GENETIC ALGORITHM RESEARCH PROJECT

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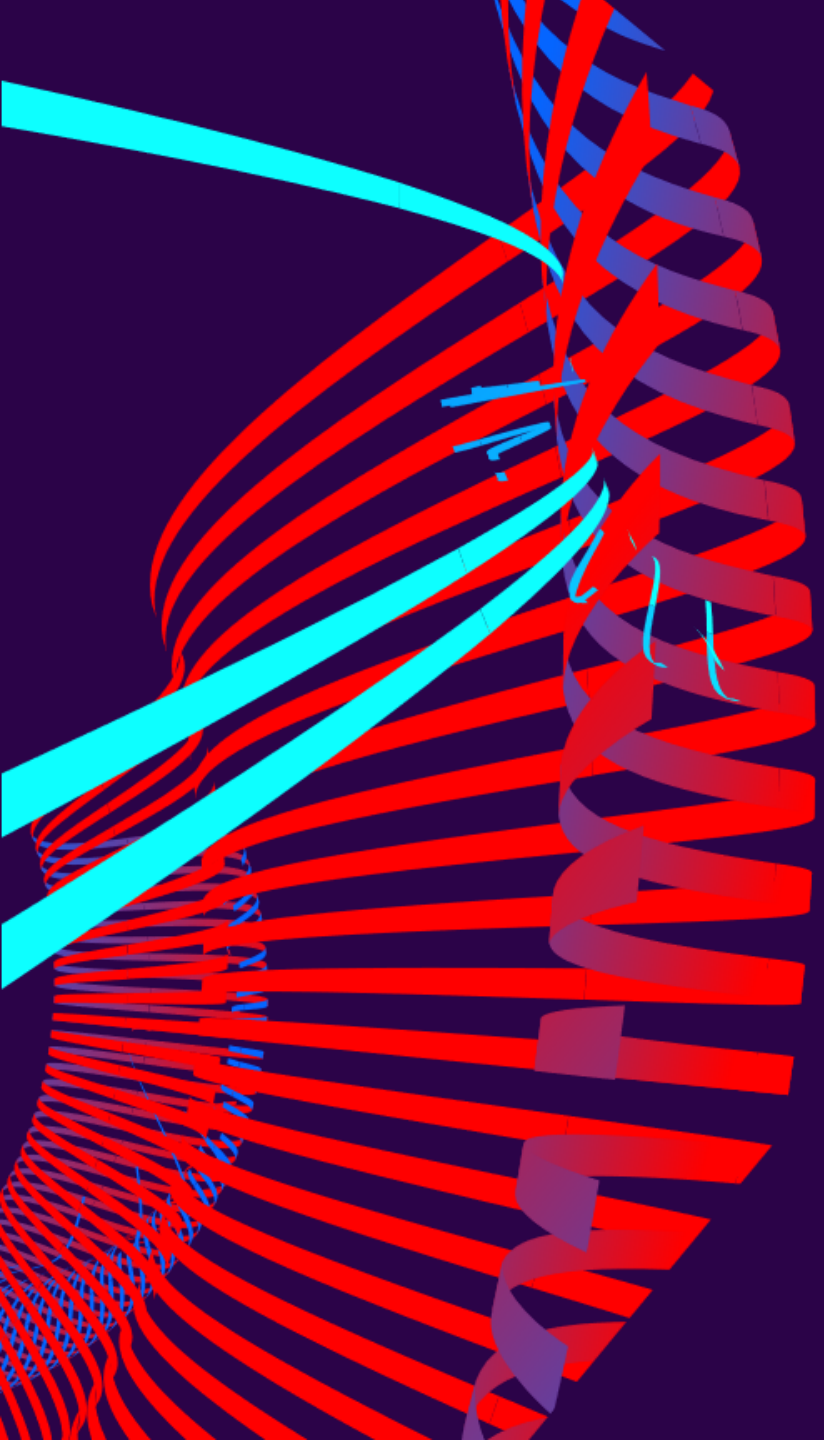
ABOUT THE SIMULATOR

