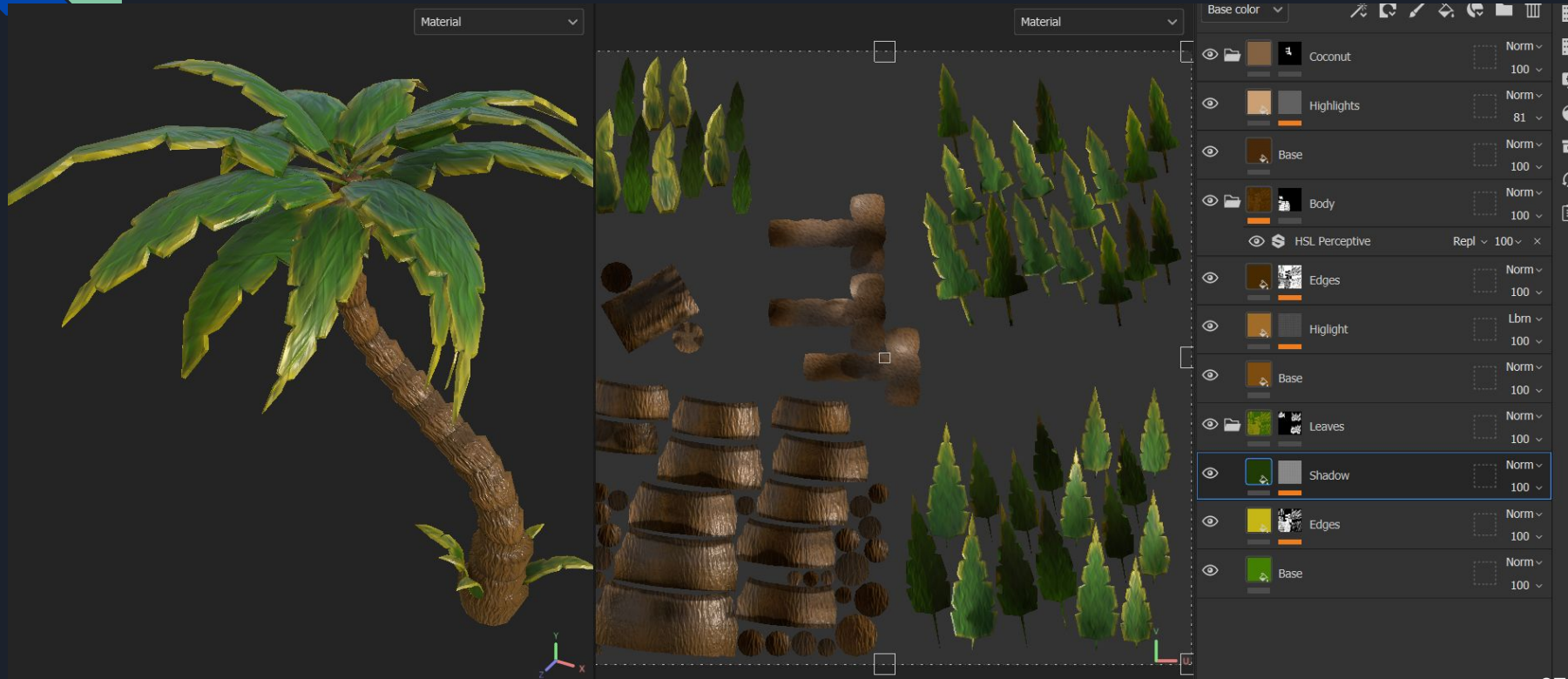
Production Process - Texturing

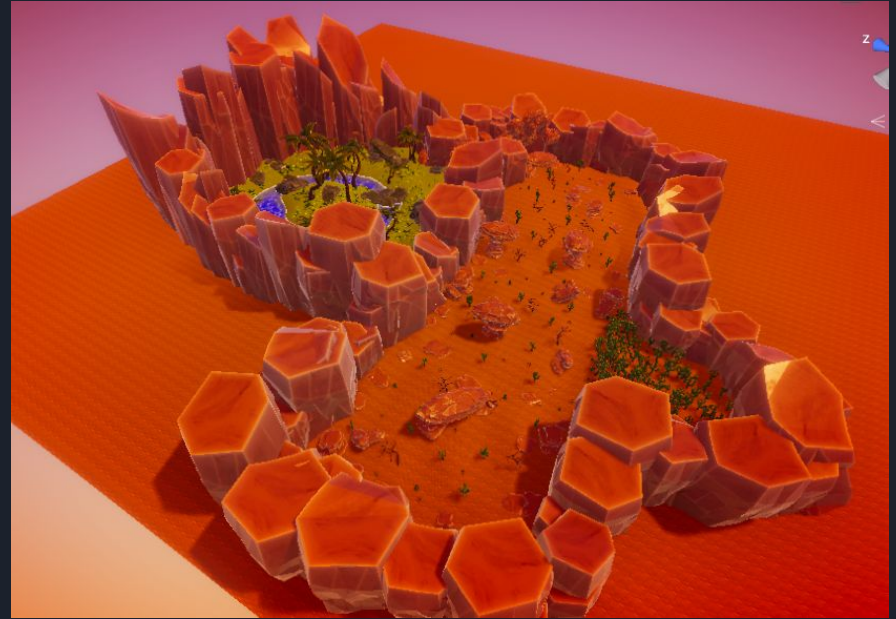# Production Process - Texturing

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Production Process - Texturing

Production Process - Scene arrangement

My terrain and my layout were completely finish from the greyboxing. I just took the exact same terrain and changed the texture layer on it. For the layout I copied it with the final cliff. I just scaled up some cliff so you couldn't see too far away, or see the oasis from the desert.

