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BOSS FIGHT ANIMATIONS
Structure of a Boss Fight Animation and How it Preconditions a Player's Actions

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ABSTRACT

The aim of this thesis was to study and create a boss fight animation for a fictional game character, MauMau2000. Qualitative methods were used by analysing existing villains and their boss fight animations, and by prototyping own animation.

The research started by explaining how villains are created and what makes an effective villain for a game. It explained what types of villains there are in games and describes some of them, in relation to the different types of villains, as well as studying what are the visual characteristics that typically makes them identifiable and their function.

Then the topic of animation in games, particularly the principal of Anticipation was discussed to understand how it works to communicate to the player. Based on all the research own character was created and this process is described thoroughly as well as animating a fight sequence and evaluating the result of it.

Finally, it was proven that the Principle of Anticipation is a highly communicative tool for players when tailored carefully and the resulting animation was an effective test to understand how this principle should function in order to be engaging and a successful part of gameplay.

Keywords: Animation, Anticipation Principle, Boss Fight, Attacks

CONTENTS

GLOSSARY

MECHA In Manga and Anime style stories and games, it is a large or gigantic armoured robot controlled by a person riding inside it.

NPC(s) Non-Playable Character or Characters

PRINCIPLES OF ANIMATION These are twelve principles that help an animation look and feel real by making the illusion that the animation adheres to laws of physics such as weight, speed, friction, etc.

RPG(s) Role playing game or games.

STORY ARC It is the chronological structure of a story plot that explains what happens (conflict) and how it is resolved. It is also known as a narrative arc and it involves directly the main characters of a story.

THEMING Disambiguation of Theme. In Game design the theme is what gives the context for players to understand what they need to accomplish and why by making a connection between the different components and the mechanics of the game, thus preconditioning the behaviour of a player.

1   INTRODUCTION

The aim of this thesis is to explore the animation principle of anticipation, study how it works applied to games, and ultimately produce and apply it to a 2D boss-fight animation asset for a platformer type game.

The author has had a personal interest in different forms of animated media, as well as the process of animating characters in particular animation in video games and how animation communicates with the player becoming part of the gameplay. This communication affects the player's decision-making progress.

Much preparation and research go into enemy animations to transmit a sense of threat to the players from such anticipatory movements which in turn prepare them to act at the right moment without distracting or overwhelming them from their goal. The animation aims to grab the player's attention at right moments to affect the player's actions in the game but not to distract and overwhelm the player. Animation is information for players. (Moleman 2009.)

Villain creation through the viewpoint of design and animation will be the first focus of this project. This will be examined through character development, shape language, colour and narrative. After this a description of boss fight anatomy will be provided. What boss fights are and how mechanics and the level structure have a role in how challenging the boss fight is.

Then the text will deal with the main topic of this thesis, animation in video games, enemy animation and especially the principle of anticipation's role in video game boss fights. This animation principle will be studied through examining boss fights from Hollow Knight and Psychonauts 2 and finding ways the animation in those two games, in those two examples, communicate to the players.

After that, this paper will describe the design and animation process of the boss fight enemy and its attack made specifically for this project according to the findings on character design covered in earlier chapters. The character is a large

mecha called MauMau2000 and looks like a big round mechanical cat which can change its form to be more battle suitable.

Finally, the conclusions and review of the results as well as what was learned from this whole process will be addressed. This will also include the next steps for the project after this thesis has been completed.

2   CREATING VILLAINS

An antagonist is described to be an opposing force against the protagonist and the main character (literarydevices.net) and is used to create conflict in the story. According to the staff from the training and education site MasterClass(2021a), an antagonist is someone or something that gets in the way of the protagonist achieving their goals. They categorize antagonists into four main types; villains who are the main conflict in the story and aim to destroy or harm the protagonist, also known as archenemies, conflict-creators or troublemakers who have different goals from the protagonist, inanimate forces like natural disasters, and the protagonist themselves and their insecurities and shortcomings that can become a form of self-sabotage. (MasterClass, 2021a.)

ARCHENEMY   TROUBLEMAKER   NATURAL FORCES   SELF

Figure 1. Example of the four types of villains in Games. Left to Right: Doctor Eggman from Sonic the Hedgehog series by SEGA games, Audrey Redheart of Wandersong by Greg Lobanov developer, Oscar Espinosa of Just Cause 4 by Avalanche Studios and Badeline from Celeste by Extremely OK Games, Ltd.

This thesis and project concentrate mostly on villains and conflict-creator type of antagonists; and characters who fall in between these categories.

2.1 Types and Characteristics of Villains

There are five characteristics of a good villain. First, a connection to the hero that links the villain and the hero together in some way. This connection can be a tool to further the hero's character development. Second, a villain should also have their own sense of morality, what they believe in, and how it affects their actions and behaviour. (MasterClass, 2021b.)

 The third characteristic that makes a good villain is them being a worthy opponent to the hero, not too weak and not too powerful and undefeatable either. In video games this characteristic can also be applied outside of just the writing of the villain, it should be incorporated in the boss fight design as well. Fighting a boss that is underwhelming and too easy to beat is boring to the player, and then again, fighting a boss that is too overpowered and difficult gets frustrating and might make the player overwhelmed and cause them to stop playing the game.

To get the audience more interested in the villain and even to sympathise with them, the villain should have a solid backstory that gives the player an idea of who the character is and what their ambitions are. A believable and compelling backstory adds depth to the villain and their actions and makes the character more engaging.

The final characteristic mentioned in the article is that villains should be fun. Fun can be understood as amusing, for characters this means that their personality is entertaining and whimsical due to the exaggeration of their behaviours which can be seen as childish or ridiculous. Villains such as Emet-Selch from Final Fantasy XIV and GLaDOS from Portal 2 are dramatic and threatening but also at times humorous and even ludicrous in their own ways.

Figure 2. Emet-Selch from Final Fantasy XIV (Square Enix 2010)

What makes Emet-Selch fall under this category of villains, is not only his shifting personality but also his engaging and compelling backstory (Final Fantasy Fandom 2022). It makes him more sympathetic as a character and gives the player some insight into his view of the world and why he believes that what he is doing is right and justified. He is a character who implies that he knows the main character personally somehow which gives a connection to the protagonist. The overall design and look of the character inform the players that this is a powerful future enemy to defeat. Creating this sort of momentum in a character's story arc will ensure that the fight is enjoyable and adequately difficult, therefore, Emet-Selch is an example of a villain that has all the characteristics fulfilling the role of a memorable antagonist and villain.

When these characteristics are not all taken into account when designing a character will make for a weak antagonist that will be easily forgettable and uninteresting to defeat. Some examples of characters with these shortcomings are Ranjit from Final Fantasy XIV, who according to players is an 'awful villain'

who falls under the typical stereotypes of what to expect from one (GameFAQs 2021) and Ganondorf from Legend of Zelda: Breath of The Wild. Ranjit is a villain who feels too strong and fighting him takes a long time and gets repetitive. He is also not given any interesting backstory nor is his personality captivating, which makes him a slightly annoying but also forgettable villain.

Figure 3. Ganondorf from Legend of Zelda: Breath of The Wild (Nintendo Entertainment 2017)

Ganondorf, specifically from Legend of Zelda: Breath of The Wild, as a boss fight is suitably challenging and mechanically interesting, but from the writing perspective he's lacking in the good villain characteristics. Like Ranjit, Ganondorf is not given a compelling backstory in this game. He is not established as a character and is simply an ancient force of evil who has no reason to be a villain outside of simply being evil just for the sake of being evil.

Neither of these characters have a strong connection to the hero, a well-established and clear morality, nor do they fall under the characteristic of fun, according to the aforementioned articles. For these listed reasons these two characters are not engaging and memorable to the players.

Additional things to consider in writing a villain are giving the villain a motivation, which is similar to earlier mentioned backstory and morality. The narrative writer

and designer, Jerry Jenkins (2022) emphasises the importance of the role of a backstory in giving the character motivation and through that, justify their actions.

Designers can also give their villains moral flaws to make them seem more believable and sometimes make the character embody a vice such as the seven deadly sins. An example of this would be the villain characters in Fullmetal Alchemist: Brotherhood that are all based on one of the seven deadly sins.

Though making a character embody a vice can be done more subtly and can also be applied to heroic characters and their flaws. Maybe the villain and the hero could even have similar flaws that they express in different ways which has led them on different paths.

Figure 4. The Homunculi from Full Metal Alchemist. (Bones Inc. 2003)

Reyhan Pradantyo (et al 2021) mention the tensions between the main character and the antagonist to be important. The way they interact and how their dynamic works can often be one of the most interesting parts in the story, and makes people want to know how their intertwined stories will end. Tension between the

characters can be created in different ways, personality, beliefs, or even with earlier in this text mentioned connection to each other.

