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The Veil: 3D Animation Gaming

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THE VEIL: 3D ANIMATION GAMING

by

Dennis Charles Hinton II

B.S., Southern Illinois University, 2015

A Research Paper

Submitted in Partial Fulfillment of the Requirements for the
Master of Science

Department of Mass Communication and Media Arts
In the Graduate School
Southern Illinois University Carbondale
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RESEARCH PAPER APPROVAL

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Approved by:

John Reid Perkins-Buzo, Chair

Graduate School
Southern Illinois University Carbondale
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AN ABSTRACT OF THE RESEARCH PAPER OF

DENNIS CHARLES HINTON II, for the Master of Science degree in MASS COMMUNICATION AND MEDIA ARTS; presented on APRIL 7th, 2017, at Southern Illinois University Carbondale.

TITLE: THE VEIL: 3D ANIMATION GAMING

MAJOR PROFESSOR: Mr. John Reid Perkins-Buzo

The video game industry seems to get bigger year by year. It has shown tremendous amount of economic growth and it will not slow down anytime soon. At first creating video games were done by students at Massachusetts Institute of Technology (MIT). Developers had to be very knowledgeable with computer science algorithms. In the evolution of technology and economic growth of video games it is easier to be a developer. In the world, we live in today you can have little to no background and can make a good game. Some key factors now are being very creative with your designs, being able to tell a good story, and perfecting your craft in animation programs. I myself do have a little experience with computer science. But I am going to focus majority on creating a game using animation programs, developing a good narration and being creative with my design.

TABLE OF CONTENTS

CHAPTER	PAGE
ABSTRACT.....	i
LIST OF FIGURES.....	iii
CHAPTERS	
CHAPTER 1 – THE NARRATIVE.....	1
CHAPTER 2 – THE APPS.....	9
CHAPTER 3 – CREATING THE WORLD IN UNREAL.....	18
CHAPTER 4 – INTERACTIVITY WITHIN THE WORLD.....	26
CHAPTER 5 – THE TRUE STRENGTH OF MY LAPTOP.....	35
BIBLIOGRAPHY.....	38
VITA.....	39

LIST OF FIGURES

<u>FIGURE</u>	<u>PAGE</u>
Figure 1.....	6
Figure 2.....	9
Figure 3.....	11
Figure 4.....	12
Figure 5.....	12
Figure 6.....	14
Figure 7.....	14
Figure 8.....	14
Figure 9.....	15
Figure 10.....	18
Figure 11.....	19
Figure 12.....	19
Figure 13.....	21
Figure 14.....	22
Figure 15.....	22
Figure 16.....	23
Figure 17.....	24
Figure 18.....	25
Figure 19.....	26
Figure 20.....	27
Figure 21.....	28
Figure 22.....	29
Figure 23.....	30

LIST OF FIGURES

<u>FIGURE</u>	<u>PAGE</u>
Figure 24.....	31
Figure 25.....	31
Figure 26.....	32
Figure 27.....	32
Figure 28.....	33
Figure 29.....	33
Figure 30.....	34

CHAPTER 1

THE NARRATIVE

Inspiration

Video games are a crucial element to my everyday life, ever since the age of six. Since then I have put in many hours playing video games. Over the span of eighteen years I have played various amounts of gaming consoles and hundreds of video games. It is safe to say that my childhood was and my adult life is surrounded with the presence of video games. Though video games have always been a hobby to me, it wasn't till I took a few three-dimensional (3D) animation courses at Southern Illinois University when I realized I could possibly create my own. Learning the process of 3D modeling and how to animate the figures within 3D applications is what created my drive to learn more about 3D capabilities in gaming. The combination of loving video games and being knowledgeable of 3D animation lead me to the creation of my project/research.

Project Intentions

For my project, I was developing an adventure 3rd person game for the personal computer (PC) with puzzle mechanics and fantasy elements. It has a multitude of characters, lore, and a rich world to explore. It is a game of choices with a complex and intriguing story to draw the player in and explore the world of The Veil. By learning more about the other worlds that exist besides our own, the player will embark on a journey to uncover hidden mysteries, characters, and secrets of the realms.

Animation has always been a strong suit of mine and something I always wanted to further enhance my capabilities in. This project was meant to help me elevate my craft to an area of animation I never explored before. I used this project to combine animation

applications I was accustomed to using with applications I am unfamiliar. In my experience, I have years of hands on work with Autodesk Maya, Autodesk MotionBuilder and Autodesk Character Generator. I fused those applications with the unfamiliar of Unreal Gaming Engine. With these four key applications, I will be able to create the video game for my project.

The Chicken or the Egg

The narrative for a video game is no different than a narrative for a movie or TV show. There must be a strong sense of creativity in the designer of the video game. There are two major key concepts the designer must keep in mind, the story and the world. The characters, dialogue, the mission, and the overall directive of the game makes the story of a game. The world is “not simply geographical but experiential; everything that is experienced by the characters involved... (culture, nature, philosophical worldviews, places, customs, events and so forth)” (Wolf, 2012). Both concepts are closely compared to the analogy of the chicken and the egg, which comes first? The designer of the game can choose any route and still have a successful game:

Worlds often exist to support the stories set in them, and they can even have stories embedded in them... Yet, while the telling of the story inevitably also tells us about the world in which the story takes place, storytelling and world building are different processes that can sometimes come into conflict. (Wolf, 2012)

When constructing the narrative for The Veil I started with the creation of the world. I felt once I created the world, the story would soon fall in place like Tetris. Just like the game of Tetris there was a lot of adjusting pieces to make the story fit well with the world. Rather you are telling a story or creating the world first the designer imagination must be prominent in the creation. What makes games stick out from the rest is the designer's originality and uniqueness

of either the story or world and in rare cases even both. The imagination of the designers can be broken into two sections per poet Samuel Taylor Coleridge:

The IMAGINATION then I consider either primary, or secondary. The primary IMAGINATION I hold to be the living Power and prime Agent of all human perception, and as a repetition in the finite mind of the eternal act of creation in the infinite I am. The secondary Imagination I consider as an echo of the former, co-existing with the conscious will, yet still identical with the primary in the kind of its agency, and differing only in *degree*, and in the *mode* of its operation. It dissolves, diffuses, dissipates, in order to recreate: (Wolf, 2012)

Taking the things that we see in our everyday lives that exist in the world and telling a story or building a world with those concepts is a form of primary imagination. For example, comic books use primary imagination for their world all the time. Spiderman story takes place in New York, a real world that exist. But on the other hand, the story of Spiderman is a form of secondary imagination. Marvel “dissolves, diffuses, dissipates” the concepts and elements of the world around us so as to recreate something new with them.” (Wolf, 2012)

My imagination for The Veil was a combination of primary and secondary. The world and the story developed by dissecting ideas from my primary imagination of the world we live in and transforming them into something new like Dr. Frankenstein. Concepts and ideals that are in my game can easily be referenced to the primary world but you will never see my story and world in existence. This then turns my world into a secondary world. The secondary world is hundred percent fictional, my world created can only be seen in the video game or in one’s imagination. Using ideals from the primary world isn’t the only source that fueled my secondary imagination when creating my game. I used concepts and elements from other secondary worlds as well. With the exposure of so many secondary worlds in cartoons, Hollywood, and

other video games it is close to impossible for a designer subconscious not to be influenced by them when creating their own game.

The Veil

The story of The Veil is about a young man Azazel Bose who lives with his mother Joanna in a small rural farm town called Geburtown. Azazel is the outcast of the town; the citizens rarely have verbal or physical contact with him. Every day was a tough day for Azazel especially his birthdays since his father disappeared on the day he was born. On Azazel's 18th birthday he discovers he has powers to control things with his mind with his best friend Eva. Not only does Azazel has the burden of his missing father but now he must learn to control his new mysterious powers. On the discovery of his new abilities some of Geburtown's civilians are nowhere to be found. Azazel uses his new powers to help the people of Geburtown to find the missing civilians. On his journey, he finds out the truth about his powers and what really happened to his father and he defends his town from pure evil. Azazel must defend his town from Lilith and the Malo Mortuum.

