3D Modelling For Realism

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Important Note:

This documentation outlines the complete process for the initial development of the Steampunk Hot Air Balloon asset. The final version of the project, which you'll see in the main showcase, has been further enhanced with additional details and elements, demonstrating the evolution of the asset.

Asset Selection

When selecting a project for the 3D realism module, I decided to focus on hard surface modeling to enhance my skills in effective modeling practices and improve my texturing abilities. I then explored four ideas for the module, each involving detailed hard surface models that would allow me to develop both my modeling and texturing skills.

Hot Air Steampunk Balloon

I chose a steampunk-style hot air balloon as the asset to model for this module. I selected this model because it consists of various components, which will help me enhance my modeling skills. Additionally, with its large scale, the project offers a wide range of textures for me to study and create, allowing me to gain valuable lessons and further improve my skills.

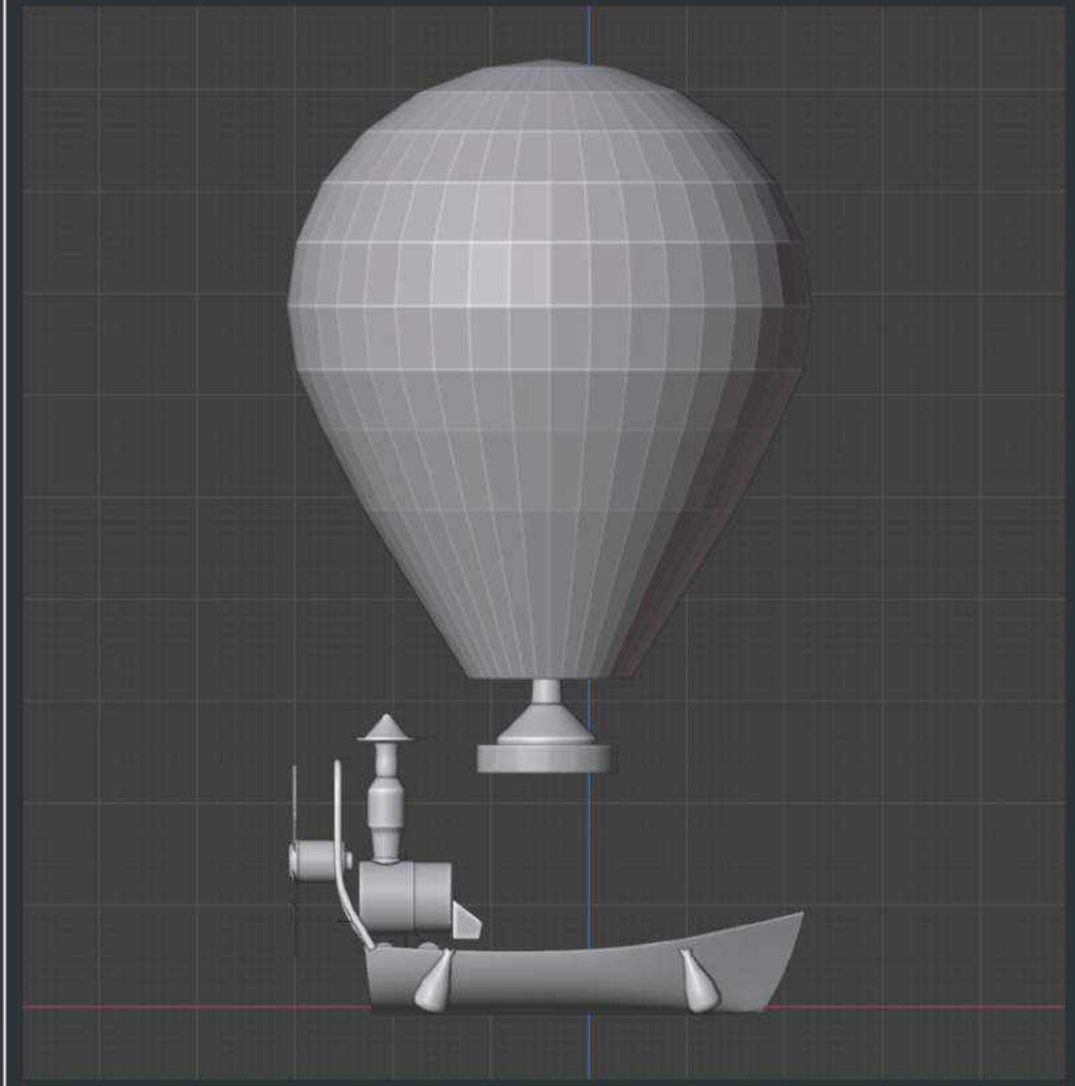
Research & Planning

After finalizing the design of my hot air steampunk balloon, I gathered additional references to enhance my visualization of the model and its individual components. This helped me better understand how to approach the development process and ensured a more detailed and accurate execution.

Breakdown

I began my research for the model by collecting references to determine the best approach for the project. At the same time, I also conducted a breakdown of the various materials needed for the asset. This helped me visualize the project more clearly and plan an efficient and effective strategy for completing it quickly.

Blockout



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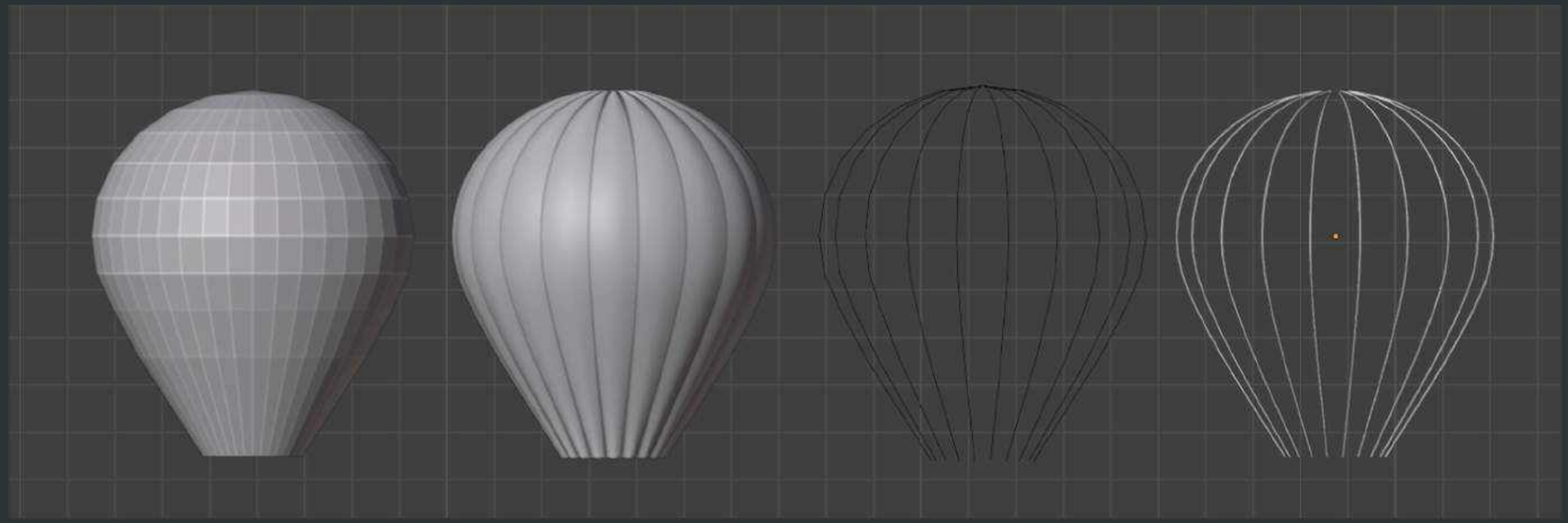
High PolyModelling

For the modeling process, I focused on creating the high poly model step by step, working on one element of the object at a time. This approach allowed me to concentrate on each part individually and produce high-quality elements for the model. I began by creating the base shape and applying modifiers, which helped me practice non-destructive modeling techniques. This method was especially useful when creating the low poly version, as I could simply remove the modifiers to achieve the lower poly count.

