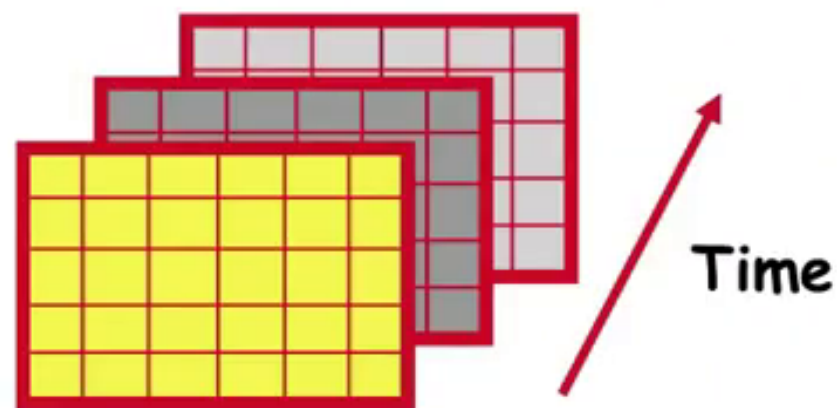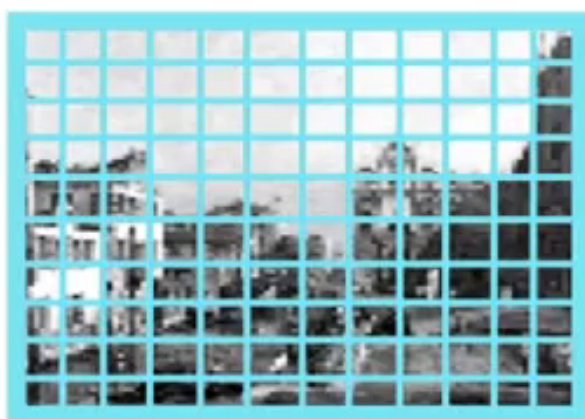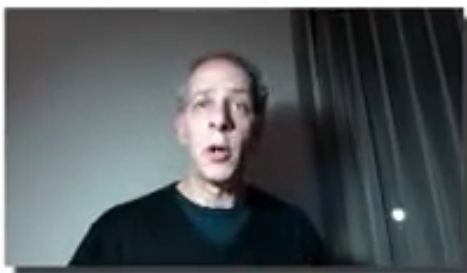# What and why a discrete computer image?
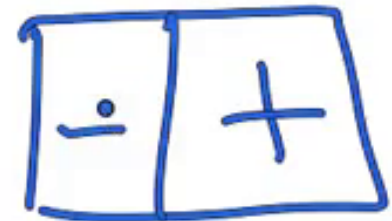

Movie courtesy "Sleepers" by W. Allen

Time

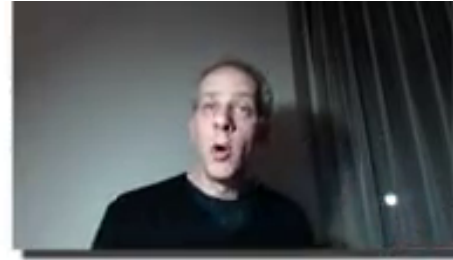# Discrete image representations

- Classical image processing is based on discrete mathematics (most of it)
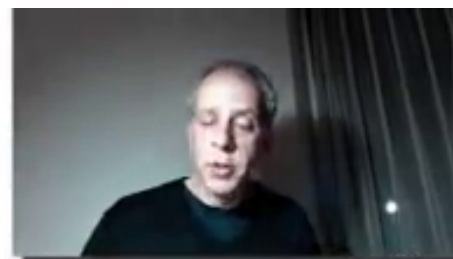
  - Sums instead of integrals

  - Re-definition of classical continuous operators such as gradients, Laplacian, etc

The PDEs approach

- Images are **continuous** objects

- Image processing is the results of **iteration of infinitesimal operations: PDEs**

- **Differential geometry** on images

- **Computer** image processing is based on **numerical analysis**

Why? Why Now? Who?

- **Why now:**
  - Computers!!!
  - People
- **Why:**
  - New concepts
  - Accuracy
  - Formal analysis (existence, uniqueness, etc)
- **Consequences:**
  - Many state of the art results
  - New tools in the bookshelf