Behind the Mask

In the year 2000 Geburtown suffered from a huge massacre from supernatural beings called the Malo Mortuum. The Malo Mortuum are demons from the deepest pit in hell. Geburtown happens to be the gateway from hell into the living world. The year 2000 was the only opening for the portal into living world from hell. The leaders of the Malo Mortuum army was Sirious and Lilith, demon siblings. Both very powerful demons who have one goal to take over the living. In the process of slaughtering the people of Geburtown Sirious finds himself

unable to kill a woman. The woman is Joanna Bose a young farm girl who bestows the heart of the demon.

With Sirious new found love he helped the people of Geburtown relinquish the demons back into hell. Sirious decides to stay with Joanna and eventually starts a family. They have a son Azazel and on his birthdate Sirious vanishes from the town. Even though Sirious saved the town everyone hated the Bose family because of their ties with demons. Azazel was the most hated person in the town because they knew he was half demon. Azazel throughout his life is completely unaware of his demon side, until his 18th birthday when his demon powers awaken.

People start to go missing in the town so he uses his demon powers to help the people of Geburtown. The portal from hell has somehow been reopened. With the help of his sidekick, his best friend Eva they fight evil to protect the town. On their journey, they realize Lilith is rebuilding the Malo Mortuum army with plans of destroying the world. Azazel and Eva travel to hell to defeat the Malo Mortuum only to discover that his father is still alive and is imprisoned in hell. Azazel mission is to save Geburtown from oblivion and return his father home.

The background story of my game has some influence from many primary world elements. If anyone tries to google Geburtown they will find only a bunch of German websites. Geburtown is a fictional location which makes my game a secondary world from the start. I reference German because German is the main root of the word. In German, the word "geburt" means birth. This is an example where I take a primary world concept and twist it into my own fiction. I choose the phrase "birth town" to show this is where the evil throughout the game was born. I choose German because out of all the languages birth in German sounds better with "town" at the end.

When creating the location for my video game I decided to use a lot of elements from the primary world. A huge element in this world is the rural farm land. Each house in the town had open fields and a lot of land. Some of the homes had their own ranch with horses. Geburtown location was along the countryside close to high hills and mountains. The town also had a small forest area like you would see in the country of the primary world (as shown in Figure 1 below).

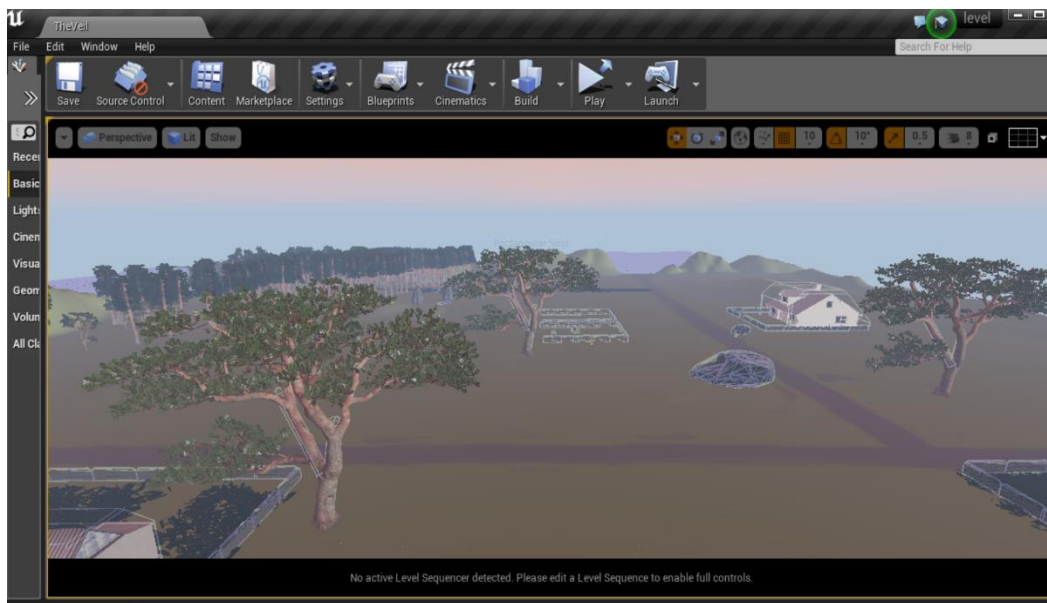


Figure 1. This is high vantage shot of Geburtown showing the primary worlds rural elements.

Malo Mortuum is the name of my vicious army in The Veil. Malo Mortuum is Latin for “evil dead”. I decide to go with Latin because it was a language that dates back thousands of years, that has a level of unknown mystique. Even a couple names of my characters have primary world ties to it. Azazel is a Hebrew name; this name has even been referenced in the Bible. I wanted to use names that had religious connections because my game is so heavily focused on my primary imagination of hell. The next name that has a religious connection is my

character Lilith. Lilith too derives from Hebrew heritage and is associated with being a female demon.

Religion, language, and rural countryside elements were my primary world concepts I created in my video game. Other secondary worlds helped me create the narrative for *The Veil*. Japanese anime is huge in my imagination, the secondary worlds produced in anime I can see in my story. Japanese anime series like *Yu Yu Hakusho*, and *Inuyasha* come to mind instantly. Both protagonists in the shows are half-blood demons using their powers for good, while killing other demons. Another secondary world from anime would be *Naruto*. In the show, *Naruto*, the protagonist's father also leaves him on the day of his birth but by death. When creating this narration, there is one element of the secondary world that came deep from my secondary subconscious. When I decided to give my protagonist powers I learned that it manifested from being an avid watcher of the show *Supernatural*. It wasn't until I finished writing the narration that I used elements from the show. A character from the show had the same powers given to him by a demon. But this event aired on TV over a decade ago and now the idea resurrected in my game.

Nuts and Bolts

The primary play mechanic is divided into two forms, one for navigating the game world and the other mechanics for interacting with characters and puzzles. Navigating through the game world takes the form in 3rd person view of the player. The player can view from a top down perspective of a map to select a specific region of the game world to move towards. After selecting an area to explore, the player is put into that region to be able to walk around. The range of physical movement is limited to the space given to each region.

The other play mechanic occurs during conversation with other characters. The perspective is still in third person point of view to display all characters' present in the specific conversation. During these conversations dialogue boxes pop up in front of the characters and are colored coded to differentiate between each other. While traveling from region to region and meeting various characters the player will encounter enemies which he must evade or fight. The fighting of the enemies will also occur in 3rd person.

The controls of the game will follow very standard PC gaming controls. To move the player there will be two set of keys to use. First will be "W, A, S, and D", these controls move the player forward, back, left and right. For those same commands, I am the creating the option to use directional keys as well. The space bar of the PC will be the jumping action for the player. The players X and Y scale of the camera will be controlled by the movement of the mouse. Lastly the clicking of the left side of the mouse will start action with whatever is clicked and the right side will commence the punching feature.

CHAPTER 2

THE APPS

When designing my video game there were certain applications that pertained to certain sections to produce my project. The applications used were Autodesk Character Generator, Autodesk Maya, Autodesk MotionBuilder and Unreal Gaming Engine. Each of these applications have a distinct service to offer. The company Autodesk has a very prominent role in the creation of my game seeing as I am using three of its programs.

Autodesk Character Generator

This is an application that can be access directly from the Autodesk website. Character Generator allows the user to create 3D model characters from preset character features. Every model I create I must export as an Filmbox (FBX) file to use it in Unreal Gaming Engine. The features available for selection gives the user the capabilities to create over a thousand 3D models (as shown in the figure 2 below).

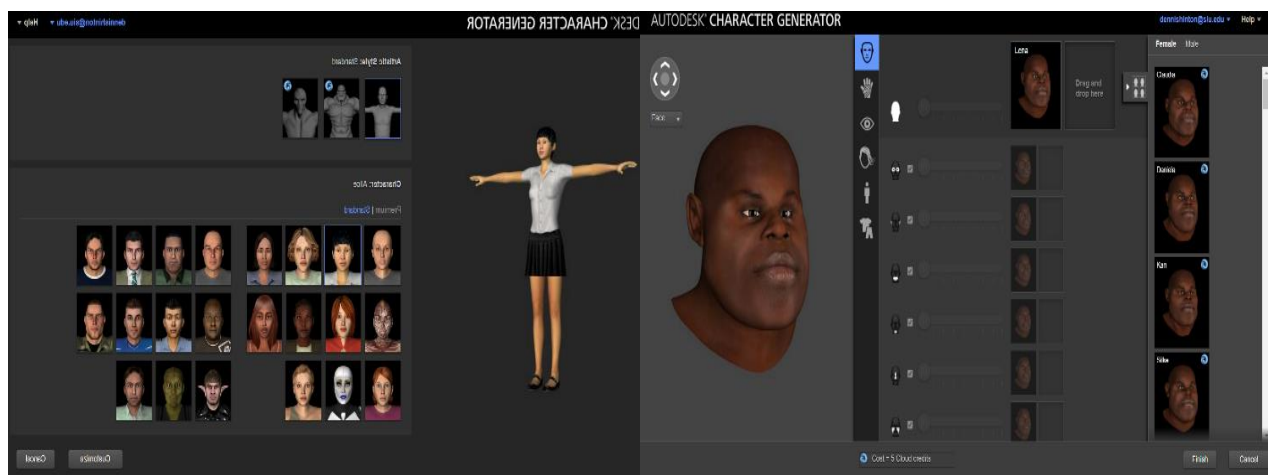


Figure 2. Character Generator has preset created models to choose from. By selecting a preset model, I then can alter its features to my liking and character design.

