GREYBOX PROCESS

greyboxing and concepting for level design

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download level: *https://oprel.work/files/nantes.zip*

tools used: Trenchbroom, QuakeSpasm
engine: Quake

jasper oprel, 2019
https://oprel.work

FOREWORD

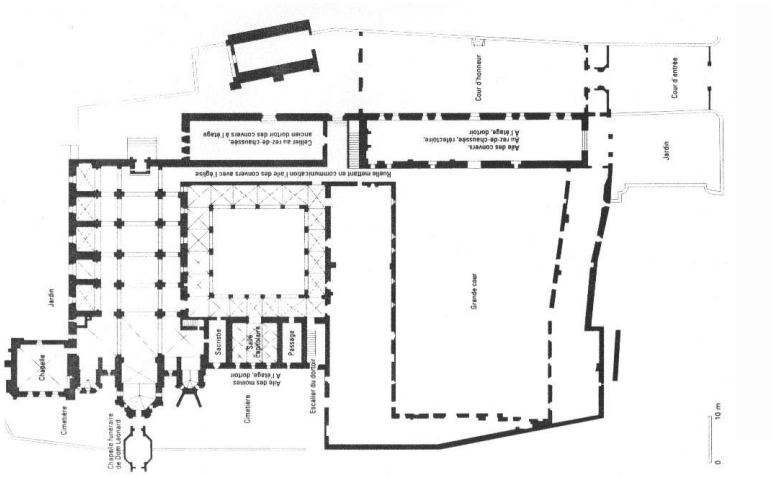
This document is a record of my thoughts and actions when starting to design a level. Hopefully this will be helpful for anyone starting to get into level design. I hope that it shows you that some things are universal to every design process *(start designing from the end-experience, thorough testing, break problems in smaller chunks etc.)*, most of the process evolves from the problem you intend to solve. In the process of making, you will find out what works best for *you.*

This project was a way to get myself acquianted with the Quake engine, so you might see some dirty brushwork here and there. I would like to extend my thanks to Andrew Yoder (@Mclogenog) for pointing me to the right resources and dumptruck_ds (@david_spell) for his illuminating youtube tutorials.

BEFORE GETTING STARTED

PREPARATION
It's time to undergo some preperation before you start designing anything. Learn the basics of the engine you are going to work in and what the limitations are of that engine. For quake this meant that I watched a tutorial series for the workflow in trenchbroom and played through the first half of the game. After that I opened the maps in trenchbroom to analyze the structure and the tricks they used to achieve different play experiences. This was very helpful to get a general sense of what goes into making a Quake map.

After that I looked at maps that are being produced today such as the products from recent Quake mapping jams and the mod Arcane Dimensions. This is an exploration of the context that this map will be released in. From it you get a sense of which expectations you are going to adhere to and which you are going to reject.



If you are working in a larger project a very important step is to study the rest of the project along with the mechanics of the game. How does your level fit into the overall structure and what skills have the players already learned at this point? What themes is the game going for and what kind of artstyle will it be? (I actually overlooked the artstyle for quite a bit in my process. more on that later)

ESTABLISHING PARAMETERS

The context that surrounds your project is very important to make explicit note of. This will give you clear goals to not only inform your design decisions, but also give you a measure to test your design against. Without a clear vision of the design problem, there really isn't much to design.

Example questions:
Who are your players? In what context will they be playing? How does your level fit in with the rest of the game? What do you want to communicate to them?

Here's the context for my level in a nutshell:

- I'm making a single standalone level for people to download off the internet.
- I'm designing for a game that I have little history with and all the playtesters I have physical access to have never played the game.
- Coming into the Quake community with an outside perspective gives me the chance to provoke.
- I have set out about 2 weeks to complete the greyboxing of the level. (detailing and texturing will come later)

From this I set the following goals for myself:

- Singleplayer level that takes about 5-10 minutes to complete.
- A fresh, new experience that aims to surprise.
- Must be playable for novices without failing to entertain hardcore Quake players.

Very simple stuff, but it's easy to lose sight of it in the middle of designing.

ABOUT PICKING A CONCEPT

To give the level a clear sense of theme, I center my map around a single mechanic or experience. Mechanics are clearly defined by the game design, teaching the player about the use of new verbs in their toolset or showing a new combination of existing verbs. An experience, however, is a more ephemeral concept to build a level around. It can be a specific feeling that a space gives (e.g. walking into a large open hall after a long tunnel) or it can be a specific concept that talks directly to the fantasy of the player (e.g. the player is shrunk down to the size of an ant). While all levels contain sections that focus on the mechanical and experiental, I have found that it helps to pick one of them to function as the backbone of the level.

THE CONCEPT

This map was going to be a standalone game experience. So it made sense to me focus the concept on an experience to offer the player rather than a progression of mechanics.

works by Krijn de Koning that shift the context of a space

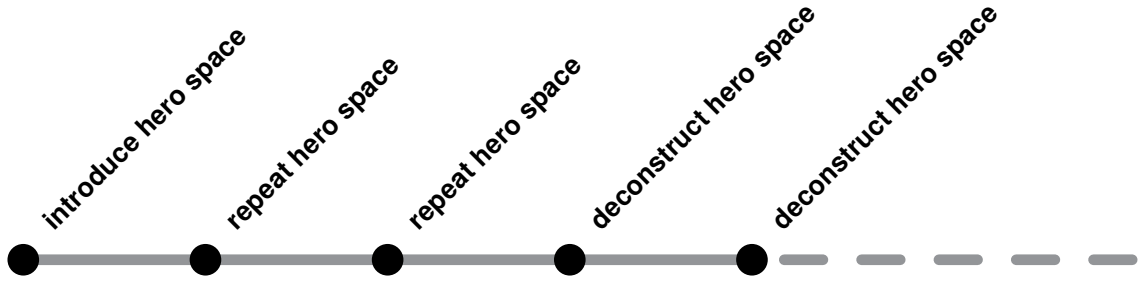
For the experience concept I was inspired by a recent talk I had with the artist Krijn de Koning. In his work he transforms the perception of a space through the addition of minimalist geometry. More specifically he showed me the main hall of the Musée des Beaux-arts in Nantes and how he went about changing it. The original hall in its minimalist glory was very well known to the visitors of the museum. By extruding existing geometry and overlaying different scales of architectural grids Krijn was able to completely change the the feeling of the room; hiding the original space.

Musée des Beaux-arts, Nantes

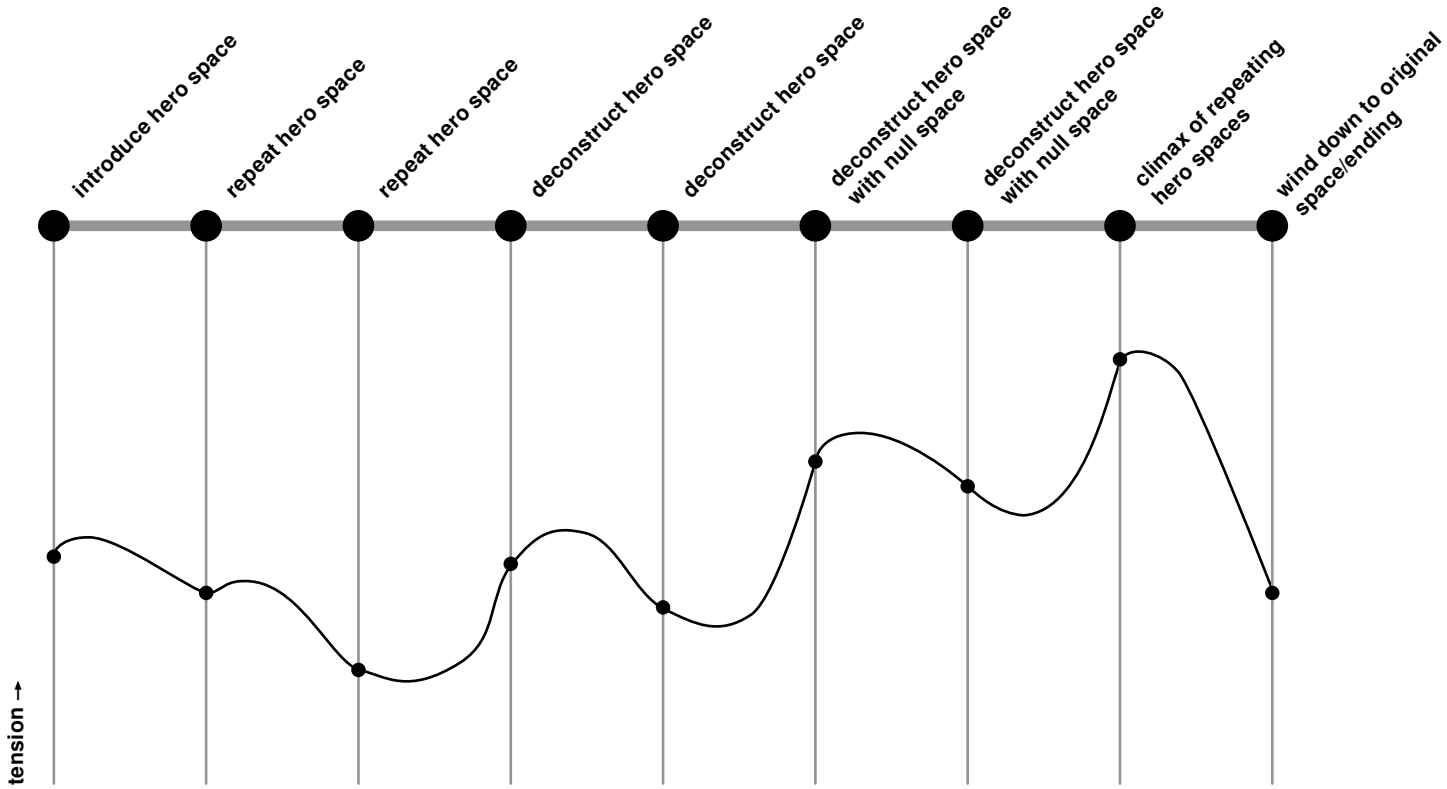
I want to recreate this experience for players of my level. I want them to get to know a space and then deconstruct what makes that space special by transforming it into something completely different.

BREAKING UP THE EXPERIENCE

Now it's time to break up the experience to see what kind of player/customer journey we want to achieve. From here on I'll call the hall that we'll be deconstructing the hero space, since it'll be at the core of the experience.

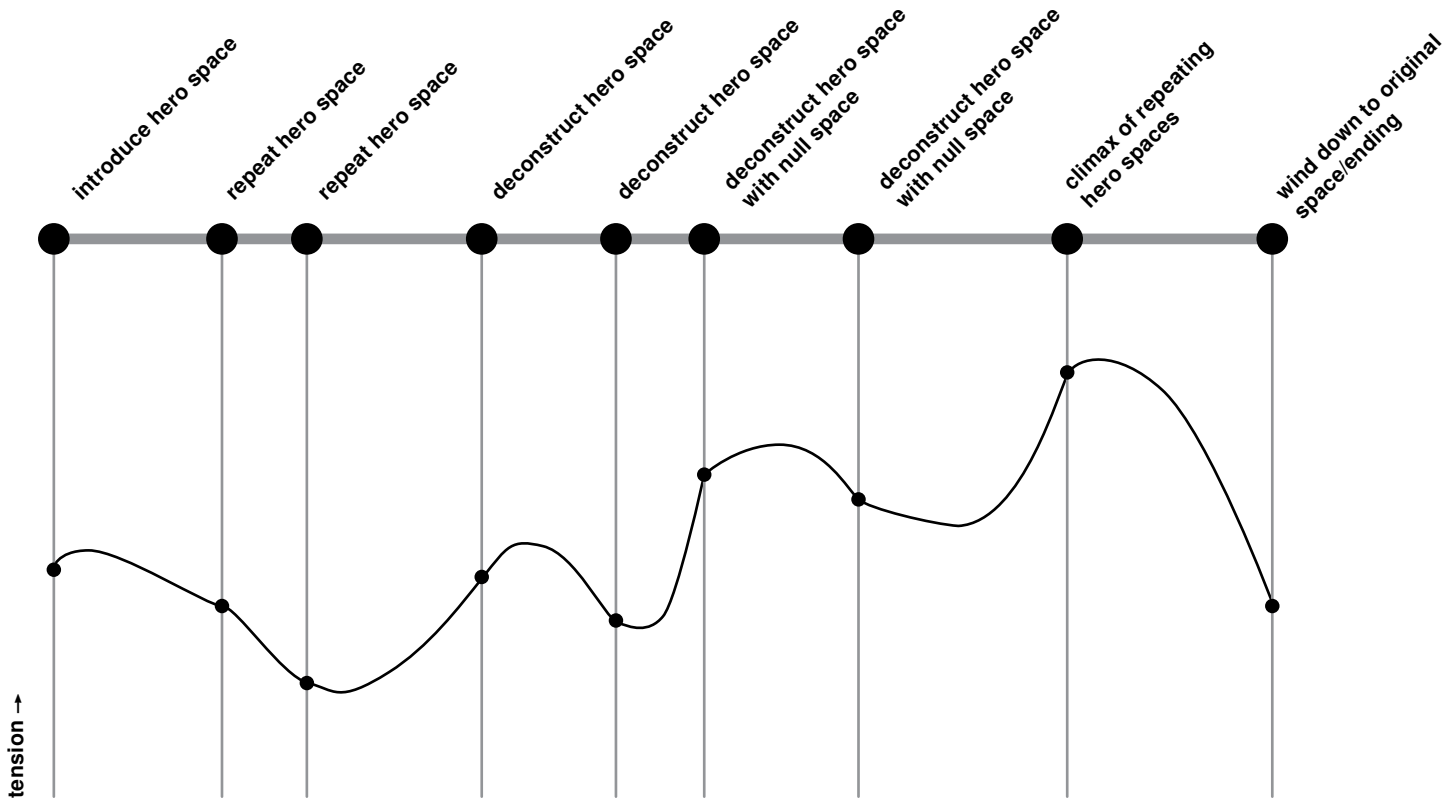


The dots are the highlights on the roadmap and are all related to the hero space. The space between these dots will be normal gameplay that doesn't involve this space. We're using the rules of threes and playing a bit by feel to get the pacing right and make sure the player doesn't get bored.



