Computer Graphics and Animation Lecture-9

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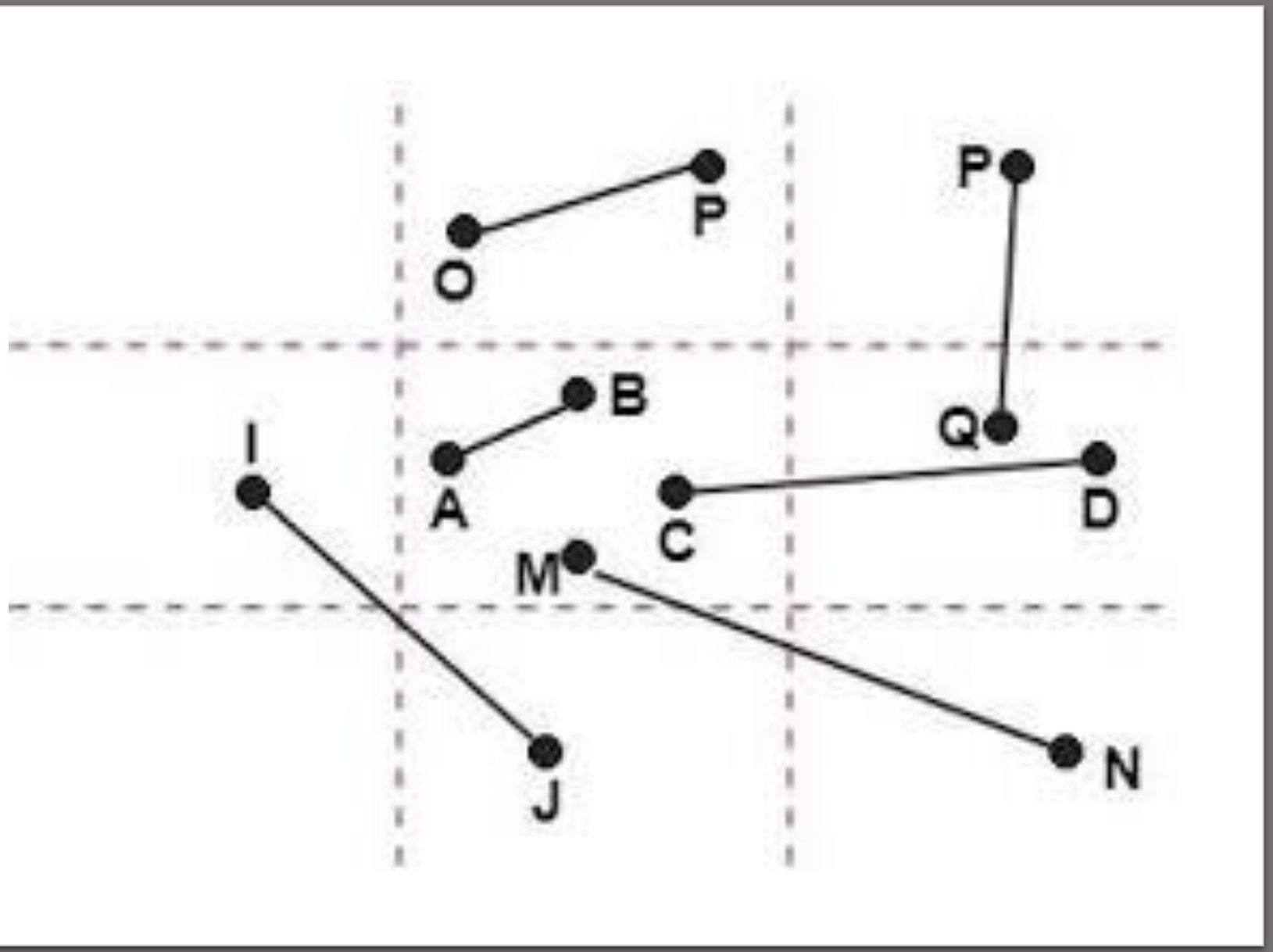
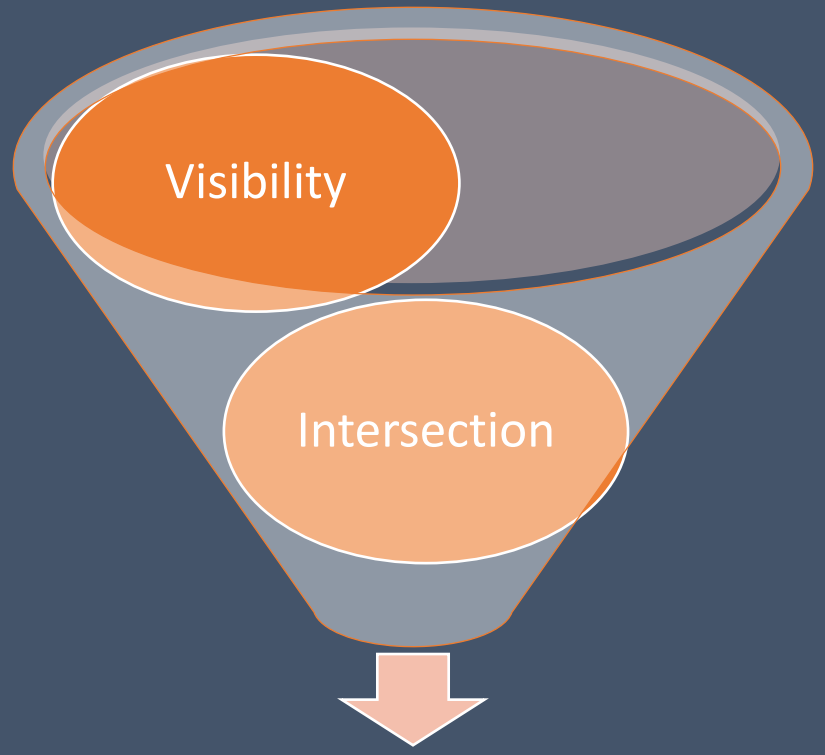


