

**EXPLORE 3D MODELLING TOOLS AND TECHNIQUES FOR DEVELOPING  
LOW POLY 3D GAME ENVIRONMENT**

**BY**

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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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**27 DECEMBER 2025**

## APPROVAL

This Project titled “**Explore 3D Modelling Tools and Techniques for Developing Low Poly 3D Game Environment**”, submitted by **Nusrat Keramat Nisha** 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 December 2025.

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We hereby declare that, this project has been done by us under the supervision of **Mr. Arif Ahmed, Professor of Practice, Department of MCT** Daffodil International University.

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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## ACKNOWLEDGEMENT

First, we express our heartiest thanks and gratefulness to almighty God for His divine blessing makes us possible to complete the final year project/internship successfully.

We really grateful and wish our profound our indebtedness to **Mr. Arif Ahmed, Professor of Practice**, Department of MCT Daffodil International University, Dhaka. Deep Knowledge & keen interest of our supervisor in the field of “*3D Animation and Visualization*” to carry out this project. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts and correcting them at all stage have made it possible to complete this project.

We would like to express our heartiest gratitude to **Kazi Jahid Hasan, Assistant Professor, Department of MCT** and **Mr. Md. Salah Uddin, Head, Department of MCT**, for his kind help to finish our project and also to other faculty member and the staff of MCT department of Daffodil International University.

We would like to thank our entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

Finally, we must acknowledge with due respect the constant support and patients of our parents.

## **ABSTRACT**

For a computer game creating a perfect game environment is very important. Because the success of a game development largely depends on the game environment. Through my project, I have created an environment that makes it possible to develop a clear, easy-to-understand and fast game. I have created a low-poly game environment in my project. Some of the advantages of creating low poly game environment are that it can be created with a small number of polygons, which makes the flat and sharp faces of the model clearly visible and makes it easy to identify an object. A user will be able to easily identify any type of object from a distance. Another advantage of low poly games is that the game size is very small, which makes it easy to download the game on computers and mobile phones. The main theme of my game environment is pirate's adventures. In reality, pirates are used to be very dark, scary, and mean. But by creating games in a low-poly style, it is possible to make their characters more appealing, environmentally friendly, and accessible. Creating a beautiful and engaging low-poly game does not require a large number of artists and the financial support of a large publisher. Small teams or individuals can create games through creativity and low budgets. Overall, A low poly pirate game has a clear, consistent art style, it works fast on almost any device and its simpler and faster to develop. This all adds up to a really fun and unique game.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Background Studies

People's tendency to play games has now evolved from just a hobby to a universal recreational activity. In the arcade and early console era, gaming was considered only as a means of entertainment. But with the increase in the use of phone, consoles and PCs, the trend of using it among the audience is also increasing. Nowadays, due to the availability of smartphones and the internet, gaming has become a huge hit among people of all ages. It is no longer just a matter of entertainment; it is a social platform and has had a huge impact on modern world culture. The environment of a game is very important because it determines the overall experience of a player. It can make a game terrifying, peaceful or adventurous, which helps to create a player's mood. A low poly game environment is a method where a very limited amount of polygon is used, resulting in a clear stylized visual that looks intentionally blocky and angular rather than realistic. Early games used this method due to technological limitations, but modern developers deliberately use this method for its functionality, timeless appeal, and unique look. Not only that, low poly game assets are easy to create, don't require a large budget, and can be easily redesigned. This is a time-consuming process. A unique low poly style is easily recognizable, making it stand out among many realistic game assets for its unique look. The pirate expedition genre is suitable for the low poly art style because its main elements are ships, palm trees, treasure chests and skulls which are very iconic. Through the low poly method, it is possible to give these elements a clean and clear look. In this project, I created a complete low poly pirate themed environment that can be used to create a complete and perfect pirate adventure game in the future.

### 1.2 Motivation

I grew up watching various pirate games, movies, and cartoons since I was a child. The life of pirates, their adventures, and mysterious lifestyles intrigued me a lot. That's why I choose this project to make that adventurous and mysterious life a reality. Besides classic

cartoons and early games were not photorealistic, they were basically the perfect combination of strong shapes, vivid colors, and clear stories. The 2D animation of our childhood can be given a realistic look through the low poly approach. For example, a ship's hull might be a simple thick U-shape or a bathtub shape instead of a complex shape and there are not many low poly pirate adventure games available in the current market. People feel very good about nostalgic views, so I think if the artistic style of our childhood can be brought back through low poly, it will be very popular with everyone. Currently, high poly games are very popular in the market, but not everyone can afford them, so they cannot enjoy these games. Through low poly games, it is possible to play on any old laptop, PC or mobile DP with less space, so more people can enjoy the game. That's why I created a low poly game environment that, when a full game is created, will have adventure, fun, and exploration. New generation kids will be able to enjoy early-era style games that are not widely available today.

### 1.3 Objective

Main objective of my project is:

- i. **The usefulness of low poly art for Hindi game developers:** If a complete game prototype can be created by doing a complete case study of this project, it can be easily analyzed how the low poly art style is an effective, efficient and powerful approach for independent developers and small teams. This will explain how a high level of artistic expression and player participation is possible without the aid of any type of photo realistic graphics.
- ii. **Providing a Foundational Framework for Aspiring Game Developers:** This project will create a detailed documentation of the entire pipeline, from initial asset creation to texturing, making it a valuable and practical learning resource for creators interested in learning.
- iii. **Demonstrating the power of stylized aesthetics in digital storytelling:** The main goal of this project is to demonstrate how a strong and consistent low poly art direction can be used to create an engaging and immersive game world. It will

demonstrate that not only mood, character and a unique identity are important, but also shape, color and light are equally essential to creating an environment.

- iv. **Promoting a specific creative vision and preserving a playful aesthetic:** A key goal of this project is to successfully translate the nostalgic and captivating feel of classic cartoons and early 3D games into a modern interactive experience. The project aims to preserve and promote the value of this timeless game aesthetic within an industry that often focuses on hyperrealism.

#### **1.4 Problem Statement**

High-budget game developers have largely set their sights on creating games with highly realistic visuals. This trend creates a significant barrier to entry for independent developers and solo creators who lack the resources to compete on a technical level. When video game developers prioritize creating graphics that closely resemble the real world, they often miss out on the opportunity to create a uniquely memorable and stylistic visual signature for their games. While stylized art styles are great for game development - because they're easy to create, run smoothly on any device, and give the game a cool and unique look - there aren't many complete videos or tutorials that show you step-by-step how to create a fully connected and fun game world from start to finish using this style. There are many tutorials or guides that only teach how to create a single 3D model, such as a tree, a house, or a sword, but they don't teach how to put all of the models together into a fully functional game world. So, people can create nice looking assets, but they often don't learn how to put them together, decorate, and polish them to create a fully playable game environment. This project aims to solve a real-world problem where there are not enough practical examples or complete guidelines to show independent small game developers how to create a completely beautiful and smooth-running free game using low poly art. The project uses a -themed game world as an example to demonstrate that low poly art works as a great alternative. This project is not just about creating a 3D model, it also records and explains every step of how it was made so that others can learn from it. Ultimately, the project aims to prove that you don't need ultra-realistic graphics to make great games. A game with a strong artistic style, fun and creative game play can be just as good or even better than this.

## **1.5 Target Audience**

This project is designed with both game developers and users in mind. This approach could be a great option for users who are indie game fans, who like creativity in games or who prefer relaxing, peaceful games over intense action or who miss the old, simple, low-poly look of early 3D games. This project will also serve as a first step for new game developers or those who learning the 3D art. Not only that, it can also be an inspiration for indie developers. They will get a clear idea of how to work step by step by watching this project. This project is also aimed at those who like to think creatively.

That's it for this part. Head to the next page for Chapter 2: Literature Review, where I will talk more about what I've already told you.

## CHAPTER 2

### LITERATURE REVIEW

low-poly 3D modeling is an important and respected method in both the game industry and education. Low poly asset creation is a key technique for both professional and educational work. It is valuable because it helps create a stylized and optimistic game world that does not require a super powerful computer. So, it is not just used for fun, it is a powerful form of the method used and recognized in industry and schools. The style is characterized by simple shapes, Flat shading, and bold forms, giving it a strong artistic look. Rather than trying to look realistic, Low-Poly emphasizes being visually appealing and functional. This is a great learning tool for beginners to modeling, as it teaches the basics of 3D modeling, such as proportions and design, without the pressure of using advanced tools or details. Because it's a less demanding and faster method of creation, low poly is perfect for developers or small game studios. They can create fully polished games without the need for expensive equipment or a large team. It makes game development more accessible, with creativity almost anyone can create something great. Low-poly modeling is a powerful, efficient, and creative way to make 3D games.

#### 2.2 Related Work and Research

There are many other pirate-themed games, game ideas, and 3D assets that use a low-poly or stylized art style. Some of them are:

- i. **Astroneer:** This is a small indie game that has become very popular and it's a great showcase to what a low-poly art style can achieve. The game uses bright, bold colors, simple geometric shapes, and a friendly, soft visuals. It creates a world that is welcoming, modern, and easily recognizable, not random or realistic, but full of life and personality. It proves that if simple design is done well, it is possible to make beautiful and professional games.
- ii. **Super Mario Odyssey:** this game shows that even big-budget games from huge studios (like Nintendo) use stylized graphics, not just realism. For example, it's various Kingdom like (the Seaside Kingdom) has use Simplified shapes, Bright,

- fun colors, Clear, cartoon-like visuals. Nintendo does this to make worlds that are instantly recognizable, full of charm, and easy to remember.
- iii. **Salt:** Salt is an indie pirate-themed game that focuses on exploration instead of fighting. It shows the peaceful and meditative side of adventure — sailing, discovering new islands, and enjoying nature. Because it uses a low-poly art style, the game feels calm, minimal, and relaxing. The simple visuals help players focus on the feeling of discovery rather than being distracted by too much detail.
  - iv. **Luna's Fishing Garden:** This game is a perfect example of the “cozy game” genre small, relaxing games designed to make players feel peaceful and happy. It uses Soft, pastel colors, Slow, gentle gameplay. The low-poly style fits this perfectly because it’s warm, clean, and easy on the eyes. The game doesn’t need high detail its charm comes from simplicity and emotion, not realism.
  - v. **Sea of Thieves:** It is the biggest and most recognizable pirate adventure game of modern times. Although it features advanced 3D graphics technology such as vast oceans, lighting and animation. Its visuals are still stylized, not photorealistic such as large waves, bulky ships and expressive characters. This game shows that you don't need realistic graphics to make a game popular and successful. Millions of players enjoy the game not only because of its realism but also because of its atmosphere, personality and sense of adventure.

### 2.3 Comparative analysis

Some low poly style games are already in the industry. But they also have some limitations, like the Salt game's environment is very peaceful, exploration-based but lacks environmental diversity. Most of the islands are visually similar and there is very limited story in them. The lighting doesn't create much of a mood or atmosphere. Textures and materials look very flat.



Figure 2.3.1: Similarity Problem in Salt

In these images, we can see that almost every island in the slot game looks the same. There is nothing special about them so there is not much to explore. The game is very limited. Since each of their weapons has a similar texture, there is no difference between them and it is very difficult to identify any object and as a result the game looks very bland.



Figure 2.3.2: Texturing Problem in Salt



Figure 2.3.4: Lighting Problem in Salt

Another example is Windward, a game that makes you feel like you're looking at the scenery from the sky. Players randomly roam around the sea, trading goods and battling other ships. This camera angle doesn't really engage players. Because they can't really feel the game. They cannot experience the beauty or atmosphere of the game environment up close. Its graphics are mostly the same and the general ocean, ships, or islands look pretty much the same.



Figure 2.3.5: Angle Problem in Windward



Figure 2.3.3: Similarity Problem in Windward

## 2.4 Thematic discussion

Low poly and stylized art have become increasingly popular in the modern gaming industry. A prime example of this is Astroneer and Luna's Fishing Garden. These games have proven that players are not only obsessed with ultra-realistic graphics, but they are also showing their interest in creativity and smoothness. Most indie games are designed to run smoothly on low-end hardware such as mobile or mid-range PCs. This is possible only with low poly art. This is because it uses fewer polygons and simpler layouts, which consumes less memory and reduces rendering time. In many studies and projects, it is seen that low poly art is an early educational step. Since no overly complex textures or sculpting are used here, it is a good system for beginners. From here, they can easily learn the basics of 3D such as form, color, scale, and proportion. But it lacks in some aspects, such as the depth, variety, or polish of the game. For example, some games use the same assets over and over again, some lack emotional depth, and some games use outdated lighting styles. My goal with this project is to create something new by combining technical limitations, strong visuals, and a modern look.

## 2.5 Tools and Techniques

All 3D models of this project were created using Autodesk Maya. Maya software is very useful for designing low-poly assets. Because it provides the user with a very flexible and efficient environment to work in, and it is very easy to design assets with precise geometry and clean poly. While creating the models, special care was taken in the optimization of each model, starting with shaping them. So that the models maintain their visual quality, and their polygon count is low. Keeping these things in mind, the models have been created so that they give good results in real-time rendering in game engines.



Figure 2.6.1: Logo of Autodesk Maya

I used Autodesk Maya's V-Ray plugin for all the texturing, lighting, and environmental modeling of the project. After completing the modeling phase of the assets, I set Autodesk Maya's materials on them. Autodesk Maya's V-Ray plugin's own powerful material editor and lighting tools brought the atmosphere of this project to life along with the textures, shadows, and atmosphere of the environment.



Figure 2.6.1: Logo of V-ray Engine

That's it for this part. Head to the next page for Chapter 3: Work Process, where I will talk more about what I've already told you.

## CHAPTER 3

### WORK PROCESS

#### 3.1 Project Overview

This chapter describes the entire process of creating my low poly 3d game environment step by step. There are three main steps in this process: modeling, texturing, and lighting. Each step has been carefully crafted to be consistent with low poly art. First, I created my references through AI. I chose Autodesk Maya to complete my modeling part. Then I used V-Ray plugin to set up all the 3D assets with their lighting, composition, and scene.

#### 3.2 Idea Generating

To begin this project, I first researched the environments and assets of various pirate-themed games. I used Gemini AI to get a better idea of what I wanted. I described the mood, style, and props I wanted to create to Gemini, and she helped me visualize all my assets accordingly. After selecting the ideas that fit my vision, I sketched them in a notebook. Based on that sketch, I began the process of creating my 3D models.

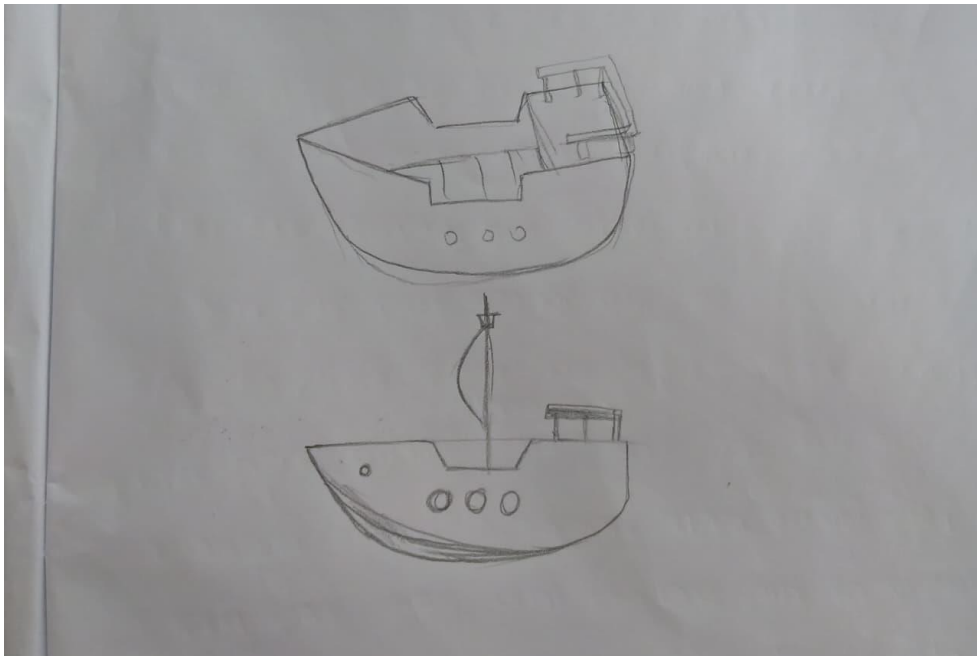


Figure 3.2.1: Ship Sketch

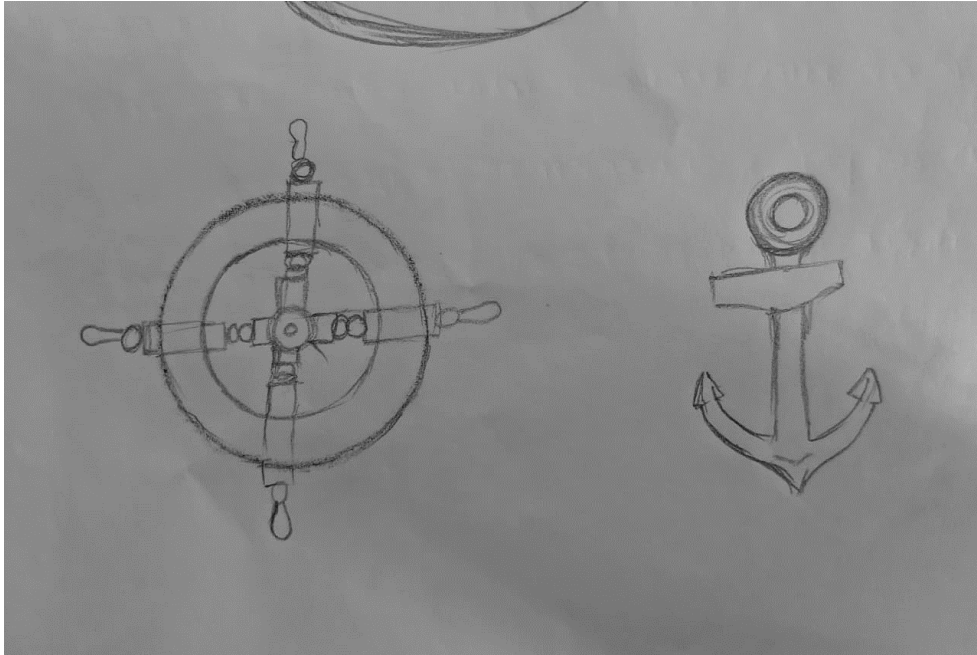


Figure 3.2.2: Anchor and Wheel Sketch

These are some reference images I drew where I made some prototypes of a ship's anchor, wheel, and houses, and based on these images, 3D models will be made later.



Figure 3.2.3: House Sketch

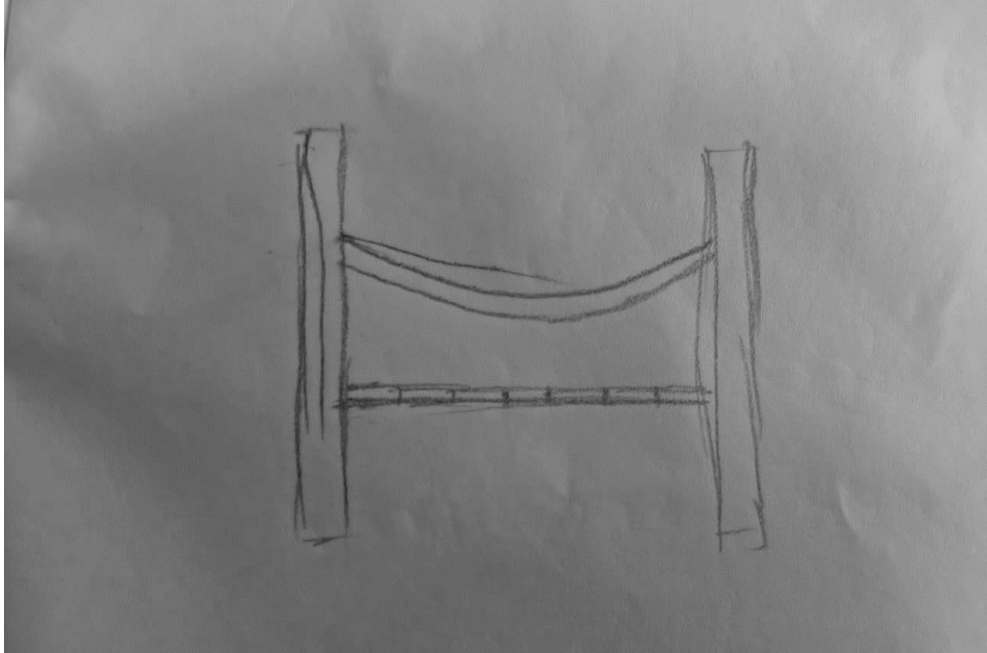


Figure 3.2.4: Bridge Sketch

These are some reference images I drew where I made some prototypes of a bridge and a watch tower and based on these images, 3D models will be made later.



Figure 3.2.5: Watch Tower Sketch

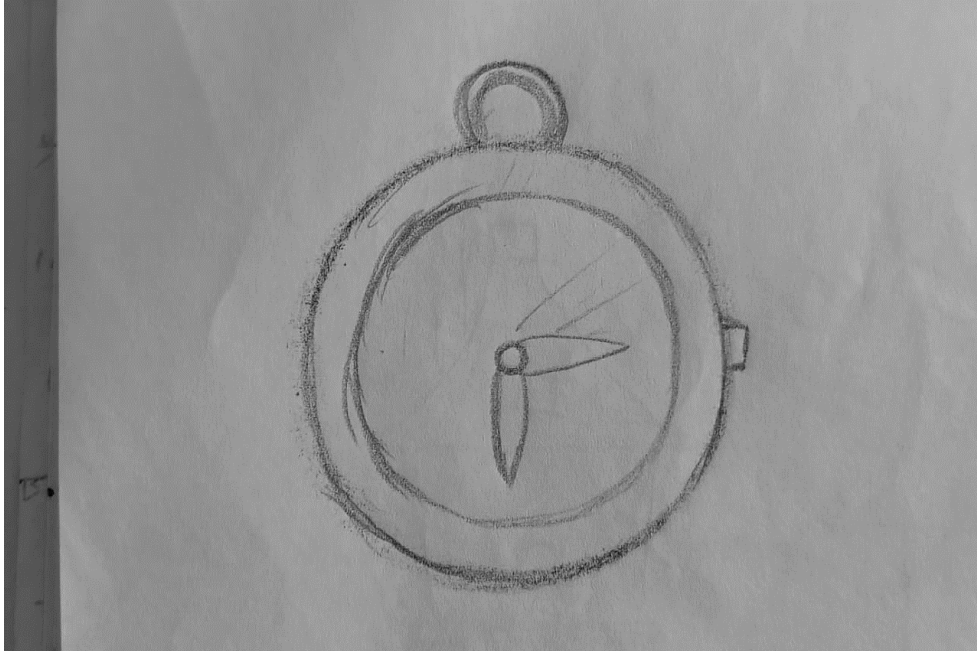


Figure 3.2.6: Compass Sketch

These are some reference images I drew where I made some prototypes of a compass and hourglass and based on these images, the 3D model will be made later.

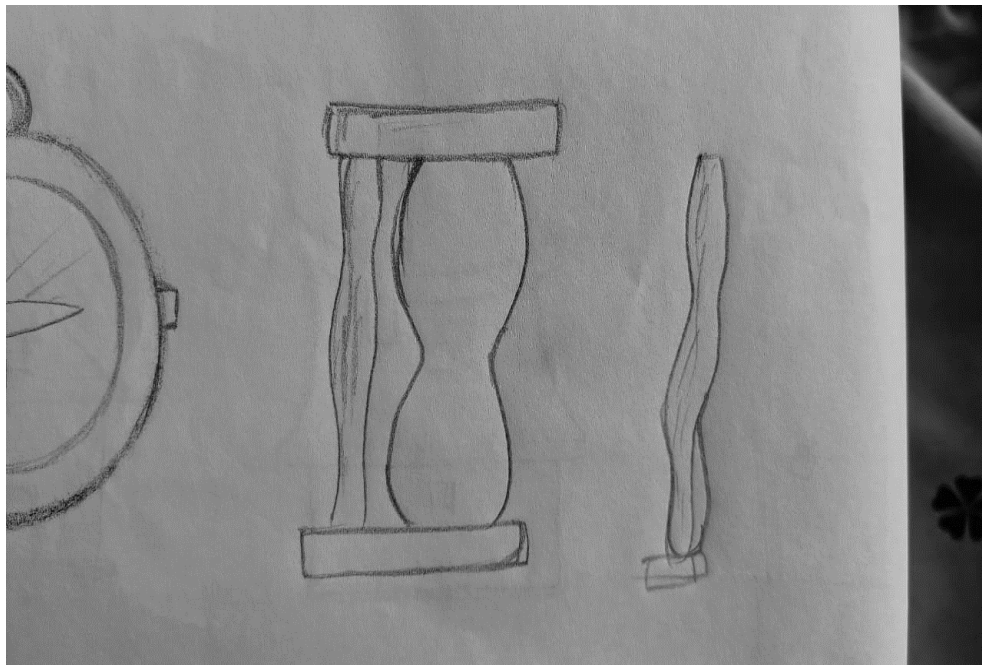


Figure 3.2.7: Hourglass Sketch

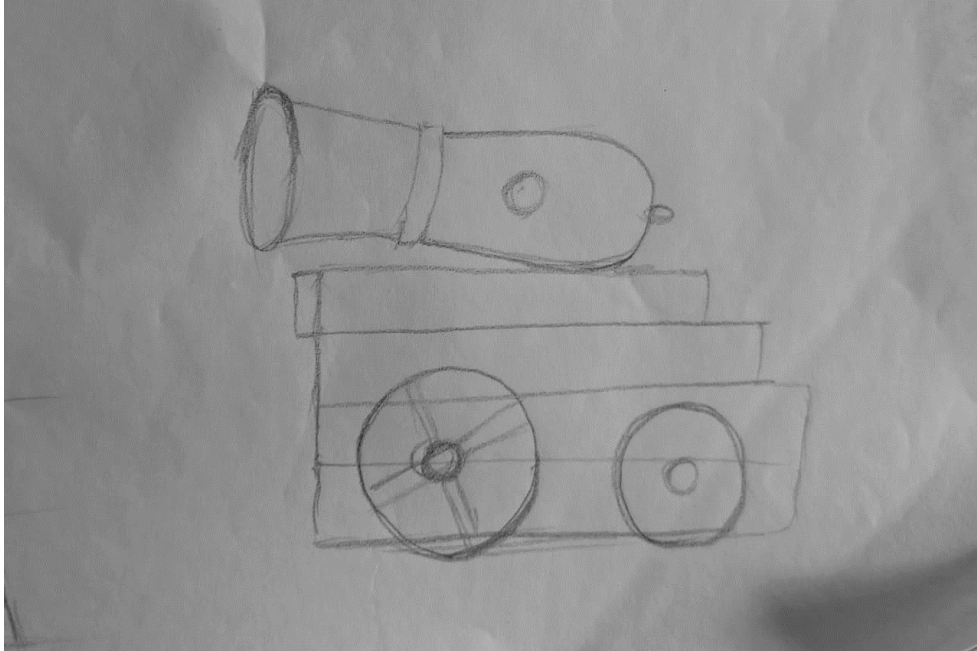


Figure 3.2.8: Cannon Sketch

These are some reference images I drew where I made some prototypes of a cannon, axe and skull and based on these images, 3D models will be made later.

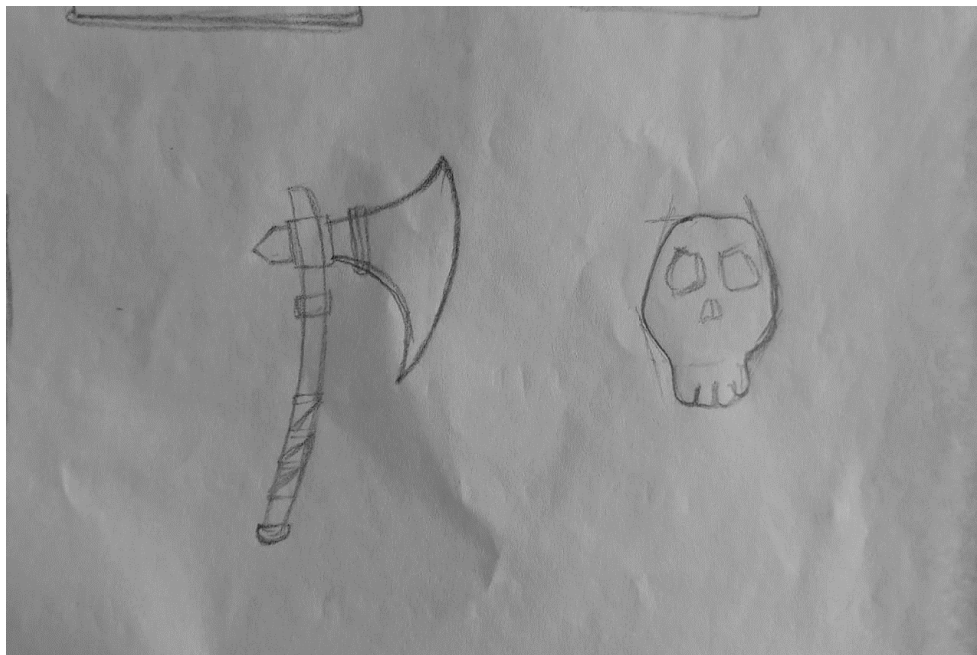


Figure 3.2.9: Axe and Skull Sketch

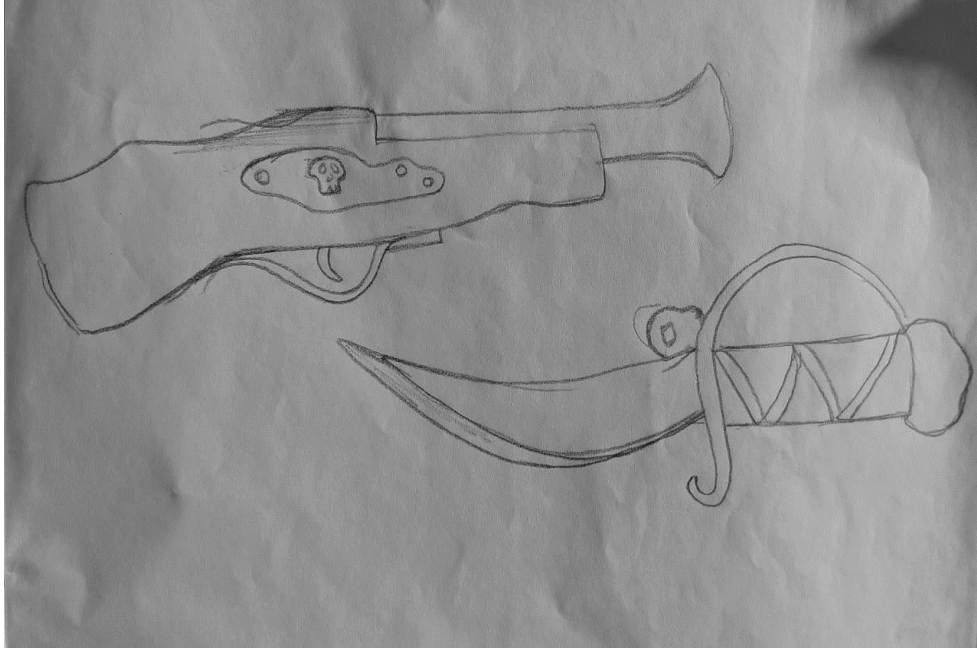


Figure 3.2.10: Pistol and Sward Sketch

These are some reference pictures I drew where I made prototypes of a gun, sword, palm tree, common fruit tree and some stones and based on these pictures, 3D models will be made later.



Figure 3.2.11: Trees Sketch

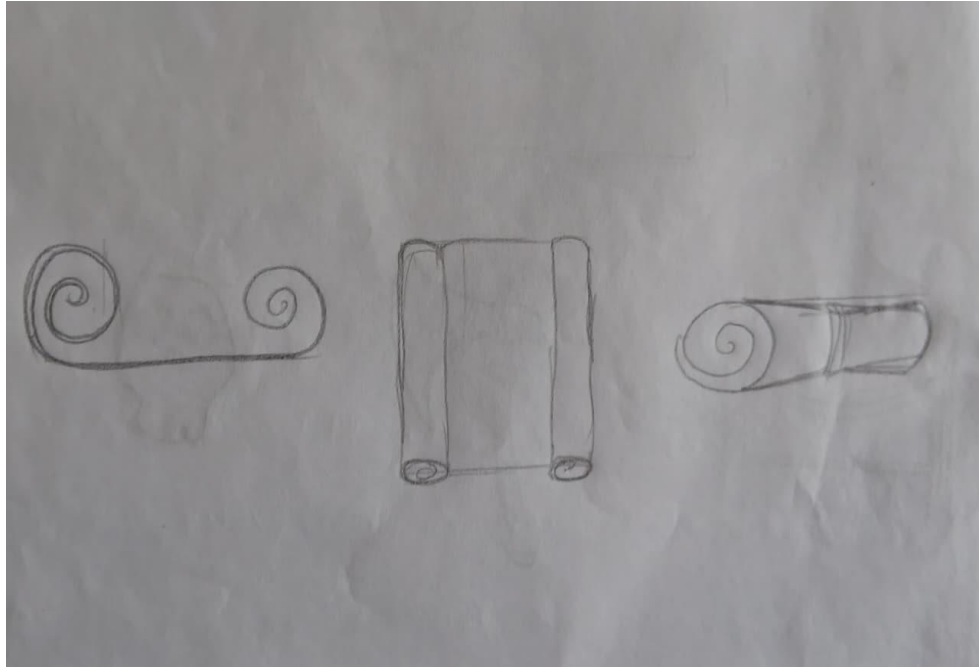


Figure 3.2.13: Maps Sketch

### 3.3 Modeling

Modeling is the foundation of any 3D project. Modeling is the initial step in creating an asset. I have chosen Autodesk Maya as the primary tool for my project. Because it provides the user with a flexible and efficient environment to work in. The types of 3D modeling are:

- i. **Polygonal modeling:** This is the most common process used in games and animations. These three elements, vertices, edges, and faces, are the fundamental building blocks of 3D models in geometry and computer graphics.
- ii. **NURBS modeling:** This is a modeling technique that helps create precise mathematically defined 3D curves and surfaces using control points. By precisely controlling the control points and node values, the user can create very smooth organic shapes or sharp, precise shapes.
- iii. **Sculpting:** This is a technique where artists use various tools such as pushing, pulling, smoothing, or scratching a virtual object, such as digital clay, to give it a

beautiful shape. The way it works is a lot like working with clay. This process is commonly used to create complex and detailed characters in games and animations.

### 3.3.1 Ship Modeling

In pirate themed games, ships are one of the symbolic and essential assets. It is not just a means of transportation, it also represents freedom, adventure and identity of the pirate community.

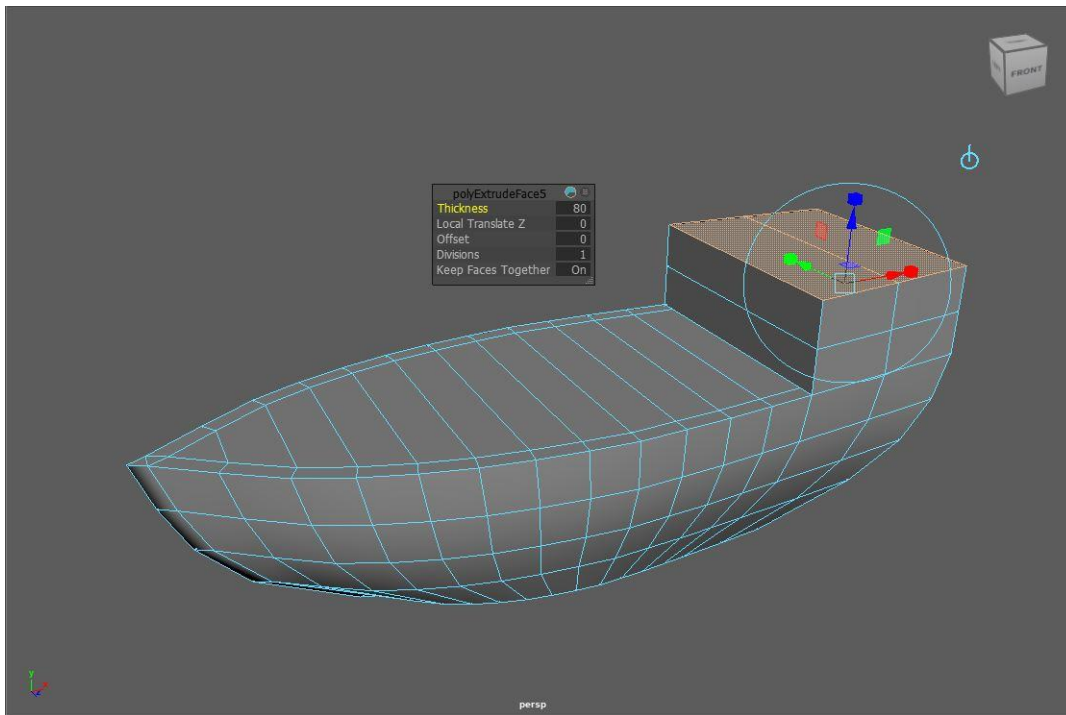


Figure 3.3.1.1: Ship Base in Wireframe Mode

To create this part, I started by using simple geometric shapes like cylinders and cubes first. Then I add several segments to the cube and create a simple base for a boat by holding their vertices. To create the back store room part, I took a few segments and extruded them and then created the storage space using offsets.

