UNIVERSITI POLY-TECH MALAYSIA

A SILENT GEAR

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BACHELOR OF ARTS in 3D ANIMATION AND DIGITAL MEDIA (HONOUR)

UNIVERSITI POLY-TECH MALAYSIA
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FINAL YEAR PROJECT 02

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AUGUST 2025

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Abstract

Neglect is a profound and often overlooked issue that affects individuals emotionally, psychologically, and socially. In A Silent Gear, neglect plays a central role in shaping the protagonist's journey and the emotional depth of the story. Thomas, the aging clocktower keeper, dedicates his life to maintaining the mechanism that keeps the city running, yet he is ignored and ridiculed by the townspeople. Their disregard for his work fosters a deep sense of isolation and unworthiness, reflecting the real-world struggles of those who feel unseen and undervalued despite their contributions. The story intensifies when the city's clocktower begins to fail, and Thomas discovers that only two gears can replace the broken core: one in his prosthetic hand and the other in his companion Cog's core. His ultimate sacrifice, dismantling Cog to restore the tower, serves as a metaphor for how neglect leads to painful choices and irreversible loss.

By utilizing 2D/3D animation and visual storytelling, A Silent Gear conveys the impact of neglect in a deeply immersive and emotional way. Rather than simply discussing neglect as an abstract concept, the animation allows the audience to witness the consequences of unappreciated dedication and the emotional weight of being forgotten. The story also raises awareness about the cost of indifference and highlights the importance of recognizing and valuing those who contribute silently to society. Through Thomas's journey, the animation delivers a poignant message on appreciation, empathy, and human connection, encouraging viewers to reflect on their own perceptions of worth and gratitude.

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During my final year project report, I would like to especially thank you to my supervisors, Sir Amir Aarieff bin Amir Hussin and Madam Nur Fazlina binti Johar for providing such insightful direction, comments, ideas, and encouragement. I would like to thank Amir Aarieff bin Amir Hussin for motivating me and for providing ideas to help me to enhance my project and Madam Nur Fazlina binti Johar for guiding me in creating the final year project report. Furthermore, I would like to thank my family and friends for their spiritual support throughout my last year project procedures.

1. INTRODUCTION

Psychologists characterize neglect as a type of emotional deprivation in which individuals perceive themselves as neglected, undervalued, or unacknowledged, frequently resulting in enduring psychological and social consequences. Neglect may show itself as the society discount of someone's efforts or the neglect of the emotional needs of those seen less important. Gerdes (2020) claim that while neglect is frequently inadvertent, it results from entrenched prejudices, society conventions, or lack of empathy. People who or organisations ignore the value of necessary but invisible tasks help to reinforce sentiments of undervaluation and isolation.

The short 3D animation in this project, "A Silent Gear," looks at the big implications of ignoring things. The main character in the novel is Thomas, an old clocktower keeper in a busy steampunk city. His quiet dedication to his job keeps the city running without anybody noticing. The people don't want him because they think he's useless, even though he plays a crucial role in keeping their lives going. They understand the scope of their responsibility only after the clocktower stops permanently; by then, it is too late to show thanks.

Three stages which are pre-production, manufacturing, and post-production—will separate the whole 3D animation process that forms part of the project approach. Autodesk Maya will be used for 3D modelling and animation; Adobe Photoshop will be used for 2D components; additional tools like Substance Painter, ZBrush, and Adobe Premiere Pro will be used for texturing, sculpting, and video editing. This method makes sure that the 3D and 2D styles blend well to make a professional, emotionally powerful movie.

“A Silent Gear” is trying to convey a strong message about empathy and understanding in the current society, where we focus on neglect, respect or the meaning of work which isn’t seen,” he said. The animation's distinct style and moving story will have people reflecting on their relationships to others and the unsung heroes in their own lives.

1.1 PROBLEM BACKGROUND

The project's issue statement focusses on the need of emotional ties and gratitude for others especially those who quietly benefit society. those can get too preoccupied with their jobs and daily routines in the fast-paced world of today, thereby neglecting the sacrifices and efforts of others family members, mentors, even those who keep society running behind-the-scenes.

This idea closely relates to the narrative of Thomas and Cog. Thomas has spent decades keeping the clocktower in place so that everyday life in the city stays unbroken. The residents of the town, however, overlook his commitment and write off his labour as negligible. They consider the clocktower's chimes as second nature, just as many in real life take their loved ones for granted until they are gone.

Rather of depending only on words, the animation is a potent tool for visually and emotionally expressing this message. By use of Thomas's narrative, the audience will experience the weight of neglect, the agony of unrecognised sacrifice, and the need of appreciating those around us prior to it is too late. The death of Cog serves to stress further that true love and loyalty can come in various forms, including the quiet kindnesses of others who aid us without expecting anything from it.

What this project eventually intends to teach is that no one is invaluable and, while you may not realize how minimal or ordinary someone's contribution may be, respect and family are things that we should never take for granted.

1.2 PROBLEM STATEMENT

This idea looks at certain problems through the lens of narrative, by using the animation called ‘A Silent Gear’ to look at the emotional and cultural effects of ignoring people specialities. The story shows how hard it is for people who work in jobs that aren’t valued, how judging too quickly can hurt others, and how respect and understanding can make a big difference in someone life. By focusing on these topics, the story ties to get people to think that every works in this world matter.

1.2.1 Essential but Unnoticed Jobs Are Not Appreciated

There are many people who are still don’t value the jobs that are really important for this world to keep working. For example, people who work as a cleaner, maintenance workers or caretaker don’t often get thanked or praised. People don’t get credit for their work most of the time because they can’t see it, even if it’s important. This lack of regard makes those who execute these important tasks feel worthless and alone for longer.

1.2.2 Society Is Quick to Judge

People often identify themselves by their appearance, career, or position. Making snap judgments and assumptions about someone without knowing what they've been through or what they've done may lead to bias and alienation. This tendency to criticize others without knowing their situation or feeling sorry for them makes society unfair and hurts people emotionally for no reason.

1.3 PROJECT OBJECTIVES

This project will make an animated short narrative that shows how important it is to respect and care for others and recognize their labour. Inspired by steampunk, the story will focus on ideas of neglect, empathy, and the unseen labour of individuals altering society. The animation will visually and emotionally enthral viewers utilising 3D storytelling techniques even as it delivers its main point of view.

1.3.1 To teach people to value the work of others

With "A Silent Gear," the 3D narrative technique seeks to emphasise the need of appreciating the effort of others and the worth of disregarded contributions. The emotional depth of the story is meant to inspire viewers to consider their behaviour towards those who could appear little but are rather important in their life.

1.3.2 To remind people to treat others with kindness

The animation aims to raise awareness among viewers of how social neglect and judgement based on income, position, or physical ability could emotionally and socially damage persons. Through presenting the life of the protagonist, Thomas, the initiative aims to motivate viewers to treat others with more empathy, respect, and compassion.

1.4 PROJECT SCOPE AND LIMITATION

The narrative of the project is around an ancient clocktower keeper from a steampunk city whose hard work goes unnoticed by everyone. Thomas spends all of his time taking care of the tower that governs the city, except for when he's with his robot friend Cog. When Thomas makes the ultimate sacrifice to rescue the tower as it starts to crumble, he brings up themes of neglect, the necessity for secret efforts, and how important it is to treat people with love and respect.

1.4.1 Project Scope

"A Silent Gear" is a three-minute short film that is being made in 3D. The main point of the story is to teach a strong moral lesson about how important it is to treat everyone with respect and value them, no matter who they are, how rich they are, or how physically strong they are. It also shows that it has depth of feeling. The finished product will be shown in 1080p Full HD resolution to make sure that the pictures are of professional quality and the story is fully engaging. Adding subtitles will also help more people see and hear it. After it's done, the animation will be shared online and shown on sites like YouTube.

The table below is the final output specification:

Specification	Description
Resolution	1920 x 1080 pixel
Video Format	MP4 in x264 codec
Duration	3 minutes
Type of content	3D Animation

Table 1: Final Output Specification

1.4.2 Project Limitation

When doing this project, there are a lot of limits I have been facing on especially when it comes to time and technical problems.

1.4.2.1 Time

The 3D animation process has to be extremely careful and pay attention to every detail at every step, in order to have a great final product. For example, while working with 3D texturing, it is highly important to keep the topology error-free since any problems with the topology might mess up the texture system and harm the final output. This method takes a lot of time and involves finding and repairing problems in numerous parts.

1.4.2.2 Technical Hardware

The create this project it needs both 2D and 3D animation tools like Adobe Photoshop and 3D Autodesk Maya. This means it needs a powerful technology so it can handle a lot of data complex and smooth rendering process. However, hardware problems like not enough storage, bad graphic or not enough device could slow down the process of making it. So, by improving the current equipment might help me making sure that the project goes smoothly.

1.4.3 Project Target Audience

This animation is for teens and young adults between the ages of 15 and 30. Kids teen in this group really like animation and visual story telling as a way to have fun (SCISPACE, 2024). By using this medium method, the goals like want to teach more important lesson such as respect others is really a choice. The animation tries to get teens to think about their behaviours and relationships by showing a touching narrative that stresses the significance of being nice to others and appreciating them. This will help them develop empathy and encourage good social conduct.

1.5 PROJECT REQUIREMENT

1.5.1 HARDWARE REQUIREMENT

Good computer performance is needed to finish the project on time. Different steps in the animation process require different levels of computing power.

Figure 1 Nitro 5 AN515-58-777X Gaming Notebook

Nitro 5 AN515-58-777X Gaming Notebook as Figure 6.1 shows is a gaming laptop that will be used for creating this project.

Description	Recommendation Specification	Purpose
Central Processing Unit (CPU)	Intel i7 13700K	Processing unit for 3D modeling and rendering.
Graphic Processing Unit (GPU)	ASUS TUF GAMING GeForce RTX 4090 OC	Speed up rendering and editing.
Ram	16 GB	More power improves software stability.
Storage	512 GB	Required space to store all necessary programs and files.

Table 2. Hardware requirement laptop for creating the short animation.

Figure 2 Ipad Air 4th Generation

The Ipad Air 4, shown in Figure 6.2, is a drawing tablet used during the pre-production and production stages. It is helpful for creating 2D animations and adding textures to assets or characters.

1.5.2 SOFTWARE REQUIREMENTS

The animation process uses several programs at different stages. Some are used throughout the process, but most are designed for specific tasks that need special tools not available in other programs. Table 3 shows all the software requirements that will be used for the project:

Software	Description
Adobe Photoshop	This will be used to create the 2D animations, textures for characters and assets, as well as storyboards and concept designs for characters and environments during the early pre-production stage.
Adobe Premiere Pro	This will combine all the 3D and 2D animations into a complete video during the post-production stage.
Autodesk Maya	This will be used to create everything related to 3D, including character modeling, rigging, lighting, props, backgrounds, and animations.

Substance Painter	This software will be used to add textures to models and assets, including the environment, characters, and props in the animation.
ZBrush	A digital sculpting tool that will be used to add detailed designs to characters, props, and backgrounds to ensure everything looks polished and matches the final design.

Table 3. Software Requirements

1.6 CONCLUSION

The fundamental themes of "A Silent Gear," neglect and respect, capture the emotional complexity of how society often ignores the efforts of those who deviate from accepted ideas of success. The narrative of Thomas exposes the terrible results of negligence and shows his quiet will to keep the city's pulse despite bearing criticism and contempt. By means of his final sacrifice, the story imparts a strong message about the need of appreciating every person, regardless of their position or social function. This little 3D animated animation aims to amuse as well as provide a moral lesson, thereby highlighting the society inclination to reject and criticise individuals seen to be little. The initiative aims to motivate viewers to treat people with compassion and acknowledge the invisible efforts maintaining the movement of the planet by motivating empathy and awareness. From pre-production to post-production, this animation offers necessary hands-on experience in the animation process, thereby developing talents in character design, narrative, and animation. It not only gets producers ready for the demands of the business but also sends a human message that appeals strongly to viewers.

2. Literature Review

2.1 Introduction

This literature research will compile and review several sources and references to enable one to completely grasp the subject. Together with studies of current projects, character studies, analyses, and pilot studies, this chapter will clarify the vocabulary utilised. Literary study seeks to provide a good grasp of the ideas that will be portrayed in the short 2D/3D animation as well as knowledge on the relevance of the subject to the target audience.

2.1.1 Terminology

Neglect is a deeply ingrained societal issue most often overlooked until its ramifications are permanent. It results from individuals or their contributions being overlooked, which produces mental anguish, loneliness, and a feeling of purposelessness. Neglect may manifest itself in many ways, from institutional and corporate control to social and familial neglect. Long-term effects of a person's psychological impact—which comprises of depressed symptoms, a decreased sense of belonging, and feelings of worthlessness—may be on their mental and emotional health (Gerdes, 2020).

Studies suggest that long-term neglect could alter a person's cognitive and behaviour capacity, therefore lowering their motivation and raising their social disengagement. Older persons who feel underappreciated despite their lifetime achievements notably show this. Like the effects of long-term loneliness, social isolation, and lack of recognition, social isolation and mental illness may become worse. Consistent disrespect or undervaluation of people's sense of purpose reduces their overall well-being and productivity (Smith et al., 2021).

Thomas serves as a metaphor for society's forgotten people in A Silent Gear—those who have devoted their life to furthering a higher good but are never acknowledged or thanked. He works tirelessly to keep the clocktower in good condition, but the villagers don't care since they think "anyone could do his job." He becomes alienated as a result of this social indifference, which supports the notion that individuals only really appreciate the contributions of others once they are no longer around. A Silent Gear encourages viewers to recognize and appreciate the unseen efforts of those around them before it's too late by using animation to show neglect and the negative effects of social apathy.

2.1.2 History

People have been neglecting others for a very long time, and most of the time, no one notices until the damage is done. People who put in a lot of extra hours behind the scenes have never been caught. Their work is only noticed when they can't do it any longer. People who have been neglected are not alone; it is a problem in society and culture that has changed how we think about worth and respect. In old societies, fighters, kings, and thinkers were often the only people who were noticed. Caretakers, workers, and artists were mostly forgotten. That's what the Greek philosopher Aristotle believed: only people who other people thought were "great" deserved respect and honor, which he believed were necessary for a happy life. From 2015 by Garrett Ray Harriman, it was thought that some people should get more credit than others. This created a fixed order in which people with important but secret roles were ignored.

Some people have also connected the idea of meaning to not paying attention to things. In many places, how much someone affects society is a big part of how much they are worth. People may feel alone just because they are not feeling seen. They could lose their sense of self, and be hurt in a personal way. History shows that grou[s that aren’t valued, like older workers, have had emotional health problems because the communities the work for don’t value them (Smith et al., 2021). Thomas’s job as a clocktower guard in A Silent Gear shows this idea. His job is important, but not enough people recognize it. This is similar to how people used to not notice quiet efforts. The narrative serves as a warning that neglect is a pervasive social problem that should not be acknowledged when it is too late.

2.1.3 Related works

I. Hugo The Movie

Figure 3: Hugo the Movie (Martin, 2011)

Figure 3 shows a series called “Hugo”. Hugo (2011) is a historical adventure drama directed by Martin Scorsese. the story follows Hugo Cabret, a 12-year-old orphan who secretly lives inside the walls of a busy train station. His father, a clockmaker, passed away in a tragic fire, leaving Hugo with an unfinished automaton a mechanical man designed to write with a pen. Hugo believes that if he repairs the automaton, it will deliver a message from his father. However, to complete his work, he steals mechanical parts from a grumpy old toymaker’s shop inside the station.

The toymaker, Georges Méliès, catches Hugo stealing and confiscates his notebook filled with sketches of the automaton’s inner workings. Determined to retrieve it, Hugo teams up with Isabelle, Méliès’ adventurous goddaughter, who is eager to unravel the mystery. Together, they find that Méliès is not just a toymaker but also one of the most influential pioneers of early cinema, a forgotten director who produced fanciful pictures but was driven into silence after World War I.

Hugo and Isabelle discover Méliès's background as they try to fix the automaton, therefore helping to preserve his legacy. A film historian helps Méliès find his lost pictures and at last honours his contributions to cinema. The film concludes with Hugo finding a new purpose not just as a boy fixing clocks, but as someone who understands the magic of storytelling and human connection.

II. Violet Evergarden: The Movie

Figure 4: Violet Evergarden: The Movie (Taichi, 2020)

The story is set years after the war that once consumed Violet's life as a soldier. Now, she works as an Auto Memory Doll, writing letters for others to help express emotions they cannot put into words. The last words Violet heard from her boyfriend, Major Gilbert Bougainvillea, who she thought had died in battle, were "I love you." He is making her feel better mentally, and her job is giving her meaning, but she can't let go of her feelings for him.

Daisy, a little boy, finds old letters that Violet wrote and is very interested in what she had to say. People can see how Violet's letters have changed people's lives, even after she is gone, through Daisy's eyes. Violet and the other people who work at CH Postal Service get a strange request from an island that is very far away from everything else. When Violet looks into it, she learns the shocking truth: Gilbert is still alive.

However, he has been living alone because he feels he doesn't deserve to be with her again because of the pain he caused in the battle. Gilbert doesn't want to see Violet because he believes she should move on. Violet is very sad, but she is eager to tell everyone how she feels. Finally, she tells Gilbert everything that's been bothering her. She lets Gilbert know how she feels and says that she has changed.

No matter what, she tells him, she still wants to be with him. After hearing what she had to say, Gilbert finally lets himself accept her love, and the two get back together. Violet stops being an Auto Memory Doll at the end of the movie and plans to live on the island with Gilbert. Daisy, on the other hand, finds her own reason for living after hearing Violet's story. This is proof that Violet's memory lives on and inspires others.

III. Spirited Away

Figure 5: Spirited Away (Miyazaki, 2001)

Ten-year-old Chihiro Ogino and her parents are on their way to a new home when they see what looks like an empty entertainment park. While Chihiro's parents look around and eat from an unguarded stall, she goes deeper and meets a mysterious kid named Haku, who tells her to leave before it gets dark. After eating the special food, Chihiro's parents turn into pigs, and before she can get away, the town turns into a busy spirit world run by the evil witch Yubaba.

She has to work at Yubaba's baths, which is for gods and ghosts, because she is scared and by herself. Getting her a job and telling her that Yubaba rules people by taking their names is how Haku helps her stay alive. To stay safe, Chihiro needs to remember who she is. Yubaba names her "Sen," which means "lost," to show that she is no longer herself. Sen meets many ghosts while working at the bathhouse. One of them is the greedy No-Face, who falls in love with how nice she is.

She also meets Lin, who works at the bathhouse and is rude but friendly, and Kamaji, who is in charge of the heating system and has many arms. She is brave when things get tough and gains her confidence with Haku's help. She also finds out that Haku is a river spirit who helped her stay alive as a child. But Yubaba controls him, and he is cursed because he stole a magical seal from Yubaba's twin sister Zeniba.

Chihiro wants to protect Haku, so she sets out to find and return the stolen seal to Zeniba. This shows that she is becoming braver and more independent. When she meets Zeniba, she is friendly and helps her understand that her love for Haku might set him free. To pass Yubaba's last test, which was to find her parents among a group of pigs, Chihiro goes back to the baths and faces her. Once she knows who she is, Yubaba lets her go. Haku, who is no longer cursed, helps her return to the world of humans. The parents of Chihiro return to

normal as she crosses the river and leaves the ghost world. They don't understand what took place. As they drive off, Chihiro gives one last look back. Since her trip, she's grown up.

2.1.4 Character references

I. Main character

Thomas, who works as a clocktower guard and is in his 70s, is a guy who is always committed. He has silvery hair, deep lines, and tired but alert eyes. He wears a dirty work coat and tough boots, and the thing that makes him stand out is a brass and steel replacement. People in the town ignore and make fun of Thomas, but he is still dedicated to keeping the city's old clocktower because he believes that everyone has a role to play, even if they aren't known for it.

- **References**

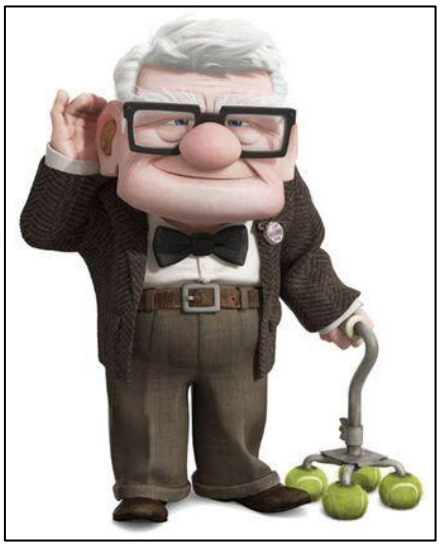


Figure 6: Carl Fredricksen from UP

Figure 7: Kamaji from Spirited Away

II. Side character

Cog, a small, brass-bodied steampunk robot with exposed gears, and a faintly lit core. Though unable to speak, Cog expresses itself through soft whirrs, clicks, and gestures, displaying an almost human-like emotional intelligence. It assists Thomas tirelessly, offering silent comfort in his moments of loneliness.

- **References**

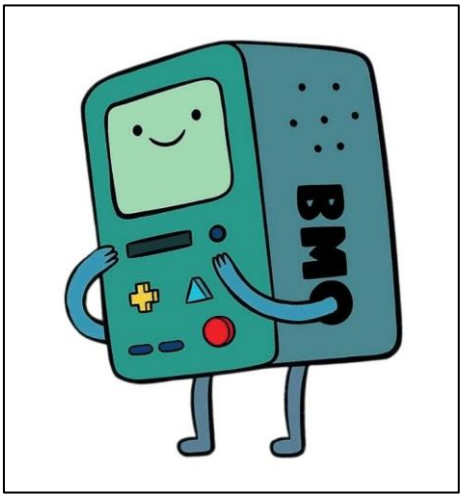


Figure 8: Beemo from Adventure Time

Figure 9: Wall-E from Disney Pixar Wall-E

2.1.4 Environment references

The environment will be a big steampunk city which relies on large clockworks all around to keep the city alive. In the middle of this is the ancient clocktower, a tall structure that has long kept time for the city, a bastion of order and progress. Inspired by classic steampunk aesthetics, the environmental theme runs with industrial decay, massive interlocking cogs, and ornate, brass-riddled buildings before evoking a sense of grandeur with moments of fragility.

- References

Figure 10: Clocktower inspired from Pinterest

Figure 11: Chamber from Professor Layton and the Unwound Future

Figure 12: Workshop inspired from Pinterest

2.2 Analysis

Storyline analysis

Criteria	Hugo	Violet Evergarden	Spirited away
Duration	2 hours 6 minutes	2 hours 20 minutes	2 hours 5 minutes
Background	Steampunk city	Japanese old traditional city	Fantasy world
Storyline	Hugo Cabret, an orphan, lives in a Paris train station's wall and maintains its clocks while repairing his father's enigmatic automaton. He meets Georges Méliès, a great director turned bitter toy store proprietor, and Isabelle, his daring goddaughter, on his search. Hugo finds Méliès' buried cinematic heritage while solving the automaton riddle. Hugo finds a home and purpose while restoring Méliès' cinematic legacy via tenacity and friendship. Taking place in a gorgeous steampunk Paris, the narrative addresses grief, purpose, and storytelling.	Former soldier turned Auto Memory Doll writes messages for others while struggling with her love for Major Gilbert Bougainvillea, whom she thinks is dead. She meets Ulysse, a terminally sick youngster, who wants to write his family a passionate letter. A stunning discovery is that Gilbert is alive but living in seclusion, feeling he no longer deserves Violet. Violet searches for him, bringing them together for a passionate declaration of love. The video tenderly depicts love, grief, healing, and human connection, ending Violet's story.	After her parents turn into pigs, 10-year-old Chihiro Ogino discovers a wonderful realm. Chihiro must labor in a bathhouse to save spirits in Yubaba's spirit world. With the mysterious Haku, she navigates the strange and deadly realm, confronting obstacles that test her strength and resilience. She frees her parents and finds Haku's identity as she becomes stronger and more autonomous. Chihiro outwits Yubaba and goes back to mankind changed by her adventure.

Table 4: Discussion on story comparison

Analysis on Character

- Thomas

Criteria	Carl Fredricksen	Kamaji	Add 1
Characteristic	Body pattern	Body pattern	

Table 5: Analysis of Thomas

- Cog

Criteria	Wall-E	Beemo	Add 1
Characteristic	Personality / color pattern	Body Pattern	

Table 6: Analysis of Cog

Analysis on Environment

Criteria	Clocktower	Chamber	Workshop
Characteristic	Shape pattern	The entire looks	The arrangement

Table 7: Analysis of the Environment

2.3 Discussion

I really looked closely at the storyline, the character I am choosing, the setting of the animated that suitable for the concept line and it shows that everything is align with the main theme of social neglect and sacrifice. The story is about an old clocktower keeper named Thomas and his robot friend Cog, who keep the city running even though most people don't appreciate them. The character and setting mode had to be drawn in a way that matched the story's emotional and moral lessons in order for it to work.

Thomas is the main character for my animation story and his design concept shows how old, weak, and dedicated he is by giving him a mechanical hand that stands for both strength and sacrifice. Meanwhile, Cog is his friend, was made to be a minor character who is friendly and loyal. He was supposed to make Thomas less lonely. The character was made to show how human with feeling and robot with none feeling also can connected and loyal until their last breath. This made the ending scene more emotional when Cog take over Thomas's job after he died.

The research on the environment showed that the clocktower and the steampunk style city around it are very important. I do not want it to looks like just a background scenery instead of its representation of time, and how society depends on it. when the clocktower breaking down at the end of the animation, it shows how the setting directly affects the story. It also show emphasises how neglecting people cam have serious Impact on others.

The story, the characters, and the setting all work together to make the animation's message stronger. The style of the art was carefully chosen so that it would not only look good, but also help tell the story and show how emotional it is. By using elements of steampunk design and character-driven stories, the end result is an animated project that flows well, and each design choice supports the message of valuing each person's addition to society.

2.4 Conclusion

Basically, disregard and sacrifice are two ideas that go against each other and change how people think about their worth and role. When we ignore someone, whether on purpose or not, they are generally pushed into our lives in a way that is scarier than we can handle. This is what Thomas does when he delivers his meaningless part with a spike of anger. Cog's decision to give up its whole life for the sake of others, on the other hand, shows that sacrifice can be a very honest and selfless response. They show the conflict between society's rejection of quiet, the work that needs to be done, and the emotional cost of being helpful. Although both indifference and sacrifice are heavy, the story shows that there is real meaning in people who are willing to give up their lives for the sake of others, even if there are no direct ties between the carer and the looked for. The world depends on us.

3. Methodology

3.1 Introduction

An animation pipeline is a well-thought-out plan that shows all the steps that need to be taken to make an animation project happen, from the first idea to the end production. The process for the 3D cartoon short "A Silent Gear" is made up of three main steps: pre-production, production, and post-production. Pre-production includes coming up with ideas for the tale, writing it, making storyboards, and making the steampunk-themed characters, sets, and props. Along with rigging the characters for animation, moving the scenes, and rendering them with the right lighting, backgrounds, and effects for the setting, the main focus of production is on making 3D models of Thomas, Cog, and the clocktower. The last steps of post-production are editing the frames that were made, adding sound effects and music to make the movie more moving, and changing the images to make the end product look great.

This project relies on an animation process to keep track of its complexity and make sure it's finished by the due date. The procedure consists of many complex procedures requiring exact synchronisation across several stages: designing character emotions, animating gear systems, and building the storming climactic scenario. Without a clear pipeline, delays at any level might throw off the whole plan, therefore complicating management of the project. Following this method helps the production crew to properly allocate time to every step, therefore guaranteeing that the final 3-minute animation perfectly realises the emotional depth, moral message, and steampunk style.

3.2 3d/2d Animation Pipeline

3.2.1 Pre-Production

Any 3D/2D animation project starts pre-production, in which case the basis of the animation is meticulously created by design, planning, and preparation. This phase helps outline ideas, stories, and visuals needed for the project, ensuring clarity and reducing confusion before production begins. Below are the key steps in the pre-production phase for "A Silent Gear."

- **Ideation**

Every great animation begins with a compelling idea. For "A Silent Gear," ideation involves brainstorming story concepts, characters, and themes. Once the concept is developed, it is presented to the supervisor for approval to ensure alignment with the project's objectives.

- **Story Creation**

  The story is made and improved until it reaches the satisfaction from me and my supervisor. In this part, I am setting up the story's structure by deciding on the character's roles, the conflict and the lesson I want to give. After getting feedback from my supervisor, the story can started to produce.

- **Script Writing**

  After story is done, a good script is written. The script is where everything about the story is told like when things happen, who the one who supposed to have the conversation, what they are doing, what time when its happen. To get more impact on emotional moment part, I put a very extra thought on the script so it can get the desired effect.

- **Storyboarding**

  Storyboard I where people show the story by picturing it. These shows how important event, character pose, camera angles, and changes was made. In storyboard, the first thing to have been a small sketch to test out the idea. Then it can turn detailed storyboard once I satisfied with every storyline.

- **Animatic**

  An animatic is what we called a simple animation or rough animation. The sketch is turned into one. This is done to make the pictures flow better. This can give me a sneak peek at how my finished animation will look like before proceed to 3D animation.

3.2.2 Production

During the production phase, all of the project's visual and video parts are made. These parts bring the story and ideas created in the pre-production phase to life. Using the information and plans made earlier, this step includes making characters, sets, settings, and scenes. Success in the production phase relies heavily on the

groundwork laid in pre-production to ensure smooth progress. Below are the core steps involved in production for "A Silent Gear."