With these ideas we can finish the player journey and with it sketch out an intended tension curve.

These goals will give us lots of concise points to test against later in the process. But it's also just a guideline, not a strict rule that the map must adhere to. Looking at the graph also gives some insight in the optimal timing of these highlights. To bend the curve into a desired shape I move the highlight points.



There are lots of thoughts and ideas that run through your head while in the concepting phase. Be sure to write these down in the margins of your preparation. As an example here are two thoughts I wrote down in my margins:

What's interesting about having this clear divide between hero and null spaces is that we can use it in the deconstruction. When we start deconstructing the space we can overlay the grid from the null spaces to give new meaning to the same space. That way the environment starts to intrude upon the territory of the hero space.

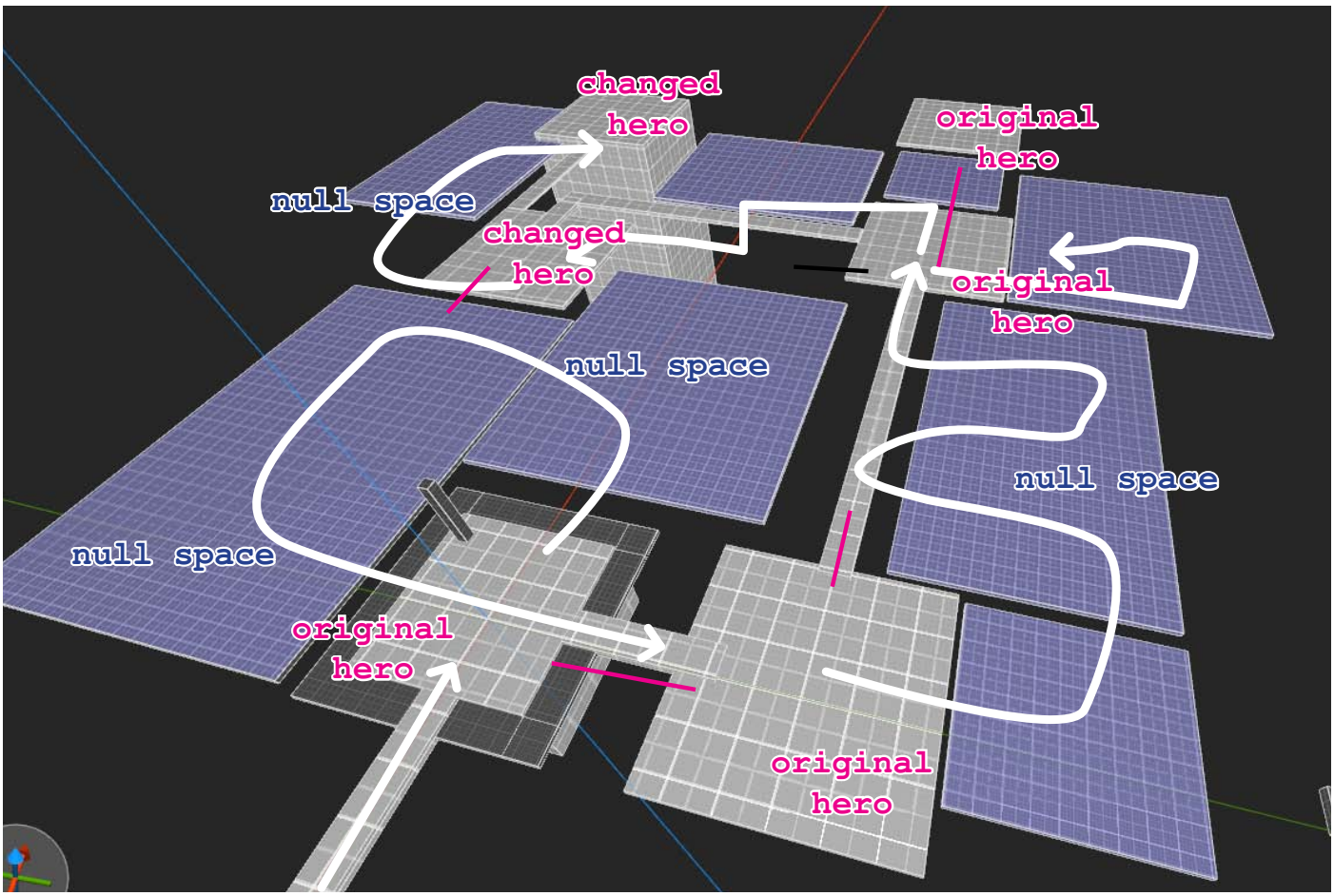
I thought about having the gameplay take place in clones of the hero space exclusively, but that would be hitting the player with the concept a little bit too early. We want there to be a bit of exploration and the pattern recognition in the player's mind to do the job. There might be room for this as a finale, though.

SKETCHING

PRINCIPAL LEVEL LAYOUT
Phew, that's all the preparation done and now get to open our map editor to play around with some blocks. I like to start sketching in engine to get a sense of scale.

I like the idea of keeping the hero space as a courtyard as a reference to the original inspiration and as a rigid space with a lot of strong lines to break. After trying out a couple of different size rooms, I ended up with a courtyard that 512x512 units surrounded by walkways with a width of 96 units. This 96 unit width then transfers over to be the dimension for general hallways.

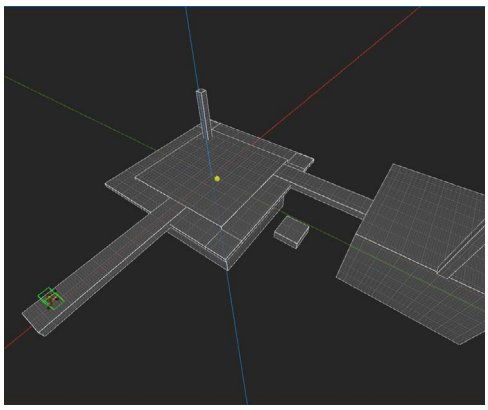
Now let's start by sketching out the first couple of rooms.

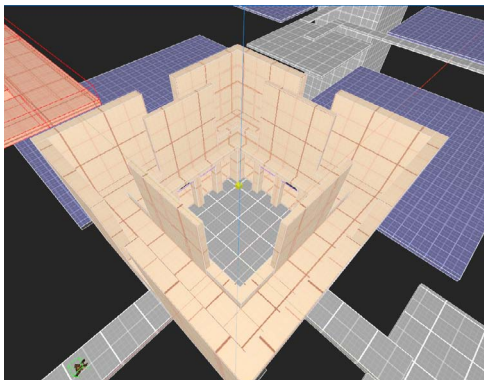


White lines indicate the general path that the player will take and the magenta lines are sightlines that promise future play. This gives players an objective when moving forward. We start with a very short-term one at the beginning and a hidden long-term one when the player is working towards achieving that goal. Distances between hero spaces are based on the graph we put together earlier.

With the setup of the copied hero spaces we want to adhere to as much invisible rules as possible. We are keeping them all on the same level, on the same grid and connected by the same entrances. This is so we have more rules to break when we are deconstructing these spaces. We don't want the player to get bored with this limited space, so variety of traversing is key.

At the end we start deconstructing these spaces. The first is slightly off-grid and the second has the player entering on the top, giving access to a new level.





scale test

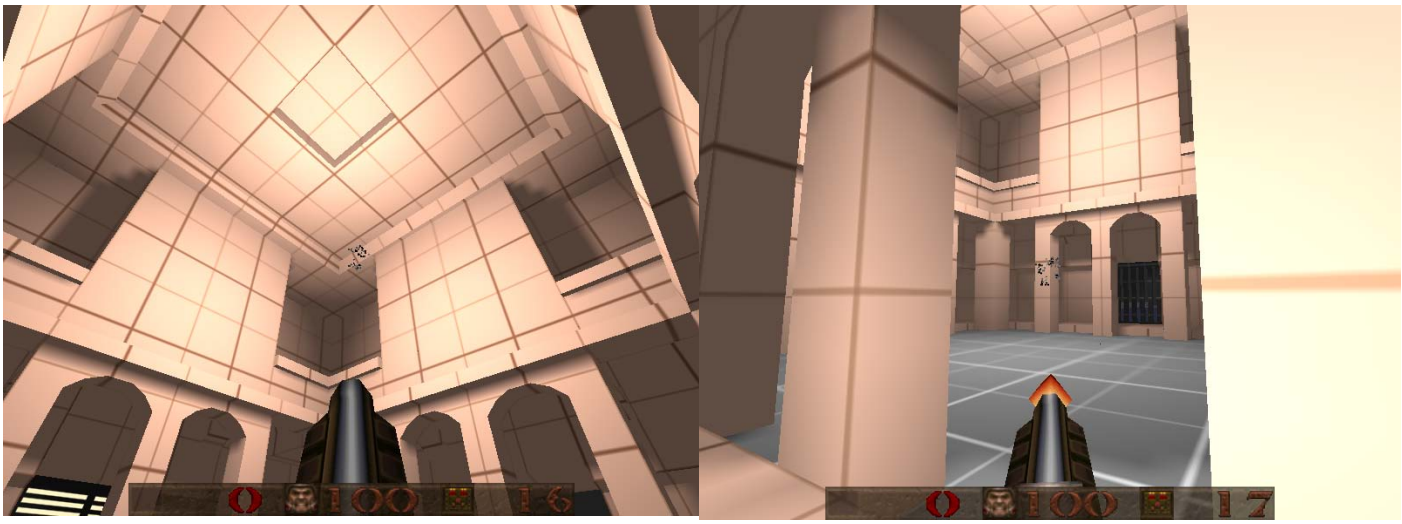
DESIGNING THE HERO SPACE

We still have a couple of deconstruction rooms to go, but before that I want to take a look at the actual hero space that we'll be deconstructing.

For this I started out with a cloister shape, similar to the space that Krijn deconstructed in Nantes. All of the sightlines combine into the open center, which focuses the attention of the visitors into a single point. It's been used in the past to bring attention to objects posited in the center or the lack thereof. The clearness of the focus will be interesting to play with when we deconstruct the space.

I want the large open space of the cloister to give a moment of peace to the player. When they experience a brief elation after intense gameplay it will help cement the hero spaces as chapter headings for each little side adventure (null space).

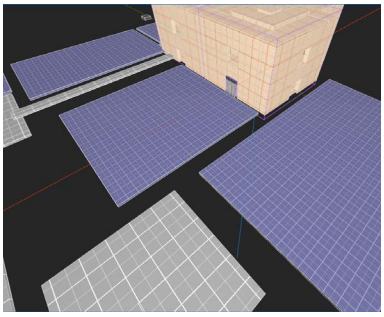
To achieve this sense of the space, though, the space needed more detail. In video games it's very hard to get away with simple geometric shapes that speak mostly through their material. And the Quake engine especially has problems with this. That's why we are adding trimming and arches to further pronounce the intentions of our existing geometry.



This might already be too much detail. We should make sure not to get too attached to it. The detail has also given our space a definite character that we can choose to accept or reject. The associations with mediterranean architecture might be a problem in building out the null space.

This also presents us with a problem that we should have thought of before. We didn’t settle on a theme for the space in our concepting phase. There’s no real idea for the physical location or narrative for this deconstruction to take place in. During the detailing phase I subconsciously modeled it after those found in French monasteries and churches. I think this idea of a large, medieval, mediterranean building for semi-public use is one I want to continue in the building of this project. I imagine the building to have been a monastery that has been continuously remodeled through the ages to fit new groups of people.

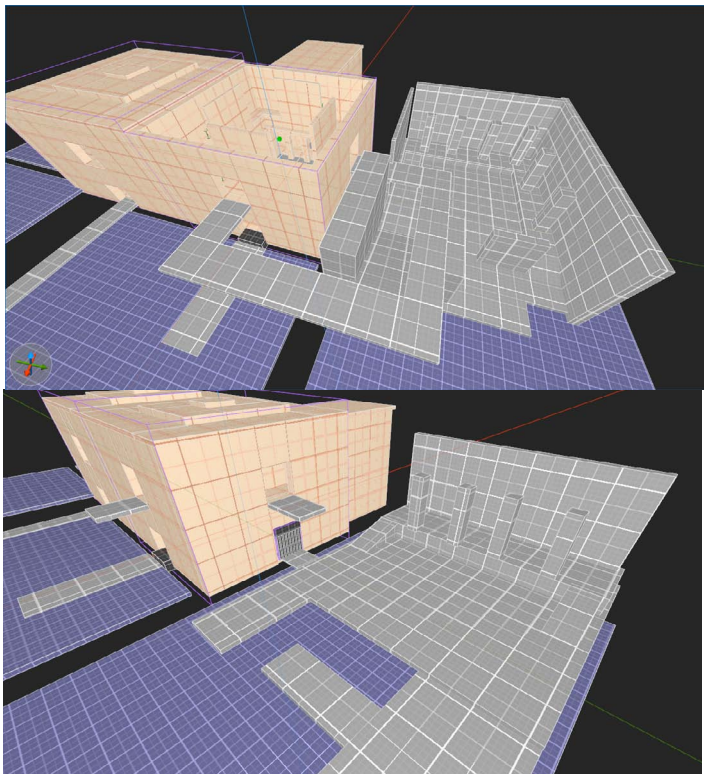
DEFINING



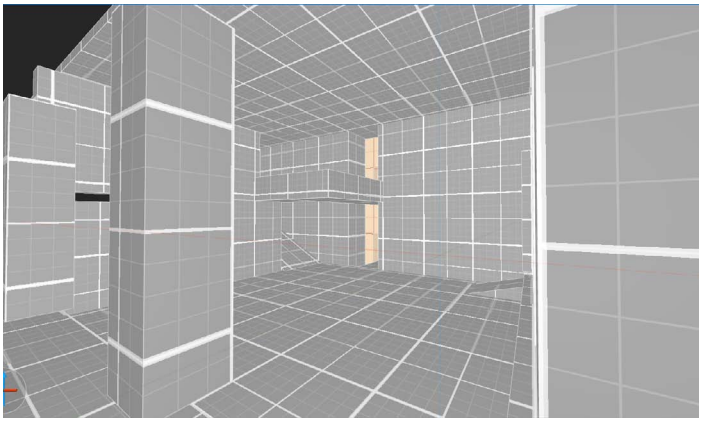
FIRST NULL SPACE
Here we have a space we need to traverse and an established timeframe and tension curve. We'll have a little increase in tension and then mellow out for a reintroduction to the hero space. I think it's easier to work back from our destination in this case.

