



# Second report

Engineers in Suits

April 2022

**Project:** Operation Labyrinthus

**Group:** Engineers in suits

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# 1 Introduction

This second report will serve as a follow-up for the book of specifications and the first report, as well as a description of the tasks that have been carried out since the hand-out of the first report. Difficulties encountered and chosen solutions will be discussed. The difficulties we encountered, and the adopted solutions, will also be described here.

As a reminder, *Operation Labyrinthus* is a First person shooting game in the making. Our group, the Engineers in Suits, have chosen to work with Unity in C#. Other software and tools have also been carefully selected.

The goal for players is to complete mazes by finding a portal in order to be teleported to another maze, and so on until the final maze. The last maze will host the final boss which the player needs to kill to claim victory. The player will also be facing waves of enemies, an optional boss per level and another player with the same goal as him, making this game a race to the finish line!

For this second stage of the project, we aimed at correcting a lot of the issues we had for the first stage of the project, in particular in the multiplayer and the player's movement, but also to add and polish quite a few assets to the game, which we are proud of. The website has been updated since our last presentation. We basically worked on making the game more aesthetically pleasing and trying to fix a few bugs we had encountered, in particular one that we still haven't fixed and is a thorn in our side because it concerns Unity Collaborate and our ability to update and share our work, but we will get back to that problem later on in this report.

## 2 Overall progression

Task	Expected	Completed
UI graphics	60%	50%
UI implementation	70%	60%
Character actions	70%	70%
Multiplayer	90%	80%
AI	80%	80%
Tutorial	30%	20%
Level design	90%	90%
Level implementation	90%	70%
Object implementation	70%	70%
Particle Effects	50%	50%
3D Modeling	70%	70%
3D animation	60%	60%
Music	70%	0%
Sound Effects	50%	50%
Writing (Storyline)	80%	80%
Website	90%	90%
Report Manager	-	-

## 3 Additional details

So here we are again. We stuck pretty close to our expectations this time and met almost all of our expectations and when we have not, we are not far behind schedule.

We have a Unity Collaborate issue that has impeded our progress quite a bit. For some reason our Collaborate decided to migrate us to Plastic SMC, which would have been fine if it was not for all the random errors that popped up, errors coming out of nowhere and which were illogical (like the one saying our project was archived and needed to be un-archived when it clearly never was archived). And to add on all of this, Plastic is being updated and some features are thus unavailable... But fear not, we will gain back our lost progress fast once this problem has been solved.

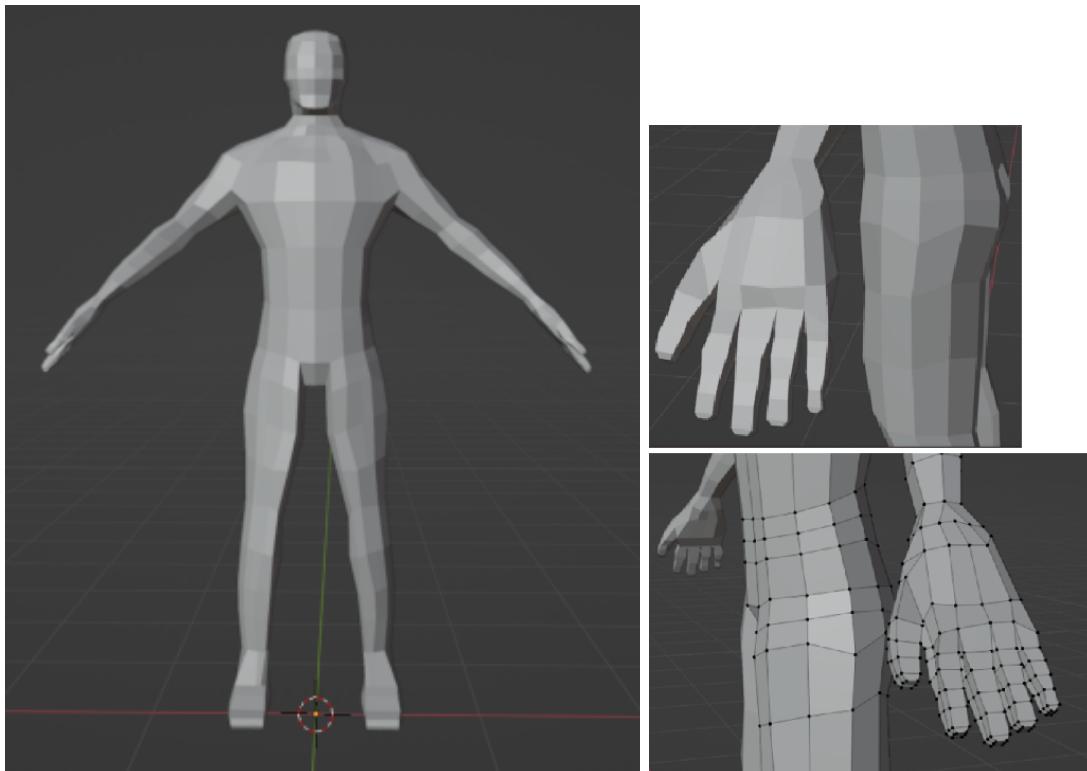
This explains the delay in some areas, as you can note these are mostly the ones concerning coding, which is directly impacted by our ability to not being able to share our work easily. On the other hand we have made great progress in the 3D design part of things with the creation of the 3D models of the two players, two enemies, one boss, one additional gun, the portals and the textures for the mazes! Others aspects such as the music and the tutorial have been pushed back for the third presentation as judged less important at the moment.

