# **Algorithm: Bresenham's Line Drawing Algorithm**

Input:

- x1, y1: Coordinates of the starting point

- x2, y2: Coordinates of the ending point

Output:

- A list of x and y coordinates representing points along the line

Steps:

1. Calculate the absolute differences in x and y coordinates:

   dx = |x2 - x1|

   dy = |y2 - y1|

2. Initialize direction variables:

   - Determine x-direction (sx):

     IF x2 > x1 THEN sx = 1 ELSE sx = -1

   - Determine y-direction (sy):

     IF y2 > y1 THEN sy = 1 ELSE sy = -1

3. Initialize coordinates:

   x = x1

   y = y1

   xes = []  // List to store x-coordinates

   yes = []  // List to store y-coordinates

4. Choose line drawing method based on line slope:

   IF dx >= dy THEN  // More horizontal line

     a) Initialize decision parameter:

        Po = (2 \* dy) - dx

        Pk = Po

     b) WHILE x < x2 DO:

        - Append current (x, y) to xes and yes

        - Increment x by sx

        - IF Pk >= 0 THEN

            Increment y by sy

            Update Pk = Pk + 2\*dy - 2\*dx

          ELSE

            Update Pk = Pk + 2\*dy

   ELSE  // More vertical line

     a) Initialize decision parameter:

        Po = (2 \* dx) - dy

        Pk = Po

     b) WHILE x < x2 DO:

        - Append current (x, y) to xes and yes

        - Increment y by sy

        - IF Pk >= 0 THEN

            Increment x by sx

            Update Pk = Pk + 2\*dx - 2\*dy

          ELSE

            Update Pk = Pk + 2\*dx

5. Visualization:

   - Plot points in xes and yes using matplotlib

   - Display the plot with markers

Termination Condition:

- Line drawing stops when x reaches x2

Output:

