HW Set Partition I – Aydin Ahmadli

1. Lets start with results from run of basic source code :

A white sign with black text

Description automatically generated

A screenshot of a cell phone

Description automatically generated

1. Now, results of my first experiment (**firstpartition.py**). From one of the runs, I got results same as below:

A close up of a keyboard

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As indicated with red line on picture, l**owest (best) difference found is** **”139“ from Run 1.** With inputs: POP\_SIZE = 100, MAX\_GEN = 1500, CX\_PROB = 0.7, MUT\_PROB = 0.3, MUT\_FLIP\_PROB = 0.1

With fitness and objective : fitness=1/(max(bw)-average(bw)), objective=(max(bw)-average(bw))

I decided that subtracting average from maximum of weights would lead to better results rather than subtracting minimum from maximum. Also, increase in maximum generation worked better, increasing it helped to drop difference more and more across hundreds of generations. Graph produced by firstpartition.py is shown below:

A screenshot of a social media post

Description automatically generated

1. Now, results of my second experiment (**secondpartition.py**). This experiment was less successful compared to first experiment . Reason for this is different fitness function and play with input values such as maximum generation, crossover probability and mutation probability.

Results from one of runs are shown below :

A screenshot of a computer

Description automatically generated

As it can be seen from picture above, difference is mostly spread over interval 200-400, and **lowest difference was 201**. With inputs: POP\_SIZE = 100, MAX\_GEN = 1000, CX\_PROB = 0.75, MUT\_PROB = 0.25, MUT\_FLIP\_PROB = 0.1

With fitness and objective : fitness=1/(average(bw)–min(bw)), objective=(average(bw)-min(bw))

Apparently, changing parameters did not lead to better results in this experiment. We can still maybe get better results with fitness function if we play carefully with probabilities of crossover and mutation, and even maybe population size. Graph generated by this run is shown below:

A screenshot of a cell phone

Description automatically generated