For the props, using the prefab painter tool it was really easy to make some randomness to the placement. It was just a question of time to place every props and tweak some settings until I got what I wanted.
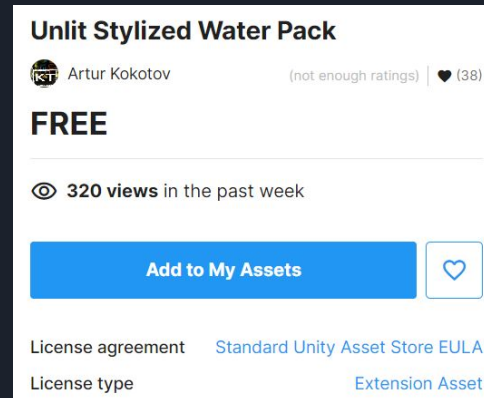

You can see that compared to my greyboxing the layout is nearly exactly the same. I really wanted to have this sharp turn between the desert and the oasis.

Production Process - Water

The water is a bit different from the water we could find in the study resources, it's because I took a free water shader online to use.
I was looking for some tutorial to make this kind of water, more stylized with foam and more colors. I couldn't find good because making water can be a bit hard. Finally I found this pack with water material on the unity asset store. Which was exactly the water I was looking for.

Unlit Stylized Water Pack

Artur Kokotov   (not enough ratings) | ♥ (38)

FREE

👁 **320 views** in the past week

Add to My Assets   ♡

License agreement   Standard Unity Asset Store EULA
License type   Extension Asset

The asset is free to use and the license is the Standar Unity Asset Store EULA

Production Process - Particles

The particles gives a lot of movement to this static scene. I used some particles from the given pack of particles and made some.

I wanted to give this impression of wind in the desert so I had to add a lot of particle for this effect, like if you were nearly in a sand storm and hard to move around.

For the oasis, I wanted something way more calm, so adding too much particles would have been overwhelming and I didn't wanted that at all. This is why the oasis has way less particles and they are slower/smaller.

I will mainly focus on the particle I did myself, because for the particles I used from the pack, I just tweaked values so it fit better the scene, the colors, the size, the speed …
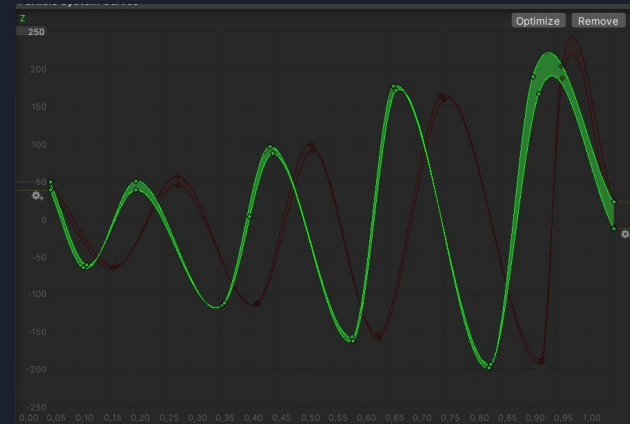
Production Process - Particles
Tornado

The tornado is a particle system that loop every 30 second and that is emitting only for a bit less than 15 second, so you have time to see it disappear and reappear.

The system is fairly simple appart for the tornado shape my particles are following. For the other stuff, it's just about changing color/size/rotation/alpha overtime so they look a bit more alive.

For the velocity part I used 2 curves that I made. They oscillate from positive to negative, and are both offsetted a little bit . This part was a lot of tweaking until I got something I liked.