I used Autodesk Character Generator to model most of my characters in *The Veil*. Before I got to the step of modeling I first had to go through the creative process of deciding their features. Physical features really define the personality of a character in animations. In 3D animation looking at a character and judging a book by its cover is the norm. The way each model is designed is done purposely because seeing the character at first glance will tell the viewer a story. Scott Rogers talks about it in his book *Level Up! The Guide to Great Video Game Design*.

Animators have known for decades that the shapes you use for your character's design will help communicate his or her personality. Circles are used to make a character feel friendly. Squares are often used for strong or dumb characters, depending on just how big the square is. Triangles are interesting. A downward-pointing triangle is often used to give a heroic character a powerful frame. However, if you use that same downward-pointing triangle for the head, he seems sinister. (Rogers, 2014)

When creating the models for my characters I kept this in mind. Just the overall shape and silhouette can tell the narration of a character. Rogers states that the silhouette:

- Tells you the character's personality at a glance
- Helps distinguish one character from another
- Identifies "friendly" or "enemy" characters
- Helps the character stand out against the background and world elements (Rogers, 2014)

I wanted to make the demons of the Malo Mortuum character drastically different from the humans in the game. When the player of the game sees the demon, I want them to think evil with no hesitation. I have two variations of demons that are in the Malo Mortuum army. I labeled the demons as "Demon1" and "Demon2" when modeling. Demon1 is tall but very slinky, long arms and huge hands. Demon1 is very skinny with poor posture. Demon2 body

shape is completely different. Demon2 is 1.5 times the width of Demon1. Demon2 is very wide and muscular built. (as shown in Figure 3 below).

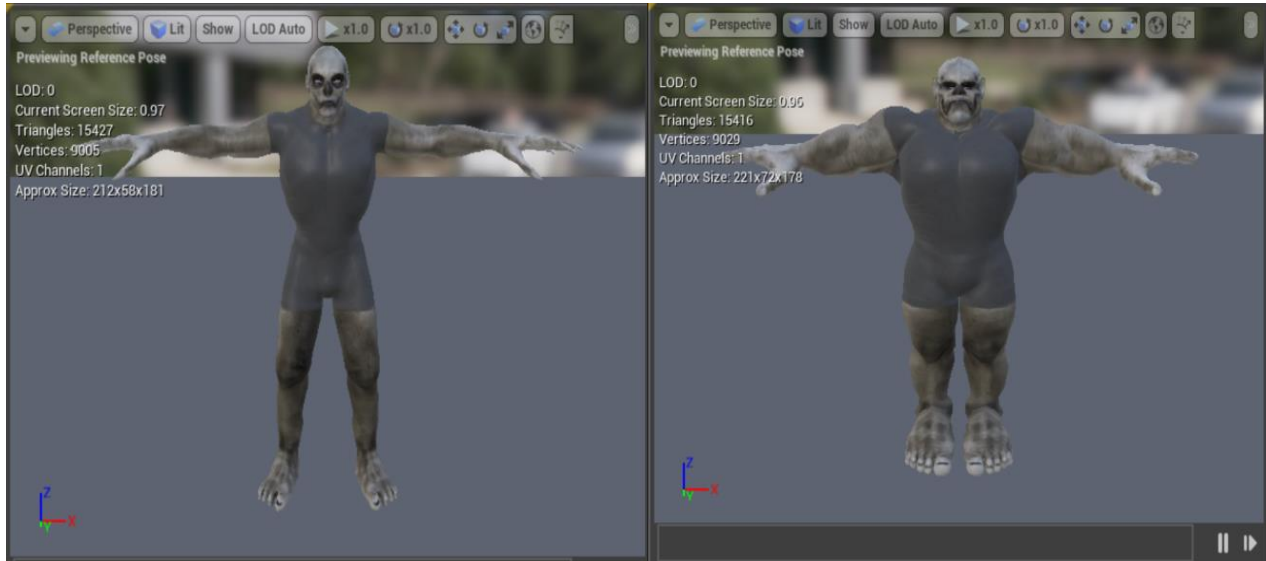


Figure 3. To the left is Demon1 and to the right is Demon2. As you can see both Demons have very different shapes.

Shapes and size are not the only way to differentiate characters in a video game. Other ways to “distinguish your characters from each other include color and texture.” (Rogers, 2014). To make the difference between humans and demons significant I gave both very distinct opposite traits. The demons have a gray rough thick skin with a raccoon masked face. The pale skin is a clear representation on evil and lack of life or soul. The demons have markings around their face to give a sense of a ritual essence. For the humans, I gave a realistic effect to their skin tone to resemble humanity. When comparing and contrasting humans and demons in *The Veil* the color and textures of the skin displays the difference between the two (as shown in Figure 4).

In *The Veil* the more powerful demons like Lilith and Sirious can take the forms of humans. It made me as a designer think of ways to make humans look more demonic without making them into variations of Demon1 and Demon2. What I did was take a primary world concept of the color black and utilized it with my Lilith character. In the primary world black is referred to as being evil or not pure. I made Lilith's wardrobe, her hair and even her eyes black. Just adding black characteristics to a human female model will create an image of evil (as shown in Figure 5).



Figure 4. On the left Azazel and on the right, is Demon1. Showing that texture and color plays a huge role with displaying characteristics.



Figure 5. Here is a close shot on the character Eva on the far left. In the middle both images are of Lilith close and full body shot. On the far right is a full body

shot of Joanna. As you can see by adding the color black to a female model allows me to capture a form of demonic imagery.

The Character Generator allowed me to create character models that didn't get me stuck in the uncanny valley. The uncanny valley is when "a character doesn't look quite right to the viewers...more realistic the model, the worse the animation tends to look" (Rogers, 2014). The application was well balanced and didn't step over the line in developing models that were too realistic. The models have a strong blend of realism and still looking like a video game. Having a game that looks too real can make the player uncomfortable and takes them out of the gaming experience.

Autodesk Maya

Autodesk Maya is a world-renowned animation application. Maya is used to create animation cartoons, video games, and special effects people see in movies and TV shows. Inside Maya the creativity process is limitless, giving you the tools to create anything you can imagine. I used Maya for basic modeling figures, applying different textures, converting files and creating skeletons for my 3D characters.

Maya was the application I used to create architecture for my farm land in my project. I used shapes and tools to create houses and fences for my games environment. I import shapes called polygons into the working area, and I alter the shapes to form an object. After forming the object, I must add a texture and colors to make it seem real. Once I completed the creation process of my object I must convert the model into a FBX file to use it in the Unreal Gaming Engine. (See figures 6, 7 and 8)

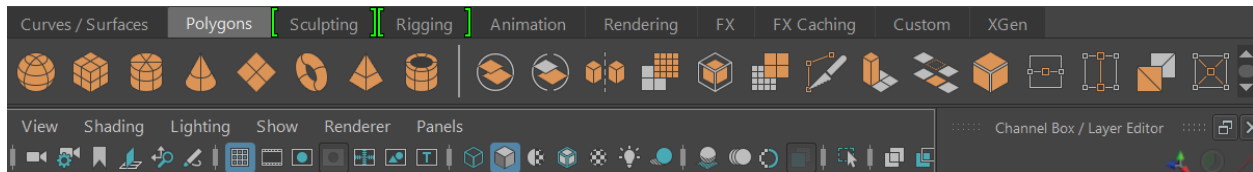


Figure 6. Maya's toolbar where you can select many options to create a desired model.

