

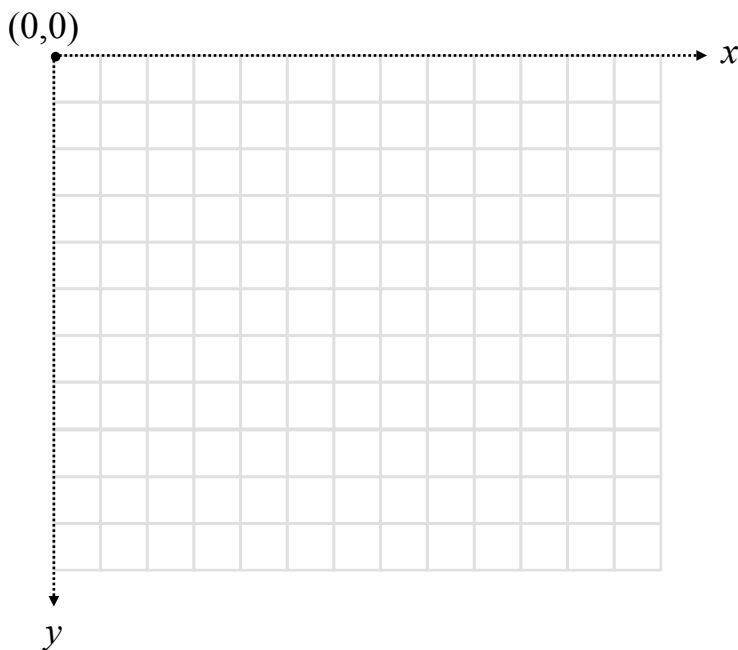
### Cohen-Sutherland Line Clipping

In this problem, you are given a clipping window (defining the “viewport”) and an example line, and asked to perform the steps of the line clipping algorithm we just learned in class. Assume the origin is at the top left and  $y$  is increasing going down (like HTML canvas).

**Input:** viewport defined by the lines  $x_{\min} = 2$ ,  $x_{\max} = 10$ ,  $y_{\min} = 3$ ,  $y_{\max} = 8$ .  
line defined by the points  $p_1 = (1, 5)$  and  $p_2 = (11, 1)$ .

**Output:**  $p'_1$  and  $p'_2$ , the points defining the line that should actually be drawn.

1. Draw out the viewport and the example line, labeling  $p_1, p_2, x_{\min}, x_{\max}, y_{\min}$ , and  $y_{\max}$ .
2. Write out the binary 4-digit codes for  $p_1$  and  $p_2$ .
3. Write out what case each point falls under and show how the algorithm would update the points. What are the final  $p'_1$  and  $p'_2$ ?



4. Label  $p'_1$  and  $p'_2$  on your picture and make sure they agree visually with your calculations.
5. How many “rounds” of clipping are required to make this example line within the viewport?