For individual stat caps of 60 you must pick a bst total from 1-300. The constraint is that your bst total must not exceed your individual stat cap multiplied by 5. This constraint is needed for the "major mutation" as there is a case where you can get stuck. There could be other uncaught cases, but I do not know of them right now.
Variables are set at the top of main again.

For testing I decided to run the a population of 50 for 300 Generations. I also diverged from the original plan and only made it list individuals that last for 20+ populations.
General Parameters – (μ = 50, Generations = 300, individualStatCaps = 60)
The parameters I will change are statCaps and seeds

Go to page 36 if you don't want to look at the outputs.

A table of testing is on page 36.

Seed 41 Tests:

Test #1 - statCap = 165:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

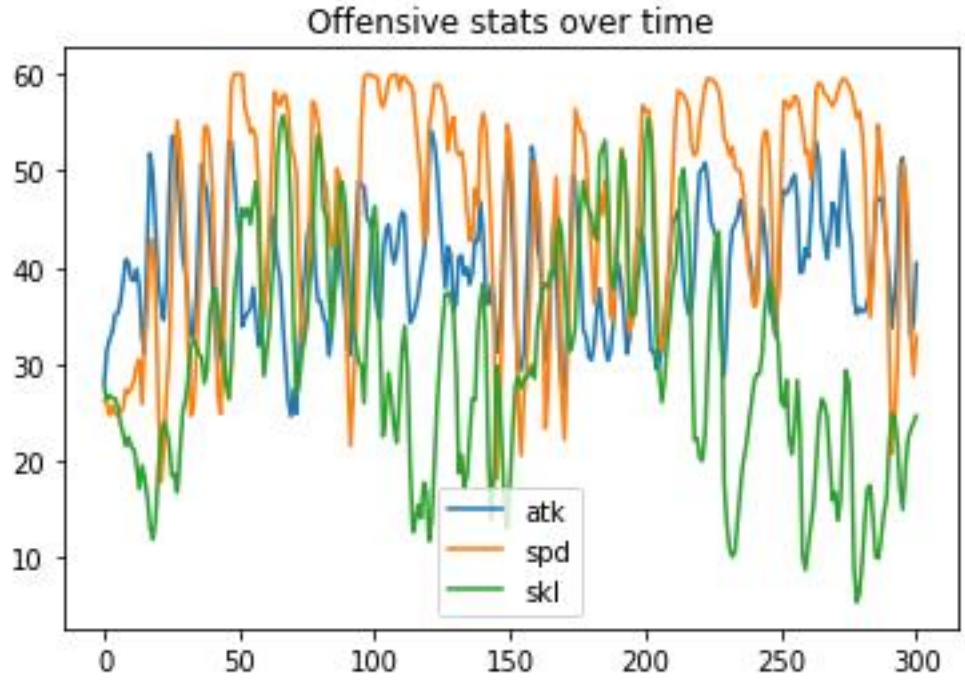
It's stats, target, and population the individual appeared.

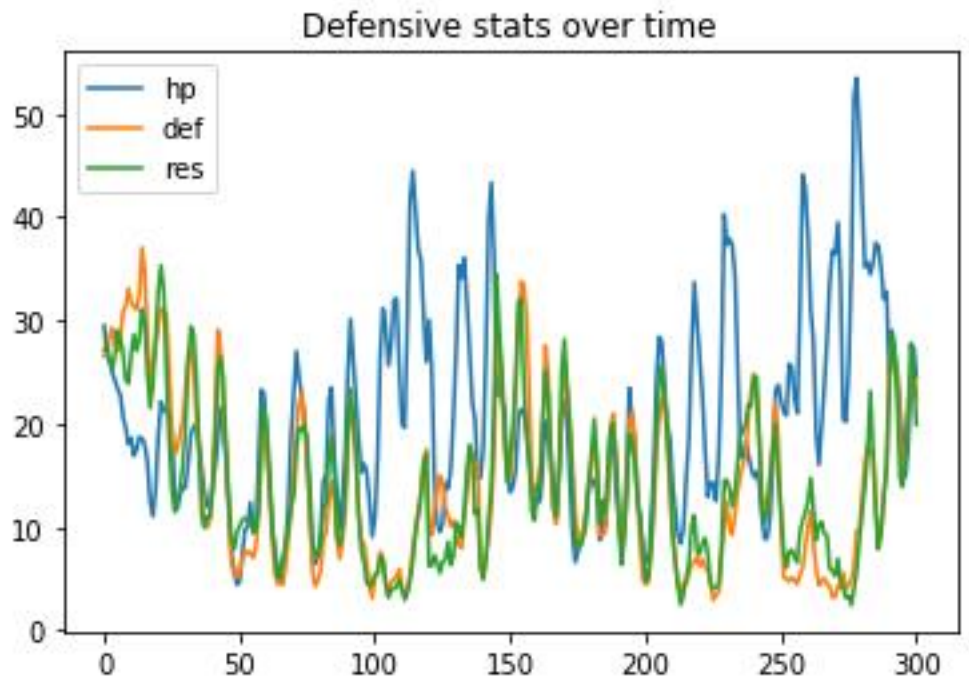
[[3, 59, 60, 39, 3, 1], 'D', 105]

[[1, 59, 60, 39, 4, 2], 'D', 106]

[[1, 55, 60, 49, 0, 0], 'D', 113]

[[1, 55, 60, 49, 0, 0], 'D', 118]





Ending averages for the population

hp atk spd skl def res

[24.62 40.44 32.92 24.66 22.42 19.94]

Test #2 - statCap = 180:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

It's stats, target, and population the individual appeared.

[[18, 36, 1, 37, 44, 44], 'D', 31]

[[1, 59, 60, 60, 0, 0], 'D', 68]

[[1, 59, 60, 60, 0, 0], 'R', 68]

[[1, 59, 60, 60, 0, 0], 'D', 71]

[[1, 59, 60, 60, 0, 0], 'D', 71]

[[1, 59, 60, 60, 0, 0], 'D', 74]

[[1, 59, 60, 60, 0, 0], 'D', 77]

[[1, 59, 60, 60, 0, 0], 'D', 78]

[[1, 59, 60, 60, 0, 0], 'D', 79]

[[1, 59, 60, 60, 0, 0], 'D', 80]

[[1, 59, 60, 60, 0, 0], 'D', 80]

[[1, 59, 60, 60, 0, 0], 'D', 81]

[[1, 59, 60, 60, 0, 0], 'D', 81]

[[1, 59, 60, 60, 0, 0], 'D', 81]

[[1, 59, 60, 60, 0, 0], 'D', 82]

[[1, 59, 60, 60, 0, 0], 'D', 82]

[[1, 59, 60, 60, 0, 0], 'D', 82]

[[1, 59, 60, 60, 0, 0], 'D', 83]

[[1, 59, 60, 60, 0, 0], 'D', 83]

[[1, 59, 60, 60, 0, 0], 'D', 83]

[[1, 59, 60, 60, 0, 0], 'D', 83]

[[1, 59, 60, 60, 0, 0], 'D', 83]

[[1, 59, 60, 60, 0, 0], 'D', 83]

[[1, 59, 60, 60, 0, 0], 'D', 84]

[[1, 59, 60, 60, 0, 0], 'D', 85]

[[1, 59, 60, 60, 0, 0], 'D', 85]

[[1, 59, 60, 60, 0, 0], 'D', 85]

[[1, 59, 60, 60, 0, 0], 'D', 85]

[[1, 59, 60, 60, 0, 0], 'D', 85]

[[1, 59, 60, 60, 0, 0], 'D', 85]

[[1, 59, 60, 60, 0, 0], 'D', 86]

[[1, 59, 60, 60, 0, 0], 'D', 87]

[[1, 59, 60, 60, 0, 0], 'D', 87]

[[1, 59, 60, 60, 0, 0], 'D', 87]

[[1, 59, 60, 60, 0, 0], 'D', 87]

[[1, 59, 60, 60, 0, 0], 'D', 88]

[[1, 59, 60, 60, 0, 0], 'D', 88]

[[1, 59, 60, 60, 0, 0], 'D', 88]

[[1, 59, 60, 60, 0, 0], 'D', 88]

[[1, 59, 60, 60, 0, 0], 'D', 88]

[[1, 59, 60, 60, 0, 0], 'D', 88]

[[1, 59, 60, 60, 0, 0], 'D', 89]

[[1, 59, 60, 60, 0, 0], 'D', 89]

[[1, 59, 60, 60, 0, 0], 'D', 89]

[[1, 59, 60, 60, 0, 0], 'D', 89]

[[1, 59, 60, 60, 0, 0], 'D', 89]

[[1, 59, 60, 60, 0, 0], 'D', 89]

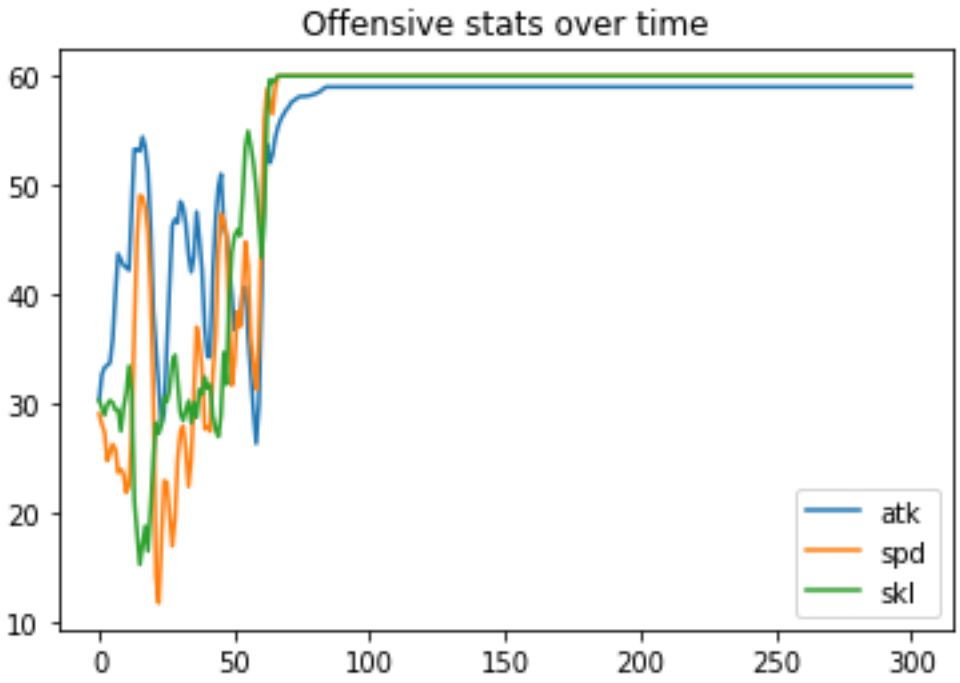
[[1, 59, 60, 60, 0, 0], 'D', 90]

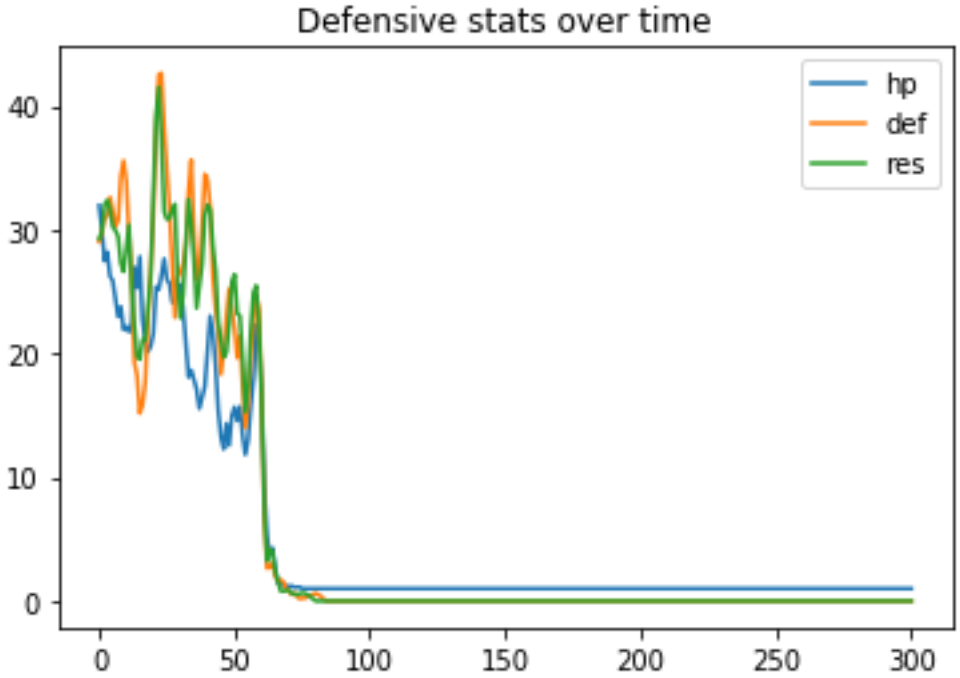
[[1, 59, 60, 60, 0, 0], 'D', 90]

