

NAME : FAYYAZ MUHAMMAD

ID : 14294

SEMESTER : 5<sup>th</sup>

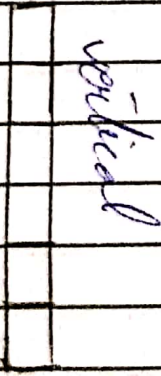
SUBJECT : Computer Graphics

TEACHER : Mam Sana.

## QUESTION # 01

On a Black and White display device, pixel is rectangular in shape, i.e. its height is triple its width. We want to draw a thinnest possible horizontal and vertical line. What difference will be there between these two? Explain your answer.

Ans: On a Black and white display if the pixel is rectangular in shape with height of pixel " $3x$ " of width is " $x$ " then according to the given situation the line can be drawn as follows:



Horizontal

The vertical line will be the thinnest possible line as compared to horizontal line. As the vertical line travels on y-axis of its width is " $x$ " where horizontal line travel on x-axis

of its height is  $3x$  which is more than width.

## QUESTION # 02

a) In True Color System, the number of bits representing each of Red, Green and Blue colors is 8. This means that each of the pixel can display total of 16,777,216 colors. Why do we prefer Direct Colour System having only 65,536 different options over the True Colour System for common use?

Ans: In direct colour system:-

RGB  $\Rightarrow R = 8 \text{ bits}, G = 8 \text{ bits}, B = 8 \text{ bits}$

$\Rightarrow N = 8$

$2^N = 2^{24} = 16,777,216$  colors also memory frames.

$\Rightarrow$  In direct colour system:-

RGB  $\Rightarrow R = 5 \text{ bits}, G = 6 \text{ bits}, B = 5 \text{ bits}$

$N_r = 5, N_g = 6, N_b = 5$

$\Rightarrow 2^N = 2^{16} = 65,536$  colors preference.

REASON No 1:-

More colors than discernable by human eye.

REASON No 2:-

More colors require more memory frames.

That why we prefer direct color over true colour in common use.

b) You have to design a new colour system. If the number of bits used for Red colour are 4; and for Green colour are 5. how many bits must be used for Blue colour if the required number of possible colours is 8192 for each pixel?

Given:-

$\Rightarrow$  No of bits used for Red color =  $N_r = 4$  bits.

$\Rightarrow$  No of bits used for Green color =  $N_g = 5$  bits.

$\Rightarrow$  No of bits used for blue color =  $N_b = ?$

we have to find Blue colour bits = ?

while total colors = 8192

$$(N_r + N_g + N_b)$$

$$\Rightarrow 2 = 8192$$

$$(4+5+N_b)$$

$$\Rightarrow 2 = 8192 \quad \text{--- (1)}$$

$$\text{Ans } 2^{13} = 8192 \quad \text{--- (1)}$$

Compare the power of 2 of eq (1) and eq (2)

$$\Rightarrow 4+5+N_b = 13$$

$$\Rightarrow N_b = 13 - 4 - 5$$

$$\Rightarrow N_b = 4 \text{ bits}$$

So the no of bits for Blue color is 4 bit.

### QUESTION No 3

Ans of Part (a)

if we consider only the display (ignoring shaded or lines) than vector display will be faster than Raster display because vector display drawn lines directly, no need of predefined grid or buffer, while raster display image using predefined grid of pixel and the images is stored in a frame buffer.

CRT Scanning Speed = 3cm/milli second  
 size of display = 10cm x 10cm  
 outline of square = 6cm (each side)

Approximate display time = ?

Solution:

Ans square has 4 sides  
 and 1 side is 6cm

⇒ So, 4 sides = 24cm (total)

Ans, 3cm Scanning take 1 millisecond

Total Scanning =  $\frac{24 \text{ cm}}{3 \text{ cm}} = 8$  times.

⇒ therefore, total 8 Scanning will be occur.

and display time will be:

$$= 8 \times 10^{-3}$$

$$= 0.008 \text{ Seconds}$$

or total Display time = 8 millisecond.

Ans of part (b):

Raster display would be better for filled square shape. because:

Reason:-

i) Advance vector system can provide a limited amount of shading.

- ii) Refresh vector displays are limited in how many lines or how much text can be shown without refresh flicker.
- iii) Irregular beam motion is slower than steady beam motion of raster display
- iv) it's difficult to use vector display for realistic (shaded) images

How-ever raster display is cheap and paint entire screen on each scan (use for area filling).