University of Science

FACULTY OF INFORMATION TECHNOLOGY

CS411 - Computer Graphics

Lab 04

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1 Draw objects and rotate around their own center rotation axis

1.1 Cube

Based on the instruction file, I draw a cube with the length of edge is 2. This cube has 6 surfaces, each surface will use a whole texture, so the coordinates of textures were used are $(0, 0)$, $(0, 1)$, $(1, 0)$, $(1, 1)$. I chose Oy as the center rotation axis of the cube.

1.2 Sphere

To draw a sphere, I used a quadric object in OpenGL. Then, I used function *gluSphere()* with the number of slices and stacks are 100 and 100 respectively.

A sphere has only one surface, so I used one texture for this object. I chose Oy as the center rotation axis of the sphere.

1.3 Cylinder

To draw a cylinder, I drew rectangles consecutively to form the surrounding face of the cylinder. Then I draw 2 circles as 2 bottoms of the cylinder.

With each coordinate of the cylinder, I calculate its equivalent texture coordinate to map texture. I used 3 textures to map into 3 surfaces of the cylinder. I rotated the cylinder a degree of 70 around Ox so the center rotation axis of the cylinder now is Oz.

1.4 Cone

To draw a cone, I drew triangles consecutively to form the surrounding face of the cone. Then I draw one circle as the bottom of the cone.

The cone has 2 surfaces, so I map 2 textures for them. I rotated the cone a degree of 80 around Ox and I chose Oz as the center rotation axis of the cone.

1.5 Torus

This torus is drawn by GL_TRIANGLE_STRIP by putting consecutive triangles together. There are 1 texture mapped into the torus. Its center rotation axis is Oy.

2 Map textures for each surfaces of each object

I load a number of textures that is equal to the number of surfaces of each object. With each object, I also calculate the texture coordinates of each surface so that the texture can be mapped into the surface.

3 Reference

- Instruction file: DHMT_TH_Lab4_EN.pdf
- Reference for drawing torus: https://electronut.in/torus/#torus-geometry

- Reference for drawing cylinder: https://gist.github.com/nikAizuddin/5ea402e9073f1ef76ba6
- Reference for drawing a sphere https://stackoverflow.com/questions/61251452/how-to-add-texture-to-this-sphere