

# Multimedia Major Project



# Table of Contents

## **Design and Management**

Statement of Intent.....	Page 3
Project Proposal.....	Page 4
Research.....	Page 5
Development of Ideas.....	Page 17
Story Boarding .....	Page 19
Finance Plan.....	Page 25
Time Plan.....	Page 26
Evidence of safe working process and OH&S Issues.....	Page 56

## **Production**

Creating the map.....	Page 32
Animating in Source Filmmaker.....	Page 45
Rendering and Exporting.....	Page 50
Post Effects and Sound.....	Page 53
Degree of Difficulty.....	Page 60

## **Evaluation of project**

Links between planning, production and statement of intent.....	Page 60
Evaluation of materials and processes used.....	Page 61
Evaluation Conclusion.....	Page 63
Major Works Diary.....	Page 64
Bibliography.....	Page 73

## Statement of Intent

For my Multimedia Major Works 2018, my aim is to create a short 3D animated film using original character, object and map models created in 3D modeling software.

### **What the Project is:**

- The project is a 3D animated short film utilising original built character, map and object models created in various multimedia software including Source Filmmaker, Blender and a range of other multimedia tools/software.

### **Motivation and Purpose of Project:**

#### **Motivation:**

My main motive for choosing a 3D animation for my project is to learn more about the 3D animation industry/3D animation software and to determine whether it is or is not a field I would be interested working in after I complete school.

#### **Purpose:**

The purpose of this project is to learn about 3D animation and a range of multimedia software used in the industry. Another purpose of the project is to discover jobs within the multimedia industry that relate to 3D animation and 3D modeling and whether or not they may be a possible career path for myself after completing the HSC/High School.

### **Technical Specifications:**

To create the 3D animated short film, I will utilise a range of multimedia programs and software in order to effectively complete the following tasks:

- Modeling characters, maps and other objects within the 3D scene
- Creating a soundtrack/s for the animation
- Constructing the animated short film frame by frame
- Rendering and exporting the animation scene to a viewable format.

Some of the Multimedia software I will employ in order to successfully complete the animated short film may include:

- Source Filmmaker
- Adobe Premiere Pro
- Adobe Audition
- Blender
- Autodesk 3DS Max
- Autodesk Maya
- Hammer Editor



This list of software is commonly used within multiple companies that create animate films and games.

## Proposal

The ultimate goal of this project is to create a two to three minute short animated film using Source Filmmaker and Blender as the main software for editing and constructing the 3D environment. Throughout the project I hope to achieve the following:

- Create a polished 3D animation
- Create original character models, objects and maps for the 3D universe
- Learn how to use 3D animating software
- Experiment with camera angling and lighting within the 3D environment
- Use a range of audio editing software to create a soundtrack for the short film.
- Learn to use advanced features of multimedia software

To create this project I will require a range of materials to successfully construct the animated short film. These materials include:

- Source Filmmaker
- Blender
- PC/Laptop with optimal GPU,CPU and RAM
- Adobe Creative Cloud
- Steam
- Windows 10 Pro
- Autodesk 3DS Max

## Research

To begin my major project I will be required to research methods of creating a 3D animation and the software used to develop it. Along with software used to create the 3D scene, I will also require a video editor to create the final product. In this section I will research the following:

### **Software and Programs:**

- Source Filmmaker
- Blender
- Autodesk Maya
- Premiere Pro

### **Researching and Comparing Similar Projects:**

- Arena (Short Film created in SFM)

### **Copyright and Legal Considerations:**

- Copyright

## Research: Source Filmmaker

Source Filmmaker (SFM) was publically released on the 10<sup>th</sup> of July 2012 by Valve Corporation and is designed to allow the user to create their own 3D animated short films. Source Filmmaker has multiple purpose some of which include making films, creating movie posters and rendering 3D scenes. Source Filmmaker can be downloaded free from Valve's gaming platform *Steam* and can be used on both Mac and Windows operating systems. Initially, Source Filmmaker was used internally by Valve to create trailers and promotional videos for their games, which include *Half-Life 2*, *Portal 2* and *Team Fortress 2*. Once downloaded, Source Filmmaker allows the user to select maps, characters and other source engine assets to add to their 3D scene. Along with pre built models, the software is extremely versatile as it allows the user to create and import their own creations, which can be made with Hammer Editor (which comes bundled with SFM) or any other 3D modeling software that supports the Source Filmmaker file extension. Source Filmmaker contains three main user interfaces, which allow the user to perform multiple tasks with ease. These include:

- **Clip Editor:** used for recording and editing shots allowing the user to insert sounds and other visual effects.
- **Motion Editor:** is mainly used for adjusting the animations of a characters and blending multiple animations together seamlessly.
- **Graph Editor:** Mostly useful for creating pose-to-pose animation as it allows to user to insert keyframes.

These interfaces allow the user to seamlessly create pose-to-pose animations with a range of lighting and camera effects making it a simple way of creating a 3D scene and rendering a completed animation.

### System Requirements:

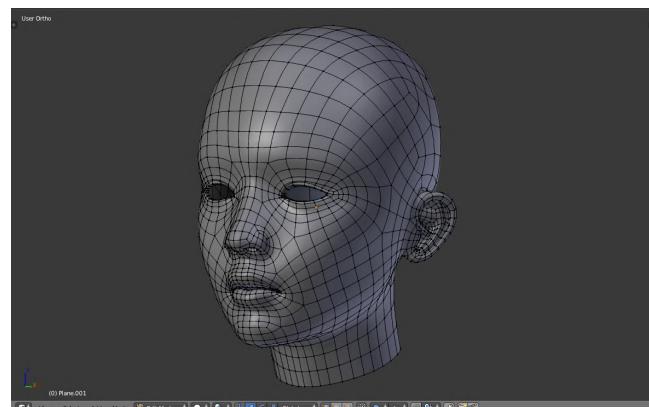
Minimum Requirements	My Current PC Specifications	School PC Specifications
<b>Operating System:</b> Windows 7	<b>OS:</b> Windows 10 Pro	<b>OS:</b> Windows 10 Education
<b>CPU:</b> 3.0 GHz P4, Dual Core 2.0 or AMD64X2	<b>CPU:</b> Intel Core i5 6600	<b>CPU:</b> Intel Core i5 6500
<b>RAM:</b> 2GB (4GB Suggested)	<b>RAM:</b> 16GB DDR4	<b>RAM:</b> 8GB DDR4
<b>Graphics Card:</b> NVIDIA GeForce 200 series card or AMD Radeon 3000 series	<b>Graphics Card:</b> Gigabyte GTX 1060 6GB VRAM	<b>Graphics Card:</b> NVIDIA GeForce GT 730
<b>Monitor:</b> 1366 x 768 Resolution	<b>Monitor:</b> Asus VS228NE 21.5" 1920x1080	<b>Monitor:</b> HP EliteDisplay E222 23" 1920x1080
<b>Hard Drive:</b> 15GB free Space	<b>Hard Drive:</b> Kingston 256GB SSD and Samsung 1TB Portable Hard Drive	<b>Hard Drive:</b> 500GB Hard Drive
<b>Sound:</b> DirectX 9.0C compatible with USB headset with microphone	<b>Sound:</b> Logitech G230 Headset with Mic	<b>Sound:</b> HD Audio Internal Speaker



## Research: Blender

Blender is a free open-source 3D graphics program, which was freely released on the 20<sup>th</sup> of August 2003. Blender has a long feature list some of which include creating 3D printed models, animated films and video games. Blender has been under development for 23 years and new features are frequently being released to the public. Currently, Blender is at version 2.79 with version 2.8 being close to release. To promote and showcase the capabilities of their software, Blender has created multiple short animated films using their own software to create them. For my major project I will mainly be focused on Blender's modeling capabilities. Blender has a range of features related to modeling objects and characters. Some features of Blender's modeling engine include:

- UV Unwrapping which allows the user to import custom textures onto an object
- Built in Brushes for sculpting
- Keyboard shortcuts allowing for a fast paced experience



For my major project, I am considering using Blender because of its modeling capabilities and the large amount of tutorial/information available on Blender. I will mainly be using Blender to create objects and character models as it allows the user to model directly off a sketch/drawing of the character or object making it easy to construct the models I require.

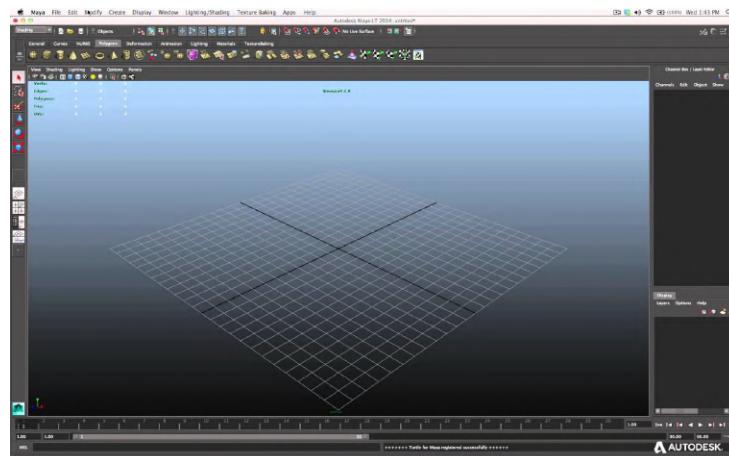
Minimum Requirements	My Current PC Specifications	School PC Specifications
<b>Operating System:</b> Windows XP	<b>OS:</b> Windows 10 Pro	<b>OS:</b> Windows 10 Education
<b>CPU:</b> Pentium 3	<b>CPU:</b> Intel Core i5 6600	<b>CPU:</b> Intel Core i5 6500
<b>RAM:</b> 256MB RAM	<b>RAM:</b> 16GB DDR4	<b>RAM:</b> 8GB DDR4
<b>Graphics Card:</b> NVIDIA GeForce	<b>Graphics Card:</b> Gigabyte GTX 1060 6GB VRAM	<b>Graphics Card:</b> NVIDIA GeForce GT 730
<b>Monitor:</b> 1366 x 768 Resolution	<b>Monitor:</b> Asus VS228NE 21.5" 1920x1080	<b>Monitor:</b> HP EliteDisplay E222 23" 1920x1080
<b>Hard Drive:</b> 15GB free Space	<b>Hard Drive:</b> Kingston 256GB SSD and Samsung 1TB Portable Hard Drive	<b>Hard Drive:</b> 500GB Hard Drive

## Research: Autodesk Maya

Autodesk Maya is a paid 3D animation software developed by Autodesk Inc. The software was released during 1998 and is compatible with Mac, Linux and Windows. Maya is widely used within the animation industry with companies such as Pixar, Disney and multiple other popular movie studios using the software to develop their projects. Maya has also been used to develop models for popular video games including *Grand Theft Auto V*,

*Watchdogs\_2* and *Mirrors Edge: Catalyst*. Maya is widely used as it contains features that allow animators to easily construct models and develop objects of movies or games. Some features Maya is equipped with include a customisable workspace, UV editor for applying 2D textures to a model, timeline editor for creating animated films within Maya and a range of other tools for streamlined development. Due to the popularity and features of the software, Autodesk Maya is charged on a monthly subscription basis of \$260 or yearly starting at \$2065. The price for the software is high but students are offered 3 years free while they are studying in either school or university.

Updates for Maya are regular and bring a range of new features to the software. During the latest update of Maya the UV editor interface was overhauled with new tools and extended functionality and live connection between *Adobe After Effects* and Autodesk Maya was added which allows the user to make real-time changes to scenes. For my Major Project I am considering using Maya as it is a more powerful and widely used 3D modeler than Blender although it will require more time to learn.



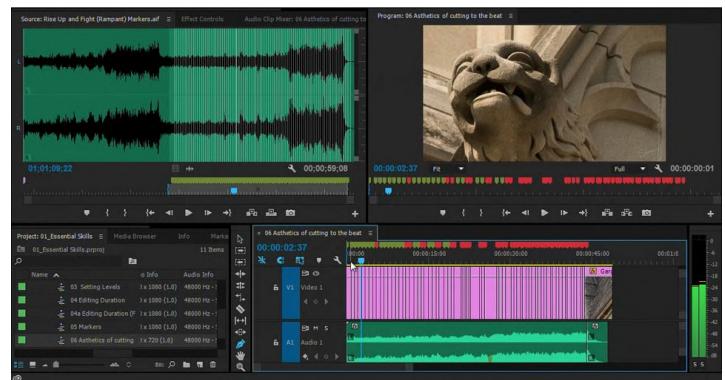
Minimum Requirements	My Current PC Specifications	School PC Specifications
<b>Operating System:</b> Windows XP	<b>OS:</b> Windows 10 Pro	<b>OS:</b> Windows 10 Education
<b>CPU:</b> Pentium 3	<b>CPU:</b> Intel Core i5 6600	<b>CPU:</b> Intel Core i5 6500
<b>RAM:</b> 256MB RAM	<b>RAM:</b> 16GB DDR4	<b>RAM:</b> 8GB DDR4
<b>Graphics Card:</b> NVIDIA GeForce	<b>Graphics Card:</b> Gigabyte GTX 1060 6GB VRAM	<b>Graphics Card:</b> NVIDIA GeForce GT 730
<b>Monitor:</b> 1366 x 768 Resolution	<b>Monitor:</b> Asus VS228NE 21.5" 1920x1080	<b>Monitor:</b> HP EliteDisplay E222 23" 1920x1080
<b>Hard Drive:</b> 15GB free Space	<b>Hard Drive:</b> Kingston 256GB SSD and Samsung 1TB Portable Hard Drive	<b>Hard Drive:</b> 500GB Hard Drive

## Research: Adobe Premiere Pro CC

Adobe Premiere Pro CC is a paid timeline based video editing software first launched in 2003. The software is compatible with both Mac OS X and Windows operating systems. Premiere Pro is one of the most widely used video editing software and has been used to edit and construct movies including *Deadpool*, *Avatar* and *Hugo*. Due to its wide popularity, Premiere Pro is available as a yearly subscription of \$343 but is freely available to students studying in Australia through the NSW Government run website *OnTheHub*. *Premiere Pro* is extremely popular in the filmmaking industry as it provides the user with a seamless way to edit together clips and add effects to them. Some of the main features Premiere Pro is capable of include:

- Chroma Key (Used for green screen work)
- Audio adjustment
- Smooth Timeline Editor
- Ability to export to a wide range of formats
- Cutting and connecting clips
- Adding a multitude effects to clips

For my Major Project I will be using *Premiere Pro* to edit my clips created in Source Filmmaker in order to create a flawless final product. *Premiere Pro* will also allow me to export the final product as an .mp4 file when the project is completed.



Minimum Requirements	My Current PC Specifications	School PC Specifications
<b>Operating System:</b> Windows Vista	<b>OS:</b> Windows 10 Pro	<b>OS:</b> Windows 10 Education
<b>CPU:</b> Intel Pentium 4 or AMD Athlon 64 processor	<b>CPU:</b> Intel Core i5 6600	<b>CPU:</b> Intel Core i5 6500
<b>RAM:</b> 2GB RAM	<b>RAM:</b> 16GB DDR4	<b>RAM:</b> 8GB DDR4
<b>Graphics Card:</b> Graphics Card with 256MB VRAM	<b>Graphics Card:</b> Gigabyte GTX 1060 6GB VRAM	<b>Graphics Card:</b> NVIDIA GeForce GT 730
<b>Monitor:</b> 1280x900 Resolution	<b>Monitor:</b> Asus VS228NE 21.5" 1920x1080	<b>Monitor:</b> HP EliteDisplay E222 23" 1920x1080
<b>Hard Drive:</b> 16.3GB free Space	<b>Hard Drive:</b> Kingston 256GB SSD and Samsung 1TB Portable Hard Drive	<b>Hard Drive:</b> 500GB Hard Drive

## Research: Creating 360-degree video in Source Filmmaker

As my project progressed, I was inspired to create something that was more interactive. While browsing for tutorials regarding Source Filmmaker, I discovered a tutorial titled 'SFM Tutorial: 360° Panoramic Videos'. This tutorial provided me with important information including the basic setup of creating a 360-degree video in Source Filmmaker and general tips/advice on 360-degree video creation.

Some of the most important things I learned through this tutorial were:

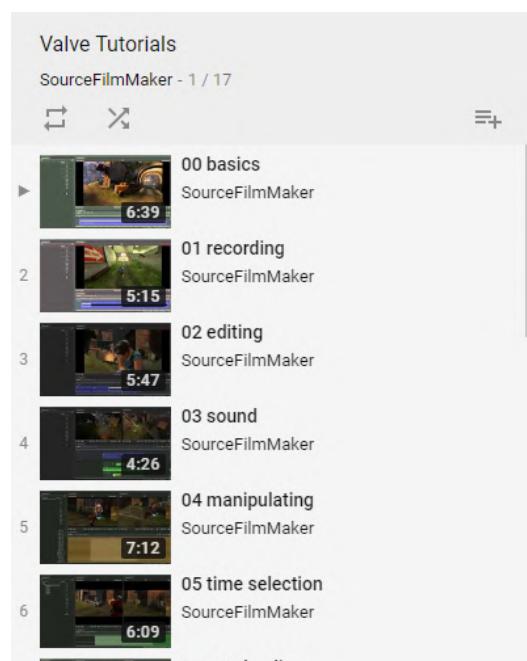
- The need to create six camera's (front, back, left, right, top and bottom) to create a '*Camera Array*'
- The exact rotation values to align each camera as necessary.
- The field of view needed for each of the six camera's
- Avoiding moving particles or textures to prevent glitching in the final render.
- Tethering all camera's to a root movement transform.
- Adding each of the six camera's to a cubemap

This tutorial also ended up redefining how each of the software (researched above), would be used in the production of the major project.

Originally I believed that I would be using Blender specifically for modeling, but through this tutorial, I learned that to create a '*Cubemap*' I would require a basic level of knowledge of using Blender. Through further research, I discovered that a '*Cubemap*' was what would join each of the six camera's to form a 360-degree video in the final render. To further my knowledge on Blender, I decided to watch a tutorial on the basics of the software. Through the tutorials I watched, I was able to gain a firm understanding of the basic functionality of Blender and was able to understand the concept of cube mapping.

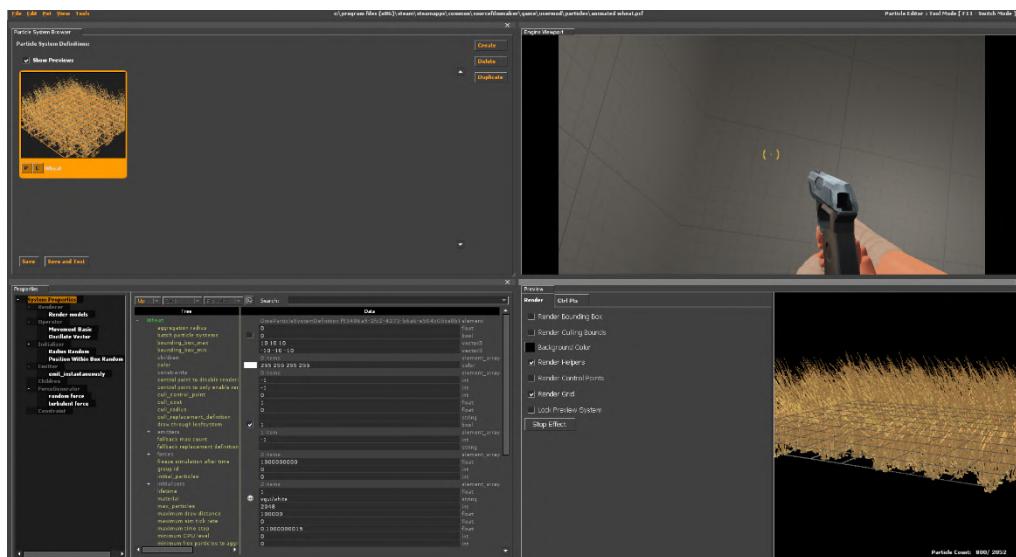
After more closely researching Blender I decided to focus on learning the basic functionality of Source Filmmaker. To do this I followed the seventeen tutorials produced by the creators of Source Filmmaker (Valve). Through these tutorials, I created my first test animation and learned to use the *Graph Editor*, *Motion Editor*, and *Timeline Editor* to animate props and humans.

My first animation was of a Robot waving towards the camera with a crow flying past the camera. This initial animation took around an hour to create but through this I learned the basics of animating a character and adding lighting to a scene.



Following my introduction to animating characters, I moved on to create my own particle effect. Most of the testing and research I conducted was based on my original storyline for the film. Due to this, the particle I created as a test was an animated wheat prop. To create this prop I used the '*Particle Editor*' to make a singular wheat particle duplicate to 100 particles per square meter. I then applied a range of settings that I was provided with through a tutorial on animated grass and wheat particles. The particle ended up working very well and I had planned on using it within the actual animation due to it working seamlessly.

