PANDEMONIUM

GDD 411

Pandemonium Design Document

A physics based TPS

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Executive Summary/Overview (Jared)

Action movies are among the best-performing movies on the market today, and video games are the bestselling entertainment medium today, but rarely do we see filmic elements translate into the world of video games. Last semester our goal was to create a game that felt like a scene from an action movie. Looking at the game as it is now, we recognize that we deprioritized cinematic aspects in favor of creating a solid game foundation to build upon here. With this added freedom, we hope to reintroduce the cinematic elements from our original design. Our mission was to empower players to feel the chaos and style that is offered by action movies by creating levels that felt set up like a film set. However, these goals came mostly from work on game systems and gameplay mechanics, and not so much the art and assets that filled the world. Last semester most of the work that got done was implementation and proof of concept for the base mechanics of the game. Our goals for this semester are to revise and polish what has already been made, and to create a set of varied and unique levels set up to function as movie styled shootouts through an increase in art assets and implementation of more game mechanics to further enforce the idea that the game is like a movie action sequence. We plan on adding different enemy types in overwhelming forces, more dynamic and varied weapon options, and more art and objects to fill the scenes. Above all, we are still committed to producing a fun and replay-able core loop that will offer players ample opportunity to experiment with game systems. Our success will arise from continuing to offer polished game systems and core loops, and that remains our sole focus for this project. Our target market is still primarily males in their late teens to their early 20’s, a similar demographic found in the marketed action film genre as well as existing action shooters.

Post-Mortem (Josh)

We were happy with the end product of Pandemonium for GDD 411, and most of the new design changes reflect expansion and polish, rather than replacement or reworking. While we're proud of the final product from last semester, it really was more of a prototype than any sort of final product. We have 2 main shortcomings that hurt the overall quality of the game. The biggest was a lack of originality. We made a competent TPS, but it brought nothing new to the table and had nothing to make players prefer our game over countless others. We need more unique mechanics and interactions to make the game more engaging and stand out more. Since Pandemonium lacked a sense of identity and uniqueness, so in the gameplay and game elements portions there will be discussion of new aspects of play to spice up the experience. Bugginess and performance was another shortfall for us. We did our best to clean things up as best as we could, and made incredible progress, but heaps of bugs still persist in need of fixing. Performance, while mostly fine, still struggled when destroying lots of objects. We need to find more methods to optimize other than just lowering the resolution. Throughout various portions of the document there will also be reflection our process and corrections we're making to improve the game this semester. Other issues were a lack of a complex/dynamic AI, rewarding players for exploration, and a lack of effective UX. Our UI is great looking, but the feedback for actions is lacking. We plan to address all of these to some extent. All of these elements will be discussed in greater detail in their respective portions of the design doc. By fixing these root issues, Pandemonium will become a unique and polished product which expands on our work from last semester and reflects more of the original intended design.

Background/Research (Son)

At first, we gathered some random ideas and put them into the randomizer machine. After going through many crazy and funny ideas, we discussed and chose the neon aesthetic 3rd person wacky physics-based game. Our research games are Totally Accurate Battle Simulator, Stick Fight, Gang Beasts, Sakuna: Rice and Ruin, The Hong Kong Massacre, and Ruiner. They all share at least one similarity to our idea.

Combining to our vision, we want our game to have chaos, movie shootout scene, funky physics. We expect our game to have the chaos in Totally Accurate Battle Simulator, Stick Fight, and Ruiner – things happen simultaneously and interact with other thing. Movie shootout scenes play an important part in our vision. We expect our game will have a slow-motion scene or zoom in/out scene whenever the player hits a headshot or something similar. The Hong Kong Massacre and Totally Accurate Battle Simulator have that feature that we can learn from them. And finally, a funky physics-based mechanic, which is one of the main features of the game, shows clearly in Totally Accurate Battle Simulator and Stick Fight. Physics are exaggerated and blown out of proportion. The interaction between objects in this game is wacky but also funky, which makes players laugh and enjoy the scene.

NEW ADDITIONS: *The former part will be preserved to showcase changes in our process between semesters*

Pandemonium is completed in terms of basic features, but what it's missing right now is a unique gameplay mechanic. We have investigated the issues, discussed the solutions, and planned the roadmap of Pandemonium this Spring semester.

