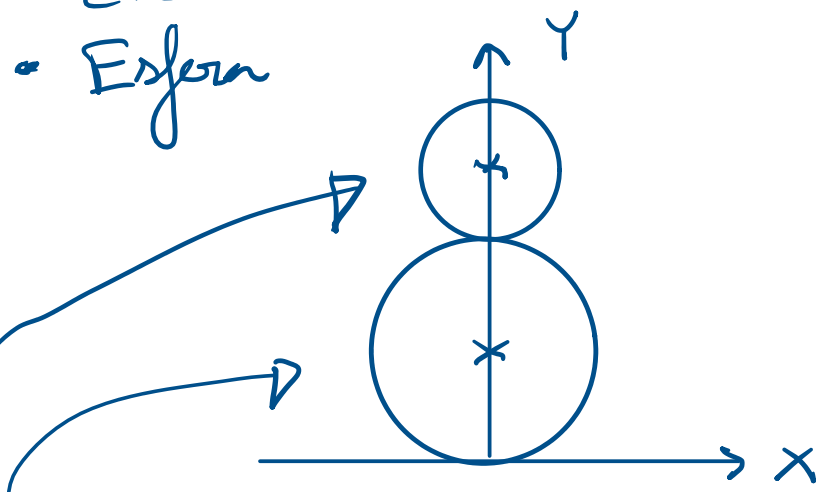
Desenhar um boneco de neve & Camera

6 de março de 2024 14:25

- Cone
- Esfera



translate 0, 0.75, 0
scale 0.75, 0.75, 0.75
esfera

~~translate 0, 1, 0~~
~~translate 0, 1.75, 0~~

scale 1/0.75, 1/0.75, 1/0.75
translate 0.25, 0.25, 0.25
esfera

translate -0.05 0.1 0.2
scale 0.05 0.05 0.05
esfera

scale 1/0.05 1/0.05 1/0.05

Informática

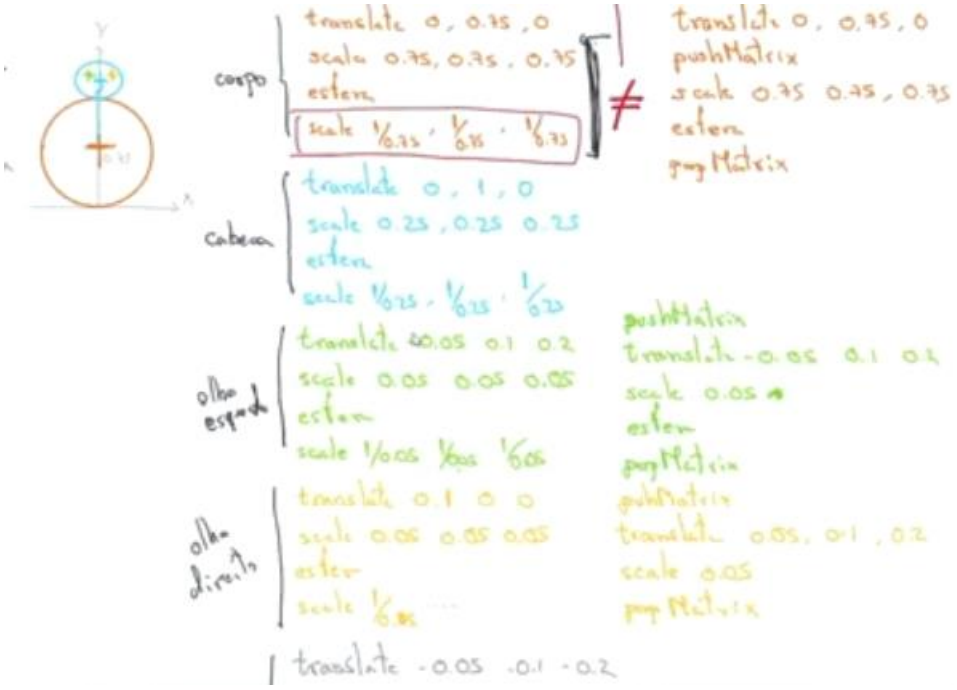
↳ Usar uma stack de matrizes
→ Fazer push e pop