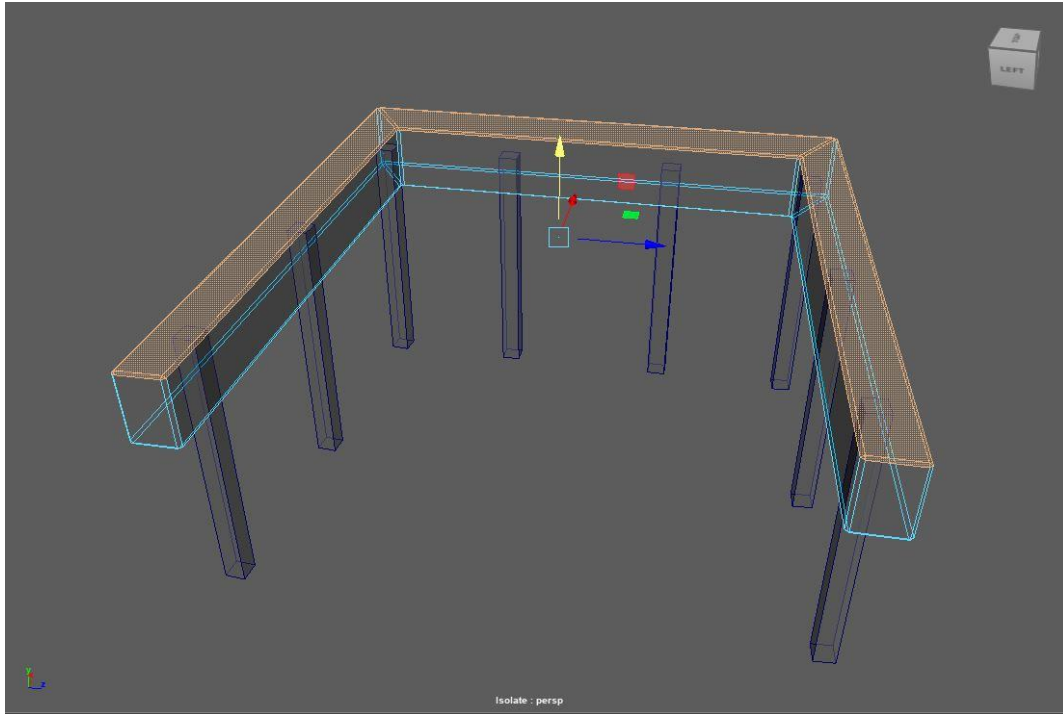


Figure 3.3.1.2: Balcony in Wireframe Mode

after creating the base, I added curves and bevels to create other parts like wheel, balcony to make it look like a real ship.

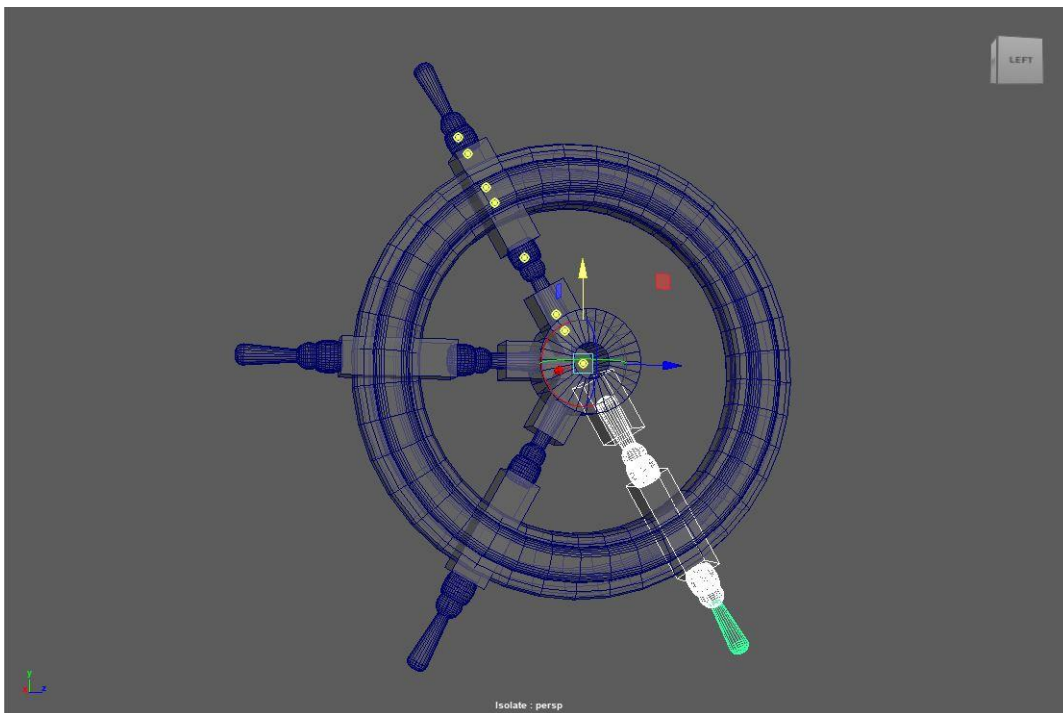


Figure 3.3.1.3: Wheel in Wireframe Mode

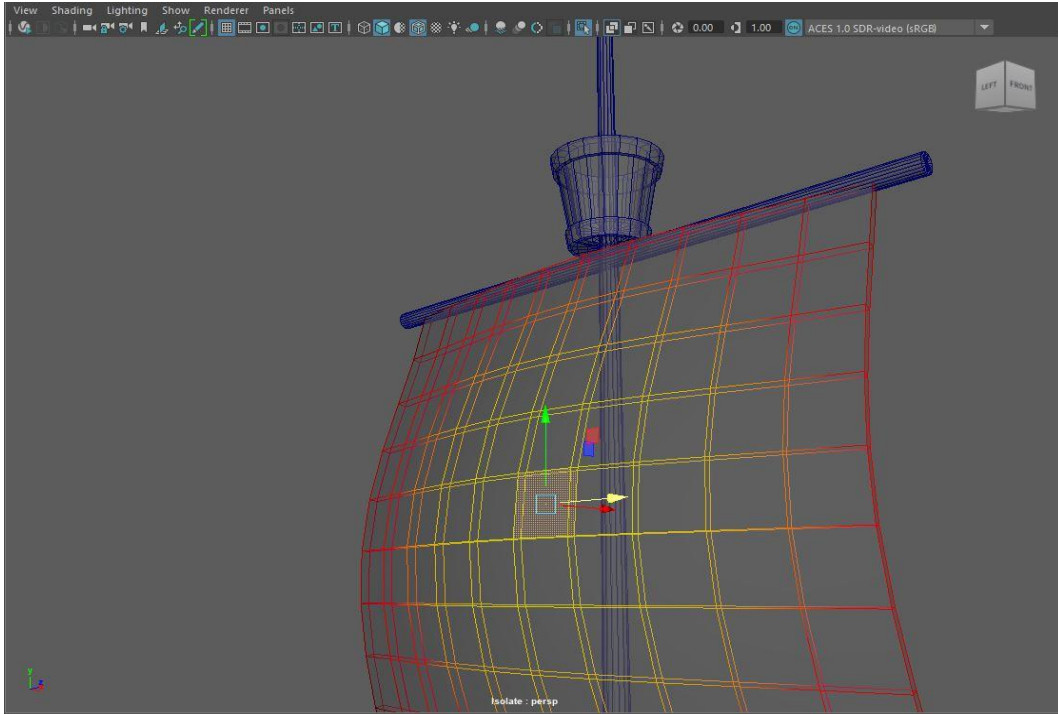


Figure 3.3.1.4: Soft Selection in Sail

To add more realism here I created each part of a ship such as anchors, mist, windows, cannons, railings etc.

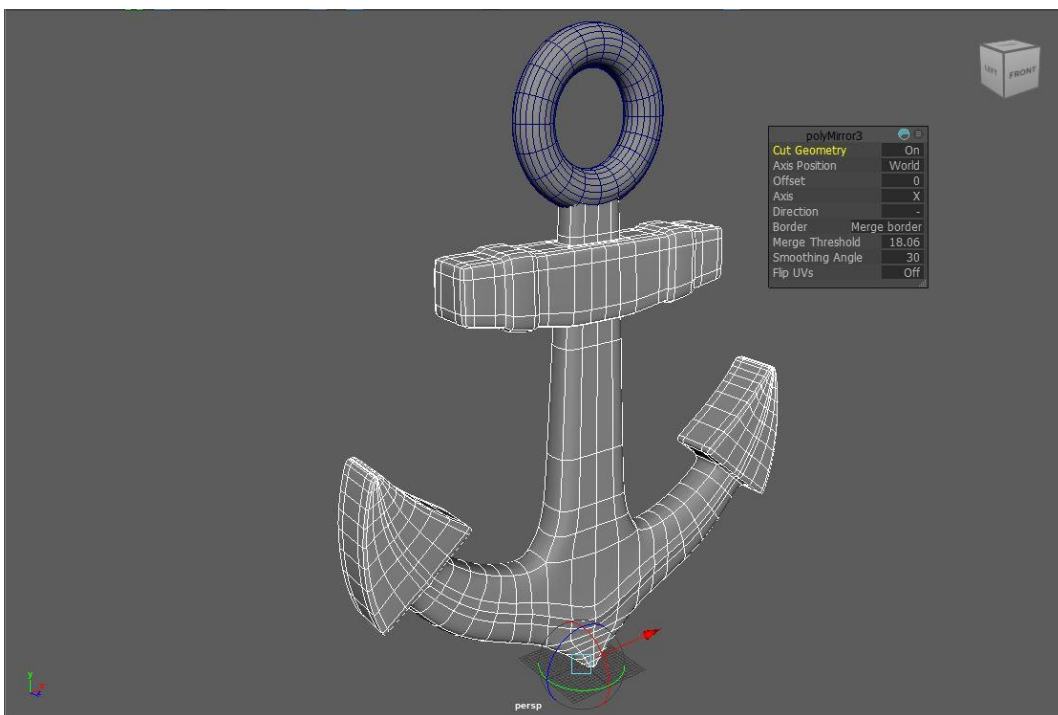


Figure 3.3.1.5: Mirror in Anchor

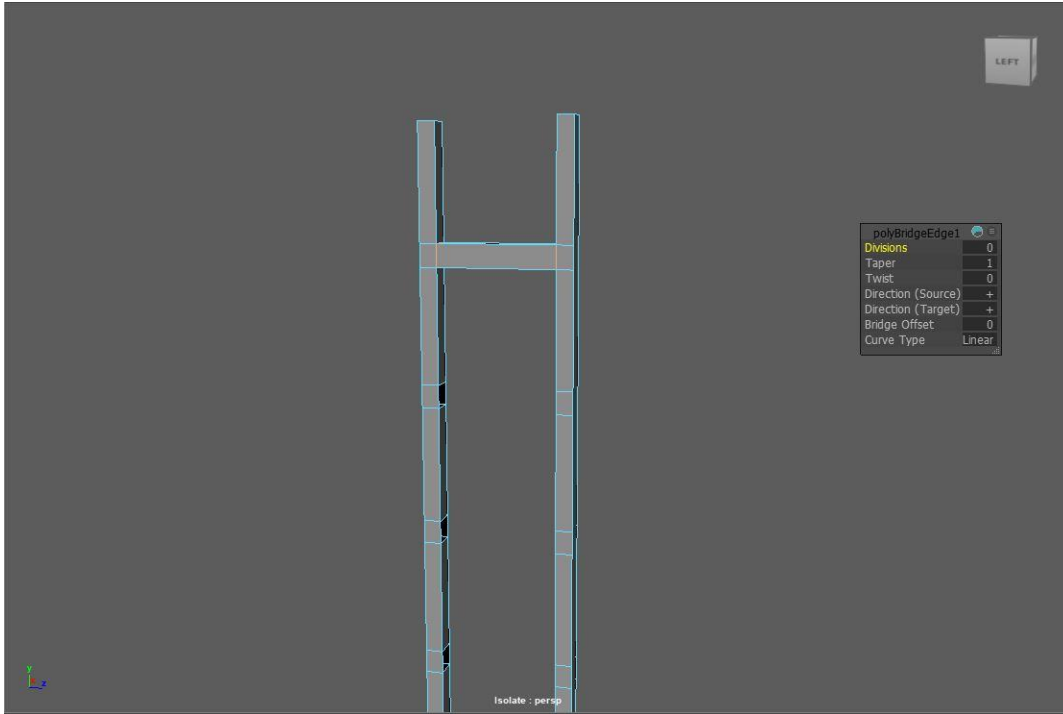


Figure 3.3.1.6: Stair in Wireframe Mode

To create the stairs, I first draw two cylinders and add some segments to their heights, then connect them together using the Bridge tool.

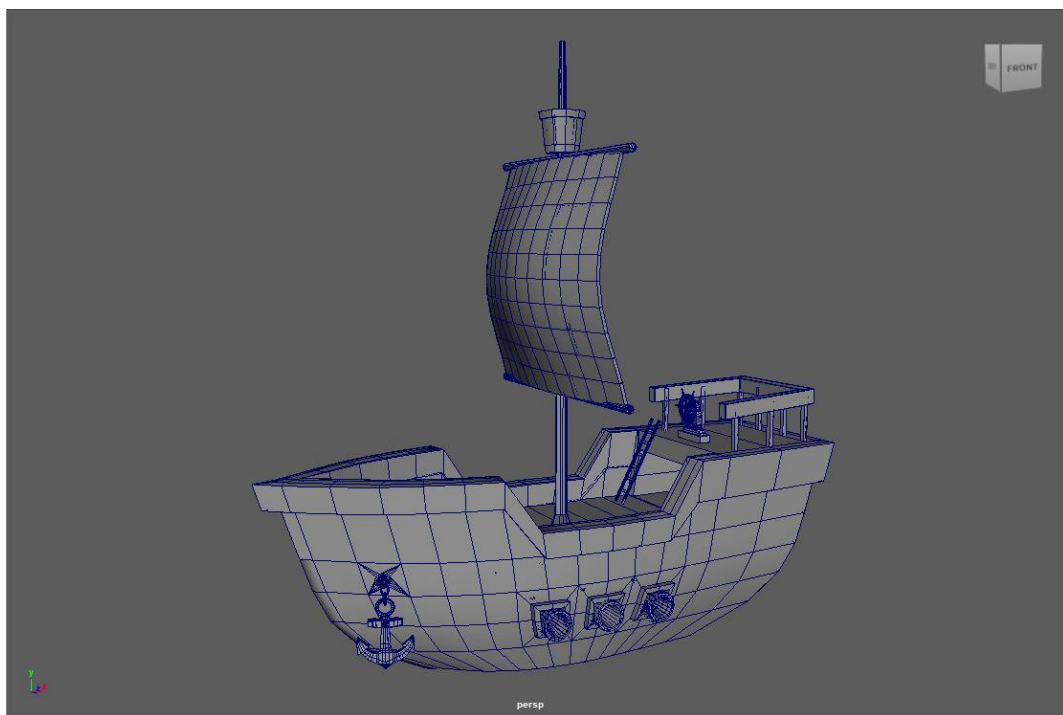


Figure 3.3.1.7: Ship Full Model

### 3.3.2 House Modeling

A pirate theme requires a house to create a setting. This adds a different dimension to the setting, story and location. The curved roof, wooden texture and rustic painting all reflect the rough, adventurous life of pirates. I first used cubes to create the basic shape of the house. I made the roof of the house slightly curved instead of flat to fit in with the pirate theme. I added doors, window frames and a chimney to complete the house.

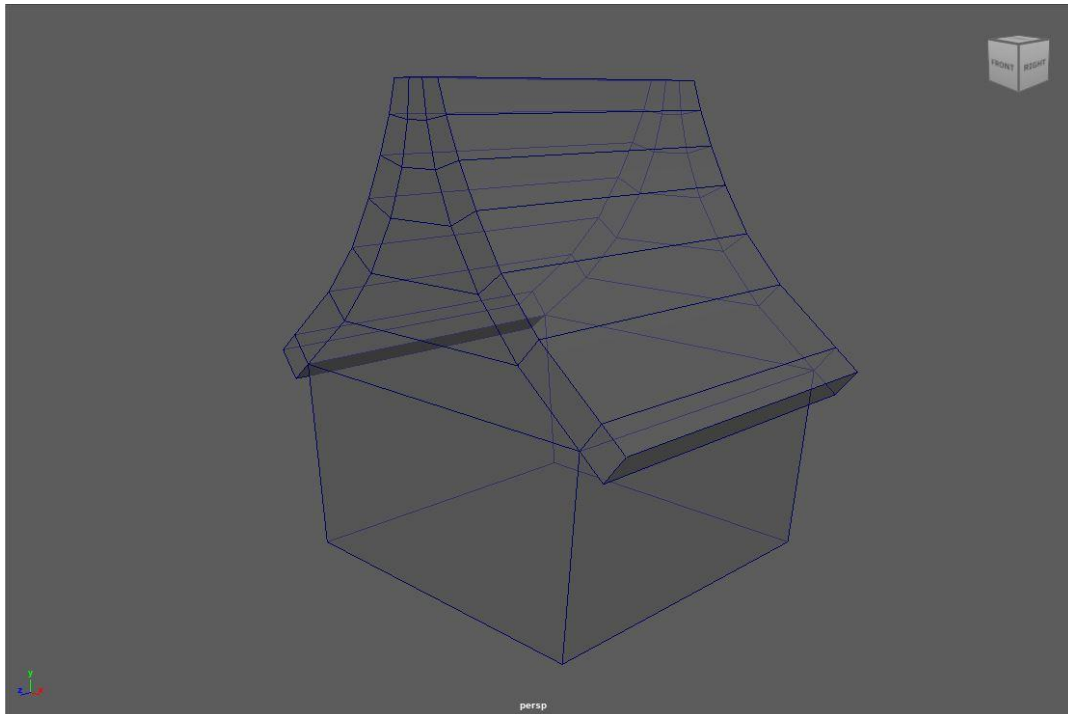


Figure 3.3.2.1: House Base in Wireframe Mode

First, I drew a cube to create the basic shape of the house. Then I take a segment in the middle of its surface and select the segment and drag it upwards to form a triangle. Then I extrude the two sides of that triangular area to form the roof of the house. To create that iconic curved shape of the pirate's house roof, I use a lot of segments on the roofs and use the soft selection tool to create the desired curved part.

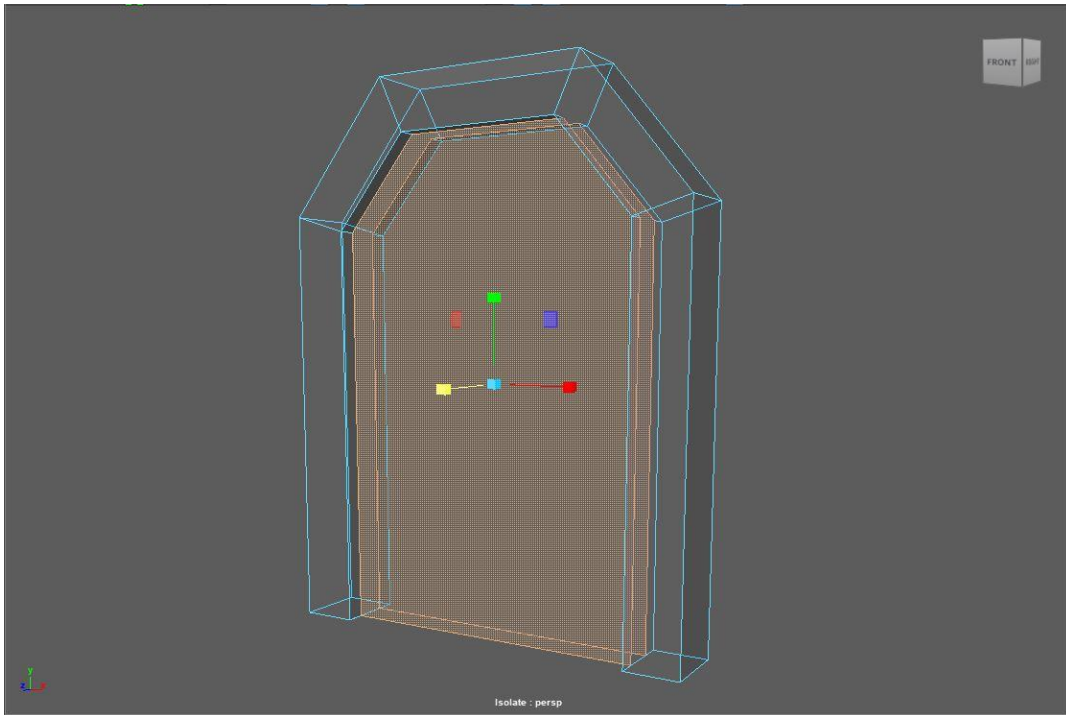


Figure 3.3.2.2: Door in Wireframe Mode

To make the door, I first took a cube. Then I added some segments to that cube and selected those faces and pushed them inwards to create a basic door shape.

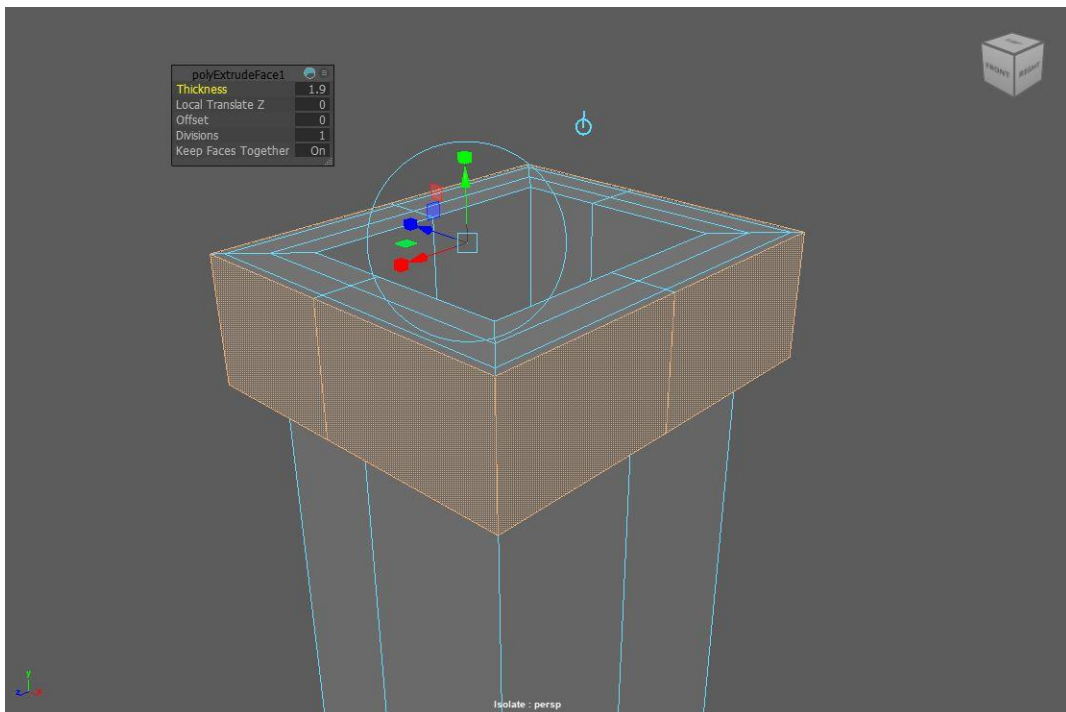


Figure 3.3.2.3: Extrude in Chimney

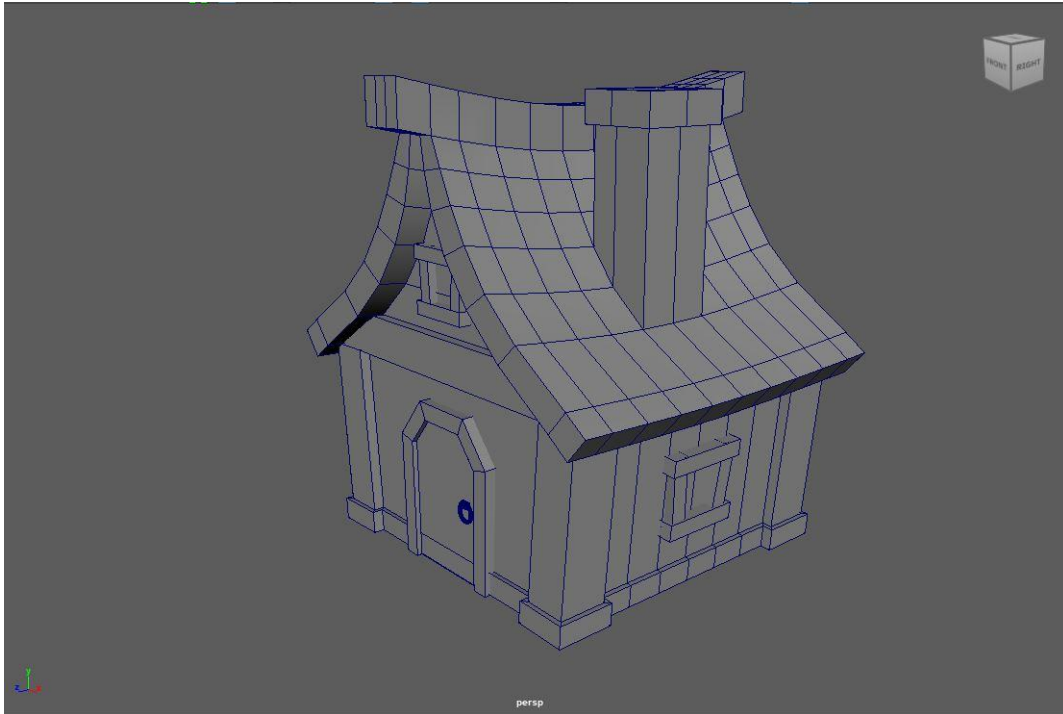


Figure 3.3.2.4: House Full Model

These are the initial looks of my houses. First, I built the one-story house. Then I built the two-story house following the same method.

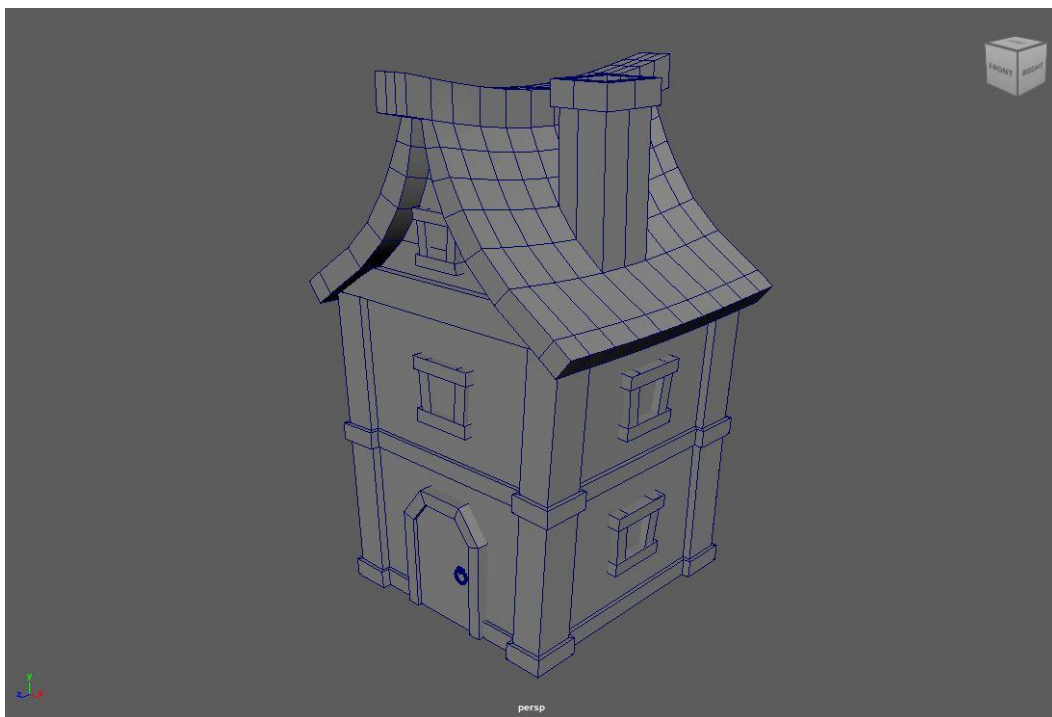


Figure 3.3.2.5: Two-story house Full Model

### 3.3.3 Bridge Modeling

Bridges are essential to the story of the pirate world. They connect important areas such as ships to docks, islands to hideouts, or mountains to forts. Players can move smoothly across them and explore the world better. Wooden bridges or docks provide clarity between a beach or island. They can be used as paths, traps, or cinematic spots. To create its basic structure, I first took cubes. I used rectangles to make the four pillars and planks for its legs. I've kept its topology clean so that it looks smooth.

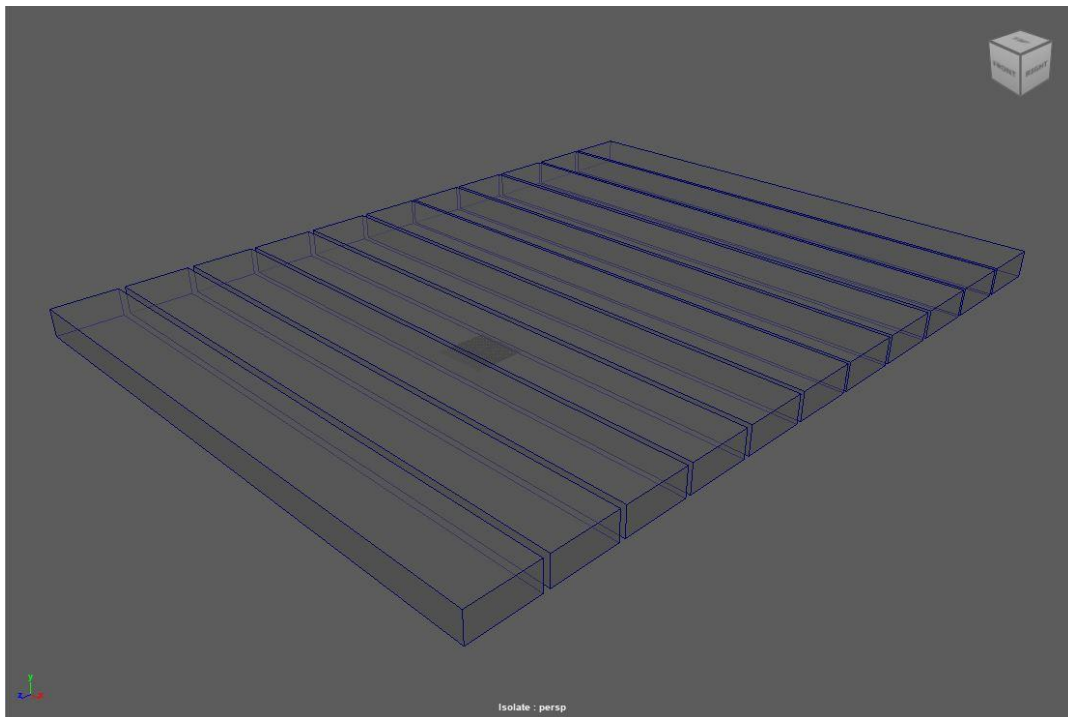


Figure 3.3.3.1: Deck in Wireframe Mode

First, I created a cube and then elongated it. Then I applied several segments to it and used the soft selection tool to create the curved part of the bridge handle. Then I created four pillars around it and placed them side by side. To create the bridge deck, I took several cubes and placed them side by side. Their shape was not changed much to create this model.

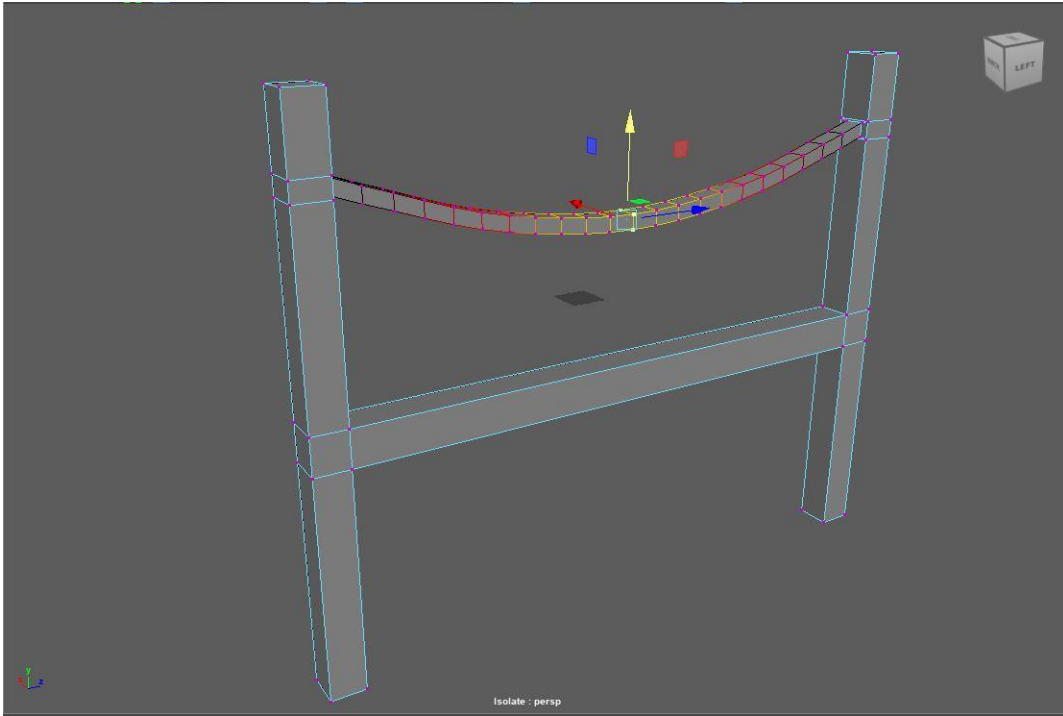


Figure 3.3.3.2: Soft Selection in Tower

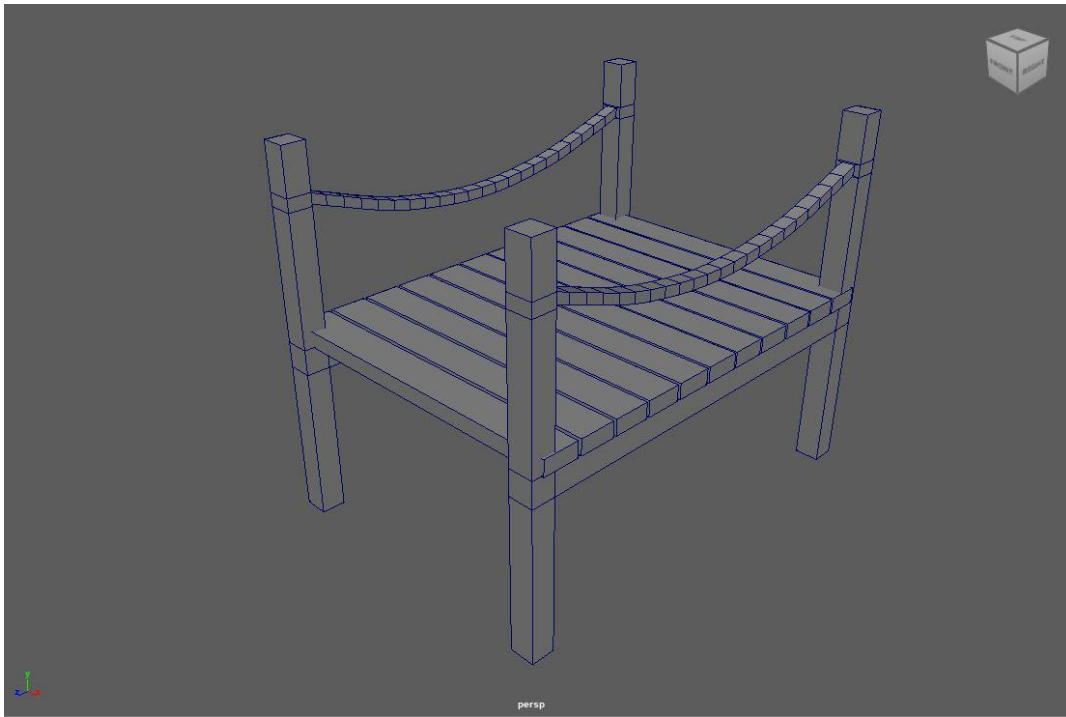


Figure 3.3.3.3: Bridge Full Model

### 3.3.4 Axe Modeling

Pirates used axes not only as weapons, but also for many everyday tasks. They used axes to cut ropes, cut wood, and board enemy ships. To create the basic structure of the axe handle and blade, I first took cylinders and cubes. I used the shrink wrap option to create the leather part of the handle. To complete the model, I used small skulls and screws to make it fit perfectly with the pirate theme.

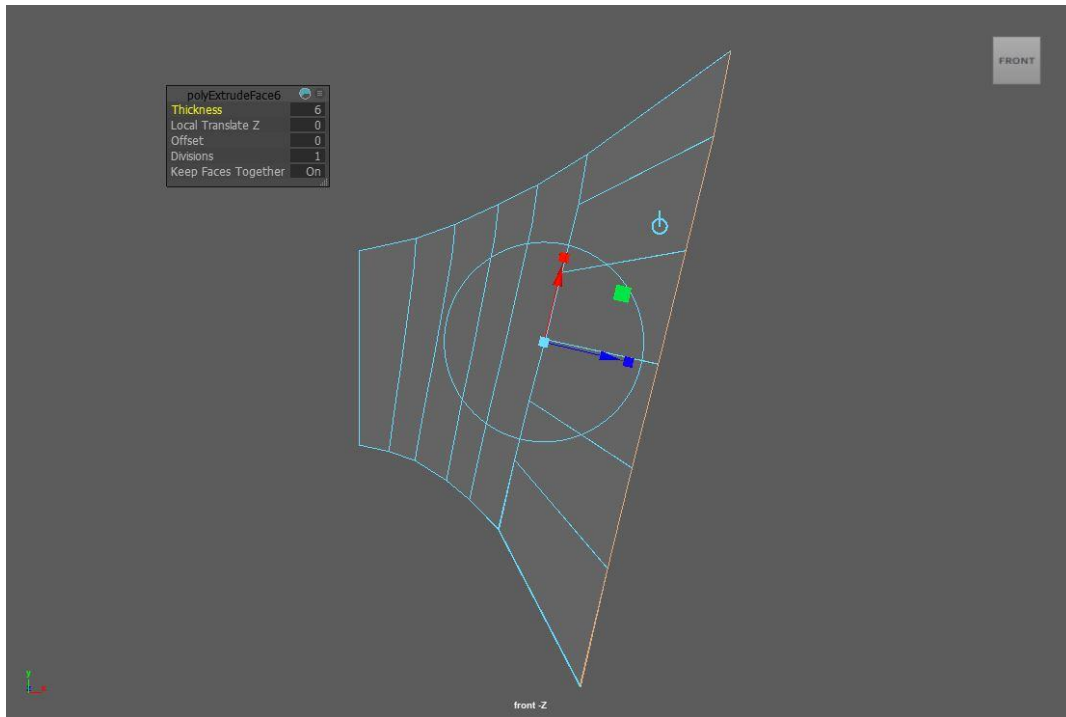


Figure 3.3.4.1: Blade in Wireframe Mode

To create a blade, I first create a plane and a basic drawing of it based on my reference image. Then I extrude that plane and shape the blade and give it sharpness. To create the skull, I first took a cube. Then I divided it into four equal parts and first created the two eyes and the teeth of the skull using Extrude. Then I created the back of the skull using a lot of segments using all the selection tools. Then after a certain shape is created, I reduce the number of extra layers.

