Modern Muses - An Exploration of A Mind That Refuses to Cooperate

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MODERN MUSES - AN EXPLORATION OF A MIND THAT REFUSES TO COOPERATE

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Fine Arts
Fine Arts

by
Carrie Holland Bull
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Accepted by:
Dr. Eric Patterson, Committee Chair
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Abstract

Ancient scholars and artists turned to the classic muses for form, worship, and inspiration in pursuit of crafting their greatest works. In an information age rife with new ideas and new artists, it is inevitable that new creative obstacles will be encountered and new muses will be called upon to overcome them. This project is an exploration of the digital modeling pipeline through the formation of such muses. It begins with the creation and iteration of concept art for three original characters, moves on to the sculpting of the characters in Zbrush, creation of clothes in Marvelous Designer, posing, and finally to rendering. The project also involves designing an environment and using a combination of modeling in Maya and sculpting in Zbrush. These characters and the environment were conceptualized to represent modern day muses within the head of an artist struggling with art block and self doubt. Design choices of both the characters and environment are inspired by both classic and contemporary depictions of the muses and the human mindscape.
Dedication

This project is dedicated to my partner, CJ, who dragged my tired body across the finish line. Thank you for being my rock through it all and never giving me a chance to fail.
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Chapter 1

Introduction

This project from a technical level is an exploration of the digital modeling pipeline from start to finish. This includes story concept, character design, concept art, modeling, sculpting, retopologizing, UV unwrapping, clothing creation/simulation, posing, environment modeling, and rendering. This exploration was inspired by a personal goal to be able to comprehend the entire process behind creating 3D models, and thus be able to work on every aspect of it. Although a lot of the steps are things that I have previous experience in, this is the first time that I will be working through the entire pipeline by myself. Though it is a bit different from the pipeline needed to complete this project, there is an informative guide on the Dream Farm Studios website that gives an overview of what steps are followed in many animation projects[24]. The graphic shown in Figure 1.1 contains most of the steps that are followed in this project.

The story surrounding the project follows three muses that take inspiration from the Muses of Greek Mythology but are translated into muses of modern art forms. The story would follow these characters in an episodic story delving into the mindscapes of struggling artists and helping to reawaken their innate creativity. The
narrative, on a personal level, began as a way to try to deal with my own recurrent art block, as I thought it might be easier to move past it if I could conceive of a real person actually being able to go into my mind and sift through all of the rejected ideas and feelings of inferiority to find the heart/spark of inspiration. As research into the mythology of the original nine Muses became a deeper exploration of each muse as an individual character, it was apparent that the art forms that they embodied were very specific to the time that the stories were being written. Thus, five of the original nine were devoted to a different form of poetry or writing, and not a single muse was dedicated to any form of visual art. Bringing the archetype of the muse into a modern setting was something that had a lot of potential, and using it as a lens to examine the internal creative landscape of artists felt like a worthy endeavor. At its core, this story line has been a means to try and examine art block, imposter syndrome, self doubt, and give a voice to the inner child that resides inside all struggling artists.
Chapter 2

Background Material

2.1 Mythology of the Ancient Muses

According to the ancient Greek poet Hesiod, the muses were the daughters of Zeus and Mnemosyne[39]. Originally, the number of muses were said to be three: Melete (“Study”), Mneme (“Memory”), and Aoide (“Song”) [35]. Eventually, the accepted number became nine, and that is how they are best remembered today[39].

Unlike most modern interpretations, the nine muses represented not just the arts, but also science and knowledge. Their names were: Thalia, the Muse of Comedy; Urania, the Muse of Astronomy; Melpomene, the Muse of Tragedy; Polyhymnia, the Muse of Hymns and Sacred Poetry; Erato, the Muse of Lyric Poetry; Calliope, the Muse of Epic Poetry; Clio, the Muse of History; Euterpe, the Muse of Flute-playing; and Terprischore, the Muse of Choral Lyric and Dancing. Calliope is generally considered to be the main Muse, as seen by the line in Hesiod’s Theogony: ”...and Calliope, who is chief among them all; for she even attends august kings.”[39].

The Muses were depicted in both positive and negative light depending on the myth. They were said to spend most of their time in Olympus, providing entertain-
ment to the other gods. Occasionally, they came down to Earth to mourn at funerals or celebrate at weddings. However, there were many times that they acted much darker. On multiple occasions, they would punish bards who claimed their talent to be better than the Muses’[60]. They were pitted against both the sirens, as well as a king’s nine daughters. Both events ended in defeat and punishment of the other party[41].

2.2 Art that Inspired my Characters

Because the three characters were intended to be modern muses, the designs are mostly inspired by the work of relatively modern artists. This research starts in the Surrealism movement with artist Remedios Varo, who painted an array of ethereal and fantastical portraits of primarily women. There are many examples to point to that encapsulate her style, but a few examples really stand out in relation to the design of the muses for this project.

Figure 2.1, The Call[57], is definitely the painting of Varo’s that most informed the character designs of the Muses. The floating hair, the flowing fabrics, and the ambient glow around her all within the same vein of ethereal that was a goal from the start for the Muses. This painting also does an exceptionally good job of having its subject appear both weightless but still present in the scene around her.

Looking to Figure 2.2, Woman Leaving the Psychoanalyst[56], the figure portrayed here also has a very mysterious and otherworldly vibe to her. Like in Figure 2.1, there is the appearance of the draping fabric and gravity-defying hair. Her expression rejects the gaze of the viewer, seemingly in the middle of an act that she does not want an audience for. The color scheme in this painting is surprisingly full of warm tones, despite the feeling of her actions taking place in the secret of night.
Figure 2.1: *The Call*, by Remedios Varo[57]

Figure 2.2: *Woman Leaving the Psychoanalyst*, by Remedios Varo[56]
Presumably this effect is partially due to the slight vignette along the left side of the canvas, the dark, smokey sky, and the ghostly trail behind her feet.

The final piece by Varo seen in Figure 2.3, *Star Catcher*[55], is much harsher than the previous two in terms of the flow of the clothing and hair. Whereas the others are fluid and streamlined, *Star Catcher* is jagged and spiked. Her clothes completely obscure her silhouette, but still have shape and folds. The light that bounces from the cage in her hand illuminates the garment in beautiful, blinding white. She has the longest face, and thus is likely the slimmest of the three, but you can only tell by the contour of her cheeks.

The three paintings in Figures 2.1, 2.2, and 2.3 are all done by the Remedios Varo, but each have distinctly different appearances. Unlike the ancient artwork done of the Greek Muses, who all looked more or less the same, the women here all have their own unique shapes, color schemes, and stories. Moving on to even more modern art, the search moves towards other artist’s interpretations of Muses specifically.
Freelance artist Sonia Matas has a character that she refers to as her muse and who she redraws every year as a means to gauge her growth as an artist. Figures 2.4, 2.5, and 2.6[44] are all iterations of the same character, all posted on her Artstation account under the title *My muse*. 

Figures 2.4, 2.5, and 2.6[44] all illustrate the freedom, beauty, and wonder that is associated with one’s muse. Matas’ muse is imaginary, but she thinks of her as a friend who she has known for so many years. All three depictions of this character have that otherworldly ethereal quality that I want to depict in my own muses, and the dynamic hair physics feels like a key element to this quality.

Figure 2.7[51] shows a piece by Sang Nguyen titled *Muses*, and is an interpre-
Figure 2.5: *My muse* 2017, by Sonia Matas[44]
Figure 2.6: *My muse* 2015, by Sonia Matas[44]
tation of a trio of muses, which felt especially relevant to this project.