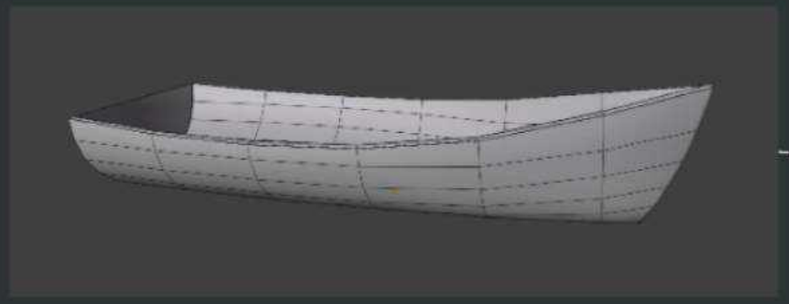
High PolyModelling Breakdown

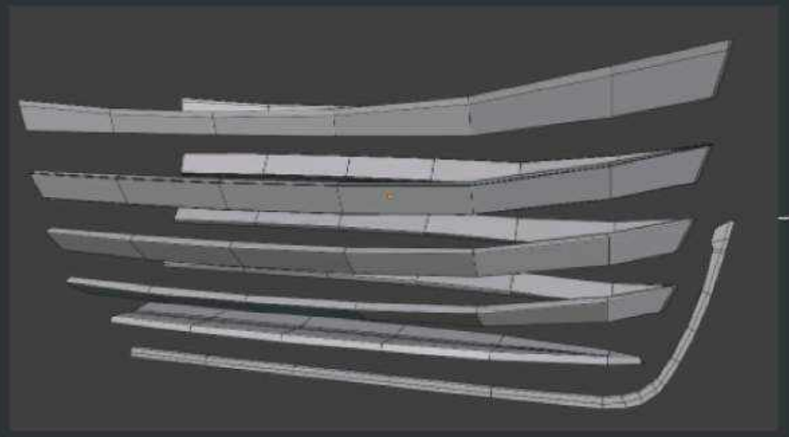
Balloon

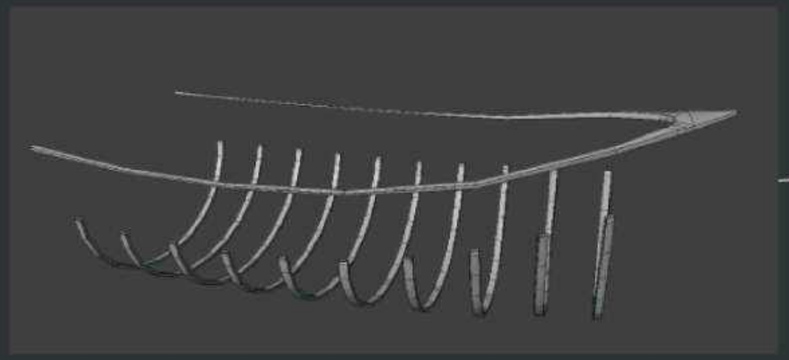


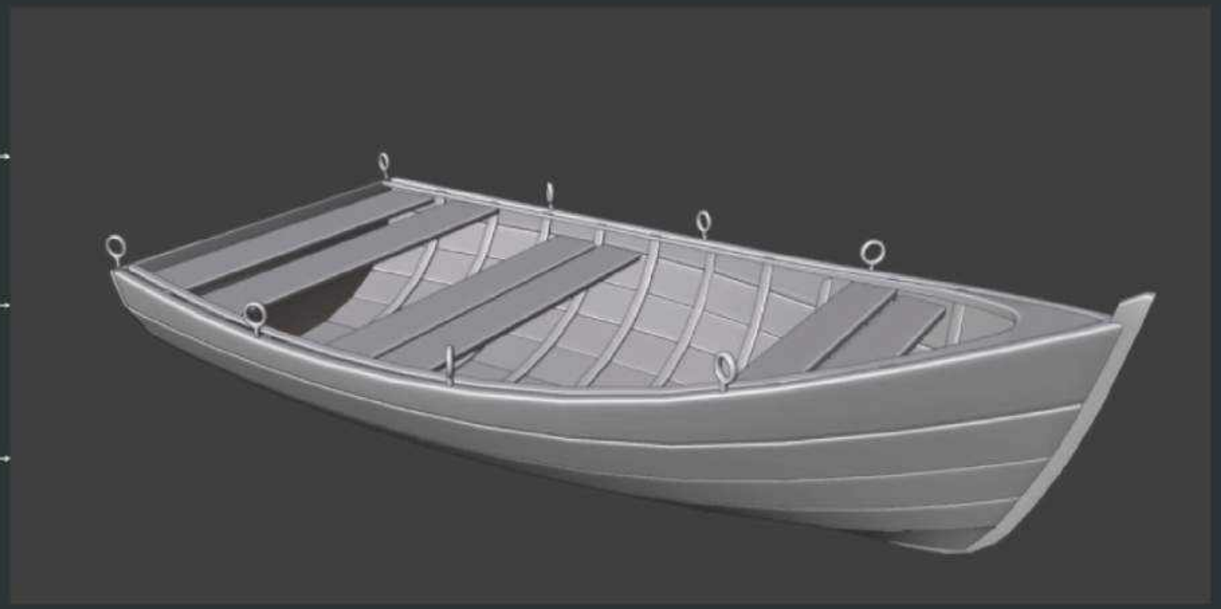
I began by creating a cylinder as the base shape for the balloon. Then, I created a basic outline of the balloon's shape. Next, I selected alternate edges of the cylinder and scaled them inwards to create the bulgy look of the balloon. To create the balloon's string, I duplicated the same edges and converted them into curves and with the help of geometry option i added depth in the curves.

