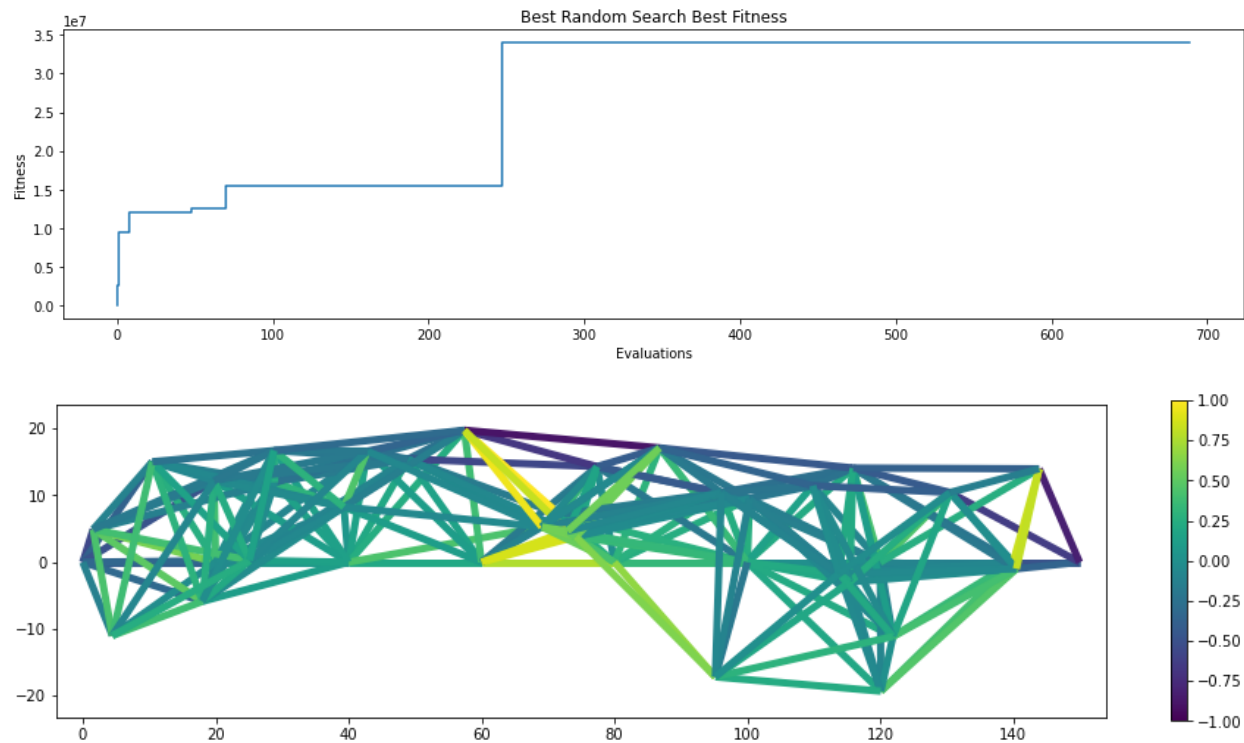# Will Humphlett (wah0028) COMP 5660 Fall 2022 Assignment 1a

Best Run

Highest observed fitness: 34,000,000

Statistical Analysis

F-Test

F-Test Two-Sample for Variances	random	mystery
Mean	24500000	47083333.33
Variance	1.5931E+13	8.8467E+13
Observations	30	30

df	29	29
α	0.025	
F	0.180078931	
P(F<=f) one-tail	7.22455E-06	
F Critical one-tail	0.475964774	

Given that F < 1 and F < F Critical one-tail (0.180 < 1 and 0.180 < 0.476), the null hypothesis of equal variances is rejected and it is determined that the two populations have significantly unequal variances.

t-Test

t-Test: Two-Sample Assuming Unequal Variances	random	mystery
Mean	24500000	47083333.33
Variance	1.5931E+13	8.8467E+13
Observations	30	30
Hypothesized Mean Difference	0	
df	39	
α	0.05	
t Stat	-12.106054	
P(T<=t) one-tail	4.38052E-15	
t Critical one-tail	1.684875122	
P(T<=t) two-tail	8.76103E-15	
t Critical two-tail	2.02269092	

Given that t Stat < 0 and t Stat < -t Critical two-tail (-12.106 < 0 and -12.106 < -2.022), the null hypothesis of equal means is rejected and it is determined that the two populations have significantly unequal means. The mystery algorithm can be assumed to produce a significantly higher mean fitness than the random algorithm.