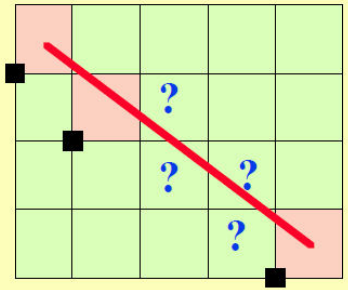
Line Drawing

We are going to analyze how this process is achieved.

Some useful definitions

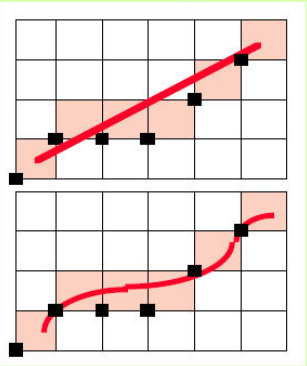
Rasterization: Process of determining which pixels provide the best approximation to a desired line on the screen.



Scan Conversion: Combination of rasterization and generating the picture in scan line order.

General requirements

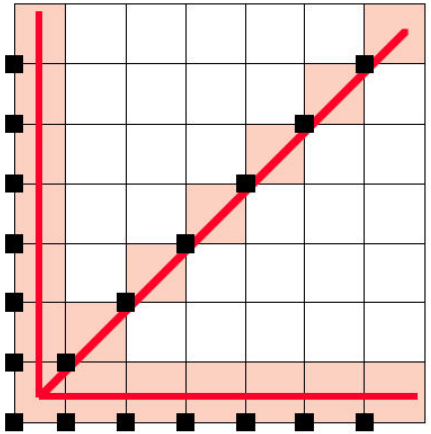
- Straight lines must appear as straight lines.



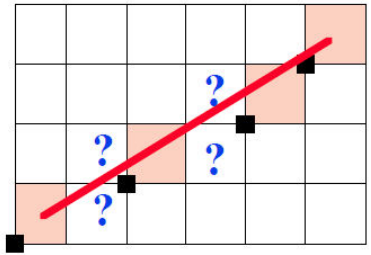
- They must start and end accurately
- Lines should have constant brightness along their length
- Lines should drawn rapidly

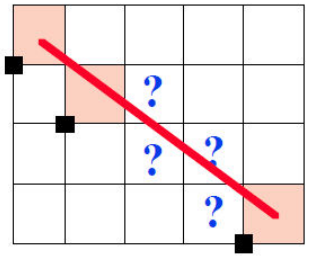
Line Drawing

For horizontal, vertical and 45° lines, the choice of raster elements is obvious. This lines exhibit constant brightness along the length:



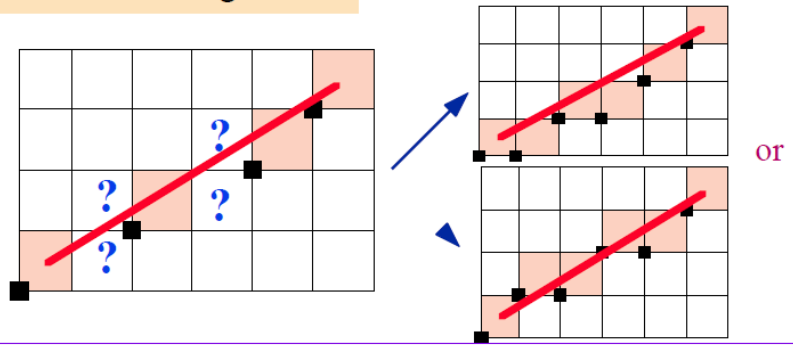
For any other orientation the choice is more difficult:





Line Drawing

Rasterization of straight lines.



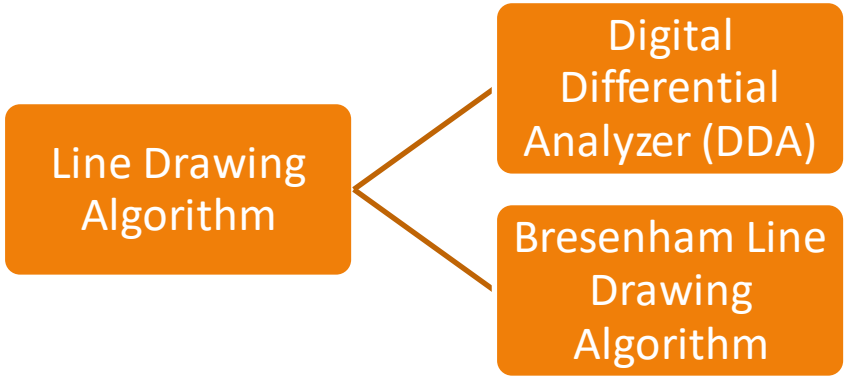
Rasterization yields uneven brightness: Horizontal and vertical lines appear brighter than the 45° lines.

For fixing so, we would need:
1. Calculation of square roots (increasing CPU time)
2. Multiple brigthness levels

=>

Compromise:
1. Calculate only an approximate line
2. Use integer arithmetic
3. Use incremental methods

Line Drawing Algorithm



DDA Algorithm-

DDA Algorithm is the simplest line drawing algorithm.

Lecture No 14 Topic: Line Drawing Algorithm Steps

Given-

Starting coordinates = (X_0, Y_0)

Ending coordinates = (X_n, Y_n)

The points generation using DDA Algorithm involves the following steps-

Step-01:

Calculate ΔX, ΔY and M from the given input.

These parameters are calculated as-

$\Delta X = X_n - X_0$

$\Delta Y = Y_n - Y_0$

$M = \Delta Y / \Delta X$