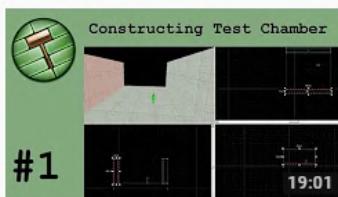
*Animated wheat particle in the 'Particle Editor'*



After feeling confident using the basic animation tools of Source Filmmaker I moved on to learning the map editing software *Hammer*. To my benefit, *Hammer* is an extremely popular map editing tool and therefore a multitude of tutorials were readily available. To begin my education of the software, I watched a video on creating lab environment's using *Hammer*. This set of tutorials taught me the following:

- Creating walls, floors and ceilings
- Applying textures
- Adding props to a map
- Using the light props effectively to generate realistic lighting
- Adding a skybox

*Set of tutorials I used to learn the basics of Hammer*



#1      19:01

**Portal 2 Hammer Tutorial for Beginners | Part 1**

Acacia Developer • 5.7K views • 2 years ago

If you want to create Portal 2 maps and haven't had any experience with Valve Hammer Editor then this is the video for you!

Whilst watching the tutorials I began creating my own first test map for the original plotline of my animation. My intention for the map was to create a lab/ robot testing facility. The test map I built was basic as I only used simple blocks and standard textures, however, it allowed me to adjust to and learn *Hammer* editor. I later used this test map as part of my test animation (*robot waving test animation mentioned earlier*)

*Adobe Premiere Pro CC 2018* did not require me to conduct further research as I was able to use the software confidently due to prior education. However, my original expectation for the usage of *Premiere Pro CC 2018* within the major project changed due to the instructions given in '*SFM Tutorial: 360° Panoramic Videos*'.

## Research: Copyright

Before using certain overlays and sounds in the final production of the project, I researched the law regarding the use of sounds and overlays uploaded to YouTube. Under YouTube's '*Fair Use Policy*' videos can be used so long as the following things are ensured:

- The video is used in an educational non-profit way
- The video is not directly stolen, meaning the video has been significantly modified
- The video used is used with no intent for monetary gain
- The video used is not used in its entirety

By following these rules, the user is protected by the YouTube's Fair Use Policy.

For my project, I was not required to seek permission for each of the sounds I used as they were licensed as '*Creative Commons Attribution license (reuse allowed)*'. The creative commons license provides a standard way for creators to allow permission for viewers to use the video within their own projects. However, the rain sound effect I used in my production was not permitted for use under the Creative Commons License. To seek permission to use the sound track, I contacted the owner of the sound track via the YouTube comments (as their business email address was not visible) and requested permission to use the video. However, the owner did not respond and I thus used the soundtrack in a way that would not violate the *Fair Use Policy*.

*Seeking approval to use the rain soundtrack*



Mawsn

Just wondering if i would be able to use this sound track in my Multimedia school project?  
Thanks



REPLY

### *The Creative Commons Attribution License on the Rain Overlay I used*



GarthVader45

Published on Sep 9, 2017

Free rain overlay animation I made in Cinema 4D that you can use in your video projects for free.

Download Link;

<https://www.dropbox.com/s/ct3z0d467zb...>

Visit my website;

<http://www.garethrichardsonmedia.com>

Category      Film & Animation

License      Creative Commons Attribution license (reuse allowed)

SHOW LESS

## Summary of Research

In summary, the tools I have research above will all be used to create the final project. Along the way, I may discover that I require other tools to make a better looking and higher quality product. Most of the software I am using is paid and requires a monthly fee to use the program. While researching I discovered a website named *OnTheHub*, which allows students studying in NSW to gain free access to multimedia software including Microsoft Office, Windows 10 and the full Adobe Suite. This site will highly reduce the cost of my project and will provide easy access at home to the software I require.

Another factor that I considered during my research was the hardware requirements of each piece of software I will be using. Most of the software requires more than two gigabytes of RAM (Random Access Memory) and at least 15GB free hard drive space. While working on my home computer, the software is completely able to run without issues due to the high-end hardware quality of my PC. The PC I own at home was custom built by myself and was designed with the intention to be able to run high end games and hardware demanding software. In order to fully test and inspect the performance of Source Filmmaker I ran the software on both my home computer and the school computers. While running Source Filmmaker at home I experienced map loading times of [insert time] and an average of [insert fps]. However while using the school computers to the test the software I received an average of [insert time] while loading a map and an average of [insert fps]. Compared to my home PC the load times and FPS averages were significantly lower which caused a moderate amount of lag. A solution if found to this was to disable *Ambient Occlusion* in the render settings of Source Filmmaker. Another issue I faced while using Source Filmmaker on the schools PC's was the fact that the Steam services were blocked from both installation and access to the Steam website. This was problematic as to install Source Filmmaker, Steam is required. To overcome this issue I brought an external hard drive with Steam and

Source Filmmaker installed and ran the software directly off the hard drive. This method was successful and I was able to run Source Filmmaker without any major issues.

However regardless of the numerous issues I resolved with Source Filmmaker on the school computers, the load times for maps and exporting animations was too long. In order to use my time more efficiently and effectively while at school, I purchased a high performance gaming laptop which was specifically built to allow for fast working with Source Filmmaker and other demanding rendering software.

As the project progressed I was required to add to my research as the goals of my project changed. To understand the concepts in creating a 360 video in Source Filmmaker, I watched the tutorial '*SFM Tutorial: 360° Panoramic Videos*' which provided me with all the basic skills and assisted in my understanding of creating 360 degree videos.

## Researching/Analysing Similar Projects

In order to gain an insight into how Source Filmmaker and Blender are used to create short animated films, I will critically analyse a project created in Source Filmmaker and Blender to generate ideas for creating my own short animated film.

The first short film have decided to critically analyse is titled *Arena* and was created by another student in a previous year who used similar tools and software to create a short animated film in Source Filmmaker. The short film uses a range of different effects and camera angles all created natively within Source Filmmaker.

### Arena: Short film (Source Filmmaker)

#### Is the Project Visually Appealing?

From the beginning of the project to the end, the use of lighting and aptly used camera angles create a visually appealing and engaging short film. The opening scene has the camera perform a smooth sweep and uses dim lighting to introduce the main scene where the animation takes place. This opening scene immediately captivates the attention of the

viewer and sets the scene for the rest of the film. The camera angles of the characters being used in the film provide a visual introduction for the viewer. The result of the project has been rendered in high definition (1080p) making the overall visual quality of the project a high standard and appealing to the viewer.

Although the overall visual quality of the project is high, one problem was the fluidity of the characters. Occasionally the movement of characters and objects was rough which is noticeable to the viewer. This could have been fixed by creating smaller key frames when pose-to-pose animating to avoid skipping from one pose to another too quickly.



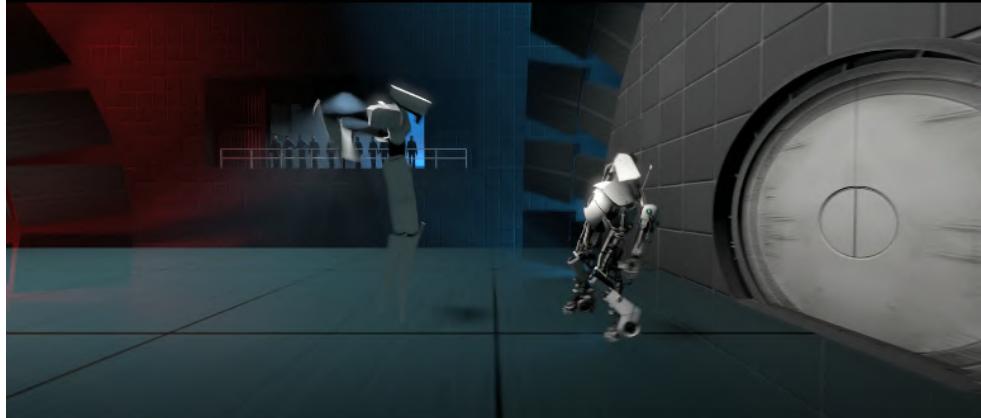
### Do the audio elements contribute in a positive way?

The sound track of the short film contributes to the short film as the soundtrack has been fitted to the actions taking place on screen. An example of this can be viewed in the fight scene where the bass drop within the sound track occurs when the battle between the two characters takes place. This creates an engaging scene in which the soundtrack runs in coordination with the actions taking place on screen. Other examples where the sound track positively adds to the film is during the opening scene where a rain sound track is used before the forest set appears on screen to create suspense and set the weather condition. Through the use of the rain sound, the attention to be instantly drawn to the film and creates atmosphere for the scene.

### Is Project Creative and Magnetic?

The project successfully captures the attention of the viewer through its custom-built map for and the characters. The overall concept of the short film is very creative with a magnetic cliffhanger ending which allows the viewer to speculate about what will take place after the

film. Through the use of camera angles, lighting and original characters, the project is engaging and creative.



## Development of Ideas

Before beginning to work on my major project, I watched multiple projects that had been created by students in previous year groups. Through doing this, I began to get an idea of what I wanted to do for my project. While watching these projects I viewed two short films created within Source Filmmaker and thought that it would be something that would be both challenging and enjoyable to do as a major project.

To generate ideas for the plot line of my own Source Filmmaker short film, I began to play through two games made in Valve's Source Engine in order to gain an understanding of what the Source Engine is capable of and what it is limited to. The games I played included *Portal 2* and *Half-Life 2*, which are both created entirely in the Source Engine and have a large fan base. After playing both games, I noticed that the gaming community was highly anticipating the release of either *Half-Life 3* and/or *Portal 3*. Valve's lack of transparency with the gaming community in regard to the release of a sequel to either of



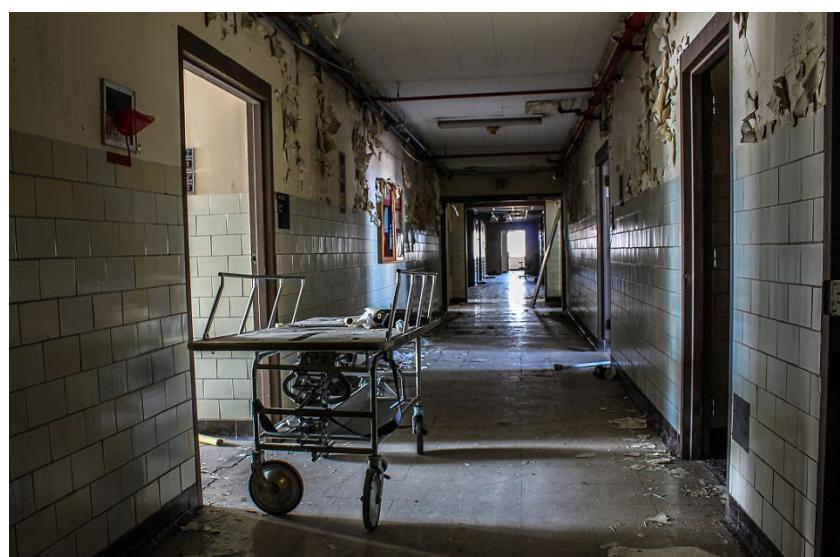
the games has led many to speculate and envision what a third title of either games would look like.

While reading some of the fan made suggestions for a third game, I began to think about how I could create my own fan-based trailer for a sequel that brought both games into the same universe. In order to gain a better insight into the timeline of both games, I read the article "*Timeline of the Half-Life Universe*". This helped me generate ideas for when my short film would take place within the Half-Life/Portal universe. In order to gain a better understanding of the storylines of both games I played through the endings of both games. *Portal 2* ends with the protagonist exiting the *Aperture Science Facility* after being held hostage by an insane AI system for many years. The scene closes with the first person view of the protagonist gazing out onto an empty crop field. After replaying the ending scene multiple times, I noticed an opportunity for a continuation of the storyline after the ending takes place.

However, as I developed ideas and plotlines for my project, I decided to shift away from the idea of continuing the ending of *Portal 2/Half Life 2* and was inspired by the survival horror video game *Slenderman: The Arrival*. Out of curiosity, I began drafting a storyboard for a short film in which an abandoned asylum/hospital is explored by the viewer, through the use of a first person POV (point-of-view). After considering the concept of this in comparison to my original idea's, I decided I would change the direction of my plot line and create a horror/asylum exploration film. To further aid my development of ideas, I watched several short animated horror films that had been created in Source Filmmaker and also scrolled through the various images that appeared under the search terms: 'Abandoned Asylum', 'Decaying Hospital' and other related search terms. By doing this I was able to visualise and create rough ideas of what environment and storyline I would use for the project.



*One of the images that inspired my project*

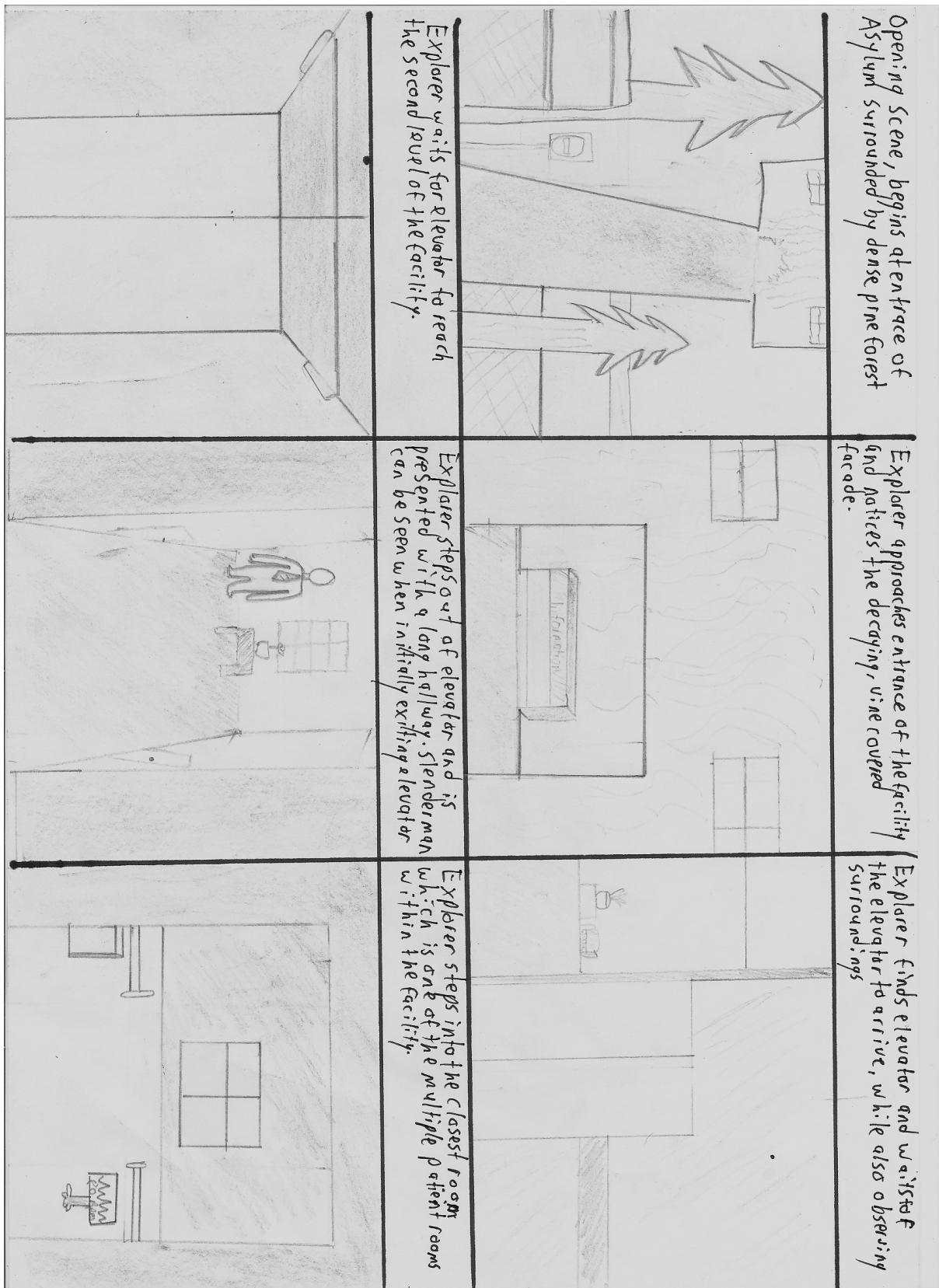


Along with changing the plotline, I later changed the direction of the project. Instead of making a non-interactive/ non VR video, I decided on making a full three hundred and sixty degree video, in which the user could interact and look around the film as it progressed. The main reason I decided on making a VR production was due to a video I noticed, in my recommendations on YouTube, a tutorial on creating 360° videos within Source Filmmaker. To generate ideas for creating a VR/360° animation, I searched for similar animations on YouTube that had also been created in Source Filmmaker.

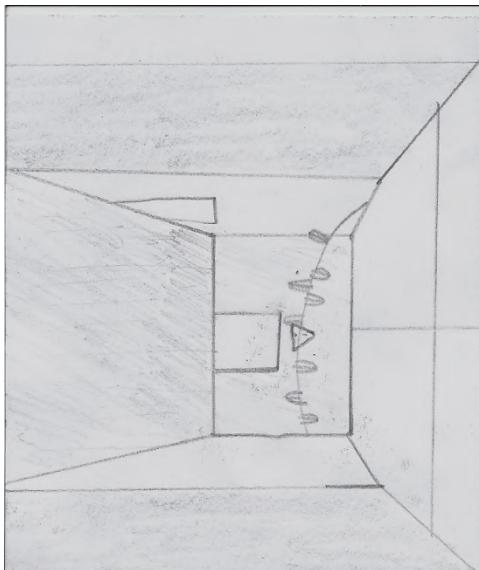
## Story Boarding

After developing ideas and concepts for my project through watching videos and playing survival horror games for inspiration, I began drafting a basic plot line and storyboards for the film. To create these storyboards, I decided to draw with a pencil and paper and then scan each paper rather than a program such as MS Paint or Photoshop as it allowed me to make fine adjustments with the pencil and easily brainstorm ideas for the plot line of the project.

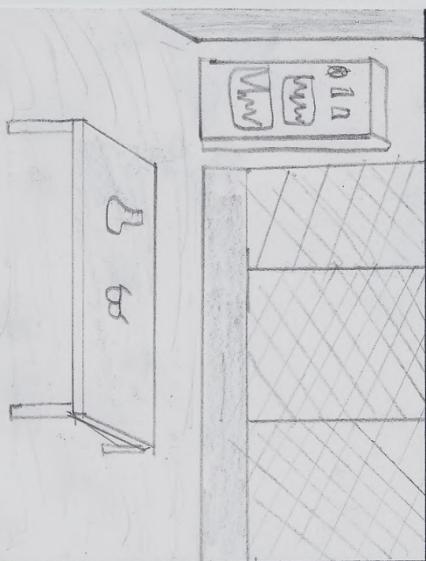
*Storyboards on following pages...*



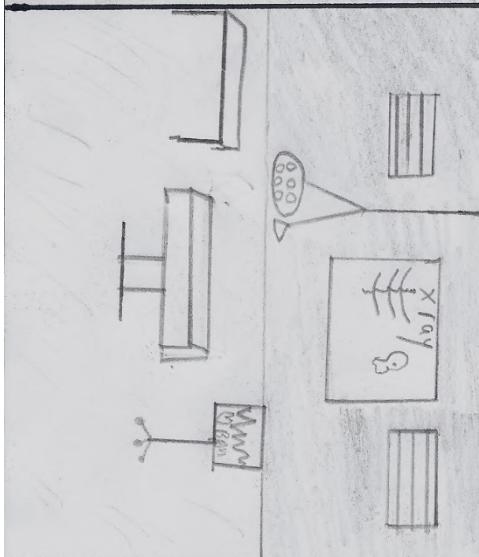
	<p>Explorer begins to exit the room and notices message on the wall as well as Slenderman in the toilet room.</p>
	<p>Explorer walks down the hallway and sees the chaser running.</p>
	<p>Explorer enters lobby/waiting area and walks up staircase to third floor.</p>



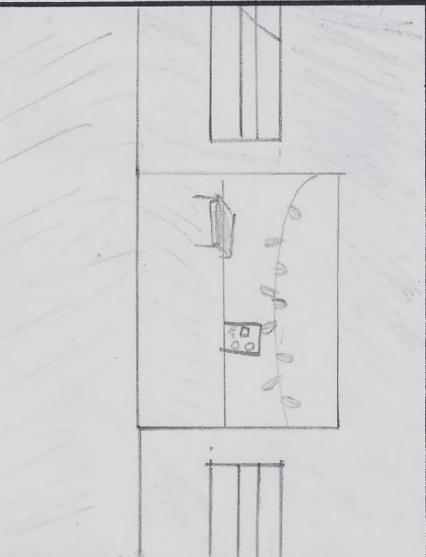
Explorer runs out of the room towards Surgery room at the end of the corridor.