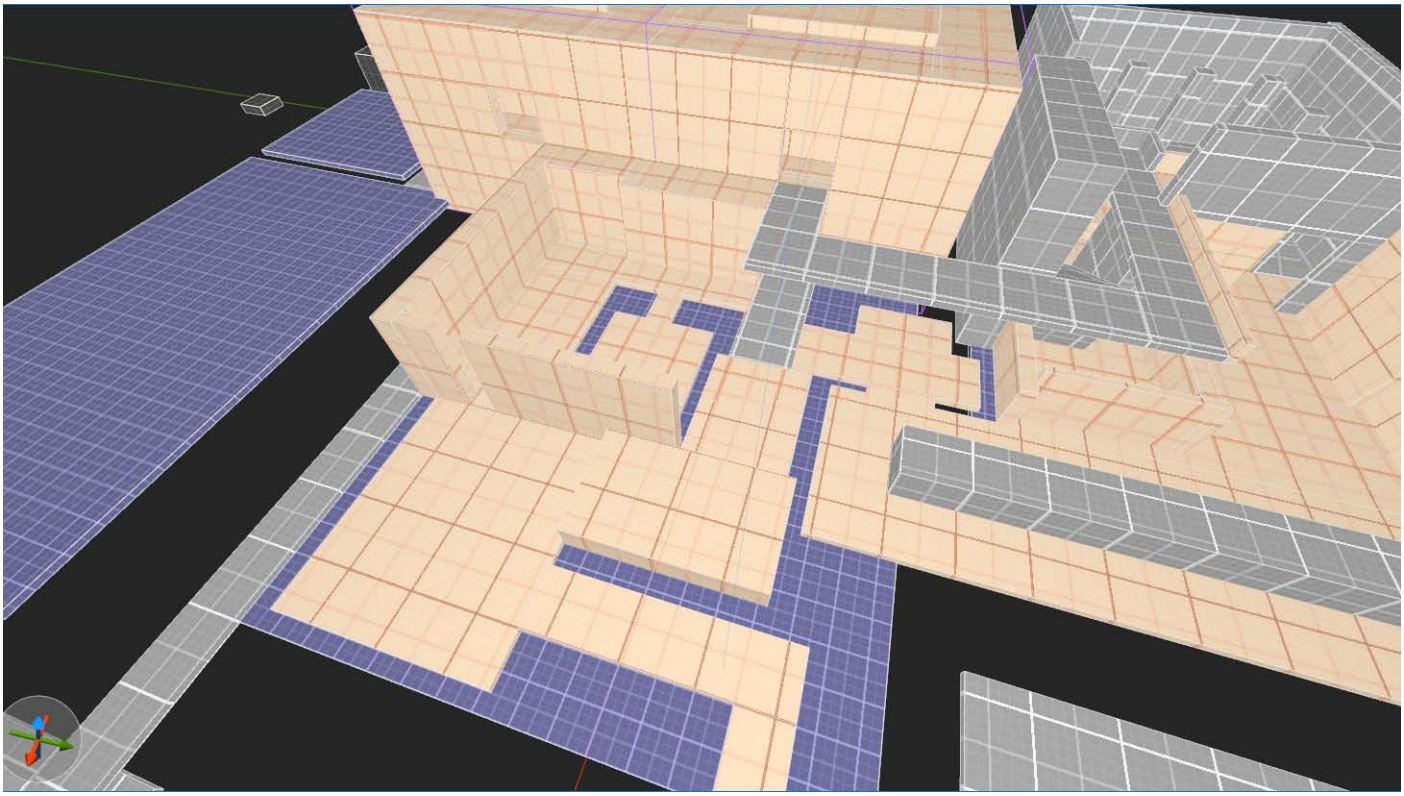
The final room in this space is some sort of giant open space. It relieves the tension of going through smaller halls of for a while, and builds up a sort of deciding confrontation. The large open space directly next to the hero space also makes for a nice non-symmetrical path (you don't start with narrow paths from the hero space and then end with them again), this adds to the sense of realism of the place.

In the narrative this could be some sort of large mess hall, since they are classically joined to open courtyards. In this line of thinking it immediately makes sense for the narrower hallways to be kitchens and food storage to provide the mess hall with meals.



First mockup of a dining hall that was way too large.

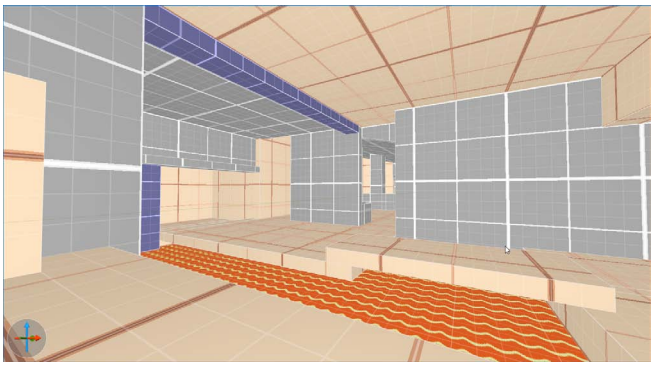




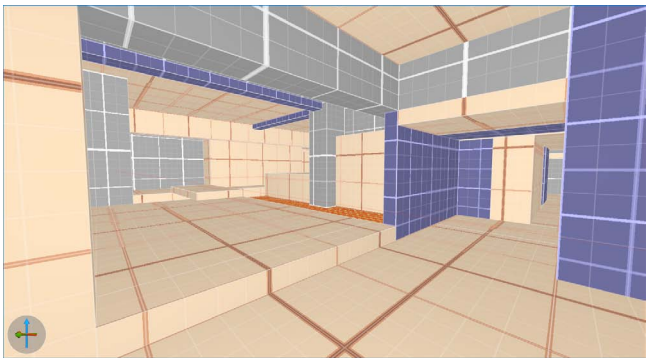
But back to the large open space. We want to give players access to the upper levels at the end of the first null space. Let's make the staircase rather obvious and show the second floor through the use of a mezzanine. Aiming to keep the upper stairs rather simple at this point of the level, we just directly connect them to the openings of the hero space. This leads to a figure 8 shape on the first floor that has no clear resolve. We are building up to something that doesn't have any pay-off. We'll have to make some changes to the hero space later to make sure the flow can continue.

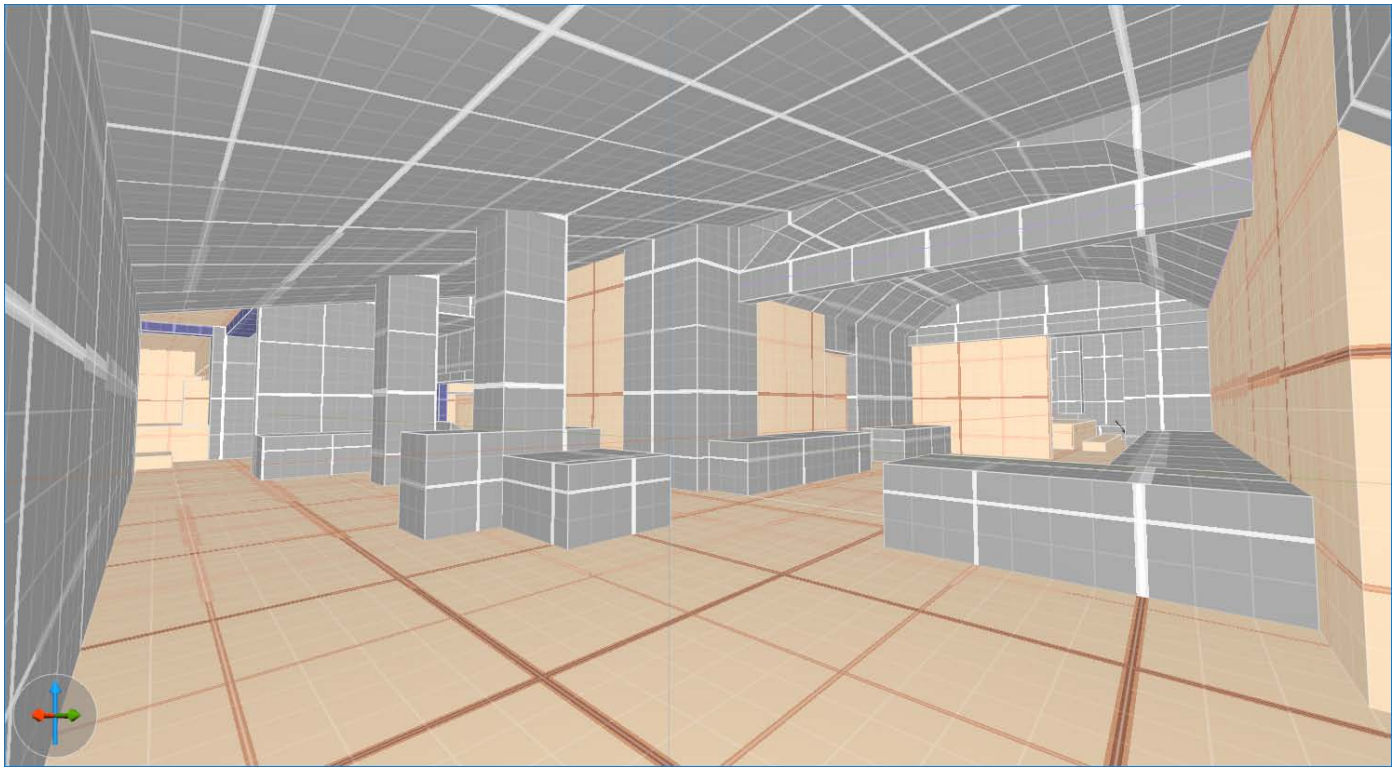
So we'll have a kitchen in the bend and storage space on the left. Entering the null space we give the player the choice to continue onto the main path to the kitchen, or take a sidepath to fully explore the storage space. This diligence is rewarded with weapons and a bit of high ground to fight enemies from.

overview from high ground

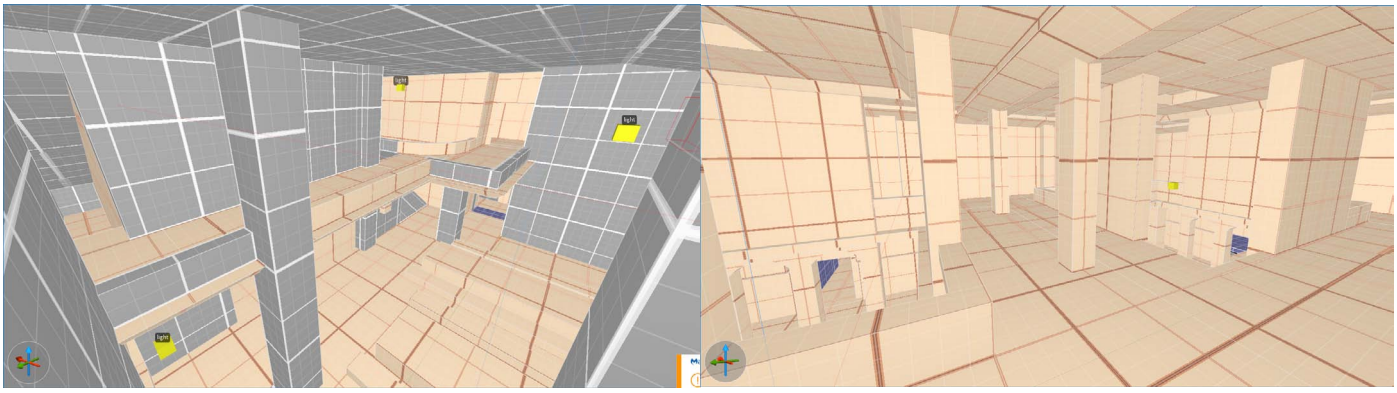


entering from main path





The kitchen then funnels the player to the dining hall. We tell the story of a renovated and expanded building through the shape language of the ceiling. Basic bend with chest-heigh covers.