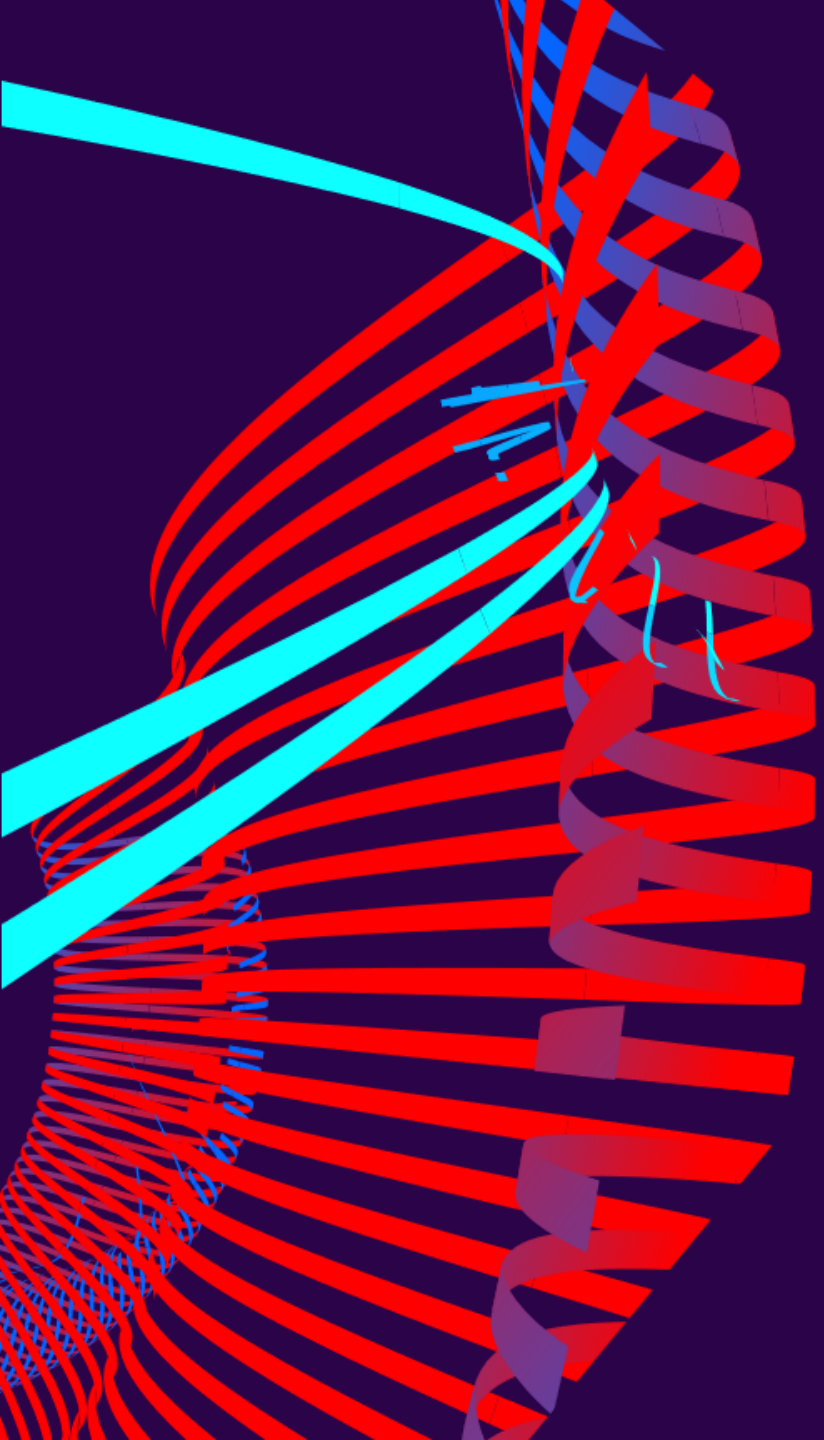
Our simulator takes a population of chromosome strings combined with user-defined conditions to simulate population evolution and fitness growth.

GENETIC ALGORITHM TERMS

CHROMOSOME	Stores a string of 1s and 0s
MUTATE	Randomly changes some bits of a chromosome
ELITISM	Preserves the most fit chromosomes
SELECT	Determines which chromosomes move to the next generation
CROSSOVER	Combines data from two chromosomes into a new one
DIVERSITY	Finds the average amount of differences between two chromosomes



