University of Puerto Rico at Bayamón

Department of Computer Science

"The Hudson Report"

A 3D action adventure horror game in Unreal Engine 4

Angel Rosario

SICI 4038

Prof. Elio Lozano

May 14, 2017

Abstract

According to Kevin Anderton on a Forbes article the video game industry is one that constantly grows throughout the years giving the possibility of more jobs to be available. It also is an industry that has proven to bring a good economic impact that will keep growing throughout the years.

This thesis describes in detail my motivation on why I decided to make a game and why I chose Unreal Engine 4 as my game engine. Aside from that it explains the game description which includes the aims and objectives of the game and the influences that my game will be based on. Furthermore, the thesis also discusses the game mechanics which include the core gameplay, game flow and the elements of the game. In the core gameplay is where I present the functional requirements of the game.

In addition, the story of the game and its characters are described giving a detail explanation of the backstory of the game, the setting in which it takes place and a small description of the characters and enemies. Apart from that, I wrote the possible system requirements, minimum and recommended. It is important to note that these requirements could change at the end of development. On another note, I describe the functionalities and features of the Unreal Engine 4 and why this engine will be used to develop the proposed game. Furthermore, there is also diagrams and mockups that describe the game flow and how the user interface would look.

Lastly, the thesis explains the results of the game. It shows all the different mechanics that where implemented and a preview of each one of them. Furthermore, it describes the different objectives that were possible and the very few that were not.

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Introduction

According to Kevin Anderton's article on the Forbes website the video game industry is one that constantly grows throughout the years giving the possibility of more jobs to be available. It also is an industry that has proven to bring a good economic impact that will keep growing throughout the years. Therefore, the video game industry has shaped the economy throughout out the years is a very positive way. Furthermore the video game industry now rivals the film industry for revenue and has become more culturally important as said by Tim Harford on a BBC News article. This is why the thesis will be about the creation of a video game.

For this thesis the purpose was to develop a small action-adventure horror 3rd person shooter game named *The Hudson Report*. This game will only have one level in which the main goal will be for the player to reach a specific point. Furthermore, it won't be as simple as walking or running toward said objective. As the player proceeds through the level he will encounter several enemy AIs that will attempt to prevent him from reaching to the destination. Therefore, the only way for the level to end is if the player reaches the objective or if he gets killed by the enemy. This game is developed with the inspiration of games like the Resident Evil series and the Last of Us while using the help of the Unreal Engine Documentation and several YouTube tutorials about game development with the Unreal Engine 4.

Project Motivation

The motivation of creating a game occurred during the first years of college. The idea of combining the current knowledge about the creativity in arts, video editing and story writing with the programming skills acquired through the different classes seemed like a good way to portray all the knowledge that had been learned during the bachelor's degree of computer science. Furthermore, when taking in consideration the huge and positive economic impact that the video game industry is achieving it also seemed like a good opportunity to create a video game demo for this thesis.

Nevertheless, taking such task was not easy specially if it is the first time using Unreal Engine 4 and creating a proper game demo by only one person. However, taking a task like shows the different versatilities that a person has which is one of the best motivations to have.

Game Description

The game *The Hudson Report* is an action-adventure horror 3rd person shooter that will be developed for Windows PC taking place in a fictional city named Western Oak.

Aims and Objectives

The aim and objectives of the game are:

- Serve as a prototype and first stage of a long development process for the game.

- Have art and designs that match the post-apocalyptic setting.

- Develop a gameplay where there are horror elements mixed with action elements.

- Develop a user friendly interface that won't distract the user while playing the game.

- Develop a gameplay where the user controllers are simple and easy.

Influences

The game is influenced by several already existing 3rd person action-adventure horror games, this is to give an idea of the right look and feel of the game. Some of the games that will be influencing The Hudson Report are the Resident Evil Series and The Last of Us. These games were chosen because they all have the same overall concept of an action-adventure horror game but each with unique art styles. Therefore, it helped to establish the right type of setting for the game.

Furthermore, it helped get the right idea of how the 3rd person view works in video games and how to maintain a clean user interface that does not distract the user while playing. Overall, these games proved to be proper guidance on how to develop an action-adventure horror game with interesting story.

Game Mechanics

Core Gameplay

- The playable character moves in a 3D space.

- The player can control the character using mouse and keyboard.

- The game has 1 complete level and 1 demo level.

- The game ends when the player dies or completes the main objective.

- The player is able to aim and shoot.

- While aiming and shooting the player can also move in all directions.

- Aside from walking the player can also run.

- The game also has appropriate music playing for each level.

- The game has a simple title screen/main menu.

- Enemy AI in the game prevents the player from reaching the objective.

Game Flow

Actions that the playable character can perform:

-Move/run in all directions

-Shoot repeatedly until the ammo has been consumed

-Climb over obstacle

-Pickup items (health/ammo recovery)

Elements of the Game

- **Health bar:** A bar that represents the health of the player, which will decrease when the player takes damage and it will increase when the player grabs a health recovery item. Once the health bar is depleted the player dies.

- **Ammo Count:** A number count of how many ammo the player currently has. As the player shoots the ammo count will decrease.

- **Health recovery item:** An item whose purpose is to recover the player's health.

- **Ammo recovery item:** An item whose purpose is to recover the player's ammo.

Game Story

In the year 2019 after a small breakout of a virus called the *Sylophus Virus* hits the city Western Oak in Idaho, US, the government decides to quarantine the area and prevent anybody from entering or leaving. The story follows a guy named Caleb Bowman, a member of the task force assigned to rescue Dr. Owen Hudson after communication with him was lost. Dr. Hudson currently has the latest reports regarding the virus outbreak and possible cure. This classified and high priority report it's what is known as The Hudson Report.

Setting

The game takes place in the year 2019 in the fictional city called Western Oak which is located in Idaho, United Sates.

Characters

- **Caleb Bowman:** Main protagonist of the story. He a member of the task force assigned to rescue Dr. Owen Hudson after communication with him was lost. When the outbreak occurs several outpost were made to divide the infected from the non-infected. Everything started to fall apart in an instant since the virus was spreading fast, luckily Bowman managed to reach one of the mayor safe houses before the chaos went uncontrollable. The government decided to put the city on lockdown and prevented anybody from leaving the area. Even if there were uninfected survivors the government decided to not take the risk of the virus spreading to other parts of the country. Several days passed and eventually most outpost started to collapse due to the sheer amount of infected people. Currently Bowman roams around the city looking for supplies and staying alive with a group of survivors hoping to find clues about the whereabouts of Dr. Owen Hudson.

- **Owen Hudson:** Dr. Hudson is one of the most capable and intelligent doctor in Western Oak that once the outbreak began the on-site military forces escorted him to a safe place so he could continue developing a possible cure. The virus strain was first found by his research group but was declared to be safe. As they started to manipulate the virus it began evolving and its threat to humanity increased. Therefore, Hudson and his team began developing a cure. It is still not clear how the virus reached the population of Western Oak, but problem was that when the outbreak occurred the cure was still not completely developed so there was no way to control the epidemic. Days passed and the communication between the doctors inside Western Oak and those outside the area was cut off. Furthermore, Dr. Hudson was the one who wrote the recent report regarding the cure and the virus, which is known as the Hudson report. So far the government only has part of said report, the most recent details are still in the hand of Dr. Hudson.

Enemy

- **Sylophus Virus:** A very deadly virus found by Dr. Owen Hudson and his team. At first it was declared harmful to humans due to several test that were made, but after they started to manipulate it they saw how the virus was evolving.

Sylophus rapidly turned from a harmful virus to a very deadly and serious one. After several illegal tests with human subjects they noticed that once a person is infected by the virus it proceeds to have violent cannibalistic impulses with a loss of intelligence and necrosis. The main way this virus can spread is if body fluids from an infected person get into the body of someone who is not infected, but the way the virus infected its first victim is still unknown.

- **The infected:** The infected is any person that is infected by the Sylophus virus. Once infected they lose all consciousness of who they are as their body starts to deteriorate. Apart from that they tend to have violent cannibalistic impulses with a loss of intelligence and necrosis.

Story Level for Thesis

For this thesis the player controls the main character, Caleb Bowman, who is in a mission to find any whereabouts of Dr. Hudson inside an abandoned warehouse. This warehouse was one of the safe houses that was used when the epidemic inside the city began to go out of control. After no luck of finding any clues Bowman must now find a way to leave before nightfall, the only problem is that the place is surrounded by the infected.

Game Requirements

Minimum:

•OS: WINDOWS 7,8,8.1,10 64-BIT

•Processor: Intel Core i5-4460, 2.70GHz or AMD FX-6300 or better

•Memory: 8 GB RAM

•Graphics: NVIDIA GeForce GTX 760 or AMD Radeon R7 260x

•DirectX: Version 11

Recommended:

•OS: WINDOWS 7,8,8.1,10 64-BIT

•Processor: Intel Core i7 3770 3.4GHz or AMD or better

•Memory: 8 GB RAM

•Graphics: NVIDIA GeForce GTX 960 or AMD Radeon R9 280X or better

•DirectX: Version 11

Tools and Technologies

The game is made using a program called Unreal Engine 4. The Unreal Engine 4 is a complete suite of game development tools that works from 2D mobile games to console blockbuster and VR as stated in the official page. However, the engine can also be used to create animated films or even architecture designs. It is currently free for everybody, but the developer must pay a 5% royalty after the first $3,000 of revenue per product per quarter on games and applications made using this engine and are released commercially. However, for film projects, architecture projects and even simulation project they do not have to pay royalty. (Epic Games, n.d.)

The Unreal Engine 4 delivers many useful tools that can help speed up the development process of a game. Some of these tools are the Blueprint Visual Scripting and a complete C++ engine and editor source code. The blueprint visual scripting is a really good tool to rapidly develop prototypes or even build entire games. However, if blueprints are used to do very memory intensive tasks then the performance of such task becomes much slower compared to the same task made with C++. (Epic Games, n.d.) The use of the C++ engine and blueprints varies depending on what the developer wants to do. Aside from this, other features that the unreal editor has are physically-based rendering UI, level building, animation, visual effects, physics, networking and asset management.

Aside from the Unreal Engine 4, other applications where used for the development of the game demo.

The applications where:

Adobe After Effects CC17: For creating and editing images, special effects, movie intros, motion graphics and visual effects.

Vegas Pro 14: For editing the cinematic movies.

Audacity: For adjusting sound effects and recording the voice acting.

Cinema4D: For editing any 3D models acquired that needed some adjustments.
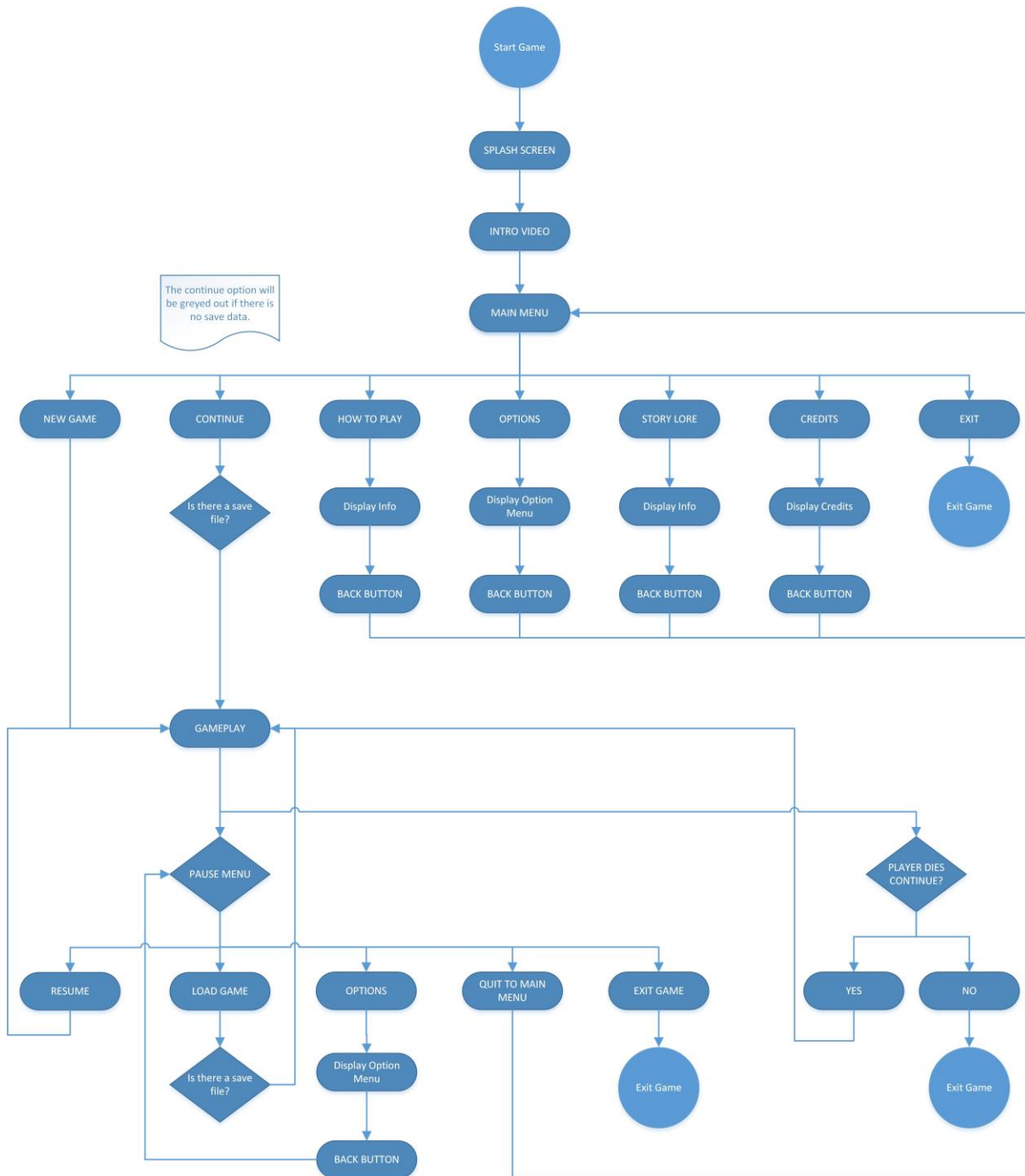
# Game Design Diagrams

Game Flowchart

Figure A: Game Flowchart

The way the user interacts with the game once it has started is very simple. As it can be seen on *Figure A* the first thing that shows up when opening the game is the splash screen. After that the game loads up showing an intro video and then we see the main menu. In the menu there are many options, but only two of them proceed to the gameplay. Those options are New Game and Continue.

