Hard Surface 3D Modeling (Portal of Time Travel, Power Generator, Metal Hour Glass)

BY

IMRAN HOSSAIN FAHAD

ID: 191-40-558

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

Supervised By

MR. KAJI JAHID HASAN

Lecturer

Department of Multimedia and Creative Technology
Daffodil International University

DAFFODIL INTERNATIONAL UNIVERSITY

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APPROVAL

This Project titled **"Hard Surface 3D Modeling (Portal of Time Travel, Power Generator, Metal Hour Glass)"**, submitted by Imran Hossain Fahad to the Department of Multimedia and Creative Technology, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Multimedia and Creative Technology and approved as to its style and contents. The presentation has been held on 27 February, 2023.

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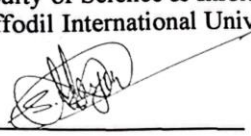

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Jahangirnagar University

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I hereby declare that, this project has been done by me under the supervision of **Mr. Kazi jahid Hasan, Lecturer, Department of Multimedia and Creative Technology,** Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for award or any degree or diploma.

Supervised by:

Jahid

Mr. Kazi Jahid Hassan
Lecturer
Department of Multimedia and Creative Technology
Daffodil International University

Submitted by:

Imran Hossain Fahad
ID: 191-40-558
Department of Multimedia and Creative Technology
Daffodil International University

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Finally, I must acknowledge with due respect the constant support and patients of my parents.

ABSTRACT

3D modeling is the process of creating a three-dimensional representation of an object or scene using specialized software. This technology allows for the creation of highly detailed, realistic and interactive 3D models that can be used for a variety of purposes, such as video game development, film production, architectural visualization, product design, and more.

3D modeling typically involves creating a digital model of an object by defining its shape, texture, and other characteristics using specialized software. This can be done through a variety of techniques, such as polygonal modeling, NURBS modeling, or sculpting. Once a 3D model is created, it can be manipulated and viewed from any angle, and can be exported to other applications for further processing or integration into a larger project.

3D modeling is an important tool in many industries, from engineering and architecture to entertainment and advertising, and has revolutionized the way that products are designed, developed, and marketed.

I choose this topic for my defense project because I feel lot of interest in 3D modeling. I will describe top to bottom of **the pipeline of 3D hard surface modeling.**

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION

This project has several parts. In this chapter firstly I will introduce 3D and 3D hard surface modeling. Then I will discuss my workflow, used software, used materials, modeling production pipeline and etc.

1.1 3D Modeling Pipeline

To Design a 3D model, designer have to follow the pipeline of the 3D Modeling.
The 3D modeling pipeline is a series of steps or stages that are followed in order to create a 3D model. Here is a general overview of the 3D modeling pipeline:

- **Concept and Design:** The first stage of the 3D modeling pipeline involves creating a concept or design for the 3D model. This could involve sketching out ideas on paper or using 2D drawing software to create detailed designs.

- **Modeling:** Once a design has been finalized, the 3D modeling process can begin. The modeler will use 3D modeling software to create a digital representation of the object or scene. This involves creating a wireframe or mesh structure and then adding details such as textures and materials.

- **Texturing:** Once the model has been created, the next step is to add textures to it. This involves mapping 2D images onto the surface of the 3D model, giving it a more realistic look and feel.

- **Lighting and Rendering:** After the model has been animated, it can be lit and rendered. This involves adding lights to the scene and rendering out the final images or video.

- **Post-Production:** Finally, the rendered images or video can be edited in post-production software to add special effects, compositing, and color grading.

The specific steps in the 3D modeling pipeline can vary depending on the project and the software being used, but this general overview provides a good understanding of the process.

1.2 Early Story of 3D

The early story of 3D dates back to the 1960s, when computer graphics was in its infancy. In 1963, Ivan Sutherland created Sketchpad, which was one of the first computer graphics programs. Sketchpad allowed users to draw on a computer screen using a light pen, which was a significant advancement at the time.

In the early 1970s, Ed Catmull and his colleagues at the University of Utah created the first 3D computer graphics. They developed a system called "RenderMan" that was used to create the first 3D computer-generated movie, "Star Trek II: The Wrath of Khan." RenderMan was later used to create other groundbreaking movies such as "Toy Story" and "Jurassic Park."

In the 1980s and 1990s, 3D graphics became more widely used in industries such as architecture, product design, and video games. The first 3D modeling software programs were developed, including AutoCAD and 3D Studio, which are still widely used today.

As computer technology advanced, 3D graphics became more sophisticated and realistic. The development of new techniques such as ray tracing, texture mapping, and global illumination allowed for more accurate simulations of light and materials. This led to the creation of increasingly realistic 3D models and environments.

Today, 3D graphics are ubiquitous in industries ranging from film and television to product design and video games. Advancements in virtual reality and augmented reality are pushing the boundaries of 3D technology even further, allowing for more immersive and interactive experiences.

1.3 Modern Day 3D Industry

The modern-day 3D industry is thriving and continues to grow rapidly. With the widespread adoption of 3D technology in various industries, the demand for 3D artists and professionals is increasing. Here are some key areas where 3D technology is being used today:

1. **Game Industry:**

The gaming industry is changing constantly with bigger and better graphics being brought to gamers. Any game art studio worth its name will use 3D modelling to create realistic images of characters and animation which helps them create better games for the public. The life-like unique characters that 3D modelling makes possible is what modern gaming uses to keep gamers hooked! It is easy to get addicted to a great game because of the hyper-realistic environment that 3D makes possible.

Figure 1.3: 3D game

2. **Film Industry:**

One of the main reasons why 3D movies became so appealing to the audiences was because we movie buffs want a cinematic experience and not just a movie we can watch from the bare eyes. This is where 3D filmmaking overtakes. It is the art of giving viewers a third-dimensional illusion. In fact, it makes you feel like you are in a different universe altogether, and all those characters in the movie feel a lot closer than they actually are.

Figure 1.3: 3D animated movie

3. Engineering Industry:

To gain approval on any project, an engineer needs to present their ideas visually, and that thing is possible with the help of 3D models. It assists engineers at every stage, from designing to conception to presenting in front of others. The popularity of 3D modeling is growing tremendously among the engineering community. However, most engineers are still not fully aware of how to include these 3D models in their designing stages and find it difficult to upgrade their engineering skills.3D modeling adds dimensions and parameters to specific engineering calculations, and the latest software helps in performing functions, programs and the like, on those values. In fact, they build real engineering knowledge into models.

Figure 1.3: 3D Machine Model

4. AR & VR Industry:

We can view a 3D model of your project in Augmented Reality (AR). The model will be displayed in a real-world environment. If we are talking about a house, we can see it from outside or have a walk inside it by choosing different scales of the 3D model.

Figure 1.3: AR And VR Technology with 3D

5. 3D Printing Industry:

3D printing or additive manufacturing is a process of making three dimensional solid objects from a digital file. The creation of a 3D printed object is achieved using additive processes. In an additive process an

object is created by laying down successive layers of material until the object is created. Each of these layers can be seen as a thinly sliced cross-section of the object.3D printing is the opposite of subtractive manufacturing which is cutting out / hollowing out a piece of metal or plastic with for instance a milling machine.

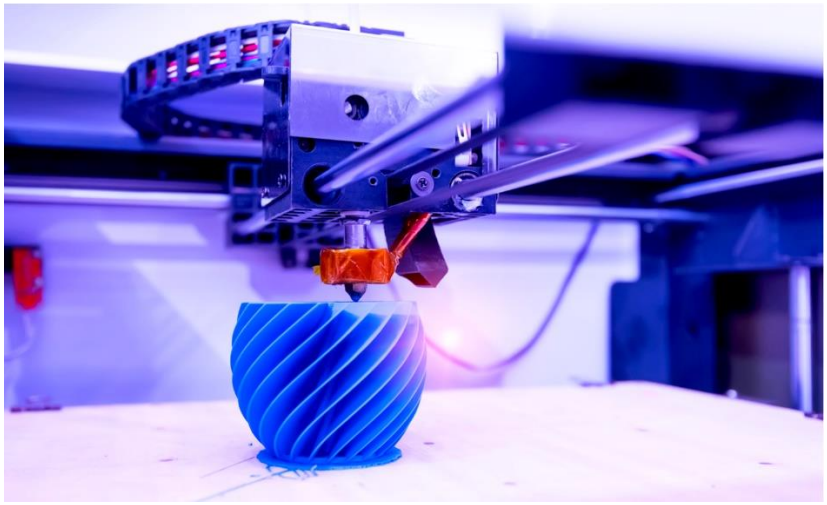


Figure 1.3: 3D Printing

6. Architecture Industry:

3D modeling software is widely used in the architecture and construction industries for visualizing and designing buildings and structures. This allows architects and designers to create accurate and detailed models that can be viewed from different angles.

Figure 1.3: 3D Architectural Model

CHAPTER 2: HARD SURFACE 3D MODELING

3D hard surface modeling is a technique used in computer graphics to create detailed, geometrically complex models of hard, man-made objects, such as machines, vehicles, weapons, and buildings. Hard surface models are characterized by their precise, angular shapes and sharp edges, as opposed to organic or natural forms.

To create a 3D hard surface model, an artist or designer uses specialized 3D modeling software like 3ds Max, Maya, Blender and many more to create a digital representation of the object. This involves creating a series of interconnected polygons that define the shape of the object, as well as its surface texture and other details.

Hard surface modeling requires a high level of technical skill and attention to detail, as it involves creating complex shapes and intricate details that must be accurate and precise. The resulting models can be used in a wide range of applications, including film and video game production, product design, architecture, and engineering.

2.1 Terminology of Hard Surface Modeling

1. Topology:

In 3D modeling, topology is important because it affects the model's efficiency, appearance, and performance. A good topology is one that has a balanced distribution of polygons, with edges and vertices placed strategically to create a smooth, clean surface. It also enables the model to deform and animate realistically without any distortion or artifacts.

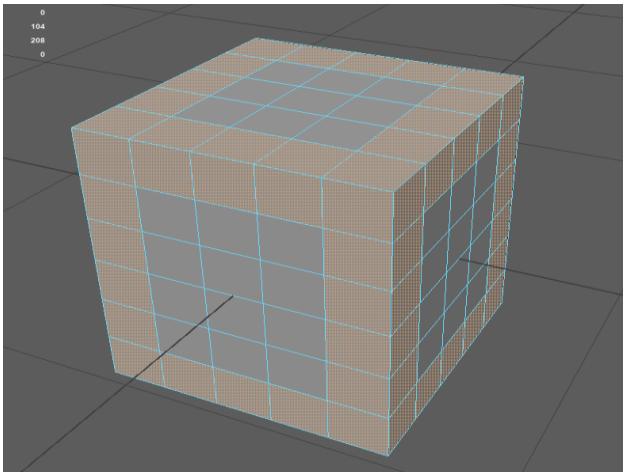


Figure 2.1: Good Topology

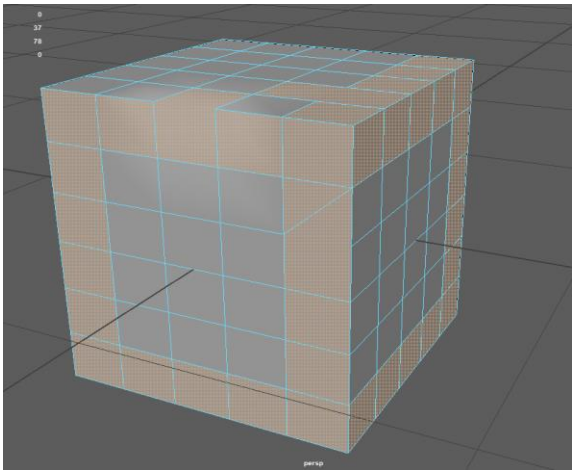


Figure 2.1: Bad Topology

2. Edge loop:

An edge loop is a continuous sequence of connected edges that form a closed loop around a 3D model. Edge loops are an important element of topology in 3D modeling, as they help to define the shape and structure of a model.

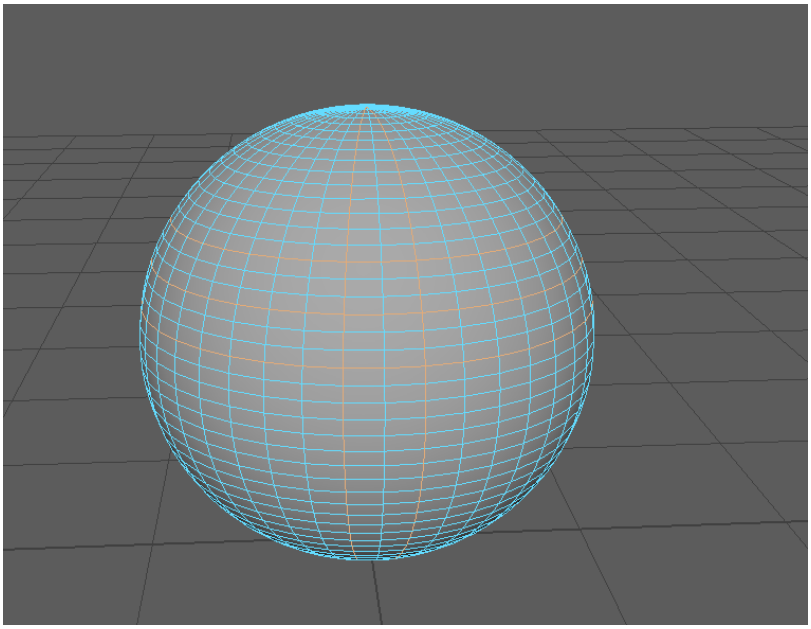


Figure 2.1: Edge Loop

3. Vertex Loop:

A vertex loop is a continuous sequence of connected vertices that form a closed loop around a 3D model. Like edge loops, vertex loops are an important element of topology in 3D modeling, as they help to define the shape and structure of a model.

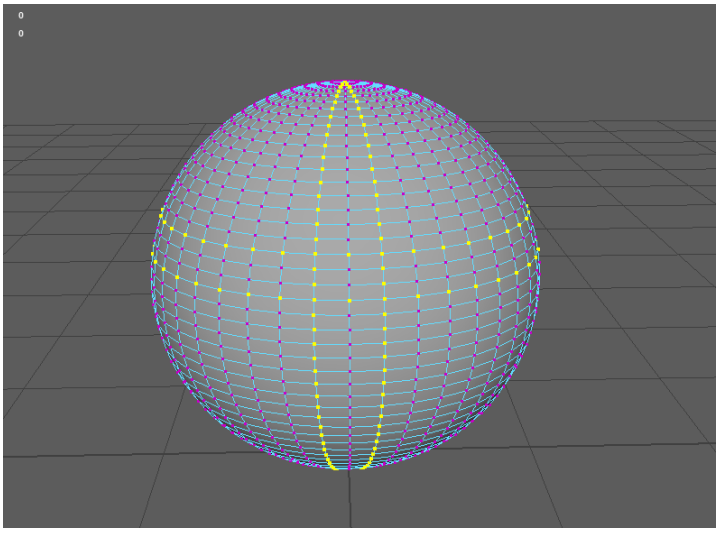


Figure 2.1: Vertex Loop

4. Supporting Edge:

A supporting edge is an edge in a 3D model that helps to define and maintain the shape of the model by supporting its topology. Supporting edges are often added to a model to create sharper edges or creases, or to prevent distortion when the model is animated or deformed.

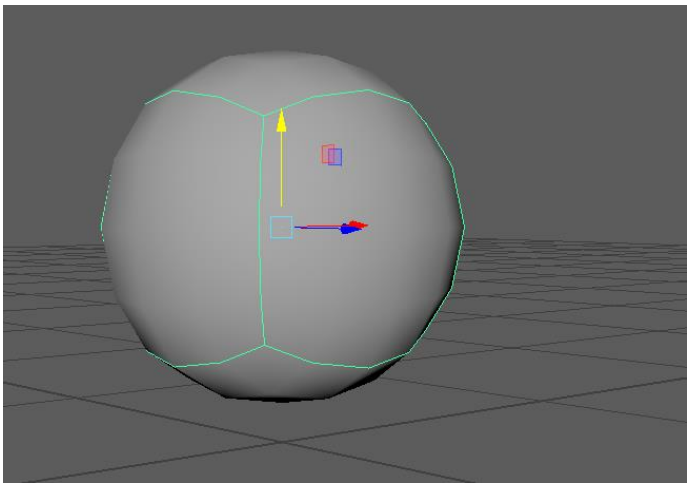


Figure 2.1: Without Supporting edge spoiled poly shape.

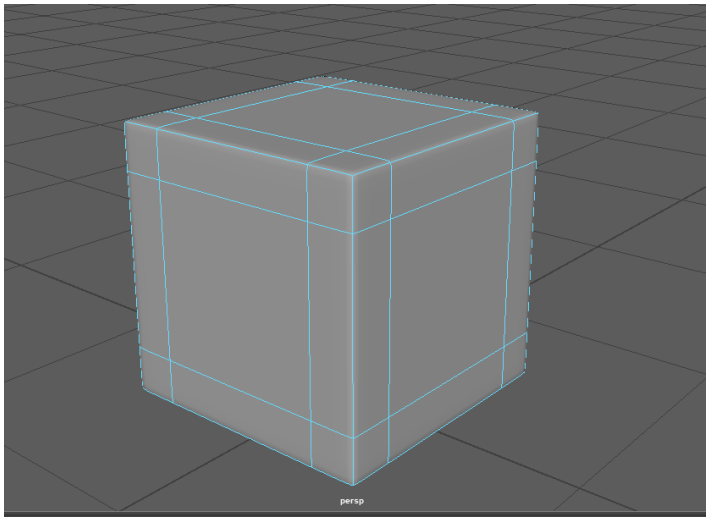


Figure 2.1: With Supporting edge Good mesh.

5. **Bevel:**

Bevel is a tool used to create smooth, rounded edges on a 3D model. Beveling is a common technique in 3D modeling, as it can help to create more natural and realistic shapes, and add depth and dimensionality to a model.

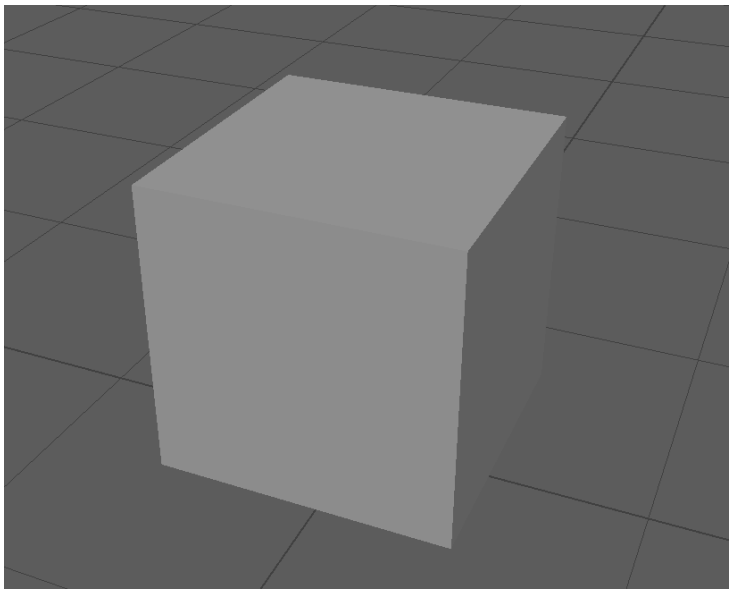


Figure 2.1: Without Bevel Sharp Mesh

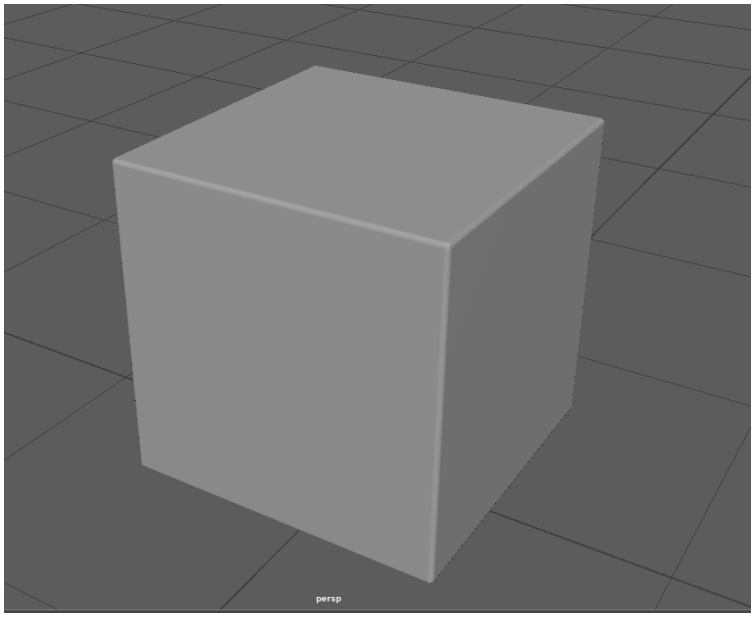


Figure 2.1: After Bevel Smooth Edge

6. **Circularize :**

Circularize is a tool used to create a circular shape by evenly distributing the vertices of a 3D model around a center point. This can be useful for creating objects with a cylindrical or circular shape, such as wheels, gears, or pipes.

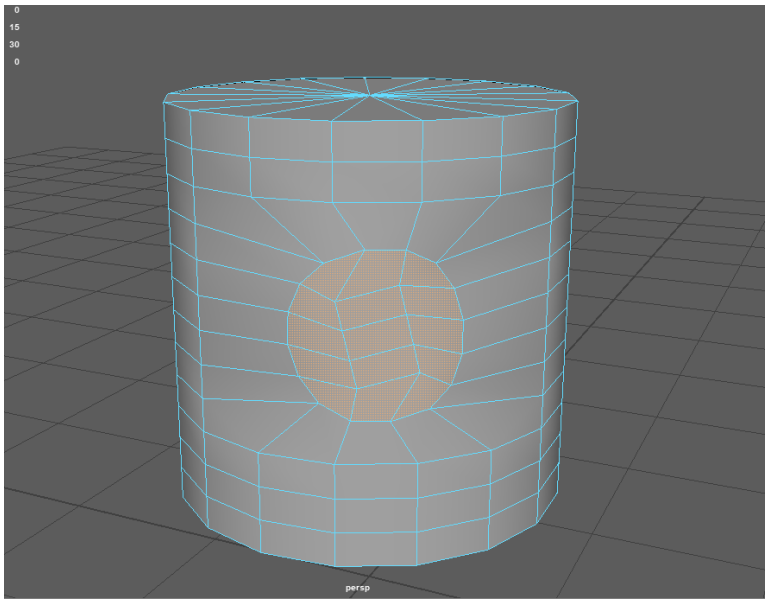


Figure 2.1: Circularize in mesh

7. Extrude:

Extrude is a tool used to create new geometry by extending an existing face, edge, or vertex of a 3D model. The extrude tool is a commonly used tool in 3D modeling, as it allows you to add depth and dimensionality to a model and create new forms and shapes.

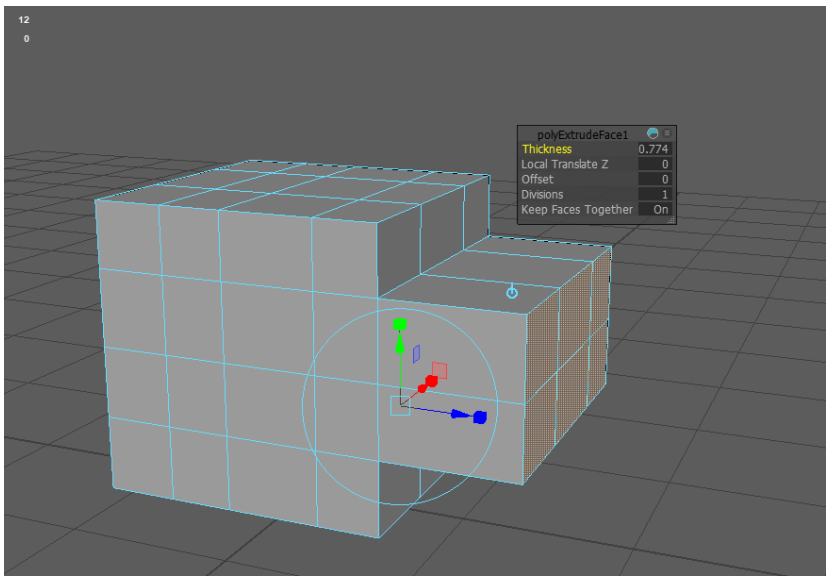


Figure 2.1: Extrude for making a new shape

8. Soften Edge :

Soften edge is a tool used to smooth the edges of a 3D model without adding any additional geometry. Softening an edge can help to create a more natural and organic look to a model, as it removes the sharp and jagged appearance of the edges.

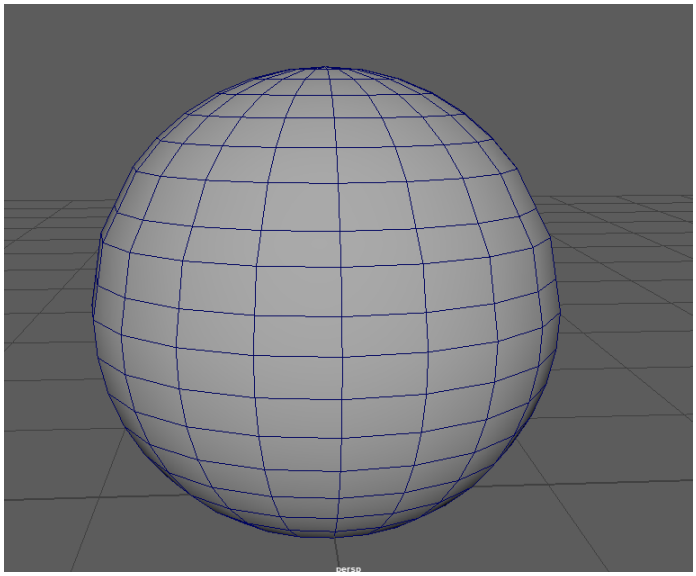


Figure 2.1: Hard edge

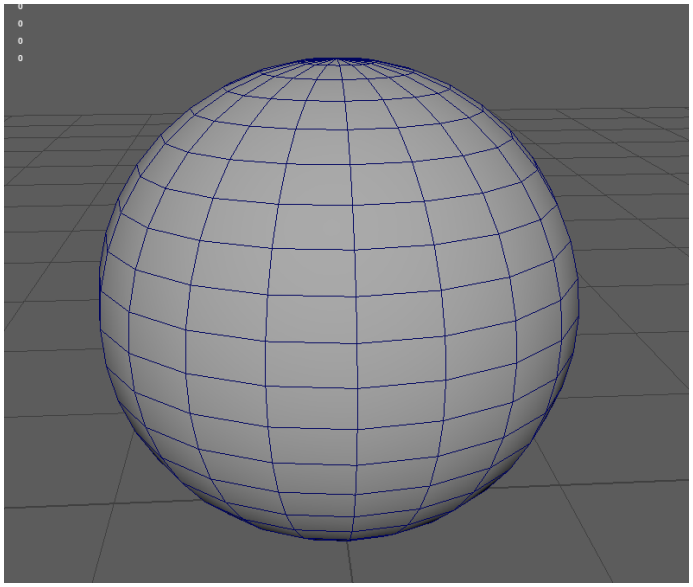


Figure 2.1: After soften the edges.

9. Bridge:

Bridge tool is a modeling tool used to connect two or more edges or curves with a set of new faces. The Bridge tool is commonly used to create complex structures and geometries in 3D models, such as bridges, tunnels, and archways.

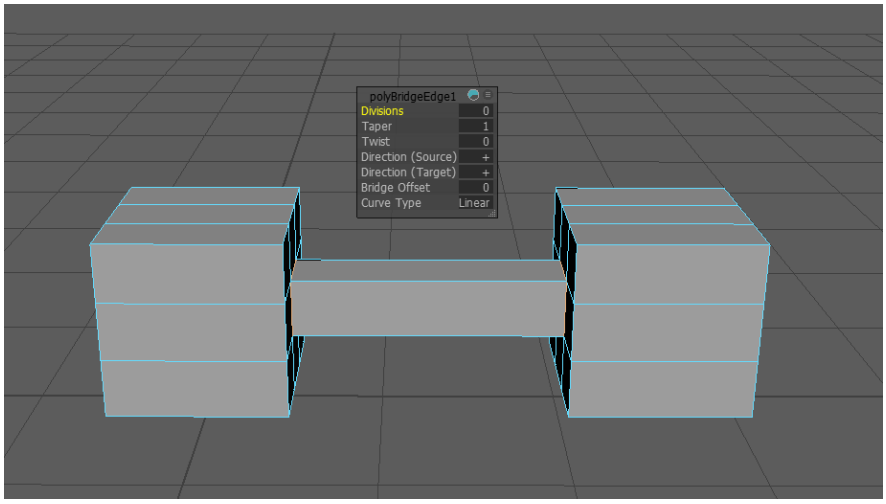


Figure 2.1: Bridge between two mesh

10. Multi cut:

Multi cut tool is a modeling tool used to cut multiple edges or faces at once, allowing for more precise control over the shape and topology of a 3D model. The Multi cut tool is commonly used to create new edges or loops on a model, and to make more complex cuts and adjustments to the geometry.

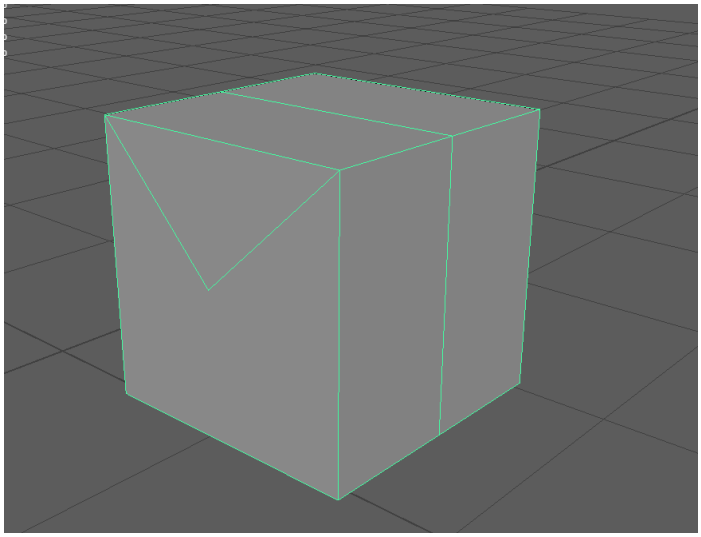


Figure 2.1: Multicut

11. Target wield :

Target Weld is a modeling tool used to merge vertices of a 3D model onto a target vertex. This can be useful when creating organic or smooth shapes that require the vertices to be merged seamlessly, without leaving any gaps or overlaps.

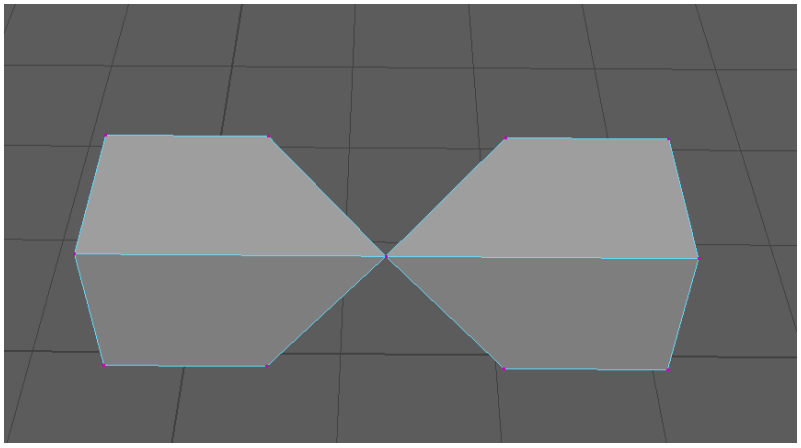


Figure 2.1: Target Wield

12. Duplicate:

Duplicate tool is a modeling tool used to create an exact copy of an existing object or selection. This can be useful when creating duplicates of a 3D model for different purposes, such as creating multiple versions of a character or object with slight variations.

