
Virtual Reality

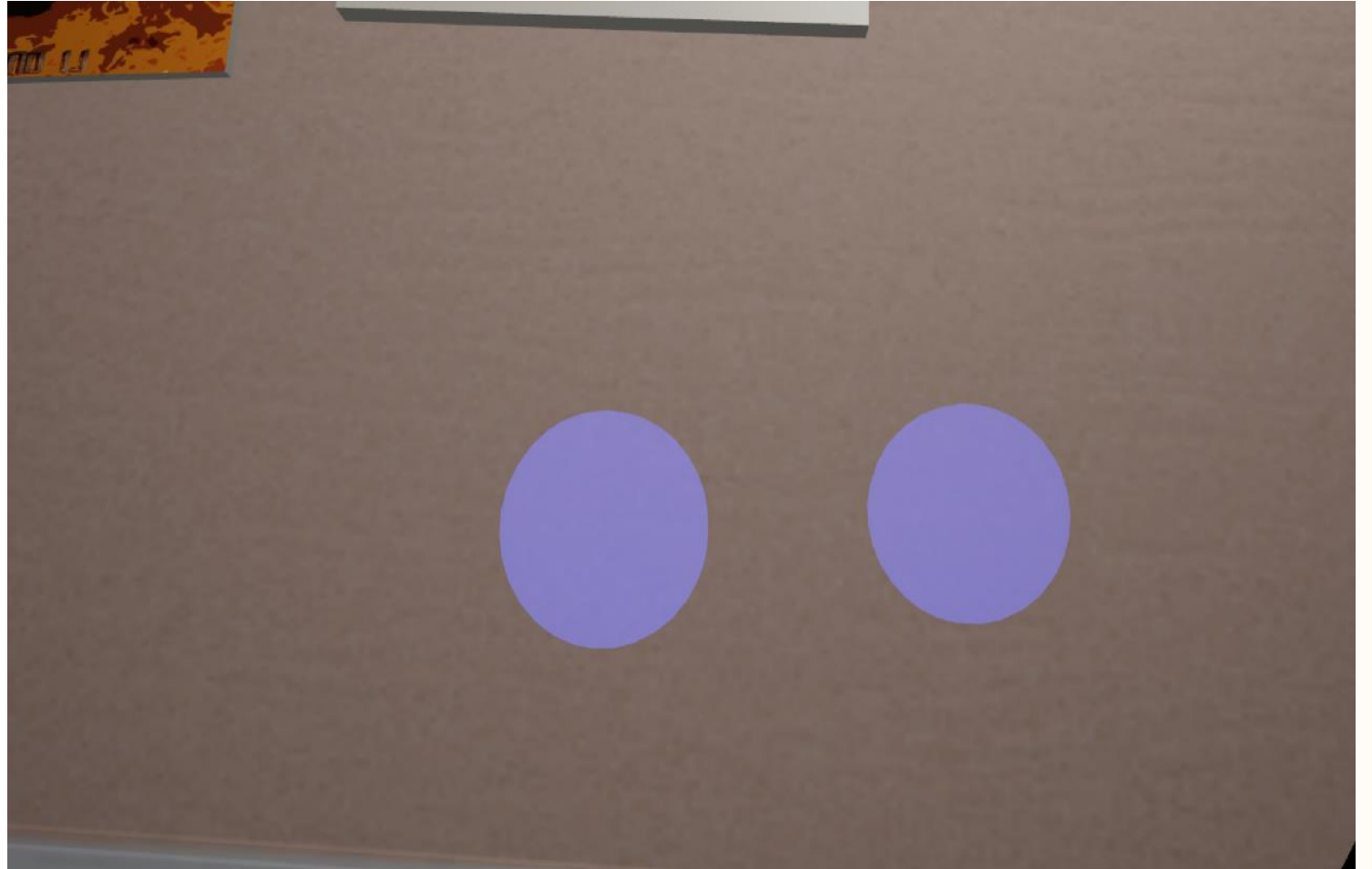
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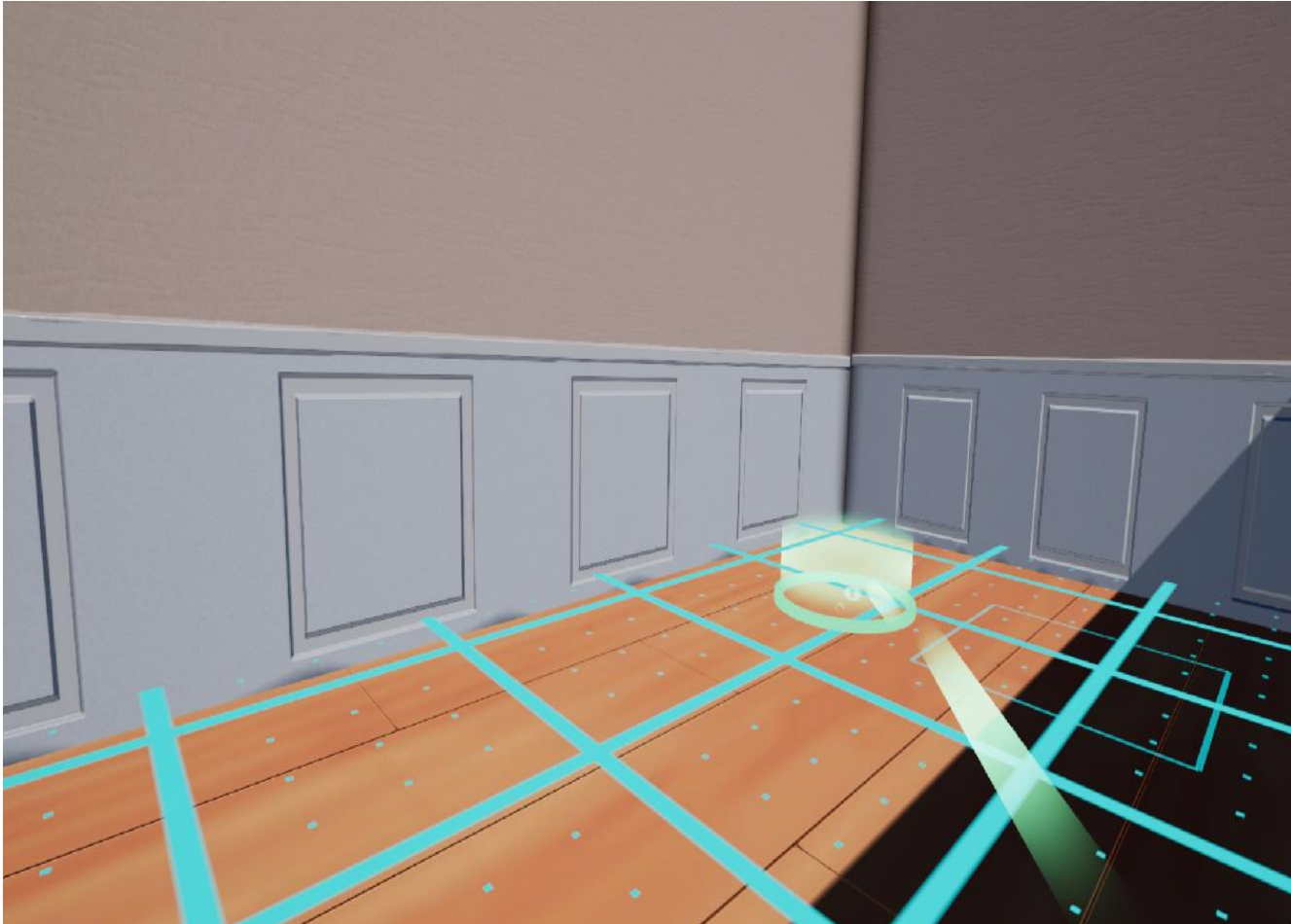
GROUP 7
LEWIS SIMON PREEN
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Hi, I'm Lew, the Lead Designer of Group 7. I was also the only designer of the team which meant everything that was done in the games engine was created by myself, from; blueprints, sound effects implementation, character controls and mission design. I worked alongside the teams Lead Artist/Animation with the project ideas. I came up with the idea to have a couple of mini games that could utilize the VR technology in an entertaining way. The group decided that the bedroom environment should be based on a teenager's room and he would travel to various locations by opening doors. I found this too simplistic and instead offered the idea of travelling via books that the player can open, this ended up being selected for the idea. For the mini games first, I created a playable dungeon that has AI interaction, puzzles and a weapon system. Then I created a mini game that involved moving objects for a character model that was to be animated to move along the world.