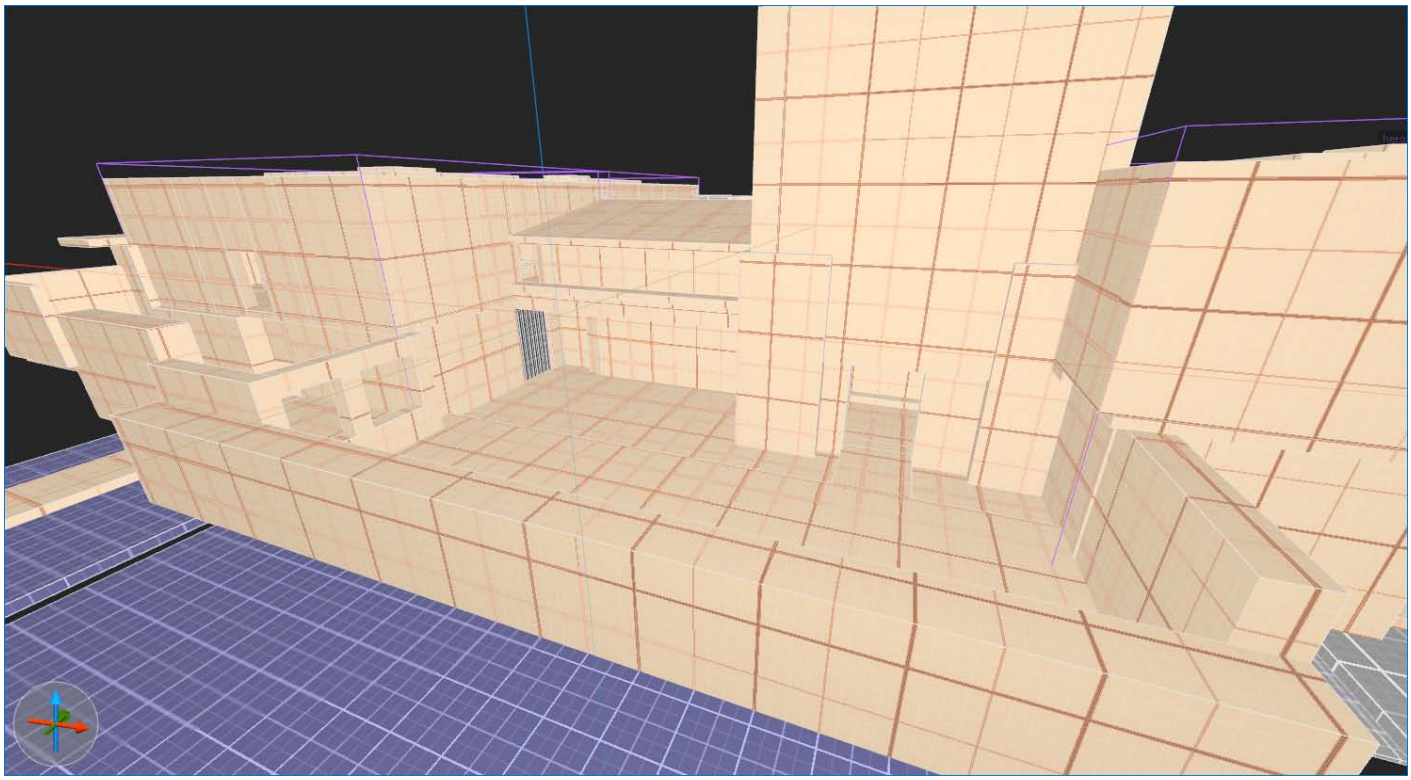
We add an extra connection to the top floor to give players the option to clear out the dining hall from the mezzanine and give the first floor a more interesting shape.

Next we change the hero space a bit. After entering from the first floor, the player is hit too suddenly with a wall blocking their way. The solution is expanding the first floor. This means that neighbouring hero spaces will encroach onto each other. This coincidentally provides us with a solution to the figure 8 problem we were having before. We join hero spaces at any level higher than the first. This also gives the player two different paths to continue onto the next area.

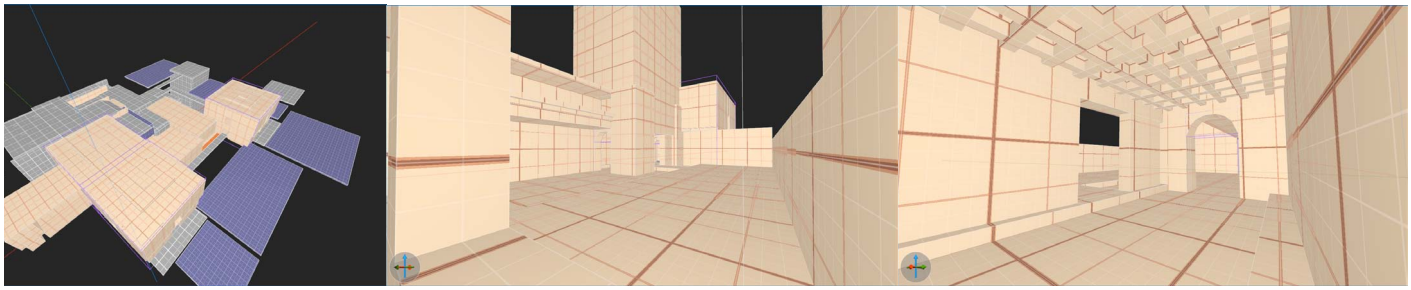
We add some detailing to sell the experience more, fill some leaks here and there and that's the geometry for the first section done.

SECOND NULL SPACE

The player is now introduced to the first hero space again and then immediately to a mirrored version of this room. That gives us the repetition we wanted in the tension graph. The original plan was to have this lead to another standalone hero space that would then slowly lead to the first deconstructed area. Some walking around shows, however, that fully exploring the map already makes players quite familiar with the hero space (we do have 8 possible entrances). That's why I'm pushing the deconstruction a bit forward with the next space already being a first step to deconstruction. We'll repeat the space again, but next to it place another hero space on a lower level.

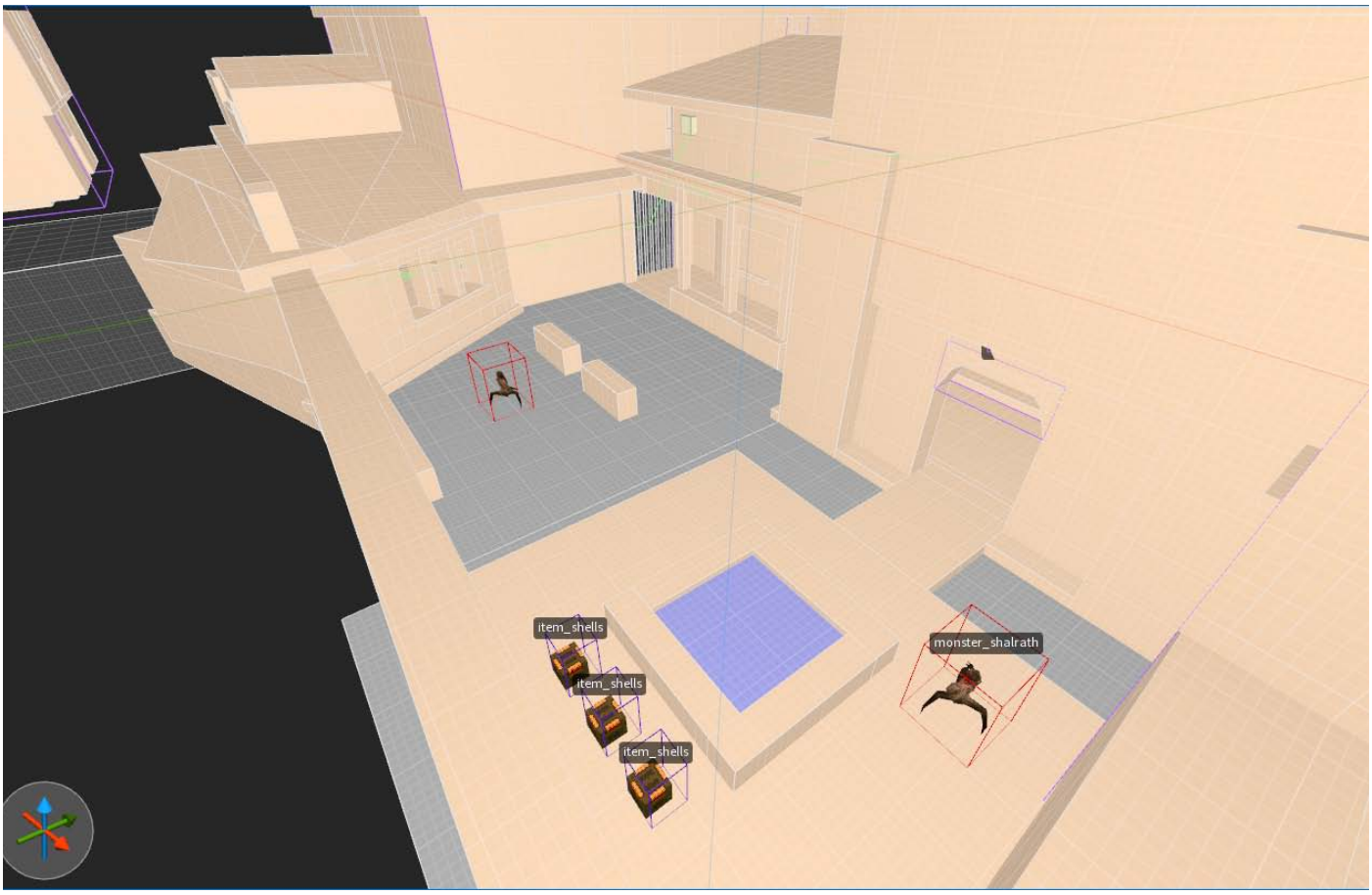


But let's talk about the null space that connects our first hero space set to our second. We want the player to follow the narrative between the two and see how they are connected. However, we have quite a bit of physical space to cover between the two. That's why I chose for a large open space in the outdoors. There's a direct sightline between the two and the entire space that separates them is instantly comprehesible by the player. It also is nice breath of *fresh air* after all the indoor spaces.



The blocking started out with covering all the exits of hero space 2. A simple staircase to the first floor in case players took the lower path. And also introducing outside to the player before we allow them to experience it. If the player just continues on their course they end up in a small room that serves a vantage point over the courtyard. Here they can activate a button to open up the gate.

In this vista the player first sees a large clocktower to indicate where they need to go. The entire courtyard is designed to feed into this clocktower, while still leaving a couple of key interest points for the player to interact with on their way there.



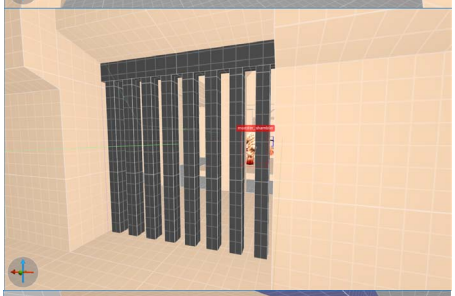
FIRST PLAY PASS

Now we have a lot of space with a designed interaction in mind. It's time to fill it out with enemies, health and weaponry to nudge players along this path. This allows us to properly playtest the space and see if the assumptions we made about the experience were correct.

In the building of the spaces I already explained what kind of experiences I wanted to build. I'm mostly following those decisions and the tension graph to place interactables, so I won't be going over every room again. Here are a couple of interactions that I thought were most interesting.

Level entrance has extra ammo and health for the player to retreat to. Rewarding their memory.

First hero space is a purely spatial experience with only a single soldier slowly wandering in.

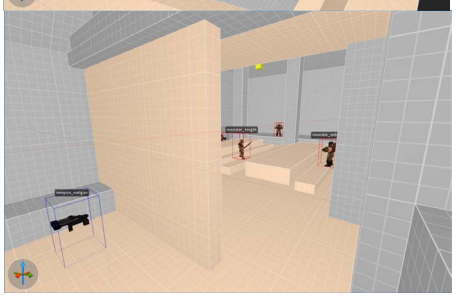


You can see (and foolishly engage with) the shambler that faces away from you in the second hero space. Foreshadowing an increase in enemy strength.

Enemies in storage room are all faced towards the center and a very easy to sneak up on via the back entrance.

Back entrance has a you stocking up on supplies while your eye is drawn to the window (movement from a caged spawn). There you see a dog walking to the door to attack you.

Shalraths are exclusive to the outside area. The first one has an area that's designed so that the player can easily counter the homing bullets. While fighting this one, the second one engages from a less favourable position.