Production Process - Particles
Birds
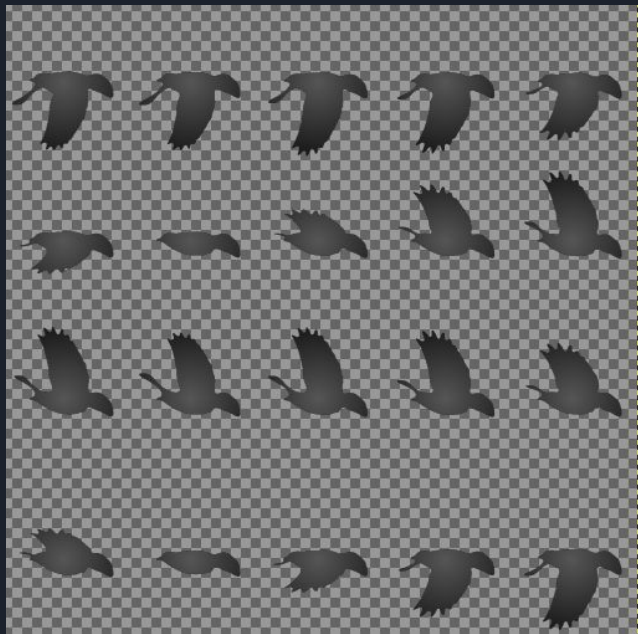
For the birds I reused the texture sheet provided with some random burst emission so it looks more natural. They then just go forward, with a little bit of noise to add this randomness.
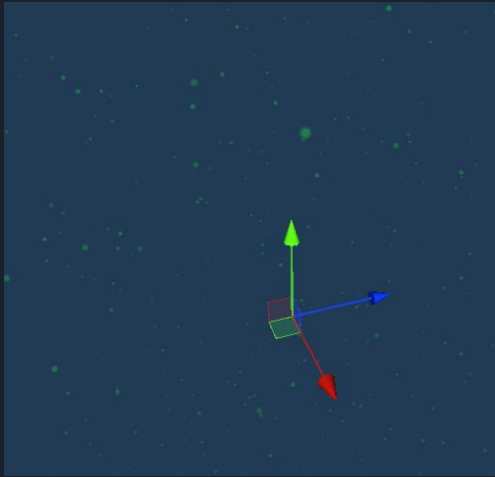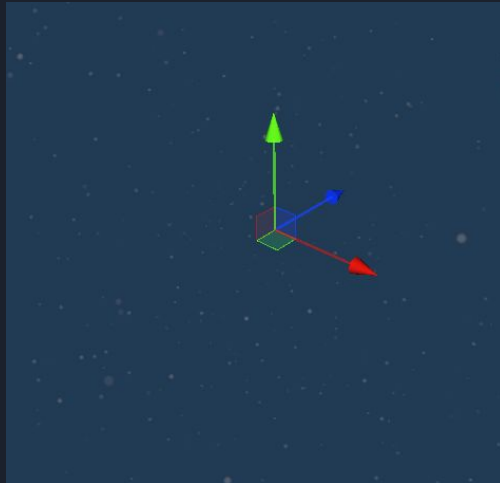
Production Process - Particles

Most of the other particles effect are really simple, or are just tweaked from the provided one.
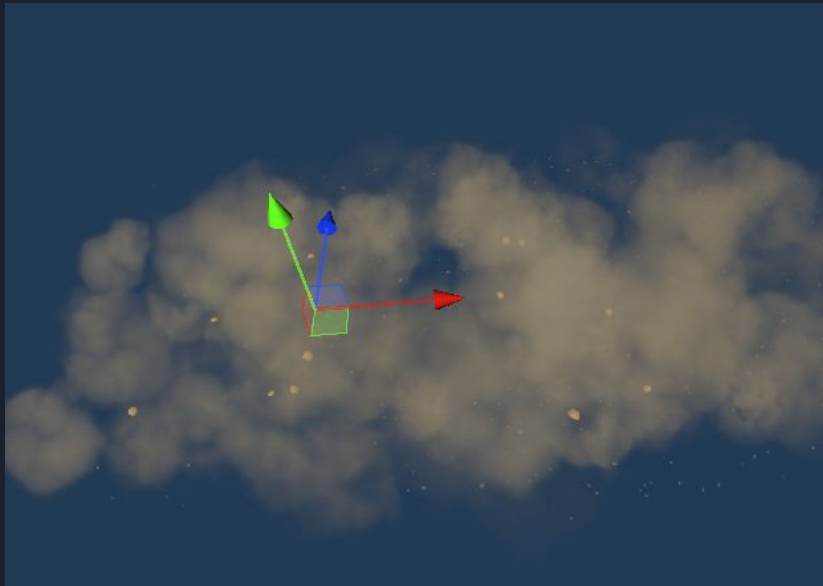

