BSc Computer Science
CS1541 Computer Graphics

Module I

Simple DDA

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DDA Algorithm

→ Digital Differential Analyzer

- Sample the line at unit intervals in one coordinate
- Determine the corresponding integer values nearest the line path in another co-ordinate

DDA Algorithm

Algorithm SimpleDDA(X1,Y1,X2,Y2)

[This algorithm draws a line from (X1,Y1) to (X2,Y2)]

Step 1: [Initialize]

X←X1

Y←Y1

Step 2: [Compute the displacement in X axis and Y axis]

DX←ABS(X2-X1)

DY←ABS(Y2-Y1)

Step 3:[Compute number of steps]

If(DX>=DY) STEP←DX

else STEP←DY

Step 4: [Compute delta X and delta Y]

DELTAX←DX/STEP

DELTAY←DY/STEP

Step 5: [Plot the pixels] while(i<=step)

Repeat I from 1 through STEP

PLOT(X,Y)

X←X+DELTAX

Y←Y+DELTAY

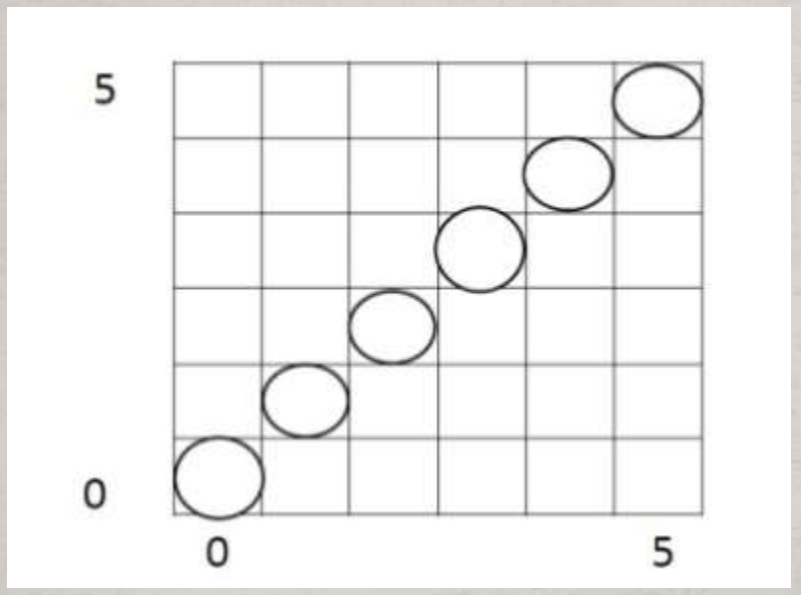
I←I+1

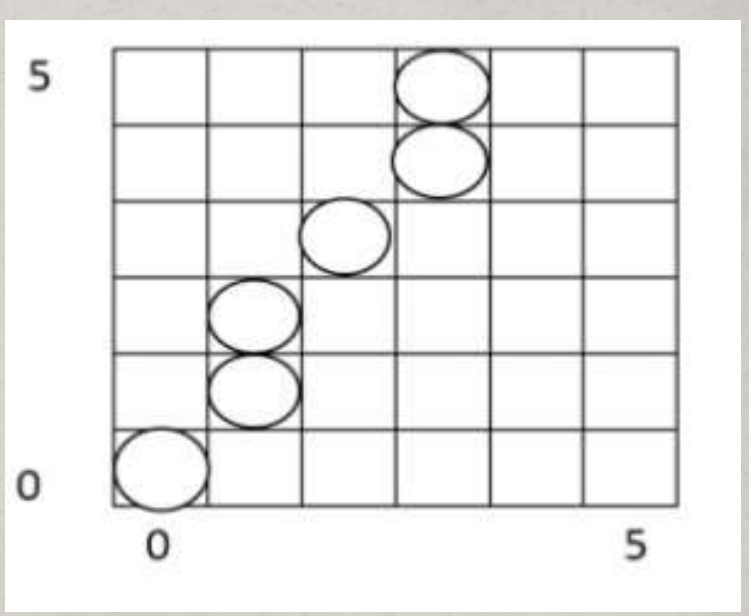
Step 6 : [Finished]

Return

Examples

- Use DDA algorithm for rasterizing line (0,0) to (6,6).
- Use DDA algorithm for rasterizing line (0,0) to (4,6).





Advantages and Disadvatages

Advantages of DDA Algorithm

1. It is the simplest algorithm and it does not require special skills for implementation.
2. It is a faster method for calculating pixel positions than the direct use of equation $y = mx + b$. It eliminates the multiplication in the equation by making use of raster characteristics, so that appropriate increments are applied in the x or y direction to find the pixel positions along the line path.

Disadvantages of DDA Algorithm

1. Floating point arithmetic in DDA algorithm is still time-consuming.
2. The algorithm is orientation dependent. So the end point accuracy is poor.

Thank You