- **3D Modeling**

  Using specialist tools like Maya, characters, objects, and backdrops are created in three dimensions. For "A Silent Gear," minute elements as the gears, chains, and Thomas's steampunk prosthetic hand are fashioned to complement the project's visual design.

- **3D Texturing**

  3D models are lifelike by use of textures and surface attributes including colours and materials. Texture designers provide intricate designs and finishes; for Cog, metallic surfaces; for Thomas's tools and clothes, weathered, worn textures.

- **3D Rigging**

  Rigging is providing a skeleton foundation to 3D models so that animators may easily move and posture them. While other components, like clocktower gears, are rigged for mechanical animation, Thomas and Cog are rigged for this project to enable expressive motions and interactions.

- **Lighting**

  Lights set the mood and atmosphere of a scene and make them better. The lighting in "A Silent Gear" is carefully changed to capture the mood, whether it's the warm brightness inside the clocktower or the dark, stormy light during Thomas's last hours.

- **Rendering**

  Characters, backdrops, lighting, and shadows help to distinguish the scenes. These layers are exported for post-production, where they are combined and polished.

- **3D Animation**

  The cartoon characters and objects bring the story to life and make it more emotional. In "A Silent Gear," artists focus on Cog's exact, mechanical actions and Thomas's slow, deliberate moves to show how his body is ageing and how they are connected.

- **2D Rough Animation**

  For sequences requiring 2D elements, rough animations are created to establish timing and movement. These rough sketches provide a foundation for further refinement.

3.2.3 Post-Production

This step is very important because it will make the movie look better, feel better, and be easier to understand. Some of the main tasks in post-production include lighting, rendering, visual effects, compositing, colour correction, editing, and putting together the final soundtrack. To generate a completed product that is polished and united, each component contributes to the entire process.

- **Compositing**

  All the drawn layers characters, backgrounds, lighting, shadows, and so on are put together during blending to make the final picture look good. This process includes simple tasks like combining a few layers and complicated tasks that involve hundreds of layers and making sure the images line up perfectly.

- **Color Correction**

  Colour corrected give a huge impact on my animation because it can fic any lighting problem that were occur during the animation. After the sequences were imported, the Lumetri Colour panel that was used for changing exposure, contrast, highlights, shadows and also colour balance

- **Sound Design**

  Sound is an important part of making an event feel real. In this step, sound effects that were carefully thought out are synced with the images. These include the ticking of gears, Cog's mechanical moves, and the chimes of the clocktower. The story is made better by Thomas's soft sighs and the sound of the storm.

- **Final Output**

  The project is turned into a digital file that can be shared and shown once all of its parts are finished. The finished version of "A Silent Gear" will be saved as an MP4 file using the x264 codec. This will make it easy to view on a variety of devices and systems.

4. Pre – Production

4.1 Introduction

Pre-production is an important first step in making any kind of animated project, whether it's a movie, an animated show, or something else. For this step, you need to carefully plan and prepare so that the manufacturing process can start on a solid foundation. During pre-production, creatives work on their story ideas, write detailed scripts, and design characters, settings, and items that are important to the visuals. At this time, you'll also be putting together a skilled production team and doing things like storyboarding, researching styles, and getting technical assets ready for animation. Software decisions, the design of the production process, and schedule all play a big role in how efficient something is. Talking about problems and setting clear goals early on in the pre-production process helps keep costs low, speeds up the process, and makes sure that the finished animation delivers on its artistic and story goals..

4.2 Idea

Today, people put their jobs and other responsibilities ahead of their relationships with other people, which can leave them mentally ignored and alone. This is where the idea comes from. The person who made it wanted to talk about neglect and sacrifice to send a message about how ignoring emotional bonds can cause permanent loss and how sacrifice can be a powerful act of love. The idea was first written down in Google Docs, and the story parts were improved before it was sent to the boss for comments and further development.

Main Ideation for the Animation Project

TITLE: A Silent Gear

GENRE: Steampunk, Drama, Storytelling

In "A Silent Gear," the story takes place in a fantasy city that is run by a huge clocktower. Thomas is an old clock master who works all the time to make sure the clocktower works. The city's people look down on him because they think he is too old and useless, even though he tries hard. One day, while doing his job, a child tries to show kindness to Thomas, but the child’s mother stops him and says Thomas doesn’t deserve it. The story follows Thomas as he faces the challenges of being ignored and ridiculed by the townspeople. He is accompanied by his robot companion, Cog, who helps him maintain the clocktower. In the end, Thomas sacrifices his life to keep the clock running, but the clock eventually stops, leaving the city in silence. Only then do the townspeople realize how important he was.

4.2.1 Thumbnails

Below is the thumbnail for the A Silent Gear short animation which consists of 4 pages and 59 box panels that picture how the story looks like.

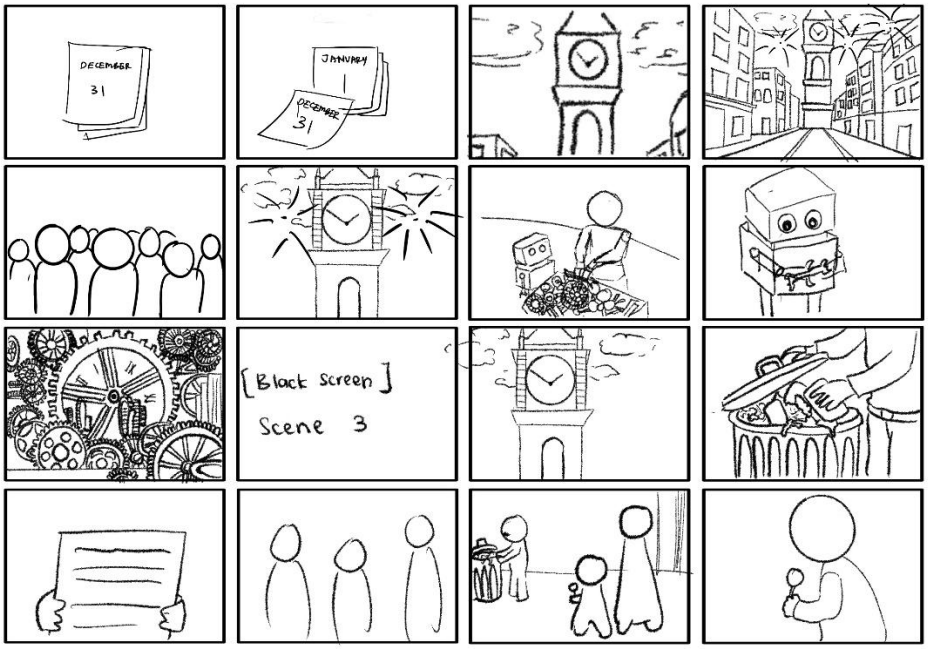


Figure 13: Page 1 of The A silent Gear

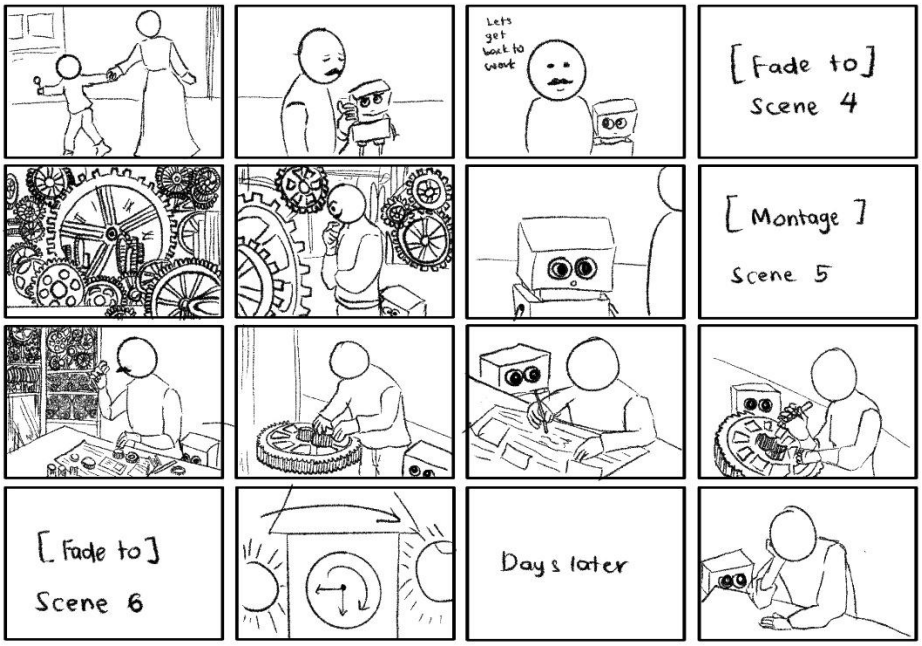


Figure 14: Page 2 of The A silent Gear

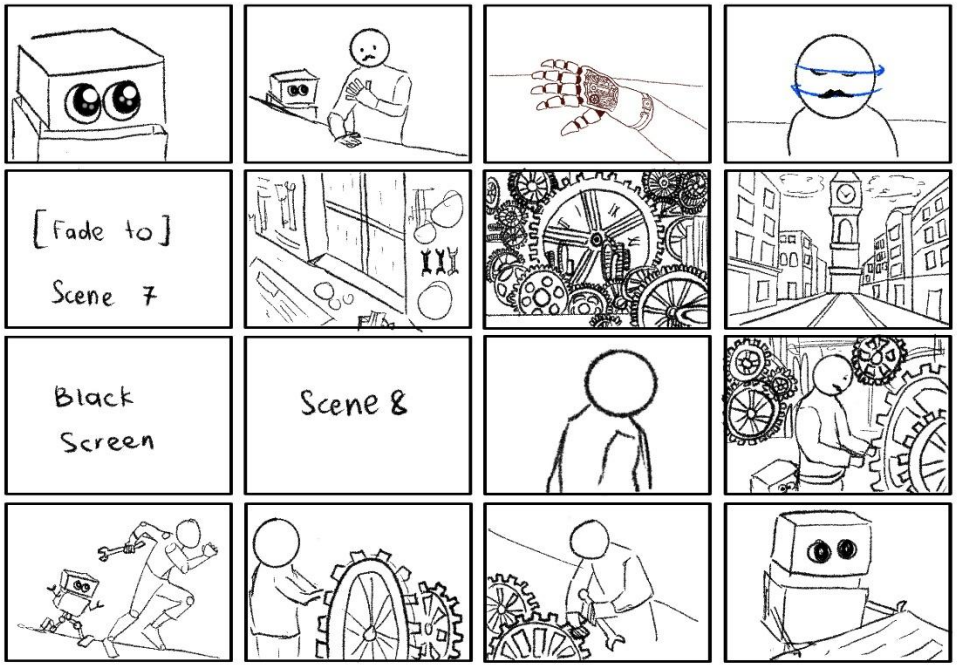


Figure 15: Page 3 of The A silent Gear

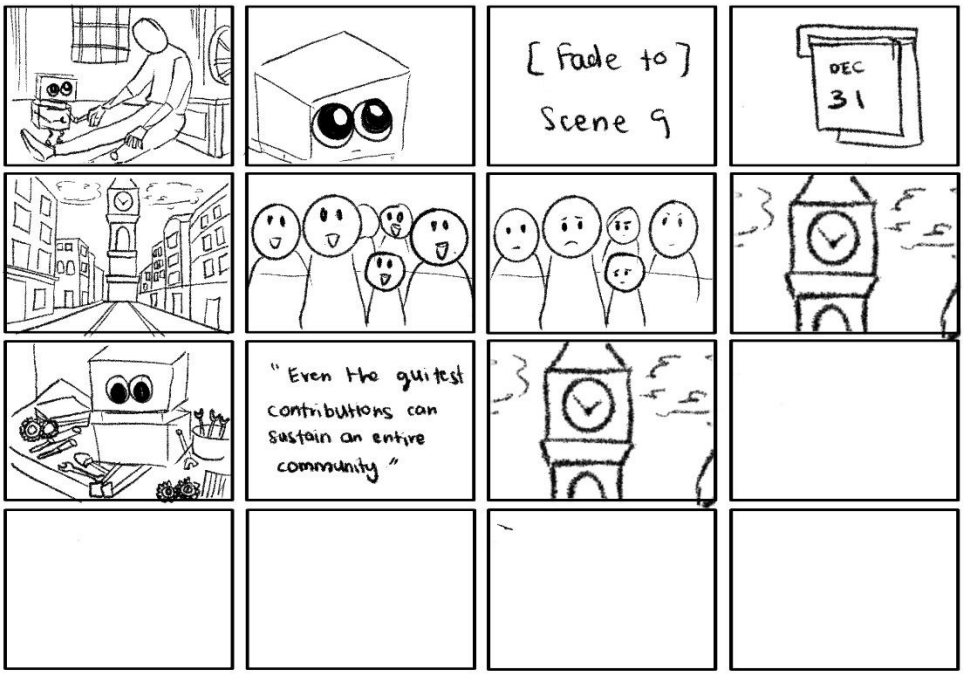


Figure 16: Page 4 of The A silent Gear

4.3 Screenwriting

The story idea and plot will be worked on even more so that they can become a complete script. The script will go into great detail about every scene, including what the characters say, do, and how the camera moves. This is very important for sketch artists because it helps them see how each scene should be framed and drawn in later stages of production. The project's script is six pages long, not counting the cover page. It makes sure that the story runs easily while still having a strong emotional and theme effect.

A SILENT GEAR

Written by

NUR SHAFIRA ALIA BINTI SUHAIMI

FADE IN:

1 EXT. STEAMPUNK CITY - SUNRISE **1**

The city hums with life. Gears turn in the buildings. The CAMERA PANS across the bustling street, revealing the grand CLOCKTOWER standing at the city's center.

DISSOLVE TO:

2 INT. CLOCKTOWER - WORKSHOP - MORNING **2**

Sunlight streams through windows. THOMAS cautiously adjust a small gear of the tower. His brass companion, COG, a small, loyal robot, scuttles around, heading him tools.

THOMAS, 70s, an aging clock keeper with a mechanical prosthetic hand.

THOMAS
(softly to Cog)
Hold it steady, now. Just a little more...

Cog chirps in response, steadying a gear with its tiny mechanical arm.

THOMAS
There we go. Good as new.

Thomas steps back, wiping his brow. The CAMERA ZOOMS OUT to show the colossal mechanisms of the clocktower, gears interlocking and moving in perfect harmony.

THOMAS
(to himself)
At least you’re still ticking, old friend.

FADE TO:

3 EXT. CLOCKTOWER - DAY **3**

Thomas rummages through the dustbin outside the clocktower. there, a man unfolds the latest newspaper.
(Newspaper headline)
"The Man Behind Time: Thomas, 50 Years of Keeping the Clocktower Alive!"

TOWNSPERSON 1

Him? On the front page? For what? turning a few gears?

TOWNSPERSON 2
Anyone could do his job. He just stands there all day, twisting screws and acting important!

TOWNSPERSON 3
A waste of ink, if you ask me. I work twice as hard, but do I get a fancy article? No!

EDEM who suddenly stop and staring up at Thomas with admiration. The boy clutches a piece of candy and runs up to the tower.

EDEM, 5, a young boy who shows kindness toward Thomas.

EDEM
Mister! This is for you!

Thomas looks down, surprised. He smiles warmly, starting to descend. Suddenly, the boy's mother grabs his arm, pulling him back.

BOY'S MOTHER, 30, a woman who neglecting people.

MOTHER
(harshly)
Don’t give that to him! He don.t deserve it. He’s not that special.

Thomas pauses mid-step, his smile fading. He watches as the mother drags the boy away. Cog chirps softly from the scaffold, sensing Thomas’s hurt.

THOMAS
(to Cog, softly)
Let’s get back to work.

FADE TO:

4 INT. CLOCKTOWER - TOP CHAMBER - NIGHT 4

The room is filled with the hum of gears. Thomas studies the massive central gear, the heart of the clocktower. He notices cracks and corrosion in the metal. The gear groans loudly with every rotation.

THOMAS
(to Cog)
It’s worse than I thought.

Cog chirps in concern, its glowing eyes dimming slightly.

THOMAS
If this stops, the whole city goes silent.

Thomas pulls out an old blueprint of the clock mechanism, spreading it across a workbench.

THOMAS
(to himself)
I've kept you running this long. I won't let you fail now.

5 INT. CLOCKTOWER - TOP CHAMBER - NIGHT - CONTINUOUS **5**
(montage)

Thomas working tirelessly on repairs, his prosthetic hand clicking as he turns bolts. Cog assisting by holding small gears and fetching tools. The clock mechanism groaning louder as its condition worsens.

6 INT. CLOCKTOWER - WORKSHOP - DAYS LATER - EVENING **6**

Thomas slumps over his workbench, exhausted. The clocktower's chimes are uneven, a haunting reminder of its deteriorating state.

COG
(chirping softly)

Thomas looks at Cog, then at his prosthetic hand. His eyes linger on the gears inside his hand, which match the design of the failing central gear.

THOMAS
(whispering)
No... there has to be another way.

7 EXT. CLOCKTOWER - NIGHT **7**

Inside the clocktower, the central gear groans one final time before snapping. The entire mechanism grinds to a halt. The chimes stop abruptly, plunging the city into silence.

8 INT. CLOCKTOWER - TOP CHAMBER - CONTINUOUS **8**

Thomas and Cog stare at the lifeless machinery.

THOMAS

(desperately)
No, no, no...

He grabs his tools, rushing to the central mechanism. Cog follows, its movements frantic.

THOMAS
(to Cog)
We need to stabilize it.

Thomas holding a replacement gear in one hand. His prosthetic hand creaks under the strain as he struggles to fit the gear into place.

COG
(chirping urgently)

Thomas slips but catches himself. He looks down at Cog, who is holding the blueprint in its tiny arms.

THOMAS
It’s not enough...

Thomas collapses onto the floor, breathing heavily. Cog rushes to his side, chirping in distress.

THOMAS
(weakly)
Thank you, Cog... for everything.

He gazes out a window at the city lights flickering back to life.

THOMAS
(smiling faintly)
It’s beautiful, isn’t it?

His eyes close, and his breathing slows. Cog sits beside him, its small frame trembling with emotion.

9 EXT. CLOCKTOWER - NIGHT - NEW YEAR'S EVE 9

The townspeople chat excitedly, their eyes darting toward the tower, waiting for the moment the clock strikes midnight.

TOWNSPERSON 1
Hmph. Any moment now. That old clock better not be late.

When it almost time, all the crowded become silent waiting and expecting for the moment. But... nothing happens.

TOWNSPERSON 2

What's happening? is it midnight already?

TOWNSPERSON 3
Where's the chime?! How we supposed to know?

The entire city had always relied on the clocktower's chime to mark every passing hour, every major event. They look up at the silent, lifeless tower. for the first time, they feel its absence.

The camera lingers on the tower then slowly tilts down to reveal—

10 INT. CLOCKTOWER - WORKSHOP - DAY 10

The final shot shows Cog sitting beside Thomas's worn-out tools, its light dim but steady.

FADE OUT.

11 TEXT ON SCREEN 11

"Even the quietest contributions can sustain an entire community."

END.

4.4 Storyboard

To help visualize the animation and visually convey concepts, a number of drawings are made. The shot and scene changes in the animation will be described in detail in the storyboard. The scene's description, shot size, shot number, scene number, camera movements, character movements, sound effects, background music, duration, and transitions are typically included in the description.