Taking an example from animation for films, in Kung Fu Panda 2 the main character Po and the movie's villain Lord Shen have connected backstories and unresolved issues, and trauma that they both have dealt with in different ways. Where Shen has grown bitter and can't move on from his past and his family, Po, when faced with traumatic memories about his family, confronts the trauma head on with help from the people around him. This similarity but still stark difference between these characters makes their connection and the tension between them interesting throughout the movie.

Figure 5. Examples of different Types of Villains, from upper left to bottom right: Asgore Dreemurr from Undertale, Deerclops from Don't Starve, Domino Hurley from Grim Fandango, GLaDOS from Portal, The Riddler from Batman: Arkham City, Kefka Palazzo from Final Fantasy VI, King Dice from Cuphead and Team Aqua Grunt from the Pokémon series (Kylmälä 2021)

Lastly, in this project, Villains can be categorized into different archetypes. These archetypes are: "Anti-villain", who is a character whose goals are justifiable and even good, and whose motivation can be sympathetic and has appealing

characteristics. "The beast" who is a literal monster like an animal or a creature. "The bully" who is described as "simple and straightforward opposition to the protagonist" by the writer(s) of the masterclass article on the topic. "The machine" who is a mechanical creation, maybe a robot or an artificial intelligence. "The mastermind" who uses mind games and complicated evil plans to defeat the hero. "Evil incarnate" is, as the name implies, an embodiment of evil. "The henchman" who works for some higher evil force or an evil character. And the last archetype is "The fanatic" who has such strong and twisted moral beliefs that it drives them to do evil.

The character created for this project would best fit the anti-villain and partly the machine archetypes because the big mecha itself is a mechanical construct, though it could be argued that since it has a personality and some almost feelings, it might not perfectly fit in among the usually non-feeling robotic villains. The alien piloting the mecha on the other hand does bad things, but his goals are simply freedom and a better life, so he can be categorized as an anti-villain.

2.2   Visual Characteristics of Villains in Animations

The illustrator and character designer Ben Camberos (2011) describes that when it comes to the visual design of a villain or an antagonist, important aspects to keep in mind are giving the character a recognizable silhouette and using geometric shapes in the design while keeping in mind what each shape is often associated with (Camberos, 2011).

Round shapes communicate a more friendly, soft and innocent character while triangles and spikes give a sense of danger, chaos and power. A clear and readable silhouette of a character is important to communicate different things about them and make them memorable. Kirby is made out of circles which makes him seen friendly and despite his simple design, his silhouette is very recognizable. Bowser has rounded shapes in his design, which makes him fit well in the universe that he's in, but he also has triangles in his silhouette and design, which give contrast to the rounder parts of him and make him look more threatening.

Figure 6. Examples of body shapes in Characters. Bowser from Super Mario Series (L) and Kirby from Super Smash Bros. Ultimate (R).

The character's colour palette is also a key communication tool, which is why it is important to plan with colour theory in mind. More contrast and more saturated and attention-grabbing colours catch the player's attention and give off a more menacing energy than more harmonious colours with less contrast and saturation. When designing a villain, making the hero and the villain opposite from the visual design standpoint helps give them contrast and establish them as opposing forces.

In their research paper entitled How the Visual Design of Video Game Antagonists Affects Perception of Morality, Reyhan Pradantyo, Max V. Birk and Scott Bateman (2021), explain that the perceived morality of a character influences the way players see the character's actions. If a character is designed in a way that makes the audience see them as a villain or an antagonist, their actions are judged in the mind of an audience in a different way than character's who are designed to be approachable. (Pradantyo et al, 2021.)

For example, in the Pixar Studios animation, Wall-E by Andrew Stanton (2008), there's a scene where one of the main characters, Eve a small robot, and the protagonist Wall-E, fall into a garbage chute and end up in the waste pit of the spaceship, where gigantic robots reside and do their work of squeezing trash into big cubes and plunging them into space. These big robots are square in shape, have no clear "faces" in their design compared to the main characters and the lighting makes them look menacing and scary. The audience is made to feel that these robots are cold and unfeeling and maybe even be perceived as evil, this of course can be deduced by description given earlier about how squares are interpreted.

Later the audience is shown the big robots standing calmly and quietly around broken Wall-E and worried Eve, looking down at them. This makes the audience think that maybe these big scary robots are not evil and uncaring after all, but just too big to notice the smaller robots. When the main characters fly away from the waste pit, the two big robots are shown waving after them. This makes them seem sympathetic and challenges the audience's earlier view of these characters. That simple act of standing around Wall-E is seen in the lens of morality and gives them a new dimension as characters.

Figure 7. Trash compactor scene: GiantsRobots as a threat (above) and Giant Robats as a Refuge(below). Wall-E (Pixar 2006)

Another example of morality and perception of a character is Batman, a hero, whose design is mysterious, spiky, with no round and friendly aspects and a dark color palette. If a person who didn't know who Batman is, saw him, they would think of him as a villain. As previously stated, different shapes are associated with different things. Batman is made out of squares and triangles. Squares can represent strength and stability but triangles on the other hand can represent power, movement and different things depending on if the shape is pointed up or down. Up pointing triangles like Batman's mask's ear-like shapes are associated with stability and strength, but down pointing triangles like the ends of Batman's cape are associated with instability and conflict. For all these listed reasons Batman's contradictory visual design reflects a character whose morality is dubious.
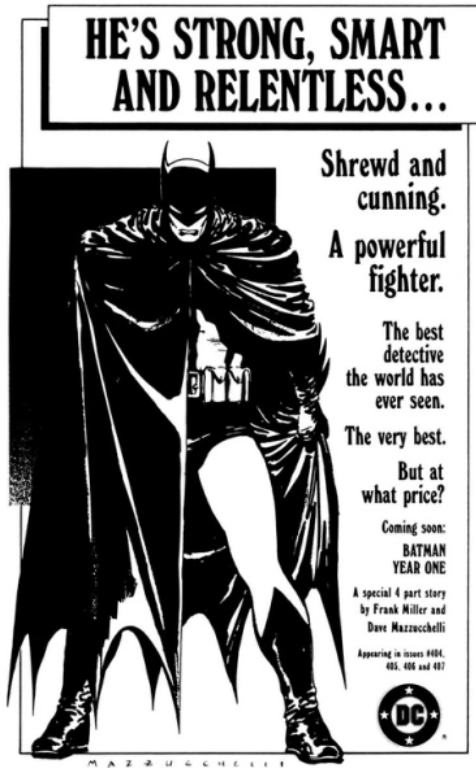
Figure 8. Add for *Batman: Year One* by Frank Miller and Dave Mazzucchelli. (DC 1986)

But these design aspects do fit Batman's serious and stoic characterization and his intentionally created somewhat gray morality. As mentioned by Eduardo A. Llano (2020) in his article as well as Dr. Bjorn Mercer (2021) and Trey Jackson in the podcast, The Everyday Scholar (2021), Batman's a complex character and his morality is questionable. He is a character who uses violence and breaks the law to achieve his goals, despite not killing people. He has his own sense of morality, he has a compelling backstory, he's strong and menacing and it could be argued that he could fit into the anti-villain archetype.

3 BOSS FIGHTS

Bosses in video games are defined as "a significant computer-controlled enemy who must be defeated to achieve a goal or continue progress". It's supposed to feel like a part of the game and that it belongs there, but it is also something that can offer new things to the player and can, to some extent, break the established rules of the game to make the fight interesting and engaging.

Boss fights are used in video games to serve three different purposes. First is rewarding the player by giving a break from the gameplay and offering something different and surprising. Second is using the boss fight to test the skills of the player to see how they have learned to use their abilities by making them face a challenging enemy that requires them to use one or multiple different skills to defeat. Some boss fights even force the player to think differently from how they've been using their abilities by limiting their skills with immunity or shields or even by taking the player's skill away for a limited amount of time. Bosses made with testing the player's skills in mind, can teach and prepare the player for what comes ahead. Boss fights can also be used as a narrative device to move the story of the game forward. This is the third purpose.

Boss fights test the player's skills with different attack patterns that have, for example, different speed and size of projectiles. Predictability of the attacks is an important aspect of boss fights and essential in teaching and testing the players. This predictability and announcing attacks are called telegraphing, and it can be done through animation, sound or even text. The difficulty of the boss fight can be affected by changing the duration of the telegraphing, and often in videogames attacks that do more harm and are difficult to dodge have longer and more visible buildup and telegraphing. Some games, like Cuphead by Studio MDHR (2017) , add difficulty by using multiple different attack patterns at the same time in different combinations after introducing the attacks one by one. New sets of different attacks and combinations keep the player active and the fight fresh and engaging throughout. Fights that are too repetitive, long, and tedious lessen the player's enjoyment of the game.

