COMP3201 – Computer Graphics

Module 2: Transformations and Scene Creation

2.5 GLUT3D Models

There are a number of 3D models available in the GLUT library. The models can be drawn in wireframe mode or in solid mode, and a full list of models is provided in the OpenGL Utility Toolkit Programming Interface API Version 3. Note that if you switch the polygon rendering mode to GL_LINE, then glutSolid* gives the same result as glutWire*.

Sphere

```
void glutSolidSphere( GLdouble radius, GLint slices, GLint stacks)
void glutWireSphere( GLdouble radius, GLint slices, GLint stacks)
```

This produces a sphere centred at the origin; **radius** is self-explanatory, **slices** represents the number of subdivisions around the z-axis, and **stacks** represents the number of subdivisions along the z-axis.

Figure 2.19 shows various wire spheres of radius 2.0:

```
glutWireSphere(2.0, 8, 15);
glutWireSphere(2.0, 14, 15);
glutWireSphere(2.0, 8, 20);
glutWireSphere(2.0, 14, 20);
```

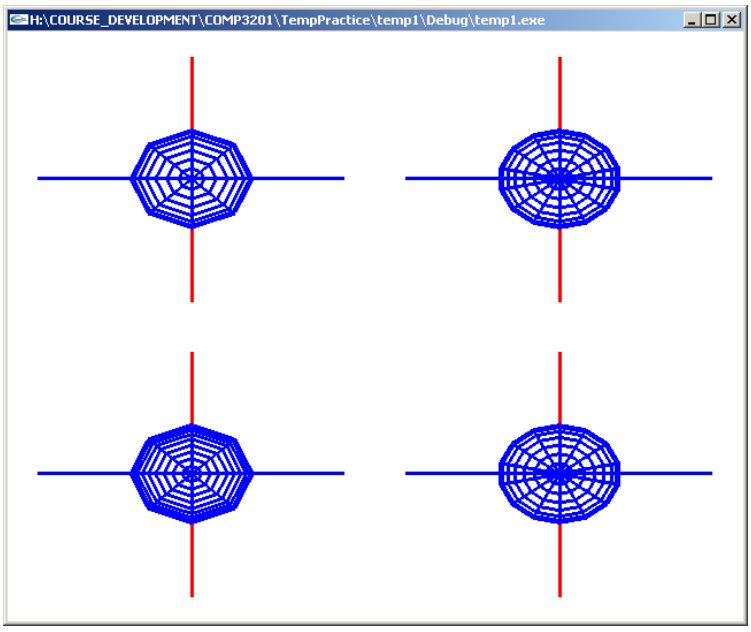

Figure 2.19

Cube

```
void glutSolidCube( GLdouble  size)
void glutWireCube( GLdouble  size)
```

This produces a cube with sides of length **size**.

Cone

```
void glutSolidCone( GLdouble base, GLdouble height, GLint slices, GLint stacks)
void glutWireCone( GLdouble base, GLdouble height, GLint slices, GLint stacks)
```

The cone has radius and height given by the parameters **base** and **height**, respectively. Again, **slices** and **stacks** represent the number of subdivisions around and along the z-axis.

Torus

```
void glutSolidTorus( GLdouble inner, GLdouble outer, GLint nsides, GLint rings)
void glutWireTorus( GLdouble inner, GLdouble outer, GLint nsides, GLint rings)
```

The torus parameters are the inner and outer radius (**inner** and **outer**), along with the number of sides for each radial section and the number of radial divisions for the torus.

Figure 2.20 shows a wire cube, a cone (rotated –90 around the x-axis), and two tori:

```
glutWireCube(2.0);
glutWireCone(1.5, 3.0, 8, 20);
glutWireTorus(2.0, 4.0, 5, 10);
glutWireTorus(1.0, 5.0, 10, 15);
```

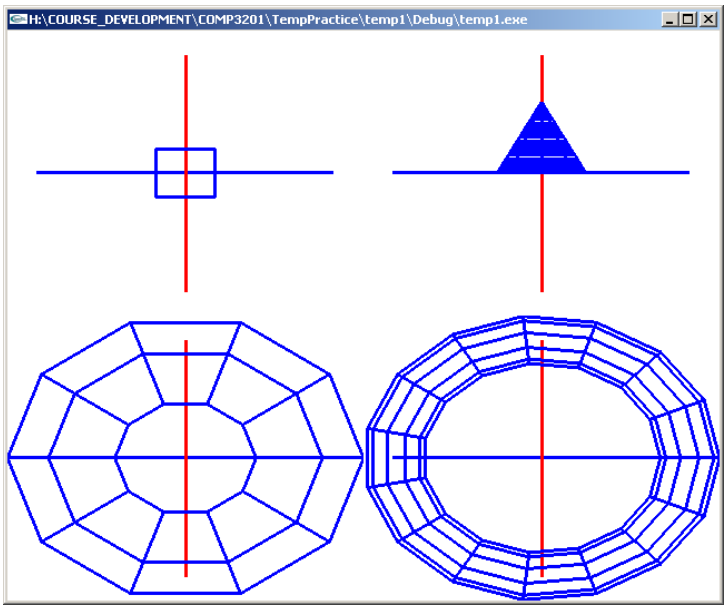

Figure 2.20

Teapot

void glutSolidTeapot(GLdouble size)
void glutWireTeapot(GLdouble size)

Other Shapes

The following shapes have fixed radius:

Icosahedron	1.0
Octahedron	1.0
Tetrahedron	$\sqrt{3}$
Dodecahedron	$\sqrt{3}$

Figure 2.21 shows a teapot, octahedron, tetrahedron and dodecahedron.

```
glutWireTeapot(4.0);

glScalef(2.0, 2.0, 2.0);
glRotatef(30, 0.0, 1.0, 0.0);
glutWireOctahedron();

glRotatef(-30.0, 0.0, 1.0, 0.0);
glScalef(4.0, 4.0, 4.0);
glutWireTetrahedron();

glRotatef(-30.0, 0.0, 1.0, 0.0);
glScalef(2.0, 2.0, 2.0);
glutWireDodecahedron();
```

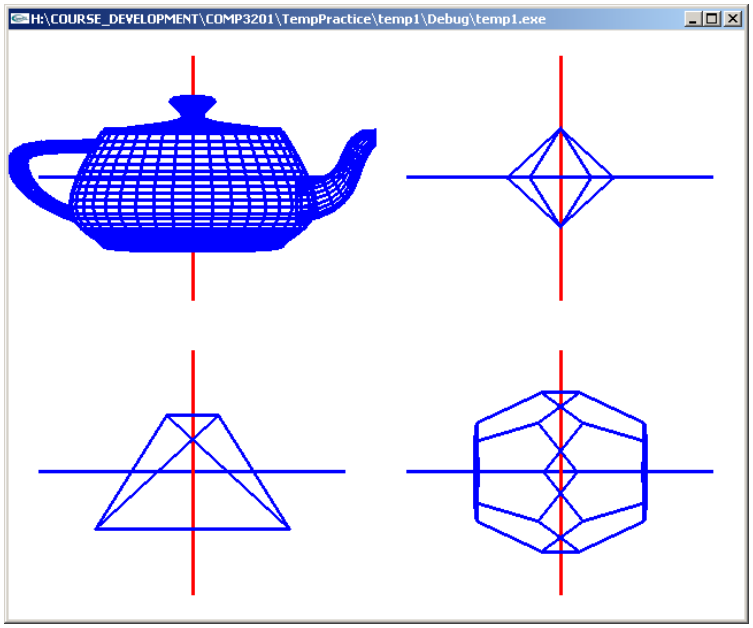

Figure 2.21