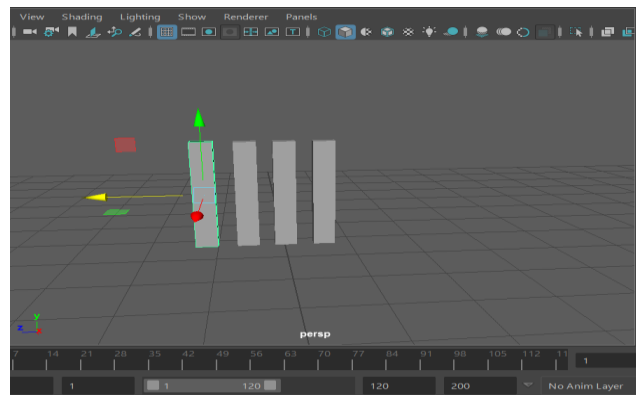


Figure 7. This is me taking the polygon shape of a cube and contorting them into smaller thinner pieces to resemble a model of a fence.

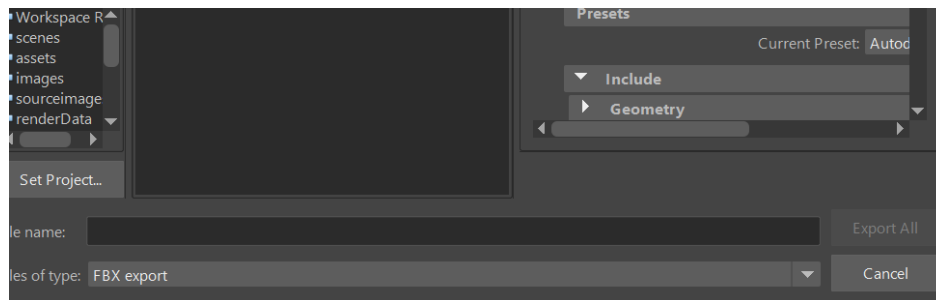


Figure 8. This is where I export the model as an FBX to import it into Unreal Gaming Engine.

Modeling the architecture of my project was one side of the coin when I was using Maya. With Maya I, can import the FBX files of my animated characters from Character Generator. Being able to do this gives me the power do alter any preset structures on the model I was not able to change within Character Generator. One thing I was focused on changing is the skeleton of some of the models from the generator. The skeleton of a model is its internal build up (shown

in figure 9). The pieces inside the skeleton are called bones, they control the animations ability to move and function. To animate the model, I must delete or add certain parts of the skeleton for I can import a Biovision Hierarchy (BVH) file onto it. BVH is a motion capture file of someone performing an action. That action is then converted to a file that you can apply to a skeleton for the animation can perform that action.

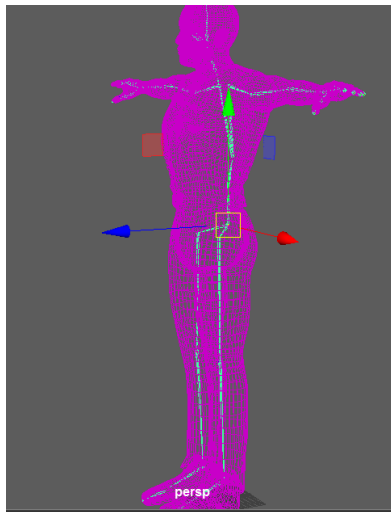


Figure 9. Above is the 3D model of Azazel from Character Generator. I hide his external features to see his skeleton. From here altered his bones for the performances of the BVH files.

Autodesk MotionBuilder

After the process of altering some skeletons bones I would then export that final form of the model into MotionBuilder. In MotionBuilder this is where I apply the BVH file onto the skeleton mesh of the model. This application is strictly meant for adding animations and actions to animated models. If the skeleton is correct this step will flow quickly and smoothly. Now if the skeleton does not accept the BVH I must go back in Maya and either try to find the error or delete the skeleton and create my own from scratch.

Unreal Gaming Engine

Unreal Gaming Engine is equivalent to Willy Wonka's golden ticket in my project. The other applications were just the chocolate bars to get to the ultimate destination. Unreal is the designing process of the game. Taking the models created from Autodesk and giving it a purpose. Tynan Sylvester in his book *Designing Games: A Guide to Engineering Experiences* describes it as "chess pieces are just tiny decorative sculptures. But when we move those pieces around according to a special set of rules, those little statues come alive." (Sylvester, 2013). Even though I created the models converted them to FBX files and added BVH's to them, they are nothing until I create the connection with Unreal.

Any creature with opposable thumbs can play a video game without thinking about how it came to fruition. "Games are composed of MECHANICS, which define how the game works." (Sylvester, 2013). Every aspect of a video game must be programmed to function. Nothing is accidentally there or created with no purpose. There are many factors to consider when designing the game, it is heavily premeditated procedure. I compare the mechanics of a game to the butterfly effect. The mechanics I design each have a strong dependence on each other, where the failure of one will have a dramatic effect on the rest. The mechanics includes but not limited to, movement, dialogue, time and space, textures, foliage, landscaping, and lighting. The goal is to reach the state of emergence, "EMERGENCE is when simple mechanics interact to create complex situations." (Sylvester, 2013).

To orchestrate these rules and mechanics together there are two ways to completing this. One way is the computer science coding route using the language of C++. The second way of completing the task is using Unreal Engine "blueprint". The blueprint is Unreal unique code

and language built inside the game. Blueprint is the route I took in developing my project. On the Unreal website, they give tutorials and documentation to help you learn their specific language. Using Unreal blueprint reminds me of a spider's web. I must take phrases and give them rules and codes then connect them with other phrases until it creates my mechanic.

CHAPTER 3

CREATING THE WORLD IN UNREAL

Terrain

When creating my level for *The Veil* I started with the environment where my game is taking place. First thing I had to do was create the terrain. When creating the terrain, the size of it is key because it is the length and width of your entire level. The terrain is measured along the x, y and z axis scale of the gaming engine. Depending on how big the designers wants his gaming universe depends on the numbers entered on the scale. I hand drawn out my level completely to know how big I wanted my terrain. I use my rough draft drawing as reference to design the level (shown in figure 10). The size of my terrain I entered was 100 across the board (shown in figure 11). Unreal has the capabilities to create a world with the scales of over 1000 in each axis.



Figure 10. Rough draft of The Veil, Level 1.

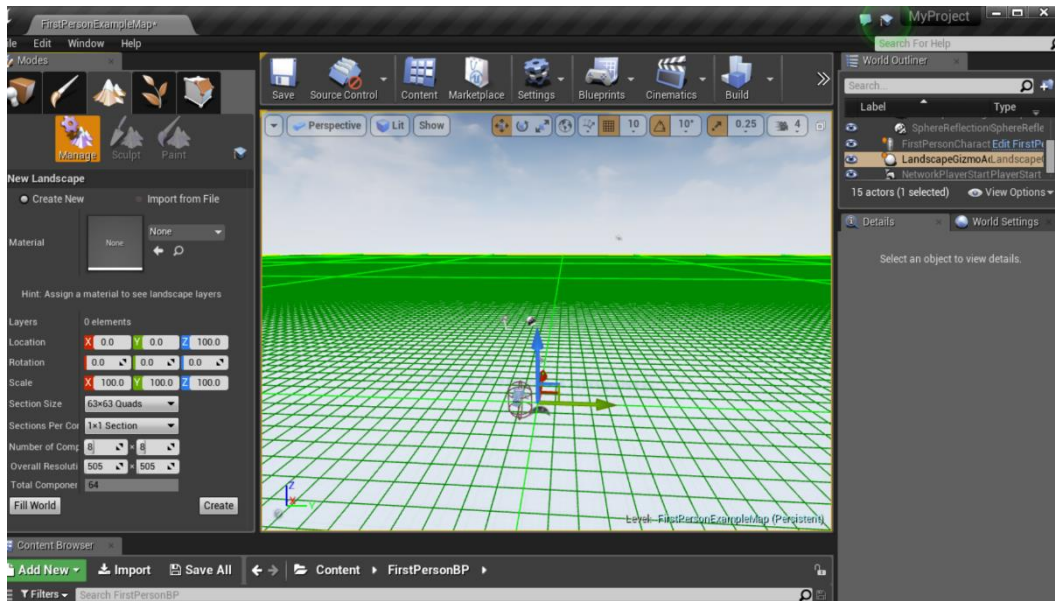


Figure 11. This is where I created my terrain and applied the scales. It is green because I was in the process of sizing the terrain. Once the size has been set the terrain turns into a flat gray surface.

