2D graphics: Overview of lecture content, rules & conditions

Lecture „2D Graphics"

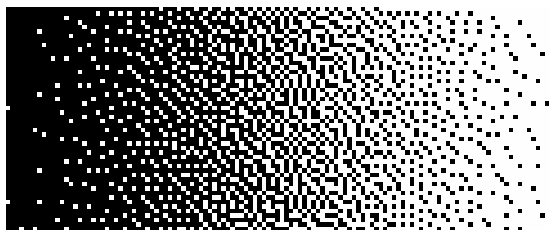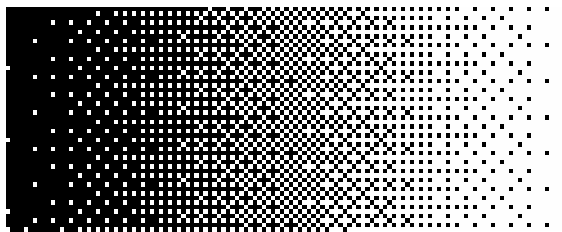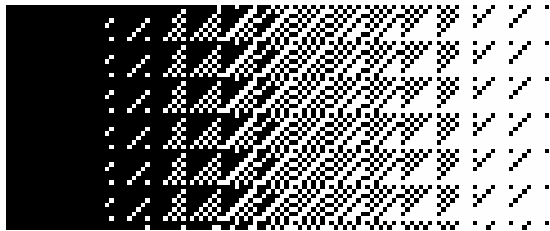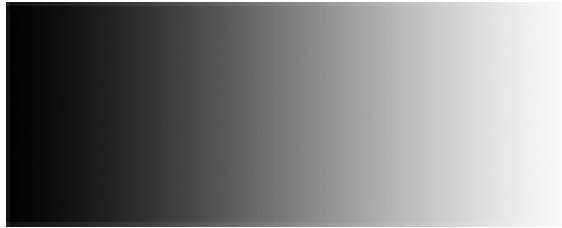Andreas Butz, Otmar Hilliges

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Topics Today

- Some Examples
- Topics of the lecture
  - What we'll do
  - What we won't do
- Exercises
- Conditions for getting the certificate
- Useful resources

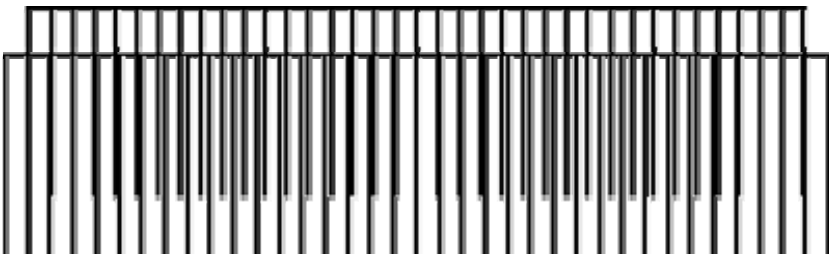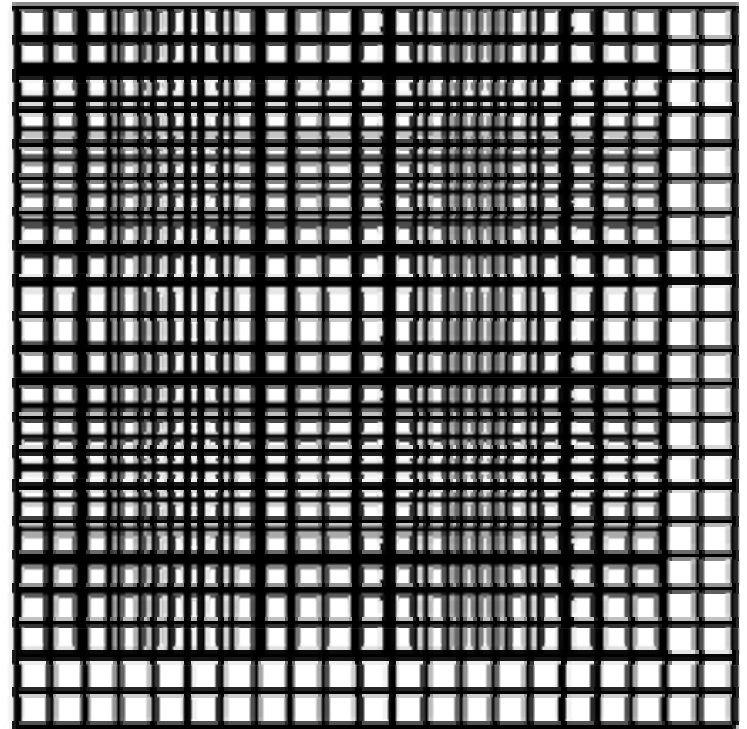# A few examples of 2D Graphics