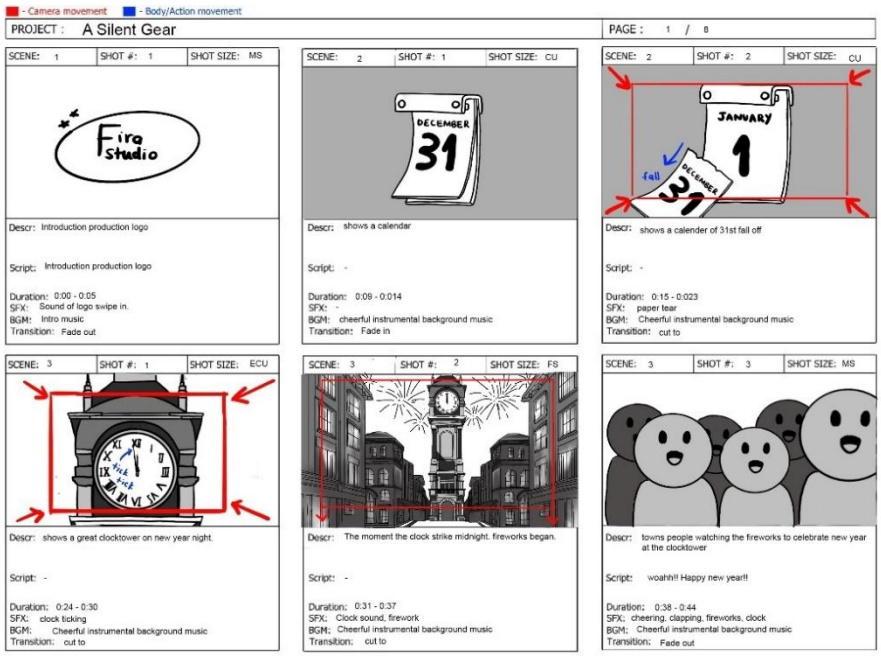


Figure 17: Page 1 of A Silent Gear

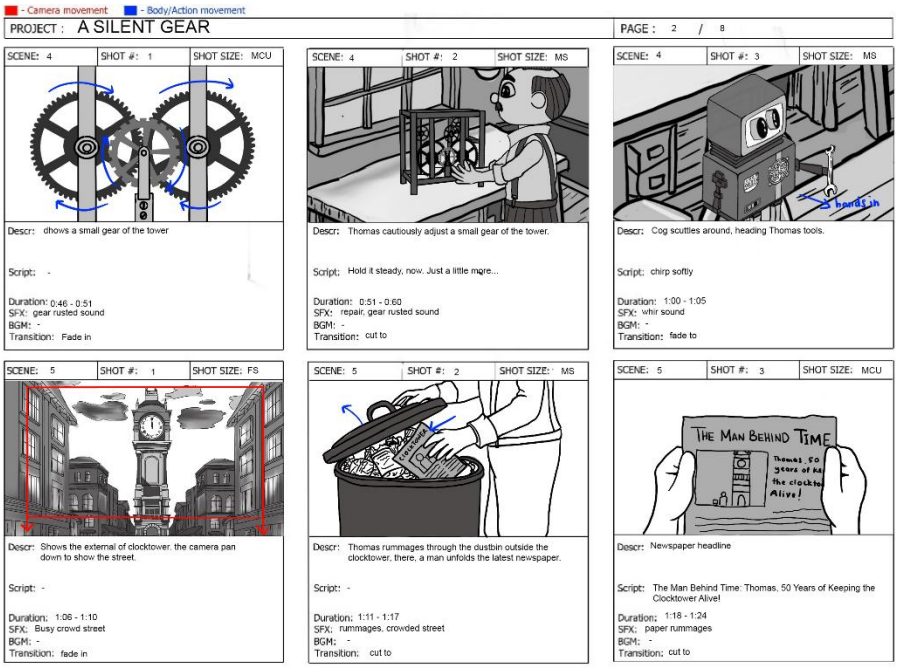


Figure 18: Page 2 of A Silent Gear

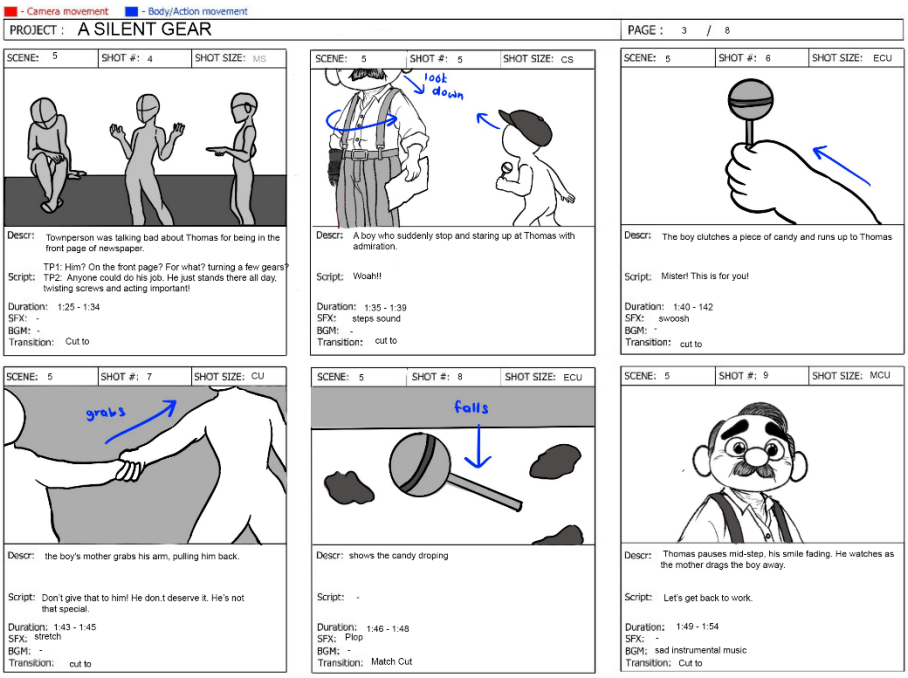


Figure 19: Page 3 of A Silent Gear

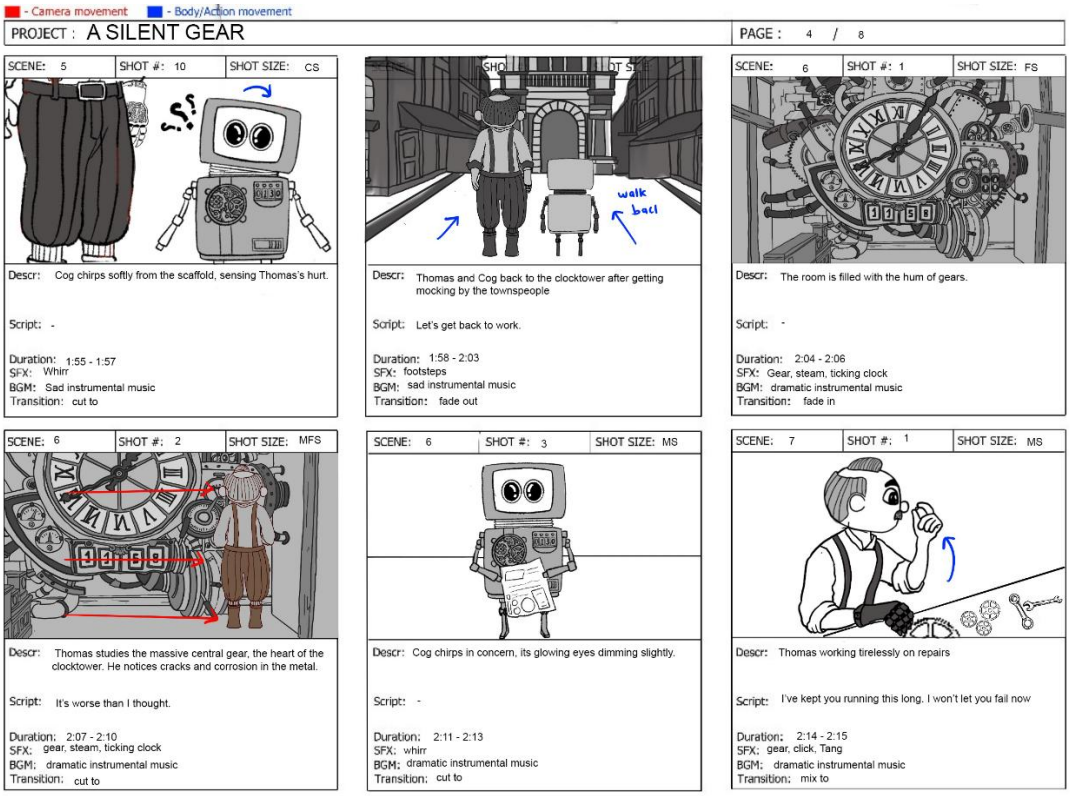


Figure 20: Page 4 of A Silent Gear

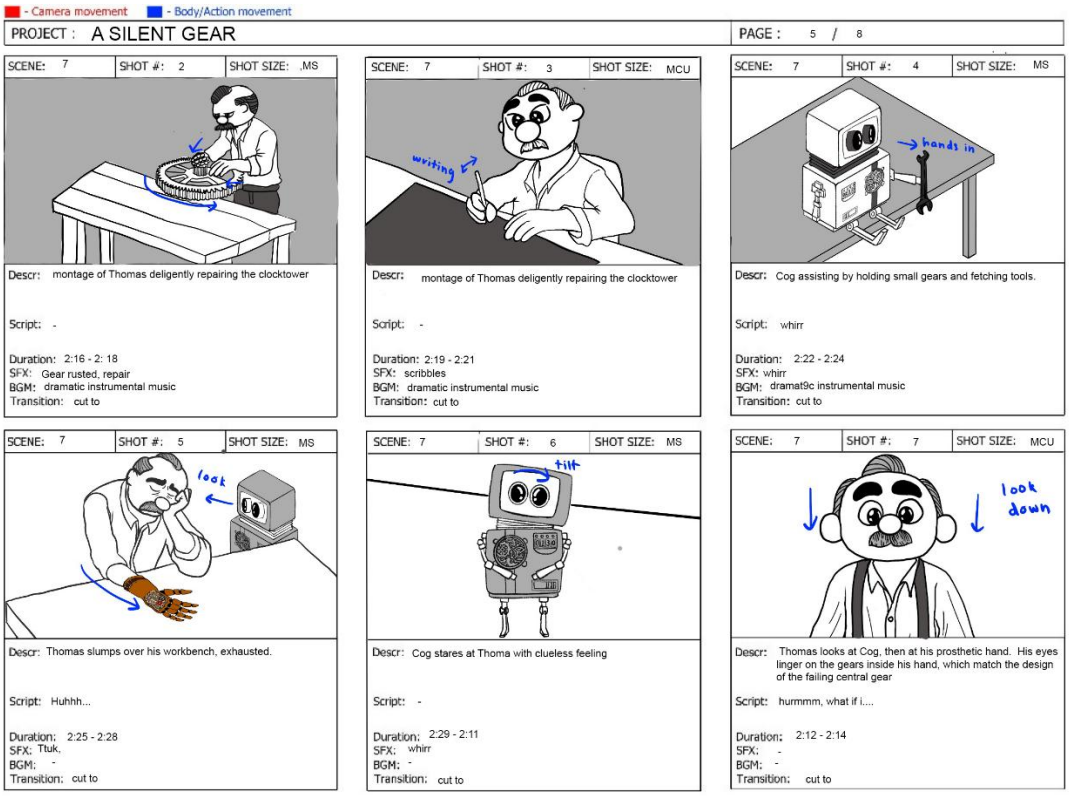


Figure 21: Page 5 of A Silent Gear

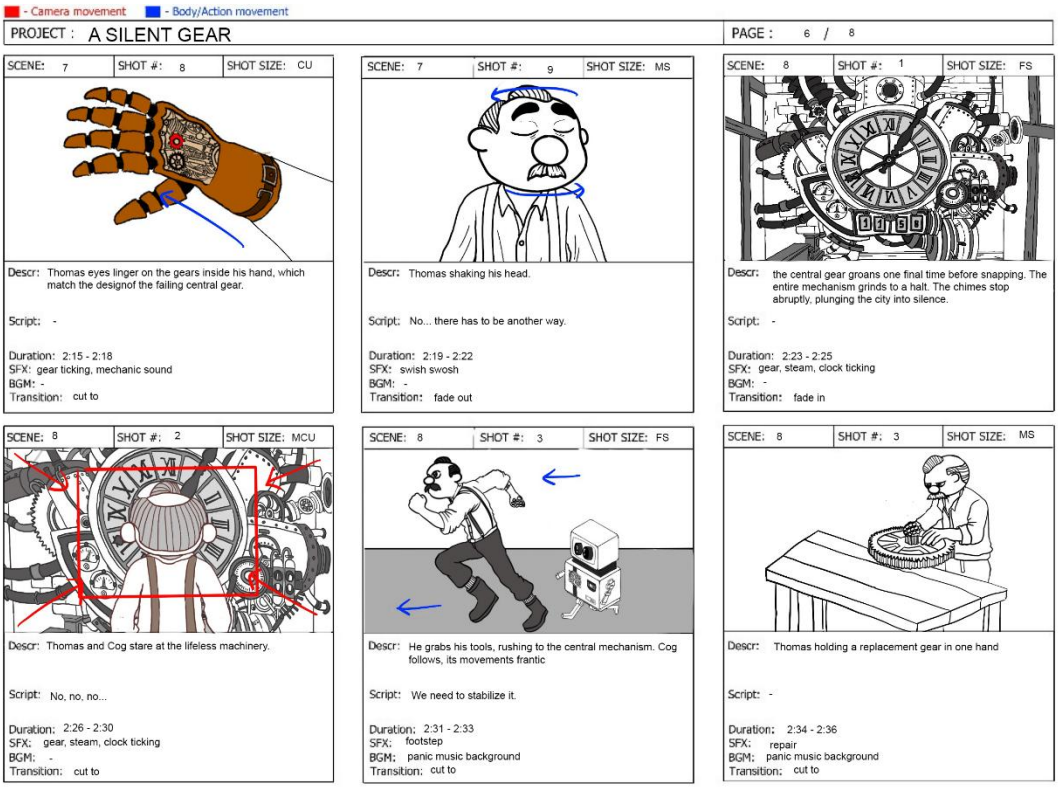


Figure 22: Page 6 of A Silent Gear

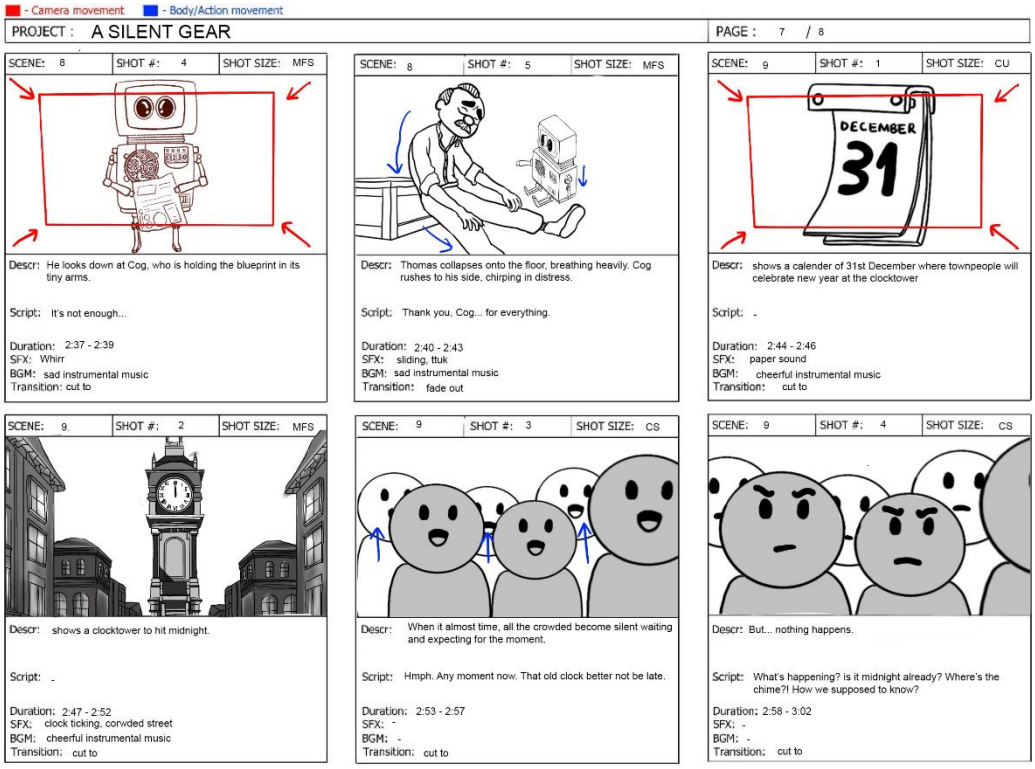


Figure 23: Page 7 of A Silent Gear

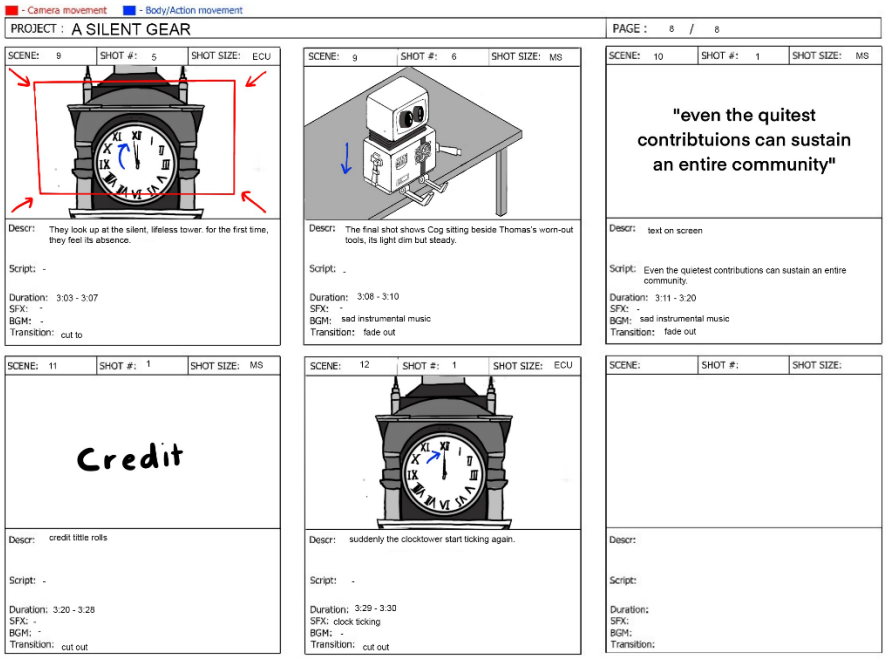


Figure 24: Page 8 of A Silent Gear

4.5 Animatic

A set of storyboard pictures that are timed to a previsualization film. Usually audio elements like music, sound effects, and conversation are added to make it seem more real. We need to be able to tell which scenes feel rushed and which ones might have a strange pause during this process. An animatic can make a big difference here. Knowing how long a shot will be on screen is important to plan things like how much work it will take and how long it will take to animate. The director and editor can also get a sense of the animation through animatics and make any required adjustments.

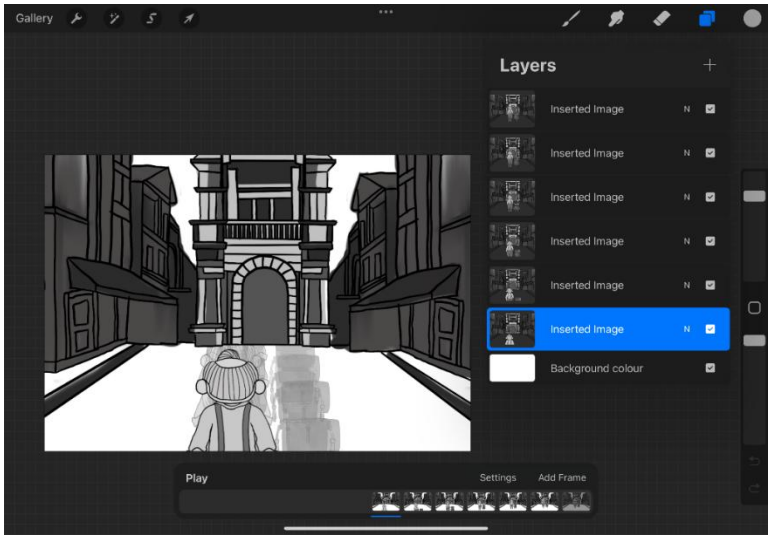


Figure 25: Animating Inside Procreate

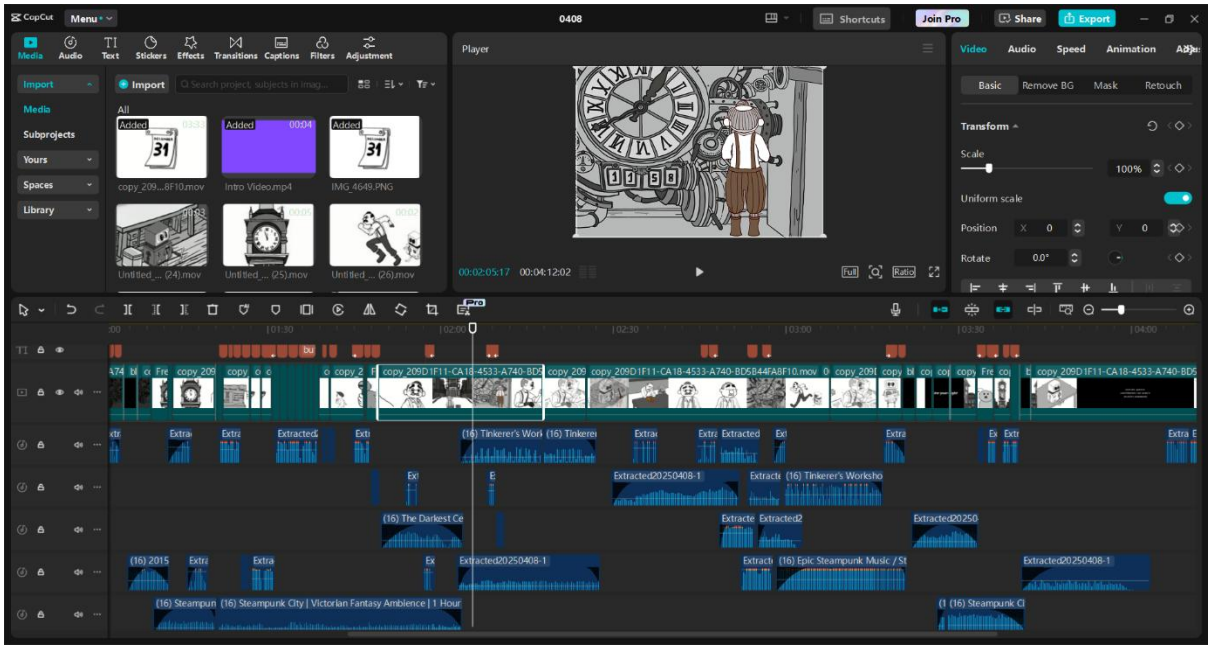


Figure 26: Editing Inside Capcut

4.6 Design

This subtopic will provide a detailed explanation of the short animation's character and environment development. Character transformation, incidentals, props, and colour study are all part of the character development process. Regarding the environment, a sizing chart and concept art will be displayed. 3D modelers can use character and environment development to get visual cues on how to model the characters. They give a distinct outline of the forms and fashions of the characters.

