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List of figures

Abstract

Within this report I will cover each element of my project showing off the production pipeline and the researched that had gone into the project itself, the project was originally created to show case my ability's as a level designer as my main deliverable for this project was to create a playable level with some gameplay mechanics that help showcase my products level and demonstrate the intended gameplay.

Within my project several areas have been touched on such as level design, animations, AI design, UI design and gameplay mechanics some of theses areas I have only touched on for the first time within this project and faced several issues when learning theses new areas although I overcame these issues with other solutions or by being persistent within blueprinting my projects mechanics.

Acknowledgements

Supervisor: Michael Holton

Secondary reader: Helen Simm

Other students who provided feed back during the developments of the projects level and game mechanics and give helpful feedback that was taken into consideration.

Asset Packs

Synty studios: Polygon – Dungeon pack

Synty studios: Polygon – Dungeon realms

UI elements

Epic games: Action RPG

Animations

Mixamo

Introduction

The overall goal for my project was to produce a highly detailed level that was both fun to navigate around and told the player a story with careful placement of assets this process is referred to as mise-en-scène and is one of the key elements within my projects level as it was important to demonstrate to the player what had occurred within the game.

The genre of game I intended on creating was that of a dungeon crawler where the player would hack and slash their way past hordes of enemies to find collectables and an escape to the dungeon.

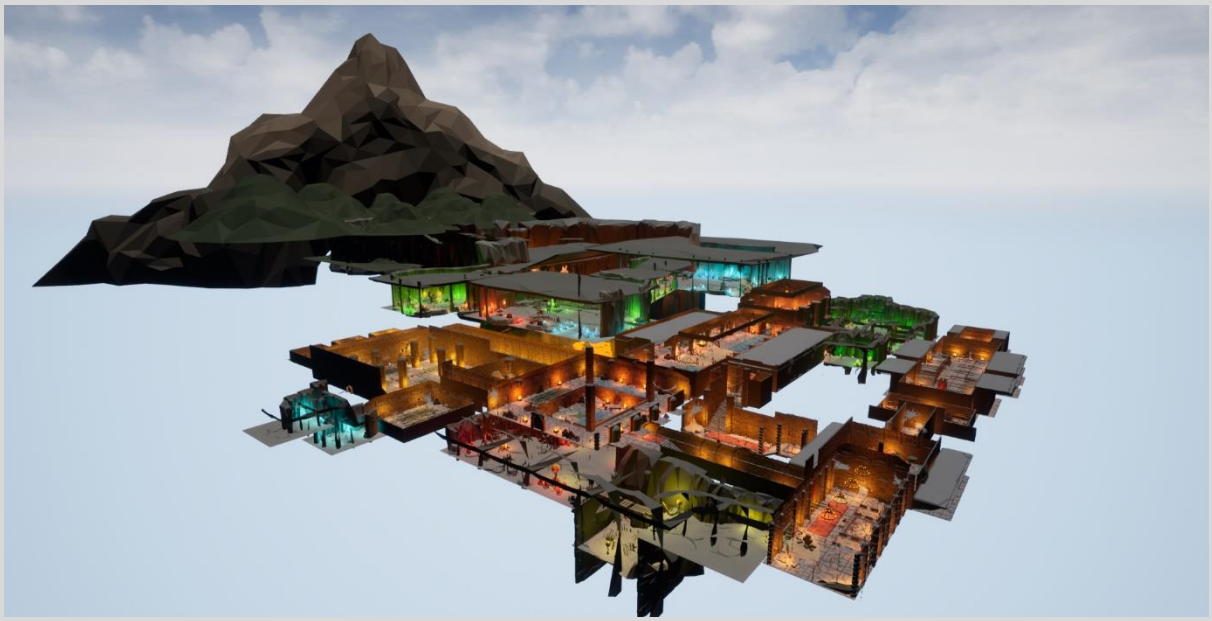

Figure 1: Level overview

Original I had planed for a more isometric top-down hack and slash dungeon crawler although after playing around with Unreal engines camera I found that an over the shoulder approach showcased each element of the project much better and allowed me to build my level more freely.

When it came down to the mechanics I wanted to create elements that would suit the style of game I was creating and give the player a sense of enjoyment during gameplay this led me to investigate creating a combat system that would feel good to engage with enemies this involved me learning how to create animation montages within Unreal engine a subject area I was not familiar with before this project.

Project Deliverables

Originally I had planned out my project differently to how it to end up as I was originally planning on having several levels within my project although due to time constraints I felt it was best to combine my ideas for these levels into one playable level and use elements of each idea within my projects level.

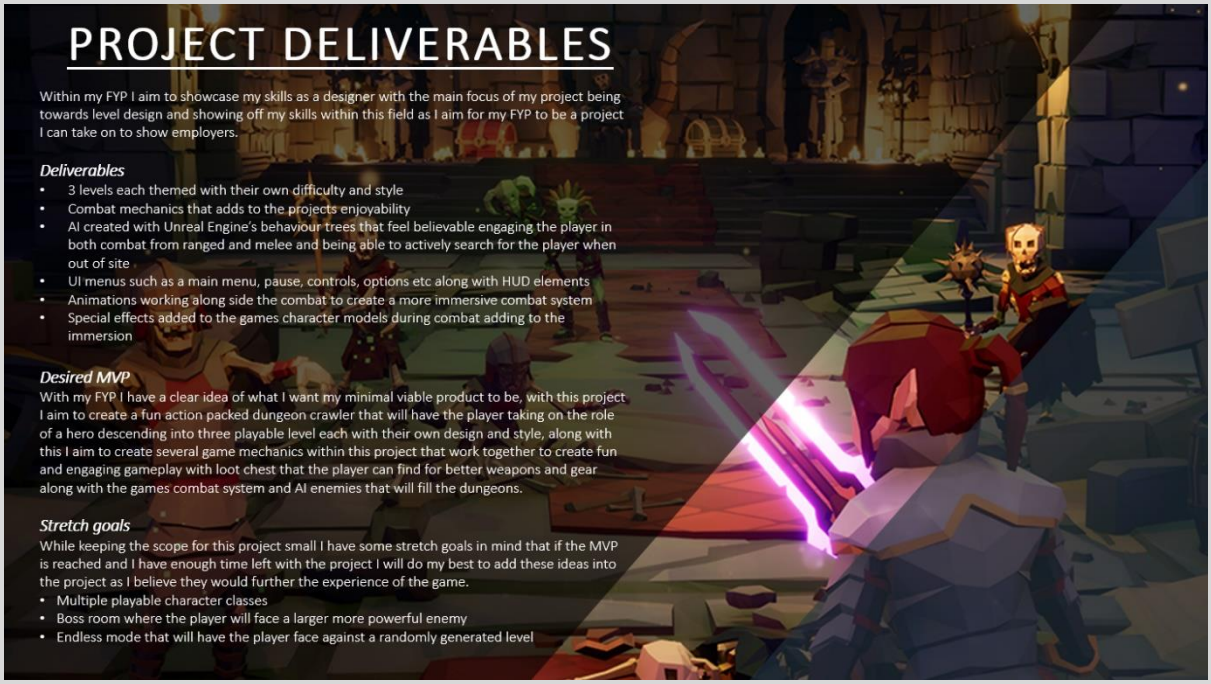

Figure 2: Project Deliverables

Overall I strongly believe that despite issues during the pipeline that had caused me to change my approach towards my project I have hit all my original deliverables for my project as I have managed to include a wide playable area that allows the player to explore along with a combat system that feels enjoyable to play with along with several UI elements that help pull my project together and showcase my product.

