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BATCH-5 (Ai&Ml)

Assignment -1

Ques.3)

Disadvantage of Cohen Hodgmen Algorithm:

This method requires a considerable amount of memory. The first of all polygons are stored in their original form. Then clipping against the left edge is done and output is stored. Then clipping against the right edge is done, then top edge. Finally, the bottom edge is clipped. Results of all these operations are stored in memory. So wastage of memory for storing intermediate polygons.

(rest in images)

Ques.1)

Some Common Cases of Rotation

Rotation of 90° counterclockwise about the origin

Rotation of 180° counterclockwise about the origin

Rotation of 270° counterclockwise about the origin

Assignment - 1

Q2) Starting Coordinates (20, 10)
         and   4   (28, 22)

Step -1

$$\Delta X = 28 - 20 = 8$$
$$\Delta Y = 22 - 10 = 12$$

Step -2

$$P_K = 2\Delta Y - \Delta X = 2(12) - 8 = 24 - 8 = 16$$

Step -3

As $P_K \neq 0$, So Case-2, Satisfied

Thus,

$$P_{K+1} = P_K + 2\Delta Y - 2\Delta X$$
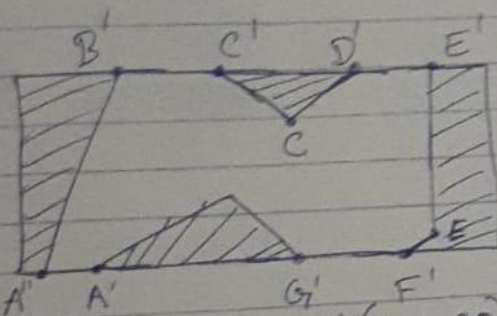$$= 16 + 24 - 16 \Rightarrow 16 + 8 \Rightarrow 24$$

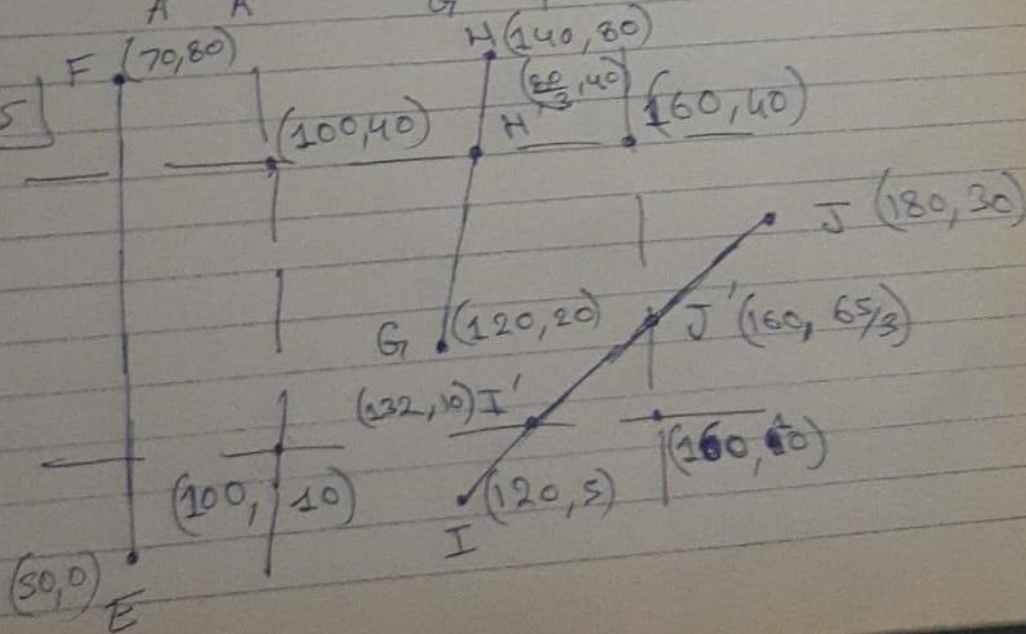$$X_{K+1} = X_K + 1 = 20 + 1 = 21$$

$$Y_{K+1} = Y_K + 1 = 11$$

No. of Iterations $= \Delta X - 1 = \underline{(7)}$ times

P_K	P_{K+1}	X_{K+1}	Y_{K+1}
		20	10
16	24	21	11
24	32	22	12
32	40	23	13
40	48	24	14
48	56	25	15
56	64	26	16
64	72	27	17
72	80	28	18

Q.3

Q 5

F (70,80)

H (140,80)

(100,40)   H $(\frac{80}{3},40)$ (160,40)

J (180,30)

G (120,20)   J' (160, 65/3)

(132,10) I'

(100, 10)   (120,5)   (160, 10)

(50,0) E

I

$x_{max} = 160$ $y_{max} = 40$

$x_{min} = 100$ $y_{min} = 10$

As we can clearly see line EF is outside the clipping window.

Now, clipping points for line ~~GF~~

1.) **GH**

Top Cut : $y \to$ Constant
$x \to$ Change

$$x = \frac{1}{m}\left(y_{w\,max} - y_1\right) + x_1$$

$$\left\{ m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{80 - 20}{140 - 120} = \frac{60}{20} = 3 \right.$$

$$x = \frac{1}{3}\left(40 - 20\right) + 120 = \frac{20}{3} + 120$$

$$x = \frac{80}{3}$$

$$\therefore H' = \left(\frac{80}{3}, 40\right)$$

For I J. $m = \dfrac{30-5}{180-120} = \dfrac{25}{60} = \dfrac{5}{12}$

Right Cut (J') → x_w → constant
                          y → change

$y = m(x_{wmax} - x_1) + y_1$

$\quad = \dfrac{5}{12}(160 - 180) + 30$

$\quad = -\left(\dfrac{5}{\cancel{12}_3} \times \cancel{20}^{5}\right) + 30 \Rightarrow \dfrac{90-25}{3} \Rightarrow \dfrac{65}{3}$

∴ J' ⟹ $\left(160, \dfrac{65}{3}\right)$

Bottom Cut (I') → y_w → constant
                             x → change

$x = \dfrac{1}{m}(y_{wmin} - y_1) + x_1$

$\quad = \dfrac{12}{5}(10 - 5) + 120$

$\quad = 132$

∴ I' = $(132, 10)$