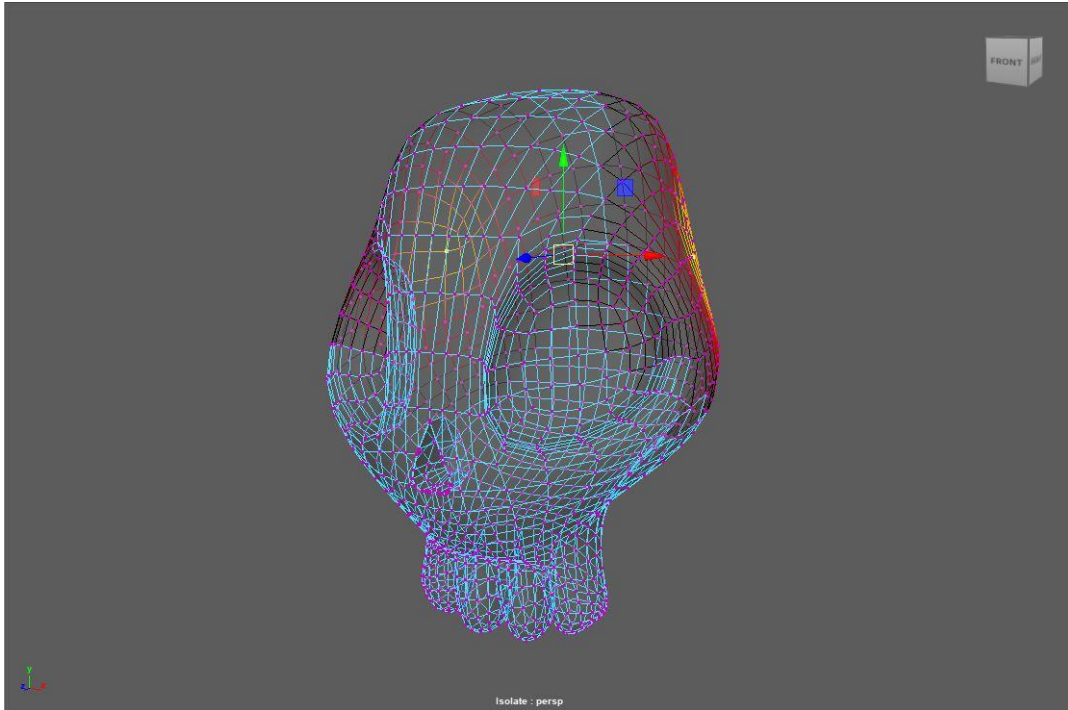


Figure 3.3.4.2: Skull in Wireframe Mode

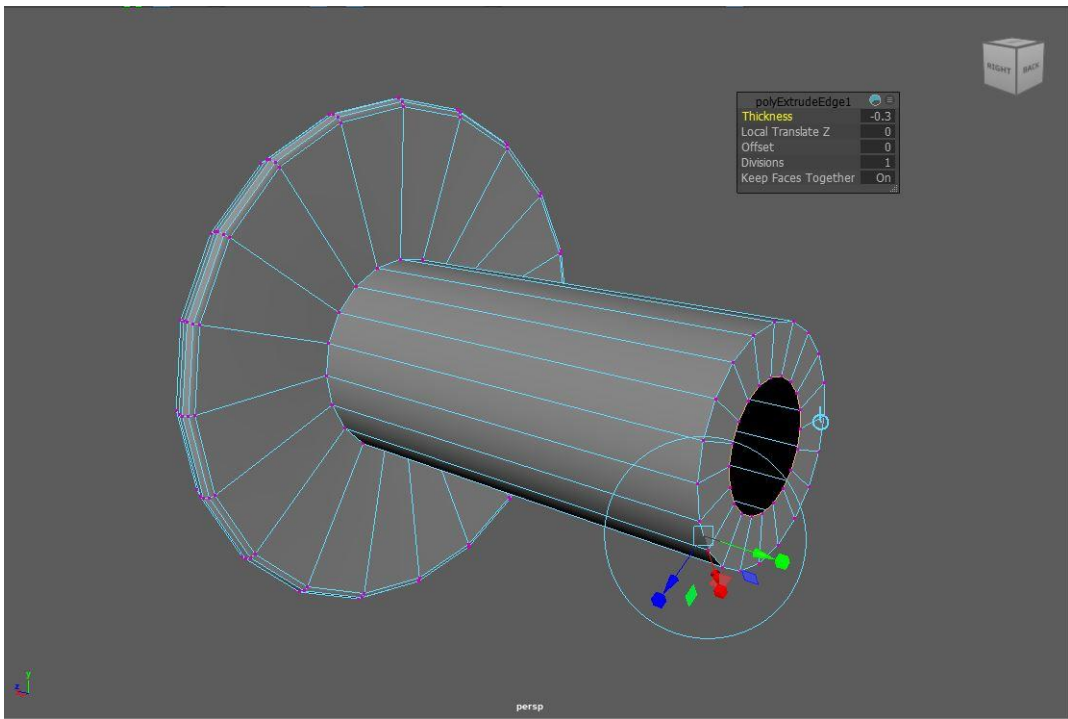


Figure 3.3.4.3: Screw in Wireframe Mode

To create this twisted piece of leather, I first copied a mass of the stick and scaled it up. Then I selected that mass and created a few more duplicate masses and created a simple

twisted shape. Then I selected them together and used the Shrink Wrap tool to create the desired shape of the leather. Then I extruded them and got the desired result.

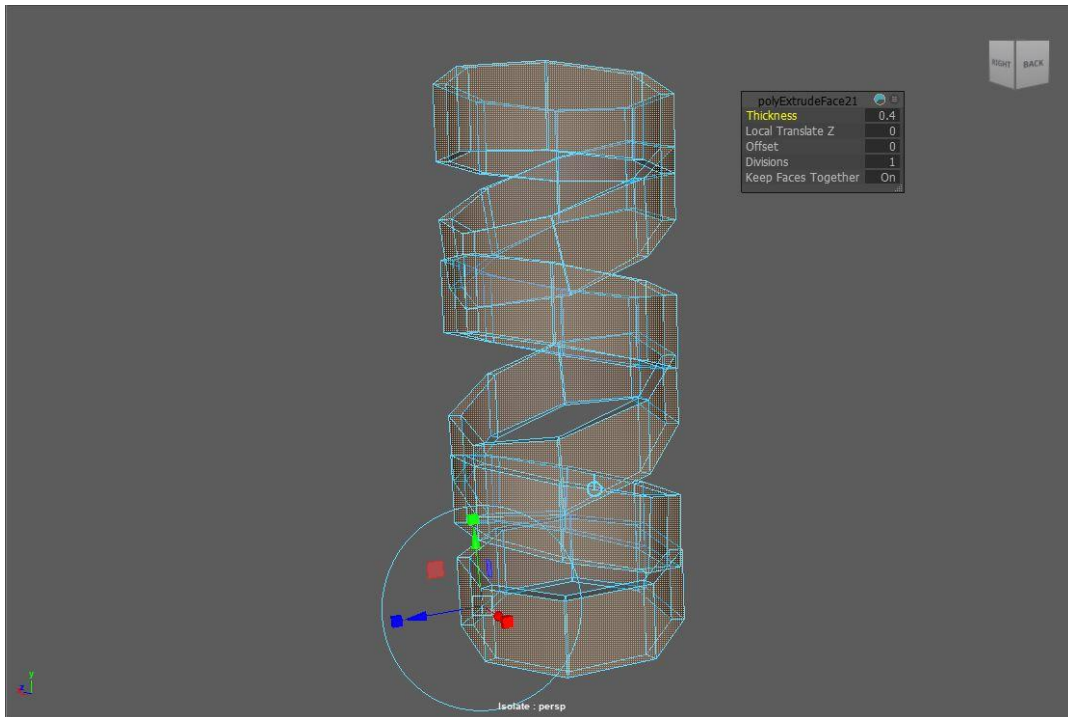
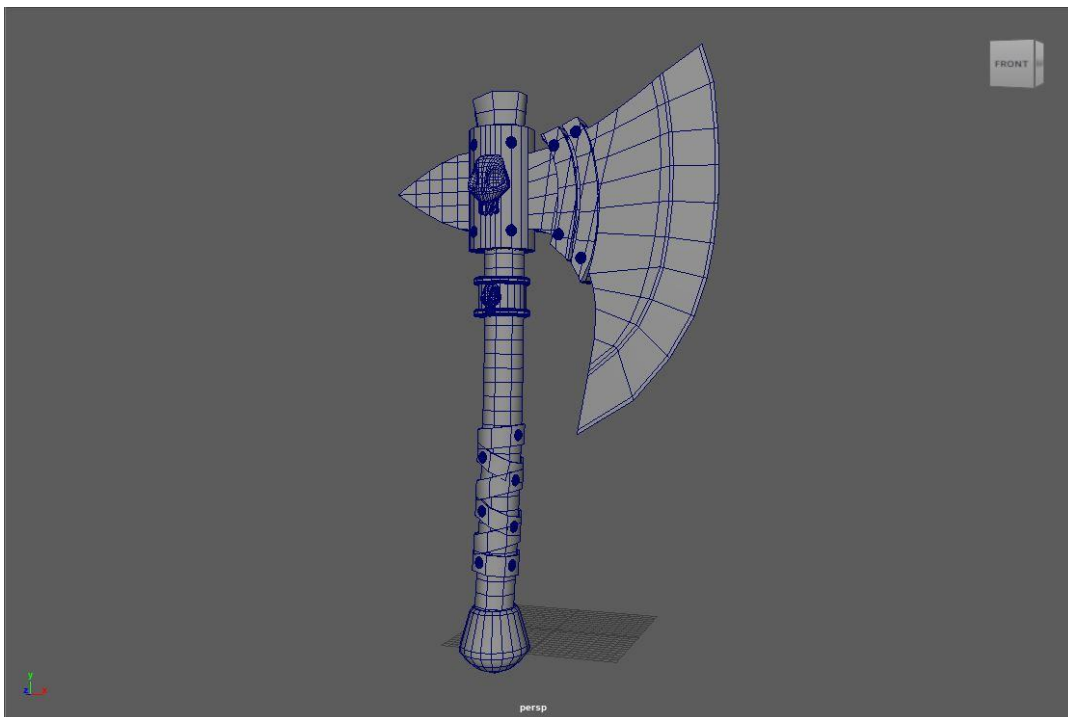


Figure 3.3.4.4: Extrude in Leather Handle Figure



3.3.4.5: Axe Full Model

### 3.3.5 Cannon Modeling

In the pirate world, cannons are one of the most iconic and essential objects. They represent the power, combat, and defense of the high seas. The cannon is the heart of a naval battle. Pirates used cannons to attack enemy ships, defend their hideouts, or destroy forts. Adding a cannon to the environment instantly highlights the adventure in the game to the players' eyes. I first used a cylinder to create the basic structure of the barrel. I used cubes and cylinders to create the base and wheels. I added skull symbols to make the model more realistic and pirate-themed.

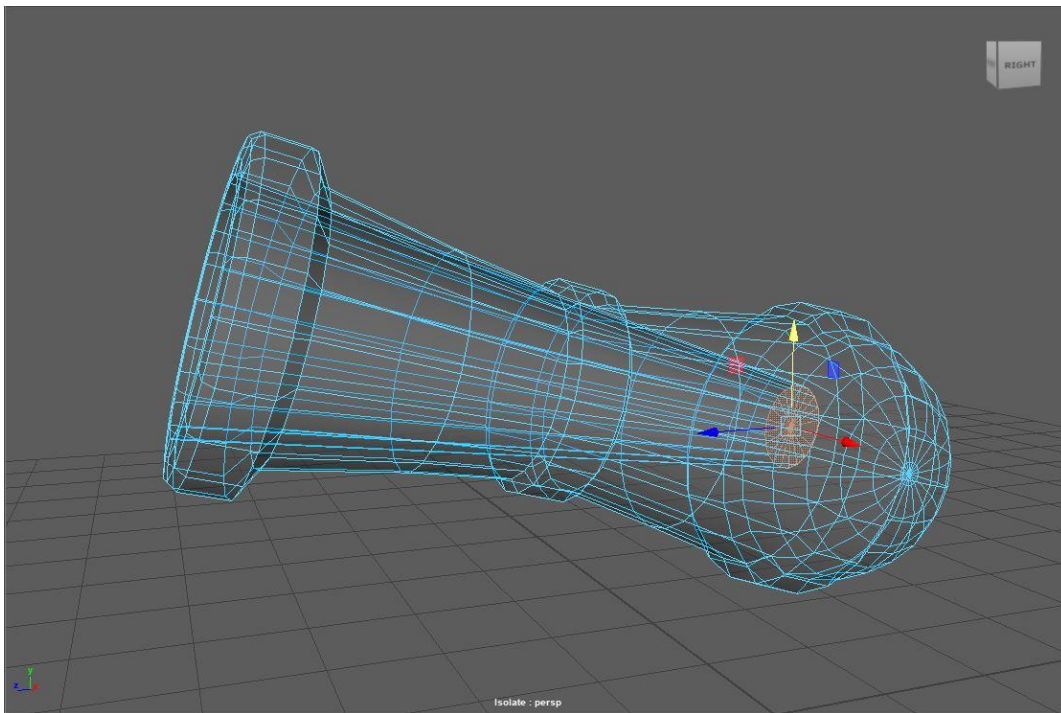


Figure 3.3.5.1: Barrel in Wireframe Mode

To create the barrel of the cannon, I first draw a cylinder. Then I beveled and smoothed the back of the cylinder. To create the wide front part, I select its vertices and scale them. Using the same process, I narrowed the middle section and gave it a classic look. Then I select the top faces of that cylinder and push them inward. To create the wooden plank, I first took a cube and provided several segments in it, using the soft selection tool, I dipped them inwards and then extruded the part on top of it.

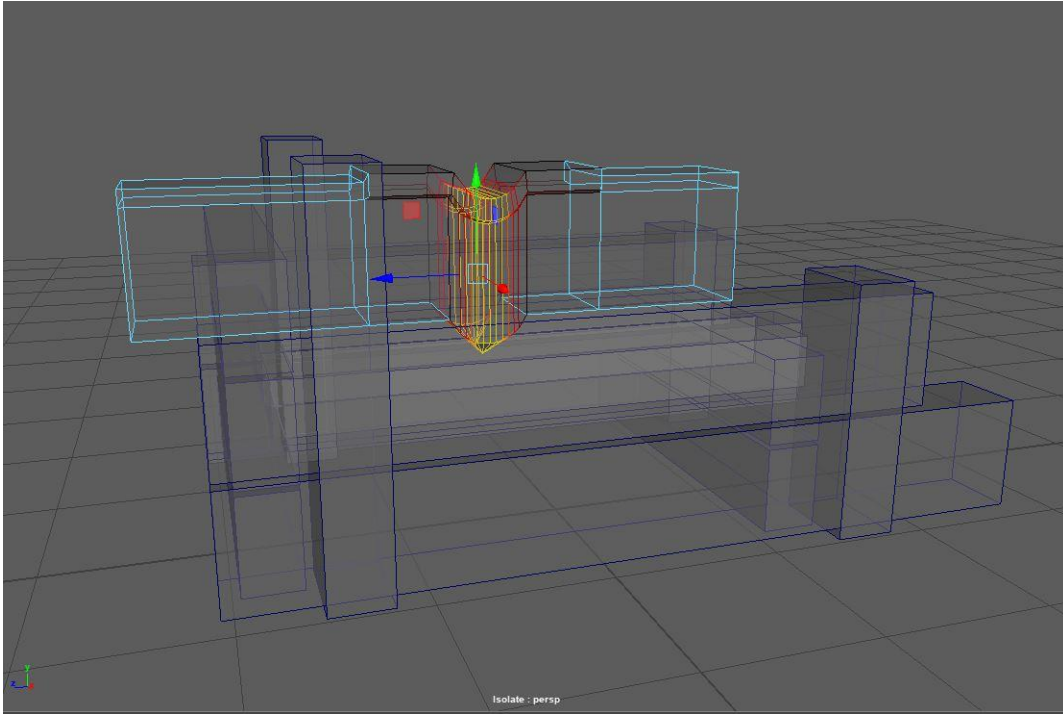


Figure 3.3.5.2: Carriage in Wireframe Mode

I took a cylinder to create the wheel. Then I took another cylinder to make the middle part and extruded it from both sides.

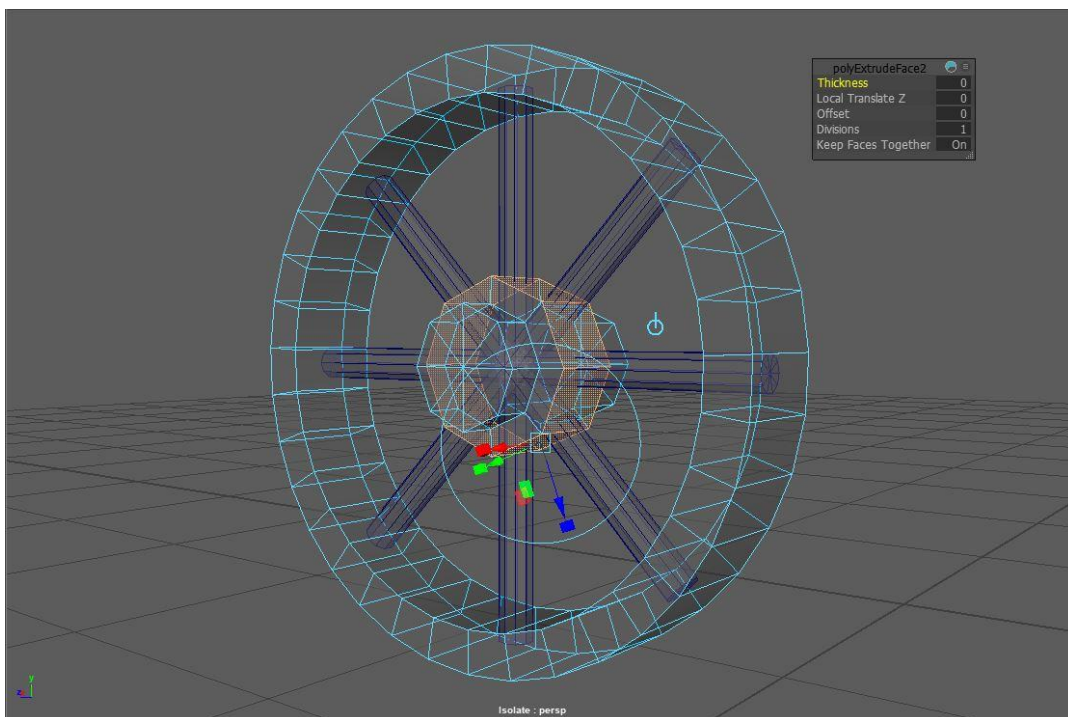


Figure 3.3.5.3: Wheel in Wireframe Mode

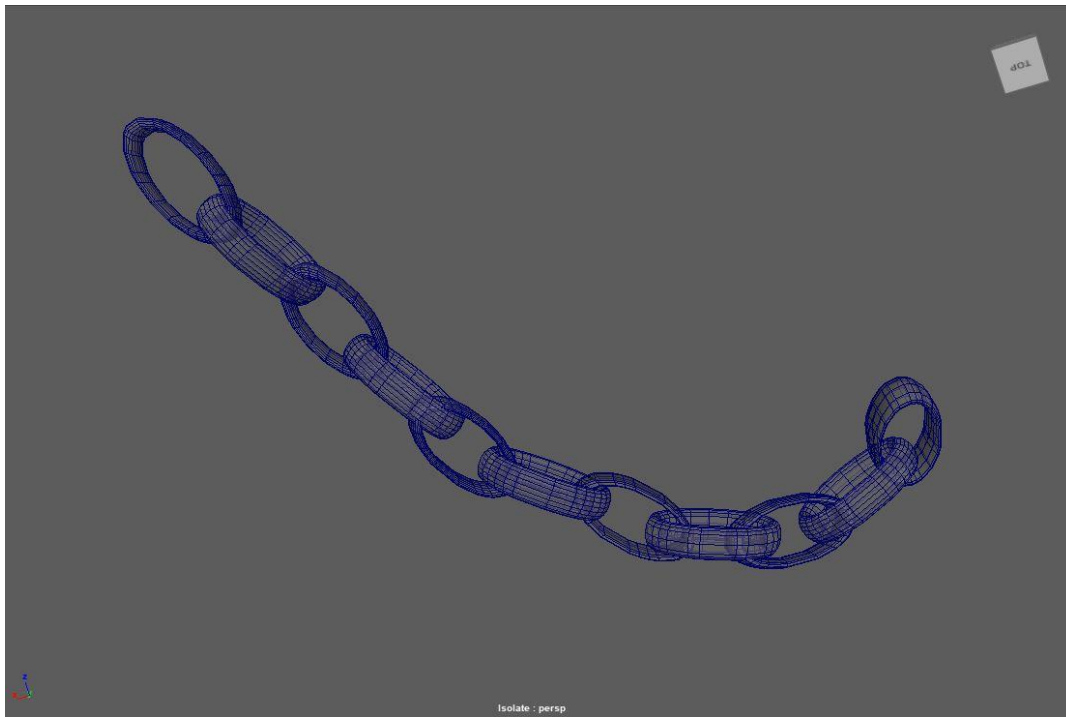


Figure 3.3.5.4: Chain in Wireframe Mode

To create the chains, I first took a torus and flattened it. Then I put many flattened toruses side by side to make the chains. To create the cannonballs, I basically took some spheres.

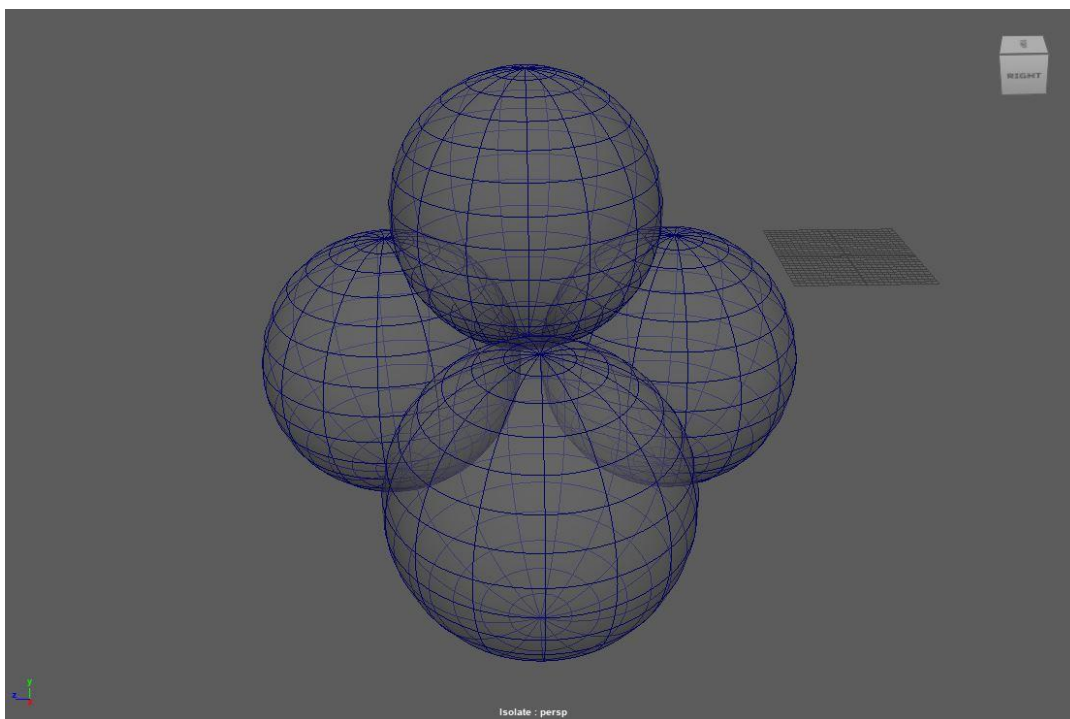


Figure 3.3.5.5: Cannon Ball in Wireframe Mode

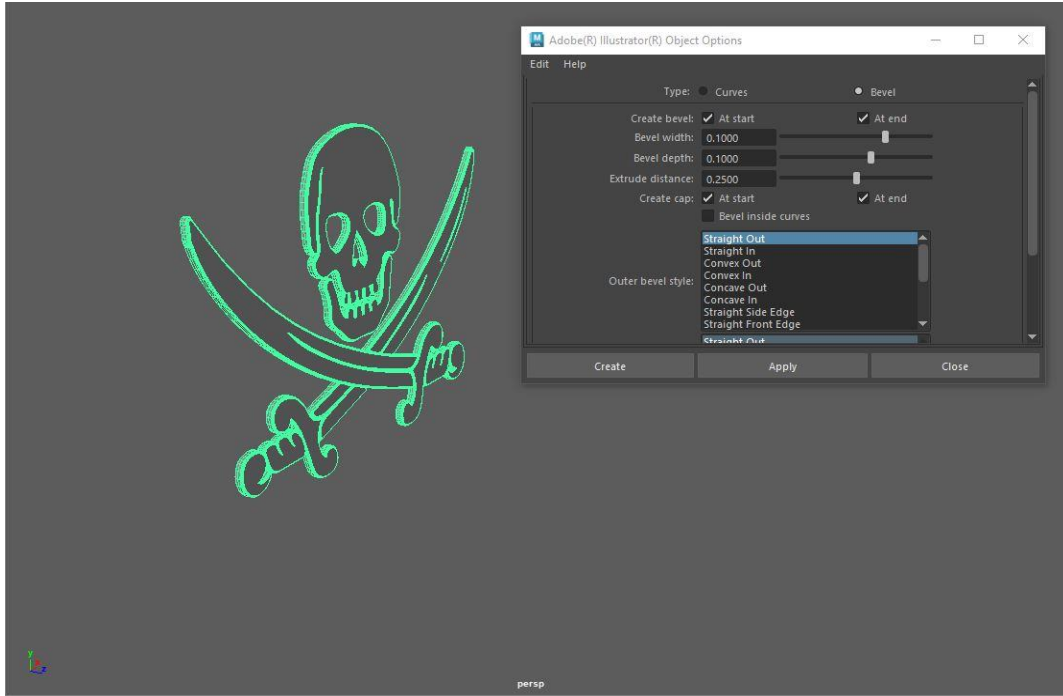


Figure 3.3.5.6: Skull Mark in Wireframe Mode

To create the skull markings, I turned a 2D Illustrator path into a 3D model by adding bevels and extrusion depths.

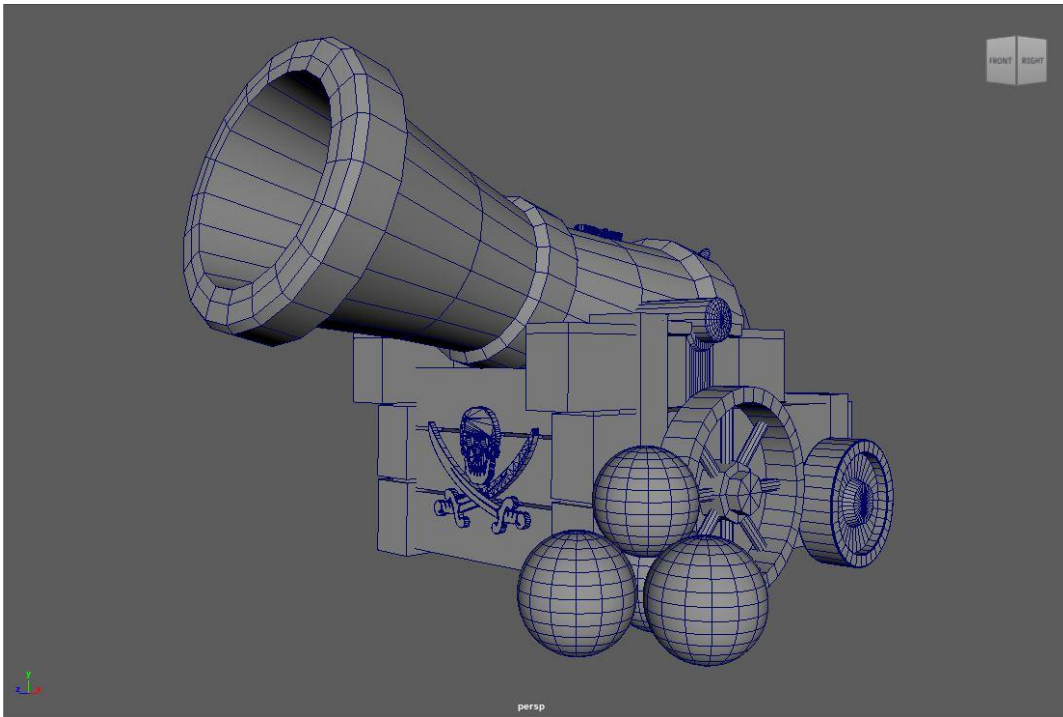


Figure 3.3.5.7: Cannon Full Model

### 3.3.6 Compass Modeling

One of the most important tools of pirate navigation is the compass. Pirates used it for various purposes, such as finding hidden islands, hidden treasures, or safe places. It is a key element of exploration. Not only that, but many pirate stories show that the compass points its holder in the direction of their deepest desires. This adds depth and magic to the story. I first used a cylinder to create the basic shape of the compass. I used cubes to create its prongs. I used small skulls here to match the pirate theme.

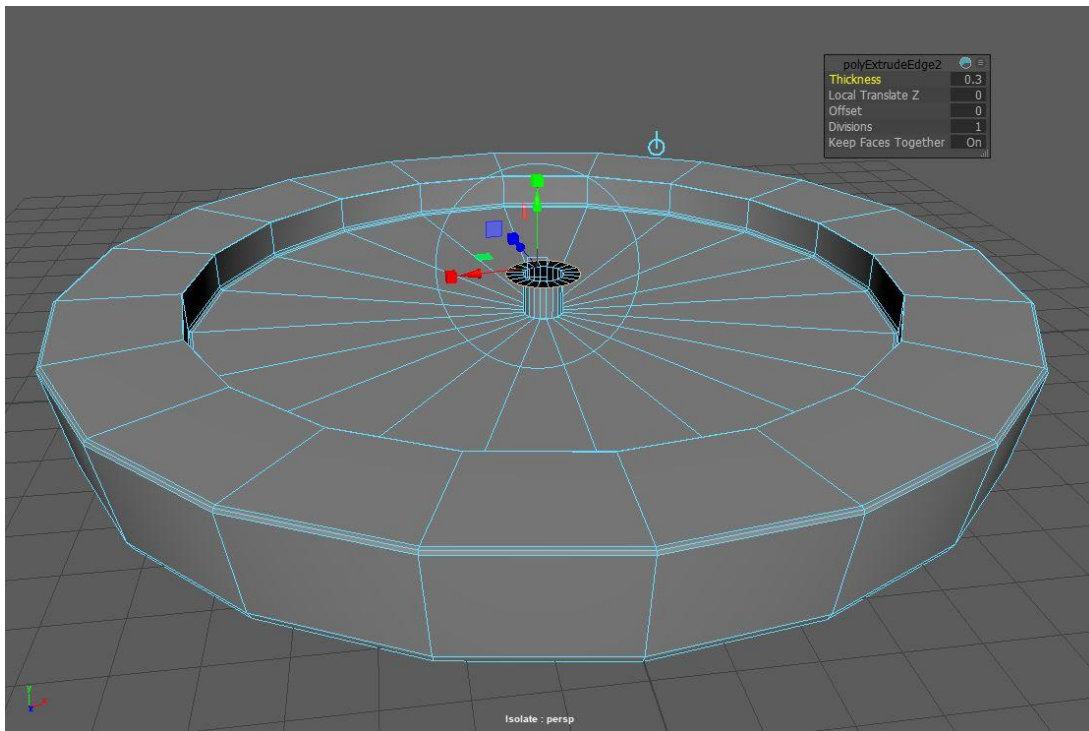


Figure 3.3.6.1: Baseplate in Wireframe Mode

To create the baseplate, first I draw a cylinder. Then I flatten it. Then I provide an offset there and select the faces of the offset part and push them down. Then I offset that part again and select the faces of that part and extrude them. Then I select the edges of that part and extrude them again and that's how I created the structure of a baseplate.

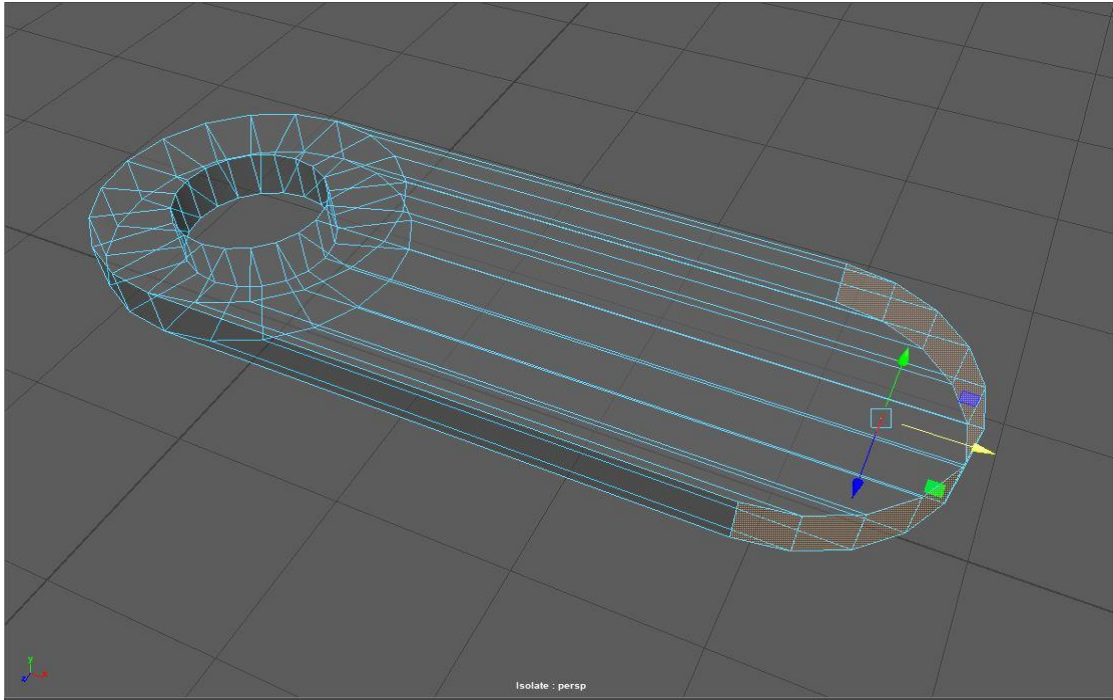


Figure 3.3.6.2: Magnetic Needle in Wireframe Mode

To create the needles, I first cut a pipe. Then I extrude a section of it. Then I press those sections together to give them a needle shape.

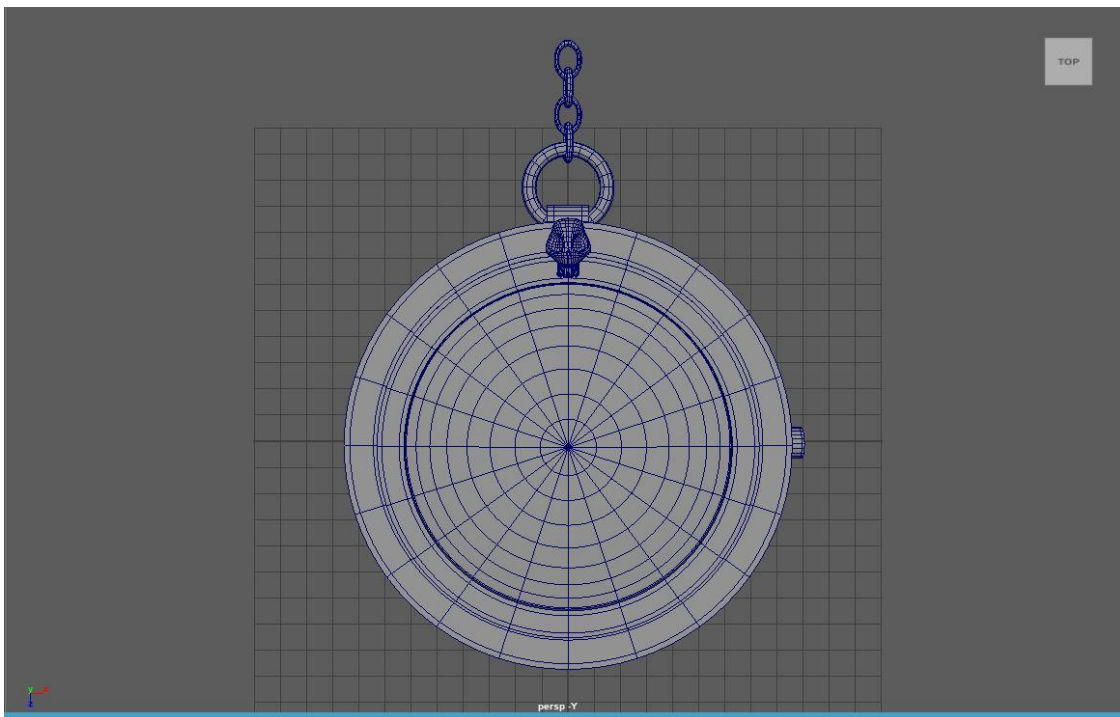


Figure 3.3.6.3: Compass Full Model

### 3.3.7 Hourglass Modeling

The hourglass is an important element in the pirate world. It is used as a symbol of the flow of time and navigation. Pirates used it while sailing or for various tasks. Especially before the advent of modern watches. It was used for various purposes such as calculating distances, tracking movements, calculating the time of cannon fire or finding hidden treasures. I created this model using the low-poly technique in Autodesk Maya. I first used cylinders to create the basic structure of the upper and lower platforms. To make the glass part, I took a cylinder shape, scaled it, and extruded it. I used cubes to make the pillars.