There are aspects to consider in boss fight design that help make the fights better, and Itay Keren (2018) lists multiple good boss fight designing rules in his GDC talk "Boss Up: Boss Battle Design Fundamentals and Retrospective". Boss fight should be clear, in setting the goals and telegraphing attacks and giving the player a clear target. If the player doesn't know what to aim at, or what to do, or doesn't know an attack is coming, the entire fight just feels confusing, unfair, and

frustrating. The player should also be able to see their progress, to make the fight feel rewarding. Often indicators of the progress of the fight are communicated via a health bar or the boss's design or animation changing to indicate how much damage it has taken and how long there is to go until the finish. Some boss fights have different phases, where the boss changes in some way visually and mechanically to indicate progression to the player and to give them a sense of accomplishment.

Keren emphasizes in his talk that the point of designing boss fights is not trying to think how to kill the player, but how to keep them alive instead. A helpful way of thinking when figuring this out, is planning ahead the use of the negative space between the projectiles that works as a safe space for the player. Making the attack patterns repeating, color coded and not too difficult to memorize helps bring good flow in the boss fight. (Keren 2018).

 To make a boss fight good and fit into the game it's put in, it should have mechanics that work with the rest of the game. Boss fights can break the established rules to make the player think differently about how to use their abilities. Like the boss being able to do something the other smaller enemies weren't able to do or, for example, on Undertale in the bossfight against the character Sans, he decides to take a nap in the middle of the fight, forcing the player to think creatively how to continue the fight and in this fight the player is able to move the gameplay area box itself to defeat the boss. Another good example of a boss that works very well in the game it's in, but also provides something surprising and creative, is the boss Ninetails from Ōkami.

This boss can use all the same abilities as the player, and even knows some techniques that the player hasn't been introduced to yet. The fight is used in teaching the player to remember what each brush stroke attack does, as well as to "draw" the brush strokes fast enough so that the boss doesn't counter them with her own if the drawing window is open for too long. Though the fight against Ninetails surprises the player, it's still not too difficult. New players that need some time to remember what each brush stroke attack does and who draw the

attacks a bit slow, are still given enough time to try again and get better as the fight progresses, and the more experienced players are given a chance to refresh their memory and skills.

Figure 9. Ninetails from Ōkami (Clover Studio 2006)

Video game bosses don't need to be outrageously difficult to be memorable and threatening. Youtuber Chariot Rider (2018) mentions in their boss fight analysis video that "A boss fight should always be interesting to engage with." Design aspects like the music, the visual style, the animation or new fight mechanics can make a boss fight feel threatening or like a fun break.

Theming of the boss fight assists in making it feel more like a natural part of the game, especially in games where the boss works as the peak of the level. From a gameplay point of view, the theming of the level can be kept consistent with new mechanics or obstacles that teach the player to handle these new aspects of the game so they can use their fresh new skills to defeat the boss at the end of the level. Games that are more narrative focused try to think how the boss fits into its environment and how the enemy's personality, backstory and motivations affect them and even the environment around them.

Designing an arena layout and the battle setup for the boss requires both, mechanics and narrative to make it work. A good example of a boss with a

consistent theming in gameplay and narrative is Lady Luctopus from Psychonauts 2 by Double Fine (2021). The boss itself is a living embodiment of a gambling addiction and the boss arena, boss design and the level before the boss all work in favour of establishing this.

Figure10. Lady Lucktopus from Psychonauts 2 (Double Fine 2021)

The Psychonauts games are known for having levels that make the player go directly into a character's mind and having themes related to the struggles of the specific character that the level is built around. The level "Hollis' hot streak" that's before the Lady Luctopus boss fight is a different version of an earlier level in the game (Hollis' classroom), which was classroom and hospital themed, but now the same areas have been combined with a casino. The boss fight arena is shaped like a card table and has poker chips that work as a safe platform from one of the attacks that make the floor a hazardous area.

Lady Luctopus herself is a giant octopus, but the reason for that, and how she perfectly fits into the level, is that there is a casino in the world of the game called "The Lady Luctopus Casino". The boss is extravagant and shiny and has light bulbs in its design. It also attacks with cards which fits the card table theme of the fight well. Mechanically the Lady Luctopus fight requires you to know the basics of the game as well as handle one new ability that the player was given in the

earlier "Hollis' classroom" level. This ability lets the player access different areas in the arena where basic jumping can't reach by letting the player connect to floating dot shaped things and moving fast between different dots. This ability is used a lot throughout the level before the boss, so the player has gotten many chances and time to practice and get an understanding of the ability.

The Lady Luctopus is the first boss of Psychonauts 2 and does its job well. First bosses establish the tone of the game and are either ways to push the narrative forward or test the player's understanding of the mechanics of the game (as previously mentioned in the roles that boss fights serve in video games part of the text). It's important not to make the difficulty spike too big but also to make the payoff of the first boss satisfying.

Lady Luctopus has an attack that tests the player's ability to dodge projectiles she spits at them and also requires the player to use their telekinesis ability to throw these projectiles back at her to deal damage. The player also has to use their levitation ability to dodge a hazardous floor and their mental connection and psi blast abilities to reach the boss' vulnerable spot. This way, the fight makes the player use almost all their abilities, including a brand new one, but doesn't make it too confusing. The fight offers breaks from gameplay in the form of cutscenes and beating Lady Luctopus feels satisfying because it moves the story forward and the cutscenes and the little gameplay sequence after it are interesting and engaging.

Sometimes boss fights may fit the theming and the narrative relatively well but are lacking in the gameplay and mechanics. Examples of this are most bosses from the game BioShock series by Irrational Games. The bosses are mechanically simple, the player chases the boss who attacks them from different spots, and eventually after doing enough damage, the player kills the boss and progresses in the game. Despite the mechanics being simple and repetitive, each more significant boss has a theme that works and has their own story. Another good example of making a boss interesting through theming from this particular

series is J.S. Steinman. He is the first boss of BioShock and he's a surgeon who has lost his sense of reality due to heavy use of a chemical substance that alters the human body and mind, and he's now obsessed with perfection and creating art through surgery and goes to extreme and grotesque lengths to try to achieve this.

Figure 11. J.S. Steinman from BioShock by Irrational Games. (2007)

The area leading up to the fight against him is a medical pavilion and mainly themed around plastic surgery with posters advertising his skills and graphs of human faces. Eventually the faces get weirder and more uncanny, which amplifies the sensation that there something is terribly wrong there.

The player can also find audio logs in the area that they can pick up and listen to, most of which are memos from Dr Steinman, and this way the player can learn about his backstory and personality and how he ended up the way he is. When the player finally finds him, he is working on a body and giving a dramatic speech about how none of the bodies fit his vision, revealing more corpses as he speaks before noticing the player and attacking them. The build-up and the payoff in a

theme and narrative sense work well.

4   ANIMATION IN GAMES

The goal of animation is to create an illusion of motion, this is achieved by making a sequence of different images. There are 12 core principles of animation originally for 2D animation, but these can be adapted for 3D animation and video game animation as well. These principles are squash and stretch, anticipation, staging, straight ahead and pose-to-pose, follow through and overlapping action, slow in and slow out, arcs, secondary action, appeal, timing, exaggeration and solid drawing.

The focus of this text is anticipation, which is described as preparation for an action and it communicates what's going to happen (Williams 2012). It's also often movement in the opposite direction than where the action is going to go, which enhances it. Anticipation helps make the animated movement more believable and gives a sense of weight and power to it. Bigger and more impactful movements such as a big heavy giant attacking or moving around require more anticipation to convey the feeling of heaviness and power.

Good examples of enemies where the animation manages to give a feeling of weight in the character, are bosses from The Shadow Of The Colossus (2005) by Sony Interactive Entertainment. All the movements of the giant bosses are slow and steady and have long wind ups.

Figure 12. Boss Fight scene from The Shadow Of The Colossus (Sony 2005)

In real life, there's always anticipation for every action, and it's an important thing to be able to recognize to better our communication between others and the environments we're in. Babies learn anticipation from games like peek-a-boo (NHS 2019) and this is how they learn skills for waiting and listening, as well as understanding that something is about to happen (Luo 2018).

4.1 Anticipation in Boss fights

Anticipation is different for the player character and the enemies, especially in games that include combat as a mechanic, where it's important to have the player character feel very responsive to the inputs of the player controlling them. (Moleman 2009) The player character often has faster anticipation or in some cases no anticipation at all in their actions as opposed to the enemies (Lehmann 2016). In video games, longer anticipation is important for npc and enemy movements because these actions are something that the players have to notice and respond to (Floyd 2020). In many boss fights there are more than just one attack, so ideally the anticipation animations should be different for each one and they should be just long enough for the player to have time to identify which attack is coming.

In boss fights anticipation animation is used in attacks so that the player can see the enemy moving in a certain way, and notice from these telegraphs that

something most likely harmful is coming. Different kinds of telegraphing are for example shadows on the ground indicating where a hit is going to land from above, specific gestures or poses that the boss does before doing specific attacks and some games use slow motion before the enemy attack hits.