Overall, we are pretty happy with our progress. We feel like we have made some good advancements and that we are on the right track. We are starting to see our progress fleshed out and that is always satisfying.

## 4 Achievements

### 4.1 Enguerrand

My main job for this defense was to keep on working on the 3D modelling. For the last presentation I create a humanoid model on Blender with the help of a tutorial on YouTube. Thanks to this work that had already been done, my progress was greatly helped this time.



Base model of the characters, done for the first presentation

#### 4.1.1 The player model

Progress that was greatly helped but still long and difficult. So, I went on with my blank model to create a player. I tried and tried for about two full days just to fail miserably to produce anything worth using. I had no idea on how to “paint” and modify my character for it to look good. It was hard and painful... so I threw it all in the trash, lit the trash on fire and sent it to the Sun for it to combust and so none may lay their eyes on it ever again.



Character to be forgotten

I started again on the following day with a fresh mindset. I watched some more guides, realized I need to buy packages and add-ons for it to look cool and that I wasn't ready to dump in 30€ into this just to have a cool looking texture for my player's body. So, I close my few hundred chrome tabs, booted up my base player model and freestyled it. And it actually looks decent (surprisingly). For the helmet, I inspired myself from a few pictures I found on the internet, from the Halo Master Chief helmet and from one helmet from a game I play way too much for my sanity's sake, Destiny 2. I added little antennas and those donut ears because I didn't want the face to look uniform and empty. I also extruded several faces to make it look like armor plating.



Inspirations for the helmet and 2020 Solstice Destiny 2 armor

I then had the great idea to apply a glowing cyan material to the edges of all those extruded faces. This gave it a cracked aesthetic reminiscent of the 2020 Solstice armor set from Destiny 2. I really like how the grey material I used shades nicely and doesn't look completely uniform. I added a little jetpack/O2 tank on the back of my character and went to paint the rest of his body. So, during my testing I thought about doing a chest plate which turned out to look good, but I realized at the end that I could just have used the chest I already had instead of modelling a chest piece over it. It was done and I didn't want to touch it again. I continued with this cracked armor vision and raised faces randomly. I then moved on to the arms (I didn't even recreate a gauntlet this time, just modified the already existing arm! Getting smarter...). I was a little more daring on some parts for the arms and extruded more than I did for the rest of the body. I then did the legs, with the same process again and for sake of simplicity decided that the hands, feet and back of the legs could be left black. My glowing space soldier was done and ready to kick some monsters in the face. I thus shipped him to the animation team.



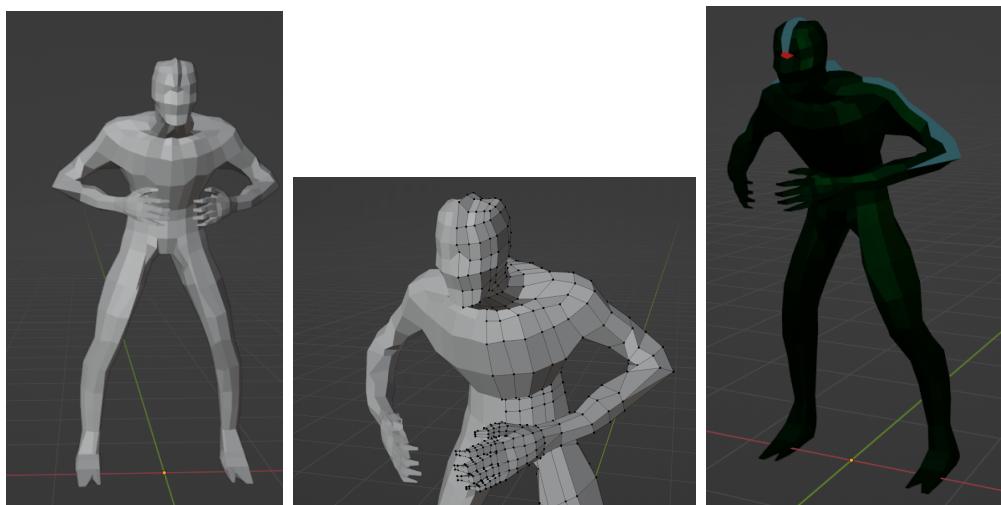
Player model, colors are inverted for the two players