While the three characters depicted in Figure 2.7 do all have very similar designs, there is still a strong sense of them being incorporeal beings. There is a subtle glow to the hair and stomachs, and some parts of their bodies are dissipating at the edges. A key takeaway from this drawing is the inhuman color schemes and the use of gold as accents.

Figures 2.8 and 2.9[26] are instances of artwork that is not intended to be interpretations of muses, but that still has a strong dynamic quality with ethereal and luminous female forms. The main artist who really portrayed these qualities well is Freelance artist Eva Balloon. Figures 2.8 and 2.9 are from an art dump titled Personal artworks. The characters shown in these drawings both have their own unique way of appearing bio-luminescent and each take on dynamic and interesting poses. The way that this artist uses hair as a way of adding lines and curves into her compositions is a big part in how the hairstyles of the three Muses from this project were originally conceived.

2.3 Art that Inspired My Environment

In the same way that Surrealism was the starting point in the research process for the character design, it once again feels like a good place to begin for the environment. Salvador Dali, arguably the most influential Surrealism artist, was known for his depictions of dreams in paintings. These usually took the form of some kind of landscape with inclusions of random objects, animals, and structures in ways that would be impossible in the waking world. These dreamscape were not far from the idea of a mindscape, and felt like a great place to look for inspiration.

This piece shown in Figure 2.10, Reflection Elephants[31], is heavily drawn
Figure 2.7: *Muses*, by Sang Nguyen[51]
Figure 2.8: *Personal artworks*, by Eva Ballon[26]
Figure 2.9: *Personal artworks*, by Eva Balloon[26]
from in the final design of the environment in terms of the tree. The way that the bird’s necks parallel the shapes of the branches, and the elephants in the reflection take the pattern a step further brings an asymmetrical balance to the piece.

*The Persistence of Memory*[^30], shown in Figure 2.11, might be the most well-known surrealist painting. It combines a mostly empty space with a few key objects that draw the eye. The clocks, though heavily distorted, are easily recognizable. The shape on the ground, however, is a bit harder to figure out. It appears to be the left side of a sleeping face, but it is so stripped of context that there is no way to be sure. This painting is another great piece of inspiration for the design of the mindscape environment because of its use of familiar imagery that is stripped of meaning by warping and decontextualizing it.

Moving into more modern art, there is no shortage of incredible work to draw inspiration from. Artist James Lott McCarthy, who describes himself as both a
Surrealist painter and a landscape artist, paints a wide variety of organic, psychedelic scenes with a dreamlike quality.

*In the Year 3073*, shown in Figure 2.12[46], is a key influence in the mindscape for this project in its use of elevation to separate its fore, mid, and background. McCarthy uses a majority green in this painting to suggest a Utopian future, and the tiny figures seen throughout the composition help to interpret scale. The sky, with its rainbow-colored clouds, stands out as a way for the color scheme to get tied in from the rest of the scene, and it feels truly reminiscent of the mind, or dreams, of an artist.

Figure 2.13, *Stars and Snow*[45], is a bit more realistic compared to McCarthy’s other work, but still manages to capture the dream-like quality with its sky. The contrast between the ethereal lights in the sky, the decaying building, and the flaming Christmas tree all come together to create a visually intriguing image.
Figure 2.12: *In the Year 3073*, by James Lott McCarthy[46]
While the Muses as a myth come from Greek Mythology, using modern artists and work as a source of inspiration helps to distinguish the Modern Muses of this project from their source material. The colors, styles, and concepts that are present in work done in the last century are vastly different from the art made around the time of the Muses conception, and to not reference it would be to forsake the premise of creating truly modern Muses.
Chapter 3

Related Work

3.1 Pop Culture that Informed My Characters

3.1.1 The Muses of Disney’s Hercules

The first and most obvious bit of pop culture that inspired the character designs are the muses in Disney’s Hercules[17]. When most people think of the Muses, this is the variant that they will likely think of. These versions of the Muses differ from the original Greek depictions in both diversity of body types, as well as in number. These characters are a strong point of inspiration for this project, not only due to the fact that they are both based on the Muses, but also because they are a group of all female characters that each have very distinct appearances. Since there are five instead of the original nine, the group shot of all of them together creates a uniform triangle, really showcasing the height and design differences in each of them. The concept art also really shows a strong tendency towards dynamic, flowing poses[17].

The concept art shown in Figures 3.1 and 3.2 are both pulled from the Hercules
Figure 3.1: The Muses, Disney’s *Hercules* [52]

Figure 3.2: Concept for the Muses, Disney’s *Hercules* [52]
art book[52]. Overall, the biggest takeaway from this interpretation of the Muses is the clothing. Each of them has a unique style, but they all are very fluid and light. The clothes also look flattering and unique to each characters appearance, but also could have been something worn back in the time of the original Muses. These designs are all references for the design of the clothing for this project, particularly in the case of the Art Muse (see Figure 4.15).

3.1.2 Disney Pixar’s Soul

When considering the ethereal quality of the characters for this project, the rendering techniques that were used in the movie Soul[21] are an excellent point of inspiration. Though different concepts, the human soul and creative instinct are similar in how they are tied to the inner child and essence of who we are. When personified, both of these concepts are often portrayed as being wispy, glowing, and ethereal. This was how the character designs in the movie Soul connect with the designs of the Muses in this project. There are interviews with the creative team on this project where they describe how they went through a process of trying to imitate the qualities of prisms and clouds[58]. This creative process can be seen in Figure 3.3, where various different methods of stylization are experimented with. Ultimately, they end up basing the final look of the souls on the material aerogel, shown in Figure 3.4, which is a translucent, incredibly lightweight material with an intangible-looking quality to it.

3.1.3 Disney Pixar’s Inside Out

The last major pop culture reference that was pulled from in terms of character design is Pixar’s Inside Out[19]. This movie features five emotions Joy, Sadness,
Figure 3.3: Concept for *Soul*, Disney Pixar’s *Soul*

Figure 3.4: Aerogel[36]
Anger, Disgust, and Fear which are personified into humanoid characters. The most compelling part of the characters designs in this movie is how different they are in their silhouettes. The connection of the characters based on human emotions to the design of characters based on creative inspiration is similar to that of Soul, being that people tend to depict the intangible essence of the human mind in a similar fashion: luminescent, weightless, and ethereal. This film provided an additional benefit as a reference due to the variety of different body shapes of the characters, and the bright colors used as a main point in their designs.

One of the main characters, Joy, is particularly dynamic in her poses. Figure 3.5 is an example of a concept sculpt of her, alongside another main character, Sadness, seen in Figure 3.6[49]. The vast difference in body language, silhouettes, and physique are particularly compelling in terms of character design. The entire cast is very diverse, and shape and size seem to have been important since the concept art phase, seen in Figure 3.7.

3.2 Pop Culture that Informed My Environment

The environment in this project was always intended to be a mindscape, and there are two main examples of this that are pulled from more than any other. Since this mind is that of an artist who is struggling with art block and feelings of doubt, it needs to be a damaged space in some way. Many shows, movies, and games have tried to capture the feeling of mental illness in a tangible sense. Some do this by using a physical landscape that is falling apart, some put demonic-looking entities all over the area, and others attempt to warp the entire area into a funhouse mirror-like impression of a real-world space. The examples in the section ahead are on opposite ends of this spectrum, but both are executed at a very high level.
Figure 3.5: Joy, Disney Pixar’s Inside Out[49]
Figure 3.6: Sadness, Disney Pixar’s Inside Out[49]
3.2.1 Double Fine Production’s *Psychonauts* Series

The first reference pulled from is the 2005 platformer game *Psychonauts* [18]. In this game, the player goes into the minds of a variety of characters, with varying degrees of mental health problems. While the graphics of this game look dated, the concept art is a great example of the way that all of these mental landscapes have unique and differing qualities. Figure 3.8 gives a look at how this game handles verticality, which ends up becoming a key feature in the environment for this project. The use of circles and curves keep the eye moving around the composition, while the extreme use of two-point perspective give a sense of unbalance. Figures 3.9 and 3.10 are both from the section of the game that explores the mind of a man with severe psychosis. The environment is a winding, dizzying trail of neighborhood streets, with cameras recording the player from every angle. This representation of a damaged psy-
che is less characterized by cracks and visual damage to the environment, and moreso an uncomfortable maze of disturbing imagery and vertigo-inducing exploration.

The sequel to *Psychonauts*, *Psychonauts 2*[^22], also explores many of the same concepts as the first game. Because of the times that each of the two were released, the sequel is notably more sensitive in its handling of some of the topics regarding mental health, and really feels like it takes the themes of healing and recovery to a much higher level than its predecessor. One of the most visually memorable sections of the game, shown by its concept art in Figure 3.11, surrounds the story of a dead person who is brought back to life, and has to readjust to the sensory overload of suddenly having all of his senses back. This level has strong representations of all of the different senses, and tells a beautiful story of re-falling in love with the world and

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Figure 3.9: City 6, *Psychonauts*[18]
Figure 3.10: City 7, *Psychonauts* [18]
what can be created with the senses.

3.2.2 P-Studio’s Persona 5

The other game that provided large amounts of inspiration for this project is the 2016 JRPG Persona 5[20]. Despite being the fifth game in the series, it stands as its own story without any real relationship with the previous entries. In this game, the player is a teenage boy with the ability to enter into the minds of people who have a “distorted” view of reality. Many of these minds are those of the game’s antagonists, but each represents a different way in which the psyche can become damaged. Such is the mind of an artist who steals work from his students and puts his name on it. His mind takes the shape of an art museum, shown in Figure 3.12. The mind of a depressed teenage girl, seen in Figure 3.13, takes the form of a pyramid, or rather, a tomb. The mind of a woman who has become a workaholic, obsessed with success and forgetting the other people in her life takes the form of a casino, Figure 3.14.

Unlike Psychonauts, this game uses slightly more realistic settings for its mindscapes. The interesting aspect to these different areas is in how they match up with the distorted way in which the person views the world. Both of these takes on the same subject were very successful depictions of damaged psyches, and the designs for
Figure 3.12: Museum, *Persona 5* [20]

Figure 3.13: Tomb, *Persona 5* [20]
the environment in this project were aimed to fall somewhere in between the two. The goal was a space that was not quite as impossible as the mindscapes in *Psychonauts*, but with the personal elements and grand scope that can be found in *Persona 5*.

With the goal of this project being to create Muses that truly embody modern art, and a mindscape environment indicative of modern artists, it is imperative to reference recent pop culture. Art-making, now more than ever, is a communal activity that involves sharing ideas and building off of pre-existing concepts. Animation and games are two types of media that are relatively new on the grand scheme of art history, and both are deeply important in the current artistic culture in the world. This, along with my own personal attachment to these particular games and films, is why the inclusions of these references made it into the process.
Chapter 4

Production Design

Creativity in the modern world is inherently derivative, and that is not the sin that some people think that it is. With the entirety of all human works at one’s fingertips, there is no way around absorbing a myriad of others’ work, nor should that even be desired. Historically, artists often had a community in which sharing and directly copying other work was the norm, and it is only a recent development that true art is only considered valid if it is unlike anything ever done before.

With all of that being said, taking the ancient concept of Muses, divine beings who are able to bless artists with sparks of creativity and wisdom, and recreating them as embodiments of modern art was a way of exploring the idea of what all goes into the act of being an artist. Now, more than ever, with nearly instant feedback (both positive and negative) on everything that an artist creates, as well as the ability to see things that are being made every day by people from every walk of life, feelings of being an imposter and self-doubt are rampant. This project is a personal journey, as I work to uncover why I experience these feelings and explore routes to overcome them.
4.1 Story

The pipeline for this project began with a basic story. Although the end goal was always simply to get some renders and maybe some 3D prints of three characters in an environment, it was much easier to conceptualize everything if there was some degree of narrative behind it. Greek mythology as a whole has always held a wealth of stories, many of which are frequently still pulled from in modern media, and the Muses have always felt like there was a strong story waiting to be written about them as the central characters. With art block being such a painful and common experience, it seemed like something that would be in natural opposition to Muses of creativity. And therein laid the idea to create three muses of modern art forms that did not even exist when the original mythological muses were created.

The main character of the story is the Muse of Digital Art. She is not originally planned to be the main one of the three, but as the character designs become fleshed out, she undeniably has the strongest character design and balanced out the other two well.

Next, there is the Muse of Programming. Since the original nine Muses embodied both art and science, it is important that one of these characters represents a science of some kind. Since computer science is a truly modern discipline, that is what is assigned to her.

Finally, the Muse of Electronic Music. This character is a nod to the three Greek muses that embody different types of music (music and dance, flute-playing, and hymns), but also feels like a good choice to round out the group of completely modern art-forms.

Together, these three characters are charged with seeking out artists who are truly lost in their craft, entering their minds, and uncovering the lost spark of inspi-
4.2 Concept Art

4.2.1 The Muse of Computer Science

4.2.1.1 Initial Design

The concept art phase begins with sketches of the Programming Muse. Her design evolves from some dynamic speed drawings that are colored with the primary color being a deep, computer screen blue. As the design progresses, a circuit board motif begins to emerge on the edges of her dress and in her hair. Researching hair accessories from around the world, the Chinese hair ornament called the buyao (shown in Figure 4.1) ends up becoming the framework for her hair clip design[61]. At first, the only reason that this style is chosen is to bring the circuit board pattern into more of the characters design. The images of the buyao online feature layered, linear patterns that hang from the head and create a striking silhouette. The goal to have the three Muses be inspired by multiple, diverse cultures was always part of the hope, but there was not a specific assignment of ethnicities at the beginning of the project. Interestingly, the research into the buyao accessory is the leading motivation in the Programming Muse’s design leaning more into Chinese culture. Even though this particular part of the ensemble is eventually scrapped, it is a pivotal part of the design process for the character.

As the design becomes more heavily influenced by cyberpunk styles, a pattern of pink, translucent lenses circling her head began to emerge. The goal in these shapes was to create the appearance of sci-fi “glasses”, without taking away from the otherworldly nature of the character. The shape of these lenses begins as ovals,
but move more into the territory of hexagons as the shape language of the character matures.

Hairstyles are arguably the most important part of the character designs to get right, as most of the reference images have long, flowing hair that adds to the composition of the entire piece. The original intent was for all three characters to have long hair, since this was a good way of adding movement into an otherwise still render. The hair styles could not, however, impede whatever activities the characters would be participating in. The original sketches of the Programming Muse all have hair tied back in a braid, which still allows for movement of the composition, but is a practical style for working on the computer. This style, along with the inclusion of the buyao hair pin, can be seen in Figure 4.2.

Clothing is the last major thing to figure out. Since this is the first Muse to design, the issue of trying to dress the Muses in a way that adds to the incorporeal and fluid nature of them without being too distracting becomes apparent. There
seems to be two good options: either going the route of barely any clothing, which is not preferred since this could easily end up with the characters hypersexualized, or using flowing, sheer fabrics that add to the ethereal nature of the character designs. To achieve this look, the dress in the digital drawings has a lowered opacity and an overlay blending effect.

4.2.1.2 Iteration

As one of the main goals for this project is to become more comfortable with trashing bad work and being able to redesign without clinging to past versions of a piece, the iteration process is vital. Each of the three muses, once the initial designs are done, get three variations on that initial design that were meant to be completely different from each other.

Before even beginning the iteration process, there are a few commonalities that begin to emerge that have worked their way into all of the designs. First, the chains. The floating, beaded chains that end up in each of the three designs began as
a physical manifestation of the idea of binding the Muse to her own artistic process. In the final forms of each design, the beads each take on the shape of the characters overall shape language, which is a statement on the steps of the artistic process and how, while it is always a lot of work, the work is still very unique to the individual.

Then, the shape language. Starting out, shape language is not a particularly big part of the design process. Since all three characters are each created separately from one another, the need for them to coexist in a space does not come up until this point. Researching shape language does not offer much help, as the only three shapes that keep popping up are circles, squares, and triangles. This makes things tricky, because the Programming Muse has more of a circular look, but more of a square personality. The EDM Muse is somewhere between a triangle and a square, with a personality somewhere between circle and triangle. And the Art Muse already has a very strong spiral motif, which does not appear to be an option. Continuing research, there are a few examples of more complex shape language here and there, including a great description of a spiral character[48]. The description for spiral psychology in Figure 4.3 is birth, death, creativity and growth. This is absolutely perfect for the Art Muse. From here, the decision to give the other two more complex shape language comes to fruition. The EDM Muse feels very much like a star, both in the sense of shape and personality. The Programming Muse is tougher, as she is relatively round as a character, but definitely has a more square-leaning personality. Ultimately, she ends up being kept the closest to a simple shape language and is assigned a rectangle. Some of her edges are sharpened a bit, her hair becomes blunt-tipped, and her dress, most importantly, takes on a very rectangular shape overall.

Moving on to the iteration process for the Programming Muse, which can be seen in Figure 4.4, the goal in refining the design for her is to streamline the overall look. In an effort to simplify the overall composition of her design, the decision is
Shape Psychology

Each shape has its own meaning and influences our minds and reactions differently. There are many psychological tests that are used to define the personality or mental condition via shapes.

**Circles**
Associated words: Soft, Unity, Cute, Power, Innocence

Circles suggest the infinite, unity, and oneness, with a sense of completion, rest, and harmony. Geometrically, a circle is the perfect shape. It is an image of infinity and completeness. They symbolize unity, integration, and perfection. Circles can also be associated with Wholeness, Spirit, and the spiritual realm.

**Squares**
Associated words: Strong, stable, balanced

Squares and rectangles contain a sense of stability and confidence. This simple shape can be seen as strong, stable, having integrity, and stability. Rectangles in nature are often seen as strong or powerful. The square is often associated with four seasons, four directions, and four elements.

**Rectangulars**
Associated words: Movement, power, harmony

Rectangles suggest movement, direction, and steadiness. They are often seen as orderly, orderly, and neat. Rectangles can be seen as strong or powerful. They can evoke a sense of strength, energy, and power and suggest stability and harmony.

**Spirals**
Associated words: Birth, Death, Creativity, Growth

Spirals are often found in nature and are expressions of the mysteries of life. They suggest the process of change and renewal. Spiral shapes symbolize the turning, birth and death, the supernatural, transformation, and cyclical change.

**Crosses**
Associated words: Balance, Hope, Ethnity

Crosses are seen as the crossbar of divine energies. They represent the intersection of opposites and the union of differences. Crosses can also be seen as a symbol of the Holy Trinity, God, Jesus Christ, and salvation. They can be seen as a symbol of strength, hope, identity, and spirituality.
made to eliminate the buyao hair ornament. Unexpectedly, the third design variation ends up emerging as the preferred choice. This contradicts the presence of the pale dress with blue accents from the very beginning of the project, but the dark color looks better against her white hair, and the pink pops more than the blue circuit board pattern. Her hair is another thing that ends up quite different from the original concept. Having the bun on top of her head with the chunky, blunt bangs proves a much more cohesive look for the character. The bun, in particular, was a very subtle nod to Figure 4.5, a portrait of Ada Lovelace, the Mother of Modern Computing.

4.2.2 The Muse of EDM (Electronic Dance Music)

4.2.2.1 Initial Design

The second muse is the electronic musician, which is shorthanded to “EDM Muse”. The main inspiration for her design is definitely raves, particularly the neon, glow stick aesthetic. As such, the main colors used for this muse are neon green, blue, and pink. Since the Programming Muse has darker skin and white hair, the EDM Muse is given the opposite set of values in her color scheme. This ended up being a pale, yellowish skin and dark black hair.

The hair for this character is the first thing designed, and the inspiration for
Figure 4.5: Portrait of Ada Lovelace, by Margaret Sarah Carpenter[27]
it can be seen in Figure 4.6. Her hair is definitely the most free-flowing of the muses, while still having the two half-buns on top to keep in line with the fun hairstyles that can be found at a rave. The addition of two glowsticks on one side of the hairstyle helps to break up the symmetry a bit, and to give a pop of color to the jet black hair.

Moving down to the face, this Muse ends up being the only one with makeup. Continuing to build off of the rave aesthetics, her look includes neon eyeliner and lipstick, as well as shimmering glitter on the cheeks to bring some color to her pale skin. Her lipstick also matches the teal shade of the eyeliner, as this felt like a way of making her look more edgy than the other two (Figure 4.7).

The outfit is simultaneously the most fun, and the most difficult. There are a lot of very visually interesting outfits that people wear to raves, and they all have that ethereal glow to them. The iconic tutu is a guaranteed part of the ensemble, as the waves and lines of the fabric are perfect (Figure 4.8), and eventually she also gets fishnets and a crop top to finish the look. The crop top ends up working well, and the fishnets are adjusted to make them look like they were almost a part of her skin,
fading into her arms and legs as they go down[23].

Finally, she needs some headphones, inspired by Figure 4.9. The decision to go with earbuds instead of the typical bulky DJ headphones is a result of the headphone aesthetic feeling a bit overdone in character designs. The headphones are also easy to make into her chain. The glow stick jewelry is used to tie all of the colors together, and really felt like a staple of the rave outfit that simply could not be left out of the outfit.

4.2.2.2 Iteration

The iteration process for the EDM Muse, shown in Figure 4.10, is difficult, because the initial design feels so strong already. Still, there are plenty of excellent rave outfits that can be played around with. Balancing the desire for a bright and neon appearance while experimenting with different outfits proves challenging. An attempt is made to introduce a holographic look in the second iteration. Ultimately, the first design remains the strongest, and the only major change that is made to the
Figure 4.8: Polychrome Tutu[4]

Figure 4.9: Glowstick Headphones[5]
initial design is pink leotard being a replacement for the neon green fishnets.

