3D Modelling Research & Process Journal

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Next Gen Asset – 'Cassiel Sword'

Starting

The first assignment for 3D Modelling was to create a Next Gen Asset which would be used in a AAA game. This asset could be anything we wanted, as long as it was a prop or weapon, which is very varied. Given the very vast creative freedom, I struggled initially thinking on what I wanted to do for my asset. Around the same time I had been trying to model World of Warcraft swords in a higher poly count than the in game model so I thought I could design my own sword in the same kind of design as world of warcraft.

Generating Ideas & Design

I knew I wanted to design a sword, I really love the fantasy design in World of Warcraft swords, with massive heavy blades and every weapon having unique silhouettes. I have a dungeons & dragons character who's a paladin so I thought I'd design him a sword as he had a great sword which was massive. I really like the design of the 'Claymore of the Prophet' sword in WoW, with the split blade being held together by a crystal.

Once I knew vaguely what I wanted to do, I collected the relevant references and collected them in a pureref document, I knew I wanted two things: a split blade and wings for the crossguard. I then drew up a concept design of what I wanted the sword to look like and so that I could use this sword design in maya to get scaling correct.
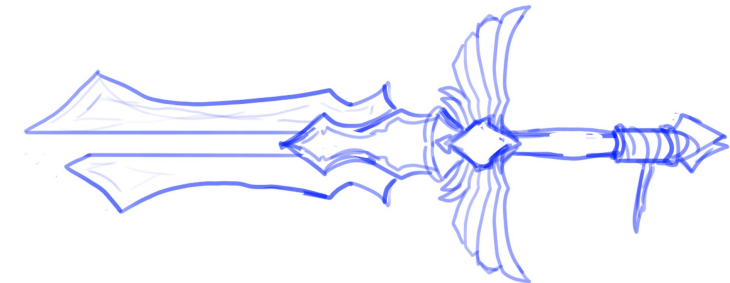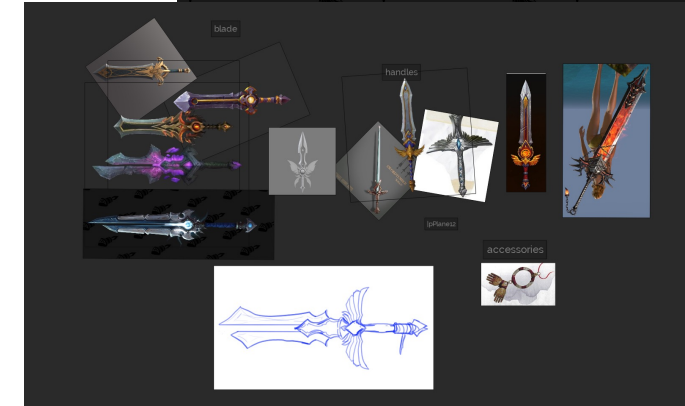
A Draw up of design idea

Modelling

The modelling on the sword was quite easy as I already had a design that I made to reference. The blades were just planes that I distorted to the exact of the image to get the scaling correct. However, the wings were the most complicated part as they were complex and smooth. I started this with the same process as I had with the rest of the model, extruding a plane to shape. I made separate planes and combined the first layer and merged the vertex' using target weld. I then extruded the the face to thicken this feather layer. I repeated this for the bottom layer too.
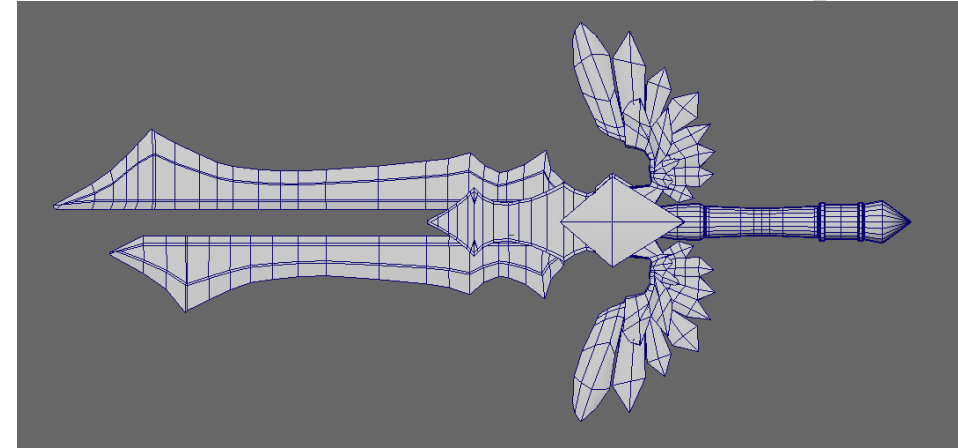
I had to change the crossguard design as I felt the original idea didn't work and look good in 3D.
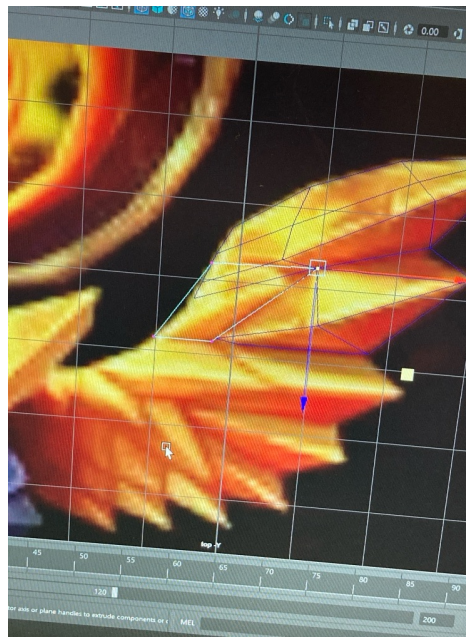
Plane extruding
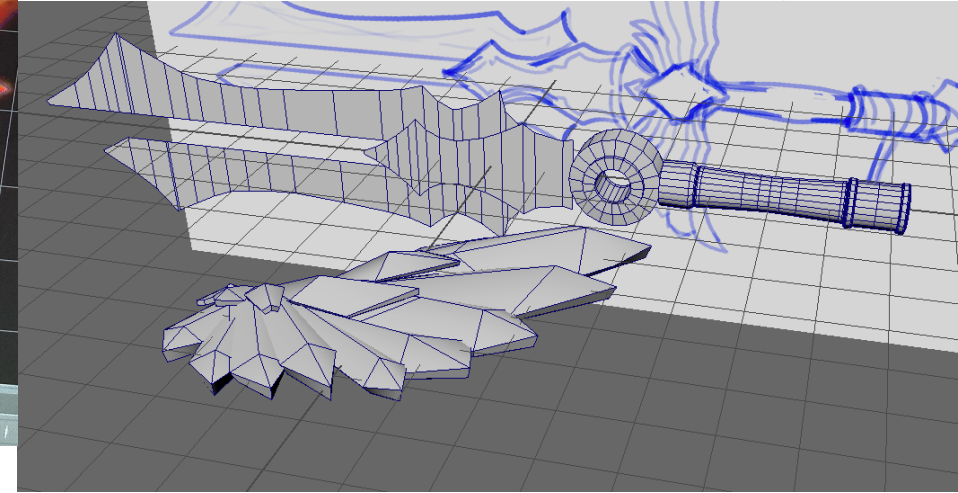
Design 1

Design 2

Texturing

As much as I wanted to recreate the iconic World of Warcraft style, I wanted to take the texturing to a more realistic point as this is for a Dungeons & Dragons Character.

Grunge layers are so useful when texturing, I find they give the texture a more realistic feel. I had the colour pallet of black, white, gold and red as to match my characters looks and armour.

The gold was the most difficult thing to texture so to speak, I really struggled getting it to look like gold. The base layer is a bright yellow with metallic but that just wasn't looking good, so I added an inverted ambient occlusion mask to bring out the shine more as well as adding a grunge layer to make the gold look a bit more worn down.

I added a scratch grunge as to give the sword a battle history with a height layer + a worn-down colour to give the scratches a pop.
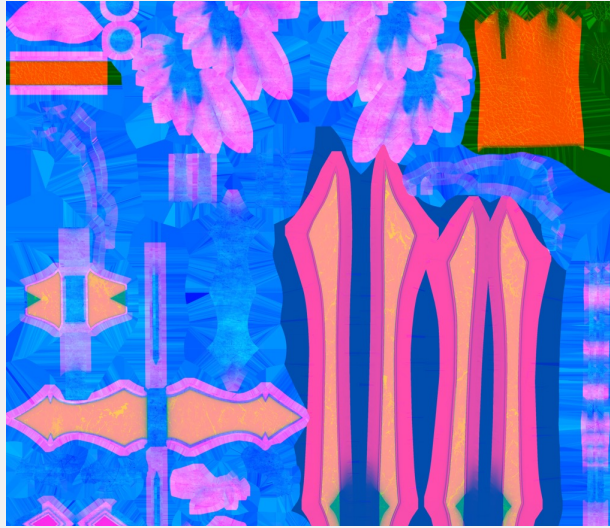

No Grunge

Grunge
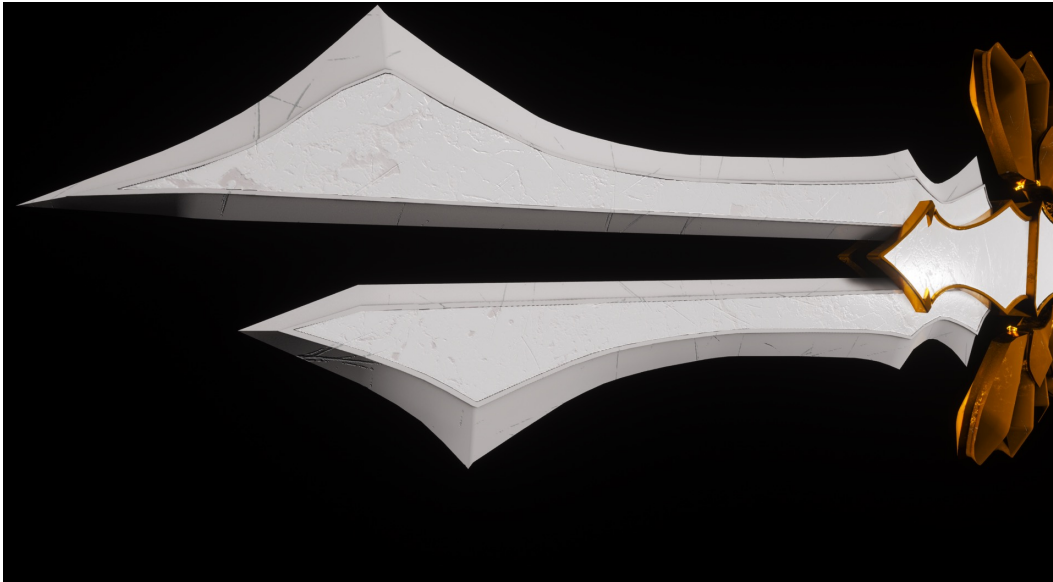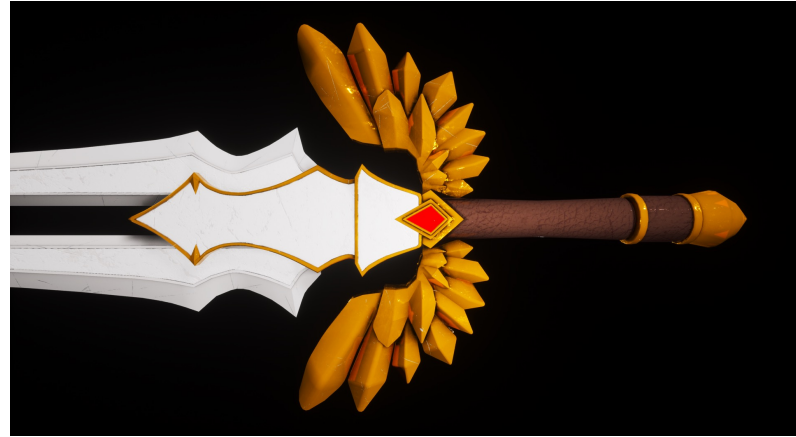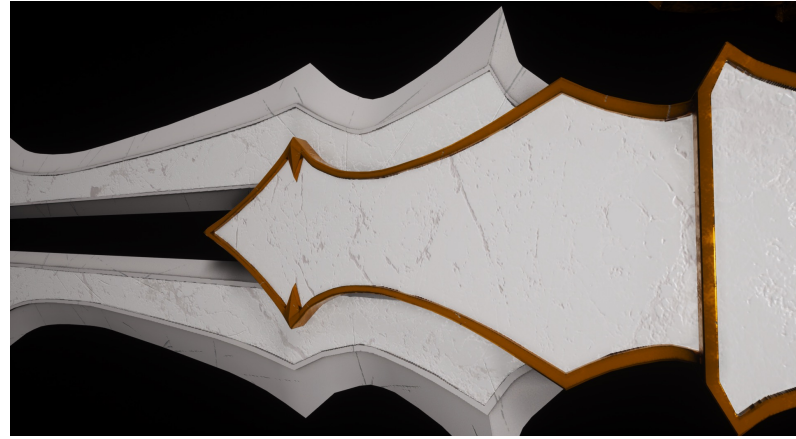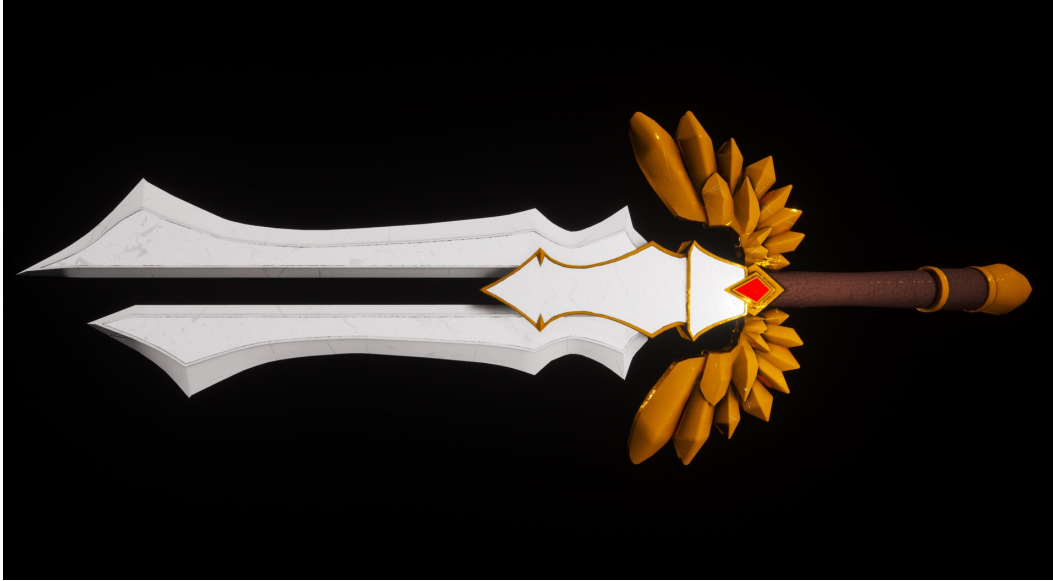
Normal map
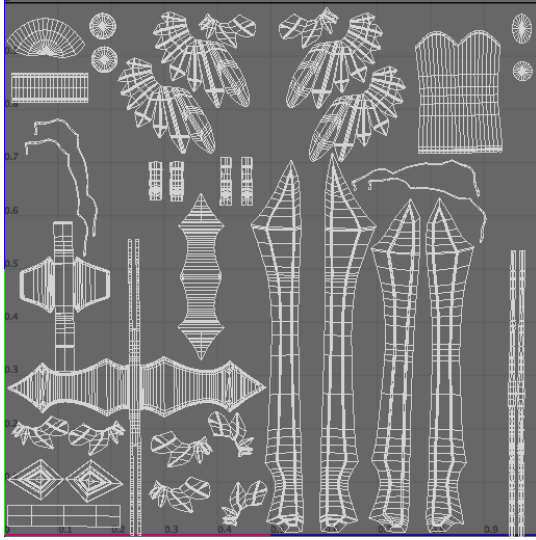
Occlusion, Roughness &
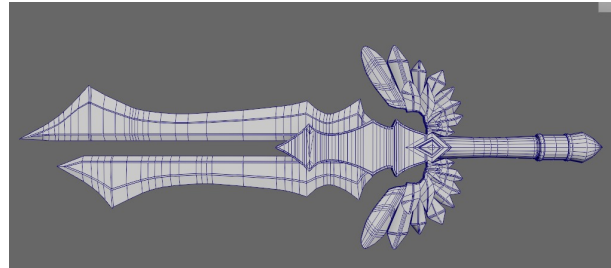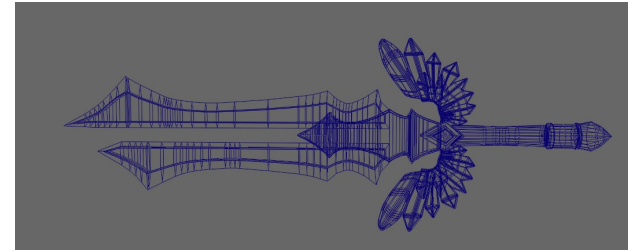Metallic Map

Colour map

Textures

Maya Screenshots

UV Map

Wireframe + Model

Wireframe

Next Gen Asset Conclusion

Looking back, I feel like my model could have been retopologised much better as I know more about topology after this model was done. I do wish I added the charm of the Church of illmater which is the church the character represents, but because of my poor management during first semester, I didn't have time to add this. There are some Uv's that I could have made so much better too.

Modular Environment – 'Indian Courtyard'

Starting

For the second assignment, we were tasked with creating an environment using modular assets. This was my first time doing anything with modular assets, the last environment I created was for last year's final 3D Modelling assignment, in which was a very small café, but I found I really enjoyed the process. For this I wanted to challenge myself and make a bigger scene which would challenge my 3d modelling skills a bit more.

I had a few ideas initially – I had a looks at environments on pinterest and wanted to make a courtyard with solarpunk inspirations however I decided to go more of a casual build.

Part 2 – Modular Modelling Set

Students should create a new bespoke environment for XB2002. This choice will need to be discussed with your tutor to determine which direction would be more successful.

You are tasked with creating a real time environment that runs inside UE4, using modular techniques (where possible). There is no poly count or texture budgets for this assignment, but the scene should run at current industry game frame rates (1080p, 60FPS)

For submission you will create a video flythrough of your scene which should be no longer than TWO MINUTES in duration.

Limitations and Expectations:

☐ Assets must be placed into Unreal Engine 4.20

In conjunction to producing these assets, you are also required to produce the Supporting Material needed to support your work and explain your process. Your Submission should consist of:

Research

- Once I decided on an Indian Courtyard I collected images into a pureref document, so I knew what I wanted my scene to looks like. I looked at Indian architecture specifically courtyards with the archways as they are the key part of this modelling process.

- I also looked at courtyards in games as to get a better understanding on how my environment would be structured. I ended up using a Spanish map from overwatch as a layout inspiration with one big arch with two smaller arches for on side with smaller archways along the other edges.
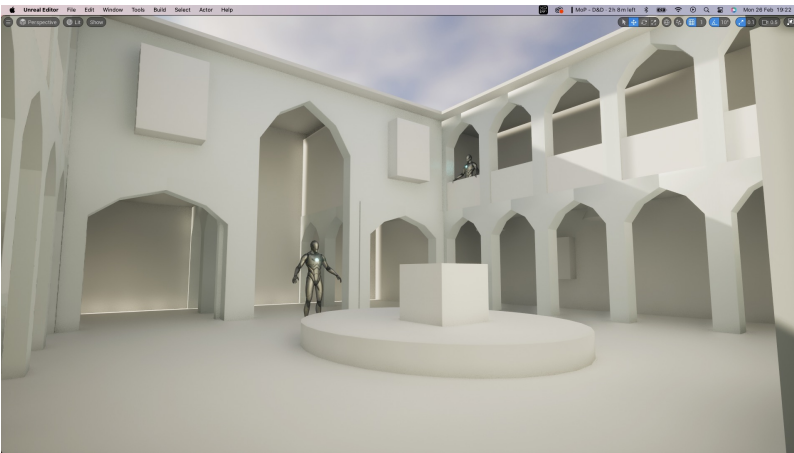
Blockout Process

- I started out blocking out by using an archway I had made in maya which is scaled correctly; I did this by downloading a model of the default UE5 character who is 180cm . I took this archway and altered its width and height to get the right feel. This helped me understand the scaling I wanted so I could go into maya and make these variant archways. Once the archways were in I then started replacing these cubes with modeled to scale and represent what it's meant to be.

Remaking Blockouts

The archways were going to be the key part of this model. I knew I was going to have 4 kinds of the small archways and 3 of the large archways so they all work with the scene. A large part of Indian architecture are the large archways with detailed edges. It was much easier to make these designs on a plane and then extrude it to the correct thickness, I also would just do one half and flip it so I would only have to do the topology on one side. I previously did all the measurements however; I had forgotten to add corner pieces for the archways which meant I needed to resize the floor tiles. I look back and I feel like I should have made the curved part its own piece and then add the pillars separately as I needed to recreate the model 4 times just to change the pillars to a more cubed shape so they would fit the corner pieces.

Remaking the blockout was the easiest part as I had all the measurements and the references as to what I was creating, however I was worried about doing too detailed as I hadn't made a trimsheet before and didn't know if a more complicated shape could make a trimsheet way too difficult.

The main inspiration of my models
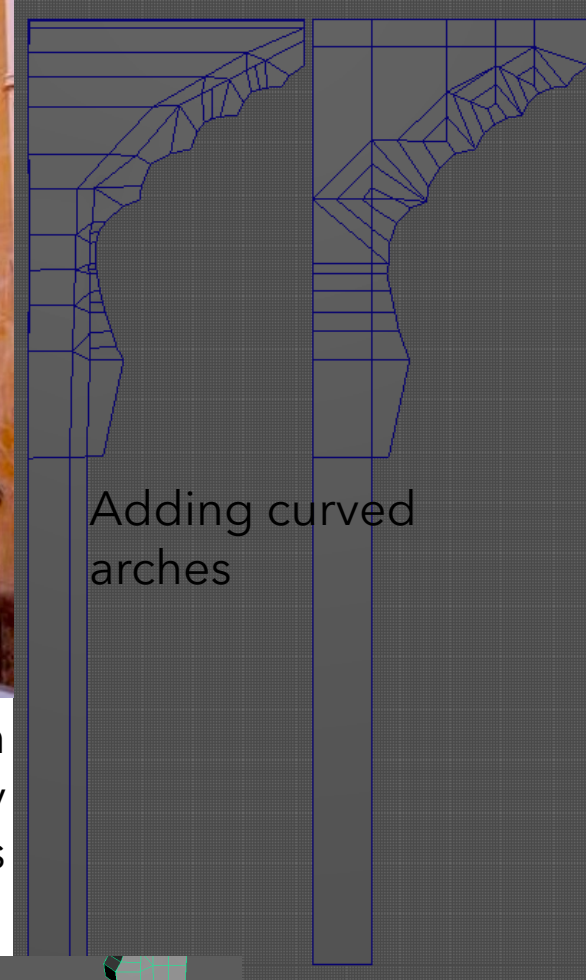
Adding curved arches
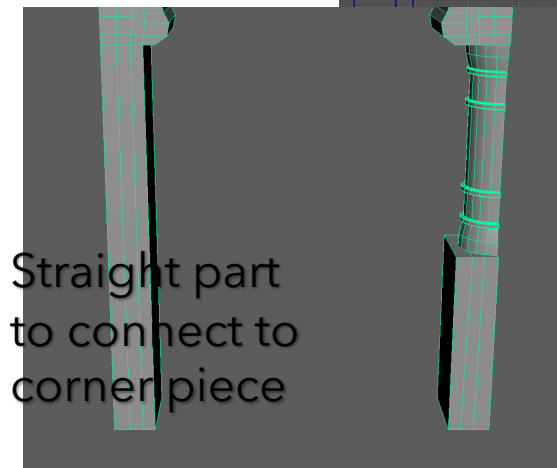
Straight part to connect to corner piece

Pillar part which connect to the other archway

Texturing Preparation

Texturing is my probably my worst skill when it comes to the modelling process. I enjoy modelling and the uv-ing and topologizing process is tedious however I can do them but texturing is a skill I've been unable to grasp. So this was the step I put off as much as I could.

I collected pictures online of what I wanted my textures to look like. I found a colour pallet from an image I already had and used that as a guide as I looked through material references.

A new part to learn for this model were trim sheets, before this assignment I had never seen trim sheets and didn't understand how they worked – mainly getting uvs to align with them. I first started to look at trimsheets similar to my modular environment as to get a rough starting point. I found numerous good trimsheets online which got me understanding how I wanted to make my textures.
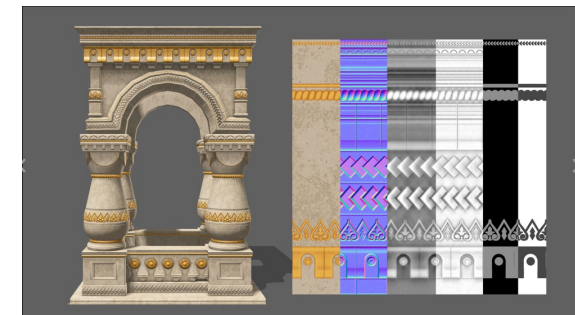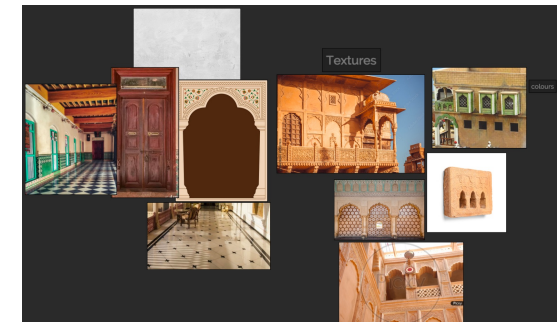
Trimsheet by Kerri Targett on artstation

Trimsheet Vuk Banovic on artstation

Creating TrimSheet

I wanted to create two trimsheets: one for all the stone/exterior walls and one for the painted walls inside these archways. One of my first things was getting the colours right, in my pureref I have a colour inspiration from one of the referenced images I liked. I went for green/pale yellow/white as I felt these 3 colours complement each other well.
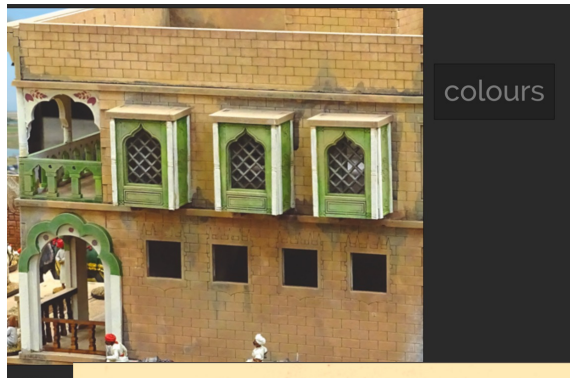
colours

I then took screenshots of what I wanted to be on my trimsheets. I found this helped me visualise what colours were going to be together. I could then go onto making my trimsheets and know how many 'trims' I needed on each.