Landscape Painting

After I manifested my terrain I must now create my texture for my land. By using my rough draft drawing of the level, it gives me guidance to what textures I am trying to produce. Seeing as my level takes place in Geburtstown which is in a rural area my textures will consist of grass, dirt, rocks and gravel. First step was to find the texture types I wanted to use within the engine. Once I decided on the textures I must bring them into the blueprint section of the coding (shown in figure 12).



Figure 12. The blueprint is an empty grid where you add phrases, numbers, and

materials to make a mechanism for a particular rule for the game.

Before bringing the textures into blueprint I must create a "Landscape Coordinator". The coordinator allows me to control how I use my textures on the terrain. Once I bring in the textures to blueprint they become texture samples. When the samples are set, I must create a "layer blend". Layer blend is telling the engine how the imparting textures are going to be used. In the layer blend, I create a section for layer and height for each texture (grass, rock, dirt and gravel). The layer in the layer blend tells the engine which order for the textures and the height tells it which should be more prominent when shown. Now inside the textures descriptions I would give certain textures more height than others. In the case of my game I want the grass to be more prominent so it receives a higher height.

Each texture I brought into the blueprint has a twin file in the engine called "normal maps". Normal maps tell the engine that the texture can have a 3D look to it. So, adding the normal map of each texture will make each component look more real. That process is the same as the texture sample. Created a new landscape coordinator and another layer blend. The final step in creating my texture is to make it into an attachable material. Inside the same blueprint, you make the material and name it. I named mine "T" short for texture. I connected the layer blend of the texture samples into the base color of the material. Lastly, I connected the layer blend of the normal map to the normal of the material. Down below there is the work done inside the texture blueprint (see Figure 13). The texture is finalized I can use the landscape paint tool to add the texture to the terrain. Using the paint tool is like coloring in a coloring book. I decide what areas of the terrain you want to be out of the four samples and just paint it on.

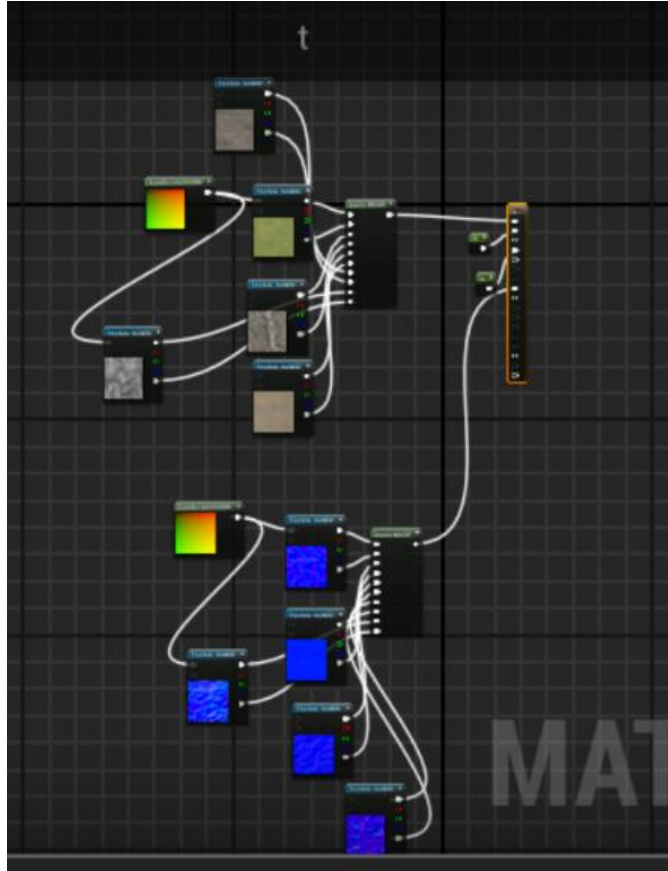


Figure 13. The blueprint for my “T” material for the terrains texture.

Landscape Sculpting

Once the terrain has received its texture it is now ready to be altered by various landscaping tools. The tools I used to landscape my terrain were sculpt, smooth, and noise. Each tool has a unique skillset that will affect the terrain. Sculpt tool makes the terrain rise to make hills and mountains. Smooth tool makes whatever I apply it more round and less rigged. The use of the noise tool is to make indents in the terrain. Unlike the sculpt tool the noise pulls the terrain down making an uneven field. The usage of the tools is simple, I just had to highlight the area I want to change. Using the tools reminds me of playing with “Play-Doh” as a child. I played with the tools till I got the terrain shaped how I wanted (shown in Figure 14 and 15).

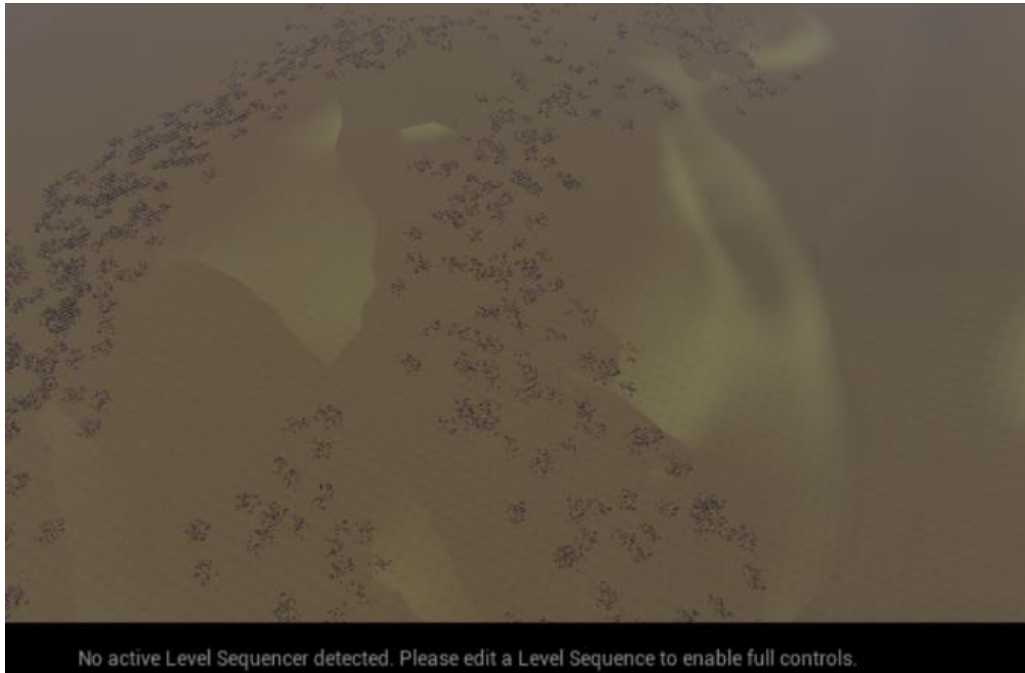


Figure 14. Here is when I used the noise sculpting tool to add depth to the terrain. Smooth tool is also present to add curvature.

