Genetic algorithms

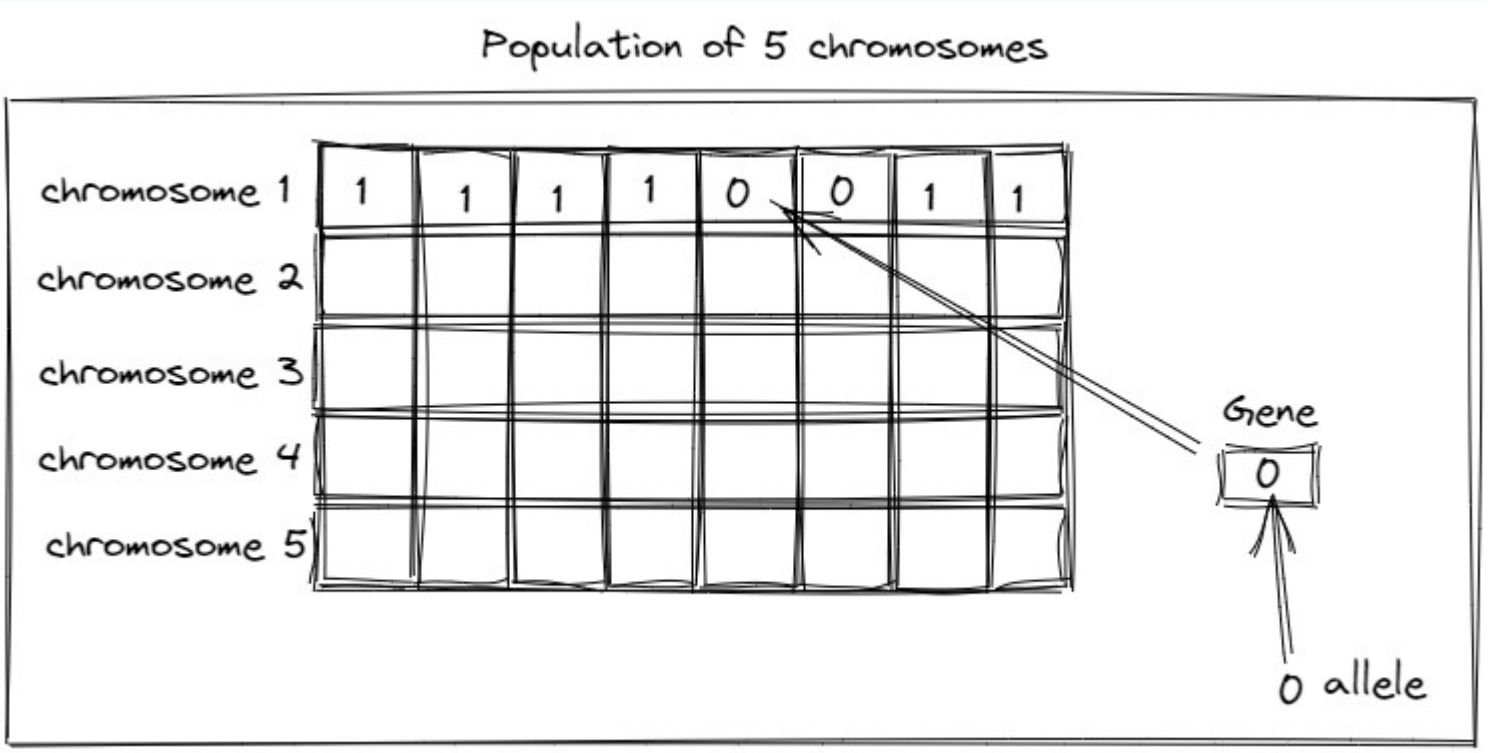
They SEARCH for a solution to maximize (minimize) a function.

There is no guarantee it will work. However, it is easy to use since is *free* of tedious math requirements.

Example

- Chromosomes are the number of solutions that you want to try.