I then went on to making my first trimsheet which was the stone. This is quite a basic texture as the stone itself isn't complex. I used multiple grunge layers with variant heights to give the stone a more textured look The pillars are bevel_line masks. I couldn't get them to repeat in a way I wanted so ended up copy and pasting them to the distance I liked. I quite like how the gold came out despite how simple it was made as I found the grunge I used worked fine, it is quite small so anything more wouldn't have showed.
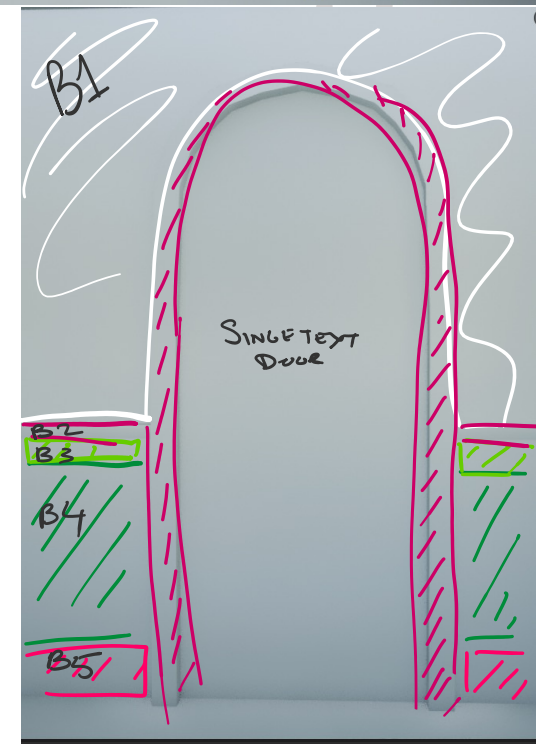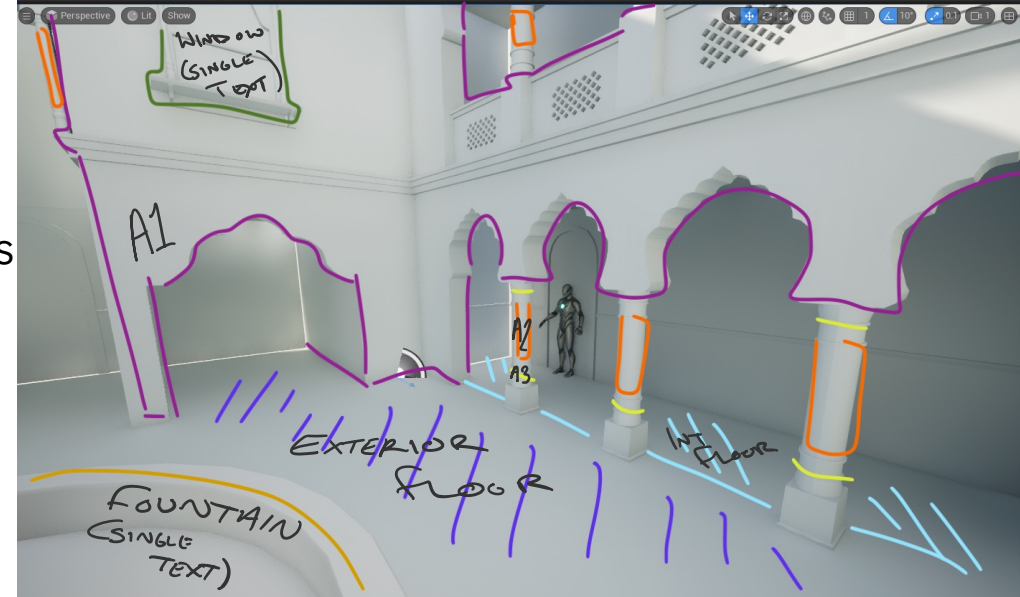
TrimSheet B

Trimsheet B was going to be the more complicated trimsheet as there were more details to implement. I first started with seperating a plane into 5, I knew that B1 and B4 would be the biggest parts and then B2,3 and 5 were similar in size. B1 is the smooth underlayer and so has an off white/yellow colour as to match the stone archways a bit more. I then added some subtle grunge with layers to give it a stoney look. B4 is also paint but is thicker than the white so has a more obvious painted look, so I added a Directional noise which has a painted texture feel to it which with a slight height change looked great. B2 is a smooth wooden rim along the walls. As I was researching I found that a lot of wood have a reddish look and so implemented that colour
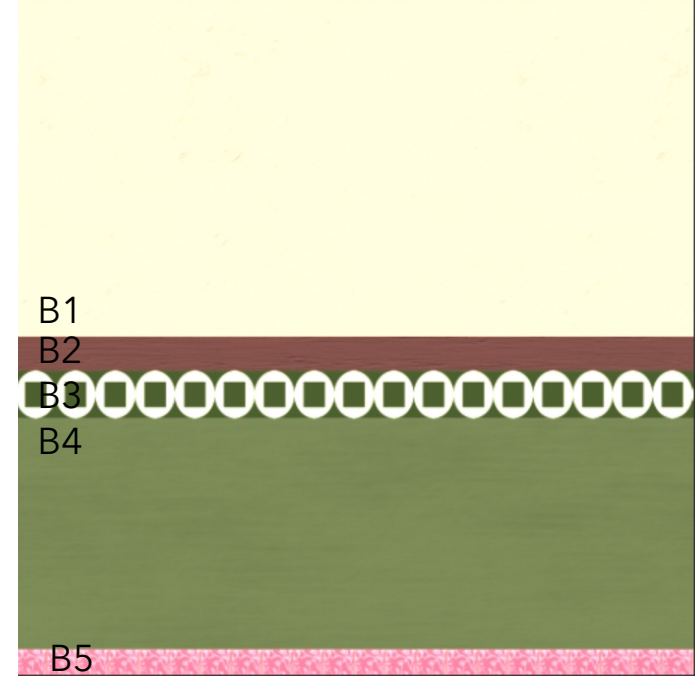
I had two more difficuilt textures to do: tiles. There are two tiles in my sheet, and I wanted to have a green to match the wood and a pink as I felt it makes a great contrast. I really liked these tiles from references I gathered however I felt like substance painter doesn't have a great way to implement this style I wanted so I placed a mockup in the trimsheet to get the measurements to uv but I'd do that in Unreal Engine. I first found two Indian tile designs I liked online and then in photoshop I heightened the quality and made the designs black and white; ready to implement in Unreal Engine.

Material Instances

Material Params being created

As I had the mask sorted for the tiles in substance, I could just import that mask as a texture sample and use as an alpha in the lerps when I added the new tiles. Having done this, that section is separate and could be made into a param which the tiling can be changed and the uving too. The image imported was just the pattern so to add the tiling effect, I would just add a tile mask which was created in substance painter.

Now the tiles were made, and now that this whole material was altered and has params, I can use these params in different instances to lineup textures. Now, usually the less instances the merrier but I really struggled lining a lot up, so I had about 9 instances created of the TrimsheetB material.

I also used material instances when creating the interior floor which were a checkered black and white pattern as the floors were different sizes.

3 different floor sizes, now lining up.

uv-ing

UV-ing using trimsheets slowly made me insane, I don't mind Uv-ing as it feels like a jigsaw puzzle and I have my process which works. However, trimsheets do not work like how I enjoy uv-ing. Staring and lining all the uv shells up was such a tedious task as I had a lot of more complicated models. I found an issue that was just a me issue but the pillars and the normal stone textures were very similar colours on the colour texture and so I would have to get up close to the screen and adjust everything manually. Trimsheet B was much easier as it was varianted and it was just a plane with some extrusions; also as there was a pattern, I could match the uv's so much easier.
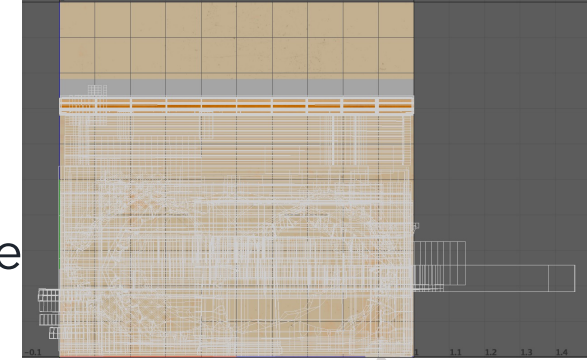
TrimA
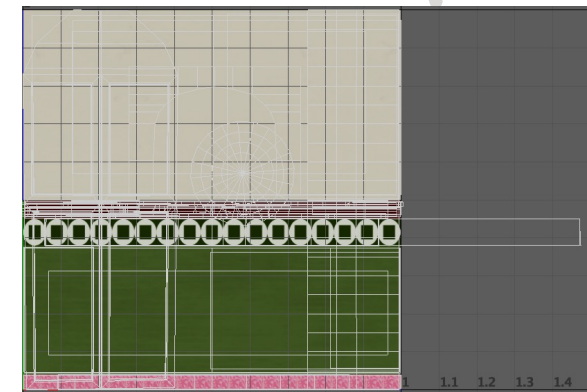
Trim B

Clutter : The fountain

I know my skillset and I feel the most confident in modelling and texturing solo objects and so making some models to fill up space was going to be my most confident part.

A large focus of this courtyard is the fountain which is in the centre of the yard. However as I researched, I found that Indian fountains were either complex statues which I'd have to learn Zbrush in less than a month for. I instead went for something simpler, I felt that the style of this scene wasn't grand, but rather just a courtyard connecting a family.

A big part was to make the textures look good. All the fountains I had looked at were a beige colour so I stuck with that and was looking at how the water wears down the stone to a darker colour so I wanted to convey this. On a grunge layer where I did the bases darker, I went over some faces with a paint to give the fountain a more realistic look. I really enjoy breaking the grunges down for texturing and thinking how different layers will add to the final look. I had a dirt grunge to add uneaveness to the base colour and height, went over with a gradient to give it a more secure feel to the ground. I felt the base was too plain so I went in with some height masks and added a tiled pattern and a bumpier face for the second base of the fountain
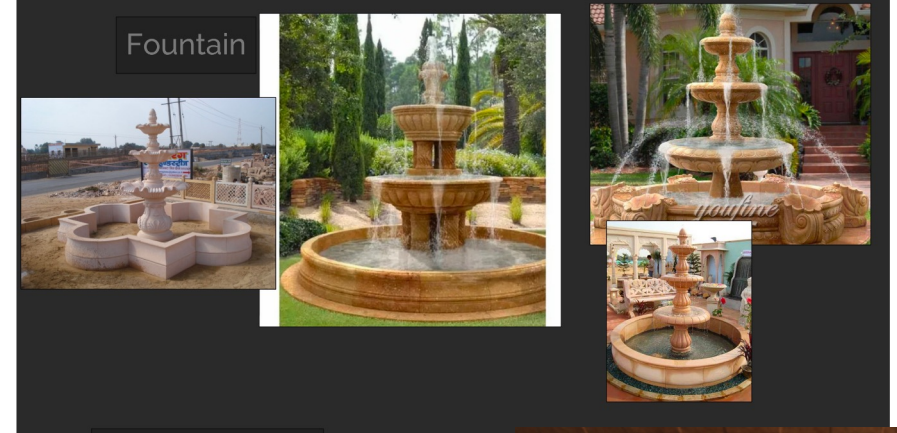
Clutter: The Windows

When originally designing the layout, I had an idea for the style of the windows and when it came to modelling the final version of the windows, I found it was Islamic, so I had to find a similar style that Indian architecture had. I knew the glass wasn't going to be see through so I left it the same material as the rest of the window, I realised a lot will be done in the textures. There was going to be two windows, one big and one small. I first modelled the small one and then I knew the big one would be the same design but with two thinner windows on the sides, I duplicated and merged the copies together. I'm really happy with the textures on these windows and how they look in game. I do think the white roofs don't really fit and I could have maybe used the trimsheet A for it.
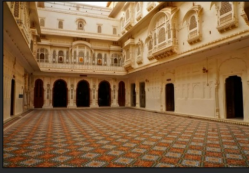
Flowers.

The scene still felt like it was missing something, then I remembered a big part of my original idea was greenery. I can't model plants yet, I looked into the process but admittedly did not leave myself enough time. I asked if I could use plants from quixel bridge, so these are the plants I used:

- English Ivy (Code : xfcnebhqx)

- Bigleaf Hydrangea (Code: vgztealha)

- Remembrandt Water Lily (Code : uc2kajgia)

- Taro (Code : sjli7)

WireFrames
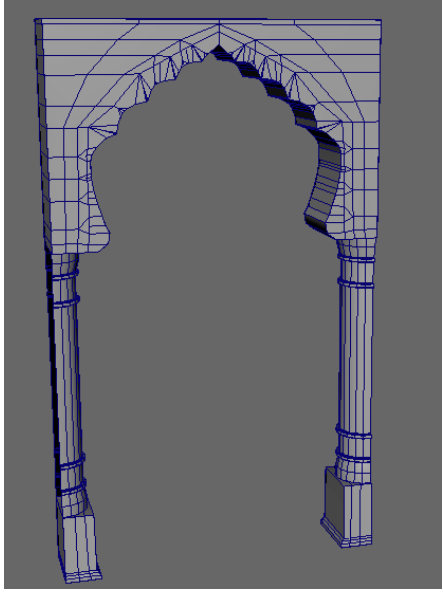
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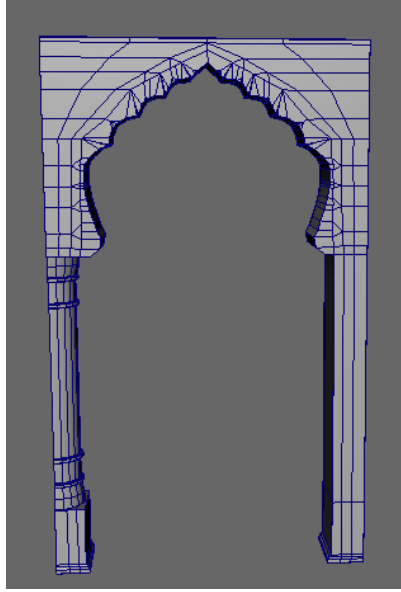
Archway1v2
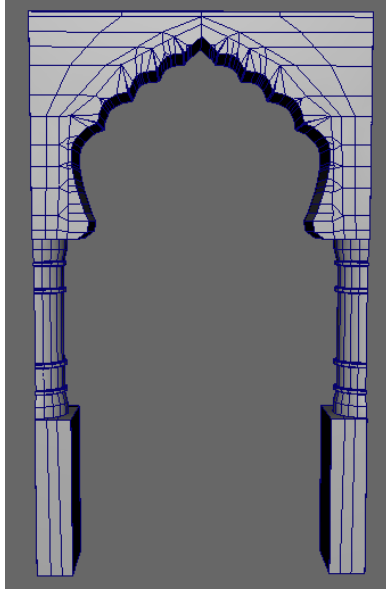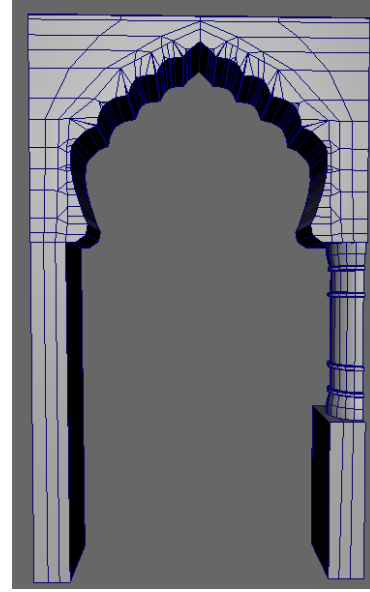
Archway1v3

