

1. Problem

The goal of this assignment is to implement texture mapping in OpenGL. We will write code to transfer the uv data to OpenGL. We should be able to reproduce a rotating textured cube as required in this assignment.

2. Method

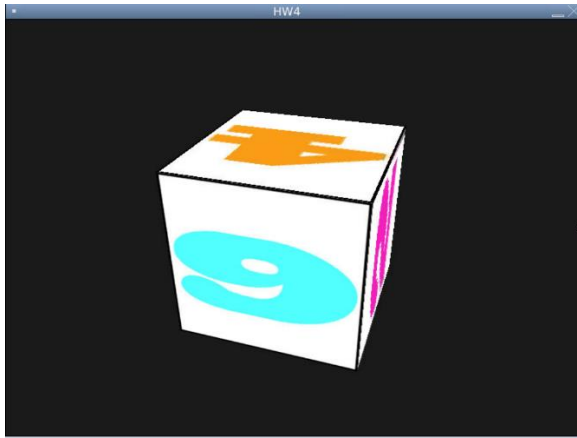
The method we use in this assignment is texture. Texture is used to add detail to an object. we can insert a lot of detail in a single image. We use Vertex buffer object (VBO) to create "*buffer objects*" for vertex attributes in high-performance memory on the server side and provides same access functions to reference the arrays. The data in vertex buffer object can be read and updated by mapping the buffer into client's memory space.

3. Solution

- + Create camera transformation by setting matrix projection. It transforms all vertex data from the eye coordinates to the clip coordinates
- + Generate the texture, bind it, fill it, and configure it. it's already done at the beginning (main.cpp)
- + Set up UV buffer, bind it, fill it, and configure it by creating a VBO (in main.cpp)
 - * Generate a new buffer object with **glGenBuffers()**
 - * Bind the buffer object with **glBindBuffer()**
 - * Copy vertex data to the buffer object with **glBufferData()**.
- + Once the buffer object has been created, we need to hook the buffer object with the corresponding ID before using the buffer object. **glBindBuffer()** takes 2 parameters: *target* and *ID*.
- + When texturing a mesh, you need a way to tell OpenGL which part of the image has to be used for each triangle. This is done with UV coordinates. Each vertex can have on top of its position, a couple of floats, U and V. These coordinates are used to access the texture. We need to set up gl Position correctly. it holds the position of the vertex in clip space and pass the vertex UV coordinates to fragment shader (texture.vs)
- + Output color of the texture at the specified UV (texture.frag)

4. Result

My reproduction matches 90% exactly to the required image.



5. Source for doing HW4

<https://www.opengl-tutorial.org/beginners-tutorials/tutorial-5-a-textured-cube/>

http://www.songho.ca/opengl/gl_vbo.html

<https://learnopengl.com/Getting-started/Textures>