CS148 Final Project

Po-Ya Wu (pywu@stanford.edu)

Final Image
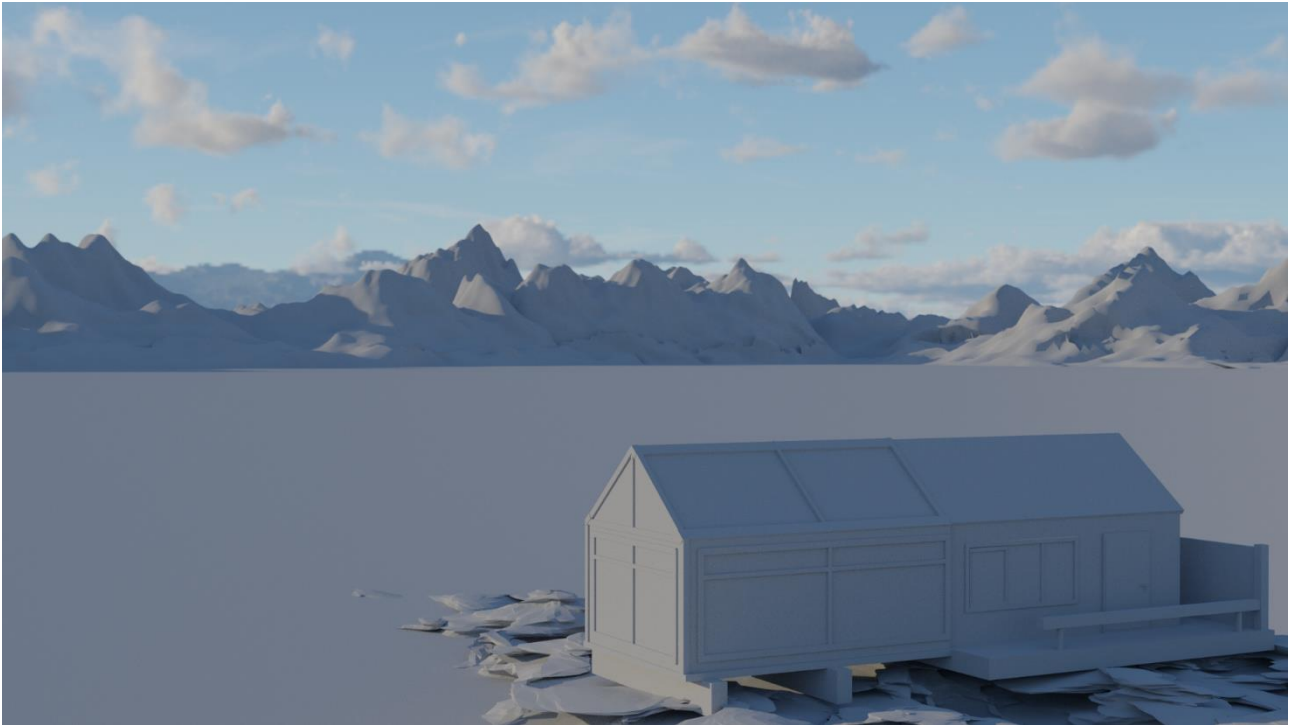
1920px*1080px

Variant A

1920px*1080px; from a different camera view

Variant B

1920px*1080px; from the original camera view and with the same exact lighting, but without textures

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Motivational Images

Image Sources: minimalselect.com, inhabitat.com, archive.curbed.com

Inspiration

At some tourist attractions with majestic natural sceneries, this kind of "glass cottage" enables travelers to enjoy the landscape at different moments of the day and stay comfortably overnight. Such cottage design is more commonly seen in places with beautiful mountains, peaks and lakes. In this project, I used Blender's Cycles engine to render a scene inspired by these motivational images. The foreground consists of a cottage built on the rocks by the lake and with a relaxing interior design. The background is composed of the large lake and snow mountains.