[[1, 59, 60, 60, 0, 0], 'D', 90]

[[1, 59, 60, 60, 0, 0], 'D', 90]

[[1, 59, 60, 60, 0, 0], 'D', 90]





Ending averages for the population

hp atk spd skl def res

[1.0 59.0 60.0 60.0 0.0 0.0]

Test #3 - statCap = 200:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

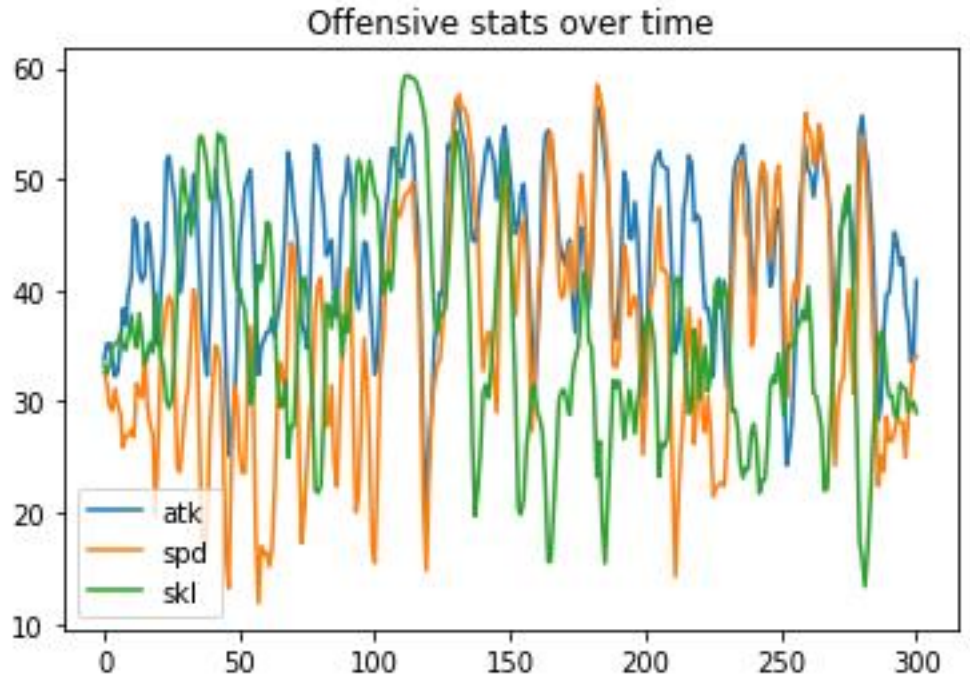
It's stats, target, and population the individual appeared.

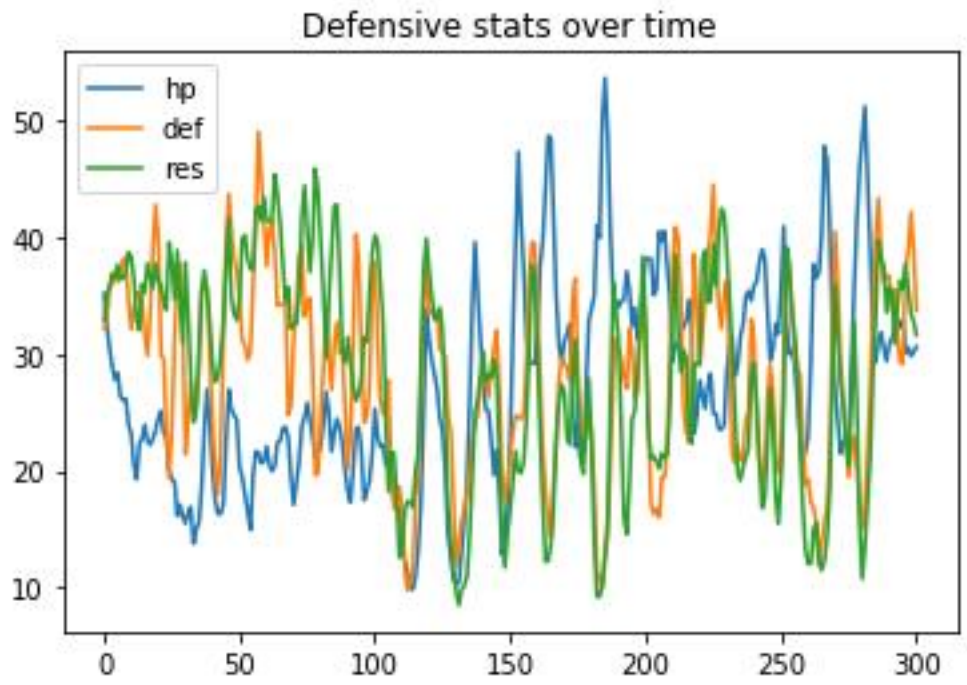
[[14, 37, 0, 49, 55, 45], 'D', 43]

[[4, 60, 60, 60, 16, 0], 'D', 112]

[[60, 60, 60, 13, 5, 2], 'D', 247]

[[1, 60, 60, 51, 24, 4], 'R', 247]





Ending averages for the population

hp atk spd skl def res

[30.64 40.88 34.1 28.96 33.76 31.66]

Test #4 - statCap = 230:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

It's stats, target, and population the individual appeared.

[[15, 60, 0, 47, 51, 57], 'R', 16]

[[15, 60, 1, 51, 50, 53], 'R', 87]

[[23, 60, 3, 49, 43, 52], 'R', 89]

[[14, 60, 1, 49, 52, 54], 'R', 91]

[[30, 1, 49, 46, 50, 54], 'D', 97]

[[13, 60, 2, 46, 55, 54], 'R', 109]

[[13, 60, 2, 46, 55, 54], 'D', 114]

[[19, 60, 4, 45, 47, 55], 'R', 115]

[[11, 60, 3, 46, 55, 55], 'D', 133]

[[12, 60, 0, 46, 57, 55], 'D', 135]

[[14, 60, 0, 46, 56, 54], 'R', 148]

[[11, 60, 2, 47, 55, 55], 'R', 155]

[[11, 60, 3, 46, 55, 55], 'R', 157]

[[11, 60, 0, 46, 58, 55], 'R', 162]

[[11, 59, 3, 46, 56, 55], 'R', 163]

[[46, 0, 38, 46, 49, 51], 'D', 178]

[[11, 60, 2, 48, 54, 55], 'R', 202]

[[15, 55, 1, 46, 54, 59], 'R', 206]

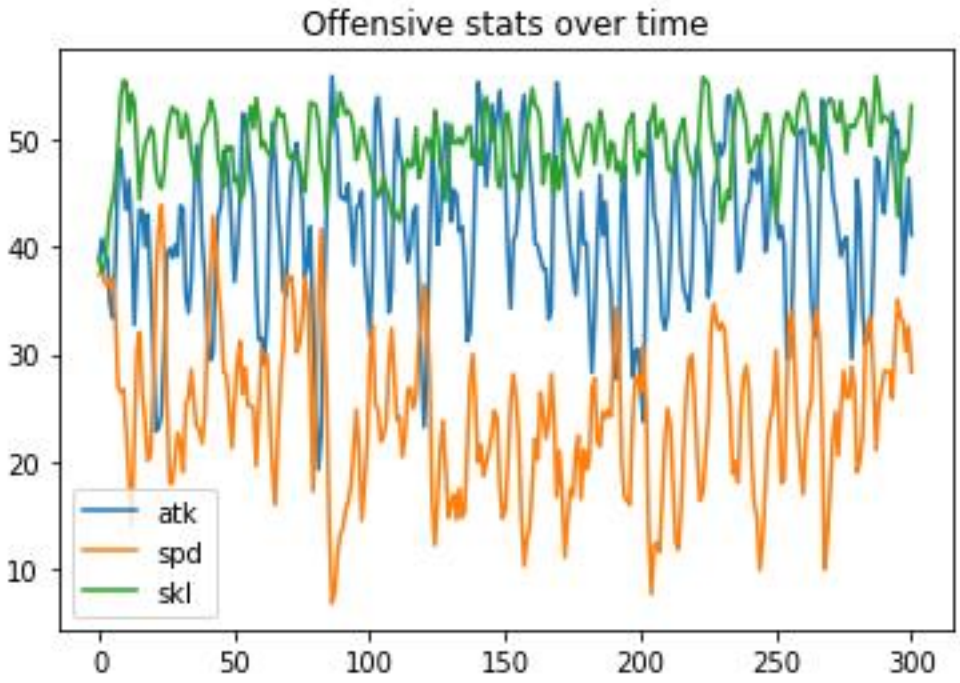
[[11, 60, 1, 48, 54, 56], 'R', 222]

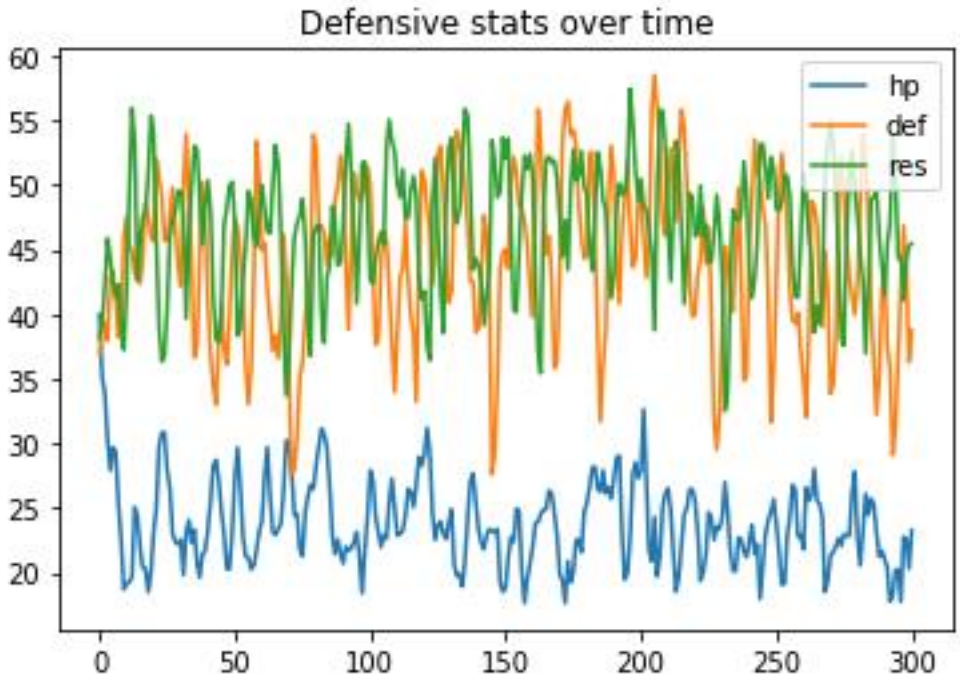
[[11, 60, 1, 49, 54, 55], 'R', 227]

[[11, 60, 0, 49, 55, 55], 'R', 233]

[[11, 60, 1, 48, 55, 55], 'D', 252]

[[11, 60, 0, 49, 55, 55], 'D', 262]





Ending averages for the population

hp atk spd skl def res

[23.28 41.08 28.36 53.1 38.74 45.44]

Test #5 - statCap = 280:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

It's stats, target, and population the individual appeared.