Oasis particle effect
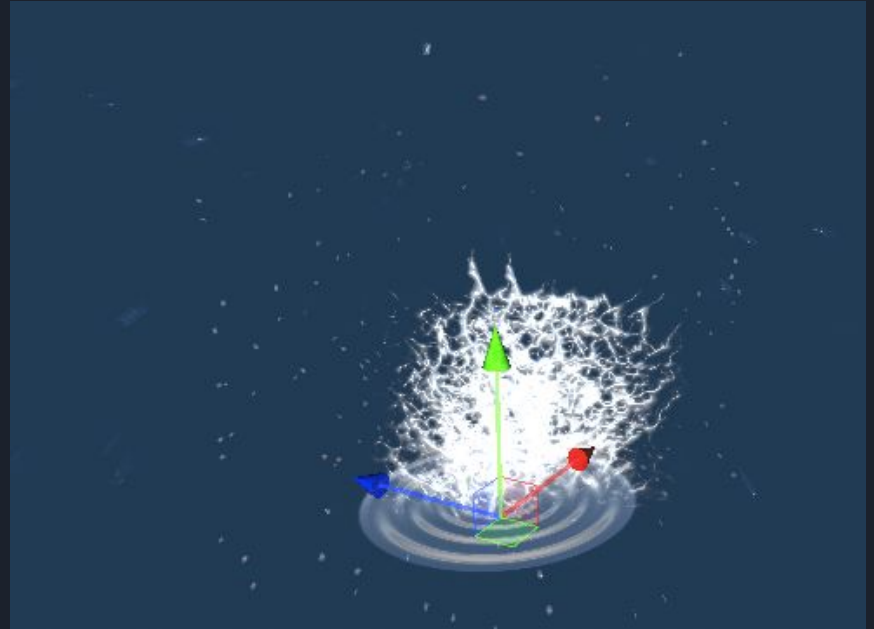

Desert dust particle effect

Sand Swirls effect

Production Process - Particles

Dust storm effect

Big splash effect

Production Process - Sound

Since I had 2 totally different environment I really needed different sound for both of them that you could distinguish.

For the desert I aimed for a really windy scene so I had to emphasis this with the sound. Plus we are a bit lost, so adding some scary animals sound like snakes could really make this feeling of not being able to see any alive entities but being surrounded by them.

For the oasis, I wanted the opposite. This is why there is really little amount of sound, only 2. It's way more calm and you not what is surrounding you.
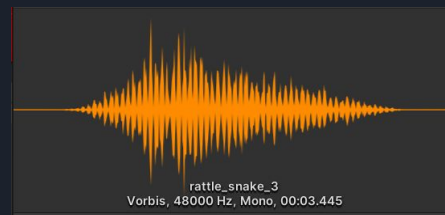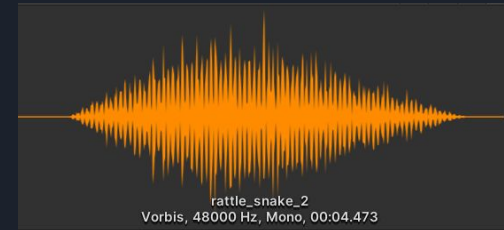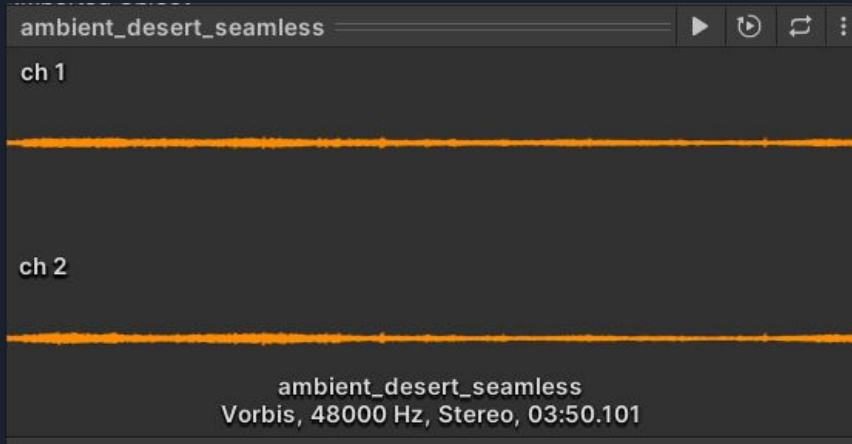
For all of my sounds I only used Audacity to amplify them or to make some of them seamless by doing the fade In, fade out trick we saw in class.

Little bonus, look behind you if you hear falling rocks.

Production Process - Sound Desert

For the desert I have one main ambient sound to emphasis the wind on the ground, that you can see every time, so you had to hear it everywhere around you.

Then I added some dynamic sound of snakes using the script provided. It happens pretty fast (between 8 and 16 seconds) so it fill their is more snakes around you.

ambient_desert_seamless
Vorbis, 48000 Hz, Stereo, 03:50.101

rattle_snake_1
Vorbis, 48000 Hz, Mono, 00:03.445

rattle_snake_2
Vorbis, 48000 Hz, Mono, 00:04.473

rattle_snake_3
Vorbis, 48000 Hz, Mono, 00:03.445

rattle_snake_4
Vorbis, 48000 Hz, Mono, 00:03.921

Mexico Desert Wind singing in the mountain, some night cricket in background made by felix.blume on freesound.org

