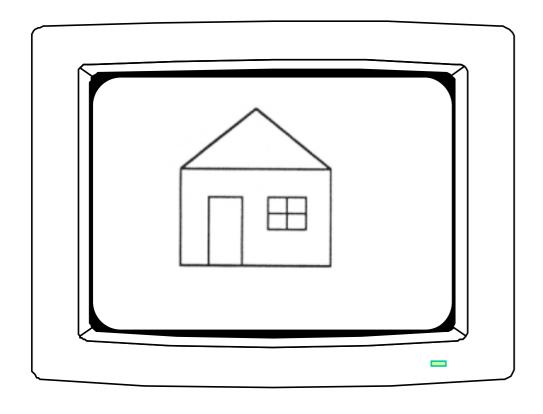
Problemas da Rasterização

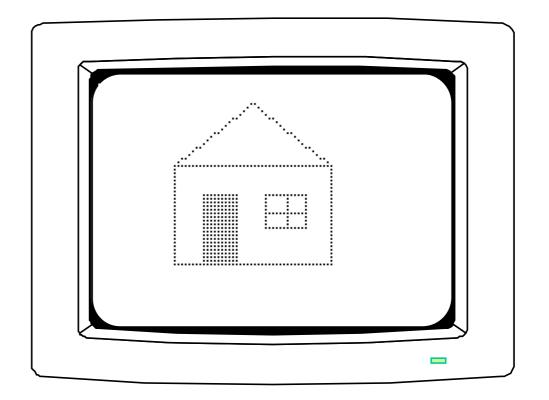


Problemas da Rasterização

Vector Display







Pen plotter (traçador)

Laser printer

DVST

Inkjet printer

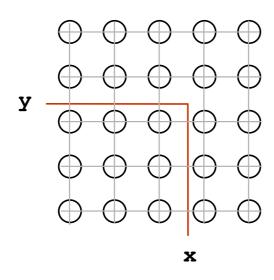


Aliasing

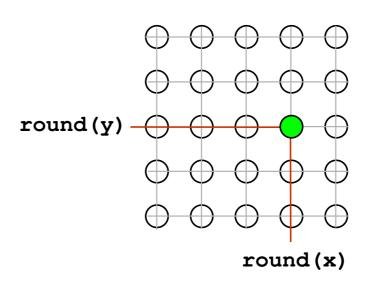
The most obvious attempt to overcome almost all the following side-effects is to deal with a higher resolution.

Aliasing

Plotting a point in a location other than its true location.



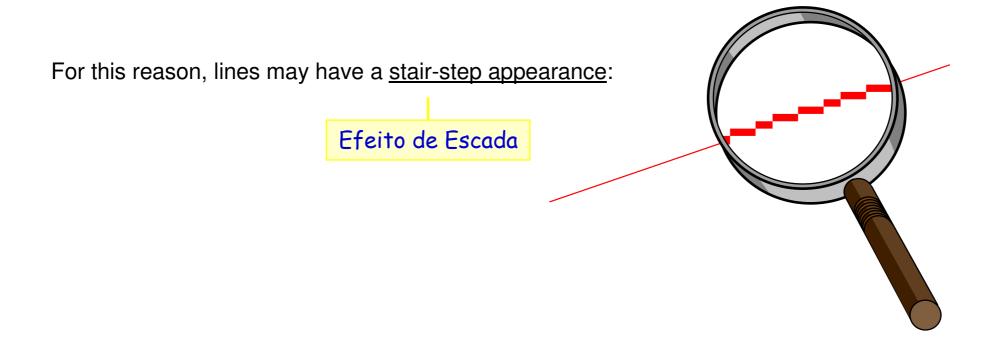




Alias location



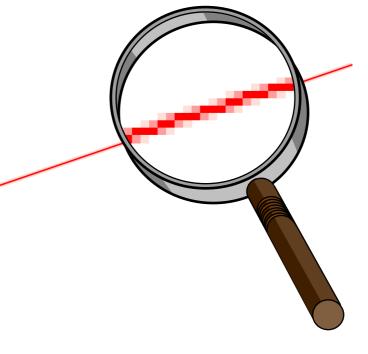
Efeito de Escada



Antialiasing technique:

Turning on more than one pixel in a column (see Bresenham or Midpoint Line algorithms) by using <u>several intensity levels</u>.

The proper value to be used will be choosen according to a function of the distance between the pixel location and the true location.





Efeito de Escada

Application to TEXT CHARACTERS:

Normal sample in Times New Roman



... and with Antialias





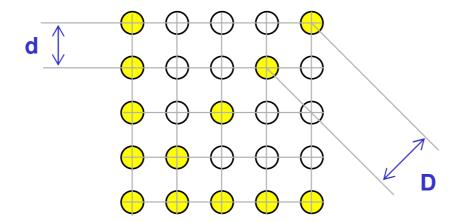
Variação da Intensidade

Unequal Intensity

Diagonal lines of pixels appear dimmer than vertical or horizontal lines.

Why?