This was my first-time using VR equipment, so I studied a lot of Unreal documentation and watched YouTube videos for reference to find the limitations of what was possible for the project. Because I found the original VR set up to be a bit jerky. I first researched on creating my own VR character model from scratch, following a video on YouTube, I was able to create my own player pawn that had various different function mechanics that it calls upon when picking up objects. Such as; holding the item, pulling and pushing items and shooting from the item. To make sure I wasn't plagiarizing someone's work, I adapted and modified parts of the tutorial until I got a feel for the character that was smooth.

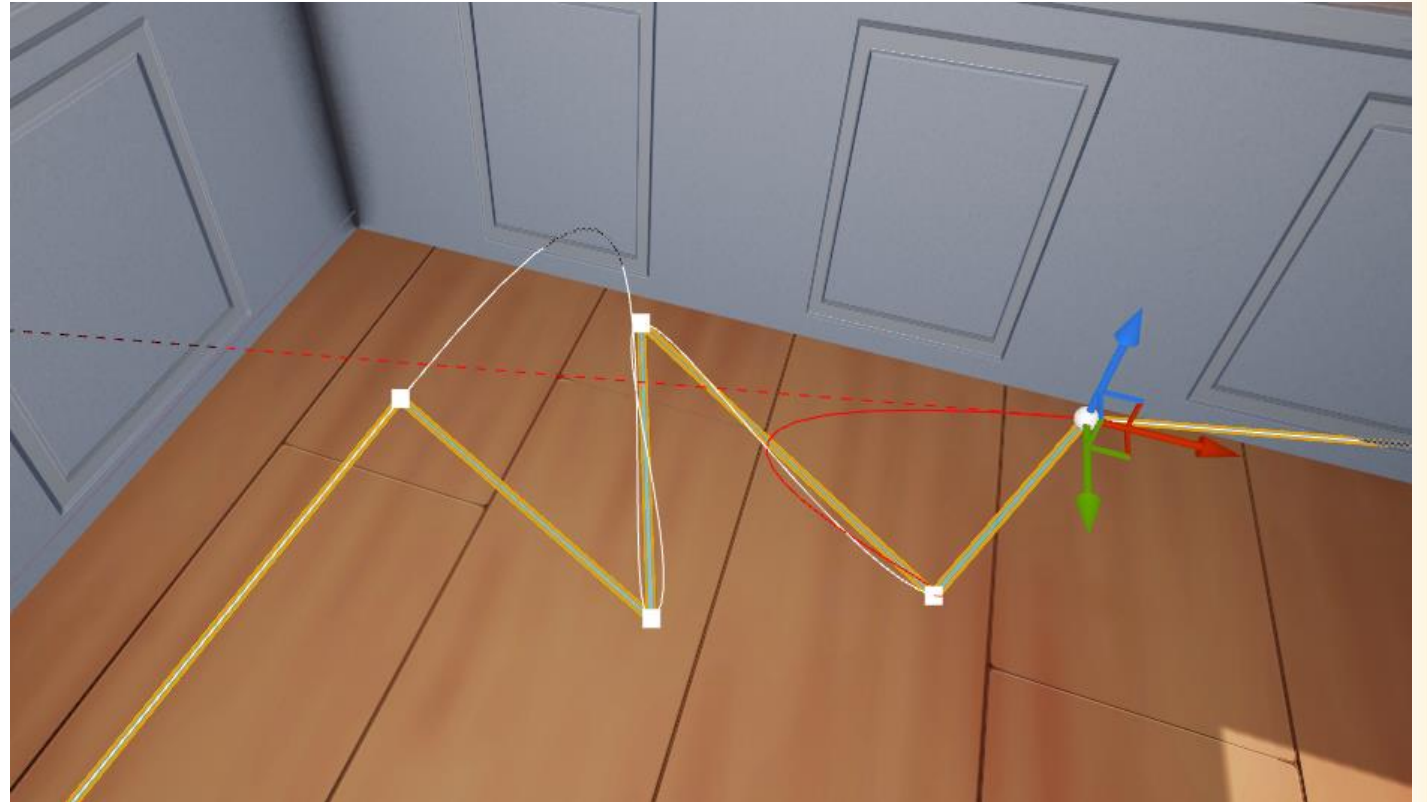
I found the original hand blueprints in the game to be a hassle especially when gripping items and snapping them to the precise location. In addition, when testing in VR you had to make sure you had the correct controller in the correct hand each time you played. To alleviate the stress of this I turned the player character into two balls this way it didn't matter which controller you picked up they appeared left or right.





I then moved onto making my own teleportation system which is basically an improvement on the game engines Nav mesh bounds, which the player character uses to move around the game world. Following again another tutorial that I adapted I was able to create a zone that allows the player to walk and teleport around. I wanted the player to be able to see when and where they could teleport, so I attached the grid to the level. This means the player can see where they can teleport too when they access the button on the controller and shows no grid if something is blocking them, for example the couch in the bedroom from behind stops the player jumping through it and makes the player walk around, like you would in real life

The most interesting part of this blueprint is that the teleportation grid is set up with spline points, this means I could easily create new spline points and create a turn point (as seen in the dungeon level) or block off specific locations that we didn't want the player to be able to teleport to.



For the bedroom I just created a simple box room that I asked the artist to create specific models for and I would place them accordingly. I wanted most things in the bedroom to be intractable. So, with the pick-up function assigned to the player character I was able to make objects in the room get picked up and tossed around. However, due to the artist workflow some items had backwards facing cull on which meant they had no edges on specific objects which showed off no texture. This was a positive because it also meant that the game didn't suffer from too much lag from over used textures and materials but a negative meaning what could be interacted within the level. The intractable objects include; books, a set of headphones, cola can, picture frames a Phony PlayStation Controller (play on Sony), a pen and some headphones.



