3D ANIMATION SHORT FILM: "THE PERFECT PAIR" ANIMATION AND RENDERING

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Multimedia and Creative Technology

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APPROVAL

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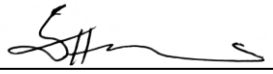

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We hereby declare that this project has been done by **Aelred Mark Dores (193-40-636)** under the supervision of **Mr. Md. Salah Uddin, Assistant Professor& Head (In-Charge), Department of Multimedia and Creative Technology,** We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

Our project is a 3D animated film that showcases the power and beauty of animation and rendering. The story of our project is an impressive display of friendship and unity between two characters from a fictional world. We use state-of-the-art animation and rendering techniques to create visuals that convey the emotions and interactions of our characters. We also explore opportunities in animation and rendering.

I have done modeling, rigging, lighting, script writing etc. to complete this project. I used Maya software to complete the work of animation. A widely used software. Our film is only one minute long, but it is full of details and emotions that make it unforgettable and impactful. I was able to learn how to get better output with less rendering time by making our project **"The Perfect Pair".**

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CHAPTER 1

INTRODUCTION

This chapter will serve as an introduction to the research conducted project, where I will first identify the central idea of this project, my motivation behind this work, and the problem that motivated me to conduct this research. Next, I will present my objectives. At the end of the project, I will illustrate the results of my project and provide a guideline for the organization of the report.

1.1 PROJECT OVERVIEW

From animated films to video games, computer graphics can bring the most impressive and imaginative scenes to life. This technique has gained immense popularity in the world of animation. Before the advent of computer animation in the late 1970s, artists created each frame by hand. But with technology, they can create stunning visuals more easily and efficiently.

The main aim of this project is to highlight various topics related to animation and rendering.

1.2 INSPIRATION

It's hard to pick one source of my inspiration. I am especially drawn to the work of animation studios and artists. Some of my main sources of inspiration for animation and rendering are mentioned below:

1.2.1 FEATURE ANIMATION STUDIOS

A feature animation studio is a company that produces animated films or series for streaming release. Where the characters' performances are created using a frame-by-frame technique. Some of the most well-known feature animation studios are Walt Disney Animation Studios and Pixar Animation Studios.

1.2.1.1 WALT DISNEY ANIMATION STUDIOS

The oldest animation studio is Walt Disney Animation Studio. They have produced 61 feature films so far. Artists are also known for their innovation and creativity in animation worldwide, creating many stories in beautiful harmony with technology. The exact year of the transition from traditional animation to fully computer-animated features has not been identified.

BAYMAX (2022)

The Baymax series consists of 6 episodes. I have enjoyed every bit of this series. Through this work, I learned how low poly models dominate animation. Which I have revealed in some pictures below-

Figure- 1.2.1.1 Baymax (a)

Figure- 1.2.1.1 Baymax (b)

Figure- 1.2.1.1 Baymax (c)

Figure- 1.2.1.1 Baymax (d)

Figure- 1.2.1.1 Baymax (e)

Figure- 1.2.1.1 Baymax (f)

1.2.1.2 PIXAR ANIMATION

Pixar Animation Company produces computer animated feature films. For example: Toy Story, Finding Nemo etc. A subsidiary of Pixar and Disney Company. Pixar has won 27 Academy Awards, 11 Golden Globes and 9 Grammys to date. Pixar is known for innovative technology, creative storytelling and memorable characters. Toy Story is one of Pixar's most popular characters. My personal favorite is their latest release, Umbrella.

UMBRELLA [2013]

I particularly love the film Umbrella from Pixar for their unique artistic style which has greatly influenced my own work. This animated film holds a special place in my heart, because of its combination of computer-generated imagery and traditional animation. I was inspired by the camera position of this film. Below are the scenes that I liked the most –

Figure- 1.2.1.2 Umbrella (a)

Figure- 1.2.1.2 Umbrella (b)

Figure- 1.2.1.2 Umbrella (c)

Figure- 1.2.1.2 Umbrella (d)

Figure- 1.2.1.2 Umbrella (e)

Figure- 1.2.1.2 Umbrella (f)

1.2.1.3 DREAMWORKS ANIMATION

DreamWorks Animation is an American animation studio. Released 46 feature films of which 44 were released theatrically. They have had high-grossing animated films with Shrek 2 (2004) being the highest at the time of release. The first film was released in Antz (1998) and the last film was Ruby Gilman's Teenage Kraken (2023).

HOW TO TRAIN YOUR DRAGON (2010)

Dragon had two sequels and several television series, and is considered one of the best animated films of all time.

Figure- 1.2.1.3 Your Dragon (a)

Figure- 1.2.1.3 Your Dragon (b)

Figure- 1.2.1.3 Your Dragon (c)

Figure- 1.2.1.3 Your Dragon (d)

Figure- 1.2.1.3 Your Dragon (e)

Figure- 1.2.1.3 Your Dragon (f)

1.2.1.4 SONY PICTURES ANIMATION

Sony Pictures Animation was founded in 2002. The studio produces a variety of animated entertainment for the audience. Academy Award for Best Animated Feature in 2019 for this work on Spider-Man: Into the Spider-Verse. Many works in other studios such as Frederator Studios etc.

THE ANGRY BIRDS MOVIE 2 (2019)

Figure- 1.2.1.4 Angry Birds (a)

Figure- 1.2.1.4 Angry Birds (b)

Figure- 1.2.1.4 Angry Birds (c)

Figure- 1.2.1.4 Angry Birds (d)

Figure- 1.2.1.4 Angry Birds (e)

Figure- 1.2.1.4 Angry Birds (f)

1.2.1.5 3D ARTISTS

3D artists from all over the world are creating beautiful works of art. I was influenced by the stylized work of the artist mentioned below-

1.2.1.6 Timothy J. Reynolds

Timothy J. Reynolds is an American artist. He created low poly landscapes, buildings, and characters. The main source of inspiration for me is the work of Timothy. I was very intrigued by his approach to low poly modeling. A few examples of his work are given below-

Figure- 1.2.1.5 Timothy J. Reynolds (a)

Figure- 1.2.1.5 Timothy J. Reynolds (b)

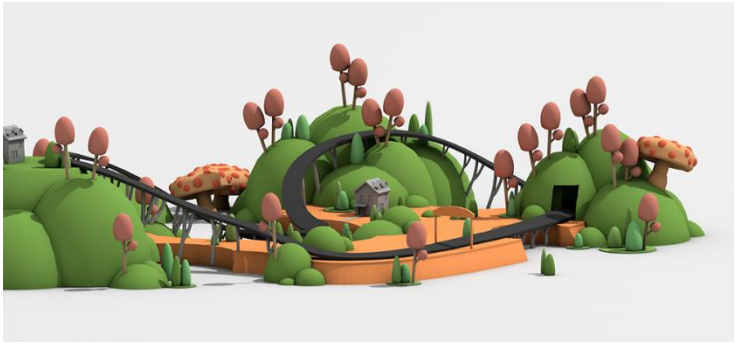

Figure- 1.2.1.5 Timothy J. Reynolds (c)

1.2.1.7 PROBLEM IDENTIFICATION

When I first learned about 3D animation and rendering, I used to think that just changing a model's position would animate it and all the work had to be done individually. Then when I went to work in real life, I realized that animation has many steps to take. For example:

- A model artist will only make models. The rest won't do anything else. In this way, everyone's work is divided. Modeling, texturing, lighting, rigging, animation arts, rendering artists, etc.

In the beginning, my group members including me did not have a clear idea about each step.

1.2.1.8 PROJECT OUTCOMES

The exhibiting outcomes of this project will include a collection of cartoon-style prop models, their rendered images, and turnaround videos, as well as a standard workflow for cartoon-style modeling for future reference. However, the abstract outcome of this projectis far more significant than it appears at first glance, which is to have developed an acute sense of artistic styles, design, and aesthetics that can only be achieved through numeroushours of active learning and deliberate practice.

CHAPTER 2

LITERATURE REVIEW

In this chapter, I will review the existing literature on 3D animation and rendering, which are essential techniques for creating realistic and immersive digital environments. I will explore the history, principles, and applications of 3D animation and rendering and the challenges and opportunities for future research in this field.

2.1 HISTORY OF THE BIRTH OF ANIMATION

The foundations of modern animation were discovered around the 19th century. The principle is that images are shown in rapid succession so that the human eye perceives them as one continuous movement. This is why various devices were invented. Eg: Phenakistoscope, Zoetrope, and Praxinoscope.

- The first person to make an animated film using a projector was Émile Reynaud, a French artist who used a device called a theater optic. He drew images on strips of perforated film and projected them onto a screen. He made several films between 1892 and 1900, such as Pauvre Pierrot and Autour dune cabinet.

- The first person to use celluloid film for animation was J. Stuart Blackton, an American cartoonist who made Comedy of Funny Faces in 1906. He used stop-motion techniques to animate drawings on a blackboard.

- The first person to use rotoscope animation, a method of tracing over live-action footage, was Max Fleischer, an American animator who created Coco the Clown in 1917. He also invented the bouncing ball technique, a way to synchronize animation with music.

- The first feature film to use computer-generated imagery (CGI) was Toy Story, a groundbreaking film by Pixar in 1995. It revolutionized the animation industry with its realistic graphics, expressive characters, and compelling story. Pixar has also produced many other popular films using CGI, such as Finding Nemo, The Incredible, and up.

2.1.1 HISTORY OF THE BIRTH OF RENDERING

Rendering is the process of creating a 2D image from a 3D model using a computer program. Rendering has many applications. For example animation, video games, architecture, and design. Rendering has a long and rich history involving various techniques, technologies, and innovations.

2.1.2 3D RENDERING SOFTWARE

Autodesk 3ds Max, Autodesk Maya, Cinema 4D and Blender.

2.1.3 PLUGIN

Some of the best plugins currently available are V-Ray, Rail Clone, Ornatrix, Thinking Particles, Arnold, etc.
7 worth mentioning that can run under different operating systems. For example:

Lumion: Most used by designers, architects, and urban planners. It is a standalone engine.

I-ray: NVidia's proprietary and visual work on material behavior and lighting. You can set up the duration of the rendering process using I-ray. Not a high-quality render but a mere draft to illustrate the artist's concept. This engine is widely used for architecture, design, engineering, advertising, film, and marketing purposes.

Key Shot: Can be used with many native CAD file formats as well. Total 3D file formats more than 40 Used for product design, animation, advertising, engineering, and other industries.

Mental Ray: Currently owned by NVidia. It is popular for architecture.

Maxwell Render: is considered the most realistic rendering engine. Most commonly used for architectural visualization, cinema, animation, and product design purposes.

Corona Renderer: This engine has plugins for many applications and also has a standalone version. Renowned for its speed and quality and ability to handle complex post-production. More popular rendering plugins than Corona Renderer are:

V-Ray: Considered the leader in the 3D rendering industry. Excellent quality as a standalone 3d rendering software as well. Known for motion blur and other amazing work. V-Ray is not only a favorite for architects and designers but also for film, TV, animation, and others.

2.1.4 3D RENDERING PROCESS PRODUCTION PIPELINE

Figure- 2.1.4 Rendering Process

CHAPTER 3

TECHNIQUES & METHODS

I will discuss all the software that I have used and which has played an effective role in completing my project work.

3.1 INTRODUCTION TO SOFTWARE

I will give a brief introduction to the software I used to complete my project and describe its usefulness.

3.1.1 AUTODESK MAYA

Autodesk Maya is a 3D software. With which realistic characters can be made for animation, visual effects and games. It can do modeling, rigging, animation, simulation, rendering and more.

Simulation of liquids, fire, smoke, snow and other natural phenomena can be easily done with this software. Character creation tools, sculpting, modeling, retopology, skinning and grooming etc. can be done very easily. In this project, I used Autodesk Maya for modeling, animation and rendering using Arnold.

Figure- 3.1.1 Autodesk May

3.1.2 ADOBE PHOTOSHOP

Adobe Photoshop is a popular photo and design software. It is used for various purposes. Like: photo retouching, creating illustrations, designing websites, creating animations, and more. In this project, I used Adobe Photoshop to edit the image of the model.

Figure- 3.1.2 Adobe Photoshop

3.1.3 ADOBE ILLUSTRATOR

Vector graphics are very easy to do with Adobe Illustrator, which can be scaled and edited without losing image quality. It is used to design logos, icons, images, typography and more for web, video and mobile applications. Adobe Illustrator is a professional and versatile software that helps create stunning graphics. In this project, I used Adobe Illustrator to graphically design the models, write scripts, etc.

Figure- 3.1.3 Adobe Illustrator

3.1.4 TOPAZ GIGA PIXEL AI

Topaz Giga Pixel AI is a software that can enlarge images up to 600% and maintain the quality its job is to beautify photos and use artificial intelligence and machine learning. This software is used for various purposes. Eg: printing large posters, restoring old photos, etc. In this project, I used Topaz Giga Pixel A to improve the rendered image quality.

Figure- 3.1.4 Topaz Giga Pixel Ai

3.1.5 MILANOTE

MilaNote creative projects can hold various data and files. It is basically used for many purposes. For example, writing, designing, brainstorming, and project writing can be covered. In this project, I used MilaNote for all sorts of things - for storing written information, keeping reference images, keeping video links, and more.

Figure- 3.1.5 MILANOTE

3.1.6 COMMONLY USED TECHNIQUES

The tools or methods I used for my modeling are very simple but combined to create something fantastic that has helped me quickly and efficiently create high-quality attractive 3D models as well as animations and renderings.

3.1.7 MOVE TOOL

The Move tool is a tool in Maya. Whose function is to move objects and elements in the scene? The Move tool can be accessed by pressing the W key on the keyboard or by clicking on the toolbar icon. In this project, I used the Move tool many times. When creating a model, use the Move tool to change the model state.

3.1.8 ROTATE TOOL

A rotate tool is a tool in Maya that is used to rotate objects and elements. Click E on the keyboard or click the icon on the toolbar to launch the rotate tool. In this project, I used the rotate tool many times. Model rotation is done with this tool.

3.1.9 SCALE TOOL

The scale tool is a tool from Maya. Its function is to change the size of objects and elements in the scene. The Scale tool can be accessed by pressing the E key on the keyboard or by clicking the toolbar icon. In this project, I used the scale tool many times. When creating a model, use the Scale tool to change the length-width of the model.

3.1.10 EXTRUDE TOOL

The Extrude tool is a tool in Maya. Its job is to create new geometry from edges or vertices. Used to make complex shapes and models, such as buildings, vehicles, characters, and more. In this project, I used the Extrude tool to create most of the models.

3.1.11 BEND DEFORMATION

Bending distortion is a technique for Maya. A model is bent or changed by applying force. In this project, I made light wire using the bend distortion technique. Above are the tools that I use the most. There are many other tools used which are not mentioned here.

CHAPTER 4
CONCEPTS AND DEVELOPMENT

4.1 Principles of Animation

The 12 principles of animation are:

- Squash and Stretch
- Anticipation
- Staging
- Straight Ahead Action and Pose-to-Pose
- Follow Through and Overlapping Action
- Ease In, Ease Out
- Arcs
- Secondary Action
- Timing
- Exaggeration
- Solid Drawing
- Appeal

Squash and stretch: The principle distorts the shape of objects. And the weight is flexible when they move. For example, a bouncing ball will squash when it hits the ground and expand when it bounces.

Foreshadowing: The principle prepares the audience for action by showing the character or object ready to perform it. For example, a person about to jump will bend their knees and lower their body before jumping.

Staging: The principle of drawing the audience's attention to the most important elements of a scene using camera angles, lighting, composition, and movement. For example, a close-up shot of a character's face emphasizes their emotions and expressions.

Pose to Pose: These are the two methods of creating animation. Straight-ahead action means drawing each frame one by one from start to finish. While pose to pose means drawing the key pose first and then filling in the frame. While pose-to-pose is better for creating planned and precise movements.

Follow Overlapping Action: This principle shows the continuity of motion of objects and characters by moving them slightly after the main action has stopped. For example, a person's hair or clothes will continue to sway even after they stop walking. Different parts of an object or character appear moving at different speeds or times. For example, a person's arms and legs will move at different rates when running.

Ease in and ease out: This principle shows acceleration and deceleration at the beginning and end of an activity by moving objects and characters faster or slower. For example: A car will move slowly then speed up and then slow down again when stopped.

Arcs: The principle shows the natural movement of objects and characters by following curved paths instead of straight lines. For example, a ball will follow an arc when it is thrown.

Secondary Action: The principle adds more detail and reality to the main action by showing other actions that support or enhance it. For example, a person who is walking may also swing their arms or nod their head.

Timing: The principle controls the speed and rhythm of the animation by adjusting the number of frames between each action. For example, Fast action has fewer frames than slow action Timing affects the emotion of the animation.

Exaggeration: The principle of making animations more dynamic and interesting by emphasizing certain features or actions. For example, a character may have larger eyes or expressions than normal.

Solid drawing: The principle shows the three-dimensional shape and volume of objects and characters using perspective anatomy. For example, a cube will look more realistic if it is drawn as a square.

Application: The principle makes animation more attractive by using attractive shapes, colors, designs, and personalities. For example, a character may have a unique style or trait that makes it stand out from others.

CHAPTER 5

IMPLEMENTATION & RESULT

In this chapter, I have dealt with 3D models, rigs, animations, script writing, presentations, enhancing the quality of rendering images and many more. I will highlight how I have completed all these tasks.

5.1 IMPLEMENTATION

I will explain how I implemented all the above points. I animate at 1080p resolution at 24 frames per second to render my project. Used Maya Arnold render engine to render.

5.1.1 COLLECTION OF REFERENCES

Before starting to work directly in Autodesk Maya, let's take a look at some things first. Collect reference images that are used to build my models or create beautiful creative models. The whole process is very beautiful which makes me good at making models. For each resource, we had to collect at least 10-15 reference images. I create a folder to collect references that helped build my model as inspiration.

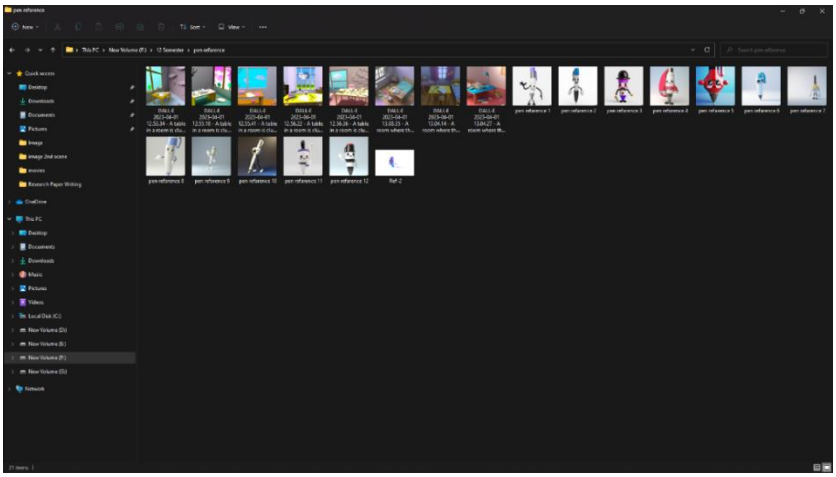

Figure- 5.1.1 Pen Reference collection

5.1.1.1 RIGGINGS

Custom rigging is creating a custom system of joints, controls, and deformers for 3D models that are used in animation. Rigging can be done in many ways in Maya. Features auto-rigging, custom rigs, modular rigging, blend shapes, facial rigging, muscle systems, and more.

In my project 2 models were pen and pencil. We use custom rigs to position and move the models' faces. I complete the rigging of the entire project alone.

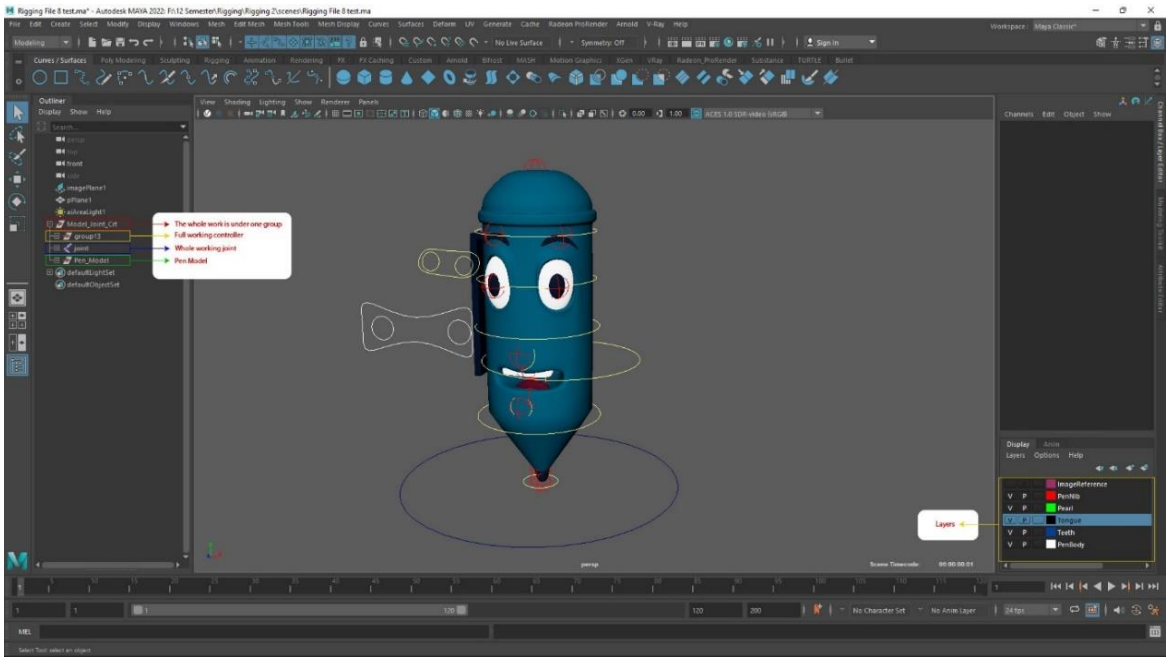

Figure- 5.1.1.1 Rigging screenshot of pen model

5.1.1.2 PROCESS OF RIGGING

To create my pencil model rigging in Maya, the steps I followed were:

- I opened the Maya software and imported the model.
- I switched to manipulation mode and created joints to control the shape and movement of the pencil.
- I used the NURBS circle tool from the Curves/Surfaces menu to create the controllers for the joints.
- I positioned the controllers on the model and adjusted their size and orientation.
- I selected the joint and model group and applied the Skin and Bind Skin commands from the Rigging menu.
- I tested the rig by moving and rotating the controllers and checking the distortion of the model.
- Thus I completed the whole rigging process.

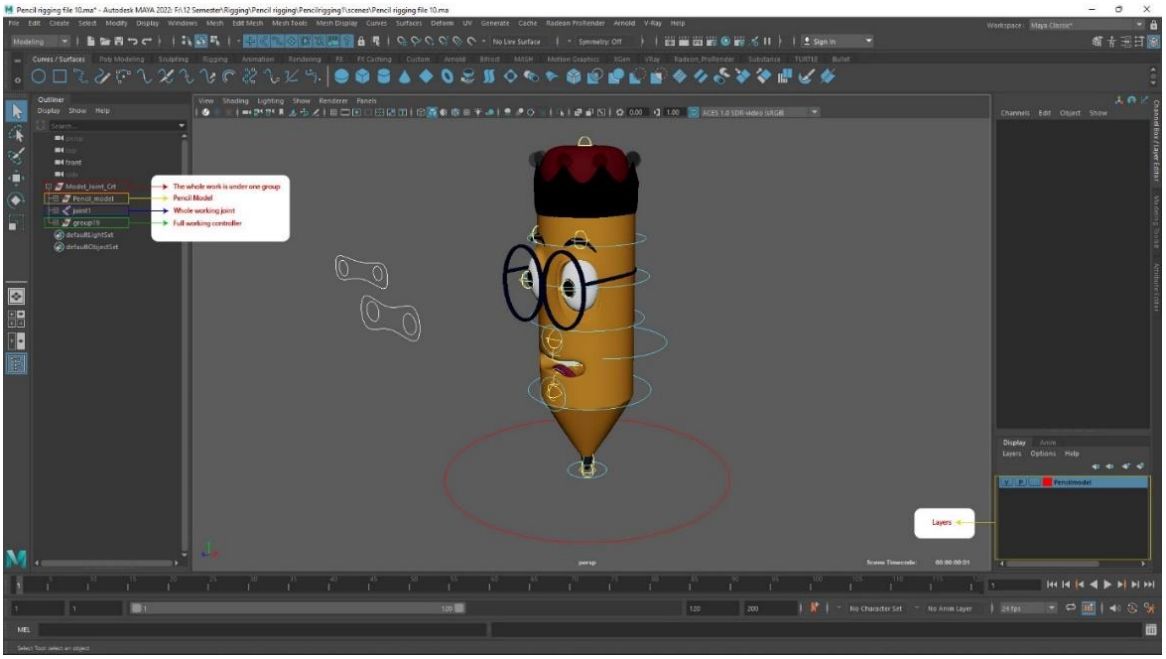

Figure- 5.1.1.2 Rigging screenshot of pencil model

5.1.1.3 ANIMATION

I did the main animation work for our project. Doing the project was very challenging and experienced. Learned a lot about how to solve different problems. One of the problems I faced was that each frame of the image took a long rendering time. It takes 45 minutes to render a frame using default settings I experimented with different rendering methods and used advanced rendering settings to reduce time. I removed unnecessary elements from the animated scene. Only the necessary models have been kept. This makes the rendering process much faster when it takes 5 minutes to render a frame.

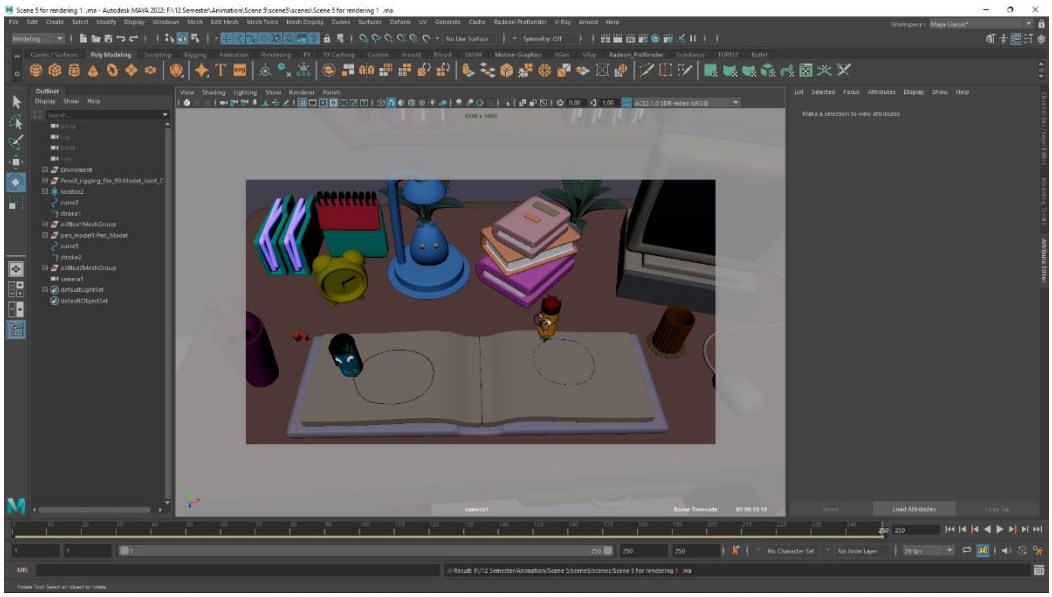

Figure- 5.1.1.3 Screenshot of animation work (a)

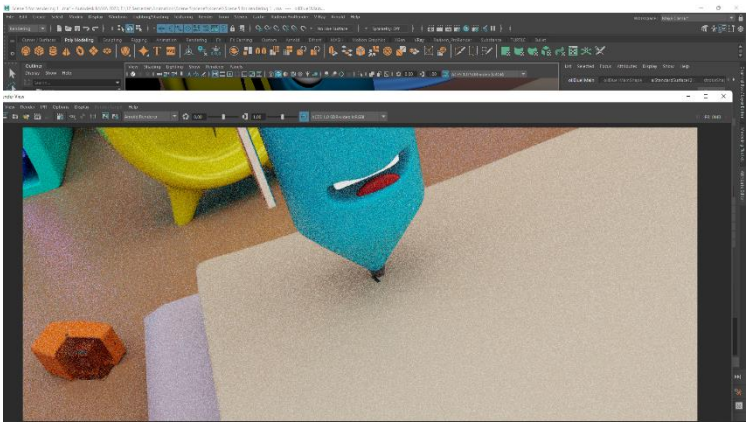

Figure- 5.1.1.3 Rigging screenshot of pen model (b)

5.1.1.4 PEN MODEL

My project is a pen and a pencil main character. For this story, I was commissioned to create a pen model. So I searched for some references online. I have collected 10 to 15 pictures of different types of pens for inspiration. Then, I used Autodesk Maya software to create the pen model. I started with a polygonal cylinder as the base shape and then added more detail using the polygon sphere, bend, smooth and other tools. This is how I created the pen, which is the main character of my project.

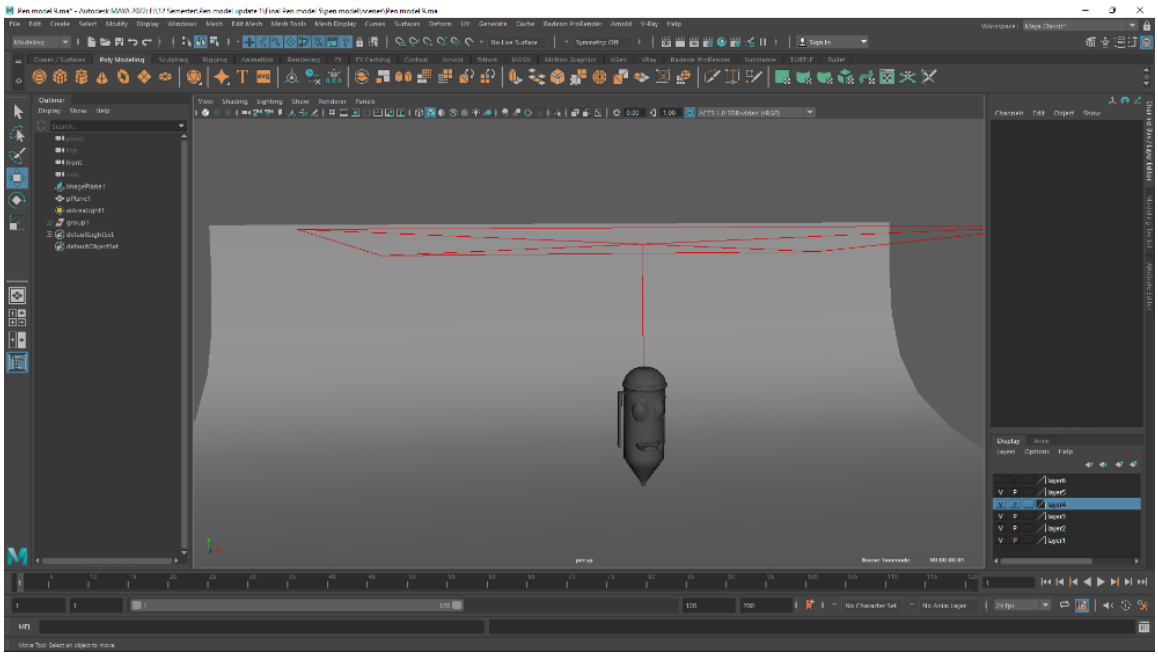

Figure- 5.1.1.4 Screenshot of the pen model

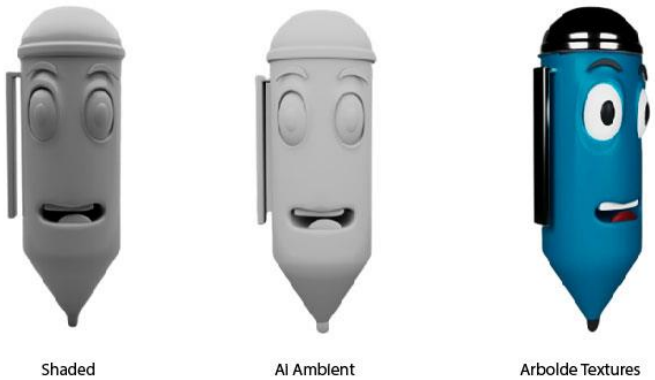

Figure- 5.1.1.4 pen model (a)

5.1.1.5 COMPUTER MODEL

This computer model is the best way to do it. I was able to make the kind of computer model needed for the story. So I feel very good about myself.

Before starting the computer model, search for some references online. I collect pictures of different types of computers. Then, I used Autodesk Maya software to create the computer model. I started with a polygonal cube as the base shape and then added more detail using the polygonal sphere, cylinder, smooth and other tools. This is how I built computers.

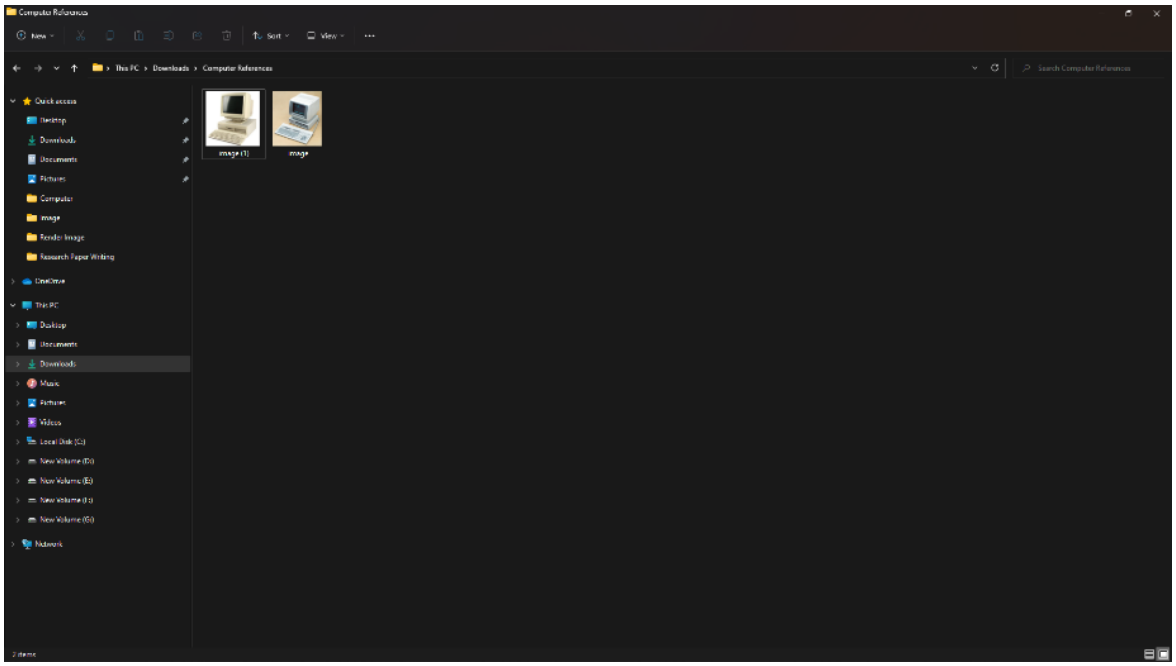

Figure- 5.1.1.5 Screenshot of the Computer model (a)

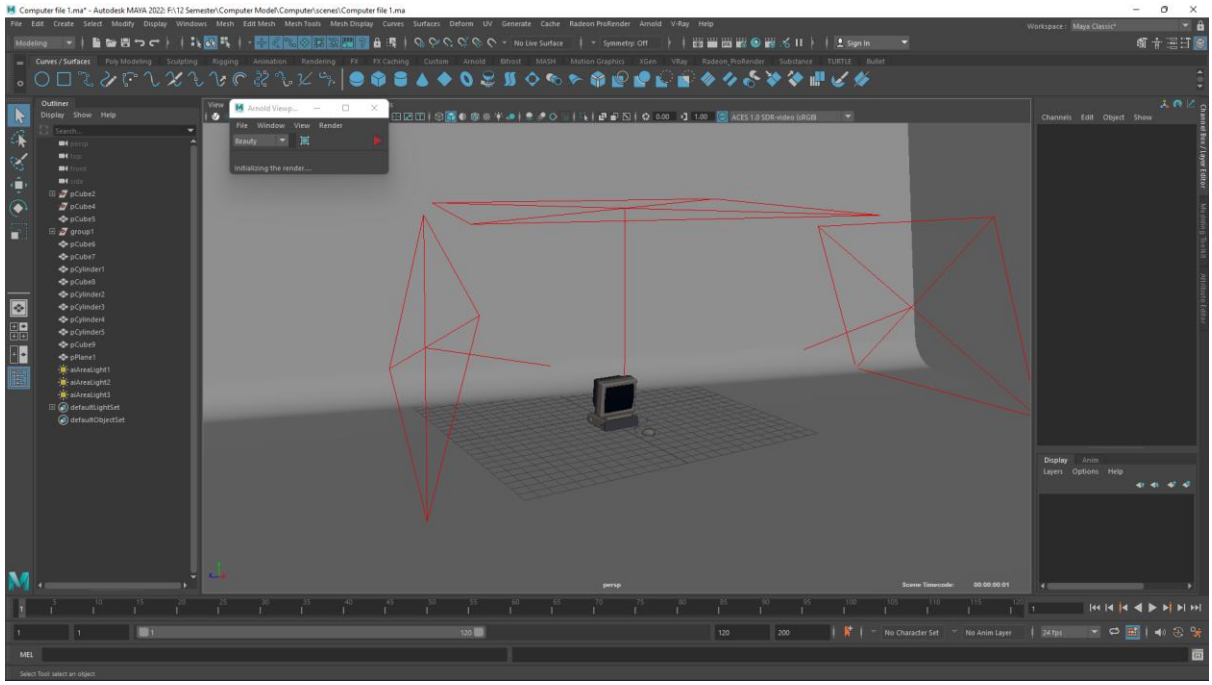

Figure- 5.1.1.5 Screenshot of the computer model (b)

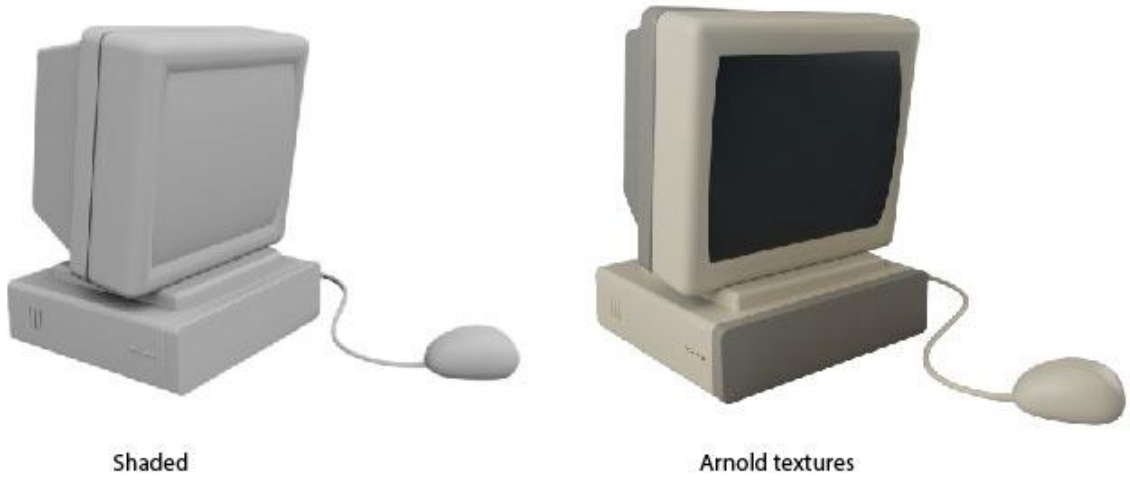

Figure- 5.1.1.5 Computer model (c)

5.1.1.6 BROOM MODEL

The main reason for making the model was to enhance beauty. Before starting the sweep model, let's look for some references online. Then, I used Autodesk Maya software to create the broom model. I added more detail using a polygon sphere, cylinder, smooth and other tools as the base shape. This is how I made the broom.

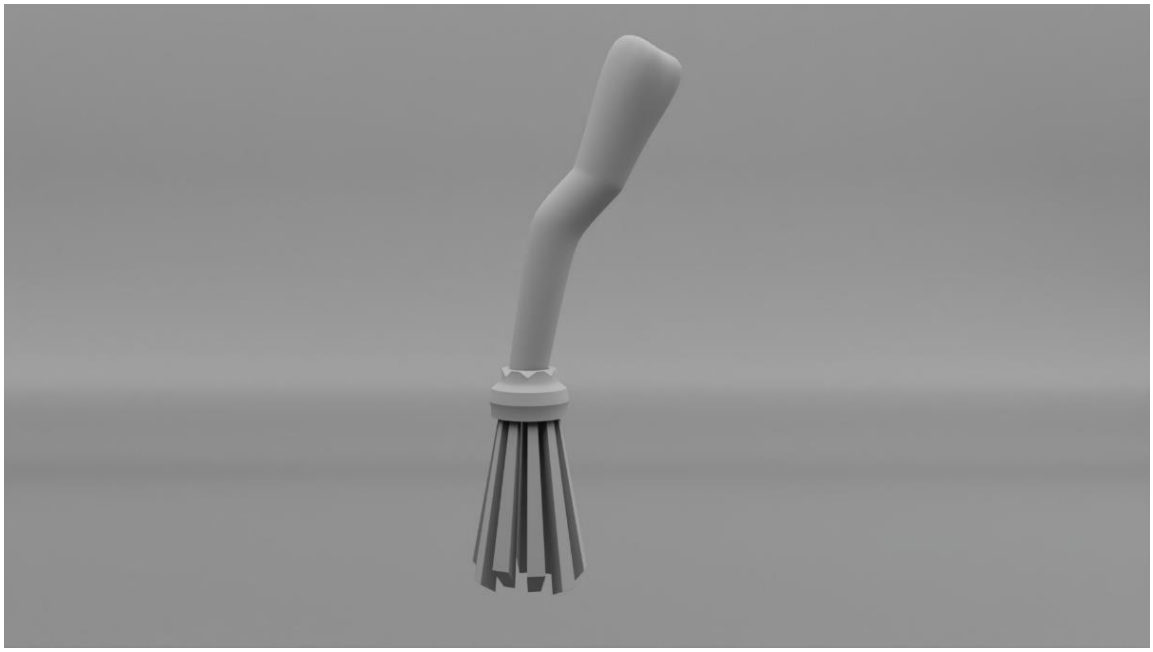

Figure- 5.1.1.6 Shaded Broom model (a)

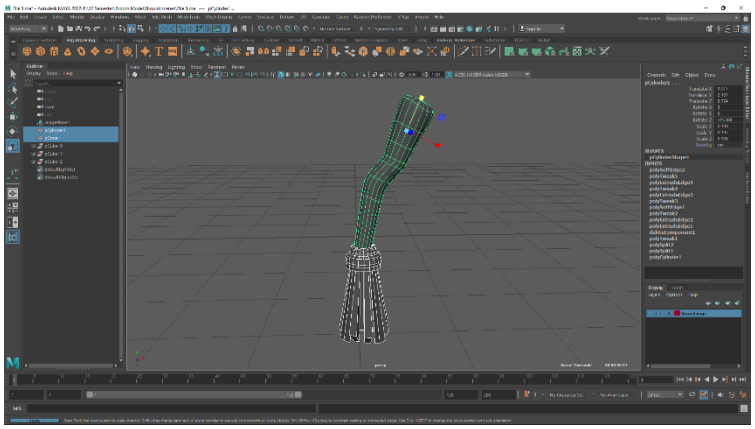

Figure- 5.1.1.6 Screenshot of the broom model (b)

Figure- 5.1.1.6 Arnold textures broom model (c)

5.1.1.7 FAN MODEL

The main reason for making this model was to increase the equipment in the room. To make my fan model, I used all the features:

Used modeling tools to create the main base, neck, cage, and buttons of the fan. I used polygon modeling to create the basic shape and added details with tools. As texture, I used Arnold Render. I have worked on what the color will be. Used keyframes to set fan position and rotation.

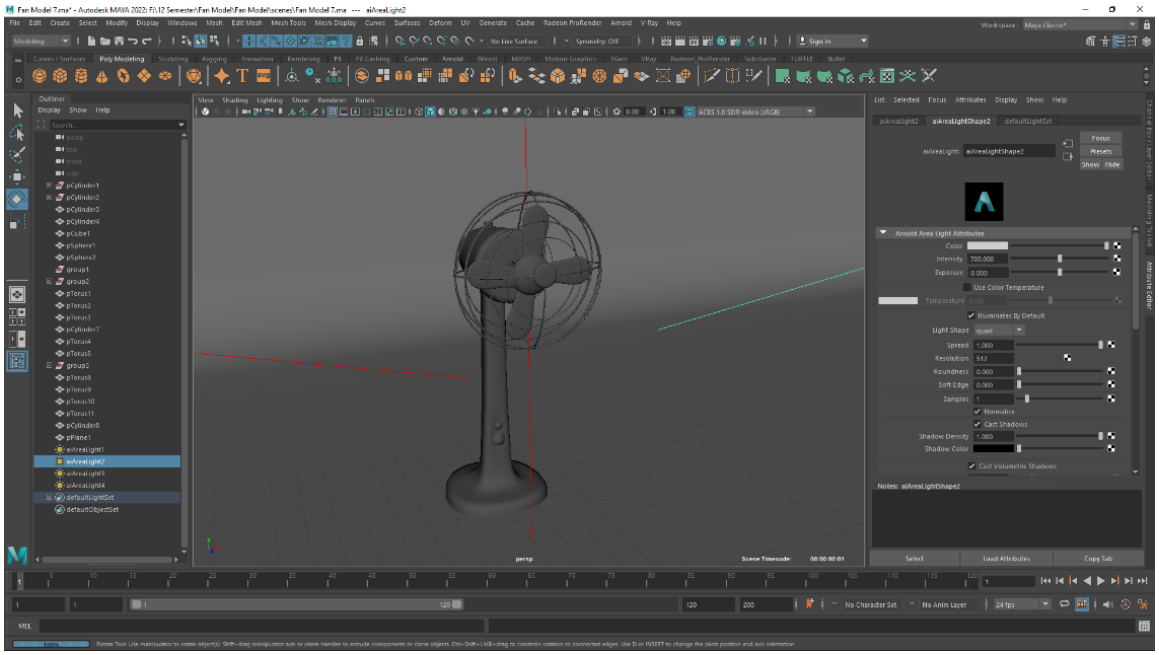

Figure- 5.1.1.7 Screenshot of the fan model (a)

5.1.1.8 POTTED PLANT MODEL (a)

The main reason for doing this model was to enhance the beauty of the room. Below is what I used to make the potted plant model:

I used a polygon modeling to create the leaves of the tree. I used the bend tool to bend the leaves. I made the pot with polygon cylinders. Used hyper-shade editor for pots and leaves. Which creates the shader. Render 2D images using Arnold renderer.

