The Art Of MEIJI

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Goals, Research and Inspirations

The goal of the project was to produce a realistic 3D environment where the focal point is a Japanese Temple. Whilst the focus was primarily the temple a scene must be built around it. Whilst this isn't a game ready environment it must adhere by industry standard practices. Various media and real-life references were used for inspiration and ideas.

Akira Kurosawa

Kurosawa’s cinematography is both visually stunning and deeply expressive. His ability to blend movement, composition, and natural elements creates a cinematic experience that feels timeless. Whether in black-and-white or color, his films remain a masterclass in visual storytelling. His work can showcase the history of Japan whilst showing its beauty allowing you get immersed into the movie. He can utilize the weather as a story telling tool whilst using dynamic cinematic camera movement, his ability to combine dynamic action with poetic imagery makes his films timeless and deeply influential. He is a strong influence when creating this project as I want to my work very expressive.

The Last Samurai

The Last Samurai is a movie that inspired me to create this environment due to its emotional depth, stunning cinematography, powerful performances, and historical themes. I found the movie a stunning ride as it progressed, and I wanted to convey the same feelings I had during this movie in my work. The movie beautifully captures the landscapes of Japan with the visuals of cherry blossoms, rolling hills, and traditional samurai villages enhance the film's immersive experience. While not 100% historically accurate, the film does a great job portraying the samurai way of life, including their philosophy (Bushido), training, and discipline. The deep respect for tradition and honor strikes a chord with many viewers not just myself.

The film captures breathtaking wide shots of rolling green fields, misty mountains, and traditional Japanese villages. There's a use of natural light where many scenes rely on soft, natural lighting, especially during the quieter moments in the samurai village. Warm golden tones are used during sunrise and sunset shots, reinforcing the film's themes of beauty and transience. Cherry blossoms are a recurring visual motif, symbolizing both beauty and the fleeting nature of life, a key theme in samurai philosophy. Traditional Japanese architecture, samurai armor, and katanas are framed with care, reinforcing the film's cultural richness. The samurai village scenes are dominated by earthy, warm tones, evoking a sense of peace and tradition. Overall watching this movie whilst not the most accurate gave me a good sense of idea on how I can light my scene but also induce beauty in my environments

Ghost of Tsushima

Ghost of Tsushima is a breathtaking blend of cinematic realism, traditional Japanese aesthetics, and Kurosawa-inspired visuals. It's historical accurately will help provide a 3D reference to help capture a feel of certain elements, this game also takes heavy inspiration from Akira Kurosawa's films, particularly in framing, lighting, and use of movement. The environment is crafted with painterly beauty, reminiscent of Japanese ink wash (sumi-e) paintings. Rolling hills, golden fields, cherry blossom trees, and misty mountains create a sense of poetic tranquility. This is seen with the Golden Forest which is a stunning area where the entire landscape is bathed in warm golden leaves that swirl in the wind. The game has a Vibrant and Symbolic Color Palette. The game's colors are bold, rich, and symbolic, reflecting different moods and themes. Red is Associated with violence, war, and the Mongol invasion. Yellow and Gold represent honor, peace, and nostalgia. Deep Blues and Purples evoke mystery and nightfall, used in stealth sequences. Overall, the art style of Ghost of Tsushima is a perfect blend of realism and traditional Japanese artistry

Shogun

Shogun is a meticulously crafted visual experience that immerses viewers and is one of core inspirations for me when creating this environment. The series employs sweeping camera movements and wide-angle shots to capture the grandeur of feudal Japan, enhancing the storytelling with a visual language that reflects the era's aesthetics. The art style emphasizes cultural authenticity, with meticulous attention to detail in set design, costumes, and props, creating an immersive experience that transports viewers to historical Japan. Like the Last Samurai the series employs lighting techniques that mimic natural sources, enhancing realism and grounding the historical setting. The strategic use of shadows and highlights contributes to the dramatic tension and underscores thematic elements. The meticulous approach to cinematography not only captures the historical essence of the period but also enriches the storytelling by providing a visually compelling backdrop that reflects the characters' internal and external journeys. Overall, it is a big inspiration for me as it showcases traditional Japanese aesthetics quite nicely.

Goals, Research and Inspirations

Before further production, these were the guidelines I was following;

- Own rendition of a Japanese temple in Blender
- Set in realistic setting
- Using historical reference to make the temple as accurate as possible
- Create environment around the temple
- Utilise mega scan assets for any foliage

My research and reference would be consolidated on a Miro board with it mostly containing historical reference however real game and cinema were used as reference as well as industry professionals which is shown below.

Lorenzeo Dragotto (2022)

Leartes Studio (2023)

Ignacio Quezada

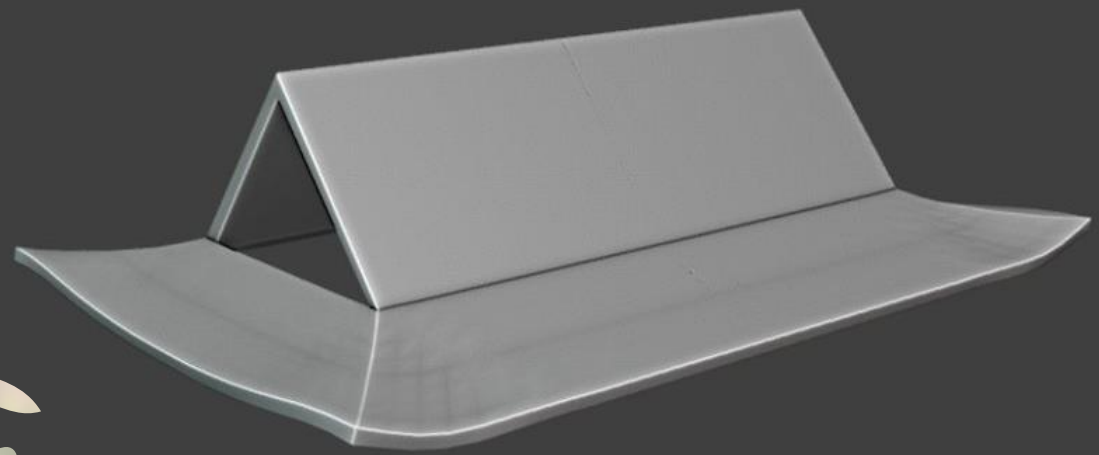
Initial Idea

The main reference I was using was the Shoshazan Engyoji Temple.

Before starting development, I produced a very basic 3D block-out with the block out then informing my ideas for the sketch I created.

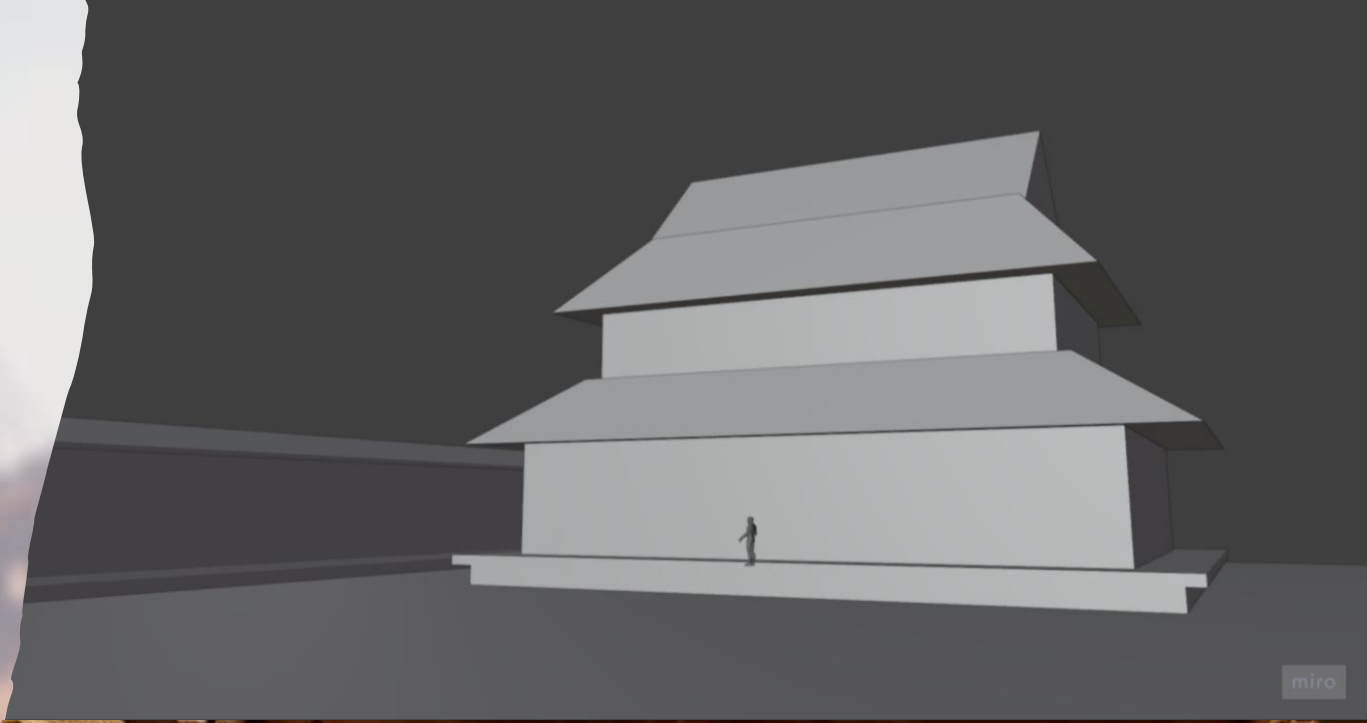
Planning phase

- The initial idea was to create a Japanese temple environment set in a traditional setting the focus point would be the temple, but it would be surrounded by props that would help compliment the focus, furthermore there would be mountains in the background to help give the scene added depth.
- As this was quite new to me, I spent time experimenting on techniques I would eventually utilize to create the temple. I found this important for the project as it helped build on my ideas and see if what I wanted to create was entirely possible. Through trial and error, I discovered a lot of errors in my first attempt at Japanese Architecture that I was later able to fix in my work.



Original block out

My block out for this project was very basic compared to what I'd done for previous projects however I wanted my core attention to be on developing the temple so at first, I didn't focus too much time on this aspect, I just focused on comparing to reference to get a core focus on the scale of the temple compared to a person.



Historical research

Due to historical accurately of the project a lot of relevant historical research was gathered.

Whilst the temple is the most important part of the project I felt like it was important to highlight the importance of Japanese gardens. Japanese gardens are very important as construction of gardens became a cultural art form. It aims at displaying natural elements and by supplying peace. The gardens in temples are named Zen gardens which are aimed to imitate the essence of nature and not it's actual appearance and to serve as an aid for meditation. They follow seven principles.

Austerity (Koko), Simplicity (Kanso), Naturalness (Shinzen), Asymmetry (Fukinsei), Mystery or Subtlety (Yugen), Magical or Unconventional (Datsuzoku) and Stillness (Seijaku)

They consist of stone, water and plants.

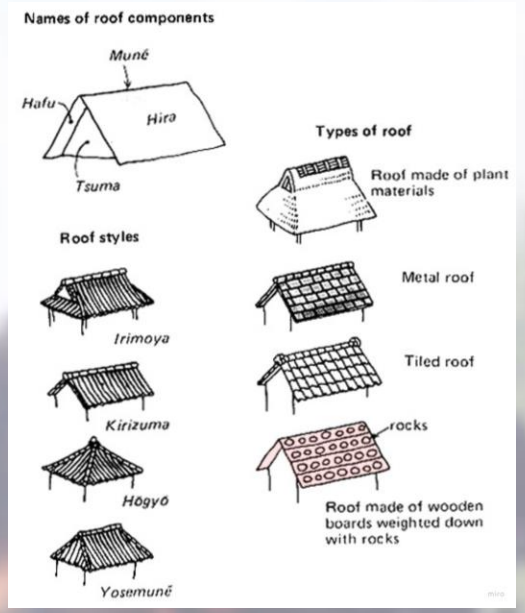
Japanese temples are built to serve the Buddhist religious tradition. Buddhism arrived in Japan in the mid-6th century, and was officially adopted in the wake of the Battle of Shigisan in 587, after which Buddhist temples began to be constructed. Buddhist temple is not primarily a place of worship, its most important buildings are used for the safekeeping of sacred objects and it is also a monastery. Most importantly they were considered the centre of where people trained, educated and learnt new skills which is important for the Japanese culture.

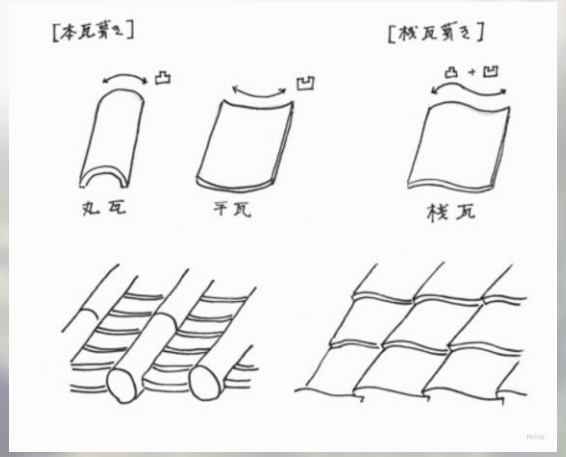
The temples take influence from contemporary Chinese architecture from the Song Dynasty.

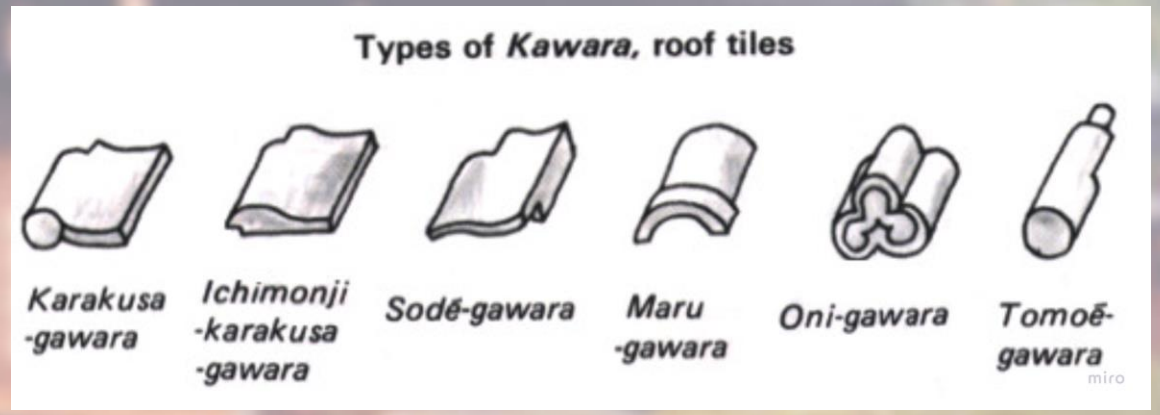
The temples were built out of wood as it is more flexible than stone or brick which is important due to the frequency of earthquakes in Japan. Characteristics of most Japanese Temples include post and lintel support, a gentle curved roof, and thin walls. The use of a single central pillar or column

Historical research

Whilst a lot research was done on the importance of temples and what they symbolise I focused a lot of my time collecting detailed information and reference of the Japanese roof tiles as on any Japanese themed build they are the most important section that our eyes are drawn too so it was important to really make it as accurate as possible.