I wanted to make the bedroom a little more entertaining and because of this I created (again following various tutorials online) a whiteboard that the player character could interact with. The player character can pick up and draw on this white board and features a rumble function that lets the player know if they have pressed down to hard or is overlapping the board. With the marker pens I made it so they were editable in the engine so I could place multiple pens and change the colour that the pen produces, and also the size of the line it creates, I would of liked to work on this a little longer and create different strokes so could be used for water colours or like pencil drawings, but sadly time was a factor.

Due to time restraints the artists never created a pen texture for the object either, but this isn't a negative because the model created by me was good enough. I also created an eraser function that lets the player rub off the pen from the board. In play testing most people just spent most of their time on the white board forgetting the rest of the room existed.

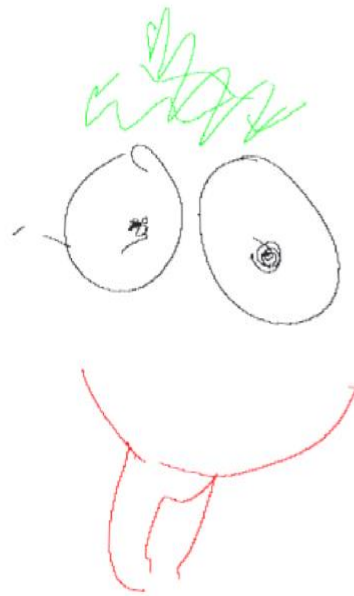




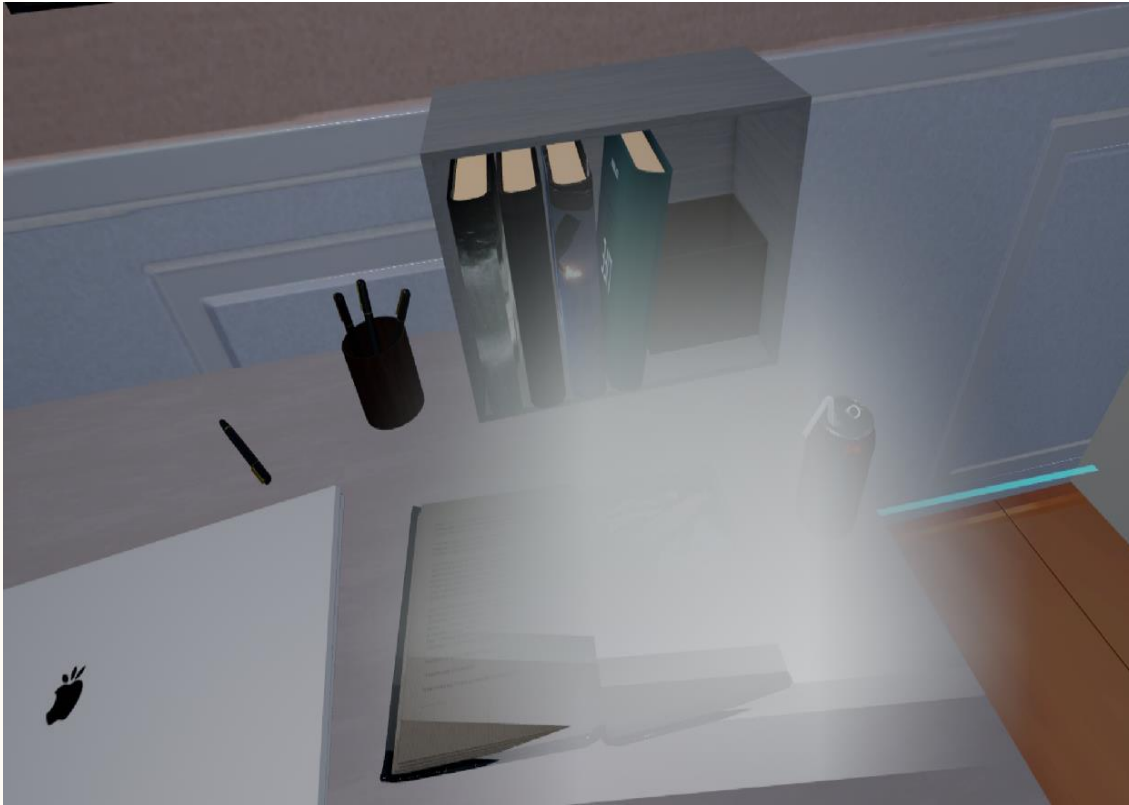
Hi



Pins



The image shows off the various colours that have been created (excluding purple) to create something on the whiteboard in play. Where the blue balls are the player character is actually holding the eraser and as you can see has rubbed out half of the word.



