Bresenham’s Line Algorithm (For all cases)

1. Input

* Start point (x0, y0) and end point (x1, y1)

1. Steps
   1. Calculate differences

∆x = | x1 – x0 |

∆y = | y1 - y0 |

* 1. Determine the dominant axis:
* If ∆x ≥ ∆y, the line has a shallow slope (|m| ≤ 1)
* If ∆x < ∆y, the line has a shallow slope (|m| > 1)
  1. Set step directions:
* Sx = 1 if x1 > x0 otherwise Sx =-1
* Sy = 1 if y1 > y0 otherwise Sy =-1
  1. Initialize Decision Parameters
* For shallow slopes (|m| ≤ 1)

P0 = 2∆y - ∆x

* For steep slopes (|m| ≤ 1)

P0 = 2∆x - ∆y

1. Plot the initial point:

* Plot (x0, y0)

1. Iterate until the endpoint is reached:

* For k = 0 to the dominant axis length (∆x or ∆y):
* For shallow slope (|m| ≤ 1)
* Increment x0 by Sx.
* If pk ≥ 0:
* Increment y0 by Sy.
* Update pk+1 = pk + 2∆y - 2∆x
* Else:
* Update pk+1 = pk + 2∆y
* For shallow slope (|m| > 1)
* Increment y0 by Sy.
* If pk ≥ 0:
* Increment x0 by Sx.
* Update pk+1= pk + 2∆x - 2∆y
* Else:
* Update pk+1 = pk + 2∆x
* Plot the new point (x0, y0).

1. Terminate:

* Stop when the endpoint (x1, y1) is plotted.

Output

A sequence of plotted points (x, y) forming the rasterized.