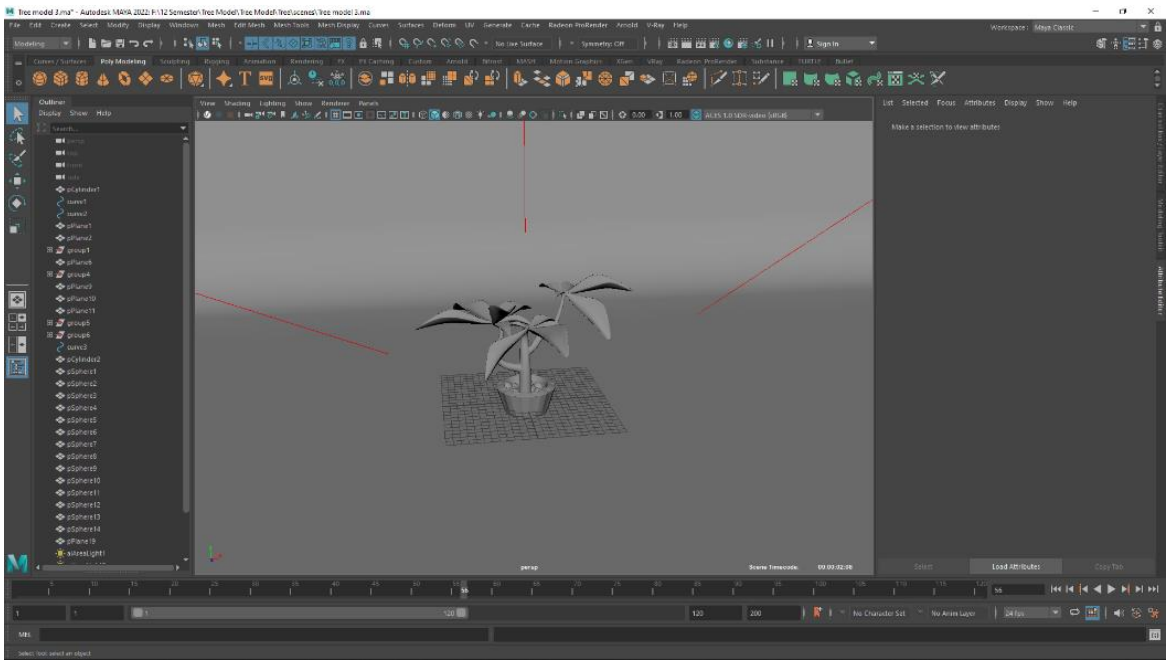

Figure- 5.1.1.8 Screenshot of the potted plant model (a)

Figure- 5.1.1.8 Shaded Potted plant model (b)

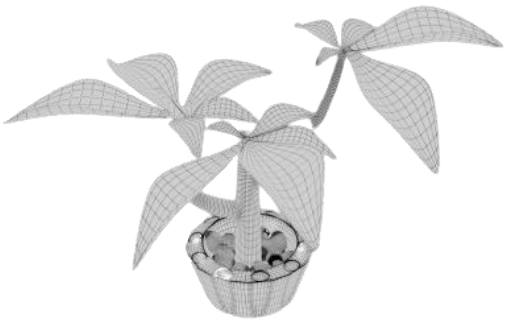

Figure- 5.1.1.8 Wireframe Potted plant model (c)

Figure- 5.1.1.8 Silhouette Potted plant model (d)

Figure- 5.1.1.8 Arnold textures potted plant model (e)

5.1.1.1 POTTED PLANT MODEL (b)

The main reason for doing this model was to enhance the beauty of the room. Below is what I used to make the potted plant model:

I used polygon modeling to create the leaves of the tree. I used the bend tool to bend the leaves. I made the pot with polygon cylinders. Used hyper-shade editor for pots and leaves. Which creates the shader. Render using Arnold renderer.

Figure- 5.1.1.9 Shaded, Wireframe, Silhouette textures
potted plant model (a)

Figure- 5.1.1.9 Arnold textures potted plant model (b)

5.1.1.10 ELECTRIC PENCIL SHARPENER MODEL

Let's model the electric pencil sharpener for our project. I made the model using less poly. I have created the basic services of the model with Poly QP. The Bevel tool creates rounded edges and corners on polygonal objects.

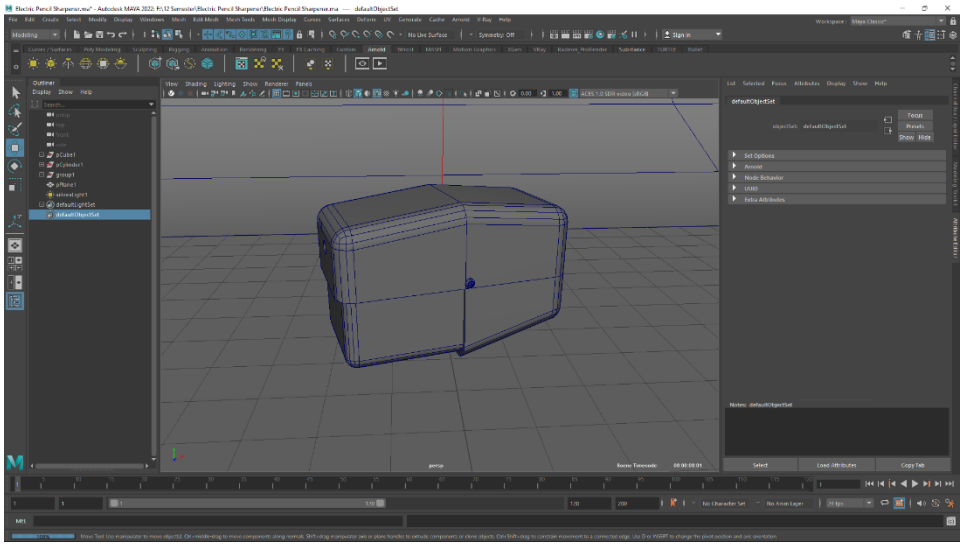

Figure- 5.1.1.10 Screenshot of the potted Electric Pencil Sharpener Model (a)

Figure- 5.1.1.10 Shaded of the potted Electric Pencil Sharpener Model (b)

Figure- 5.1.1.10 Ai Ambient of the potted Electric Pencil Sharpener Model (c)

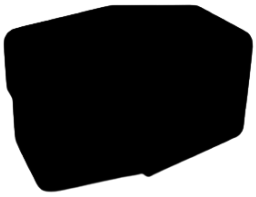

Figure- 5.1.1.10 Silhouette of the potted Electric Pencil Sharpener Model (d)

Figure- 5.1.1.10 Arnold textures of the potted Electric Pencil Sharpener Model (d)

5.1.1.11 WINDOW MODEL

Before starting the window model I searched for some references online. After that I created the model using Autodesk Maya software. I started with a polygonal cube as the base shape and then added more detail using the polygon sphere, bend, smooth and other tools. This is how I created the window, which attracts my project room.

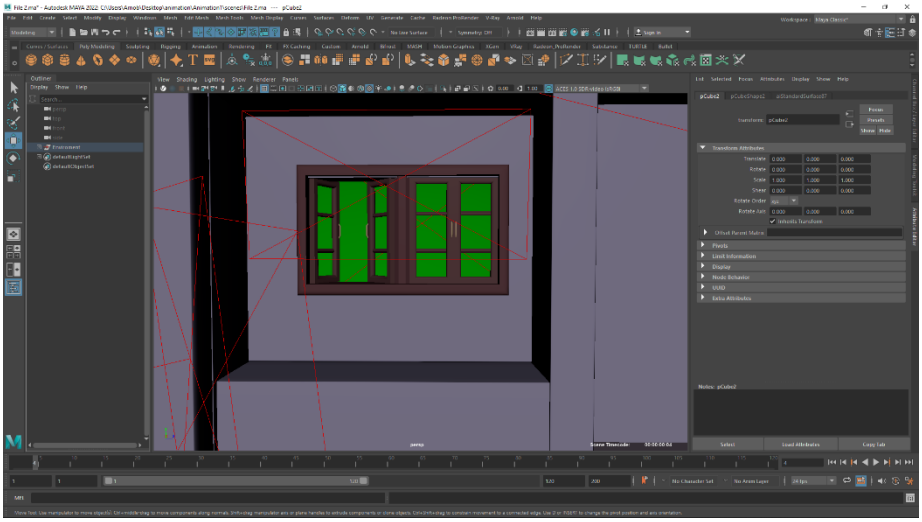

Figure- 5.1.1.11 Screenshot of the window model (a)

Figure- 5.1.1.11 Shaded, Wireframe, window model (b)

Figure- 5.1.1.11 Arnold textures window model (c)

5.1.2 PHOTO FRAME MODEL

I needed to model a picture frame in this project. Because of our story of friendship and bond which I will express in photo frame. For which this modeling was important. I created the model using Autodesk Maya software. I started with a polygon cube as the base shape and then added more detail using polygon smoothing and other tools. This is how I created the frame model, which draws my project.

Figure- 5.1.2 Shaded photo frame model (a)

Figure- 5.1.2 Arnold textures photo frame model (b)

5.1.3 CHAIR MODEL

The chair model is very important in my project. Most of the time the scene of the chair will be shown in animation. So at the beginning of making this model, I searched for some references online. After that, I created the model using Autodesk Maya software. I started with a polygon cube as the base shape and then added more detail using polygon smoothing and other tools. This is how I created the chair model, which graces my project room.

Figure- 5.1.3 Shaded chair model (a)

Figure- 5.1.3 Arnold textures chair model (b)

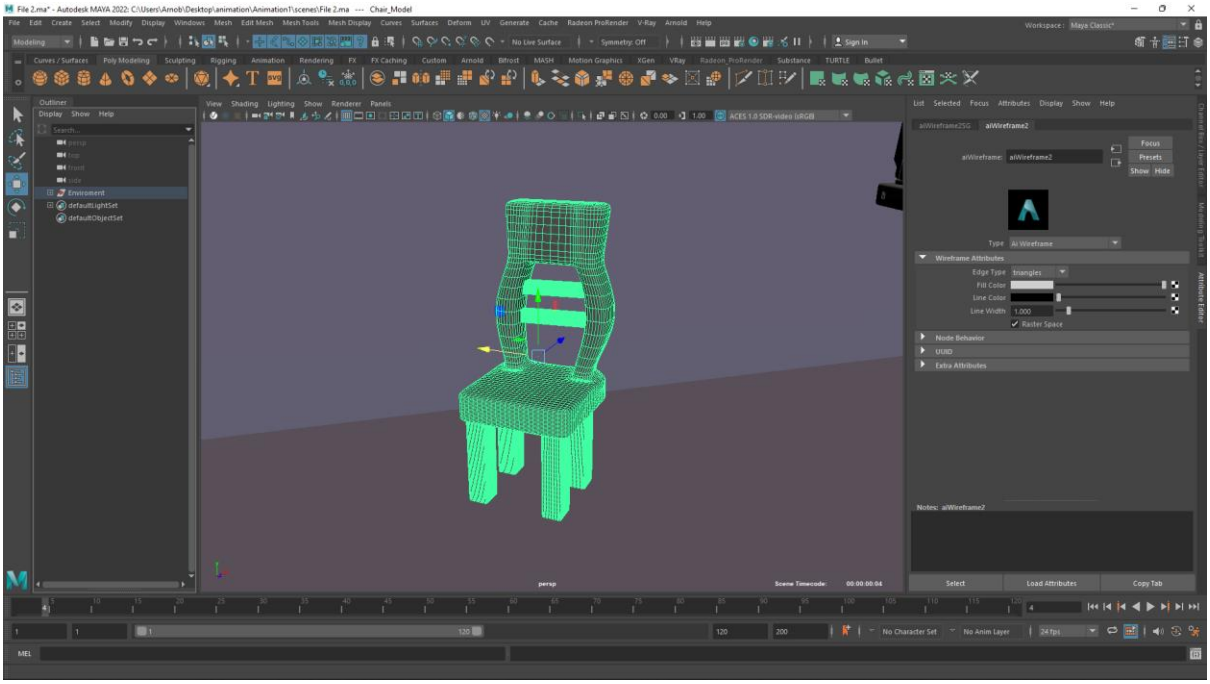

Figure- 5.1.3 Screenshot of the chair model (c)

5.1.4 ROOM MODEL

The room model is very important in my project. Because the whole time the animation will be inside the room. As a result, I made the following room model after thinking a lot to make the room design beautiful. I created the model using Autodesk Maya software. I started with a polygon cube as the base shape and then added more detail using polygon smoothing and other tools. This is how I created the room model, which draws my project.