Archway1v4
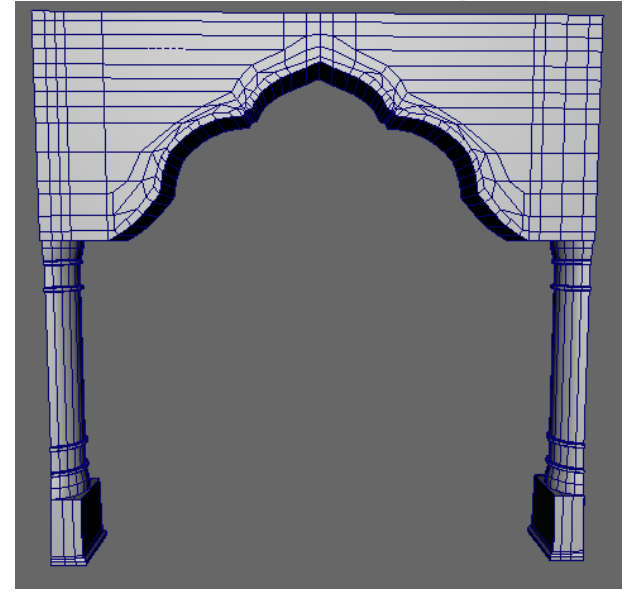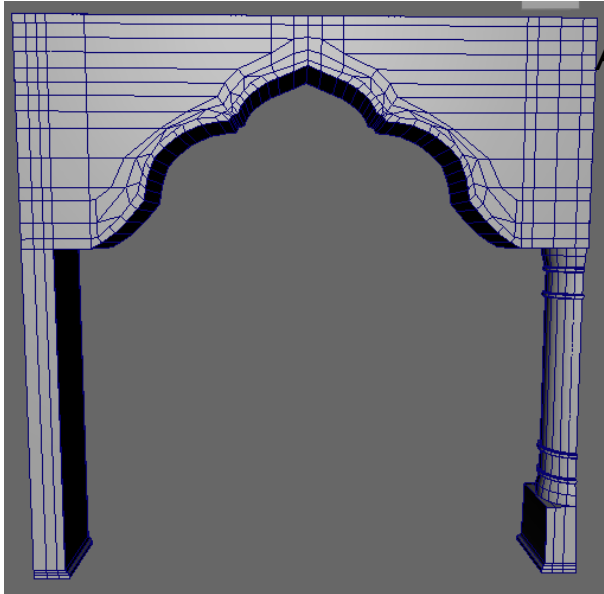
Archway2v1

Archway2v2

Archway2v3
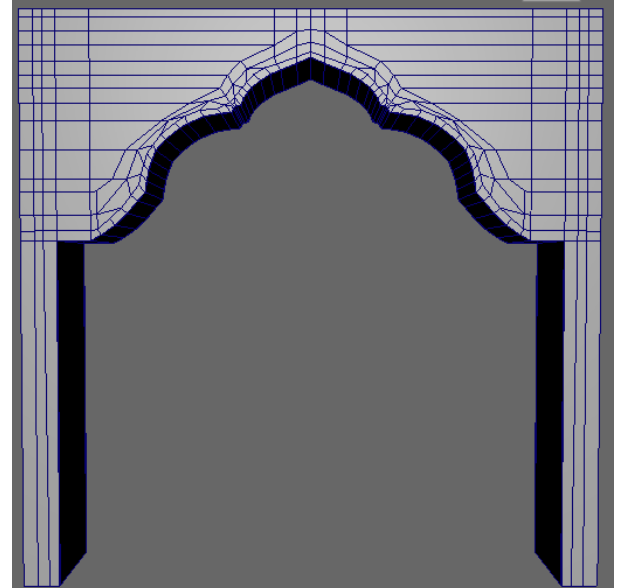
Wireframes

Archway3
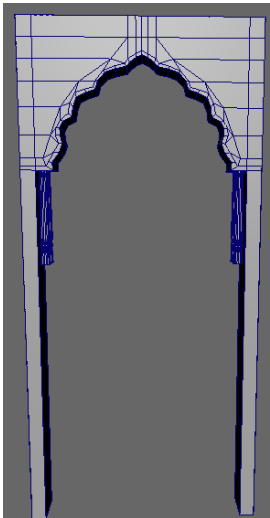
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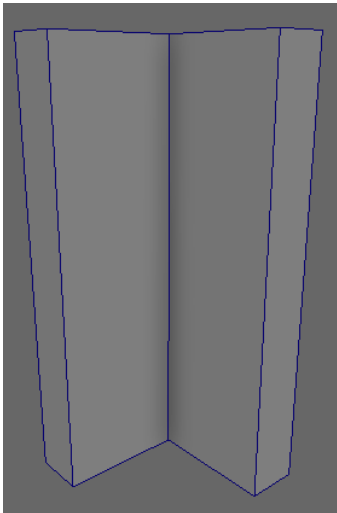
Corner2

Fence

Inner Ledge

Floor2

Floor3

Floor1

Floor5

Floor4

Floor6

Floor7

FloorArch1

FloorSmall

FloorArch3

perspy -Y
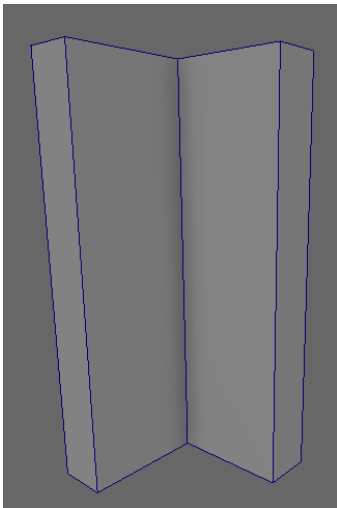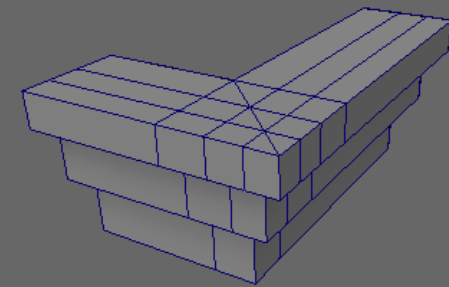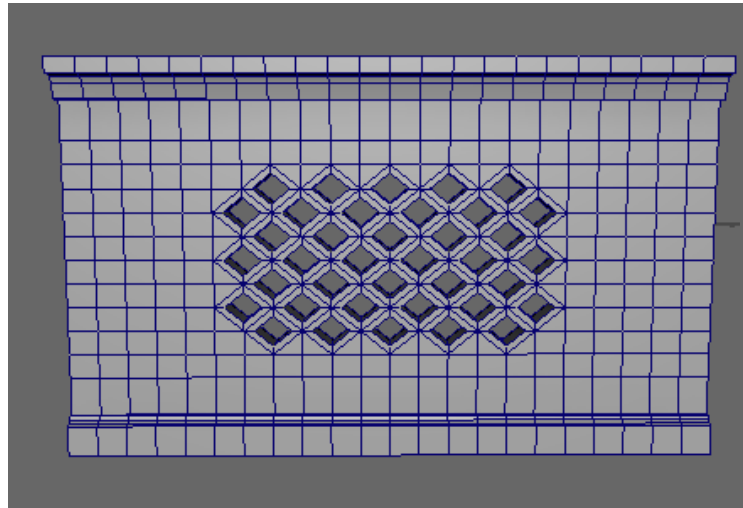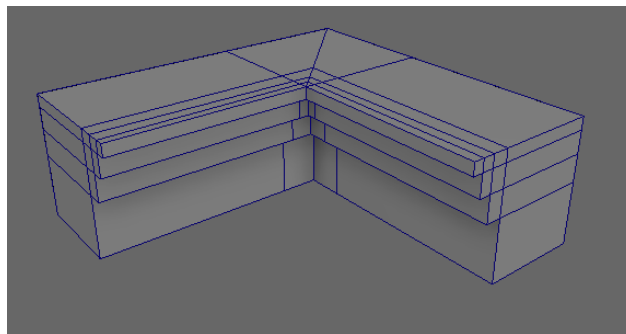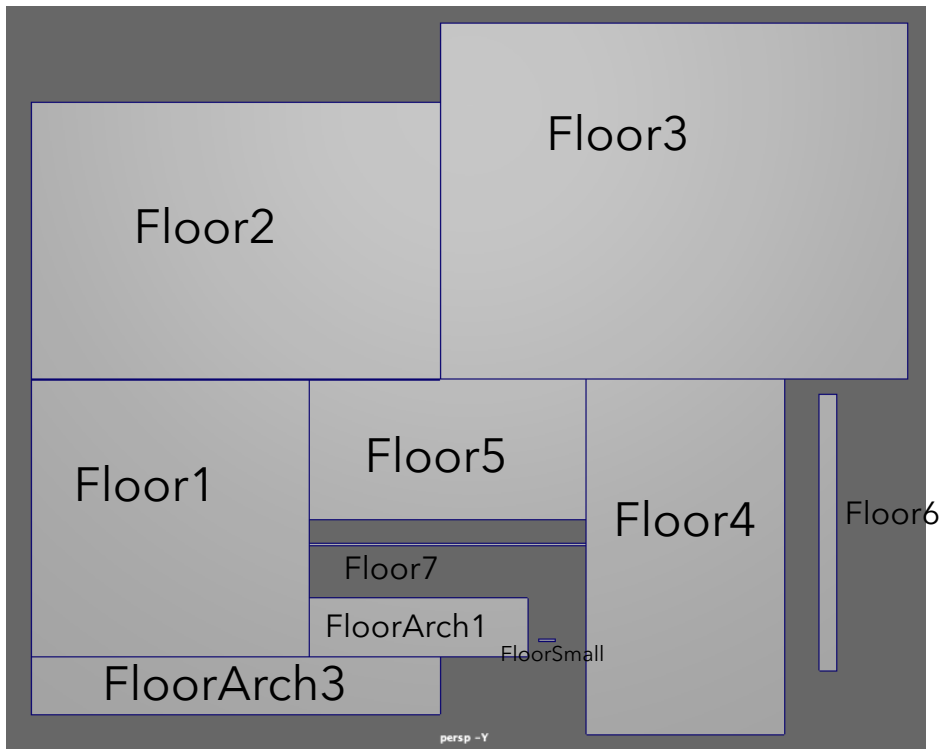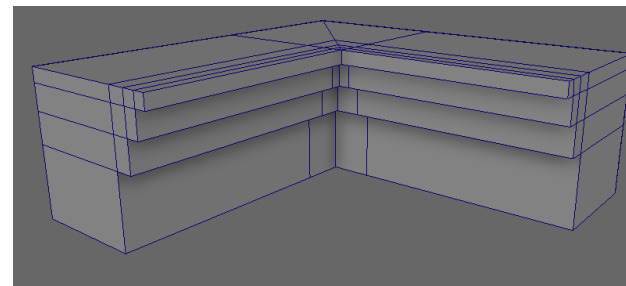
LedgeCorner1

LedgeCorner2
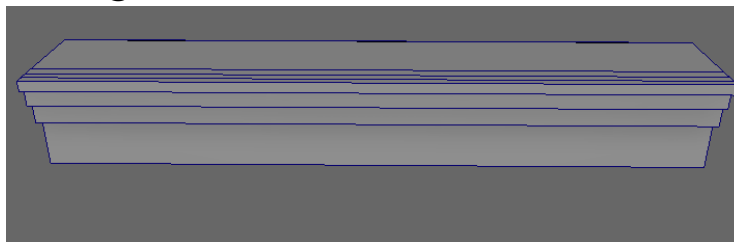
Ledge2
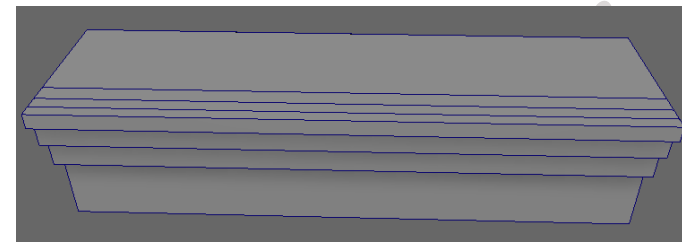
Ledge1

Wireframes
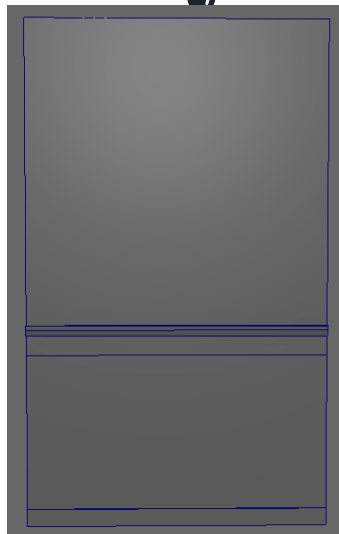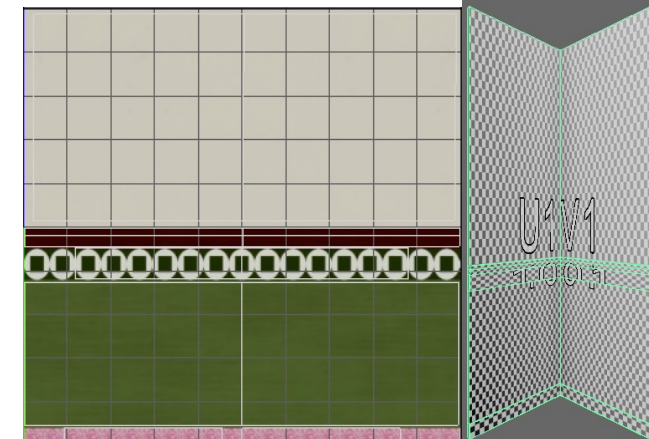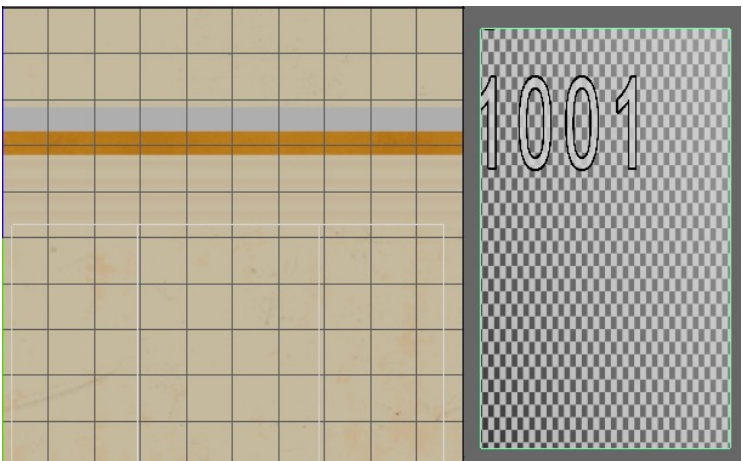