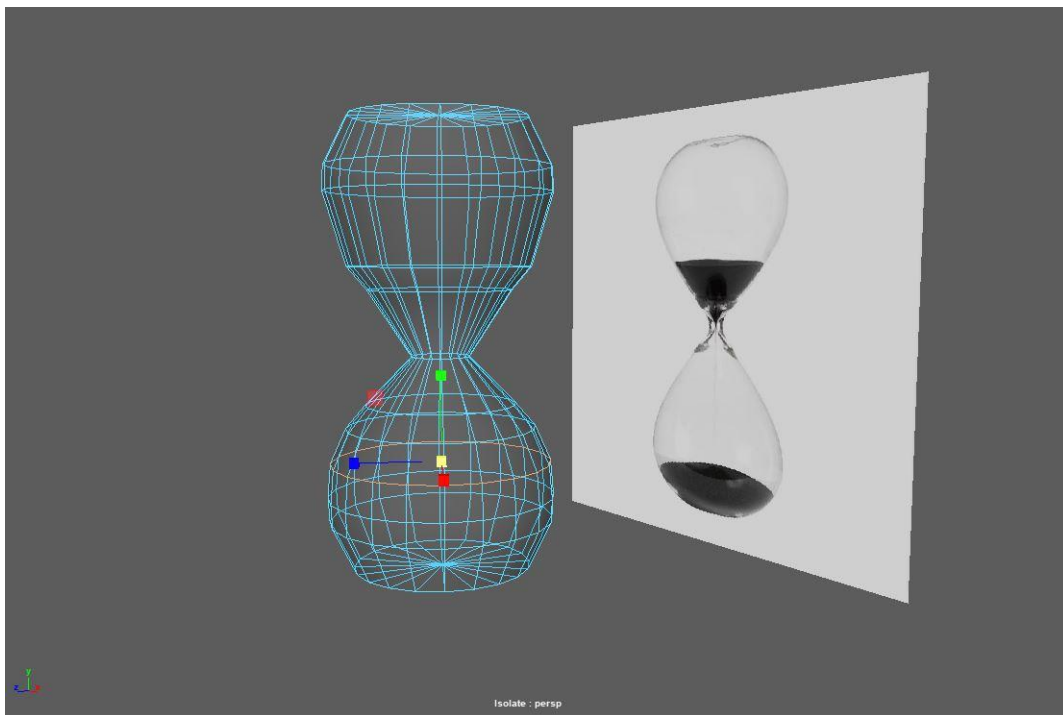


Figure 3.3.7.1: Glass bulbs in Wireframe Mode

To create the glass bulb, I first took a cylinder. Then I took a segment in the middle of it. Then I beveled the top and bottom edges. Then I used some more segments to create a complete glass bulb shape. To create this middle piece of leather, I first copied and enlarged one face of the glass bulb. Then I selected that face and made a few more duplicate faces to create a simple shape. Then I selected them all together and used the Shrink Wrap tool to create the desired shape of the leather. Then I extruded them to get the desired result.

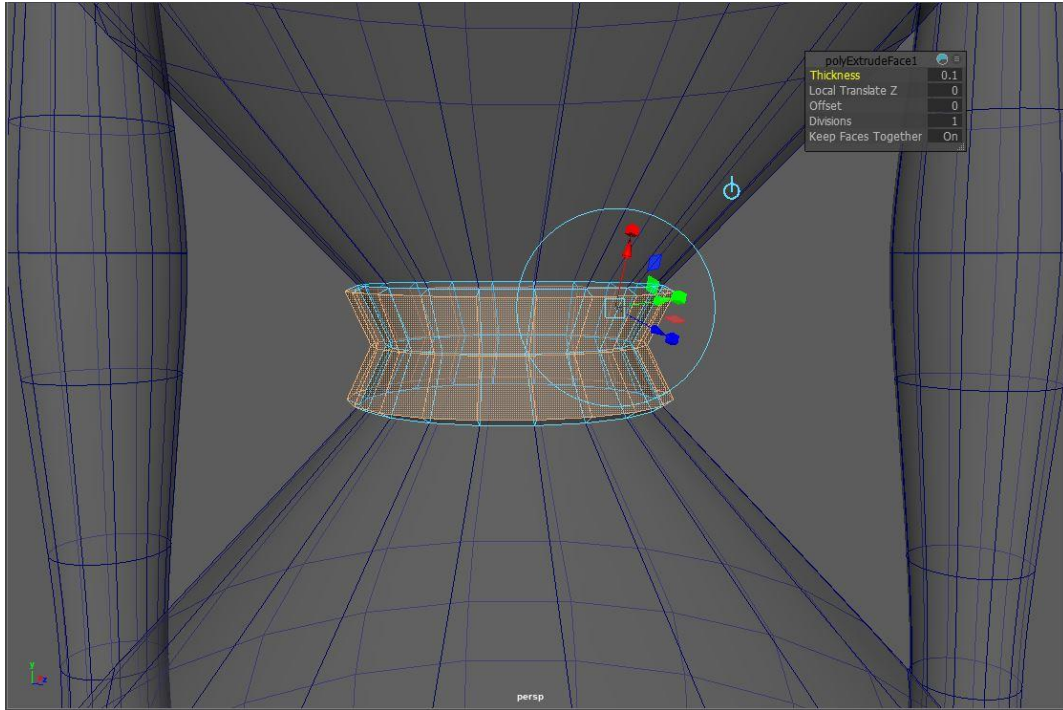


Figure 3.3.7.2: Neck in Wireframe Mode

To create the columns, I take a cylinder and take two segments at the top and bottom, tapering them inward. Then I use a few more segments to create the desired design.

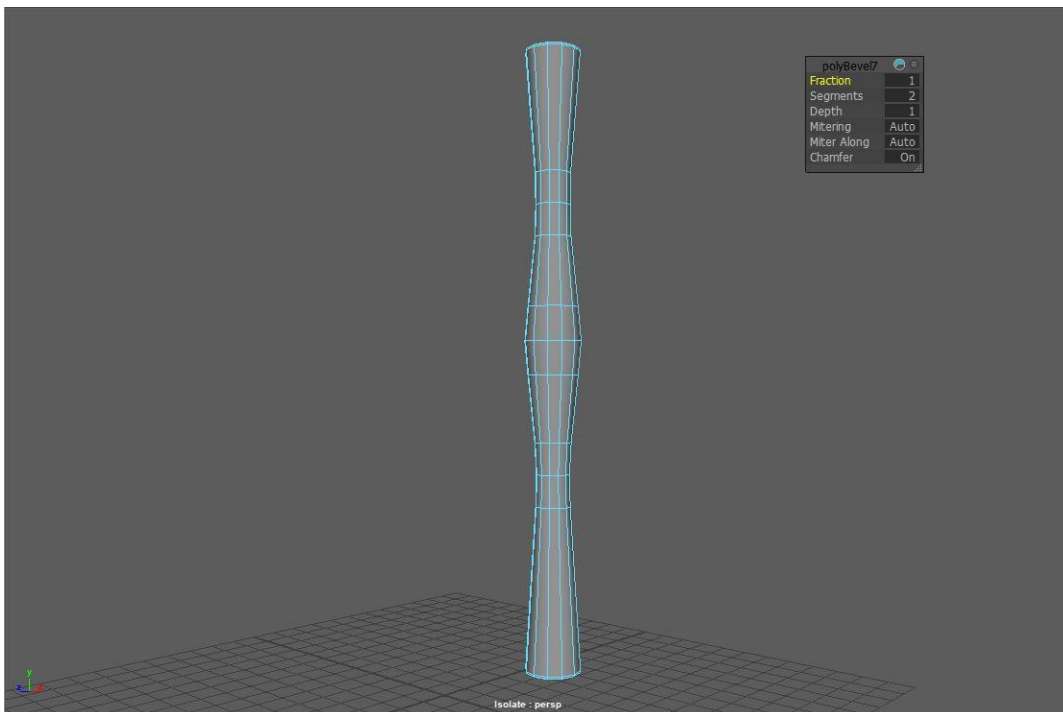


Figure 3.3.7.3: Columns in Wireframe Mood

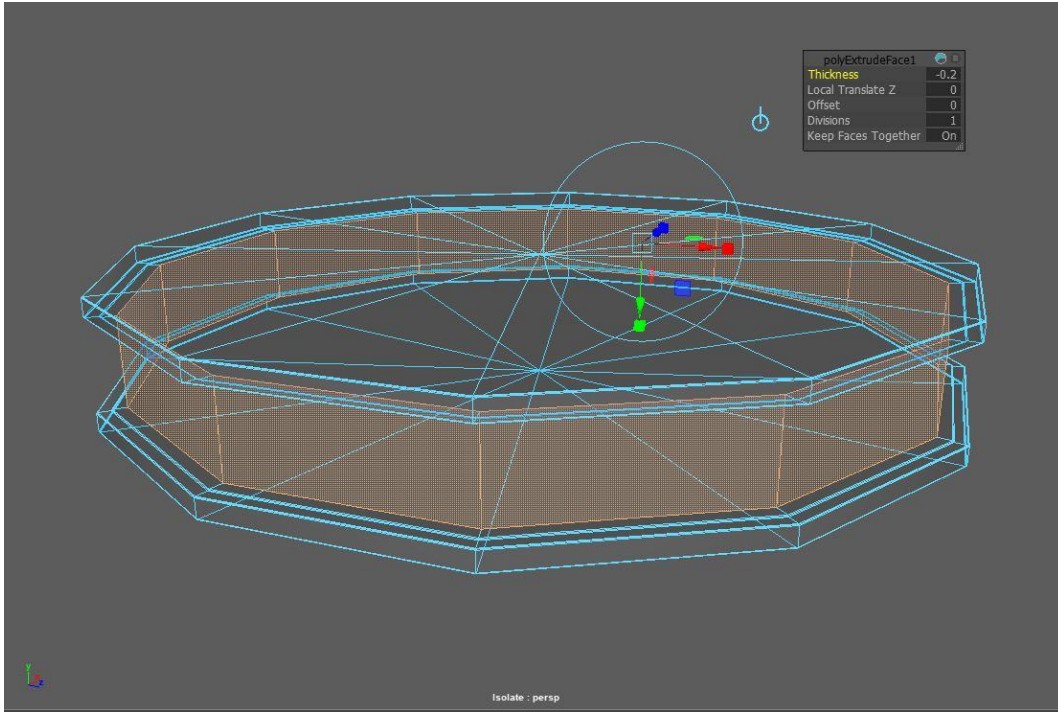


Figure 3.3.7.4: Base in Wireframe Mode

To create the base I first took a cylinder. Then I reduce its segments a bit and extrude and increase the middle part and form the shape of the platform.

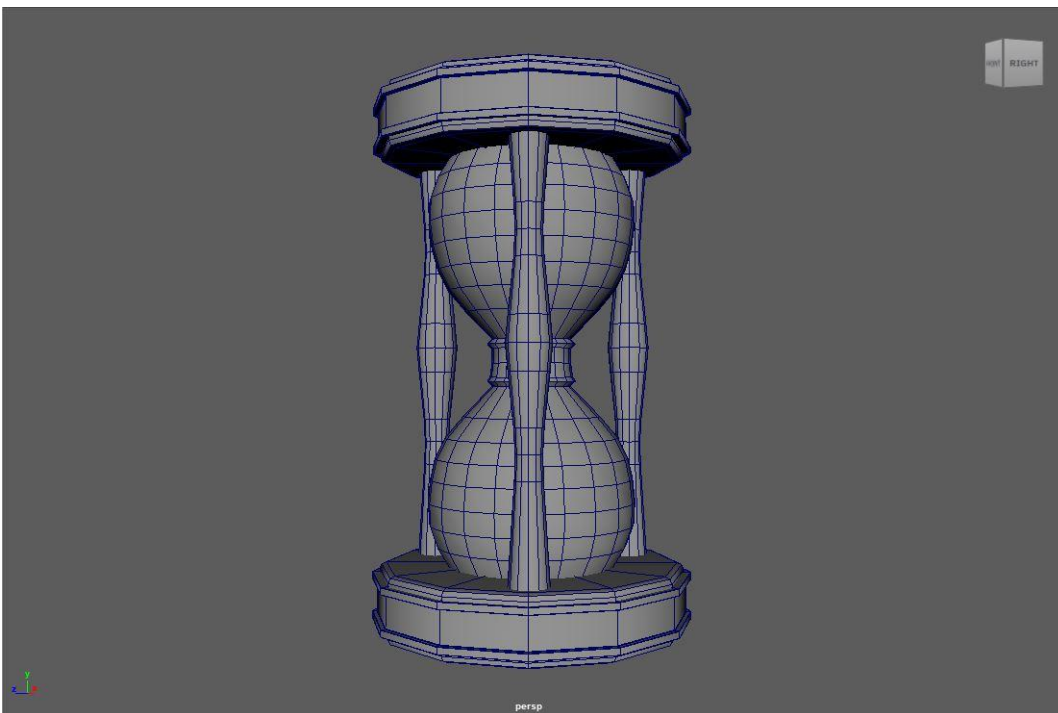


Figure 3.3.7.5: Hourglass Full Model

### 3.3.8 Map Modeling

To talk about a pirate story, the first thing to talk about is its iconic map. It is impossible to create a pirate environment without a map. It is the main means of adventure, hidden secrets and exploration. It guides the player and takes them to the right path. Not only to find treasure, but also to travel around the world by boat, which is very valuable for the present era.

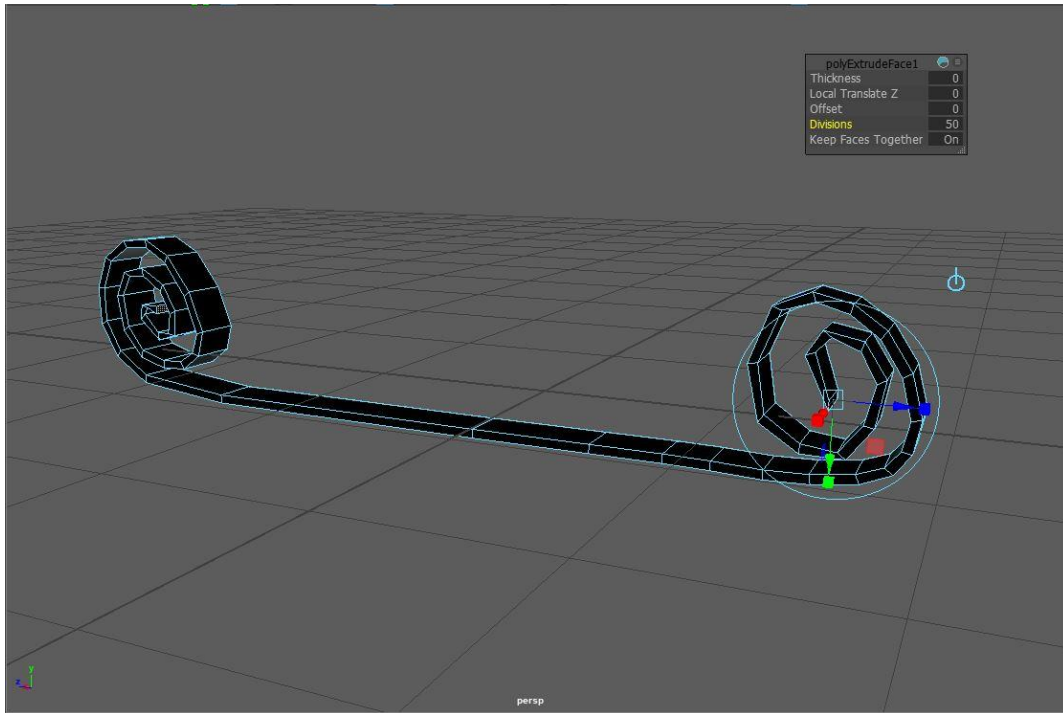


Figure 3.3.8.1: Curves Tool

To create the map, I first draw a line using the curve tool. Then I create a cube and delete three of its side faces. Then I extrude the face and the curve together and increase the segments. Then I select the entire model together, reverse its faces, and increase the length by grabbing the vertices on both sides. As a result, a beautiful map shape is formed. I used the Lattice tool to create the inward-sloping part of the folding map. Lattice is a tool where i can reshape my model by bending a cage around it. Instead of editing the mesh directly, i push and pull the cage points for a smooth deformation.

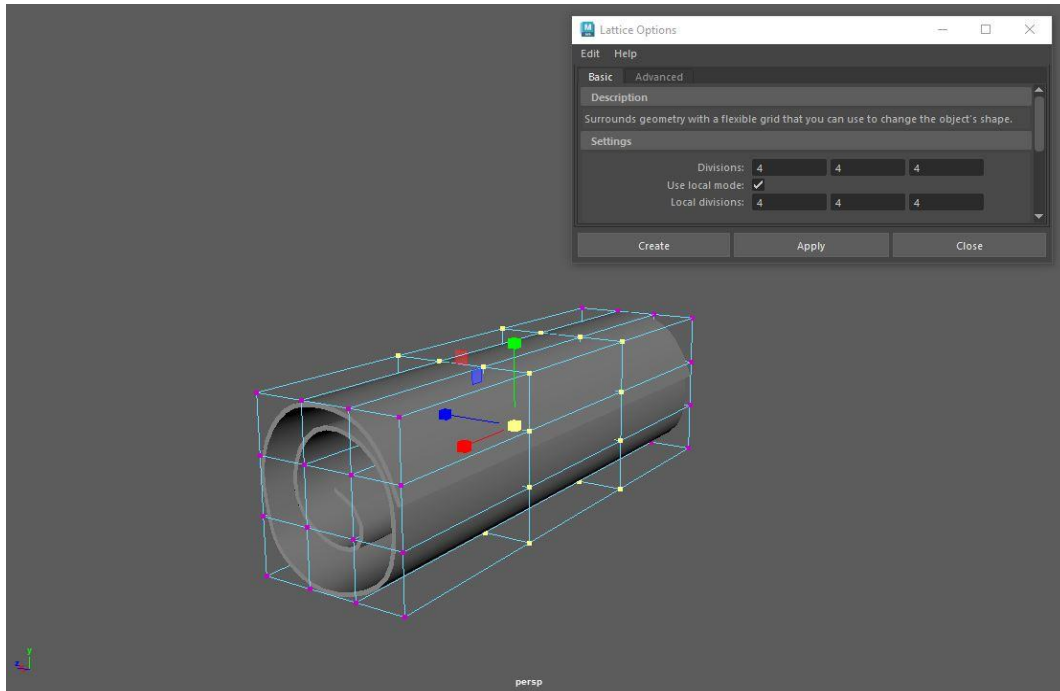


Figure 3.3.8.2: Lattice Tool

To create the scroll band, I first create a torus and reduce its segments. Then I adjust it by dragging its vertices according to the shape of my map.

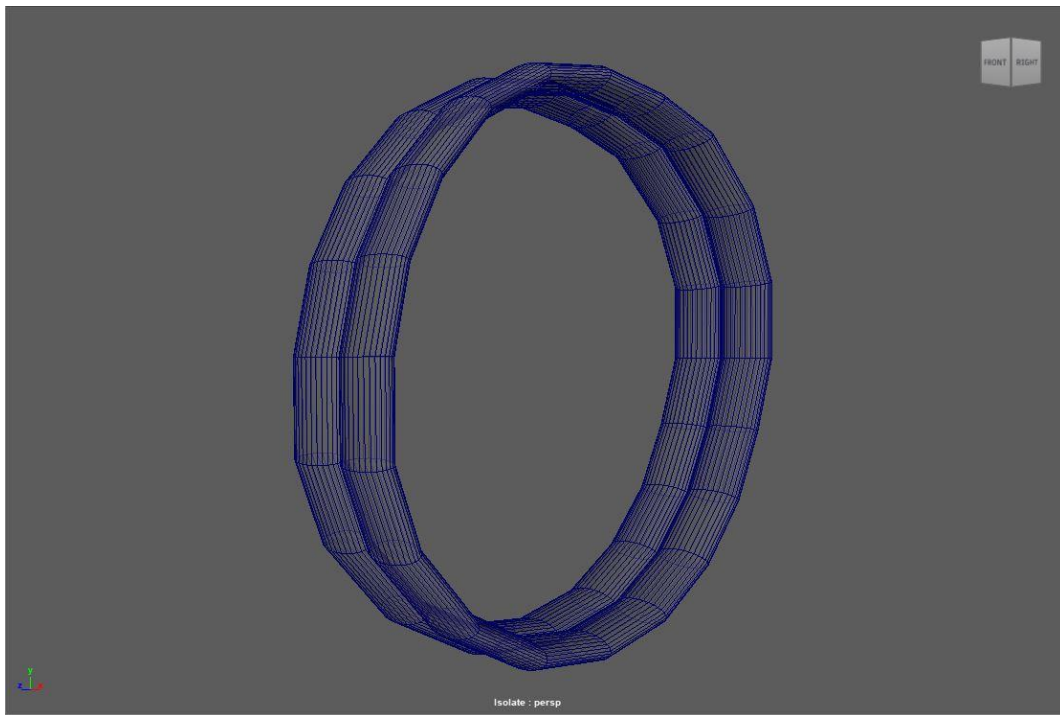


Figure 3.3.8.3: Scroll Band in Wireframe Mode

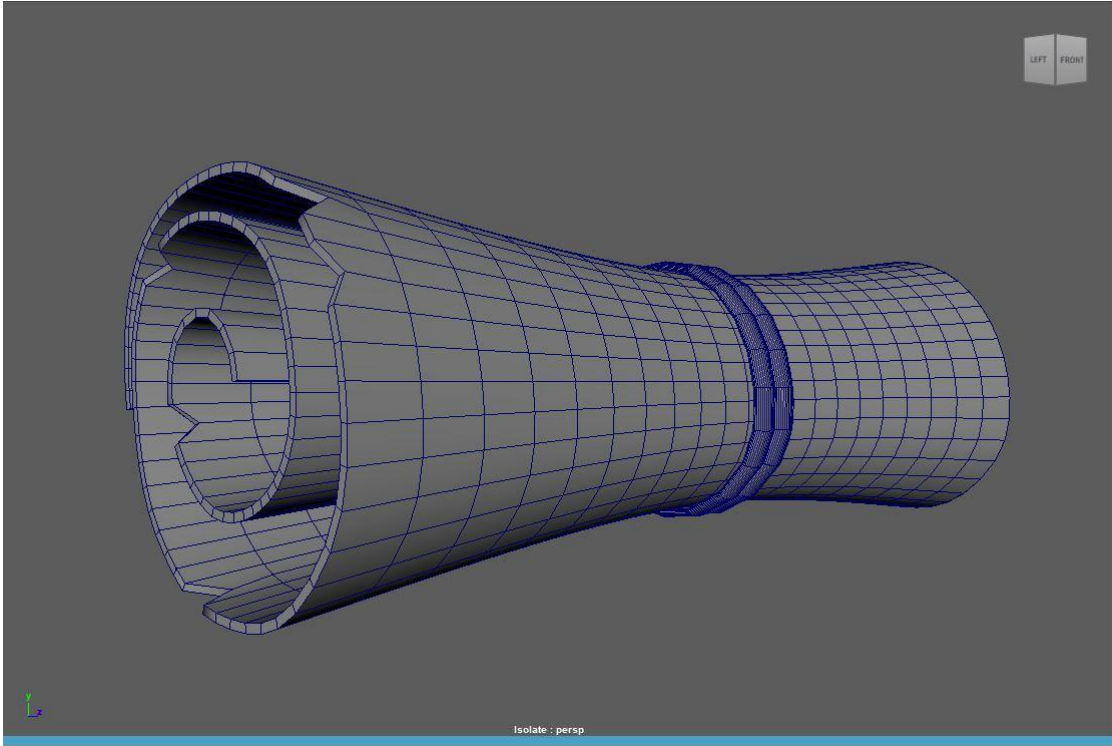


Figure 3.3.8.2: Scroll Map Full Model

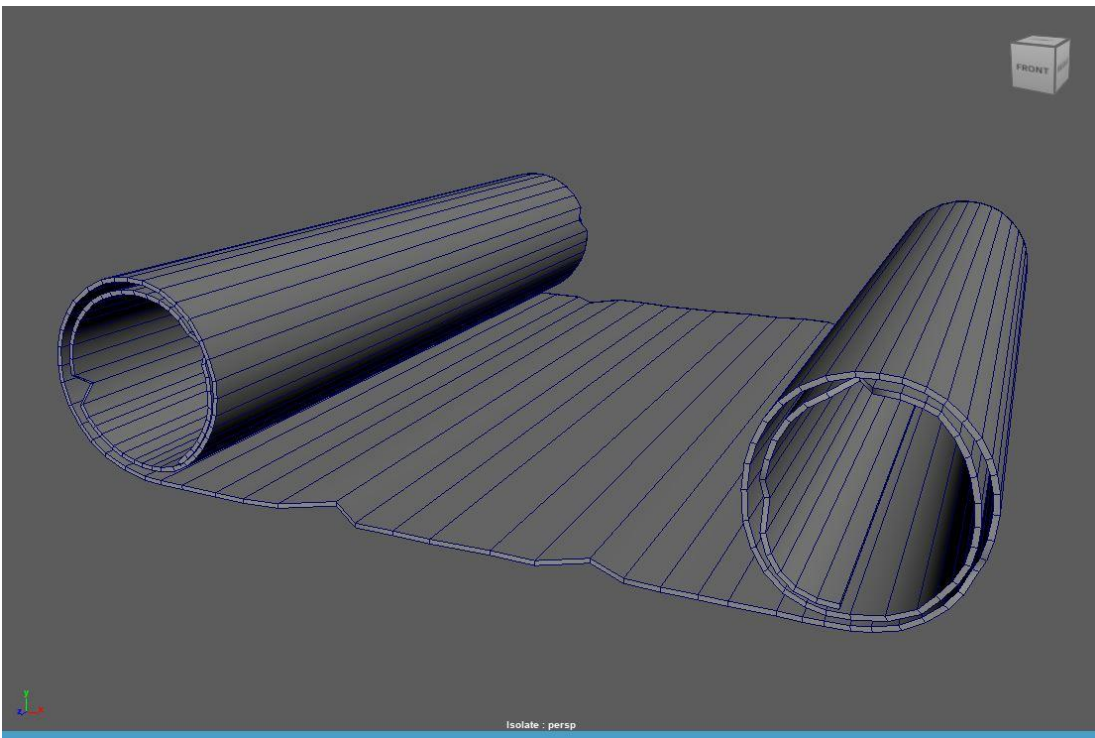


Figure 3.3.8.3: Open Map Full Model

### 3.3.9 Telescope Modeling

The telescope is an important element of the pirate environment. This is a unique element of exploration navigation and survival at sea. Pirates used it to identify enemy ships, find land, and identify hidden dangers.

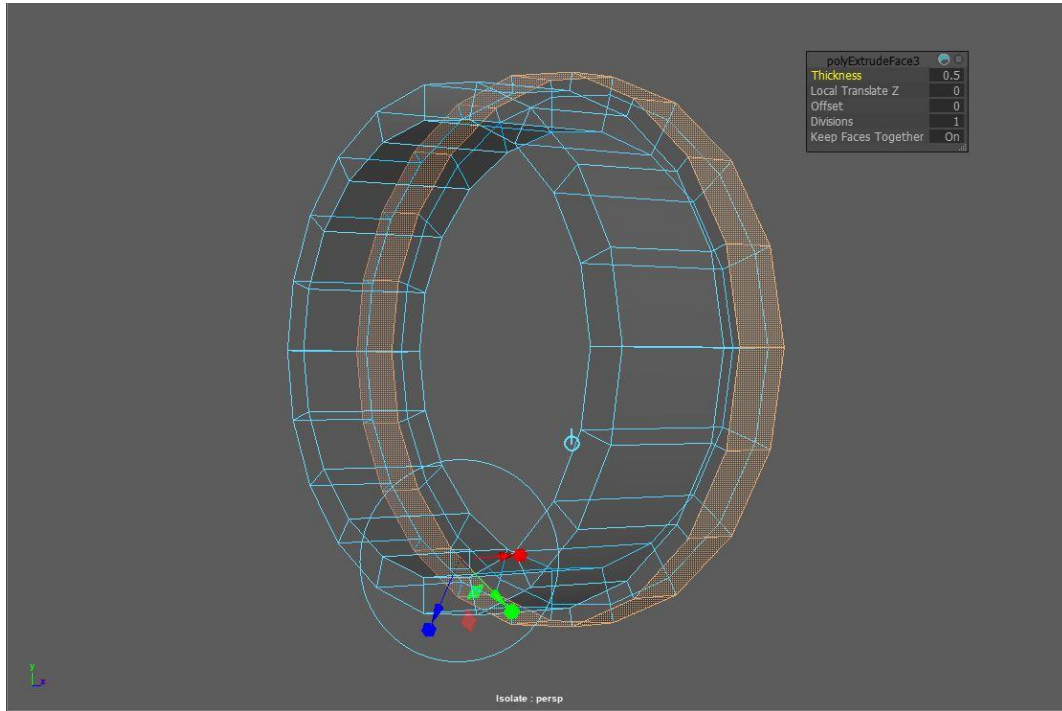


Figure 3.3.9.1: Objective Lens in Wireframe Mode

To create the objective lens, I first flattened it using a sphere. Then I selected one of the vertices and widened them a little towards the back. To create the middle part, I selected the front facets, offset them and extruded them inwards. Then I connected the edges of the back and front parts using the Bridge tool. Then to create the main lens, I first made a sphere and flattened it to give it the shape of a lens. I followed the same procedure to create the eyepiece lens.

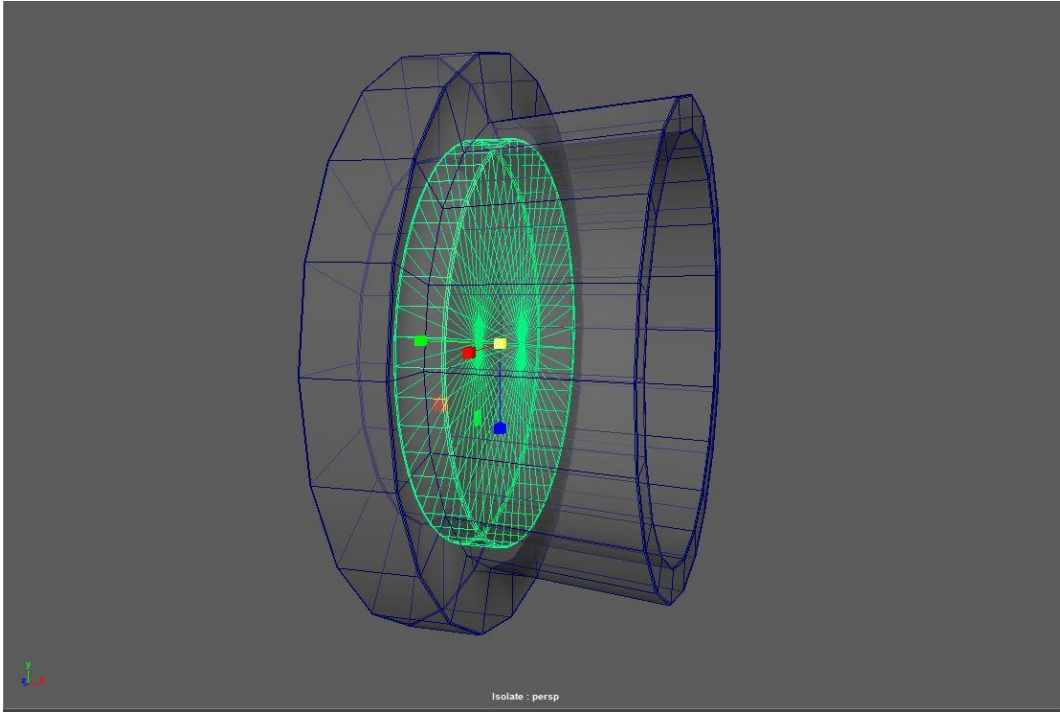


Figure 3.3.9.2: Eyepiece Lens in Wireframe Mode

I first took a pipe shape to create the barrel of the telescope. I kept the front part of the pipe a little wider and the back part narrower.

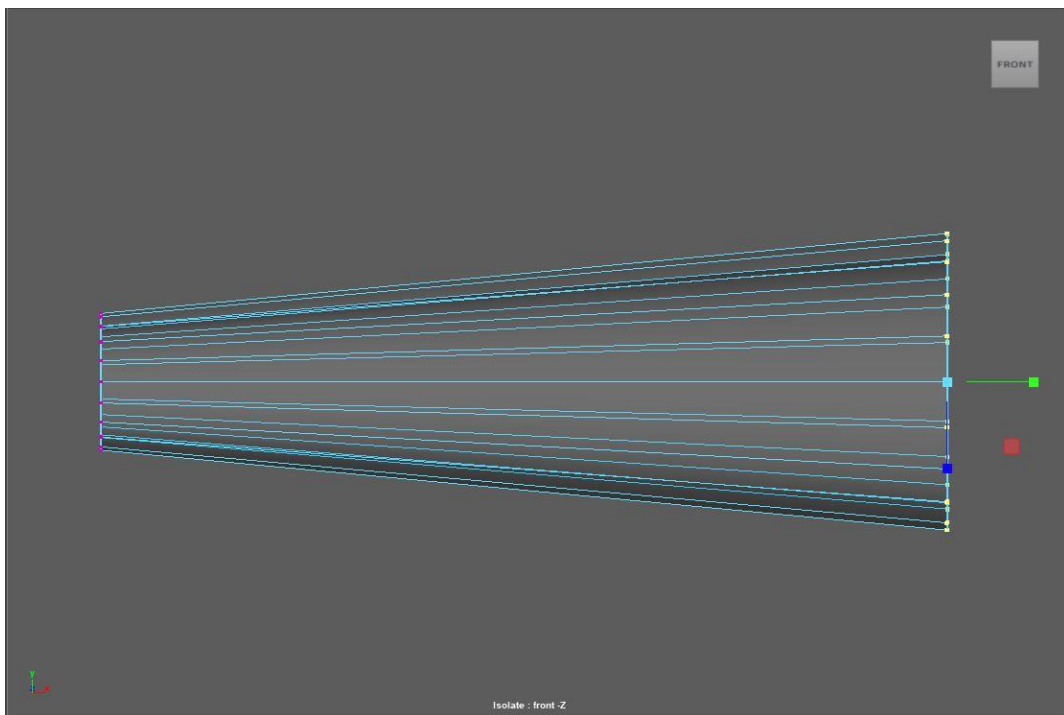


Figure 3.3.9.3: Barrel in Wireframe Mode

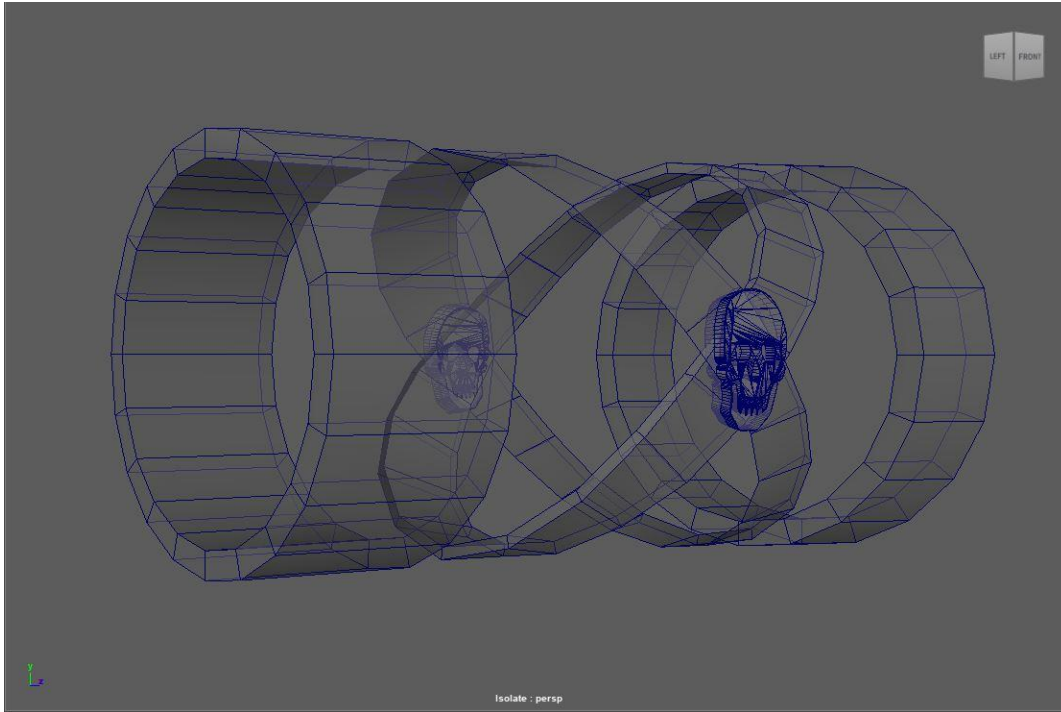


Figure 3.3.9.4: Decorative Parts Map Full Model

I also used some decorations on the telescope barrel to match the pirate theme, such as leather wrap and skull markings.

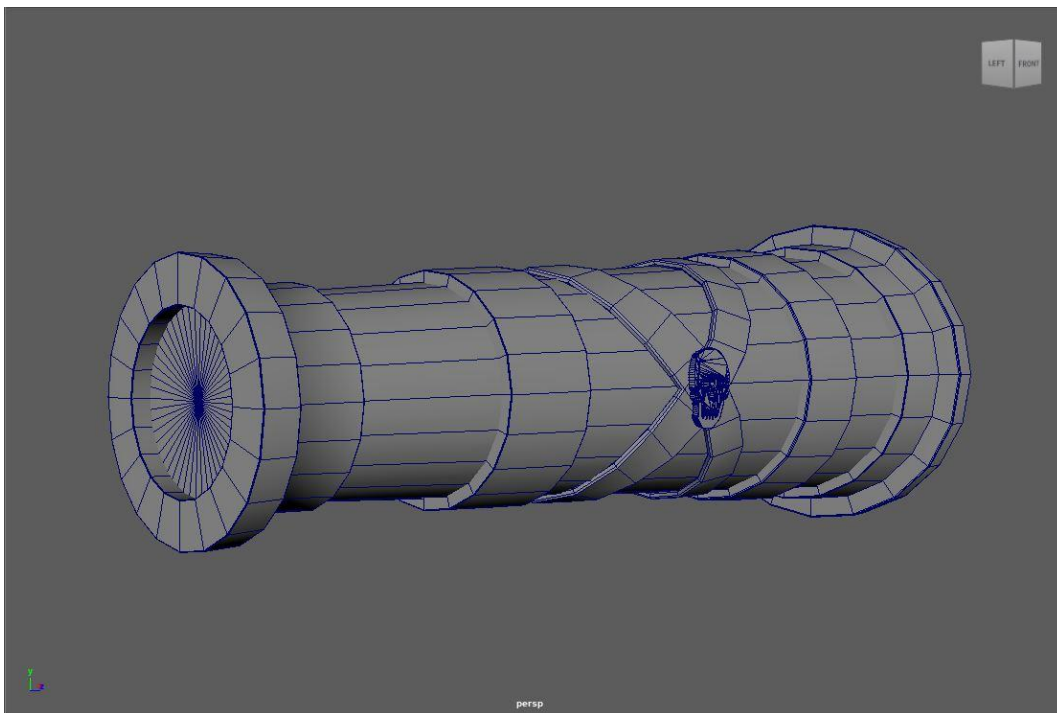


Figure 3.3.9.5: Telescope Full Model

### 3.3.10 Pistol Modeling

Pirates used a variety of weapons in their daily adventures. One of the most important weapons among them is the pistol. They used it as a primary weapon to board various enemy ships or to protect their treasure. To form the wooden structure of the pistol, I first used a cube. Then I used a cylinder to make the barrel. I added some thickness to it to give it the look of a traditional pirate pistol. Then I used the cylinder and cube to make the trigger and other small parts.

