

CS148 Final Report

How You Met the Project Requirements

1. Leveraging the Power of Ray Tracing:

We utilized several advanced ray-tracing techniques available in Blender's Cycles engine to achieve realistic lighting and shadows. We added **area lights** and **HDRI environments** to simulate realistic outdoor and indoor lighting scenarios, ensuring that the rendered scenes were physically accurate and visually appealing.

2. Main Geometry From Scratch:

We modeled the **hexagonal grids** for the *Catan* board game entirely from scratch. Using Blender's modeling tools, we created the base hexagonal shapes and customized each tile to represent different landscapes such as **mountains**, **grasslands**, **forests**, **deserts**, and **wheat fields**. Advanced tools like **brushes**, **modifiers** (e.g., array, displacement, and subdivision modifiers), and the **particle system** were used to add details. For instance:

- The **grass and wheat field** was generated using Blender's particle system to create realistic textures.
- The **mountains** were sculpted using sculpting brushes with added displacement maps for fine details.

3. UV Mapping and Texturing From Scratch:

The bases of the hexagonal grids were UV unwrapped by ourselves. The texture of the grass was created by ourselves with Photoshop.

4. Blender/Cycles Advanced Features:

We explored and implemented advanced features of Blender and Cycles,

such as:

- **Subdivision Surface Modifiers:** To add smoothness to the hexagonal tiles and characters.
 - **Shader Nodes:** Used complex node setups to blend materials and create photorealistic effects, such as **rough, rocky textures** for mountains.
 - **Physics Simulations:** Incorporated particle physics for grass generation and soft-body physics for creating realistic cloth effects on certain assets.
 - **Depth of field:** Depth of field is applied and focused on the forest.
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What Each Member of the Group Did

Both team members contributed equally to the project. Both members collaborated on **rendering, scene arrangement, and final project polishing**, ensuring a cohesive and high-quality output.

Assets Downloaded From Online vs. Made Ourself

We deeply appreciate the open resources available online and made use of the following assets for specific elements:

- **Downloaded Assets:**

- **Textures:** [ambientCG](#) for high-resolution textures (e.g., rocks, wood, grass).

- **Book Model:** [Hardcover Book 3D Model](#)
 - **Miniature Landscape:** [Sketchfab Miniature Landscape](#)
 - **Sheep:** [Free3D](#)
 - **Created From Scratch:**
 - All **hexagonal grids** for the *Catan* game board, including the **mountain, grass, forest, desert, and paddy fields** tiles.
 - The **terrain and environment** (e.g., ground, vegetation, and water).
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Tutorials and References

The following tutorials and resources were instrumental in helping us complete this project:

- [Blender Beginner Tutorial](#): A comprehensive guide to Blender for beginners, which helped us understand the basics of modeling, texturing, and rendering.
 - [ambientCG](#): A source for free, high-quality textures that we used and customized for our project.
 - [CGTrader Hardcover Book](#): Provided a detailed 3D model of a book for use as a prop in the scene.
 - [Anime Grass Tutorial](#): A guide to create the anime-style grass
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Conclusion

By combining original work with carefully selected online assets and advanced Blender techniques, we were able to meet all the project requirements and deliver a polished, visually engaging result. This project allowed us to deepen our

understanding of 3D modeling, texturing, and rendering while showcasing the power of Blender and ray tracing.