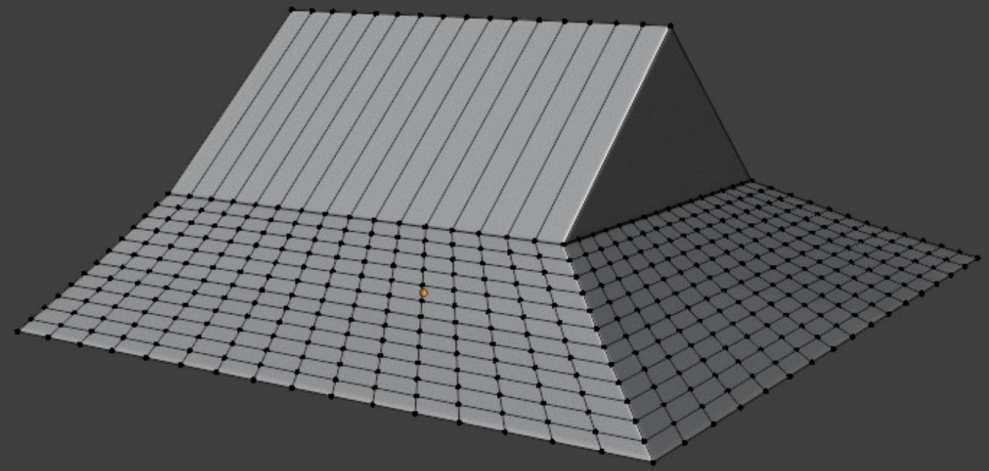


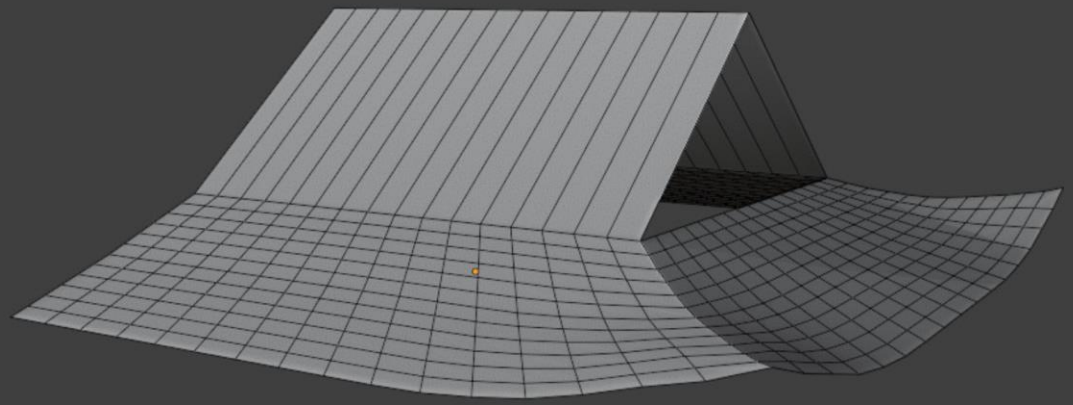


Temple Production

When I started to model the temple, I focused a lot on modelling the roof. To me modelling the roof was the main section of the temple so I had to make it as accurate as possible.

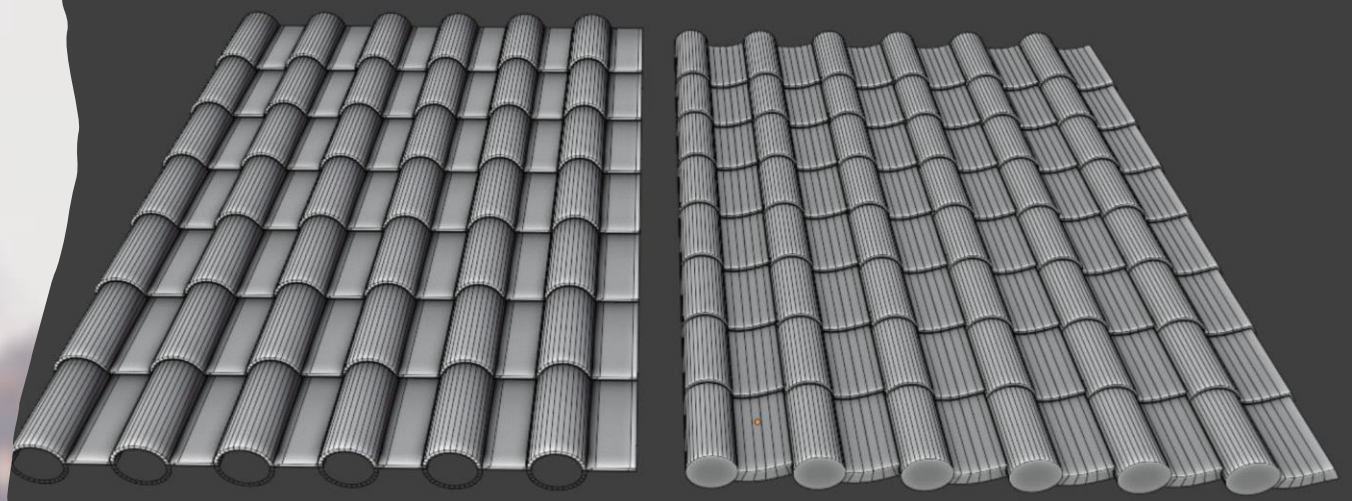
When creating the roof, I used a lot of proportional editing in Blender. I decided to add a lot of loops just to get the curvature right on the roof.



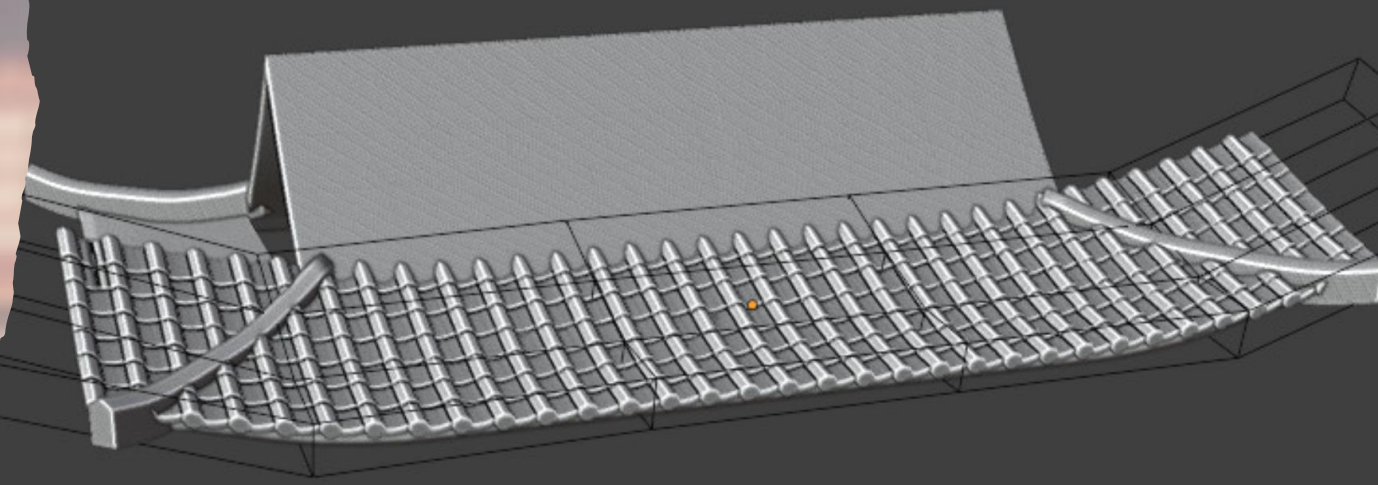


Temple Production

The tile portion of the temple was trial and error in order to get something that fit the temple and looked nice. In my first attempt at creating the temple I designed two variants of the tile. I decided to go with the second variants as it was the easiest option out of them but was modelled more precisely.

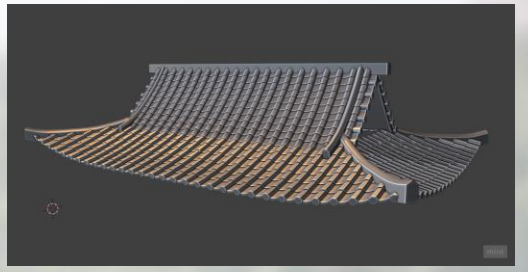


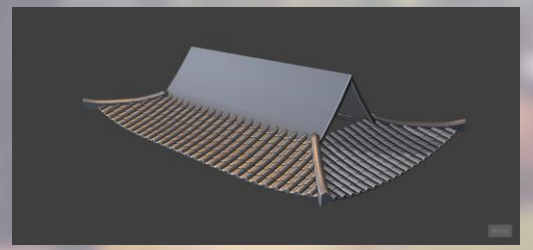
The tiling of the roof was the hardest challenge how I achieved my end result was by utilising a lattice and shrinkwrap modifier. It required a lot of adjustment and when I was happy with the outcome, I used a boolean modifier to cut off the ends.



Temple Production

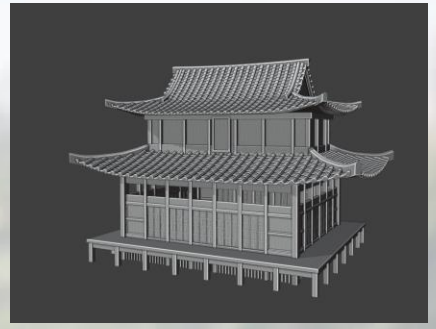
This was the final result of the original roof method I created. With this method I was able to repeat it several times on the temple to get the desired result. Overall, I was able to mimic and replicate a roof from the Japanese period quite nicely in my work however there was some visible flaws for example it's not optimised (something I realise and will touch on a lot later) but also sections don't blend correctly. For example, the section picked out is just awkwardly inside another part – in a game or cinematic situation however at this stage I knew it'd something I would correct.

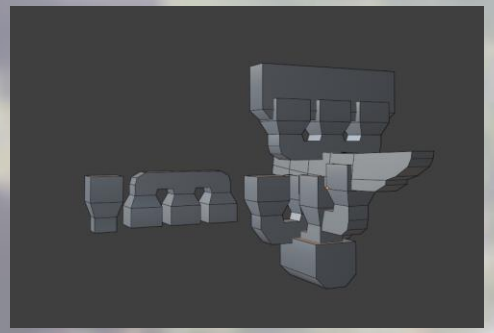


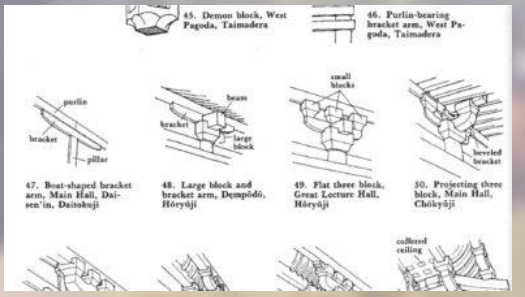


Temple Production

At this stage I had completed the main block out of the building but it was time to model the wooden support and bracket. The wooden detail was especially important as close up it looks really amazing to see but furthermore just ties the building together. The brackets are really simple geometry and shapes that are just repeated throughout, I saw it as a pattern that I can repeat throughout so I really made sure to get it looking good regardless if it was simple shapes.

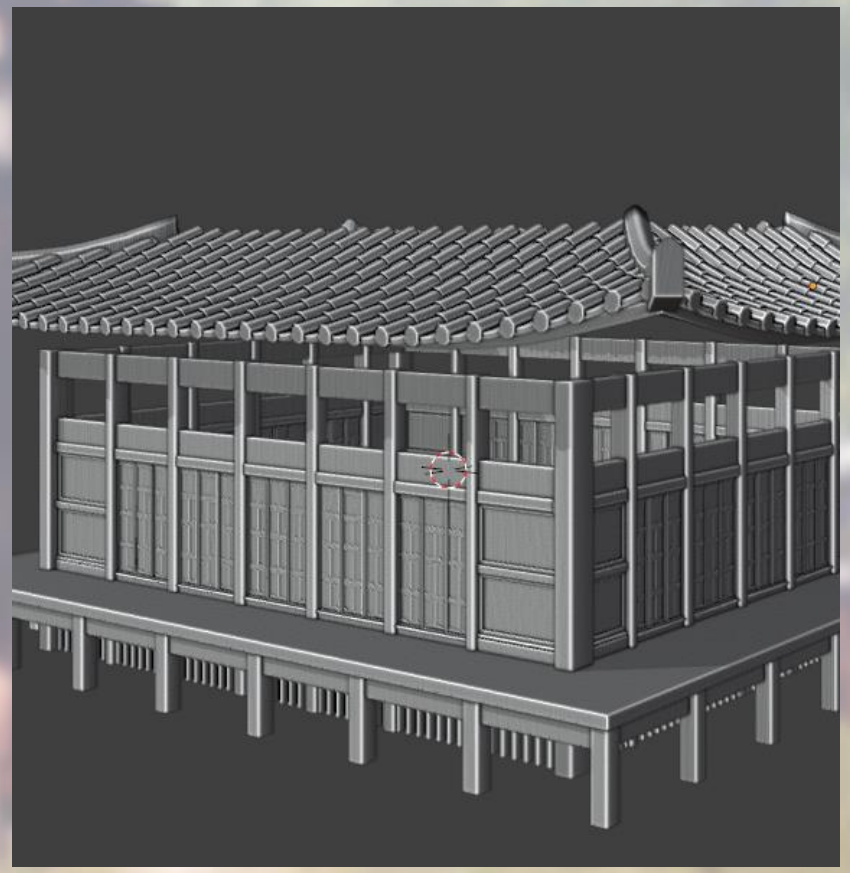






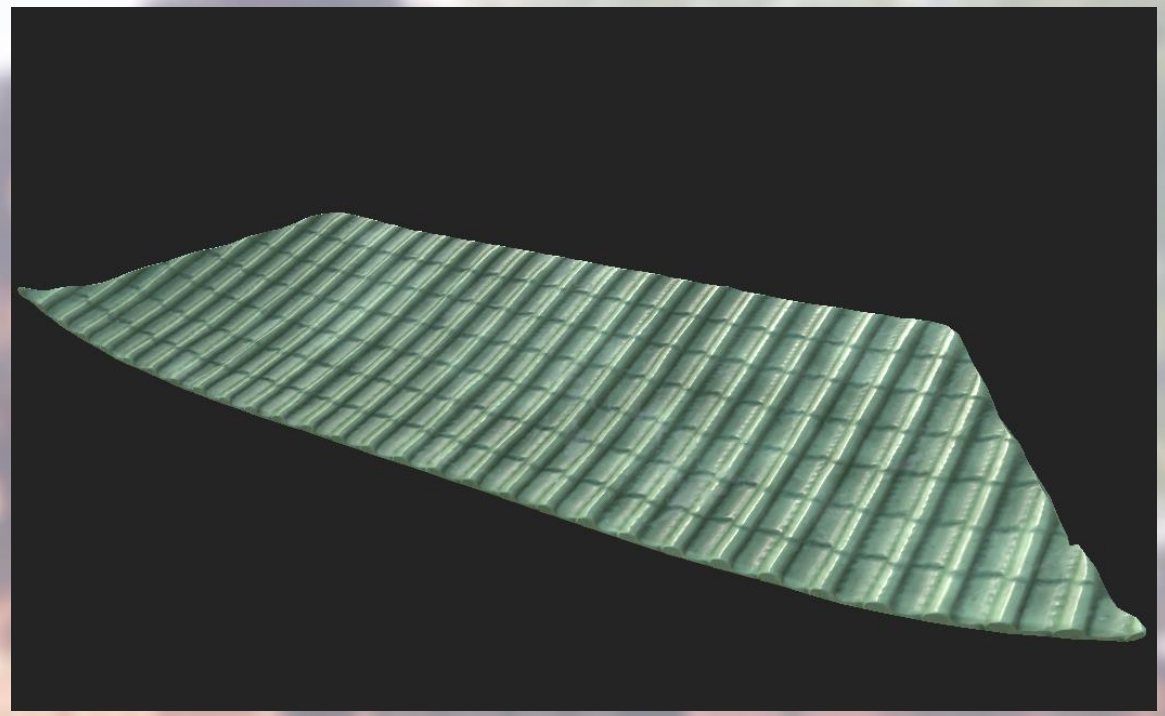
Temple Production - Problems

The first major problem I have encountered in this project is the scaling regarding the roof. Scaling in games and especially with unique buildings is very important which is why it's important I focus a lot on this part of the project to try and fix it, so it doesn't look visually weird in game. I have started to try to fix the roof, and this is the progress so far. The scaling was a problem with the temple throughout the project as it was something that perplexed my mind throughout however you can see on going fixes throughout the development blog.



