simple visibility algorithm

a *and* b *are the end points of the line, with components* x *and* y

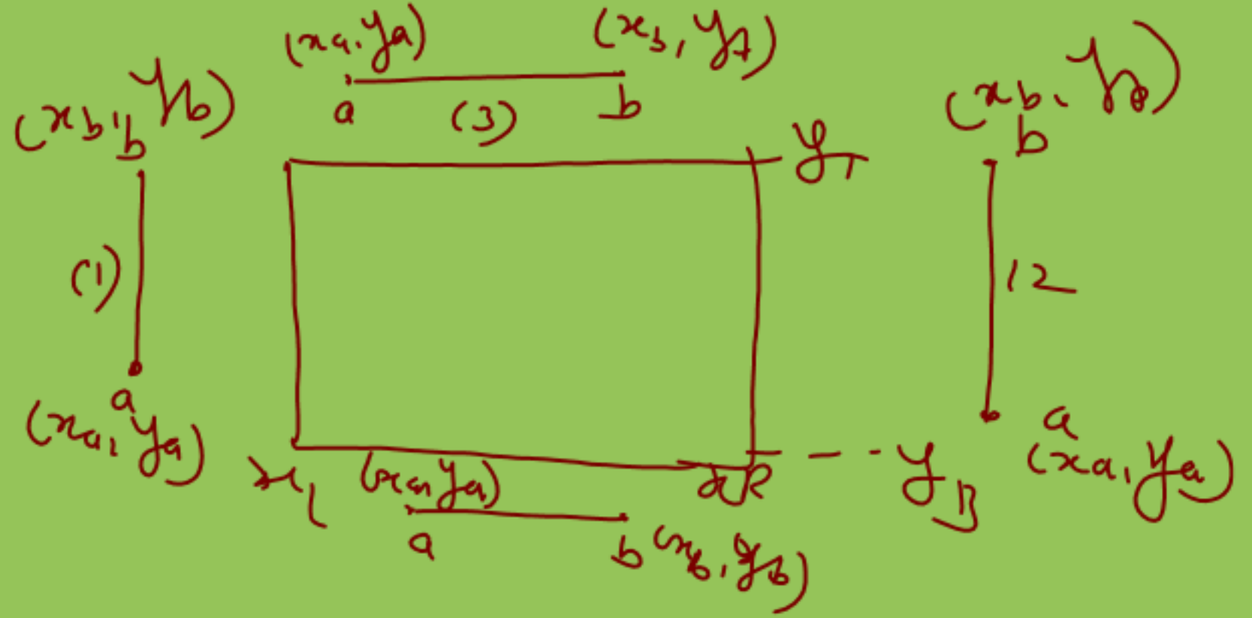
for each line

Visibility = True

check for totally invisible lines

if both end points are left, right, above or below the window, the line is trivially invisible

if $x_a < x_L$ and $x_b < x_L$ then Visibility = False ✓
if $x_a > x_R$ and $x_b > x_R$ then Visibility = False ✓
if $y_a > y_T$ and $y_b > y_T$ then Visibility = False ✓
if $y_a < y_B$ and $y_b < y_B$ then Visibility = False



if Visibility <> False **then** *avoid the totally visible calculation*

check if the line is totally visible

if any coordinate of either end point is outside the window, then the line is not totally visible

