

Project 1

Knut Halvor Skrede

February 11, 2011

Part B)

Problem representation

Genotypes and phenotypes

The genotype is represented as an array of $B * S$ boolean values (where S is the number of available soldiers and B is the number of battles.) The genotype was chosen such that no genes would be "worth" more soldiers than others.

A restriction is set on the genotype to contain exactly S true values. The genotype is initialized such that each boolean of the genotype has a probability of $1/B$ chance of being true.

The phenotype is represented as an array of B integers. These integers represent how many troops the colonel shows up with at each battle.

Crossover

The crossover is done by finding all places where in the genotype array individual 1 is true and individual 2 is not. And then finding all places where in the genotype array individual 2 is true and individual 1 is not. Then using this information to randomly construct a bit-mask to be used in the crossover.

Mutation

Mutation is done by selecting two random places in the genotype that has different values, and switching places. This guarantees that there will still be S troops.

Evaluation

The evaluation is done exactly as proposed by the assignment.

Strategy entropy

The average strategy entropy is calculated as proposed by the assignment and plotted along with the fitness plots.

EA settings

The settings used for all ea runs:

Size of child pool: 30

Size of adult pool: 30

number of generations: 200

mutation rate: 1

crossover rate: 0.9

selection protocol: Full generational replacement

selection strategy: Sigma scaling

elitism: 2

Table of strategies and results

descriptions of the 3 signature cases

All the runs resulted in converging results. Don't have time to add fitness plots. The plots for all runs are included in a zip file. The plots are named B-Rf-Lf.png, they should correspond to the table above.

B	Rf	Lf	Shifts between
5	1.0	0.0	Basicly no shifting
5	0.0	1.0	Basicly no shifting
5	1.0	1.0	Basicly no shifting
20	1.0	0.0	Basicly no shifting
20	0.0	1.0	Basicly no shifting
20	1.0	1.0	Basicly no shifting
5	0.0	0.0	Basicly no shifting
8	0.0	0.0	Basicly no shifting
11	0.0	0.0	2 basic groups
14	0.0	0.0	3 basic groups
17	0.0	0.0	A variety of groups
20	0.0	0.0	A variety of groups
15	1.0	1.0	Basicly no shifting
15	0.7	0.0	Basicly no shifting
15	0.0	7.0	Basicly no shifting
15	0.5	0.5	Basicly no shifting
8	0.0	1.0	Basicly no shifting
8	1.0	0.0	Basicly no shifting
8	1.0	1.0	Basicly no shifting

Figure 1: Example of