Research review

When looking for research I first started by looking into games that had inspired me to create this project originally these where games such as Minecraft Dungeons (Mojang 2020) and even Diablo (Blizzard Entertainment 1997) I specifically looked into both theses games as they are the classic dungeon crawler formula with wide levels where the player is tasked with slaying hordes of enemies as a given time, this allowed me to get a clear an consist idea on how I would later approach my enemy AI with my project.

I also researched into other games that had an over the shoulder combat system as my project had changed during the pipeline to suite this for this I look more towards Dark souls (FromSoftwear 2011) to help me get an understanding of how I wanted my combat to look during gameplay and how I wanted my player to move around the level itself as this served as a grate reference point.

With level design being my focus of the project I spent some time researching different elements of how to approach creating my level during this research I looked at images of old castle structures as reference to help me get an understanding of how old medieval structures were built along with looking at images of caves to see how natural cave formations look to help me gather an understanding on how I would go about creating these section of my level, while researching for my level design I looked at Skyrim (Bethesda games studio 2011) as this had plenty of references to both man made dungeons and natural cave dungeons that I could look at for inspiration and referencing.

With my project being made within Unreal engine 4 I understood that my games mechanics would be implemented using blueprinting although this is not my speciality I took some time to research several different mechanics online to help gather an idea of what was possible to implemented within the project as I was not aware of how much work this would be because of this I spent some time looking at several videos on YouTube teaching myself on how to implement animations that I had gotten from Mixamo to my playable character along with teaching myself how to implement AI behaviour trees that I found from Ryan Laley (YouTube 2020) following tutorials online from several sources I was able to confidently start the implementation of my projects mechanics.

Implementation

Levels

Spawn

During the implementation of my projects level it was crucial that the player had a spawn point that would allow them to gather themselves and get accustomed to the games mechanics and controls before progressing any further due to this I started by creating a starting room that the player would spawn in and be able to gather their items.

Figure 3: starting room

One design choice I made early on when designing my projects level was to have a colour scheem be aparant around my level this was to both indicated to the player where they where within the level while also giving each section its own uniqe feeling one way I did this was the use of rug on ground and bannars on the wall with left side of my level using a green colour scheem the right using a red and the progressing stright forward from spawn the player would see a blue colour scheem I belive this attention to detile not only gives my level viraity but helps give sutile hits to the player on there location within the dungeon.

Grand hall

Once the game spawn area was completed I decided that on creating the games next area this would be the grand hall an area to the left on the spawn that would hold a grand table filled with dead bodies and debris and would be one of the areas on where the player would find an enemy encounter, this area was built to be much larger in scale to give the player a sense of curiosity to explore around as see what they can find.

Figure 4: Grand Hall

Within this section I also included several small rooms that the player can explore and find items to use while searching for the games collectibles one theses collectibles can be found within a back room behind a broken wall I decide to place a collectable this early in the level to encourage the player to explore further to find the rest of these collectibles.

Figure 5: kitchen room/collectable area

Armory and forge

The next section I created was to the right of the player spawn as this is a hall of heroes I felt it was only necessary to include an armoury along with a forge where their weapons where created although this area is not just for show within this section I included a cave system that shows where the Orc enemies had broken into and gather the weapons the slay the residents of the hall of heroes while also serving as a way for the player to navigate around the level while reducing backtracking.

Figure 6: Armory and Forge

As mentioned this section of the level contains an opening to a cave system where the orc enemies live within the dark depths when designing the area around this opening I included rubble and debris along with orc banners to show that they had taken over and were claiming this as their home, this design choice only added to my level details while conveying information to the player when see these orc nests that they would be a higher amount of enemies within this section and should proceed with caution.

Figure 7: Orc nest

Prison cellar

Leading on from the forge I created a prison cellar where criminals would be held while the hall of heroes was running as normal although during its fall this section also has fallen victim to the orc hoard due to some prisoners steeling pickaxes and mining into a cave system releasing a hoard or orcs into the prison.

When creating this section I used darker lighting to give this area a more foreboding feeling to it along with this I placed in a large statue of death as for when the player enters this area they would get a clear understanding this section was used for more dark reasons this is shown by the torturer devices and skeletons chained to walls all around this area.

Figure 8: Prison cellar

Figure 9: Death statue

Figure 10: Prisoner escape attempt

Main hall and throne room

The last man made structure I had created for my projects level was the main hall along with the champion of heroes throne room this section would be straight ahead from the spawn I created this section last as I wanted to link up the other two previously mentioned section from the spawn to this main hall viva hall ways or cave systems given the player multiple paths depending on what rout they had taken within the level that would ultimately put them on the desired path to completing the level.

Figure 11: Main Hall and throne room

Within this section I included more story telling with asset placement with the throne room showing that the champion of heroes never helped in the fight against the orc hoard instead protecting is massive piles of gold going as far to die on his throne, along with this I also included a clear indicator to where the player should go next from this area having a massive hole within the wall surrounded by cannons and dead soldiers who tried to hold off the attack.

When designing this section is was crucial that I made sure the player would always end up within this area as this is the direct path to completing the games level to make sure of this I made several hall ways from each section that would lead the player right to the main hall along with an alternate path from the prison cellar viva a cave system this design choice received positive feedback during gameplay as players would find them self naturally finding their way around the level without getting lost among the large areas.

Caves

During the project my personally favourite sections to create where the cave systems as they each had their own unique style and look to them as some caves I crated with more for a nature aesthetic with plant life growing from the walls whereas others I included larger orc tribes that set up their home with main shafts.

Figure 12: Large cave section

As mentioned previously I also used the caves as a cleaver way to create paths to sections to help reduce on back tacking all the while showing off the orcs and how they had lived behind the walls of the hall of heroes I believe theses sections show off the level design of the project best as although they where slightly difficulty to get to look correct when done the options for variety let me create a lot of unique environments.

Figure 13: Lava cave section

Figure 14: Nature cave section

Outdoors

The outdoors section can be found at the end of the cave systems once the player as fought their way past the orcs they will see and opening from a mineshaft this section will naturel draw the players attention as this is the only outdoors area within the level, this section serves to end the game when the player run up to the portal shrine within the middle section of the wood.