translate 0, 0.75, 0
push Matrix
scale 0.75, 0.75, 0.75
esfera
pop Matrix

OPERATIONS with Floating point numbers
⇒ Small ERRORS

↓

"erros de vírgula flutuante"




```
void drawSnowMan() {
    glColor3f(1.0f, 1.0f, 1.0f);

// Draw Body
    glTranslatef(0.0f ,0.75f, 0.0f);
    glutSolidSphere(0.75f,20,20);

// Draw Head
    glTranslatef(0.0f, 1.0f, 0.0f);
    glutSolidSphere(0.25f,20,20);

// Draw Eyes
    glPushMatrix();
    glColor3f(0.0f,0.0f,0.0f);
    glTranslatef(0.05f, 0.10f, 0.18f);
    glutSolidSphere(0.05f,10,10);
    glTranslatef(-0.1f, 0.0f, 0.0f);
    glutSolidSphere(0.05f,10,10);
    glPopMatrix();

// Draw Nose
    glColor3f(1.0, 0.5, 0.0 );
    glRotatef(0.0f,1.0f, 0.0f, 0.0f);
    glutSolidCone(0.08f,0.5f,10,2);
}
```

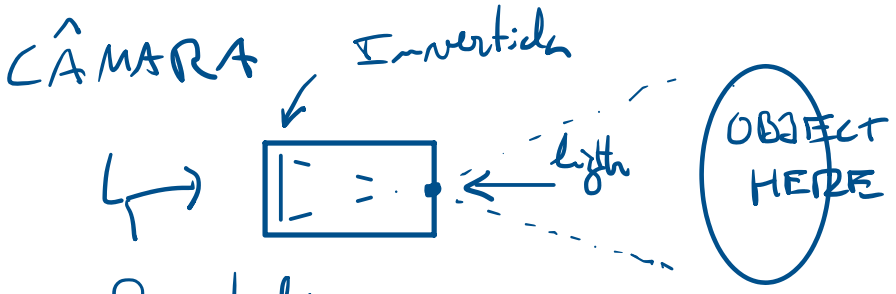
PUSH MATRIX

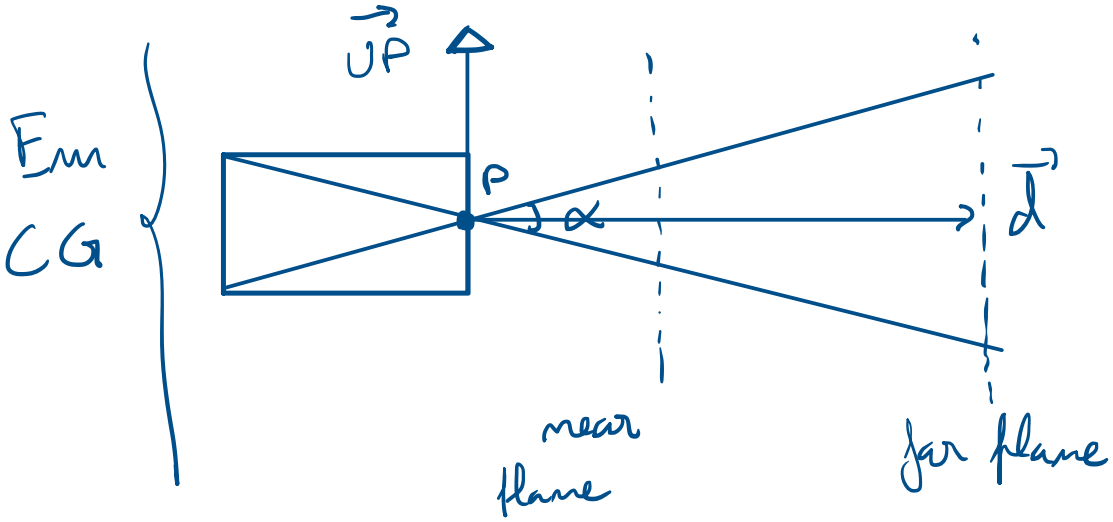
escalar

POP MATRIX

⇒ Deixa o sistema de eixos como o encontrou

