$r_x = 8$ $r_y = 6$ start $(0, r_y)$ $(0, 6)$

Reg 1

(x_k, y_k)	Decision par. P_1 or P_2	(x_{k+1}, y_{k+1})	dx: $2x_{k+1} r_y^2$	dy: $2y_{k+1} r_x^2$
0 $(0,6)$	$p_1(0) = -332$	$(1, 6)$	$2(1)(6)^2 = 72$	$2(6)(8)^2 = 768$
1 $(1,6)$	$p_1(1) = -332 + 72 + (6)^2 = -224$	$(2, 6)$	$4(36) = 144$	768
		$(3, 6)$	$6(36) = 216$	768
$(2,6)$	$p_1(2) = -44$		$8(36) = 288$	640
$(3,6)$	$p_1(3) = 208$	$(4, 5)$		
			360	640
$(4,5)$	$p_{14} = -108$	$(5,5)$		
			432	512
$(5,5)$	$p_{15} = 288$	$(6,4)$	504	384
$(6,4)$	$p_{16} = 244$	$(7,3)$		

14

dx > dy

R2 — $\boxed{2r_y^2 x_{k+1} \geq 2r_x^2 y_{k+1}}$ $(8, 2)$ 576 256

-23

$(7,3)$

Reg 1 —

$P_{1k} = r_y^2 + \frac{r_x^2}{4} - r_y r_x^2$

P_{k+1} = $P_{1k} \geq 0$ $(x_k + 1, y_k - 1)$

< 0 $(x_k + 1, y_k)$

$P_{2k} \geq 0$ $(x_k, y_k - 1)$

< 0 $(x_k + 1, y_k - 1)$

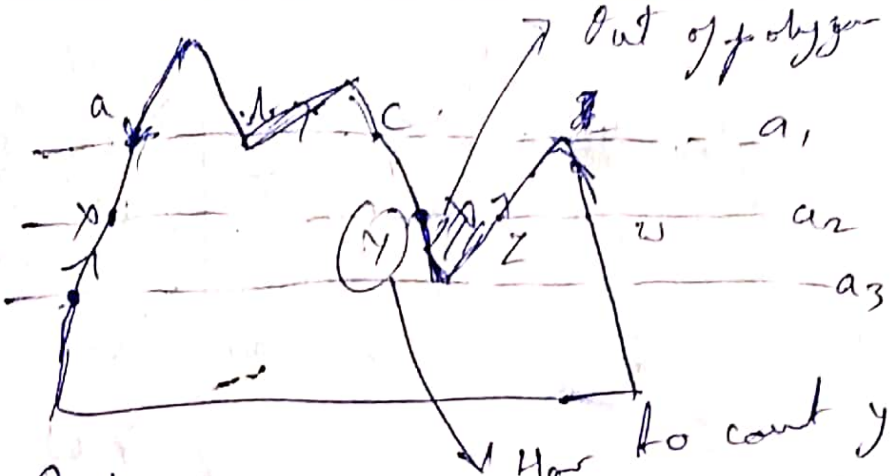
Polygon fill —

Many edges & vertices

Color such that for boundary

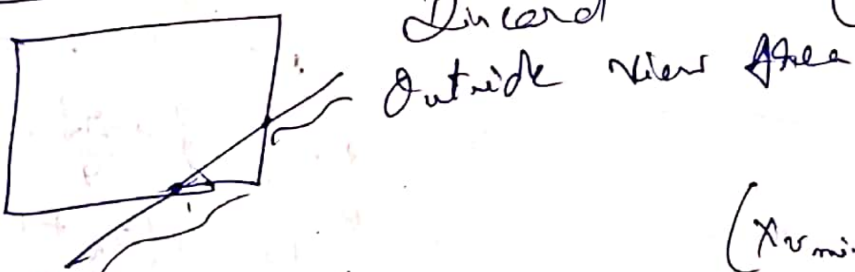
- for each scan line
- Locate the intersection of scan line with the edges
- Sort the intersection point from left to right.
- Draw the interven intersection points pair (a – b) (c – d) pixels fill colour