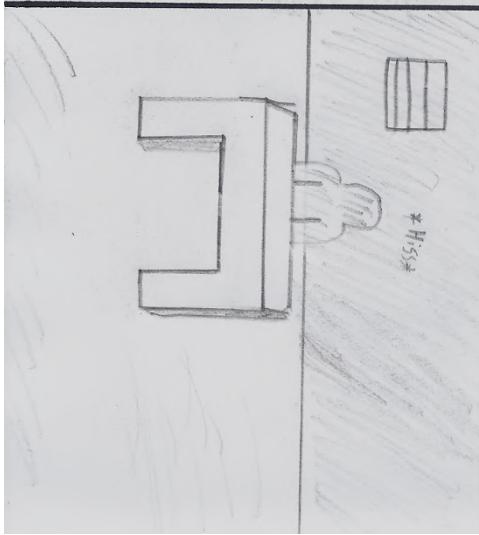
Explorer hears child's laughter in lab and walks cautiously around.



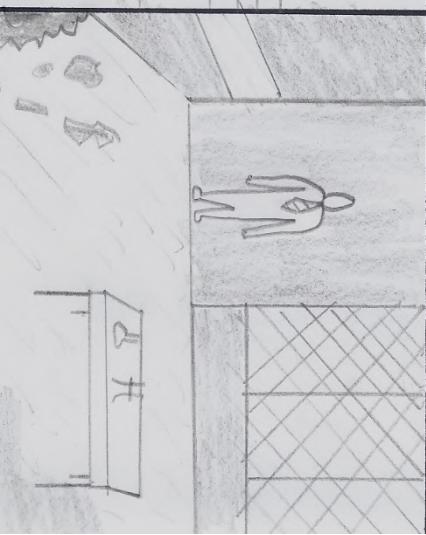
Explorer enters Surgery room, observing Surgery table, lamps and other medical equipment



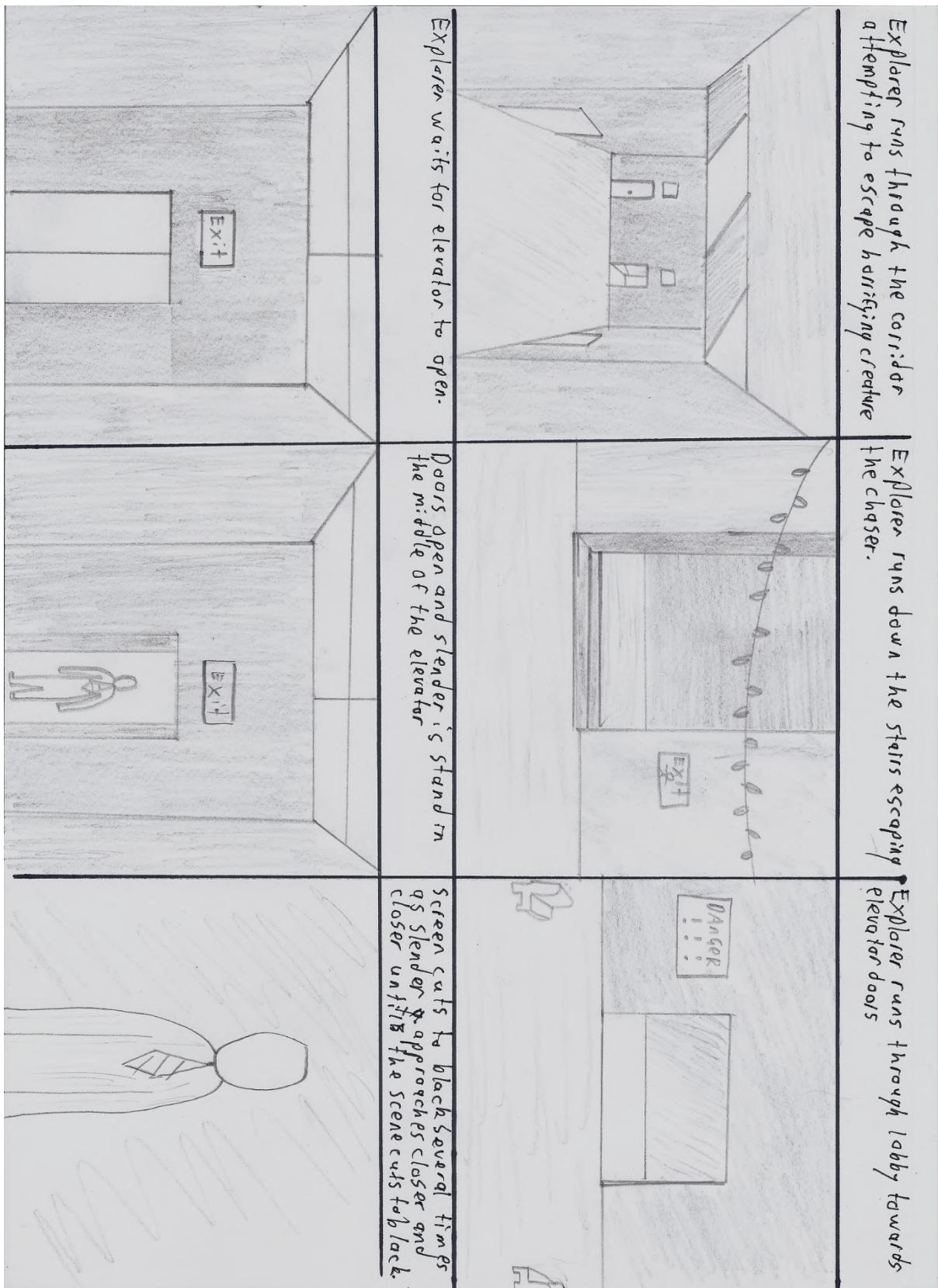
Explorer exits laboratory one and enters the second lab which is significantly damaged



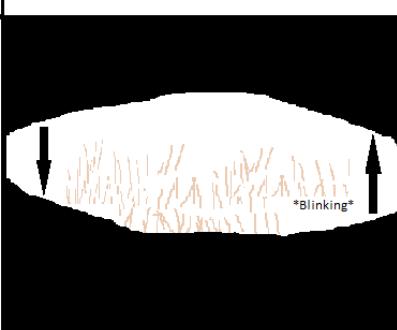
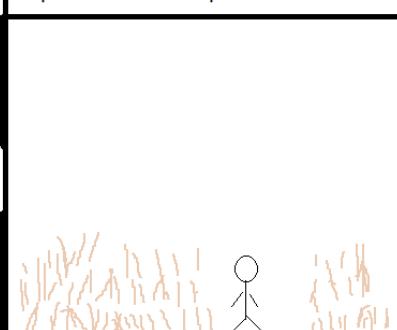
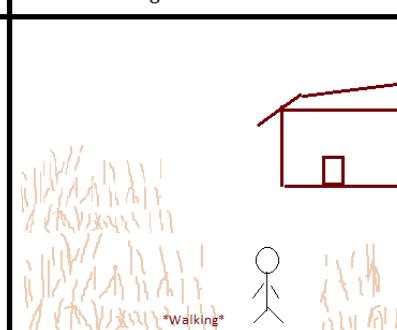
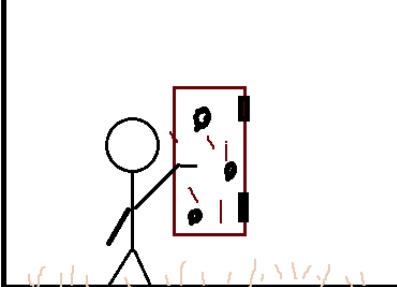
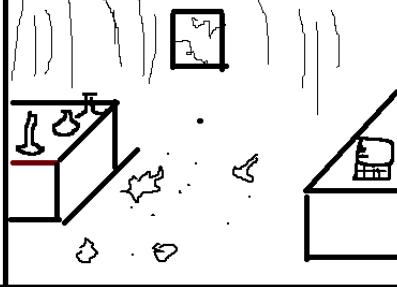
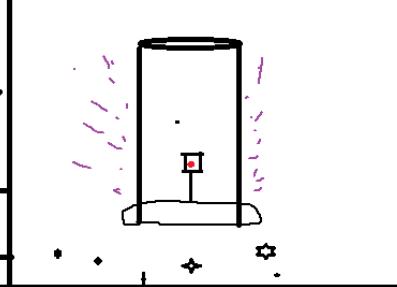
Chaser suddenly appears from behind a desk and screams.



Slenderman appears towards the back of the lab.



As mentioned in *Development of Ideas*, I originally intended to create a short film based off the endings of both *Portal 2* and *Half Life 3*. The following storyboard was done before the central plot line of my project was changed.

Camera fades in using a blinking animation from the first person view of the character.	Third person view and high angle shows the character amongst the vast empty crop field like landscape.	Continuing the third person and high angle the character begins to walk towards a small building in the distance.
		
From first person view character opens broken rusty door of the building and notices that the building is a science lab	First person angle is continued as character explores the building observing the remains of the lab.	Character notices a glowing cylindrical container with a smashed glass door and a wall of buttons inside.
		

## Finance Plan

<i>Item</i>	<i>Prices</i>	<i>Total Costs:</i>
<b>Blender</b>	<b>Free</b>	<b>Free</b>
<b>Adobe Photoshop CC</b>	<b>\$343.08</b>	<b>Free (through school)</b>
<b>Premiere Pro CC</b>	<b>\$348</b>	<b>Free (through school)</b>
<b>Source Filmmaker</b>	<b>Free</b>	<b>Free</b>
<b>1TB External Hard Drive</b>	<b>\$80</b>	<b>Already Owned</b>
<b>Custom Built PC (including mouse, keyboard etc.)</b>	<b>\$2000</b>	<b>Already Owned</b>
<b>Internet Access (per month)</b>	<b>\$82</b>	<b>Already Owned</b>
<b>Windows 10 Pro</b>	<b>\$40</b>	<b>Already Owned</b>
<b>Metabox Gaming Laptop</b>	<b>\$1500</b>	<b>\$800 (bought on sale)</b>
	<b><u>Total Costs:</u></b>	<b>\$800.00</b>

### **Evaluation:**

Through the use of a financial table, I was able to understand the price of producing my major project from an Industrial Point of view. Being a student, most of the resources I require to create the project are free through school or are already currently owned by me. However as I delved deeper into the project, the school computers became increasingly difficult to use with the software I required. To resolve this issue, I purchased gaming laptop which had higher performance parts so that I could use more time at school more effectively. If I did not have all the resources required to create this project, the total amount I would be required to spend, possibly, close to three thousand dollars on both software and hardware supplies.

### **Time Plan**

To begin my time management plan, I created a projected Gantt Chart to develop a rough idea of when certain tasks in the project would be completed. In the end my actual Gantt Chart compared to my proposed timeline was extremely different. This was mainly due to the changes to the production I made as the project progressed.

*Proposed and Actual Timeline on following pages...*

Proposed Timeline		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	Week 21
Assessment Task Received																						
Research																						
Storyboarding																						
Gantt Chart																						
Project Production																						
Portfolio																						
Statement of Intent																						
Drafting																						
Presentation																						



Actual Timeline		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	Week 21
Assessment Task Received																						
Research																						
Storyboarding																						
Gantt Chart																						
Project Production																						
Portfolio																						
Statement of Intent																						
Drafting																						
Presentation																						



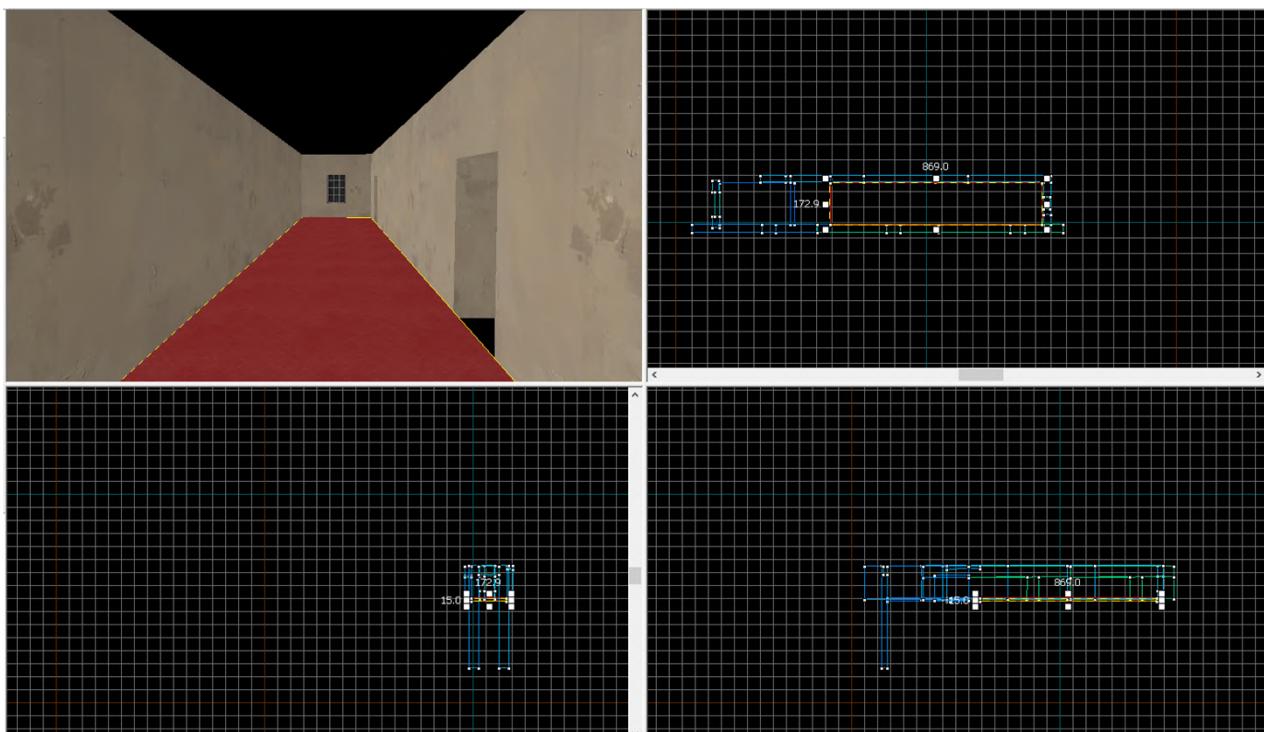
## Production Process

### Creating the Hospital/Asylum:

After developing my plot line and storyboards, I began to further experiment with animation in Source Filmmaker and modeling for the Source Filmmaker within Blender.

To begin production I watched and followed a series of tutorials created by *Valve* and created my first test animation. This tutorial provided me with the basic set of skills to create an animation using the clip editor, graph editor, motion editor and other essential tools/functions within Source Filmmaker. Following the *Source Filmmaker* tutorials, I also watched a number of tutorials on the Source Engine map editing tool called *Hammer*.

The first task I carried out on my final production was creating the map/scene where the film would take place. To achieve this I used Valve's free to use software *Hammer* editor. As a start i began creating a hallway/patient ward of the asylum/hospital. *Hammer* proved to be a relatively easy program to use when making maps and I was easily able to learn the tools and their usage.



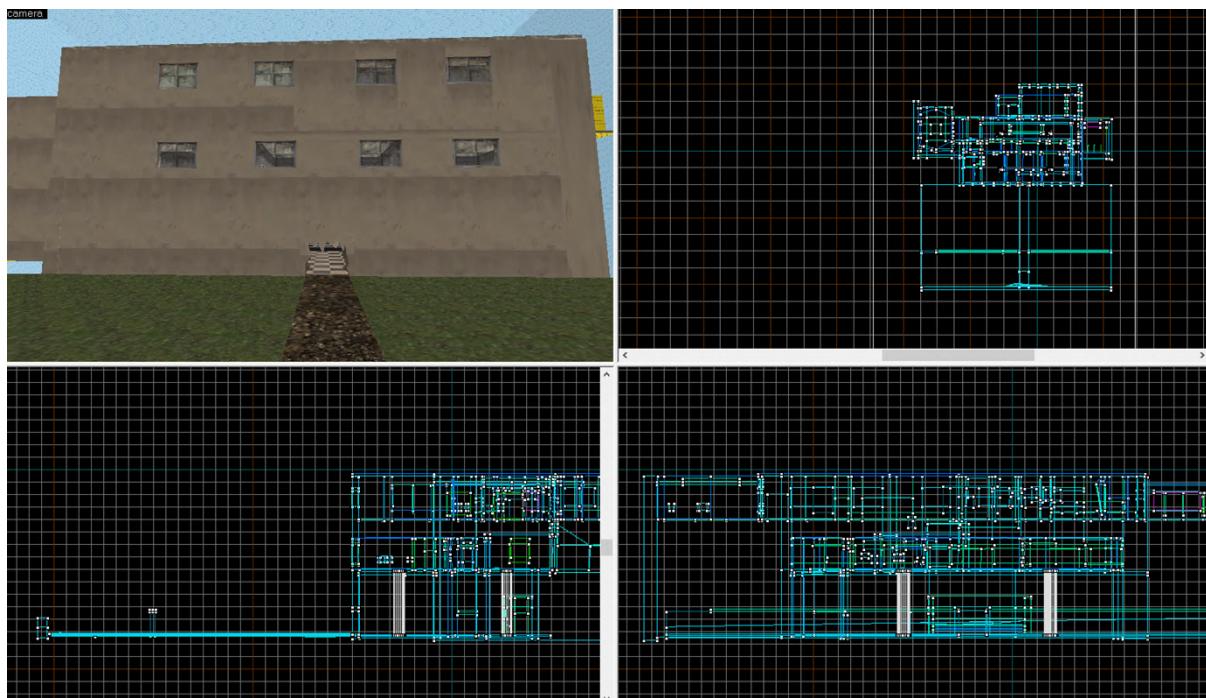
After creating the first part of the map I began to add all the rooms and floors to the facility. This was a lengthy process as I experimented with what looked fitting for an abandoned asylum. For inspiration I watched the YouTube video “*ABANDONED HOSPITAL Found Amazing Room!!*” by popular YouTuber ‘Exploring with Josh’. Watching this video allowed me to observe the room structure of a decayed hospital which generated new ideas for rooms and textures for walls/floors I could potentially add to my map.