Figure 15: Outdoors section

UI elements

Menus

During the production of my product I made several widget elements to work as menus for the game and help brake up gameplay under situation these UI elements included a main menu that would load in when the player starts the game that would allow them to quit the game or load into the level, a death menu that appears once the players health reaches zero giving the player the option to quit or play again also a pause menu that pauses the game for the player and a menu to inform the player they have beaten the game once they cross the portal at the end of the level.

Figure 16: Main menu

Figure 17: Death Menu

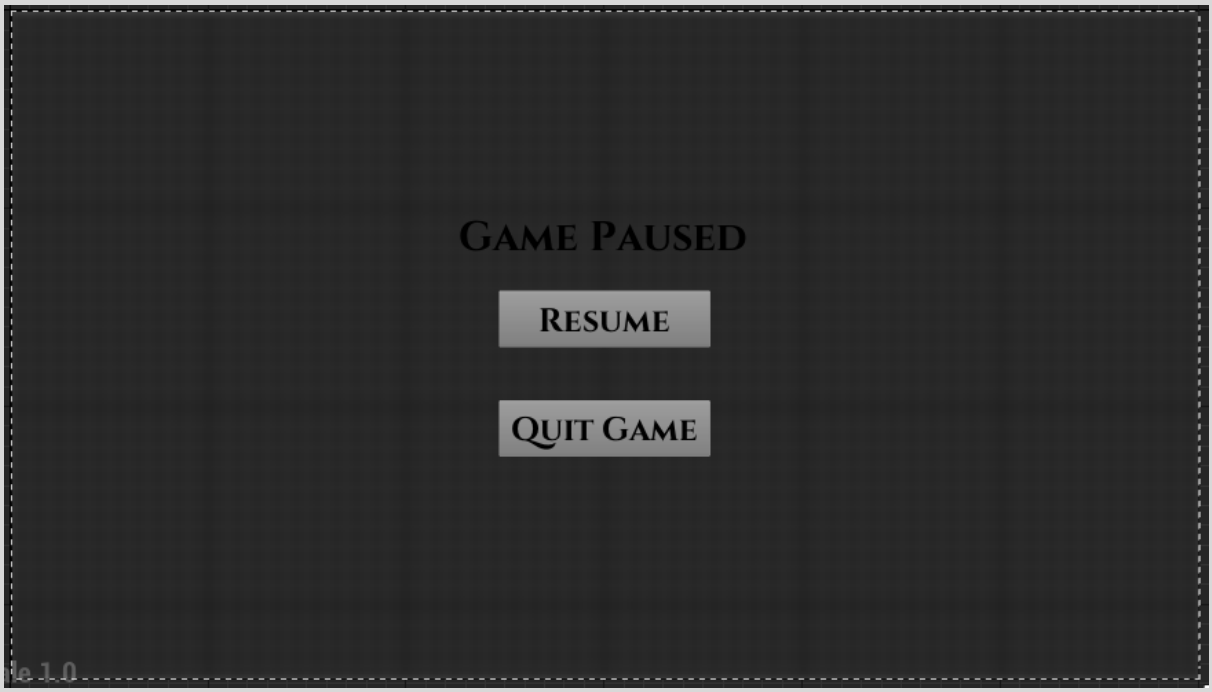

Figure 18: Pause menu

Figure 19: End game menu

Each of these menus where easy to implement as they where just simple widgets blueprinted into the project the end game menu holds in place for around five seconds before quitting the game as at this point the game is over.

Player HUD

The players HUD was more complicated as I had to have it react with what the player was both looking at and had picked up and placed within their inventory this was done by calling to the player controller blueprint that I had created to make this process easier.

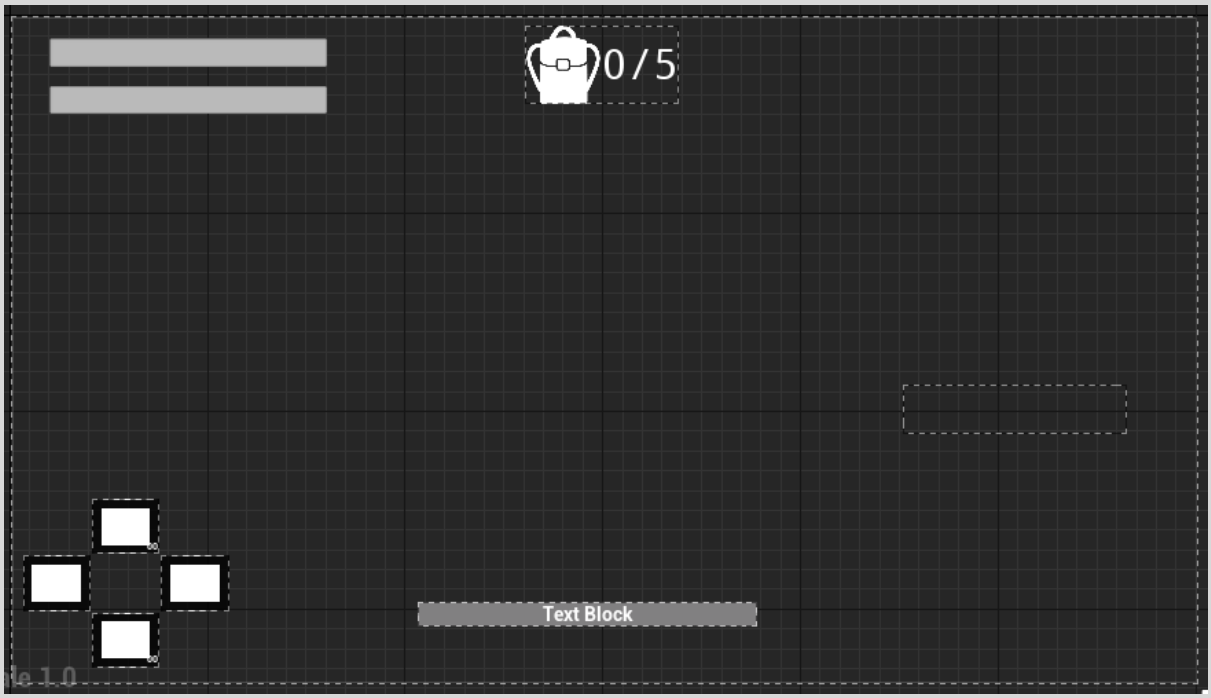

Figure 20: Player HUD

As mentioned I had blueprinted in so that the game would track the players eyes and would then show what they player was looking at with a text box within the centre of the screen this took some time to learn although once I had found how to do this the process became much easier.