Example of Cohen Sutherland Algorithm Clipping window

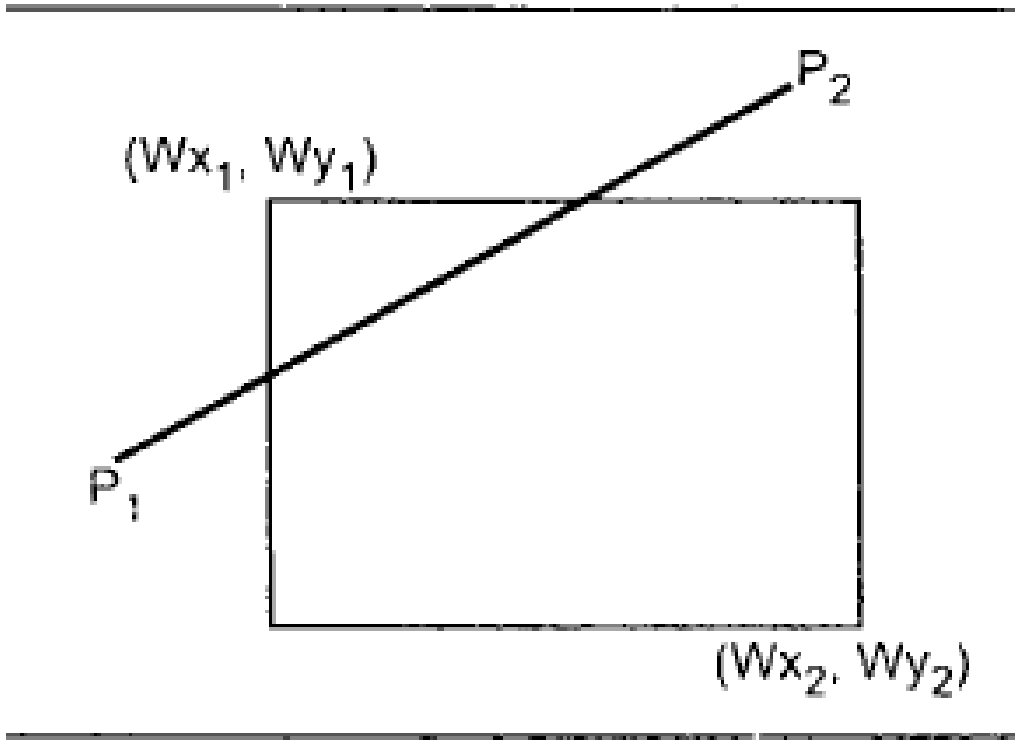
Cohen Sutherland Line Clipping



Cohen Sutherland Algorithm

Cohen Sutherland Line Clipping Algorithm

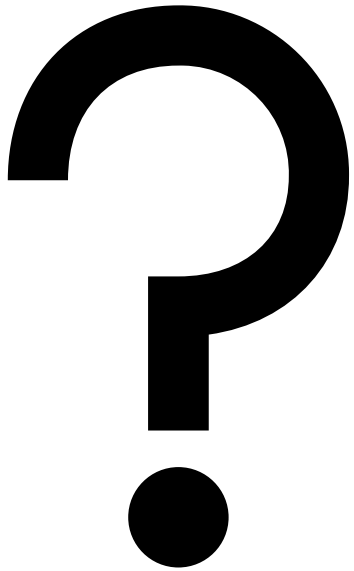
- Intersection point with clipping boundary can be calculated using Slope Intercept form of the line equation.
- The equation of line passing through points P1(x1,y1) and P2(x2,y2) is :
- y=m(x-x1)+y1 or y=m(x-x2)+y2.
- Slope M=(y2-y1)/(x2-x1)



