CAD of Digital Circuits — Physical Design

Spring 2014, Final Project Submission Instructions
Due Date: Wed, May 7

Your final project should be submitted electronically as a tar/zipped directory. Name the package *student-name.tar* or *student-name.zip*, email it to me or send it to me via Google drive or through your website so I can download it. The package should contain: i) a PDF file of your report in single-column format; ii) a sub-directory containing your source code and executable; iii) the information required to recreate one simple experiment that you tried.

Project Report: The report should describe: i) the problem that you studied; ii) the VLSI/CAD or software engineering application; iii) the theoretical basis for the solution; iv) your algorithm design (*e.g.* if you developed a graph algorithm) or constraint generation procedure (*e.g.* if you iteratively generated and solved some linear or quadratic constraints using a mathematical optimization tool); v) experimental setup, results and any observations you made through the experiments.

Your report may (or probably should) include a simple example to demonstrate the key concepts behind your approach — sort of like a tutorial/didactic example. This example could also serve as an experiment that I could re-create using your code. For example, if you are solving quadratic placement subject to a timing constraint (inequality), then the example netlist could be described in your paper and the GUROBI source file should be provided with the package. *Try to be creative w.r.t. the design of this illustrative example.* For instance, if your optimization approach performs hill-climbing, then maybe you could depict the configuration(s) showing cost increase in iteration i and a cost decrease in iteration $i + 1$.

Your Program: If you developed a computer program, I will experiment with it too. So that is why I would like the source and the executable and any compile instructions (or a makefile). Keep a separate directory for the sources and a separate directory for the design benchmarks. If you need any help finding/generating appropriate benchmark netlists, feel free to consult me.

Experiments: If possible, try to compare your result w.r.t. conventional techniques. For example, if your project is based on placement, compare your result with that of Capo. [It is okay if your results do not compare favourably.] If you are modeling a crossing-minimal router, then you could compare your result with any conventional non-crossing-aware router (e.g. by turning off the crossing-optimization routines in your code). I understand that such a comparison may not always be feasible, but I want you to think about it. Such a comparison will also educate you about the benefits and limitations of different approaches.

You may include any other materials or information pertinent to your project in the submission. If I need anything else from you, I will send you an email by Friday, May 9. And feel free to consult me regarding any issues that may arise. Good luck!