For the last build, we are having problems with:

- Bugs related to collision
    - Some collisions are not so “real” due to the object’s material. We want to utilize the material of the object on how it reacts to the collision. Like the fabric curtain should behave more flexibly than the metal curtain we are having right now.
- AI intelligence
    - AI is always a hard problem. For the last build, our AI just walks around the map and finds the player in range. We want to make them more of a “gangster” by adding a detective feature that if an enemy is down, every AI in a certain area will know this and attack the player at the same time.
- Gameplay unique mechanic
    - We are discussing the gameplay unique and testing them on our MVP.

The goal of this semester is we want to enhance our gameplay experience by adding some special features besides shooting and giving players a specific theme/ topic of the game instead of just a Third-person shooter. This will be mentioned in more detail in the following sections.

Target Market (Josh)

Our target market is based in more serious gamer market. People who play games frequently are our core audience. As for age, we feel the high-speed action and simpler narrative presence would best resonate with a younger audience, but the more violent content will require our market to aim a little older. We decided on an audience in their late teens to early 20’s, as they will have the tastes of the action gameplay but would be old enough to handle the more

mature content on display. In terms of traits for this market, we're targeting players that enjoy films and cinema, particularly films in the "Gun Kata" sub-genre, such as the John Wick films or the films produced by John Woo such as Hardboiled.

Pitch (Josh)

Pandemonium is a third-person shooter with a focus on cinematic action and chaotic firefights. Players are tasked with clearing levels of a variety of enemies (see Game Elements section for more detail) to achieve a high score and associated rank. The art style of our game is a low-poly neon/cyberpunk art style. The USP of our game is its incorporation of physics into the gameplay systems, allowing players to get creative in incorporating different parts of the level's construction to finish a level, making new paths or using enemy ragdolls to clear a path. Our title addresses our mission statement of empowering players by offering a low TTK and a variety of weapons, while also translating film inspiration in the level design. Our game will stand out from other games by focusing on creating fun and varied gameplay, offering a replayable game foundation allowing for continued growth and expansion. For publishing purposes, we have selected Itch.io due to its lack of a paywall, as well as it's accessibility and file support.

Gameplay (Josh)

As a third-person shooter, the core activity the player will engage in is shooting. We're also prioritizing the combat systems while keeping other aspects, such as narrative, to a minimum. As combat is more or less the only means of interaction with the game world, it's important that those interactions are varied. Geometry can break apart from bullets to create new

sightlines and remove obstacles, enemies can be flung across the map to break more objects, and the positioning of weapons and ammo can dictate level flow. We are investigating even more potential interactions and systems such as:

- Weapon throwing
    - Weapons utilize limited ammo and can be thrown to disrupt enemy attacks and new weapons must be picked up to continue shooting.
- Combo systems
    - Detect different types of attacks or actions done in succession and reward a certain point value
- Random level generation (LONG STRETCH GOAL)
    - Game can piece together level pieces to create unique levels
- Health tweaks
    - Recovery options, regen on kill, decrease over time
- Score System Rework
    - Account for deaths, combos, getting damaged, positional damage, etc.

Game Elements (Josh)

Weapons: (Josh)

- Pistol ***(DONE)***
    - Low damage and short range
    - Meant as a fallback
    - Always equipped
    - Only effective for headshots
    - Starting weapon
- SMG ***(DONE)***
    - Same damage as pistol, but fully automatic

    - Large magazine size and high rate of fire
- Assault Rifle ***(NOT DONE)***
    - Medium damage value
    - Effective for medium-to-long range
    - Slower rate of fire
- Shotgun ***(DONE)***
    - Short range, high damage weapon
    - At longer ranges damage falls off
    - Only found on rushers
- Grenades ***(NOT DONE)***
    - Pickup weapons
    - AoE weapon type
    - Limited in availability
    - Can damage player as well

- **NOTE**
    - The only weapon featured, but not usable by the player is the LMG. This is because we want the LMG to seem like an incredible force and danger, not a tool for the player. Also, it's presence at the end of a level would negate any real use for the weapon.