#### 4.1.2 The thrall monster

Next came the first creature I had to design. I went with something reminiscent of the triton creature and a thrall from... you guessed it, Destiny 2. I used the stooped posture from that last one to shape my creature (which I'll name a thrall, original I know), so, no, it's not a hunchback. I gifted it a cool looking spine, and had to change his arm posture and legs to fit more into what I had imagined. In my head it would slash and try to grab the players with its claws. It was at this point that my laptop decided it had seen enough, and Blender would just freeze every twenty seconds. I would close the window, reopen it, try to change something just for it to freeze again. After multiple rebootings and sobs I gave up and decided these color scheme would have to be enough. It's not as detailed as I would have liked but it will do the job nicely.



Triton creature and thrall from Destiny 2



Our thrall

#### 4.1.3 Textures

And finally, I went on the hunt for some cool sci-fi textures to slap onto the mazes because I realized how much work it would be to create custom skins for them... (I like Blender but not that much). So, after roaming around and downloading some suspicious things I found a texture pack which will do nicely. I haven't dabbled that much more with them but it should not take me more than a day to find a perfect fit for the mazes.



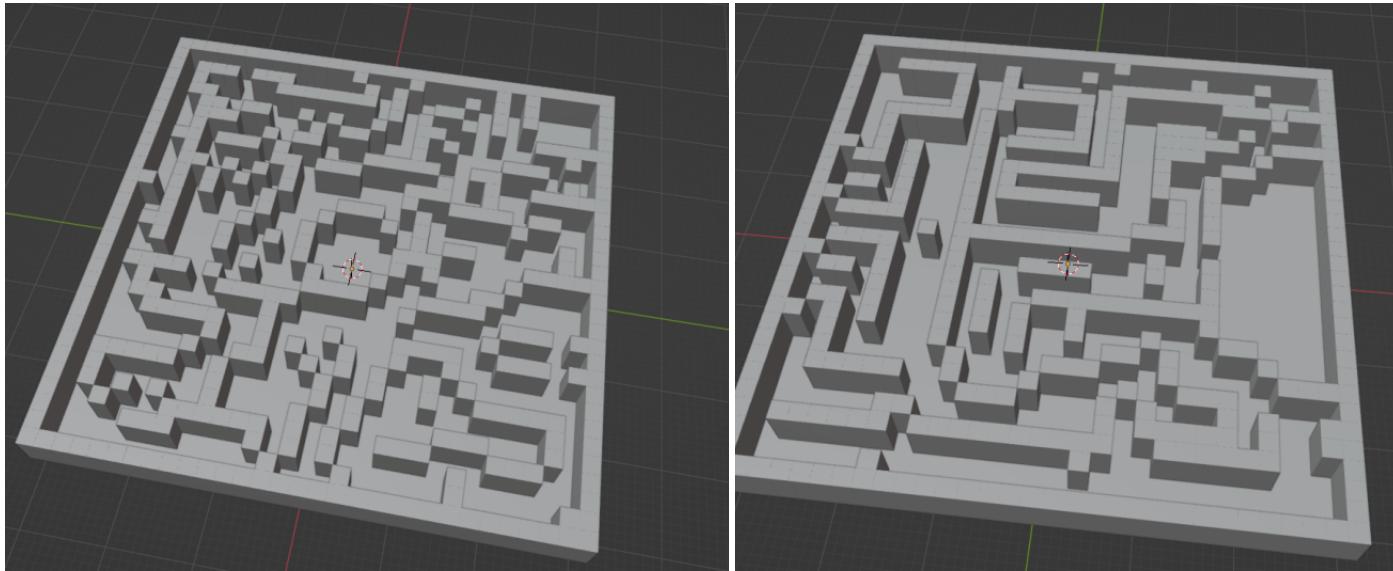
Some of the textures I found

#### 4.1.4 Conclusion

So, what do I have left to do for the next defense? Great question (thanks)! I still need to do a couple enemies but we still have not decided how many we want. I think I will probably end up doing an additional two, plus the one Emmanuel has already done and maybe one more from him. I need to create a tutorial, which I have not started but I know what I want it to look like and already have everything figured out. I will create a tutorial with slides, so, just pictures telling you how to shoot, reload and explaining the base game mechanics. I also need to make the UI more aesthetically pleasing which should not be very difficult. And I also want to create a menu background, which I think will be the two players facing each other with a maze in between, and a loading screen, which will probably be sketches and designs, some back stage images of the creation of the game. I think that will look nice and be interesting. And finally I need to create a few more mazes and do some cool little particle effects, but these really should be the work of just a couple hours total.