4.6.1 Character Design

- Main character's design

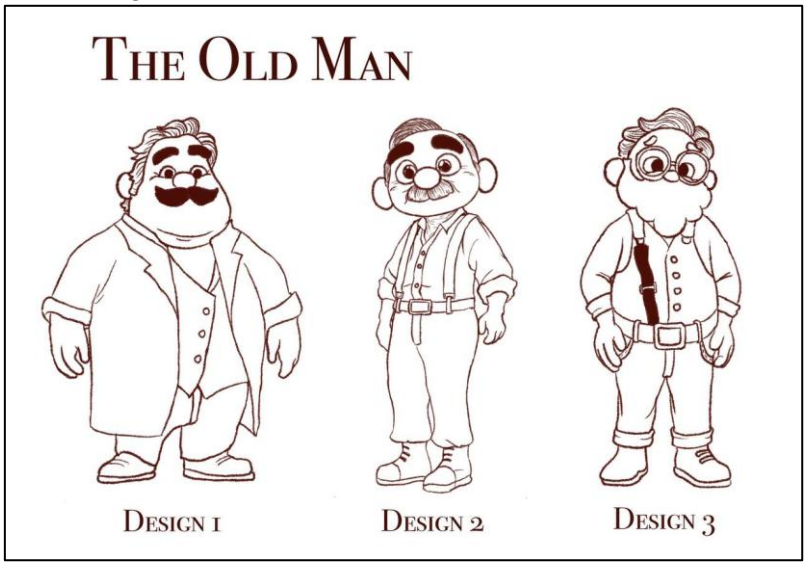


Figure 27: Thomas's 3 Concept Design

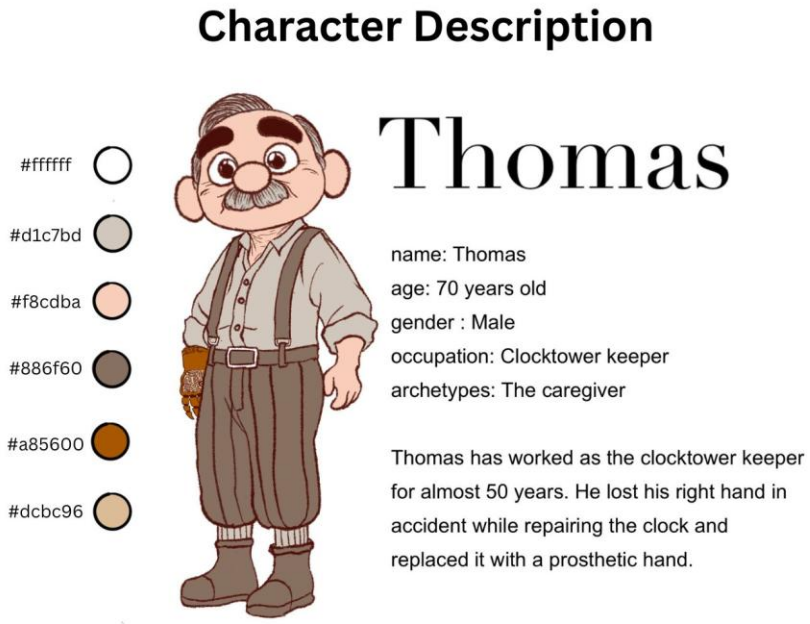


Figure 28: Thomas's Character Description

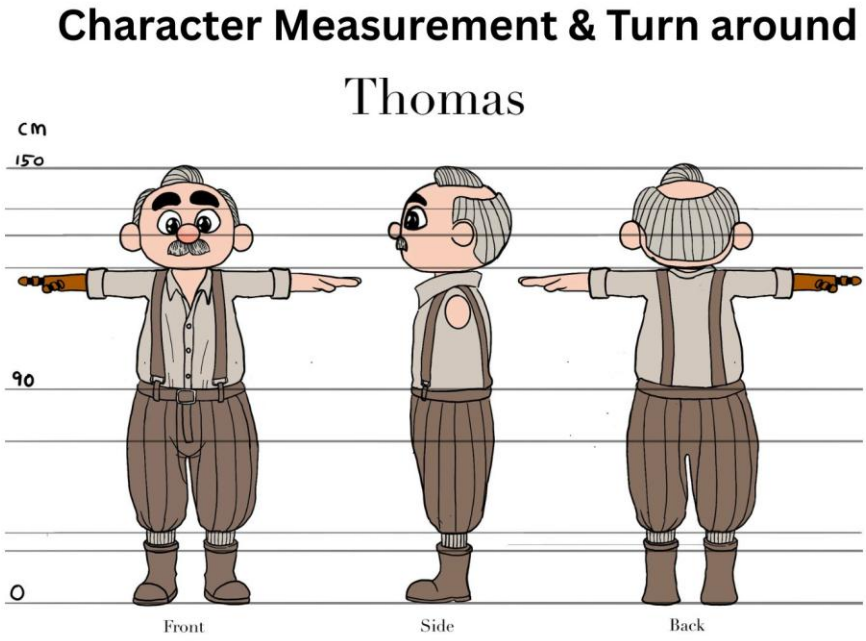


Figure 29: Thomas's Character Orthographic View

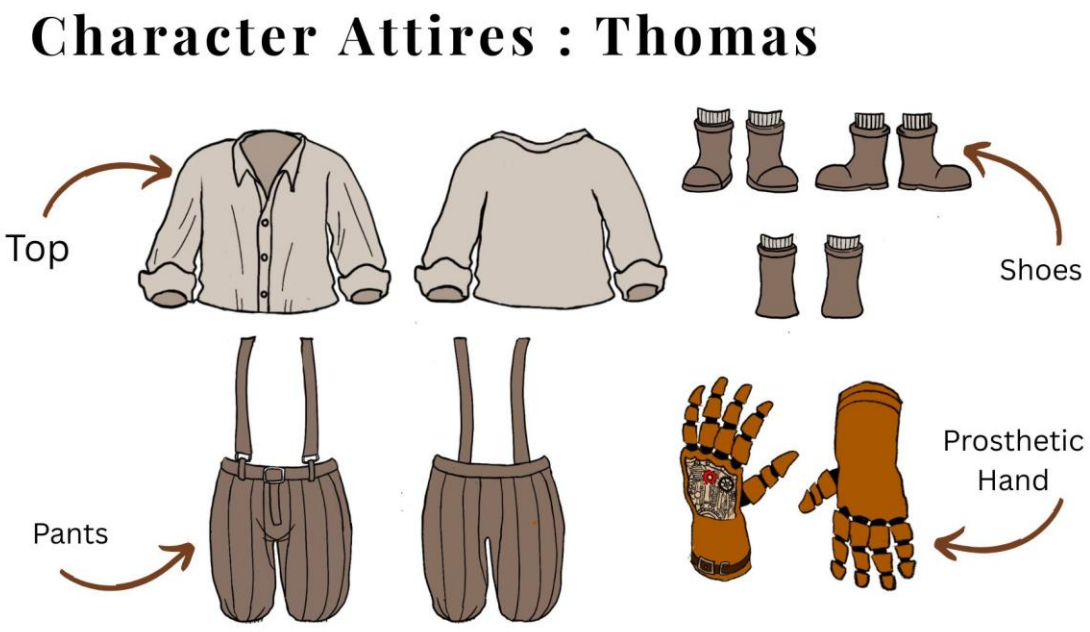


Figure 30: Thomas's Character Accessories

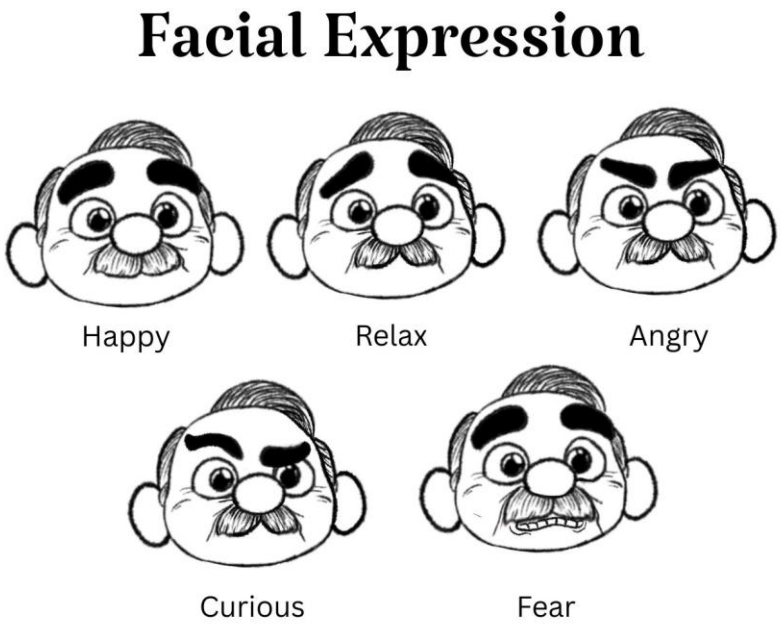


Figure 31: Thomas's Facial Expression

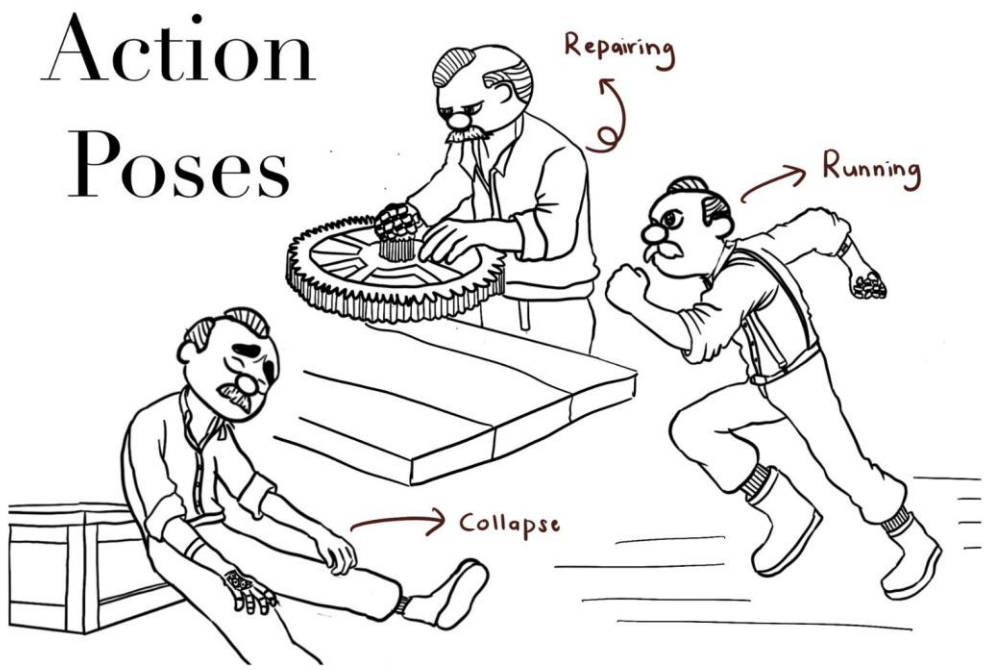


Figure 32: Page 1 of Thomas's Character Poses

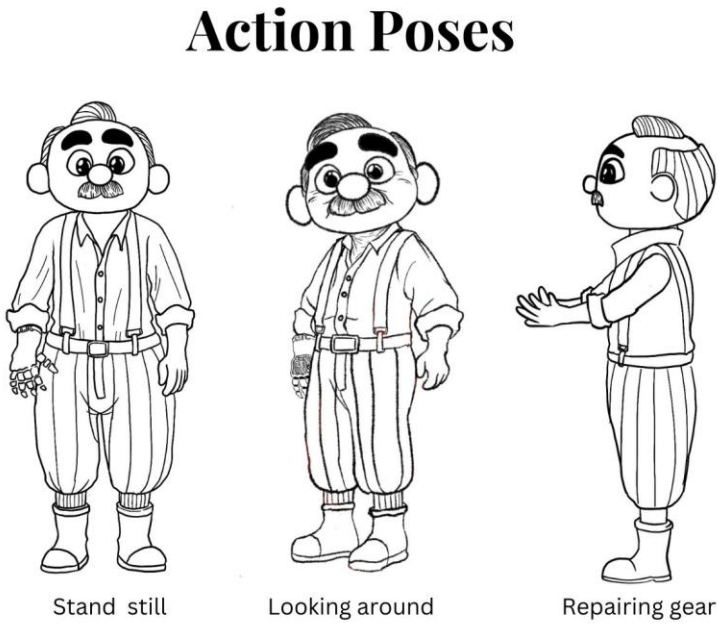


Figure 33: Page 2 of Thomas's Character Poses

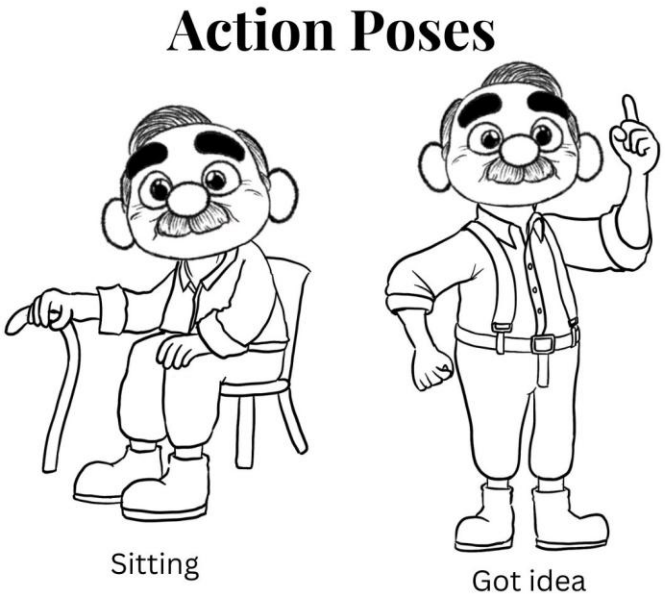


Figure 34: Page 3 of Thomas's Character Poses

- Side Character's Design

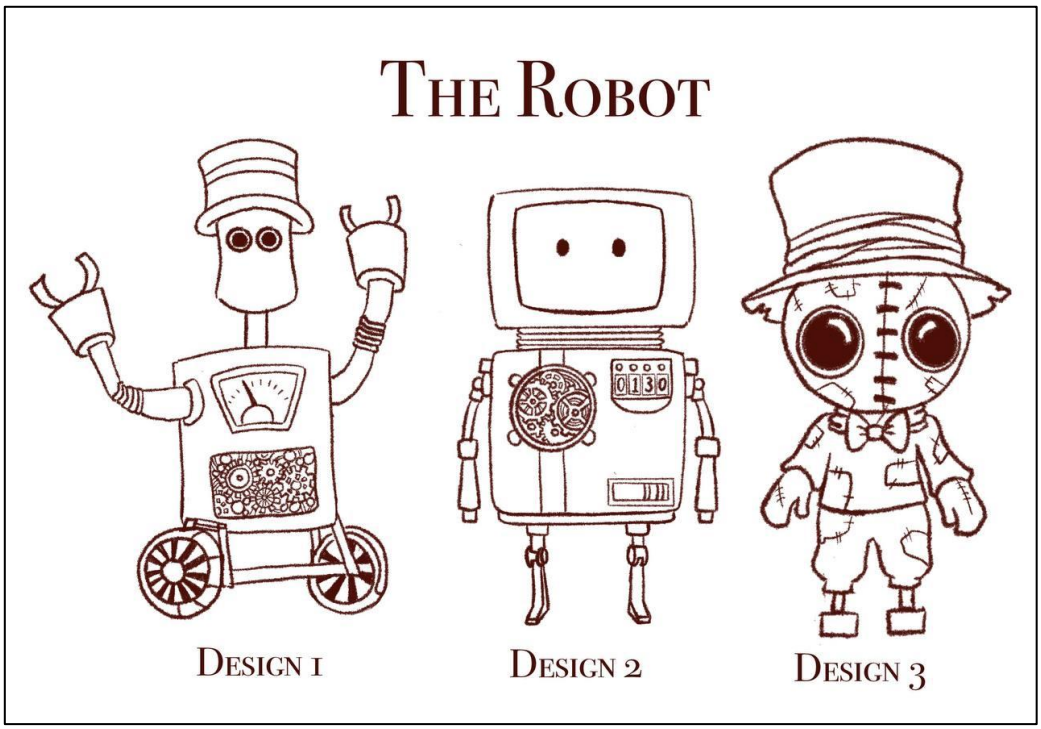


Figure 35: Cog (Thomas's Robot) 3 Concept Design

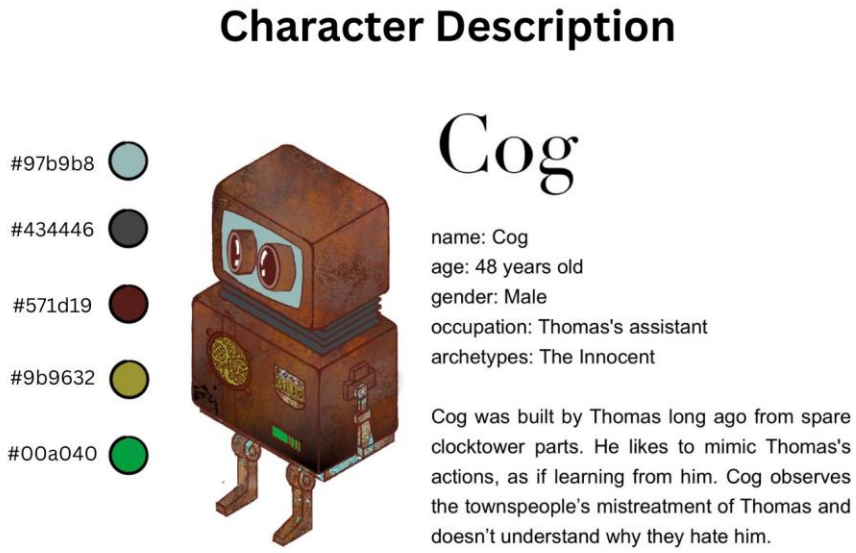


Figure 36: Cog (Thomas's Robot) Character Description

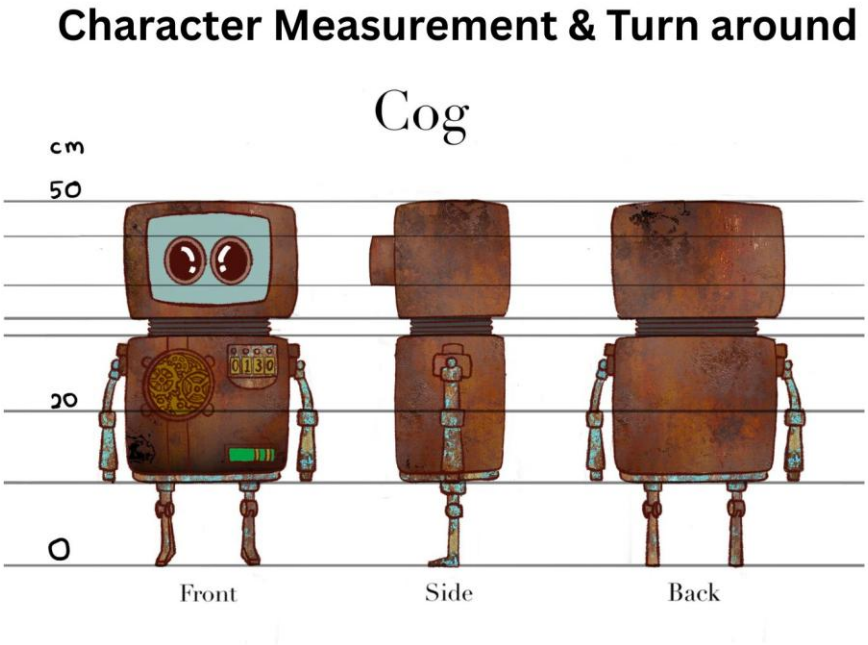


Figure 37: Cog (Thomas's Robot) Character Orthographic View

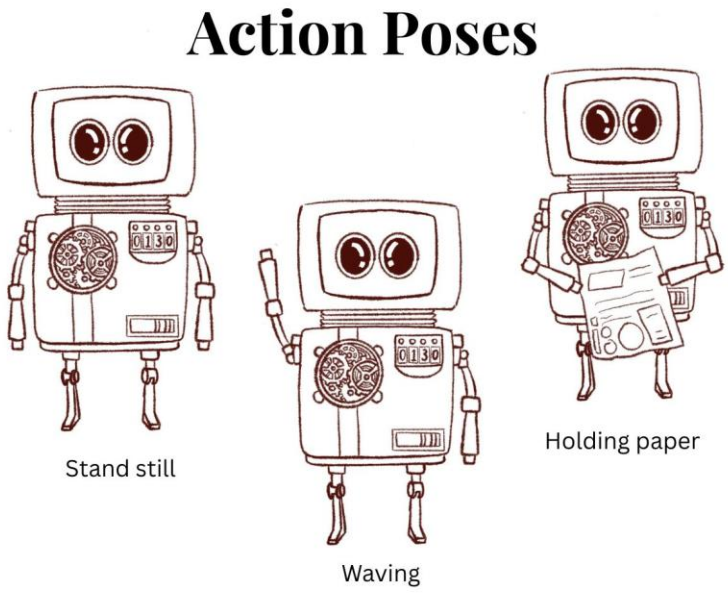


Figure 38: Page 1 of Cog (Thomas's Robot) Character Poses

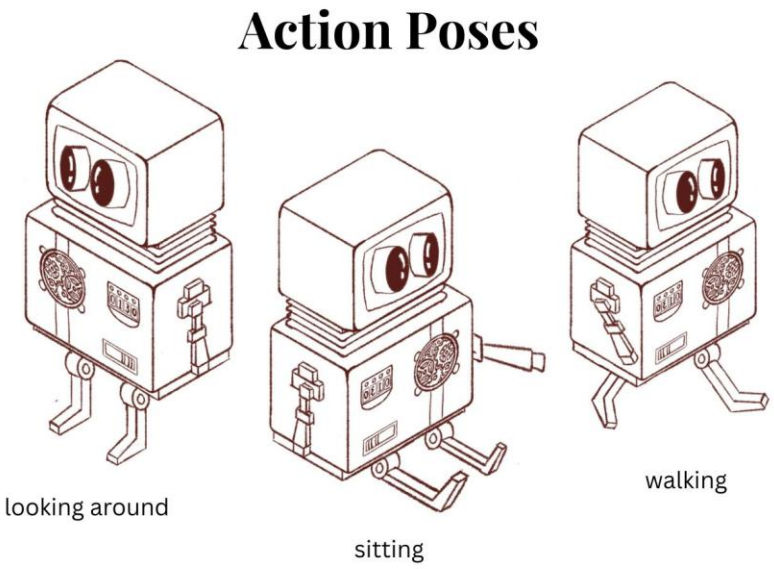


Figure 39: Page 2 of Cog (Thomas's Robot) Character Poses

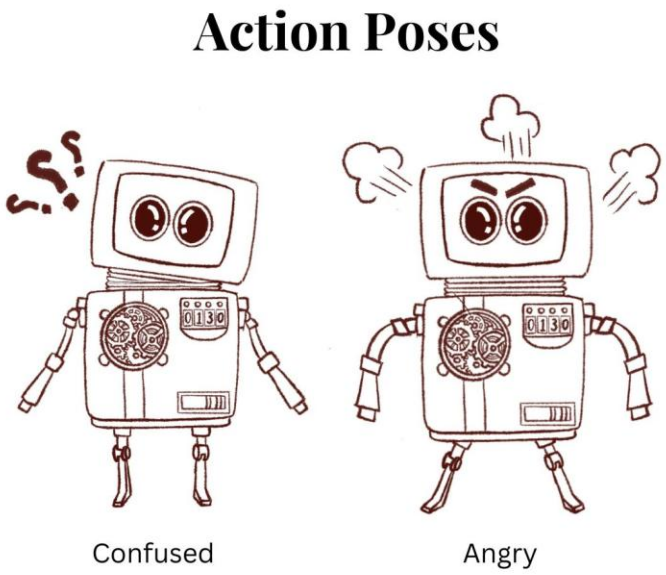


Figure 40: Page 3 of Cog (Thomas's Robot) Character Poses

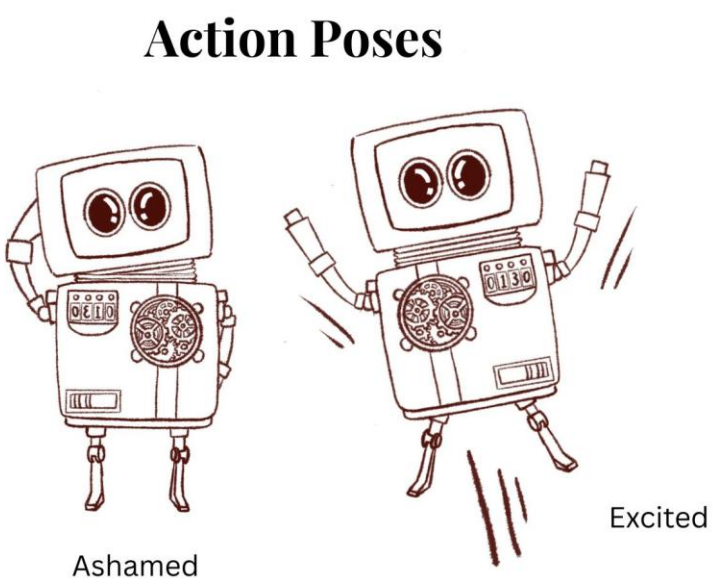


Figure 41: Page 4 of Cog (Thomas's Robot) Character Poses

4.6.2 Environment Design

The background environment in this project will take place in 2 places. The first place is interior where the main character work and spend his life until his last breath. This scene can be seen in rising action of the story. The background can be seen in most part in the story at exposition, rising action & climax throughout the ending. The second place is exterior where the main character got mocking by the townspeople. This background can be seen in rising action of the story.

Figure 42: Environment setting in city public area

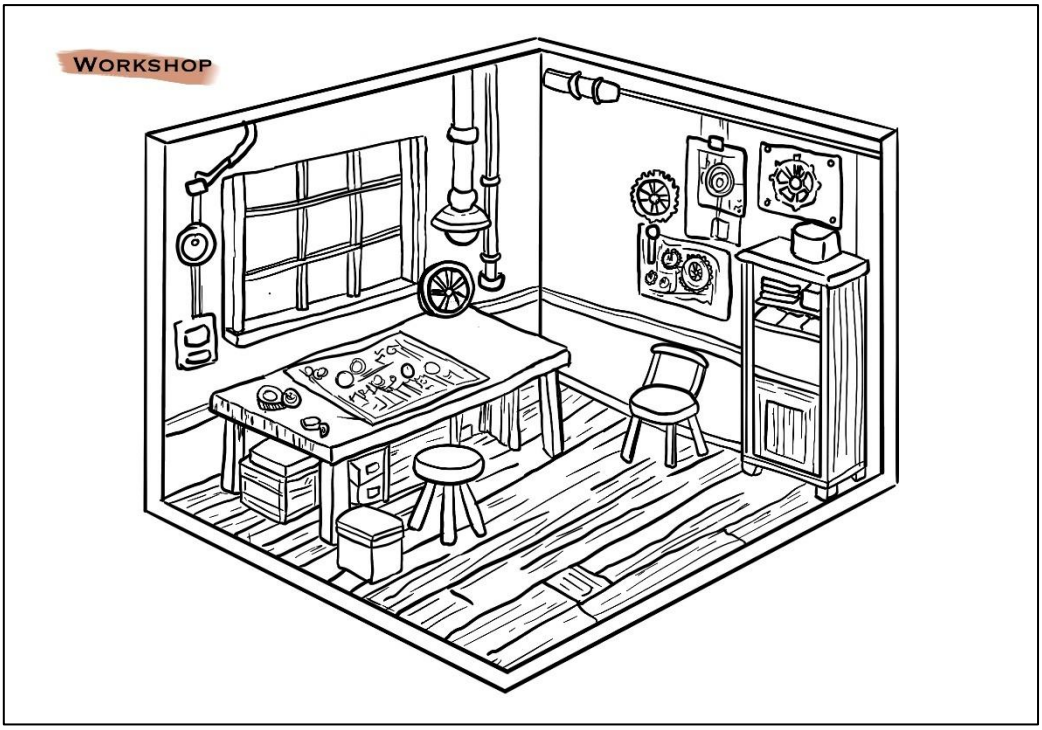


Figure 43: Environment setting in Thomas's workshop in clocktower

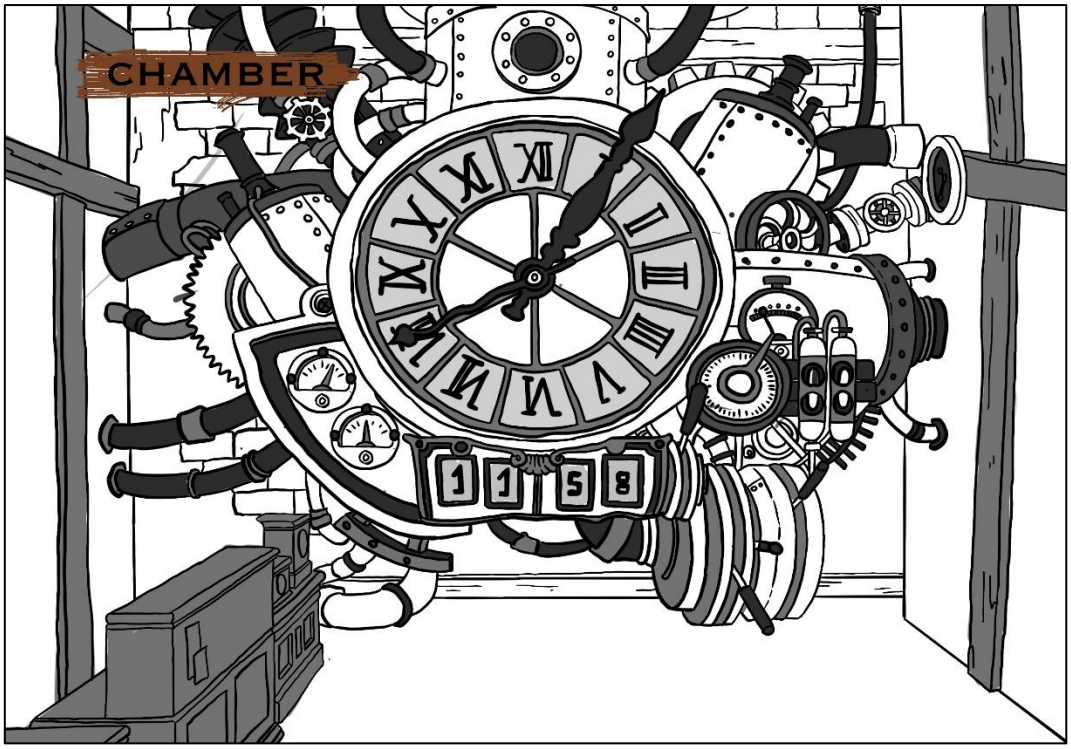


Figure 44: Environment setting in Chamber of Clocktower

4.7 Conclusion

Put simply, pre-production phase of 3D animation is relevant since it creates the groundwork of a good project. Each of the steps contributes to the development of the story and the appearance of the animation, the generation of ideas and plot writing, character design, world creation, and production of detailed storyboards. Through the pre-production planning of the creative team, the subsequent stages of the animation are guaranteed to have a proper direction and flow of the animation. It is a lot about the planning and detail it pays in pre-production, as it determines the final success and quality of the 3D animation.

5. PRODUCTION

5.1 Introduction

In this chapter, I discuss the way I created my project, a short 3D animated story named A Silent Gear. The best part of 3D animation is the production process where the ideas and the plans earlier taken are transformed into full-fledged drawn scenes. This is where the technical and artistic work gets to be put together. Aspects of the story, such as Thomas and Cog are represented as 3D, the clocktower is constructed, and major segments of the story are animated. Caution is observed to ensure that each job is suited to a visual style and emotional tone of the story. All these ensure that the animation work produced does not only appear good, but the central theme of the piece on sacrifice, respect, and human value is honoured.

5.2 Modelling

The figures and settings of A Silent Gear will be converted into realistic 3D models when the initial plan is completed. In modelling one should observe shape accuracy, topology and structure design such that every object appears good and animates well. To achieve this, you are advised to continue seeking the comments of managers, teachers, and experienced peers and get their assistance. Through their ideas, it is possible to make the shapes improved, correct technology issues, and enhance the models in general.

5.2.1 Character

5.2.1.1 Thomas

This is where the characters and settings in use in A Silent Gear will be made into real 3D models when the initial plan has been completed. Shaping accuracy, topology, and structure design when building is an important aspect to be observed, to ensure all objects appear good and can be used in animation. In case you desire to do this, then you should always seek feedback and help of bosses, teachers, and more experienced peers. Such ideas can be used to improve the shapes, the technology, and the models in general.

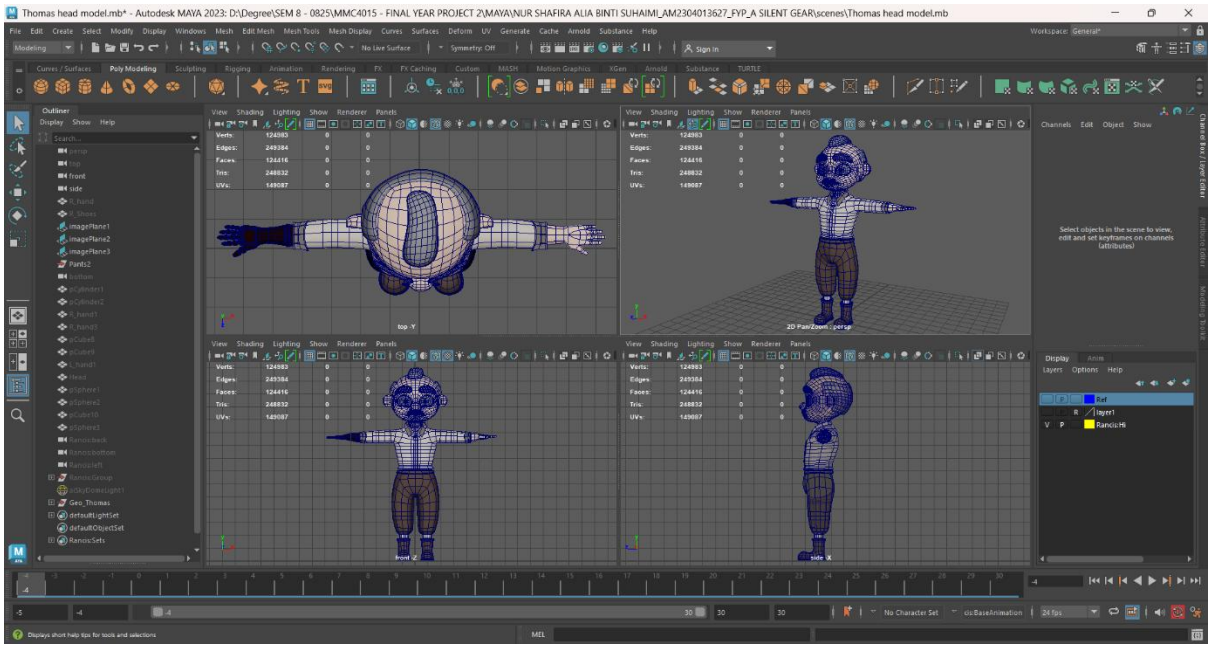


Figure 45: Thomas model from top, perspective, front, and side view

The bevel tool was used to round the lines of the model to make Thomas look more natural and real. We scribbled down the ends of his arms, and the folds in his clothes, to make them less sharp and more battered, by way of fitting his ancient appearance. The Insert Edge Loop tool provided shape to such places as elbows, knees, and fingers which require movement without difficulties. This allows the figure to redefine itself.

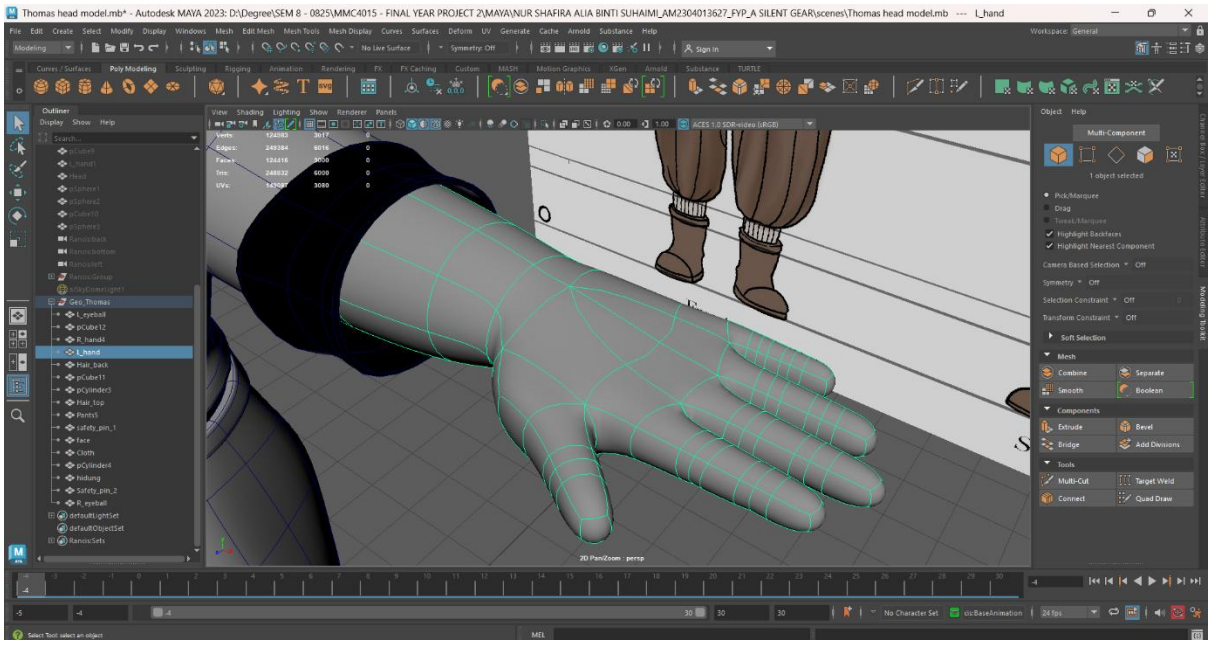


Figure 46: Thomas's bevelled shirt sleeve

The artificial hand was one of the most difficult elements of the model created by Thomas, and it was necessary to make it work and align with the steampunk theme. It was a hand that

began as a plain cube and then it formed the shape of the palm and the wrist. The artificial fingers were designed by incorporating cylinders which were cut into three so as to resemble a real joint. The bevel tool was used to flatten sharp edges in order to retain the metal appearance. The finger joints and the wrist were circled with the Insert Edge Loop tool to ensure that the animation would bend in the right way, and it possesses sufficient geometry to move smoothly. In order to enhance the steampunk appearance, additional gears, screws, and miniature metal plates were created independently and subsequently attached, which made the hand useful and relevant to the story setting and the theme.

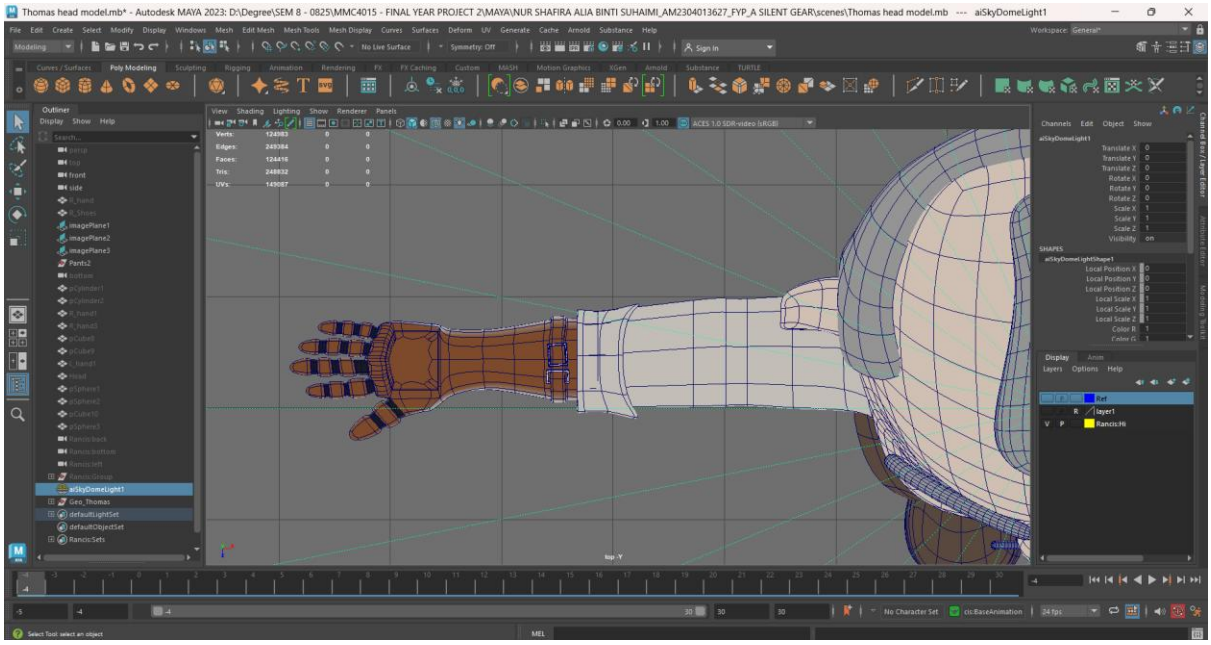


Figure 47: Thomas's Prosthetic hand

5.2.1.2 Cog

The sub character Cog was designed in the steampunk fashion by means of metal, gears, and a glowing core to indicate that it is a robot. Although the design appears very basic and tiny, making Cog was a meticulous process, to ensure that it is a good and appealing product. It was intended to depict fine details of gears and mechanical components and not to burden the form. Simple forms such as cubes and spheres were used in starting the modelling process that was then refined and arranged with a reference sheet. All the components were constructed with a lot of care to enable Cog to be repaired and transported without losing its distinctive appearance as the loyal companion of Thomas.

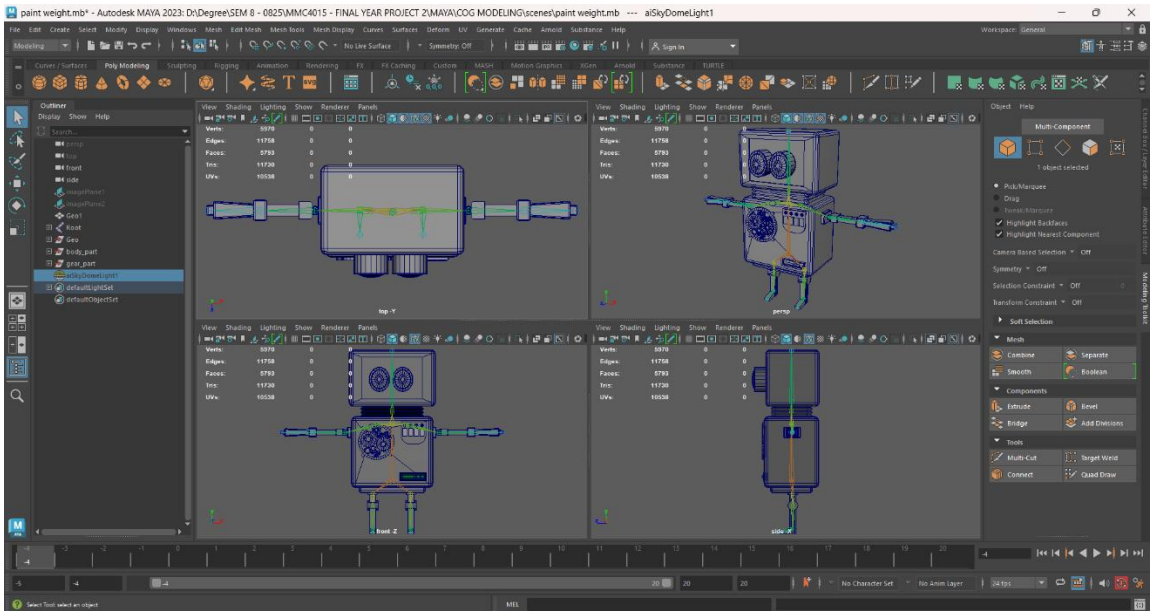


Figure 48: Cog model from top, perspective, front, and side view

Cog has a heart that is designed to resemble a steampunk piece of gear to demonstrate functionality and emotion. The primitive shape of the base began with a simple gear, and in Maya the teeth became distinctly sharp, and machine like in appearance. Smaller internal gears and additional cylinders were included at the top to make it three-dimensional giving a complex appearance, which makes it look like the device is in motion. The bevel tool had been used to flatten some edges to give the appearance of a gear that was used and not worn out. The curves and details were clean with an Insert Edge Loop around the center hub. A bright ball was placed in the centre to indicate the source of energy of Cog and mechanical teeth surrounding it indicated how the heart and the machine co-operate. This design assisted the character to be memorable as well as to emphasize the theme of sacrifice since the heart of Cog was major in the rescue of the city.

