Name :- Krunal Rank

Roll No :- U18CO081

Class :- Btech 3rd Year

Computer Engineering

Semester :- 6

Exam :- Mid Semester Exam

SECTION B

Ans 8:

Random ~~Raster~~ Scan	Raster Scan
• It has high resolution.	• It has low resolution.
• Beam penetration technology is used.	• Shadow mask technology is used.
• It is more expensive.	• It is less expensive.
• Refresh rate depends on resolution.	• In Raster Scan, refresh rate doesn't depend on the resolution of image.
• Solid patterns are difficult to display.	• Relatively, solid patterns are easier to display.
• It does not involve interlacing.	• It involves interlacing technique.

(-4)
(-12)

Ans 9:

Given the Square :-

$$X = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 4 & 1 \\ 4 & 4 & 1 \\ 4 & 0 & 1 \end{bmatrix}$$

Its centre is (2,2). For the centre to remain same, centre must be translated to origin.

①

Hence $T = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -2 & -2 & 1 \end{bmatrix}$

Now, Scaling the square to half its size,

$S = \begin{bmatrix} 0.5 & 0 & 0 \\ 0 & 0.5 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

Hence,

Again translating the centre to (2,2),

$T' = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 2 & 2 & 1 \end{bmatrix}$

Hence,

$X' = XTST'$ $X' = XTST'$

Let us first calculate TST'.
Hence,

$TST' = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -2 & -2 & 1 \end{bmatrix} \begin{bmatrix} 0.5 & 0 & 0 \\ 0 & 0.5 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 2 & 2 & 1 \end{bmatrix}$

$= \begin{bmatrix} 0.5 & 0 & 0 \\ 0 & 0.5 & 0 \\ -1 & -1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 2 & 2 & 1 \end{bmatrix}$

$= \begin{bmatrix} 0.5 & 0 & 0 \\ 0 & 0.5 & 0 \\ 1 & 1 & 1 \end{bmatrix}$ ← Transformation Matrix.

Ans

Itera
0
1
2
3
4

②

Hence,

$$X' = X(TST')$$

$$= \begin{bmatrix} 0 & 0 & 1 \\ 0 & 4 & 1 \\ 4 & 4 & 1 \\ 4 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0.5 & 0 & 0 \\ 0 & 0.5 & 0 \\ 1 & 1 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 1 & 1 \\ 1 & 3 & 1 \\ 3 & 3 & 1 \\ 3 & 1 & 1 \end{bmatrix} \quad \leftarrow \text{Resultant Coordinates.}$$

Ans 10, Given,

Radius $r = 10$

Centre $x_c = 2$

$y_c = 3$

$d_1 = 2x_i + 3$

$d_2 = 2(x_i - y_i) + 5$

When $P_i < 0$ $P_i += d_1$

Else $P_i += d_2$ (negative value always)

$x_1 = 0 \quad y_1 = 10$

$P_i = 5/4 - r \approx 1 - r = -9$ (Points)

Iteration	P_i	x_i	y_i	P_{i+1}	$x_i + x_c$	$y_i + y_c$
0	-9	0	10	-17	(2,13)	(13,2)
1	-17	1	10	-11	(3,13)	(13,3)
2	-11	2	10	-1	(4,13)	(13,4)
3	-1	3	10	13	(5,13)	(13,5)
4	13	4	9	-5	(6,12)	(12,6)
5	-5	5	9	17	(7,12)	(12,7)
6	17	6	8	11	(8,11)	(11,8)
7	11	7	7	13	(9,10)	(10,9)