## 4.2 Emmanuel

On my side, I had to keep making mazes, so we would have enough levels.

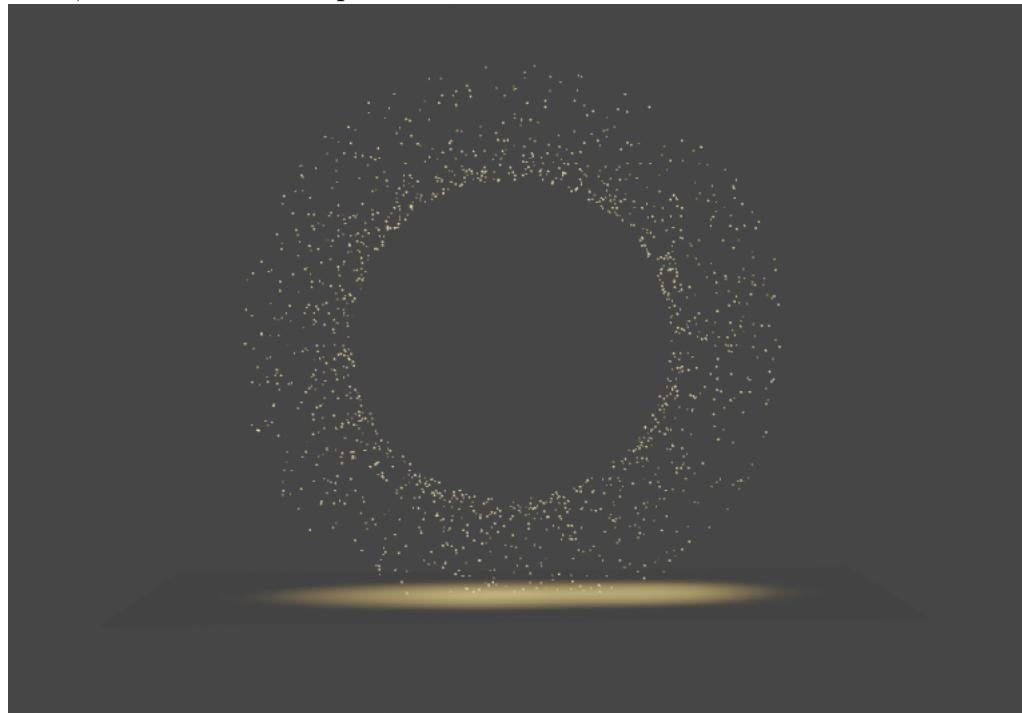


On the left a maze that will be used as a level, on the right a simple maze for the tutorial.

