CSC 155-02

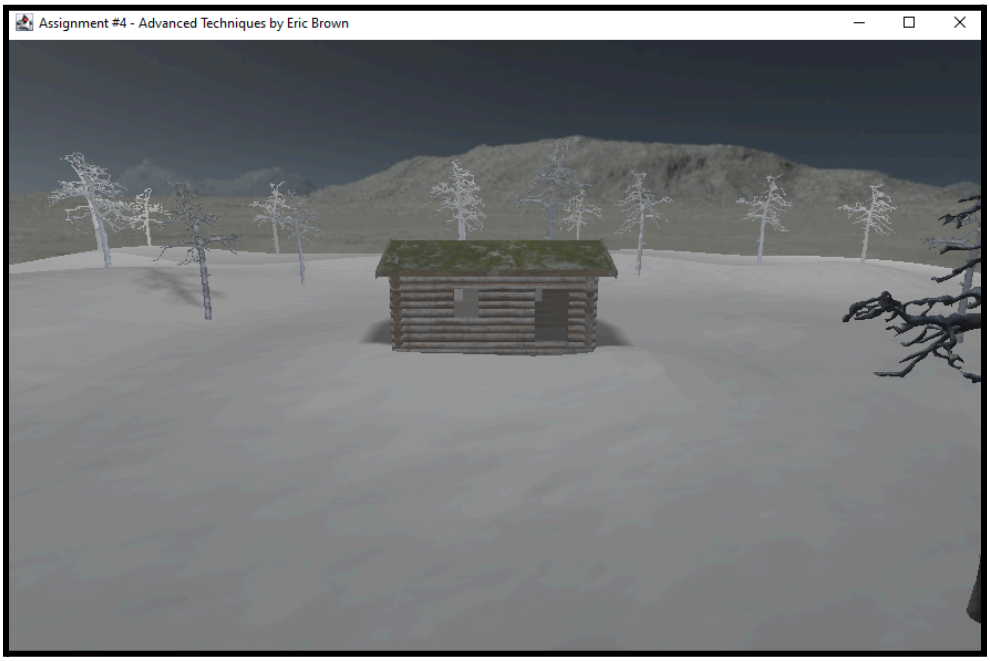
Assignment 4 - Advanced Techniques

Eric Brown

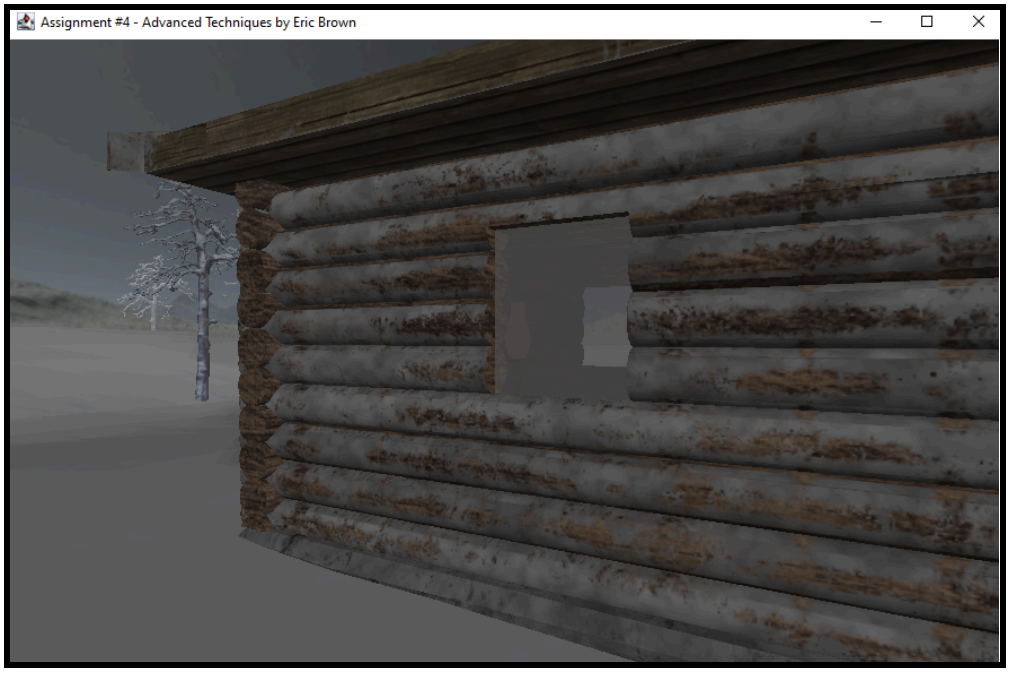
Spring 2024

1. Scene Pictures:

a.



b.