If the New Game option is pressed the game will start from the first level, but if the Continue option is pressed then the game will continue were the player left off. It is important to know that there is only one save slot and if there is no saved game then the continue option will be greyed out. Once in the game the player can back out to the main menu through the pause menu or, once the player has died, by hitting the No option on the dead screen.
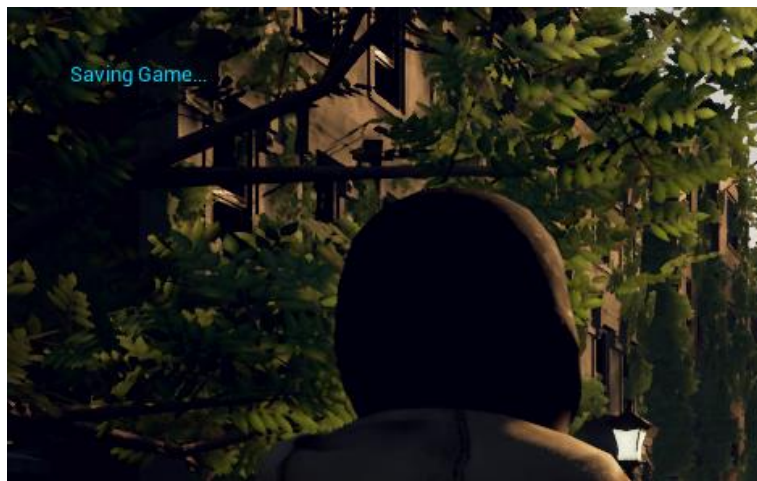
Figure 1: Notification that appear when saving the game

When saving the game it is stored in a text file with the format of .sav which is a standard format for Unreal Engine 4. When finishing a level the game checks first if there is a save file available. If there is one then he overwrites it, but if there is none then the game proceeds to create a new one. A notification appear in game when the game is saving which appears on the top left corner as seen on *Figure 1*. This was done with the help of Totally Unreal's tutorial video about Saving and Loading.

The other options in the main menu are How to Play which shows brief important information about the gameplay and the controls for it. In the Options button it shows the different graphical customizations that the player can do so that they can optimize the game enough for it to run however they want. In the Story Lore the player can read a short summary of the backstory of the game. The Credits option displays the acknowledgements of the game giving proper credit to the creators of the music and the websites where I acquired the 3D models. Finally, the Exit option is to close the game, but before that a small confirmation window will appear to make sure the player really wants to close the game.
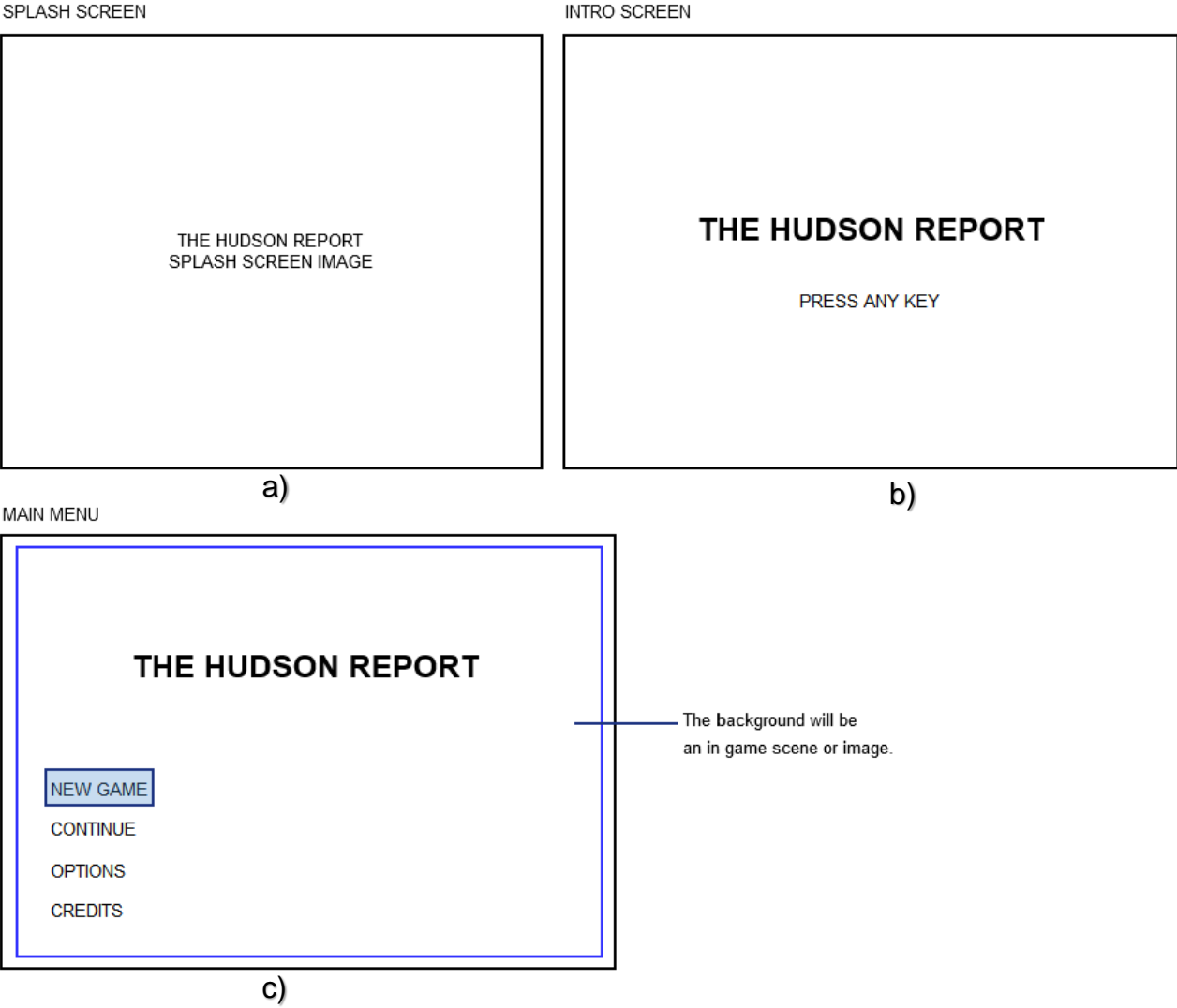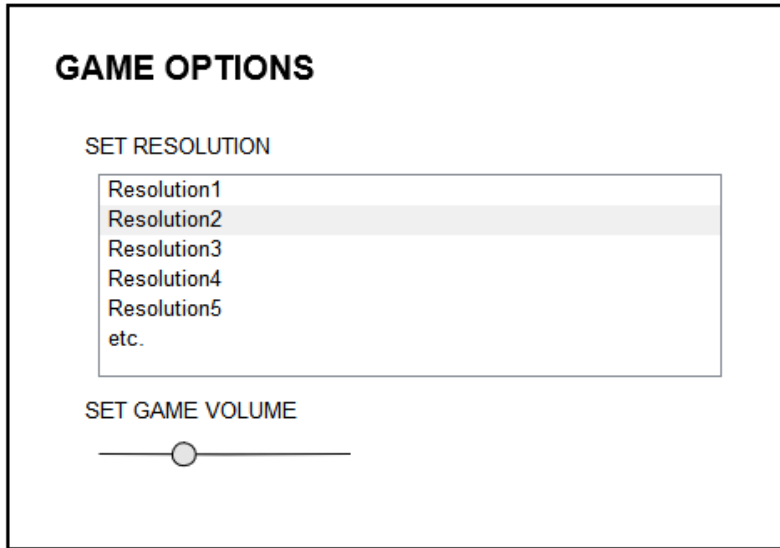
Interface Initial Draft Mockups

SPLASH SCREEN

THE HUDSON REPORT
SPLASH SCREEN IMAGE

a)

INTRO SCREEN

THE HUDSON REPORT

PRESS ANY KEY

b)

MAIN MENU

THE HUDSON REPORT

NEW GAME

CONTINUE

OPTIONS

CREDITS

The background will be
an in game scene or image.

c)

Figure 2: Draft Mockups of the **a)** Splash Screen, **b)** Intro Screen and **c)** Main Menu

OPTIONS

GAME OPTIONS

SET RESOLUTION

Resolution1
Resolution2
Resolution3
Resolution4
Resolution5
etc.

SET GAME VOLUME

a)

CREDITS

CREDITS

FULL CREDITS OF THE GAME, ASSETS
USED, VIDEO GAME ENGINE USED, ETC.
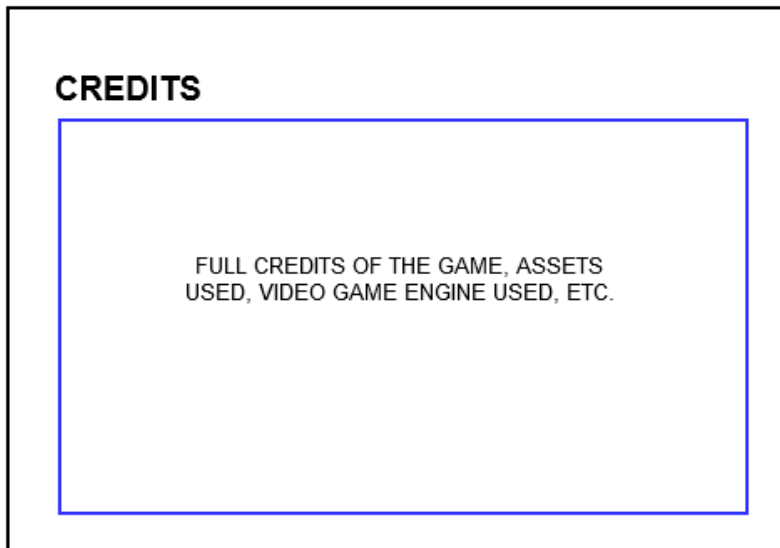
b)

Figure 3: Draft Mockups of the **a)** Game Options and **b)** Credits menu

IN GAME UI

HEALTH BAR

AMMO COUNT

7/23

a)

PAUSE MENU

GAME PAUSED

RESUME

QUIT
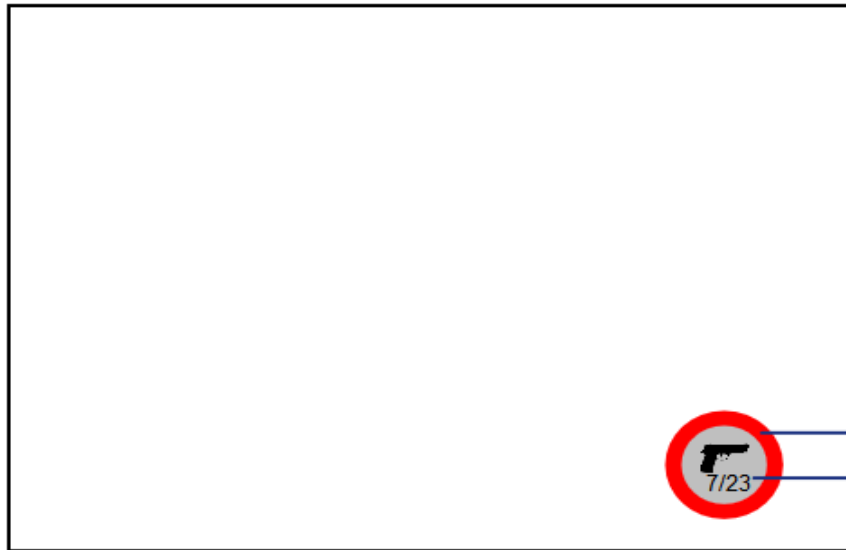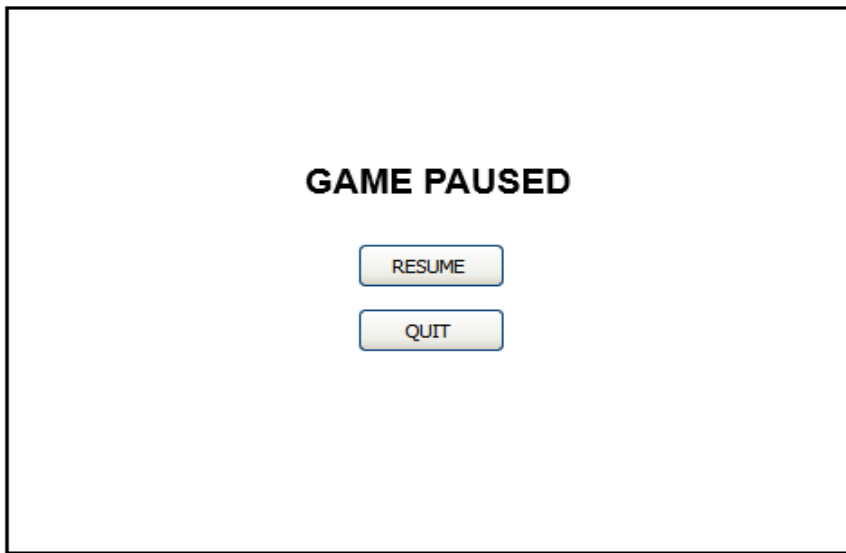
b)

