UNIVERSITY OF CALIFORNIA AT BERKELEY
COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Fall 2013 Project Report
Due Thurs 12/12/1200 pm

The final report is a technical description of the device that you have designed and built for your project. In general, the main purposes of documentation are to allow users to understand and operate your device, and for your fellow engineers to understand your design so it can be upgraded, improved, and maintained. Without adequate documentation, many great designs are sent to the scrap heap.

For this semester, since the difference-of-Gaussians calculation block and related interface (down sampler, up sampler, SRAM arbiter) are the heart of the project, we want those to be given the most emphasis.

Your report should follow this general outline:

1. Title + Authors + Abstract (1 page)
2. Overview (1-2 pages text + figures)
    a. Design (Detailed Block Diagram)
        i. You may draw this by hand, but use a straight edge at least
        ii. make sure to identify and label the various clock domains
    b. Brief Description of Major Sub-Modules
        i. Keep this part short
        ii. Don't bother telling us what we already know (DVI interface, ImageBufferWriter, etc)
3. Detailed System Description (4-6 pages text) plus figures
    a. Subsystems 1: Datapath
        i. Connections to SRAM
        ii. We want LOTS of details on your difference-of-Gaussians filter blocks, connections to frame buffer and connections to ImageBufferWriter
        iii. Down sampler and up sampler
    b. Subsystems 2: Control
        i. How do you deal with any addressing issues, including blank rows or columns?
        ii. What was your general control design (e.g. multiple FSM, counter based control, etc.)
        iii. State diagrams and functional timing diagrams for key operations (e.g. Ready/Valid signals as appropriate).
    c. Design Decisions and Tradeoffs
        i. Describe design decisions you made for clock rates, extra FIR padding pixels, Moore vs. Mealy controllers, etc.
        ii. What problems did you encounter during implementation and debugging? How did you resolve those issues or change design decisions?
4. Design Metrics (1 page max)
    a. Critical timing path for your design, and maximum clock rate
    b. Number of 6-LUTs, BlockRAMs
        i. How many more Gaussian filter blocks could be added within available resources?
    c. Division of labor. How did you organize yourselves as a team? Exactly who did what? Estimate labor hours spent in design/debug etc.
5. Conclusion (1 page)
    a. Summary of main features
    b. What would you do differently next time

The detailed system description can start with functional and input/output specifications. Modules can be described in order from input to output, or from most to least important module. Illustrate the descriptions with the block diagrams and timing diagrams you have prepared; refer to these as figures. Don't bother going into the details of very simple modules. However, do give detailed descriptions and figures for modules like your Difference of Gaussians filter stack.

For the conclusion, summarize the key design features. What will the reader need to be careful about if they were to attempt to duplicate, modify, or extend your design? And, what are possible improvements which could be made to the design?

Standard hints for the Final Project Report:

1. Leave time for editing, typing, and proof--reading. We will grade for clarity, organization, and grammar.
2. Type this report. DO NOT hand write it (diagrams and figures are an exception but make them neat).
3. Use standard 8.5 by 11 paper throughout the report. Minimum 12pt font, single spaced with 1 inch margins. Text portion of report should not exceed 11 pages. Appendices, including timing diagrams and schematics can be up to 20 pages MAX.
4. Make a copy of your report for safety. (A scanned version called `report.pdf` should be loaded to your GitHub repository.)
5. Make sure the copy you hand in is easily readable
6. Include block diagrams, timing diagrams, state diagrams, and tables as appropriate and on or as near as possible to the page in which they are referenced.
7. Put titles/captions on all figures and diagrams.
8. Control Unit documentation. Explain control signals you are using (e.g. a table helps). Use a mnemonically labeled state machine diagram, and INCLUDE COMMENTS! Since notation of the form 00/100 is hard to follow for state transitions, instead use proper signal names.