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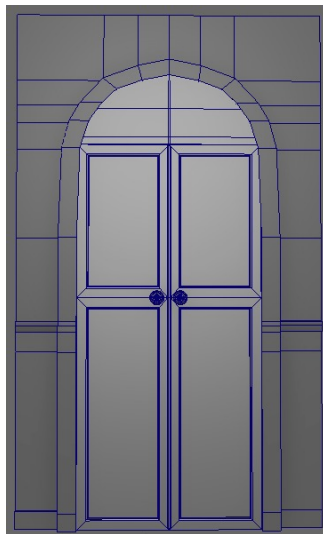
HighWall1v2
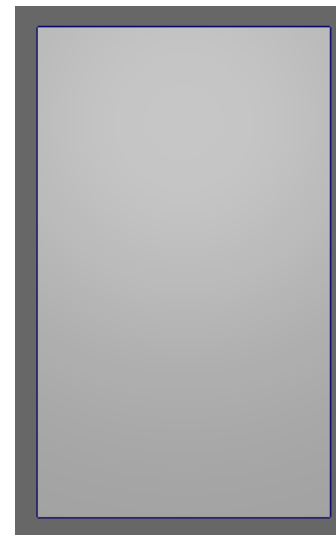
HighWall2

LowWall1
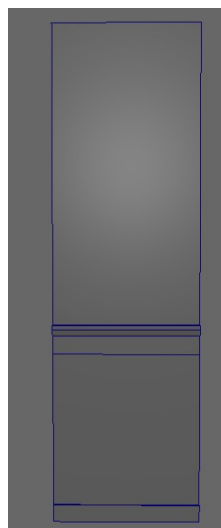
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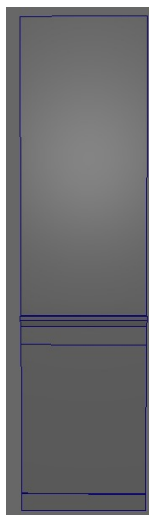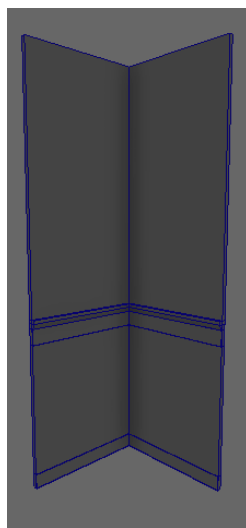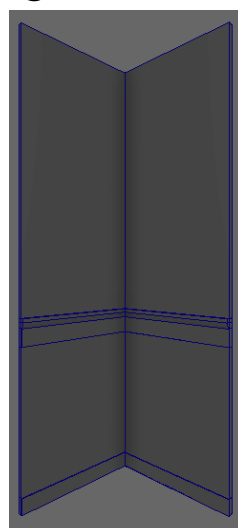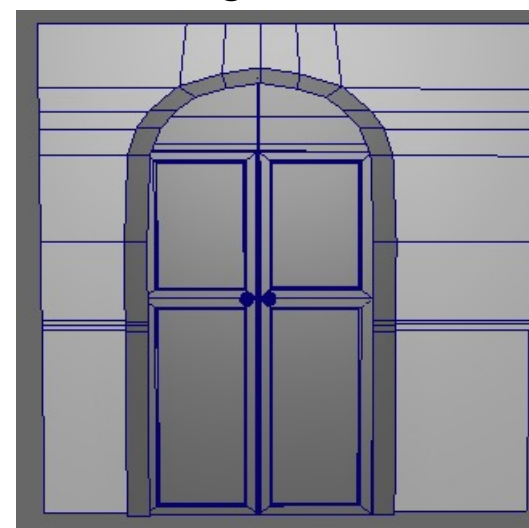
Wireframes
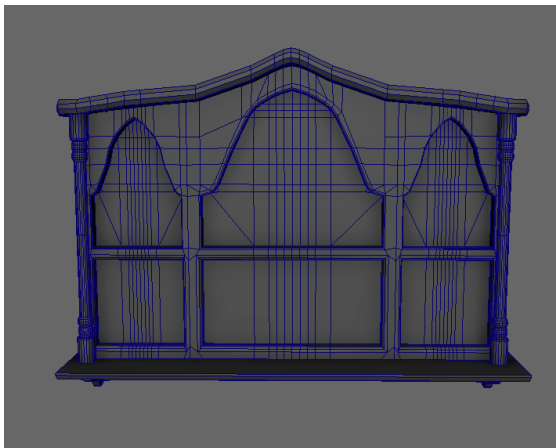
Window2
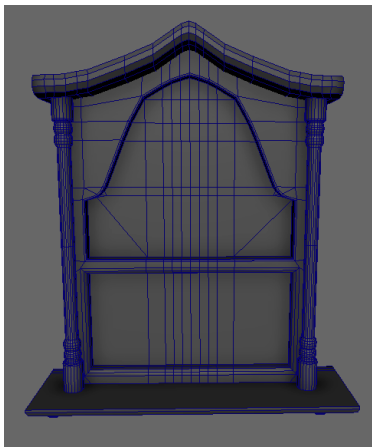
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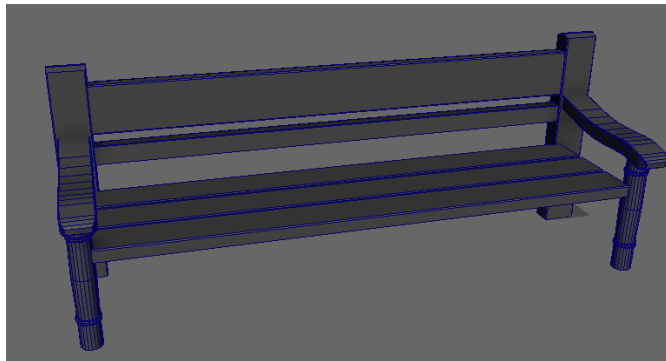
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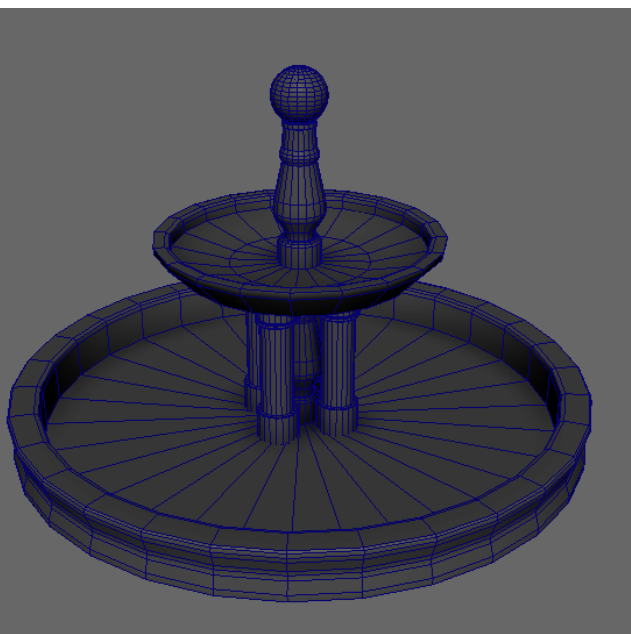
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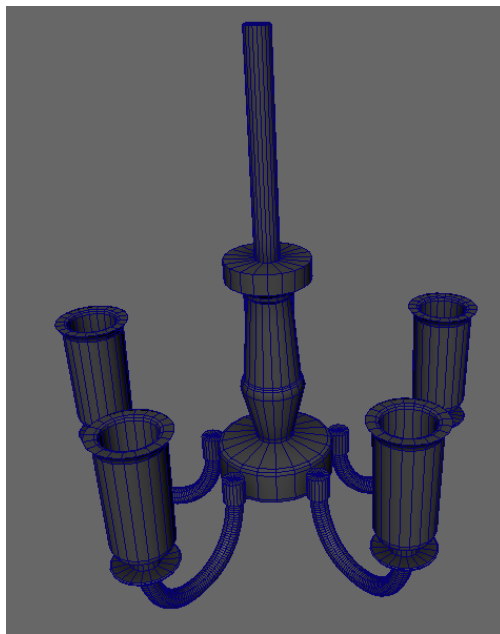
Chandelier

Pots

UVs
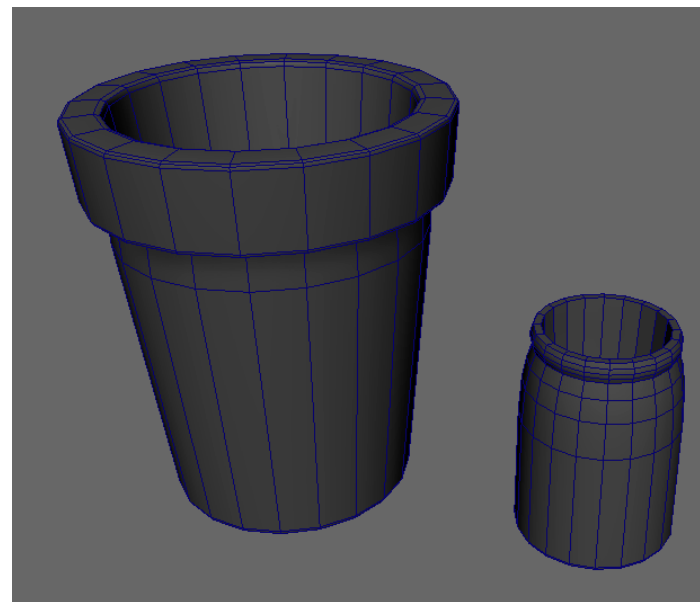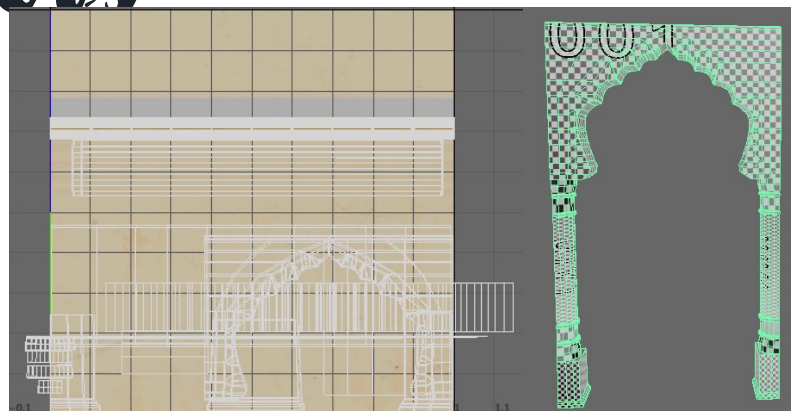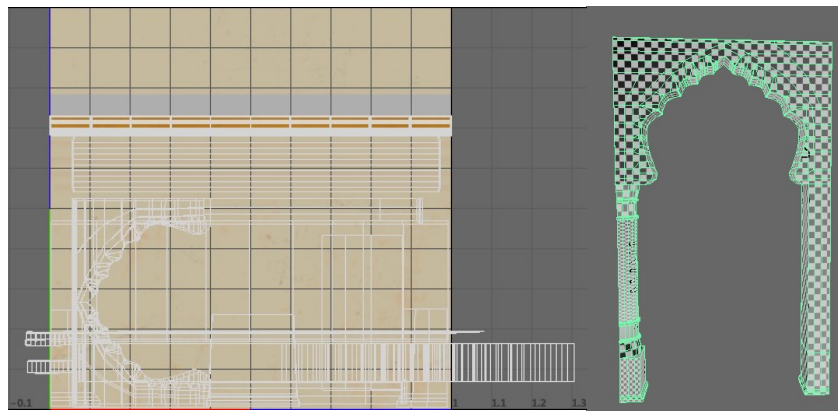
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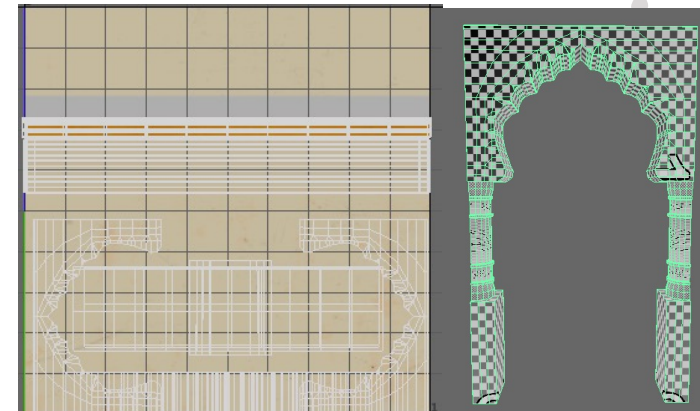
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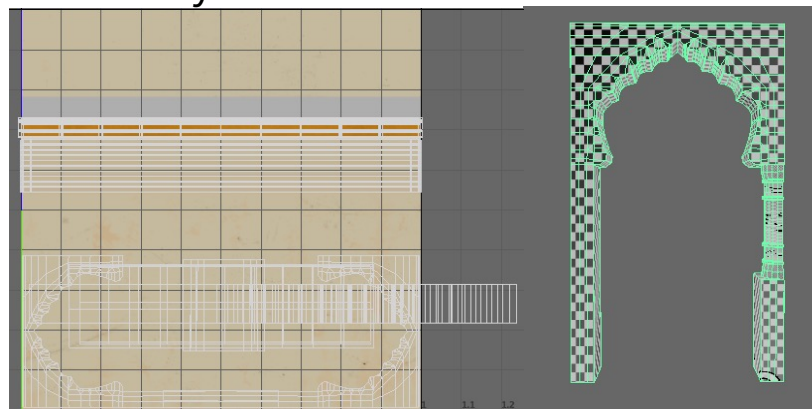
Archway1v3