4.2.3 The Muse of Digital Art

4.2.3.1 Initial Design

The final muse designed is the digital art muse. It is a key part of her design right out of the gate to give her vitiligo, as it is a very common condition that is so rarely given representation. It also makes a lot of sense for the art muse to have it, since the skin patterns can resemble paint strokes and splatters. The research into the condition helps to figure out where the most common areas of depigmentation are, and how it typically affects areas like the lips and eyelids[38]. Having a realistic distribution of the patterning is important in the design, so she has lighter patches on the hands, feet, and on the eyes, nose, and mouth. Figure 4.11 is the main reference for the pattern on the Art Muse’s face.
After defining the skin pattern, the next step is figuring out the color scheme. Since this is the Muse of Art, there is a good case for using earth tones versus using more vibrant colors, since both are representative of art. In the end, her skin is more of an earthy color, but the accent colors are blue, pink, purple, and gold.

Another key part of this character design is her braids. This also involves a good bit of research into different styles and patterns of braids, and results in a combination of several beautiful styles that all work well on the character. There are so many different directions that her hair takes throughout the design process, such as in Figure 4.12. At first, she was going to have loose hair like the other two in the form of a long and full afro, but it ends up looking a lot more cohesive and interesting when it is tied up in a ponytail and paired with the braids. A couple of the early concept sketches for her hair can be seen in Figure 4.13.

As the design for her hair continues to be fleshed out, I begin to play with a variety of different types of accessories. At first, the style contains a few simple round
Figure 4.12: Braid Styles [7] [13]

Figure 4.13: Digital Art Muse Early Concepts
beads, but eventually these become golden cuffs (Figure 4.14). The cuffs fit in with the gold of her right eye much better, and just give an overall elegant look to the style.

Of the three characters, her outfit is the most difficult to settle on a design for. At first, trying to give her a dress that loosely resembles an art smock seems like a good direction, but every variation on the design looks awkward next to the goddess-like hair and face. The process of breaking down different styles and finding something that is modern, but still feels like something that a Muse would wear, is definitely one of the biggest challenges in the concept phase. The eventual result is a knee-length flowing dress with off the shoulder sleeves and a jeweled brooch on the center. This feels like a good balance between the portrayals of some of the ancient muses, but still has aspects that feel like they could be worn today.
4.2.3.2 Iteration

The iteration process for the Art Muse almost ends up feeling like just another step in the initial design process. She is the last to be designed and the first to be iterated, so there was not a concrete decision on what she looked like yet. Since she is still in such an experimental phase, her final design ends up taking from all three of the iterations, shown in Figure 4.15. It incorporates the hairstyle from C, the torso of the dress from A, the bottom of the dress from B, and the color palette from A.
Chapter 5

Production

5.1 Sculpting

5.1.1 The Muse of Digital Art

After finishing the iteration process, then begins the initial blocking of each character in ZBrush. The Art Muse is first, and step one is to find a good face model to base the sculpt on. After hunting around for a while, Figure 5.1 stands out as being a good real-life parallel to the drawing, particularly in the wide-set eyes and shorter face. The trouble with using this reference is that her name was not listed anywhere on the photo. This is seemingly the only photo of this woman online, but it is too perfect not to use. In the end, this photo is used for the front view, and other people with somewhat similar appearances are used for the side and body.

Further reference images include a few examples of swirl pattern braids, shown in Figure 5.2. Since there is not one image that has the exact style desired, a few are used as references to pull from to try and get close to the goal.

The sketch to be sculpted on is very simple, and does not even have the
Figure 5.1: Digital Art Muse Model

Figure 5.2: Spiral Braid Pattern[13][33][8]
majority of her hair (Figure 5.3). It is kept this way so that it is easier to copy the contours of the body.

In the second semester of research, the Art Muse is the only model is worked on. Building her up from scratch gives me the opportunity to really get her features exactly right, and allows for greater stylization.

Figure 5.4 shows the earliest ZTool that was kept for this character. Some notable features from this version are the defined body landmarks, such as the ribs, bellybutton, and spine. While she still maintains most of these throughout, they become much softer as a way of acquiring that stylization. Her head is also a bit smaller in this first version, which ended up changing as well on the same path to stylization.
Figure 5.4: Digital Art Muse Starting ZTool
The biggest goal for her by the end of the semester is to implement her braids. The hair has already been roughly blocked in, but getting the braids right is a different task altogether. The biggest challenge is that every braid curve brush seemed to be built for hanging braids in straight hair. Most of the brushes look wrong when laid tightly against the scalp, and left large areas of empty skin. To achieve the correct style, several references are pulled from other artists working on similar characters, such as Figure 5.5.

Figure 5.6 shows the final turnaround at the end of the first semester of work. She continues to be worked on, but this is technically when she is put down so that the other two can be started on.

Notable changes here include the curvature of her spine being more defined, particularly in reference to the overall distribution of weight. The braids were also added, and the hair. The braids are complete at this point, but her hair ended up getting some texture added to it before moving on to posing.

The biggest hurdle in sculpting this character was definitely her hair. Unfortunately, there were very few references to stylized, afro-textured hair in ZBrush. Among this small number, a lot of them were done using fibermesh, which was a bit too realistic for the character. In the end, there is no real consensus on how to get a good result that looks finished, and somewhat accurate to the way that this texture of hair realistically falls. Figures 5.7[25], 5.8[43], and 5.9[53] are preferred examples, each with its own pros and cons.

While these all feel pretty good, they do not exactly seem right for the Art Muse’s hair. The textures seem too angular, and not quite exaggerated enough in the contrast of depth. This is also when the swirl shape language really begins to take over, as the tight spirals in her hair both give some good texture, as well as mirror the shape of her braids, and the accessories that she would be getting in the clothing
Figure 5.5: Fka Twigs Face by Bente van Beers\cite{54}
Figure 5.6: Digital Art Muse Turnaround
Figure 5.7: Prince, by Hajar Amin[25]
Figure 5.8: Assasin Afro, by Ivan Cortes Martiradoni\cite{43}
phase.

Figure 5.10 shows one final turnaround from her final design before making clothes. The most important changes to note here are the addition of defined swirls in her hair, a rough layout of her vitiligo pattern, and a touch more fullness added to her cheeks.

For each Muse that is sculpted, there is a retopologized version made. This process is carried out in Topogun, and involves redrawing the grid that covers the character models to be uniform and descriptive. The shapes below the squares still need to be fully outlined, but the lower the number of squares, the better for later on in the process. The Art Muse’s wireframe view after being retopologized can be seen in Figure 5.11.
Figure 5.10: Digital Art Muse Hair Detail Turnaround

Figure 5.11: Wireframe Art Turnaround
5.1.2 The Muse of EDM

The second semester of sculpting is spent working on both the EDM and the Programming Muses. Since this time period is split between two characters, some of the steps are skipped to save on time. That being said, these two characters benefit from being made immediately after all of the trial and error of creating the Art Muse, so they come together a lot more smoothly.

Figure 5.12 shows the reference drawing for the initial blocking out of the EDM Muse. This is the final opportunity for tweaking the design, and this is where she loses the loose hanging hair down her back. Because the Art Muse has this feature, the other two muses end up looking more distinct with their own individual hairstyles.

At the beginning of this semester, Figure 5.13 shows the first saved version of this character in ZBrush. It can definitely be noticed in this version that her face is a lot shorter, much closer to the Art Muse. She is also a bit more flat-chested, and has the overly-exaggerated spine and rib cage problem that the Art Muse had in her first iteration as well. Her head also is very long in the back, which definitely gets remedied by the end of the semester.