Rattle_Snake.wav made by 7h3_lark on freesound.org

Production Process - Sound Desert

Last sound I added for the desert is one spatial for the tornado. The tornado felt empty without sound going with them since they are suppose to be scary. So I wrote a little script that would play a sound when the particle system is emitting particles. When my tornado start the sound start playing in the same time.
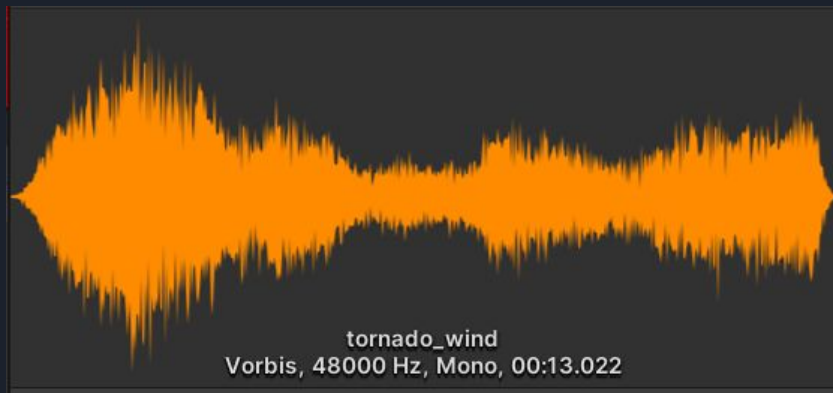
```
public class PlaySoundOnParticleStart : MonoBehaviour
{

    public AudioSource audioSource;

    public ParticleSystem particleSystem;
    // Start is called before the first frame update

    void Start()
    {
    }

    // Update is called once per frame

    void Update()
    {
        if (particleSystem.particleCount > 1 && !audioSource.isPlaying)
            audioSource.Play();
    }
}
```

tornado_wind
Vorbis, 48000 Hz, Mono, 00:13.022

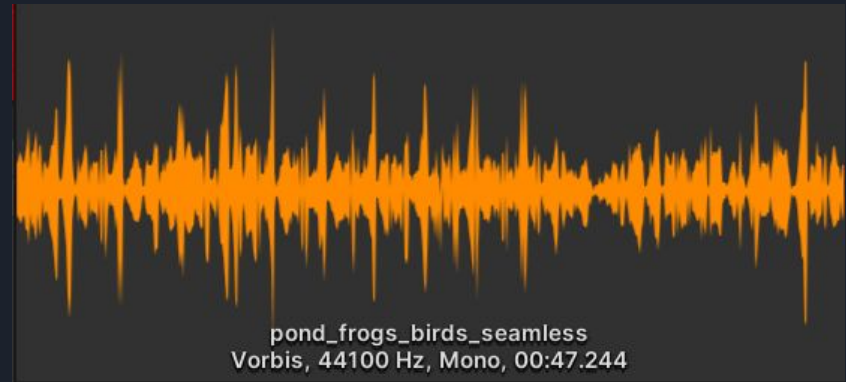Medium Wind made by kangaroovindaloo on freesound.org

Production Process - Sound Oasis

As I said before for the oasis I wanted something calm that would be the opposite from the desert.
This is why there is only 2 different sound.
I have one spatial sound coming from the center of the oasis and will work pretty much as an ambient sound that you would hear everywhere in the oasis.

Then I added an other spatial sound to go with the waterfall or it would have look weird to not hear the water fall.

cascade_river_seamless
Vorbis, 48000 Hz, Mono, 01:56.245

Cascade.wav made by nome_diva on freesound.org

pond_frogs_birds_seamless
Vorbis, 44100 Hz, Mono, 00:47.244

It come from the study resources given.

Production Process - Lighting

For the lighting I went pretty simple, since it is a realistic and natural scene and I had no emissive texture, the only way I could add light was via a "sun".
For this I kept the directional light for the shadow and stuff. But for the main lighting and the color I used my sky. My sky use a gradient from yellow to blue and thus pass by a red color like this and with some tweaking I could end up with something really warm and that could looks like a sun in a desert with no cloud.

Just increasing the sky lighting intensity could really add a lot of color to the scene.
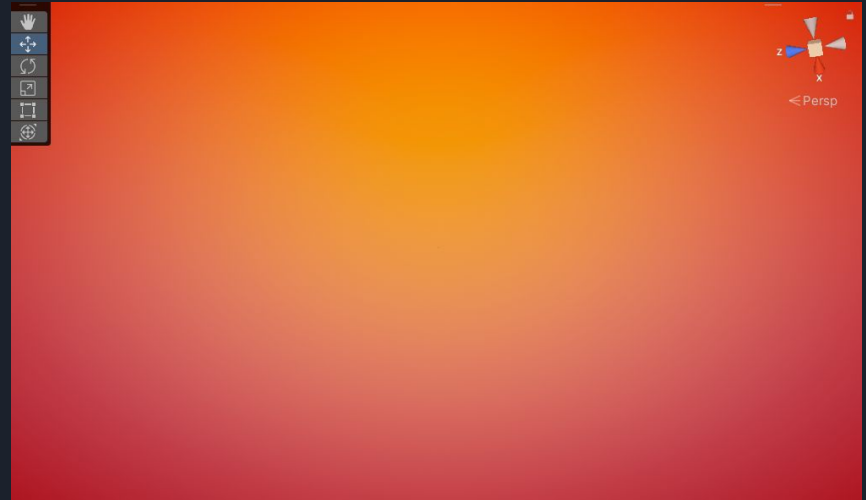

This is my sky when you look up.

Production Process - Post process

All the post process effects would be the most important to give 2 really different mood between the desert and the oasis.

So I used 2 different post processing volume, delimiting them with different box collider.

The desert have to feel really warm and and overwhelming with everything going around you.