The books on the desk (of which there is only one at a time) is how the player navigates various worlds. I wanted it make it feel like the player was getting lost in a book that he/she was reading. Due to limitations of the VR controls with tracking and collisions to enter the books and traverse to different worlds I created a simple invisible button that activates when the player presses down onto the book which sends a signal via a blueprint to open the book. This then sets off a particle system of fog that engulfs the player as they are then transported inside the book.

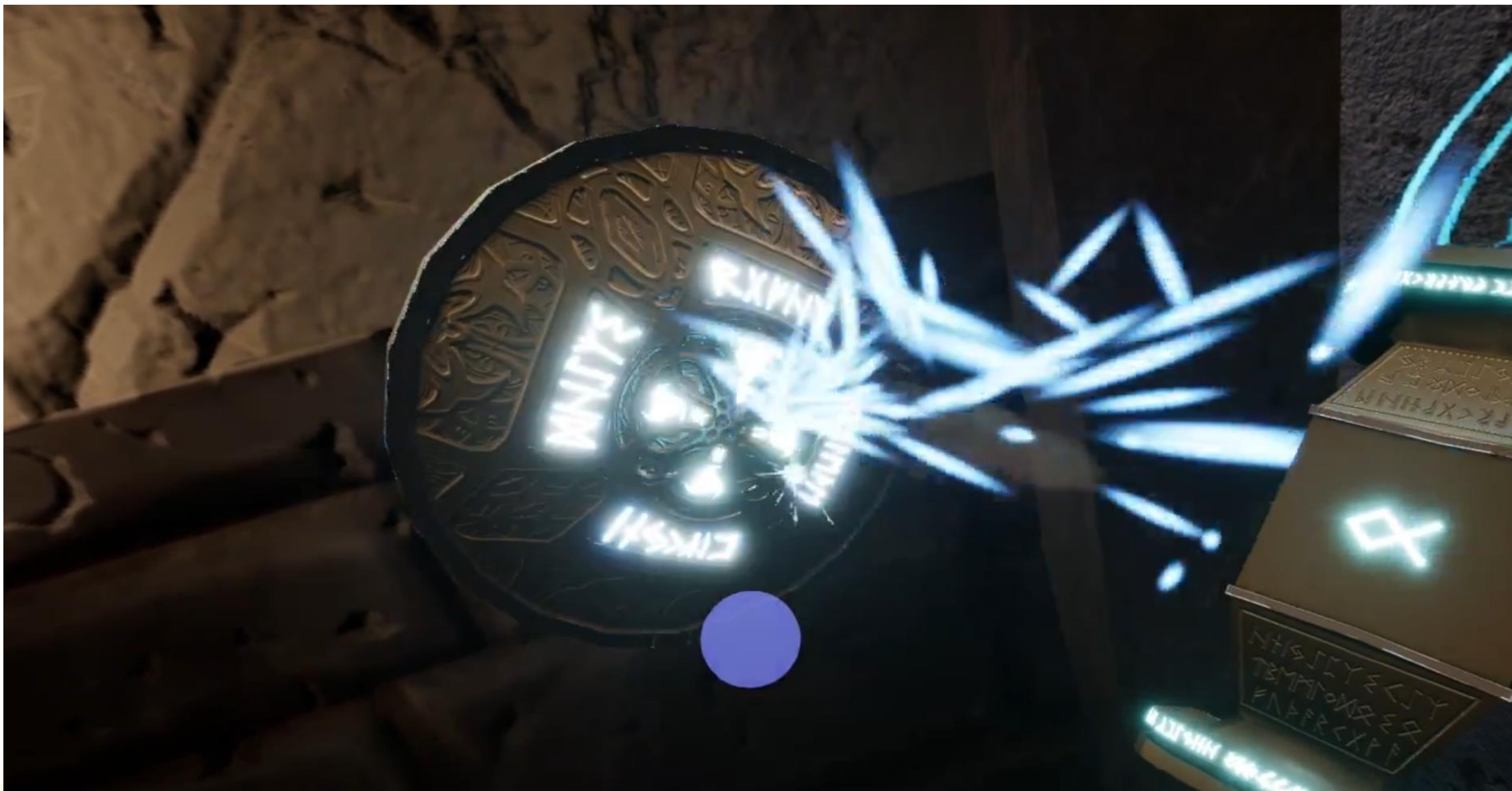
When the bedroom was completed, I then started work on the Dungeon level, personally I wanted this level to be filled with puzzles and different traps and triggers as I knew the limitations of the controls. But the team wanted enemy AI interactions which can be a bit of a handful and when there is only one designer it was a lot of additional work to added on top of what I already had planned for the level. I created a simple puzzle that required the player to find specific items and hold them against a door to open it, this worked for various playtesting purposes until I started playing around with AI. This was because I tried to create a melee function that the hammer could interact with the enemy, but due to the functions I had created to make the item a physics actor it wouldn't collide with the enemy AI. I tried to fix this by making the weapons collision overlap all and block all dynamic but when this happened the hammer you pick up wouldn't be in the correct location and fell through the game map into oblivion.