[[28, 60, 22, 60, 50, 60], 'R', 7]

[[60, 1, 60, 56, 51, 52], 'D', 46]

[[47, 60, 8, 47, 58, 60], 'R', 54]

[[40, 60, 0, 60, 60, 60], 'R', 56]

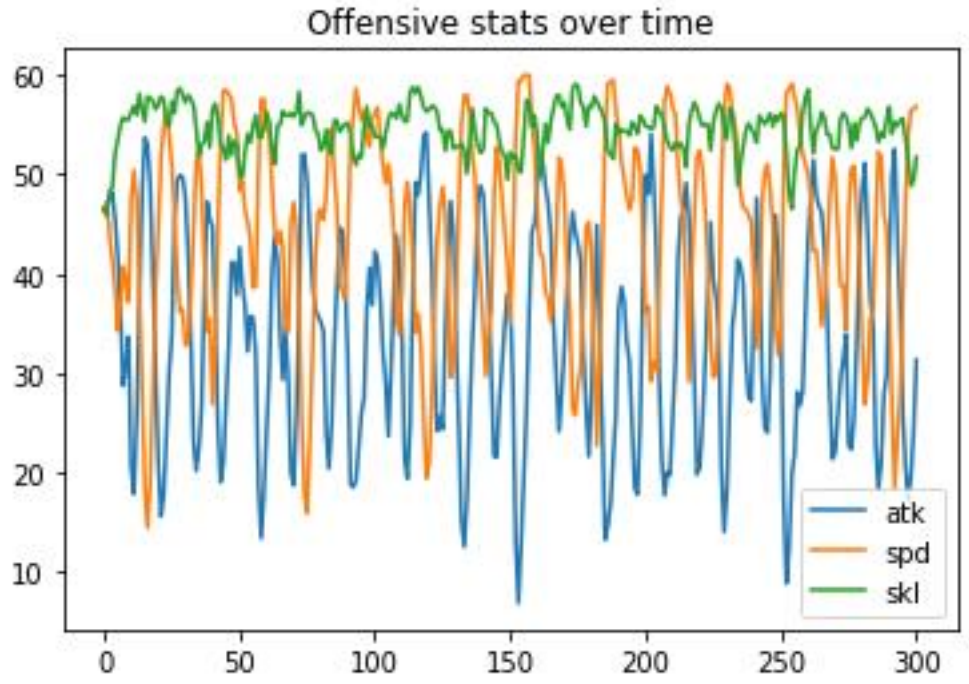
[[28, 60, 16, 56, 60, 60], 'R', 109]

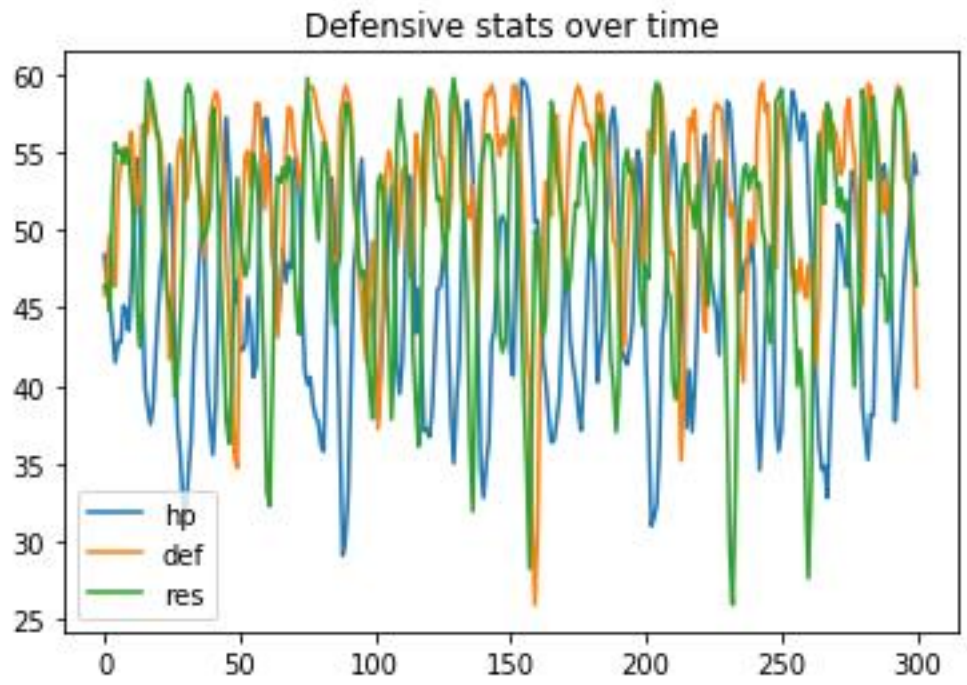
[[22, 60, 26, 52, 60, 60], 'R', 129]

[[60, 0, 60, 57, 50, 53], 'D', 221]

[[19, 60, 34, 47, 60, 60], 'R', 229]

[[34, 60, 10, 56, 60, 60], 'R', 264]





Ending averages for the population

hp atk spd skl def res

[53.64 31.36 56.86 51.76 39.9 46.48]

Seed 102934.7 Tests:

Test #6 - statCap = 165:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

It's stats, target, and population the individual appeared.

[[51, 40, 56, 7, 6, 5], 'R', 66]

[[15, 29, 0, 45, 39, 37], 'R', 128]

[[1, 44, 60, 60, 0, 0], 'D', 142]

[[1, 44, 60, 60, 0, 0], 'D', 143]

[[1, 44, 60, 60, 0, 0], 'D', 145]

[[1, 44, 60, 60, 0, 0], 'D', 147]

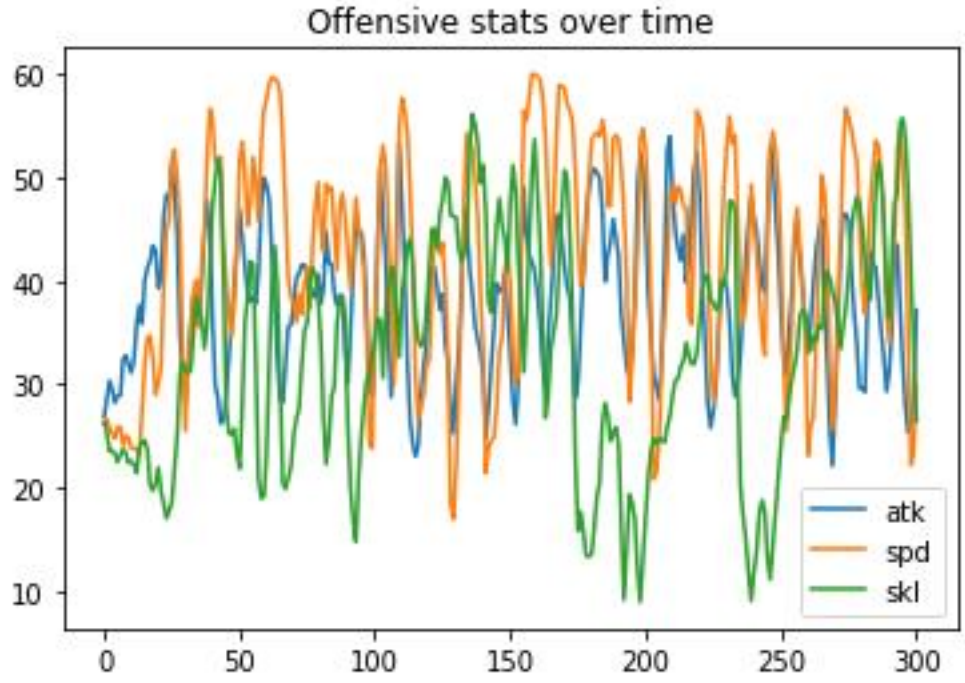
[[1, 44, 60, 60, 0, 0], 'D', 148]

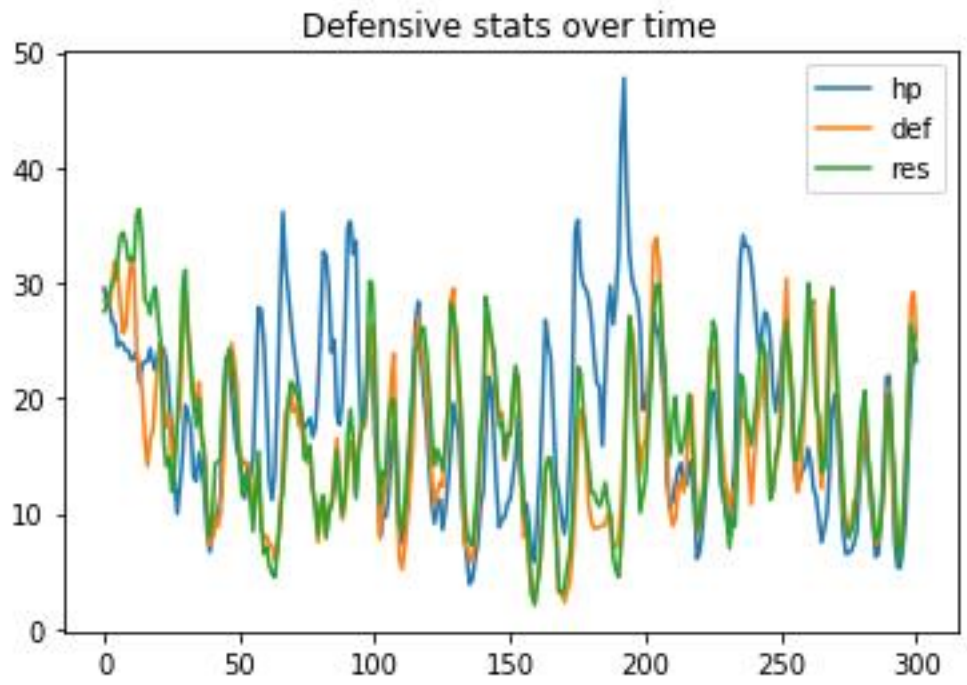
[[1, 44, 60, 60, 0, 0], 'D', 148]

[[1, 44, 60, 60, 0, 0], 'D', 150]

[[1, 44, 60, 60, 0, 0], 'D', 150]

[[1, 44, 60, 60, 0, 0], 'D', 151]





Ending averages for the population

hp atk spd skl def res

[23.18 37.2 29.76 26.48 25.06 23.32]

Test #7 - statCap = 180:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

It's stats, target, and population the individual appeared.

[[1, 59, 60, 60, 0, 0], 'D', 192]

[[1, 59, 60, 60, 0, 0], 'D', 198]

[[1, 59, 60, 60, 0, 0], 'D', 202]

[[1, 59, 60, 60, 0, 0], 'D', 202]

[[1, 59, 60, 60, 0, 0], 'D', 219]

[[1, 59, 60, 60, 0, 0], 'D', 227]

[[1, 59, 60, 60, 0, 0], 'D', 228]

[[1, 59, 60, 60, 0, 0], 'D', 230]

[[1, 59, 60, 60, 0, 0], 'D', 230]

[[1, 59, 60, 60, 0, 0], 'D', 230]

[[1, 59, 60, 60, 0, 0], 'D', 232]

[[1, 59, 60, 60, 0, 0], 'D', 232]

[[1, 59, 60, 60, 0, 0], 'D', 233]

[[1, 59, 60, 60, 0, 0], 'D', 233]

[[1, 59, 60, 60, 0, 0], 'D', 233]

[[1, 59, 60, 60, 0, 0], 'D', 234]

[[1, 59, 60, 60, 0, 0], 'D', 234]

[[1, 59, 60, 60, 0, 0], 'D', 235]

[[1, 59, 60, 60, 0, 0], 'D', 235]

[[1, 59, 60, 60, 0, 0], 'D', 236]

[[1, 59, 60, 60, 0, 0], 'D', 237]

[[1, 59, 60, 60, 0, 0], 'D', 237]

[[1, 59, 60, 60, 0, 0], 'D', 237]

[[1, 59, 60, 60, 0, 0], 'D', 238]

[[1, 59, 60, 60, 0, 0], 'D', 238]

[[1, 59, 60, 60, 0, 0], 'D', 238]

[[1, 59, 60, 60, 0, 0], 'D', 238]

[[1, 59, 60, 60, 0, 0], 'D', 238]

[[1, 59, 60, 60, 0, 0], 'D', 238]

[[1, 59, 60, 60, 0, 0], 'D', 239]

[[1, 59, 60, 60, 0, 0], 'D', 239]

[[1, 59, 60, 60, 0, 0], 'D', 240]

[[1, 59, 60, 60, 0, 0], 'D', 240]

[[1, 59, 60, 60, 0, 0], 'D', 240]

[[1, 59, 60, 60, 0, 0], 'D', 241]

[[1, 59, 60, 60, 0, 0], 'D', 241]

[[1, 59, 60, 60, 0, 0], 'D', 241]

[[1, 59, 60, 60, 0, 0], 'D', 241]

[[1, 59, 60, 60, 0, 0], 'D', 242]

[[1, 59, 60, 60, 0, 0], 'D', 242]

[[1, 59, 60, 60, 0, 0], 'D', 242]

[[1, 59, 60, 60, 0, 0], 'D', 242]

[[1, 59, 60, 60, 0, 0], 'D', 243]

[[1, 59, 60, 60, 0, 0], 'D', 243]

[[1, 59, 60, 60, 0, 0], 'D', 243]

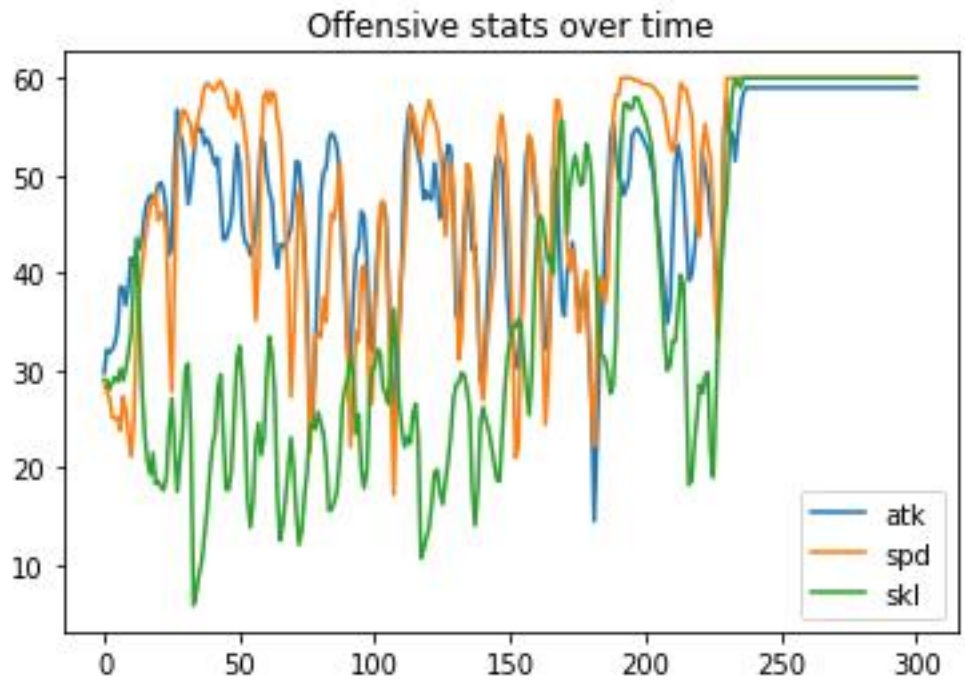
[[1, 59, 60, 60, 0, 0], 'D', 243]