Boat



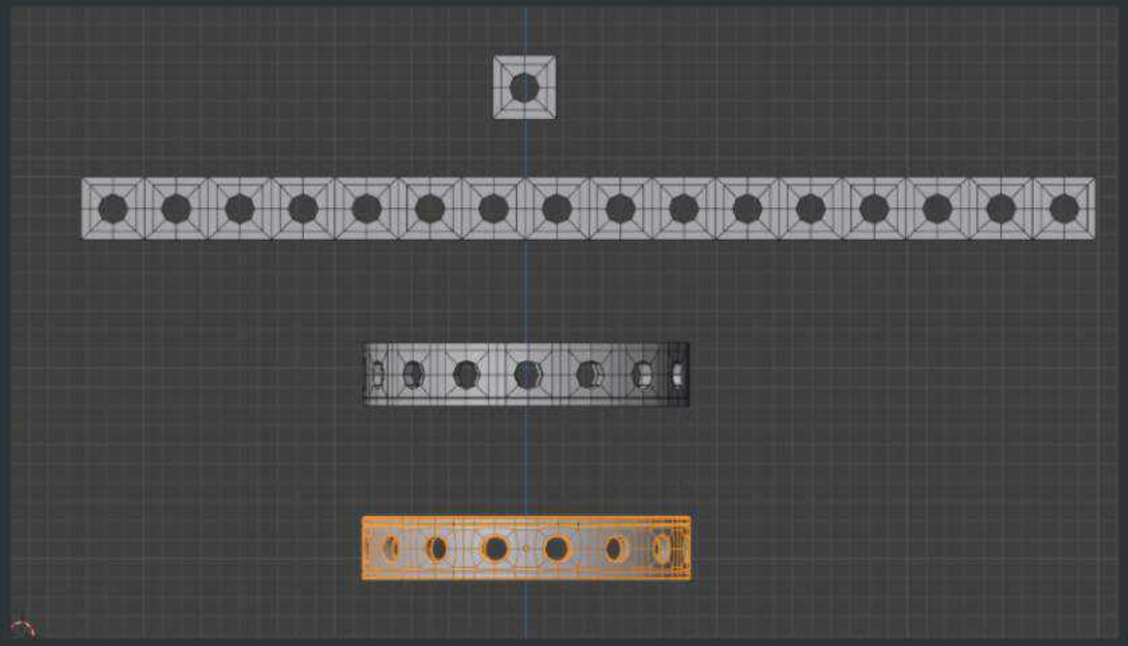






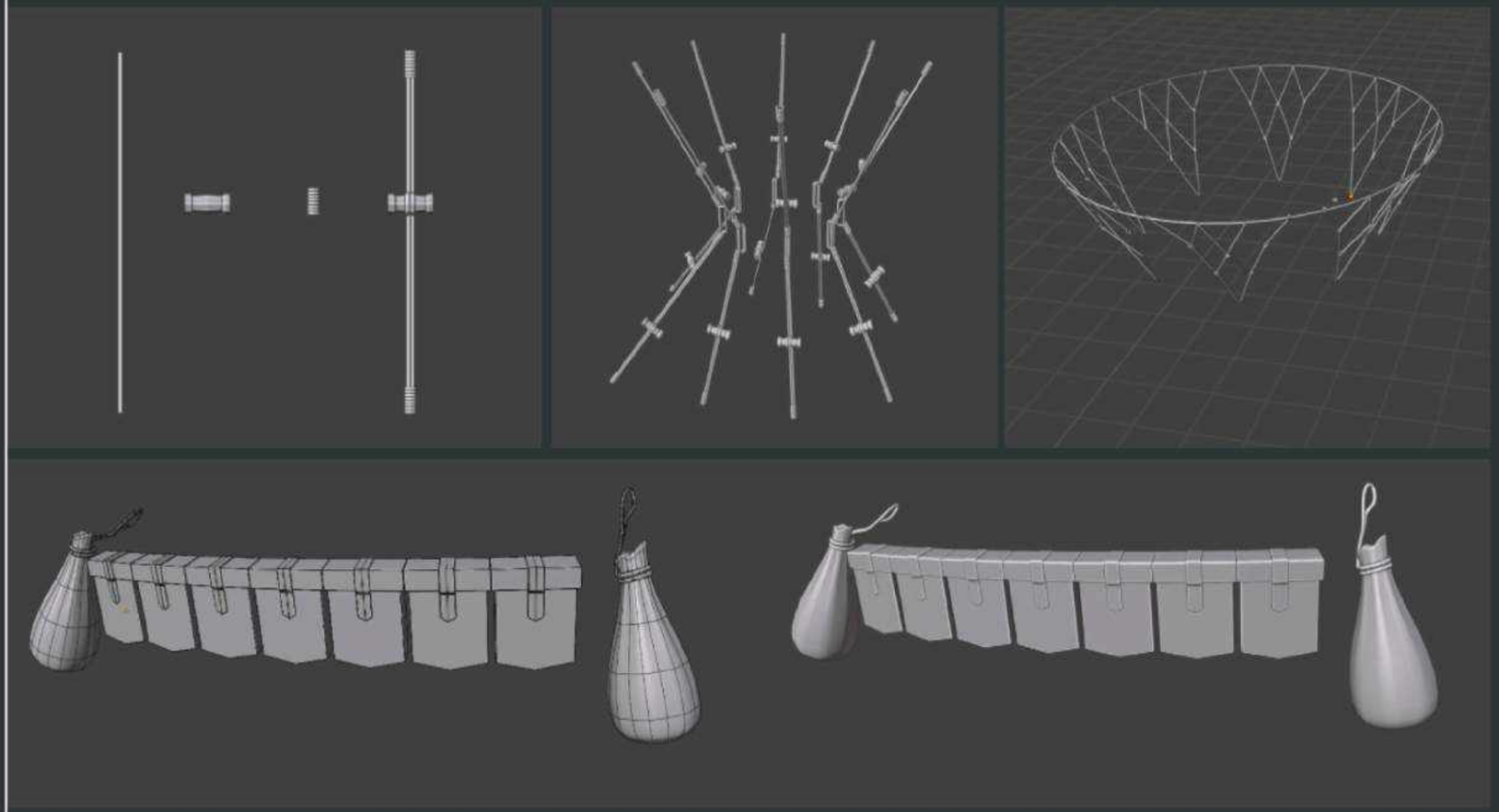
I began by creating a cylindrical shape as the base for the boat. I then deleted one half of the cylinder and shaped the remaining half into a boat-like shape. To add realism, I separated each loop of the cylinder to create individual wooden planks, replicating the gaps and unevenness found in real boats. For added structural integrity, I incorporated an internal support structure and additional wooden planks

Burner



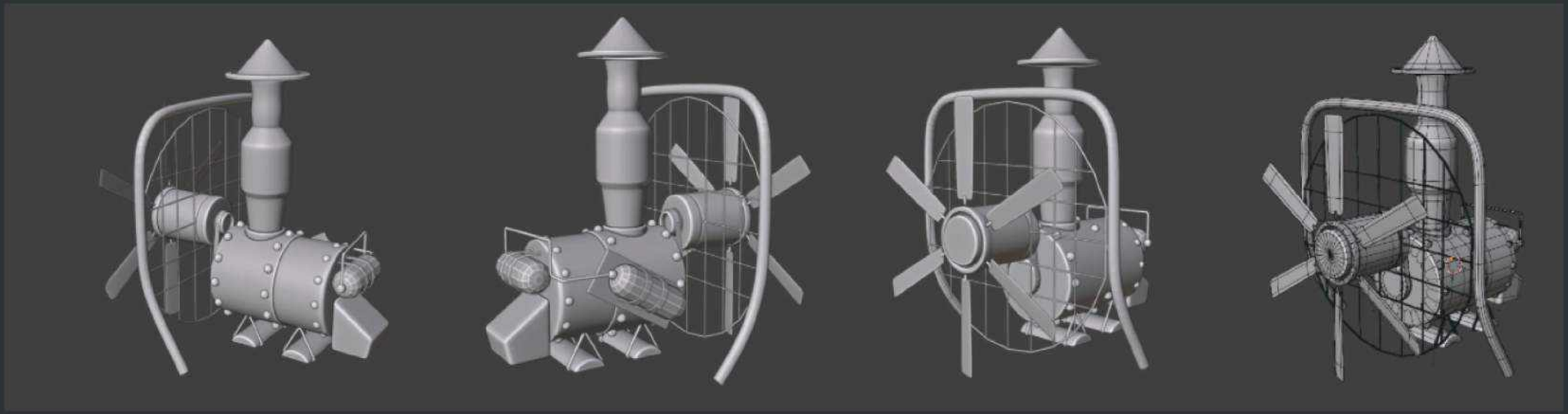
Creating the ring with holes around the burner was a fun challenge that allowed me to utilize various modeling techniques. I started with a base plane and cut a hole in the center. Then, I employed the Array modifier to generate multiple duplicates of the plane, which I subsequently welded together. To form the circular shape, I applied the Simple Deform modifier. Finally, I modeled the burner and carefully positioned it within the center of the ring.

