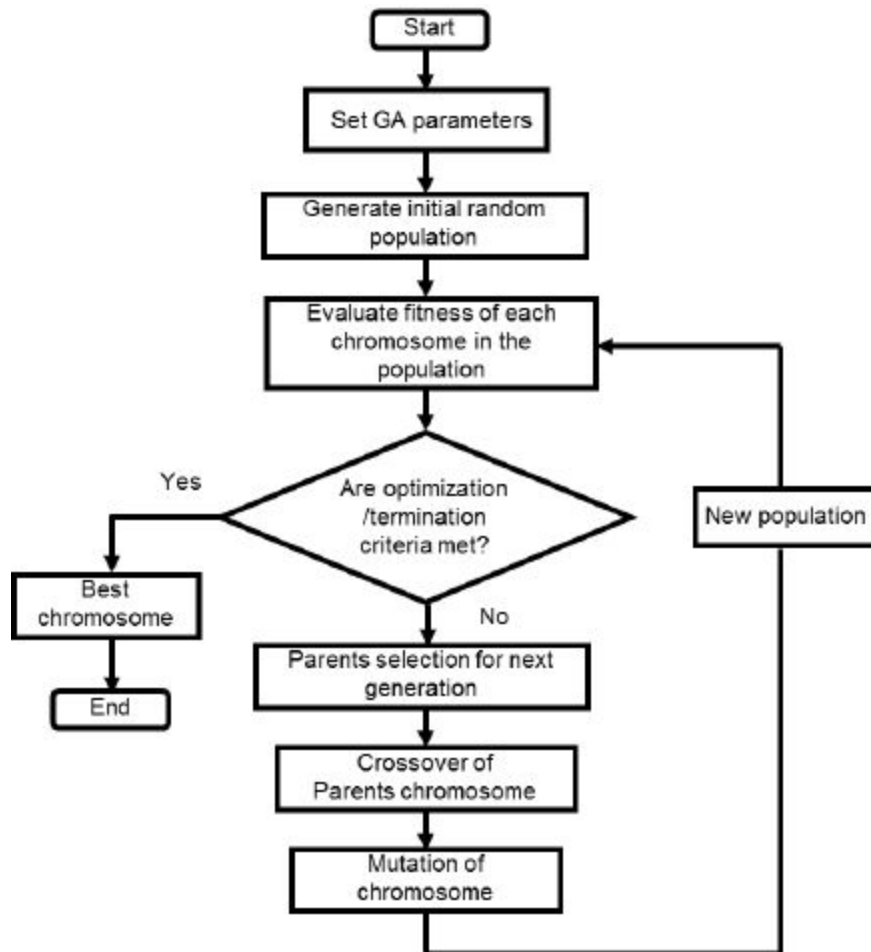


What is a genetic Algorithm?

In computer science and operations research, a genetic algorithm is a metaheuristic inspired by the process of natural selection.

Visual depiction of a Genetic algorithm.



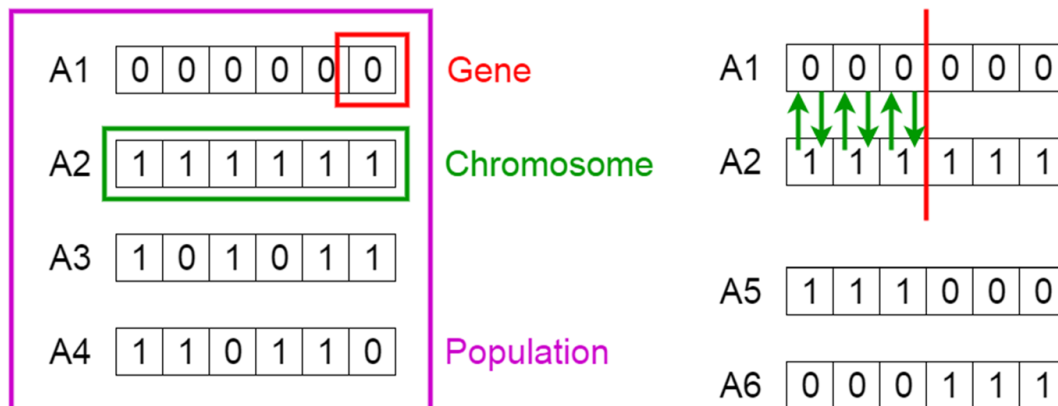
To understand how to code a genetic algorithm you need to First understand the steps of it. First you need to open a file and read from the file. And once you're done reading from the file you need to assign all the lines of the file to a string.

How to find fitness score?

The process usually starts from a population of randomly generated individuals, and is an iterative process, with the population in each iteration called a generation. In each generation, the fitness of every individual in the population is evaluated; the fitness is usually the value of the objective function in the optimization problem being solved.

Visual depiction of fitness score.

# Genetic Algorithms



What is mutation ?

Mutation is a genetic operator used to maintain genetic diversity from one generation of a population of genetic algorithm chromosomes to the next. It is analogous to biological mutation. Mutation alters one or more gene values in a chromosome from its initial state. In mutation, the solution may change entirely from the previous solution. Hence GA can come to a better solution by using mutation. Mutation occurs during evolution according to a user-definable mutation probability. This probability should be set low. If it is set too high, the search will turn into a primitive random search.

The take for an example a mutation operator that involves a probability that an arbitrary bit in a genetic sequence will be changed from its original state. A common method of implementing the mutation operator involves generating a random variable for each bit in a sequence. This random variable tells whether or not a particular bit will be modified. This mutation procedure, based on the biological point mutation, is called single point mutation.

Visual depiction of mutation.

## Before Mutation

A5	1	1	1	0	0	0
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## After Mutation

A5	1	1	0	1	1	0
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What is the crossover method?

In genetic algorithms and evolutionary computation, crossover, is a genetic operator used to combine the genetic information of two parents to generate new offspring. It is one way to generate new solutions from an existing population.

Visual depiction of the crossover method.