Enemy Types: (Josh)

- Goon ***(DONE)***
    - Low health
    - Equipped with pistol
    - Inaccurate, slow moving
    - Purpose
        - Act as a training dummy for the player
        - Not meant to pose a challenge, but allow players to get acquainted with systems in a live environment
- Assaulter ***(NOT DONE)***
    - "Standard" enemy
    - Medium amount of health
    - Equipped with SMG's and Assault Rifles
    - Moderately accurate, but tend to stay at range
    - Purpose

        - Act as the default enemy type and be most common to provide contrast with more unique enemy types
- Rusher ***(NOT DONE)***
    - More aggressive, short range enemy
    - Larger amount of health
    - Slower movement speed
    - Equipped with shotgun
    - Purpose
        - Force player to think about placement and stay on the move
- Boss ***(PARTIALLY DONE)***
    - Large amount of health, deal large amounts of damage
    - Very slow moving
    - Equipped with an LMG
    - Purpose
        - Act as a cap to a level and provide a formidable challenge
    - Boss in need of rework and more complex AI, currently just a beefy goon enemy with an SMG

Level Design: (Josh)

The core tenet of our level design is the utilization of indoor space. With our current resources and capabilities, exterior levels and wide-open spaces wouldn't work for our style of play. Our levels lack height but are densely packed with objects to try and feel more alive. We are interested, however, in adding more vertical level elements, or even multiple floors.

In terms of visual design and theming, we're taking inspiration from Hollywood action shootouts, so areas like clubs, hospitals, apartments, and other interior locales are all options to explore.

We've distributed enemies and weapons to make sure there's always something in every room, whether it be a weapon, ammo, or enemies, often a combination of the three. Our goal is to continually reward, or at the very least react, to every action a player does, and we've designed our level structure to reflect that goal.

Player Health Model: (Josh)

As of now, health is a standard deduction method without any means of recovering health. Players must make it to the end of a level (or at least to the next checkpoint) without dying. We are experimenting with new ways to utilize health, such as health constantly decreasing, being recovered by killing enemies, putting players under pressure to keep making progress into a level.

Physics Interactions: (Josh)

Physics plays a big role in our game, as the destructible environments and enemy ragdolls, and nearly all other objects aside from the level geometry will all have physics capabilities. They will be able to be knocked around by bullets or in collision with other objects. For example, an enemy ragdoll will be able to be flung into a door, shattering the door and sending those pieces flying, potentially continuing the chain by clashing with even more objects. Currently these interactions are more visual than integral, and across this current development cycle we will be looking for more ways to make them meaningful.

Destructible Objects: (Josh)

Most interior walls, furniture, and world objects are destructible. We utilize 2 methods of destruction. Large meshes are split into pieces and then have their rigidbodies frozen via script. When a bullet collides with the object, the affected piece will have it's rigidbody unfrozen and fall away. Smaller objects utilize a destruction function from our starting kit's toolset which breaks the mesh automatically and swaps the models when a bullet collides with the object. These pieces delete after an editor-specified amount of time. Currently facing issues with

optimization, as dramatic frame drop spikes occur when a lot of objects are destroyed all at once.

Slow Motion: (Josh)

Currently slow motion usage has been a point of contention, and it's use has been included and removed in different builds, but we plan to revisit our original design for them outlined here:

Players will have a meter that represents the availability of slow motion, slowing down the gameplay and allowing players to aim more accurately. When the ability is activated via button press, the meter will begin to decrease. A percentage of the slow-motion meter will be refilled for each bit of damage dealt to enemies, with more refilled for each enemy killed.

Scoring System: (Josh)

The main goal for the player will be to pass the level with a certain score. Damage to enemies and enemy kills will provide the player with a score value, that score will accumulate by the end of the level. We also hope to provide score based on other factors, such as:

- Weapon diversity
- Locational Damage
- Slow Motion Activated
- Combo multiplier
- Potential for other factors to be added later…

These scores to correlate to Grade/Rank system, such as the ones that can be found in games such as Devil May Cry or Metal Gear Solid. These rank systems seem to drive players to replay level in hopes of getting the best score and act as a sort of reward mechanism to the player.

