

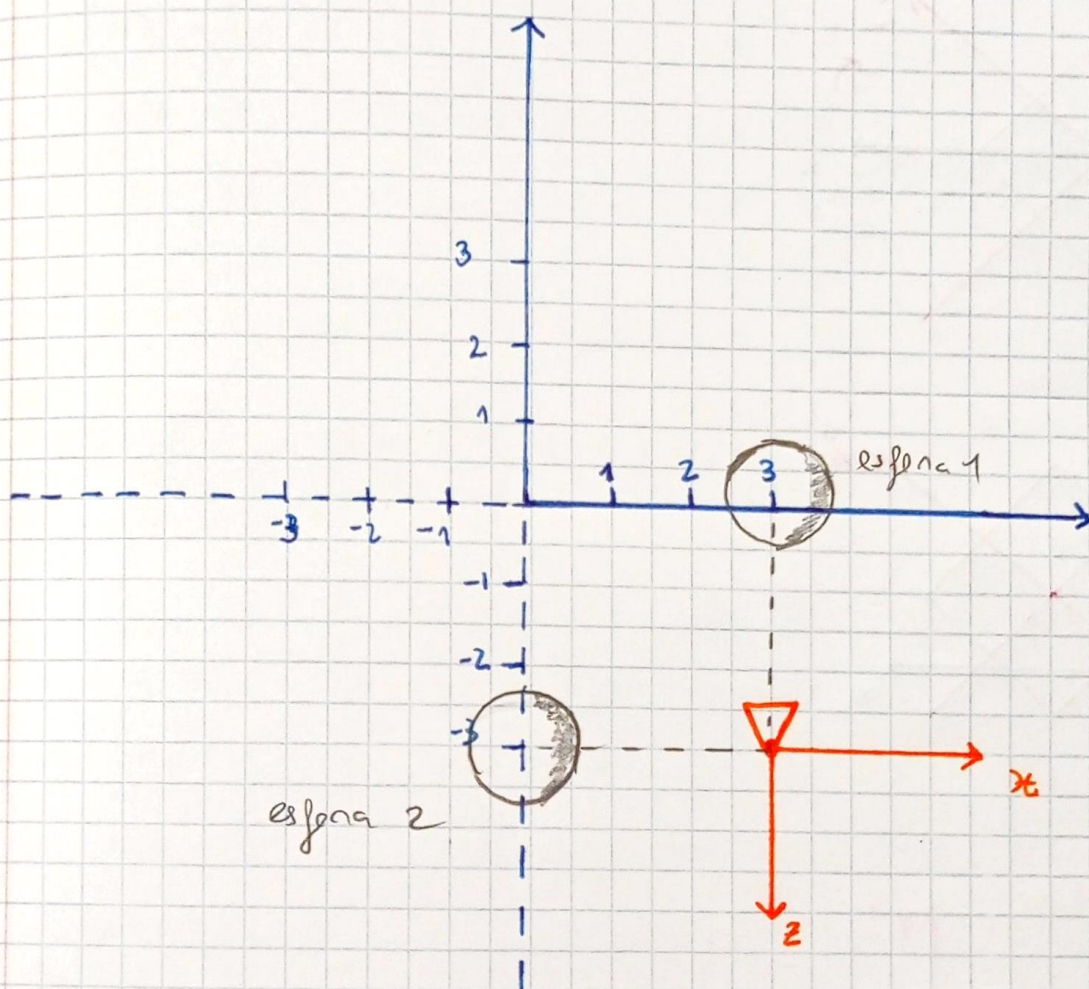
Teste CG 22/23

①

```
translate (0, 0, -3);  
drawSphere (); // 1  
translate (0, 0, 3);  
gluLookAt (3, 0, -3, 3, 0, 0, 0, 1, 0);  
translate (0, 0, -3);  
drawSphere (); // 2
```

