Assignment2: Lighting

106034061
曾靖渝

1. Environment:

a. OS: Mac OS
b. CPU :intel i7 4 core
c. GPU:Intel Iris Plus Graphics 655 1536 MB
d. RAM:8G

2. Implementation

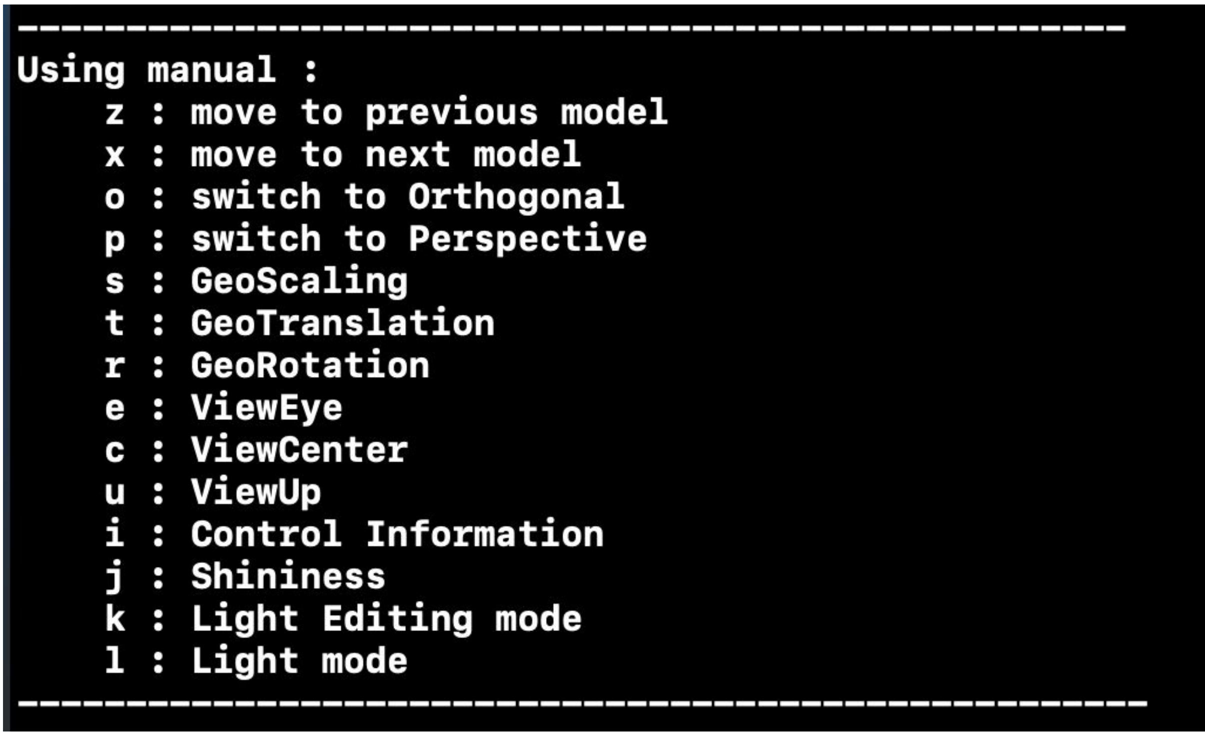
a. Shaders:
    i. Fragment shader: rasterization in fragment shader can realize perpixel mode
    ii. Vertex shader: rasterization in vertex shader can realize vertex mode
    iii. Direction Light:
        1. Implement according to the lecture notes.
        2. Ambient + diffuse + Specular without attenuation
    iv. Point Light:
        1. compute attenuation of diffuse and specular
    v. Spot Light:
        1. compute attenuation of diffuse and specular
        2. compute spotlight effect only in cutoff angle.

b. Main.cpp
    i. OnDisplay:
        1. Divide viewport into two part: vertex and per-pixel
        2. pass different uniform in order to choose different rasterization methods.
        3. Render Scene in each view port.
    ii. LoadModel:
        1. push initial shininess into material objects.
    iii. RenderScene:
        1. pass Light mode into shader
        2. drawLight and draw models.
    iv. DrawModel:
        1. iterate each shape in current model
        2. pass uniform Ka, Kd, Ks into shader
        3. pass uniform viewing matrix, projecting matrix, model transformation matrix into shader.
    v. DrawLight:
        1. pass uniform ambient, diffuse, specular and light position into shader.

vi. initLightInfor:

1. initial parameter for Light.

