Project #1 - Genetic Algorithm

Biological Computation   
Spring 2017  
Due: February 21st

The goal of this project is to perform a simple experiment using a genetic algorithm (GA). Start with the GA we developed in class, but make any additions or modifications that are necessary for you experiment. Possible experiments include testing the effects of changing basic parameters of the GA:

* Population size
* Mutation rate
* Selection pressure
* Selection method
* Etc.

More involved experiments could include:

* Testing the effect of incorporating more accurate biological concepts: diploid genomes, more accurate versions of crossover, etc.
* More complex fitness functions. For example, the benchmark problems at: <https://www.cs.cmu.edu/afs/cs/project/jair/pub/volume24/ortizboyer05a-html/node6.html> or biologically more relevant functions.

You need to pick the details of the GA: population size, mutation rate, etc.

**Project Write-up:**

Write a short paper describing the results of your project that includes the following sections:

* **Abstract** - a short summary of what you did and what the results were.
* **Algorithm descriptions** - clear, complete descriptions of your GA. Be careful to include all of the details someone would need to replicate your work. Examples of necessary details include (there are others):
  + How fitness is measured
  + Exactly how initial random solutions are generated
  + Mutation rates
  + etc.

Basically every time you make a decision about how the algorithm works (what type of crossover it uses, how mutation is performed, etc.) you should make a note of it.

* **Results** - you should include graphs and/or tables to make it easy to understand the results. Make sure that the graphs and table are clearly labeled.
* **Conclusions** - based on your results draw some specific conclusions about how the algorithm performed.

Sub-Project #a - Genetic Algorithm

Biological Computation   
Spring 2017  
Due: February 9th

Turn in a one paragraph summary of your proposed experiment and one *proposed* graph or table that you will produce to show your results. The graph or table should not contain real data (yet), but should represent how you plan to analyze the data. You will not be held to this proposal if you get a better idea before the project due data.