espaço
cunha

espaço
global

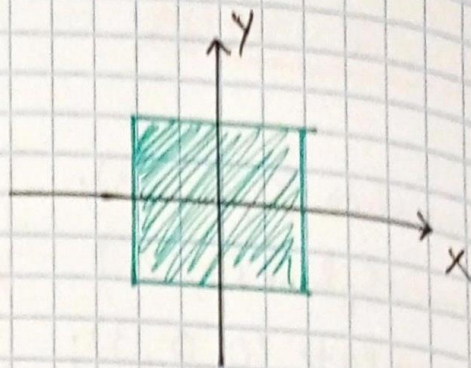


②

$glRotate(45, 0.0, 0.0, 1.0)$

$glTranslate(2.0, 0.0, 0.0)$

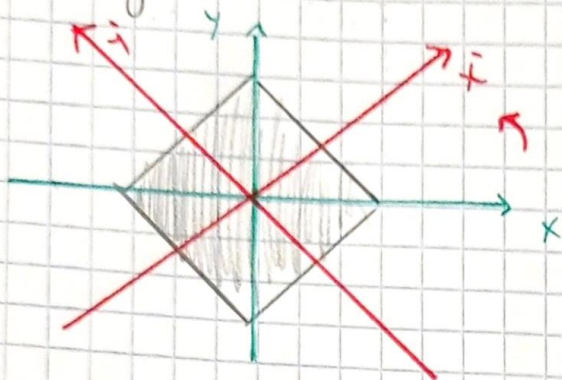
$glRotate(-45, 0.0, 0.0, 1.0)$



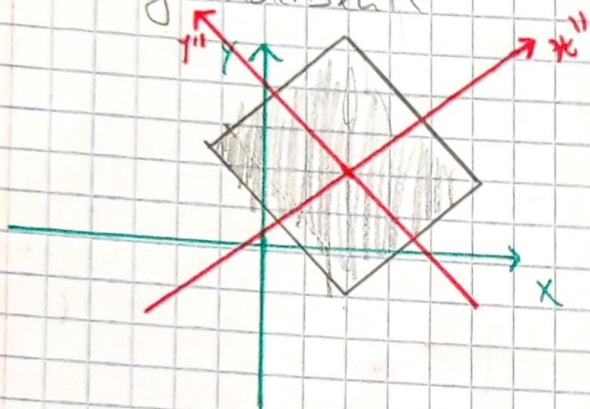
A verde: eixo original

A vermelho: eixo transformado

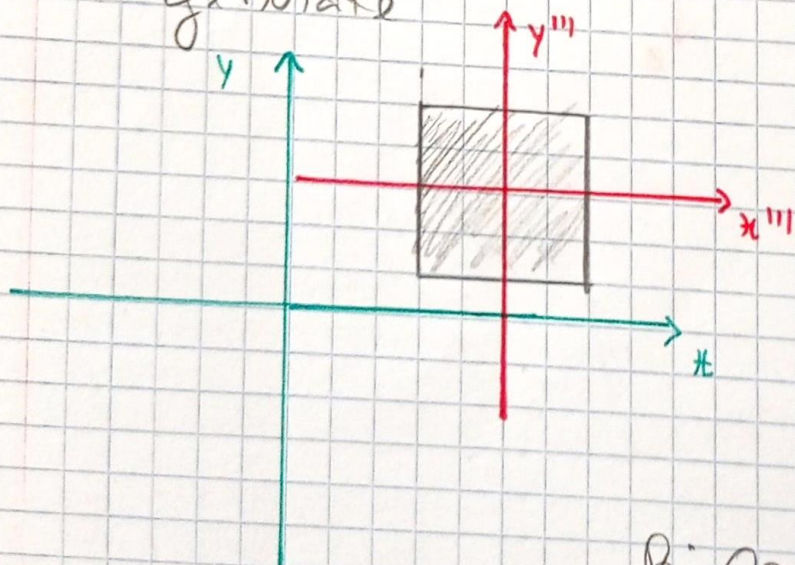
1º: $glRotate$



2º: $glTranslate$



3º: $glRotate$



R: Operação e

③

$$\begin{bmatrix} 4 & 0 & 0 & 4 \\ 0 & 4 & 0 & 4 \\ 0 & 0 & 4 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

a) $glTranslatef(1, 1, 1)$
 $glScalef(4, 4, 4)$

$$\begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} 4 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 \\ 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 4 & 0 & 0 & 1 \\ 0 & 4 & 0 & 1 \\ 0 & 0 & 4 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