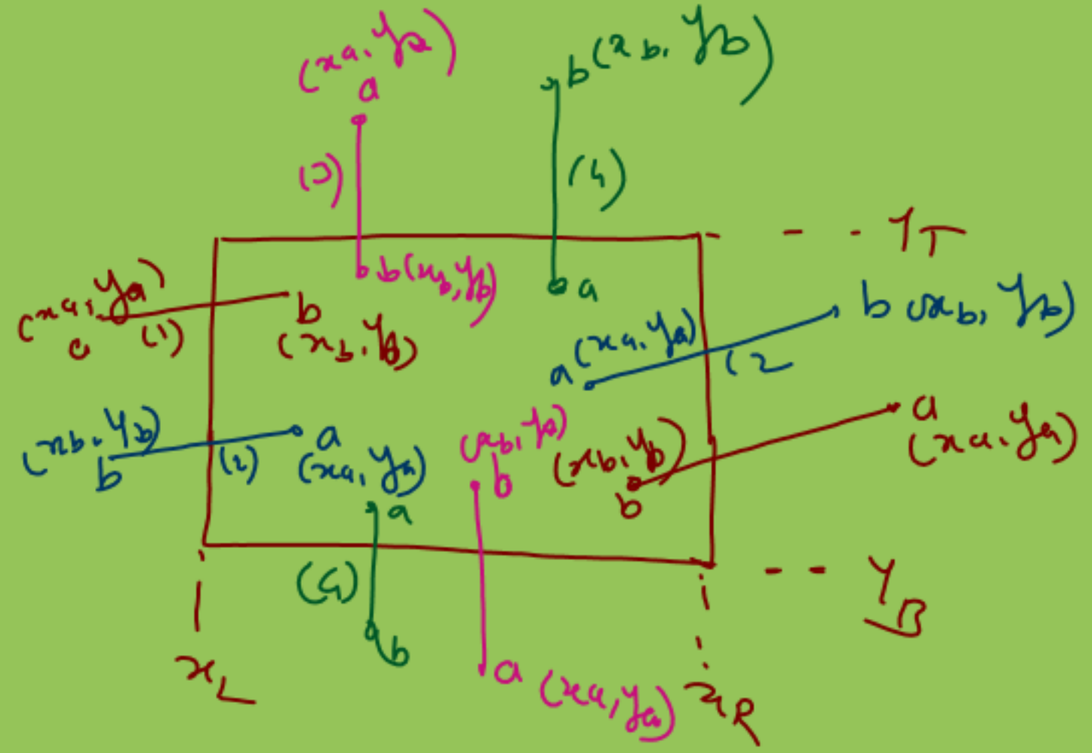
if $x_a < x_L$ **or** $x_a > x_R$ **then** Visibility = Partial Point a is outside

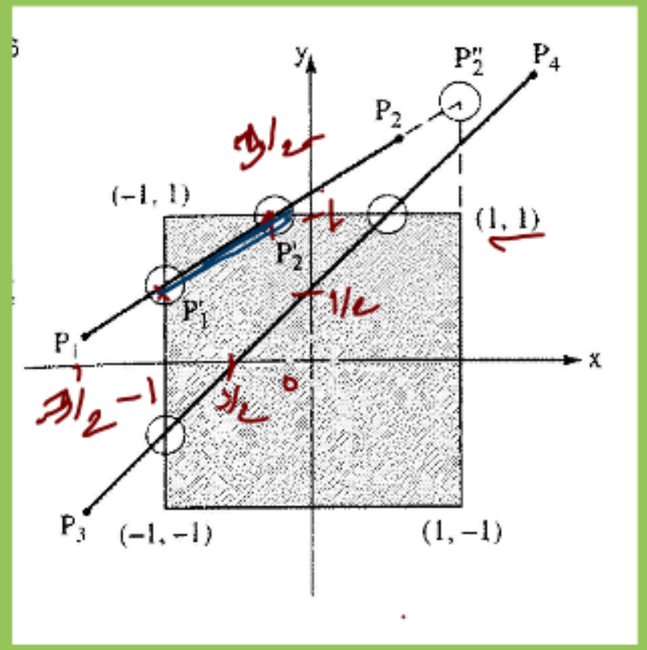
if $x_b < x_L$ **or** $x_b > x_R$ **then** Visibility = Partial Point b is outside

if $y_a < y_B$ **or** $y_a > y_T$ **then** Visibility = Partial Point a is outside

if $y_b < y_B$ **or** $y_b > y_T$ **then** Visibility = Partial Point b is outside

end if





Given $P_1(-3/2, 1/6)$ & $P_2(1/2, 3/2)$ $x_L = -1$

Lower left corner is $(-1, -1)$ $x_R = 1$

Upper left corner is $(1, 1)$ $y_T = 1$

$y_B = -1$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = 2/3$$

4 Bit code is

$P_1 = 0001$, $P_2 = 1000$ Logical AND of P_1 & $P_2 = 0000$

The line is not totally visible nor trivially invisible

The line crosses left edge w.r.t P_1 & top edge w.r.t. P_2

① With respect to P_1

Left: $x = x_L = -1$. $y = m(x_L - x_1) + y_1 = 2/3\left[-1 - (-3/2)\right] + 1/6 = 1/2$

$P_1' \rightarrow \boxed{x = -1,\ y = 1/2}$ – 1st intersection (left)

② With respect to P_2

Top: $y = y_T = 1$, $x = x_1 + \left(\frac{1}{m}\right)(y_T - y_1) = -3/2 + 3/2\left[1 - 1/6\right] = -1/4$

$P_2' \rightarrow \boxed{x = -1/4,\ y = 1}$ – 2nd intersection (Top)

So, the clipped line is $P_1'(-1, 1/2)$ to $P_2'(-1/4, 1)$

$P_1(70, 20)$ & $P_2(100, 10)$

lower left corner is $(50, 10)$

upper ~~left~~ right corner is $(80, 40)$

Clipped line $P_1(70, 20)$, $P_2(80, 16.67)$