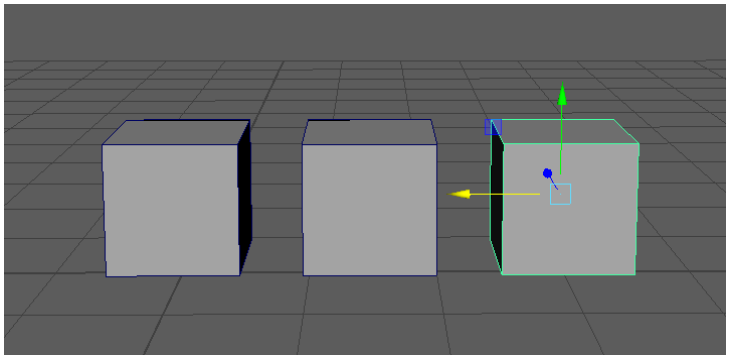


Figure 2.1: Duplicate

13. Deform:

Deform tool is a modeling tool used to modify the shape of a 3D object by applying various deformation methods, such as bending, twisting, or stretching. The Deform tool can be used to create a variety of effects, such as creating smooth curves or wrinkles in a surface, or creating more complex shapes and forms.

There are various kind of deform. As example:

Bend: This tool bends an object along a curve or an axis, allowing you to create smooth curves or twisted shapes.

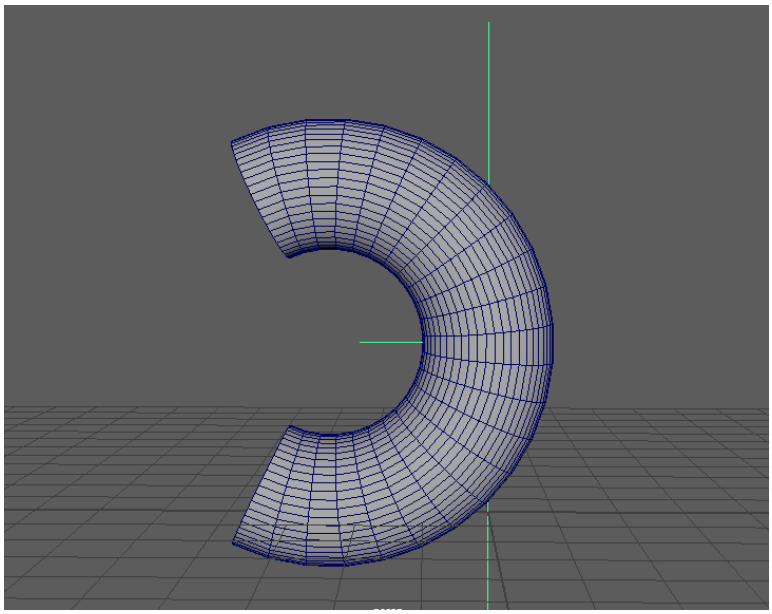


Figure 2.1: Bend

Twist: This tool rotates an object around its axis, allowing you to create twisted shapes and forms.

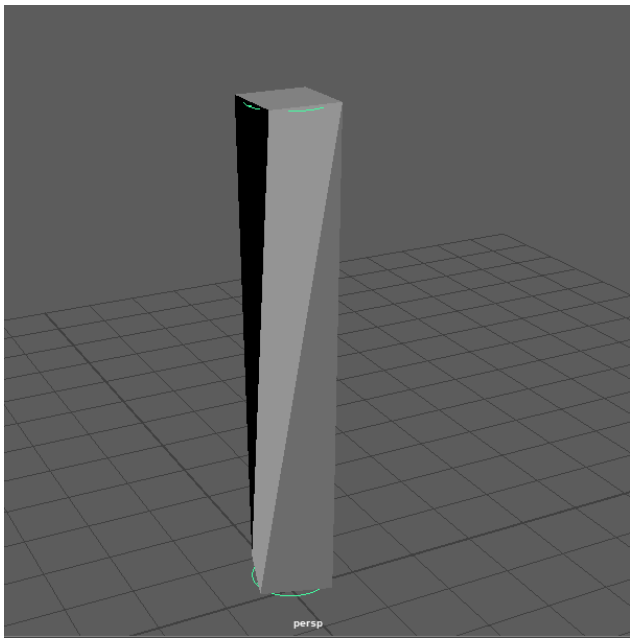


Figure 2.1: Twist

2.2 Types of Materials

1 Iron

2 Steel

3 Bronze

4 Glass

5 Wood

6 Plastic

7 Cloth

2.3 Bake Texture

Bake texture is a process used in 3D computer graphics to create a 2D texture map from the 3D information of a model. This process involves projecting the color, lighting, and other surface properties of a 3D object onto a 2D texture map, which can then be used to texture the object in a game or rendering engine.

The texture bake process can be used to create a variety of textures, such as diffuse maps, normal maps, displacement maps, and ambient occlusion maps. By baking textures, the 3D artist can create a more realistic and detailed final product, as the texture map can capture subtle details like surface roughness, reflections, and shadows that would be difficult or impossible to create manually

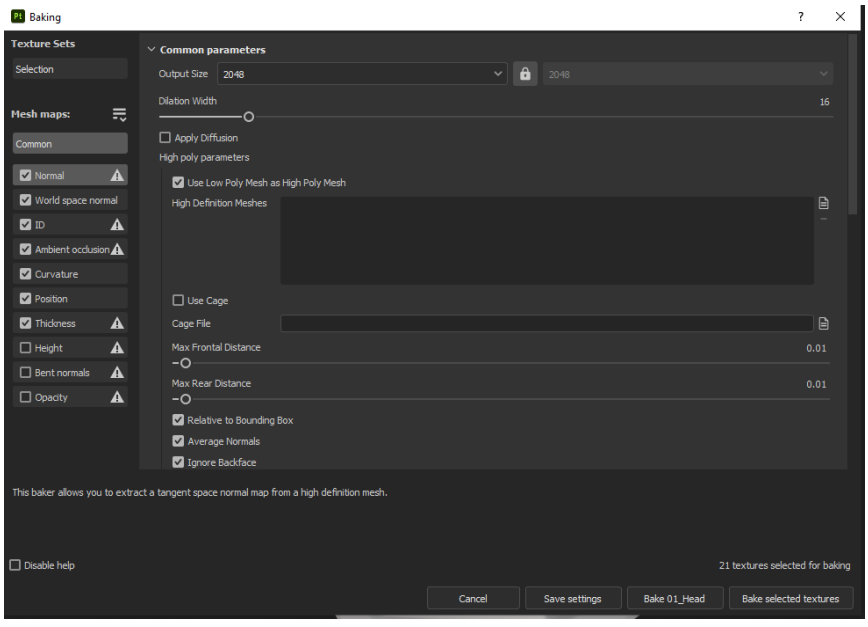


Figure 2.3: Texture baking Preset

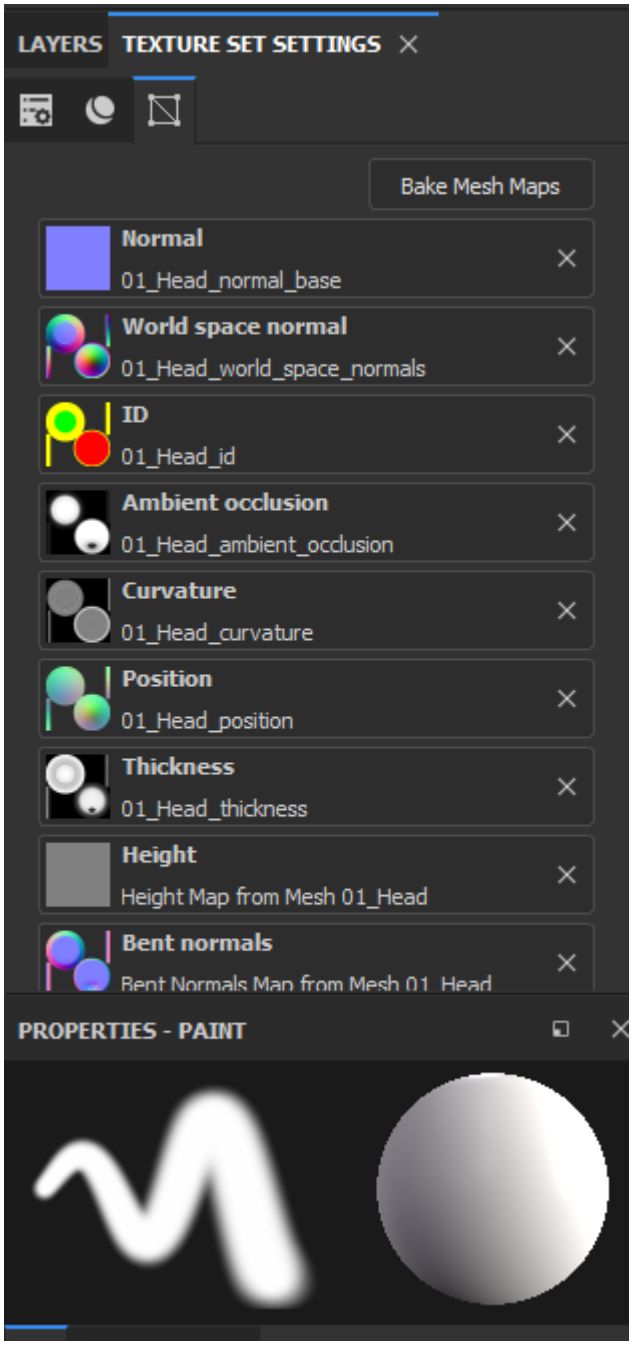


Figure 2.3: Texture baking map

2.4 Make Texture:

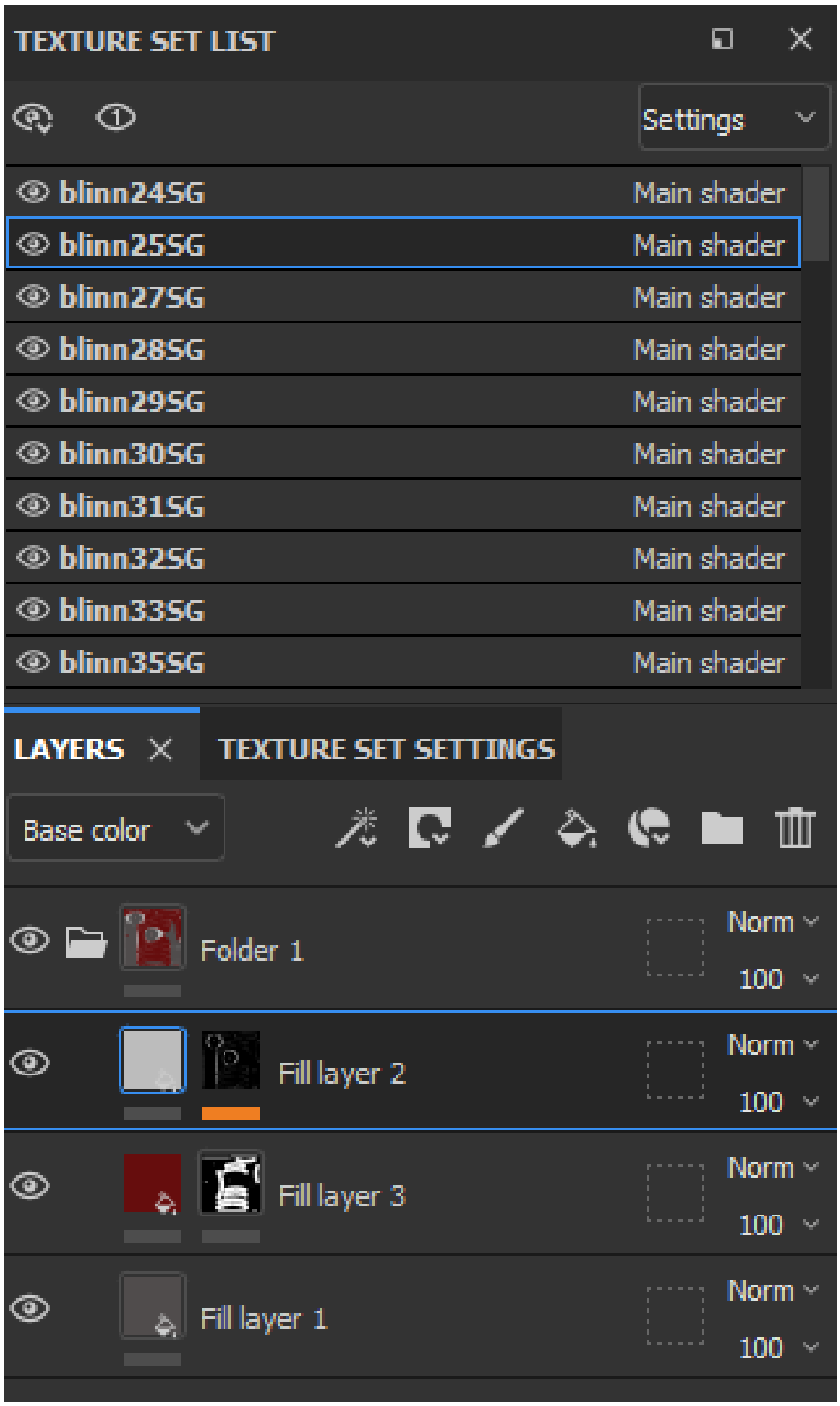


Figure 2.4: Texture Making preset

2.5 Rendering preset:

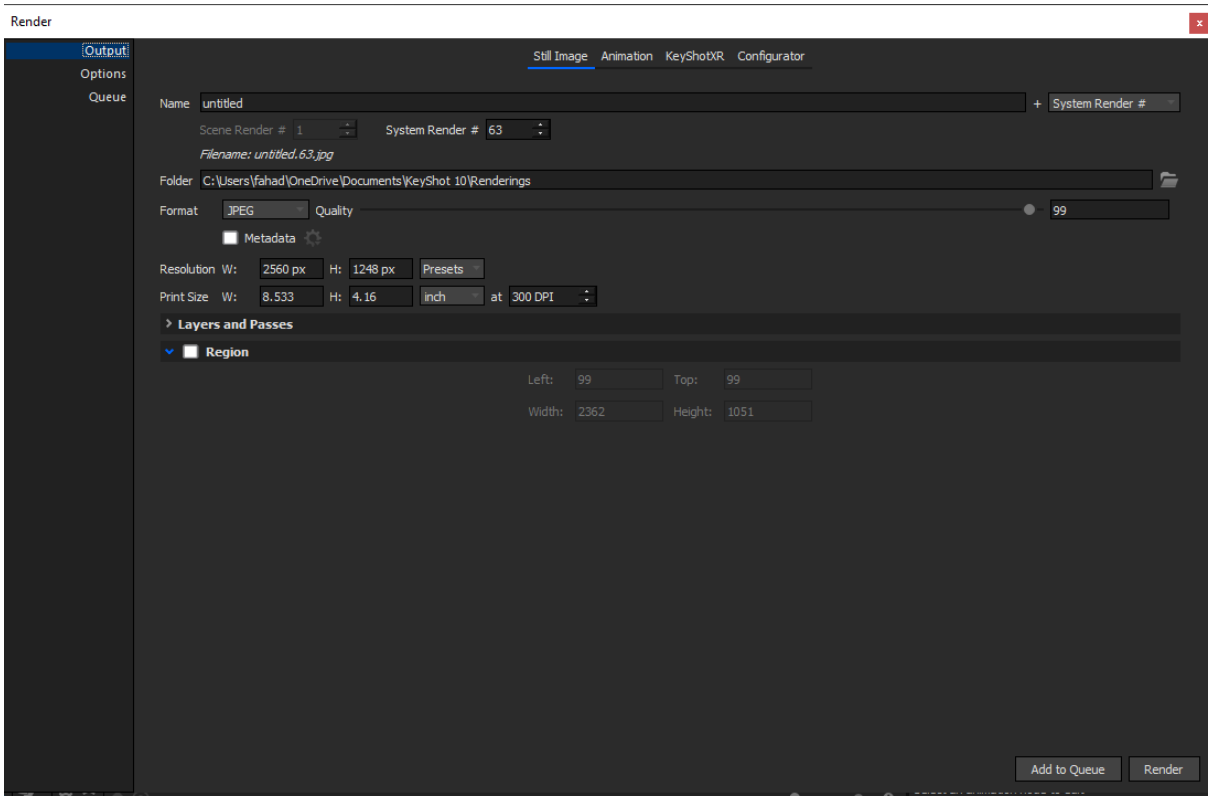


Figure 2.5: Rendering Preset

CHAPTER 3: USED SOFTWARE INTRODUCTION

3.1 Autodesk Maya:

Autodesk Maya is a 3D computer graphics software that is widely used for creating animations, visual effects, video games, and other 3D content. It was developed by Alias Systems Corporation, which was later acquired by Autodesk in 2005.

Maya provides a wide range of tools and features for 3D modeling, animation, texturing, lighting, and rendering. It is used by professionals in various industries, including film, television, video games, and advertising, as well as independent artists and hobbyists.

Some of the key features of Autodesk Maya include:

- 3D Modeling: Maya provides a range of tools for creating and editing 3D models, including polygon modeling, NURBS modeling, and subdivision surface modeling.
- Animation: Maya provides a powerful animation system that allows users to create keyframe animations, motion graphics, and character animations.
- Texturing: Maya allows users to apply textures and materials to their 3D models, including image-based textures, procedural textures, and shaders.
- Lighting: Maya provides a range of tools for creating and editing lights and shadows, including ambient lighting, directional lighting, and area lighting.
- Rendering: Maya provides a range of options for rendering 3D scenes, including software rendering and hardware rendering, as well as support for third-party rendering engines.

Maya also provides support for scripting and programming through its Maya Embedded Language (MEL) and Python scripting, which allows users to automate repetitive tasks and customize the software to their specific needs.

Overall, Autodesk Maya is a powerful and versatile tool for creating 3D content and is widely used in various industries for its rich features and capabilities.

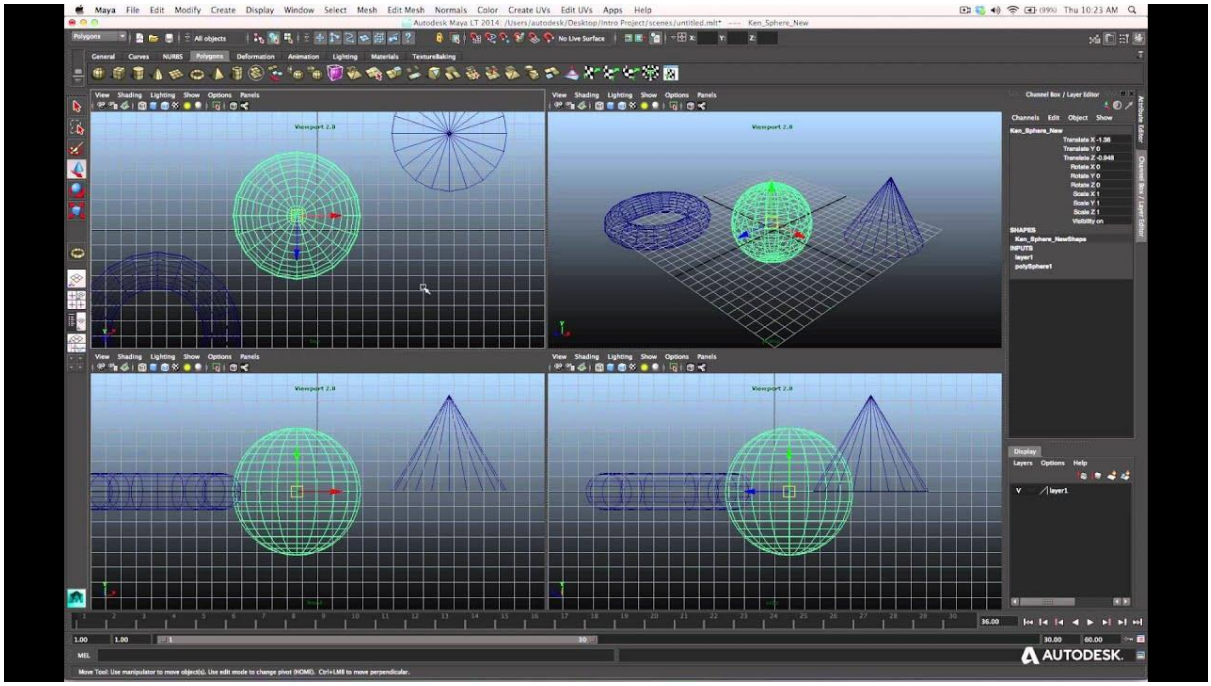


Figure 3.1: Autodesk Maya

3.2 Autodesk Maya UV Editor

The Autodesk Maya UV Editor is a tool used in 3D modeling to create and edit UV (texture) coordinates for 3D models. UV coordinates are used to map 2D textures onto 3D objects in a way that aligns the texture properly with the object's surface.

In Maya, the UV Editor can be accessed by opening the UV Editor window, which displays a 2D representation of the UV map for the selected object. In this window, the user can select and manipulate individual UV points, edges, or faces to adjust the mapping of the texture onto the object.

Some of the features of the Maya UV Editor include the ability to:

- Cut, sew, and stitch UV edges to create a continuous UV map
- Relax UVs to reduce stretching and distortion in the texture
- Scale, rotate, and translate UVs to adjust the texture mapping
- Apply different types of UV projections, such as planar, cylindrical, or spherical, to map the texture onto the object
- Use UV distortion tools to visualize and correct any issues with the UV mapping

The UV Editor is an important tool for creating high-quality textures for 3D models, and is widely used in industries such as game development, visual effects, and product design.

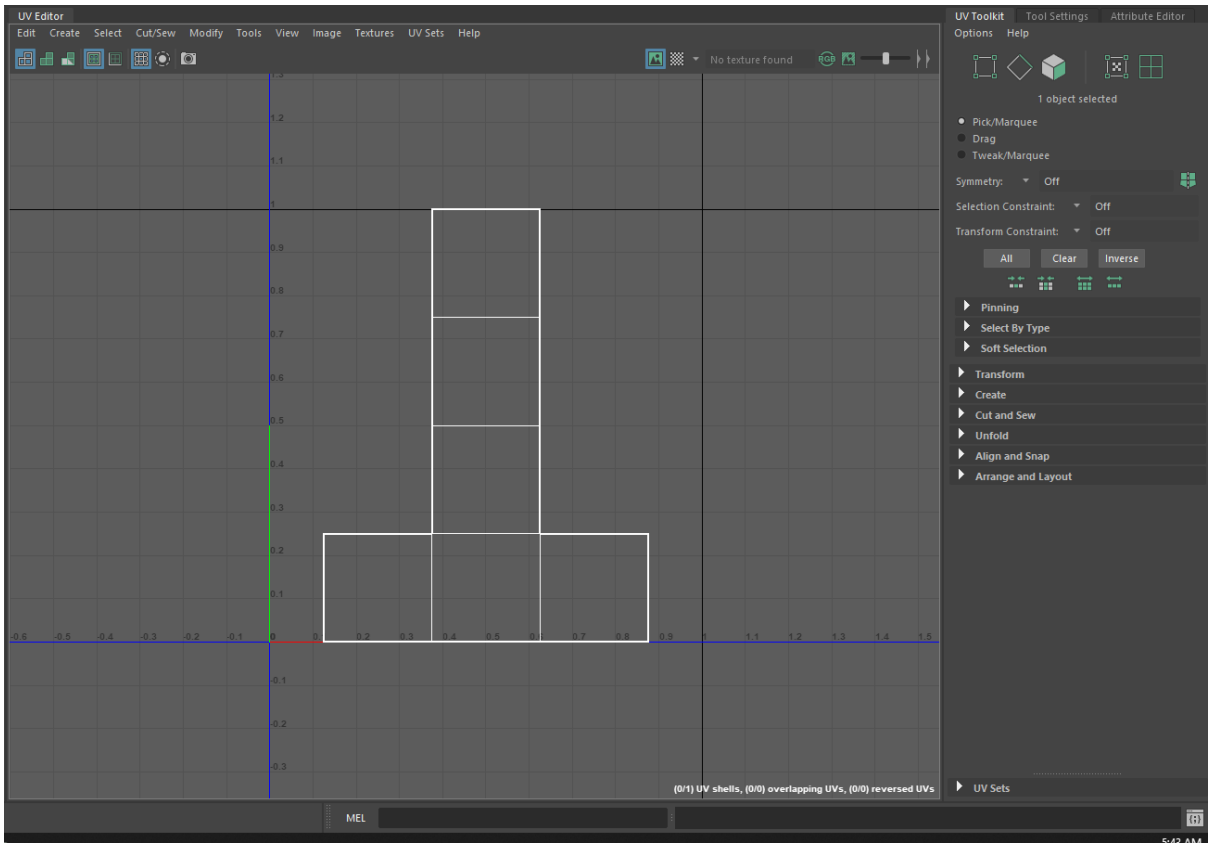


Figure 3.2: Autodesk Maya UV Editor

3.3 Adobe Substance Painter

Adobe Substance Painter is a 3D painting software that is used to create textures and materials for 3D models. It allows artists to create and apply textures to 3D models in real-time, making it possible to see how textures will look in a final render before the model is finished.

Some of the features of Substance Painter include:

- A user-friendly interface that makes it easy to paint textures on 3D models.
- Real-time feedback that allows users to see how the texture will look on the model as they work.
- Support for a wide range of 3D file formats, including OBJ, FBX, and Alembic.
- The ability to paint and edit textures using a variety of tools, including brushes, masks, and generators.

- The ability to work with a wide range of materials, including metals, plastics, and fabrics.
- The ability to create custom shaders and export them to other software applications.

Substance Painter is widely used in the game development, film, and visual effects industries to create high-quality textures and materials for 3D models. Its real-time feedback and wide range of tools make it a powerful tool for creating realistic textures that can enhance the look and feel of 3D models.

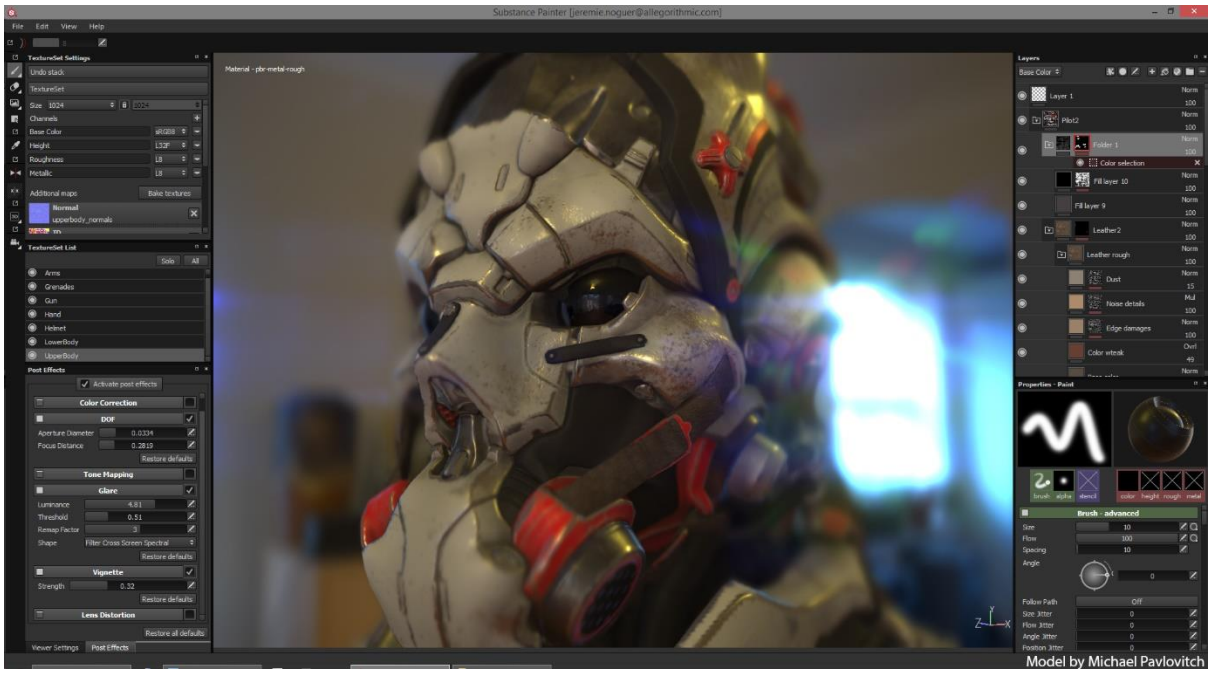


Figure 3.3: Adobe Substance Painter

3.4 Keyshot 10

KeyShot 10 is a 3D rendering and animation software that is used to create high-quality visuals of 3D models. It is known for its ease of use, fast rendering speeds, and advanced features that allow users to create photorealistic images and animations.

Some of the features of KeyShot 10 include:

- Real-time rendering: KeyShot 10 allows users to see how their 3D models will look in real-time as they make changes to lighting, materials, and camera angles.
- Advanced material creation: KeyShot 10 includes a wide range of materials and textures, as well as tools for creating custom materials and textures.

- Lighting and environment: KeyShot 10 includes a variety of lighting presets and environments, as well as the ability to create custom lighting setups.
- Animation: KeyShot 10 allows users to create animations of their 3D models, including camera animations and object animations.
- Integration with other software: KeyShot 10 can import 3D models from a wide range of software applications, including SolidWorks, Rhino, and SketchUp.
- Collaboration: KeyShot 10 includes features for collaborating on 3D models with other users, including real-time viewing and commenting.

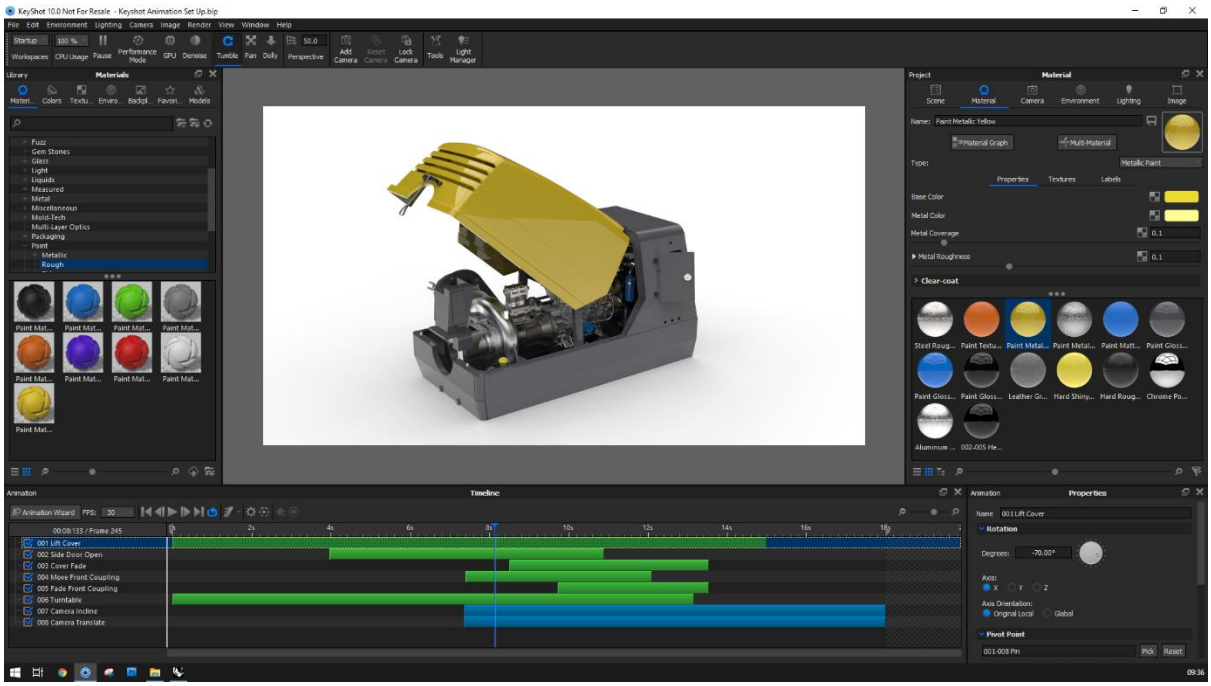


Figure 3.4: Keyshot 10

3.5 Adobe Photoshop CC

Adobe Photoshop is a raster graphics editor developed and published by Adobe Inc. for Windows and macOS. It was originally created in 1987 by Thomas and John Knoll. Since then, the software has become the most used tool for professional digital art, especially in raster graphics editing.

