B581/FALL 2015

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1.1

Main advantage of a nonphysical approach is less computational intensive. Also it is easy to accomplish. Disadvantage is that we can't handle more picture information such as lighting, shading and texture.

1.2

Yes. We can also find the origins of triangles and squares. Then we can estimate the radius of circle by calculating the distance from origins to the vertices of triangles and squares. Also we can use multiple triangle fans and strips to approximate a circle.

1.8

Time for one pixel = $\frac{1}{1024*1280*72} = 1.06 * 10^{-8}$

1.10

Primitives: point, line, polygon, text.

Attributes: position, color, viewer point, clip window.

1.12

Nvidia desktop GPU	year	Pixel processing(Mpixels/s)
GeForce 256 DDR	2000	480
GeForce3 TI200	2001	700
GeForce4 ti4200	2002	1000
GeForce5 FX5900	2004	1900
GeForce6 6800XT	2005	2600
GeForce7 7600GT	2006	4480
GeForce8 8600GT	2007	4.32(GP/S)
GeForce9 9600GT	2008	10.4(GP/S)

2.a

$$\begin{bmatrix} 0.25 & 0 & 0 \\ 0 & 0.3 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

2.b

Translation by(2, 3) $\begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$

Scale by (2, 0.5) $\begin{bmatrix} 2 & 0 & 2 \\ 0 & 0.5 & 3 \\ 0 & 0 & 1 \end{bmatrix}$

Translation by (0, 5) $\begin{bmatrix} 2 & 0 & 2 \\ 0 & 0.5 & 8 \\ 0 & 0 & 1 \end{bmatrix}$

3.a(2.9)

$$\frac{X-Xmin}{Xmax-Xmin} = \frac{(Xs-u)}{w} \rightarrow Xs = u + \frac{(X-Xmin)*w}{Xmax-Xmin}$$

$$\frac{Y-Ymin}{Ymax-Ymin} = \frac{(Ys-v)}{h} \rightarrow Ys = \frac{(Y-Ymin)*h}{Ymax-Ymin} + v$$

3.b(2.18)

Because of 4 = 2^2 each framebuffer can hold 2bits per pixel. So it's a low quality monitor

4

Geometric primitives are the building blocks for other geometrics objects.