Temple Production

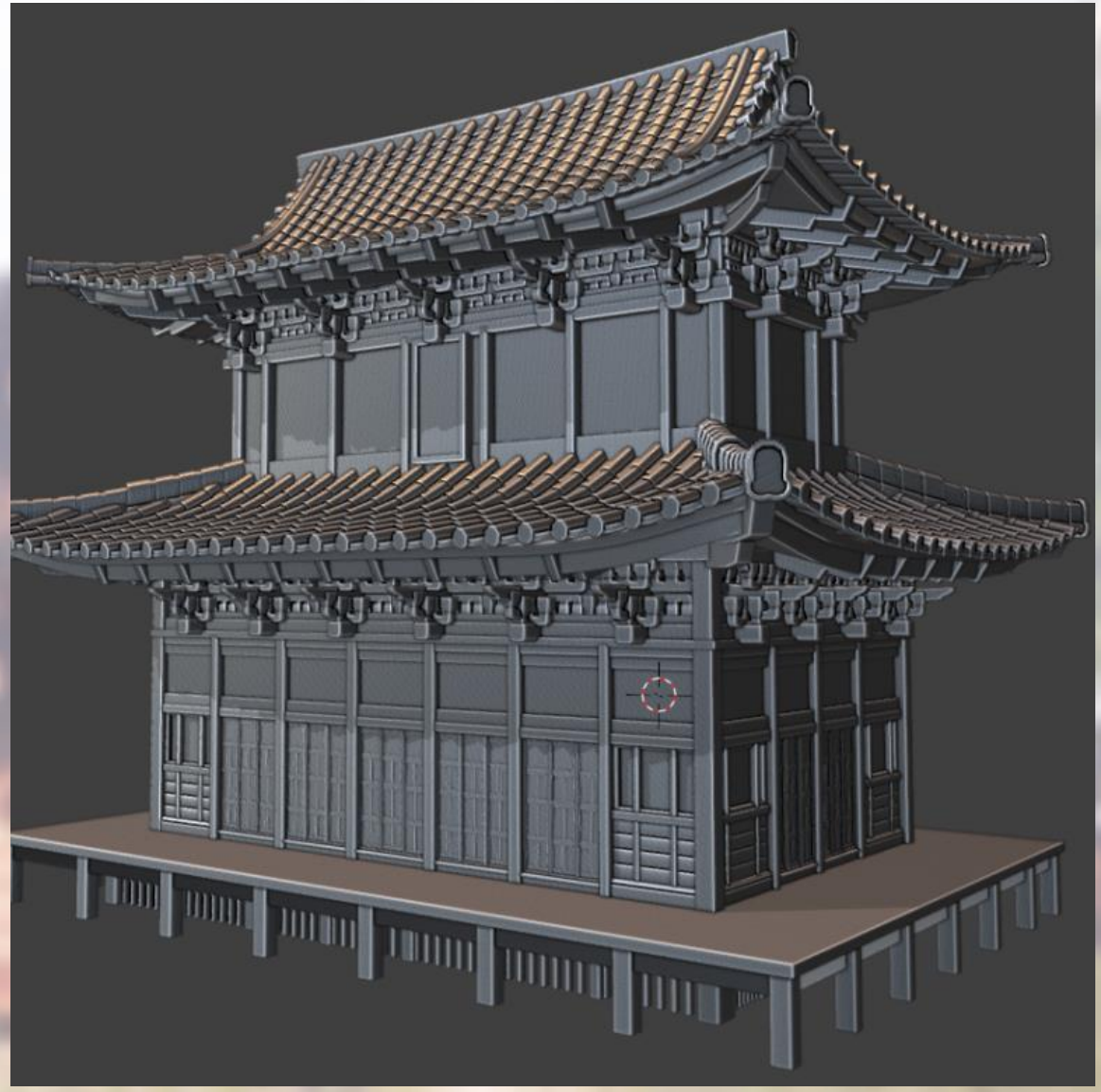
At this stage I was advised by my project supervisor to test a new approach for the roof as it may have a better result. The process involves modelling a base high poly tile mesh in modelling software and exporting into Zbrush to add some further detail such as polish or wear and tear and then baking onto a low poly version and texturing in substance painter. This was the result of this test overall it delivered good results but at this stage I don't think I'll utilise it.

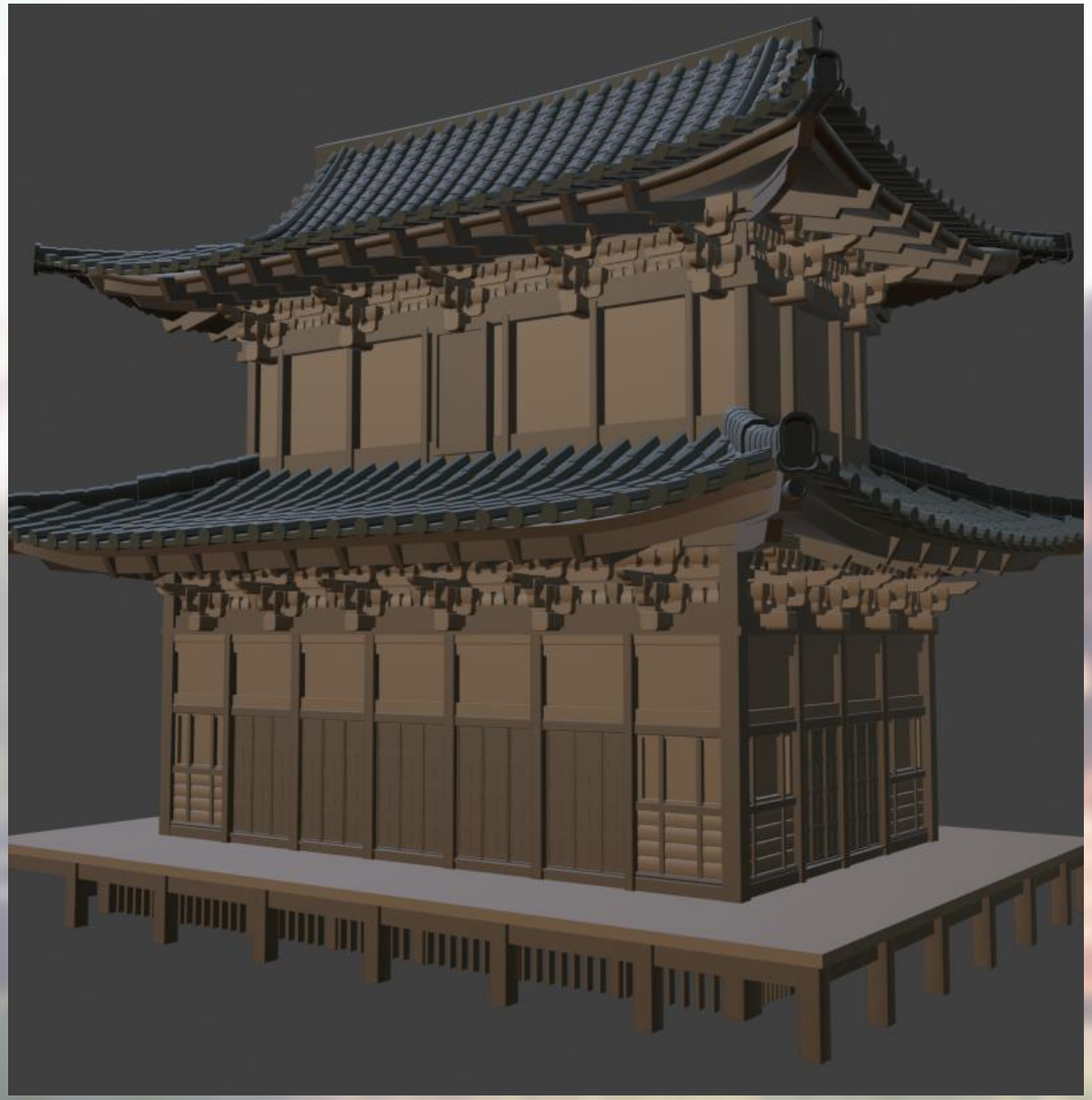


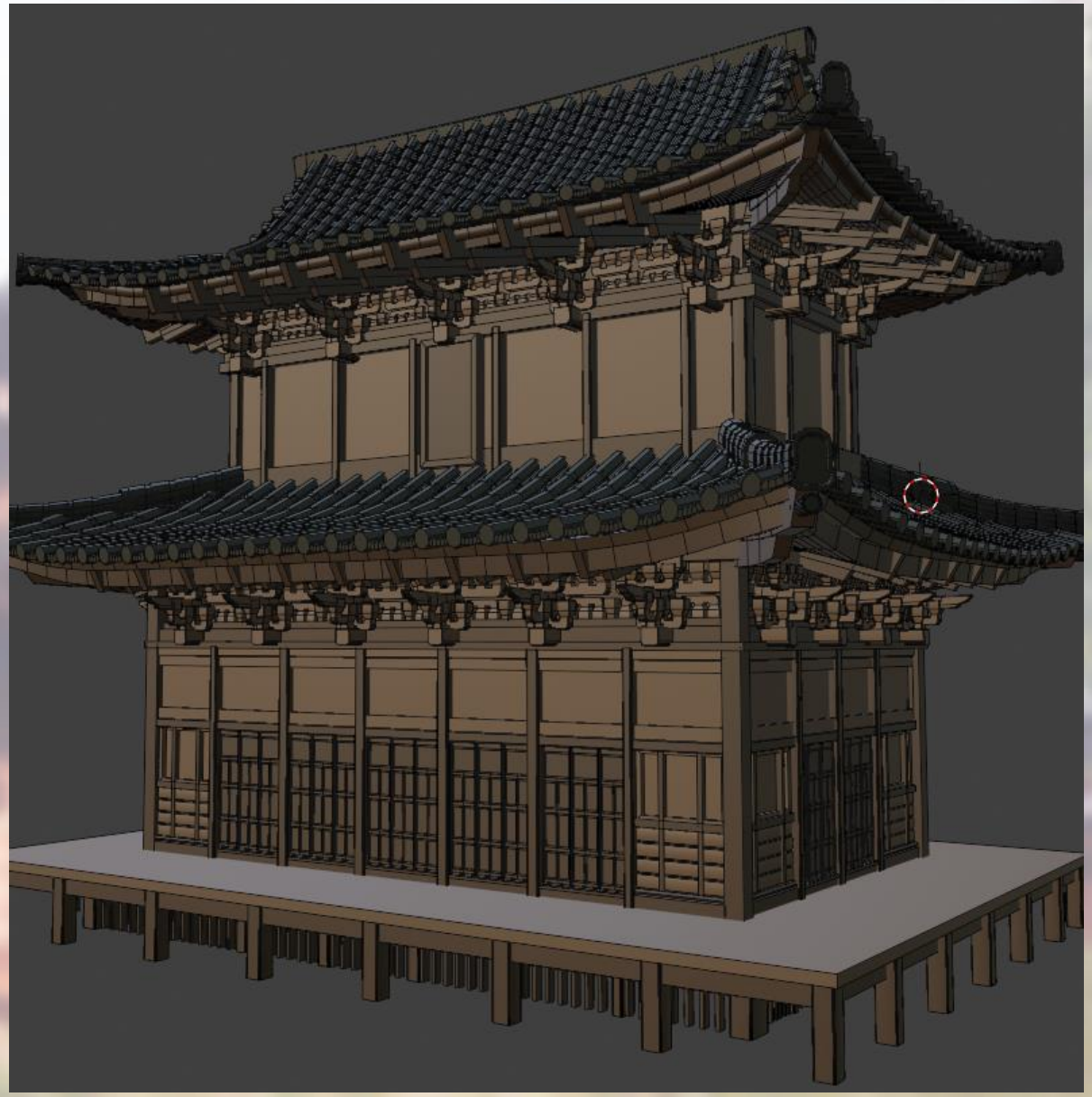
Temple Production – Completed high poly

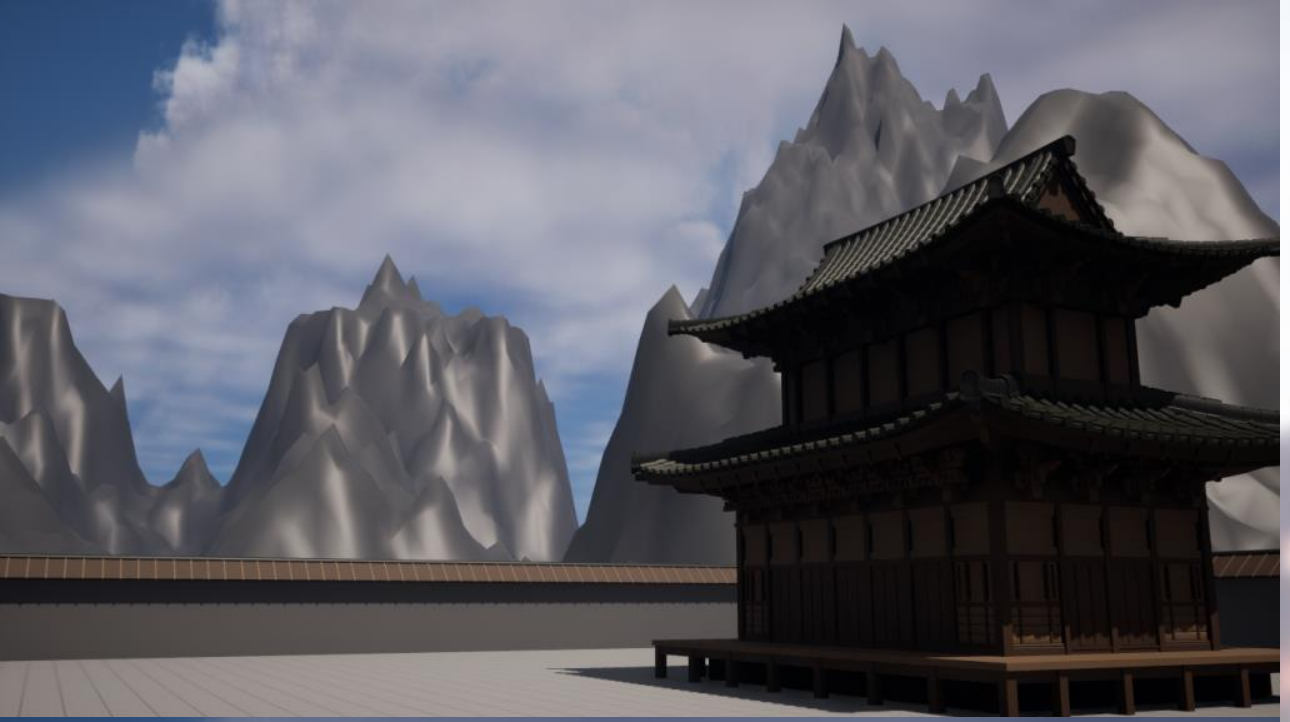
Completed high poly block out.