Figure 4: Draft Mockups of the **a)** In Game UI and the **b)** Pause Menu
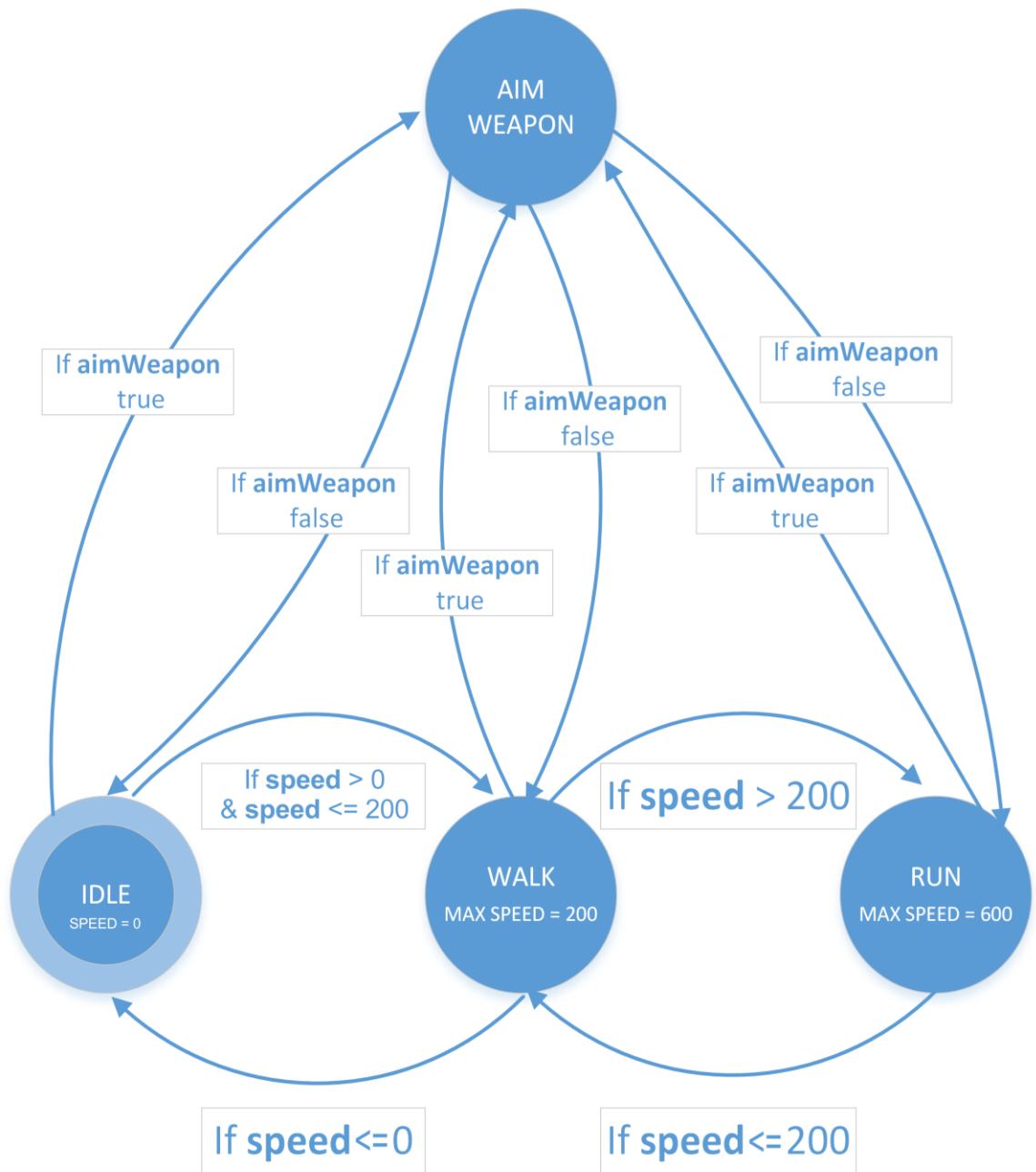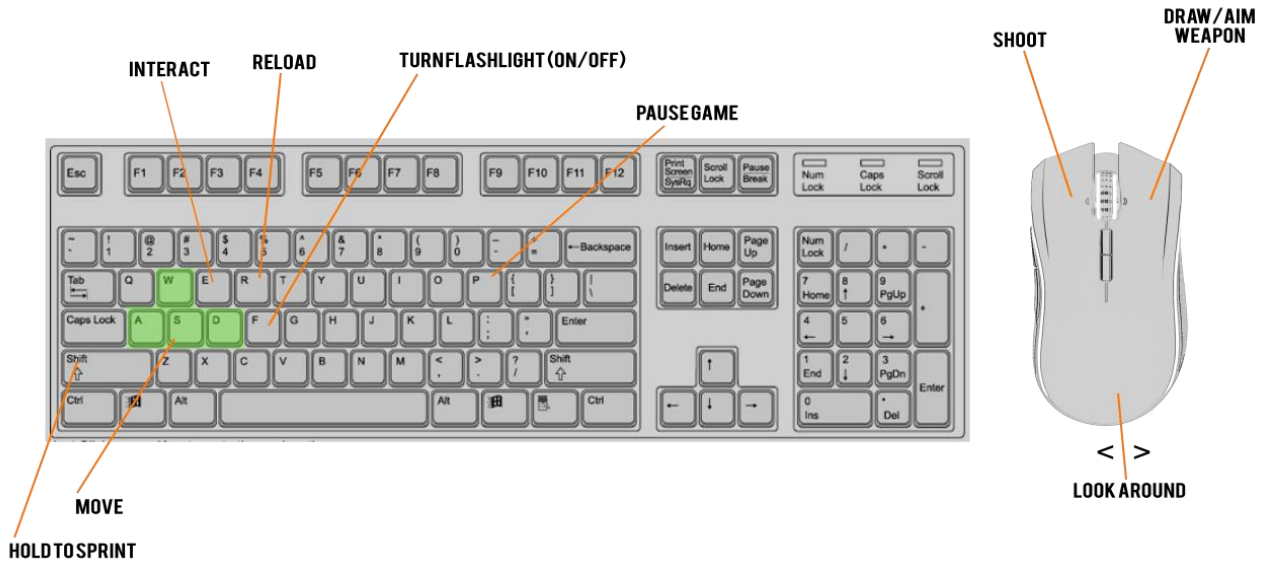
Figure 5: State Machine Diagram of the main character's behavior

In *Figure 5* shows the initial concept of the state machine diagram for the animations of the main character.

Game Controls
Keyboard & Mouse

Figure 8: View of the keyboard and mouse functions for the game.

In relation to the controls shown in *Figure 8* it is important to remember that to reload the gun or turn on/off the flashlight you must aim the gun first. The flashlight will automatically be turned off when holstering the gun. When moving hold "SHIFT" to sprint, and to interact make sure to be close to the object.

Keyboard

WASD – Move

Left Shift – Hold to sprint

E – Interact

R – Reload (Only While Aiming)

F – Turn Flashlight (On/Off) (Only While Aiming)

Mouse

Left Click – Shoot

Right Click – Draw/Aim Weapon

Mouse Movement – Look Around
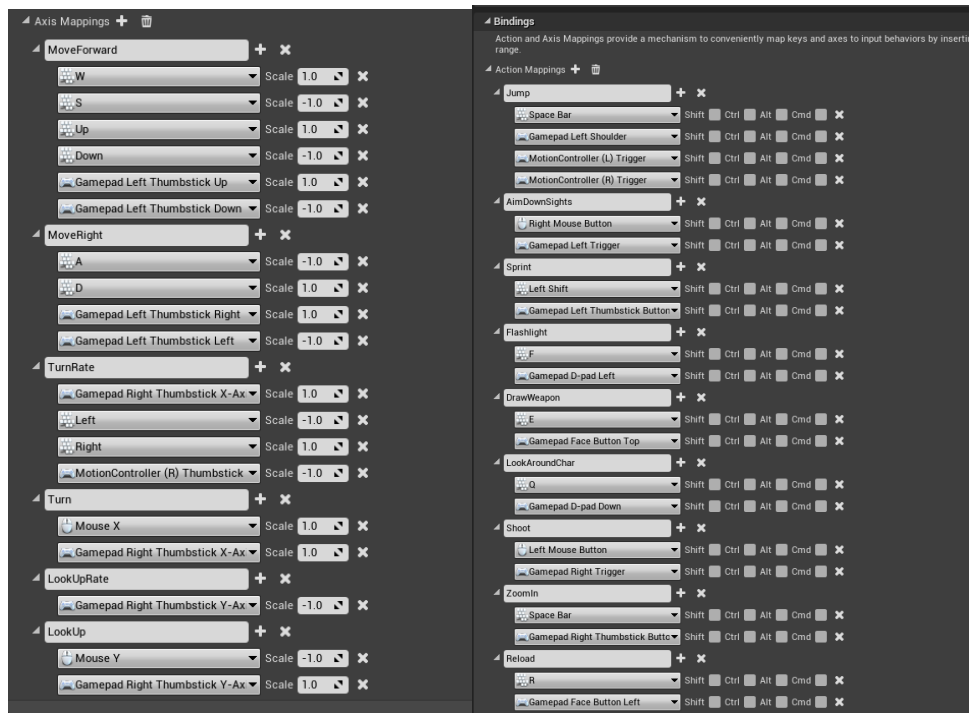
Figure 9: View of the bindings that we can do inside the project settings of Unreal Engine 4.

The Hudson Report takes advantage of the Unreal Engine 4's ability to set Action Mapping and Axis Mapping buttons, like show in *Figure 9* so that we can set the functionalities of each button for keyboard/mouse and controller in a way that we will call later on our program to reference the node that will then connect the functionality to both the keyboard or mouse, and controller.
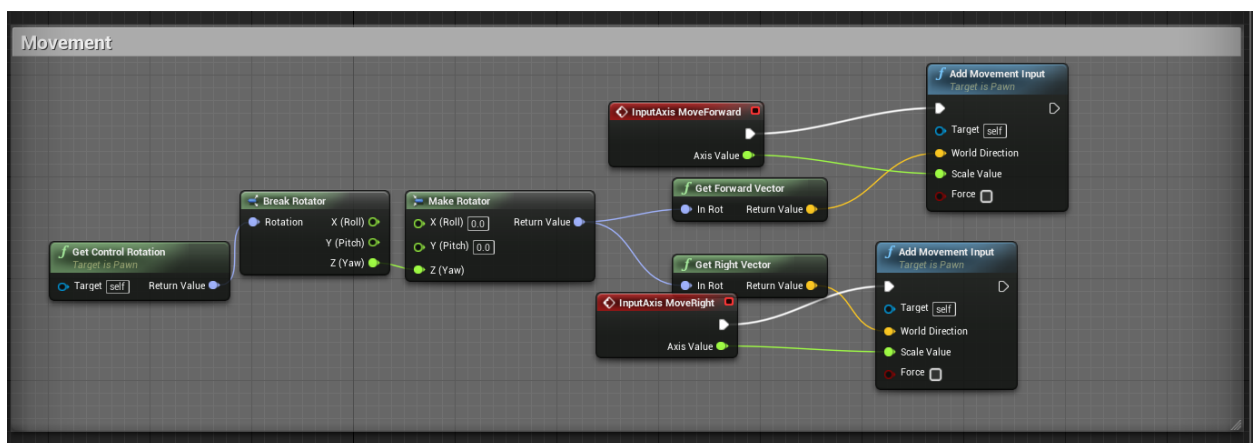
Figure 10: The implementation of the Unreal Engine 4 bindings using blueprint programming

This is a way to set the movement inputs for when the InputAction *MoveFoward*(WSAD keys) of the Axis Mapping settings are being pressed.