Photoshop can edit and compose raster images in multiple layers and supports masks, alpha compositing and several color models. Photoshop uses its own PSD and PSB file formats to support these features. In addition to raster graphics, Photoshop has limited abilities to edit or render text and vector graphics (especially through clipping path for the latter), as well as 3D graphics and video. Its feature set can be expanded by plug-ins; programs developed and distributed independently of Photoshop that run inside it and offer new or enhanced features.

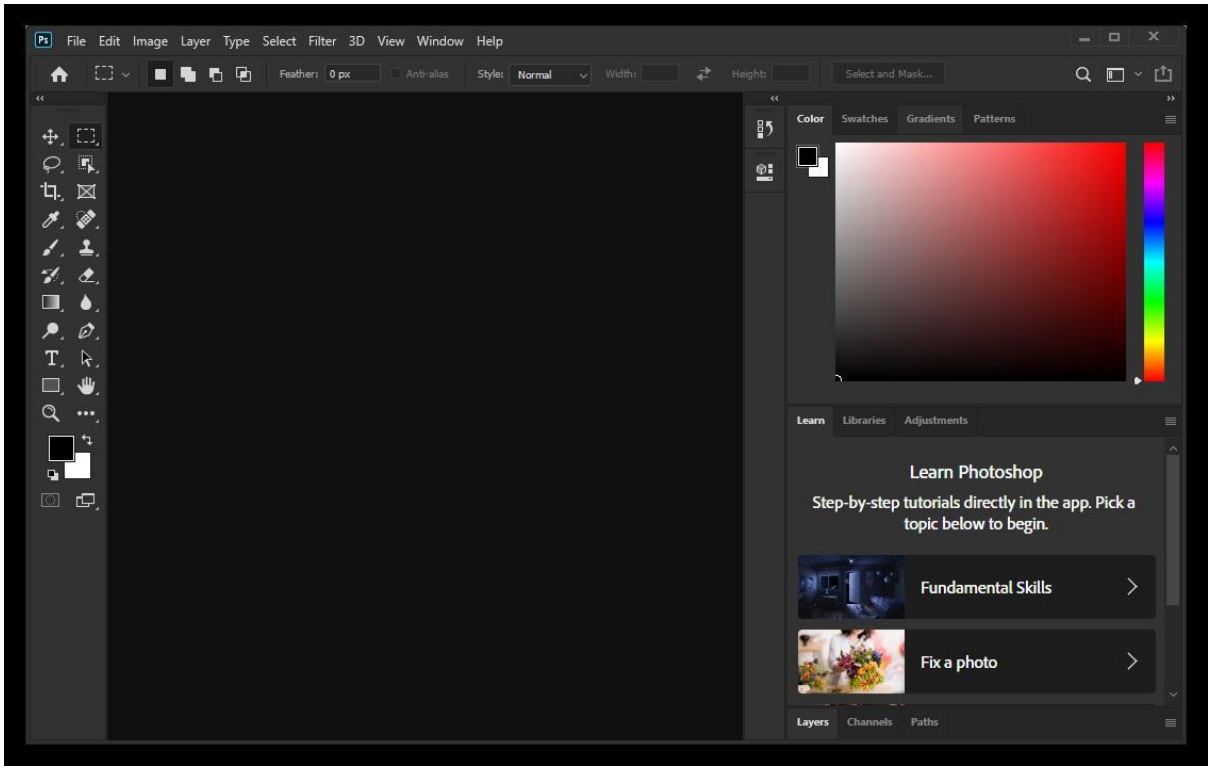


Figure 3.5: Adobe Photoshop CC

CHAPTER 4: PORTAL OF TIME TRAVEL PRESENTATION

4.1 Thought Process

As a huge fan of Marvel Cinematic Universe, I found a great interest on the time travel process in “Avengers End Game”. From that movie I generated the idea of my project “Portal of Time Travel”. In movie they used a big portal for travel between different time and different places. I generated a CG 3D model of that portal. I followed the hard surface modeling pipeline to complete my project. Now I’m going to give a brief of my working process to generate this CG 3D model below,

4.2 Pre- Production

4.2.1 Gather References

As it is a movie material so I couldn’t find any decent reference on internet or anywhere. So I took screenshot from the Movie “Avengers End Game”.

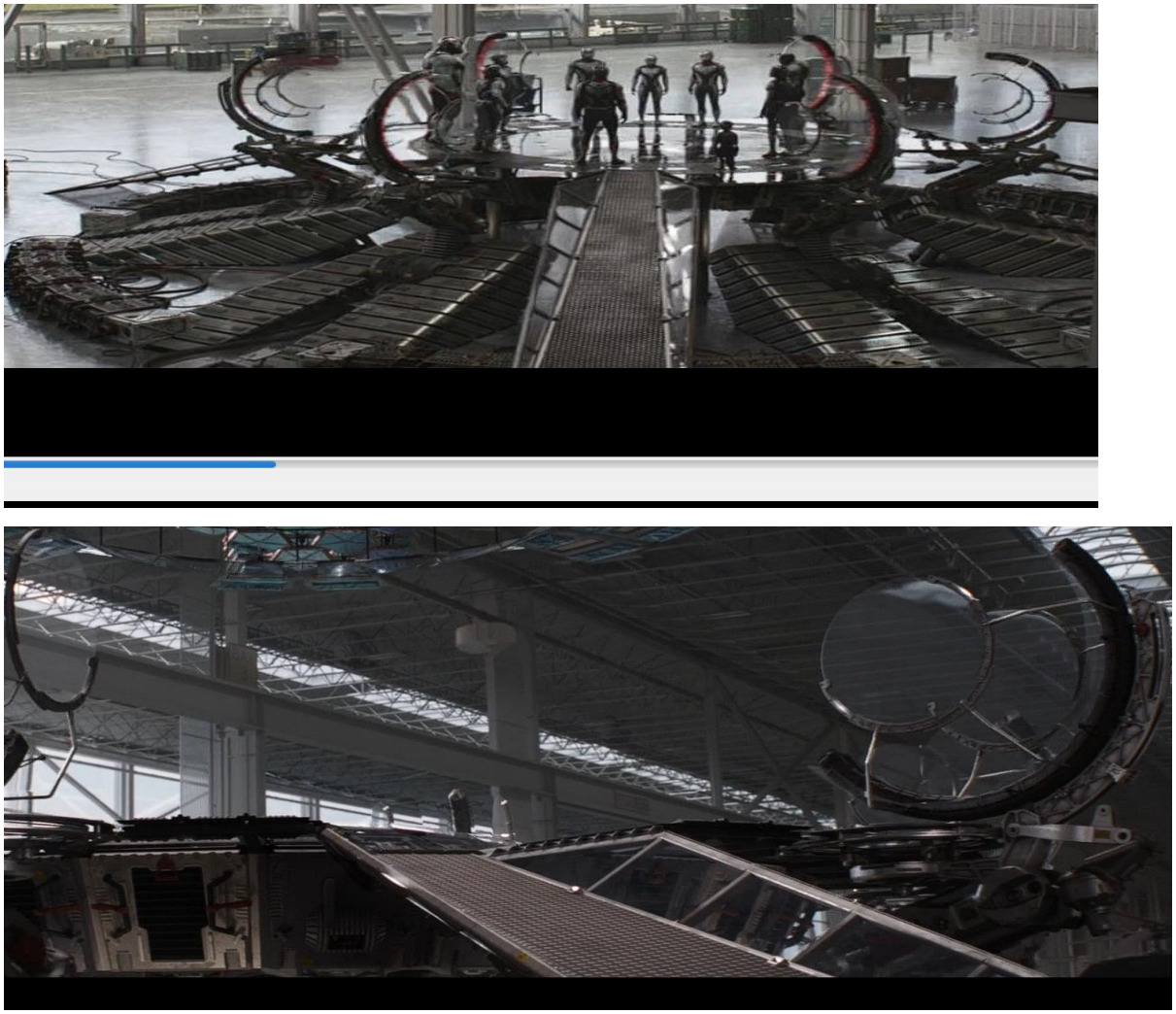


Figure 4.2: References from movie

4.2.2 Hand Sketch

As I didn’t find any clear reference so I ruffed some of the parts of this model by hand to help visualize the scene.

Figure 4.2 : Some Rough Sketch

4.3 Production

4.3.1 Modeling

Most challenging part of my “Portal of Time Travel” project was modeling part. As it is a hard surface model so I had to give more attention and effort for create every detailing in my model. I used “**Autodesk Maya 2020**” for modeling. I’m going to share my modeling experience of “Portal of Time Travel” below,

At first, I started my modeling from basic primitive’s shapes like,

1. Cube
2. Sphere
3. Cylinder
4. Plane
5. Torus

Then Step by step I made detail on the shapes by multiple tools like,

1. Topology
2. Edge loop
3. Vertex Loop
4. Supporting Edge
5. Bevel
6. Circularize
7. Extrude
8. Edge smoothing
9. Bridge
10. Multi cut
11. Target wield
12. Duplicate
13. Deform
14. Duplicate

15. Duplicate Special
16. Merge vertex
17. Reverse
18. Tweaking
19. And many more.

Now here I will share some picture of my modeling below,

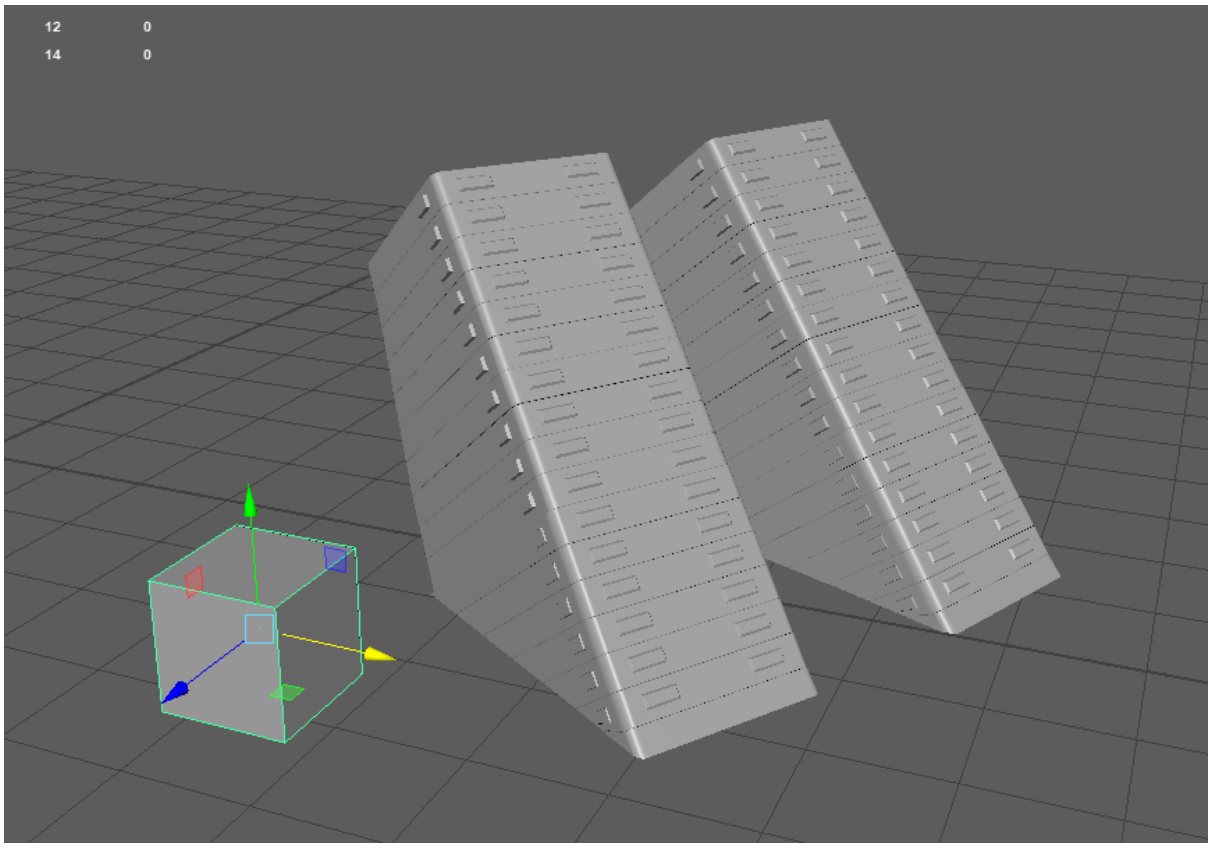


Figure 4.3.1: Model of Portal of Time Travel

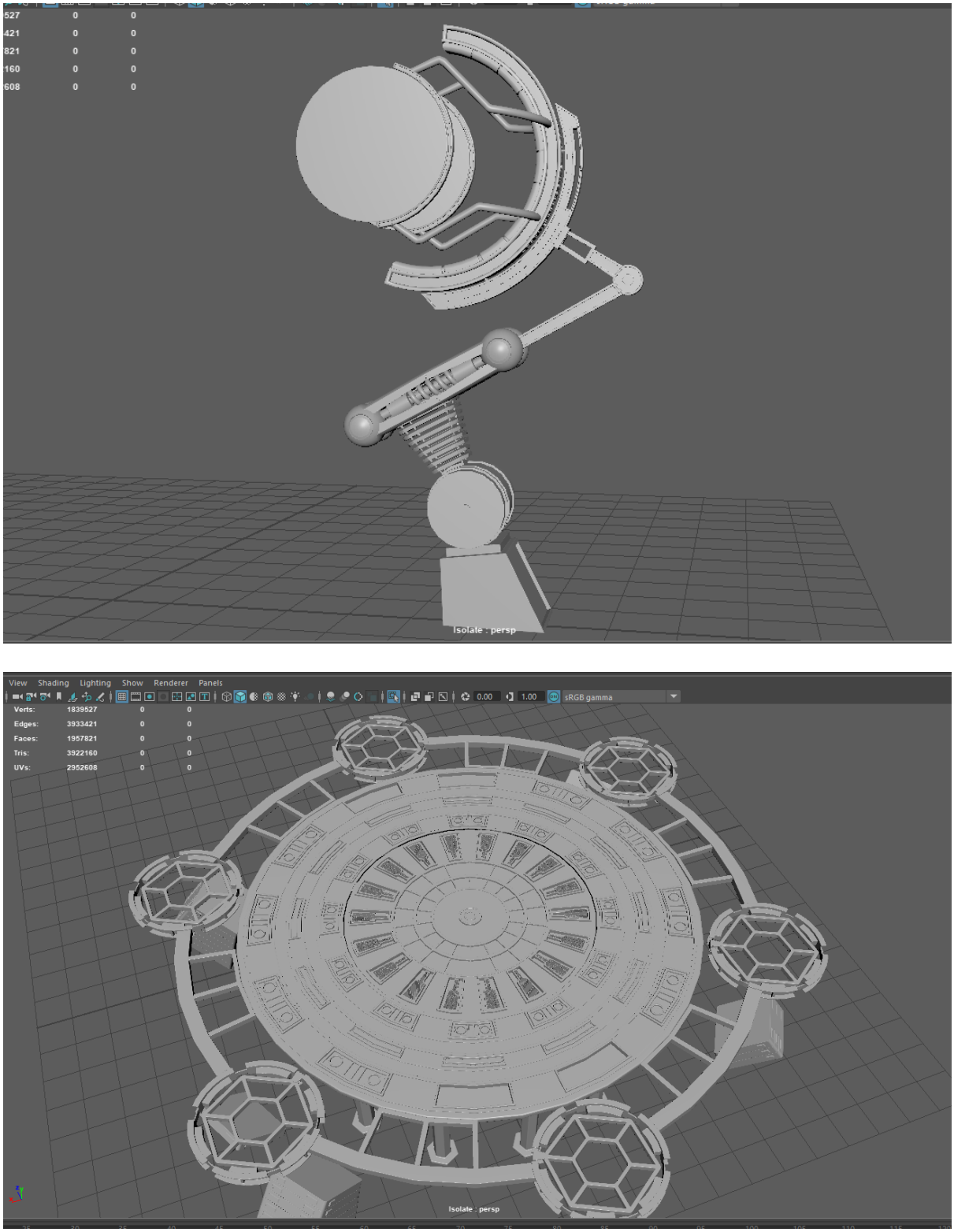


Figure 4.3.1: Model of Portal of Time Travel

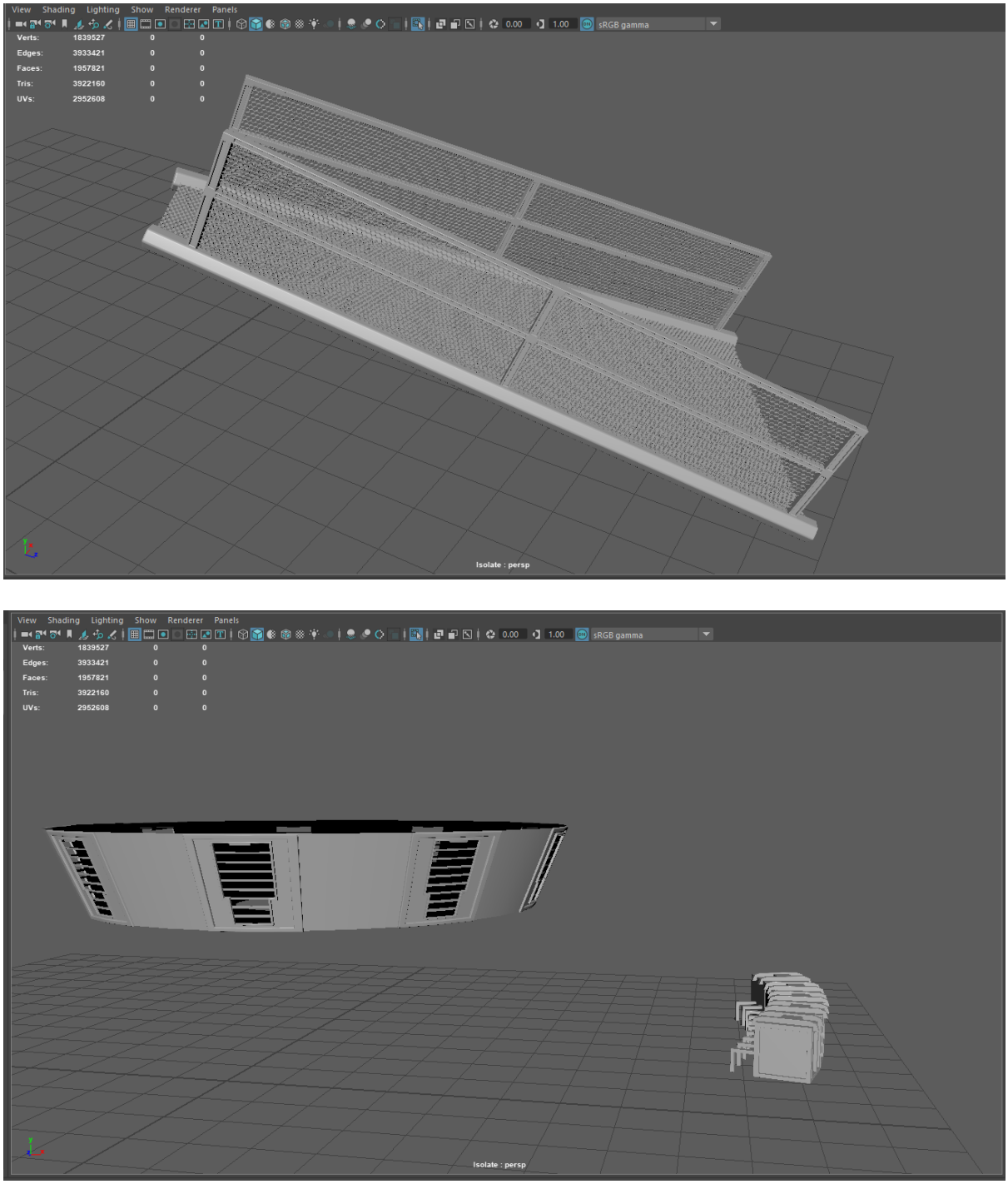


Figure 4.3.1: Model of Portal of Time Travel

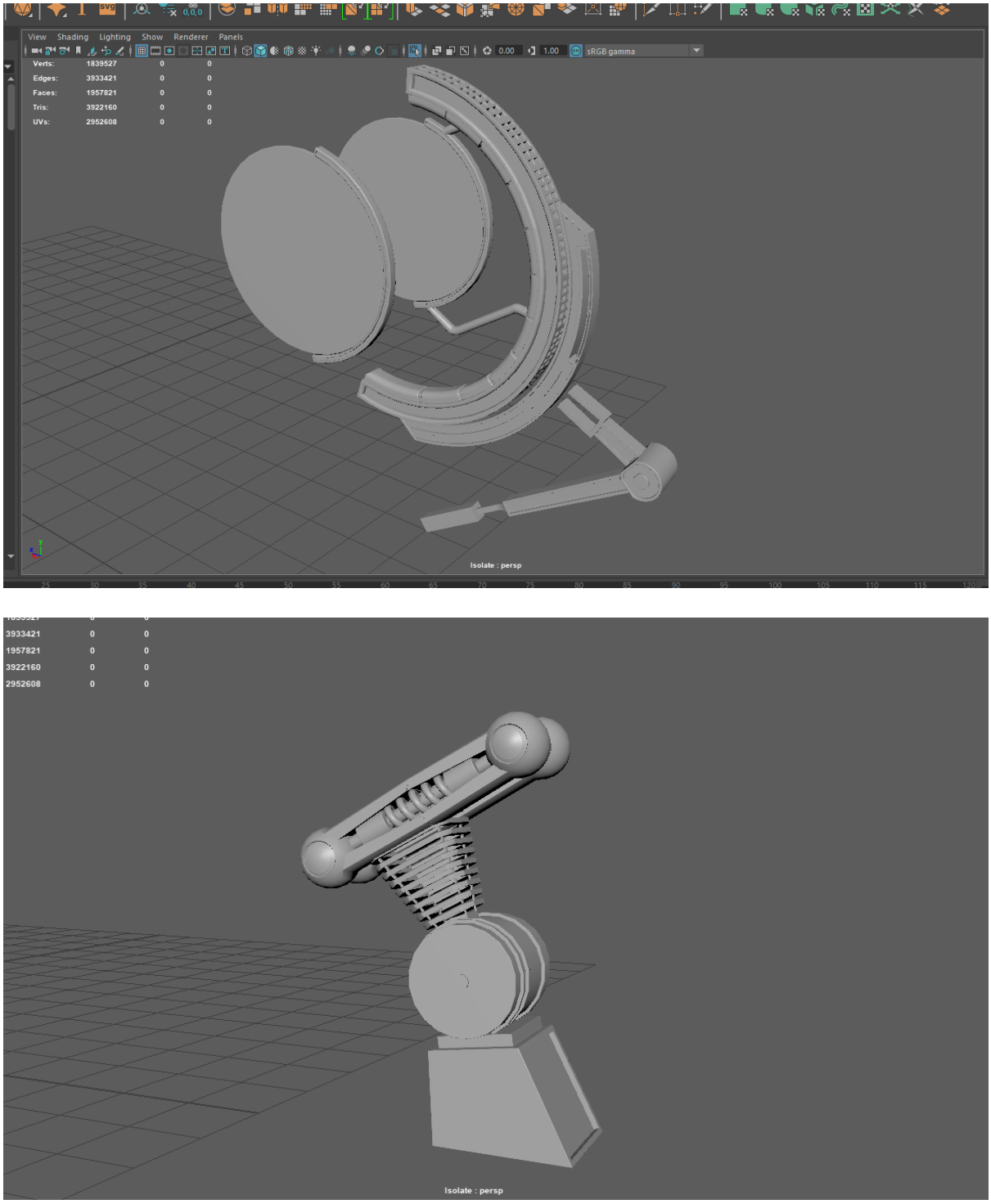


Figure 4.3.1: Model of Portal of Time Travel

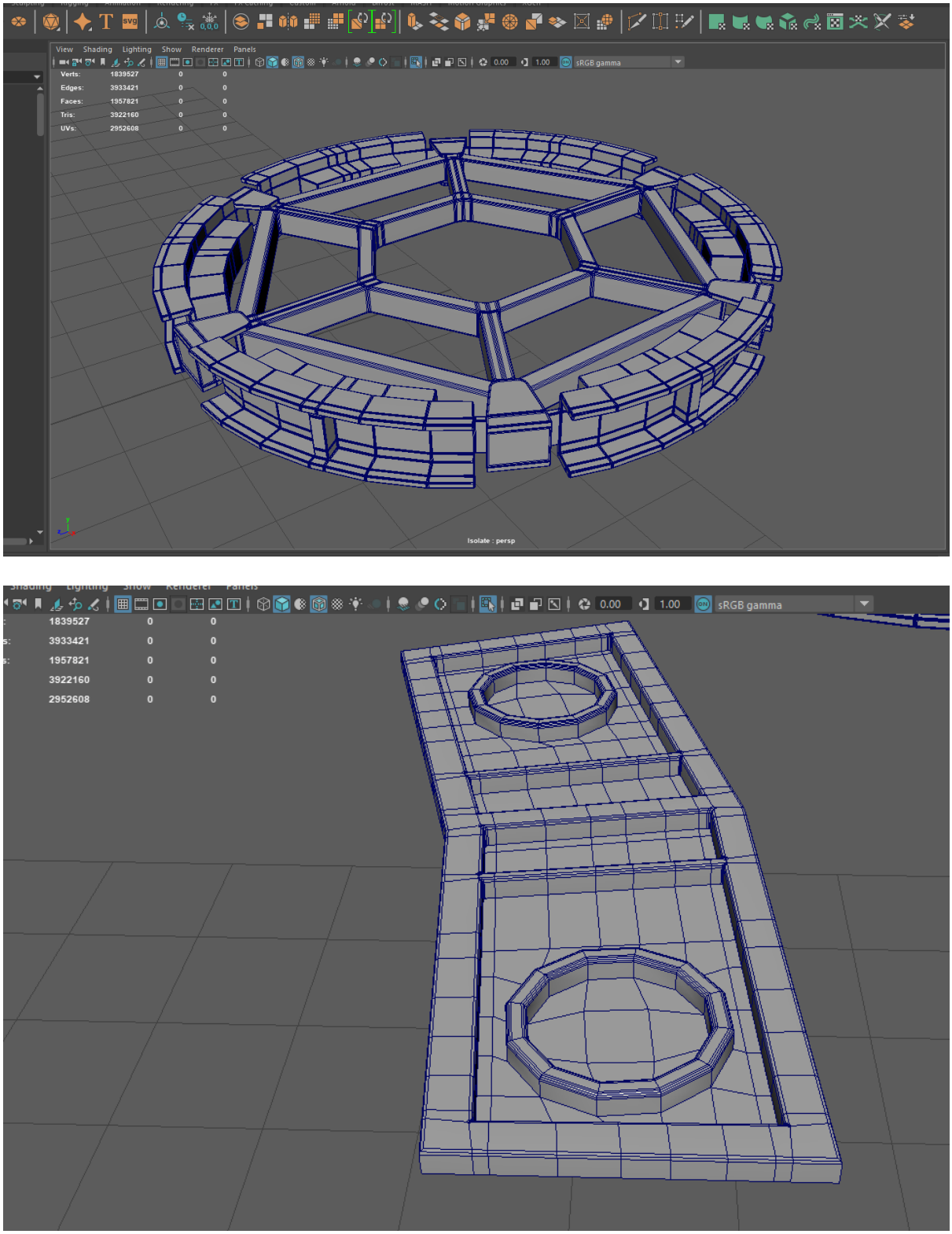


Figure 4.3.1: Model of Portal of Time Travel

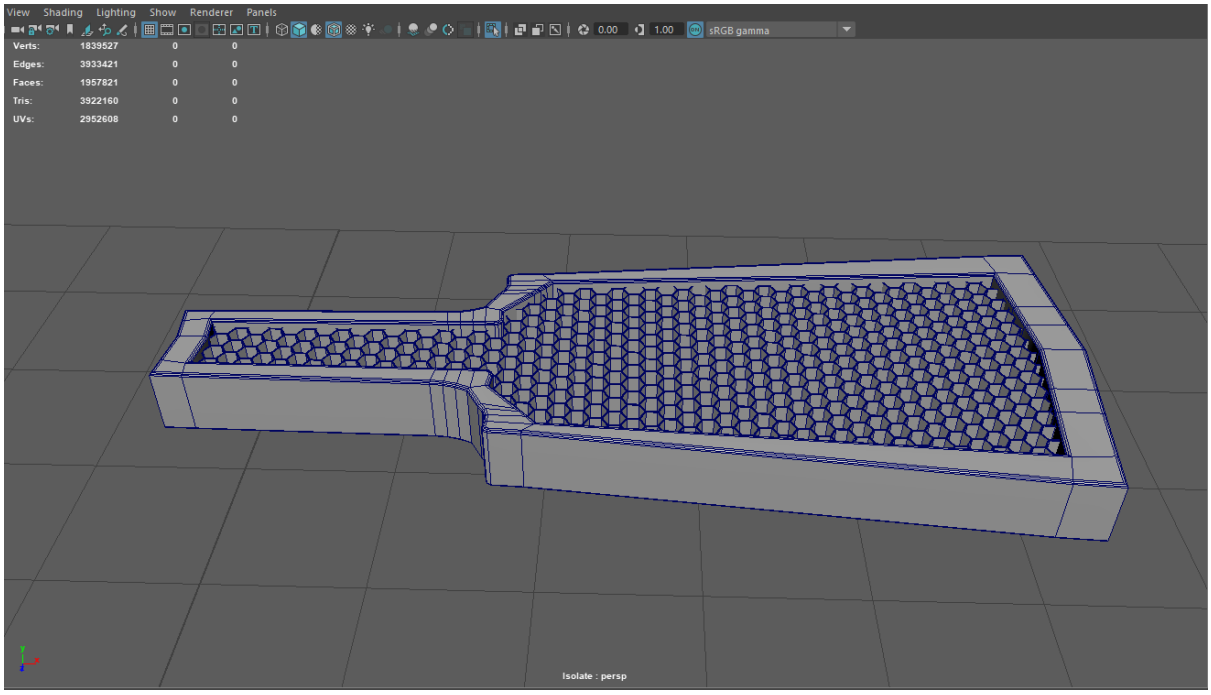


Figure 4.3.1: Model of Portal of Time Travel

4.3.2 Retopology

Retopology is often used in conjunction with other workflows such as sculpting and 3D scanning. For example, a sculpted model may need to be retopologized before it can be animated, or a 3D scan may require retopology to reduce its polygon count and make it more efficient to work with.