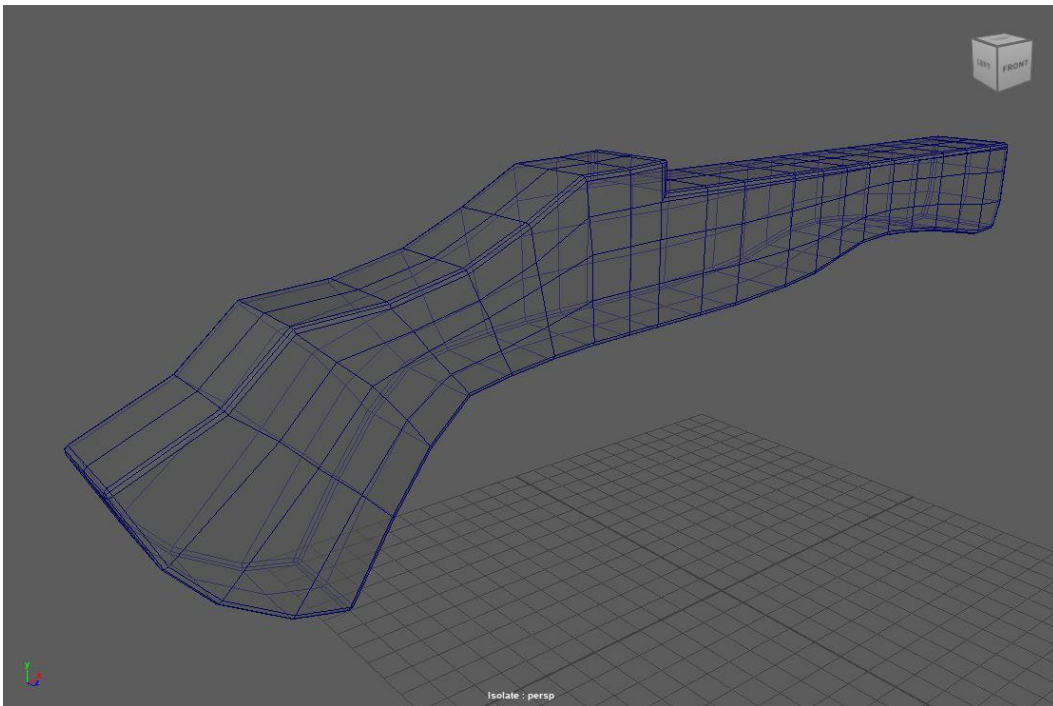


Figure 3.3.10.1: Pistol Base in Wireframe Mode

To make the base of the pistol, I first cut a cube. Then I extruded that cube several times to form a basic shape. To create the hammer part of the gun, I first took a plane. Then I extrude the edges of that plane and create the shape of a hammer. Then I select the faces of the entire plane and extrude them. Then I sharpen some part of one end of the hammer. This is how I create the complete shape of the hammer. Then I took a pipe and widened a section of that pipe to make the barrel.

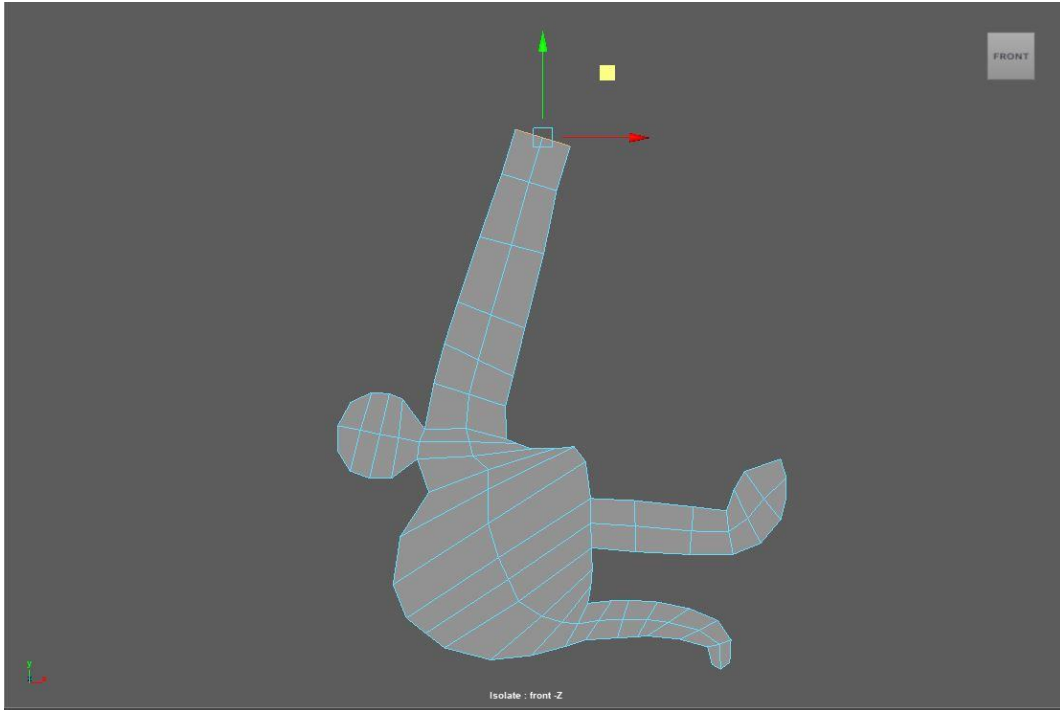


Figure 3.3.10.2: Hammer Making

To create the gun barrel, I first took a pipe. Then I widened a section of that pipe. So that it looks a bit like a microphone.

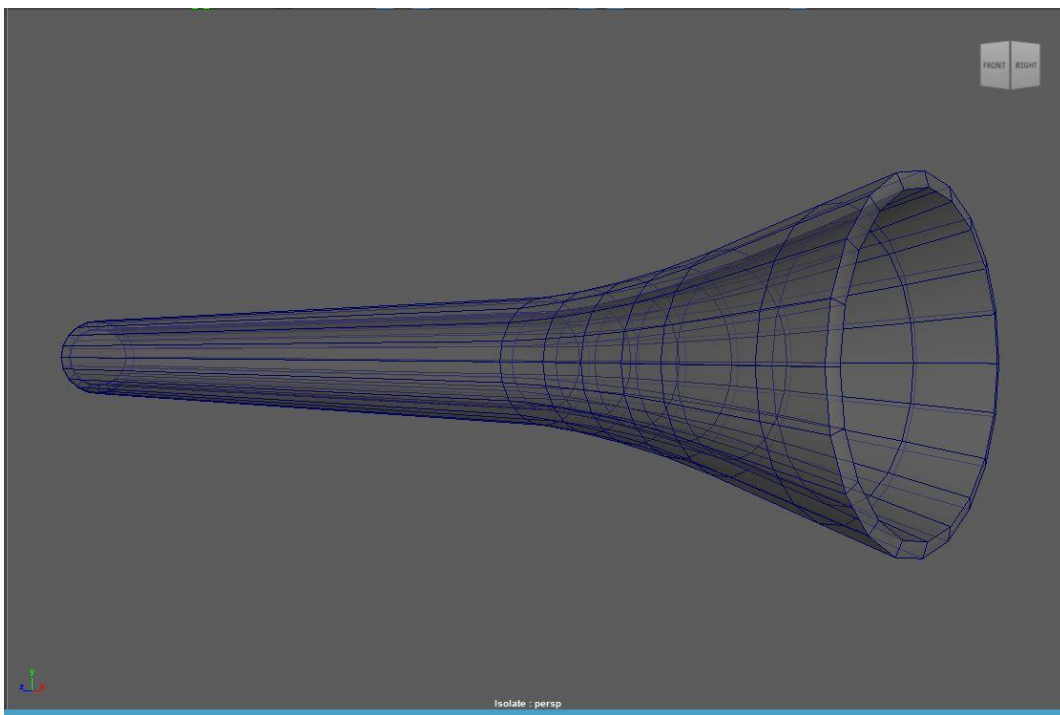


Figure 3.3.10.3: Barrel in Wireframe Mode

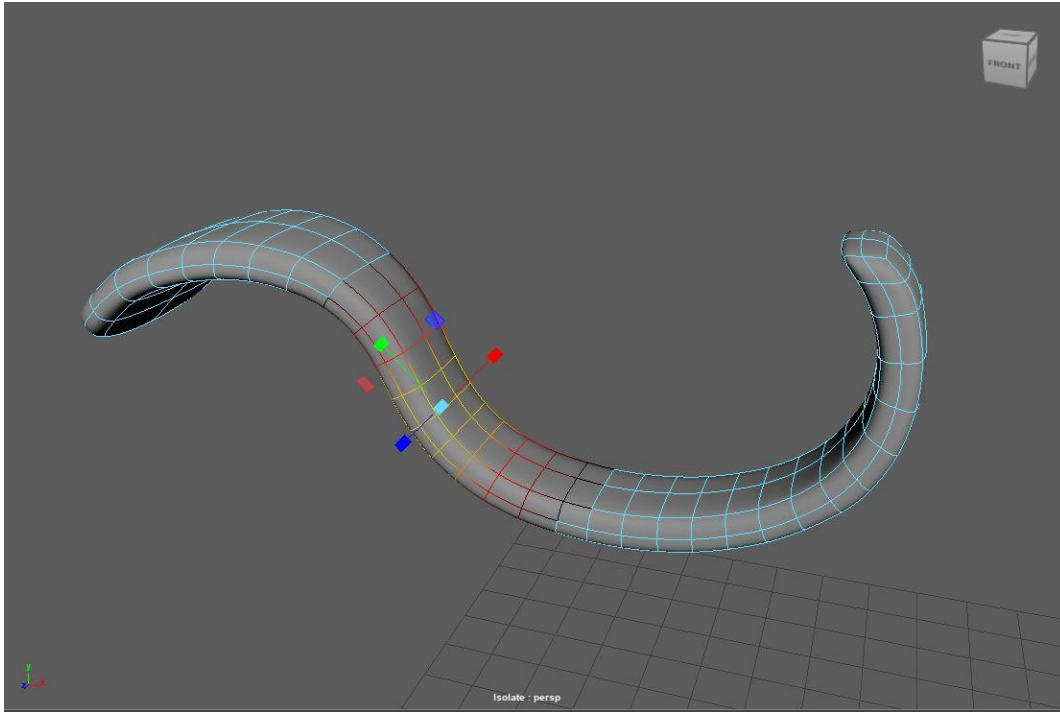


Figure 3.3.10.4: Soft Selection in Trigger

I use the Curve tool to create the basic shape of the trigger. Then I use the Soft Selection tool to give it a perfect shape.

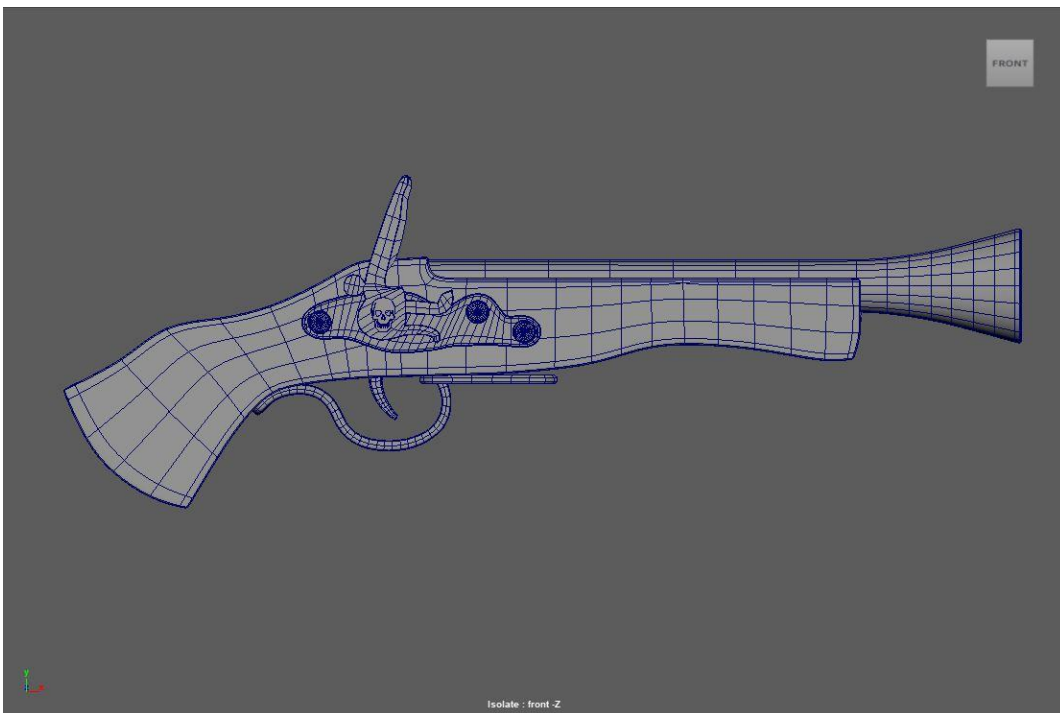


Figure 3.3.10.5: Pistol Full Model

### 3.3.11 Rapier Modeling

The rapier is a classic weapon used by naval officers, captains and skilled duelists. It is not just a weapon but also a symbol of the pirate's authority, poise and close combat skills. It adds a different dimension to the pirate's atmosphere. To make a model of the rapier, I started working with part of its blade. To make the blade, I first took a cube. Then I pressed it to create the upper part. I took a cylinder to make the handle. I used loops to create the details of the leather-wrapped part. I used curves to create the guard of the handle. I used various small decorative tools, including a round pommel, to complete the work.

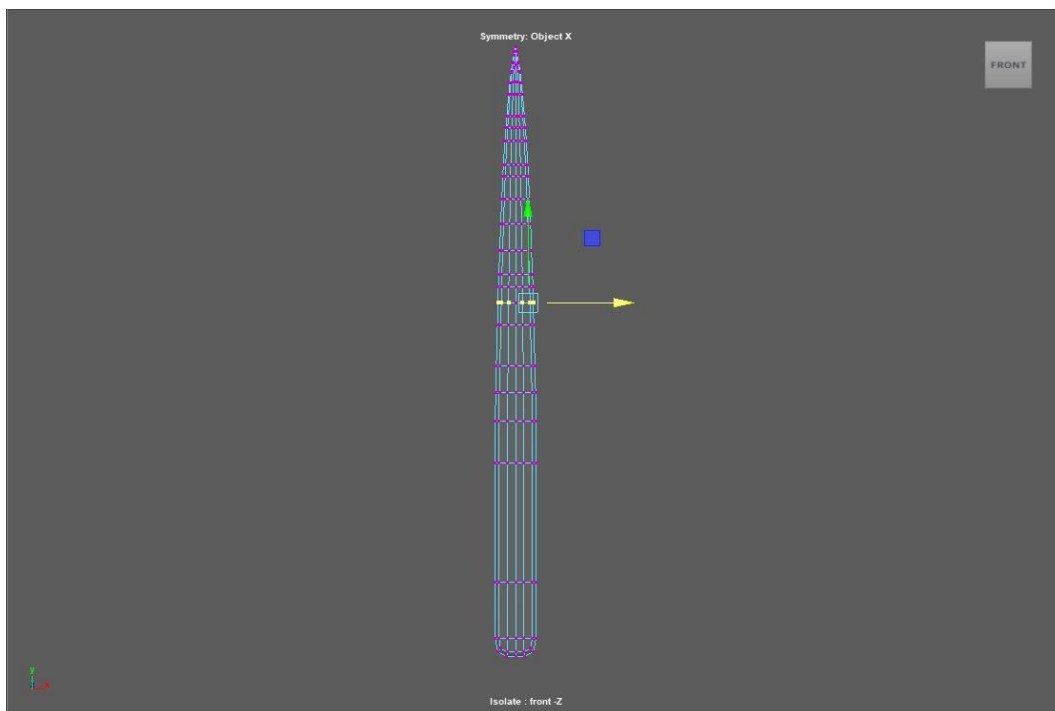


Figure 3.3.11.1: Rapier Blade in Wireframe Mode

To create the blade, I first took a cube. Then I selected the vertices on it and pressed them together to form a sharp edge. Then I pressed the two sides of it again to create the sharp shape of the blade. To create the handle guard, I first create a basic shape for the guard using the Curve tool. Then I create a cube and delete three of its side faces. Then I extrude the face and the curve together and increase the parts. Then I select the entire model together, invert its faces and increase the length by taking the vertices on both sides. Then I use the Soft Selection tool to give it a perfect shape.

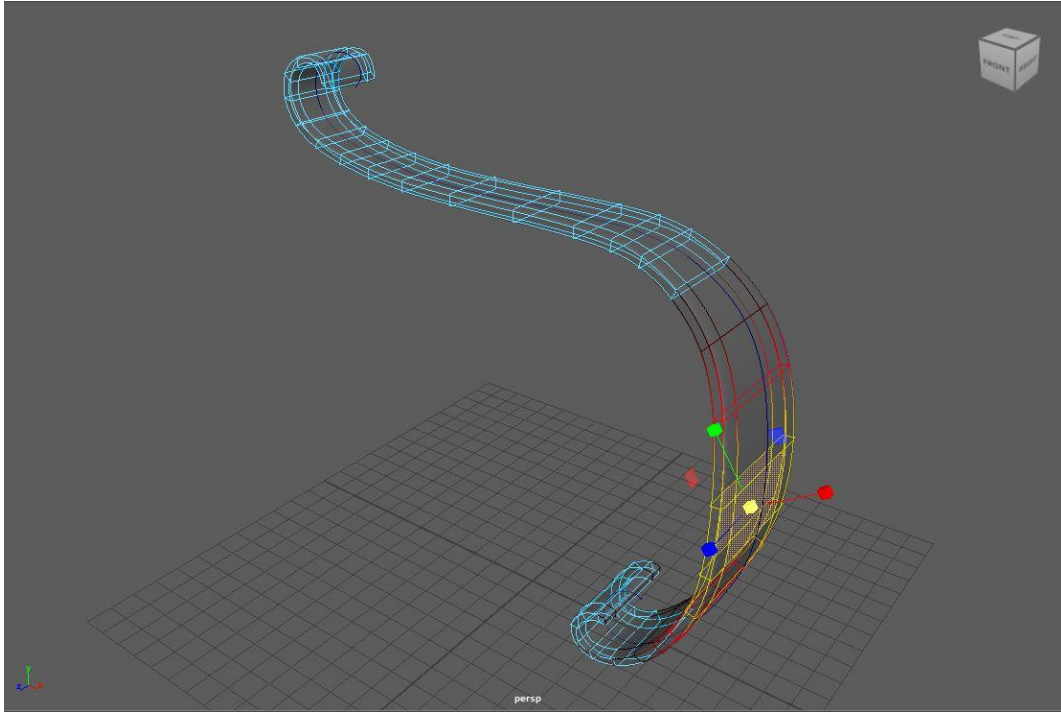


Figure 3.3.11.2: Guard in Wireframe Mode

I took a cylinder to make the body of the handle. To make the top part, I took a pipe and compressed it. To make the bottom part, I cut a cylinder and then beveled the bottom part.

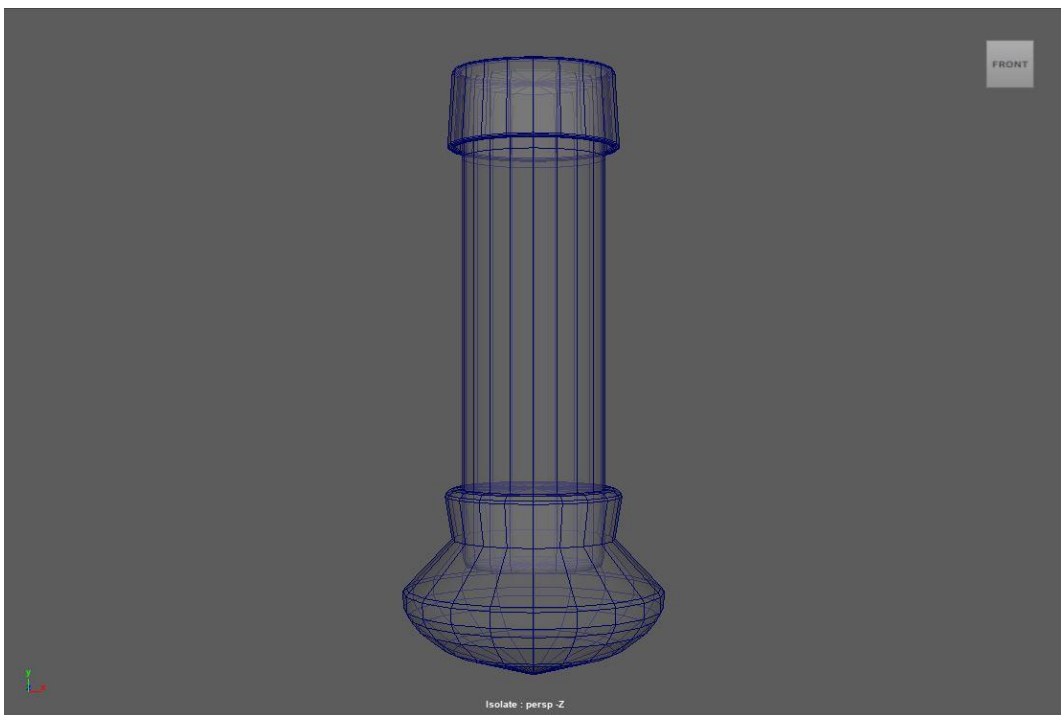


Figure 3.3.11.3: Handle in Wireframe Mode

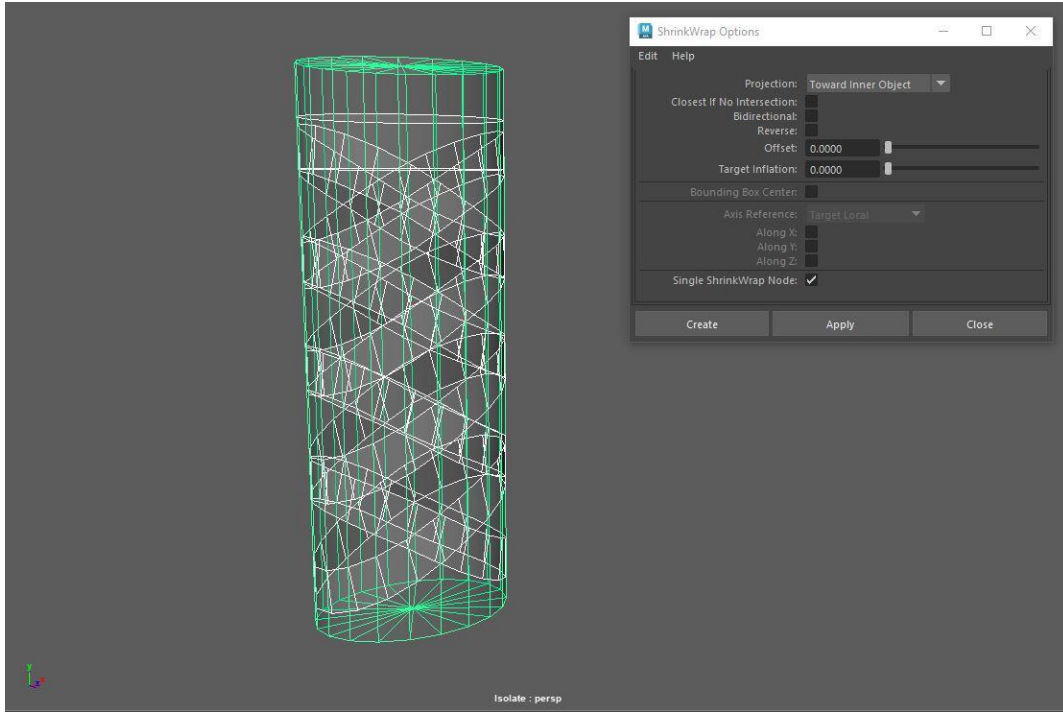


Figure 3.3.11.4: Shrink Wrap

In this image we can see how I created the leather part of my handle using the Shrink Wrap tool.

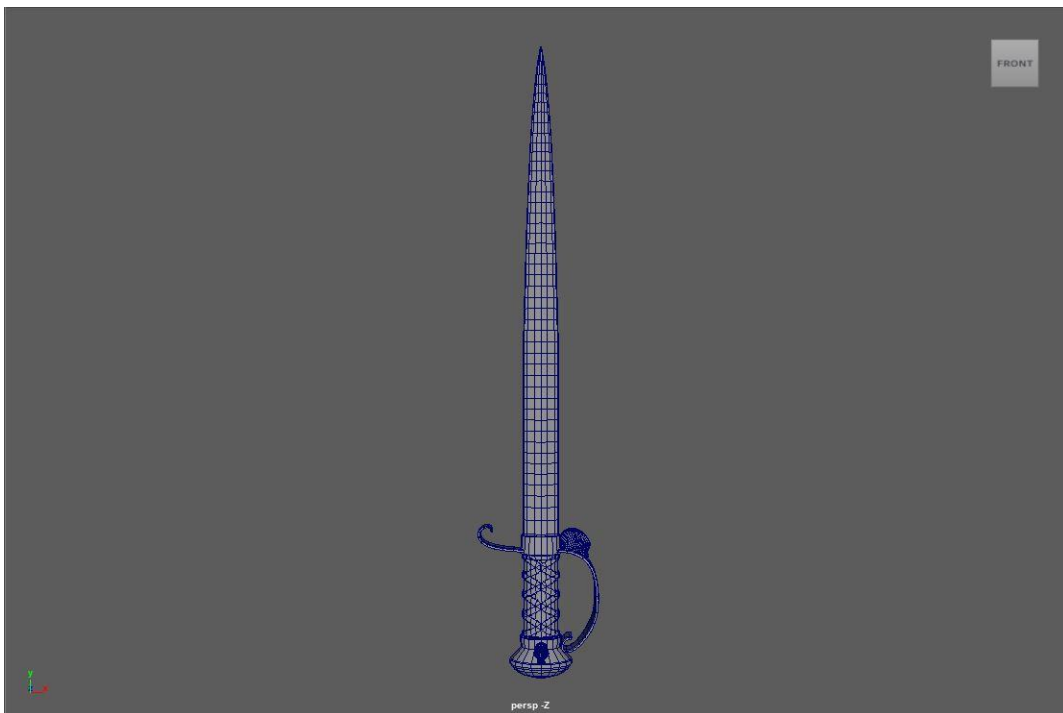


Figure 3.3.11.5: Rapier Full Model

### 3.3.12 Sward Modeling

When you think of a pirate, the first thing that comes to mind is a sword in his hand. It reflects his personality. A sword is used by pirates for many purposes in warfare such as hand-to-hand combat, defense, special attacks, etc. Apart from this, they used swords for many daily tasks such as cutting ropes, opening boxes, breaking locks, fighting sea monsters. To make the blade, I first took a cube. Then I pressed it and made the upper pointed part. To make the handle, I took a cylinder. I used loops to create the details of the leather-wrapped part. I used curves to create the guard of the handle. I used various small decorative tools, including a round pommel, to complete the work.

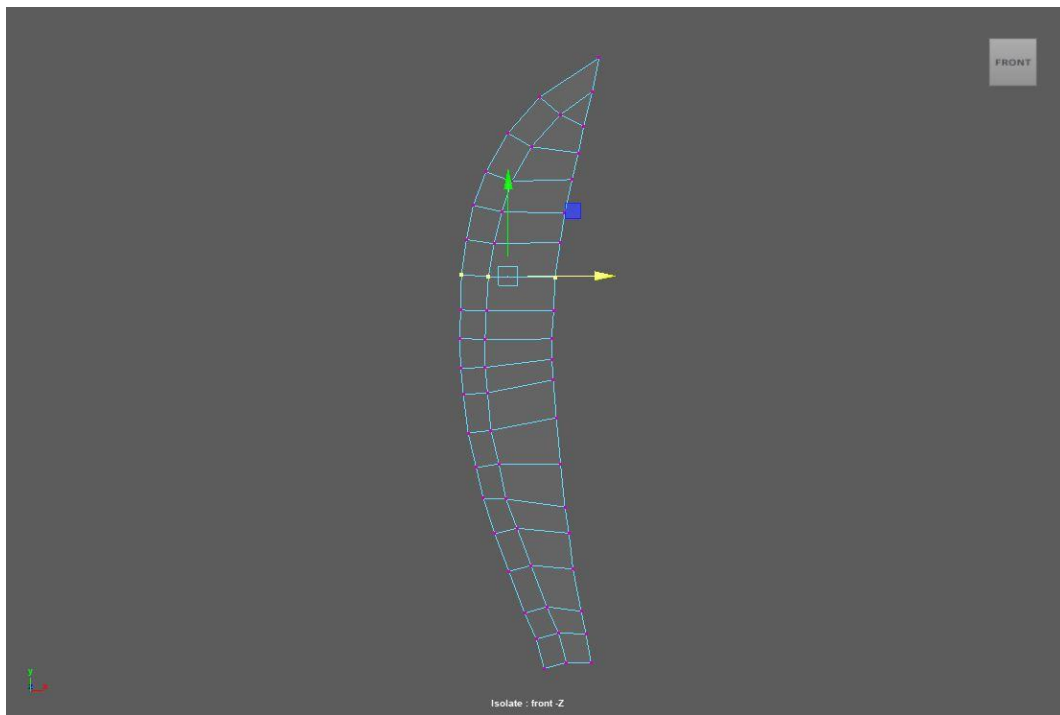


Figure 3.3.12.1: Sward Blade in Wireframe Mode

To create the blade, I first took a cube. Then I selected the vertices on it and pressed them together to form a sharp edge. Then I pressed the two sides of it again to create the sharp shape of the blade.

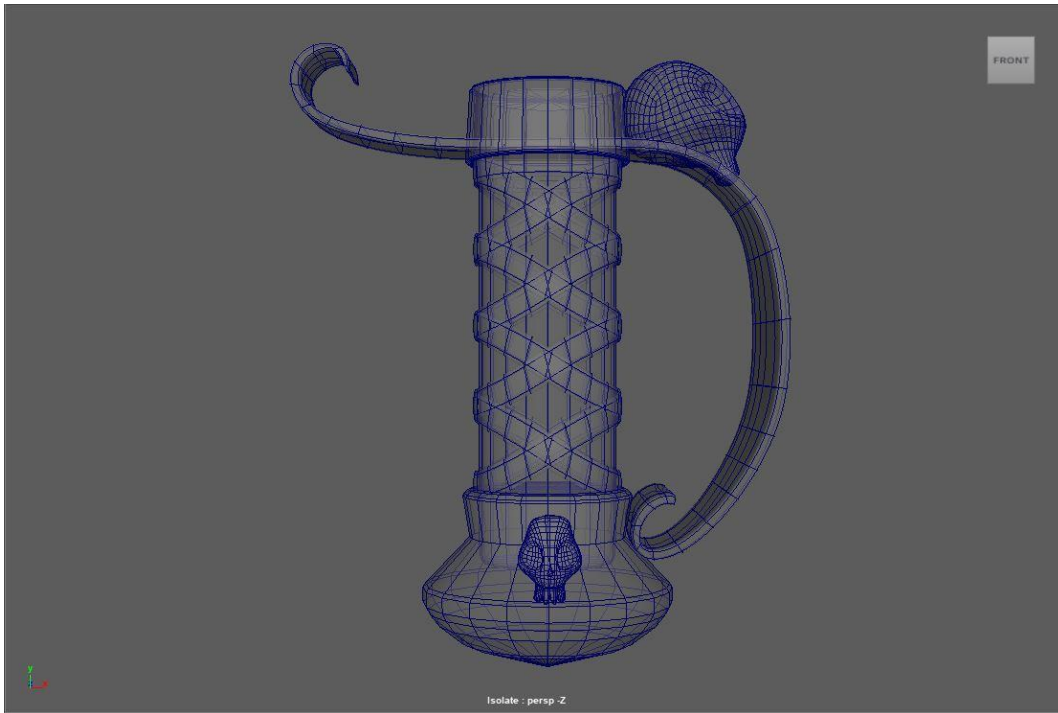


Figure 3.3.12.2: Full Handle in Wireframe Mode

I made the handle for the sword using the same process as the rapier handle. I used skulls on it to match the pirate theme of my sword.

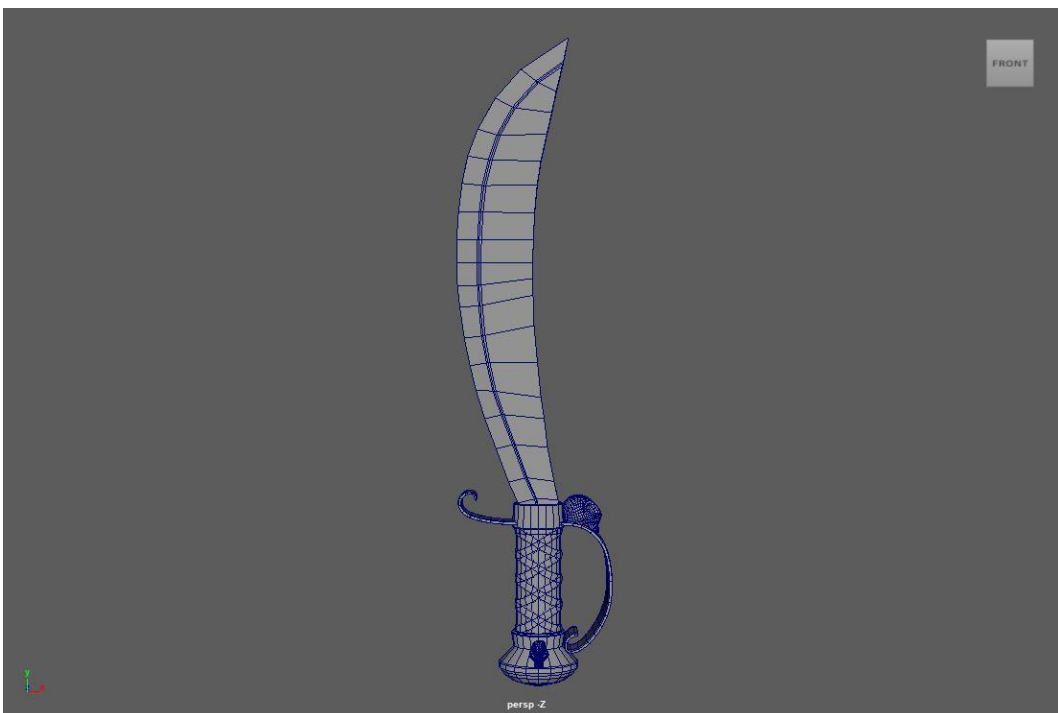


Figure 3.3.12.3: Sword Full Model

### 3.3.13 Treasure Chest Modeling

Treasure chests are an essential element in a pirate environment. Pirates would keep all their looted coins, precious stones, or valuable materials inside it. It was not only used to store valuables but also contained many useful items. It was mainly used as a storage box.

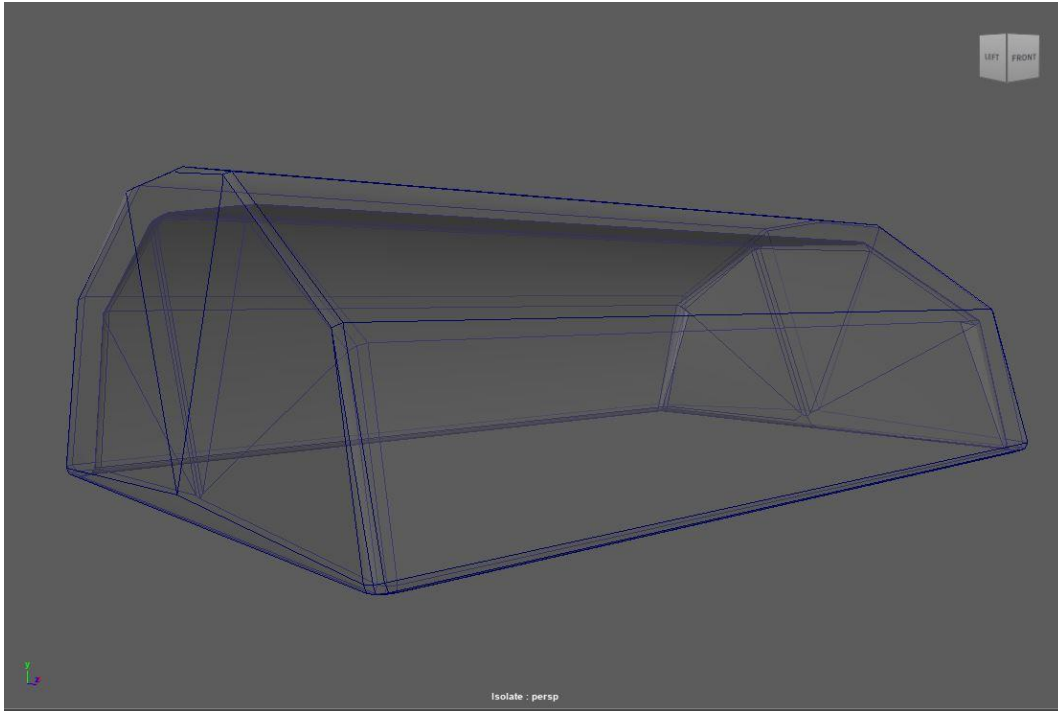


Figure 3.3.13.1: Lid in Wireframe Mode

To make its body, I first took a cube. Then I extruded its top surface and used an offset to push that part down to create a box-like shape. Then I used another cube to create its lid. First, I selected the bottom surface of that cube and used an offset to push it inward. Then I grabbed the top corners and pushed them inward to create a basic lid shape. This created the complete lid. Then I added a lock to it, which I made with cubes. Then I used skull marks and other tools to match the entire treasure chest with the pirate theme. I filled the box with many gold coins, various precious stones, and pearls to give it its full form.