Figure 5.14 is the final version before posing and clothing. This final look has her much more narrow all the way down, emphasizing her build and height. The hair is also added, and the pigtails and buns are made with a combination of alphas and the hair curve brushes.

The wireframe view of the final EDM Muse after retopology is shown in Figure 5.15.
Figure 5.12: EDM Muse Blocking Reference
Figure 5.13: First EDM Muse Turnaround
Figure 5.14: EDM Muse Turnaround with Hair
Figure 5.15: Wireframe EDM Turnaround
5.1.3 The Muse of Computer Science

As stated above, the Programming Muse is made in the same semester as the EDM Muse, so there is much more of a time crunch on each of them.

Figure 5.16 shows the layout drawing for this character, but this is definitely the one out of the three that gets the most changed as her sculpt progresses. The notable changes in the character design here are the absence of the ponytail, for the same reason as the change in the EDM Muse’s hair at this stage, as well as a slightly more rectangular body shape. This would be softened a bit in the sculpting process, but the aim is to match her up to her shape language of a rectangle a bit more in her physique.

At the beginning of the semester, the initial sculpt can be seen in Figure 5.17. This one undeniably has a long way to go, and there is a lot of difficulty matching up the silhouette in the sculpt to the silhouette in the drawing (Figure 5.16). The likely culprit of these issues is presumably a combination of learning how to accurately add fullness to a plus sized character, and also having a hard time finding good references for Chinese facial features on a 3D sculpt.

The final version of this character at the end of the semester, seen in Figure 5.18, is definitely a lot better, though she is missing detail in her bun. This would be added right before posing. The biggest improvements are in the shape of the face, and in the fat distribution around her body. Her face remains somewhat flatter from a side view, but all of her features are a lot closer together from the front, which more closely resembled the original art. Of the three muses, she is the only one without cupid’s bow lips. She also developed a more defined puffiness under her eyes, known as an aegyo sal in Korea, or a wocan in China[28]. This is a common feature for people with a monolid, which is the case for the Programming Muse. In regards to
Figure 5.16: Computer Science Muse Initial layout
Figure 5.17: First Computer Science Muse Turnaround
fat distribution, it is particularly evident on her belly from the side profile, on her limbs, and in her backside that her weight is a lot more accurately depicted.

The wireframe view for the Programming Muse after her retopology can be seen in Figure 5.19.

5.2 Posing

After the sculpting of all three characters is complete, they need to be posed. There is already a garment file in Marvelous for each of their outfits, but in order for the cloth to drape properly, they needed to be in their final form. The most important aspect of this part of the process is making sure that they all looked good
Figure 5.19: Wireframe Computer Science Turnaround
alone, as well as together in an ensemble. Since these characters are all intended to look ethereal and weightless, their poses all defy gravity to an extent. Before beginning with the posing, an overall sketch of how all three would look together needed to be made (Figure 5.21). This sketch references several photos online, shown in Figure 5.20.

5.2.1 The Muse of Digital Art

Being the main character, the Art Muse is given a very balanced pose to bring some symmetry to the overall composition. Her arms are held out at a similar angle, and her right leg is raised to kind of point at the curl on the tip of her hair. Her expression is also kept relatively neutral, with a small smile and slight flex to her eyes.

Unlike the other two, this character has one foot flat on the ground. Since she is going to be in the center of the triad, it made sense to give her the appearance of landing on solid ground while the other two are a few seconds behind her. That
Figure 5.21: Muse Trio Posing Concept
Figure 5.22: Digital Art Muse Posing Turnaround
said, she does not have any real flex to her leg in order to maintain the appearance of weightlessness. Her hair takes on a bit of a tilt backwards, but it is not overly emphasized since the dress will be adding to the movement of the ensemble.

In preparation for the outfit that she will eventually be draped in, her arms are intentionally kept at a lower angle so that there will not be as much difficulty getting her off-the-shoulder dress to fall correctly. The final pose before adding garments is shown in Figure 5.22.

5.2.2 The Muse of EDM

The EDM Muse, being the most energetic of the three characters, has a very wide stance, with one arm back and up, the other out and down, and one leg raised high up behind her. Unlike the Art Muse, this pose is clearly taken from the middle of a dance. There is inertia behind all over her limbs, and her hair balances out the weight of the pose. This is also the first time that she is seen with makeup on.

With clothes as a forethought, there is an intentional space left for them on the left side of the torso and hips. This will be the direction that the fabric is pushed, further balancing out the character’s composition. Her pose can be seen in Figure 5.23.

5.2.3 The Muse of Computer Science

Finally, the Programming Muse is articulated to convey her much more sedate posture. Her expression is kept fairly neutral, and her limbs are kept a lot closer to her body. Unlike the other two, the majority of her movement comes from the twist to her torso.

Figure 5.24 is also the first time that her bun can be seen finished with all of
the individual hair strands wrapping around it. At its base, it looks more tapered with the plan of adding her chain around it during the clothing stage.

5.3 Clothing

Working in Marvelous Designer is always a mixed experience, as it undeniably makes the process of creating realistically draped garments far easier, but it can also slow even a high end computer down drastically with very little actually being simulated. Having used this program before on past projects of a similar nature, I was not unfamiliar with the process, but there were still some major problems that needed to be solved in order to achieve the desired look.
Figure 5.24: Computer Science Muse Posing Turnaround
5.3.1 The Muse of Digital Art

The Art Muse, with her off the shoulder sleeves and high-low style of dress, is destined to be the hardest outfit to make from the start. For one thing, the particular style of dress that she wears does not seem to actually exist anywhere in the world. The sleeves can be found, but not with a beaded neckline. The skirt can be found, but not with that style of bust. In the end, it is a guarantee that some degree of kitbashing will need to be done.

The first step is finding good references for the individual pieces of the dress. The skirt was relatively easy, as it is a popular style, and the reference found is even an example of a 3D modeled skirt in this custom Sims dress by Marigold, Figure 5.25.
Obviously there is no perfect match for the style of sleeves in the concept art, but I never expected it to be as hard as it ended up being. Ultimately, there is never found to be a perfect reference for this style, but the closest ones can be seen in Figure 5.26. Moving over to Marvelous, I begin the process of drawing out the pieces of fabric and sewing them together. Since this is such a different project from any previous experiences, Youtube videos for various steps of the process are very helpful in getting reacquainted with the software. Still, there is no Youtube videos showcasing anything like what I am making, so I can only get help with bits and pieces of the process.

When looking up how to make a high-low skirt, the most common recommendation is to just make an off-center doughnut. While this looks okay, it looks even better when the edges are squished in a bit. Even further improvements are made when the front is cut from the rest of the doughnut and then sewn onto the torso of the dress with a bit less excess, as this gives a smoother look to the stomach of the dress.

The torso of the dress also is not particularly complicated, really just being
two rectangles sewn together into a tube shape. The addition of a separate piece of fabric at the bottom of this part made it look even better, as it is able to be frozen once in place so the skirt does not pull down the body of the dress with its excess weight.

Figure 5.27 shows the final layout of the dress on the 2D viewport in Marvelous. The hot pink strips are the dress’s trim, and the pale pink are the rest of the fabric.

The final outfit simulation, seen in Figure 5.28, has her dress falling slightly to the left, and her sleeves hanging off of her shoulders. Her chain circles her neck
and arms, mirroring the silhouette of the sleeves trim and connecting to her broach. As an additional touch, she is given two gold, swirly earrings that further touch on her shape language, and her gold cuff is added to her side ponytail.