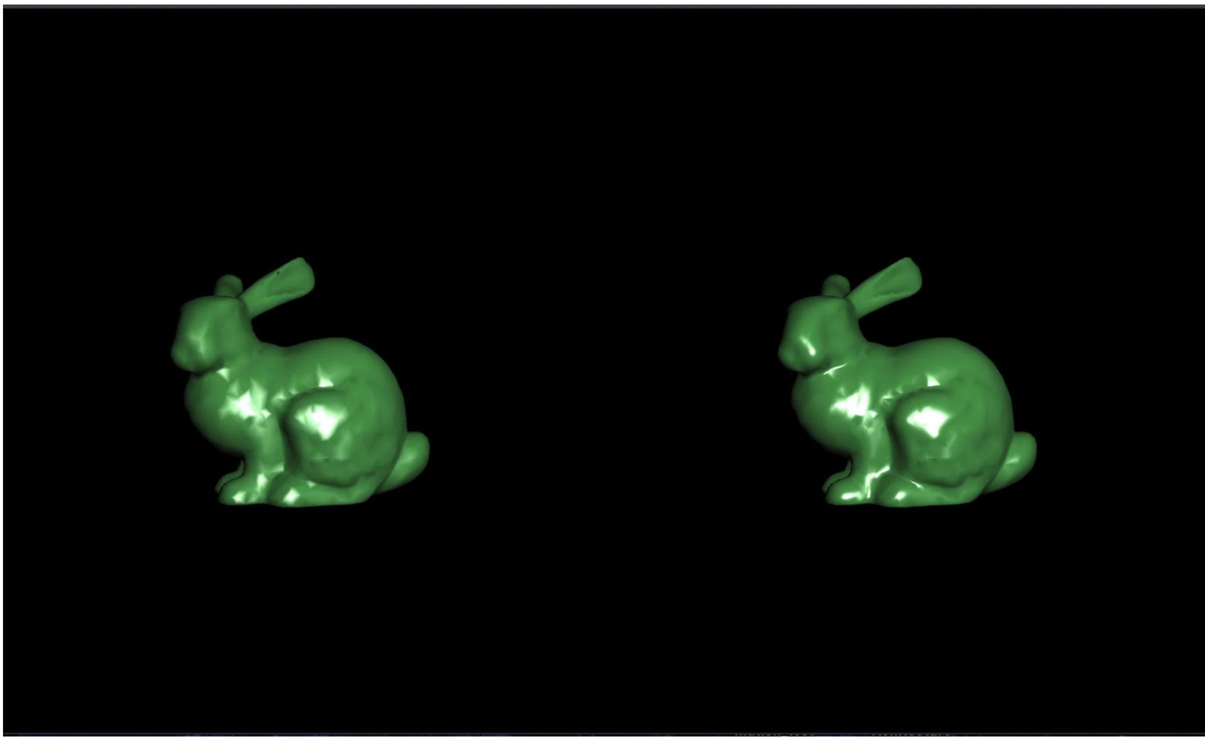
3. Control

a. 

