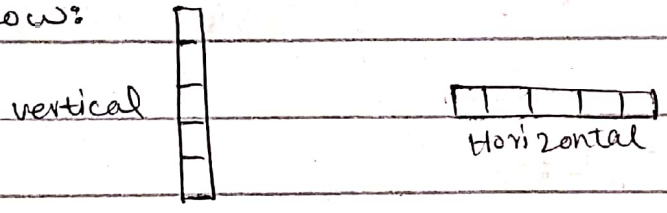


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Q1. If the pixel is rectangular on a black or white display then its width is x and according to the given situation the line can be drawn as follows:



The vertical line will be the thinnest possible line as compare to horizontal line, as the vertical width is x and it travels on y-axis where horizontal line travel on x-axis on its width $3x$ which is more than width.

②

Q2.

Part a:

In direct color system:-

RGB \Rightarrow R = 8 bits, G = 8 bits

B = 8 bits

$\Rightarrow N = 8$

$$2^N = 2^{24} = 16,777,216 \text{ colors}$$

also memory frames.

\Rightarrow In direct color systems-

RGB \Rightarrow R = 5 bits, G = 6 bits

B = 5 bits

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

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

Preference:-

Reason No 1:-

More colors than
are discernable by human eye.

Reason No 2:-

More colors require
more memory frames.

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

Q2. Part b

Given

No of bits used for red = $N_r = 4$ bits

" used for green = $N_g = 5$ bits

" used for blue = $N_B = ?$

Blue color bits = ?

Total colors = 8192

$$(N_r + N_g + N_B)$$

$$\Rightarrow 2^{(4+5+N_B)} = 8192$$

$$(4+5+N_B)$$

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

$$\text{As } 2^{13} = 8192 \text{ --- (2)}$$

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

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

$$N_B = 13 - 4 - 5$$

$$\boxed{N_B = 4 \text{ bits}}$$

So, the No of bits for blue color is 4 bits.

Q3. Part a

If we ignore shaded or lines and only consider the display than vector

④

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 stored in a frame buffer.

CRT scanning speed = 3cm/milli second
size of display = $10\text{cm} \times 10\text{cm}$
outline of square = 6cm (each side)
Approximate display time = ?

Solution:

As square has 4 sides and 1 side is 6cm

\Rightarrow so, 4 sides = 24cm

As, 3cm scanning take 1 millisecond total scanning

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

\Rightarrow therefore, total 8 scanning will be occur and

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display time will be :

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

$$= 0.008 \text{ seconds}$$

or total display time = 8 milliseconds

Q3 Part B

Raster display would be better for filled square shape because:

→ Advance vector system can provide a limited amount of shading.

→ Refresh vector display are limited in how many lines or how much text can be shown without refresh flicker.

→ Irregular beam motion is slower than steady beam motion of raster display.

→ It's difficult to use vector display for realistic (shaded) images.

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However raster display is
cheap \downarrow paint entire
screen on each scan
(use for area filling).