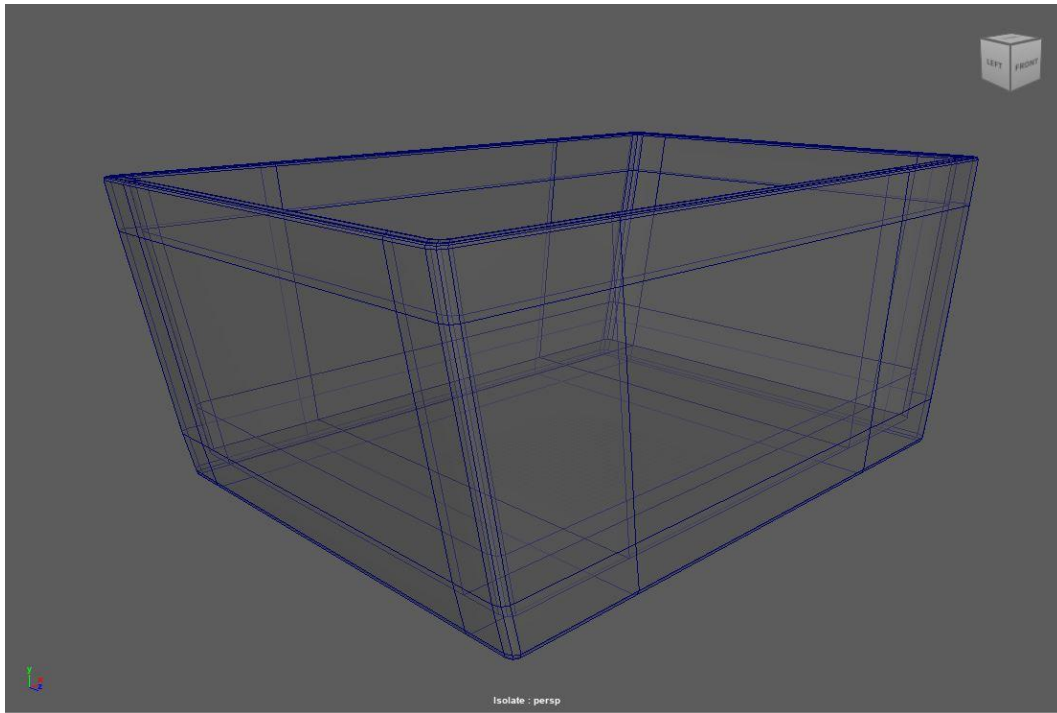


Figure 3.3.13.2: Box in Wireframe Mode

I used skull marks and other tools to match the treasure chest with the pirate theme. I filled the box with many gold coins, precious stones, and pearls to give it its full form.

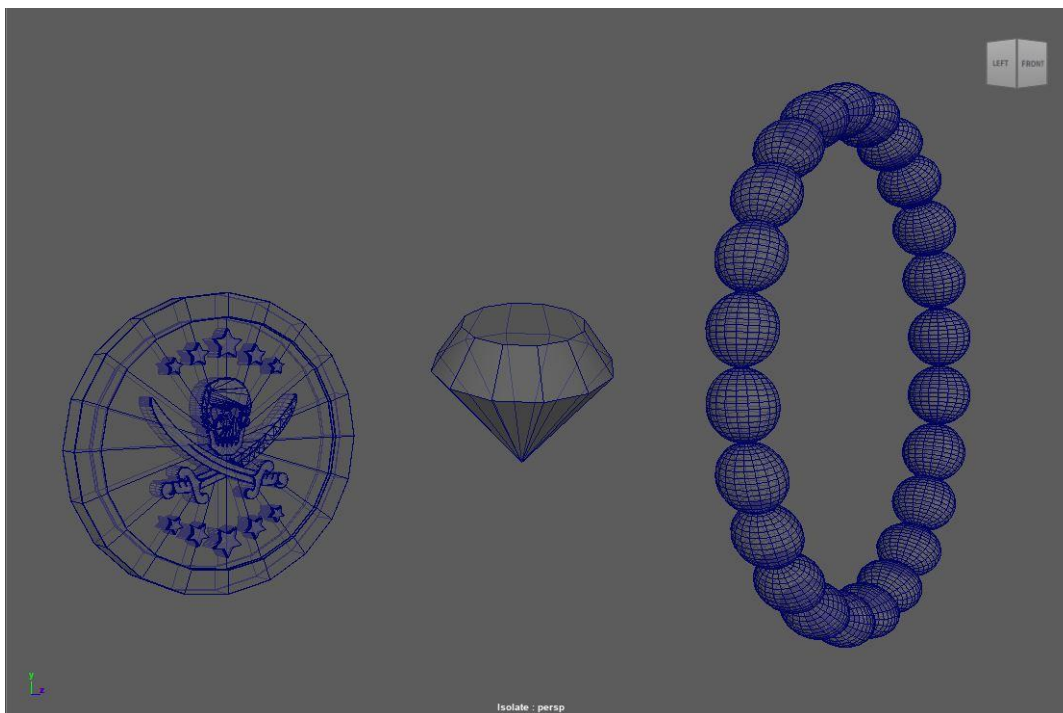


Figure 3.3.13.3: Accessories in Wireframe Mode

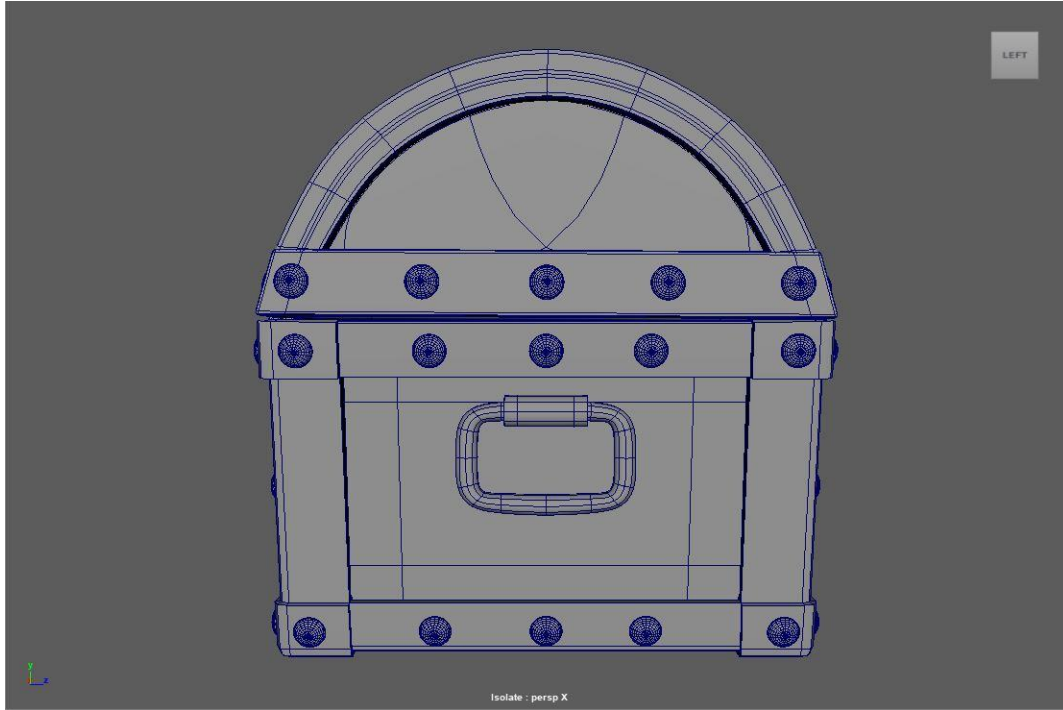


Figure 3.3.13.4: Treasure Chest Left View

These images show the treasure chest from a different perspective, so that all the small details can be seen clearly.



Figure 3.3.13.5: Treasure Chest Front View

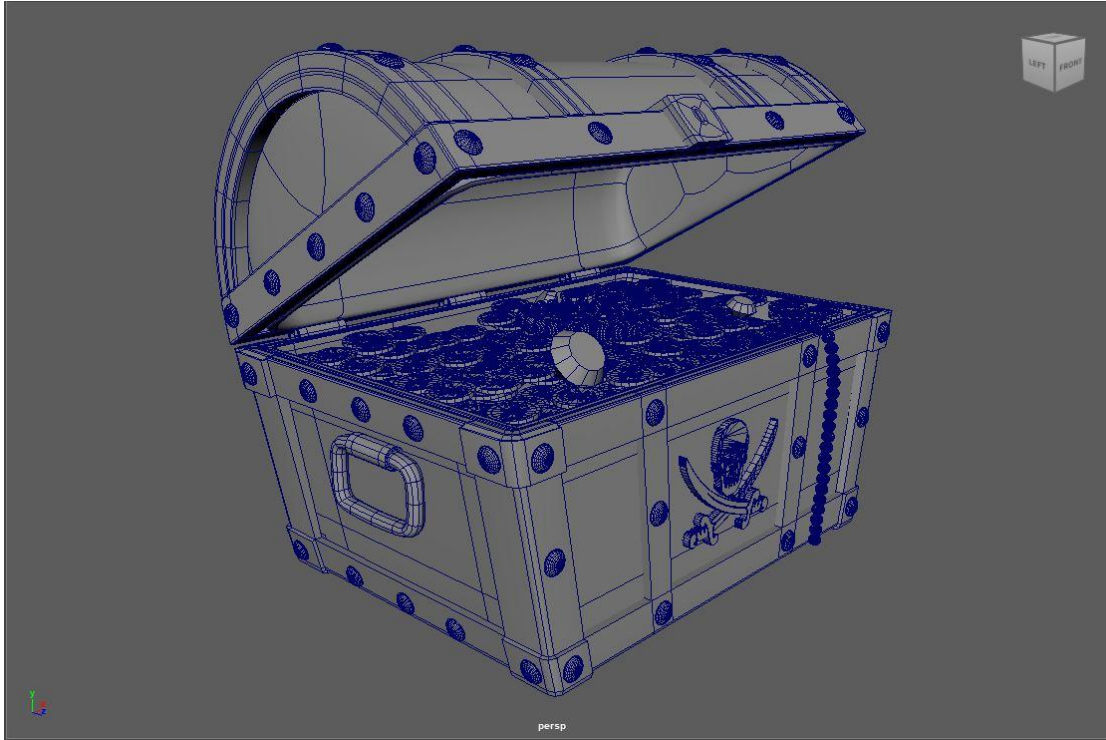


Figure 3.3.13.6: Treasure Chest Full Model

### 3.3.14 Wooden Barrel Modeling

Barrels are one of the most important elements in the pirate world. Historically, pirates would store almost everything in them, such as rum, gunpowder, food, water, extra supplies, etc. Their use was so widespread that they could be found almost everywhere on ships, docks, beaches, or hideouts. To create the wooden barrel, I first took a cylinder. Then I added several segments to that cylinder. Then I beveled those segments. Then I selected the faces of those bevels and extruded them and pushed them inwards. To make the top lids, I first drew a cylinder and flattened it. Then I hollowed them out using Boolean. I used the soft selection tool to press the top and bottom edges of the barrel.

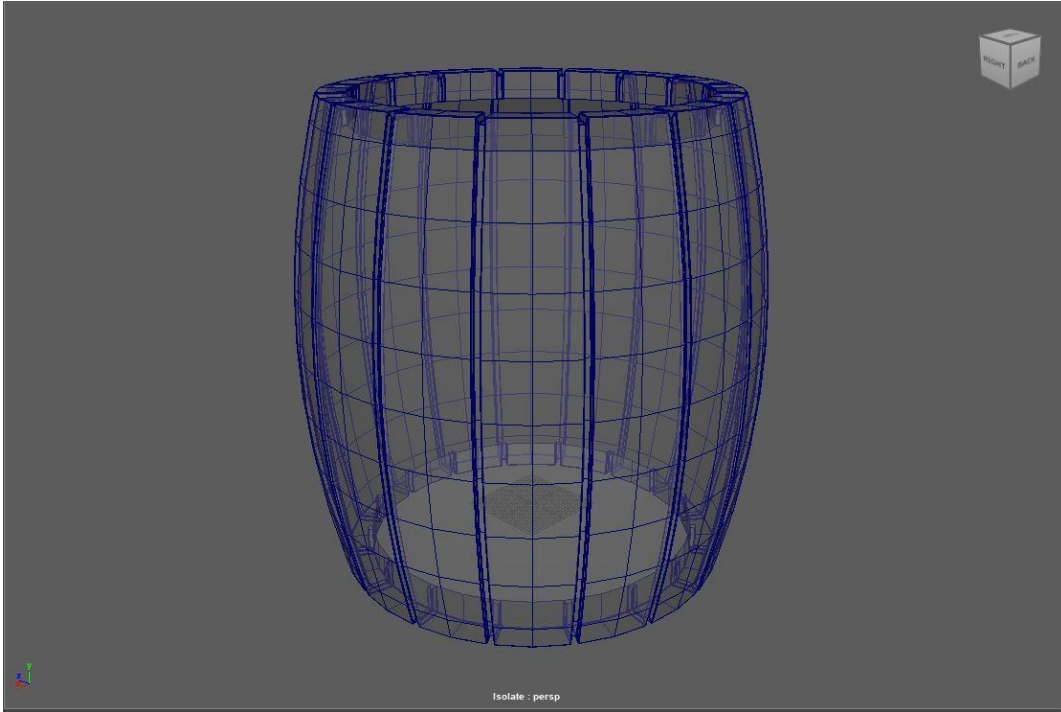


Figure 3.3.14.1: Staves in Wireframe Mode

To create hoops, I first copied and enlarged one face of the barrel. Then I used the Shrink Wrap tool and extruded the faces.

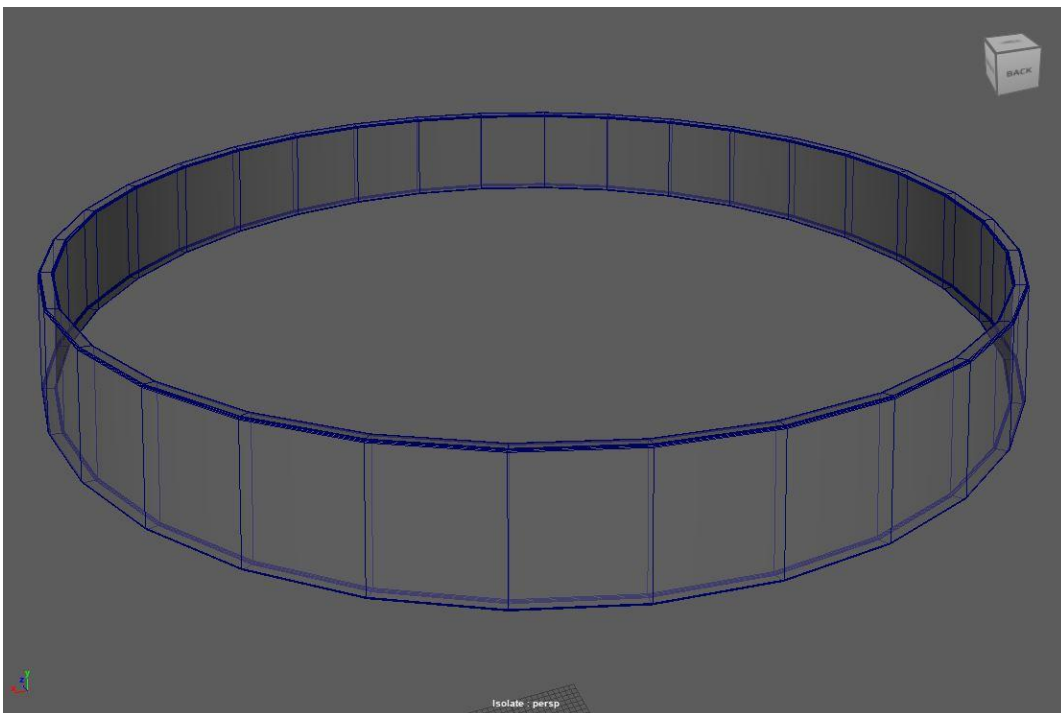


Figure 3.3.14.2: Hoops in Wireframe Mode



Figure 3.3.14.3: Wooden Barrel Full Model

### 3.3.15 Wooden Mug Modeling

A wooden mug is very small but it has a lot of importance in daily life. It is a powerful asset. Pirates used these mugs when they spent most of their time in taverns, ships or tents. Usually, they used them to drink rum, ale and water. So, if a wooden mug can be used in the environment, it will add a lot of realism to the environment. To create this model, I first took a cylinder. Then I added several segments to that cylinder. Then I beveled those segments. Then I selected the faces of those bevels and extruded them and pushed them inwards. Then, to create the upper part, I use the soft selection tool to place the part there. Then, I create the wooden plank part through extrude.

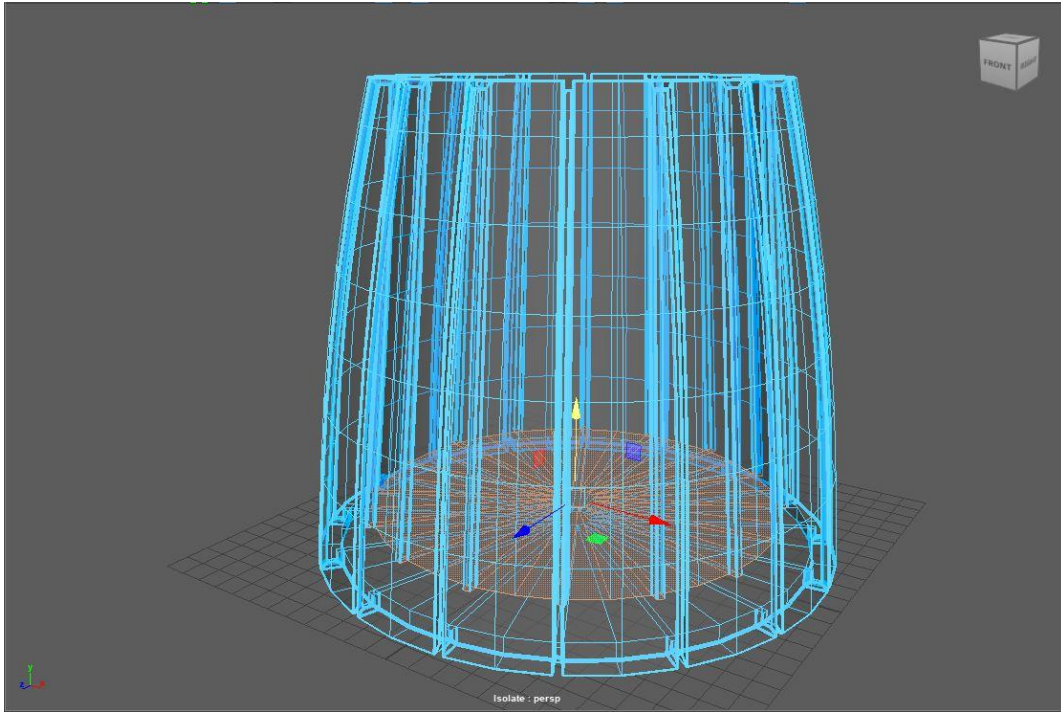


Figure 3.3.15.1: Mug in Wireframe Mode

To create its handle, I first took a cylinder and extruded it. Then created its curved part.

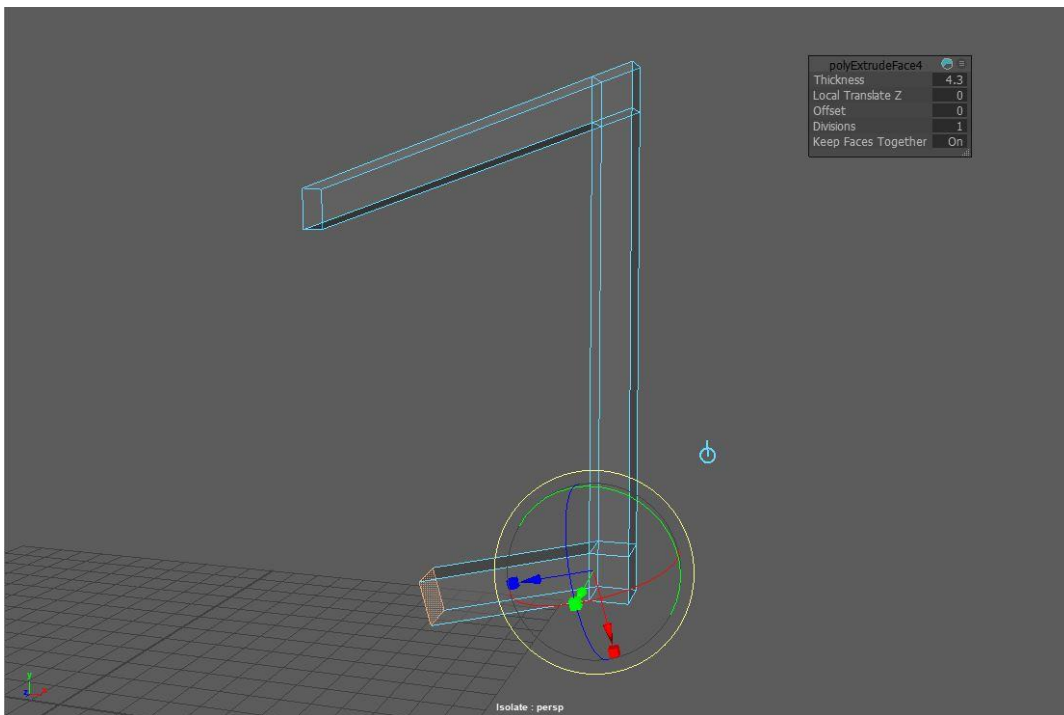


Figure 3.3.15.2: Handle in Wireframe Mode

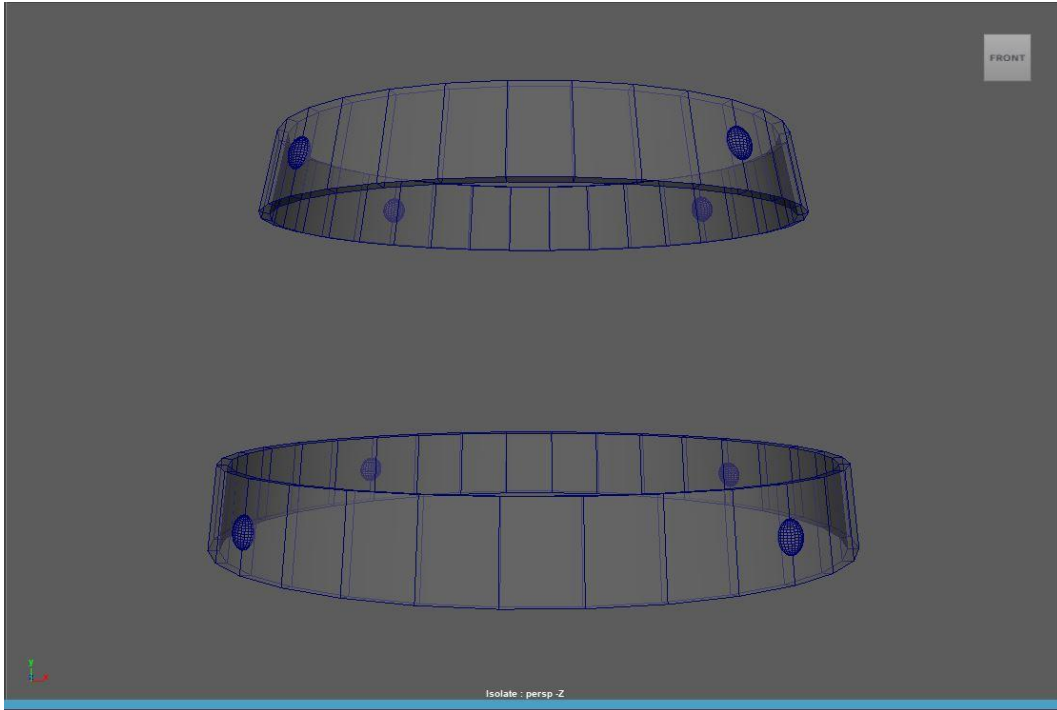


Figure 3.3.15.3: Mug Hoops in Wireframe Mode

To create hoops, I first copied and enlarged one face of the barrel. Then I used the Shrink Wrap tool and extruded the faces. I used skull marks to complete my mug.

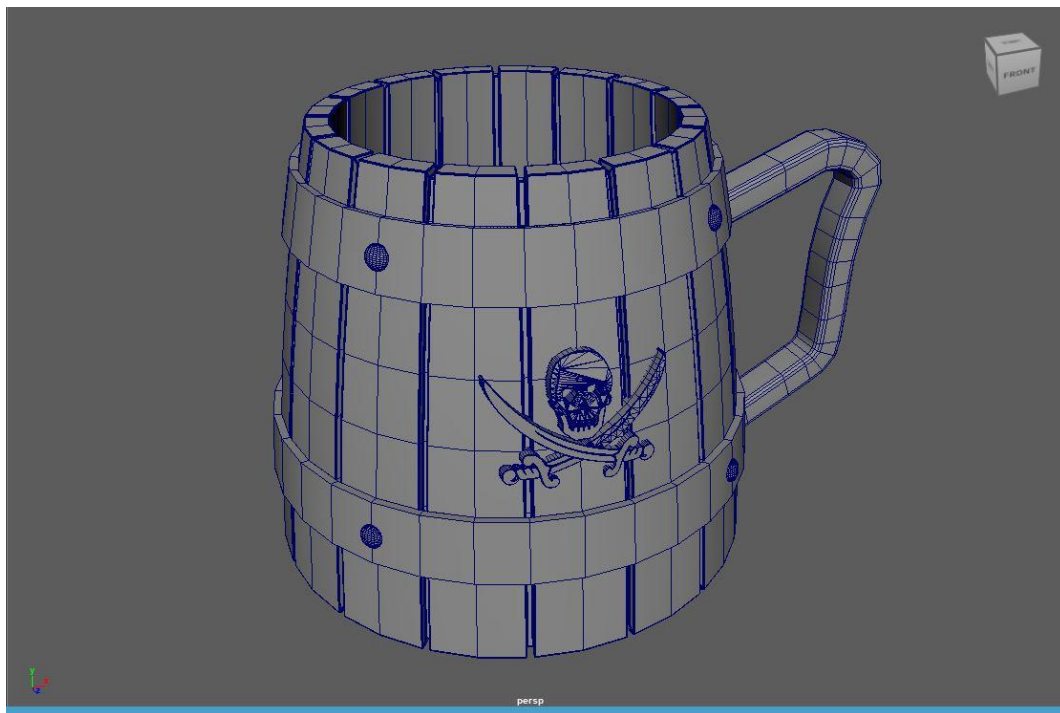


Figure 3.3.15.4: Wooden Mug Full Model

### 3.3.16 Watch Tower Modeling

The watchtower is an important observation element. Pirates used it to detect outside pirates, enemy ships, storms or threats from afar. It also served as a warning to the villagers. It is very important for creating a game environment. To create it, I first made four rectangles and then placed them at the four corners to create the main pillars. Then I added X-shaped cross supports to strengthen its structure. Then I added some wooden platforms there. Then I added railings and roof supports. I used a ladder here so that the players can use it to climb up.

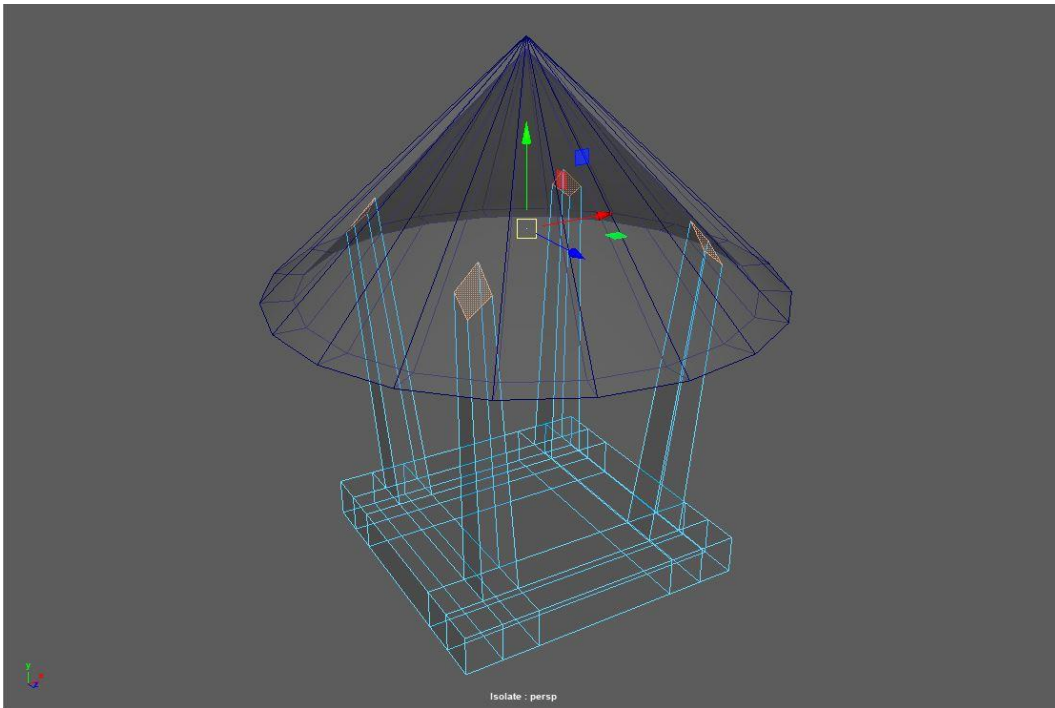


Figure 3.3.16.1: Roof in Wireframe Mode

In this picture we can see the roof of the watch tower. To make the roof, I first took a cylinder. Then I flattened it into four parts and made four pillars from it. Then I placed a cone-shaped roof on top of the pillars.

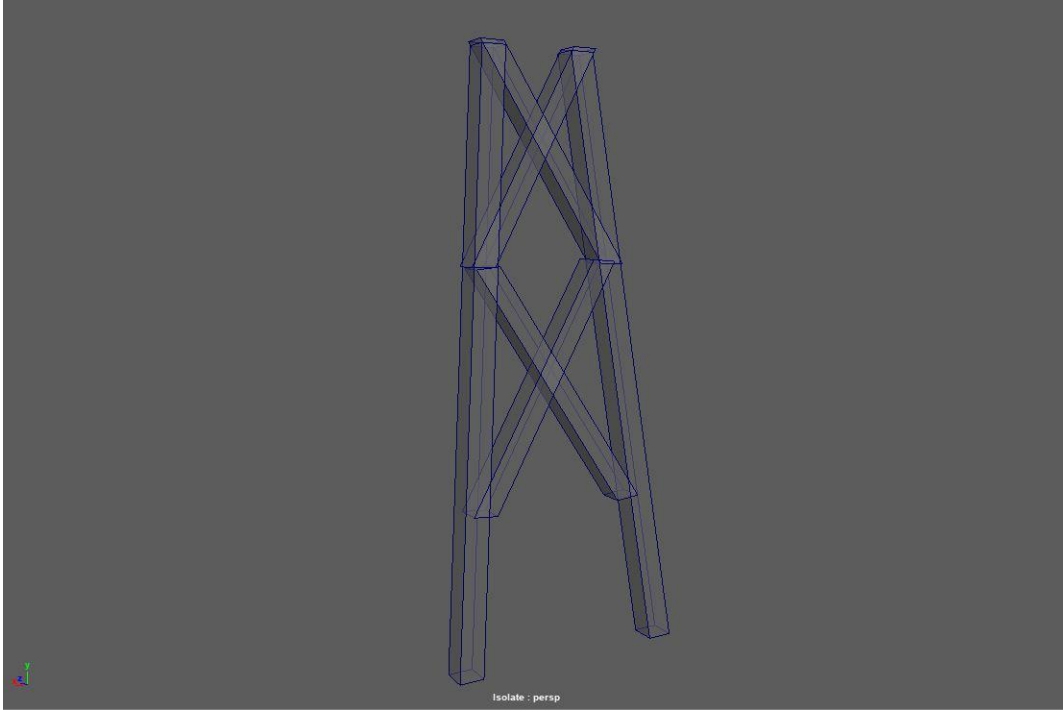


Figure 3.3.16.2: Base in Wireframe Mode

In this picture we can see that I have put X-shaped cross supports to strengthen its structure.

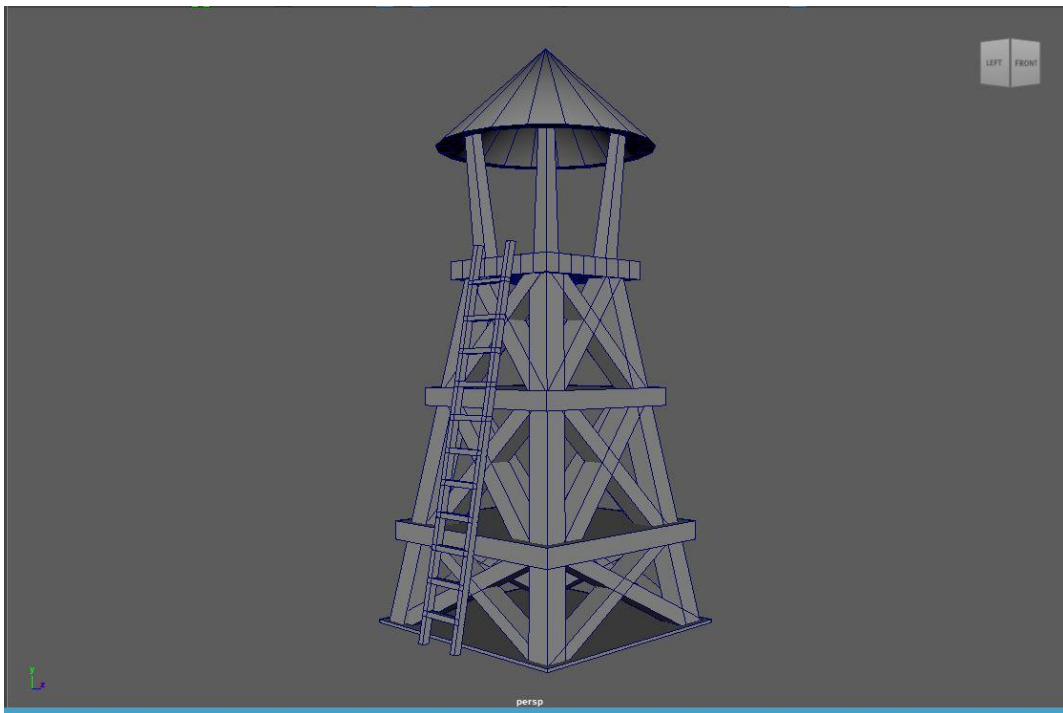


Figure 3.3.16.3: Watch Tower Full Model

### 3.3.17 Boat Modeling

Since pirates spent most of their time on the water, a boat was a very important vehicle for them. They used boats for various purposes such as traveling from ship to island, hiding in enemy trenches, using them as a secondary if the main ship sank, and also used them in narrow passages. The main thing is that there are no limitations to its use.

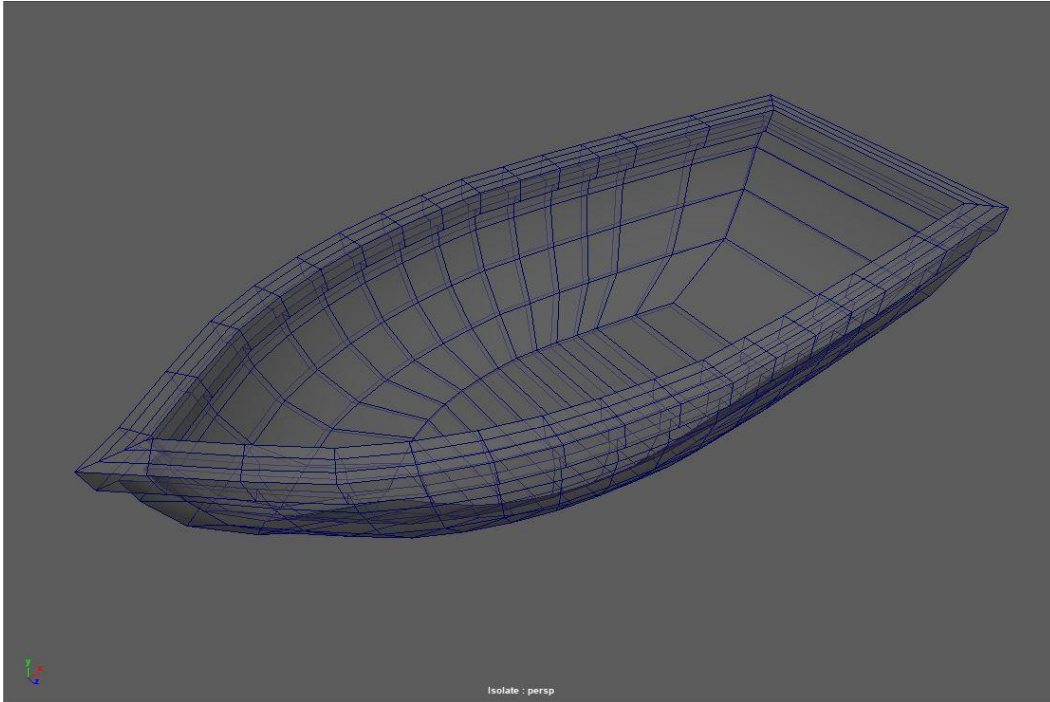


Figure 3.3.17.1: Hull in Wireframe Mode

To make the boat structure, I first took a cylinder. Then I lightly pressed on both sides of the cylinder to create its base. Then I pressed down the top faces to create the structure of the boat.