Ropes & Weights



To connect the balloon, burner engine, and boat, I created ropes using simple cylinder and torus shapes. I duplicated these shapes and strategically positioned them around the burner to form the desired connections.To create the weighted bags and sacks, I started with basic primitive shapes like cubes or spheres.To optimize the models for lower poly counts, I am focusing on simplifying the geometry while retaining essential details and visual appeal as discussed in class.

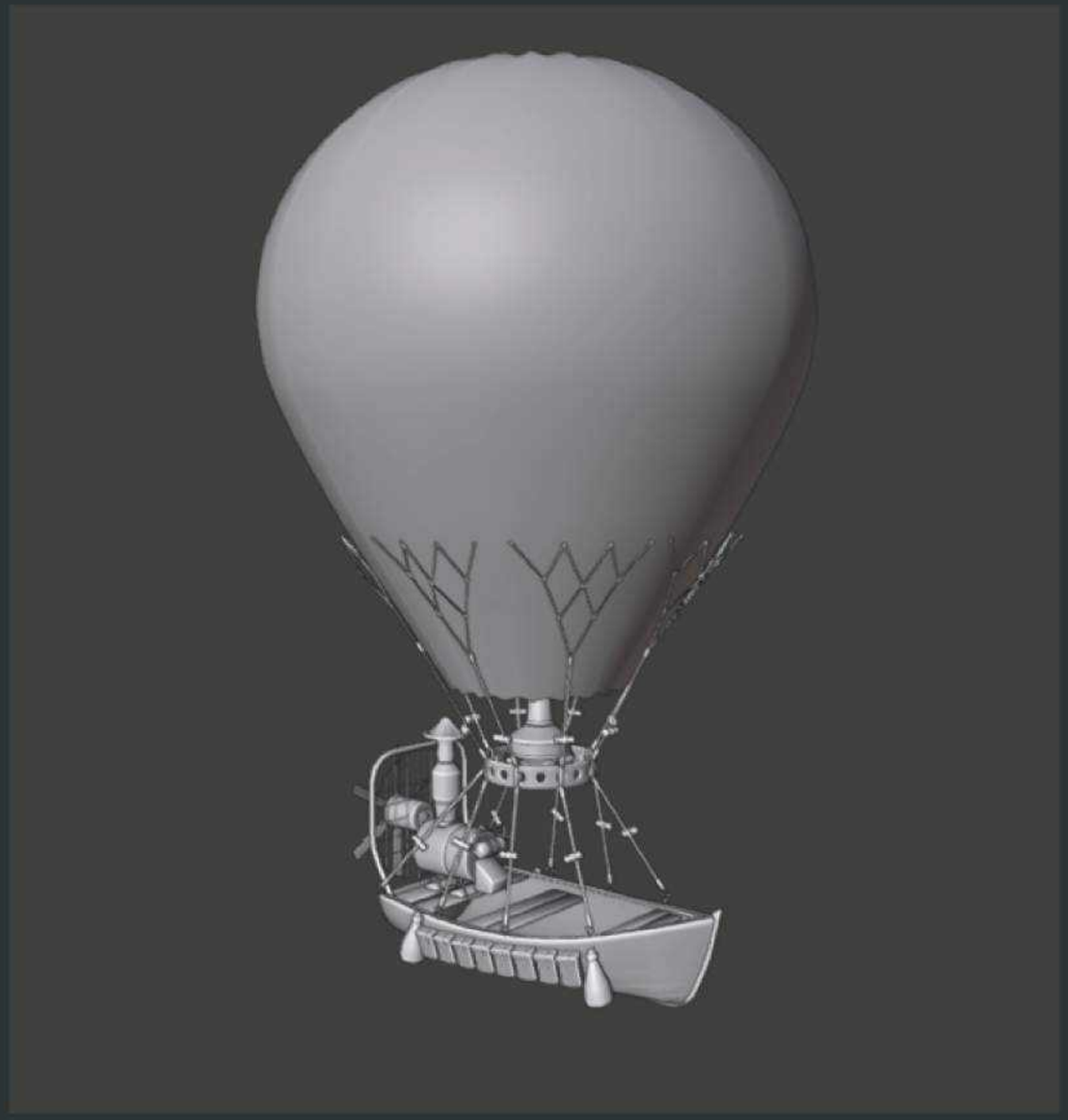
Engine



To model the boat's engine, I utilized a combination of primitive shapes to construct the desired form. For the supporting cage-like structure, I converted a mesh into curves and then added depth to create the intricate details.