To counter this I made the hammer shoot magic out of the top and this became a key feature to the dungeon as the projectile it spawned could become an overlapping object. Using this projectile, I was able to have some creativeness about the level and made the doors now work only when they were shot at with magic. The enemies could now be destroyed, and I also got them moving on their own blackboard tree that lets the free roam. Originally this was an issue as they couldn't sense the player character even when I added an invisible box to the players head. To counteract this, I had the enemies trace the hammer itself meaning that the enemy AI would only chase the player once they saw the hammer. The model I used for the enemy AI was a Goblin was sourced from the Unreal Mixamo pack and the animations from the Adobe Mixamo website.



I wanted to make the second puzzle a little difficult, so I created a bunch of new materials that made the shield pickup no longer have an emissive glow to it. So, when the player approaches the door holding the shield it doesn't open, because its not powered up. For this the player must work out they have to use the magic hammer on the shield, it will glow, allowing the player to continue.



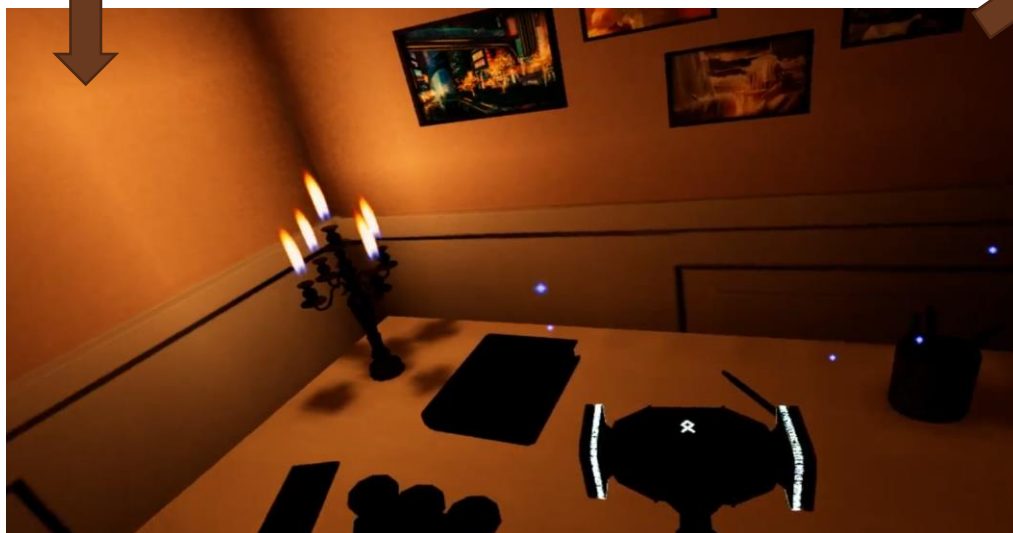
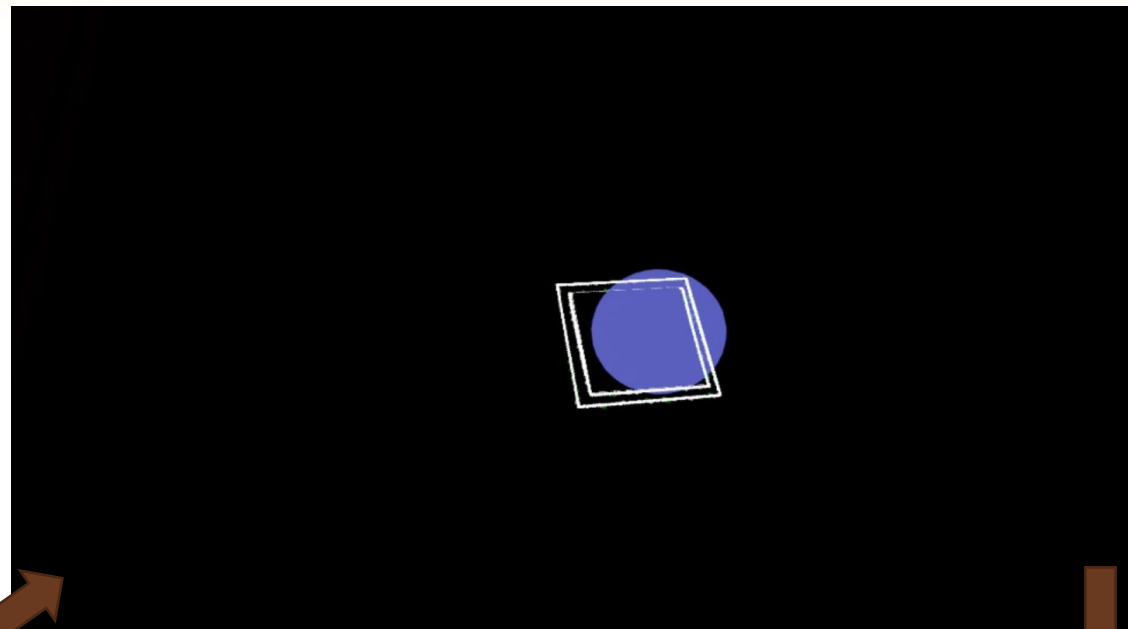




The final room of the dungeon I wanted a puzzle with a trap. So, I created a bunch of small shields and placed them around the room and the player must shoot from the hammer at each of the shields, once this is done the player will be able to escape, unfortunately there is a locked cell to the right which releases some Goblins and the player must quickly dispatch of these before shooting the final door which then sends the player back to the bedroom

Back in the bedroom I wanted the player to not forget where he has been, so I made some of the dungeon elements spawn in the bedroom such as the hammer, shield and coins that were in the dungeon room. Upon coming back to the bedroom there is a new book that creates an almost jump scare that when opened turns all the lights off in the room and the player has to find the light switch. Once done the bedroom is returned to its original state except the dungeon books is replaced with the final level the Kitchen book.

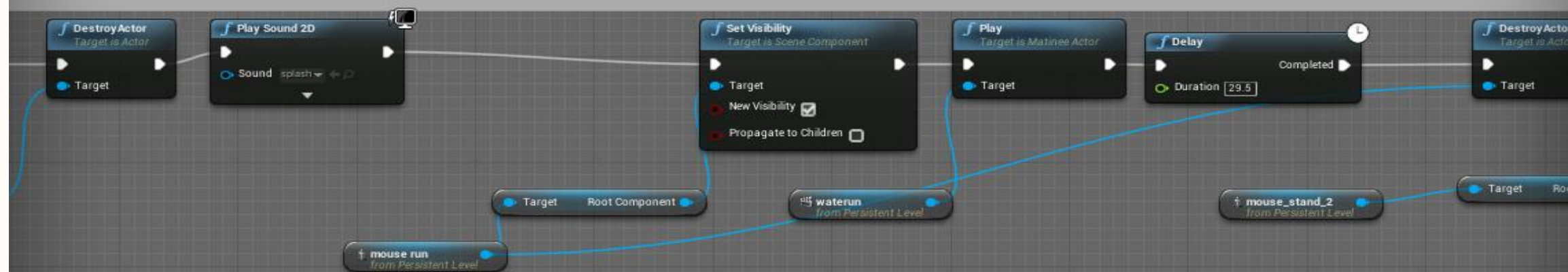
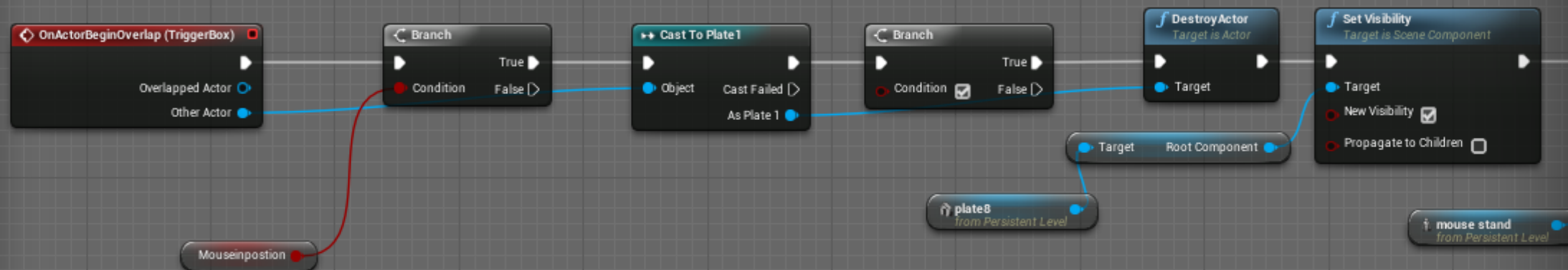