Archway1v4
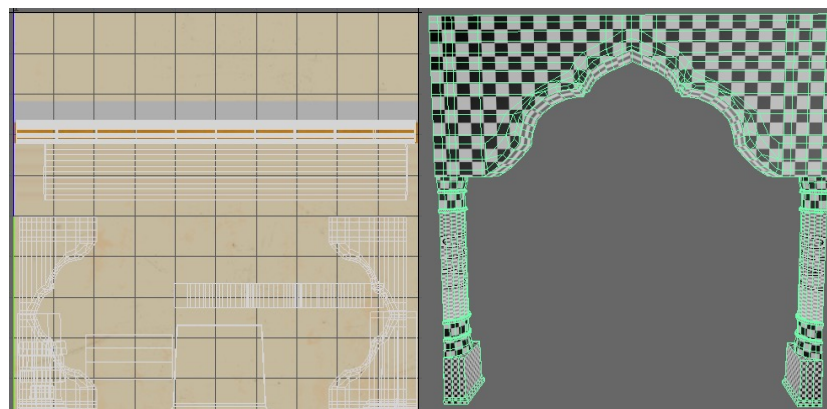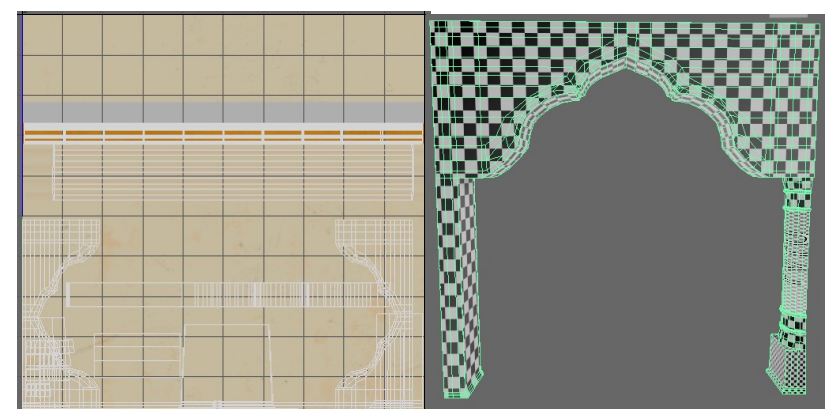
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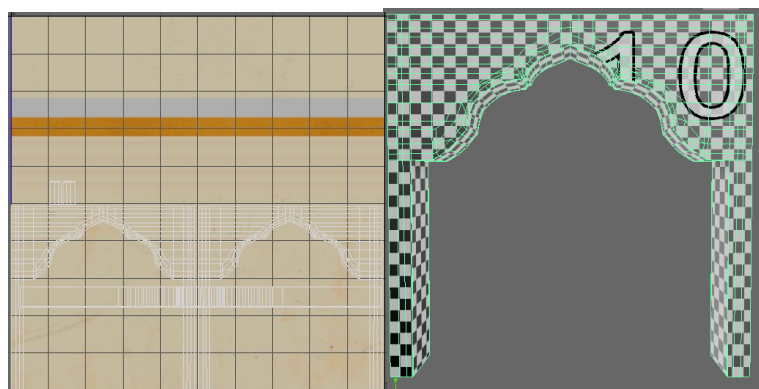
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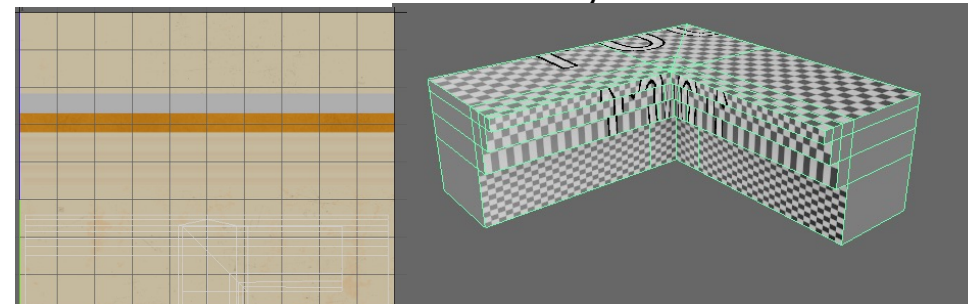
LedgeCorner1

UVs
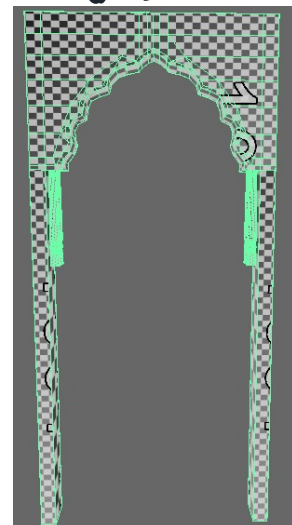
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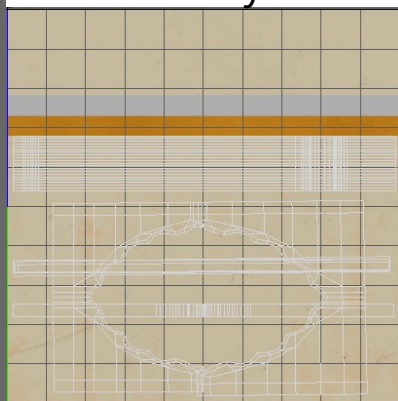
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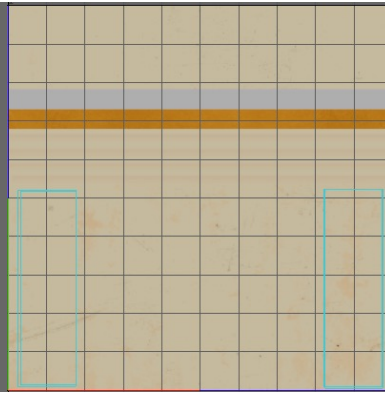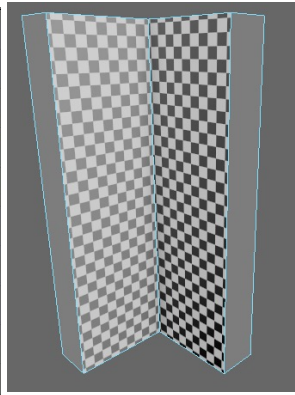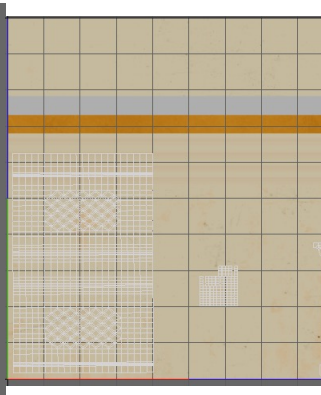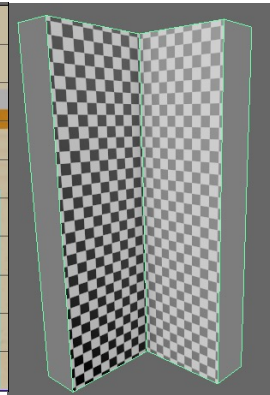
Corner2

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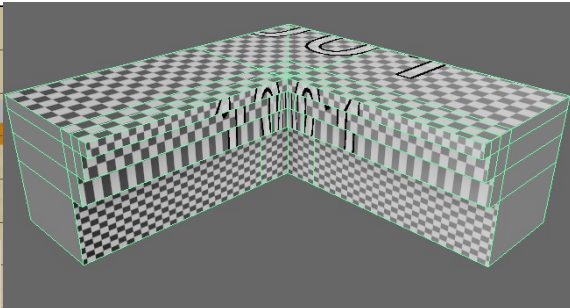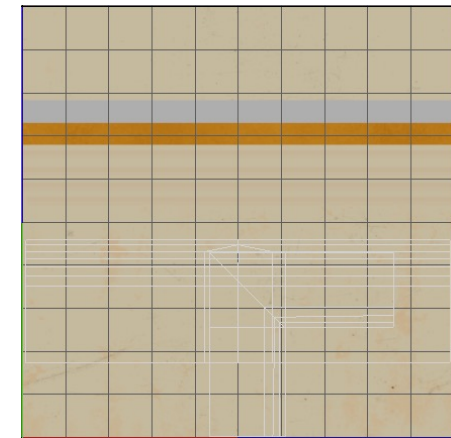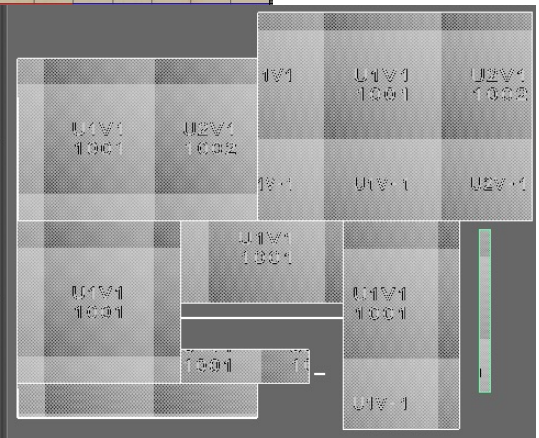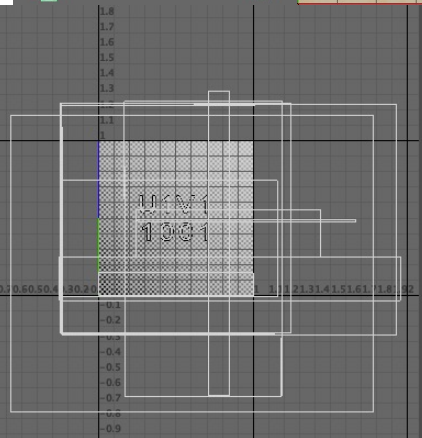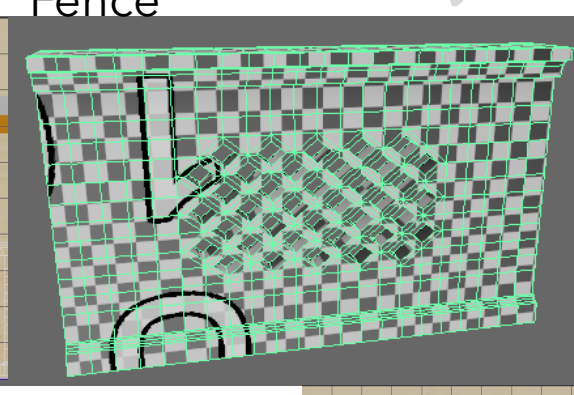
Floors

LedgeCorner2

InnerLedge
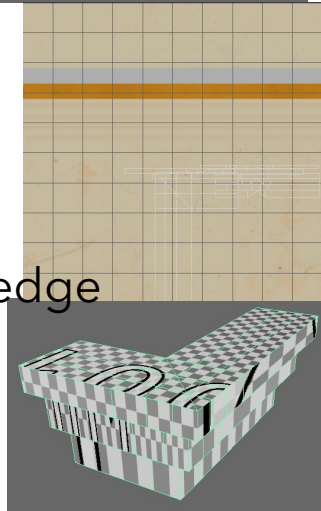
Ledge2
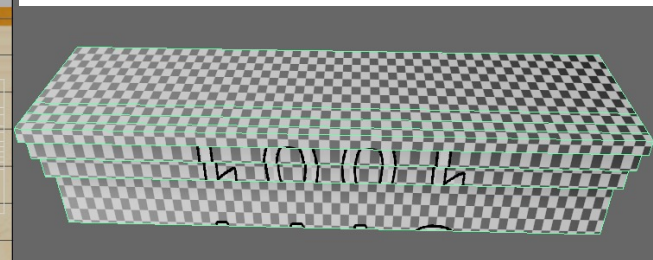
Ledge1
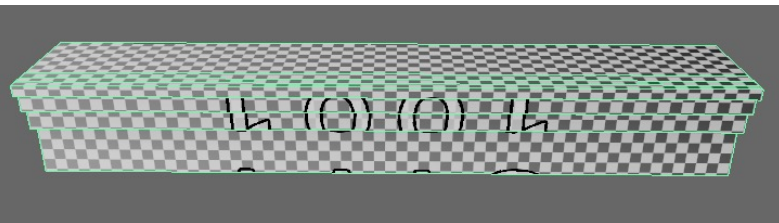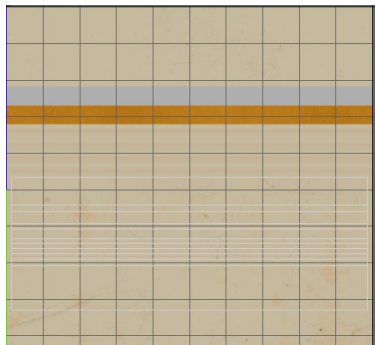
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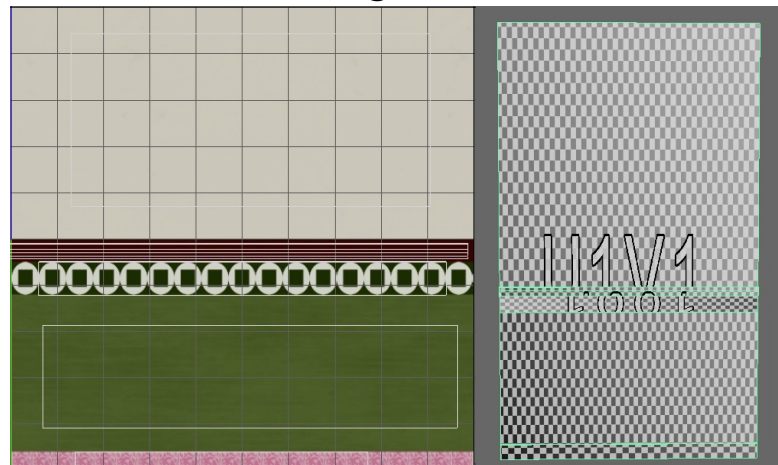
HighWall1v1

