

Primordial Soup

Genetic algorithms in 20 minutes

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Introduction

- Why genetic algorithms?
- Chromosomes
- Populations
- When and where to use them
- Genetic Programming

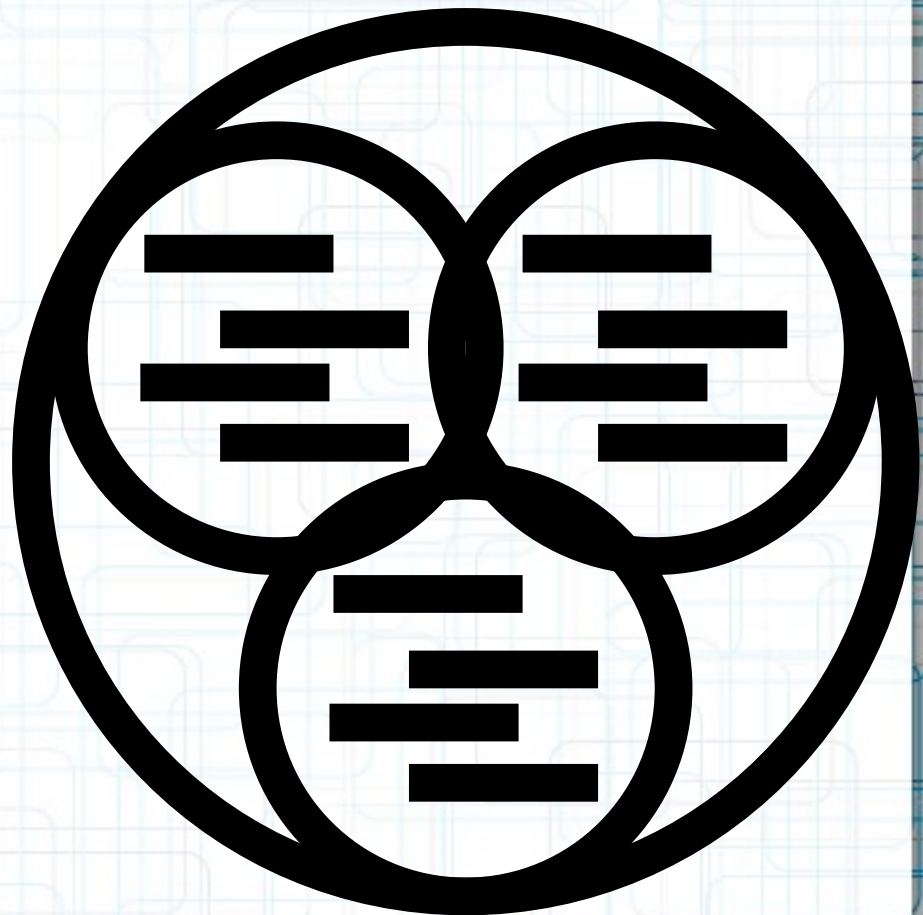
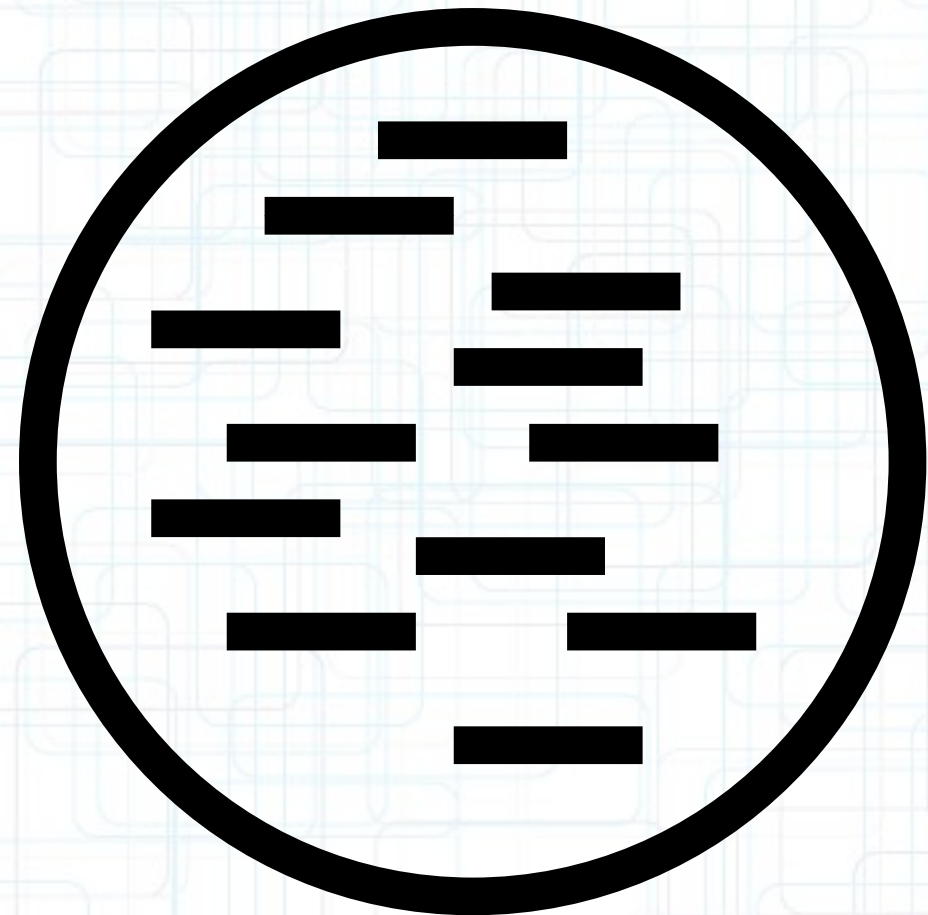
Chromosome