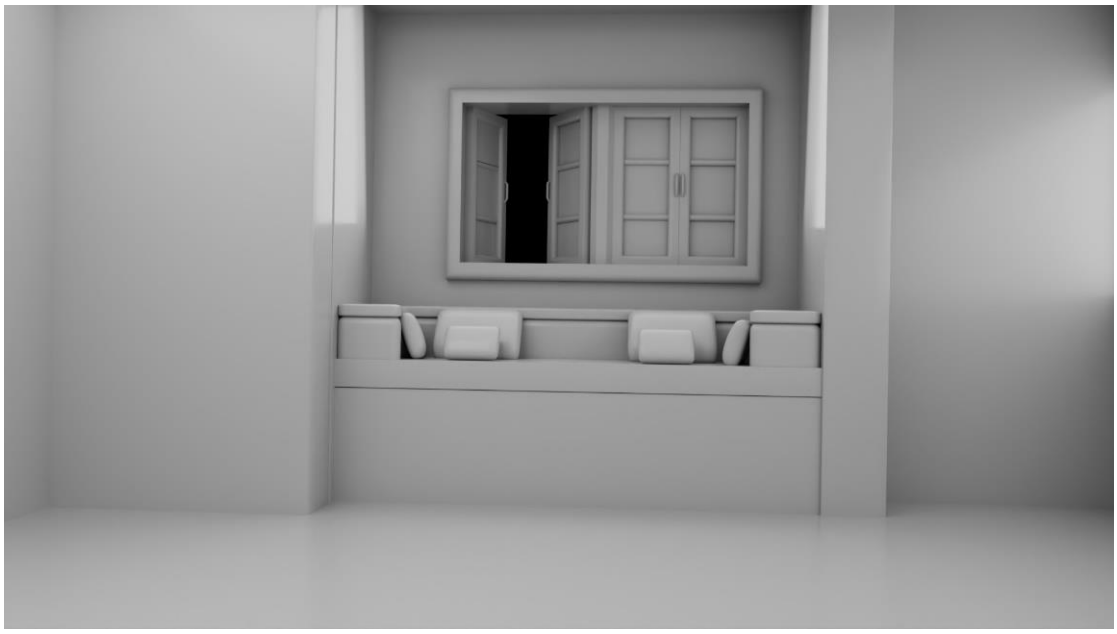

Figure- 5.1.4 Shaded *Room Model (a)*

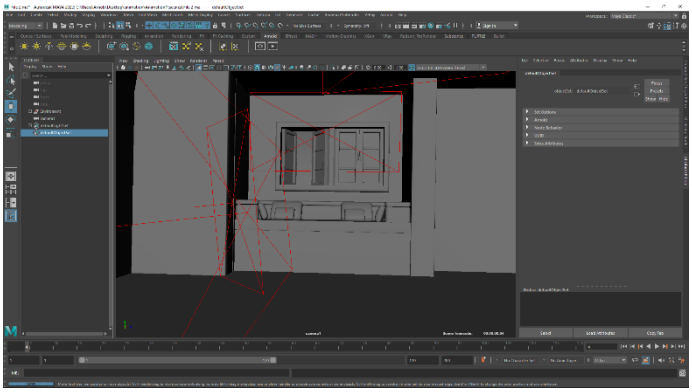

Figure- 5.1.4 Screenshot of the *Room Model (b)*

Figure- 5.1.4 Arnold textures Room Model (c)

5.1.5 BED MODEL

This project modeled the bed. Because our story needs to model this. I created the model using Autodesk Maya software. I started with a polygon cube as the base shape and then added more detail using polygon smoothing and other tools.

I have to work hard to make sheets and pillows. The sheet has to be bent. This is how I created the bed model, which draws my project.

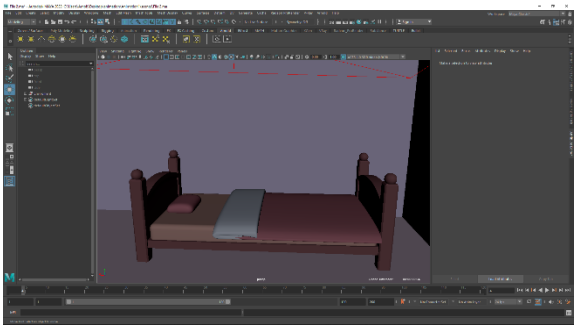

Figure- 5.1.5 Screenshot of the *Bed Model (a)*

Figure- 5.1.5 Shaded Bed Model (b)

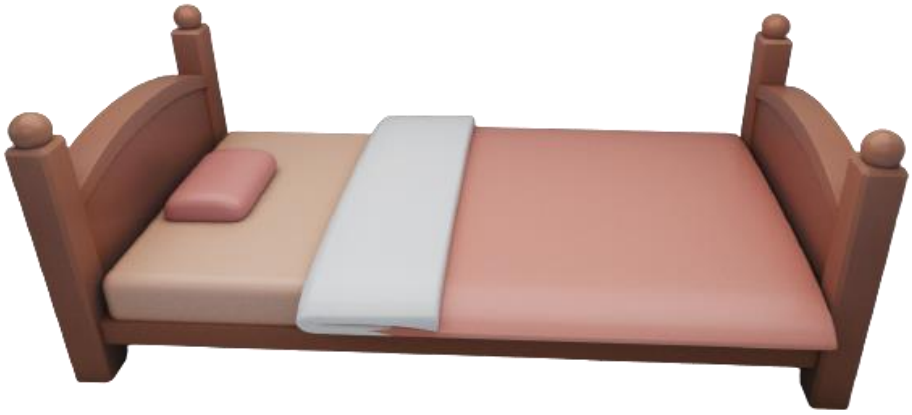

Figure- 5.1.5 Arnold textures Bed Model (c)

5.1.6 SHELF MODEL

This project has modeled the shelf. Because our story needs to model this. I created the model using Autodesk Maya software. Made to hold books and trees. I started with a polygon cube as the base shape and then added more detail using polygon smoothing and other tools. Make 2 shelves and 1-speed shelf. That's how I created my shelf, which draws my project.

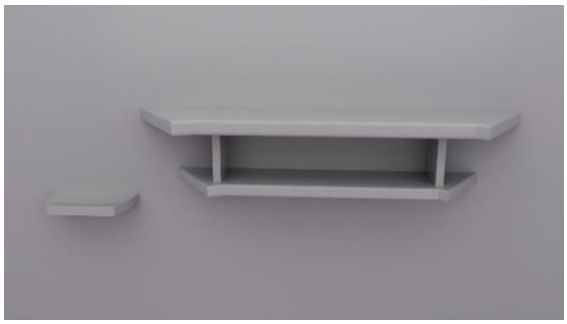

Figure- 5.1.6 Shaded Shelf Model (a)

Figure- 5.1.6 Silhouette textures *Shelf Model (b)*

Figure- 5.1.6 Arnold textures Shelf Model (c)

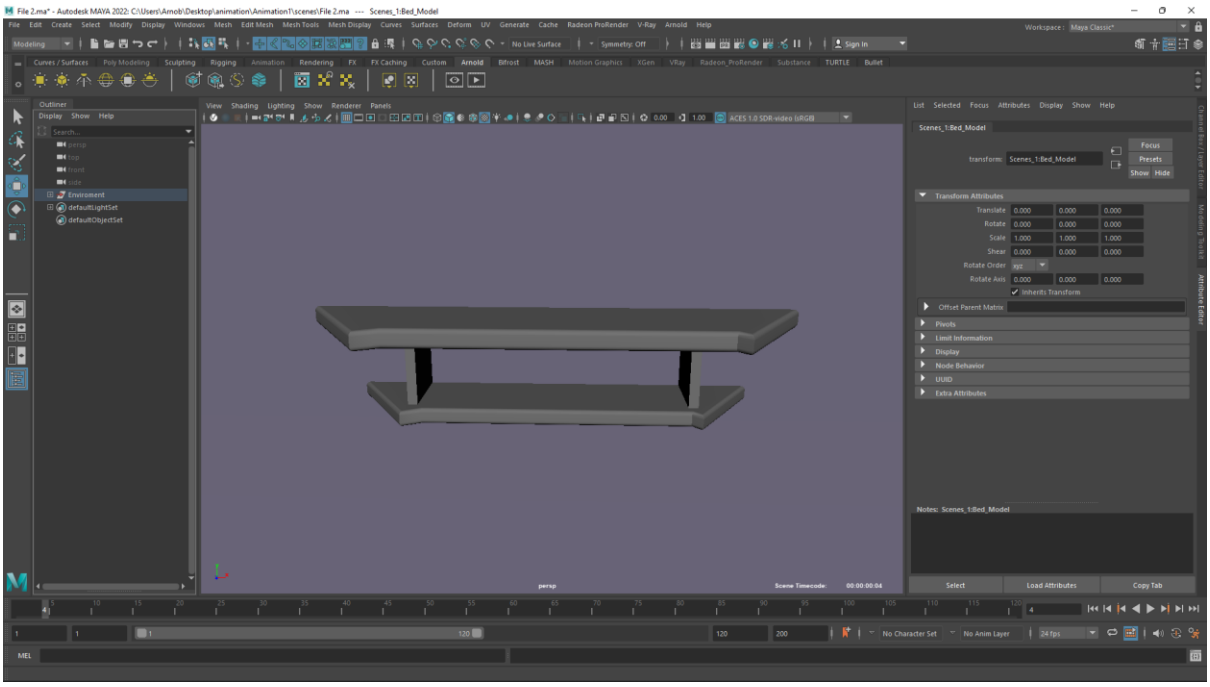

Figure- 5.1.6 Screenshot of the Shelf Model (d)

5.1.7 FAIRY LIGHTS MODEL

Fairy lights are modeled in this project. Because our story needs to model this. I created the model using Autodesk Maya software. Made to enhance the beauty of the house. I made the wire model by bending it and making the lights. Added more detail using polygon smoothing and other tools. This is how I created the Fairy Light model, which is the charm of my project.

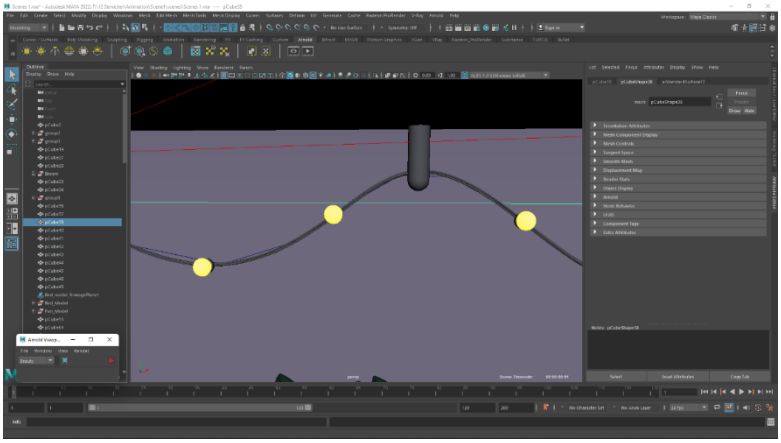

Figure- 5.1.7 Screenshot of the Fairy Lights Model (a)

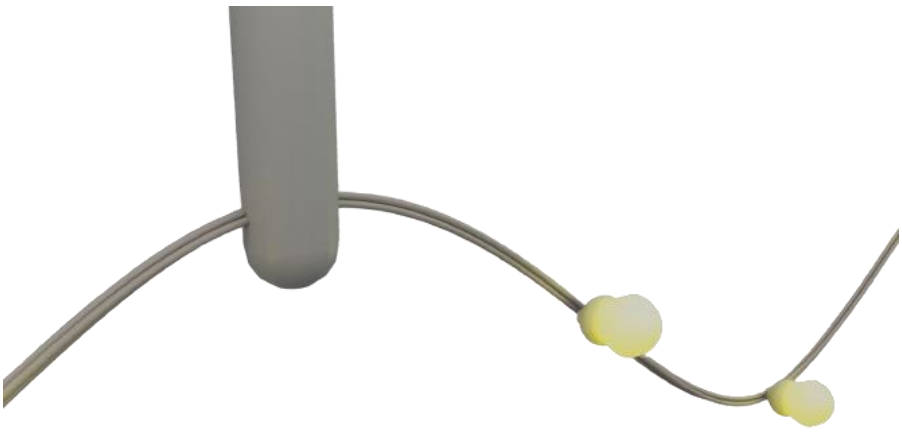

Figure- 5.1.7 Arnold textures Fairy Lights Model (b)

5.1.8 LEAF MODEL

Fairy lights are modeled in this project. Because our story needs to model this. I created the model using Autodesk Maya software. Made to enhance the beauty of the house. I made the wire model by bending it and making the lights. Added more detail using polygon smoothing and other tools. This is how I created the Fairy Light model, which is the charm of my project.