5.3.2 The Muse of EDM

Next is the EDM Muse, whose outfit is a crop top t-shirt and a three-layer tutu. The shirt is very easy to make, as it is just a regular t-shirt, but shorter on the torso. The shape of the pieces are kept relatively flat, as it is meant to hang off of the character rather dramatically. The skirt is also simple, with a bounty of tutorials made of very similar styles[32].

The layout in Figure 5.29 shows a standard pattern for the shirt (top), and
Figure 5.29: Tutu Layout in Marvelous
three long rectangles for the skirt. The two additional pink and green triangles above the main skirt segments essentially work as spacers, extending the pink and green layers at the top before they puff out at the bottom. This allowed the skirt to hang more similarly to the drawing, despite the volume of the garment.

The outfit on the model, shown in Figure 5.30, is light and bouncy, and the shape of the skirt gives her the silhouette that she has in the concept art. The leotard is added back in ZBrush, using a mask and an extract function. As for the glowsticks, the ones around the neck and limbs are made using a curve brush that was created from a basic cylinder. The hair glow sticks are modeled using ZModeler and live Boolean.
5.3.3 The Muse of Programming

The final outfit to be designed is the Programming Muse. Due to the decision to give this character a rectangular shape language, the neck is flattened out. There are plenty of good references online for dresses similar to this one, but Figure 5.31 has a strong shape to it that works well with the character.

The Programming Muse has by far the easiest outfit to create in Marvelous. The only real difference from the front of the dress to the back is the neckline, and the change is subtle. As far as challenges when on this design, the wrinkles are probably
the biggest. While typically in the real world, dresses like this one are meant to be worn in a very form-fitting fashion, the simulated cloth does not look real at all when it is cut like that. The waistline actually needs to be widened, closer to a maternity dress, to get the realistic folds along the lower back. The other design decision made on this dress is the inclusion of the slits on either side, with the rounded edges. Having a split was present on the earlier designs of this dress, but got removed with the final iteration. In Figure 5.32, it is brought back to add a bit more movement and personality to the garment, and the slightly rounded edges make it look more intentional, without compromising the rectangular silhouette.

The turnaround pictured in Figure 5.33 has an additional view at the end, which includes the character’s visors. This was given transparency using the ZBrush Best Preview Render (BPR), which is the only way to see transparency in ZBrush, and pasted next to the rest of the lineup.

5.4 Environment

5.4.1 Concept Art

The process of creating the environment is a bit different from the rest of the models, as everything in the scene is modeled in Maya before being sculpted in ZBrush. The first step is to create a sketch of the layout. This involves several iterations of different scenes, all quite different. Since there are some concept art designs of different mindscapes from a previous semester, the original idea is to use one of those. They can be seen in Figures 5.34 and 5.35.

These do not have much in the way of small detail though, and rely more heavily on the distant landscape. The decision is made to use these drawings as
Figure 5.32: Dress Layout in Marvelous
Figure 5.33: Computer Science Muse Final Turnaround
Figure 5.34: Digital Art Muse Concept Environment
Figure 5.35: EDM Muse Concept Environment
an idea for the background behind the renders, but to do something different for
the foreground. Some of these initial sketches have the scene taking place inside a
crumbling building, some have a lighthouse as a focal point, and some have the entire
scene look like it is made out of blocks. The final design, though, features a tree
growing out of a well, a spiral staircase, and an artist desk on top of a cliff.

5.4.2 Modeling

Much like the rest of this project, a lot of creating the environment is trial and
error. Youtube videos are an incredibly big help in learning how to use new tools,
and some parts of this project might not have even been possible if not for the help of tutorials.

The first step in the modeling process is the creation of a ground plane. This
is made using a cube, and warped using soft select. The ground is split into three
main components: the base, the hill, and the cliff. In the Maya file, all three of these
are kept super low poly, and they are all UV unwrapped before being taken over to
ZBrush.

The tree is made using curves to define the shape of the branches, and then a
cylinder is extruded along its shape. Each branch after the main trunk is extruded
from four faces along the branches, and tapered. The first few steps of this are
explained and guided by a Youtube tutorial[40].

The staircase is one of the aspects that is a learning process. It involves
making a basic staircase with a flat plane, and then using a bend deformer to give it
the right shape. From here, the stairs are each split in half to make them look more
like wooden planks, and stilts are extruded from the rail to connect it to the ground.
This is also loosely guided by a Youtube tutorial[34]. The lowpoly environment before
being moved over to ZBrush can be seen in Figure 5.36.

5.4.3 UVs

Before moving everything over to ZBrush, all of the objects in the scene have to be UV unwrapped. This is to allow for easier use of alphas, as well as to prepare for a possibility of adding color at a later point in time. UVs, though time consuming, are very familiar territory and are able to get done quickly and efficiently. Figures 5.37, 5.38, and 5.39 are all objects in the scene that exemplify the final product of the UV unwrapping process. For this project, Maya’s included UV Editor is able to achieve good results in unwrapping the geometry with minimal distortion.

As an additional step, I also go ahead and unwrap one of the characters, the
Figure 5.37: Tree UV

Figure 5.38: Cliff UV
Programming Muse, shown in Figure 5.40. Though this process is similar to the rest of the objects in the scene that are unwrapped, character models do not have as obvious of spots where the cuts can be made without causing distortion. The model that is unwrapped for this project has each of her limbs cut off, and then cut in half, her hands and feet are split top from bottom, her eye sockets are cut out, her face and ears are cut away from her neck, and her torso is cut along each side. This allows for minimal distortion and for many of the seams to be covered with clothing and hair.

5.4.4 Sculpting

Moving over to ZBrush, things shift into more familiar territory. The goal is to give everything some amount of texture, while still keeping it stylized. This is definitely a challenge, as the alphas tend to look a little too real, but sculpting
every detail by hand is painstakingly tedious. The rhythm that ends up working best during this process is to a) get the piece of geometry to a good shape and store morph target, b) mask whatever is,, being worked on by alpha, c) inflate by either 1 or -1, depending on the alpha, d) use the morph brush to clean up the edges of the UVs, and e) go over parts of the mesh with a brush and add or subtract, using the alpha as a guide. The best examples of this process can be found in the tree, Figure 5.41, and the staircase, Figure 5.42.

The cliff and ground have to be done a little differently. Simply making up the shape of the cliff edge is not getting any good results, so I turn to some references online. The image that is followed the most closely while sculpting is Figure 5.43[37].

Slowly, the cliff begins to take form. The base shape of the original model is a good starting point and, using the Clay Buildup brush, it is easy to carve into
Figure 5.41: Tree Detail
Figure 5.42: Stairs Detail
Figure 5.43: Cliff Reference Art[37]
and give some interesting texture. Once the texture is feeling strong, I use the Trim Dynamic brush to give it some harder edges. After most of the cliff is squared off, the Dam Standard and Pinch brushes are used to add some cuts and cracks. Finally, to imitate the layered effect of real cliffs, I use the Mask Lasso to select layers of the cliff and scaled them up. The final touch is adding some rocky texture to the top, where the desk is. To do that, I use various brushes from the Orb-brushes Pack for Zbrush by Gumroad user Michael Vicente[59]. The final version of the cliff face can be seen in Figure 5.44.