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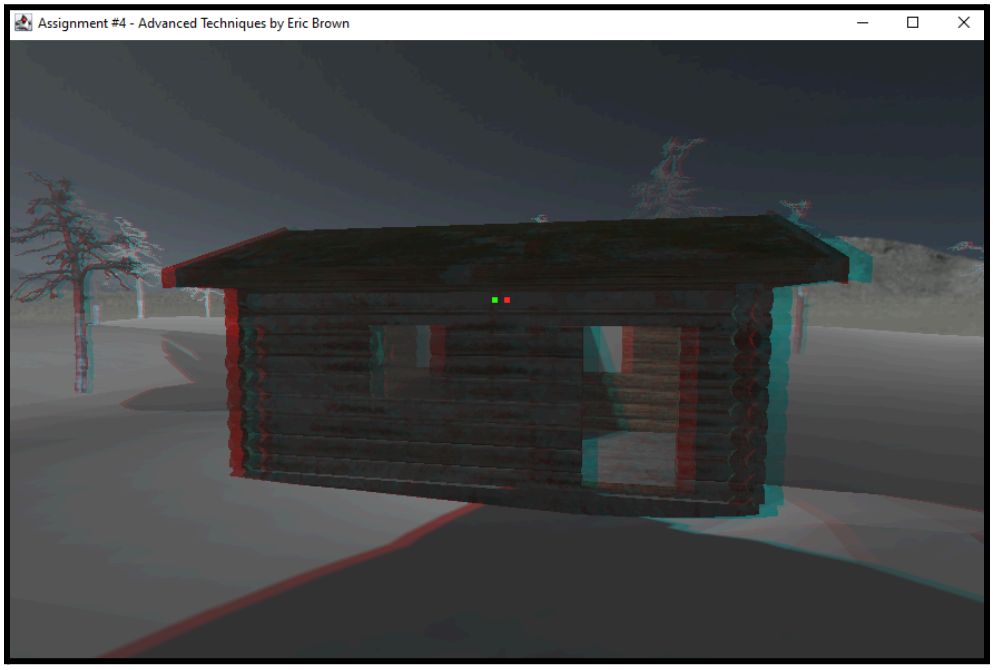
c.

d.



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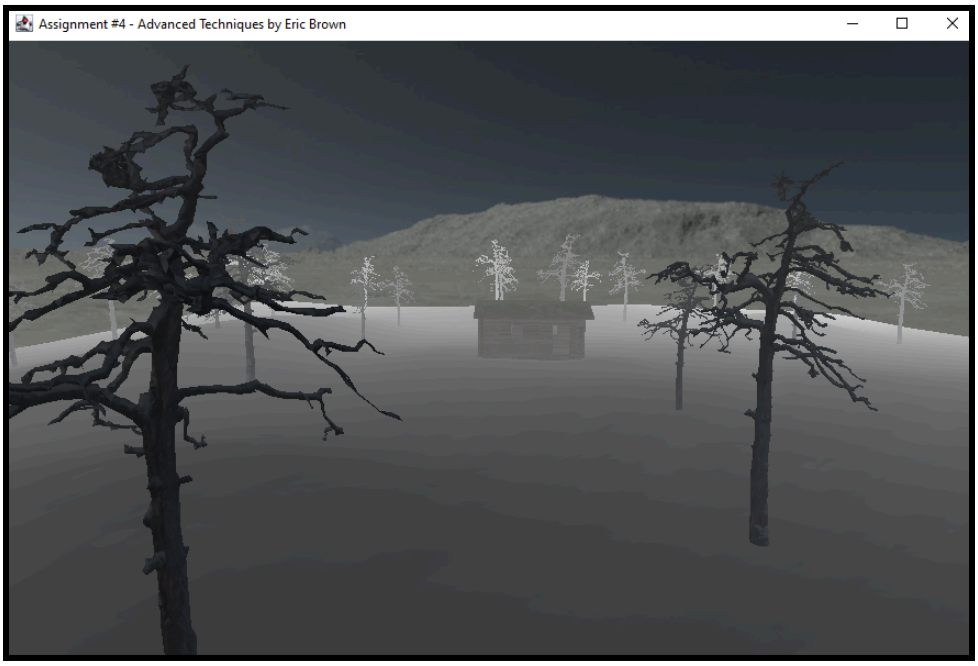
e.



f.