HighWall1v2
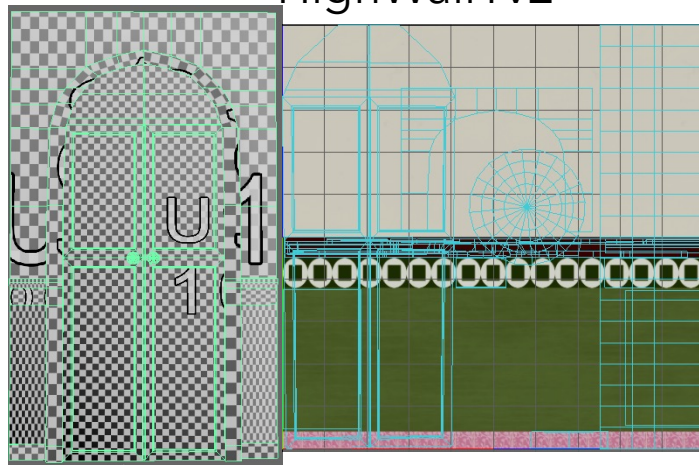
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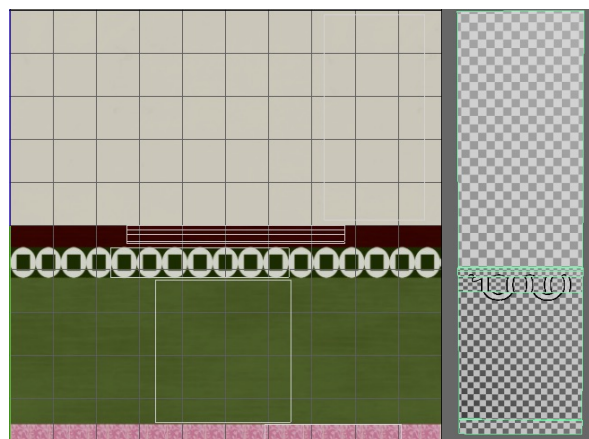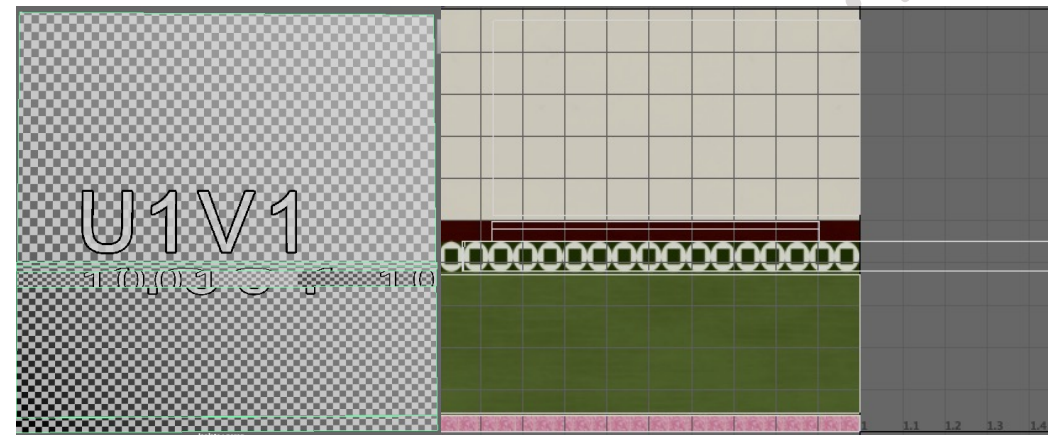
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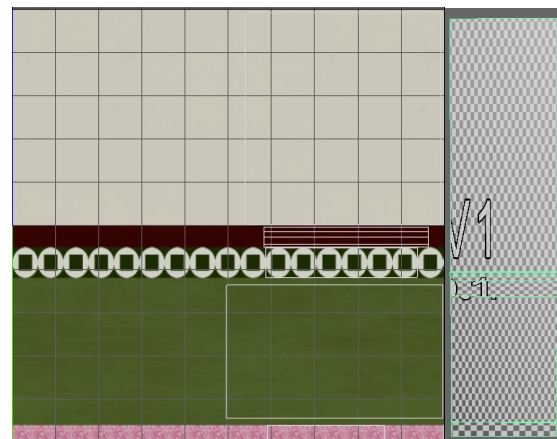
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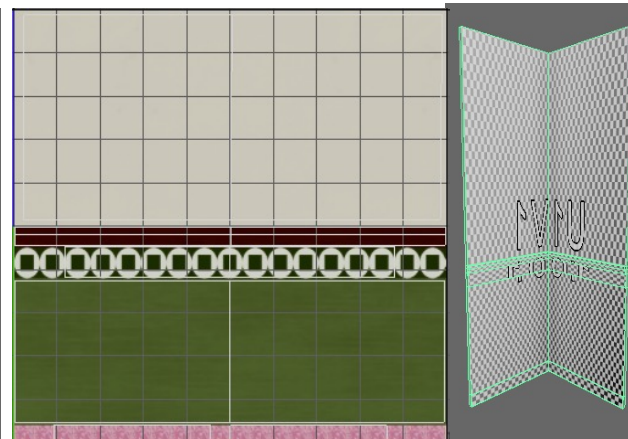
HighWallCorner1

HighWallCorner2

UVs

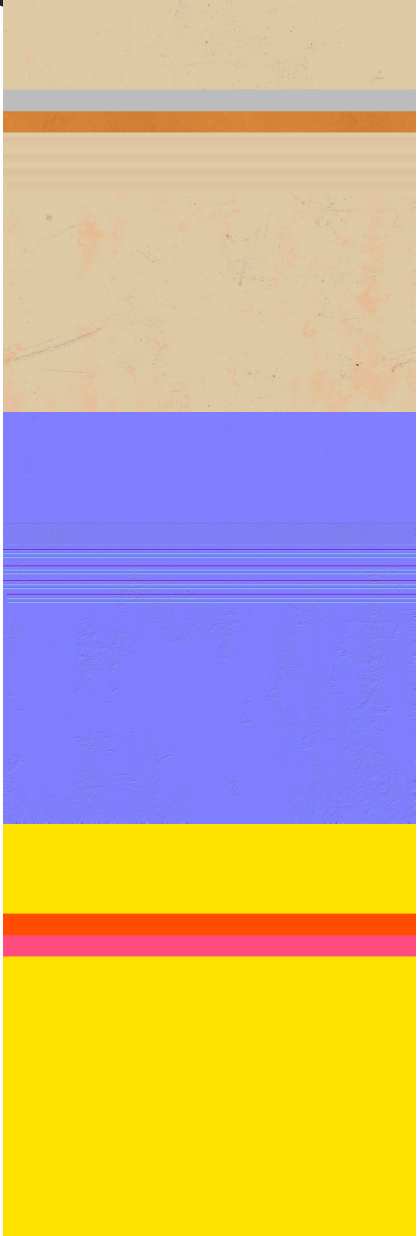

LowWall1
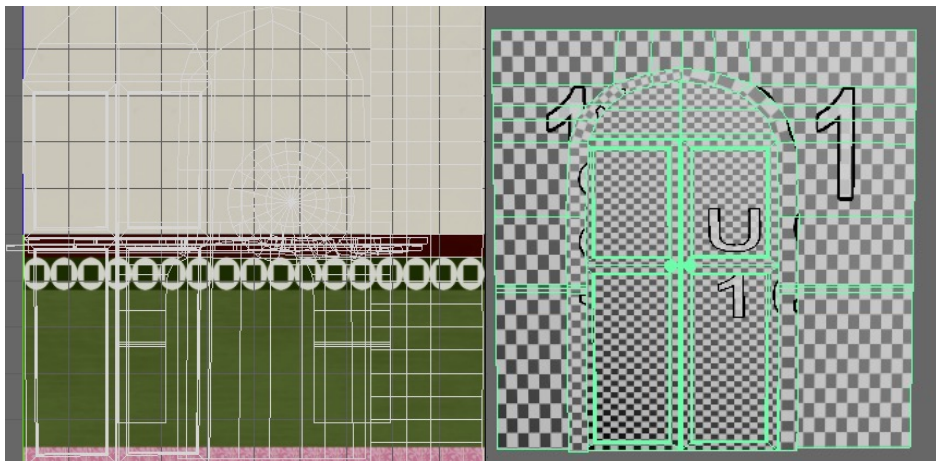
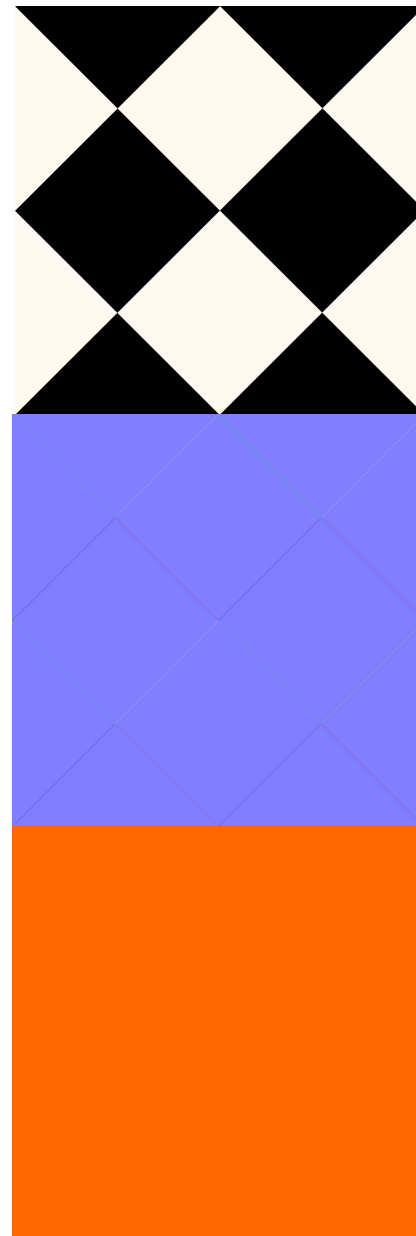HighWall2v2
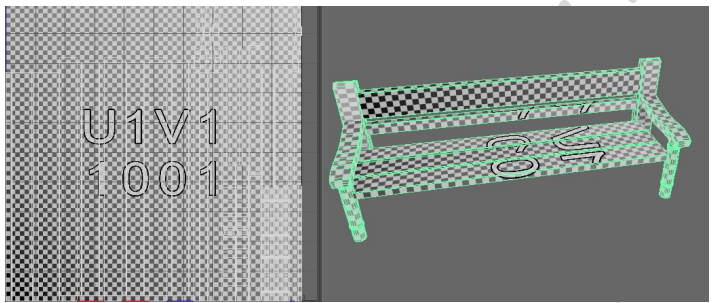
Bench
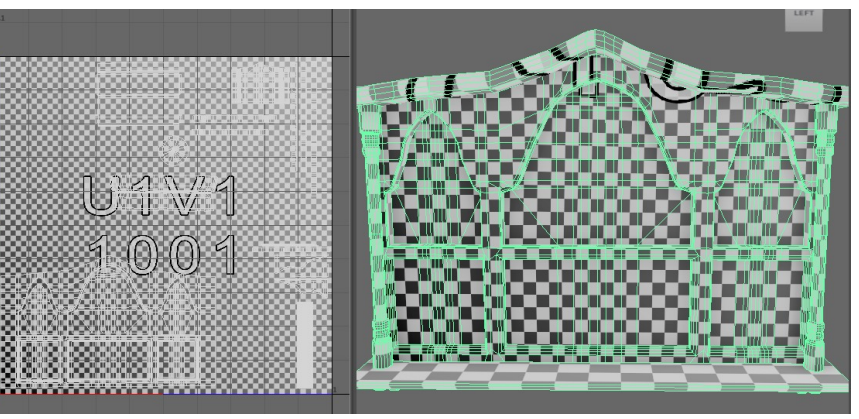
Window2
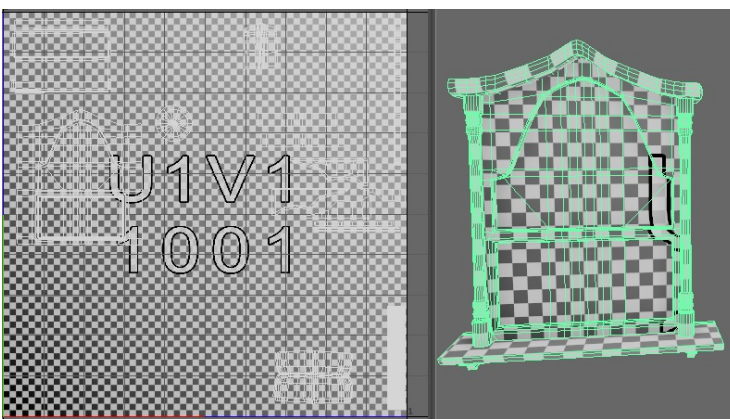
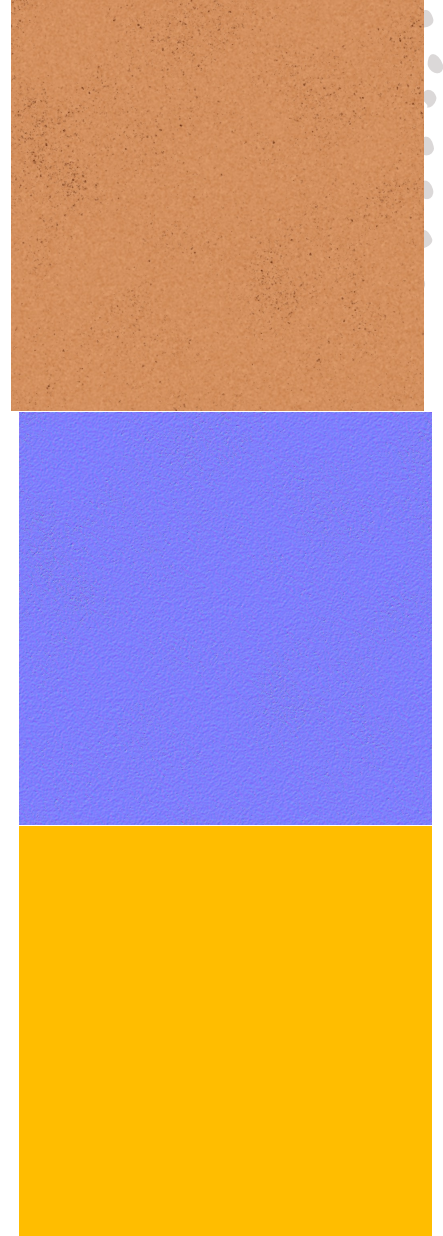Window1
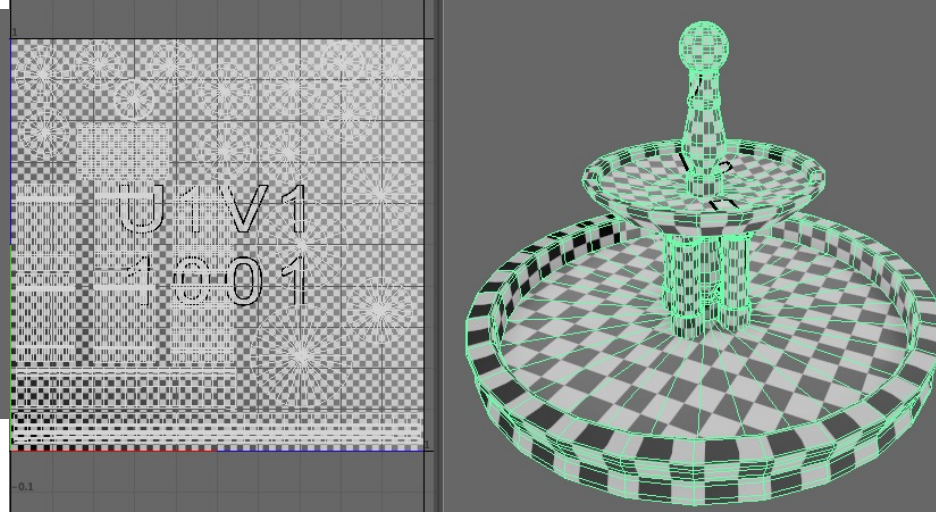
Fountain