LIVE DEMONSTRATION



DESIGN PRINCIPLES

OO DESIGN PRINCIPLE #2: STRUCTURE DESIGN AROUND DATA

CHROMOSOME

POPULATION

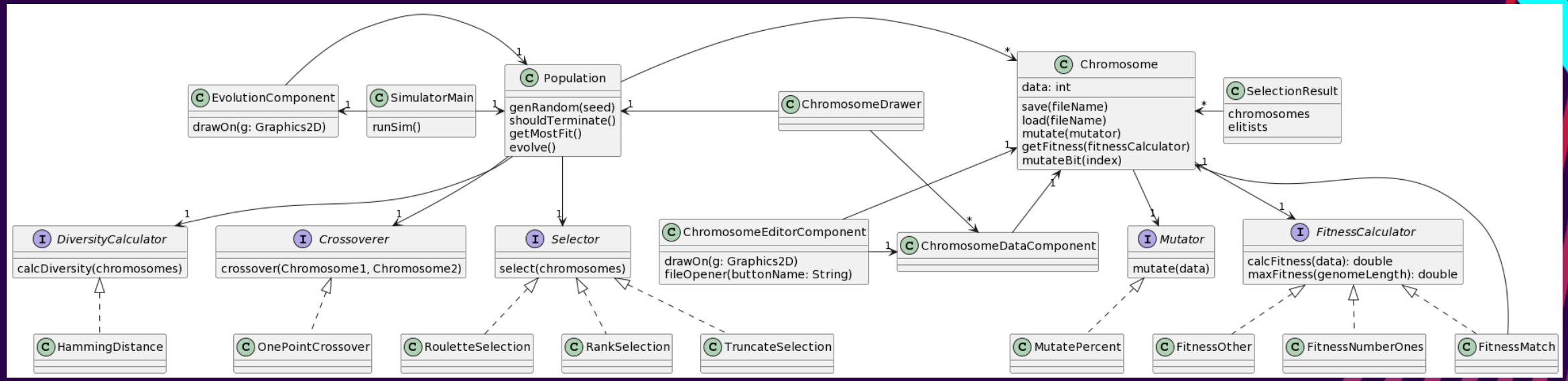
SELECTOR

MUTATOR