- Looks like:
- Bool, int, Whatever you like

0	1	1	1	0	1	0	1
0	1	1	1	0	1	0	1

Population

- Single or multiple



Breeding

- Selection
 - Fitness
 - Selection of Parents
- Crossover
- Mutation
- Migration (for multiple populations)

Selection

- Fitness
- Selection method
 - Ranking
 - Stochastic Universal Sampling

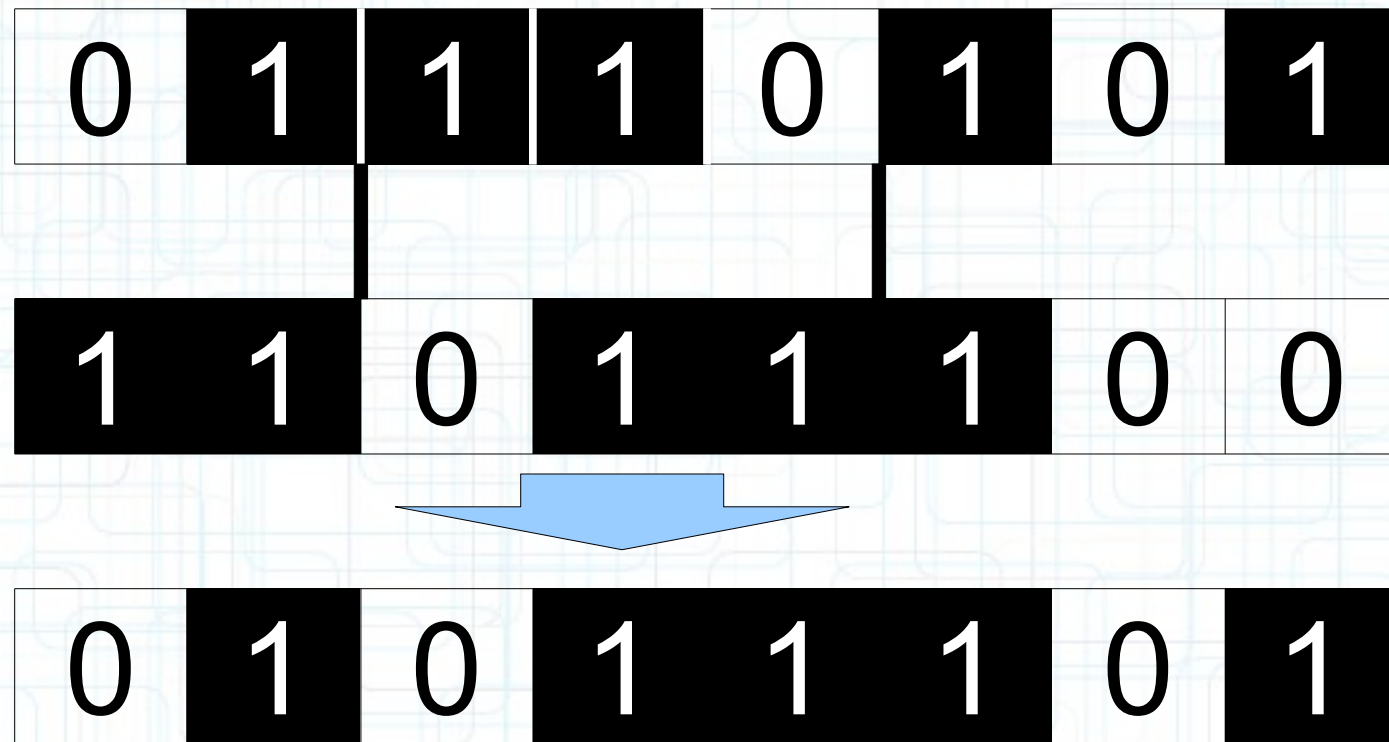
$$0 \quad 1 \quad 1 \quad 1 \quad 0 \quad 1 \quad 0 \quad 1 = 5$$