ABANDONED HOSPITAL Found Amazing Room!!  
490,561 views  
Exploring With Josh · Published on Sep 3, 2016  
MUSIC HERE - Marc Jungermann  
<https://www.youtube.com/channel/UCU9Y...>

[SUBSCRIBE 3.1M](#)  
[SHOW MORE](#)

Following two weeks of adjustment to the facility, I began working on texturing the walls, floors and other objects and also added some basic props to the world. *The finished structure of the facility can be seen below*

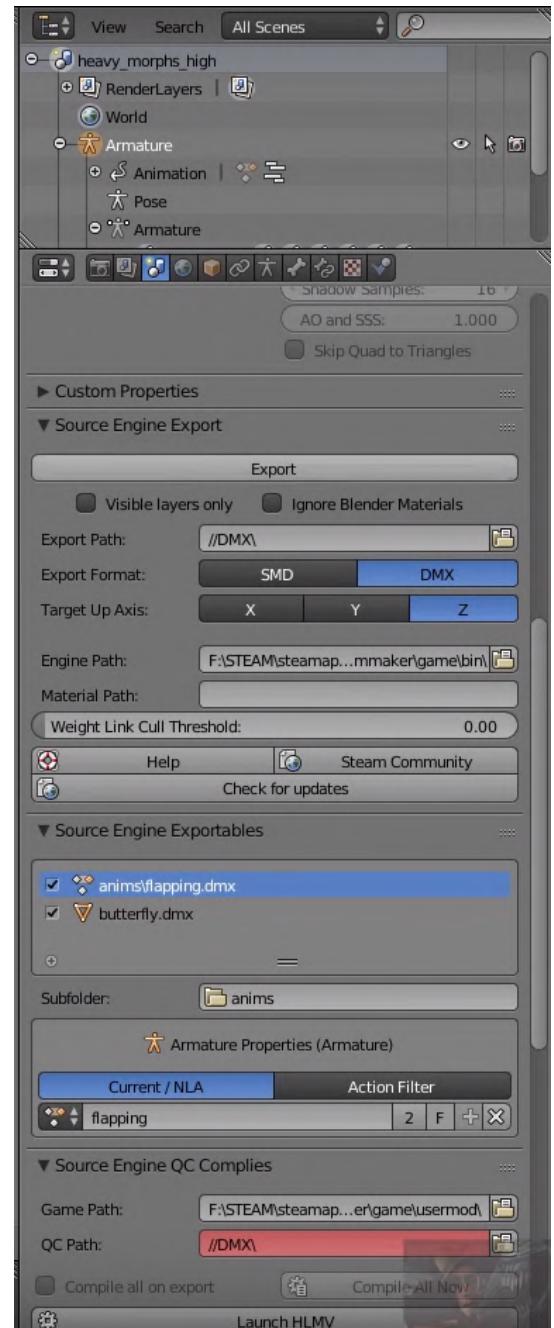


## Adding Props:

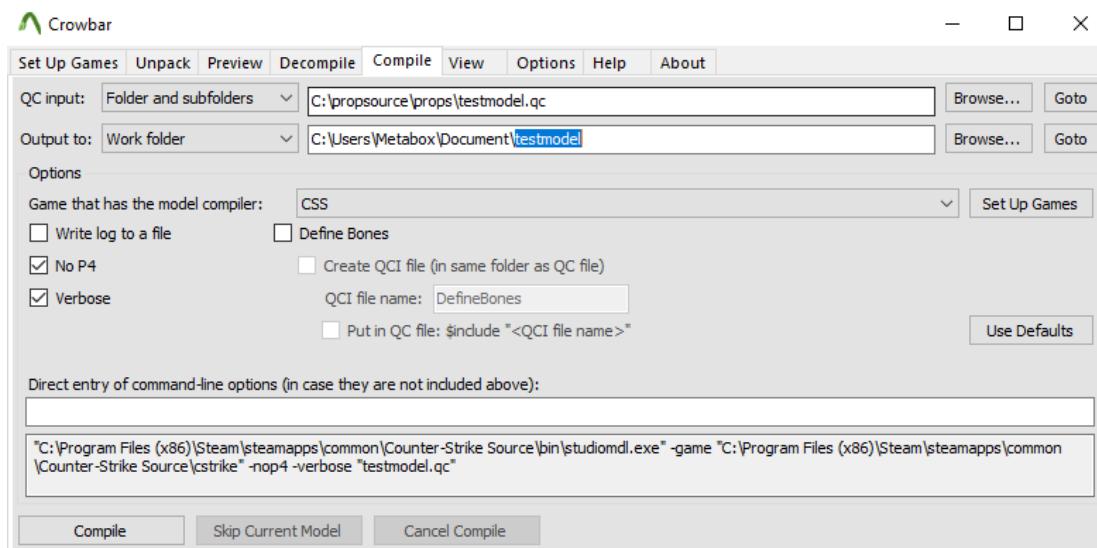
When adding props, I attempted to create my own original items within Blender. As a test I followed the Blender tutorial titled “*Making a simple house in Blender 2.71 (Beginner Tutorial)*”. Creating the model itself was relatively difficult as it was my first time using Blender to create a model. After finishing the model within Blender I ran into a problem. The issue was that the file type/extension Blender exports models in is not directly compatible with the Source Engine/Source Filmmaker. To solve this problem, I discovered a plugin for Blender titled ‘*Blender Source Tools*’. This plugin allowed for the user to export models as a .DMX file format which could then be complied into the Source Filmmaker format (.mdl). The setup of the plugin was complicated and I used a tutorial to setup the settings for the plugin.

After exporting my test model to a .dmx file, I followed a tutorial to create/code a .QC to compile the model for the Source Engine. A QC file communicates with the compiling tool the located where assets such as textures and other materials are stored which need to be applied to the model. I used a basic QC file as my model did not contain complex or transparent textures. *QC code below:*

```
$modelname    "props\testmodel"  
$staticprop  
$surfaceprop   metal  
$cdmaterials   "models\materials\blendertextures"  
  
$sequence idle  "testmodel-ref.smd"
```



To compile to model with the QC file I used the widely used tool *Crowbar* to compile the model to a .mdl file compatible with Source Filmmaker. After compiling with *Crowbar*, I loaded Source Filmmaker and loaded the prop into the level. This test was successful although it proved to be difficult to get the textures working without error in Source Filmmaker.

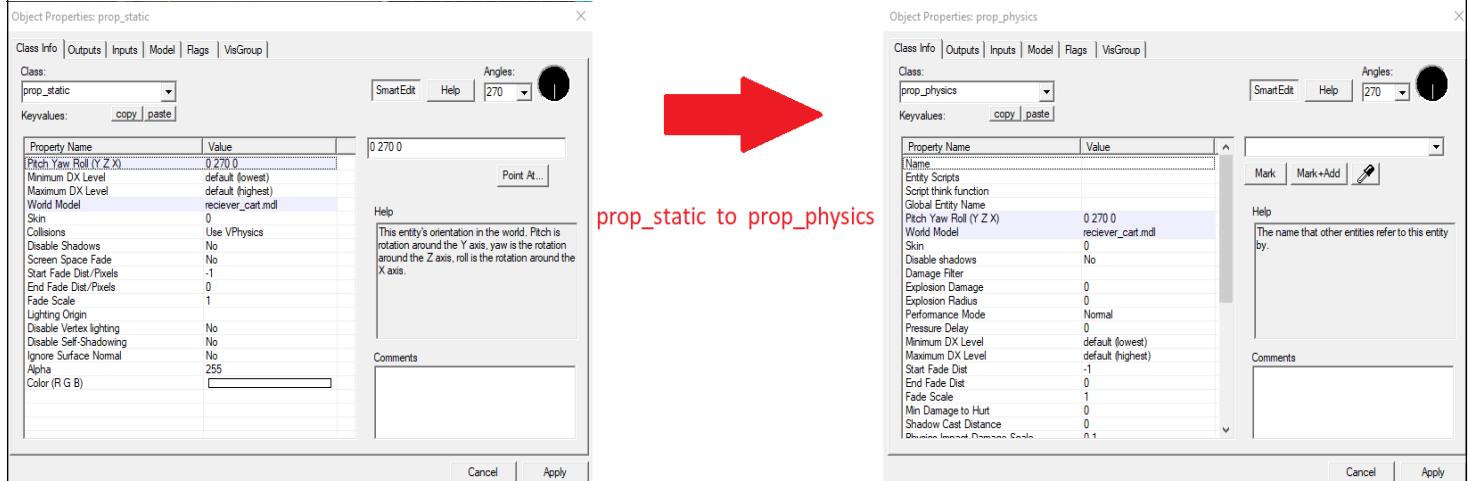


However, after experimenting with modeling in Blender and exporting the models in the Source Engine, I decided to not model my own props as the process for creating each model took too long and would slow down the overall progress of my major project.

Instead of solely using my own props, I searched the Source Filmmaker workshop and the included files within Source Filmmaker for models that would fit the theme of the abandoned asylum. After browsing collecting a range of potentially useful models, I began decorating the top level of the hospital. Initially, I began decorating and adding props to the map using *Hammer* editor as it was the most quick and efficient way to add props to the map. However, when I compiled the map and tested the map in Source Filmmaker, some props did not appear. To resolve this issue I first reviewed the logs *Hammer* output when the map was compiled and found multiple errors. *Hammer logs shown below:*

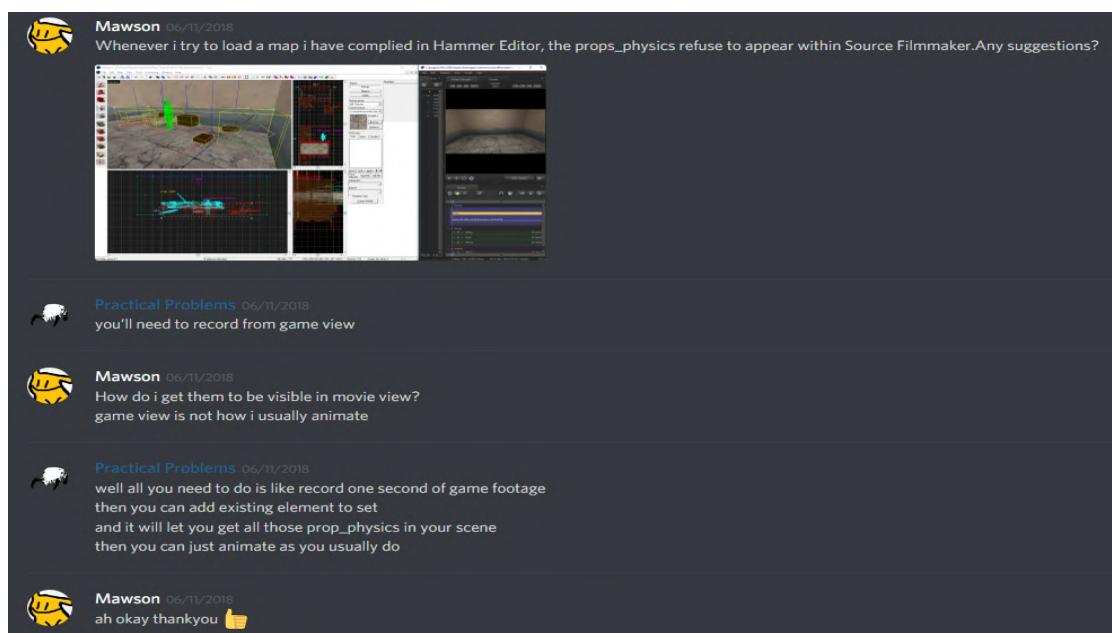
```
Error! To use model "models/mark2580/deadbydaylight/trees_plants/tallgrass01.mdl"
    with prop_static, it must be compiled with $staticprop!
Error loading studio model "models/mark2580/deadbydaylight/trees_plants/tallgrass01.mdl"!
Error loading studio model "!"
Error! prop_static using model "models/mrimax/mrimax.mdl", which must be used on a dynamic entity (i.e. prop_physics). Deleted.
Error loading studio model "models/mrimax/mrimax.mdl"!
Error! prop_static using model "models/hospitalxray/hospitalxray.mdl", which must be used on a dynamic entity (i.e. prop_physics). Deleted.
Error loading studio model "models/hospitalxray/hospitalxray.mdl"!
Error! To use model "models/props_lab/keypad.mdl"
    with prop_static, it must be compiled with $staticprop!
Error loading studio model "models/props_lab/Keypad.mdl"!
Error! prop_static using model "models/props_lab/reciever_cart.mdl", which must be used on a dynamic entity (i.e. prop_physics). Deleted.
Error loading studio model "models/props_lab/reciever_cart.mdl"!
Error! prop_static using model "models/props_industrial/gascanister02.mdl", which must be used on a dynamic entity (i.e. prop_physics). Deleted.
Error loading studio model "models/props_industrial/gascanister02.mdl"!
Error! prop_static using model "models/props/cs_office/fire_extinguisher.mdl", which must be used on a dynamic entity (i.e. prop_physics). Deleted.
Error loading studio model "models/props/cs_office/fire_extinguisher.mdl"!
Error! To use model "models/humans/props/scientist_syringe.mdl"!
```

I resolved the problem by switching the props causing errors to prop\_physics rather than prop\_static. The difference between the prop classes is that one is able to be interacted with by players; prop physics (*if the map was being used for a game such as Counter Strike, Portal 2 and any other game run on the Source Engine*) and the other is a static prop which is not able to be interacted with by players and has no defined physics.



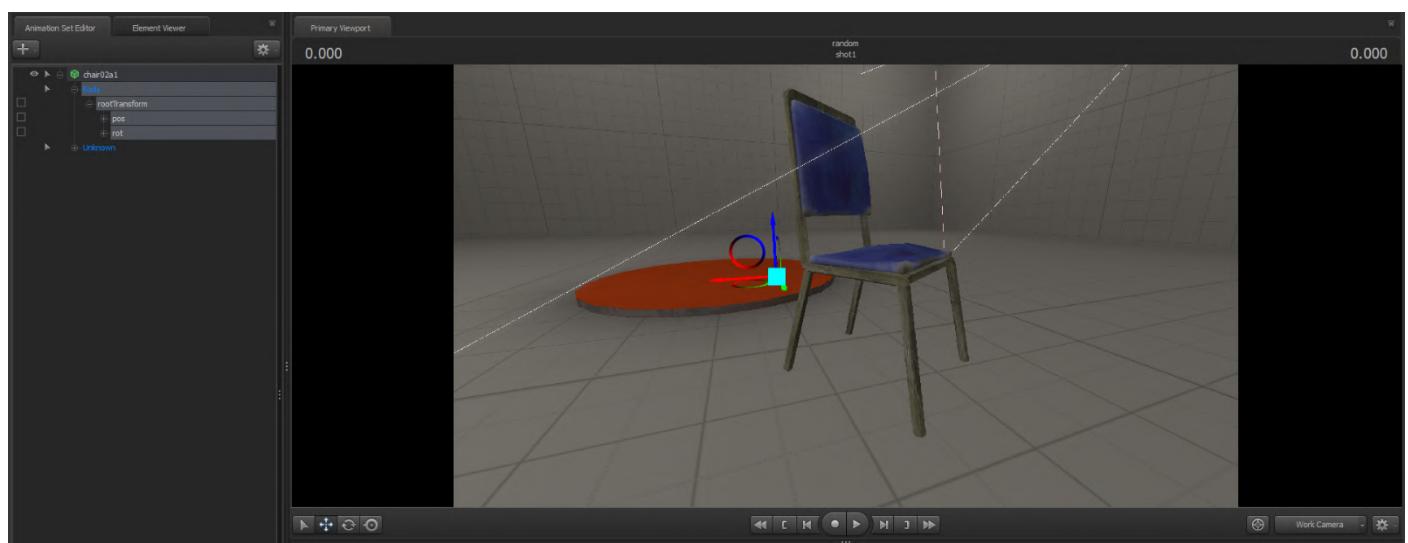
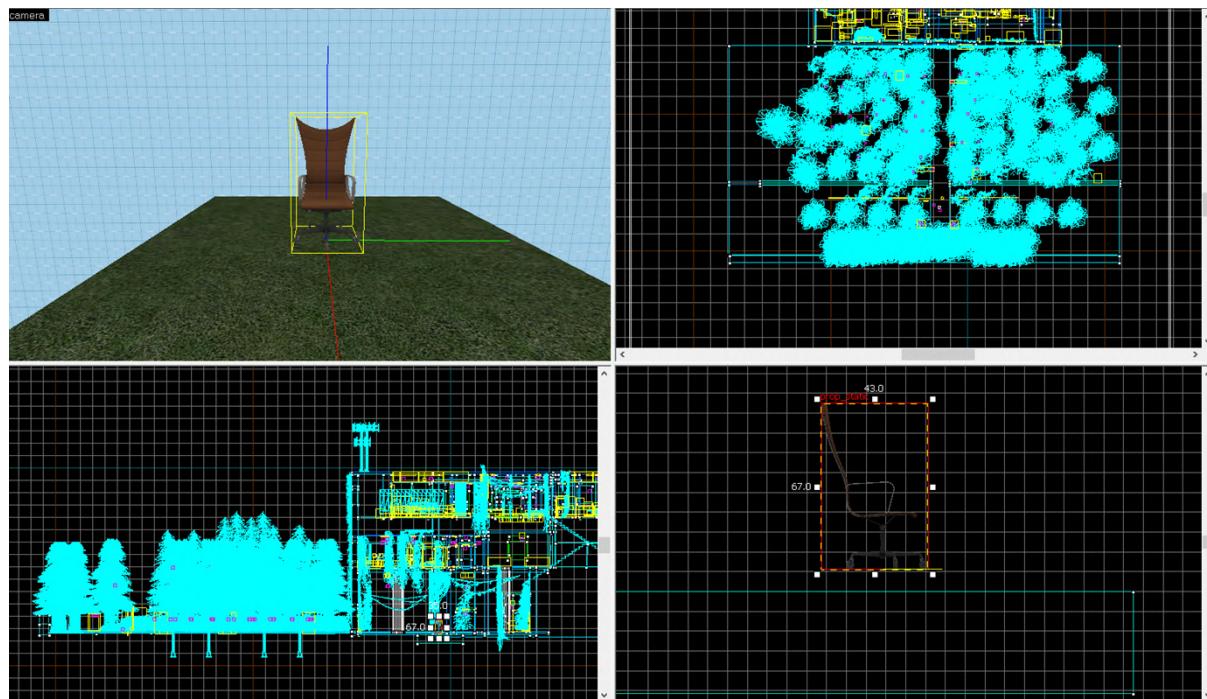
Even after resolving the issue with props, the items still did not show up within Source Filmmaker. I researched for a solution but was unable to find any documentation on a fix for the issue. I used the popular online communication app *Discord* to join a Source Filmmaker Community where I asked a professional of the software how I could resolve the problem. I was told that using the Source Filmmaker's game window mode to record a short one second clip of the map would allow me to see the props within Source Filmmaker by using the function '*Add Existing Element/s*' and adding in each prop used in *Hammer*.

*Discord message log where I requested assistance to fix the issues with props*



The solution worked perfectly but was a complicated process. Instead of adding props that required the prop\_physics class in *Hammer*, I decided to use the alternate option which was to add props into the scene via Source Filmmaker. This method is known as ‘scene building’ but was not my preferred method to adding props as I found the user interface and way of interacting with props in Source Filmmaker more difficult and less user friendly compared to the CAD Editor interface of *Hammer*.

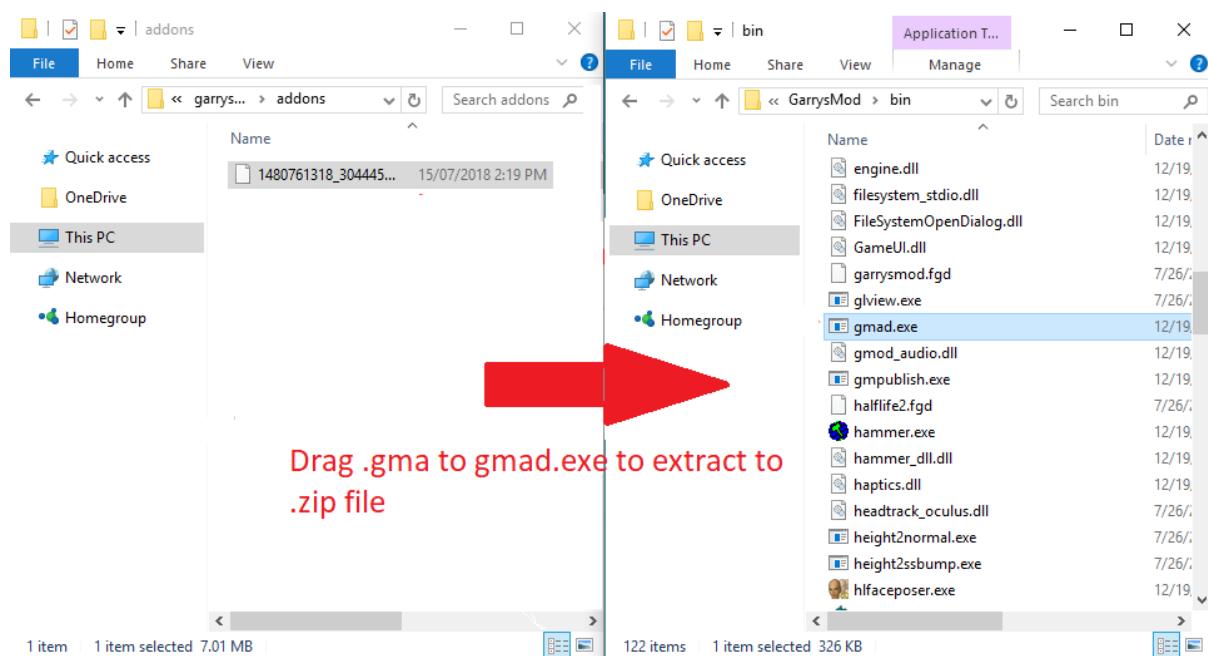
*Process of adding props in Hammer compared to adding props in Source Filmmaker:*



Decorating each room with props, was the one of the most time consuming part of the project. To create realistic looking hospital rooms I continually referenced images of hospitals online and took inspiration from in real life visits to hospital/medical clinics. To begin with, I designed one of the lab rooms. To decorate the lab I used a combination of props from the preinstalled assets of Source Filmmaker and workshop addons. However, some of the props I wanted to add into the lab were not built for use within Source Filmmaker as they were made for use in the game *Garry's Mod*. I was able to use the props designed for *Garry's Mod* by extracting the addon files (.GMA file format) using the inbuilt '*gmad.exe*' that is included with *Garry's Mod*.

The addons I extracted included:

- Hospital Prop Pack (contained MRI Scanner, X-Ray table and other radiology props)
- Slender man and Chaser Character Pack
- Labware Props (included beakers, Bunsen burners, lab goggles and other relevant science tools)
- Animals Prop Pack (included ambient creatures such as rats,bats,crows etc.)



After extracting each .gma file to an extractable .zip format, I was able to drag the materials and models folders contained within each .zip file to the Source Filmmaker workshop directory and place the materials in each folder into the corresponding folders in the Source Filmmaker directory. Using the props I extracted from the *Garry's Mod* workshop I successfully decorated/propped the two labs and surgery room.