Currently basic "goon" enemies are worth 10 points each, and the "boss" is worth 100 points.

Our current rank system breakdown is:

- Score = 0
    - Rank F
- Score = 1 to 50
    - Rank D
- Score = 51 to 100
    - Rank C
- Score = 101 to 150
    - Rank B
- Score = 151 to 200
    - Rank A
- Score = 201 and above
    - Rank S

Our ranking system was implemented late into the last development cycle, so we intend on making revisions and tweaks based on gathered feedback this cycle.

Artistic Style (Aaron and Jared)

Our game, “Pandemonium”, is going to be a 3D game with a 3rd person point of view. Since the game is going to be 3D, we decided to take the route of having the environment be low poly, so the amount of detail does not overload the player in the ragdoll and crazy physics environment. For the visual style, we’re aiming for a neon, cyberpunk aesthetic. We want a loud visual palette to push the idea of high-octane pacing on the player. Some of the artistic inspiration for the

game comes from a game called Cloud Punk which is an open-world cyberpunk game, but low poly which is the feeling that we are going for. Another artistic inspiration for the game is the characters from Totally Accurate Battle Simulator since the characters are low poly.

The setting for the level is in a tea shop that serves as a front for the bad guys which explains why there is a large storage area in the back. For the textures in this game, we wanted to make sure they complimented the low poly models that were being made so, in large part, the textures are just colors with some adjustments to the metallic shine and roughness. This helped flush out the low poly look that is found in low poly games. With the assistance of Mixamo, the character rigging and animation process was quite smooth once the location for the drag and drop camera was found. We were able to partially get the cyberpunk feel within the game through the emissive colors on the objects. The original idea was to bake the emissive “lights” from the objects into the scene however, this would not have worked since the objects in the scene are destructive. This would mean that the lighting is showing even though it is not there. We were able to get the gist of what we were going for however, it never came to fruition. While we did an okay job of filling up space and tried to create the location, it was never fully built out. The rooms had objects in them however, the atmosphere and look of the rooms never truly looked how we thought they would which is going to be a larger focus going forward. Focusing more on filling out the location and creating an atmosphere for the player to admire, then destroy is the goal moving forward. This will be done by adding some textures for the walls, ceiling, and floor as well as adding more models to populate the space. Adding plants, paintings, and some varied furniture would diversify what is currently in the game and improve the overall look and feel.

Figure 1- Color Palette for Pandemonium

Process (Son)

We have divided the game mechanic/art/design that we expect to acquire at the end of the semester into three categories: Foundation, Primary, and Feature. Each category has different priorities and working times.

Foundation (F) is the basic mechanics that make the game can function, and also, we must complete them before the midterm.

Our Foundation elements include the following:

- Ragdoll
- Moving
- Shooting
- Enemy Spawning
- Basic Wacky Physics

Primary (P) is mechanics/artwork/design that make our game have its own trait and differentiate it to other game in the same gerne.

Our Primary elements include the following:

- Enhanced Wacky Physics
- Character skills
- Animation
- Character Design

- Level Design
- Game constraints
- Color effect
- Basic UI/ Feedback to player
- Environment Design
- Different type of enemy
- Etc.

Addition (A) is additional mechanics/artwork/design that enhance the player's experience.

These mechanics aren't important as the two above, but they will be a great way to communicate with our players.

Our Addition elements include the following:

- Narrative / Dialogue
- Destructible object
- Gallery of Weapon
- Mini game / Bonus after few levels
- Etc.

Each week, we will try to complete at least 1 F and 2 P/A. Every category will be posted on Trello.

For technical challenges, we think the hardest thing to make it work is applying physics to every concept of the game, from character, enemies to object, environment. Animation is also a problem, since there is physics, this game's animation will be different from the regular one. This requires a lot of research and experiment to solve these technical challenges.

For the MVP, our goal is to acquire the basic concept of 4 F, except the Ragdoll. The player can move, shoot enemies that spawned in a specific area, and show the "wacky physics" interaction between the character and everything else (object, recoil, etc.).

For the Midterm, our goal is to acquire 5 F and at least 6 P included Animation, Level Design, Character skills, Character Design, UI/Feedback, and Environment Design. At least 1 playable level. The game should show the idea clearly at this point.