Assets

I.   The cottage

- **Wooden building**

I modeled the geometry of the cottage by editing some basic meshes from scratch and added suitable texture onto different parts of the building: roof: textures.com, walls: publicdomaintextures, door: textures.com, cottage ground: publicdomaintextures, terrace ground/ wooden column under the cottage: publicdomaintextures, side wall of the terrace: textures.com

- **Glass wall and roof**

The meshes of the glasses are simply planes with thickness and transparent material properties. To make the glasses look more natural, in addition to transmitted lights, I adjusted the parameters of the glass shader (IOR, transmission) to make the reflections of the interior of the room visible as well. Examples of such reflection:

(Image on the right is from a different camera angle)

- **Furniture inside the cottage**

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	• **Bed** I modeled the whole geometry from scratch. In addition to the basic wooden bed structure, I modeled the quilt, blankets and pillows on the bed using cloth simulation and some sculpting for the details. The quilt and blankets were simulated using planes, and the pillows were based on cubes with side edges merged together and suitable volume of the cotton added inside (ref: youtube). And to make the four pillows look distinct, I sculpted them to create wrinkles on the surfaces. Textures and patterns of the components are wood: polyhaven, pillows: textures.com/3dsky, quilt: 3dsky, blankets on the quilt: publicdomaintextures/3dsky, mattress: 3dsky • **Carpet on the ground** The mesh was originally a plane. To create the hairy effect, I used particle system with "Hair" on it. The carpet looks fluffy with proper hair length and hair number.
	• **Couch** I modeled the geometry from scratch. The couch cushions were sculpted from cubes. The handles and structures were edited from planes, then subdivision and solidify modifiers were applied to make them smooth and thick. The blanket on the couch was modeled using cloth simulation, and particle system with "Hair" was applied to create the hairy and warm effect. Also, different textures were applied on different part of the couch: cushions: polyhaven, wood: publicdomaintextures, pillow and blanket on the couch: cgtrader, textures.com
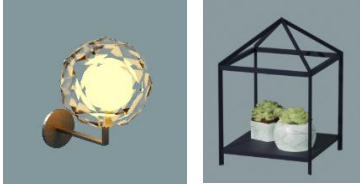
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	• **Candle-like chandelier** I modeled this from scratch by editing the basic meshes. Emission spheres were placed inside. Also, volumetric materials were placed inside the fire-like light sources on top of the candles to create the fire colors but still appeared to be somehow transparent. • **Sphere wall light** I modeled this from scratch with some basic meshes. The outside of the light is with transparent glass BSDF, and an emission sphere was placed inside. • **Bracket of the succulent plants on the central table** I created this from scratch by editing the basic meshes, and applying metal material property on them. The succulent plants are from cgtrader.
	• **Imported assets in the cottage** I imported the following models from the online resources and applied suitable textures on the items to make them fit in well with the scene. tables: cgtrader/publicdomaintextures, camera: polyhaven, table and the chairs & decoration on the wall: cgtrader, desk nearby the window & plants on top of it & chandelier on the right: cgtrader, curtain: cgtrader

II.   The landscape

• **Rocks in the foreground (under the cottage)**
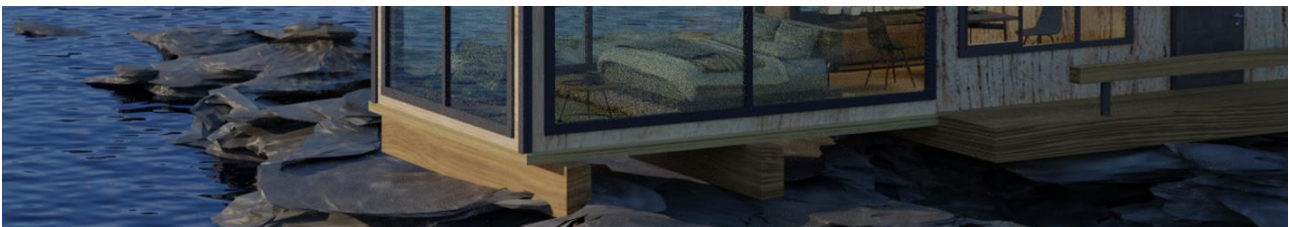
I created the mesh from a plane by editing to get the rough stone shape. To create the sharp and rocky details, I applied a subdivision modifier, and then added two displacement modifiers based on cloud textures (one with a larger noise size and another with a smaller size to create the rock details). By adjusting the size and the contrast of the cloud textures, I was able to make the rock shapes look realistic. Also, this cliff texture was applied on them: textures.com.