Hornet from Hollow Knight is a boss that has three different attacks that each have a different telegraphing leading up to the attack. For one of them, Hornet jumps into the air, face towards the player's location, and quickly launches at the player, weapon drawn. If the player doesn't keep moving, they will get hit by this attack. (Figure 18)

Figure 13. Spear Attack in Hollow Knight (Team Cherry 2017)

One of the other two attacks has Hornet jump into the air, turn her head and body away from the 'camera' and leaning forward in the air. After this, her sprite is covered by a light for a split second before it dissipates to reveal her yarn attack, where her needle and yarn fly messily and quickly around her, forming a protec-tive area for her that damages the player if they come close to her.

The last of Hornet's three attacks is on the ground. Hornet stands in her idle pose and takes a step backwards, lifting her nail spear and aiming it forward. She pulls it back and throws it to the direction she's facing. This is amplified by effect animation giving the movement a sense of swiftness. Hornet then leans forward, which works as a follow-through animation as well as a form of anticipation animation in a way. Hornet doesn't immediately go back to her default pose after throwing the spear, which warns the player that the attack isn't finished yet. As

soon as Hornet's nail travels far enough away from her, it slows slightly and between Hornet and the nail there appears some yarn lines to give a message of the nail being pulled back towards Hornet. Hornet stays in her pose until the nail reaches her and she grabs it and goes back to the default/idle pose. All these attacks happen really fast, but all of them have clear and distinct anticipation for the player to differentiate them and dodge out of the way accordingly. (Appendix 1)

In 3D boss fights it's even more important to make sure the player notices the telegraphing since often the 3D space is big and the camera can turn in any direction. In Psychonauts 2 in the boss fight against Lady Luctopus, the boss itself is not only very eye-catching in its design, but also the only thing moving in the arena apart from the player. Her tentacle holding the cards where some NPCs are trapped in, do have an idle animation, but it's not nearly as attention-grabbing as the boss itself in the middle. Lady Luctopus has 3 attacks and three phases, each phase introducing a new attack in her rotation. (Appendix 3)

The first attack she does, is spitting bombs at the player's location, much like how earlier example hornet dashes to the player's location. Her anticipation movements for this attack start by her stopping her idle animation of shuffling cards, to holding the cards in one of her tentacles to look at them. She then takes one card and reveals it to the player. The card has a picture of a lightbulb, and she throws it in the front it the arena. This way even if the player didn't initially notice which card she took from the deck, they have time to look at it.

After throwing the card, Lady Luctopus moves down, and a red lightbulb pops above her head, she lifts her head back up and now she has a red lightbulb in her mouth. She leans menacingly forward, her shadow covering the arena, and she finally spits the lightbulb at the player. The lightbulb lands on the ground surrounded by a red circle and if the player goes into this circle, or get hit by the lightbulb, they take damage. This attack has multiple anticipatory movements that finally lead up to the attack.

In the second phase, Lady Luctopus introduces a new attack. This time she breaks out of her idle animation by casually leaning her head against one of tentacles, before lifting up multiple tentacles holding cards from the front and sides of the arena, simultaneously there appears red lines from each one on the ground. Like previously with the lightbulbs, red on the ground means damage, so the player has to quickly dodge out of the way before all the tentacles push towards the middle of the arena, shooting cards from their decks and these cards start moving along the red lines with very high speed. This creates only a few specific safe zones between the moving cards that the player can stand in.

In the last phase of the fight, Lady Luctopus starts using the last new attack. This one is similar to the first attack, where she takes a card from her deck and shows it to the player, but this time the image on the card isn't a red lightbulb but a yellow lightning bolt. Like in the first attack, she throws the card in front of her, so the player has a chance to see it properly and react to it. After this, the anticipation animation continues. Two floating windows lift up behind Lady Luctopus and from these windows appear two of Lady Luctopus' tentacles, holding two external paddles for shock triggering from a defibrillator. At the same time as this happens, Lady Luctopus is not left idle, but she straightens her necktie. The tentacles slam the paddles together and move them to look like they're creating electricity.

Subsequently, Lady Luctopus lifts the defibrillator paddles up and looks down on the ground of the arena, signaling that that's where the paddles are going down upon. Then she quickly slams the paddles down on the arena, electrocuting the entire ground and making it a hazardous area that does damage to the player in the process.

Both these examples have 3 different attacks each that all have distinct anticipation in their animations. Anticipation can be something small like a change in pose like Hornet's attacks, or a longer array or multiple poses and movements in a row leading up to the attack like in Lady Luctopus' attacks.

5 CREATION OF A BOSS AND ITS FIGHT ANIMATION

For this project the aim of the author was to do something that met the criteria of fun as previously describes and could also fit into the visual characteristics of what is known as a 'cute' character, despite the goal being a villain and a boss fight. Thus, the whole design process was spent trying to determine if something that met the afore mentioned criteria could be made into something dangerous and villainous. First ideas and sketches were of a cat alien and a big robotic cat and then the development of the story for the character started when there was a theme idea as seen in Figure 12 (p 23). Inspiration for the character was taken from the bosses of Undertale (2015) and Deltarune (2018) both created by the game developer Toby Fox. The enemies in those games are all challenging but light-hearted and charming in their own way.

Figure 14. Studies and Sketches. (Kylmälä 2022)

The shape of the robot cat stayed round throughout the designing process; it was decided that it would be called MauMau2000. Figure This was because even

though villains are often associated with sharper shapes, as mentioned in the text about villain design, some enemies such as the previously showed Bowser from the Super Mario franchise and King Dedede from the Kirby games, are very round, especially King Dedede (Appendix 3). Bowser has spikes and triangular shapes, such as his hair and bracelets with small spikes, added to his design to give off a more menacing look despite the core shape being round. This is what was aimed at when designing the character for this project.
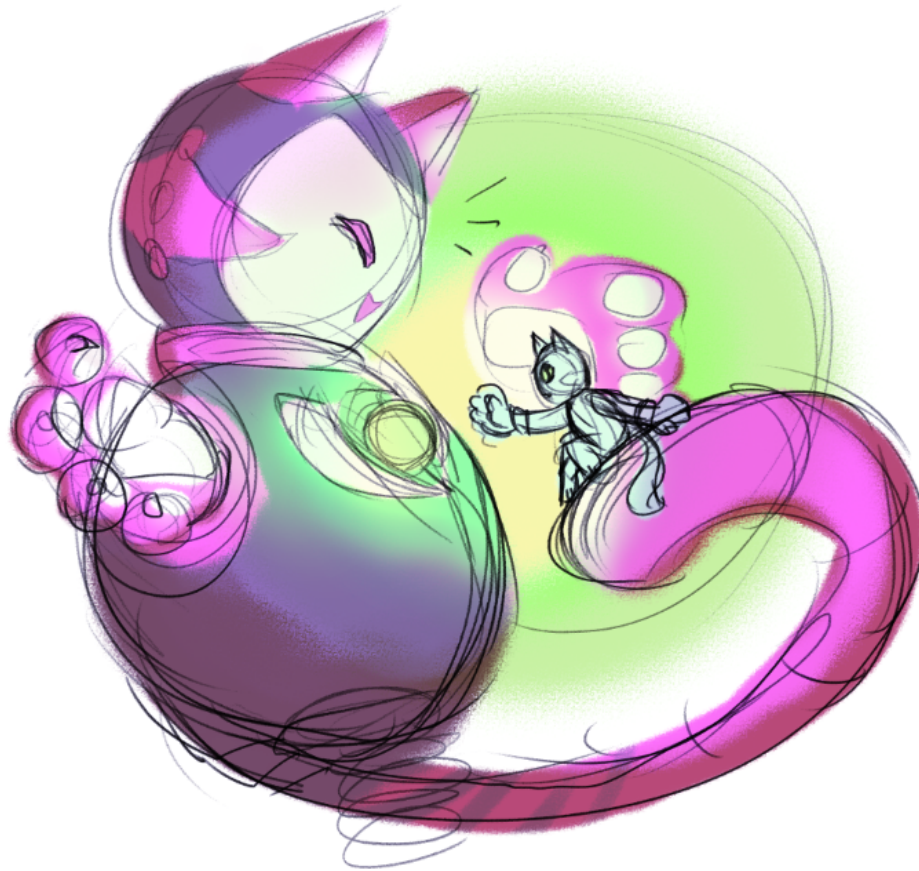
Figure 15. MauMau2000 and Bob. (Kylmälä 2022)