Dithering

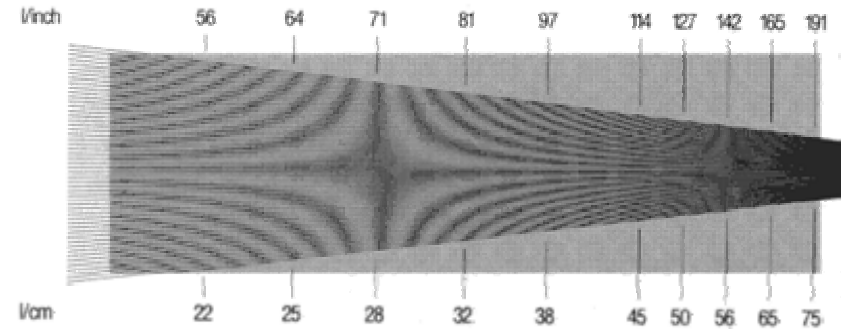- Source image with many colors (here: 256 greys)
- Target image with less colors (here: b/w)
- Idea: simulate missing colors by mixing available ones on neighboring pixels
- Loss of resolution

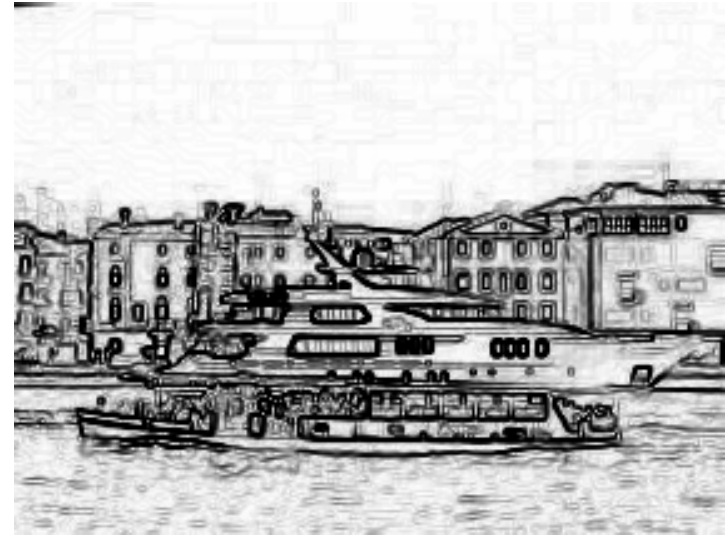# Moiree patterns

Noise reduction

Image Sharpening

- Often used, hardly understood
- Basic idea: increase local contrast
- Different methods available
- Can do more damage than good
- Happens without notice in cameras

Edge detection

- Idea: find harsh changes in brightness or color
- Can be used to „stylize" images
- Can also be the basis for vectorization

Morphological Operators

Test 1 2 3

Test 1 2 3

Test 1 2 3

Test 1 2 3

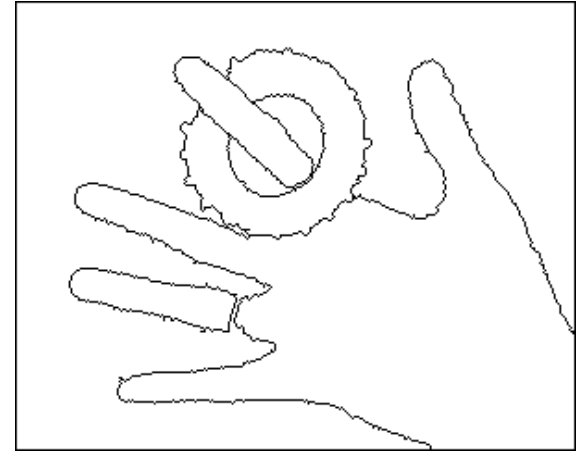Test 1 2 3

- Based on neighboring pixels
- Can „erode" or „dilate" areas
- Can close holes
- Can simplify shapes
- Can remove dirt

Image Segmentation

- One possible idea: find regions of similar color

- Can also be used to vectorize images

- Prerequisite of shape recognition
  - > automatic image classification
  - > search function in image databases ?!?

About the lecture & exercises

Lecture topics

- Pixel graphics basics
- Digital Photography
- Managing color
- Mathematics for image processing
- Image improvements
- Image segmentation
- Morphological operations
- Image recognition
- A few Tools

Some topics NOT covered

- 2D vector graphics & rasterization
  - > Axel Hoppe: 3DCG
- SVG
  - > Bry & Ohlbach: "Sprachen für neue Medien"
- Image compression
  - > Hussmann: „Medientechnik" + „Digitale Medien"
- 3D computer vision
  - > own nontrivial research field

Exercises

- Build a small 2D display software in Java
- From week to week add functionality to it
- Exact rules in a separate document…

… → enter: Otmar Hilliges

Some useful resources

- Klaus D. Tönnies: "Grundlagen der Bildverarbeitung", ISBN 3-8273-7155-4

- Script and news:
- http://mimuc.de/lehre/ws0506/2dg.html

- Exercises:
- https://wiki.medien.ifi.lmu.de/view/Main/Uebung2DGrafikWS0506

- Mailing list:
- https://tools.rz.ifi.lmu.de/mailman/listinfo/2dgrafik