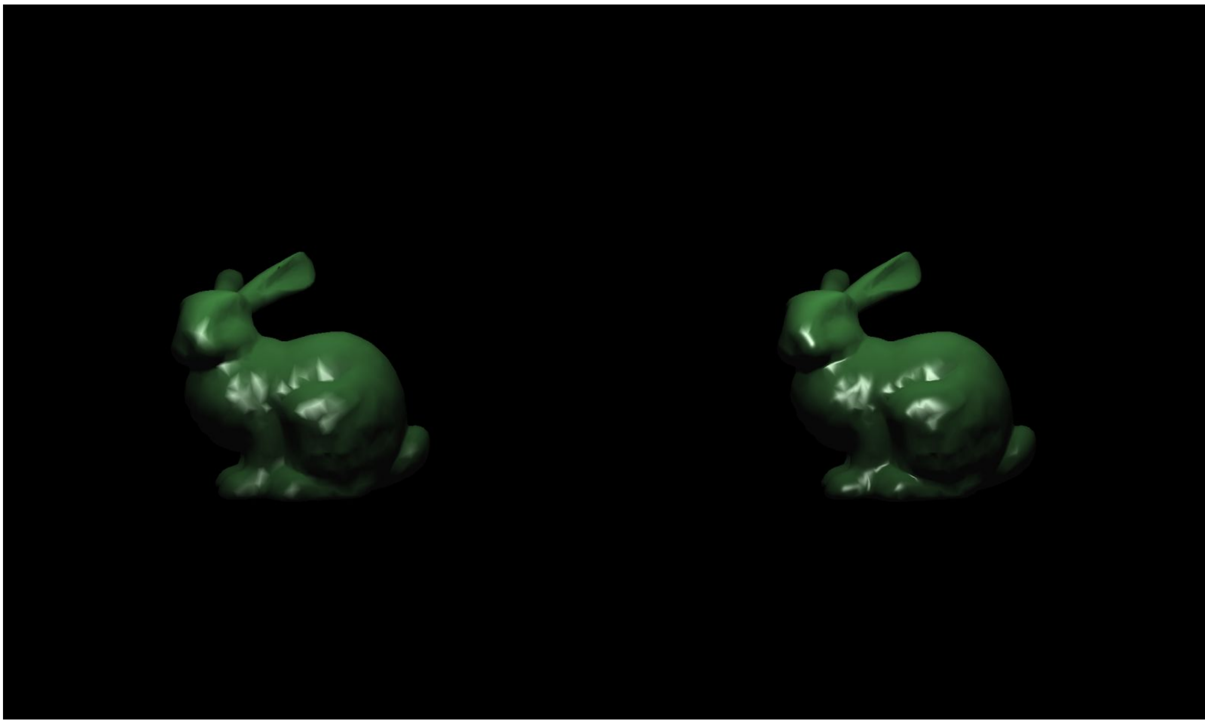
```
---------------------------------------------------
Using manual :
    z : move to previous model
    x : move to next model
    o : switch to Orthogonal
    p : switch to Perspective
    s : GeoScaling
    t : GeoTranslation
    r : GeoRotation
    e : ViewEye
    c : ViewCenter
    u : ViewUp
    i : Control Information
    j : Shininess
    k : Light Editing mode
    l : Light mode
----------------------------------------------------
```