I was happy with the results at this stage, and it was time to start texturing.

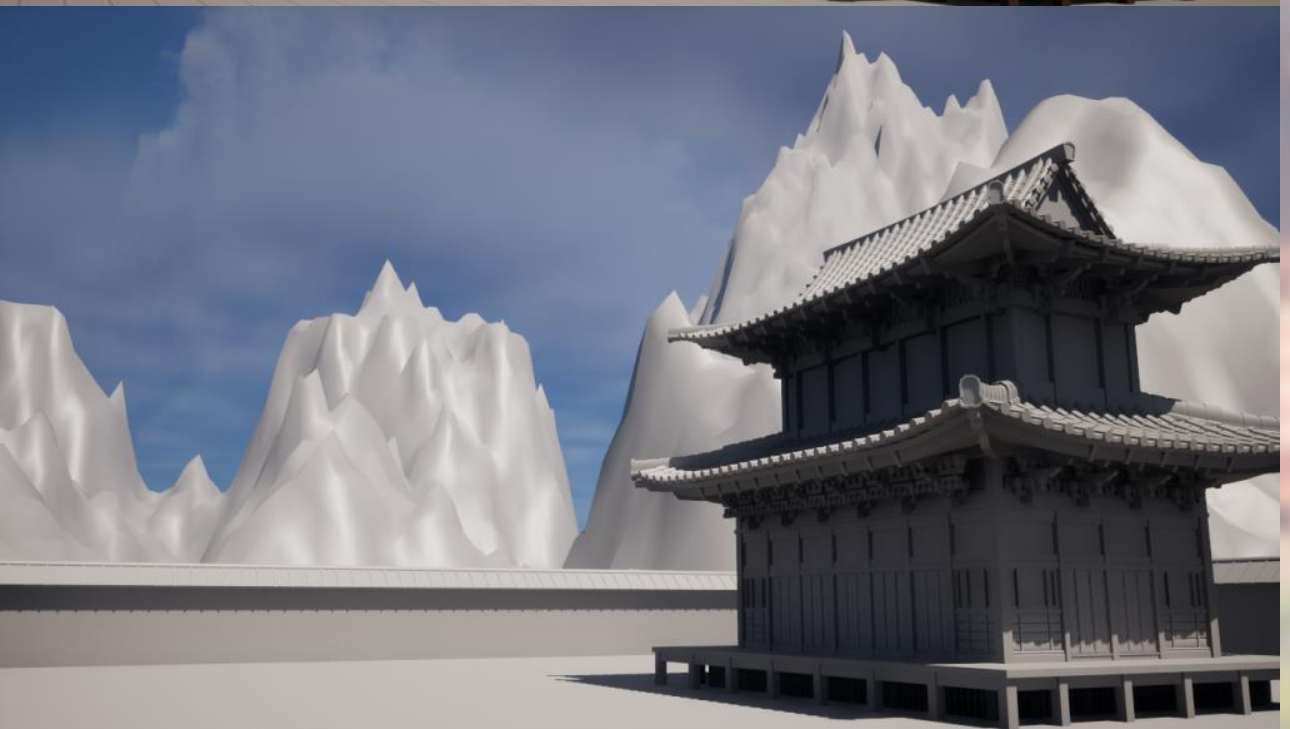








Unreal engine import



Textured

Detail Lighting

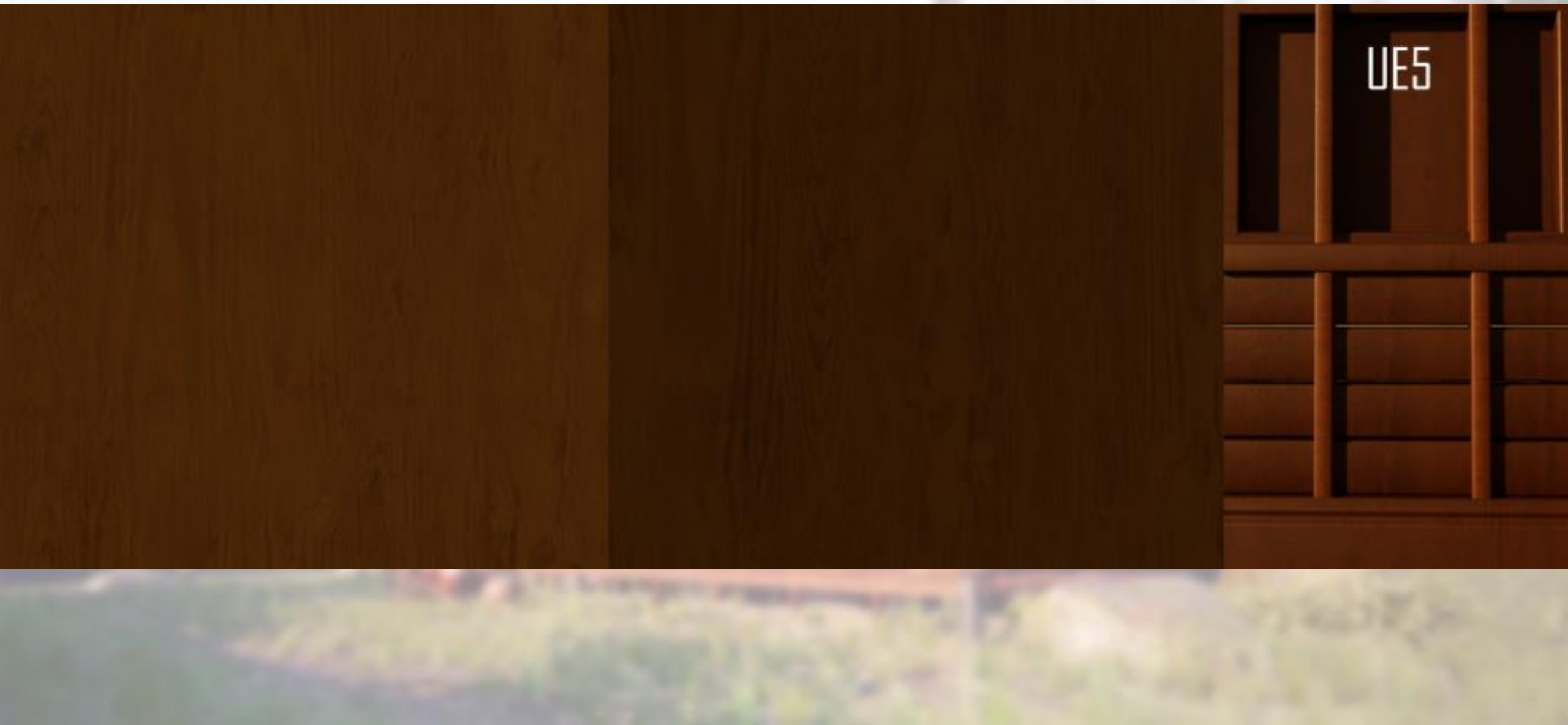
Temple Production – Texturing

I did no work during the Christmas break to refresh myself but also to think of the next steps when it came to this project. I decided the next approach for this project was to fix the texture work and amend mistakes in the temple (again). To start off I decided how I wanted to create the wood texture, I had used a smart material beforehand to trial how it could look textured but nice-looking I had already done the UV process, so I just had to focus on making a nice-looking texture.

Smart material test – I used a texture from Substance painter in the first stage of texturing as I wanted to see what it would look like with textures in engine, this gave me a good idea of which details would be see and which wouldn't but also would give me an idea of what to do and what not to do.

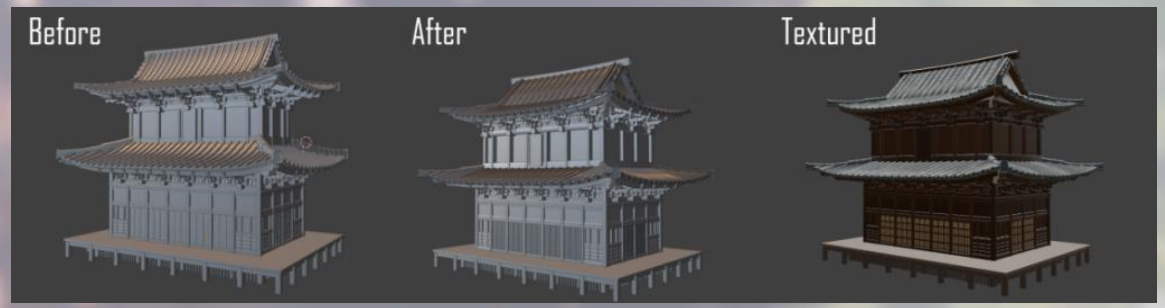
Temple Production - Texturing

I realised that most wooden temples doesn't have visible grains unless you look up texture, so I had more emphasis on the colour with the grains more blending into the colour as I don't want it too rough. After I had created this texture, I decided to create another shade to give the temple added depth, I just made it a lighter colour and pressed random seed on the grains. To apply the wood textures, in Blender it's quite simple. I would select specific sections and do my texture work and then I would be able to apply to repeating pieces in the temple and there is a lot of repeating pieces. For example, in the screenshot below I had made changes to the UV, to do this I press CTRL+L and pressed 'Copy UV Maps'. This can apply to everything from modifiers and to materials which is what I used. Overall, the wood texture works great but can be easily changed if it doesn't look right in engine.


UE5

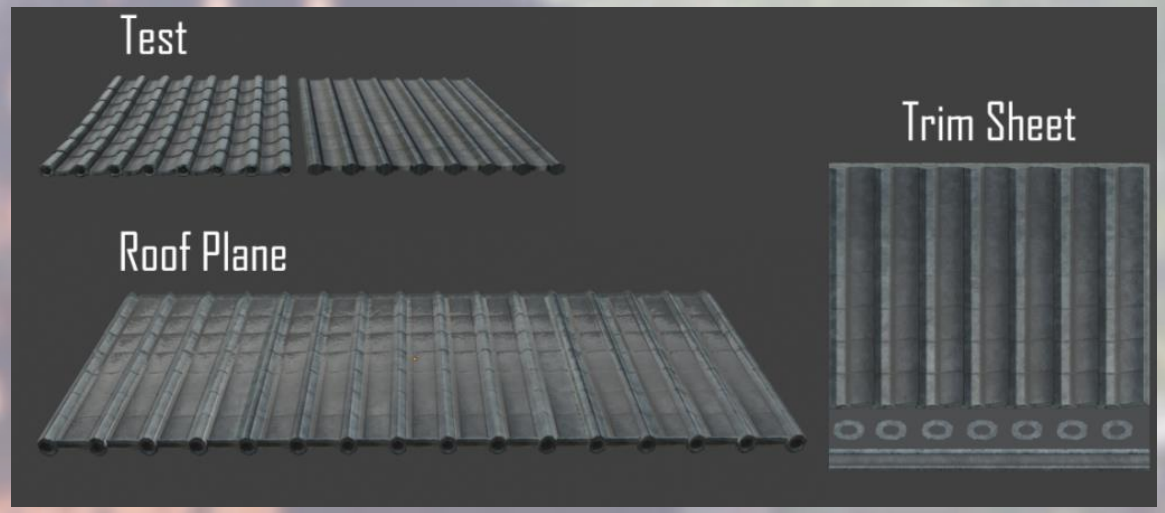
Temple Production - Fixing

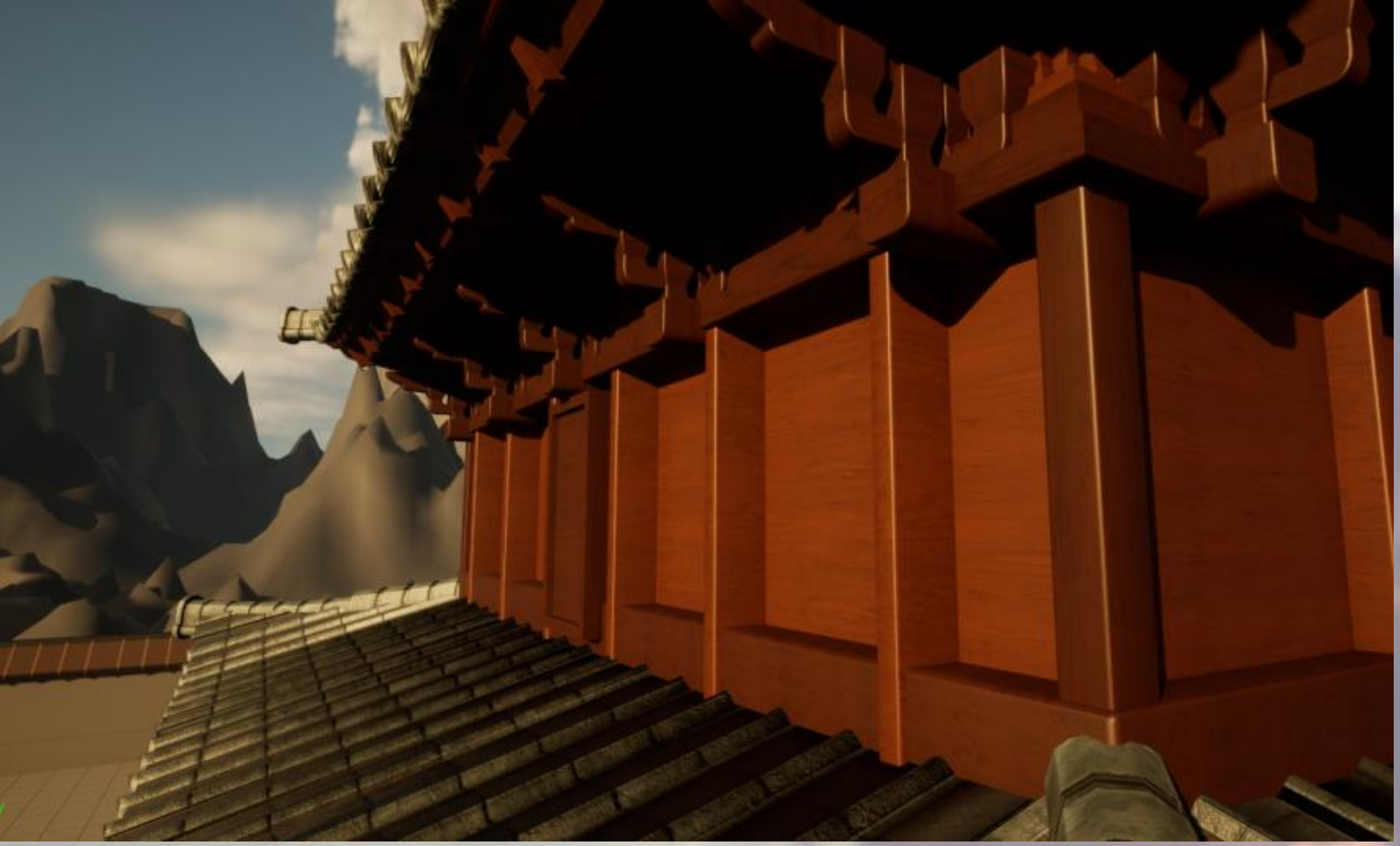
After a lot of self reflection on my work and progress I realised it was time to fix the building itself with the main problem being the roof. The roof of the early Japanese temples were symmetrical whereas my building was not, which in result made it look really weird and out of place. I had struggled to pin point on how to fix this however the solution was as simple as duplicating the lower roof and adjusting it accordingly.