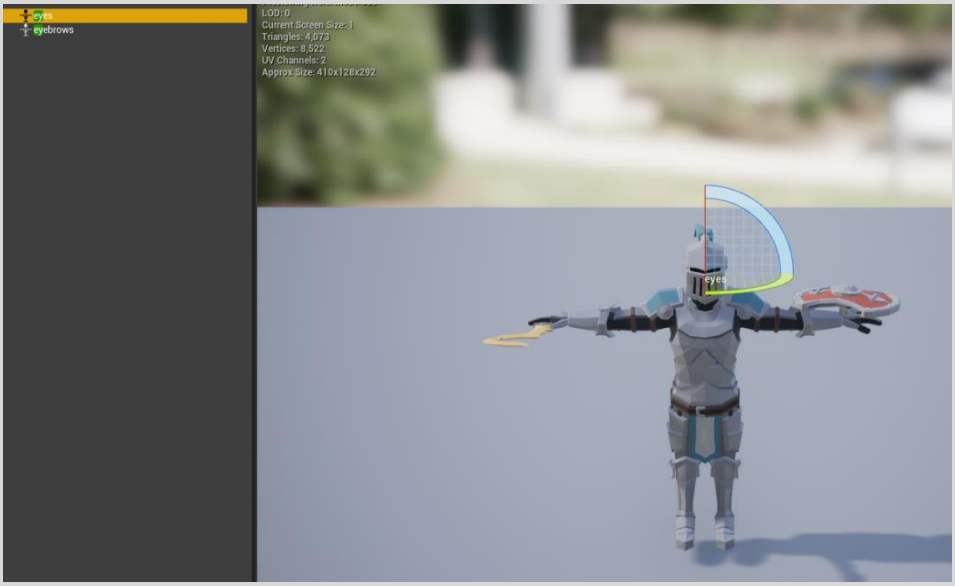

Figure 21: Players eyes within skeleton tree

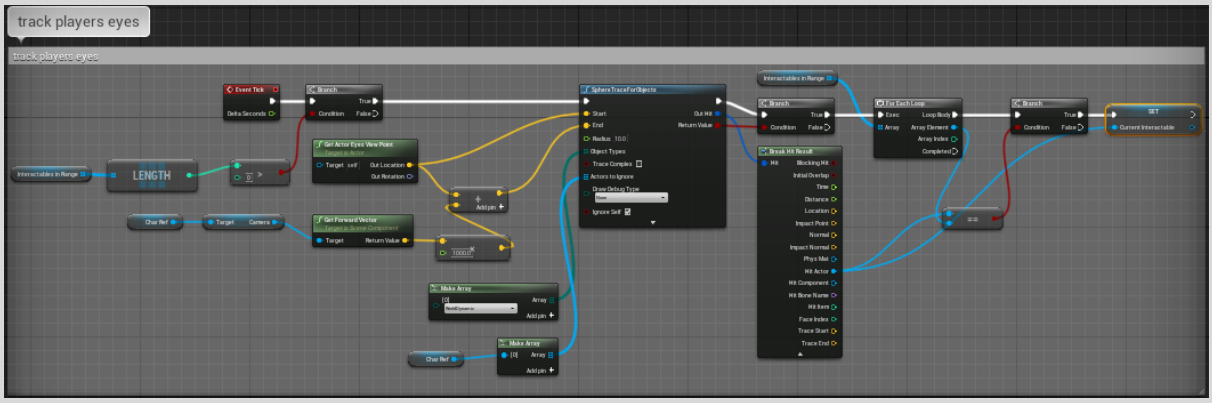

Figure 22: Blueprint for tacking players eyes

The players item bar to the left of the player HUD ran on similar code although would then inform the player what they had picked by displaying an icon in the given slots such as if the player was holding a sword this would be represented by a sword icon within the HUD or alternatively if the player was holding and Axe it would then show an axe icon this also told the player how many pick ups they where carrying at the time along with if the shield was equipped.

Figure 23: Player HUD displaying items

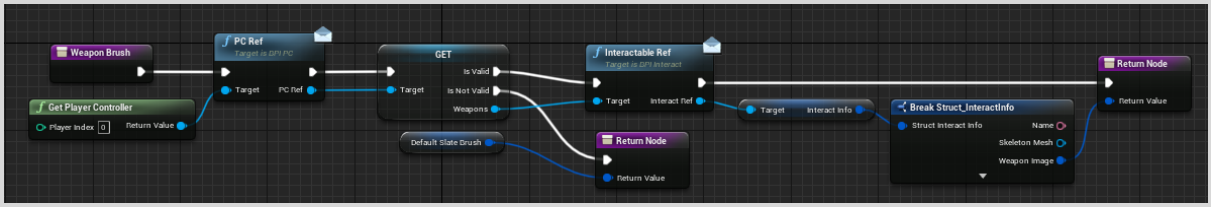

Figure 24: Blueprint for displaying icons

Each of the items that the player can interact with and pick up into their inventory run off this same logic as it calls to the PC Ref this is a reference I made to keep a list of all the items within the game as this is much easier than calling from multiple files.

Also within the player HUD there is a counter to show how many runes the player has collected this is show within top centre of the screen for the player to easily see and will update as the player collects the runes around the level.

Figure 25: Collectable counter

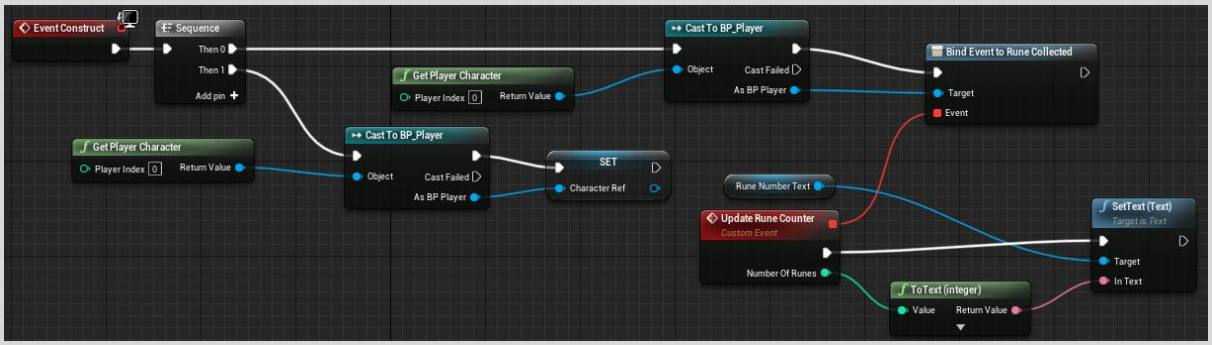

Figure 26: Blueprint to display the collectable number to the player HUD

Health and Stamina bar

I have also included a simple health and stamina bar that take into account the players health and stamin and represent this within the top left of the players HUD.