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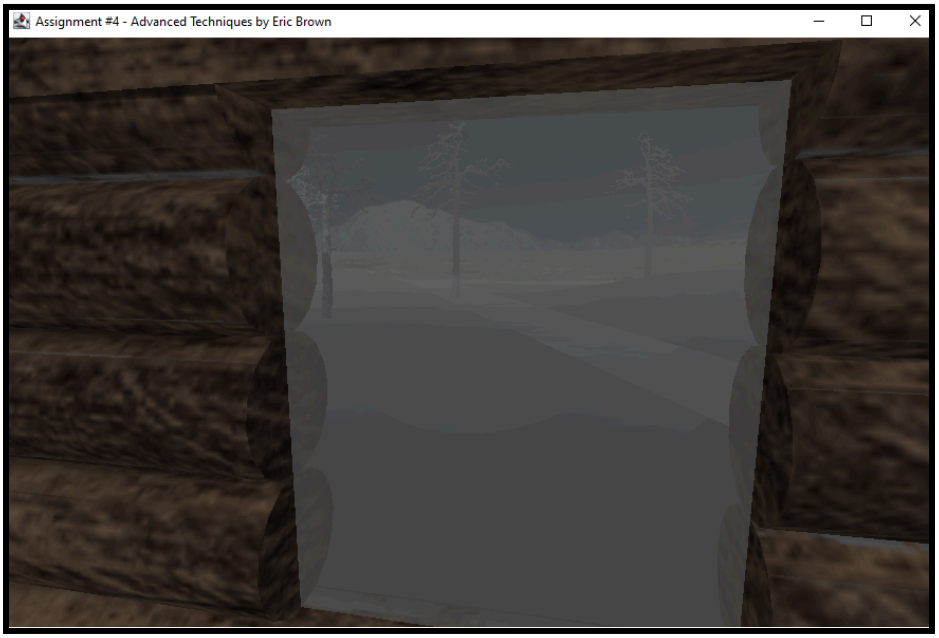
g. 

2. **Scene Description:**
    a. My scene is of a log cabin in the middle of winter. Inside the cabin, there is a chair that is facing a television and vase that are resting on a table and stand respectively. The television displays static while the vase has some bumps on it. The cabin has a few transparent windows, and there are some trees that surround the cabin with no leaves as expected in winter. There is a white fog in the scene and the ground is white for snow.

3. **Shadow-mapped Objects:**
    a. All objects except for the skybox and world-axes should participate in shadow-mapping although the shadows look much better closer to the origin of the scene which is to be expected.

4. **Advanced Features:**
    a. Inside the log cabin, there is a TV that displays static. This static is generated by flipping through different textures that were generated by the **noise** technique shown in the book.
    b. Also inside the cabin, there is a vase to the right of the TV. This vase is **procedurally bump-mapped** and can be seen then the light is inside the cabin.
    c. **Stereoscopy** can be toggled in the scene by pressing **R**.
    d. The log cabin has several brownish windows that use **blending/transparency** which is visible from both sides of the windows. There is also a white **fog** that is present in the scene and is most noticeable by looking at the trees on the horizon when the camera is further back with the light off.

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5. **User Controls:**
    a. **R** to toggle the positional light on/off.
    b. **LEFT CLICK + DRAG** to move the light in the UV-plane (parallel to camera)
    c. **SCROLL UP** to move the light away from the camera along the N-vector.
    d. **SCROLL DOWN** to move the light closer from the camera along the N-vector.
    e. **WASD** to move the camera horizontally.
    f. **Q** and **E** to elevate and lower the camera respectively.
    g. **F** to toggle stereoscopy.
    h. **SPACE** to toggle the world axes.

6. **Unimplemented Requirements:**
    a. There are no unimplemented requirements in this assignment.

