EE/CprE/SE 491 WEEKLY REPORT 4

October 3rd – October 10, 2024

Group number: sdmay25-19

Project title: ReRAM AI Accelerator

Client &/Advisor: Dr. Henry Duwe and Dr. Cheng Wang

Team Members/Role: Noah Mack, Olivia Price, Sam Burns, Travis Jakl

- **Weekly Summary:**

Once we completed the inverter tutorial that was in the ChipForge teams platform, we decided to try and build an inverter using an 80-page document that sort of lays it out. However, the document was made in 2023 and most software was updated this semester. So we are running into bugs. So while we are trying to follow the instructions, we are also debugging them.

- **Past week accomplishments**

• Travis: Worked towards completing an inverter, working alongside the 80-page document as a tutorial, taking notes on any issues I ran into. Got as far as the wrapper integration.

• Olivia: Got through the inverter tutorial on the ChipForge teams platform. Worked on the design document. Trying to follow the 80-page tutorial on how to build and inverter while also troubleshooting it.

• Sam: Worked to address errors I was getting while following a tutorial from past teams. The error is resulting in incorrect SPICE files which are causing simulation errors. I also worked on making revisions to our design document based on advisor feedback. I am also looking to set up a meeting with the past team to ask about their troubleshooting strategies.

• Noah: Did a lot of analysis of the past team's project and looked around on the open source silicon website. There is not a whole lot of information about mixed-signal design, but what I did see made it seem like you can use digital macros in your analog

schematic. We'll learn more and more as we keep digging, but because of this I started working on the 80-page tutorial to make an inverter from scratch in a blank project to get some more practice with analog design.

- **Pending issues**

• Travis: Wrapper LVS is providing errors. However, I have yet to find where the Magic and Xschem files differ.

• Sam Burns: SPICE file generation, gaw waveform viewer has disappeared

- Noah Mack: Ngspice disappeared from my computer, I probably need to reinstall the tools to fix this. I don't know why this happened, but hopefully it is an easy fix.

- **Individual contributions**

NAME	**Individual Contributions** *(Quick list of contributions. This should be short.)*	**Hours this week**	**HOURS cumulative**
Noah Mack	Analyzed previous team's design, worked on inverter in blank project.	6	35
Sam Burns	Worked to eliminate errors in SPICE file creation	6	35
Travis Jakl	Worked through the 80-page document, making an inverter and getting it integrated into a wrapper, but failing LVS check	6	24
Olivia Price	Working through the 80-page tutorial on how to build an inverter in Xschem and Magic. Also trying to get it to pass pre-check.	6	30

- **Plans for the upcoming week**

• Sam Burns: Address the issues that we face when working on a new project file to get a new inverter through precheck. Help with updating the documentation for the analog workflow with the efabless process.

• Noah Mack: Finish working through the tutorial, creating an inverter and taking it all the way through precheck, making updates to the tutorial as needed

• Olivia Price: Proceed to work on the 80-page tutorial and debug it. The tutorial is outdated so many things have changed since it was created. Also, create a troubleshooting page for the analog part of ChipForge to help them.

• Travis Jakl: Finish the LVS troubleshooting, take the inverter through pre check. After that has been completed, I will update documentation on the tutorials for it. I will also start working with integration and testing of past teams work.

○ **Summary of weekly advisor meeting**

This weekly advisor meeting was relatively short since the advisors were not good at using the tools that we needed for this project. We talked about going through and trying to finish creating an inverter by ourselves. Then try to get it to pass pre-check. Once we have finished, the professors have requested that we create a troubleshooting guide for the ChipForge club on the analog side. This will hopefully help other students not struggle with the tools and hopefully push the club farther along.