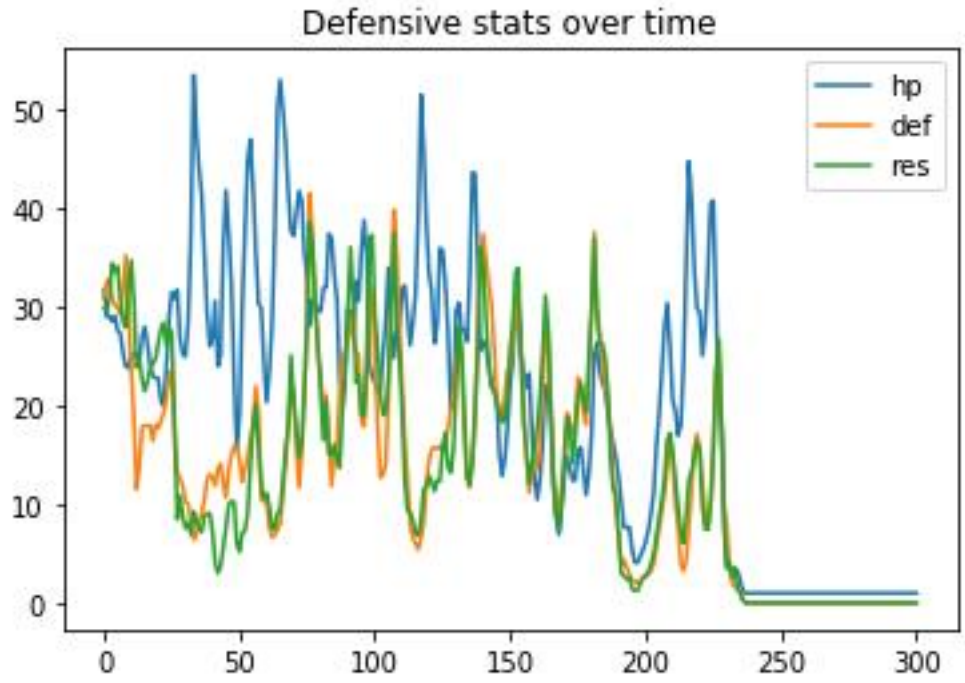
[[1, 59, 60, 60, 0, 0], 'D', 243]

[[1, 59, 60, 60, 0, 0], 'D', 243]

[[1, 59, 60, 60, 0, 0], 'D', 243]

[[1, 59, 60, 60, 0, 0], 'D', 243]





Ending averages for the population

hp atk spd skl def res

[1.0 59.0 60.0 60.0 0.0 0.0]

Test #8 - statCap = 200:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

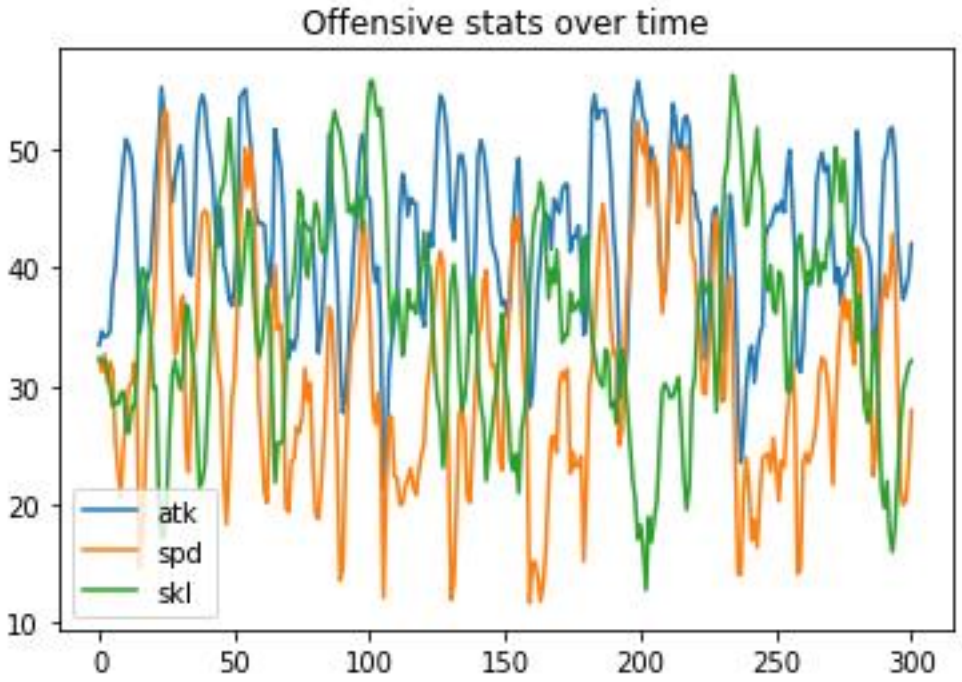
It's stats, target, and population the individual appeared.

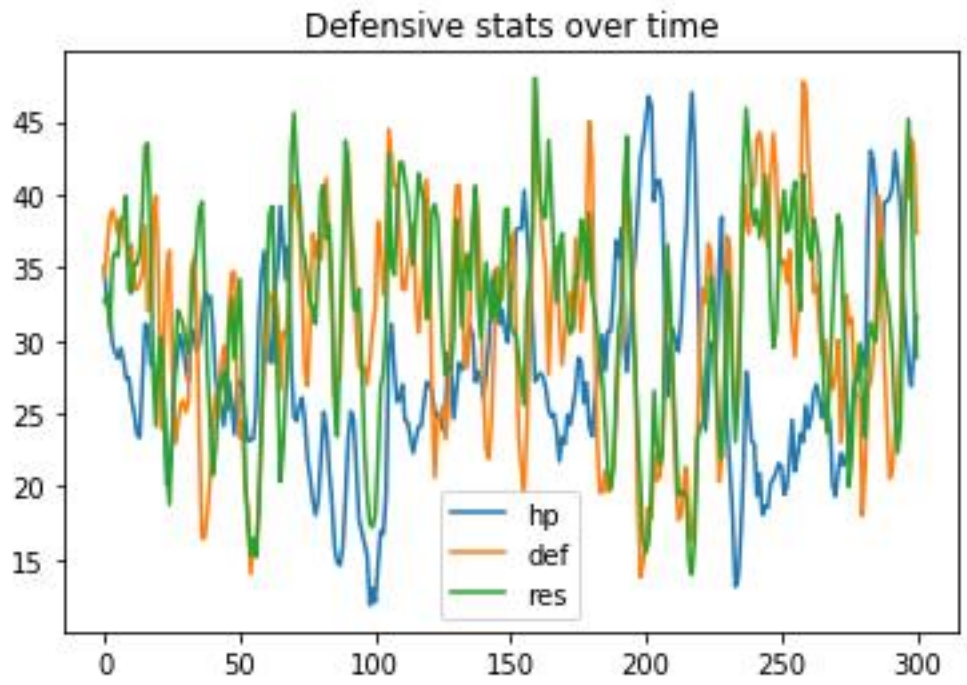
[[14, 34, 2, 47, 51, 52], 'D', 69]

[[18, 54, 1, 40, 44, 43], 'D', 107]

[[15, 32, 1, 49, 54, 49], 'D', 225]

[[28, 30, 4, 47, 44, 47], 'D', 262]





Ending averages for the population

hp atk spd skl def res

[31.68 42.04 27.94 32.14 37.36 28.84]

Test #9 - statCap = 230:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

It's stats, target, and population the individual appeared.

[[14, 60, 1, 46, 51, 58], 'R', 39]

[[16, 60, 0, 45, 51, 58], 'R', 41]

[[15, 60, 0, 50, 53, 52], 'R', 51]

[[16, 55, 2, 50, 54, 53], 'R', 74]

[[16, 55, 0, 50, 55, 54], 'R', 80]

[[14, 60, 46, 60, 0, 50], 'D', 85]

[[27, 2, 42, 50, 49, 60], 'D', 109]

[[17, 60, 0, 52, 47, 54], 'D', 113]

[[17, 60, 2, 47, 52, 52], 'R', 142]

[[17, 60, 2, 47, 52, 52], 'D', 149]

[[17, 60, 1, 47, 53, 52], 'R', 151]

[[17, 60, 2, 47, 52, 52], 'R', 155]

[[17, 60, 1, 47, 53, 52], 'R', 156]

[[43, 0, 37, 45, 53, 52], 'D', 179]

[[17, 60, 1, 47, 53, 52], 'R', 182]

[[15, 60, 2, 47, 53, 53], 'R', 207]

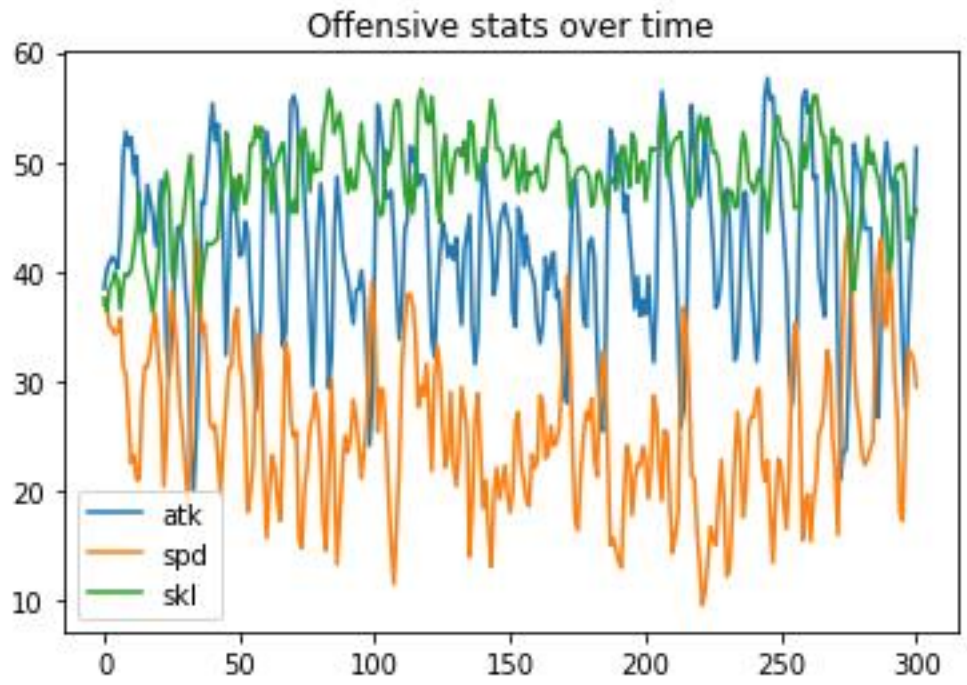
[[17, 60, 0, 48, 53, 52], 'D', 209]

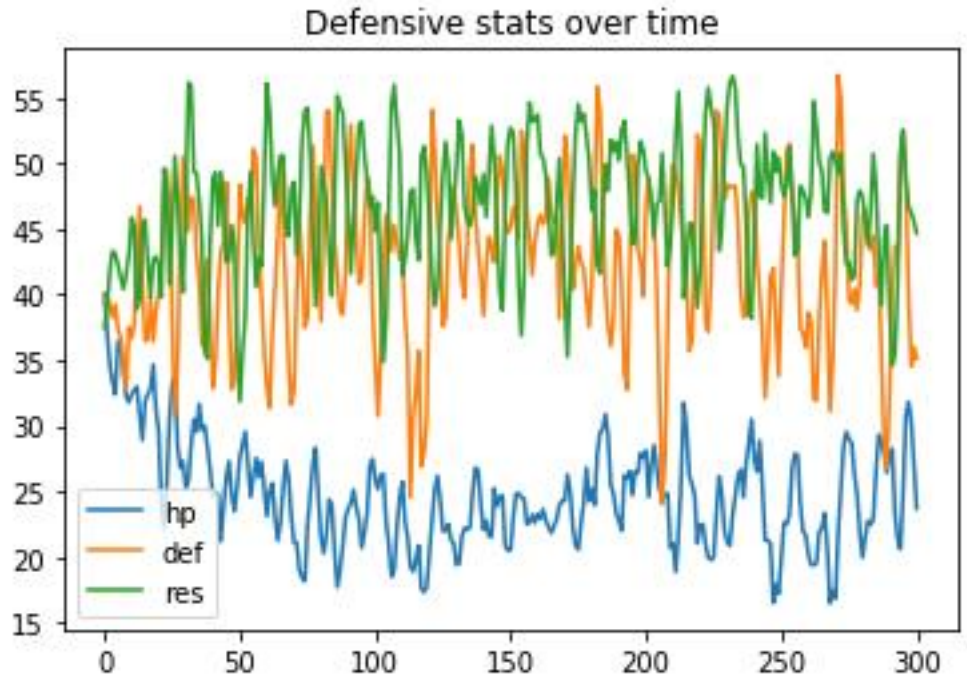
[[15, 60, 1, 47, 54, 53], 'D', 211]

[[17, 60, 0, 47, 53, 53], 'D', 212]

[[15, 60, 0, 47, 55, 53], 'R', 240]

[[17, 60, 1, 48, 59, 45], 'R', 243]





Ending averages for the population

hp atk spd skl def res

[23.7 51.28 29.5 45.7 35.14 44.68]

Test #10 - statCap = 280:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

It's stats, target, and population the individual appeared.