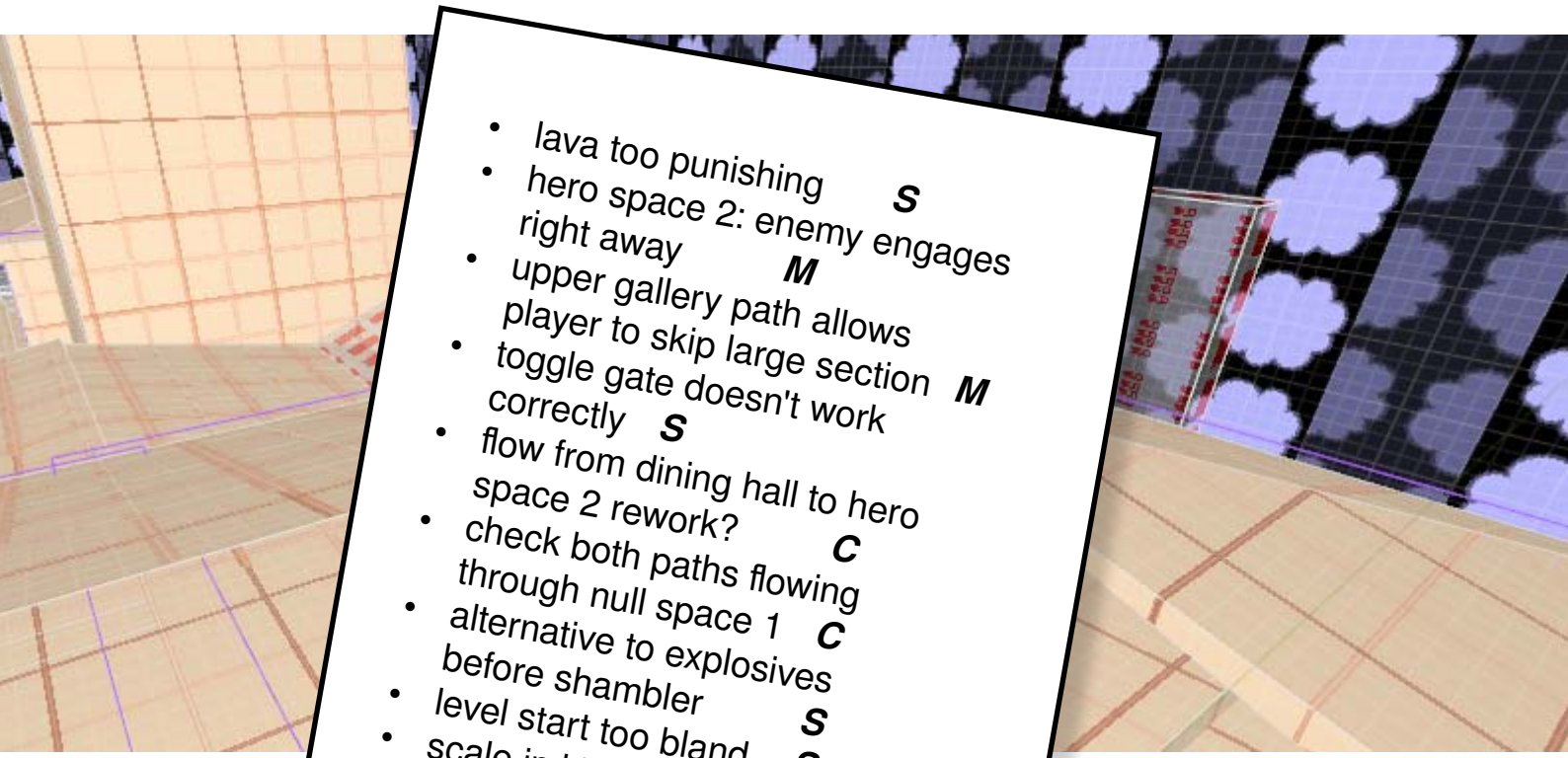
Nailgun right before the player's encounter with lots of squishies in the dining hall. Elating relief of tension.

TESTING

PLAYTESTING
At this point there is enough of the level finished to sit myself down for an actual playtest. This consists of clearing my mind and playing through the level from start to finish, writing down issues as I run into them. I categorize these problems and ideas following the MoSCoW principle. Each issue gets one of the following labels:

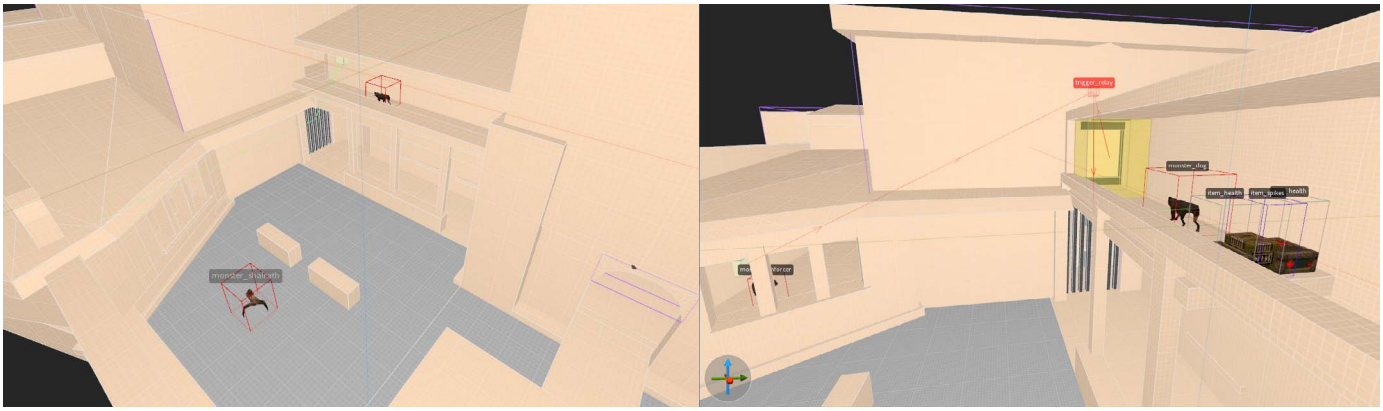
- **M**ust fix right now
- **S**hould fix before testing with others
- **C**ould fix if I have enough time
- **W**ould fix if I had unlimited time and budget

This helps to give me a clear priority of what I should change first and if things that I notice during gameplay can be fixed within a reasonable timeframe. Before I want to involve outside playtesters I need all my M's to be resolved and ideally my S's as well.

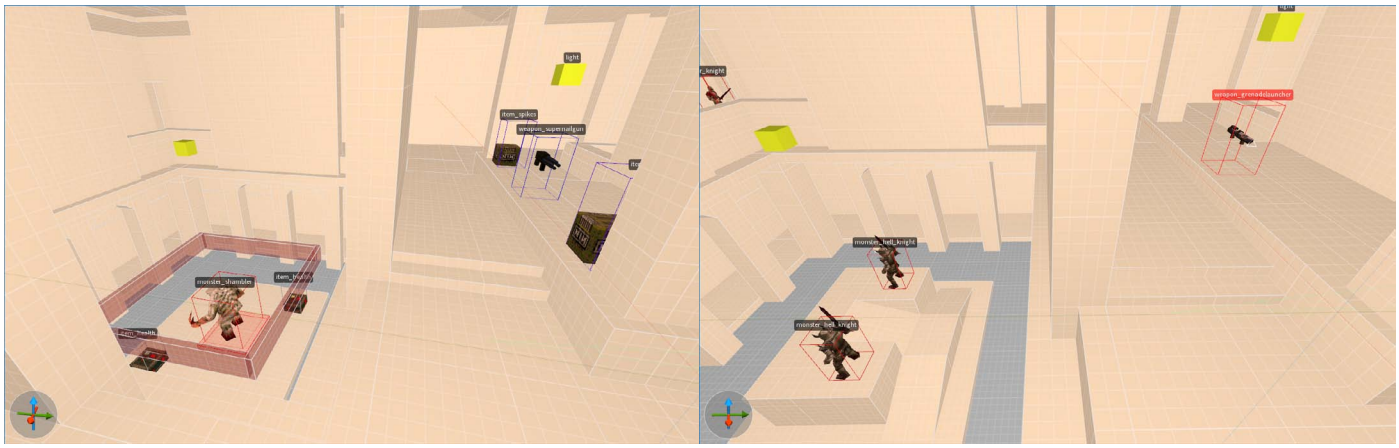


my testing notes
at this point

One of the first things I addressed was a Could fix, but it took so little time that I just wanted to quickly get it over with. Basically I set the vantage point over the garden to be at an angle. This gives a better overview of the space and the tower. It much more clearly sets the tower as a goal for the player. It also is the first time I break up the grid, giving the space more meaning in the experience of the player.



The upper gallery also needed a rework. It allowed for players to move past the the hero space much too quickly. I liked the idea of giving this option to advanced players, so in place of the boardwalk there is now a trapdoor that closes behind the player. Forcing them to fight the Shalraths with less weapons at their disposal.



In hero space 2 it was very difficult to get the right interaction. At first I wanted the player to see a shambler at the start of the stage, which they could later explode from above. I found out, however, that the shambler is strong against explosives and it would wander around too much after engaging. I tried to constrain its movement and give the player a super nailgun to fire more accurately, but the magic of the moment was lost. I ended up replacing the shambler with two hell knights that need to work their way down from a pedestal. We still get foreboding and comeuppance this way.

REPEAT

FAST FORWARD
We're now a week into the project and about a quarter way through. I don't have enough time free time left to keep up writing down a concise play-by-play of every decision, so from here on out I will describe my process more globally. Fortunately for you, we have already gone over every individual aspect that composes my process.

I also took a little summer break at this point to participate in a game jam in South Korea. Getting a chance to come back to your work with a fresh mind is always a delight.

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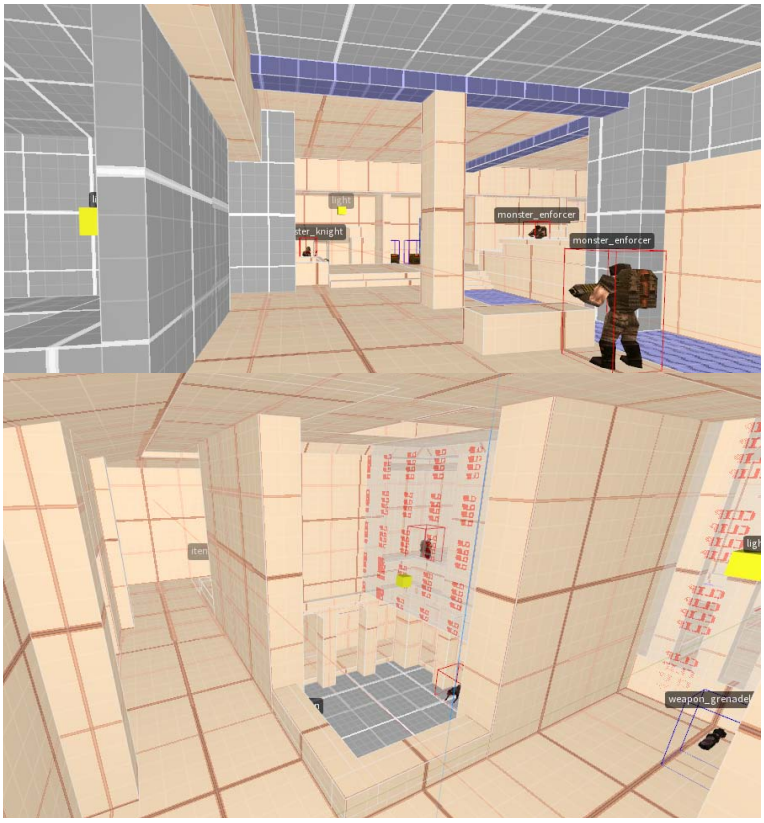
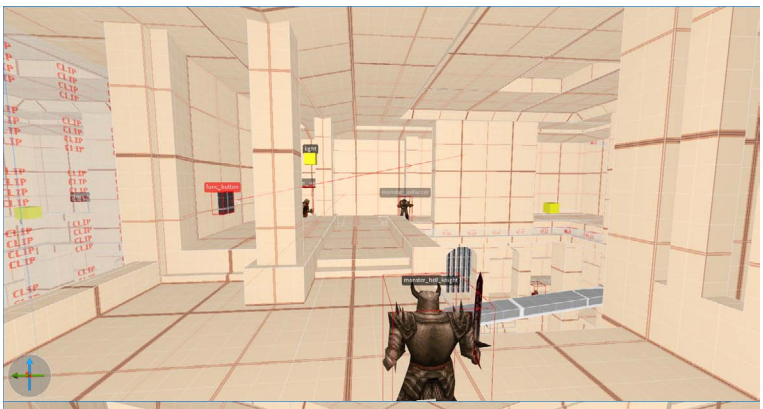
day 1 I'm alternating between playtesting and improving existing spaces and working on adding new spaces. It helps me find a flow in the ways players move through the space and find the flow of the level in general.

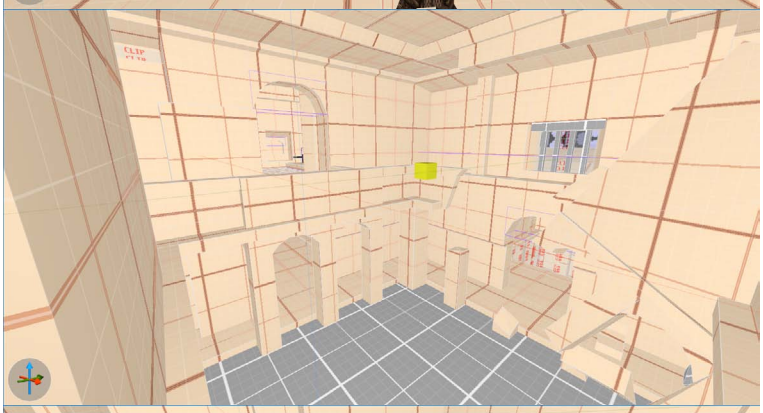


Added more cover opportunities to the kitchen and seperated the enemy layout in clearer waves.

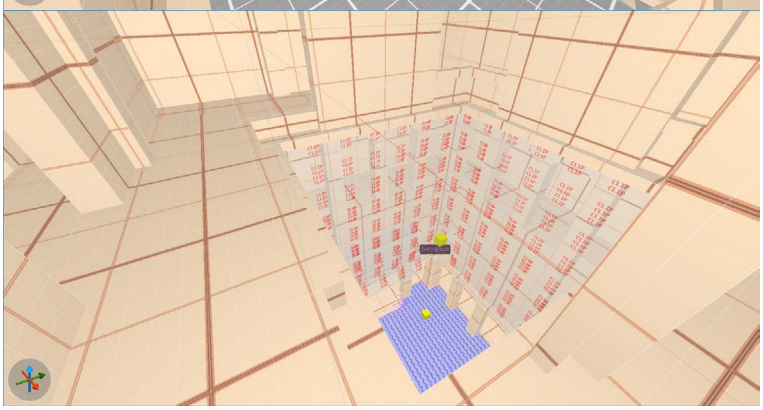
Player is encouraged to take the upper path through enemies and is rewarded with extra weaponry. Drops down after this "bonus."



