Jarrett Hill

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COMP 6660 Fall 2023 Assignment 1c

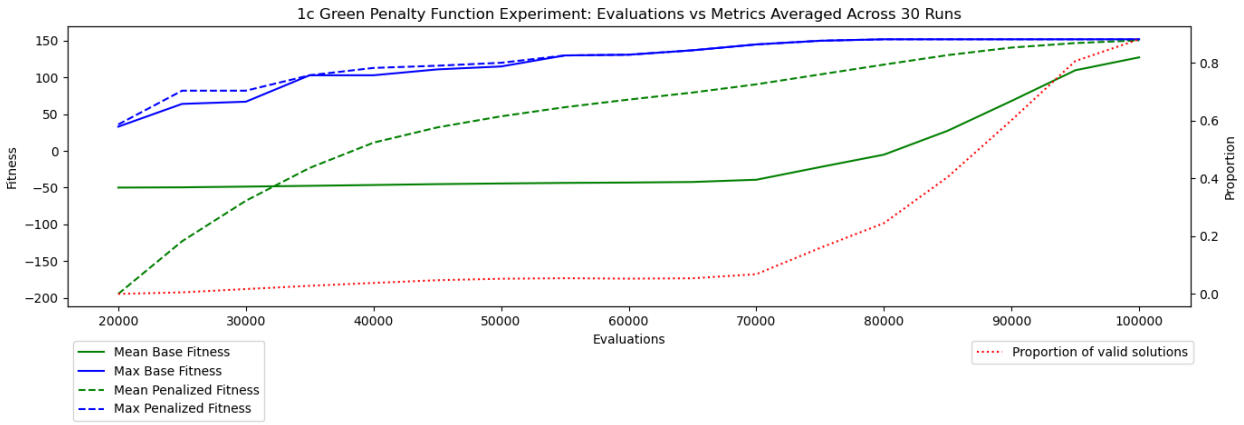
Parameter table for penalty function:

Section	Parameter	Value
ea	mu	20,000
	num_children	5,000
	mutation_rate	0.075
	parent_selection	k_tournament_with_replacement
	survival_selection	k_tournament_without_replacement
	individual_class	LinearGenotype
recombination_kwargs	method	uniform
parent_selection_kwargs	k	128
survival_selection_kwargs	k	64
fitness_kwargs	penalty_coefficient	5
	red	False
mutation_kwargs	bonus	False

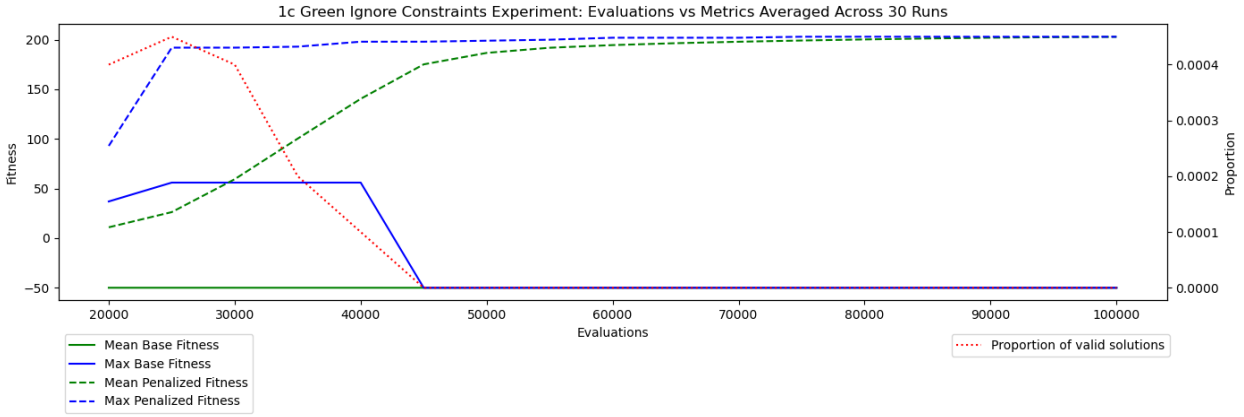
Parameter table for ignore constraints:

Section	Parameter	Value
ea	mu	20,000
	num_children	5,000
	mutation_rate	0.075
	parent_selection	k_tournament_with_replacement
	survival_selection	k_tournament_without_replacement
	individual_class	LinearGenotype
recombination_kwargs	method	uniform
parent_selection_kwargs	k	128
survival_selection_kwargs	k	64
fitness_kwargs	penalty_coefficient	0
	red	False
mutation_kwargs	bonus	False

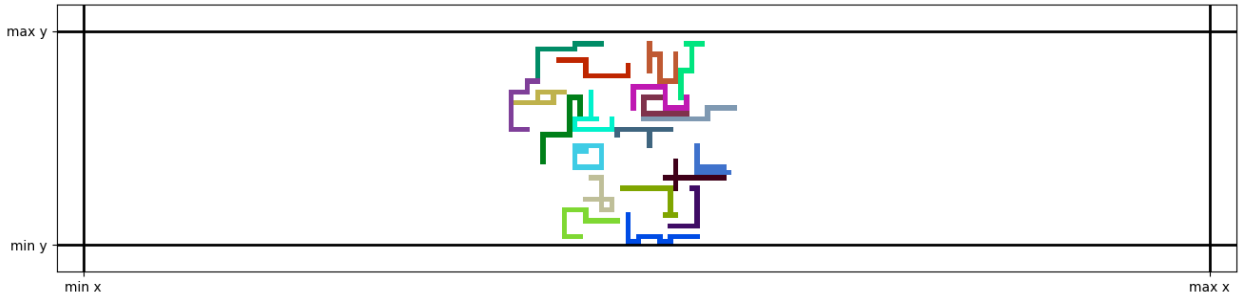
Evals-vs-fitness for penalty function data:



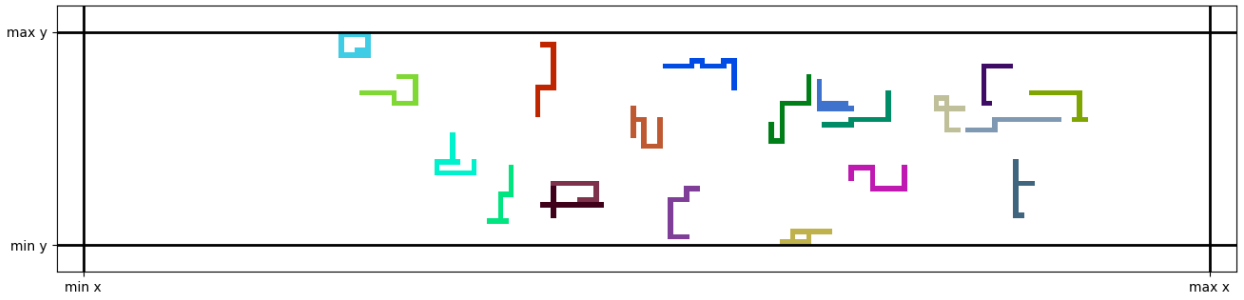
Evals-vs-fitness for ignore constraints data:



Best penalty function result visualized:



Best ignore constraints result visualized:



Statistical analysis:

Sample data mean: 92.7
Sample data stdv: 10.269304781223273

1c penalty data mean: 158.53333333333333
1c penalty data stdv: 5.424931802103255
p-value (penalty function vs sample): 1.4449380764468897e-31
alpha = 0.025 (0.05 / num_tests=2)

Our p-value is much smaller than our alpha this indicates that the two algorithms are statistically different from one another. The penalty function algorithm outperformed our sample algorithm.

1c ignore data mean: 42.13333333333333
1c ignore data stdv: 17.6082530284138
p-value (ignore constraints vs sample): 7.748701303013016e-18
alpha = 0.025 (0.05 / num_tests=2)

Our p-value is much smaller than our alpha this indicates that the two algorithms are statistically different from one another. The ignore constraints algorithm outperformed our sample algorithm, however you can clearly see that it did not perform as well as the penalty function algorithm.

Disclosure to save a headache:
I have not addressed the issues in my code pointed out to me in the programming practice section of my 1b feedback so you can go ahead and apply those penalties