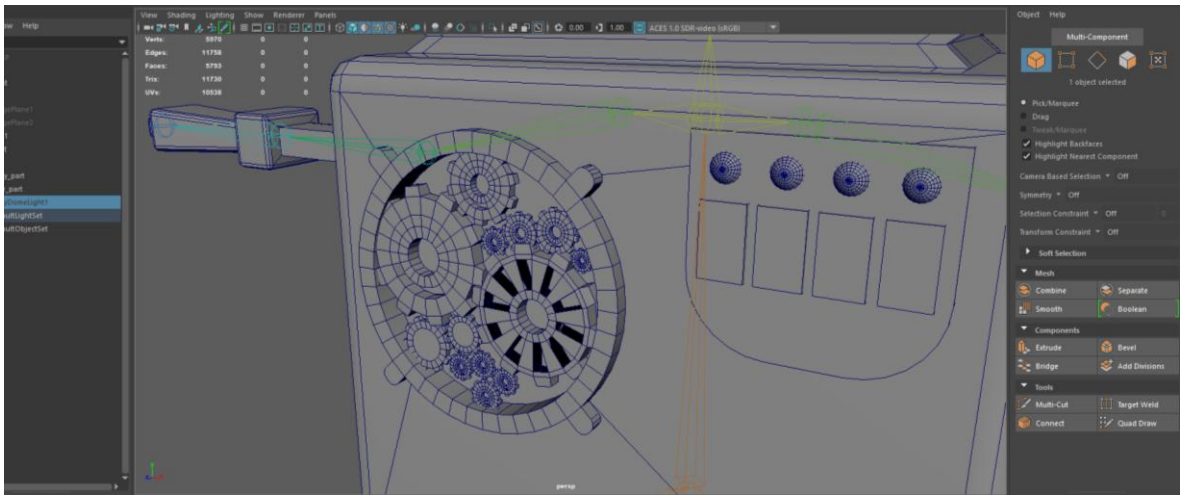


Figure 49: Cog's heart gear core modeling

5.2.2 Environment

Although the landscape may not be as detailed as the characters, it also has its role of setting the mood of the animation. The metaphor of sacrifice and neglect in A Silent Gear is represented by clocktower and the city surrounding it. When setting is realistic, viewers are able to see the story better. The plot is also helped by the background design and makes the story look more nice as it displays the parts of the clocktower and the tone of the city.

5.2.2.1 Clocktower

The outside of the clocktower is the principal landmark. It is also high in the center of the city and displays rhythm, order and time. The rusty metal, old gears and coarse surfaces were used to make the town look old and deserted. Although this appears to be an interesting sight, there are cracks, indicating that the city pays no attention to something that is used by people on a daily basis. This location predetermines the mood of the story by demonstrating the significance of the clock tower and hinting at the fact that society does not pay much attention to it.

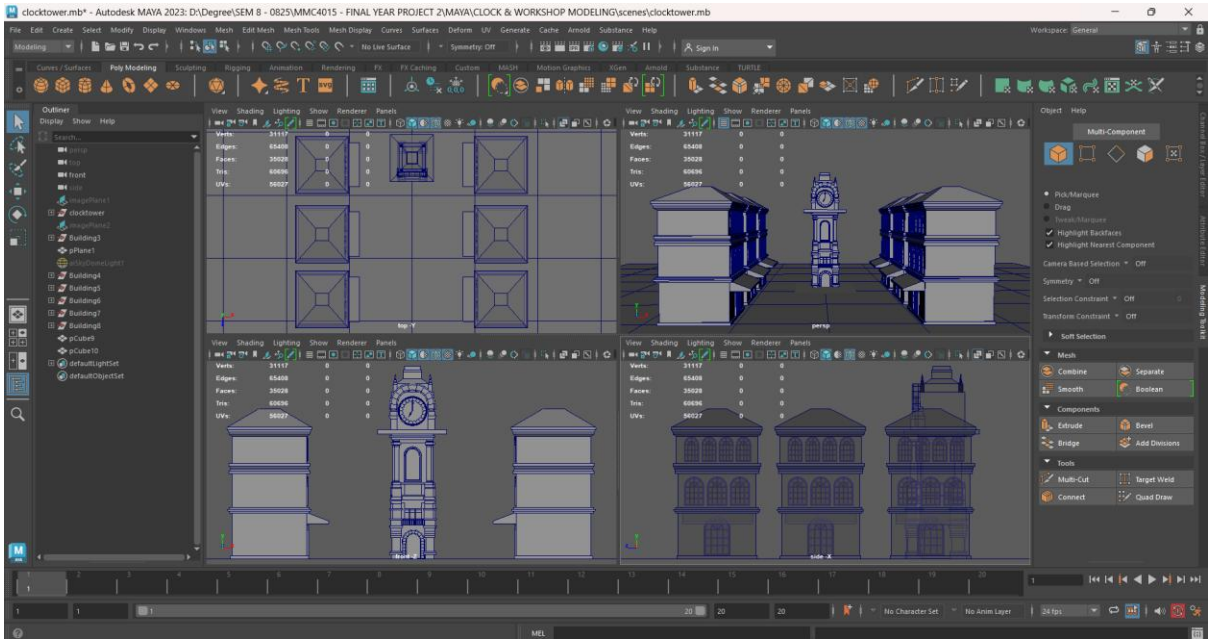


Figure 50: Clocktower model from top, perspective, front, and side view

The clocktower was an old-fashioned cube which began with a simple cube. The tall shape of the tower was achieved by the extension of cube in numerous ways. And then we added the clock face, the windows and the door to make it look good. The major part was made out of cubes; a cylinder was introduced to make the clock look round and lifelike.

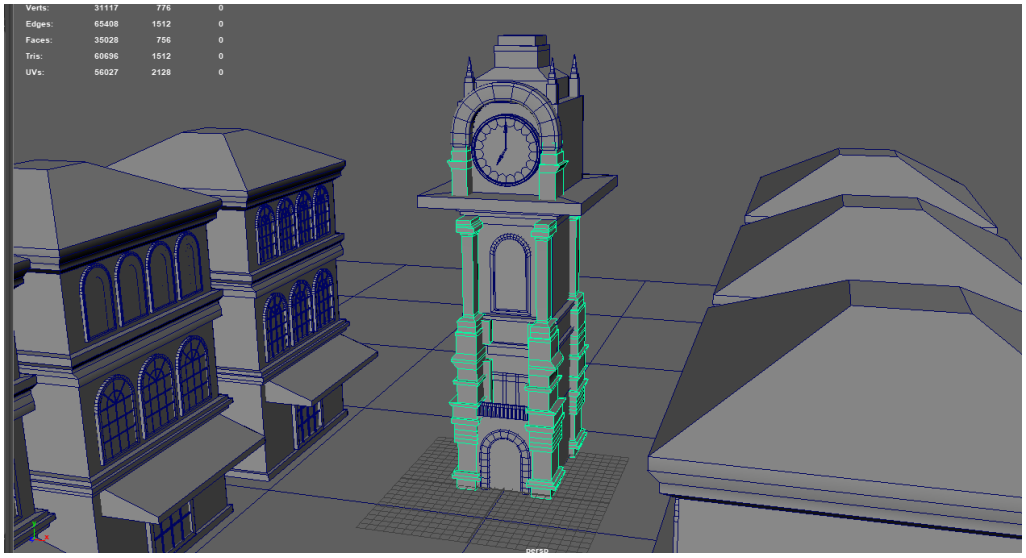


Figure 51: Clocktower foundation with big building

The surrounding environment such as the street was also done in cubes. We put more information such as windows and canopies so that the buildings appear deeper and more authentic. The completed image depicts a consistent style of building with steampunk atmosphere which fits the subject of the animation.

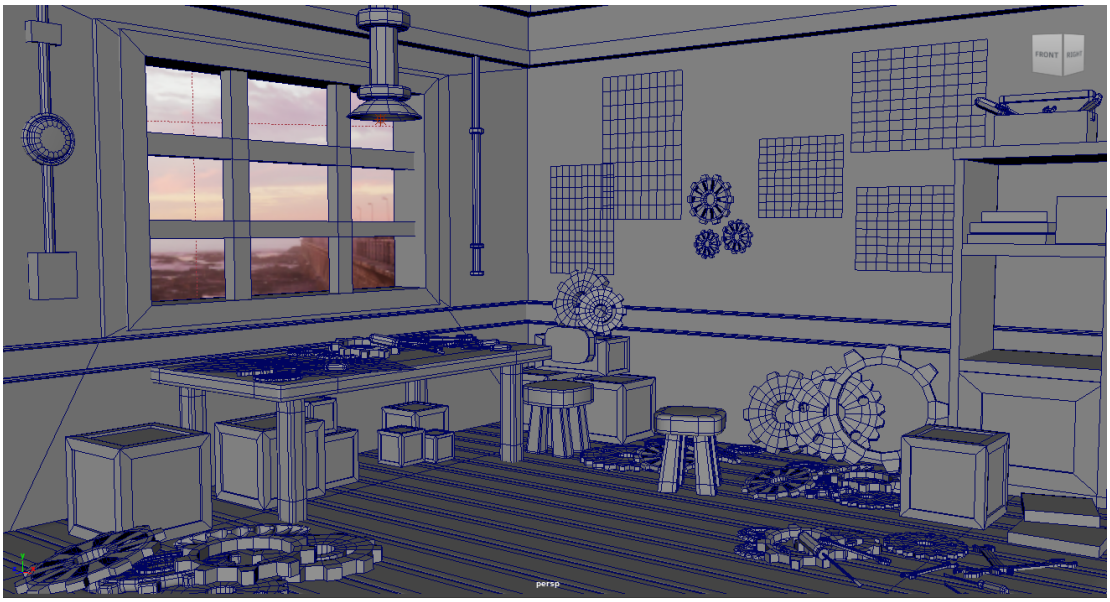


Figure 52: Workshop inside the clocktower

Thomas and Cog spend a majority of their time in the workshop where they store and repair gears. This field reveals the simple, organized, and hard-working character of Thomas. In trying to demonstrate the commitment of Thomas, there are numerous gears, plans and half-complete gears found in the workshop.

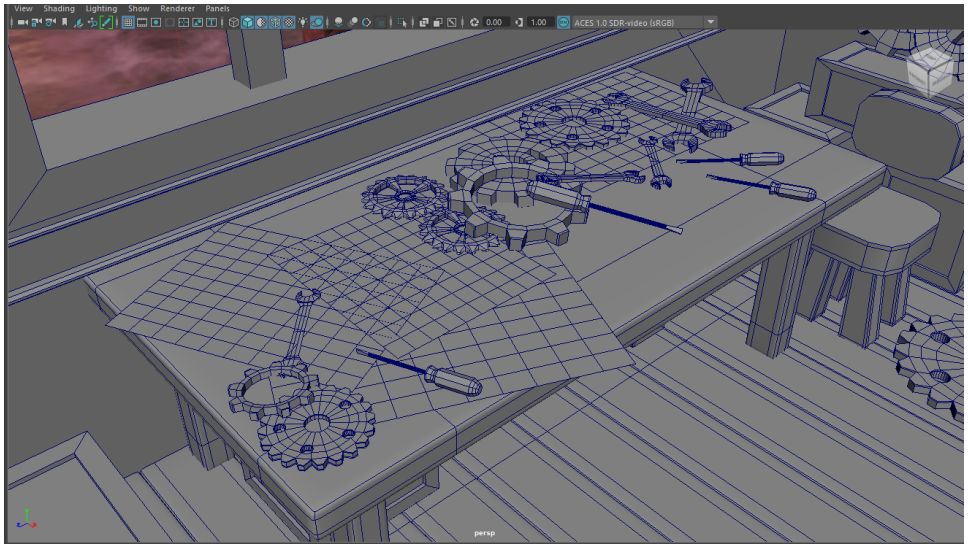


Figure 53: Mechanical tools and blueprint

Tools and gears in the workshop were made out of cubes and cylinders. We rolled cube faces to make the tools such as screwdrivers, hammers, and wrenches. Gear teeth were made on cut edges of cylinders, and a bevel tool was used to smooth them. To add detail, we made smaller gears and bolts by scaling and copying them.

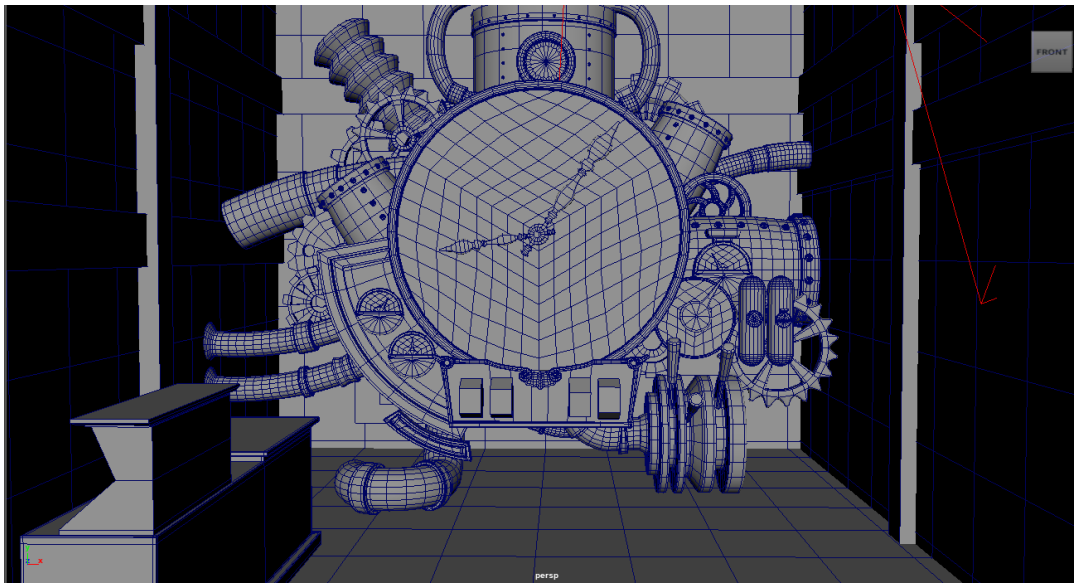


Figure 54: Chamber inside the clocktower

The image depicts the interior room of the clocktower that has a powerful steampunk appearance and numerous mechanical elements. The main focus is on the big round gear which forms the centrepiece of the tower. It was beginning as a cylinder, but was stretched and enlarged to achieve the main clock frame. To provide more layers of industrial appearance, we built more pipes, gears and joints around it with the help of cylinders, torus-shaped, and cut cubes.

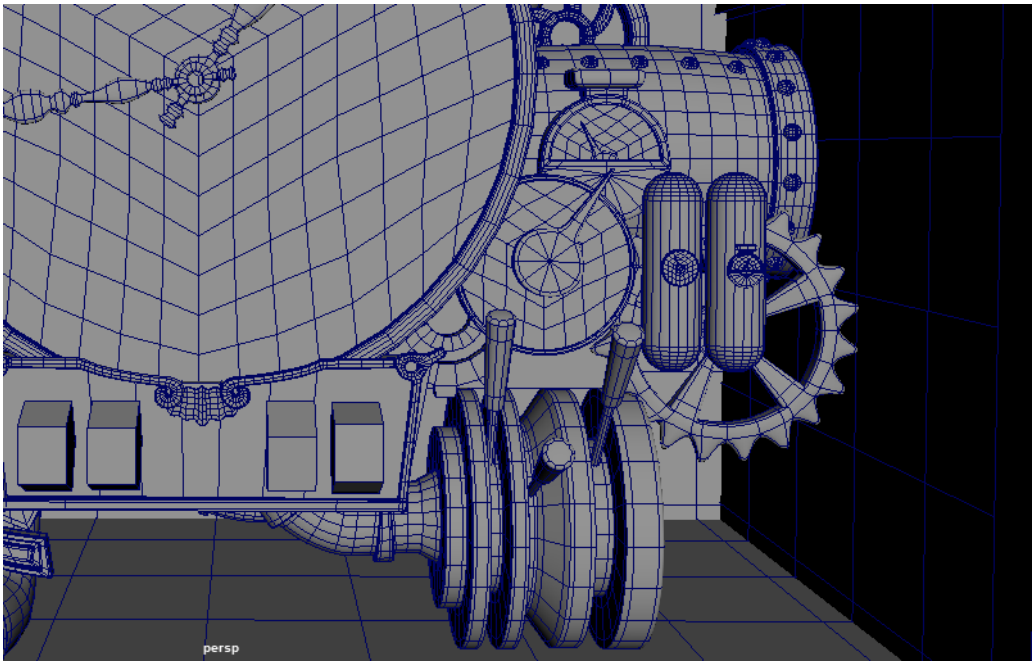


Figure 55: Detailing on the clocktower mechanism

The machine appeared complex and useful by replication and attaching small gears, nuts, and coil tubes. The fact that steam or pressure flows through them made us introduce the numerous connecting pipes which twist and curve across the main gear. Cubes were protruded to make some areas of the rectangles and the control panels. Walls and floor were made of simple cubes and flat surfaces to create a tight mechanical space emphasizing on the huge gear center.

5.3 Texturing

Autodesk Maya and Substance Painter were used to texture objects and provide believable and attractive surfaces. Our UV-unwrapping of every 3D model is performed in Maya and then textures are added. This allows us to paint textures in a smooth fashion and have greater control. We then imported models into Substance Painter where we created materials such as metal and brass as well as worn materials to suit the steampunk aesthetic after the UVs had been set. This Maya / Substance painter workflow provided us with realistic and artistic final textures which were versatile.

5.3.1 Thomas's and Cog Texturing

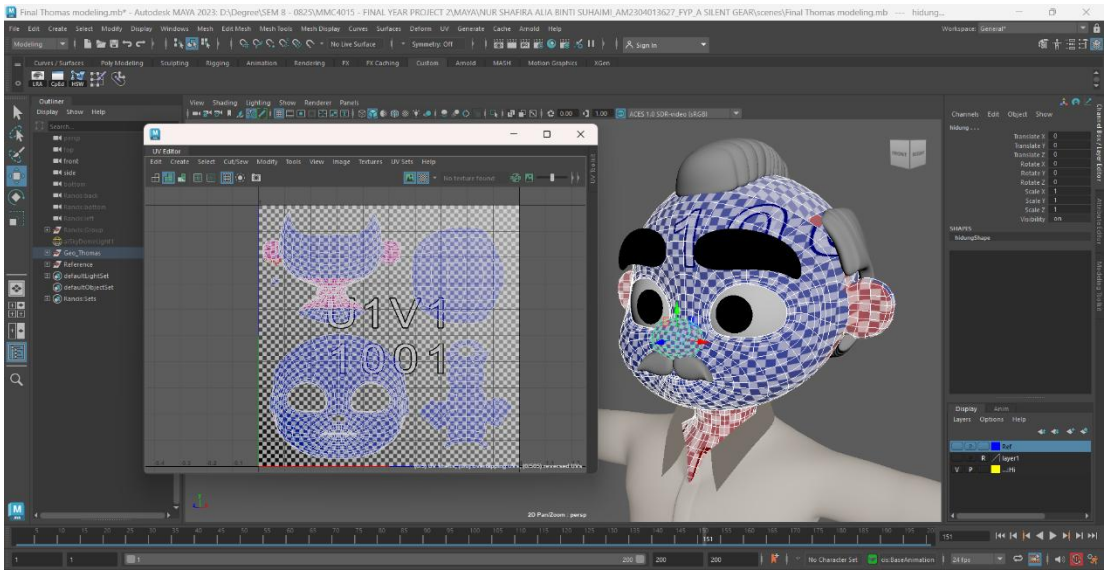


Figure 56: Thomas's face UV mapping

At Maya we completed UV unwrapping the model of Thomas and provided it to Substance Painter. To get the texture maps correctly, we divided every aspect of Thomas including his body and clothing into UV shells.

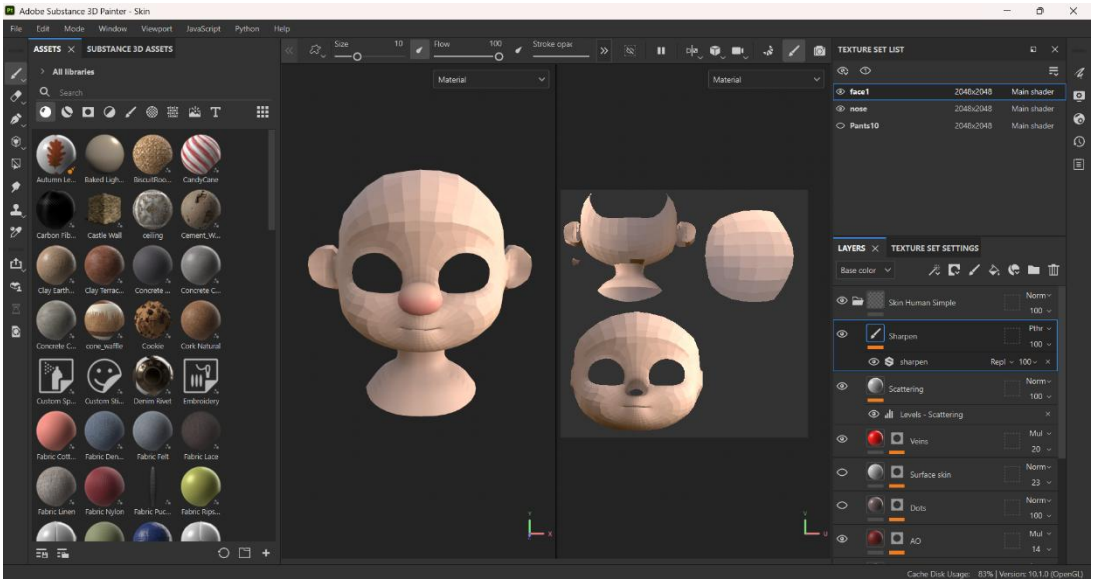


Figure 57: Thomas's face texturing

Thomas had a realistic and fashioned skin by Substance Painter. We took his skin and put a light shade of pale skins on it as aged skins, blended slight details of roughness and wrinkles with normal and height maps, and gave it some light shades of reddish and brown on cheeks and hands to make it seem like a real person.

Figure 58: Cog’s body texturing

The appearance of Cog was provided by Substance Painter in order to render it in a steampunk manner. The central body is rough in texture made of rusted metal. The crevices, corrosion and peeling paint add the effects of realism and align to the tale. The neck has a rubber texture which creates flexibility and demonstrates movement.

5.3.2 Environment texturing

The entire environment was textured to create a realistic steampunk world by Maya and Substance Painter. In Maya, we UV-unwrapped each of our models. We took metal, wood and stone textures to age and to use in reality and dirt and rust were added to make it real. This caused every surface in the setting to work to support the story, and demonstrates the rough and ancient world of Thomas and Cog.

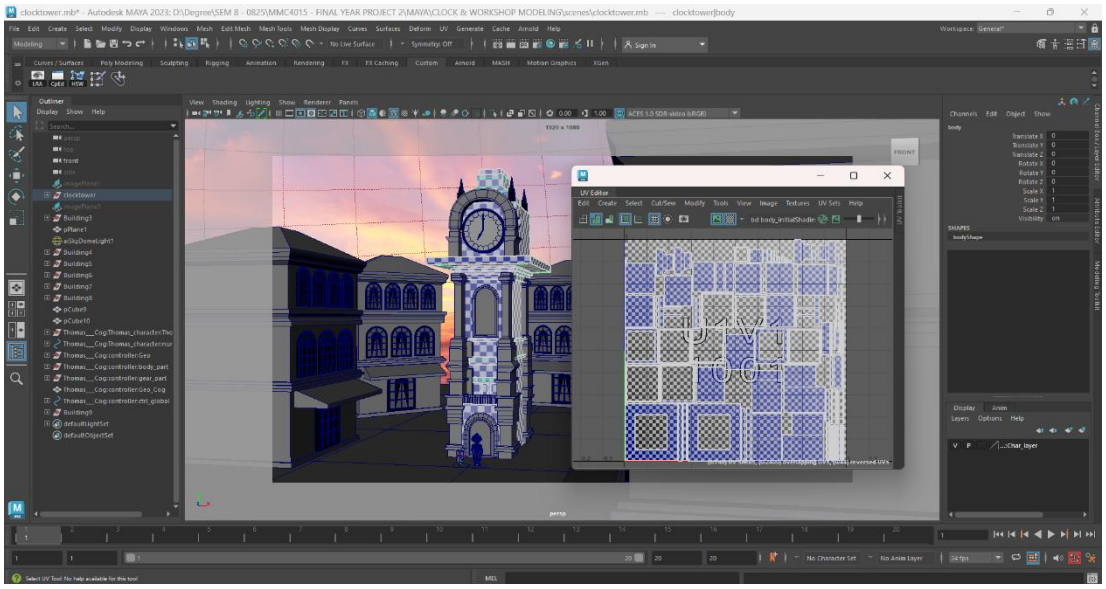


Figure 59: UV mapping for Clocktower

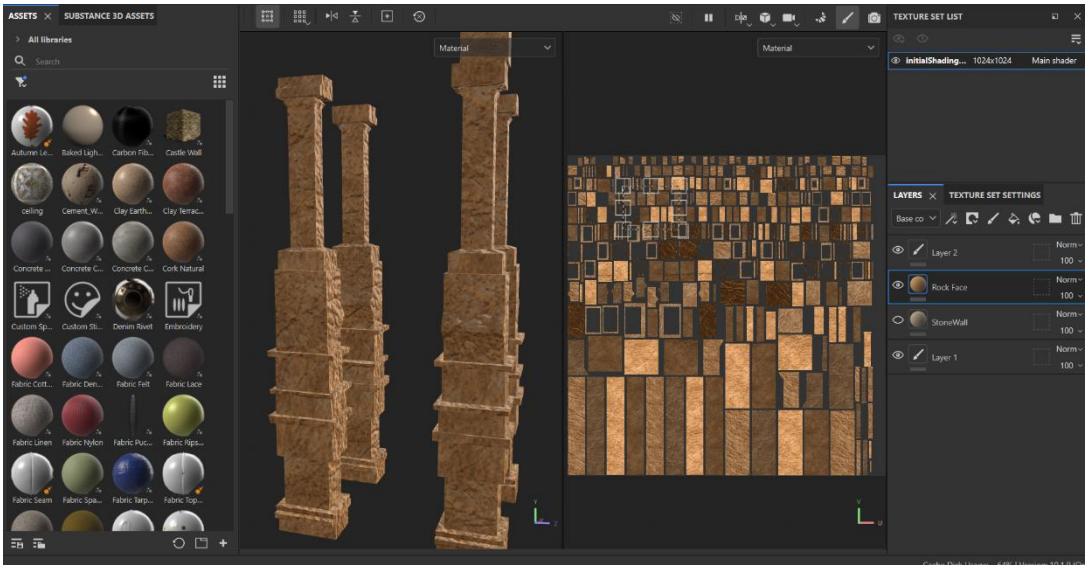


Figure 60: Texturing clocktower pole inside Adobe Substance Painter

To make the clocktower look old and grand we textured its exterior in Substance Painter. We employed worn stone and bronze finishes. To indicate time and weather we applied grime and rust around windows and clock face and sides. The clock face was given a smooth metallic finish of a small scratch to make it vintage.