4. Demo

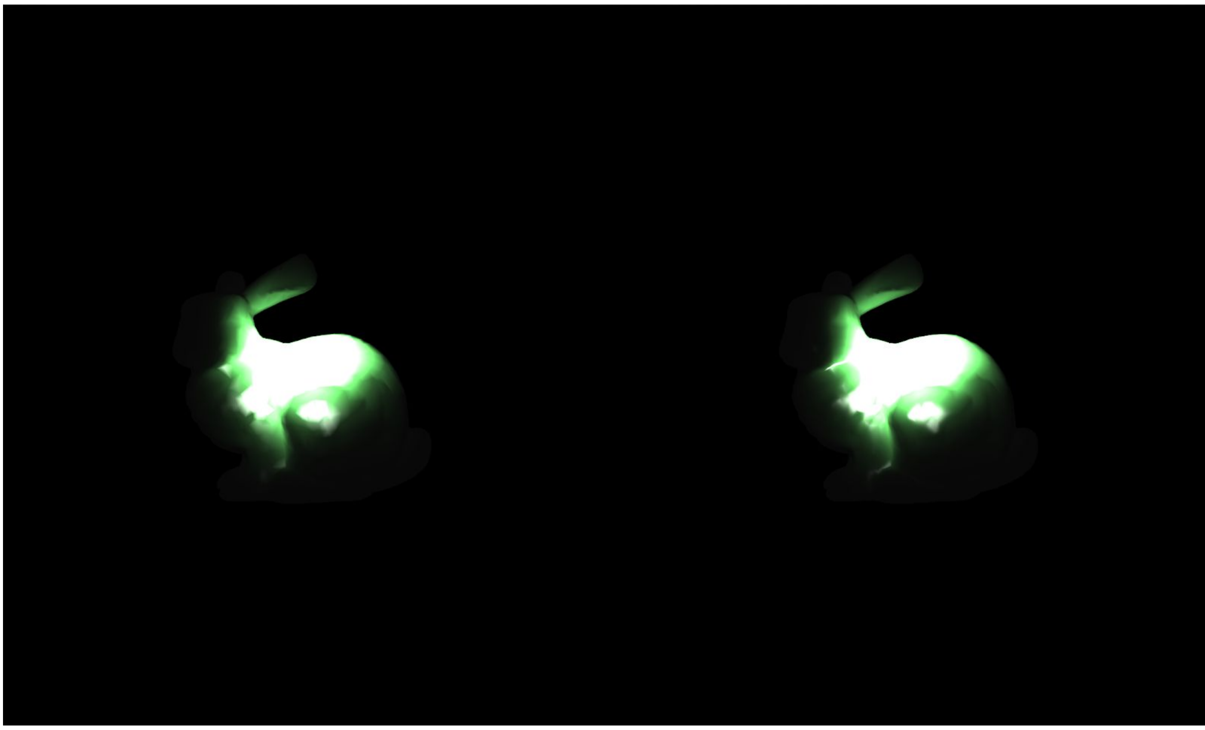
a. Directional Light



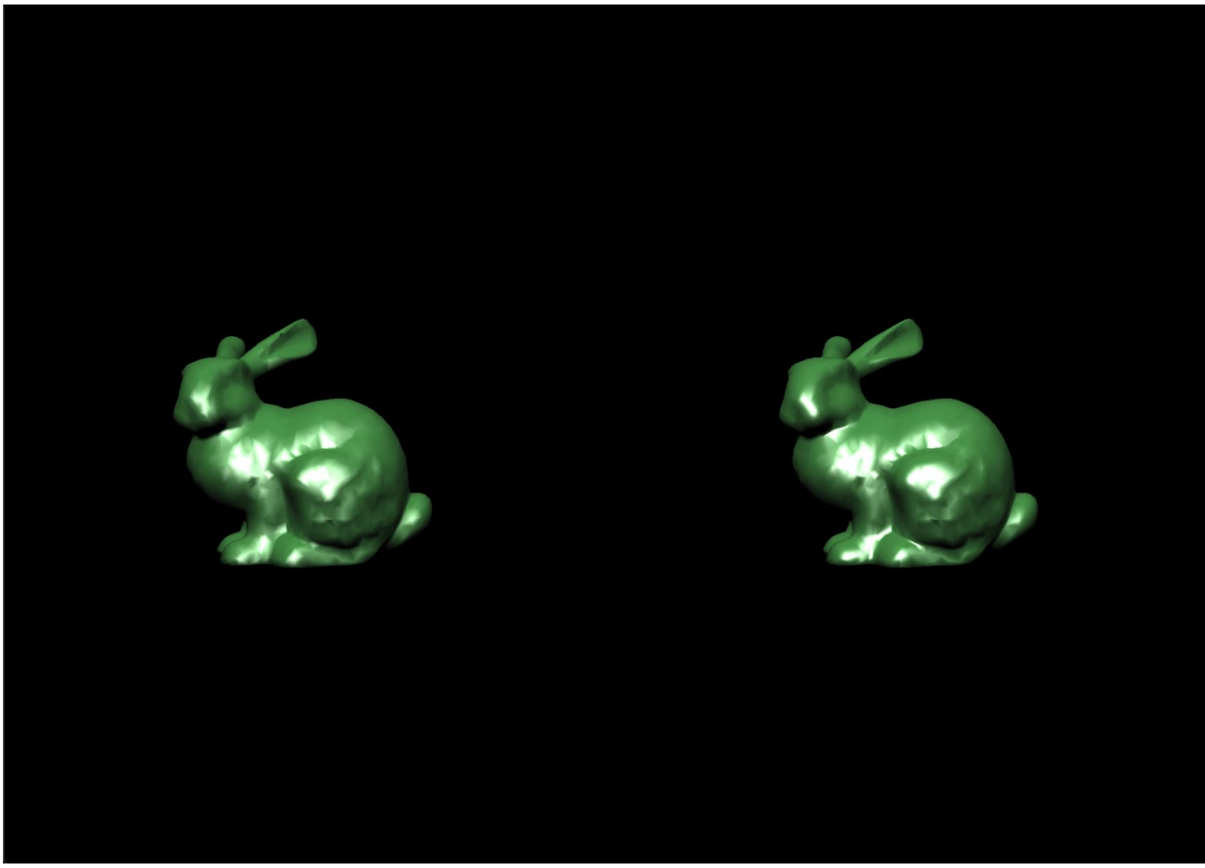
b. Point Light