The big mecha, MauMau2000, is round and has a friendly face, before the fight starts and the boss gains sharper additional shapes in its design in the form of pointy metallic 'whiskers' popping out from the sides of its head and sharp claws appearing on its paws. It also opens its eyes to look at the player and starts smiling to reveal its sharp teeth. Though MauMau2000 doesn't truly have teeth

since its entire face is a screen, its facial expressions are mere projections. But the teeth still help give additional sharpness in the design and make the boss more menacing. The head of the mecha also pops off from the body and is attached by a long neck. This was to give the design an uncanny feeling and get more variety and difference in the boss battle design versus the usual design of MauMau2000.
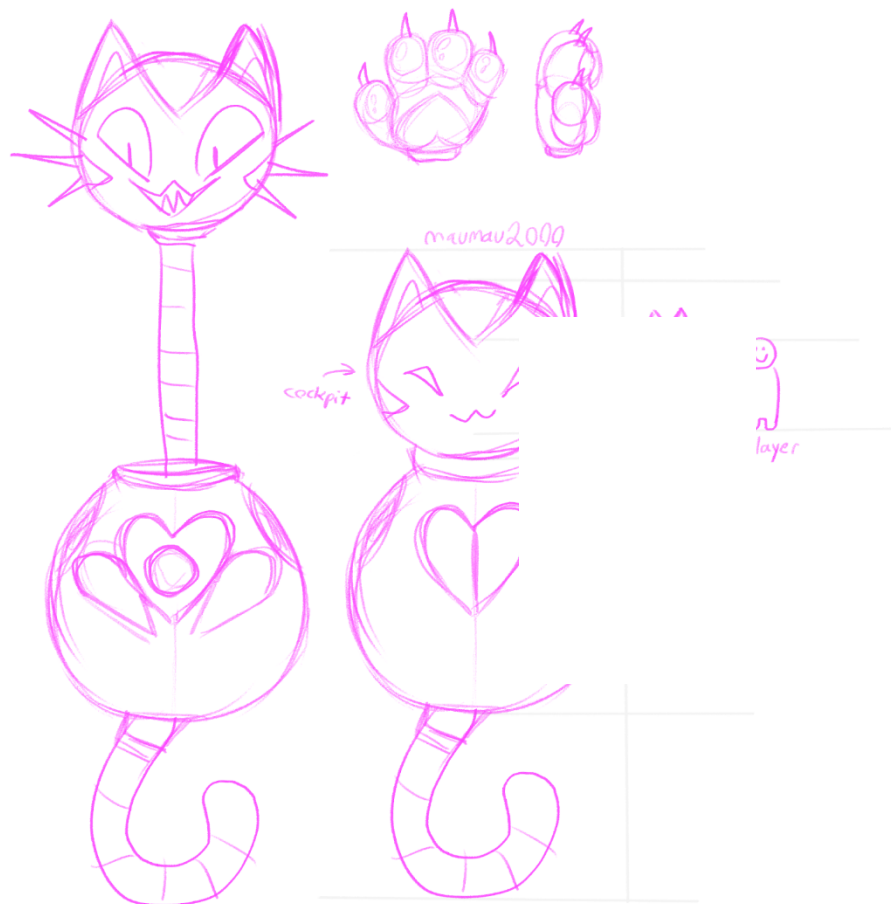

Figure 14. MauMau2000 and Bob the pilot size comparison. (Kylmälä 2022)

The original idea of a feline alien with gauntlets as a weapon wanted to be included in the final design of the boss so he became the pilot of the large cat mecha. Since the focus of this project is the mecha and its attack moves, the pilot's design is not finalized. The pilot "Bob" is an essential part of MauMau2000's backstory and they are aimed to be seen as a pair. MauMau2000 and Bob fit into the conflict creator category of antagonists since they don't want

to harm the protagonist, but they simply have opposing goals. The protagonist of the game would be the detective hired to find them and bring them back, but Bob and MauMau2000 do not want this and do everything they can to avoid it. This results in the protagonist having to confront them in a fight. Both Bob and MauMau2000 are anti-villains since their main goal is freedom and revenge against a megacorporation.

The characters also are appealing in their design which also fits the anti-villain archetype, making it easier for the players to sympathise with them. MauMau2000 by itself could into the machine archetype, if taken by its constitution only as a giant robot.

Figure 15. Bob and MauMau2000, study sketches. (Kylmälä 2022)

Originally when the character was going to be simply a small alien enemy with gauntlets it would've had two close range attacks with one ranged attack to give the attack pattern some variety so it would be interesting or challenging for the player.

As will be noted later in the boss fight analyses from Hollow Knight and Psychonauts 2, the enemies had only three varying attacks, so that's something attempted to incorporate into the project when brainstorming what attacks to design and produce. Three attacks are enough to give the fight variety without making it too complicated or difficult and time consuming to produce. The design for the cat mecha was a strong contender for the boss and eventually won against the smaller cat alien, since there were more ideas for the mecha's attacks than the pilot's.

In an ideal situation, both designs would be included into one boss fight as different phases, but this had to be cut due to time and health restrictions. In this version of the fight the player would first fight against Bob and his attacks would be punching the player, creating a damaging forcefield around himself and shooting a projectile at the player's location. The mechanics tested in this boss fight would be dodging, attacking, and jumping.

After the player would get Bob's health low enough, there would be a break in the fight while Bob losing all his health would trigger an animation of him teleporting into the cat mecha. The animation would be him simply disappearing and then the mecha MauMau2000 rising up from "behind" the boss fight arena with Bob in it before it closes and MauMau2000's 'face' lights up and the fight continues.

MauMau2000 works as the second phase of the fight, still keeping the theme of testing the player's skill of dodging and attacking and jumping. This phase 2 is the version of the boss fight that was animated for the project.

Attack one of MauMau2000 is it leaning its head and paw on either left or right side of the screen, blocking that part of the arena, and lifting one of its paws up. The floating paw would float above the player left and right and on the ground under the paw would be a shadow, indicating the area of effect. The paw stops after some time, the shadow on the ground and the glowing paw pads changes colour into red right before the paws slam down on the ground. Another version

of this attack would have both paws moving around the screen in a sideways 8 shaped pattern for a random amount of time, before starting the telegraphing for the attack. MauMau2000's body and head would keep looping in the idle animation while the paws float around the screen, with changes in expression when about to hit the player with its paws. (Figure 16)
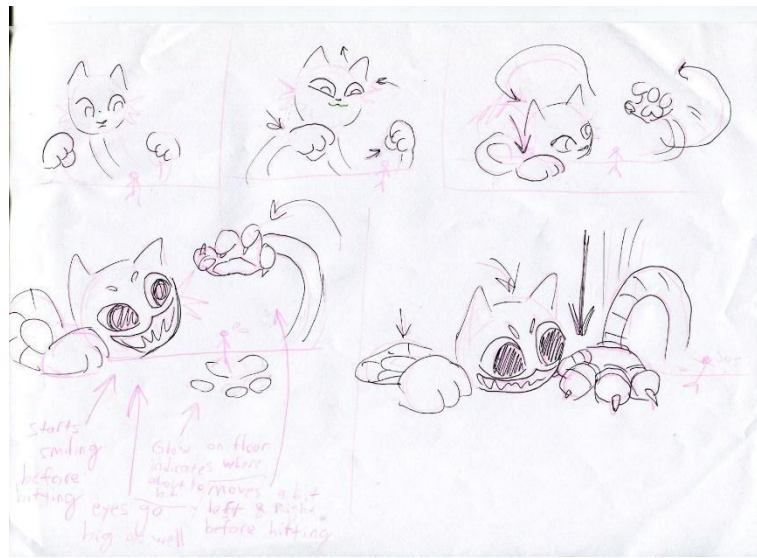

Figure.16 Plan and study sketches for Phase 1 Attack. (Kylmälä 2022)

Attack two of Maumau2000 is the heart shaped doors on its chest opening and revealing a glowing orb. The orb glows some lighter but still noticeable colour to communicate that this is a vulnerable spot for the boss. From this orb come diamond shaped projectiles that float around it and start aiming for the player and fly at them in small groups. The projectiles would change colour when about to launch to warn the player.

Third attack would be a paw swipe or a paw laser from either the right or the left side of the screen. Originally there was an idea for this to be a tail swipe attack, but for time limit purposes the tail had to be taken out of the final design to simplify it for animation. The paw swipe attack would be for testing the player's jumping skills. The paw would swipe fast near the ground from one side of the screen to another so the player would have to dodge it by jumping at the right time.

The same attack could be executed with a laser shooting from the paw that would force the player to jump over it, this laser animation would have a simpler execution when it comes to animating it, so it would be the ideal pick. The telegraphing of this would be the paws first disappearing from the screen to the direction of the side where they're going to pop up from again. The paw would float still on the side of the screen 'charging up' which would be seen as the glow of the paw pads turning red slowly and there would be some effects in front of the paw to indicate a laser beam charging before shooting. (See Appendix 7)

6   CONCLUSIONS

By taking on this thesis project, the author discovered that the lack of knowledge and experience on villain design and boss fight design was an obstacle, and more was needed to learn in order to be able to make an effective 2D boss fight animation. There was, and still is the desire to make 2D boss fight animations for video games due to the challenges they present, and the many skills that have to be mastered to be successful at this.

Working on this subject it has broadened the skills and knowledge of the author, when it comes to writing characters and how to make antagonists effective and work for the project they're created for.

There were aspects of the character design process that the author was already familiar with, such as shape language, colours theory and psychology and overall the creation of visual design for characters. The author was less experienced in writing, so all new knowledge about writing villains and what different categories there are, has provided the tools that will be continue to be used in future projects.

