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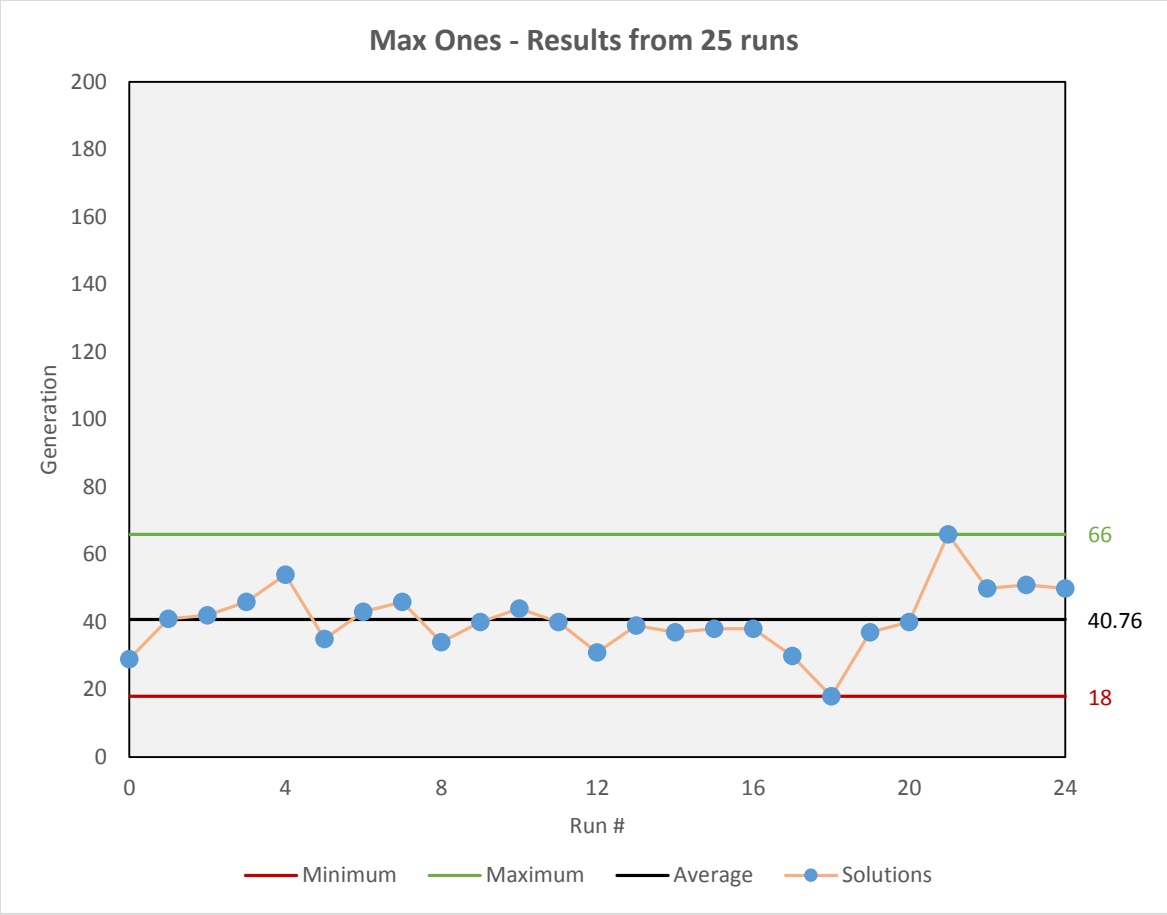
Homework 1: Genetic Algorithms – *Max Ones*



The genetic algorithm was run a total of 25 times, starting from Run #0 to Run #24. The data was outputted to a .csv file and later edited into an Excel file with the Scatterplot and Minimum, Maximum, and Average values added.

In my testing on the Windows environment, I found that the default range for RAND_MAX is between $[0,2^{15}]$, but on the Linux environment it increased to $[0,2^{31}]$. The results appeared to vary randomly about the same.

In designing my approach, I decided to optimize by using an "unsigned integer" to hold the list of my Genotypes. Then, I used bitwise operations to perform the crossover and genotype manipulation. This allowed my program to speed up the processing of up to 1 million generations in only 1.5 seconds. In order to achieve such a slow rate of fitness increase, I ran the program with initial population genotype probability of 0.05, crossover probability of 0.007, and mutation genotype probability of 0.00000025.