In the other part the oasis must feel more like a redemption a bit magical compared to the desert, even if it's realist.
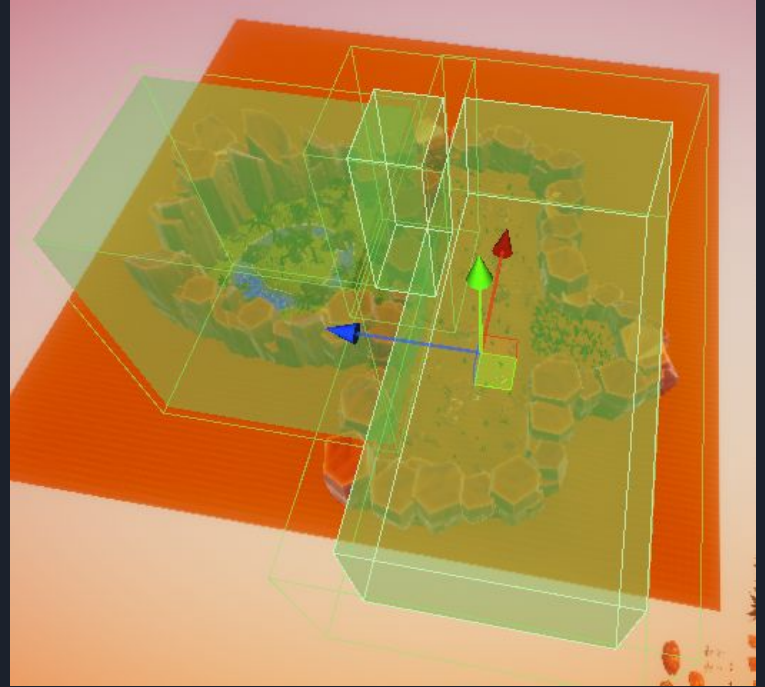
Production Process - Post process Desert

I added a color grading and tweaked mainly the temperature so the color would be way more warm and exactly like you would expect a desert to be.
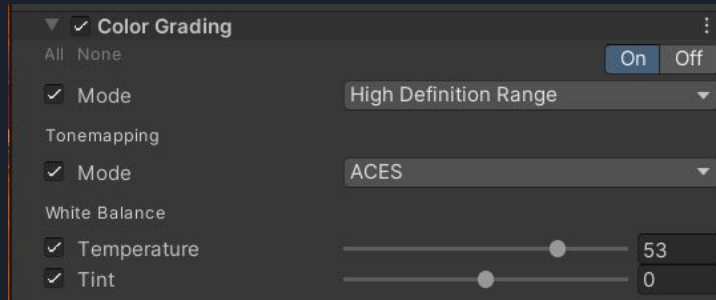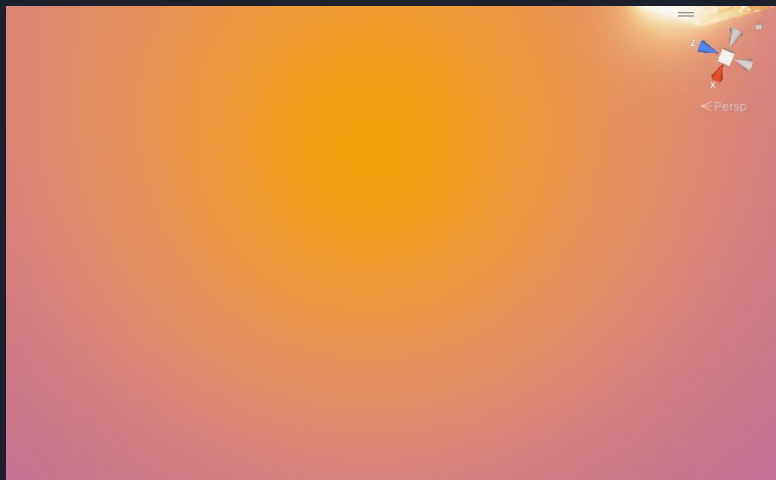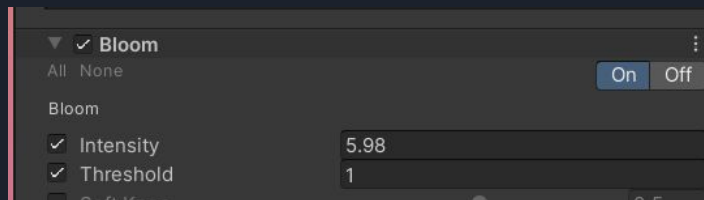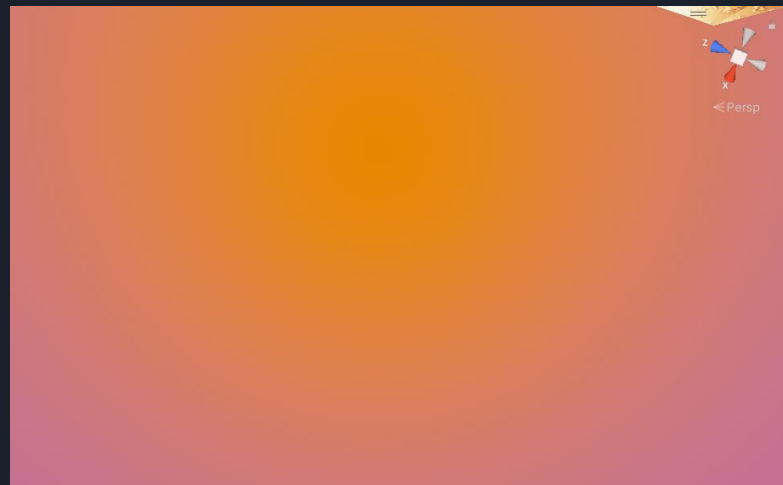