Crossover

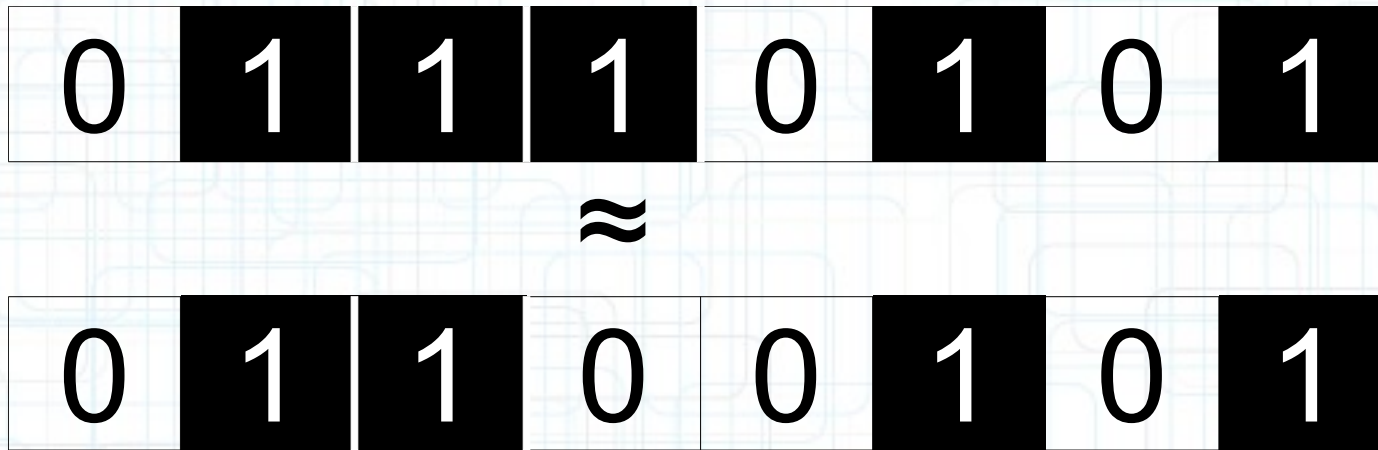
- Single point
- 2-point

0	1	1	1	0	1	0	1
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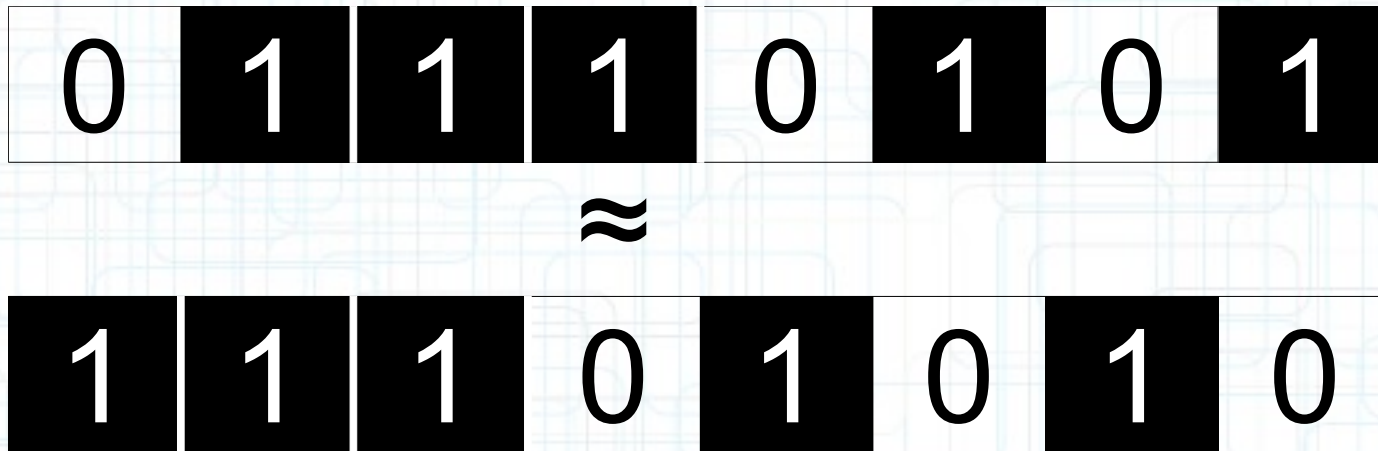
Two-Point Crossover



