Checkpoint 2 Report

During checkpoint two, Aldo started it off by cleaning up the code that was already pushed to the repository (changing variable names, decreasing warnings and unused inputs/outputs. The code was a mess so this was a big job). Brian focused on making a prototype of the arbiter to begin testing. Brian also started the forwarding module, which holds the combinational logic for our forwarding. All worked on debugging and hazard detection. We verified these functionalities by attempting to run the provided test code to make sure the larger bugs were out of the way, and unit tested some specific instruction combinations that we thought would cause errors separately. Evan diagrammed the advanced design documents.

Checkpoint 3 Roadmap

To get full points in the advanced design option stage, all of our advanced design options have to tally to 20 points. Evan and Aldo will work on Memory Stage Leapfrogging [12 points]. Brian will work on the L2+ cache system [2 points] and 8-way set associative caches [3+ points]. All three members will work together on implementing a basic multiplier design [3 points]. Memory stage leapfrogging is letting instructions that have no dependencies on each other continue through to the WB stage, if one of the instructions is stuck in the MEM stage when the other one would not need to wait there for a fetch. An L2+ cache system makes it so that it will be faster to pull the data from successive memory pulls, because the higher cache buffers a larger set of data, in return for a longer critical path. 8-way set associative caches decreases the number of evictions for data locations that are closer together, which is important for the IF stage, because the data it is pulling from is very close together in memory. A basic multiplier design expands upon the RISC-V architecture and allows for a mult instruction to be made that multiplies two numbers together and outputs them into a register.

UPDATED DRAW.IO OF CHECKPOINT 2 AND ADVANCED DESIGN OPTION
https://app.diagrams.net/#G1if7mQQ-dhZF2kFCC1dRF3tHj5iwz_FQL