ECE 558/658 VLSI Design -- Fall 2020
Lab 5: Individual Project

Labs 0-4 taught how to use industrial VLSI design tools for circuit simulation, layout and extraction, synthesis, and place & route. Because you were learning the design tools in those labs, we gave you specific steps to follow. Lab 5 demonstrates your understanding of VLSI and the tools by having you formulate and solve a small design problem of your own choosing.

Your topic should be non-trivial, but otherwise not too ambitious given the limited time remaining. By now you should have a good sense of the difficulty of various tasks, so plan accordingly. Don't worry in advance about the possibility of finding roadblocks along the way. You will be evaluated on the quality of your work, and not on the quantitative results of your experiment. Negative results are acceptable if the work quality is good. Some appropriate-scope projects have been mentioned in lecture, and more will be posted on Piazza; these are intended only to be general ideas to help with getting started.

The output of your lab 5 should be a 2 page report in pdf format. The report should contain quantitative data such as tables, plots, or waveforms. Depending on your problem it may also include layout images or schematics (in which case it will likely exceed 2 pages). You will upload your design files and/or scripts with the lab report when making the final submission, and these will count for 10 points of the lab 5 grade. Organize your report according to the 3 section headings below; the content of each section can be adapted as appropriate for your project.

Report Section 1: Problem Statement with Objectives [20 pts]

This section of your lab report describes the problem that you want to solve and why you picked it. At a high-level, what are you trying to find out? For example:

- Find out whether assumption X from class is consistent with findings from design tool Y.
- Characterize/Optimize for quantity X by manipulating parameter Y
- Compare two methods of implementing circuit X to find which is better according to metric Y.
- Find the achievable tradeoffs between synthesis objectives of X and Y.

Report Section 2: Experimental Plan [20 pts]

Describe your approach for accomplishing what is described in section 1. Examples of what to include:

- What designs and formats are you using?
- What tool(s) are you using and what are you doing with it?
- What data are you obtaining from the tools to answer your research question?

Report Section 3: Results and analysis [50 pts]

Some examples of what to include in this section:

- Data summarized in an appropriate format such as table(s) or plot(s). Explain what your data says about the problem you were trying to answer. What is the conclusion?
- What have your learned along the way? Explain issues or difficulties you encountered and steps you took to understand and resolve them.
- If you were to start this experiment anew, would you use a different approach? If you were to expand the scope of this project, what would you do next?