CS 550000 Computer Graphics
Homework4 Texture Mapping

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PROJECT ABSTRACT

Based on homework three, adding texture information when loading model into buffers and binding them into GLSL shader programs. And plus some control commands on changing texture-related parameters. The work on this project is minor but another additional features on previous works.

WORKS

First thing to do is adding some basic handler on object information parsing on object file which is supported by new `glm.*` library provided by TA, and texture file parsing supported by bitmap(BMP) header definitions in `Texture.h` and parser in modified model loading functions. Next, same as previous work, add **some additional uniform and attribute variables location bindings** between main program and shader program. The new **l**ocations information stores in a nested data structure `GLResource`. Next job is to update the **traversal in object with supplementary data about texture when loading them to `buffers`** which are in the right vertex order and will later be passing into graphic display directly. The big modifications on code are that there are s**ome new OpenGL built-in texture functions**, such as gen-textures, bind-texture and tex-image2d settings and Mipmap generating to fulfill the texture mapping correctly on multi-textures and models.

Another part of project are **shaders**. In shader, remain most of code the same as previous work. The only difference is adding a 2D sampler and sending it with tex-coords into GLSL texture2D function, and then it will output a UV-mapped colors about texture on each points. And then **update the final color `gl_FragColor` with new equation: *gl_FragColor = diffuseColor * texColor + specularColor***. And the **bonus part on per pixel shading use the same** methods.

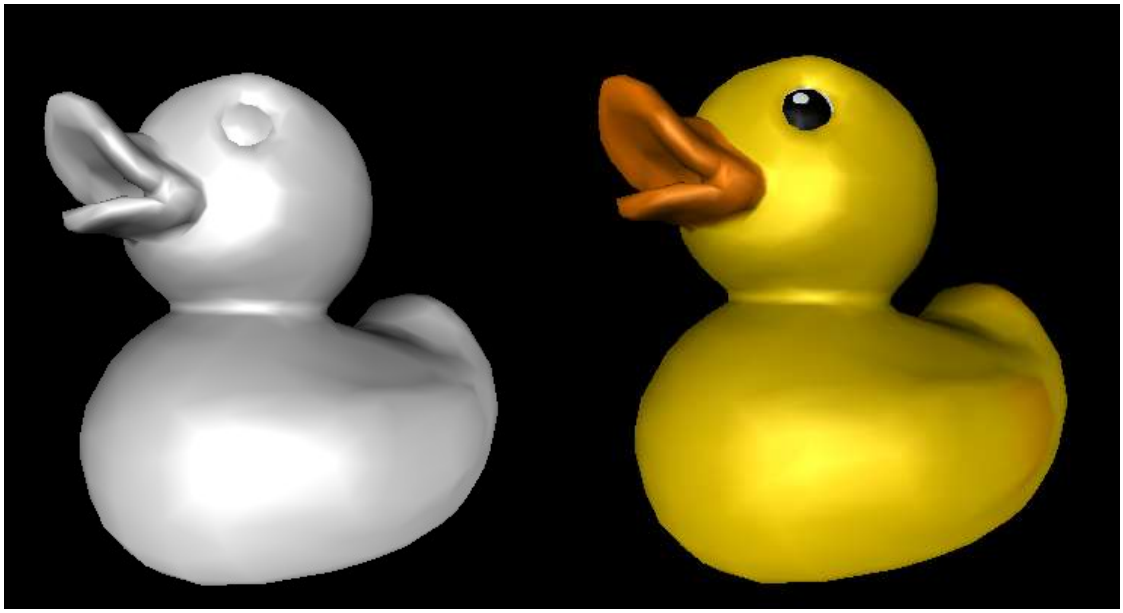
NEW COMMANDS

Add control on texture controls:

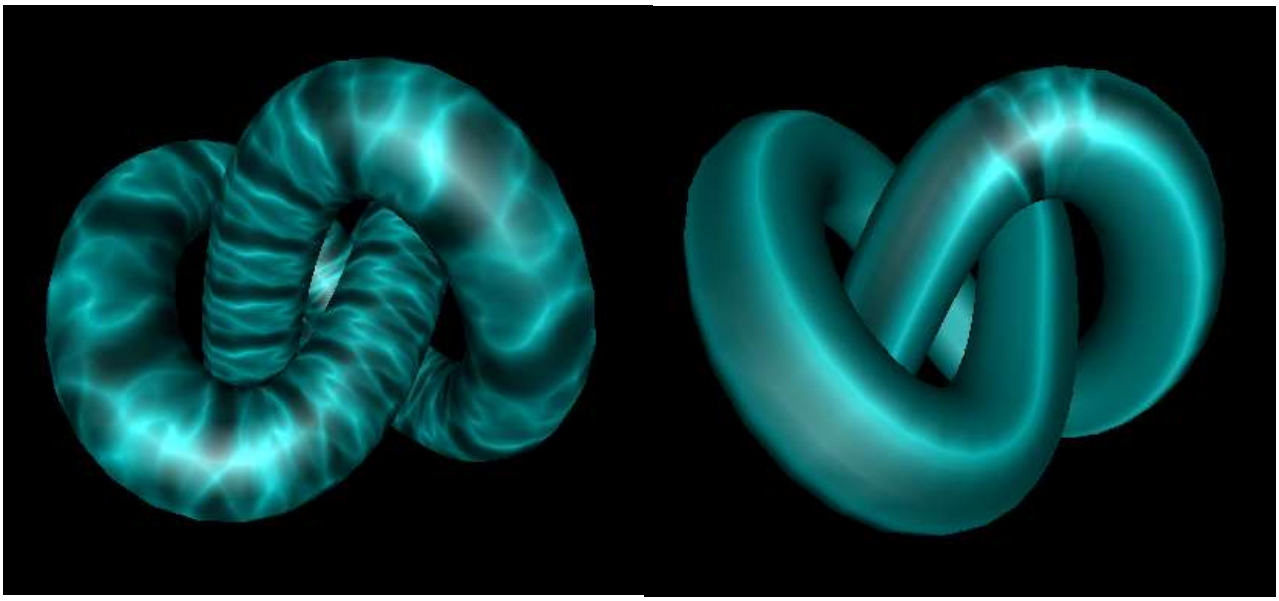
- Key ‘Y’: toggle texture on / off
- Key ‘W’: toggle texture wrap mode clamp / repeat
- Key ‘F’: toggle texture filter on magnify between linear / nearest
- Key ‘f’: toggle texture filter on minify between linear / nearest
- Key ‘5’: changing shader lighting between vertex / fragment