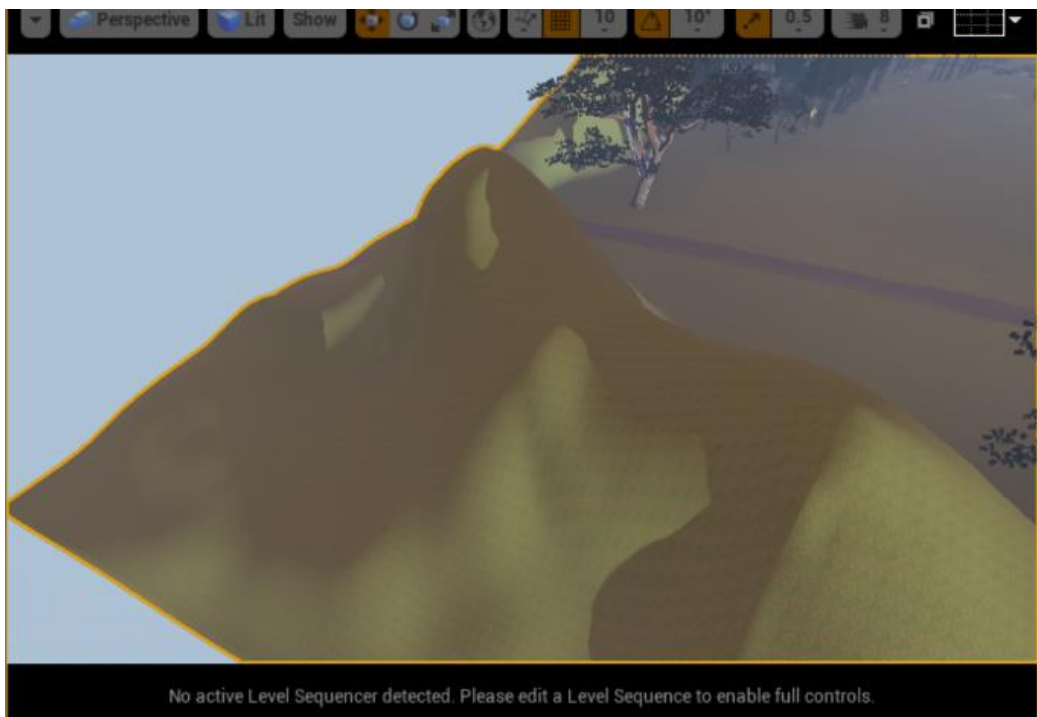


Figure 15. This is an example of the sculpt tool to rise the terrain above the surface level.

Lighting the World

When developing a video game in Unreal the engine starts you off with a generic sky. The sky is already full with clouds and it is very sunny. I believe this is done for the developer of the game would not have to start from nothing in complete darkness. There is an item inside the engine that controls whether its night or day. This item is called the light source. The light source is a directional beam light focused on the level of the game. You can control the output of the light source through blueprint or rearranging its direction within the level. What I did was change the direction of the light source and rotated opposite of the level. By doing this I created a reddish orange sky with less brightness of the sun on my level (see Figure 16).



Figure 16. The Veils skyline

Foliage

In Unreal Engine foliage is the plants, leaves, rocks, trees, and anything that is considered nature. The foliage tool gives the designer access to incorporating nature elements in the video game. To use the foliage tool, I must load static meshes into its database. A static mesh is Unreal's own way of saying 3D model of an image. Once I load the static mesh into the database I then can alter them however I see fit. Loading the static mesh into the foliage is as simple as drag and drop but there is hefty waiting time. The engine has static meshes of many

nature elements that come in different sizes large to small and some with greater details than others. The wait time to enter the database can be anywhere from 10 minutes to an hour (see Figure 17). This is called the render time. Rendering in animation is when the program is creating the model you want into fruition with 100 percent completion. Rendering is making the model, adding the textures, applying the light source, and loading it into the database at the same time. Once all rendered and loaded in the database I can finally select areas to put my foliage.

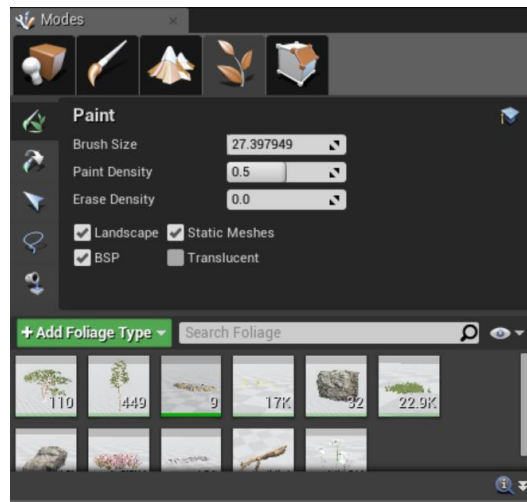


Figure 17. This is where you add the static mesh to the foliage tool. After adding them you can paint it on the terrain. The brush size is very important because that controls how much foliage you apply with every click of the mouse.

The nature elements I choose for my project were trees, field grass, flowers, and various rocks. With the use of all these nature elements I captured a realism environment of the primary world country side. The foliage tool allowed me to perfectly execute the rough draft of my level (shown in Figure 18). I designed a huge open field with rocks grass, yarrow flowers, and heather flowers. I created a forest with many trees, logs, rocks, that has a stone pathway

leading to it. On the outside of the forest I designed a mountain to add more primary world elements. The foliage tool made the models I imported from Maya come more to life.



Figure 18. This is the top view of my level. The dark green in the bottom right is the forest of the level.

CHAPTER 4

INTERACTIVITY

Frozen Pieces

I am at the stage of my project where it is time to animate my 3D models within Unreal Engine. I am completely done design my world, the terrain, textures, sculpting, and foliage are all complete. I now have characters set in their right positions for the level. Next thing to do is to bring in the BVH files I had attached to them in MotionBuilder. This process was as simple as going to the animation screen of each character and putting a timeframe on how long and often I wanted the model to perform that BVH. Once the character start performing the BVH the Unreal Engine application shuts off completely. Once I load my level back up the BVH file is no longer in affect. So, I perform the same process repeatedly with multiple characters performing different BVH movements. No matter what I did it was always ended with the same result. So, at this point and time I have all my characters in the game level but they are standing perfectly still (see Figure 19).



Figure 19. This is Azazel is inside the level of the game. He is in the same T-shape when I made him in Character Generator. All the characters inside my game are motionless and are in the exact same stance.

The Player

The Veil is a 3rd person adventure game. When the game is in third person the camera is behind the player looking over its shoulder or right behind the entirety of its body. The 3rd person playable character in my game was Azazel. Since Azazel is unable to move I decided to go a different route with my 3rd person character for the game. Through the Unreal website, they have models you can download and upload onto the software. I downloaded a generic character model from their server into the engine. The model looks like a robotic being made of steel, and it is also faceless (see Figure 20). With the model being made from the Unreal company I wanted to see if I would have a different outcome with trying to animate this model.

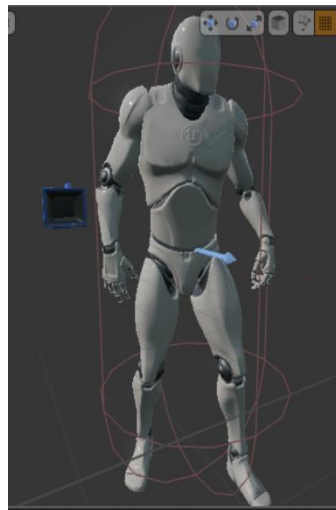


Figure 20. This is the Generic robot uploaded from Unreal website. In the back, you can see the camera behind the model, this is what makes it a 3rd person game.

Unlike the other characters where the BVH was added from another program the animations I am going to add to the generic robot will be added inside Unreal Engine. Animations for the robot were in the same documents as the model. I added the animations to Unreal engine and then loaded them onto my model. After waiting for them to load I then

adjusted the timeframe of the animations to move within the game. The generic robot could move without the software crashing. It was hard to do but I kicked Azazel to the curb and then generic robot became my half demon. This is where the narration of *The Veil* makes a detour from the original plan.

The Commands

The ball is rolling now, I finally have a player for the game that can execute animations. The next step is creating the commands to control the model. This is where I set up the buttons that need to be pushed by the person playing the video game to control the generic robot. I had to change the settings of my level. Had to go to the input of the level and change the binding through the axis mappings. Axis mappings is where you go to tell the engine what is going to be happening with the controls on the map of the level. I named the controls and then select the buttons I wanted to use for them (see in figure21). I gave each movement a number on how much I wanted it to move on the axis.

