# \(\lambda\) Lounge

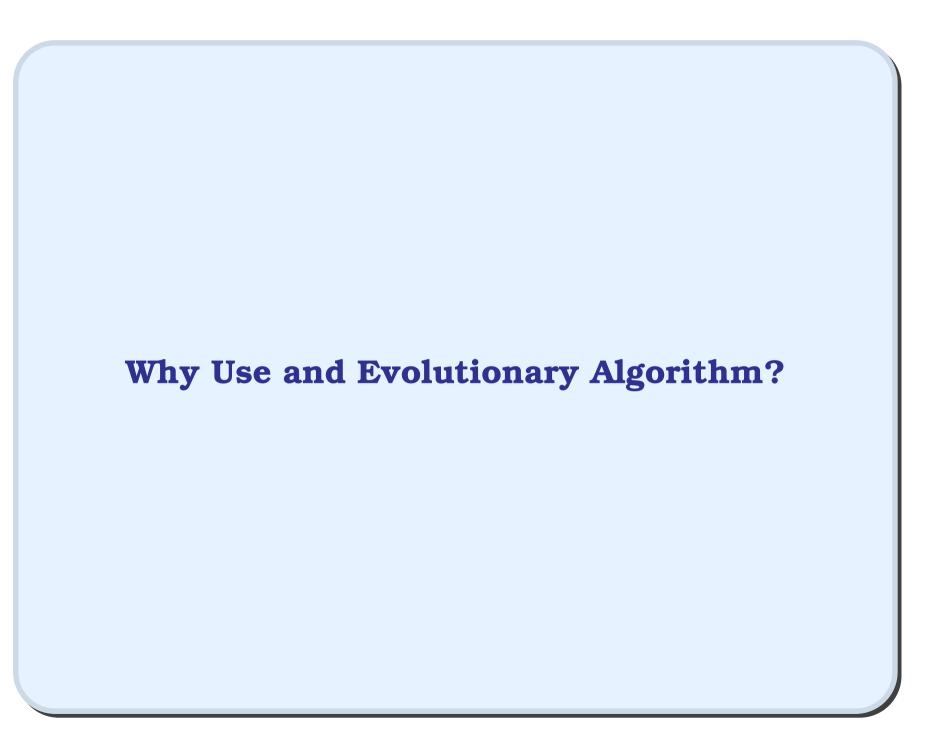
## **Evolutionary Algorithms**

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### The Evolutionary Algorithm

- 1. Population Initialization: generate a new population.
- 2. Fitness Evaluation: rate each member of the population.
- 3. Repeatedly:
  - (a) Parent Selection: choose who to breed.
  - (b) Recombination: cross the parents.
  - (c) Mutation: applied to the offspring.
  - (d) Fitness Evaluation: usually just the new offspring.
  - (e) Survivor Selection: kill off the weak.

#### **Population Initialization**

"It's turtles all the way down ... until it's not."

• Intelligently seed the population: think Adam and Eve. This is common if you are fine-tuning a solution you already have, either generated from your EA in a previous run, or from some different system.

**Pro:** you can start off the population somewhere useful.

Con: you have to know where "somewhere useful" is.

- Randomly generate the population.

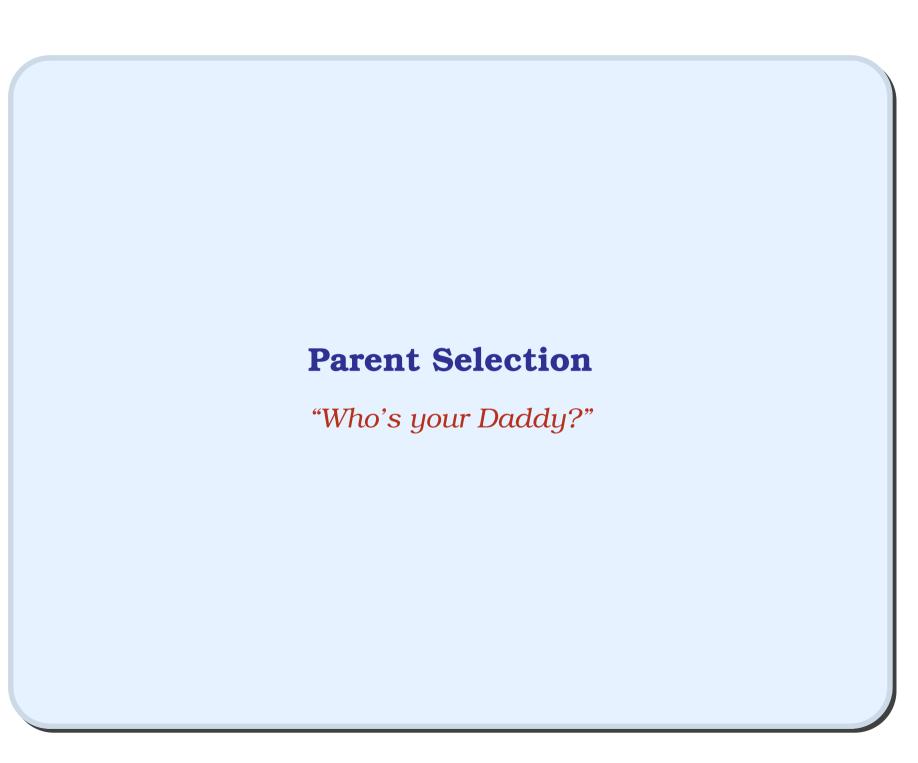
  This is usually easy and usually doesn't cost too many generations.
- Doing both at the same time isn't uncommon.