Cohen Sutherland Line Clipping Algorithm

Intersection with clipping boundaries of the window is,

TBRL(Window)	Equation
Left xL,	y =m(xL-x1)+y1 ; m!=∞
Right xR,	y =m(xR-x1)+y1 ;m!=∞
Top yT,	x =x1 +(1/m)(yT-y1); m!=0
Bottom yB,	x =x1 +(1/m)(yB-y1); m!=0



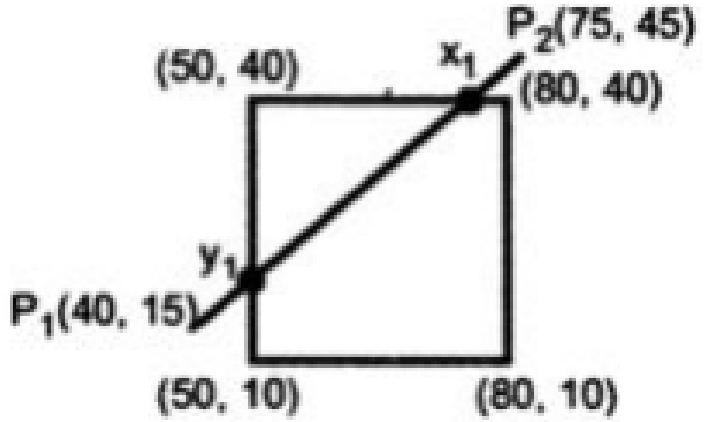
Use Cohen-Sutherland algorithm to clip two lines P1 (40, 15), P2 (75, 45) and P3(70, 20), P4 (100, 10) against,

a window A (50, 10), B (80, 10), C(80, 40) & D(50,40)

Solution

- Line 1 : P1 (40, 15) - P2 (75, 45) Wx1= 50 Wy1 = 40 Wx2 = 80 Wy2 = 10

- m =(45-15)/(75-40)=6/7
- y1 = m(xL – x) + y = (6/7)(50-40)+15 = 23.57
- x1 =(1/m) (yT – y) + x =(7/6) (40-15)+40 = 69.16
- y2 = m(xR – x) + y = (6/7)(80-40)+15 = 49.28
- x2 = (1/m) (yB – y) + x = (7/6)(10-15)+40 = 34.16

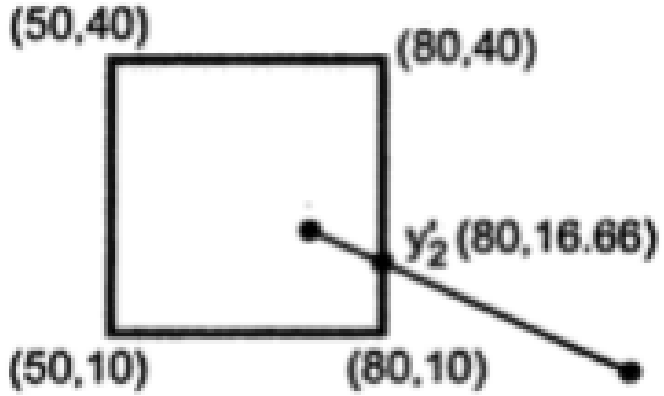


Point	End Code	ANDing	
P1	0001	0000	(Partially visible)
P2	1000		

Solution for Line 2

- Line 2 : P3 (70,20) – P4 (100,10) Wx1 = 50 Wy2 = 40 Wx2 = 80 Wy2 = 10

- Slope m`=(10-20)/(100-70)=-1/3
- y`1 = m(xL – x) + y = (-1/3)(50-70)+20 = 26.66
- x`1 =(1/m) (yT – y) + x = - 3 (40-20)+70 = 10
- y`2 = m(xR – x) + y = (-1/3) (80-70)+20 = 16.66
- x`2 = (1/m)(yB – y) + x = - 3 (10-20)+70 = 100



Point	End Code	ANDing	
P3	0000	0000	Partially Visible
P4	0010		

Use Cohen-Sutherland algorithm to clip two lines P1 (35,20) -- P2 (80,50) and P3 against a window A (50, 10), B (80, 10). C(80, 40) & D(50,40)

QUIZ

Thank You