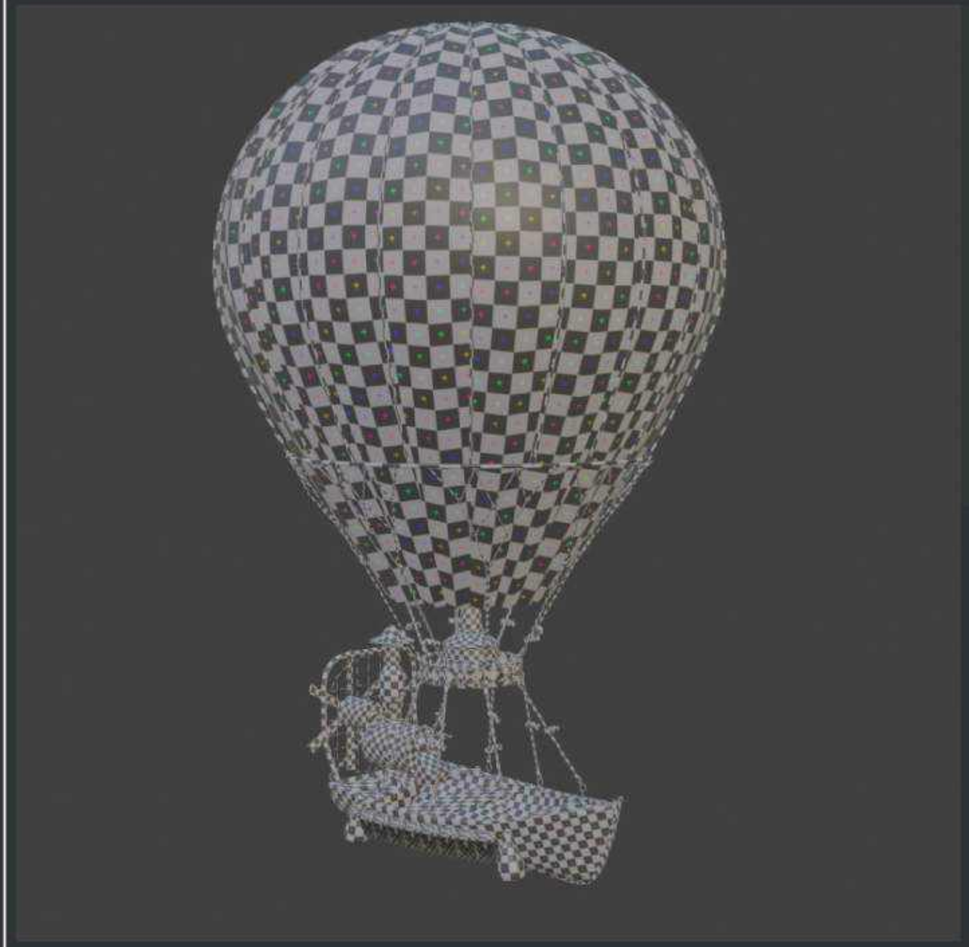
High-Poly Model

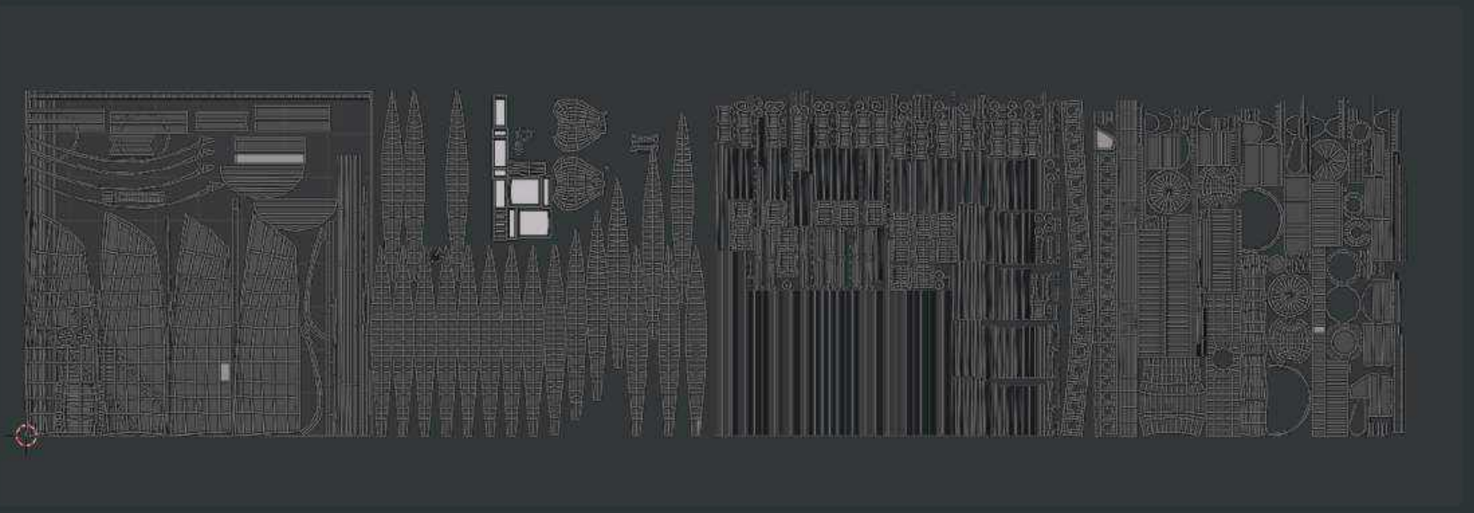
Low-Poly Model



As I was using a non-destructive method for high poly modeling, it became easier to create the low poly version of my model. All I had to do was remove the modifiers and convert the high poly model into a low poly one. Initially, I wasn't planning to create a low poly version, as I intended the model to be used in films. However, after discussing it with Human, I decided to take on the challenge of making the model game-ready, keeping the poly count within the 45,000 tri range. This was my first attempt at creating a low poly, game-ready asset.

UV Unwrapping

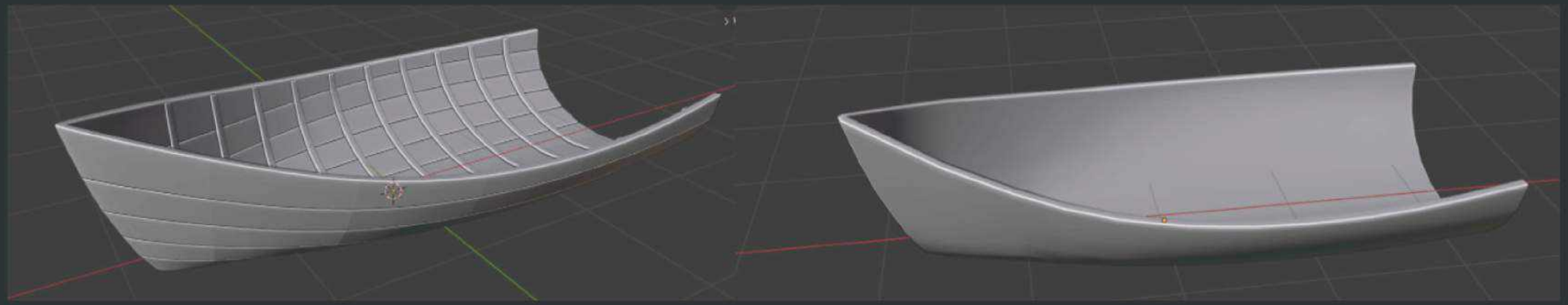




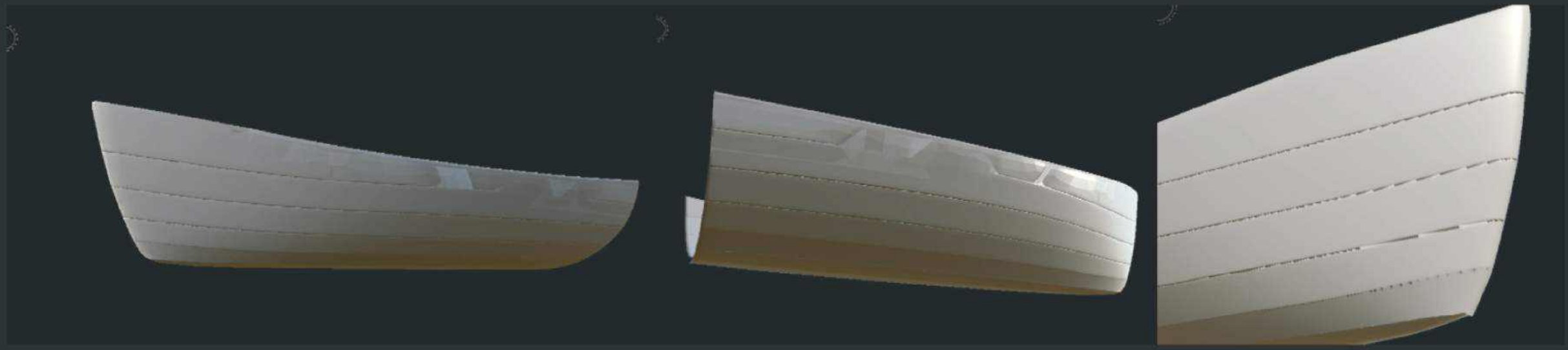
After completing the low poly model, I decided to use UDIMs for the UV unwrapping, as there were many elements to consider. To achieve higher-quality textures and ensure good texel density across the objects, I divided the entire model into four UV tiles.

