

Reading: W&E Sections 8.3, Chappell SRAM paper, Low Power SRAM notes

To reduce the amount of time you need to spend on the FemptoHAL project, we've eliminated the register file from the design. You may instead treat the register file as a black box; a SPICE deck will be provided.

The objective of this milestone is to present your completed preliminary design. You should have schematics drawn, but not necessarily sized, of all circuits in the path. You should also have it running in SPICE, at least correctly performing one addition with no bypass.

Be sure to pay attention to:

- The static/domino interface: where are latches needed?
- What phases are used for each dynamic gate?
- Do you satisfy the monotonicity requirements of your dynamic gates?
- Will charge sharing cause any of your gates to fail?
- What clock frequency do you expect to hit?

Your adder self-bypass path should definitely be implemented with domino circuits for speed. Other paths can be implemented with either static or dynamic logic, as timing allows. You are encouraged but not required to implement some paths with static logic to get experience with the static/domino interface issues.

Your team will meet with the instructor or one of the TAs for fifteen minutes to present your circuit. Please sign up for a time.

After your review, you will need to finish optimizing the design and get it to correctly simulate in SPICE. Test vectors will be provided to help verify operation. You will present your results to the class on the last day, emphasizing your microarchitectural optimization(s), your adder architecture, any other interesting circuit tricks you used, and your overall performance. The rest of the class will critique your design, so make sure you have a convincing argument that you could actually build a chip that runs as fast as you predict; don't fudge parasitic capacitance, use unreasonable device sizes, or do other unrealistic tricks. Exception: the clock waveforms provided are unreasonably good and have no skew, but you may assume that you magically get them.