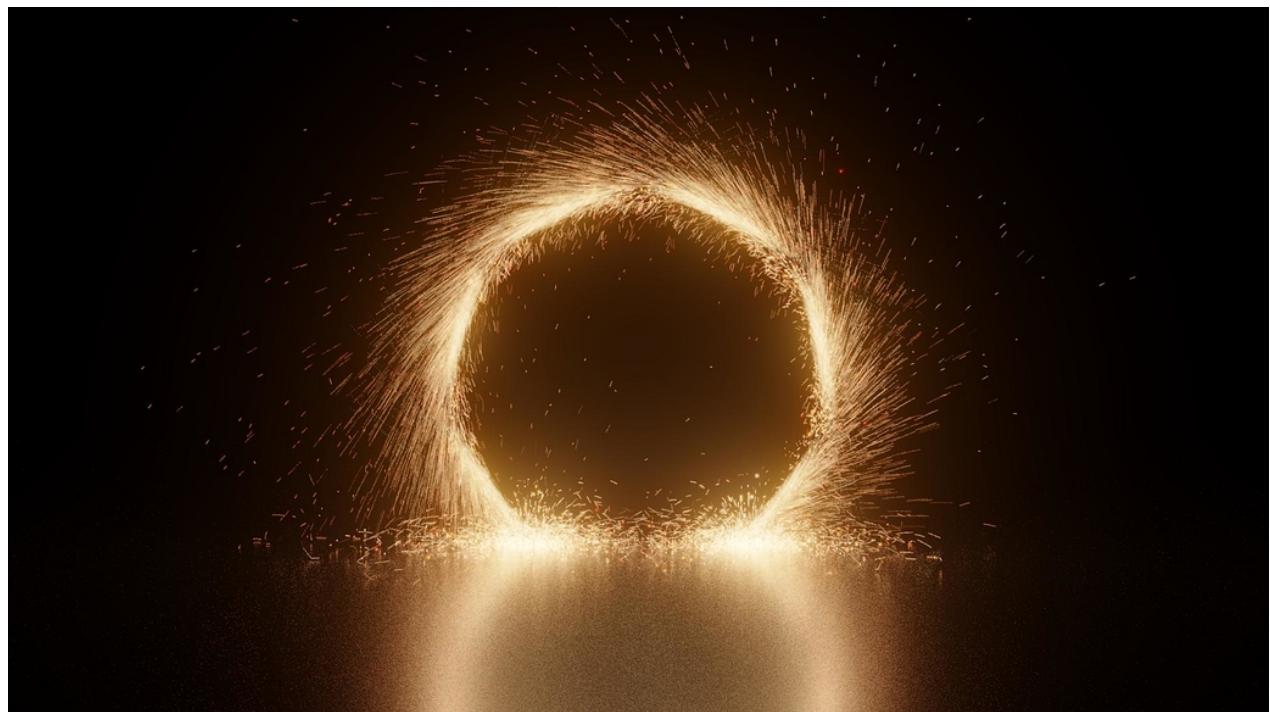
I also had to work alongside with Enguerrand on the 3D modeling. Given that he had already done the base character model, we decided that he would focus on the anthropomorphic characters. On the other hand, I created non-humanoid characters, the portal that will teleport you to the next maze and a weapon, a rifle to be more precise.

#### 4.2.1 Portal

First, let's focus on the portal.



As you can see, the portal is a simple circle with little sparks spinning around it. I got my inspiration from Marvel Comics' Doctor Strange's portals



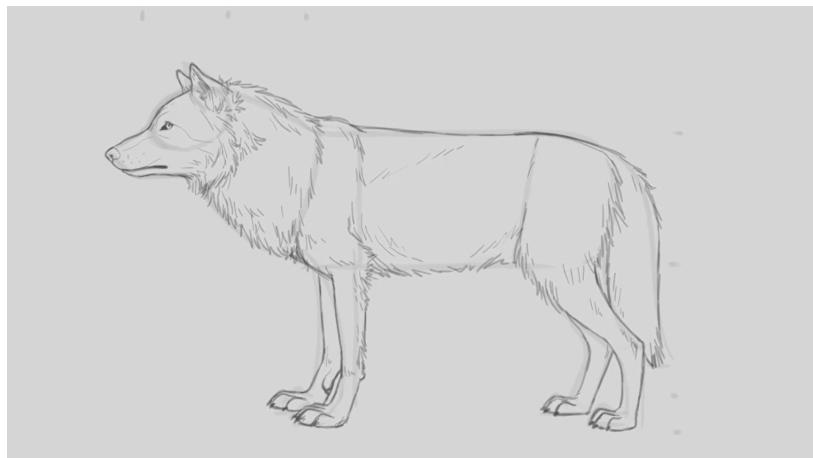
Doctor Strange's portal

I decided to simplify it because the graphics of the game are going to be low-poly, so if there is suddenly a highly detailed object in the game, it will look weird, this is also why I decided to make a portal like this instead of a "smoke" portal.

Making the portal was quite straight-forward : create an empty cylinder, shrink it as much as you can, apply a particle effect to it, the particles emitted are going to be the simplest glowing ico-spheres possible, so there aren't too many polygons, put a vortex at the center of the portal, and it is done. I spent most of my time trying to find the right amount of particles to emit, the right color to chose and finding the best speed for the animation.