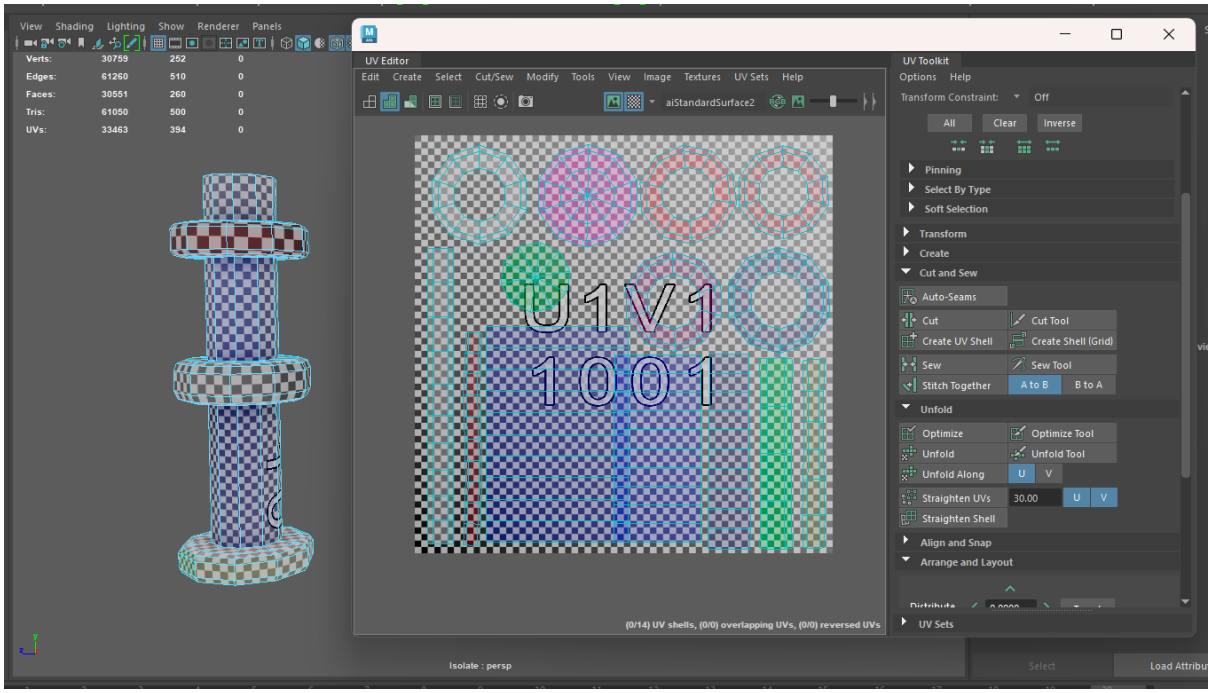


Figure 61: UV mapping for tools in Workshop

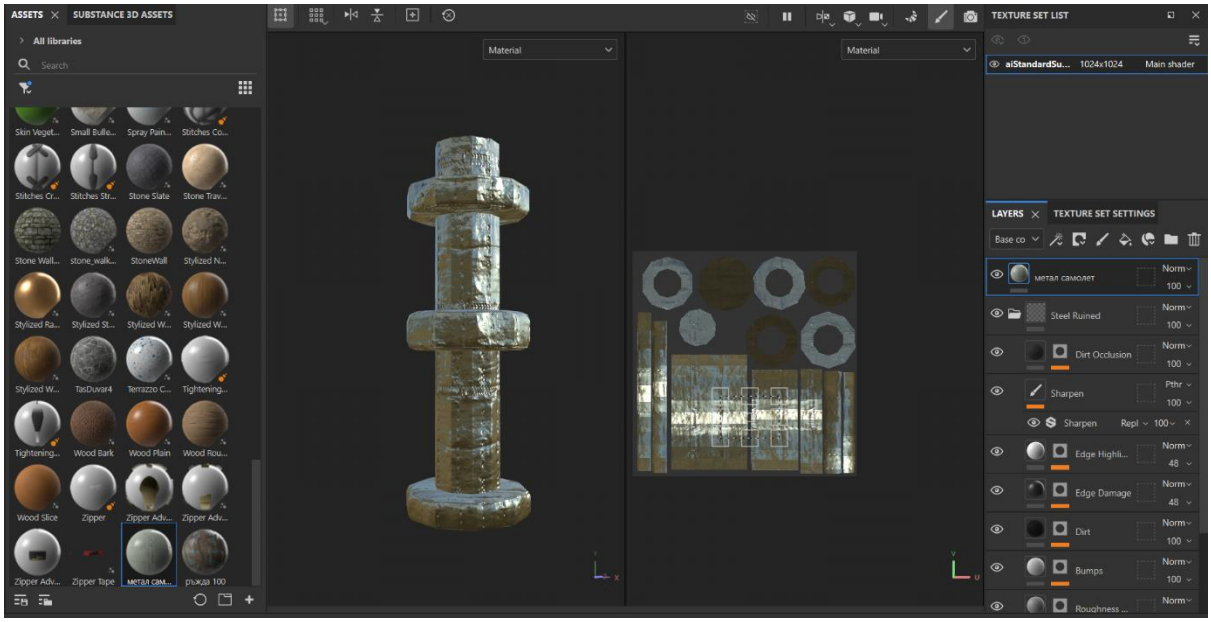


Figure 62: Texturing tools in workshop

I greased, dusted and rusted metal tools and gears to make them look real. Dark textures on the table and the walls are used to emphasize on the steampunk feel. The workshop is cozy and worn-out. Painting on wooden surfaces is old and scratched.

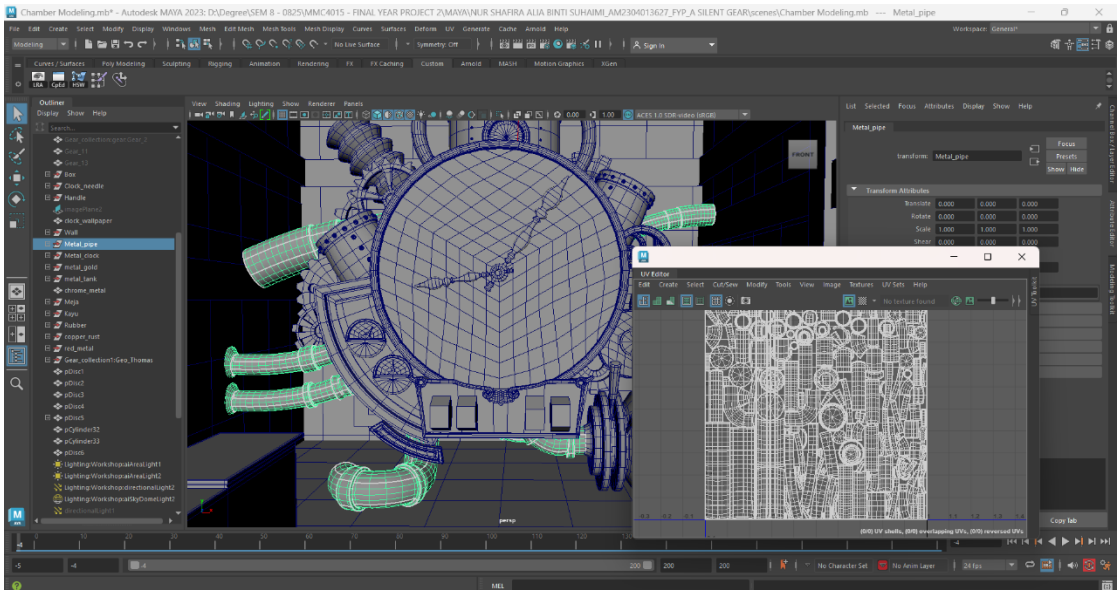


Figure 63: UV mapping chamber of the clocktower

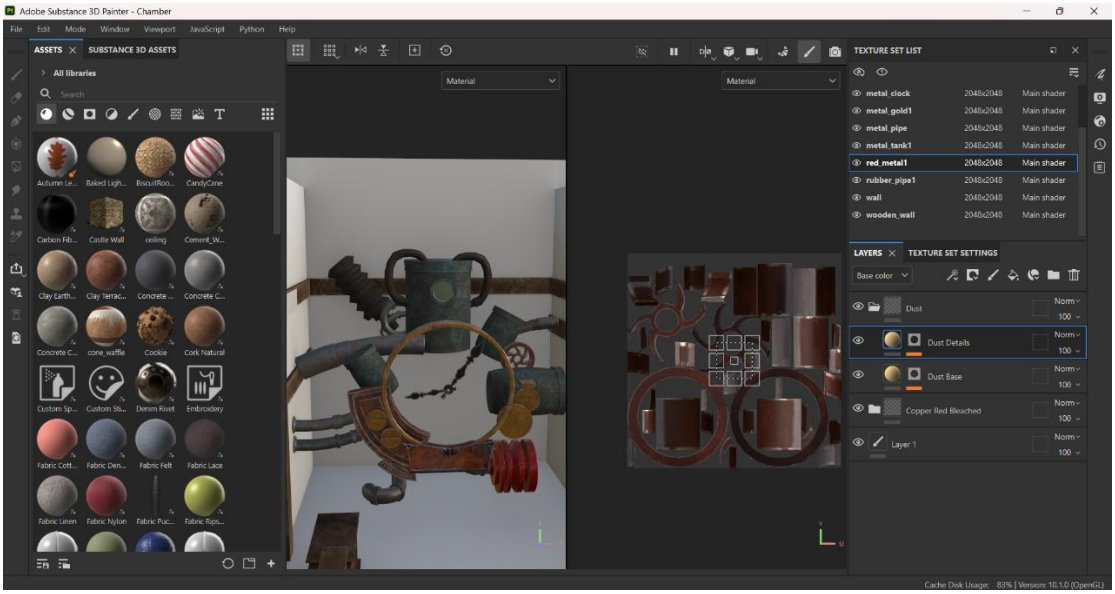


Figure 64: Texturing chamber of the clocktower

The clock chamber is the core of the tower, which is mechanical and sacred. I had brass, steel, and iron on gears, pipes, and machines in Substance Painter. To indicate the age of the tower we added dirt and rust to the inside of the mechanisms. We applied gold and brown colours to make it more three-dimensional and complex.

5.4 Rigging

Rigging Rigging is creating a skeleton inside a 3D model using bones and joints. The skeleton allows the animators to move and place the character or object in the animation. Control handles are used to manipulate the model, a motionless 3D object into a moving puppet. The rigging involves the construction of the bone joints, connecting the mesh with the skeleton,

and the weights of the skin to move naturally. It also introduces control mechanism such as Inverse Kinematics (IK) and Forward Kinematics (FK) to control the motion. The rig is then put into test and fixed to animate smoothly.

5.5 Skeleton

5.5.1 Thomas's Skeleton

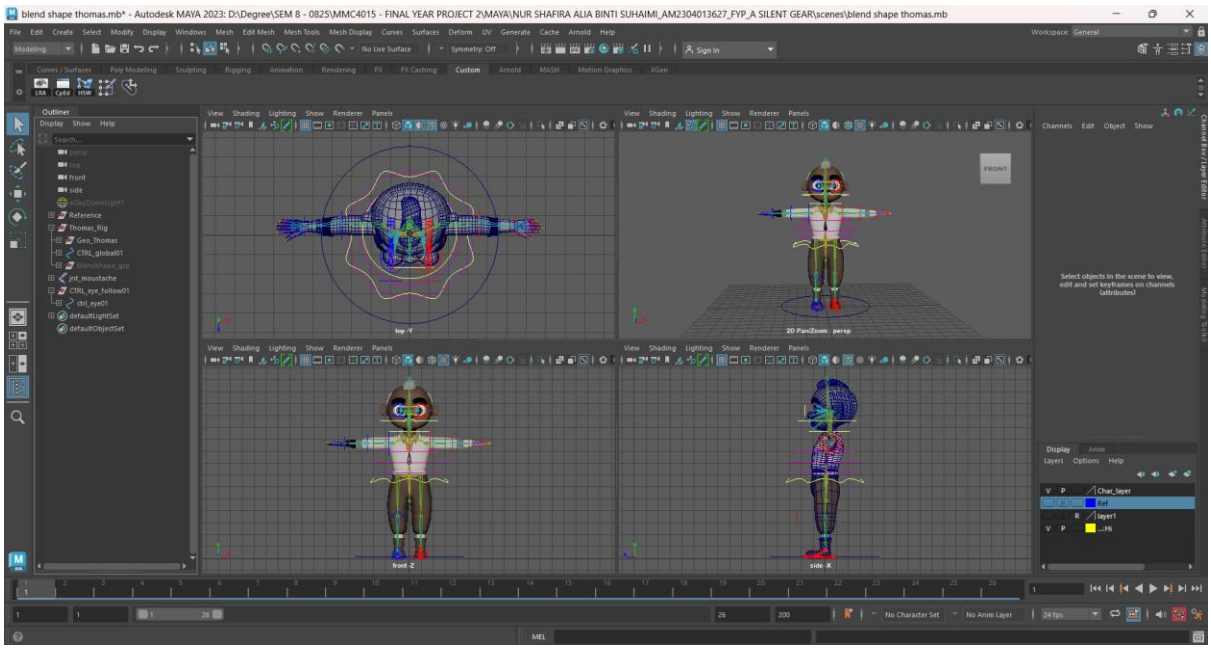


Figure 65: Create skeleton for Thomas's body

The first thing I did was to put joint bones on the body of Thomas. I inserted joints in the body, the arms, the legs, the neck and the fingers so that everything would move freely. Then I constructed FK and IK of the skeleton. FK enables you to adjust each joint individually to control movement whereas IK realigns joint positions automatically to move more and faster. After the skeleton was put together, I added controller circles and attached them to the joints using NURBS circles. These commands allow me to move Thomas with ease.

5.5.2 Cog's Skeleton

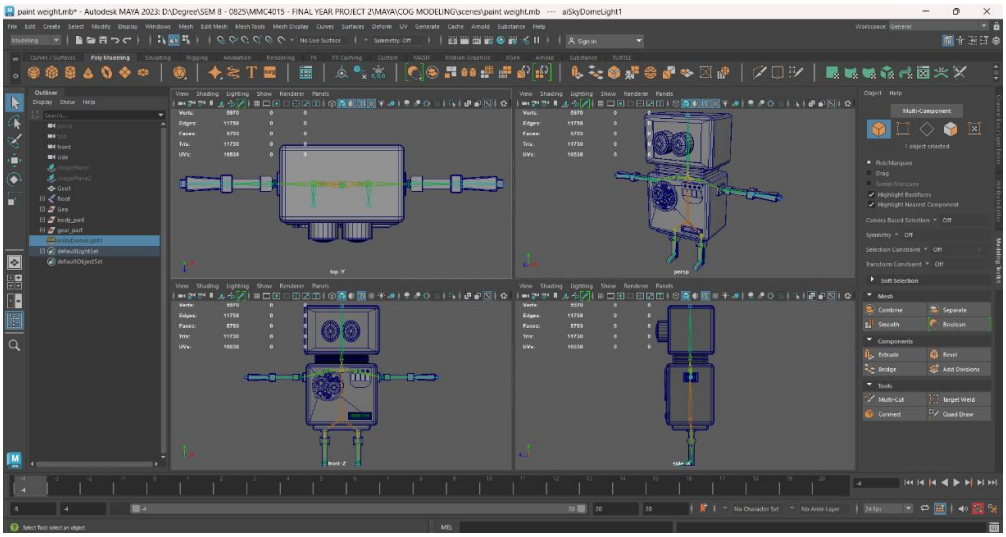


Figure 66: Create skeleton for Cog's body

Rigging Cog I began by inserting joint bones into his robot body. In Cog mostly I used joint bones in the neck, arms, body and legs so that they could move a little but accurately. In contrast to Thomas, the movement of Cog should be mechanical in appearance, that is why I paid a lot of attention to the position of every joint and demonstrated the hardness of the gears and metallic components. Once the skeleton was prepared, FK was the only thing that I was able to use to have controlled his movements. FK dealt with little mechanical movements such as swinging his arms..

5.6 Paint Weight

5.6.1 Thomas's Paint Weight

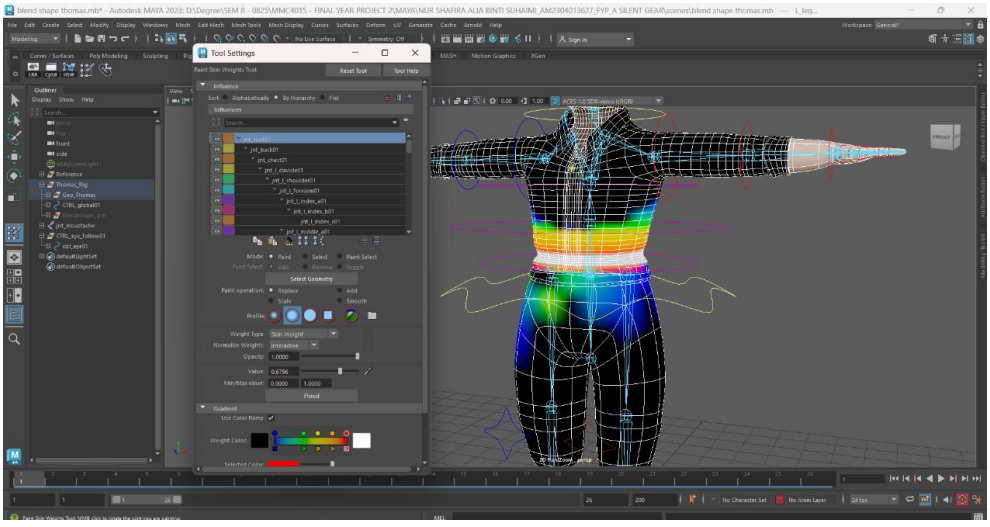


Figure 67: Paint weighting Process of Thomas's body

To start the weight painting, Thomas took the main vertices and manipulated them at the Component Editor. This assisted in modifying the reaction of every component of the mesh to the movement of the skeleton. The Paint Weight Tool was used to make the adjustments necessary on the shoulders, elbows, and fingers, after the initial set up. I ensured that his joints were free to move because Thomas is a human being, and therefore, his prosthetic hand and body easily moved without wrenching and twisting the mesh.

5.6.2 Cog's Paint Weight

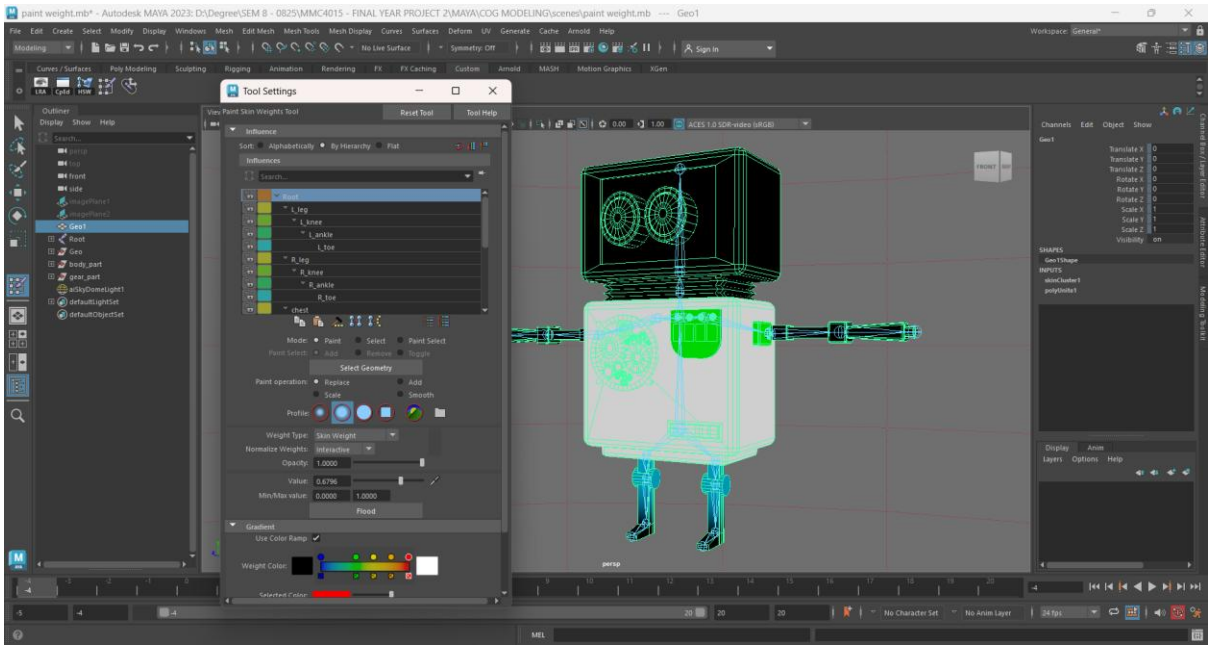


Figure 68: Paint weighting Process of Cog's body

This was not the case with Cog and weight painting. Since it was a robot, I wanted to have him being stiff and mechanical in his movements. I employed the Component Editor so as to provide the correct weights to every joint, minimizing undesirable bending. Then I went to the Paint Weight Tool to clean the torso, arms, and neck to be rigid. Cog has stiff and organized joints which result in his intentioned mechanical manner.

5.7 Animation

One of the main elements of the work on A Silent Gear is animation. Every character, prop, and the environment that has been modelled, rigged, and textured is currently in motion. Animation gives it emotion, establishes a rhythm to the audience and makes the story easier to understand.

5.7.1 3D Animation

In Autodesk Maya, Thomas, Cog and the silhouette were animated. An average animation consists of 3,000 to 4,000 frames per second. There are also some scenes with rough smoothness which will be corrected in Adobe Premiere Pro in the final cut. The approximate duration of the run time is 4 minutes and 40 seconds.

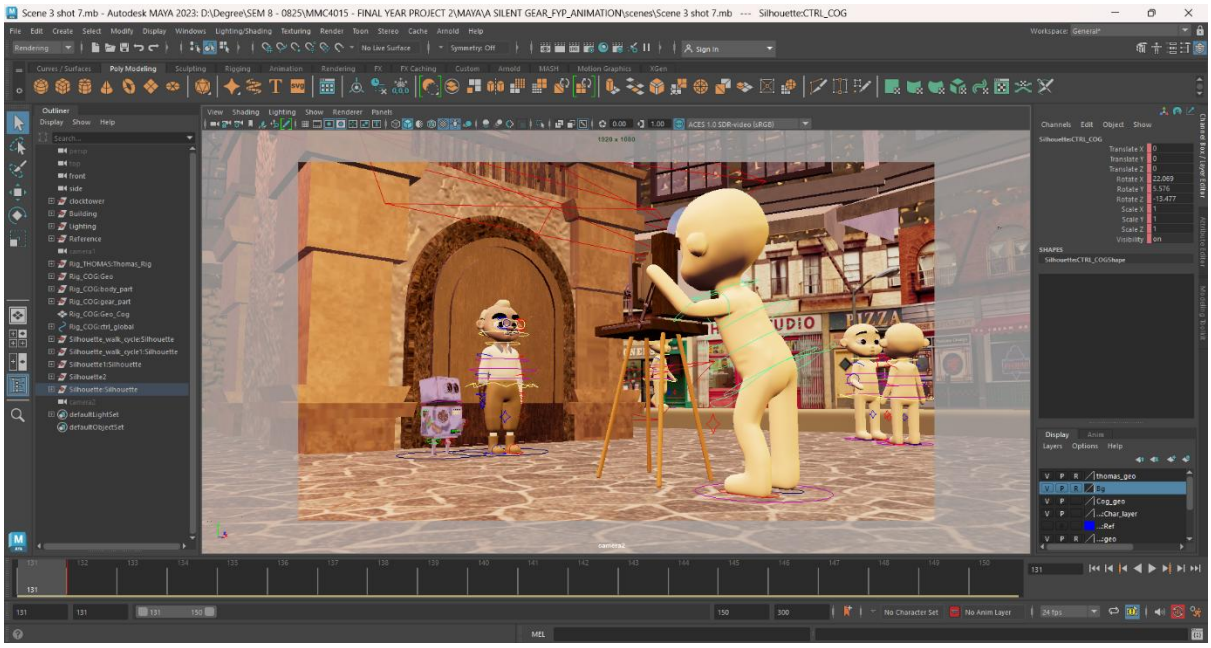


Figure 69: Animation process in Autodesk Maya

5.8 Conclusion

Stated briefly, animation is what gives the 3D film life because it transforms non-animated figures into performances. After the script, animatic and storyboard, each movement in Maya was aligned with the mood of the story, and particularly in the sequences related to the falling of the clocktower and silent scenes between Thomas and Cog. The fact that the animation was divided into multiple Maya files, one of which dealt with the workshop, one with the outside of the clocktower, and another with the chamber, helped maintain the tech issues at a minimum and made the project manageable. This piece demonstrates that proper planning, consistent animation and powerful story telling can narrate a powerful narrative. The last scene is the appreciation of untold sacrifices and is approximately 4 minutes 40 seconds.

6. POST – PRODUCTION

6.1 Introduction

Once all of the produced animation sequences have been modified and assembled into a polished short film, the final element of the process of producing A Silent Gear is the post-production stage. This step is very important because it will make the movie look better, feel better, and be easier to understand. Some of the main tasks in post-production include lighting, rendering, visual effects, compositing, colour correction, editing, and putting together the final soundtrack. To generate a completed product that is polished and united, each component contributes to the entire process.

6.2 Lighting

Since lighting establishes the mood, ambiance, and emotional tone of each scene, it is an essential component of the 3D animation production process. Lighting was thoughtfully designed and implemented in this project to fit the steampunk style of the setting and improve the narrative of A Silent Gear. Before moving on to the rendering stage, each scene's visual depth and dramatic effect were enhanced via the employment of several lighting approaches and HDRI sources.

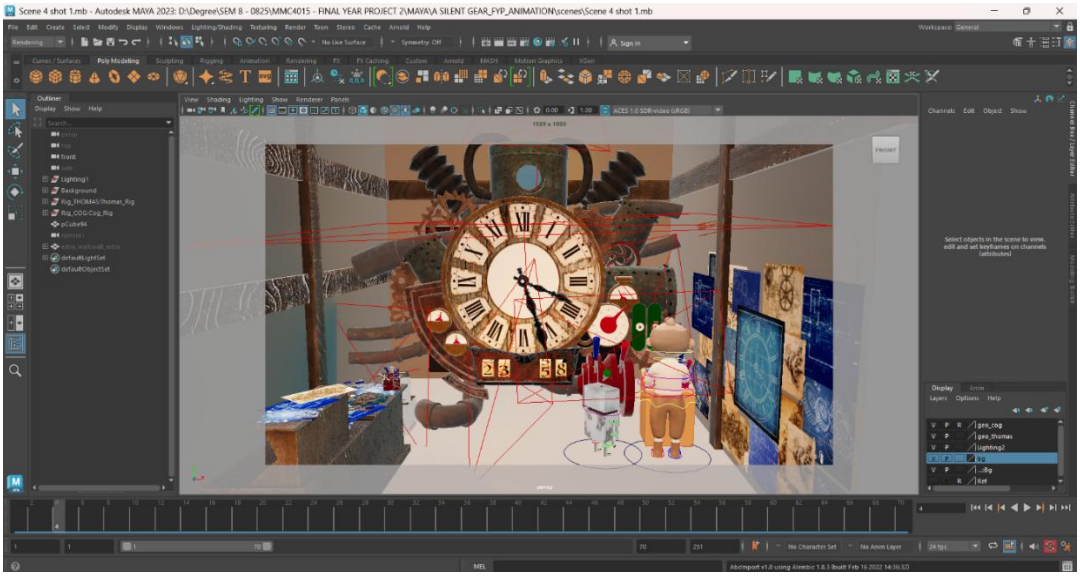


Figure 70: Lighting setup in Chamber Scene of A Silent Gear

The figure 70 shows an example of a lighting setup in one of the scenes in A Silent Gear film. I used Arnold Lighting in Maya to add Skydome and Area Lights to make the steampunk setting look more lifelike with natural shadows, depth, and reflections. To give the scene a warm and nostalgic feel, a Skydome Light with an HDRI from PolyHaven was used, specifically an evening sky HDRI. I used several Area Lights with dim red and orange colours in the chamber

to make the dramatic tension stronger when the machines start to break down. The illumination makes the event seem more dangerous and urgent.

Figure 71: Rendered scene lighting sample in Chamber scene

6.3 Rendering

Arnold Renderer in Autodesk Maya was used to produce A Silent Gear. After the lighting for each scene was put up, the animation was produced in separate passes so that it would be easier to control during compositing. Each image was carefully adjusted just to get the right sampling level to keep the render time short and reduce noise. Some pictures, especially those taken in the chamber, needed higher sampling values to get clearer results because there were so many light sources and the details were so clear.

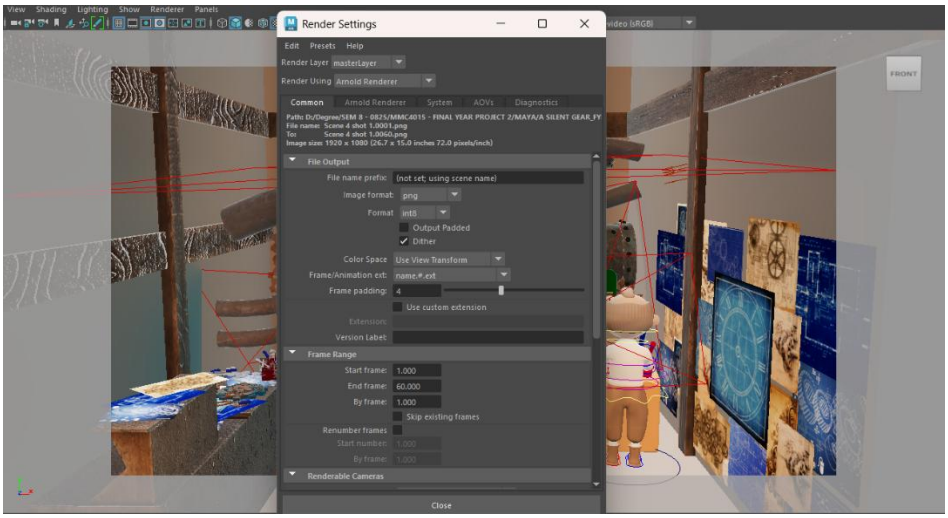


Figure 72: Arnold Rendered setting in Autodesk Maya

6.4 Compositing

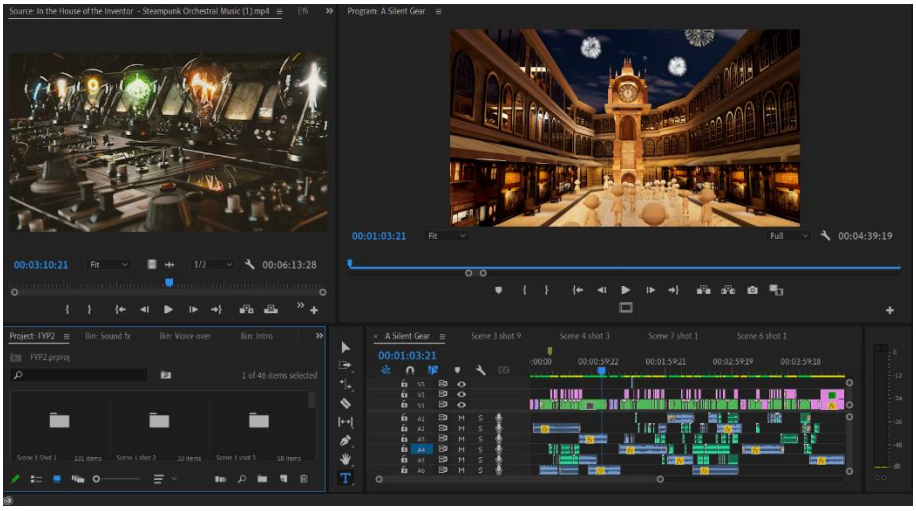


Figure 73: Compiling video scene in Adobe Premiere Pro

After rendering was done, all of the image sequances were import into Adobe Premiere Pro for compositing and final editing. In this part, color correction was made to make sure the scenes were consistent. In example, the warm colour of the workshop was apply to get the right mood on the animation. During compositing stages, sound effects, and background music were added to make the scene more emotional. After audio were synced up, the last step in this phase was exported the project in high quality.