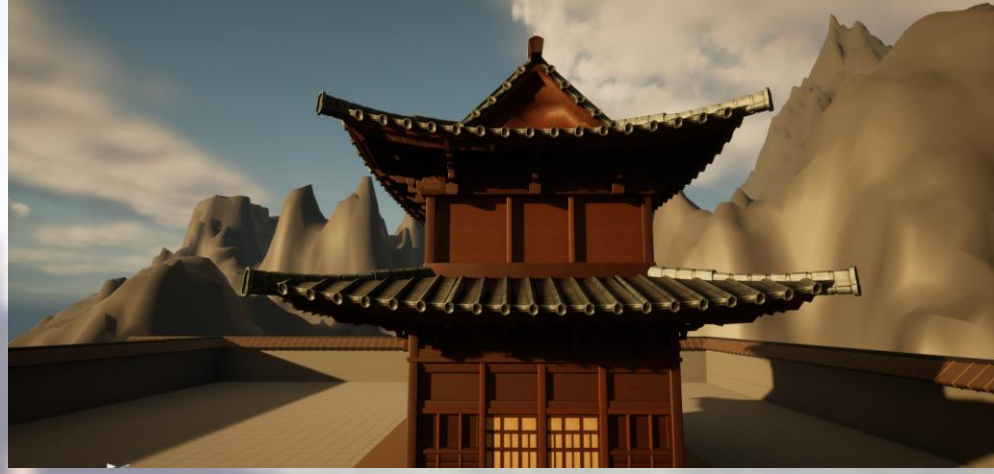


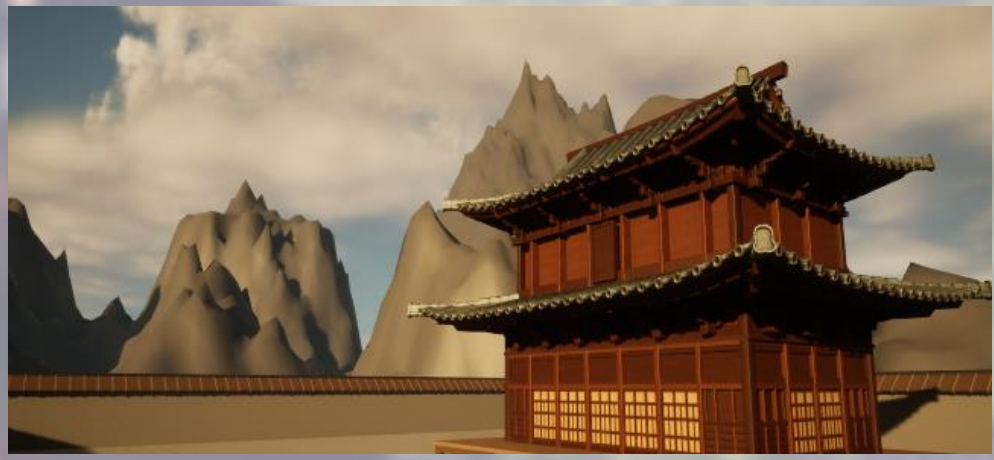
Temple Production - Fixing

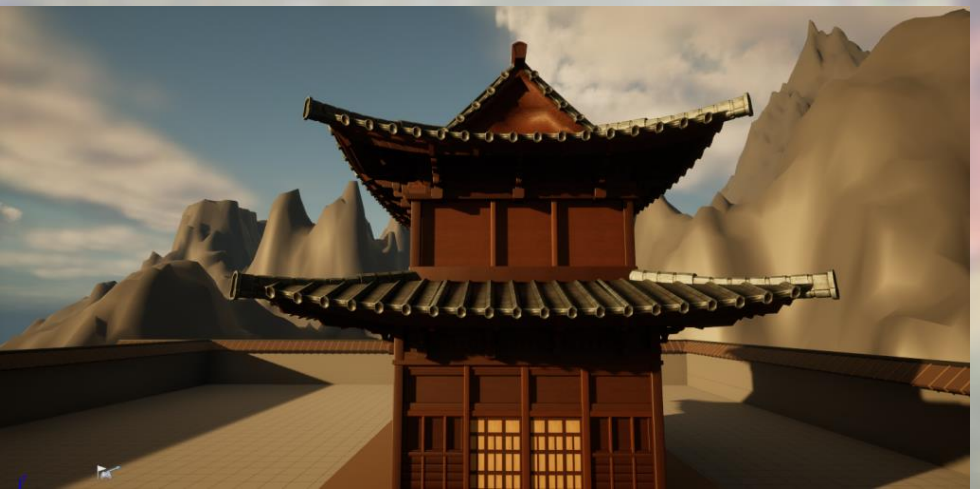
After modelling and fixing the texture, it was time to move onto the roof tiles. Beforehand I had modelled the roof tiles however this was wrong and really not optimal but also looked weird when textured and baked down itself. I took the roof tiles I had modelled and baked them onto a plane and created a trim sheet. I had tested this method out prior and liked the result, from my test I just iterated upon the process and added more details. After applying the texture, I added edge loops which helped the detail pop out.









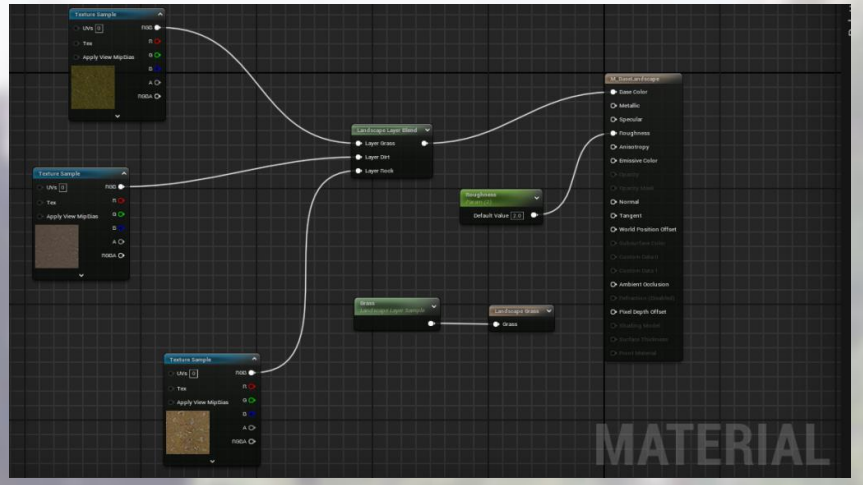


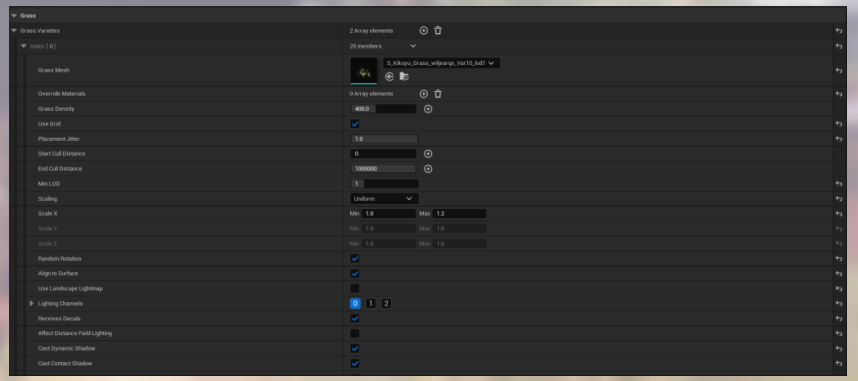
Temple Production – Texture adjusting

After showcasing my new changes in Unreal I decided I needed to fixup my wood texture. It didn't have enough roughness to it and looked quite flat close up. In the temples the grains aren't visible up close and do appear quite flat I wanted it to.

Temple production - Landscape

After completing the high poly of the temple and texturing it. It was finally time to start working on the landscape. For the most part I utilised trees from the Unreal engine European Hornbeam pack. To create the grass, I used a blueprint which would allow me have an array of options to decorate the landscape.





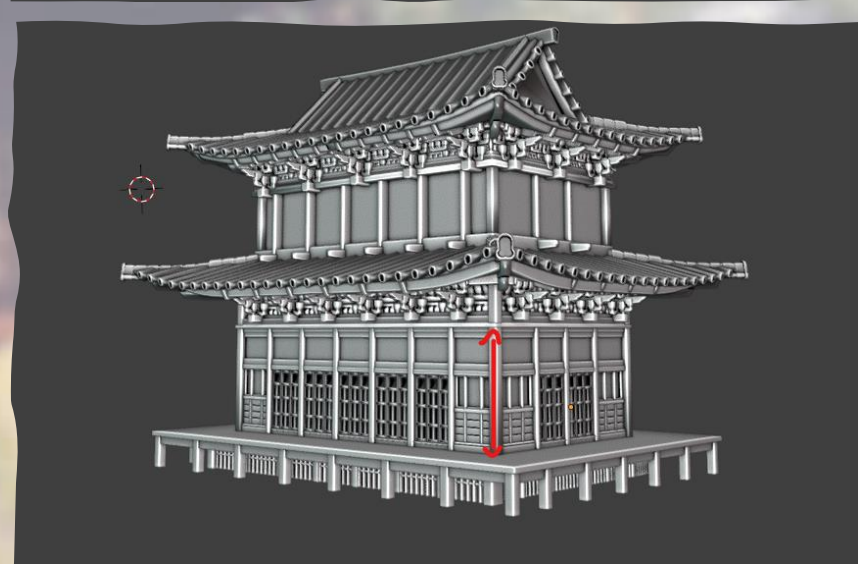



Temple Production – Landscape and Lighting

At this stage I was making a lot of changes to the landscape – grass and foliage and lighting. I couldn't decide what to do with the lighting at this stage I just wanted to make the scene as good as I could and go from there. I also created a placeholder wall as I hadn't designed the real wall yet, for the wall I just utilised the roof trim sheet I made for the tiles, and it worked quite well.

Self Reflection

At this stage of the project I wanted to self reflect on my progress so far as I knew I wasn't pleased with my work that I had produced so far. I fixed the long-time problem I had with the roof but I still felt it was off whether it was with scale or just parts not being aligned properly. To fix it I looked at expanding the sides and looking at the height of the building.



Self Reflection

I started to analyse and further research Japanese architecture in depth to help fix my model more and make some detailed notes of what the criticism and the analyse I did. The silver ratio used in Chinese and by extension Japanese architecture is the square root of 2, or in other words 1:1.4, so I tried to keep that ratio in mind when judging the space between bays, between vertical and horizontal beams. The ridge beams on the corners and top of the roof are called mune, specifically sumimune and omune respectively and these need to have more thickness on the model on top of having offspring ridges on the corners, as well as gawara tiles at the ends of the main ridge. There is gawara at the ends of the corner ridges already, though they're just kind of stuck to the ends but should be set on top of a marugawara tile protruding from underneath. Whilst proportion, angles, and hip curvature of the roof all roughly correct. I think part of why it looks "off" is that the ridge beams are definitely not thick enough.

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a. The ratio of depth (207.45 meters) to width (114.42 meters) of the overall layout of the core building complex is 9/5, symbolizing the "Ninth Five Year Plan supremacy" of imperial power(Fig.3a);

b. The length width ratio between the distance from the south edge of Ji doors pedestal to the north edge of the pedestal on the third floor of Xiang hall Hall (128.835 meters) and the surface width of the main courtyard (91.05 meters) is $\sqrt{2}$ (Fig. 3a);

c. The ratio of the distance (78.765 meters) from the north edge of the Ji doors pedestal to the south edge of the small pedestal of the hall of enjoyment to the surface width of the main courtyard (91.05 meters) is $\sqrt{3}/2$ (Fig. 3b);

d. The ratio of the distance from the East-West Center line of the front door to the East-West Center line of the Ji doors (54.94 meters) to the distance from the East-West Center line of the Ji doors (62.89 meters) is $\sqrt{3}/2$ (Fig. 3b);

e. The ratio of the total height of the Xiang hall (30.123 meters) to the total width of the foundation (82.64 meters) is about $2\sqrt{2}$ (Fig. 4a);

f. The ratio of the height above the foundation of the Xiang hall (26.645 meters) to the width of the open space (9.59 meters) is about $2\sqrt{2}$ (Fig. 4a);

g. The ratio of the width of the open space (9.59m) to the height of the eave column (6.865m) is $\sqrt{2}$ (Fig. 4b);

h. The ratio of the width of the open space (9.59m) to the width of the secondary space (6.43m) is $\sqrt{2}$ (Fig. 4b).

