Computer Graphics: HW04

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1 Objective

In this assignment, we are supposed to modify the main.cpp and shader code to apply textures on models. In the meantime, we are required to do per-pixel lighting and per-vertex lighting.

2 Implementation

I basically use glTexImages2D, glTexParameteri, glBindTexture to bind and create mipmap for each group. As for shader, simply follow the rules of lighting.

3 Usage

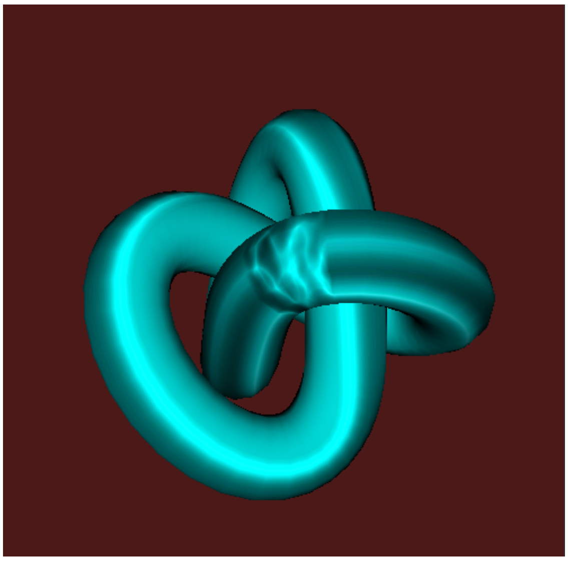
Mouse:
One can simply use mouse to control the position of model: click left button and the drag the model is to translate the position. click right button and then drag is to rotate the model. Scroll the middle button to change the model's size.

Keyboard:
h - show help menu
M - switch MAG_FILTER between GL _LINEAR / GL_NEAREST
m - switch MIN_FILTER between GL_LINEAR / GL_NEAREST
w / W switch TEXTURE_WRAP between GL_REPEAT / GL_CLAMP
z / Z change to previous model
x / X change to next model
t / T trigger Texture Mapping ON / OFF
1 trigger Directional light ON / OFF
2 trigger Point light ON / OFF

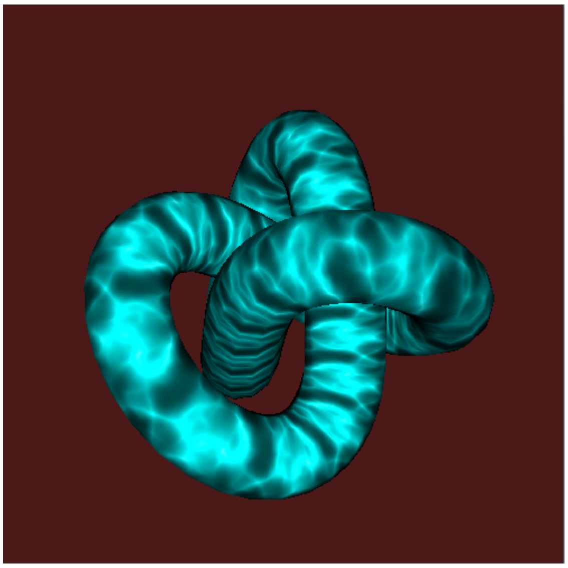
3 trigger Spot light ON / OFF

v - switch vertex / fragment shader lighting

4 Results



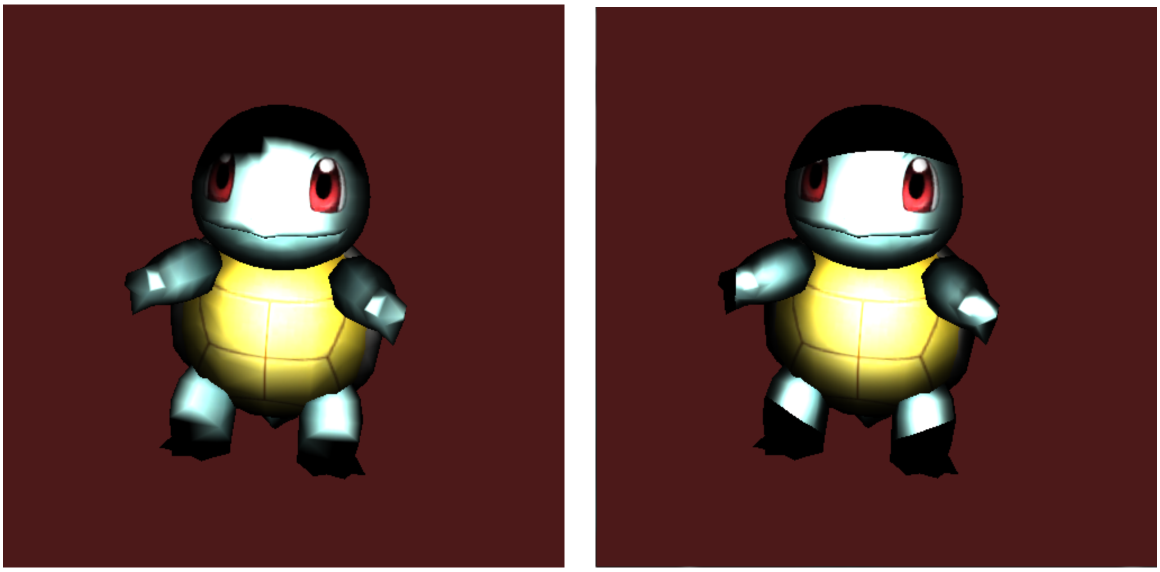
(a) Clamp



(b) Repeat

(c) nearest

(d) linear



(e) spotlight per vertex

(f) spotlight per pixel

5 Challenges

Normals: When debugging, never left codes unchecked each segment. I spent two days thinking that my shader is incorrect, but it turns out that the normals were wrongly assigned at the beginning TextureModel().

Fragment: In fragment, we should normalize the varying variables properly. When assigning value to gl_fragColor, we need to multiply the lighting effect by texture color rather add on it.