It was expected the process would be more confusing, since there is a lack of experience in design a proper boss fight from scratch. Reading and learning more about how boss fights work and being able to take the time to look at some of this author's favourite fights and how their mechanics and animations work together, helped immensely to deepen the understanding on how big a part animation and anticipation principles truly plays in them.

Learning how telegraphing has a wide variety of options on ways to execute them in a clear enough way, was a revelation on itself. It is surprising how much animation and detail can be put into something that happens so fast as boss fights, which leads to wonder about how other principles act in different animations of a game and how they interact with the mechanics of 2D games. It is important to point out that when it comes to the principle of anticipation, it can

be not just one anticipation movement, but a combination of multiple movements.

Anticipation plays an essential role in video game animation and especially in boss fights as studied in this text. In the future it would be recommended that taking some time to look more closely at how anticipation is executed in different boss fights and have a more comprehensive look into how they achieve it in various mediums and genres would be of enormous benefit to the author and anyone interested in boss fight animation for games.

Although it was not possible to show screenshots of the animation at the time the written part of this research was handed in, the animation process of MauMau2000 and Bob the pilot, continues. The author is highly interested in being able to continue working on animation for games since it was a pleasure learning new things and the author had a great time designing these characters.

REFERENCES

Boss Fight Database. 2018. Shadow of the Colossus PS4: All Bosses and Ending. Available at https://www.youtube.com/watch?v=9IFaTBN9wIo [Last Accessed 9 May 2022].

Camberos, B. 2011. Creating Hero Versus Villain Character Archetypes. EnvatoTuts. Available at https://design.tutsplus.com/tutorials/creating-hero-versus-villain-character-archetypes--vector-4241 [Last Accessed 9 May 2022].

Chariot Rider. 2018. [Design Deliberation] Boss Fight Design. Available at https://www.youtube.com/watch?v=ywshx1HPZU4&list=PLipWcAaLUnRTrbq1u3uFrf6LOtDFQVBwp&index=8 [Last Accessed 9 May 2022].

Concept Start. 2014. Shape language & silhouette in art & design. Available at https://www.conceptstart.net/art-tutorial/improve-shape-language-silhouette-in-concept-art-design-illustration [Last Accessed 9 May 2022].

Design Doc YouTube Channel. 2021. What Makes A Great First Boss? Available at https://www.youtube.com/watch?v=0NGBo3HUrn0&t=1s [Last Accessed 9 May 2022].

Final Fantasy FANDOM. Emet-Selch. Available at https://finalfantasy.fandom.com/wiki/Emet-Selch#Personality [Last Accessed 9 May 2022].

Floyd, D. 2020. ANTICIPATION - The 12 Principles of Animation in Games. New Frame Plus Youtube Channel. Available at https://www.youtube.com/watch?v=28s1Hv3Zqlo&list=PLipWcAaLUnRTrbq1u3uFrf6LOtDFQVBwp&index=34 [Last Accessed 9 May 2022].

Game Developer. 2019. The 12 principles of animation in video games. Available at https://www.gamedeveloper.com/production/the-12-principles-of-animation-in-video-games [Last Accessed 9 May 2022].

Game FAQS.2021. Available at https://gamefaqs.gamespot.com/boards/678050-final-fantasy-xiv-online-a-realm-reborn/78993815?page=7 [Last Accessed 9 May 2022].

Game Maker's Toolkit. 2017. How Cuphead's Bosses (Try to) Kill You. Game Maker's Toolkit YouTube Channel. Available at https://www.youtube.com/watch?v=F8T6UI4aHTI&list=PLipWcAaLUnRTrbq1u3uFrf6LOtDFQVBwp&index=18 [Last Accessed 9 May 2022].

Gamerax YouTube Channel. 2017. What Makes a Good Boss Fight?. Available at https://www.youtube.com/watch?v=d28xjiji9fc&list=PLipWcAaLUnRTrbq1u3uFrf6 LOtDFQVBwp&index=13 [Last Accessed 9 May 2022].

Jackson, T. 2021. The Everyday Scholar. *Episode 51. The Ethics of Batman: Lessons for the Modern World*. Available at https://podcasts.apple.com/us/podcast/the-ethics-of-batman-lessons-for-the-mod ern-world-ep51/id1473048843?i=1000541491939 [Last Accessed 9 May 2022].

Jenkins, J. 2022. What Makes a Great Villain? Your Checklist for Writing a Good Bad Guy. Available at https://jerryjenkins.com/what-makes-a-good-villain/ [Last Accessed 9 May 2022].

Keren, I. 2018. Boss Up: Boss Battle Design Fundamentals and Retrospective. GDC Youtube Channel. Available at https://www.youtube.com/watch?v=48Ymh4Ge5j8&list=PLipWcAaLUnRTrbq1u3u Frf6LOtDFQVBwp&index=9 [Last Accessed 9 May 2022].

Lehman, A. et al 2016. The best Animation Tricks (For 2016). Game Developers Conference 2016. Available at https://www.youtube.com/watch?v=_1j5Tf6ulII&list=PLipWcAaLUnRTrbq1u3uFrf6 LOtDFQVBwp&index=36 [Last Accessed 9 May 2022].

Literary Devices. Definition and Examples of Literary Terms December 2021. Antagonist. Available at https://literarydevices.net/antagonist/ [Last Accessed 9 May 2022].

Llano, E. 2020. The Philosophy of Batman. The philosophical background of this iconic character. Available at https://theapeiron.co.uk/the-philosophy-of-batman-86dd3bbacc84 [Last Accessed 9 May 2022].

Luo, Y. et al. 2018. Well-being and Anticipation for Future Positive Events: Evidences from an fMRI Study. *Frontiers in psychology*, *8*, 2199. Available at https://doi.org/10.3389/fpsyg.2017.02199 [Last Accessed 9 May 2022].

MasterClass (1a). The 4 Main Types of Antagonists. 2021. Available at https://www.masterclass.com/articles/the-main-types-of-antagonists [Last Accessed 9 May 2022].

MasterClass (1b). How to Write an Unforgettable Villain: Tips for Writing a Great Villain for Your Novel or Short Story. 2021. Available at https://www.masterclass.com/how-to-write-an-unforgettable-villain-tips-for-writing-a-great-villain-for-your-novel-or-short-story [Last Accessed 9 May 2022].

MasterClass (1c) 2021. 8 Villain Archetypes: How to Write Different Types of Villains. Available at https://www.masterclass.com/articles/how-to-write-different-types-of-villains#8-villain-archetypes [Last Accessed 9 May 2022].

Melior Games. 2019. The Key Principles Of Animation In Video Games. Available at https://meliorgames.com/game-art-design/the-key-principles-of-animation-in-video-games/ [Last Accessed 9 May 2022].

Mercer, B. 2021. The Ethics of Batman: Lessons for the Modern World. American Public University. Available at https://apuedge.com/the-ethics-of-batman-lessons-for-the-modern-world/ [Last Accessed 9 May 2022].

Millard, A. 2018. The Anatomy of a Bossfight. Adam Millard-The Architect of Games, YouTube Channel. Available at https://www.youtube.com/watch?v=6BL0O7CL0N4&list=PLipWcAaLUnRTrbq1u3uFrf6LOtDFQVBwp&index=11&t=1s [Last Accessed 9 May 2022].

Moleman, C. 2009. The Necessity of Interactive Animation for Games., London: Game Developer.Informa PLC Informa UK Limited. Available at https://www.gamedeveloper.com/design/the-necessity-of-interactive-animation-for-games [Last Accessed 9 May 2022].

NHS: The National Health Service. 2019. Children's Speech and Language Therapy Service, Anticipation Play. Available at https://www.leicspart.nhs.uk/wp-content/uploads/2019/02/Anticipation-Play.pdf [Last Accessed 9 May 2022].

Qwarky. 2017. Hollow Knight - Hornet fight. Qwarky YouTube Channel. Available at https://www.youtube.com/watch?v=jBdlJPHoaNw [Last Accessed 9 May 2022].

Reyhan, P. et al. 2021. How the Visual Design of Video Game Antagonists Affects Perception of Morality. Frontiers in Computer Science. Available at

https://www.frontiersin.org/articles/10.3389/fcomp.2021.531713/full [Last Accessed 9 May 2022].