(Data source: *Squares and Circles, A Sum of Heaven and Earth*)

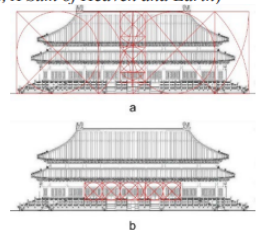
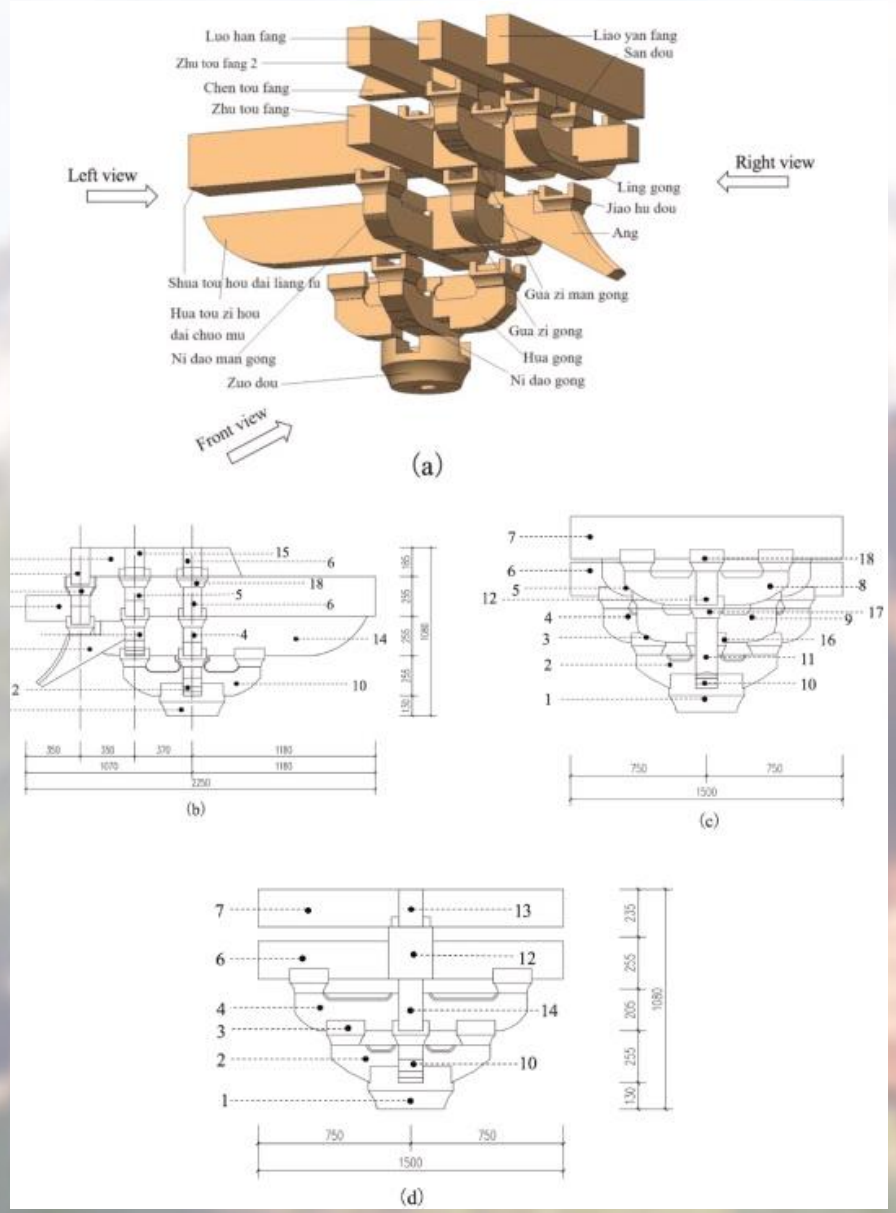
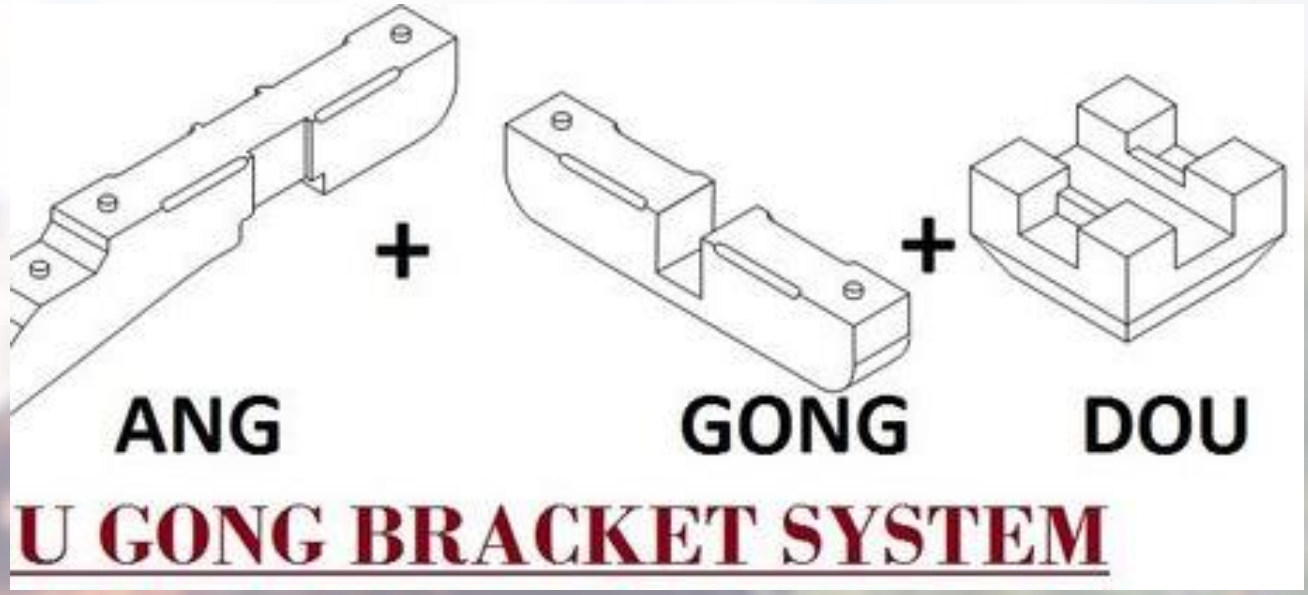
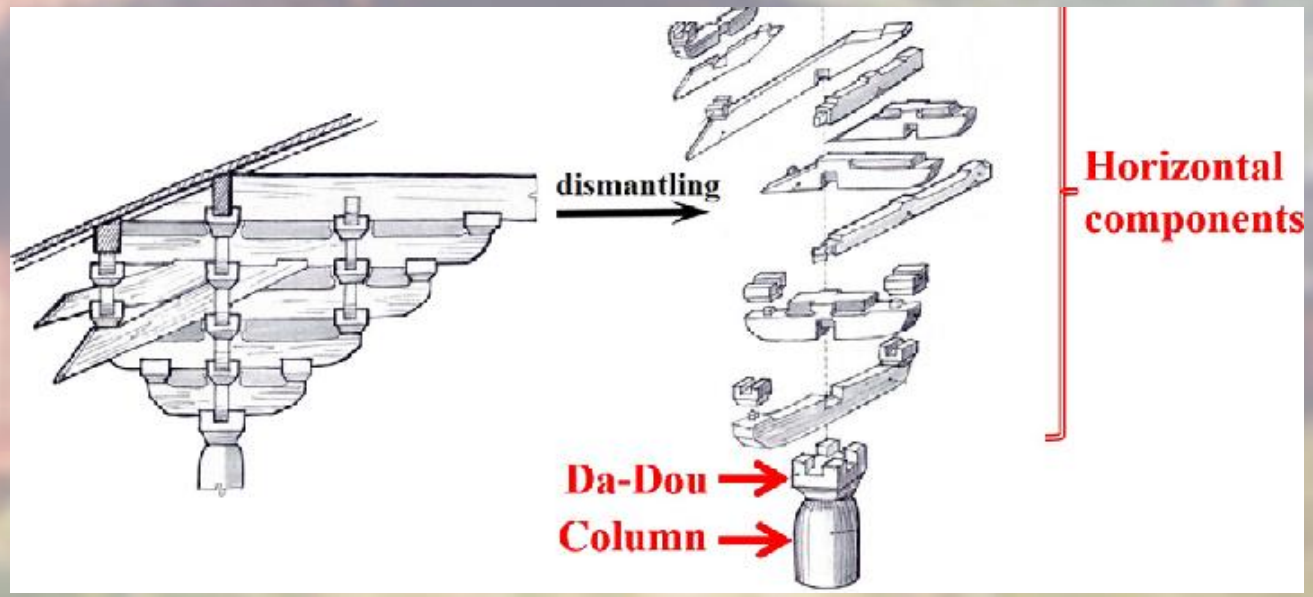


Figure 4: Analysis of the proportion of enjoying the temple


Luo han fang
Zhu tou fang 2
Chen tou fang
Zhu tou fang
Liao yan fang
San dou
Left view
Right view
Ling gong
Jiao hu dou
Ang
Shua tou hou dai liang fu
Hua tou zi hou
dai chuo mu
Ni dao man gong
Zuo dou
Gua zi man gong
Gua zi gong
Hua gong
Ni dao gong
Front view
(a)
(b)
(c)
(d)


ANG
GONG
DOU
U GONG BRACKET SYSTEM


dismantling
Horizontal components
Da-Dou
Column

Temple Production

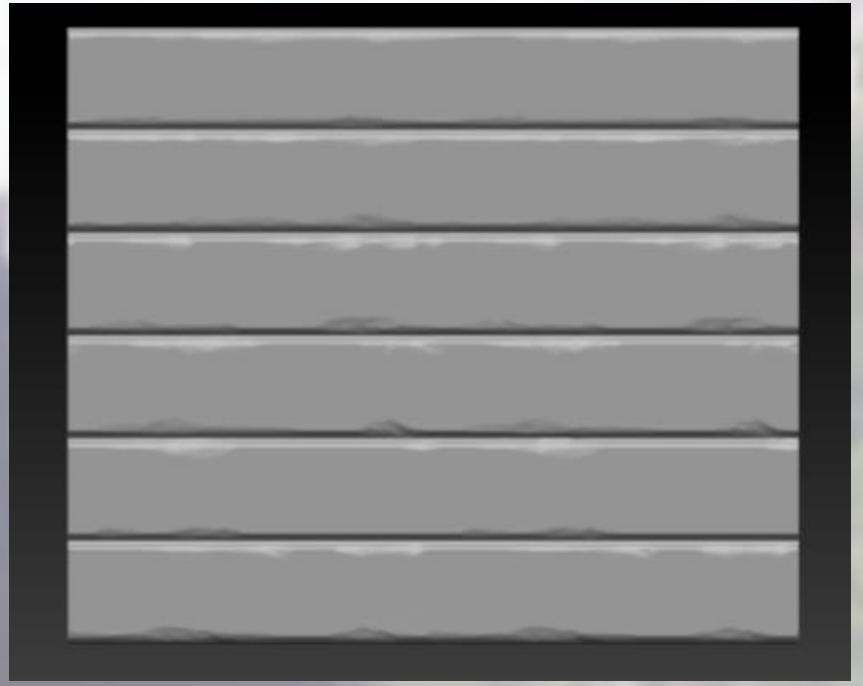
After analysing and reflecting on my work I started to correct my mistakes. I did this by essentially dissecting my current work.