Here is some topology image of my model given below,

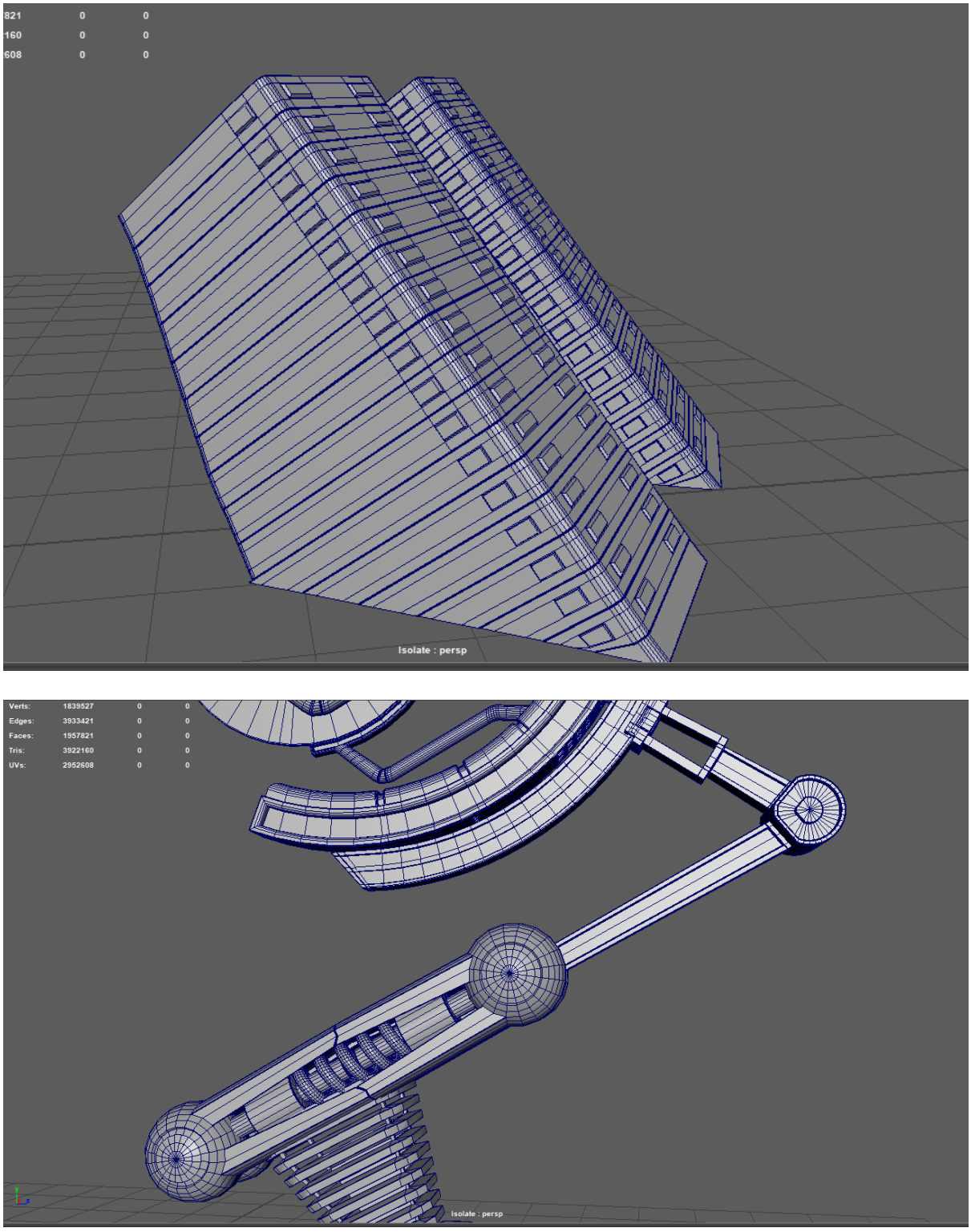


Figure 4.3.2: Retopologized Mesh

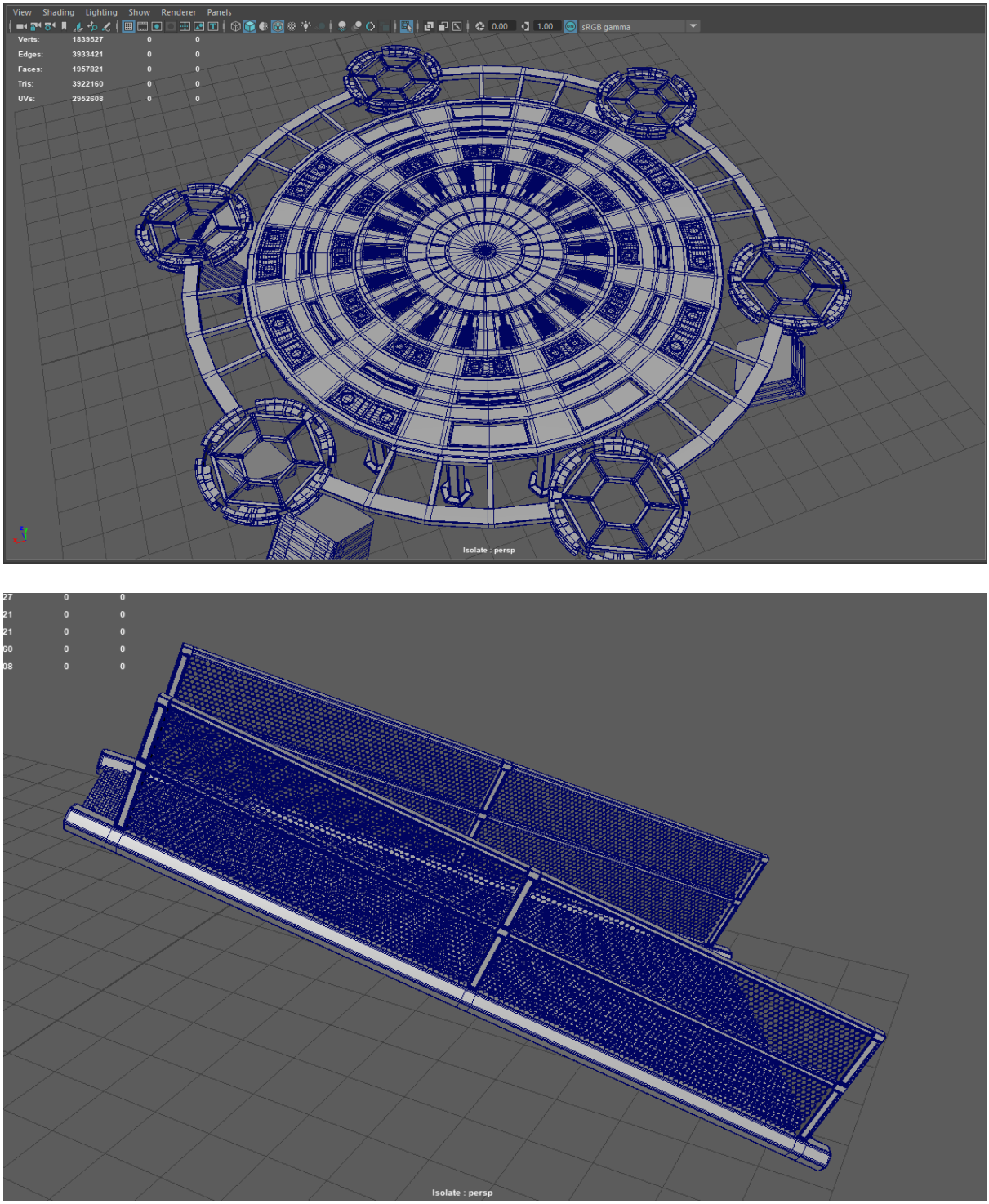


Figure 4.3.2: Retopologized Mesh

4.3.3 UV Unwrap

UV unwrapping is a process of creating a 2D texture map that represents the 3D surface of a model. In Autodesk Maya, UV unwrapping involves flattening the 3D model's surface and creating a 2D representation of the model's texture coordinates, which are used to apply textures and other 2D artwork to the 3D model.

Now I'm going to add some picture of UV unwrap of "Portal of Time Travel" below,

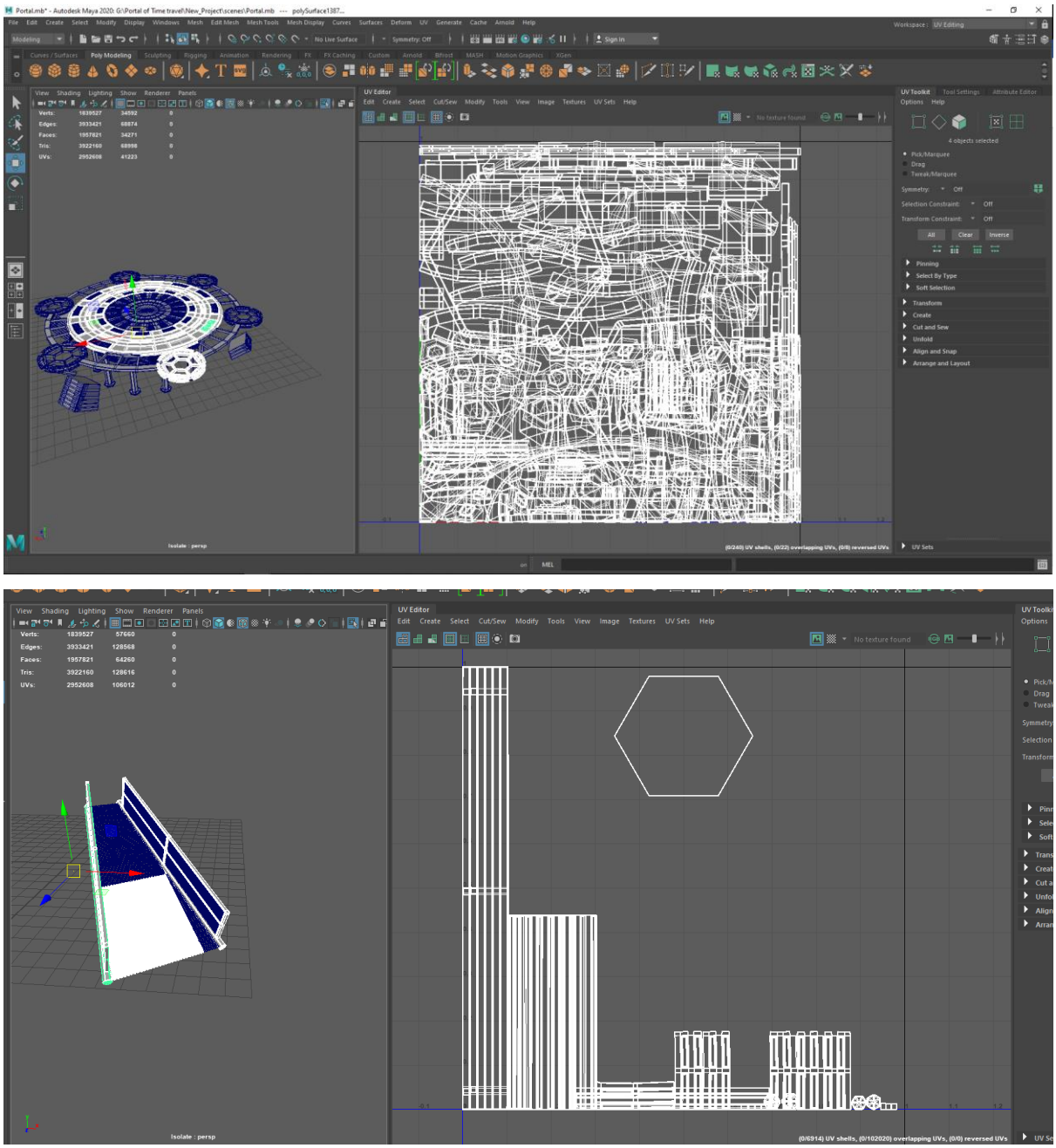


Figure 4.3.3: UV Unwrap of Portal of Time Travel

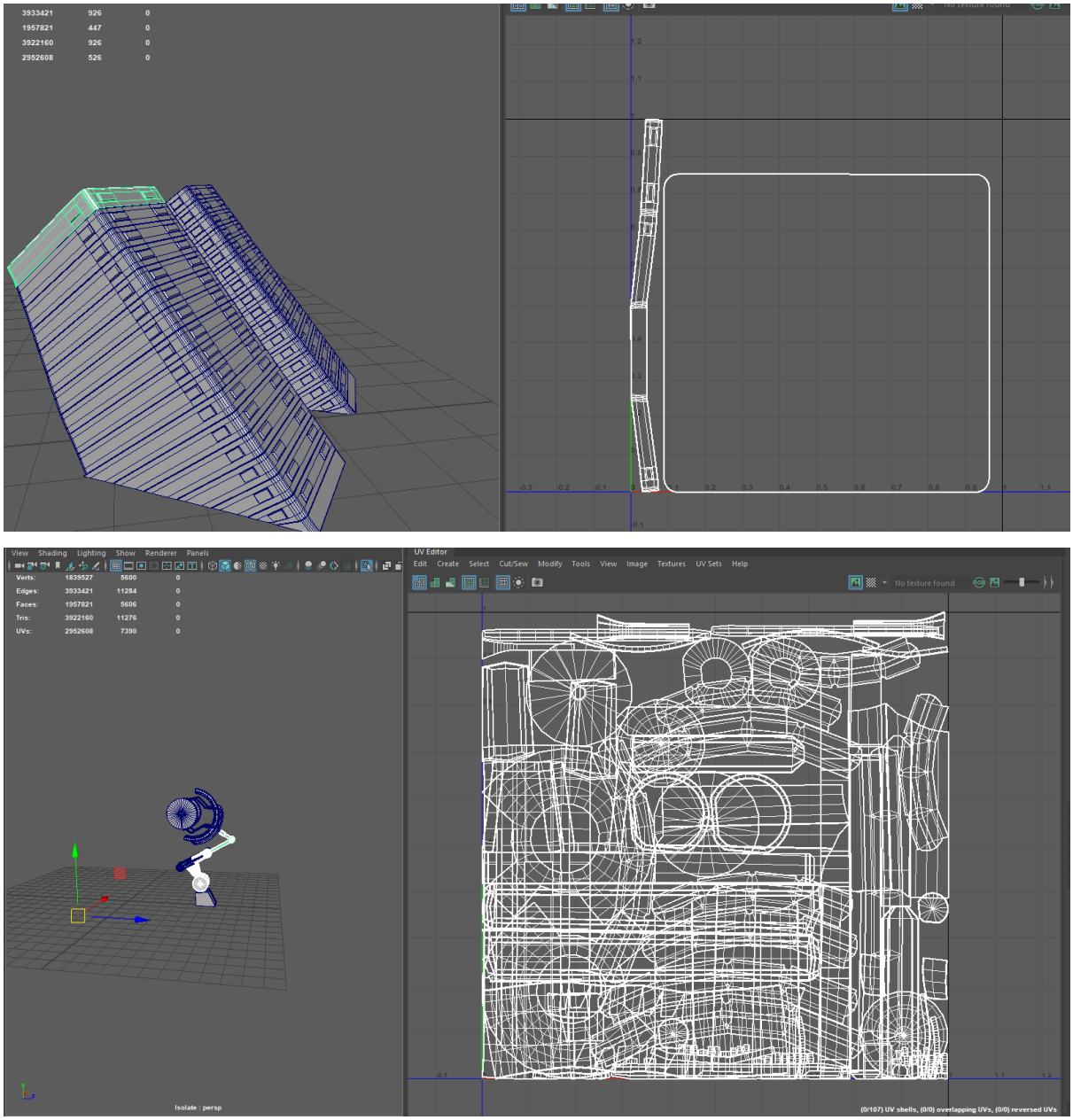


Figure 4.3.3: UV Unwrap of Portal of Time Travel

4.3.4 Baking

I baked my texture in 2k (2048 px) resolutions.

Here is a baking preset image given below,

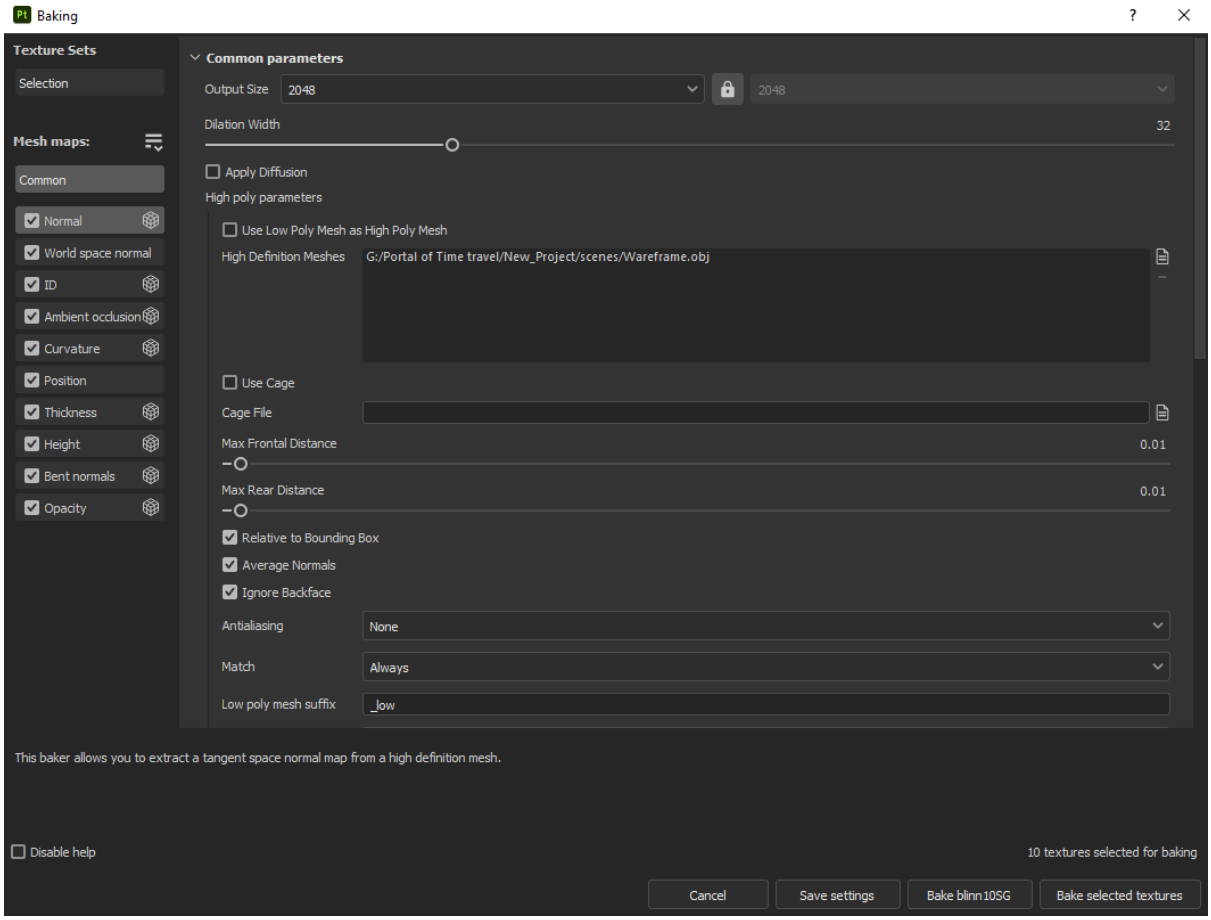


Figure 4.3.4: Baking in 2k Resolution.

4.4.5 Texturing

I used "**Adobe Substance Painter**" for texture my "Portal of Time Travel".

Now I'm going to share my texturing images below,

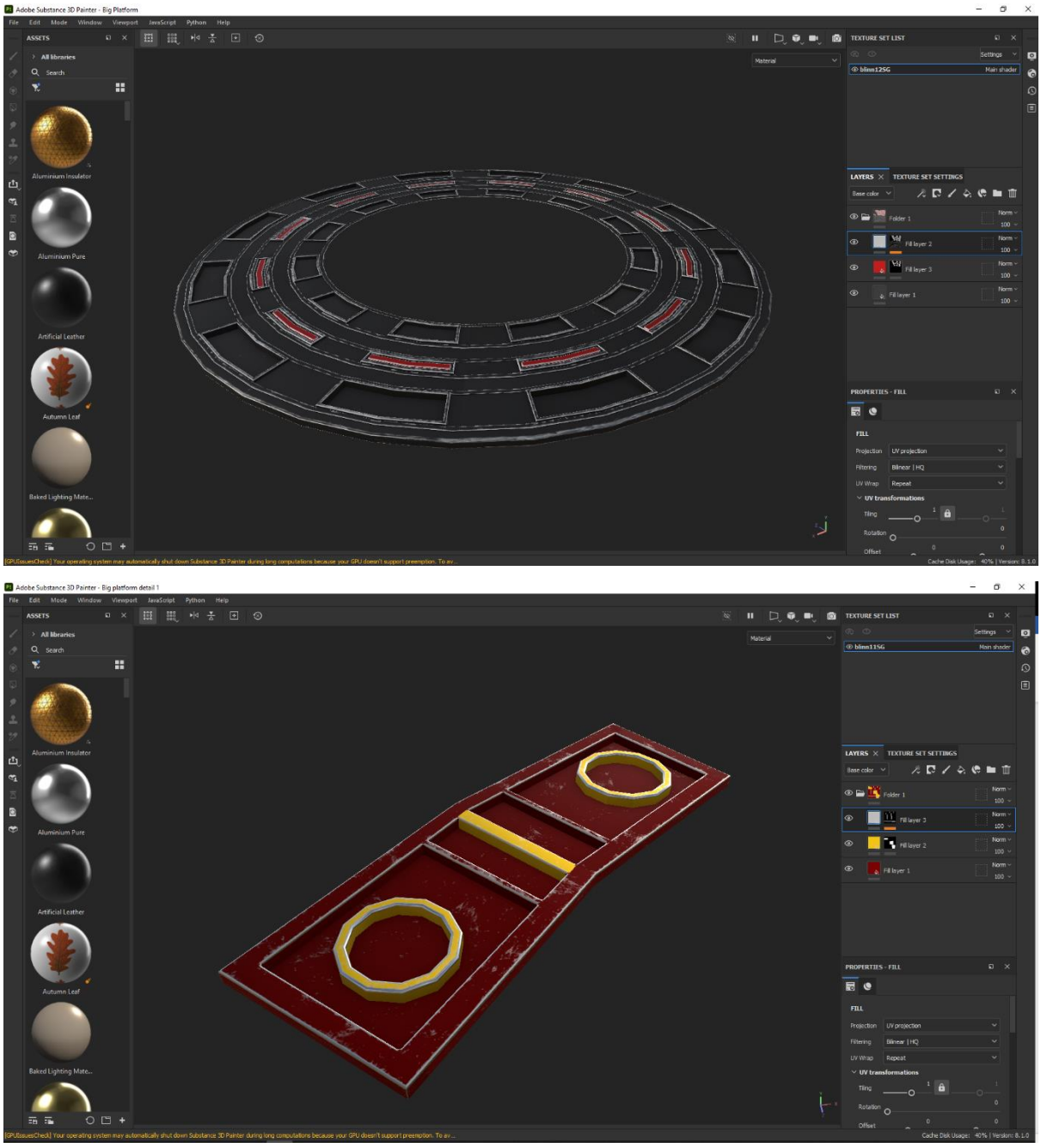


Figure 4.3.5: Texturing in Adobe Substance Painter

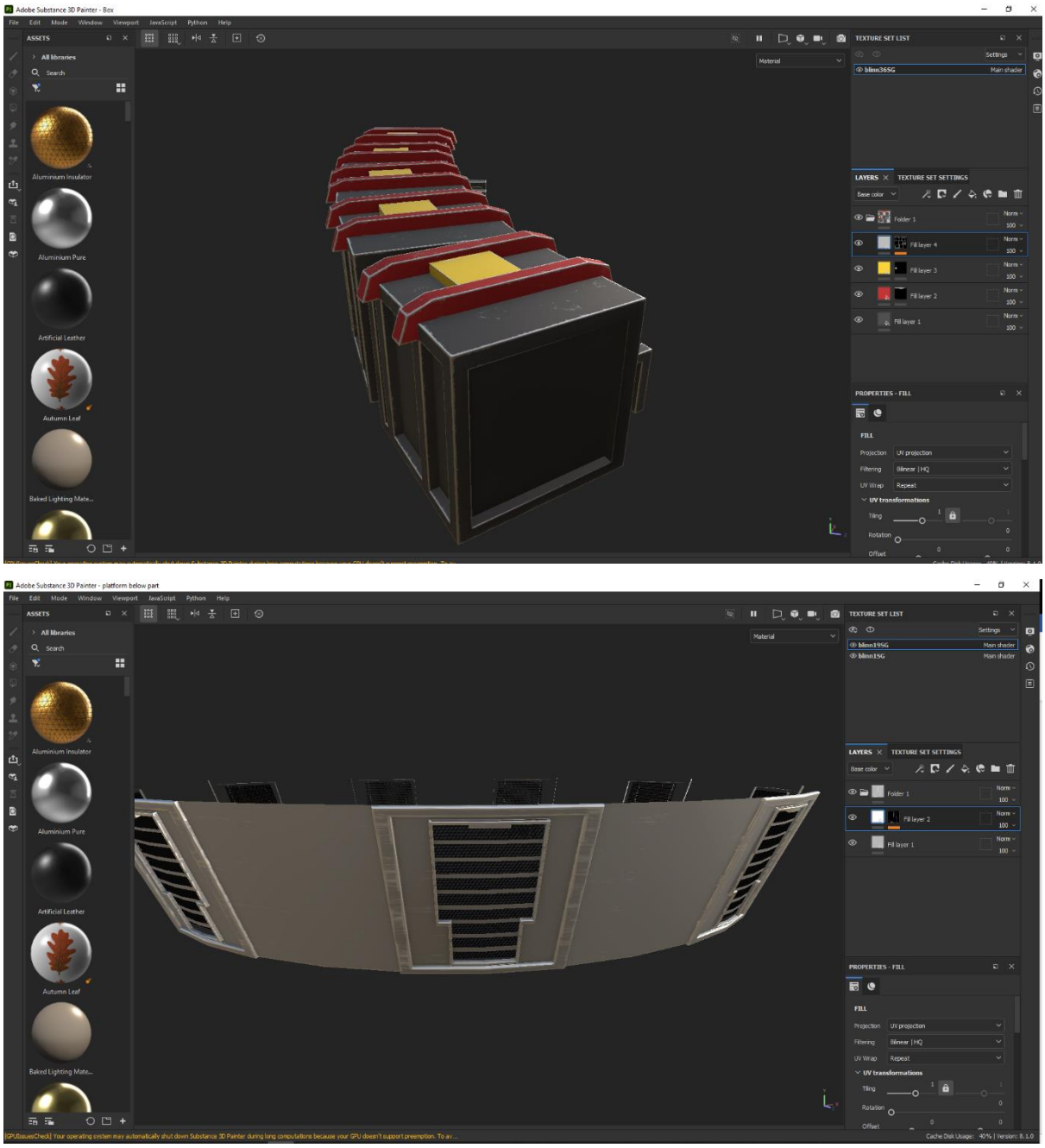


Figure 4.3.5: Texturing in Adobe Substance Painter

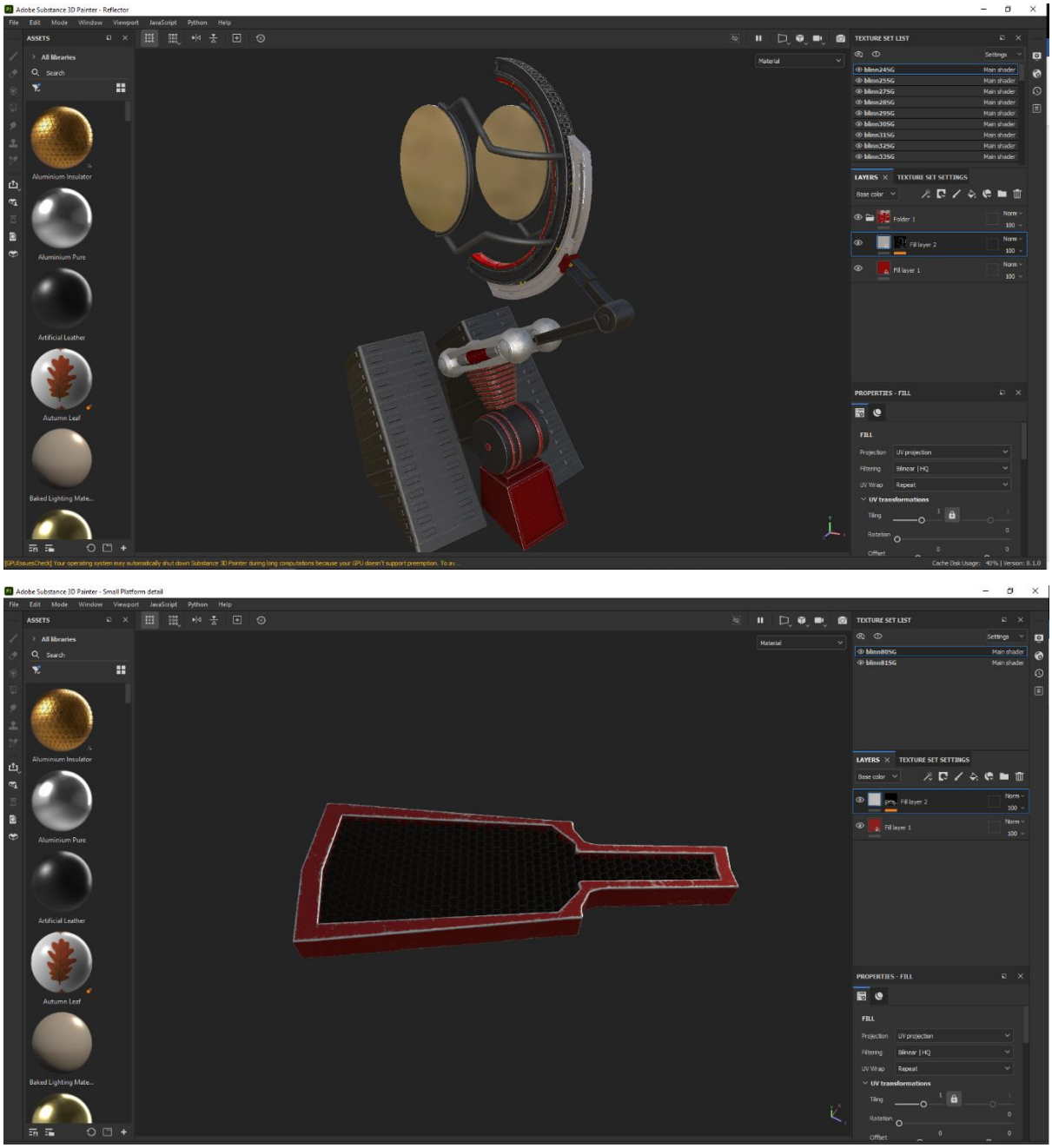


Figure 4.3.5: Texturing in Adobe Substance Painter

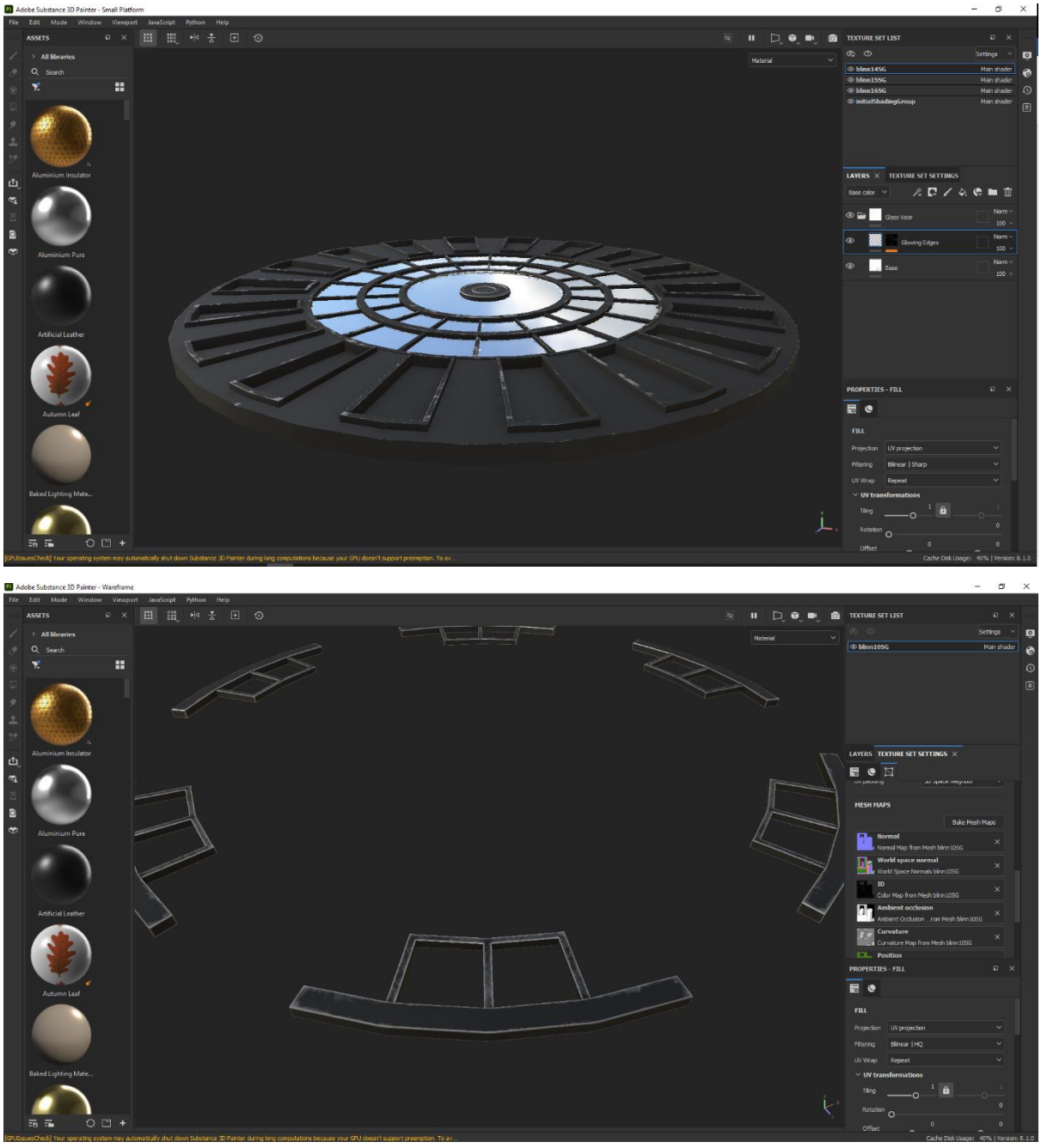


Figure 4.3.5: Texturing in Adobe Substance Painter

4.3.6 Lighting

I used Luxion Keyshot 10 for lighting my “Portal of Time Travel”