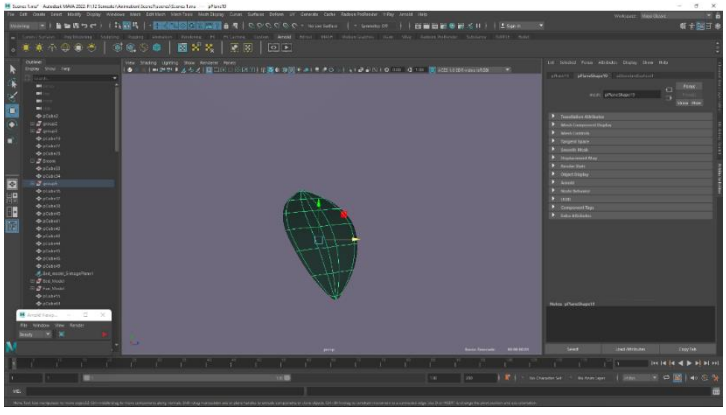

Figure- 5.1.8 Screenshot of the Leaf Model (a)

Figure- 5.1.8 Shaded, Silhouette, *Arnold* model *(b)*

5.1.9 SCRIPTWRITING

I have written the script. Before writing a script, one must first understand the basis of the story. Which means coming up with a premise, genre, setting, and protagonist that drives my plot. I first think about the problems that I think about what will happen at the end of the story. Before writing a script I use Notepad, Milanota A Final Save, and this software. Work to enhance research, creativity, and layout skills. This is how I end up writing scripts

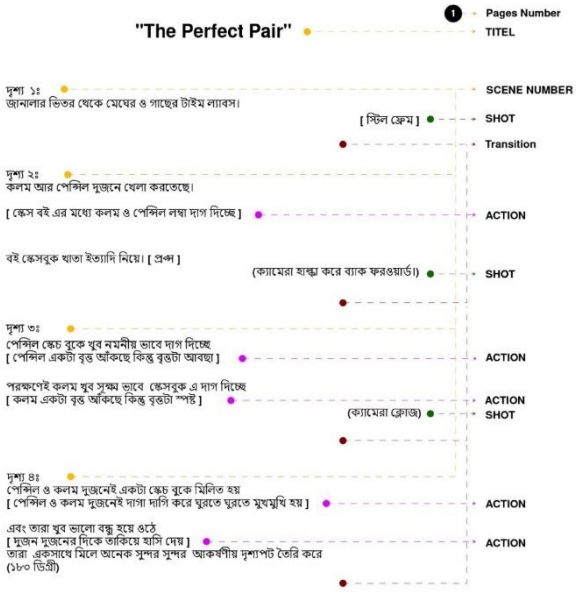

Figure- 5.1.9 Scriptwriting *(a)*

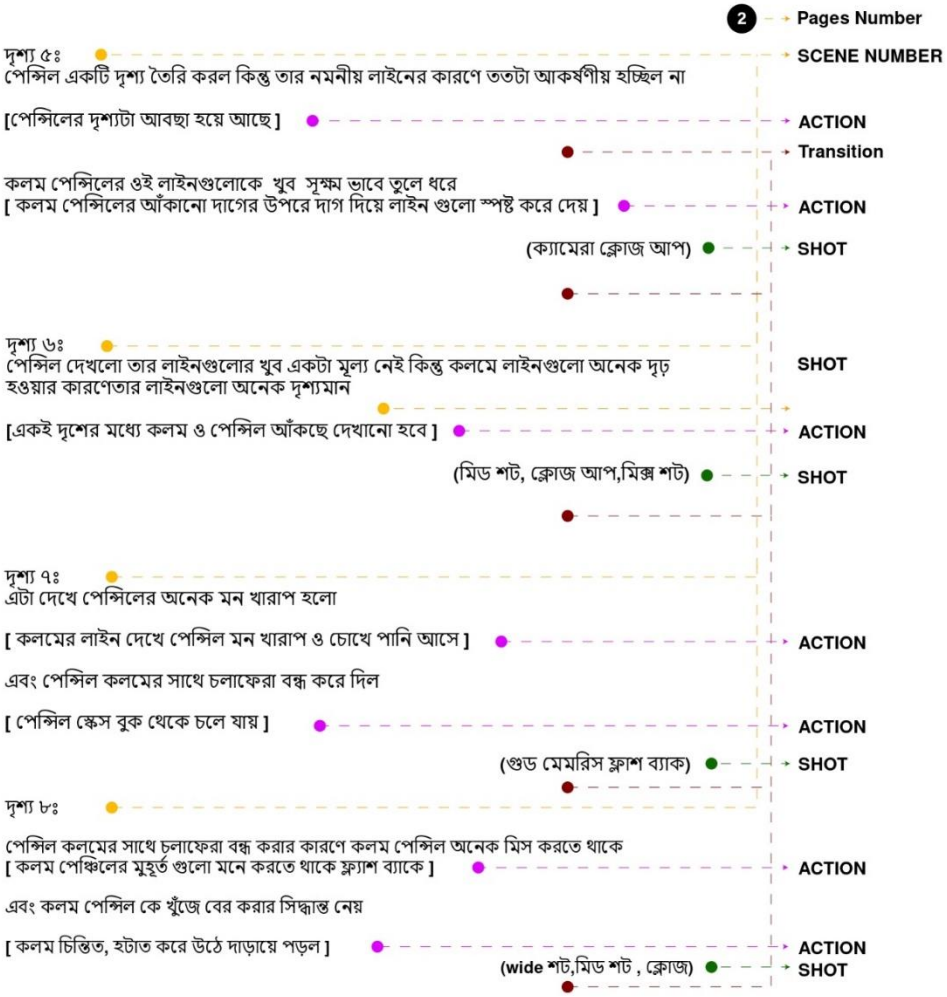

Figure- 5.1.9 Scriptwriting *(b)*

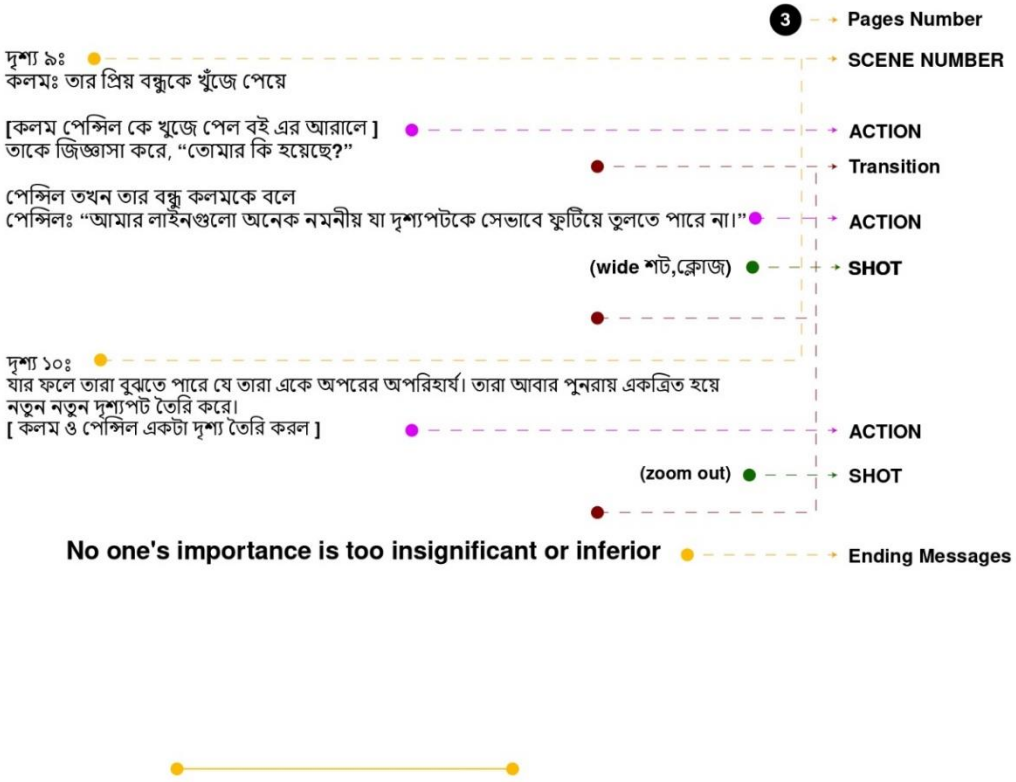

Figure- 5.1.9 Scriptwriting *(c)*

5.1.10 TOPAZ GIGA PIXEL AI

With "TOPAZ GIGA PIXEL AI" I have improved the quality of the rendered images of our project. Our project has 1800 render images. I have enhanced the quality of all images myself. It took me 10 seconds to enhance the image quality with TOPAZ GIGA PIXEL AI. Below are screenshots of some image quality enhancements-