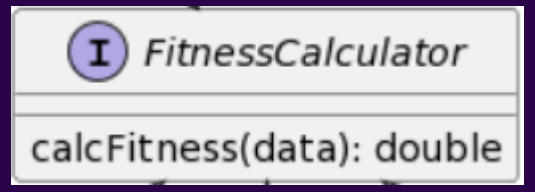
CROSSOVER

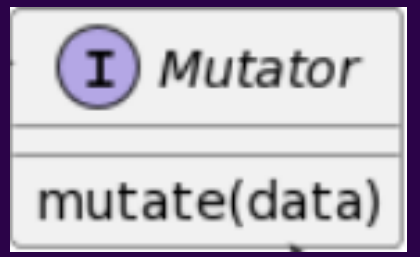
FITNESS CALCULATOR

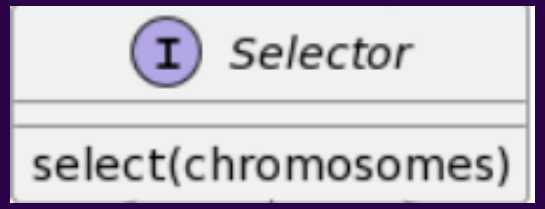
OO PRINCIPLE #3: FUNCTIONALITY SHOULD BE DISTRIBUTED EFFICIENTLY