- **Mountains**
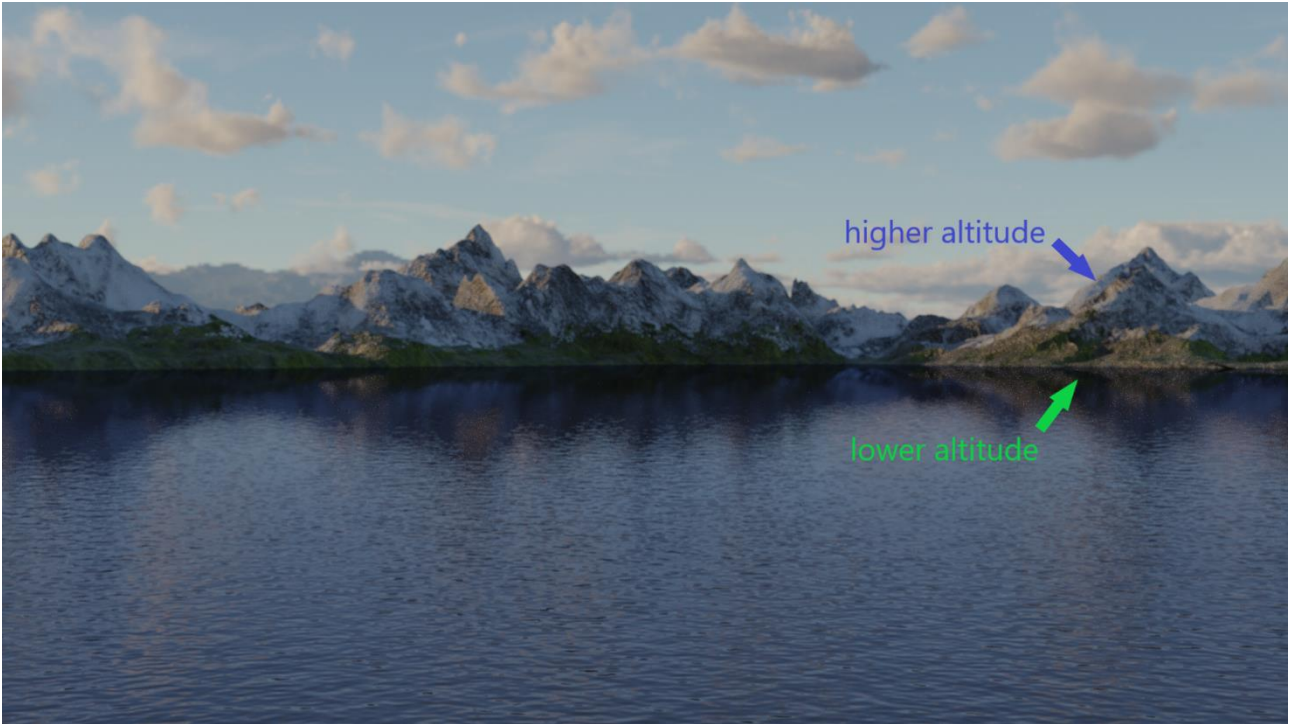
I used the "landscape" add-on (ref: youtube) to generate the basic shape of the mountains. With different scales and noises, the mountain shapes look unique and natural. To create the colors and shapes of the snow and rocks on the mountain, I used mix shader to combine two textures (adjusted to proper Normal and ColorRamp of mixture): snow texture publicdomaintextures and cliff texture textures.com.

