Computer Graphics and Animations
L-5

SYIT

Rohini D, Madhavi A

Bresenham's Line Drawing Algorithm

- The Bresenham's algorithm uses only integer addition, subtraction and multiplication by 2
- And we know that computer can perform integer addition and subtraction very rapidly.
- The computer is also time efficient when performing integer multiplication by 2.
- The basic principle of Bresenham's algorithm is to select the optimum raster locations to represent a straight line.

- To accomplish this the algorithm always increments either x or y by one unit depending upon the slope of the line.
- The increment in other variable is determined by examining the distance between the actual line location and the nearest pixel.
- This distance is called decision variable or error.
- The error term is initially set as $e=2*\Delta y- \Delta x$.
- Let us study the algorithm now:

Algorithm

Read the coordinates of the two end points (x_1,y_1) & (x_2,y_2) such that they are not equal.(if equal then plot that point and exit)

$\Delta x = |x2-x1|$ and $\Delta y = |y2-y1|$.

Initialize the starting point i.e x=x1 and y=y1.

Calculate $e = 2\Delta y - \Delta x$

Initialize i=1.

Plot(x,y)

Algorithm

While(e≥0)

{

y=y+1

e=e-2*Δx

}

x=x+1

e=e+2*Δy

i=i+1

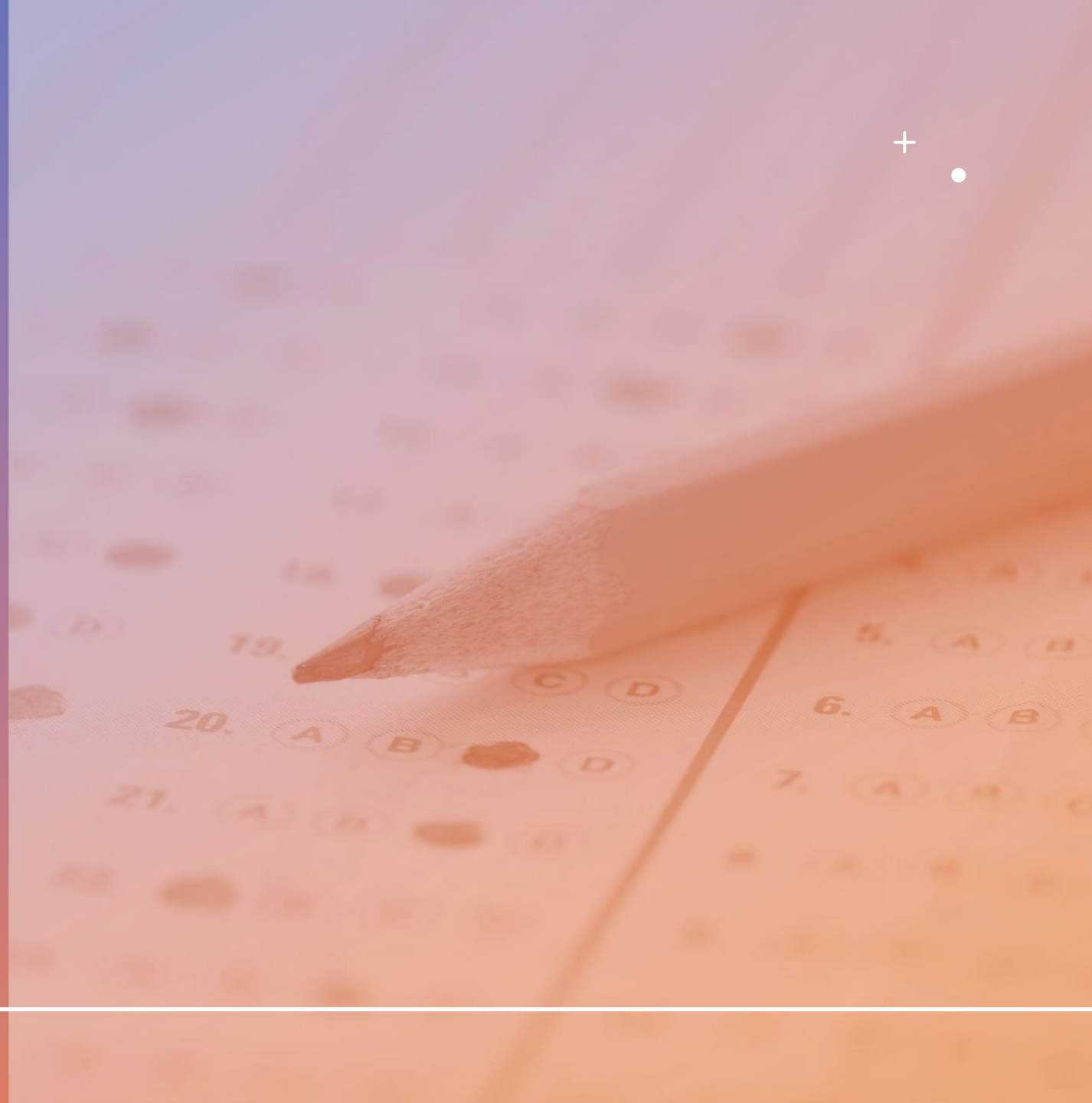
if(i≤Δx) then go to step 6.

Stop.

Examples

1	Consider the line from (5,5) to (13,9). Use Bresenham's algorithm to rasterize the line.
2	Calculate the points between the starting coordinates (9, 18) and ending coordinates (14, 22).
3	Calculate the points between the starting coordinates (20, 10) and ending coordinates (30, 18).

Quiz



Thank You