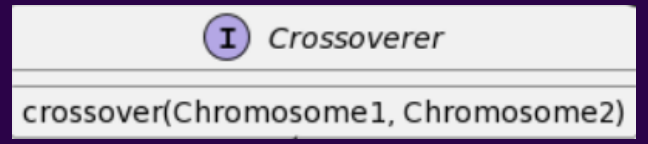


OO PRINCIPLE #5: DON'T DUPLICATE CODE

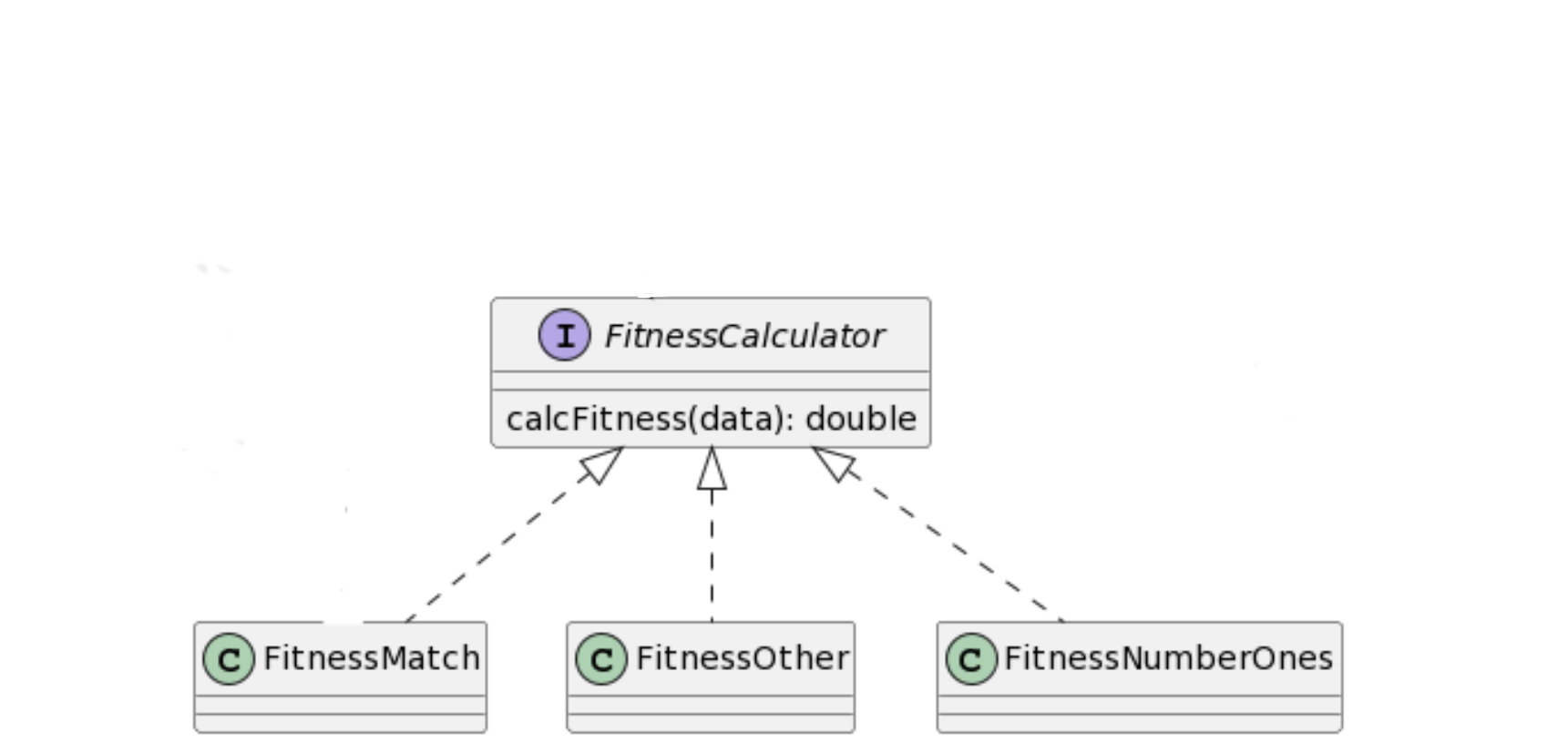


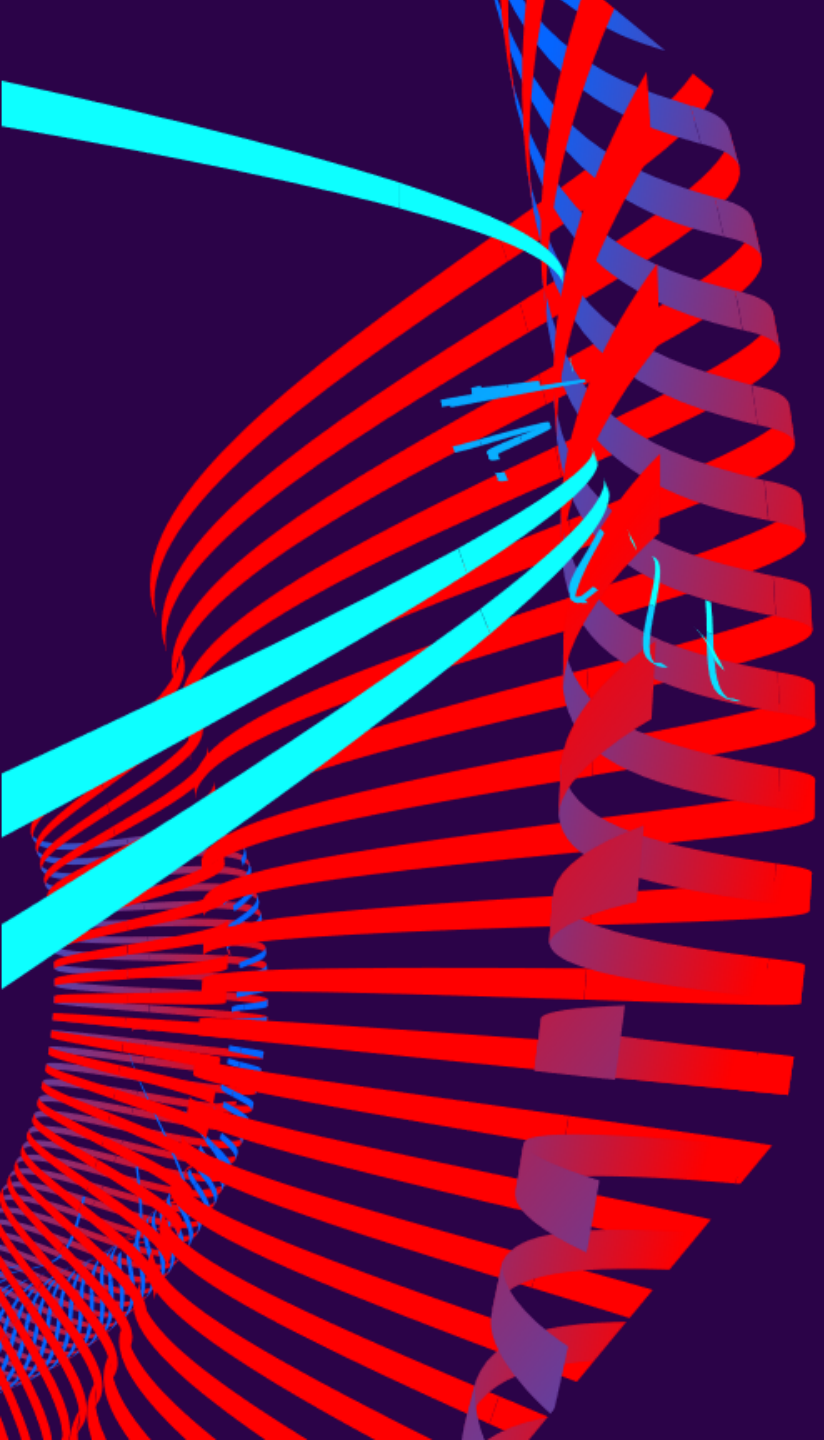






