EE/CprE/SE 491 WEEKLY REPORT 1

September 27th – October 3, 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:**

The overall objective for this week was to get pre-check to work or even run. Another objective was to try and create a test bench for the ReRAM cell to see how it behaves. These objectives aimed to help us understand how the cell works and what else we need to include in our schematic to control the ReRAM cell. We also need to be able to pre-check the past team's designs in order to put their designs in the same project wrapper.

- **Past week accomplishments**

• Travis: Found some more documentation that we could use to help us understand the prior team's design flow. Worked towards a successful precheck with the analog tutorial's inverter

• Olivia: Found directions from passed teams for pre-checking the designs before they go to Fabless to get fabricated. Tried to start making an inverter and see if it can pass all the DRC and LVS criteria.

• Sam: I tried to get the past teams project through precheck. I also reached out to a different ReRAM team to get some of the documentation they are working on concerning precheck

• Noah: Worked towards a getting precheck done on the inverter. Also checked out a past senior design team's digital design in order to gain an understanding of the digital project structure. I found that the digital project layout is fairly similar to the analog project structure.

- **Pending issues**

• Travis: Final Inverter LVS is providing errors, causing the precheck to be invalid

• Sam Burns: Finding more documentation for Precheck

- **Individual contributions**

NAME	**Individual Contributions** *(Quick list of contributions. This should be short.)*	**Hours this week**	**HOURS cumulative**
Noah Mack	Worked towards getting inverter through precheck and analyzed past group's digital design.	6	29
Sam Burns	Attempted to get the past project of a past ReRAM group through precheck, also try to get the example folder through precheck	6	29
Travis Jakl	Looked into more documentation from past teams. Worked towards getting the final LVS and precheck to work.	6	24
Olivia Price	Looked into their design documents and saw how they approached the project. Also tried the pre-check from the other group, which failed with their ReRAM crossbar.	6	24

- **Comments and extended discussion**

Right now we are getting a start on our design document. In our meeting this week we had our advisor take a look at the work we had done so far and they gave us lots of helpful feedback to implement.

- **Plans for the upcoming week**

• Sam Burns: To make an inverter project and get it through precheck. Creating a new project of our own will also provide us the opportunity to work with magic as well, using DRC and LVS in these open source tools.

• Noah Mack: I want to start working on a digital wrapper for an analog circuit that we can extrapolate to our final design once we have our analog components finished. This will probably include analysis of the previous ReRAM team's project.

• Olivia Price: Plans for the upcoming week are to try to get an inverter made in Xschem and then export it to Magic. Then, I will try to get it to pass the LVS and DRC. Lastly, I am going to try and get a perfect pre-check.

• Travis Jakl: Build my own inverter using magic and xschem and take it through the entire process of start to precheck. After that, investigate sdDec23-08 files, top level design, and start verifying that their

- **Summary of weekly advisor meeting**

In our weekly meeting, we mostly went over the progress we made on our design document. Dr. Duwe and Dr. Wang gave some great suggestions for improvements to our problem statement, users/user needs, and requirements. Through this process, we also gained even more clarity about what Dr. Duwe wants our final product to look like.