6.5 Visual Effect

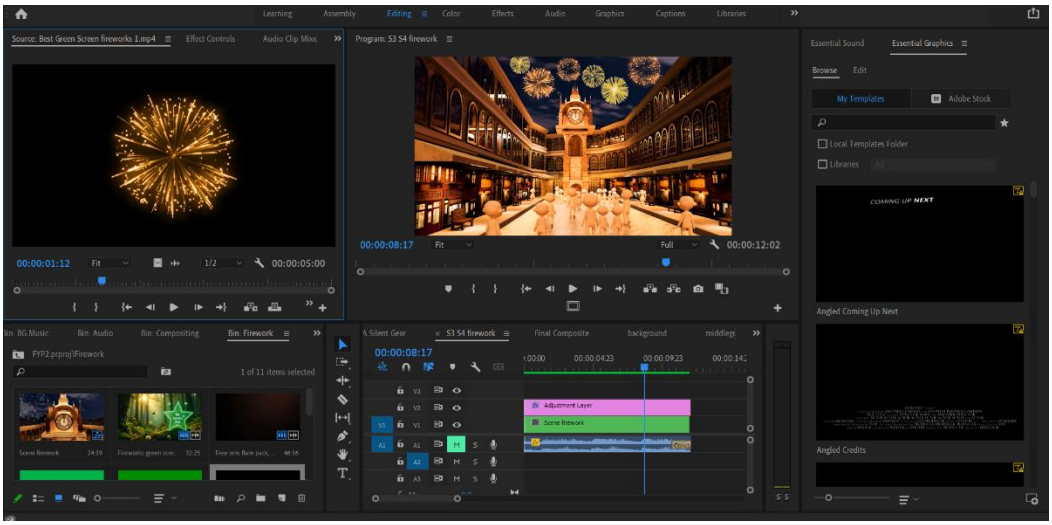


Figure 74: Effect added using Premiere Pro

The visual effects (VFX) stage adds to the story by including things that Autodesk Maya can't made. This production use visual effects to make the stories emotional resolution stronger, especially during the New Year's Eve scene. The fireworks effect was using a green screen clip that I downloaded from Youtube. Then I used chroma key effect in Premiere Pro to get rid of the background.

6.6 Colour Correction

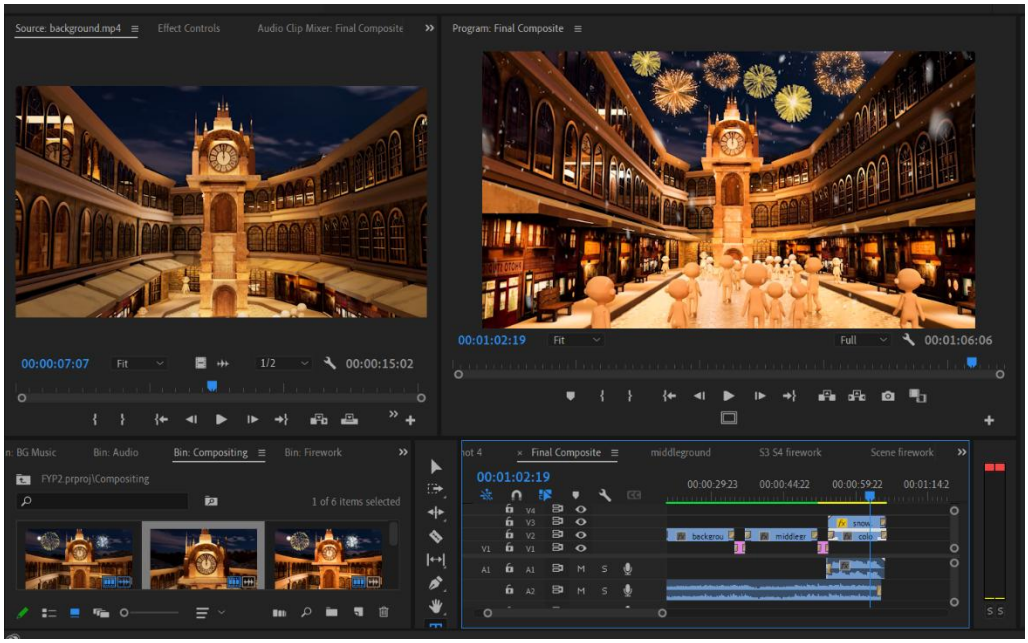


Figure 75: Color correction process in Adobe Premiere Pro

For colour correct I'm also using Premier Pro so that the animation will look more alive. After the sequences were imported, the Lumetri Colour panel that was used for changing exposure, contrast, highlights, shadows and also colour balance was the main tool that I'm using for. Colour corrected give a huge impact on my animation because it can fic any lighting problem that were occur during the animation. In example, based on the figure above where I'm using warm toned to highlight the clocktower at the center.

6.7 Final Output

Figure 76: Screenshot of the final output video

The last step was to export the finished animation after done with the final editing. This included sound design, visual effects, and also background music. The final animation was made with Adobe Premiere Pro and was exported as an MP4 file. For final outcome, I already included the logo production, opening tittle, and also the closing credits.

6.8 Conclusion

The last and most important step in making A Silent Gear was post production, where the visual, audio, and plot elements were putting together to create an epic animation. To match the story's emotional tone and steampunk style, from the raw scene until the it got colour corrected, adding lighting, rendering and then mixed them all together. Each environment had its own mood thanks to Arnold, HDRI sky domes, and also area light. The used of green screen for visual effect to make my animation more fun was really a great idea. The colour correction feature in Adobe Premiere Pro kept the film's mood, tone, and contrast. Sound changes made the story more emotional and kept people interested. This is the last step of the animation progress before its ready.

7. EVALUATION

7.1 Introduction

This chapter examines the survey questions designed to assess the audience's perception of the final video's impact and overall values, which serve as metric for the project's success. Getting input from the audience and looking at it may help the project's future outcomes and show what works and what doesn't.

7.2 Evaluation Method

7.2.1 Questionnaire

Google Forms was used to build a questionnaire to get input from the audience on the animation project. The goal of these eleven questions is to find out how valuable the project is overall and how well it meets its primary goal, which is to show how important it is to appreciate the work of others and the value of contributions that are often ignored. It also wants to make people more aware of how social neglect and judging someone based on their money, job, or physical ability may hurt them emotionally.

No.	Question	Answer
1.	What is your gender?	Answer option consist of:

		• Male • Female
2.	How old are you?	Answer option consist of: • Below 18 years old • 18 - 25 years old • 26 - 30 years old • Above 30 years old
3.	Do you find the story easy to understand?	Answer option consist of: • Yes • No • Maybe • Very clear
4.	Does the theme of appreciating others come across clearly?	Answer option consist of: • Yes, very clear • Not really • I'm not sure • Yes
5.	How well did you feel the emotional connection between Thomas and Cog?	Answer option consist of: • Very strong • Weak • None
6.	What do you think about Thomas as the main character?	Answer option consist of: • Relatable • Nuetral • Not relatable
7.	How would you rate the 3D modelling and animation quality?	Answer option consist of: • Excellent • Average • Poor
8.	Did the music and sound design match the mood of the story?	Answer option consist of: • Yes • Maybe

		• No
9.	Which moment impacted you the most in the animation?	This question uses a text base answer. Relying on the audience's personal thoughts and opinions.
10.	Do you think the ending made you reflect on the theme of appreciation?	Answer option consist of: • Yes • A little • No
11.	Overall, how would you rate “A Silent Gear”?	Rating scale of 1 star to 5 stars

Table 8: The Questionnaire’s Survey and Answer’s Option

7.3 Conclusion

The results of this research demonstrate the effectiveness of the animation taking into account what the people who are the target have said and suggested. We used Google Forms to build a survey and get answers from the people we wanted to hear from. The study focusses on several significant topics. The audience's demographics, how well the project's aims were reached, what people thought of the animation as a whole, and suggestions on how to make it better in the future are all presented.

8. DISCUSSION OF FINDINGS

8.1 Introduction

This chapter talks about what we learnt from the audience poll we did for A Silent Gear, a 3D short animation production that deals with issues of recognition, neglect, and silent contribution. The study sought to gauge viewer perceptions about the plot, characters, emotional resonance, thematic clarity, and the overall efficacy of the animation. We looked at all the replies to see how effectively the story and pictures got over the idea they were trying to get across. The findings provide us useful information about what works well in the animation and what may be better in the future.

8.2 Evaluation Results

8.2.1 Questionnaire Feedback

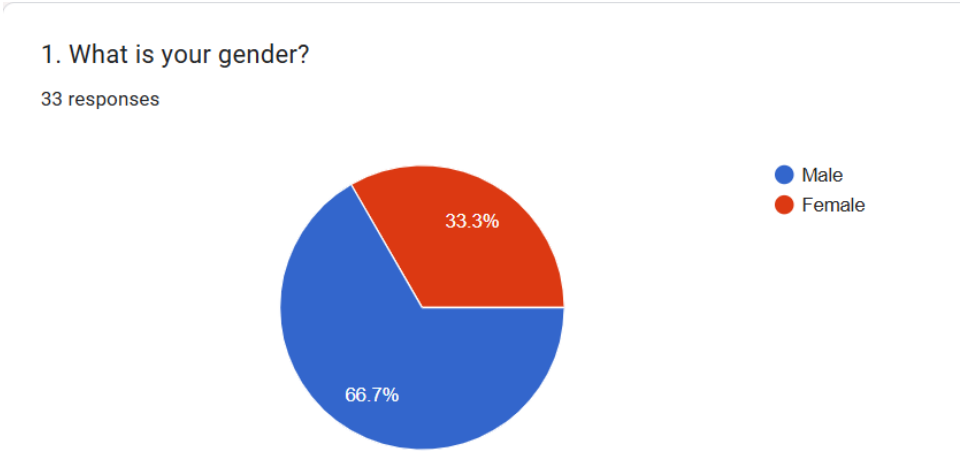


Figure 77: Screenshot of the questionnaire's first question result

Based on the figure 77 above, there were 66.7% of respondents were male while the remain 33.3% were female respondents for this evaluation survey.

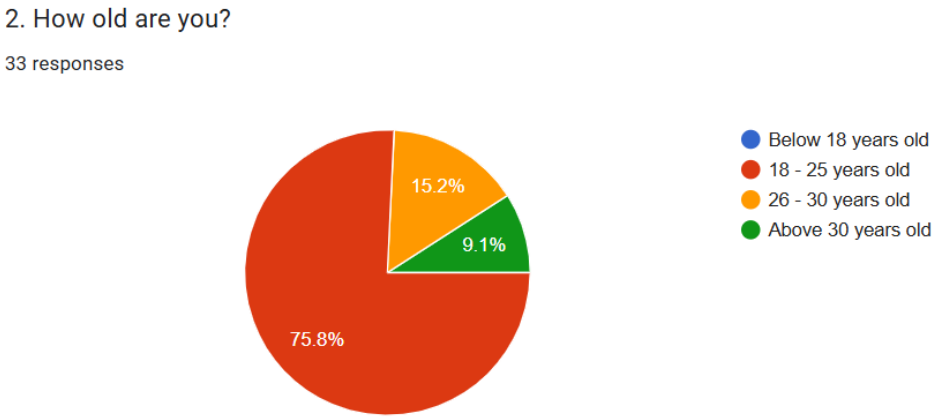


Figure 78: Screenshot of the questionnaire's second question result

Based on the figure 78, there are 75.8% of the respondents were around 18 to 25 years old, 15.2% of the respondents are around 26 to 30 years old while 9.1% are above 30 years old.

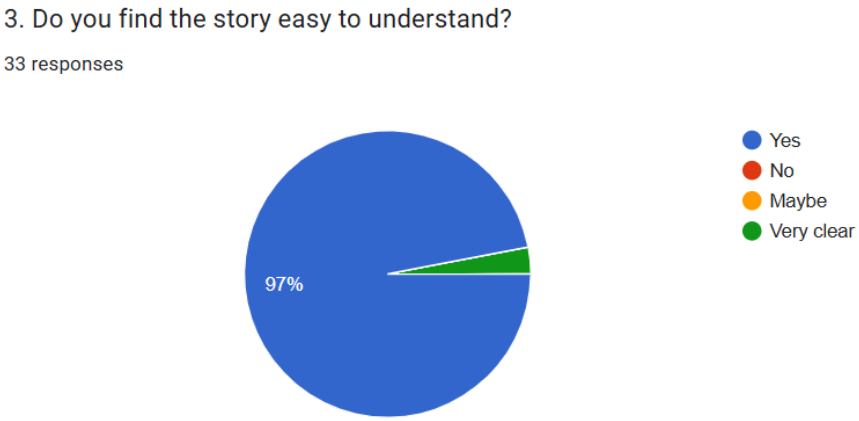


Figure 79: Screenshot of the questionnaire's third question result

Based on the figure 79, around 97% of the respondents were find the story easy to understand by saying yes and only 3% with very clear understanding.

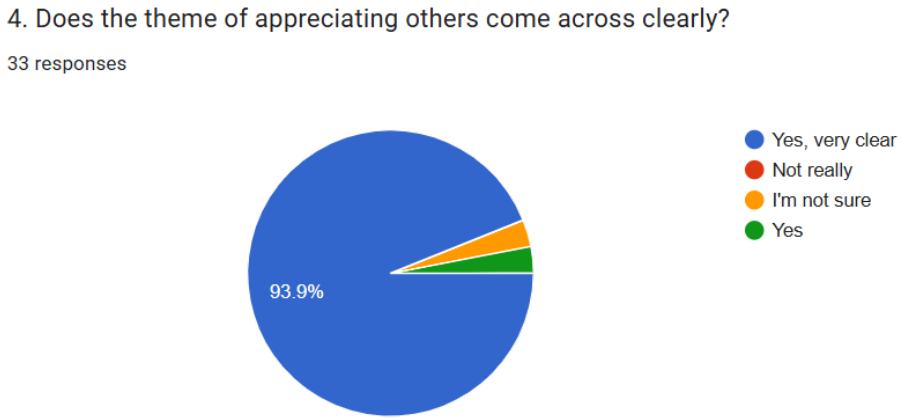


Figure 80: Screenshot of the questionnaire's fourth question result

Based on figure 80, around 93.9% of the respondents was clear with the theme of appreciating others while 3% said yes and another 3% saying not sure.

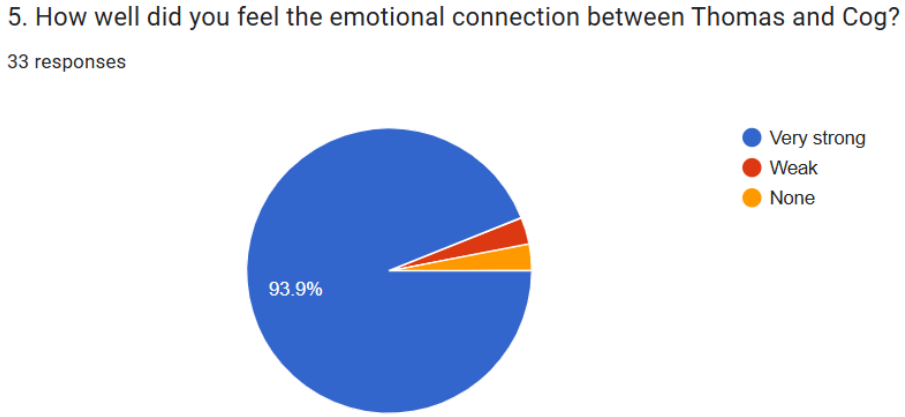


Figure 81: Screenshot of the questionnaire's fifth question result

Based on figure 81, around 93.9% of the respondents feel the emotional connection between Thomas and Cog are very strong while 3% said weak and another 3% saying none.

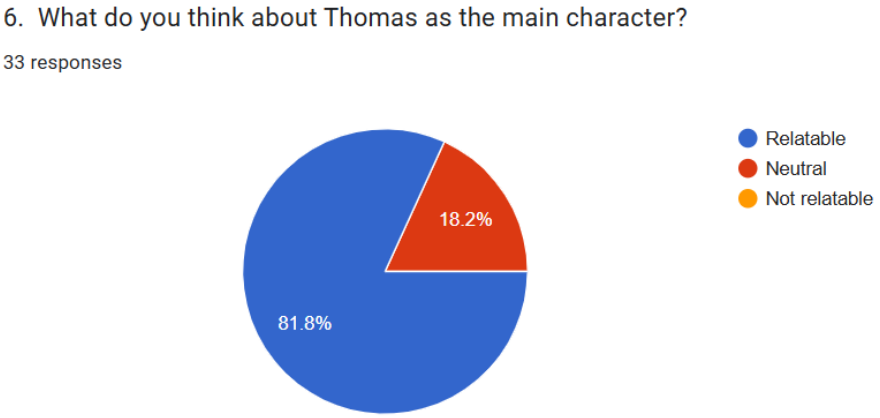


Figure 82: Screenshot of the questionnaire's sixth question result

Based on figure 82, around 81.8% were related with Thomas as the main character while 18.2% said neutral.

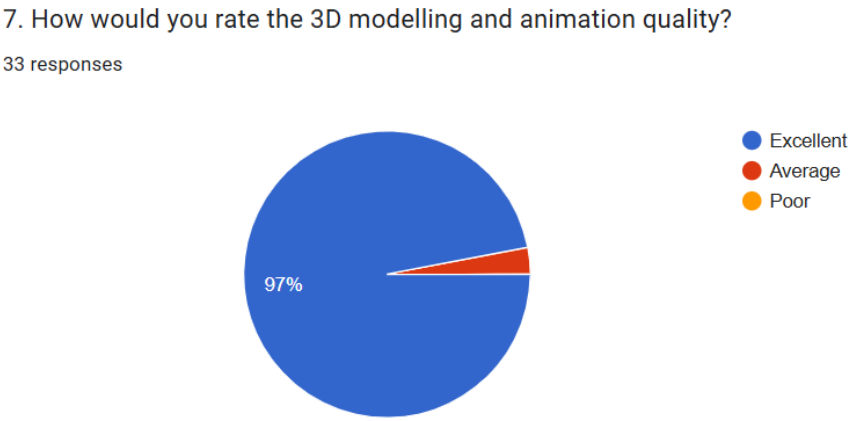


Figure 83: Screenshot of the questionnaire's seventh question result

Based on figure 83, around 97% of the respondents rating excellent for the modelling and animation quality while 3% average.

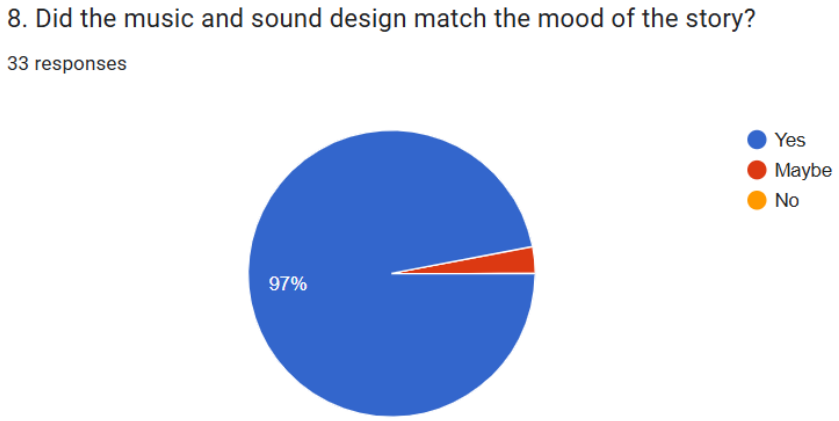


Figure 84: Screenshot of the questionnaire's eighth question result

Based on figure 84, around 97% of the respondents agreed that the music and sound design match the mood of the story while 3% with maybe.

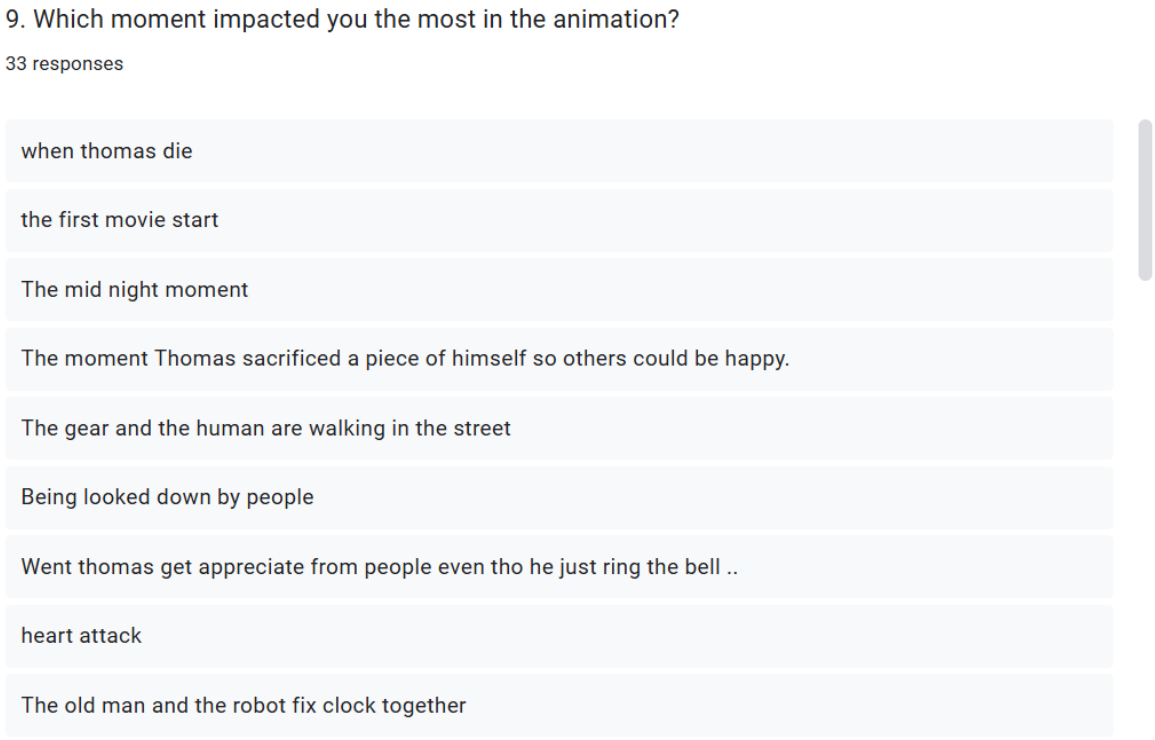


Figure 85: Screenshot of the questionnaire's ninth question result

9. Which moment impacted you the most in the animation?

33 responses

Fixing the gear

The ending part

Subtitles: [Heart attack]

When the clock tower broke down and Thomas sudden heart attack.

the song does matched the mood of the story

When the old man isnt there anymore :(but his robot assistant continues his legacy

The story

Thomas dead😫 😫

Gear

Figure 86: Screenshot of the questionnaire's ninth question result

9. Which moment impacted you the most in the animation?

33 responses

When the Thomas and the robot have a strong relationship

When people start mocking thomas

When the moment everyone thought that the main lead was dead

when the gear start to tremble and how the way use camera shot and camera movement, good job

scene when the uncle die, i feel so sad

when the uncle die, i feel so sad

texture, camera , theme..

ending scene when Thomas died (not sure if he died or not)

when he was looked down by people and when Cog managed to fix the clock

Figure 87: Screenshot of the questionnaire's ninth question result

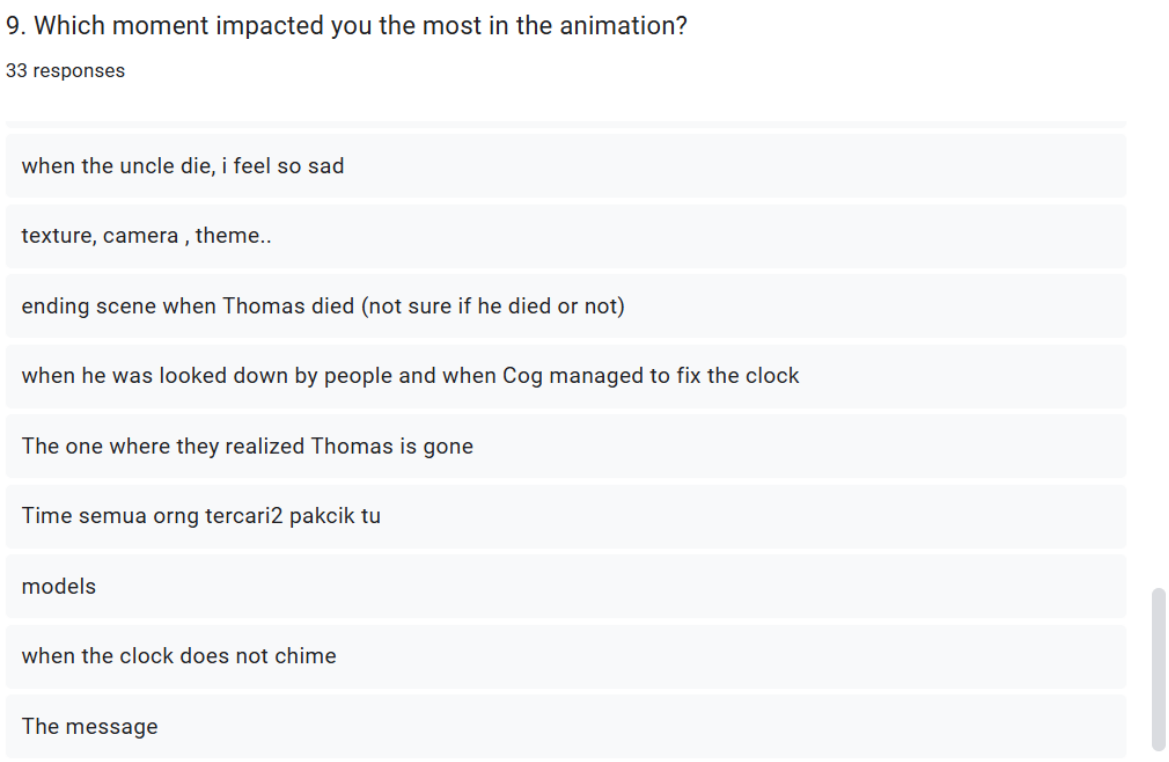


Figure 88: Screenshot of the questionnaire's ninth question result

Based on the figure 85, 86, 87 and 88, the majority of the respondents said that when the clocktower collapsed and Thomas was having a heart attack is the moment impact them the most in the animation.

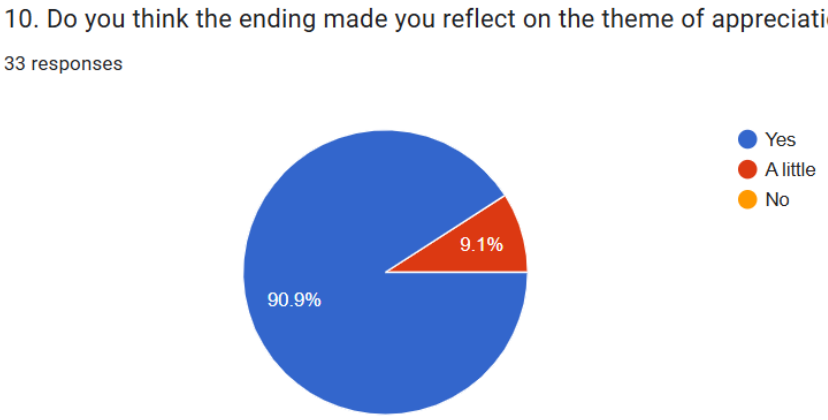


Figure 89: Screenshot of the questionnaire's tenth question result

Based on figure 89, around 90.9% of the respondents were thinking that the ending does reflect on the theme of appreciation while only 9.1% said a little.

