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Why is RGB additive ?
Intensities of the primary colours are added to produce other colors. Each color point within the bounds of the cube can be represented as the triple (R, G, B) where values for R, G, B are assigned in the range 0 to 1. A color ~~is~~ C_λ is represented in RGB components as :

$$C_\lambda = RR + GG + BB$$

RGB to YIQ :

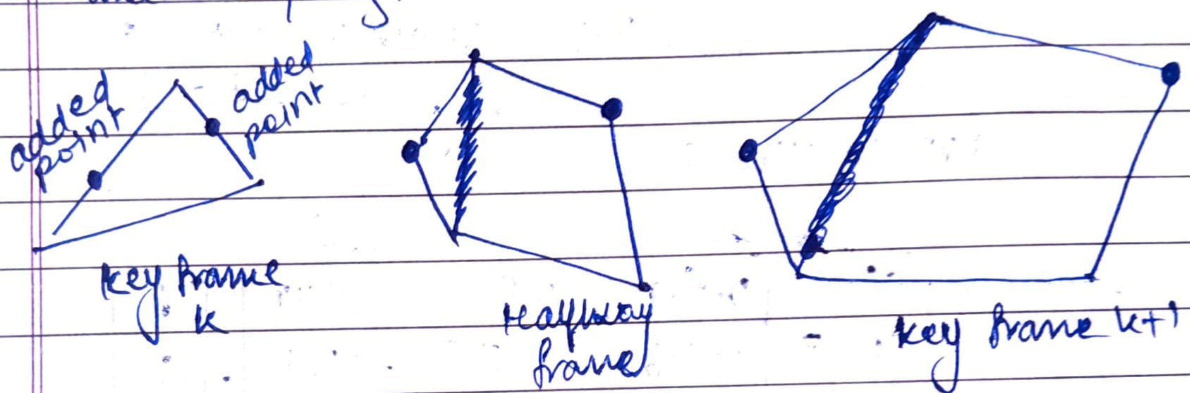
$$\begin{bmatrix} Y \\ I \\ Q \end{bmatrix} = \begin{bmatrix} 0.299 & 0.587 & 0.444 \\ 0.596 & -0.275 & -0.321 \\ 0.212 & -0.528 & 0.311 \end{bmatrix} \cdot \begin{bmatrix} R \\ G \\ B \end{bmatrix}$$

Why is CMY model subtractive ?
The colours are seen by reflected light, a subtractive process. In CMY, (1, 1, 1) represents black as all components of the incident light are subtracted. ~~Origin~~ ~~represent white light. A combination~~ Origin represents white light. Cyan can be formed by adding green and blue light. ∴ when white light is reflected from cyan colored ink, the reflected light has no red component. i.e. red light is subtracted by ink. Magenta subtracts green from incident light and yellow subtracts blue.

Specify the rules to equalize key frame k and 'k+1' in an animation scene.

General preprocessing rules for equalizing key frames ~~in terms~~ can be stated ~~as either~~ in terms of either no. of edges or no. of vertices to be added to a key frame.

~~Case 1: Equalize.~~



Advantage of convex hull property:

1. The four polynomials sum to unity and thus the value of the fourth polynomial for any value of t can be found by subtracting the first three from unity.
2. Useful for clipping curve segments. Rather than clipping each short line piece of a curve segment, we first apply a poly clip algo to clip the C.H. or its extent against the clip region. If C.H is completely within clip region, so is entire curve segment. If C.H is outside the clip region, so is entire curve segment. Only if C.H intersects the clip region, curve segment needs to be examined.

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List any foure logical input device classification

1) Locator devices
Eg : Mouse, keyboard, lightpen, trackball etc.

2) String devices
Eg : Keyboard

3) Valuator
Eg : control dial, joystick

4) Pick
Eg : mouse, cursor keys, tablet

5) Choice
Eg : mouse, keyboard, touch panel

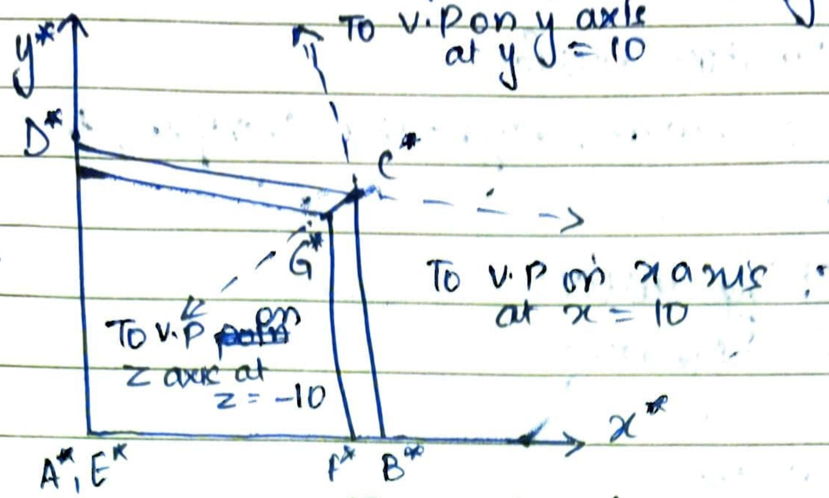
Advantages of homogeneous coordinates ?

1) Translation of a point by the change of coordinate cannot be combined with other transformations by using simple matrix mult.