UVs
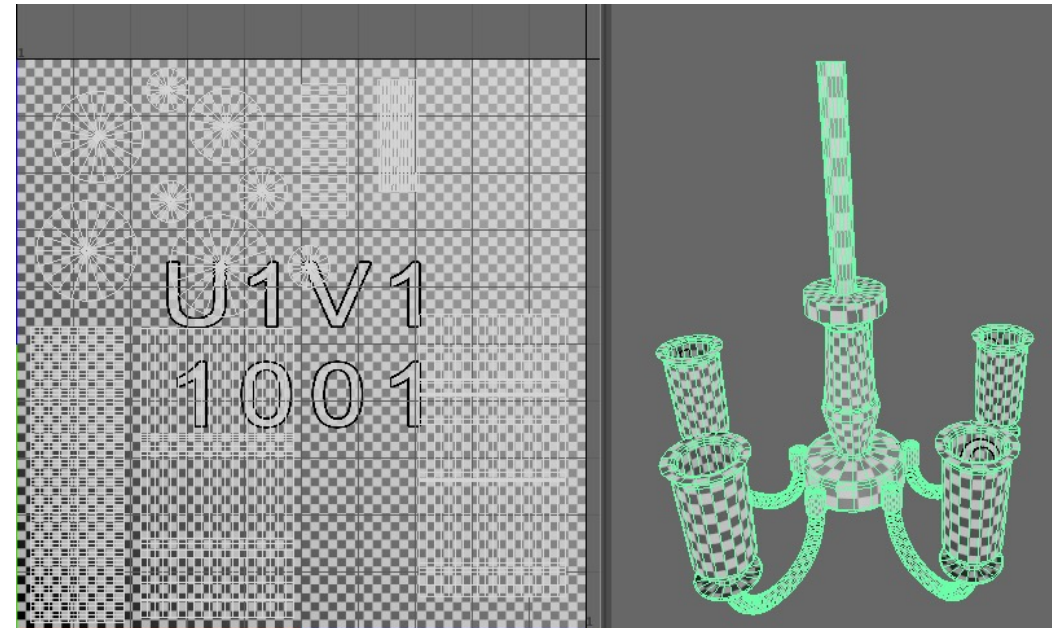
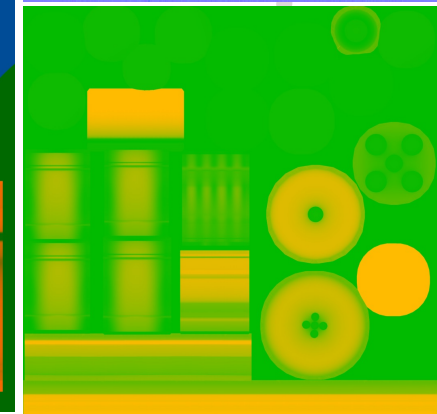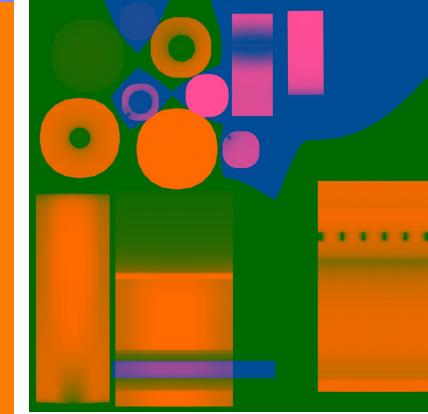Chandelier
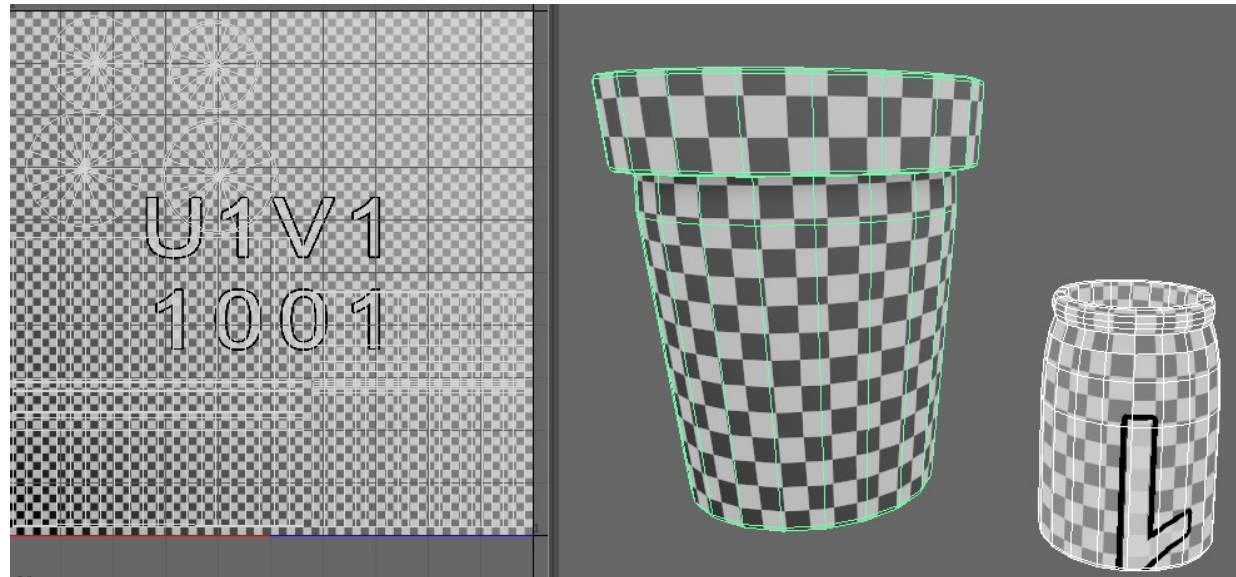
Pots

Textures

TrimsheetA

TrimsheetB

Door

Checkered Floor

Exterior Floor

Textures
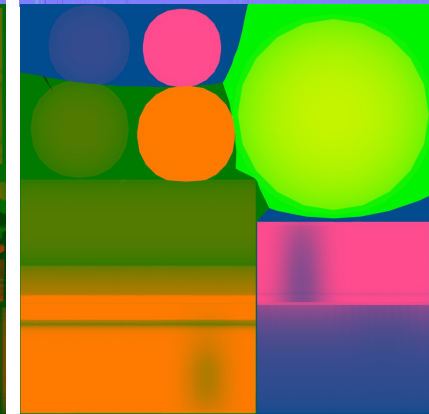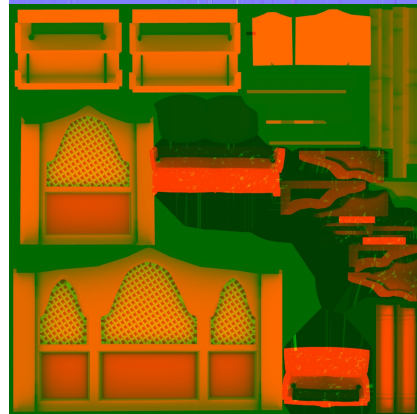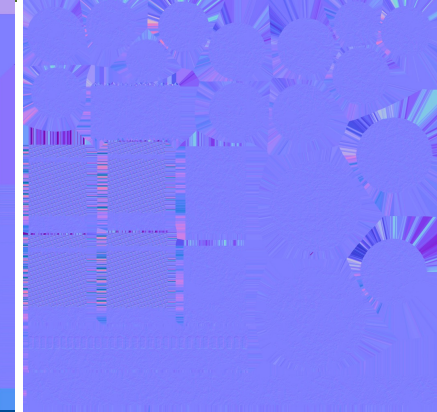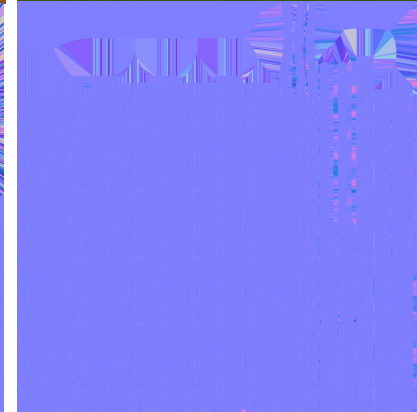
Ceiling   Windows   Pots   Chair   Chandelier   Fountain

Modular Assets

Some Solo Renders

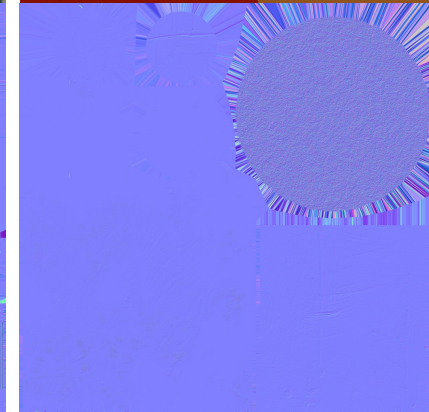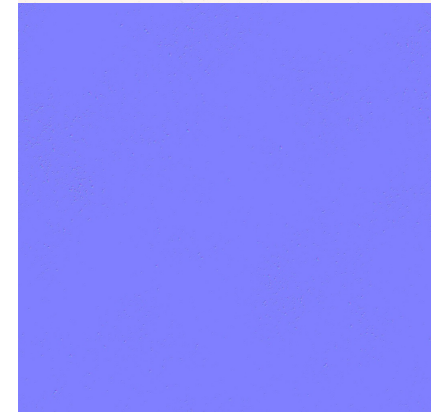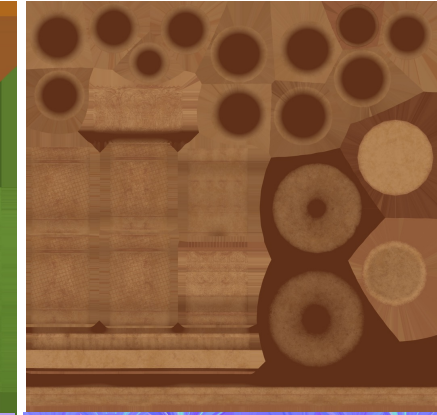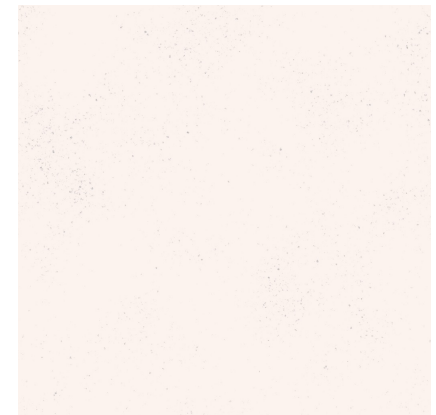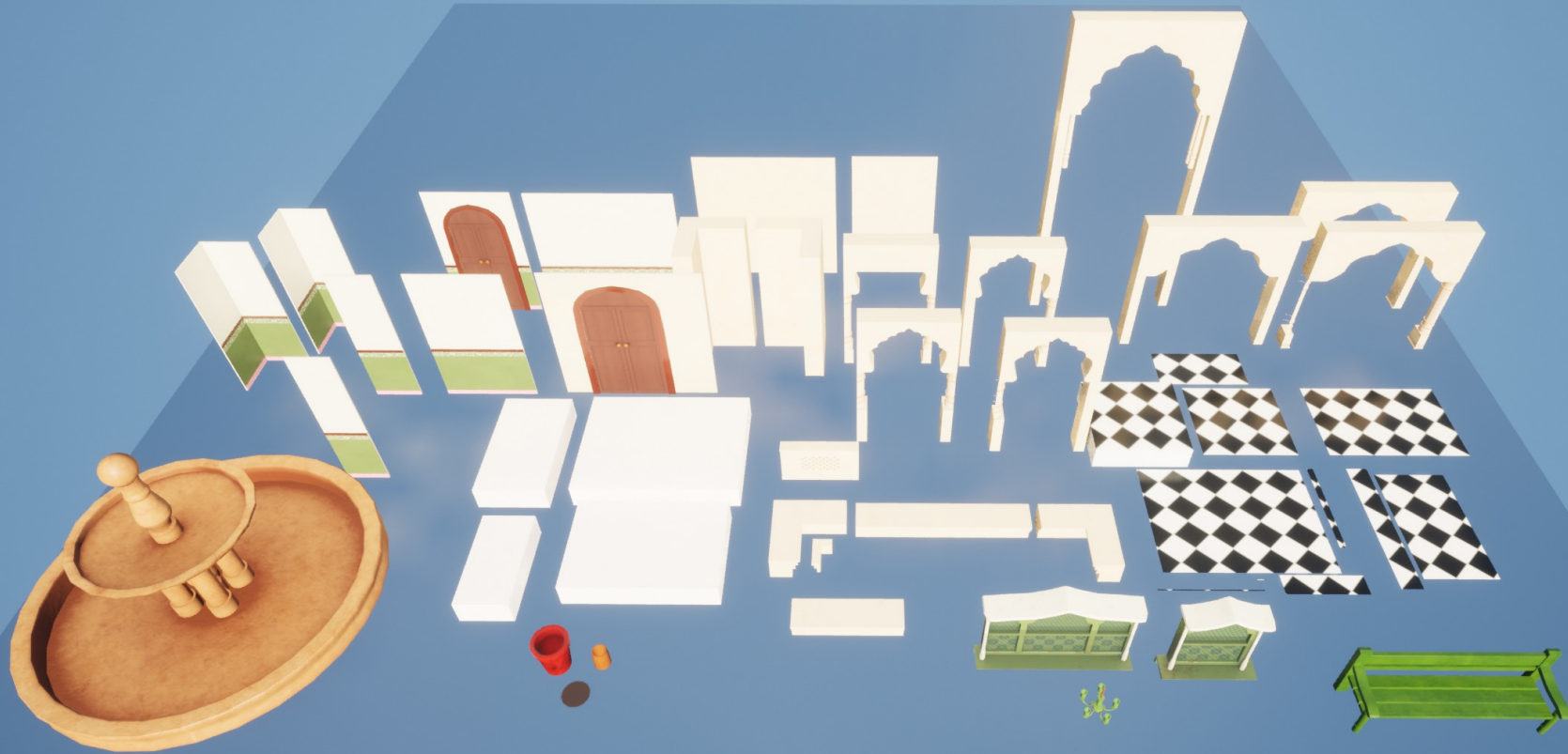# Modular Conclusion

Looking back, I think I was too careful and so the final project hasn't came out as well as I would have hoped. I think my worry of texturing held me back. Now that I now know what a modular environment involves, I think I can improve upon what I have made. Looking back on last year with my diorama, I think I have taken points that I was weaker on and have improved on that, meaning that objects shared textures this time. I think I could have improved on the lighting but as it's an open environment, I don't know what else I could have done.

To Conclude…

After this year I do feel more confident in my 3D modelling skills, my texturing does need to get better but I am determined to learn substance designer and z brush over the summer. I feel like I could better the topology in my next gen asset looking back now however the overall weapon looks good. I do think when I continue modelling, I will stick to props however I understand the process of modularity builds and the skills of working to ratio of a player character is beneficial.