



Curve generation

Problem: Generate a digital curve

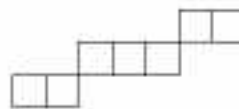
Find a connected sequence of discrete pixels that follows the curve as closely as possible

The curve should be either 4-connected or 8-connected, one pixel wide

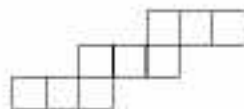


Connectivity

8-connected: horizontal, vertical and diagonal moves are allowed:



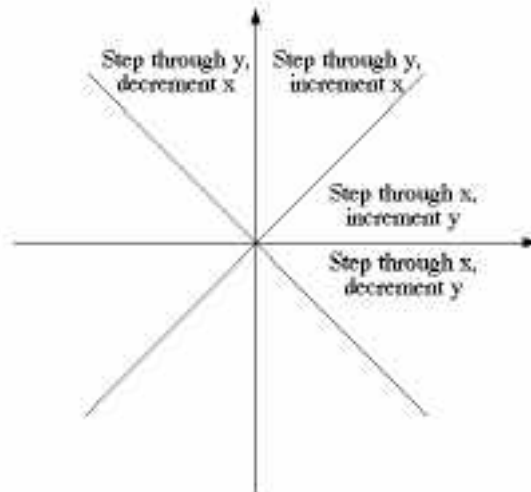
4-connected: diagonal moves are not allowed:



Choose one, don't mix them! 8-connectedness most common for curve generation.



We need to move differently in different directions



Two line drawing algorithms:

The DDA algorithm:

Simple but slow on low-end hardware

The Bresenham algorithm:

Extremely fast on any hardware



Line drawing, summary

DDA algorithm

Floating-point
Simple and straightforward

Bresenham's algorithm

Integer-based
Incremental; Additions and shifts only
Ideal for low-power hardware



Curve attributes

Width
Color and patterns
End caps of curves
Corner shapes
Dashed lines



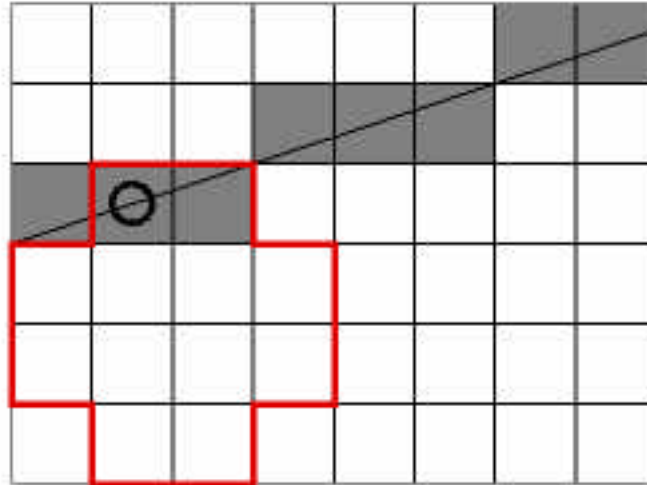
Drawing curves with greater width than 1

Two approaches:

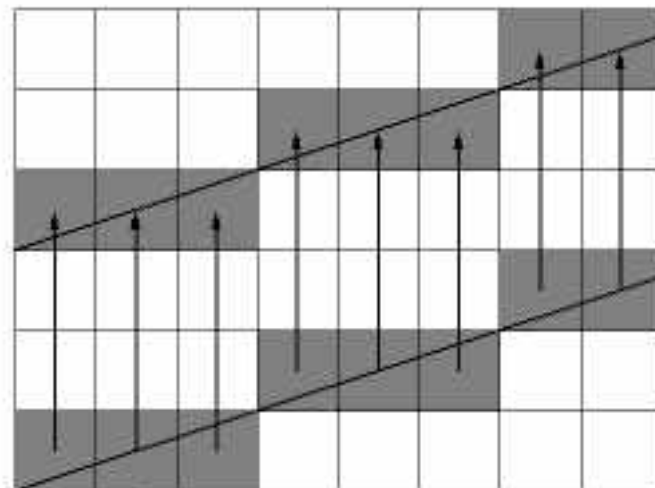
- (1) Using a pen shape
- (2) Using two parallel curves



Using a pen shape



Using two parallel curves





Drawing a wide circle

How?



End caps