Figure 27: Health and stamina bar

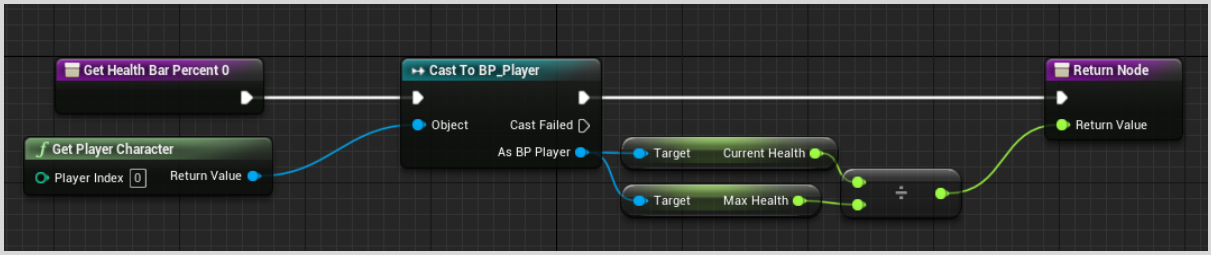

Figure 28: Health bar Blueprint

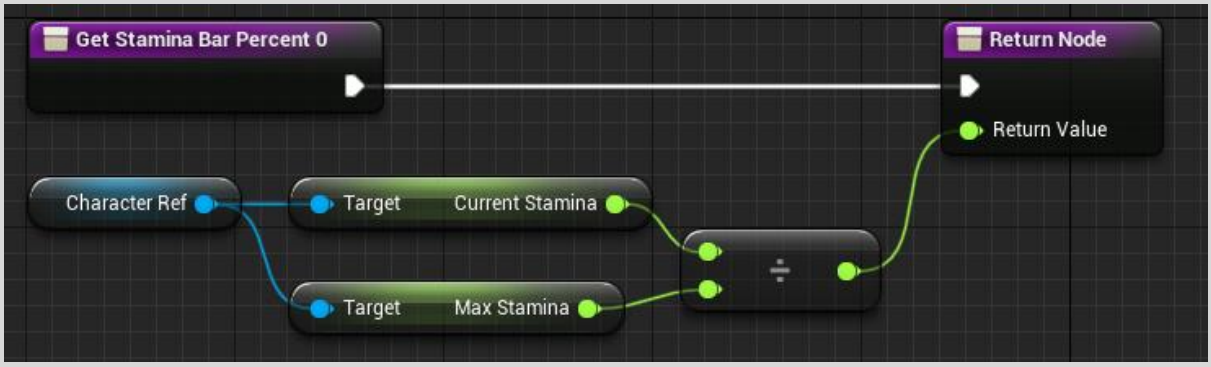

Figure 29: Stamina Bar Blueprint

Collectables

To encourage the player to explore each area of my level I also implemented a quick collectable system as mentioned previously this took little to no time to get implemented and working the way I wanted it to as when the player is close to the rune it will gravitate towards the player with some attraction and update the HUD.

Figure 30: Set of collectable runes

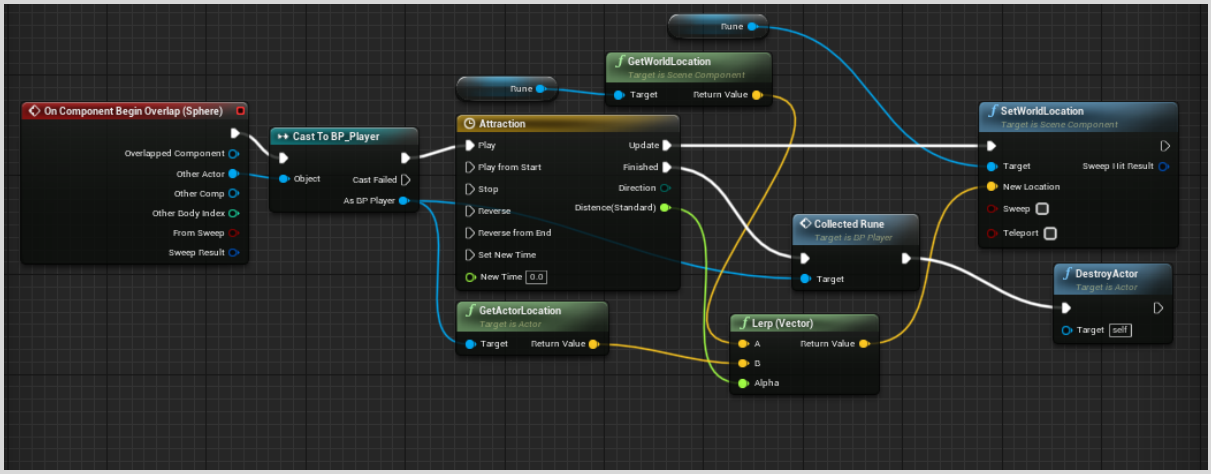

Figure 31: Blueprint for the collectable system

Animations

Animations for both my player character and the enemy AI where crucial elements of my project that I had to learn enterally from scratch and although this was a new area within Unreal Engine that I had not previously touch on before and did cause me some issues while implementing I eventually found a solution to the issues I was having while implementing theses animations to my player character that I will cover further into this document.

I first started by getting my animations from Mixamo and then importing them into Unreal Engine, after this I created an animation blend space this allowed me to then create a walk animation that I could then then latter use for both my players movement and my enemies movement this part was simple.