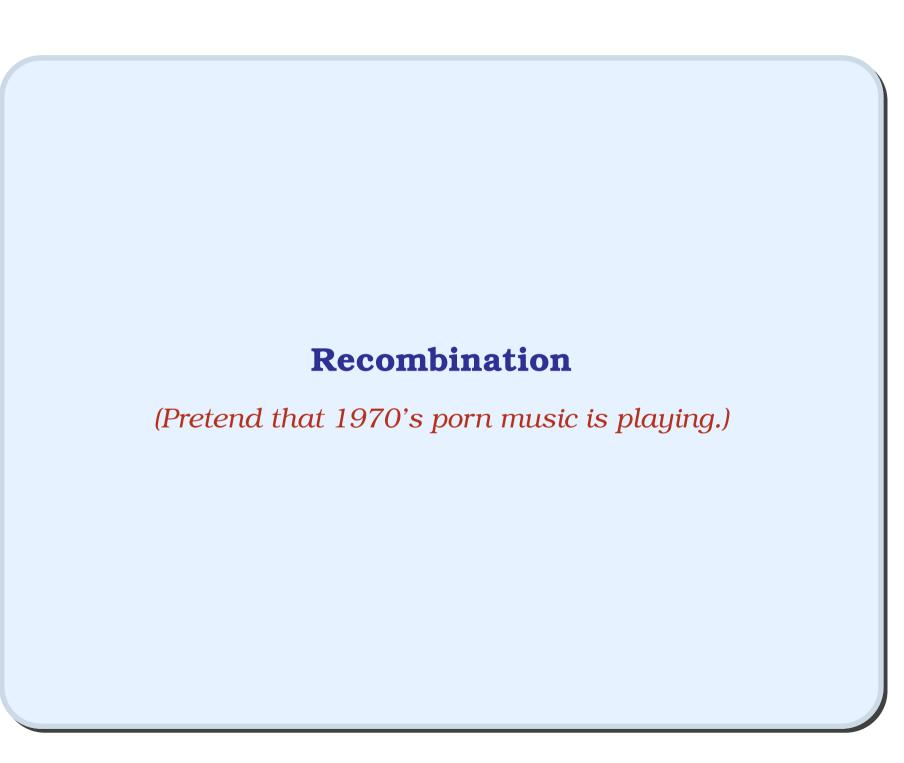
#### **Fitness Evaluation**

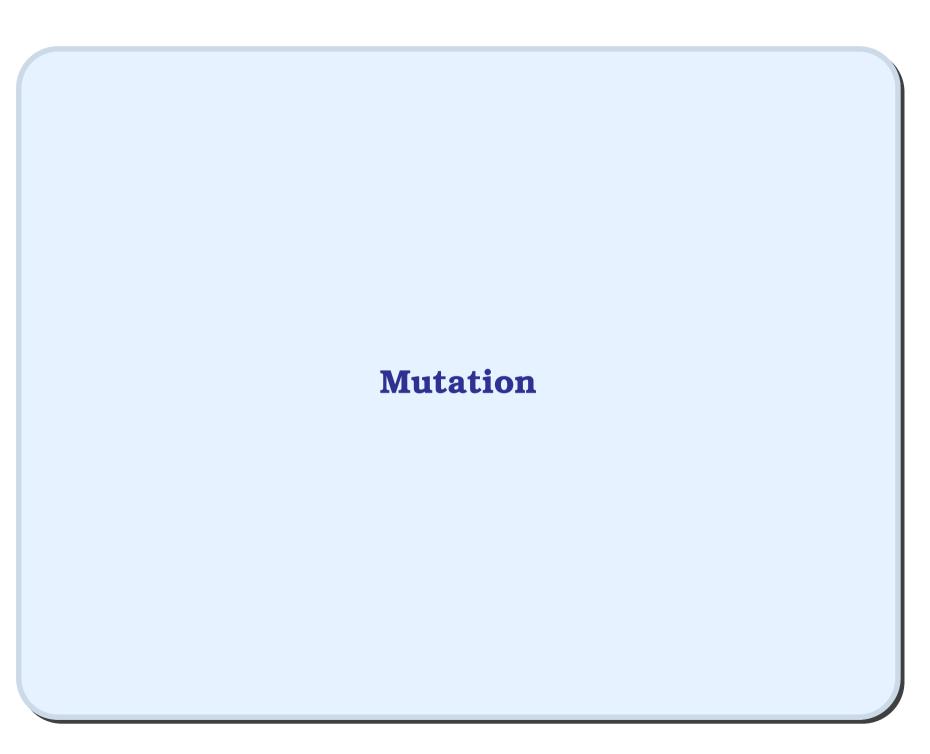
"I'm so much more beautiful/intelligent/strong/fast/rich than you could ever hope to be."

We need to determine the fitness of our solutions.

- Minimum or maximum direct value.
- Simulation of an environment.
- Some fitness heuristic.
- Head-to-head competition.







Survivor Selection
"I brought you into this world, and I can take you out of it."

# Let's look at code!