Character Functionality
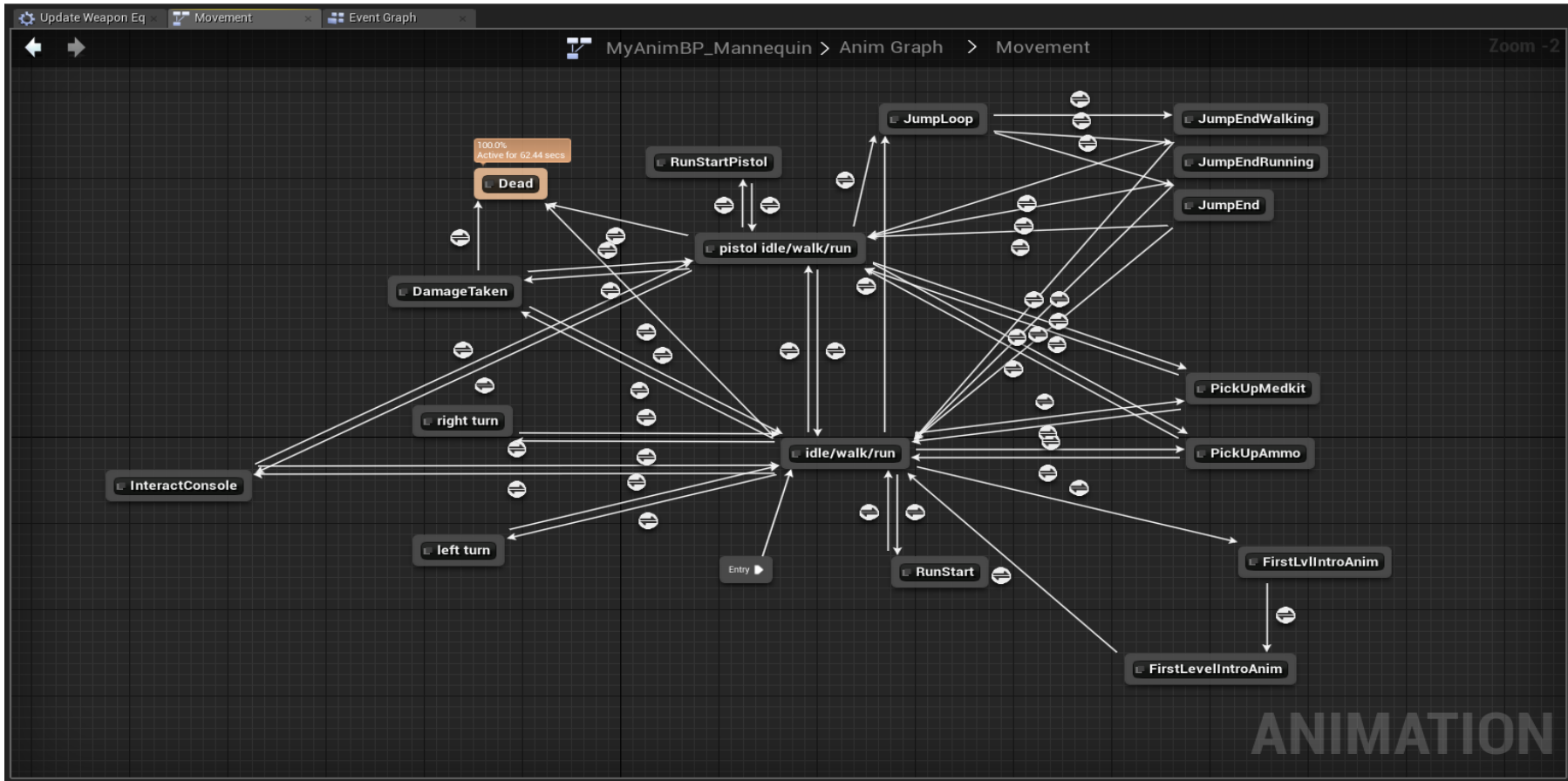
Figure 11: State Machine Diagram of the main character

Figure 12: Complete animation diagram of main character

In the game the user can move the character in a 3D space using the WASD keyboard functions. They player is be able to aim and shoot and whenever the weapon runs out of ammo you can use the reload input to replenish it. The character can move or run while having the weapon equipped or when the weapon is holstered. Aside from that you are able to use a flashlight, using the flashlight input, only when aiming your gun. To climb over an obstacle just move towards a climbable obstacle and the character will automatically climb over it. On *Figure 12* is shown the complete animation diagram of the main character that was done using blueprint programming
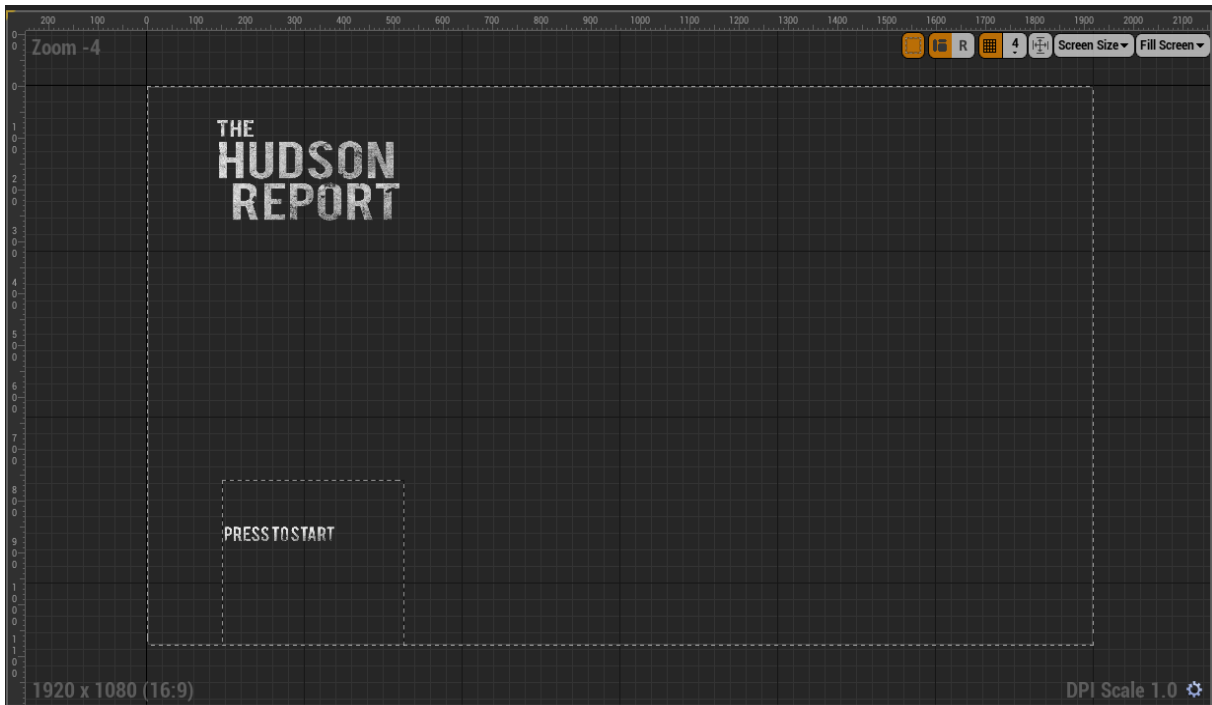
Main Menu

Figure 13: The main menu for The Hudson Report

The main menu for The Hudson Report shows Caleb Bowman in the background inside the safe house and gives the player different options that appear in a row on the left side of the screen as shown in *Figure 13*.

These options are:

- **New Game:** Starts the game from the first level.
- **Continue:** Starts the game from the last saved level.
- **How to Play:** Shows a small and simple guide on how to play the game.
- **Options:** Gives the player the option to customize the resolution and graphics quality of the game.
- **Story Lore:** Presents the events, in text form, which happened before the game's main storyline.
- **Credits:** Shows the main credits of the game.
- **Exit:** Closes the game.
- **Back:** Returns to the title screen.

Figure 14: Designer view of the GUI in Unreal Engine 4

In the designer view is where you graphically create the GUI of the main menu, in game UI and many other useful things. Aside from that, there is a graph section in which you use blueprint programming to create the functionalities of your GUI. The useful thing about designing the different GUIs of the game is that everything is just drag and drop into the design area and then adjust the settings that would appear on the right side for each item.

The main menu level was created with the help of several YouTube tutorials. The GUI of the main menu and its functionalities were created based on the tutorial from HorusHeretic. With the tutorial of Mathew Wadstein the camera fade in at the beginning was made. Nevertheless, the real time background for the main menu was created following the tutorial from Resurrection21.
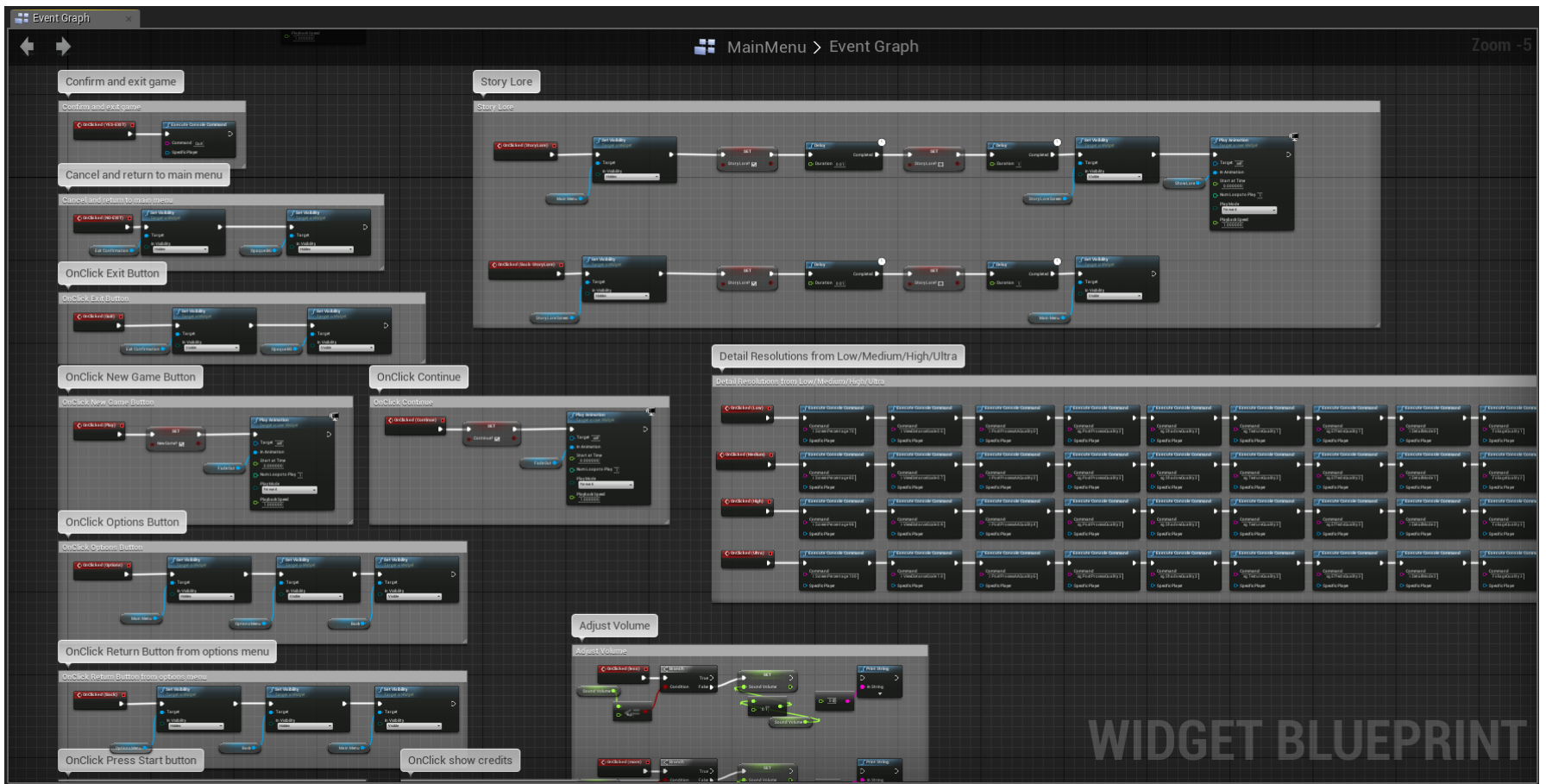
Figure 15: Event graph view of the GUI in Unreal Engine 4 (Not all of it)

Figure 15 is a preview of part of the event diagram that is used to give the functionality to the main menu.

Elements of the Game
In Game Screen

Figure 16: In game footage of The Hudson Report

The in-game GUI is simple and gives all the necessary information to the player while playing the game. On *Figure 16* in the bottom right corner is the health bar (1), the image of the gun (2) that the player is currently using and the ammo count for ammo in magazine (3) and ammo reserved (4). On the top right is the current objective (5) that the player must complete in order to finish the level. Furthermore, in the center of the screen is the crosshair (6) which is useful for the player to aim the weapon correctly.

The health bar of the player can be refilled by picking up a health pack. The ammo count for the ammo in magazine will update whenever the player reloads. For the gun on *Figure 16* the magazine size is 15 so whenever the player reloads it will update the number to 15 if there is enough ammo reserved. If there is not enough ammo reserved then the ammo in magazine will update with the remaining ammo left. As for the ammo reserved it will update whenever the player picks up ammo.

Figure 17: Message that appear when the weapon magazine is out of ammo

The message shown on *Figure 17* will appear whenever the magazine of the weapon is empty letting the player know that he has to reload.

Figure 18: Interaction notification

The interaction notification as show on *Figure 18* appears on screen whenever the player gets near an object he can interact with. Some objects may have their own individual input button so their message might appear in game and not in the GUI.

The Main Character

Caleb Bowman

Figure 19: Caleb Bowman

As mentioned before Caleb Bowman, as shown on *Figure 19*, is the main protagonist of the story. He a member of the task force assigned to rescue Dr. Owen Hudson after communication with him was lost. Currently Bowman roams around the city looking for supplies and staying alive with a group of survivors hoping to find clues about the whereabouts of Dr. Owen Hudson.

His 3D model was bought from the Unreal Engine Marketplace. His military style clothing and colors represent the uniform of the task force assigned to rescue Dr. Hudson. Other soldiers from the task force tend to have ballistic helmets or even body armor, Bowman just chooses not to wear them since they are uncomfortable. He currently is the only character seen in the game demo aside from the infected.