For the Final, our goal is mastering 5 F and acquiring at least 10 P + A. At least 2 playable levels. At this point, we will focus more on polishing the game rather than adding new features. A complete Alpha+ test that can be released is our final goal.

NEW ADDITIONS: *The former part will be preserved to showcase changes in our process between semesters*

We will run the same format as last semester since it was effective for our team.

We have divided the game mechanic/art/design that we expect to acquire at the end of the semester into three categories: Foundation, Primary, and Feature. Each category has a different priorities and working times.

- Foundation (F) is the basic mechanic that makes the game function, and we must complete them before the midterm.
- Primary (P) is a mechanic/artwork/design that makes our game have its own trait and differentiate it to other games in the same genre.
- Addition (A) is additional mechanic/artwork/design that enhances the player's experience.

  These mechanics aren't important as the two above, but they will be a great way to communicate with our players.

These mechanics will be mentioned in the backlog on Trello. Each week, we will try to complete at least 1 F and 2 P/A. Every category will be posted on Trello.

We have experience in the implementation of physics object/ ragdoll from last semester, so for technical challenges, I don't think we may face many in this semester since the hardest part has been solved. Animation and rigging are difficult parts for our art team, but other teams will try their best to help them.

For MVP, we want to introduce the potential unique mechanics that we have discussed.

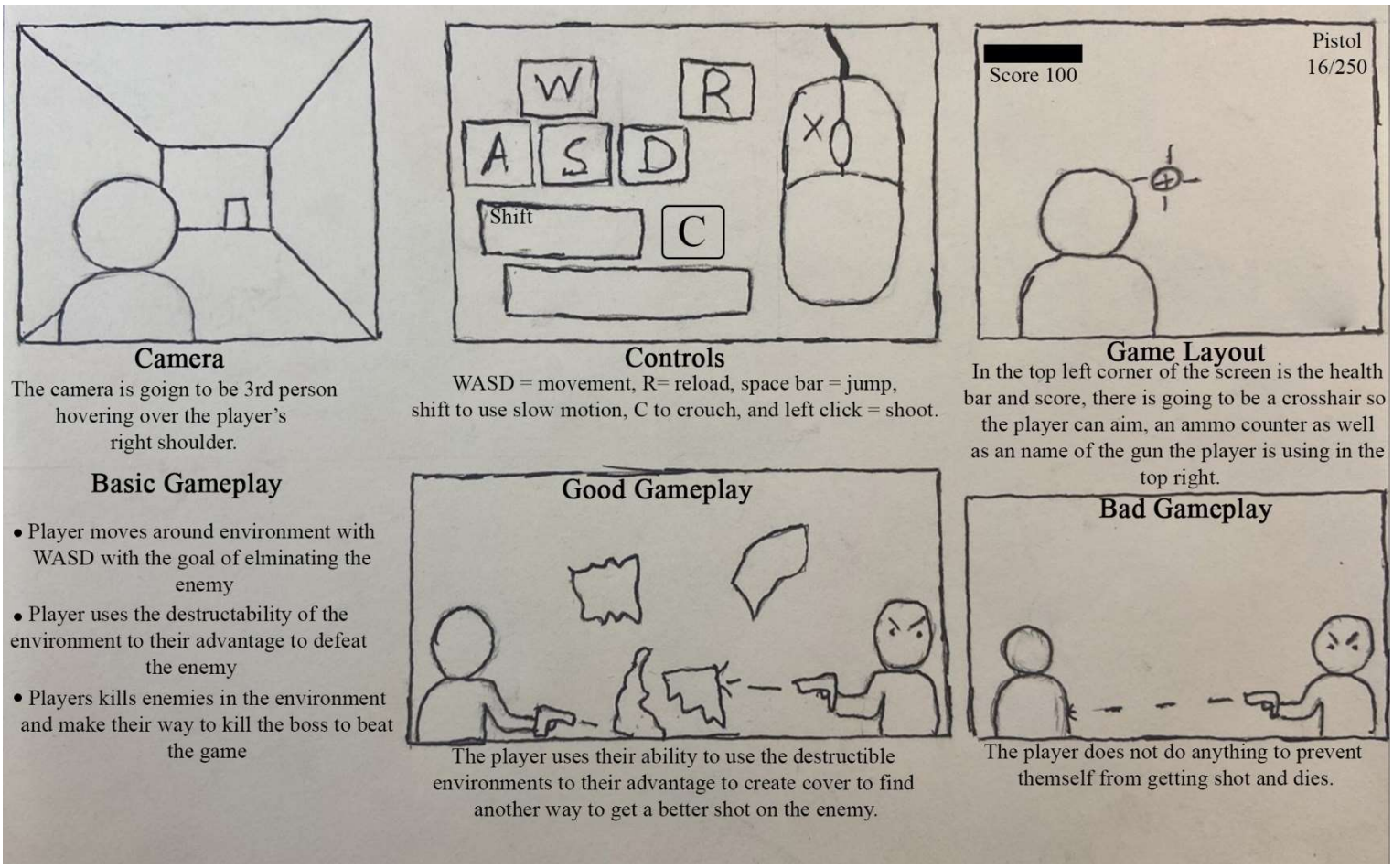
For Midterm, we want to implement that unique mechanic and make sure it works well with the game.