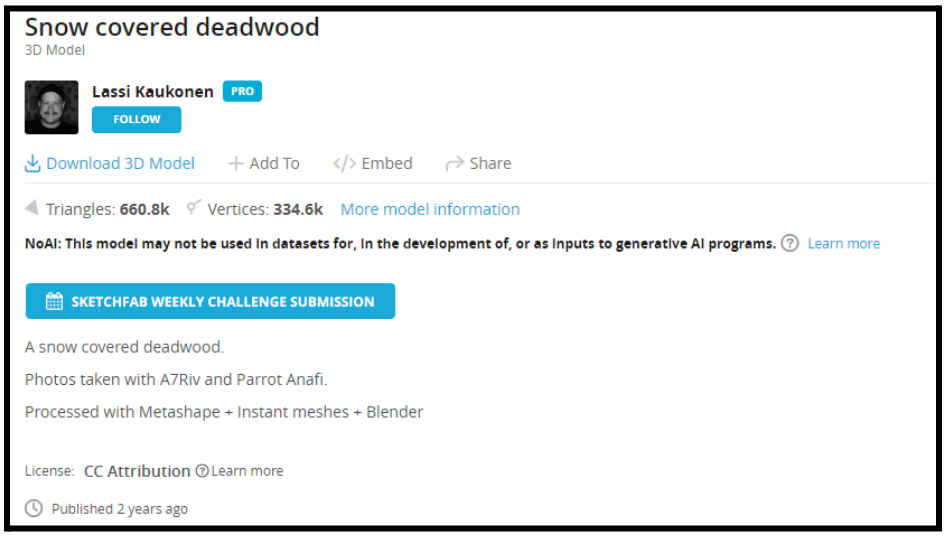
7. **Extra Requirements:**
    a. There are no extra requirements implemented in this assignment.

8. **Texture and Model Sources:**
    a. The material specification was made by me.
    b. The skybox (**assets/skybox**) was created by me using Terragen 4.
    c. The windows (**assets/windows**) texture (**windows.obj**) was made by me using Aseprite and the and the windows model (**windows.png**) was made by me using Blender.
    d. The ground (**assets/ground**) model (**ground.obj**) was made by me using Blender while the snow texture (**ground.png**) is from OpenGameArt.org under the **CC0 license.** (https://opengameart.org/content/seamless-snow-texture-0) The license is visible on the lower left hand corner of the webpage and is pictured below.
        i. 

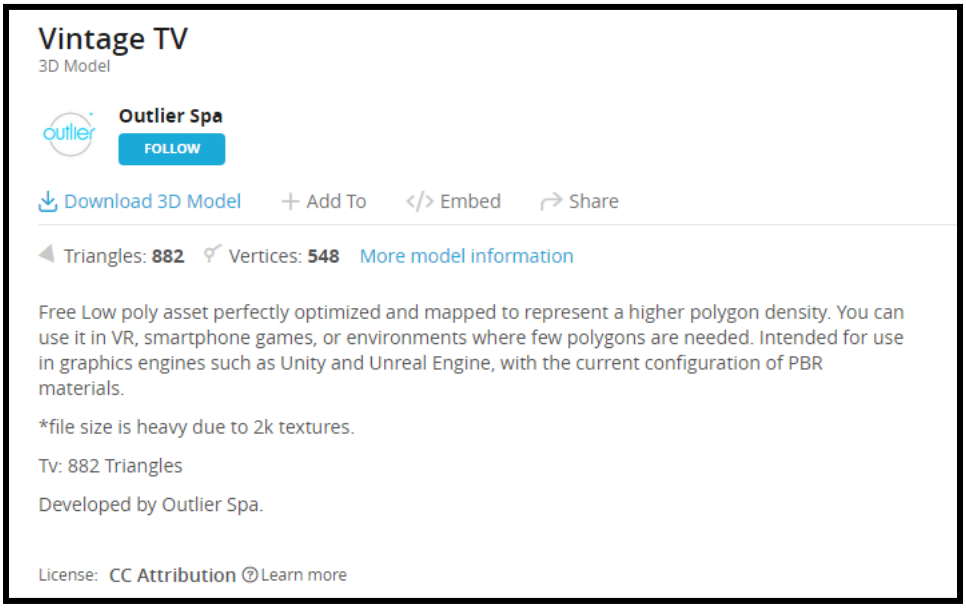
    e. The following models and textures come from Sketchfab all under the **CC Attribution license** (http://creativecommons.org/licenses/by/4.0/). The CC Attribution license requires that the **author be attributed** in a reasonable manner and that the user **indicates if any changes were made to the work**. The license is visible under the author's name and is depicted below for each model,

along with any changes made to each asset. The license and attribution information is also included directly in the assets folder under **assets/license.txt**.

i. **"Snow covered deadwood"** (https://skfb.ly/osxr6) by **Lassi Kaukonen**. I removed the ground mesh from the model and applied a decimate modifier in Blender to reduce the mesh resolution. I also copied the model several times and exported it as a single file. Found in **assets/trees**.

1. 

ii. **"Vintage TV"** (https://skfb.ly/oQQul) by **Outlier Spa**. I removed the TV screen and exported both the screen and TV body as separate objects. Found in **assets/tv**.

