COSC 4V82/5P71 Genetic Programming Project
Instructor: B. Ross

Due date: End of term (exact date TBA).

Evaluation: An 8-12-page paper, and relevant code and data listings.

Topics: Two basic types of topics are as follows:

1. Application: Use genetic programming to solve some application problem of your choosing. You might try using a new variation of GP towards a known problem, or even an improvement of some other researcher’s approach as described in the literature. You might even think of a novel problem in which GP has yet to be applied. Lots of data for different real-world problems is available at the UCI Machine Learning Repository (www.ics.uci.edu/~mlearn/MLRepository.html).

The results of your experiment should be described in a suitable report, which lists all the relevant parameters and results. Attention should be given to experimental methodology and analyses. Your assignments will give you practice in writing formal reports.

2. System: Create a new genetic programming system with some interesting features. Possibilities include:

   - Koza’s GP system in a language of your choice (other than Lisp). You might embellish it with some new features.
   - Extend an existing GP system (lil-GP 1.1, ECJ, OpenBeagle, ...) in a useful and nontrivial way.
   - Create a visualization tool for a genetic programming system. Many papers exist on techniques for visualizing runs, populations, progress, etc.
   - A distributed GP system. This is similar to subpopulations, except the populations are run on different processors.
   - Applying GP on a GPU (e.g. using CUDA).
   - A new GP representation, using grammars, linear chromosomes, ...

System projects will require testing on experimental data. Therefore, such projects will still require a formal report of experimental evidence of the implemented system. There will be less emphasis on experimental methodology and analysis compared to application-oriented projects. The report should also describe the system design and implementation of the implemented system.

Topic decision: Please pass your topic idea to me for approval before you start work on it.

Background research: Be sure to research relevant background research to your topic. See online citation indices, journals, conferences, technical reports, etc.

(turn over)
**COSC 4V82 requirements:** You are to work in teams of 2 on the project. Both group members should contribute equally to the project. You should indicate in your hand-in the tasks performed by each group member. The same mark is allocated to each group member. If you are having problems with your partner, you should talk to me ASAP.

**COSC 5P71 requirements:** MSc students are to do their projects individually. There will be additional requirements for MSc projects, with respect to the scope of projects undertaken, as well as analysis of results. Empirical results should be analyzed using appropriate statistical methods. These requirements will be communicated to you during the course.

**Comments:** The intention of the project is to give you an opportunity to be creative with ideas you have been exposed to during the course. Please keep your project idea focused and within reasonable limits. Many might use very interesting ideas and obtain impressive research results, which could be potentially published at a research conference (although this is not an expected criteria for the project).

Grading will focus on the scientific maturity of your report. Experiment methodology should be sound and rigorous. New systems should be tested using appropriate experimental test cases.