## Design

We followed the instructions from the final document description to design our CPU. For the elements of the design that were missing in the project description, we made inferences from previous lab submissions and translated the 8 bit implementations into 16-bit implementations.

## Challenges

The first challenge we encountered was re-designing the decimal decoder for 16 bit input. The previous lab submissions that we inferred from, the input bits were 32 though the width was 8 bit. Scaling to a 16 bit width and 16 bit data size proved challenging. Nonetheless, we took up the challenge and created a decimal decoder test component to simulate its output while we made changes to the underlying circuit till we got it working.

The second issue we had was the working of the RAM. Initially, I wrote the RAM instructions in binary and it was not working as expected. After seeking help from our colleagues, we were reminded that the input should be in hexadecimal. After the conversion and updating the RAM data, the circuit worked as expected.

## Insights

We learned to apply the concepts and understanding of how a circuit works. That understanding helped us to solve some of the trivial issues we encountered. We enjoyed building the decimal decoder. It was exciting to see the progress of every connection we made and that helped us to appreciate the modern CPU architecture and designs.