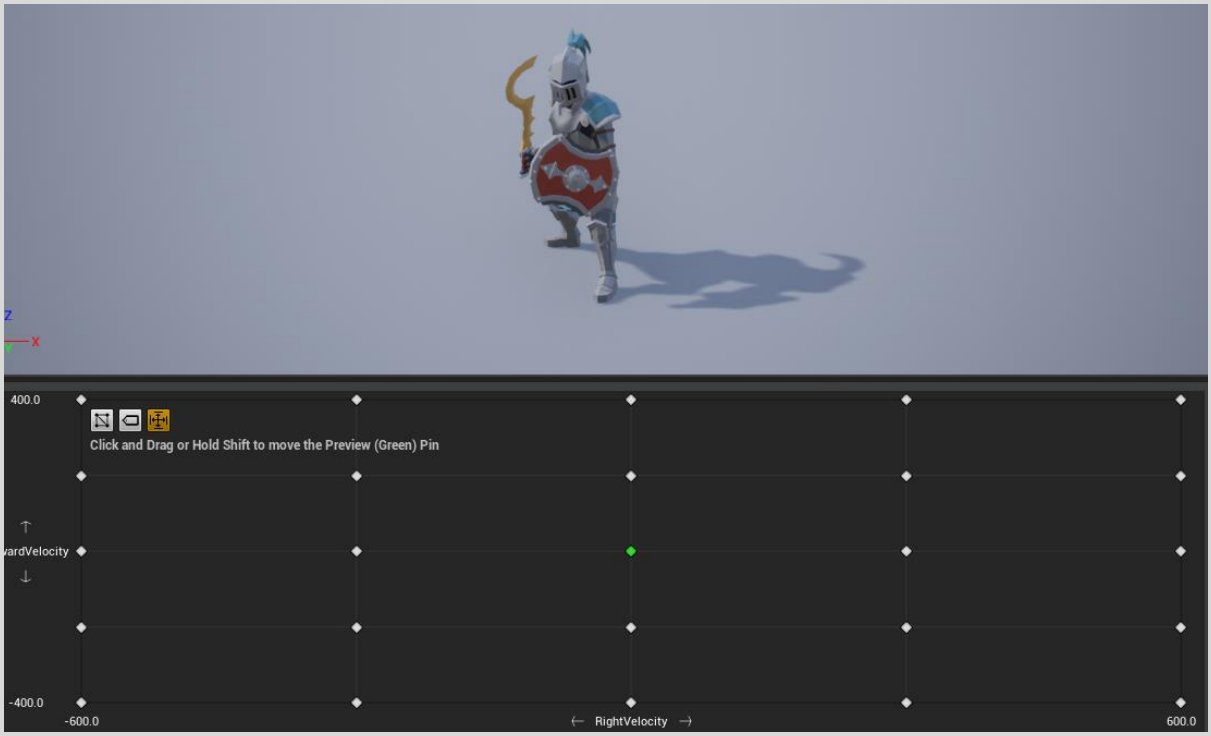

Figure 32: Animation blend space

Next I needed to create an animation montage so that when my player attacked they could have several attack animations play instead of just one I decided to do this as one of my projects deliverables was to have combat that felt fun and engaging to the player as there would be a lot of combat within the project.

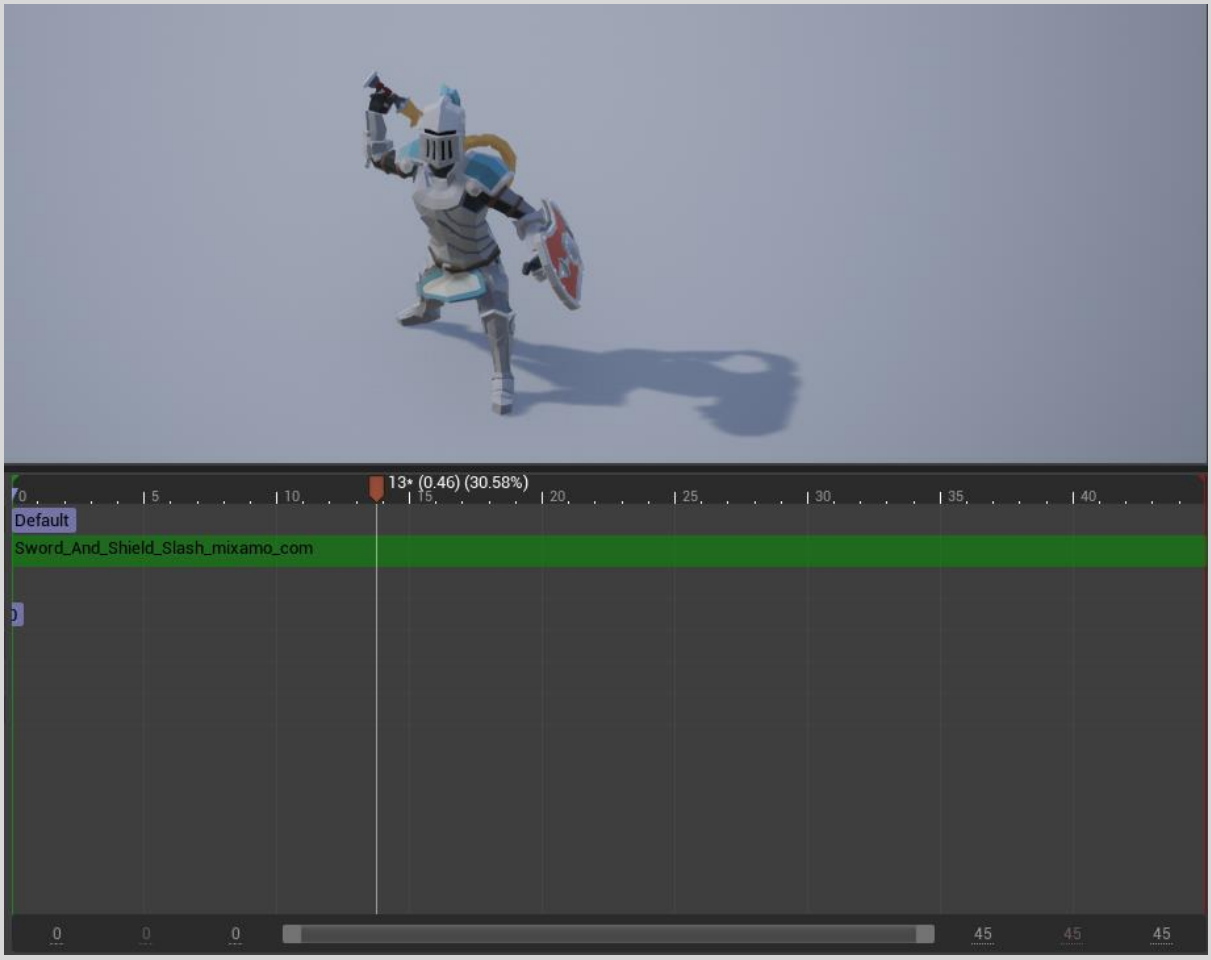

Figure 33: Animation Montage

Once these elements where implemented correctly it was just a simple case of telling the game when to play them and when to blend back into the standard walking animation for this I created a set of blueprints for this within the animation blend space.