Williams, R. 2012. The Animator's Survival Kit. Expanded Edition. Farrar, Straus & Giroux Publishers. New York, USA.
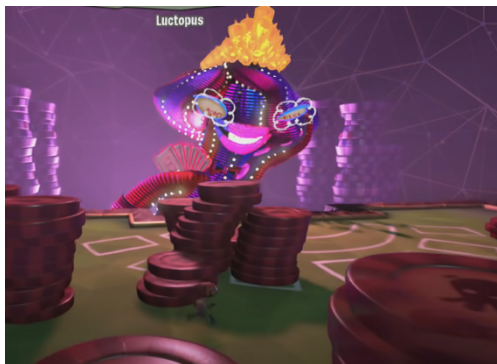
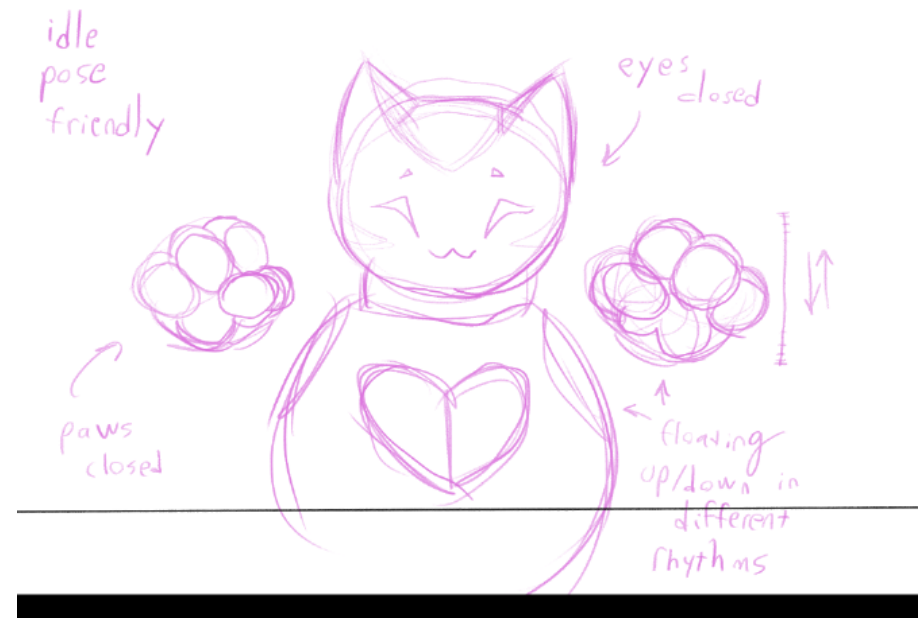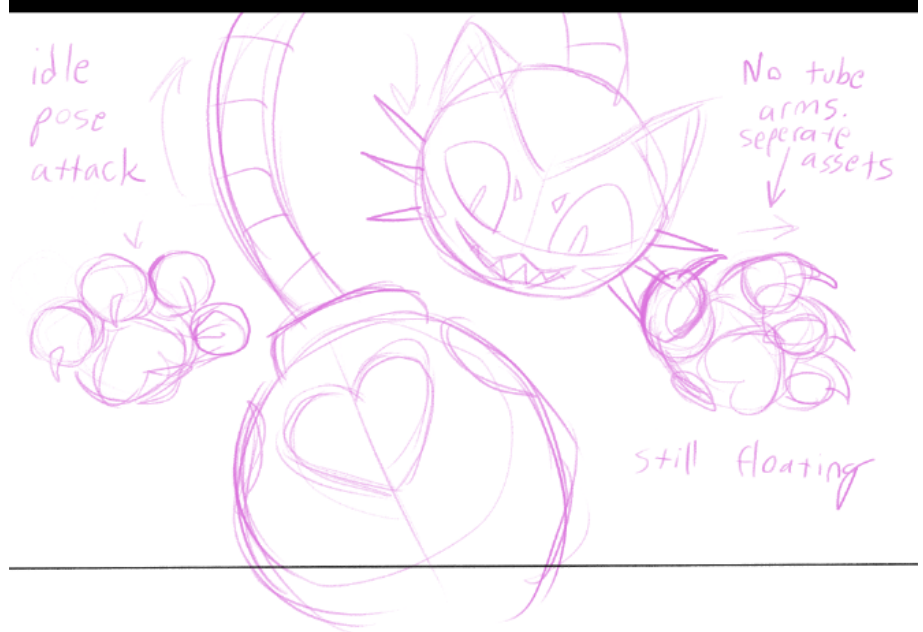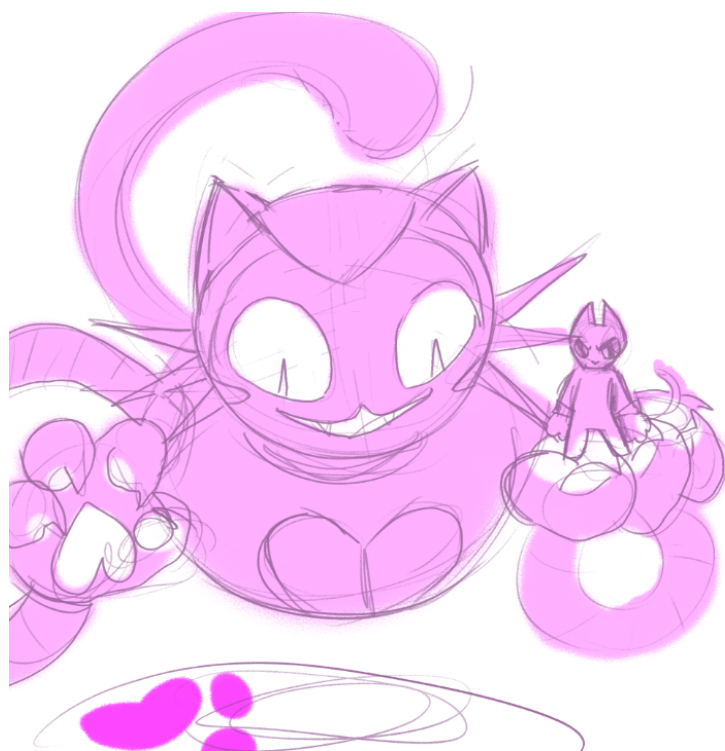**Attacks from Hollow Knight**
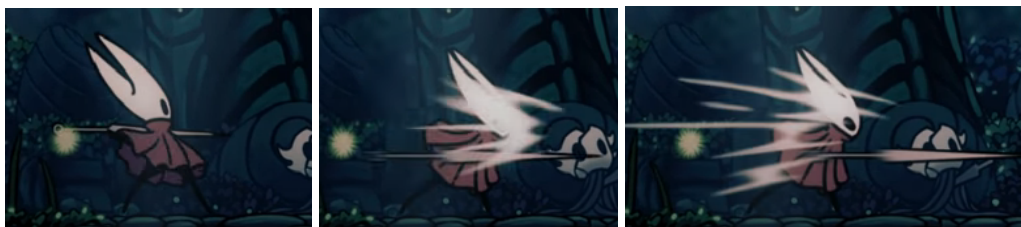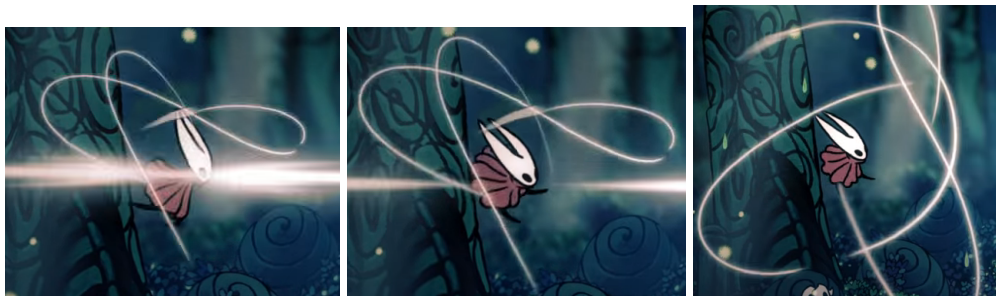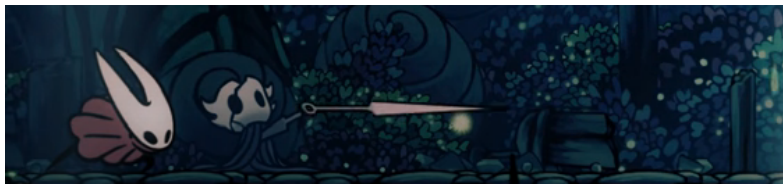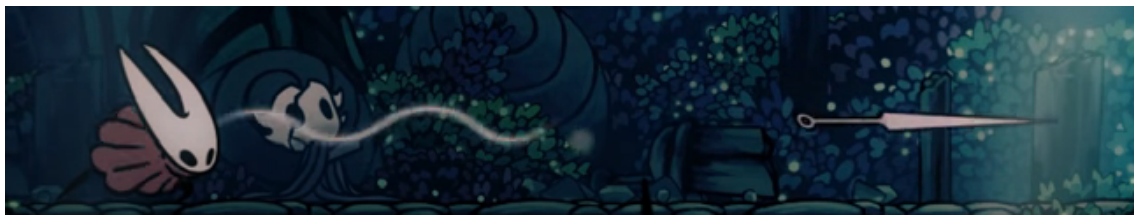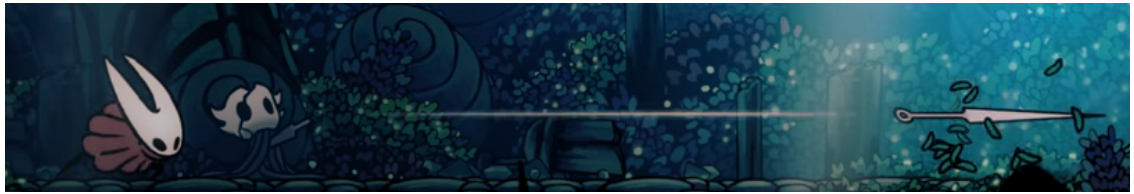
Lady Luctopus Attacks