For the same intensity of light sources, our perception of light also depends on their density.



$$D = d\sqrt{2}$$

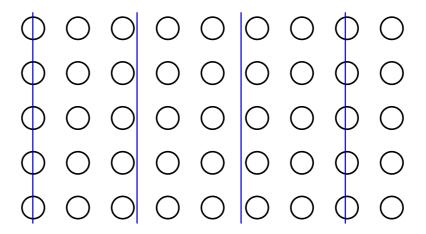
"Picket Fence"

Picket Fence

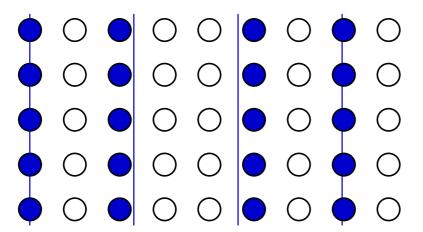
A decision problem about dimensions will occur if an object does not fit exactly into the raster.

Given a <u>picket fence</u> as the original object:

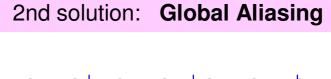
Vedação com estacas (paliçada) Exemplo em desenho técnico: tracejado

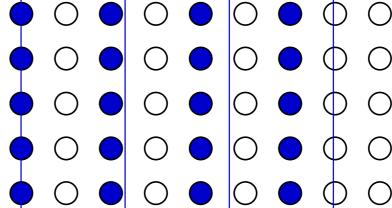


1st solution: Local Aliasing



Equal overall length but different distances between pickets.



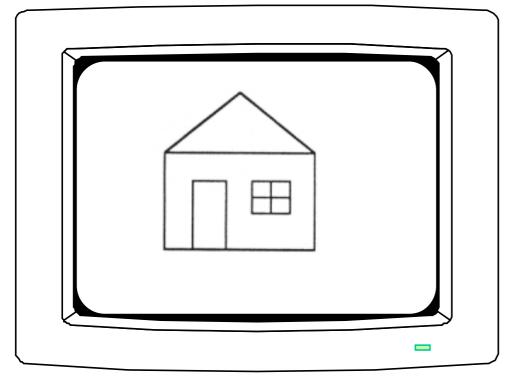


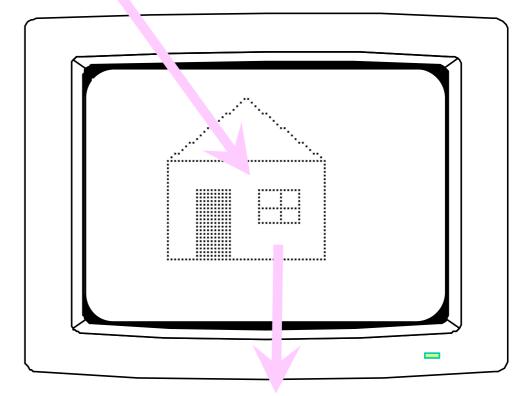
Equal distances between pickets but different overall length.



Global vs Local Aliasing

Example

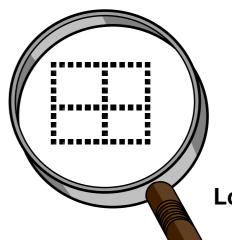






Which one do you prefer?

Global Aliasing



Local Aliasing



Antialiasing por Filtragem

ANTIALIASING pelo Método da Filtragem

Aplica-se (por pós-processamento) a uma imagem já existente.

Método: o valor de cada pixel contribui, por soma ponderada, para os valores dos pixels vizinhos e na relação inversa da distância.

Este cálculo não é cumulativo, dando resultados bastante aceitáveis tanto para linhas como para polígonos.

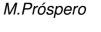
Como a menor das vizinhanças é a de pixels adjacentes, o menor dos filtros possíveis é 3x3.

Por exemplo:

1/36 1/9 1/36 y 1/9 4/9 1/9 1/36 1/9 1/36

X

Os valores numéricos indicam as ponderações de intensidade de todos os nove pixels para o cálculo da intensidade no pixel (x,y).





Exemplo de aplicação

Exemplo de aplicação concreta do filtro 3x3:

Imagem original:

(com o cálculo de três dos pixels a tratar)

Black=0 White=1

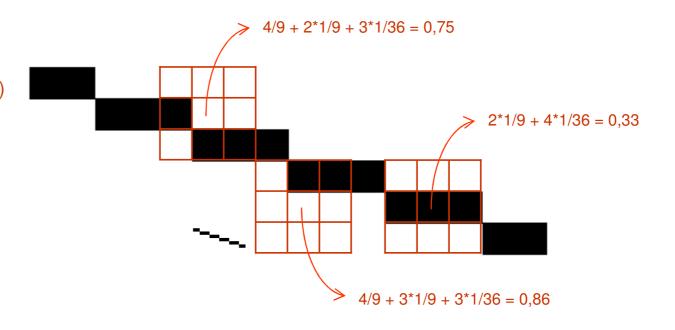


Imagem tratada:



(inconveniente: as linhas finas ficarão mais ténues)

