Assignment 1 : Creating your own OpenGL program

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1 INTRODUCTION

This is my very first OpenGL programe.This program is based on the OpenGL's core-profile,which load object from file and supports manipulating the camera and lighting with Phong lighting model.

2 IMPLEMENTATION DETAILS

2.1 Enable enable the multi-sample full-screen antialiasingfunctionality of OpenGL.

Calling glfwWindowHInt to use a mutisample buffer,then enable multisampling by calling glEnable with GL_MULTISAMPLE

2.2 Load mesh objects from files and draw the meshes

Load the vertex and their normal in a struct, load the index in a vector, then bind this the data struct with VBO, then send it to GPU, bind VAO with current vertex configuration.At last draw these triangles with index bind to EBO.

2.3 Render objects with Phong lighting model.

Use GLSL to program vertex shader and fragment shader, vertex shader get the data of vertex, fragment shader output the fragment color.Phong lighting model consists of three parts: ambient,diffuse and specular,calulate each part then add them up and times the object color,the output color will be the final color.

2.4 Manipulate the camera and use keyboard to control the camera

Change the vertex coordinates from the world coordinates into view coordinates by calculate view matrix then use Look At function to modify the change.Get input from keyboard,then change the position of camera, WS for up and down, AD for left and right, OP for front and back. Then capture the cursor, calculate the pitch and yaw by the position of cursor current and last frame.Then calculate the final front vector of the camera.

2.5 Support lighting with multiple point light sources

Modify the fragment shader and origin light data, set array to store position and color of different light, in the fragment shader, calculate each light's configuration then add them up and times the object color,the output color will be the final color.Also set a simple position_change of the position of each light by time.

3 RESULTS

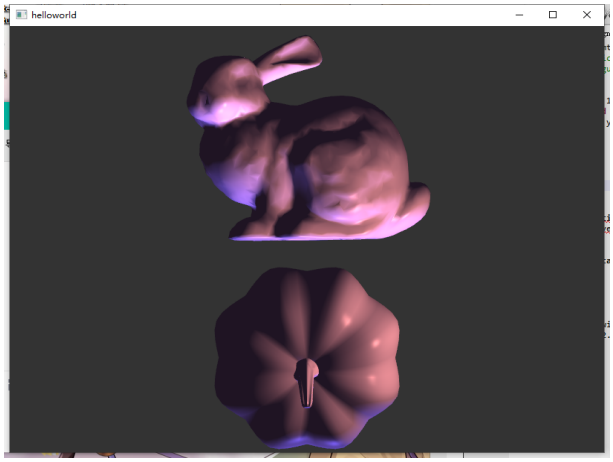

Fig. 1. figure 1.png .

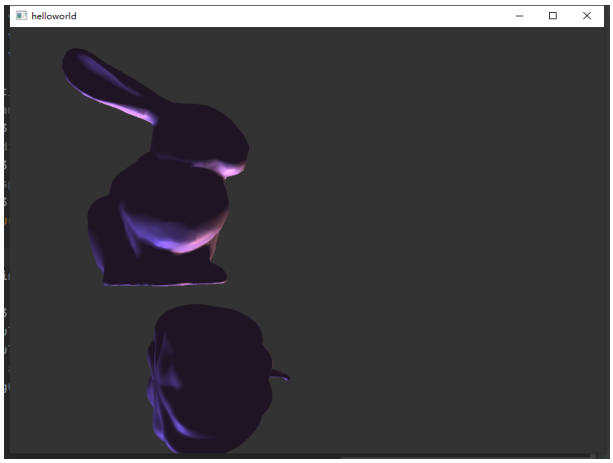

Fig. 2. figure 3.png .