With the previous path rearranged, I had to look critically at everything that was connected to it. The upper floor of hero space 2 was now a dead end. It made sense to move the button for the large gate to the focus point of this section.



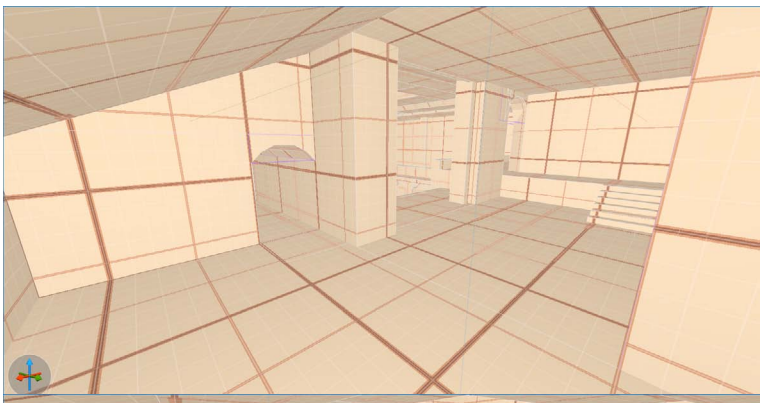
Hero space 3 is put together. A simplified room path. I want the player to be able to move through it quickly, since they are so familiar with it right now. Broke one of the facades to indicate the critical path.



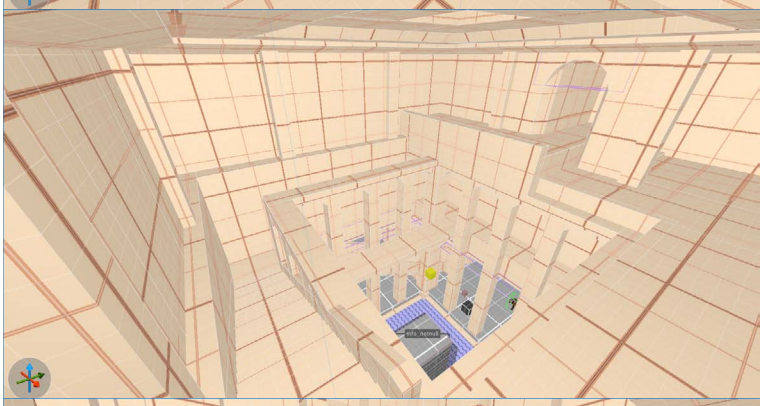
After this the player plummets into deconstruction. They fall down a large chute of repeated hero space floors.

day 2 I wanted to move forward a bit, so I ended up blocking out the last remaining section of the level. Going for a large drop and a danker dungeon atmosphere.

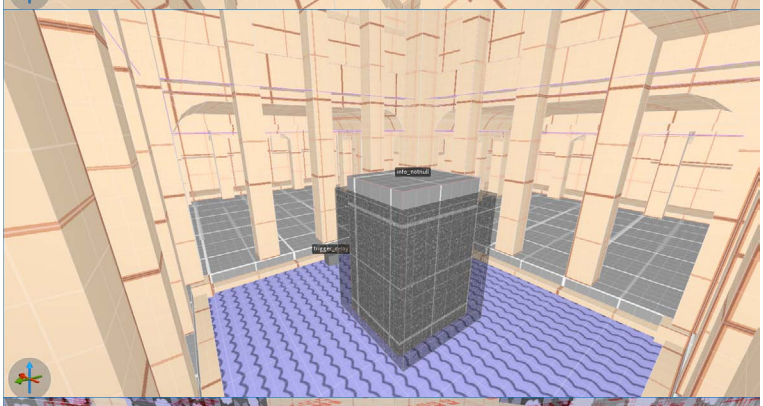
Large closed of gate with side chambers.



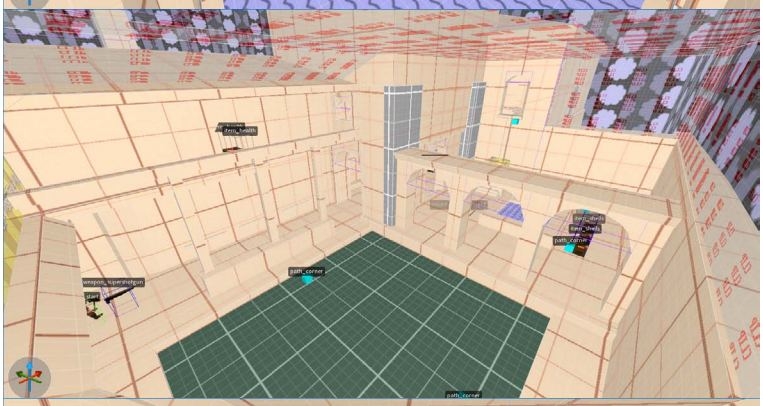
One of the side chambers opens up to the atrium.



Large staircase spiralling down to the ultimate destination. Small hidden path gives player access to area between floors.



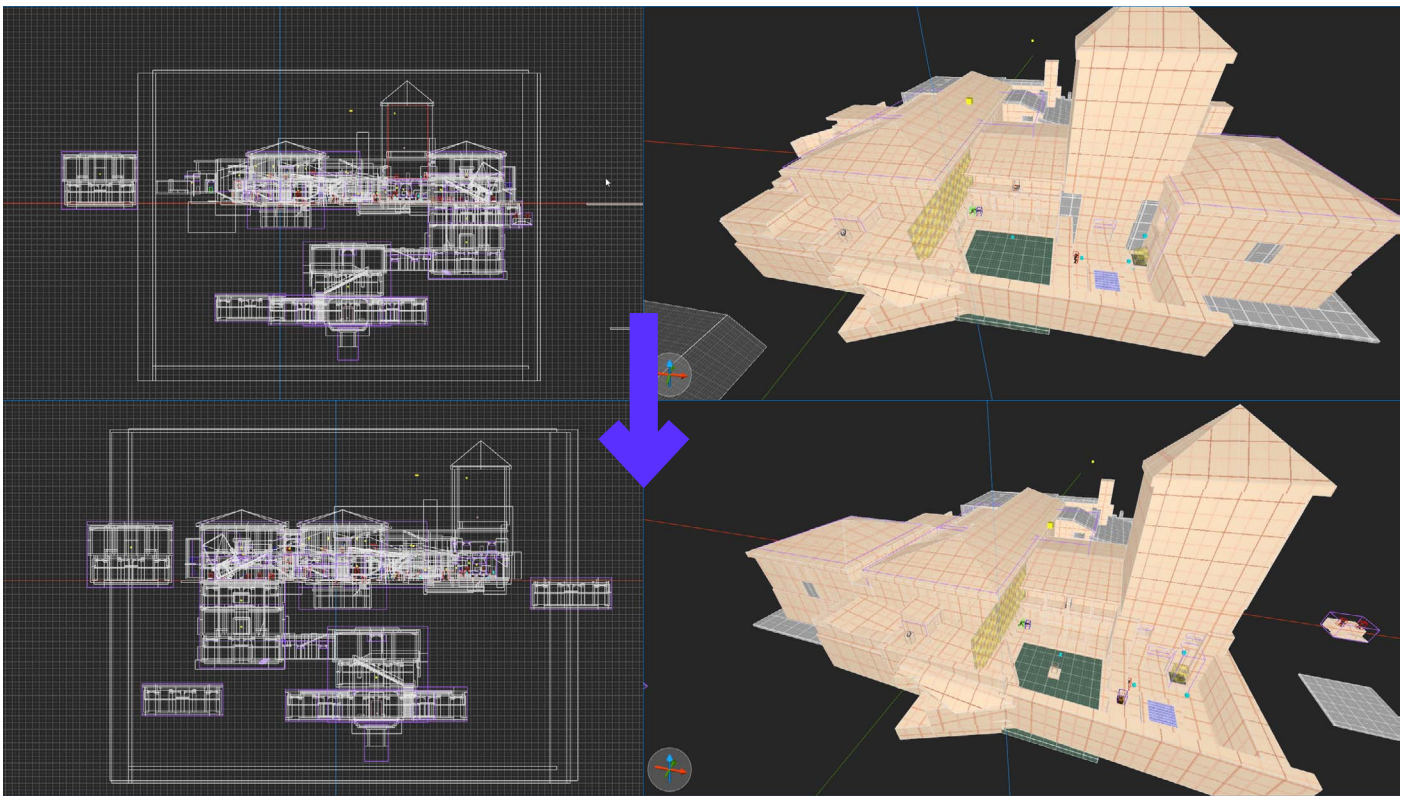
Shrine pops out in the center after the objective here has been achieved.



More clear divide for the two sections in the garden. This area isn't flowing nicely. Removed the enemy encounters here for the time being.

Playtested with some other people for a bit to test out different encounters.

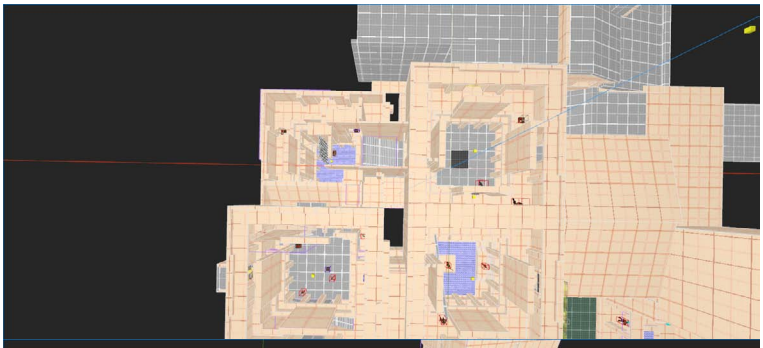
day 4 The fourth day, in which a miraculous breakthrough is achieved. And I feel so proud that I want to explain it in detail.



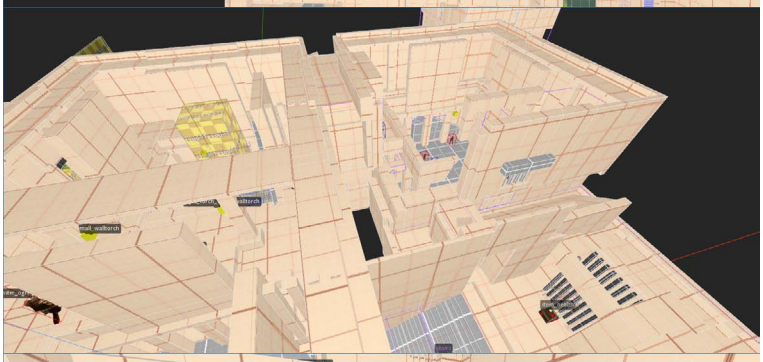
I was struggling with connecting hero space 2 and 3. It was just too much of an unexplained dead zone. A long straight walk without anything interesting to do for the player. There's friction here in the way tension is heightened and released. The section directly before the garden has variable tension with different paths that lead out into the open area. This means that if we release the tension on the path to a new area we might give a breather to one player and horribly bore another.

I liked having the moment of pause, though, so I went forward with accepting the peace as a destination instead of a transit path. That's when solution clicked for me in the most satisfying way. I flipped the third hero space and all the of the boss chamber on its axis and moved it all the way to the left to directly connect to the second hero space. Now the player has to pick up a key in a dead-end garden to continue to the the third hero space. It's up to them to decide when to continue. Making it less utilitary changes the entire context of the garden to a more pleasurable space.

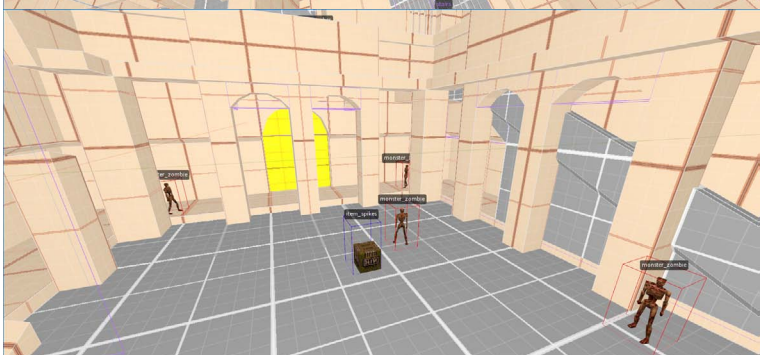
The connection of the hero spaces also makes for a nice square layout. I was afraid of doing this during the initial blockout, because the route might become too predictable. Having ran the route a couple of times now, I can say there are enough digressions from this path to engage with to keep the player guessing.



Overview of the newly made square layout.

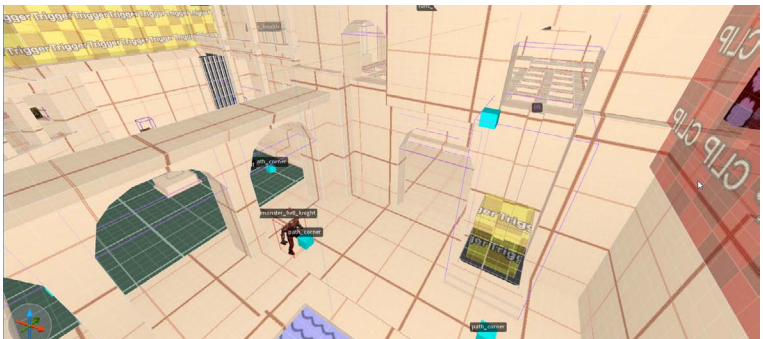


Quite a bit of time went into properly moving and welding all the geometry. The chute underneath the level start was a very tight fit.