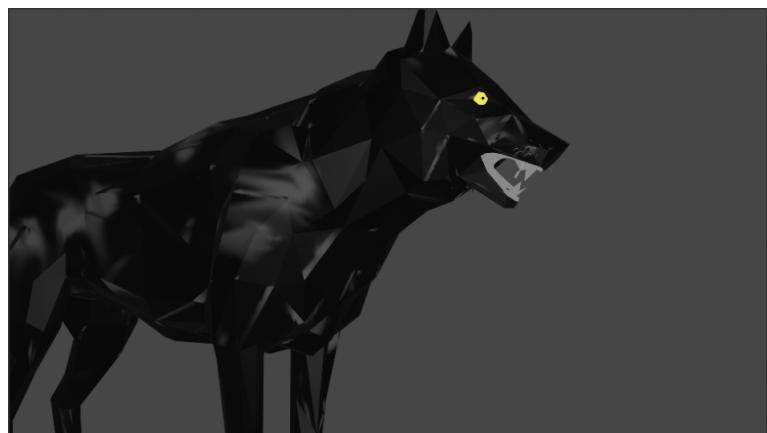
#### 4.2.2 The Wolf

Right after making the portal, I had a new mission : create the first boss of the game. Since I like wolves, I thought a wolf would suit the atmosphere of the game and would make an interesting boss. So I immediately searched on Google some guides that would explain how to create such an animal on Blender, after watching parts, or entire tutorials, I started to create my own wolf using many models for the different body parts.



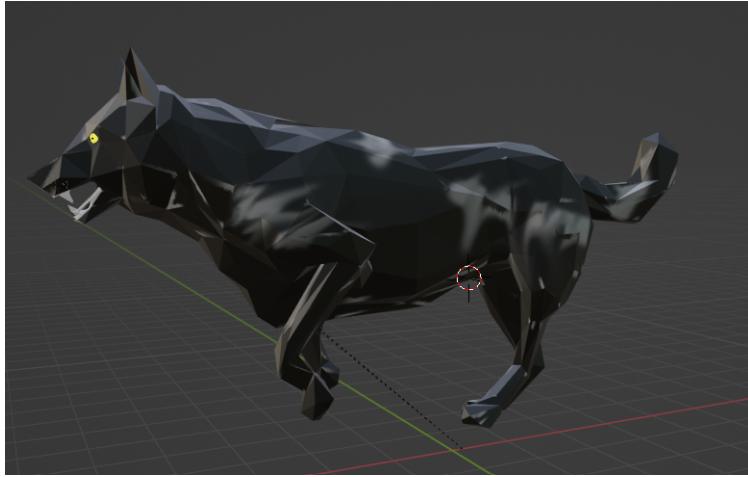
One of the many models used

Here is the final result :



I decided to give him the colors of Fenrir the mythological wolf.

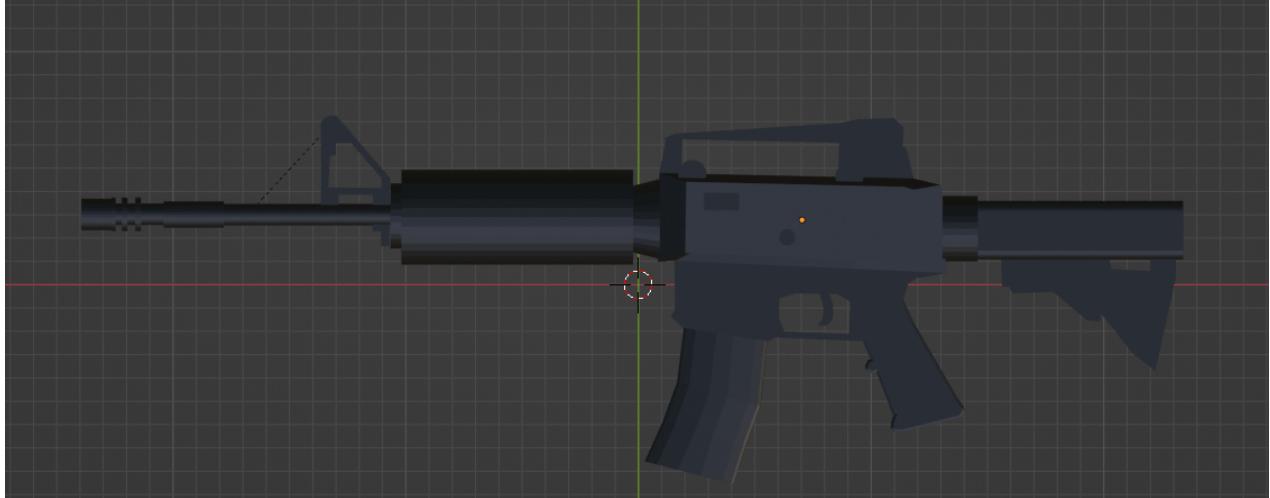
I have also done the running animation, here, a frame of the animation :



In the end the wolf will not be used as a boss but as an enemy, you will see many of them while playing our game.

#### 4.2.3 Rifle

Finally, I have created a rifle, in our game there will be the possibility to unlock new weapons, so it is important to make models for these new weapons, have a look to the rifle :



## 4.3 Edouard

For this second presentation I fixed the major issues we had with the multiplayer, I created riggs for the players and animations for these characters.