The development for the character's functionality was a very complex one. It took several YouTube tutorials guides to develop the custom functionality of this character. For the creation of blend spaces for the character the tutorials from the Unreal Engine Youtube Channel and the channel of PyroDev were ideal. With the help of Jonas Mølgaar's tutorial the character is able to holster his weapon with an animation. The aiming functionality for the character was done using the tutorial of Kyle Dail as a guide. As for the Ben Ormstad tutorial, it helped to create the ability for the character to sprint.

Showcased Level
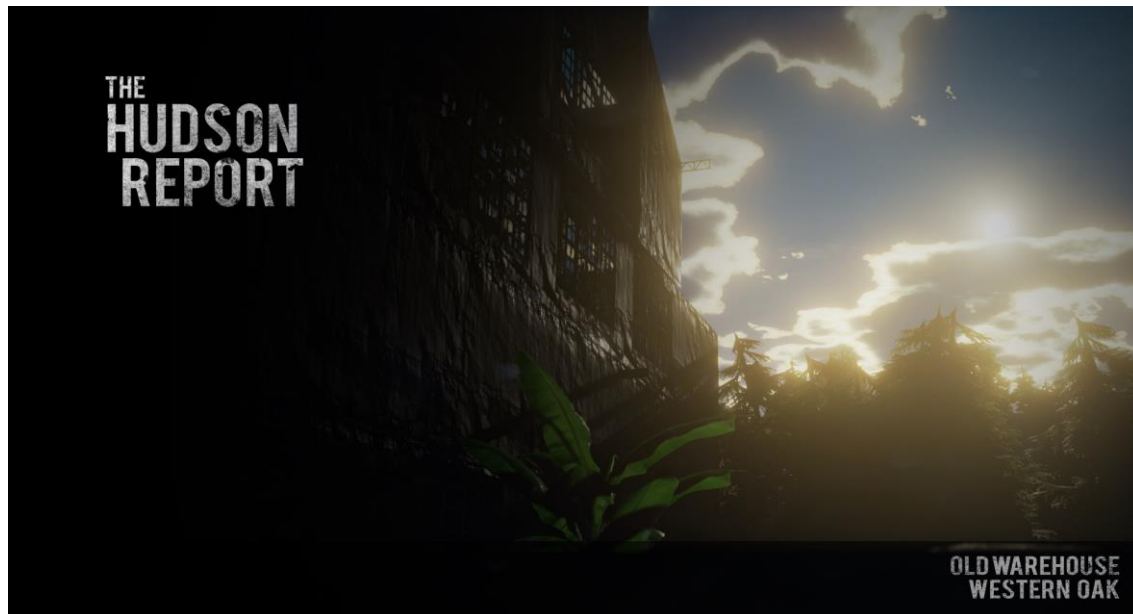
Figure 20: Loading screen for the first level

The first level of the story takes place in an old warehouse located in the outskirts of the city Western Oak. This warehouse was one of the safe houses that was used when the epidemic inside the city began to go out of control. The level starts after the first cut scene where the protagonist is running from a horde of infected people. After a loading screen like the one showed in *Figure 20* the player begins to take control of the character inside a control room where there are two dead bodies with some ammo boxes around and a health kit. At the beginning of the level the player only has 5 bullets left in his magazine and his health is not 100%. Therefore it is recommended that the player must pick up the first two ammo boxes seen and the health kit before leaving the room. As the player moves through the warehouse to find an exit he must eliminate all the infected that he encounters. Eventually the player will reach a specific console that opens the gate to leave the warehouse.

Nevertheless, after opening the gate 3 special infected spawn in the area near the player. To complete the level it is not necessary to kill each one of them, but eliminating them will secure a safe path for the player to move through. Furthermore, all of the 3D assets that were used to build the level were bought through the Unreal Engine Marketplace. Furthermore, the game uses level streaming for the transition between each level and cutscene.

Weapon

Figure 21: Weapon used in the demo

For the game demo of The Hudson Report only one gun was created for the player to use. The 3D gun is an M9 Beretta with a flashlight mount as seen in *Figure 21*. The 3D model without the flashlight and the flashlight alone was acquired from Free3D.com. To mount the flashlight into the gun a program called Cinema4D was used. In the game the gun can hold a maximum of 15 bullets inside the magazine and the flashlight is fully functional with the ability for the player to turn it on and off while aiming. The functionalities for the weapon were based on the tutorial about projectile shooting from PyroDev.

Figure 22: View of the flashlight in game.

The Enemy

Figure 23: The Infected

The Infected as shown on *Figure 19* are the main enemies of the game. They are dangerous when grouped but can easily be killed. Most of the infected are slow, but there are still a few that can run. There is no way to identify which zombie is a runner or a walker so being careful is important. Nevertheless, there are also some special infected that once encountered a though fight will happen.

Furthermore, in this demo of The Hudson Report the AI of the infected is still a work in progress because currently the AI will move towards the player if he sees him and will attack the player whenever is near, but the AI does not interact with sound so the infected are not attracted by the gunshots or footsteps of the player.

However, the infected have their own idle, detected and attacking sounds to immerse the player in the danger that is around him. The 3D models for the infected and their animations where acquired from Mixamo.com. The functionalities for the Infected AI were based on the Zombie AI tutorial from Sam Jones.

In Game Items

Figure 24: Ammo & Health Pack

The game items that can be found in each levels are Ammo Boxes and Health Packs as shown on *Figure 20*. Each item gives the player either more ammo or health.

- **Ammo Box:** The ammo boxes each contain an amount of 10 bullets. Picking one up will increase the ammo reserved by 10 more bullets.
- **Health Pack:** The health pack will give the player up to 30% of his health back.

The infected do not drop health pack or ammo, they can only be found around the map. These items will have a green triangle above them so the player can easily identify them.

The ammo box and health pack were both acquired from Free3D.com. The identifiers above them were created inside the game engine so the items can noticed easier.

In Game Interaction

Figure 25: Example of an interactive object

The player can interact with different objects around the level, but the object must have a green triangle above them. The green triangle is the same one that appears on the ammo boxes and health packs. Once the player is close the interaction option will appear letting the player know he can interact with the object. The object shown in *Figure 21* is an example of an object the player can interact with.

Music and Sound Effects

The music used for the game was acquired from Machinima Sound, Purple-Planet and Video Copilot. During the main menu there is a 2D sound playing in the background which is the main menu music, but on the first level and the dummy second level each have their own ambient music. Furthermore, in the first level after the player opens the gate to leave the area the ambient music switches to a more dramatic and intense music since the special infected had spawned.

The sound effects used for the game were acquired from a library of sounds that is a collection of different sound effects that had been gathered throughout the years of video editing. Nevertheless, some of them were customized using Audacity.

Installation

For the installation of The Hudson Report first run the THRsetup.exe to begin. Once the THRsetup is running a confirmation from windows might appear, if so press yes and after that the setup wizard for the game will start. Then press next and read carefully the license agreement for the end user. After reading the license agreement click "I accept the agreement" and then press next. On the next screen there is an option to choose where to install the game. Press browse if the default location is not desired and wish to change it, and then press next. The next screen that will appear is to select the folder for the Start Menu. Same thing as the last screen, it can be the default folder or any other folder from the Start Menu, after that press next.

An option will appear on the next screen to choose if a desktop icon should be created or not. After choosing an option press next. Furthermore, the next screen will present a summary of the selected options for the installation. If anything needs to be changed then press back to return to the previous screens, if everything is ok press Install. Once installing the setup will begin to extract the game files. It will take a few minutes, but once installed a desktop shortcut will appear, if the option was chosen, and the game files will be on the previous selected folder.
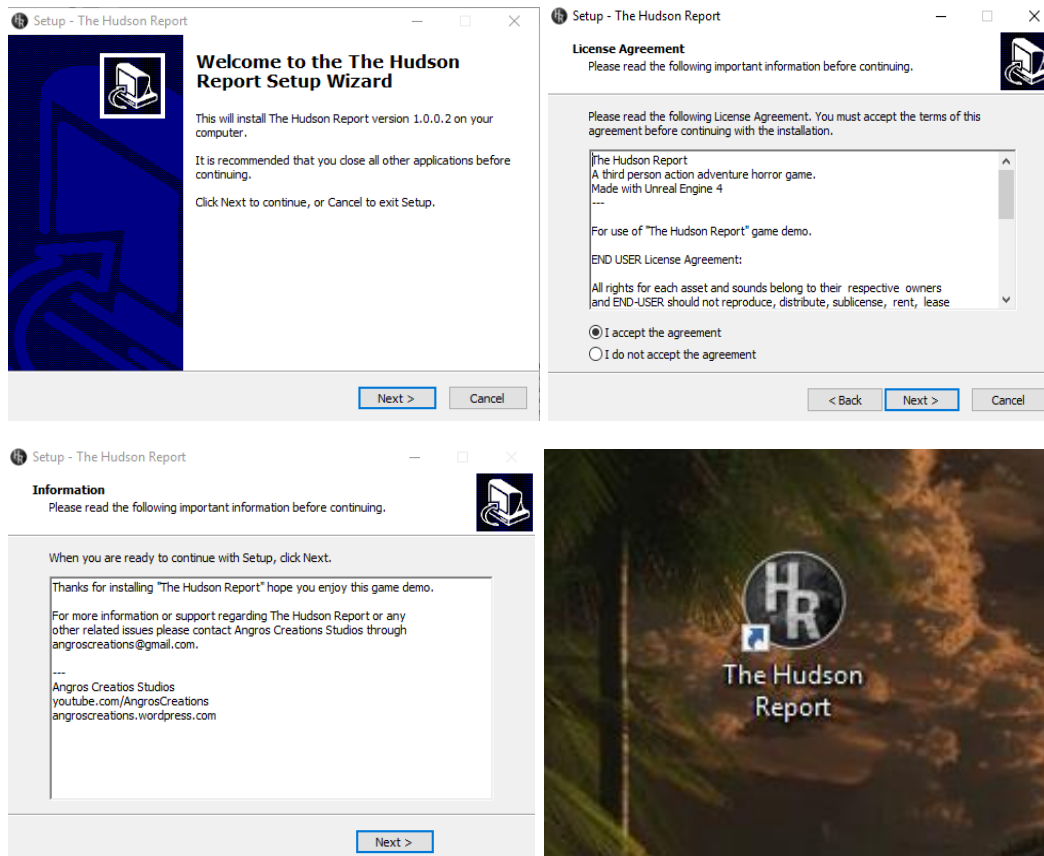
Figure 26: Images for the installation of the game

Future Work

There are many things that still need to be done before the game is considered complete. Some of those things are:

- Create more characters for the story.

- Finish writing the story.

- Develop more levels and enemies.

- Fix any bugs that might still occur.

- Improve the animations to be smoother looking.

- Add more weapons

Conclusion

The development of a game is a long and difficult process that takes a lot of patience. This demo for The Hudson Report took around 5 months to develop and almost all of the things that were established in the proposal where achieved. The only thing that was left out was a proper gamepad support for the game. Controllers work, but are not fully optimized. Aside from that, the main functionality of the game was achieved and has now passed the first stage of development. Furthermore, the game still needs more work for it to be completed, but it is now concept made into fully functional game demo.

Acknowledgments

For the development of the game its main focus was on the technical part therefore is used websites like Machinima Sound, Purple Planet and Video Copilot to find suitable music for my game. As for the 3D models used in the game they were acquired from the Unreal Engine Marketplace, Mixamo and Free3D.