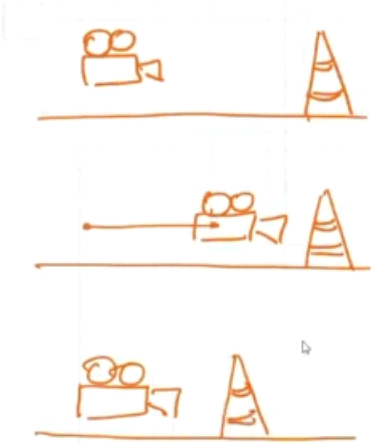
—— // ——





- Parâmetros extrínsecos
  - P posição
  - $\vec{UP}$ orientação vertical
  - $\vec{d}$ direção do olhar
- Parâmetros intrínsecos
  - α :: fov - field of view
  - near & far plane

↳ Definem um "Volume de visualização"



} Situações equivalentes

"Colocar a câmara no espaço global"

$M = TR$

desloca a câmara — orienta a câmara

$$T = \begin{bmatrix} 1 & 0 & 0 & P_x \\ 0 & 1 & 0 & P_y \\ 0 & 0 & 1 & P_z \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

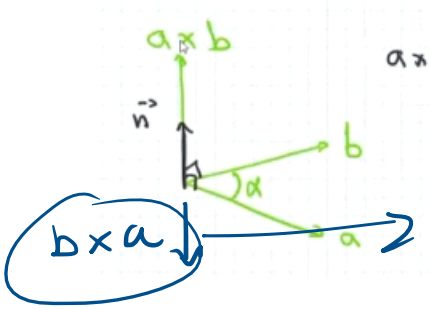
$$R = \begin{bmatrix} X & Y & Z & 0 \\ & & & 0 \\ & & & 0 \\ & & & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

gluLookAt (P_x, P_y, P_z, l_x, l_y, l_z, u_x, u_y, u_z)

CROSS PRODUCT

Cross Product

↳ produto externo ou vetorial

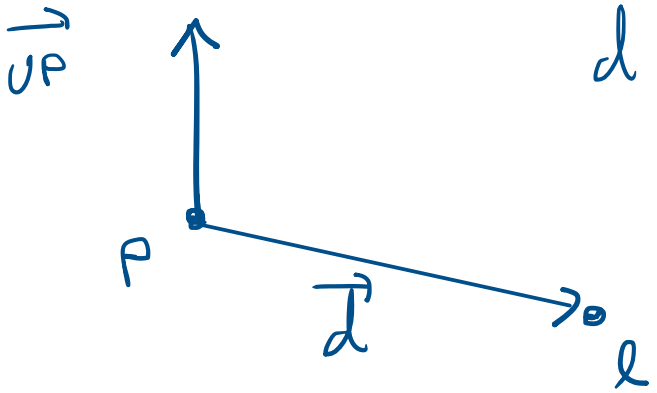


$a \times b = |\vec{a}||\vec{b}| \cdot \sin(\alpha) \cdot \vec{n}$

↳ ?

