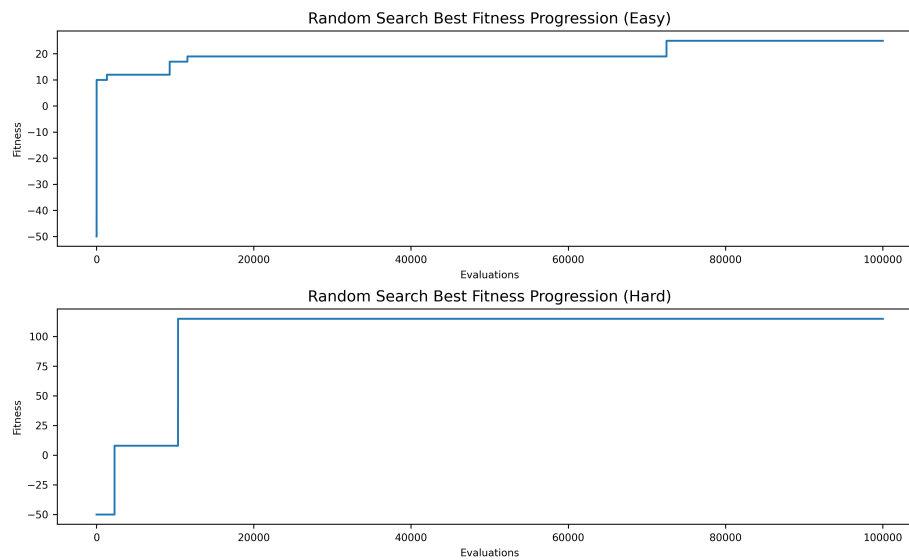


COMP 5660 Fall 2024 Assignment 1a

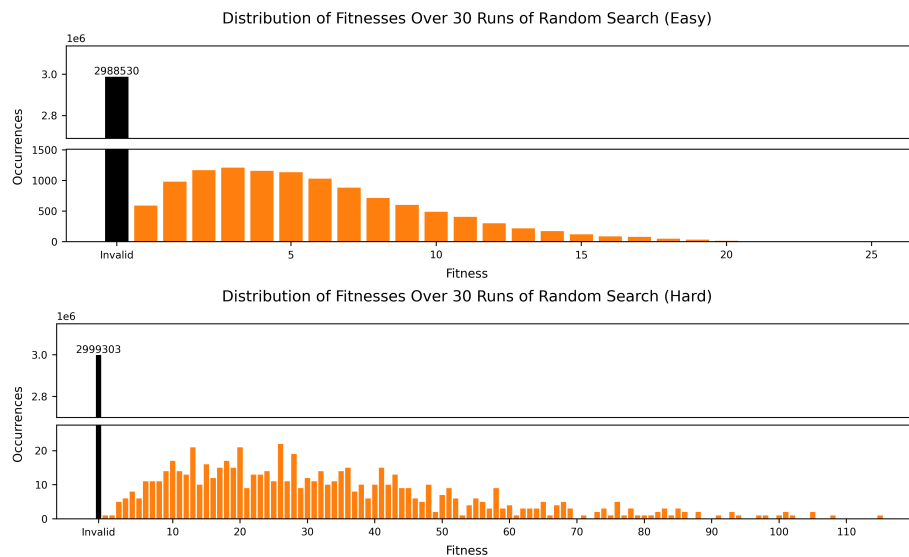
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1 Graphs

1.1 Stairstep Plots



1.2 Histogram Plots



1.3 Best Solutions

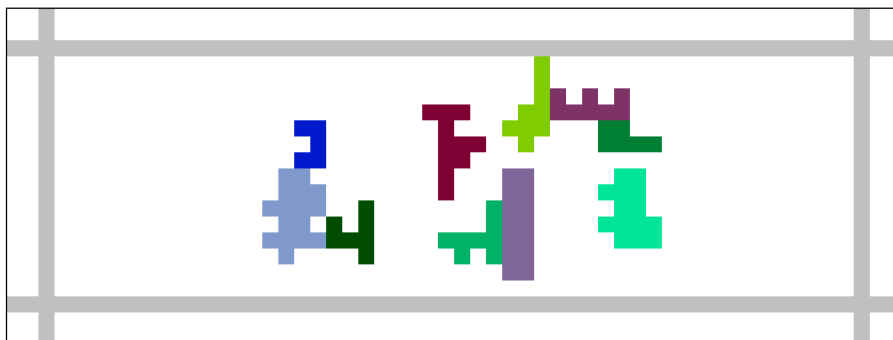


Figure 1: Best solution found after 30 runs of random search for the **easy** configuration.



Figure 2: Best solution found after 30 runs of random search for the **hard** configuration.

2 Statistical Analysis

2.1 Easy Mystery Data

	Best Run - Random Search	Easy Mystery Data
Mean Fitness	21	37.46666666666667
Standard Deviation	1.6815428055498771	1.0080138659874618
# of samples	30	
p-value	5.029045257999176e-41	
α -value	0.05	

Table 1: Results of a T-test between the best runs of the random search and the runs of the easy mystery data set.

Given that the p-value is much less than the α -value, this means that the results between the random search and the easy mystery data has a large statistical difference. Given that mean fitness of the mystery data is so much higher and the standard deviation is also much lower, we can confidently conclude that the mystery data is the best solution.

2.2 Hard Mystery Data

	Best Run - Random Search	Hard Mystery Data
Mean Fitness	83.16666666666667	334.93333333333334
Standard Deviation	16.70449729519142	8.325007334917897
# of samples	30	
p-value	1.4028859047989313e-46	
α -value	0.05	

Table 2: Results of a T-test between the best runs of the random search and the runs of hard mystery data set.

Given that the p-value is much less than the α -value, this means that the results between the random search and the hard mystery data has a large statistical difference. Given that mean fitness of the mystery data is so much higher and the standard deviation is also much lower, we can confidently conclude that the mystery data is the best solution.