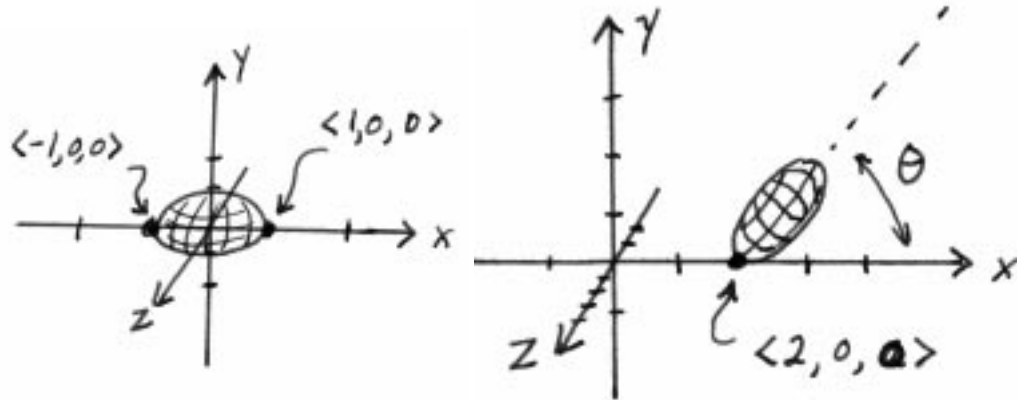


Name:

Student ID:

CSE 167 - Intro to Computer Graphics - Fall 2004

Quiz #3 ANSWER KEY — October 21 — Transformations in \mathbb{R}^3



Suppose there is a routine `drawEllipsoid()` that draws the ellipsoid shown in the figure on the left. This ellipsoid has left-right length equal to 2. The ellipsoid is drawn centered at the origin and its leftmost point is $\langle -1, 0, 0 \rangle$ and its rightmost point is $\langle 1, 0, 0 \rangle$. The routine `drawEllipsoid()` is as follows:

```
drawEllipsoid() {  
    glScalef( 1.0, 0.5, 0.5 );  
    glutWireSphere ( 1.0, 8, 8 );  
}
```

1. Write the OpenGL commands that will use the routine `drawEllipsoid()` but will draw the ellipsoid in the position shown in the figure on the right. In effect, the ellipsoid has been (1) moved so that its leftmost point is positioned at $\langle 2, 0, 0 \rangle$, and then (2) rotated through an angle θ upwards towards the y -axis, with the rotation holding the leftmost point fixed. Now OpenGL commands cannot do both (1) and (2) in precisely that way. Your assignment is to write some OpenGL commands that achieve the same effect.

Two possible answers:

```
glMatrixMode(GL_MODELVIEW);  
glLoadIdentity();  
glTranslatef(2,0,0);  
glRotatef( $\theta$ ,0,0,1);  
glTranslatef(1,0,0);  
drawEllipsoid();
```

```
glMatrixMode(GL_MODELVIEW);  
glLoadIdentity();  
glTranslatef(2 + cos( $\theta$ ), sin( $\theta$ ), 0);  
glRotatef( $\theta$ ,0,0,1);  
drawEllipsoid();
```