*Images of each area decorated using extracted Garry's Mod and Source Filmmaker props on next page*



Above: Lab One

Below: Surgery Room





After decorating the two labs and surgery room I worked on the patient rooms and the lobby of the facility. Even after gaining the ability to use *Garry's Mod* workshop props within Source Filmmaker I still lacked some of the main props used within hospitals. The main prop I wanted in the facility was a ECG Scanner. This is a commonly used tool in rooms of patients in hospitals and I was determined to have it featured within the rooms. To implement this prop I decided to create it within *Hammer* editor using the block tool and custom textures for the ECG screen. To create the texture I used an ECG monitor texture I found through Google Images and divided the image in two using Photoshop CC 2018 to create a perfectly square texture while avoiding distortion. After dividing the image in half I used the software named *VTFEdit* to convert the images (.png) to a texture file readable by Source Filmmaker (.vtf and .vmf). To create the complete texture of the ECG screen I was required to compile both halves of the ECG image and save them into the Source Filmmaker custom textures directory (*adding custom textures will be further discussed in 'Adding Textures'*). After creating the texture/s I was able to apply them to the screen of each ECG monitor in the patient rooms which created the final prop I desired.

#### *Exporting the ECG texture in VTFEdit*



Overall, I was pleased with how the prop turned out. However, I would have ideally preferred a more decayed and damaged ECG monitor to add to the realism of the setting.

*ECG Monitor, created in Hammer Editor using custom textures created using VTFEdit*



After the completion of the interior of the facility I began to work the environment outside (in which the viewer begins their journey). From the beginning of the original concept of the abandoned hospital, I had a firm idea of what I wanted the exterior of the facility to look like. In keeping with many horror survival games and/or movies, I wanted the film to begin in a dark pine wood forest surrounded by warnings for the explorer to keep away. To create the pine wood forest, I searched for tree models that would best supplement the eerie forest feel of the environment. I came across an addon (Plants and Rocks Pack) which contained the pine trees I had envisioned for the environment.



### Adding Textures:

To complete the construction of the map ready for animation, I worked on the textures (appearance of objects such as floors, walls etc.) on the interior and exterior of the facility.

To keep in the theme of an abandoned asylum I searched for a texture that was decayed and had a dark striped blue colour for the main walls. For the floors I attempted to find a linoleum texture as many medical institutions use similar materials for the floor

Originally I textured the hospital in a more soft and more modern way. However, I later conducted an overhaul of all textures as some of the original issues had problems with distortion and inconsistency. The new textures also supplemented the abandoned feeling of the hospital better as they are stained and damaged more than the original textures

*Texture overhaul pictured, before and after*



To perfect the textures in the facility to my satisfaction was required to make dozens of custom textures. To create custom textures I used the free application *VTFEdit* to export standard image formats (i.e png, jpg, gif etc.) to .vtf and .vmf file which are compatible with Source Filmmaker. To import custom textures into *Hammer* I created a folder named '*custom textures*' in the

*SourceFilmmaker\game\workshop\materials\* folder so that I could easily locate custom textures when working in *Hammer*.

As well as textures for the building, I also designed posters to add to the realism of each room. A list of each texture I added included:

- Anatomy Poster
- Radioactive warning signs
- Biohazard warning poster
- Bathroom wall texture
- Outdoor pathway texture
- Hospital façade

Name
ajacks
brick
carpet
cc
chaomaterials
concrete
correction
customtextures
decals
detail

- Hospital lobby floor
- Wood texture for desks
- Front desk textures

To create these textures I used images found on *Google* and modified them to suit the purpose in the map.

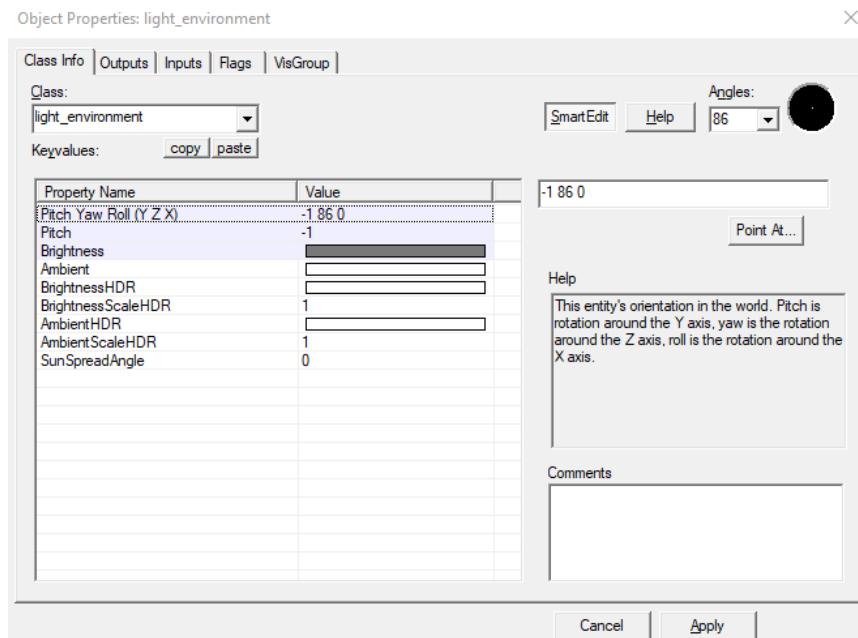
While texturing, I also attempted to take my own photos of an object in the real world and use it as a texture within the map. I attempted to create the following textures using photos from the real world:

- Wooden floor
- Forest floor
- Bathroom wall texture
- Rock textures (for outdoor setting)

After attempting to equalise the lighting and contrast of the photo in *Photoshop CC 2018* I decided not to use utilise my own textures as they did not blend together properly in *Hammer* which made it obvious to see the texture repeating itself. To fix this issue i would have had to use a high quality 3D object scanner to extract real world textures without error.

## Finishing the Map:

After adding textures, building the structure of the facility and adding props, I was began working on fine details such as lighting, fog effects and optimisation of the level. For lighting I used a global light setting which defined the standard lighting for the map. To implement global lighting I used a env\_light entity and set the values to the following:



After implementing global lighting, I decided to add fog to add to the ominous setting of the film. To add fog I watched a tutorial titled '*'Hammer Tutorial V2 Series #16 "Adding Fog to Your Level"*'. Through this tutorial I was able to add fog to my map using the *env\_fog\_controller* entity which dissipated as the camera/user got closer towards an object.

The final step I took to finish the map was optimisation. Each time I complied the map for testing within Source Filmmaker, I experienced long compiling times especially after adding the *env\_lighting* entity. Before even begin to further research methods to optimise a map, I was aware that adding the *NODRAW* texture to objects that would not be seen by the user (such as the back walls of the facility) would provide significant increases in compiling times. Another way I optimised the map was ensuring all geometry (walls, floors etc.) were not overlapping. By perfecting the measurements of all walls and removing the overlapping sections of the facility, my compiling times for the map were reduced significantly again.



### Animating in Source Filmmaker:

To begin animating in Source Filmmaker with full 360 degree field of view I watched an extremely resourceful tutorial titled '*SFM Tutorial: 360° Panoramic Videos*' on setting up Source Filmmaker for VR animation. Without this tutorial, creating a VR video within Source Filmmaker would have been close to impossible as the video provide the exact mathematical data required to perfectly set the field of view and rotation of each camera. To animate in 360°, six cameras were required to be set up in Source Filmmaker. To begin I created a camera and completed the following:

1. Went into the 'transform' properties of the camera and changed all three values in 'transform-rot' to zero. This positioned the camera to look at exactly zero. After changing the rotation values, I then right clicked on the 'fieldofview' property and clicked on the 'Change Field of View' button. I then changed the 'max' to 106.25 and dragged the field of view slider to the maximum (to set the field of view to the desired 106.25)
2. After changing the values of the second camera I copy and pasted it to create the second camera. Following that, I changed the rot-transform values of each camera to the specified numbers given in the tutorial. These included:

Second Camera (Left): Change right most number to 90

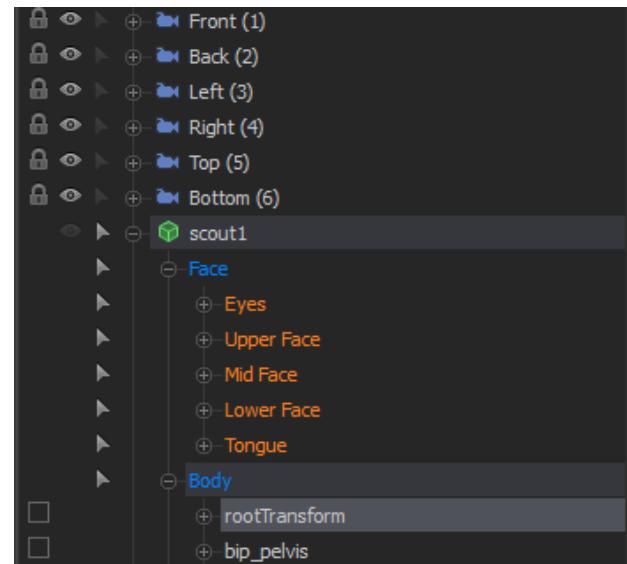
Third Camera (Back): Change right most number to 180

Forth Camera (Right): Change right most number to -90

Fifth Camera (Bottom): Change middle number to 90

Sixth Camera (Top): Change middle number to -90

After setting the rotation and field of view of each camera, I then needed to lock all six camera's to a universal root\_transform attribute of any model within Source Filmmaker. This was necessary as if any of the six cameras were moved without being tethered together, the complete 360° view would be damaged and the final render would turn out to be distorted and broken. Considering the plot of my map, I decided to use a hwm\_scout model rather than a standard object (i.e bottle, chair, furniture model etc.) to lock to camera's to as I realised that I would later require a humanistic model to animate stepping motion. To begin the tethering process I



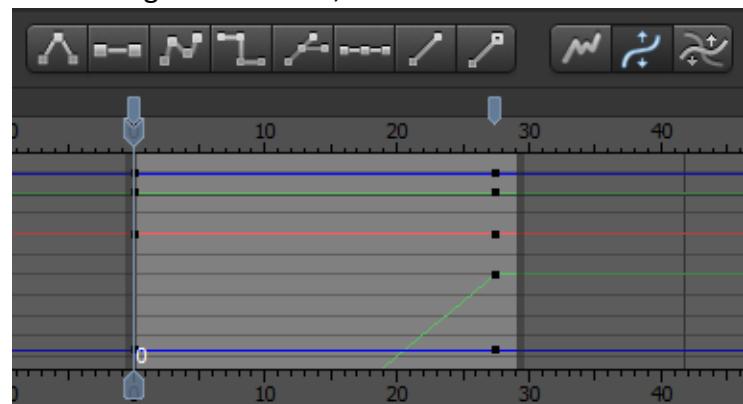
changed the method used in the tutorial to better suit my project. The steps to this process included:

1. Spawn scout\_hwm model
2. Drag Camera 1 (Top) 'transform' attribute to the 'rootTransform' attribute of the hwm\_scout model.
3. Ensure 'rootTransform' of hwm\_scout is selected and drag the 'zero slider' to its maximum. This set the hwm\_scout model to be positioned in the exact middle of all six camera's.
4. Drag rootTransform and bip\_pelvis attribute of the hwm\_scout to the transform of all six camera's. All camera's are now locked/tethered to the 'rootTransform' of the Scout model.

The modifications I made to the steps provided in the tutorial was the I needed to lock the 'bip\_pelvis' attribute of the Scout so that I could animate the stepping motion as well as the movement of the camera's simultaneously.

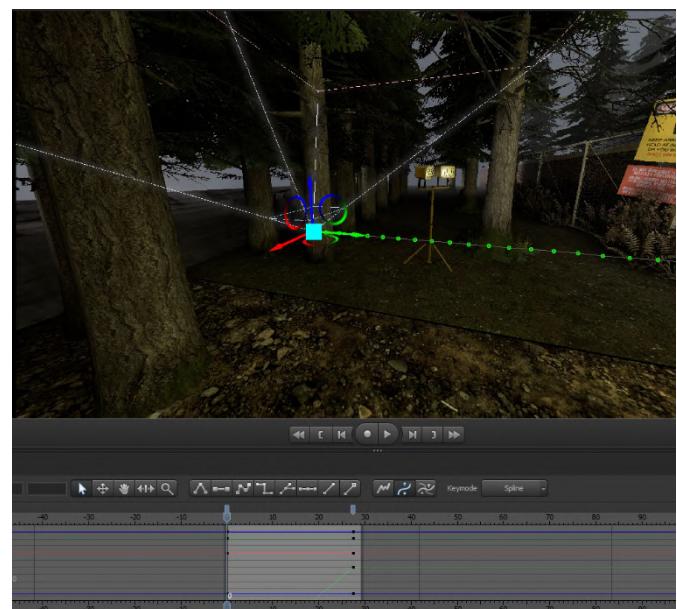
After setting up the camera's I then began animating (using the graph editor) the movement path of the camera's through the facility. While moving the camera's, I switched between the Equalize tangent, Spline Tangent and Step Tangent to create fluid movement of the camera. Each tangent defined how smooth and quickly the camera would move, but I predominantly used the spline tangent as it provide the smoothest camera movement.

*Different tangent's available within Source Filmmaker's Graph Editor*



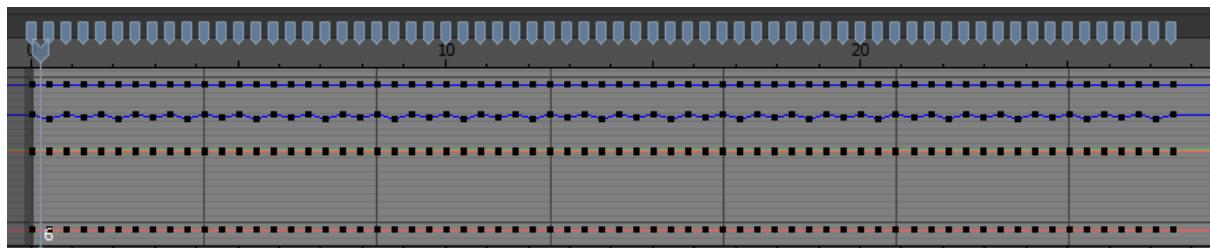
Moving the camera through the map was a relatively simple process, define the starting point of the camera by pressing 'M' on the graph editor timeline, move the slider to the time at which the user desires the camera to finish it's movement, use the XYZ controls to move the camera to the desired location.

*Process of moving the camera through the map*



Following the completion of the camera's movement through the map, I animated a first person walk cycle/stepping motion to create a realistic first-person experience. To achieve this, I shifted the bip\_pelvis upwards and then counted ten frames on the timeline forward and shifted the bip\_pelvis down. This created one step, which I then copy and pasted to repeat the first person stepping motion effect. As the project progressed I had to make some of the steps longer by (for a running effect) or shorter (for a cautious/curious walking effect)

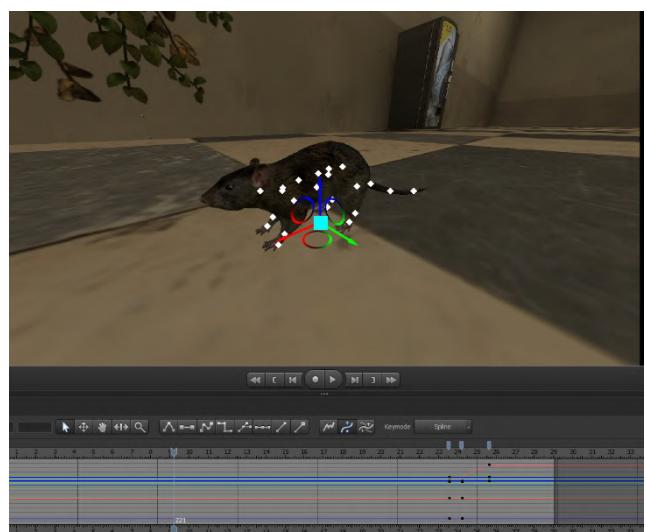
*Stepping animation using the bip\_pelvis for movement*



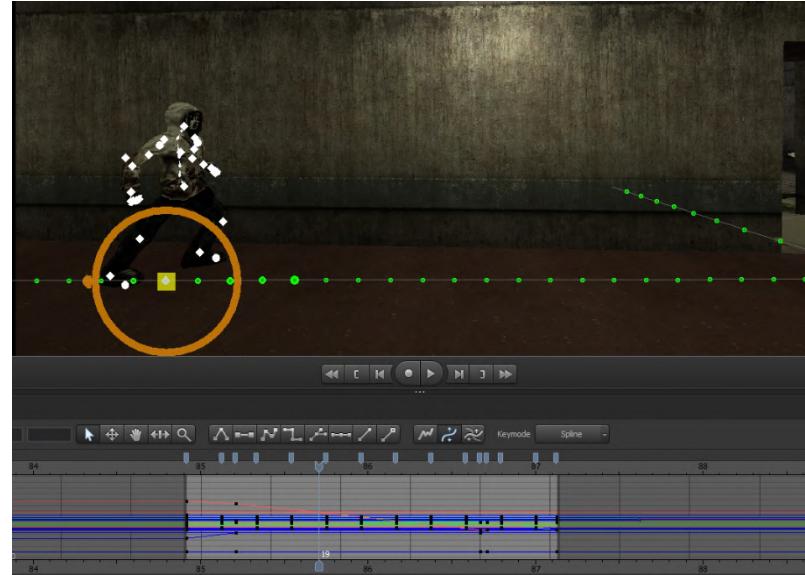
After constructing the basic camera movement and stepping motion I began animating ambient animations including:

- Run cycle for rats
- Flying path for crows
- Slenderman
- Chaser (Kate)
- Elevator Doors

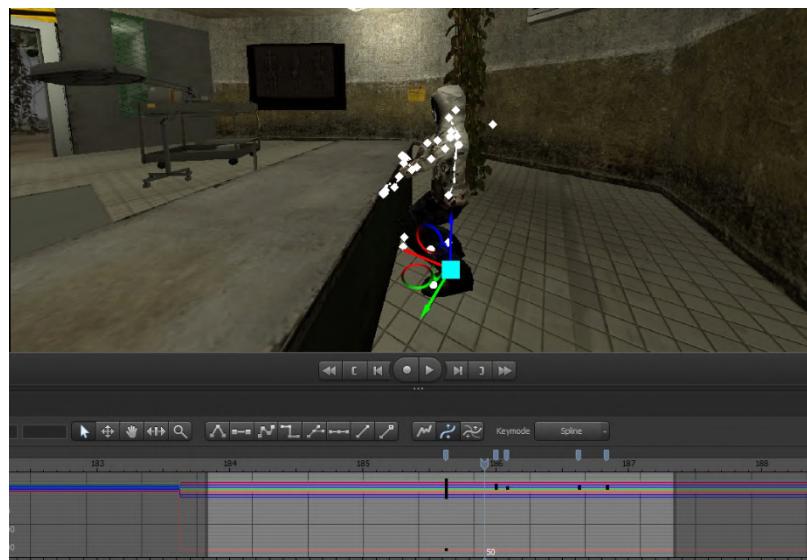
The first animation I began working on was the run cycle for rats. The reason I chose to specifically implement rats within the film, was that I wanted to create the most realistic feeling hospital I could and using animals such as rats, crows and other small animals. To animate the rat I required some sort of reference so that I could make an accurate to the real world run cycle. To do this I used an iPhone SE to record a short clip of a live mouse (pet mouse) running across a desk. After doing this I applied the default flying cycle to the crow and moved it into the position/s I desired throughout the facility.



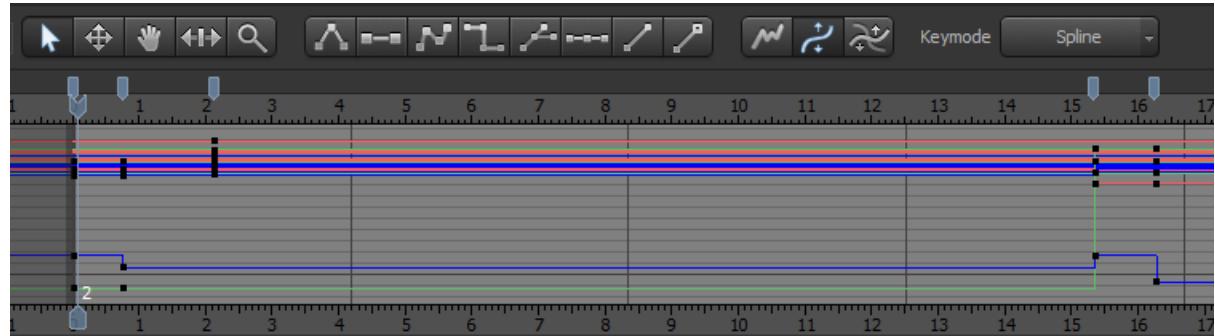
Animating the Chaser (better known in the game *Slenderman: The Arrival* as Kate) was the one of the most difficult tasks as I was required to create a run cycle by referencing the Kate run cycle within *Slenderman: The Arrival*. Due to the fact that the Chaser did not have an included rig (script that groups model bones to allow for more fluid and easy animation) I used the Source Filmmaker Workshop addon 'Auto-Rigger' to create a semi-working rig. Although the rig was not perfect and had many glitches, was able to create a run cycle by locking both arms to the pelvis and moving the legs and arms forward using the game run cycle as my main reference. After creating one full step, I used the copy-and-paste method to quickly create a complete run cycle.