Baking

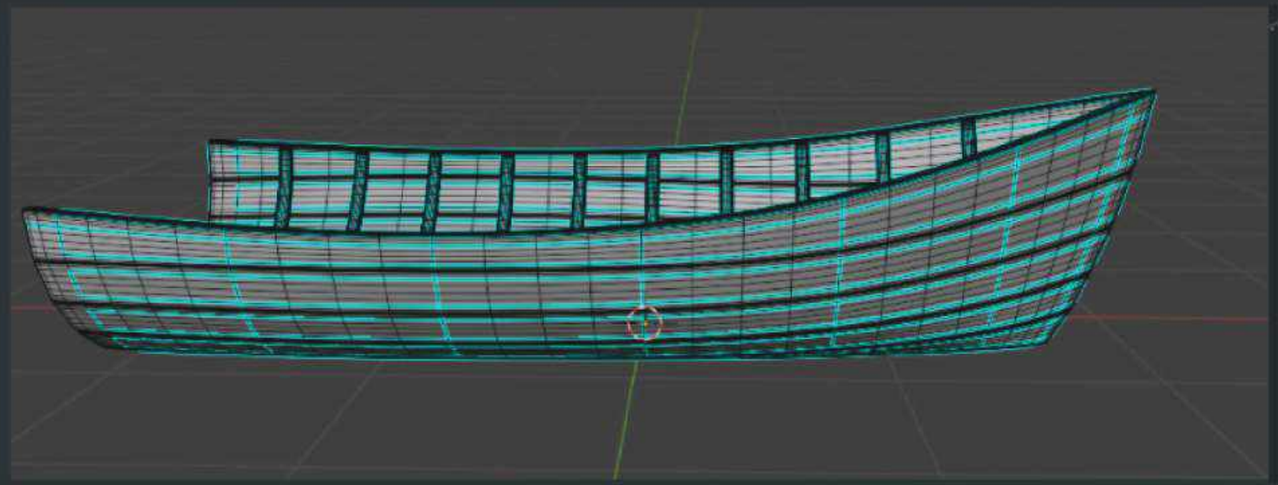
My initial plan was to create the model for film, so I wasn't very concerned about the polycount. However, after a detailed discussion with Human, I decided to take on the challenge of making the model game-ready, which required lowering the polycount. After analyzing the model, I aimed to keep the polycount under 60k. I then began the baking process, during which I encountered various issues.

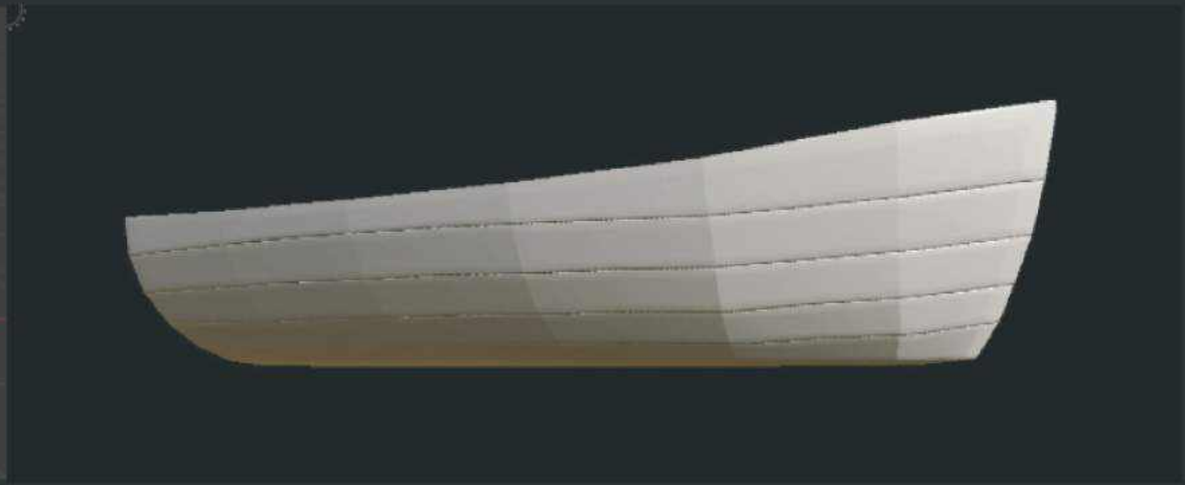


To create the final boat model, I first combined all the individual wooden planks into a high-poly mesh. This detailed mesh, consisting of approximately 115,152 triangles, captured the intricate details of the boat's structure. Simultaneously, I created a simplified, low-poly version of the boat with approximately 1196 triangles. This low-poly model will be used for real-time rendering and game engines, while the high-poly model will serve as a reference for baking high-quality textures and normal maps.

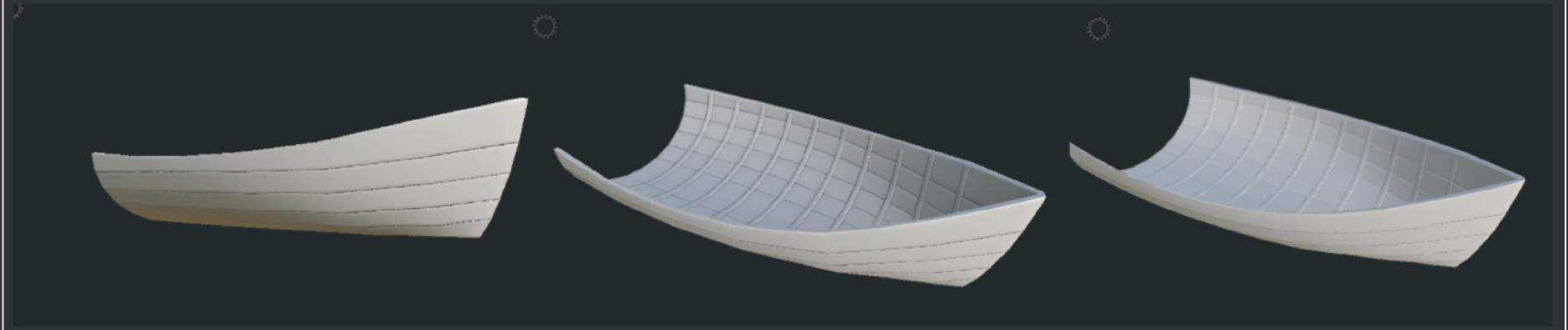


I began the baking process with the boat model. Unfortunately, I encountered several challenges during this initial attempt. The resulting bakes displayed various artifacts and inaccuracies, highlighting the need for further refinement of the model's topology and UV mapping. These initial setbacks have provided valuable insights into the intricacies of the baking process and the importance of careful preparation.





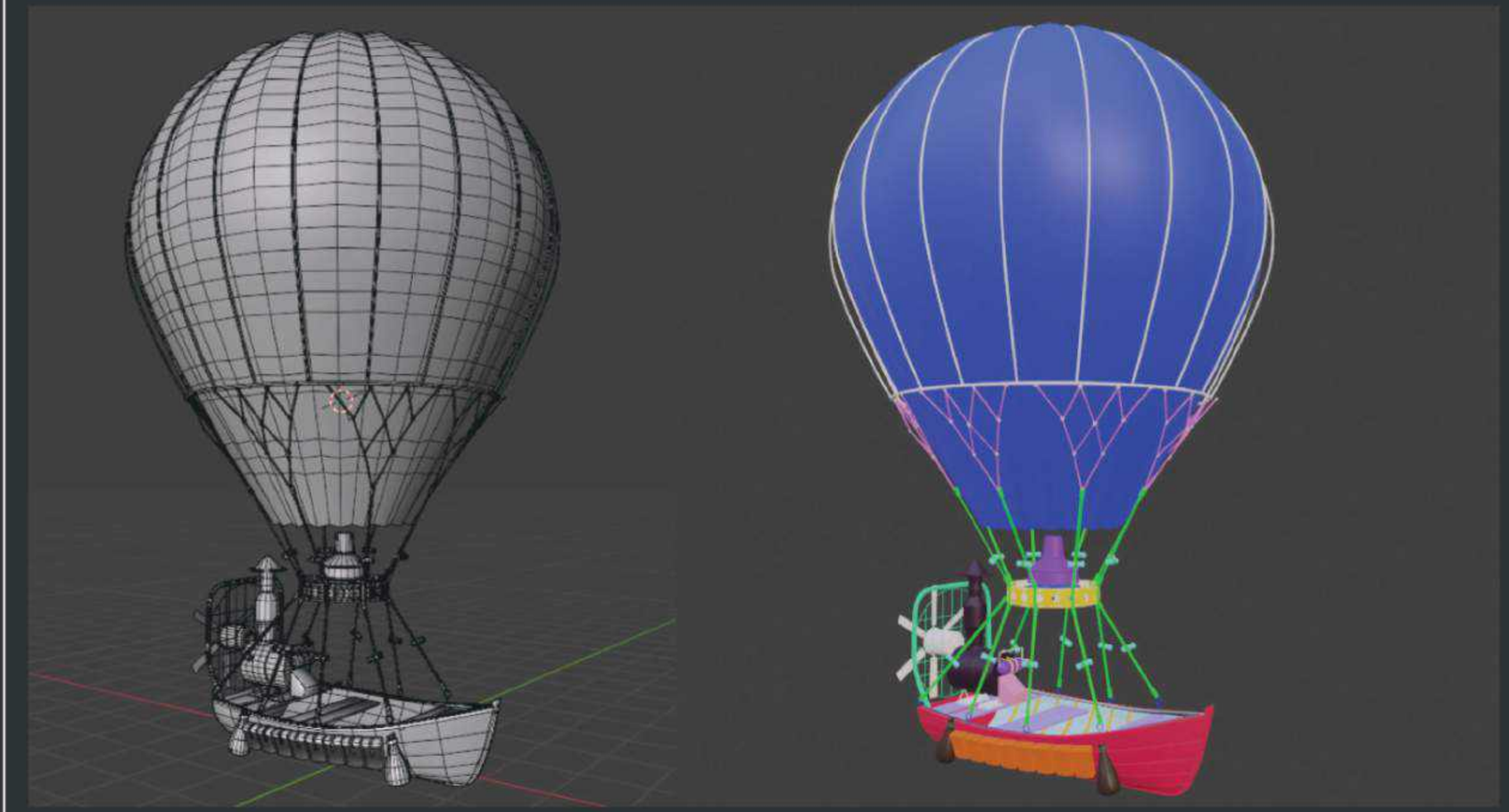
After refining the UV layout and experimenting with different baking settings, I successfully achieved a high-quality bake for the boat model. However, I encountered an issue with sharp edges appearing on the outer surface of the baked model. To resolve this, I delved into the topology of the high-poly model, identifying and removing any unnecessary hard edges.