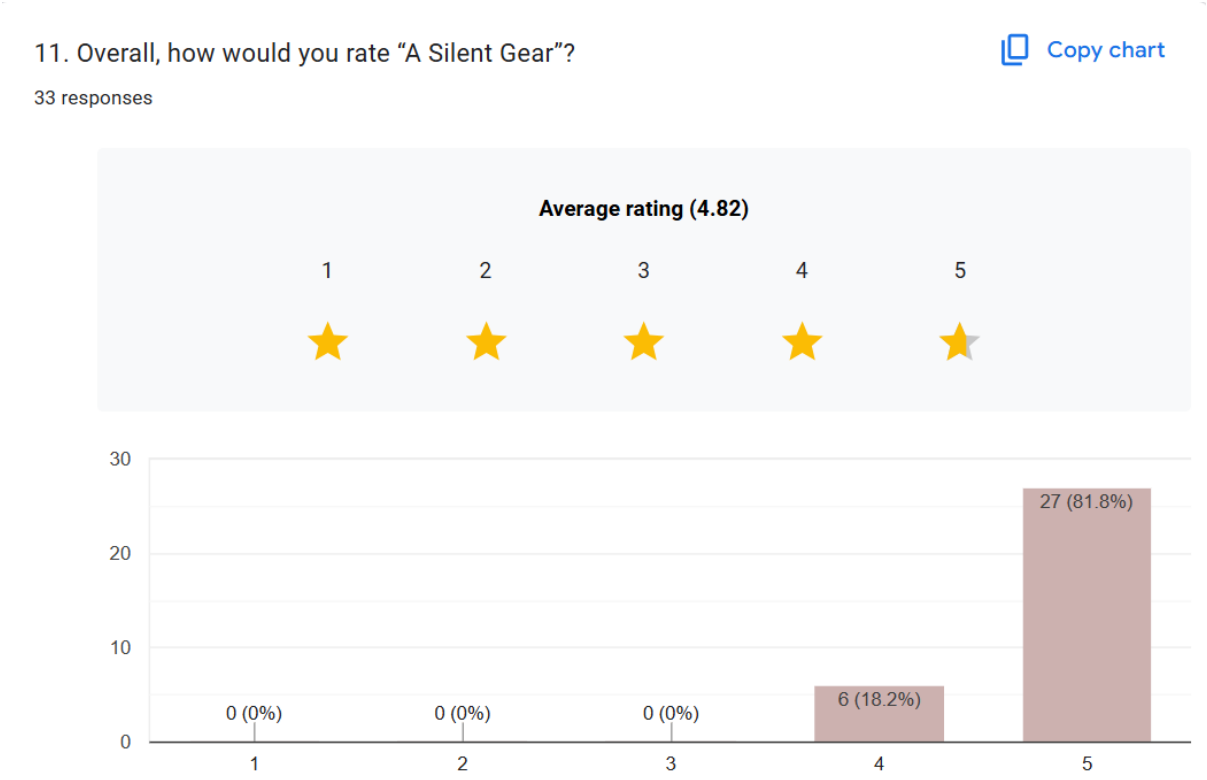


Figure 90: Screenshot of the questionnaire’s eleventh question result

Based on the figure 90, around 81.8% of the respondents rating 5 stars while 18.2% rating 4 of the star for their rating of A Silent Gear short animation.

8.3 Discussion

The survey results show the majority of respondents were aged 18 to 25, this means that the audience primarily consisted of young adults who are familiar with animation storytelling. Most of the people who took part said that the story was easy to understand. This prove that the story structure and visual cues were clear and easy to follow. People who answer the survey said that the theme of A Silent Gear carried was clearly communicated. This shows that Thomas's problems and Cog's sacrifice did a good job to send the emotional the emotional message.

The answer show that many people felt an emotional connection to the story. Almost all the viewer said that the scene where Cog trying to fix the clocktower and when the townspeople getting ready for the New Year countdown were especially interesting and made the animation more emotional. The fact that animation makes people think shows that the main goal was successful in giving people an interesting experience. The people who took part said that the character design made the story much better. People thought Thomas was nice, while Cog was a unique sidekick.

The steampunk setting, especially the clock tower chamber, got good reviews for making the story mood better. Feedback from the audience shows that this part made key scene more emotional because some critics say that changing up the camera angles could make some scenes less slow or boring. This means that both the tempo and cinematography might need to be better. Even respondents consistently gave the animation with high rate, with most giving it a perfect score. This shows that the audience was happy and that the animation was giving big impact to them.

8.4 Conclusion

The survey result show that the Animation of A Silent Gear was able to get its ideas and emotional message towards the audience. People who watch the animation understood the storyline, liked the characters and also like how deep the relationship between Thomas and Cog was. This purpose of this animation is to meet the goal of the tale, the themes, and the way it looked but there is need for better pacing. The result shows that the animation may improve people's understanding on how much they recognize and see other labour values.

9. CONCLUSIONS

9.1 Introduction

This chapter presents a summary of the overall progress, results, and conclusions of the final-year project titled A Silent Gear. The project aimed to produce a brief 3D animated film set in a steampunk environment, utilizing emotionally resonant storytelling to emphasize the significance of valuing the contributions of others. This project required a combination of creative planning, technical execution, and problem-solving throughout the three phases: pre-production, production, and post-production. This conclusion summarizes the project's achievements, addresses the challenges encountered, and proposes recommendations for enhancing future efforts.

9.2 Achievement

9.2.1 First Point of the Objective

The very first point of the objective is to teach people how important it is to be grateful for what others have done. To align with the goal of the story, Thomas who is a hard-working clocktower keeper whose work goes unnoticed by the townspeople finally got recognized after his death. The lesson of gratitude was clear during big emotional scene, like when the clocktower breaking down, the people being confused, and Cog’s repair the clocktower. The survey result shows that people got it and connected with the idea of the what the story want to tell. This shows that the animation did a very good job of getting this point across.

9.2.2 Second Point of the Objective

The second point of the objective is to make an animation that tells a story and makes people reflected on their behaviour. The goal was reached by using expressive character animation, and not only that, also by planning camera angles also give a huge impact on delivers the story. To make it more emotional, a smart lighting choice that align with the steampunk concept also important. People who saw the animation said that the emotional parts especially the friendship between Thomas and Cog were well received. This show that the way the story was told worked well.

9.3 Problem and Constraints

There were many problems that I faced at the time A Silent Gear animation was create. Not only problems with the technology, but also not have enough time. It took me a lot of tries to get the right topology when modelling so that it can reduce error when its time on rigging part. When I first rendering my first scene, it took me a longer time just to finish 200 frames

sequences. I try to search for other alternative by asking my supervisor and friends and got the solution immediately. They told me to use GPU instead of CPU since its takes only 1-2 minutes just to render one frame. Even with these problems, the project moved forward toward completion because I was able to adapt and can deal with them.

9.4 Future Work

To improve my animation result, I have made a several changes such as changing the camera angles and shot choices more often may speed up the pace and make the visuals more interesting. To make my animation looks more better, I'm going on adding more visual effects on my next project. Adding more complex facial rigging and also applied the 12 principles of animation can improve my next character animation. A longer runtime or a sequel could make the story better by adding more depth to the world and making the emotional undertones stronger in A Silent Gear.

9.5 Conclusion

In conclusion, A Silent Gear told us not only a story, but also a piece of life that we're facing now. The project shows that I have made a lot of progress in both technical and creative parts while doing this short animation. The project was finished despite some problems that I'm facing. The animation also shows how important it is to appreciate the works of others that are often overlooked.

APPENDIX A – Questionnaire

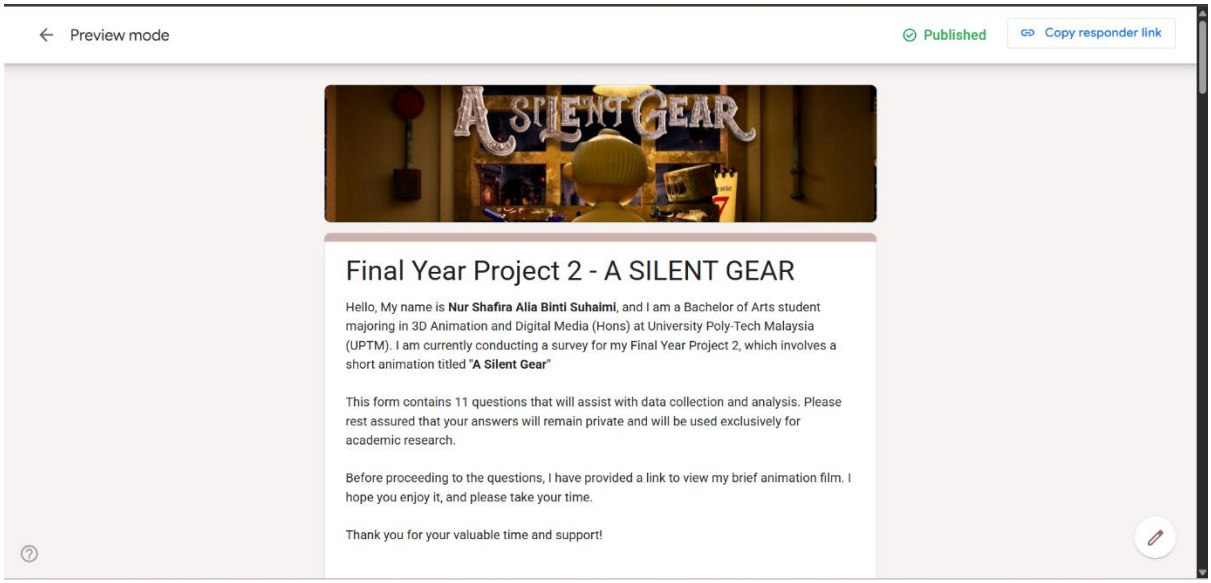


Figure 91: Page 1 of the Google Form Survey

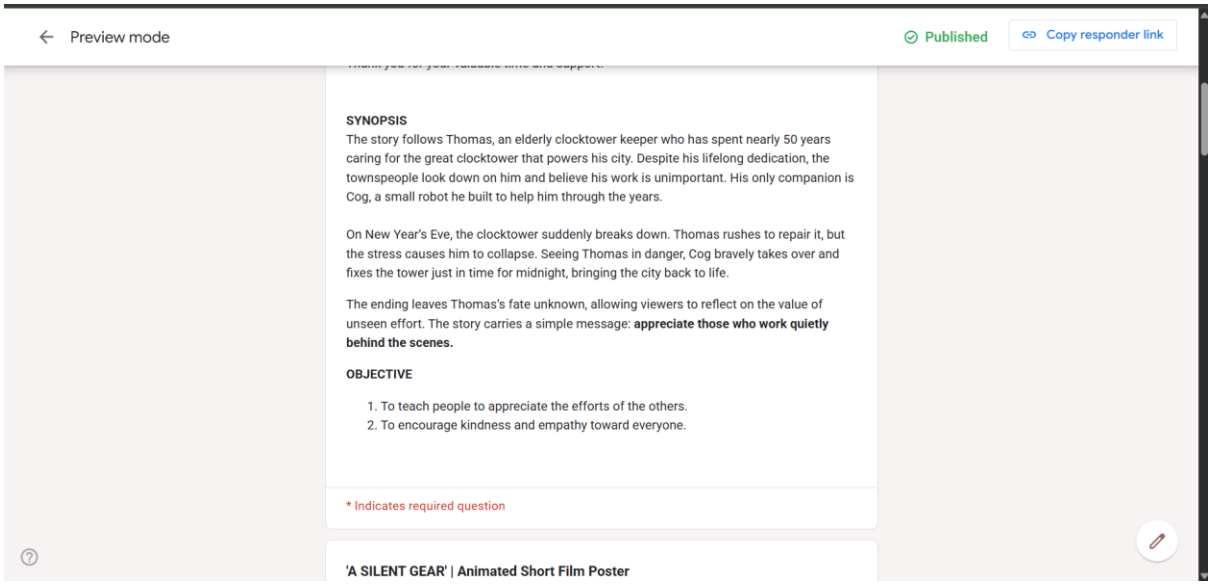


Figure 92: Page 2 of the Google Form Survey

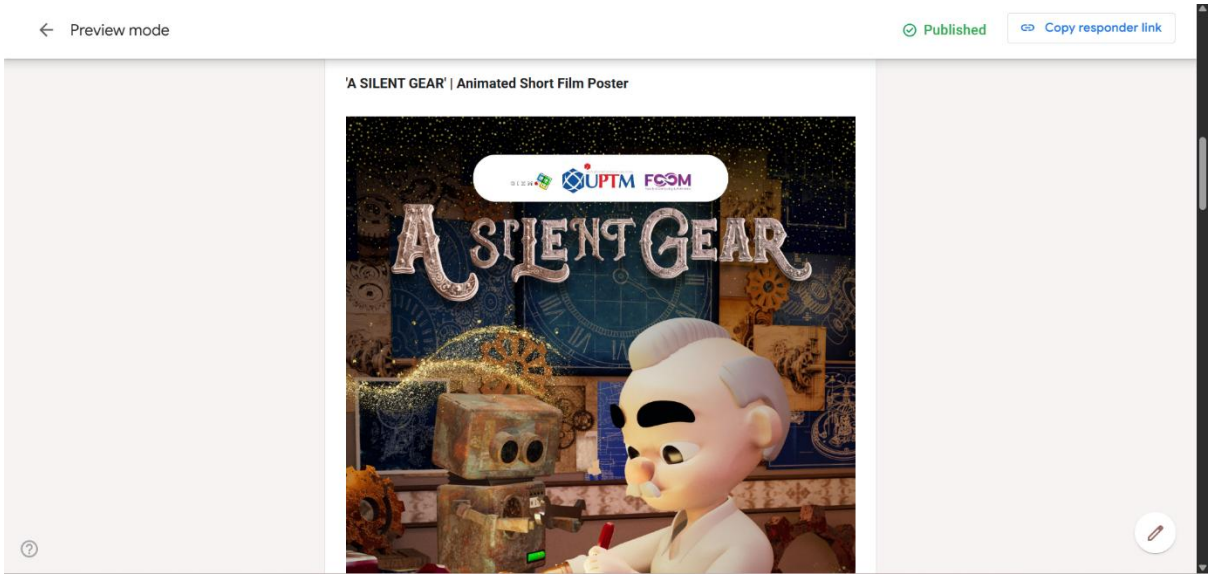


Figure 93: Page 3 of the Google Form Survey

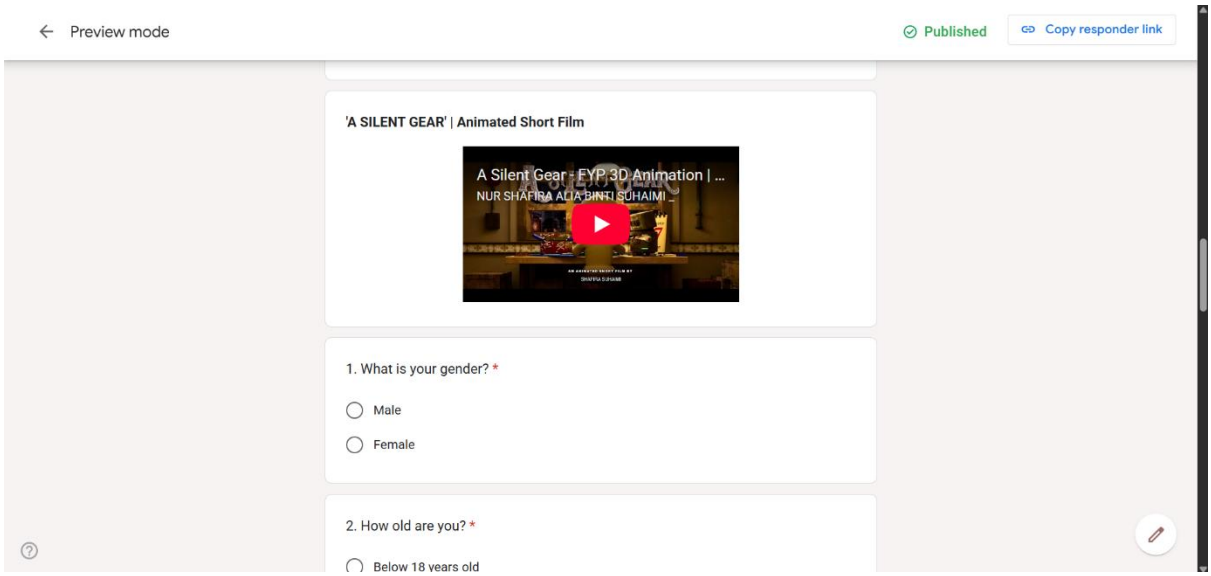


Figure 94: Page 4 of the Google Form Survey

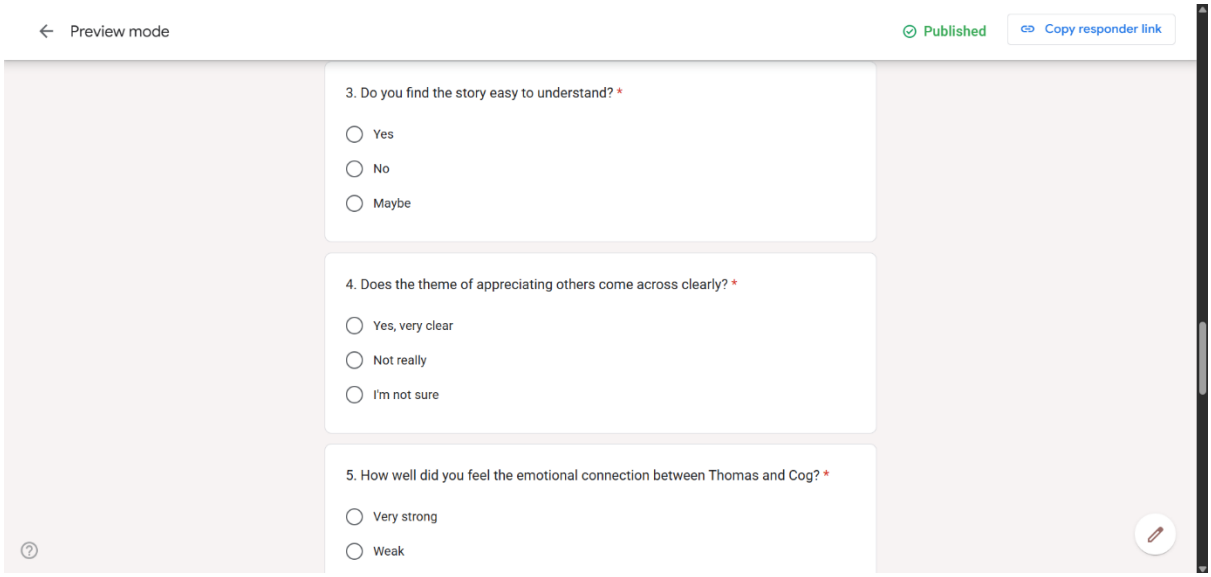


Figure 95: Page 5 of the Google Form Survey

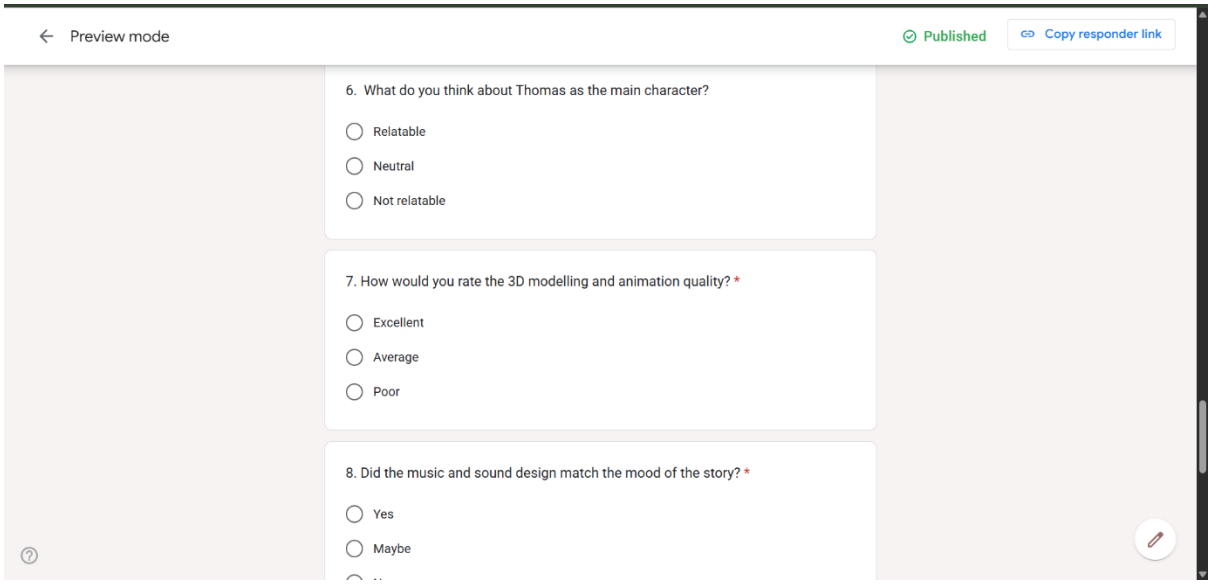


Figure 96: Page 6 of the Google Form Survey

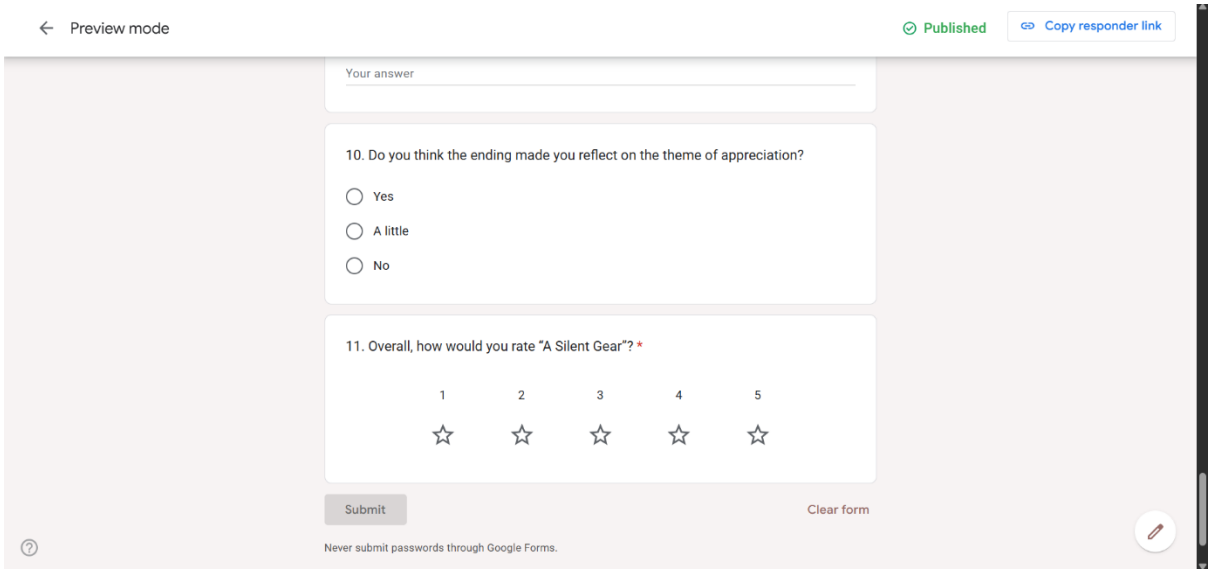
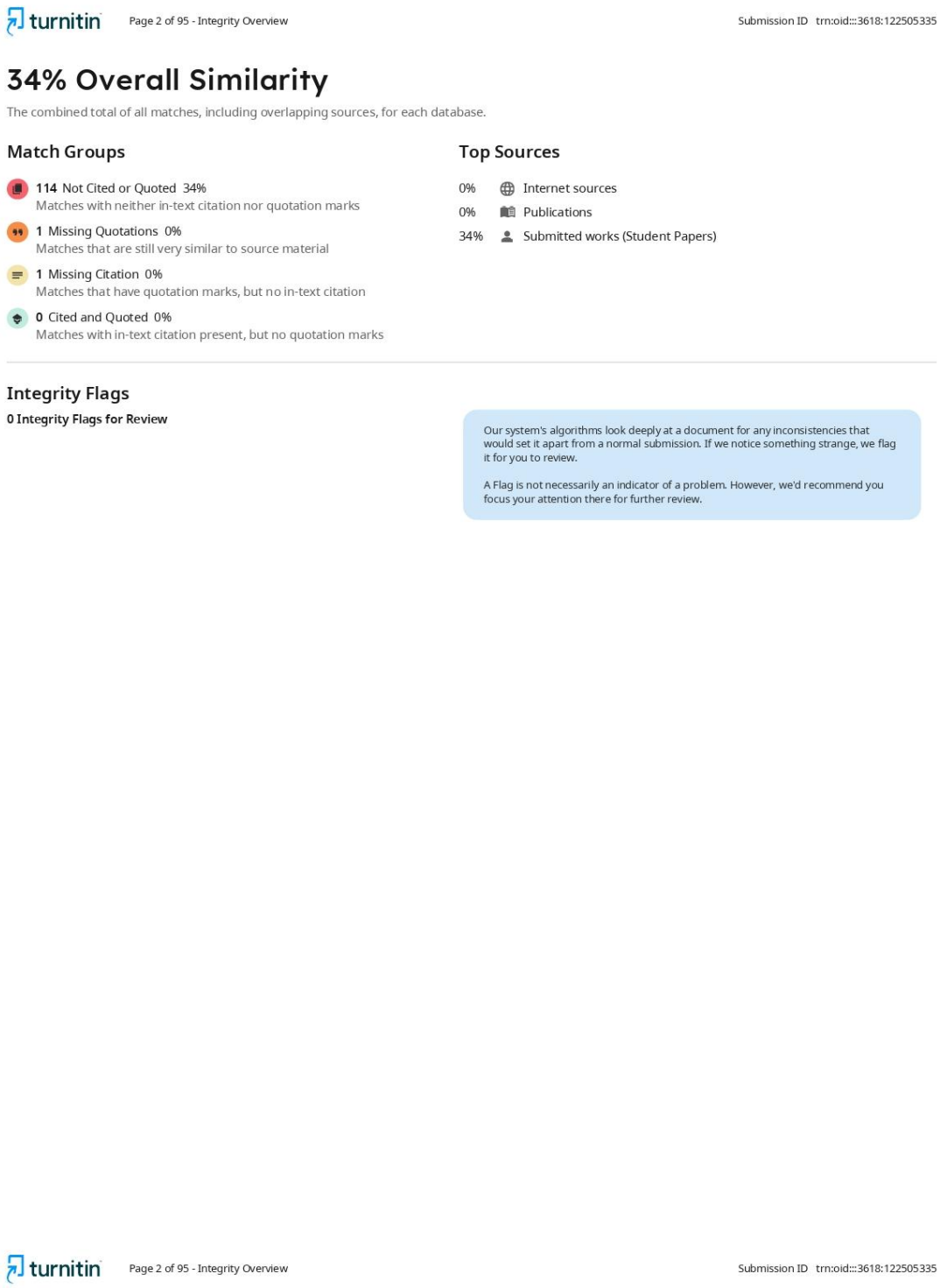


Figure 97: Page 7 of the Google Form Survey

APPENDIX B – Turnitin Result



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Integrity Flags

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What does 'qualifying text' mean?

Our model only processes qualifying text in the form of long-form writing. Long-form writing means individual sentences contained in paragraphs that make up a longer piece of written work, such as an essay, a dissertation, or an article, etc. Qualifying text that has been determined to be likely AI-generated will be highlighted in cyan in the submission, and likely AI-generated and then likely AI-paraphrased will be highlighted purple.

Non-qualifying text, such as bullet points, annotated bibliographies, etc., will not be processed and can create disparity between the submission highlights and the percentage shown.

APPENDIX C – Log Book

CM201 / BACHELOR OF ARTS in 3D ANIMATION AND DIGITAL MEDIA (HONOURS)

UNIVERSITI POLY-TECH MALAYSIA

UPTM

FACULTY OF COMPUTING & MULTIMEDIA (FCOM)

FINAL YEAR PROJECT 02

LOGBOOK

STUDENT'S NAME	: NUR SHAFIRA ALIA BINTI SUHAIMI
ID NO.	: AM2304013627
SUPERVISOR	: SIR AMIR AARIEFF BIN AMIR HUSSIN
PROJECT TITLE	: A SILENT GEAR

CM201 / BACHELOR OF ARTS in 3D ANIMATION AND DIGITAL MEDIA (HONOURS)

Week		Agenda	Next Agenda	Signature (Supervisor / Coordinator)
	1	Started modelling Thomas with basic body shape first.	Continue Thomas modelling and begin early environment block-out.	
	2	Continued modelling Thomas (clothes, pants, shoes).	Refine Thomas's topology.	
	3	Modelled Thomas's head using Quad Draw tool. Improved topology on Thomas characters.	Continue refining character model and start environment modelling.	
	4	Completed 70% of character modelling. Modelled chamber interior and began details modelling.	Finish character modelling and continue detailing environment assets.	
	5	Finished Thomas modelling. Modelled gears, screwdrivers, tools, and pipes for the chamber.	Start UV unwrapping for both characters and environments.	

	6	Completed full UV unwrap for Thomas. Started UV unwrap for environment assets. Prepared models for Substance Painter texturing.	Begin texturing characters in Substance Painter.	//

	7	Textured Thomas's hair. Started texturing clocktower, workshop and chamber assets.	Finish environment texturing and prepare all models for rigging.	//

CM201 / BACHELOR OF ARTS in 3D ANIMATION AND DIGITAL MEDIA (HONOURS)

Week		Agenda	Next Agenda	Signature (Supervisor / Coordinator)
	8	Completed environment texturing for all 3 environments. Began rigging Thomas.	Start rigging Cog and blend shape for Thomas.	
	9	Finished rigging Cog. Applied controllers for both characters. Started paint weighting Thomas.	Begin animation blocking once rigging is finalized.	

	10	Completed paint weighting for both characters. Started animation blocking for key scenes. Shot planning and camera layout for all scenes.	Continue animation and refine poses.	
	11	Completed animation for Cog. Started animating Thomas and fixed camera angles to improve visual flow.	Finish all character animation.	

	12	Completed all animation for Thomas and Cog. Began lighting setup for each environment.	Begin rendering test shots.	
	13	Rendered all scenes using Arnold. Applied visual effects for firework.	Final color correction and polish.	
	14	Completed all remaining production tasks. Finished compositing and final color correction. Ready for final submission and presentation.	Submit final project.	AMIR AARIEFF BIN AMIR HUSSIN Penyarah Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia

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