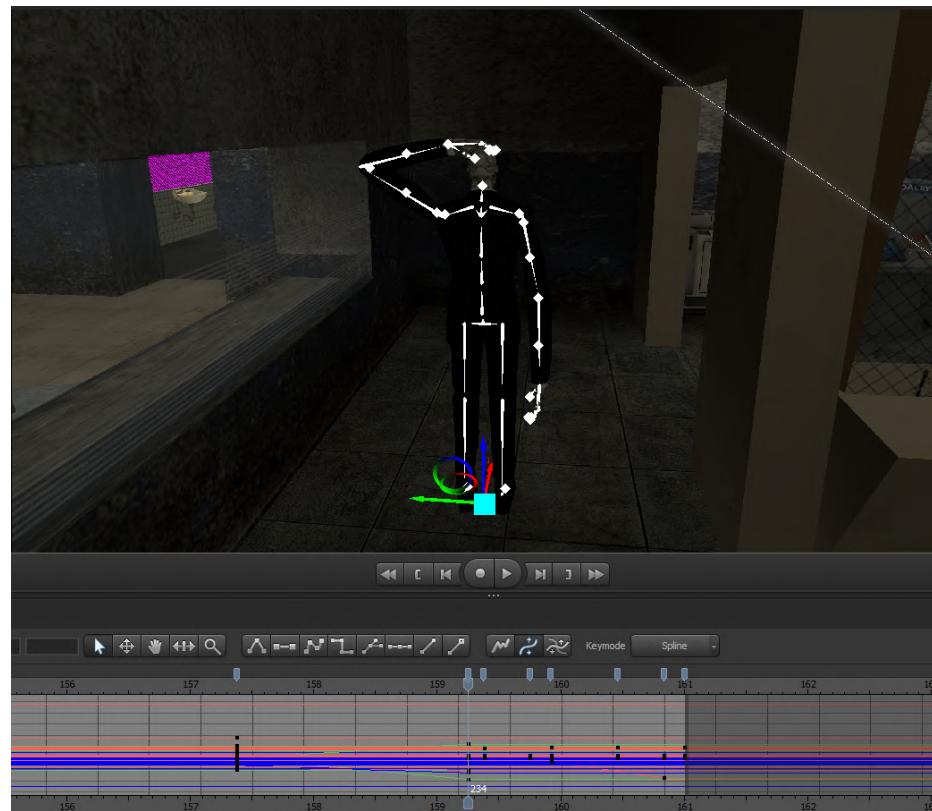
As well as animating the run cycle for the Chaser, I also animated her pushing up from a desk in the surgery room and hissing at the viewer camera. I found animating this action to be significantly easier than the run cycle as I was only required to position two hands in one position as the bip\_pelvis was able to make the hands move in sync with the motion of the pelvis. For both Chaser animations, I used the spline tangent and the graph editor as it allowed for smooth and as close to realistic animations as possible within Source Filmmaker.



To animate the actions of Slenderman, I gained referenced the behaviour and actions of the character in the game *Slenderman: The Arrival*. Most of the animations I created for Slenderman used the step tangent as the main behaviour of Slenderman, traditionally, is to teleport around the player. Using the step tangent allowed me to have Slenderman seemingly disappear and reappear at random times throughout the film.



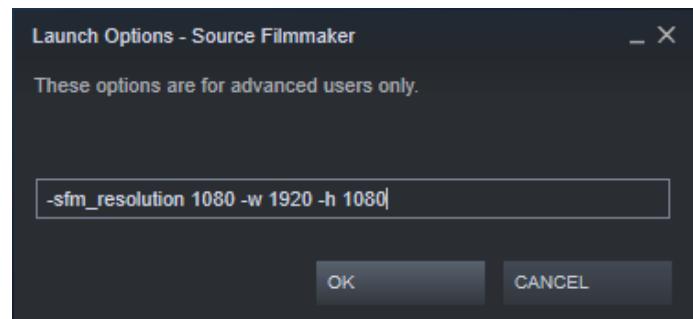
Along with animating Slenderman teleportation animation, I decided to further my animation by making the viewer witness Slenderman twisting his head around in one of the lab rooms. To create this animation sequence I used the same rig script that I used with the Chaser's run cycle and animated using the spline tangent for smooth humanistic movement. As well as the two main head twist and teleport animations I added a few hidden locations where Slenderman performs a slight head tilt to surprise the viewer.



### Rendering and Exporting the 360-degree video:

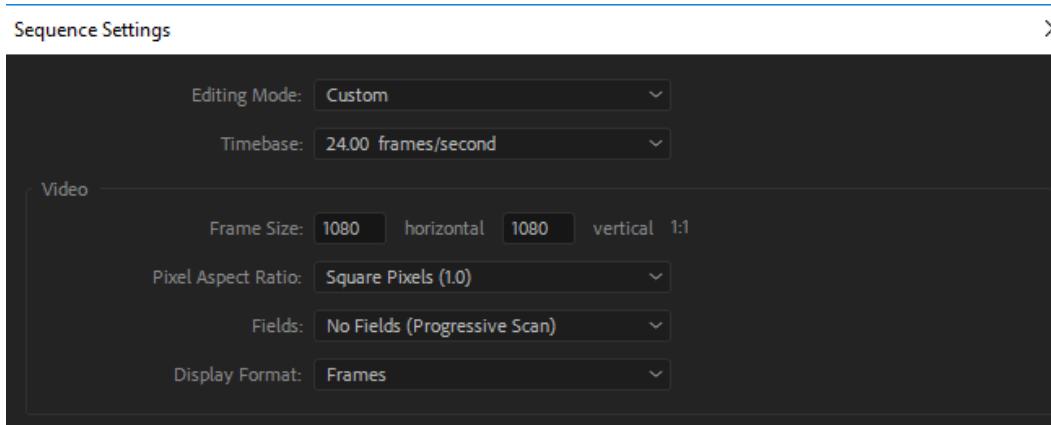
Finally, after completing all the map design, animation and optimisation, my project was ready to export from Source Filmmaker. The process of exporting the final 360 degree video was lengthy and required me to use three different pieces of software and over 30 hours of continual rendering.

The first step of exporting the final product was to render each of the six camera's (Front,Back,Left,Right,Top and Bottom) in Source Filmmaker. I learned this skills to this, again, by following the tips provided in the '*SFM Tutorial: 360° Panoramic Videos*' tutorial. Due to the fact that I wanted to export the final animation as an Ultra HD 4K video, I was required to modify the start-up settings of Source Filmmaker so that I was able to export renders in 1080p. I used the 1080p resolution rather than 4K as to create a 4K 360-degree video I only required 1080p video files.



To perfect the render, I set the output format to image sequence (tip given by '*SFM Tutorial: 360° Panoramic Videos*'). Each of the six camera's took 2.3 hours to render bringing the total rendering time in Source Filmmaker to **13.8 hours**. Due to the extremely long render time I setup three high powered rendering/gaming computers to simultaneously render each a different camera. This brought the total render time to a more reasonable 4.6 hours. One problem I encountered whilst rendering in Source Filmmaker was the lack of hard drives I had to available for storing each render. For each computer rendering the camera's I required a minimum of 11.7 GB (benchmarked using the first camera I rendered as an experiment). This was a problem as I only had a one terabyte external hard drive and my laptop hard drive (256GB). To resolve this I scrapped a hard drive from an old PC and installed it into the other rendering PC I had setup.

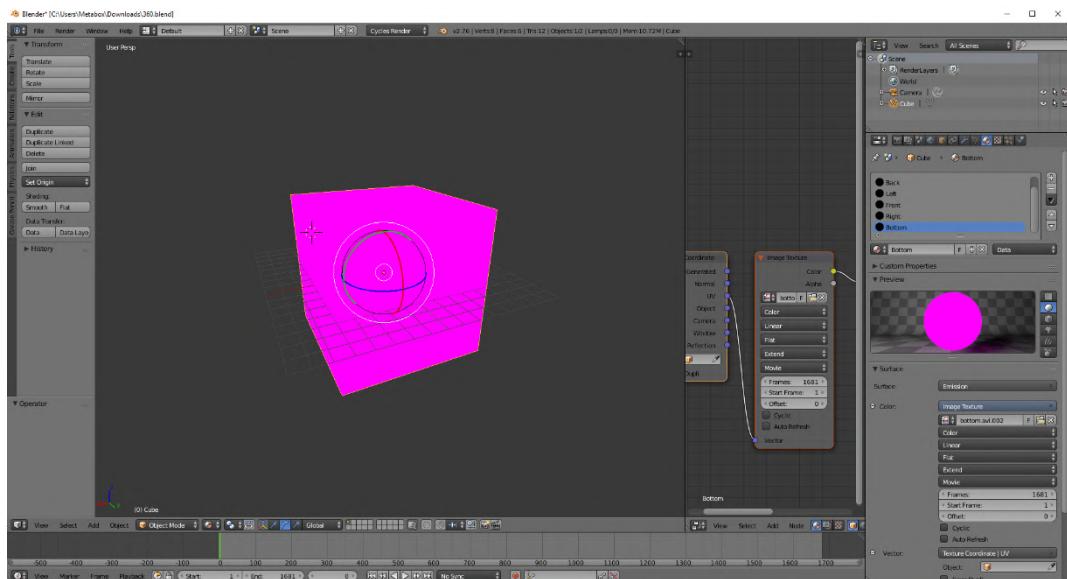
After the rendering in Source Filmmaker was complete, I then imported each of the six camera image sequences and change the sequence settings in Premiere to have a 1080x1080 frame size (1:1 ratio) as mentioned in the tutorial.



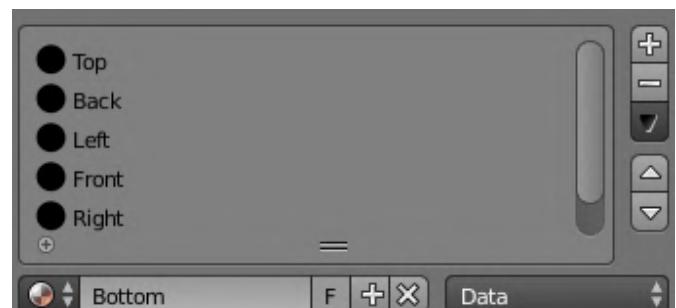
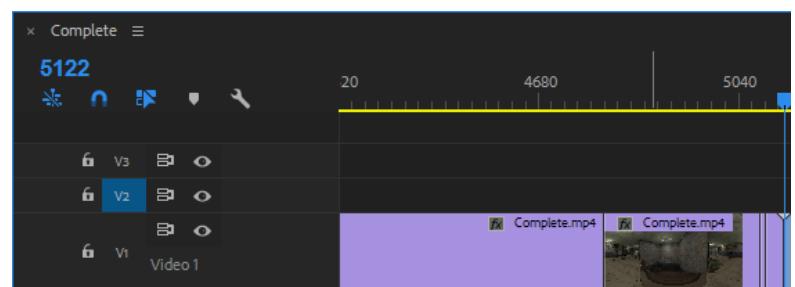
Once the Premiere Pro settings were correctly adjusted, I exported each of the six camera's in an 'Uncompressed AVI' format. Each camera took approximately 15-20 mins to render/export.

Following exporting each camera, I then downloaded a cube map (provided by the tutorial) to use in Blender so that I could create the 360 degree video. A cube map is a cube consisting of six squares in which the six angles of a camera (front, back, left, right, top and bottom) can be joined to form a complete picture or video.

*Cubemap file used to render all six camera views*



To set up the cube map I was required to adjust some settings so that the final product would be properly rendered. To begin I raised the output resolution of the render to 3840x2160 from 1920x1080 as I wanted my video to be rendered in the best quality possible. After that, I changed the 'End Frame' to 5122 frames (a number which I determined by placing the needle in Premiere Pro at the end of one of the camera sequences. Following that I imported each of the six camera outputs into the respective materials tab in Blender.



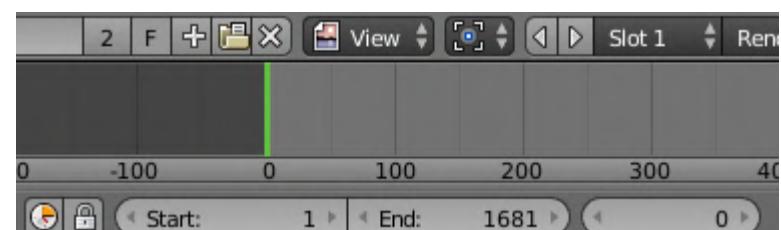
After setting up the cubemap, I then clicked on the ‘Animation’ button and allowed the film to render. Using the ‘Last’ feature in Blender I worked out an approximation for the total render time. Each frame was taking approximately 19.8 seconds to render which I then multiplied by 5122 which gave me a total of 101415 seconds or 28 hours for the render to complete. This was an issue as I did not want to leave my laptop running for over one day as I was concerned about power usage and the effects of running my laptop on full performance for 28 hours. To combat the long render time, I used the three PC’s I had setup for rendering within Source Filmmaker. Making these computers render a different part of the final animation simultaneously was challenging. To achieve the most efficient and fast render times, I divided the 5122 frames by 3 (giving my 1707 frames to render per computer). The next issue I had when attempting to do this, was setting each computer to start rendering from a specified frame.

*Attempted solution to render from a specified part of the film only*



I applied a number of methods including changing each of the six sides to start on a specified frame within the ‘Materials’ tab in Blender and changing the number of frames to the amount I wanted to render on that specific computer. However after trialling both methods, I did not have any success. After conducting some further research, I discovered that the solution was much more simple than what I had been attempting to do. To change the frame each computer started on I had to change the ‘Start Frame’ setting located at the bottom of the timeline in Blender.

*Solution used to render simultaneously across three computers*

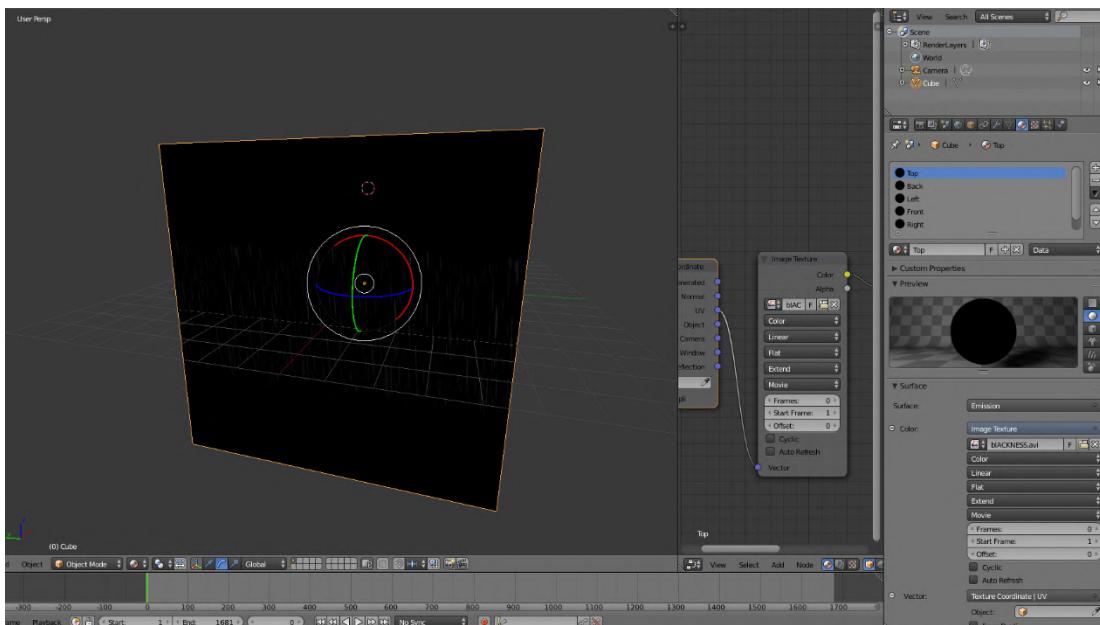


After this each computer began rendering a different section of the film reducing my render times significantly.

### **Sound and Post Effects:**

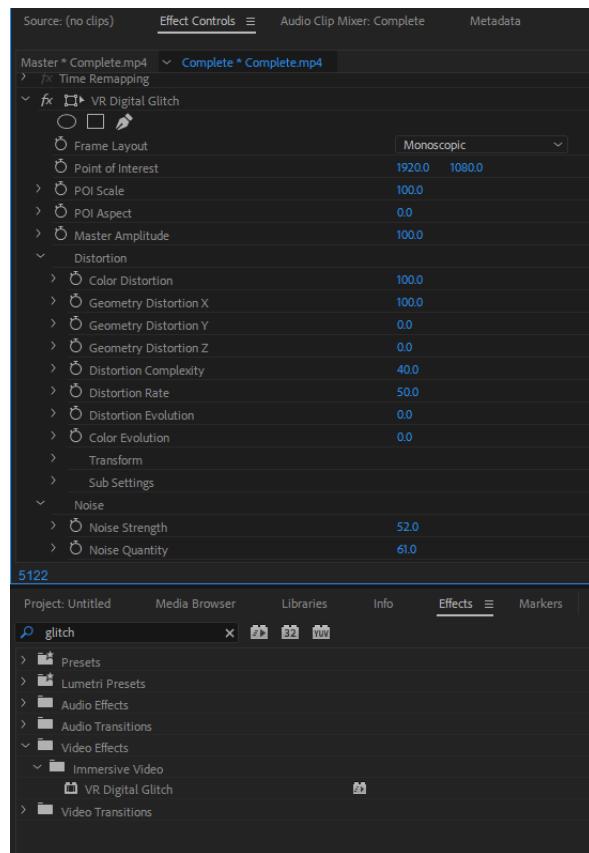
After nine hours of rendering, I was finally able to import the complete 360 degree video into Premiere Pro to add sound and post effects. The first post effect I added was the rain overlay. I ended up having to create this 360 degree overlay from scratch using a 2D non-360 rain template. To create this I used the same cubemap method used to create the final animation, but added blackness for the top and bottom faces of the cube as the rain would appear to be falling horizontally if the viewer was to look directly upwards. The rain overlay only took about 20 minutes to render as I rendered it in 1080p as opposed to 4K.

*Creating the 360 degree rain overlay*



The next post effect I worked on was a digital glitch effect. I added this effect as in the game *Slenderman: The Arrival* the player's vision will glitch and crackle when close by to Slender. To my benefit, this digital glitch effect was already available as an "*Immersive Effect/ VR Effect*" in Premiere Pro and therefore I did not need to create another overlay.

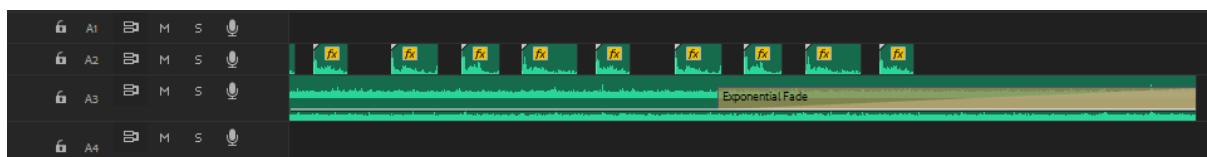
The *VR Digital Glitch Effect* was highly customisable allowing me to create randomised glitching patterns each time I wanted to use it. To apply the effect, I simply dragged the effect from the '*Effects*' tab and dropped it onto the clip I desired.



*Customising the glitch effect using the 'Effects Control' tab in Premiere Pro*

Once all the post effects were complete I added in all the necessary sound files. The majority of these sounds were found on YouTube under the search term '*Royalty Free* \_\_\_' to ensure no legal or copyright laws were broken. However, to find some sounds I searched manually through the files of Source Filmmaker. The sounds extracted from Source Filmmaker that I used were the foot stepping sounds as I found that the sounds fit perfectly with what I required. To create perfect sound I used a range of effects available in Premiere. The one I used most frequently was the '*Exponential Fade*' effect which allowed for sound tracks to gradually fade out instead of abruptly ending.