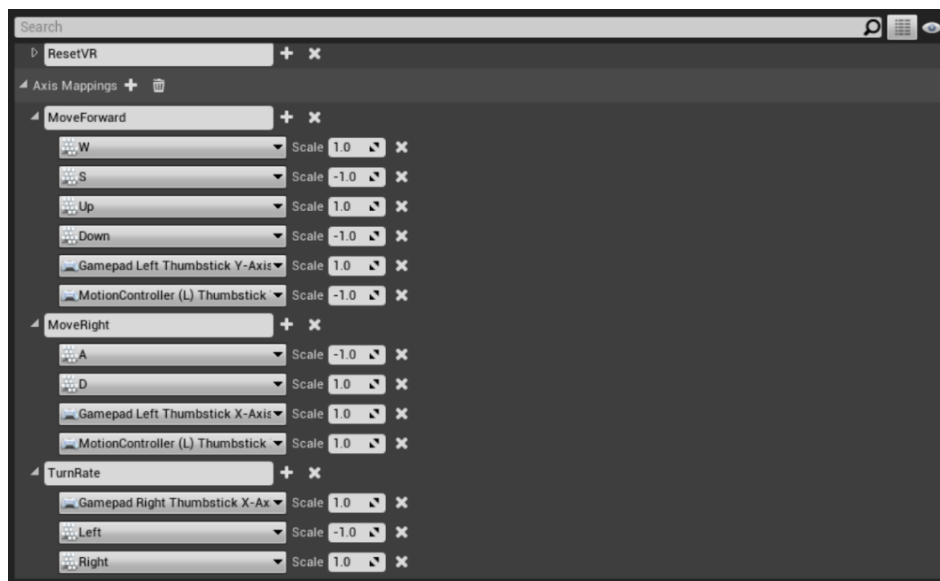


Figure 21. Here in the axis mappings I am telling Unreal Engine what buttons I want to use to perform the animations.

To get the buttons working properly I lived in blueprint troubleshooting for a long time. I needed to make a blueprint rule for the buttons, mouse, character movement, characters touch, characters jump, and lastly his positioning in the game. When creating the controlling rules for a character it is really a big game of true or false and what if questions. By the meaning of that I must write rules for rhetorical questions. For example, “if I click the button to turn right is my character really turning, right? If so how far on the scale is it turning?” So, I will write a rule saying a right turn will travel on a 1 on the x axis. I will then have to write a false rule for the engine can always know that 1 on the x axis is correct. To do that will make -1 on the x axis the false statement to move right. I needed to write rules like that for up, down, and left. For my character to jump properly I would have to tell the engine when I jump how far and how long I would have to be in the air and where should the character be after the jump. If this is done incorrectly a jump in the air can turn my robot into a flying superman and he would never come down. Down below in Figure 22 is my entire blueprint to control the player.

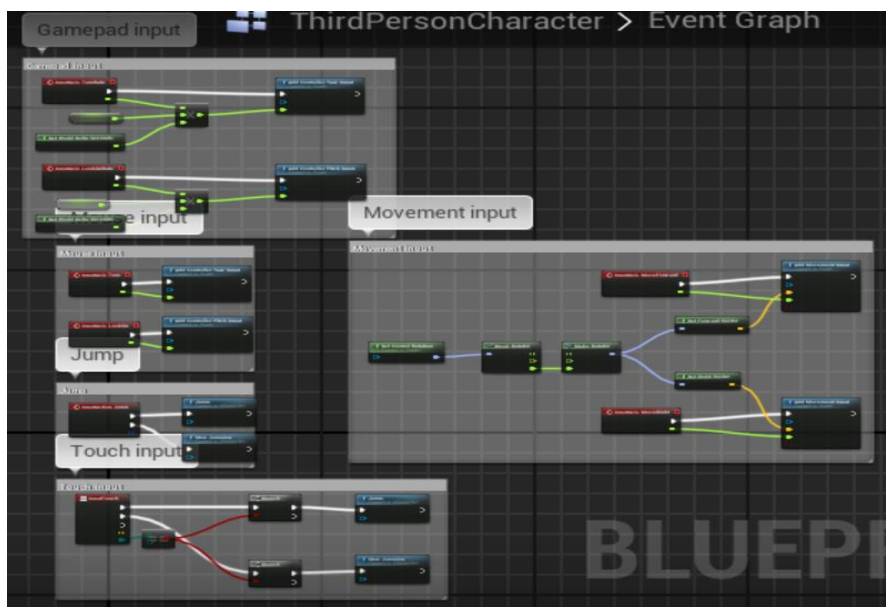


Figure 22. Blueprint of animation control of the player.

Gameplay

The generic robot is now able to move throughout the game and I am excited at that moment. I can adventure through *The Veil* and travel through the level. Moving through the space is special on its own because of the realism I captured in the creation on my environment. The game is nowhere close to the stage of being finalized but it is still able to be played because I set up the 3rd person camera to the generic robot (see in Figure 23, 24, 25, 26, 27 28, 29 and 30). To play the game I must create and attach a player start to the robot. Player start is an item you bring into the level and place it anywhere in the level you want your player to begin.



Figure 23. Player start in the game in front the Bose family house next to Joanna and Eva.



Figure 24. Showing the players interactions with other models within the level.



Figure 25. Gameplay of character standing in the open field.



Figure 26. The player is exploring the world and finds a member of the demon army.

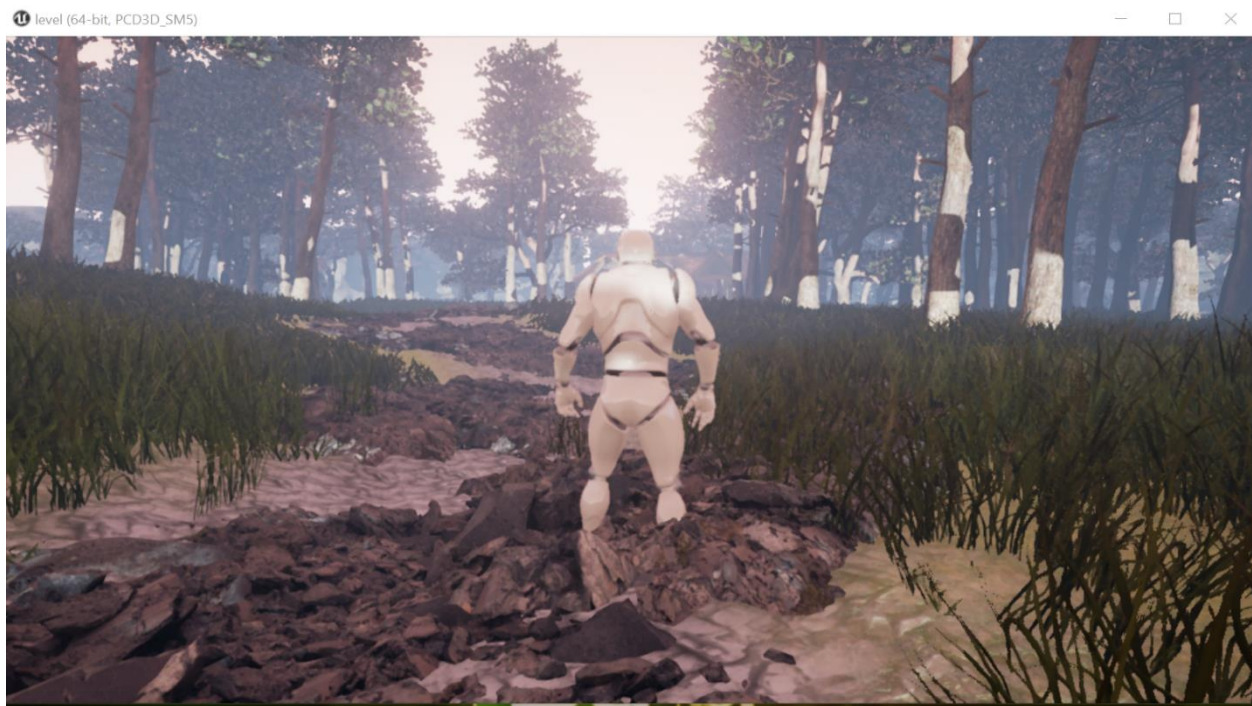


Figure 27. This is a shot of the player first entering the forest following the stone pathway.



Figure 28. The player is getting deeper into the woods, getting a nice close-up of the grass and trees.