King Dedede in its latest version thirty years after its original creation. (Nintendo 2022)

idle pose attack

No tube arms. seperate assets

still floating

idle pose friendly

eyes closed

paws closed

floating up/down in different rhythms

follows player

Big keyframe

make more menacing

Paws hanging onto ground

anticipation

flicks tail before stopping following with head and goes into attack anticipation animation

BIG fast action

Blocks part of arena & limits the dodging space
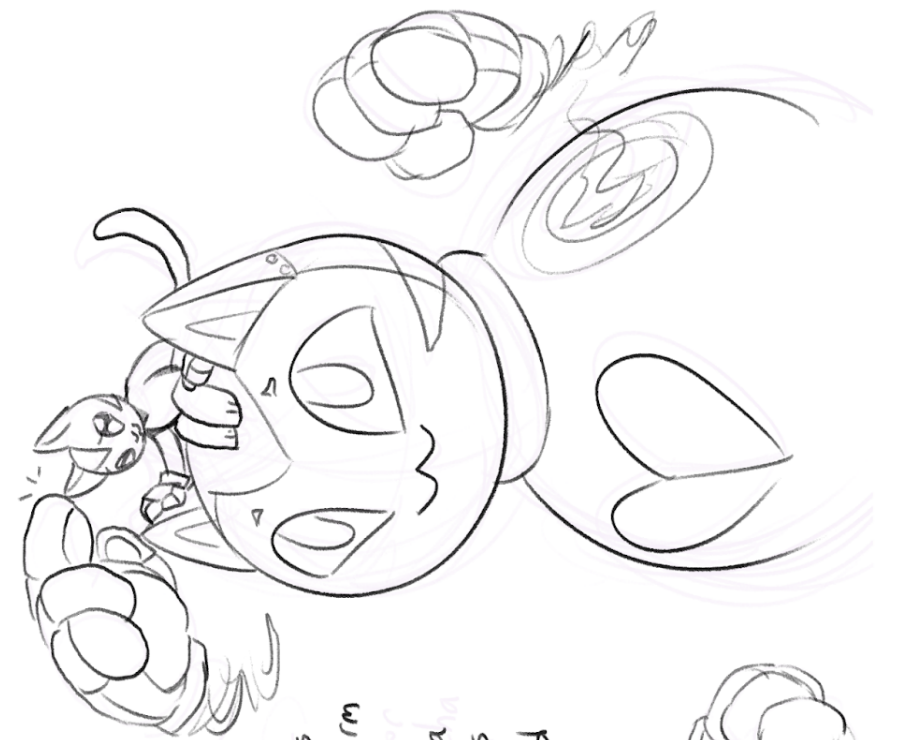
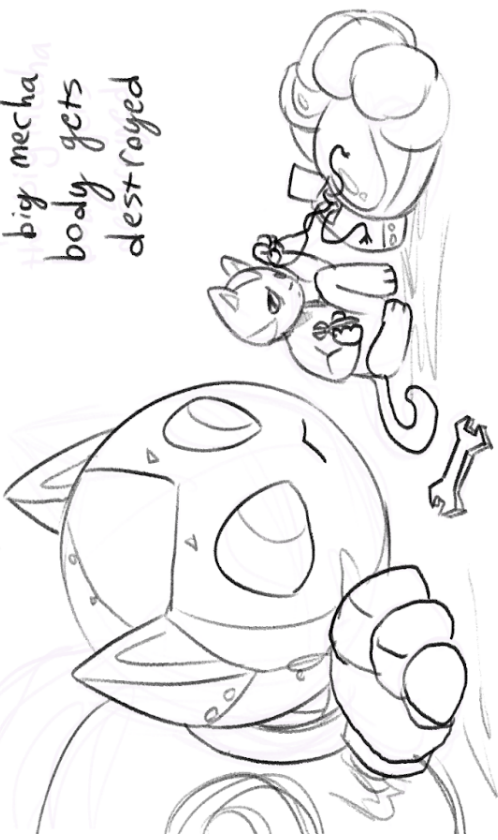rests head and paw on the arena like a lazy kitty
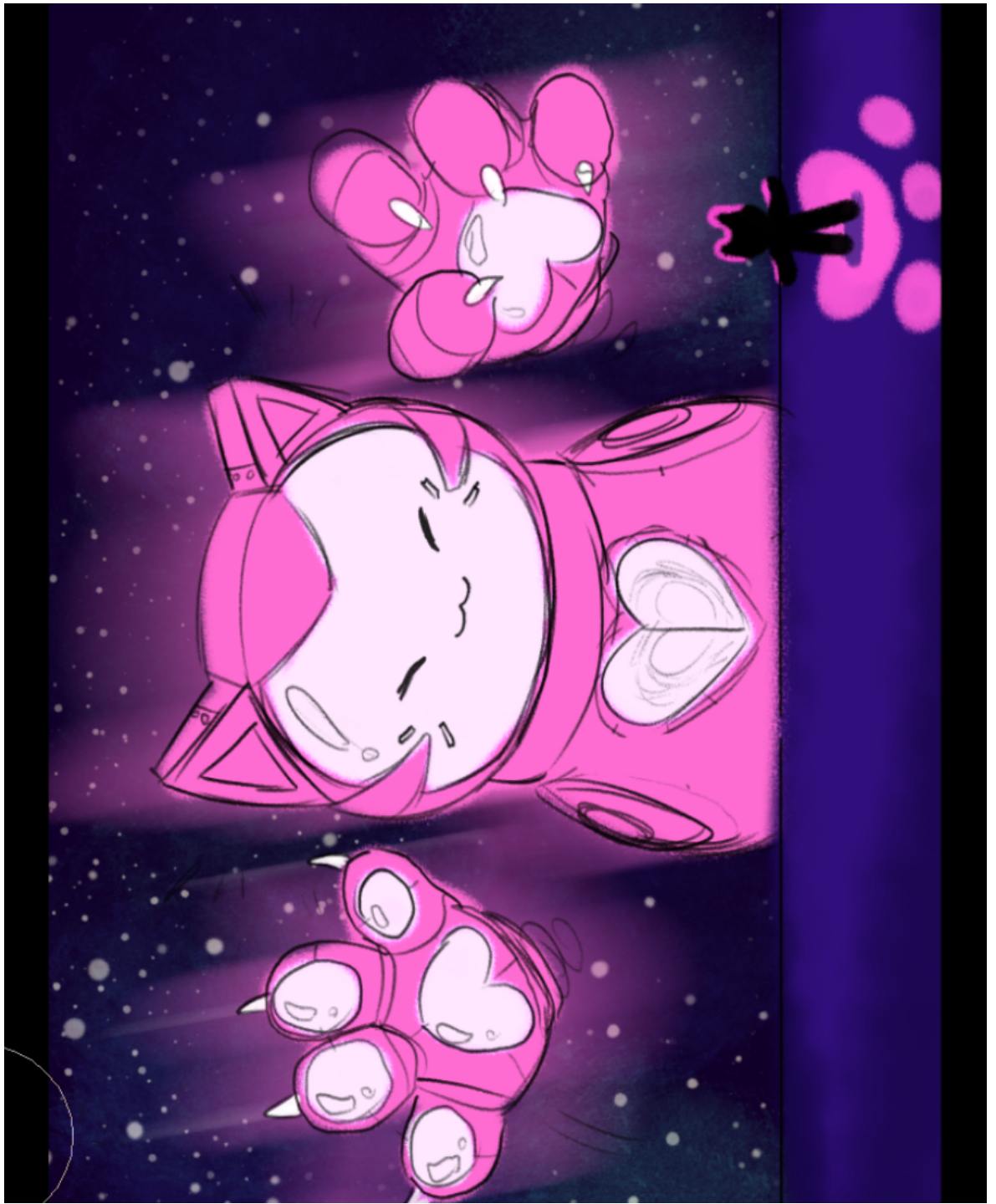
Appendix 8

MauMau's smaller form after the big mecha body gets destroyed

Classification of Villains by Type, Characteristics Physical and/or Psychological Attributes.

Type	
ARCHENEMY	ANTIVILLAIN
TROUBLEMAKER	BEAST
NATURAL FORCE	BULLY
SELF	MACHINE
	MASTER MIND
	EVIL INCARNATE
	HENCHMAN
	FANATIC