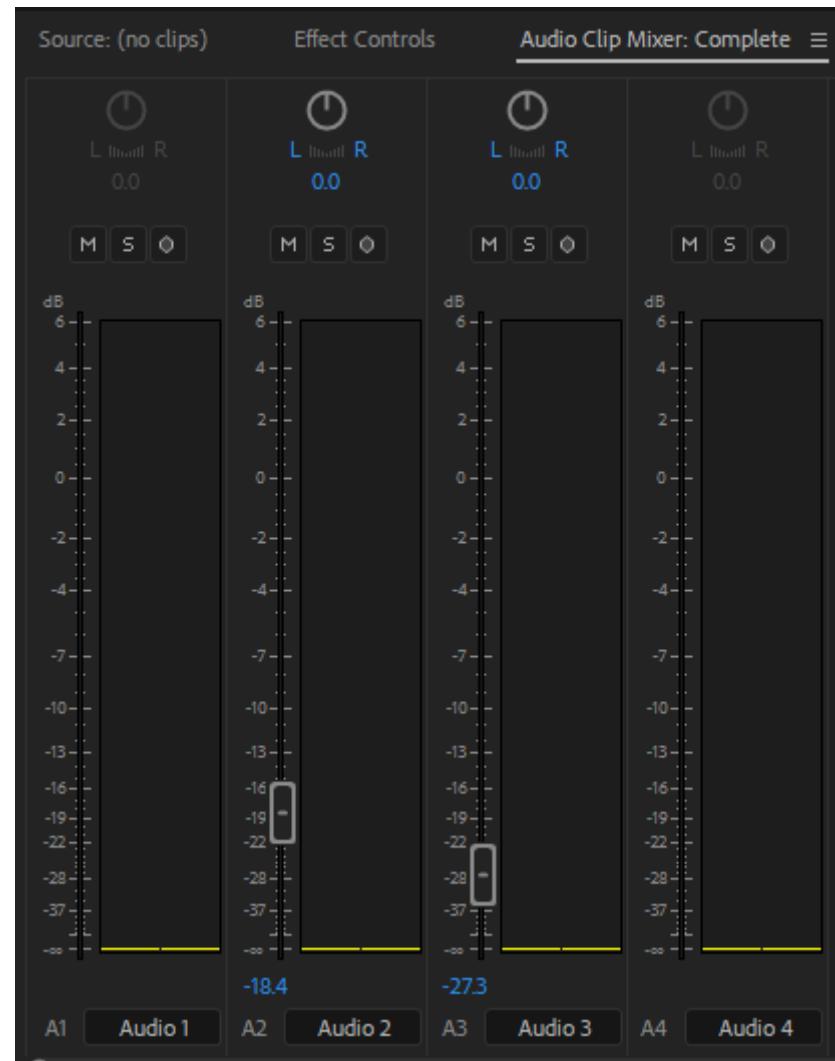
#### *Use of the Exponential Fade Effect*



After adding in all the sound files I equalised them using the 'Audio Clip Mixer' so that sounds played all at the appropriate level. For example I reduced the volume of footsteps to -8.3 as they are naturally not loud.

*Audio editing within the 'Audio Clip Mixer'*

Once all the sound files and post effects were working correctly I exported the animation to a .mp4 file which was the completed product.



## Testing and Prototyping

Before and after the final product was complete, I ran multiple tests to ensure there were no small errors and to make sure that the video was compatible (via YouTube) on some of the most popular VR headsets available. Along with testing for compatibility for VR headsets, I also conducted tests before rendering the final product. Through each test I ensured that animations, lighting and the map were working as I intended.

To begin my first prototype I uploaded a short tour of the map to YouTube so that I could test the following:

- There were no errors in the rendering of the project
- The lighting in the map was at a realistic level
- The compatibility of the video on VR Headsets (HTC Vive, PSVR and Google Cardboard)
- Whether 1080p was good enough quality or 4K was needed

Through my testing I was able to identify problems and resolve them. To generate an unbiased opinion, I advertised the test video in the Source Filmmaker Discord community and asked for feedback. By doing this I was range of feedback. The most prevalent suggestion I received was to increase the resolution of the film so that it could play in Ultra HD/4K. Personally, the biggest issue I found with the test was the seam lines that appeared at the top and bottom of the video. After some research, I discovered that these were caused by the flickering light effect I had used as in each camera the lighting was slightly different resulting in inconsistency between the six cameras. To fix this, I was forced to change the lights to a static illumination rather than the more ominous flickering effect I originally envisioned.

## Evidence of safe working process and OH&S Issues

In order to complete my major project I ensured that when working I followed as many applicable Occupational Health and Safety precautions. Due to the fact that I was required to spend a lengthy amount of hours working on both desktop computers and laptop's, I ensured a number safety precautions were taken into consideration.

One of the most important things when working on a computer is maintaining correct posture which can be achieved by setting up your workstation correctly. When working at home on my project, I was able to maintain correct posture as my chair and workstation are setup to suit my needs.

*Chair used throughout the duration of the major project*



The chair I used when working on the major project was specifically designed for gaming and extended periods of sitting in front of the computer. The chair can go as low as 110cm above the ground which is the most appropriate level for my height of 6'3 as my wrists and arms remain completely flat on the desk and keyboard at all times. Using this chair also prevent me from spinal injury due to the lumbar support which prevented me from slouching due to be uncomfortable when working for long periods of time.

The NSW Worksafe website recommends the following setup for all workstations to prevent any potential injuries:

## Ergonomic set up of sit to stand workstations

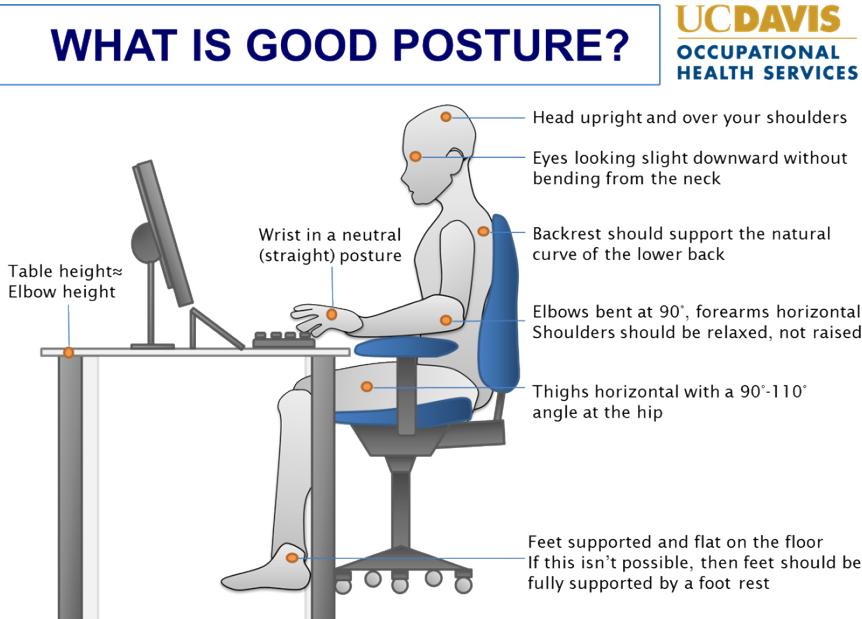
Setting up a sit to stand workstation is similar to setting up a seated computer workstation. Adjust the workstation so that when standing or sitting:

- you are in a forward facing posture
- the top of the desk surface (where keyboard and mouse are positioned) is at elbow height or just below
- the keyboard is directly in front of you, push the keyboard back so that your forearms are supported on the front part of the desk when typing (touch typists may prefer to position the keyboard closer to them)
- the keyboard and mouse can be comfortably used on the same level and close to each other
- your arm is close to your side when using the mouse
- the monitor is positioned so that you do not tilt/arch your head back or twist your neck
- the monitor is generally positioned at approximately arm's length or further away from you
- the top of the screen is at your eye height or lower
- the monitor height is slightly adjusted when standing to be visually comfortable while maintaining the correct posture
- multiple monitors are set up correctly.

In addition, use a document holder if you refer to documents when typing and check that it suits the workstation selected (keep all frequently used items within easy reach).

*Below: Poster displaying correct posture and set up of a computer workstation*

Another



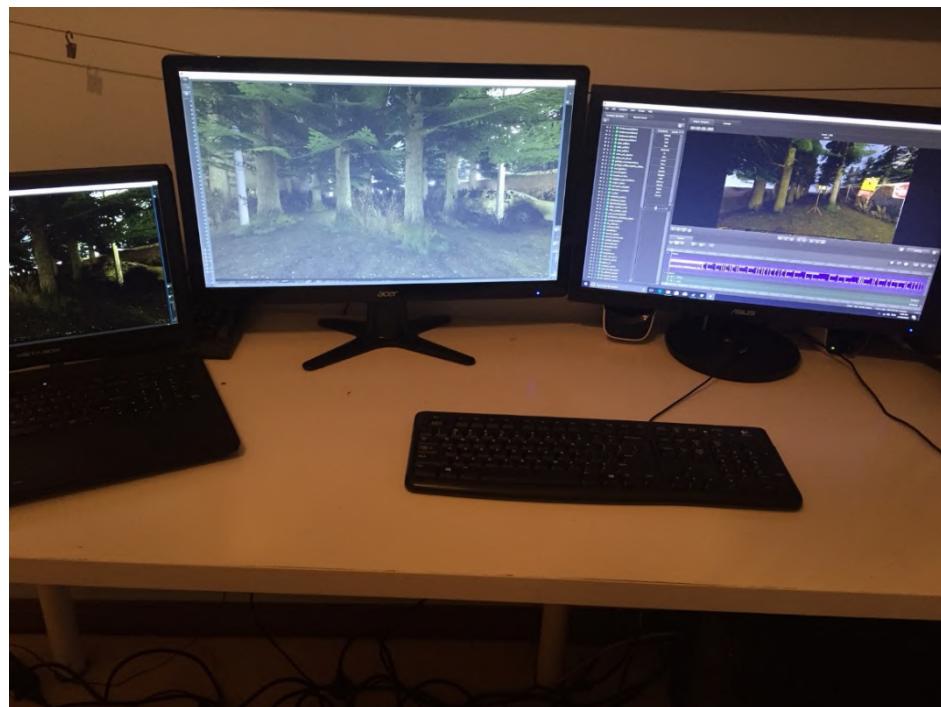
consideration I had when completing the project was potential electrical hazards. As mentioned earlier in the portfolio, to render my final product I used three computers simultaneously. This concerned me as the only way to power these computers was by using a power board and filling all four of the available plugs. My solution was the remove the

display power cables as soon as I had finished setting each computer up to render thus allowing me to only have two plugs running simultaneously.

*Top: Power board used to power the two desktop computers*



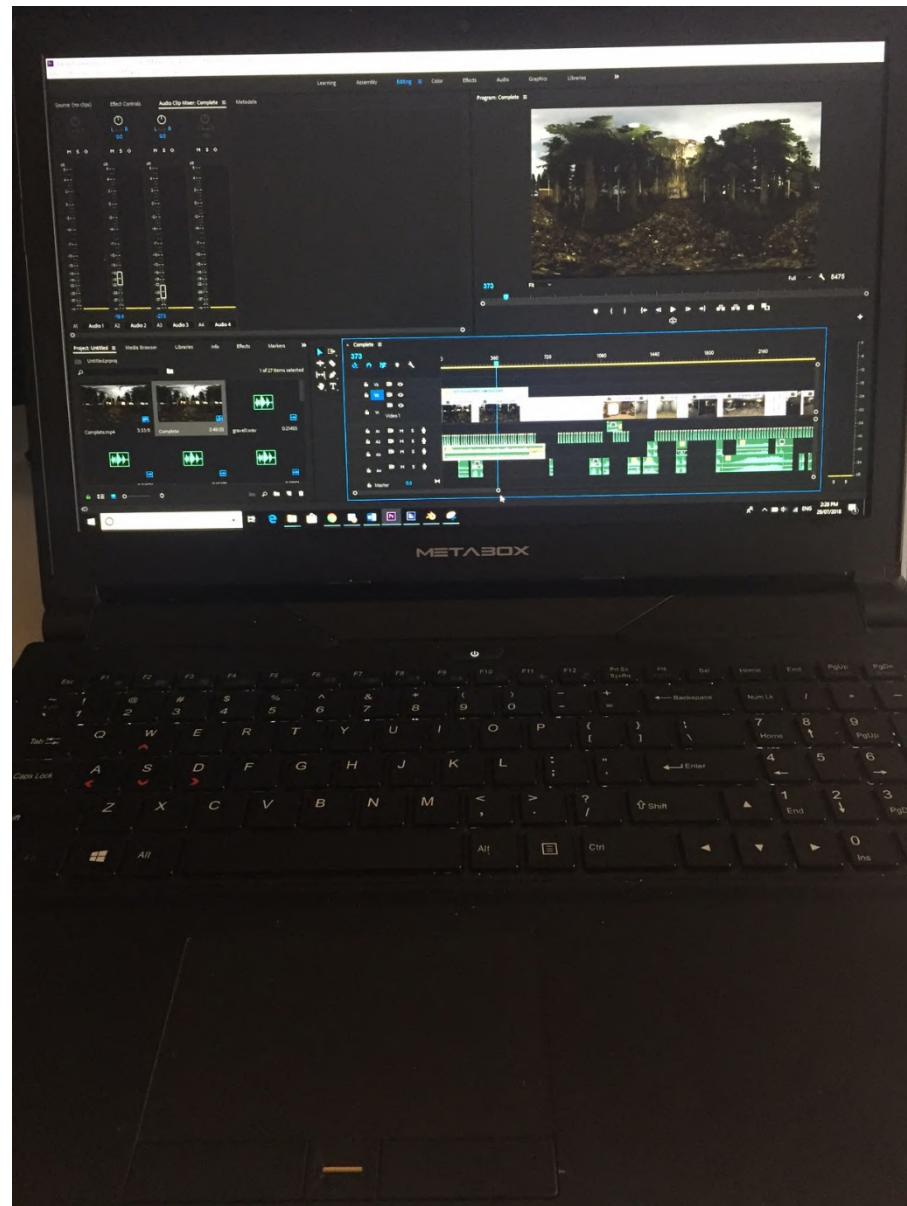
*Below: The three computers used to render the animation*



The final health and safety consideration I made while completing the project was taking breaks when working for extended periods of time. Every hour I spent on the computer, I would take 10-15 minute breaks in which I had something to eat/drink and walked around to prevent muscular strain caused by spending excess amounts of time on a computer.

One of the health and safety issues I was unable to resolve was the setup of the workstations at school. Due to my height, the desks and chairs were not properly suited which resulted in me slouching due to both uncomfortability and the need to get a better view of the monitor.

*Laptop used when working at school on the project*



## Degree of Difficulty

Overall the project was extremely demanding as I had to manage a multitude of aspects of the project. The use of Blender, Source Filmmaker, Premiere Pro CC 2018, Hammer, VTFEdit, Photoshop and a range of other software required me to develop a deep understanding the working of each software. In total I spent over 300 hours within Source Filmmaker alone (*which can be seen via my Steam Profile*). The most difficult task during the project was making sure all six of the cameras were perfectly aligned and adjusted to create a fluid final product. In future to make creating VR videos more easy, I would use something other than Source Filmmaker as it did not support 360 degree as smoothly as software such as Blender or other animating software would have.

## Evaluation: Links between Planning and Production

Overall my project linked closely with what I had planned and researched. However as I progressed, certain applications such as Blender and Premiere Pro ended up being used for different purposes than what I had originally envisioned. Instead of create my own models in Blender, I predominantly used it for its ability to create and render an animation in a cube map format. As for *Premiere Pro*, I originally thought I would only be using it to piece clips together but instead I ended up using it to export the image sequences output by Source Filmmaker to an Uncompressed AVI format that was ready to use with Blender.

Perhaps, the most significant change between my planning and final production was that instead of creating an animation that could be viewed as a standard video, I ended up creating an interactive 360/VR experience. The ultimate reason I decided to make such a large adjustment to the intent of the project is that I examined more closely the exact definition of the term '*Multimedia*' and decided that my project would better suit the term if the user was able to interact, in some way, with the final product.

*Definition of multimedia which allowed me to better construct my project*

# multimedia

[muhl-tee-mee-dee-uh, muhl-tahy-]

[Examples](#)    [Word Origin](#)

[See more synonyms on Thesaurus.com](#)

**noun** (*used with a singular verb*)

1. the combined use of several [media](#), as sound and full-motion video in computer applications.

One other change I made between planning and production was the plot of the animation and storyboards. Originally I intended on continuing the plotline for *Half-Life 2* and *Portal 2* but was instead inspired by the video game *Slenderman: The Arrival*. I also discussed my major project plotline with friends and family and was able to generate and develop a solid idea for what an abandoned asylum/hospital VR animation would look like.

Although I made significant change to the formatting of my animation (changing it from standard video to VR) and scrapped my original plotline, I still followed my original statement of intent as I achieved my personal goals and intentions I mentioned in the statement of intent.

Overall, my project linked closely with my statement of intent which stated that I would create a “short 3D animated film”

## Evaluation: Materials and Process Used

I was generally satisfied with the final production, however there are a multitude of things I believe could have been completed to a higher standard. In terms of the production itself, a number of issue were unfortunately left in the final product. These were mostly due to human error but some were also due to the software I used to create the animation.

The first, and most prominent issue, was the glitching of textures and lighting within the final render. When compiling the map in *Hammer* I missed texturing the mirror in the bathroom properly and it therefore can be seen on screen for around 1-2 seconds in the final animation. Another issue I noticed in the final project was the lighting glitches between some floors and walls. The most prominent of these is in the hall way (just after the camera goes out the elevator doors). This glitch was caused by a geometrical error in *Hammer* which was most likely due to the overlapping of two walls.

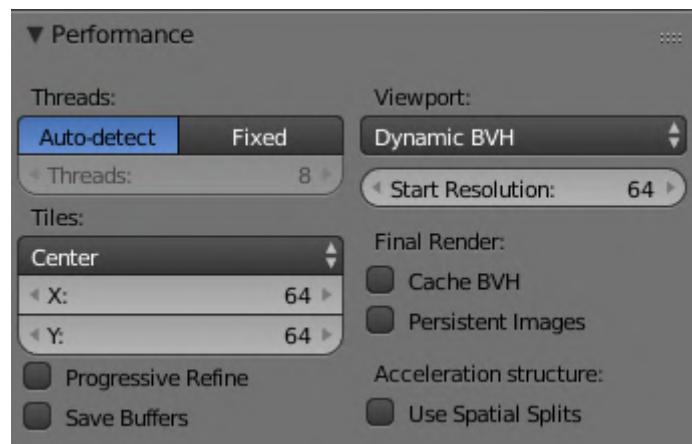
*Some of the glitches with the construction of the map. Pink and white textures were a mirror that I forgot to texture properly before rendering.*



To prevent these errors in a future release of the project, I could fix the overlapping in Hammer and replace the error texture with the intended texture.

The most tedious task during the project was the rendering of the animation. The process in general was extremely demanding and required large amounts of setup to reduce rendering times. However, after I completed all the rendering required I discovered a way to increase the speed of rendering in Blender by up to 300%. By changing the tile size in Blender to 256 (from 64) each computer was able to render each frame quicker. Looking back, I should have done better research into the setup of Blender as it would have allowed me to work on the production more rather than the setup of Blender on each computer.

*Performance tab in Blender, providing settings to reduce render times*



In regard to post production and sound, I had originally envisioned a camera recording overlay to give the video a more homemade, explorer in the woods, type of feel. After researching methods of applying a static non-360 video as an overlay I was unsuccessful and decided to not include it within the final product.

*Recording overlay concept*



My final concern with the project was the top camera slightly distorting some objects. Looking back I should have not locked the bip\_pelvis to the transform of the top camera as it caused distortion and glitching.