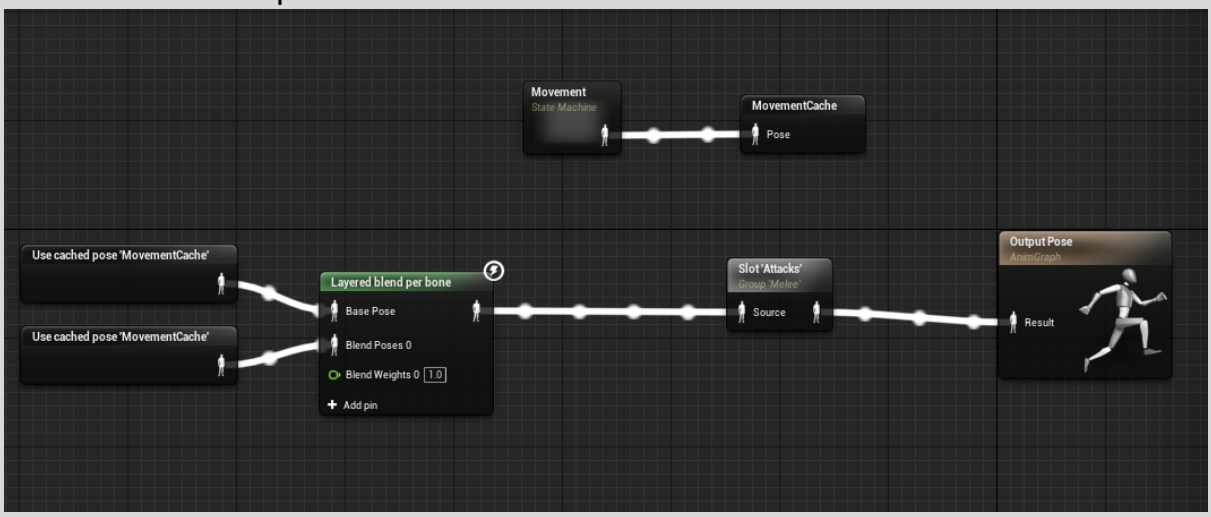

Figure 34: Animation blend space Anim graph

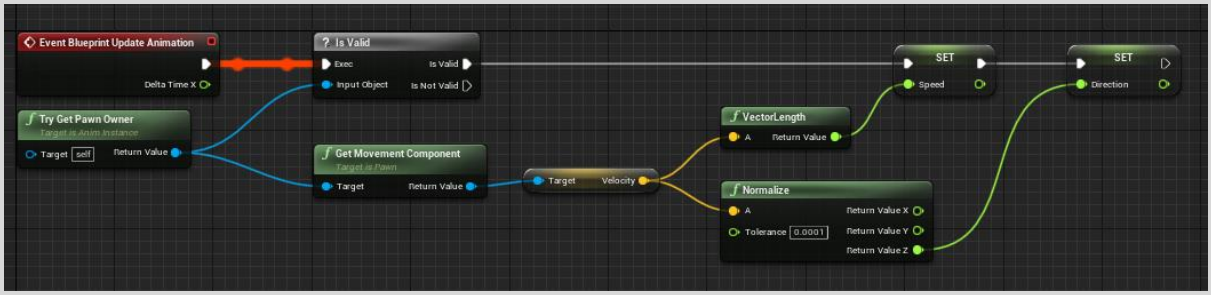

Figure 35: Animation blend space blueprint on movement

Player Mechanics

When creating the mechanics for my player and the objects that they could interact with I created a blue print class that would let me call each of these functions all into one place from here I stared to implement the ability to interact with items within the level things such as the weapons and the shield and even the potions on the ground this allowed me to easily blueprint in what I needed and was less demanding on the engine as it was all being called to one place.

Within this blueprint class I coded in most of my players more complicated mechanics such as the intractable system that let me classify items as a specific class that would then let me add them into the level as an interactable to help save a lot of time when creating multiple intractable within the project although learning to do this did take some time as this was rather complicated and required further research to get to work correctly.

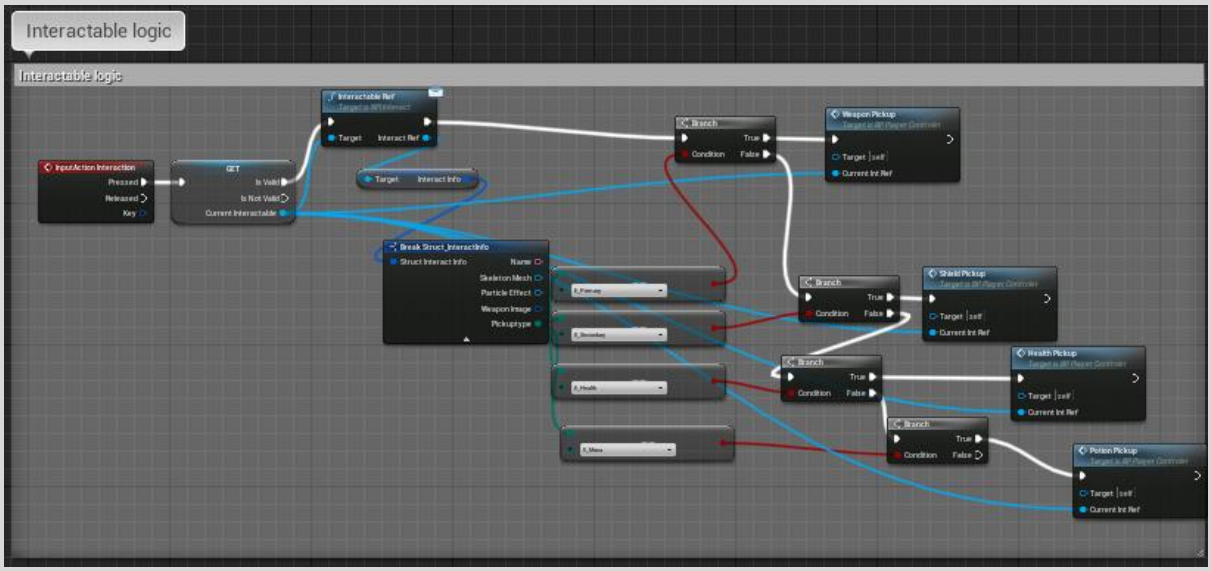

Figure 36: Blueprint for games interactable items

To have my weapons and shield attach to the player model I had to go into the character skeleton and rig this myself we new sockets that the items would spawn into this was straight forward.