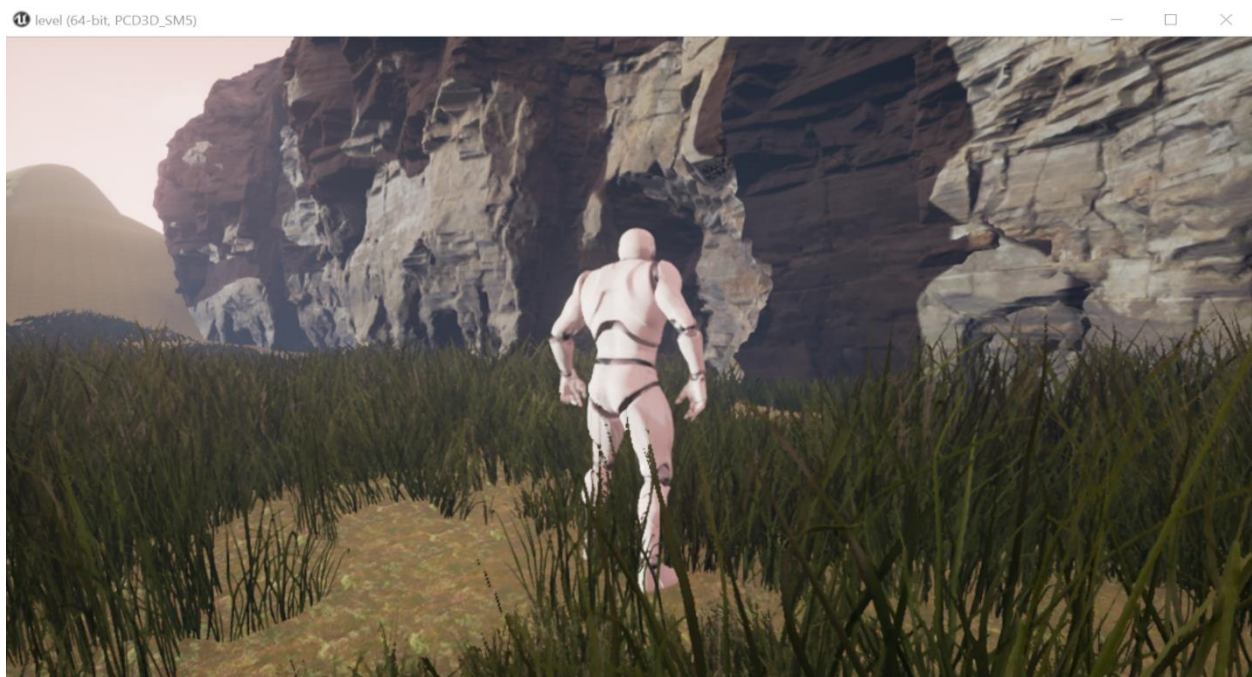


Figure 29. Moving around the terrain the player reaches the boundaries of the level that stops the player with mountains.

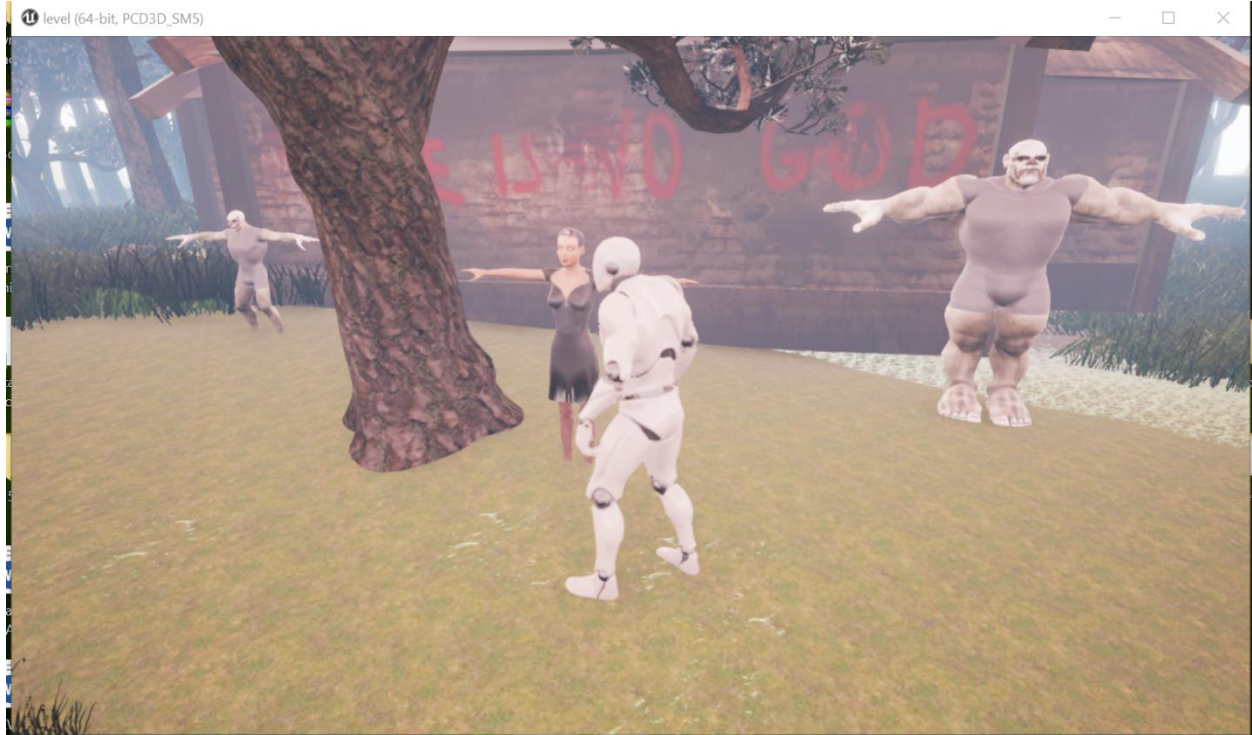


Figure 30. The player reaches the end of the forest where Lilith and a couple demons resides.

CHAPTER 5

THE TRUE STRENGTH OF MY LAPTOP

When designing my video game everything was running smoothly until I wanted to animate my models to conduct BVH files. My first conclusion that maybe I was doing something wrong in my process. My second conclusion was maybe Unreal Engine is not capable of transferring BVH files from other sources. Looking at the documentation online on the Unreal site and various YouTube videos people have successfully added BVH files from other programs. After doing some searching on the web I finally came to the realization that my laptop is the problem. I have the proper specs to run the software of Unreal Engine but they are not good enough for me to max out the engine potential. I accumulated too much data when developing my world. All the models imported in, static mesh used, foliage, and terrain made my level heavy. Every time I open my level in Unreal my computer was using all its possible strength the ram and processor had to offer.

The area of the level that really caused problems for my computer to run the engine properly was the foliage. The foliage tool is a massive double edge sword when you do not know how to use it correctly. I was happy go lucky when discovering the foliage tool, adding as many static meshes as I could into its database. It wasn't till I finished designing my level when I found out I was supposed to create a new foliage each time I want to use a static mesh. Instead I added each static mesh into one foliage. When I was switching back and forth painting different nature elements all over the level I was creating one big piece. For example, if I click one little flower. By clicking that flower, I also selected every tree, rock, and grass I ever painted

on this level. Even if I wanted to delete some of the foliage I couldn't without deleting my entire world.

Adding animations to the models was not the only thing affected by the heavy data of the foliage. My dialogue between the characters was crippled by the foliage as well. The steps needed to create a dialogue between characters requires heavy blueprint rule writing. That's the hard part, the easy part is what gave my computers problems. The first step to adding dialogue is creating a box around a character that activates when the player walks within that box. By walking in that box the dialogue commences. Each time I tried to add that box the engine gave out.

Going to a prestigious school like Southern Illinois I figured I can just use the schools' computers, they have better specs compared to my laptop. It was a bright idea until I had a Homer Simpson moment, a "doh" moment. My computer is a PC and the only computers on campus that had the Unreal software were Macintoshes. So, I was very cautious because now I must go through the phase of converting my project PC files into Mac files. To be on the safe side I bought an extra hard drive and copied my project files. I am glad I did because once I converted the files into the Mac some of my Unreal saved data was lost in translation. I was still unable to use proper specs to get my game to do what I initially intended.

Far from Done

There is a bitter sweet taste in my mouth from working on this project. The game I could produce was visually a work of art. The realism I reached exceeded my expectations. I never imagined I would be able to create a world like that. The bitterness comes from not being able to tell my story. The low specs on my computer created a halt on some of my progression

developing my story throughout the game. My next move is to upgrade my specs. I am going to invest in bigger ram size and a stronger processor to finish this game. As of right now my project feels like a vessel but no soul. Vessel being the world and the soul being the story to make it all one and complete.

BIBLIOGRAPHY

Wolf, Mark J.P (2012). Building Imaginary Worlds. New York: Routledge.

Rogers, Scoot (2014). Level Up! The Guide to Great Video Game Design. United Kingdom: John Wiley and Sons Ltd.

Sylvester, Tynan (2013). Designing Games: A Guide to Engineering Experiences. Sebastopol: O'Reilly Media, Inc.

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