[[60, 3, 58, 46, 56, 57], 'D', 3]

[[51, 60, 4, 45, 60, 60], 'R', 45]

[[29, 60, 20, 60, 51, 60], 'R', 57]

[[31, 60, 21, 48, 60, 60], 'R', 102]

[[20, 60, 28, 52, 60, 60], 'R', 107]

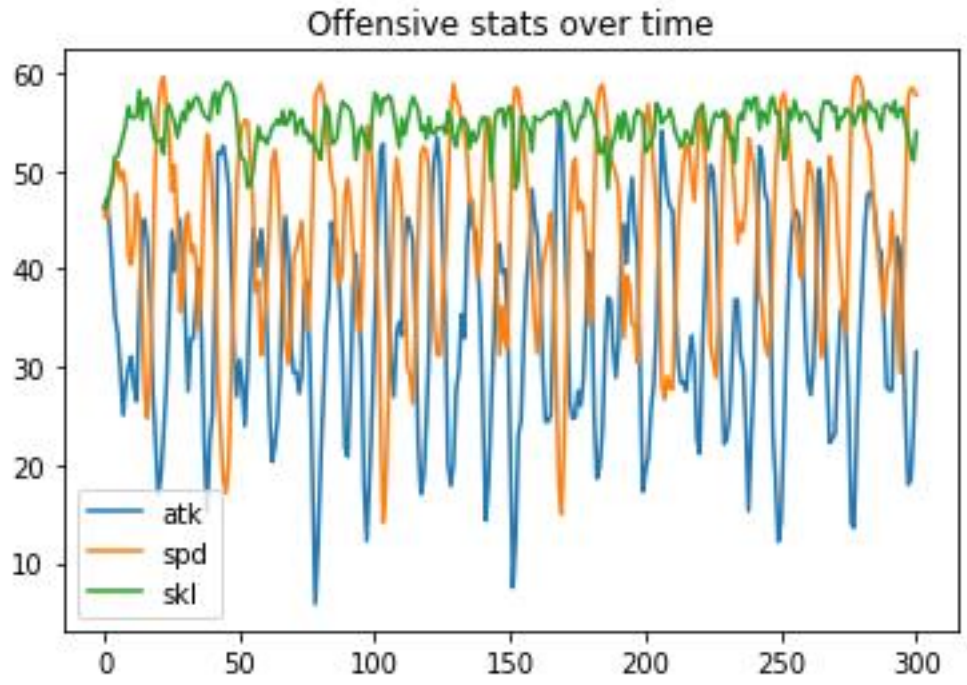
[[36, 60, 12, 52, 60, 60], 'R', 136]

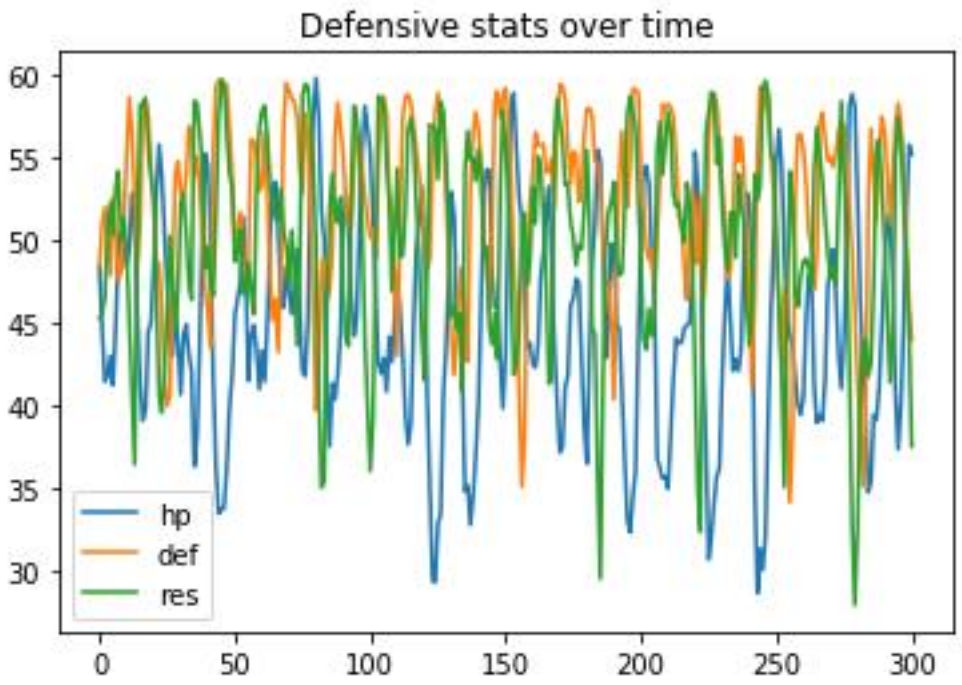
[[27, 60, 22, 60, 51, 60], 'R', 158]

[[24, 60, 26, 50, 60, 60], 'R', 193]

[[27, 60, 22, 51, 60, 60], 'R', 203]

[[27, 60, 22, 52, 60, 59], 'R', 210]





Ending averages for the population

hp atk spd skl def res

[55.22 31.54 57.74 54.0 43.98 37.52]

Seed 456753852951 Tests:

Test #11 - statCap = 165:

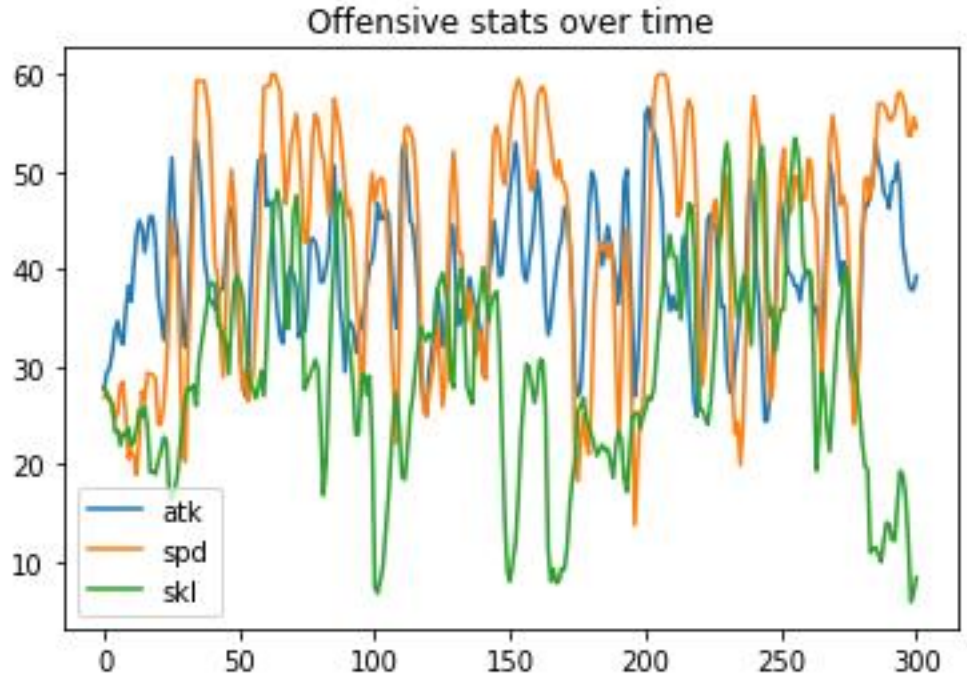
Listing of individuals stat spreads that lasted for 20+ populations.

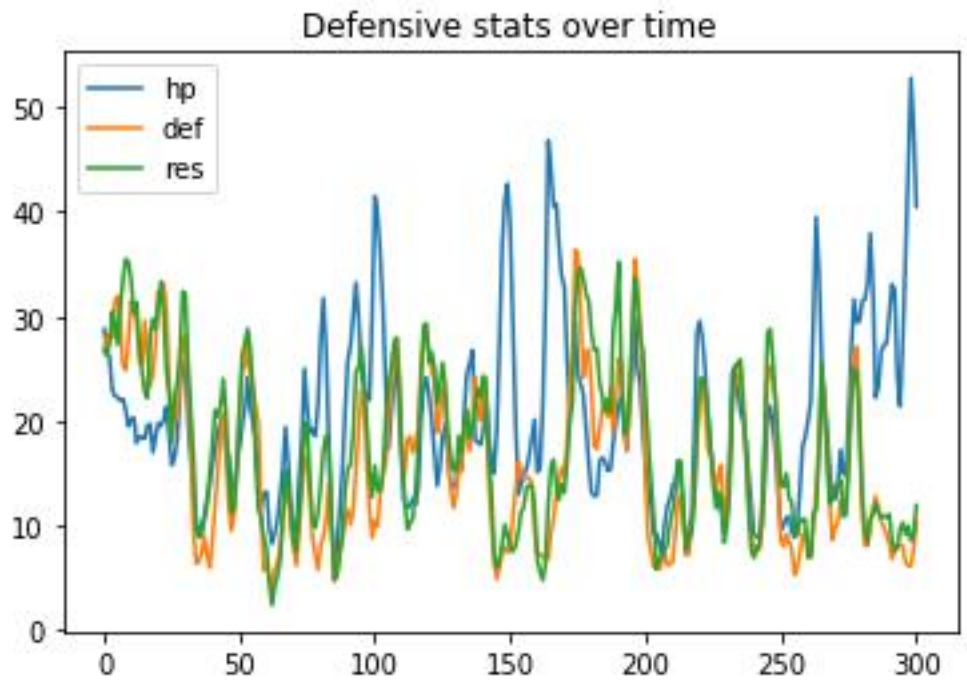
Duplicates may appear

It's stats, target, and population the individual appeared.

[[18, 29, 3, 50, 22, 43], 'D', 240]

[[1, 47, 60, 57, 0, 0], 'R', 241]





Ending averages for the population

hp atk spd skl def res

[40.5 39.3 54.48 8.4 10.38 11.94]

Test #12 - statCap = 180:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

It's stats, target, and population the individual appeared.

[[27, 23, 2, 49, 43, 36], 'R', 27]

[[1, 59, 60, 60, 0, 0], 'D', 73]

[[1, 59, 60, 60, 0, 0], 'D', 80]

[[1, 59, 60, 60, 0, 0], 'D', 85]

[[1, 59, 60, 60, 0, 0], 'D', 85]

[[1, 59, 60, 60, 0, 0], 'D', 87]

[[1, 59, 60, 60, 0, 0], 'D', 88]

[[1, 59, 60, 60, 0, 0], 'D', 88]

[[1, 59, 60, 60, 0, 0], 'D', 89]

[[1, 59, 60, 60, 0, 0], 'D', 89]

[[1, 59, 60, 60, 0, 0], 'D', 90]

[[1, 59, 60, 60, 0, 0], 'D', 90]

[[1, 59, 60, 60, 0, 0], 'D', 90]

[[1, 59, 60, 60, 0, 0], 'D', 90]

[[35, 3, 20, 49, 35, 38], 'R', 91]

[[1, 59, 60, 60, 0, 0], 'D', 91]

[[1, 59, 60, 60, 0, 0], 'D', 91]

[[1, 59, 60, 60, 0, 0], 'D', 91]

[[1, 59, 60, 60, 0, 0], 'D', 103]

[[60, 60, 53, 1, 1, 5], 'D', 145]

[[53, 43, 56, 7, 11, 10], 'D', 211]