R: Incorreta

b) $glTranslatef(4, 4, 4)$
 $glScalef(4, 4, 4)$

$$\begin{bmatrix} 1 & 0 & 0 & 4 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 1 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} 4 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 \\ 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 4 & 0 & 0 & 4 \\ 0 & 4 & 0 & 4 \\ 0 & 0 & 4 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

R: Correta

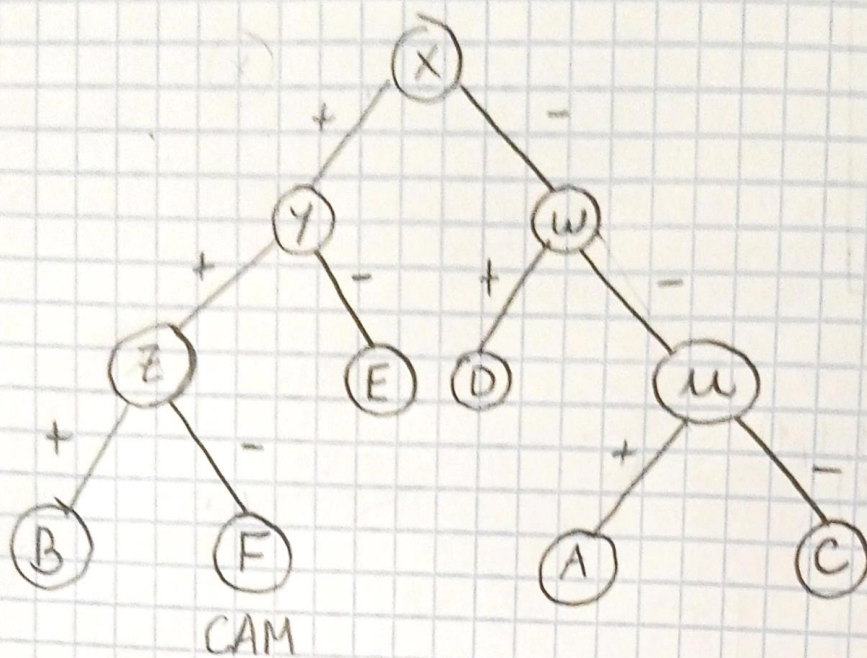
c) $glScalef(4, 4, 4)$
 $glTranslatef(1, 1, 1)$

$$\begin{bmatrix} 4 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 \\ 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 4 & 0 & 0 & 4 \\ 0 & 4 & 0 & 4 \\ 0 & 0 & 4 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

R: Correta

4)

a)



c)

1º: F

2º: B

3º: E

4º: D

5º: C

6º: A

5)

$P_0(-1, 0)$

$P_1(5, 3)$

$P_2(-5, 3)$

$P_3(1, 0)$

Não me lembro com certeza

⑥

glBegin (GL_Quads):

glTexCoord (0.0, 0.0); glVertex3f(-1.0f, -1.0f, 0.0f);

glTexCoord (1.0, 0.0); glVertex3f(1.0f, -1.0f, 0.0f);

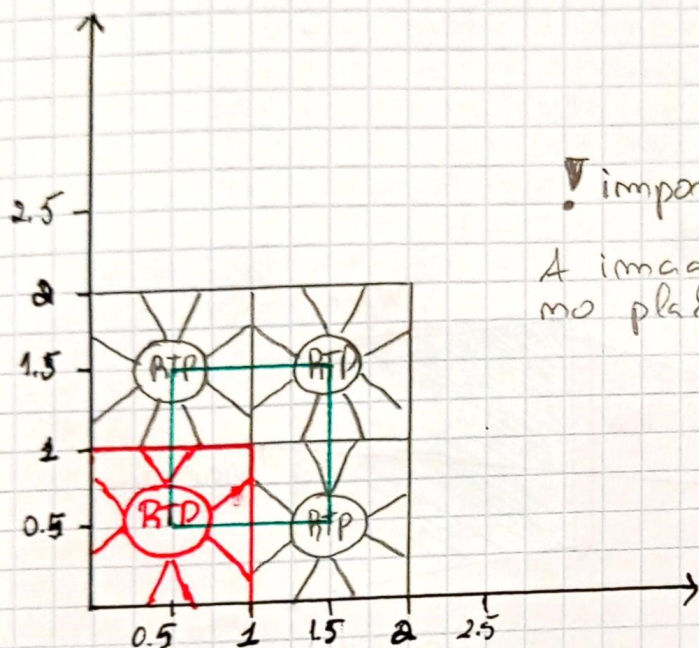
glTexCoord (1.0, 1.0); glVertex3f(1.0f, 1.0f, 0.0f);

glTexCoord (0.0, 1.0); glVertex3f(-1.0f, 1.0f, 0.0f);

glEnd();

vermelho: figura original

verde: figura rotacionada



! importante !