Music by:

- Machinimasound.com
- Purple-planet.com
- Videocopilot.net

3D model assets & animations from:

- Unreal Engine Marketplace
- Mixamo.com
- Free3D.com

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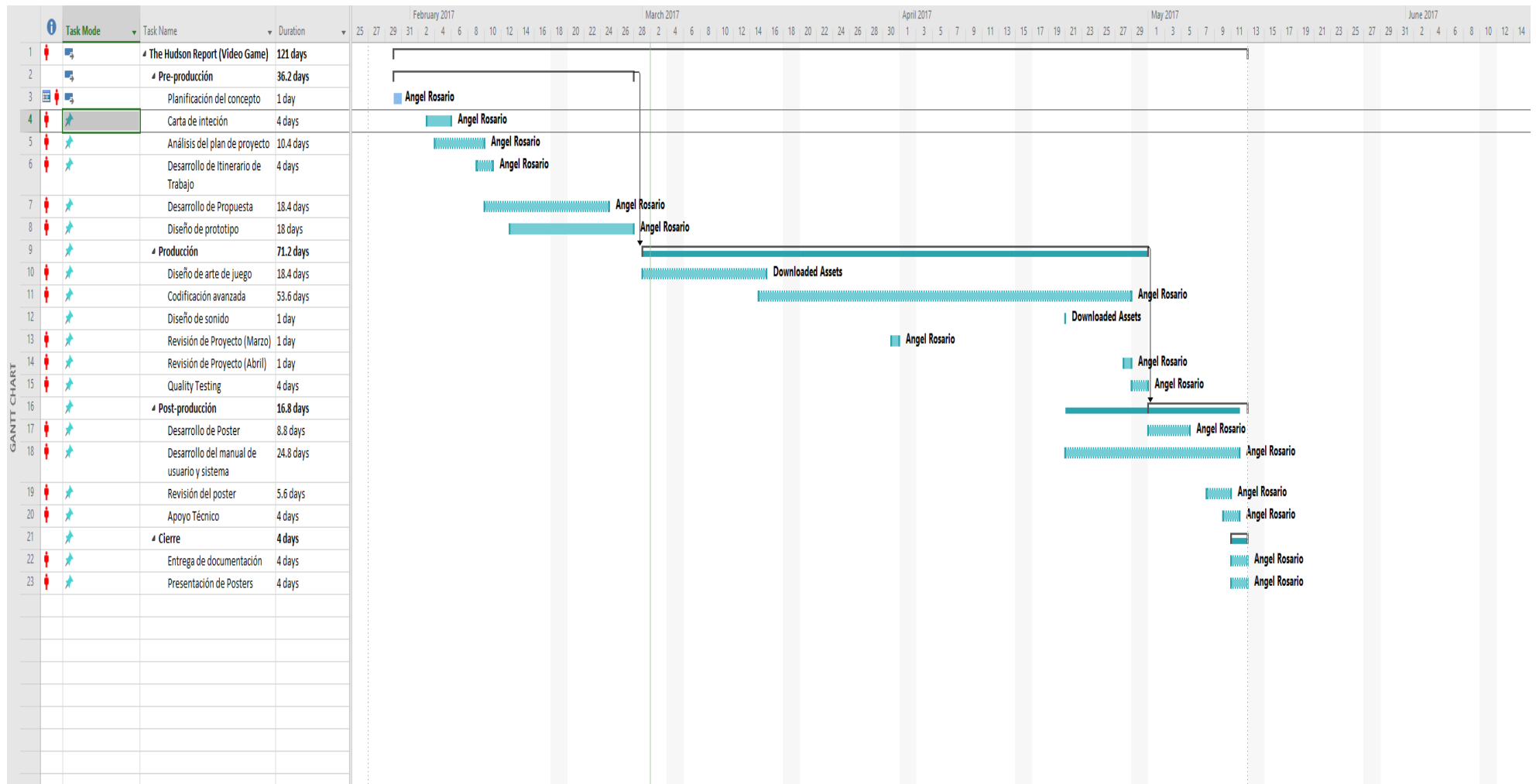
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Appendix

	ⓘ	Task Mode	Task Name	Duration	Start	Finish	Predecessor	Resource Names
1			◢ **The Hudson Report (Video Game)**	**121 days**	**Mon 1/30/17**	**Fri 5/12/17**		**Angel Rosario**
2			◢ **Pre-producción**	**36.2 days**	**Mon 1/30/17**	**Tue 2/28/17**		
3			Planificación del concepto	1 day	Mon 1/30/17	Mon 1/30/17		Angel Rosario
4			Carta de inteción	4 days	Fri 2/3/17	Mon 2/6/17		Angel Rosario
5			Análisis del plan de proyecto	10.4 days	Sat 2/4/17	Thu 2/9/17		Angel Rosario
6			Desarrollo de Itinerario de Trabajo	4 days	Thu 2/9/17	Fri 2/10/17		Angel Rosario
7			Desarrollo de Propuesta	18.4 days	Fri 2/10/17	Fri 2/24/17		Angel Rosario
8			Diseño de prototipo	18 days	Mon 2/13/17	Tue 2/28/17		Angel Rosario
9			◢ **Producción**	**71.2 days**	**Wed 3/1/17**	**Sun 4/30/17**	2	
10			Diseño de arte de juego	18.4 days	Wed 3/1/17	Wed 3/15/17		Downloaded Assets
11			Codificación avanzada	53.6 days	Wed 3/15/17	Fri 4/28/17		Angel Rosario
12			Diseño de sonido	1 day	Fri 4/21/17	Fri 4/21/17		Downloaded Assets
13			Revisión de Proyecto (Marzo)	1 day	Fri 3/31/17	Fri 3/31/17		Angel Rosario
14			Revisión de Proyecto (Abril)	1 day	Fri 4/28/17	Fri 4/28/17		Angel Rosario
15			Quality Testing	4 days	Sat 4/29/17	Sun 4/30/17		Angel Rosario
16			◢ **Post-producción**	**16.8 days**	**Mon 5/1/17**	**Fri 5/12/17**	9	
17			Desarrollo de Poster	8.8 days	Mon 5/1/17	Fri 5/5/17		Angel Rosario
18			Desarrollo del manual de usuario y sistema	24.8 days	Fri 4/21/17	Thu 5/11/17		Angel Rosario
19			Revisión del poster	5.6 days	Mon 5/8/17	Wed 5/10/17		Angel Rosario
20			Apoyo Técnico	4 days	Wed 5/10/17	Thu 5/11/17		Angel Rosario
21			◢ **Cierre**	**4 days**	**Thu 5/11/17**	**Fri 5/12/17**		
22			Entrega de documentación	4 days	Thu 5/11/17	Fri 5/12/17		Angel Rosario
23			Presentación de Posters	4 days	Thu 5/11/17	Fri 5/12/17		Angel Rosario

Appendix 1: Time frame and work schedule

#	Task Mode	Task Name	Duration
1		The Hudson Report (Video Game)	121 days
2		Pre-producción	36.2 days
3		Planificación del concepto	1 day
4		Carta de inteción	4 days
5		Análisis del plan de proyecto	10.4 days
6		Desarrollo de Itinerario de Trabajo	4 days
7		Desarrollo de Propuesta	18.4 days
8		Diseño de prototipo	18 days
9		Producción	71.2 days
10		Diseño de arte de juego	18.4 days
11		Codificación avanzada	53.6 days
12		Diseño de sonido	1 day
13		Revisión de Proyecto (Marzo)	1 day
14		Revisión de Proyecto (Abril)	1 day
15		Quality Testing	4 days
16		Post-producción	16.8 days
17		Desarrollo de Poster	8.8 days
18		Desarrollo del manual de usuario y sistema	24.8 days
19		Revisión del poster	5.6 days
20		Apoyo Técnico	4 days
21		Cierre	4 days
22		Entrega de documentación	4 days
23		Presentación de Posters	4 days

Appendix 2: Grantt Chart of the time frame & work schedule
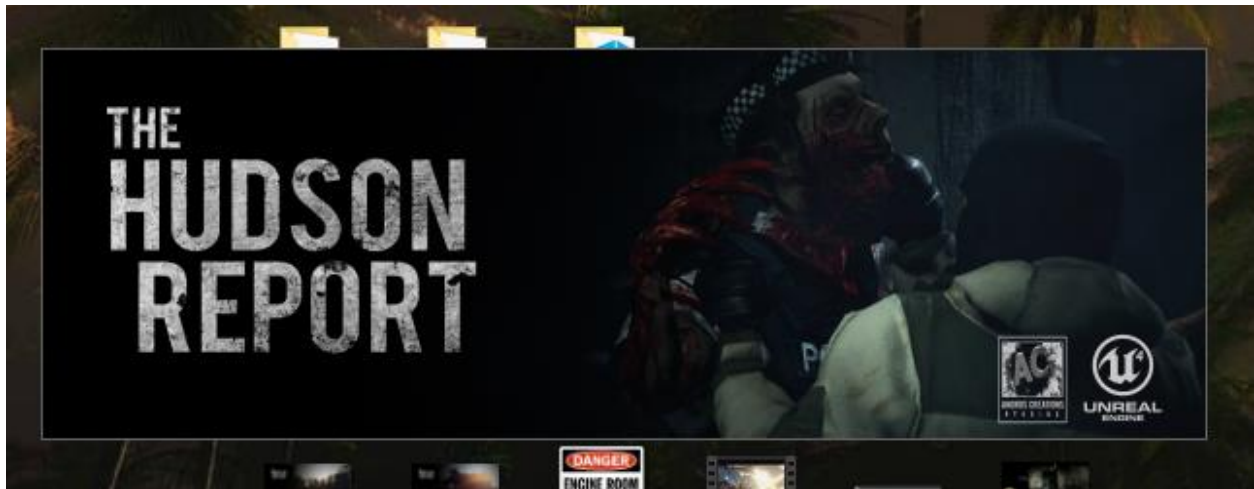
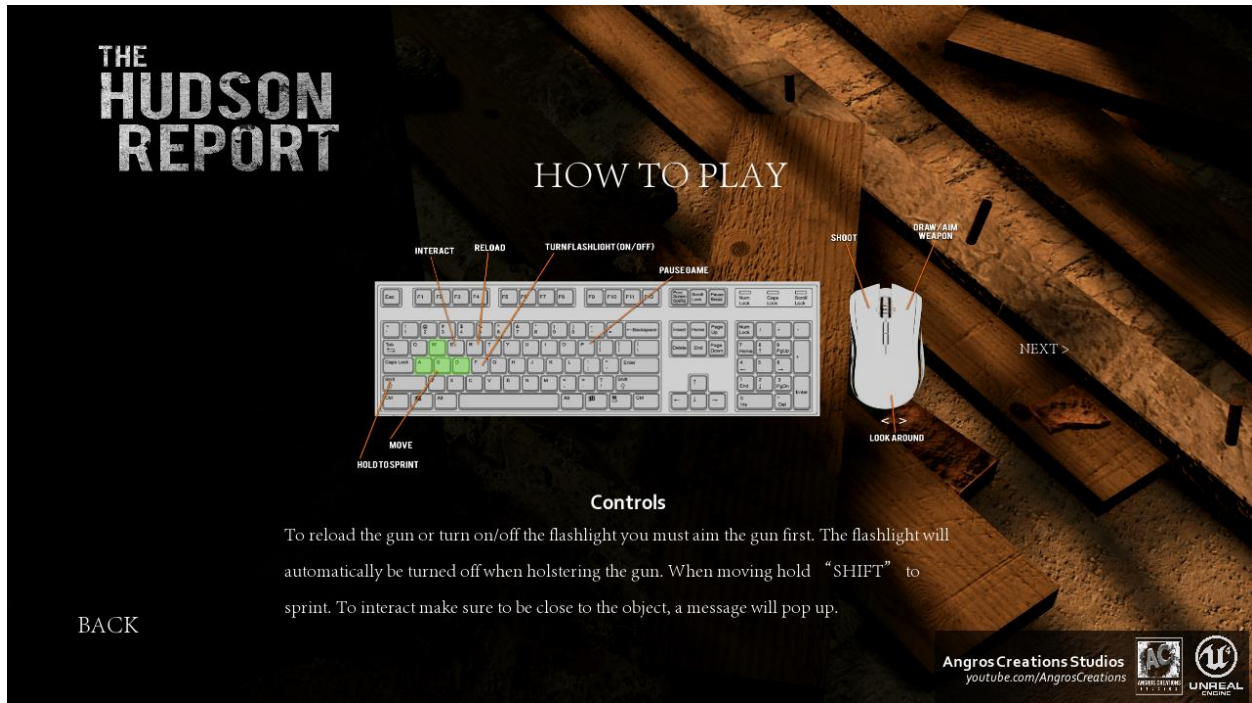**Appendix 3:** Splash Screen for the game
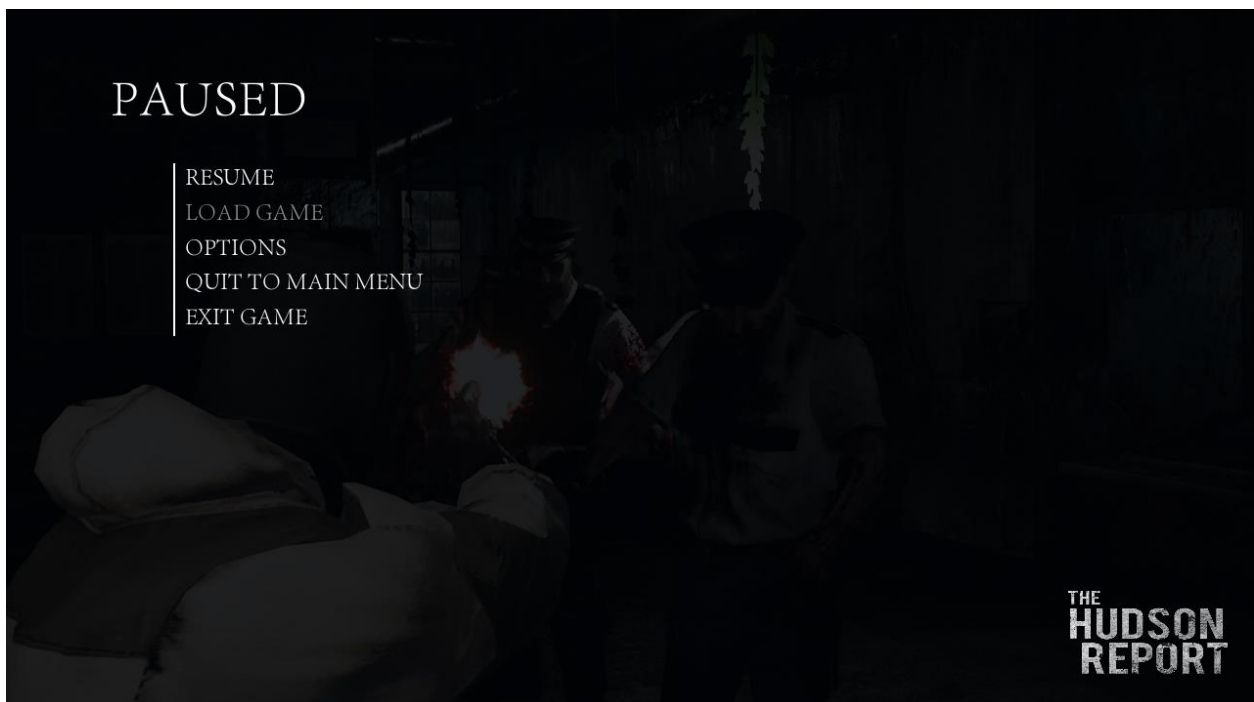
Appendix 4: Pause Menu for the game
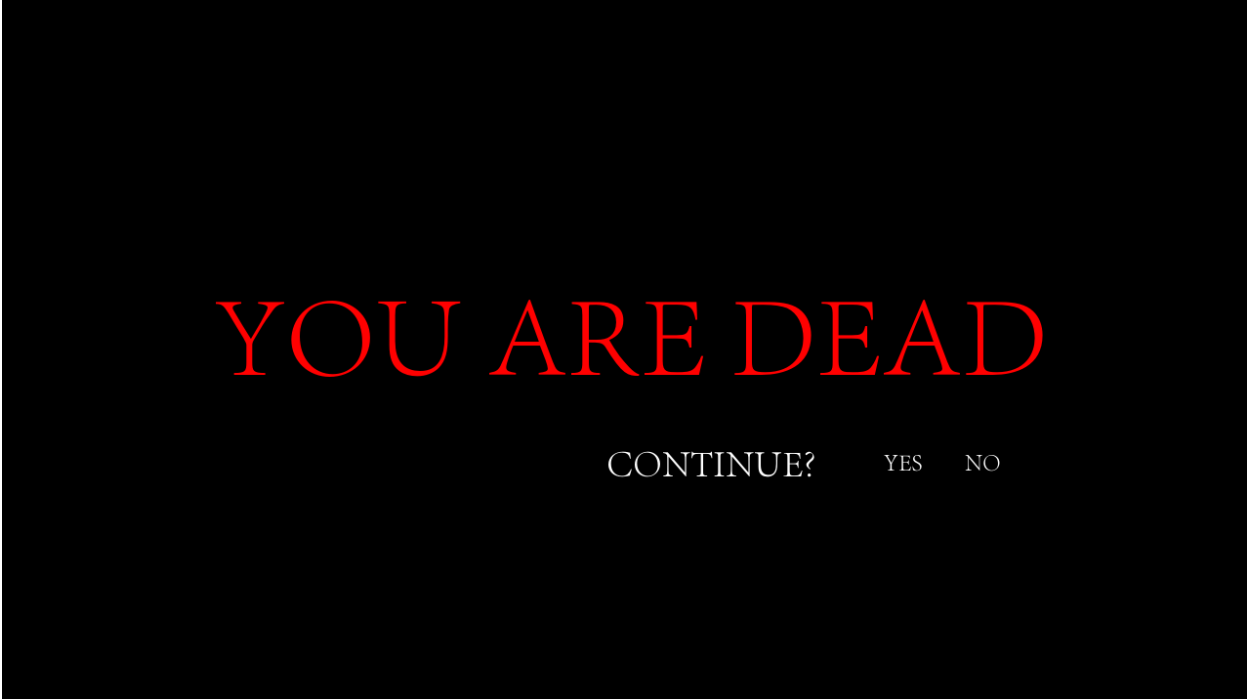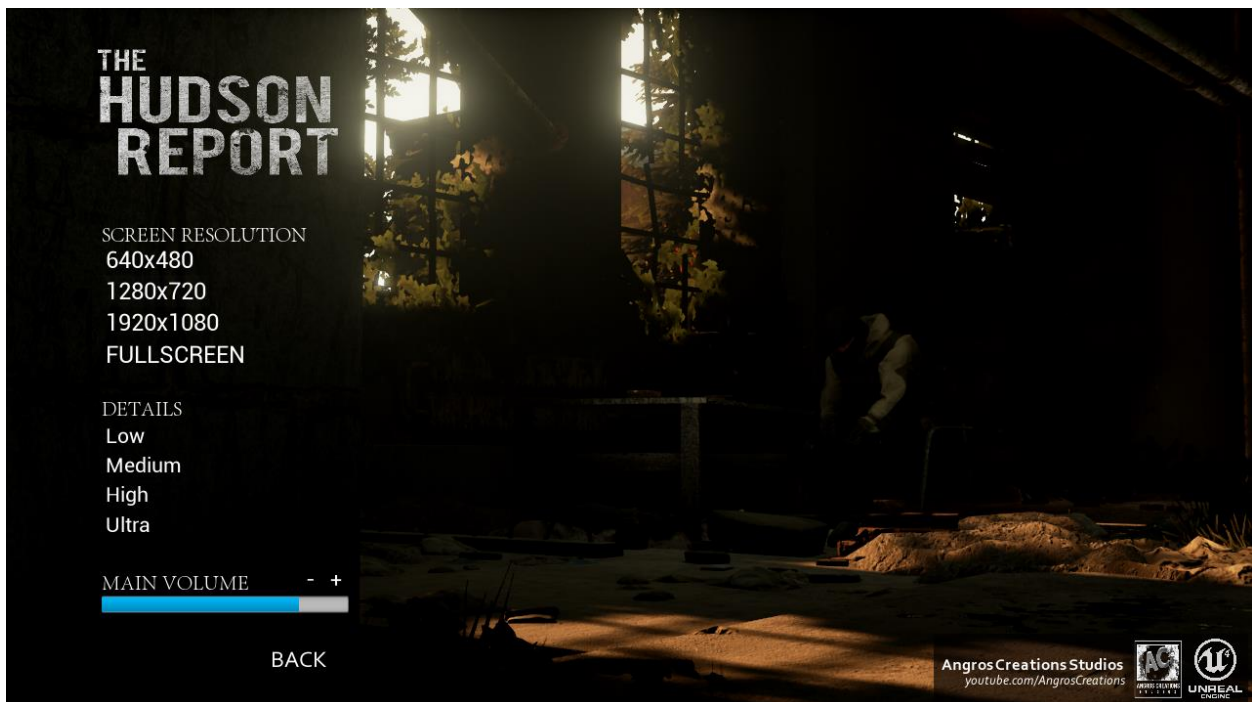
Appendix 5: Death Screen for the game