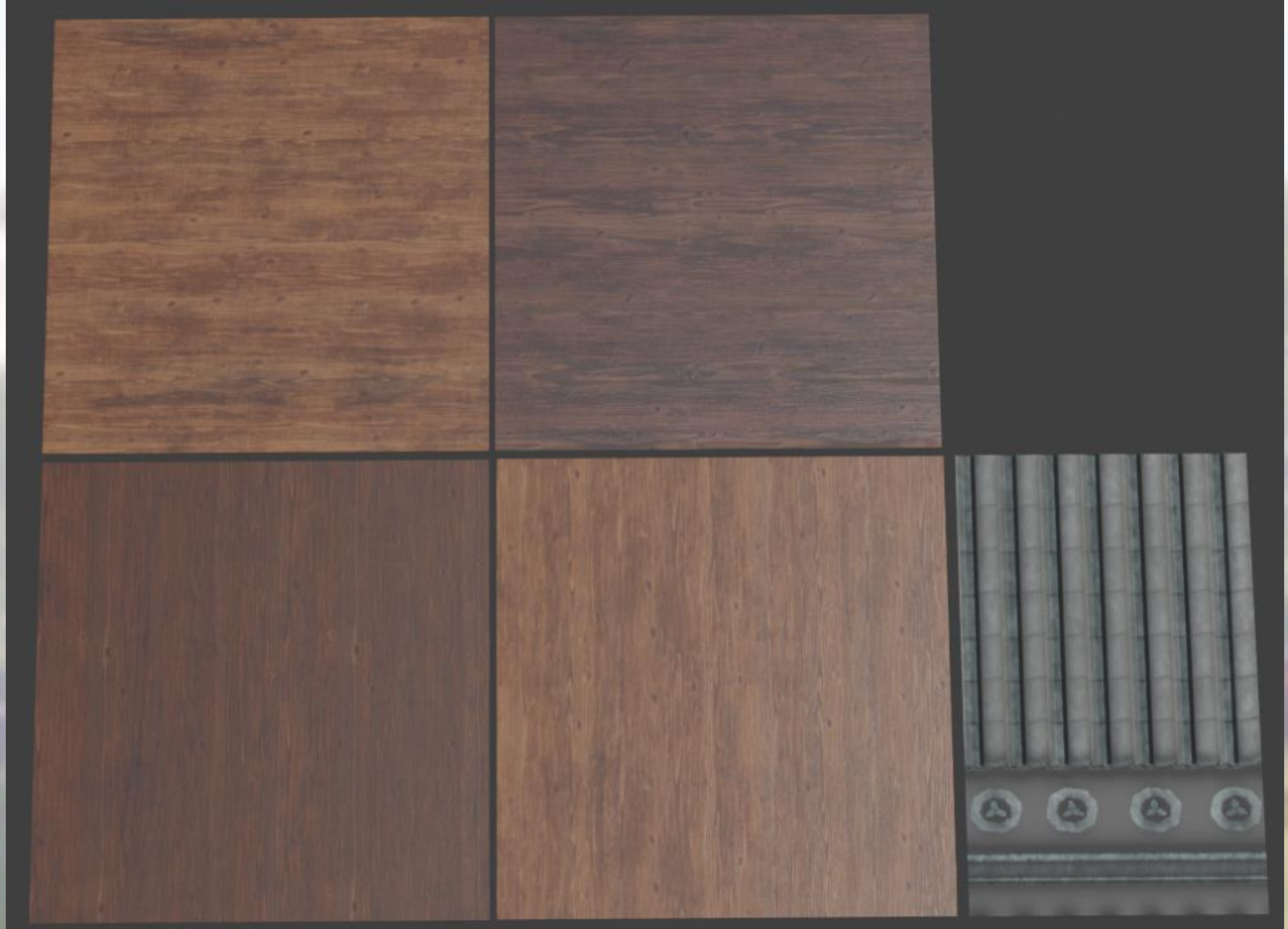
Temple Production - Lantern

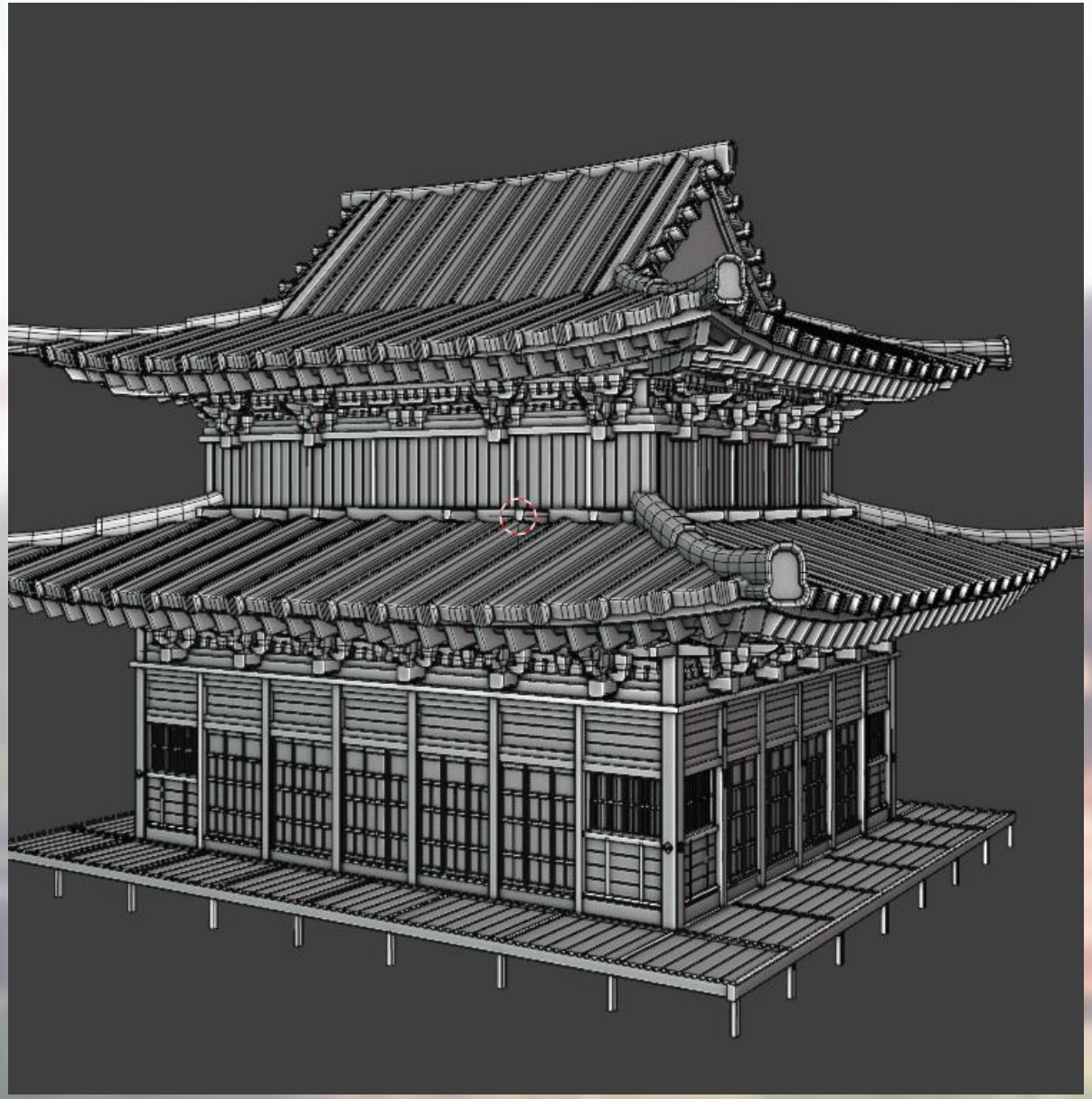
To add further flair to the temple I created the lantern prop.

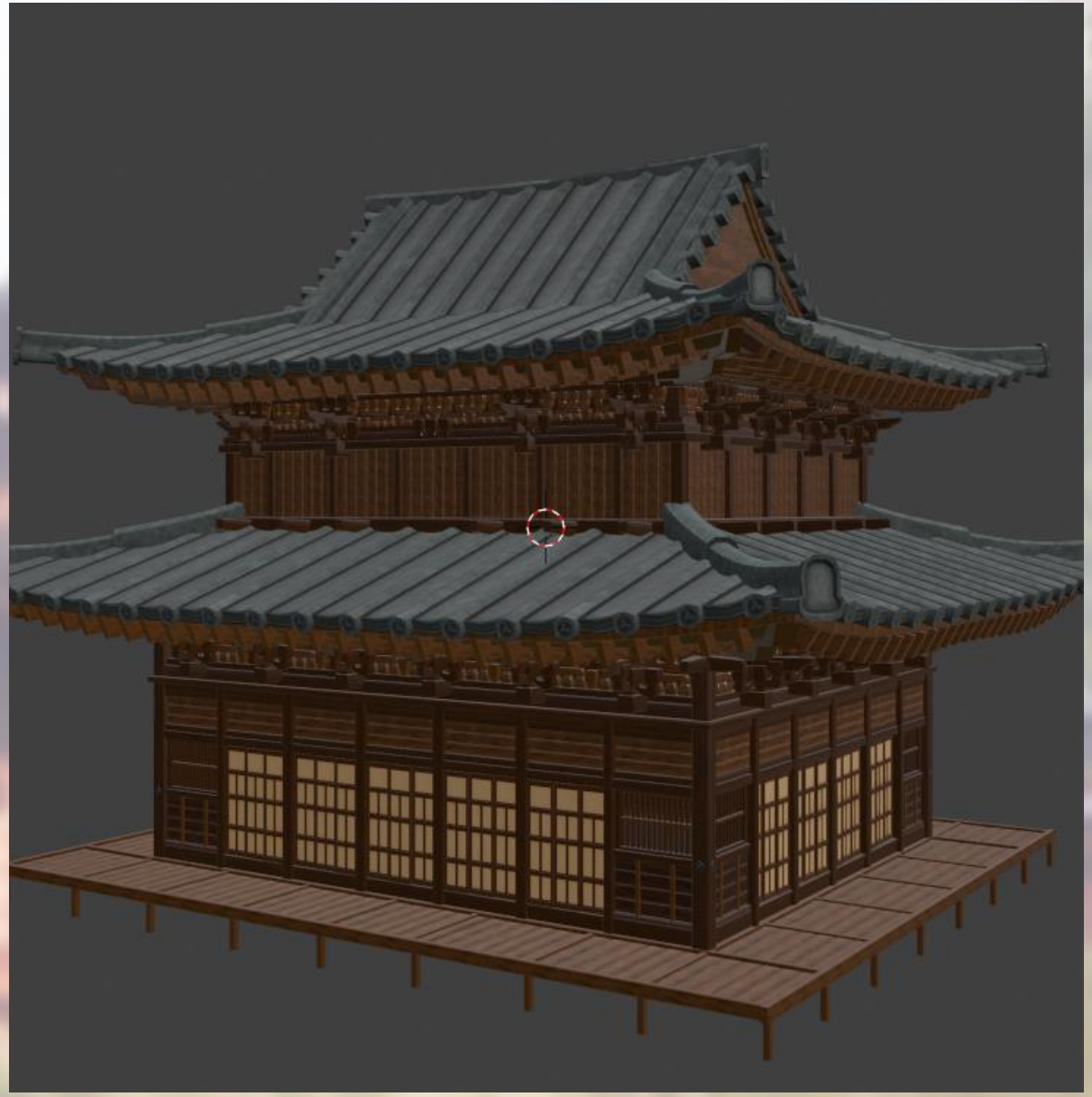
Temple Production

After reflecting on my work, I paid more attention to reference in photos as I felt like the temple lacked detail. I focused on improving my textures and adding more variation to the building. I created a wooden plank texture in Zbrush just to add further depth to the building in parts there could be planks. I didn't want to add too much detail in Zbrush - mostly just edge wear and damage to make them look worn as I knew I can add a lot of detail in substance painter. Overall, the planks came out looking good and really add to the temple





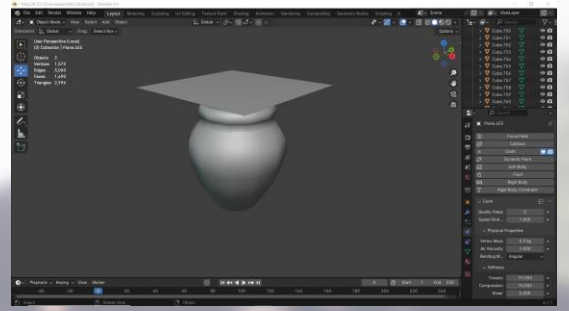




Temple Production – Optimizing Mega scans

Megascans contain a lot of triangles and are very unoptimized as they are mostly used for cinematic purposes. To try optimize them I researched on LOD and nanite which overall reduced the polycount – however in future I'll create my own foliage to avoid this problem entirely however it was a good solution to the ongoing problem I was having.

Temple Production - Props



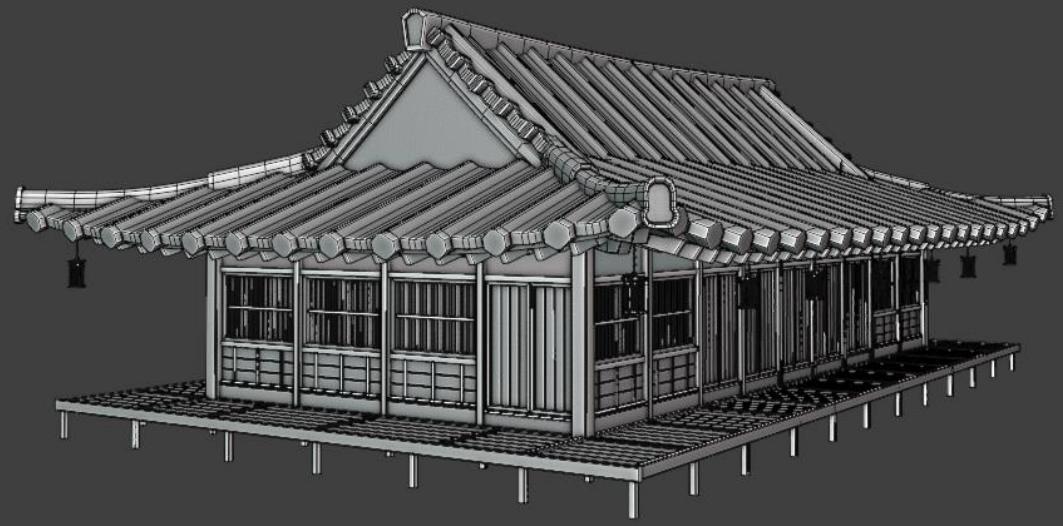
With the remaining weeks left I focused on creating props to help bring my scene together. I focused more on the props that would most likely be saw in the scene a lot more like the carrier and the pots. For the pots I simulated the fabric that goes on top of it for more realism.

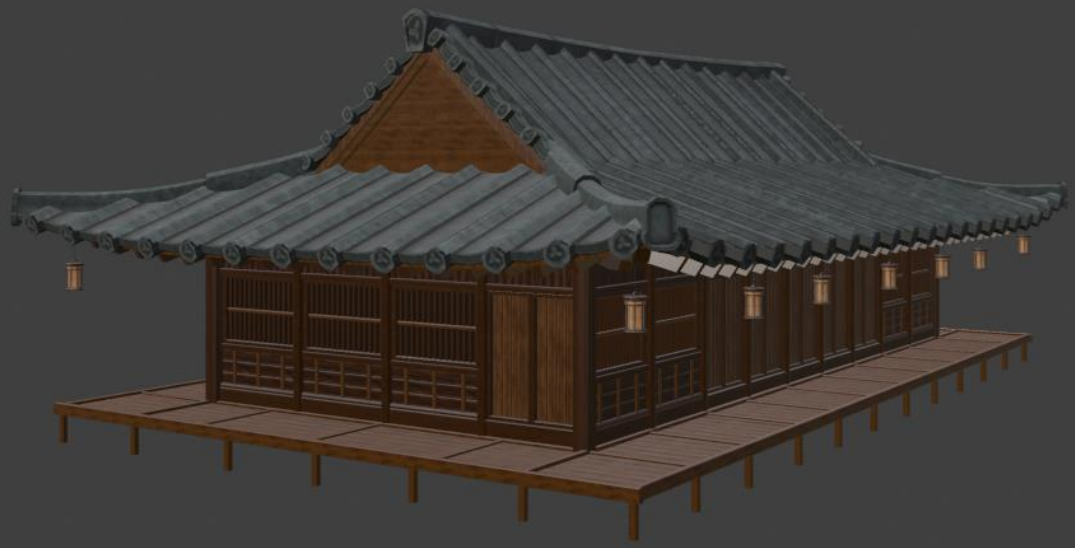
Temple Production - Props

When creating the carrier and pots I referenced industry work and tried to replicate props from Ghost of Tsushima.

Temple Production - Props

I created another building to go alongside the temple, this building is something that just adds to the scene and won't be the focus. I was able to create this building quite easily to fit in.





Temple Production – Environment Design

When designing the level environment this was something I was stuck on for a while however I managed to get a lot of inspiration from Ghost of Tsushima and how they create their temple sections in the game. My main source of inspiration was the location 'Koshi Temple'. I always knew I was only going to make a small portion of a temple courtyard however personally it was hard to put into perspective on how to do this best so the location in the game really helped me come up with new ideas on how to do it best. There's a lot of space where the environment is able to showcase the beauty elements.