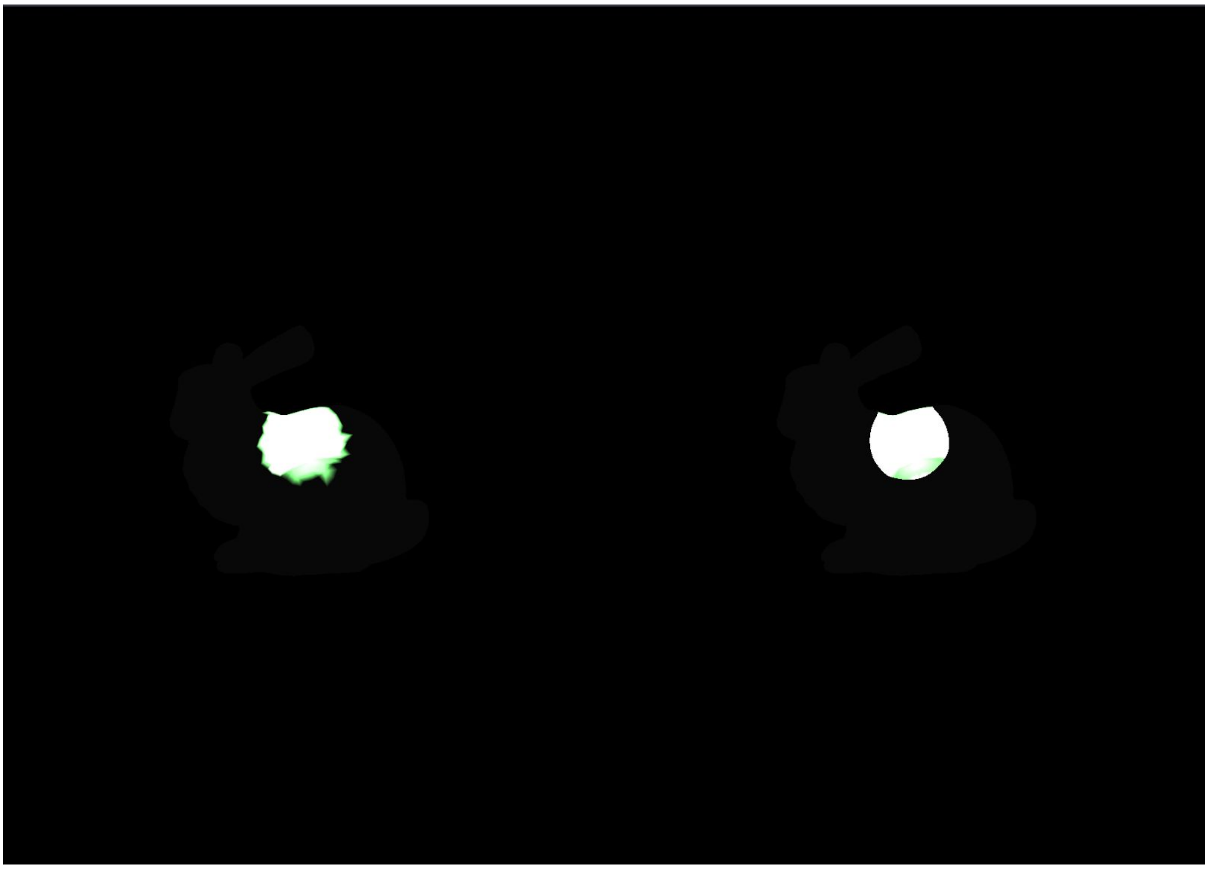
c. Spot Light



d. Directional Light Position



e. Spot Light Cutoff



f. Shininess