### 4.3.1 Multiplayer

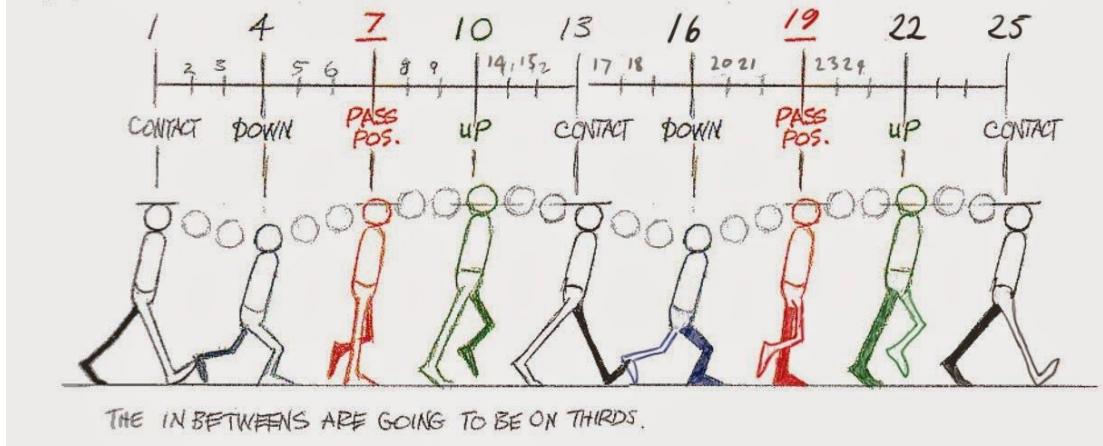
As it was mentioned in the last report our multiplayer wasn't operational during our last defense. The issue I encountered was the fact that I wasn't able to adapt the player movement script to the multiplayer one, this issue caused the asynchronous movements between the two players which has now been fixed. To do so I worked with Rayan to restructure the player movement script and the architecture of the player game object to better fit my needs. So now with core multiplayer part fixed I can move on to the more interesting parts of the implementation of it such as the AI that will have to be adjusted to work with multiple players and player versus player interactions.

### 4.3.2 Rigging

As mentioned in my introduction I had to rigg the player characters and one of the mobs. The process I had to go through was pretty much the same for all three of the characters since the players are the same shape and the mob has a humanoid shape so the modifications I had to make to my method were minimal. However for the first rig I did I struggled a lot, most of all with the target bones on which I made small mistakes that had a big impact on the final result and forced me to do the whole rigging of a character all the way from the beginning. I also encountered an issue with the synchronization between my rig and the character itself which bent the character in ways I didn't want it to. But as I said once I got familiar doing the first of these riggs I got the other two done quickly with nary a mistake. And with the rigging done I was able to move on to the animations.

### 4.3.3 Animating

Once the rigging was done I was able to move on to the fun part, animating. Any part of this project with which I have been tasked with was new to me, which meant I struggled with them and animation wasn't any different from those. The biggest hurdle I encountered was the fact that when I animated my character and then I looped the animation one of the legs would be animated for a cycle but then it would just stay in its idle position, this issue despite taking me a lot of time to figure out what went wrong with it, turned out to be an easy and quick fix. For this defence I ended up animating only the enemy and not the characters because I have yet to resolve my issues which I am not sure if yet if they come from my rigging or if I am doing something wrong in the animations. The animation I created for the mob is a walking animation since considering the appearance of it I felt like it fitted him the best (the enemy in question is the thrall monster.) To do so I used walk cycle's which I found on the internet, here is an example of one of the walk cycle which I used.



For the last defence I will finish creating all animations for the player characters, and animate the other mobs created by my teammates.

## **4.4 Rayan**

For the second presentation as was the case for the first, I was tasked with implementing the various graphics and features that were brought forth into the game.

### **4.4.1 Models**

This includes the two player models, the thrall monster and the wolf enemy. That part was pretty straight forward, drag the blender models in unity and, setup their generation and interactions. The difficulty rose with making specific collider and mesh agents that would target the player in their specific ways. The wolf had a shorter and longer outline, the thrall was more angled forward.

### **4.4.2 Portal**

What had to also be implemented was the portal. Here a simple script which would change the players position to be one in another maze was all that was needed.

### **4.4.3 Bugs**

The various bugs that needed to be fixed were the player movements, the player was either moving too fast or clipping into walls and falling off the map, so the player movement script had to be rewritten into something more manageable and simpler to configure since the last script was overfilled with features that were not necessary for the core movement.