Figure- 5.1.9 Topaz Giga Pixel Ai *(a)*

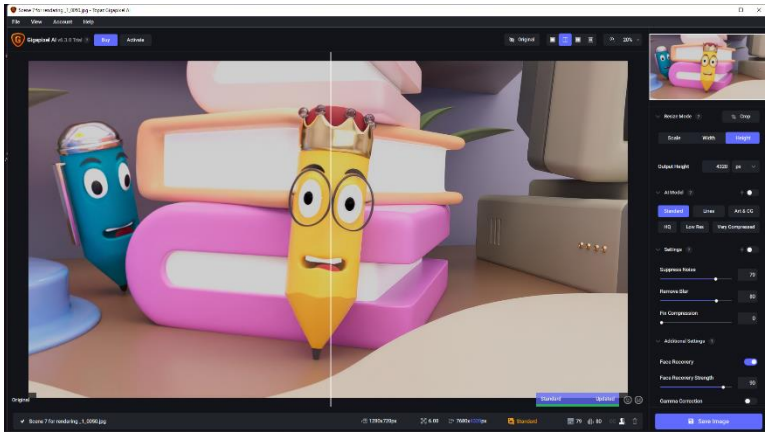

Figure- 5.1.9 Topaz Giga Pixel Ai *(b)*

5.1.11 MILANOTE

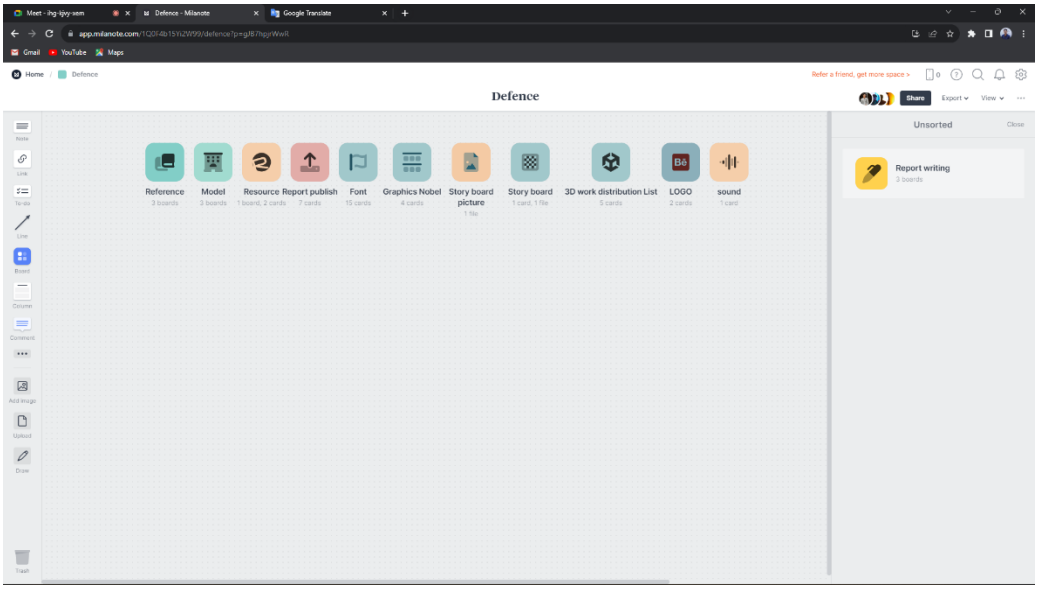

Figure- 5.1.10 Screenshot of Milannot working *(a)*

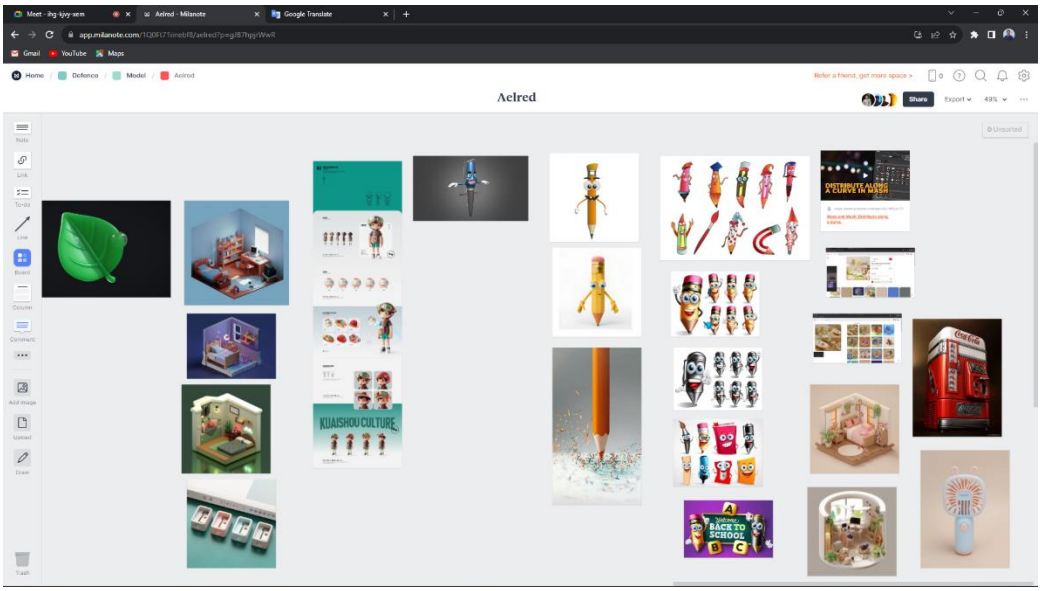

Figure- 5.1.10 Screenshot of Milannot working *(b)*

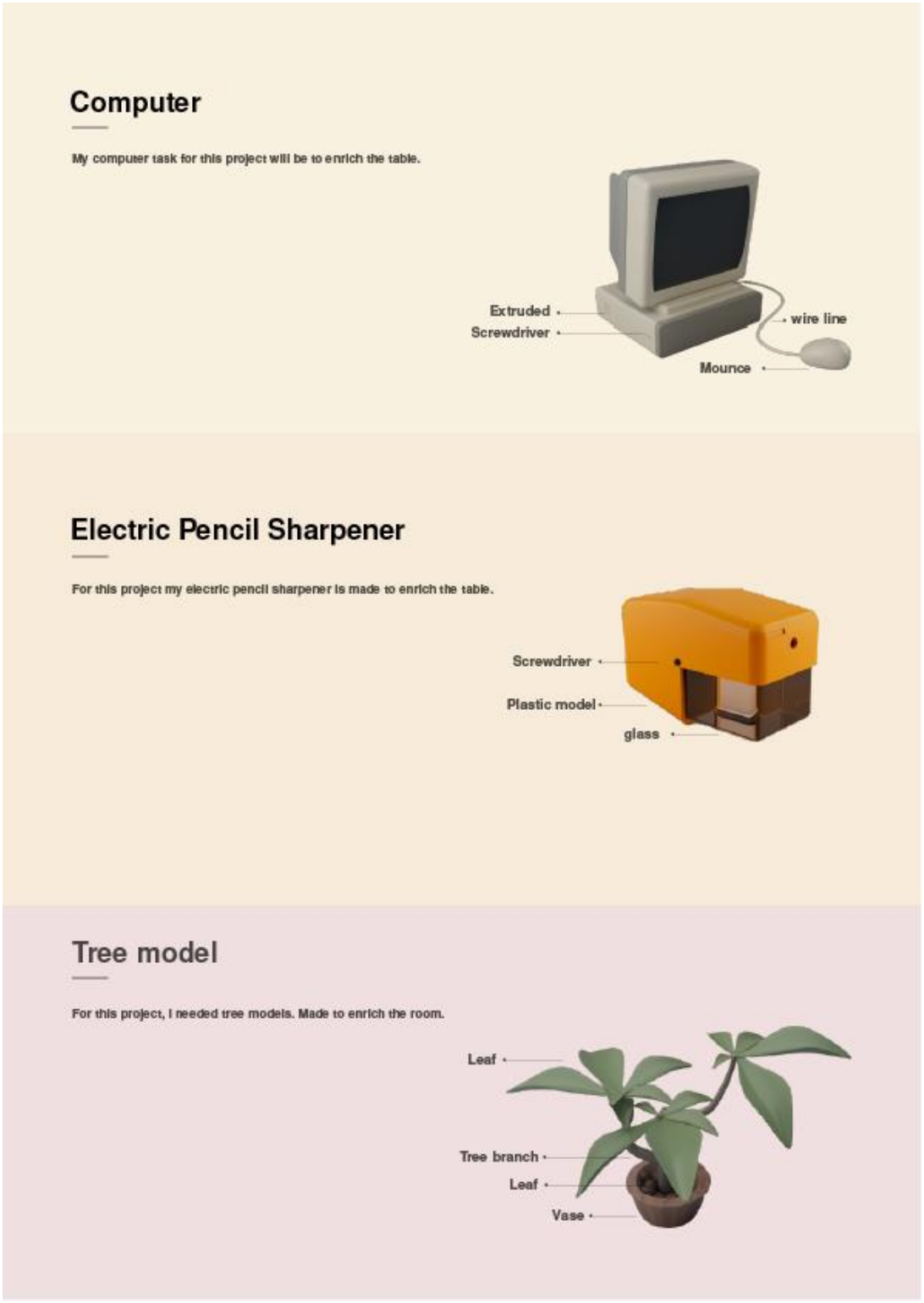

Figure- 5.1.10 Description of each model (Adobe Illustration) *(c)*

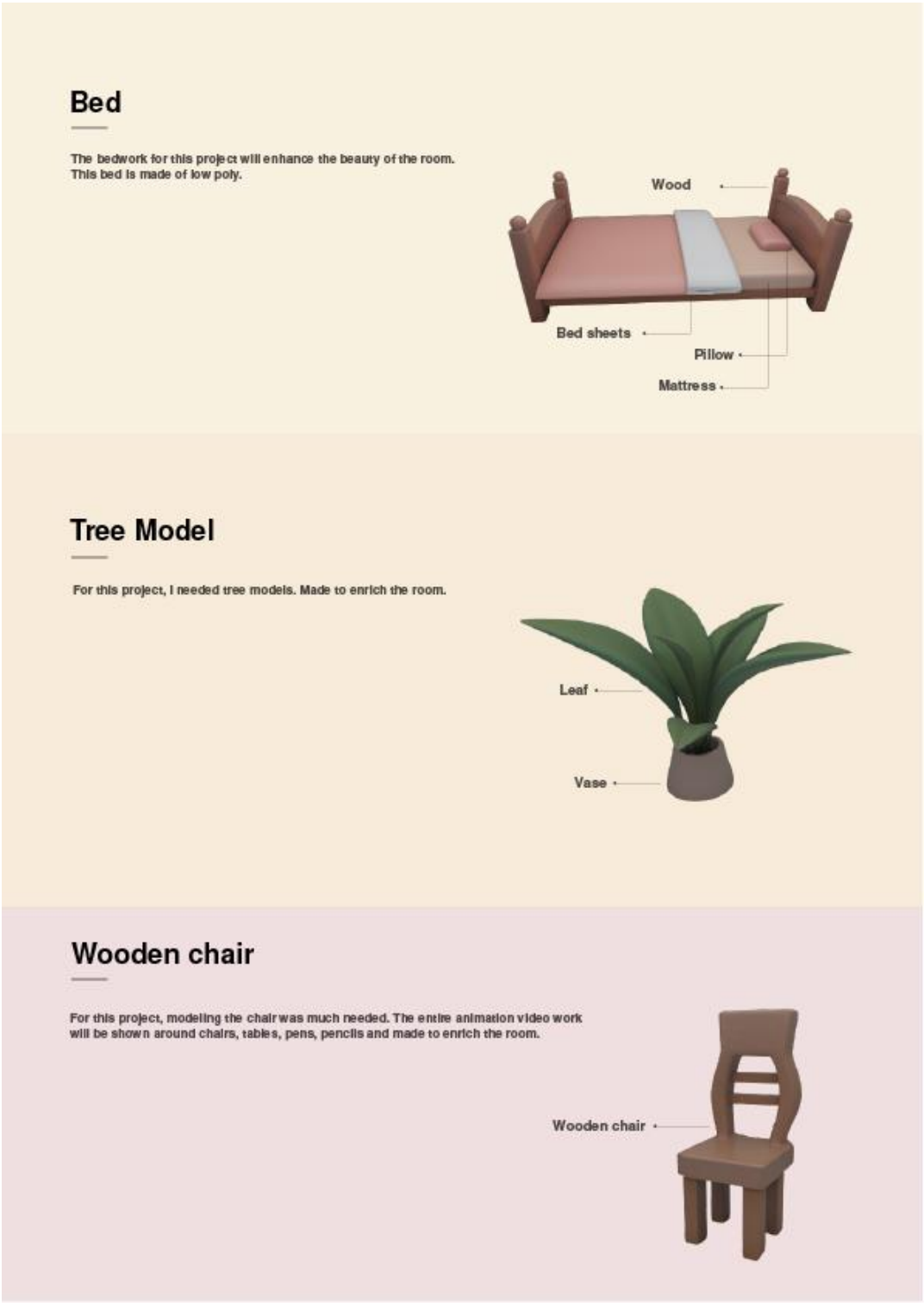

Figure- 5.1.10 Description of each model (Adobe Illustration) *(c)*

CHAPTER 6

DISCUSSION

6.1 COMPARISON

In this report, we explore the story of an animation project with themes of friendship and unity, discussing animation and rendering. Below nicely displays the growth and bonding, between characters. Detailed character modeling aimed to capture realism and unique features while complex texturing techniques breathed life into them.

The combination of elements enhanced the project by effectively conveying emotion and interaction. As a result, we have an animation that visually and thematically emphasizes the importance of friendship and unity. An impressive animation that resonates with emotion. The evolution of the characters reflected their attention to design enhanced by the texturing that made them relatable. In short, the integration of these elements highlighted the themes of friendship and unity that elevated the animation as a deep and moving experience.

CHAPTER 7

CONCLUSION

Animation and rendering are two essential processes in creating a 3D animated short film. Animation is the process of giving life and movement to 3D models and scenes. Rendering is the process of creating final images and videos from 3D data. Accomplishing both tasks requires a lot of skill, creativity and technical know-how.

For our project story, "The Perfect Pair", we used Autodesk Maya as our main software for animation and rendering. Maya is a powerful and versatile 3D software that allows us to create realistic characters and effects for animation, visual effects and games. We used Maya to model, rig, animate, simulate, render and composite our 3D scenes. We also use some other software and tools to enhance our workflow, such as Adobe Photoshop, Adobe Premiere Pro, Adobe Illustrator, Topaz Giga Pixel AI and MILANOTE.
Our story is about the friendship between a pencil and a pen, who are both anthropomorphic characters with facial expressions and body language. We wanted to express their emotions and personalities through animation and rendering. We used squash and stretch, anticipation, exaggeration and other principles of animation to make their movements more dynamic and interesting. We used shadows, lighting, texturing and color to make them look more realistic. During our animation and rendering process we faced some challenges and difficulties, such as managing the complexity of the scene, optimizing the performance of the software, fixing bugs and errors and meeting deadlines. We learned a lot from our experience. For example: improving our technical skills, enhancing artistic vision, collaborating with team members and solving problems creatively.

We have successfully completed our final animation. Which is a 2 minute 3D animated short film which is a story of friendship and understanding we hope viewers enjoy watching it as much as we enjoyed making it. We also hope that our project will inspire other animators and render artists to follow their passion and create their own stories.

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