— Stop —

③

$$\begin{bmatrix} 0 & 0 \\ 1 & 0 \\ 2 & 1 \end{bmatrix}$$

Ans 12₂ Given,

Triangle

$$X = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 1 & 1 \\ 5 & 2 & 1 \end{bmatrix}$$

i) About Origin,

$$R = \begin{bmatrix} 0.707 & 0.707 & 0 \\ -0.707 & 0.707 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$X' = \phi \times R = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 1 & 1 \\ 5 & 2 & 1 \end{bmatrix} \begin{bmatrix} 0.707 & 0.707 & 0 \\ -0.707 & 0.707 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1.414 & 1 \\ 2.121 & 4.949 & 1 \end{bmatrix} \approx \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 1 \\ 2 & 5 & 1 \end{bmatrix}$$

ii) About P(-1, -1)

$$T_1 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix} \qquad R = \begin{bmatrix} 0.707 & 0.707 & 0 \\ -0.707 & 0.707 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$T_2 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -1 & -1 & 1 \end{bmatrix}$$

④

Now,

$$T \cdot R \cdot T = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} 0.707 & 0.707 & 0 \\ -0.707 & 0.707 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -1 & -1 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 0.707 & 0.707 & 0 \\ -0.707 & 0.707 & 0 \\ 0 & \underset{1.414}{1.414} & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -1 & -1 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 0.707 & 0.707 & 0 \\ -0.707 & 0.707 & 0 \\ -1 & 0.414 & 1 \end{bmatrix}$$

Hence,

$$X' = X T R T$$

$$= \begin{bmatrix} -1 & 0.414 & 1 \\ -1 & 1.828 & 1 \\ 1.121 & 5.363 & 1 \end{bmatrix} \approx \begin{bmatrix} -1 & 0 & 1 \\ -1 & 2 & 1 \\ 1 & 5 & 1 \end{bmatrix}$$

Ans 13: Shadow Mask technique is commonly used in Raster Scan System because they produce a much wider range of colours than beam penetration technique.

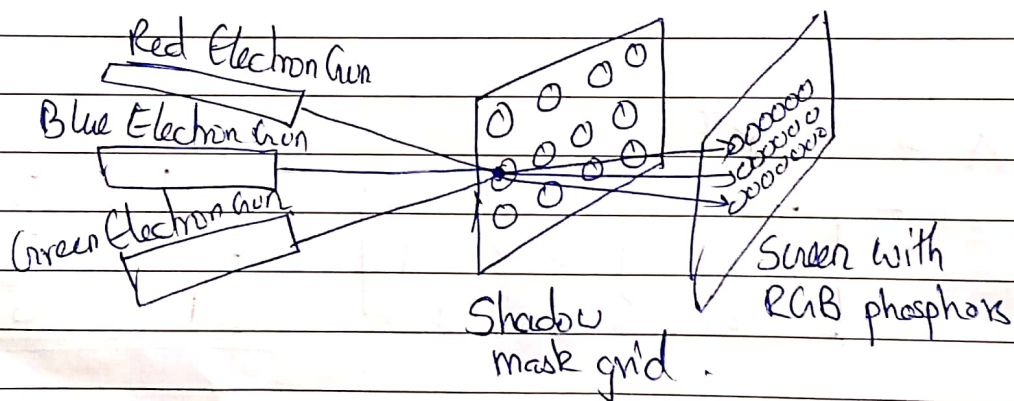It is used in majority of colour & TV sets and monitors.

S

Construction:-
A shadow Mask CRT has 3 phosphor colour dots at each pixel.
They are the Red, Green and Blue dots.

There are 3 electron guns, one for each colour and a shadow mask grid behind the phosphor coated Screen.

The shadow mask grid is pierced with small holes in triangular pattern.

Red Electron Gun
Blue Electron Gun
Green Electron Gun
Shadow mask grid.
Screen with RGB phosphors

operates
The deflection system of CRT, on all 3 electron beams simultaneously.
When a colour beam passes through a shadow mask, they activate the respective colour.
The phosphor dots in the triangles are organised so that each colour electron beam can activate only its corresponding colour.

(6)

There are two types of arrangement for the dots :-

The triad   The Inline

(R)

(R) (G) (B)

(G)   (B)

Advantages:-
• Realistic Image
• Million different colours can be generated based on Electron Beam Intesity Quantum.
• Shadow Screens are possible.

Disadvantages:-
• Expensive.
• Poor resolution
• Convergence Problem.