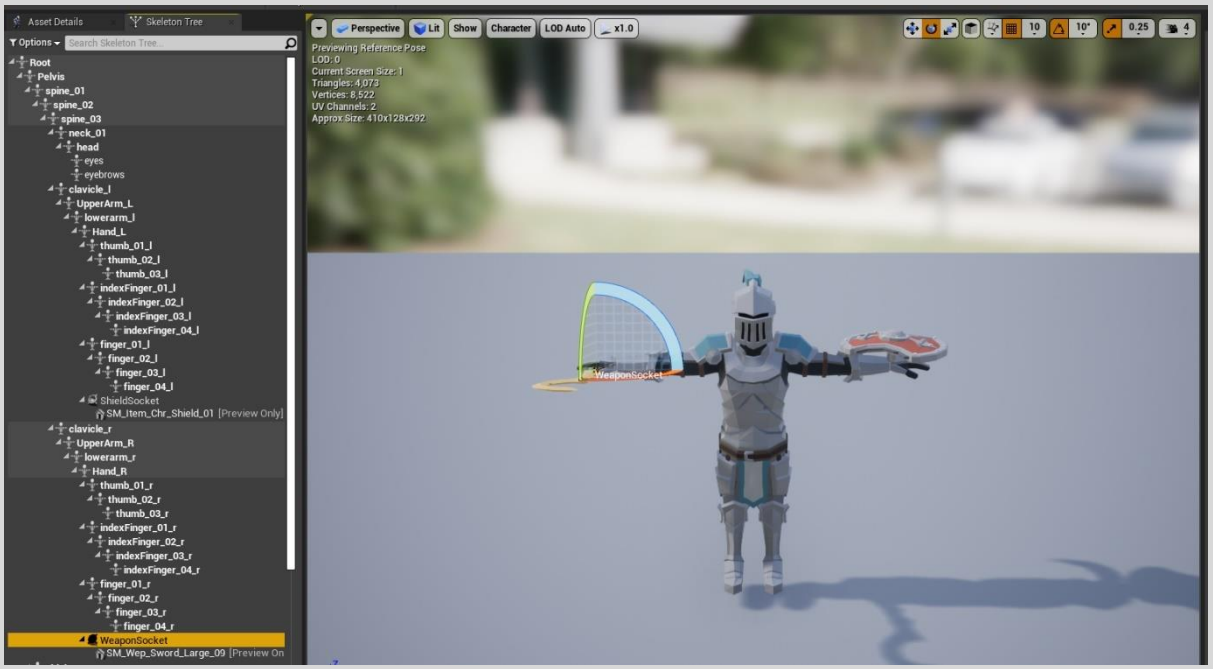

Figure 37: Skelton rig of player character

Enemy AI

As I had already set animation for my player my enemies would have the same skeletal mesh as the player this would make work on applying animation a lot easier for myself although as I had a combat system that felt good to play with I also felt it was important to have an enemy AI that followed a set of instructions that would give the enemies a sense of strategy for this a looked into AI behaviour trees this is an area I have touch on within other projects so this process wasn't to hard to implement itself.

I wanted my AI to sense the players location and then run to this location once the AI had reached this point I wanted them to keep a safe distance away from the player so they could not be attacked and then take turns in attacking the player I did this by creating a fighting director this let the engine prioritise the enemies on what enemy should attack the player and how often it would attack.

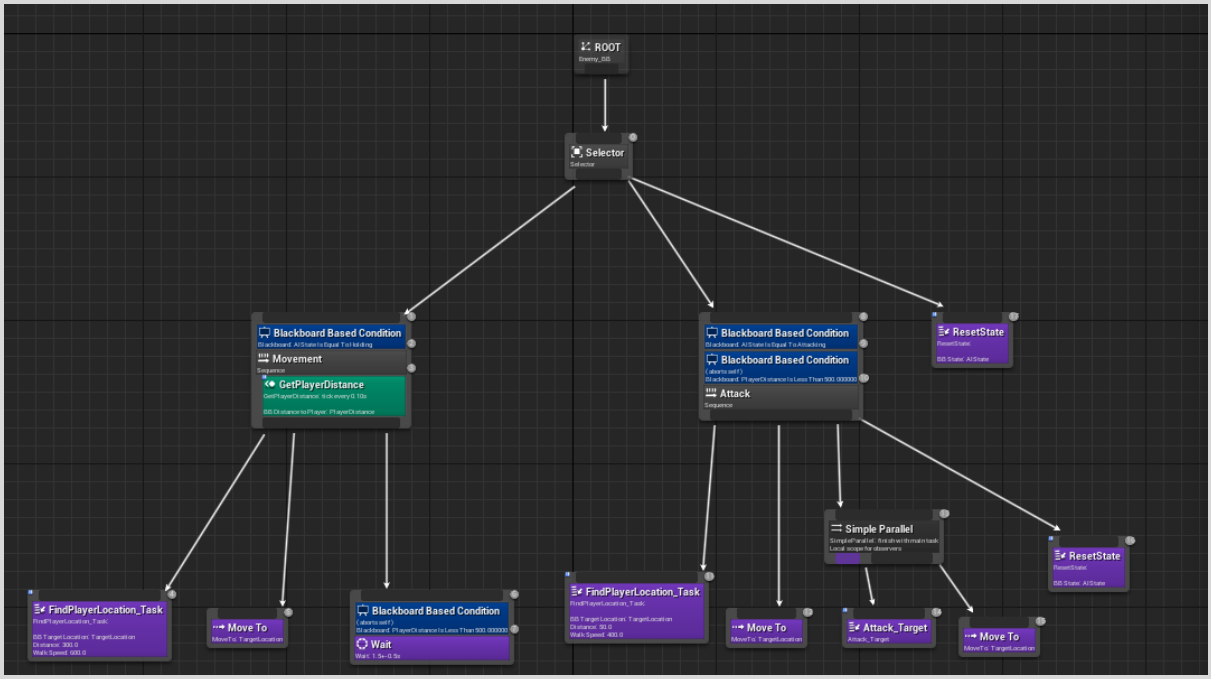

Figure 38: AI behaviour tree

This AI behaviour tree allowed me to create a set of AI that attacks the player in turns and keeps a safe distance when not in combat overall for an area that I do not specialise in I believe this turned out really well.

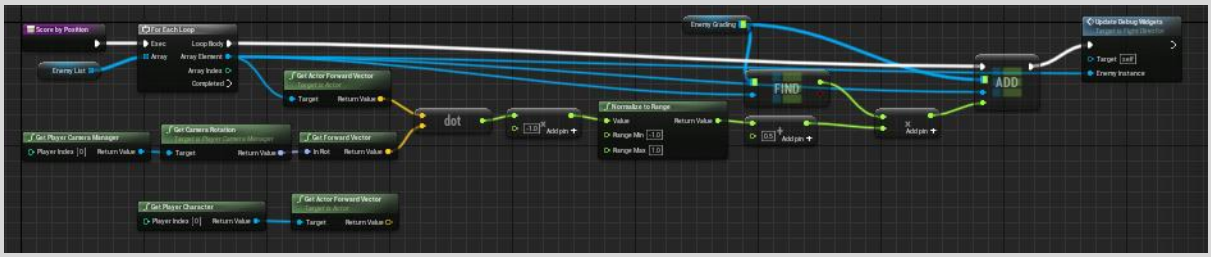

Figure 39: Fight director Blueprint

Figure 39: AI Behaviour elements

Problems and solutions

During the process of creating my project some of the more notable issues I had where down to getting animations to work with my characters skeleton as when I tried to apply animations my player character would brake although after playing around with this I found a strange solution to be to convert the animations to the Unreal 4 mannequin and then to convert them to my characters skeleton for some reason this seemed to fix the issue.

Another issue I seemed to have was that my enemy AI could sense the player from and fair distance and would run around the level abandoning the areas where I wanted my enemies to be although I could not get this to work with the behaviour tree or even blueprinting I found that if split up the nav mesh where the AI could walk and left areas that the AI could not get to this fixed my issue with having enemies chasseing the player all around my level.

Evaluation

Overall I believe that I have achieved my project deliverables that I set out for myself, and I am extremely proud of how my projects level and mechanics have turned out as not only is my level been met with positive feedback from other students, but the game also feels fun and engaging to play with and each element that I felt was crucial to my project has been successfully implemented.

During this project I've taught myself several new elements that I now have a much grater understanding of such as AI behaviour trees and animations as these where two areas I had rather no experience within or verry little experience.

Within future projects I would spend more time focusing on my projects mechanics as although am proud of how each element of my project has turned out I feel if given more time I could sharpen a lot of the games mechanics and add more to the overall experience of the game itself.

In the end I believe I've done well in delivering on my projects deliverables and am proud of each and ever element of my project and have found a lot of elements I can take on into industry and future projects to benefit my work within the future.