### **4.4.4 File architecture**

To make the files more readable and manipulable, I rearranged the file architecture and created containers for each of the enemies and player, and one object which would spawn them in, something I should have done sooner since it made editing and adding features all the more simple.

### **4.4.5 Major Problem**

The major problem that came up was with the change by unity from Collaborate to Plastic CSM. This is one hurdle that we have yet to overcome and even after multiple exchanges with the unity support team and failed attempts we still couldn't fix the syncing problem, so we made a new project file that was already fit to work with this new way of collaborating.

#### **4.4.6 Website**

For the website, the main pages needed were added and the buttons too. Which constitutes a home page, an about page, a roadmap which lets people follow the timeline and progress of different features and a Download page. All that's left to do is to file in the missing descriptions and add the option to look at the past books of specifications and download the game.

## 4.5 Website

A website has already been created to show the progress of our work. On this website you will find all sorts of information about us, our game, and a download page (not finished as of now) where you will find all our files such as the book of specifications and executables for the game. The link of the website is <https://eninsts.github.io/>

### 4.5.1 Description of the site

The website is the element that will allow anyone to follow our project, discover our game and later on, even play it.

Our website is divided in 4 pages

- The homepage, it contains a short introduction to our project and an overview of the steps of the development of our game
- The "About" page, you will find here further information on our game, a presentation of the team, and a personal presentation of each member of the team.
- The "Roadmap", in this page there are : a countdown to the final presentation which corresponds to the release date of *Operation Labyrinthus* and progress bars for each aspect of the game
- Finally, the Download, where you will find all the file, from the book of specifications to the final game when it will be ready.

### 4.5.2 Backend

The backend is handled by GitHub, it provides free hosting for the website and server backend. All we had to do to put the website online was to put it in a GitHub repository.

### 4.5.3 Frontend

The website has been done with HTML and CSS for the layer and the theme of the pages.

The most challenging part in the making of the website was the choice of the colors. We had to make a website that is good-looking and that fits at least a bit our game. Another difficulty that we faced regards the homepage, more precisely the slides on the homepage because we wanted to be able to see the next picture while we are scrolling.

We chose to stay simple, the main color is the yellow, the background is white and the secondary color is a pale pink.

Here is an image of our home page



# LABYRINTHUS



## OUR PROJECT

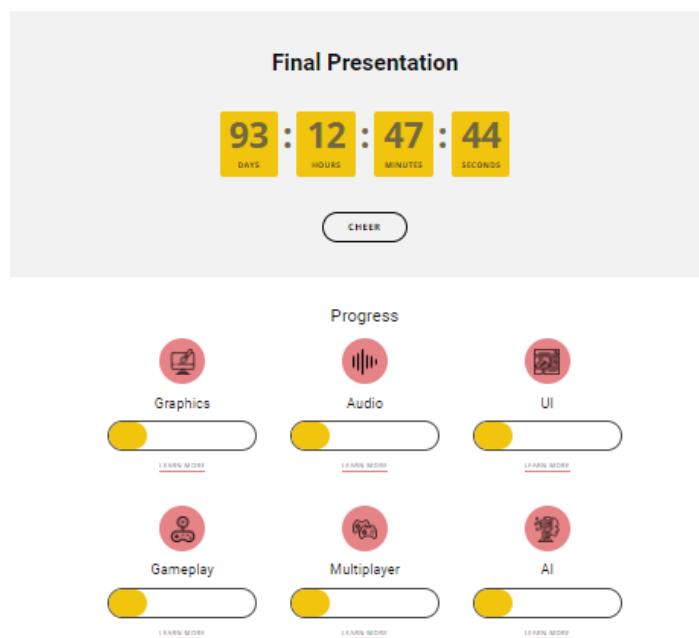


As part of the second semester project we have decided to create a two-player maze runner, beating each other to reach the top of the tower. On their journey there, they will encounter mobs and bosses trying to slow them down.  
May the fastest man WIN



## KEY PHASES

Here, a look at the roadmap



## 5 Conclusion

Despite some difficulties, we are overall on schedule on our project. Some tasks may not be as on schedule as others but we should be able to progress faster in the upcoming weeks. Although we will now have to add on finals revisions, we will try to work as much as possible to not get any organisational problems.

To sum up : the website is online, we have some basic controls and mechanics for both the player and the AI, we have some levels and a lot of the models have been done. We all got to learn new skills which will help us progress faster, in particular for the last few models we need to create. We have fleshed out our skeleton and we now need to add features to it.

We are looking to increase our work rate for the following defenses because we still have a lot to do.

So far this project has been a great experience for us, it has allowed us to learn new skills, like the use of different software but also some organizational skills that will help us work better as a team.