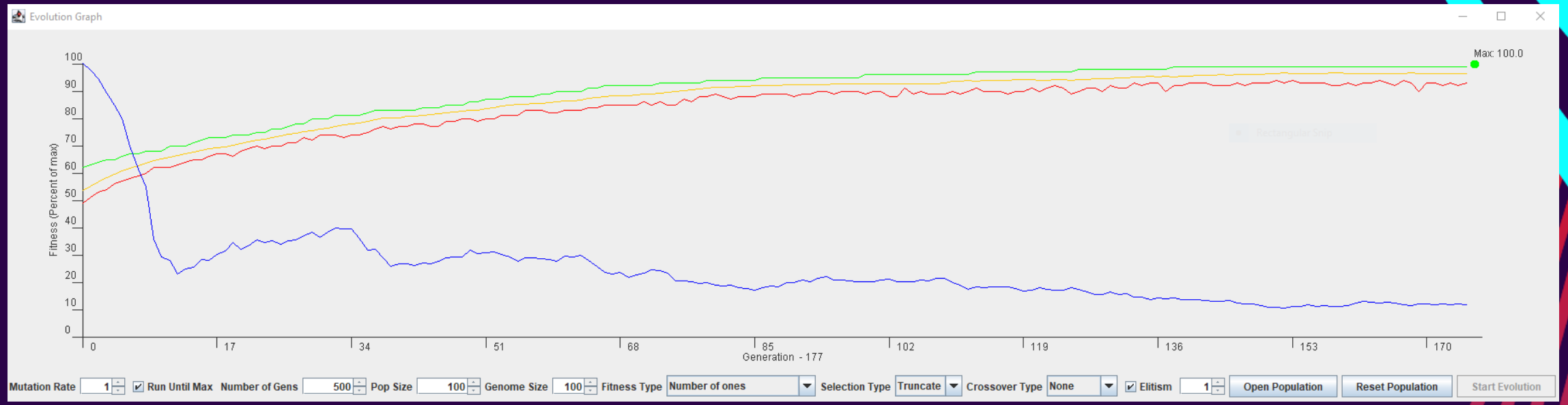
FITNESS FUNCTION





EXPERIMENTS

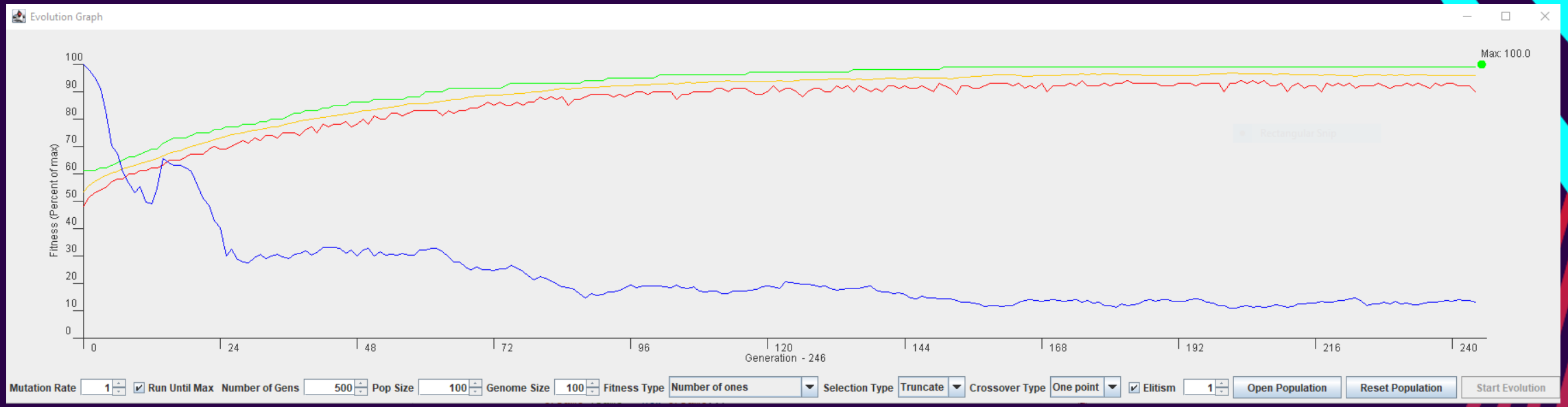
MUTATION



run #	1	2	3	4	5	6	7	8	9	10
gens	177	221	357	223	178	273	207	303	154	249