Here is the lighting setup,

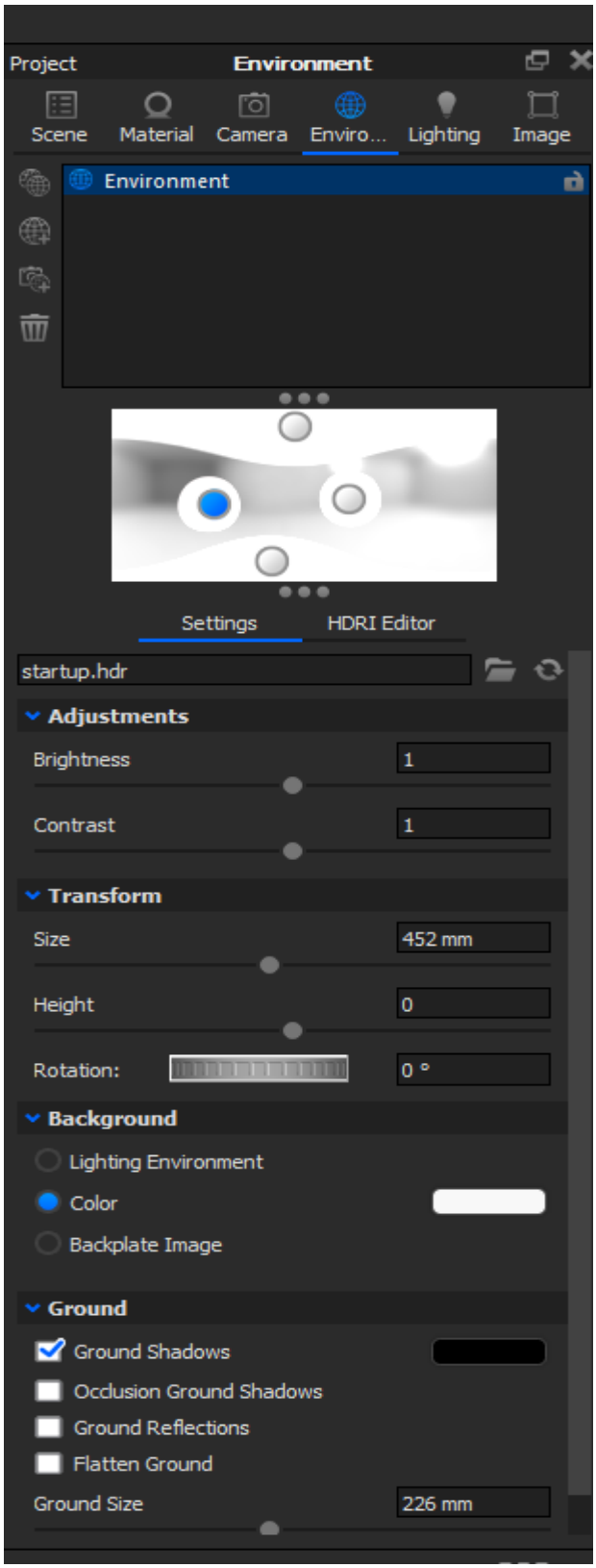


Figure 4.3.6 : Lighting Setup

4.3.7 Rendering

I used Keyshot 10 as my render engine.

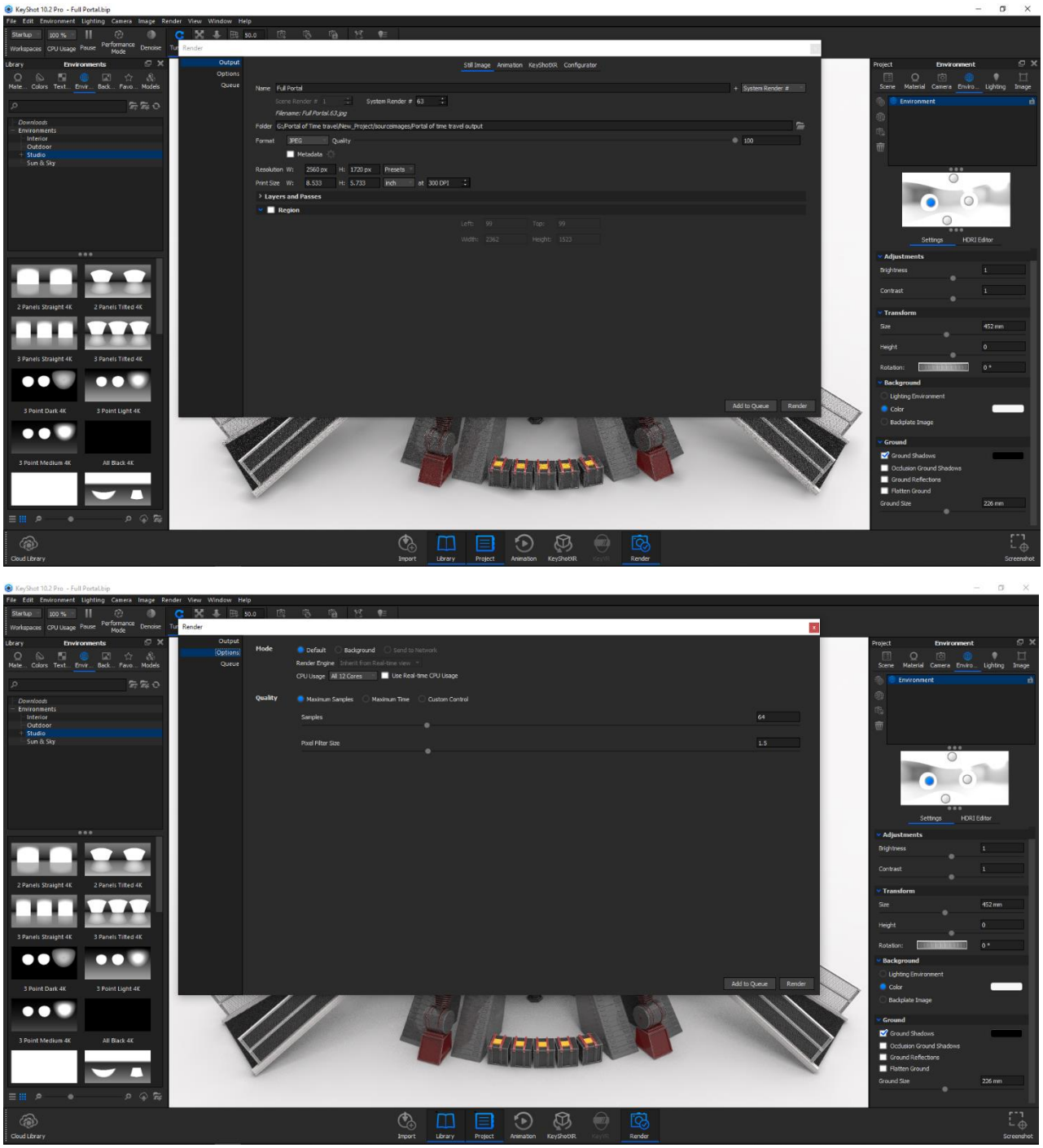


Figure 4.3.7: Rendering Preset

And then my output made me forget all my tiredness.

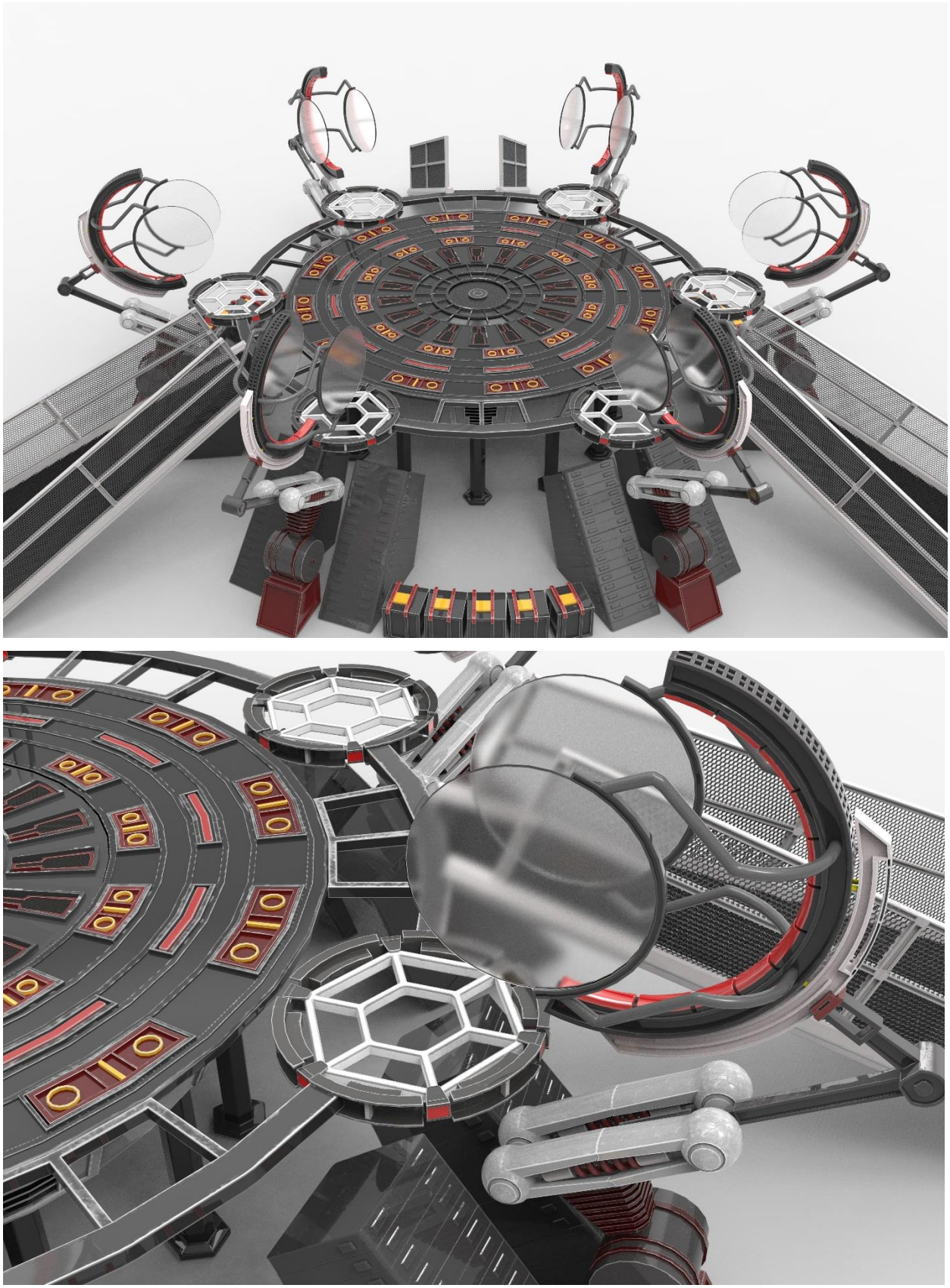


Figure 4.3.7 Rendered Output of “Portal of Time Travel”

4.4 Post Production

4.4.1 Retouching

After get the final render output I made some color correction in “Adobe Photoshop CC”

After retouching my output here is the result.

Figure 4.4.1 : Final Output of My “Portal Of Time Travel”

Figure 4.4.1 : Final Output of My “Portal Of Time Travel”

Figure 4.4.1 : Final Output of My “Portal Of Time Travel”

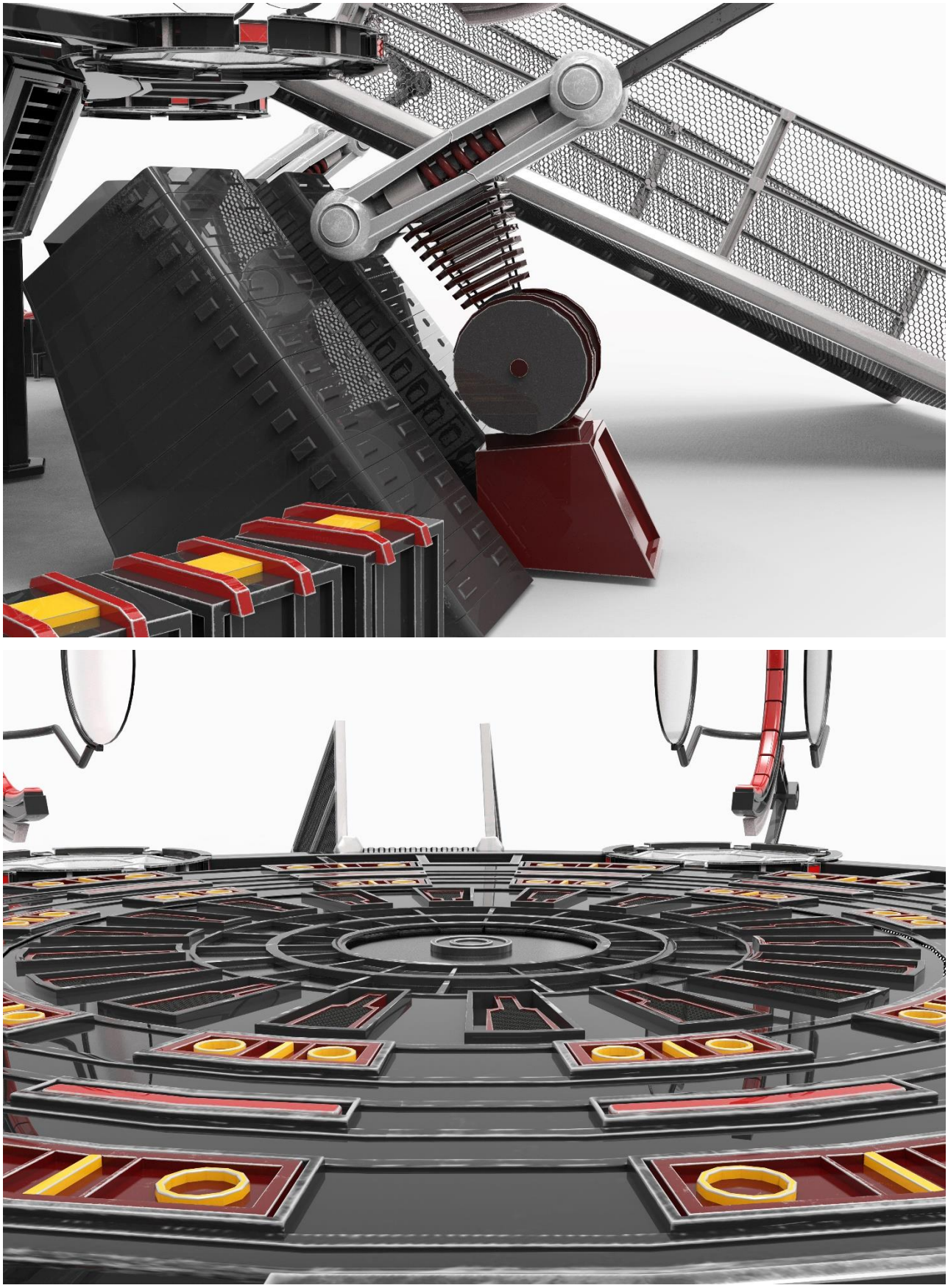


Figure 4.4.1 : Final Output of My “Portal Of Time Travel”

Figure 4.4.1 : Final Output of My “Portal Of Time Travel”

4.5 Use of My Portal of Time Travel in 3D Industry

- My “Portal of Time Travel” is fit for **3D Animated Film Industry**.
- As it is a high poly Model So, it can be used in **Game Industry** after baking in low poly.
- Then this model can be use in **3D Printing Industry** as a toy of a child.
- It is a high detailed and well-furnished model of various machineries so this model can be used in **Engineering Industry**.

CHAPTER 5: POWER GENERATOR PRESENTATION

5.1 Thought Process

As per my topic was hard surface modeling so I tried to choose my project wisely. Power generator is a mechanical product which is used in engineering industry. So I tried to generate a 3D model of a power generator.

5.2 Pre- Production

5.2.1 Hand Sketch

I generated the idea of this model from research in google about electric power generator. Then I combined the idea from various kind of power generator then I made some rough sketch of my project **"Power Generator".**

Some of my sketches are given below

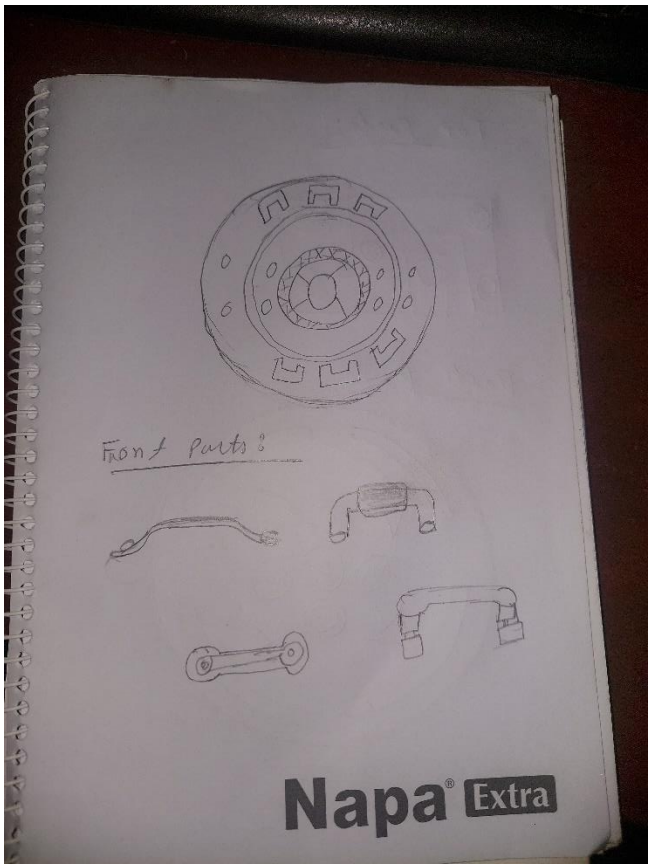


Figure 5.2.1: Sketch of power generator

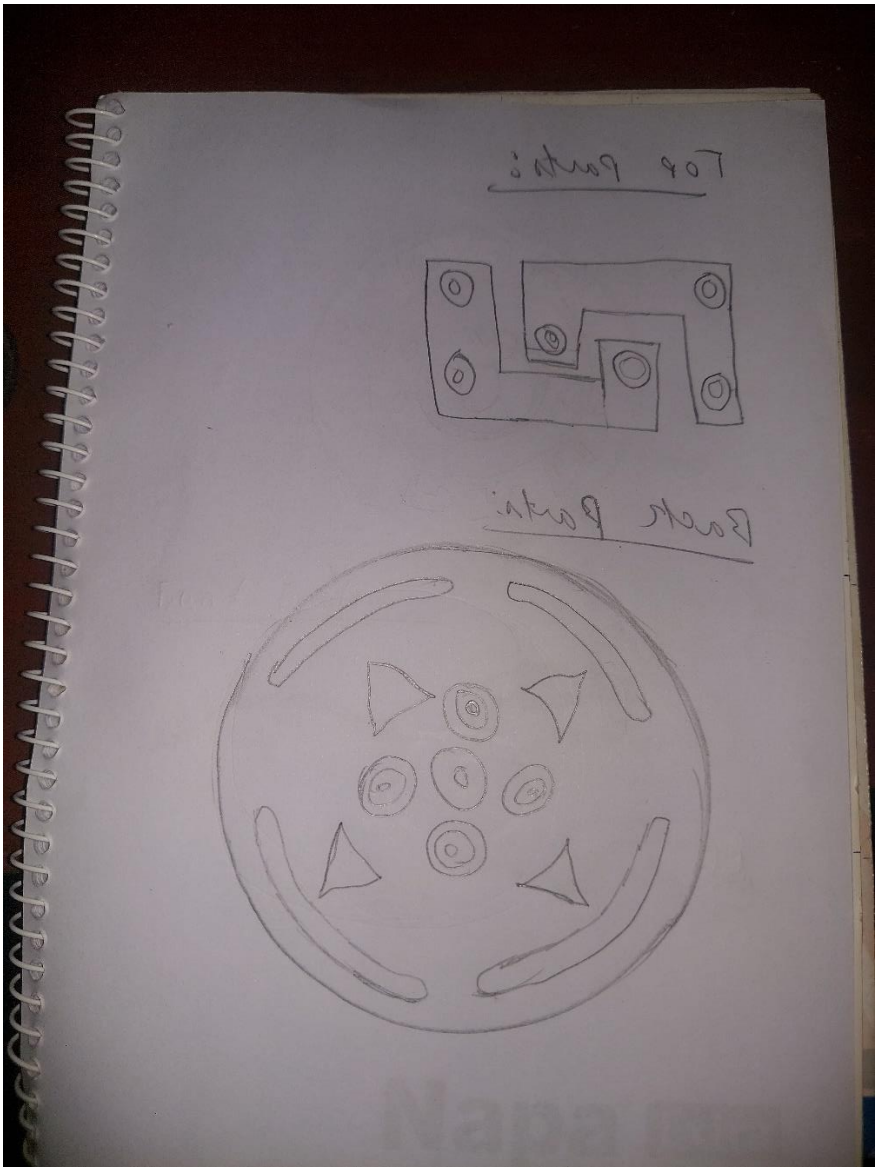


Figure 5.2.1: Sketch of power generator

5.3 Production

5.3.1 Modeling

I used “Autodesk Maya” for model this project. This model has developed step by step from a sphere poly primitive.

Here I’m going to share some picture of modeling process of my “Power Generator”.