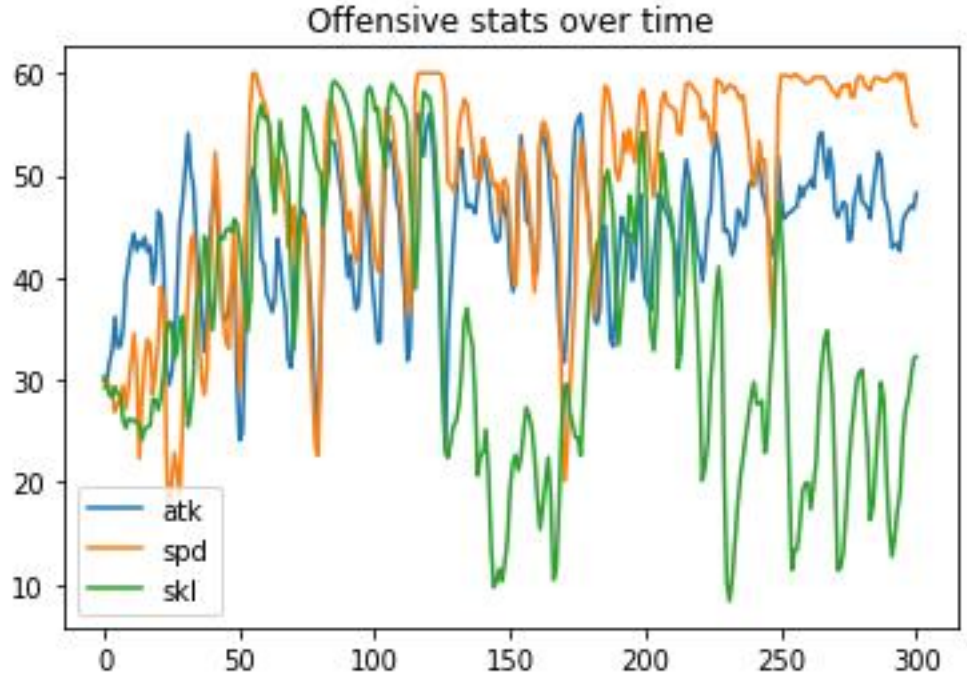
[[1, 60, 60, 59, 0, 0], 'R', 231]

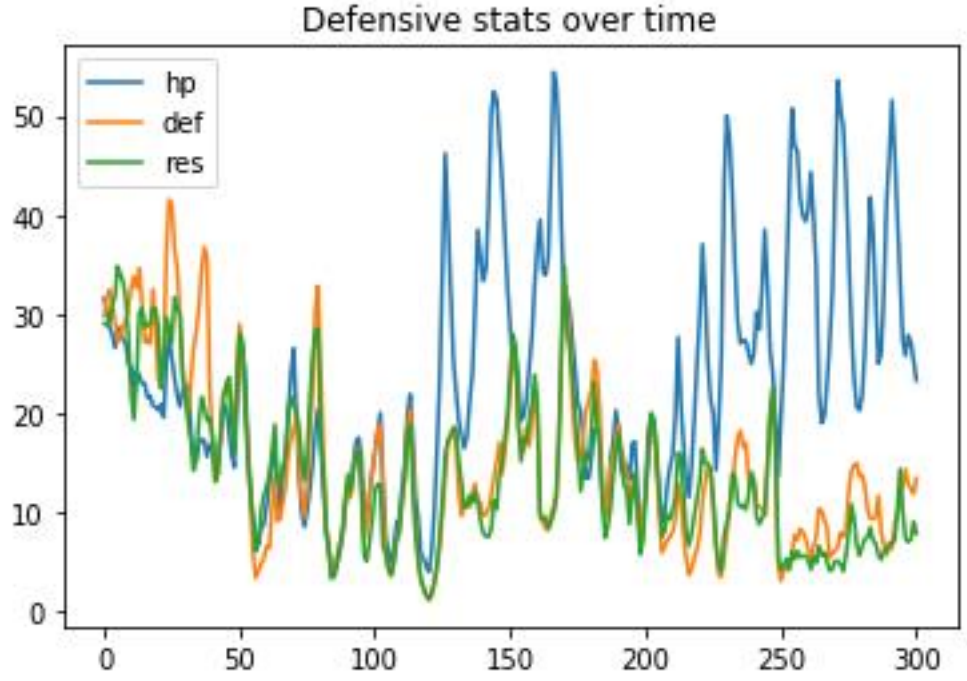
[[60, 43, 60, 13, 2, 2], 'D', 235]

[[60, 43, 60, 13, 3, 1], 'D', 241]

[[2, 60, 60, 37, 19, 2], 'R', 264]

[[3, 60, 60, 40, 17, 0], 'R', 281]





Ending averages for the population

hp atk spd skl def res

[23.3 48.28 54.86 32.28 13.42 7.86]

Test #13 - statCap = 200:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

It's stats, target, and population the individual appeared.

[[30, 29, 7, 47, 46, 41], 'D', 36]

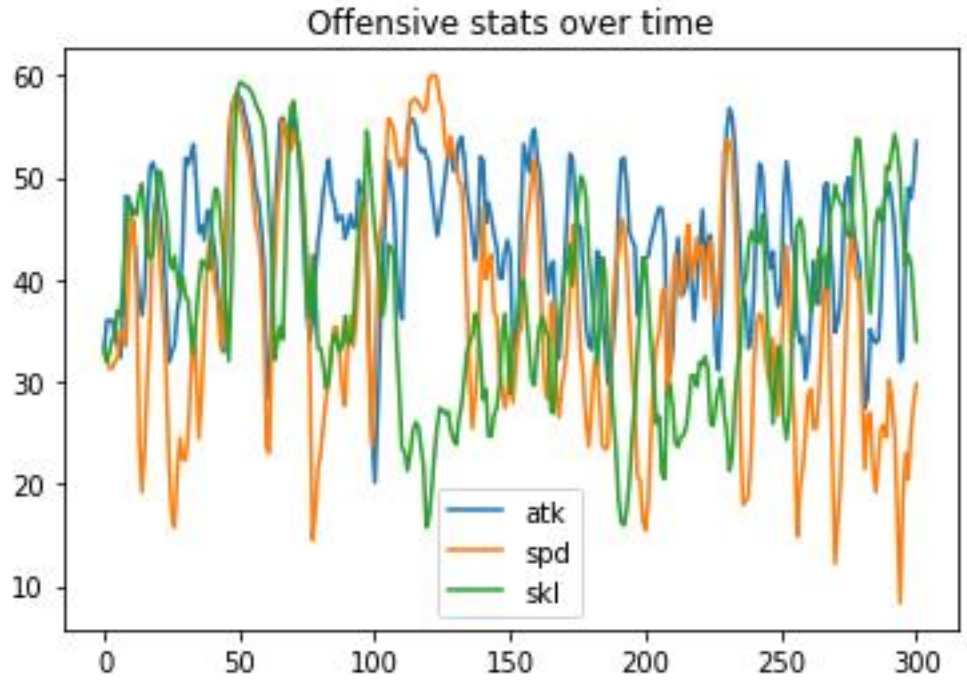
[[60, 60, 60, 17, 2, 1], 'D', 125]

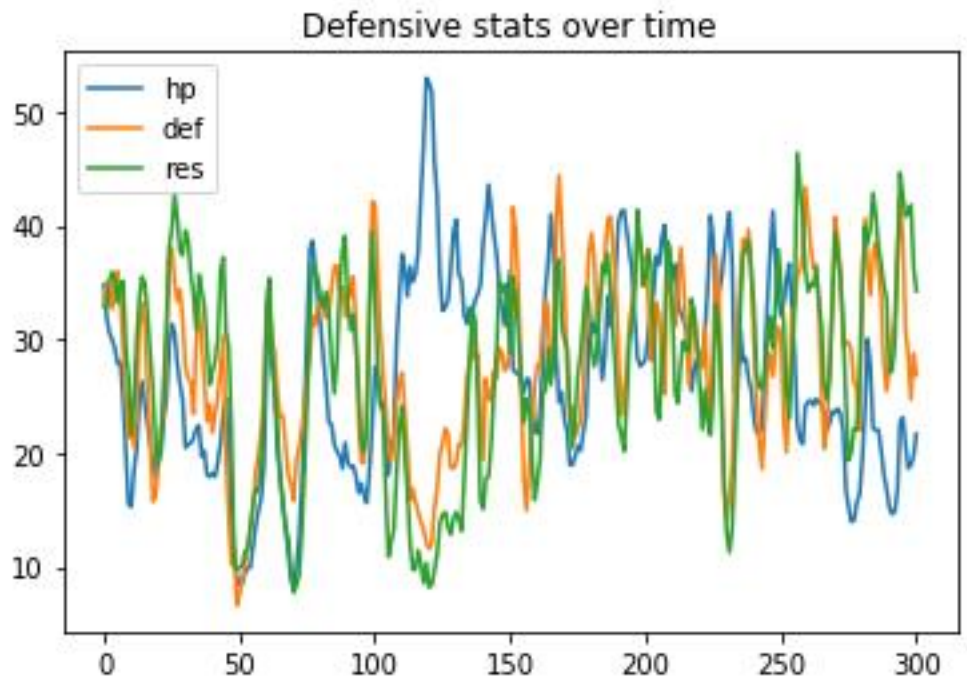
[[60, 60, 60, 17, 2, 1], 'D', 127]

[[17, 54, 3, 38, 45, 43], 'R', 153]

[[30, 15, 24, 34, 49, 48], 'D', 199]

[[13, 33, 8, 46, 49, 51], 'D', 254]





Ending averages for the population

hp atk spd skl def res

[21.68 53.5 29.78 33.96 26.84 34.24]

Test #14 - statCap = 230:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

It's stats, target, and population the individual appeared.

[[15, 6, 56, 51, 51, 51], 'D', 3]

[[11, 55, 0, 51, 57, 56], 'R', 40]

[[15, 60, 9, 45, 51, 50], 'R', 47]

[[20, 60, 1, 45, 52, 52], 'R', 55]

[[17, 60, 0, 48, 53, 52], 'D', 58]

[[17, 59, 1, 48, 53, 52], 'R', 66]

[[17, 60, 31, 57, 5, 60], 'D', 75]

[[16, 60, 0, 48, 53, 53], 'R', 78]

[[23, 60, 2, 46, 49, 50], 'R', 82]

[[15, 60, 0, 48, 53, 54], 'R', 82]

[[23, 60, 2, 46, 49, 50], 'D', 84]

[[23, 60, 1, 47, 49, 50], 'R', 109]

[[19, 60, 0, 45, 52, 54], 'D', 113]

[[19, 60, 2, 45, 52, 52], 'R', 117]

[[9, 60, 4, 45, 56, 56], 'R', 119]

[[23, 59, 0, 48, 50, 50], 'R', 151]

[[19, 60, 0, 46, 52, 53], 'R', 157]

[[19, 60, 1, 45, 53, 52], 'D', 162]

[[17, 60, 1, 45, 54, 53], 'R', 165]

[[15, 60, 2, 46, 54, 53], 'D', 166]

[[16, 60, 0, 47, 54, 53], 'R', 167]

[[16, 60, 0, 47, 54, 53], 'R', 173]

[[11, 60, 2, 47, 60, 50], 'R', 197]

[[11, 60, 1, 48, 60, 50], 'R', 198]

[[19, 60, 0, 46, 53, 52], 'D', 216]

[[20, 60, 1, 45, 52, 52], 'D', 229]

[[23, 60, 20, 57, 19, 51], 'D', 229]

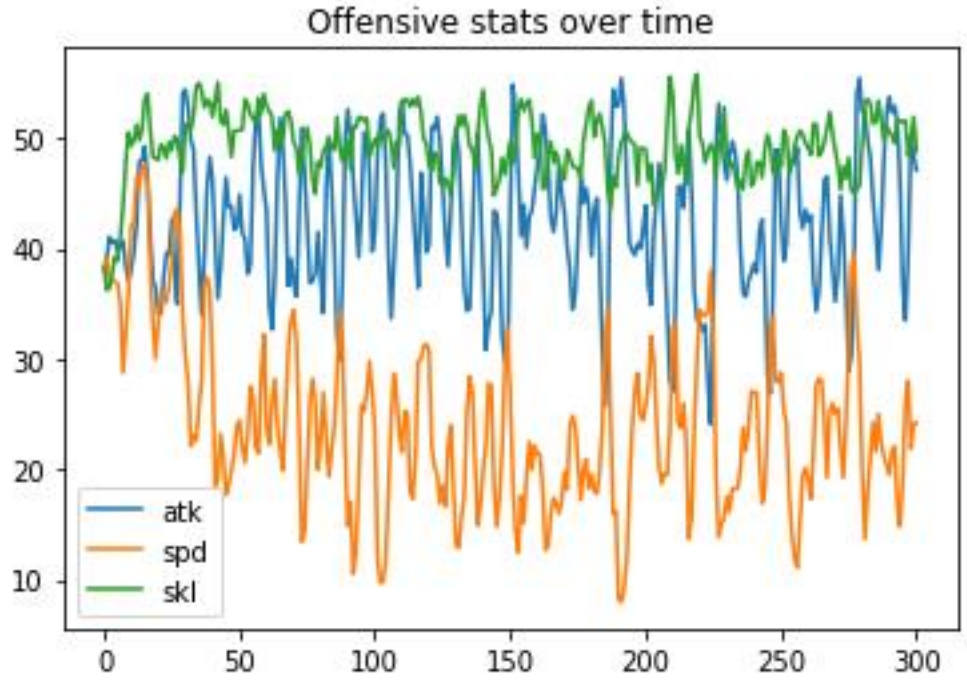
[[20, 60, 4, 46, 46, 54], 'R', 240]

