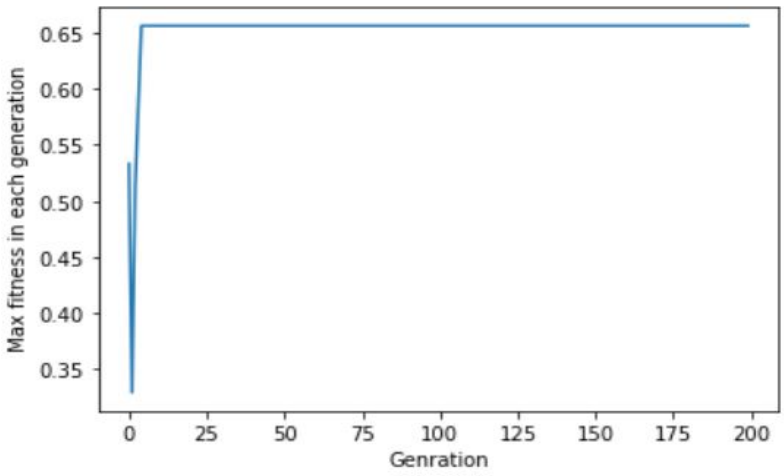
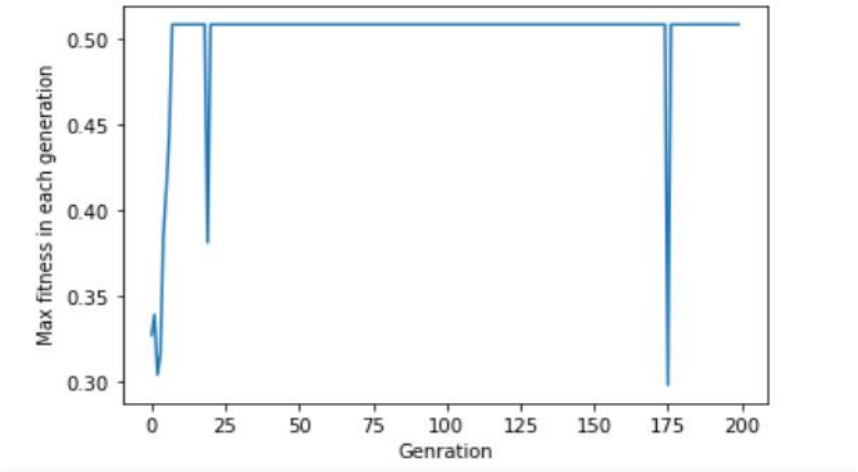
Genetic Algorithm case study report

Case-1: prob_crossing=0.7 & prob_mutation=0.01:

As probability of crossing is more last few bits will change in the offspring which is of less value, so there won't be much affect. Mutation probability is 0.01(1/100) which is too low so mostly the bits will not be flipped. As both values have very less impact on the populations in each generation, when generation reaches to a certain maximum value for the given function and for that auto generated population, the graph will be more flattened. Unless it is mutated, the graph will be a straight line after few generations as all population's fitness value in the



generation will be maximum



Even there are fluctuations those are due to mutation and rest of the graph is mostly flat

Case-2: prob_mutation=0.1 & prob_crossing=0.7:

As probability of mutation is more 0.1 (1/10) the graph is more fluctuating. But probability of crossing is for the last few bits only.

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0, 1, 0, 1, 0, 0, 1, 0, 0, 1]]
Best fit value to the function:  3.3303987270316906  and
1]]
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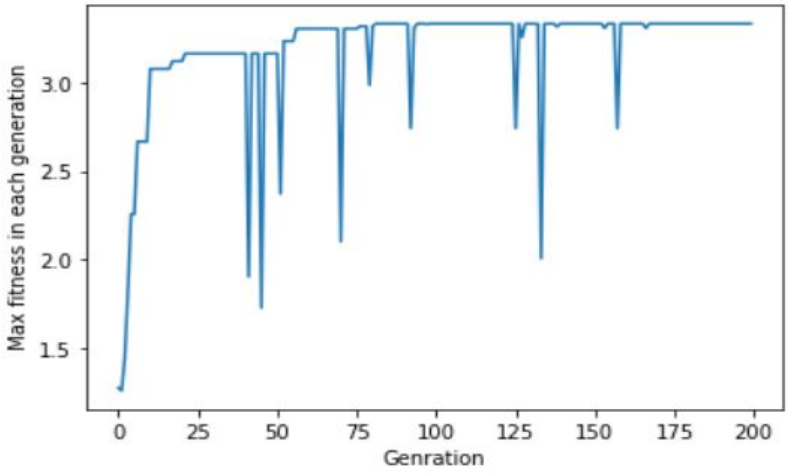