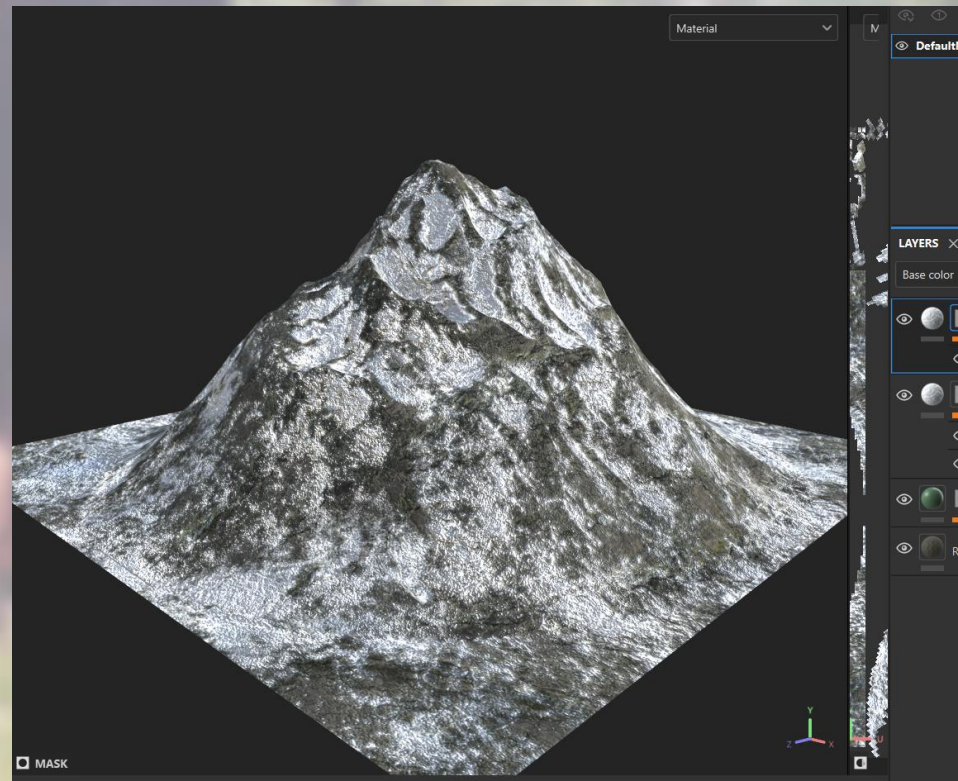
Temple Production – Niagra Particles

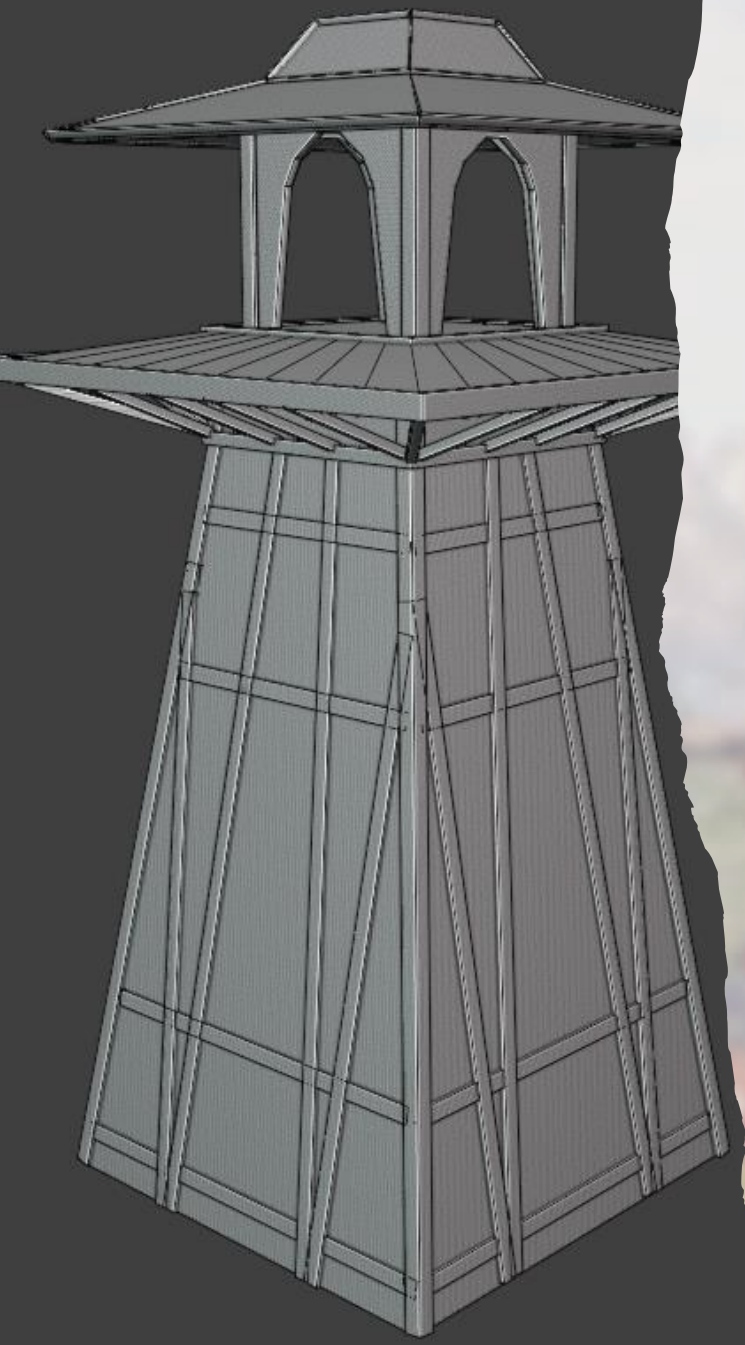
To polish up my scene I started to look at Niagra Particle system as I knew I could utilize it to create falling leaves. I made it so the leaves collide with meshes and landscape, so it creates a nice effect.

Temple Production - Backdrop

To help bring the scene together in the background I made mountains that would fit in the background. This helped add an illusion that there's more out in the world I had created and that there is more to explore. The textures I got from ambientcg and was able to texture in Substance Painter, for the snow I had a base where I applied blur filter and then the main snow effect on top and it combined for a nice effect overall.

https://ambientcg.com/view?id=Rock028





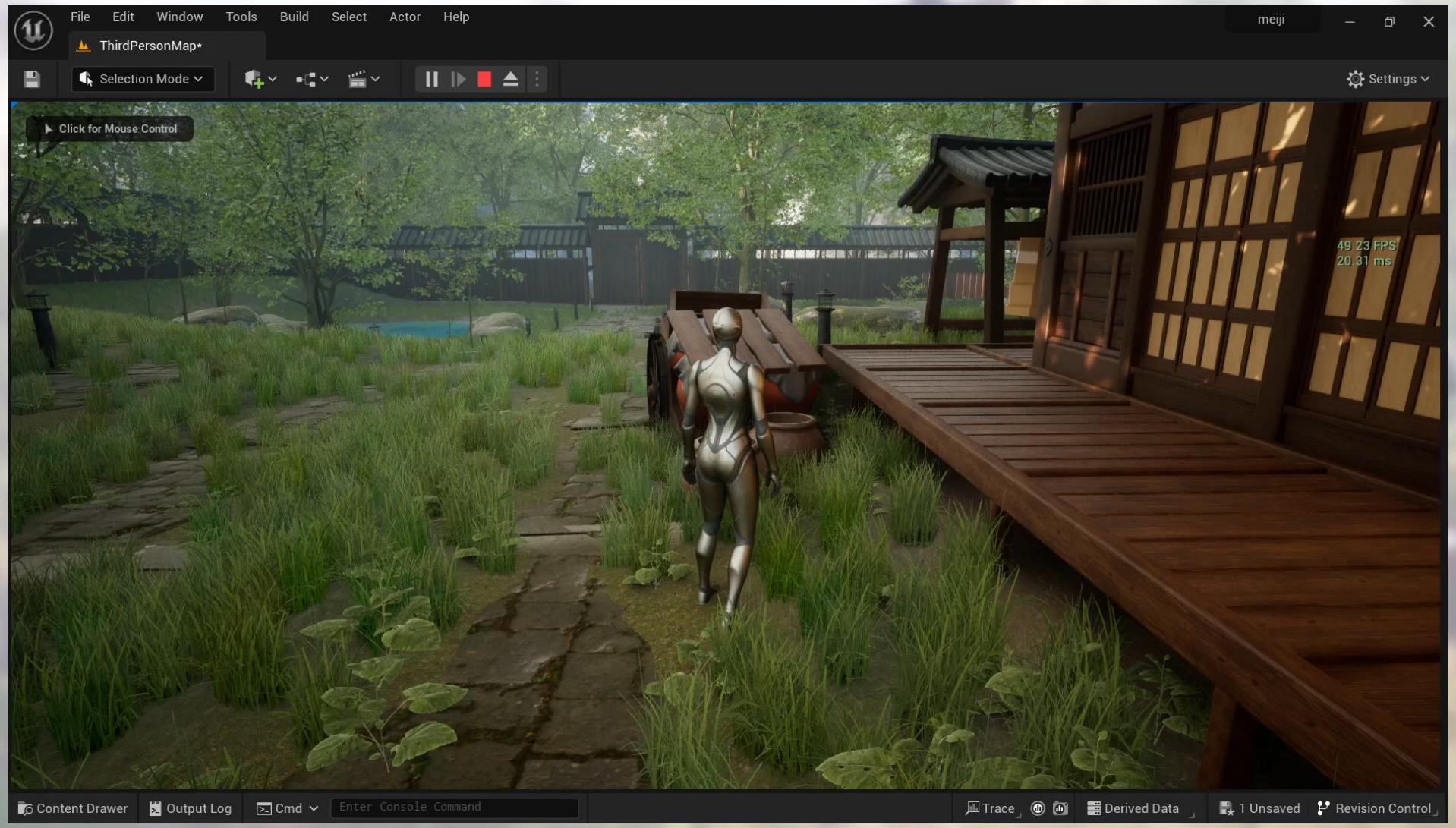
Temple Production – Backdrop

I created a Japanese Watchtower to fit in the background. It just uses the materials I made prior.

Temple Production – Playability

When designing the level I didn't want to base it around a game exactly and I wanted it be something you could play but also be realistic enough that you could utilize it for film and TV, and I believe I achieved both. When playing the level at times I was able to achieve a solid 60 FPS however for the most part it ranged between 40-60 FPS. Although it frequented between 40-60 FPS it remained a smooth experience throughout. The video showcased that you can play and experience the level and the close-up details which is what I intended to implement at the start of the project.

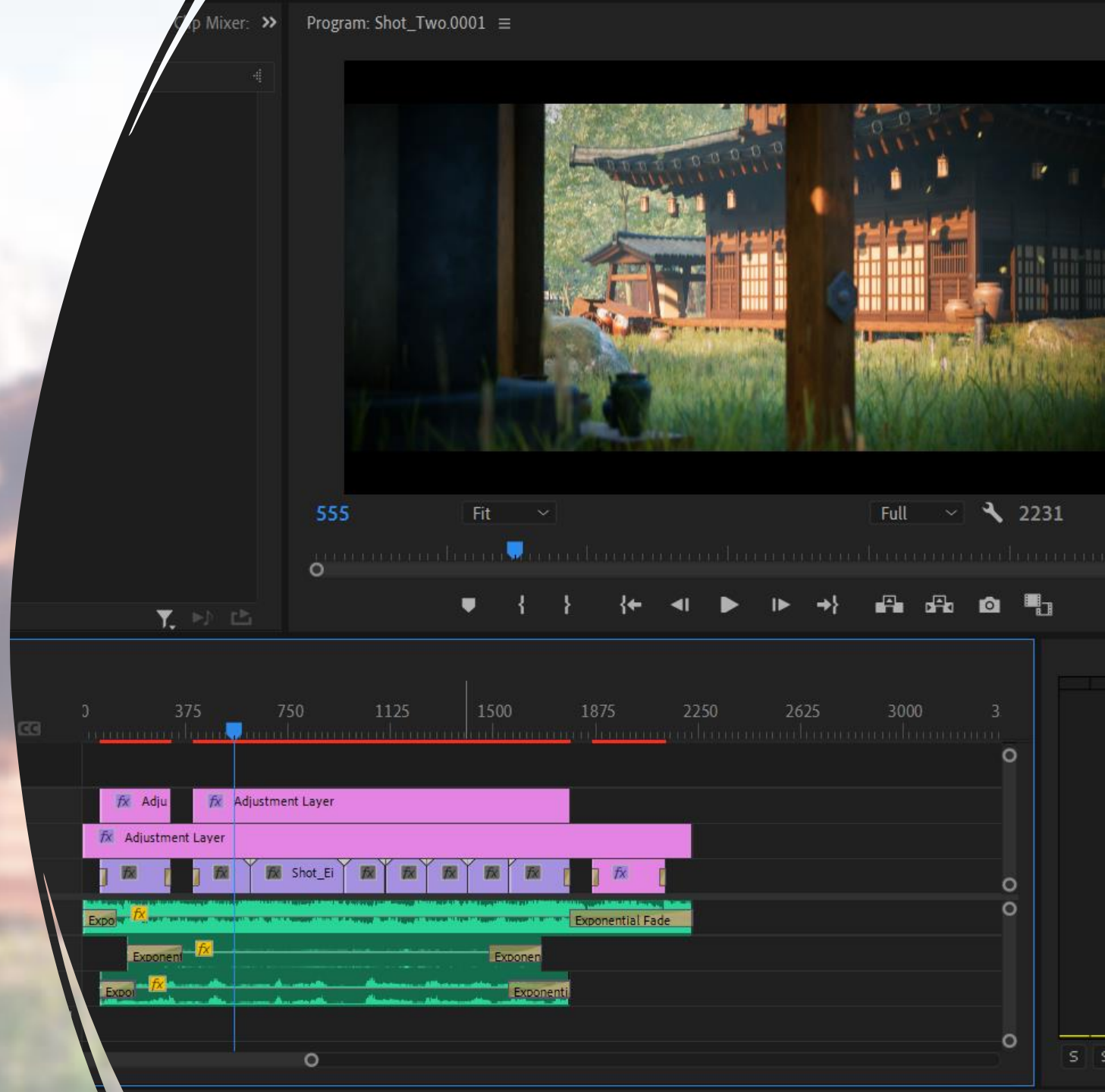
Temple Production – Playability



Asset Zoo – Unreal

Temple Production - Cinematic

To go alongside the renders, I created an in depth short cinematic of my environment which was able to showcase the beauty elements that I was trying to capture. I named the cinematic "A Silent Journey" as the temple is in a remote place and can only be found if people want to find it therefore it requires devotion. Overall, I think the cinematic came out looking great and gives people another chance to view the work I have created.



Critical Reflection

Overall, the project was a success as I learnt a lot and evolved my skillset as I learnt more on understanding production of game environments and techniques that can be used on future projects. Whilst the outcome is good there was issues in planning and time management with attention to reference was not so much evident at the start of the project which caused issues with how much time is left later down the line. In future projects more time should be spent focused efficiently planning and utilizing viable reference. The use of mega scans with the foliage – specifically the grass and trees caused a lot of performance issues later down the line. Megascan trees are highly detailed, which can lead to performance drops, especially when using many of them in large open-world environments. While UE5's Nanite helps optimize high-poly assets, it does not work with foliage or trees yet, meaning traditional Level of Detail (LOD) systems must be used. Furthermore, foliage has many transparent leaves, which can cause excessive overdraw (multiple layers of transparent textures being rendered), slowing down performance. Megascan trees often use high-quality textures that may not interact well with Lumen, causing incorrect light bouncing or unnatural shadows. To help smooth out performance I used LODs to reduce the polycount. Due to time constraints with focusing on certain parts more than others it was difficult to create trees as it was something I wasn't familiar with at the time but it's something more than likely I'll polish on before uploading on my portfolio and can create more accurate trees for the environment as the mega scans might not have fit the environment the best. After using the mega scans, it didn't make for the best playable experience however creates an excellent cinematic. Overall, the focus was on the temple so I didn't see the need to include that I will create trees in my project proposal, and they suit the scene for what I wanted to create. They provide unmatched realism, but they are heavy on performance. In future I will create my own foliage. Whilst the project is great at creating an immersive scene its greatest failures is lack of diversity when creating textures, for example no decals are utilized in the scene and some sections of the temple appear too perfect whereas it should have a combination of weathered whilst looking maintained.

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