Definitions (Son)

- **Slow motion:**
    - An ability to slow down the gameplay in order for the player to aim more accurately.
- **Fracturing:**
    - A process that allows a game object's model that can be broken into pieces after a collision, and each piece can impact other structures or destructible objects.
- **Cyberpunk:**
    - An art style that uses neon colors as the main theme. The cyberpunk style focuses on a gritty futuristic appearance, more utilitarian than visually attractive. Most of the structures/buildings are grayscale color and highlighted by some decorations using neon colors.
- **Area of Effect (AoE):**
    - An impact zone indicates the area that a special skill or attack can affect. The larger the Area of Effect, the higher the number of affected enemies.

- **Ragdoll:**
    - Ragdolls, a mechanic in Unity, are variants of animated objects whose bones are completely taken over by the force of physics.
- **Physics:**
    - The Unity Physics Engine enables objects to approximate universal forces in nature such as gravity, velocity, acceleration, and friction. It allows for a wide range of objects with various physical properties to interact with other objects in a Scene dynamically.

Appendix (Aaron)



Visual Reference: (Aaron)

Figure 2 Example of the color palette

Figure 3 Low poly cyberpunk environment

Figure 4 Low poly cyberpunk

Figure 5 example of what player can look like

Figure 6 Cyberpunk world, compliments color palette

Figure 7 Possible examples of the weapons

Figure 8 More examples of what the player could look like

Figure 9 Cyberpunk diner, possible location

Figure 10 Low poly example for outdoors

Figure 11 Another low poly example for outdoors

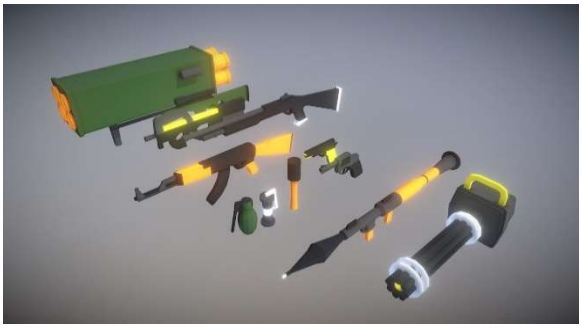


Figure 12 Examples of low poly weapons

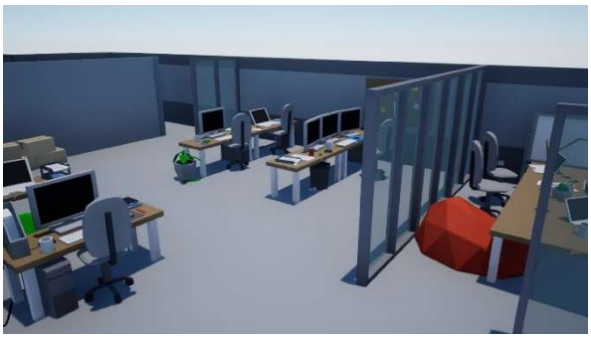


Figure 13 A possible in door space

Editing and piecing individual pieces together done by Josh