CSC 155-02

Assignment 3 - Lighting, Materials, and Skyboxes

Eric Brown

Spring 2024

1. 

2. **Lighting:**
    a. There is a global ambient light that is always on.
    b. There is one positional light that can be moved and toggled. It is located above the ship, near the bow/front. It is denoted by a yellow square when enabled as shown in the image above.

3. **Camera Controls:**
    a. **W/S** to move the camera forwards and backwards.
    b. **A/D** to move the camera left and right.
    c. **Q/E** to move the camera up and down.
    d. **LEFT/RIGHT** to turn the camera left and right.
    e. **UP/DOWN** to turn the camera up and down.
    f. **SPACE** to toggle the world axes.

4. **Light 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.

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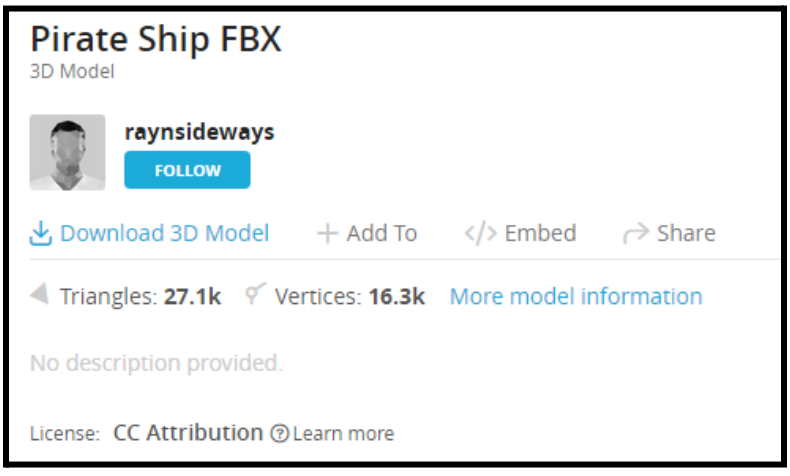
5. **Matrix Stack:**
    a. Used to position the seagull on the top of the ship's mast.
    b. Used to position the flying parrot a set distance from the ship. This is hard to tell because the parrot and the ship both follow their own trajectories based on sine/cosine functions, but the parrot''s position still uses the matrix stack.
    c. Used to position and rotate the parrot's wings next to the parrot for animated flying.
    d. The ocean is NOT part of the matrix stack.

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

7. **Texture and Model Sources:**
    a. The skybox comes from the textbook's supplemental files (**StormClouds**).
    b. The next three come from Sketchfab all under the CC attribution license (http://creativecommons.org/licenses/by/4.0/). The license is visible under the author's name and is depicted below for each model. The license and attribution information is also included directly in the assets folder under **license.txt**.

        i. **"Pirate Ship FBX"** (https://skfb.ly/6nJVL) by **raynsideways**:

        ii. 

        iii. **"Low poly flying parrot (4 pieces)"** (https://skfb.ly/6xMGA) by **Anna Vidal (Milaein)**:

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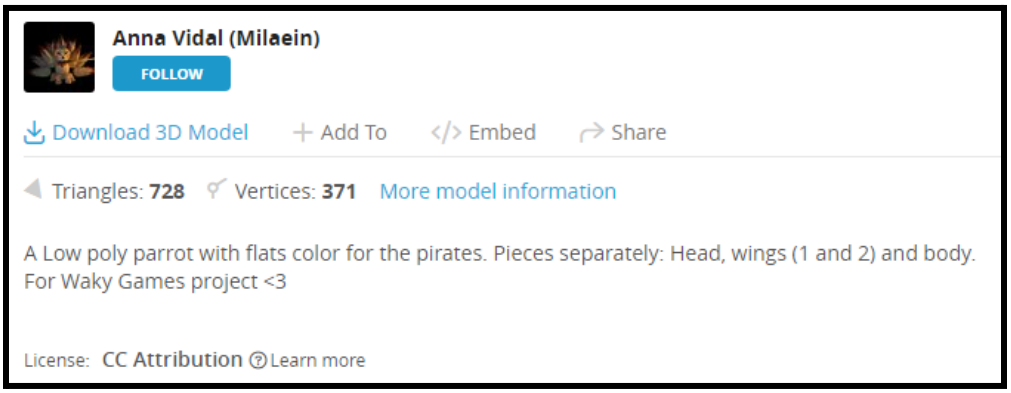
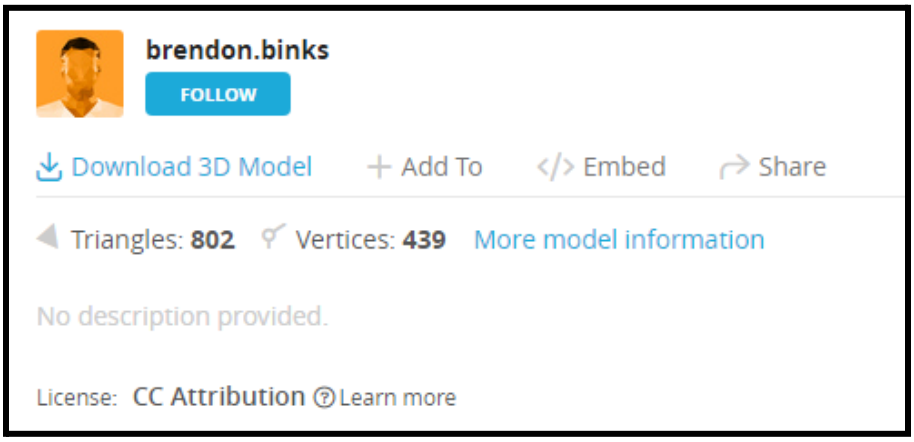
iv. 

v. **"Seagull"** (https://skfb.ly/6XQo6) by **brendon.binks**:

vi. 

8. **My code is tested and working on lab machine DONKEYKONG.**

Additional Notes:

- The function to generate the noise values for the ocean plane in **oceanVertexShader.glsl** is an implementation of simplex noise from The Book of Shaders (https://thebookofshaders.com/11/). The actual code can be found here (https://thebookofshaders.com/edit.php#11/2d-snoise-clear.frag) and is distributed under the open-source MIT license as shown below (https://opensource.org/license/mit). Professor Gordon gave me the OK to use this code when I asked him about it.

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```
//
// Description : GLSL 2D simplex noise function
//      Author : Ian McEwan, Ashima Arts
//  Maintainer : ijm
//     Lastmod : 20110822 (ijm)
//     License :
//  Copyright (C) 2011 Ashima Arts. All rights reserved.
//  Distributed under the MIT License. See LICENSE file.
//  https://github.com/ashima/webgl-noise
//
float snoise(vec2 v) {
```