With color grading

Without color grading

Production Process - Post process Desert

Even if I add nothing emissive in the desert I added bloom to make the sky/sun more powerful.
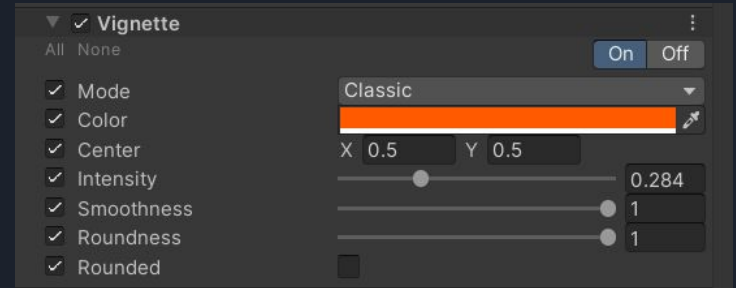

With bloom

Without bloom

Production Process - Post process Desert

Adding an orange vignette add a lot to the warm effect I want and it make the vision more restricted so you feel even more overwhelm by the element around you.
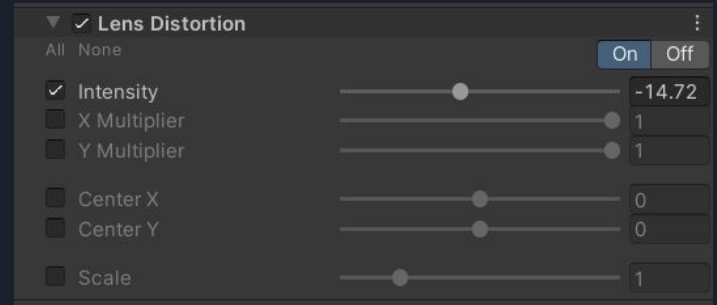

With vignette

Without vignette

Production Process - Post process Desert

Finally it's really subtle but I added a lens distortion like the distortion you could have when it's extremely hot outside. It's extremely subtle and small because if it's too big when you moving you have everything deforming and it could just hurt the eyes.
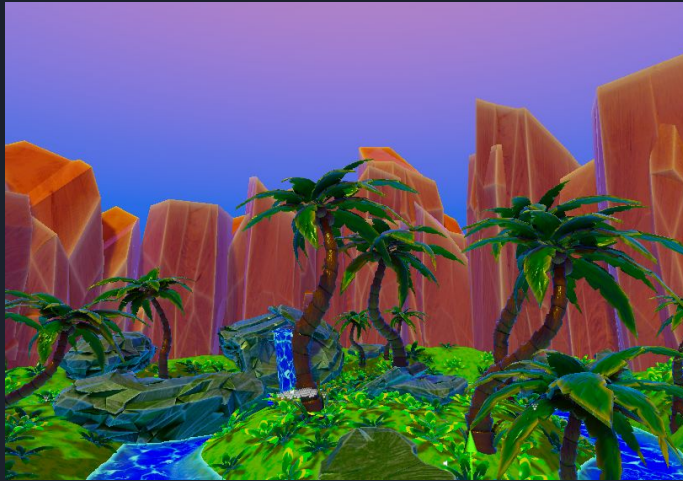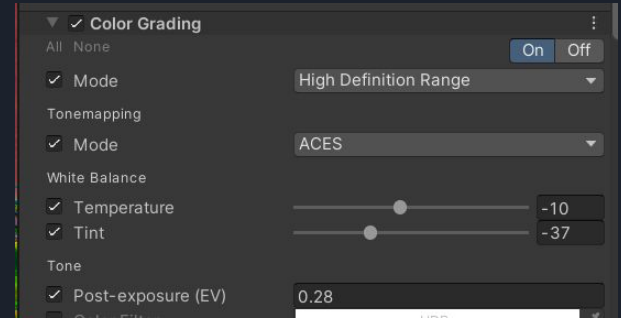

With lens distortion

Without lens distortion

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Production Process - Post process Oasis

Again added color grading and at the opposite of the desert I wanted the scene to look cooler and emphasis and the green/blue color.
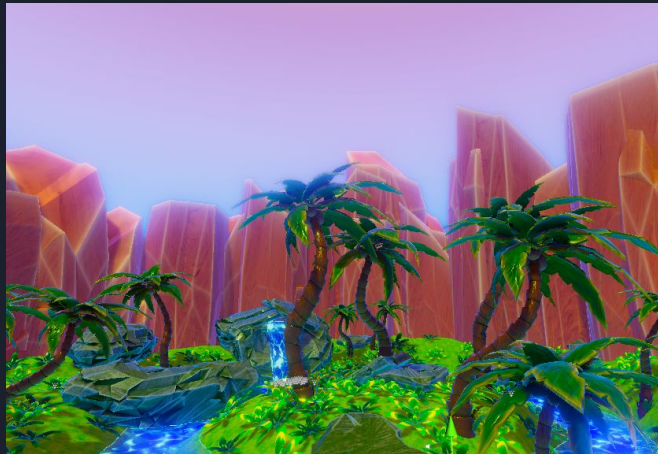