SNAPSHOTS

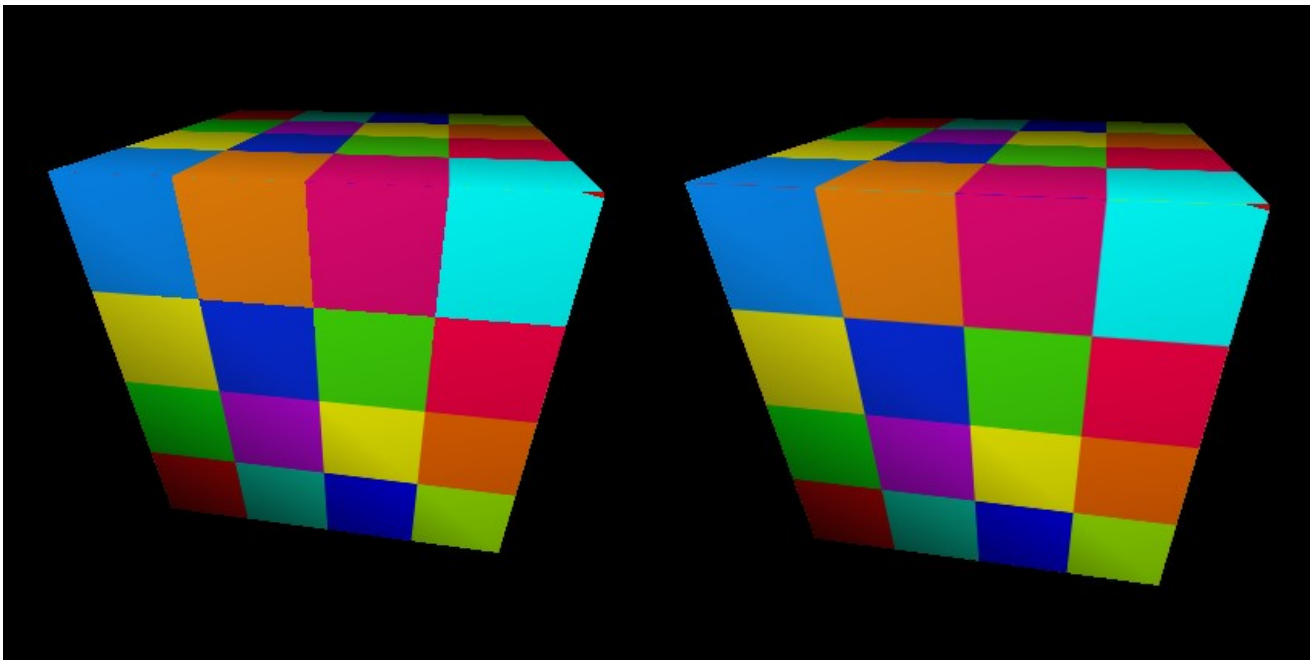
- Texture on / off



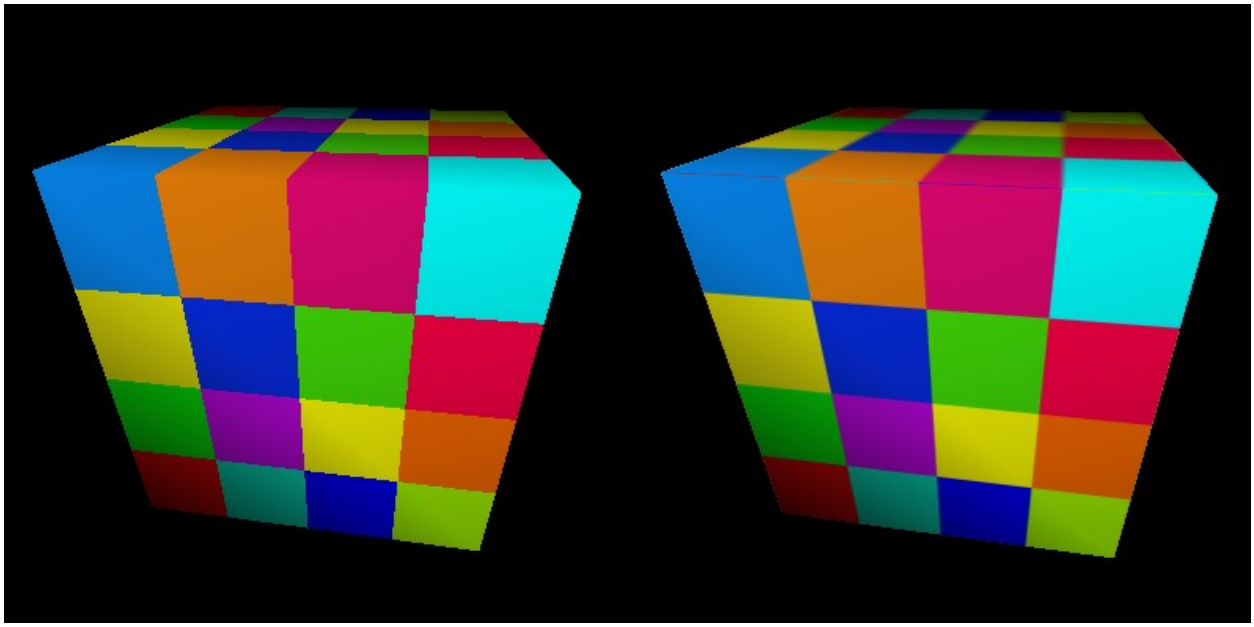
- Texture wrap mode clamp / repeat



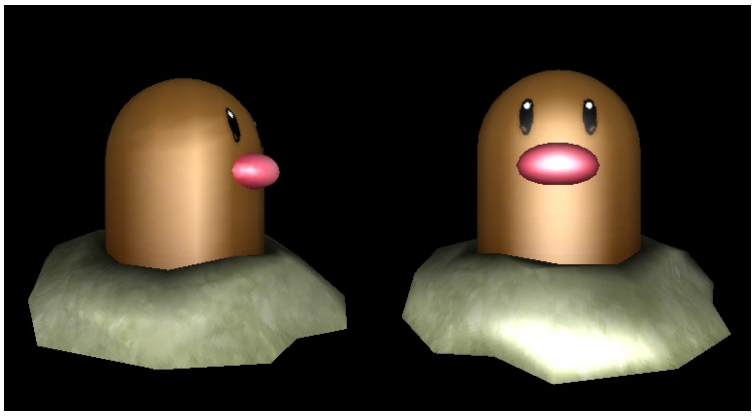
- Magnify filter between nearest / linear



- Magnify filter between nearest / linear_mipmap_linear



- Vertex lighting / Fragment lighting



- Additional textured model