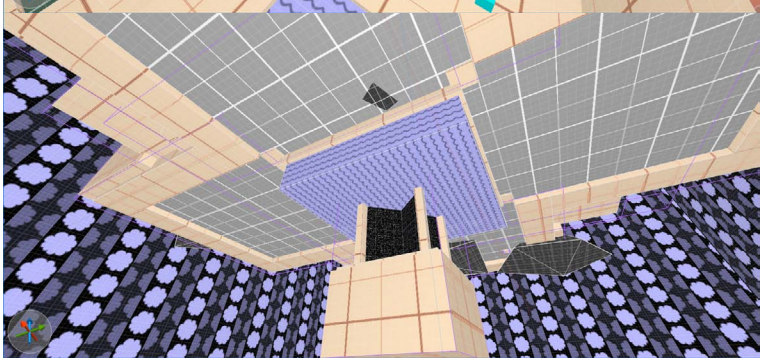


Designed a new encounter for the third hero space that consists exclusively of zombies and explosives.

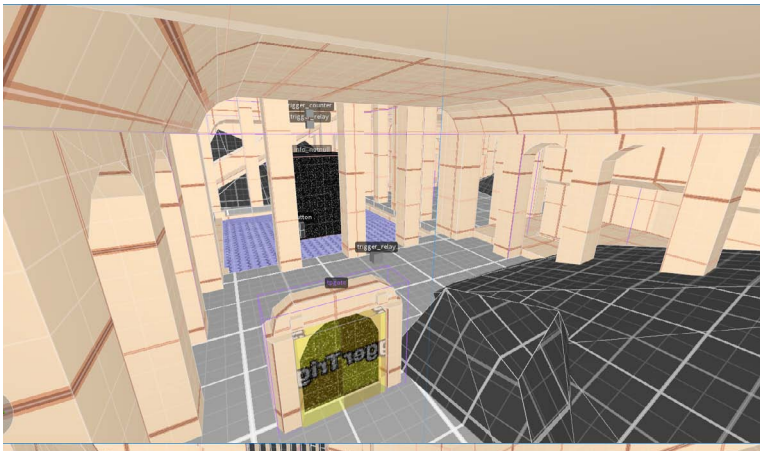
day 5 Fleshing out the last areas. Also ran through the level a couple of times with a new tester, added some pickups everywhere and moved some enemies to better foreshadow their presence.



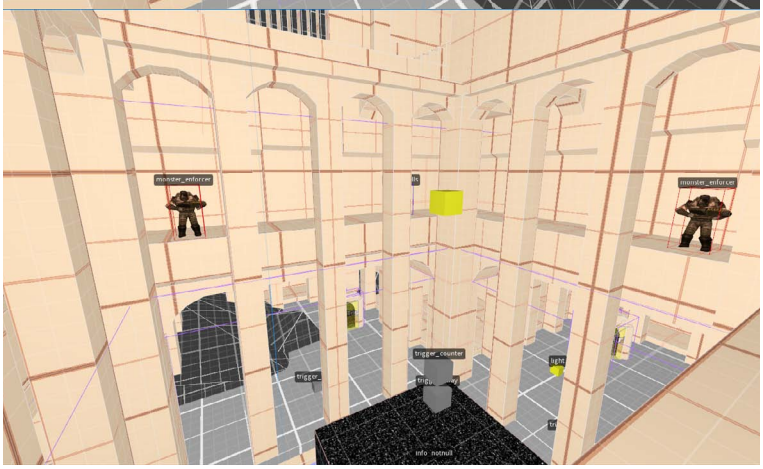
Hidden space on top of the grate and a couple of little fixes to make the garden more interesting to explore.



Scripted the final teleporter to move up through the floor at the end of the level.



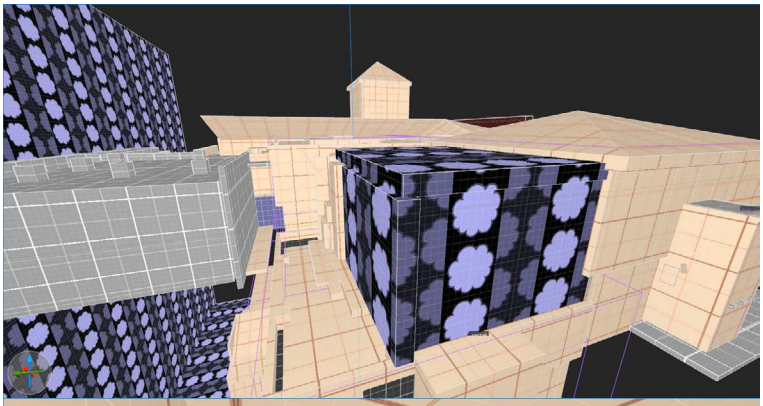
Designed the "final boss room". Players walk through four different gates to summon the final gate (and enemies in the process).



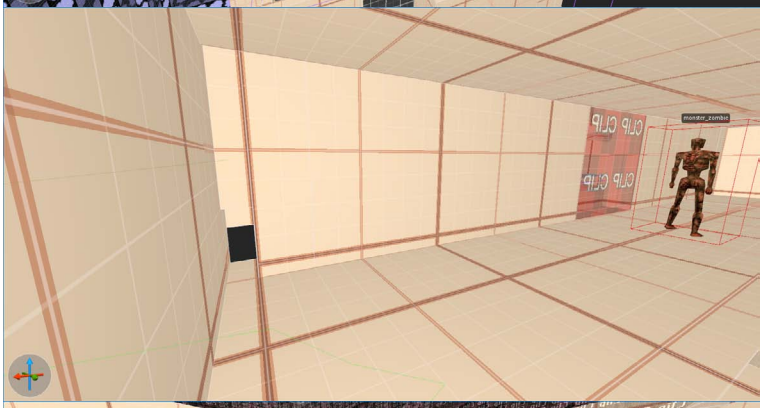
The place is now more heavily guarded to build up the final encounter. Large heaps of "something or other" to indicate the end of the path and a used space.

day 6 Mostly a day of maintenance and preparing for texturing. I started doing large light volumes first to give a broad impression of every area.

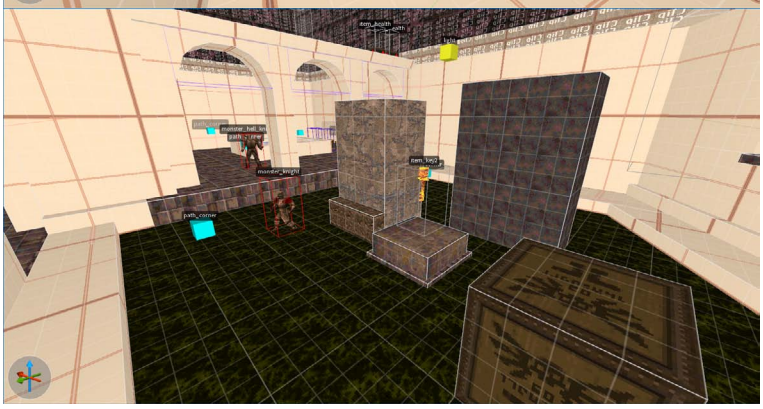
Did lighting for most of the areas to indicate where to go and where to look.



Replaced the large bounding skybox with smaller local skyboxes for optimzation.

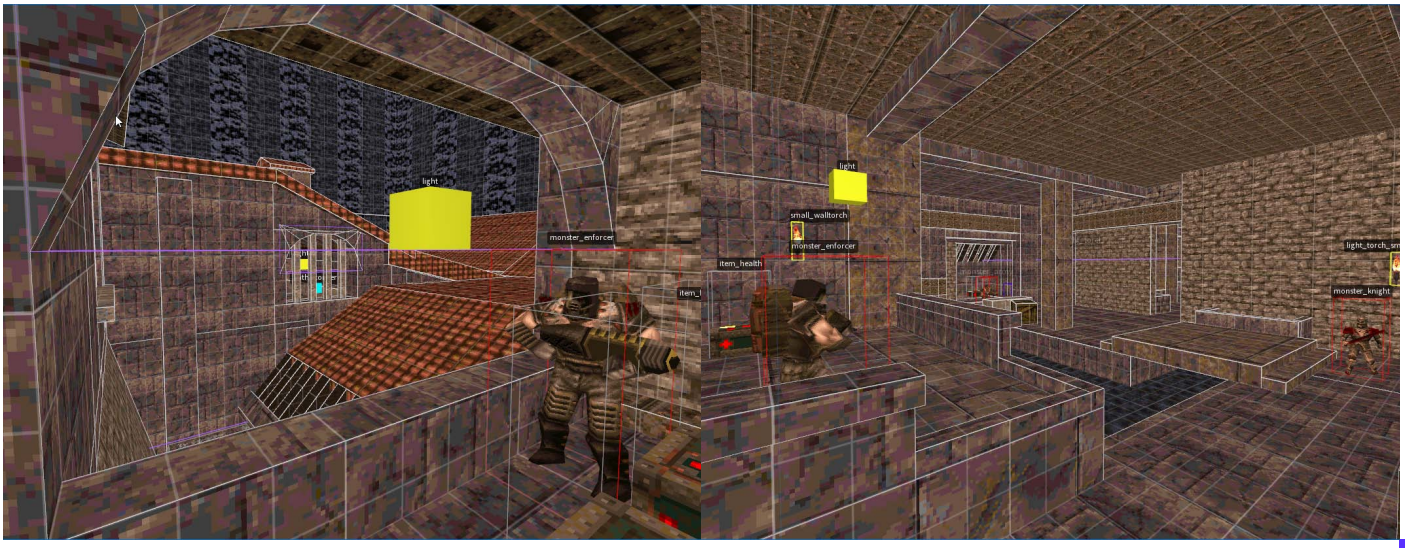


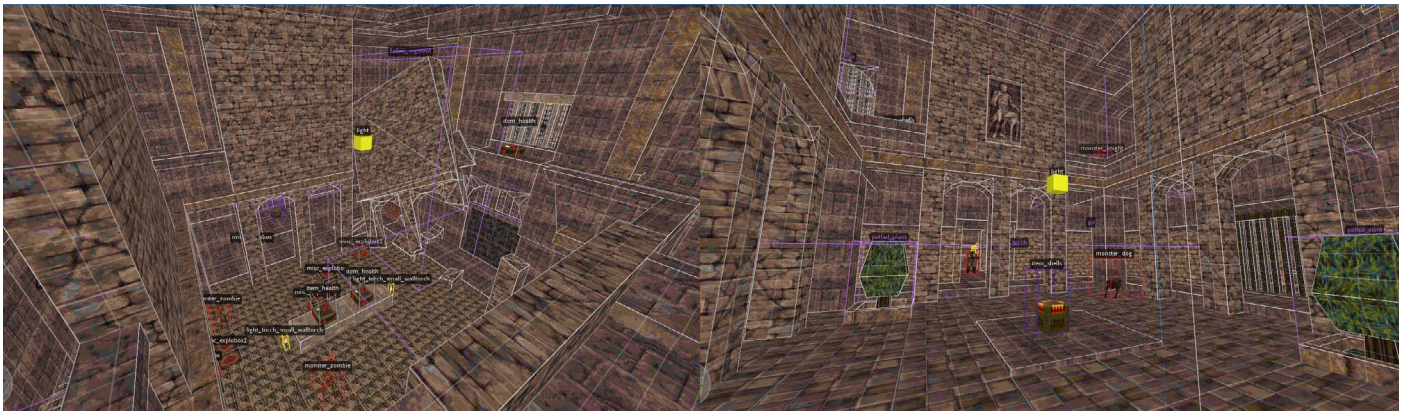
In the process I'm finding leaks in the level and temporary brushes that I intended to delete earlier.



Started experimenting with texture wads to use. *(Ended up going with Hexen2 and hipnotic.)*

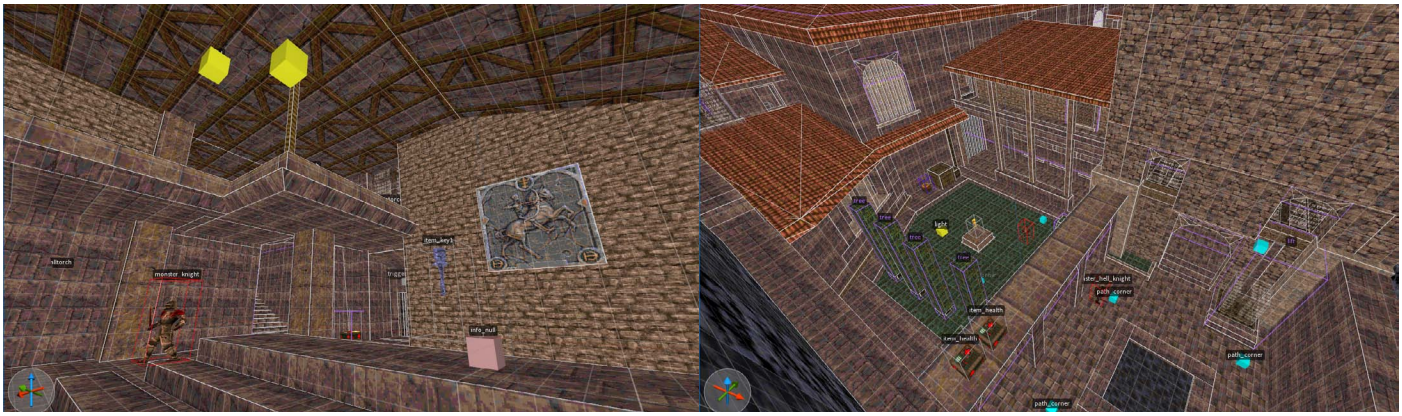
day 7 Texturing! It has a very slight connection to the topic of greyboxing, but it just makes that much nicer to play for people outside of the project. That's why I took out a day of texturing before getting some online consultancy.