At the lower portion of the mountain, I wanted to create the color of rocks and some green plants to show that the snow did not reach the lower altitude part. I first created the mesh by duplicating the mountain shapes and editing to get suitable shapes of the lower portions of the mountains, then applied a technique similar to the one on upper portions of the mountains: I used mix shader to mix different textures: moss texture textures.com and cliff texture textures.com.

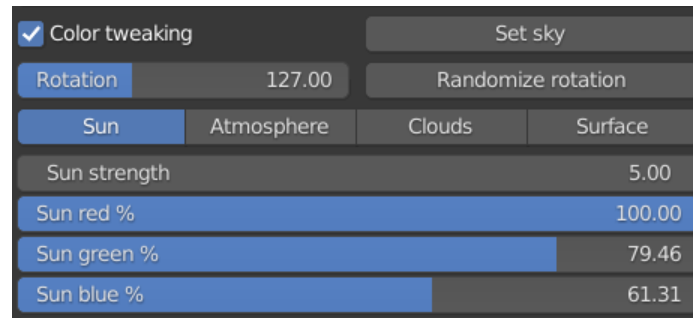Ref for the mix shader technique: youtube

- **Lake**

The mesh is simply a plane. The texture is based on glass BSDF to show the reflections of the surrounding landscape. Then I used procedural generation to create the ripples on the lake: two levels of noise generations are multiplied and applied on the normal to create the ripples.

Ref for the ripple generation technique: youtube

- **World**

I used the add-on "SceneSkies" to create the background and world illumination. I rotated the background to get a suitable portion of the clouds and faraway mountains. To simulate the illumination in the dusk, I adjusted the ratio of RGB colors of the sunlight to make the scene look dim, and the interior lights and furniture inside the cottage became more clearly seen.

Settings of my scene:

✔ Color tweaking	Set sky
Rotation 127.00	Randomize rotation
Sun	Atmosphere	Clouds	Surface
Sun strength   5.00
Sun red %   100.00
Sun green %   79.46
Sun blue %   61.31

Project Requirements

- **Geometry from scratch**
  - All geometries except those mentioned in the "Imported assets in the cottage" section were created by myself from scratch. Details of techniques (editing, simulating, sculpting, adding specific modifiers, etc) applied on each geometry are described above.
- **UV mapping and texturing from scratch**
  - UV unwrap the object yourself: cottage building, woods of the bed, couch, tables, mountains
  - Create a texture from scratch either via hand-painting or procedural generation with Blender's material nodes: lake (noise texture multiplication and normal adjustment)
- **Create a custom/procedural material**
  - Cottage, bed, couch, tables, rocks: textures
  - Mountains: textures, mix shader on high and low altitudes and with ColorRamp converter
  - Lake: noise textures, multiplication, bump vector to adjust normal
- **Blender/Cycles feature**
  - Depth of field: The final images was rendered with focal length 50mm, focusing on the cottage and F-stop 3.0.
  - Volumetric: As described above, I used volumetric materials inside the candle-like chandelier.

Technical Contributions

- **Cloth simulations on geometries**

I used cloth simulations and sculpting with steps described above to create the quilt, blankets and pillows.

- **Glass roof and wall**

Suitable material settings were added on the glasses to make the transmission and reflection colors realistic.

- **Shapes of the rocks in the foreground**

As described above, the rocks were created from scratch from a plane mesh by editing and adding suitable modifiers.

- **Mountain texture**

I used mix shaders to create the textures for the portions of high and low altitudes on the mountains. The textures with mixtures of rock, snow and moss make the mountains look realistic.

- **Lake**

I used procedural generation to create the ripples on the lake in addition to the glass material displaying the reflections of the surrounding landscape.