The ground is built up using a variety of different alphas and brushes, seen in Figure 5.45. Most of these alphas, such as SW Rocks and Cracks 18 and 39, come from the Pixologic website[16] and are by user mokthemagicman. In addition, the Noise brush and some of the default alphas in the ZBrush startup palette are able to achieve the sandy, rocky ground. The cracks coming out from the door are mostly made using the Dam Standard brush and the Clay Buildup brush. The hill the part of the ground that the tree and well sit on top of is textured using the exact same techniques as the ground. Once again, the defined rock shapes all over the ground
were added using the Orb-brushes Pack[59].

The rocks are made using three main techniques. First, they are carved down using the Clip Curve tool. This gives them very hard edges with defined shape. Next, the Trim Dynamic tool is used to add more edges, but give them a little softer and more sculpted of a look. Finally, I use the Crumple brush very lightly on each rock to add a quality of randomness to the shapes. Upon discovering that this brush can be used in this way, I then go back and use it a bit on the cliff as well.

Everything else in the scene is sculpted using a combination of the techniques listed above, and then are imported back into Maya to finish modeling the clutter up at the desk area. The final version of the scene in ZBrush is shown in Figure 5.46.
5.4.5 Using MASH For Clutter Generation

Since the goal is for the artist space at the top of the cliff to look messy and cluttered, Maya’s built-in bullet solver ends up being very useful for procedural generation. As this is an unfamiliar tool, I follow a tutorial on Youtube to learn some of the different aspects of it[50]. The biggest area of clutter in terms of object generation is the plastic bin filled with paint tubes, so I focus on that area. The first step in this process is to create several variations of paint tubes (Figure 5.47).

These range from a full tube, to a completely empty one that had been twisted aggressively to get all of the last bits of paint out. The next step is to use an ID node to tell MASH that there are five objects that all need to be in the simulation. Next, I use a Distribute node to create a grid of these five objects, repeated several times. Finally, the Dynamics node creates the bullet solver and allows the paint to fall into
the bin. The bin needs to be added to a list of collider objects in the attribute editor, which allows it to be treated as a solid container. Once all of this is done, the timeline is adjusted to 2000 frames so that there will be plenty of time for the simulation to run, and I press play.

The physics simulation is unfortunately a bit flawed, as twelve paint tubes come out the bottom and sides of the bin. This adds time onto what should have been a mostly one-step process, and ends up less accurate than it could have been. There is, of course, a chance that the errors are due to my own inexperience, and it will not stop me from trying it out again, but the paint bin ended up split around 50/50 with procedural generation versus manual repositioning (Figure 5.48).

Being able to move back and forth between multiple different programs is an essential part of working on the pipeline. Every program has the things that it does
Figure 5.48: Bin of Paint Tubes
best, and knowing which to use for which step of the project is a learning process. Though this project focused mainly on swapping between Maya and Zbrush, there were also moments where I took things over to programs like Topogun to quickly adjust a topology issue that was difficult to solve in Maya. Similarly, Photoshop was also used to make and alter alphas that were used in ZBrush. All of these different skills are important to have a solid understanding of in order to make the best final product, and were essential in the crafting of the end result.
Chapter 6

Results

6.1 Renders

6.1.1 Environment

The rendering process for the final environment is done in Maya, using the Arnold Renderer. Since the scene in ZBrush has gotten extremely heavy, it needs to be decimated before sending it over. The decimation takes the file from around 20 million polygons down to about four million. It is still pretty heavy for Maya, but any smaller and it risked having visible polygons in the render.

Since the scene is in an outdoor space, I use a skydome light with an HDRI to illuminate most of the scene. The HDRI is taken from the free asset site Poly Haven, and is called Kiara 9 Dusk by Greg Zaal[62]. The other light source is comprised of three area lights inside of the lamp by the desk area. These lights are given a warm tone, which helps them to stand out from the cool shades of the HDRI. The settings used for the renders are shown in Figure 6.1. On top of this, there is also the addition of an Ambient Occlusion render layer added, to help exaggerate the shadows.
The final renders of the environment alone are seen in Figures 6.2 and 6.3. They are given an aiStandardSurface shader with a uniform color to highlight the details from the sculpting. The HDRI is hidden from the render and just used as a light source due to the graininess of the image. This also helps the detail of the tree and the lamp to be more clearly visible and defined. The two renders shown here are both pulled full views of the environment, but with the difference being the focal length. The render in Figure 6.2 has a focal length of 45, while Figure 6.3 has one of 144.

### 6.1.2 Characters

The characters are rendered in ZBrush, and are shown from two different angles. ZBrush renders are saved as multiple passes, like Arnold, and then composited in Photoshop. The lighting setup for this is very simple, and only changed in color slightly with the addition of the Polypaint in some of the renders. There are three
lights: the key light, which is slightly warm toned and brighter than the others, the rim light, which is cool toned, and the fill light, which is the warmest. The key light is aimed down from overhead, the rim light hits from the opposite direction from behind, and the fill light is pointed up from below.

These renders also have wax preview enabled, which gave the Muses some colorful edges to their bodies and outfits, and essentially functions like ZBrush’s version of subsurface scattering. The color of the wax is a different temperature for each Muse, with it mirroring the hue of their skin. Three renders are done without Polypaint, seen in Figures 6.4, 6.5, and 6.6, and three are done with the color and a closer view of the faces, Figures 6.7, 6.8, and 6.9.

Compositing the renders in Photoshop is relatively straightforward, and really just involves varying opacity and using whichever blend mode looks the best. In nearly every case, the Shadow layer is around 50 percent opacity, the Ambient Occlusion
Figure 6.3: Environment Render 2
Figure 6.4: Digital Art Muse Render 1
Figure 6.5: EDM Muse Render 1

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Figure 6.6: Computer Science Muse Render 1
layer is about 70 percent opacity, and the Depth layer is around 40 percent opacity, all with a Darken blend mode on. In the colorful renders, an additional render was made using the Flat Color shader in ZBrush, which gets rid of all shadow and texture. This layer is set to around 20 percent opacity and given a Color blend effect. All of the renders are also given a simple background, with a gradient giving a halo effect around the character in colors that are pulled from the render.
Figure 6.8: EDM Muse Render 2
Figure 6.9: Computer Science Muse Render 2
6.1.3 Characters in Environment

The final step is the reposing of the characters and their addition to the environment. To repose the characters, I first add them all into the environment file and roughly shape their limbs into a shape that makes sense for the space. The Art Muse is placed at the top of the staircase, running up to the artist area. The EDM Muse is shuffling down the bank into the dried up river while pointing up at the Art Muse. The Programming Muse is looking over her shoulder, distracted from her inspection of the door. In addition to the characters in the scene, these renders also include some rocks in the foreground to hide the abrupt cutoff at the bottom of the scene. Everything in the scene is given an aiStandardSurface shader, but the Muses are a lighter shade, and the foreground rocks are much darker.
Figure 6.11: Art Muse Render Close-up

Figure 6.12: Programming Muse Render Close-up
Figure 6.13: EDM Muse Render Close-up
Chapter 7

Conclusions

This project, being a journey with the goal of exploring as much of the pipeline by myself as possible, is eye opening in more ways than I could have anticipated. Learning more about the Muses of antiquity gives me a greater appreciation for how things have changed, both in terms of how we as humans view art and inspiration, and how beauty standards have changed and diversified. Coming into this project, there are so many unknowns in regards to both the story, as well as the technical process. Considering this is based on the concept of art block and self doubt, it is both ironic and fitting that I experience plenty of these feelings throughout the entire journey. Still, the final manifestation of the mindscape and the Muses feel like discovering a part of myself, and gives me a new perspective on what goes on during my own creative process.
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