A imagem repete-se infinitamente no plano, sempre.

glBegin (GL_Quads);

glTexCoord2f(0.5f, 0.5f); glVertex3f(-1.0f, -1.0f, 0.0f);

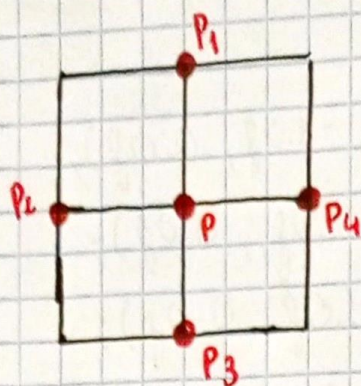
glTexCoord2f(1.5f, 0.5f); glVertex3f(1.0f, -1.0f, 0.0f);

glTexCoord2f(1.5f, 1.5f); glVertex3f(1.0f, 1.0f, 0.0f);

glTexCoord2f(0.5f, 1.5f); glVertex3f(-1.0f, 1.0f, 0.0f);

glEnd();

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$$P_1' = (P_1 x, h(P_1), P_1(z))$$

$$P_2' = (P_2 x, h(P_2), P_2(z))$$

$$P_3' = (P_3 x, h(P_3), P_3(z))$$

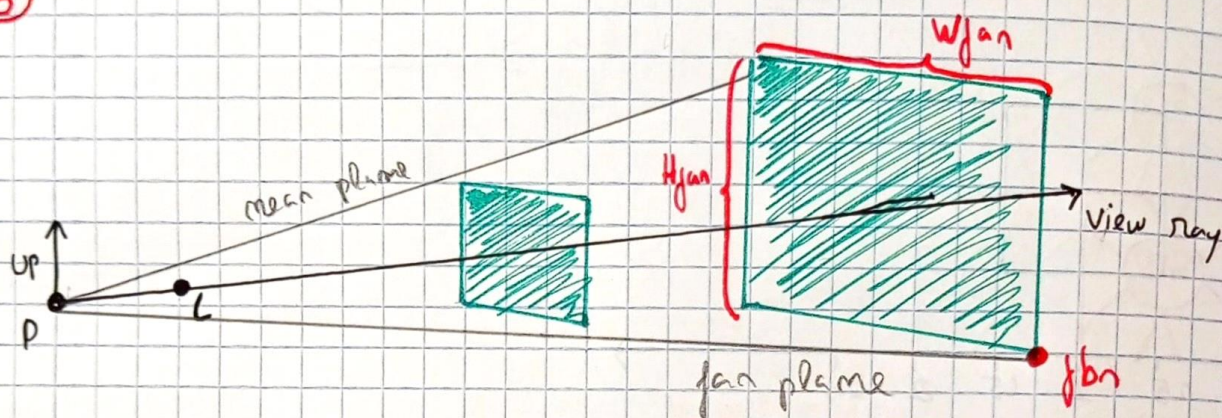
$$P_4' = (P_4 x, h(P_4), P_4(z))$$

$$\vec{V}_1 = P_3' - P_1'$$

$$\vec{V}_2 = P_4' - P_2'$$

$$\vec{N}_p = \frac{\vec{V}_1 \times \vec{V}_2}{|\vec{V}_1 \times \vec{V}_2|}$$

8



a)

$$H_{fan} = \tan\left(\frac{fov}{L}\right)$$

$$w_{fan} = ratio - H_{fan}$$

b)

$$Right = Up * L$$

$$Center = P + L * fan\ plane$$

$$CenterDown = Center + (-Up) * \frac{H_{fan}}{2}$$

$$fbn = CenterDown + Right * \frac{w_{fan}}{2}$$