1. 

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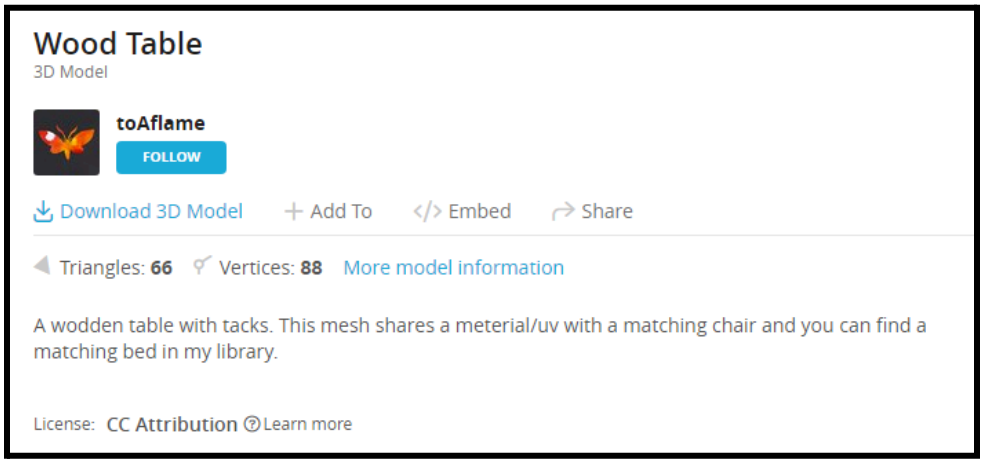
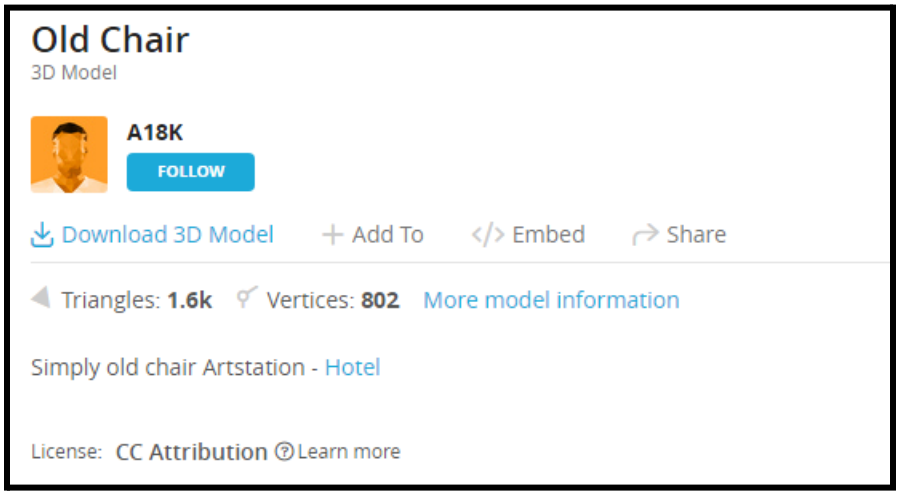
iii. **"Wood Table"** (https://skfb.ly/Y6yA) by **toAflame**. Found in **assets/table**.

1. 

iv. **"Old Chair"** (https://skfb.ly/6T6VF) by **A18K**. Found in **assets/chair**.

1. 

v. **"Fern Stand"** (https://skfb.ly/6y8Wt) by **siotech2011**. Found in **assets/stand**.

