

CS435/535 Computer Graphics
Spring 2019
Project #4

Spotlight

Due: Mar. 20 by 11:59 pm

The project is to investigate the difference between applying the light and material interaction in the vertex shader and in the fragment shader, specifically the effect of a spot light on a stage when the light and material interaction is applied in the vertex shader and in the fragment shader.

Modeling

- The scenario is a square-shaped stage. However, the square could be divided into many smaller ones, depending on the input.

Lighting

- Set up a spotlight above the center of the stage. The position and the cutoff angle of the spotlight are fixed. The spot light can be aimed at a minimum of 5x5 specific positions on the stage. The user can change the aiming point using the four arrow buttons. The aiming point cannot be moved out of the stage.

Viewing

- The viewer can be fixed. However, make sure the viewer can see the stage clearly.

Input

- Four arrow buttons (left, right, up, and down) to move the aiming point of the spot light.
- Two shading buttons.
 - Per-vertex shading: Applying the light and material interaction in the vertex shader, and the stage can be divided into $N \times N$ smaller squares. N is obtained from a slider (an input component). The minimum of N is 1 (no division) and the spot light will not be seen when $N=1$. When N becomes larger, the spot light can be seen better. You need to find a good maximal value for N such that the spot light can be seen clearly under the maximal division.
 - Per-fragment shading: Applying the light and material interaction in the fragment shader, and the stage is just a single square.

Create a directory called *project4* under your cs435 or cs535 home directory. Move into that directory, and create two files: *spotlight.html* and *spotlight.js* to complete this project.

Submission Requirements:

- Make sure the *project4* directory contain the two files: *spotlight.html* and *spotlight.js*. (Here we assume the *Common* directory is located in the same directory as the *project4* directory, and you do not need to submit the *Common* directory.)
- The title of *spotlight.html* should contain your name, CS435 or CS535, Project #4
- The *spotlight.js* file should contain the following information at the beginning: CS435 or CS535, Project #4, your name, a description of the program. Add other necessary comments whenever a part of the code is not obvious.
- Compress the *project4* directory into *project4.zip* and submit the compressed file as an attachment on Blackboard.