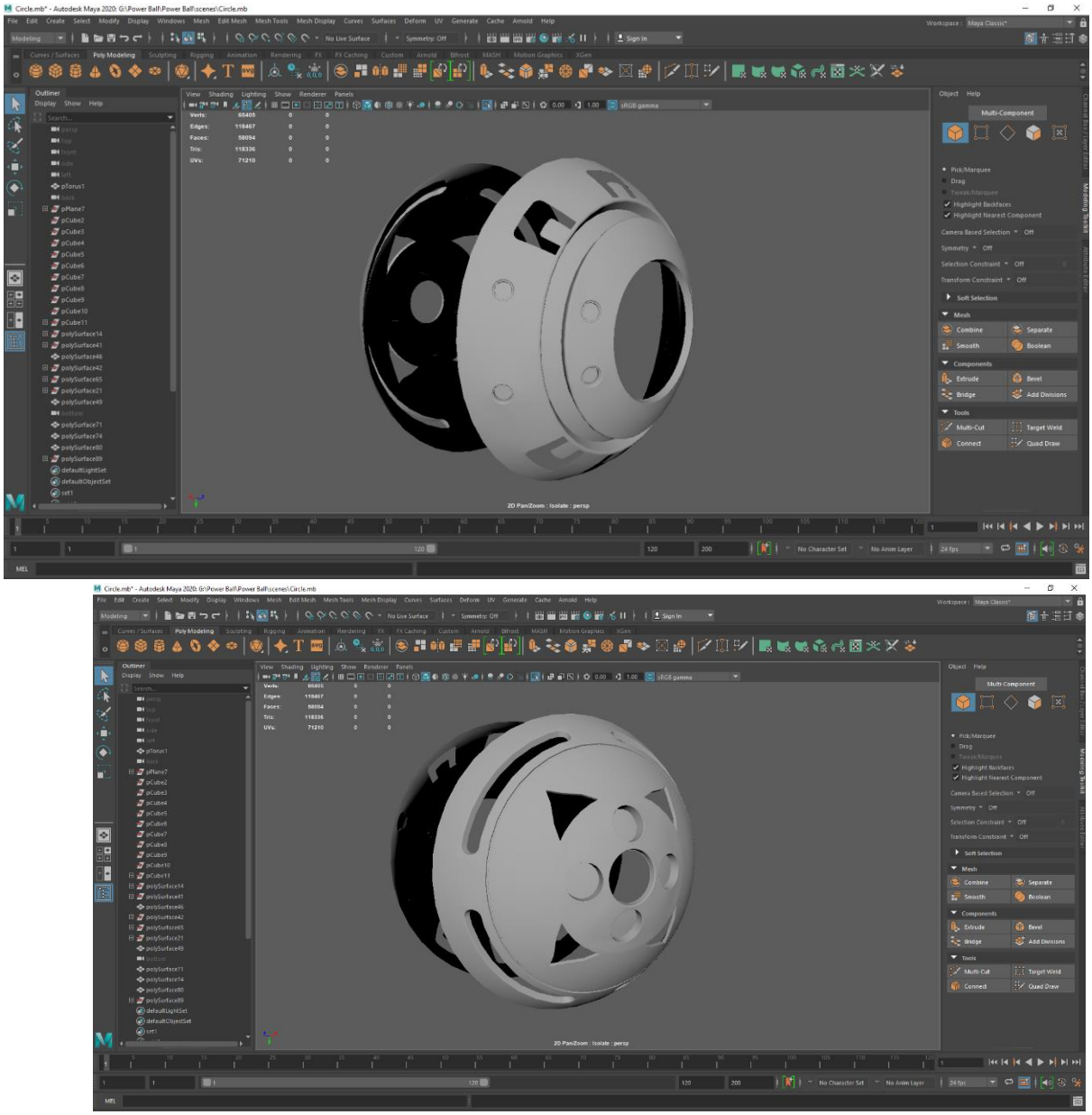


Figure 5.3.1: Modeling of Power Generator

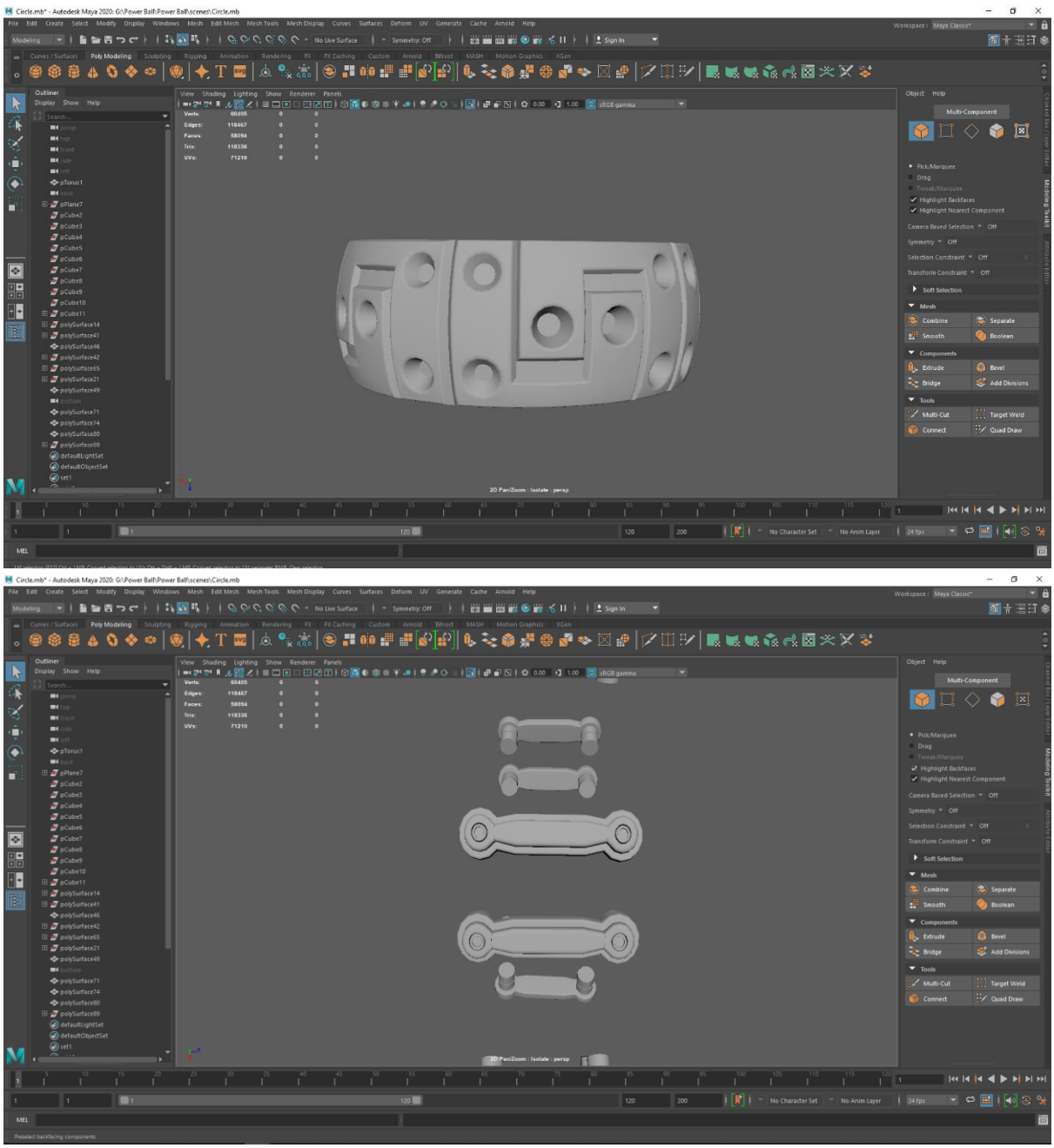


Figure 5.3.1: Modeling of Power Generator

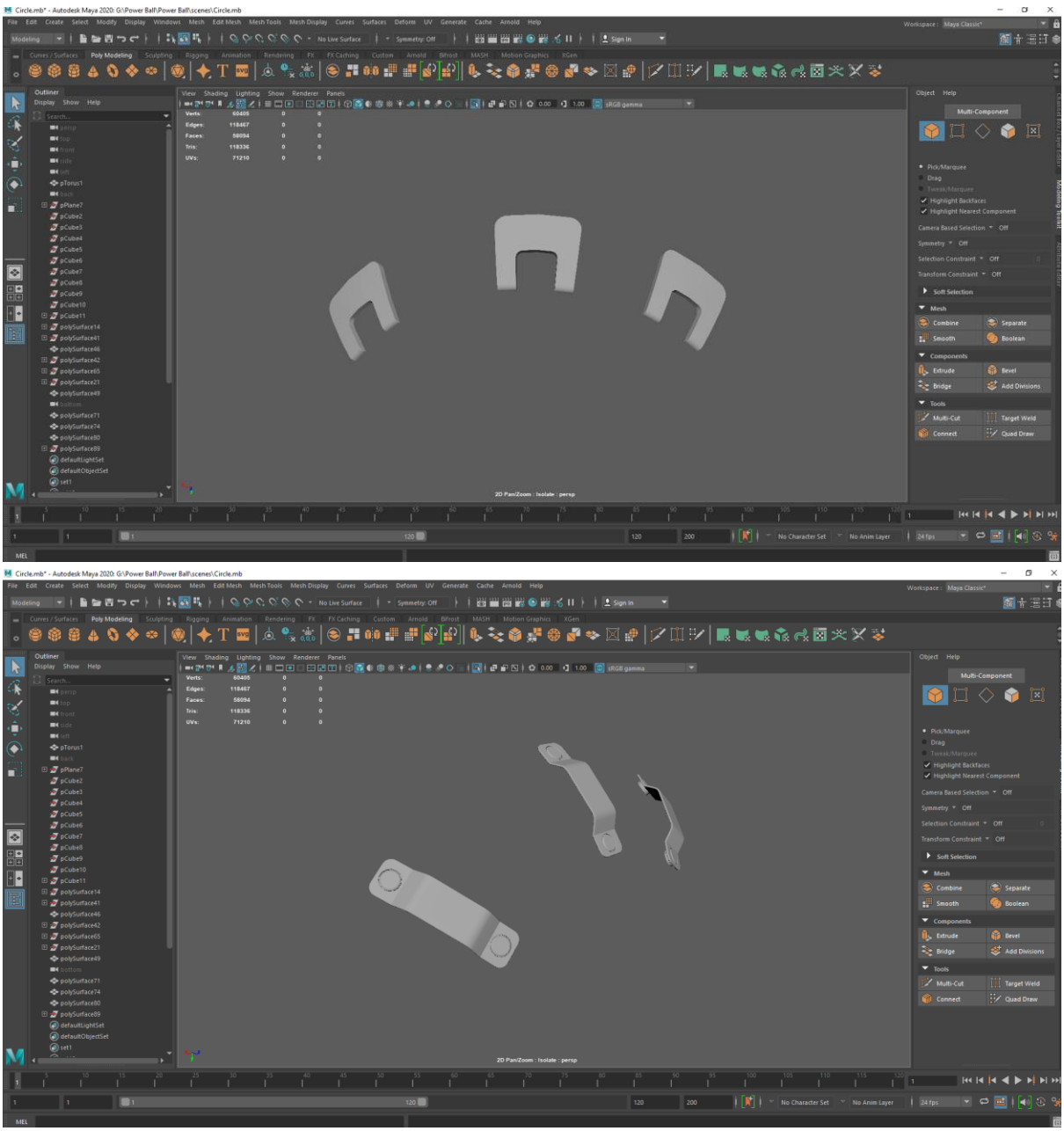


Figure 5.3.1: Modeling of Power Generator

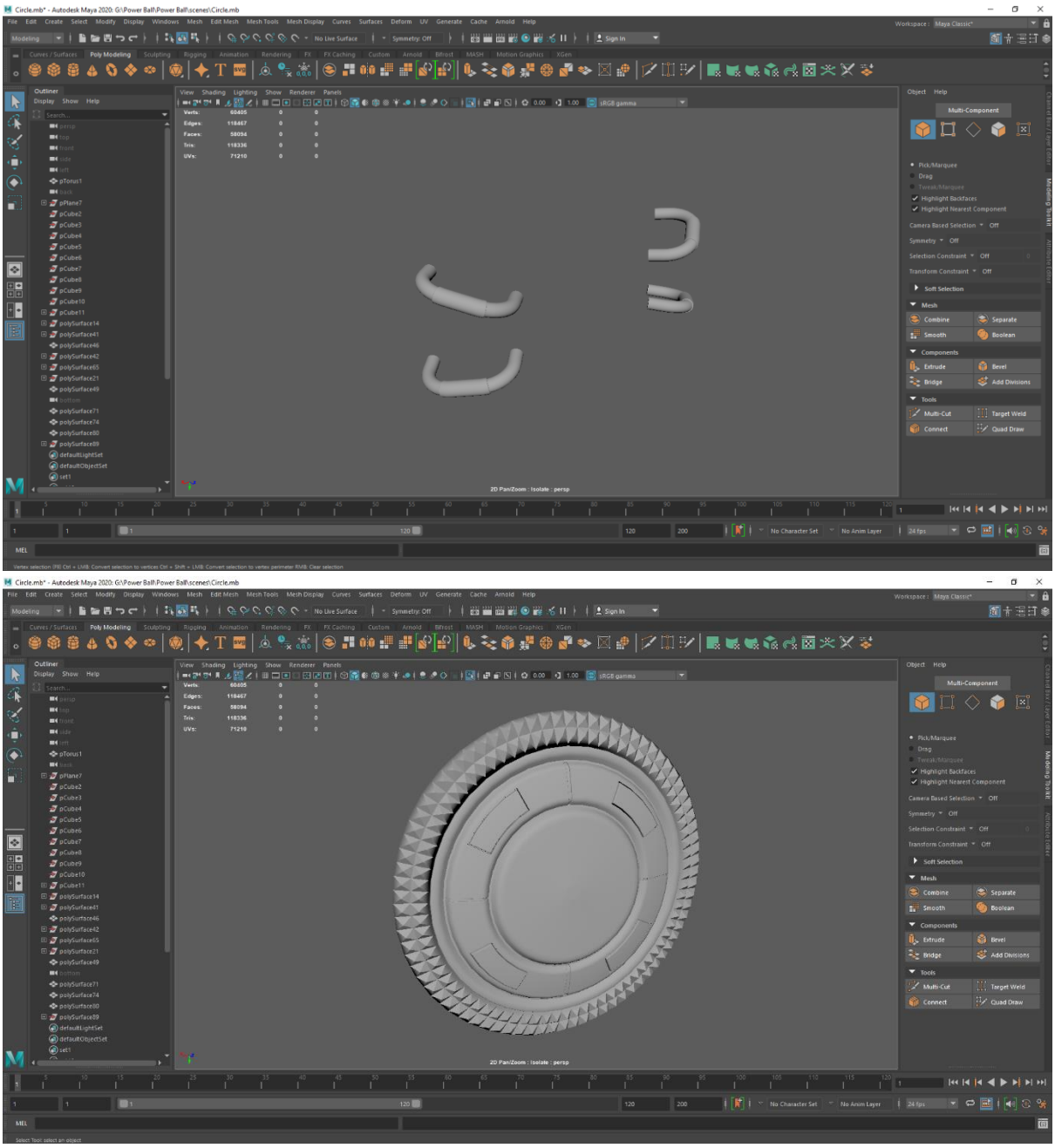


Figure 5.3.1: Modeling of Power Generator

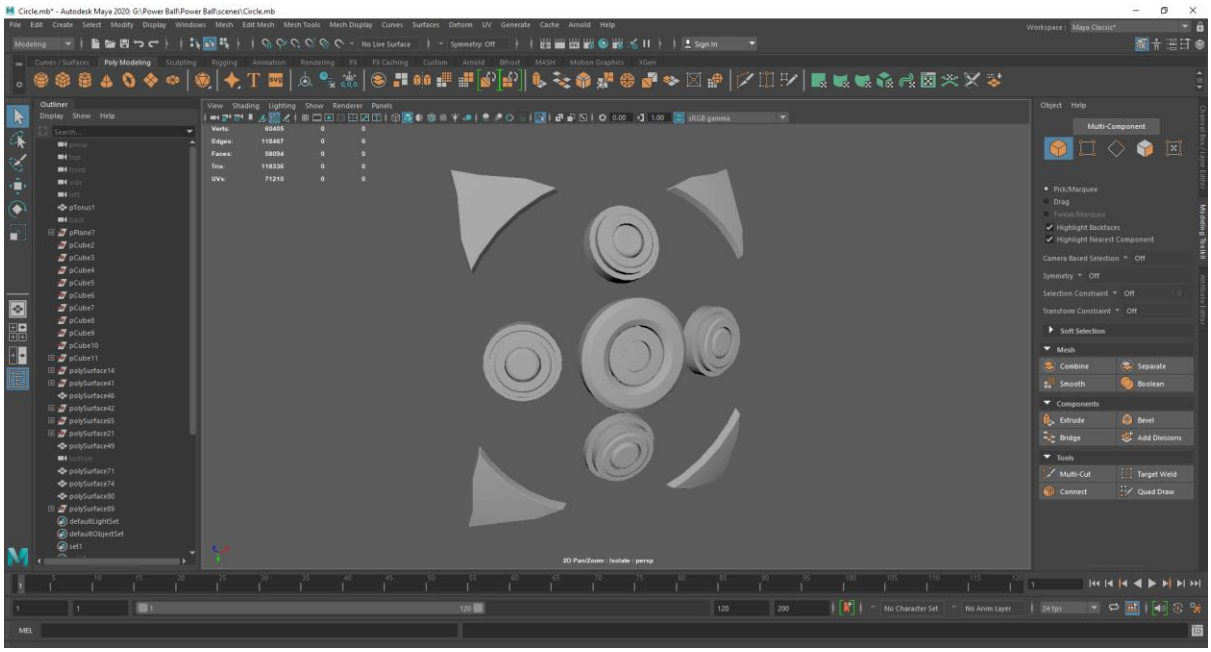


Figure 5.3.1: Modeling of Power Generator

5.3.2 Retopology:

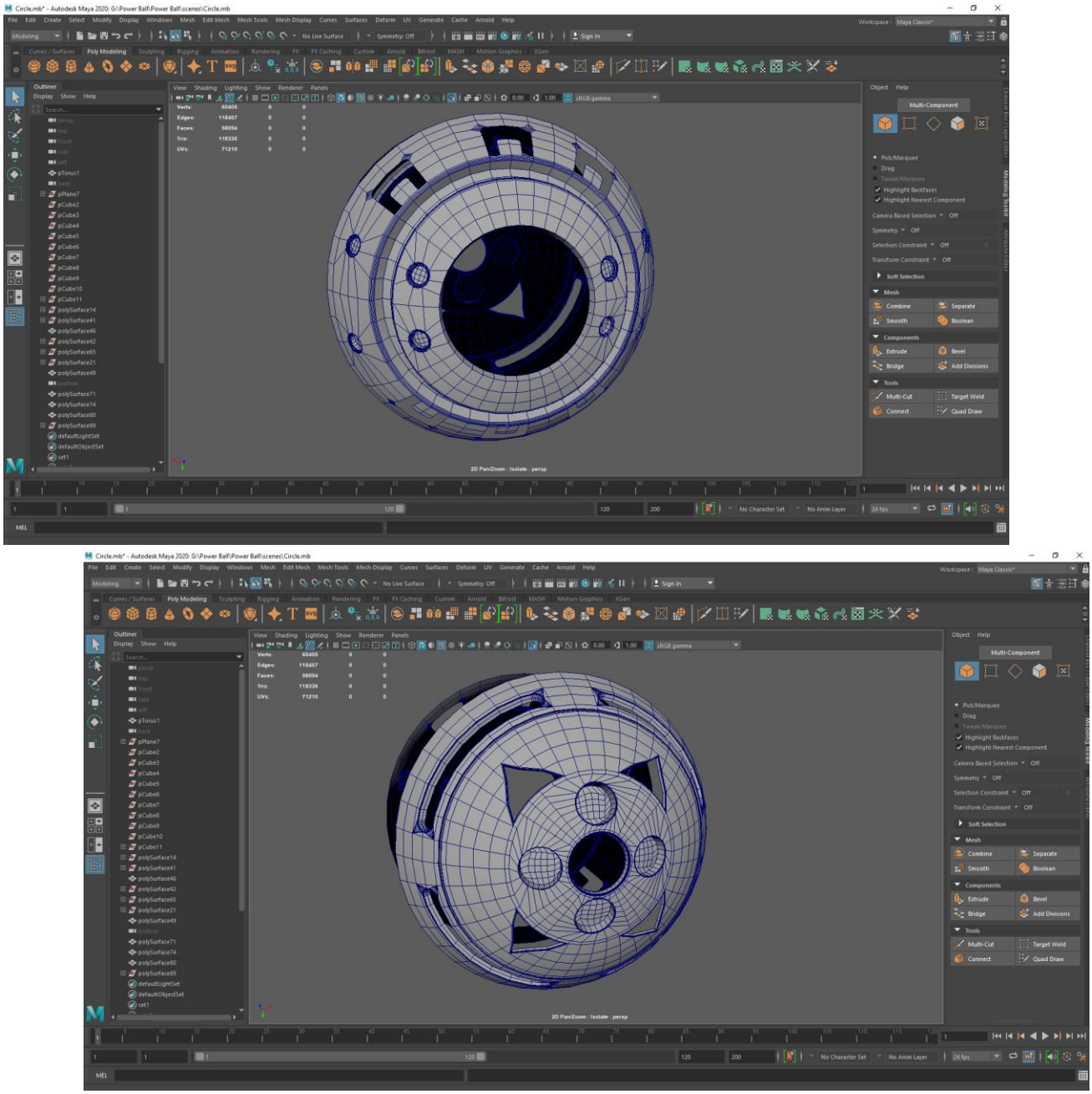


Figure 5.3.2: Topology of Power Generator

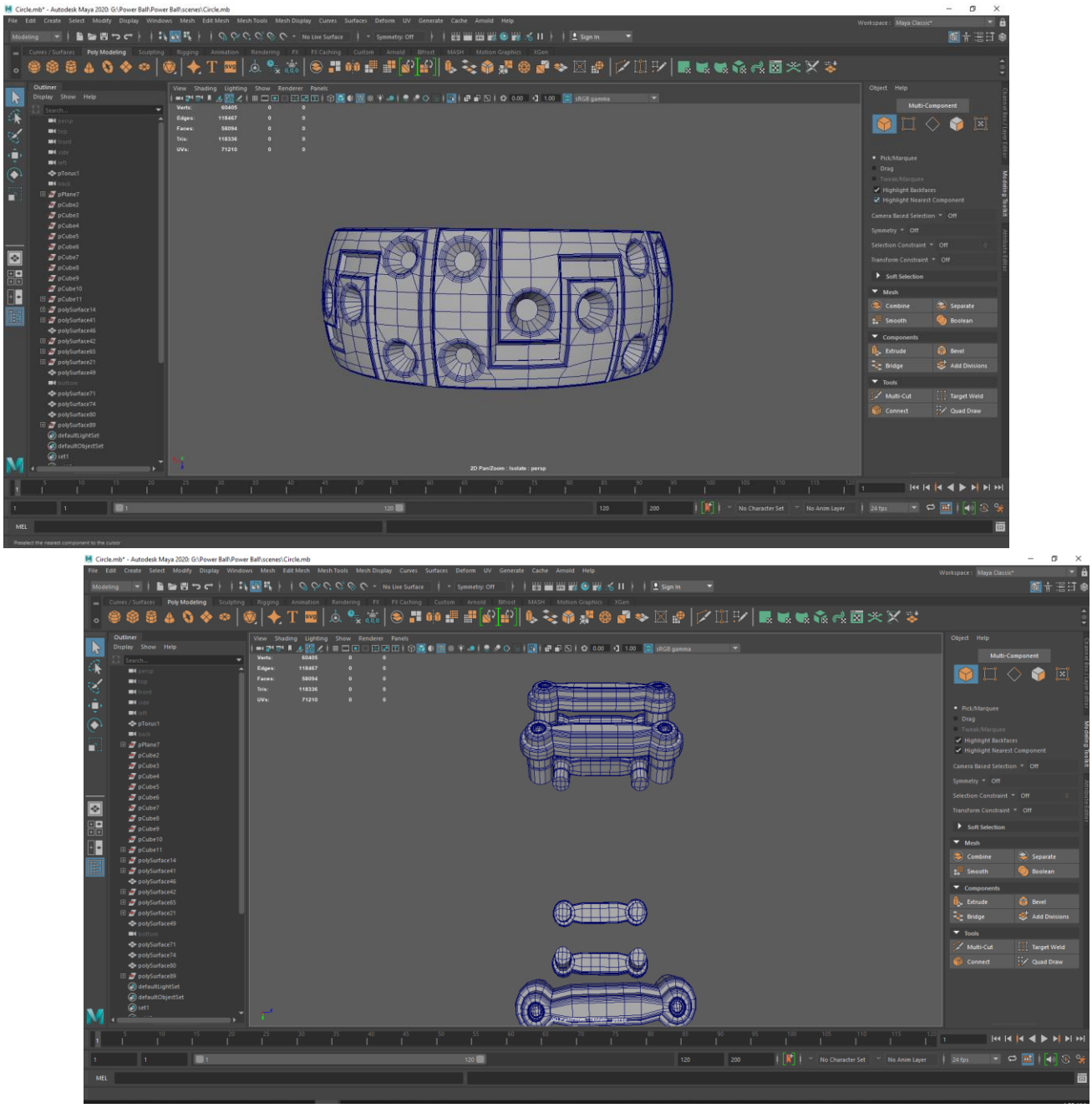


Figure 5.3.2: Topology of Power Generator

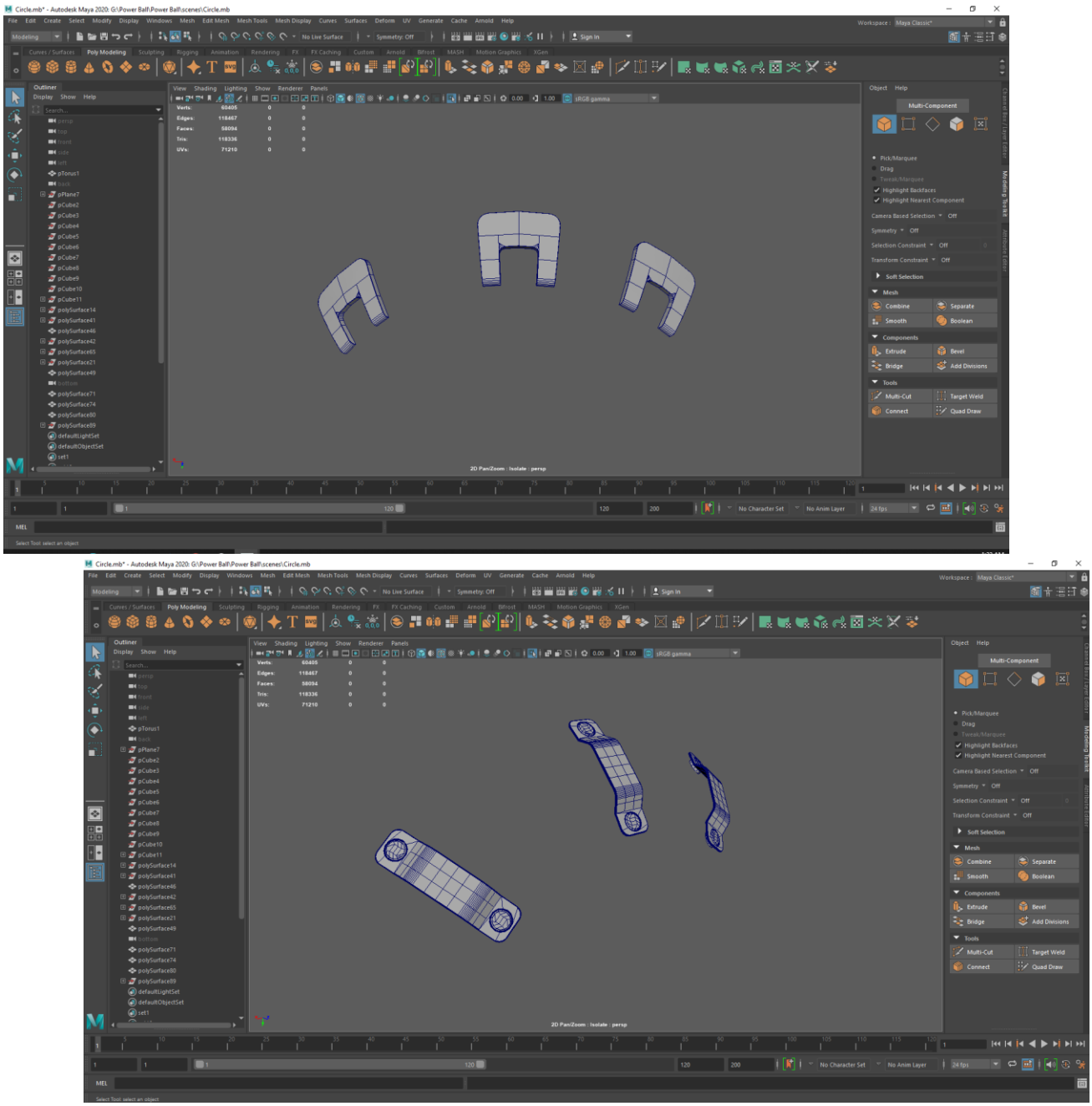


Figure 5.3.2: Topology of Power Generator

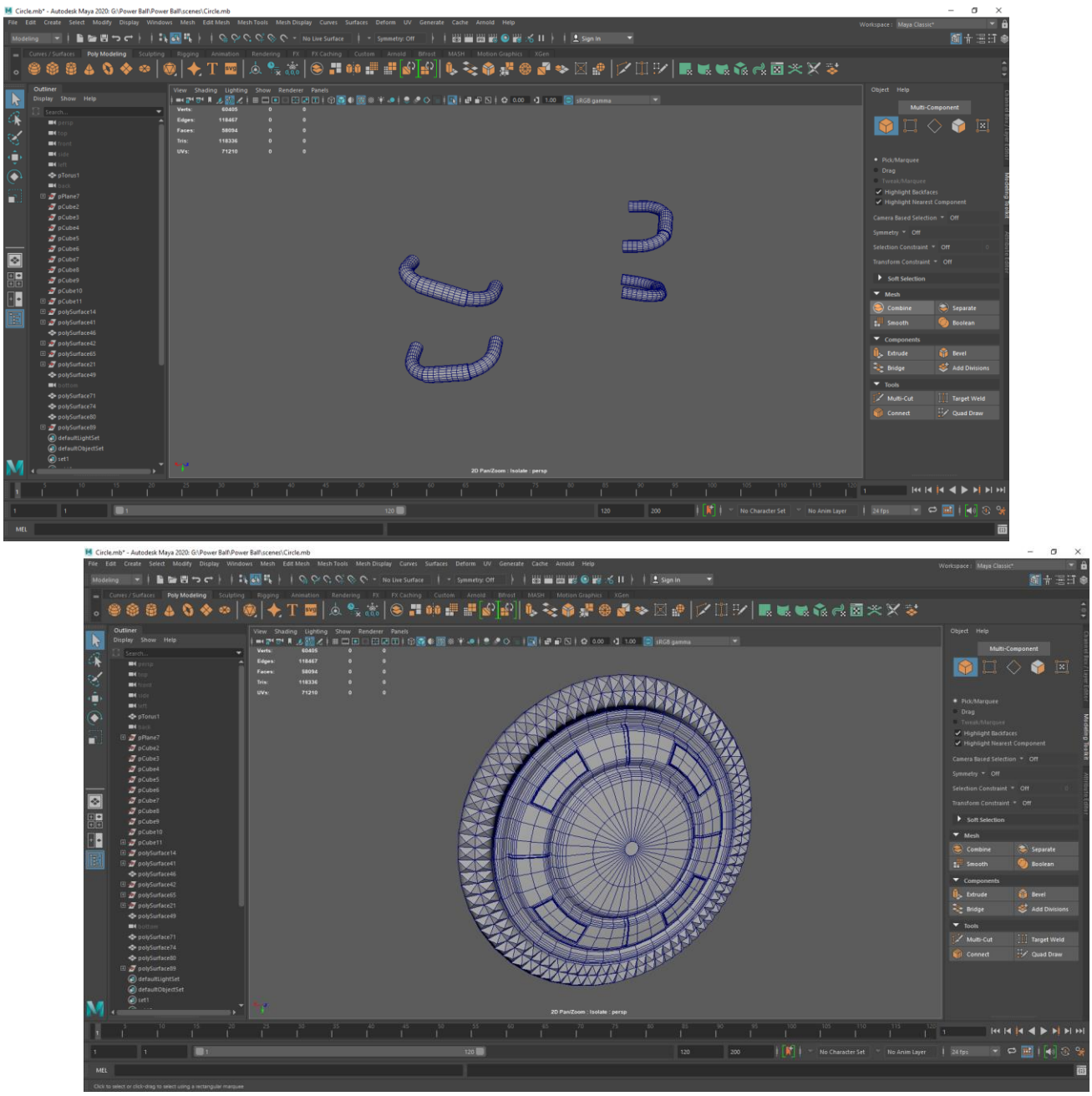


Figure 5.3.2: Topology of Power Generator

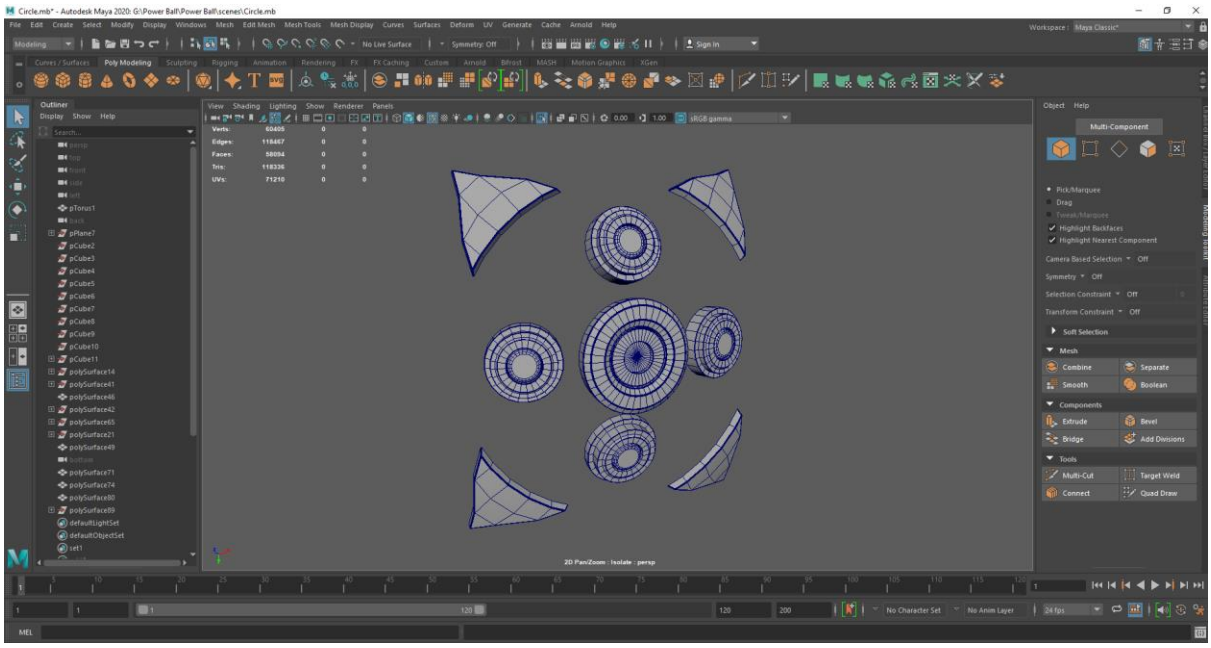


Figure 5.3.2: Topology of Power Generator

5.3.3 UV Unwrapping

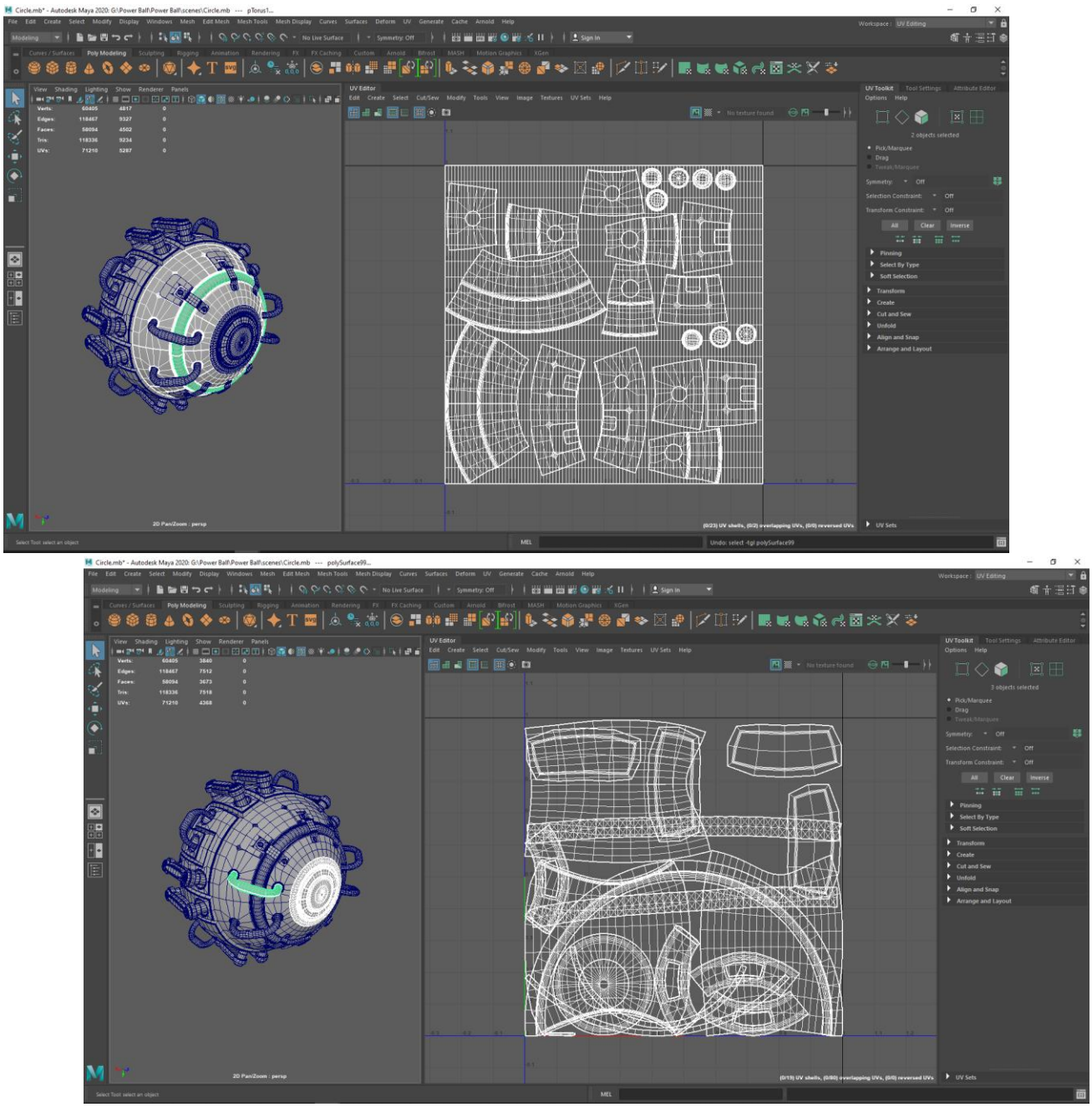
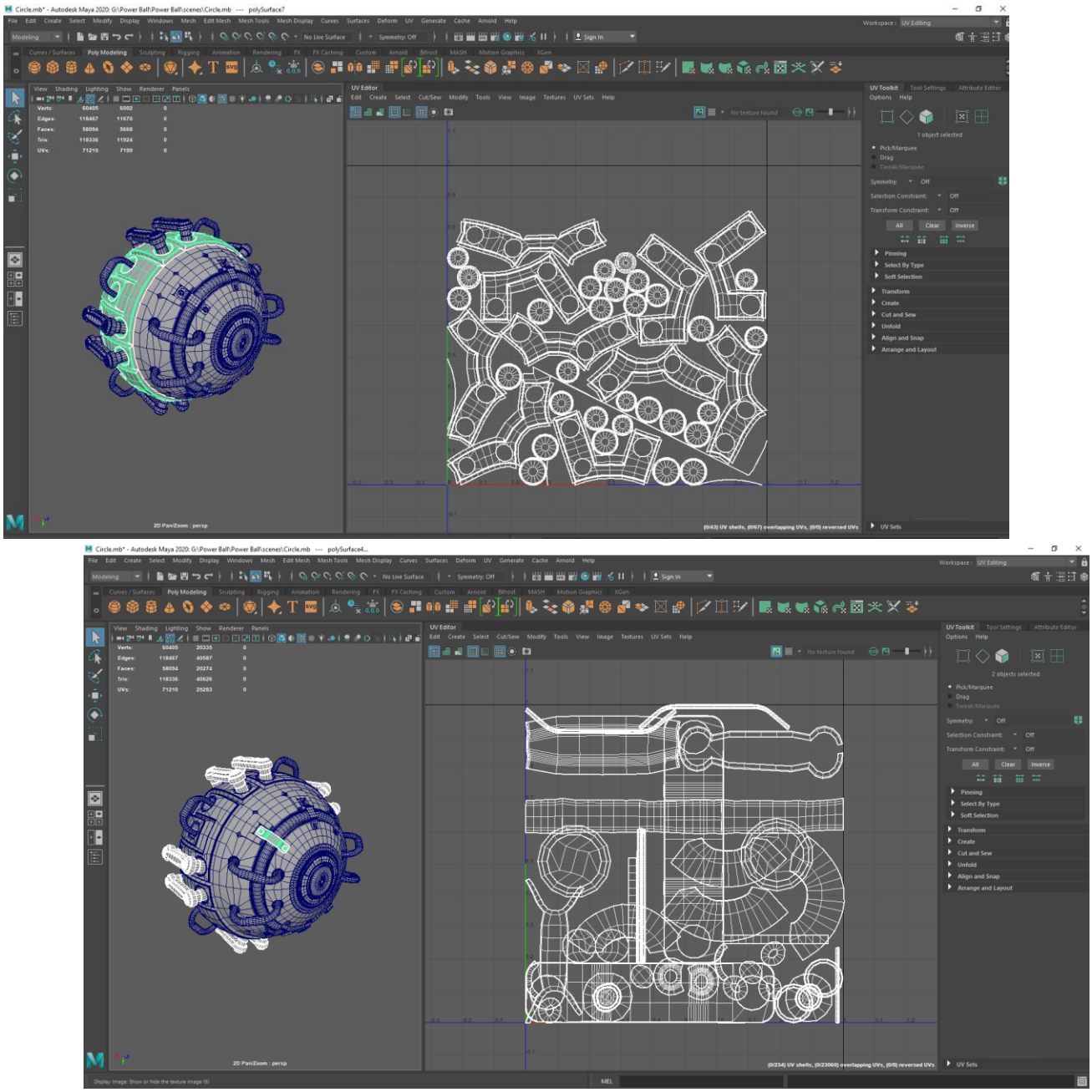