By carefully adjusting the smoothing groups and weighted normals, I was able to mitigate the sharp edge artifacts and achieve a more realistic and visually appealing bake. With the guidance of my lecturer, I was able to effectively address this issue and improve the overall quality of the baked model.these are low quality bake .

The final bake of the balloon and rope assembly resulted in a significant reduction in polygon count, from approximately 28,000 triangles to 2,600 triangles. To achieve this optimization, I carefully analyzed the geometry and removed unnecessary details while preserving the overall shape and visual quality. To ensure accurate texturing, I assigned unique material IDs to different parts of the combined model, allowing for precise material assignment and texture baking.

Final Baking Proccess



After finishing the testing bake, I focused on the final baking process, using the bake-by-mesh-name method due to the large number of objects in the asset. Additionally, I assigned different material IDs to the high poly model to ensure accurate data for texturing in Substance Painter.

Final Bake

Texturing

After completing the bake, I moved on to the texturing phase of the model. The model has around five primary materials, including steel, copper, brass, wood, and rope. I approached the texturing process by focusing on one material at a time. For the overall look, I aimed for an old, worn aesthetic, incorporating subtle wear and tear, as well as dirt, on each material. With this in mind, I built the materials from scratch, layering multiple details to achieve a realistic and worn feel.

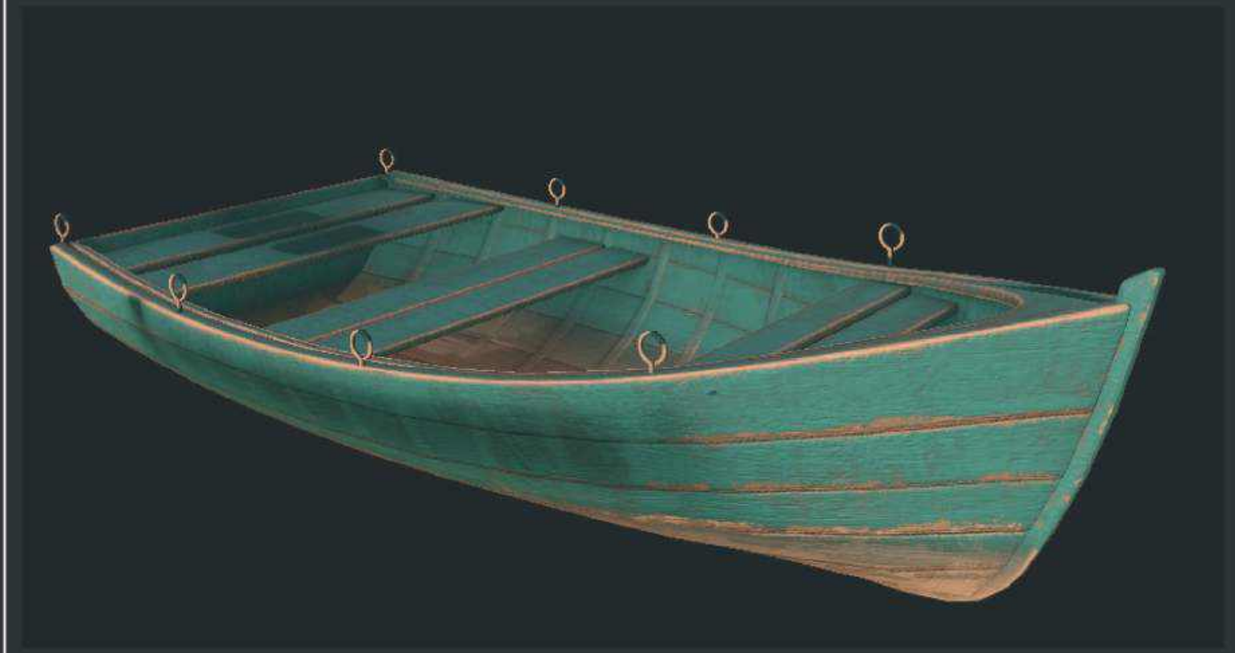
Metal Texturing

My model features various metal parts, including steel, brass, and copper. For the metal textures, I aimed to achieve a worn-out appearance, so I used different maps to add dents and height information to the textures. The most interesting and challenging aspect of texturing the metals was creating the burn and welding marks on the model. I really enjoyed this process, as these details added a significant level of realism to the final result.