Avg = 234.2

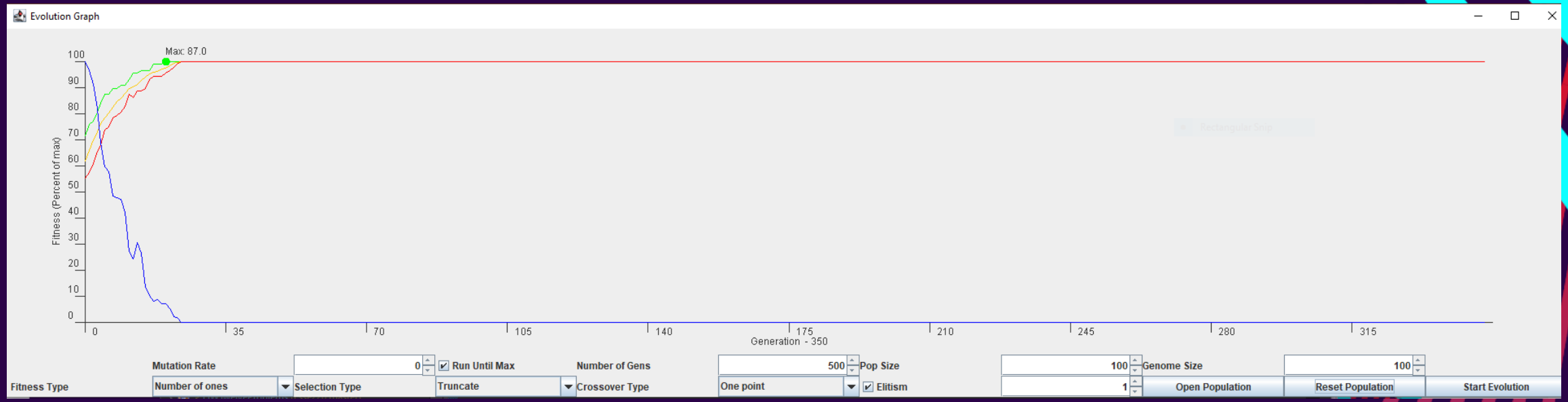
MUTATION AND CROSSOVER



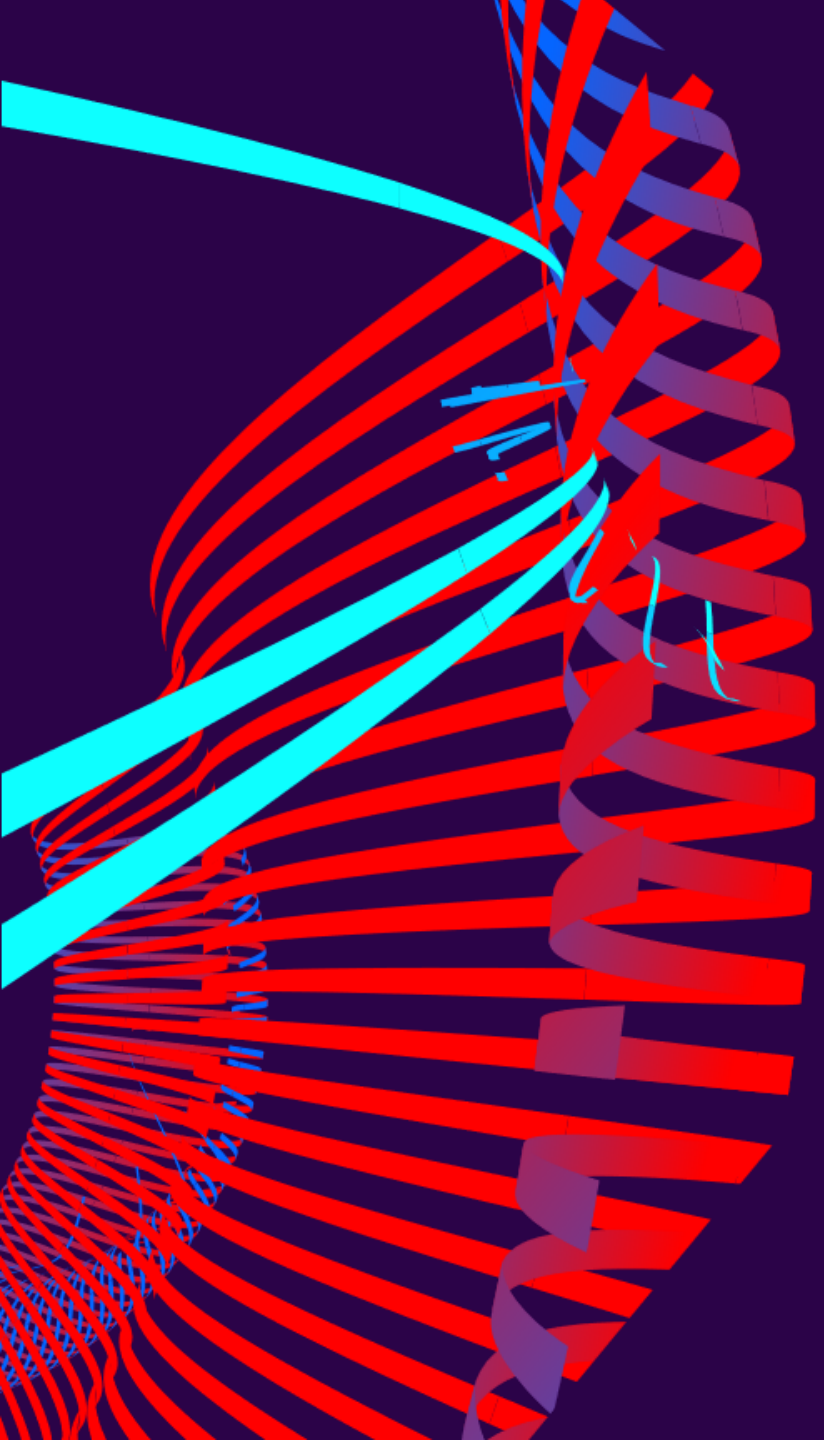
run #	1	2	3	4	5	6	7	8	9	10
gens	222	242	187	315	252	179	242	236	245	246