Figure 5.3.3: UV Unwrapping of Power Generator



\ Figure 5.3.3: UV Unwrapping of Power Generator

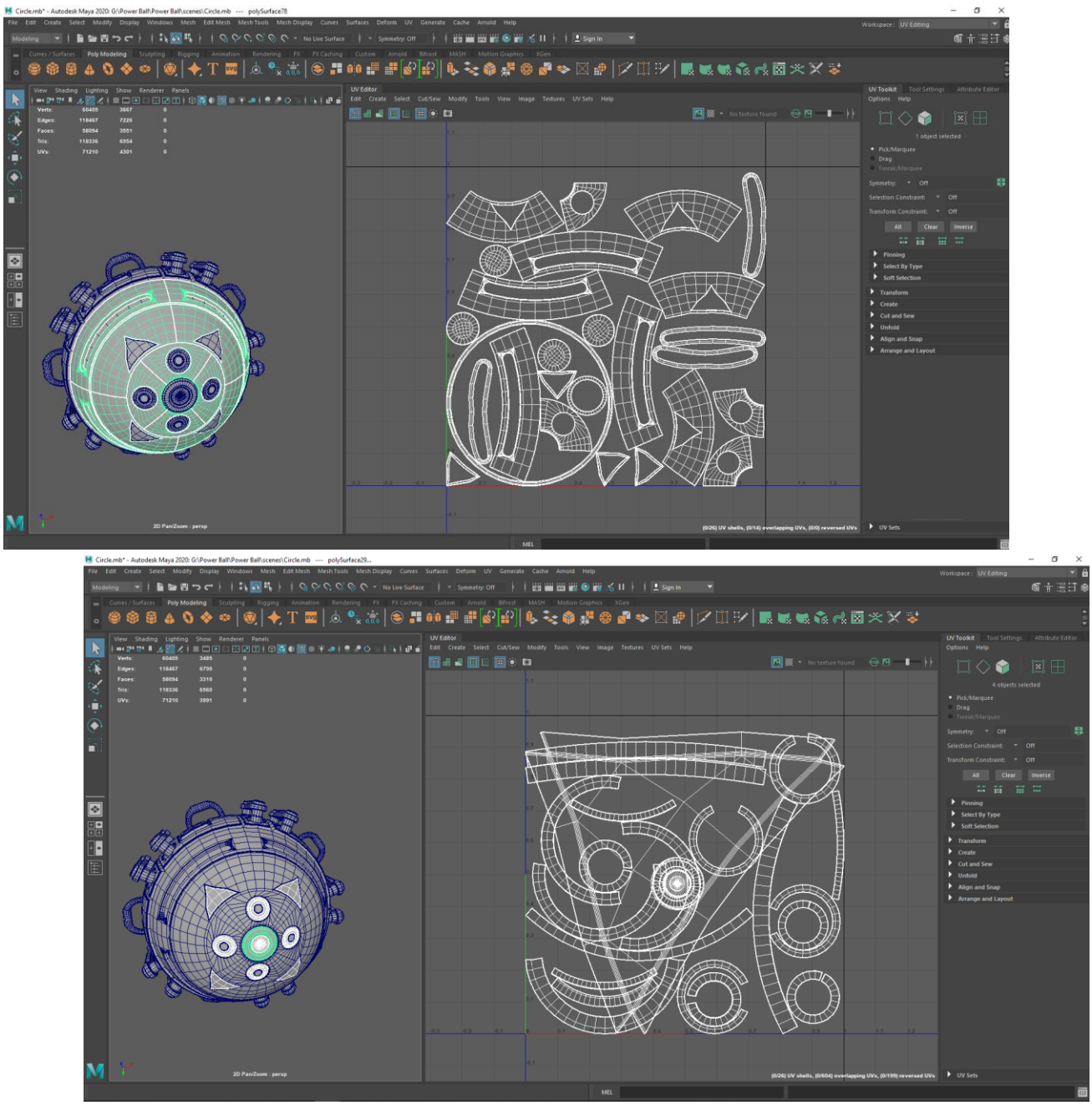


Figure 5.3.3: UV Unwrapping of Power Generator

5.3.4 Baking

I used **“Adobe Substance Painter”** for bake my texture.

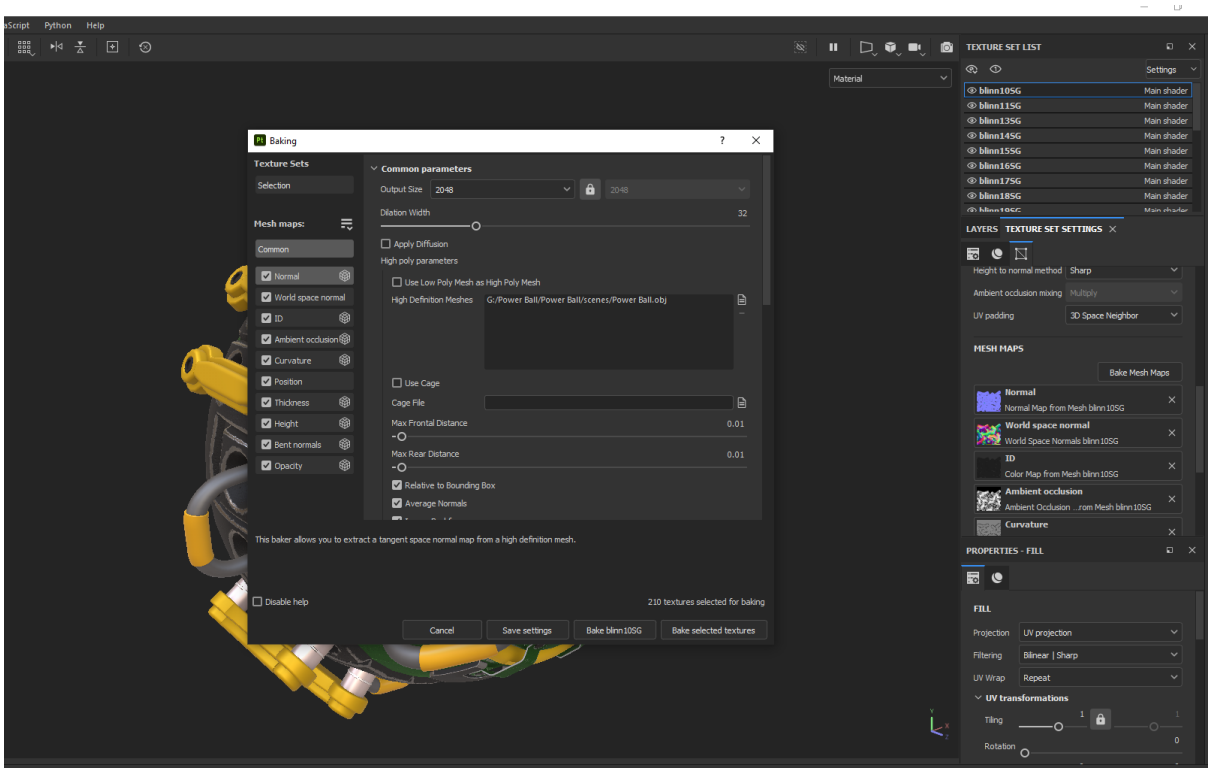


Figure 5.3.4: Baking of Power Generator

5.3.5 Texturing

I used **“Adobe Substance Painter”** for texturing my model.

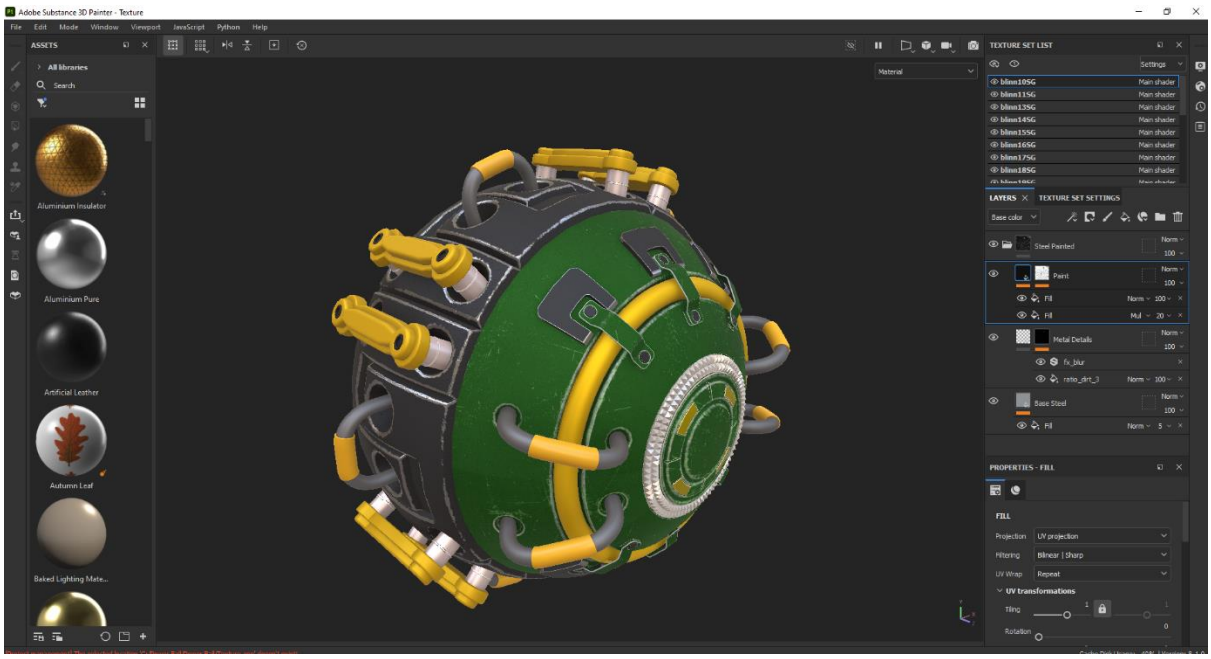


Figure 5.3.5: Texturing of Power Generator

5.3.6 Lighting

I used **"Keyshot 10"** for lighting my model.

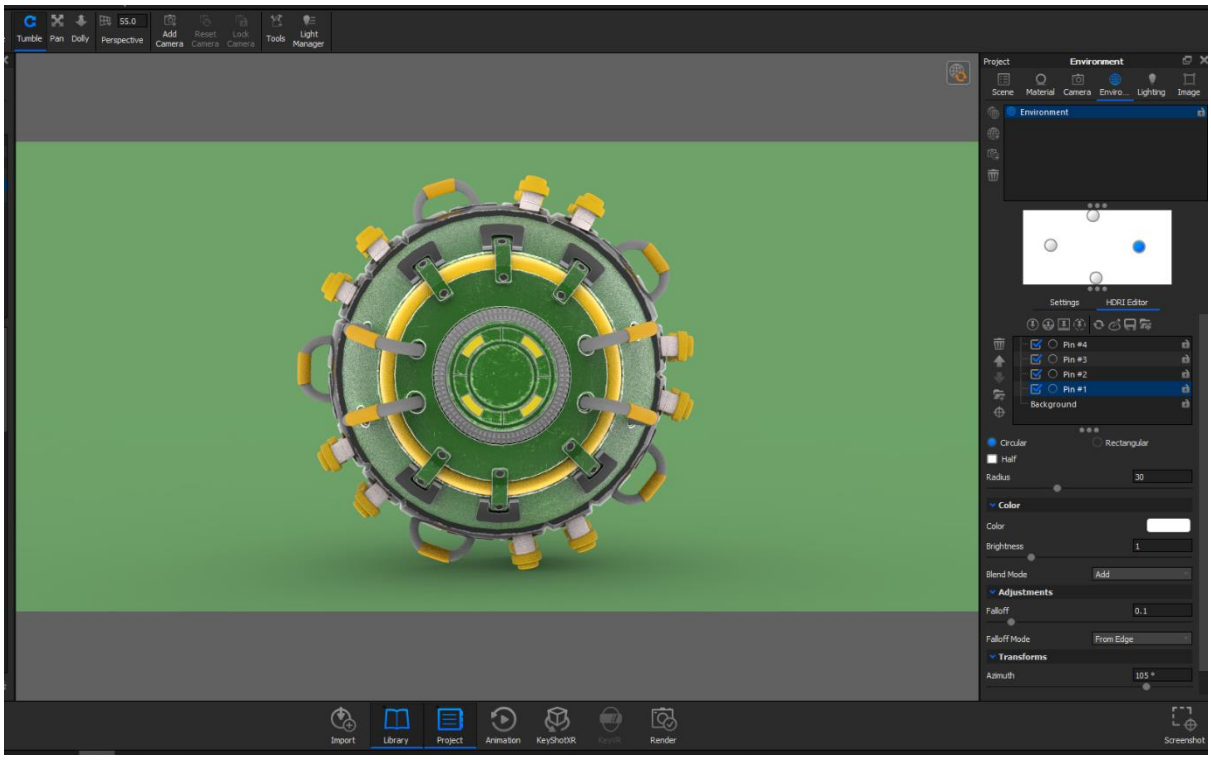


Figure 5.3.6: Lighting of Power Generator

5.3.7 Rendering

I used **"Keyshot 10"** as my render engine.

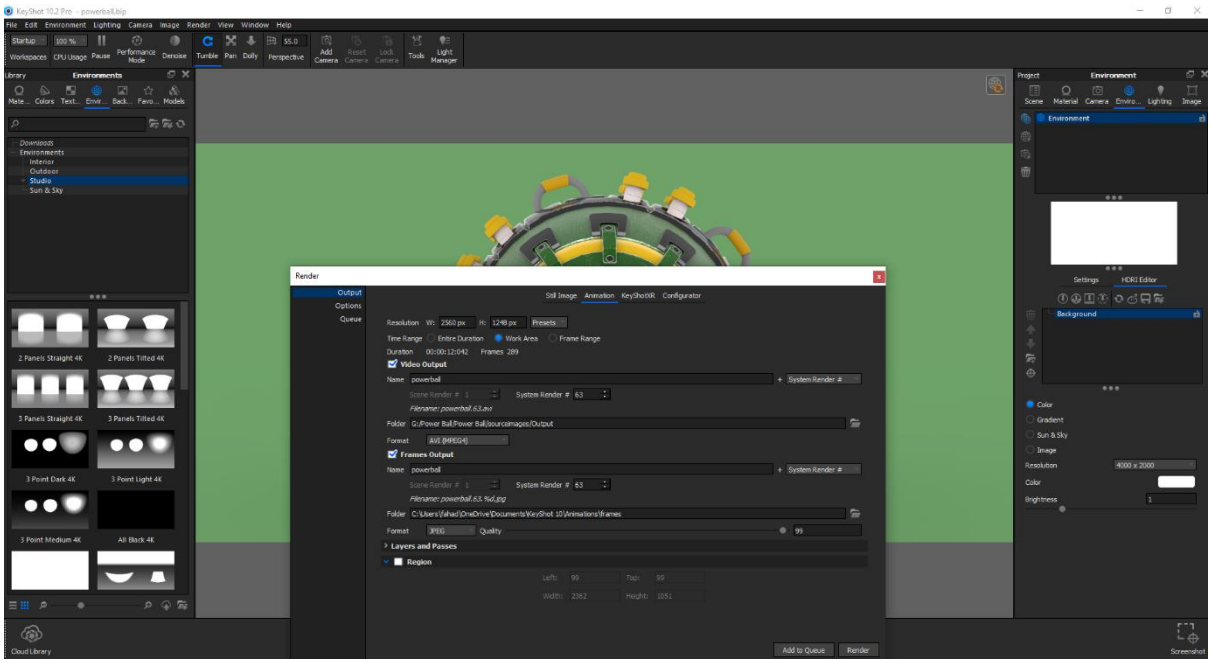


Figure 5.3.6: Rendering of Power Generator

Render Output:

Figure 5.3.7: Render Output of Power Generator

Figure 5.3.7: Render Output of Power Generator

Figure 5.3.7: Render Output of Power Generator

Figure 5.3.7: Render Output of Power Generator

5.4 Post Production

5.4.1 Retouching

After retouch in **"Adobe Photoshop CC"** my render output these are the final result of my Power generator,

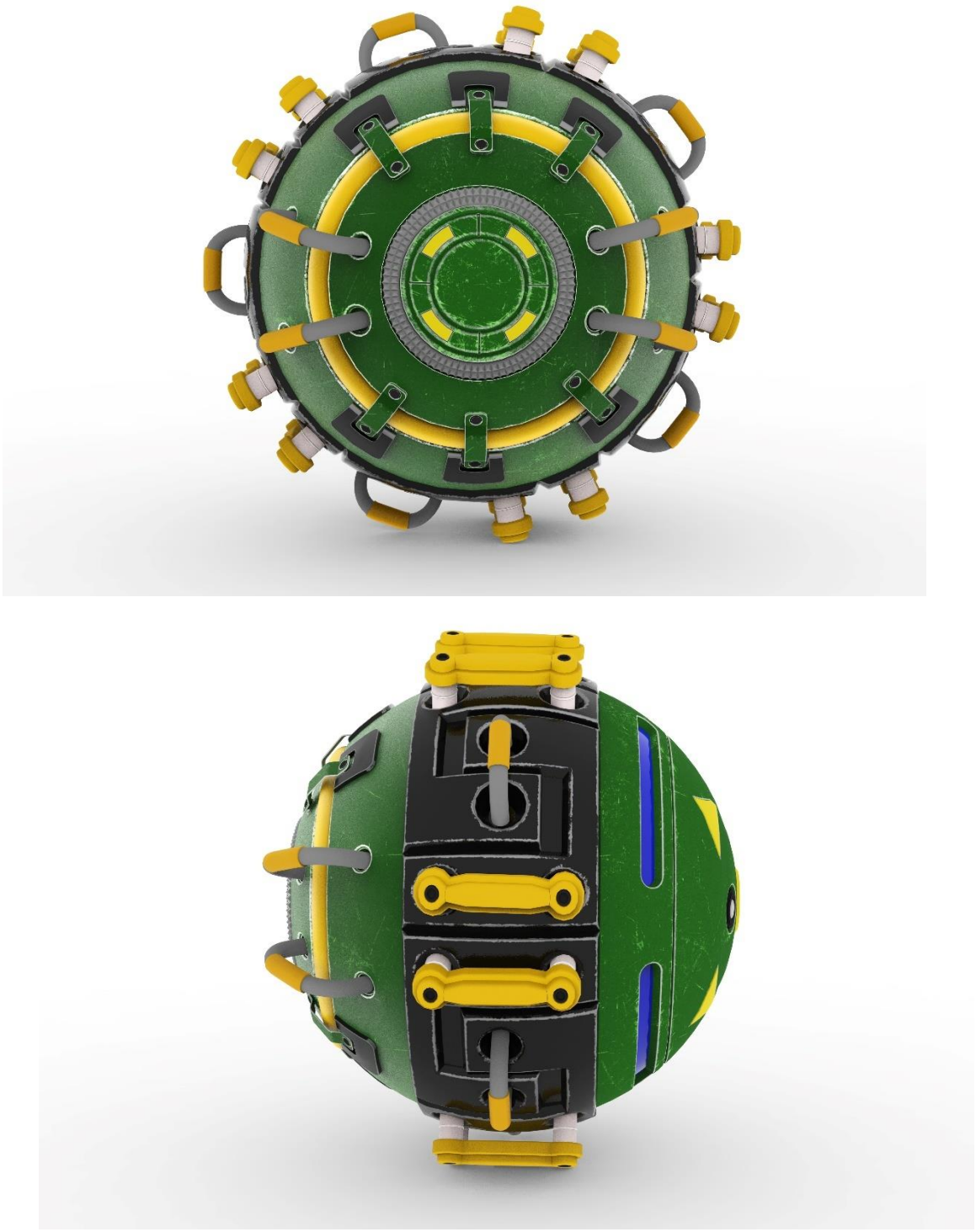


Figure 5.4.1: Final Output of Power Generator

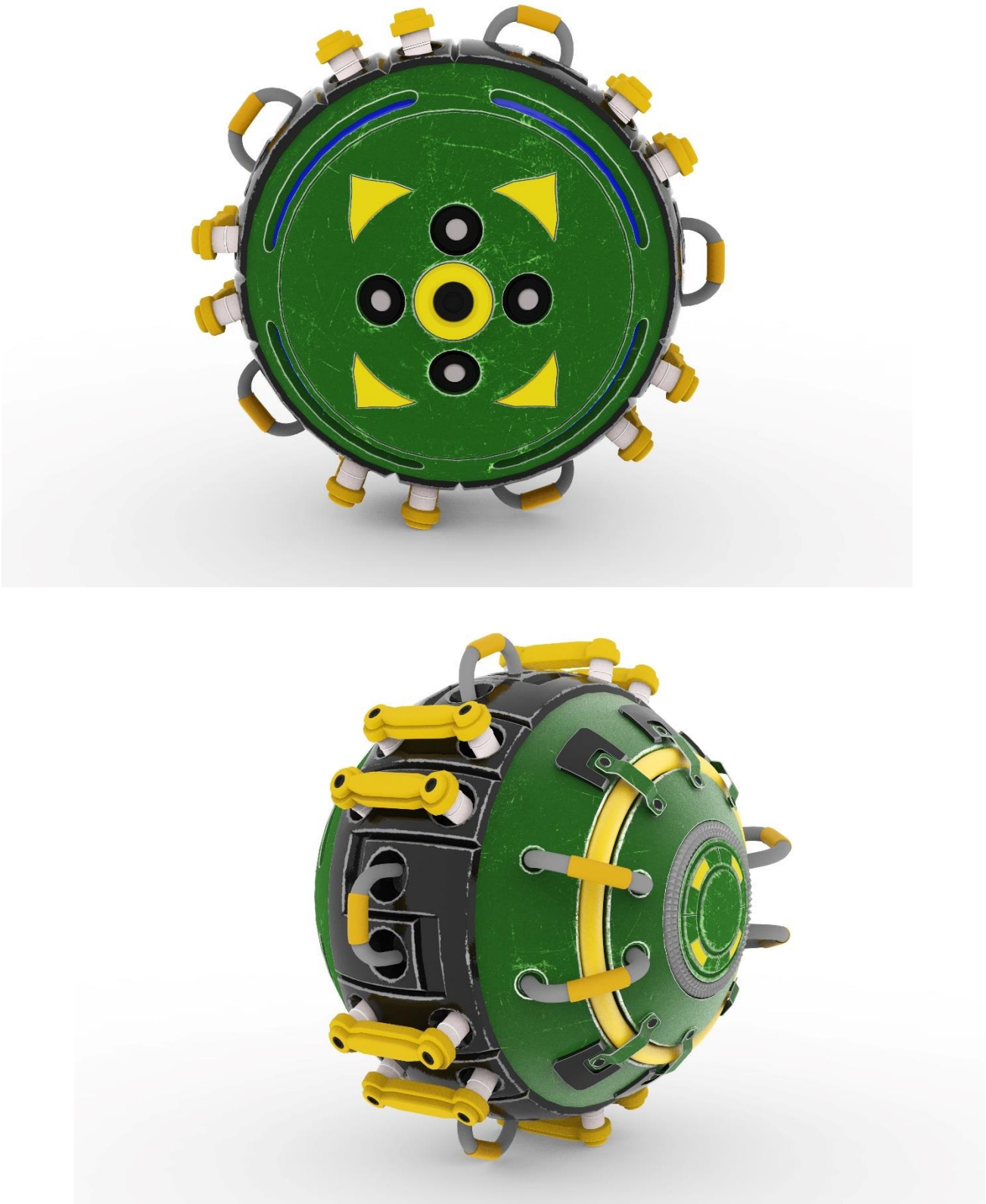


Figure 5.4.1: Final Output of Power Generator

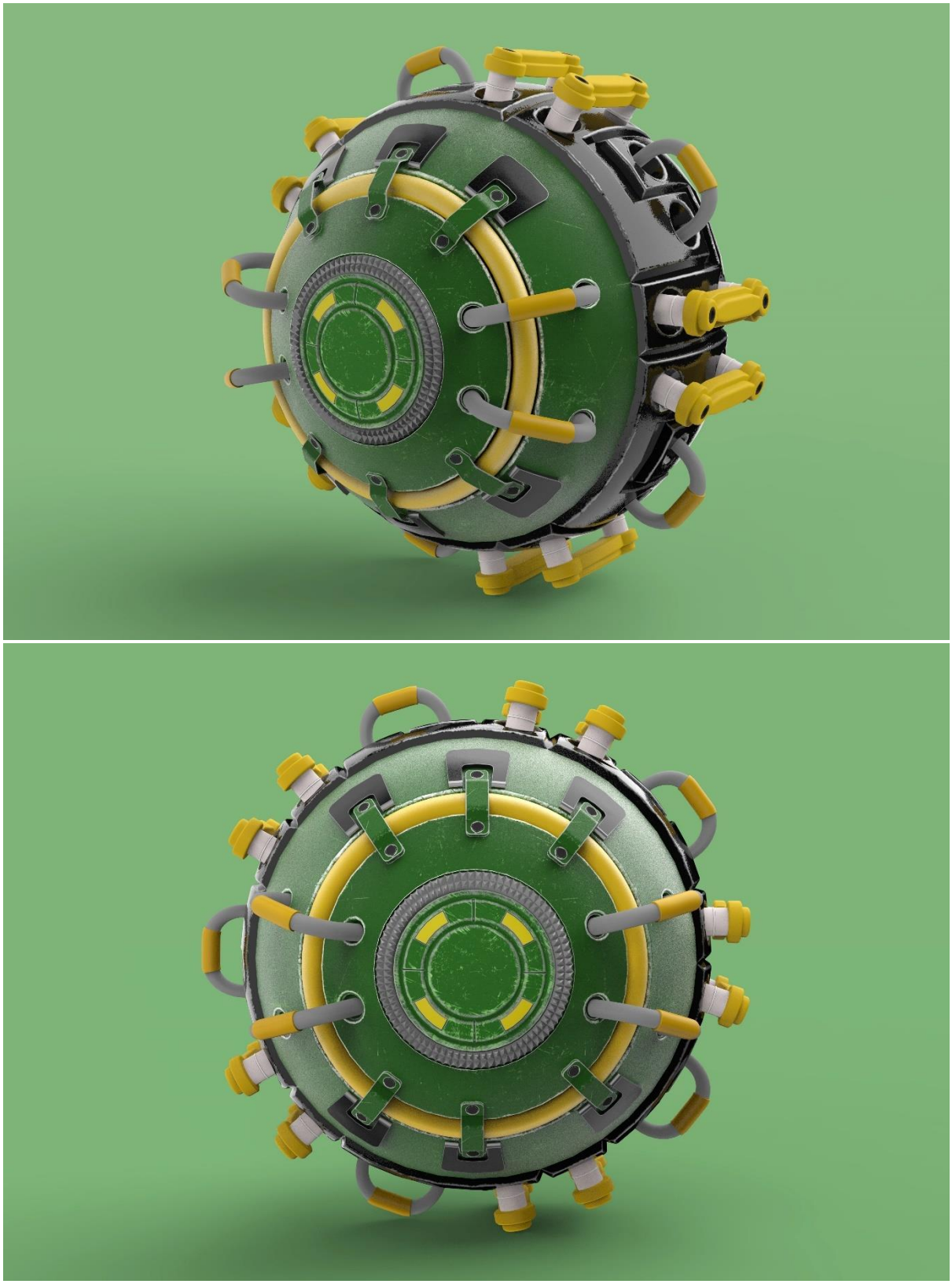


Figure 5.4.1: Final Output of Power Generator

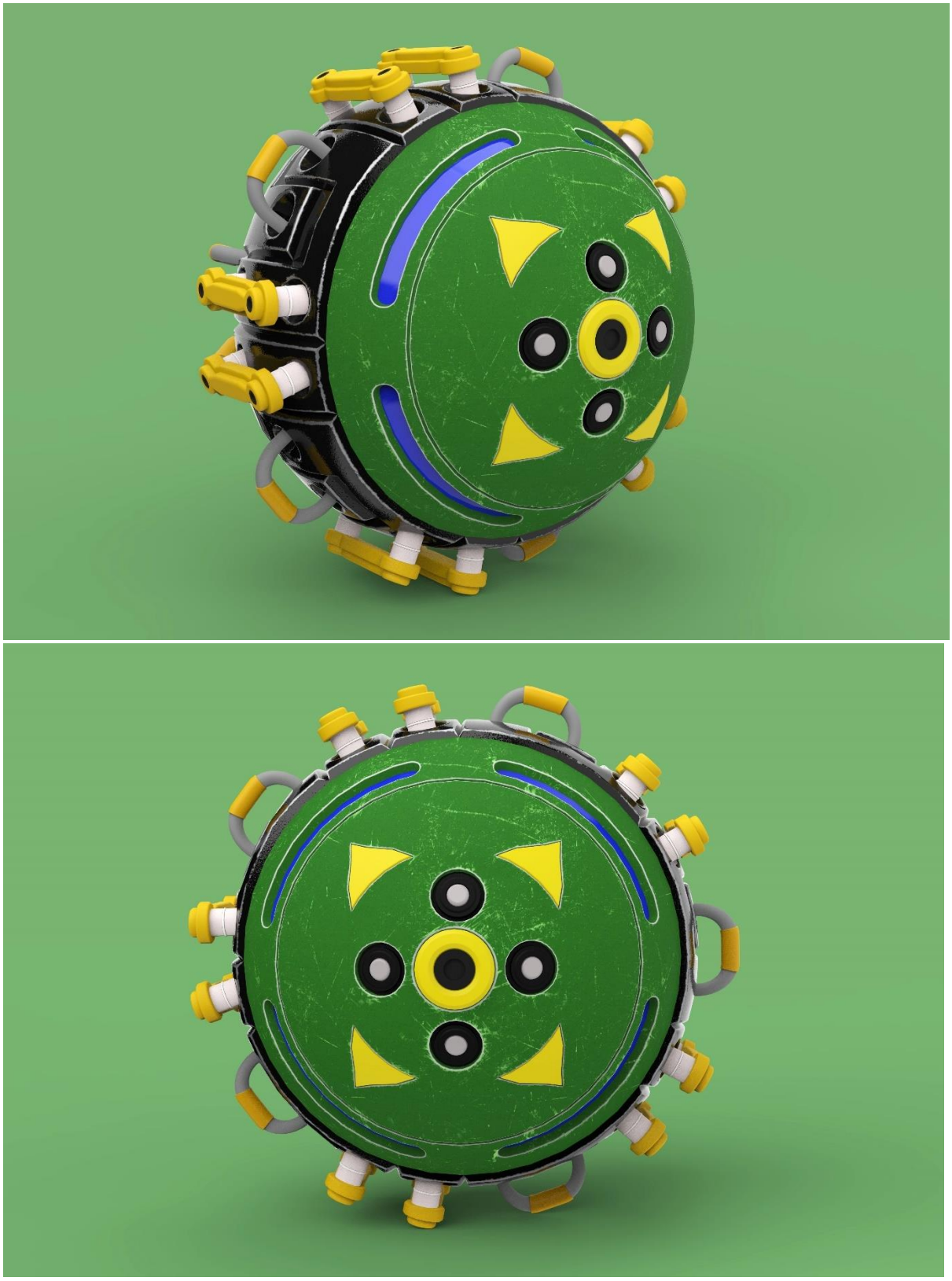


Figure 5.4.1:Final Output of Power Generator

Figure 5.4.1: Final Output of Power Generator

5.5 Use of My Power Generator in 3D indusrtey

As this model is a high poly and high detailed model so it can be use in many industries. As like,

- My “Power Generator” 3D model has a great demand in engeenering industry.
- It can be use in game industry.
- “Power generator’ can also use in 3D animated movie.