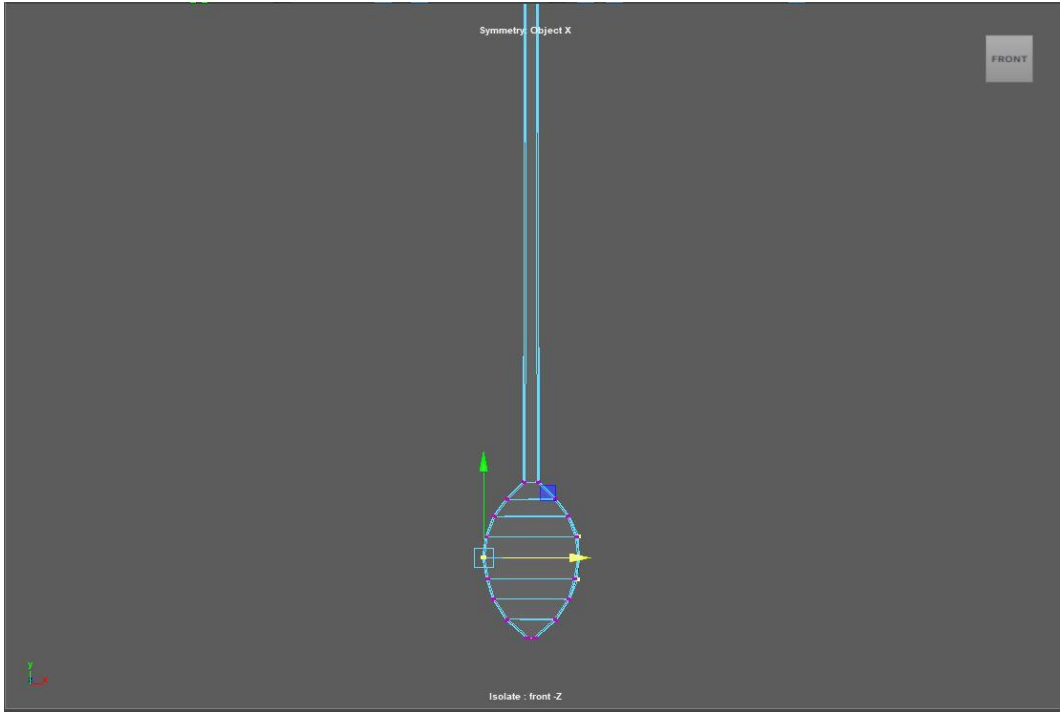


Figure 3.3.17.2: Paddle in Wireframe Mode

To create the boat's paddle, I first took a cube. Then I extruded it until I got its basic shape.

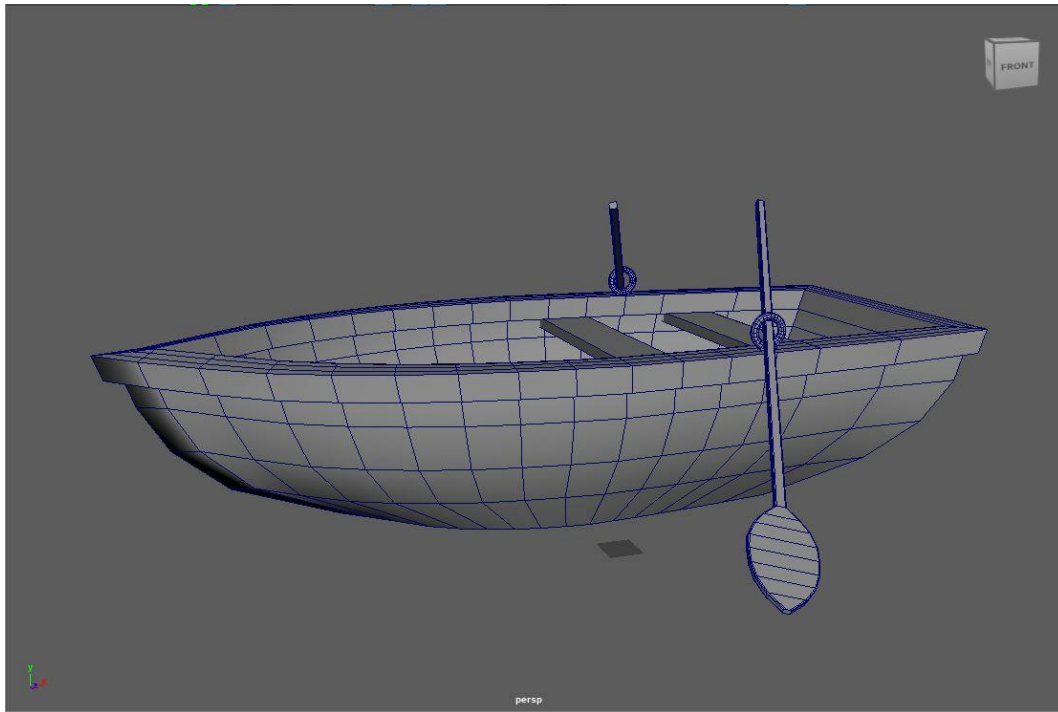


Figure 3.3.17.3: Boat Full Model

### 3.3.18 Rocks Modeling

Rocks are very important to complete an environment. They enhance the beauty of the environment. Rocks can be found everywhere, such as mountains, coasts, caves, etc. Without rocks, the environment seems empty and flat. Moreover, rocks can be used to hide treasures, create barriers during battles, and create secret doors to caves.

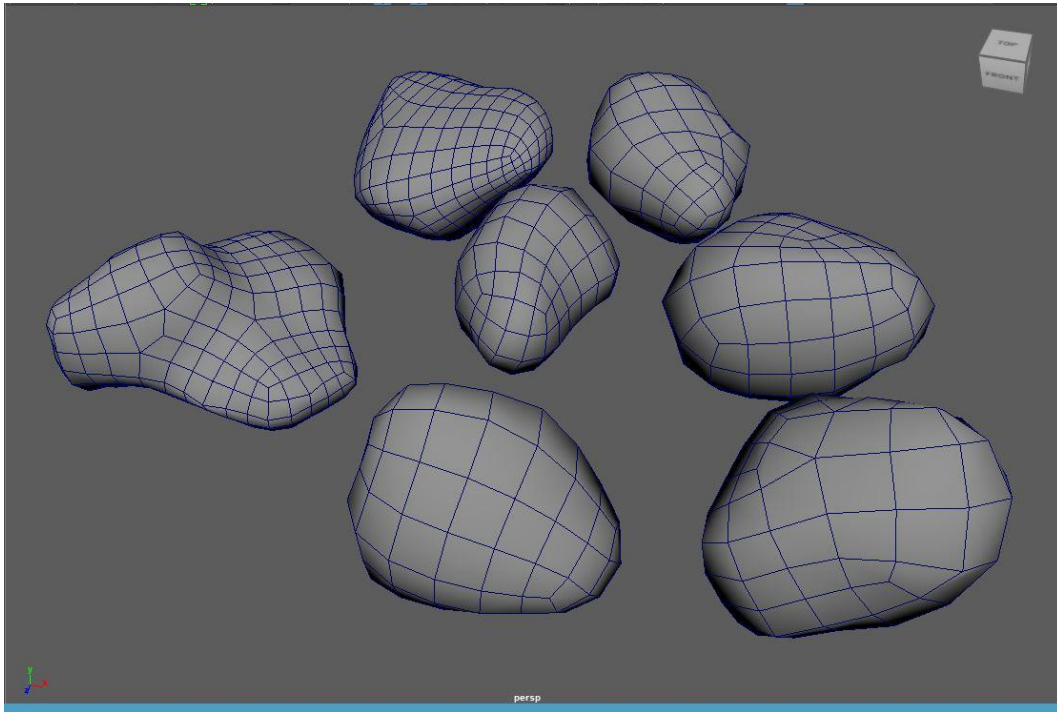


Figure 3.3.18.1: Rocks Full Model

To create rocks, I first create a sphere. Then I add many subdivisions to it. Then I use the sculpting tool to shape it into a rock. Then I clean up the excess polygons and give it a low poly look so that it fits my environment.

### 3.3.19 Trees Modeling

Trees are an important element to complete an environment. Palm trees in particular beautifully represent a classic pirate island. It makes the environment warm, natural and lively.

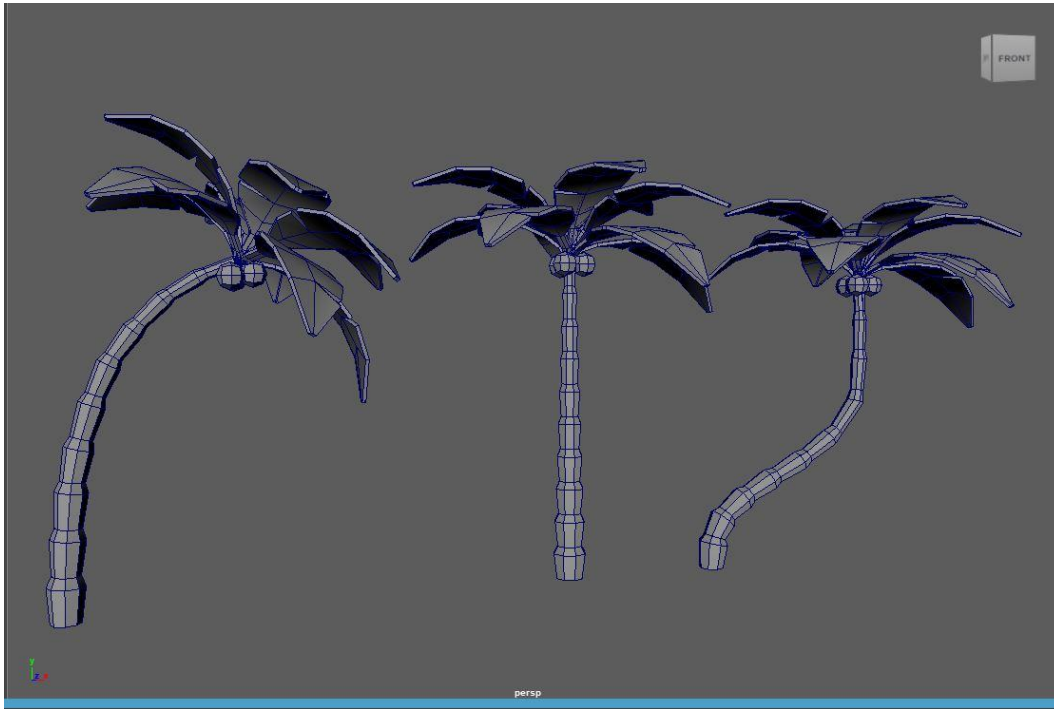


Figure 3.3.19.1: Palm Tree Full Model

To create the tree trunk, I first create a cylinder and then use the curve tool to create curved parts. I created different types of curved stems with the curve tool so that each tree looks different. And to create the leaves, I first create a plane and then give it the shape of a leaf and then select the face of the entire plane and extrude it and then use soft selection to create the curved parts of the leaves. To create the fruit tree, I use a cylinder to create its curved body. And to create the leaves, I use a cube. Then I increase its polygons and use the sculpting tool to create the shape of the leaves. Then I reduce the number of excess polygons and that's how I form the leaves.

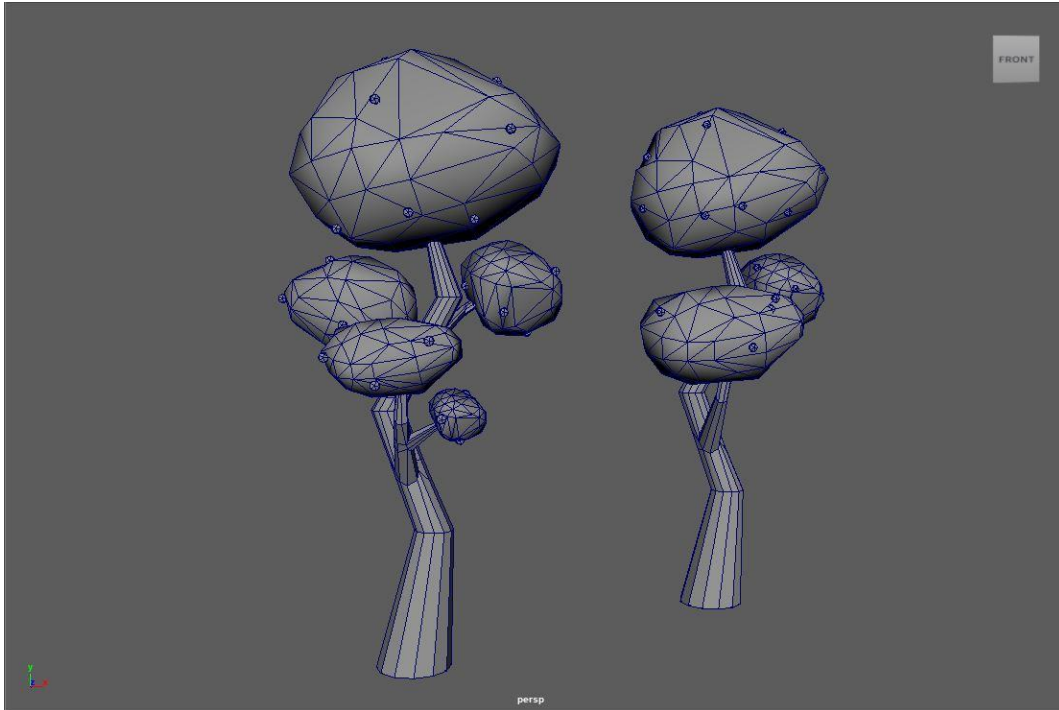


Figure 3.3.19.2: Fruit Tree Full Model

To create the dry trees, first I took a cylinder. Then I extrude it several times to create its curved body.

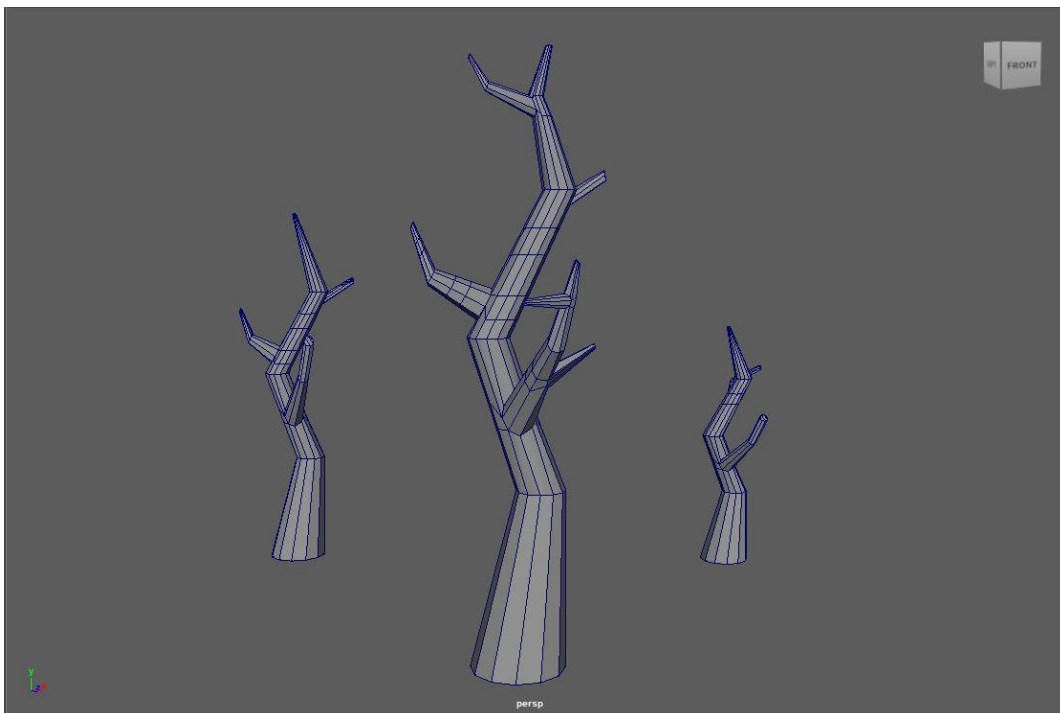


Figure 3.3.19.3: Dry Tree Full Model

### 3.4 UV Unwrapping

Unwrap is one of the popular methods for doing UV of any 3d object. UV means to represent the face of a 3D object with a flat 2D face. It is used to texture the 3D object smoothly. This process of creating UV maps is called UV unwrapping. Then U and V represent two axes in 2D space and in 3D space, the three (X, Y, Z) axes represent 3 different directions. For these objects I am using UV unwrap maps. These types of objects have many edges or faces, so it is quite difficult to keep them open. First, take an edge that defines the center then apply Cut > Undo > Again Cut the side faces again and apply Undo. Basically, isolate the parts where the texture won't be the same. This is known as cut and undo. All this is being done in Autodesk Maya.

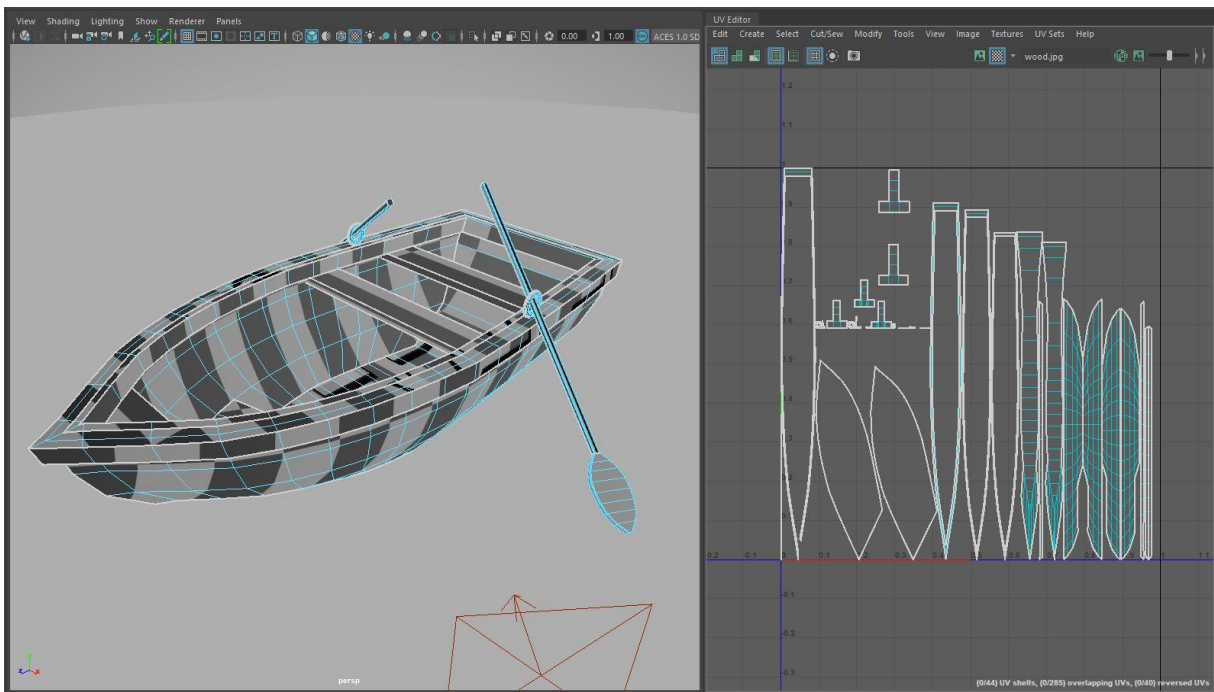


Figure 3.4.1: UV Unwrapping of Boat

In the picture, we can see an unwrapped image of a boat. To unwrap this, I first select the edges of the corners of the boat. Then press the cut option. Then select the UV mesh and unfold the entire model.

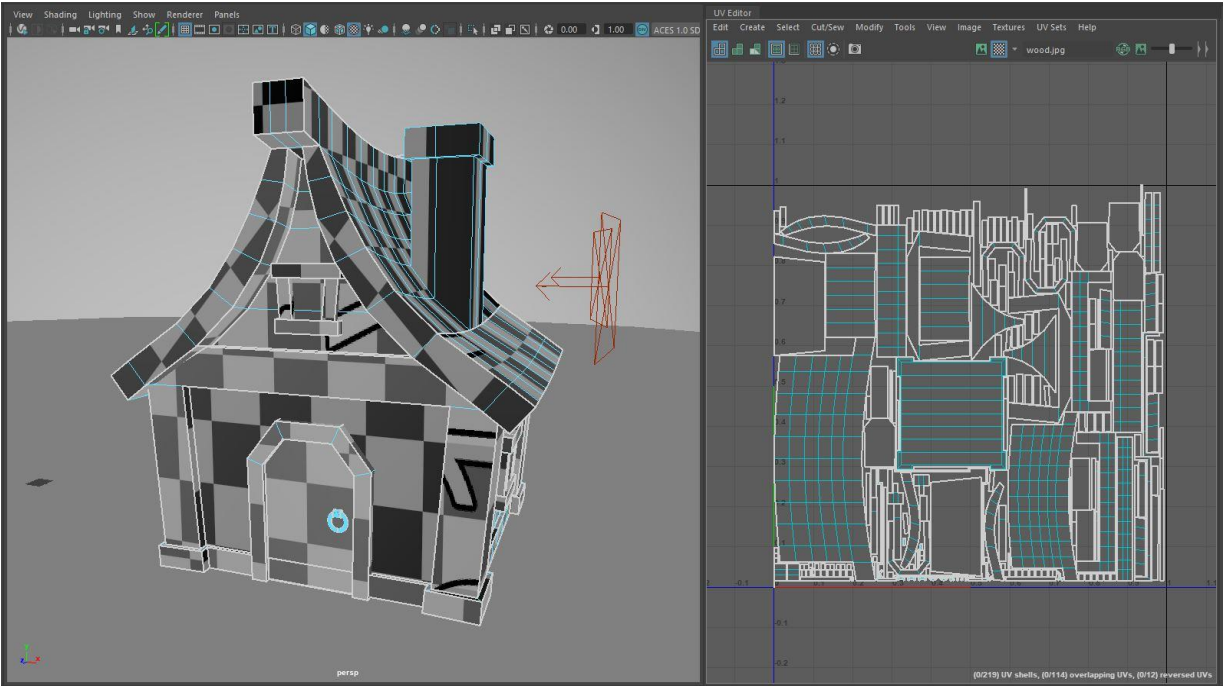


Figure 3.4.2: UV Unwrapping of House

To unwrap the house and the axe, I first select the edges of each of them. Then press the cut option. Then select the UV mesh and unfold the entire model.

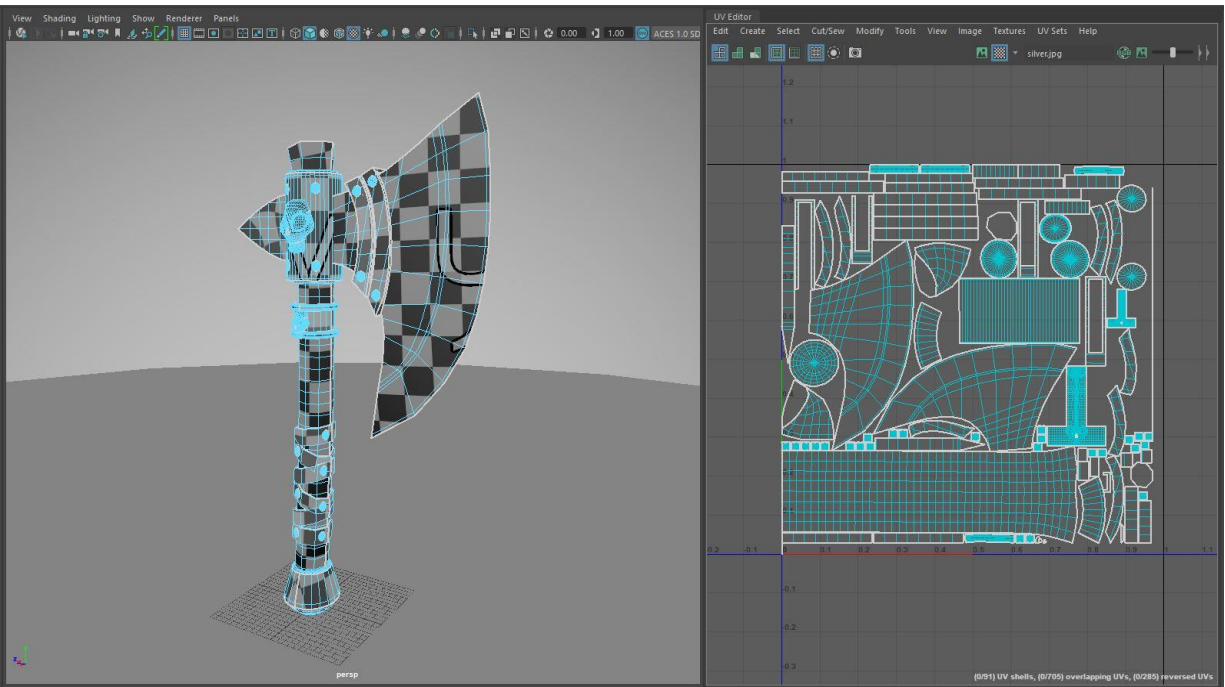


Figure 3.4.3: UV Unwrapping of Axe

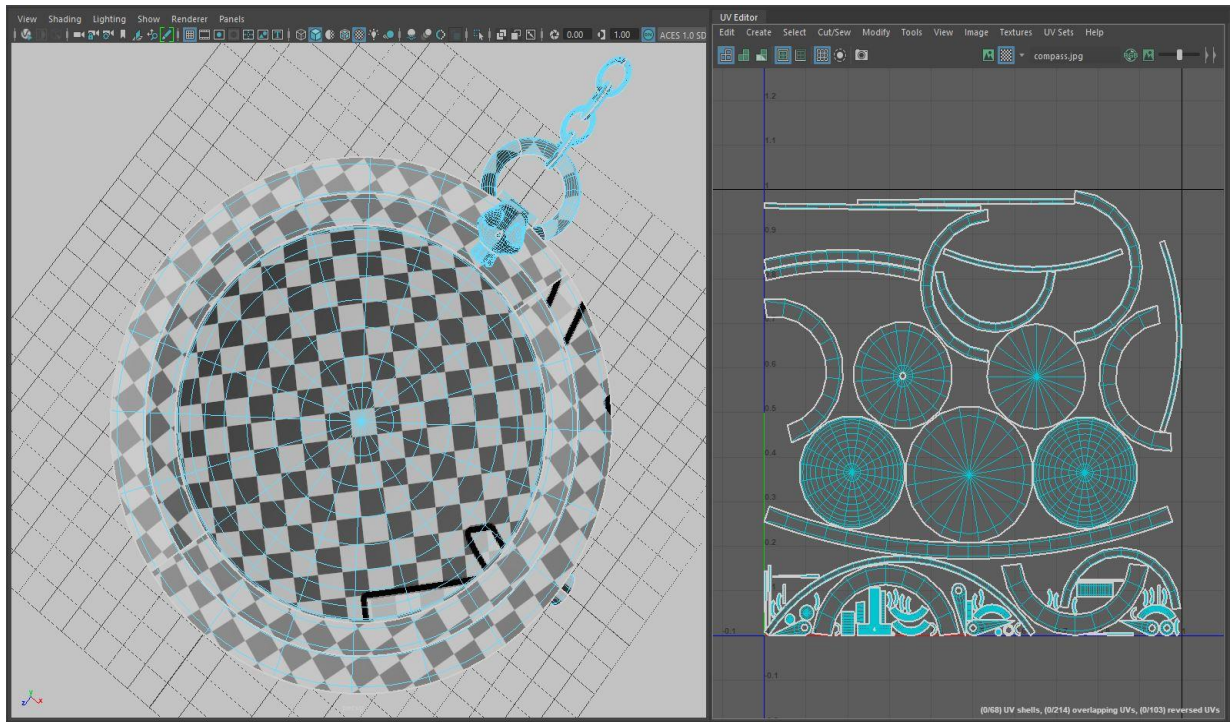


Figure 3.4.3: UV Unwrapping of Compass

To unwrap the compass and cannon, I first select the edges of each of them. Then press the cut option. Then select the UV mesh and unfold the entire model.

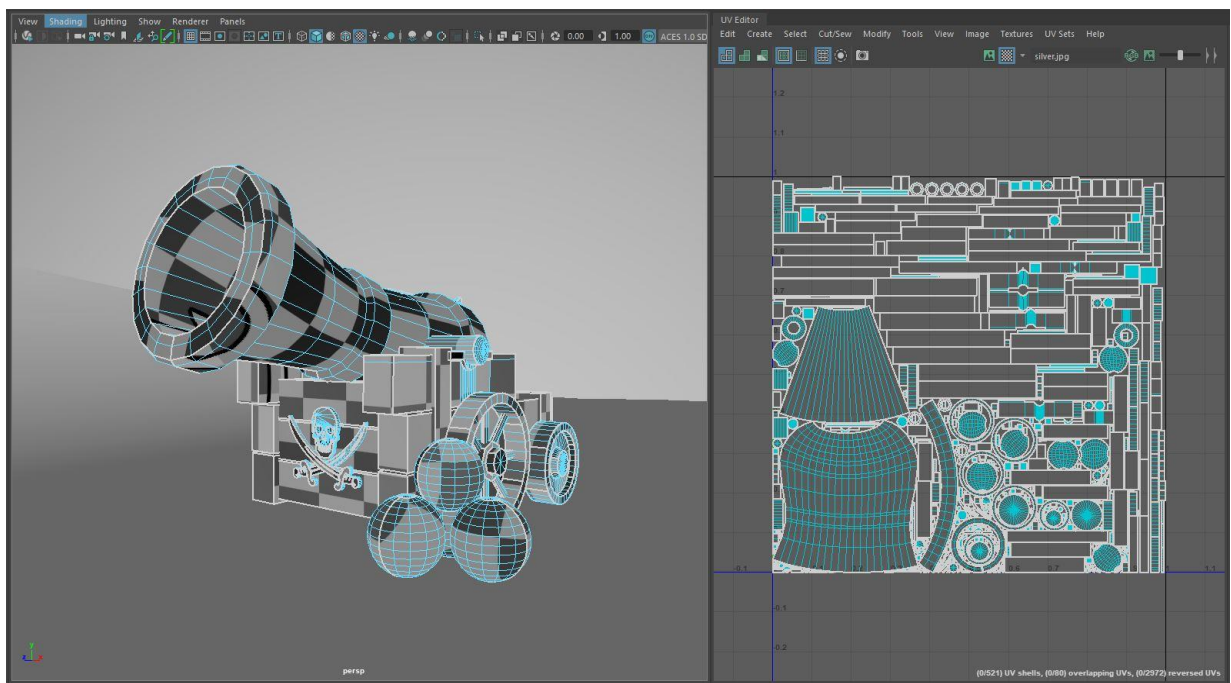


Figure 3.4.3: UV Unwrapping of Cannon

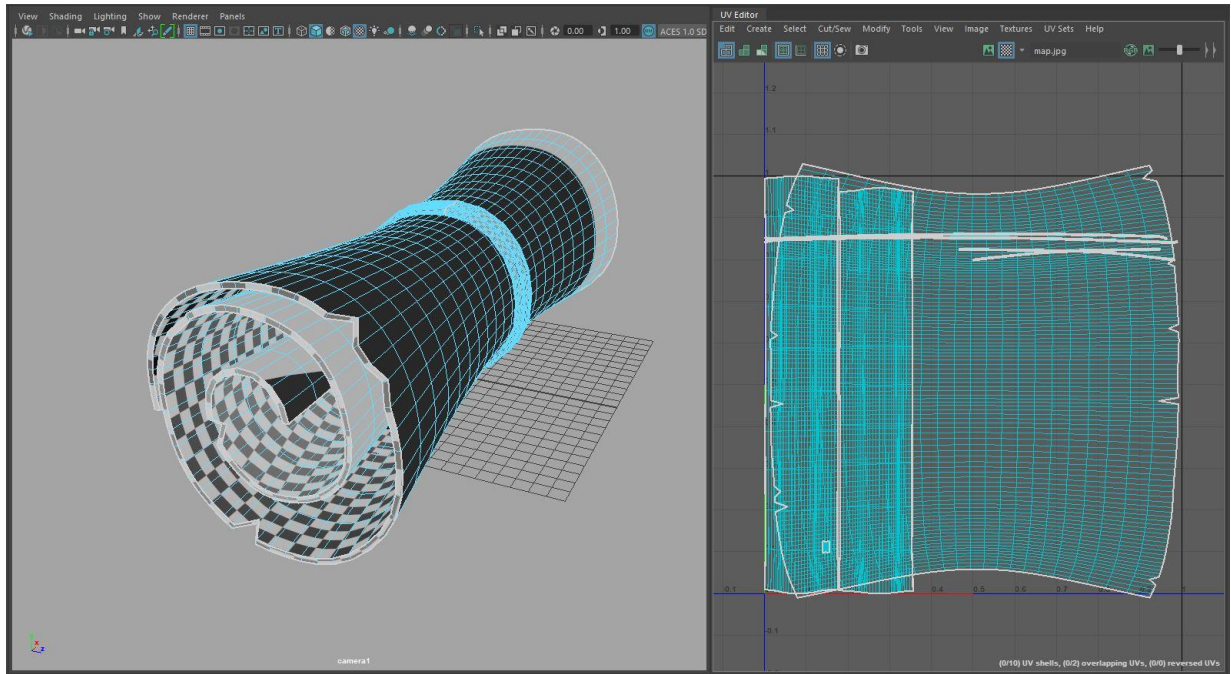


Figure 3.4.3: UV Unwrapping of Map

To unwrap the map and telescope, I first select the edges of each of them. Then press the cut option. Then select the UV mesh and unfold the entire model.

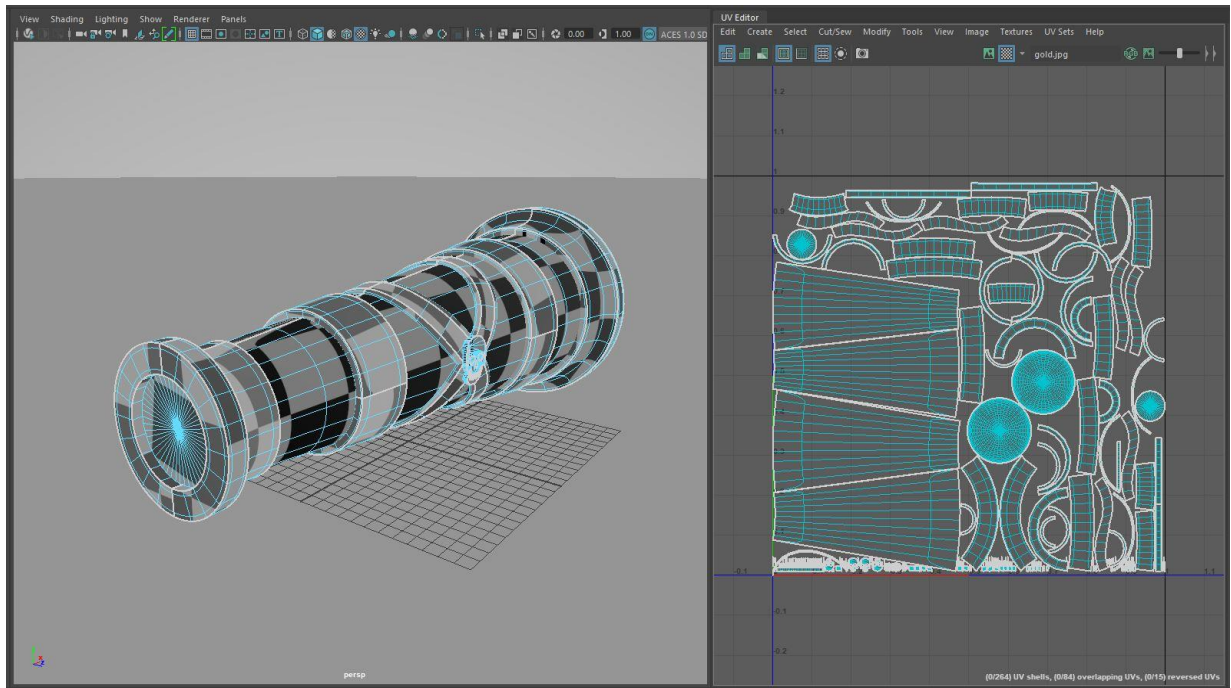


Figure 3.4.3: UV Unwrapping of Telescope

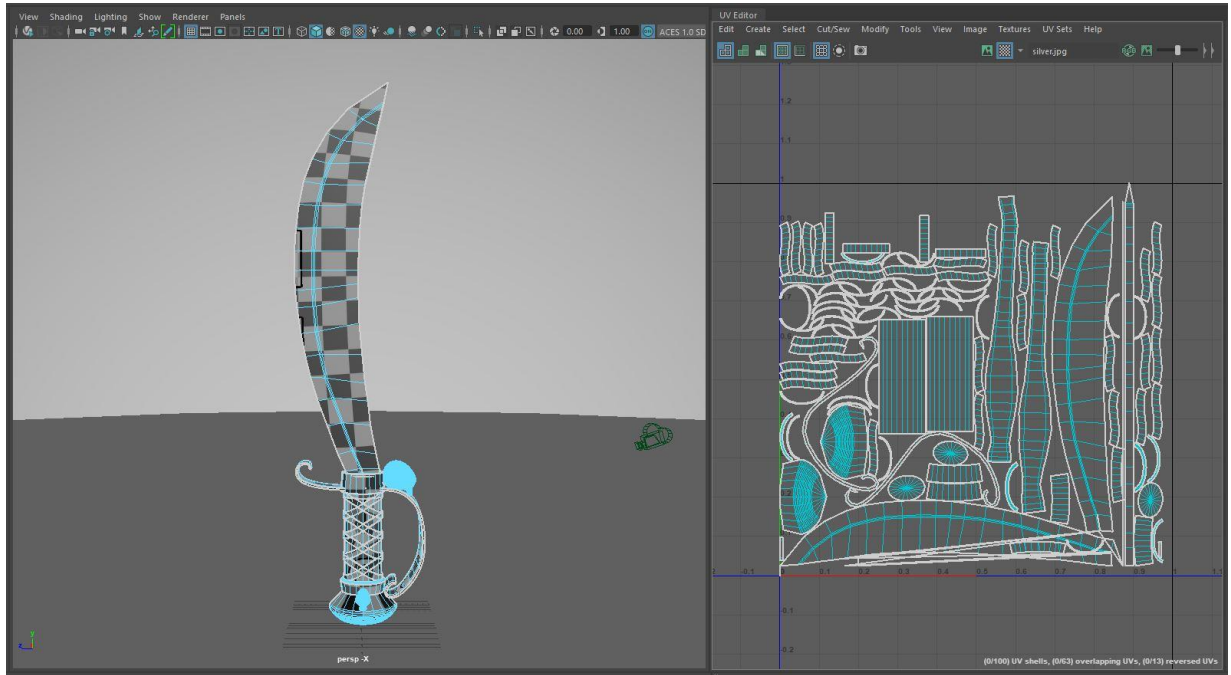


Figure 3.4.3: UV Unwrapping of Sword

To unwrap the sword and treasure chest, I first select the edges of each of them. Then press the cut option. Then select the UV mesh and unfold the entire model.

