

CS 148 Final Project Report

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Reference picture



What attracts me most about this reference image is its strong atmosphere and balanced composition. The antique gramophone is the main focal point, while the wooden table, vintage lamp, books, glass bottles, and plants create a complete and believable environment. I especially like the lighting. Most of the room is dark, while the table lamp creates a warm pool of yellow light on the left side. This contrast gives the scene a cozy, nostalgic, and slightly mysterious feeling. The reflections on the glass objects also make the image more visually interesting. However, the lighting may be too dark for the project and ray tracing, so I will choose to put the scene near a window under sunlight to get better illumination.

Another reason I chose this reference is the variety of materials. The scene includes polished wood, metal, colored glass, and paper, which all interact with light differently. This makes it a useful reference for practicing realistic modeling, material textures, lighting, and rendering in Blender.

I. Rendered Image



II. How I met the project requirements

1. Leveraging the power of ray tracing

I leveraged the power of ray tracing by rendering the scene in Cycles and combining sunlight, global illumination, and the warm local light from the stained-glass desk lamp. I used physically based transmission for the whisky bottle, glasses, window panes, and amber liquid so that light could refract through them and create convincing reflections and highlights. I also used metallic materials with controlled roughness on the gramophone horn, tonearm, window handles, and desk hardware so that each surface responded differently to the two main light sources. I added subtle volumetric scattering near the window to reveal several soft rays of sunlight without making them resemble spotlights. These effects allow the sunlight and lamp light to interact naturally with the glass, liquid, wood, brass, and vinyl surfaces.

2. Main geometry from scratch

I modeled several of the main custom elements in the scene from scratch. I created the main gramophone study with a layered wooden cabinet, turntable, record, tonearm, needle, crank, and an eight-petal horn. Additionally, I modeled the crystal whisky bottle, the matching drinking glasses, the desktop book rack, the room structure, and the complete casement window. I constructed window frames, corner joints, hinges, detailed handles, and individual glass panes as separate components so that the right window could open realistically. The desk, bookshelf, lamp, books and pen are imported from external sources. I adjusted their scale, materials, and placement to fit

the composition.

3. UV mapping and texturing from scratch

I UV unwrapped the record and used its UV map to place the imported album artwork precisely on the circular label at the center. For the black playing surface, I used the UV radial coordinates to calculate the distance from the center of the record, then combined Math, Color Ramp, Noise, and Bump nodes to generate the concentric grooves and subtle roughness variations procedurally. I also created the glass, whisky, wood, brass, and dark metal materials for my custom objects through shader nodes, using UV coordinates when the grain or surface pattern required a specific direction and scale.

4. Blender/Cycles advanced feature

I utilized volumetric rendering with controlled density, anisotropy, procedural noise, and gradual edge falloff to create soft sunlight scattering through the window. I used multiple overlapping light volumes instead of one strong beam so that the Tyndall effect would appear distributed naturally across the room and desktop. I also used camera depth of field to keep the open book, lamp, whisky set, and gramophone visually prominent while allowing the exterior landscape and distant furniture to remain slightly soft. I adjusted the Cycles bounce settings, adaptive sampling, denoising, and color management to preserve detail in the transparent glass, reflective brass, dark wood, and shadowed interior without losing the bright atmosphere outside the window.

III. Assets I made myself

Gramophone

Crystal whisky decanter

Matching crystal whisky glasses

Desktop wooden book rack

Two sash casement window

Window frames, hinges, handles, and glass panes

Room walls and interior architectural geometry

IV. Assets I downloaded online

Tiffany Lamp: <https://sketchfab.com/3d-models/tiffany-lamp-9c7543add48f4321b330c2c92174b6c0>

Lake Lucerne Window Background:

https://commons.wikimedia.org/wiki/File:CH.LU.Weggis.Bannholz_Lake-Lucerne_16K_16x9-R.jpg

Antique Old Opened Book: <https://sketchfab.com/3d-models/antique-old-opened-book-2fc707e68e2d490cbb900fb212e04bc5>

Antique Book Set: <https://sketchfab.com/3d-models/antique-book-set-a7e1164cca004a65ab53ce0e8553586c>

LAMY Safari Pen: <https://sketchfab.com/3d-models/lamy-safari-4096px2-0b98e18da9d14553af5bfb1827ead726>

Dusty Old Bookshelf: <https://sketchfab.com/3d-models/dusty-old-bookshelf-free-6c5ac2547db34c3c81b2e4808b000386>

Walnut Pedestal Desk: <https://www.cgtrader.com/free-3d-models/furniture/table/walnut-pedestal-desk>

V. What each member of the group did

I did the final project individually. Therefore, all the work was done by me, including motivation, scene design, modeling, UV unwrapping, texture, lighting and rendering.

VI. Tutorials I referenced

Blender Light Objects and Light Types:

https://docs.blender.org/manual/en/latest/render/lights/light_object.html

Blender Guru Lighting for Beginners: <https://www.youtube.com/watch?v=Bruu7-OREos>

Blender Guru Lighting Mastery Series:

<https://www.blenderguru.com/posts/2019/lighting-mastery>

Blender 4.0 Lighting and Sky Texture:

<https://www.youtube.com/watch?v=KO29y5eW61g>

Cycles Light Paths and Bounce Settings:

https://docs.blender.org/manual/en/latest/render/cycles/render_settings/light_paths.html

Volume Scatter and Anisotropy:

https://docs.blender.org/manual/en/latest/render/shader_nodes/shader/volume_scatter.html

Volumetric Lighting and God Rays in Cycles: [God Rays Blender Tutorial Under 2 Min](#)

Cycles Sampling and Denoising:

https://docs.blender.org/manual/en/latest/render/cycles/render_settings/sampling.html

AgX Color Management and Exposure:

https://docs.blender.org/manual/en/latest/render/color_management.html

Blender Camera Settings, Lens Shift, and Composition Guides:

<https://docs.blender.org/manual/en/latest/render/cameras.html>

How to Use Depth of Field in Blender: <https://blender.fi/2022/05/08/how-to-use-depth-of-field-in-blender-tutorial/>

Top 10 Essential Blender Camera Tips: <https://blender.fi/2022/04/20/lets-learn-blender-top-10-essential-camera-tips/>

Appendix

Image at a different angle



Image with no texture