<u>Case-3: prob_mutation=0.01 & prob_crossing=0.2:</u>

As probability of crossover is more 0.2 (1/5) the graph is fluctuating but there's no much impact like that of mutated one's. It's good practice to have crossover probability >= 0.6

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0]]
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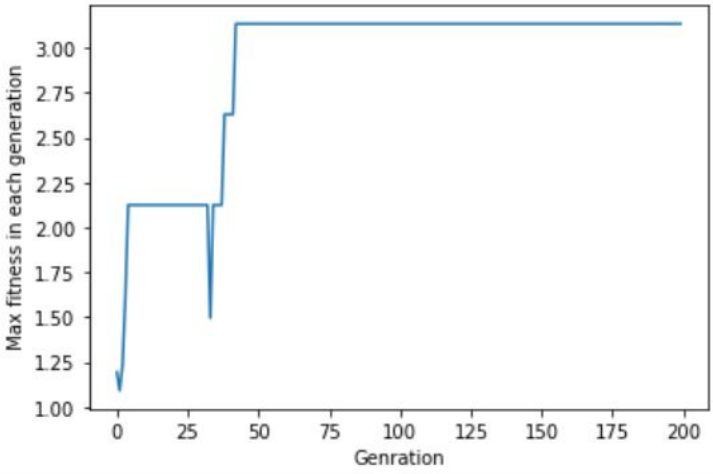
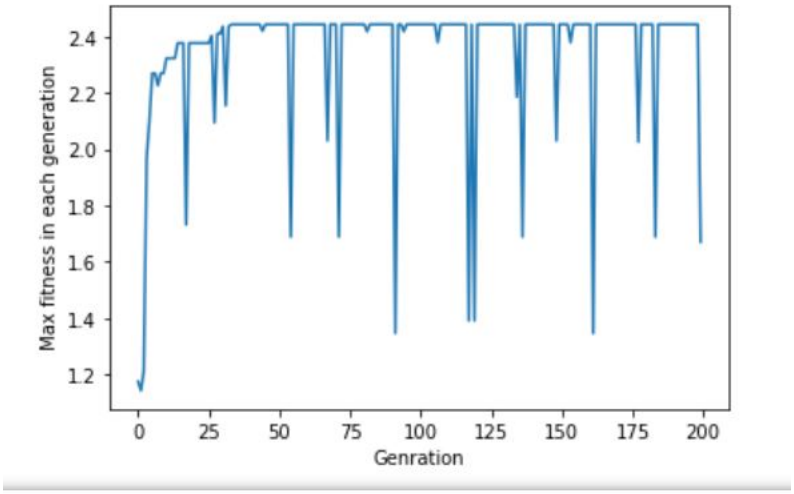


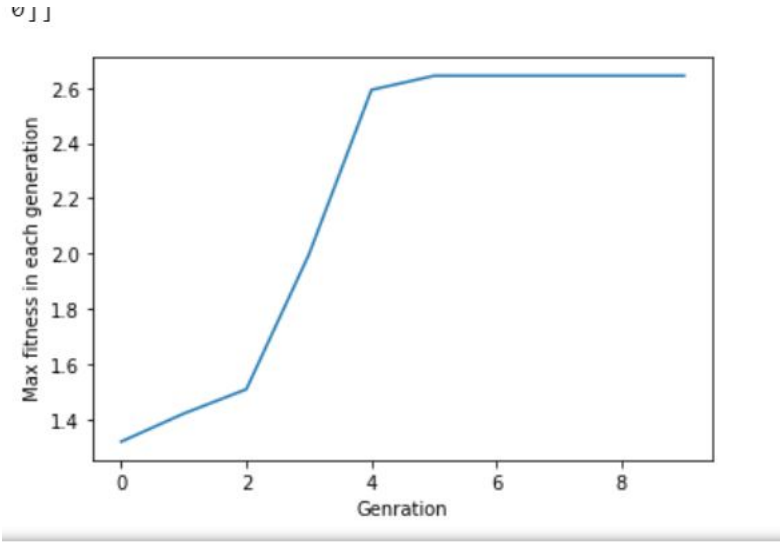
<u>Case-4: prob_mutation=0.1 & prob_crossing=0.2:</u>

As probability of crossover and mutations also is more, the graph's fluctuations are very high.



Case-5: Number of generations=10:

As number of generations are very less we may or may not get the optimum value of that function by the time iteration of generations is completed.



We may also try with different automatically generated populations for each generation instead of sending the best parent's crossover, mutated offsprings, then try to find the highest among them. So that we will know what set of population is best fit to the given fitness function first and then we can try choosing parents among the best of the population and crossover, mutation of that generation will be add in next generation and get the best fitness value after 200 generations.