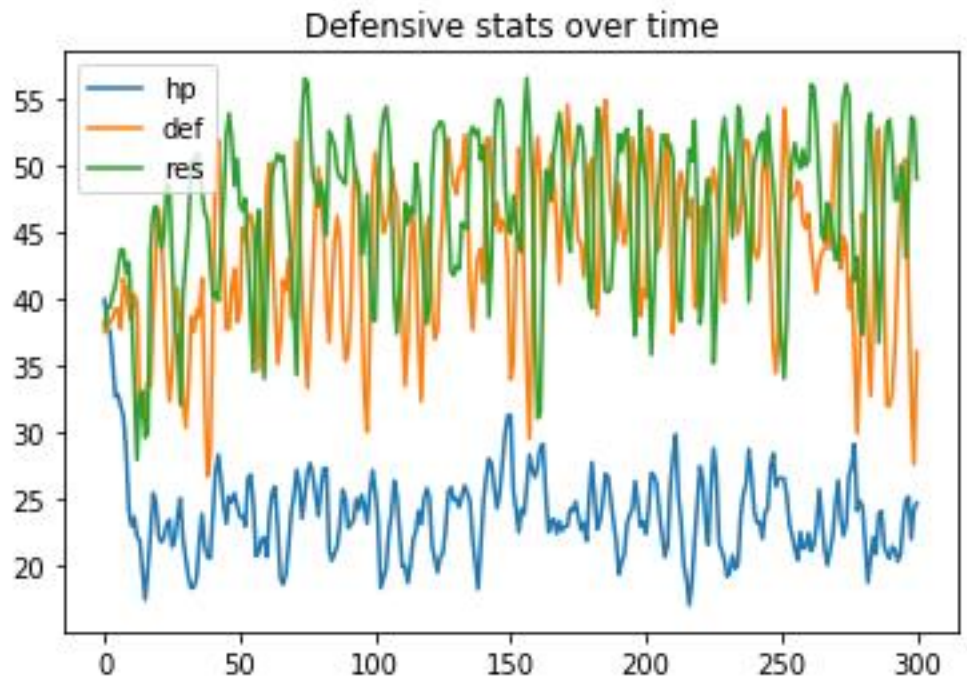
[[19, 60, 1, 45, 53, 52], 'D', 248]

[[17, 60, 0, 46, 55, 52], 'R', 278]

[[16, 60, 0, 48, 53, 53], 'R', 279]

[[17, 60, 0, 48, 55, 50], 'R', 279]





Ending averages for the population

hp atk spd skl def res

[24.72 47.1 24.22 48.84 36.08 49.04]

Test #15 - statCap = 280:

Listing of individuals stat spreads that lasted for 20+ populations.

Duplicates may appear

It's stats, target, and population the individual appeared.

[[26, 60, 15, 60, 59, 60], 'R', 12]

[[47, 60, 2, 51, 60, 60], 'R', 31]

[[28, 60, 18, 60, 54, 60], 'R', 32]

[[60, 0, 60, 46, 60, 54], 'D', 89]

[[25, 60, 15, 60, 60, 60], 'R', 105]

[[60, 0, 60, 53, 58, 49], 'D', 128]

[[60, 0, 60, 45, 60, 55], 'D', 135]

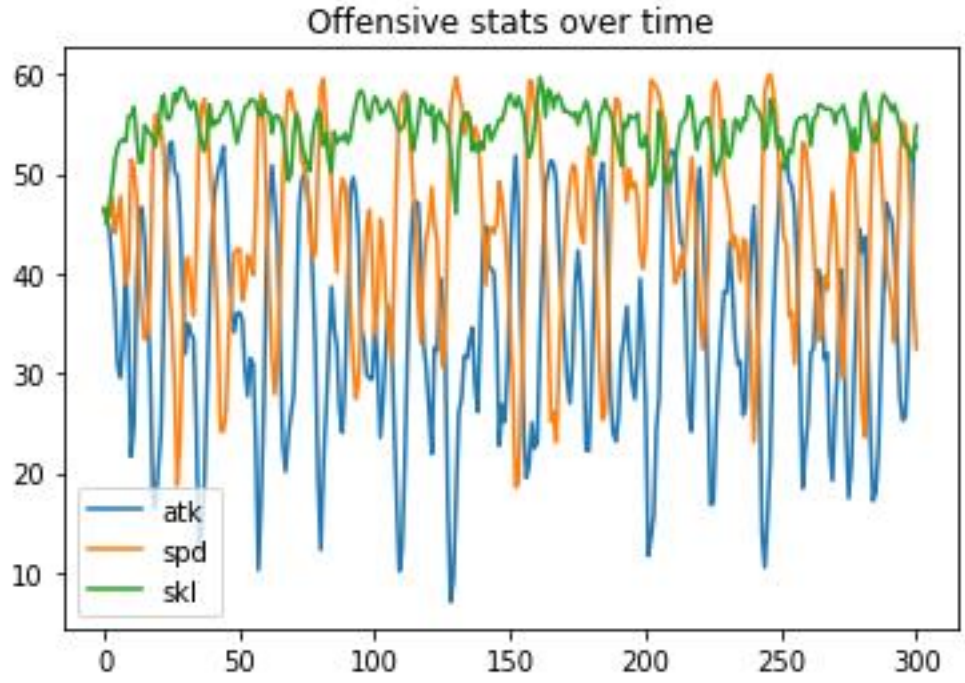
[[19, 60, 21, 60, 60, 60], 'R', 165]

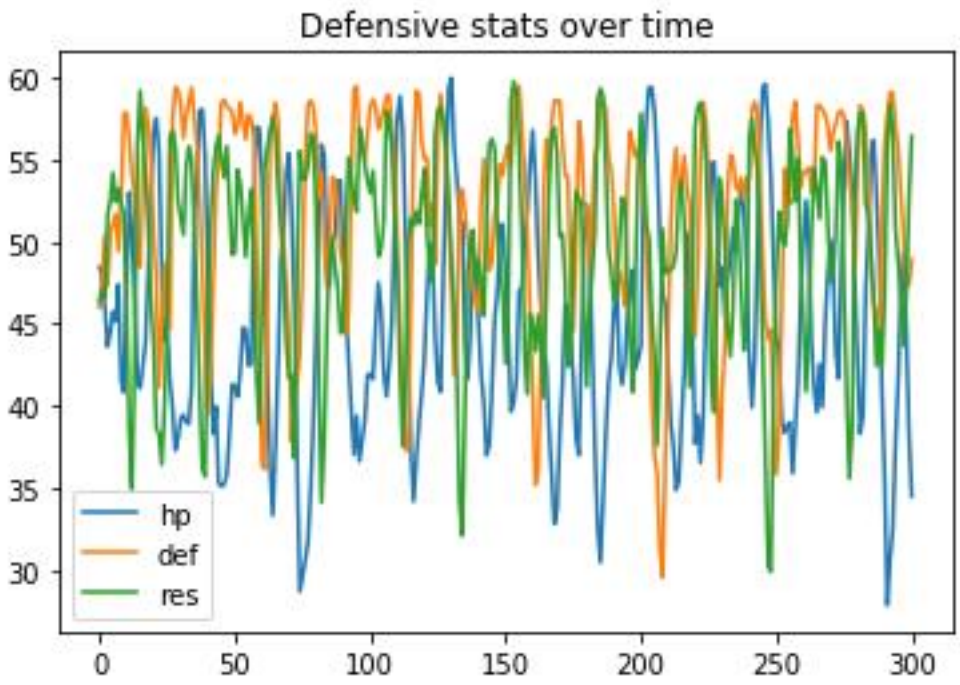
[[24, 60, 16, 60, 60, 60], 'R', 167]

[[29, 60, 19, 52, 60, 60], 'R', 173]

[[27, 60, 21, 52, 60, 60], 'R', 181]

[[39, 60, 11, 60, 50, 60], 'R', 269]





Ending averages for the population

hp atk spd skl def res

[34.5 52.78 32.46 54.86 48.94 56.46]

Table of test results

Seed and Bst	Ending stat averages	List of individuals that lasted 20+ gens with duplicates (num) means more than 1 of the same in the same population made
41 Bst: 165	hp atk spd skl def res [24.62 40.44 32.92 24.66 22.42 19.94]	[[3, 59, 60, 39, 3, 1], 'D', 105] [[1, 59, 60, 39, 4, 2], 'D', 106] [[1, 55, 60, 49, 0, 0], 'D', 113] [[1, 55, 60, 49, 0, 0], 'D', 118]
41 Bst: 180	[1.0 59.0 60.0 60.0 0.0 0.0] (converged)	[[18, 36, 1, 37, 44, 44], 'D', 31] [[1, 59, 60, 60, 0, 0], 'D', 68] [[1, 59, 60, 60, 0, 0], 'R', 68] [[1, 59, 60, 60, 0, 0], 'D', 71] (2) [[1, 59, 60, 60, 0, 0], 'D', 74] [[1, 59, 60, 60, 0, 0], 'D', 77] [[1, 59, 60, 60, 0, 0], 'D', 78] [[1, 59, 60, 60, 0, 0], 'D', 79] [[1, 59, 60, 60, 0, 0], 'D', 80] (2) [[1, 59, 60, 60, 0, 0], 'D', 81] (3) [[1, 59, 60, 60, 0, 0], 'D', 82] (3) [[1, 59, 60, 60, 0, 0], 'D', 83] (6) [[1, 59, 60, 60, 0, 0], 'D', 84] [[1, 59, 60, 60, 0, 0], 'D', 85] (6) [[1, 59, 60, 60, 0, 0], 'D', 86] [[1, 59, 60, 60, 0, 0], 'D', 87] (4) [[1, 59, 60, 60, 0, 0], 'D', 88] (6) [[1, 59, 60, 60, 0, 0], 'D', 89] (6) [[1, 59, 60, 60, 0, 0], 'D', 90] (5)
41 Bst: 200	[30.64 40.88 34.1 28.96 33.76 31.66]	[[14, 37, 0, 49, 55, 45], 'D', 43] [[4, 60, 60, 60, 16, 0], 'D', 112] [[60, 60, 60, 13, 5, 2], 'D', 247] [[1, 60, 60, 51, 24, 4], 'R', 247]
41 Bst: 230	[23.28 41.08 28.36 53.1 38.74 45.44]	[[15, 60, 0, 47, 51, 57], 'R', 16] [[15, 60, 1, 51, 50, 53], 'R', 87] [[23, 60, 3, 49, 43, 52], 'R', 89] [[14, 60, 1, 49, 52, 54], 'R', 91] [[30, 1, 49, 46, 50, 54], 'D', 97] [[13, 60, 2, 46, 55, 54], 'R', 109] [[13, 60, 2, 46, 55, 54], 'D', 114] [[19, 60, 4, 45, 47, 55], 'R', 115] [[11, 60, 3, 46, 55, 55], 'D', 133] [[12, 60, 0, 46, 57, 55], 'D', 135] [[14, 60, 0, 46, 56, 54], 'R', 148] [[11, 60, 2, 47, 55, 55], 'R', 155] [[11, 60, 3, 46, 55, 55], 'R', 157] [[11, 60, 0, 46, 58, 55], 'R', 162] [[11, 59, 3, 46, 56, 55], 'R', 163]