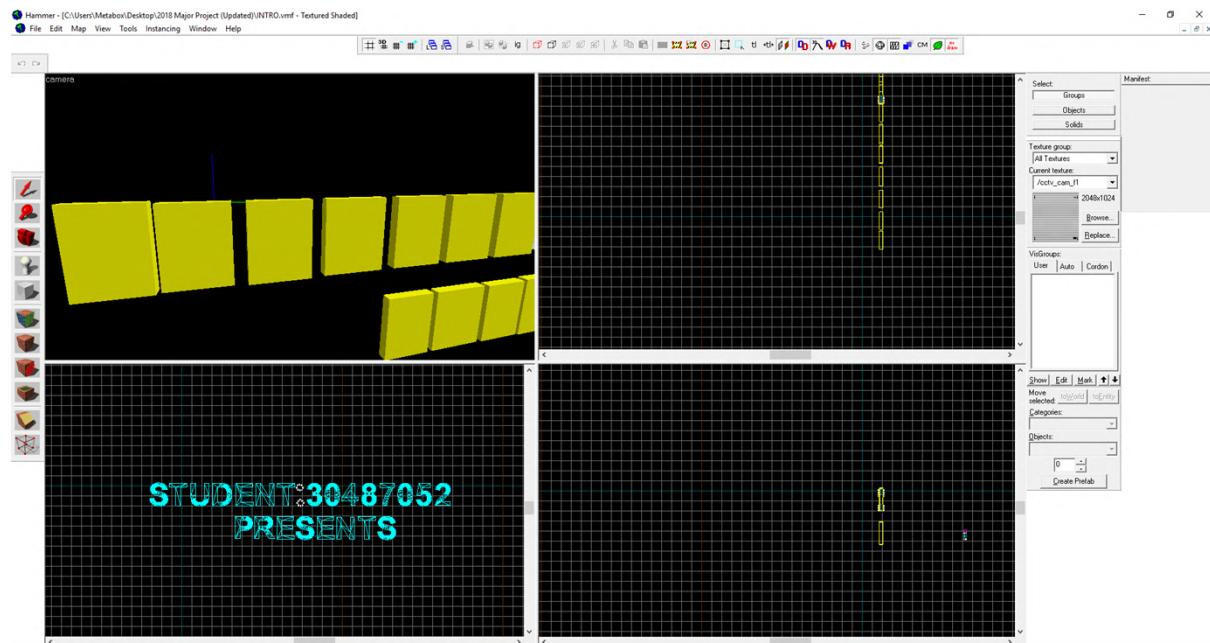
## Evaluation: Conclusion

Overall, I was happy with the result of the project. Although there were a number of issues, the animation turned out in high 4K (Ultra HD) quality and surpassed my original expectations for the project. In retrospect, I would like to have better researched the software more commonly used for creating VR productions as Source Filmmaker did not support 360 video production as well as other software would have. I also would have liked to have decided more early what direction my project would take as it limited me to a smaller time period to complete the project. Another had planned on doing but did not end up completing was the use of an introduction. I had designs ready for the opening introduction but was unable to complete the render with the time I had. This wasn't the worst thing to exclude from the final product but I would have added to the attempted professionalism of the project.

### *Production of introduction which I was unable to add due to time restrictions*

Some of things that I thought turned out well included the post effects and sound. Although I added sound and post effects with limited time, I thought that they turned out well as they were synchronised with the video and added realism to the project.

### *Concept of introduction I planned on adding to the beginning of the animation*



## Major Project Diary

Date	Description
<u>16/11/2017</u>	Created diary and Gantt chart for Major Works
<u>17/11/2017</u>	Explored a range of multimedia software to find out what I wanted to do for my major project
<u>20/11/2017</u>	Research 3D modeling and animation
<u>23/11/2017</u>	Experimented with Blender and Source Filmmaker
<u>27/11/2017</u>	Watched a video on the features of Source Filmmaker
<u>29/11/2017</u>	Researched alternate ways and software of creating a short 3D animation
<u>1/12/2017</u>	Downloaded Source Filmmaker and began experimenting with the software
<u>5/12/2017</u>	Created a sample 3D set within Source Filmmaker and rendered it using multiple lighting effects
<u>11/12/2017</u>	Downloaded Blender and began watching tutorials on how to import Blender models into Source Filmmaker
<u>15/12/2017</u>	Followed a short tutorial to build a house model within Blender and imported it to Source Filmmaker
<u>30/01/2018</u>	Started writing statement of intent
<u>31/01/2018</u>	Completed Statement of Intent
<u>1/02/2018</u>	Did some research on Source Filmmaker
<u>2/02/2018</u>	Watched part 1 of a tutorial on Source Filmmaker
<u>5/02/2018</u>	Completed the Source Filmmaker tutorial series
<u>6/02/2018</u>	Referred to other Major Works that have been completed in previous years to get an idea of what to do for the major project.
<u>7/02/2018</u>	Began creating portfolio with Table of Contents and title page to begin the portfolio with.
<u>7/02/2018</u>	Added new fields to the Gantt chart.
<u>14/02/2018</u>	Began writing the “Proposal” section of the portfolio. Did research on 3D modeling software (Unity Editor)

<u>19/02/2018</u>	Started the research component of the assignment and read previous students portfolio to get an idea of what to write in the research section.
<u>21/02/2018</u>	Completed research on Source Filmmaker and began looking at Blender.
<u>22/02/2018</u>	Began research on Blender by visiting their site and viewing a showcase of the software
<u>26/02/2018</u>	Completed research on Blender and began exploring other software that I will require when producing the project
<u>27/02/2018</u>	Did research on both Maya and other Autodesk programs used in animation and decided to write about Maya in the portfolio.
<u>1/03/2018</u>	Finished research on Autodesk Maya and began writing another research part on Adobe Premiere. Visited Adobe site and explored whether Premiere was the best video editing software to use for the final production.
<u>2/03/2018</u>	Added images and list of minimum system requirements for each piece of software I researched in the portfolio.
<u>5/03/2018</u>	Began working on PowerPoint presentation assessment tasks. Set out the layout of each slide and the theme of the PowerPoint.
<u>9/03/2018</u>	Completed: Statement of Intent, Proposed Gantt chart and WHS safety slides of the PowerPoint.
<u>10/03/2018</u>	Did extensive research into possible plot lines for my animation and created two basic storyboards for my PowerPoint assessment
<u>11/03/2018</u>	Completed my PowerPoint passemment on Major Works drafting
<u>16/03/2018</u>	Worked on Development of Ideas in the portfolio
<u>18/03/2018</u>	Did research on similar projects to gain an idea of what I could create for my project and to gain insight into the creation of each.
<u>23/03/2018</u>	Watched a video on the best software to use for animation. Updated portfollio and gantt chart.Began development of ideas by playing through games that shared similar concepts to the short film I wish to create

<u>26/03/2018</u>	Began to learn how to use <i>Hammer</i> editor based off a series of tutorials.
<u>30/03/2018</u>	Continued watching <i>Hammer</i> tutorials and constructing my first test map for my animation
<u>2/04/2018</u>	Whilst watching the <i>Hammer</i> tutorials I began to create a map for my storyboard
<u>4/04/2018</u>	Continued making test map for my animation
<u>7/04/2018</u>	Complied and tested the map for the first time within Source Filmmaker
<u>10/04/2018</u>	Continued working on test map and experimented with different options in Source Filmmaker
<u>20/04/2018</u>	Updated portfolio by adding more to the development of ideas
<u>2/05/2018</u>	Followed Valve's Source Filmmaker tutorial's to create my first test animation
<u>3/05/2018</u>	Continued following the Official Valve Source Filmmaker tutorial to create my first animation prototype.
<u>4/05/2018</u>	Continued working of the animation test/prototype. Viewed multiple tutorials on lighting and camera angling to create a smooth result
<u>5/05/2018</u>	Used the graph editor and motion editor to make fine adjustments to characters and cameras within the prototype animation set.
<u>6/05/2018</u>	Completed production of the prototype animation and exported the final build to an mp4 file.
<u>7/05/2018</u>	Decided on which models and objects I wanted to create within Blender and began watching a tutorial on creating the head of a character model.
<u>8/05/2018</u>	Did extensive research on the issues that had the possibility to occur when exporting Blender models to Source Filmmaker. Discovered the <i>Source Tools Add-on</i> for Blender which solved issues of compatibility when compiling and exporting. Followed a tutorial on creating animated wheat field particles within the Source Filmmaker particle editor for added effect within the opening scene of my final production.
<u>9/05/2018</u>	Continued experimentation with wheat field particles by following a tutorial which explained how to add

	natural wind physics to the wheat within the scene. Created a basic model within Blender and attempted to use the <i>Source Tools Addon</i> to compile and export the model to Blender successfully.
<b><u>10/05/2018</u></b>	Watched multiple tutorials on building a basic scene and setting up props for the set. Started building my own scene for the opening of the film. Experimented with different maps and models to create an effective and realistic set.
<b><u>11/05/2018</u></b>	Continued experimenting with set building and watched tutorials on effectively lighting the set and character models using the intensity, colour and FOV tools. Did extensive research on grass/wheat particles.
<b><u>12/05/2018</u></b>	Continued scene building and positioning character models for the opening. After following a tutorial on the graph editor, I decided to use the graph editor as my predominant way of editing and thus created my first pose-to-pose animation.
<b><u>14/05/2018</u></b>	Researched and examined tutorials on particles concerning creating clouds and a twinkling night sky. Contacted Source Filmmaker professional online and received tips on using the particle editor effectively.
<b><u>15/05/2018</u></b>	Returned to studying modeling objects for Source Filmmaker within Blender and adding custom textures/materials to objects. Updated portfolio with significant information on the production process and my storyboard sketches.
<b><u>20/05/2018</u></b>	Changed the direction of my project both with the storyline and technical specifications of the project. I watched a video creating 360 degree videos in SFM and was inspired to make an interactive 360 video
<b><u>24/05/2018</u></b>	Set up my first animation set for testing 360 degree animation within Source Filmmaker
<b><u>26/05/2018</u></b>	Played through the game Slenderman the Arrival and was inspired to create a short survival/horror 360 animation
<b><u>27/05/2018</u></b>	Watched more tutorial's on map building to use <i>Hammer</i> editor to create a realistic map/set for where my animation would take place

<u>29/05/2018</u>	Continued watching more advanced tutorials on creating maps within <i>Hammer</i> whilst designing my own map alongside the education provided by the tutorials
<u>1/06/2018</u>	Continued creating my map within <i>Hammer</i> . Began the general construction of the facility.
<u>2/06/2018</u>	Continued to create the general construction of the asylum/hospital
<u>3/06/2018</u>	Continued to create the general construction of the asylum/hospital
<u>4/06/2018</u>	Continued to create the general construction of the asylum/hospital. Began watching tutorial on adding textures to wall, floors etc.
<u>5/06/2018</u>	Continued to create the general construction of the asylum/hospital. Updated development of ideas in the portfolio
<u>6/06/2018</u>	Continued to create the general construction of the asylum/hospital. Began adding textures to walls
<u>7/06/2018</u>	Continued to create the general construction of the asylum/hospital. Also continued to experiment with different textures.
<u>8/06/2018</u>	Continued to create the general construction of the asylum/hospital. Researched on adding props to the map such as furniture and trees
<u>9/06/2018</u>	Continued to create the general construction of the asylum/hospital. Began adding props within the patient rooms and outside the facility. Researched further into creating 360 videos within Source Filmmaker by watching the tutorial a second time.
<u>10/06/2018</u>	Continued to create the general construction of the asylum/hospital. Textured floors and ceilings of most of the rooms
<u>11/06/2018</u>	Adding finishing touches to the construction of the facility
<u>12/06/2018</u>	Adjusted the construction of the hospital and added an extra room.
<u>13/06/2018</u>	Did a complete overhaul of all textures making the hospital have a more run down/ abandoned appearance

<u>14/06/2018</u>	Watched a tutorial on adding lighting to a <i>Hammer</i> map and experiment with different lighting entities.
<u>20/06/2018</u>	Added lights to the bottom floor of the hospital by using the 'light' entity and positioning it underneath a light prop
<u>22/06/2018</u>	Continued to add lighting to the map, worked on the lighting in the patient rooms and second floor hallway.
<u>23/06/2018</u>	Completed lighting by adding it to the top floor. Began research on setting world lighting and fog effects
<u>24/06/2018</u>	Added world lighting by using the 'env_light' entity discussed in tutorials I viewed. Added in a fog controller and experimented with the different intensities of fog.
<u>27/06/2018</u>	Optimised the map as compiling times were long. Added the 'nodraw' texture to all unseen parts of the facility.
<u>28/06/2018</u>	Using my previously made 360 degree camera setup, I animated the camera's to move forward through the bottom section of the hospital as a test. Used Blender and Premiere Pro to render the test and then uploaded it to YouTube.
<u>30/06/2018</u>	Used a Google Cardboard and PSVR headset to test the fluidity of the animation and to check for any errors within the render.
<u>1/07/2018</u>	Identified several issues with the test render and was able to resolve them by making small changes to the map itself and props added within Source Filmmaker
<u>3/07/2018</u>	Began to add props to the map using <i>Hammer</i> editor. Used the Steam workshop to find appropriate materials for the map.
<u>4/07/2018</u>	Continued adding props in using <i>Hammer</i> editor
<u>6/07/2018</u>	Identified an issue with adding props in <i>Hammer</i> and then animating with them in Source Filmmaker. Resolved this by asking online for assistance
<u>8/07/2018</u>	Continued to add props via <i>Hammer</i> . Began adding in certain props via Source Filmmaker. Did a more fluid and better working setup of my six cameras ready for animation.

<b><u>9/07/2018</u></b>	Used the Garry's Mod Workshop to find medical props such as an MRI Scanner and X-Ray table. I then converted these and added them into the map via Source Filmmaker. Created an ECG Scanner using VTFEdit, Photoshop and Hammer Editor.
<b><u>10/07/2018</u></b>	Continued adding props via Source Filmmaker. Began working on updating all parts of the portfolio.
<b><u>12/07/2018</u></b>	Continued adding props via Source Filmmaker and worked with specific lighting effects in Source Filmmaker
<b><u>13/07/2018</u></b>	Started the animation process in Source Filmmaker. Locked all six cameras to an anchorage point so that I could move them all simultaneously. Animated a stepping motion effect using the bip_pelvis.
<b><u>14/07/2018</u></b>	Began animating camera path, moving them through the facility. Added stepping motion effect to each of the camera movements I had done and made sure they were correctly synchronised with the speed of the camera movement
<b><u>16/07/2018</u></b>	Finished the path of which the camera would move along. Added the stepping motion effect to the rest of the animation. Started working on a walk cycle for the Chaser/Kate
<b><u>17/07/2018</u></b>	Finished working on a walk cycle for the Chaser and exported it as a .dmx file. Started animating ambient animations such as crows flying and rats running across the floor.
<b><u>19/07/2018</u></b>	Completed all necessary ambient animations and worked on the animation sequences required for Slenderman.
<b><u>20/07/2018</u></b>	Finished animating the actions performed by Slenderman. Made small adjustments to the map to reduce glitching of walls and lighting. Added some more minute detail such as posters and medical trays for added realism.
<b><u>21/07/2018</u></b>	Made fine adjustments to certain animations in Source Filmmaker including the ambient and camera actions.
<b><u>22/07/2018</u></b>	Animated elevator doors timed with the movement of the camera. Began the rendering process first by

	exporting each of the six cameras from Source Filmmaker. Converted the exported image sequences output by Source Filmmaker to the Uncompressed AVI format using Premiere Pro CC 2018 to create an exactly square resolution.
<u>23/07/2018</u>	Continued the rendering process by importing all six AVI's into the cubemap Blender file and adjusting the start/end frames and adjusting the output resolution.
<u>24/07/2018</u>	Rendering completed and I began adding post effects using Premiere Pro CC 2018. First I added glitching effects and then created a 360 degree rain overlay done by taking a 2D template, adding it to the cubemap in Blender and exporting it.
<u>25/07/2018</u>	Completed post effects and added sound to the video.
<u>26/07/2018</u>	Perfected sound and post effects to create a seamless product
<u>27/07/2018</u>	Completed production of project. Uploaded the 360 degree animation project to YouTube.
<u>28/07/2018</u>	Worked on portfolio
<u>29/07/2018</u>	Worked on portfolio
<u>30/07/2018</u>	Worked on portfolio
<u>31/07/2018</u>	Worked on portfolio
<u>1/08/2018</u>	Worked on portfolio
<u>2/08/2018</u>	Worked on portfolio, completed 2018 Multimedia Major Project

## Bibliography

<b>Sites, Videos and Sounds Used</b>	<b>Description of purpose within project</b>
www.discordapp.com	Used to communicate in online forms where I found assistance with Source Filmmaker and Hammer
<a href="https://www.youtube.com/watch?v=dres21tAHrA">https://www.youtube.com/watch?v=dres21tAHrA</a>	Main source of information regarding the creation of 360 degree videos within Source Filmmaker and Blender
<a href="https://www.youtube.com/watch?v=jF3er5Iaeg&amp;list=PL-454Fe3dQH1L38FnKkz_O1CqYx6sKaXk">https://www.youtube.com/watch?v=jF3er5Iaeg&amp;list=PL-454Fe3dQH1L38FnKkz_O1CqYx6sKaXk</a>	Series used to learn the fundamental knowledge required to make maps within Hammer Editor
<a href="https://steamcommunity.com/">https://steamcommunity.com/</a>	Used to find general tips on using Source Filmmaker. Provided basic troubleshooting
<a href="https://www.youtube.com/watch?v=oL0cR5bZ8mY">https://www.youtube.com/watch?v=oL0cR5bZ8mY</a>	Used for learning basic of Hammer
<a href="https://www.youtube.com/watch?v=N8p6o6CTh-k">https://www.youtube.com/watch?v=N8p6o6CTh-k</a>	Hammer tutorial

<a href="https://www.youtube.com/watch?v=ICBP-7x7Chc">https://www.youtube.com/watch?v=ICBP-7x7Chc</a>	Blender tutorial for modeling
<a href="https://www.youtube.com/watch?v=RKcZuh2tUFw">https://www.youtube.com/watch?v=RKcZuh2tUFw</a>	Tutorial on exporting Blender models to Source Filmmaker
<a href="https://www.youtube.com/channel/UC-qkWBQi0MIYPGhBz3xzb5A">https://www.youtube.com/channel/UC-qkWBQi0MIYPGhBz3xzb5A</a>	YouTube channel used to find information on exporting Blender models to Source Filmmaker
<a href="https://www.youtube.com/watch?v=NYdU3q-7ilg&amp;list=PLZavzoXLqZCpMVk6HOZlEdCeBWy375tIO">https://www.youtube.com/watch?v=NYdU3q-7ilg&amp;list=PLZavzoXLqZCpMVk6HOZlEdCeBWy375tIO</a>	Series followed to export Blender models to Source Filmmaker
<a href="https://www.youtube.com/watch?v=PqcRoizrv3Q&amp;list=PL2B46DEB4157E67C4">https://www.youtube.com/watch?v=PqcRoizrv3Q&amp;list=PL2B46DEB4157E67C4</a>	Main set of tutorials used to learn the fundamental skills of Source Filmmaker
<a href="https://www.youtube.com/watch?v=NO30dk_tPd8">https://www.youtube.com/watch?v=NO30dk_tPd8</a>	Adding lighting in Source Filmmaker
<a href="https://www.youtube.com/watch?v=-W31BDQosdw">https://www.youtube.com/watch?v=-W31BDQosdw</a>	Animating walk cycles in Source Filmmaker tutorial
<a href="https://classroom.google.com/u/0/">https://classroom.google.com/u/0/</a>	Used to access information on Major Project including criteria etc.
<a href="https://www.youtube.com/watch?v=AOoqt92IEcc">https://www.youtube.com/watch?v=AOoqt92IEcc</a>	Tutorial on exporting

	Blender efficiently
<a href="https://www.youtube.com/watch?v=R0zRnFw8K6c">https://www.youtube.com/watch?v=R0zRnFw8K6c</a>	Used to export elevator doors as a prop file for animation
<a href="https://www.youtube.com/watch?v=qv6Q-5Fh4QA">https://www.youtube.com/watch?v=qv6Q-5Fh4QA</a>	Video used for inspiration
<a href="https://www.youtube.com/watch?v=jsw0dl50nxg">https://www.youtube.com/watch?v=jsw0dl50nxg</a>	Glitching sound effect
<a href="https://www.youtube.com/watch?v=kyUQOrliPfM">https://www.youtube.com/watch?v=kyUQOrliPfM</a>	Rain sound effect
<a href="https://www.youtube.com/watch?v=RjkV9USsba4">https://www.youtube.com/watch?v=RjkV9USsba4</a>	Rain overlay
<a href="https://www.youtube.com/watch?v=gTPruO5Xr4s">https://www.youtube.com/watch?v=gTPruO5Xr4s</a>	Sounds used for the chaser
<a href="https://www.youtube.com/watch?v=sYeJdBBCe34">https://www.youtube.com/watch?v=sYeJdBBCe34</a>	Whisper sound effect
<a href="https://www.youtube.com/watch?v=qOrd7KI3VfY">https://www.youtube.com/watch?v=qOrd7KI3VfY</a>	Creepy music sound effect
<a href="https://www.youtube.com/watch?v=tiS9Db2XY6w">https://www.youtube.com/watch?v=tiS9Db2XY6w</a>	Ending sound effect
<a href="https://www.youtube.com/watch?v=xyHUuhCQO70">https://www.youtube.com/watch?v=xyHUuhCQO70</a>	Tutorial used to create particle effects
<a href="https://www.youtube.com/">https://www.youtube.com/</a>	Used for feedback and uploading 360 degree video tests
<a href="https://www.youtube.com/watch?v=mdpDGjCPDxU">https://www.youtube.com/watch?v=mdpDGjCPDxU</a>	Fix for problems with Source Filmmaker
<a href="https://www.youtube.com/watch?v=YNp3M7XKo-o">https://www.youtube.com/watch?v=YNp3M7XKo-o</a>	Information I used to find out more about VR effects in Premiere Pro