

Computer Graphics
and Multimedia Applications

- SC5A1503

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Section: C1

Assignment -1

Fill in the blanks

- ① a. Higher
- ② False
- ③ The refresh buffer or frame buffer
- ④ P_k where $P_k = 2dy - dx$
- ⑤ a. $P_0 = 1 - r$

Short Answers

- ① Refresh CRT means the repeated drawing of a picture to keep the glowing of the phosphor intact.
- ② The merits and demerits of direct view storage tube (DVST) are as follows:
 - It has a flat screen
 - Refreshing of screen is not needed
 - Selective or part erasing of screen is not possible.

- It has poor contrast
- Performance is inferior to the refresh CRT.

③ Raster Scan

- The electron beam is swept across the screen, one row at a time, from top to bottom.
- Screen points/pixels are used to draw an image
- Cost is less
- It is used for photos, that is why Photoshop is Raster editing program.
- Raster scan mainly in photos like JPG, PNG, GIF File format.

Random Scan

- The electron beam is directed only to be parts of screen where a picture is to be drawn.
- Mathematical functions are used to draw an image
- Cost is more
- It is used for text, logs, letterheads
- Random scan system High Quality Images In SVG, the size is Resizable like Logo in sites.

④ Graphics Primitives include:

- Line, Circles, Arcs, Rectangle, etc.
- Character Fonts
- Imported Images

Three basic attributes:

Color

width

style

⑤ Drawbacks of mid point circle algorithm.

→ It consumes too much time

→ The distance between the pixels is not equal so we won't get smooth circle.

Long Answer

① ~~given~~,

~~starting coord~~

Bresenham Line Drawing Algorithm:

Procedure:

given,

starting coordinates = (x_0, y_0)

Ending coordinates = (x_n, y_n)

Step 1:

Calculate Δx and Δy from the given input.

These parameters are calculated as:

- $\Delta x = x_n - x_0$

- $\Delta y = y_n - y_0$

step 2:

calculate the decision parameter P_k

these parameters are calculated as

$$P_k = 2\Delta Y - \Delta X$$

step 3:

suppose the current point is (x_k, y_k) and the next point is (x_{k+1}, y_{k+1})

find the next point depending on the value of decision parameter P_k .

Follow the below two cases -

Case 1:

If $P_k < 0$

$$P_{k+1} = P_k + 2\Delta Y$$

$$x_{k+1} = x_k + 1$$

$$y_{k+1} = y_k$$

Case 2:

If $P_k \geq 0$

$$P_{k+1} = P_k + 2\Delta Y - 2\Delta X$$

$$x_{k+1} = x_k + 1$$

$$y_{k+1} = y_k + 1$$

step 4:

keep repeating step-03 until the end point is reached
or number of iterations equals to $(\Delta X - 1)$ times.

Problem

Given,

starting coordinate $= (x_0, y_0) = (9, 18)$

Ending coordinate $= (x_n, y_n) = (14, 22)$

step 1:

Calculate ΔX and ΔY

$$\begin{aligned}\Delta X &= x_n - x_0 \\ &= 14 - 9 = 5\end{aligned}$$

$$\begin{aligned}\Delta Y &= y_n - y_0 \\ &= 22 - 18 = 4\end{aligned}$$

step 2:

Calculate the decision parameters.

$$\begin{aligned}P_k &= 2\Delta Y - \Delta X \\ &= 2 \times 4 - 5 \\ &= 3\end{aligned}$$

$$P_k = 3$$

step 3:

As $P_k \geq 0$, so case -02 is satisfied

Thus,

$$\begin{aligned}P_{k+1} &= P_k + 2\Delta Y - 2\Delta X \\&= 3 + (2 \times 4) - (2 \times 5) \\&= 1\end{aligned}$$

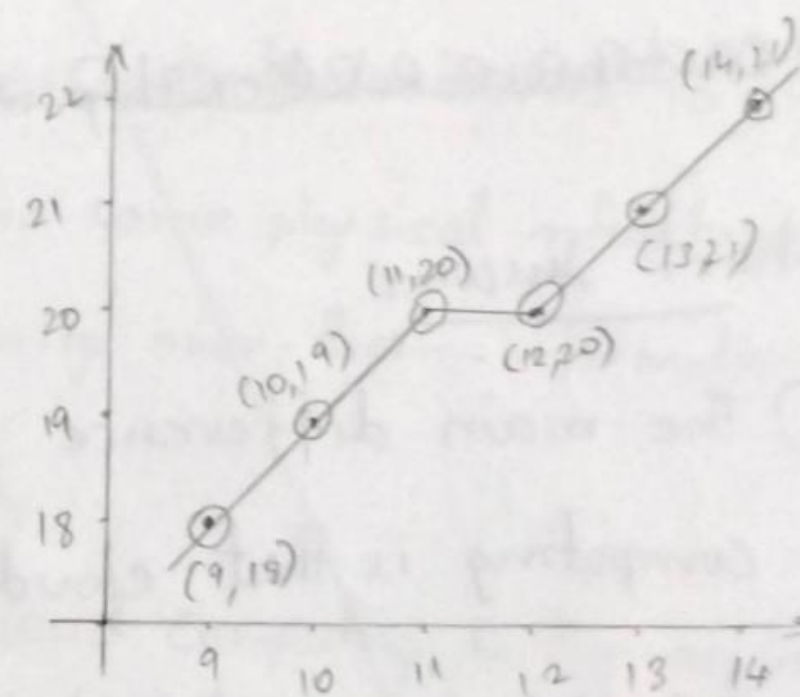
$$\begin{aligned}X_{k+1} &= X_k + 1 \\&= 9 + 1 \\&= 10\end{aligned}$$

$$\begin{aligned}Y_{k+1} &= Y_k + 1 \\&= 18 + 1 \\&= 19\end{aligned}$$

Similarly, step-3 is executed until the end point is reached or number of iterations equal to 4 times.

$$\text{Number of iterations} = \Delta X - 1 = 5 - 1 = 4$$

P_k	P_{k+1}	X_{k+1}	Y_{k+1}
		9	18
3	1	10	19
1	-1	11	20
-1	7	12	20
7	5	13	21
5	3	14	22



The generated points between the starting coordinates (9, 18) and ending coordinates (14, 22) are
(10, 19), (11, 20), (12, 20), (13, 21)