Regra da mão direita

$$v = a \times b$$
$$v_x = a_y b_z - a_z b_y$$
$$v_y = a_z b_x - a_x b_z$$
$$v_z = a_x b_y - a_y b_x$$



$\vec{d} = l - p$

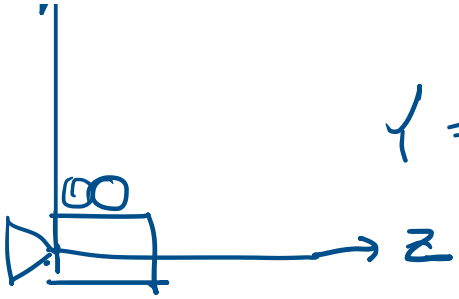
$z = -\vec{d} / |\vec{d}|$

↳ normalizar (evitar escalas)

$X = Y \times Z$

Y ↑

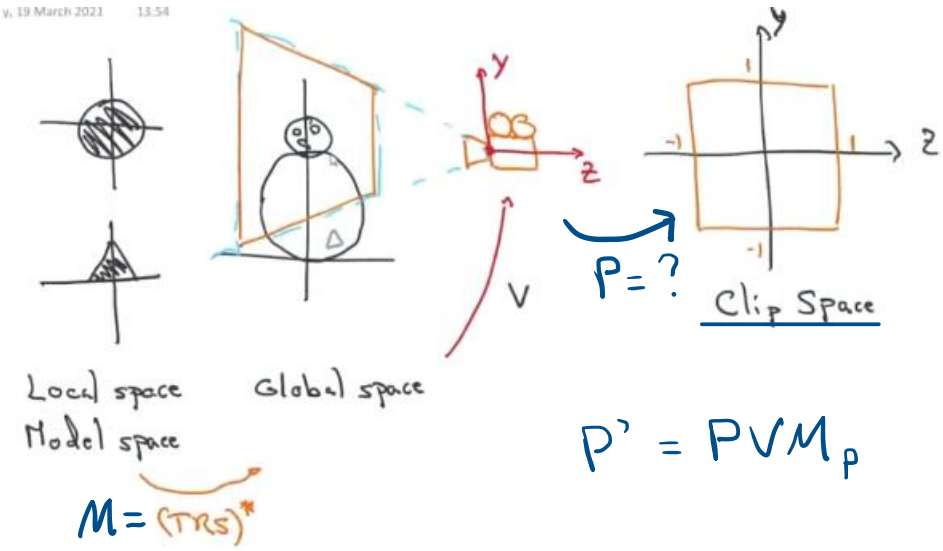
$X = \dfrac{\vec{VP} \times z}{|\vec{VP} \times z|}$



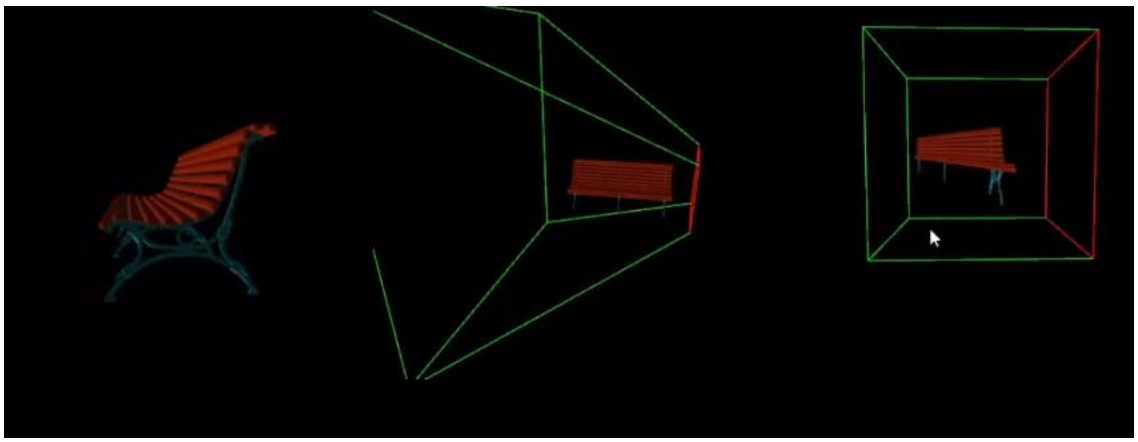
$\vec{UP} \times \vec{z}$

$y = z \times x$

$V = M^{-1} = (TR^{-1}) = R^{-1}T^{-1}$



$P' = PVM_p$



Aula: Projeção

min 13