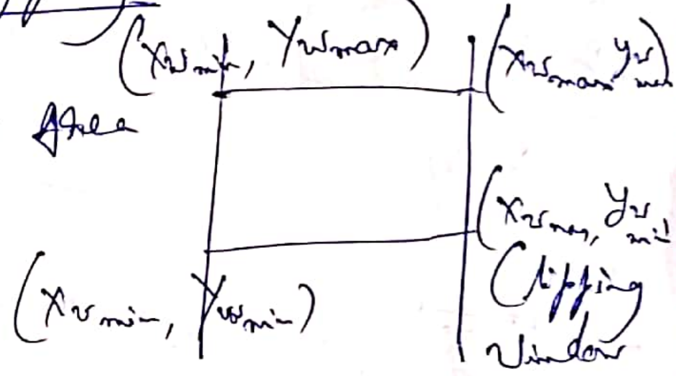
15



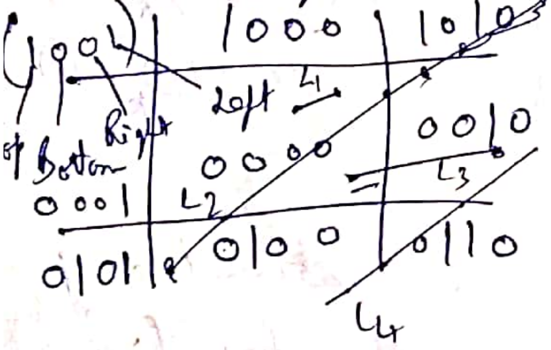
Sol: —
Make a clock wise or counter clock wise traversal on edges
→ Check y if y is monotonically increasing or decreasing & if direction of edges changes we have to count double the intersection points. Otherwise there is a single intersection.

Cohen Sutherland Line Clipping —





4 Bit Region Code



Algo —
Step I - Assign a region code for each end points.
II If both end points have a region code 0000 then accept it.
III Else perform logical AND operation for both (line) region code.
both 1 → 1
or — 0
if the result is not 0000 then reject the line

else you need Clipping -

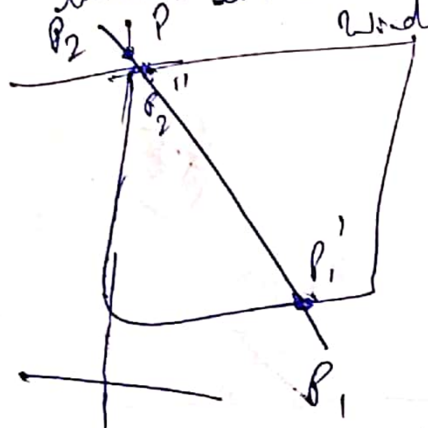
(1) - Select the end points of the line that is outside the window.

(16)

(2) - Find the intersection point at the window boundaries ~~boundary~~.

(3) - Replace end points with the intersection points & update region code.

(4) - Repeat step (2) until we find a clipped line, either trivially accepted or trivially rejected.



$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$y = y_1 + m(x - x_1)$$

$$x = x_1 + \frac{y - y_1}{m}$$

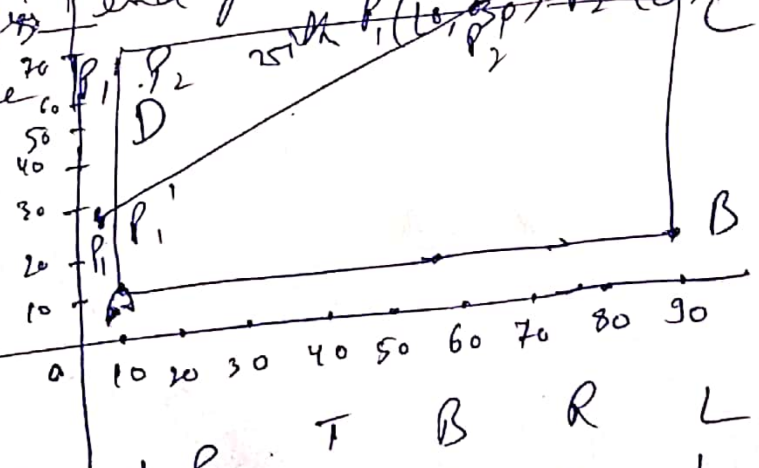
x_{wmin}

x_{wmax}.

y_{wmin}

y_{wmax}.

Let ABCD be the rectangular window with A(20, 20) B(90, 20) C(90, 70) & D(20, 70). Find Region ~~window~~ code ~~for~~ end points & use ~~Cohen~~ Cohen code — algo to clip line with $P_1(10, 30)$ $P_2(80, 90)$



		T	B	R	L
Region Code of	P_1	0	0	0	1
	P_2	1	0	0	0
AND		0	0	0	0

$\boxed{0 \quad 0 \quad 0 \quad 0}$ ⟵ Clip the line

Scanned with CamScanner

Slope of $P_1 P_2$ line $= \dfrac{y_2 - y_1}{x_2 - x_1}$

$= \dfrac{90 - 30}{80 - 10} = \dfrac{60}{70} = \dfrac{6}{7}$

1. X_{min}, $y = m(X_{min} - x_1) + y_1$ Left Boundary
2. X_{max}, $y = m(X_{max} - x_1) + y_1$ Right —
3. Y_{max}, $x = \dfrac{1}{m}(Y_{max} - y_1) + x_1$ Top
4. Y_{min} ; $x = \dfrac{1}{m}(Y_{min} - y_1) + x$ Bottom

(17)

$P_1' = \cancel{(}. x = 20$

$y = \dfrac{6}{7}(20 - 10) + 30 = 38.5$

$y_{max} = 70$

$x = \dfrac{7}{6}(70 - 90) + 80 = 56.8$

Scanned with CamScanner