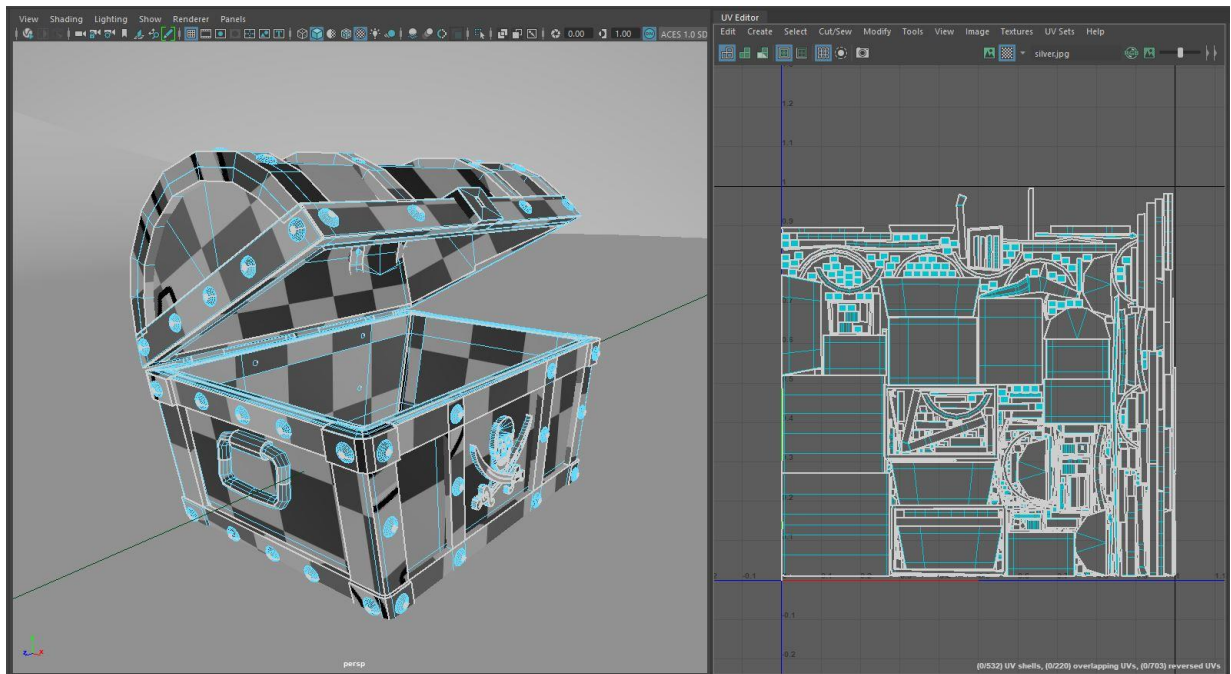


Figure 3.4.3: UV Unwrapping of Treasure Chest

### 3.5 Rendering

Rendering is the process of transforming a 3D scene into a final 2D image using computer software. A scene model, texture, lighting, and camera are combined to create a final image called a render. The rendering engine reads all the information in a scene file and determines its colors, shadows, reflections, and how the light will work. This step is like an artist putting the final polish on a painting, carefully determining the mood and details. For this project, I used Autodesk Maya with the V-Ray plugin to render a stylized pirate island environment. After finishing the models, I imported the textures and adjusted the materials to match my preferred soft stylistic art style. I experimented with different lighting setups that matched the tropical pirate environment, such as warm sunset light, soft ambient light, and soft shadows. Each experiment helped me improve the mood and overall look of the environment.



Figure 3.5.1: Ship Render

After finalizing the lighting and materials, I created the final render and took additional photos from different angles for a better representation. To keep all the models consistent, I used the same lighting setup and the same render settings for all the assets, including the

pirate ship, hut, trees, rocks, and props. Finally, I exported the renders in high resolution so that the details of the stylized environment could be clearly seen.



Figure 3.5.2: House Render

The images show the final rendered look of the one-story and two-story houses I built.



Figure 3.5.3: Two-Story House Render



Figure 3.5.4: Bridge Render

The images show the final rendered look of the wooden bridge and axe I created after applying the final materials and lighting.



Figure 3.5.5: Axe Render

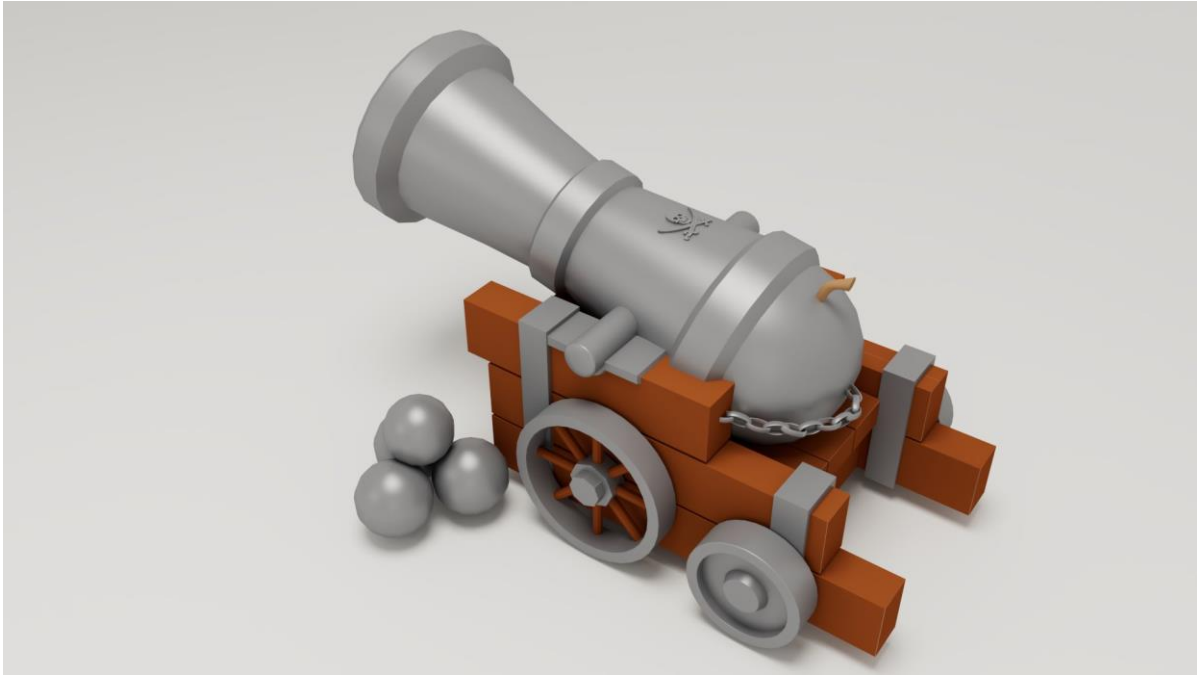


Figure 3.5.6: Cannon Render

The images show the final rendered look of the cannon and compass I created after applying the final materials and lighting.



Figure 3.5.7: Compass Render



Figure 3.5.8: Hourglass Render

The images show the final rendered look of the hourglass and map I created after applying the final materials and lighting.

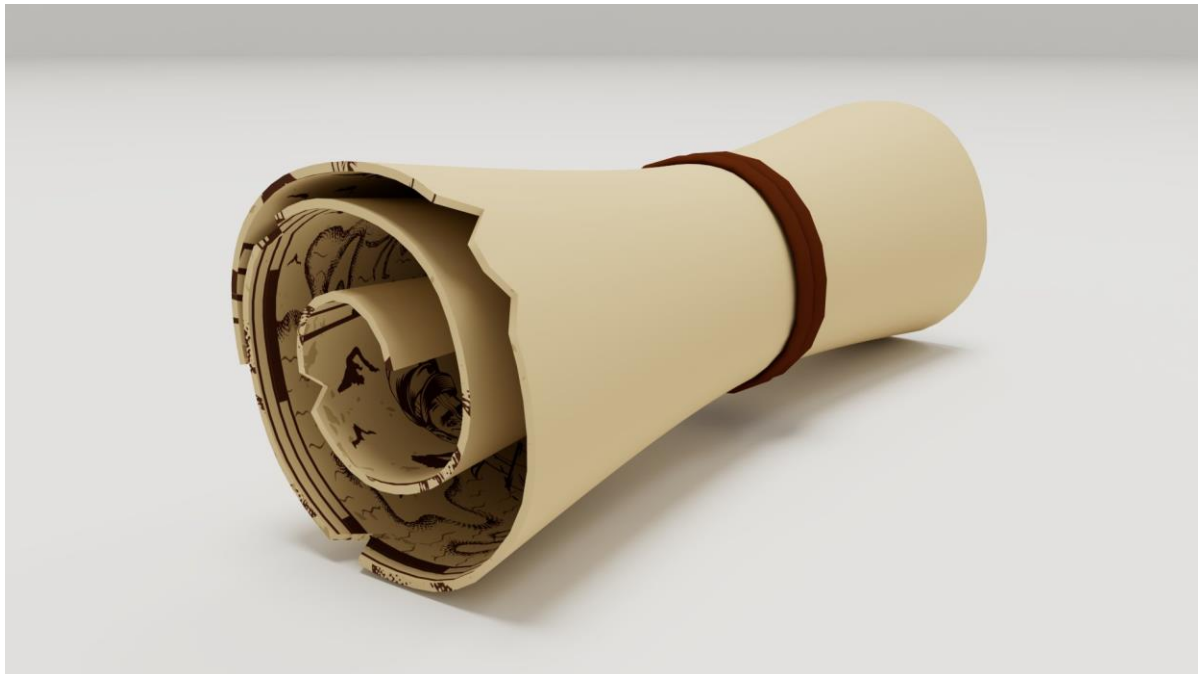


Figure 3.5.9: Folded Map Render



Figure 3.5.10: Open Map Render

The images show the final rendered look of the open map and telescope I created after applying the final materials and lighting.

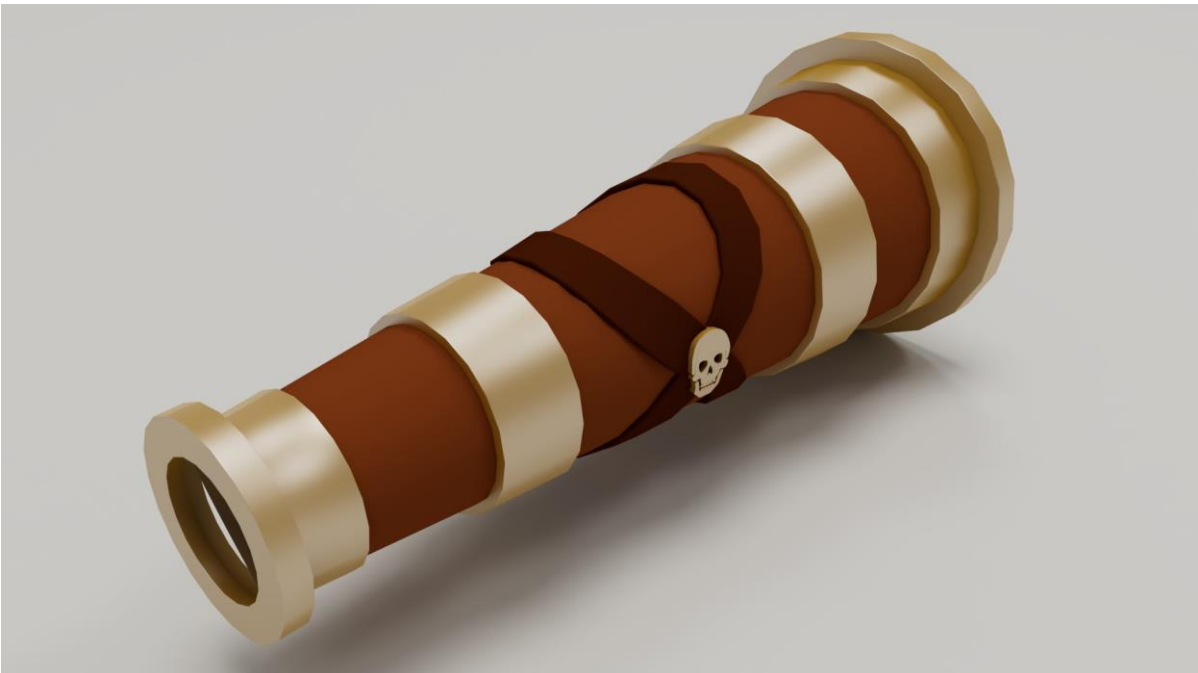


Figure 3.5.11: Telescope Render



Figure 3.5.12: Pistol Render

The images show the final rendered look of the pistol and rapier I created after applying the final materials and lighting.



Figure 3.5.13: Rapier Render



Figure 3.5.14: Sward Render

The images show the final rendered look of the sward and treasure chest I created after applying the final materials and lighting.



Figure 3.5.15: Treasure Chest Render



Figure 3.5.16: Wooden Barrel Render

The images show the final rendered look of the wooden barrel and wooden mug I created after applying the final materials and lighting.



Figure 3.5.17: Wooden Mug Render

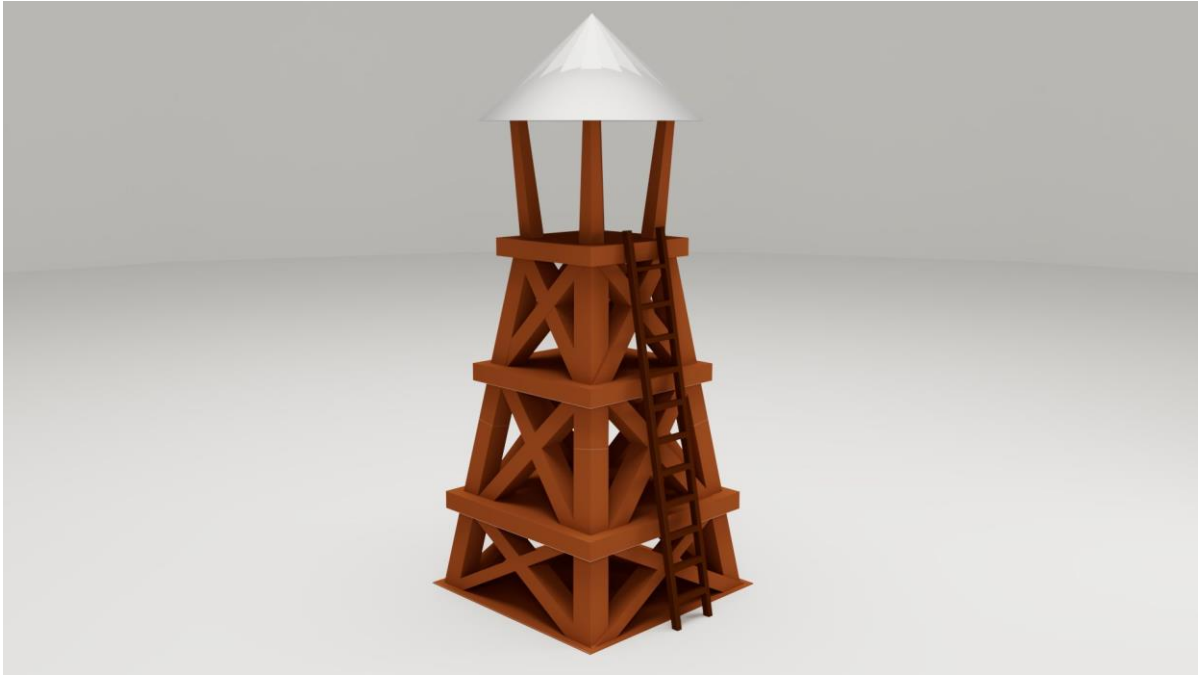


Figure 3.5.18: Watch Tower Render

The images show the final rendered look of the watch tower and boat I created after applying the final materials and lighting.

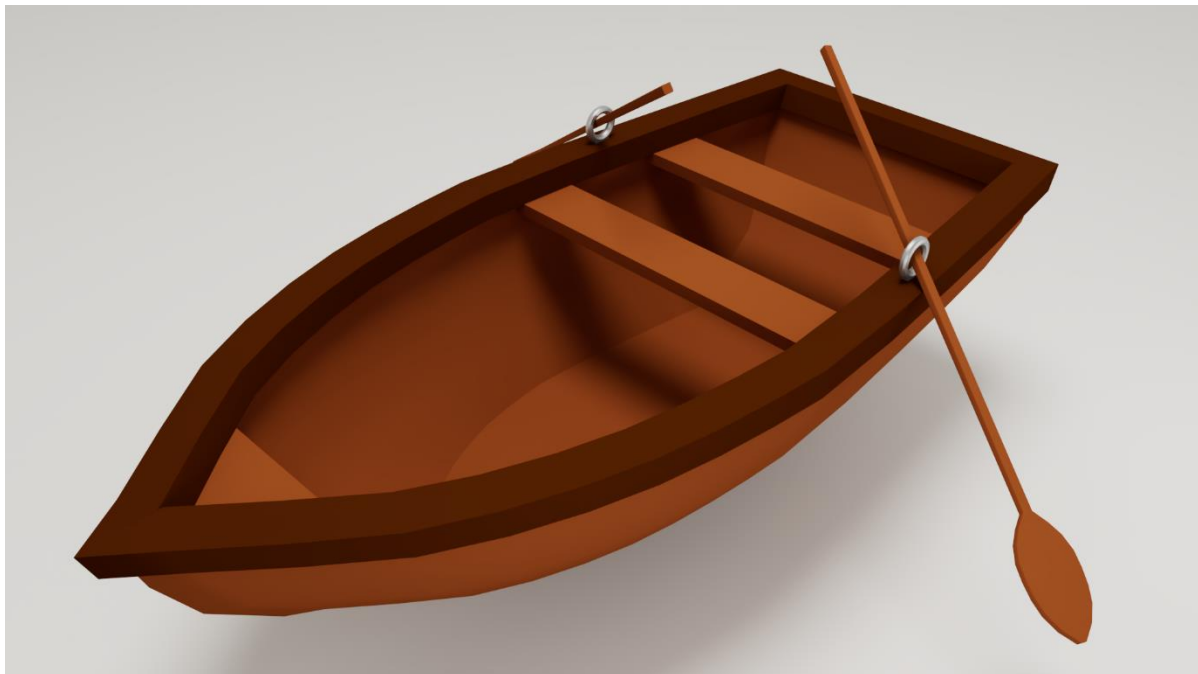


Figure 3.5.19: Boat Render

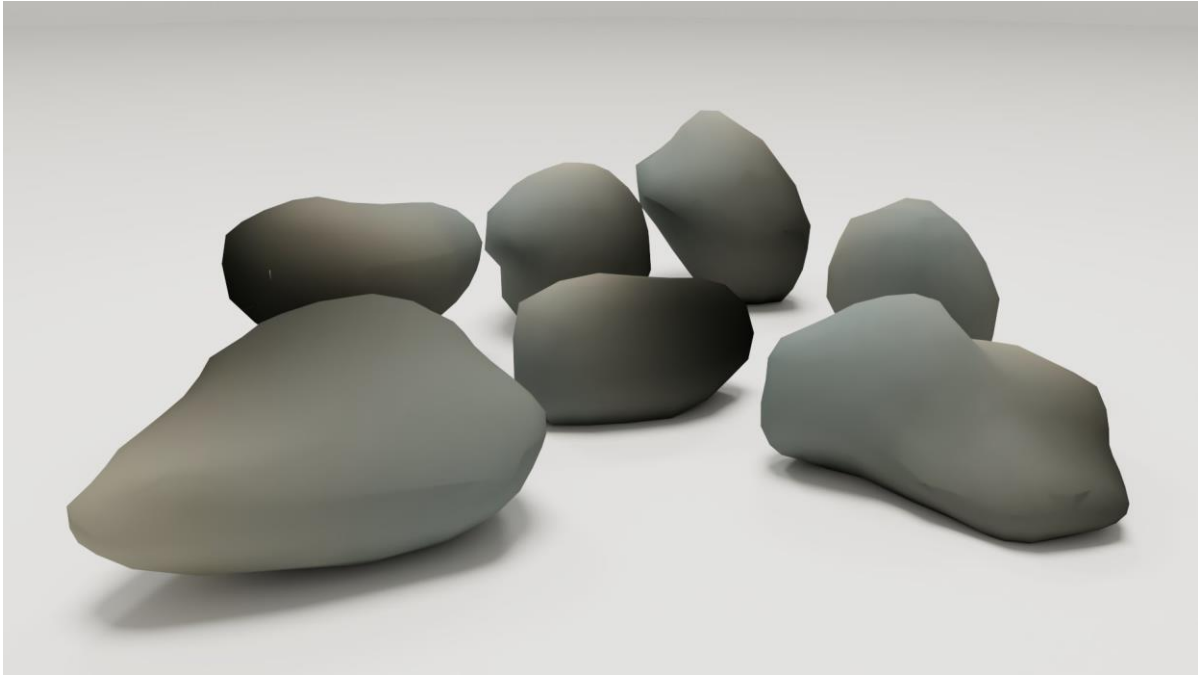


Figure 3.5.20: Rocks Render

The images show the final rendered look of the rocks and palm trees that I have created after applying the final materials and lighting.



Figure 3.5.21: Palm Tree Render



Figure .5.22: Fruit Tree Render

The images show the final rendered look of the basic fruit trees and some dried-up trees that I have created after applying the final materials and lighting.



Figure 3.5.23: Dry Tree Render

That's it for this part. Head to the next page for Chapter 4: Result and Discussion, where I will talk more about what I've already told you.

## **CHAPTER 4**

### **RESULT AND DISCUSSION**

#### **4.1 Final Output Overview**

I ended up with my project exactly as I had planned from the beginning. The project has a nice effect of stylized shapes, simple details and vibrant colors, which has resulted in the assets successfully bringing out the adventurous side of the pirate world. Each model, such as pirate ships, palm trees, island huts, boats, rocks, etc., is made with low-poly but very clear shapes, making the models suitable for a stylized game environment. After arranging the assets together in a scene, they made the scene's environment more lifelike and visually beautiful. The models were created using Autodesk Maya and textured with a stylized approach in mind. Proper lighting, color balance, and careful composition helped to more strongly convey the mood of a tropical pirate island. This project shows how it is possible to create a strong visual identity using stylized modeling, even with student-level assets.

##### **4.1.1 Environment Showcase**

I have illustrated a complete pirate environment using some assets created in my project. This environment showcases how individual models such as pirate ships, boats, island houses, treasure chests, palm trees, etc. can be put together to create a complete game scene. When I put the entire island scene together, I was able to check if the models had the right sizes, if the lighting looked natural, and if the overall mood of the environment was right. After putting the scene together, I realized how the objects would look when placed in an environment. It showed me how colors, shapes, and the right layout go together to create a perfect pirate-themed look. The finished environment shows that all the assets work smoothly, match the same style, and are suitable for use in a real game.



Figure 4.1.1: Pirates Island View 1

These images show that all the models have been brought into a scene and the right amount of lighting and texture has been used according to their mood.



Figure 4.1.2: Pirates Island View 2

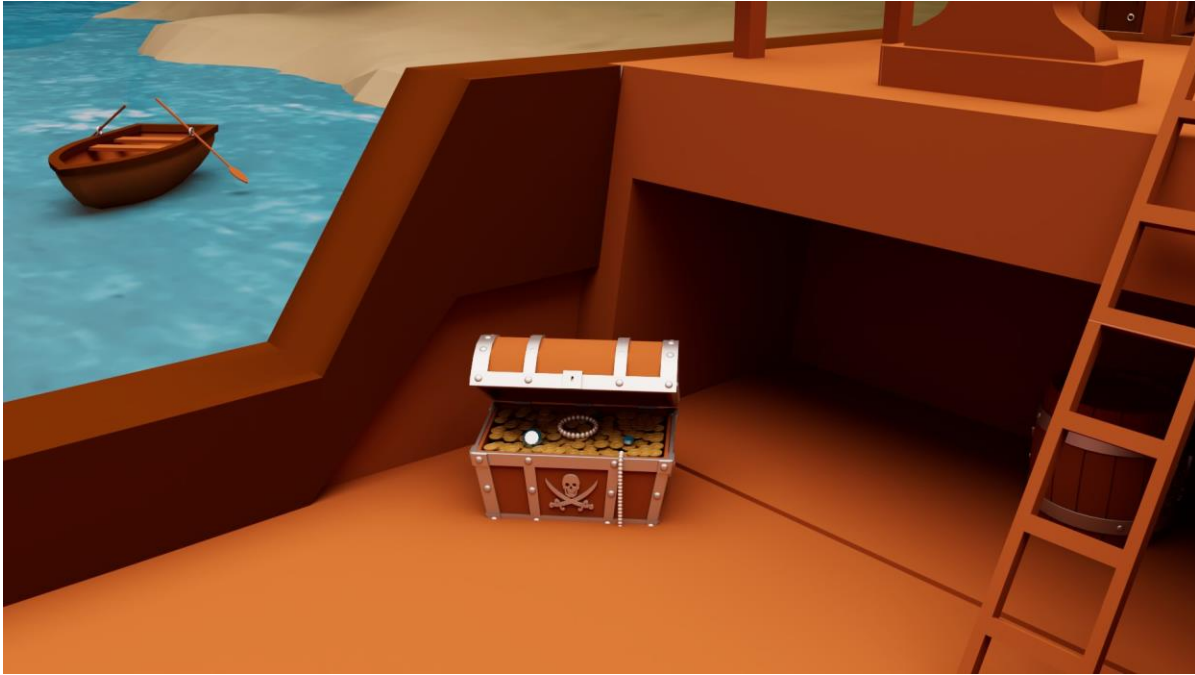


Figure 4.1.3: Pirates Island View 3

These images show the scenes from a different perspective, so that all the small details can be seen clearly.



Figure 4.1.4: Pirates Island View 4

## **4.2 Evaluation of the Stylized Modeling Approach**

Using stylized art made it easier for me to determine how the assets would look and how well they would function. Instead of going too realistic, I created the models with simple, clean shapes and bold shapes. This made the models look attractive and made them easier to use and customize in the game. The stylized approach made the pirate ships, palm trees and treasure chests look better and their shapes were recognizable from a distance, which is very important in the game. The use of simple textures and bright colors helped create a warm, adventurous atmosphere that fit the pirate world. The lighting and materials added effects that gave the island a soft and inviting look. Overall, the stylized approach created a good balance between creativity and practicality, resulting in assets that would feel like they would perform well in a game.

## **4.3 Comparison with Initial Goals**

The main objective of this project was to create assets for a pirate-themed game environment and combine them into a complete scene. The final result matched my goals very well. Each model followed a specific art style, the whole environment looked cohesive, and the pirate theme was clearly shown through things like ships, props, huts, and natural elements. The assets turned out exactly as I wanted them to look, low poly and stylish. At the same time, they retained their interesting and important details. Although I faced challenges such as limited time and limited software to run, the final environment came together very strongly. It shows that good planning and creative thinking can help overcome all obstacles. In the end, the project successfully achieved its visual and thematic goals and proved that stylized modeling is a very effective way to create game worlds.

## **4.4 Feedback and Peer Review**

When I was putting together all my project, getting feedback from others was super helpful. I showed my first ideas to classmates, teachers, and professors to get their thoughts. Everyone pointed out at the beginning that I should keep a consistent style and proportion across all my assets. This process helped me adjust the size and scale of my models so that everything worked well together. Many people liked the pirate ship and said it strongly

showed the pirate theme. Some suggested adding more small props—like barrels, gold coins, and different types of palm trees—to make the world feel more alive. Adding these items made the environment look more complete. Not only that, I also received a lot of advice on my composition and lighting, which after applying, improved my renders greatly, making the island feel warmer, brighter, and more welcoming. I upload some of my work on online platforms and get good feedback from there. All in all, getting feedback from others really made the environment better. They gave me new ideas and pointed out little things that didn't quite fit. It pushed me to think harder about what I will doing. it also helped me polish the scene, make the environment more visually appealing, and ensure that everything matched the project's goals.

That's it for this part. Head to the next page for Chapter 5: Limitation and Challenges, where I will talk more about what I've already told you.

## CHAPTER 5

### LIMITATIONS AND CHALLENGES

#### 5.1 Limitations

Every mistake is an opportunity to learn something new. Materializing an idea isn't as easy as planning. Giving form to my idea wasn't much easy. There I had to face several problems, confusion and error in my design. Some problems happen due to my mistake and ignorance in the workflow. Though every problem killed my time and energy I come suitable to break and avoid them coming time. In this chapter challenges, I had faced and the results will be discussed. A lot of impalpable limitations were faced while working on this design. These limitations affected the affair of our design in one way or another. Some of these are discussed below. The most impalpable limitation was the lack of experience. There were some gests in all the way in this process but the proper channel was no way followed. Also, the compass of skill perpetration was also limited. A 3D vitality is a form of art that combines a lot of other forms of art. For initiating a design like this a lot of effects from the cultural angle need to be considered. Similar to the color palette of the film, the aesthetics of the models, camera angle, camera movement, a sense of composition, etc.

#### 5.2 Challenges

There are a number of challenges that can arise when it comes to low-poly 3D pirate-themed game environment. Some of the key challenges include:

- i. **Artistic Balance:** The main feature of low poly art is that it is very easy to see. But this is actually the biggest challenge in creating this work. Because making something simple and beautiful at the same time sometimes creates obstacles. Since this work does not allow for a large number of detailed textures, the main goal of creating models here is to create them with strong shapes, balance, and composition. For example, how to make a ship, house or cannon attractive without very few polygons and details. If they are too simple in shape, they look incomplete. On the other hand, if you give them too many details, they turn into high poly.

- ii. **Visual Consistency:** Since I'm creating a pirate theme environment, it's surprisingly difficult to make every single model like- ship, tree, house, tower, etc. in the same style, scale, and tone and it requires a lot of observation and re-introduction. But I had to face a lot of change in this work due to the lack of proper references.
- iii. **Atmosphere Setup:** Lighting is a big challenge in any game. It has a huge impact on the emotion and depth of a world. I used Autodesk Maya V-ray plugin in my project which uses Stylized lighting. But it has to be used very carefully. Because if the light is too harsh it will break the soft low poly look and if it is too dim the assets will lose their appeal.
- iv. **Storytelling:** Since there are no people in my world, telling stories through the environment is a challenge. That is, since there is no dialogue or animation of any kind, I have to choose objects and light as the medium of communication.

That's it for this part. Head to the next page for Chapter 6: Conclusion and Future Scope, where I will talk more about what I've already told you.

## CHAPTER 6

### CONCLUSION AND FUTURE SCOPE

In conclusion, this project shows how creating a stylized 3D pirate island can bring together digital art, low-poly modeling, and environment design to build a fun and visually appealing world. By making each asset by hand, setting up the atmosphere, and arranging everything in a story-focused layout, the final scene successfully captures the adventurous feeling of a pirate environment. Even without characters or dialogue, the environment itself tells a story. It shows how stylized 3D worlds can express mood, atmosphere, and world-building in animation, games, and visual storytelling.

Looking to the future, this project has great potential to be expanded. Since 3D software and game engines are always evolving, the island can be upgraded with animation, interactive elements such as objects, weather effects like rain or fog, and moving lights to make the world feel more alive. Placing this scene into Unity or Unreal Engine would enable players to walk around the island, interact with objects, or experience cinematic cutscenes. More sections can also be included, like- hidden caves, treasure spots, larger landscapes. These additions would enrich the world and make it more interesting. It is possible that in future this project can grow into a full game level, a short-animated video, or even a VR experience. This opens many creative possibilities and strengthens the overall storytelling power of the environment.

## REFERENCES

1. Reddit user u/[username] (2014). *Which weapons did pirates use during the Golden Age of Piracy?* [Online forum post]. [https://www.reddit.com/r/AskHistorians/comments/27tb89/which\\_weapons\\_did\\_pirates\\_use\\_during\\_the\\_golden/](https://www.reddit.com/r/AskHistorians/comments/27tb89/which_weapons_did_pirates_use_during_the_golden/) , last accessed on 04-09-2025 at 10:20 AM.
2. Reddit user u/skeltcher (2022). *How to properly make 3D models for games?* [Online forum post]. [https://www.reddit.com/r/gamedev/comments/uqvmf/how\\_to\\_properly\\_make\\_3d\\_models\\_for\\_games/](https://www.reddit.com/r/gamedev/comments/uqvmf/how_to_properly_make_3d_models_for_games/) , last accessed on 13-09-2025 at 01:10 AM.
3. CG Cookie (2024). *Beginner's Overview of 3D Game Asset Creation in Blender* [Web article]. <https://cgcookie.com/posts/beginner-s-overview-of-3d-game-asset-creation> , last accessed on 13-09-2025 at 01:30 AM.
4. Sony Pictures Entertainment (2011). *The Pirates! Band of Misfits – Official Trailer* [Video]. YouTube. <https://www.youtube.com/watch?v=iYtpKqhFReo>, last accessed on 05-09-2025 at 09:15 PM.
5. Toei Animation (1999–present). *One Piece* [Anime series]. <https://www.toei-animation.com/catalog/one-piece/> , last accessed on 04-09-2025 at 9:10 AM.
6. Various Studios (1922–present). *Treasure Island – Various Animated Versions* [Animation series/films]. (Multiple adaptations). Last accessed on 04-09-2025 at 10:00 AM.
7. System Era Softworks (2019). *Astroneer* [Video game]. <https://astroneer.space>, last accessed on 07-12-2025 at 09:10 PM.
8. Nintendo (2017). *Super Mario Odyssey* [Video game]. <https://supermario.nintendo.com>, last accessed on 07-12-2025 at 07:10 PM.
9. Tasharen Entertainment, Inc. (2015). *Windward* [Video game]. <https://www.tasharen.com/windward>, last accessed on 07-12-2025 at 08:10 PM.
10. Rare Ltd. (2018). **Sea of Thieves – Environment & Prop Designs** [Game art]. <https://www.seaofthieves.com/>, last accessed on 07-12-2025 at 09:10 PM
11. Coldwild Games & illufinch (2021). *Luna's Fishing Garden* [Video game]. [https://store.steampowered.com/app/1477790/Lunas\\_Fishing\\_Garden/](https://store.steampowered.com/app/1477790/Lunas_Fishing_Garden/), last accessed on 07-09-2025 at 08:10 PM.
12. Lavaboos Studios (2018). *Salt* [Game]. <https://www.saltthegame.com/>, last accessed on 07-09-2025 at 09:10 PM
13. OpenAI & Google (2025). *Custom Pirate Game Asset Concepts* [AI-generated game art]. Created with ChatGPT and Gemini. <https://chat.openai.com> , <https://www.google.com/gemini> , last accessed on 02-09-2025 at 10:10 AM.

14. CG Lads (2025). *Stylized Pirate Island Pack – Low Poly 3D Assets* [3D environment art]. <https://sketchfab.com/3d-models/stylized-pirate-island-pack-low-poly-3d-assets-77d8d91e3fb14ef289850bc59d8683d6?>, last accessed on 07-09-2025 at 09:10 PM.
15. Jeebs (2025) basic 3d weapon pack [Weapons & Military 3D models]. <https://sketchfab.com/3d-models/basic-3d-weapon-pack-4a9825c5969f4fdcaa79d7f238c63e80> last accessed on 10-09-2025 at 10:10 PM
16. Pasha (2025) Low poly Tree pack [Nature & Plants 3D models]. <https://sketchfab.com/3d-models/low-poly-tree-pack-1edaac90fe8d4bb28546740496684d96>, last accessed on 07-09-2025 at 10:30 PM
17. Jessica (2019) Alchemist's House [3D environment art]. <https://sketchfab.com/3d-models/alchemists-house-eb96a47b322b4295ae26f9ae175b23c2> last accessed on 10-09-2025 at 10:10 PM.
18. [Author Unknown]. *Low Poly House* [3D environment art]. <https://sketchfab.com/tags/low-poly-house> , last accessed on 07-12-2025 at 10:10 PM.
19. Raaj Ratna (2021). *Pirate Telescope* [3D environment art]. <https://sketchfab.com/3d-models/pirate-telescope-74b015b4ed7e415e812ffe61bb73e9cc> , last accessed on 07-12-2025 at 10:10 PM.
20. SkyFightUltra (2022). *HourGlass Low Poly* [3D environment art]. <https://sketchfab.com/3d-models/hourglass-low-poly-c48b8826e0814926b140ac98a3395623> , last accessed on 07-12-2025 at 10:10 PM.
21. ArtStation user A-Shipwright (n.d.). *Pirate Treasure Chest* [Digital concept art]. <https://www.artstation.com/artwork/x2WXr> last accessed on 15-10-2025 at 12:05 AM.
22. Pinterest Inc. (2010–present). *Pinterest* – Visual discovery & inspiration platform [Website]. <https://www.pinterest.com/pin/68609594318001886/> , last accessed on 05-10-2025 at 11:00 PM.
23. Freepik (2010–present). *Freepik* – *Water Textures & Vectors* [Stock image & vector website]. <https://www.freepik.com/free-photos-vectors/water-texture> last accessed on 04-12-2025 at 10:30 PM.
24. Getty Images (n.d.). *Beautiful sky with clouds* [Video footage]. <https://www.gettyimages.com/> , last accessed on 04-12-2025 at 10:10 PM.
25. Keygames (n.d.). *Island of Pirates* [Video game]. <https://www.keygames.com/game/island-of-pirates/> , last accessed on 03-12-2025 at 10:10 AM.
26. Freepik (n.d.). *Vintage Monochrome Old Pirate Treasure Map* [Vector image]. [https://www.freepik.com/free-vector/vintage-monochrome-old-pirate-treasure-map\\_7998455.htm](https://www.freepik.com/free-vector/vintage-monochrome-old-pirate-treasure-map_7998455.htm) , last accessed on 03-12-2025 at 10:10 PM.

## APPENDIX

You can find storyboards, concept art, character designs, software workflows, sound bits, and rendering examples in the appendix.

For everything, check out this link:

- Appendices Materials:  
[https://drive.google.com/drive/folders/1pUW4CeIasKsOhoDx22fNTPqgIE1qC5sz?usp=s\\_haring](https://drive.google.com/drive/folders/1pUW4CeIasKsOhoDx22fNTPqgIE1qC5sz?usp=s_haring)