Assignment-1

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Ans. to the ques. no.- 01

Given,

image = Width x Height = 640×480

$x = 14 + 18 = 32$

$y = 18$

Width, $W = 640$

So,

$S = 3W$

$= 3 \times 640$

$= 1920$

$\therefore$ The value of buffer offset A in true color frame buffer, $A = 3x + Sy$

$= 3 \times 32 + 1920 \times 18$

$= 34656$

(Ans)

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Ans. to the ques. no.-02

Here,

$R = 144$

$G = 018$

$B = 55$

So,

$R = \frac{144}{255} = 0.56$

$G = \frac{18}{255} = 0.07$

$B = \frac{55}{255} = 0.22$

$C = 1 - R = 1 - 0.56 = 0.44$

$M = 1 - G = 1 - 0.07 = 0.93$

$Y = 1 - B = 1 - 0.22 = 0.78$

(Ans.)

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Ans. to the ques. no.-03

Here,

$$A = 6 + 8 = 14$$

So,

The image is $= A \times A = 14 \times 14$ inch.

So, the resolution is $= \frac{640}{14} \times \frac{480}{14}$ pixels per inch

$$= 45.7 \times 34.3$$

(Ans).

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Ans. to the ques. no.-04

Let,

A normal vector $\vec{n} = (a, b, c)$ is a vector that is perpendicular to a plane E.

That is $\vec{n} \perp E$.

Suppose, the point $P_0 = (x_0, y_0, z_0)$ is on the plane E. So, P_0 is a point normal form of a plane.

Let $P(x, y, z)$ an arbitrary point on the plane E.

So, $\overrightarrow{P_0P}$ is perpendicular to $\vec{n}$. $\overrightarrow{P_0P} \perp \vec{n}$.

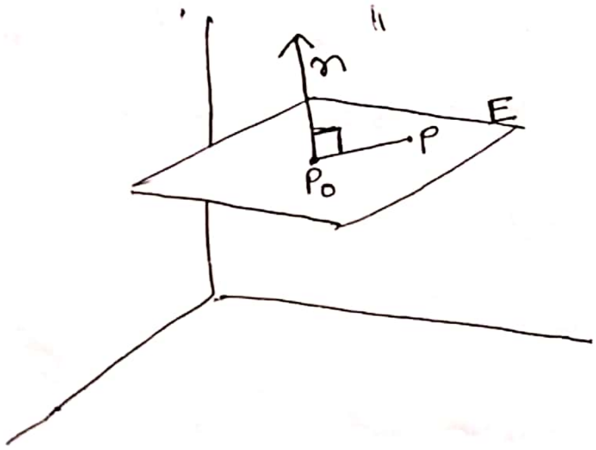

figure: Point Normal form to Parametric Eqn

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So, $\vec{P_0P} \cdot \vec{n} = 0$ [perpendicular so dot product is 0]

$\Rightarrow$ $\cancel{Ex_0}$ $(x-x_0, y-y_0, z-z_0) \cdot (a,b,c) = 0$

$\Rightarrow$ $a(x-x_0) + b(y-y_0) + c(z-z_0) = 0$ ---- (1)

which is a parametric or plane Eqn.

<u>Example:</u>

If the Point $P_0(-2,3,4)$ and perpendicular to the vector $\vec{n} = (1,3,-7)$

then, From, Eqn (1) we can write:

$$a(x-x_0) + b(y-y_0) + c(z-z_0) = 0$$

$$\Rightarrow 1(x+2) + 3(y-3) + (-7)(z-4) = 0$$

$$\Rightarrow x+2 + 3y - 9 - 7z + \cancel{34}\,28 = 0$$

$$\Rightarrow x + 3y - 7z + 21 = 0$$

This the equation of the plane;

parametri. equation would be:

$$a(x+2) + b(y-3) + c(z-4) = 0$$

 Sayan Roy (Sign)

Ans. to the ques. no. - 05

Given,

Plane eqn : ~~3x+~~ $3x - y + 4z = 6$

For Line :

Point $P(3,2,0)$ & vector $v(-1,1,5)$

We know that,

Parametric Eqn of a line is :

$$L(t) = P + tv$$

$$= (3,2,0) + (-1,1,5)t$$

$$= (3-t, 2+t, 5t)$$

Putting the Line x, y, z in the Plane equation we get :

$$3x - y + 4z = 6$$

$$\Rightarrow 3(3-t) - (2+t) + 4 \times 5t = 6$$

$$\Rightarrow 9 - 3t - 2 - t + 20t = 6$$

$$\Rightarrow 16t = 6 - 9 + 2$$

$$\Rightarrow t = \frac{-1}{16}$$

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So, the Line equation $L(t) = \left(3 + \frac{1}{16}, 2 - \frac{1}{16}, -\frac{5}{16}\right)$

$$= \left(\frac{49}{16}, \frac{31}{16}, -\frac{5}{16}\right)$$

Putting the line x, y, z on the plane equation ~~Right~~ Left Hand side we get,

$$L.H.S = 3\left(\frac{49}{16}\right) - \frac{31}{16} + 4\left(-\frac{5}{16}\right)$$

$$= \frac{147}{16} - \frac{31}{16} - \frac{5}{4}$$

$$= 6$$

$$= R.H.S.$$

So, the line intersects the given Plane.

Since, we found a single value of t, we know that the line intersect the plane in a single point. here, $t = -\frac{1}{16}$.

Ant the point of intersection $= \left(\frac{49}{16}, \frac{31}{16}, \frac{-5}{16}\right)$ (Ans)