18110016 Deepraj Bhosale

Batch - A

CG Tutorial-2

1. (23,25) and (24,16)

$m < \frac{\Delta y}{\Delta y} = \frac{-9}{1} = -9$

$\Delta y = 16 - 25 = -9$

$\Delta x = 24 - 23 = 1$

- we slope, $|m| > 1$

We have

$P_0 = -2\Delta x - \Delta y$

$P_k > 0 \quad (x_k, y_{k-1}) \quad P_{k+1} = P_k - 2\Delta x$

else $(x_{k+1}, y_{k-1}) \quad P_{k+1} = -P_k - 2\Delta x - 2\Delta y$

$P_0 = -2(1) - (-9) = -2 + 9 = 7$

$\therefore P_0 > 0$ i.e $P_k > 0 \quad (x_k, y_{k-1})$

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

$x_0 = x_k = 23$

$y_0 = y_k = 25$

① $P_0 > 0$

point = $(23, 25-1) = (23, 24)$

$P_1 = P_0 - 2\Delta x = 7 - 2(1) = 5$

② $P_1 > 0$

point = $(23, 24-1) = (23, 23)$

$P_2 = P_1 - 2\Delta x = 5 - 2(1) = 3$

③ $P_2 > 0$

point = $(23, 23-1) = (23, 22)$

$P_3 = P_2 - 2\Delta x) = 3 - 2(1) = 1$

④ $P_3 > 0$

point = $(23, 21)$

$P_4 = P_3 - 2(\Delta x) = 1 - (1)2 = 1 - 2 = -1$

⑤ $P_4 \leq 0$

point = $(24, 20)$

$P_5 = -P_k - 2\Delta x - 2\Delta y = (-1) - 2(1) - 2(-9) = 17$

⑥ $P_5 > 0$ point = $(24, 19)$

$P_6 = 17 - 2(\Delta x) = 17 - 2 = 15$

⑧ $P_6 > 0$

point = (24, 18)

$P_7 = 15 - 2(1) = 13$

⑧ $P_7 > 0$

point = (24, 17)

$P_8 = 13 - 2(1) = 11$

⑨ $P_8 > 0$

point = (24, 16) (Done)

∴ The points between end points

(23, 25) & (24, 16) are (23, 25), (23, 24), (23, 23), (23, 22), (23, 21), (24, 20), (24, 19), (24, 18), (24, 17) & (24, 16)

2. (2, 40) and (10, 45)

$\Delta y = 5$

$\Delta x = 8$

$m = \frac{\Delta y}{\Delta x} = 5/8 = 0.62$

the slope, $|m| < 1$

we have

$P_0 = 2\Delta y - \Delta x$

$P_k < 0$ (x_{k+1}, y_k) $P_{k+1} = P_k + 2\Delta y$

$P_k \geq 0$ (x_{k+1}, y_{k+1}) $P_{k+1} = P_k + 2\Delta y - 2\Delta x$

$x_0 = x_k = 2$ $y_0 = y_k = 40$

① $P_0 = 2(5) - 8 = 10 - 8 = 2$

$P_k \geq 0$ i.e $P_0 \geq 0$

point = (3, 41)

$P_1 = P_k + 2\Delta y - 2(\Delta x) = 2 + 2(5) - 2(8) = -4$

② $P_1 < 0$

point = (4, 41)

$P_2 = P_1 + 2\Delta y = -4 + 2(5) = 6$

③ $P_2 \geq 0$

point = (5, 42)

$P_3 = P_2 + 2\Delta y - 2\Delta x = 6 + 2(5) - 2(8) = 0$

④ $P_3 \geq 0$

point $= (6, 43)$

$P_4 = 20 + 2(5) - 2(8)$

$= -6$

⑤ $P_4 < 0$

point $= (7, 43)$

$P_5 = -6 + 2(5) = 4$

⑥ $P_5 \geq 0$

point $= (8, 44)$

$P_6 = 4 + 2(5) - 2(8)$

$= -2$

⑦ $P_6 < 0$

point $= (9, 44)$

$P_7 = -2 + 2(5) = -2 + 10 = 8$

⑧ $P_7 \geq 0$

point $= (10, 45)$ — Done.

∴ The points between end points (2,40) & (10,45) are (2,40), (3,41), (4,41), (5,42), (6,43), (7,43), (8,44), (9,44) & (10,45)

3 (26,26) and (33,14)

$\Delta y = -12$, $2\Delta x = 14$

$\Delta x = 7$ $2\Delta y = -24$

$m = \Delta y / \Delta x = -12/7 = -1.71$

- m slope, $|m| > 1$

we have $P_0 = -2\Delta x - \Delta y$

$P_k > 0$ $(x_{k+1}, y_k - 1)$ $P_{k+1} = P_k - 2\Delta x$

else $(x_{k+1}, y_k - 1)$ $P_{k+1} = -P_k - 2\Delta y - 2\Delta x$

$x_0 = x_k = 26$

$y_0 = y_k = 26$

① $P_0 = -14 - (-12) = -2$

$P_0 \leq 0$

Point = (29, 25)

$P_1 = -P_0 - 2Dy - 2Dx = 2 + 24 - 14 = 12$

② $P_1 > 0$

Point = (29, 24)

$P_2 = P_1 - 2Dx$

$= 12 - 2(7) = -2$

③ $P_2 \leq 0$

Point = (28, 23)

$P_3 = 2 + 24 - 14 = 12$

④ $P_3 \geq 0$

Point = (28, 22)

$P_4 = 12 - 14 = -2$

⑤ $P_4 \leq 0$

Point = (29, 21)

$P_5 = 2 + 24 - 14 = 12$

⑥ $P_5 > 0$

Point = (29, 20)

$P_6 = 12 - 14 = -2$

⑦ $P_6 \leq 0$

Point = (30, 19)

$P_7 = 2 + 24 - 14 = 12$

⑧ $P_7 > 0$

Point = (30, 18)

$P_8 = 12 - 14 = -2$

⑨ $P_8 \leq 0$

Point = (31, 17)

$P_9 = 2 + 24 - 14 = 12$

⑩ $P_9 > 0$

Point = (31, 16)

$P_{10} = 12 - 14 = -2$