Balloon & Rope Texturing

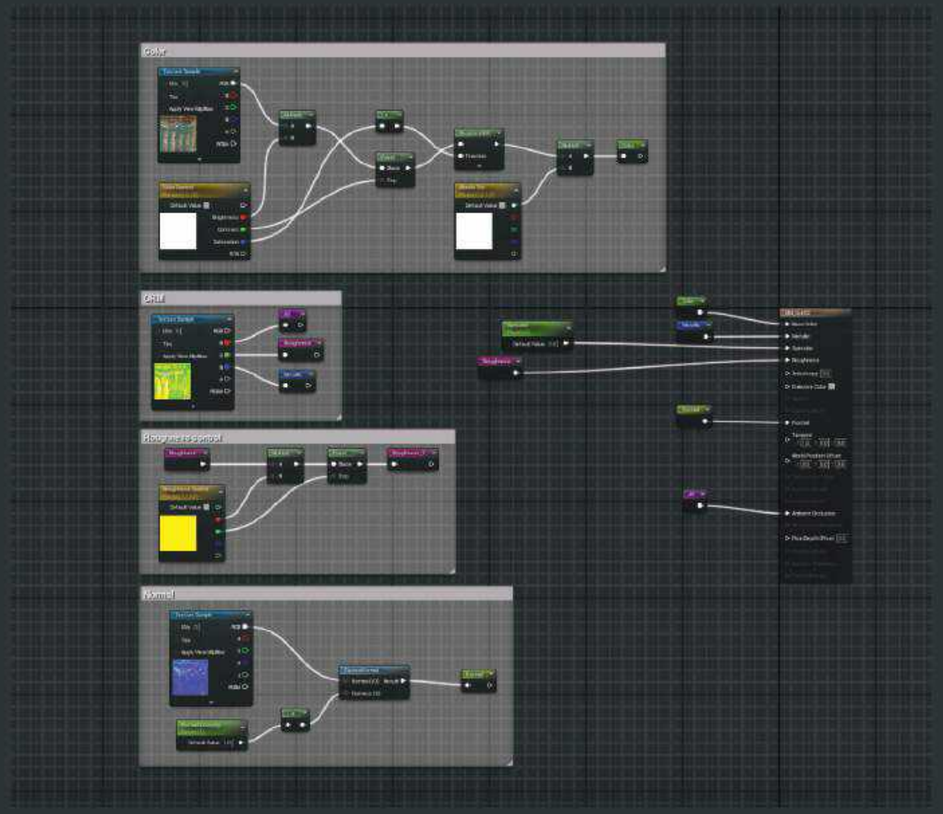
The balloon texture was created with subtle wear and dirt, while the rope was textured to show signs of use and aging. For both, I focused on layering different materials and using stencils to reveal underlying details, just as I did with the wood and metal. Here are some images of the final textures, showcasing the attention to detail in each material.

Wood Texturing



For the wood texture on the model, I followed a similar approach to achieve a damaged, worn look. The wood was particularly interesting, as I layered paint over it and used various stencil alphas to reveal the wood beneath. To enhance the realism, I also added dried watermarks, which further contributed to the authentic,

Presentation



I exported the textures as Unreal 4-packed from Substance Painter and then moved the asset into Unreal for material setup and rendering. In Unreal, I created the main material, added various parameters such as normal intensity, specular, tint, and color control. For lighting the scene, I initially used the 3-point lighting method; however, due to the large scale of the object, I added additional lights throughout the scene to achieve well-lit, visually appealing renders.

Presentation Sheet

Presentation 01

For my presentation sheet, I chose a solid grey background with a vignette effect around the corners to add a subtle touch. Inspired by the presentation sheets from Grafit Studio, I also included wireframe renders and lowered the opacity of the layer. This helped make the sheet more visually engaging and added an extra layer of depth to the overall presentation.

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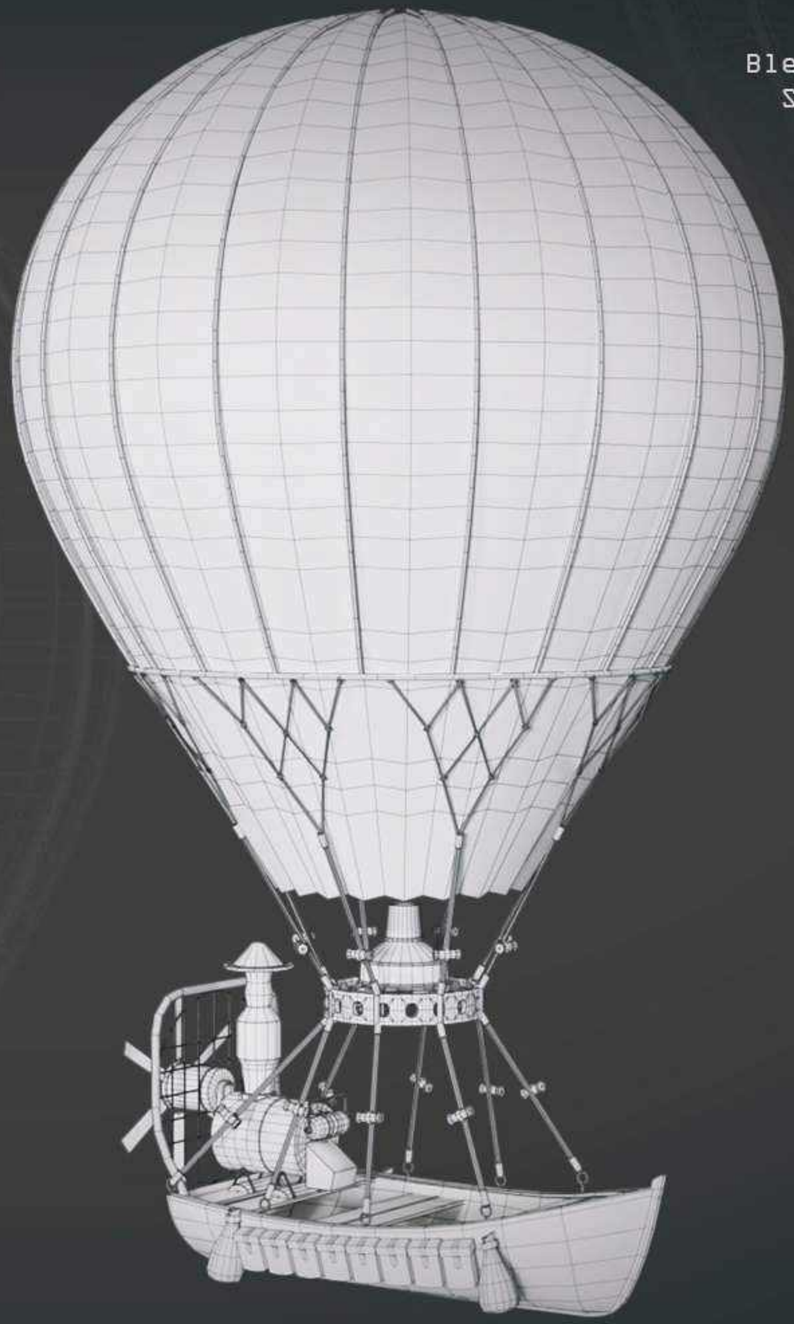
Hot Air SteampunkBalloon
47188 Tris
Blender| Modelling and Unwrapping
Substance| Baking and Texturing
Unreal | Rendering



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UNREAL ENGINE

Presentation:Comparison to Industry Examples

When comparing my presentation sheets to industry standards, I noticed that most use a solid color background and feature no more than three models per sheet. One notable difference is that the lighting in industry presentation sheets is often very clean, with the lighting drawing the viewer's eye directly to the objects. Most of them also have relevent company as well as games logo on the bottom corner and also a good composition of renders.

Improvements that could be made

1. I need to conduct more in-depth research to better utilize my time and work more efficiently.
2. Proper planning is crucial to ensure I can complete tasks quickly and before deadlines.
3. I should implement basic baking techniques earlier in the process to minimize extra modeling work.
4. I need to learn more about Substance Painter, as it's a more powerful tool than I initially realized. Mastering it could reduce the amount of modeling work required, as some tasks can be handled during the texturing stage instead.
5. I need to spend more time on unwrapping and improve my understanding of texel density. Additionally, I need to focus on packing the UVs more efficiently to make better use of the UV space.
6. I need to dedicate more time to studying lighting, as it plays a critical role in enhancing the model or 3D scene. Proper lighting can really bring character and depth to the visuals.
7. Gaining a stronger understanding of Unreal Engine is essential. I currently lack knowledge in the software, and learning it will not only speed up my workflow but also help me produce higher-quality outputs.
8. I need to increase my knowledge of color theory and camera angles for rendering, as well as gain a better understanding of render settings to achieve the best possible results.

Thank You.