Stochastic Hill Climbing

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The Problem:

- How can we place 50 polygons in order to best reproduce an image?

Huge Search Space

- 50 Polygons * 10 vertices * 100 integral X coordinates * 100 integral Y coordinates * 2^32 colors = ~2 * 10^16 Possibilities
- Assuming we could evaluate 1000 potential solutions per second, a comprehensive search would take over 680,000 Years.

Genetic Algorithms

- Randomly Create a Population
- Fitness Proportionate Selection for Breeding and Mutation

Simplest Solution

- CI-GD runs too slowly
- Naive Overlapping converges too slowly
- Single Thread is wasteful

Tweaks

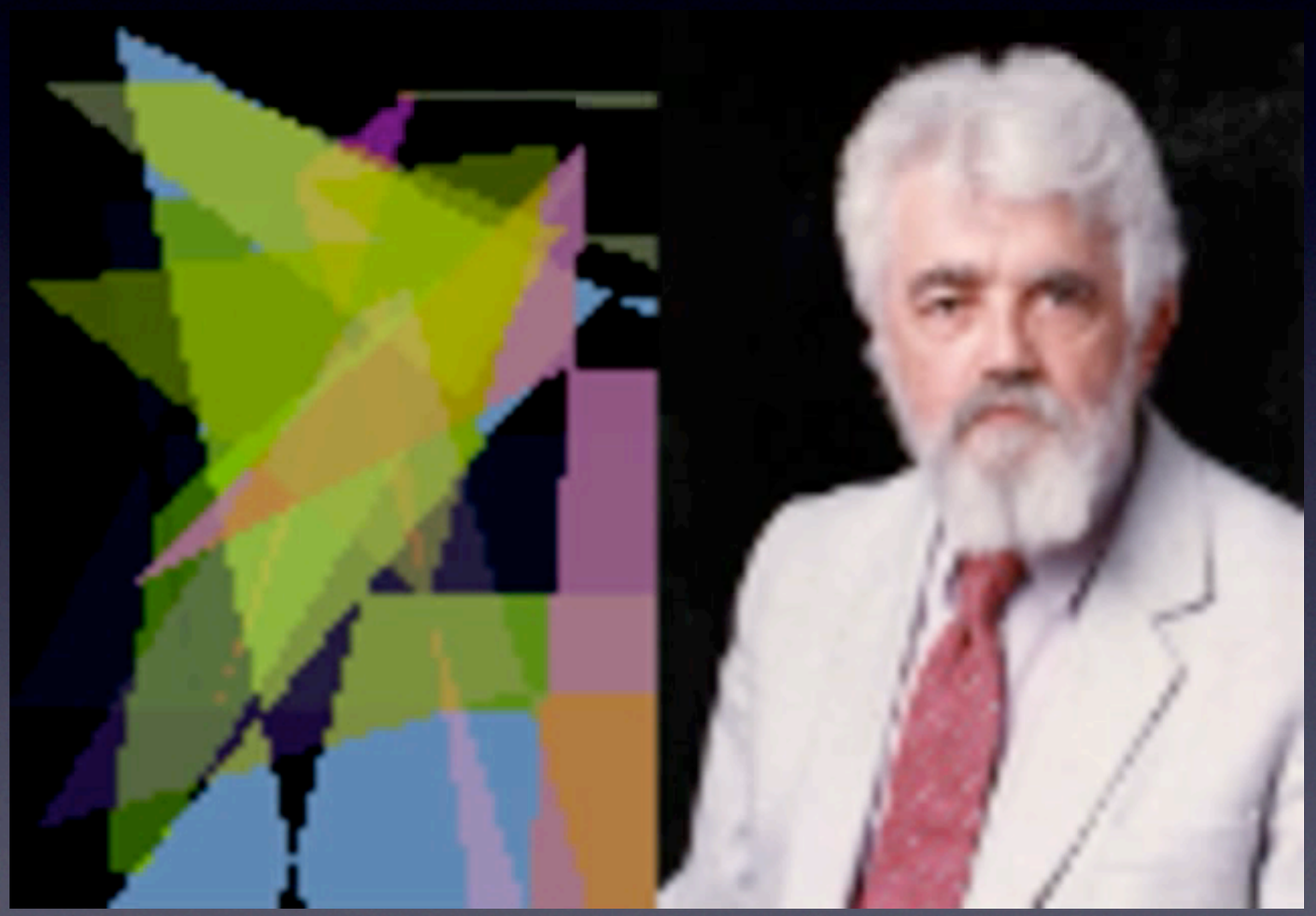
- Mutate separately, not in the course of reproduction
- Choose survivors deterministically
- Choose parents with roulette-wheel selection

Code

- http://github.com/smanek/ga
  - ga.asd for package management
  - global.lisp for configuration
  - bitmap.lisp for BMP manipulation
  - color.lisp for bit twiddling
  - chromosome.lisp for multi-threading

The Result

Bonus



Gratuitous Example