At the end of the day I sent a beta version of the map to some online friends and shared it on a Quake Mapping discord server and the func_msgboard. They sent me back some demos of them playing the level and I got some valuable Quake-specific feedback about lighting and indicating key use.

In their opinion I could also up the difficulty a bit. Since this was one of the design goals I hesitated to bring about dramatic changes on this front, but I decided to add some enemies in places where it was optional to fight them.



notes from the demos

Heresy

- *Need a secret in the beginning*
- *Higher contrast in lighting*
- *key symbols next to door*
- *texture alignment (ceiling start, boxes in storage)*
- *hide the door going up*
- *more push to jump down the shaft*
- *more things to do at the end*
- *more enemies*
- *less ammo/health*
- *better indication of secrets*
- *remove light from worldspawn*
- *more detailing*

Chris Holden

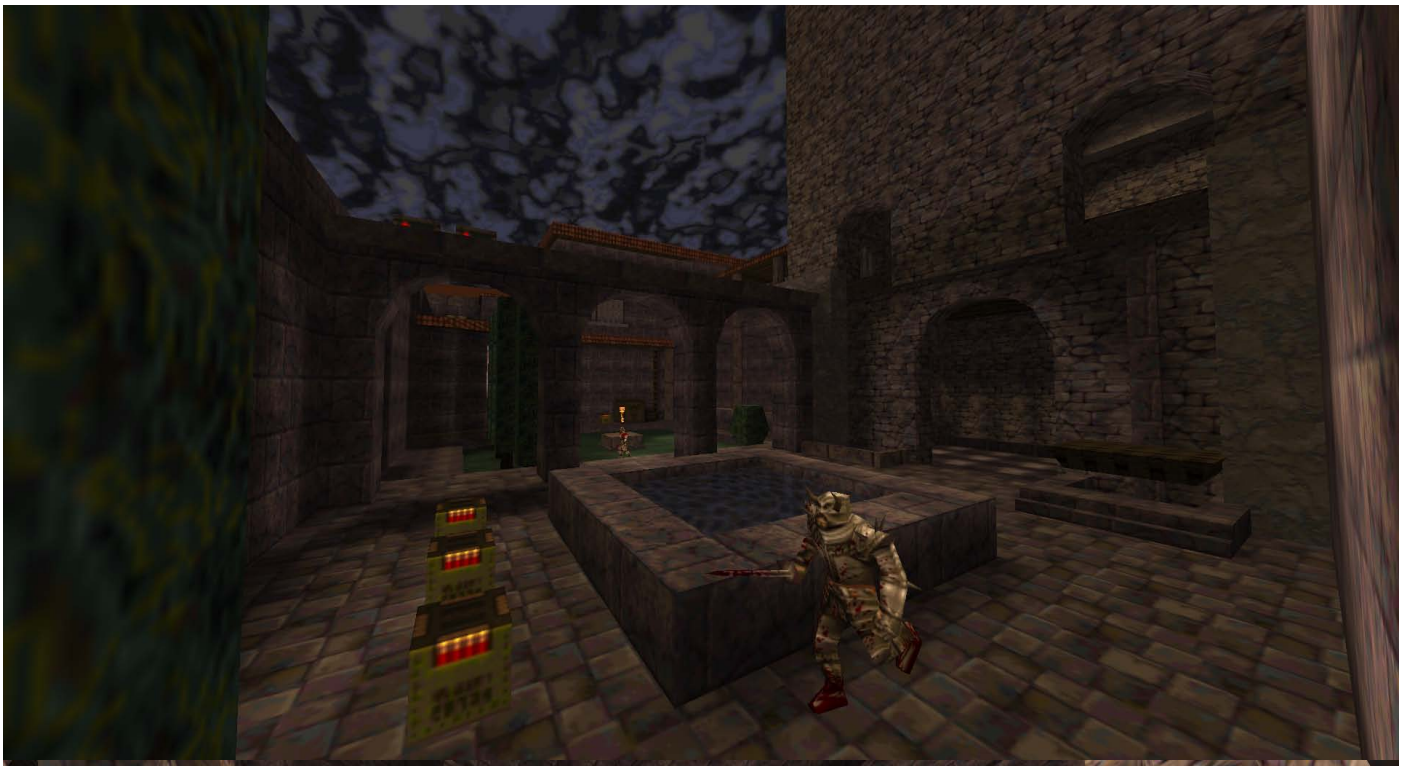
moved through the downstairs garden window and got lost.

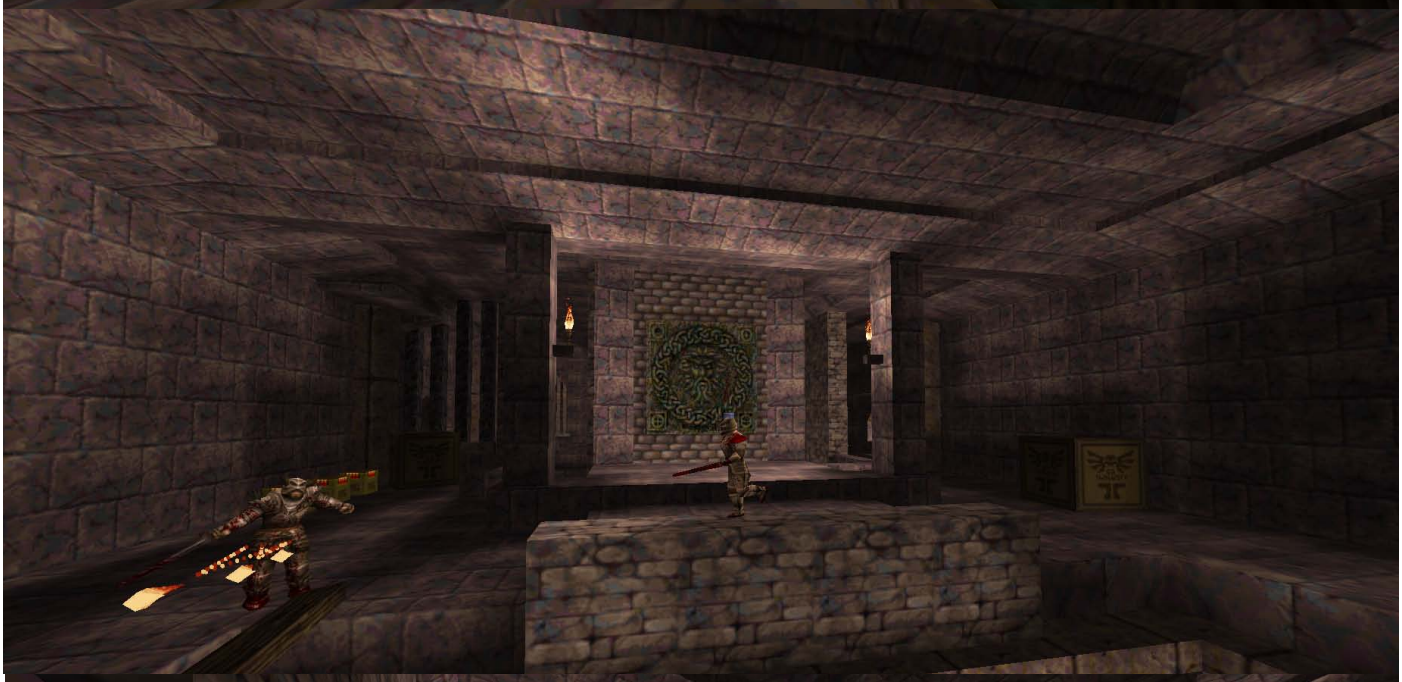
Cocerello

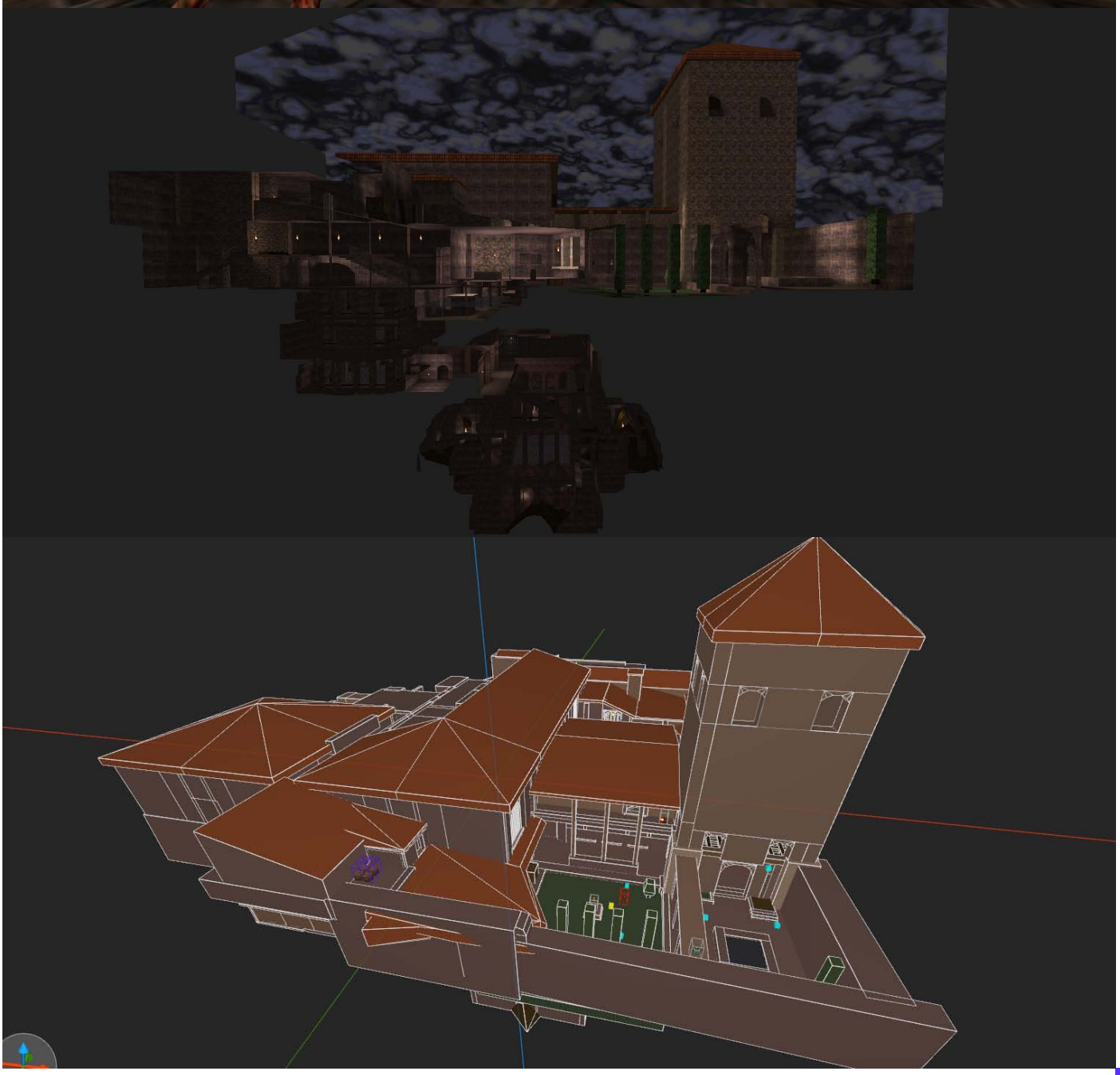
- *Lighting is dull, while low contrast lighting is ...*
- *beginning should not be marked for, as they open without a key later, which can be misleading.*
- *You may want to add a silver or gold key texture like in id maps to make it obvious for everyone they are for that. It can lead to misunderstanding and people getting lost.*
- *That ring of shadows probably needs to count as a secret.*
- *Those crates you saw me looking on while on top of them need the textures to be aligned, but it also seems that all of them have the wrong size compared with the texture they use.*
- *You should probably put a non invisible wall on top of that rooftop or any other mechanic.*
- *Theres too many green armours, even for skill 1, but better too ...*

The feedback I'm getting from the playtests are now more and more focused on the polishing side of things (detailing, texturing, attuning lighting). I'll keep polishing the map for publication, but for the sake of this document I'm calling the map finished right here. Otherwise we would stray way too far from the subject of greyboxing.

SCREENSHOTS
nantes.map, 31st October 2019







CONCLUSION

FINAL THOUGHTS
The map came together in a total of two weeks with a couple of breaks in between and I'm fairly happy with it. I would have preferred to have settled on a setting/theme beforehand and there are some sections that could use some iteration to let them really shine (the section between the chute and the boss room is very linear and not very engaging). All in all it was very fun to work in the Quake engine and Trenchbroom is a delight. I'd heartilly recommend it to anyone starting out with mapping and level design in general.

I remember looking for detailed documentation of design decisions when I was just starting out with creating levels. When starting to learn something new I first like to emulate someone else's workflow before making it my own. However, I found it very hard to find accounts of the day-to-day of designing. I hope that this write-up proves useful for someone that is looking to make a start designing maps.

I would also like to state that this is how I personally like to design levels. My background in architecture makes me want to design the space first and then find interesting interactions within it. Others might like to think of engaging encounters first and then puzzle them together. As I said in the beginning, there's not one way to go about it; you have to find a style that works for *you*.

Thank you very much for reading!

If you have any questions or comments, feel free to email me at: **jasper@oprel.work**
Or you can find me on twitter: **@jasperoprel**