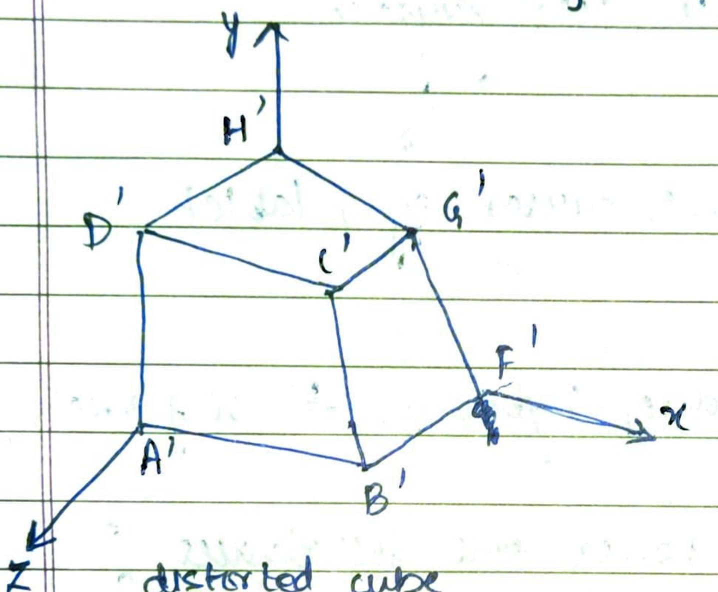
2) They are used in design & construction application.

3) They can represent projection as well as pointed at infinity.

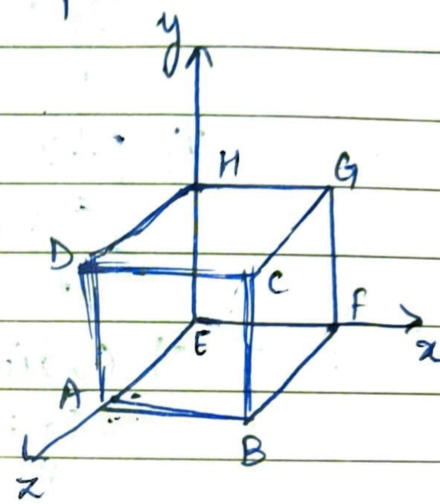
3-point pers. proj with vanishing points :-



3-p proj onto z=0 plane



distorted cube



original cube

Define hue, intensity, saturation & purity of light

Hue : An angle about the vertical axis, ranging from 0° at red through 360°

Saturation : It varies from 0 to 1. It is represented as ratio of purity of a selected hue to its max. purity at S=1.

Purity : At the top of hexcone, colours have max. intensity. When V=1, S=1, we have 'pure' hues.

Intensity : Each primary colour can take an intensity value ranging from 0 to 1. Mixing them at diff. intensity levels produces a variety of colors.

2019

$P_{1x} = 3 \qquad P_{2x} = 5$

Q1. (b) $P_1(3,0)$ — $P_2(5,0)$

$P_4(7,0)$ — $P_3(6,0)$

$P_{3x} = 6 \qquad P_{4x} = 7$

$$Q(t) = T \cdot M_B \cdot G_B$$

$$= \begin{bmatrix} t^3 & t^2 & t & 1 \end{bmatrix} \begin{bmatrix} -1 & 3 & -3 & 1 \\ 3 & -6 & 3 & 0 \\ -3 & 3 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} 3 & 0 \\ 5 & 0 \\ 6 & 0 \\ 7 & 0 \end{bmatrix}$$

$$= \begin{bmatrix} t^3 & t^2 & t & 1 \end{bmatrix} \begin{bmatrix} -3+15-18+7 & 0 \\ 9-30+18+0 & 0 \\ -9+15+0+0 & 0 \\ 3 & 0 \end{bmatrix}$$

$$= \begin{bmatrix} t^3 & t^2 & t & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ -3 & 0 \\ 6 & 0 \\ 3 & 0 \end{bmatrix}$$

$$= \begin{bmatrix} \underbrace{t^3 - 3t^2 + 6t + 3}_{x(t)} & \underbrace{0}_{y(t)} \end{bmatrix}$$

$$R_{1x} = t(0) = 0 - 3(0) + 6(0) + 3$$
$$= 3$$

$$R_{4x} = t(1) = 1 - 3(1) + 6(1) + 3$$
$$= 1 - 3 + 6 + 3$$
$$= 7$$

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(c) resolution = 1280 X 1024 (len, width)

Aspect ratio $= \frac{1}{1} = \frac{9.6}{12} = \frac{\text{vertical pixel}}{\text{horizontal}}$ value

~~∴ 12 pixel inch = 1280 inch pixel~~

~~∴ 1 pixel = $\frac{1280}{12}$ inch~~

~~$\frac{12}{1280}$ = 1 pixel~~

~~9.6 pixel inch~~

∴ $\frac{9.6}{12} = \frac{1024}{1280} = \frac{\text{len of pixel}}{\text{wid of pixel}}$

$\frac{9.6}{1024} = \frac{12}{1280}$

(c) 1280 pixel wide = 12 inch

width $= \frac{12}{1280} = 0.009375$

diameter

Paper 2019

Q1. (f) $z(x, y)$ can be determined by interpolating the z coordinates of the polygon's vertices along pairs of edges and then across each scan line.

~~For z(x+1, y)~~ At $(x + \Delta x, y)$, the value of z is

$$z_1 - \frac{A}{C}(\Delta x)$$

Only one subtraction is needed ~~given~~ to calculate $z(x+1, y)$, given $z(x, y)$

At $(x, y + \Delta y)$, the value of z is

$$z_1 - \frac{B}{C}(\Delta y)$$

Only one incremental calc. is req. to determine $z(x, y+1)$

(g)