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CS 335

Assignment 1

1.

The code first created a new list called *new\_generation* meant to hold the offspring of the new generation that is yet to be created. Then it proceeds to select the top 10% best-fit individuals of the current population and add them to the *new\_generation* list, this ensures that good genes will be present in the next generation. Then the code runs a loop of the size of the remaining 90% of the population. This will ensure population size conservation since the new generation will have the same size as the initial population. During this part of the code, two parents are randomly selected from the top 50% of the population to mate/ crossover and create new offspring, who will be part of the *new\_generation.* By using these two strategies, the code ensures that the new generation will be of the same size as the initial one while preserving the good genes as well as population diversity. Then the *new\_generation* replaces the initial *population.*

2.

Changes have been made in the python file.

3.

Changes have been made in the python file. In order to make the *mutated\_genes* and *create\_gnome* methods not take in *self,* the methods were changed from @classmethod to @staticmethod above the function declaration. Now to access them correctly we need to use the following code *Individual.mutated\_genes()* and *Individual.create\_gnome()* when calling the method.

4.

Changes have been made in the python file. If we want improvement to happen faster across the generations we can play with the element of probability of gene inheritance. The original code showed:

35% chance of inheriting genes from parent 1

35% chance of inheriting genes from parent 2 (total 70% inherited from parents)

30% chance of gene mutation. This may have a little too much randomness, thus causing the algorithm to have a slower rate of improvement.

If we want the learning curve to happen faster over the generations we would probably want to decrease a little bit the level of randomness, but yet still preserve a healthy rate of mutation. With the following percentages, the fitness of the generations seems to be advancing faster.

35% of inheritance from parent 1

50% of inheritance from parent 2 (total 85% inherited from parents)

15% mutation