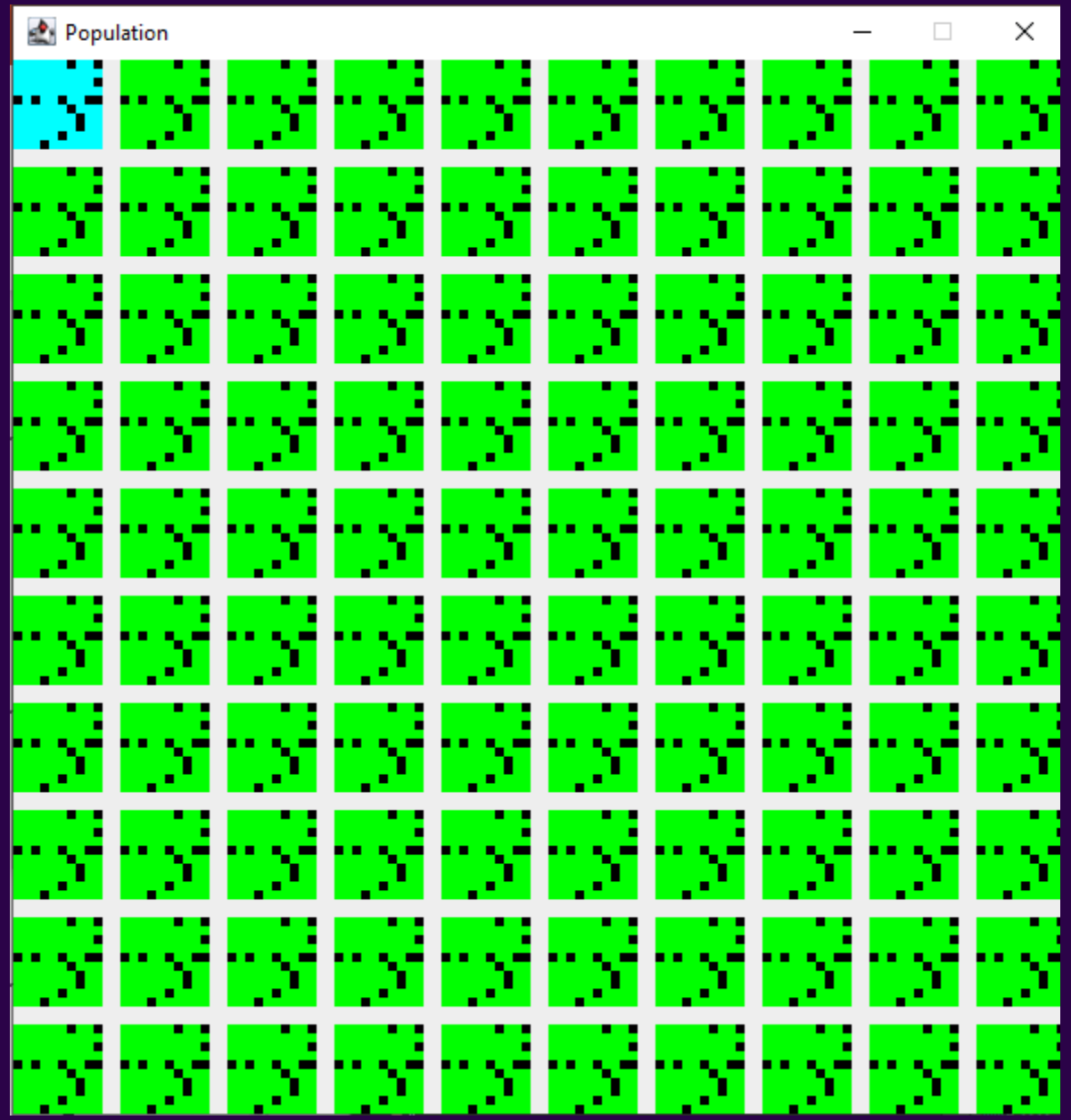
Avg = 236.6

CROSSOVER

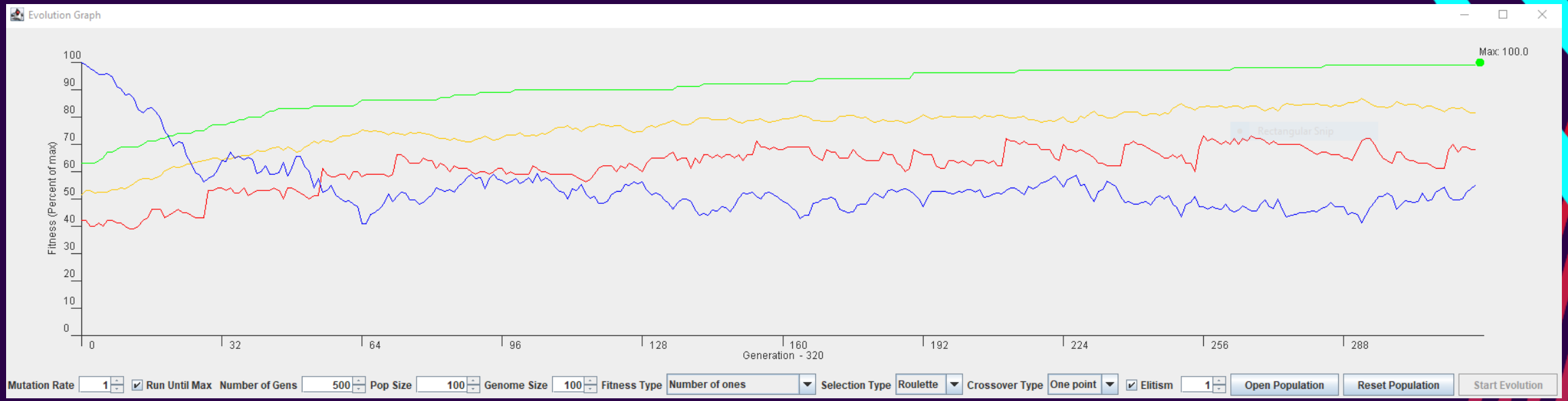


run #	1	2	3	4	5	6	7	8	9	10
gens	0	0	0	0	0	0	0	0	0	0




Population

ROULETTE



run #	1	2	3	4	5	6	7	8	9	10
gens	471	327	379	559	1131	518	501	424	647	320

Avg = 527.7