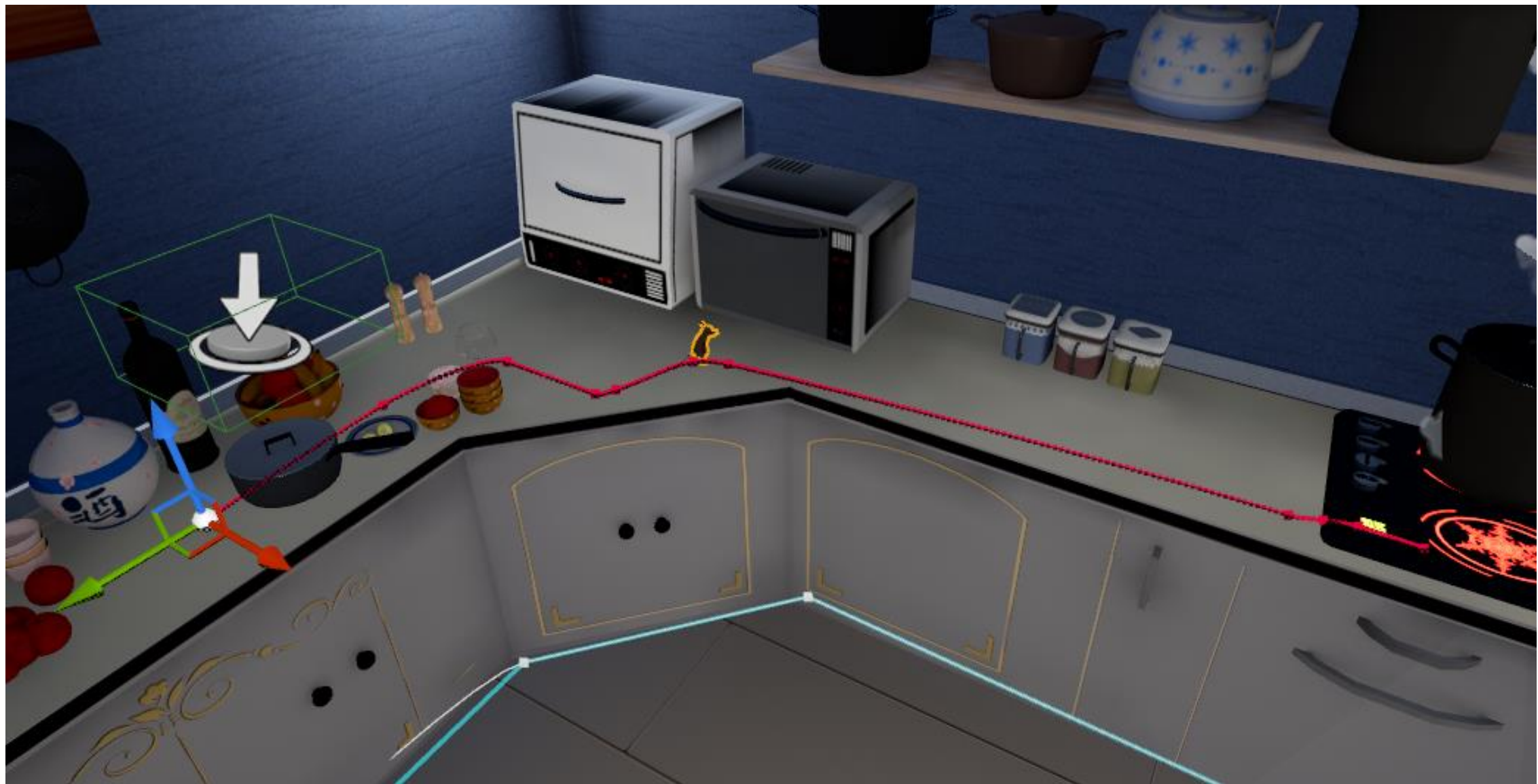


The final level I worked on was a kitchen level where the player aids a mouse through a few obstacles that's are blocking its path. For this I used a variety of trigger boxes that linked back to the animated mouse. There was an issue with the mouse at first as the animator could not export the mouse as an .fbx and so I had to improvise using slight or hand/eye trickery, by having multiple mice around the room and have them destroy themselves and show hidden visibility during transitions. This level was pretty simple to create and to make the various mice move along the map I created a series of matinees that just moved the skeletal mesh of the mouse where I needed it to go.

Mouse cross sink

Mouse cross sink







This level we wanted to just be short and demonstrate off the artwork and the animation of the mouse. Unfortunately, due to the file that was given the textures did not apply to the mouse when built, this was because we didn't attach them before doing the matinees. If time wasn't a factor I would have fixed this issue, but as it stands its plays well and it doesn't really hinder the gameplay performance.

I did create a few other rooms and blueprints that sadly didn't make it into the final product such as a credits screen and a tutorial level, which was an empty room with books that the player opens and it teaches the player how to play specific parts of the game, how to interact with various objects and how to navigate the VR teleportation grid I created.



The final thing I worked on just before packaging and building the game was adding sound effects to the game. Two other members of the team sourced the sounds and level music and handed them to me to place into the game. I had to convert a couple of the sound effects in Audacity to .wav files as they are the only files that play properly in the Unreal Engine. Whilst in Audacity I also had to crop the length of some of the files due to playback length being too long.

Lewis Simon Preen