		[[46, 0, 38, 46, 49, 51], 'D', 178] [[11, 60, 2, 48, 54, 55], 'R', 202] [[15, 55, 1, 46, 54, 59], 'R', 206] [[11, 60, 1, 48, 54, 56], 'R', 222] [[11, 60, 1, 49, 54, 55], 'R', 227] [[11, 60, 0, 49, 55, 55], 'R', 233] [[11, 60, 1, 48, 55, 55], 'D', 252] [[11, 60, 0, 49, 55, 55], 'D', 262]
41 Bst: 280	[53.64 31.36 56.86 51.76 39.9 46.48]	[[28, 60, 22, 60, 50, 60], 'R', 7] [[60, 1, 60, 56, 51, 52], 'D', 46] [[47, 60, 8, 47, 58, 60], 'R', 54] [[40, 60, 0, 60, 60, 60], 'R', 56] [[28, 60, 16, 56, 60, 60], 'R', 109] [[22, 60, 26, 52, 60, 60], 'R', 129] [[60, 0, 60, 57, 50, 53], 'D', 221] [[19, 60, 34, 47, 60, 60], 'R', 229] [[34, 60, 10, 56, 60, 60], 'R', 264]
102934.7 Bst: 165	[23.18 37.2 29.76 26.48 25.06 23.32]	[[51, 40, 56, 7, 6, 5], 'R', 66] [[15, 29, 0, 45, 39, 37], 'R', 128] [[1, 44, 60, 60, 0, 0], 'D', 142] [[1, 44, 60, 60, 0, 0], 'D', 143] [[1, 44, 60, 60, 0, 0], 'D', 145] [[1, 44, 60, 60, 0, 0], 'D', 147] [[1, 44, 60, 60, 0, 0], 'D', 148] (2) [[1, 44, 60, 60, 0, 0], 'D', 150] (2) [[1, 44, 60, 60, 0, 0], 'D', 151]
102934.7 Bst: 180	[1.0 59.0 60.0 60.0 0.0 0.0] (converged)	[[1, 59, 60, 60, 0, 0], 'D', 192] [[1, 59, 60, 60, 0, 0], 'D', 198] [[1, 59, 60, 60, 0, 0], 'D', 202] (2) [[1, 59, 60, 60, 0, 0], 'D', 219] [[1, 59, 60, 60, 0, 0], 'D', 227] [[1, 59, 60, 60, 0, 0], 'D', 228] [[1, 59, 60, 60, 0, 0], 'D', 230] (3) [[1, 59, 60, 60, 0, 0], 'D', 232] (2) [[1, 59, 60, 60, 0, 0], 'D', 233] (3) [[1, 59, 60, 60, 0, 0], 'D', 234] (2) [[1, 59, 60, 60, 0, 0], 'D', 235] (2) [[1, 59, 60, 60, 0, 0], 'D', 236] [[1, 59, 60, 60, 0, 0], 'D', 237] (3) [[1, 59, 60, 60, 0, 0], 'D', 238] (6) [[1, 59, 60, 60, 0, 0], 'D', 239] (2) [[1, 59, 60, 60, 0, 0], 'D', 240] (3) [[1, 59, 60, 60, 0, 0], 'D', 241] (4) [[1, 59, 60, 60, 0, 0], 'D', 242] (4) [[1, 59, 60, 60, 0, 0], 'D', 243] (8)
102934.7 Bst: 200	[31.68 42.04 27.94 32.14 37.36 28.84]	[[14, 34, 2, 47, 51, 52], 'D', 69] [[18, 54, 1, 40, 44, 43], 'D', 107] [[15, 32, 1, 49, 54, 49], 'D', 225]

		[[28, 30, 4, 47, 44, 47], 'D', 262]
102934.7 Bst: 230	[23.7 51.28 29.5 45.7 35.14 44.68]	[[14, 60, 1, 46, 51, 58], 'R', 39] [[16, 60, 0, 45, 51, 58], 'R', 41] [[15, 60, 0, 50, 53, 52], 'R', 51] [[16, 55, 2, 50, 54, 53], 'R', 74] [[16, 55, 0, 50, 55, 54], 'R', 80] [[14, 60, 46, 60, 0, 50], 'D', 85] [[27, 2, 42, 50, 49, 60], 'D', 109] [[17, 60, 0, 52, 47, 54], 'D', 113] [[17, 60, 2, 47, 52, 52], 'R', 142] [[17, 60, 2, 47, 52, 52], 'D', 149] [[17, 60, 1, 47, 53, 52], 'R', 151] [[17, 60, 2, 47, 52, 52], 'R', 155] [[17, 60, 1, 47, 53, 52], 'R', 156] [[43, 0, 37, 45, 53, 52], 'D', 179] [[17, 60, 1, 47, 53, 52], 'R', 182] [[15, 60, 2, 47, 53, 53], 'R', 207] [[17, 60, 0, 48, 53, 52], 'D', 209] [[15, 60, 1, 47, 54, 53], 'D', 211] [[17, 60, 0, 47, 53, 53], 'D', 212] [[15, 60, 0, 47, 55, 53], 'R', 240] [[17, 60, 1, 48, 59, 45], 'R', 243]
102934.7 Bst: 280	[55.22 31.54 57.74 54.0 43.98 37.52]	[[60, 3, 58, 46, 56, 57], 'D', 3] [[51, 60, 4, 45, 60, 60], 'R', 45] [[29, 60, 20, 60, 51, 60], 'R', 57] [[31, 60, 21, 48, 60, 60], 'R', 102] [[20, 60, 28, 52, 60, 60], 'R', 107] [[36, 60, 12, 52, 60, 60], 'R', 136] [[27, 60, 22, 60, 51, 60], 'R', 158] [[24, 60, 26, 50, 60, 60], 'R', 193] [[27, 60, 22, 51, 60, 60], 'R', 203] [[27, 60, 22, 52, 60, 59], 'R', 210]
456753852951 Bst: 165	[40.5 39.3 54.48 8.4 10.38 11.94]	[[18, 29, 3, 50, 22, 43], 'D', 240] [[1, 47, 60, 57, 0, 0], 'R', 241]
456753852951 Bst: 180	[23.3 48.28 54.86 32.28 13.42 7.86]	[[27, 23, 2, 49, 43, 36], 'R', 27] [[1, 59, 60, 60, 0, 0], 'D', 73] [[1, 59, 60, 60, 0, 0], 'D', 80] [[1, 59, 60, 60, 0, 0], 'D', 85] (2) [[1, 59, 60, 60, 0, 0], 'D', 87] [[1, 59, 60, 60, 0, 0], 'D', 88] (2) [[1, 59, 60, 60, 0, 0], 'D', 89] (2) [[1, 59, 60, 60, 0, 0], 'D', 90] (4) [[35, 3, 20, 49, 35, 38], 'R', 91] [[1, 59, 60, 60, 0, 0], 'D', 91] (3) [[1, 59, 60, 60, 0, 0], 'D', 103] [[60, 60, 53, 1, 1, 5], 'D', 145] [[53, 43, 56, 7, 11, 10], 'D', 211] [[1, 60, 60, 59, 0, 0], 'R', 231]

		[[60, 43, 60, 13, 2, 2], 'D', 235] [[60, 43, 60, 13, 3, 1], 'D', 241] [[2, 60, 60, 37, 19, 2], 'R', 264] [[3, 60, 60, 40, 17, 0], 'R', 281]
456753852951 Bst: 200	[21.68 53.5 29.78 33.96 26.84 34.24]	[[30, 29, 7, 47, 46, 41], 'D', 36] [[60, 60, 60, 17, 2, 1], 'D', 125] [[60, 60, 60, 17, 2, 1], 'D', 127] [[17, 54, 3, 38, 45, 43], 'R', 153] [[30, 15, 24, 34, 49, 48], 'D', 199] [[13, 33, 8, 46, 49, 51], 'D', 254]
456753852951 Bst: 230	[24.72 47.1 24.22 48.84 36.08 49.04]	[[15, 6, 56, 51, 51, 51], 'D', 3] [[11, 55, 0, 51, 57, 56], 'R', 40] [[15, 60, 9, 45, 51, 50], 'R', 47] [[20, 60, 1, 45, 52, 52], 'R', 55] [[17, 60, 0, 48, 53, 52], 'D', 58] [[17, 59, 1, 48, 53, 52], 'R', 66] [[17, 60, 31, 57, 5, 60], 'D', 75] [[16, 60, 0, 48, 53, 53], 'R', 78] [[23, 60, 2, 46, 49, 50], 'R', 82] [[15, 60, 0, 48, 53, 54], 'R', 82] [[23, 60, 2, 46, 49, 50], 'D', 84] [[23, 60, 1, 47, 49, 50], 'R', 109] [[19, 60, 0, 45, 52, 54], 'D', 113] [[19, 60, 2, 45, 52, 52], 'R', 117] [[9, 60, 4, 45, 56, 56], 'R', 119] [[23, 59, 0, 48, 50, 50], 'R', 151] [[19, 60, 0, 46, 52, 53], 'R', 157] [[19, 60, 1, 45, 53, 52], 'D', 162] [[17, 60, 1, 45, 54, 53], 'R', 165] [[15, 60, 2, 46, 54, 53], 'D', 166] [[16, 60, 0, 47, 54, 53], 'R', 167] [[16, 60, 0, 47, 54, 53], 'R', 173] [[11, 60, 2, 47, 60, 50], 'R', 197] [[11, 60, 1, 48, 60, 50], 'R', 198] [[19, 60, 0, 46, 53, 52], 'D', 216] [[20, 60, 1, 45, 52, 52], 'D', 229] [[23, 60, 20, 57, 19, 51], 'D', 229] [[20, 60, 4, 46, 46, 54], 'R', 240] [[19, 60, 1, 45, 53, 52], 'D', 248] [[17, 60, 0, 46, 55, 52], 'R', 278] [[16, 60, 0, 48, 53, 53], 'R', 279] [[17, 60, 0, 48, 55, 50], 'R', 279]
456753852951 Bst: 280	[34.5 52.78 32.46 54.86 48.94 56.46]	[[26, 60, 15, 60, 59, 60], 'R', 12] [[47, 60, 2, 51, 60, 60], 'R', 31] [[28, 60, 18, 60, 54, 60], 'R', 32] [[60, 0, 60, 46, 60, 54], 'D', 89] [[25, 60, 15, 60, 60, 60], 'R', 105] [[60, 0, 60, 53, 58, 49], 'D', 128]

		[[60, 0, 60, 45, 60, 55], 'D', 135] [[19, 60, 21, 60, 60, 60], 'R', 165] [[24, 60, 16, 60, 60, 60], 'R', 167] [[29, 60, 19, 52, 60, 60], 'R', 173] [[27, 60, 21, 52, 60, 60], 'R', 181] [[39, 60, 11, 60, 50, 60], 'R', 269]

Table to help visualize the differences in test final stat averages.

Bst \ Seed	41	102934.7	456753852951
165	[24.62 40.44 32.92 24.66 22.42 19.94]	[23.18 37.2 29.76 26.48 25.06 23.32]	[40.5 39.3 54.48 8.4 10.38 11.94]
180	[1.0 59.0 60.0 60.0 0.0 0.0]	[1.0 59.0 60.0 60.0 0.0 0.0]	[23.3 48.28 54.86 32.28 13.42 7.86]
200	[30.64 40.88 34.1 28.96 33.76 31.66]	[31.68 42.04 27.94 32.14 37.36 28.84]	[21.68 53.5 29.78 33.96 26.84 34.24]
230	[23.28 41.08 28.36 53.1 38.74 45.44]	[23.7 51.28 29.5 45.7 35.14 44.68]	[24.72 47.1 24.22 48.84 36.08 49.04]
280	[53.64 31.36 56.86 51.76 39.9 46.48]	[55.22 31.54 57.74 54.0 43.98 37.52]	[34.5 52.78 32.46 54.86 48.94 56.46]

Conclusion:

When base stat totals are lower than or equal to 180, the offensive stats seem to play more of a major role. From testing the 180 base stat total tests favor optimizing to win the speed and skill check. Because the base stat total is so low winning both the speed and skill check while having high attack can give a major edge. The edge is that you can attack the lowest stat of the opponent twice before taking any damage, hence the 1 hp that the strong individual has. (If you have 16 more speed you do 2 hits before taking any damage and having 16 more skill lets you attack the lowest stat on the opponent.) This is probably the reason that two of the 180 tests converge to 1, 59, 60, 60, 0, 0 targeting defense. This individual is beatable with an individual like this, 60,0,0,60,60,0 targeting resistance or defense. The issue with second individual is that it will lose to 1,59,60,60,0,0 targeting resistance. This means that the general fitness of 60,0,0,60,60,0 is probably not as good as individual the program converges to. Because survivor selection fitness is based off the population + offspring, fitness is population dependent. The 165 bst tests don't converge to an individual, but the idea that there will probably be low stats will still hold true and make the same logic apply to some extent.

Based off the 180 tests I knew I needed to test some higher base stat totals as I was sure this would make the program have different results. The 200 bst tests seem to produce very different types of individuals. Seed 41 seems to show some strong individuals that maximize hp attack and speed. But the other tests go past that and split stats amongst attack, skill, def, and res. There are some individuals

that value speed and other just don't value it at all. Of course, strong individuals will be population dependent, but the overall fitness of the individuals of the last two seeds are probably better as the last seed gets individuals like seed 41 then switches over to seed 102934.7 like individuals.

Finally, we test base stat totals of 230 and 280. Most individuals that last for 20+ generations seem to show high attack, skill, def, and res. Hp tends to be middling to high. While speed is either incredibly low or one stat gets tanked (generally attack, but not always) to get it up to a high / middling range. The overall result is that with more stats you still want to have enough skill to not get your lowest stat attacked. This puts it at around 45+. Given that you have high defense and resistance you are minimizing the damage taken. The generally seems to split amongst the other stat to make variations in populations.

Future improvements:

1. Thread the battles for every generation.
   If battles are threaded this section of code could see major improvements in speed.
2. Make new mutations.
   The two mutations created are the one detailed in the project proposal, but it only selects 2-4 stats. And a second one that takes some amount away from a single stat and moves it into other stats.
3. Setup global variables for battle.py.
   Right now checks in battle.py are hardcoded to values. But if some of those values are set to global variables it will allow users to change checks to work however they like.
4. Make a counter that increments when an individual is at the top of their generation.
   Right now there is a counter that increments whenever an individual survives plus survivor selection. This change would make another variable that increments when the individual is at the top of the current generation. This change may help narrow what the actual best individuals for certain games are, or there might not be any information gain.