With color grading

Without color grading

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Production Process - Post process Oasis

To make the scene a bit more refreshing and like a redemption compared to the desert I added bloom and auto exposure.
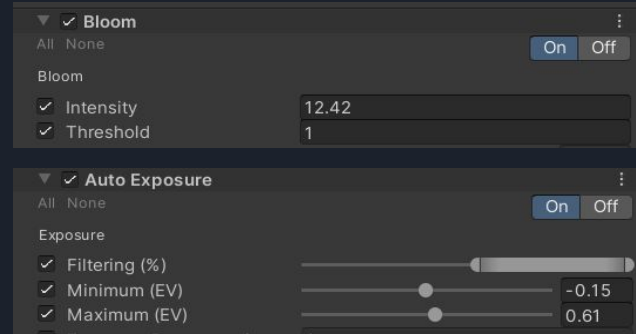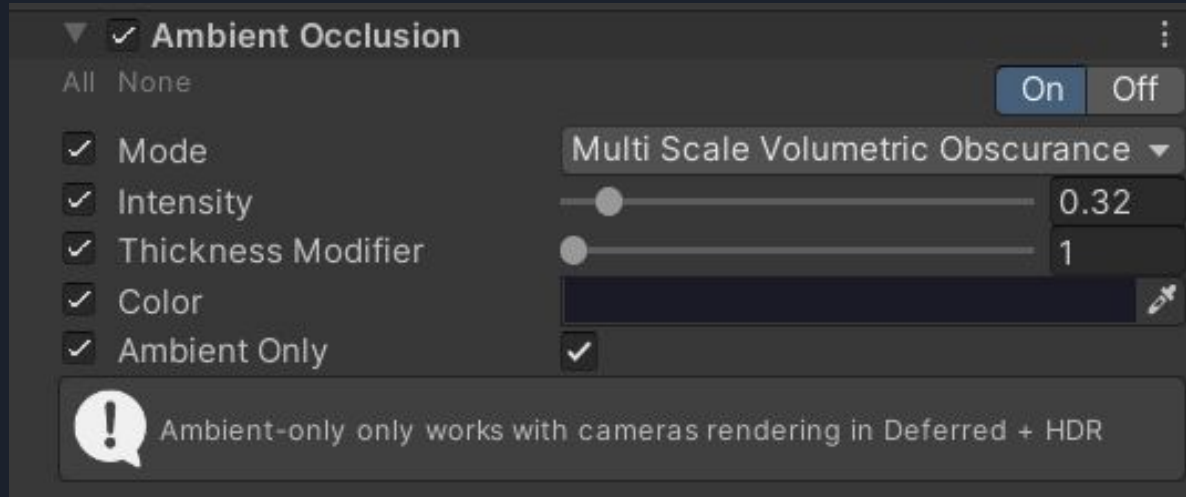

With bloom and auto exposure

Without bloom and auto exposure

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Production Process - Post process

I added ambient occlusion for both of the environment because the shadow just look better, I don't see any reason to not put some ambient occlusion to a scene.

Production Process - Miscellaneous

Something that I wanted to add, is that I tried to follow the same principle for everything on my scene.

The desert had to be overwhelming compare to the oasis and I really wanted a big distinction between those 2. This is why for everything from modeling to post processing or particles/sounds … the desert has way more of everything. More post processing, more sound, more particles, more different models.

Finally it work pretty well and we can really feel that the desert has way more going on compare at the oasis which is more calm.

Reflections - Improvement

- It might be my laptop, but there is some area with too much vertices, and I am dropping to 40 fps on my laptop, at the moment there is no big lag spikes so it isn't a big deal for the immersion. I tried to reduce the mesh, it improved a little bit, but I might have put to much props using the prefab painter. I didn't realise I could reach a point where it would make my scene slower. But at least in the build it's smooth and you should not experience any FPS drop.

- Following the same point as before, just before building the game, on the last day I found that one of my mesh (the bigs rocks) had a hole in the model, it's really annoying to find that at the last moment, I couldn't repair it before the submission. You might not even notice it, but when you know it's there it looks like you can only see this.

Reflections

- First I am really proud and happy of the result, of course there is always improvement but I really like my final scene. If I had a little more time I could have repair the little problem I found previous slide.

- I am happy that I could reproduce exactly what I had in my head, my final scene really looks like what I was expecting. I managed my time way better than assignment 1, I even had more time to add some additional element that were not asked but add a lot to the scene. Like the floating tumbleweed, or the falling rocks (the falling rocks are suppose to block you, it's consistent in the unity project, but in the build sometimes they don't).

- At the beginning I didn't think I would be able to do this, the other student projects from last semester where really impressive. Looking forward for assignment 3.