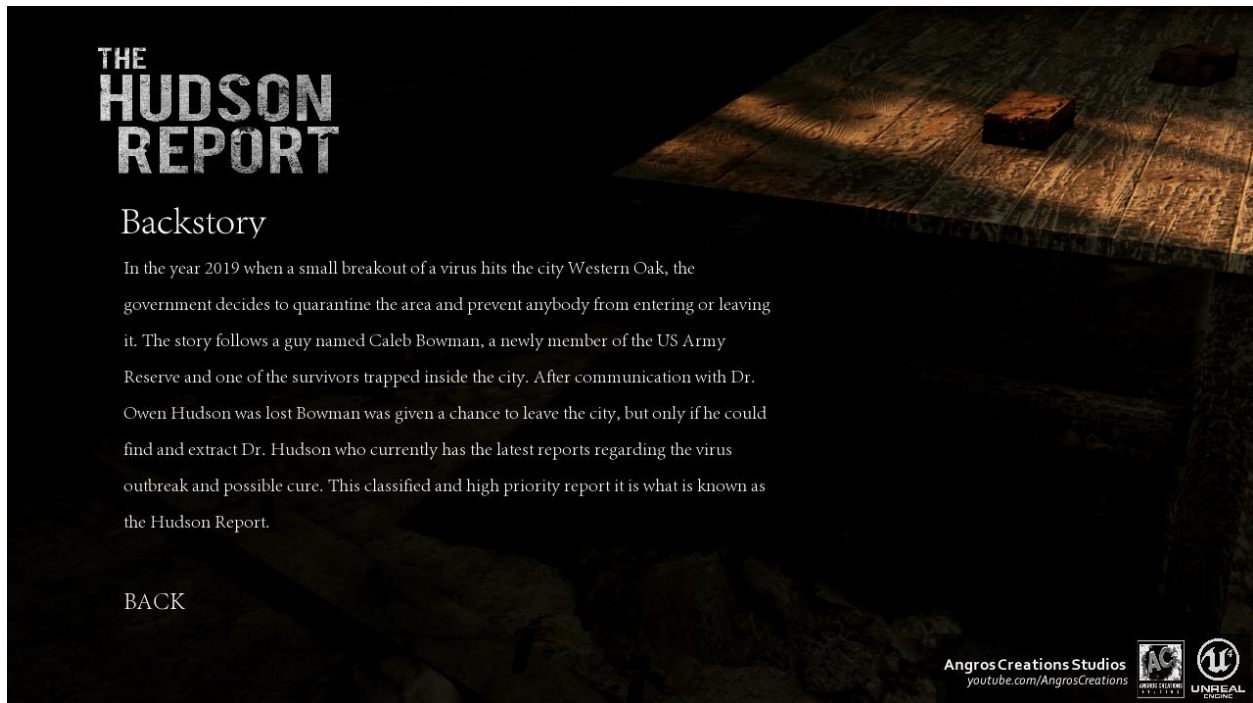

Appendix 6: Title Screen for the game

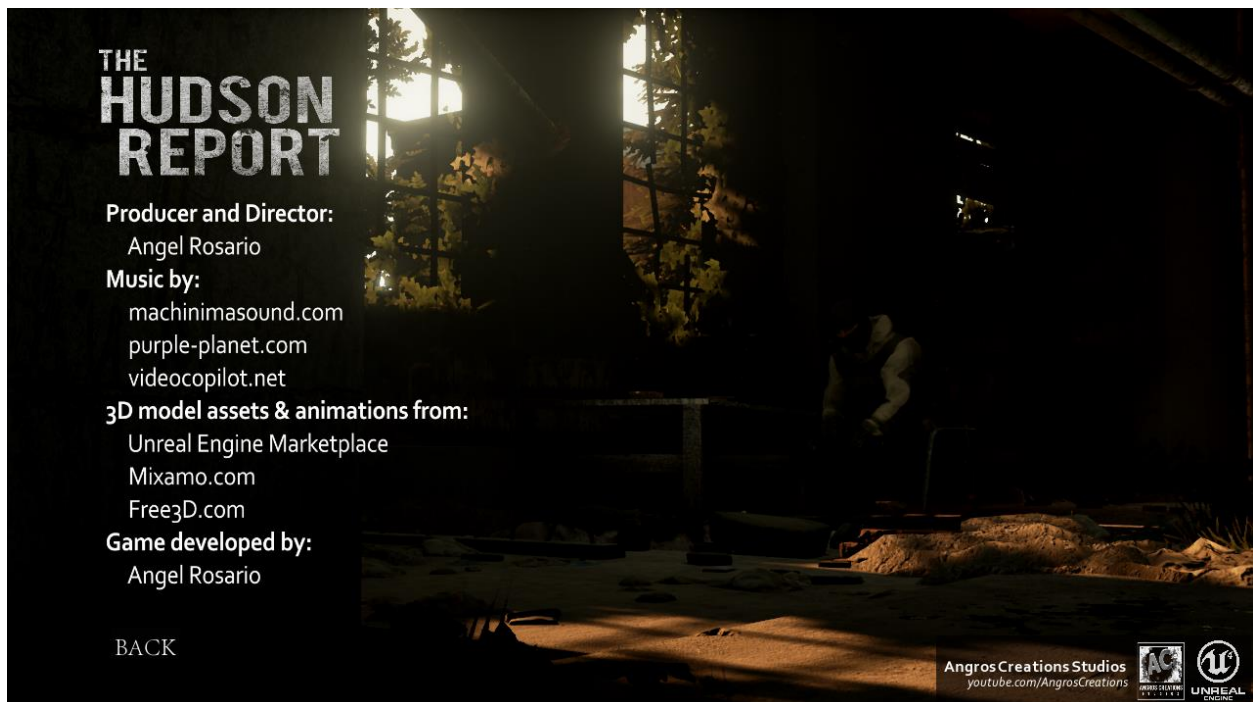**Appendix 7:** How To Play Screen for the game

Appendix 8: Option Screen for the game

Appendix 9: Story Lore Screen for the game
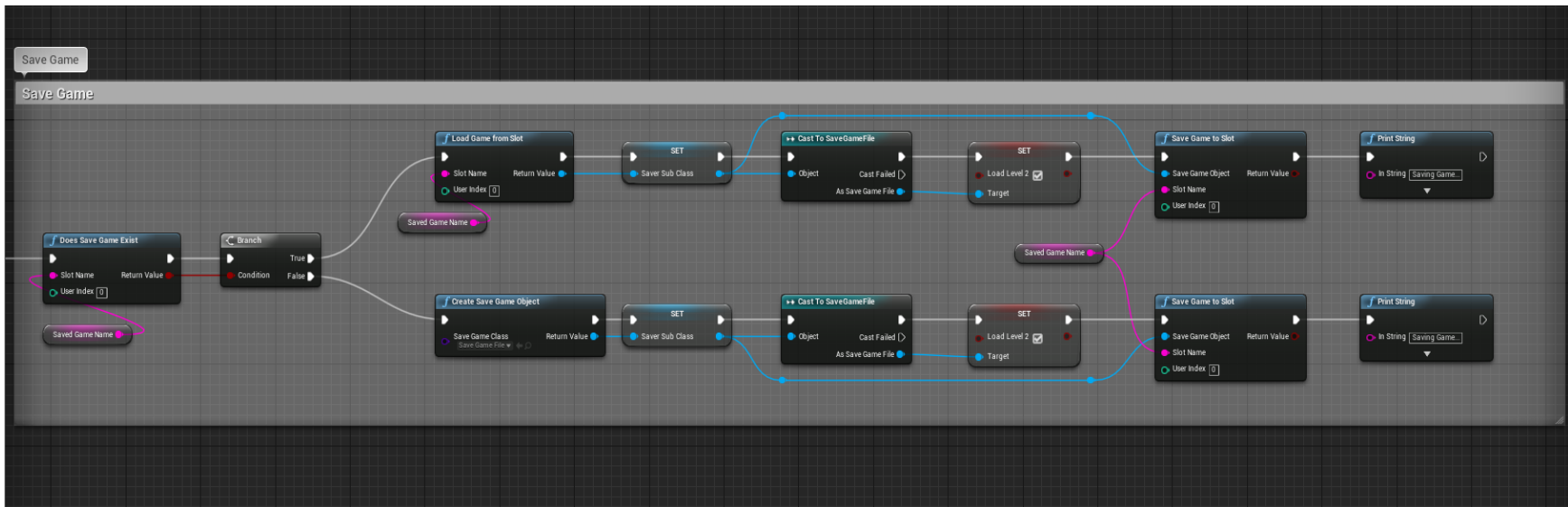

