

# Final Project

## IE411 Graphs and Network Flows

### Dr. Ralphs

The final project will be done on an individual basis and will consist of a project in one of the following general categories.

1. Analyze the implementation of GiMPy itself in detail and implement some alternatives. Do a set of computational experiments comparing the alternatives for different problem classes and draw conclusions.
2. Choose a paper from the literature describing a state-of-the art implementation of an algorithm related to the material covered in the course and try to implement the algorithm described in the paper. Design a set of computational experiments to test your algorithm and report on the results.
3. Choose a problem that is a variant of one we discussed in class and implement several algorithms for it using GiMPy. Perform a comparison of these alternatives and draw conclusions.
4. Design your own computational project that will demonstrate your mastery of the topics covered in the course.

It is up to you to precisely define the kind of computational experiments you want to do, but I expect a detailed analysis that includes some or all of the following.

- Comparison of theoretical and empirical running times.
- Analysis of what are the bottleneck operations are using a profiler.
- Comparisons that take into account the affect of size and structure of the graph on the performance across different algorithms/implementations.
- Comparison of algorithms using performance profiles based on appropriate measures, such as empirical running time or representative operation counts.

I expect you to turn in your code, including the code you ran to do your testing so that I can replicate your results by running a single function. Providing visualizations of your algorithm will be considered an additional bonus.

You should submit a one paragraph proposal to me by 4:00 PM on April 8, 2014, describing what you would like to do your project on. The final product will be a written report submitted to me along with your code by e-mail tentatively by May 7, 2014.