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Solid Sphere without using glutSolidSphere

The Task was to make a solid sphere using some primitives without using the inbuilt opengl method **"glutSolidSphere()"** . I have drawn sphere by drawing line through the points (x,y,z) where x, y, z are the spherical coordinates of a sphere.
$x = r^* \sin\theta * \cos\emptyset$

$y = r^* \sin\theta * \sin\emptyset$

$z = r^* \cos\theta$

```
def sphere():
    glPushMatrix()
    glTranslate(-1,-1.5,0)
    glScalef(1,0.1,1)
    glColor3f(0.1,0.1,0)
    glutSolidCube(10)
    glPopMatrix()
    glPushMatrix()
    glColor3f(1,1,1)
    glLineWidth(2)
    for phi in range(0,180,5):
        glBegin(GL_LINE_STRIP)
        for theta in range(0,365,5):

            x = r*cos(theta * pi/180) * sin(phi*pi/180)
            y = r*sin(theta * pi/180) * sin(phi*pi/180)
            z = r*cos(phi * pi/180)
            glVertex3f(x,y,z)

        glEnd()
    for theta in range(0,360,5):
        glBegin(GL_LINE_STRIP)
        for phi in range(0,185,5):

            x = r*cos(theta * pi/180) * sin(phi*pi/180)
            y = r*sin(theta * pi/180) * sin(phi*pi/180)
            z = r*cos(phi * pi/180)
            glVertex3f(x,y,z)
        glEnd()
    glPopMatrix()
    glutSwapBuffers()
    glFlush()
```

Sphere can be drawn using these coordinated and varying the value of θ to 0^0 to 360^0 and varying Ø from 0^0 to 180^0. In order to get a better sphere I have drawn another concentric sphere of same radius perpendicular to the first one. The method '**def sphere ()**' in the code uses the two loops to draw the two concentric circles. I have the placed the circle on a cube to make it look visually better and I gave some lighting effects in the method '**def display ()**'.

The method '**def keyboard ()**' is used to handle keyboard inputs. Key 'r' or 'R' rotates the sphere and key 'c' and 'C' rotates the camera.

Keyboard Input and effects

'c' or 'C' – rotates Camera

'r' or 'R' – rotates Sphere