- Genes are the variables for each solution.



What is a gene?

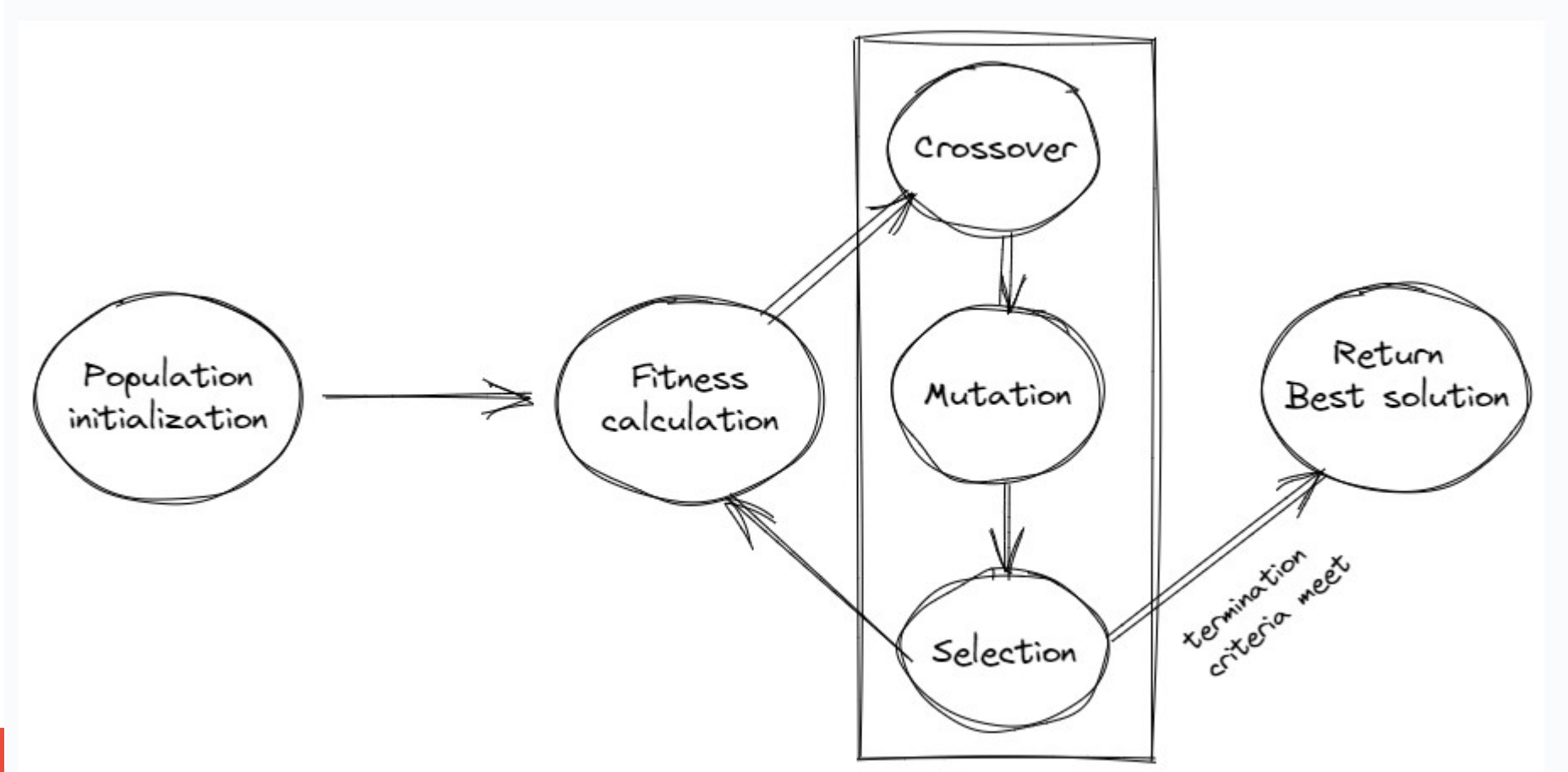
$$f(x_1, x_2) = x_1^2 + x_2^2$$

How many solutions you want to try = # chromosomes

How many genes? TWO: x1 and x2

Overview

$$f(x_1, x_2) = x_1^2 + x_2^2$$



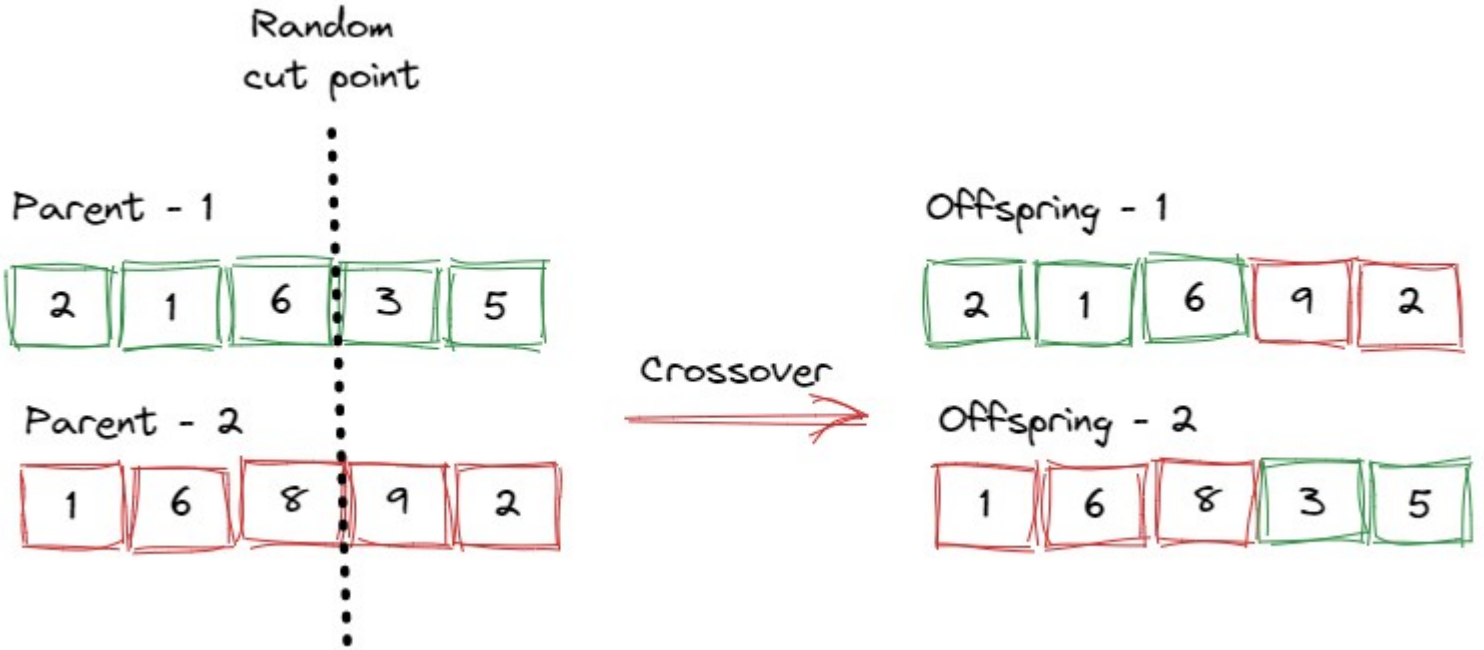
Fitness calculation

$$f(x_1, x_2) = x_1^2 + x_2^2$$

Crossover

From the # of chromosomes, we choose a # of parents, the rest will be the offspring.

We create the offspring by mixing the genes from the parents, and possibly we mutate the genes



When do we stop?

- **Different criteria:**
  - By # of generations
  - No change in the fitness function