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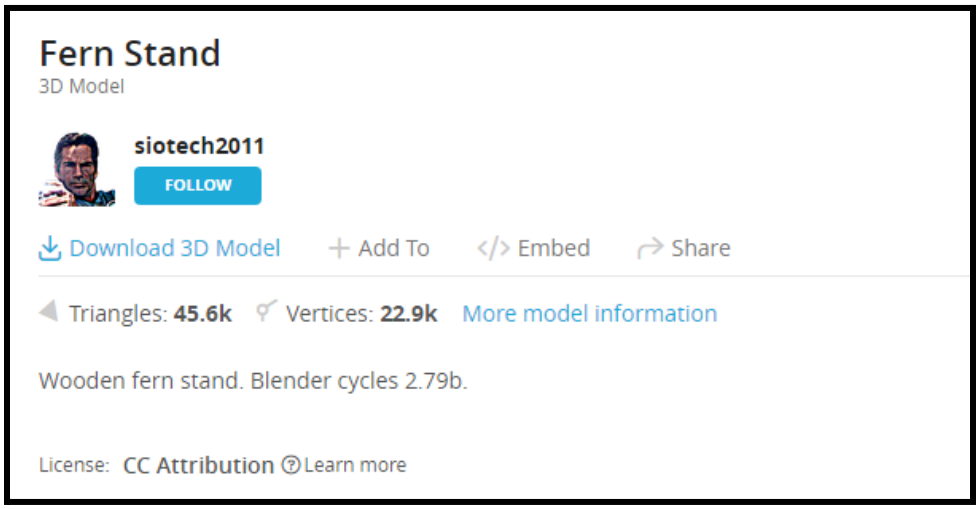
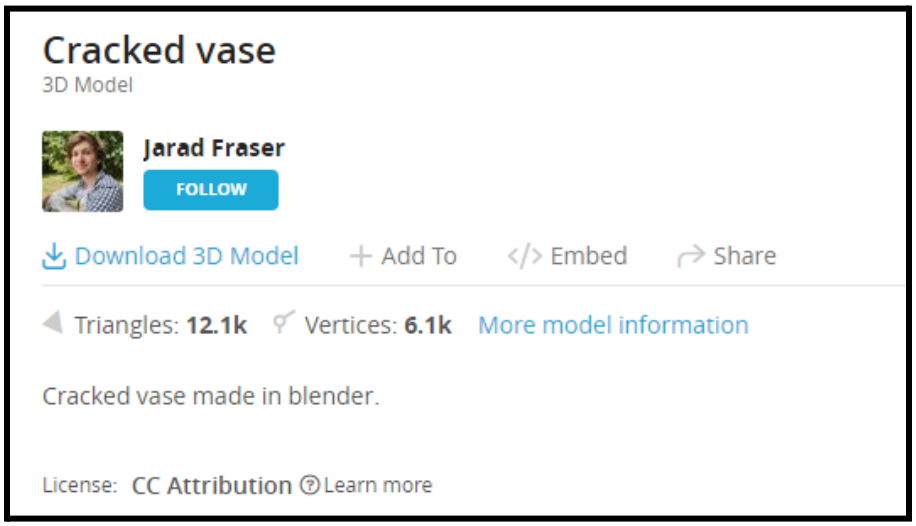
1. 

vi. "Cracked vase" (https://skfb.ly/6RMZO) by **Jarad Fraser**. Found in **assets/vase**. I created the texture (**vase.png**) using MS Paint.

1. 

f. **"Wintercabin"** (https://skfb.ly/6VotE) by **Thunder** is licensed under Creative Commons Attribution-ShareAlike (http://creativecommons.org/licenses/by-sa/4.0/). Found in **assets/cabin**.

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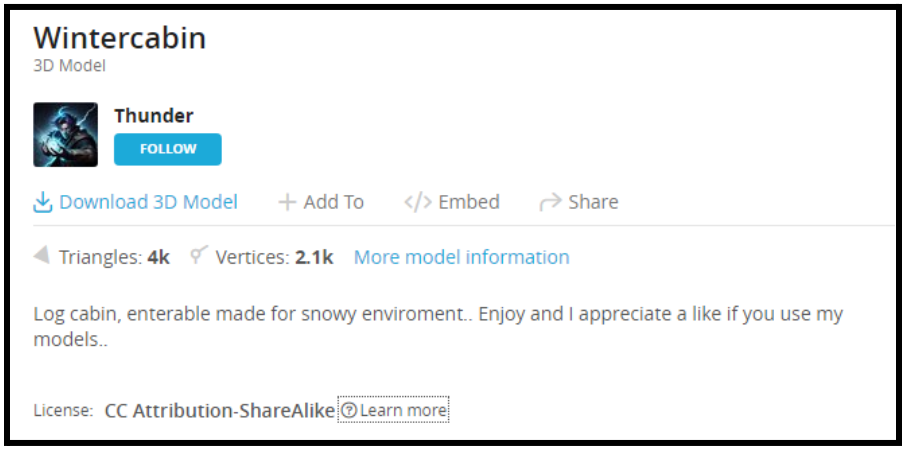
i. 

9. **My code is tested and working on lab machine METALSLUG (Next the door as you enter the lab on the right).**

Additional Notes:

- The models were positioned in world space in blender and then re-exported with their transforms changed in order to save time positioning objects in the world. This is why the model matrix remains unchanged from the identity matrix. All of the external models had their rotation, scale, and locations changed before exporting as new .obj files.