Genetic Algorithm Documentation

**DNA**: The basic information storage for an individual. Essentially a chromosome.

Constructors:

1. [n]: randomly creates a DNA strand of length n

Variables (p=private, P=Public):

1. (p) data: store genetic information

Methods:

1. get()/set(n, val): Get/set gene
2. size(): Get DNA length
3. info(): Get data (raw)
4. toString(): Get data (String)

**Person**: The individual of a population. A test case for evolution.

Constructors:

1. [n, m]: randomly creates a Person with n uniform-length chromosomes of length m
2. [{m}]: randomly creates a Person with m.length() unique-length chromosomes, with c\_i having length m[i]

Variables (p=private, P=Public):

1. (p) data: store genotype
2. (p) fitness: evolutionary fitness

Methods:

1. get()/set(n, val): Get/set chromosome
2. setGene(n, m, val): set gene m on chromosome m to val
3. size(): Get number of chromosomes
4. gLength(n): Length of chromosome
5. getFitness(): Get fitness
6. calcFitness(): Fitness calculation function
7. genome(): Get data (raw)
8. toString(): Get data (String)

**Population**: The gene pool being tested. Includes variety, natural selection, mutation, and mating.

Constructors:

1. [n, m, k]: creates a population of n people with m uniform k-chromosomes
2. [n, {m}]: created a population of n people of {m} chromosomes

Variables (p=private, P=Public):

1. (p) data: store population information
2. (p) gLengths: respective chromosome lengths per person
3. (p) unique: whether every Person has uniform or unique length chromosomes
4. (p, s, f) uniformRate: chance of receiving maternal gene
5. (p, s, f) mutationRate: chance of mutation per gene
6. (p, s, f) tournamentSize: pool to pick a person from (when mating)
7. (p, s, f) elitism: whether we retain the fittest or use them to mate

Methods:

1. evolve(): evolve the population one step
2. getFittest(): get the best of a population
3. mate(a, b): mate Persons a, b
4. mutate(a): expose Person a to chance of genetic mutation
5. get()/set(n, val): Get/set Person
6. pickIndiv(): select a Person for mating
7. popSize(): Get size of genepool
8. info(): Get data (raw)
9. toString(): Get data (String)