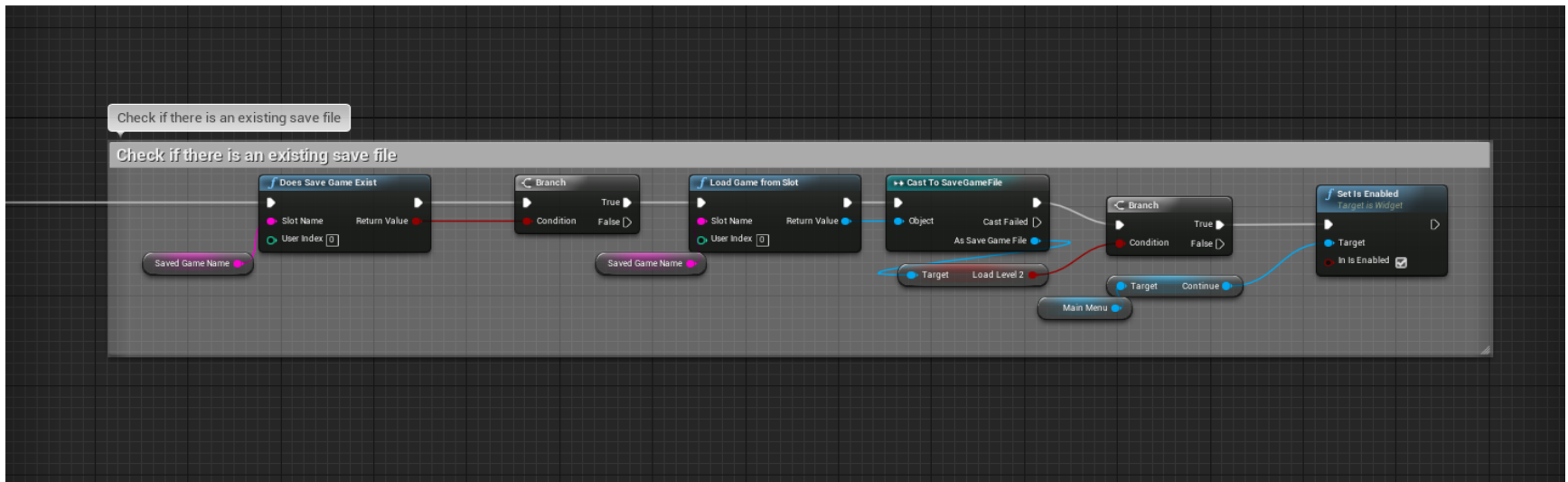**Appendix 10:** Credits Screen for the game
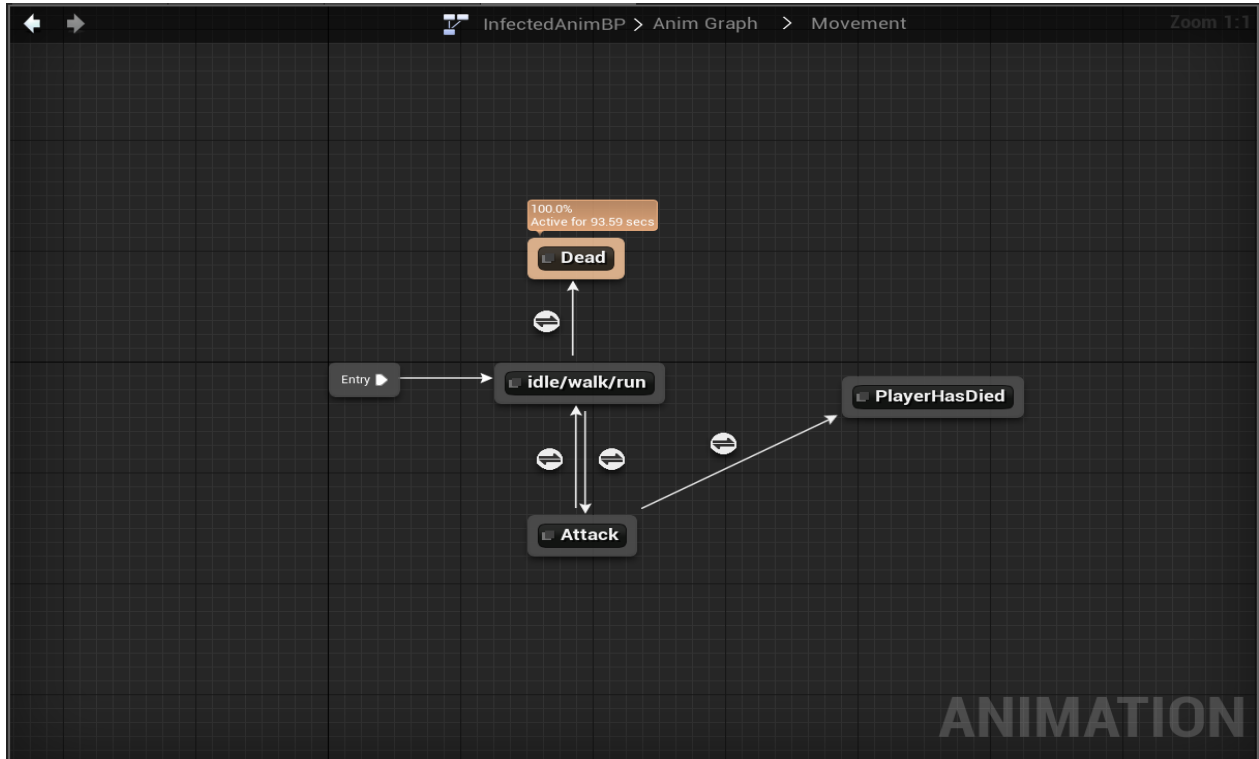
a)

b)

Appendix 11: Some Artwork images and the a) game icon and b) project icon
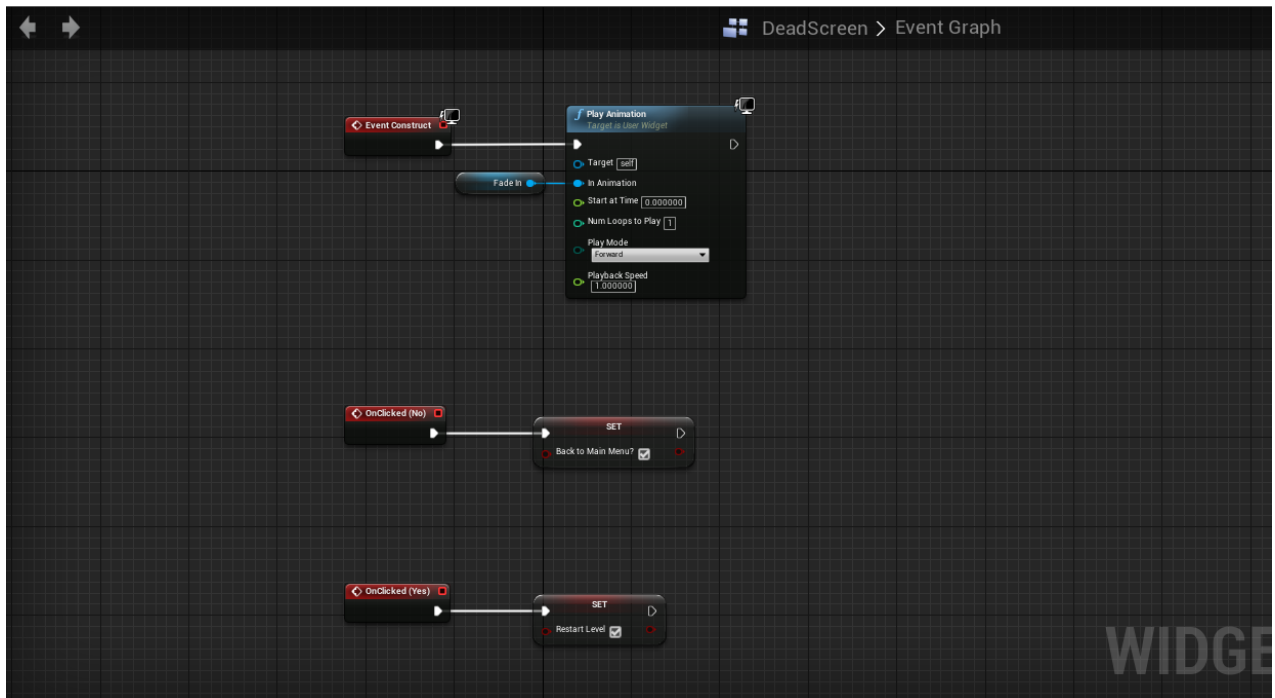
Appendix 12: Blueprint for how the game saves

Appendix 13: Blueprint for how the game checks if there is a save file

Appendix 14: State Machine for the Infected AI

Appendix 15: Blueprint for the Death Screen

Links to view the longer blueprint codes

- Characters
    - MyChar: https://blueprintue.com/blueprint/d8mvkjkv/
    - MyChar (Animation Graph): https://blueprintue.com/blueprint/ptsf7tn0/
    - MyChar (Event Graph): https://blueprintue.com/blueprint/45zzz_me/
    - Infected-AI: https://blueprintue.com/blueprint/smir1kth/
    - Infected-AI (Event Graph): https://blueprintue.com/blueprint/_mt7r3jt/
- Levels
    - MainMenu: https://blueprintue.com/blueprint/dvuw-ipt/
    - FirstLevel: https://blueprintue.com/blueprint/sr4pz4bf/
    - SecondLevel: https://blueprintue.com/blueprint/9a5ilyq-/
- GUI
    - In Game UI: https://blueprintue.com/blueprint/1z11w9-_/
    - Pause Menu: https://blueprintue.com/blueprint/7khmfglu/
    - Main Menu: https://blueprintue.com/blueprint/8x2kurbl/

Code for Pawn Movement

```cpp
1.  void UCollidingPawnMovementComponent::TickComponent(float DeltaTime, enum ELevelTick TickType, FActor
    ComponentTickFunction *ThisTickFunction)
2.  {
3.      Super::TickComponent(DeltaTime, TickType, ThisTickFunction);
4.
5.      // Make sure that everything is still valid, and that we are allowed to move.
6.      if (!PawnOwner || !UpdatedComponent || ShouldSkipUpdate(DeltaTime))
7.      {
8.          return;
9.      }
10.
11.         // Get (and then clear) the movement vector that we set in ACollidingPawn::Tick
12.         FVector DesiredMovementThisFrame = ConsumeInputVector().GetClampedToMaxSize(1.0f) * DeltaTi
    me * 150.0f;
13.         if (!DesiredMovementThisFrame.IsNearlyZero())
14.         {
15.             FHitResult Hit;
16.             SafeMoveUpdatedComponent(DesiredMovementThisFrame, UpdatedComponent-
    >GetComponentRotation(), true, Hit);
17.
18.             // If we bumped into something, try to slide along it
19.             if (Hit.IsValidBlockingHit())
20.             {
21.                 SlideAlongSurface(DesiredMovementThisFrame, 1.f - Hit.Time, Hit.Normal, Hit);
22.             }
23.         }
24.     };
```

External Links

The following are external links to the different 3D assets that were used for the making of this game demo.

https://www.unrealengine.com/marketplace/pistol-animset-pro

https://www.unrealengine.com/marketplace/splatter-decals

https://www.unrealengine.com/marketplace/ultra-dynamic-sky

https://www.unrealengine.com/marketplace/bullet-vfx-pack

https://www.unrealengine.com/marketplace/movement-animset-pro

https://www.unrealengine.com/marketplace/post-apocalyptic-world

https://www.unrealengine.com/marketplace/old-train-factory

https://www.unrealengine.com/marketplace/russian-soldier-military-and-police-customizable-versions

https://www.unrealengine.com/marketplace/abandoned-place

https://www.mixamo.com/store/#/search?page=1&type=Character

https://www.mixamo.com/store/#/search?page=1&type=Motion%252CMotionPack

https://free3d.com/

https://free3d.com/3d-model/m9-38463.html

https://free3d.com/3d-model/ammo-box-59806.html

https://free3d.com/3d-model/first-aid-med-kit-89062.html

https://www.youtube.com/user/AngrosCreations

Gameplay Video of "*The Hudson Report*"

https://www.youtube.com/watch?v=oVUh62rPHZs

youtube.com/AngrosCreations
Angros Creations Studios