CHAPTER 6: METALLIC HOUR GLASS PRESENTATION

6.1 Thought Process

After research a lot I thought I can make an “Hour Glass”. As I modeled “Portal of Time Travel” so Hour glass can be a substitute model for my big project. So I made a decision to make an hour glass.

6.2 Pre-Production

6.2.1 Research References

I saw various kind of hour glass on internet then I gather all the idea I had. After that I modelled this 3D Hour Glass.

6.3 Production:

6.3.1 Modeling

I used “Autodesk Maya” for model this project. This model has developed step by step from a Cube poly primitive.

Here I’m going to share some picture of modeling process of my “Hour Glass”

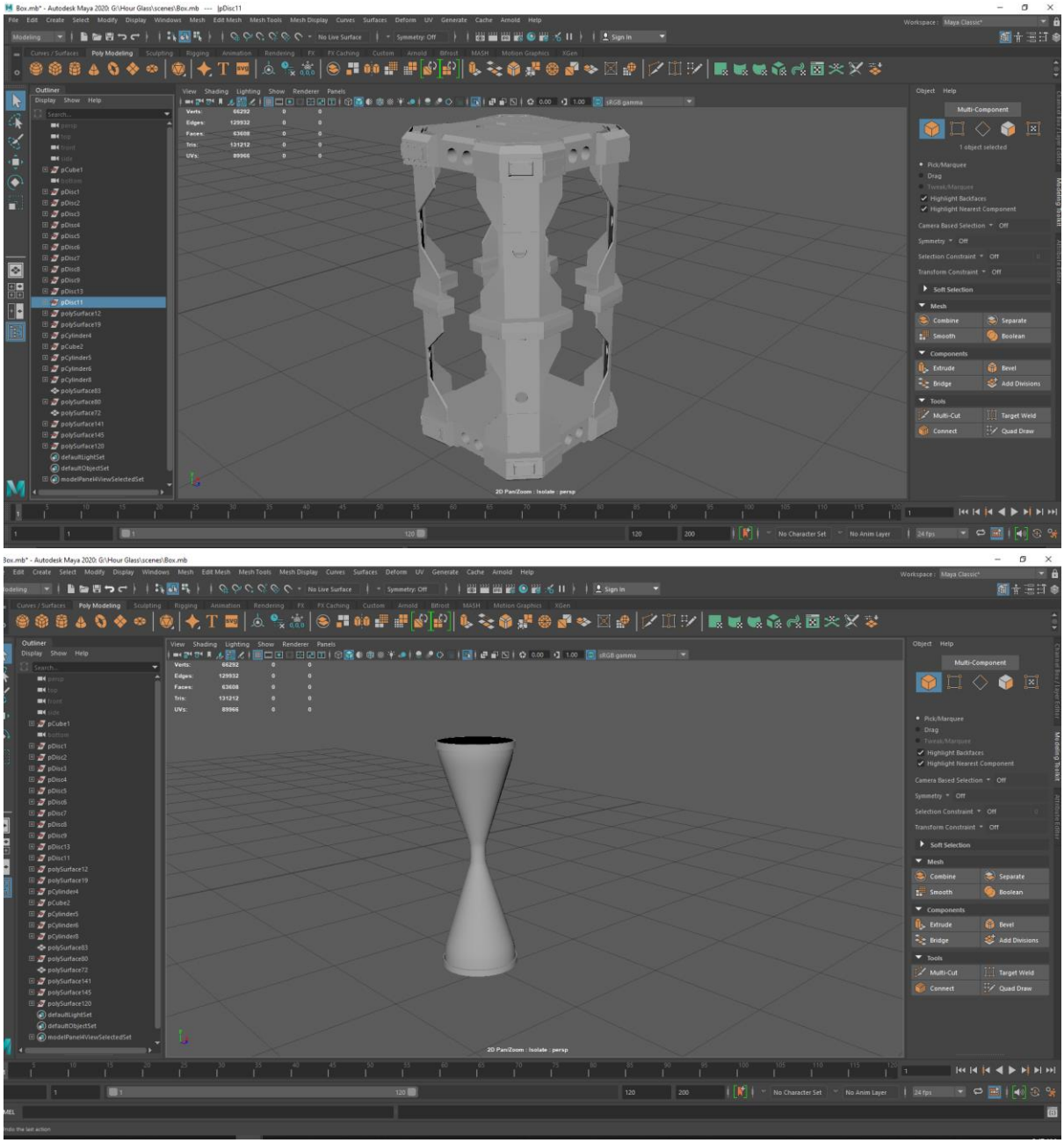


Figure 6.3.1: Modeling of Hour Glass

6.3.2 Retopology

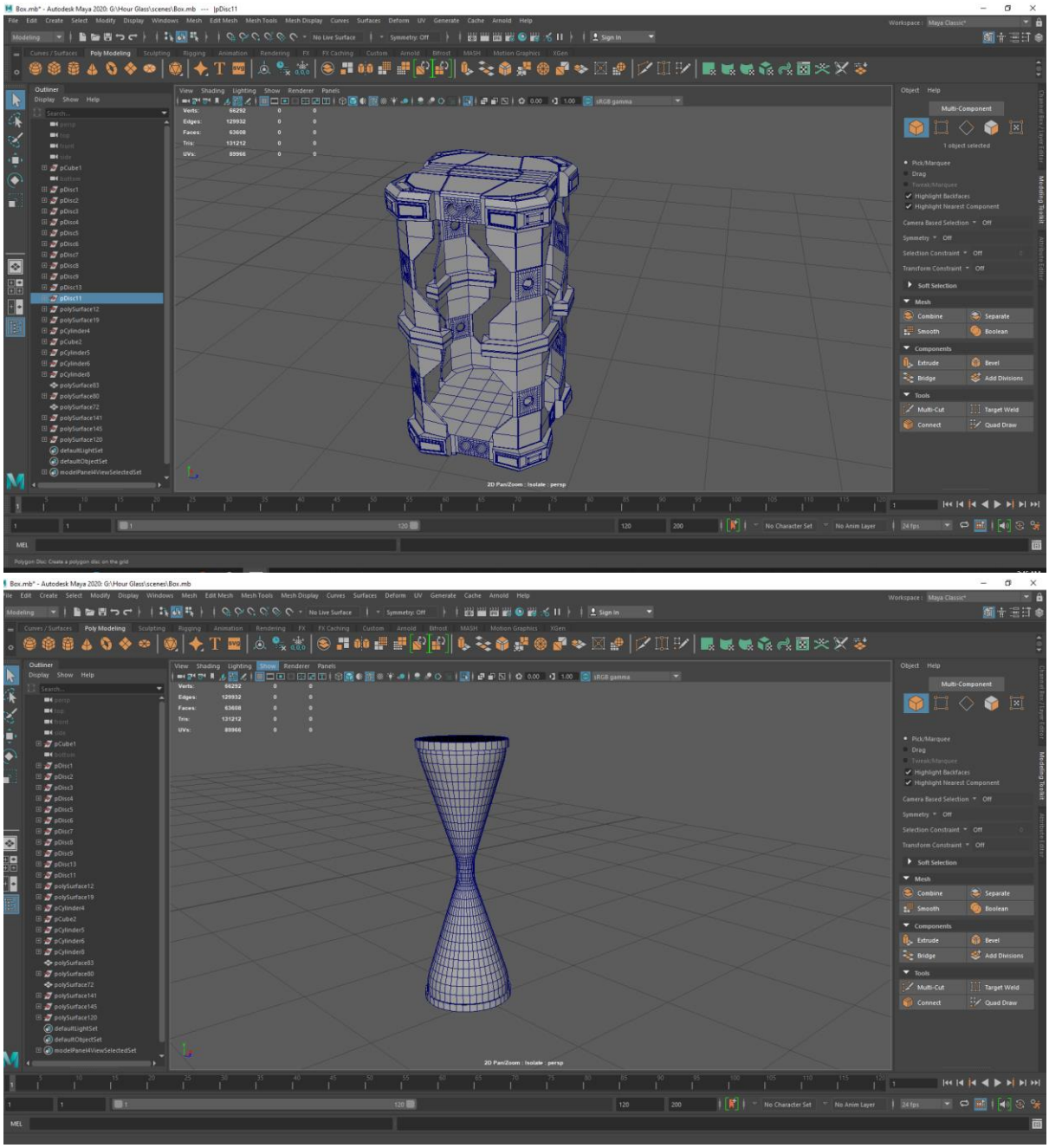


Figure 6.3.2: Retopology of Hour Glass

6.3.3 UV Unwrap

I used ‘Autodesk Maya Uv editor” for unwrap this model.

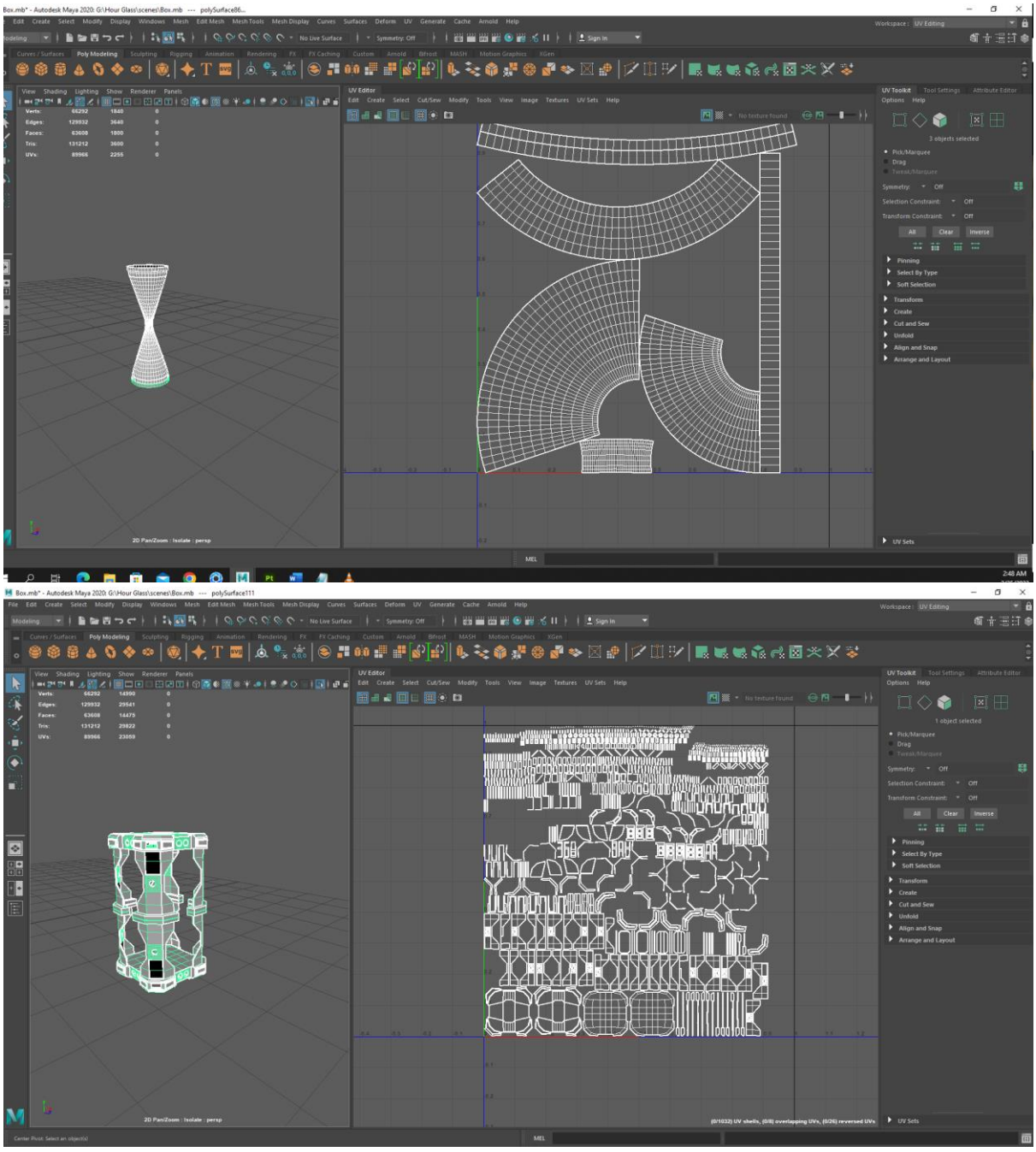


Figure 6.3.3: UV Unwrap of Hour Glass

6.3.4 Baking

I used “Adobe Substance Painter” for bake my texture.

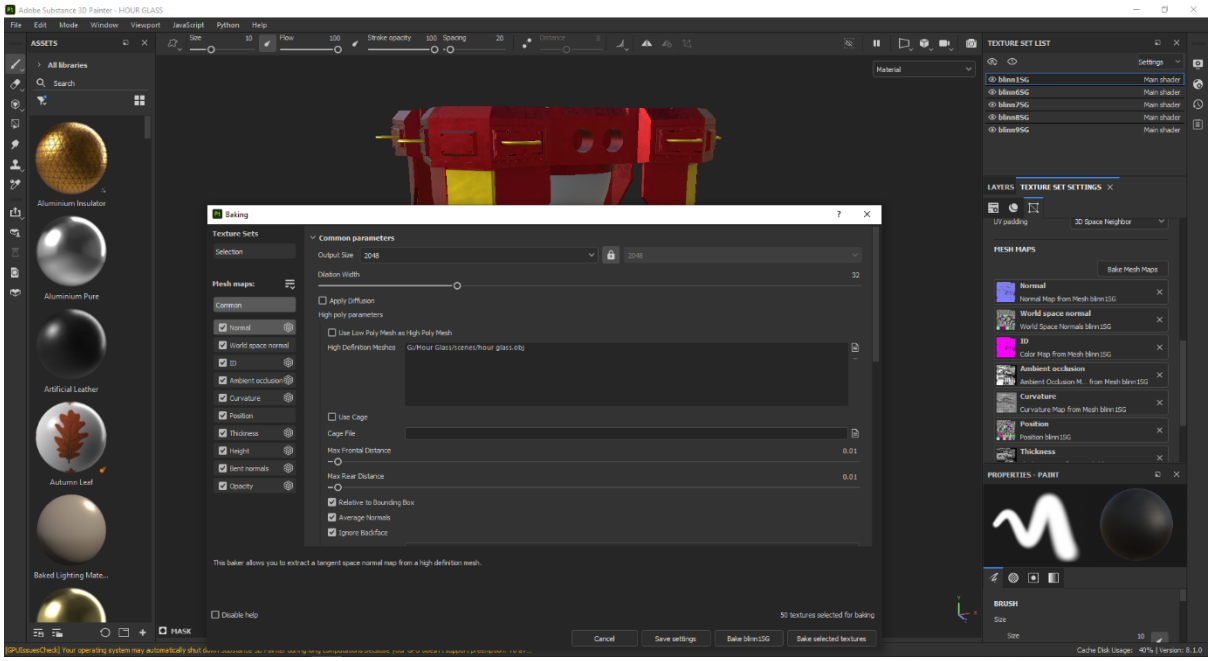


Figure 6.3.4 : Baking of Hour Glass

6.3.5 Texturing

I used “Adobe Substance Painter” for texturing my model.

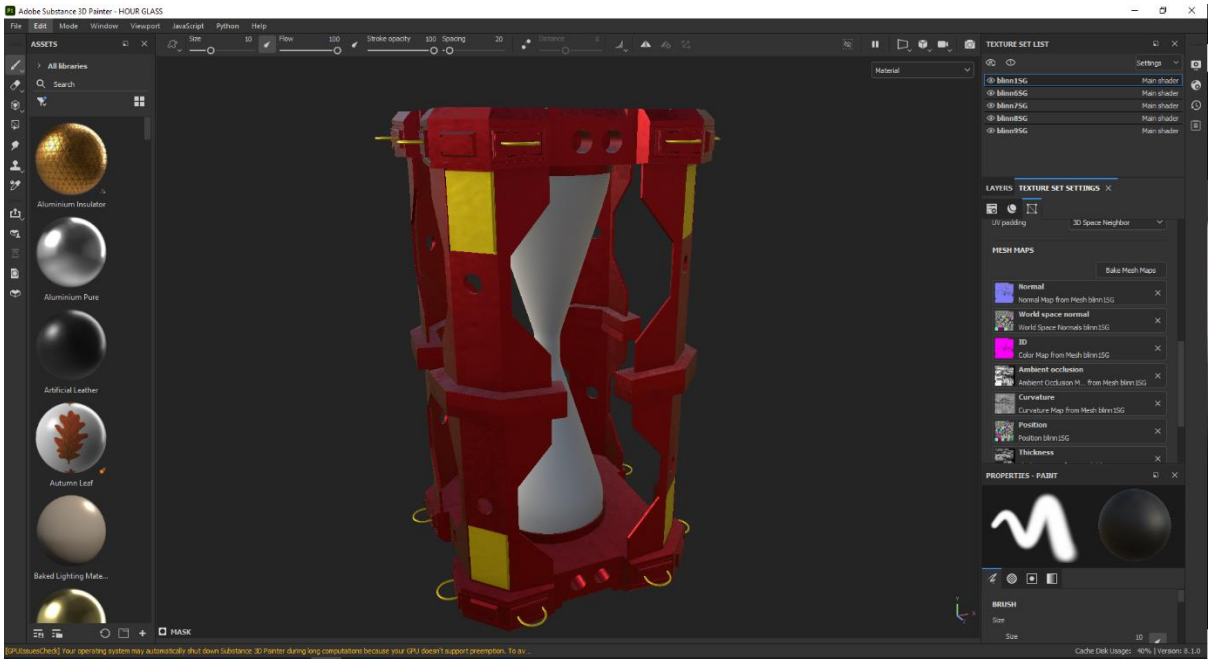


Figure 6.3.5: Texturing of Hour Glass

6.3.6 Lighting

I used “Keyshot 10” for lighting my model.

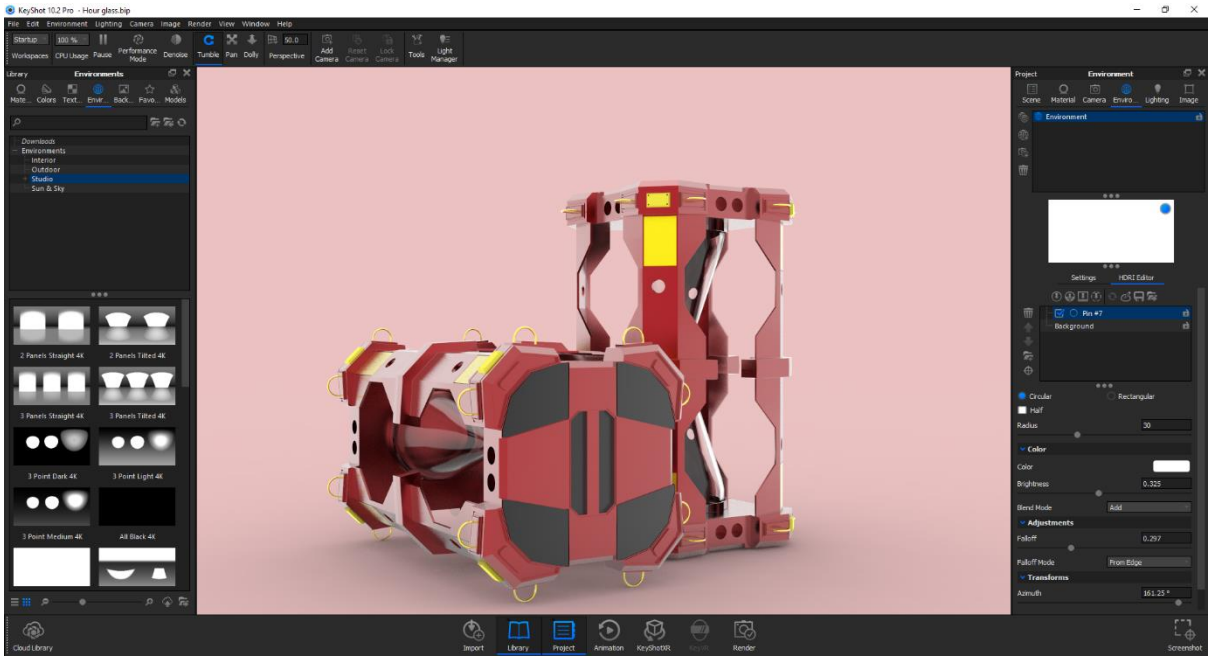


Figure 6.3.6: Lighting of Hour Glass

6.3.7 Rendering

I used “Keyshot 10” as my render engine.

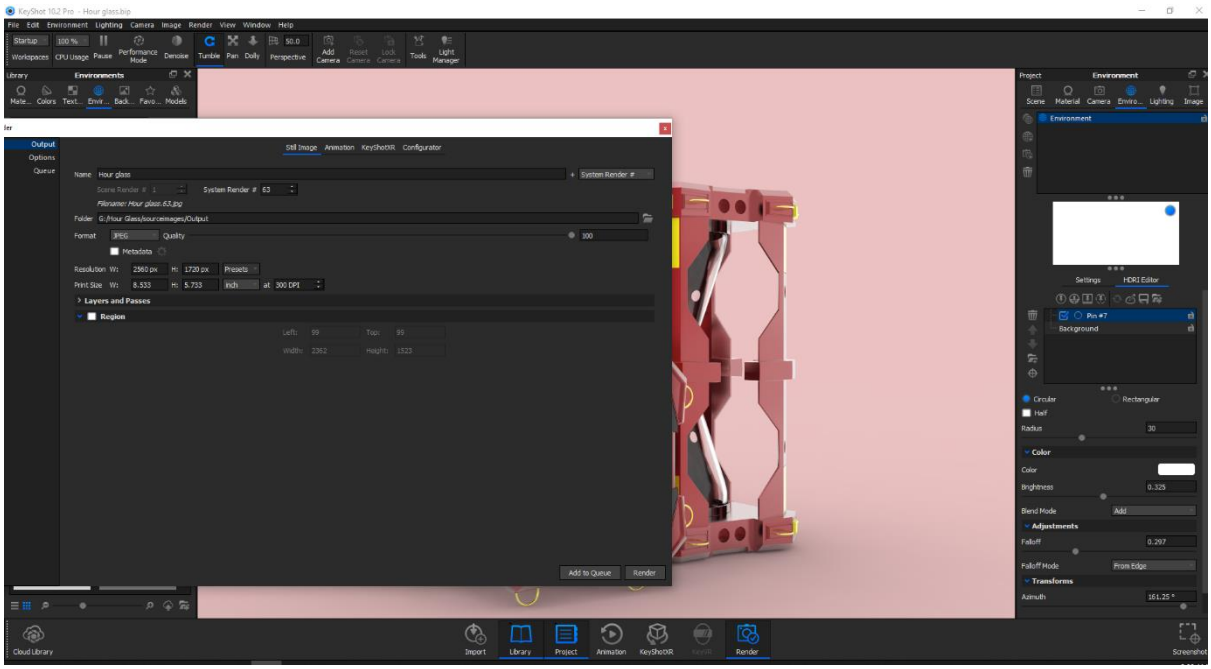


Figure 6.3.7 Rendering

Render Output:

Figure 6.3.7 Render Output

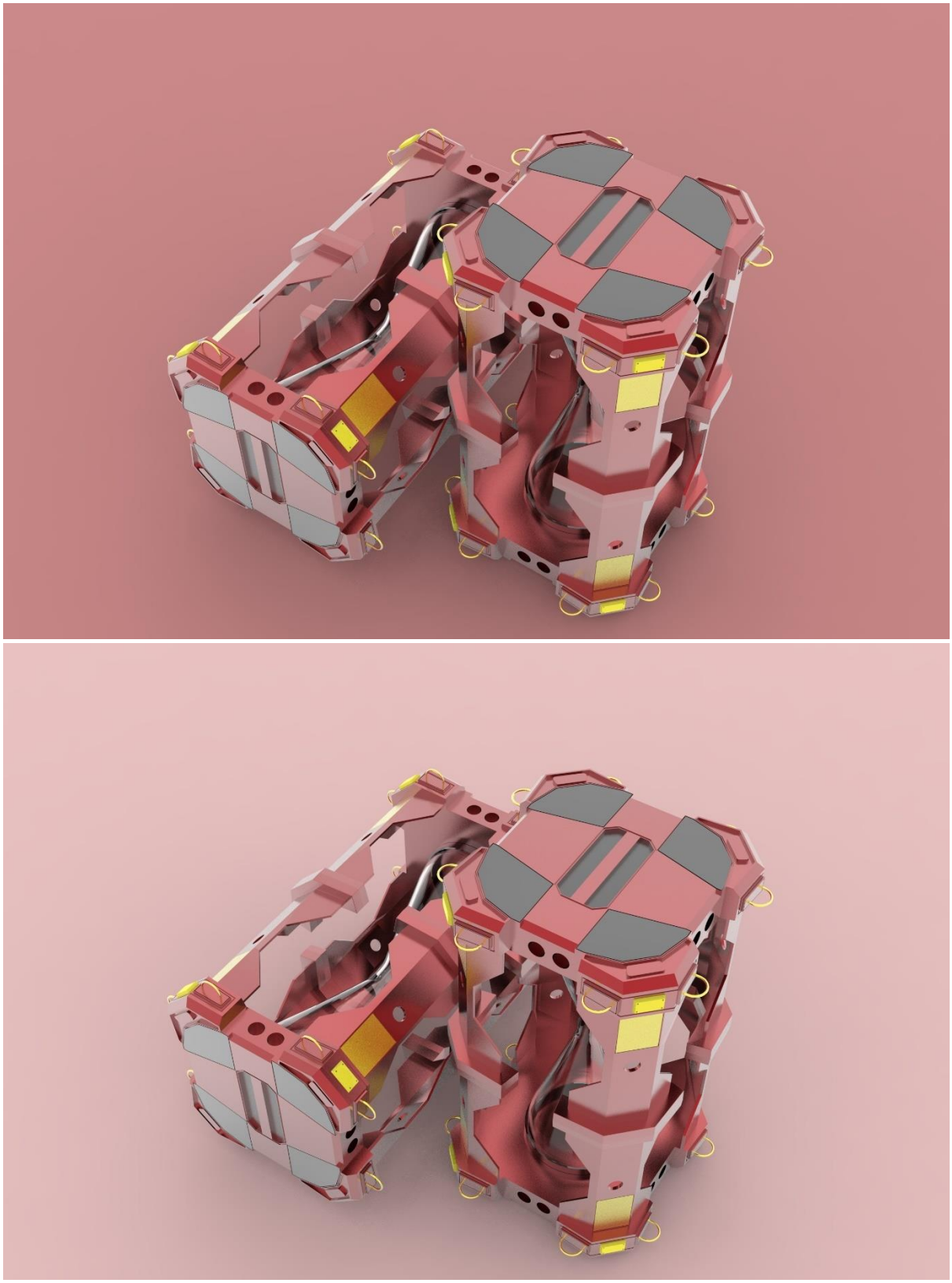


Figure 6.3.7 Render Output

Figure 6.3.7 Render Output

6.4 Retouching

I used “Adobe Photoshop CC” for retouching my render output.

Figure 6.4 Final Output

Figure 6.4 Final Output

Figure 6.4 Final Output

Figure 6.4 Final Output

6.5 Use of My Metallic Hour Glass in 3D Industry

As this model is a high poly and high detailed model so it can be use in many industries. As like,

- My “Hour Glass” 3D model has a great demand in engeenering industry.
- It can be use in game industry.
- “Hour Glass’ can also use in 3D animated movie.

CHAPTER 7: CONCLUSION

In conclusion, my 3D hard surface modeling project aimed to explore the process of creating detailed 3D models of mechanical and industrial objects using Autodesk Maya. Throughout my project, I learned about various modeling techniques, such as edge loops, vertex loops, supporting edges, beveling, circularizing, extruding, edge smoothing, softening, bridging, multicutting, and target welding.

I also explored the importance of topology in 3D modeling and how it affects the shape, smoothness, and deformation of 3D objects. I learned how to create clean and efficient topology by using edge loops and supporting edges, and how to avoid common issues such as non-manifold geometry, n-gons, and triangles.

My project showed that 3D hard surface modeling is a complex and challenging process that requires a good understanding of topology, modeling techniques, and deformation tools. However, with the right skills and knowledge, it can also be a rewarding and creative process that allows me to bring my ideas to life in 3D.

Overall, My project contributed to my understanding of 3D hard surface modeling and provided me with valuable skills and knowledge that I can apply in my future projects and careers in 3D modeling and animation.

Thank You

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