UCS1712 – GRAPHICS AND MULTIMEDIA LAB

Ex. No.10 Creating a 3D Scene in C++ using OpenGL

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Question:

Write a C++ program using Opengl to draw atleast four 3D objects.

Apply lighting and texture and render the scene.

Apply transformations to create a simple 3D animation.

[Use built-in transformation functions]

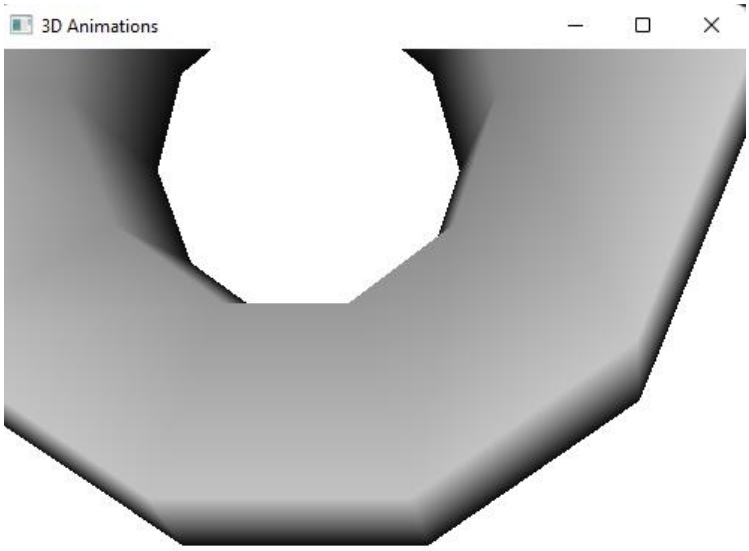
OpenGL Functions to use: glShadeModel() glMaterialfv() glLightfv() glEnable() glGenTextures() glTexEnvf() glBindTexture() glTexParameteri() glTexCoord2f()

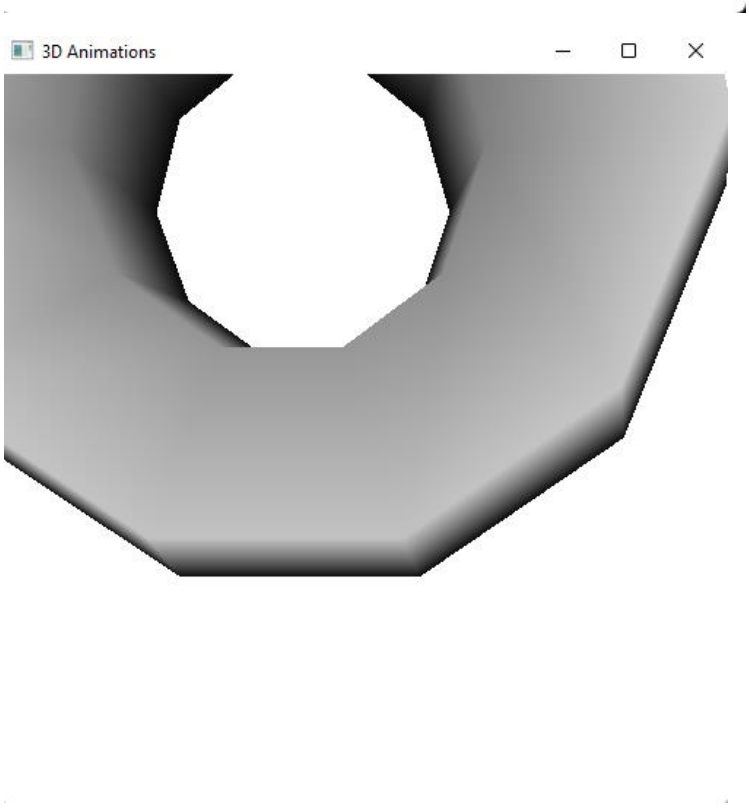
Code:

```
#include <GL/glut.h>
#include <GL/glu.h>
#include <stdlib.h>
#include <stdio.h>

int increment = 1;
void initialize(void)
{
	glClearColor(1.0, 1.0, 1.0, 0.0);
	glEnable(GL_LIGHTING);
	glEnable(GL_LIGHT0);
	glEnable(GL_DEPTH_TEST);
}

void draw_objects(int state)
{
	glClear(GL_COLOR_BUFFER_BIT | GL_DEPTH_BUFFER_BIT);

	if (state == 0) increment = 1;
	else if (state == 10) increment = -1;

	glLoadIdentity();
	gluLookAt(0.0, 1.0, 7.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0);
	glMatrixMode(GL_MODELVIEW);

	glPushMatrix();
	GLfloat ball_color[] = {
		0.59,
		0.1,
```

```
            0.55,
            1.0
      };

      double scale = 0.15;
      glTranslatef(-1, 2.5 + scale * state, 0);
      /*glutSolidSphere(0.5, 10, 10);*/
      /*glutSolidCube(1.0);*/
      /*glutSolidTeapot(0.7);*/
      glutSolidTorus(2.0, 4.0, 5, 10);
      glPopMatrix();
      glutSwapBuffers();

      glutTimerFunc(1000 / 60, draw_objects, state + increment);
}

void threedanim() {
      glClear(GL_COLOR_BUFFER_BIT | GL_DEPTH_BUFFER_BIT);
      glutTimerFunc(1000 / 60, draw_objects, 0);
}

void reshape(int width, int height)
{
      glViewport(0, 0, (GLsizei)width, (GLsizei)height);
      glMatrixMode(GL_PROJECTION);
      glLoadIdentity();
      gluPerspective(75, 1, 1, 20);
      glMatrixMode(GL_MODELVIEW);
}

int main(int argc, char** argv)
{
      glutInit(&argc, argv);
      glutInitDisplayMode(GLUT_DOUBLE | GLUT_RGB);
      glutInitWindowSize(500, 500);
      glutCreateWindow("3D Animations");
      initialize();
      glutDisplayFunc(threedanim);
      glutReshapeFunc(reshape);
      glutMainLoop();
      return 0;
}
```

Output:


3D Animations


3D Animations