A Genetic Algorithm for the 3SAT problem

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1. Who will be working on the project? You must work in teams of two or three.

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2. What is the question that you will be studying?

We will try to build an efficient algorithm for finding satisfying assignments of 3SAT problems. This will be done using a genetic algorithm.

3. What is your motivation for studying that question? Why would others in the field be interested in your work?

3SAT is a classic NP-Complete problem, building an efficient algorithm for it using GAs would indicate that the GA could be a powerful tool for attacking other NP-complete problems.

4. How do you plan to study your question?

- If experimental, what experiments will you run? Why those experiments?
- If theoretical, what mathematical approaches will you use? Why is the selected approach appropriate?
- If applied, what comparisons to existing work will you make? Why compare against those methods?

A project may contain components of one, two, or all three aspects.

We will apply many of the techniques we learned in class and read papers about. We will decide on a good GA based on its performance on test 3SAT instances from https://www.cs.ubc.ca/~hoos/SATLIB/benchm.html.

5. If you will be running a GA, please describe how you will represent the information to be encoded on a GA individual.

The information of the individuals will be encoded as a string of 1's and 0's, representing the Boolean value of the variables that form the 3 SAT problem.

6. If you will be running a GA, please describe your fitness function.

The fitness of an individual is the number of clauses of the 3SAT problem that it satisfies.

7. What do you expect will be the contribution of your work? How will it extend current published work?

This work will extend current published work by taking methods made for a general GA and testing them on a GA for 3SAT. Some methods we might test include random migration, speciation, and uniform crossover. In case the GA we find out that our designed GA is already published, our work will serve as a verification of it.