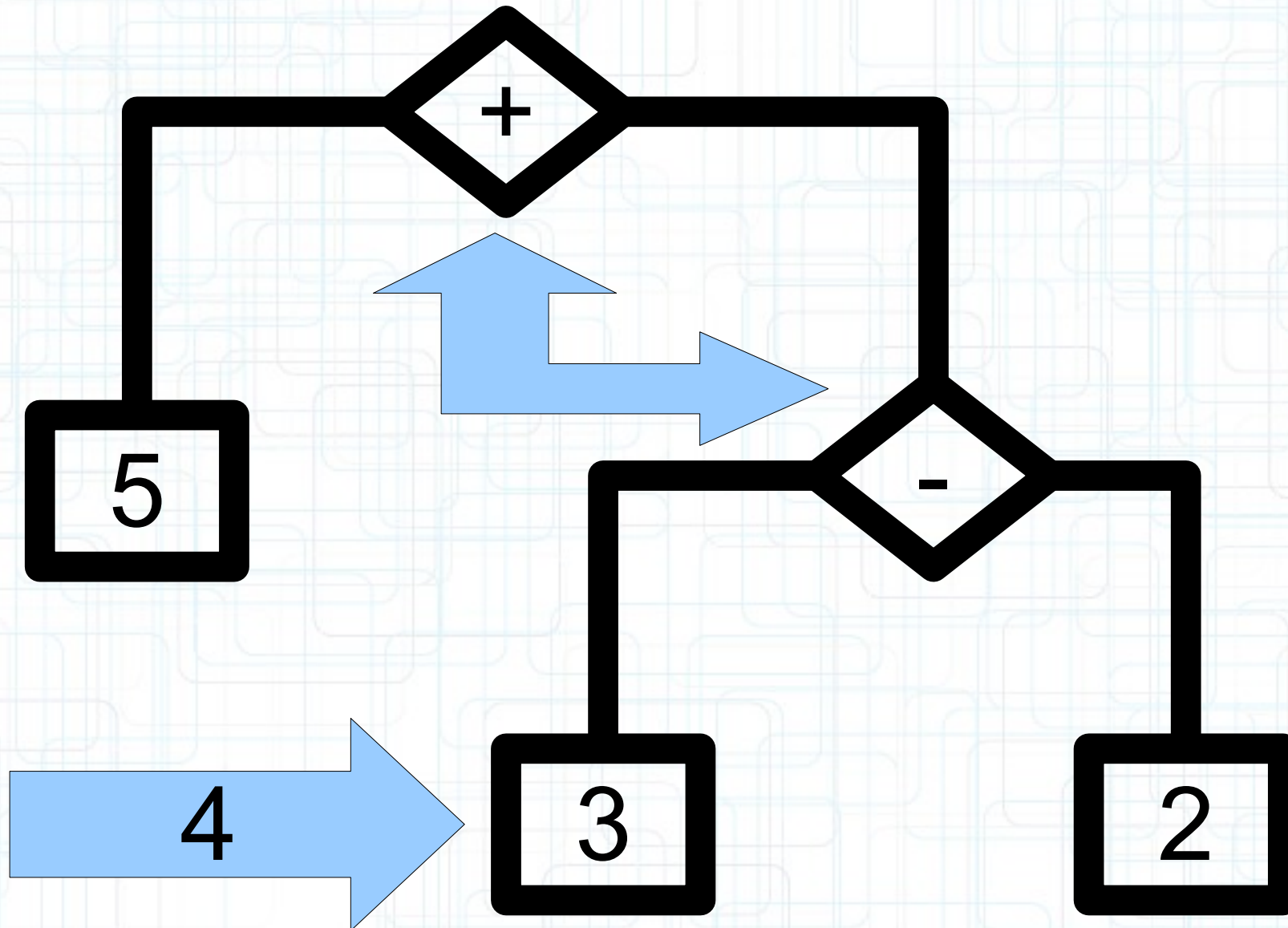
Mutation



Permutation



Genetic Programming



When to use them

- Large search space
- Hard to predict where answer is
- Easy to calculate fitness function

Things to watch

- Randomness & Seeding
- Defining the right chromosomes
- Setting the parameters correctly
 - Mutation Rate
 - Crossover Method
 - Selection Method

Thanks

- <http://code.google.com/p/geneticalgorithmtemplates>
- <http://craignicol.wordpress.com>
- <http://www.twitter.com/craignicol>
- craig.nicol@gmail.com
- Thank you for listening